

Fig. 7. Map showing location of stratigraphic columns within NZMS 260 Sheet V20.

<i>Stratigraphic Column No:</i> 83	<i>Grid Reference:</i> <i>Top</i>	<i>Bottom</i>	NZMS 260 V20 83 2 of 3
<i>GPS Waypoint No(s):</i> Wp 517-518	<i>E:</i> 2830375	2830050	
<i>Region:</i> Glengarry	<i>N:</i> 6197087	6196373	
<i>Location:</i> Mangaone River upstream of Olsen's farm.	<i>Altitude:</i> 98m	98m	
<i>NZMS 260 Sheet:</i> V20 Esk	<i>Page 2 of 2</i>	Author: K. Bland	

Age	Strat. Unit	Scale (metres)	Lithology	Sampling interval	Facies	WP No.	Samples	Contacts	Description						
										Int.	N.Z.				
Late Pliocene	Lower Nukumaru Mangaheia Group/Matahorua Formation Papakiri Member								<p>Blue-grey, non fossiliferous siltstone, gradationally overlying fossiliferous greywacke conglomerate. The lower 0.2 m of this bed contains scattered very well sorted greywacke granules.</p> <p>Moderately well sorted moderately fossiliferous greywacke conglomerate bed. Fauna are dominated by redeposited valves of <i>Paphies australis</i>. This conglomerate sharply overlies the underlying sandstone bed.</p> <p>Non cemented fine sandstone with rare greywacke granules.</p> <p>Fine-grained slightly cemented non fossiliferous granule-sized greywacke conglomerate. Overlain by a 0.1 m-thick fossiliferous bed rich in <i>Austrovenus</i> valves, and in turn by a 0.2 m-thick greywacke granule-rich shelly fine sandstone with abundant <i>Austrovenus</i> valves.</p>						
			<table border="1"> <tr> <td>mud</td> <td>fine mud</td> <td>fine silt</td> <td>fine sand</td> <td>coarse sand</td> <td>pebb. gravel</td> <td>cobb. gravel</td> <td>bould.</td> </tr> </table>	mud	fine mud	fine silt	fine sand	coarse sand	pebb. gravel	cobb. gravel	bould.				
mud	fine mud	fine silt	fine sand	coarse sand	pebb. gravel	cobb. gravel	bould.								



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Stratigraphic Column No: 84	Grid Reference: Top	Bottom	NZMS 260 V20 84 1 of 2
GPS Waypoint No(s): Wp 178	E: 2825961		
Region: Patoka	N: 6200233		
Location: Gravel pit on Huiarangi Road near Newark Farm.	Altitude: 369m	-	
NZMS 260 Sheet: V20 Esk	Page 1 of 1		Author: K. Bland

Age	Strat. Unit	Lithology	Sampling interval	Facies	WP No.	Samples	Contacts	Description								
									Int.	N.Z.						
Late Pliocene	Lower Nukumaruan							<p>Massive non to sparsely fossiliferous siltstone.</p>								
	Upper Manganapian							<p>Massive moderately fossiliferous pebbly siltstone. Clasts are greywacke dominated. Macrofauna are dominated by <i>Neilo</i>, with <i>Dosinia greyi</i>.</p> <p>0.5 m-thick, highly-ossiliferous greywacke conglomerate bed dominated by <i>Phialopecten triphooki</i> and <i>Glycymeris</i> sp., with common <i>Purpurocardia purpurata</i> in the lower half. Occasional <i>Maoricolpus</i>, <i>Tucetona laticostata</i>, <i>Alcithoe</i> sp., and <i>Zeacolpus</i> are present, as well as rare <i>Ostrea chilensis</i> valves. The conglomerate is poorly to moderately sorted, with clasts from granule to pebble in size (up to 60mm diameter) that are moderately to well rounded and spherical to oblate in shape. <i>Phialopecten triphooki</i> is more common in the middle half of the unit. Also contains rare abraded <i>Austrovenus stutchburyi</i>.</p>								
	Mangaheia Group/Matahorua Formation Papakiri Member							<p>Crudely-bedded, poorly to well sorted greywacke conglomerate bed with common fine to medium sandstone lenses and stringers up to 0.3 m thick and 2 m in length. Average thickness of sandstone lenses is 0.1 m thick by 1.5 m in length, with lenses more common in lower portions of the exposure. Greywacke clasts are well rounded and dominantly oblate in shape, and range from medium pebble to medium cobble in size. Unit is underlain by a silty sandstone very rich in fossilised plant leaves.</p>								
	Trelimoe Mbr							<p>Creamy to rusty-coloured, massive to laminated siltstone with abundant, very well preserved leaves and leaf impressions.</p>								
		<table border="1"> <tr> <td>mud</td> <td>fine silt</td> <td>coarse med.</td> <td>fine med.</td> <td>coarse granu.</td> <td>pebb.</td> <td>cobb.</td> <td>bovid.</td> </tr> </table>	mud	fine silt	coarse med.	fine med.	coarse granu.	pebb.	cobb.	bovid.						
mud	fine silt	coarse med.	fine med.	coarse granu.	pebb.	cobb.	bovid.									

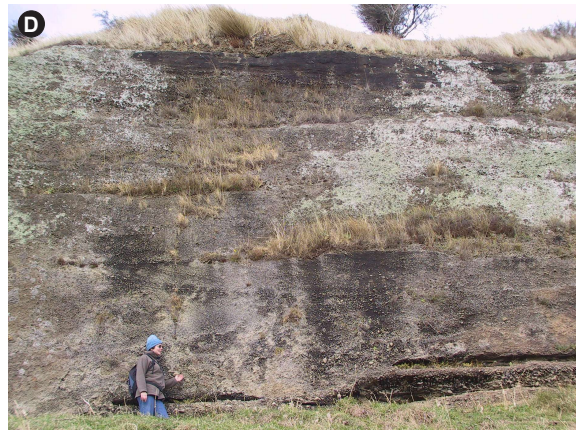


Stratigraphic Column No: 85	Grid Reference: Top	Bottom	NZMS 260 V20 85 1 of 2
GPS Waypoint No(s): Wp 200-201	E: 2825425	2825602	
Region: Patoka	N: 6200362	6200556	
Location: Steep hillside beside spiral on Huiarangi Road.	Altitude: 395m	358m	
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Age Int. N.Z.	Strat. Unit	Lithology	Sampling interval	Facies	WP No.	Samples	Contacts	Description										
	Late Pliocene																	
	Upper Mangapanian																	
	Mangaheia Group/Matahorua Formation																	
	Trelinnoe Member																	
	Papakiri Member																	
							<p>Poorly to very well sorted non to slightly cemented granule to cobble-sized greywacke conglomerate. Common fine to medium sandstone beds and lenses in the lower 1 m of the unit that display fine-scale laminations and low-angle, small-scale cross-bedding. Moderate-scale, moderate-angle trough cross-bedding is visible in the lower third of the unit. Lower portions of the conglomerate are clast supported with no matrix present in coarser-grained beds. Clasts are moderately to well rounded.</p> <p>While not exposed at this locality, nearby exposures show that this interval is represented by light-brown, non to well cemented, non fossiliferous, slightly micaceous fine to medium siliciclastic sandstone with rare concretions up to 1 m in diameter.</p> <p>White, non cemented tephra bed very sharply overlying light-brown, non cemented, bioturbated fine to medium sandstone. Burrows are highlighted by tephra incorporated into the unit. This then grades into approximately 1.5 m of laminated to trough cross-bedded tephric sandstone with medium ash-sized clasts. The tephric units are then overlain by the same fine to medium siliciclastic sandstone that underlies them.</p>											
		<table border="1"> <tr> <td>mud</td> <td>fine silt</td> <td>med. silt</td> <td>coarse silt</td> <td>fine sand</td> <td>med. sand</td> <td>coarse sand</td> <td>granu. gravel</td> <td>pebb. gravel</td> <td>cobb. gravel</td> <td>bolud. gravel</td> </tr> </table>	mud	fine silt	med. silt	coarse silt	fine sand	med. sand	coarse sand	granu. gravel	pebb. gravel	cobb. gravel	bolud. gravel					
mud	fine silt	med. silt	coarse silt	fine sand	med. sand	coarse sand	granu. gravel	pebb. gravel	cobb. gravel	bolud. gravel								

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Stratigraphic Column No: 86
 Section: W1
 GPS Waypoint No(s):
 Region: Central Hawkes Bay
 Location: The Gorges
 NZMS 260 Sheet: V20

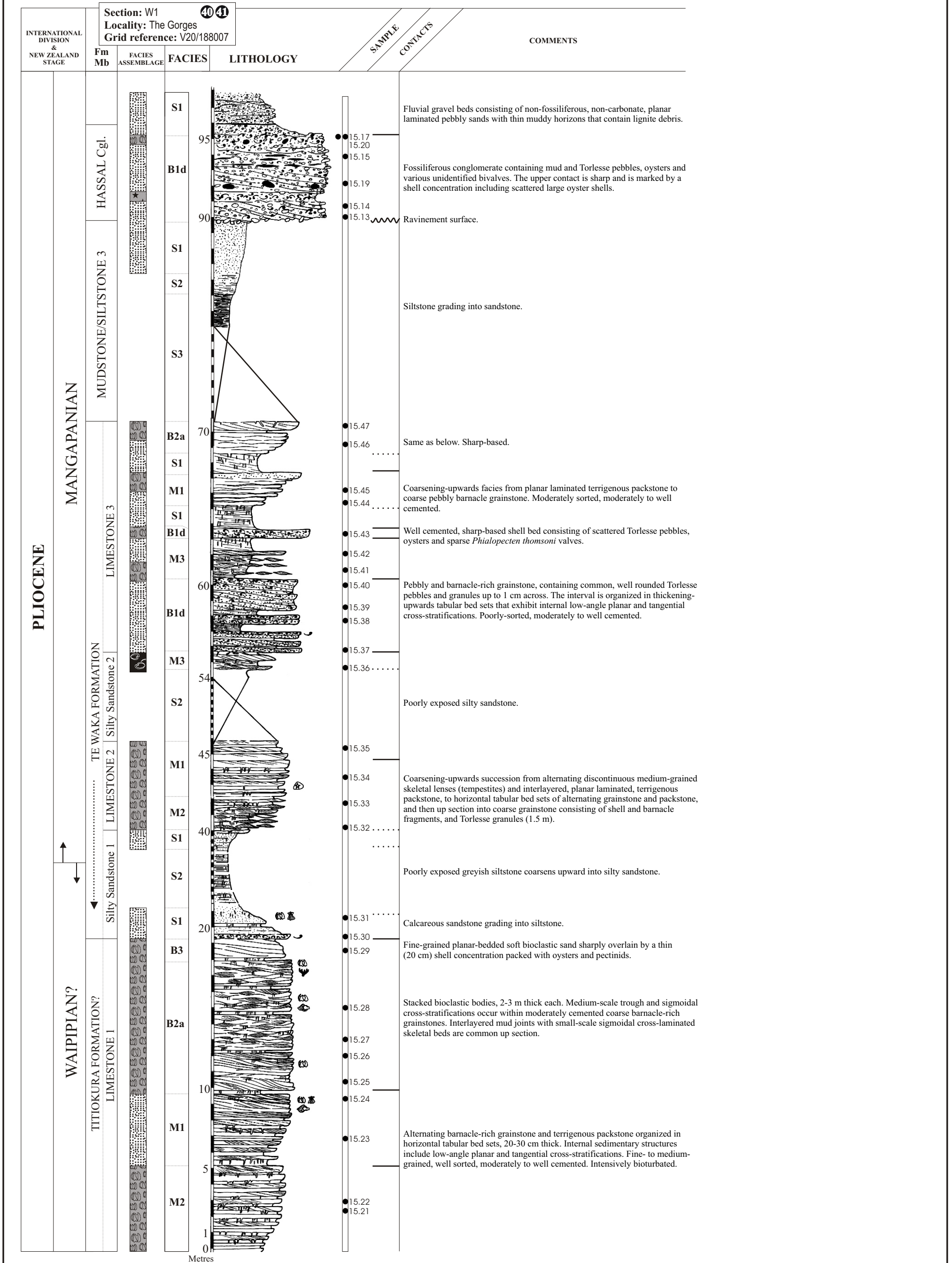
Grid Reference: Top Bottom
 E: 2818800 -
 N: 6200700 -
 Altitude: -

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Author: V. Caron



Stratigraphic Column No: 86

Grid Reference: Top Bottom

NZMS 260 V20

Section: W1

E: 2818800

-

GPS Waypoint No(s):

N: 6200700

-

Region: Central Hawkes Bay

Altitude:

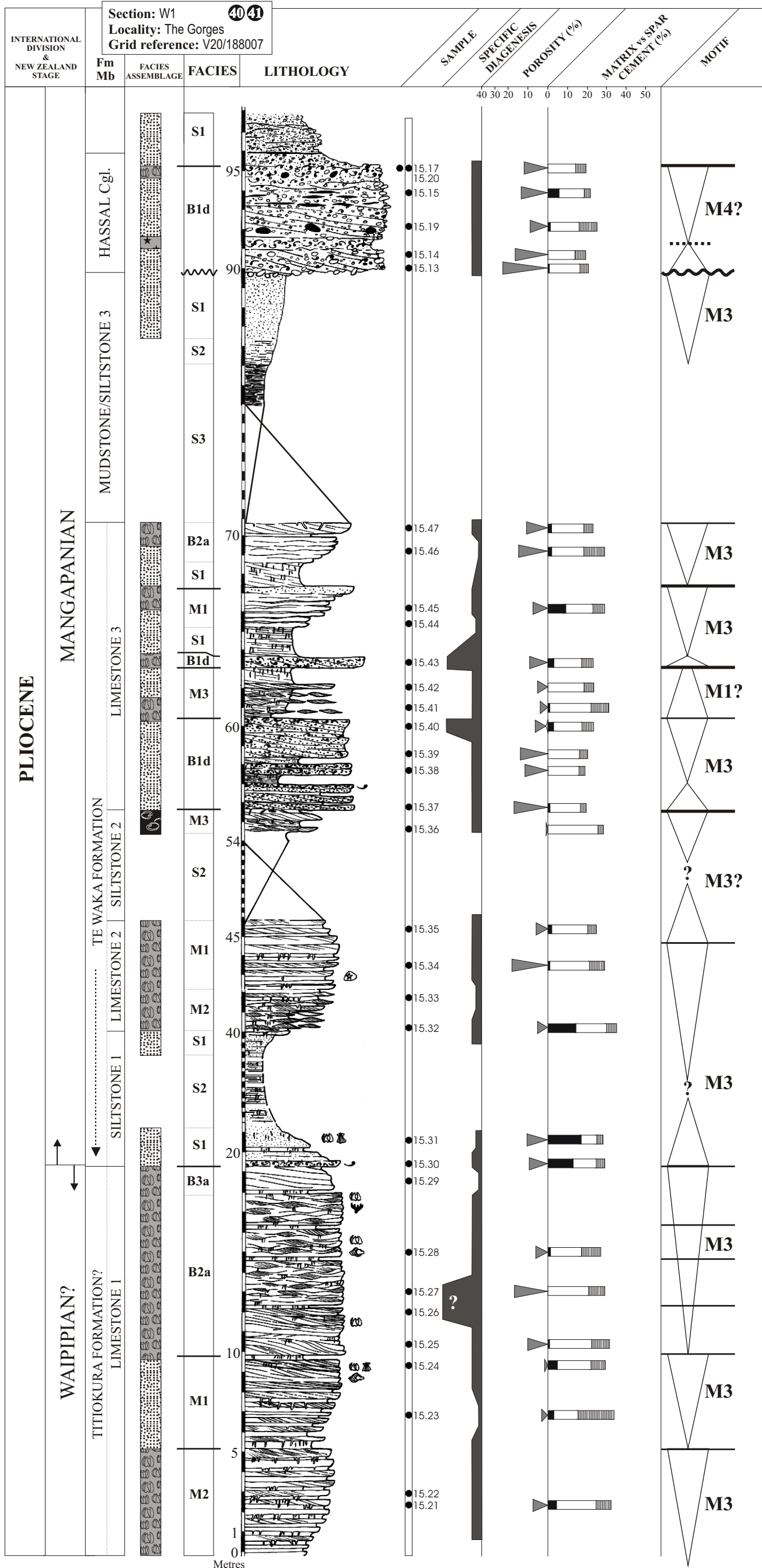
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Location: The Gorges

Author: V. Caron

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Stratigraphic Column No: 87 **Grid Reference: Top** **Bottom** **NZMS 260 V20**
GPS Waypoint No(s): Wp 365, 627 **E:** 2819716 2818656
Region: Patoka: **Logged by V. Caron (2002)** **N:** 6201109 6201140
Location: The Gorges, headwaters of Wai-iti Stream below Puketitiri Road **Altitude:** 417 m 363 m
NZMS 260 Sheet: V20 Esk **Page 1 of 2** **Author: K. Bland** **87**
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Age	Strat. Unit		Scale (metres)	Lithology	Sampling interval	Facies	WP No.	Samples	Contacts	Description
	Int.	N.Z.								
Late Pliocene	Mangapanian		42 40 38 36 34 32 30 28 26 24 22 20		↑ Page 2	BC ₆				Poorly exposed greyish siltstone. Coarsens upsection and passes into silty sandstone.
	Te Waka Formation									
Late Pliocene	? Waipian		18 16 14 12 10 8 6 4 2		F	BC ₂				Laminated to planar cross-bedded bioclastic fine sandstone capped by a thin shellbed packed with oysters and pectinids.
	Mangaheia Group									
		? Titokura Formation			G	BC ₁				Moderately to well sorted alternating bodies 20-30 cm thick of barnacles-rich grainstone and siliciclastic packstone arranged in horizontal tabular sets. Beds are typically well sorted and fine to medium-grained. Internal sedimentary structures include low-angle planar cross-stratification. Intensively bioturbated.
										Calcareous sandstone grading into siltstone.
										Stacked bioclastic-dominated bodies 2-3 m thick. Medium-scale trough and sigmoidal cross-stratifications occur within moderately cemented coarse-grained barnacle-rich grainstones.
										WP 365

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

Stratigraphic Column No: 87 **Grid Reference: Top** **Bottom** **NZMS 260 V20**
GPS Waypoint No(s): Wp 365, 627 **E:** 2819716 2818656
Region: Patoka **N:** 6201109 6201140
Location: The Gorges, headwaters of Wai-iti Stream below Puketitiri Road **Altitude:** 417 m 363 m
NZMS 260 Sheet: V20 Esk **Page 2 of 2** **Author:** K. Bland **2 of 3**

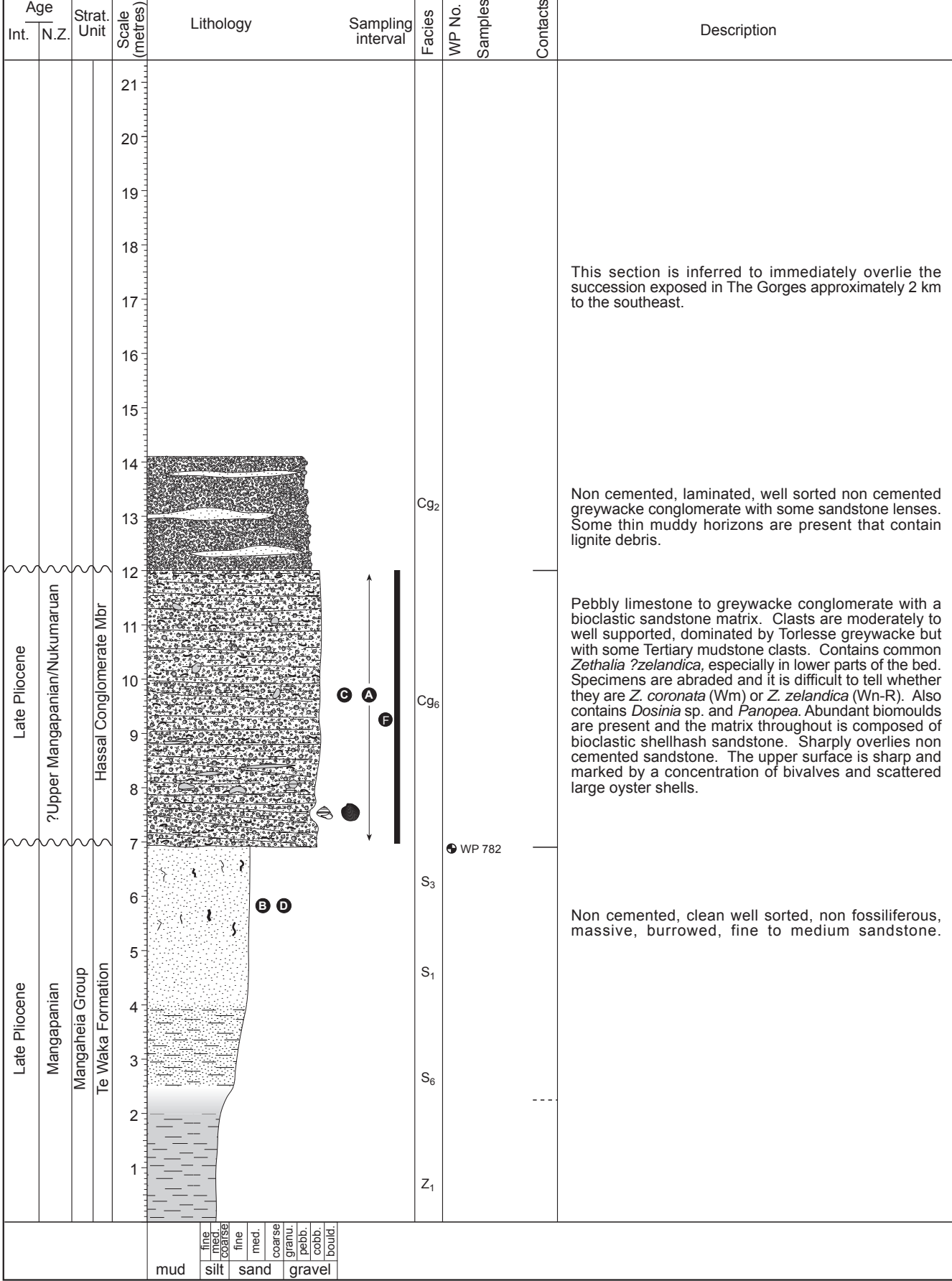
Age	Strat. Unit	Scale (metres)	Lithology	Sampling interval	Facies	WP No.	Samples	Contacts	Description		
										Int.	N.Z.
Late Pliocene	Mangapanian	Mangaheia Group	Te Waka Formation	84							
				82							
				80							
				78							
				76							Siltstone grading into sandstone, in turn overlain by fossiliferous greywacke conglomerate and fluvial gravel beds. This interval is partially exposed on Mount Hassal north of this section.
				74							
				72							
				70							Moderately to well cemented, moderately sorted coarsening-upwards package from laminated siliciclastic packstone to coarse-grained barnacle-rich grainstone. Beds are 0.3-0.4 m thick and moderately bioturbated. Sharply overlies similar package below.
				68							
				66							Moderately to well cemented, moderately-sorted coarsening-upwards bioturbated package from laminated siliciclastic packstone to coarse-grained barnacle-rich grainstone. Individual beds 0.3-0.4 m thick.
				64					WP 627		Well cemented, sharp based shellbed containing scattered greywacke pebbles, oyster and sparse <i>Phialopecten thomsoni</i> valves.
				62							
60											
58							Poorly sorted, moderately to well cemented pebbly and barnacle-rich grainstone containing common, well rounded Torlesse greywacke granules and pebbles up to 1 cm across. This package comprises thickening-upwards tabular sets that display low-angle planar and tangential cross-stratifications.				
56											
54											
52											
50							Poorly exposed silty sandstone.				
48											
46											
44							Coarsening-upwards succession from alternating, discontinuous medium-grained skeletal lenses and interlayered, laminated siliciclastic packstone to horizontal tabular sets of alternating grainstone and packstone. Section capped by a coarse grainstone comprising shell and barnacle fragments and Torlesse greywacke pebbles.				

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



Stratigraphic Column No: 88	Grid Reference: Top	Bottom	NZMS 260 V20 88 1 of 2
GPS Waypoint No(s): Wp 782	E: 2816822	-	
Region: Hawkston	N: 6202740	-	
Location: Top of Mount Hassal, Mount Hassal farm	Altitude: 602 m	-	
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mud	fine med coarse	fine med.	coarse granu. pebb. cobb. bould.
silt	sand	gravel	

