HIL Hilpara Land System

Rocky range in the Minburra-Yalpara district. Name derives from Hilpara Creek which cuts through the range.

Area: 254.2 km^2

Geology: Saddleworth Formation (Pbs) siltstones and Cradock Quartzite (Pbv) which outcrop in the Minburra-Yalpara district and Appila Tillite (Pua) which forms the main range. Other formations which underlie the system include Tapley Hill Formation siltstones, Pound and ABC Range Quartzite, Skillogalee Dolomite and Wonoka Formation siltstones. Outwash sediments from these rocks underlie plains, pediments and creek flats. Deep weathering materials with associated ironstone gravels occur on some pediments.

Topography: Linear, arcuate parallel low rocky ranges with pediments and wide inter-range valleys. Etch plains of low relief on basement rock are included in the south east of the land system.

Elevation: There is decreasing elevation from 450 m asl in the north-west to 350 m in the south east. Similarly, the low hilly ranges give way to low rises where the land system abuts the Black Rock Plain land system in the south-west.

Relief: In the ranges, the relief is mostly around 40 - 50 m but occasional is as much as 70 m

Annual rainfall: 230 – 335 mm average

Soils: Very shallow and stony red sandy loam to loam soils on hard basement rock occur on upper slopes and crests, where rock outcrop is extensive. Moderately deep red gradational sandy loams to clay loams on weathered siltstones and sandstones occur on slopes. Loam to clay loam over red friable clay with soft carbonate segregations occur on lower slopes and pediments on sediment derived from siltstones and other fine-grained rocks.

Calcareous loam grading to highly calcareous clay occurs on lower slopes and pediments.

Main soils

L1 Shallow stony soil on rock
L1a Shallow stony loam on fine grained rock
L1b Shallow stony sandy loam on medium grained rock
L1c Shallow stony loamy sand on coarse grained rock
L1d Shallow stony sandy loam on quartzite
A5 Rubbly calcareous loam on clay
C2 Gradational loam on rock
D1 Loam over (pedaric) clay on rock

Minor soils

Formed on basement rock

A2 Shallow calcareous loam
B2 Shallow calcareous loam on calcrete
D7 Loam over poorly structured clay on rock
RR Rock outcrop

Formed on outwash deposits or deep weathering material

A3 Deep moderately calcareous loam to sandy loam
A4 Deep (rubbly) calcareous sandy loam to loam
A6 Gradational calcareous clay loam
C1 Gradational sandy loam
C3 Friable gradational (sandy) clay loam
C4 Hard gradational clay loam
D2 Sandy loam to clay loam over red clay
D4 Loam to clay loam over pedaric red clay
D6 Ironstone gravelly loam over red clay
E2 Red cracking clay
J1 Ironstone gravelly clay loam over brown clay
M1 Deep alluvial sandy loam
M3 Stony alluvial soil

Summary: The Hilpara Land System consists of an arcuate linear range. Soils range from shallow sandy loam to loam soils on siltstones and quartzites on upper slopes, to deeper gradational and sodic (pedaric) texture contrast soils on lower slopes and pediments. Calcareous soils occur in places on some pediments. Scalding and gully erosion, mostly relics from the days of early settlement, are widespread. Some local areas of salinity are associated with exposed saline weathered parent rock.

Soil Landscape Unit summary: 89 Soil Landscape Units (SLUs) mapped in the Hilpara Land System:

SLU	% of area	Component	Main soils	Prop#	Notes
AAH	0.2	Rolling rises	L1	D	Rolling rises with shallow rocky calcareous soils formed on fine-grained rocks. Rock outcrops are common. Watercourses are eroded, with up to 20% of land affected by gullying. Relief is 9-30m, slopes are 10-30%. Main soils: shallow stony loam - **L1**a with shallow calcareous loam - **A2** and gradational loam on rock -**C2**.
ABA	1.7	Undulating low hills	L1RR	D	Hills and rises with linear rocky quartzite outcrops and shallow rocky soils on interbedded fine-grained rocks. **ABA** Undulating low hills. Relief is 30-90m, slopes are 3-10%. **ABH** Rolling rises with eroded watercourses. Relief is 9-30m, slopes are 10-30%. Main soils: shallow stony sandy loam to loam - **L1**a,b,d and rock outcrop - **RR**, with shallow calcareous loam - **A2**.
ABH	0.5	Rolling rises	L1RR	D	
ADD	0.4	Steep low hills	L1RR	D	Non arable rocky rises formed on limestones and calc-siltstones such as Skillogalee Dolomite with very shallow loamy soils. **ADD** Steep low hills. Relief is 30-90m, slopes are 30-50%. **ADG** Undulating low hills with eroded watercourses. Relief is 30-90m, slopes are 3-10%. **ADH** Rolling rises, with eroded watercourses. Relief is 9-30m, slopes are 10-30%. Main soils: shallow stony loam - **L1**a, with shallow calcareous loam - **A2**, gradational loam on rock - **C2** and rock outcrop - **RR**. Non-arable, limited pastoral use.
ADG	1.0	Undulating low hills	L1	D	
ADH	1.3	Rolling rises	L1	D	
AIC	0.5	Rolling low hills	L1RRC2	D	Hills with shallow rocky soils formed mainly on fine grained rocks with interbedded quartzites. Rock outcrop is common. **AIC** Rolling low hills. Relief is 30-90m, slopes are 3-10%. **AID** Steep low hills. Relief is 30-90m, slopes are 10-30%. **AIH** Rolling rises with more than 20% gullied land and 0-5%
AID	0.8	Steep low hills	L1RRC2	D	
AIH	0.6	Rolling rises	L1RRC2	D	
AIJ	1.3	Steep low	L1RRC2	D	

		hills			scalded. Relief is 9-30m, slopes are 3-10%.
AIV	0.8	Steep low hills	L1RRC2	D	**AIJ** Steep low hills with more than 20% gullied land and 0-5% scalded. Relief is 30-90m, slopes are 10-30%. **AIV** Steep low hills with more than 20% gullied land and more than 5% affected by landslips. Relief is 30-90m, slopes are 10-30%. Main soils: shallow stony loam - **L1a**, rock outcrop - **RR** and gradational loam on rock - **C2**. Minor clay loam over pedaric red clay - **D4** on lower slopes and depressions. Non-arable.
APB	1.9	Rolling rises	L1D1	D	Hills and rises on coarse-grained basement rocks particularly Appila Tillite Formation. **APB** Rolling rises. Relief is 9-30m, slopes are 10-30%. **APE** Steep hills with more than 20% gullied land and potential for mass movement. Relief is more than 90m, slopes are 30 - 60%. **APF** Very steep hills with more than 20% gullied land and potential for mass movement. Relief is more than 90m, slopes are more than 60%. **APH** Rolling rises with 10-20% gullied land, locally severe, minor scalding/sheet erosion. Relief is 9-30m, slopes are 10-30%. **APJ** Steep low hills with eroded watercourses. Relief is 30-90m, slopes are 30-50%. Main soils: shallow stony sandy loam - **L1b** and loam over (pedaric) red clay on rock - **D1**. Non arable.
APE	0.4	Steep hills	L1D1	D	
APF	0.2	Very steep hills	L1D1RR	D	
APH	3.3	Rolling rises	L1D1	D	
APJ	7.5	Steep low hills	L1D1	D	
AQB	1.6	Rolling rises	L1	D	Non-arable low hills formed on Pound Quartzite Formation with very shallow stony soils and rocky outcrops. **AQB** Rolling rises. Relief is 9-30m, slopes are 3-10%. **AQC** Rolling low hills. Relief is 30-90m, slopes are 3-10%. **AQN** Rolling rises with 10-50% scalded land and 0-5% gullied. Relief is 9-30m, slopes are 3-10%. Main soils: shallow stony loamy sand to sandy loam - **L1c**&**d**, with rock outcrop - **RR** and gradational loam over rock - **C2**. Non arable.
AQC	0.8	Rolling low hills	L1	D	
AQN	0.4	Rolling rises	L1	D	
AYA	0.2	Undulating rises	A2L1RR	D	Undulating rises on fine grained rocks, especially siltstones of the Tapley Hill Formation. Relief is less than 30m, slopes are 3-10%. Main soils: shallow calcareous loam - **A2**, shallow stony loam - **L1a** and rock outcrop - **RR**.
DaI	0.4	Rolling pediments	D1D4C2	D	Rolling pediments with clay loamy soils over basement within a metre of the surface. Slopes are 10-20%. 10-20% of land is gullied and subsoils are slightly saline. Main soils: loam over clay on rock- **D1**, loam over pedaric red clay - **D4** and gradational loam on rock - **C2**, with shallow stony loam - **L1a** and rock outcrop - **RR**.
ECC	2.7	Undulating rises	L1C2	D	Rises formed on Tapley Hill Formation siltstones with shallow soils. Subsoils are moderately saline. **ECC** Undulating rises. Relief is less than 30m, slopes are 3-10%. **ECD** Rolling rises. Relief is 9-30m, slopes are 10-30%. **ECG** Gently undulating rises. 10-20% of land is gullied. Slopes are 1-3%, relief is less than 30m. **ECH** Undulating rises. 5-10% of land is gullied. Relief is less than 30m, slopes are 3-10%. Main soils: shallow stony sandy loam - **L1b** and gradational loam on rock - **C2**, with sandy loam to loam over clay on rock - **D1**.
ECD	0.7	Rolling rises	L1C2	D	
ECG	1.1	Gently undulating rises	L1C2	D	
ECH	5.6	Undulating rises	L1C2	D	
EFC	2.4	Undulating rises	A2D7L1	D	Rises and plains with moderately shallow soils overlying hard calcareous rocks, including Appila Tillite, and various

EFP	0.2	Plains	L1C2	D	siltstones and limestones.
EFQ	2.0	Gently undulating rises	L1C2	D	**EFC** Undulating rises with minor scalding. Relief is less than 30m, slopes are 3-10%. Main soils: shallow calcareous loam - **A2**, loam over poorly structured clay on rock - **D7** and shallow stony loam - **L1a**.
EFU	0.3	Plains	L1C2	D	
EFX	0.2	Rolling rises	D7L1	D	**EFP** Plains with minor scalding and gullying. Most soils are saline and there are 10-50% "magnesia" patches. Slopes are less than 1% and relief is less than 9m. Main soils: shallow stony sandy loam - **L1b** and gradational loam on rock - **C2**, with sandy loam to loam over clay on rock - **D1**. **EFQ** Gently undulating rises with minor scalding and gullying. Most soils are saline and there are 10-50% "magnesia" patches. Slopes are 1-3%, relief is less than 30m. Main soils: shallow stony sandy loam - **L1b** and gradational loam on rock - **C2**, with sandy loam to loam over clay on rock - **D1**. **EFU** Plains with 0-5% gullied land, 5-10% scalded and soils have moderate subsoil salinity. Slopes are less than 1% and relief is less than 9m. Main soils: shallow stony sandy loam - **L1b** and gradational loam on rock - **C2**, with sandy loam to loam over clay on rock - **D1**. **EFX** Rolling rises on calc-siltstone, with moderate scalding. Rocky outcrops are common. Relief is 9-30m, slopes are 10-30%. Main soils: loam over poorly structured clay on rock - **D7** and shallow stony sandy loam - **L1b**.
EHB	0.1	Gently sloping plain	A2	V	Rises and pediments on calcareous shales, siltstones and limestones such as the Tindelpina Shale of the Tapley Hill Formation, Wonoka Formation and the ABC Range Quartzite of the Wilpena Group. The soil-landscape units are also associated with Bunyeroo Formation shales with some outwash contribution from calcareous Wonoka Formation calc-siltstones. **EHB** Gently undulating pediments with rocky rises *Pediments:* Slopes are 1-3%, relief is less than 9m. *Rocky Rises:* Slopes are 3-10%, relief is 9-30m. **EHV** Gently undulating pediments with rocky rises *Pediments:* Gently undulating plains, 10-50% of land is scalded. Slopes are 1-3%, relief is less than 9m. *Rocky Rises:* Undulating rises, Up to 5% of land is scalded. Slopes are 3-10%, relief is 9-30m. Main soils: *Plains and Pediments:* shallow calcareous loam - **A2**, with shallow calcareous loam on calcrete - **B2** and shallow stony loam - **L1a**. *Rocky rises:* Shallow stony loam - **L1a** with rock outcrop - **RR**.
		Rocky outcrops	RR	L	
EHV	0.3	Gently sloping plain	A2	V	
		Rocky outcrops	RR	L	
ERC	0.3	Undulating rises	A2L1RR	D	Undulating rises with shallow dark brown clay loamy calcareous soils on calc-siltstones and shales typically Willochra Formation. Relief is 9-30m, slopes are 3-10%. Main soils: shallow calcareous clay loam - **A2**, shallow stony loam - **L1a** and rock outcrop - **RR**.
EVC	1.3	Undulating rises	A2	V	Rises with rock outcrops and shallow calcareous soils formed on fine-grained calcareous rocks. **EVC** Undulating rises. Slopes are 3-10%, relief is less than 9-30m. **EVD** Rolling rises. Relief is 9-30m, slopes are 10-30%. Main soils: *Rises*: shallow calcareous loam - **A2**, with rubbly calcareous loam on clay - A5 and shallow calcareous loam on
		Rocky outcrops	RR	C	
EVD	0.1	Rolling rises	A2	V	
		Rocky outcrops	RR	C	

					calcrete - **B2** *Rocky outcrops*: rock outcrop - **RR** with shallow stony loam - **L1a**.
EWC	4.1	Undulating rises	C2L1RR	D	Rises formed on tillite, siltstone or quartzite. Rocky outcrops are common. Sporadic ironstone gravel patches. **EWC** Undulating rises. Relief is 9-30m, slopes are 3-10%. **EWH** Undulating rises with 5-10% gullied land. Relief is 9-30m, slopes are 3-10%. **EWI** Rolling rises; more than 20% of land is gullied and is therefore non-arable. Relief is 9-30m, Slopes are 10-30%. **EWV** Gently undulating rises with 10-20% gullied land, and 5-10% scalded. Subsoils are moderately saline. Slopes are 1-3%, relief is less than 30m. **EWW** Undulating rises with 0-5% gullied land and 10-20% scalded. Relief is 9-30m, slopes are 3-10%. Main soils: gradational loam on rock - **C2**, shallow stony sandy loam - **L1b** and rock outcrop - **RR**.
EWH	0.3	Undulating rises	C2L1RR	D	
EWI	3.7	Rolling low hills	C2L1RR	D	
EWV	0.8	Gently undulating rises	C2L1RR	D	
EWW	0.8	Undulating rises	C2L1RR	D	
EZB	0.3	Gently undulating rises	A2A5B2	V	Rises with mostly shallow calcareous soils on weathered siltstones of the Tapley Hill Formation and Tarcowie Siltstone **EZB** Gently undulating rises with rocky outcrops. Up to 5% of land is gullied and/or scalded. Subsoils are moderately saline. Slopes are 1-3%, relief is less than 30m. **EZG** Gently undulating rises with rocky outcrops. 10-20% of land is gullied and 5-10% is scalded. Subsoils are moderately saline. Slopes are 1-3%, relief is less than 30m. **EZl** Gently undulating rises with rocky outcrops, with 10-50% of land scalded and 10-20% gullied. Moderate subsoil salinity is common. Slopes are 1-3%, relief is less than 30m. Main soils: *Rises*: shallow calcareous loam - **A2**, rubbly calcareous loam on clay - **A5** and shallow calcareous loam on calcrete - **B2.** *Rocky outcrops*: rock outcrop - **RR**, with shallow stony loam - **L1a** and shallow calcareous loam on calcrete - **B2**
		Rocky outcrops	RR	C	
EZG	0.4	Gently undulating rises	A2A5B2	V	
		Rocky outcrops	RR	C	
EZl	0.5	Gently undulating rises	A2A5B2	V	
		Rocky outcrops	RR	C	
JFB	0.5	Gently undulating pediments	D2D4C1	D	Pediments with mostly clay loamy soils formed on fine grained outwash deposits. **JFB** Gently undulating pediments. Slopes are 1-3%, relief is less than 9m. **JFC** Undulating pediments. Slopes are 3-10%, relief is less than 9m. Main soils: clay loam over red clay - **D2**, clay loam over pedaric red clay - **D4** and gradational sandy loam - **C1**.
JFC	0.1	Undulating pediments	D2D4C1	D	
JJG	3.3	Gently sloping plain	D6A3	D	Pediments and plains with deep loamy soils underlain by Saddleworth Formation siltstones and associated outwash sediments. **JJG** Gently sloping plain with 10-20% gullied land and 5-10% scalded. Slopes are 1-3%, relief is less than 9m. **JJV** Gently sloping plain with 0-5% gullied land; 10-50% scalded and subsoils are moderately saline. Slopes are 1-3%, relief is less than 9m. Main soils: ironstone gravelly loam over red clay - **D6** and deep moderately calcareous loam - **A3**.
JJV	0.2	Gently sloping plain	D6A3	D	
JKG	0.8	Pediments	D2A3A5	D	Pediments with mostly deep sandy loam surfaced soils. 10-20% of land is gullied and 0-5% is scalded. Subsoils are moderately saline. Slopes are 1-3%, relief is less than 9m. Main soils: sandy loam over red clay - **D2**, deep moderately calcareous sandy loam - **A3** and rubbly calcareous loam on clay - **A5**, with gradational sandy loam - **C1**.
JNo	0.1	Creek flats	D4D2A5	D	Pediments and plains with deep clay loamy soils formed on fine grained outwash deposits. **JNo** Creek flats; 10-20% affected by gullying and 10-50%
JNU	0.7	Plains	D4D2A5	D	
JNY	0.2	Drainage	D4D2A5	D	

		line			scalded, locally more than 50%. **JNU** Level plain; 5-10% scalded. **JNY** drainage line with 5-10% scalding and less than 5% gullying. Main soils: clay loam over pedaric red clay - **D4**, clay loam over red clay - **D2**, and rubbly calcareous loam on clay - **A5**, with red cracking clay - **E2**.
JOU	0.8	Plains	JID4	D	Plains with clay loamy soils, some ironstone gravelly, formed on fine grained outwash deposits. Plains have 10-50% scalding and 0-5% gullying. Subsoils are moderately saline. Main soils: ironstone gravelly clay loam over brown clay - **J1** and clay loam over pedaric red clay - **D4**.
JXB	1.4	Gently sloping pediments	D2	V	Complex of pediments and rocky rises. Most soils have clay loam surfaces. Slopes are 1-3%. Main soils: *Pediments:* clay loam over red clay - **D2**, with loam over clay on rock - **D1** *Rises*: loam over clay on rock - **D1**, with rock outcrop - **RR**.
		Rocky rises	D1	C	
JYll	0.4	Pediments	D4D1D7	V	Complex of gently sloping clay loamy pediments (1-3% slope) and rocky rises. Gullying affects 10-20% of land and scalding affects 10-50% on pediments. Main soils: *Pediments*: clay loam over pedaric red clay - **D4**, loam over clay on rock - **D1** and loam over poorly structured clay on rock - **D7**, with rubbly calcareous loam on clay - **A5** and gradational loam on rock - **C2**. *Rises:* rock outcrop - **RR** with shallow stony loam - **L1a**.
		Rocky rises	RR	C	
JZo	0.6	Creek flat	D4A5	V	Complex of creek flats and pediments formed on fine grained outwash sediments and basement rocks, and rocky rises. **JZo** Creek flat with rocky outcrops. Over 20% of the creek banks have unstable gullies and more than 50% of the banks are scalded. The rocky outcrops are not scalded or gullied. **JZv** Gently undulating pediments with rocky rises. 10-50% of pediments are scalded, and gullying affects 10-20%. Slopes are 1-3% on pediments and 3-10% on rises. Main soils: *Pediments and flats*: clay loam over pedaric red clay - **D4**, loam over clay on rock - **D1**, clay loam over red clay - **D2** and rubbly calcareous loam on clay - **A5**, with deep moderately calcareous loam - **A3**. *Rocky rises:* rock outcrop - **RR** and loam over clay on rock- **D1** with shallow stony loam - **L1a**.
		Rocky outcrops	RR	C	
JZv	0.3	Gently undulating pediments	D4D1D2	V	
		Rocky rises	D1	C	
KcH	0.7	Pediments	A5A4	D	Undulating pediments formed on outwash sediments with slopes of 3-10%.10-20% of land is gullied. Main soils: rubbly calcareous loam on clay - **A5** and deep (rubbly) calcareous sandy loam - **A4** with friable gradational clay loam - **C3**.
KGB	2.2	Gently undulating pediments	C3C1	D	Pediments and plains formed on medium textured outwash sediments. **KGB** Gently undulating pediments, with minor scalding and gullying. Slopes are 1-3%. **KGl** Gently undulating pediments with slight scalding (less than 5%) and minor gullying which is locally more severe along drainage lines. Slopes are 1-3%. **KGo** Creek flat with 10-20% gullied banks and 0-5% scalding. **KGV** Gently undulating pediments with 10-20% scalding
KGl	1.2	Gently undulating pediments	C3C1	D	
KGo	0.6	Creek flat	C3C1	D	
KGV	0.1	Gently undulating pediments	C3C1	D	

KGW	0.6	Undulating pediments	C3C1	D	and 0-5% gullying. Slopes are 1-3%. **KGW** Undulating pediments with 10-20% scalding and 5-10% gullying. Slopes are 3-10%. Main soils: friable gradational sandy clay loam - **C3** and gradational sandy loam - **C1**.
KHC	0.4	Undulating pediments	A4D4C1	D	Pediments formed on outwash sediments. **KHC** Undulating pediments. Slopes are 3-10%, relief is less than 9m. **KHE** Drainage line. Slopes are 1-3%, relief is less than 9m. **KHG** Gently undulating pediments. Gullying affects 5-10% of land. Subsoils are moderately saline. Slopes are 1-3%, relief is less than 9m. **KHl** Gently undulating pediments. Gullying affects 5-10% of land and 10-50% is scalded. Subsoils are moderately saline. Slopes are 1-3%, relief is less than 9m. **KHm** Undulating pediments. Gullying affects 10-20% of land and 5-10% is scalded. Slopes are 3-10%, relief is less than 9m. Main soils: deep (rubbly) calcareous sandy loam - **A4**, loam over pedaric red clay - **D4** and gradational sandy loam - **C1**.
KHE	0.2	Drainage line	A4D4C1	D	
KHG	4.4	Gently undulating pediments	A4D4C1	D	
KHl	0.4	Gently undulating pediments	A4D4C1	D	
KHm	0.5	Undulating pediments	A4D4C1	D	
KIH	2.3	Undulating pediments	D1D4E2	D	Undulating pediments formed on fine grained rock and associated outwash sediments with clay loamy soils. 5-10% of land is gullied. Slopes are 3-10%. Main soils: loam over clay on rock - **D1**, clay loam over pedaric red clay - **D4** and red cracking clay - **E2**.
KJB	0.7	Gently undulating pediments	C4C3A6	D	Pediments with clay loam surfaced soils formed on fine grained outwash sediments. **KJB** Gently undulating pediments. Slopes are 1-3%, relief is less than 9m. **KJC** Undulating pediments. Slopes are 3-10%, relief is less than 9m. **KJH** Undulating pediments with up to 20% gullying. Slopes are 3-10%, relief is less than 9m. **KJJ** Drainage line with more than 20% gullying. Main soils: hard gradational clay loam - **C4**, friable gradational sandy clay loam - **C3** and gradational calcareous clay loam - **A6**, with rubbly calcareous loam on clay - **A5** and clay loam over pedaric red clay - **D4.**
KJC	0.7	Undulating pediments	C4C3A6	D	
KJH	0.5	Undulating pediments	C4C3A6	D	
KJJ	0.3	Drainage line	C4C3A6	D	
KKB	1.8	Gently undulating pediments	A6A5	D	Pediments formed on fine grained outwash sediments with calcareous clay loamy soils. **KKB** Gently undulating pediments. Slopes are 1-3%, relief is less than 9m. **KKC** Undulating pediments with 5-10% gullied land and 0-5% scalded. Subsoils are moderately saline. Slopes are 3-10%, relief is less than 9m. **KKD** Rolling pediments with 5-10% gullied land and 0-5% scalded. Subsoils are moderately saline. Slopes are 10-30%, relief is less than 9m. **KKG** Gently undulating pediments with 10-20% gullied land and 0-5% scalded. Subsoils are moderately saline. Slopes are 1-3%, relief is less than 9m. **KKH** Gently undulating pediment with 5-10% of land affected by gullying, scalding occurs on 0-5%. Subsoils are moderately saline. Slopes are 1-3%, relief is less than 9m. **KKV** Gently undulating pediment with 0-5% of land affected by gullying, scalding occurs on 5-10%. Subsoils are moderately saline. Slopes are 1-3%, relief is less than 9m. Main soils: gradational calcareous clay loam - **A6** and rubbly calcareous loam on clay - **A5**, with friable gradational clay loam - **C3,** red cracking clay - **E2** and shallow stony loam - **L1a**.
KKC	0.6	Undulating pediments	A6A5	D	
KKD	0.2	Rolling pediments	A6A5L1	D	
KKG	0.6	Gently undulating pediments	A6A5	D	
KKH	1.0	Undulating pediments	A6A5	D	
KKV	0.3	Gently undulating pediments	A6A5	D	

KLB	2.2	Gently undulating pediments	A5	D	Pediments with clay loamy calcareous soils. **KLB** Gently undulating pediments with slopes of 1-3%. Subsoils have moderate salinity.
KLC	0.2	Undulating pediments	A5	D	**KLC** Undulating pediment with slopes of 3-10%, up to 5% scalded and gullied land. Subsoils have moderate salinity. Main soils: rubbly calcareous clay loam on clay - **A5**, with shallow calcareous loam - **A2**, gradational loam on rock - **C2** and shallow calcareous loam on calcrete - **B2**.
KMB	1.0	Gently undulating pediments	A5D4	D	Gently sloping pediments formed on fine grained outwash sediments with slopes of 1-3%. Main soils: rubbly calcareous loam on clay - **A5** and loam over pedaric red clay - **D4**.
KOU	8.8	Plains	A6A5	D	Plains formed on fine grained outwash sediments with mostly calcareous clay loamy soils. Slopes are less than 1%. Main soils: gradational calcareous clay loam - **A6** and rubbly calcareous loam on clay - **A5**, with clay loam over pedaric red clay - **D4** and deep (rubbly) calcareous sandy loam - **A4**.
KQl	0.7	Gently undulating pediments	A5	V	Complex of pediments formed on outwash sediments, and low basement rock stony rises with mostly calcareous gradational soils. **KQl** Gently undulating pediments with stony rises. Up to 50% of land on pediments is scalded and over 20% is gullied. Subsoils have moderate salinity (dry saline land). Rises have few or no scalds and gullies. Slopes are 1-3%, relief is less than 9m.
		Low stony rises	A2	C	
KQU	0.1	Plains	A5	V	
		Low stony rises	A2	C	
KQV	1.7	Gently undulating pediments	A5	V	**KQU** Plains with low stony rises. Up to 10% of pediment land is scalded, and around 5% is gullied. Rises are generally not gullied and scalding occurs on less than 5% of land.
		Low stony rises	A2	C	**KQV** Gently undulating pediments with low stony rises. Up to 10% of pediment land is scalded, and around 5% is gullied. Rises generally are not gullied and scalding occurs on less than 5% of land. Slopes are 1-3%. Main soils: *Pediments*: rubbly calcareous loam on clay - **A5**, with loam over pedaric red clay - **D4**. *Rises*: shallow calcareous loam - **A2**, with shallow calcareous loam on calcrete - **B2** and rock outcrop - **RR**.
KXI	0.1	Rolling pediments	C1	D	Rolling pediments formed o sandy alluvium. Gullying is severe, affecting more than 20% of land. Slopes are 10-20%, relief is less than 9m. Main soils: gradational sandy loam - **C1**, with rubbly calcareous loam on clay - **A5** and deep moderately calcareous sandy loam - **A3**.
KYC	0.4	Undulating pediments	A5	D	Undulating pediments formed on medium grained outwash sediments. Slopes are 3-10%. Main soils: rubbly calcareous loam on clay - **A5** with clay loam over pedaric red clay - **D4**.
XAA	0.1	Flood plain	M1M3D4	D	Floodplain with mixed alluvium. Main soils: deep alluvial loam - M1, deep gravelly sandy loam -**M3** and loam over pedaric red clay - **D4**.
XKH	1.0	Alluvial plains	M1M3D4	D	Alluvial plains with scalded and eroded watercourses. Soils are mostly medium textured (silty). Scalding affects 5-10% and watercourses have unstable gullies. Main soils: deep alluvial loam - **M1**, deep gravelly sandy loam -**M3** and loam over pedaric red clay - **D4**.

PROPORTION codes assigned to Soil Landscape Unit (SLU) components:

D	Dominant in extent (>90% of SLU)	C	Common in extent (20–30% of SLU)
V	Very extensive in extent (60–90% of SLU)	L	Limited in extent (10–20% of SLU)
E	Extensive in extent (30–60% of SLU)	M	Minor in extent (<10% of SLU)

Detailed soil profile descriptions:

A2 Shallow calcareous loam (Paralithic, Hypercalcic / Lithocalcic Calcarosol)
Calcareous stony loam grading to soft or rubbly carbonate over weathering dolomite or calc-siltstone within 50 cm.

A3 Deep moderately calcareous sandy loam to loam (Regolithic, Calcic Calcarosol)
Calcareous loam to sandy loam grading to a loamy to clayey subsoil without a significant carbonate accumulation in the subsoil, grading to medium to fine grained alluvium.

A4 Deep (rubbly) calcareous loam (Regolithic, Hypercalcic / Lithocalcic Calcarosol)
Calcareous sandy loam to clay loam grading to a very highly calcareous sandy clay loam to light clay with variable rubble, continuing below 120 cm.

A5 Rubbly calcareous loam on clay (Regolithic, Hypercalcic / Lithocalcic Calcarosol)
Calcareous sandy loam to clay loam grading to a very highly calcareous rubbly sandy clay loam to light clay, over a clayey substrate deeper than 60 cm, but within 120 cm.

A6 Gradational calcareous clay loam (Pedal, Hypercalcic / Supracalcic Calcarosol)
Calcareous loam to clay loam grading to a well structured very highly calcareous (sometimes rubbly) clay, over a red clayey substrate within 120 cm.

B2 Shallow calcareous loam on calcrete (Petrocalcic, Calcic / Lithocalcic Calcarosol)
Stony calcareous sandy loam to loam, often with a very highly calcareous more clayey subsoil, over sheet calcrete within 50 cm. This grades to rubbly carbonate over weathering basement rock within 150 cm.

C1 Gradational sandy loam (Hypercalcic, Red Kandosol)
Friable sandy to loamy topsoil grading to massive red-brown alkaline loamy to clay loamy subsoil, highly calcareous with depth, over alluvium.

C2 Gradational loam on rock (Calcic / Hypercalcic Red Dermosol)
Loam to clay loam grading to a friable red clay with soft Class I carbonate within 50 cm, grading to weathering rock within 100 cm.

C3 Friable gradational clay loam (Calcic / Hypercalcic Red Dermosol)
Loam to clay loam grading to a friable red clay with abundant soft Class I carbonate within 50 cm, overlying alluvium within 100 cm.

C4 Hard gradational clay loam (Sodic, Hypercalcic, Red Dermosol)
Hard setting loam to clay loam grading to a coarsely structured dispersive red clay, highly calcareous with depth, over clayey alluvium. Includes eroded former texture contrast soils.

D1 Loam to clay loam over clay on rock (Hypercalcic / Calcic, Red Chromosol)
Medium thickness hard gravelly loam over a friable and finely structured red clay, calcareous with depth, grading to weathering basement rock within 100 cm.

D2 Sandy loam to clay loam over red clay (Calcic / Hypercalcic, Red Chromosol)
Hard setting sandy loam to clay loam (with variable quartzite stones) abruptly overlying a well structured red clay with soft Class I carbonate at depth.

D4 Loam to clay loam over crumbly (pedaric) red clay (Calcic, Pedaric, Red Sodosol)
Thin to medium thickness fine sandy loam to loam over a finely structured friable red clay, calcareous from about 50 cm, grading to fine or medium grained alluvium.

D6 Ironstone gravelly loam over red clay (Ferric, Calcic, Red Chromosol)
Ironstone gravelly sandy loam to loam abruptly overlying a red weakly to moderately well structured clay grading to highly weathered alluvial sediments.

D7 Loam over dispersive red clay on rock (Calcic / Hypercalcic, Red Sodosol)
Medium to thick hard sandy loam to clay loam sharply overlying a coarsely structured dispersive red clay, calcareous with depth, grading to highly weathered kaolinized siltstone or quartzite.

E2 Red cracking clay (Epicalcareous, Epipedal, Red Vertosol)
Dark strongly structured clay grading to a well structured red calcareous medium to heavy clay continuing below 100 cm. Often containing gypsum segregations in subsoil.

J1 Ironstone gravelly clay loam over brown clay (Ferric, Calcic, Brown Sodosol)
Ironstone gravelly clay loam to loam overlying a brown alkaline clayey subsoil, calcareous with depth, grading to highly weathered, kaolinized sediments or basement rocks.

L1a Shallow stony loam on fine grained rock (Paralithic, Leptic Tenosol)
Shallow stony loam, often calcareous with depth, overlying weathering fine grained rock shallower than 50 cm.

L1b Shallow stony sandy loam on medium grained rock (Paralithic, Leptic Tenosol)
Shallow stony sandy loam, often calcareous with depth, overlying weathering fine to medium grained sandstone or tillite shallower than 50 cm.

L1c Shallow stony loamy sand on coarse grained rock (Paralithic, Leptic Tenosol)
Shallow stony loam, often calcareous with depth, overlying weathering coarse grained sandstone shallower than 50 cm.

L1d Shallow stony sandy loam on quartzite (Paralithic, Leptic Tenosol)
Shallow stony loam, often calcareous with depth, overlying quartzite shallower than 50 cm.

M1 Deep alluvial sandy loam (Calcareous, Regolithic, Brown-Orthic Tenosol)
Very thick brown loamy sand to sandy loam, usually calcareous with depth, continuing below 100 cm.

M3 Stony alluvial soil (Basic, Fluvic, Clastic Rudosol OR Basic, Regolithic, Red-Orthic Tenosol)
Thick to very thick sandy loam with more than 50% quartzite stones overlying boulder beds.

RR Rock outcrop

Further information: DEWNR Soil and Land Program