BTN Belton Land System

Area: 183.6 km^2

Landscape: Rises with shallow red clay-loamy duplex soils formed on siltstones with extensive, gently sloping pediment plains with red clayey soils. Gently undulating to rolling rises on Ulupa Siltstone (Pwu), surrounding a basin formed of pediments and broad alluvial plains near Belton. Moderately scalded clay plains also occur, with gullying erosion on the steeper slopes. Parts of the lower pediments and broad drainage lines are moderately saline, which causes some reduction in crop/pasture growth or requires the use of salt tolerant species. The mainly thin surface soils are susceptible to sheet erosion which can leave of infertile subsoils exposed and results in the loss of productivity and increased erosion risk. Some upper slopes have highly calcareous loamy to clay loamy surface soils, where the soil material derives from calcareous rocks of the adjacent Walpunda Land System. Shallow soils and rocks limit production on rises due to poor moisture holding capacity and interference with tillage.

Annual rainfall: 280 – 330 mm average

Main soils:
D4 (21%) Loam over pedaric red clay (Pedaric Red Sodosol-Dermosol)
D2 (20%) Loam over red clay (Calcic-Hypercalcic Red Chromosol-Sodosol)
A5 (20%) Rubbly calcareous loam on clay (Supracalcic-Lithocalcic Calcarosol on clay)
D1 (12%) Loam over clay on rock (Shallow Calcic-Hypercalcic Red Chromosol)

Minor soils:
E2 (6%) Red cracking clay (Red Vertosol)
L1 (6%) Shallow soil on rock (Rocky Rudosol-Tenosol)
D7 (4%) Loam over poorly structured clay on rock (Shallow Calcic-Hypercalcic Red Chromosol)

Summary: The Belton Land System is a roughly circular basin drained by the intermittent Weira Creek, which drains towards the southwest. The outer flanks of the land system are hilly with discontinuous hard rock rises and hills separated by pediments and plains. Shallow soils occur on the bedrock highs and red texture contrast soils with crumbly subsoils occur on plains and pediments. Salinity occurs on lower slopes and drainage lines, affecting productivity and potential land use.

Soil Landscape Unit summary: Belton Land System (BTN)

SLU	% of area	Component	Main soils	Prop#	Notes
AAB	0.04	Rolling Rises	L1	D	Rises and hills with shallow rocky calcareous soils formed on Tapley Hill Formation calc-siltstones. **AAB** Rolling rises. Relief: less than 30m, slopes: 10-30%. **AAG** Undulating rises with eroded watercourses; up to 20% of land affected by gullying. Relief is less than 30m, slopes are 3-10%. **AAH** Rolling rises with eroded watercourses; up to 20% of land affected by gullying. Relief is 9-30m, slopes are 10-30%. Main soils: Shallow stony soils on rock **- L1**. Minor soils: Loam over poorly structured clay on rock – **D7**.
AAG	1.6	Undulating Rises	L1D7	D	
AAH	2.1	Rolling Rises	L1	D	
AFB	1.5	Rolling rises	L1A2	D	Rises and hills with shallow soils on fine grained

AFI	3.6	Rolling low hills	L1A2	D	basement rocks. 20-50% of soils have calcreted layers. **AFB** Rolling rises. Relief is 9-30m, slopes are 10-30%. **AFI** Rolling low hills with eroded watercourses; more than 20% affected by gullying, non arable. Relief is 30-90m, slopes are 10-30%. Main soils: Shallow stony soils on rock **- L1** and Calcareous loam on rock – **A2**.
AGB	1.3	Rolling rises	D1	D	Hills and rises with shallow non-calcareous soils. Over 50% of basement rocks are fine grained (ie give rise to non-sandy surface textures of L, CL, LC) Less than 20% of soils have secondary carbonate accumulations. More than 50% of soils have texture contrast profiles. **AGB** Rolling rises; 10-20% of land is gullied. Relief is less than 30m, slopes are 10-30%. **AGH** Rolling rises; with more than 20% gullied land. Relief is less than 30m, slopes are 10-30%. **AGI** Rolling hills with more than 20% gullied land. Relief is 90-300m, slopes are 10-30%. Main soils: Loam over clay on rock - **D1** and Shallow stony soils on rock **- L1**.
AGH	1.5	Rolling rises	D1	D	
AGI	0.9	Rolling low hills	D1	D	
DNB	2.2	Gently undulating rises	D1	D	Rises with shallow texture contrast soils formed on fine-grained rocks, typically Brachina Shale Formation. The soils have clay loam surface textures. **DNB** Gently undulating rises. Slopes are 1-3%, relief is less than 30m. **DNC** Undulating rises. Relief is 9-30m, slopes are 3-10%. **DND** Rolling rises. Relief is 9-30m, slopes are 10-30%. **DNH** Undulating rises with 10-20% of land gullied. Relief is 9-30m, slopes are 3-10%. **DNV** Gently undulating rises. Scalding occurs on 5-50% of land. Slopes are 1-3%, relief is less than 30m. **DNW** Undulating rises; 5-10% of land is scalded and gullied. Relief is 9-30m, slopes are 3-10%. **DNn** Rolling rises. Gullying affects up to 20% of land and scalding occurs on 5-50%. Relief: 9-30m, slopes: 10-30%. Main soils: Loam over red clay - **D2**, Clay loam over pedaric red clay on rock - **D1** and Loam over pedaric red clay - **D4**.
DNC	1.4	Undulating rises	D2D1	D	
DND	0.5	Rolling Rises	D2D4	D	
DNH	0.6	Undulating rises	D2D1	D	
DNV	0.8	Gently undulating rises	D1	D	
DNW	0.1	Undulating rises	D2D1	D	
DNn	0.9	Rolling Rises	D2D1	D	
DXB	0.2	Gently undulating rises	D1L1	V	Soils formed on basement rock in complex with soils formed in outwash materials. Gently undulating rises with red duplex soils over basement rock or saprolite within one metre of the surface. More than 20% of soils are formed on outwash sediments, that is pediments occupy >20% of the soil landscape unit. Surface textures are loamy. Main soils: ***Rises:*** Rocky rises have shallow red duplex soils on rock. Clay loam over pedaric red clay on rock - **D1** and Shallow stony soils on rock - **L1**. ***Pediments:*** Pediment slopes have red duplex and gradational soils. Loam over red clay - **D2**, Loam over pedaric red clay - **D4** and Friable gradational clay loam - **C3**.
		Pediments	D2D4C3	C	
EFC	0.2	Undulating Rises	A2D7L1	D	Undulating rises with only minor scalding with moderately shallow soils overlying hard calcareous rocks, typically Hawker Group siltstones and limestones. Relief is less than 30m, slopes are 3-10%. Main soils: Calcareous loam on rock – **A2**, Loam over poorly structured clay on rock - **D7** and Shallow stony soils on rock **- L1**.
JFk	2.3	Plains	D2D4C1	D	Plains with mostly red texture contrast soils with clay

					loam surfaces, calcareous soils occupy more than 20% and other gradational soils occupy more than 10%. Plains have around 50% scalded land and over 20% is gullied. Main soils: Loam over red clay - **D2**, Loam over pedaric red clay - **D4** and Gradational sandy loam - **C1**.
JNA	0.2	Plains	D4D2A5	D	Pediments and plains with non-stony pedaric, texture contrast soils with calcareous subsoils. Surface textures are clay loamy most commonly. **JNA** Plains. Slopes are less than 1%, relief is less than 9m. **JNB** Gently sloping pediments. **JNF** Plain with 10-20% affected by gullying and 10-20% scalded. Slopes are 1-3%, relief is less than 9m **JNG** Gently sloping pediments; 10-20% of land is gullied. Slopes are 1-3%, relief is less than 9m. **JNH** Undulating pediments with 10-20% of land affected by gullying. Slopes are 3-10%, relief is less than 9m. **JNU** Level plain; 5-10% scalded. Slopes are less than 1%, relief is less than 9m. **JNV** Gently sloping pediments. Scalding affects 10-50% of land. Slopes are 1-3%, relief is less than 9m. **JNW** Undulating pediments. Scalding affects 10-50% of land. Slopes are 3-10%, relief is less than 9m. **JNu** Level plain; 10-50% scalded and patchy dryland salinity affects up to 50%. **JNY** Drainage line with eroded banks, stable now. **JNl** Gently sloping pediment plain; gullying affects up to 50% of land, most severe along watercourses. Scalding affects nearly 50% of land. Slopes: 1-3%, relief: less than 9m. **JNo** Creek flat 10-20% affected by gullying and 40-50% scalded. Scalding may be more than 50% locally. Main soils: Loam over red clay - **D2**, Loam over pedaric red clay - **D4** and Rubbly calcareous loam on clay - **A5**. Red clay soils (**E2**) occur in minor association.
JNB	1.1	Gently sloping pediments	D4D2A5	D	
JNF	0.4	Plains	D4D2A5	D	
JNG	1.5	Gently sloping pediments	D4D2A5	D	
JNH	1.0	Undulating Pediments	D4D2A5	D	
JNU	5.9	Plains	D4D2A5	D	
JNV	24.7	Gently sloping pediments	D4D2A5	D	
JNW	0.1	Undulating Pediments	D4D2A5	D	
JNY	3.9	Drainage line	D4D2A5	D	
JNl	2.1	Gently sloping pediments	D4D2A5	D	
JNm	1.4	Undulating Pediments	D4D2A5	D	
JNo	7.2	Creek flats	D4D2A5	D	
JYB	0.7	Pediments	D4D1D7	D	Pediments with mostly clay loam surfaced texture contrast soils and more than 10% soils which are calcareous throughout. **JYB** Gently undulating pediments. Slopes are 1-3% relief is less than 9 metres. **JYG** Gently undulating pediments Gullying affects 10-20% of land. Semi-arable. Slopes are 3-10%, relief is less than 9 metres. **JYH** Undulating pediments. Gullying affects 10-20% of land. Semi-arable. Slopes: 3-10%; relief: less than 9m. **JYl** Gently sloping pediments. Gullying affects over 20% of land and scalding affects 5-50%. Slopes are 1-3%; relief is less than 9 metres. Main soils: Loam over pedaric red clay - **D4** and Loam over clay on rock- **D1** and Loam over poorly structured clay on rock - **D7**. Significant minor soils include Rubbly calcareous loam on clay - **A5** and Gradational loam on rock - **C2**.
JYG	1.7	Gently undulating pediments	D4D1D7	D	
JYH	1.0	Undulating pediments	D4D1D7	D	
JYl	7.7	Pediments	D4D1D7	D	
JZl	5.4	Gently undulating pediments	D4D1D2	V	Gently undulating pediments and rocky rise complex with red texture contrast soils on pediments and 20-30% rocky rises with shallow texture contrast soils. The pediments have between 10-50% of gullied land, with 20-75% scalded. Rises are not affected. Slopes are 1-3% on pediments and 3-10% on rises. Main soils: ***Pediments and plains:*** Loam over pedaric red clay - **D4**, Loam over clay on rock- **D1** and Loam over red clay - **D2** with minor Rubbly calcareous loam on clay - **A5**.
		Rocky rises	D1	C	

					Rocky rises: Loam over clay on rock- **D1** with 10-30% bare rock.
KFH	0.9	Pediment	A5	D	Undulating pediment with calcareous gradational soils and more than 20% red pedaric texture contrast soils. 10-20% of land is gullied. Slopes are 3-10%, relief is less than 9m. Main soils: Rubbly calcareous loam on clay - **A5** with over 20% Loam over pedaric red clay - **D4**.
KJB	0.4	Gently undulating pediments	C4C3A6	D	Gently undulating pediments with clay loam surface-textured red gradational soils with calcareous subsoils and gradational calcareous soils. Slopes are 1-3%, relief is less than 9m. Main soils: Hard gradational clay loam - **C4**, Friable gradational sandy clay loam - **C3** and Gradational calcareous clay - **A6**.
KLB	1.3	Pediment	A5	D	Gently undulating pediment with clay loamy calcareous soils. Slopes are 1-3%, relief is less than 9m. Main soils: Rubbly calcareous clay loam on clay - **A5**. Minor soils include: Calcareous clay loam on rock – **A2**, Gradational red-brown clay loam over rock-**C2** and Shallow calcareous loam on calcrete – **B2**.
KMG	6.8	Pediment	A6A5	D	Gently sloping pediment on which gradational calcareous soils are dominant, and in combination with red texture contrast soils occupy over 90% of the land. Slopes are 1-3%, relief is less than 9m. Main soils: Gradational calcareous clay - **A6** and Rubbly calcareous clay loam on clay - **A5**. Loam over red clay - **D2** occurs on less than 30% of land.
KPG	1.4	Gently sloping pediment	A3A4	D	Gently undulating pediment with sandy surface-textured, gradational, calcareous soils. 5-10% of land is gullied. Slopes are 1-3%, relief is less than 9m. Main soils: Deep moderately calcareous sandy loam - **A3** and Deep (rubbly) calcareous sandy loam **-A4**.
XHB	0.7	Creek flats	M1C1C3	D	Drainage lines with mostly coarse textured soils. **XHB** Creek flats with eroded watercourses. **XHZ** Creek flats with unstable, eroded banks; scalding affects 10-50%. Main soils: Deep alluvial loam - **M1**, Gradational sandy loam - **C1** and Friable gradational sandy clay loam - **C3**.
XHZ	0.6	Creek flats	M1C1C3	D	
XOW	0.1	Flood plain	M2A6C3	D	Flood plain, swampy and saline, with clayey calcareous soils on alluvium. Dryland salinity induces high salinity throughout soil profiles. 0-5% scalding. Gullying affects more than 20% of land. Main soils: Deep friable gradational clay loam - **M2**, Gradational calcareous clay - **A6** and Friable gradational clay loam - **C3**.

PROPORTION codes assigned to components within Soil Landscape Units (SLU):

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

Detailed soil profile descriptions:

A2/L1 Shallow calcareous loam (Paralithic, Hypercalcic / Lithocalcic Calcarosol) (**A2**) **OR** Shallow stony loam (Calcareous, Paralithic, Leptic Tenosol) (**L1**)

A3 Deep moderately calcareous (sandy) loam (Calcic Calcarosol)
Calcareous (sandy) loam topsoil grading into loamy-clay loamy subsoil without a significant CO_3 buildup in the subsoil (<20% CO_3 in subsoil). Pediment type Calcarosols.

A4 Deep (rubbly) calcareous loam (Hypercalcic-Lithocalcic Calcarosol)
Calcareous sandy-clay loamy topsoil grading into loamy-clay loamy subsoil with a significant CO_3 buildup in the subsoil. Often rubbly. Soil usually >120 cm in depth.

A5 Rubbly calcareous loamy sand on clay (Supracalcic-Lithocalcic Calcarosol on clay)
Calcareous loamy sand topsoil grading into loamy-clay loamy subsoil on a clayey substrate. Usually rubbly. Clayey substrate occurs at >60 cm and <120 cm.

A6 Gradational calcareous clay loam (Pedal Hypercalcic-Lithocalcic Calcarosol on clayey subsoil)
Calcareous loams to clay loams grading into brown-red clay. Often rubbly.

C1 Gradational sandy loam (Calcic-Hypercalcic Kandosol-Calcarosol)
Friable sandy to loamy topsoil grading into massive red-brown alkaline loamy to clay loamy subsoil.

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

C4 Hard gradational clay loam (Calcic-Hypercalcic Sodic Red Dermosol-Calcarosol)
Topsoil <30 cm over a poorly structured subsoil. Often hard setting clay loam to loam grading into prismatic/poorly structured/sodic red (-brown) alkaline clayey to clay loamy subsoil. Includes eroded former texture contrast soils.

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

D2 Hard 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 over red friable 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.

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.

L1 Shallow stony loam (Paralithic, Leptic Tenosol)
Shallow stony loam, often calcareous throughout or with depth, overlying weathering rock shallower than 50 cm.

M1 Alluvial loam (Orthic Tenosol)
Very thick loam with variable gritty or more-clayey lenses, formed over recent alluvium.

M2 Deep friable gradational clay loam (Red-Brown-Grey-Black Dermosol)
Deep well structured red clay loamy soil.

Further information: DEWNR Soil and Land Program