

ne

NORTH EELAH



Landscape—undulating low hills on Permian sediments and basalt in the East Maitland Hills region. Slopes are 5–12%, local relief to 70 m, elevation to 130 m. Banded rock outcrop (10–50%) commonly occurs. Cleared tall open-forest.

Soils—moderately deep (<75 cm), well-drained Euchrozems (Uf6.31), Red Clays (Ug5.37), some deep (<200 cm), well-drained Non-calcic Brown Soils (Db1.12) and Chocolate Soils (Db3.21) with deep (>200 cm), imperfectly drained Black Earths (Ug5.1) and Prairie Soils (Gn3.41) on basaltic parent material; moderately deep (<150 cm), well to imperfectly drained yellow Soloths (Dy3.41) and shallow to moderately deep (<70 cm), rapidly drained Lithosols (Um6.21) on sandstone and conglomerate.

Qualities and Limitations—water erosion hazard, localised shallow soils, rock outcrop and acid soils of low fertility on sedimentary parent material, foundation hazard on basaltic parent material.

LOCATION

Undulating low hills in the East Maitland Hills region in the centre-west of the area, including part of the North Eelah property. Type location is along Rosebrook Road after it branches from Tocal Road and crosses the North Coast Railway Line (Area reference 3 66***E, 63 83***N).

LANDSCAPE

Geology and Regolith

Permian Dalwood Group, in particular, Lochinvar Formation—lithic felspathic sandstone, siltstone, shale, tuff, basalt flows, erratics; and Allendale Formation—lithic sandstone, tuff and conglomerate.

Topography

Undulating low hills. Slope gradients are 5–12%. Local relief is up to 70 m, elevation is up to 130 m. Moderately broad (200 m) to broad (>300 m) crests, gentle convex sideslopes with narrow (<2 m), incised drainage lines in the upper reaches which broaden to wide flats (10–15 m) in the lower reaches, particularly on basaltic parent material. Rock outcrop occurs on sedimentary parent material (10–50%), often in swathes or bands at approximately 20–40 m intervals. Boulders occasionally occur on upper slopes.

Vegetation

Predominantly cleared tall open-forest, with dominant species dependent on parent material.

On basaltic parent material *Eucalyptus crebra* (narrow-leaved ironbark), *E. moluccana* (grey box), *E. tereticornis* (forest red gum) and *Angophora floribunda* (rough-barked apple) occur.

Occasionally, a remnant understorey of *Notelaea longifolia* (large mock olive), *Notelaea venosa* (smooth mock olive), *Clerodendron tomentosum* (hairy clerodendrum) and *Elaeocarpus obovatus* (hard quandong) may occur.

On sedimentary parent material *Eucalyptus maculata* (spotted gum) and *E. crebra* (narrow-leaved ironbark) dominate.

Land Use

Predominantly cattle and horse grazing on improved pasture. North Eelah operates a horse stud. Part of the Tocal Agricultural College occurs within this soil landscape.

Existing Land Degradation

Minor gully erosion occurs in drainage lines. Soils developed on basaltic parent material may exhibit minor rill erosion on batters. Subsoils on sedimentary parent material are prone to tunnel erosion.

SOILS

Soils are formed on two distinctly different parent materials, each having a different suite of soil materials.

Dominant Soil Materials**ne1—Black cracking self-mulching clay (topsoil—A horizon)**

Colour	black (7.5YR 2/1)
Texture	light to light medium clay, increasing from a clay loam at the surface 1–2 cm
Structure	5–10 mm granular peds at the surface, becoming coarser with depth to strong, 50–100 mm angular blocky peds which may part to 20–50 mm angular blocky or lenticular peds
Fabric	smooth ped
Field pH	slightly acid to neutral (pH 6.0–7.0)
Roots	abundant, fine and in-ped
Coarse fragments	few gravels and subrounded ironstones
Exposed condition	self-mulching, occasionally hardsetting with very firm dry consistence. Cracks 20–50 mm wide occur when dry
Permeability	moderate to slow
Type location	at North Eelah, 2 km north of Rosebrook Road (Grid Ref. 3 6365*E, 63, 8565*N). Soil Data System card 248, 0–20 cm

ne2—Dark brown self-mulching clay (topsoil—A horizon)

Colour	dark brown (7.5YR 3/4) to dark reddish brown (5YR 3/4)
Texture	light to medium clay which increases from a clay loam texture at the top 1–2 cm
Structure	moderate to strong, 10–20 mm sub-angular blocky peds which part to 5–10 mm granular peds at the surface
Fabric	smooth ped
Field pH	slightly acid to neutral (pH 6.0–7.0)
Coarse fragments	few, gravels
Roots	many to abundant, fine and in-ped
Exposed condition	loose when dry, soft when moist
Permeability	moderate
Type location	Quarry at Abingdon 1 km north of Rosebrook Rd (Grid Ref. 3 6490*E, 63 8410*N). Soil Data System card 327, 0–5 cm

ne3—Brown pedal clay loam (topsoil—A horizon)

Colour	dark brown (7.5YR 3/3) to brownish black (10YR 3/1), rarely black (7.5YR 2/1)
Texture	clay loam to fine sandy clay loam
Structure	moderate, 5–10 mm granular or polyhedral peds which may part to 2–5 mm polyhedral or sub-angular blocky peds
Fabric	smooth ped
Field pH	moderately to slightly acid (pH 5.5–6.0)
Coarse fragments	absent
Roots	common to abundant, well branched and in-ped
Exposed condition	soft when moist, occasionally hardsetting when dry with moderately weak crumbly consistence

Permeability	moderate
Type location	Comerfords Hill (Grid Ref. 3 6585*E, 63 8260*N). Soil Data System card 324, 0–20 cm

ne4—Brownish black fluffy loam (topsoil—A₁ horizon)

Colour	brownish black (7.5YR 3/2, 10YR 2/3, 10YR 3/2)
Texture	sandy loam to loam, occasionally silty clay loam
Structure	weak, 2–5 mm crumb peds, which part from 10–20 mm sub-angular blocky peds, rarely massive
Fabric	rough ped, rarely earthy
Field pH	moderately to slightly acid (pH 5.5–6.0)
Coarse fragments	common to occasionally abundant angular gravels and cobbles
Roots	generally common to abundant, in-ped
Exposed condition	hardsetting when dry, soft when moist
Permeability	high
Type location	1 km north of Rosebrook Road at Maitland Vale (Grid Ref. 3 6420*E, 63 8465*N). Soil Data System card 331, 0–22 cm

ne5—Bleached dull yellowish brown clay loam (topsoil—A₂ horizon)

Colour	dull yellowish brown (10YR 5/4) occasionally bright brown (7.5YR 5/6), commonly bleached dull yellow orange (10YR 7/3) when dry
Texture	light sandy clay loam to silty clay loam
Structure	massive
Fabric	earthy
Field pH	moderately to slightly acid (pH 5.5–6.5)
Coarse fragments	few gravel fragments may occur
Roots	few to common
Exposed condition	massive and hardsetting
Permeability	moderate
Type location	1 km north of Rosebrook Road at Maitland Vale (Grid Ref. 3 6420*E, 63 8465*N). Soil Data System card 331, 22–48 cm

ne6—Pedal mottled yellowish brown clay (subsoil—B horizon)

Colour	yellowish brown (10YR 5/6) with common grey mottles
Texture	sandy clay to light medium clay
Structure	moderate, 20–50 mm sub-angular blocky peds
Fabric	smooth ped
Field pH	slightly acid to neutral (pH 6.5–7.0)
Coarse fragments	common, gravels
Roots	few
Exposed condition	rarely exposed
Permeability	slow
Type location	1 km north of Rosebrook Road at Maitland Vale (Grid Ref. 3 6420*E, 63 8465*N). Soil Data System card 331, 48–>80 cm

ne7—Dark reddish brown strongly structured clay (subsoil—B horizon)

Colour	dark reddish brown (5YR 3/4, 5YR 3/6), rarely brownish black (7.5YR 3/2)
Texture Structure	light-medium to medium-heavy clay peds are strong, 10–20 mm polyhedral or sub-angular blocky increasing in size with depth to 50–100 mm lenticular or sub-angular blocky peds, rarely a 50–100 mm prismatic ped occurs at the top of this material
Fabric	smooth ped, slickensides may be common
Field pH	commonly neutral, but ranging from slightly acid to slightly alkaline (pH 6.5–8.0)
Coarse fragments	few gravel and subrounded manganese nodules
Roots	common to many, well branched and in-ped
Exposed condition	forms fine (<2 mm) fragments on exposure, with surface cracking
Permeability	moderate
Type location	Comerfords Hill (Grid Ref. 3 6585*E, 63 8260*N). Soil Data System card 324, 20–140 cm

ne8—Strongly structured black clay (subsoil—B horizon)

Colour	black (7.5YR 2/1)
Texture Structure	medium to medium-heavy clay strong, 20–50 mm lenticular and angular blocky peds which may part from 50–100 mm prismatic peds
Fabric	smooth ped
Field pH	slightly alkaline (pH 8.0)
Coarse fragments	absent
Roots	few to common in- and ex-ped

Exposed condition

pedal with very firm dry consistence
slow

Permeability**Type location**

Abingdon, 1 km north of Rosebrook Road (Grid Ref. 3 6470*E, 63 8430*N). Soil Data System card 328, 25–>80 cm

ne9—Gravelly brown clay (subsoil—C Horizon)

Colour	brown (7.5YR 4/6, 7.5YR 4/4)
Texture Structure	light clay massive
Fabric	earthy
Field pH	neutral (pH 7.0–7.5)
Coarse fragments	common to abundant rounded/sub-rounded gravels and cobbles
Roots	few, fine

Exposed condition

massive with weak, crumbly consistence
moderate

Permeability**Type location**

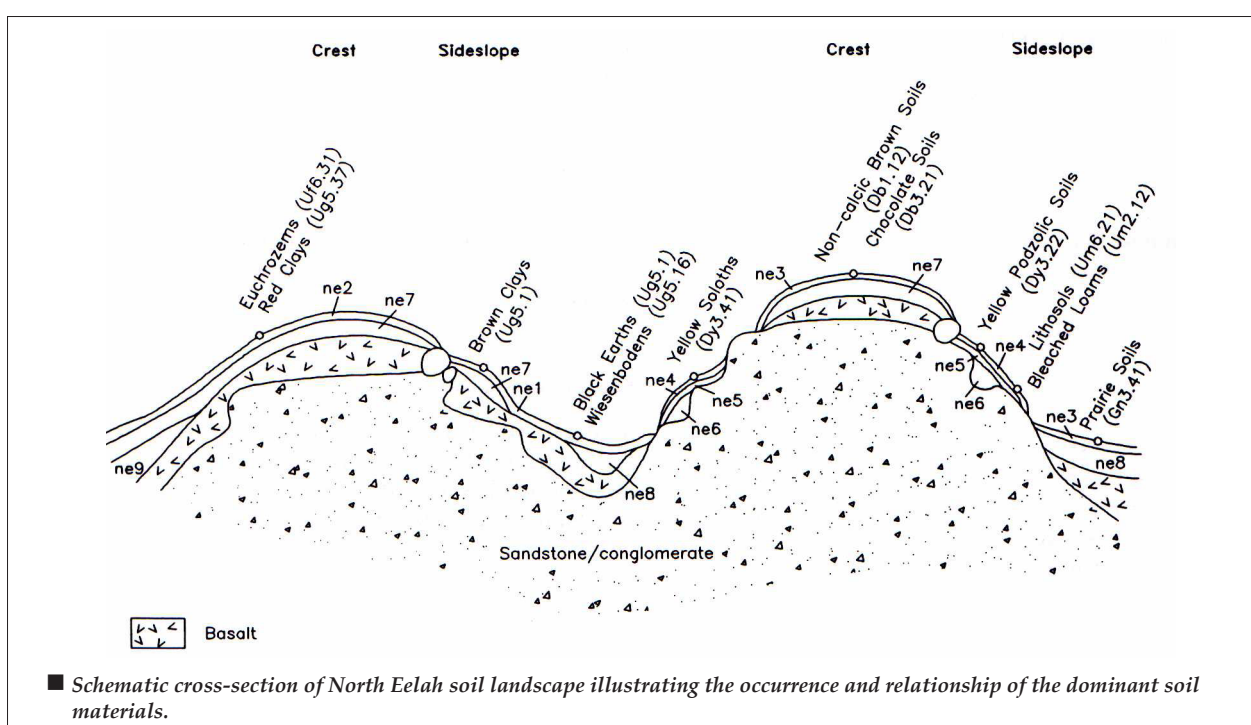
Comerfords Hill (Grid Ref. 3 658**E, 63 826**N). Soil Data System card 324, 140–220 cm

Occurrence and Relationships

Basaltic parent material soils are highly complex. Following are the more common relationships found to occur.

Crests and well-drained sideslopes. 5–10 cm dark brown self-mulching clay (**ne2**) overlies 35–>60 cm dark reddish brown pedal clay (**ne7**) and often up to 30 cm of gravelly brown clay (**ne9**). Soil boundaries are clear to gradual. Total soil depth is up to 75 cm [well-drained Euechrozems (Uf6.31) and Red Clays (Ug5.37)].

Up to 20 cm brown pedal clay loam (**ne3**) overlies >200 cm **ne7**. Soil boundaries are clear. Total soil depth exceeds 220 cm [well-drained Non-calciic Brown Soils (Db1.12) and Chocolate soils (Db3.21)].



Occasionally, up to 20 cm black cracking self-mulching clay (**ne1**) overlies >60 cm **ne7**. Soil boundaries are gradual. Total soil depth exceeds 80 cm [well-drained Brown Clays (Ug5.1)].

On imperfectly to poorly drained lower slopes and drainage depressions. Up to 25 cm **ne1** overlies >80 cm strongly structured black clay. Soil boundaries are gradual. Total soil depth is >80 cm [imperfectly drained Black Earths (Ug5.1) and poorly drained Wiesenbodens (Ug5.16)].

In upper reaches of drainage lines. Up to 25 cm **ne3** overlies >200 cm **ne8**. Soil boundaries are gradual. Total Soil depth is >200 cm [imperfectly drained Prairie Soils (Gn3.41)].

On sedimentary parent materials. Soils are discontinuous and interspersed with bands of outcropping sandstone, and conglomerate boulders are common on the surface. Up to 20 cm brownish black fluffy loam (**ne4**) overlies up to 30 cm bleached clay loam (**ne5**) and up to 60 cm pedal mottled yellowish brown clay (**ne6**). Soil boundaries are clear to abrupt. Total soil depth is <150 cm [well to imperfectly drained yellow Soloths (Dy3.41) and some Yellow Podzolic Soils (Dy3.22)].

In association with rock outcrop. 10–15 cm **ne4** overlies rock or up to 50 cm **ne5**. Total soil depth is <70 cm. Soil boundaries are clear [well to rapidly drained Lithosols (Um6.21) and imperfectly drained Bleached Loams (Um2.12)].

QUALITIES AND LIMITATIONS

Landscape Limitations

Seasonal waterlogging (localised, lower slopes)
Water erosion hazard
Shallow soils (localised, sandstone parent material)
Foundation hazard
Rock outcrop (localised, sandstone parent material)

Soil Limitations

ne1 Moderate shrink-swell
High plasticity
Hardsetting (localised)
Low available water-holding capacity

ne2 Low wet bearing strength
Moderate shrink-swell
Strong acidity
Low available water-holding capacity

ne3 Low wet bearing strength
High shrink-swell
Hardsetting (localised)
Low available water-holding capacity

ne4 Stoniness (localised)
High erodibility
Low fertility
Low available water-holding capacity

ne5 Hardsetting surfaces
Low fertility
Low available water-holding capacity

ne6 Moderate shrink-swell
High plasticity
Sodicity/dispersion
Low permeability
Low fertility
Low available water-holding capacity

ne7 High shrink-swell
High plasticity
Low available water-holding capacity

ne8 Low wet bearing strength
High shrink-swell
High plasticity
High erodibility
Low permeability
Low available water-holding capacity

ne9 Stoniness
High erodibility
Low available water-holding capacity

Fertility

Soil Materials as a Plant Growth Media. Soil material suitability as growth media is high (**ne2, ne3, ne7**) to moderate (**ne1, ne4, ne8, ne9**) or low (**ne5, ne6**). Generally, soil materials derived from basaltic parent materials are moderately to highly suitable, with moderate to very high organic matter and high nutrient storage capacity, but moderately high to very high phosphorus sorption. Soil materials derived from sandstone parent material have moderate to low suitability, with very low to moderate nutrient storage capacity and exchangeable cations, while **ne4** and **ne5** have low to very low pH buffer capacity.

Soil Profile Fertility. Suitability as a growth medium is high for moderately deep, well-drained Euzozems, Red Clays, Non-calcic Brown Soils and Chocolate Soils; moderate for deep imperfectly drained Black Earths, Prairie Soils and poorly drained Wiesenbodens. Soil volumes available for root penetration are moderate to high. Suitability is low for moderately deep, imperfectly drained yellow Soloths, Yellow Podzolic Soils and shallow Lithosols and Bleached Loams. Soil volumes for root penetration are low to moderate.

Erodibility

	K factor	Non-concentrated flows	Concentrated flows	Wind
ne1	0.029	moderate	moderate	slight
ne2	0.023	moderate	moderate	slight
ne3	0.017	low	moderate	slight
ne4	0.042	high	high	slight
ne5	0.047	high	high	slight
ne6	0.034	moderate	high	slight
ne7	0.028	moderate	moderate	slight
ne8	0.037	moderate	high	slight
ne9	0.041	high	high	slight

Erosion Hazard

	Non-concentrated flows	Concentrated flows	Wind
grazing	low	moderate	slight
cultivation	moderate	moderate	slight
urban	moderate	moderate	slight

Foundation Hazard

Moderate, due to moderate to high shrink-swell (reactive) soil materials. Localised deeper (>200 cm) soils have a high foundation hazard. Topsoil depth is 5–50 cm. Total soil depth is <20–>220 cm.

Urban Capability

Generally moderate limitations for urban development.

Rural Capability

Generally moderate limitations for cultivation and low limitations for grazing.

Sustainable Land Management Recommendations

Localised shallow soils and rock outcrop present problems for cultivation. Gypsum applications may improve the

structural condition of Black Earths. Soils should not be worked when too wet or too dry to avoid shattering or smearing and compaction of soils.

Soil Conservation Earthworks

Moderate to high limitations for earthworks. Problems include high shrink-swell soils, shallow soils and some highly permeable soil materials. Soils tested have earthworks categories J for **ne2**, **ne3**, **ne4** and **ne5**, H for **ne1**, **ne7** and **ne8**, G for **ne6** and I for **ne9**.