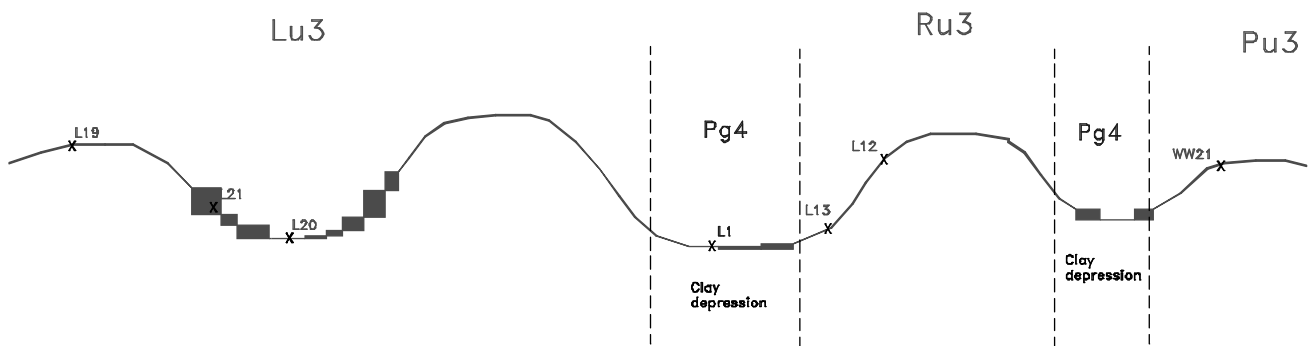


6.2.3 STRANDED BEACH RIDGES -3 LAND SYSTEM

Map units Lu3, Pu3, Ru3



Landscape

Stranded beach ridges trending NNW-SSE occur throughout the shire. The parent material is Tertiary sediments (Parilla sand) and is often close to the surface. The ridges in this land system have been specifically differentiated as they are of higher relief than the ridges through the rest of the shire, or else they have Parilla sand closer to the surface than other similar trending ridges, and therefore need to be managed as a separate area. Where the stranded beach ridges run through the Big and Little Deserts they often have deeper unconsolidated sand deposits (Lowan sand) on top of the cemented Parilla sand (Pu3, Ru3).

Prominent areas of the stranded beach ridges have formed low hills (Lu3). The main example in the shire is the Diapur Ridge (also known as the Lawloit Range) in the north east corner of the shire.

As well as having recent sand deposited on top of the Parilla sand, wind blown clay and carbonates have been deposited in some areas, such as benches or broad swales, within the low hill complex.

Due to different wind blown deposits occurring at different times, the soil type is variable over these land units.

Native Vegetation

Mallee Eucalypt and Broombush occur on the deeper sandy areas. While Yellow Gum can occur on areas of shallower sand deposits, Black box and Lignum Bush occur on the elevated depressions when associated with cracking clay soils.

Soil Types

The soils are variable on the ridges as they have varying degrees of windblown material deposited on top of the Parilla sand.

The crest of the ridges of the undulating low hills (Lu3) tend to have some material derived from the weathering of the parent material, although they also have more recent deposits of wind blown sands. There is often a weakly developed ironstone layer above the clay (L19). The slopes off the crests tend to have a sandy surface horizon overlying bleached sand with variable amounts of ironstone accumulation. The top of the subsoil has the characteristic hardsetting clay columns with the hard bleached capping above, typical of solodised solonetz. Windblown calcium carbonate has accumulated in the subsoil (L21).

Soils that have primarily developed on the Parilla sand, particularly the crests and upper slopes of

the undulating low hills unit, are non-sodic with slightly acid to neutral pH trends. Soils lower down the slope and those areas of accumulated fine aeolian sediments are alkaline, sodic and, to varying degrees, calcareous.

The landscape consists of minor flat benches on the NNW-SSE trending low hills (Lu3) that have deep deposits of windblown sand and calcareous clay. There is often a sporadically bleached A2 horizon and a well structured subsoil.

Further soil type variations include shallow soils on the ridges, formed mainly from the weathering of the parent material, and soils with a more prominent ironstone layer above the clay (ferric sodosol).

The undulating rises unit (Ru3) has a variety of soil types. The eastern and western aspects of some rises show evidence of different soils. On the western aspect of some rises, the profiles are commonly shallow sandy clay loam topsoils over reddish brown, well structured heavy clay (red sodosols). Red sodosols can also occur on the eastern aspect, although they differ to those found on the western aspect in that the surface horizon has a loamy sand texture and their subsoil has large columnar structure under a bleached capping (solodised solonetz). Weathered Parilla sand occurs to varying depths.

On the undulating plains unit (Pu3), there is often more superficial aeolian sand deposits over material derived from the weathering of the Parilla sand, although the soil can be less than one metre deep (WW21).

Representative soil types of land units

Although the land suitability assessments have been conducted for a range of land elements, i.e. ridge, crest, slope covering the three land units (Lu3, Pu3, Ru3), one dominant soil type has been identified as the most representative of each land unit.

For the undulating low hills (Lu3) land unit, the crest (L19) has been defined as the most appropriate soil type to represent the whole unit. For the undulating rise (Ru3), the upper slope (L12) has been used, and for the undulating plain (Pu3), the crest (WW21) is the most appropriate soil type to represent the unit.



Plate 9 The Parilla sand is close to the surface on the crest of the Diapur Ridge. Parilla sand is partially ferruginised forming a weak sandstone that is used as substrate for roading in the region.

REPRESENTATIVE SOIL TYPE FOR THE STRANDED BEACH RIDGES - 3 - Lu3 LAND UNIT

MAP UNIT: Lu3

Site No.: L19

Position in Landscape: Crest

Aust Soil Classification: Eutrophic, Mottled-Subnatric, Grey SODOSOL (deep sandy)

Northcote Factual Key: Dy 4.12

Great Soil Group: soloth

General Landscape Description:

Some of the stranded beach ridges in the north east corner of the shire are of relatively high relief and are therefore referred to as undulating low hills. This soil description is from the crest of a spur on a north-south trending ridge and is regarded as the most appropriate land element to represent this land unit. Average slope ranges from three to five per cent.



Soil Profile Morphology

Topsoil

A10 0-5 cm Very dark greyish brown (10YR3/2) *loamy sand*, weak granular structure, weak consistence dry. pH 6.5.

A11 5-45 cm Dark yellowish brown (10YR4/6) *sand*, structureless. pH 6.7.

A12 45-50 cm Dark reddish brown (5YR3/3) *loamy sand*. pH 6.2.

A13 50-80 cm Yellowish red (5YR4/8) *sand*, with a common (10 -20%) amount of ironstone nodules. pH 6.7.

Subsoil

B21 80-110 cm Very pale brown (10YR7/3) and red (2.5YR3/8) mottled *heavy clay*, coarse columnar, breaking down to strong coarse prismatic structure; hard bleached capping at top of columnar structure, very strong consistence dry. pH 6.5.

C 110 cm+ Weathered sandstone.

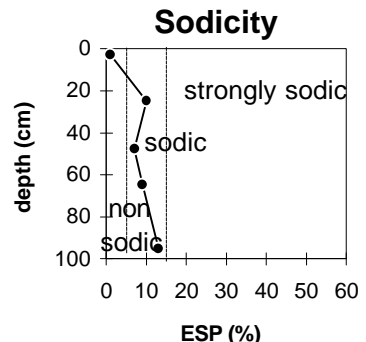
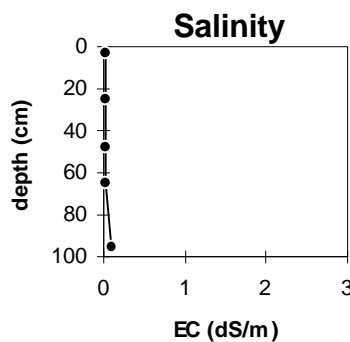
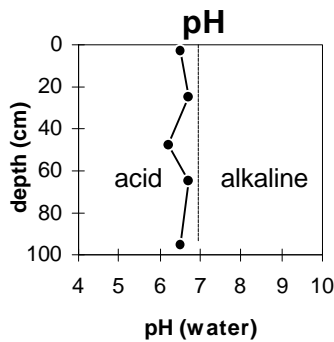


Soil Profile Characteristics:

| Horizon | pH | Salinity | Sodicity | Dispersion | Internal Drainage | Hydrophobicity |
|------------------------------|---------------|----------|-----------|------------|--------------------------------------|----------------|
| Surface (A1 horizon) | slightly acid | very low | non-sodic | nil | | moderate* |
| Subsoil (B21 horizon) | slightly acid | very low | sodic | nil | moderately well drained [#] | |

most impeding horizon of the profile that will affect plant growth

* estimate



Key Profile Features:

- Deep sandy surface soil (i.e. 80 cm).
- Hydrophobic topsoil
- Strong texture contrast between sandy topsoil and clay subsoil.
- Sodic subsoil
- slightly acidic topsoil and subsoil

Soil Restrictions and Management Prescriptions

| Feature | Result | Management Prescription |
|---|--|---|
| Sandy topsoil | Poor plant available water holding capacity. Poor nutrient holding capacity. Increased risk of wind erosion. Potential for hydrophobicity. | Establish wind protection barriers. <i>Horticulture</i> - improve organic matter through maintenance of vegetative cover and growing green manure crops. Establish wind protection barriers. Increase frequency of fertiliser (e.g. side dressings) and irrigations. |
| Hydrophobic topsoil | Poor infiltration of water into the soil. Increased risk of water erosion. Poor seed germination. | Maintenance of surface vegetative cover. Claying. |
| Strong textural contrast between topsoil and subsoil (duplex) | Strong textural and structural difference between the topsoil and the subsoil. Can result in impeded internal drainage and restricted root growth | Improve organic matter through maintenance of vegetative cover and growing green manure crops. Reduce tillage. Mounding for orchards and vineyards. Bed formation for vegetables. Optimise plant growth through regular balanced fertiliser programme. Consider sub-surface drainage (if appropriate). |
| Sodic clay subsoil | Poor water and air movement into the subsoil resulting in waterlogging (impeded internal drainage). Poor root growth into the subsoil reducing the volume of the soil able to be exploited. | Gypsum applications if the subsoil is close to the surface and topsoil textures are light. <i>Horticulture</i> - deep ripping with gypsum, install tile drainage (if appropriate). |

| | | |
|----------------|---|--|
| Acidic topsoil | Potential nutrient imbalance. Unsuitable for acid intolerant plants. | Apply lime. |
| Acidic subsoil | Potential nutrient imbalance. Unsuitable for acid intolerant plants. | Grow acid tolerant species or varieties. |

Land Suitability Rating Table

| LAND USE | SUITABILITY CLASS | MAJOR LIMITING COMPONENT |
|------------------------------------|--------------------------|---------------------------------|
| Wheat | 3 | Soil |
| Canola | 3 | Soil |
| Chickpeas | 3 | Soil |
| Lentils | 3 | Soil |
| White clover seed | 3 | Soil |
| Lucerne for seed production | 2 | Climate, landscape, soil |
| Viticulture | 3 | Soil |
| Apples | 3 | Soil |
| Potatoes | 2 | Climate, landscape, soil |
| Carrots | 2 | Landscape, soil |
| Onions | 2 | Climate, landscape, soil |
| Sweet corn | 3 | Soil |
| Radiata Pine | 3 | Climate |
| Blue Gum | 3 | Climate |

Land Suitability Assessment and Primary Limitations

| | | | |
|------------------|------------------|----|--|
| Wheat | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 2 | Low hill, wind erosion |
| | <i>Soil</i> | 3 | Deep sandy profile |
| Canola | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 2 | Low hill, wind erosion |
| | <i>Soil</i> | 3 | Deep sandy profile |
| Chickpeas | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 2 | Low hill, wind erosion |
| | <i>Soil</i> | 3 | Deep sandy profile |

| | | | |
|------------------------------------|------------------|----|--|
| Lentils | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 2 | Low hill, wind erosion |
| | <i>Soil</i> | 3 | Deep sandy profile |
| White clover seed | <i>Climate</i> | 1 | No major limitation |
| | <i>Landscape</i> | 2 | Low hill, wind erosion hazard |
| | <i>Soil</i> | 3 | Deep sandy profile |
| Lucerne for seed production | <i>Climate</i> | 2 | Moderate frost risk |
| | <i>Landscape</i> | 2 | Wind erosion hazard |
| | <i>Soil</i> | 2 | Deep sandy profile, slightly impeded internal drainage, hydrophobicity |
| Viticulture | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 1 | No major limitation |
| | <i>Soil</i> | 3 | Deep sandy profile |
| Apples | <i>Climate</i> | 2* | High frost risk throughout most of the shire, slightly high mean maximum January temperature |
| | <i>Landscape</i> | 1 | No major limitations |
| | <i>Soil</i> | 3 | Sandy subsoil texture |
| Potatoes | <i>Climate</i> | 2 | Slightly high mean maximum, January temperature |
| | <i>Landscape</i> | 2 | Low hill, wind erosion hazard |
| | <i>Soil</i> | 2 | Slightly impeded internal drainage, hydrophobicity |
| Carrots | <i>Climate</i> | 1 | No major limitation |
| | <i>Landscape</i> | 2 | Low hills, wind erosion hazard |
| | <i>Soil</i> | 2 | Slightly impeded internal drainage, hydrophobicity |
| Onions | <i>Climate</i> | 2* | High frost risk for most of the land unit |
| | <i>Landscape</i> | 2 | Low hills, wind erosion hazard |
| | <i>Soil</i> | 2 | Sandy topsoil texture, slightly impeded internal drainage, hydrophobicity |
| Sweet corn | <i>Climate</i> | 1 | No major limitation |
| | <i>Landscape</i> | 2 | Low hill, wind erosion hazard |
| | <i>Soil</i> | 3 | Deep sandy profile |
| Radiata Pine | <i>Climate</i> | 3 | Low rainfall |
| | <i>Landscape</i> | 2 | Wind erosion hazard |

| | | | |
|-----------------|------------------|---|---|
| | <i>Soil</i> | 2 | Depth to weathered sandstone, hydrophobicity |
| Blue Gum | <i>Climate</i> | 3 | Low rainfall |
| | <i>Landscape</i> | 2 | Wind erosion hazard |
| | <i>Soil</i> | 2 | Depth to weathered sandstone, hydrophobicity |

* Some areas may be higher frost risk therefore they may be potentially unsuitable. Obtain local knowledge on frost prior to investment.

ASSOCIATED SOIL TYPE FOR THE STRANDED BEACH RIDGES - 3 - Lu3 LAND UNIT

MAP UNIT: Lu3

Site No.: L21

Position in Landscape: Lower slope

Australian Soil Classification: Calcic, Mottled-Hypernatric, Grey SODOSOL (sandy)

Northcote Factual Key: Dy 5.43

Great Soil Group: solodised solonetz

General Landscape Description:

This soil description is from the lower slope on the eastern flank of a north-south trending ridge with average slopes of four per cent. This soil type is associated with the crests of the low hills (L19); L19 has been used to represent this land unit. Shallow erosion gullies (1-1.5 m deep) are present.

Soil Profile Morphology

Topsoil

A1 0-15 cm Very dark greyish brown (10YR3/2) *loamy sand*, weakly structured, weak consistence dry. pH 6.1.

A2 15 - 20 cm Conspicuously bleached *loamy sand*, structureless, weak consistence dry, contains a common (10 %) amount of ironstone nodules. pH 7.4. Sharp change to:

A3 20-21 cm Conspicuously bleached cemented sand capping. pH 7.8.

Subsoil

B21 21-35 cm Dark greyish brown (10YR4/2) with yellowish brown (10YR5/4) and strong brown (7.5YR4/6) mottled *heavy clay*, moderate columnar structure, very strong consistence dry. pH 8.3.

B22 35-65 cm Yellowish brown (10YR5/6) with yellowish red (5YR5/6) mottled *medium heavy clay*, strong prismatic, breaking to strong blocky structure, strong consistence moist, contains very few (2 %) ironstone nodules and many (50 %) soft calcareous segregations. pH 8.9.

C 65 cm+ Weathered sandstone.

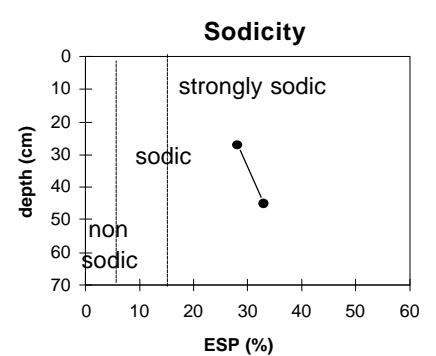
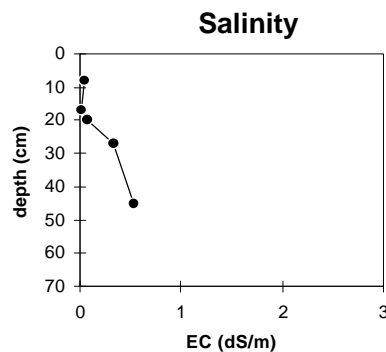
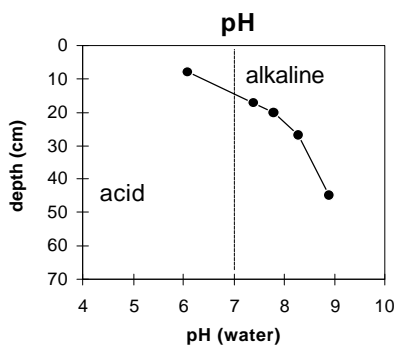


Soil Profile Characteristics:

| Horizon | pH | Salinity | Sodicity | Dispersion | Internal Drainage | Hydrophobicity |
|-----------------------------|---------------------|----------|----------------|------------|----------------------------------|----------------|
| Surface (A1 horizon) | slightly acid | very low | non-sodic | nil | | moderate* |
| Subsoil (B21 horizon) | moderately alkaline | very low | strongly sodic | complete | imperfectly drained [#] | |
| Deeper subsoil (at 1 metre) | strongly alkaline | medium | strongly sodic | strong | | |

most impeding horizon of the profile that will affect plant growth

* estimate



Key Profile Features:

- Sandy topsoil
- Hydrophobic topsoil
- Strong texture contrast between sandy topsoil and subsoil
- Bleached A2 horizon
- Mottled subsoil
- Coarse columnar structure at top of subsoil
- Strongly sodic subsoil
- Completely dispersive subsoil
- Alkaline subsoil

Soil Restrictions and Management Prescriptions

| Feature | Result | Management Prescription |
|---|---|--|
| Sandy topsoil | Poor plant available water holding capacity. Poor nutrient holding capacity. Increased risk of wind erosion. Potential for hydrophobicity. | <i>Dryland cropping</i> - minimum tillage and stubble retention, improve organic matter through maintenance of vegetative cover and growing green manure crops. Establish wind protection barriers. |
| Hydrophobic topsoil | Poor infiltration of water into the soil. Increased risk of water erosion. Poor seed germination. | Maintenance of surface vegetative cover. Claying. |
| Strong textural contrast between topsoil and subsoil (duplex) | Strong textural and structural difference between the topsoil and the subsoil. Can result in impeded internal drainage and restricted root growth | Improve organic matter through maintenance of vegetative cover and growing green manure crops. Reduce tillage. Optimise plant growth through regular balanced fertiliser programme. Consider sub-surface drainage (if appropriate). |
| Bleached A ₂ horizon | Indication of waterlogged condition (impeded internal drainage) within the topsoil. Poor soil structure (often massive). Low organic matter, water holding capacity and nutrition within the horizon. | <i>Dryland cropping</i> - include deep rooted crops in the rotation, minimum tillage and stubble retention. Apply gypsum if the topsoil is sodic. Optimise plant growth through a regular and balanced fertiliser programme. |
| Mottled subsoil | Indication of periodic waterlogging, particularly if grey and yellow mottles predominate. | Consider sub-surface drainage (if appropriate). Apply gypsum if subsoil is sodic and close to the surface. |
| Columnar or prismatic subsoil structure | Indication of sodic clay subsoil. Poor water and air movement into the | Apply gypsum if the subsoil is close to the surface and topsoil textures are light. <i>Dryland cropping</i> - include deep |

| | | |
|-----------------------|---|--|
| | <p>subsoil resulting in waterlogging (impeded internal drainage). Poor root growth into the subsoil reducing the volume of the soil able to be exploited. Very difficult to cultivate particularly if topsoil is shallow.</p> | <p>rooted crops in the rotation, minimum tillage and stubble retention. These soil are difficult to manage, not suitable for high levels of production unless substantial modification can be achieved.</p> |
| Sodic clay subsoil | <p>Poor water and air movement into the subsoil resulting in waterlogging (impeded internal drainage). Poor root growth into the subsoil reducing the volume of the soil able to be exploited.</p> | <p>Gypsum applications if the subsoil is close to the surface and topsoil textures are light. <i>Dryland cropping</i> - include deep rooted crops in the rotation, minimum tillage and stubble retention.</p> |
| Dispersion (dry soil) | <p>Indication of soil sodicity. Soil structure collapses following wetting resulting in poor soil structure that reduces water movement and plant root growth (see sodic subsoil). Increases water erosion hazard.</p> | <p><i>Dryland cropping</i> - apply gypsum, include deep rooted crops in the rotation, minimum tillage and stubble retention.</p> |
| Alkaline subsoil | <p>Potential nutrient imbalance. Unsuitable for alkaline intolerant plants. May indicate subsoil sodicity.</p> | <p>Grow shallow rooted species. Grow alkaline tolerant plants.</p> |

Land Suitability Rating Table

| LAND USE | OVERALL RATING | MAJOR LIMITING COMPONENT |
|------------------------------------|----------------|--------------------------|
| Wheat | 2 | Climate, landscape, soil |
| Canola | 2 | Climate, landscape, soil |
| Chickpeas | 3 | Soil |
| Lentils | 3 | Soil |
| White clover seed | 2 | Landscape, soil |
| Lucerne for seed production | 3 | Soil |
| Viticulture | 3 | Soil |
| Apples | 3 | Soil |
| Potatoes | 3 | Landscape, soil |
| Carrots | 3 | Landscape, soil |
| Onions | 3 | Landscape, soil |
| Sweet corn | 3 | Soil |
| Radiata Pine | 3 | Climate, soil |
| Blue Gum | 3 | Climate, soil |

Land Suitability Assessment and Primary Limitations

| | | | |
|------------------|------------------|----|--|
| Wheat | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 2 | Low hill, wind erosion hazard, gully erosion hazard |
| | <i>Soil</i> | 2 | Slightly impeded internal drainage, hydrophobicity |
| Canola | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 2 | Low hill, wind erosion hazard, gully erosion hazard |
| | <i>Soil</i> | 2 | Clay subsoil texture, slightly impeded internal drainage, slightly alkaline subsoil pH, hydrophobicity |
| Chickpeas | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 2 | Low hill, wind erosion hazard, gully erosion hazard |
| | <i>Soil</i> | 3 | Impeded internal drainage, sandy topsoil texture |
| Lentils | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 2 | Low hill, wind erosion hazard, gully erosion hazard |
| | <i>Soil</i> | 3 | Impeded internal drainage, sandy topsoil texture |

| | | | |
|--------------------------|------------------|----|---|
| White clover seed | <i>Climate</i> | 1 | No major limitation |
| | <i>Landscape</i> | 2 | Low hill, wind erosion hazard, gully erosion hazard |
| | <i>Soil</i> | 2 | Slightly alkaline subsoil pH, soil salinity, slightly impeded internal drainage, hydrophobicity |
| Lucerne for seed | <i>Climate</i> | 2 | Moderate frost risk |
| | <i>Landscape</i> | 2 | Wind erosion hazard, gully erosion hazard |
| | <i>Soil</i> | 3 | Impeded internal drainage |
| Viticulture | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 1 | No major limitation |
| | <i>Soil</i> | 3 | Impeded internal drainage |
| Apples | <i>Climate</i> | 2* | High frost risk throughout most of the shire, slightly high mean maximum January temperature |
| | <i>Landscape</i> | 1 | No major limitation |
| | <i>Soil</i> | 3 | Depth to weathered sandstone |
| Potatoes | <i>Climate</i> | 2 | Slightly high mean maximum January temperature |
| | <i>Landscape</i> | 3 | Gully erosion hazard |
| | <i>Soil</i> | 3 | Shallow topsoil depth, impeded internal drainage |
| Carrots | <i>Climate</i> | 1 | No major limitation |
| | <i>Landscape</i> | 3 | Gully erosion hazard |
| | <i>Soil</i> | 3 | Shallow topsoil, impeded internal drainage |
| Onions | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 3 | Gully erosion hazard |
| | <i>Soil</i> | 3 | Shallow topsoil, impeded internal drainage |
| Sweet corn | <i>Climate</i> | 1 | No major limitation |
| | <i>Landscape</i> | 2 | Low hills, wind and gully erosion hazard |
| | <i>Soil</i> | 3 | Sandy topsoil texture, impeded internal drainage |
| Radiata Pine | <i>Climate</i> | 3 | Low rainfall |
| | <i>Landscape</i> | 2 | Wind erosion hazard, gully erosion hazard |
| | <i>Soil</i> | 3 | Depth to weathered sandstone |
| Blue Gum | <i>Climate</i> | 3 | Low rainfall |
| | <i>Landscape</i> | 2 | Wind erosion hazard, gully erosion hazard |
| | <i>Soil</i> | 3 | Depth to weathered sandstone |

* Some areas may be higher frost risk therefore they may be potentially unsuitable. Obtain local knowledge prior to investment

ASSOCIATED SOIL TYPE FOR THE STRANDED BEACH RIDGES - 3 - Lu3 LAND UNIT

MAP UNIT: Lu3

Site No.: L20

Position in Landscape: Bench

Australian Soil Classification: Calcic, Mesonatric, Brown SODOSOL

Northcote Factual Key: Db 1.33

Great Soil Group: solonetz

General Landscape Description:

This soil type is from a flat minor ledge on NNW/SSE trending ridge. This element is associated with the crest of the undulating low hills (L19) which has been used to represent this land unit.



Soil Profile Morphology

Topsoil

A1 0-10 cm Dark brown (10YR3/3) *fine sandy clay loam*, weakly structured but fractures into platy fragments (caused by cultivation), firm consistence dry. pH 6.4.

A2 10-20 cm Dark brown (10YR3/3) sporadically bleached *sandy loam*, massive structure, very strong consistence dry. pH 7.4. Sharp and wavy change to:



Subsoil

B21 20-40 cm Dark brown (10YR4/3) *medium clay*, moderate prismatic, breaking to strong blocky structure, very strong consistence dry. pH 8.7.

B22 40-65 cm Brown (10YR5/3) *medium heavy clay*, strong prismatic, breaking to strong blocky structure, very strong consistence dry. pH 8.9.

B23 65-100⁺ cm Yellowish red (5YR4/6) *heavy clay*, strong prismatic, breaking to strong blocky structure, contains few (5 - 10%) soft carbonate segregations as well as very few ironstone nodules. pH 9.1.

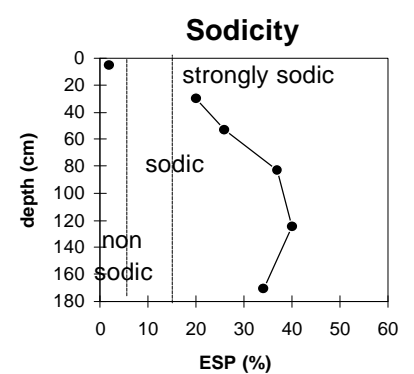
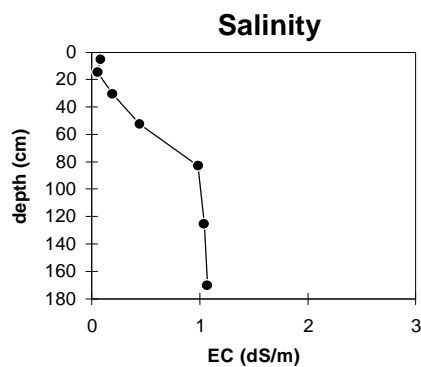
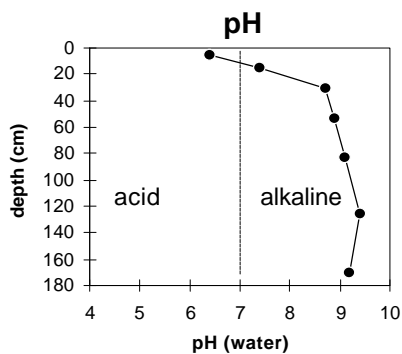
Soil Profile Characteristics:

| Horizon | pH | Salinity | Sodicity | Dispersion | Internal Drainage | Hydro-phobicity |
|------------------------------------|------------------------|----------|----------------|-------------------------------------|----------------------------------|-----------------|
| Surface (A1 horizon) | slightly acid | very low | non-sodic | slaking, no dispersion ¹ | | nil* |
| Subsoil (B21 horizon) | strongly alkaline | very low | strongly sodic | slight | imperfectly drained [#] | |
| Deeper subsoil (at 1 metre) | very strongly alkaline | high | strongly sodic | complete | | |

1 moderate dispersion after remoulding.

most impeding horizon of the profile that will affect plant growth

* estimate



Key Profile Features:

- Strong texture contrast between topsoil and subsoil
- Hardsetting topsoil
- Topsoil slakes
- Bleached A2 horizon
- Strongly sodic subsoil
- Slightly acid topsoil and alkaline subsoil

Soil Restrictions and Management Prescriptions

| Feature | Result | Management Prescription |
|---|--|--|
| Strong textural contrast between topsoil and subsoil (duplex) | Strong texture and structure difference between the topsoil and the subsoil. Can result in impeded internal drainage and restricted root growth | Improve organic matter through maintenance of vegetative cover and growing green manure crops. Reduce tillage. Optimise plant growth through regular balanced fertiliser programme. Consider sub-surface drainage (if appropriate). |
| Hardsetting topsoil | Poor seed germination and seedling establishment. Poor root growth and exploration of the topsoil. Poor infiltration of water into the topsoil and air movement through the topsoil. | <i>Dryland cropping</i> - include deep rooted crops in the rotation, minimum tillage and stubble retention. Apply gypsum if the topsoil is sodic. |
| Slaking (dry soil) | Soil structure collapses following wetting. Results in poor soil structure that reduces water movement and plant root growth. Increases water erosion hazard. | Improve organic matter through maintenance of vegetative cover and growing green manure crops. Do not cultivate soil when dry (cultivate when moist). |
| Bleached A ₂ horizon | Indication of waterlogged condition (impeded internal drainage) within the topsoil. Poor soil structure (often massive). Low organic matter, water holding capacity | <i>Dryland cropping</i> - include deep rooted crops in the rotation, minimum tillage and stubble retention. Apply gypsum if the topsoil is sodic. Optimise plant growth through a regular and balanced fertiliser programme. |

| | | |
|--------------------|--|---|
| | and nutrition within the horizon. | |
| Sodic clay subsoil | Poor water and air movement into the subsoil resulting in waterlogging (impeded internal drainage). Poor root growth into the subsoil reducing the volume of the soil able to be exploited. | Gypsum applications if the subsoil is close to the surface and topsoil textures are light. <i>Dryland cropping</i> - include deep rooted crops in the rotation, minimum tillage and stubble retention. |
| Acidic topsoil | Potential nutrient imbalance. Unsuitable for acid intolerant plants. | Apply lime. |
| Alkaline subsoil | Potential nutrient imbalance. Unsuitable for alkaline intolerant plants. May indicate subsoil sodicity. | Grow shallow rooted species. Grow alkaline tolerant plants. |

Land Suitability Rating Table

| LAND USE | SUITABILITY CLASS | MAJOR LIMITING COMPONENT |
|------------------------------------|--------------------------|---------------------------------|
| Wheat | 2 | Climate, landscape, soil |
| Canola | 2 | Climate, landscape, soil |
| Chickpeas | 3 | Soil |
| Lentils | 3 | Soil |
| White clover seed | 2 | Landscape, soil |
| Lucerne for seed production | 3 | Soil |
| Viticulture | 3 | Soil |
| Apples | 3 | Soil |
| Potatoes | 3 | Soil |
| Carrots | 3 | Soil |
| Onions | 3 | Soil |
| Sweet corn | 3 | Soil |
| Radiata Pine | 3 | Climate |
| Blue Gum | 3 | Climate |

Land Suitability Assessment and Primary Limitations

| | | | |
|---|------------------|----|--|
| <i>Wheat</i> | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 2 | Low hill |
| | <i>Soil</i> | 2 | Slightly alkaline subsoil pH, soil salinity, slightly impeded internal drainage |
| <i>Canola</i> | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 2 | Low hill |
| | <i>Soil</i> | 2 | Slightly alkaline subsoil pH, soil salinity, slightly impeded internal drainage |
| <i>Chickpeas</i> | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 2 | Low hill |
| | <i>Soil</i> | 3 | Impeded internal drainage |
| <i>Lentils</i> | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 2 | Low hill |
| | <i>Soil</i> | 3 | Impeded internal drainage |
| <i>White clover seed</i> | <i>Climate</i> | 1 | No major limitation |
| | <i>Landscape</i> | 2 | Low hill |
| | <i>Soil</i> | 2 | Slightly alkaline subsoil pH, soil salinity, slightly impeded internal drainage |
| <i>Lucerne for seed production</i> | <i>Climate</i> | 2 | Moderate frost risk |
| | <i>Landscape</i> | 1 | No major limitation |
| | <i>Soil</i> | 3 | Impeded internal drainage, soil salinity |
| <i>Viticulture</i> | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 1 | No major limitation |
| | <i>Soil</i> | 3 | Impeded internal drainage, soil salinity |
| <i>Apples</i> | <i>Climate</i> | 2* | High frost risk throughout most of the shire, slightly high mean maximum January temperature |
| | <i>Landscape</i> | 1 | No major limitations |
| | <i>Soil</i> | 3 | Soil salinity |
| <i>Potatoes</i> | <i>Climate</i> | 2 | Slightly high mean maximum January temperature |
| | <i>Landscape</i> | 2 | Low hill |
| | <i>Soil</i> | 3 | Depth of topsoil, impeded internal drainage |

| | | | |
|----------------------------|------------------|----|---|
| <i>Carrots</i> | <i>Climate</i> | 1 | No major limitation |
| | <i>Landscape</i> | 2 | Low hill |
| | <i>Soil</i> | 3 | Depth of topsoil, impeded internal drainage |
| <i>Onions</i> | <i>Climate</i> | 2* | High frost risk throughout most of the shire |
| | <i>Landscape</i> | 2 | Low hill |
| | <i>Soil</i> | 3 | Impeded internal drainage |
| <i>Sweet corn</i> | <i>Climate</i> | 1 | No major limitation |
| | <i>Landscape</i> | 2 | Low hill |
| | <i>Soil</i> | 3 | Impeded internal drainage |
| <i>Radiata Pine</i> | <i>Climate</i> | 3 | Low rainfall |
| | <i>Landscape</i> | 1 | No major limitation |
| | <i>Soil</i> | 2 | Topsoil depth, slightly alkaline subsoil pH, slightly impeded internal drainage |
| <i>Blue Gum</i> | <i>Climate</i> | 3 | Low rainfall |
| | <i>Landscape</i> | 1 | No major limitation |
| | <i>Soil</i> | 2 | Topsoil depth, slightly alkaline subsoil pH, slightly impeded internal drainage |

* Some areas may be higher frost risk therefore they may be potentially unsuitable. Obtain local knowledge on frost prior to investment