

APPENDIX A FIGURES

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Doral

**Mine Closure Plan
Proposed Yoongarillup Mineral Sands Project**

Regional Location

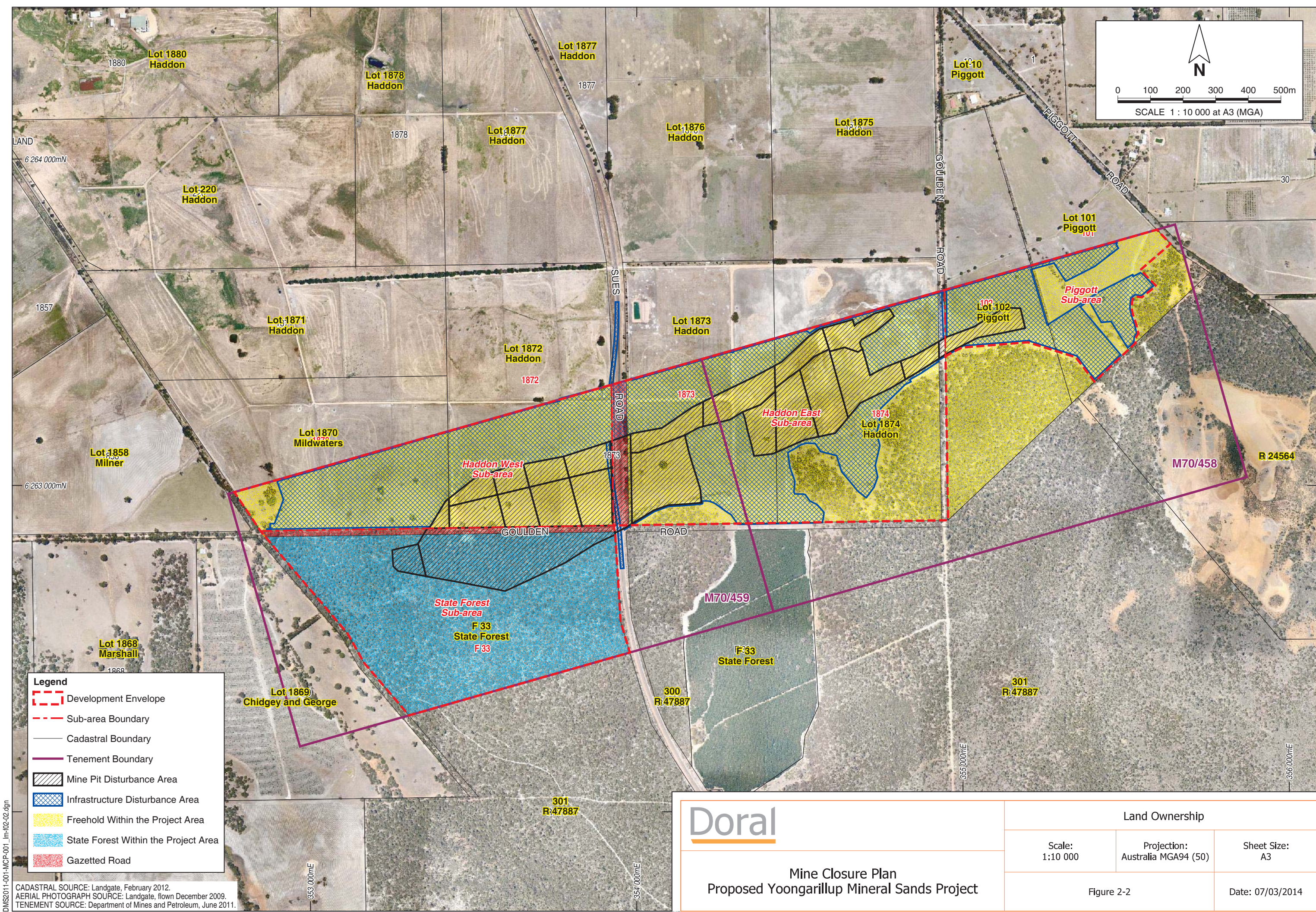
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Projection:
Australia MGA94 (50)

Sheet Size:
A4

Figure 2-1

Date: 19/02/2014



DIMS2011-001-MCP-001_1m-102-02.dgn

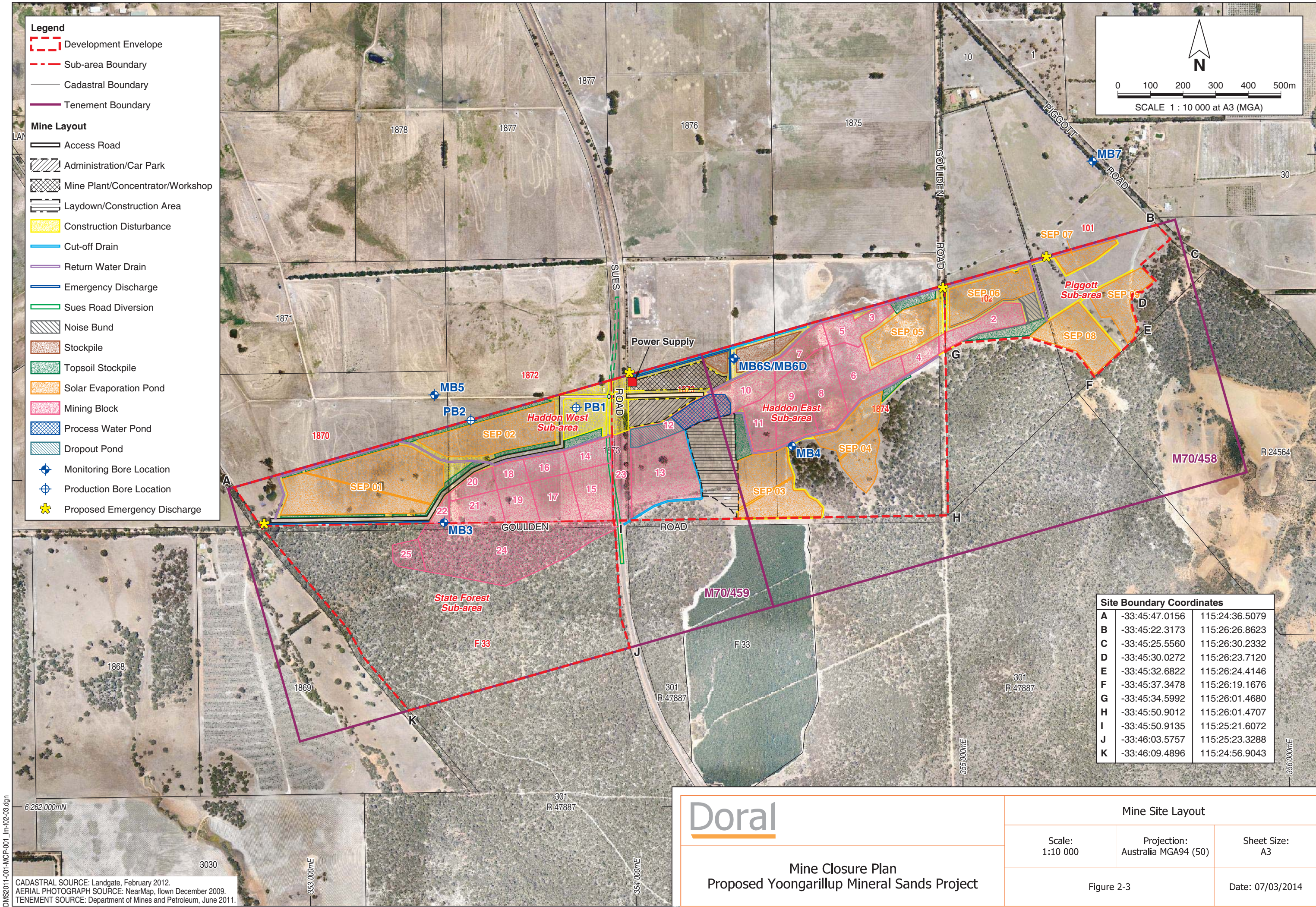
CADASTRAL SOURCE: Landgate, February 2012.
AERIAL PHOTOGRAPH SOURCE: Landgate, flown December 2009.
TENEMENT SOURCE: Department of Mines and Petroleum, June 2011.

Doral

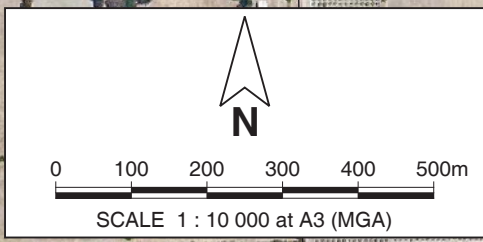
Mine Closure Plan
Proposed Yoongarillup Mineral Sands Project

Land Ownership

Scale: 1:10 000	Projection: Australia MGA94 (50)	Sheet Size: A3
Figure 2-2		Date: 07/03/2014



- Legend**
 - Development Envelope
 - Sub-area Boundary
 - Cadastral Boundary
 - Tenement Boundary
- Mine Layout**
 - Access Road
 - Administration/Car Park
 - Mine Plant/Concentrator/Workshop
 - Laydown/Construction Area
 - Construction Disturbance
 - Cut-off Drain
 - Return Water Drain
 - Emergency Discharge
 - Sues Road Diversion
 - Noise Bund
 - Stockpile
 - Topsoil Stockpile
 - Solar Evaporation Pond
 - Mining Block
 - Process Water Pond
 - Dropout Pond
 - Monitoring Bore Location
 - Production Bore Location
 - Proposed Emergency Discharge



Site Boundary Coordinates		
A	-33:45:47.0156	115:24:36.5079
B	-33:45:22.3173	115:26:26.8623
C	-33:45:25.5560	115:26:30.2332
D	-33:45:30.0272	115:26:23.7120
E	-33:45:32.6822	115:26:24.4146
F	-33:45:37.3478	115:26:19.1676
G	-33:45:34.5992	115:26:01.4680
H	-33:45:50.9012	115:26:01.4707
I	-33:45:50.9135	115:25:21.6072
J	-33:46:03.5757	115:25:23.3288
K	-33:46:09.4896	115:24:56.9043

DMS2011-001-MCP-001_lm-f02-03.dgn

6 262 000mN

3030

353 000mE

301 R 47887

354 000mE

CADASTRAL SOURCE: Landgate, February 2012.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown December 2009.
TENEMENT SOURCE: Department of Mines and Petroleum, June 2011.

Mine Closure Plan
Proposed Yoongarillup Mineral Sands Project

Mine Site Layout

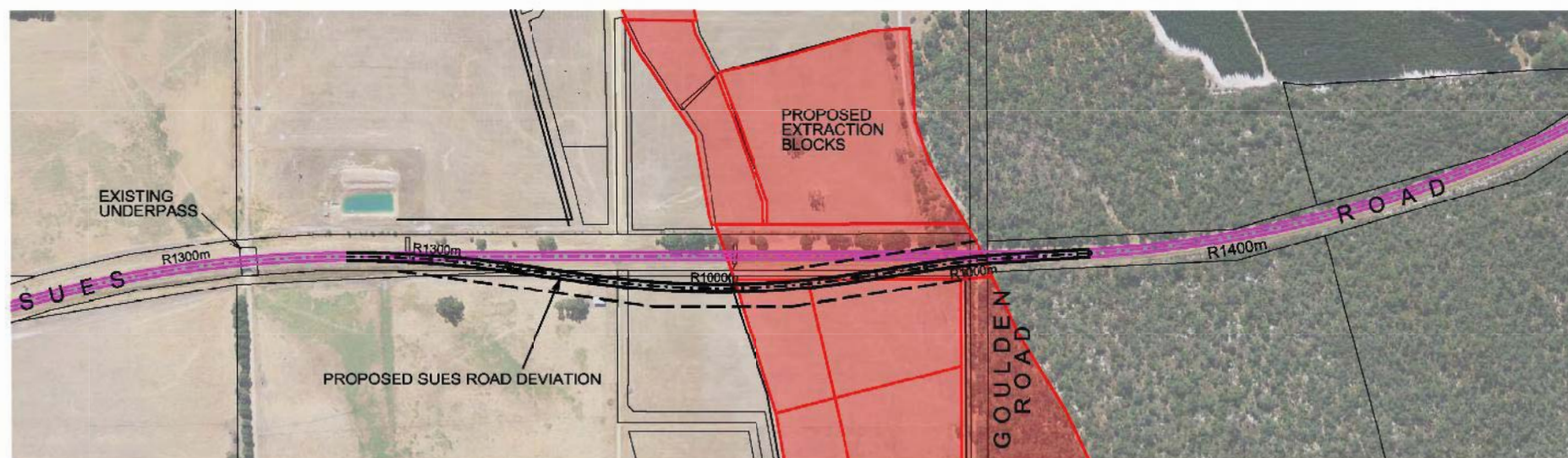
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Projection:
Australia MGA94 (50)

Sheet Size:
A3

Figure 2-3

Date: 07/03/2014



COATES
CIVIL
CONSULTING



0 50 100 150 200 250m
SCALE 1 : 7 000 at A4 (MGA)

Doral

Mine Closure Plan
Proposed Yoongarillup Mineral Sands Project

Proposed Sues Road Deviation
Preliminary Concept Alignment

Scale:
1:7 000

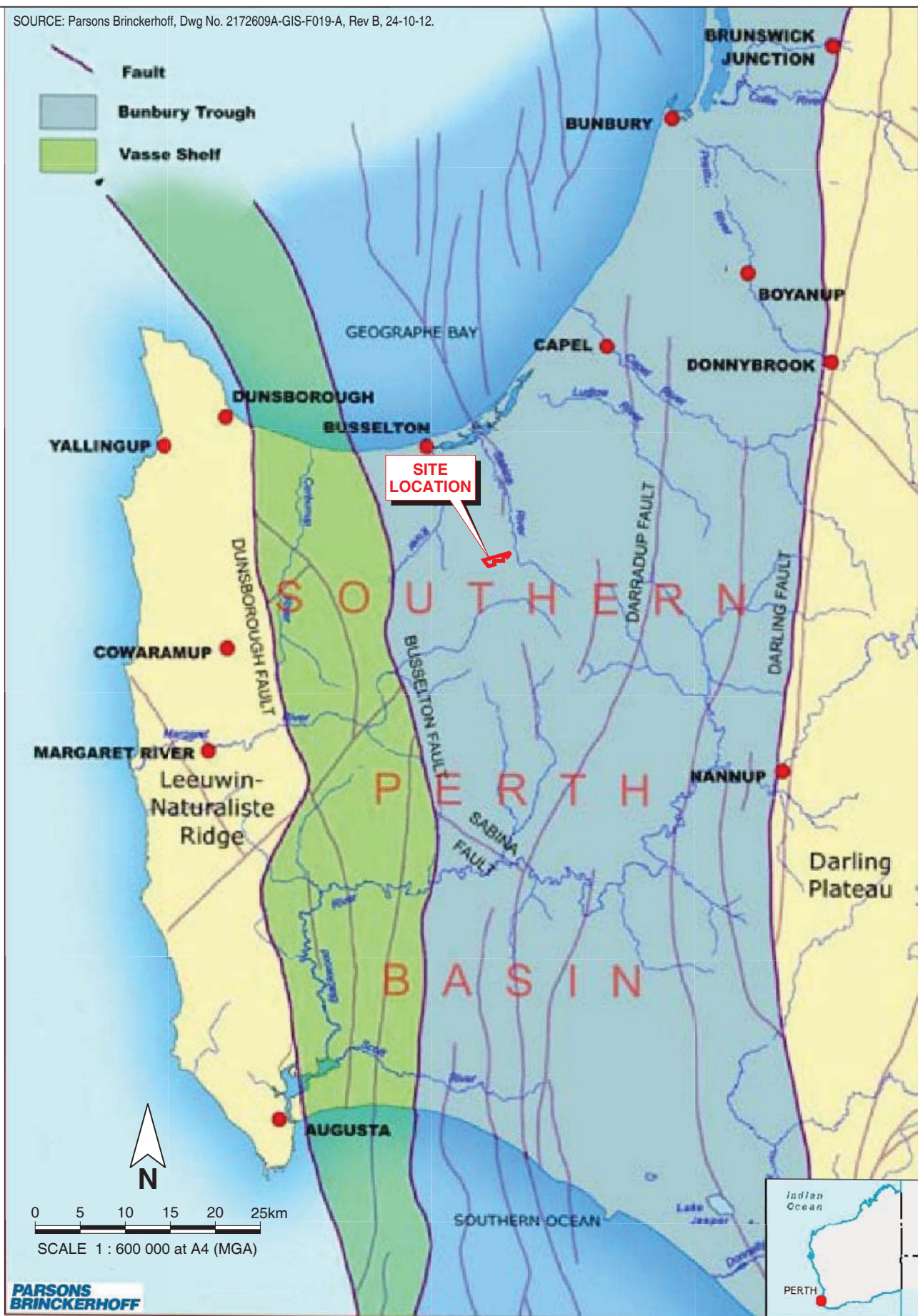
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Australia MGA94 (50)

Sheet Size:
A4

Figure 2-4

Date: 19/02/2014





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PARSONS
BRINCKERHOFF

Doral

Mine Closure Plan
Proposed Yoongarillup Mineral Sands Project

Structural Geology

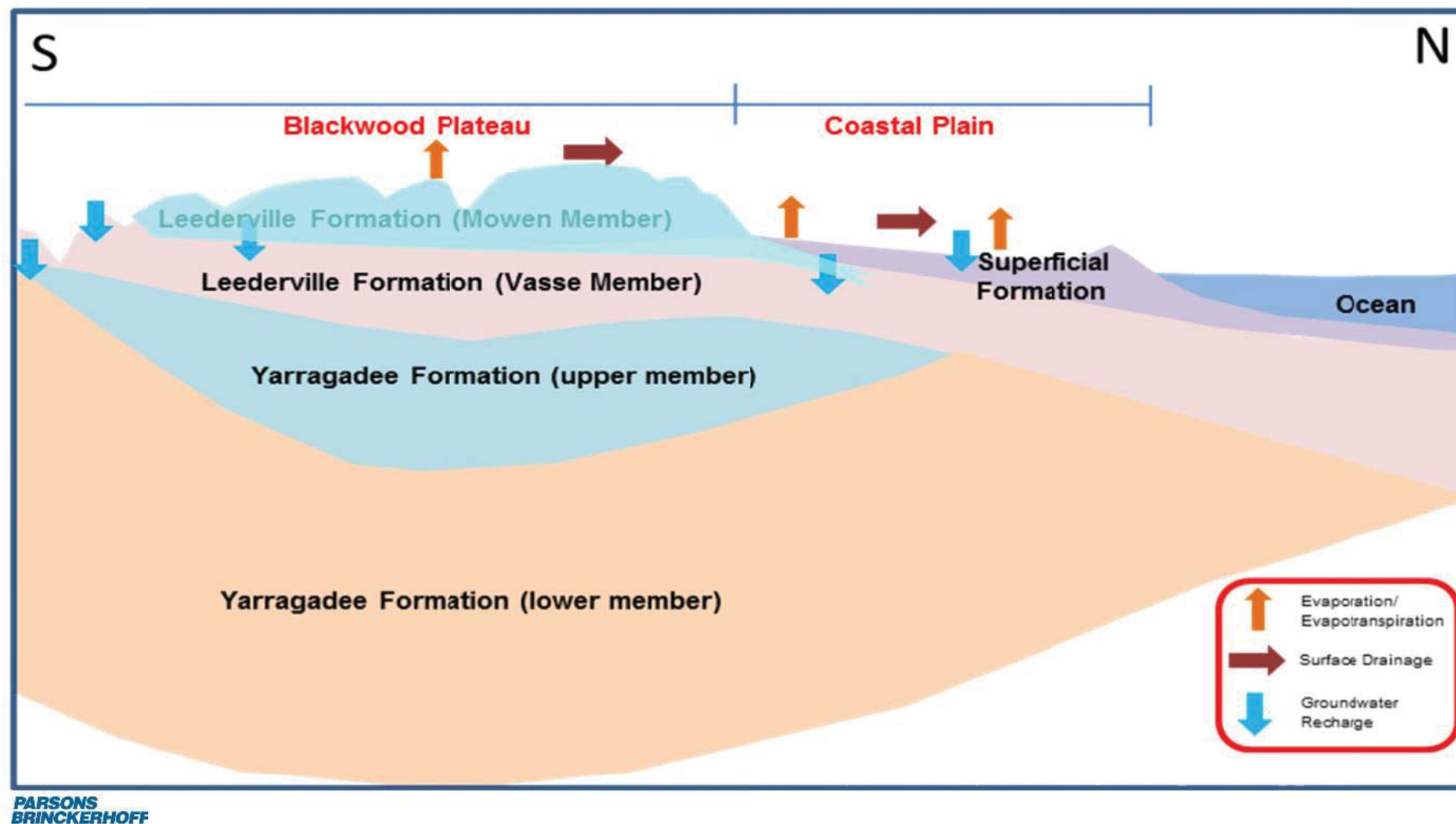
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Projection:
Australia MGA94 (50)

Sheet Size:
A4

Figure 4-1

Date: 19/02/2014



Doral

Mine Closure Plan
Proposed Yoongarillup Mineral Sands Project

Hydrogeological Cross Section

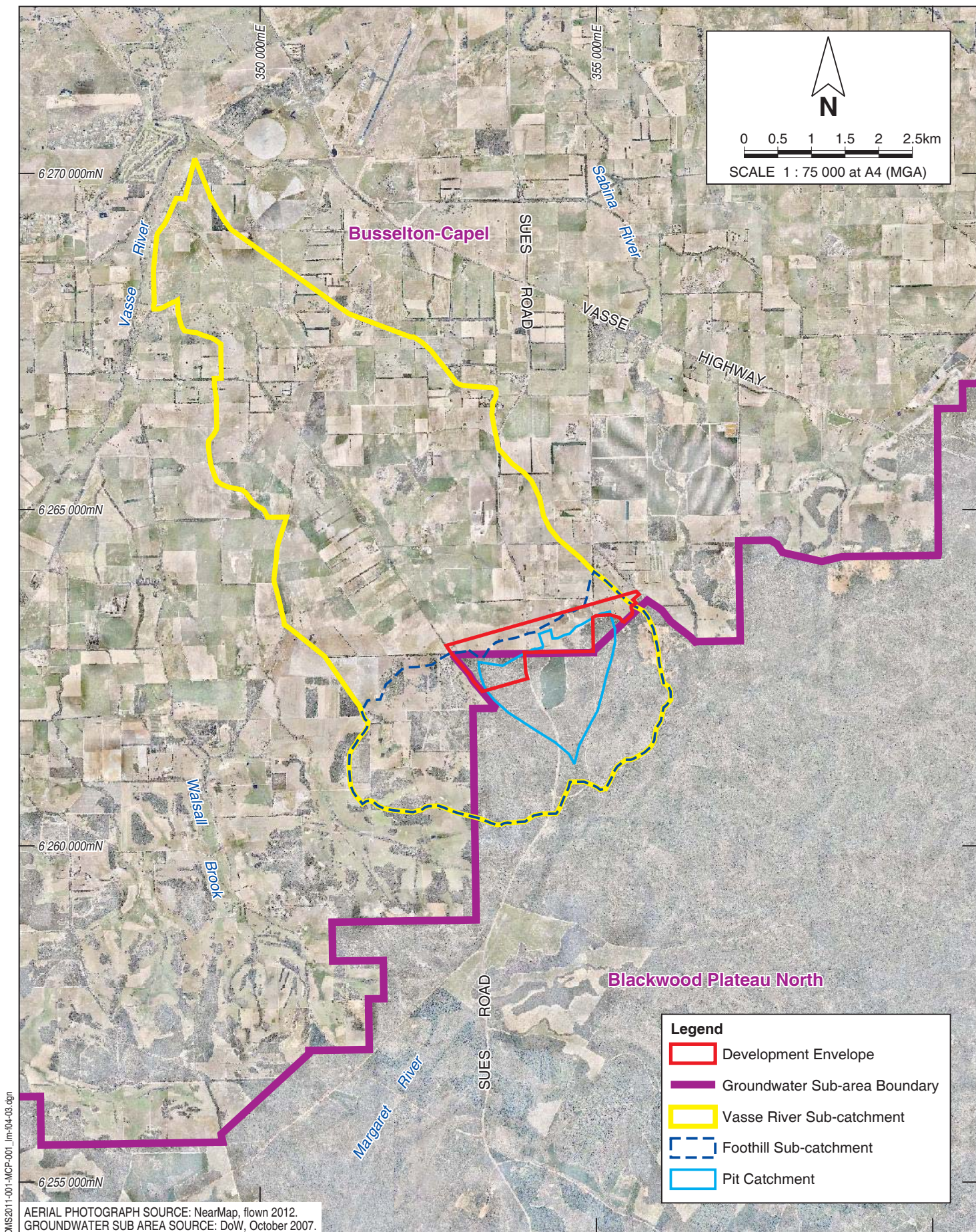
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NTS

Projection:
Australia MGA94 (50)

Sheet Size:
A4

Figure 4-2

Date: 19/02/2014



Doral

**Mine Closure Plan
Proposed Yoongarillup Mineral Sands Project**

Water Management Areas

Scale:
1:75 000

Projection:
Australia MGA94 (50)

Sheet Size:
A4

Figure 4-3

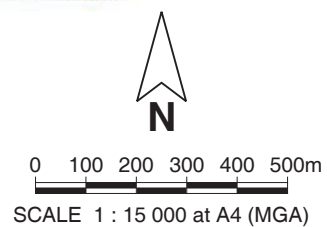
Date: 19/02/2014



Soil_Type

- Deep Pale Sands
- Disturbed
- Shallow Gravels

Landloch



SOURCE: Landloch, Figure 6.

Doral

Mine Closure Plan
Proposed Yoongarillup Mineral Sands Project

Soil Mapping of the Proposal Area

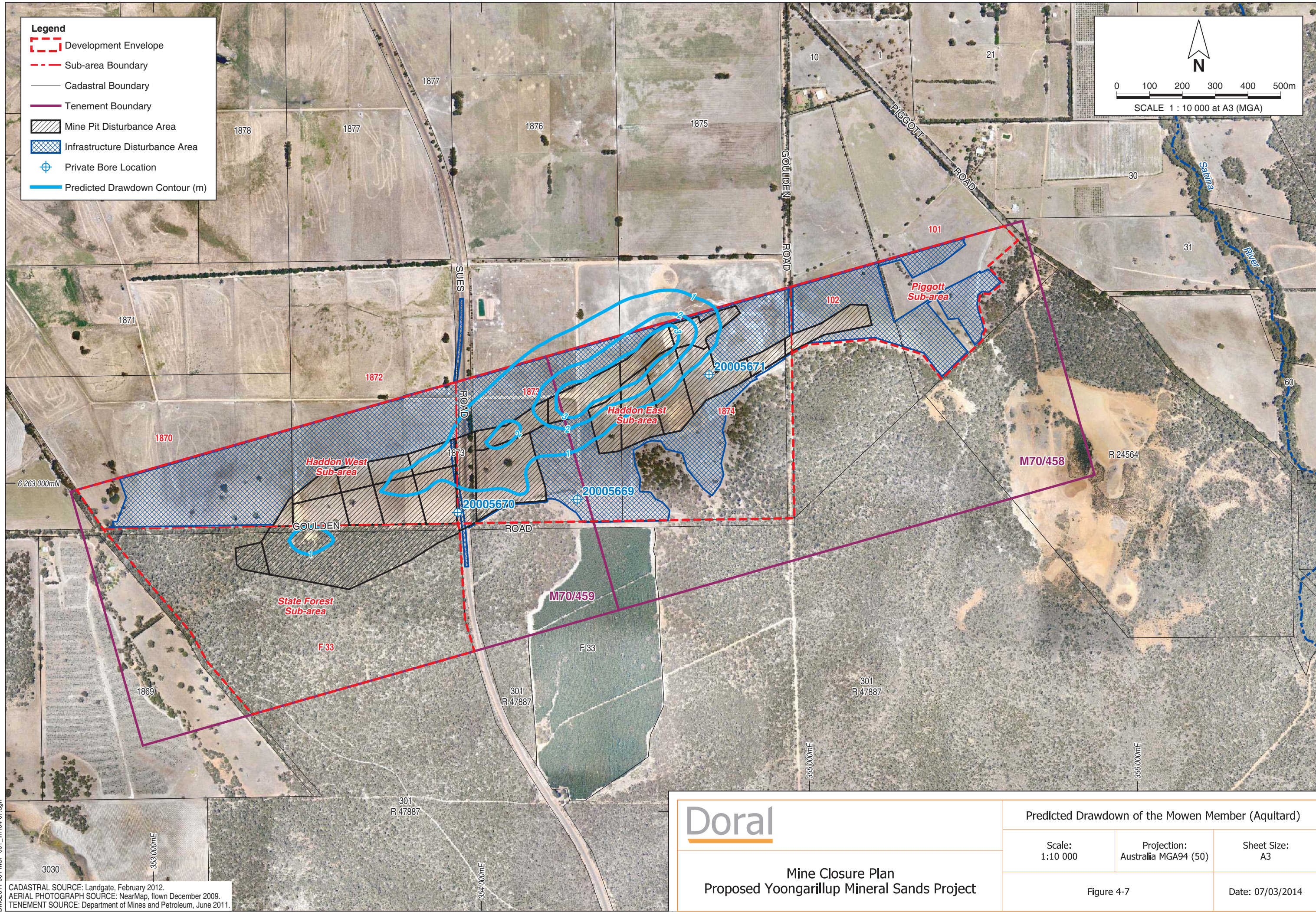
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Sheet Size:
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Figure 4-5

Date: 19/02/2014



DIMS2011-001-MCP-001_1m-104-07.dgn

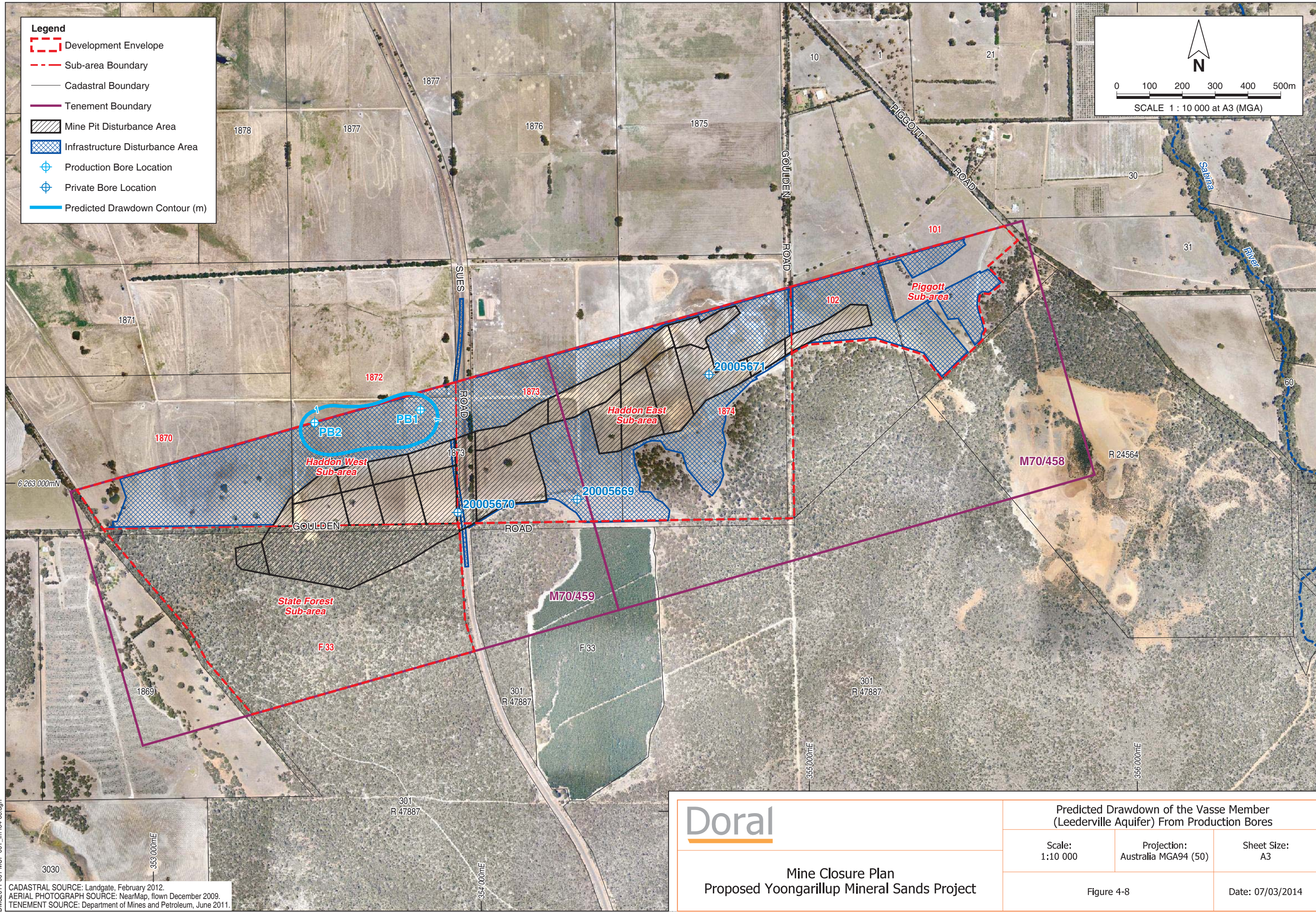
CADASTRAL SOURCE: Landgate, February 2012.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown December 2009.
TENEMENT SOURCE: Department of Mines and Petroleum, June 2011.



Mine Closure Plan

Proposed Yoongarillup Mineral Sands Project

Predicted Drawdown of the Mowen Member (Aquitard)		
Scale: 1:10 000	Projection: Australia MGA94 (50)	Sheet Size: A3
Figure 4-7		Date: 07/03/2014



Legend

Development Envelope

Sub-area Boundary

Cadastral Boundary

Tenement Boundary

Mine Pit Disturbance Area

Infrastructure Disturbance Area

Production Bore Location

Private Bore Location

Predicted Drawdown Contour (m)

N

0100200300400500m

SCALE 1 : 10 000 at A3 (MGA)

DIMS2011-001-MCP-001_1m-104-08.dgn

CADASTRAL SOURCE: Landgate, February 2012.

AERIAL PHOTOGRAPH SOURCE: NearMap, flown December 2009.

TENEMENT SOURCE: Department of Mines and Petroleum, June 2011.

Doral

Mine Closure Plan

Proposed Yoongarillup Mineral Sands Project

Predicted Drawdown of the Vasse Member
(Leederville Aquifer) From Production Bores

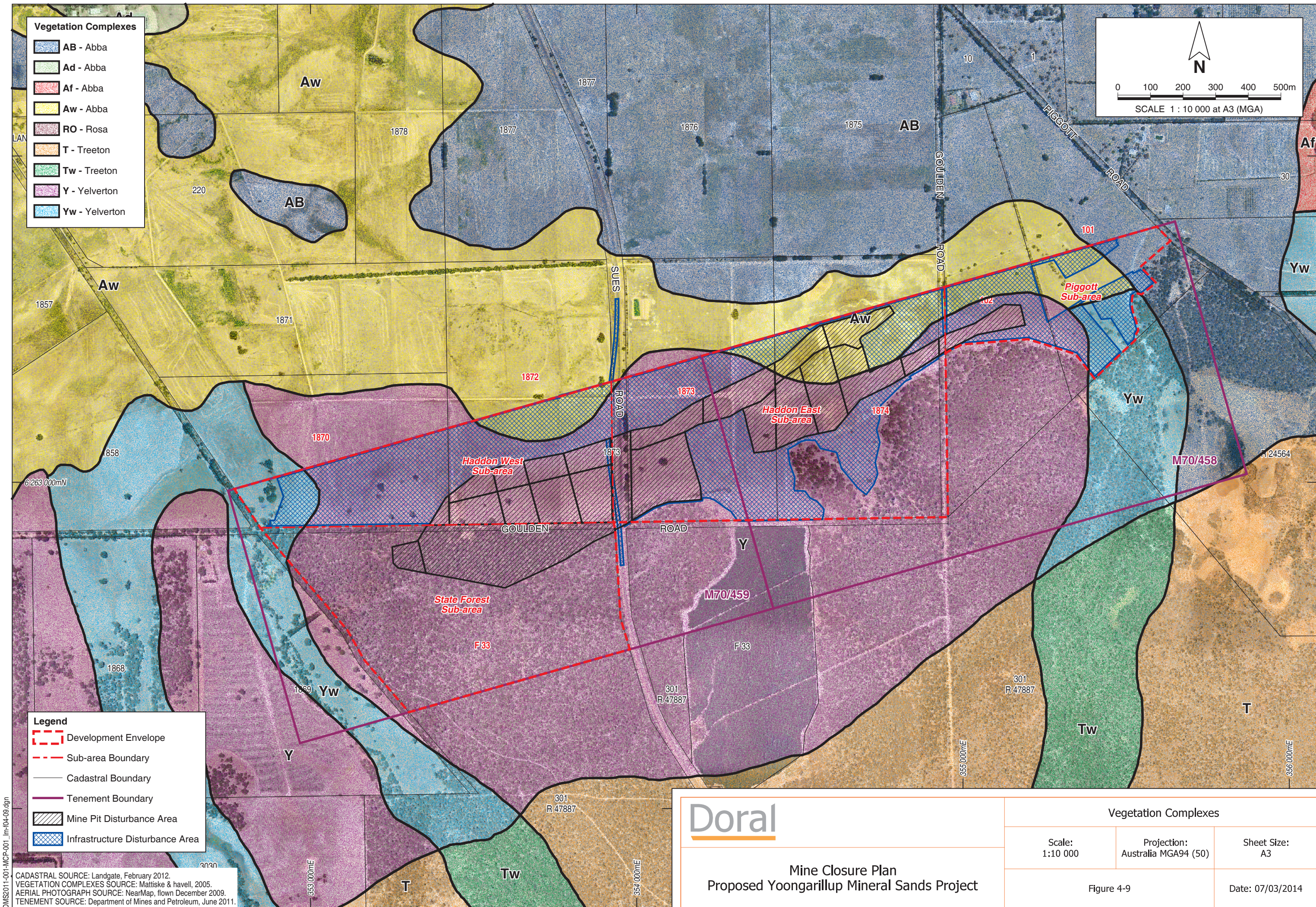
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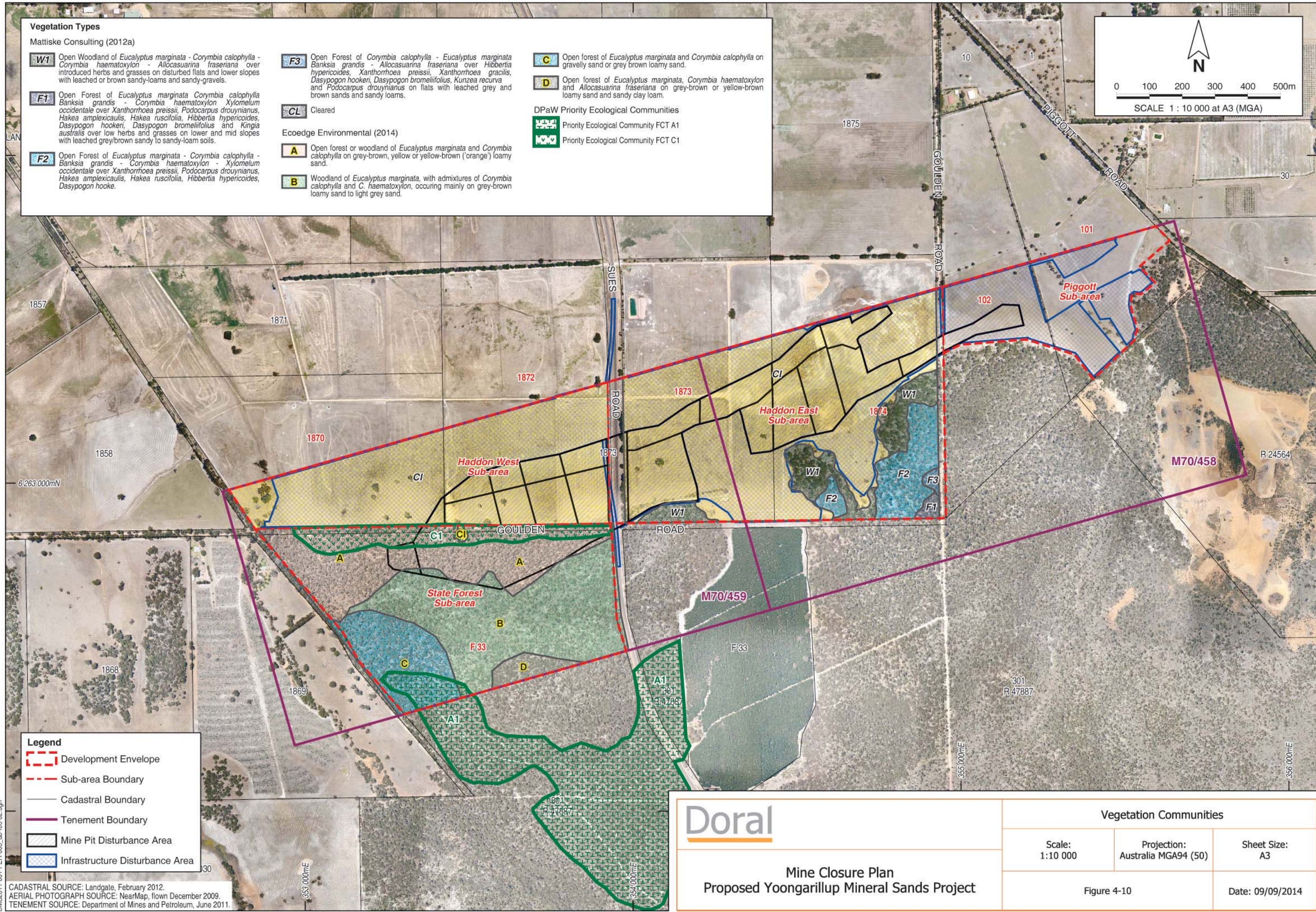
Projection:
Australia MGA94 (50)

Sheet Size:
A3

Figure 4-8

Date: 07/03/2014





Vegetation Types

Mattiske Consulting (2012a)

- W1** Open Woodland of *Eucalyptus marginata* - *Corymbia calophylla* - *Corymbia haematoxylon* - *Allocasuarina fraseriana* over introduced herbs and grasses on disturbed flats and lower slopes with leached or brown sandy-loams and sandy-gravels.
- F1** Open Forest of *Eucalyptus marginata* *Corymbia calophylla* *Banksia grandis* - *Corymbia haematoxylon* *Xylomelum occidentale* over *Xanthorrhoea preissii*, *Podocarpus drouynianus*, *Hakea amplexicaulis*, *Hakea ruscifolia*, *Hibbertia hypericoides*, *Dasypogon hookeri*, *Dasypogon bromeliifolius* and *Kingia australis* over low herbs and grasses on lower and mid slopes with leached grey/brown sandy to sandy-loam soils.
- F2** Open Forest of *Eucalyptus marginata* - *Corymbia calophylla* - *Banksia grandis* - *Corymbia haematoxylon* - *Xylomelum occidentale* over *Xanthorrhoea preissii*, *Podocarpus drouynianus*, *Hakea amplexicaulis*, *Hakea ruscifolia*, *Hibbertia hypericoides*, *Dasypogon hookeri*.

- F3** Open Forest of *Corymbia calophylla* - *Eucalyptus marginata* *Banksia grandis* - *Allocasuarina fraseriana* over *Hibbertia hypericoides*, *Xanthorrhoea preissii*, *Xanthorrhoea gracilis*, *Dasypogon hookeri*, *Dasypogon bromeliifolius*, *Kunzea recurva* and *Podocarpus drouynianus* on flats with leached grey and brown sands and sandy loams.

- CL** Cleared

Ecoedge Environmental (2014)

- A** Open forest or woodland of *Eucalyptus marginata* and *Corymbia calophylla* on grey-brown, yellow or yellow-brown ('orange') loamy sand.
- B** Woodland of *Eucalyptus marginata*, with admixtures of *Corymbia calophylla* and *C. haematoxylon*, occurring mainly on grey-brown loamy sand to light grey sand.

- C** Open forest of *Eucalyptus marginata* and *Corymbia calophylla* on gravelly sand or grey brown loamy sand.

- D** Open forest of *Eucalyptus marginata*, *Corymbia haematoxylon* and *Allocasuarina fraseriana* on grey-brown or yellow-brown loamy sand and sandy clay loam.

DPaW Priority Ecological Communities

- Priority Ecological Community FCT A1**
- Priority Ecological Community FCT C1**

Legend

- Development Envelope**
- Sub-area Boundary**
- Cadastral Boundary**
- Tenement Boundary**
- Mine Pit Disturbance Area**
- Infrastructure Disturbance Area**

CADASTRAL SOURCE: Landgate, February 2012.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown December 2009.
TENEMENT SOURCE: Department of Mines and Petroleum, June 2011.

Doral

Mine Closure Plan
Proposed Yoongarillup Mineral Sands Project

Vegetation Communities

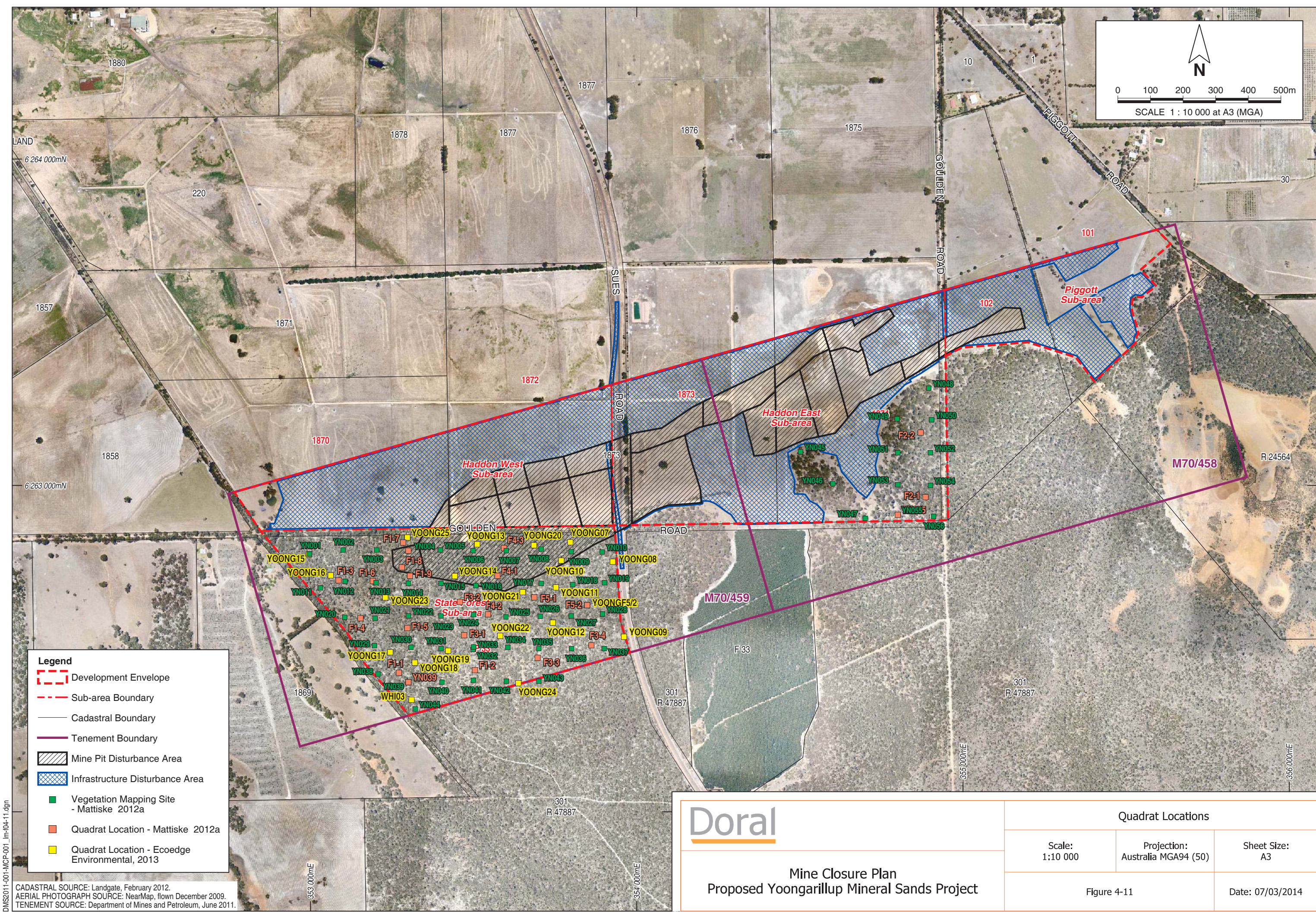
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Sheet Size:
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Figure 4-10

Date: 09/09/2014



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CADASTRAL SOURCE: Landgate, February 2012.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown December 2009.
TENEMENT SOURCE: Department of Mines and Petroleum, June 2011.

Doral

Mine Closure Plan
Proposed Yoongarillup Mineral Sands Project

Quadrat Locations

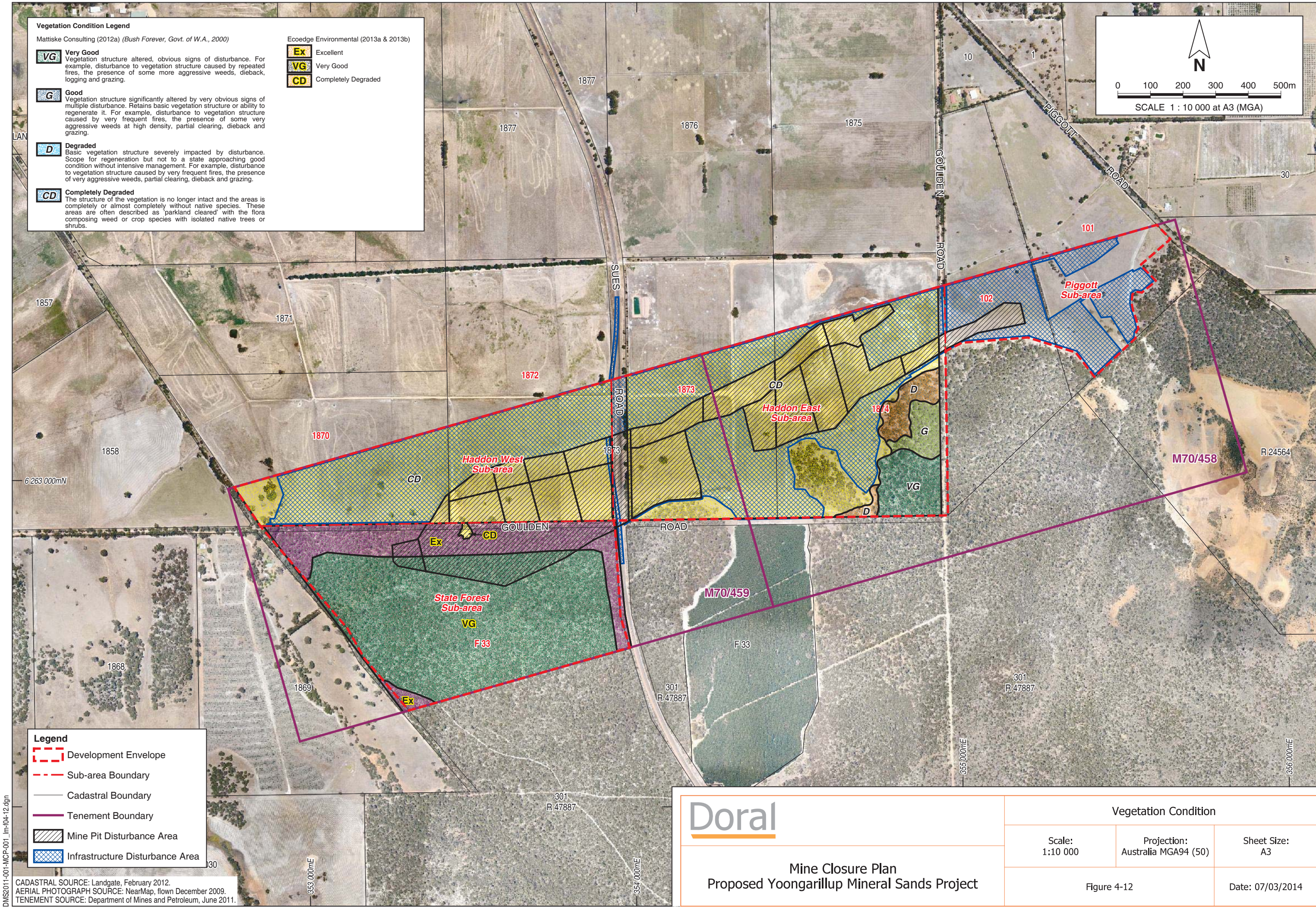
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Projection:
Australia MGA94 (50)

Sheet Size:
A3

Figure 4-11

Date: 07/03/2014



Vegetation Condition Legend

Mattiske Consulting (2012a) (*Bush Forever*, Govt. of W.A., 2000)

VG

Very Good
Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.

G

Good
Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.

D

Degraded
Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

CD

Completely Degraded
The structure of the vegetation is no longer intact and the areas is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora composing weed or crop species with isolated native trees or shrubs.

Ecoedge Environmental (2013a & 2013b)

Ex

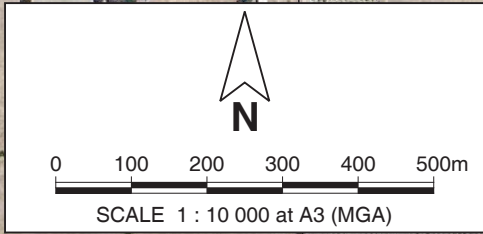
Excellent

VG

Very Good

CD

Completely Degraded



Legend

Development Envelope

Sub-area Boundary

Cadastral Boundary

Tenement Boundary

Mine Pit Disturbance Area

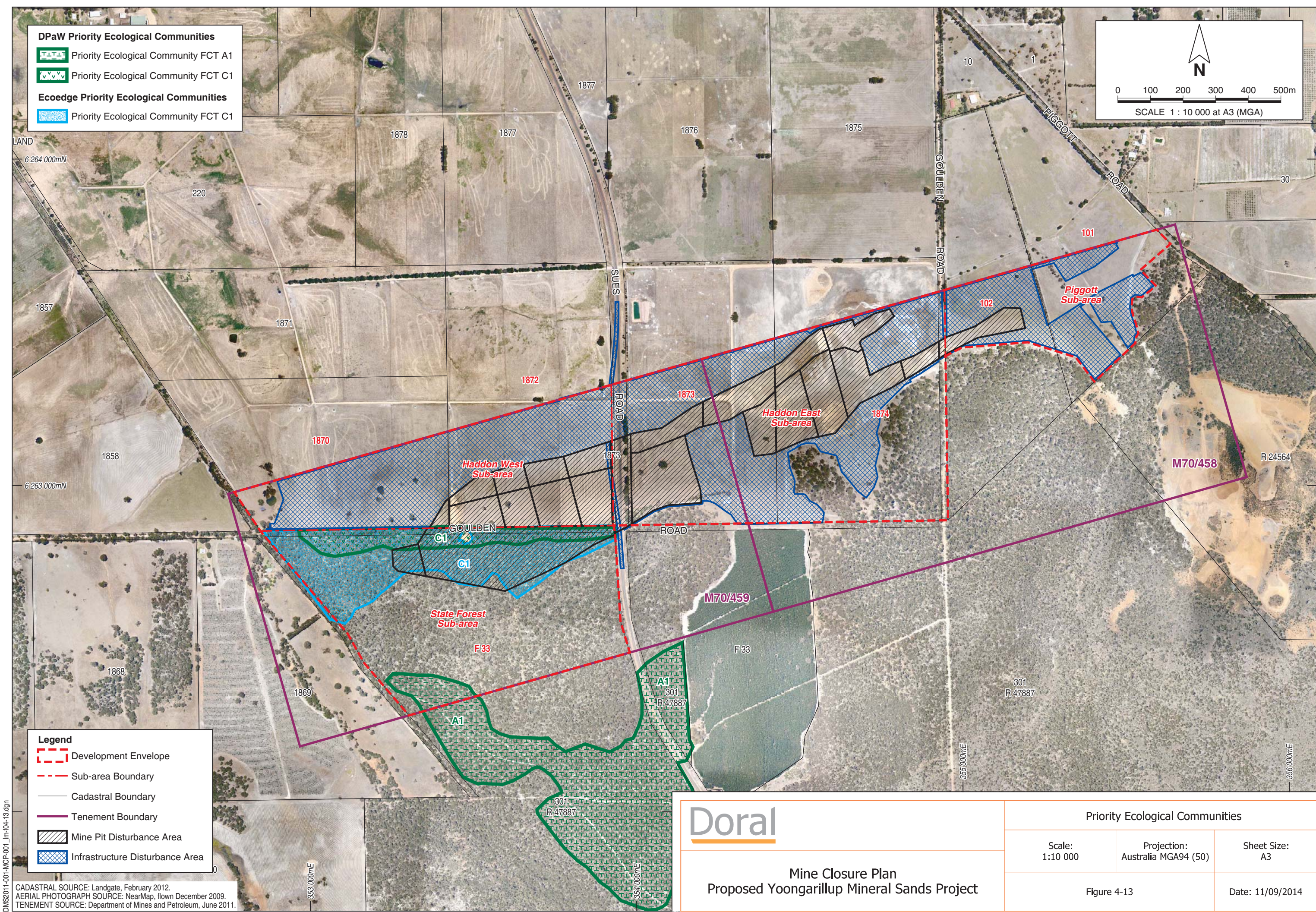
Infrastructure Disturbance Area

DIMS2011-001-MCP-001_1m-104-12.dgn

CADASTRAL SOURCE: Landgate, February 2012.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown December 2009.
TENEMENT SOURCE: Department of Mines and Petroleum, June 2011.

Mine Closure Plan
Proposed Yoongarillup Mineral Sands Project

Vegetation Condition		
Scale: 1:10 000	Projection: Australia MGA94 (50)	Sheet Size: A3
Figure 4-12		Date: 07/03/2014



DPaW Priority Ecological Communities

Priority Ecological Community FCT A1

Priority Ecological Community FCT C1

Ecoedge Priority Ecological Communities

Priority Ecological Community FCT C1

0 100 200 300 400 500m

SCALE 1 : 10 000 at A3 (MGA)

Legend

Development Envelope

Sub-area Boundary

Cadastral Boundary

Tenement Boundary

Mine Pit Disturbance Area

Infrastructure Disturbance Area

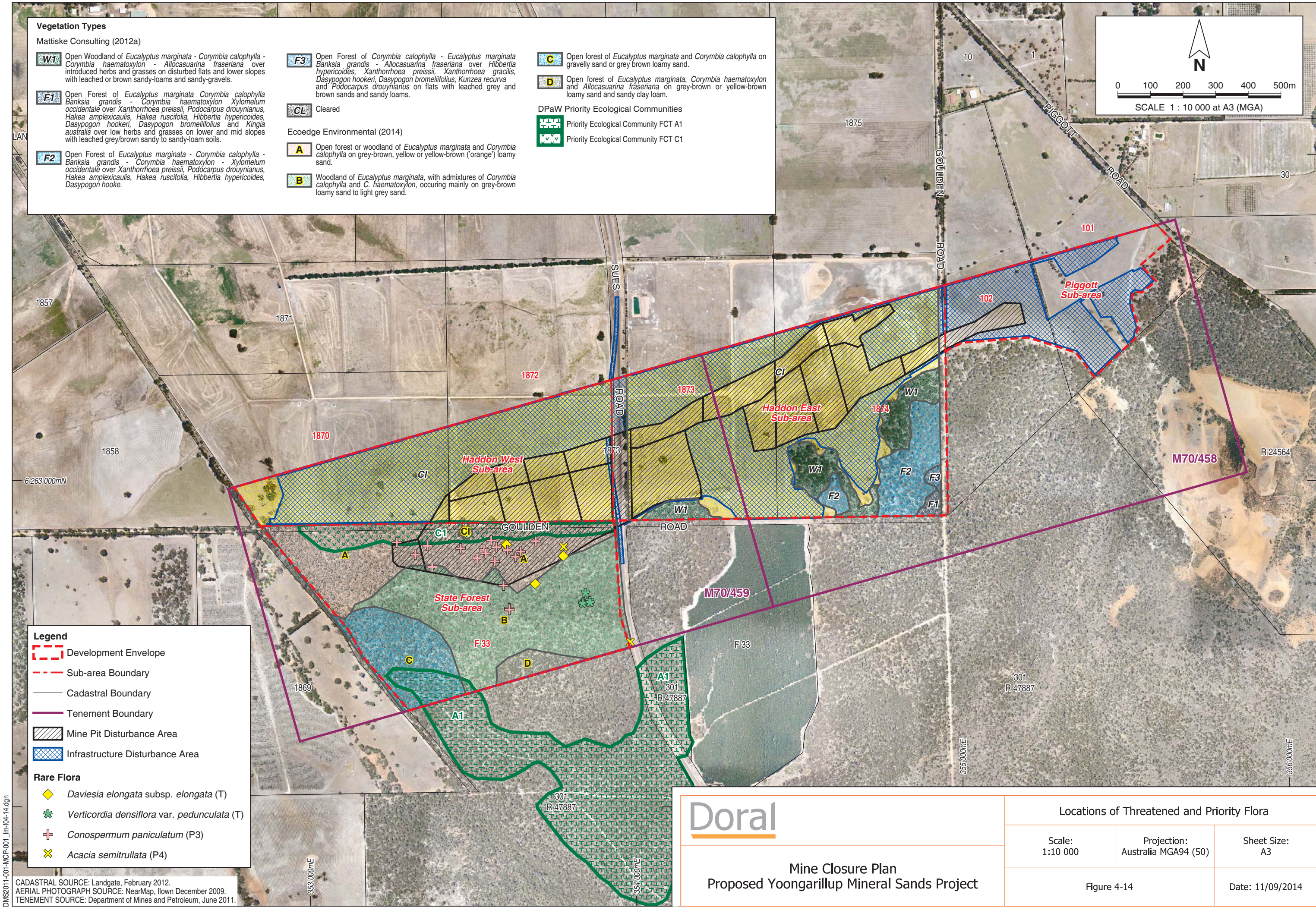
DIMS2011-001-MCP-001_1m-104-13.dgn

CADASTRAL SOURCE: Landgate, February 2012.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown December 2009.
TENEMENT SOURCE: Department of Mines and Petroleum, June 2011.

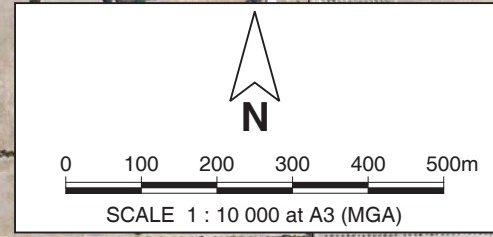


Mine Closure Plan
Proposed Yoongarillup Mineral Sands Project

Priority Ecological Communities		
Scale: 1:10 000	Projection: Australia MGA94 (50)	Sheet Size: A3
Figure 4-13		Date: 11/09/2014



- Vegetation Types**
Mattiske Consulting (2012a)
- W1** Open Woodland of *Eucalyptus marginata* - *Corymbia calophylla* - *Corymbia haematoxylon* - *Allocasuarina fraseriana* over introduced herbs and grasses on disturbed flats and lower slopes with leached or brown sandy-loams and sandy-gravels.
 - F1** Open Forest of *Eucalyptus marginata* *Corymbia calophylla* *Banksia grandis* - *Corymbia haematoxylon* *Xylomelum occidentale* over *Xanthorrhoea preissii*, *Podocarpus drouynianus*, *Hakea amplexicaulis*, *Hakea ruscifolia*, *Hibbertia hypericoides*, *Dasyopogon hookeri*, *Dasyopogon bromeliifolius* and *Kingia australis* over low herbs and grasses on lower and mid slopes with leached grey/brown sandy to sandy-loam soils.
 - F2** Open Forest of *Eucalyptus marginata* - *Corymbia calophylla* - *Banksia grandis* - *Corymbia haematoxylon* - *Xylomelum occidentale* over *Xanthorrhoea preissii*, *Podocarpus drouynianus*, *Hakea amplexicaulis*, *Hakea ruscifolia*, *Hibbertia hypericoides*, *Dasyopogon hookeri*.
 - F3** Open Forest of *Corymbia calophylla* - *Eucalyptus marginata* *Banksia grandis* - *Allocasuarina fraseriana* over *Hibbertia hypericoides*, *Xanthorrhoea preissii*, *Xanthorrhoea gracilis*, *Dasyopogon hookeri*, *Dasyopogon bromeliifolius*, *Kunzea recurva* and *Podocarpus drouynianus* on flats with leached grey and brown sands and sandy loams.
 - CL** Cleared
 - A** Open forest or woodland of *Eucalyptus marginata* and *Corymbia calophylla* on grey-brown, yellow or yellow-brown ('orange') loamy sand.
 - B** Woodland of *Eucalyptus marginata*, with admixtures of *Corymbia calophylla* and *C. haematoxylon*, occurring mainly on grey-brown loamy sand to light grey sand.
 - C** Open forest of *Eucalyptus marginata* and *Corymbia calophylla* on gravelly sand or grey brown loamy sand.
 - D** Open forest of *Eucalyptus marginata*, *Corymbia haematoxylon* and *Allocasuarina fraseriana* on grey-brown or yellow-brown loamy sand and sandy clay loam.
- DPaW Priority Ecological Communities**
- FCT A1** Priority Ecological Community FCT A1
 - FCT C1** Priority Ecological Community FCT C1
- Ecoedge Environmental (2014)**



- Legend**
- Development Envelope** (Red dashed line)
 - Sub-area Boundary** (Red dashed line)
 - Cadastral Boundary** (Black solid line)
 - Tenement Boundary** (Purple solid line)
 - Mine Pit Disturbance Area** (Hatched pattern)
 - Infrastructure Disturbance Area** (Blue hatched pattern)
- Rare Flora**
- Yellow diamond** *Daviesia elongata* subsp. *elongata* (T)
 - Green cross** *Verticordia densiflora* var. *pedunculata* (T)
 - Red plus** *Conospermum paniculatum* (P3)
 - Yellow X** *Acacia semitrullata* (P4)

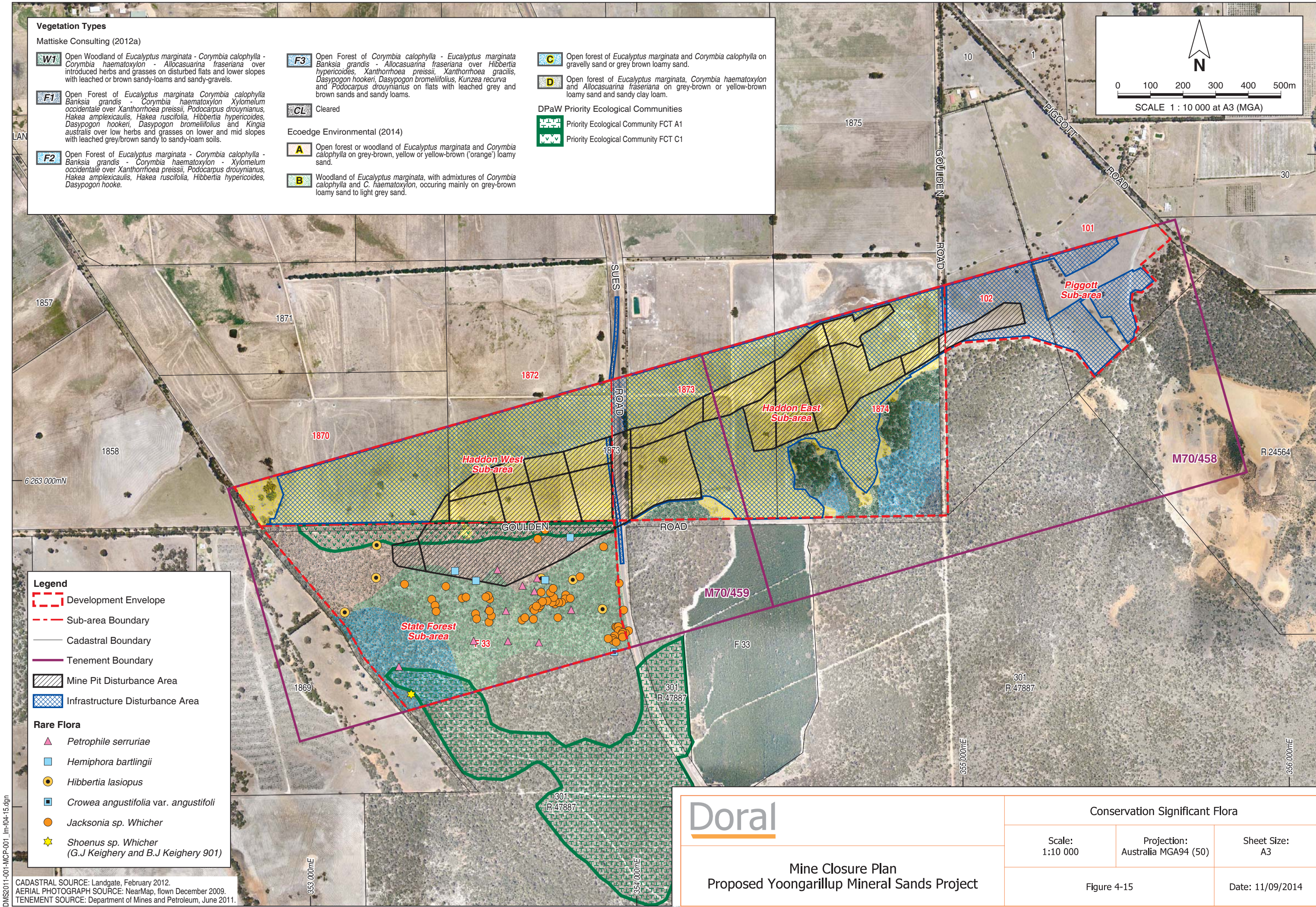
CADASTRAL SOURCE: Landgate, February 2012.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown December 2009.
TENEMENT SOURCE: Department of Mines and Petroleum, June 2011.



Mine Closure Plan
Proposed Yoongarillup Mineral Sands Project

Locations of Threatened and Priority Flora

Scale: 1:10 000	Projection: Australia MGA94 (50)	Sheet Size: A3
Figure 4-14		Date: 11/09/2014

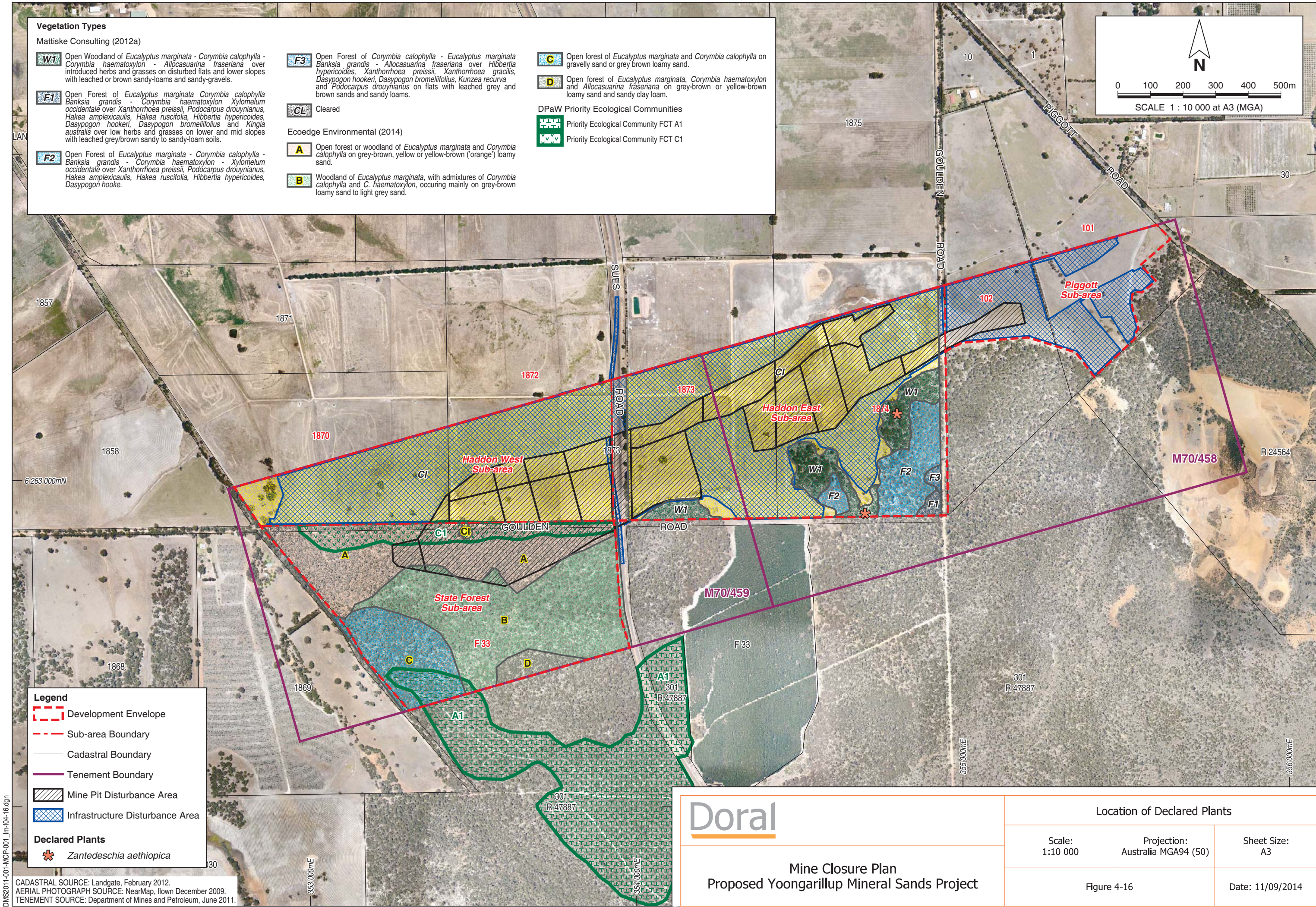


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CADASTRAL SOURCE: Landgate, February 2012.
 AERIAL PHOTOGRAPH SOURCE: NearMap, flown December 2009.
 TENEMENT SOURCE: Department of Mines and Petroleum, June 2011.

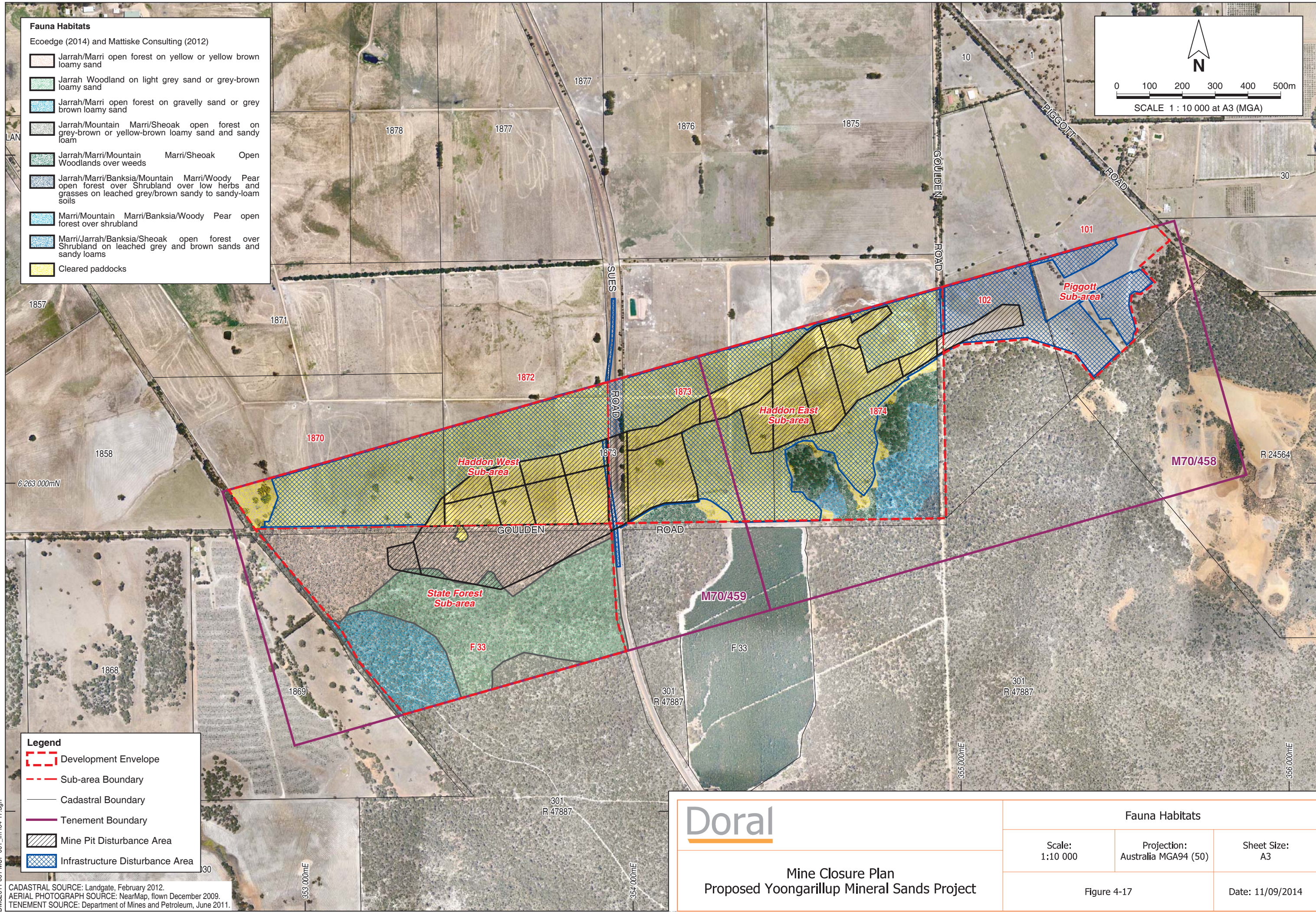
Mine Closure Plan
 Proposed Yoongarillup Mineral Sands Project

Conservation Significant Flora		
Scale: 1:10 000	Projection: Australia MGA94 (50)	Sheet Size: A3
Figure 4-15		Date: 11/09/2014



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CADASTRAL SOURCE: Landgate, February 2012.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown December 2009.
TENEMENT SOURCE: Department of Mines and Petroleum, June 2011.



Fauna Habitats
Ecoedge (2014) and Mattiske Consulting (2012)

- Jarrah/Marri open forest on yellow or yellow brown loamy sand
- Jarrah Woodland on light grey sand or grey-brown loamy sand
- Jarrah/Marri open forest on gravelly sand or grey brown loamy sand
- Jarrah/Mountain Marri/Sheoak open forest on grey-brown or yellow-brown loamy sand and sandy loam
- Jarrah/Marri/Mountain Marri/Sheoak Open Woodlands over weeds
- Jarrah/Marri/Banksia/Mountain Marri/Woody Pear open forest over Shrubland over low herbs and grasses on leached grey/brown sandy to sandy-loam soils
- Marri/Mountain Marri/Banksia/Woody Pear open forest over shrubland
- Marri/Jarrah/Banksia/Sheoak open forest over Shrubland on leached grey and brown sands and sandy loams
- Cleared paddocks

0 100 200 300 400 500m
SCALE 1 : 10 000 at A3 (MGA)

Legend

- Development Envelope
- Sub-area Boundary
- Cadastral Boundary
- Tenement Boundary
- Mine Pit Disturbance Area
- Infrastructure Disturbance Area

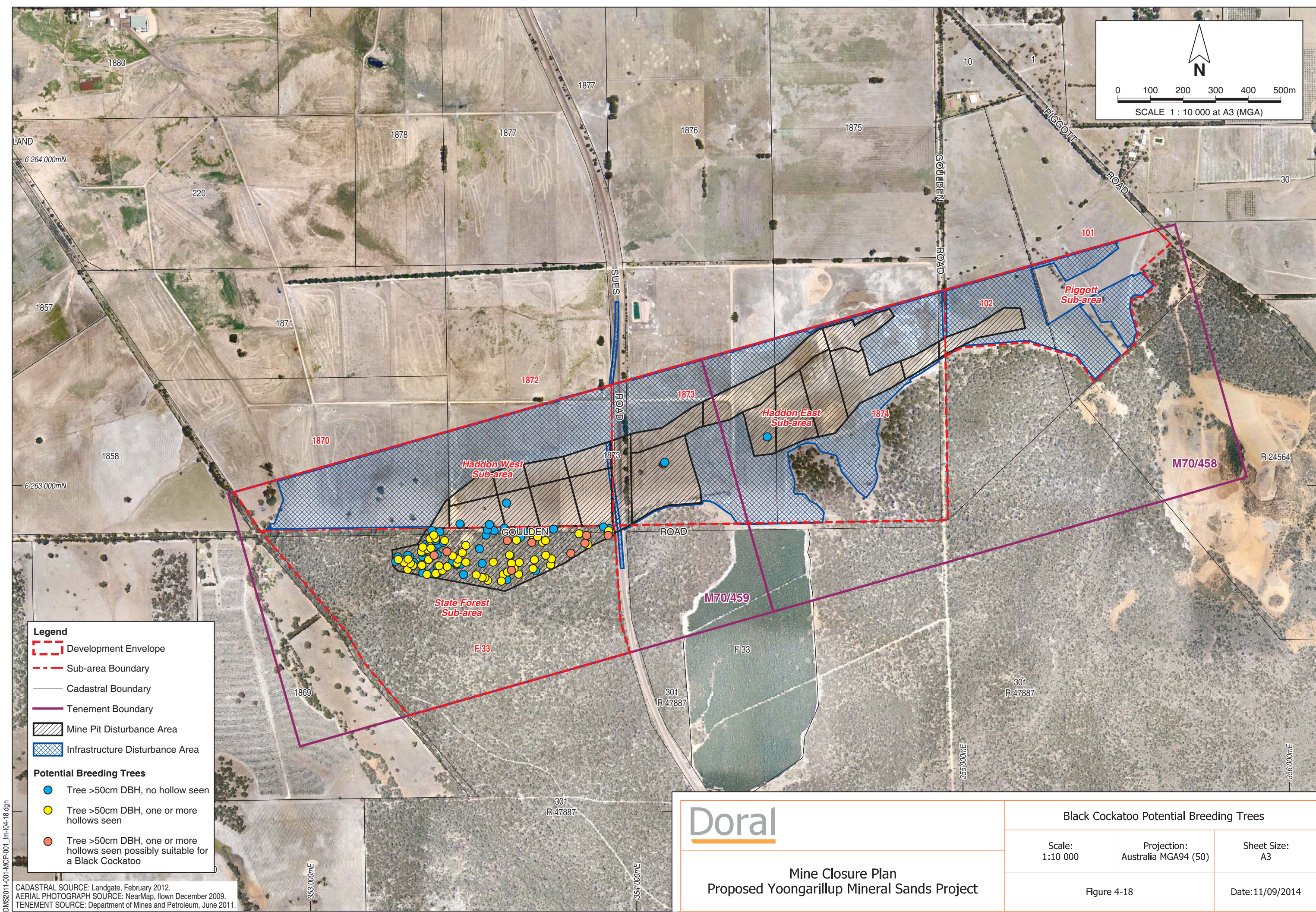
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CADASTRAL SOURCE: Landgate, February 2012.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown December 2009.
TENEMENT SOURCE: Department of Mines and Petroleum, June 2011.



Mine Closure Plan
Proposed Yoongarillup Mineral Sands Project

Fauna Habitats		
Scale: 1:10 000	Projection: Australia MGA94 (50)	Sheet Size: A3
Figure 4-17		Date: 11/09/2014



DIMS2011-001-MCP-001_1m-04-18.dgn

CADASTRAL SOURCE: Landgate, February 2012.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown December 2009.
TENEMENT SOURCE: Department of Mines and Petroleum, June 2011.

Doral

**Mine Closure Plan
Proposed Yoongarillup Mineral Sands Project**

Black Cockatoo Potential Breeding Trees

Scale:
1:10 000

Projection:
Australia MGA94 (50)

Sheet Size:
A3

Figure 4-18

Date:11/09/2014