

APPENDIX I ESA



Environmental Site Assessment

WELLINGTON SOLAR FARM

NOVEMBER 2017



Document Verification



Project Title:

Wellington Solar Farm

Project Number: 17-076

Project File Name: Wellington Solar Farm ESA Draft V1

Revision	Date	Prepared by (name)	Reviewed by (name)	Approved by (name)
Draft v1	17/05/17	Marilyn Purton Jane Blomfield Brooke Marshall	Jane Blomfield	Brooke Marshall
Final v1	01/11/17	Marilyn Purton	Minor changes	Jane Blomfield

NGH Environmental prints all documents on environmentally sustainable paper including paper made from bagasse (a by-product of sugar production) or recycled paper.

NGH Environmental Pty Ltd (ACN: 124 444 622. ABN: 31 124 444 622) and NGH Environmental (Heritage) Pty Ltd (ACN: 603 938 549. ABN: 62 603 938 549) are part of the NGH Environmental Group of Companies.

www.nghenvironmental.com.au

e: ngh@nghenvironmental.com.au

Bega - ACT and South East NSW
suite 1, 216 carp st (po box 470)
bega nsw 2550 (t 02 6492 8333)

Sydney Region
18/21 mary st
surry hills nsw 2010 (t 02 8202 8333)

Canberra - NSW SE & ACT
8/27 yallourn st (po box 62)
fyshwick act 2609 (t 02 6280 5053)

Brisbane
8 trawalla st
the gap qld 4061 (t 07 3511 0238)

Newcastle - Hunter and North Coast
7/11 union st
newcastle west nsw 2302 (t 02 4929 2301)

Wagga Wagga - Riverina and Western NSW
suite 1, 39 fitzmaurice st (po box 5464)
wagga wagga nsw 2650 (t 02 6971 9696)

Bathurst - Central West and Orana
35 morrisset st (po box 434)
bathurst nsw 2795 (t 02 6331 4541)

CONTENTS

1 INTRODUCTION 2

2 METHOD..... 3

2.1 DESKTOP REVIEW3

2.2 LANDOWNER CONSULTATION3

2.3 SITE VISIT3

3 RESULTS..... 4

3.1 LOCAL LAND USE4

 3.1.1 Eastern lots 4

 3.1.2 Western lots 4

3.2 GEOLOGY AND HYDROGEOLOGY DATA5

 3.2.1 Geology..... 5

 3.2.2 Mining..... 6

3.3 ENVIRONMENTAL REGULATORY/AGENCY LISTS.....7

3.4 SITE OBSERVATIONS..... 10

4 CONCLUSION 12

5 REFERENCES 13

APPENDIX A PHOTOGRAPHS A-1

TABLES

Table 3-1 Regional geohydrology5

Table 3-2 Current mining characteristics6

Table 3-3 Desktop review search results7

Table 3-4 Potential for contaminants and existing site features10

FIGURES

Figure 1-1 Map of proposed site with Lot numbers2

Figure 3-1 Current mining exploration licences and drill holes (red) close to the proposal site (yellow) (Minview 2017).....7

1 INTRODUCTION

First Solar proposes to construct a solar farm approximately 2km north east of Wellington, NSW. The proposal site is 493 hectares in size and encompasses Lots 89, 90, 91, 92, 99, 102, 103 and 104/DP2987; Lot 1/DP34690; Lot 1/DP520396; and Lot 2/DP807187.

The purpose of this Environmental Site Assessment (ESA) is to evaluate the potential presence of hazardous substances and soil and/or groundwater contamination at the proposal site. Note, the substation lot (Lot 1/DP1226751) has been excluded from this assessment.

The assessment has been undertaken by performing a review of past and current site land uses for indications of the manufacture, generation, use, storage and/or disposal of hazardous substances. This has included a desktop review of available information, consultation with the current landowners and a site inspection. Methods and results are provided in Sections 2 and 3. A conclusion regarding the risk of hazardous substances and soil and/or groundwater contamination is provided in Section 4.

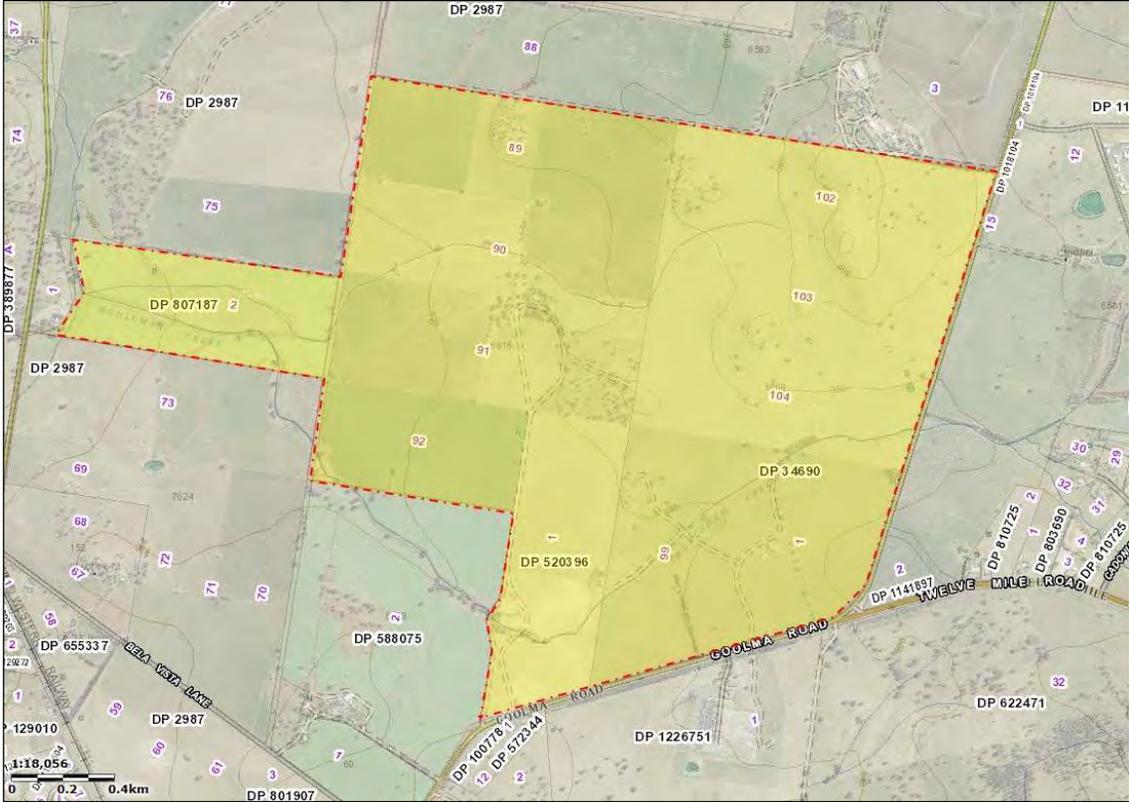


Figure 1-1 Map of proposed site with Lot numbers

2 METHOD

2.1 DESKTOP REVIEW

The following database searches were carried out to determine if the proposal site is contaminated and to obtain lists of contaminants that have the potential to occur at the proposal site:

- NSW Environment Protection Authority (EPA) contaminated lands register
- POEO public register licence application and notices
- MinView geoscience and exploration title information
- State of the Environment (SoE) Report - Former Wellington Council SoE 2015/16
- *Wellington Local Environmental Plan (LEP) 2012*

2.2 LANDOWNER CONSULTATION

Two landowners are relevant to the proposal site:

- Landowner 1: Lots 1 DP34690 and Lots 99, 102, 103, 104/DP2987 (eastern lots)
- Landowner 2: Lots 89-92/DP2987, Lot 2/DP807187 and Lot 1/DP520396 (western lots)

Discussions with the current landowners were held on 15 May 2017 to inform this assessment.

2.3 SITE VISIT

A site visit was undertaken on 27 April 2017. Approximately 3 hours were spent onsite, inspecting all lots with the exception of Lot 92 DP2987. A further inspection was carried out for Lot 92 DP2987 on 8-10 May 2017 as part of the biodiversity assessment of the proposal site. The site inspections were undertaken by vehicle and foot traverses. Landforms, vegetation and structures of the proposal site were inspected for signs of contamination. Additionally, notes were taken on existing site conditions, activities and types of land use and businesses within the area, that have potential for the use or storage of hazardous or industrial chemicals or petroleum products.

Photographs are provided in 5Appendix A.

3 RESULTS

3.1 LOCAL LAND USE

The proposal site is located on land across two land use zones, as identified in the *Wellington Local Environmental Plan 2012*. These are:

- RU1 - Primary Production
- R5 – Large Lot Residential

No residential subdivision development has occurred; only one residence is located onsite.

The dominant land use in the area is agriculture. The steeper landforms in the area support mainly grazing activities and the flatter landforms are mostly cropped. Sheep (western lots) and cattle (eastern lots) currently graze the site.

Mining exploration activities are common in the region. A Soil Conservation Research facility is located to the immediate north. It has a very low staff number at present. A substation is located to the immediate south. A chicken farm occurs within 5km of the proposal site. No other intensive land uses were noted of relevance to the site.

3.1.1 Eastern lots

The current landowner has undertaken grazing with occasional cropping for approximately 25 years. It is assumed similar land use preceded this. Dilapidated abattoir and office buildings present onsite have sometimes been used for storage of grains. These buildings were constructed by a previous landowner and were never completed or utilised as an abattoir. Drainage and septic tanks similarly were never utilised (if completed). An old single room building is also located onsite that may have been used by shearers or as a milk separating shed in the past. Above ground water tanks for bore water used for stock are also located within the proposal site.

The following was also found for the eastern lots:

- No mining is known to have occurred on site.
- No diesel fuel, fertilisers or herbicides are stored onsite.
- No underground storage tanks are known to occur onsite.
- No buried waste is understood to be present onsite. All waste generated are disposed of at the local tip.
- No odours or discolouration of soil or vegetation was noted during the site inspection. Additionally, no salt scalding was present.

3.1.2 Western lots

The current landowner has undertaken cropping and grazing for the last 30 years. It is assumed similar land use preceded this. No mining activities are known to occur at the site.

The residence onsite has a septic tank, which is regularly emptied and disposed of offsite. Domestic waste generated onsite is disposed of at the local tip. No buried waste is understood to be present onsite. Additional structures onsite include a small building in the western portion as well as sheds and pumping equipment.

Diesel fuel is stored onsite, no more than 250 gallons is kept onsite. No underground fuel storage tanks are present onsite. No significant quantities of other chemicals such as herbicides or pesticides are stored onsite.

During the site inspection, no odours or discolouration of soil or vegetation was noted in this area, although it is noted that some salt scalding occurs periodically in a lower paddock. Tree planting and specific crops are used to address this upward percolation of the salts in the water table.

3.2 GEOLOGY AND HYDROGEOLOGY DATA

3.2.1 Geology

Rock types that have been previously observed on the proposal site are (DPI n.d.):

- Sedimentary rock.
- Metamorphic rock – quartz vein (observed 1934).
- Camelford limestone (observed 1996).
- Siltstone and sandstone, cherty (observed 1996).

Regional geohydrology characteristics of relevant to the site are noted below.

Table 3-1 Regional geohydrology

Feature	Comment
Significant physiographic features for the Dubbo LGA	<ul style="list-style-type: none"> • Catchment: Macquarie-Bogan Size: 74, 800 m² • Two major storage facilities: <ul style="list-style-type: none"> ○ Burrendong dam ○ Windamere dam • Major waterways: <ul style="list-style-type: none"> ○ Macquarie River ○ Talbragar River • Dubbo potable water supply: <ul style="list-style-type: none"> ○ 70% - Macquarie River ○ 30% - bore water
Geological characteristics as they relate to the susceptibility of groundwater to contamination	<p>Flat lying sediments, intrusive units, tertiary basalts and quaternary alluvium (Dubbo Regional Council 2016).</p> <p>Central West Catchment is considered at the macroscopic level, materials have been consolidated (lithified) over time into hard rock. Some remain unlithified and exist as unconsolidated to semi-unconsolidated materials derived from the weathering and erosion of hard rock and deposition by streams, wind and gravity (Woolridge <i>et al</i> 2013).</p>
Rainfall and climate	<p>584mm annual rainfall, with rainfall being dominant during the summer months.</p> <p>Within the region, summer has an average maximum temperature of 33°C and an average minimum temperature of 2.6°C in winter.</p>
Groundwater characteristics	<p>Waterlogging does not occur naturally in NSW western landscapes (Woolridge <i>et al.</i> 2013).</p> <p>A search of the DPI Office of Water’s Groundwater Map (2016), the proposal site has one bore located within the middle. The bore is for the purpose of stock and is 20.7m deep. No other information is available.</p> <p>The proposal site is located within the Bodangora Hydrogeological Landscape System. Within this system there is minor salt sites that are associated with</p>

Feature	Comment
	topographic highs and landforms structures (geology) and basin shaped depressions. Seasonal salt sites exist during wet years. During wet periods the stored salt can be mobilised (OEH 2013).
Erosion	<p>The soil landscape of within the proposed site is classified as Bodangora 'bz'. Limitations of this soil landscape include:</p> <ul style="list-style-type: none"> • High erosion hazard under cultivation and low groundcover levels • Aggregated clays may leak in the earthworks.

3.2.2 Mining

The MinView website was searched for mining exploration applications and licences on the 2 May 2017. Results are found below in Table 3-3. None are relevant to the site.

Table 3-2 Current mining characteristics

Item searched	Location	Comments
Metallic and Industrial deposits	Namina Quarry, within 200m of the south western proposal site boundary.	Sandstone and Siltstone quarry. Classed as unprocessed construction materials - major
Limestone Deposit	Within 2km of the western proposal site boundary	Limestone deposits Two sites found.
Mining exploration and Titles	Wellington (suburb)	<p>There have been no mining exploration or titles for the proposal site. The Minview portal map illustrated several historic and current mining exploration titles in the area. Refer to Figure 3-1 below for map location.</p> <p>Minerals found in the surrounding district include: metallic commodities, ore deposits (shale and sapphire), gold, sapphire and ruby rich gravels.</p> <p>Current licenses:</p> <ul style="list-style-type: none"> • EL8212 (1992 Act) Endeavour Minerals Pty Ltd – Group 1; metallic Minerals • EL8212 (1992 Act) Endeavour Minerals Pty Ltd – Group 1; metallic minerals
Drill holes for metallic minerals (DPI n.d.)	Wellington (suburb)	See Figure 3-1 below – red dots indicate all drill holes. The majority are for the purpose of metallic minerals.

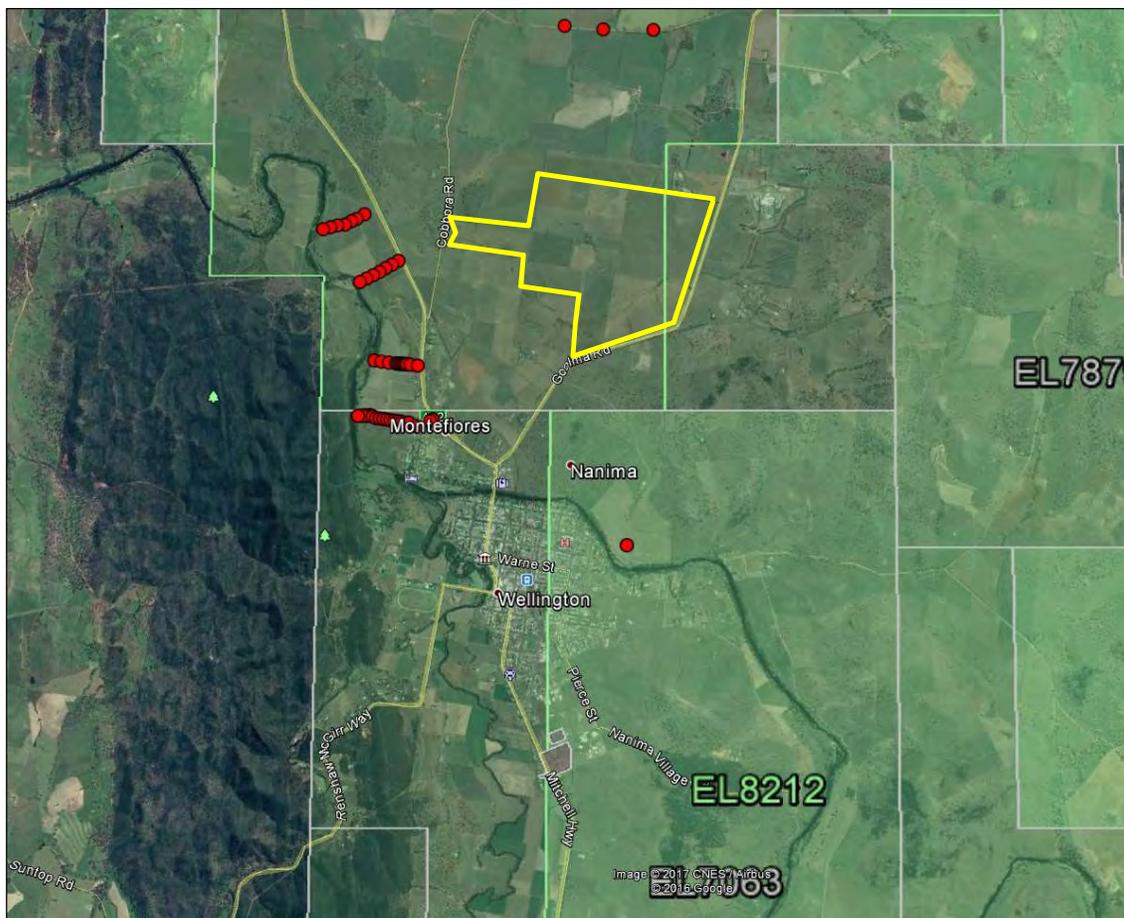


Figure 3-1 Current mining exploration licences and drill holes (red) close to the proposal site (yellow) (Minview 2017).

3.3 ENVIRONMENTAL REGULATORY/AGENCY LISTS

The EPA’s Contaminated land website and *Protection of the Environment Operations Act 1997* (POEO Act), was searched on the 2 May 2017. Results are found below in Table 3-3.

Table 3-3 Desktop review search results

Item searched	Location	Comments
POEO licence list NSW	Wellington	One license issued for Wellington swimming pool, Warne Street, Wellington. It is a miscellaneous licence to discharge water (at any time).
POEO licence applications	Wellington	Five applications: <ul style="list-style-type: none"> • 1016492 - s.58 licence variation, Brennans Way, Western Plains Regional Council (WPRC), 2001. • 1542838 – POEO licence transfer, 77 Falls Road, WRPC, 2016.

Item searched	Location	Comments
		<ul style="list-style-type: none"> • 1542839 – POEO licence transfer, Brennans Way, WRPC, 2016. • 1542841 – POEO licence transfer, Nanima Road, WRPC, 2016. • 1542851 – POEO licence transfer, Warne Street, WRPC, 2016.
POEO licences	Wellington	<ul style="list-style-type: none"> • Transgrid – Goolma Road, Issued 6 April 2001, no longer in force. • WPRC – 77 Falls Road, issued 6 March 2000. • WPRC – Brennans Way, issued 21 March 2000. • WPRC – Namina Road, issued 17 October 2000 • WPRC – Warne Street, issued 4 April 2003
Delicensed premises still regulated by the EPA	Wellington (suburb)	No records found
Health related environmental issues		No records found
Pollution studies and reduction programs		One result in Wellington (suburb). Western Plains Regional Council, Brennans Way, Wellington, NSW, Line emergency holding pond (sewage treatment works).
Records of aboveground and underground storage tanks		No records found
Environmental incidents or violations documented by the agencies		No records found
Permits and use records for chemicals National Pollutant inventory (NPI).	NSW – map view, manual location of NPI	<ul style="list-style-type: none"> • Molong Quarry, 3 Rivers Road, Molong, NSW. Class: Gravel and Sand quarry Activity: Dust suppression – water sprays/chemical suppression. • Mirambee Feedlot, 123 Old Dubbo Road, Dubbo. Class: Beef cattle Feedlots Activity: Dust decreasing measures in place. • Boral Berry Quarry, Springridge Road, Beryl, NSW. Class: Other construction Material Mining. Activity: Dust monitor (three locations onsite).

Item searched	Location	Comments
		<ul style="list-style-type: none">• Elgas Limited Mudgee, 7 Sydney Road, Mudgee, NSW. Class: Industrial gas manufacturing Activity: Processing and transfer of LPG and other gases.
Contaminated lands register	Wellington (suburb)	No records found

3.4 SITE OBSERVATIONS

The following notes are provided on typical contaminants and contaminant pathways, in discussion with the landowners and with reference to the site inspections.

Table 3-4 Potential for contaminants and existing site features.

Feature	Comment
Sewage disposal methods at each property.	Eastern lots: none.
	Western lots: pump out septic, disposed of offsite.
Knowledge of environmental permits, incidents, violation notices, environmental litigation, environmental liens or activity use limitations.	Eastern lots: no knowledge.
	Western lots: no knowledge.
Past or present use, storage, handling, or disposal of hazardous substances including petroleum, pesticides, PCBs, asbestos containing materials, lead based paint and other hazardous substances.	Eastern lots: no knowledge.
	Western lots: 250 gallon diesel at most, used for tractors. No quantities of herbicides, pesticides or fertilisers are regularly stored onsite.
Waste generation, handling, storage, and disposal methods.	Eastern lots: nothing buried, disposed of at local tip.
	Western lots: domestic disposal is via the local tip. The underground septic tank is regularly emptied and disposed of offsite.
Aboveground and underground storage tanks	Eastern lots: silo only – grain.
	Western lots: water tanks x 2. No underground fuel storage, bowser for diesel not underground.
Health related environmental issues	Eastern lots: no knowledge.
	Western lots: none known of.
Environmental incidents or violations documented by the agencies	Eastern lots: no knowledge.
	Western lots: none known of.
Pollution – air quality	Generally good. Pollutants include dust in dry times, during soil cultivation and spraying crops onsite and nearby.
Chemicals	Eastern lots: none stored onsite.
	Western lots: fertilisers and herbicides purchased for specifically applications and drums disposed of at tip. Not regularly stored onsite. Diesel, as above, up to 250 gallons stored onsite in above ground drums and bowser.
Contaminants	Eastern lots: no knowledge.
	Western lots: none known of.
Evidence of stressed vegetation	Eastern lots: none observed.

Feature	Comment
	Western lots: none observed.
Evidence of soil staining	Eastern lots: none observed.
	Western lots: some salt scalding is present in the lower area of paddock.
Evidence of abnormal odours	Eastern lots: none observed.
	Western lots: none observed.
Potentially contaminated surface water discharges and/or stormwater	Eastern lots: none observed.
	Western lots: none observed.
Liquid or solid waste dumping and/or disposal.	Eastern lots: none observed.
	Western lots: none observed.
Discoloured flowing or ponded water	Eastern lots: none observed.
	Western lots: none observed.
Onsite water supply, monitoring, oil, gas, and/or disposal wells	Eastern lots: bore water only.
	Western lots: rainwater and bore water.
Cisterns, septic tanks, pits, sumps, drywells, and/or catch basins	Eastern lots: water tanks above ground only.
	Western lots: as above, septic only.
Electrical transformers or large capacitors on the subject property	Eastern lots: powerline overhead.
	Western lots: powerline overhead.
Dumping of hazardous material, debris or construction materials, and topographic features which indicate extensive use of non-native fill on the subject property	Eastern lots: no dumping but masonry, plaster, glass, timber and iron, from dilapidated structures are present.
	Western lots: no dumping but timber and iron, masonry from dilapidated structures are present.
Activities on adjacent properties, to the extent practical, which may use, generate, and/or store hazardous substances/wastes	Eastern lots: adjacent substation to the east and Soil conservation research facility to the north.
	Western lots: adjacent substation to the east.

4 CONCLUSION

This ESA has evaluated the potential presence of hazardous substances and soil and/or groundwater contamination at the site of the proposed solar farm. The evaluation was undertaken by a desktop review of available information, consultation with the current landowner and a site inspection.

The desktop review searched records with the EPA and under the POEO Act. No evidence of contaminated land occurs within the Wellington locality. No evidence was found of historical POEO Act licences or current application on the proposed site.

The historical dominant land use activity for the area is agricultural. The proposed sites dominant land use continues to be agriculture, including grazing and cropping.

The key environmental issues that are detrimental to land resources are salinity, waterlogging and erosion in the catchment (Woolridge *et al.* 2013). In agricultural areas, buried waste including contaminants can occur, affecting soil and water resources. For the subject sites, some localised salinity is present. No evidence of contaminated land was found and, considering the past and current land uses it is considered unlikely that buried contaminants occur onsite.

5 REFERENCES

Dubbo Regional Council, 2016, Land and salinity, accessed 3 May 2017 from <https://www.dubbo.nsw.gov.au/Our-Region-and-Environment/Natural-environment/land-salinity>

Dubbo Regional Council, 2016, *Wellington Local Environmental Plan 2012*, accessed 9 May 2017 from <https://www.dubbo.nsw.gov.au/Builders-and-Developers/Planning-Controls--Tools-and-Resources/wellington-local-environmental-plan-2012>

Environmental protection Authority (EPA), 2017, *Environmental protection licences -POEO public register*, accessed 3 May 2017 from <http://www.epa.nsw.gov.au/prpoeoapp/SearchResult.aspx?SearchTag=all&searchrange=general&range=general>

NSW Department of Industry, n.d, *Minerals and Petroleum – Area for downloads and Queries*, accessed 3 May 2017 from <http://dwh.minerals.nsw.gov.au/CI/warehouse/>

NSW Office of Environment, 2013, *Hydrogeological Landscapes for the Central West Catchment Management Authority Western Study Area: May 2013 (Second Edition)*, accessed 11 May 2017 from <http://data.environment.nsw.gov.au/dataset/hydrogeological-landscapes-for-the-central-west-catchment-management-authority-western-study-ar>

NSW Office of Water, 2017, Groundwater Map, accessed 11 May 2017 from <http://allwaterdata.water.nsw.gov.au/water.stm>

Regional Development Australia – Orana, 2016, *Wellington Region*, accessed 13 April 2016, <http://www.lovethefifelive.com.au/our-towns/wellington/>

Woolridge, A., Nicholson, A., Muller, R, Cook, W., Winkler, M., Jenkins, B., Grant, S., Agar, B. and Brennan, N, 2013, *Hydrogeological Landscapes for the Central West Catchment Management Authority – Final report*, NSW Office of Environment & Heritage, Department of Premier and Cabinet, Wagga Wagga.

APPENDIX A PHOTOGRAPHS

Eastern lots



Western lots

