Crudine Ridge Wind Farm
Preliminary Environmental Assessment
February 2011

Document Control

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Prepared by Wind Prospect CWP Pty Ltd on behalf of Crudine Ridge Wind Farm Pty Ltd

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1. Introduction

Wind Prospect CWP Pty Ltd (WPCWP) has prepared this Preliminary Environmental Assessment (PEA) to provide preliminary details of the proposed Crudine Ridge Wind Farm (CRWF*) located midway between Bathurst and Mudgee (Appendix 1).

This report provides a description of the development proposal, lists the relevant planning instruments, provides a general description of the key environmental issues and outlines the studies to be undertaken as part of the development process.

** (In earlier communication with some stakeholders the proposed CRWF was referred to as "Sofala Wind Farm")*

1.1 Applicant Details

The applicant for CRWF is Crudine Ridge Wind Farm Pty Ltd. WPCWP will prepare the relevant project documentation for CRWF. WPCWP is jointly owned by the Wind Prospect Group (WP) and Continental Wind Partners (CWP).

Contact details for the project are as follows:

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WPCWP have extensive experience in the development of wind farms, the portfolio of which includes those identified in sections 1.1.1 and 1.1.2.

1.1.1 Wind Prospect Group

WP undertakes all aspects of wind energy development, including design, construction, operation and commercial services, with offices in the UK, Ireland, Canada, Australia and China. With over 18 years of successful development within the industry, WP has been involved in over 2,500 MW of approved wind farms, including onshore and offshore projects, in terms of development, construction, operations and commercial services, and has a further 4,000 MW in the early phase of development. The company's civil, electrical and mechanical engineers have been involved in the commissioning of over 50 wind farms around the world.

WP's development offices in Australia are in Adelaide, Newcastle, Brisbane and Melbourne. Wind Prospect Pty Ltd (WPPL) is the most successful developer in Australia, having achieved planning approval for 12 wind farms totalling over 1,000 MW, of which 565 MW is operating or under construction. Our most recent planning success is in New South Wales with the Boco Rock Wind Farm (260 MW) located approximately 40 km south of Cooma (Table 1).

Table 1 – WPPL Wind Farm Developments To Date

Wind Farm	State	Turbines	Total MW	Status
Hallett I (Brown Hill)	SA	45	94.5	Operating
Snowtown (Stage 1)	SA	47	98.7	Operating
Canunda	SA	23	46	Operating
Mt Millar	SA	35	70	Operating
Hallett II (Hallett Hill)	SA	34	71.4	Operating
Hallett IV (North Brown Hill)	SA	63	132.3	Under Construction
Hallett V (The Bluff Range)	SA	25	52.5	Under Construction
Snowtown (Stage 2)	SA	83	166	Approved
Willogoleche Hill	SA	26	52	Approved
Troubridge Point	SA	15	30	Approved
Green Point	SA	18	54	Approved
Boco Rock	NSW	122	260	Approved
Sapphire	NSW	159	325	Near Submission
Totals		695	1,452 MW	

1.1.2 Continental Wind Partners

CWP were established in 2007 to finance the development of wind farms in Romania and Poland. They have since grown to be a leader in renewable energy development, expanding into the rest of Europe and Australia; with projects totalling over 4,500 MW including the largest project in Europe, the 600 MW Fantanele wind farm now operating in Romania. Their primary focus remains in wind energy, however they also have interests in solar, hydro, biomass and other renewable energies.

Their successful and rapid expansion is based on a proven model of co-operation with local developers. Here CWP's international expertise in the finance/banking industry and technical aspects of development are combined with the developers own technical expertise and local knowledge. It is this collaborative partnership that ensures accelerated, professional wind development in a mutually successful manner.

2. Project Description

2.1 Purpose

The purpose of this document is to provide a description of the proposed CRWF, together with a review of the environmental issues associated with the development, which will assist the Director-General of Planning NSW to determine appropriate environmental assessment requirements.

A Planning Focus Meeting (PFM) and site visit has been undertaken to obtain input from the following stakeholders:

- Bathurst Regional Council (BRC);
- Mid-Western Regional (MWRC);
- Department of Environment and Climate Change (DECC, *now DECCW*);
- Rural Fire Service (RFS);
- Department of Primary Industries (DPI); and
- NSW Department of Planning (DoP).

This document sets out:

- A summary of the project;
- Potential impacts arising from the wind farm's development and operation;
- Potential project timeframe;
- A overview of planning context and review process for the project; and
- Proposed approach to the assessment of key potential impacts.

2.2 Project Overview

2.2.1 Turbine Layout

An indicative layout envelope for CRWF is shown in Appendix 2, within which there is the potential for approximately 70 to 110 wind turbines (subject to final wind turbine selection). It is anticipated that final numbers and positions of the wind turbines will be refined through the assessment process, with adjustments being made with respect to social, environmental or engineering issues.

2.2.2 Turbine Specifications and Operation

The current CRWF layout has been modelled using a range of wind turbines that have rotor diameters in the range of 80 m to 120 m, with nominal capacities from 1.5 MW up to 3.4 MW based on available technology in the market. Wind turbines in this range include tower heights (or hub heights) of 70 m to 100 m. With respect to the range of wind turbines available for this project, the CRWF could comprise of a larger number of the smaller capacity smaller geometry machines, or vice versa.

The wind turbines will be automated to face into the wind with cut-in and cut-out speeds dependent on the model of turbine selected. Typically a turbine will begin generating around 4 metres per second (m/s) and shut down around 25 m/s to avoid damage to the equipment and prevent unsafe operation.

2.2.3 Electrical Connection and Ancillary Facilities

The individual turbines will be connected electrically by underground cables (where possible) to a new collector substation constructed on site. The location of the collector substation will take into account the findings of the various assessments which will be carried out as part of the planning

process. It is likely that a facilities building will also be located close or adjacent to the collector substation.

To connect to the existing transmission lines a new easement approximately 13 km will be required along which a 132 kV power line will need to be constructed (Appendix 2). A switching substation may be required close to the point of connection with the existing transmission line. If required, the location of the switching substation will take into account the findings of the various assessments to be carried out as part of the planning process.

2.2.4 Access Routes

Access tracks will be required between each of the wind turbine sites, the collector substation and facilities building. Access to the wind farm would be required from local roads in the area. Possible locations include Prices Lane, Hill End Road and Aarons Pass Road. The suitability of locations for site access will be assessed as part of the planning process.

2.2.5 Material Supplies and Compounds

During the construction phase it will be necessary to supply concrete for turbine footings and substation construction works, as well as gravel for surfacing access roads. Concrete mix for the project is most likely to be produced from a temporary batching plant constructed on or close to site. The supply of water will be a key consideration in this decision.

Gravel for road base will comprise of the material excavated from turbine footings and, if necessary, other local or on-site sources may be required.

Both temporary (during the construction phase) and permanent materials compounds will be required for the project, locations of which will be determined through the assessment process.

2.3 Location Details and Environmental Setting

The proposed CRWF is located approximately 45 km south of Mudgee and 45 km north of Bathurst, New South Wales. The turbines extend over a 16 km span along the Crudine Ridge, south west from Aarons Pass Rd. The individual turbine positions are located on land with elevations ranging from approximately 890 m to 1,000 m Australian Height Datum (AHD).

The project site is on rural land within the Bathurst Regional and Mid-Western Regional Council Areas and currently spans 17 privately owned properties. Details of property ownership are shown in Appendix 3.

Appendix 2 shows the locations of residences surrounding the proposed wind farm. These have been identified from a review of topographic maps and by ground-truthing visits to the area. Neighbouring properties will be assessed against the potential audio and visual impacts of the wind farm and appropriate setback distances will be a key design consideration in finalising the wind farm layout.

The site displays quartz outcrops and the elevated areas appear to have soil cover to a reasonable depth. The climate of the site is characterised by annual rainfall of about 630-690 mm, and daily temperatures ranging from -2 ^{o}C in winter to 30 ^{o}C in summer.

The CRWF is situated within the Central West Catchment area. Locally, the site drains into the Turon and Crudine Rivers. Based on the nature of the project and controls to be implemented, it is not expected that any of the local watercourses will be affected by the development.

2.3.1 Project Contractor

WPCWP will engage a contractor to supply the required equipment and construct the CRWF. The contract specification will address the project's 'Statement of Commitments', submitted with the Environmental Assessment (EA), and if necessary, amend the statement to address any consent conditions. WPCWP will work with the contractor to finalise design elements, complete planning and, subject to obtaining the necessary approvals, to progress the construction and operation of the wind farm.

Most of the wind farm equipment suppliers are familiar with environmental construction issues and have well developed environmental management systems. In selecting the project contractor, WPCWP will review the contractor's prior environmental performance to make certain that the contractor has an effective environmental management system ensuring that the project's environmental commitments are achieved.

2.3.2 TransGrid

TransGrid will have a key role in specifying its requirements for the grid connection, as the owner and operator of the existing 132 kV transmission line to which the wind farm could be connected. WPCWP, the project contractor and TransGrid will work together to reach a suitable design that facilitates wind farm operation while maintaining a secure grid.

The final grid connection arrangement will be dependent on the outcome of the formal connection process and the proposed construction schedule.

2.4 Project Timeframe

This PEA is provided to seek environmental assessment requirements from the NSW Director-General. Assuming that assessment requirements are issued in March 2011 we would look to lodge an EA late 2011/early 2012 with the objective of obtaining planning approval within the first half of 2012.

Construction would commence following the completion of all pre-construction consent commitments and the awarding of the final construction contract. Assuming satisfactory progress of the pre-construction stage and construction works it is anticipated that the wind farm will commence commissioning during 2014, as indicated in Table 2.

Table 2 – Potential Project Timeframe

Project Stage	Duration	Completion
DG's Assessment Requirements issued	1 month	March 2011
Planning and Environmental Assessment	9 months	December 2011
Consent authority review and approvals	4 months	April 2012
Pre-construction contract negotiations	6 months	October 2012
Construction and grid connection	18 months	April 2014
Commissioning (commences during construction)	2 months	June 2014
Operation	20 years	June 2034
Decommissioning or re-powering	1 year	June 2035

3. Planning Context and Instruments

3.1 Context for Wind Energy Development

The Australian Government's mandated Renewable Energy Target (RET) is a scheme which has been established to encourage additional generation of electricity from renewable energy sources to achieve a commitment of a 20 percent share of renewables in Australia's electricity supply by 2020. The RET places a legal liability on wholesale purchases of electricity (e.g. electricity retailers) to proportionally contribute to an additional 45,000 gigawatt hours (GWh) of renewable energy each year.

The steep 'ramp up' profile of the requirements of RET up to 2020 and the significant lead time which is required to complete renewable energy developments and construction, requires the commencement of new projects now.

3.2 Statutory planning requirements

Development of wind farms in NSW is subject to the Environmental and Planning Assessment (EP&A) Act, its Regulation, various NSW environmental legislations, State Environmental Planning Policies, any relevant Regional Environmental Plans and the Commonwealth Environmental Protection and Biodiversity Conservation Act.

3.2.1 Local Environmental Plans

The wind farm site is currently zoned *Agriculture* in the Mid-Western Regional Interim Local Environmental Plan (LEP) 2008 and *1(e) (Outer Rural)* under the Bathurst Regional (Interim) LEP 2005. Both LEPs neither prohibit the development, nor allow it without development consent, therefore it is permissible once development consent has been granted.

3.2.2 State Environmental Planning Policy (Major Projects) 2005

On August 14, 2008 the Director General of The Department of Planning advised that the proposed CRWF project is classified as a Major Project and subject to assessment under Part 3A of the EP&A Act. Accordingly, the approval authority is the Minister for Planning and an EA will need to be submitted to support the Project Application.

3.2.3 Roads Act 1993

Permits may be required under Section 138 of the Roads Act 1993 for underground cabling that could pass under the bordering roads. Advice will be sought with respect to the associated road authority.

3.2.4 Environmental Assessment

The matters to be addressed by the EA are specified by the Director-General of Planning NSW (DG) and generally referred to as the Director-General's Requirements (DGRs).

The EA will describe the potential impacts of the project and how they will be managed. A Statement of Commitments is required to be compiled and incorporated in the EA. The assessment may be completed prior to finalising equipment specifications and will therefore aim to address the potential impacts based on the worst case parameters of each turbine type, size and capacity considered for the project.

3.2.5 Environmental Protection and Biodiversity Conservation Act 1999 and Threatened Species Conservation Act 1995

The project will also need to consider relevant matters listed under the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 as well as the Threatened Species Conservation Act 1995.

Any listed matters relevant to the project may be considered in accordance with a bilateral agreement between the Commonwealth and State Environment Ministers. Specialist advice will be sought in respect of any such issues.

3.2.6 Stakeholders

Consultation will be required with a range of stakeholders including government agencies, neighbours to the wind farm and the broader local community. Various media types will be used to identify and consult with the local community including the creation of a project specific website which will be launched to coincide with the first public open day exclusively relating to the proposed development. The website will be designed to be interactive to allow for community feedback.

The proponent acknowledges that a wind farm development can be contentious. It is our belief this is a result of much misinformation that precedes wind farm projects. The Project Manager for CRWF will make every effort to make contact with and/or meet neighbouring residents within a 3 to 5 km radius of the project to discuss all aspects of the proposal.

4. Environmental Issues and Management

A range of environmental issues will need to be assessed as part of the planning and approvals process for this project and, where necessary, environmental controls incorporated into the project. The key environmental issues relating to wind farm developments are well defined and for the CRWF the key anticipated issues are outlined below.

4.1 Wind Farm Layout

The wind farm layout will be prepared to maximise utilisation of the available wind resource whilst gaining regulatory and broad community acceptance of the development. The planning and design stages of the wind farm layout will consider any potential environmental impacts on flora communities, fauna habitat, heritage aspects as well as the location of neighbouring properties and residences.

It is expected that some adjustment of the turbine locations will occur during the planning and assessment phase in response to stakeholder consultation and findings of the various planning studies. Access routes will be designed to achieve practical transport paths that minimise disruption to local traffic and environmental impacts. Initial options are currently being reviewed with further detailed studies necessary to reflect both practicality and acceptability to the Councils, landowners and local road users.

4.2 Construction Phase

The construction phase is expected to extend over 18 months and will involve:

- Transport of equipment and materials to site;
- Daily movement of a small work force between the site and the local centres;
- Earthworks for access tracks, turbine footings, underground cables and a substation;
- Erection of turbines and substation structures and construction of a facilities building;
- Electrical connections within the wind farm and to the TransGrid transmission grid;
- Commissioning of the wind farm; and
- Restoration of any disturbed areas of land.

All construction will be undertaken in accordance with an environmental management plan and monitoring of performance will be routinely undertaken.

The transport of materials and equipment to site during the construction phase will involve a temporary increase in the local traffic volume. Vehicles accessing the site will include a range of ‘over-size’ and ‘over-mass’ vehicles. Preliminary indications are that several access points from public roads will be needed to access the wind farm. The EA will include a review of the suitability of roads that can be used to access the site and any potential impacts on road safety and local traffic movements. Where necessary, mitigation measures will be proposed and incorporated within a traffic management plan.

Initial site works will include establishment of a temporary construction site office, preparation of access tracks to turbines sites, excavation of footings for turbines and trenching for underground cables.

The potential for soil erosion and dust generation during construction will be assessed and measures identified to mitigate such impacts. Earthworks also have the potential to disturb any surface or

shallow sub-surface heritage items. Accordingly, an assessment of indigenous and non-indigenous heritage values of the site will be undertaken by a specialist consultant in conjunction with relevant stakeholders, prior to the excavation of any earthworks.

Noise impacts can be associated with the construction phase arising from the transport of materials and equipment to site, as well as general construction activity. Controls will be incorporated in the environmental management plan and will include adoption of specific working hours and use of compliant equipment appropriate to the development.

Site restoration following construction works will focus on revegetation of disturbed ground, reduction of weed development and control of any erosion and sedimentation.

Construction contractors will, in consultation with the RFS, implement fire prevention procedures during the wind farm construction phase. Fire fighting equipment will be located on site and all site vehicles will have diesel engines to minimise fire risk. Construction activities will be modified to suit any fire bans when appropriate to do so.

4.3 Operational Phase

Once constructed and commissioned the wind farm will operate for a period of 20 to 25 years. A regular maintenance program will be an integral part of the operation and any repairs will be undertaken as required. The operation of the wind farm may have various impacts, as detailed below.

4.3.1 Visual

Visual impact can be a key issue for neighbours to wind farm developments and a comprehensive visual assessment will be undertaken including landscape assessment, view field analysis, preparation of photomontages from representative view points and a review of options for mitigation of the visual impacts. Issues of shadow flicker and glint will also be addressed.

4.3.2 Noise

Once commissioned, the main potential for noise impacts will be from the operating wind turbines or the substation facility. As part of the EA, and compliance with the Department for Environment and Climate Change's Environmental Protection Licence, a consultant will be appointed to assess the acoustic environment within the vicinity of the site and potential impacts on nearby residences. A management plan to address potential impacts will be developed and implemented.

4.3.3 Blade-strike

Blade strike can affect avifauna species and specialist advice will be sought in relation to the site of the project. The flora and fauna assessment will be undertaken for the site in relation to the species present, their site utilisation and risk of blade strike. As necessary, mitigation measures will be developed and adopted.

4.3.4 Telecommunications

An assessment of local telecommunications services will be made. Potential for interference from the wind farm construction and operation at locations surrounding the site will be assessed. Mitigation measures will be identified for the potential impacts and a management plan developed where necessary.

4.3.5 Aircraft Safety

Consultation with the Civil Aviation Safety Authority (CASA), Airservices Australia, the Defence Department and the Aerial Agricultural Association of Australia will be incorporated into the

planning stages of the development. Through this consultation, agreements will be made to ensure safe operation of the wind farm in respect to aircraft. This may include aviation warning lights at selected locations within the wind farm.

4.3.6 Water Quality

While the wind farm will not require any significant amount of water, there is the possibility of an oil leak resulting in contamination of local water courses. Spill containment will be provided as a redundant prevention measure at locations where oil is present should the equipment's default containment become faulty.

4.3.7 Bush Fire

The wind farm operator will maintain a limited fire fighting capability on site to control small grass fires and to assist fire authorities to control any larger fires that may occur on the site. All site vehicles during the construction phase will have diesel engines and will use the site access roads to minimise the likelihood of igniting dry grass. On very rare occasions it is possible that equipment malfunctions could cause a fire on site and appropriate management plans will be put in place to deal with such an event. Agreed procedures for liaison with fire fighting authorities will be developed to address the possibility of a bushfire occurring on site.

5. Proposed Surveys

It is proposed that the EA will provide a comprehensive assessment of all relevant environmental issues. In turn, these issues and their management strategies will play a key role in determining the final wind farm layout. The EA will address the Director-General's Requirements and is expected to include the following key specialist assessments as shown in Table 3.

Table 3 – Proposed Key Site Surveys

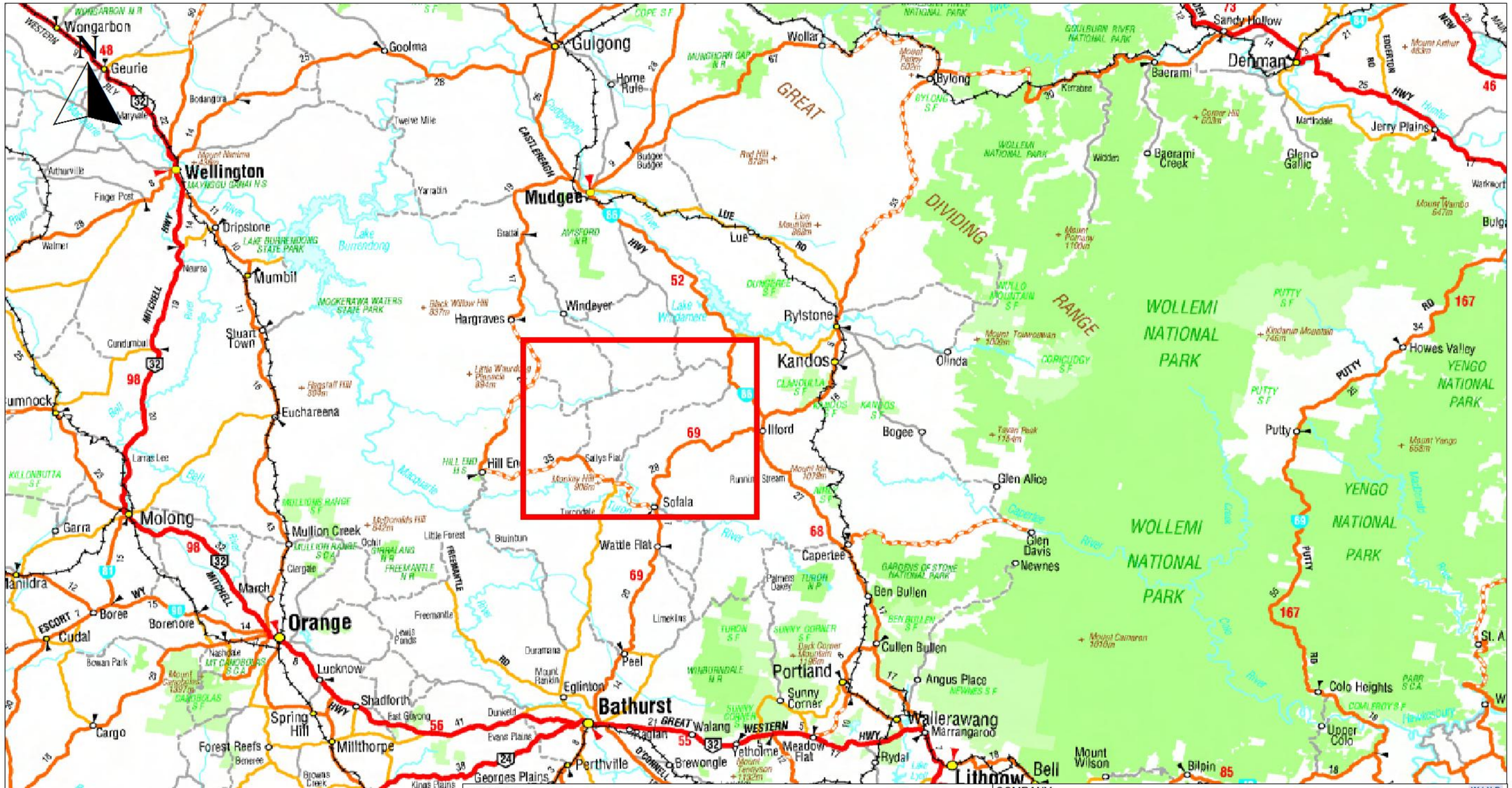
Issue	Scope of Assessment
Visual	A comprehensive visual impact assessment will be undertaken incorporating landscape analysis, view field identification, provision of photomontages and review of likely visibility at key viewpoints surrounding the wind farm. Potential mitigation measures will also be identified. Issues of shadow flicker and glint will be assessed and documented in the EA.
Noise	A comprehensive Noise Assessment will be undertaken in accordance with the South Australian EPA's Environmental Noise Guidelines for Wind Farms (2003).
Flora and Fauna	A review of vegetation of the site will be conducted with a focus on native vegetation, particularly those having conservation significance. Important areas of vegetation and fauna habitat will be identified and, as far as possible, such areas will be avoided by the development. Impact on such areas would only occur subject to agreement with relevant authorities and the necessary mitigation measures being incorporated into the project. Assessment of relevant avifauna species will be undertaken to identify any potential at-risk species.
Archaeological / Heritage	A heritage assessment will be undertaken by a suitable specialist in conjunction with representatives of one or more indigenous stakeholder groups.
Traffic Assessment	A comprehensive assessment may be required to determine suitability of local roads to cope with the increased traffic load, and specifically the impacts associated with over-size and over-mass vehicles accessing the site during the construction phase.
Telecommunications	An assessment of services potentially impacted will be undertaken.
Geology soils and geotechnical information	Information on these aspects will be compiled and incorporated in the EA.
Air safety, bushfire risk, catchment issues, community consultation, etc.	A number of issues will be dealt with, as necessary, by review of the issue, identification of options for mitigation and consultation with relevant stakeholders. The outcome will be incorporated into the EA.

6. Conclusion

The Crudine Ridge Wind Farm proposes to be an environmentally sensitive, sustainable development in order to meet renewable energy targets for Australia's electricity supply.

Through community and stakeholder consultation, meeting planning requirements, carrying out environmental assessments and employing mitigation measures where necessary, the project aims to create minimal environmental impact during construction and operation while generating clean, renewable energy.

Appendix 1 – Locality map



LEGEND

Proposed Crudine Ridge Wind Farm

COMPANY

CRUDINE RIDGE WIND FARM PTY LTD

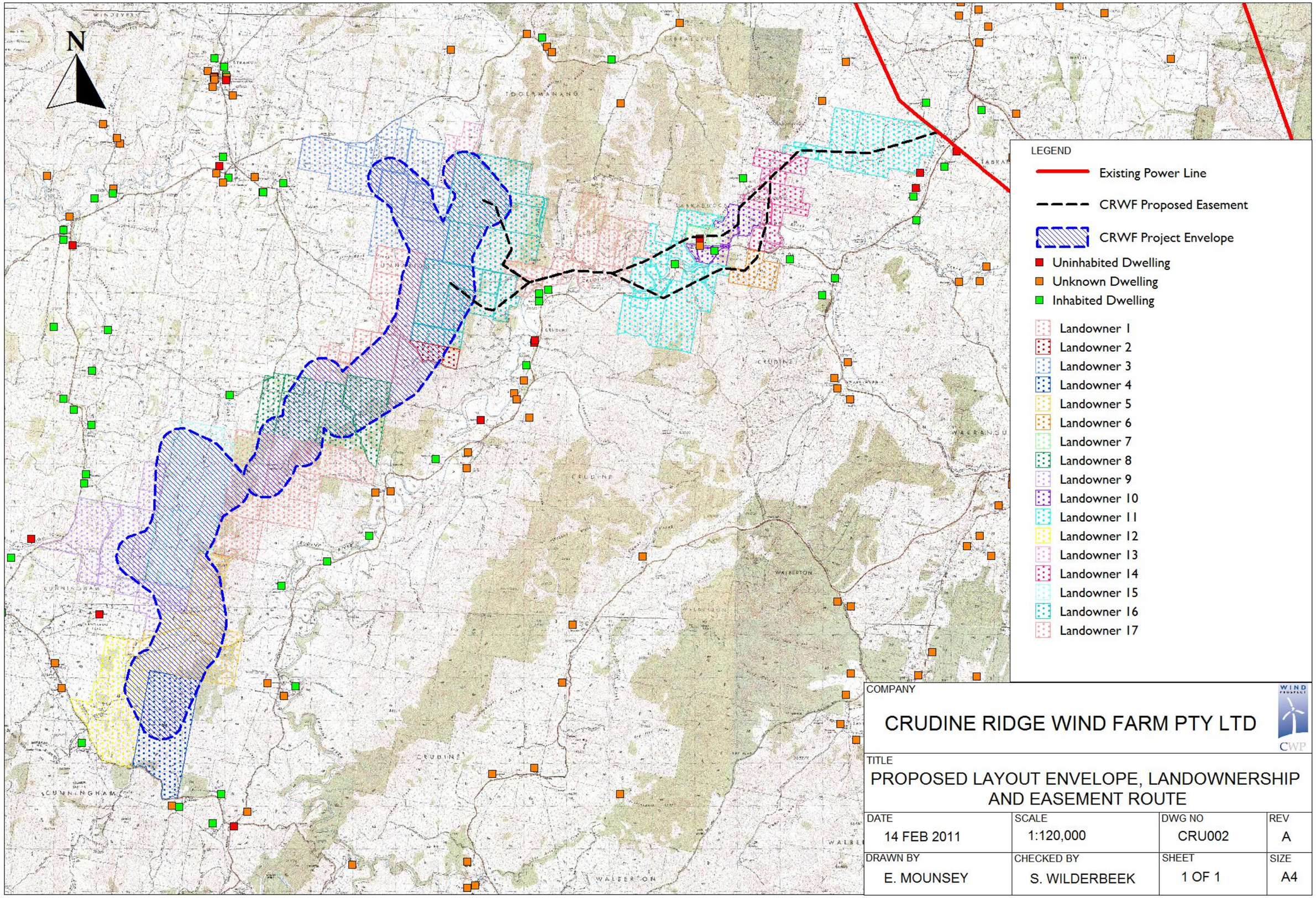
CWP

TITLE

PROJECT LOCALITY

DATE	SCALE	DWG NO	REV
14 FEB 2011	1:800,000	CRU001	A
DRAWN BY	CHECKED BY	SHEET	SIZE
E. MOUNSEY	S. WILDERBEEK	1 OF 1	A4

Appendix 2 – Proposed layout envelope, topographic map and neighbouring residences



COMPANY

CRUDINE RIDGE WIND FARM PTY LTD

TITLE

PROPOSED LAYOUT ENVELOPE, LANDOWNERSHIP AND EASEMENT ROUTE

DATE	SCALE	DWG NO	REV
14 FEB 2011	1:120,000	CRU002	A
DRAWN BY	CHECKED BY	SHEET	SIZE
E. MOUNSEY	S. WILDERBEEK	1 OF 1	A4

Appendix 3 – Property details for land on which the wind farm/easement would be located

Plan No.	Lot	Landowner
DP756913	35	
DP756913	39	
DP756913	159	
DP756913	191	
DP756913	160	
DP756913	186	
DP756913	24	
DP756913	36	Landowner 1
DP756913	124	
DP756913	98	
DP756913	187	
DP756913	125	
DP756913	17	
DP756913	47	
DP756913	141	
DP756913	177	Landowner 2
DP756913	176	
DP756913	202	
DP756913	57	
DP756913	210	
DP756913	190	
DP756913	27	Landowner 3
DP756913	211	
DP756913	137	
DP756913	134	
DP756913	136	
DP756913	135	
DP756878	100	Landowner 4
DP756878	76	
DP756878	17	
DP756878	97	
DP734393	1	Landowner 5
DP704748	184	
DP756878	161	
DP756878	75	
DP755768	83	Landowner 6
DP755792	27	Landowner 7
DP756913	100	
DP756913	165	
DP756913	184	Landowner 8
DP756913	49	
DP756913	185	
DP756878	133	
DP756878	3	
DP756900	2	
DP756878	105	Landowner 9
DP756900	120	
DP756878	2	
DP756878	113	
DP756900	71	
DP740568	2	Landowner 10
DP755768	60	
DP755768	36	
DP755792	88	
DP755768	40	
DP755792	65	
DP755792	79	
DP756913	38	Landowner 11
DP755792	89	
DP756913	46	
DP755768	99	
DP756913	37	
DP755768	161	
DP756913	127	
DP756913	53	
DP756878	35	Landowner 12
DP756913	8	
DP756913	4	Landowner 13
DP756913	18	
DP756913	199	
DP755792	63	
DP1097478	1	
DP755792	64	
DP384097	1	
DP755768	24	Landowner 14
DP755792	44	
DP755792	70	
DP755792	62	
DP755792	81	
DP756913	209	Landowner 15
DP756913	218	
DP756913	170	
DP756913	172	
DP756913	179	
DP756913	196	
DP756913	162	
DP756913	197	Landowner 16
DP756913	140	
DP756913	173	
DP756913	171	
DP756913	195	
DP756913	214	
DP756913	203	
DP756913	169	
DP756913	14	Landowner 17
DP756913	123	
DP756913	129	
DP756913	188	