Wyalla GCMP monitoring bores

Regional Planning Interests Act 2014 Assessment Application Report

'Wyalla' Property (Lot 1 on RP117442)

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Contents

1. Purpose

The Applicant proposes to undertake petroleum activities within an Area of Regional Interest including Priority Agricultural Area (PAA) and Strategic Cropping Area (SCA). This report provides the required supporting information for an application for a Regional Interest Development Approval (RIDA) under the *Regional Planning Interests Act 2014* (RPI Act).

1.1 Scope

The Applicant is undertaking a Groundwater Characteristics Monitoring Program (the "GCMP") within PL253. This application's scope describes the petroleum activities which support the GCMP and are proposed to occur on the "Wyalla" property located on Lot 1 RP117442 owned by Arrow CSG (Australia) Pty Ltd. The proposed works occur wholly within Petroleum Lease 253 and have an associated Environmental Authority (EA) EA0001401. It is a requirement under condition Water 1A of the EA for Arrow to undertake the GCMP.

Additional parts of the GCMP are occurring on PAA and SCA, located on private properties where the Applicant has, or intends to negotiate, conduct and compensation agreements (CCAs) with relevant landholders. In such circumstances, the proposed works on private properties are considered an *exempt resource activity* pursuant to Section 22 of the RPI Act.

1.2 Context

Section 29 of the RPI Act requires that a RIDA be accompanied by a report that:

- Assesses the resource activity or regulated activity's impact on the area of regional interest; and
- Identifies any constraints on the configuration or operation of the activity.

The *RPI Act Guideline 01/14 - How to make an assessment application for a regional interests development approval under the Regional Planning Interests Act 2014* and supplemental guidelines describe the matters to be addressed by an assessment application report. Table 1-1 lists these requirements and a reference to the sections of this report where they are addressed.

Table 1-1 - Assessment report information requirements

Information requirement	Where addressed
The location, nature, extent (in hectares) and duration of the surface impacts of the authorised activity.	Sections 0, 3, 4
A description of the impact of the proposed activities on the feature, quality, characteristic or other attribute of the area.	Sections 3, 4

Information requirement	Where addressed
Include a table identifying the location and surface area of each of the proposed activities.	Table 2-3
The report must also include an explanation of how the proposed activity will meet the required outcome/s and address the prescribed solution/s contained in the assessment criteria for the area of regional interest.	Section 0

1.3 Applicant

The Applicant for this assessment application is the resource authority holder for PL253, Arrow CSG (Australia) Pty Ltd ABN 54 054 260 650 (see Appendix A).

The owner of the Land that is subject to this application is Arrow CSG (Australia) Pty Ltd (ABN 54 054 260 650) ("the Landowner") (see Appendix B).

1.4 Arrow activities

Arrow Energy produces CSG from fields in the Surat Basin in southern Queensland and the Bowen Basin in central Queensland. It has been safely and sustainably developing CSG since 2000 and supplying it commercially since 2004.

Arrow owns one of Queensland's largest power stations, Braemar 2 near Dalby, and has interests in a further two, with generation capacity equivalent to the power requirements of around 800,000 homes.

Arrow's first Surat Basin tenure was granted in March 2000 and Arrow drilled its first Surat Basin exploration well in June 2001.

1.5 Applicant's co-existence commitments

The Applicant ("Arrow") considers coexistence to mean allowing Australia to enjoy the full benefits from both agricultural and resource industries. Arrow has made 12 commitments to coexistence on Intensively Farmed Land ("IFL") in the Surat Basin:

1. No permanent alienation
2. Minimised operational footprint – less than 2% of total IFL area
3. Flexibility on CSG well locations, but all wells located by edge of farm paddocks
4. Pad drilling (up to 8 wells from a single pad) used where coal depth and geology allows
5. Spacing between wells maximised (average of between 800m – 1500m)
6. Pitless drilling only

7. No major infrastructure facilities on IFL (dams, compression stations, gas gathering stations, water treatment)

8. Treated CSG water used to substitute existing users' allocations on IFL

9. No brine/salt treatment or disposal on IFL

10. Flexibility on power supply option – above or below ground

11. Fair compensation – including elements of 'added value'

12. Continued proactive engagements with community and transparency on coexistence field activities

*Commitment 8 refers to the area of greatest predicted drawdown on the Condamine Alluvium resulting from CSG extraction by Arrow Energy.

1.6 Area wide planning

Area Wide Planning (AWP) is a unique program developed by Arrow to incorporate landholders' knowledge into its field development plans. Landholders and Arrow staff work together to identify locations for infrastructure, such as well pads, gathering lines and access tracks, across farming districts and on flood plains. The process strengthens Arrow's ability to coexist with agricultural activities. Planning occurs one-on-one with landholders and, where appropriate, in local area meetings with neighbouring landholders. Specific landholder agreements are then formalised in Conduct and Compensation Agreements ("CCAs"). The program demonstrates a commitment to genuine engagement and a commitment to preserving the values that are important to landholders.

The Area Wide Planning process has been incorporated into CCA negotiations with surrounding Landholders in support of the GCMP.

The Area Wide Planning process, together with the technical requirements for the location of the Wells, has also been used to consider the location of infrastructure in the CCA between the Applicant and the Landholder and, a separate CCA between the Applicant and the Occupier for the Land the subject of this application.

2. Proposed Works

2.1 Description of work activities

Arrow, in support of the GCMP, is drilling eight groundwater monitoring bores; data will be provided to the Queensland Government Office of Groundwater Impact Assessment and Department of Environment and Science, to contribute to a broader understanding of the groundwater system in the area. The activities are undertaken pursuant to Environmental Authority EA0001401.

The authorised petroleum activities to occur on the Land include the construction of two ground water monitoring bores (the "Wells") on a single well pad, including:

- Site preparation (surveying and set out, demolition of existing cattle yard remains, clearing of trees and general levelling of the site);
- Installation of a hardstand area approximately 75m x 50m (including the importing of gravel to be used in the immediate vicinity of the wells on the operational footprint only);
- Drilling and completion of two Wells;
- Installation of water monitoring and telemetry equipment;
- Installation of cattle proof fencing around the Wells and surface equipment – approximately 288m^2;
- Rehabilitation of the site outside of the hardstand area (including re-spreading of topsoil and waste removal); and
- Periodic inspections and monitoring.

The above activities are the subject of this application.

The majority of the authorised petroleum activities for the GCMP are not subject to a RIDA. This includes authorised petroleum activities on surrounding properties, by agreement with those Landholders, which are therefore exempt from a RIDA under section 22 (2) (a) (ii) of the RPI Act in this instance.

2.2 Definition of work activities

The table below outlines the definition of work activities:

Table 2-1 – Definitions

Activity	Definition
Construction of Wells Installation of a single well pad and two Wells (for water monitoring bores) at	• Construction of one multi-well pad (Hopeland 20 & Hopeland 21) • Drilling of two wells:

locations indicated in Appendix C and D.	○ Hopeland 20 ("HL 20") ○ Hopeland 21 ("HL21") • Installation of surface equipment: ○ Well skid including telemetry and well monitoring equipment ○ Permanent fencing around well pad operational footprint
Post-construction Rehabilitation of well pad construction area leaving the operational well pad.	• Removal of excess material • Rehabilitation in accordance with Environmental Authority • Reseeding of disturbed areas • Weed control as required
Operate and Maintain Inspect, operate and maintain the wells. Inspect and maintain the rehabilitated area.	• Carry out regular well inspections • Carry out maintenance, as required • Collection of water samples • Monitor rehabilitation activities and undertake ongoing maintenance of rehabilitated areas, as required • Weed control as required
Decommissioning and Final Rehabilitation	• Plug and abandon the wells using a drilling rig • Rehabilitation of the surface of the land • Reseeding of disturbed areas • Weed control, as required

Table 2-2 Definitions for purposes of assessment

Resource Activity	Definition
Multi-well pad	A pad for two water monitoring wells and associated infrastructure of dimensions no more than 13,000m^2 during construction and no more than 3750m^2 during operation
Ground Water monitoring bore	A water bore designed to collect water quality samples, monitor water levels, and assess aquifer properties.
Well	For the purposes of this application a Well is a Ground Water monitoring bore

2.3 The Land

The Land is described in Table 2-3 below:

Table 2-3 – the Land

Item	Description
Land	Lot 1 RP117442
Address	16 Mile Hall Road, Hopeland, QLD 4413
Area of Land	287.39 ha
Property Name	Wyalla
Land Owner	Arrow CSG (Australia) Pty Ltd ABN 54 054 260 650
Land Purchased	29 November 2013
Local Government	Western Downs Regional Council
Zoning	Rural and Rural Activity
Regional Plan	Darling Downs Regional Plan
Areas of Regional Interest	Priority Agricultural Area (PAA) and Strategic Cropping Area (SCA)
Land	Portion of Lot 1 RP117442
Expected Area of Impact on the Land	**Construction: 1.3 ha or 0.452%** of the Land (Construction period is less than 12 months) **Operations: 0.375 ha or 0.13%** of the Land

2.3.1 Current Land Use

The current land use of the Land is primarily agricultural (grazing) under a lease arrangement with a neighbouring landholder.

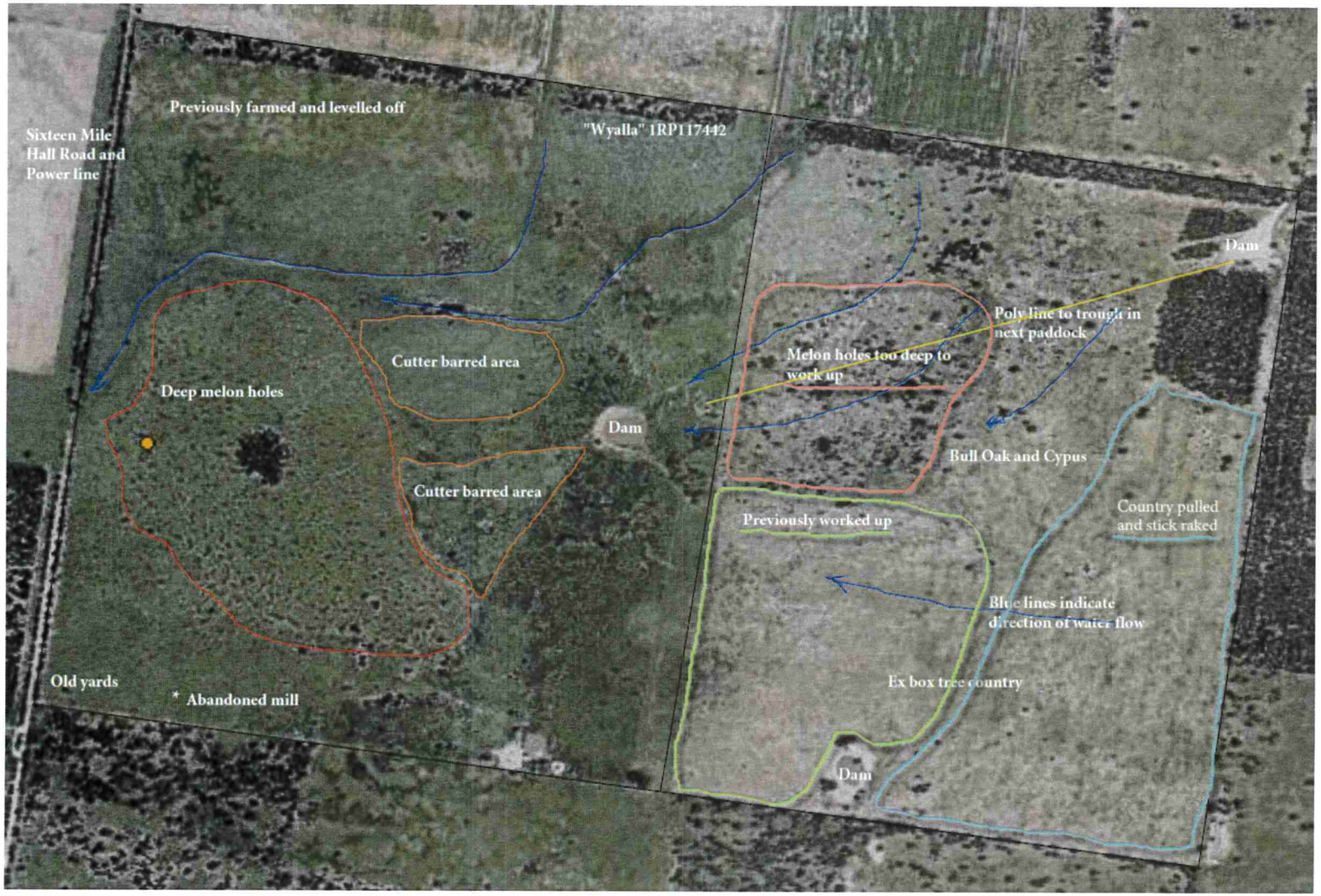
Plate 1 below shows the various areas of the Land and how they have been used over time. As can been seen looking at the image, the Eastern half of the Land has been previously worked up (more than 10 years ago) or pulled and stick raked. This is also evident by the dark lines running North-South near the Eastern boundary. The blue lines in the image indicate the surface flow of water from North-East to South-West (note this is away from neighbouring farmed land). The Western half of the Land shows previous attempts to farm the land which occurred more than 10 years ago (see section 3.1.3 below for more detail on this) and melon hole areas. The Western half is used for grazing purposes only within the last 10 years.

Due to the nature, duration and limited extent of the expected area of impact the authorised petroleum activities there will not be significant impact on the use of

the Land for agricultural purposes. To this extent, the design and location of infrastructure minimises the impacts on the agricultural use of the Land. This is further detailed in sections 5.1 and 5.7 below.

Photo 1 – Current land use of Lot 1 RP117442

Plate 1 – Current and Historical landuse



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2.3.2 Surrounding Land Uses

The existing surrounding land uses compromise areas used for ongoing operation of existing petroleum activities as well as for productive rural purposes, such as dryland cropping and grazing of beef cattle.

Refer to Appendix G – Surrounding Land Uses.

2.4 Existing Authorities

The Land is subject to existing authorities described in Table 2.4 below:

Table 2-4: Existing authorities

Tenure	PL253
Tenure granted	26.02.2019
Tenement Holder	Arrow CSG (Australia) Pty Ltd
Environmental Authority	Permit No: EA0001401 (effective 26.02.2019)

2.5 Location of GCMP monitoring bores on Wyalla

Please see the following Appendices:

Appendix C – Locality Plan – showing the Land the subject of the assessment application.

Appendix D - Site Plan –showing the location of the two water monitoring bores on the land with an expected area of construction impact of **1.3ha**.

3. Areas of Regional Interest

3.1 Priority Agricultural Area

PAAs are strategic areas, identified on a regional scale, that contain significant clusters of a region's high value intensive agricultural land uses. The PAA surrounding the Land includes areas of high value agricultural land uses, in particular areas of dryland cropping and grazing.

Within the PAA, Priority Agricultural Land Use (PALU) is given priority by ensuring that the location of resource activities can coexist with these uses.

3.1.1 Assessment of Priority Agricultural Land Use

The RPI Act Guideline 07/14: *How to identify a priority agricultural land use* (PALU) was consulted to determine if the Land within the Darling Downs Regional Plan is, or has been, utilised as PALU. This is summarised in Section 3.1.2 – 3.1.4 below.

3.1.2 Australian Land Use Management

A search at the secondary level of the Australian Land Use Management (ALUM) classification for the Land generally identifies the area within Class 2 Production from Relatively Natural Environments.

The Land is located within the Western Downs Planning Scheme (Lot 1 RP117442). Under the Western Downs Planning Scheme the western portion of the lot is mapped as Agricultural Land Classification Class A and the eastern portion has no agricultural attribute mapped.

The Land is also located within the Darling Downs Regional Plan. The Darling Downs Regional Plan indicates the following Land uses on the Land:

- Brigalow with melon holes on the relevant Western part of the Land where the authorised petroleum activities are proposed; and
- Bulloak on the Eastern part of the Land.

The above land uses are not as conducive to PALU and intensive cropping as some other land uses. The melon holes or gilgai found on the Land are such that it is not considered economical to improve the surface of the land (through intensive grading and levelling) to the state necessary to support intensive cropping.

Photo 2 – Evidence of Gilgai on Lot 1 RP117442 below is taken from the approximate Well location looking East. The Southern fence line can be seen on the right hand side of the photo and the vegetated drainage line is located within this area.

3.1.3 Frequency of Agricultural Activity

Schedule 2 of the RPI Regulation states that:

- For land or property in relation to PALU, means the land or property has been used for a PALU for at least three years during the 10 years immediately before an assessment application is made in relation to the land.

Several methods of data collection have been used to determine the history of the use of the Land, being Forage Crop Frequency Reports, Queensland Land Use Mapping (QLUMP) and discussion with the current and previous owners.

Forage Crop Frequency Reports

To determine the frequency of agricultural activity, Forage Crop Frequency Reports (Reports) (see Appendix E) were obtained for the Land. The results of the Reports conclude the following:

- Lot 1 RP117442: Approximately two or fewer crops were recorded between 2008 and 2018

Cropping History Table

Based on information provided by the current and previous owners and the current tenant, the following cropping history has been identified:

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

The Applicant purchased the Land in November 2013. Since that date, the Land has been used only for grazing and has not been cropped. The previous owner confirmed to the Applicant that between 11 and 15 years ago parts of the land were levelled, farmed briefly with Forage Sorghum and sown to pasture, primarily for the purpose of weed control, to provide a quick fodder crop and then to convert the land to improved pasture for grazing. Further attempts at farming the Land were abandoned as uneconomical due to the nature of the soil and number and depth of gilgai on the Land. At no time was the area of the Land proposed for the GCMP Wells farmed.

The Applicant has developed the location of the proposed infrastructure in accordance with the co-existence commitments. This in turn minimises any impact on agricultural activities on the Land.

Queensland Land Use Mapping

Queensland Land Use Mapping ("Qlump") assessments have been undertaken as follows:

- 1999 – see Appendix F - Queensland Land Use Mapping – showing predominant land uses of Production from Relatively Natural Environments;
- 2006 – see Appendix F - Queensland Land Use Mapping – showing predominant land uses of Production from Relatively Natural Environments; and
- 2012 – see Appendix F - Queensland Land Use Mapping – showing predominant land uses of Production from Relatively Natural Environments.

The historical Qlump maps confirm little evidence of previous cropping activity. As stated above, the location of the Wells have been designed to minimise impacts on the use of the Land and preserve the existing land use.

Table 2-5 below shows the yearly analysis of the crop frequency satellite imagery compared to Arrow cropping records above.

Table 3-5 – The Land

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
cropping history	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Estimated total crop frequency map	White indicating 2 or less crops	White indicating 2 or less crops	White indicating 2 or less crops	White indicating 2 or less crops	White indicating 2 or less crops	White indicating 2 or less crops	White indicating 2 or less crops	White indicating 2 or less crops	White indicating 2 or less crops	No imagery available	No imagery available
Satellite imagery suggestion	Feb Green Sept Light green/brown	Feb Light green/brown Sept Light green in SW corner, light brown elsewhere	Feb Green Sept Light green/brown	Feb Green Sept Light green/brown	Feb Light green/brown Sept brown	Feb Green Sept Light green/brown	Feb Green Sept Light green/brown NW corner has a strip of light brown	Feb Green Sept Brown	Feb Brown Sept Brown	Feb Green Sept Green	No imagery available
Analysis	Consistent Green areas in Feb due summer grass	Consistent Green areas in Feb due summer grass Green areas in SW corner in Sept due to Gilgai country	Consistent Green areas in Feb due summer grass	Consistent Green areas in Feb due summer grass	Consistent	Consistent Green areas in Feb due summer grass	Consistent Green areas in Feb due summer grass The NW corner strip of light brown is consistent with the brown of the fallow paddocks to the North. This may be due to this area undergoing recovery from earlier farming and levelling and the lack of winter herbages.	Consistent Green areas in Feb due summer grass	Consistent	Consistent	

3.1.4 Conclusions on PALU

There is no PALU, as defined under the RPI Act, on Lot 1 on RP117442. Therefore, the authorised activities will not impact on PALU on the Land. Additionally, the authorised activities have been located so as to minimise any significant impact on PAA on the Land. Further, the authorised activities have been located, in accordance with the co-existence commitments, to avoid any significant impact on any PALU or PAA on surrounding land.

3.2 Strategic Cropping Area

The SCA consists of the areas shown on the strategic cropping land (SCL) trigger map as SCL.

A Compliance Certificate (SCLRD2012/000003 dated 26.07.2012 – refer Appendix H – SCL Compliance Certificate) was issued under the *Strategic Cropping Land Act 2011*. The compliance certificate was for resource activities which included up to 60 wells. The Wells the subject of this application form part of those 60 wells in the SCL compliance certificate. Pursuant to s.103 of the Regional Planning Interests Act, this SCL compliance certificate is deemed to be a Regional Interests Development Approval for the resource activity. Accordingly, this regional interests development application is only in relation to PAA as a RIDA is already in place for SCA.

4. Extent and duration of disturbance

Generally, land within the area of the Wyalla property is used for productive rural purposes, including cropping and grazing of beef cattle as well as for existing petroleum activities. However, the Land that is the subject of this application has no recent history of being cropped as outlined in section 3.1 above.

Therefore, the authorised activities will result in no direct disturbance of cropping lands during construction, and as outlined in 3.1 above will not result in permanent impacts to the current uses of the Land. As the Applicant leases the Land to a nearby neighbour, who has been using the Land for grazing, an arrangement has been entered into with the Lessor to ensure grazing activities will be maintained away from the construction area during that time.

During the well operational phase, Arrow Energy will:

- Ensure that routine and scheduled maintenance activities are conducted so that they cause minimum disruption to potential agricultural operations by managing vehicle movements,
- Minimise the probability of transport of weeds from property to property as a consequence of the proposed construction and operational activities,
- Minimise the likelihood of any dislocation of existing farming practices and stock injury and loss on the Land.

The extent and duration of the authorised activities is as follows:

Expected area of impact

Priority Agricultural Area – Construction **1.3 ha,** Operations **0.375 ha**

As can be seen in Appendix D, the location of the well pad minimises the expected area of impact through location in the South West corner of the paddock. Consequently, agricultural activities can continue up to the fenced off well pad during construction and operation as there is no unusable area of surrounding land and this location also disperses with the need for a separate access track.

4.1 Expected Duration of Disturbance

Construction is expected to take approximately 10 weeks over a period of 5-6 months, weather permitting.

Once constructed and operational, the wells will be monitored on quarterly basis until 2049 or longer if required under the Environmental Authority or Tenement conditions.

Disturbance area of the operational footprint of the wells on PAA land has been calculated to be 0.375ha or 0.13%.

5. Management of mitigation measures

5.1 Assessment of alternatives

The GCMP aims to record data for specific monitoring purposes and accordingly, the monitoring Wells are required to be placed in specific geographical locations determined by groundwater modelling for the area. Given this purpose and constraint on location there are few alternatives available. Specifically, for HL20 & HL21 the only alternatives involved locating the Wells further away from the fence line of Lot 1 RP 117442, further into the paddock, where the Wells would create an imposition on the general use of that paddock. The Wells were initially proposed in this location however, after consultation with the tenant and considering feedback from the tenant, the location was moved to the current proposal in the South-West corner of the paddock. The location has been designed to avoid farm infrastructure such as the old wind mill and associated borehole, previously cropped areas to the North and West of the proposed site, areas of significant vegetation, water troughs and dams on the Land. This location is an example of working with the user of the land (the tenant) to design the location of the infrastructure in a mutually acceptable location where both petroleum and agricultural activities can co-exist.

To the greatest extent possible and in accordance with the co-existence commitments, the construction and operation footprint of the authorised activities has been minimised. As stated above, the location of the infrastructure next to the access road and in the south-west corner of the paddock abutting the property boundary, within Gilgai country, has been designed to minimise impacts

on the future use of the land including any potential to crop again in those areas where previously improved pasture has been undertaken.

The location of Wells on the Land has been designed with a view to maintaining the productive agricultural capacity of the Land in its current use and in the future. The well locations have been determined to be away from key farm infrastructure (noting the cattle yards are abandoned, partly demolished, no longer used and will be taken down as part of the preparation of the drilling pad – refer photo 3 below) and in a location that allows agricultural activities in the remainder of the paddock to continue unabated.

Photo 3 – Abandoned and partially demolished cattle yards

5.2 Construction activities

5.2.1 Wells

Drilling and completion of two vertical Wells on one well pad on the Land.

The construction method involves:

- A reasonable level of grading to form a level pad with corresponding compaction of soil, as required, due to the number and depth of gilgai on the site;

- Gravel placed on the area to be used for the operational footprint of the Wells but no greater than 1.0ha;
- Construction of a 'cellar' in the ground – approximately 1.5m x 1.5m x 1.5m deep to support drilling activities. The well is drilled in the centre of the cellar (see photo 4);
- Drilling of the first Well using a coring rig. This is estimated to take 10 days including bringing the rig to site, drilling the Well and removing the rig from site;
- Drilling of the second Well using a non-coring rig. This is estimated to take seven days including bringing the rig to site, drilling the Well and removing the rig from site;
- Installation of an aboveground well head known as "Christmas Tree" for each well (see photo 4).

As the well pad location abuts the road (16 Mile Hall Road), no additional access track is required.

5.2.2 Surface Infrastructure

Once the Wells have been drilled, downhole monitoring equipment will be installed and the Wells will be completed with surface infrastructure including Well heads & Christmas Tree, a skid with solar panels and telemetry equipment and erection of the permanent cattle panels around the operational footprint of the Wells. This is estimated to require one week to complete.

Sampling of groundwater from the Wells will occur at this stage using a wire line unit mounted on a small truck together with a small crane.

Photo 4 – Typical Water monitoring bore surface installation including square cellar at ground level, christmas tree above the well head in the centre of the cellar, monitoring equipment skid and cattle panel fencing.

5.3 Reinstatement and rehabilitation

Reinstatement and rehabilitation measures will be applied to all areas disturbed during construction as soon as practical following the completion of the construction of authorised petroleum activities.

All reinstatement and rehabilitation will be carried out in accordance with the Environmental Authority requirements. Generally, this will include:

- Stockpiling of grasses, woody vegetation after clearing and prior to construction
- Segregation of topsoil to ensure topsoil integrity when soil clearing is required as part of construction
- Reinstatement of the land contours/land surface and drainage
- Reinstatement of topsoils
- Implementation of stabilisation measures (which may include re-seeding for local grass specifies if applicable).

The construction footprint of the land will be returned to its previous general state and use once construction is completed and rehabilitation is undertaken leaving only the operational footprint and, the land will be visually consistent with the surrounding land features. Periodic monitoring will be undertaken to ensure integrity of the rehabilitation.

Detailed erosion and sediment control measures will also be implemented and maintained consistent with the Environmental Authority during construction, and as required following construction.

Other reinstatement activities will include:

- Removal of any foreign construction material and waste
- Restoration of fencing as required

5.3.1 Rehabilitation from construction to operational footprint

The rehabilitation process of the multi-well pad from construction to operational footprint (called site stabilisation) involves:

Rehabilitation Action	Description
Soil Assessment	Assessment of the soil type at the site and the risks of impacts of the proposed rehabilitation activities in accordance with Arrow's Land Disturbance Procedure. A plan of rehabilitation is then developed to support revegetation of the site.
Soil compaction	Where soil is likely to have become compacted the soil will be treated (i.e. shallow or deep ripped as required) to alleviate the compaction. This will occur prior to reshaping the upper layers of the soil stratum.
Sodic soil amelioration	When sodic soil is encountered it will be blended with an appropriate soil ameliorant (i.e. gypsum or a calcium based ameliorant) during rehabilitation to reduce dispersiveness. Topsoil will then be placed above the sodic soils.
Topsoil management	Topsoil which was stripped and stored as part of the construction activities will be re-spread as part of the stabilisation and rehabilitation activities. Correctly preserved topsoil can assist greatly with establishment of vegetation. Where necessary, the topsoil will be ameliorated with gypsum, lime or organic mulch to improve soil structure, infiltration and soil aeration which in turn promotes vegetation establishment.
Establishment of vegetation	The surface of the land will be returned to its former use. Where the area is to be established for grazing this will involve reseeding with a seed mix

	complementary to the surrounding grasses, application of fertiliser if required and stock proof fencing of the area if required to protect the establishing vegetation.

Photo 5 below shows a previously drilled water monitoring bore with an operational footprint in the background with re-established ground cover suitable for grazing in the rehabilitated area used for construction in the foreground. This was undertaken on gilgai country similar to Wyalla.

5.4 Commissioning

Commissioning of the Wells will commence at the completion of construction. This involves connecting the skid equipment to the "Christmas Tree" on the well head and checking monitoring equipment function.

5.5 Operational activities

Other ongoing activities will be required to be undertaken by the Tenement Holder to support the operation of the Wells, including:

- Monitoring and maintenance associated with the Wells
- Regular inspections to ascertain whether there are weeds and pests requiring management on the pad and immediately surrounding areas and the most appropriate method of management given the surrounding activities (e.g. use of a pesticide or herbicide which will not negatively impact on any surrounding crops or cattle grazing or farm biosecurity requirements);
- Weed and pest management in accordance with the Environmental Authority, the *Biosecurity Act 2014*, the *Local Government Act 2009* and the Land Access Code 2016;
- Regular inspections for any erosion or subsidence of the pad and its immediate surrounds, and the most appropriate method of management and mitigation;
- Regular inspections to ascertain whether the area used for construction has been successfully rehabilitated with an establishment of appropriate ground cover (as the case may be) and the soil has stabilised adequately and, if not, what further management actions are required.

Access to the site for operations and maintenance will be undertaken according to the Land Access Code (September 2016) and the requirements of the relevant legislation.

Generally, works will temporarily cease during wet weather to minimise impacts to the land and soil erosion.

In accordance with the co-existence commitments, operational activities will be undertaken in consultation with the Landholder and Occupier in in a manner (timing) to minimise impacts on the Land.

Photo 6 below shows a typical water monitoring bore surface infrastructure in operational mode.

5.6 Decommissioning

5.6.1 Decommissioning of the infrastructure

At the conclusion of the activity, the monitoring Wells will be decommissioned. This involves:

- using a drilling rig to plug the well with concrete to isolate formations and prevent leakage to the surface ; and
- removal of all surface infrastructure, cutting off the well casing below ground surface.

5.6.2 Final rehabilitation from operational footprint

After decommissioning, the operational well pad area will be returned to the previous use of grazing.

This rehabilitation involves:

Rehabilitation Action	Description
Soil Assessment	Assessment of the soil type at the site and the risks of impacts of the proposed rehabilitation activities in accordance with Arrow's Land Disturbance Procedure. A plan of rehabilitation is then developed to support the return of the site to the surrounding land use.
Soil compaction	Where soil is likely to have become compacted the soil will be treated (i.e. deep ripped) to alleviate the compaction. This will occur prior to reshaping the upper layers of the soil stratum.
Sodic soil amelioration	When sodic soil is encountered it will be blended with an appropriate soil ameliorant (i.e. gypsum or a calcium based ameliorant) during rehabilitation to reduce dispersiveness. Topsoil will then be placed above the sodic soils.
Topsoil management	Topsoil which was stripped and stored as part of the construction activities will be re-spread as part of the stabilisation and rehabilitation activities. Correctly preserved topsoil can assist greatly with establishment of vegetation. Where necessary, the topsoil will be ameliorated with gypsum, lime or organic mulch to improve soil structure, infiltration and soil aeration which in turn promotes vegetation establishment.
Establishment of vegetation	The surface of the land will be returned to its former use, or a use consistent with its former use and current surrounding land uses as identified in the initial rehabilitation assessment. Where the area is to be established for grazing this will involve reseeding with a seed mix complementary to the surrounding grasses, application of fertiliser if required and stock proof fencing of the area if required to protect the establishing vegetation.

5.7 Consideration of Petroleum Activities upon PALU

5.7.1 Impact on farm machinery and surrounding cropping

The location of the multi-well pad has been specifically designed to minimise any impact on the ability of the surrounding land to be cropped (if possible) in the future. As stated above, the pad has been located abutting the access road and the Southern boundary of the Land, minimising the intrusion into the paddock and the need to additional access tracks. This layout maximises the available balance land for agricultural activities.

Further, Arrow will install fencing around the well pad which will not impede on the ability to use boom equipment around the pad. (Refer photo 5 above showing typical cattle panel fencing around the operational footprint of the well)

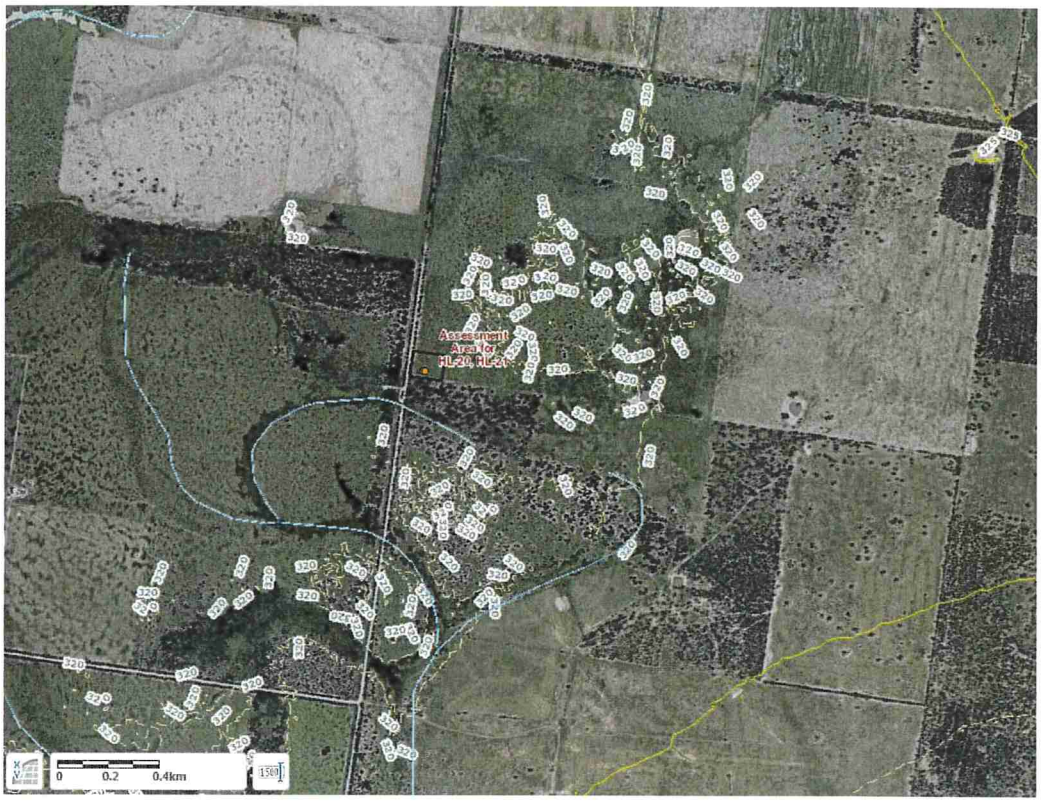
5.7.2 Impact on water run-off and shadowing

The image below shows the subject lot of this application and the surrounding areas with contour lines at 5m intervals generally and 1m intervals in the Gilgai areas. The watercourse to the South of the property is shown in light blue. This image shows the land is generally level in the area of the Wells.

Drainage on this part of the Land flows from the North East to the South West into the natural drainage watercourse South of the property boundary. The construction pad area will be prepared to work with this natural drainage line and allow water to flow across the pad or around it and into the watercourse to the South of the boundary.

The proposed Wells and associated pad is not considered to have an impact or impede on the cropped land to the North and North-West of the Land given the overall surface water run-off described above, which is away from those cropping activities.

Image 1 - Wyalla Contours and drainage



5.7.3 Weed management impact on PALU

The predominant method of weed management currently on the Land is mechanical. This is consistent with the original purpose to attempt to farm and level off parts of the Land. Mechanical weed management creates less chemical run-off compared to some forms of chemical spraying meaning less run-off onto neighbouring dryland cropping areas. Further, as outlined above, the flow of surface water is away from the cropping areas to the North and North-West further minimising the likelihood of chemical run-off into these areas.

5.7.4 Impact of the authorised activities on PALU

The Applicant considers the land the subject of the authorised petroleum activities is not PALU. Therefore there is no impact on PALU as a consequence of the activities.

Notwithstanding this, if the area of the authorised petroleum activities were to be considered PALU, the Applicant considers the authorised activities would not have a significant impact on PALU. As outlined above, this is due to:

- the location of the pad abutting the access road to the West and the property boundary to the South, utilising the minimum area possible and maximising the balance land available for agricultural activities;
- location of the well pad on a previously disturbed area of cattle yards;
- the location of the pad removing the requirement for an additional access track;
- the design of the pad will facilitate the existing surface flow of water run off on the land from North Ease to South West and into the drainage watercourse to the South of the property boundary;
- location and design of the well pad to avoid interference with farm machinery such as tractor routes, use of surrounding fencing which will not interfere with the use of booms on farm machinery as they can be raised above the fence line when turning close to the infrastructure. In this way, the design of the infrastructure will not impact on the style of farming on the property;
- the construction period for the multi-well and pad will take less than 12 months;
- rehabilitation techniques to ensure the construction footprint does not have a significant or long term impact on the ability to use the underlying area for agricultural activities in the future; and
- rehabilitation techniques to ensure that when the wells are decommissioned, the operational pad area is rehabilitated and returned to productive agricultural use, in accordance with the Environmental Authority.

5.7.5 Future use of Wyalla property

As stated above, the property is currently leased to a neighbouring Landholder and the property is used for agricultural purposes by the Tenant. It is the Applicant and the Landholder's intention that both agricultural and petroleum activities can and shall co-exist on the property at the same time, as will be the case during the construction and operation of the wells the subject of this application. The Landholder will continue to consult with the Tenant regarding the ongoing petroleum activities and ongoing co-existence on the Land.

6. Public Notification

The Land is not mapped as Priority Living Area (PLA). Accordingly this assessment application does not meet the definition of a notifiable application pursuant to Section 34(2) of the RPI Act or section 13 of the *Regional Planning Interests Regulation 2014* and therefore public notification is not required.

Arrow has also undertaken consultation with the relevant landholders as part of an Area-Wide planning process and negotiations related to the GCMP.

7. Assessment Application Fees

This assessment application is accompanied by the fee prescribed under the RPI Regulation 2014.

Schedule 4 of the RPI Regulation provides a definition of the expected area of impact for an assessment application, which means the area in which:

- The activity is proposed to be carried out; and
- Carrying out the activity is likely to have an impact

Given the authorised petroleum activities and the expected area of impact (**1.3ha**), the following assessment application fees have been calculated.

Area of Regional Interest	Nature of assessment application	Fee
Priority Agricultural Area	Complies with the prescribed solution for required outcome 1	$3131.00

8. Required Outcome Assessment

8.1 Priority Agricultural Area

The PAA Assessment Criteria provides a required outcome for activities in PAAs that deals with impacts on a property level. As the authorised petroleum activities are limited to the Land, impacts on a regional level (Required Outcome 2) are not applicable for the purposes of this assessment application.

Schedule 2, Part 2 of the RPI Regulation sets out the Required Outcome and prescribed solutions for activities carried out in a PAA. Please refer to Table 8-1 for evidence associated with the prescribed solution of Required Outcome 1.

Table 8-1 - PAA Assessment Criteria – Required Outcome 1

Required Outcome 1 - Managing impacts on use of property for priority agricultural land use in a priority agricultural area The activity will be carried out on a property in a priority agricultural area and will not result in a material impact on the use of the property for a priority agricultural land use.	
Prescribed Solution	**Evidence/Response**
The application demonstrates the activity will not be located on land that is used for a priority agricultural land use	
a) If the applicant is not the owner of the land and has not entered into a voluntary agreement with the owner: i. The applicant has taken all reasonable steps to consult and negotiate with the owner about the expected impact of carrying out the activity on each priority agricultural land use for which the land is used; and ii. Carrying out the activity on the property will not result in a loss of more than 2% of both: A. The land on the property used for a priority agricultural land use; and B. The productive capacity of any priority agricultural land use on the property	Not applicable - the applicant is the owner of the land and will enter into a voluntary Conduct and Compensation Agreement in relation to the authorised petroleum activities with Arrow CSG (Australia) Pty Ltd ABN 54 054 260 650.

b) the activity cannot be carried out on other land that is not used for a priority agricultural land use, including for example, land elsewhere on the property, on an adjacent property or at another nearby location; c) the construction and operation footprint of the activity on the part of the property used for a priority agricultural land use is minimised to the greatest extent possible.	As evidenced by Section 3.1 not all of the land of Lot 1 RP117442 is currently being or has previously been used as PALU. The site of the proposed Wells is not PALU.
d) the activity will not constrain, restrict or prevent the ongoing conduct on the property of a priority agricultural land use, including, for example, everyday farm practices and an activity or infrastructure essential to the operation of a priority agricultural land use on the property	As evidenced by Section 3.1 not all of the land is currently being or has previously been used as PALU. In any case, as evidenced by Section 5.7 the authorised petroleum activity will not constrain, restrict or prevent the ongoing use of the balance of the Land for agricultural activities. The nearest mapped PALU is adjacent to the Land (i.e. to the NW of the property boundary) however, as outlined in this application the activities have been designed not to impact surrounding PALU. Refer to Appendix G – Surrounding Land Uses.

e) the activity is not likely to have a significant impact on the priority agricultural area	As evidenced by Section 3.1 not all of the land is currently being or has previously been used as PALU. Although it is identified within the PAA, the authorised petroleum activities will not have a significant impact on PAA as the expected area of impact is minimised to the greatest extent possible as evidenced by Section 5.1 and the existing use of the Land is grazing only which can co-exist around the authorised petroleum activities.
f) the activity is not likely to have an impact on land owned by a person other than the applicant or the land owner mentioned in paragraph (a).	The authorised petroleum activities, due to the nature and extent of the expected area of impact, will not have an impact upon the adjoining landowners. The location of infrastructure, construction methods and rehabilitation has taken into consideration any potential impacts on water overland flow. No additional impact on overland flow is expected from the proposed development.

9. Abbreviations and Acronyms

Definitions of terms used in this report:

Term	Definition
Applicant	Arrow CSG (Australia) Pty Ltd ABN 54 054 260 650
EHP	Department of Environment and Heritage Protection
EP Act	*Environmental Protection Act 1994*
GCMP	Groundwater Characteristics Monitoring Program
ha	Hectare
IFL	Intensively farmed land is a subset of the Queensland Government's Strategic Cropping Land. It is premium cropping land that is being actively used for broad acre cropping with either dry land or irrigated farming practices, and having been altered to suit those cropping purposes (e.g. laser leveled, irrigation channels and existing dams).
Land	Lot 1 RP117442
PAA	Priority Agricultural Area
PALU	Priority Agricultural Land Use
PALU 3.3.0	Primary Production from Dryland Agriculture and Plantations
PL	Petroleum Lease
Property	Lot 1 RP117442
Authorised petroleum activities	Please see Section 0.
Reports	Forage Crop Frequency Reports
RIDA	Regional Interests Development Approval
RPI Act	*Regional Planning Interests Act 2014*
RPI Regulation	Regional Planning Interests Regulation 2014
SCA	Strategic Cropping Area
SCL	Strategic Cropping Land

Appendix A – Resource Authority

PL 253 Resource authority public report

Table of Contents

PL 253 Resource authority public report

Queensland Government

Permit details

Permit ID:	PL 253
Status:	Granted
Lodged date:	09/03/2007
Grant date:	26/02/2019
Commencement date:	26/02/2019
Expiry date:	25/02/2049
Plan/program expiry date:	25/02/2024
Current term:	30 years
Conditions:	Lot 40 on DY85 has been excluded from the area.
Locality:	HOPELAND
Remarks:	
Act permit granted under:	Petroleum and Gas (Production and Safety) Act 2004
Act now administered under:	Petroleum and Gas (Production and Safety) Act 2004

Holders

	Holder name	Share %	Status	Held from	Held to	Authorised holder
*	ARROW CSG (AUSTRALIA) PTY LTD C/- Tenement Manager GPO Box 5262 BRISBANE QLD 4001	100.000000000000	Current	26/02/2019		Yes
	AUSTRALIAN CBM PTY LTD	100.000000000000	Former	09/03/2007	28/04/2014	

Tenancy type: Sole Holder

PL 253 Resource authority public report

Queensland Government

Area

Location: View Map

Mining district: Dalby

Local authority: Western Downs Regional Council

Area: 71 Sub-blocks

Exclusions:

Marked out date:

Sub-blocks

BM	Block	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Brisbane	2456	A	B	C			F	G	H	J		L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Brisbane	2457																Q					V	W			
Brisbane	2528	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U					Z
Brisbane	2529	A	B	C			F	G	H	J		L	M	N	O		Q	R	S	T	U	V	W	X	Y	Z
Brisbane	2530																Q	R				V	W			

Background land

No data available

Survey plans

No data available

Relinquishment details

No data available

Sub-blocks retained

No data available

Term history

Term	Date notice issued	Date lodged	Date approved	Date commenced	Date term ends	Term	Act granted under
2019 - 2049		09/03/2007	26/02/2019	26/02/2019	25/02/2049	30 years	Petroleum and Gas (Production and Safety) Act 2004

Native title

Outcome	Process
Existing private ILUA	Existing Private ILUA

Purpose and minerals

Purpose
Gas, PETROLEUM

Related permits

Pre-requisite permits: ATP 676 - ADMINISTERED UNDER P&G ACT 2004

PL 253 Resource authority public report

Queensland Government

Financial

Rent details

Area units:	218
Rate/unit area:	$155.80

Activities

Activity name	Activity / Dealing No	Status	Date received	Expected completion	Date completed	Remarks
Change of holder name	1019581	Closed	05/10/2010	05/10/2010	05/10/2010	Changed name from SHELL CSG (AUSTRALIA) PTY LTD to ARROW CSG (AUSTRALIA) PTY LTD

Appendix B – Title Search

CURRENT TITLE SEARCH

NATURAL RESOURCES, MINES AND ENERGY, QUEENSLAND

Request No: 30920176
Search Date: 01/04/2019 10:41

Title Reference: 14343100
Date Created: 22/08/1969

Previous Title: 14040056
14040057

REGISTERED OWNER

Dealing No: 715867806 30/06/2014

ARROW CSG (AUSTRALIA) PTY LTD A.B.N. 54 054 260 650

ESTATE AND LAND

Estate in Fee Simple

LOT 1 REGISTERED PLAN 117442
Local Government: WESTERN DOWNS

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 14040056 (POR 8)
Deed of Grant No. 14040057 (POR 8)

ADMINISTRATIVE ADVICES

Dealing	Type	Lodgement Date	Status
714476021	VEG NOTICE VEGETATION MANAGEMENT ACT 1999	22/05/2012 13:55	CURRENT
714628206	VEG NOTICE VEGETATION MANAGEMENT ACT 1999	20/08/2012 10:32	CURRENT

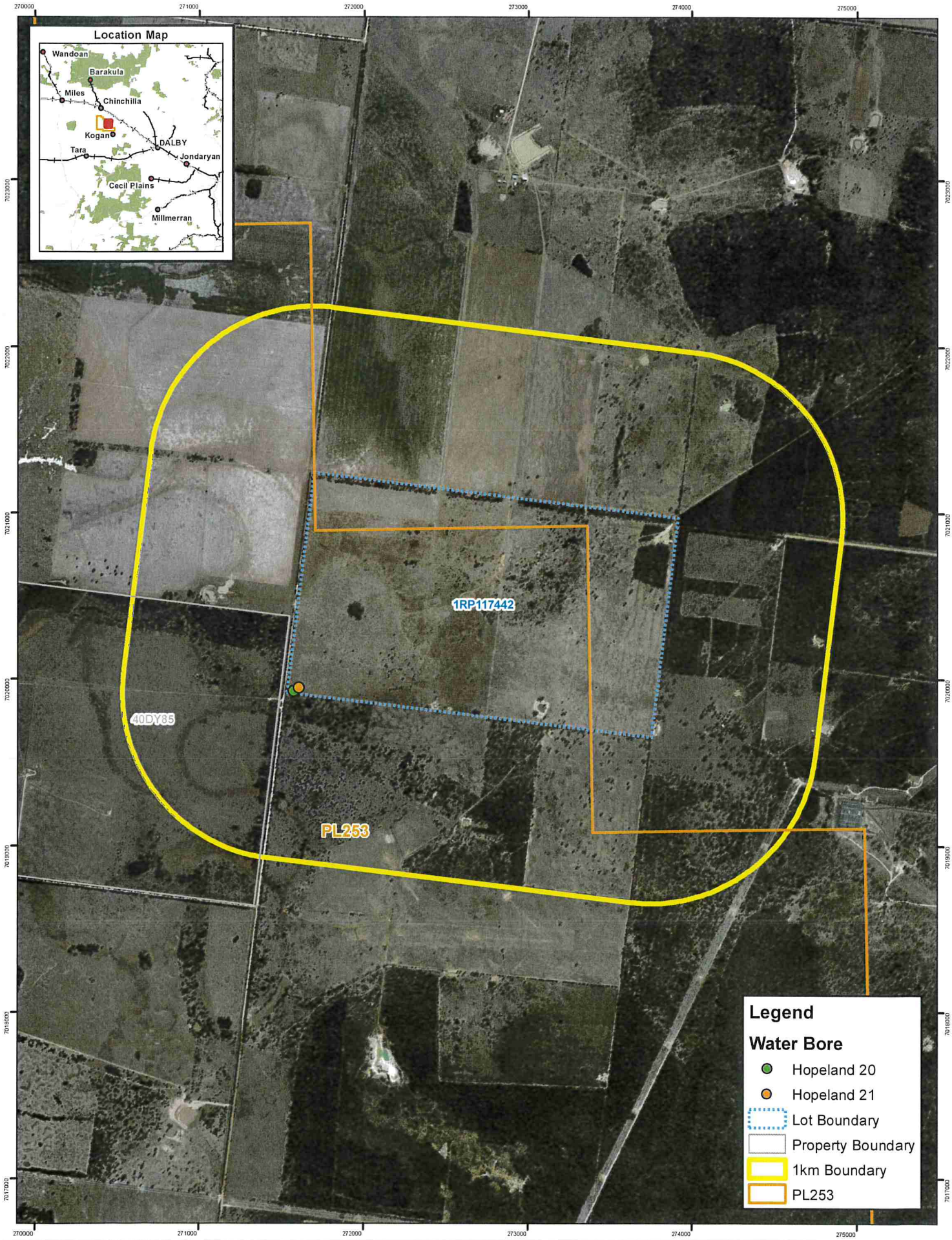
UNREGISTERED DEALINGS - NIL

CERTIFICATE OF TITLE ISSUED - No

** End of Current Title Search **

Requested By: D-ENQ CITEC CONFIRM

Appendix C – Locality Plan



N

Coordinate System: GDA 1994 MGA Zone 56

Meters

0 125 250 500

Source:
Arrow Energy Limited, Geosciences Australia
Dept. Envir. and Resource Mgmt.

Status: IFI
Issued To: L Turner
Author: lstringer

arrow energy
go further

Lot 1 RP117442

Location

Uncontrolled (B) Date: 7/03/2019

Document: V:\Products\Australia\Queensland\Surat_Basin\Infrastructure\150212_Hopelands_QLUMP_LT\mxd\Locality_Lot 1 RP117442.mxd

NOT FOR CONSTRUCTION

Confidential: For Internal Use Only

Appendix D - Site Plan

ARROW ENERGY - SURAT GAS PROJECT

ARROW CSG (AUSTRALIA) PTY LTD

Source: Arrow Energy Pty Ltd
Geoscience Australia
Dept. Natural Resources and Mines

Date: 25/02/2019
Issued To: Ian McClymont
Author: awilliams

Kilometers
0 0.1 0.2 0.4 0.6 0.8

Scale: 1:10,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56

N

GDA

arrow energy
go further

Document: V:\Products\Australia\Queensland\Surat_Basin\General\Surat_Integration\180214_Area Wide Planning_(RM)\MXD\SB_Arrow_Wide_Planning_Arrow_Pilbin_Overview_A3_Portrait.mxd

NOT FOR CONSTRUCTION

Appendix E – Forage Crop Frequency Reports

FORAGE REPORT: CROP FREQUENCY AND TYPE

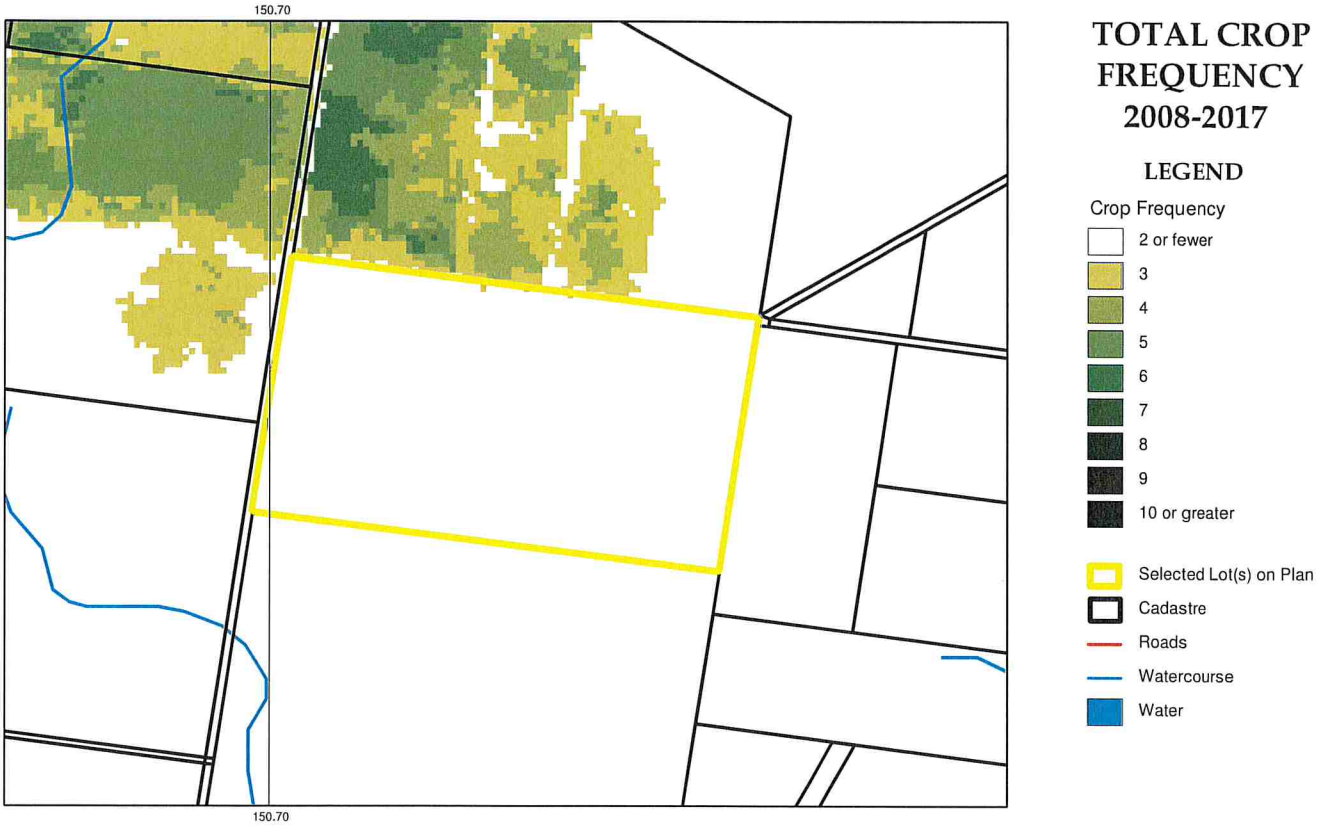
http://www.longpaddock.qld.gov.au/forage *January 25, 2019* *Lot on Plan: 1RP117442* *Label: noLabel*

Queensland Government

Introduction

This report presents crop frequency and broad crop type information for your chosen area, for the time period selected (ten year period between 1988 and current). The report includes crop frequency mapping which is based on time series analysis of satellite imagery (30m spatial resolution) over the summer and winter growing seasons. The approach is based on detection of seasonal cycles of vegetation greenness, therefore some perennial crops may not be represented. Seasonal images displaying the maximum greenness within a summer and winter growing season for each year are also provided. For further information, refer to the FORAGE User Guide (https://data.longpaddock.qld.gov.au/static/forage_user_guide.pdf) .

Estimated total crop frequency map (2008 - 2018)



How to interpret the information

Crop frequency mapping: Coloured areas on the maps indicate locations where active crops have been detected three or more times in the summer and winter growing seasons, for a ten year period. The map on this page shows 'Total Frequency' which is a count of number of years that an active crop was detected. The two maps on the following page show the summer and winter crop frequency, respectively. These maps show a count of the number of times an active crop was detected in each of those distinct growing seasons. The detection of active crops is based on time-series analysis of satellite imagery. Due to the limitations of the automated method used to detect active cropping, you should also view the temporally adaptive seasonal image composite on page 6, compiled to represent the maximum greenness (per pixel) within a growing season.

Mapping of broad crop groups: Crop frequency information is also separated into estimates of dominant broad crop groups within the region. This estimation is based on an automated classification approach for each season (see Pringle *et al.* 2018 for more details).

In the winter season the classification differentiates between classes:

- Cereal crop (e.g. wheat, barley, oats);
- Pulse crop (e.g. chickpea).

In the summer season the classification differentiates between the classes:

- Coarse-grain and pulse (e.g. sorghum, maize, mungbean);
- Cotton crop.

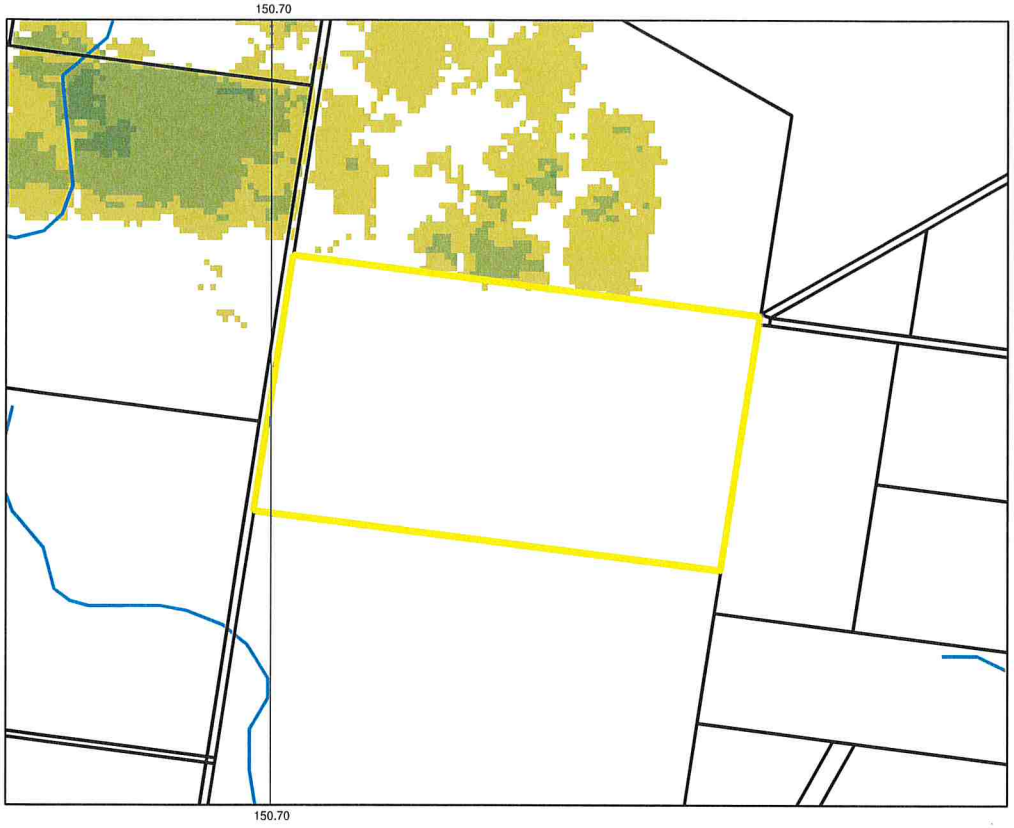
Landsat satellite imagery: Landsat imagery at 30m spatial resolution are predominately used. Since 2015 Sentinel-2 imagery are included and re-sampled to a 30m spatial resolution to match the Landsat imagery. Since 2000 imagery from MODIS serve as backup data in case of large (> 4 weeks) data gap (e.g. cloud issues). The seasonal maximum vegetation imagery for summer (around February) and winter (around September) on the following pages help confirm the presence of an active crop. Each maximum vegetation image is designed to optimise the identification of winter and summer cropping and is generated from a number of images acquired within the growing season. The cropped areas will generally appear bright green in the imagery compared with the surrounding landscape. Even if the crop frequency mapping does not indicate cropping in an area, it is important to check each Landsat image to confirm that cropping has not been undertaken. Sometimes it will not be possible to clearly identify cropped areas in the imagery. For example, in some wetter seasons, much of the imagery can appear very green and cropping may be difficult to identify. Where this is the case, it is recommended to undertake further investigation using other information sources. Note: It is not possible to visually differentiate between crop groups in the seasonal maximum vegetation image. This image is only used to confirm the presence or absence of cropping activities.

FORAGE REPORT: CROP FREQUENCY AND TYPE

http://www.longpaddock.qld.gov.au/forage *January 25, 2019* *Lot on Plan: 1RP117442* *Label: noLabel*

Queensland Government

Estimated frequency map for summer (February) crop (2008 - 2018)



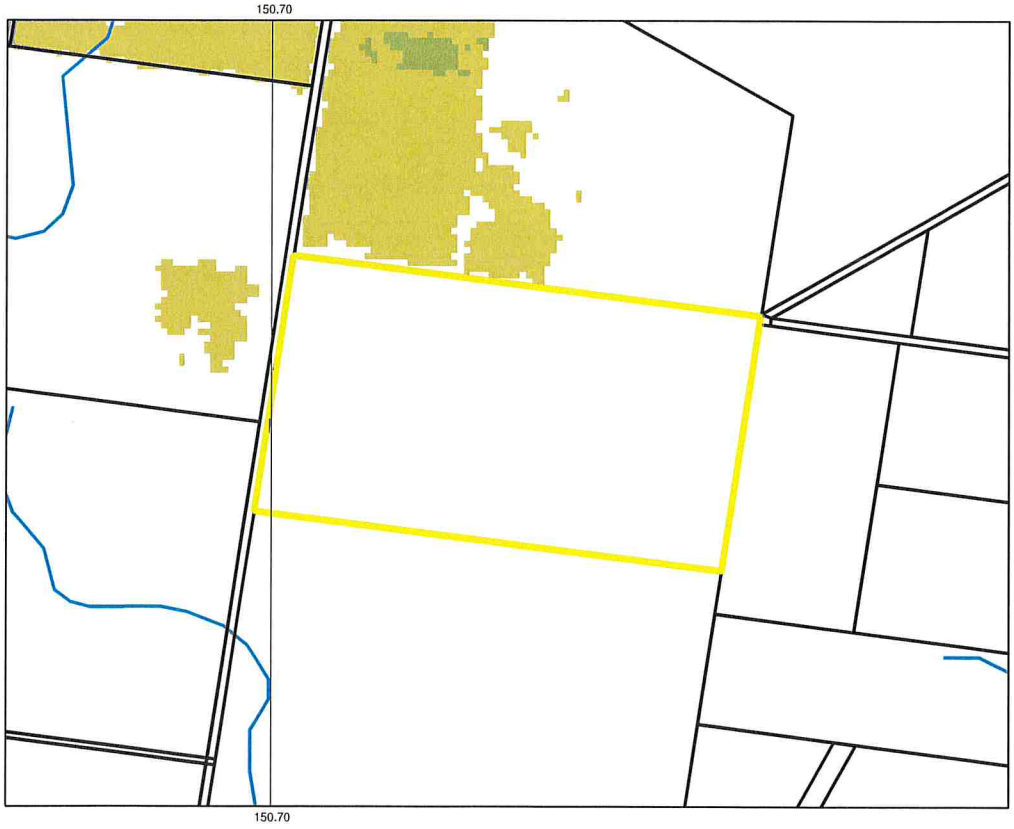
SUMMER CROP FREQUENCY 2008-2017

LEGEND

Crop Frequency
- 2 or fewer
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 or greater

- Selected Lot(s) on Plan
- Cadastre
- Roads
- Watercourse
- Water

Estimated frequency map for winter (September) crop (2008 - 2018)



WINTER CROP FREQUENCY 2008-2017

LEGEND

Crop Frequency
- 2 or fewer
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 or greater

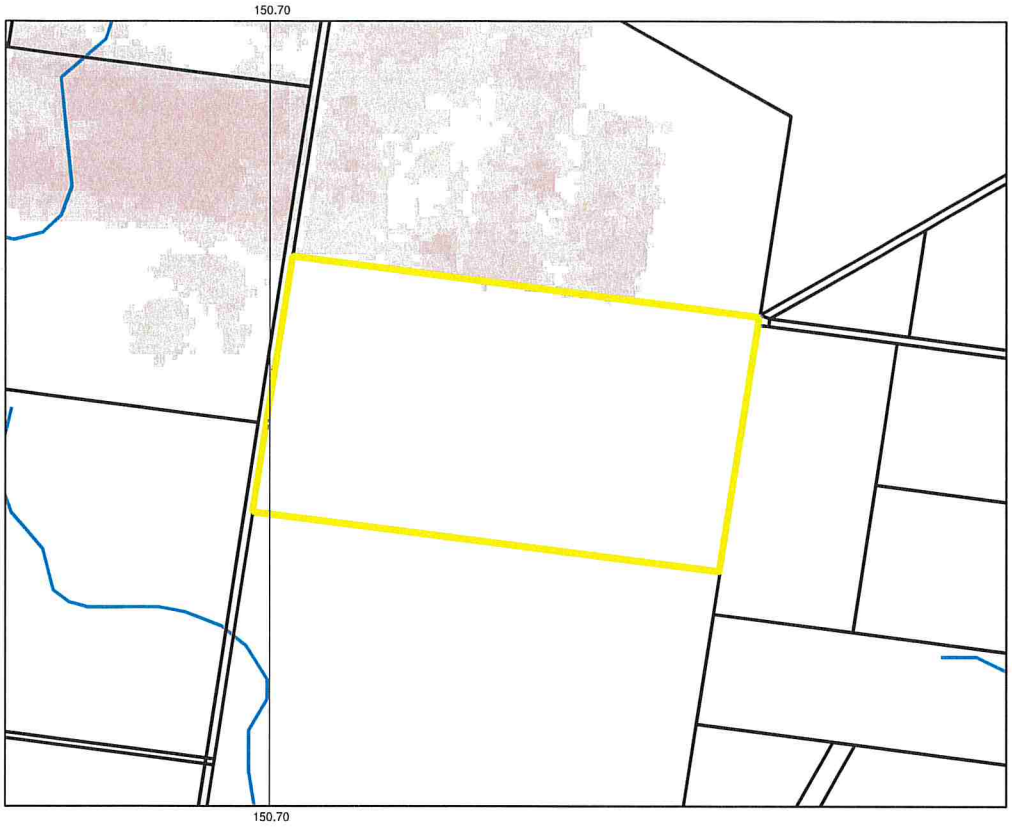
- Selected Lot(s) on Plan
- Cadastre
- Roads
- Watercourse
- Water

FORAGE REPORT: CROP FREQUENCY AND TYPE

http://www.longpaddock.qld.gov.au/forage *January 25, 2019* *Lot on Plan: 1RP117442* *Label: noLabel*

Queensland Government

Estimated frequency map for summer (February) coarse grain and pulse crop (2008 - 2018)



SUMMER Grain FREQUENCY 2008-2016

LEGEND

Crop Frequency

- 1 or fewer
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 or greater

- Selected Lot(s) on Plan
- Cadastre
- Roads
- Watercourse
- Water

Estimated frequency map for summer (February) cotton crop (2008 - 2018)

SUMMER Cotton FREQUENCY 2008-2016

LEGEND

Crop Frequency

- 1 or fewer
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 or greater

- Selected Lot(s) on Plan
- Cadastre
- Roads
- Watercourse
- Water

FORAGE REPORT: CROP FREQUENCY

http://www.longpaddock.qld.gov.au/forage *January 25, 2019* *Lot on Plan: 1RP117442* *Label: noLabel*

Queensland Government

Estimated frequency map for winter (September) pulse crop (2008 - 2018)

WINTER Pulse FREQUENCY 2008-2016

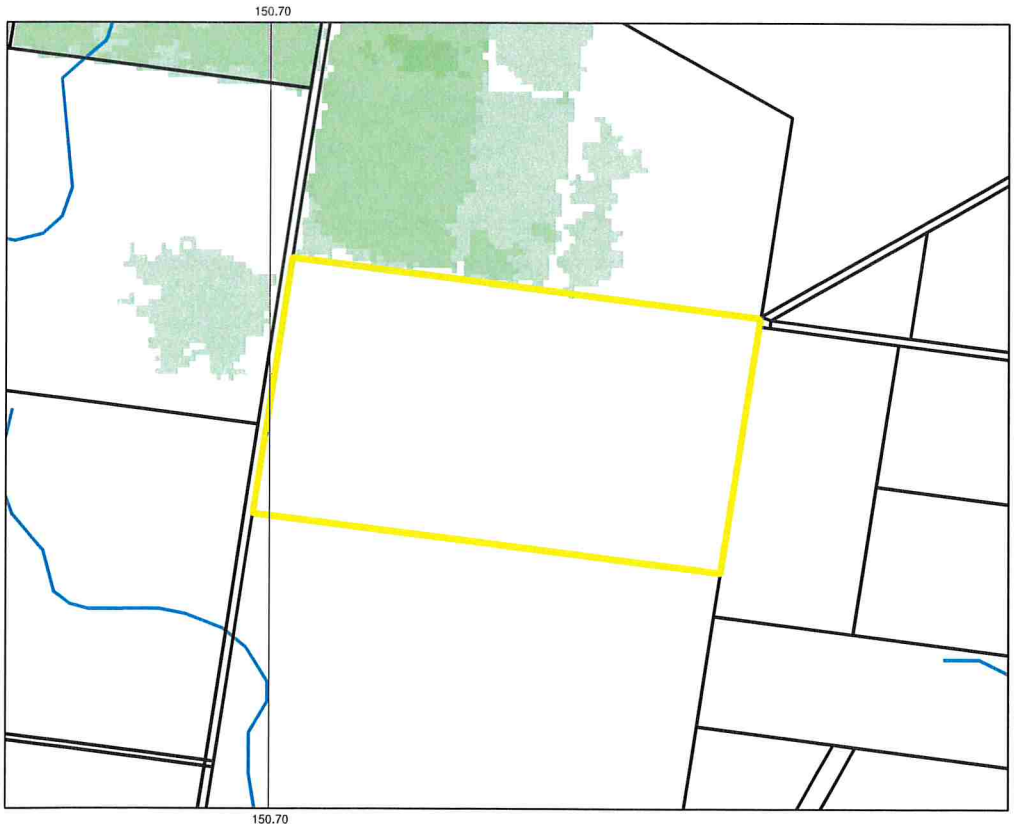
LEGEND

Crop Frequency

- 1 or fewer
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 or greater

- Selected Lot(s) on Plan
- Cadastre
- Roads
- Watercourse
- Water

Estimated frequency map for winter (September) cereal crop (2008 - 2018)



WINTER Cereal FREQUENCY 2008-2016

LEGEND

Crop Frequency

- 1 or fewer
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 or greater

- Selected Lot(s) on Plan
- Cadastre
- Roads
- Watercourse
- Water

FORAGE REPORT: CROP FREQUENCY

http://www.longpaddock.qld.gov.au/forage *January 25, 2019* *Lot on Plan: 1RP117442* *Label: noLabel*

Queensland Government

February (left) and September (right) images for 2008

February (left) and September (right) images for 2009

February (left) and September (right) images for 2010

FORAGE REPORT: CROP FREQUENCY

http://www.longpaddock.qld.gov.au/forage *January 25, 2019* *Lot on Plan: 1RP117442* *Label: noLabel*

Queensland Government

February (left) and September (right) images for 2011

February (left) and September (right) images for 2012

February (left) and September (right) images for 2013

FORAGE REPORT: CROP FREQUENCY

http://www.longpaddock.qld.gov.au/forage *January 25, 2019* *Lot on Plan: 1RP117442* *Label: noLabel*

Queensland Government

February (left) and September (right) images for 2014

February (left) and September (right) images for 2015

February (left) and September (right) images for 2016

FORAGE REPORT: CROP FREQUENCY

http://www.longpaddock.qld.gov.au/forage *January 25, 2019* *Lot on Plan: 1RP117442* *Label: noLabel*

Queensland Government

February (left) and September (right) images for 2017

February (left) and September (right) images for 2018

Image not available

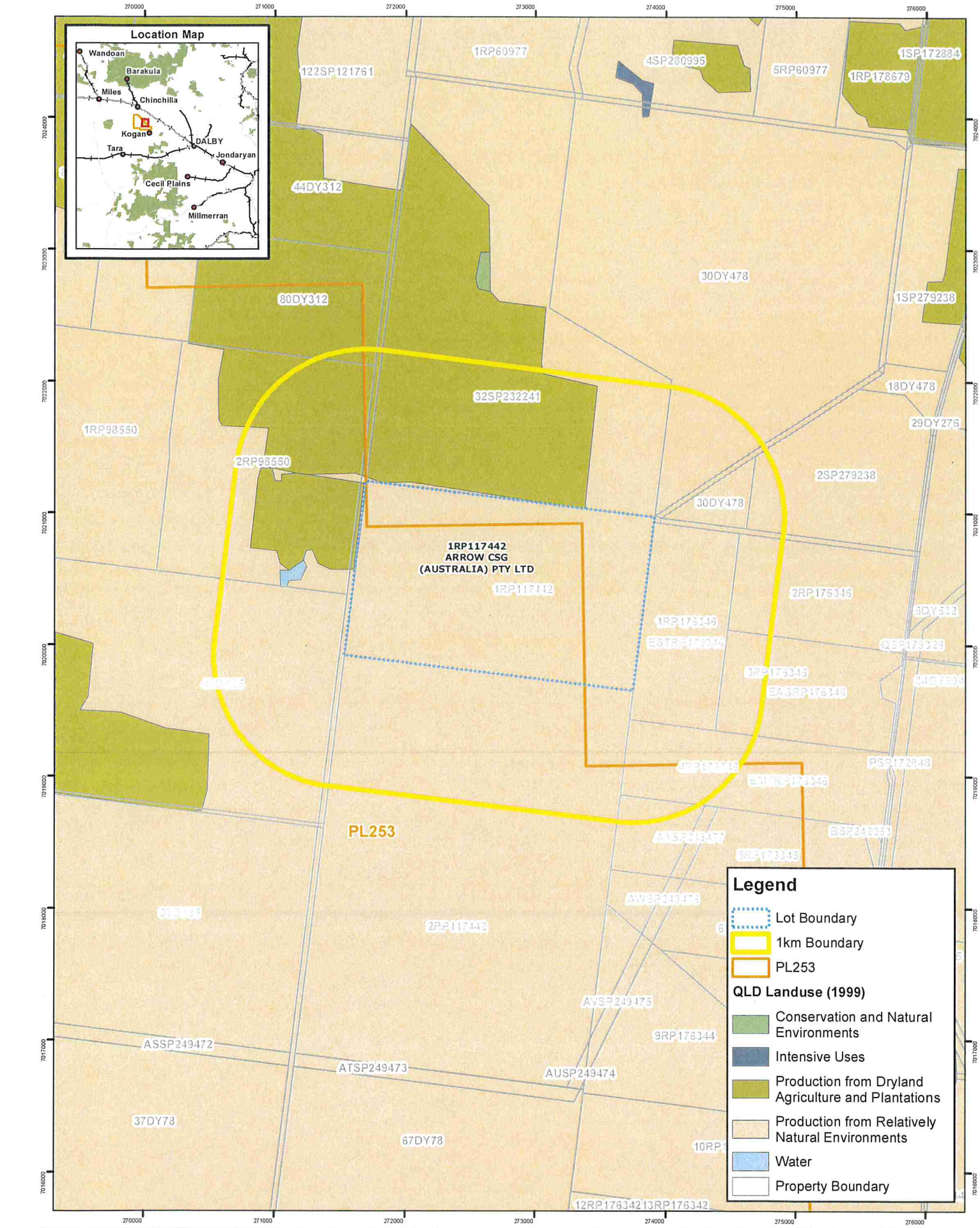
Image not available

Reference

Pringle, M., Schmidt, M., and Tindall, D. (2018): Multi-decade, multi-sensor time-series modelling based on geostatistical concepts to predict broad groups of crops. Remote Sensing of Environment.

Disclaimer

Appendix F – Queensland Land Use Mapping 1999, 2006, 2012



N

Coordinate System: GDA 1994 MGA Zone 56

Metres

0 250 500 1,000

Source:
Arrow Energy Limited, Geosciences Australia
Dept. Envir. and Resource Mgmt.

Status: IFI
Issued To: L Turner
Author: tstringer

arrowenergy go further

Lot 1 RP117442

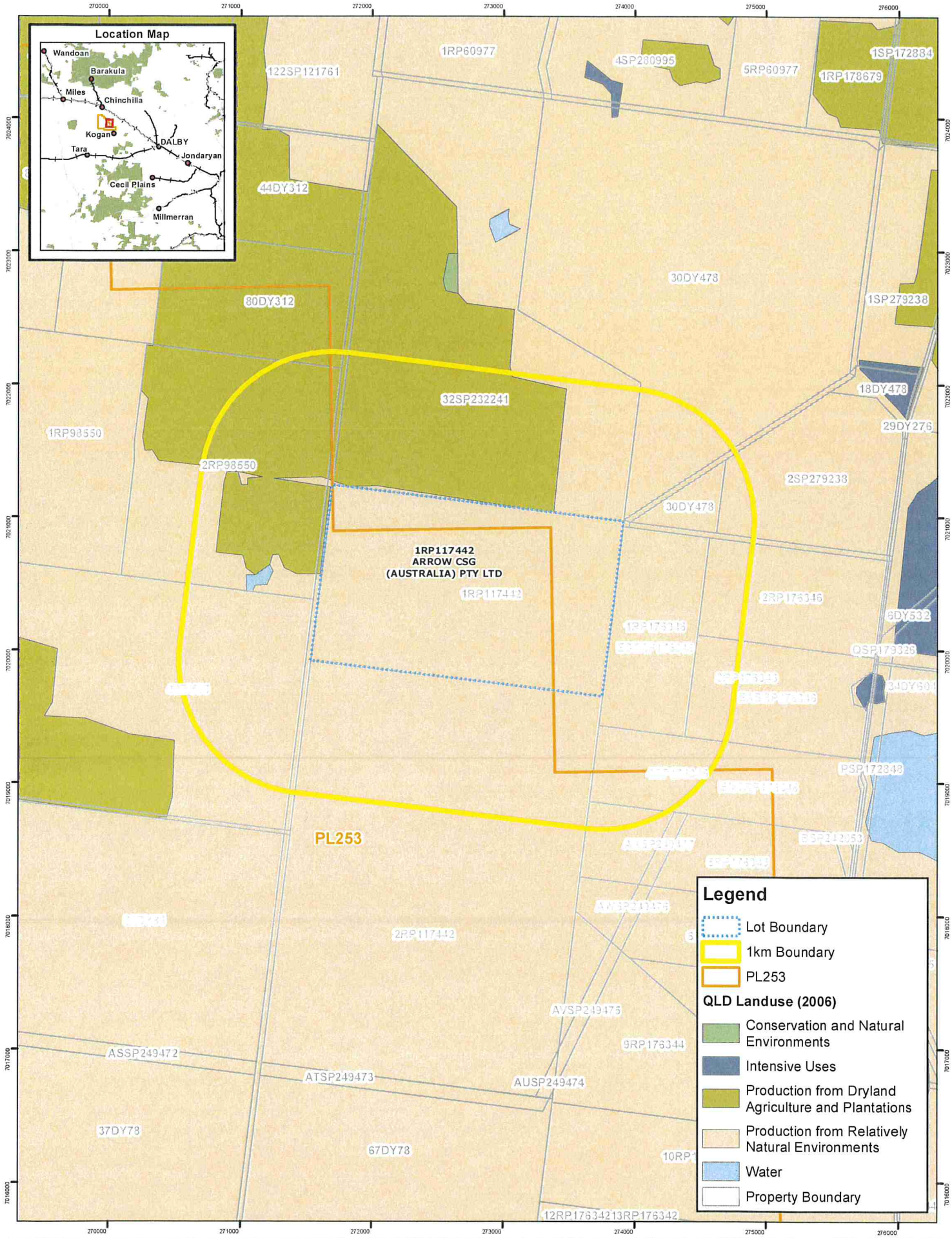
QLUMP - 1999

Uncontrolled (B) Date: 7/03/2019

Document: V:\Products\Australia\Queensland\Surat_Basin\Infrastructure\190212_Hopelands_QLUMP_LT\mxd\Hopelands_QLUMP_1999_B.mxd

NOT FOR CONSTRUCTION

Confidential: For Internal Use Only



N

Coordinate System: GDA 1994 MGA Zone 56

0 250 500 1,000 Metres

Source:
Arrow Energy Limited, Geosciences Australia
Dept. Envir. and Resource Mgmt.

Status: IFI
Issued To: L Turner
Author: tstringer

arrowenergy go further

Lot 1 RP117442

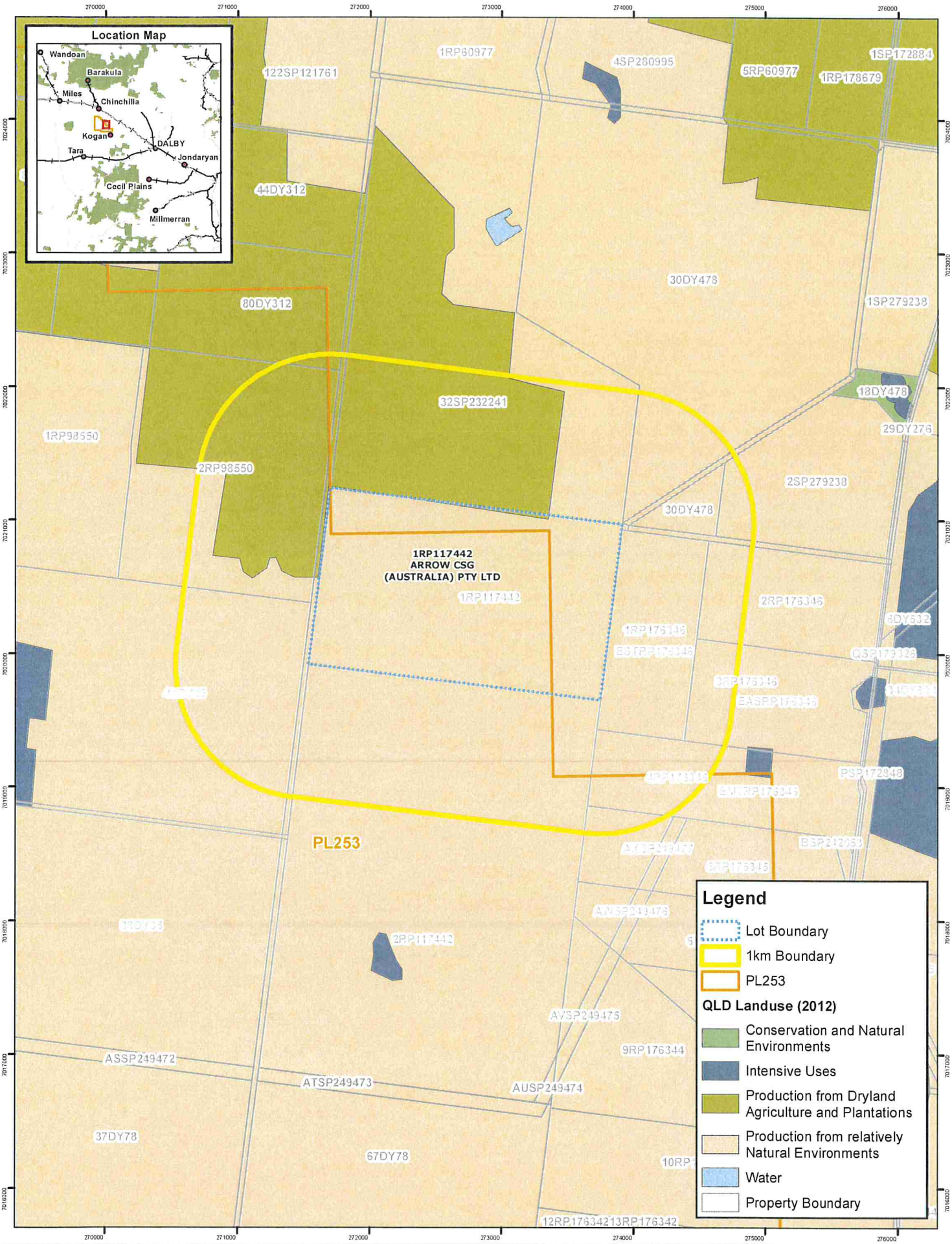
QLUMP - 2006

Uncontrolled (B) Date: 7/03/2019

Document: V:\Products\Australia\Queensland\Surat_Basin\Infrastructure\190212_Hopelands_QLUMP_LT\mxd\Hopelands_QLUMP_2006_B.mxd

NOT FOR CONSTRUCTION

Confidential: For Internal Use Only



N

Coordinate System: GDA 1994 MGA Zone 56

Metres

0 175 350 700

Source:
Arrow Energy Limited, Geosciences Australia
Dept. Envir. and Resource Mgmt.

Status: IFI
Issued To: L Turner
Author: lstringer

arrow energy
go further

Lot 1 RP117442

QLUMP - 2012

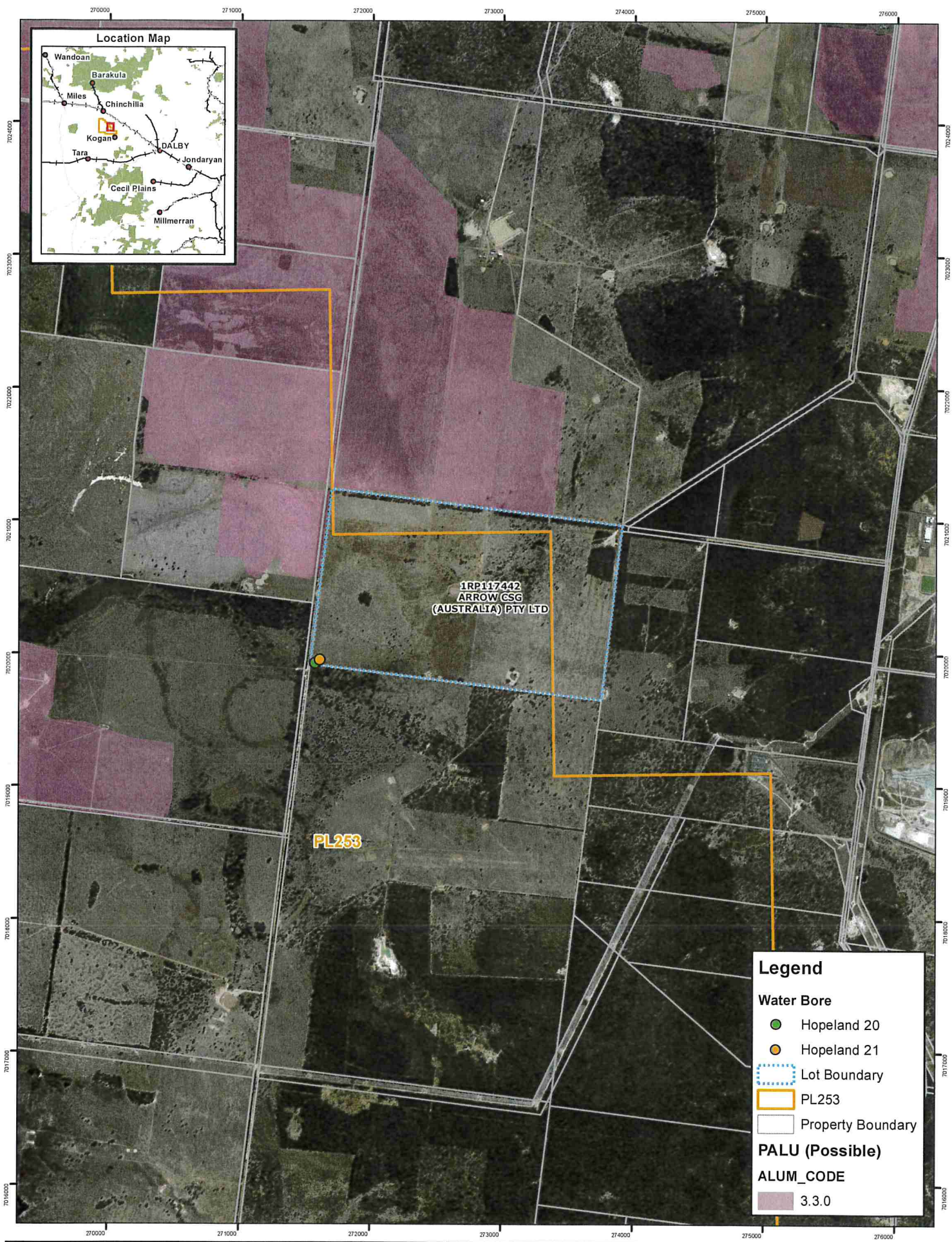
Uncontrolled (B) Date: 7/03/2019

Document: V:\Products\Australia\Queensland\Surat_Basin\Infrastructure\190212_Hopelands_QLUMP_LT\mxd\Hopelands_QLUMP_2012_B.mxd

NOT FOR CONSTRUCTION

Confidential: For Internal Use Only

Appendix G – Surrounding Land Uses



Legend

Water Bore

- Hopeland 20
- Hopeland 21
- Lot Boundary
- PL253
- Property Boundary

PALU (Possible)

ALUM_CODE

- 3.3.0

N

Coordinate System: GDA 1994 MGA Zone 56

0 250 500 1,000 Metres

Source:
Arrow Energy Limited, Geosciences Australia
Dept. Envir. and Resource Mgmt.

Status: IFI
Issued To: L Turner
Author: tstringer

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Lot 1 RP117442

Priority Agricultural Land Use

Uncontrolled (B) Date: 7/03/2019

Document: V:\Products\Australia\Queensland\Surat_Basin\Infrastructure\190212_Hopelands_QLUMP_LT\mxd\Hopelands_PALU_B.mxd

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Appendix H – SCL Compliance Certificate

Department of Natural Resources and Mines

DOC CONTROLLED
Date: 21/9/12
By: SM
Ref: ENV12-IN-304

Compliance certificate

Strategic Cropping Land Act 2011

Strategic cropping land compliance certificate: SCLRD2012/000003

This certificate is given under s. 118 of the Strategic Cropping Land Act 2011, by the administering authority for the resource activities specified in this certificate, to be undertaken in accordance with the conditions in the strategic cropping land standard conditions code for resource activities (the SCL standard conditions code).

This strategic cropping land compliance certificate was given on: **26 July 2012**

Holder(s)	Address
Principal holder: Australian CBM Pty Ltd Joint Holder: Arrow CSG (Australia) Pty Ltd	Level 19, AM60 42-60 Albert St BRISBANE 4000

Resource activities	Environmental authority	Location(s)
The construction of an additional 5 regulated dams and the undertaking of exploration activities including 60 wells and 100 km of seismic exploration; to the extent that these activities do not impact on strategic cropping land or potential strategic cropping land, or alternatively, where these activities comply with the Strategic Cropping Land Standard Condition Code.	PEN100052007	ATP 676

Notes:

Department of Natural Resources and Mines
ABN 59 020 847 551

1. Sections 76, 77 and 78 of the *Strategic Cropping Land Act 2011* outline offences and penalties for permanently or temporarily impacting on strategic cropping land or potential strategic cropping land without a resource authority for the resource activity.

   The conditions under the SCL standard conditions code for carrying out the resource activity are taken to be conditions of the environmental authority. Therefore, if conditions of the SCL standard conditions code are not complied with, there is no authority to undertake the resource activity.

2. It is your responsibility to ensure that all required financial assurance is paid prior to carrying out, or allowing the carrying out of, any resource activities on strategic cropping land or potential strategic cropping land, in accordance with the SCL standard conditions code.

Signature

26 July 2012

Date

Stephen Smith
Manager, Property Planning and Assessment
Delegate of the Chief Executive
Strategic Cropping Land Act 2011

Enquiries:
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