

## **7. AGRICULTURE**

This chapter of the Supplementary Report to the Surat Gas Project EIS (SREIS) provides an update on work being undertaken by Arrow to address landholders' concerns regarding agriculture raised in consultation and presented in submissions on the Surat Gas Project Environmental Impact Statement (EIS) (Coffey Environments, 2012b).

Legislation and policies pertaining to agriculture have been updated since the release of the EIS. Relevant legislation and policy changes are summarised in Chapter 2, Project Approvals, and described in detail in Attachment 7, Legislation and Policy.

The revised project description is provided in Chapter 3, Project Description. The relevant aspects of revised legislation and policy and of the project description changes are discussed in this chapter, along with information on several initiatives instigated by Arrow to develop a framework for and to demonstrate coexistence with agricultural activities. A list of topics raised in submissions is provided in Section 7.7, Issues Raised in Submissions, with responses to all issues provided in Part B, Chapter 19, Submission Responses. A list of updated commitments is also provided.

### **7.1 Studies and Assessments Completed for the EIS**

The EIS recognised the importance of agriculture in the region. The contribution of agriculture to the regional economy was described in EIS Appendix O, Economic Impact Assessment. EIS Chapter 13, Agriculture, provided a summary of the agricultural values within and surrounding the project development area and an assessment of the potential for these values to be affected by direct and indirect impacts associated with the construction, operation and decommissioning phases of the project.

Gilbert & Sutherland Proprietary Limited was engaged to conduct the Arrow Energy Surat Gas Project Agricultural Report, which was included in the EIS as Appendix F. The report provided a desktop assessment of agricultural enterprises and activities, particular aspects of the activities that contribute to their success and viability, potential impacts of project development on agricultural activities, and proposed management measures.

Section 13.6 in EIS Chapter 13 noted that impacts have been assessed and that management is proposed through the implementation of 12 performance-based objectives. The performance-based objectives provide an opportunity for Arrow to work with the landholder regarding property-specific values and farming practices and demonstrate capability to coexist with agriculture.

Arrow is working with various groups (including the Arrow Intensively Farmed Land (AIFL) Committee, irrigator groups and the Arrow Surat Community Reference Group) to develop and revise the management measures that give effect to the 12 objectives.

Table 7.1 lists the agriculture commitments presented in EIS Attachment 8, Commitments Summary.

**Table 7.1 Agriculture commitments presented in the EIS**

No.	Commitment
C015	Clear areas progressively and implement rehabilitation as soon as practicable following construction and decommissioning activities.
C034	Develop an erosion and sediment control plan and install and maintain appropriate site-specific controls.
C062	Strip, salvage and stockpile topsoil near the work site separately to subsoils (in consultation with landowners). Ensure topsoil stockpiles have a maximum height of 2 m, where the future use is intended for rehabilitation, and are protected from erosion.
C075	Comply with the provisions of the Petroleum and Gas (Production and Safety) Act 2004 and the Land Access Code (DEEDI, 2010a) prior to accessing private land. All appropriate agreements (with accompanying maps of the area of interest and detail on infrastructure development) will be in place prior to entry onto the land. Arrow will ensure all appropriate landowners are notified prior to access being required to allow stock to be moved and access routes to be cleared of machinery or materials.
C076	Avoid infrastructure and associated farm management areas of intensive farming operations, including piggeries, feedlots, vineyards, orchards, horticultural enterprises, poultry farms and small-lot plantations.
C077	Maintain the grievance process (complaint management system) for the community to register complaints, issues, comments and suggestions.
C078	Retain and regularly inspect erosion and sediment control structures until reinstated soils have been stabilised and sown.
C080	Plan and integrate construction and operations activities with harvesting, spraying and withholding periods.
C081	Develop and implement a compensation framework to 'add value' rather than just compensating for impacts.
C082	Develop coal seam gas development property plans to address key issues raised by landowners relating to potential impacts on intensively farmed land.
C083	Investigate the opportunity to increase well spacing from 160 acres (65 ha) to 320 acres (129 ha) or greater to reduce the footprint on strategic cropping land.
C084	Consult and agree with landowners on the appropriate location for infrastructure and access routes (to well sites and to and along pipelines). Clearly identify the outcome of the discussions on scaled plans of the property and clearly indicate agreed access routes using signs, temporary fencing, barricade tape or traffic control measures.
C085	Study methods to reduce impacts and maintain the soil profile during gathering system pipeline construction by understanding the soil type, reducing pipe diameters, plowing (instead of trenching) and potentially burying deeper than the minimum standard.
C086	Develop or facilitate the development of a method for assessing impacts on productivity (crop yields) that incorporates statistical analysis and appropriate control and sampling sites.
C087	Investigate alternative drilling technologies, such as using directional drilling to access coal measures, reducing gathering system pipe diameters and drilling multiple wells from one drill pad to potentially reduce the footprint on strategic cropping land.

**Table 7.1 Agriculture commitments presented in the EIS (cont'd)**

No.	Commitment
C088	<p>Consult with landowners on the most appropriate method to minimise disruption to cultivation paddocks (including the introduction of additional headlands) and loss of productive land in controlled-traffic paddocks. The following measures will be considered in reaching agreement:</p> <ul style="list-style-type: none"> <li>• Locate infrastructure (in order of preference) outside of cultivation areas, in headlands or at the corners of cultivated areas, adjacent to boundary fences or in areas of a paddock with the lowest-quality soil.</li> <li>• Locate access tracks in headlands or adjacent to boundary fences.</li> <li>• Utilise existing access tracks and trafficked areas.</li> <li>• Align gathering lines and new access tracks parallel to the direction of cultivation, soil conservation structures and controlled traffic runs and avoid perpendicular or lateral connections.</li> <li>• Lay out drill pads in accordance with landowner requirements, subject to safety requirements, to reduce the overall impact on cultivation, where practicable.</li> </ul>
C089	<p>Develop construction methods and design access tracks in cultivation paddocks to maintain the existing hydrologic and hydraulic regime of the site and in a way that does not cause erosion.</p>
C090	<p>Backfill soils in the reverse order of removal, and undertake backfilling progressively and regularly during pipeline construction.</p>
C091	<p>Ensure construction activities do not extend beyond the work site boundaries.</p>
C092	<p>Ensure dams for coal seam gas water and brine are not constructed on intensively farmed land.</p>
C093	<p>Install gates in fences of an appropriate standard to restrict access to authorised personnel, vehicles, plant and equipment.</p>
C094	<p>Ensure an Arrow representative is in attendance at the time of first entry to check contractors have the appropriate environmental management procedures and property specific information.</p>
C095	<p>Maintain the integrity and efficiency of surface irrigation systems by adopting the following measures:</p> <ul style="list-style-type: none"> <li>• Locate infrastructure at or adjacent to the end of head ditches or tail drains and in a manner that does not significantly interfere with swept paths of boom irrigators to avoid severance or fragmentation of water delivery systems.</li> <li>• Locate wells, gathering lines and access tracks adjacent to boundary fences, where practicable.</li> <li>• Align gathering lines and access tracks perpendicular to the direction of head ditches and tail drains (i.e., parallel to the direction of surface flows and cultivation).</li> </ul>
C096	<p>Use surface tanks (not pits) to manage drilling muds on black soils when drilling production wells.</p>
C097	<p>Fence the exclusion zone of production well sites (i.e., 10 m by 10 m) to exclude unauthorised personnel, stock and wildlife from that area.</p>
C098	<p>Inspect work sites and access routes for notifiable weeds and pest plants and animals prior to accessing the site; and if detected, manage in accordance with the Petroleum Industry – Minimising Pest Spread Advisory Guidelines, Queensland Department of Primary Industries and Fisheries, June 2008 (Biosecurity Queensland, 2008).</p>
C099	<p>Wash down vehicles and equipment that have potentially been in contact with weeds before entering new work sites.</p>
C100	<p>When operating on black soils, collect, contain and store drilling fluids and waste (solid and liquid) on site in appropriate storage tanks until recycled, treated (if necessary) or disposed of off site.</p>

**Table 7.1 Agriculture commitments presented in the EIS (cont'd)**

No.	Commitment
C101	Stockpile drilling cuttings adjacent to the well or in containers and dispose of appropriately in consultation with the landowner.
C102	Store onsite materials in suitable containment systems constructed to industry standards and Australian standards (AS 1940-2004, The Storage and Handling of Flammable and Combustible Liquids (Standards Australia, 2004a), and AS 3780, The Storage and Handling of Corrosive Substances (Standards Australia, 2008b) at a minimum). Maintain quality control and quality assurance procedures to monitor volumes and quantities. Bund aboveground storage areas to contain spills.
C103	Manage soil contaminated by oil, fuel and grease in accordance with the hydrocarbon management plan (prepared as part of the Arrow HSEMS), which includes procedures for the excavation and removal to a licensed landfill or remediation at site. Where contamination has occurred, investigate and remediate in accordance with Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland, Department of Environment, 1998 (DE, 1998).
C104	Maintain a minimum separation, as agreed with the landowner, between animal enclosures and production wells and facilities.
C105	Suspend works when rainfall or storm events produce onsite conditions that, if trafficked or worked, would compromise the effectiveness of erosion and sediment control structures, or would lead to rutting and compaction of soils or mixing or inversion of soil horizons.
C106	Stockpile cleared or mulched vegetation along the inside edge of the work sites (separate from soil stockpiles), to aid the control of runoff and ensure stockpiled vegetation does not pose a bushfire hazard.
C108	Construct batters and embankments of drill pads and production facility benches at appropriate slopes and protect from erosion.
C109	Stockpile imported fill for bedding of pipes adjacent to the trench and away from vegetation, topsoil and subsoil stockpiles.
C110	Remove excess imported fill and residual subsoil from the work site, and reuse or dispose of in accordance with landowner requirements.
C111	<p>Maintain the operation and effectiveness of soil conservation structures by adopting the following measures:</p> <ul style="list-style-type: none"> <li>• Avoid breaching, diversion or disturbance of contour banks, waterways and dams.</li> <li>• Avoid earthworks that affect waterway function.</li> <li>• Locate wells, access tracks and gathering lines downhill and parallel to soil conservation structures and avoid perpendicular or lateral connections.</li> <li>• Utilise existing access tracks and trafficked areas.</li> </ul>
C112	Remove sediment fencing prior to cultivation and dispose of in accordance with landowner requirements or in accordance with the waste management plan of the Arrow HSEMS.
C113	Cap or fit wellhead equipment to wells at the completion of drilling to ensure no uncontrolled release of gas or water.
C114	Remove salt from the landscape as part of decommissioning works and dispose of in an approved and regulated landfill.
C115	Replace or rehabilitate all disturbed infrastructure to predisturbance condition.
C116	Regrade work sites to original surface contours following reinstatement of soil.
C117	Mulch vegetation and reuse in site rehabilitation.

**Table 7.1 Agriculture commitments presented in the EIS (cont'd)**

No.	Commitment
C118	Deep rip and cross rip all construction areas and temporary access tracks to a depth of at least 0.4 m. Repeat following topsoil reinstatement to promote infiltration and assist the re-establishment of connections between soil horizons.
C119	Compact padding material and subsoils used to backfill pipeline trenches to reduce settling. Limit compaction to no deeper than 0.5 m below natural surface level.
C121	Rehabilitate clean water diversions, down-gradient soil erosion control works and temporary sediment dams to preconstruction site levels, and rip prior to sowing with crops or pasture grasses.
C122	Clean and reinstate (if necessary) erosion and sediment control structures prior to and following storm events and periodically during long periods of rain.
C123	Visually inspect rehabilitated work sites for flow diversions and evidence of erosion associated with trench settling or incomplete reinstatement of surface contours.
C497	Ensure coal seam gas water used for dust suppression on roads or for construction and operation activities is treated if required.
C503	Prevent subsurface water flows and erosion along the backfilled trench by appropriate means, such as trench blocks and compaction of backfilled soils.
C505	Inspect erosion and sediment control measures following significant rainfall events to ensure effectiveness of measures is maintained.
C506	Inspect pipeline ROWs routinely until ground stabilisation and natural revegetation or pasture grasses or crops are established.
C519	Monitor crop productivity or pasture health periodically to measure productivity on disturbed areas.
C540	Ensure that the quality of coal seam gas water used for dust suppression meets the prescribed limits.

## 7.2 Project Description Updates

The main updates to the project description that have the potential to affect agriculture are:

- Reduction in the size of the project development area.
- Revision of the development sequence and timing.
- Reduction in the number of facilities and wells.
- The use of multi-well pads.
- An increased requirement for aggregate.
- The preference for grid power to be installed with the gathering systems (in the same right of way) where possible.
- A reduction in the number of water treatment facilities.

### 7.2.1 Size of Project Development Area

In accordance with the conditions of its petroleum permits, Arrow has relinquished blocks within its exploration tenements, resulting in a reduction in the overall size of the project development

area from 8,600 km<sup>2</sup> to 6,100 km<sup>2</sup>. The majority of the relinquishments were made in the Goondiwindi development region.

### **7.2.2 Development Sequence and Timing**

Field development sequence planning has advanced since publication of the EIS. At the time the EIS was published, progressive development of five development regions (Wandoan, Chinchilla, Dalby, Millmerran/Kogan and Goondiwindi) was proposed (EIS Chapter 5, Project Description, Section 5.3.1). The development sequence has been revised to the progressive development of 11 drainage areas that correspond with the gas reserves that will be extracted and piped to the associated central gas processing facility (CGPF) (see Figure 3.6).

### **7.2.3 Number and Location of Facilities and Wells**

Initially, 8 of the 11 drainage areas will be developed. This constitutes a reduction in the number of CGPFs from the 12 described in the EIS to 8.

The number of water treatment facilities has been reduced from the six described in the EIS to two. There have been changes to the volumes of water treated by these facilities, which were described in the EIS as having a capacity of 30 to 60 ML/d. The northern water treatment facility, co-located with the CGPF in drainage area 2 (CGPF2), is expected to be sized to treat approximately 35 ML/d of coal seam gas water. The southern water treatment facility, co-located with CGPF9 in drainage area 9, is expected to treat approximately 90 ML/d of coal seam gas water.

The locations of four CGPFs (CGPF2, CGPF7, CGPF8 and CGPF9) have been confirmed through Arrow's acquisition or leasing of properties in the project development area. The proposed water treatment facilities will be sited on the CGPF2 and CGPF9 properties adjacent to CGPF. The known CGPF properties are adjacent to the western extent of potential strategic cropping land (SCL) and good quality agricultural land. Arrow has also identified a location for a temporary workers accommodation facility (TAAF) and has acquired the property. The exact siting and arrangement of infrastructure within the properties has not been determined as yet. Detailed design will consider constraints mapping in determining the final siting of the infrastructure.

The smaller project development area has also resulted in a reduction in the number of production wells anticipated to be drilled from 7,500 to approximately 6,500.

### **7.2.4 Use of Multi-well Pads**

In addition to single-wells pads, multi-well pads will also be used, which will comprise up to 12 wells per pad, approximately 8 m apart. Multi-well pads will typically allow a reduction in the total number of well pad sites and an increase in the distance between well pads. The introduction of multi-well pads will reduce the total surface impact of well pads. Whilst multi-well pads occupy a larger area, this is significantly less area than 12 single well pads.

Arrow aims to be flexible in siting well pads, targeting areas that will have minimum impact on the land use (e.g., practices of the agriculture industry) surrounding the identified pad locations. Multi-well pads will comprise vertical and deviated production wells. A likely configuration will comprise one central vertical production well, with the remainder of the wells being deviated production wells.

### **7.2.5 Increased Aggregate Requirement**

Estimates of aggregate required for construction were presented in the EIS Chapter 5, Project Description. Subsequent investigations and studies commissioned to support detailed design of the gas fields have enabled revised aggregate volumes to be calculated. The increased volumes of aggregate present a conservative assessment of the requirements for construction. Arrow is reviewing the best methods (including swamp mats, types of vehicles, tracks and access methods) to limit and manage soil compaction around project-related infrastructure. This includes minimising the amount of aggregate required to establish and maintain each well.

### **7.2.6 Use of Grid Power for Gathering Facilities**

Electricity supplied to facility substations will be distributed to production facilities, production wells and associated infrastructure via a network of overhead distribution lines and underground cables. Underground cable burial depth will be decided in consideration of the surrounding land use, landholder requirements and other subsurface features, such as pipelines. This will reduce the amount of overhead transmission lines significantly.

### **7.2.7 Water treatment Facilities**

The six water treatment facilities presented in the EIS have been reduced to two to be located adjacent to CGPFs. The area required to establish a water treatment facility (approximately 2 km<sup>2</sup>) has not changed from that presented in the EIS; however, the capacity of the raw and treated water and brine dams is being reviewed, with the final sizes dependent on the coal seam gas water and brine management strategy.

The preference for brine disposal is through an industry selective salt recovery plant or an Arrow-only selective salt recovery plant. However, the option for disposal to offsite landfill is retained, as is the option for disposal via an ocean outfall. As water treatment and brine production has been consolidated at the two proposed water treatment facilities, transport of brine concentrate to landfill from these sites has been modelled in the SREIS roads and transport technical study to represent the worst-case scenario, which assumes a site east of the project area. Arrow has committed not to dispose of brine (as a salt concentrate) to the registered landfill site at Swanbank.

## **7.3 Legislative and Planning Update**

The EIS provided a succinct overview of the *Strategic Cropping Land Act 2011* (SCL Act) (Qld) as the SCL Act came into effect after preparation of the EIS. Additionally, the Darling Downs Regional Plan will take effect after the preparation of the SREIS.

This section discusses the requirements of the SCL Act, its related standard conditions code (DNRM, 2012a), and the Darling Downs Regional Plan and the implications of these instruments for the project.

### **7.3.1 Strategic Cropping Land Act 2011**

The SCL Act was enacted in January 2012. The SCL Act:

- Identifies areas in which land that is likely to be highly suitable for cropping may exist (called 'potential strategic cropping land').
- Sets out provisions for deciding whether or not land is highly suitable for cropping.
- Establishes protection areas and the management area for SCL and potential strategic cropping land.
- Lists principles to protect land that is SCL or potential strategic cropping land to manage the impacts of development.

Section 80 of the SCL Act requires the state planning policy – and s. 81 enables a regulation – to make a code, the standard conditions code (see Section 7.3.2, Strategic Cropping Land: Standard Conditions Code for Resource Activities).

Under the SCL Act, development is considered to have a permanent impact on land if carrying out the development impedes the land from being cropped for at least 50 years or from being restored to its pre-development condition or if the activity involves open cut mining or the storage of mine wastes on land verified as SCL.

Development is considered to have a temporary impact if it does not have a permanent impact or it is a type prescribed under a regulation.

### **7.3.2 Strategic Cropping Land: Standard Conditions Code for Resource Activities**

The SCL Act allows the proponents of certain resource activities that have a temporary impact on SCL or potential strategic cropping land to apply for a compliance certificate to operate under a standards conditions code. The Strategic Cropping Land: Standard Conditions Code for Resource Activities (DNRM, 2012a) was made under the Strategic Cropping Land Regulation 2011 and contains standard conditions that apply to certain resource activities that are triggered for assessment under the SCL Act. Under s. 81 of the SCL Act, this code cannot be used for a resource activity that will have a permanent impact in a protection area.

The Department of Natural Resources and Mines simplified the SCL compliance framework in December 2012 for certain resource activities provided for in the code that have a temporary impact and pose a relatively low risk of adversely impacting on SCL. The revised standard conditions code came into effect after the EIS was prepared.

The revised code contains three parts as discussed in Chapter 2, Project Approvals, of which Part 3 applies to a number of the proposed Surat Gas Project petroleum activities. The parts are (DNRM, 2012a):

Part 1 of this Code applies to resource activities that will have no additional impact on strategic cropping land or potential strategic cropping land beyond what was previously authorised [under an environmental authority] for the land.

Part 2 of this Code applies to resource activities that are considered to have a minimal and temporary impact on SCL [strategic cropping land] or potential SCL. They are generally surface resource activities that are limited to excavations using hand-held tools and light vehicles. These resource activities do not require the construction of formed, gravelled or sealed access tracks.

Part 3 of this Code applies to resource activities that are considered to have a low and temporary impact on SCL or potential SCL and provides for a wider range of resource activities than those activities provided for in Part 2 of this Code.

The code nominates the following activities as satisfying the conditions in Part 3 (DNRM, 2012a):

- Excavation.
- Buried linear infrastructure, including gathering lines and power lines.
- Sample pits and geotechnical pits.
- Stockpiling soil.
- Well leases.
- Lay down areas.
- Chemical and fuel storage.
- Sumps.
- Access tracks (formed or gravelled).
- Geophysical surveying.
- Exploratory drilling and core holes.
- Water monitoring bores.
- Temporary camps and accommodation.

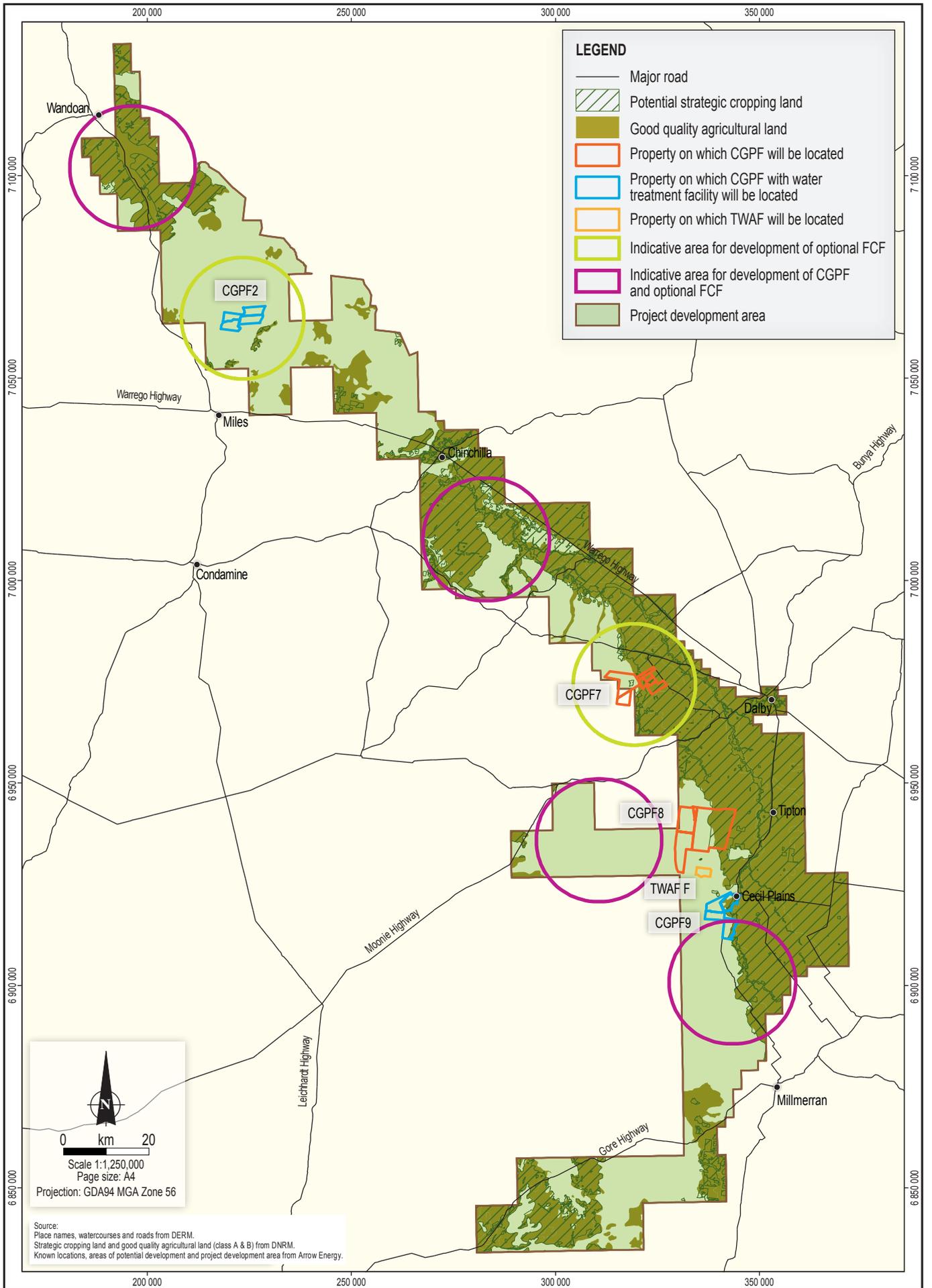
Where a proponent intends to undertake a resource activity on SCL or potential strategic cropping land that is not provided for in the standard conditions code, such as production facilities, or where the proponent cannot comply with the conditions of this code, a full SCL development assessment is required to provide the basis for a SCL protection decision.

The standard conditions code works on the basis that the holder must first avoid impacts on SCL. Where avoidance is not possible, strategies to minimise the impacts of resource activities on SCL or potential strategic cropping land must be employed.

Standard conditions and advisory notes have been developed for permitted resource activities under Part 3 of the code; financial assurance; permitted resource activities that require soil excavation; permitted resource activities that require soil stockpiling; cumulative impact of resource activities; buried linear infrastructure; access tracks; exploratory drilling for coal and minerals; well leases for petroleum and gas; sumps, voids and mobile storage tanks; laydown areas and chemical fuel storage; surveys involving site preparations; sample pits and geotechnical pits; construction of water monitoring bores; temporary camps and mobile sewerage plants; and restoration.

Proponents can apply to operate under the conditions of the code, which will be imposed through a condition on the environmental authority. If relevant conditions of the standard conditions code are not complied with, it is a breach of the environmental authority for the resource activity under the *Environmental Protection Act 1994* (Qld) and also a breach of the SCL Act.

Figure 7.1 shows the location of the proposed CGPFs and areas of interest for future CGPFs and field compression facilities, as well as the TWAFF property in relation to good quality agricultural land and potential strategic cropping land. An arrow will determine the need for a compliance certificate after the final locations of coal seam gas infrastructure, including production facilities, is confirmed.



### 7.3.3 Regional Planning

The Queensland Government is currently preparing the Darling Downs Regional Plan. This statutory regional plan will provide an integrated planning policy for the region. Regional plans prevail if there is inconsistency between a regional plan and other planning instruments, policies or codes prepared under the *Sustainable Planning Act 2009* (Qld).

The Darling Downs Regional Plan is being prepared to resolve land use conflicts arising from agricultural and mining activities, to foster diverse and strong economic growth, to plan and prioritise infrastructure, and to manage impacts on the environment.

The Darling Downs Regional Plan is scheduled for release in late 2013. Arrow will review the plan when released, to understand any implications for the conduct of its activities where they occur outside a petroleum lease. Petroleum activities on a petroleum lease are exempt development under the Sustainable Planning Act. Arrow will seek to obtain all relevant permits and approvals that are applicable following the release of the regional plan and to otherwise comply with any conditions it may impose. Further detail on the Darling Downs Regional Plan is provided in Attachment 7 Legislation and Policy.

## 7.4 Agricultural Economics Update

The EIS recognises the importance of agriculture in the region. The contribution of agriculture to the regional economy was described in the EIS Appendix O, Economic Impact Assessment. EIS Chapter 13, Agriculture, provides a summary of the agricultural values within and adjacent to the project development area. Further detail was set out in EIS Appendix F, Agricultural Report. At the time of preparing the EIS, Australian Census data from 2006 was the most recent census data available.

Appendix 14, Supplementary Agricultural Economics Report, contains the Analysis of Agricultural Production and Issues in the Darling Downs Report. This report has been prepared by AEC Group Ltd and provides updated agricultural production data and analysis of trends. Data from the 2010-11 Agricultural Census (ABS, 2012) has been used, as well as other relevant data sources. The report also examines current and emerging factors influencing the agricultural industry in the Darling Downs.

Section 1.2 of Appendix 14 notes that the agricultural industry has recorded strong growth in recent years in both the Darling Downs Statistical Division and in Queensland overall, having rebounded from the drought conditions confronting the industry for the majority of the first decade of the 2000s. Table 1.2 in Appendix 14 provides a production comparison of various agricultural commodities (including broadacre crops and horticulture) in the Darling Downs Statistical Division between 2000-2001 and 2010-2011.

Some key trends identified within the Darling Downs Statistical Division during this period include:

- Cereal crop and cotton production levels were considerably higher in 2000-01 and 2010-11 compared to those recorded in 2006-07 during the drought.
- Horticulture and crops cut for hay experienced lower production levels in 2000-01 and 2010-11 compared to 2006-07.
- Sheep and lamb numbers have declined since 2000-01.
- Poultry numbers have increased since 2000-01.

- Area used for agriculture has declined by approximately 2 million hectares between 2000-01 and 2010-11.

Section 1.3 of Appendix 14 looks at trends and factors that have affected the agricultural sector in the Darling Downs over the past decade, including climatic conditions and rural downturn, the global financial crisis, improved technology and farming practices, ageing agricultural workforce, competition for land and labour, government policy, global demand and preferences, and competing exporters. Notable influences on the sector have included floods and drought which have reduced production levels and contributed to increased industry costs and a reduced demand for products during the global financial crisis which have resulted in a decline in commodity prices. Competition from future residents and industry expansion are also expected to continue to create competition for agricultural land. This encroachment and pressures on water availability during drought are already leading to increases in efficiency and productivity gains being realised in the region.

## 7.5 Intensively Farmed Land

Intensively farmed land (IFL) is a term developed by Arrow to recognise those agricultural areas within the project development area that employ farming practises that are more sensitive to the impacts of coal seam gas infrastructure. The EIS included the following definition of IFL:

Intensively farmed land is a term developed by Arrow to reflect agricultural areas on sensitive soils (i.e., black soils) that are currently intensively farmed (i.e., irrigated, cropped), where relatively minor changes to the landform and farming activities can have a disproportionate impact on the productivity of the land.

In defining IFL for the EIS, Arrow noted the following:

- Some areas that are defined as potential strategic cropping land or SCL will also be defined as IFL but not all SCL will be considered IFL, as it may not currently be intensively farmed.
- Some areas that are not defined as potential strategic cropping land or SCL may be defined as IFL.
- Black soil areas where intensively farmed are considered IFL.

Arrow has provided further clarification of its definition of IFL, an example of which is shown in Plate 7.1, to address community concerns. Arrow's website includes the following revised definition of IFL.

It [IFL] refers to land actively being used for broad acre cropping, using either dry land or irrigated farming practices and having been altered to suit those cropping purposes – e.g., laser levelled, irrigation channels and existing dams.

IFL, like SCL, will be identified and mapped at the property level and once mapped will be taken into consideration in determining the location and arrangement of coal seam gas infrastructure on the property to be resolved through consultation with the landholder. The AIFL Committee was formed in 2010 to provide a consultative forum on Arrow's development of coal seam gas infrastructure on IFL within the Surat Basin. This is a forum for developing management measures to enable coal seam gas activities to be carried out on IFL. The committee includes both representatives of Arrow and various landholders representing different agricultural enterprises on IFL and meets every second month. The committee continues to work through the issues of most concern to landholders, resolution of which will facilitate opportunities for coexistence of coal seam gas development on IFL.



**Plate 7.1**  
Intensively farmed land

## 7.6 Coexistence

Arrow considers coexistence to mean allowing the region to enjoy the full benefits of both agricultural enterprises and resource industries, while ensuring that the resource footprint is minimised, that there is no permanent damage to the productivity of that land, and that landholders are fairly compensated for impacts.

Coexistence (integration with farming operations) is the objective of Arrow's development planning. Arrow understands that its development activities will have an impact on landholders and recognises that its development plans need to consider the location of infrastructure, the timing and duration of site access, and how drilling and construction activities are conducted in light of the needs of the landholder. Siting of wells in consultation with landholders in locations that minimise impacts on productive areas and provide the best opportunity for rehabilitation, as well as locating production facilities in less productive land, are key strategies for reducing the potential for permanent alienation of IFL.

Coexistence features in emerging government policy. The SCL Act protects land that is highly suitable for cropping, manages the impacts of development and preserves the productive capacity of land for future generations. The Strategic Cropping Land: Standard Conditions Code for Resource Activities (DNRM, 2012a) prescribes the types of resource activities that are permissible under the code and the way in which those activities are to be carried out, thereby acknowledging the importance of gas resources and that coal seam gas activities can coexist with SCL if managed properly.

Arrow has published the ways in which it will demonstrate coexistence in collaboration with landholders on its website. The three ways are:

- Predevelopment design work to minimise Arrow's footprint.
- Best practice construction management to minimise Arrow's impact on soil during the drilling phase.
- Best practice operational management to minimise Arrow's impact on farm productivity.

Arrow is also investigating best practise management to minimise impact on soil during the construction of well pads, wells and their gathering systems.

Additionally, Arrow has published 12 coexistence commitments on its website, which are:

- No permanent alienation.
- Minimised operational footprint – less than 2% of total area.
- Flexibility on coal seam gas well locations, but all wells located by the edge of farm paddocks.
- Pad drilling (up to 8 wells from a single pad) used where coal depth and geology allows.
- Spacing between wells maximised (between 800 m and 1.5 km).
- Pitless drilling only.
- No major infrastructure facilities on IFL (dams, compression stations, gas gathering stations, water treatment).
- Treated coal seam gas water used to substitute existing users' allocations on IFL.
- No brine/salt treatment or disposal on IFL.

- Flexibility on power supply option, above or below ground.
- Fair compensation, including elements of 'added value'.
- Continued proactive engagements with community and transparency on coexistence field activities.

Arrow is working with various groups, principally the AIFL Committee, on the following initiatives:

- Area Wide Planning.
- Demonstration of the integration of coal seam gas activities with agriculture at its Theten property.
- Access protocol.
- Compensation business case.

Further information about these initiatives is provided in the following sections.

### **7.6.1 Area Wide Planning**

Arrow has commenced the Area Wide Planning pilot, following its identification as a priority by the AIFL Committee. The process includes the preparation of concept field development plans in consultation with landholders to understand how the layout of coal seam gas infrastructure can be designed to minimise disruption to farming activities.

Through the Area Wide Planning process, Arrow will create an integrated development plan to demonstrate drainage basin-scale development. The aim is to balance the individual needs of landholders and neighbouring properties with Arrow's project needs. Area Wide Planning will also consider overland flow during preparation of an integrated development plan.

### **7.6.2 Theten Demonstration Property**

Arrow has purchased property to demonstrate the use of coal seam gas water for irrigation, integration of coal seam gas infrastructure and drilling methods. The property, known as Theten, commenced using treated coal seam gas water for irrigation in late December 2012. Water, soil and weather monitoring stations have been established on the property and will collect data to monitor the use of treated water for irrigation.

Arrow provides updates on work at Theten on its website and will provide information in support of stakeholder engagement and the demonstration project. Arrow has hosted various stakeholder groups and research organisations to visit, review and participate in an ongoing understanding of the sustainable use of coal seam gas water and the appropriate development of coal seam gas infrastructure.

### **7.6.3 Access Protocol**

A key concern of landholders is access, specifically who has right of access. Arrow is developing protocols for access that will recognise landholders' farming activities and access requirements, as well as Arrow's access requirements. It will involve the AIFL Committee in this development. While access will always be required, Arrow is investigating methods and procedures that will reduce the need to visit wells except for workovers and infrequent maintenance. This includes operation and monitoring of the well by remote control systems. Issues being worked through include:

- Health and safety management plans for the simultaneous operation of landholder's and Arrow's activities.
- Notification and communication protocols for landholder and Arrow activities.
- Construction and operational activity planning of Arrow's activities.

#### **7.6.4 Compensation Business Case**

Compensation for temporary disruption during construction and for infrastructure on land is paid to landholders in accordance with the requirements of the *Acquisition of Land Act 1967* (Qld). The required conduct and compensation agreement captures the outcomes of the negotiation. It is supported by guidelines for its preparation.

Arrow recognises the duration of its activities and the need to periodically undertake workovers does not reflect the once-off upfront payment of compensation contemplated under the act. Accordingly, it is exploring options for compensation based on a business case that accounts for the area of impact, periodic temporary disturbance and disruption to farming activities, and a value proposition. Compensation calculations will be based on land value (improved land value of the directly impacted area), land use (of the directly impacted area), added value (of the directly impacted area), disturbance payments (for loss of amenity, development intensity and construction intensity), management time (per well) and professional fees.

### **7.7 Issues Raised in Submissions**

Submissions on the EIS raised a range of issues relating to agriculture. The issues fall into broad topics, which are listed below:

- Access.
- Agricultural value.
- Animal welfare/biosecurity concerns.
- Brine.
- Coexistence.
- Specialist study consultant experience.
- Desktop study for agriculture in the EIS.
- Farming practices.
- Good quality agricultural land and SCL.
- Legislation.
- Management measures.
- Electricity.
- Pipelines.
- Rehabilitation.

The topics list is provided to give an idea of the types of issues that have been raised in relation to agriculture and for which responses have been provided under the heading 'Agriculture', in Part B, Chapter 19, Submission Responses.

### **7.8 Commitments Update**

Changes to the management measures (commitments) in Table 1 of Attachment 8 of the EIS are set out in Table 7.2.

**Table 7.2 Commitment update: agriculture**

No.	Commitment	Change
C062	Strip, salvage and stockpile topsoil near the work site separately to subsoils (in consultation with landowners). Ensure topsoil stockpiles are designed in accordance with best practise principles and are protected from erosion by wind, rain and floods. Stockpile topsoil to a maximum height of 2.5 m to maintain fertility and if stored for extended periods, sow with appropriate vegetation to maintain organic matter and microbial activity.	The increase in stockpile height is in accordance with SCL Protection Decision SCLRD2013/000097, dated 10/5/13, which allows stockpiles to be 2.5 m high to reduce corridor width for the construction and operation of 51 km of buried pipeline on potential strategic cropping land.

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