10.3 Agricultural Resources

GSSE was engaged by Centennial Mandalong to assess the potential impacts of the Mandalong Southern Extension Project on agricultural resources and/or industries within and surrounding the Southern Extension Area. The term "agricultural resource" is used to describe the land on which agriculture is dependent and the associated water resources that are linked to that land. The Study Area adopted by GSSE for this assessment comprised the Southern Extension Area and an additional area external to the Southern Extension Area covering the 26.5 degree of draw from the edge of proposed mine plan, totalling approximately 4,613 hectares. The remainder of the Project Application Area (to the north of the Study Area) was not assessed given that it comprises existing approved workings and infrastructure and there are no additional activities or disturbance proposed.

The NSW Government recently released the *Strategic Regional Land Use Policy* to assist the development of a long-term strategy for continued progress of the mining industry that also ensures local community sustainability and on-going viability of existing industries. This Policy requires all State significant mining development proposals, whether or not they are located on land mapped as strategic agricultural land, to prepare an Agricultural Impact Statement for consideration at the development application stage.

A copy of the GSSE's *Agricultural Impact Statement* (2013b) prepared for this Project is contained within **Appendix L**, with significant findings and recommendations summarised in the below sub-sections. It has been prepared to address the DGRs (see **Section 1.7.2**) and in accordance with the *Guideline for Agricultural Impact Statements* (DP&I 2012).

10.3.1 Local and Regional Agricultural Enterprises

Land Use

Most agricultural enterprises within the Study Area have traditionally been small farm enterprises conducted in pockets of cleared native bushland, reliant upon off-farm income to be sustainable (GSSE 2013b). Cattle grazing, pleasure horse agistment and small orchard areas are the main agricultural activities in the area. There is a commercial Charolais stud, known as "Douglasdale", that is partially located within the Study Area. Apart from this, grazing within the Study Area appears to be used as a grass and vegetation management tool rather than an income generating agricultural enterprise. Overall farm size is considered small and many would be classified as hobby farms with a very low potential to produce agricultural income.

The agriculture land uses in the Lake Macquarie and Wyong LGAs, as report by GSSE (2013b), are summarised in **Table 27.**

Table 27 – Agricultural Land Use within the Lake Macquarie and Wyong LGAs

	Wyong LGA	Lake Macquarie LGA	Total
Agricultural Land Area			
Total land area within LGA	74,010 ha	64,020 ha	138,030 ha
Area of agricultural land	5,847 ha	3,763 ha	9,610 ha
Proportion of agricultural land	7.9 %	5.9 %	7 %
Agricultural Enterprises			
Land under cropping activities	576 ha	18 ha	594 ha
Land under grazing activities	5,271 ha	3,745 ha	9,016 ha
Proportion of agricultural land used for grazing	90.2 %	99.5 %	93.8 %

Key points in relation to **Table 27** include:

- Agriculture is a minor land use, accounting for only 7 percent of land use within the Lake Macquarie and Wyong LGAs.
- Agricultural land is almost exclusively for grazing, utilising close to 94 percent of all agricultural land within the Lake Macquarie and Wyong LGAs. The primary enterprise is meat cattle farming, which accounts for 88.7 percent of livestock numbers, followed by milk cattle and sheep farming.
- Cropping enterprises comprise a minor portion of agricultural activities. The primary crops grown are vegetables, fruit and other non-cereal crops. No cereals for grains are grown in the region.

There is minimal irrigation cropping carried out, accounting for only 10.4 percent of the agricultural land in the Lake Macquarie and Wyong LGAs. Agriculture is a minor water user in these LGAs, with approximately 2,524 megalitres per annum used to irrigate approximately 1,000 hectares of agricultural land, and an additional 363 megalitres per annum utilised for other agricultural uses, such as poultry and egg production (GSSE 2013b).

Employment

Agriculture is not a major employer within the Lake Macquarie and Wyong LGAs, accounting for only 6.8 percent of the total employed population. GSSE (2013b) advises the following in relation to that 6.8 percent:

- Agriculture-related wholesaling and retailing is responsible for close to 69 percent of total agricultural-related employment, followed by processing and manufacturing (24.1 percent) and agricultural production (7.3 percent).
- The major agricultural production employers are nursery and floriculture production and poultry farming.
- The main agriculture-related processing and manufacturing employment relates to cereal, pasta, baking mix and other grain-mill manufacturing, followed by poultry processing.
- Supermarkets and grocery stores account for the vast majority of wholesaling and retailing.

GSSE (2013b) advises that the income generated from agricultural enterprises within the Study Area is minimal due to the small average holding size, with landholders relying on off-farm income. On this basis, GSSE (2013b) assumes that there are minimal individuals directly employed within agriculture.

Agricultural Production Value

Agricultural production values for the Lake Macquarie and Wyong LGAs total $61.3 million per annum, with the main agricultural production by value being from nurseries and cut flowers, along with poultry production (meat and eggs) (GSSE 2013b).

The potential agricultural productivity of the Study Area was determined by GSSE (2013b) using DTIRIS data for agricultural enterprises suitable for each of the land and soil capability classes (see **Section 10.2.1**) that will be impacted. This analysis has been undertaken on the potential capability of the land rather than current land use. In summary, Class 4, Class 5 and Class 7 land within the Study Area has the potential to generate (gross margins) approximately $164 per hectare, $109 per hectare and $55 per hectare, respectively, from beef cattle grazing enterprises (GSSE 2013b).

Based on the nominated gross margins, GSSE (2013b) calculates that the Study Area has the capacity to generate an estimated gross margin of $385,000 per annum. It is important to note that this is derived from the optimum potential uses and is likely to be much higher than the actual incomes currently being achieved (GSSE 2013b).

Agricultural Support Infrastructure

Agricultural support infrastructure within the Lake Macquarie and Wyong LGAs includes the Sydney-Newcastle F3 Freeway (as the major arterial road) and rail infrastructure providing transport from agricultural areas in the west and north of the State. The main purpose-built agricultural support infrastructure is a number of large poultry sheds, which are used for raising meat chickens and egg production. There are also a number of small retail agricultural suppliers that service the numerous hobby farms in the region. Outside of this, there is little formal infrastructure for the support of agricultural industries in either the Lake Macquarie or Wyong LGA.

10.3.2 Impact Assessment

Land Temporarily Removed From Agriculture

The proposed Mandalong South Surface Site and access road will temporarily remove approximately 20 hectares of land from potential agricultural production during the life of the Project. The land and soil capability classes within this 20 hectares are outlined in **Section 10.2.1** At the end of the Project it is intended that the surface infrastructure will be decommissioned and the land rehabilitated to a mixture of native bushland and grazing areas that are generally consistent with pre-mining conditions (see **Section 10.19**).

GSSE (2013b) estimates the net annual economic impact on potential agricultural productivity as a result of this temporary loss of land to be $1,507 per annum. The flow-on effects to employment and local business are considered to be minimal as the area of land to be disturbed and relative agricultural productivity is low.

Mine subsidence within the Study Area has the potential to impact upon agricultural enterprises by affecting fencing and farm gates, farm dams, water reticulation and ponding. Various mitigation measures and management strategies have been committed to in this EIS to address these potential impacts.

Umwelt's (2013) assessment of the predicted subsided landform indicates negligible changes to remnant ponding, with a total increase in area of approximately 3.6 hectares (i.e. an increase of less than 2 percent) (see **Section 10.5.2**). The small areas of increased remnant ponding are largely confined to the existing flow paths/watercourses. Adopting a precautionary approach, GSSE (2013b) has assumed that the entire 3.6 hectares is classified as Class 4 land and soil capability. The estimated net annual economic impact on potential agricultural productivity as a result of the predicted remnant ponding is approximately $591 per annum (GSSE 2013b).

Total potential loss to agricultural enterprises due to the proposed surface infrastructure and remnant ponding is $2,098 per annum. When compared to the gross annual value of agricultural production for the Lake Macquarie LGA ($27.3 million) and Wyong LGA ($34 million), $2,098 is considered a negligible impact on agricultural enterprises and related industries (GSSE 2013b).

The "Douglasdale" Charolais stud, which is partially located in the Study Area, is not expected to be impacted by the Project. There is no proposed surface infrastructure in this extent of the Study Area and it is located on the eastern edge of the 26.5 degree angle of draw.

Land Permanently Removed From Agriculture

There is no land within the Study Area that will be permanently removed from agriculture as a result of the Project. While there may be an increase in remnant ponding as a result of subsidence, mitigation measures and management strategies are proposed (see **Section 10.5.3**).

The Mandalong South Surface Site and access road will be decommissioned at the end of the Project and the land rehabilitated to a mixture of native bushland and grazing land generally consistent with pre-mining land and soil capability and agricultural suitability classes (see **Section 10.19**).

Acid Sulfate Soils

The likelihood of acid sulfate soils occurring within the Study Area is very low due to the Study Area's position away from the coast and potential acid sulfate landform type (GSSE 2013b). This is supported by the Wyong LGA and Lake Macquarie LGA acid sulfate soil mapping.

The Wyong Soil Landscape Unit, which covers just over 6 percent of the Study Area, is the only soil landscape unit within the Study Area that has acid sulfate soil potential. As evident on **Figure 6**, all areas of the Wyong Soil Landscape Unit (Soil Type 1) are significantly removed from the proposed Mandalong South Surface Site and will not be subject to surface disturbance as part of the Project.

Surface Water

The potential impacts of the Project on surface water resources has been minimised by the iterative process Centennial Mandalong has undertaken to develop and refine the mine design to minimise subsidence and associated impacts on the natural and built environment (Umwelt 2013).

As outlined in **Section 10.5**, Umwelt (2013) advises that there is limited potential for changes to water quantities, including annual flow volumes, baseflows and environmental flows. On this basis, downstream users are unlikely to experience significant changes to water availability as a consequence of the Project. It is concluded that the Project will not result in adverse cumulative impacts on water use, flows or qualities within or surrounding the Southern Extension Area.

Groundwater

Based on existing groundwater quality data for Mandalong Mine, the proposed mine workings are not expected to reduce the beneficial use category of alluvial groundwater (i.e. stock watering) or the beneficial use category of porous and fractured rock groundwater sources (i.e. primary industry) within the Southern Extension Area (GHD 2013a).

As outlined in **Section 10.4**, GHD (2013a) concludes that the predicted impacts on alluvial groundwater and porous and fractured rock groundwater sources as a result of the Project should be less than the Level 1 minimal impact considerations from the AIP and are therefore considered to be acceptable. Any impacts on basic landholder rights and existing registered bores (noting that no registered alluvial bores located in the Southern Extension Area) are expected to be minor and acceptable (GHD 2013a).

Water Reallocation

The groundwater removed from the underground mine workings through de-watering is not considered suitable for general agricultural use. The water and salt balance undertaken for the Project by GHD (2013b) (see **Section 10.6**) adopts a mine water electrical conductivity of 5,882 microSiemens per centimetre (µS/cm), which, according to *Measuring Water Salinity* (I&I 2009, cited in GSSE 2013b), is above the desirable limit for healthy growth in cattle and horses, and suitable only for crops with a high tolerance to saline water.

On this basis, while the current dewatering licence (20BL169424) at the Cooranbong Entry Site permits Centennial Mandalong to extract groundwater from the coal seam, this water is not considered by GSSE (2013b) to be taken from potential agricultural use as the water quality is not considered suitable for general agricultural production.

Biophysical Strategic Agricultural Land

As outlined in **Section 10.2.3**, the *Soil and Land Capability Assessment* (GSSE 2013a) undertaken for the Project did not identify any BSAL within the Study Area.

Other Potential Impacts on Agriculture

Other impacts which may affect the regional community include visual amenity, dust emissions, noise emissions, traffic generation, bushfire risk and greenhouse gas production. Each of these areas has been thoroughly assessed by specialist consultants, with the key findings and conclusions summarised in this EIS. Numerous mitigation measures, monitoring activities and management strategies, as recommended by the specialist consultants, have been committed to in this EIS to ensure impact to the local environment and regional community as a result of the Project is minimised.

Forestry, Conservation and Recreational Land Use

As shown on **Figure 5**, parts of the Olney State Forest are located within the Project Application Area. The Olney State Forest is popular for recreational activities, including hiking, camping and four-wheel driving. Forests NSW advises that the forests in this area have been harvested for timber for many decades and today comprise regrowth forests. Jilliby SCA extends into the north-western extent of the Southern Extension Area.

Based on the scope of the Project and findings of the various specialist assessments undertaken and presented in this EIS, the Project is not expected to have an adverse impact on forestry, conservation or recreational land uses within the Project Application Area. Notable considerations include:

- There are no mining activities or surface infrastructure proposed within the Jilliby SCA. There are also significant separation distances between the SCA and proposed areas of mining and new surface facilities.
- While the Project does include mining under parts of the Olney State Forest, there is no surface infrastructure proposed within the State Forest. There are significant separation distances between the State Forest and the proposed Mandalong South Surface Site.
- The post-disturbance soil and land capability classes and agricultural suitability classes within the Southern Extension Area are predicted to remain the same as the pre-disturbance classes (GSSE 2013a). This indicates that the potential for degradation of forestry and conservation values within the Olney State Forest and Jilliby SCA is negligible.
- In accordance with the subsidence assessment (DGS 2013) and surface water assessment (Umwelt 2013), there are negligible changes to remnant ponding predicted over the whole of the Southern Extension Area, with a total increase in area of approximately 3.6 hectares (i.e. an increase of less than 2 percent). The small areas of increased remnant ponding are largely confined to the existing flow paths/watercourses. This indicates that the potential for reduced forestry, conservation and recreational activities/values within the Olney State Forest and Jilliby SCA is negligible.
- Umwelt (2013) advises that there is limited potential for changes to water quantities, including annual flow volumes, baseflows and environmental flows. On this basis, the Olney State Forest and Jilliby SCA are unlikely to experience significant changes to water availability as a consequence of the Project.
- Based on the levels of subsidence predicted for the proposed mine plan, RPS (2013a) advises that the main flora and fauna impacts are expected to be caused from the clearance works required to establish the Mandalong South Surface Site and access road, which are significantly removed from the Olney State Forest and Jilliby SCA. RPS (2013a) concludes that the Project will not significantly impact upon occurring or potentially occurring threatened flora, fauna and/or ecological communities.
- The proposed Mandalong South Surface Site will have a negligible to low visual impact on people partaking in recreational activities in the Southern Extension Area. The existing landform and tree cover will result in a high visual absorption capability, there are no significant views toward the proposed surface site from formal public lookouts and distant public vantage points are unlikely to be visually impacted (GBD 2013).

Conclusion

The Southern Extension Area contains no areas of potential BSAL and the Project will not result in any changes to the land and soil capability classes. The Project will have negligible impact on surface water and groundwater resources relied on by agriculture, and GSSE (2013b) predicts the post-mining agricultural economic activity to be similar to the pre-mining agricultural activity.

The Project will provide considerable positive economic benefits to the local and broader communities (Aigis Group 2013). GSSE (2013b) advises that these benefits are much greater than the potential income lost by existing and/or potential agricultural enterprises, conservatively calculated as $2,098 per annum. GSSE (2013b) concludes that the Project will provide economic benefits to the region whilst having negligible impact on agricultural resources, enterprises or related industries.

10.3.3 Mitigation and Management

Whilst the majority of impacts on agricultural enterprises and resources have been assessed as negligible, by adopting the recommendations made in various other specialist assessments, including those in the *Subsidence Impact Assessment* (DGS 2013)*, Soil and Land Capability Assessment* (GSSE 2013a), *Air Quality Impact Assessment* (SLR 2013a), *Surface Water Assessment* (Umwelt 2013) and the *Decommissioning and Rehabilitation Strategy* (GSSE 2013c), any predicted impacts will be further minimised. On this basis, no additional specific recommendations are proposed to mitigate or manage impacts to agricultural resources as a result of the Project.