Appendix N

# Greenhouse Gas Assessment (AECOM Australia Pty Ltd, 2010c)

# Myuna Colliery Extension of Mining

## Greenhouse Gas Assessment

# Greenhouse Gas Assessment

Myuna Colliery Extension of Mining

Prepared for

Centennial Myuna Pty Ltd

Prepared by

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# 1.0 Introduction

AECOM was commissioned by Centennial Myuna Pty Ltd (CMPL) to prepare an Environmental Assessment (EA) for the Myuna Colliery Extension of Mining (proposed Project) located near Lake Macquarie, approximately 90 km north-east of Sydney. This study was undertaken as part of an Environmental Assessment to support an application for Project Approval under Part 3A of the Environmental Planning & Assessment Act 1979.

The Project will extend mining and coal handling at Myuna Colliery within the Project Application Area and proposes to:

- mine using bord and pillar methods in the Wallarah, Great Northern and Fassifern seams in CCL762 and ML1370, for a further 21 years;
- produce, handle and distribute to Eraring Power Station, up to 2 Mtpa using existing infrastructure;
- continue the use of ancillary infrastructure and services for a further 21 years;
- upgrade the water management system; and
- rehabilitate the surface facilities within 5 years of completion of mining.

Myuna Colliery's Surface Facilities Area is located in Wangi Wangi on the western side of Lake Macquarie, 25 km south-west of Newcastle. The Myuna Colliery Surface Facilities Area is surrounded by vegetated ridgelines and is adjacent to the now disused Wangi Power Station. All existing infrastructure within the Surface Facilities Area of Myuna Colliery will be utilised to service the proposed Project, with some minor modification. Myuna Colliery will continue to use the Eraring Energy owned Enclosed Overland Conveyor to transport coal to Eraring Power Station.

CMPL undertakes underground mining at Myuna Colliery:

- Within the Development Consent Mining Area; and
- Within Consolidated Coal Lease (CCL) 762 and Mining Lease (ML) 1370 but external to the Development Consent Mining Area, pursuant to the combined operation of Section 74(1) of the Mining Act 1992 (Mining Act) and clause 8K of the Environmental Planning and Assessment Regulation 2000.

The Project Application Area encompasses ML 1370, a portion of CCL 762 and the Surface Facilities Area. The Project Application Area comprises an area within the boundaries of CCL 762 and ML 1370, but external to the Development Consent Mining Area (with the exception of the inclusion of the Surface Facilities Area).

AECOM was commissioned to undertake an assessment of greenhouse gas (GHG) emissions from the proposed Project for inclusion in the EA.

## 1.1 Scope of Works

The purpose of this assessment was to estimate the change in annual GHG emissions associated with the proposed Project. A quantitative assessment of the potential scope 1, 2 and 3 GHG emissions from the project were made in relation to the following sources:

- Emissions from combustion of fuel by on-site vehicles used to transport men and materials associated with operations and to handle and manage the mine's small ROM coal stockpile (Scope 1);
- Emissions from the use of Liquefied Petroleum Gas (LPG), sulphur hexafluoride (SF6), and oils and greases (Scope 1);
- Fugitive emissions from the extraction of coal (Scope 1);
- Fugitive emissions from post mining activities (stockpiled coal) (Scope 1);
- Electricity use (Scope 2 and 3);
- Indirect emissions from the combustion of the coal produced at Myuna Colliery by Eraring Power Station (Scope 3).

Scope 1 and Scope 2 emissions were estimated using data provided by CMPL and emission factors and methods specified in the National Greenhouse and Energy Reporting System (NGERS) (to which CMPL is a mandatory respondent). Indirect emissions (Scope 3) associated with the operation of the facility, namely those associated with use of the product coal by Eraring Power Station, were estimated using National Greenhouse Account (NGA) Factors (DCC; June, 2009), as NGERS has no Scope 3 requirement.

Emissions were assessed for two scenarios:

- Existing production (2008/09 data); and
- Proposed maximum production (2.0 Mtpa).

Results were compared to historical Australian emission levels.

# 2.0 Project Description

The Project will extend mining at Myuna Colliery within the Project Application Area, comprising an area external to the Development Consent Mining Area (with the exception of the inclusion of the Surface Facilities Area) but within the boundaries of CCL 762 and ML 1370.

The Project's mining operations will continue to be carried out using bord and pillar methods in the Wallarah, Great Northern and Fassifern coal seams, generally consistent with the manner in which CMPL undertakes current mining operations at Myuna Colliery. Further, all existing infrastructure and services at the Surface Facilities Area will be utilised to service the Project.

## 2.1 Mining Area

The Project Application Area encompasses the three coal seams (Wallarah, Great Northern and Fassifern) previously mined at Myuna Colliery and, as such, includes some existing workings and areas requiring new workings to be developed. Access to new areas will be from the existing workings.

## 2.2 Mining Methods

The Project's mining operations will continue to be carried out using bord and pillar methods in the Wallarah, Great Northern and Fassifern coal seams, generally consistent with the manner in which CMPL undertakes current mining operations at Myuna Colliery. The mining layout to be implemented within the three seams in any given area of the Project Application Area will be determined during detailed mine planning and development of a geotechnically -engineered mine design. The mine design will address the various mine constraints, including (at least) the High Water Level Subsidence Control Zone; the 40 metres of solid rock head and the coal pillar factor of safety. For areas where secondary extraction is proposed to be undertaken, CMPL will seek approval from Industry and Investment NSW.

## 2.3 ROM Coal Production Limits

Myuna Colliery is currently authorised to produce up to 1.3 Mtpa within the Development Consent Mining Area. The Project seeks approval for ROM Coal production up to 2.0 Mtpa, which is within the operational capacities of the existing approved CHP.

## 2.4 Coal Transport

No changes are proposed to the current coal transport methods. Coal produced by Myuna Colliery will continue to be supplied directly to Eraring Power Station by the Eraring Energy owned Enclosed Overland Conveyor. The small ROM coal stockpile area will continue to be used when Eraring Energy is unable to accept deliveries due to scheduled maintenance or conveyor breakdown. During these outages, a front-end loader recovers coal from the stockpile and loads it onto trucks that dump the coal into a reclaim hopper for transportation to Eraring Power Station by the Enclosed Overland Conveyor as required.

## 2.5 Coal Handling

No changes are proposed to the current coal handling, preparation, or stockpiling procedures of the existing operations. A negligible amount of waste rock from the CHP will continue to be transported on the Surface Facilities Area and stored back underground.

## 2.6 Mine Access and Surface Facilities

Existing mining areas (including existing underground workings for ventilation) will continue to be utilised for the Project including (but not limited to) mine access, emergency management and underground services and infrastructure. As such, no changes are proposed to the current mine access, infrastructure or facilities. Minor changes to the licensed discharge point configuration and temporary coal stockpile area (involving minor water management works) will be required to improve water management at the Surface Facilities Area. Vehicles operated on site use diesel fuel, while the coal handling plant, conveyor and other plant are electrically powered.

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# 3.0 Greenhouse Gases

GHGs are gases found in the atmosphere that absorb outgoing heat that is reflected from the sun. The absorption of the heat energy warms the air, enabling life to survive, and is known as the Greenhouse Effect. The primary greenhouse gas is carbon dioxide ($CO_2$).

Human activities, such as the combustion of carbon-based fuels, increase the amount of GHGs in the atmosphere. This leads to greater absorption of heat and increases in atmospheric temperature, known as the Enhanced Greenhouse Effect.

The NSW Government has committed to a long term GHG reduction target of 60% reduction in GHG emissions by 2050 and a return to year 2000 GHG emission levels in NSW by 2025. There are, however, no legislative limits for emissions of $CO_2$, methane ($CH_4$) or nitrous oxide ($N_2O$).

Due to the complex interdependencies of environmental and atmospheric systems, quantification of the likely environmental effects associated with a particular amount of GHG release into the atmosphere cannot be made. In general terms, increasing GHG levels in the atmosphere result in increased average global temperatures. These temperature increases can result in changes in ocean levels (due to melting of glaciers and polar ice caps) and water temperatures and greater humidity. Changes in weather patterns are also associated with increased atmospheric temperatures, resulting in effects such as increased droughts in some areas and increased flooding in others.

## 3.1 Global Warming Potential

Different GHGs have different heat absorbing capacities. In order to achieve a basic unit of measurement, each GHG is compared to the absorptive capacity of $CO_2$, and measurements and estimates of GHG levels are reported in terms of $CO_2$ equivalent emissions ($CO_2$-e). Global warming potentials (GWPs) are used to compare the abilities of GHGs to trap heat in the atmosphere. A GWP is based on the radiative efficiency of a gas (i.e. its heat-absorbing ability), relative to that of $CO_2$, and its decay rate (i.e. atmospheric lifetime), also relative to $CO_2$. The GWP provides a means to convert emissions of GHGs into $CO_2$-e units. The global warming potentials of the primary greenhouse gases are shown in **Table 1**.

**Table 1: Greenhouse Warming Potentials - Select Greenhouse Gases**

| Greenhouse Gas | Global Warming Potential* |
|---|---|
| Carbon dioxide ($CO_2$) | 1 |
| Methane ($CH_4$) | 21 |
| Nitrous oxide ($N_2O$) | 310 |
| Sulphur hexafluoride ($SF_6$) | 23,900 |
| *GWP factors specified for calculating emissions under Kyoto accounting provisions<br>Source: NGA Factors, June 2009 | |

## 3.2 National Response to Climate Change

### 3.2.1 Kyoto Protocol

The Kyoto Protocol is an international agreement created under the United Nations Framework Convention on Climate Change in Kyoto, Japan in 1997. The Kyoto Protocol aims to reduce the collective GHG emissions of developed countries by at least 5 % below 1990 levels during the period 2008 to 2012, which is known as the first commitment period.

Australia ratified the Kyoto Protocol in December, 2007, with the action taking effect in March 2008. Australia has committed to ensuring its GHG emissions over 2008 to 2012 are no more than 8 per cent above 1990 levels.

### 3.2.2 National Greenhouse Gas Inventory

Australia's National Greenhouse Gas Inventories are designed to provide estimates of Australia's net GHG emissions and track Australia's progress towards its Kyoto target. Australia has updated and published annual national GHG inventories for each year from 1990 to 2008 inclusive. The inventories are prepared according to international guidelines. Details of the most recent inventory (2008) are shown in **Table 2**.

**Table 2: Australian National Greenhouse Gas Emissions, 2008**

| Sector | Mt $CO_2$-e |
|---|---|
| Agriculture, forestry, fishing | 120.1 |
| Mining | 57.8 |
| ***Coal Mining*** | ***32.1*** |
| Manufacturing | 72.7 |
| Electricity, gas, water | 210.8 |
| Construction | 1.8 |
| Commercial services | 17.6 |
| Transport & storage | 41.0 |
| Residential | 54.3 |
| Total of all economic (ANZSIC) sectors | 576.2 |
| *Source: Australian Greenhouse Emissions Information System, Department of Climate Change and Energy Efficiency. (Wed Jun 30 09:44:41 2010)* | |

In 2008, Australia's net GHG emissions were 576.2 Mt $CO_2$-e. Of the total Australian emissions, 32.1 Mt $CO_2$-e (5.5 %) were emitted by the coal mining industry. The change in emissions from coal mining in Australia between 1990 and 2008 are shown in **Figure 1**. Emission levels steadily increased between 2002 and 2007.


**Figure 1: Greenhouse Gas Emissions from Coal Mining - Australia, 1990 - 2007**

*Source: [http://ageis.climatechange.gov.au/ANZSIC.aspx](http://ageis.climatechange.gov.au/ANZSIC.aspx); accessed 30 June 2010*

### 3.2.3 Greenhouse Gas Reporting

The National Greenhouse and Energy Reporting Act 2007 (the NGER Act) was passed in September 2007. The NGER Act establishes a mandatory reporting system for corporate GHG emissions and energy production and consumption in Australia. The first reporting period under the Act commenced on 1 July 2008.

The NGER Act requires controlling corporations to register and report if they emit GHGs, produce energy, or consume energy at or above specified quantities per financial year (1 July to 30 June). The reporting timeline is shown in **Figure 2**. Corporations emitting the greatest amount of GHG or consuming the most energy were initially targeted for the first phase, while corporations with lower emission and energy consumption levels are now being incorporated. The final threshold is 50 kilotonnes of $CO_2$ equivalent or 200 terajoules of energy.

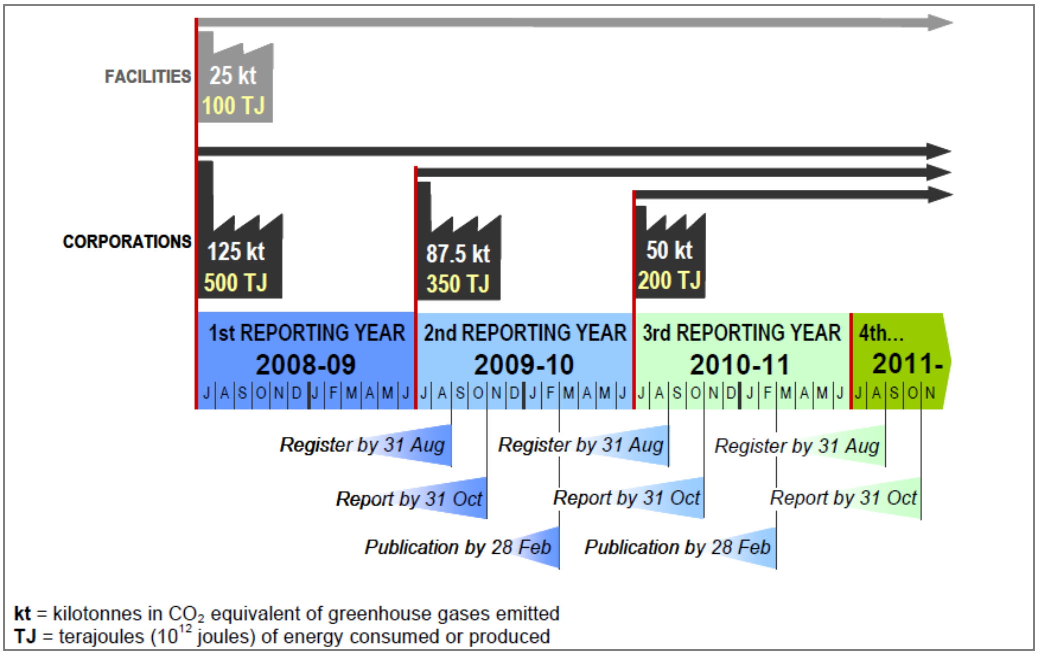


**Figure 2: NGER Reporting Timeline**

Corporations, such as CMPL, that meet the NGER thresholds must report on:

- GHG emissions;
- Energy production; and
- Energy consumption.

The NGER (Measurement) Determination 2008 outlines calculation methods and criteria for GHG emissions, energy production and consumption. The Determination provides for four methods of calculation:

- Method 1 (default method) is derived from the National Greenhouse Accounts methods, and is based on national average estimates;
- Method 2 is a facility-specific method that uses industry practices for sampling and Australian or equivalent standards for analysis;
- Method 3, which is the same as Method 2 but is based on Australian or equivalent standards for both sampling and analysis; and
- Method 4, which relates to direct measurement of emissions by continuous or periodic emissions monitoring.

# 4.0 Emissions Estimates

## 4.1 Methodology

Estimation of the GHG emissions associated with the existing approved operations and proposed Project was undertaken using the emission factors and methods outlined in the National Greenhouse and Energy Reporting (Measurement) Determination 2008 and complementary to the National Greenhouse Accounts (NGA) Factors (June, 2009). The NGA Factors provide three types of assessment categories:

- **Scope 1**, which covers direct emissions from sources within the boundary of an organisation, such as fuel combustion and manufacturing processes;
- **Scope 2**, which covers indirect emissions from the consumption of purchased electricity, steam or heat produced by another organisation; and
- **Scope 3**, which includes all other indirect emissions that are a consequence of an organisation's activities but are not from sources owned or controlled by the organisation; that is, emissions associated with the production of fuels and emissions from the generation of purchased electricity (external emissions).

Annual emissions from the following sources were assessed, based on information provided by CMPL:

- Emissions from combustion of fuel by on-site vehicles used to transport staff and materials associated with operations and to handle and manage the mine's small ROM coal stockpile (Scope 1);
- Emissions from the use of Liquefied Petroleum Gas (LPG), sulphur hexafluoride ($SF_6$), and oils and greases (Scope 1);
- Fugitive emissions from the extraction of coal (Scope 1);
- Fugitive emissions from post mining activities (stockpiled coal) (Scope 1);
- Electricity use (Scope 2 and 3);
- Indirect emissions from the combustion of the coal produced at Myuna Colliery by Eraring Power Station (Scope 3).

CMPL provided historical electricity and diesel use for the period 2006/07 – 2008/09 and expected electricity and diesel use for the Colliery operating at 2 Mtpa. The historical and predicted data were used in the calculations as described in the following sections.

CMPL monitors fugitive emissions associated with the extraction of coal at the ventilation shaft on a monthly basis as required by the NGER Act 2007. The mine operates in the Fassifern, Great Northern and Wallarah seams, and the monitoring data indicates that the gas concentration in the ventilation flow is related to gassy Fassifern seam workings and is not associated with production levels. As such, the fugitive emissions measured between July 2008 and June 2009 were taken to be indicative of both existing and potential future emissions associated with coal production (refer to **Section 4.2.5**).

## 4.2 Emission Estimates

### 4.2.1 Combustion of Liquid Fuel (Scope 1)

***Fuel Combustion***

The combustion of diesel fuel in vehicles is a source of GHGs. For this assessment, diesel-powered mobile vehicles used on site were included in the assessment. Emission factors for transport-related emissions are shown in **Table 3**.

**Table 3: Emission Factors – Diesel Oil Combustion (Transport)**

| Transport equipment type | Energy content factor (GJ/kL) | Emission Factor (kg $CO_2$-e/GJ) | | |
|---|---|---|---|---|
| | | $CO_2$ | $CH_4$ | $N_2O$ |
| General transport | 38.6 | 69.2 | 0.2 | 0.5 |
| *Source: Schedule 1 Part 4 Item 54, NGERS Measurement Determination 2008* | | | | |

Diesel usage at Myuna Colliery is related to the coal production levels, the requirement to transport men in and out of the mine, and to the supply of support materials to the working faces. Historical and predicted diesel use and their associated production levels are shown in **Table 4**. CMPL has applied a key performance indicator (KPI) of 0.000247 kL/ t ROM for future fuel use based on historical production levels and diesel fuel use. This KPI was used to predict fuel use at the proposed maximum production level of 2 Mtpa as shown below.

**Table 4: Historical and Predicted Diesel Use**

| Period | Year | Production (t ROM) | Diesel Use (L) |
|---|---|---|---|
| Historical | 2006/07 | 1,078,020 | 233,862 |
| | 2007/08 | 1,169,093 | 272,550 |
| | 2008/09 | 1,132,974 | 271,579 |
| Predicted | 2009/10 | 1,154,141 | 286,822 |
| | 2011/12 | 1,592,000 | 393,000 |
| | 2012/13 | 1,850,000 | 457,000 |
| | 2013/14 | 1,850,000 | 457,000 |
| Maximum Production Predicted | | 2,000,000 | 494,000 |

Emissions associated with the combustion of fuel on-site at Myuna Colliery are shown in **Table 5** (existing) and **Table 6** (proposed). Comparison of the data indicates an additional 600 t$CO_2$-e would be emitted under the proposed production rate of 2 Mtpa.

**Table 5: Scope 1 Emissions – Existing Fuel Combustion (Transport)**

| Activity Data | Amount (kL) | Energy Content Factor | Energy Content | Emission Factors | Gases | NGERS Method | Scope 1 Emissions (t $CO_2$-e) |
|---|---|---|---|---|---|---|---|
| Diesel oil | 271.6 | 38.6 | 10,483.0 | 69.2 | $CO_2$ | Method 1 | 725 |
| | | | | 0.2 | $CH_4$ | | 2.1 |
| | | | | 0.5 | $NO_2$ | | 5.2 |
| **Total** | | | | | | | **733** |

**Table 6: Scope 1 Emissions – Proposed Fuel Combustion (Transport)**

| Activity Data | Amount (kL) | Energy Content Factor | Energy Content | Emission Factors | Gases | NGERS Method | Scope 1 Emissions (t $CO_2$-e) |
|---|---|---|---|---|---|---|---|
| Diesel oil | 494.0 | 38.6 | 19,068.4 | 69.2 | $CO_2$ | Method 1 | 1,320 |
| | | | | 0.2 | $CH_4$ | | 3.8 |
| | | | | 0.5 | $NO_2$ | | 9.5 |
| **Total** | | | | | | | **1,333** |

### 4.2.2 Fugitive Emissions from the use of Liquefied Petroleum Gas (LPG) (Scope 1)

CPML uses a small quantity of LPG on site. This usage is not expected to change as a result of the proposed increase in production. GHG emissions associated with LPG use at the site are summarised in **Table 7**; these represent existing and predicted emissions.

**Table 7: Scope 1 Emissions - LPG**

| Activity Data | Amount (kL) | Energy Content Factor | Energy Content | Emission Factors | Gases | NGERS Method | Scope 1 Emissions (t $CO_2$-e) |
|---|---|---|---|---|---|---|---|
| LPG | 0.63 | 25.3 | 15.939 | 51.2 | $CO_2$ | Method 1 | 1 |
| | | | | 0.1 | $CH_4$ | | 0 |
| | | | | 0.03 | $NO_2$ | | 0 |
| **Total** | | | | | | | 1 |

### 4.2.3 Fugitive Emissions from Sulphur Hexafluoride (Scope 1)

The mine electrical distribution system uses switchgear insulated by sulphur hexafluoride ($SF_6$). The quantity of gas within switchgear at the mine is not expected to increase with the planned increase in production. GHG emissions associated with $SF_6$ use at the site are summarised in **Table 8**; these represent existing and predicted emissions.

**Table 8: Scope 1 Emissions – SF6**

| Activity Data | Amount (t) | Emission Factor | NGERS Method | Scope 1 Emissions (t $CO_2$-e) |
|---|---|---|---|---|
| $SF_6$ | 0.012 | 0.005 | Method 1 | 0 |
| **Total** | | | | **0** |

### 4.2.4 Emissions from Energy Consumed by other than Combustion (Oils and Greases) (Scope 1)

In 2008/09, the mine consumed 360 kL of oils/ greases in the course of operating and maintaining production and ancillary plant and equipment. During this period, the mine had a total production level of 1.13 Mt. GHG emissions associated with this use of materials were equivalent to 390.5 3 t$CO_2$-e as shown in **Table 9**.

**Table 9: Scope 1 Emissions – Oil/Grease (2008/09 - Existing)**

| Activity Data | Amount (kL) | Energy Content Factor | Emission Factors | Gases | NGERS Method | Scope 1 Emissions (t $CO_2$-e) |
|---|---|---|---|---|---|---|
| Petroleum based oils(other than petroleum based oil as fuel) | 354.852 | 38.6 | 27.9 | $CO_2$ | Method 1 | 384.13 |
| | | | 0 | $CH_4$ | | 0 |
| | | | 0 | $NO_2$ | | 0 |
| Petroleum based greases | 5.909 | 38.6 | 27.9 | $CO_2$ | Method 1 | 6.4 |
| | | | 0 | $CH_4$ | | 0 |
| | | | 0 | $NO_2$ | | 0 |
| **Total** | | | | | | **390.53** |

The use of oil/grease at the site is expected to increase proportionally with the proposed increase in production. Predicted emissions associated with the use of oil/grease at the proposed maximum production level of 2 Mtpa are shown in **Table 10**.

**Table 10: Scope 1 Emissions – Oil/Grease (Proposed)**

| Activity Data | Amount (kL) | Energy Content Factor | Emission Factors | Gases | NGERS Method | Scope 1 Emissions (t $CO_2$-e) |
|---|---|---|---|---|---|---|
| Petroleum based oils(other than petroleum based oil as fuel) | 626.408 | 38.6 | 27.9 | $CO_2$ | Method 1 | 678.10 |
| | | | 0 | $CH_4$ | | 0 |
| | | | 0 | $NO_2$ | | 0 |
| Petroleum based greases | 10.431 | 38.6 | 27.9 | $CO_2$ | Method 1 | 11.29 |
| | | | 0 | $CH_4$ | | 0 |
| | | | 0 | $NO_2$ | | 0 |
| **Total** | | | | | | **689.39** |

### 4.2.5 Fugitive Emissions from the Extraction of Coal

Fugitive emissions associated with extraction of coal comprise Methane ($CH_4$) and Carbon Dioxide ($CO_2$) released at the coalface during production activities and also ongoing from the coal pillars left after mining

CMPL currently produces coal from 3 seams the Wallarah, Great Northern and Fassifern with each seam having different characteristics with respect to the gases contained and subsequently released. The potential for emissions from each seam is related to the seam characteristics, quantity and rate of production activity along with ventilation required for production areas and old mine workings.

With this in mind and considering the planned increase in production will in the near future see all production activity concentrated in the Fassifern seam as below:

- October 2010 - 1 production unit in Wallarah seam, 2 production units in Fassifern seam.
- November 2010 - 1 production unit in Wallarah seam, 3 production units in Fassifern seam –,
- May 2012 - 4 production units in Fassifern seam

And as can be seen from **Table 11** the Fassifern Seam has the greatest contribution to GHG emissions at the mine.

**Table 11: Gas contribution current operating pattern (1 production unit in each of 3 seams)**

| | | $CH_4$ | | $CO_2$ | |
|---|---|---|---|---|---|
| **Seam** | **Ventilation Flow ($M^3$/sec)** | **Gas %** | **Gas Flow (L/sec)** | **Gas %** | **Gas Flow (L/sec)** |
| Wallarah(1 pdx unit) | 80 | 0.05 | 40 | 0.4 | 32 |
| Great Northern(1 pdx unit) | 30 | 0.09 | 27 | 0.5 | 15 |
| Old Fassifern(no pdx) | 45 | 0.1 | 45 | 0.2 | 9 |
| Fassifern(1 pdx unit) | 130 | 0.55 | 715 | 0.3 | 39 |
| **Total** | **285** | | **827** | | **95** |
| Gas make and balance as at August 2010; data provided by CMPL. | | | | | |

CMPL measures emissions of $CH_4$ and $CO_2$ from the Myuna ventilation shaft on a monthly basis using Method 4 as required by NGERS. Inspection of the data measured between July 2008 and June 2009, presented in **Table 12** are indicative of the current operation having 1 production unit operating in each of the 3 seams at the mine.

**Table 12: Scope 1 Fugitive Emissions from Coal Extraction (2008/09 – Existing)**

| Activity Type | Amount | Unit | Gas | NGERS Method | Scope 1 Emissions* (t $CO_2$-e) |
|---|---|---|---|---|---|
| Run of mine coal extracted from gassy underground mine | 1,132,974 | Tonnes of coal | $CO_2$ | Method 4 | 9,212 |
| | | | $CH_4$ | Method 4 | 414,566 |
| **Total** | | | | | **423,778** |
| *Estimated using measurements and methods as specified in NGERS; data for 2008/09 provided by CMPL. | | | | | |

Total estimated fugitive emissions (NGERS Method 4) from extraction of coal as measured at the mine ventilation shaft in the 2008/09 financial year were 423,778 t $CO_2$-e[1]. From May 2012 CMPL plan to have implemented operational changes to produce coal from 4 units in the Fassifern seam the resulting fugitive emissions from extraction of coal have been estimated using seam characteristics, historical gas make and balance data and presented in **Table 13**.

**Table 13: Proposed Scope 1 Fugitive Emissions from Coal Extraction (4 production units in Fassifern seam)**

| Activity Type | Amount | Unit | Gas | NGERS Method | Scope 1 Emissions* (t $CO_2$-e) |
|---|---|---|---|---|---|
| Run of mine coal extracted from gassy underground mine | 2,000,000 | Tonnes of coal | $CO_2$ | Method 4 | 7,388 |
| | | | $CH_4$ | Method 4 | 569,213 |
| **Total** | | | | | **576,593** |
| *Estimated as specified in NGERS methods using historical data and modelling; data provided by CMPL. | | | | | |

Total estimated fugitive emissions (NGERS Method 4) for the proposed increased production from operations wholly within the Fassifern seam from extraction of coal amount to 576,593 t $CO_2$-e[2]. being an estimated increase of 152,815 t $CO_2$-e[3].

### 4.2.6 Fugitive Emissions from Post-Mining Activities (Stockpiled Coal)

Fugitive emissions from the stockpiled coal were estimated as shown in **Table 14**. In accordance with the method required by the NGERS (Measurement) Determination, default values for gassy coal mines were used in these calculations. All ROM coal was assumed to be product coal. Fugitive emissions from the coal mined at Myuna Colliery would equate to approximately 28,000 t $CO_2$-e per year at the proposed production level of 2 Mtpa.

[1] Reported in Myuna Colliery NGERS Report, 2008/09

[2] Reported in Myuna Colliery NGERS Report, 2008/09

[3] Reported in Myuna Colliery NGERS Report, 2008/09

**Table 14: Fugitive Emissions - Coal**

| Scenario | Amount (t) | Emission Factor – methane (t $CO_2$-e/t raw coal)* | Fugitive emissions (t $CO_2$-e) |
|---|---|---|---|
| Existing | 1,132,974 | 0.014 | 15,862 |
| Proposed | 2,000,000 | | 28,000 |
| Difference | 867,026, | - | 12,138 |

* NGERS Measurement Determination, Chapter 3, Part 3.2 section 3.17 – gassy underground coal mine.

A gassy mine is defined as an underground mine that has at least 0.1 % methane in the mine's return ventilation [National Greenhouse and Energy Reporting (Measurement) Technical Guidelines 2009]

Total fugitive emissions associated with the coal mining process would be 423,778 t $CO_2$-e (extraction of coal) plus 28,000 t $CO_2$-e (post mining stockpile) or 451,778 t $CO_2$-e in total. This represents an increase of approximately 12,138 t $CO_2$-e per year at the proposed 2 Mtpa production level.

### 4.2.7 Emissions from Electricity Use (Scopes 2 and 3)

Coal mining, coal haulage, coal clearance and coal handling plant and equipment at the site, including roof bolters, continuous miners, shuttle cars, conveyors and crushing and screening plant, are electrically-powered. Electricity consumption for 2008/09 was 26.33 MWh; of this, approximately 50% was used in the production process (i.e. is subject to increase under the proposed production rate increase), and the other 50% represented base load (ventilation, compressed air, office/bathhouse and workshop facilities), which is unlikely to change. CMPL estimated electricity consumption for 2011/12 to 2013/14 based on increasing the production-related electricity use in line with the expected production increases; the maximum estimated consumption rate of 37 MWh was used in this assessment as indicative of electricity use for the proposed 2 Mtpa production rate. Results are shown in **Table 15.** The proposed increase in production would result in an additional 0.01 Mt $CO_2$-e per year compared to existing levels.

**Table 15: GHG Emissions from Electricity Use**

| Emissions Type | Emission Factor (kg $CO_2$-e/kWh)* | GHG Emissions (t $CO_2$-e) | | |
|---|---|---|---|---|
| | | Existing | Proposed | Difference |
| Scope 2 | 0.89* | 23,433.2 | 32,955 | 9,521.8 |
| Scope 3 | 0.18** | 4739.3 | 5,281.6 | 542.3 |
| **Full Fuel Cycle (total)** | **1.07** | **28,172.5** | **38,236.6** | **10,064** |

* *NGERS (Measurement) Determination 2008, Schedule 1, Part 6, Item 77*

***Table 39, NGA Factors, June 2009*

### 4.2.8 External Emissions (Scope 3)

External emissions are those associated with the operations of a facility but are not under the control of the facility. The external emission sources investigated in this assessment were derived from the hypothetical combustion of the maximum permitted ROM coal produced by Myuna Colliery per annum. The emission factors for calculating emissions from the combustion of black coal are shown in **Table 16**.

**Table 16: Emission Factors - Combustion of Coal**

| Fuel type | Energy content factor (GJ/t) | Emission Factor (kg $CO_2$-e/GJ) | | |
|---|---|---|---|---|
| | | $CO_2$ | $CH_4$ | $N_2O$ |
| Black coal (other than that used to produce coke) | 27 | 88.2 | 0.03 | 0.2 |
| *Source: Table 1 of NGA Factors, June 2009* | | | | |

The above emission factors were used to calculate the emissions associated with the combustion of the coal produced by the Myuna Colliery; results are outlined in **Table 17**.

**Table 17: External Emissions - Combustion of Myuna Colliery Coal**

| Greenhouse Gas | Estimated GHG Emissions (t $CO_2$-e) | | |
|---|---|---|---|
| | Existing | Proposed | Difference |
| $CO_2$ | 2,698,064 | 4,762,800 | 2,064,736 |
| $CH_4$ | 918 | 1,620 | 702 |
| $N_2O$ | 6,118 | 10,800 | 4,682 |
| **Total** | **2,705,100** | **4,775,220** | **2,070,120** |

As shown, the proposed increase in coal production at the mine has the potential to lead to the release of an additional 2 Mt $CO_2$-e per year (external to the site).

## 4.3 Emissions Summary

Emissions estimates from all sources described above are summarised in **Table 18**.

**Table 18: Annual Greenhouse Gas Emissions Summary**

| Scope | Activity | Estimated Emissions (t $CO_2$-e) | | |
|---|---|---|---|---|
| | | Existing | Proposed | Difference |
| 1 | On-site transport (diesel oil) | 733 | 1,333 | 600 |
| | LPG | 1 | 1 | 0 |
| | $SF_6$ | 0 | 0 | 0 |
| | Oil and grease | 391 | 689 | 298 |
| | Extraction of coal | 423,778 | 576,593 | 152,815 |
| | Stockpiled coal | 15,862 | 28,000 | 12,138 |
| 2 | Electricity use | 23,433 | 32,955 | 9,521 |
| | **Total (mine operations only)** | **464,198** | **639,571** | **175,373** |
| *3* | *Electricity* | *4,739* | *5,282* | *542* |
| | *Combustion of mined coal* | *2,705,100* | *4,775,220* | *2,070,120* |
| | ***Total*** | ***3,174,037*** | ***5,420,073*** | ***2,2464,036*** |

The existing mine operations generated an estimated 0.46Mt $CO_2$-e for 2008/09. Emissions would increase to approximately 0.64 Mt $CO_2$-e at the proposed maximum production rate of 2.0 Mtpa. Fugitive emissions associated with the extraction of coal are the greatest source of emissions associated with on-site activities.

When indirect emissions, including Scope 3 electricity emissions and emissions associated with the combustion of the produced coal, are taken into account, the emissions increase to 3.2 Mtpa and 5.4 Mtpa respectively. As indicated, combustion of the coal generates the most GHG emissions of all activities related to the site's operations.

The total additional emissions associated with the proposed Project represent an approximate increase of 38 % over existing site emissions (i.e. excluding Scope 3 emissions), due to the gaseous nature of future mining within the Fassifern seam. At the proposed production level of 2 Mtpa, Myuna Colliery's on-site emissions represent approximately 2 % of mining emissions in Australia and 0.1 % of total Australian emissions (based on 2008 data from the Australian Greenhouse Emissions Information System, Department of Climate Change and Energy Efficiency, 2010). As such, the proposed increase in production would not substantially increase the total Australian emissions or impede emission reduction actions.

## 4.4 Emission Reduction Opportunities

As shown in **Table 18**, the greatest emission sources associated with the proposed Project are those associated with the combustion of the coal (Scope 3), the management of which is not controlled by CMPL, followed by fugitive emissions from the mine (Scope 1), which are primarily associated with emissions from ventilation of the underground workings.

The most likely method of directly reducing Scope 2 GHG emissions from the site will be through the ongoing implementation of the site's Energy Saving Action Plan (ESAP). Investigations into opportunities for improvements in energy efficiency are assessed annually in CMPL's ESAP reporting, with emission reduction strategies developed that are cost effective and feasible. The ESAP will continue to identify where potential savings in fuel and electricity could be made, together with the subsequent implementation of energy efficiency strategies where practical. Potential mitigation measures that will be considered include:

- The use of low emission fuels where possible;
- Energy savings initiatives in the key focus areas of:
  - Power factor correction;
  - Metering and monitoring;
  - Compressed air;
  - Coal handling plant; and
- Keeping equipment in good operating order to maintain efficiency. Machinery, plant and equipment will be serviced and kept in good working order and service records will be kept.

CMPL has committed to mitigation and offset of Scope 1 emissions, specifically by:

- Undertaking research into reducing the emissions generated by ventilation air methane (VAM). This includes government funding to investigate VAM technology at Mandalong Mine, and if proven successful and cost effective, then this technology will provide opportunities for application at other mines.
- Committing to offset 10% of its Scope 1 and Scope 2 emissions per annum. This commitment will coincide with the reporting and auditing obligations outlined under the NGER Act, whereby the tonnes of CO2-e offset each year will go through a rigorous verification process. These offsets will be located in Australia, will be accredited to a recognised scheme or standard (or in the process of achieving accreditation), will be independently verified, and will be undertaken in accordance with any relevant Australian Government policies and standards at that time. These offsets will be put in place where opportunities to avoid or mitigate emissions are not available, or until a National emissions trading scheme is imposed on the Colliery.

Such actions are in keeping with Centennial's commitment to GHG reduction strategies.

# 5.0 Conclusion

CMPL proposes to continue operations at the Myuna Colliery at an increased production rate of 2 Mtpa. Operations at the site generate GHG emissions associated with:

- Emissions from combustion of fuel by on-site vehicles used to transport men and materials associated with operations and to handle and manage the mine's small ROM coal stockpile (Scope 1);
- Emissions from the use of Liquefied Petroleum Gas (LPG), sulphur hexafluoride (SF6), and oils and greases (Scope 1);
- Fugitive emissions from the extraction of coal (Scope 1);
- Fugitive emissions from post mining activities (stockpiled coal) (Scope 1);
- Electricity use (Scope 2 and 3); and
- Indirect emissions from the combustion of the coal produced at Myuna Colliery (Scope 3).

CMPL provided historical electricity and diesel use for the period 2006/07 – 2008/09 and expected electricity and diesel use for the Colliery operating at 2 Mtpa for 2011/12 – 2013/14. The historical data and predictions were used in the calculations as described in the following sections.

CMPL monitors fugitive emissions associated with the extraction of coal at the ventilation shaft on a monthly basis as required by the NGER Act 2007. The mine operates in the Fassifern, Great Northern and Wallarah seams, and the monitoring data indicate that the gas concentration in the ventilation flow is related to gassy Fassifern seam workings and is not associated with production levels. As such, the fugitive emissions measured between July 2008 and June 2009 were used in the calculations of current and potential future fugitive emissions.

The proposed Project would increase the potential GHG emissions from the operation Myuna Colliery from the current average emissions by approximately 0.01 Mt $CO_2$-e per year. External emissions associated with the combustion of the coal to generate electricity at a power station represent the greatest proportion of emissions associated with the site's activities (on-site and external).

GHG emission levels of the on-site activities represent approximately 0.1 % of total Australian emissions and 2 % of mining emissions in Australia (based on 2008 data from Australian Greenhouse Emissions Information System, Department of Climate Change and Energy Efficiency). The percentage increase in emissions (38 %) over existing levels is due to the gaseous nature of future mining in the Fassifern seam, though this increase is not considered likely to significantly affect total NSW or Australian emissions or impede emission reduction actions. CMPL is committed to undertaking research into reducing and/or offsetting a portion of its Scope 1 and Scope 2 emissions to addressing the effects of its operations on the Enhanced Greenhouse Effect.

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# Worldwide Locations

| | |
|---|---|
| Australia | +61-2-8484-8999 |
| Azerbaijan | +994 12 4975881 |
| Belgium | +32-3-540-95-86 |
| Bolivia | +591-3-354-8564 |
| Brazil | +55-21-3526-8160 |
| China | +86-20-8130-3737 |
| England | +44 1928-726006 |
| France | +33(0)1 48 42 59 53 |
| Germany | +49-631-341-13-62 |
| Ireland | +353 1631 9356 |
| Italy | +39-02-3180 77 1 |
| Japan | +813-3541 5926 |
| Malaysia | +603-7725-0380 |
| Netherlands | +31 10 2120 744 |
| Philippines | +632 910 6226 |
| Scotland | +44 (0) 1224-624624 |
| Singapore | +65 6295 5752 |
| Thailand | +662 642 6161 |
| Turkey | +90-312-428-3667 |
| United States | +1 978-589-3200 |
| Venezuela | +58-212-762-63 39 |

**Australian Locations**

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Singleton

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Appendix O

# Economic Assessment (Gillespie Economics, 2010)

# Myuna Colliery
# Extension of Mining

## Economic Assessment

*Prepared for*

## AECOM PTY LTD

*By*

**Gillespie Economics**
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**OCTOBER 2010**

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## EXECUTIVE SUMMARY

Centennial Myuna Pty Ltd (CMPL) seeks a Project Approval under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to extend underground mining and associated activities at Myuna Colliery within the Project Application Area for a further 21 years (the proposed Project).

The Project requires the preparation of an Environmental Assessment (EA) in accordance with the requirements of the EP&A Act. An economic assessment is required as part of the EA.

From an economic perspective there are two important aspects of the Project that have been considered:

- The economic efficiency of the Project (i.e. consideration of economic costs and benefits) which can be evaluated using benefit cost analysis; and
- The economic impacts of the Project (i.e. the economic stimulus that the Project would provide to the regional or State economy) which can be evaluated using regional economic impact assessment.

A benefit cost analysis identified a range of potential economic costs and benefits of the Project. Values were placed on production and external costs and benefits. The net production benefits of the Project were estimated at $343M. The external costs from the Project relate to greenhouse gas generation, valued at $166M. External benefits associated with employment provided by the Project were estimated at $100M.

Overall the Project is estimated to have net benefits of $278M and hence is desirable and justified from an economic efficiency perspective.

A regional economic impact analysis, using input-output analysis, estimated that in total, the Project will contribute the following to the regional economy:

- $159M in annual direct and indirect regional output or business turnover;
- $71M in annual direct and indirect regional value added;
- $53M in annual household income; and
- 451 direct and indirect jobs.

At the State level the Project will make the following contribution to the economy:

- $222M in annual direct and indirect output or business turnover;
- $104M in annual direct and indirect value added;
- $71M in annual direct and indirect household income; and
- 732 direct and indirect jobs.

This stimulus would be felt across a range of sectors in the economy including the coal mining sector, structural metal products manufacturing sector, agricultural and mining machinery manufacturing sector, electricity sector, wholesale trade sector, retail trade sector, health sector, other business services sector, and the hotels, cafes and restaurants sector.

A 21-year approval is being sought for the Project. On cessation of mining the economic stimulus provided by the Project will cease. The significance of these Project cessation impacts will depend on:

- The degree to which any displaced workers and their families remain within the region;

- The economic structure and trends in the regional economy at the time.
- Whether other mining developments or other opportunities in the region arise that allow employment of displaced workers.

Nevertheless, given the uncertainties about the circumstances within which Project cessation will occur, it is important for regional authorities and leaders to take every advantage from the stimulation to regional economic activity and skills and expertise that the Project brings to the region, to strengthen and broaden the region's economic base.

# 1 INTRODUCTION

Centennial Myuna Pty Ltd (CMPL), a 100% subsidiary of Centennial Coal Company Ltd (CCCL), operates the Myuna Coal Mine. Myuna Colliery's Surface Facilities Area is on the western side of Lake Macquarie, approximately 25 kilometres south-west of Newcastle.

CMPL seeks a Project Approval under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to extend underground mining and associated activities within the Project Application Area for a further 21 years (the proposed Project).

An Environmental Assessment (EA) for the Project is required in accordance with the provisions of the EP&A Act. The NSW Department of Planning (DoP) Director-General's Requirements for the Project indicate that an economic assessment is needed as part of the EA. The Director-General's Requirements identify the need for:

- *"A detailed assessment of the costs and benefits of the Project as a whole, and whether it would result in a net benefit to the community.*
- *A conclusion justifying the Project on................economic grounds,..."*

From an economic perspective there are two important aspects of the Project that can be considered:

- The economic efficiency of the Project (i.e. consideration of economic costs and benefits); and
- The economic impacts of the Project (i.e. the economic stimulus that the Project will provide to the regional or State economy).

Planning NSW (James and Gillespie, 2002) *Guideline for Economic Effects and Evaluation in EIA* identifies economic efficiency as the key consideration of economic analysis. Benefit Cost Analysis (BCA) is the method used to consider the economic efficiency of proposals. The draft guideline identifies BCA as essential to undertaking a proper economic evaluation of proposed developments that are likely to have significant environmental impacts.

The above draft guideline indicates that economic impact assessment may provide additional information as an adjunct to the economic efficiency analysis. Economic stimulus to the regional and State economy can be estimated using input-output modelling.

This study relates to the preparation of each of the following types of analyses:

- A BCA of the Project; and
- An economic impact assessment of the Project.

# 2 BENEFIT COST ANALYSIS

## 2.1 INTRODUCTION

For the Project to be economically desirable from a community perspective, it must be economically efficient. Technically, a development is economically efficient and desirable on economic grounds if the benefits to society exceed the costs (James and Gillespie, 2002). For mining developments, the main economic benefit is the producer surplus generated by the mine and the employment benefits it provides, while the main economic costs relate to environmental and cultural costs. The technique that is used to weigh up these benefits and costs is BCA.

BCA involves the following key steps:

- identification of the base case or “without” Project case;
- identification of the “with” Project scenario;
- physical quantification and valuation of the projects incremental benefits and costs;
- consolidation of values using discounting to account for the different timing of costs and benefits;
- application of decision criteria;
- sensitivity testing; and
- consideration of non-quantified benefits and costs, where applicable.

The sub-sections below provide a BCA of the Project based on financial, technical and environmental advice provided by CMPL and its specialist consultants.

## 2.2 IDENTIFICATION OF THE BASE CASE AND PROJECT

Identification of the “base case” or “without” Project scenario is required in order to facilitate the identification and measurement of the incremental economic benefits and costs of the Project.

Under the base case, mining under the existing 1977 development consent and within the development consent boundary would be able to operate viably for approximately another 5 years, though at a decreasing production rate. For the purpose of the analysis, the following base case production profile is assumed:

**Table 2.1**
**Production Under the Base Case**

| Year of Future Production | Annual Coal Production (Mtpa) |
|---|---|
| Yr 1 - 2011 | 1.3 |
| Yr 2 - 2012 | 1.3 |
| Yr 3 - 2013 | 1.3 |
| Yr 4 - 2014 | 0.8 |
| Yr 5 - 2015 | 0.4 |

In contrast, the Project will extend mining and coal handling at Myuna Colliery within the Project Application Area and proposes to:

- mine using bord and pillar methods in the Wallarah, Great Northern and Fassifern seams in CCL762 and ML1370, for a further 21 years;
- produce, handle and distribute to Eraring Power Station, up to 2Mtpa using existing infrastructure;
- continue the use of ancillary infrastructure and services for a further 21 years;
- upgrade the water management system; and
- rehabilitate the surface facilities within 5 years of completion of mining.

CMPL's alternatives for the mining of coal are essentially limited to different scales, designs, technologies, processes, impact mitigation measures etc. However, these alternatives could be considered to be variants of the proposed Project rather than distinct alternatives. Consequently, this BCA focuses on the Project compared to the identified base case.

## 2.3 IDENTIFICATION OF BENEFITS AND COSTS

Relative to the base case or "without" scenario, the Project may have the potential incremental economic benefits and costs shown in Table 2.2.

**Table 2.2**
**Incremental Economic Benefits and Costs of the Project**

| Category | Costs | Benefits |
|---|---|---|
| Production | Opportunity cost of existing land owned by CMPL<br>Opportunity cost of capital<br>Capital costs associated with continued coal production<br>Operating costs, including administration, mining, processing and rehabilitation (ex royalties)<br>Decommissioning costs of the Project | Avoided decommissioning costs under the base case<br>Economic value of coal<br>Residual value of capital and land at the cessation of the Project |
| Potential Externalities | Air quality impacts<br>Greenhouse gas impacts<br>Acoustic impacts<br>Aquatic ecology impacts<br>Terrestrial ecology impacts<br>Aboriginal and Non-Aboriginal heritage impacts<br>Groundwater impacts<br>Traffic and transport impacts<br>Visual impacts<br>Surface water impacts and sediment/erosion control | Economic and social benefits of employment provided by the Project |

It should be noted that the potential external costs, listed in Table 2.1, are only economic costs to the extent that they affect individual and community well-being through direct use of resources by individuals or non-use. If the potential impacts are mitigated to the extent where community wellbeing is insignificantly affected, then no external economic costs arise.

## 2.4 QUANTIFICATION/VALUATION OF BENEFITS AND COSTS

In accordance with NSW *Treasury Guidelines for Economic Appraisal* (NSW Treasury, 2007), where competitive market prices are available, they have generally been used as an indicator of economic values.

### 2.4.1 ***Production Costs and Benefits***

***Production Costs***

*Opportunity Cost of Land*

There is an opportunity cost associated with continuing to use land already owned by CMPL for the Project mine infrastructure instead of its next best use. An indication of the opportunity cost of the land can be gained from its market value, estimated at $2.6 Million (M). This opportunity cost occurs in year 5 when under the base case the existing mining operation would likely cease.

*Opportunity Cost of Capital*

Where continued mining would utilise plant and machinery already owned by CMPL, there is an opportunity cost associated with utilising this plant rather than selling it or using it elsewhere. An indication of its opportunity cost can be gained from its estimated market value. The market value estimated by CMPL is in the order $49M. This opportunity cost occurs in year 5 when under the base case the existing mining operation would likely cease.

*Capital Cost of the Project*

Incremental capital costs over the life of the Project are estimated at $150M including major mining equipment, mobile mining equipment, site infrastructure maintenance, sustaining capital and contingency costs. These costs are included in the economic analysis in the years that they are expected to occur.

*Annual Operating Costs of the Project*

The operating costs of the Project include those associated with labour, stores and supplies, repairs and maintenance, general expenses and overheads. Average annual incremental operating costs of the mine are estimated at $67M.

While royalties are a cost to CMPL they are part of the overall producer surplus benefit of the mining that is redistributed by government. Royalties are therefore not included in the calculation of the resource costs of operating the Project. Nevertheless, it should be noted that the Project will generate total incremental royalties in the order of $109M (undiscounted).

*Decommissioning Costs*

At the cessation of the Project the surface infrastructure is assumed to be decommissioned at an estimated cost of $4M.

***Production Benefits***

*Avoided Decommissioning Costs*

Under the base case the site would be decommissioned in 2015. With the Project these costs are avoided (but incurred at the end of the Project life). Avoiding this decommissioning cost in 2015 is a benefit of the Project.

*Economic Value of Coal*

Production is assumed to occur at up to 2 Mtpa for a period of 21 years.

There are two main economic benefits of the Project related coal product. The first relates to the direct value of the coal recovered from Myuna Colliery. An indication of this value is the market value of the coal as indicated by the contract price with Eraring Power Station.

The second economic benefit relates to the fact that without the Project, higher value export coal from other Centennial Mines in Lake Macquarie would be required to supply Eraring Power Station. The Project enables this higher value coal to be diverted to its highest value use – export, rather than lower value domestic thermal use. The value of this additional benefit is equal to the premium obtained by exporting coal instead of supplying it to Eraring Power Station adjusted for additional washing and delivery costs (to Newcastle Port) compared to delivery to Eraring Power Station.[1]

There is obviously considerable uncertainty around future coal prices and hence assumed coal values have been subjected to sensitivity testing (see Section 2.6).

*Residual Value at End of the Evaluation Period*

At the end of the Project, the rehabilitated surface infrastructure site and purchased capital equipment may have some residual value that could be realised by sale. This is assumed to be $2.6M and $49M, respectively.

### 2.4.2 ***External Costs and Benefits***

Acoustics – the Myuna Colliery Surface Facilities Area is located within a topographic depression approximately 500 metres north west of the nearest potentially affected receiver located at Summerhill Drive, Wangi Wangi, and approximately 600 metres west of residences in Donnelly Rd, Arcadia Vale. Maximum noise levels on Summerhill Drive and Sunset Close, Wangi Wangi, are predicted to be below LAmax 30 dBA. The highest LAmax noise level at any residential area is predicted to occur as a result of forklift pass-by events in the materials yard under the influence of a temperature inversion. External noise levels up to LAmax 43 dBA may occur at residences on Donnelly Road under these circumstances. Hence, predicted noise levels meet the most stringent recommended sleep disturbance noise goal of 49 dBA at Donnelly Road receivers under adverse weather conditions. Based on the negligible impacts predicted, there are not expected to be any external acoustic costs of the Project.

Limited underground blasting may be required for the proposed Project. Vibration from underground blasting is predicted to be negligible and below levels of human perception at the nearest residential locations. The main potential vibration generating activities at the Surface Facilities Area will include the operation of mobile equipment such as the loader and trucks. Given the separation distance between mining operations and the nearest potentially affected residential locations, vibration levels from these activities is predicted to be negligible and below levels for human perception at the nearest residential receivers. Based on the negligible impacts predicted, blasting is not expected to result in an external cost of the Project.

Air quality – sensitive air quality receptors surrounding the Surface Facilities Area include the residential areas of Wangi Wangi and Arcadia Vale. All modelling predictions indicate that the concentrations of particulate matter and dust deposition attributable to the proposed Project would be within the current NSW DECCW air quality goals at all surrounding receivers near to the Surface Facilities Area. Based on the negligible impacts predicted, there are not expected to be any external air quality costs of the Project.

Greenhouse gases – the Project is predicted to generate in the order of 644,853 tonnes of greenhouse gas emissions ($CO_2$-e) associated with mining and transport of product coal via conveyor

[1] An alternative but equivalent approach to the consideration of the economic value of the coal is to recognise that while the Myuna Colliery supplies coal to Eraring Power Station at a negotiated financial price, the appropriate estimate of the economic value for thermal coal from the Myuna Colliery is the world price for this coal (Sinden and Thampapillai 1995). The current FOB world price for thermal coal is around $100/t. However, this relates to washed coal delivered to Port. The operating costs referred to earlier do not include allocations for washing and delivery to port as this is not required by Eraring Power Station. Consequently the economic value is the world prices for thermal coal adjusted for additional washing and delivery costs (to Newcastle Port) compared to delivery to Eraring Power Station.

to Eraring Power Station[2]. To place an economic value on carbon dioxide equivalent ($CO_2$-e) emissions, a shadow price of carbon is required that reflects its social costs. The social cost of carbon is the present value of additional economic damages now and in the future caused by an additional tonne of carbon emissions. There is great uncertainty around the social cost of carbon with a wide range of estimated damage costs reported in the literature. An alternative method to trying to estimate the damage costs of carbon dioxide is to examine the price of carbon credits. Again, however, there is a wide range of permit prices. For this analysis, a shadow price of carbon of AUS$30/t $CO_2$-e was used, with sensitivity testing from AUS$8/t $CO_2$-e to AUS$40/t $CO_2$-e (refer to Appendix 1).

Aquatic Ecology – part of the Project Application Area is located below Lake Macquarie, which is inhabited by estuarine plants and animals living on or within the lake bed, in the water column and within the intertidal zone along the foreshore. Seagrass habitat is extensive throughout shallow near-shore sections of the Project Application Area, however, given that predicted subsidence levels where seagrass beds occur would be negligible (< 20 millimetres), the Project is not considered to have any substantial impact on seagrass habitat. Direct or indirect impacts to fish and threatened species that utilise seagrass habitat are not therefore expected. Saltmarsh and mangrove habitat are not known to occur within or in proximity of the Project Application Area and would not be affected by the Project. Part of the Lake Macquarie State Conservation Area (Point Wolstoncroft), does occur within the Project Application Area. Pulbah Island Nature Reserve also occurs near the boundary of the Project Application Area. However, no impact to the conservation values of this these areas (in terms of aquatic ecology) as a result of the Project is expected. Based on the negligible impacts predicted, there are not expected to be any external aquatic ecology costs of the Project.

Terrestrial Ecology – the Project Application Area includes areas of native vegetation, State Forest, State Conservation Areas and partially disturbed vegetation, among the developed residential and industrial areas of Eraring and Morisset Peninsula. However, due to the negligible subsidence (i.e. less than 20 millimetres) proposed on the land-based areas of the Project Application Area the proposed Project is unlikely to significantly impact on any species, population or ecological community listed under the *Threatened Species Conservation Act 1995*, *Environment Protection and Biodiversity Conservation Act 1999* or State Environmental Planning Policy No. 44 – Koala Habitat Protection. No threatened species, endangered populations or threatened ecological communities were identified during a survey of the area of the proposed minor drainage works at the Surface Facilities Area. Based on the negligible impacts predicted, there are not expected to be any external terrestrial ecology costs of the Project.

Aboriginal and non-Aboriginal heritage – impacts on highly significant Aboriginal heritage sites have been shown to affect the well-being of the broader community (Gillespie Economic 2008). The fieldwork undertaken for the Aboriginal cultural heritage impact assessment led to the recording of four new Aboriginal cultural heritage sites within the Project Application Area. However, due to the negligible subsidence (i.e. less than 20 millimetres) proposed on the land-based areas of the Project Application Area, it is considered that the proposed Project is unlikely to have significant impacts on items or works of Aboriginal or European heritage significance. No listed or new items or works of European Heritage significance have been previously recorded within the Project Application Area. Based on the negligible impacts predicted, there are not expected to be any external Aboriginal and non-Aboriginal heritage costs of the Project.

Groundwater – the Project will result in additional groundwater seepage into the workings requiring an increase in the amount of water delivered back to the surface and underground storage. However, the Project is not likely to result in significant impacts to the local groundwater regime, as the groundwater make will continue to be discharged back into Lake Macquarie. Similarly, the saline water which will continue to enter the mine and be discharged back into a saline environment following settlement is not predicted to alter the salinity balance of Lake Macquarie. Areas subject to subsidence of less than

[2] It should be noted that greenhouse gas generation associated with usage of the product coal is considered to be outside of the scope of the BCA of the Project.

20 millimetres (Morisset Peninsular and Point Wolstoncroft) may experience minimal disturbance to the rock overlying the coal seam and so negligible disturbance to shallow alluvial groundwaters is predicted. Based on the negligible impacts predicted, there are not expected to be any external Groundwater costs of the Project

Traffic and transport – the proposed Project will not significantly alter the existing traffic and transport network for deliveries and staff movements to and from the Surface Facilities Area. No coal is proposed to be transported by road. Traffic impacts of the Project are therefore expected to be negligible. Based on the negligible impacts predicted, there are not expected to be any external transport costs of the Project.

Visual impacts – Myuna Colliery Surface Facilities Area is primarily surrounded by an elevated, vegetated buffer, largely screening it from residential receptors. Due to the topographical positioning and surrounding landforms, Myuna Colliery is generally not visible to the local community, thereby having little effect on the visual amenity of the local area. As no new infrastructure is proposed for the Project there is not expected to be any external visual costs of the Project.

Surface water impacts – the Project will continue to undertake treatment and discharge of ground and surface waters in accordance with an Environmental Protection Licence (EPL). The Project will effect an increase in discharges though the EPL's two licensed discharge points due to the increase in the extent of mining. These increases will be accommodated in the approved discharge limits and will adhere to the water quality criteria of the EPL. The increased discharges requires by the Project will not require any variation to existing EPL conditions. Surface water will continue to be managed in accordance with the Water Management System to control and separate clean and dirty water with discharges designed to meet DECCW requirements. This will be aided by the proposed clean water diversions at the Myuna Colliery Surface Facilities Area. No negative surface water impacts are anticipated, thus it is not expected to result in an external cost of the Project.

Social and economic value of employment – the Project would require approximately 210 direct jobs for a period of 21 years. Historically, employment benefits of projects have tended to be omitted from benefit cost analysis on the implicit assumption that labour resources used in a project would otherwise be employed elsewhere. Where this is not the case and labour resources would otherwise be unemployed for some period of time, Streeting and Hamilton (1991) and Bennett (1996) outline that otherwise unemployed labour resources utilised in a project should be valued in a BCA at their opportunity cost (wages less social security payments and income tax) rather than the wage rate which has the effect of increasing the net production benefits of the project. In addition, there may be social costs of unemployment that require the estimation of people's willingness to pay to avoid the trauma created by unemployment. These are non-market values.

More recently, it has been recognised that the broader community may hold non-environmental, non-market values (Portney 1994) for social outcomes such as employment (Johnson and Desvouges 1997) and the viability of rural communities (Bennett et al 2004). Gillespie Economics (2008) estimated the value the community hold for the 23 years that the Metropolitan Colliery provides 320 jobs, to be $756M (present value). Gillespie Economics (2009) estimated the value the community hold for the 30 years that the Bulli Seam Operations provides 1,170 jobs, to be $870M (present value). The value for 10 years that the Warkworth Mine provides 975 jobs was estimated at $286M (present value).

The Project will provide approximately 210 direct jobs for a period of 21 years. Using the more conservative Bulli Seam Operation employment value gives an estimated $107M for the employment benefits of the Project[3]. This community benefit value has been included in the BCA.

[3] This value was placed in year 1 of the analysis and discounted at 7%.

## 2.5 CONSOLIDATION OF VALUE ESTIMATES

The present value of costs and benefits of the Project, using a 7% discount rate are provided in Table 2.3.

**Table 2.3**
**Benefit Cost Analysis Results of the Project (Present Values @ 7% discount rate)**

| COSTS ($M) | | BENEFITS ($M) | |
|---|---|---|---|
| ***Production*** | | | |
| Opportunity cost of land | $2 | Avoided decommissioning costs | $3 |
| Opportunity cost of capital | $35 | Coal value | $1,093 |
| Capital costs | $71 | Residual value of land | $1 |
| Operating costs | $656 | Residual value of capital | $12 |
| Decommissioning costs | $1 | | |
| **Total Production Costs** | **$766** | **Total Production Benefits** | **$1,109** |
| | | **Net Production Benefits** | **$343** |
| **Potential Externalities** | | | |
| Air quality impacts | Negligible impacts | Social and economic values of employment | $100 |
| Greenhouse gas impacts | $166 | | |
| Acoustic impacts | Negligible impacts | | |
| Aquatic ecology impacts | Negligible impacts | | |
| Terrestrial ecology impacts | Negligible impacts | | |
| Aboriginal and Non-Aboriginal heritage impacts | Negligible impacts | | |
| Groundwater impacts | Negligible impacts | | |
| Traffic and transport impacts | Negligible impacts | | |
| Visual impacts | Negligible impacts | | |
| Surface water impacts and sediment/erosion control | Negligible impacts | | |
| **TOTAL QUANTIFIED** | **$931** | **TOTAL QUANTIFIED** | **$1,209** |
| **NET QUANTIFIED BENEFITS (NPV)** | | **$278** | |

The main decision criterion for assessing the economic desirability of a project to society is its net present value (NPV). NPV is the present value of benefits less the present value of costs. A positive NPV indicates that it would be desirable from an economic perspective for society to allocate resources to the Project, because the community as a whole would obtain net benefits from the Project. Table 2.3 indicates that the Project will have net production benefits of $343M.

The net production benefit shown in Table 2.3 is distributed amongst a range of stakeholders including:

- CMPL and its shareholders;
- The NSW Government via royalties; and
- The Commonwealth Government in the form of Company tax.

The NSW Government receives additional benefits in the form of payroll tax and local councils also benefit through rates and development contributions.

The external costs from the Project relate to greenhouse gas generation. Greenhouse gas costs have been valued at $166M. CMPL proposes internalising some of these costs by offsetting 10% of its Scope 1 emissions where opportunities to avoid or mitigate emissions are not available.

External benefits associated with employment provided by the Project have been estimated at $100M.

Overall, the Project is estimated to have net benefits of $278M and hence is desirable and justified from an economic efficiency perspective.

## 2.6 SENSITIVITY ANALYSIS

This NPV presented in Table 2.3 is based on a range of assumptions around which there is some level of uncertainty. Uncertainty in a BCA can be dealt with through changing the values of critical variables in the analysis (James and Gillespie, 2002) to determine the effect on the NPV.

In this analysis, the BCA result was tested for 20% changes to the following variables at a 4%, 7% and 10% discount rate:

- Opportunity cost of land;
- Opportunity cost of capital;
- Capital costs;
- Operating costs;
- Decommissioning costs;
- Value of coal;
- Residual value of capital and land;
- Greenhouse costs; and
- Employment benefits.

What this analysis indicates (refer to Appendix 2) is that the results of the BCA are not sensitive to reasonable changes in assumptions regarding any of these variables. In particular, significant increases in the value used for the external impact of greenhouse gas generation had little impact on the economic desirability of the Project.

The results were most sensitive to increases in operating costs and decreases in the economic value of the coal.

# 3 ECONOMIC IMPACT ASSESSMENT

## 3.1 INPUT-OUTPUT TABLE AND ECONOMIC STRUCTURE OF THE REGION

Economic impact assessment is primarily concerned with the effect of an impacting agent on an economy in terms of a number of specific indicators, such as gross regional output, value-added, income and employment.

These indicators can be defined as follows:

- ***Gross regional output*** – the gross value of business turnover;
- ***Value-added*** – the difference between the gross regional output and the costs of the inputs of raw materials, components and services bought in to produce the gross regional output;
- ***Income*** – the wages paid to employees including imputed wages for self employed and business owners; and
- ***Employment*** – the number of people employed (including full-time and part-time).

An impacting agent may be an existing activity within an economy or may be a change to a local economy (Powell *et al.,* 1985; Jensen and West, 1986). This assessment is concerned with the impact of 2 Mtpa of ROM coal production at the Myuna Colliery.

The economy on which the impact is measured can range from a township to the entire nation (Powell *et al.,* 1985). In selecting the appropriate economy, regard needs to be had to capturing the local expenditure and employment associated with the Myuna Project, but not making the economy so large that the impact of the Project becomes trivial (Powell and Chalmers, 1995). Advice is that the workforce is likely to predominantly reside in the Newcastle Statistical Sub-Division (SSD) comprising Cessnock Statistical Local Area (SLA), Lake Macquarie SLA, Maitland SLA, Port Stephens SLA and Newcastle SLA. Consequently, for this study, the economic impacts of the Project have been estimated for the Australian Bureau of Statistics (ABS) Newcastle SSD.

A range of methods can be used to examine the economic impacts of an activity on an economy including economic base theory, Keynesian multipliers, econometric models, mathematical programming models and input-output models (Powell *et al.,* 1985). This study uses input-output analysis.

Input-output analysis essentially involves two steps:

- Construction of an appropriate input-output table (regional transaction table) that can be used to identify the economic structure of the region and multipliers for each sector of the economy; and
- Identification of the initial impact or stimulus of the Project (construction and/or operation) in a form that is compatible with the input-output equations so that the input-output multipliers and flow-on effects can then be estimated (West, 1993).

A 2005-06 input-output table of the regional economy (Newcastle SSD) was developed using the Generation of Input-Output Tables (GRIT) procedure (Appendix 3) and a 2005-06 input-output table of the NSW economy (developed by Monash University) as the parent table. The 109 sector input-output table of the regional economy was aggregated to 30 sectors and 6 sectors for the purpose of describing the economies.

A highly aggregated 2005-06 input-output table for the regional economy is provided in Table 3.1. The rows of the table indicate how the gross regional output of an industry is allocated as sales to other industries, to households, to exports and other final demands (OFD - which includes stock changes, capital expenditure and government expenditure). The corresponding column shows the sources of inputs to produce that gross regional output. These include purchases of intermediate inputs from other industries, the use of labour (household income), the returns to capital or other value-added (OVA - which includes gross operating surplus and depreciation and net indirect taxes and subsidies) and goods and services imported from outside the region. The number of people employed in each industry is also indicated in the final row.

**Table 3.1**
**Aggregated Transactions Table: Regional Economy 2005-06 ($'000)**

| | Ag, forestry, fishing | Mining | Manuf. | Utilities | Building | Services | TOTAL | Household Expenditure | OFD | Exports | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ag, forestry, fishing | 5,210 | 104 | 53,983 | 17 | 640 | 20,108 | 80,062 | 36,107 | 88,978 | 146,046 | 351,193 |
| Mining | 16 | 42,584 | 83,271 | 125,586 | 6,359 | 4,153 | 261,969 | 1,394 | -27,225 | 916,730 | 1,152,868 |
| Manuf. | 32,231 | 37,215 | 1,797,045 | 28,654 | 381,091 | 997,263 | 3,273,500 | 705,662 | 731,871 | 5,765,119 | 10,476,153 |
| Utilities | 3,584 | 7,473 | 163,699 | 979,533 | 16,256 | 193,578 | 1,364,123 | 144,583 | 20,054 | 618,646 | 2,147,406 |
| Building | 2,463 | 8,617 | 24,290 | 28,291 | 672,890 | 271,283 | 1,007,834 | 0 | 2,038,505 | 164,397 | 3,210,736 |
| Services | 41,939 | 66,754 | 1,167,476 | 68,708 | 361,460 | 4,469,637 | 6,175,975 | 4,392,512 | 5,466,987 | 8,009,805 | 24,045,279 |
| **TOTAL** | 85,443 | 162,747 | 3,289,764 | 1,230,788 | 1,438,697 | 5,956,023 | 12,163,463 | 5,280,258 | 8,319,170 | 15,620,743 | 41,383,635 |
| Household Income | 69,912 | 150,384 | 1,581,260 | 155,696 | 817,163 | 8,675,384 | 11,449,801 | 0 | 0 | 0 | 11,449,801 |
| OVA | 62,747 | 709,177 | 1,345,491 | 411,354 | 308,138 | 4,021,630 | 6,858,537 | 672,889 | 294,152 | 28,076 | 7,853,654 |
| Imports | 133,091 | 130,559 | 4,259,637 | 349,568 | 646,738 | 5,392,241 | 10,911,834 | 6,242,146 | 1,580,417 | 1,107,411 | 19,841,809 |
| **TOTAL** | 351,193 | 1,152,868 | 10,476,153 | 2,147,406 | 3,210,736 | 24,045,279 | 41,383,635 | 12,195,294 | 10,193,739 | 16,756,230 | 80,528,898 |
| **Employment** | 1,805 | 2,273 | 22,802 | 2,281 | 11,708 | 140,819 | 181,688 | | | | |

Gross regional product (GRP or Value-added) for the regional economy is estimated at $19,3030M, comprising $11,449M to households as wages and salaries (including payments to self employed persons and employers) and $7,853M in OVA.

The employment total working in the region was 181,688 people.

The economic structure of the regional economy can be contrasted with that for NSW through a comparison of results from the respective input-output models (Figures 3.1 and 3.2). This reveals that the economies are not dissimilar with the main difference being the greater relative importance of the manufacturing sectors to the regional economy as well as the greater relative importance of GRP and output in the mining and utilities sectors to the regional economy. The agriculture/forestry/fishing sectors, building sectors and services sectors are of slightly lower relative importance to the regional economy than they are to the NSW economy.

**Figure 3.1**
**Summary of Aggregated Sectors: Regional Economy (2005-06)**

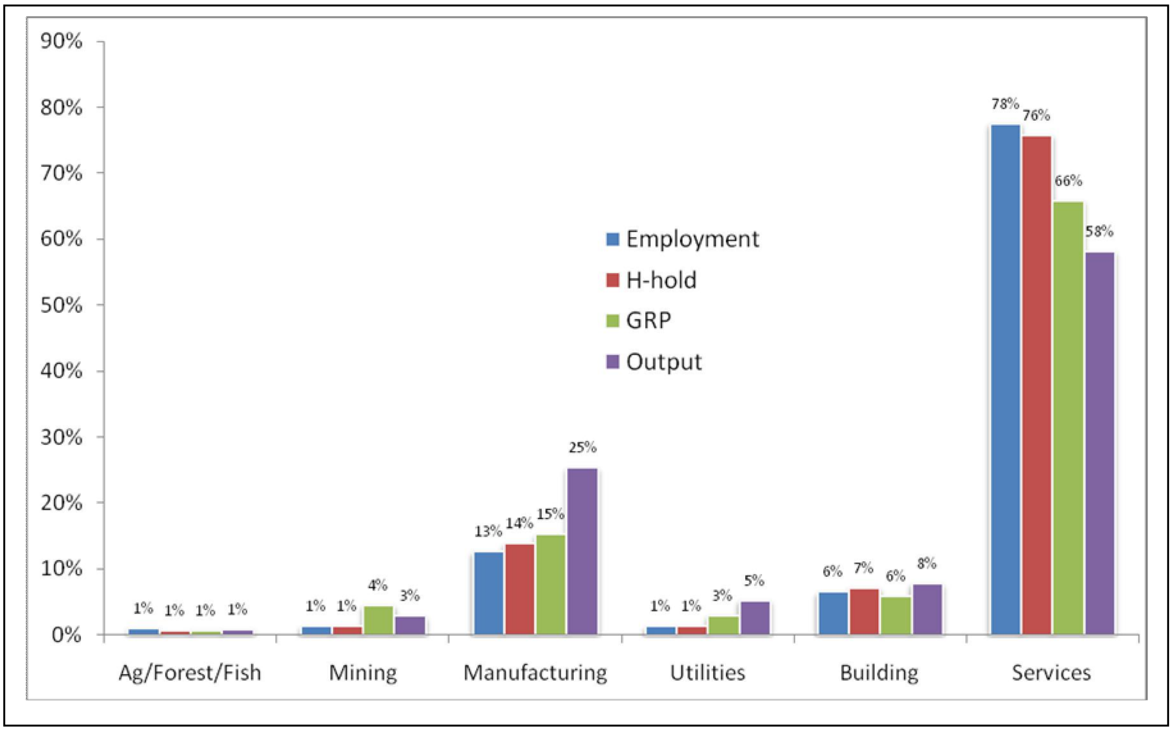
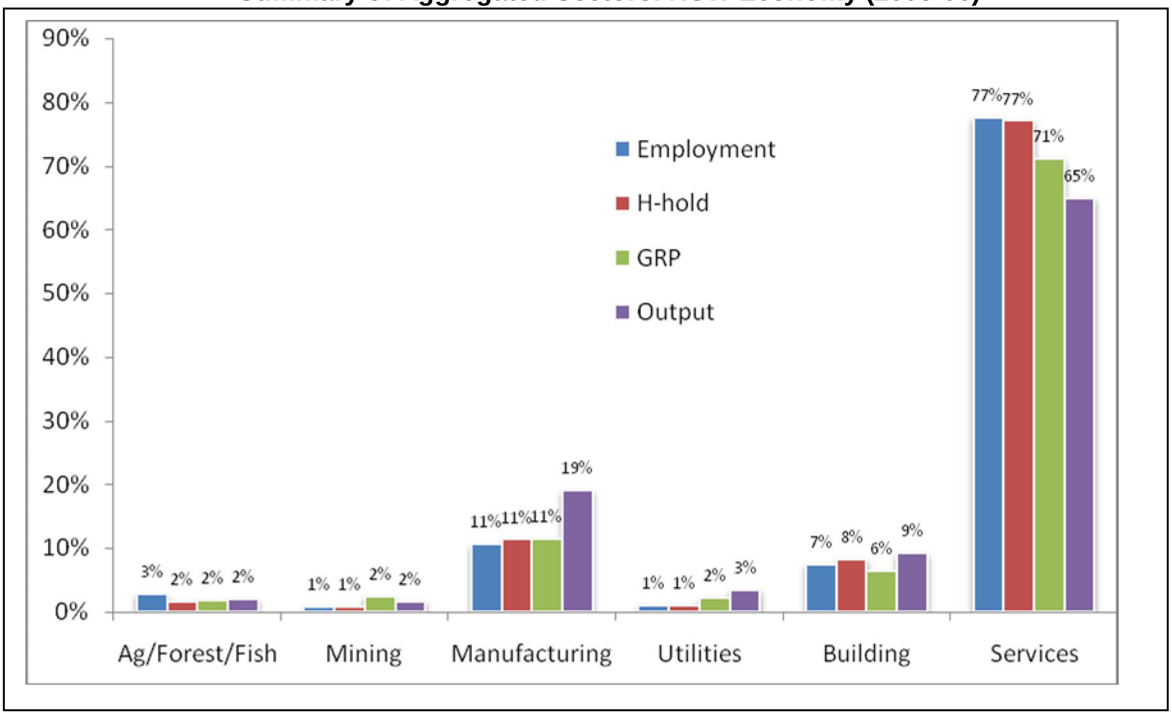



**Figure 3.2**
**Summary of Aggregated Sectors: NSW Economy (2005-06)**



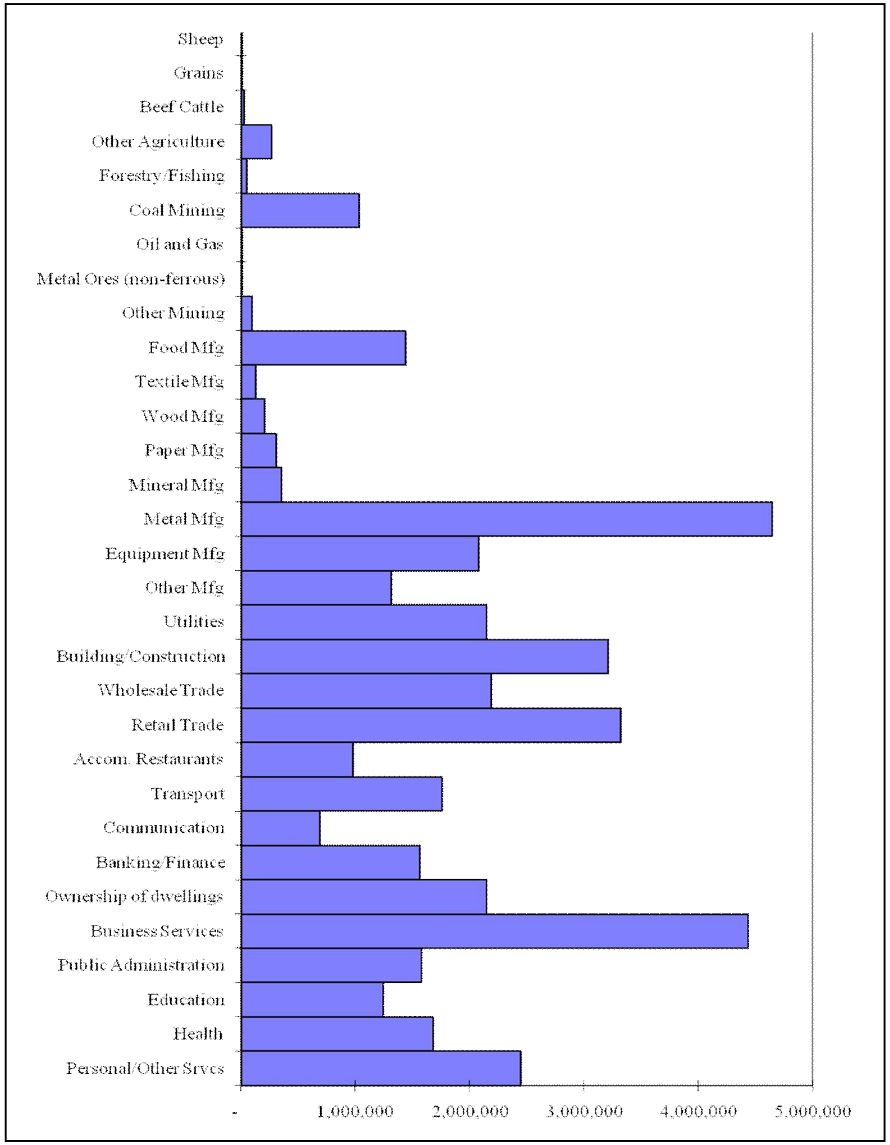
Figures 3.3 to 3.5 provide a more expansive sectoral distribution of gross regional output, employment, household income, value-added, exports and imports, and can be used to provide some more detail in the description of the economic structure of the economy.

What is clear from these figures is the importance of the tertiary sectors and manufacturing sectors to the economy, with coal mining being the dominant primary sector activity. In terms of gross regional output the business services sectors and metal manufacturing sectors are the most significant, with the business services sectors also being the most significant in terms of value-added and income. The retail sector is the most significant sector in term of employment while the metal manufacturing sectors the most significant sectors in terms of exports and imports.

At an individual sector level the retail trade sector and basic non-ferrous metal manufacturing sector are the most significant sectors for output while the retail trade sector and health sector are the most significant sectors in terms of value-added, employment and income. The retail trade sector and basic non-ferrous metal manufacturing sector are the most significant sectors for imports and exports.

**Figure 3.3 Sectoral Distribution of Gross Regional Output and Value-Added ($'000)**

## Gross Regional Output




## Gross Value-Added

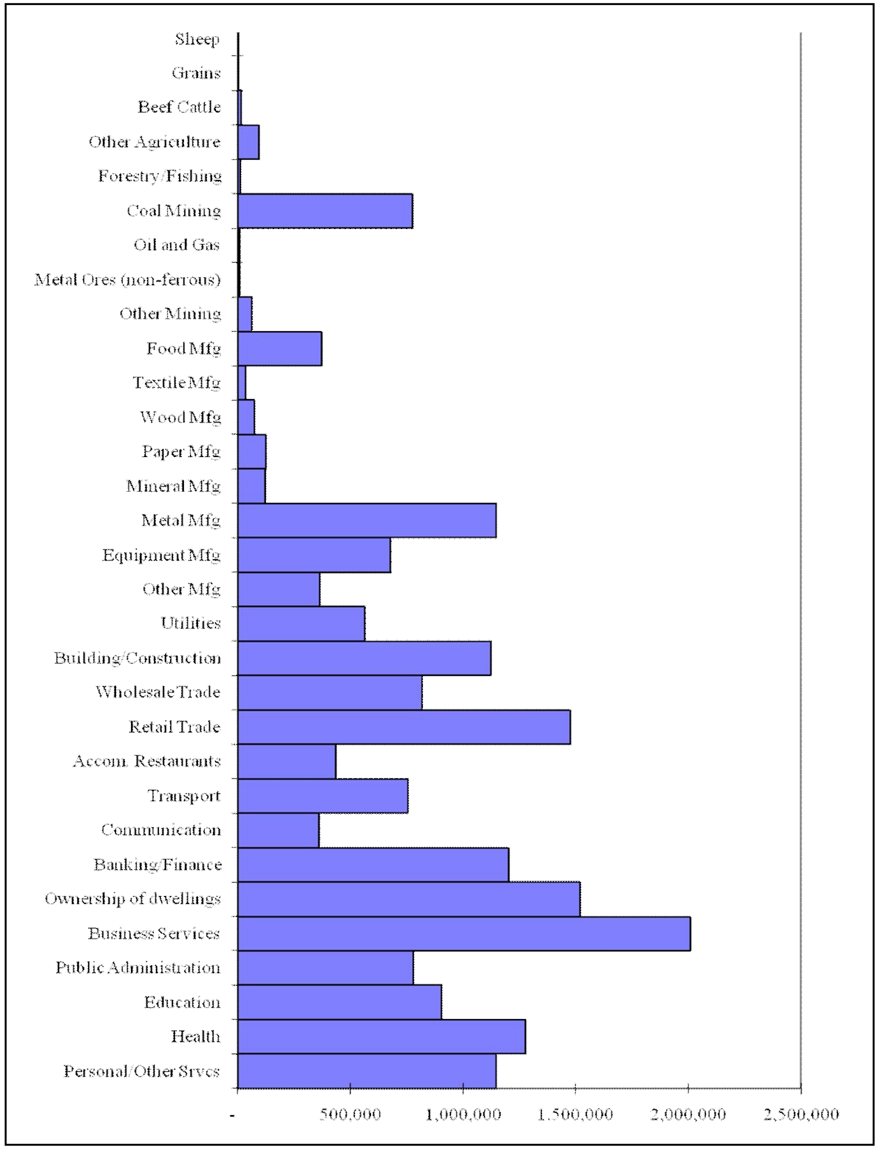
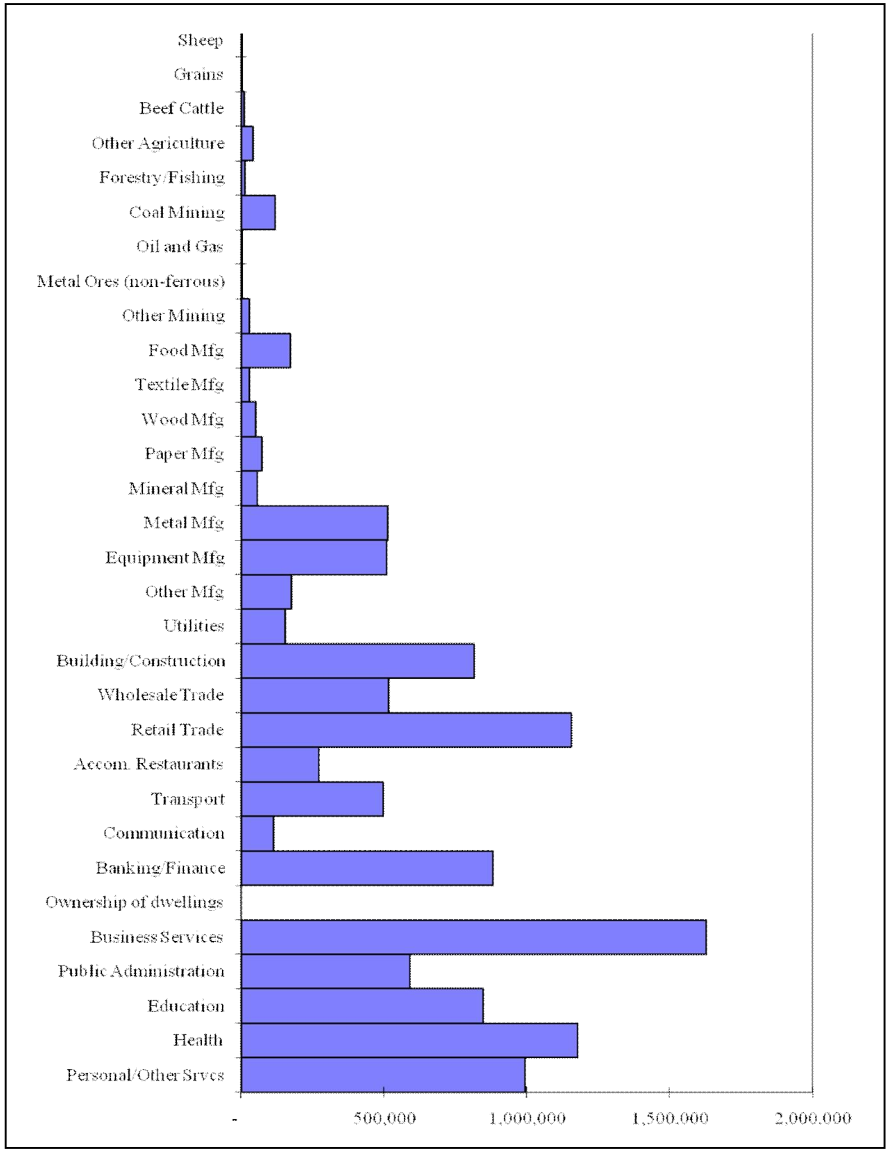
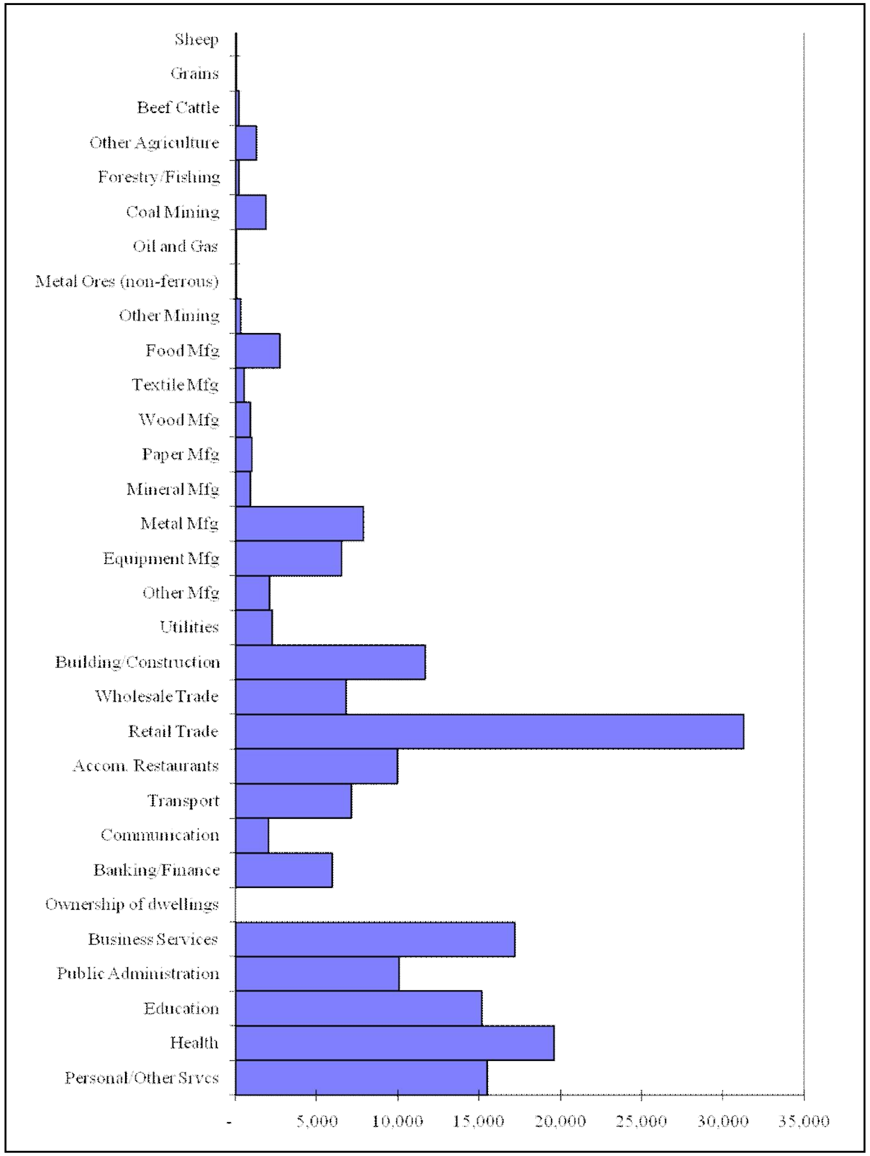


**Figure 3.4 Sectoral Distribution of Gross Regional Income ($'000) and Employment (No.)**

**Income**

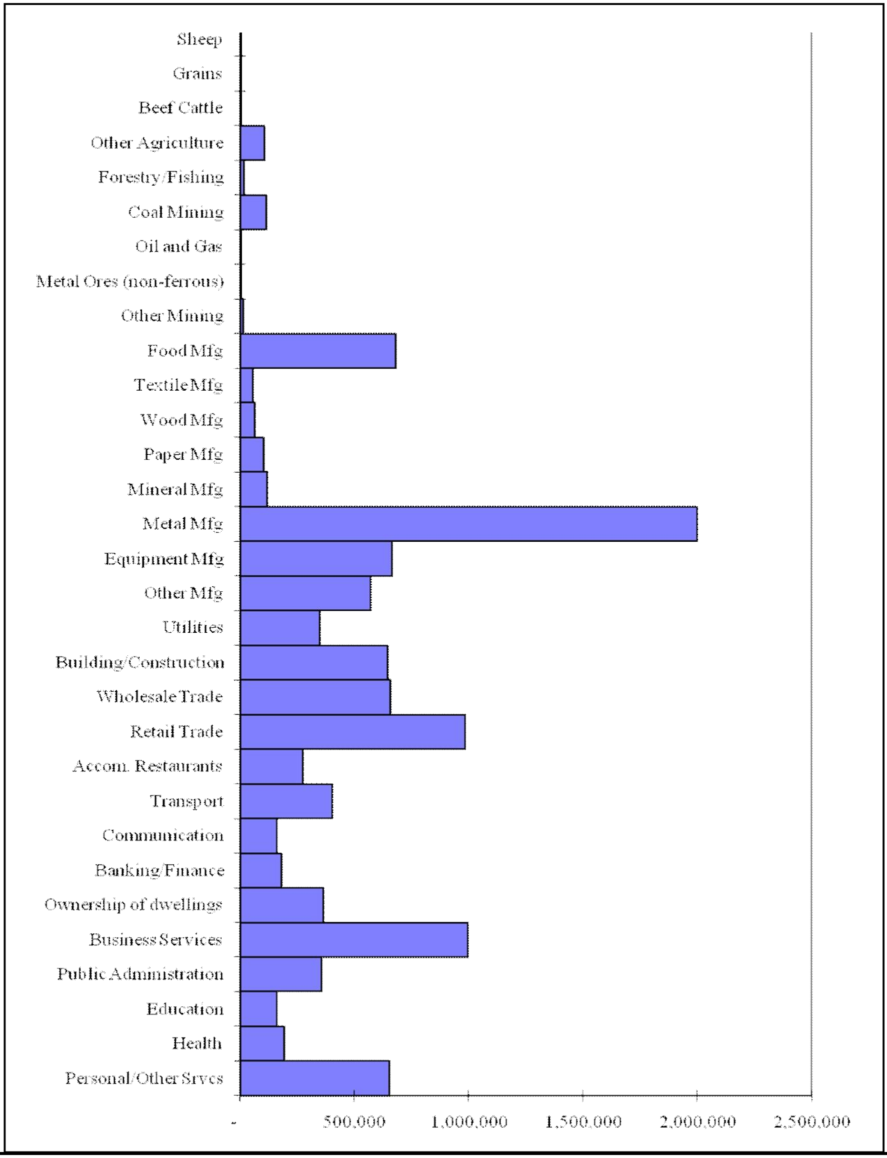



**Regional Employment**

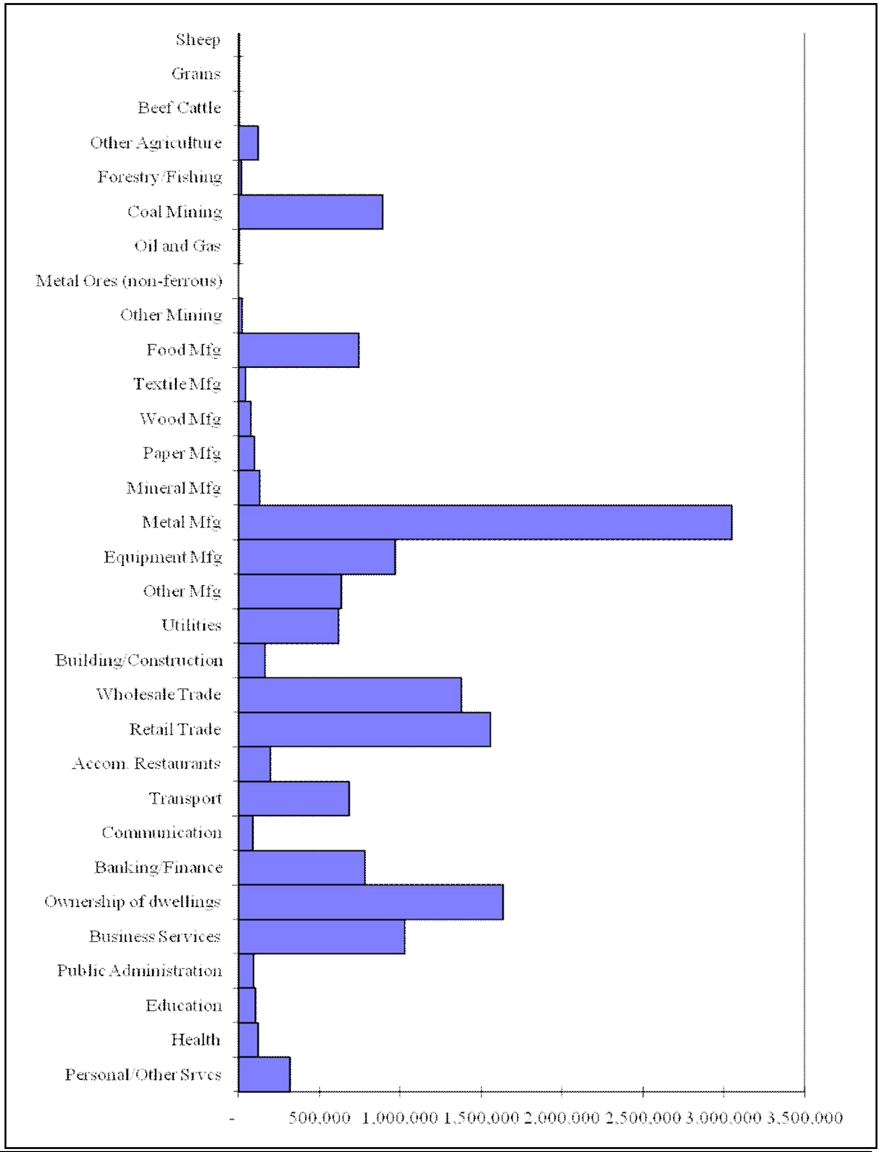


## Figure 3.5 Sectoral Distribution of Imports and Exports ($'000)

### Regional Imports




### Regional Exports



## 3.2 REGIONAL ECONOMIC IMPACT OF THE PROJECT

### 3.2.1 *Introduction*

For the analysis of the extension of mining at Myuna Colliery, a new Myuna Coal Mine sector was inserted into the regional input-output table reflecting production levels of approximately 2 Mtpa of coal for the Project and employment levels of 210. The revenue, expenditure and employment data for this new sector was obtained from financial information provided by CMPL. For this new sector:

- the estimated gross annual revenue was allocated to the *Output* row;
- the estimated wage bill of the direct employment residing in the region (100%) was allocated to the *household wages* row;
- non-wage expenditure was initially allocated across the relevant *intermediate sectors* in the economy, *imports* and *other value-added*;
- allocation was then made between *intermediate sectors* in the local economy and *imports* based on regional location quotients;
- purchase prices for expenditure in each sector in the region were adjusted to basic values and margins and taxes and allocated to appropriate sectors using relationships in the 2001-02 National Input-Output Tables;
- the difference between total revenue and total costs was allocated to the *other value-added* row*;* and
- employment that resides in the region was allocated to the *employment* row.

### 3.2.2 *Impacts of the Project on the Regional Economy*

The total and disaggregated annual impacts of the Project on the regional economy in terms of output, value-added, income and employment (in 2010 dollars) are shown in Table 3.2.

**Table 3.2**
**Annual Regional Economic Impacts of the Project**

| | Direct Effect | Production Induced | Consump. Induced | Total Flow-on | TOTAL EFFECT |
|---|---|---|---|---|---|
| **OUTPUT ($'000)** | 85,130 | 42,843 | 31,329 | 74,172 | 159,302 |
| *Type 11A Ratio* | *1.00* | *0.50* | *0.37* | *0.87* | *1.87* |
| **VALUE ADDED ($'000)** | 40,778 | 15,501 | 14,756 | 30,256 | 71,035 |
| *Type 11A Ratio* | *1.00* | *0.38* | *0.36* | *0.74* | *1.74* |
| **INCOME ($'000)** | 31,552 | 10,677 | 10,850 | 21,527 | 53,079 |
| *Type 11A Ratio* | *1.00* | *0.34* | *0.34* | *0.68* | *1.68* |
| **EMPL. (No.)** | 210 | 104 | 138 | 241 | 451 |
| *Type 11A Ratio* | *1.00* | *0.49* | *0.66* | *1.15* | *2.15* |

In total, the Project is estimated to make up to the following contribution to the regional economy:

- $159M in annual direct and indirect regional output or business turnover;
- $71M in annual direct and indirect regional value added;
- $53M in annual household income; and
- 451 direct and indirect jobs.

### 3.2.3 *Multipliers*

The Type 11A ratio multipliers for the Project range from 1.68 for income up to 2.15 for employment.

Capital intensive industries tend to have a high level of linkage with other sectors in an economy thus contributing substantial flow-on employment while at the same time only having a lower level of direct employment (relative to output levels). This tends to lead to a relatively high ratio multiplier for employment. A lower ratio multiplier for income (compared to employment) also generally occur as a result of comparatively higher wage levels in the mining sectors compared to incomes in the sectors that would experience flow-on effects from the Project. Capital intensive mining projects also typically have a relatively low ratio multiplier for value-added reflecting the relatively high direct value-added for the Project compared to that in flow-on sectors. The low output ratio multiplier largely reflects the high direct output value of the Project compared to those sectors that experience flow-on effects from the Project.

### 3.2.4 *Main Sectors Affected*

Flow-on impacts from the Project are likely to affect a number of different sectors of the regional economy. The sectors most impacted by output, value-added and income flow-ons are likely to be the:

- Structural metal products manufacturing;
- Agricultural and mining machinery manufacturing sector;
- Electricity sector;
- Health services sector;
- Wholesale trade sector;
- Retail trade sector;
- Other business services sector; and
- Hotels, cafes and restaurants sector.

Examination of the estimated direct and flow-on employment impacts gives an indication of the sectors in which employment opportunities will be generated (Table 3.3).

**Table 3.3**
**Sectoral Distribution of Total Regional Employment Impacts**

| Sector | Average Direct Effects | Production induced | Consumption-induced | Total |
|---|---|---|---|---|
| Primary | 0 | 0 | 1 | 1 |
| Mining | 210 | 2 | 0 | 212 |
| Manufacturing | 0 | 49 | 8 | 58 |
| Utilities | 0 | 4 | 2 | 6 |
| Wholesale/Retail | 0 | 14 | 30 | 44 |
| Accommodation, cafes, restaurants | 0 | 2 | 21 | 23 |
| Building/Construction | 0 | 2 | 1 | 3 |
| Transport | 0 | 7 | 5 | 12 |
| Services | 0 | 22 | 70 | 92 |
| **Total** | **210** | **104** | **138** | **451** |

Note: Totals may have minor discrepancies due to rounding.

Table 3.3 indicates that direct, production-induced and consumption-induced employment impacts of the Project on the regional economy are likely to have different distributions across sectors. Production-induced flow-on employment will occur mainly in the manufacturing sectors, wholesale/retail sectors and services sectors while consumption induced flow-on employment will be mainly in the services sectors, wholesale/retail sectors and accommodation/cafes/restaurants sectors.

Businesses that can provide the inputs to the production process at Myuna Colliery and/or the products and services required by employees will directly benefit from the Project by way of an increase in economic activity. However, because of the inter-linkages between sectors, many indirect businesses also benefit.

## 3.3 STATE ECONOMIC IMPACTS OF THE PROJECT

### 3.3.1 *Introduction*

The State economic impacts of the Project were assessed in the same manner as for estimation of the regional impacts. A new Myuna Coal Mine sector was inserted into a 2010 NSW input-output table in the same manner described in Section 3.2.1. The primary difference from the sector identified for the regional economy was that a greater level of expenditure was captured by NSW economy compared to the regional economy.

### 3.3.2 *Impacts of the Project on NSW*

The total and disaggregated annual impacts of the Project on the NSW economy in terms of output, value-added, income and employment (in 2010 dollars) are shown in Table 3.4.

**Table 3.4**
**Annual State Economic Impacts of the Project**

| | Direct Effect | Production Induced | Consump. Induced | Total Flow-on | TOTAL EFFECT |
|---|---|---|---|---|---|
| **OUTPUT ($'000)** | 85,130 | 54,394 | 82,432 | 136,826 | 221,956 |
| *Type 11A Ratio* | *1.00* | *0.64* | *0.97* | *1.61* | *2.61* |
| **VALUE ADDED ($'000)** | 40,779 | 20,864 | 41,987 | 62,851 | 103,630 |
| *Type 11A Ratio* | *1.00* | *0.51* | *1.03* | *1.54* | *2.54* |
| **INCOME ($'000)** | 31,553 | 15,493 | 24,028 | 39,521 | 71,074 |
| *Type 11A Ratio* | *1.00* | *0.49* | *0.76* | *1.25* | *2.25* |
| **EMPL. (No.)** | 210 | 179 | 343 | 522 | 732 |
| *Type 11A Ratio* | *1.00* | *0.85* | *1.64* | *2.49* | *3.49* |

In total, the Project is estimated to make the following contribution to the NSW economy:

- $222M in annual direct and indirect output or business turnover;
- $104M in annual direct and indirect value added;
- $71M in annual household income; and
- 732 direct and indirect jobs.

The impacts on the NSW economy are greater than for the regional economy, as the NSW economy is able to capture more mine and household expenditure, and there is a greater level of intersectoral linkages in the larger NSW economy.

## 3.4 PROJECT CESSATION

The Project will continue to stimulate demand in the regional and NSW economy leading to sustained business turnover in a range of sectors and ongoing employment opportunities. Conversely, the cessation of the mining operations in the future would result in a contraction in regional economic activity.

The magnitude of the regional economic impacts of cessation of the Project would depend on a number of interrelated factors at the time, including:

- The movements of workers and their families;
- Alternative development opportunities; and
- Economic structure and trends in the regional economy at the time.

Ignoring all other influences, the impact of Project cessation would depend on whether the workers and their families affected would leave the region. If it is assumed that some or all of the workers remain in the region, then the impacts of Project cessation would not be as severe compared to a greater level leaving the region. This is because the consumption-induced flow-ons of the decline would be reduced through the continued consumption expenditure of those who stay (Economic and Planning Impact Consultants, 1989). Under this assumption, the regional economic impacts of Project cessation would approximate the direct and production-induced effects in Table 3.2. However, if displaced workers and their families leave the region then impacts would be greater and begin to approximate the total effects in Table 3.2.

The decision by workers, on cessation of the Project, to move or stay would be affected by a number of factors including the prospects of gaining employment in the local region compared to other regions, the likely loss or gain from homeowners selling, and the extent of "attachment" to the local region (Economic and Planning Impact Consultants, 1989).

To the extent that alternative development opportunities arise in the regional economy, the regional economic impacts associated with mining closure that arise through reduced production and employment expenditure can be substantially ameliorated and absorbed by the growth of the region. One key factor in the growth potential of a region is its capacity to expand its factors of productions by attracting investment and labour from outside the region (BIE, 1994). This in turn can depend on a region's natural endowments. In this respect, the Newcastle SSD region is highly prospective with considerable coal resources (NSW DPI, 2009). It is therefore likely that over time, new mining developments will occur, offering potential to strengthen and broaden the economic base of the region and hence buffer against impacts of the cessation of individual activities.

Ultimately, the significance of the economic impacts of cessation of the Project would depend on the economic structure and trends in the regional economy at the time. For example, if Project cessation takes place in a declining economy, the impacts might be more significant. Alternatively, if Project cessation takes place in a growing diversified economy where there are other development opportunities, the ultimate cessation of the Project may not be a cause for concern.

Nevertheless, given that it is not possible to foresee the likely circumstances within which Project cessation would occur, it is important that regional authorities and leaders take every advantage from the stimulation to regional economic activity and skills and expertise that the Project would maintain in the region.

# 4 CONCLUSION

A BCA identified a range of potential economic costs and benefits of the Project. Values were placed on production costs and benefits as well as external costs and benefits. The net production benefits of the Project were estimated at $343M. The main external cost from the Project relate to greenhouse gas generation, estimated at $166. External benefits associated with employment provided by the Project have been estimated at $100M.

Overall, the Project is estimated to have net benefits of $278M and hence is desirable and justified from an economic efficiency perspective.

A regional economic impact analysis, using input-output analysis, estimated that in total, the Project will contribute the following to the regional economy:

- $159M in annual direct and indirect regional output or business turnover;
- $71M in annual direct and indirect regional value added;
- $53M in annual household income; and
- 451 direct and indirect and indirect direct jobs.

At the State level the Project will make the following contribution to the economy:

- $222M in annual direct and indirect output or business turnover;
- $104M in annual direct and indirect value added;
- $71M in annual direct and indirect household income; and
- 732 direct and indirect jobs.

This stimulus would be felt across a range of sectors in the economy including the coal mining sector, structural metal products manufacturing sector, agricultural and mining machinery manufacturing sector, electricity sector, wholesale trade sector, retail trade sector, health sector, other business services sector, and hotels, cafes and restaurants sector.

A 21-year approval is being sought for the Project. On cessation of mining the economic stimulus provided by the Project will cease. The significance of these Project cessation impacts will depend on:

- The degree to which any displaced workers and their families remain within the region;
- The economic structure and trends in the regional economy at the time.
- Whether other mining developments or other opportunities in the region arise that allow employment of displaced workers.

Nevertheless, given the uncertainties about the circumstances within which Project cessation will occur, it is important for regional authorities and leaders to take every advantage from the stimulation to regional economic activity and skills and expertise that the Project brings to the region, to strengthen and broaden the region's economic base.

# 5 REFERENCES

Australian Government (2008) *The Carbon Pollution Reduction Scheme: Australia's Low Pollution Future, White Paper*.

Bayne, B. and West, G. (1988), *GRIT – Generation of Regional Input-Output Tables: Users Reference Manual*. Australian Regional Developments No. 15, Office of Local Government, Department of Immigration, Local Government and Ethnic Affairs, AGPS.

Bennett, J. (1996) *The Economic Efficiency of RACAC Resource Allocation Options: A Conceptual Framework*, prepared for the Resource and Conservation Assessment Council.

Bennett, J., van Bueren, M., and Whitten, S. (2004) Estimating society's willingness to pay to maintain viable rural communities, *Australian Journal of Agricultural and Resource Economics*, 48:3, pp. 487-512.

Bureau of Industry Economics (BIE) (1994), *Regional Development: Patterns and Policy Implications*. AGPS, Canberra.

Economic and Planning Impact Consultants (1989) *The Economic Impact of the Woodchipping Industry in South Eastern NSW.* Report to the Wilderness Society.

Gillespie Economics (2008) *Managing the Impacts of a Mine in the Southern Coalfield, A Survey of Community Attitudes*, prepared for Helensburgh Coal Pty Ltd, In Peabody (2009) Metropolitan Coal Project Responses to Planning Assessment Commissions Queries.

Gillespie Economics (2009) *Bulli Seam Operations Socio-Economic Assessment*, prepared for Illawarra Coal Holdings Pty Ltd.

Johnson, F. and W. Desvouges (1997). Estimating Stated Preferences with Rated-Pair Data: Environmental, Health and Employment Effects of Energy Programs.*Journal of Environmental Economics and Management,* 34, 75-99

James, D. and Gillespie, R. (2002) *Guidelines for Economic Effects and Evaluation for EIA*. Prepared for NSW Department of Urban Affairs and Planning.

Jensen, G. (1980) The concept of accuracy in regional input-output models. *International Regional Science Review*, 5(2), 139-54.

Jensen, R. and West, G. (1986), *Input-output for Practitioners: Theory and Applications*. Prepared for Department of Local Government and Administrative Services, Local Government and Regional Development Division, Australian Government Publishing Service.

Nordhaus, W. (2008) *A Question of Balance: Weighing the Options on Global Warming Policies*, Yales University Press, New Haven and London.

NSW Department of Primary Industries (DPI) (2009) *New South Wales Coal Industry Profile*.

NSW Treasury (2007) *Treasury Guidelines for Economic Appraisal*. Website: www.treasury.nsw.gov.au. Date Accessed: 26 July 2010.

Portney, P. (1994). .The Contingent Valuation Debate: Why Economists Should Care., *Journal of Economic Perspectives,* 8(4), 3-18

Powell, R. and Chalmers, L. (1995), *The Regional Economic Impact of Gibraltar Range and Dorrigo National Park*. A Report for the NSW National Parks and Wildlife Service.

Powell, R., Jensen, R. and Gibson, A. (1985), *The Economic Impact of Irrigated Agriculture in NSW*. A report to the NSW Irrigators' Council Limited.

Sinden, J. and Thampapillai, D. (1995) *Introduction to Benefit Cost Analysis*, Longman, Australia.

Stern, N. (2006) *Stern Review: The Economics of Climate Change – Executive Summary*, Cabinet Office – HM Treasury, www.hm-treasury.gov.uk/media/8AC/F7/Executive_Summary.pdf

Streeting, M. and Hamilton, C. (1991) *Economic analysis of the forests of south-eastern Australia*, prepared for the Resource Assessment Commission.

Tol, R. (2005) *The marginal damage costs of carbon dioxide emissions: an assessment of the uncertainties*, Energy Policy 33 (2005) p. 2064-2074.

Tol, R. (2006) *The Stern Review of the Economics of Climate Change: A Comment.* Economic and Social Research Institute, Hamburg, Vrije and Carnegie Mellon Universities.

West, G. (1993), *Input-Output Analysis for Practitioners, Version 7.1, User's Guide*.

**Appendix 1 – Valuing Greenhouse Gas Emissions**

To place an economic value on $CO_2$-e emissions a shadow price of carbon is required that reflects its social costs. The social cost of carbon is the present value of additional economic damages now and in the future caused by an additional tonne of carbon emissions.

A prerequisite to valuing this environmental damage is scientific dose-response functions identifying how incremental emissions of $CO_2$-e would impact climate change and subsequently impact human activities, health and the environment on a spatial basis. Only once these physical linkages are identified is it possible to begin to place economic values on the physical changes using a range of market and non market valuation methods. Neither the identification of the physical impacts of additional greenhouse gas nor valuation of these impacts is an easy task, although various attempts have been made using different climate and economic modelling tools. The result is a great range in the estimated damage costs of greenhouse gas.

The Stern Review: Economics of Climate Change (Stern 2006) acknowledged that the academic literature provides a wide range of estimates of the social cost of carbon. It adopted an estimate of US$85/t $CO_2$-e for the "business as usual" case, i.e. an environment in which there is an annually increasing concentration of greenhouse gas in the atmosphere.

Tol (2006) highlights some significant concerns with Stern's damage cost estimates including:

- that in estimating the damage of climate change Stern has consistently selected the most pessimistic study in the literature in relation to impacts;
- Stern's estimate of the social cost of carbon is based on a single integrated assessment model, PAGE2002, which assumes all climate change impacts are necessarily negative and that vulnerability to climate change is independent of development;
- Stern uses a near zero discount rate which contravenes economic theory and the approach recommended by Treasury's around the world

All these have the effect of magnifying the social cost of carbon estimate, providing what Tol (2006) considers to be an outlier in the marginal damage cost literature.

Tol (2005) in a review of 103 estimates of the social cost of carbon from 28 published studies found that the range of estimates was right-skewed: the mode was US$0.55/t $CO_2$-e (in 1995 US$), the median was US$3.82/t $CO_2$-e, the mean US$25.34/t $CO_2$-e and the 95$^{th}$ percentile US$95.37/t $CO_2$-e. He also found that studies that used a lower discount rate and those that used equity weighting across regions with different average incomes per head, generated higher estimates and larger uncertainties. The studies did not use a standard reference scenario, but in general considered 'business as usual' trajectories.

Tol (2005) concluded that "it is unlikely that the marginal damage costs of carbon dioxide emissions exceed US$14/t $CO_2$-e and are likely to be substantially smaller than that". Nordhaus's (2008) modelling using the DICE-2007 Model suggests a social cost of carbon with no emissions limitations of US$30 per tonne of carbon (/tC) (US$8/t $CO_2$-e).

An alternative method to trying to estimate the damage costs of carbon dioxide is to examine the price of carbon credits. This is relevant because emitters can essentially emit $CO_2$-e resulting in climate change damage costs or may purchase credits that offset their $CO_2$-e impacts, internalising the cost of the externality at the price of the carbon credit. The price of carbon credits therefore provides an alternative estimate of the economic cost of greenhouse gas. However, the price is ultimately a function of the characteristics of the scheme and the scarcity of permits etc and hence may or may not reflect the actual social cost of carbon.

In 2008 the price of carbon credits under the European Union Emissions Trading Scheme were around €24/t $CO_2$-e, the equivalent of about US$38 t $CO_2$-e while spot prices in the Chicago Climate Exchange were in the order of US$3.95 t $CO_2$-e.

As of July 2008 the spot price under the NSW Government Greenhouse Gas Reduction Scheme was AUS$7.25 t $CO_2$-e. Prices under the Commonwealth Governments Greenhouse Friendly Voluntary Scheme were AUS$8.30 t $CO_2$-e and Australian Emissions Trading Unit (in advance of the Australian Governments Emissions Trading Scheme) was priced at AUS$21 t $CO_2$-e (Next Generation Energy Solutions pers. comms. 24 July 2008).

A National Emissions Trading Scheme was foreshadowed in Australia by 2010. While the ultimate design and hence liabilities under any scheme are still a work in progress, the National Emissions Trading Taskforce cited a carbon permit price of around AUS$35 t $CO_2$-e.

The Carbon Pollution Reduction Scheme: Australia's Low Pollution Future White Paper (Australian Government,2008) cited a carbon permit price of AUS$23/t $CO_2$-e in 2010 and AUS$35/t $CO_2$-e in 2020 (in 2005) dollars for a 5% reduction in carbon pollution below 2000 levels by 2020.

Given the above information and the great uncertainty around damage cost estimates, a range for the social cost of greenhouse gas emissions from AUS$8/ t $CO_2$-e to AUS$40/ t $CO_2$-e was used in the sensitivity analysis in Section 2.6, with a conservatively high central value of AUS$30/ t $CO_2$-e.

## Appendix 2 – Sensitivity Testing (NPV A$M)

| INCREASE 20% | 4% | 7% | 10% |
|---|---|---|---|
| Opportunity cost of land | $357 | $278 | $226 |
| Opportunity cost of capital | $353 | $273 | $221 |
| Capital costs | $338 | $264 | $215 |
| Operating costs | $179 | $147 | $126 |
| Decommissioning costs | $357 | $278 | $227 |
| Value of coal | $653 | $497 | $393 |
| Residual value of capital and land | $362 | $281 | $228 |
| Greenhouse costs @$40/t | $282 | $223 | $184 |
| Employment benefits | $378 | $298 | $246 |
| | | | |
| DECREASE 20% | | | |
| Opportunity cost of land | $357 | $278 | $227 |
| Opportunity cost of capital | $361 | $283 | $231 |
| Capital costs | $376 | $292 | $237 |
| Operating costs | $535 | $409 | $326 |
| Decommissioning costs | $357 | $278 | $226 |
| Value of coal | $61 | $59 | $60 |
| Residual value of capital and land | $352 | $276 | $225 |
| Greenhouse costs @ $8/t | $521 | $399 | $319 |
| Employment benefits | $336 | $258 | $207 |

## Appendix 3 – The GRIT System for Generating Input-Output Tables

"The Generation of Regional Input-Output Tables (GRIT) system was designed to:

- combine the benefits of survey based tables (accuracy and understanding of the economic structure) with those of non-survey tables (speed and low cost);
- enable the tables to be compiled from other recently compiled tables;
- allow tables to be constructed for any region for which certain minimum amounts of data were available;
- develop regional tables from national tables using available region-specific data;
- produce tables consistent with the national tables in terms of sector classification and accounting conventions;
- proceed in a number of clearly defined stages; and
- provide for the possibility of ready updates of the tables.

The resultant GRIT procedure has a number of well-defined steps. Of particular significance are those that involve the analyst incorporating region-specific data and information specific to the objectives of the study. The analyst has to be satisfied about the accuracy of the information used for the important sectors; in this case the non-ferrous metals and building and construction sectors. The method allows the analyst to allocate available research resources to improving the data for those sectors of the economy that are most important for the study. It also means that the method should be used by an analyst who is familiar with the economy being modelled, or at least someone with that familiarity should be consulted.

An important characteristic of GRIT-produced tables relates to their accuracy. In the past, survey-based tables involved gathering data for every cell in the table, thereby building up a table with considerable accuracy. A fundamental principle of the GRIT method is that not all cells in the table are equally important. Some are not important because they are of very small value and, therefore, have no possibility of having a significant effect on the estimates of multipliers and economic impacts. Others are not important because of the lack of linkages that relate to the particular sectors that are being studied. Therefore, the GRIT procedure involves determining those sectors and, in some cases, cells that are of particular significance for the analysis. These represent the main targets for the allocation of research resources in data gathering. For the remainder of the table, the aim is for it to be 'holistically' accurate (Jensen, 1980). That means a generally accurate representation of the economy is provided by the table, but does not guarantee the accuracy of any particular cell. A summary of the steps involved in the GRIT process is shown in Table A-1" (Powell and Chalmers, 1995).

**Table A-1**
**The GRIT Method**

| Phase | Step | Action |
|---|---|---|
| PHASE 1 | | ADJUSTMENTS TO NATIONAL TABLE |
| | 1 | Selection of national input-output table (106-sector table with direct allocation of all imports, in basic values). |
| | 2 | Adjustment of national table for updating. |
| | 3 | Adjustment for international trade. |
| PHASE II | | ADJUSTMENTS FOR REGIONAL IMPORTS |
| | | (*Steps 4-14 apply to each region for which input-output tables are required*) |
| | 4 | Calculation of 'non-existent' sectors. |
| | 5 | Calculation of remaining imports. |
| PHASE III | | DEFINITION OF REGIONAL SECTORS |
| | 6 | Insertion of disaggregated superior data. |
| | 7 | Aggregation of sectors. |
| | 8 | Insertion of aggregated superior data. |
| PHASE IV | | DERIVATION OF PROTOTYPE TRANSACTIONS TABLES |
| | 9 | Derivation of transactions values. |
| | 10 | Adjustments to complete the prototype tables. |
| | 11 | Derivation of inverses and multipliers for prototype tables. |
| PHASE V | | DERIVATION OF FINAL TRANSACTIONS TABLES |
| | 12 | Final superior data insertions and other adjustments. |
| | 13 | Derivation of final transactions tables. |
| | 14 | Derivation of inverses and multipliers for final tables. |

Source: Bayne and West (1988)

# Appendix P

# Schedule of Land

| Lot | Schedule | DP |
|---|---|---|
| | | 37670 |
| | | 45057 |
| | | 70772 |
| 1 | | 1018646 |
| 1 | | 1039389 |
| 1 | | 1058010 |
| 1 | | 1074358 |
| 1 | | 1088536 |
| 1 | | 1092888 |
| 1 | | 1094699 |
| 1 | | 1107356 |
| 1 | | 11539 |
| 1 | | 12863 |
| 1 | | 13120 |
| 1 | | 13123 |
| 1 | | 15556 |
| 1 | | 16793 |
| 1 | | 17781 |
| 1 | | 18060 |
| 1 | | 204202 |
| 1 | | 204737 |
| 1 | | 22842 |
| 1 | | 23604 |
| 1 | | 250973 |
| 1 | | 251160 |
| 1 | | 25985 |
| 1 | | 262960 |
| 1 | | 26549 |
| 1 | | 26634 |
| 1 | | 270423 |
| 1 | | 28046 |
| 1 | | 285482 |
| 1 | | 317336 |
| 1 | | 436113 |
| 1 | | 500470 |
| 1 | | 505798 |
| 1 | | 533069 |
| 1 | | 542486 |
| 1 | | 548107 |
| 1 | | 551113 |
| 1 | | 551787 |
| 1 | | 561577 |
| 1 | | 566927 |
| 1 | | 567633 |
| 1 | | 568311 |
| 1 | | 579042 |
| 1 | | 583186 |
| 1 | | 602008 |
| 1 | | 608817 |
| 1 | | 621171 |
| 1 | | 622484 |
| 1 | | 629396 |
| 1 | | 632417 |
| 1 | | 651963 |
| 1 | | 704468 |
| 1 | | 704490 |
| 1 | | 727245 |
| 1 | | 727939 |
| 1 | | 746870 |
| 1 | | 778463 |
| 1 | | 803077 |
| 1 | | 806513 |
| 1 | | 807936 |
| 1 | | 814599 |
| 1 | | 861549 |
| 1 | | 870118 |
| 1 | C | 27655 |
| 1 | F | 27655 |
| 1 | H | 2458 |
| 1 | J | 2458 |
| 10 | | 1022724 |
| 10 | | 1055349 |
| 10 | | 1071069 |
| 10 | | 11287 |
| 10 | | 11995 |
| 10 | | 13123 |
| 10 | | 15556 |
| 10 | | 16793 |
| 10 | | 17367 |
| 10 | | 17781 |
| 10 | | 22842 |
| 10 | | 23604 |
| 10 | | 248691 |
| 10 | | 26634 |
| 10 | | 28046 |
| 10 | | 28068 |
| 10 | | 582048 |
| 10 | | 808724 |
| 10 | C | 27655 |
| 10 | D | 2458 |
| 10 | E | 2458 |
| 10 | E | 27655 |
| 10 | F | 27655 |
| 10 | J | 27655 |
| 100 | | 1088711 |
| 100 | | 11539 |
| 100 | | 11995 |
| 100 | | 13123 |
| 100 | | 15556 |
| 100 | | 17367 |
| 100 | | 713777 |
| 100 | | 790729 |
| 100 | | 8055 |
| 100 | | 863278 |
| 100 | | 880089 |
| 1003 | | 650194 |
| 101 | | 1014736 |
| 101 | | 1088711 |
| 101 | | 1119224 |
| 101 | | 11539 |
| 101 | | 11995 |
| 101 | | 15556 |
| 101 | | 17367 |
| 101 | | 558722 |
| 101 | | 730402 |
| 101 | | 790729 |
| 101 | | 8055 |
| 101 | | 844302 |
| 101 | | 863278 |
| 101 | | 880089 |
| 102 | | 1014736 |
| 102 | | 1088711 |
| 102 | | 1119224 |
| 102 | | 11287 |
| 102 | | 11539 |
| 102 | | 11995 |
| 102 | | 13123 |
| 102 | | 17367 |
| 102 | | 238489 |
| 102 | | 558722 |
| 102 | | 730402 |
| 102 | | 8055 |
| 102 | | 844302 |
| 103 | | 1014736 |
| 103 | | 1088711 |
| 103 | | 1119224 |
| 103 | | 11287 |
| 103 | | 11539 |
| 103 | | 11995 |
| 103 | | 13123 |

| Lot | Schedule | DP |
|---|---|---|
| 103 | | 15556 |
| 103 | | 17367 |
| 103 | | 238489 |
| 103 | | 730402 |
| 103 | | 8055 |
| 104 | | 1088711 |
| 104 | | 1119224 |
| 104 | | 11287 |
| 104 | | 11539 |
| 104 | | 11995 |
| 104 | | 13123 |
| 104 | | 17367 |
| 104 | | 238489 |
| 104 | | 8055 |
| 105 | | 1088711 |
| 105 | | 1119224 |
| 105 | | 11287 |
| 105 | | 11539 |
| 105 | | 11995 |
| 105 | | 13123 |
| 105 | | 15556 |
| 105 | | 17367 |
| 105 | | 238489 |
| 105 | | 8055 |
| 106 | | 1088711 |
| 106 | | 1119224 |
| 106 | | 11287 |
| 106 | | 11539 |
| 106 | | 11995 |
| 106 | | 13123 |
| 106 | | 15556 |
| 106 | | 17367 |
| 106 | | 8055 |
| 107 | | 1088711 |
| 107 | | 11539 |

| Lot | Schedule | DP |
|---|---|---|
| 107 | | 11995 |
| 107 | | 13123 |
| 107 | | 15556 |
| 107 | | 17367 |
| 107 | | 8055 |
| 108 | | 1088711 |
| 108 | | 11287 |
| 108 | | 11539 |
| 108 | | 11995 |
| 108 | | 13123 |
| 108 | | 17367 |
| 108 | | 8055 |
| 109 | | 1088711 |
| 109 | | 11287 |
| 109 | | 11995 |
| 109 | | 13123 |
| 109 | | 15556 |
| 109 | | 17367 |
| 109 | | 8055 |
| 11 | | 1022724 |
| 11 | | 1050120 |
| 11 | | 11287 |
| 11 | | 11995 |
| 11 | | 13120 |
| 11 | | 13123 |
| 11 | | 15556 |
| 11 | | 16793 |
| 11 | | 17367 |
| 11 | | 22842 |
| 11 | | 23604 |
| 11 | | 248691 |
| 11 | | 26634 |
| 11 | | 28046 |
| 11 | | 582048 |
| 11 | | 625009 |

| Lot | Schedule | DP |
|---|---|---|
| 11 | | 701829 |
| 11 | | 803842 |
| 11 | | 808724 |
| 11 | C | 27655 |
| 11 | D | 2458 |
| 11 | E | 2458 |
| 11 | E | 27655 |
| 11 | F | 27655 |
| 11 | J | 27655 |
| 110 | | 1088711 |
| 110 | | 11995 |
| 110 | | 13123 |
| 110 | | 15556 |
| 110 | | 17367 |
| 110 | | 8055 |
| 111 | | 1088711 |
| 111 | | 1116254 |
| 111 | | 13123 |
| 111 | | 15556 |
| 111 | | 17367 |
| 111 | | 629441 |
| 111 | | 8055 |
| 112 | | 1088711 |
| 112 | | 1116254 |
| 112 | | 11287 |
| 112 | | 11995 |
| 112 | | 13123 |
| 112 | | 15556 |
| 112 | | 17367 |
| 112 | | 629441 |
| 112 | | 8055 |
| 113 | | 1088711 |
| 113 | | 1116254 |
| 113 | | 11995 |
| 113 | | 13123 |

| Lot | Schedule | DP |
|---|---|---|
| 113 | | 15556 |
| 113 | | 17367 |
| 113 | | 8055 |
| 114 | | 1088711 |
| 114 | | 11995 |
| 114 | | 13123 |
| 114 | | 15556 |
| 114 | | 17367 |
| 114 | | 8055 |
| 115 | | 1088711 |
| 115 | | 11287 |
| 115 | | 11995 |
| 115 | | 13123 |
| 115 | | 15556 |
| 115 | | 17367 |
| 115 | | 8055 |
| 116 | | 1088711 |
| 116 | | 11287 |
| 116 | | 11995 |
| 116 | | 13123 |
| 116 | | 15556 |
| 116 | | 17367 |
| 116 | | 8055 |
| 117 | | 1088711 |
| 117 | | 11287 |
| 117 | | 11995 |
| 117 | | 13123 |
| 117 | | 15556 |
| 117 | | 17367 |
| 117 | | 8055 |
| 118 | | 1088711 |
| 118 | | 11287 |
| 118 | | 11995 |
| 118 | | 13123 |
| 118 | | 15556 |

| Lot | Schedule | DP |
|---|---|---|
| 118 | | 17367 |
| 119 | | 1088711 |
| 119 | | 11287 |
| 119 | | 11995 |
| 119 | | 13123 |
| 119 | | 17367 |
| 119 | | 8055 |
| 12 | | 1022724 |
| 12 | | 1050193 |
| 12 | | 11287 |
| 12 | | 11995 |
| 12 | | 13120 |
| 12 | | 13123 |
| 12 | | 15556 |
| 12 | | 16793 |
| 12 | | 17367 |
| 12 | | 22842 |
| 12 | | 23604 |
| 12 | | 248691 |
| 12 | | 26634 |
| 12 | | 582049 |
| 12 | | 621361 |
| 12 | | 625009 |
| 12 | | 701829 |
| 12 | | 716529 |
| 12 | C | 27655 |
| 12 | D | 2458 |
| 12 | E | 2458 |
| 12 | E | 27655 |
| 12 | F | 27655 |
| 12 | J | 27655 |
| 120 | | 1088711 |
| 120 | | 11287 |
| 120 | | 11539 |
| 120 | | 11995 |

| Lot | Schedule | DP |
|---|---|---|
| 120 | | 13123 |
| 120 | | 15556 |
| 120 | | 17367 |
| 120 | | 8055 |
| 121 | | 1088711 |
| 121 | | 11287 |
| 121 | | 11539 |
| 121 | | 11995 |
| 121 | | 13123 |
| 121 | | 15556 |
| 121 | | 17367 |
| 121 | | 8055 |
| 121 | | 836139 |
| 122 | | 1088711 |
| 122 | | 11287 |
| 122 | | 11539 |
| 122 | | 11995 |
| 122 | | 13123 |
| 122 | | 15556 |
| 122 | | 17367 |
| 122 | | 8055 |
| 123 | | 1088711 |
| 123 | | 11287 |
| 123 | | 11539 |
| 123 | | 11995 |
| 123 | | 13123 |
| 123 | | 15556 |
| 123 | | 17367 |
| 123 | | 8055 |
| 124 | | 1088711 |
| 124 | | 11287 |
| 124 | | 11539 |
| 124 | | 11995 |
| 124 | | 13123 |
| 124 | | 15556 |

| Lot | Schedule | DP |
|---|---|---|
| 124 | | 17367 |
| 124 | | 8055 |
| 125 | | 11287 |
| 125 | | 11539 |
| 125 | | 11995 |
| 125 | | 13123 |
| 125 | | 15556 |
| 125 | | 17367 |
| 125 | | 8055 |
| 126 | | 11287 |
| 126 | | 11539 |
| 126 | | 13123 |
| 126 | | 15556 |
| 126 | | 17367 |
| 126 | | 8055 |
| 127 | | 11539 |
| 127 | | 13123 |
| 127 | | 15556 |
| 127 | | 17367 |
| 127 | | 8055 |
| 1271 | | 1010499 |
| 1272 | | 1010499 |
| 128 | | 11287 |
| 128 | | 11539 |
| 128 | | 13123 |
| 128 | | 15556 |
| 128 | | 17367 |
| 128 | | 8055 |
| 129 | | 11287 |
| 129 | | 13123 |
| 129 | | 15556 |
| 129 | | 17367 |
| 129 | | 8055 |
| 13 | | 11287 |
| 13 | | 11995 |

| Lot | Schedule | DP |
|---|---|---|
| 13 | | 13120 |
| 13 | | 13123 |
| 13 | | 15556 |
| 13 | | 17367 |
| 13 | | 22842 |
| 13 | | 23604 |
| 13 | | 248691 |
| 13 | | 26634 |
| 13 | | 28068 |
| 13 | | 582049 |
| 13 | | 625009 |
| 13 | | 701829 |
| 13 | | 716529 |
| 13 | C | 27655 |
| 13 | D | 2458 |
| 13 | E | 2458 |
| 13 | E | 27655 |
| 13 | J | 27655 |
| 130 | | 11287 |
| 130 | | 13123 |
| 130 | | 15556 |
| 130 | | 17367 |
| 130 | | 8055 |
| 131 | | 11287 |
| 131 | | 13123 |
| 131 | | 15556 |
| 131 | | 17367 |
| 131 | | 249719 |
| 131 | | 8055 |
| 131 | | 859693 |
| 132 | | 11287 |
| 132 | | 15556 |
| 132 | | 17367 |
| 132 | | 249719 |
| 132 | | 6945 |

| Lot | Schedule | DP |
|---|---|---|
| 132 | | 8055 |
| 132 | | 859693 |
| 133 | | 11287 |
| 133 | | 15556 |
| 133 | | 17367 |
| 133 | | 249719 |
| 133 | | 6945 |
| 133 | | 8055 |
| 134 | | 11287 |
| 134 | | 15556 |
| 134 | | 17367 |
| 134 | | 249719 |
| 134 | | 8055 |
| 1341 | | 844700 |
| 1342 | | 844700 |
| 135 | | 11287 |
| 135 | | 15556 |
| 135 | | 17367 |
| 135 | | 249719 |
| 135 | | 8055 |
| 136 | | 11287 |
| 136 | | 15556 |
| 136 | | 17367 |
| 136 | | 249719 |
| 136 | | 8055 |
| 137 | | 11287 |
| 137 | | 15556 |
| 137 | | 17367 |
| 137 | | 249719 |
| 137 | | 8055 |
| 138 | | 11287 |
| 138 | | 13123 |
| 138 | | 15556 |
| 138 | | 17367 |
| 138 | | 8055 |

| Lot | Schedule | DP |
|---|---|---|
| 139 | | 13123 |
| 139 | | 15556 |
| 139 | | 17367 |
| 139 | | 8055 |
| 1391 | | 580454 |
| 1392 | | 580454 |
| 14 | | 11287 |
| 14 | | 11995 |
| 14 | | 13120 |
| 14 | | 13123 |
| 14 | | 15556 |
| 14 | | 17367 |
| 14 | | 22842 |
| 14 | | 23604 |
| 14 | | 248691 |
| 14 | | 26634 |
| 14 | | 28068 |
| 14 | | 538780 |
| 14 | | 582049 |
| 14 | C | 27655 |
| 14 | D | 2458 |
| 14 | E | 2458 |
| 14 | E | 27655 |
| 14 | J | 27655 |
| 140 | | 13123 |
| 140 | | 15556 |
| 140 | | 17367 |
| 140 | | 656807 |
| 140 | | 8055 |
| 141 | | 1105594 |
| 141 | | 11287 |
| 141 | | 13123 |
| 141 | | 15556 |
| 141 | | 17367 |
| 141 | | 852383 |

| Lot | Schedule | DP |
|---|---|---|
| 142 | | 1105594 |
| 142 | | 11287 |
| 142 | | 13123 |
| 142 | | 15556 |
| 142 | | 17367 |
| 142 | | 8055 |
| 142 | | 852383 |
| 143 | | 1105594 |
| 143 | | 11287 |
| 143 | | 13123 |
| 143 | | 17367 |
| 144 | | 11287 |
| 144 | | 13123 |
| 144 | | 17367 |
| 144 | | 8055 |
| 145 | | 11287 |
| 145 | | 13123 |
| 145 | | 17367 |
| 145A | | 17367 |
| 146 | | 11539 |
| 146 | | 13123 |
| 146 | | 17367 |
| 1461 | | 856874 |
| 147 | | 11287 |
| 147 | | 11539 |
| 147 | | 13123 |
| 147 | | 17367 |
| 147 | | 8055 |
| 148 | | 11287 |
| 148 | | 11539 |
| 148 | | 13123 |
| 148 | | 17367 |
| 1482 | | 562711 |
| 149 | | 11287 |
| 149 | | 11539 |

| Lot | Schedule | DP |
|---|---|---|
| 149 | | 13123 |
| 149 | | 17367 |
| 15 | | 11287 |
| 15 | | 11995 |
| 15 | | 13120 |
| 15 | | 13123 |
| 15 | | 15556 |
| 15 | | 22842 |
| 15 | | 23604 |
| 15 | | 248691 |
| 15 | | 26634 |
| 15 | | 28068 |
| 15 | | 538780 |
| 15 | | 582049 |
| 15 | C | 27655 |
| 15 | D | 2458 |
| 15 | E | 2458 |
| 15 | E | 27655 |
| 15 | J | 27655 |
| 150 | | 11287 |
| 150 | | 11539 |
| 150 | | 13123 |
| 150 | | 17367 |
| 150 | | 6945 |
| 151 | | 11287 |
| 151 | | 11539 |
| 151 | | 13123 |
| 151 | | 17367 |
| 151 | | 6945 |
| 151 | | 734618 |
| 151 | | 854877 |
| 152 | | 11539 |
| 152 | | 13123 |
| 152 | | 17367 |
| 152 | | 854877 |

| Lot | Schedule | DP |
|---|---|---|
| 153 | | 11287 |
| 153 | | 11539 |
| 153 | | 13123 |
| 153 | | 17367 |
| 154 | | 11287 |
| 154 | | 11539 |
| 154 | | 13123 |
| 154 | | 17367 |
| 154 | | 8055 |
| 155 | | 11287 |
| 155 | | 11539 |
| 155 | | 13123 |
| 155 | | 17367 |
| 155 | | 8055 |
| 156 | | 11287 |
| 156 | | 11539 |
| 156 | | 13123 |
| 156 | | 17367 |
| 156 | | 8055 |
| 157 | | 11287 |
| 157 | | 11539 |
| 157 | | 13123 |
| 157 | | 8055 |
| 1572 | | 1043970 |
| 158 | | 11287 |
| 158 | | 11539 |
| 158 | | 13123 |
| 158 | | 17367 |
| 158 | | 8055 |
| 159 | | 11539 |
| 159 | | 13123 |
| 159 | | 17367 |
| 159 | | 8055 |
| 16 | | 11287 |
| 16 | | 11995 |

| Lot | Schedule | DP |
|---|---|---|
| 16 | | 13120 |
| 16 | | 13123 |
| 16 | | 15556 |
| 16 | | 22842 |
| 16 | | 23604 |
| 16 | | 248691 |
| 16 | | 26634 |
| 16 | | 573091 |
| 16 | | 582050 |
| 16 | C | 27655 |
| 16 | D | 2458 |
| 16 | E | 2458 |
| 16 | E | 27655 |
| 16 | F | 2458 |
| 16 | J | 27655 |
| 160 | | 11287 |
| 160 | | 11539 |
| 160 | | 13123 |
| 160 | | 17367 |
| 161 | | 11287 |
| 161 | | 11539 |
| 161 | | 13123 |
| 161 | | 17367 |
| 162 | | 11287 |
| 162 | | 11539 |
| 162 | | 13123 |
| 162 | | 17367 |
| 163 | | 11287 |
| 163 | | 11539 |
| 163 | | 13123 |
| 163 | | 17367 |
| 164 | | 11287 |
| 164 | | 11539 |
| 164 | | 13123 |
| 164 | | 17367 |

| Lot | Schedule | DP |
|---|---|---|
| 164 | | 8055 |
| 165 | | 11287 |
| 165 | | 11539 |
| 165 | | 13123 |
| 165 | | 17367 |
| 165 | | 8055 |
| 166 | | 11287 |
| 166 | | 13123 |
| 166 | | 17367 |
| 166 | | 8055 |
| 167 | | 11287 |
| 167 | | 13123 |
| 167 | | 8055 |
| 168 | | 11287 |
| 168 | | 13123 |
| 168 | | 15556 |
| 168 | | 8055 |
| 169 | | 8055 |
| 1691 | | 1110053 |
| 1692 | | 1110053 |
| 1693 | | 1110053 |
| 17 | | 11287 |
| 17 | | 11995 |
| 17 | | 13120 |
| 17 | | 13123 |
| 17 | | 15556 |
| 17 | | 22842 |
| 17 | | 23604 |
| 17 | | 248691 |
| 17 | | 26634 |
| 17 | | 28068 |
| 17 | | 573091 |
| 17 | | 582050 |
| 17 | C | 27655 |
| 17 | D | 2458 |

| Lot | Schedule | DP |
|---|---|---|
| 17 | E | 2458 |
| 17 | E | 27655 |
| 17 | F | 2458 |
| 17 | J | 27655 |
| 170 | | 8055 |
| 171 | | 8055 |
| 172 | | 11287 |
| 172 | | 8055 |
| 173 | | 11287 |
| 173 | | 15556 |
| 173 | | 8055 |
| 174 | | 11287 |
| 174 | | 8055 |
| 175 | | 11287 |
| 175 | | 8055 |
| 176 | | 11287 |
| 176 | | 15556 |
| 176 | | 8055 |
| 177 | | 11287 |
| 177 | | 8055 |
| 178 | | 11287 |
| 178 | | 8055 |
| 179 | | 11287 |
| 179 | | 15556 |
| 179 | | 8055 |
| 18 | | 11287 |
| 18 | | 11995 |
| 18 | | 13120 |
| 18 | | 13123 |
| 18 | | 15556 |
| 18 | | 22842 |
| 18 | | 23604 |
| 18 | | 248691 |
| 18 | | 26634 |
| 18 | | 28068 |

| Lot | Schedule | DP |
|---|---|---|
| 18 | | 527120 |
| 18 | | 582050 |
| 18 | C | 27655 |
| 18 | D | 2458 |
| 18 | E | 2458 |
| 18 | E | 27655 |
| 18 | F | 2458 |
| 18 | J | 27655 |
| 180 | | 11287 |
| 180 | | 8055 |
| 181 | | 11287 |
| 181 | | 8055 |
| 182 | | 11287 |
| 183 | | 11287 |
| 183 | | 8055 |
| 184 | | 11287 |
| 184 | | 8055 |
| 185 | | 11287 |
| 185 | | 15556 |
| 185 | | 8055 |
| 186 | | 11287 |
| 186 | | 15556 |
| 186 | | 8055 |
| 187 | | 11287 |
| 187 | | 15556 |
| 188 | | 11287 |
| 189 | | 11287 |
| 189 | | 8055 |
| 19 | | 11287 |
| 19 | | 11995 |
| 19 | | 13120 |
| 19 | | 13123 |
| 19 | | 15556 |
| 19 | | 22842 |
| 19 | | 23604 |

| Lot | Schedule | DP |
|---|---|---|
| 19 | | 248691 |
| 19 | | 26634 |
| 19 | | 582051 |
| 19 | C | 27655 |
| 19 | D | 2458 |
| 19 | E | 27655 |
| 19 | F | 2458 |
| 190 | | 11287 |
| 190 | | 8055 |
| 191 | | 1046133 |
| 191 | | 11287 |
| 191 | | 8055 |
| 191 | | 880592 |
| 192 | | 1046133 |
| 192 | | 11287 |
| 192 | | 8055 |
| 192 | | 880592 |
| 193 | | 11287 |
| 193 | | 8055 |
| 194 | | 11287 |
| 194 | | 8055 |
| 195 | | 11287 |
| 195 | | 8055 |
| 196 | | 11287 |
| 196 | | 8055 |
| 197 | | 11287 |
| 197 | | 8055 |
| 198 | | 11287 |
| 198 | | 8055 |
| 199 | | 11287 |
| 199 | | 8055 |
| 2 | | 1013763 |
| 2 | | 1018646 |
| 2 | | 1058010 |
| 2 | | 1074358 |

| Lot | Schedule | DP |
|---|---|---|
| 2 | | 1094699 |
| 2 | | 1107356 |
| 2 | | 11539 |
| 2 | | 13120 |
| 2 | | 13123 |
| 2 | | 15556 |
| 2 | | 16793 |
| 2 | | 17367 |
| 2 | | 17781 |
| 2 | | 18060 |
| 2 | | 204202 |
| 2 | | 204737 |
| 2 | | 22842 |
| 2 | | 23604 |
| 2 | | 251160 |
| 2 | | 25985 |
| 2 | | 262960 |
| 2 | | 26634 |
| 2 | | 270423 |
| 2 | | 28046 |
| 2 | | 28068 |
| 2 | | 285482 |
| 2 | | 311027 |
| 2 | | 375836 |
| 2 | | 500470 |
| 2 | | 505798 |
| 2 | | 512166 |
| 2 | | 533069 |
| 2 | | 542486 |
| 2 | | 548107 |
| 2 | | 548546 |
| 2 | | 551787 |
| 2 | | 561577 |
| 2 | | 567633 |
| 2 | | 568311 |

| Lot | Schedule | DP |
|---|---|---|
| 2 | | 568493 |
| 2 | | 579042 |
| 2 | | 583186 |
| 2 | | 585142 |
| 2 | | 597631 |
| 2 | | 614183 |
| 2 | | 621171 |
| 2 | | 629396 |
| 2 | | 632417 |
| 2 | | 634668 |
| 2 | | 704490 |
| 2 | | 746870 |
| 2 | | 778463 |
| 2 | | 803077 |
| 2 | | 806513 |
| 2 | | 807936 |
| 2 | | 810981 |
| 2 | | 814599 |
| 2 | | 861549 |
| 2 | | 870118 |
| 2 | C | 27655 |
| 2 | E | 27655 |
| 2 | F | 27655 |
| 2 | H | 2458 |
| 20 | | 1075811 |
| 20 | | 11995 |
| 20 | | 13120 |
| 20 | | 13123 |
| 20 | | 15556 |
| 20 | | 22842 |
| 20 | | 23604 |
| 20 | | 248691 |
| 20 | | 26634 |
| 20 | | 582051 |
| 20 | C | 27655 |

| Lot | Schedule | DP |
|---|---|---|
| 20 | D | 2458 |
| 20 | E | 27655 |
| 20 | F | 2458 |
| 200 | | 11287 |
| 200 | | 600959 |
| 200 | | 8055 |
| 200 | | 843074 |
| 201 | | 1093288 |
| 201 | | 700345 |
| 201 | | 8055 |
| 201 | | 843074 |
| 2011 | | 1052556 |
| 2012 | | 1052556 |
| 202 | | 1020262 |
| 202 | | 1093288 |
| 202 | | 11287 |
| 202 | | 700345 |
| 202 | | 8055 |
| 203 | | 1020262 |
| 203 | | 11287 |
| 203 | | 8055 |
| 204 | | 1017819 |
| 204 | | 11287 |
| 204 | | 8055 |
| 205 | | 1017819 |
| 205 | | 11287 |
| 205 | | 8055 |
| 206 | | 11287 |
| 206 | | 15556 |
| 2061 | | 1011261 |
| 2062 | | 1011261 |
| 207 | | 11287 |
| 207 | | 8055 |
| 208 | | 11287 |
| 208 | | 8055 |

| Lot | Schedule | DP |
|---|---|---|
| 209 | | 11287 |
| 209 | | 8055 |
| 21 | | 1029069 |
| 21 | | 1075811 |
| 21 | | 11995 |
| 21 | | 13120 |
| 21 | | 13123 |
| 21 | | 15556 |
| 21 | | 17367 |
| 21 | | 23604 |
| 21 | | 248691 |
| 21 | | 27749 |
| 21 | | 582052 |
| 21 | C | 27655 |
| 21 | D | 2458 |
| 21 | E | 27655 |
| 21 | F | 2458 |
| 21 | F | 27655 |
| 21 | J | 27655 |
| 210 | | 11287 |
| 210 | | 8055 |
| 211 | | 11287 |
| 211 | | 8055 |
| 212 | | 11287 |
| 212 | | 8055 |
| 213 | | 11287 |
| 214 | | 11287 |
| 215 | | 11287 |
| 215 | | 8055 |
| 216 | | 8055 |
| 2161 | | 580453 |
| 2162 | | 580453 |
| 2163 | | 580453 |
| 2164 | | 580453 |
| 2165 | | 580455 |

| Lot | Schedule | DP |
|---|---|---|
| 2166 | | 580455 |
| 2167 | | 580455 |
| 217 | | 11287 |
| 217 | | 8055 |
| 218 | | 11287 |
| 218 | | 8055 |
| 219 | | 11287 |
| 219 | | 8055 |
| 22 | | 1016699 |
| 22 | | 1029069 |
| 22 | | 13120 |
| 22 | | 13123 |
| 22 | | 15556 |
| 22 | | 23604 |
| 22 | | 248691 |
| 22 | | 27749 |
| 22 | | 582052 |
| 22 | C | 27655 |
| 22 | D | 2458 |
| 22 | E | 27655 |
| 22 | F | 2458 |
| 22 | F | 27655 |
| 220 | | 11287 |
| 220 | | 8055 |
| 221 | | 1066814 |
| 221 | | 11287 |
| 221 | | 8055 |
| 222 | | 1066814 |
| 222 | | 11287 |
| 222 | | 8055 |
| 222 | | 833454 |
| 223 | | 1004649 |
| 223 | | 11287 |
| 223 | | 8055 |
| 223 | | 833454 |

| Lot | Schedule | DP |
|---|---|---|
| 224 | | 1004649 |
| 224 | | 11287 |
| 224 | | 8055 |
| 225 | | 11287 |
| 225 | | 8055 |
| 226 | | 11287 |
| 226 | | 8055 |
| 227 | | 11287 |
| 227 | | 8055 |
| 228 | | 12507 |
| 228 | | 8055 |
| 229 | | 8055 |
| 2291 | | 554538 |
| 2292 | | 554538 |
| 23 | | 1016699 |
| 23 | | 11287 |
| 23 | | 13120 |
| 23 | | 13123 |
| 23 | | 15556 |
| 23 | | 23604 |
| 23 | | 248691 |
| 23 | | 26634 |
| 23 | | 27749 |
| 23 | | 582052 |
| 23 | C | 27655 |
| 23 | D | 2458 |
| 23 | E | 27655 |
| 23 | F | 2458 |
| 23 | F | 27655 |
| 230 | | 11287 |
| 230 | | 8055 |
| 231 | | 11287 |
| 231 | | 8055 |
| 232 | | 11287 |
| 232 | | 8055 |

| Lot | Schedule | DP |
|---|---|---|
| 233 | | 11287 |
| 233 | | 8055 |
| 234 | | 11287 |
| 234 | | 8055 |
| 235 | | 11287 |
| 235 | | 8055 |
| 236 | | 11287 |
| 236 | | 8055 |
| 237 | | 8055 |
| 2371 | | 1042396 |
| 2372 | | 1042396 |
| 238 | | 8055 |
| 2381 | | 574218 |
| 2382 | | 574218 |
| 239 | | 11287 |
| 239 | | 8055 |
| 24 | | 11287 |
| 24 | | 13120 |
| 24 | | 13123 |
| 24 | | 15556 |
| 24 | | 17367 |
| 24 | | 23604 |
| 24 | | 27749 |
| 24 | | 582052 |
| 24 | C | 27655 |
| 24 | D | 2458 |
| 24 | E | 27655 |
| 24 | F | 27655 |
| 240 | | 8055 |
| 241 | | 8055 |
| 242 | | 8055 |
| 243 | | 8055 |
| 244 | | 8055 |
| 245 | | 8055 |
| 246 | | 8055 |

| Lot | Schedule | DP |
|---|---|---|
| 247 | | 12507 |
| 247 | | 8055 |
| 248 | | 12507 |
| 248 | | 8055 |
| 249 | | 12507 |
| 249 | | 8055 |
| 25 | | 11287 |
| 25 | | 11995 |
| 25 | | 13120 |
| 25 | | 13123 |
| 25 | | 15556 |
| 25 | | 17367 |
| 25 | | 23604 |
| 25 | | 27749 |
| 25 | | 582053 |
| 25 | C | 27655 |
| 25 | D | 2458 |
| 25 | E | 27655 |
| 250 | | 12507 |
| 250 | | 8055 |
| 251 | | 8055 |
| 252 | | 8055 |
| 253 | | 8055 |
| 254 | | 8055 |
| 255 | | 8055 |
| 256 | | 8055 |
| 257 | | 12507 |
| 259 | | 8055 |
| 26 | | 11287 |
| 26 | | 11995 |
| 26 | | 13120 |
| 26 | | 13123 |
| 26 | | 15556 |
| 26 | | 23604 |
| 26 | | 27749 |

| Lot | Schedule | DP |
|---|---|---|
| 26 | | 582053 |
| 26 | C | 27655 |
| 26 | D | 2458 |
| 26 | E | 27655 |
| 26 | F | 27655 |
| 260 | | 8055 |
| 264 | | 11287 |
| 265 | | 11287 |
| 266 | | 11287 |
| 267 | | 11287 |
| 268 | | 11287 |
| 27 | | 11287 |
| 27 | | 11995 |
| 27 | | 13120 |
| 27 | | 13123 |
| 27 | | 15556 |
| 27 | | 23604 |
| 27 | | 27749 |
| 27 | | 582054 |
| 27 | C | 27655 |
| 27 | D | 2458 |
| 27 | F | 27655 |
| 271 | | 845831 |
| 272 | | 845831 |
| 274 | | 11287 |
| 274 | | 755207 |
| 275 | | 11287 |
| 276 | | 11287 |
| 277 | | 11287 |
| 278 | | 11287 |
| 279 | | 11287 |
| 28 | | 11287 |
| 28 | | 11995 |
| 28 | | 13120 |
| 28 | | 13123 |

| Lot | Schedule | DP |
|---|---|---|
| 28 | | 15556 |
| 28 | | 23604 |
| 28 | | 27749 |
| 28 | | 582054 |
| 28 | C | 27655 |
| 28 | D | 2458 |
| 28 | E | 27655 |
| 280 | | 11287 |
| 284 | | 11287 |
| 285 | | 11287 |
| 286 | | 11287 |
| 287 | | 11287 |
| 288 | | 11287 |
| 29 | | 11287 |
| 29 | | 11995 |
| 29 | | 13120 |
| 29 | | 13123 |
| 29 | | 15556 |
| 29 | | 23604 |
| 29 | | 27749 |
| 29 | | 548114 |
| 29 | | 582054 |
| 29 | C | 27655 |
| 29 | D | 2458 |
| 29 | E | 27655 |
| 29 | F | 2458 |
| 3 | | 1018646 |
| 3 | | 1074358 |
| 3 | | 1079794 |
| 3 | | 11539 |
| 3 | | 11995 |
| 3 | | 13120 |
| 3 | | 13123 |
| 3 | | 15556 |
| 3 | | 16793 |

| Lot | Schedule | DP |
|---|---|---|
| 3 | | 17781 |
| 3 | | 18060 |
| 3 | | 204737 |
| 3 | | 22842 |
| 3 | | 23604 |
| 3 | | 250973 |
| 3 | | 251160 |
| 3 | | 25985 |
| 3 | | 262960 |
| 3 | | 26549 |
| 3 | | 26634 |
| 3 | | 270423 |
| 3 | | 28046 |
| 3 | | 28068 |
| 3 | | 285482 |
| 3 | | 315830 |
| 3 | | 375836 |
| 3 | | 533069 |
| 3 | | 548107 |
| 3 | | 548546 |
| 3 | | 561577 |
| 3 | | 568311 |
| 3 | | 579042 |
| 3 | | 621171 |
| 3 | | 627231 |
| 3 | | 629396 |
| 3 | | 778463 |
| 3 | | 803077 |
| 3 | | 814599 |
| 3 | | 861549 |
| 3 | | 981104 |
| 3 | C | 27655 |
| 3 | E | 27655 |
| 3 | F | 27655 |
| 3 | H | 2458 |

| Lot | Schedule | DP |
|---|---|---|
| 30 | | 11287 |
| 30 | | 11995 |
| 30 | | 13120 |
| 30 | | 13123 |
| 30 | | 15556 |
| 30 | | 23604 |
| 30 | | 27749 |
| 30 | | 548114 |
| 30 | | 582055 |
| 30 | C | 27655 |
| 30 | D | 2458 |
| 30 | E | 27655 |
| 30 | F | 2458 |
| 302 | | 11287 |
| 303 | | 11287 |
| 304 | | 11287 |
| 305 | | 11287 |
| 306 | | 11287 |
| 307 | | 11287 |
| 308 | | 11287 |
| 309 | | 658235 |
| 31 | | 1083788 |
| 31 | | 11287 |
| 31 | | 11995 |
| 31 | | 13120 |
| 31 | | 13123 |
| 31 | | 15556 |
| 31 | | 23604 |
| 31 | | 27749 |
| 31 | | 548114 |
| 31 | | 582055 |
| 31 | C | 27655 |
| 31 | D | 2458 |
| 31 | E | 27655 |
| 31 | F | 2458 |

| Lot | Schedule | DP |
|---|---|---|
| 313 | | 11287 |
| 314 | | 11287 |
| 315 | | 11287 |
| 316 | | 11287 |
| 316 | | 755242 |
| 317 | | 11287 |
| 318 | | 11287 |
| 319 | | 11287 |
| 32 | | 1083788 |
| 32 | | 11287 |
| 32 | | 11995 |
| 32 | | 13120 |
| 32 | | 13123 |
| 32 | | 15556 |
| 32 | | 23604 |
| 32 | | 524726 |
| 32 | | 582055 |
| 32 | C | 27655 |
| 32 | D | 2458 |
| 32 | E | 27655 |
| 32 | F | 2458 |
| 320 | | 11287 |
| 321 | | 11287 |
| 322 | | 11287 |
| 323 | | 11287 |
| 324 | | 11287 |
| 325 | | 11287 |
| 326 | | 11287 |
| 327 | | 11287 |
| 328 | | 11287 |
| 33 | | 11287 |
| 33 | | 11995 |
| 33 | | 13120 |
| 33 | | 13123 |
| 33 | | 15556 |

| Lot | Schedule | DP |
|---|---|---|
| 33 | | 23604 |
| 33 | | 524726 |
| 33 | | 582056 |
| 33 | C | 27655 |
| 33 | D | 2458 |
| 33 | F | 2458 |
| 330 | | 710063 |
| 34 | | 11287 |
| 34 | | 11539 |
| 34 | | 11995 |
| 34 | | 13120 |
| 34 | | 13123 |
| 34 | | 15556 |
| 34 | | 23604 |
| 34 | | 27749 |
| 34 | | 582056 |
| 34 | D | 2458 |
| 34 | F | 2458 |
| 340 | | 11287 |
| 341 | | 11287 |
| 341 | | 556246 |
| 342 | | 11287 |
| 342 | | 556246 |
| 343 | | 11287 |
| 343 | | 556246 |
| 344 | | 11287 |
| 345 | | 11287 |
| 346 | | 11287 |
| 347 | | 11287 |
| 348 | | 11287 |
| 349 | | 11287 |
| 35 | | 11287 |
| 35 | | 11539 |
| 35 | | 11995 |
| 35 | | 13120 |

| Lot | Schedule | DP |
|---|---|---|
| 35 | | 13123 |
| 35 | | 17367 |
| 35 | | 27749 |
| 35 | | 582056 |
| 35 | C | 27655 |
| 35 | D | 2458 |
| 35 | F | 2458 |
| 350 | | 11287 |
| 351 | | 11287 |
| 351 | | 840188 |
| 352 | | 11287 |
| 352 | | 840188 |
| 353 | | 11287 |
| 3530 | | 555858 |
| 3531 | | 555858 |
| 354 | | 11287 |
| 355 | | 11287 |
| 356 | | 11287 |
| 357 | | 11287 |
| 358 | | 11287 |
| 359 | | 11287 |
| 36 | | 11287 |
| 36 | | 11995 |
| 36 | | 13120 |
| 36 | | 13123 |
| 36 | | 15556 |
| 36 | | 17367 |
| 36 | | 27749 |
| 36 | | 582056 |
| 36 | C | 27655 |
| 36 | D | 2458 |
| 36 | F | 2458 |
| 360 | | 11287 |
| 361 | | 11287 |
| 363 | | 11287 |

| Lot | Schedule | DP |
|---|---|---|
| 364 | | 11287 |
| 365 | | 11287 |
| 365 | | 46746 |
| 366 | | 11287 |
| 3671 | | 874598 |
| 3672 | | 874598 |
| 37 | | 11287 |
| 37 | | 11539 |
| 37 | | 11995 |
| 37 | | 13120 |
| 37 | | 13123 |
| 37 | | 15556 |
| 37 | | 17367 |
| 37 | | 27749 |
| 37 | | 582057 |
| 37 | C | 27655 |
| 37 | D | 2458 |
| 370 | | 11287 |
| 371 | | 11287 |
| 372 | | 11287 |
| 373 | | 11287 |
| 374 | | 11287 |
| 374 | | 727253 |
| 375 | | 11287 |
| 376 | | 11287 |
| 376 | | 727253 |
| 377 | | 11287 |
| 378 | | 11287 |
| 379 | | 11287 |
| 38 | | 11287 |
| 38 | | 11539 |
| 38 | | 11995 |
| 38 | | 13120 |
| 38 | | 13123 |
| 38 | | 15556 |

| Lot | Schedule | DP |
|---|---|---|
| 38 | | 17367 |
| 38 | | 27749 |
| 38 | | 582057 |
| 38 | C | 27655 |
| 38 | D | 2458 |
| 380 | | 11287 |
| 380 | | 755242 |
| 3810 | | 1049904 |
| 3811 | | 1049904 |
| 3812 | | 1049904 |
| 383 | | 755242 |
| 385 | | 755242 |
| 386 | | 727264 |
| 386 | | 755242 |
| 387 | | 755242 |
| 388 | | 727264 |
| 388 | | 755242 |
| 389 | | 755242 |
| 39 | | 11287 |
| 39 | | 11539 |
| 39 | | 11995 |
| 39 | | 13120 |
| 39 | | 13123 |
| 39 | | 15556 |
| 39 | | 17367 |
| 39 | | 27749 |
| 39 | | 582057 |
| 39 | C | 27655 |
| 39 | D | 2458 |
| 390 | | 755242 |
| 391 | | 729419 |
| 391 | | 755242 |
| 392 | | 755242 |
| 393 | | 755242 |
| 394 | | 11287 |

| Lot | Schedule | DP |
|---|---|---|
| 394 | | 755242 |
| 395 | | 755242 |
| 396 | | 755242 |
| 397 | | 755242 |
| 398 | | 755242 |
| 399 | | 755242 |
| 4 | | 1018646 |
| 4 | | 1063845 |
| 4 | | 1074358 |
| 4 | | 11539 |
| 4 | | 11995 |
| 4 | | 13120 |
| 4 | | 13123 |
| 4 | | 15556 |
| 4 | | 16793 |
| 4 | | 17367 |
| 4 | | 17781 |
| 4 | | 18060 |
| 4 | | 23604 |
| 4 | | 248691 |
| 4 | | 250973 |
| 4 | | 251160 |
| 4 | | 25985 |
| 4 | | 262960 |
| 4 | | 26634 |
| 4 | | 270423 |
| 4 | | 28046 |
| 4 | | 28068 |
| 4 | | 548107 |
| 4 | | 568311 |
| 4 | | 778463 |
| 4 | | 981106 |
| 4 | C | 27655 |
| 4 | E | 27655 |
| 4 | F | 27655 |

| Lot | Schedule | DP |
|---|---|---|
| 4 | G | 2458 |
| 4 | H | 2458 |
| 40 | | 1102122 |
| 40 | | 11287 |
| 40 | | 11539 |
| 40 | | 11995 |
| 40 | | 13120 |
| 40 | | 13123 |
| 40 | | 15556 |
| 40 | | 17367 |
| 40 | | 27749 |
| 40 | | 582057 |
| 40 | C | 27655 |
| 40 | D | 2458 |
| 402 | | 48820 |
| 409 | | 11287 |
| 41 | | 1073017 |
| 41 | | 11287 |
| 41 | | 11995 |
| 41 | | 13120 |
| 41 | | 13123 |
| 41 | | 15556 |
| 41 | | 17367 |
| 41 | | 27749 |
| 41 | | 539413 |
| 41 | | 559640 |
| 41 | | 582058 |
| 41 | | 872109 |
| 41 | C | 27655 |
| 41 | D | 2458 |
| 410 | | 11287 |
| 411 | | 11287 |
| 412 | | 11287 |
| 413 | | 11287 |
| 413 | | 755242 |

| Lot | Schedule | DP |
|---|---|---|
| 414 | | 11287 |
| 414 | | 755242 |
| 415 | | 755242 |
| 416 | | 755242 |
| 417 | | 755242 |
| 418 | | 755242 |
| 419 | | 755242 |
| 42 | | 1073017 |
| 42 | | 11287 |
| 42 | | 11995 |
| 42 | | 13120 |
| 42 | | 13123 |
| 42 | | 15556 |
| 42 | | 17367 |
| 42 | | 27749 |
| 42 | | 539413 |
| 42 | | 582058 |
| 42 | | 872109 |
| 42 | C | 27655 |
| 42 | D | 2458 |
| 420 | | 755242 |
| 421 | | 755242 |
| 423 | | 755242 |
| 424 | | 755242 |
| 43 | | 1073017 |
| 43 | | 11287 |
| 43 | | 11995 |
| 43 | | 13120 |
| 43 | | 13123 |
| 43 | | 15556 |
| 43 | | 17367 |
| 43 | | 27749 |
| 43 | | 539413 |
| 43 | | 582058 |
| 43 | C | 27655 |

| Lot | Schedule | DP |
|---|---|---|
| 43 | D | 2458 |
| 430 | | 12507 |
| 437 | | 12507 |
| 439 | | 755242 |
| 44 | | 11287 |
| 44 | | 11995 |
| 44 | | 13120 |
| 44 | | 13123 |
| 44 | | 15556 |
| 44 | | 17367 |
| 44 | | 27749 |
| 44 | | 548118 |
| 44 | | 582058 |
| 44 | | 862349 |
| 44 | C | 27655 |
| 44 | D | 2458 |
| 45 | | 1109834 |
| 45 | | 11287 |
| 45 | | 11995 |
| 45 | | 13120 |
| 45 | | 13123 |
| 45 | | 15556 |
| 45 | | 654334 |
| 45 | C | 27655 |
| 45 | D | 2458 |
| 450 | | 818534 |
| 46 | | 11287 |
| 46 | | 11995 |
| 46 | | 13120 |
| 46 | | 13123 |
| 46 | | 15556 |
| 46 | | 27749 |
| 46 | | 654032 |
| 46 | | 859972 |
| 46 | C | 27655 |

| Lot | Schedule | DP |
|---|---|---|
| 466 | | 1138964 |
| 469 | | 1138964 |
| 47 | | 11287 |
| 47 | | 11995 |
| 47 | | 13120 |
| 47 | | 13123 |
| 47 | | 15556 |
| 47 | | 17367 |
| 47 | | 27749 |
| 47 | | 755207 |
| 47 | | 859972 |
| 471 | | 1138964 |
| 472 | | 1138964 |
| 48 | | 11287 |
| 48 | | 11995 |
| 48 | | 13120 |
| 48 | | 13123 |
| 48 | | 15556 |
| 48 | | 17367 |
| 48 | | 27749 |
| 48 | C | 27655 |
| 49 | | 11287 |
| 49 | | 11995 |
| 49 | | 13120 |
| 49 | | 13123 |
| 49 | | 15556 |
| 49 | | 17367 |
| 49 | | 27749 |
| 49 | C | 27655 |
| 5 | | 1018646 |
| 5 | | 1063845 |
| 5 | | 1074358 |
| 5 | | 11287 |
| 5 | | 11539 |
| 5 | | 11995 |

| Lot | Schedule | DP |
|---|---|---|
| 5 | | 13120 |
| 5 | | 13123 |
| 5 | | 15556 |
| 5 | | 16793 |
| 5 | | 17367 |
| 5 | | 17781 |
| 5 | | 18060 |
| 5 | | 22842 |
| 5 | | 23604 |
| 5 | | 248691 |
| 5 | | 250973 |
| 5 | | 251160 |
| 5 | | 25985 |
| 5 | | 262960 |
| 5 | | 26634 |
| 5 | | 270423 |
| 5 | | 28046 |
| 5 | | 285482 |
| 5 | | 519261 |
| 5 | | 582046 |
| 5 | | 778463 |
| 5 | | 981103 |
| 5 | C | 27655 |
| 5 | E | 2458 |
| 5 | E | 27655 |
| 5 | F | 27655 |
| 50 | | 11287 |
| 50 | | 11995 |
| 50 | | 13120 |
| 50 | | 13123 |
| 50 | | 15556 |
| 50 | | 17367 |
| 50 | | 27749 |
| 50 | C | 27655 |
| 500 | | 755242 |

| Lot | Schedule | DP |
|---|---|---|
| 51 | | 11287 |
| 51 | | 11995 |
| 51 | | 13120 |
| 51 | | 13123 |
| 51 | | 15556 |
| 51 | | 17367 |
| 51 | | 27749 |
| 51 | | 785435 |
| 51 | | 792987 |
| 51 | C | 27655 |
| 517 | | 12507 |
| 518 | | 12507 |
| 519 | | 12507 |
| 52 | | 11287 |
| 52 | | 11995 |
| 52 | | 13120 |
| 52 | | 15556 |
| 52 | | 17367 |
| 52 | | 27749 |
| 52 | | 785435 |
| 52 | | 792987 |
| 52 | C | 27655 |
| 520 | | 12507 |
| 521 | | 1054794 |
| 521 | | 12507 |
| 521 | | 543408 |
| 522 | | 1054794 |
| 522 | | 12507 |
| 522 | | 543408 |
| 523 | | 12507 |
| 524 | | 12507 |
| 525 | | 12507 |
| 526 | | 12507 |
| 527 | | 12507 |
| 528 | | 12507 |

| Lot | Schedule | DP |
|---|---|---|
| 529 | | 12507 |
| 53 | | 11287 |
| 53 | | 11995 |
| 53 | | 13120 |
| 53 | | 15556 |
| 53 | | 17367 |
| 53 | | 27749 |
| 53 | | 755207 |
| 53 | | 785435 |
| 53 | C | 27655 |
| 530 | | 12507 |
| 531 | | 12507 |
| 532 | | 12507 |
| 533 | | 12507 |
| 534 | | 12507 |
| 536 | | 12507 |
| 537 | | 12507 |
| 538 | | 12507 |
| 539 | | 12507 |
| 54 | | 11287 |
| 54 | | 11995 |
| 54 | | 13120 |
| 54 | | 13123 |
| 54 | | 15556 |
| 54 | | 17367 |
| 54 | | 27749 |
| 54 | | 785435 |
| 54 | C | 27655 |
| 540 | | 12507 |
| 541 | | 12507 |
| 542 | | 12507 |
| 543 | | 12507 |
| 544 | | 12507 |
| 545 | | 12507 |
| 55 | | 11287 |

| Lot | Schedule | DP |
|---|---|---|
| 55 | | 11995 |
| 55 | | 13120 |
| 55 | | 13123 |
| 55 | | 15556 |
| 55 | | 17367 |
| 55 | | 27749 |
| 55 | | 785435 |
| 55 | C | 27655 |
| 557 | | 12507 |
| 56 | | 11287 |
| 56 | | 11995 |
| 56 | | 13120 |
| 56 | | 13123 |
| 56 | | 15556 |
| 56 | | 17367 |
| 56 | | 27749 |
| 56 | C | 27655 |
| 57 | | 11287 |
| 57 | | 11995 |
| 57 | | 13120 |
| 57 | | 15556 |
| 57 | | 17367 |
| 57 | | 27749 |
| 58 | | 11287 |
| 58 | | 11995 |
| 58 | | 13120 |
| 58 | | 15556 |
| 58 | | 17367 |
| 58 | | 27749 |
| 582 | | 12507 |
| 583 | | 12507 |
| 584 | | 12507 |
| 585 | | 12507 |
| 586 | | 12507 |
| 587 | | 12507 |

| Lot | Schedule | DP |
|---|---|---|
| 588 | | 12507 |
| 589 | | 12507 |
| 59 | | 11287 |
| 59 | | 11995 |
| 59 | | 13120 |
| 59 | | 15556 |
| 59 | | 17367 |
| 59 | | 27749 |
| 590 | | 12507 |
| 591 | | 12507 |
| 592 | | 12507 |
| 593 | | 12507 |
| 594 | | 12507 |
| 595 | | 12507 |
| 596 | | 12507 |
| 597 | | 12507 |
| 598 | | 12507 |
| 599 | | 12507 |
| 6 | | 1018646 |
| 6 | | 11287 |
| 6 | | 11539 |
| 6 | | 11995 |
| 6 | | 13120 |
| 6 | | 13123 |
| 6 | | 15556 |
| 6 | | 16793 |
| 6 | | 17367 |
| 6 | | 17781 |
| 6 | | 18060 |
| 6 | | 22842 |
| 6 | | 248691 |
| 6 | | 251160 |
| 6 | | 25985 |
| 6 | | 26549 |
| 6 | | 26634 |

| Lot | Schedule | DP |
|---|---|---|
| 6 | | 270423 |
| 6 | | 28046 |
| 6 | | 285482 |
| 6 | | 519261 |
| 6 | | 582047 |
| 6 | C | 27655 |
| 6 | E | 2458 |
| 6 | E | 27655 |
| 6 | F | 27655 |
| 60 | | 1074161 |
| 60 | | 11287 |
| 60 | | 11995 |
| 60 | | 13120 |
| 60 | | 15556 |
| 60 | | 17367 |
| 60 | | 27749 |
| 600 | | 12507 |
| 601 | | 12507 |
| 602 | | 12507 |
| 603 | | 12507 |
| 604 | | 12507 |
| 605 | | 12507 |
| 606 | | 12507 |
| 607 | | 12507 |
| 6081 | | 806879 |
| 6082 | | 806879 |
| 609 | | 12507 |
| 61 | | 1074161 |
| 61 | | 11995 |
| 61 | | 15556 |
| 61 | | 17367 |
| 61 | | 27749 |
| 610 | | 12507 |
| 611 | | 12507 |
| 611 | | 816224 |

| Lot | Schedule | DP |
|---|---|---|
| 612 | | 12507 |
| 612 | | 816224 |
| 613 | | 12507 |
| 613 | | 816224 |
| 614 | | 12507 |
| 615 | | 12507 |
| 6161 | | 870274 |
| 6162 | | 870274 |
| 617 | | 12507 |
| 617 | | 821603 |
| 618 | | 12507 |
| 619 | | 12507 |
| 62 | | 1074161 |
| 62 | | 11995 |
| 62 | | 15556 |
| 62 | | 17367 |
| 62 | | 27749 |
| 620 | | 12507 |
| 621 | | 12507 |
| 6221 | | 819628 |
| 6222 | | 819628 |
| 6231 | | 806876 |
| 6232 | | 806876 |
| 624 | | 12507 |
| 6271 | | 792607 |
| 6272 | | 792607 |
| 6273 | | 792607 |
| 628 | | 12507 |
| 629 | | 12507 |
| 63 | | 1074161 |
| 63 | | 11995 |
| 63 | | 13123 |
| 63 | | 17367 |
| 63 | | 27749 |
| 630 | | 12507 |

| Lot | Schedule | DP |
|---|---|---|
| 631 | | 12507 |
| 631 | | 872639 |
| 632 | | 12507 |
| 632 | | 872639 |
| 633 | | 12507 |
| 634 | | 12507 |
| 64 | | 11995 |
| 64 | | 13123 |
| 64 | | 15556 |
| 64 | | 17367 |
| 64 | | 27749 |
| 65 | | 11995 |
| 65 | | 13123 |
| 65 | | 15556 |
| 65 | | 17367 |
| 65 | | 27749 |
| 66 | | 11539 |
| 66 | | 11995 |
| 66 | | 13123 |
| 66 | | 15556 |
| 66 | | 17367 |
| 66 | | 27749 |
| 661 | | 12507 |
| 662 | | 12507 |
| 663 | | 12507 |
| 664 | | 12507 |
| 665 | | 12507 |
| 666 | | 12507 |
| 667 | | 12507 |
| 668 | | 12507 |
| 669 | | 12507 |
| 67 | | 11539 |
| 67 | | 11995 |
| 67 | | 13123 |
| 67 | | 15556 |

| Lot | Schedule | DP |
|---|---|---|
| 67 | | 17367 |
| 67 | | 27749 |
| 670 | | 12507 |
| 671 | | 12507 |
| 672 | | 12507 |
| 673 | | 12507 |
| 674 | | 12507 |
| 675 | | 12507 |
| 677 | | 12507 |
| 678 | | 12507 |
| 679 | | 12507 |
| 68 | | 11539 |
| 68 | | 11995 |
| 68 | | 12507 |
| 68 | | 13123 |
| 68 | | 15556 |
| 68 | | 17367 |
| 68 | | 27749 |
| 680 | | 12507 |
| 681 | | 12507 |
| 682 | | 12507 |
| 683 | | 12507 |
| 684 | | 12507 |
| 685 | | 12507 |
| 686 | | 12507 |
| 687 | | 12507 |
| 688 | | 12507 |
| 689 | | 12507 |
| 69 | | 11539 |
| 69 | | 11995 |
| 69 | | 12507 |
| 69 | | 13123 |
| 69 | | 15556 |
| 69 | | 17367 |
| 69 | | 27749 |

| Lot | Schedule | DP |
|---|---|---|
| 690 | | 12507 |
| 691 | | 12507 |
| 692 | | 12507 |
| 693 | | 12507 |
| 694 | | 12507 |
| 695 | | 12507 |
| 696 | | 12507 |
| 697 | | 12507 |
| 698 | | 12507 |
| 699 | | 12507 |
| 7 | | 11287 |
| 7 | | 11995 |
| 7 | | 13120 |
| 7 | | 13123 |
| 7 | | 15556 |
| 7 | | 16793 |
| 7 | | 17367 |
| 7 | | 17781 |
| 7 | | 18060 |
| 7 | | 22842 |
| 7 | | 248691 |
| 7 | | 26634 |
| 7 | | 28046 |
| 7 | | 285482 |
| 7 | | 524374 |
| 7 | | 582047 |
| 7 | A | 2458 |
| 7 | C | 27655 |
| 7 | D | 2458 |
| 7 | E | 2458 |
| 7 | E | 27655 |
| 7 | F | 27655 |
| 70 | | 11539 |
| 70 | | 12507 |
| 70 | | 13123 |

| Lot | Schedule | DP |
|---|---|---|
| 70 | | 15556 |
| 70 | | 17367 |
| 70 | | 27749 |
| 700 | | 12507 |
| 7001 | | 1077055 |
| 7005 | | 1066246 |
| 701 | | 12507 |
| 7015 | | 1119454 |
| 7016 | | 1021267 |
| 7021 | | 584905 |
| 7022 | | 584905 |
| 703 | | 12507 |
| 7033 | | 1021485 |
| 7074 | | 1029683 |
| 71 | | 11539 |
| 71 | | 11995 |
| 71 | | 12507 |
| 71 | | 13123 |
| 71 | | 15556 |
| 71 | | 17367 |
| 71 | | 568495 |
| 71 | | 618457 |
| 72 | | 11539 |
| 72 | | 11995 |
| 72 | | 13123 |
| 72 | | 15556 |
| 72 | | 17367 |
| 72 | | 568495 |
| 721 | | 537942 |
| 721 | | 737050 |
| 722 | | 537942 |
| 722 | | 737050 |
| 729 | | 12507 |
| 73 | | 11539 |
| 73 | | 11995 |

| Lot | Schedule | DP |
|---|---|---|
| 73 | | 13123 |
| 73 | | 15556 |
| 73 | | 17367 |
| 73 | | 568495 |
| 730 | | 12507 |
| 730 | | 836821 |
| 731 | | 836821 |
| 74 | | 11539 |
| 74 | | 11995 |
| 74 | | 13123 |
| 74 | | 15556 |
| 74 | | 17367 |
| 746 | | 12507 |
| 747 | | 12507 |
| 748 | | 12507 |
| 749 | | 12507 |
| 75 | | 11995 |
| 75 | | 12507 |
| 75 | | 13123 |
| 75 | | 15556 |
| 75 | | 17367 |
| 750 | | 12507 |
| 751 | | 1099436 |
| 751 | | 12507 |
| 752 | | 1099436 |
| 752 | | 12507 |
| 753 | | 1099436 |
| 753 | | 12507 |
| 754 | | 12507 |
| 755 | | 12507 |
| 756 | | 12507 |
| 757 | | 12507 |
| 758 | | 12507 |
| 76 | | 11995 |
| 76 | | 12507 |

| Lot | Schedule | DP |
|---|---|---|
| 76 | | 13123 |
| 76 | | 15556 |
| 76 | | 17367 |
| 76 | | 8055 |
| 760 | | 12507 |
| 77 | | 11995 |
| 77 | | 13123 |
| 77 | | 15556 |
| 77 | | 17367 |
| 771 | | 619779 |
| 772 | | 619779 |
| 773 | | 619779 |
| 78 | | 11995 |
| 78 | | 13123 |
| 78 | | 17367 |
| 78 | | 8055 |
| 781 | | 1060935 |
| 782 | | 1060935 |
| 79 | | 11287 |
| 79 | | 11995 |
| 79 | | 13123 |
| 79 | | 15556 |
| 79 | | 17367 |
| 8 | | 11287 |
| 8 | | 11995 |
| 8 | | 13120 |
| 8 | | 13123 |
| 8 | | 15556 |
| 8 | | 16793 |
| 8 | | 17367 |
| 8 | | 17781 |
| 8 | | 22842 |
| 8 | | 248691 |
| 8 | | 26634 |
| 8 | | 28046 |

| Lot | Schedule | DP |
|---|---|---|
| 8 | | 524374 |
| 8 | | 582048 |
| 8 | | 931022 |
| 8 | C | 27655 |
| 8 | D | 2458 |
| 8 | E | 2458 |
| 8 | E | 27655 |
| 8 | F | 27655 |
| 80 | | 11287 |
| 80 | | 11995 |
| 80 | | 13123 |
| 80 | | 17367 |
| 801 | | 1038413 |
| 802 | | 1038413 |
| 81 | | 11287 |
| 81 | | 11995 |
| 81 | | 13123 |
| 81 | | 17367 |
| 81 | | 620426 |
| 81 | | 8055 |
| 811 | | 816616 |
| 812 | | 816616 |
| 82 | | 11995 |
| 82 | | 13123 |
| 82 | | 17367 |
| 82 | | 620426 |
| 82 | | 740968 |
| 821 | | 588493 |
| 822 | | 588493 |
| 83 | | 11287 |
| 83 | | 11995 |
| 83 | | 13123 |
| 83 | | 17367 |
| 83 | | 620426 |
| 831 | | 598304 |

| Lot | Schedule | DP |
|---|---|---|
| 832 | | 598304 |
| 833 | | 598304 |
| 84 | | 11287 |
| 84 | | 11995 |
| 84 | | 13123 |
| 84 | | 17367 |
| 841 | | 810843 |
| 842 | | 810843 |
| 843 | | 810843 |
| 844 | | 810843 |
| 845 | | 810843 |
| 846 | | 810843 |
| 847 | | 810843 |
| 848 | | 810843 |
| 849 | | 810843 |
| 85 | | 11287 |
| 85 | | 11995 |
| 85 | | 13123 |
| 85 | | 17367 |
| 850 | | 810843 |
| 851 | | 810843 |
| 86 | | 11287 |
| 86 | | 11995 |
| 86 | | 13123 |
| 86 | | 15556 |
| 86 | | 17367 |
| 861 | | 557889 |
| 862 | | 557889 |
| 87 | | 11287 |
| 87 | | 11995 |
| 87 | | 13123 |
| 87 | | 17367 |
| 87 | | 8055 |
| 871 | | 733417 |
| 872 | | 733417 |

| Lot | Schedule | DP |
|---|---|---|
| 873 | | 733417 |
| 88 | | 11287 |
| 88 | | 11995 |
| 88 | | 13123 |
| 88 | | 15556 |
| 88 | | 17367 |
| 88 | | 8055 |
| 89 | | 11287 |
| 89 | | 11995 |
| 89 | | 13123 |
| 89 | | 17367 |
| 89 | | 8055 |
| 9 | | 11287 |
| 9 | | 11995 |
| 9 | | 13120 |
| 9 | | 13123 |
| 9 | | 15556 |
| 9 | | 16793 |
| 9 | | 17367 |
| 9 | | 17781 |
| 9 | | 22842 |
| 9 | | 248691 |
| 9 | | 26634 |
| 9 | | 28046 |
| 9 | | 28068 |
| 9 | | 582048 |
| 9 | C | 27655 |
| 9 | D | 2458 |
| 9 | E | 2458 |
| 9 | E | 27655 |
| 9 | F | 27655 |
| 90 | | 11287 |
| 90 | | 11995 |
| 90 | | 13123 |
| 90 | | 17367 |

| Lot | Schedule | DP |
|---|---|---|
| 90 | | 8055 |
| 91 | | 11287 |
| 91 | | 11995 |
| 91 | | 13123 |
| 91 | | 17367 |
| 91 | | 800646 |
| 91 | | 8055 |
| 91 | | 880881 |
| 911 | | 747550 |
| 912 | | 747550 |
| 92 | | 11287 |
| 92 | | 11995 |
| 92 | | 13123 |
| 92 | | 17367 |
| 92 | | 800646 |
| 92 | | 8055 |
| 93 | | 11287 |
| 93 | | 11995 |
| 93 | | 13123 |
| 93 | | 17367 |
| 93 | | 8055 |
| 94 | | 11287 |
| 94 | | 11995 |
| 94 | | 13123 |
| 94 | | 17367 |
| 94 | | 8055 |
| 95 | | 11287 |
| 95 | | 11995 |
| 95 | | 13123 |
| 95 | | 17367 |
| 95 | | 8055 |
| 96 | | 11287 |
| 96 | | 11995 |
| 96 | | 13123 |
| 96 | | 17367 |

| Lot | Schedule | DP |
|---|---|---|
| 96 | | 8055 |
| 97 | | 11287 |
| 97 | | 11995 |
| 97 | | 13123 |
| 97 | | 17367 |
| 97 | | 8055 |
| 98 | | 11287 |
| 98 | | 11995 |
| 98 | | 13123 |
| 98 | | 15556 |
| 98 | | 17367 |
| 98 | | 8055 |
| 99 | | 11995 |
| 99 | | 13123 |
| 99 | | 15556 |
| 99 | | 17367 |
| 99 | | 8055 |
| A | | 336081 |
| A | | 340249 |
| A | | 365476 |
| A | | 367461 |
| A | | 380066 |
| A | | 391075 |
| B | | 25385 |
| B | | 327578 |
| B | | 336081 |
| B | | 340249 |
| B | | 365476 |
| B | | 367461 |
| B | | 380066 |
| B | | 391075 |
| B | | 395654 |
| C | | 25385 |
| C | | 327578 |
| C | | 365476 |

| Lot | Schedule | DP |
|---|---|---|
| CL | | U. |
| D | | 25385 |
| D | | 356160 |
| E | | 25385 |