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Coal & Allied Industries Limited

Report for Lower Hunter Lands
Project

Minmi Link Road and
Stockrington: Water Sensitive
Urban Design, Flooding and
Stormwater Management

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1. Introduction

1.1 Background

It is proposed that the entire Coal & Allied Industries Limited (Coal & Allied) owned Minmi/Link Road and Stockrington sites be rezoned/listed as a 'State Significant Site' (SSS) in Schedule 3 of State Environmental Planning Policy (Major Development). A draft Schedule 3 listing will be prepared with the Concept Plan Application.

The Concept Plan for a residential subdivision of the Minmi/Link Road site will apply to the entire 520ha Minmi/Link Road and the transfer of the 1544ha of the Stockrington site and 17ha of the minmi site as conservation land. The key parameters for the proposed development of the site are as follows:

- » Dedication of 1561ha of conservation land to the New South Wales Government (NSWG) that is identified in the Lower Hunter Regional Strategy and Lower Hunter Regional Conservation Plan, comprising 1544ha of the Stockrington site and 17ha of the minmi Link Rd site,;
- » Maximum dwelling yield of 3,300 dwellings over 520ha.
- » Indicative development staging. The number of lots and extent of staging for release areas will be largely dictated by the service infrastructure requirements as well as responding to market forces.
- » The provision of associated infrastructure.
- » Torrens title subdivision of the Minmi/Link Road site. .

Approval will not be sought under the Concept Plan for a specific lot or road layout. An indicative lot layout will indicate how the maximum dwelling yield of 3,300 dwellings could be achieved on the site.

Similarly, approval will not be sought under the Concept Plan for subdivision or construction of individual houses. However, the desired future character of the proposed concept plan will be included in Urban Design Guidelines. Urban Design Guidelines will be prepared to inform the Concept Plan in respect of urban form, built form, open space and landscape, access and movement and visual impact for the site.

It is proposed to dedicate land for conservation purposes as part of the Major Project Application via a Voluntary Planning Agreement (VPA) between Coal & Allied and the NSWG in accordance with s.93F of the Environmental Planning & Assessment Act, 1979 (EP&A Act).

This report supports the Concept Plan application, addressing Water Sensitive Urban Design, Flooding and Stormwater Management for the proposed site, shown in the Concept Plan in Appendix A.

1.2 Water Sensitive Urban Design (WSUD)

WSUD encompasses all aspects of urban water cycle management including water supply, wastewater and stormwater management. WSUD is a multi-disciplinary approach that promotes opportunities for linking water infrastructure, landscape design and the urban built form to minimise the impacts of development upon the water cycle and achieve more sustainable forms of urban development.

The principles of WSUD are incorporated in the Newcastle City Council DCP 2005 (NCC DCP 2005) and Lake Macquarie City Council DCP 1 (LMCC DCP 1). Councils' requirements in relation to stormwater management are to ensure systems are carefully planned, designed and located to prevent the disturbance, redirection, reshaping or modification of watercourses (and associated vegetation) and to



protect the quality of receiving waters. If adequate WSUD measures are not adopted, the proposed development may have the following impacts:

- » Increased stormwater runoff and altered/increased pollutant loads, potentially impacting sensitive downstream habitats in terms of flushing regimes (frequency, volume and rate) and wetting cycles;
- » Reduction in rainfall infiltration and decreased groundwater recharge; and
- » Disturbance of groundwater flow due to site compaction, fill, landform reshaping and underground structures.

The suitability of WSUD solutions to any proposed development depends upon a number of factors, including climate and rainfall, site topography, geology and available land. Steeper slopes, make construction and locating of larger treatment measures such as offline precinct scale detention basins more difficult, while online systems upstream of road crossings are considered appropriate and practical. WSUD measures such as swales, bio-swales along with smaller detention basins and constructed wetlands are considered more suited to the Minmi/Link Road topography.



2. Existing Conditions and Derived Constraints

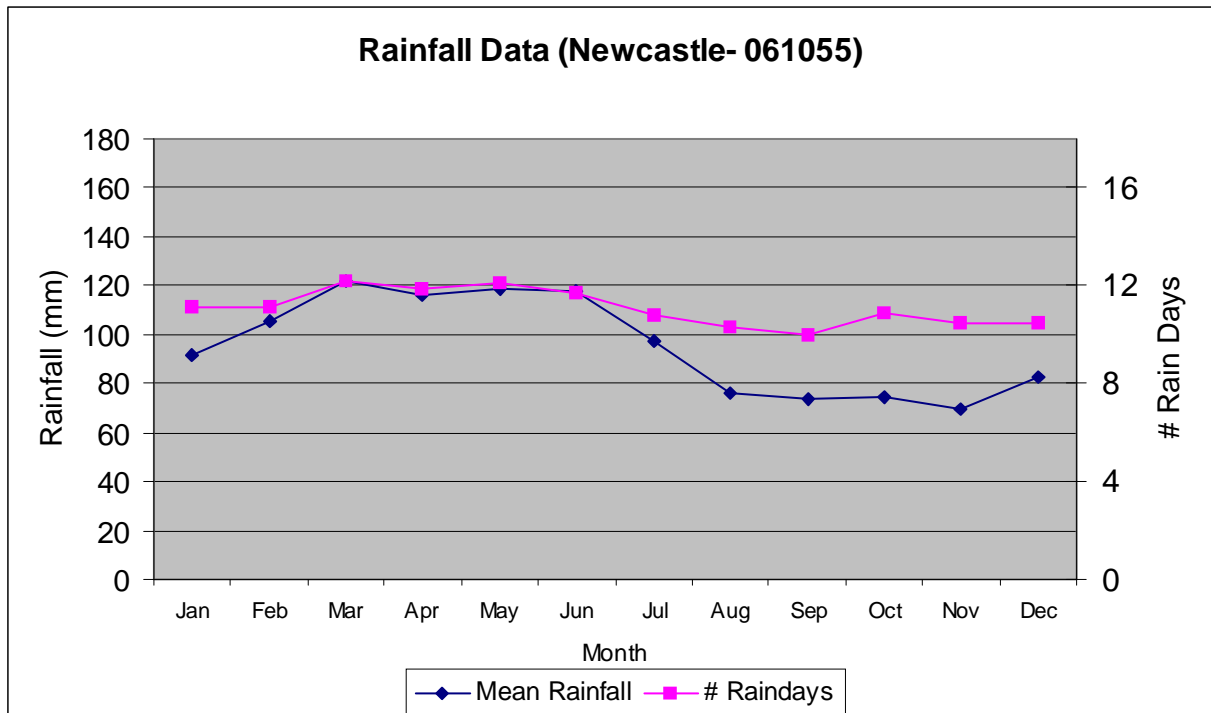
2.1 Climate and Rainfall

The Minmi/Link Road and Stockrington sites experience a sub-tropical climate with rainfall predominantly occurring in late summer and autumn. A typical operational daily rainfall station is located at Newcastle Nobby's Signal Station (BOM Stn 061055), which registered a mean annual rainfall of 1144.6 mm for the period 1862 to date.

Figure 1 shows the mean monthly rainfall and number of rain days recorded by the Newcastle station. The figure shows elevated monthly rainfalls in the months of February to July, with the least rainfall being recorded in August to November. The mean number of rain days varies between approximately 10 and 12 days of rain days per month.

The high likelihood of rainfall occurring in any month throughout the year would support utilisation of vegetated systems such as swales, bioretention, wetlands and detention basins to manage stormwater. Furthermore, the mild seasonal variability would indicate that rainwater collection via rainwater tanks might be viable.

Figure 1 Monthly Rainfall





2.2 Topography and Slopes

Topography is an important consideration when planning the location of stormwater management facilities, such as detention basins. On the Minmi/Link Road site, many land parcels have areas of steep gradients. In addition drainage catchments discharge at a number of locations from the sites. In general slopes are highly variable and generally reflect a terrain that has been modified by past mining activity. The Link Road North site is located to the south of the existing Minmi village, at the extent of the Hexham Swamp catchment. This site slopes steeply towards the north. The Link Road South site, located south of Link Road, comprises more gentle slopes and drains towards the south and Lake Macquarie.

Areas of steeper slopes (greater than 5%) generally do not suit WSUD facilities such as bioretention swales. In such cases, flow attenuation via vegetated swales and bio-retention systems are less desirable due to excessive flow velocities, reduced detention times and potential scouring.

2.3 Soils and Erosion Risk

According to the Soil Landscapes of the Newcastle 1:100 000 Sheet (Matthie: 1995), the Northern Areas are underlain by four major and two minor soil landscape groupings. The major groupings are:

- » *Killingworth Landscape* underlies most of the Minmi and Link Road North sites. The limitations of this soil group include high susceptibility to water erosion, shallow, low strength and highly acidic soils and seasonal water logging.
- » *Cedar Hill Landscape* underlies much of the steeply sloped areas of the sites. The limitations of this soil group include susceptibility to erosion by mass movement and acidic soils.
- » *Warners Bay Landscape* underlies much of the Link Road South site. The limitations of this soil group include high susceptibility to water erosion, localised steep slopes subject to mass movement hazard, highly acidic and low fertility soils and seasonal water logging.
- » *Disturbed Terrain Landscape* is shown within a number of pockets across the land parcels. At these sites, the landscape has been highly modified due to past mining activity. In these areas, there is likely to be unconsolidated materials requiring rehabilitation prior to construction commencing.

The minor groupings are:

- » *Beresfield Landscape* underlies some of the northern extent of the Minmi sites. The limitations of this soil group include high susceptibility to water erosion, highly acidic, low fertility soils and seasonal water logging.
- » *Bobs Farm Landscape* is shown at the downstream end of some of the watercourses on the Minmi sites. These are low areas that contain remnant lake shore deposits and consequently have high potential for acid sulphate soil formation, high water tables, seasonal water logging and are prone to flooding.

The limitations of the soil groups and propensity to erosion would need to be considered when planning WSUD facilities. Ground water aspects are dealt with in a separate groundwater report, and WSUD facilities relying on infiltration may need to be lined to prevent contamination of ground water.



2.4 Watercourses, Creeks, Riparian Corridors and Receiving Waters

The watercourses draining the Minmi Link Road North sites discharge into Hexham Swamp, a large wetland system of the Hunter River estuary.

The main channel of Minmi Creek flows through the area to the west of the existing Minmi village. Back Creek, a major tributary of Minmi Creek, rises on the Link Road North site, flows north through the Minmi East site, before the confluence with Minmi Creek just prior to discharging into receiving environment of Hexham Swamp. There are a number of additional tributaries on the Minmi East site, discharging directly to Hexham Swamp.

The geomorphic features of many of these creeks have been modified by past mining activities and construction of the stormwater system for the existing Minmi village. Typically the upper reaches show defined bed and banks, steep bed slopes and good riparian vegetation along their length.

The Link Road South site gives rise to a number of tributaries, which converge, into Brush Creek. Brush Creek eventually flows through the urban areas of Edgeworth and Argenton and enters Cockle Creek at the Waratah Golf Club. Cockle Creek flows into the northwest corner of Lake Macquarie.

Issues relating to riparian corridors and corridor widths have been dealt with in the Ecological Assessment Report for Minmi/Link Road.

In terms of riparian corridors, the requirements of the Water Management Act are noted, and while the proposal seeks to encompass the intent of the Water Management Act which is not triggered for a development being considered, under Part 3A of the EP & A Act Adequate setbacks are proposed for the Minmi/Link Rd site which cater for the proposed hydrological / drainage requirements while making due consideration to the existing ecological character of creeks.

2.5 Adjoining Land Uses

The Minmi and Link Road North sites surround the existing Minmi Village, which currently supports both residential and rural residential development. The Sydney to Newcastle Freeway is located to the west and the Blue Gum Hills Regional Park is located to the southeast of the site. The residential area of Fletcher and the Summer Hill Waste Management Facility are located further to the east.

The Link Road South site is located adjacent to the existing residential area of Cameron Park, with an industrial estate on Cameron Park Drive to the west.

2.6 Key Statutory Requirements

In addition to the statutory requirements under the Part 3A of the *Environmental Planning and Assessment Act 1979 (EP& A Act)* process, the key discipline specific guidelines relating to Water Sensitive Urban Design, Flooding and Stormwater Management which should be considered include:

- » Integrated Catchment Management Plan for the Central Coast 2002 and Draft Hunter Central Rivers Catchment Management Authority (HCRCA) Catchment Action Plan 2006 – both plans are administered by the HCRCA and prioritise investment in natural resource management for this area;
- » NCC LEP and Development Control Plan 2005 - guides development across the Newcastle LGA, notably in the areas of flood and water management,