# STATEMENT OF ENVIRONMENTAL EFFECTS

**APPLICATION TO MODIFY PROJECT APPROVAL MP06_0228**
**SHOALHAVEN STARCHES EXPANSION PROJECT**

**MODIFICATION APPLICATION No. 23 (Mod 23)**
**(MADE PURSUANT TO S.4.55(2) OF THE ENVIRONMENTAL PLANNING & ASSESSMENT ACT)**

**PROPOSED MODIFICATION TO APPROVED GAS FIRED CO-GENERATION PLANT**

**Shoalhaven Starches**
**Bolong Road, Bomaderry**

**Prepared for**

**Shoalhaven Starches Pty Ltd**
**September 2021**

**COWMAN STODDART PTY LTD**

# Statement of Environment Effects

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|---|---|
| Project | Application to Modify Project Approval MP06_0228,<br>Shoalhaven Starches Expansion Project<br>(Modification Application No. 23 (Mod 23))<br>Proposed Modification to Approved Gas Fired Co-generation Plant |
| Address | Bolong Road, Bomaderry |
| Our ref: | 21/12 |
| Prepared by | Stephen Richardson |
| Draft | 25 August 2021 |
| Final | 2 September 2021 |



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# CONTENTS

# FIGURES

# ANNEXURES

| | |
|---|---|
| **Annexure 1** | Responses from Government Agencies |
| **Annexure 2** | Plans of Proposal |
| **Annexure 3** | Air Quality Impact Assessment<br>prepared by GHD |
| **Annexure 4** | Noise Assessment<br>prepared by Harwood Acoustics |
| **Annexure 5** | Flood Compliance Report<br>prepared by WMA Water |
| **Annexure 6** | Preliminary Hazard Analysis<br>prepared by Pinnacle Risk Management |
| **Annexure 7** | Riverbank Stability Assessment<br>prepared by GHD |
| **Annexure 8** | Greenhouse Gas Emissions Assessment<br>prepared by GHD |
| **Annexure 9** | Written Request made pursuant to Clause 4.6<br>prepared by Cowman Stoddart Pty Ltd |

# EXECUTIVE SUMMARY

Shoalhaven Starches is a member of the Manildra Group of companies. The Manildra Group is a wholly Australian owned business and the largest processor of wheat in Australia. It manufactures a wide range of wheat based products for food and industrial markets both locally and internationally.

The Shoalhaven Starches factory located on Bolong Road, Bomaderry produces a range of products for the food, beverage, confectionary, paper and motor transport industries including starch, gluten, glucose and ethanol.

Project Approval MP06_0228 was granted by the Minister for Planning on the 28th January 2009 for the Shoalhaven Starches Expansion Project. This approval also encapsulated previous approvals for the site into one overall approval for the site (at that time).

The Shoalhaven Starches Expansion Project sought to increase ethanol production at the Bomaderry plant in a staged manner from 126 million litres per year to 300 million litres per year. To accomplish the increase in ethanol production, this project required a series of plant upgrades and increase in throughput of raw materials, principally flour and grain.

Following the Minister's determination Shoalhaven Starches have been implementing and commissioning works in accordance with this Project Approval.

Project Approval MP06_0228 included provision for a gas fired co-generation plant that was to be situated within the western part of the factory site. The approved gas fired co-generation plant was to comprise two gas turbine generators that would deliver an anticipated net power output of 40 MW of power for the site.

Subsequently, under Mod 16, the Independent Planning Commission approved an additional coal fired co-generation plant. This coal fired co-generation plant was to be sited immediately to the south of the existing Boiler House complex situated to the east of Abernethy's Creek. This coal fired co-generation plant would generate a total of 15 MW of power for the site.

Neither the approved gas nor coal fired co-generation plants have been constructed to date.

As the Department is aware, following the original Project Approval, Shoalhaven Starches have obtained approval and / or are seeking approval for a range of Modifications to the original approved project including:

- Construction of Starch Dryer No. 5 (Mod 7);
- Modification to the existing Ethanol Distillery (Mod 12);
- Installation of additional Flour Mill (Mod 16);
- Construction of New Product Dryer (Mod 16);

- Proposed Ethanol Plant upgrade to increase proportion of Beverage Grade Ethanol (Mod 19).

Shoalhaven Starches are forecasting that the electrical power load demand created by these and other additional works, subsequent to the original Project Approved development, will exceed the power supply capacity of the gas fired co-generation plan approved under the original Project Approval; as well as the additional coal fired co-generation plant approved under Mod 16.

Shoalhaven Starches now propose to construct a new gas-fired co-generation plant essentially in the same location as the original approved gas fired co-generation plant within the western part of the factory site. The new gas fired cogeneration plant, will consist of two natural gas turbines that will generate an anticipated power output each of 30 MW, providing a total power to the site of 60 MW.

The waste heat from each of the gas turbine exhausts will be used to generate 11 barg steam in two 110 t/hr heat recovery steam boilers. The boilers will be fired with natural gas and will be able to operate at full output when the turbine is offline for maintenance.

The proposed new gas fired co-generation plant will be housed within a building with a footprint of 62 metres by 50 metres and an overall height above ground level of 20.56 metres (and 45 metres to top of the exhaust stacks for the turbines.

In addition to the gas turbines, the proposal will include the erection of four water tanks at the southern end of the gas fired co-generation building. These water tanks will each have a height above ground level of 21.6 metres.

A gas compressor will also be sited to the southern end of the gas fired co-generation building adjacent to the water tanks. The gas compressor building will have a footprint of 28 metres by 17.5 metres and a height above ground level of 11 metres.

The gas fired co-generation plant will necessitate the construction of a new electrical sub-station which is to be located to the east of the gas fired co-generation plant building and in a position that was previously approved for the No. 6 DDG Dryer (but which is yet to be constructed).

It is therefore also proposed to relocate as part of this Modification Proposal the approved by yet to be constructed No. 6 DDG Dryer to the south of the existing No. 4 DDG Dryer.

The proposed new gas fired co-generation plant will replace the gas fired co-generation plant approved under the original Project Approval as well as the coal fired co-generation plant approved under Mod 16.

The proposed gas fired co-generation plant will be supplied with natural gas; and will be connected to Shoalhaven Starches internal electrical and steam distribution systems. In doing so this new gas fired co-generation plant is forecasted by Shoalhaven Starches to be able to supply the anticipated power load for both recent approved and proposed modifications to the Project Approved development.

In addition it is also proposed that the existing coal fired boilers on the site that supply steam for the Shoalhaven Starches operation will also be converted to gas operation.

As a result of the works associated with this Modification Proposal will result in a significant reduction of Greenhouse Gas emissions from the overall site operations.

The Shoalhaven Starches Expansion Project was a 'transitional Part 3A Project" for the purposes of Schedule 6A of the Environmental Planning & Assessment Act. As of the 1st March 2018 the transitional arrangements for former Part 3A projects have been discontinued. The discontinuation of the transitional arrangements for Part 3A projects and concept plans means that modifications are assessed through the State Significant Development (SSD) pathway. As such this Modification Application is made pursuant to Section 4.55(2) of the Environmental Planning & Assessment Act 1979.

The preparation of this SEE has been undertaken following consultation with the DPIE, the EPA, The Natural Resource Access Regulator (NRAR), Fire & Rescue NSW, The Australian Department of Defence and Shoalhaven City Council.

The SEE is supported by the following expert assessments:

- An Air Quality Impact Assessment by GHD (**Annexure 3**). Odour dispersion modelling undertaken by GHD for the quarter with maximum odour emissions (in accordance with the methodology adopted for past modification air quality assessments) identified marginal increase in odour predictions predicted at two receptors and a marginal decrease predicted at three receptors. According to GHD the fluctuation in odour predictions for this modification (Mod 23) when compared with the previous modification (Mod 19) was attributed to variability in odour sampling.

  According to GHD odour dispersion modelling predicted compliance of the odour criteria at all residential receptors.

  In addition dispersion modelling of combustion products, particulates, PAH, VOCs and metals predicted compliance with the criteria at all residential sensitive receptors.

  Overall, according to GHD, the proposal should be acceptable from an air quality perspective.

- A Noise Assessment by Harwood Acoustics (**Annexure 4**) provides noise control recommendations to reduce the level of noise from the modified project to within site specific noise design goals at all receptor locations. The noise design goals have been established to ensure that the noise limits prescribed in the Environment Protection Licence for the site (EPL 883) continue to be met at all receptors..
- A Flood Compliance Report prepared by WMAwater (**Annexure 5**) concludes that there is no change in the 1% AEP flood level outside the Shoalhaven Starches plant as a result of the proposed Modification.
- A Preliminary Hazard Analysis (PHA) undertaken by Pinnacle Risk Management (**Annexure 6**) that assess the risks associated with the proposed modifications and provides a comparison against relevant risk criteria. The PHA demonstrates the Modification Proposal will comply with all risk criteria. The PHA also concludes that societal risk, area cumulative risk and environmental risk will be acceptable. The primary reason for the low risk levels from the modifications is the low likelihood of significant pipe failures leading to off-site impact from jet or flash fires, or explosions.

  Based on the analysis in this PHA, the following recommendations are made:

  - Provide natural gas leak detection in the proposed co-generation plant building with, at least, an alarm in the control room.
  - Provide an actuated valve on the natural gas supply pipe outside of the co-generation plant building for isolation in an emergency.
  - Given the high natural gas pressure in the supply pipeline, class the pipe as a critical pipe and therefore perform routine inspections and integrity checks.
- A Geotechnical and Riverbank Stability Assessment by GHD (**Annexure 7**) that concludes that the proposed modified co-generation plant, founded on piles, will not adversely affect the stability of the eastern bank of Bomaderry Creek.
- A Greenhouse Gas Emissions Assessment prepared by GHD (**Annexure 8**) which demonstrates the works associated with the Modification Application are projected to reduce the site operational greenhouse gas emissions.

This SEE demonstrates that this Modification proposal will have net environmental benefits including:

- A reduction in greenhouse gas emissions and intensity for the overall site operations.
- An improvement in air quality generally with a reduction in emissions.
- A reduction in heavy vehicle movements to and from the site.

The Modification Application will not involve changes to the size, scale or intensity of the existing Shoalhaven Starches operations. The modification proposal will not result in any increases in overall production rates from the site, nor will it involve any significant changes in level of impacts arising from the approved development.

The SEE concludes that the proposed modifications will have not have significant adverse environmental impacts (indeed the Modification Proposal will result in beneficial environmental outcomes); and the development to which Project Approval MP06_0228 as modified by the Modification Application relates, will be substantially the same development as the development for which this consent was originally granted and before that consent as originally granted was modified.

# 1.0 INTRODUCTION

Project Approval MP06_0228 was granted by the Minister for Planning on the 28th January 2009 for the Shoalhaven Starches Expansion Project. This approval also encapsulated previous approvals for the site into one overall approval for the site (at that time).

The Shoalhaven Starches Expansion Project sought to increase ethanol production at the Bomaderry plant in a staged manner from 126 million litres per year to 300 million litres per year. To accomplish the increase in ethanol production, this project required a series of plant upgrades and increase in throughput of raw materials, principally flour and grain.

Following the Minister's determination, Shoalhaven Starches have been implementing and commissioning works in accordance with this approval.

Project Approval MP06_0228 included provision for a gas fired co-generation plant that was to be situated within the western part of the factory site. This gas fired co-generation plant was to comprise two gas turbine generators that would deliver an anticipated net power output of 40 MW of power for the site.

Under Mod 16 the Independent Planning Commission approved an additional coal fired co-generation plant. This coal fired co-generation plant was to be sited immediately to the south of the existing Boiler House complex situated to the east of Abernethy's Creek. This coal fired co-generation plant would generate a total of 15 MW of power for the site.

Neither the approved gas nor coal fired co-generation plants have been constructed to date.

As the Department is aware following the original Project Approval Shoalhaven Starches have obtained approval and / or are seeking approval for a range of Mods to the original Project including such projects as:

- Construction of Starch Dryer No. 5 (Mod 7);
- Modification to the existing Ethanol Distillery (Mod 12);
- Installation of additional Flour Mill (Mod 16);
- Construction of New Product Dryer (Mod 16);
- Proposed Ethanol Plant upgrade to increase proportion of Beverage Grade Ethanol (Mod 19).

Shoalhaven Starches are forecasting that the electrical power load demand created by these and other additional works, subsequent to the original Project Approved development, will exceed the power supply capacity of the gas fired co-generation plan approved under the original Project Approval; as well as the additional coal fired co-generation plant approved under Mod 16.

Shoalhaven Starches now propose to construct a new gas-fired co-generation plant essentially in the same location as the original approved gas fired co-generation plant within the western part of the factory site. The new gas fired cogeneration plant, will consist of two natural gas turbines that will generate an anticipated power output each of 30 MW, providing a total power to the site of 60 MW.

The waste heat from each of the gas turbine exhausts will be used to generate 11 barg steam in two 110 t/hr heat recovery steam boilers. The boilers will be fired with natural gas and will be able to operate at full output when the turbine is offline for maintenance.

The proposed new gas fired co-generation plant will be housed within a building with a footprint of 62 metres by 50 metres and an overall height above ground level of 20.56 metres (and 45 metres to top of the exhaust stacks for the turbines).

In addition to the gas turbines, the proposal will include the erection of four water tanks at the southern end of the gas fired co-generation building. These water tanks will each have a height above ground level of 21.6 metres.

A gas compressor will also be sited to the southern end of the gas fired co-generation building adjacent to the water tanks. The gas compressor building will have a footprint of 28 metres by 17.5 metres and a height above ground level of 11 metres.

The gas fired co-generation plant will necessitate the construction of a new electrical sub-station which is to be located to the east of the gas fired co-generation plant building and in a position that was previously approved for the No. 6 DDG Dryer (but which is yet to be constructed).

It is therefore also proposed to relocate as part of this Modification Proposal the approved by yet to be constructed No. 6 DDG Dryer to the south of the existing No. 4 Dryer.

The proposed new gas fired co-generation plant will replace the gas fired co-generation plant approved under the original Project Approval as well as the coal fired co-generation plant approved under Mod 16.

The proposed gas fired co-generation plant will be supplied with natural gas; and will be connected to Shoalhaven Starches internal electrical and steam distribution systems. In doing so, this new gas fired co-generation plant is forecasted by Shoalhaven Starches to be able to supply the anticipated power load for both recent approved and proposed modifications to the Project Approved development.

The Modification Application will not involve changes to the size, scale or intensity of the existing Shoalhaven Starches operations. The modification proposal will not result in any increases in production rates from the site, nor will it involve any changes in level of impacts arising from the approved development.

The Modification Application is made pursuant to Section 4.55(2) of the Environmental Planning & Assessment Act. This SEE has been prepared in support of the Modification Application.

The SEE has been prepared following consultation with the:

- DPIE;
- EPA;
- NRAR;
- Fire & Rescue NSW;
- Australian Department of Defence;
- Shoalhaven City Council.

Responses from the above government agencies that have been received at the time of preparing this SEE are included as **Annexure 1** to this SEE.

The Modification Application is supported by plans included in **Annexure 2**, and the following expert assessment reports:

- Air Quality Assessment prepared by GHD Pty Ltd (**Annexure 3**);
- An Environmental Noise Impact assessment prepared by Harwood Acoustics (**Annexure 4**);
- A Flood Compliance Report prepared by WMA Water (**Annexure 5**);
- A Preliminary Hazard Analysis prepared by Pinnacle Risk Management (**Annexure 6**);
- A Geotechnical & Riverbank Stability Assessment prepared by GHD (**Annexure 7**).

This SEE demonstrates that this Modification proposal will have net environmental benefits including:

- A reduction in greenhouse gas emissions and intensity for the overall site operations.
- An improvement in air quality generally with a reduction in emissions.
- A reduction in heavy vehicle movements to and from the site.

It is considered that the components associated with this Modification Application will not have any significant adverse environmental impacts; and as a result of this Modification Application the development to which Project Approval MP06_0228 as modified relates will be substantially the same development as the development for which this consent was originally granted and before that consent as originally granted was modified.

# 2.0 SITE AND SURROUNDS

## 2.1 LOCAL AND REGIONAL CONTEXT

The Shoalhaven Starches factory complex is situated upon various allotments of land along Bolong Road, Bomaderry, within the Shoalhaven local government area. The factory site is located on the southern side of Bolong Road on the northern bank of the Shoalhaven River with some operations located on the northern side of Bolong Road. The Shoalhaven Starches site (excluding the former Dairy Farmers and former Paper Mill sites) has an area of approximately 12.5 hectares.

The works associated with this modification proposal involve Lots 31 and 34 DP 1222627. **Figure 1** is a site locality plan.

The land associated with this modifications is zoned IN1 (General Industrial) zone under the provisions of SLEP 2014.

The town of Bomaderry is located 0.5 km (approx.) to the west of the factory site, and the Nowra urban area is situated 2.0 km to the south-west of the site. The "Riverview Road" area of the Nowra Township is situated approximately 1000 metres immediately opposite the factory site across the Shoalhaven River.

The village of Terara is situated approximately 1.5 kilometres to the south east of the site, across the Shoalhaven River. Burraga (Pig) Island is situated between the factory site and the village of Terara and is currently used for dairy cattle grazing.

There are a number of industrial land uses which have developed on the strip of land between Bolong Road and the Shoalhaven River. Industrial activities have included a metal fabrication factory, the Shoalhaven Starches site and the former Dairy Farmers factory and Shoalhaven Paper Mill (now owned by the Manildra Group of Companies). The industrial area is serviced by a privately owned spur railway line that runs from just north of the Nowra-Bomaderry station to the Starches Site.

The state railway terminates at Bomaderry with a separate, privately owned spur line to the factory site. Shoalhaven City Council sewerage treatment works is situated between the railway line and the factory.

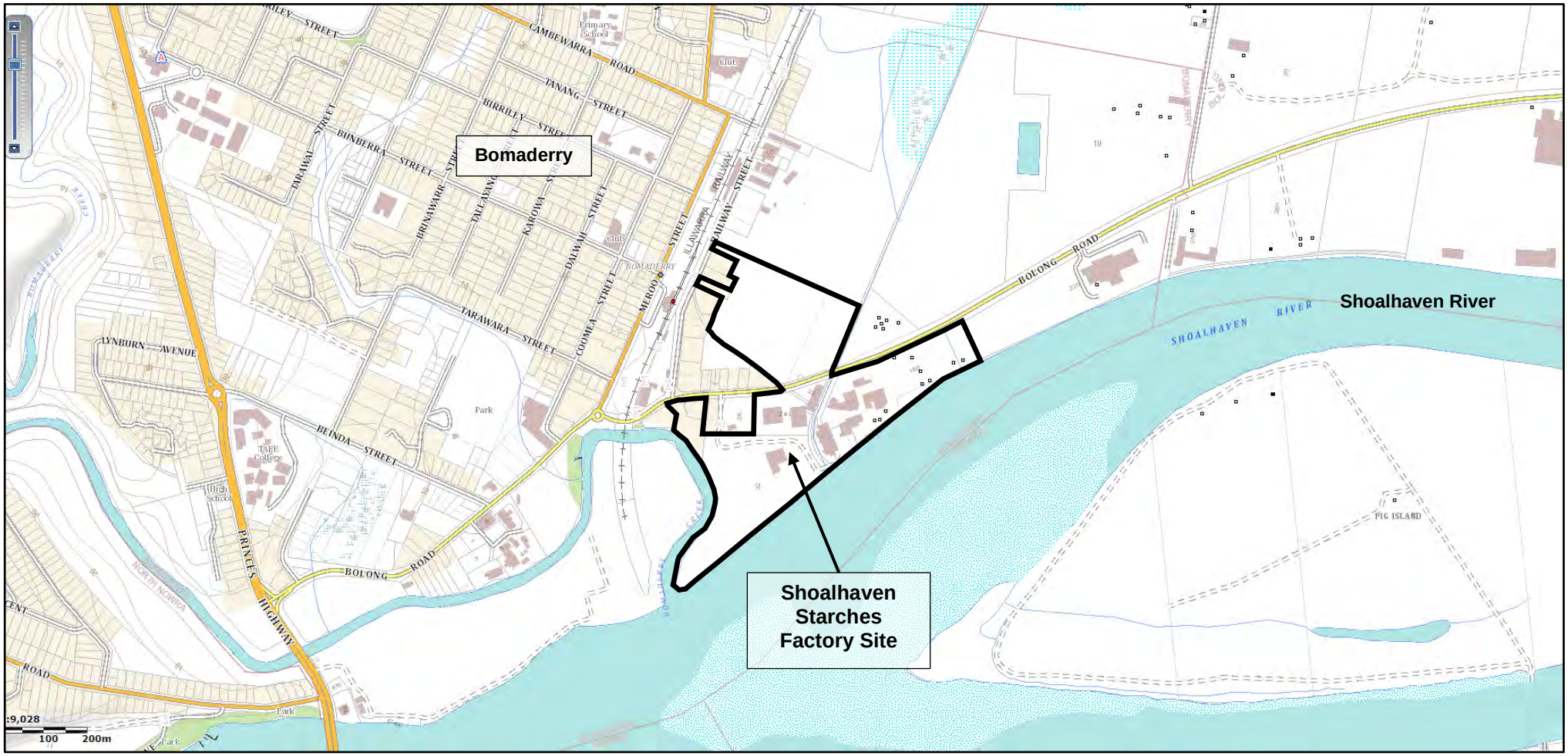


**Figure 1: Site Locality Plan.**

The Company also carries out irrigation activities on the Company's Environmental Farm located over 1000 hectares on the northern side of Bolong Road. This area is cleared grazing land and also contains a wastewater treatment plant, wet weather storage ponds and spray irrigation lines. The wet weather storage ponds on the farm form part of the irrigation management system for the factory. The Environmental Farm stretches over a broad area of the northern floodplain of the Shoalhaven River stretching from Bolong Road in the south towards Jaspers Brush in the north. Apart from the Environmental Farm this broad area is mainly used for grazing (dairy cattle).

The factory site has direct road frontage to Bolong Road to the north. The Shoalhaven River flows along the southern boundary of the factory site.

**Figures 2** and **3** are aerial photographs of the locality and the site respectively. **Figure 4** provides an aerial photograph of the location of the works associated with this Modification Application.

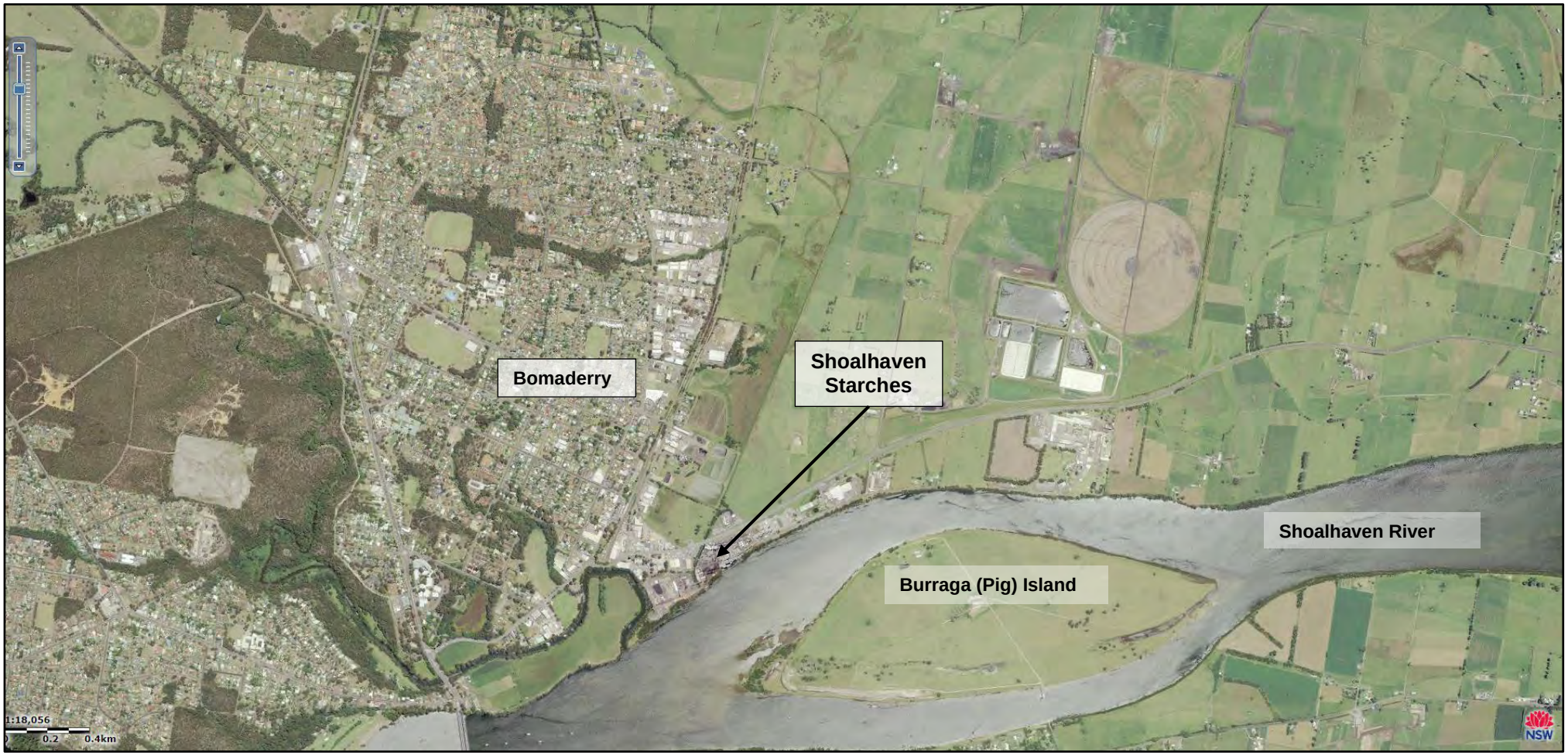


**Figure 2: Aerial photograph of locality.**


**Figure 3: Aerial photograph of Shoalhaven Starches factory site.**


**Figure 4: Aerial view of location of proposed Gas-fired Co-generation Plant**

# 3.0 BACKGROUND

## 3.1 PRODUCTION PROCESSES

The production process at the Shoalhaven Starches plant have evolved over a number of decades. Originally the plant was primarily concerned with the production of starch and gluten from flour. However, the Company has pursued a number of technological innovations particularly with respect to reducing the environmental impacts of the Company's operations. As a result, Shoalhaven Starches has been moving towards a "closed" system of production. Essentially this entails the efficient use of end products to ensure wastage is reduced to a minimum.

The first step in the production process is the delivery of flour and grain, by rail, from the Company's flour mills at Manildra, Gunnedah and Narrandera. The trainloads are brought into the plant via the switching yard at Bomaderry.

The Company received approval from the Minister for Planning for the erection of flour mills on site to enable the milling of part of the Company's flour requirements to be processed directly on the site. The remainder of the Company's flour requirements continue to be sourced from the Company's off-site flour mills.

Flour is transferred via storage to the "wet end" of the plant where fresh water is added. The subsequent mixing and separation process produces starch and gluten. The gluten is dried to enable it to be packaged and distributed as a high protein food additive for human consumption. This product is then taken from the site after packaging for both local and export markets.

The starch that is separated from the flour is either dried or remains in liquid form. The dried and liquid starch is sold to the paper and food industries. The starch is used for food, cardboard, paper and other industrial purposes. Liquid starch is used in the ethanol production process.

Starch is also used in the production of syrups on the site. The syrups plant products include glucose and brewer's syrup. These are used for foods, chocolates, confectionery, beer, soft drinks and fruit juice. The syrups plant products can also be used in the ethanol process.

The by-products from the starch, gluten and syrup production processes are combined to feed the fermentation and distillation stage of ethanol production. The outputs are fuel, industrial, beverage and hand sanitising grade alcohol. Industrial grade ethanol is used in producing pharmaceuticals, printer's ink and methylated spirits.

Ethanol production results in some liquid and solid by-products, which are processed through the stillage recovery process plant (which was approved as part of PRP No. 7 in 2005). The solids in the stillage are recovered as Dried Distillers Grains and Syrup (DDGS), dried and sold as a high protein cattle feed with the remaining water used for irrigation.

The wastewater resulting from the ethanol production is treated in the wastewater treatment plant located on the northern side of Bolong Road and is re-used in the Starch Plant and the surplus is irrigated onto Shoalhaven Starches Environmental Farm to the north of Bolong Road. This farmland is used for fodder crops, pasture and cattle grazing.

Boilers are used to produce steam which is used for a multitude of purposes throughout the factory site wherever product is dried, evaporated or heated.

## 3.2 RECENT DEVELOPMENT AND APPROVAL HISTORY

### 3.2.1 Project Approval MP 06_0228

On the 28th January 2009 the then Minister for Planning, issued Project Approval MP 06_0228 for the Shoalhaven Starches Expansion Project.

The primary objective of the Shoalhaven Starches Expansion Project was to increase the Company's ethanol production capacity to meet the expected increase in demand for ethanol primarily, arising from the then NSW Government's mandate to increase ethanol content by volume in petrol in NSW from 2% to 6% from October 2011, by upgrading the existing ethanol plant.

The approval, subject to certain conditions, enabled Shoalhaven Starches to increase ethanol production in a staged manner at its Bomaderry Plant from 126 million litres per year to 300 million litres per year.

To accomplish the increase in ethanol production, the Project Approval enabled Shoalhaven Starches to upgrade plant and increase throughput of raw materials, principally comprising flour and grain.

Project Approval MP06_0228 included provision for a gas fired co-generation plant that was to be situated within the western part of the factory site. This gas fired co-generation plant was to comprise two gas turbine generators that would deliver an anticipated net power output of 40 MW of power for the site.

In addition, as part of the Project Approval, Shoalhaven Starches were required to undertake comprehensive odour reduction measures for both the existing factory site and the works associated with the Expansion Project.

The Project Approval enabled a staged implementation of the expansion project. Under the approval up to 200 million litres of ethanol will be able to be produced at the Bomaderry Plant and eventually increased up to 300 million litres.

The Project Approval also enabled the biological treatment of waste waters from the factory site and the re-use of over half the treated wastewater within the factory processes, with the remainder irrigated onto the Company's Environmental Farm. The Project Approval also consolidated all previous approvals into the one approval so that there would be essentially one approval for the site.

### 3.2.2 Approval History following MP 06_0228

***DA 10/1843 – Upgrade Vehicle Entrance (Former Dairy Farmers Factory Site)***

Project Approval MP 06_0228 required vehicle access points to the Bomaderry site to be upgraded to the satisfaction of Council and the RMS. The subsequent upgrading works included the construction of a concrete median along the centre of Bolong Road to the east of Abernethy's drain in such a manner that prevented vehicles travelling east along Bolong Road turning right into the central vehicle access point to the Shoalhaven Starches site and prevented vehicles turning right out from this access point and travelling east along Bolong Road.

These works also prevented vehicles turning right out from the BOC Carbon Dioxide Plant located opposite the Shoalhaven Starches site. Shoalhaven Starches therefore sought approval from Shoalhaven City Council to upgrade the former Dairy Farmers site vehicular access and relocate the access to enable vehicles to enter Access Point 2 from the east. These works would also allow vehicles wishing to travel west from BOC Carbon Dioxide Plant to leave this site to first travel east; by allowing vehicles to travel to the former Dairy Farmers Factory Complex and using the upgraded access to turn around before travelling west along Bolong Road.

***RA 11/1002 Interim Packing Plant***

Following Project Approval MP 06_0228 Shoalhaven Starches also obtained a separate development approval to use an existing factory building located at 22 Bolong Road (Lot 21 DP 100265) as an Interim Packing Plant from Shoalhaven City Council (RA 11/1002 dated 26th October 2011). This Interim Packing Plant operates in conjunction with the Company's existing Packing Plant which is located within the existing factory site.

***DA 11/1855 – Widening of Driveway***

A further development application (DA 11/1855) was submitted to Shoalhaven City Council on the 4th August 2011 seeking approval to widen the driveways serving

22 Bolong Road Bomaderry (ie. the site of the Interim Packing Plant) to accommodate semi-trailers. This development application was approved by Shoalhaven City Council on the 24th August 2011.

***DA 13/1713 – Demolition of Dimethyl Ether Plant***

On the 5th July 2013 Shoalhaven Starches submitted a development application to Shoalhaven City Council seeking the demolition of a Dimethyl Ether Plant on the site. This development application was approved by Shoalhaven City Council on the 15th July 2013.

***DA 14/2161 – Additional Two (2) Grain Silos***

On the 19th September 2014 Shoalhaven Starches submitted a development application to Shoalhaven City Council seeking development consent to erect two additional grain silos on the factory site within the vicinity of the existing Flour Mill, to provide security of raw material storage and supply when there are closures of the Illawarra rail line serving the Shoalhaven Starches site. Shoalhaven City Council approved this development application on the 27th April 2017.

***DA 16/1827 – Demolition of Existing Air Compressor Shed***

On the 7th July 2016 Shoalhaven Starches submitted a development application to Shoalhaven City Council seeking the demolition of an existing air compressor shed on the site. This development application was approved by Shoalhaven City Council on the 29th July 2016.

***Other Approvals***

There have been other approvals that have been issued by Shoalhaven City Council that are associated with the Shoalhaven Starches operations, but which do not directly relate to the operations of Shoalhaven Starches including:

- DA 11/1936 – Algae Demonstration Plant for evaluation of algae production and processing for alternative fuel and $CO_2$ sequestration. Proponent - Algae Tec Pty Ltd at 220 Bolong Road (former Dairy Farmers factory site).
- DA 14/1327 – Alterations to existing building (former Dairy Farmers Factory Building) and re-use as a meat processing plant. Proponent – Candal Investments Pty Ltd at 220 Bolong Road (former Dairy Farmers factory site).
- DA 15/1892 – Installation of Liquid Oxygen Vessel (6,000 L). Proponent – Argyle Prestige Meats Ltd at 220 Bolong Road (former Dairy Farmers factory site).

### *Modification Applications*

Project Approval MP 06_0228 has also been the subject of the following modifications applications (**Table 1**).

**Table 1**

**Summary of Recent Modification Applications**

| *Modification* | *Summary of Modifications* | *Approval Date* |
|---|---|---|
| Modification 1 | • Removed the requirement for dried distillers grain (DDG) pelletising plant from the list of mandatory odour controls.<br>• Implement alternate odour controls including a new loading chute with dust extractor and extension of the load-out shed to fully enclose truck loading. | 30/9/2011 |
| Modification 2 | • Install additional infrastructure to improve operational and energy efficiency, including two additional fermenter tanks, an evaporator, beer column, heat exchangers, substation and compressors. | 14/9/2012 |
| Modification 3 | • Relocate approved 60 space staff car park to the former Dairy Farmers site and include the site in the project approval, following acquisition by the Applicant. | 9/10/21012 |
| Modification 4 | • Relocate the approved DDG pelletising plant within the factory site, increases its footprint and approved height, from 21 m to 28 m. | 24/3/2014 |
| Modification 5 | • Modify the design, footprint and odour controls on the DDG pelletising plant including a 49 m air discharge stack and eight storage silos. | 16/9/2015 |
| Modification 6 | • Demolish a disused industrial building “Moorehouse” purchased by the Applicant<br>• Construct a temporary car park on the northern side of Bolong Road. | 25/112015 |
| Modification 7 | • Relocate the approved Starch Dryer No. 5 to the former “Moorehouse” site, increase the footprint and construct a substation, pipework and pipe gantry. | 18/12016 |
| Modification 8 | • Extend the existing flour mill to increase flour production from 265,000 to 400,000 tonnes per annum (tpa) and offset imports of flour to the factory from mills in western NSW. | 1/3/2016 |
| Modification 9 | • Increase the size of the approved packing plant to increase the type and volume of packaged dried products.<br>• Construct a container storage and truck loading area with noise barriers.<br>• Extend and duplicate the approved rail spur line.<br>• Install product pipes under Bolong Road, a small bag packer at the DDG pellet plant and a new stormwater detention tank. | 8/3/2017 |
| Modification 10 | • Construct a new flour mill B and increase flour production on site from 400,000 tpa to 842,400 tpa. Relocate storage silos and construct a mill feed structure. | 18/4/2017 |

**Table 1 (continued)**

| *Modification* | *Summary of Modifications* | *Approval Date* |
|---|---|---|
| Modification 11 | • Reducing the number of approved DDGS Dryers from six to four.<br>• A minor modification to the footprint of the four DDG dryers.<br>• Relocation of the cooling towers in the DDG Plant.<br>• A Mill Feed Silo and structure to feed DDG dryers.<br>• Expanded use of the existing coal and woodchip storage area within the SS Environmental farm.<br>• The addition of two biofilters to cope with the increased number of DDG Dryers.<br>• A forklift maintenance building adjacent to the relocated DDG dryers, along with a container preparation area adjacent to the relocated DDG Dryers. | 1/9/2017 |
| Modification 12 | Modifications to the existing Ethanol Distillery Plant to increase the proportion of 'beverage" grade ethanol that is able to be produced on the site. This modification will enable increased flexibility in terms of the range of types of ethanol produced at the site (ie. between fuel, industrial and beverage grade ethanol) to meet market demands; and modify the type and location of the Water Balance Recovery Evaporator that has been previously approved under Mod 2 adjacent to the Ethanol Plant. | 1/9/2017 |
| Modification 13 | • Modification of boilers 2 and 4, with the conversion of boiler 4 from gas fired to coal fired.<br>• Installation of an additional baghouse on boiler 6. | 18/1/2018 |
| Modification 14 | Modifications to the former paper mill site. | 27/4/2018 |
| Modification 15 | Construction of the SupaGas $CO_2$ plant at the former Dairy Farmers factory site. | 7/8/2018 |
| Modification 16 | • Installation of a third flour mill C within the existing flour mill B building.<br>• Undertaking modifications to flour mills A and B.<br>• The construction of a new industrial building adjoining the Starch Dryer No. 5 building containing:<br>– The new product dryer;<br>– Plant and equipment associated with the processing of specialised speciality products.<br>• Addition to Starch Dryer No. 5 building to house a baghouse for this dryer<br>– Conversion of two existing gluten dryers (1 and 2) to starch dryers.<br>– Additional sifter for the interim packing plant.<br>– Construction of a coal-fired co-generation plant to the south of the existing boiler house complex. The co-generation plant will house a new boiler (no. 8).<br>– Construction of lime silos: The lime injection system will consist of two storage silos and associated equipment for injecting powdered lime into each of the coal fired boilers.<br>– Relocation of the existing boiler no. 7 to the northern side of the overall boiler house complex. | 18/6/2019 |

**Table 1 (continued)**

| *Modification* | *Summary of Modifications* | *Approval Date* |
|---|---|---|
| | – Construction of an indoor electrical substation on the northern side of Bolong Road.<br>– Construction of an additional rail intake pit for the unloading of rail wagons.<br>– Extension of the existing electrical substation located within the main factory area.<br>• An additional coal fired co-generation plant was also approved under Mod 16. This coal fired co-generation plant was to be sited immediately to the south of the existing boiler house complex situated to the east of Abernethy's Creek. This coal fired co-generation plant would generate a total of 15 MW of power for the site. It is proposed that this coal fired co-generation plant will be in part replaced by the proposed gas fired co-generation plant as part of this Modification Application. | |
| Modification 17 | • Relocation of Baghouse for Starch Dryer No. 5.<br>• Installation of Service Lift adjacent to Starch Dryer No. 5.<br>• Elevating Service Conduit extending from factory site on southern side of Bolong Road to approved packing plant on northern side of Bolong Road above ground.<br>• Use of woodchips as fuel source in Boilers 2 and 4.<br>• Modification to condition 14J(e) – Amendment to design specification for silencers to exhaust fans for Flour Mill B.<br>• The increase in the building footprint of Product Dryer Building (PDB).<br>• The increase in the building footprint of the Specialty Products Building (SPB) which adjoins the PDB building.<br>• The provision of additional bulk chemical storage to the south of the PDB and SPB buildings.<br>• Demolition of part of the existing Maintenance Office and Stores to facilitate the extension of the PDB and SPB buildings to the west.<br>• Repurposing the remaining part of the Maintenance building to provide staff amenities and Plant Operation Control Rooms.<br>• To facilitate internal truck movements associated with the amendments to the SPB, existing car parking (48 spaces) currently located to the north and west of the Maintenance Building will be relocated to an existing approved car parking located on the north side of Bolong Road.<br>• Extend the sifter room situated on top of the interim packing plant.<br>• Install a Product Dryer (No. 9) within the footprint of the SPB as approved under Mod 16. | 23/10/2020 |
| Modification 18 | • Relocation of Approved Gas Fired Boiler and other Associated Works to Facilitate Production of 'Hand Sanitiser' Alcohol in response to COVID 19 Crisis. | 4/9/2020 |
| Modification 19 | • Expansion of the ethanol distillery plant including new distillery columns, three ethanol storage tanks and cooling towers to facilitate the production of 100 mega litres (ML) of beverage grade ethanol within the approved limits and additional site infrastructure. | 8/3/21 |

# 4.0 CONSULTATION

Prior to the preparation of this SEE consultation has been undertaken with:

- Department of Planning, Industry and Environment;
- EPA;
- Natural Resource Access Regulator (NRAR);
- NSW Fire & Rescue;
- Shoalhaven City Council (SCC);
- Australian Department of Defence.

An initial meeting was held between staff from DPIE, Shoalhaven Starches and Cowman Stoddart on the 11th February 2021. Following that meeting DPIE confirmed that the Modification Application could be considered pursuant to Section 4.55(2) of the Environmental Planning & Assessment Act and subsequently confirmed the requirements for the preparation of this SEE.

Written consultation was undertaken separately with the EPA, NRAR, NSW Fire & Rescue, SCC and the Australian Department of Defence. At the time of preparing this SEE responses have been received from the NRAR, SCC, and NSW Fire & Rescue; and these responses are included in **Annexure 1** to this SEE. The following is a summary of the responses made by government agencies to this proposal at the time of preparing this report.

***NRAR***

In an email dated 9th March 2021 the NRAR provided the following response to this Modification Proposal (with our responses to each of the matters they raise):

> *Thanks for getting in contact with NRAR in relation to the request for requirements for the Preparation of Statements of Environmental Effects for Proposed Mods 21, 22 and 23, Shoalhaven Starches Expansion Project (MP06_0228). NRAR do not have any comments on the proposal at this stage other than the following general requirements we request proponents to consider in their major project submissions (where relevant):*
>
> - *Identification and impact assessment of all works/activities that may intercept, extract, use, divert or receive water.*

Response

No works associated with this Mod will intercept, extract, use, divert or receive water from local watercourses or groundwaters.

- *The identification of all water take for the project. Include details of water sources that water will be taken from where water entitlements need to be acquired to account for the water take.*

Response

Prior to the Shoalhaven Starches Expansion Project Approval Shoalhaven Starches daily average water usage consisted of 8, 300 kilolitres which comprised:

- 7500 KL from the municipal drinking water supply; and
- 2400 KL from a raw water supply provided by Shoalhaven City Council via a pipeline from the former Australian Paper Mill.

The Shoalhaven Starches Expansion Project Approval necessitated an increase in water usage, both potable water for the processing of flour and non-potable for steam generation, cooking and other uses. Following the installation of the Waste Water Treatment Plant on the Environmental Farms associated with the Project Approval, and the subsequent availability of treated water for reuse, the current daily water supply for the Shoalhaven Starches operations is approximately:

- o 4000 KL of potable quality water (obtained from Shoalhaven City Council).
- o 3700 KL of raw water (obtained via the raw water supply provided by Shoalhaven Water via the pipeline from the former Australian Paper Mill site).
- o 6000 KL of treated water for re-use (obtained from the Waste Water Treatment Plant ion the company's Environmental Farm).

The current Mod will not alter the requirements for water supply to the site as outlined above.

- *Details of Water Access Licences (WALs) held to account for any take of water, or demonstration that WALs can be obtained prior to take of water occurring.*

Response

The Shoalhaven Starches operations do not have any Water Access Licences. This Mod proposal does not require the need for a WAL.

- *Assessment of the project's compliance with any exemptions or exclusions to requiring approvals or licenses under the Water Management Act 2000.*

Response

As a State Significant Development, under Section 4.41(1)(g) of the Environmental Planning & Assessment Act, a water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the *Water Management Act 2000* are not required.

- *Identification and impact assessment of all works located on waterfront land including consideration of the NRAR Guidelines for Controlled Activities on Waterfront Land (2018).*

Response

The proposed Gas-Fired Co-generation Plant will be situated 33 metres from the banks of Bomaderry Creek, and therefore will be situated within 'waterfront land" (being located within 40 metres of this watercourse).

It should be noted however that the footprint of the proposed gas fired co-generation plant will be situated essentially in the same position as that which was identified for the original approved gas fired co-generation plant under the Project Approval for the site. No new works are proposed any closer to Bomaderry Creek compared to that originally approved for this site.

Indeed, this Mod includes the removal of the coal-fired co-generation plant approved under Mod 16 which was to be sited as close as only about five (5) metres from the banks of the Shoalhaven River.

The location of the proposed gas-fired co-generation plant is situated within an existing industrial site. No native of riparian vegetation will be disturbed by this proposal.

Furthermore under the terms of the Project Approval for the site a detailed Landscape and Vegetation Management Plan has been prepared for the Shoalhaven Starches factory site in accordance with condition 43 of the Project Approval and including making provision for the landscaping and management of the riparian areas along the Shoalhaven Rover and Bomaderry and Abernethy's Creeks.

- *A detailed and consolidated site water balance.*

Response

The water supply requirements for the site are detailed above.

- *Assessment of project against relevant policy and guidelines, e.g. Water Sharing Plans, Floodplain Management Plans, NSW Aquifer Interference Policy, NSW Floodplain Harvesting Policy, Guidelines for Controlled Activities on Waterfront Land (2018).*

Response

- o The SEE is supported by a Flood Compliance Report prepared by WMAwater (**Annexure 5**).
- o Issues pertaining to the development of waterfront land and the NRAR Guidelines for Controlled Activities on Waterfront Land (2018) are discussed above.
- o The proposal does not raise issues in terms of aquifer interference or floodplain harvesting therefore these guidelines will have no relevance to this proposal.

***NSW Fire & Rescue***

In an email dated 16th March 2021 the NSW Fire & Rescue provided the following response to this Modification Proposal:

> *Thank you for your email regarding the proposed modifications to the Shoalhaven Starches site.*
>
> *Fire and Rescue NSW (FRNSW) have no specific requirements to be addressed within the forthcoming Statement of Environmental Effects that are being prepared in support of the Modification Applications (the Applications).*
>
> *FRNSW will review the Applications once exhibited by the Department of Planning, Industry and Environment (the Department), and may provide comment at this time if deemed necessary.*
>
> *Should the Department approve the Applications, FRNSW may request that a Condition be included in the relevant Instruments of Consent that would require the existing Fire Safety Study for the site to be updated and approved prior to the issuing of the relevant Construction Certificates. FRNSW considers that this may be required in order to address any potential increase in risk posed by the proposed modifications.*
>
> *I trust that this satisfies your requirements at this time, please do not hesitate to contact me should you have any further queries.*

***Shoalhaven City Council***

> *Development Engineering Comments/Requirements*
>
> 1. *No actual works in road reserve are anticipated. Underbore of Bolong Road to connect natural gas pipeline.*

Comment

The proposal does include works within Bolong Road, with the connection of the development to the proposed Gas Pipeline which is to be located on the north side of Bolong Road. This will be undertaken by underboring.

> 2. *A hydraulic impact assessment is required to ensure that the proposed development will not adversely increase flood hazard and damage to other properties or adversely affect flood behaviour for a 5% AEP up to the PMF Scenario. Besides, flood related development controls (Chapter G9, Shoalhaven Development Control Plan 2014) need to be assessed appropriately.*

Comment

The proposal is supported by a Flood Compliance Assessment prepared by WMAwater (**Annexure 5**).

# 5.0 PROPOSED MODIFICATION TO PROJECT APPROVAL MP06_0228

## 5.1 SUMMARY OF MODIFICATION PROPOSAL

**Table 2** below provides a summary of the proposed works associated with this Modification Application.

**Table 2**

**Summary of Proposed Works under Mod 23**

| ***Factory Component*** | ***Proposed Works associated with Modification Application No. 23 (Mod 23)*** |
|---|---|
| ***Modifications to Approved Gas Fired Co-generation Plant*** | |
| Gas Fired Co-generation Plant | • New gas fired cogeneration plant, will consist of two natural gas turbines that will generate an anticipated power output each of 30 MW, providing a total power to the site of 60 MW.<br>• The waste heat from each of the gas turbine exhausts will be used to generate 11 barg steam in two 110 t/hr heat recovery steam boilers. The boilers will be fired with natural gas and will be able to operate at full output when the turbine is offline for maintenance.<br>• The proposed new gas fired co-generation plant will replace the gas fired co-generation plant approved under the original Project Approval as well as the coal fired co-generation plant approved under Mod 16.<br>• In addition to the gas turbines, the proposal will include the erection of four water tanks at the southern end of the gas fired co-generation building. These water tanks will feed supply water for the gas turbine heat recovery boilers to enable the production of steam.<br>• A gas compressor will also be sited to the southern end of the gas fired co-generation building adjacent to the water tanks. The gas fired turbines will operate at a gas pressure of 4000 kpa. The supply from the eastern Gas Pipeline however can only be guaranteed to be supplied at 3500 kpa at Pestells Lane, 5.5 kilometres away from the Plant. A gas compressor is therefore required to be installed to increase the pressure of the gas supplied from the external supplier to the proposed gas fired turbines.<br>• The gas fired co-generation plant will necessitate the construction of a new electrical sub-station which will also be located to the south of the gas fired co-generation plant building. The electrical sub-station will contain controls and switch gear necessary to integrate power generated from the proposed gas fired co-generation plant into the electrical power system for the Shoalhaven Starches factory site.<br>• The proposal will also include the provision of cooling towers within the site of the original approved DDG Dryer No. 6. |

**Table 2 (continued)**

| *Factory Component* | *Proposed Works associated with Modification Application No. 23 (Mod 23)* |
|---|---|
| | • The siting of the proposed cooling towers in the position of the original approved DDG Dryer No. 6 will require the relocation of the approved but yet to be constructed No. 6 DDG Dryer to the south of the existing No. 4 DDG Dryer.<br>• The Modification Proposal also includes the slight re-alignment of the approved pipe bridge that will connect the gas supply from the approved gas pipeline the gas fired co-generation plant. This pipe bridge has an approved height of 18 metres above ground level. The height of this pipe bridge does not change under this Modification Proposal; only its alignment. |

## 5.2 MODIFICATIONS TO APPROVED GAS FIRED CO-GENERATION PLANT

The original Project Approval included provision for a gas fired co-generation plant that was to be situated within the western part of the factory site. This gas fired co-generation plant was to comprise two gas turbine generators that would deliver an anticipated net power output of 40 MW of power for the site.

Under Mod 16 the Independent Planning Commission approved an additional coal fired co-generation plant. This coal fired co-generation plant was to be sited immediately to the south of the existing Boiler House complex situated to the east of Abernethy's Creek. This coal fired co-generation plant would generate a total of 15 MW of power for the site.

Neither the approved gas nor coal fired co-generation plants have been constructed to date.

As the Department is aware following the original Project Approval Shoalhaven Starches have obtained approval and / or are seeking approval for a range of Mods to the original Project including such projects as:

- Construction of Starch Dryer No. 5 (Mod 7);
- Modification to the existing Ethanol Distillery (Mod 12);
- Installation of additional Flour Mill (Mod 16);
- Construction of New Product Dryer (Mod 16);
- Proposed Ethanol Plant upgrade to increase proportion of Beverage Grade Ethanol (Mod 19).

Shoalhaven Starches are forecasting that the electrical power load demand created by these and other additional works, subsequent to the original Project Approved development, will exceed the power supply capacity of the gas fired co-generation plan approved under the

original Project Approval; as well as the additional coal fired co-generation plant approved under Mod 16.

Shoalhaven Starches now propose to construct a new gas-fired co-generation plant essentially in the same location as the original approved gas fired co-generation plant within the western part of the factory site. The new gas fired cogeneration plant, will consist of two natural gas turbines that will generate an anticipated power output each of 30 MW, providing a total power to the site of 60 MW. **Plate 1** below provides a view of the type of plant that is proposed.

The waste heat from each of the gas turbine exhausts will be used to generate 11 barg steam in two 110 t/hr heat recovery steam boilers. The boilers will be fired with natural gas and will be able to operate at full output when the turbine is offline for maintenance.

**Plate 1:** View of gas fired co-generation plant.

The proposed new gas fired co-generation plant will replace the gas fired co-generation plant approved under the original Project Approval as well as the coal fired co-generation plant approved under Mod 16 (**Figure 5**).

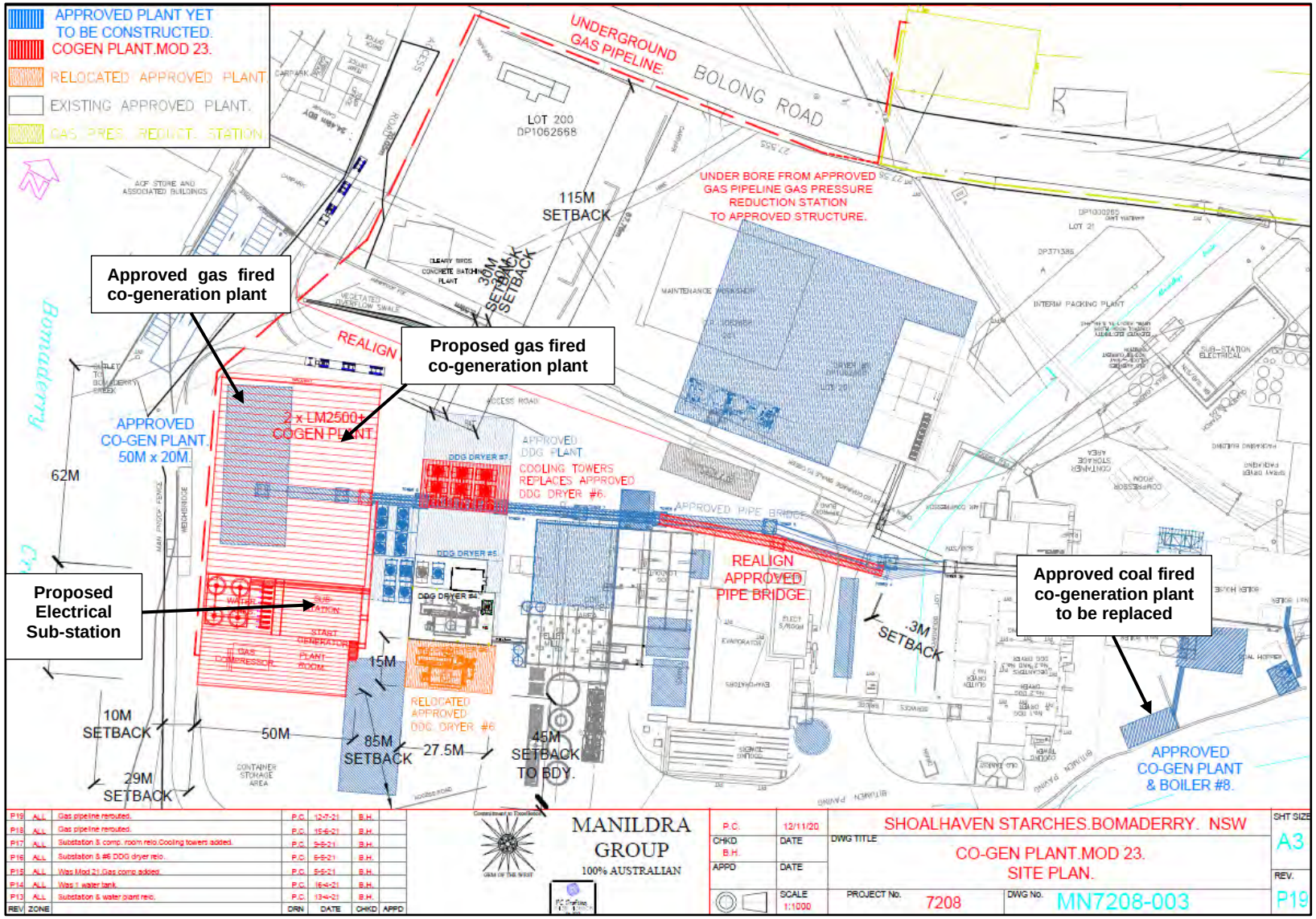


**Figure 5: Site Plan showing location of approved and proposed gas fired co-generation plant and location of coal fired co-generation plant which is to be replaced**

The proposed gas fired co-generation plant will be supplied with natural gas; and will be connected to Shoalhaven Starches internal electrical and steam distribution systems. In doing so this new gas fired co-generation plant is forecasted by Shoalhaven Starches to be able to supply the anticipated power load for both recent approved and proposed modifications to the Project Approved development.

The proposed cogeneration plant to be built at the Shoalhaven Starches facility is a continuous process based on two natural gas fired turbines, each coupled to a generator capable of generating up to 30 MW of power each at 11kV. The power will be connected to the site's main substation for distribution through the existing electrical distribution network.

The exhaust gasses from the turbines will be ducted into two heat recovery steam generators (HRSG) which capture the waste heat from the exhaust in conjunction with co-firing of natural gas to produce up to 110 T/hr of saturated steam per HRSG at 1100 kPa.

Each HRSG has a stack for emission of the combined exhaust gases from the turbine and HRSG.

*Natural Gas Supply*

Natural gas will be supplied to the cogeneration plant at 4000 kPa for supply to the turbines. The gas is further reduced to 500 kPa for supply to the co-firing of the HRSGs. Under maximum output conditions, natural gas consumption will be 12293 kg/hr for the turbines and 5455 kg/hr for the HRSGs.

*Steam Supply*

Steam is supplied from the cogeneration plant at 1100kPa and will be transported via a pipebridge to the existing site boiler house for distribution through the existing steam network. The cogeneration plant has a capacity of 220 T/hr.

*Condensate*

Condensate will be returned from the existing process plant via the Boilerhouse and the pipebridge at 100°C and provides 70% of the water requirements for the operation of the HRSGs. Condensate is returned directly to the deaerators of the HRSGs.

*Makeup Water*

Makeup water will be supplied at ambient temperature from the Boilerhouse via the pipebridge and provides the remainder of the water supply required for operation of the HRSGs. A 250 $m^3$ makeup water storage tank, equivalent to ~4 hours of makeup water supply, will be installed on the cogeneration plant. The makeup water is preheated prior to supply to the deaerators.

*Electricity Supply*

Power will be supplied from the cogeneration plant at 11kV and will be reticulated via cabling on the pipebridge to the existing main substation for distribution through the existing electricity network. The cogeneration plant has a capacity of 60 MW.

*Electricity Supply - Synchronization*

The generators will be connected in parallel with the external electricity supply network. To prevent a catastrophic failure of the electrical infrastructure, the generators must be "in phase" with the network prior to connection in a process known as synchronization. The generator control system adjusts the throttle of the turbine to correct the frequency and phase of the generator and adjusts the excitation voltage of the generator to correct the voltage output, such that these values correspond with the external supply. Prior to the closing of a critical circuit breaker, a "check sync" protection relay on the circuit breaker compares the frequency and phase across the circuit breaker to allow closing of the circuit breaker.

*Electricity Supply – Reverse Power Protection*

To prevent the export of power from the Shoalhaven Starches cogeneration plant, a protection scheme will be provided to monitor the direction of power flow and will trip the incoming supply circuit breakers on detection of any export. The setting of the reverse power protection scheme will be determined in consultation with the local supply authority.

*Automatic Control*

Automatic control of the cogeneration plant will be via a vendor supplied control system comprising Wodward Micronet+ controllers and RX3i sequencers. Turbine combustion control is achieved by modulation of an electronically controlled fuel metering valve that adjusts the fuel supply to the turbine. The fuel is mixed with the air flowing through the turbine before ignition in the combustor section. The Micronet+ controller monitors the combustion process for abnormal conditions and initiates pre-determined control actions including trip of the turbine.

The original approved gas fired cogeneration plant was to comprise a structure with a footprint of 1000 $m^2$ and a height of almost 20 metres; while the coal fired co-generation plant was to be housed within an overall building footprint with an area of almost 430 $m^2$ and height of 40 metres (boiler stack).

The new gas fired co-generation plant will be housed within a building comprising dimensions of 62 metres by 50 metres providing a footprint of 3100 $m^2$, and a height above ground level of 20.5 metres , with the exhaust stacks for the gas turbines rising to 45 metres above ground level (**Figure 6**).

In addition to the gas turbines, the proposal will include the erection of four water tanks at the southern end of the gas fired co-generation building. These water tanks will each have a height above ground level of 21.6 metres. These water tanks will be feed water tanks to supply water for the gas turbine heat recovery boilers to enable the production of steam.

A gas compressor will also be sited to the southern end of the gas fired co-generation building adjacent to the water tanks. The gas fired turbines will operate at a gas pressure of 4000 kpa. The supply from the eastern Gas Pipeline however can only be guaranteed to be supplied at 3500 kpa at Pestells Lane, 5.5 kilometres away from the Plant. A gas compressor is therefore required to be installed as part of this Modification Proposal to increase the pressure of the gas supplied from the external supplier to the proposed gas fired turbines.

The water tanks and gas compressor are also shown in **Figure 6** below.

The gas fired co-generation plant will necessitate the construction of a new electrical sub-station which will also be located to the south of the gas fired co-generation plant building. The electrical sub-station will contain controls and switch gear necessary to integrate power generated from the proposed gas fired co-generation plant into the electrical power system for the Shoalhaven Starches factory site (**Figure 7**).

The proposal will also include the provision of cooling towers within the site of the original approved DDG Dryer No. 6.

The siting of the proposed cooling towers in the position of the original approved DDG Dryer No. 6 will therefore require the relocation as part of this Modification Proposal the approved by yet to be constructed No. 6 DDG Dryer to the south of the existing No. 4 DDG Dryer (**Figure 5**).

The Modification Proposal also includes the slight re-alignment of the approved pipe bridge that will connect the gas supply from the approved gas pipeline the gas fired co-generation plant. This pipe bridge has an approved height of 18 metres above ground level. The height of this pipe bridge does not change under this Modification Proposal; only its alignment.

The proposed new gas fired co-generation plant will replace the gas fired co-generation plant approved under the original Project Approval as well as the coal fired co-generation plant approved under Mod 16.

In addition to the above it is proposed that the existing coal fired boilers on the site will be fitted with natural gas burners. Consequently, coal will no longer be used on the site following the commissioning of the new plant.

As a result greenhouse gas emissions and intensity will be reduced as coal will no longer be used on the site.

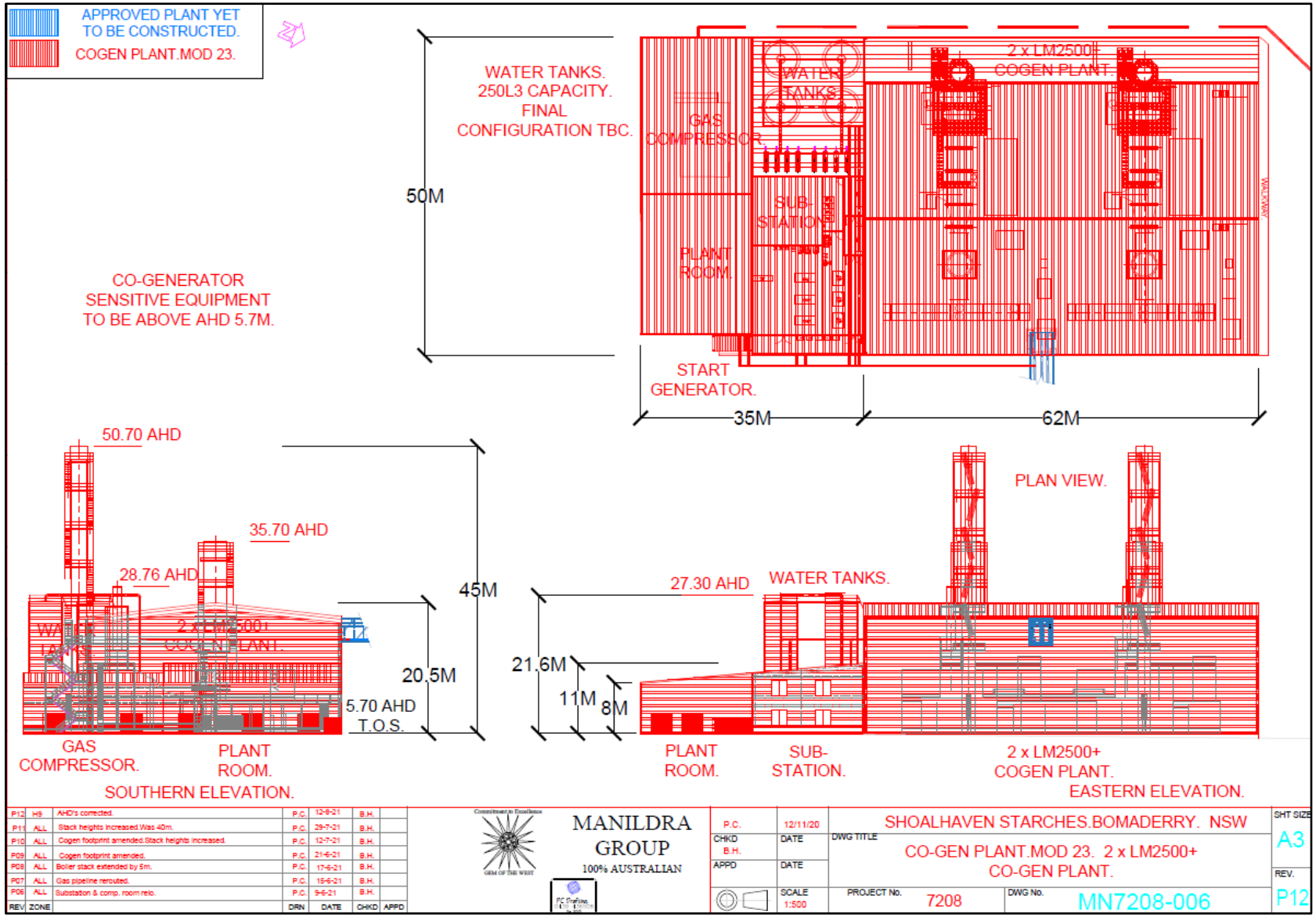


**Figure 6: Floor plan and elevations of gas fired co-generation building and associated plant.**

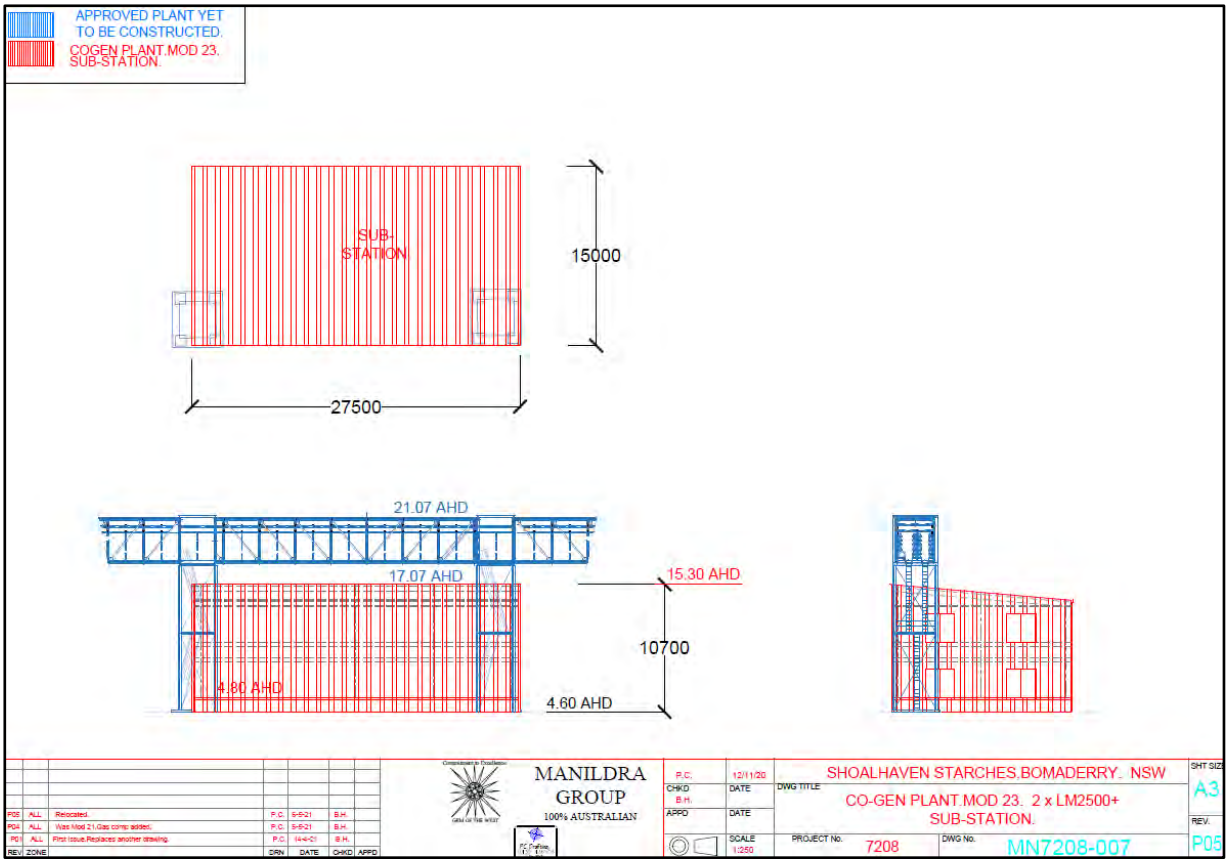


**Figure 7: Floor plan and elevations of electrical substation.**

A drawing set of the works associated with this Modification Proposal are included as **Annexure 2** to this SEE.

# 6.0 SECTION 4.55(2) OF THE EP&A ACT

This application is made pursuant to Section 4.55(2) of the Environmental Planning & Assessment (EP&A) Act.

Section 4.55(2) of the EP&A Act reads:

> *(2)* ***Other modifications***
>
> *A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if—*
>
> *(a) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all), and*
>
> *(b) it has consulted with the relevant Minister, public authority or approval body (within the meaning of Division 4.8) in respect of a condition imposed as a requirement of a concurrence to the consent or in accordance with the general terms of an approval proposed to be granted by the approval body and that Minister, authority or body has not, within 21 days after being consulted, objected to the modification of that consent, and*
>
> *(c) it has notified the application in accordance with—*
>
> *(i) the regulations, if the regulations so require, or*
>
> *(ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and*
>
> *(d) it has considered any submissions made concerning the proposed modification within the period prescribed by the regulations or provided by the development control plan, as the case may be.*
>
> *Subsections (1) and (1A) do not apply to such a modification.*

Fundamentally an application made pursuant to Section 4.55(2) must demonstrate that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified.

Such an assessment would typically need to appreciate both the qualitative and quantitative aspects of the development being compared in its proper context as described by Bignold J at paragraphs 54 to 56 in *Moto Projects (No.2) Pty Ltd v North Sydney C [1999] NSWLEC 280*. This judgment includes the following comments:

> *54. The relevant satisfaction required by* ***s 96(2)(a)*** *to be found to exist in order that the modification power be available involves an ultimate finding of fact based upon the primary facts found. I must be satisfied that the modified*

*development is substantially the same as the originally approved development.*

*55. The requisite factual finding obviously requires a comparison between the development, as currently approved, and the development as proposed to be modified. The result of the comparison must be a finding that the modified development is "essentially or materially" the same as the (currently) approved development.*

*56. The comparative task does not merely involve a comparison of the physical features or components of the development as currently approved and modified where that comparative exercise is undertaken in some type of sterile vacuum. Rather, the comparison involves an appreciation, qualitative, as well as quantitative, of the developments being compared in their proper contexts (including the circumstances in which the development consent was granted).*

The *Modifying an Approved Project* draft guidelines produced as part of the *Draft Environmental Impact Assessment Guidance Serie*s by the NSW Department of Planning and Environment in June 2017, provides some guidance when assessing modifications of State Significant development:

*For SSD, a proponent must demonstrate that the change, if carried out, would result in a development that would be substantially the same development as the original development. In order to draw this conclusion, a proponent must have regard to the following considerations, which have been established through decisions of the NSWLEC:*

- *''Substantially'' means ''essentially or materially'' or ''having the same essence.''*
- *A development can still be substantially the same even if the development as modified involves land that was not the subject of the original consent (provided that the consent authority is satisfied that the proposal is substantially the same).*
- *If the development as modified, involves an ''additional and distinct land use'', it is not substantially the same development.*
- *Notwithstanding the above, development as modified would not necessarily be substantially the same solely because it was for precisely the same use as that for which consent was originally granted.*
- *To determine whether something is ''substantially the same'' requires a comparative task between the whole development as originally approved and the development as proposed to be modified. In order for the proposal to be ''substantially the same'', the comparative task must:*
    - *result in a finding that the modified development is ''essentially or materially'' the same*
    - *appreciate the qualitative and quantitative differences in their proper context*
    - *in addition to the physical difference, consider the environmental impacts of proposed Modification Applications to approved developments.*

> ***''Substantially'' means ''essentially or materially'' or ''having the same essence.''***

Comment

It is considered the modification proposal is substantially the same as that approved and is development that could be considered "*materially the same as that previously approved".* Furthermore, it is considered that the modifications proposed are of the same '*essence'* as the approved development given that:

- the proposal maintains the current land use approved at the site and does not seek to alter the over-riding character of development;
- the proposed built form is substantially the same as that already approved, in that development is to consist of industrial buildings, plant and equipment located within the general confines of the Shoalhaven Starches factory site;
- The proposed modifications do not represent an expansion of the of Shoalhaven Starches' footprint and the majority of the modifications will be located within the main factory site; and
- The proposed buildings maintain the same form as that approved with due consideration given in the Modification Application to relevant issues pertaining to air quality, noise and flood impacts.
- The proposal does not seek to increase overall production from the site as outlined under the Project Approval as modified nor will it involve the generation of any additional significant environmental impacts.

> ***A development can still be substantially the same even if the development as modified involves land that was not the subject of the original consent (provided that the consent authority is satisfied that the proposal is substantially the same).***

Comment

The proposal does not involve land that was not the subject of the approval which was in place at the time that the Shoalhaven Starches Expansion Project site transitioned from the Transitional Part 3A provisions to being assessed as State Significant Development

> ***If the development as modified, involves an ''additional and distinct land use'', it is not substantially the same development.***

Comment

The proposal does not involve an *''additional and distinct land use'.* None of the proposed modifications represent an additional and distinct land use. Whilst this modification proposal involves a number of individual components these modifications all relate to existing approved development on the site.

***Notwithstanding the above, development as modified would not necessarily be substantially the same solely because it was for precisely the same use as that for which consent was originally granted.***

Comment

Whilst this this Modification Application seeks to increase the scale of the approved Gas Fired Coal Generation Plant, this has come about to meet the power demands of the development of the overall site as approved.

***To determine whether something is ''substantially the same'' requires a comparative task between the whole development as originally approved and the development as proposed to be modified. In order for the proposal to be ''substantially the same'', the comparative task must:***

- ***result in a finding that the modified development is ''essentially or materially'' the same***
- ***appreciate the qualitative and quantitative differences in their proper context***
- ***in addition to the physical difference, consider the environmental impacts of proposed Modification Applications to approved developments.***

Comment

Quantitatively, the proposal does not represent any increases in production in the terms of processing of flour and starch / gluten or overall ethanol production.

The qualitative elements of the proposal demonstrate that the environmental and amenity impacts of the modification proposal are limited and justifies this proposal being considered as a modification.

This proposal will not expand the overall footprint of the approved Shoalhaven Starches factory. All of the proposed modifications are located within the existing Shoalhaven factory site. The proposed development will have a limited additional visual impact. The bulk, character and scale of the structures associated with this modification application will not be dissimilar to that of other industrial type development associated with the existing factory site. Furthermore, the proposed works will be sited within proximity of similar structures of a similar nature. The works will be sited in the midst of the existing factory complex and will be viewed within this context.

The SEE is supported by the following expert assessments:

- An Air Quality Assessment by GHD which concludes the proposal should be acceptable from an air quality perspective.
- An Environmental Noise Impact Assessment by Harwood Acoustics that makes recommendations to reduce noise levels to ensure compliance with noise limits prescribed by the EPL for the overall site.

- A Flood Compliance Report by WMA Water concludes that there is no change in the 1% AEP flood level outside the Shoalhaven Starches plant as a result of the proposed Modification.
- A Preliminary Hazard Analysis (PHA) prepared by Pinnacle Risk Management demonstrates the Modification Proposal will comply with all risk criteria; and also societal risk, area cumulative risk and environmental risk will be acceptable.
- A Riverbank Stability Assessment prepared by GHD that demonstrates the proposed co-generation plant, founded on piles, will not adversely affect the stability of the eastern bank of Bomaderry Creek.
- A Greenhouse Gas Emissions Assessment prepared by GHD (**Annexure 8**) which demonstrates the works associated with the Modification Application are projected to reduce the site operational greenhouse gas emissions.

The works associated with this modification application do not represent an additional and or distinct land use as all proposed modifications facilitate and improve the existing approved production processes.

The proposal will not comprise any qualitative or quantitative changes in overall production from the site. The proposal essentially seeks to ensure that the site will be able to generate sufficient electrical power to accommodate the demand of the approved (as modified) development.

The modified proposal represents a scale of development that will be commensurate with the bulk, scale and character of the approved development.

As is evident from the expert consultant assessments that support the Modification Application the Modified proposal will not result in any significant qualitative or quantitative environmental impacts when compared to the approved development. The modification proposal will therefore have a minimal environmental impact.

It is our view that the development is substantially the same as approved Project. As such the modification proposal is considered consistent with provisions of Section 4.55(1A) of the Act in this instance.

Given the above circumstances it is our view that the modification proposal; will have minimal environmental impacts when compared to the original approved development; and the development as modified by this modification application will be substantially the same development as the development for which consent was originally granted having regard to both the qualitative and quantitative elements of that development.

# 7.0 SECTION 4.15(1)(A) – ENVIRONMENTAL PLANNING PROVISIONS

In determining an application made pursuant to Section 4.55 of the EP&A Act the consent authority must take into consideration such of the matters referred to in Section 4.15(1) as are of relevance to the development the subject of the application.

## 7.1 ENVIRONMENTAL PLANNING INSTRUMENTS

### 7.1.1 State Environmental Planning Policies

**Table 3** details State Environmental Planning Policies (SEPP) that apply to the land and whether they are applicable to the proposal.

**Table 3**

**State Environmental Planning Policies that Apply to the Subject Site**

| ***State Environmental Planning Policy*** | ***Applicable Yes/No*** |
|---|---|
| State Environmental Planning Policy (Affordable Rental Housing) 2009 (pub. 2009-07-31) | No |
| State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004 (pub. 2004-06-25) | No |
| State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 (pub. 2008-12-12) | No |
| State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 (pub. 2004-03-31) | No |
| State Environmental Planning Policy (Infrastructure) 2007 (pub. 2007-12-21) | Yes |
| State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (pub. 2007-02-16) | No |
| State Environmental Planning Policy (Miscellaneous Consent Provisions) 2007 (pub. 2007-09-28) | No |
| State Environmental Planning Policy No 1-Development Standards \|(pub. 1980-10-17) | No |
| State Environmental Planning Policy No 21-Caravan Parks (pub. 1992-04-24) | No |
| State Environmental Planning Policy No 30-Intensive Agriculture (pub. 1989-12-08) | No |
| State Environmental Planning Policy No 33-Hazardous and Offensive Development (pub. 1992-03-13) | Yes |
| State Environmental Planning Policy No 36-Manufactured Home Estates (pub. 1993-07-16) | No |
| State Environmental Planning Policy No 50-Canal Estate Development (pub. 1997-11-10) | No |
| State Environmental Planning Policy No 55-Remediation of Land (pub. 1998-08-28) | No |

**Table 3 (continued)**

| ***State Environmental Planning Policy*** | ***Applicable Yes/No*** |
|---|---|
| State Environmental Planning Policy No 62-Sustainable Aquaculture (pub. 2000-08-25) | No |
| State Environmental Planning Policy No 64-Advertising and Signage (pub. 2001-03-16) | No |
| State Environmental Planning Policy No 65-Design Quality of Residential Apartment Development (pub. 2002-07-26) | No |
| State Environmental Planning Policy No 70-Affordable Housing (Revised Schemes) (pub. 2002-05-01) | No |
| State Environmental Planning Policy (Primary Production and Rural Development) 2019 | No |
| State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017: Subject Land (pub. 2017-08-25) | No |
| State Environmental Planning Policy (Coastal Management) 2018 | Yes |

***SEPP – Infrastructure***

This SEPP aims to facilitate the effective delivery of infrastructure across the state and that appropriate agencies are made aware of and are given an opportunity to make representations in respect of certain development, including traffic generating developments. Division 17 relates to Road and Traffic infrastructure while Schedule 3 of the SEPP outlines traffic generating development which requires referral to Roads and Maritime Services (RMS). The proposal does not trigger the criteria in this Schedule that would warrant the development application being referred to the RMS, and therefore the provisions of this SEPP would not apply to this proposal.

Schedule 3 includes the following criteria that may have relevance to this proposal:

| ***Development purpose*** | ***Column 1: Size or capacity – site with access to any road*** | ***Column 2 Size or capacity—site with access to classified road or to road that connects to classified road (if access within 90m of connection, measured along alignment of connecting road)*** |
|---|---|---|
| Car parks | 200 or more car parking spaces | 50 or more car parking spaces |
| Industry | 20,000m$^2$ in site area or (if the site area is less than the gross floor area) gross floor area | 5,000 m$^2$ in site area or (if the site area is less than the gross floor area) gross floor area |
| Any other purpose | 200 or more motor vehicles per hour | 50 or more motor vehicles per hour |

The modification proposal does not specifically trigger the above criteria. Under these circumstances the RMS is not required to be notified of this proposal.

***SEPP No.33 – Hazardous and Offensive Development***

The objectives of SEPP No. 33 are set out in clause 2 of the SEPP and include:

*(a) to amend the definitions of hazardous and offensive industries where used in environmental planning instruments, and*

*(b) to render ineffective a provision of any environmental planning instrument that prohibits development for the purpose of a storage facility on the ground that the facility is hazardous or offensive if it is not a hazardous or offensive storage establishment as defined in this Policy, and*

*(c) to require development consent for hazardous or offensive development proposed to be carried out in the Western Division, and*

*(d) to ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account, and*

*(e) to ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact, and*

*(f) to require the advertising of applications to carry out any such development.*

The Modification Proposal is supported by a Preliminary Hazard Analysis prepared by Pinnacle Risk Pty Ltd in accordance with the provisions of this SEPP (**Annexure 6**). Pinnacle Risk have undertaken a review of the works associated with this current Modification Proposal and assessed and compared the proposed works against relevant risk criteria.

***SEPP (Coastal Management) 2018***

*This SEPP seeks* to promote an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the *Coastal Management Act 2016* by:

*a) managing development in the coastal zone and protecting the environmental assets of the coast, and*

*b) establishing a framework for land use planning to guide decision-making in the coastal zone, and*

*c) mapping the 4 coastal management areas which comprise the NSW coastal zone, in accordance with the definitions in the Coastal Management Act 2016.*

This Policy applies to land within the coastal zone. Section 5 of the *Coastal Management Act 2016* provides that the ***coastal zone*** means the area of land comprised of the following coastal management areas:

a) the coastal wetlands and littoral rainforests area,

b) the coastal vulnerability area,

c) the coastal environment area,

d) the coastal use area.

Part 2 of the Coastal Management SEPP stipulates the Development Controls for Coastal Management Areas. Division 1 outlines the controls to be applied to development in the Coastal Wetlands and Littoral Rainforests Area.

***Coastal Wetlands and Littoral Rainforests Area.***

Mapping supporting the SEPP outlines the subject land is not mapped as containing coastal wetlands or littoral rainforest.

***Coastal Environment Area***

Division 3 of the SEPP stipulates the controls to be applied to development in the Coastal Environment Area.

The subject land is mapped under the NSW Coastal Management SEPP Mapping as being located within the Coastal Environment Area as seen below in **Figure 8**.

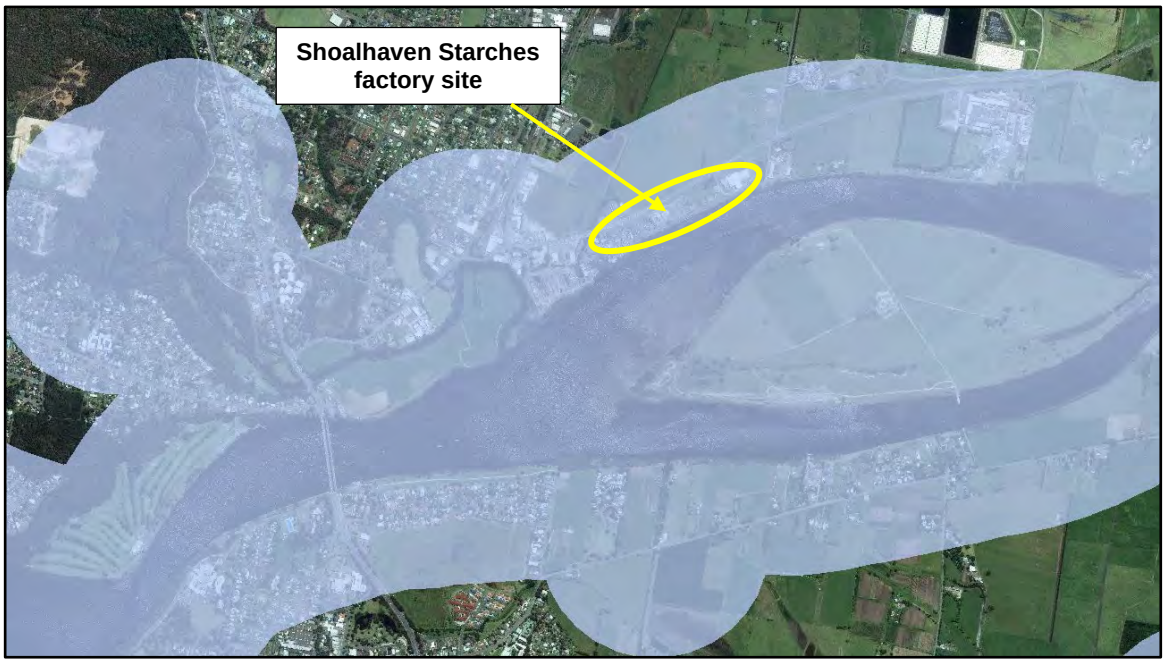


**Figure 8: NSW Coastal Management SEPP: Coastal Environment Area Map.**

Clause 13 of the SEPP specifies matters that must be considered in determining development applications on land within the Coastal Environment Area. Clause 13 reads:

*1) Development consent must not be granted to development on land that is within the coastal environment area unless the consent authority has*

*considered whether the proposed development is likely to cause an adverse impact on the following:*

*a) the integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment,*

*b) coastal environmental values and natural coastal processes,*

*c) the water quality of the marine estate (within the meaning of the Marine Estate Management Act 2014), in particular, the cumulative impacts of the proposed development on any of the sensitive coastal lakes identified in Schedule 1,*

*d) marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms,*

*e) existing public open space and safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,*

*f) Aboriginal cultural heritage, practices and places,*

*g) the use of the surf zone.*

*2) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:*

*a) the development is designed, sited and will be managed to avoid an adverse impact referred to in subclause (1), or*

*b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or*

*c) if that impact cannot be minimised—the development will be managed to mitigate that impact.*

Comment:

- The proposal is not near a headland or rock platform and as such does not impact on public access to these areas.
- The proposal will not adversely impact on the visual amenity and scenic qualities of the coast.
- The proposal involves works within an existing developed industrial site and is unlikely to impact on items of Aboriginal cultural heritage.
- The proposal involves works within an existing developed industrial site and will not impact upon the integrity or resilience of the biophysical or ecological environment.
- The proposal will incorporate erosion and sediment control measures to minimise impact on the water quality of the adjoining watercourses.
- The proposal will not involve any significant adverse impact on marine or native vegetation.
- The proposed development is not located within close proximity to the surf zone and will not impact on coastal environmental values or natural coastal processes.

***Coastal Use Area***

Division 4 of the SEPP specifies the controls to be applied to development in the Coastal Use Area. The subject land is also within the Coastal Use zone as seen below in **Figure 9**. As such the provisions which apply to this mapping are relevant to the proposed development.


**Figure 9: NSW Coastal Management SEPP: Coastal Use Area Map.**

Clause 14 of the SEPP specifies matters that must be considered in determining development applications on land within the Coastal Use Area. Clause 14 reads:

> *(1) Development consent must not be granted to development on land that is within the coastal use area unless the consent authority:*
>
> *(a) has considered whether the proposed development is likely to cause an adverse impact on the following:*
>
> *(i) existing, safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,*
>
> *(ii) overshadowing, wind funneling and the loss of views from public places to foreshores,*
>
> *(iii) the visual amenity and scenic qualities of the coast, including coastal headlands,*
>
> *(iv) Aboriginal cultural heritage, practices and places,*
>
> *(v) cultural and built environment heritage, and*
>
> *(b) is satisfied that:*
>
> *(i) the development is designed, sited and will be managed to avoid an adverse impact referred to in paragraph (a), or*

*(ii) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or*

*(iii) if that impact cannot be minimised—the development will be managed to mitigate that impact, and*

*(c) has taken into account the surrounding coastal and built environment, and the bulk, scale and size of the proposed development.*

Comment:

- The proposal will not impact on existing safe access to the foreshore. The proposal is not near a beach, headland or rock platform and as such does not impact on public access to these areas.
- The works associated with this modification proposal will not cause overshadowing of the foreshore area or wind funnelling. The development will not block views from public places. The proposal will not adversely impact on the visual amenity and scenic qualities of the coast.
- As detailed above, the proposal will not adversely impact on Aboriginal cultural heritage and places.
- The works associated with this modification proposal are of a bulk, scale and size that are consistent with existing industrial development on the site and will not create an adverse visual impact in this locality.

Under these circumstances the proposal is considered to be consistent with the objectives

### 7.1.2 Local Environmental Plan

***Shoalhaven Local Environmental Plan 2014***

The parcels of land associated with this modification application are zoned IN1 General Industrial under the provisions of the Shoalhaven LEP 2014 (refer **Figure 10**).

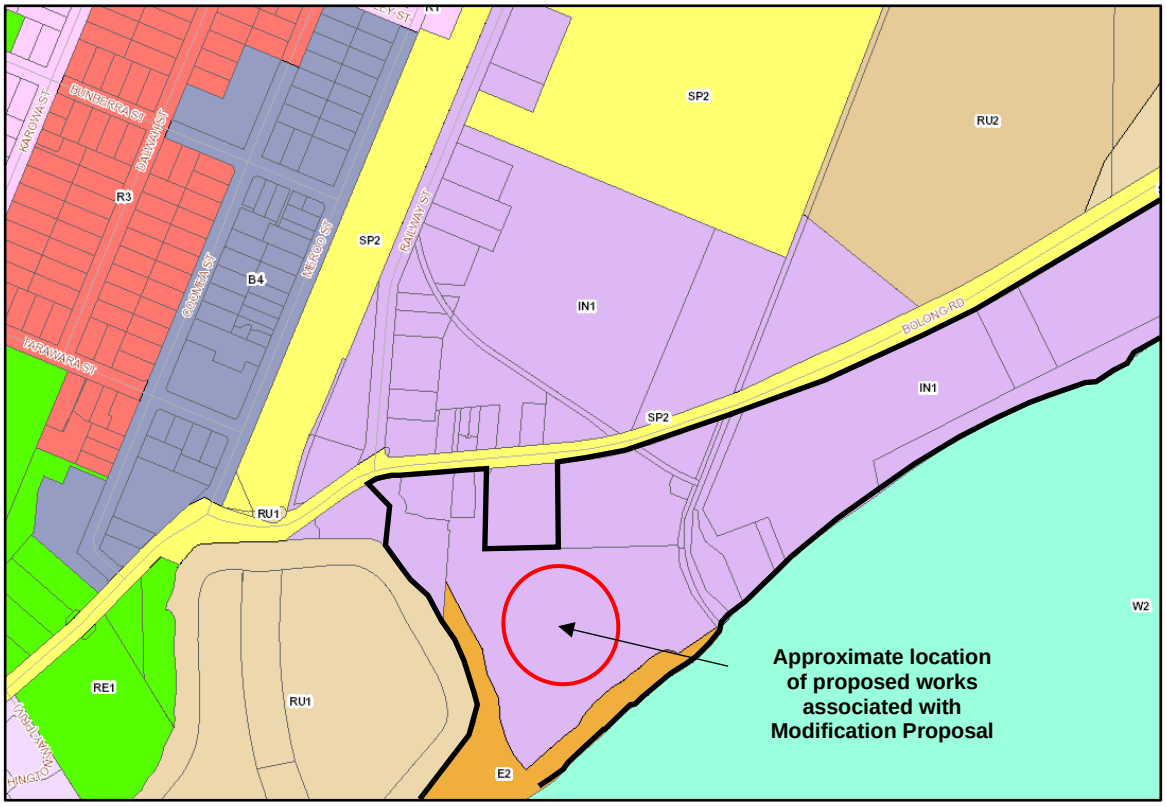


**Figure 10: Extract of zoning map under the SLEP 2014.**

The objectives of the IN1 zone are:

- *To provide a wide range of industrial and warehouse land uses.*
- *To encourage employment opportunities.*
- *To minimise any adverse effect of industry on other land uses.*
- *To support and protect industrial land for industrial uses.*
- *To allow a diversity of activities that do not significantly conflict with the operation of existing or proposed development.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of workers in the area.*

It is our view that the proposal is consistent with these objectives as the proposal involves modifications to an existing industrial facility.

"*General industries*" are permissible within the IN1 zone subject to consent (**Table 4**). The proposal involves modifications to an existing industrial development and is therefore permissible with consent.

**Table 4**
**Land Use Permissibility – IN1 Zone (Shoalhaven LEP 2014)**

| | |
|---|---|
| **Permitted without consent** | Nil. |
| **Permitted with consent** | Bulky goods premises; Depots; Freight transport facilities; **General industries**; Industrial training facilities; Kiosks; Light industries; Markets; Neighbourhood shops; Roads; Take away food and drink premises; Timber yards; Warehouse or distribution centres |
| **Prohibited** | Agriculture; Air transport facilities; Airstrips; Amusement centres; Animal boarding or training establishments; Camping grounds; Caravan parks; Cemeteries; Charter and tourism boating facilities; Child care centres; Correctional centres; Crematoria; Eco-tourist facilities; Educational establishments; Environmental facilities; Exhibition villages; Extractive industries; Farm buildings; Forestry; Function centres; Health services facilities; Highway service centres; Home-based childcare; Home businesses; Home occupations; Home occupations (sex services); Information and education facilities; Marinas; Mooring pens; Moorings; Office premises; Open cut mining; Places of public worship; Registered clubs; Residential accommodation; Respite day care centres; Restricted premises; Retail premises; Sex services premises; Tourist and visitor accommodation; Water recreation structures; Wharf or boating facilities. |

The SLEP 2014 also has a number of specific provisions that apply to the land. The implications that these provisions have in relation to this proposal are discussed in **Table 5** below:

## Table 5
## Shoalhaven Local Environment Plan Provisions

| ***SLEP 2014 Clause*** | ***Provisions*** | ***Comments*** |
|---|---|---|
| *Clause4.3*<br>*Height of Buildings* | *(1) The objectives of this clause are as follows:*<br>*(a) to ensure that buildings are compatible with the height, bulk and scale of the existing and desired future character of a locality,*<br>*(b) to minimise visual impact, disruption of views, loss of privacy and loss of solar access to existing development,*<br>*(c) to ensure that the height of buildings on or in the vicinity of a heritage item or within a heritage conservation area respect heritage significance.*<br>*(2) The height of a building on any land is not to exceed the maximum height shown for the land on the Height of Buildings Map.*<br>*(2A) If the Height of Buildings Map does not show a maximum height for any land, the height of a building on the land is not to exceed 11 metres.* | Although there is no maximum height specified for the subject land, Clause 4.3(2A) imposes a maximum building height of 11 m where no specific height limit is designated.<br>The proposal will involve the erection of an emissions stack with a height of 45 metres above ground level; water tanks with a height of 21.6 metres above ground level; and the Gas Fired Co-generation Plant building with a height of 20.5 metres above ground level; and re-aligned pipe bridge 18 metres above ground level; and therefore all these structures will be above the 11 metres height limit.<br>Under these circumstances this SEE is supported by a Written Request made pursuant to Clause 4.6 (**Annexure 9**) justifying non-compliance with this maximum building height limit. |
| *Clause 4.6*<br>*Exceptions to development standards* | *(1) The objectives of this clause are as follows:*<br>*(a) to provide an appropriate degree of flexibility in applying certain development standards to particular development,*<br>*(b) to achieve better outcomes for and from development by allowing flexibility in particular circumstances.*<br>*(2) Development consent may, subject to this clause, be granted for development even though the development would contravene a development standard imposed by this or any other environmental planning instrument. However, this clause does not apply to a development standard that is expressly excluded from the operation of this clause.*<br>*(3) Development consent must not be granted for development that contravenes a development standard unless the consent authority has considered a written request from the applicant that seeks to justify the contravention of the development standard by demonstrating:*<br>*(a) that compliance with the development standard is unreasonable or unnecessary in the circumstances of the case, and* | The proposal will involve the erection of a range of structures that will exceed the 11 metres building height limit set by Clause 4.3(2A).<br>The proposed development will be erected within the broader approved Shoalhaven Starches factory site.<br>As the proposed works will be built within the existing industrial complex it is not expected that the new structures will have an undue effect due to its height.<br>This Modification Application is supported by a Clause 4.6 Written Request justifying a departure to Clause 4.3(2A) under the specific circumstances of this case. |

**Table 5 (continued)**

| *SLEP 2014 Clause* | *Provisions* | *Comments* |
|---|---|---|
| *4.6 continued* | *(b) that there are sufficient environmental planning grounds to justify contravening the development standard.*<br>*(4) Development consent must not be granted for development that contravenes a development standard unless:*<br>*(a) the consent authority is satisfied that:*<br>*(i) the applicant's written request has adequately addressed the matters required to be demonstrated by subclause (3), and*<br>*(ii) the proposed development will be in the public interest because it is consistent with the objectives of the particular standard and the objectives for development within the zone in which the development is proposed to be carried out, and*<br>*(b) the concurrence of the Director-General has been obtained.*<br>*(5) In deciding whether to grant concurrence, the Director-General must consider:*<br>*(a) whether contravention of the development standard raises any matter of significance for State or regional environmental planning, and*<br>*(b) the public benefit of maintaining the development standard, and*<br>*(c) any other matters required to be taken into consideration by the Director- General before granting concurrence.*<br>*(6) Development consent must not be granted under this clause for a subdivision of land in Zone RU1 Primary Production, Zone RU2 Rural Landscape, Zone RU3 Forestry, Zone RU4 Primary Production Small Lots, Zone RU6 Transition, Zone R5 Large Lot Residential, Zone E2 Environmental Conservation, Zone E3 Environmental Management or Zone E4 Environmental Living if:*<br>*(a) the subdivision will result in 2 or more lots of less than the minimum area specified for such lots by a development standard, or* | |

**Table 5 (continued)**

| *SLEP 2014 Clause* | *Provisions* | *Comments* |
|---|---|---|
| *4.6 continued* | *(b) the subdivision will result in at least one lot that is less than 90% of the minimum area specified for such a lot by a development standard.*<br>*Note. When this Plan was made it did not include all of these zones.*<br>*(7) After determining a development application made pursuant to this clause, the consent authority must keep a record of its assessment of the factors required to be addressed in the applicant's written request referred to in subclause (3).* | |
| *Clause 5.10*<br>*Heritage Conservation* | *(1) The objectives of this clause are:*<br>*(a) to conserve the environmental heritage of Shoalhaven; and*<br>*(b) to conserve the heritage significance of heritage items and heritage conservation areas including associated fabric, settings and views; and*<br>*(c) to conserve archaeological sites; and*<br>*(d) to conserve Aboriginal objects and Aboriginal places of heritage significance.*<br>*(2) Development consent is required for any of the following:*<br>*(a) demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):*<br>*(i) a heritage item,*<br>*(ii) an Aboriginal object*<br>*(iii) a building, work, relic or tree within a heritage conservation area,*<br>*(b) altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item,* | There are no heritage items within the subject land, and the subject site is not located within a heritage conservation area.<br>The site is a highly disturbed industrial site that has been used for industrial purposes for decades. No excavation is proposed as such the proposal is not expected to disturb any Aboriginal objects or relics. |

**Table 5 (continued)**

<table>
<tr><th>SLEP 2014 Clause</th><th>Provisions</th><th>Comments</th></tr>
<tr><td>5.10 continued</td><td>
(c) disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being,<br>
discovered, exposed, moved damaged or destroyed,<br>
(d) disturbing or excavating an Aboriginal place of heritage significance,<br>
(e) erecting a building on land:<br>
(i) on which a heritage item is located or that is within a heritage conservation area;<br>
(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance,<br>
(f) subdividing land:<br>
(i) on which a heritage item is located or that is within a heritage conservation area, or<br>
(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.
</td><td></td></tr>
<tr><td>Clause 7.1<br>Acid sulfate soils</td><td>
(1) The objective of this clause is to ensure that development does not disturb, expose or drain acid sulfate soils and cause environmental damage.<br>
(2) Development consent is required for the carrying out of works described in the Table to this subclause on land shown on the Acid Sulfate Soils Map as being of the class specified for those works, except as provided by this clause.
<table>
<tr><th>Class of Land</th><th>Works</th></tr>
<tr><td>1</td><td>Any works.</td></tr>
<tr><td>2</td><td>Works below the natural ground surface.<br>Works by which the watertable is likely to be lowered.</td></tr>
</table>
</td><td>An Acid Sulphate Soils Management Plan in accordance with Condition 21 of the original Project Approval has been formulated for the site. This plan will need to be updated to reflect this modification proposal; however it is not considered necessary, that further assessment is required to be undertaken in relation to this Modification Application in terms of ASS.</td></tr>
</table>

**Table 5 (continued)**

<table>
<tr><th>SLEP 2014 Clause</th><th>Provisions</th><th>Comments</th></tr>
<tr><td>7.1 continued</td><td>
<table>
<tr><td>3</td><td>Works more than 1 metre below the natural ground surface.<br>Works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface.</td></tr>
<tr><td>4</td><td>Works more than 2 metres below the natural ground surface.<br>Works by which the watertable is likely to be lowered more than 2 metres below the natural ground surface.</td></tr>
<tr><td>5</td><td>Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.</td></tr>
</table>
(3) Development consent must not be granted under this clause for the carrying out of works unless an acid sulfate soils management plan has been prepared for the proposed works in accordance with the Acid Sulfate Soils Manual and has been provided to the consent authority.
(4) Despite subclause (2), development consent is not required under this clause for the carrying out of works if:
(a) a preliminary assessment of the proposed works prepared in accordance with the Acid Sulfate Soils Manual indicates that an acid sulfate soils management plan is not required for the works, and
(b) the preliminary assessment has been provided to the consent authority and the consent authority has confirmed the assessment by notice in writing to the person proposing to carry out the works.
(5) Despite subclause (2), development consent is not required under this clause for the carrying out of any of the following works by a public authority (including ancillary work such as excavation, construction of access ways or the supply of power):
(a) emergency work, being the repair of the works of the public authority required to be carried out urgently because the works have been damaged, have ceased to function or pose a risk to the environment or to public health and safety,
</td><td></td></tr>
</table>

**Table 5 (continued)**

| *SLEP 2014 Clause* | *Provisions* | *Comments* |
|---|---|---|
| *7.1 continued* | *(b) routine management work, being the periodic inspection, cleaning, repair or replacement of the works of the public authority (other than work that involves the disturbance of more than 1 tonne of soil).*<br>*(c) minor work, being work that costs less than $20,000 (other than drainage work).*<br>*(6) Despite subclause (2), development consent is not required under this clause to carry out any works if:*<br>*(a) the works involve the disturbance of less than 1 tonne of soil, and*<br>*(b) the works are not likely to lower the watertable.* | |
| *Clause 7.3*<br>*Flood Planning* | *(1) The objectives of this clause are as follows:*<br>*(a) to minimise the flood risk to life and property associated with the use of land,*<br>*(b) to allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change,*<br>*(c) to avoid significant adverse impacts on flood behaviour and the environment.*<br>*(2) This clause applies to land at or below the flood planning level.*<br>*(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development:*<br>*(a) is compatible with the flood hazard of the land, and*<br>*(b) will not significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties, and*<br>*(c) incorporates appropriate measures to manage risk to life from flood, and* | The application is supported by a Flood Compliance Report prepared by WMAwater (**Annexure 5**) which concludes that there is no change in the 1% AEP flood level outside the Shoalhaven Starches plant as a result of the modification proposal. This issue is further addressed in Section 7.2.6 of this SEE. |

**Table 5 (continued)**

| *SLEP 2014 Clause* | *Provisions* | *Comments* |
|---|---|---|
| | *(d) will not significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses, and*<br>*(e) is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding, and*<br>*(f) will not affect the safe occupation or evacuation of the land.*<br>*(4) A word or expression used in this clause has the same meaning as it has in the Floodplain Development Manual (ISBN 0 7347 5476 0) published by the NSW Government in April 2005, unless it is otherwise defined in this Plan.*<br>*(5) (Repealed)* | |
| *Clause 7.4*<br>*Coastal Risk Planning* | *(1) The objectives of this clause are as follows:*<br>*(a) to avoid significant adverse impacts from coastal hazards,*<br>*(b) to ensure uses of land identified as coastal risk are compatible with the risks presented by coastal hazards,*<br>*(c) to enable the evacuation of land identified as coastal risk in an emergency,*<br>*(d) to avoid development that increases the severity of coastal hazards.*<br>*(2) This clause applies to the land identified as "Coastal Risk Planning Area" on the Coastal Risk Planning Map.*<br>*(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development:*<br>*(a) will avoid, minimise or mitigate exposure to coastal processes, and*<br>*(b) is not likely to cause detrimental increases in coastal risks to other development or properties, and*<br>*(c) is not likely to alter coastal processes and the impacts of coastal hazards to the detriment of the environment, and* | The *Coastal Risk Planning Map* that accompanies the SLEP 2014 does not identify the subject land as a "*Coastal Risk Planning Area"*.<br>The provisions of this clause therefore do not apply to the subject site. |

**Table 5 (continued)**

| *SLEP 2014 Clause* | *Provisions* | *Comments* |
|---|---|---|
| *7.4 continued* | *(d) incorporates appropriate measures to manage risk to life from coastal risks, and*<br>*(e) is likely to avoid or minimise adverse effects from the impact of coastal processes and the exposure to coastal hazards, and*<br>*(f) provides for the relocation, modification or removal of the development to adapt to the impact of coastal processes and coastal hazards, and*<br>*(g) has regard to the impacts of sea level rise.*<br>*(4) A word or expression used in this clause has the same meaning as it has in the NSW Coastal Planning Guideline: Adapting to Sea Level Rise (ISBN 978-1-74263-035-9) published by the NSW Government in August 2010, unless it is otherwise defined in this clause.*<br>*(5) In this clause:*<br>***coastal hazard** has the same meaning as in the Coastal Protection Act 1979.* | |
| *Clause 7.5 Terrestrial Biodiversity* | *(1) The objective of this clause is to maintain terrestrial biodiversity, by:*<br>*(a) protecting native flora and fauna,*<br>*(b) protecting the ecological processes necessary for their continued existence, and*<br>*(c) encouraging the recovery of native flora and fauna, and their habitats.*<br>*(2) This clause applies to land:*<br>*(a) identified as "Biodiversity—habitat corridor" or "Biodiversity—significant vegetation" on the Terrestrial Biodiversity Map, and*<br>*(b) situated within 40m of the bank (measured horizontally from the top of the bank) of a natural waterbody.*<br>*(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider:*<br>*(a) whether the development is likely to have:* | The Terrestrial Biodiversity Map that accompanies the SLEP 2014 does not identify the subject land as including areas of Biodiversity - habitat corridor and/or Biodiversity - significant vegetation.<br>Given the developed industrial nature of the site the proposal is unlikely to have any adverse impacts on the ecological value of the land. |

**Table 5 (continued)**

| *SLEP 2014 Clause* | *Provisions* | *Comments* |
|---|---|---|
| *7.5 continued* | *(i) any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and*<br>*(ii) any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and*<br>*(iii) any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and*<br>*(iv) any adverse impact on the habitat elements providing connectivity on the land, and*<br>*(b) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.*<br>*(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:*<br>*(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or*<br>*(b) if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or*<br>*(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.*<br>*(5) For the purpose of this clause:*<br>***bank** means the limit of the bed of a natural waterbody.*<br>***bed,** of a natural waterbody, means the whole of the soil of the channel in which the waterbody flows, including the portion that is alternatively covered and left bear with an increase or diminution in the supply of water and that is adequate to contain the waterbody at its average or mean stage without reference to extraordinary freshets in the time of flood or to extreme droughts.* | |

**Table 5 (continued)**

| *SLEP 2014 Clause* | *Provisions* | *Comments* |
|---|---|---|
| *Clause 7.6*<br>*Riparian land and watercourses* | *(1) The objective of this clause is to protect and maintain the following:*<br>*(a) water quality within watercourses,*<br>*(b) the stability of the bed and banks of watercourses,*<br>*(c) aquatic and riparian habitats,*<br>*(d) ecological processes within watercourses and riparian areas.*<br>*(2) This clause applies to all of the following:*<br>*(a) land identified as "Riparian Land" on the Riparian Lands and Watercourses Map,*<br>*(b) land identified as "Watercourse Category 1", "Watercourse Category 2" or "Watercourse Category 3" on that map,*<br>*(c) all land that is within 50 metres of the top of the bank of each watercourse on land identified as "Watercourse Category 1", "Watercourse Category 2" or "Watercourse Category 3" on that map.*<br>*(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider:*<br>*(a) whether or not the development is likely to have any adverse impact on the following:*<br>*(i) the water quality and flows within the watercourse,*<br>*(ii) aquatic and riparian species, habitats and ecosystems of the watercourse,*<br>*(iii) the stability of the bed and banks of the watercourse,*<br>*(iv) the free passage of fish and other aquatic organisms within or along the watercourse,*<br>*(v) any future rehabilitation of the watercourse and its riparian areas, and*<br>*(b) whether or not the development is likely to increase water extraction from the watercourse, and*<br>*(c) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.* | The *Riparian Lands and Watercourses Map* that accompanies the SLEP 2014 identifies category 1 watercourse (Shoalhaven River and Bomaderry Creek), adjacent to the southern and western boundaries of the Shoalhaven Starches factory site respectively and a category 2 watercourse, Abernethy's Creek, flowing through the factory site (north-south). The proposed works associated with this Modification Application are to be sited 29 metres from the banks of Bomaderry Creek and 45 metres from the banks of the Shoalhaven River (relocated DDG Dryer No. 6).<br>An assessment has been undertaken by GHD in relation to riverbank stability in relation to Bomaderry Creek (**Annexure 8**). This assessment concludes the proposed Co-generation Plant, founded on piles, will not adversely affect the stability of the eastern bank of Bomaderry Creek. |

**Table 5 (continued)**

| *SLEP 2014 Clause* | *Provisions* | *Comments* |
|---|---|---|
| *7.6 continued* | *(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:*<br>*(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or*<br>*(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or*<br>*(c) if that impact cannot be minimised—the development will be managed to mitigate that impact*<br>*(5) For the purpose of this clause:*<br>***bank** means the limit of the bed of a watercourse.*<br>***bed**, of a watercourse, means the whole of the soil of the channel in which the watercourse flows, including the portion that is alternatively covered and left bear with an increase or diminution in the supply of water and that is adequate to contain the watercourse at its average or mean stage without reference to extraordinary freshets in the time of flood or to extreme droughts.* | |
| *Clause 7.7*<br>*Landslide risk and other land degradation* | *(1) The objective of this clause is to maintain soil resources and the diversity and stability of landscapes, including protecting land:*<br>*(a) comprising steep slopes, and*<br>*(b) susceptible to other forms of land degradation.*<br>*(2) This clause applies to the following land:*<br>*(a) land with a slope in excess of 20% (1:5), as measured from the contours of a 1:25,000 topographical map, and*<br>*(b) land identified as "Sensitive Area" on the Natural Resource Sensitivity—Land Map.*<br>*(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider any potential adverse impact, either from, or as a result of, the development in relation to:* | The proposed works involve land that is only partly identified as sensitive land under the SLEP 2014 mapping. In this regard the land upon which the gas-fired co-generation plant is to be situated is not affected by these provisions.<br>The only works likely to be located on land that is affected by these provisions relates to above ground pipe bridge that largely follows the line of the original approved pipe bridge and crosses land already associated with the approved Gluten Dryer No. 8 and Specialty Product Building. Given these circumstances it is not considered this clause will have significant implications for the works associated with this Modification Application. |

**Table 5 (continued)**

| *SLEP 2014 Clause* | *Provisions* | *Comments* |
|---|---|---|
| | *(a) the geotechnical stability of the site, and*<br>*(b) the probability of increased erosion or other land degradation processes.*<br>*(4) Before granting consent to development on land to which this clause applies, the consent authority must be satisfied that:*<br>*(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or*<br>*(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or*<br>*(c) if that impact cannot be minimised – the development will be managed to mitigate that impact.*<br>*(5) In this clause, topographical map means the most current edition of a topographical map, produced by Land and Property Information division of the Department of Finance and Services, that identifies the Council's local government area and boundary.* | As outlined above in relation to Clause 7.6, an assessment has been undertaken by GHD in relation to riverbank stability in relation to Bomaderry Creek (**Annexure 7**). This assessment concludes the proposed Co-generation Plant, founded on piles, will not adversely affect the stability of the eastern bank of Bomaderry Creek. |
| *7.8 Scenic protection* | *(1) The objective of this clause is to protect the natural environmental and scenic amenity of land that is of high scenic value.*<br>*(2) This clause applies to land identified as "Scenic Protection" on the Scenic Protection Area Map.*<br>*(3) In deciding whether to grant development consent for development on land to which this clause applies, the consent authority must:*<br>*(a) consider the visual impact of the development when viewed from a public place and be satisfied that the development will involve the taking of measures that will minimise any detrimental visual impact, and*<br>*(b) consider the number, type and location of existing trees and shrubs that are to be retained and the extent of landscaping to be carried out on the site, and*<br>*(c) consider the siting of the proposed buildings.* | The subject land is <u>not</u> identified as being within a "*Scenic Protection"* area by *Scenic Protection Area Mapping* that accompanies the SLEP 2014.<br>The provisions of this clause therefore do not apply to the subject site.<br>The visual impact associated with this proposal are discussed in Section 7.2.5 of this SEE. |

| ***SLEP 2014 Clause*** | ***Provisions*** | ***Comments*** |
|---|---|---|
| *Clause 7.9*<br>*HMAS Albatross airspace operations* | *(1) The objectives of this clause are as follows—*<br>*(a) to provide for the effective and on-going operation of the HMAS Albatross Military Airfield by ensuring that such operation is not compromised by proposed development that penetrates the Limitation or Operations Surface for that airport,*<br>*(b) to protect the community from undue risk from that operation.*<br>*(2) If a development application is received and the consent authority is satisfied that the proposed development will penetrate the Limitation or Operations Surface, the consent authority must not grant development consent unless it has consulted with the relevant Commonwealth body about the application.*<br>*(3) The consent authority may grant development consent for the development if the relevant Commonwealth body advises that—*<br>*(a) the development will penetrate the Limitation or Operations Surface but it has no objection to its construction, or*<br>*(b) the development will not penetrate the Limitation or Operations Surface.*<br>*(4) The consent authority must not grant development consent for the development if the relevant Commonwealth body advises that the development will penetrate the Limitation or Operations Surface and should not be carried out.*<br>*(5) In this clause—*<br>***Limitation or Operations Surface** means the Obstacle Limitation Surface or the Procedures for Air Navigation Services Operations Surface as shown on the Obstacle Limitation Surface Map or the Procedures for Air Navigation Services Operations Surface Map for the HMAS Albatross Military Airfield.*<br>***Relevant Commonwealth body** means the body, under Commonwealth legislation, that is responsible for development approvals for development that penetrates the Limitation or Operations Surface for the HMAS Albatross Military Airfield* | Consultation with the Department of Defence has been undertaken as part of the preparation of this SEE with respect to the provisions of this clause. The Departments response is included in **Annexure 1** to this SEE. |

### 7.1.3 Development Control Plans (DCP) and Policies

***Shoalhaven Development Control Plan (DCP) 2014***

Given the nature of the works associated with this modification proposal it is considered the provisions of the Shoalhaven DCP 2014 are not directly relevant to this modification application apart from the provisions of *Chapter G9: Development on Flood Prone Land*.

The SEE is supported by a Flood Compliance Report prepared by WMAwater which addresses flooding issues which arise in relation to this Modification Proposal. A copy of the WMAwater submission is included in **Annexure 5** of this SEE. Flooding issues are addressed further in Section 7.2.6 of this SEE.

**Table 6** below is an extract from the WMAwater submission addressing the relevant provisions (section 5.1) of Chapter G9 of the Shoalhaven DCP 2014.

**Table 6**

**Performance Criteria – General (Section 5.1 DCP 2014)**
**Extract from WMAwater Flood Compliance Report**

| ***Performance Criteria*** | ***Response*** |
|---|---|
| **P1 Development or work on flood prone land will meet the following:** | |
| *The development will not increase the risk to life or safety of persons during a flood event on the development site and adjoining land.* | No additional workers will be on the site as a result of the proposed works. |
| *The development or work will not unduly restrict the flow behaviour of floodwaters.* | Refer Hydraulic Impact Assessment. |
| *The development or work will not unduly increase the level or flow of floodwaters or stormwater runoff on land in the vicinity.*<br>*The development or work will not exacerbate the adverse consequences of floodwaters flowing on the land with regard to erosion, siltation and destruction of vegetation.* | The proposed development is within existing built-up industrial land with minimal vegetation on the site. All runoff under existing and future conditions will reach the ground in nearly identical locations and thus the works will have no impact on erosion or siltation. |
| *The structural characteristics of any building or work that are the subject of the application are capable of withstanding flooding in accordance with the requirements of the Council.* | A separate structural report will be provided. |
| *The development will not become unsafe during floods or result in moving debris that potentially threatens the safety of people or the integrity of structures.* | A separate structural report on the potential failure of existing buildings and stored equipment and product will be provided. |
| *Potential damage due to inundation of proposed buildings and structures is minimised.* | Inundation of the site and the proposed plant and / or debris impact may cause damage to electrical and other components feeding the equipment as well as damage to the plant itself. These issues will be considered in an updated Shoalhaven Starches Flood Plan taking into account the proposed works. |

**Table 6 (continued)**

| ***Performance Criteria*** | ***Response*** |
|---|---|
| *The development will not obstruct escape routes for both people and stock in the event of a flood.* | The proposed works will not occupy escape routes or cause workers to become trapped. |
| *The development will not unduly increase dependency on emergency services.* | The works will not increase the number of workers from Shoalhaven Starches who may be subject to flood risk as a result of the proposed works. |
| *Interaction of flooding from all possible sources has been taken into account in assessing the proposed development against risks to life and property resulting from any adverse hydraulic impacts.* | Refer Hydraulic Impact Assessment below. |
| *The development will not adversely affect the integrity of floodplains and floodway's, including riparian vegetation, fluvial geomorphologic environmental processes and water quality.* | The works will be constructed on land that is partly designated as high hazard floodway in the 1% AEP event. The site is industrial land with limited existing vegetation and is beyond the influence of normal fluvial geomorphic processes. The works will have no impact on water quality. |

### 7.1.4 Protection of the Environment Operations Act and Associated Regulations

The existing Shoalhaven Starches factory site and Environmental Farm are subject to an Environmental Protection Licence (EPL) under the Protection of the Environment Operations Act 1997 (POEO Act) (EPL No. 883) issued by the EPA. The licence imposes requirements in terms of:

- discharges to air, water and land;
- irrigation controls;
- management of irrigation;
- maintenance of irrigation reticulation;
- odour control;
- noise.

If approved, the proposed modification may necessitate the terms/provisions of this licence to be also reviewed.

## 7.2 THE LIKELY IMPACTS OF THE DEVELOPMENT, INCLUDING ENVIRONMENTAL IMPACTS ON BOTH NATURAL AND BUILT ENVIRONMENTS, AND SOCIAL AND ECONOMIC IMPACTS IN THE LOCALITY

### 7.2.1 Risk Assessment of Potential Environmental Impacts

The purpose of this section of the SEE is to provide a risk assessment of the potential environmental impacts associated with the modification proposal. This section (**Table 7**) compares the potential impacts from the proposed modification against the approved project. The comparison uses the key environmental impacts assessed in the original EA that supported the original MP06_0228 and summarises the relative change in environmental impacts associated with the proposed modification.

## Table 7

## Risk Assessment

| *Relative Change in Environmental Impact* | *Additional Management or Mitigation Measures Required* | *Significance of Issue with this Modification Proposal* |
|---|---|---|
| **Air Quality (including Odour) Assessment** | | |
| One of the primary issues that was addressed in the original EA for the Shoalhaven Starches Expansion Project concerned the need for a comprehensive air quality assessment (including odour assessment) and reduction of odours as part of the project.<br>This SEE is supported by an air quality assessment prepared by GHD which addresses the relevant aspects of this Modification Application in terms of air quality (including odour) impacts.<br>GHD's assessment concludes that the proposal should be acceptable from an air quality perspective. | GHD do not propose and additional management or mitigation measures for the Modification Proposal. | This issue is further addressed in Section 7.2.2 of this SEE. |
| **Greenhouse Gas Emissions** | | |
| The SEE is supported by a Greenhouse Gas Emissions Assessment prepared by GHD (**Annexure 8**). GHD's assessment concludes in part that overall, there is a significant difference in the emissions associated with the two future increased production scenarios. The scenario without the Modification Proposal would see annual emissions of 812,712 t $CO_2$-e and with the Modification Proposal scenario would see emissions of 471,878 t $CO_2$-e. This represents a 58% difference in emissions between the two scenarios. The major differences between the two scenarios are the elimination of coal, decrease in electricity usage and the increase in natural gas usage. The amount of grid electricity is reduced as the proposed Co-Generation Plant is in operation. | GHD do not propose any additional management or mitigative measures for this Modification Proposal. | This issue is further addressed in Section 7.2.8 of this SEE. |

**Table 7 (continued)**

| *Relative Change in Environmental Impact* | *Additional Management or Mitigation Measures Required* | *Significance of Issue with this Modification Proposal* |
|---|---|---|
| **Transport and Traffic** | | |
| As the approved coal fired co-generation plant approved under Mod 16 will now no longer be pursued as a result of this modification proposal; and the existing coal fired boilers on the site will be converted to gas, coal will no longer need to be transported to the site.<br>As a result heavy vehicle movements to the site are expected to be reduced as coal, fly ash and hydrated lime will no longer be required to enter and exit the site via the western access (Gate 13). At present the site generates the following heavy vehicle movements associated with the coal fired boilers:<br>• 55 truck movements associated with the haulage of coal to the site per week.<br>• The haulage of approximately 55 truck loads of coal ash for use of the Environmental Farm per week.<br>• Two heavy vehicles hauling lime to the site per week.<br>The proposed gas-fired co-generation plant will be fuelled by gas brought to the site by the approved gas pipeline (MP 10_0144 and MP 10_0108). This modification proposal in itself will therefore not generate any additional heavy vehicle movements to and from the site<br>The proposal also involves the conversion of existing coal fired boilers to gas. This Modification Application will therefore result in a reduction of at least 112 heavy vehicles movements per week. As a result it is expected that this Modification will result in a net reduction in overall heavy vehicle movements to the site.<br>Given these circumstances it is considered the proposal will not raise any traffic issues that will require further consideration as part of any Modification Application. | No additional management or mitigative measures are proposed in terms of traffic or car parking. | Not a key issue. This issue is not further addressed in this SEE. |

**Table 7 (continued)**

| *Relative Change in Environmental Impact* | *Additional Management or Mitigation Measures Required* | *Significance of Issue with this Modification Proposal* |
|---|---|---|
| **Site Contamination** | | |
| Coffey Environments as part of their report titled *Preliminary Environmental Site Assessment and Geotechnical Investigation, Proposed Ethanol Expansion, Shoalhaven Starches,, Bolong Road, Bomaderry"* which supported the original Project Application for the Shoalhaven Starches Expansion Project addressed the issue of site contamination including in relation to the western part of the site where the gas fired co-generation plant was originally approved. With respect to the western part of the site where the gas fired co-generation plant was originally approved, Coffey's previously concluded:<br>*No obvious evidence of fill or contamination was noted in the soils at the sampling locations. Concentrations of the potentials chemicals of concern tested as part of this study did not suggest evidence of soil contamination in these areas. There were some access restrictions in these areas due to the presence of existing infrastructure and chemical storage tanks. Based on the results of this assessment, the potential for widespread soil contamination that would preclude these areas from being redeveloped is considered to be low. Some relatively localised contamination could exist from previous activities and localised spillages. We are of the understanding that the amount of soil disturbance in the Shoalhaven Starches Plant areas is likely to be relatively limited and that structures would be supported on driven piles*.<br>Given the above findings there would appear to be little justification for further investigation and assessment in this regard in relation to the current modification proposal. | No additional management or mitigative measures are proposed in terms of this issue. | Not a key issue. This issue is not further addressed in this SEE. |

**Table 7 (continued)**

| *Relative Change in Environmental Impact* | *Additional Management or Mitigation Measures Required* | *Significance of Issue with this Modification Proposal* |
|---|---|---|
| **Acid Sulphate Soils** | | |
| All of the subject site is identified as potentially containing acid sulphate soils. The areas of the subject site associated with this Modification Application are similar to those previously examined by the Coffey report referred to above. With respect to ASSs Coffey's identified with respect to the western part of the site that:<br>*Sampling locations in this area recorded fill soils ranging from 0 to 1.1m comprised mainly of gravels and sands (probably pavement materials) which were not indicative of ASS. Underlying soils were typically described as alluvial silts and clays. No evidence of jarosite staining was noted at the locations. Screening results did not record a field pH below 4 or a pH below 3 after oxidation with H2O2. Three samples selected for testing using the SPOCAS or SCR method. These results are presented in Table LR10. CBH13/1.5-1.6m recorded a TAA value of 24m/t which exceeded the action criteria of 18m/t. Results for this sample suggest the acidity in non-sulfuric and therefore not considered to be an ASS.*<br>*Sample CBH102/1.0-1.45m recorded a TAA value of 40m/t. This sample suggests that the soil in this horizon could be an actual ASS, but does not appear to have capacity for further additional acid production.*<br>With respect to ASS, and with relevance to that part of the site where the current proposal is located Coffey's concluded: | No additional management or mitigative measures are proposed in terms of this issue. | Not a key issue. This issue is not further addressed in this SEE. |

**Table 7 (continued)**

| *Relative Change in Environmental Impact* | *Additional Management or Mitigation Measures Required* | *Significance of Issue with this Modification Proposal* |
|---|---|---|
| *Acid sulphate soil risk maps suggest that the majority of areas being assessed are in an area with a low probability of acid sulphate soil occurrence. The area of the proposed water treatment and filtration plant near the effluent ponds is closer or within a high risk area. Field screening and laboratory results indicated that ASS were not likely to be present in the central and eastern plant areas and fire service area. ASS are likely to be encountered within the packing plant (particularly the lower lying areas, north and east) and were confirmed in this assessment. For the remaining areas (western plant area, gas facility, near Pond 7, and pipeline routes) ASS are likely to be sporadic and possibly in lenses (if present).*<br><br>*We would recommend that an Acid Sulphate Soils Management Plan (ASSMP) be prepared for the packing plant and areas of the site where soil disturbances are likely to intersect ASS. Depending on further details of the proposed development and level of disturbance, further assessment could be carried out to increase the confidence in the lateral and vertical extent of the ASS.*<br><br>*It is probable that acid sulphate soils could occur at depths beyond those assessed in this study. Should the proposed depth of disturbance change or different soils be encountered, then this would need to be re-assessed.*<br><br>An Acid Sulphate Soils Management Plan in accordance with Condition 21 of the original Project Approval has been formulated | | |

**Table 7 (continued)**

| *Relative Change in Environmental Impact* | *Additional Management or Mitigation Measures Required* | *Significance of Issue with this Modification Proposal* |
|---|---|---|
| for the site. This plan will need to be updated to reflect this modification proposal; however it is not considered necessary, that further assessment is required to be undertaken in relation to this Modification Application in terms of ASS. | | |
| **Noise** | | |
| This SEE is supported by an Environmental Noise Impact Assessment prepared by Harwood Acoustics Pty Ltd. A copy of this assessment is included in **Annexure 4** to this SEE. Harwood Acoustics make a number of noise control recommendations to reduce the level of noise emissions for the Modification Proposal to within site specific noise design goals as prescribed by the EPL (No. 883) for the site. | The Environmental Noise Impact Assessment prepared by Harwood Acoustics includes a number of recommendations for noise mitigation and those are discussed in Section 7.2.3 of this SEE. | Noise impacts are further addressed in Section 7.2.3 of this SEE. |
| **Hazards** | | |
| The Modification Application is supported by a Preliminary Hazard Analysis (PHA) prepared by Pinnacle Risk Management which assesses the risks associated with the proposed modifications and compares against relevant risk criteria. The PHA identifies that the proposed modifications will comply with all risk criteria.<br>Societal risk, area cumulative risk and environmental risk are also concluded to be acceptable. | The PHA prepared by Pinnacle Risk includes the following recommendations:<br>1. *Provide natural gas leak detection in the proposed co-generation plant building with, at least, an alarm in the control room.*<br>2. *Provide an actuated valve on the natural gas supply pipe outside of the co-generation plant building for isolation in an emergency.*<br>3. *Given the high natural gas pressure in the supply pipeline, class the pipe as a critical pipe and therefore perform routine inspections and integrity checks.* | The SEE is supported by a PHA prepared by Pinnacle Risk Management addressing this issue (**Annexure 6**). This issue is further addressing Section 7.2.4 of this SEE. |

**Table 7 (continued)**

| *Relative Change in Environmental Impact* | *Additional Management or Mitigation Measures Required* | *Significance of Issue with this Modification Proposal* |
|---|---|---|
| **Flooding** | | |
| The subject site is inundated during the 1% Annual Exceedance Probability (AEP) flood event by floodwaters from the Shoalhaven River. The sites are categorised as high hazard floodway and high hazard flood storage. This Modification Application is supported by an assessment submission prepared by WMAwater ("WMA") (**Annexure 5**).<br>The submission prepared by WMAwater concludes that there will no change in the 1% AEP flood level outside the Shoalhaven Starches plant as a result of this modification proposal. | No additional management or mitigation measures proposed. | The SEE is supported by a submission prepared by WMAwater addressing this issue (**Annexure 5**). This issue is further addressing Section 7.2.67 of this SEE. |
| **Waste Management** | | |
| The proposed modifications will not alter the way waste is managed on the site. The site is already subject to an existing Waste Management Plan prepared in accordance with the original Project Approval. | No additional management or mitigation measures proposed, although any approval for this Modification Application should require the existing Waste Management Plan to be revised to incorporate the elements that form part of this Modification Application. | Not a key issue. This issue is not further addressed in this SEE. |
| **Site Stormwater Management** | | |
| A Stormwater Management Plan (SMP) has been prepared by Stephenson Environmental Management (SEMA) for the Shoalhaven Starches site in accordance with condition 22 (Schedule 3) of the original Project Approval dated March 2009. It is understood the preparation of this SMP included preparation with Shoalhaven City Council.<br>The SMP identifies that Shoalhaven Starches has a Surface Water (Stormwater) Management Plan for the Factory site (EN-P-0180 Rev 1 – Stormwater Management Factory). This plan illustrates the existing stormwater areas on the site and outlines how the controls work. The management system is divided into three main zones. The works associated with this Modification Application are confined to within the area nominated as Zone 3. All stormwater generated in this zone | No additional management or mitigation measures proposed. | Not a key issue. This issue is not further addressed in this SEE. |

**Table 7 (continued)**

| *Relative Change in Environmental Impact* | *Additional Management or Mitigation Measures Required* | *Significance of Issue with this Modification Proposal* |
|---|---|---|
| is collected and pumped to the Environmental Farm during small storm events. Stormwater is discharged to the Shoalhaven River during heavy rainfall events.<br>Whilst this proposal will increase the overall footprint of the gas fired co-generator from that which was approved; this will have little impact on the level of stormwater that need to be treated and disposal from this area of the site give the area is already sealed and stormwater from this part of the site is already treated in accordance with the existing Surface Water (Stormwater) management Plan. This proposal does not warrant any changes to the SMP. | | |
| **Visual Impact** | | |
| The majority of the works associated with this modification will be situated within the vicinity of existing industrial development of a similar scale to that which is proposed. | No additional management or mitigation measures proposed. | The visual impacts associated with this modification proposal are addressed in Section 7.2.5 of this SEE. |
| **Flora and Fauna** | | |
| The proposed works associated with this modification will all be located within the factory site, which is largely devoid of vegetation.<br>The original Flora and Fauna Assessment carried out by Kevin Mills & Associates for the Expansion Project did not identify any specific ecological constraints with this part of the site.<br>The proposal will not require any additional native vegetation to be disturbed. No change in environmental impacts from that originally identified in the EA are envisaged. | No additional management or mitigation measures proposed. | Not a key issue. This issue is not further addressed in this SEE. |

**Table 7 (continued)**

| *Relative Change in Environmental Impact* | *Additional Management or Mitigation Measures Required* | *Significance of Issue with this Modification Proposal* |
|---|---|---|
| **Heritage and Archaeological** | | |
| The proposed works associated with this modification will be located within the factory site which was not previously identified by the EA for the Shoalhaven Starches Expansion Project as an area subject to either Aboriginal or European cultural heritage significance. The original Aboriginal Archaeological Assessment that supported the EA prepared by South East Archaeology did not identify any constraints with respect to the parts of the site associated with this modification proposal. The proposed works will have no additional impact in terms of indigenous or non-indigenous heritage.<br>No change in environmental impacts from that originally identified in EA. | No additional management or mitigation measures proposed. | Not a key issue. This issue is not further addressed in this SEE. |
| **Effluent Irrigation and Storage** | | |
| This Modification Proposal will not increase waste waters that will need to be generated, treated and disposed. This Modification Application does not seek to alter the existing approve wastewater treatment and disposal measures for the existing site operations. | No additional management or mitigation measures proposed. | Not a key issue. This issue is not further addressed in this SEE. |
| **Wastewater Treatment** | | |
| *Water Discharges*<br>The Shoalhaven Starches Factory and Environmental Farm are licensed premises under the Protection of the Environmental Operations Act. Wastewater discharges from the site are licensed by the DEC (EPL 883).<br>The plant has a licensed outfall into the Shoalhaven River. The outfall point is a 50 cm diameter metal pipe discharging at the end of an existing jetty. It also has a cooling water discharge comprising a 50 cm diameter pipe which discharges onto a gabion spillway. | No additional management or mitigation measures. | Not a key issue. This issue is not further addressed in this SEE. |

**Table 7 (continued)**

| *Relative Change in Environmental Impact* | *Additional Management or Mitigation Measures Required* | *Significance of Issue with this Modification Proposal* |
|---|---|---|
| Under the terms of the Company's EPL discharge streams associated with the plant include:<br>• river water passed through the boiler condensers and the primary side of the heat exchangers;<br>• boiler water treatment plant regeneration waters; and<br>• pH adjusted glucose plant ion exchange unit regeneration waters.<br>All these must be discharged from the cooling water discharges.<br>The limiting conditions in relation to these discharges include:<br>• The volume of water discharged from the cooling water discharges must not exceed 100,000 kilolitres per day.<br>• The wastewaters discharged at both points shall not exceed a temperature of 32°C.<br>• This Modification Proposal will not involve any changes to these discharge waters. | | |

### 7.2.2 Air Quality Issues

GHD were engaged to conduct an air quality impact assessment for the proposed modifications associated with this Modification Application (**Annexure 3**). This section of the SEE provides a summary of the findings of the GHD Air Quality Impact Assessment for this Modification Application.

The site is proximate to a number of sensitive receptors. The township of Bomaderry lies to the north-west of the factory and west of the packing plant. Nowra is situated south of the plant. Commercial and industrial sensitive receptors are located directly adjacent to the site and across from it along Bolong Road.

According to GHD, the nearest residential sensitive receptors are located between 150 to 1300 metres from the site. The nearest commercial/industrial sensitive and residential sensitive receptors to the site have been included in the modelling and are shown in **Figures 11** and **12**.

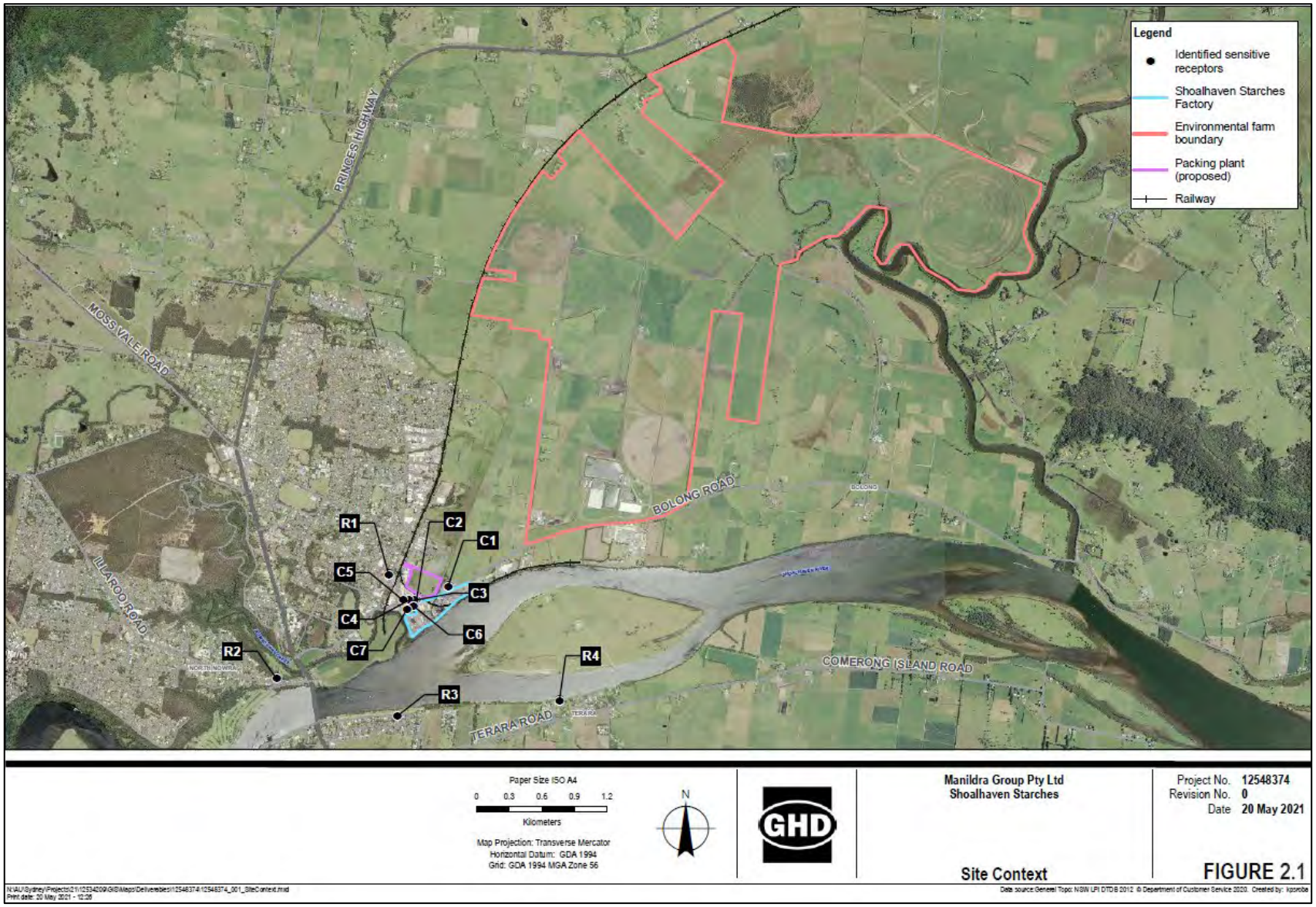


**Figure 11: Site context and receptor locations.**


**Figure 12: Site location and layout**

### *7.2.2.1 Meteorological Data*

A 12-month dataset was constructed by GHD using the 3D prognostic modelling package, TAPM and the diagnostic 3D meteorological model, CALMET for the period from January to December 2004. This 12 month period was chosen by GHD to be consistent with previous modelling undertaken for the 2008 Air Quality Assessment, approved at the time by EPA and to allow to a direct comparison to previous modelling.

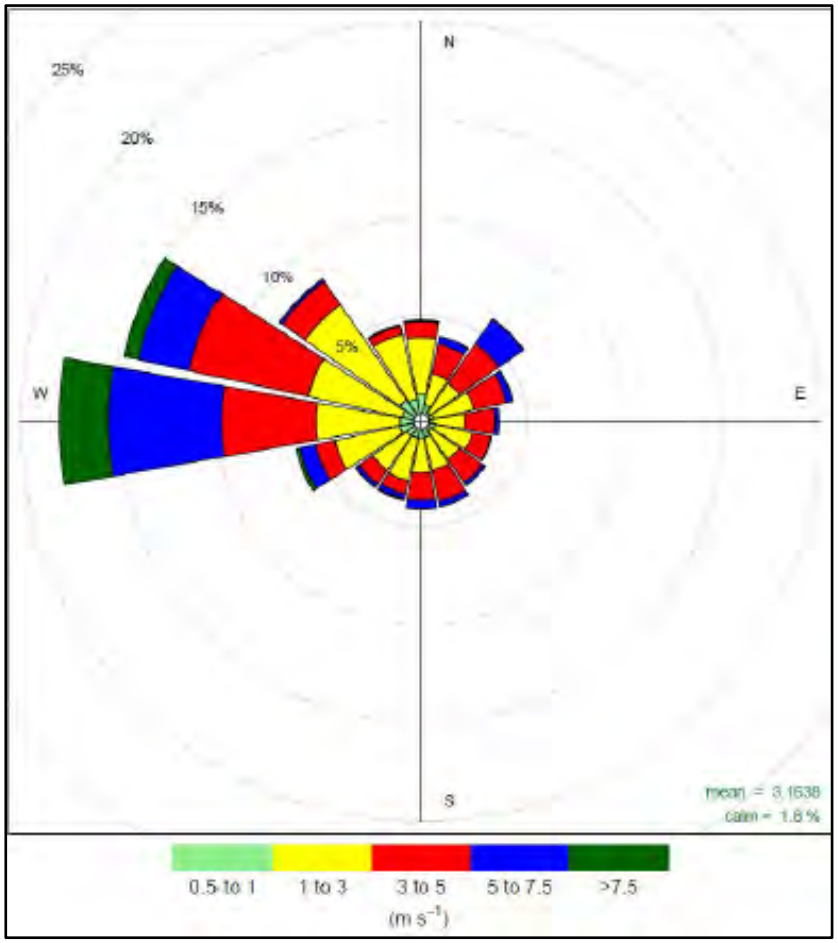


**Figure 13: Frequency of counts by wind direction (%).**

An annual wind rose generated using CALMET is provided in **Figure 13** above to show the wind field at the factory. The following trends are evident from **Figure 13**:

- Annual average wind speed of 3.2 m/s.
- Winds are most prevalent from the west and west north-west, accounting for around one third of all winds.
- Winds are least prevalent along the north-south axis.
- Light winds (shown in grey) are more prevalent from the north-west.

- Drainage flows occurring during stable conditions at night time are dominated by the following distinct features (in order of scale):
  - Shoalhaven River running west to east through the site;
  - Browns Mountains to the northwest of the site;
  - Yalwal State Forest mountain range to the west.

#### *7.2.2.2 Odour assessment*

***Emissions Inventory***

Odour emanating from Shoalhaven Starches is comprised of a complex mixture of primarily odorous volatile organic compounds (VOCs). VOC speciation data from a range of principal odour sources indicates that the individual VOCs within the mixture tend to be classified under odour-based air quality criteria rather than toxicity-based criteria. Therefore, the identified sources of odour are modelled collectively as odour.

Consistent with the previous air quality assessments, the following sources contribute to the majority of the odour impacts from the Shoalhaven Starches sites:

- DDG Plant (including Pellet Plant exhaust stack and biofilters)
- Starch Plant (Gluten and Starch Dryers)
- Ethanol Plant (yeast propagators and retention tank).

***Predicted Odour Impacts***

**Figure 14** shows the predicted odour levels for the proposal Mod 23 and the previous modification results as identified by GHD .

The predicted odour levels for Mod 23 show a general decrease compared against Mod 21 (Q2) predictions and are relatively unchanged compared against Mod 21 (Q3) predictions. The decrease compared to Mod 21 Q2 odour levels is attributed to conversion of boilers to gas and therefore removal of coal/woodchip fired boilers 2 and 4 as an odour source. The relatively minor fluctuation in odour predictions compared to Mod 21 Q3 is attributed to variability in odour sampling.

The results for Mod 23 according to GHD demonstrate that the impact assessment odour criteria are achieved at all residential sensitive receptors.

Seven commercial/industrial receptors are included in the assessment. These are all located within approximately 125 m of the site. One second, 99$^{th}$ percentile odour impacts have been predicted based on the hours of operation of the receptors (ie. predicted odour impacts when the sites are not operational have been excluded from the assessment).

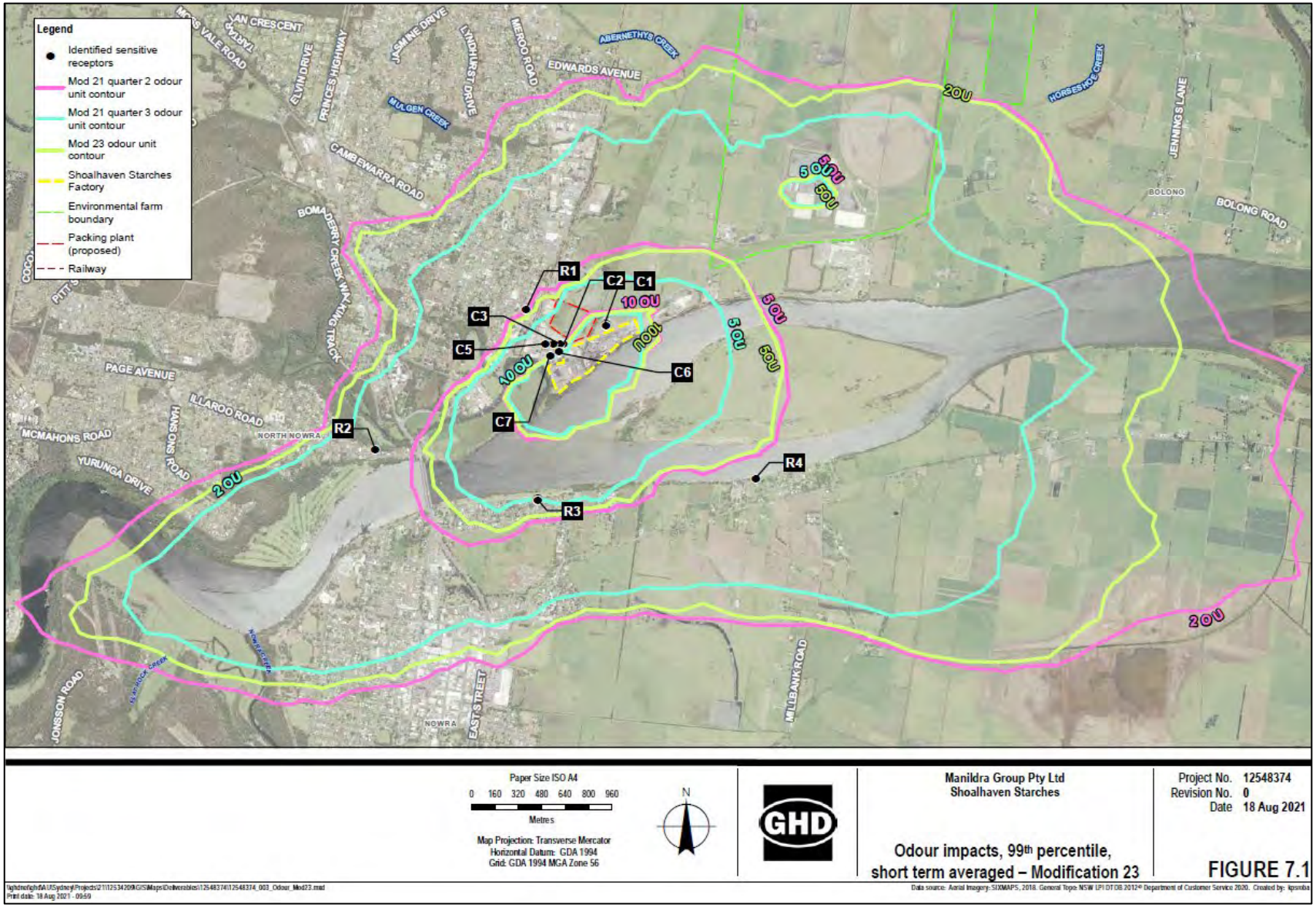


**Figure 14: Odour impacts, 99th percentile, short term averaged**

Mod 23 predicted marginal exceedances of the 6 OU criteria (assumed the same criteria as R1) at commercial/industrial receptors C2, C3, C4, C5, and C7 due to the higher quarterly odour sampling results.

Commercial receptors C1 and C6 are located approximately 45 and 80 metres from the site. Given the industrial nature of these receptor, and its existing proximity to the site no significant odour impacts are anticipated from the proposal according to GHD.

Two odour complaints (one in October 2020 and one in March 2021) attributed to the Shoalhaven Starches plant was received in the last year.

#### *7.2.2.3 Air Quality Assessment*

***Emissions Inventory***

In addition to odour emissions, the operation of the Shoalhaven Starches plant has also the potential to generate emissions of particulate matter and products of combustion.

The emissions inventory undertaken by GHD for Modification 23 includes all existing air emissions sources and those proposed in previous Modifications (up to and including Modification 21). Emission rates were estimated by GHD for a factory throughput of 300 ML per annum (maximum approved throughput).

Two new emission sources being the new gas-fired co-generation plant consisting of two natural gas turbines are proposed as part of Modification 23. The new gas fired natural gas turbines would replace the approved (but not constructed) gas fired and coal fired co-generators. Additionally, all existing coal fired boilers would also be converted to gas fired.

The gas turbines and gas-fired boilers would be a source of particulates, combustion pollutants, PAH, VOC's and metals.

Generally the emissions estimation methodology adopted for Modification 23 was consistent with that of previous modifications. Modification 23 emission rates were updated based on most recent sampling data to reflect the site's current operations. Assumptions and changes made to the baseline air quality model as part of this assessment are discussed in detail below for each of the individual source types.

***Predicted air quality impacts***

*Particulates*

The impact of dust emissions principally relates to the potential effect on human health of inhalation of particles in the air column, and it is the finer fraction that have the greater potential to cause respiratory health effects. EPA have advised to assess $PM_{2.5}$, if $PM_{10}$

impacts are significant. According to GHD, as the boilers are proposed to be converted to gas fired, it is anticipated that particulate emissions would be primarily composed of finer fraction particulates.

The $PM_{2.5}$ emissions from some sources on site are not known, however guidance is available for estimates of $PM_{2.5}$ from gas fired boilers in the NPI. NPI emission factors for gas fired boilers state that $PM_{2.5}$ emissions are equal to that of $PM_{10}$ emissions. Therefore a ratio of $PM_{10}$ to $PM_{2.5}$ emissions of 1:1 was adopted.

According to GHD, the worst case predicted incremental $PM_{10}$ level at a residential sensitive receptors is at R1 with a level of 7.6 $\mu g/m^3$.

A contemporaneous assessment has been undertaken by GHD for the year 2004 in accordance with the Approved Methods. Predicted 24 hour $PM_{2.5}$ and $PM_{10}$ values from the site in 2004 have been added to the 24 hour measured values at Wollongong for every day in the year.

GHD's assessment demonstrates full compliance with the $PM_{2.5}$ and $PM_{10}$ 24 hour criteria at the worst impacted residential sensitive receptor R1.

The results of the assessment predict exceedances of the $PM_{10}$ 24 hour criteria and the $PM_{2.5}$ 24 hour criteria for 3 days of the year at the worst impacted commercial receptor C6. The exceedances are primarily attributed by GHD to high background concentrations as background $PM_{10}$ accounts for 94%, 92% and 97% of the criteria and background $PM_{2.5}$ accounts for 89%, 80% and 58% of the criteria on the days of the predicted exceedances.

Plots of the predicted 24 hour maximum $PM_{10}$ levels are provided in **Figure 15** (incremental impact) and in **Figure 16** (cumulative impact with $70^{th}$ percentile $PM_{10}$ levels at Albion Park South 2016 for comparative purposes).

Plots of the predicted 24 hour maximum $PM_{2.5}$ levels are provided in **Figure 17** (cumulative impact with $70^{th}$ percentile $PM_{2.5}$ levels at Albion Park South 2016 for comparative purposes).

*Products of combustion*

The primary pollutants in gas fired boilers and gas turbines emissions are oxides of nitrogen ($NO_x$), formed by the high temperatures in the combustors, carbon monoxide (CO), VOCs, and polycyclic aromatic hydrocarbons (PAH) all formed by incomplete combustion of the fuel.

All pollutants have been assessed by GHD against their relevant criteria from the Approved Methods. The predicted levels comply at all receptors for $SO_2$, $NO_2$ and CO.

The predicted levels for nitrogen dioxide were presented for two cases. The first case assumed that 100% of NO will be converted to $NO_2$ as per Method 1 of the Approved Methods. This is considered extremely conservative as in reality, only a fraction of the NO will be converted to $NO_2$. The second case adopted a more detailed assessment by using Method 2 of the Approved Methods which is based on NO reacting with ozone in the atmosphere to form $NO_2$. Background ozone data was sourced from Kembla Grange for the year 2004.

*Effect of Mod 23 changes*

According to GHD, conversion of existing coal fired boilers to gas significantly reduces the emissions of combustion pollutants and consequently the proposal is predicted by GHD to have a positive impact (compared with Mod 21) on combustion emissions as air emissions from gas are typically lower than coal.

*PAH, VOCs and metals*

The maximum predicted (99.9 percentile, 1-hour average) ground level incremental PAH, VOC and metal concentrations (with the exception of lead which is presented as a 100 percentile annually averaged concentration to align with its assessment criteria), within and beyond the factory site boundary were also assessed by GHD. The predicted levels are significantly lower than the respective EPA principal toxic air pollutant criteria for all substances both within and beyond the site boundary.

*Effect of Mod 23 changes*

According to GHD, the conversion of existing coal fired boilers to gas significantly reduces the emissions of PAH, VOCs and metals and eliminates the emission of some pollutants including antimony, Tin and Vanadium and consequently the proposal was predicted to have a positive impact (compared with Mod 21) on combustion emissions as air emissions from gas are typically lower than coal.

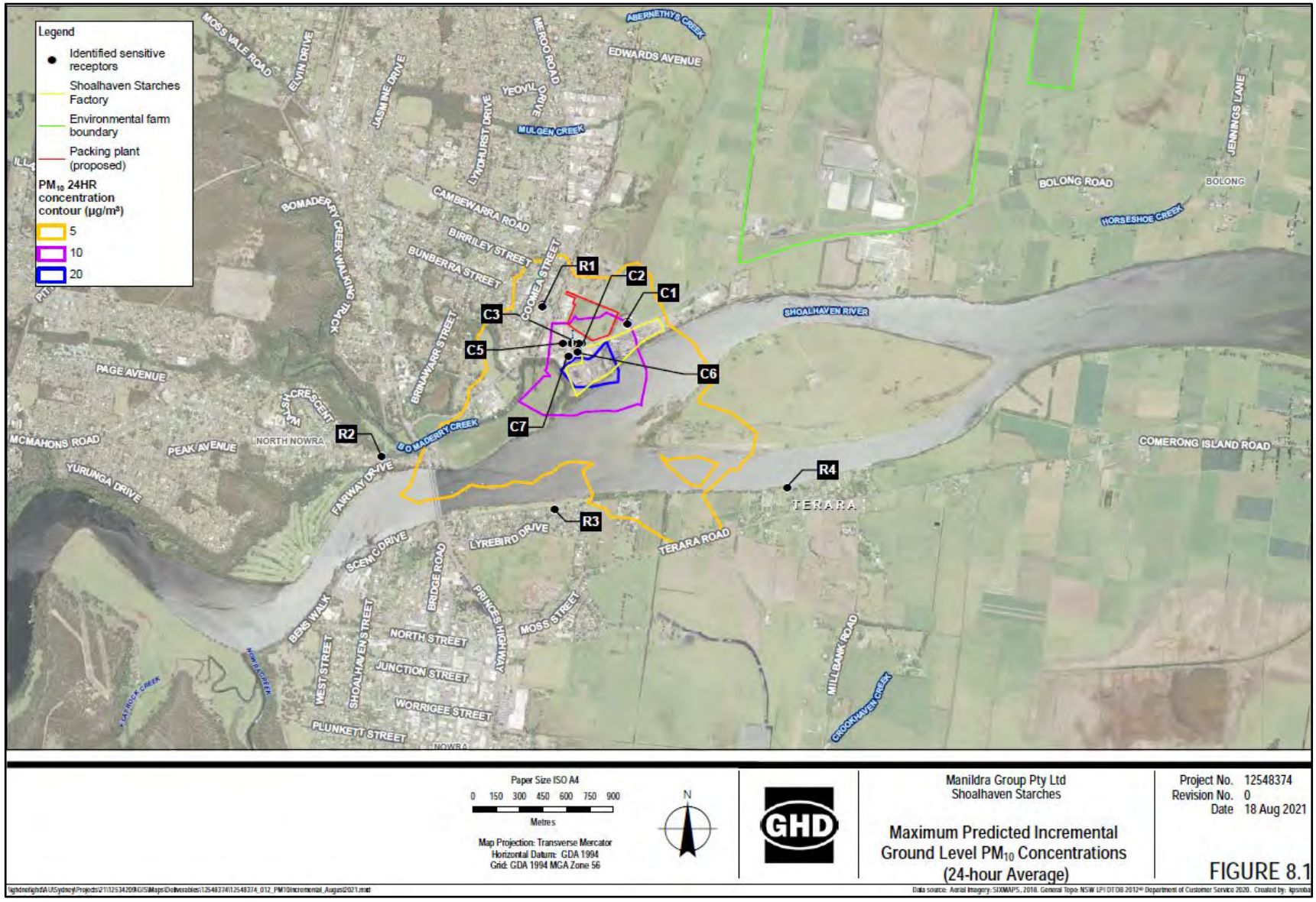


**Figure 15: Maximum predicted incremental ground level $PM_{10}$ concentrations (24-hour Average).**

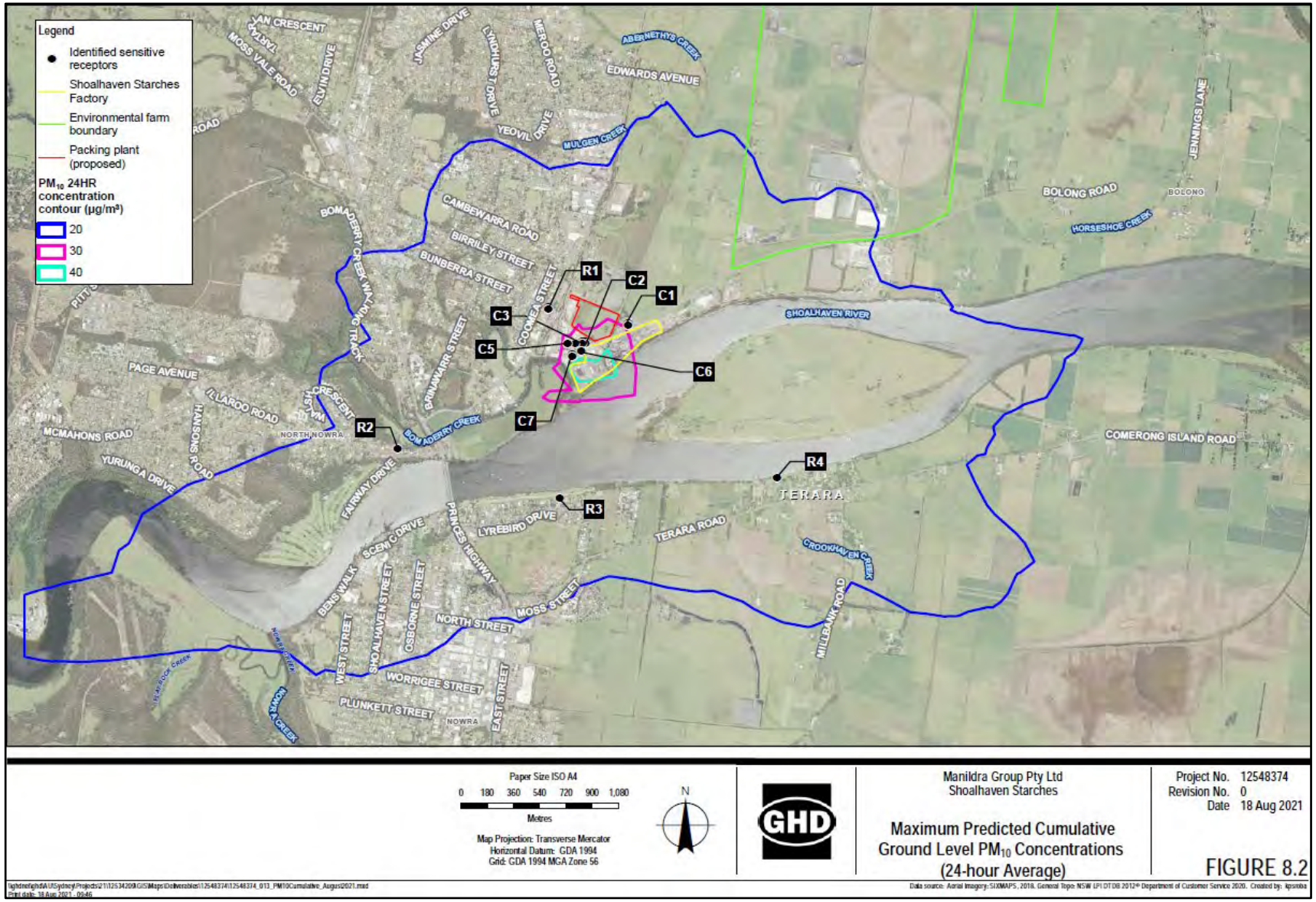


**Figure 16: Maximum predicted cumulative ground level $PM_{10}$ concentrations (24-hour average).**

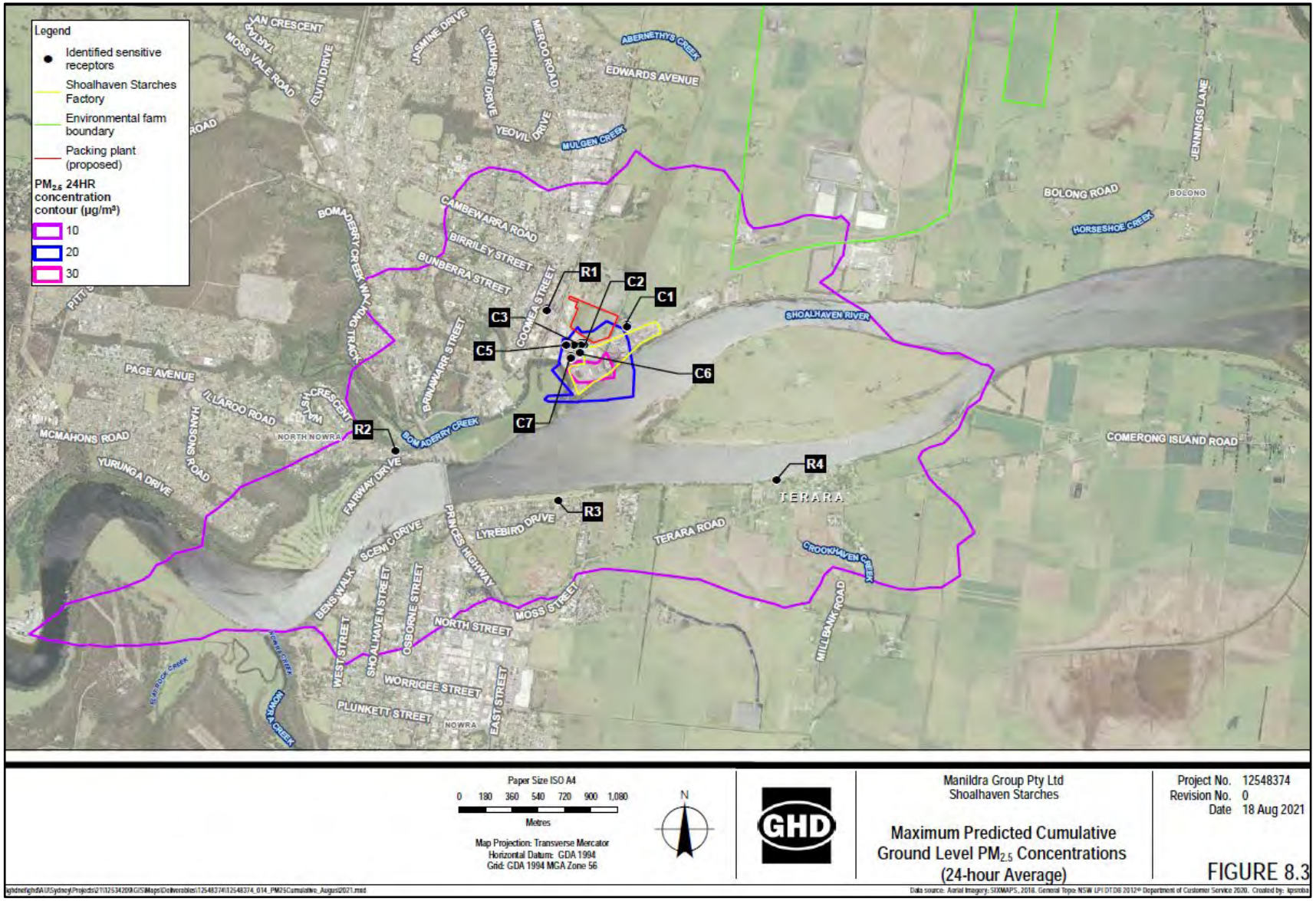


**Figure 17: Maximum predicted cumulative ground level $PM_{2.5}$ concentrations (24-hour average).**

The Air Quality Assessment undertaken by GHD concludes:

> *"GHD was engaged by Manildra to conduct an air quality and odour impact assessment for a proposed modification to the approved SSEP. The modification proposes a new gas-fired co-generation plant (to replace the approved gas fired and coal fired co-generators) and conversion of existing coal fired boilers to gas. In addition, Manildra propose to install additional biofilter capacity in the previously approved location to improve odour performance.*
>
> *Odour dispersion modelling was undertaken for the quarter with maximum odour emissions (in accordance with the methodology adopted for past modification air quality assessments). A marginal decrease in odour levels was predicted compared against Mod 21 Q2 and relatively unchanged odour levels was predicted compared against Mod 21 Q3. The decrease compared to Mod 21 Q2 odour levels is attributed to conversion of boilers to gas and therefore removal of coal/woodchip fired boilers 2 and 4 as an odour source. The relatively minor fluctuation in odour predictions compared to Mod 21 Q3 is attributed to variability in odour sampling.*
>
> *The odour dispersion modelling predicted compliance of the odour criteria at all residential receptors.*
>
> *Dispersion modelling of combustion products, particulates, PAH, VOCs and metals predicted compliance with the criteria at all residential sensitive receptors.*
>
> *Overall, the proposal should be acceptable from an air quality perspective."*

### 7.2.3 Noise Impact Issues

Harwood Acoustics were engaged to conduct a noise impact assessment for the proposed modifications associated with this Modification Application (**Annexure 4**). A copy of Harwood Acoustics findings in relation to this current Modification Application as a result of this review is included as **Annexure 4** to this SEE. This section of the SEE provides a summary of the findings of the Environmental Noise Impact Assessment prepared by Harwood Acoustics for this Modification Application.

The nearest residential receptor locations to the proposal according to Harwood Acoustics are as follows:

- Location 1 – Nobblers Lane, Terara approximately 1550 metres to the south-east;
- Location 2 – Riverview Road, Nowra approximately 820 metres to the south-west;
- Location 3 – Meroo Street, Bomaderry approximately 385 metres to the north-west;
- Location 4 – Coomea Street, Bomaderry approximately 455 metres to the north-west.

The Shoalhaven Starches site and receptor locations are shown in **Figure 18** along with some of the main components of the proposal.


**Figure 18: Receptor locations (Harwood Acoustics)**

***Noise Criteria***

*NSW Department of Planning and Environment*

*Existing Project Approval*

The original Project Approval incorporates noise mitigation measures recommended in the 'Acoustical Assessment, Proposed Ethanol Upgrade, Shoalhaven Starches' – prepared by The Acoustic Group Pty Ltd, ref 38.3849.R52:ZJM, dated 26 June 2008. This document forms part of the EA and statement of commitments and it is implicit that the noise control recommendations within this document are required to be implemented as part of the Project Approval.

Schedule 3, Conditions 11 to 14 inclusive of the Project Approval, also refer to noise emission and are summarised as follows:

- Condition 11 relates to restricted hours of construction activities.
- Condition 12 reiterates the noise limits contained with Environment Protection Licence 883.

- Condition 13 requires that all feasible and reasonable noise mitigation measures must be implemented during the construction phase of the project.
- Condition 14 required the preparation of a noise management plan.

*Existing Project Approval*

In response to a request for information relating to noise emission from the proposed modification, the NSW Department of Planning and Environment requires an assessment of the potential for noise impact.

*NSW EPA's Environment Protection Licence*

Shoalhaven Starches operates under Environment Protection Licence 883 issued by the NSW Environment Protection Authority.

Section L5 'Noise Limits' of the licence states:

> *"L5.1 the $L_{Aeq\ (15min)}$* sound pressure level contribution generated from the premises must not exceed the following levels when measured at or near the boundary of any residential premises:*
>
> *a) 38 dBA at locations in Terara on the south side of the Shoalhaven River,*
>
> *b) 38 dBA at locations in Nowra on the south side of the Shoalhaven River,*
>
> *c) 42 dBA at locations in Meroo Street, Bomaderry,*
>
> *d) 40 dBA at other locations in Bomaderry."*

These noise limits apply to the overall operation of the Shoalhaven Starches complex.

*Shoalhaven Starches Noise Management Plan*

Previous approval for the Shoalhaven Starches Expansion Project, required the preparation of a Noise Management Plan for addressing and managing noise emission from the expansion project.

The Shoalhaven Starches Noise Management Plan originally prepared 31 October 2009 and revised 7 September 2010 addresses, among other things, acoustic criteria relating to the Shoalhaven Starches complex and any new developments. Section 3 of the plan lists noise limits from the Environmental Protection Licence as shown in Section 4.1 above and states:

> *"Compliance testing conducted on a regular basis on behalf of the Mill*
>
> [Shoalhaven Starches complex] *has found noise emission from the premises satisfies the EPA criteria as a result of works on the Shoalhaven Starches site. In order to ensure that there is no increase in noise emission from the subject premises, with respect to the noise criteria nominated by the EPA in License*

*Condition 6.3* [now 5.1]*, the design goal for such additional plant should be at least 10 dB below the criteria nominated by the EPA."*

Given the number of modifications subsequent to the original approval and location of new noise sources, it is recommended that the noise design goals are set to a minimum 15 dB below the EPL noise limits henceforth.

*Construction Noise Criteria*

The NSW EPA published the Interim Construction Noise Guideline in July 2009. While some noise from construction sites is inevitable, the aim of the Guideline is to protect the majority of residences and other sensitive land uses from noise pollution most of the time.

The Guideline presents two ways of assessing construction noise impacts; the quantitative method and the qualitative method.

The quantitative method is generally suited to longer term construction projects and involves predicting noise levels from the construction phase and comparing them with noise management levels given in the guideline.

The qualitative method for assessing construction noise is a simplified way to identify the cause of potential noise impacts and may be used for short-term works, such as repair and maintenance projects of short duration.

In this instance the entire construction phase may take several months although significant noise producing aspects, such as piling, if required, will last a total of approximately two weeks. Consideration is given to the potential for noise impact from construction activities on residential receptors in Section 6 of this report.

Table 2 in Section 4 of the Guideline sets out noise management levels at affected residences and how they are to be applied during normal construction hours. The noise management level is derived from the rating background level (RBL) plus 10 dB in accordance with the Guideline. This level is considered to be the 'noise affected level' which represents the point above which there may be some community reaction to noise.

Harwood Acoustics have carried out numerous noise surveys in Nowra, Bomaderry and Terara and has found daytime background noise levels range between 33 and 40 dBA depending on the location, as shown in **Table 8** below.

**Table 8**

**Rating Background Levels – Nowra, Terara and Bomaderry, NSW**

| ***Location*** | ***Time of Day*** | ***Rating Background Level ($L_{90}$)*** |
|---|---|---|
| 135 Terara Road, Terara<br>March 2012 | Day<br>(7 am to 6 pm) | **33 dBA** |
| 55 Terara Road, Nowra<br>February 2015 | Day<br>(7 am to 6 pm) | **36 dBA** |
| Cambewarra Rd, Bomaderry<br>July2010 | Day<br>(7 am to 6 pm) | **40 dBA** |
| Shoalhaven Village Caravan Park, Nowra<br>March 2012 | Day<br>(7 am to 6 pm) | **40 dBA** |

For the purpose of determining the potential for community reaction to noise emission from construction activities, previously measured background noise levels in the vicinity of each receptor location have been used to determine the noise management levels as shown in **Table 9** below.

**Table 9**

**$L_{eq}$ Noise Management Levels from Construction Activities**

| ***Receptor Location*** | ***Noise Management Level*** | ***How to Apply*** |
|---|---|---|
| Location 1<br>(Terara) | **43 dBA**<br>(33 + 10) | The noise affected level represents the point above which theremay be some community reaction to noise.<br>▪ Where the predicted or measured $L_{Aeq\ (15\ min)}$ noise level is greater than the noise affected level, the proponent should apply all feasible and reasonable* work practices to meet thenoise affected level.<br>▪ The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details. |
| Location 2<br>(Nowra) | **50 dBA**<br>(40 + 10) | |
| Locations3 & 4<br>(Bomaderry) | **48 dBA**<br>(38 + 10) | |
| | **Highly noise affected 75 dB(A)** | The highly noise affected level represents the point above whichthere may be strong community reaction to noise.<br>▪ Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account:<br>1. times identified by the community when they are lesssensitive to noise (such as before and after school forworks near schools, or mid-morning or mid-afternoonfor works near residences).<br>2. if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times. |

** Section 6, "work practices" of The Interim Construction Noise Guideline, states:-*

*"there are no prescribed noise controls for construction works. Instead, all feasible and reasonable workpractices should be implemented to minimise noise impacts.*

*This approach gives construction site managers and construction workers the greatest flexibility to manage noise".*

*Definitions of the terms feasible and reasonable are given in Section 1.4 of the Guideline.*

*The 'highly noise affected' level of 75 dBA represents the point above which there may be strong community reaction to noise. This level is provided in the Guideline and is not based on the RBL.*

*Project Specific Noise Goals*

The most relevant criteria are as follows:

Operational Phase (Environment Protection Licence noise limits less **15 dB**) -

- *23 dBA (Leq, 15 minute) at locations in Terara on the south side of the Shoalhaven River,*
- *23 dBA (Leq, 15 minute) at locations in Nowra on the south side of the Shoalhaven River,*
- *27 dBA (Leq, 15 minute) at locations in Meroo Street, Bomaderry,*
- *25 dBA (Leq, 15 minute) at other locations in Bomaderry.*

Construction Phase Noise Management Levels

- *43 dBA (Leq, 15 minute) at locations in Terara,*
- *48 dBA (Leq, 15 minute) at locations in Bomaderry, and*
- *50 BA (Leq, 15 minute) at locations in Nowra.*

***Co-generation Plant Noise Emission***

*Co-Generation Plant and Equipment Source Noise Levels*

The co-gen plant will be supplied by GE Power (GE) and for the purpose of noise modelling the overall co-gen plant has been broken down in to three components:

- the turbines (2);
- the heat recovery steam generators (HRSG) (2); and
- the heat exhaust stacks (4).

*Turbines*

An itemised breakdown of the constituent parts of the Turbine components have been supplied by GE and a schedule of octave band and overall 'A' frequency weighted near field sound pressure levels is shown in **Table 10**.

**Table 10**

**$L_{eq}$ Near Field Sound Pressure Levels – Plant and Equipment**
**Turbine Components LM2500 Classic (as supplied by GE)**

| *Plant Item* | *dBA* | *Sound Pressure Levels (dB) at Octave Band Centre Frequencies (Hz)* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *63* | *125* | *250* | *500* | *1k* | *2k* | *4k* | *8k* |
| Air filter inlet faces | 79 | 87 | 88 | 78 | 74 | 69 | 75 | 65 | 51 |
| Air filter house casing | 85 | 92 | 94 | 83 | 79 | 75 | 79 | 72 | 62 |
| Air inlet plenum | 86 | 92 | 95 | 86 | 82 | 78 | 77 | 76 | 66 |
| Turbine enclosure | 86 | 91 | 98 | 85 | 81 | 77 | 74 | 77 | 64 |
| Turbine combustion inlet | 88 | 93 | 101 | 86 | 81 | 77 | 74 | 75 | 62 |
| Turbine exhaust inlet | 84 | 91 | 97 | 84 | 77 | 76 | 72 | 69 | 62 |
| Turbine vent outlet | 85 | 92 | 98 | 84 | 79 | 76 | 73 | 74 | 63 |
| Coupling guard to TE | 84 | 89 | 96 | 82 | 80 | 77 | 73 | 73 | 61 |
| Coupling guard to GE | 86 | 90 | 97 | 85 | 81 | 78 | 74 | 78 | 68 |
| Gear box | 87 | 93 | 93 | 87 | 82 | 80 | 81 | 78 | 72 |
| GB shaft | 83 | 89 | 89 | 81 | 77 | 74 | 78 | 71 | 64 |
| Generator enclosure | 82 | 91 | 94 | 82 | 77 | 71 | 69 | 66 | 56 |
| Generator cooling | 82 | 91 | 94 | 82 | 78 | 71 | 70 | 67 | 56 |
| Generator exciter | 80 | 90 | 91 | 81 | 76 | 69 | 68 | 63 | 53 |
| Generator lube oil | 80 | 90 | 92 | 81 | 77 | 69 | 66 | 62 | 52 |
| Side exhaust ex joint | 80 | 86 | 90 | 79 | 75 | 71 | 73 | 69 | 58 |

*HRSG*

The heat recovery steam generator captures heat from the gas turbine exhaust and generates steam. Details of the HRSG are not finalised at this stage, however the supplier has stipulated that it will be able to meet a near field noise target of **88 dBA at 1 metre** at any point around the unit, at 1.5 metres above ground level.

*Exhaust Stacks*

Each of the heat recovery steam generators will have a heat exhaust stack and there is also a bypass stack between each of the turbines and the generators. When the generators are down for maintenance the heat created by the turbines will exhaust via the bypass stack.

The supplier has stipulated that noise controls will be provided for each of the four exhaust stacks to achieve a **sound power level** ($L_w$) at the discharge outlet of no more than **88 dBA**. This is equivalent to approximately 80 dBA at 1 metre from the outlet of each duct and this is used in calculations in this assessment.

The Turbines and the HRSG plant will be located within a purpose-built building and the exhaust stacks will penetrate the roof.

*Noise Level Predictions*

*Predicted Noise Levels*

Predicted noise levels by Harwood Acoustics at each receptor location are shown in **Table 11** below.

The predicted noise levels assume recommendations made by Harwood Acoustics have been implemented.

**Table 11**

**Predicted Noise Levels at Receptor Locations**

| ***Description*** | ***Predicted Noise Level $L_{eq,\ 15\ minute}$ (dBA) at Receptor Location*** | | | |
|---|---|---|---|---|
| | ***Location 1*** | ***Location 2*** | ***Location 3*** | ***Location 4*** |
| **Design Noise Goal ($L_{eq,\ 15\ minute}$)** | **23** | **23** | **27** | **25** |
| Turbine and HRSG plant within building | 16 | 21 | 24 | 23 |
| Exhaust stacks | < 5 | 15 | 25 | 22 |
| **Combined** | **16** | **22** | **27** | **25** |
| ***Complies*** | ***Yes*** | ***Yes*** | ***Yes*** | ***Yes*** |

***Construction Noise Emission***

The construction works will consist of piling, pouring of concrete slabs for the buildings, construction of the building and the installation of all plant and equipment.

**Table 12** below shows a schedule of sound power levels for typical construction equipment.

**Table 12**

**Typical Construction Equipment – $L_{eq}$ Sound Power Levels**

| ***Description*** | ***$L_{eq}$ Sound Power Level (dBA)*** |
|---|---|
| Auger Piling (CFA Rig) | 113 |
| Hammer or Driven Piling | 118 |
| Mobile Crane (Diesel) | 110 |
| 30 Tonne Excavator | 110 |
| Concrete Truck / Pump | 105 |
| Dump Truck | 110 |
| Grinder | 105 |
| Power Saw | 101 |

**Table 13** below shows the predicted level of potential noise emission by Harwood Acoustics from construction activities at each of the receptor locations.

**Table 13**

**Predicted Noise Levels at Receptor Locations – Construction Phase**

| ***Description*** | ***Predicted Noise Level $L_{eq,\ 15\ minute}$ (dBA)at Receptor Locations*** | | | |
|---|---|---|---|---|
| | ***Location 1*** | ***Location 2*** | ***Location 3*** | ***Location 4*** |
| **Noise Design Goal($L_{eq,\ 15\ minute}$)** | **43** | **50** | **48** | **48** |
| With hammer piling | 41 | 51 | 58 | 57 |
| With auger piling | 38 | 48 | 55 | 53 |
| Construction activity(no piling) | 35 | 45 | 52 | 51 |
| ***Complies*** | ***Yes*** | ***No + 1 dB (if hammer piling*** | ***No + 4 to 10 dB*** | ***No +3 to 9 dB*** |

There is potential for noise construction noise design goals to be exceed at receptors R2, R3 and R4 on occasion.

The exceedance of 1 dB predicted at receptor R2 may only occur if hammer piling is undertaken.

***Recommended Noise Controls***

Harwood Acoustics recommend the following noise control measures to achieve predicted noise levels.

***Buildings Construction***

*Walls*

- *All external walls of the co-gen plant building will be constructed using 150 mmm thick (minimum) tilt up concrete panels or in situ concrete which will be acceptable,*

*Roof / Ceiling*

- *The roof of the building should achieve a minimum Rw rating of 45, with minimum R ratings of:*
  - *26 dB at 63 Hz, and*
  - *28 dB at 125 Hz.*
- *Example roof construction materials may include:*
  - *Hebel power panel, OR*
  - *Masonry (100 mm concrete slab), OR*

- *Corrugated sheet steel with 10 mm thick sound rated plasterboard (or 9 mm thick fibre cement sheet) below with R 3.0 (minimum) polyester or glaswool insulation in the cavity, OR*
- *Any proprietary roof system meeting the minimum acoustical performance requirements,*

- *Any and all penetrations in the roof should be acoustically sealed.*

*The construction details of the roof system will be finalised prior to commencement of construction.*

*Exhaust Penetrations*

*There should be no acoustically untreated penetrations in the roof of the building.*

*Penetrations in the roof for the four (4) exhaust stacks is discussed in Section 6.2 below.*

*Penetrations for passive exhaust may be located in the eastern wall of the building, providing that they do not exceed a total of **40 m²** and that any and all penetrations are fitted with acoustic louvres with the minimum insertion losses shown in Table 8 below:*

***Table 8 Example Acoustic Louvre Sound Transmission Loss***

| ***Plant item*** | ***dBA*** | ***Minimum Insertion Loss (dB) at Octave Band Centre Frequencies (Hz)*** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ***63*** | ***125*** | ***250*** | ***500*** | ***1k*** | ***2k*** | ***4k*** | ***8k*** |
| Acoustic Louvre* | 24 | 32 | 27 | 22 | 20 | 19 | 15 | 12 | 9 |

** Based on Fantech SBL2 louvre*

***Exhaust Duct Roof Penetrations***

*The supplier has stipulated that each of the four (4) exhaust stacks that will penetrate the building roof will not exceed a sound power level at the stack outlet of 88 dBA, which equates to an energy average sound pressure level (Leq) of **70 dBA** when measured at 3 metres from the outlet.*

*The construction of the stack or duct must also be such that it does not undermine the acoustical integrity and performance of the roof at the penetration. For example the breakout noise from the exhaust stack walls must be a minimum 10 dB less than that at the outlet.*

*A final assessment will be undertaken at the Noise Design Verification stage, once the details of all proposed exhaust stacks are finalised.*

***Construction Noise***

*The Project Approval prescribes allowable operation hours for construction activities in Clause 11 and Clause 13, which states:*

> *"During construction, the Applicant shall implement all reasonable and feasible measures to minimise the construction noise impacts of the project development."*

*Given the proximity of the co-gen plant to the township of Bomaderry, there is potential for noise goals to be exceeded at receptors R3 and R4 during a variety of works, most notably during piling activity.*

*Augur (CFA) or bored or rotary piling should be adopted over driven piling where practicable.*

*Additional construction noise mitigation measures and management practises will be detailed in the Construction Noise Management Plan that will be prepared by Shoalhaven Starches in accordance with NSW EPA's Interim Construction Noise Guideline and to satisfy Condition 13 of the Project Approval if required.*

The Environmental Noise Impact Assessment prepared by Harwood Acoustics concludes:

*"An assessment of the potential noise impact from the proposed construction and operation of a 60 MW gas fired co-generation plant to be installed at Shoalhaven Starches facility on Bolong Road, Bomaderry, NSW has been undertaken.*

*Noise control recommendations are made in Section 6 of this Report to reduce the level of noise emission from the co-gen plant to within site specific noise design goals at all receptor locations.*

*The noise design goals are established to ensure that the noise limits prescribed in Environment Protection Licence 883 continue to be met at all receptors from the overall operation of the facility.*

*The level of noise emission from the construction phase of the may exceed the noise management levels set by the NSW EPA's Interim Construction Noise Guideline at receptors in Bomaderry on some occasions.*

*Construction noise mitigation measures are included in the Construction Safety & Environmental Management Plan prepared by Shoalhaven Starches."*

### 7.2.4 Preliminary Hazard Analysis

Pinnacle Risk Management were engaged to undertake a Preliminary Hazard Analysis (PHA) for the proposed modifications associated with this Modification Application (**Annexure 6**). A copy of Pinnacle Risk Management's findings as a result of this review is included as **Annexure 6** to this SEE. This section of the SEE provides a summary of the findings of the Preliminary Hazard Analysis prepared by Pinnacle Risk Management for this Modification Application.

The risks associated with the proposed modifications have been assessed by Pinnacle Risk Management and compared against relevant risk criteria issued by the DPIE (**Table 14**).

## Table 14

## Risk Analysis

| *Release Case:* | *Probability of Ignition* | *Probability of Event Type* | *Likelihood of Failure (times/year.m)* | *Pipeline Distance for Off-Site Impact (m)* | *Probability of Wind Direction (from the south)* | *Individual Fatality Risk Estimate (pmpy)* |
|---|---|---|---|---|---|---|
| **Boilers:** | | | | | | |
| Jet Fire - Full Bore Pipe Failure | 0.3 | 0.3 | 7.00E-08 | 44 | 0.15 | 4.16E-08 |
| Jet Fire - 50 mm Hole | 0.3 | 0.3 | 5.00E-07 | 14 | 0.15 | 9.45E-08 |
| Flash Fire - Full Bore Pipe Failure | 0.3 | 0.4 | 7.00E-08 | 120 | 0.15 | 1.51E-07 |
| Flash Fire - 50 mm Hole | 0.3 | 0.4 | 5.00E-07 | 19 | 0.15 | 1.71E-07 |
| Vapour Explosion - Full Bore | 0.3 | 0.3 | 7.00E-08 | 45 | 0.15 | 4.25E-08 |
| Vapour Explosion - 50 mm hole | 0.3 | 0.3 | 5.00E-07 | 5 | 0.15 | 3.38E-08 |
| | | | | | **Total** | **5.35E-07** |
| **Co-Generation Plant:** | | | | | | |
| Jet Fire - Full Bore Pipe Failure | 0.3 | 0.3 | 7.00E-08 | 29 | 0.15 | 2.74E-08 |
| Jet Fire - 50 mm Hole | 0.3 | 0.3 | 5.00E-07 | 29 | 0.15 | 1.96E-07 |
| Flash Fire - Full Bore Pipe Failure | 0.3 | 0.4 | 7.00E-08 | 100 | 0.15 | 1.26E-07 |
| Flash Fire - 50 mm Hole | 0.3 | 0.4 | 5.00E-07 | 100 | 0.15 | 9.00E-07 |
| Vapour Explosion - Full Bore | 0.3 | 0.3 | 7.00E-08 | 39 | 0.15 | 3.69E-08 |
| Vapour Explosion - 50 mm hole | 0.3 | 0.3 | 5.00E-07 | 39 | 0.15 | 2.63E-07 |
| | | | | | **Total** | **1.55E-06** |

According to Pinnacle Risk the simplified risk analysis shows that the individual fatality risk at the site's boundary will be no higher than 0.5 pmpy for the boilers natural gas supply pipe and 2 pmpy for the co-generation plant natural gas supply pipe. As this is less than 50 pmpy then this HIPAP 4 risk criterion is according to Pinnacle Risk satisfied. As the two pipes enter the site at different locations with a separation distance of approximately 300 m then the results in 13 do not need to be summated for cumulative risk estimation.

This according to Pinnacle Risk is a low level of risk, it is below the risk criteria not considered intolerable. The ALARP (As Low As Reasonably Practicable) principle is achieved; primarily due to compliance with the Australian Standards for piping.

Compliance with the HIPAP 4 risk criteria is shown in **Table 15** above.

***Propagation and cumulative risk***

There are design and safety management system controls that according to Pinnacle Risk are designed to prevent hazardous events occurring. These include designing to Australian and international standards and codes, hazardous area assessments and controls of ignition sources, e.g. permits to work. Should these prevention controls fail and an incident occur then propagation is possible for some events, eg. due to radiant heat from jet or flash fires, or explosion overpressures.

Propagation from potential natural gas releases according to Pinnacle Risk is a low likelihood. Compliance and certification to the boiler codes ensures the risk of incidents achieves ALARP.

Correspondingly, it is reasonable Pinnacle Risk concludes that the Modification Proposal does not make a significant contribution to the existing cumulative risk in the area.

*Societal risk*

The criteria in HIPAP 4 for individual risk do not necessarily reflect the overall risk associated with any proposal. In some cases, for instance, where the 1 pmpy contour approaches closely to residential areas or sensitive land uses, the potential may exist for multiple fatalities as the result of a single accident. One attempt to make comparative assessments of such cases involves the calculation of societal risk.

Societal risk results are usually presented as F-N curves, which show the frequency of events (F) resulting in N or more fatalities. To determine societal risk, it is necessary to quantify the population within each zone of risk surrounding a facility. By combining the results for different risk levels, a societal risk curve can be produced.

## Table 15

## HIPAP 4 Risk Criteria Compliance

| *Description* | *Risk Criteria* | *Comments* | *Risk Acceptable?* |
|---|---|---|---|
| Fatality risk to sensitive uses, including hospitals, schools, aged care. | 0.5 x $10^{-6}$ per year | No adverse levels of radiant heat or explosion overpressures to impact any of these land users. For example, the nearest residential area is approximately 400 m from the co-generation building. | Yes |
| Fatality risk to residential and hotels. | 1 x $10^{-6}$ per year | No adverse levels of radiant heat or explosion overpressures to impact any of these land users. For example, the nearest residential area is approximately 400 m from the co-generation building. | Yes |
| Fatality risk to commercial areas, including offices, retail centres, warehouses. | 5 x $10^{-6}$ per year | The estimated individual fatality risk at the site boundary is up to 2 pmpy. This is below this criterion. | Yes |
| Fatality risk to sporting complexes and active open spaces | 10 x $10^{-6}$ per year | The are no sporting complexes or active open spaces where adverse levels of radiant heat or explosion overpressures are expected. | Yes |
| Fatality risk to be contained within the boundary of an industrial site. | 50 x $10^{-6}$ per year | The estimated risk at the site boundary is up to 2 pmpy. This is below this criterion. | Yes |
| Injury risk – incident heat flux radiation at residential areas should not exceed 4.7 kW/$m^2$ at frequencies of more than 50 chances in a million per year or incident explosion overpressure at residential areas should not exceed 7 kPa at frequencies of more than 50 chances in a million per year. | 50 x $10^{-6}$ per year | No adverse levels of radiant heat or explosion overpressures to impact any residential areas. For example, the nearest residential area is approximately 400 m from the co-generation building. | Yes |
| Toxic exposure - Toxic concentrations in residential areas which would be seriously injurious to sensitive members of the community following a relatively short period of exposure. | 10 x $10^{-6}$ per year | No toxic gases associated with this modification. | Yes |
| Toxic exposure - Toxic concentrations in residential areas which should cause irritation to eyes or throat, coughing or other acute physiological responses in sensitive members of the community. | 50 x $10^{-6}$ per year | No toxic gases associated with this modification. | Yes |
| Propagation due to Fire and Explosion – exceed radiant heat levels of 23 kW/$m^2$ or explosion overpressures of 14 kPa in adjacent industrial facilities | 50 x $10^{-6}$ per year | As the estimated individual fatality risk at the site boundary is up to 2 pmpy then this criterion is satisfied. | Yes |

According to Pinnacle Risk in relation to this Modification Proposal, the risk of off-site fatality is below the HIPAP 4 risk criteria. As the nearest house is approximately 400 m away and the low likelihoods for pipe failures, the concept of societal risk applying to populated areas is therefore according to Pinnacle Risk not applicable for this project.

*Risk to the biophysical environment*

The main concern for risk to the biophysical environment is generally with effects on whole systems or populations. For the Modification Proposal involving natural gas, steam, boiler feedwater and power, there are no solid, liquid or gaseous effluents that could significantly impact the environment.

Whereas any adverse effect on the environment is obviously undesirable, according to Pinnace Risk the risk of losses of containment is broadly acceptable.

The PHA prepared by Pinnacle Risk concludes:

> *The risks associated with the proposed modifications at the Shoalhaven Starches Bomaderry site have been assessed and compared against the DoP risk criteria.*
>
> *The results presented in this report show compliance with all risk criteria.*
>
> *Societal risk, area cumulative risk and environmental risk are also concluded to be acceptable.*
>
> *The primary reason for the low risk levels from the modifications is the low likelihood of significant pipe failures leading to off-site impact from jet or flash fires, or explosions.*
>
> *Based on the analysis in this PHA, the following recommendations are made:*
>
> 1. *Provide natural gas leak detection in the proposed co-generation plant building with, at least, an alarm in the control room.*
> 2. *Provide an actuated valve on the natural gas supply pipe outside of the co-generation plant building for isolation in an emergency.*
> 3. *Given the high natural gas pressure in the supply pipeline, class the pipe as a critical pipe and therefore perform routine inspections and integrity checks.*

### 7.2.5 Visual Impact

The Shoalhaven Starches factory site is situated on Bolong Road, the gateway to Bomaderry, within an area currently containing a mixture of rural and industrial land uses. These different land uses contrast with each other and result in a mixed visual character.

The rural areas, much of which comprises the Shoalhaven Starches Environmental Farm, are generally flat to gently undulating and planted with pasture grasses. These areas have a typical rural/agricultural character, common throughout the region. To the north and

forming a background to the rural landscape are the timbered slopes of the Cambewarra escarpment.

The Shoalhaven Starches factory complex is characterised by typical industrial structures with an overall bulk and scale that dominates the surrounding locality. The site, despite being partially screened by vegetation along Bolong Road, the Shoalhaven River and Abernethy's Creek visually dominates the immediate locality. The development is particularly exposed to view along Bolong Road. This view reveals some of the internal structures within the site including recovery and storage tanks, car park, fermentation tanks and the Ethanol Plant. Overall the appearance of the site is typical of an industrial facility of this scale and nature.

The most relevant vantage points from where the overall factory site is visible (see **Figure 19**) would include:

- The Princes Highway – views of the existing factory site are possible from selected locations along the Princes Highway north of Bomaderry, travelling in both a northerly and southerly direction. Whilst the factory site is visible in the landscape, its overall visual impact is reduced by virtue of the distance between the plant; the intermittent nature of the views; a rise in topography which screens the site from view; and vegetation.
- Burraga (Pig) Island – Burraga Island is situated in the middle of the Shoalhaven River and provides the closest vantage point to the southern boundary of the site. The island however is privately owned and not accessible to the public. Vegetation screening along the riverbank adjacent to the site also reduces the visibility of the existing buildings and structures.
- Bolong Road – Bolong Road runs along the frontage of the site. Views of the factory are possible when travelling in either an easterly or westerly direction. Some attempts have been made to provide some tree planting along the boundaries to "soften" the appearance of the development. The existing building forms and structures are however clearly visible to motorists travelling along this stretch of Bolong Road.
- Nowra Bridge – The Nowra Bridge crosses the Shoalhaven River and provides limited opportunities for views of the factory site. The dominant visual elements from the bridge are the river, vegetation along the riverbanks and the escarpment. The visual impact of the factory site is reduced by distance as well as the bridge structure which permits only glimpses of the site.

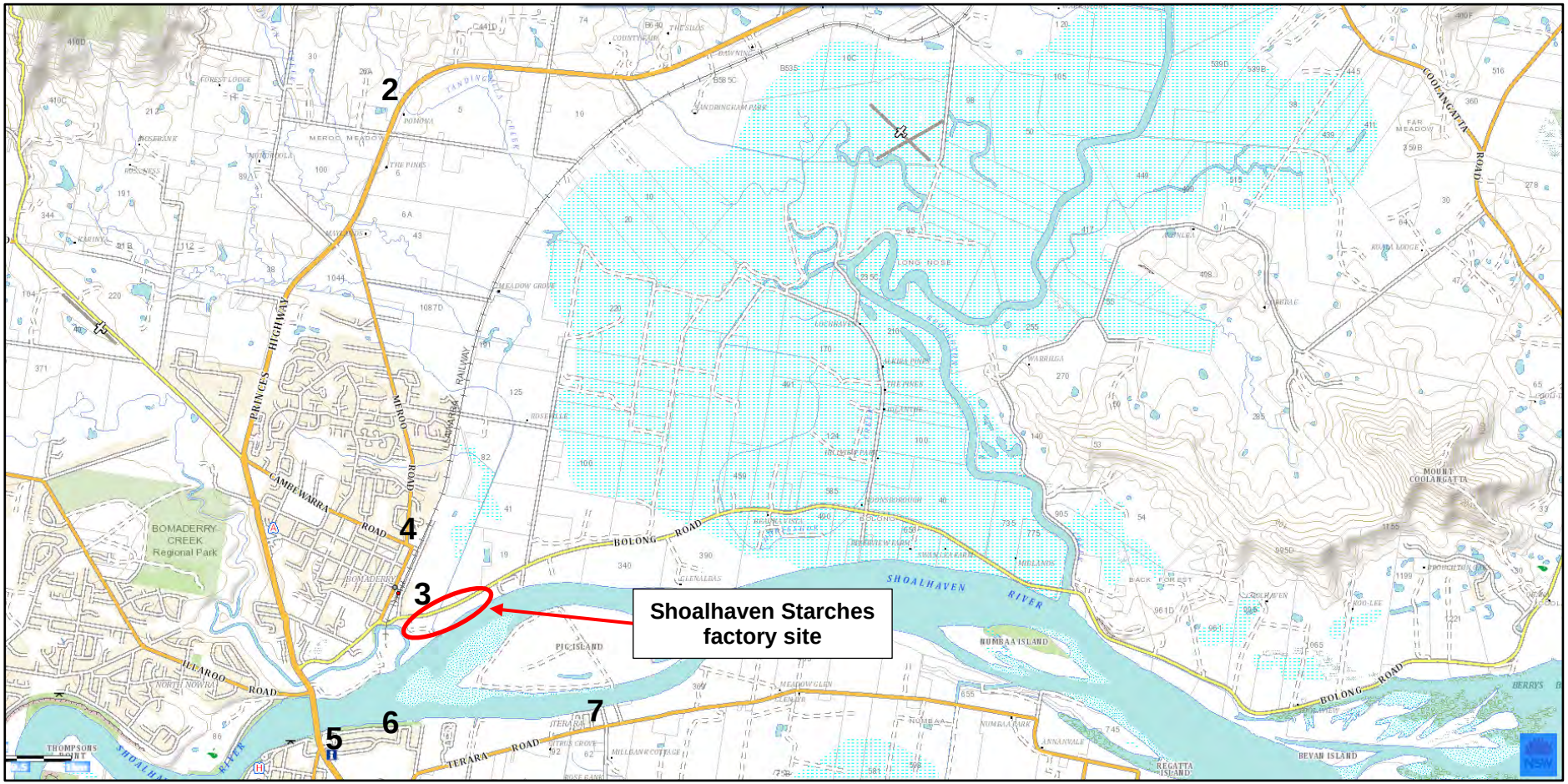


**Figure 19: Vantage Points for Plates 2 – 7.**

- Bomaderry urban area – The existing plant is visible from a number of locations within the eastern outskirts of Bomaderry. Bomaderry is slightly elevated and some locations within the urban area do have extensive views of the site.
- Terara – Distant views of the Plant are possible from a number of vantage points in and around the village of Terara on the southern bank of the River. The visual impact of the site however is reduced by distance, the intervening landform of Burraga (Pig) Island and the vegetated riverbanks.
- Riverview Road – Views of the site are available from residential development on the southern bank of the Shoalhaven River. Vegetation along both the northern and southern banks of the river partially screen the site from view.
- Cambewarra Lookout – Cambewarra lookout is a popular tourist lookout providing panoramic views over the Shoalhaven floodplain and estuary. Shoalhaven Starches, like the other significant industrial sites, is visible from the lookout.

***The Proposal***

The proposed Co-generation plant building overall will have a footprint of 97 metres by 50 metres. The main building will have a height above ground level of 20.5 metres, with exhaust stacks, comprising a maximum height above ground level of 45 metres.

The building will be sited towards the western edge of the factory site, approximately 115 metres from the Bolong Road frontage to the north; 29 metres from Bomaderry Creek to the west; and 85 metres from the Shoalhaven River frontage to the site to the south.

*The Princes Highway*

The Shoalhaven Starches factory is mainly visible from a section of the Princes Highway between Boxsells Lane and Devitts Lane, Jaspers Brush (refer **Plate 2**). Due to the configuration of the highway and the siting of the factory, only southbound vehicles view the site. Vantage points along this section of the highway are 4.5 to 5.0 km from the site. The site becomes less exposed and is eventually obscured by a rise in topography further south of Boxsells Lane.

Given the distance from these vantage points the factory site is only barely visible. The rising topography upon which Bomaderry is sited screens the western portion of the site, as does intervening vegetation.

Given the distance of these views, and the screening of the site attributed to terrain and vegetation it is considered the works associated with this modification proposal will not adversely impact on views from these vantage points.

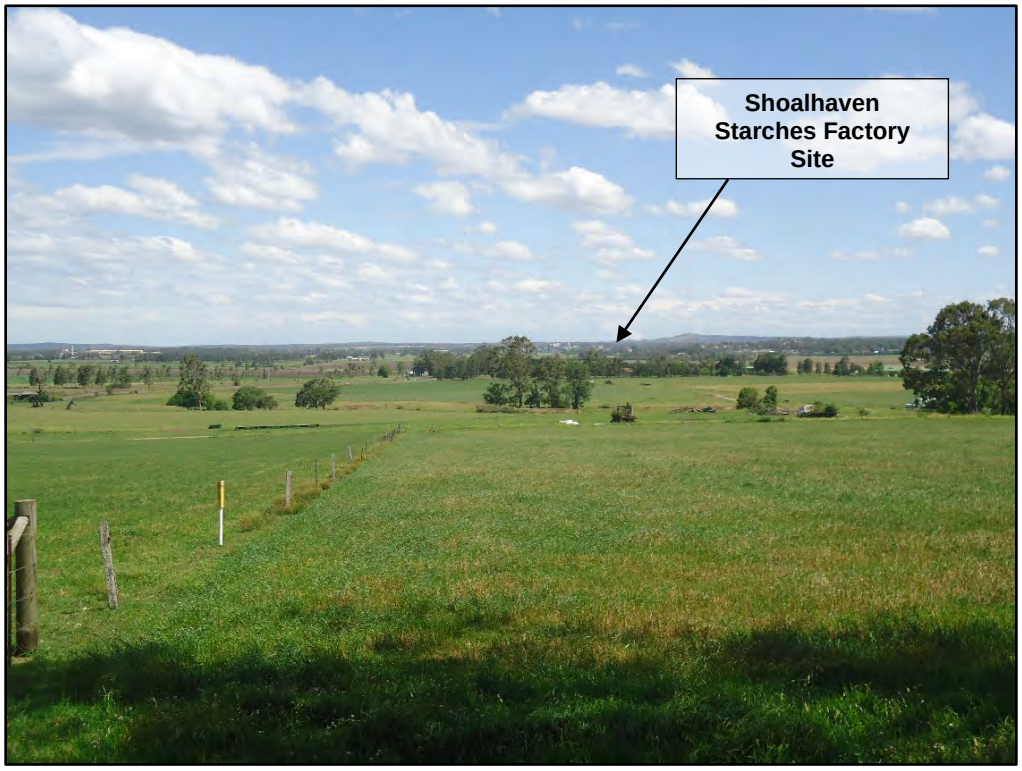


**Plate 2:** View of Shoalhaven Starches Factory from Princes Highway (within vicinity of Devitts Lane).
(Site of proposed works not clearly visible from this vantage point.)

*Bolong Road*

The existing factory site is clearly visible from Bolong Road by vehicles approaching from the east and west, and along the frontage of the site refer (**Plate 3**).

The Co-generation Plant will be set back 115 metres from the Bolong Road frontage. From the above vantage point the proposed works will be sited to the rear of the existing Cleary Bros site and the large Eucalyptus trees shown in the above picture. The proposed works will be partially obscured by this existing development and these trees. The proposed works will however be visible from this vantage point, although they will have a similar bulk scale and height as the existing DDG Pellet Plant and No. 4 DDG Dryer which are situated slightly to the left of the above plate and will therefore not be inconsistent with the scale of development from this vantage point.


**Plate 3:** View of Shoalhaven Starches factory site
(Prosed works to be sited to rear of Cleary Bros site (left side of above picture).

*Bomaderry Urban Area*

The township of Bomaderry is slightly elevated and some locations within this urban area have extensive views of the site (refer **Plate 4**).

In light of the prevailing scale of existing development located within Shoalhaven Starches site the proposed modification works will be largely viewed as part of the main industrial centre of the Shoalhaven factory site. With respect to the works shown in **Plate 4** below, the proposed works will have a similar scale as the existing DDG Pellet Plant and DDG No. 4 Dryer.


**Plate 4:** View of Shoalhaven Starches factory site from corner of Railway Street and Cambewarra Road, Bomaderry.

*Nowra Bridge*

The view from Nowra Bridge to the east is mainly dominated by the river, riparian vegetation and the floodplain (refer **Plate 5**).

The site is largely obscured by riverside vegetation. The DDG Pellet Plant building is partially visible from this vantage point.

The works associated with this Modification Proposal will be sited in the immediate foreground of the DDG Pellet Plant that is visible in **Plate 5** below. These structures however would be in context of these existing buildings and within the scale of other structures visible from this vantage point.

**Plate 5:** View of Shoalhaven Starches factory site from Nowra Bridge over the Shoalhaven River.

*Riverview Road*

**Plate 6** below provides a view of the Shoalhaven Starches factory site from Riverview Road located on the south side of the Shoalhaven River. This view is from a distance of about 750 metres. Riparian vegetation along both the northern and southern banks of the river softens much of the site from view. The proposed works associated with this Modification will rise visually above the riparian vegetation, much as the existing DDG Pellet Mill does from this vantage point. In this regard the proposed works will not be as large as the DDG Pellet Mill building.

As with the view from the Nowra Bridge in **Plate 5,** these structures would be in context of this existing building and within the scale of other structures which are also visible from this vantage point.

**Plate 6:** View of Shoalhaven Starches factory site from Riverview Road area.

*Terara*

The village of Terara is approximately 1.5 kilometres from the factory. The view of the Shoalhaven Starches factory site as seen from the banks of the Shoalhaven River adjacent to the village of Terara is shown in **Plate 7**.

The view from this vantage point is across and over Burraga (Pig) Island. Vegetation on the island and along the northern banks of Shoalhaven River also help to obscure the view of the existing factory site.

Various parts of the existing factory site are visible from this vantage point, although somewhat obscured by vegetation. The works associated with the Modification Proposal will be mainly obscured by existing buildings associated with the Shoalhaven Starches operations from this vantage point and will not be visually prominent.

**Plate 7:** View of Shoalhaven Starches factory site from village of Terara.

*Cambewarra Lookout*

Cambewarra Lookout is situated about 7 km to the north-west of the site. Views from the lookout are from an elevation over 620 m ASL and encompass the Shoalhaven River floodplain and the coast including Jervis Bay. Whilst the factory site is visible from this vantage point, due to scale of the view, it would be extremely difficult to make out the works associated with the project from this vantage point.

Overall it is considered that the proposed works will not create a significant adverse visual impact due, principally, due to the works comprising a scale and character consistent with existing development on the site. There are however measures which Shoalhaven Starches could undertake to minimise the visual impact of the proposal. Where appropriate and possible, the proposed structures should be constructed of similar materials as those previously used on the site and be of a non-reflective nature. Colours should blend with existing structures on the site to ensure visual harmony. Consideration should be given to incorporating a cladding colour if possible which will match existing development on the site.

### 7.2.6 Flooding

WMAwater were engaged to undertake a Flood Compliance Report for the proposed modifications associated with this Modification Application (**Annexure 5**). This section of the SEE provides a summary of the findings of the WMAwater's flood assessment for this Modification Application.

According to WMAwater the proposed works are inundated in the 1% Annual Exceedance Probability (AEP) flood event by floodwaters from the Shoalhaven River. The report prepared by WMAwater (**Annexure 5**) provides an assessment of the implications of this modification proposal on flood levels, flows and velocities.

WMAwater (formerly known as Webb McKeown & Associates) undertook the 1990 Shoalhaven River Flood Study and subsequent 2008 Floodplain Risk Management Study and Plan for Shoalhaven City Council. WMAwater have also undertaken many similar flood assessments for Shoalhaven Starches in the past and are therefore very familiar with flooding in the Shoalhaven River floodplain and the implications for flooding of further development in the northern floodplain and along Bolong Road.

***Hydraulic Impact Assessment***

Detailed hydraulic assessment and modelling was undertaken as part of WMAwater's report "*Proposed Modification Application To MP06-0228, Shoalhaven Starches Expansion Project, Modification To DDG Dryers and Container Store, Flood Impact Assessment"* dated 23rd May 2016 ("23 May 2016 report"), therefore WMAwater's assessment in support of this Modification Proposal assessment only addresses whether the proposed works change the results from those provided in their 23rd May 2016 report.

***Overview of Hydraulic Modelling***

Ponding of water in low lying areas on the northern floodplain of the Shoalhaven River occurs following periods of heavy and continuous rain. Some parts of the land are only 1 m above high tide and consequently are frequently inundated. This results from direct rainfall over the area and also from overflow from the creeks which flow through the area. In larger floods, both Abernethy's Drain and Bomaderry Creek will overtop their banks and inundate the area. This would have occurred, according to WMAwater, in March 1978 and the other floods which occurred in the 1970s (August 1974, June 1975 and October 1976) as well as the April 1988 event. According to residents' reports none of these floods overtopped the northern river bank, in the vicinity of the Shoalhaven Starches plant or the Paper Mill, to any significant extent.

The existing and proposed works, since approximately 1990, on the northern floodplain do not increase flood levels in these "small" floods as there is no significant velocity and the area is a very large storage basin. The largest of these events occurred in March 1978 which approximated a 5% AEP flood. For the above reasons, construction of the existing works since 1990 plus the proposed works on the northern floodplain will not cause, according to WMA Water, any significant increases in flood levels for these events. These are the most frequent events that affect the area, and the above five historical events are typical examples.

However, floods larger than March 1978 will occur and they will overtop the bank, causing a significant inflow of floodwaters to the area. In these larger overtopping floods the proposed and existing works since 1990 on the northern floodplain will have an impact upon flood levels by restricting flow and reducing temporary floodplain storage. These are much rarer events and generally the majority of the northern floodplain is inundated by up to 3 m depth of water. Some parts of Shoalhaven Starches plant are already inundated by up to 1.5 m depth of water and consequently the small increase in level caused by the existing and proposed works since 1990 is unlikely to be significant. Hydraulic modelling is undertaken to assess the impacts on the northern floodplain of further development within the Shoalhaven Starches plant.

***Overview of Hydraulic Modelling***

The 1990 Lower Shoalhaven River Flood Study was commissioned by the NSW Government Public Works and determined design flood levels along the river and adjoining floodplain. From approximately the year 2000 to 2010 the hydraulic computer model, termed the CELLS model, established in that study was used by WMAwater, on behalf of Shoalhaven Starches, to evaluate the potential increases in flood level due to further works on the northern floodplain, including expansion of the plant itself and construction of the storage ponds.

The CELLS model of the Shoalhaven River represented the channel and floodplain as a series of interconnected cells, termed either river or floodplain cells. According to WMAwater since 1990 there have been significant advancements in the field of hydraulic modelling through the use of more complex computer software that allows the river and floodplain to be discretised into a grid. This is typically 15 m by 15 m on large rivers and up to 2 m by 2 m on small urban catchments. These models are termed 2 Dimensional (2D) in that they determine the flow direction between grid cells producing vector velocities. These models are thus able to more accurately define the topography and in

turn can more accurately represent the hydraulic effects of even a small development on a large floodplain.

In 2013, Shoalhaven Starches commissioned WMAwater to update the Shoalhaven River Flood Study to current best practice using the TUFLOW 2D hydraulic modelling software. 2D hydraulic models require detailed survey data and this has only become possible with the advent of what is known as Airborne Laser Scanning survey (ALS) or Light Detecting and Ranging (LIDAR). ALS uses laser technology that is emitted from a plane to define the ground levels (height in mAHD) and co-ordinates of points on the ground or on buildings. ALS cannot penetrate deep water in the Shoalhaven River and a detailed bathymetric survey of the river is therefore also required. Ortho-rectified digital aerial photography is also required in combination with ALS to ensure that buildings and other features on the floodplain are accurately accounted for.

***Results from TUFLOW Hydraulic Modelling***

The proposed works associated with this Modification Proposal were included in the TUFLOW hydraulic model and a comparison of results for the 1% AEP event is provided on **Figure 20** below as an impact map (ie. the change in the 1% AEP flood level due to the proposed works).

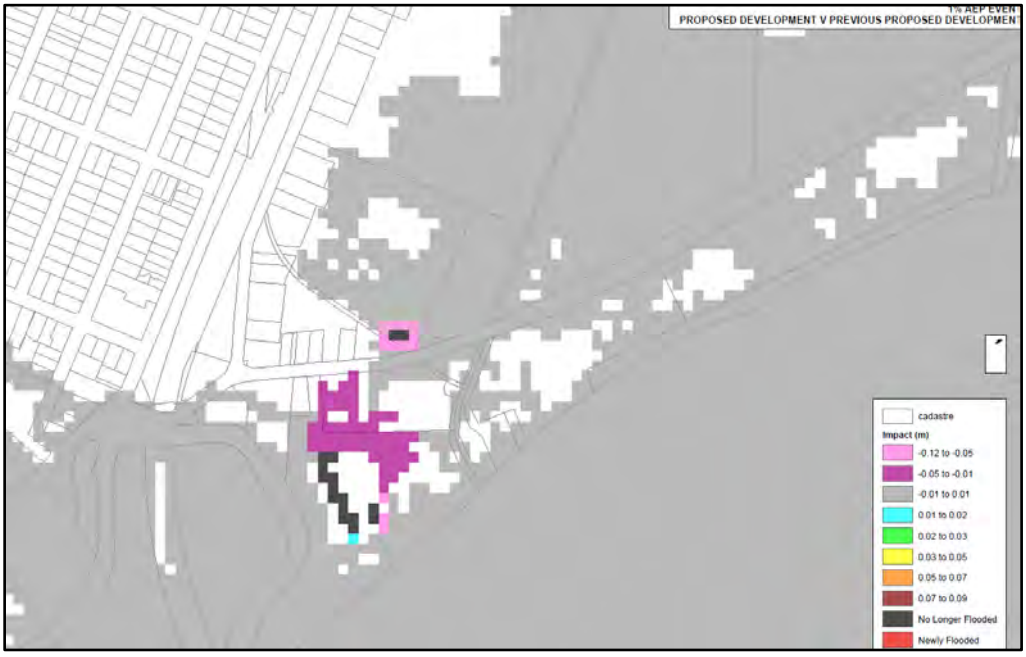


**Figure 20: Peak Flood Level impact 1% AEP Event**
**Proposed Development v Previous Proposed Development (WMAwater, 2021)**

The results detailed in **Figure 20** above, according to WMAwater indicate that there is no change in the 1% AEP flood level outside the Shoalhaven Starches plant.

### 7.2.7 Geotechnical and Riverbank Stability

GHD were engaged to

- Provide geotechnical advice on the anticipated ground conditions with respect to the proposed development works.
- Provided geotechnical advice in relation to the proximity of the various structures proposed for the Co-Generation Plant to the eastern bank of Bomaderry Creek and potential effects of the proposed modifications (Mod 23) to the plant on the stability of the nearby creek bank.

With respect to the impact of that the Modification Proposal would have on the stability of the nearby Bomaderry Creek GHD concluded:

> *The analyses show that the failure scenarios are driven by slope instability approximately between the wire mesh fence and the top of the creek bank as shown in Section A-A'. The failure scenarios at Section B-B' extend to the weighbridge and edge of carriageway. A minimum FoS of 3.72 was achieved for all slope stability scenarios, indicating currently stable conditions and a very low risk of slope instability under current and recent flood conditions.*
>
> *Based on the above stability assessment, it is concluded that the construction of the proposed Co-Gen Plant has little or no influence on slope instability for the assessed model. Hence, we conclude that the proposed Co-Gen Plant, founded on piles, will not adversely affect the stability of the eastern bank of Bomaderry Creek.*
>
> *The slope stability analyses are based on the assumptions outlined above. If any aspects of the assumptions made are incorrect or significant changes occur to the current site conditions or proposed development, then GHD should be notified and the analyses should be re-assessed.*

### 7.2.8 Greenhouse Gas Emissions

GHD were engaged to conduct a Greenhouse Gas (GHG) assessment of the Modification Proposal.

Two scenarios were developed by GHD to model the scope 1 and 2 emissions from the Modification Proposal, against each other and the emissions associated with the financial year ending 2020 (as reported for National Greenhouse and Energy Rating (NGER)). Those scenarios involved the projection of emissions at an increased level of production using a mixture of increased gas and grid electricity plus consistent coal use; and the proposed scenario of increased natural gas use through a Modification Proposal, but no coal use and greatly reduced grid electricity use as a result of the cogeneration plant.

GHD's assessment is the same as used for the site's annual NGER report. Scope 1 emissions are the direct emissions associated with the on-site combustion of fuels during

operations, and scope 2 emissions are indirect emissions associated with the consumption of grid electricity.

**Table 16** below provides a summary of the three scenarios involved: the FY20 emissions; future increased productionwith no co-generation; and future with increased production and the Co-generation facility in operation. The FY20 emissions scenario refers to the current emissions reported at 866,625 tonnes per annum (TPA) of flour throughput. As allowed under its existing Project Approval, from 2022 Shoalhaven Starches propose to increase production by 37% to 1,300,000 TPA of flour throughput. The introduction of the proposed Co-generation plant unit will dramatically decrease the project's reliance on grid electricity, GHD predict that the scope 2 emissions will fall in comparison to FY2020. Thus, byimplementing the modifications, Manildra is projected to reduce the facility's operational emissions by 43% in comparison to FY20.

**Table 16**

**Summary of Three Scenarios**

| ***Activity*** | ***FY20*** | ***Future increased production (no co-gen)*** | ***Future increased production (Co-gen facilityin operation)*** |
|---|---|---|---|
| Product (flour) throughput (TPA) | 866,625 | 1,300,000 | 1,300,000 |
| Steam requirement (TPA) | 1,484,873 | 2,116,800 | 2,116,800 |
| Emissions | (t CO2-e / year) | (t CO2-e / year) | (t CO2-e / year) |
| Natural Gas | 79,547 | 182,790 | 432,543 |
| Coal | 269,854 | 264,190 | 0 |
| Biogas | 1,376 | 2,710 | 2,710 |
| Liquified Petroleum Gas (LPG) | 50 | 0 | 0 |
| Diesel | 1,146 | 1,146 | 1,146 |
| Scope 1 Total | 351,973 | 450,836 | 436,400 |
| Electricity | 247,016 | 361,876 | 35,478 |
| Scope 2 Total | 247,016 | 361,876 | 35,478 |
| **Total** | **598,989** | **812,712** | **471,878** |
| **$tCO_2$-e/ flour throughput (tpa)** | **0.69** | **0.62** | **0.36** |

The GHG Assessment by GHD finds:

> *Overall, there is a significant difference in the emissions associated with the two future increased production scenarios. The scenario without co-gen would see annual emissions of 812,712 t $CO_2$-e and with co-gen scenariowould see*

*emissions of 471,878 t $CO_2$-e. This represents a 58% difference in emissions between the two scenarios. The major differences between the two scenarios are the elimination of coal, decrease in electricity usage and the increase in natural gas usage. The amount of grid electricity is reduced as the co-gen is in operation.*

*Between the two future increased production scenarios, there is 42% increase in natural gas consumption from182,790 t $CO_2$-e to 432,543 t $CO_2$-e. However, despite the large increase in natural gas consumption, the decrease in coal consumption and electricity is much higher. The coal consumption decreases from 264,190 t $CO_2$-e to zero and electricity decreases from 361,876 t $CO_2$-e to 35,478 t $CO_2$-e (10% decrease in emissions).*

*As per Table 3.5 Australian GHG emissions for the year up until September 2020 are estimated to be 510.1 Mt $CO_2$-e. Compared with the estimated GHG of 0.8 Mt $CO_2$-e and 0.4 Mt $CO_2$-e for the future increased production without and with co-gen, respectively, the impact of increases in annual greenhouse gas emissions is minor in thecontext of Australia's greenhouse gas emissions as a whole.*

### *Table 3.5 Impact of project emissions on national totals*

| ***Emissions Source*** | ***Total Emissions 2019 (Mt $CO_2$-e)[1]*** | ***Year to September 2020 Australian Emissions (Mt $Co_{2}$-$e$)[2]*** | ***Potential Annual Contribution of Operations emissions no co gen (%)*** | ***Potential Annual Contribution of Operations emissions with co-gen (%)*** |
|---|---|---|---|---|
| ***Overall Total*** | ***518.9*** | ***510.1*** | ***0.16%*** | ***0.09%*** |

1. *Table 2.1, Department of the Environment and Energy "State and Territory Greenhouse Gas Inventories 2019" April 2021*
2. *Table 3, Department of the Environment and Energy "Quarterly Update of Australia's National Greenhouse Gas Inventory:June 2020" Incorporating emissions from the NEM up to September 2020.*

*A comparison of all assessed scenarios is presented in Figure 3.1.*

*The introduction of a co-gen facility and the elimination of coal would result in a decrease in emissions from current levels but an increase in scope 1 emissions. Overall, there is a large reduction in emissions as a result ofthe introduction of the co-gen facility.*

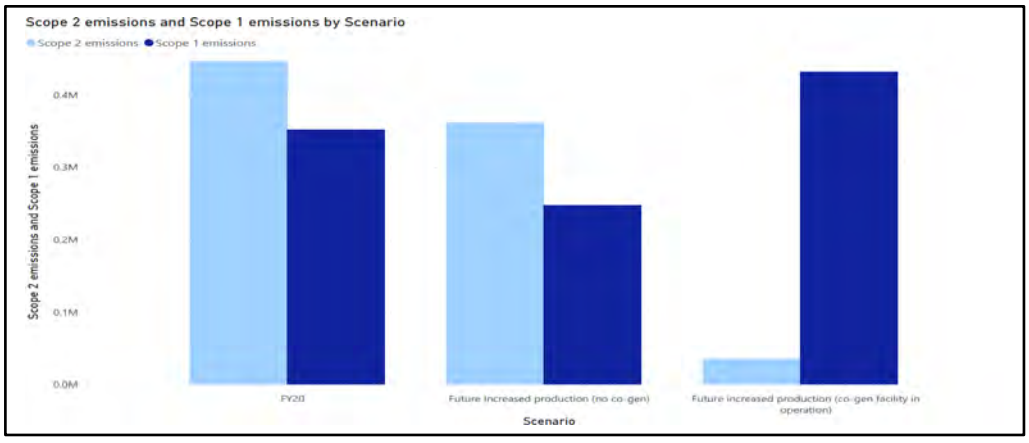


***Figure 3.1 Scope 1 and 2 emissions by scenario***

## 7.3 THE SUITABILITY OF THE SITE FOR DEVELOPMENT

In our view the site is suitable for the development, and including the development as modified by this application:

- The subject land is suitably zoned and the proposal satisfies state and local planning provisions applying to the land.
- The modified proposal will not have any significant additional impacts on the environmental values of this locality over and above those envisaged by the original approved development.
- The modified development will not result in any significant adverse effects on local amenity.
- The modification proposal does not seek to alter the approved physical extent of operations. Under these circumstances the proposal will not result in any increased inputs to the production process; increased production; or increases in traffic or other impacts on the locality.

Given these circumstances it is our view that the subject site is suitable for the proposed development.

## 7.4 SUBMISSIONS

It is envisaged that the development application once submitted to the Department will be placed on public exhibition; and the general public will be afforded an opportunity to review the documentation supporting the application.

Any public submissions made following the exhibition will need to be taken into consideration by Council when it determines the application.

## 7.5 THE PUBLIC INTEREST

It is our view that the modification proposal is in the public interest:

- The proposal is consistent with the objectives of state and local planning provisions applying to the site.
- The modified proposal will not result in any significant adverse environmental impacts.
- The modified proposal will not result in any significant amenity impacts in the locality.
- The modified proposal will be substantially the same development as that approved under the Project Approval.

# 8.0 CONCLUSION

The Shoalhaven Starches factory located on Bolong Road, Bomaderry produces a range of products for the food, beverage, confectionary, paper and motor transport industries including starch, gluten, glucose and ethanol.

Project Approval MP06_0228 was granted by the Minister for Planning on the 28th January 2009 for the Shoalhaven Starches Expansion Project. This approval also encapsulated previous approvals for the site into one overall approval for the site (at that time).

The Shoalhaven Starches Expansion Project sought to increase ethanol production at the Bomaderry plant in a staged manner from 126 million litres per year to 300 million litres per year. To accomplish the increase in ethanol production, this project required a series of plant upgrades and increase in throughput of raw materials, principally flour and grain.

Following the Minister's determination Shoalhaven Starches have been implementing and commissioning works in accordance with this Project Approval.

Project Approval MP06_0228 included provision for a gas fired Co-generation Plant that was to be situated within the western part of the factory site. This gas fired Co-generation Plant was to comprise two gas turbine generators that would deliver an anticipated net power output of 40 MW of power for the site.

Under Mod 16 the Independent Planning Commission approved an additional coal fired co-generation plant. This coal fired Co-generation Plant was to be sited immediately to the south of the existing Boiler House complex situated to the east of Abernethy's Creek. This coal fired Co-generation Plant would generate a total of 15 MW of power for the site.

Neither the approved gas nor coal fired co-generation plants have been constructed to date.

As the Department is aware following the original Project Approval Shoalhaven Starches have obtained approval and / or are seeking approval for a range of Mods to the original Project including such projects as:

- Construction of Starch Dryer No. 5 (Mod 7);
- Modification to the existing Ethanol Distillery (Mod 12);
- Installation of additional Flour Mill (Mod 16);
- Construction of New Product Dryer (Mod 16);
- Proposed Ethanol Plant upgrade to increase proportion of Beverage Grade Ethanol (Mod 19).

Shoalhaven Starches are forecasting that the electrical power load demand created by these and other additional works, subsequent to the original Project Approved development, will exceed the power supply capacity of the gas fired co-generation plan approved under the original Project Approval; as well as the additional coal fired Co-generation Plant approved under Mod 16.

Shoalhaven Starches now propose to construct a new gas-fired Co-generation Plant essentially in the same location as the original approved gas fired Co-generation Plant within the western part of the factory site. The new gas fired co-generation plant, will consist of two natural gas turbines that will generate an anticipated power output each of 30 MW, providing a total power to the site of 60 MW.

The waste heat from each of the gas turbine exhausts will be used to generate 11 barg steam in two 110 t/hr heat recovery steam boilers. The boilers will be fired with natural gas and will be able to operate at full output when the turbine is offline for maintenance.

In addition to the gas turbines, the proposal will include the erection of four water tanks at the southern end of the gas fired co-generation building. A gas compressor will also be sited to the southern end of the gas fired co-generation building adjacent to the water tanks.

The gas fired co-generation plant will also necessitate the construction of a new electrical sub-station which is to be located to the east of the gas fired co-generation plant building and in a position that was previously approved for the No. 6 DDG Dryer (but which is yet to be constructed). The approved No. 6 DDG Dryer will be relocated to the south of the existing

The proposed new gas fired co-generation plant will replace the gas fired co-generation plant approved under the original Project Approval as well as the coal fired co-generation plant approved under Mod 16.

The Modification Application will not involve changes to the size, scale or intensity of the existing Shoalhaven Starches operations. The modification proposal will not result in any increases in production rates from the site, nor will it involve any changes in level of impacts arising from the approved development.

The Shoalhaven Starches Expansion Project was a 'transitional Part 3A Project" for the purposes of Schedule 6A of the Environmental Planning & Assessment Act. As of the 1st March 2018 the transitional arrangements for former Part 3A projects have been discontinued. The discontinuation of the transitional arrangements for Part 3A projects and concept plans means that modifications are assessed through the State Significant Development (SSD) pathway. As such this Modification Application is made pursuant to Section 4.55(2) of the Environmental Planning & Assessment Act 1979.

This SEE therefore supports a modification application made pursuant to Section 4.55(2) of the Environmental Planning & Assessment Act.

The preparation of this SEE has been undertaken following consultation with The Department of Planning, Industry and Environment, EPA, NRAR, Fire & Rescue NSW, Shoalhaven City Council and the Australian Department of Defence.

The SEE is also supported by the following expert assessments:

- An Air Quality Impact Assessment by GHD (**Annexure 3**) which concludes the proposal should be acceptable from an air quality perspective.
- A Noise Assessment by Harwood Acoustics (**Annexure 4**) which provides noise control recommendations to reduce the level of noise from the modified project to within site specific noise design goals at all receptor locations. The noise design goals have been established to ensure that the noise limits prescribed in the Environment Protection Licence for the site (EPL 883) continue to be met at all receptors.
- A Flood Assessment prepared by WMAwater (**Annexure 5**) which concludes that there is no change in the 1% AEP flood level outside the Shoalhaven Starches plant as a result of this Modification Proposal..
- A Preliminary Hazard Analysis (PHA) undertaken by Pinnacle Risk Management (**Annexure 6**) that assesses the risks associated with the proposed modifications and compares them against the relevant risk criteria. The PHA demonstrates the Modification Proposal will comply with all risk criteria. The PHA also concludes that societal risk, area cumulative risk and environmental risk will be acceptable.
- A Geotechnical Assessment that included an analysis of the impact of the proposed modification on riverbank stability by GHD (**Annexure 7**) that concludes the proposed Co-generation Plant, founded on piles, will not adversely affect the stability of the eastern bank of Bomaderry Creek.

This SEE demonstrates that this Modification Proposal will have net environmental benefits including:

- A reduction in greenhouse gas emissions and intensity for the overall site operations.
- An improvement in air quality generally with a reduction in emissions.
- A reduction in heavy vehicle movements to and from the site.

The Modification Application will not involve changes to the size, scale or intensity of the existing Shoalhaven Starches operations. The modification proposal will not result in any increases in

production rates from the site, nor will it involve any changes in level of impacts arising from the approved development.

It is considered that this Modification Application; will have not result in any significant adverse environmental impacts; and the development to which Project Approval MP06_0228 as modified relates will be substantially the same development as the development for which this consent was originally granted and before that consent as originally granted was modified.

The SEE includes an assessment of the proposal having regard to the relevant matters for consideration as listed under Section 4.15 of the Environmental Planning and Assessment Act, 1979. The assessment concludes that the modification proposal, within its local context, is satisfactory and should be approved.

Approval for this Modification Application is sought.

**Stephen Richardson RPIA**
**COWMAN STODDART PTY LTD**

# ANNEXURE 1

## Responses from Government Agencies

**Shoalhaven Starches**
**Bolong Road, Bomaderry**

# ANNEXURE 2

## Plans of Modification Proposal

**Shoalhaven Starches**
**Bolong Road, Bomaderry**

# ANNEXURE 3

**Air Quality Assessment**

**prepared by**

**GHD Pty Ltd**

**Shoalhaven Starches**
**Bolong Road, Bomaderry**

# ANNEXURE 4

**Environmental Noise Impact Assessment**

**prepared by**

**Harwood Acoustics**

**Shoalhaven Starches**
**Bolong Road, Bomaderry**

# ANNEXURE 5

**Flood Compliance Report**

**prepared by**

**WMA Water**

**Shoalhaven Starches**
**Bolong Road, Bomaderry**

# ANNEXURE 6

**Preliminary Hazard Analysis**

**prepared by**

**Pinnacle Risk Pty Ltd**

**Shoalhaven Starches**
**Bolong Road, Bomaderry**

# ANNEXURE 7

**Geotechnical and Riverbank Stability Assessment**

**prepared by**

**GHD Pty Ltd**

**Shoalhaven Starches**
**Bolong Road, Bomaderry**

# ANNEXURE 8

**Greenhouse Gas Emissions**

**prepared by**

**GHD Pty Ltd**

**Shoalhaven Starches**
**Bolong Road, Bomaderry**

# ANNEXURE 9

**Clause 4.6 Written Request**

**prepared by**

**Cowman Stoddart Pty Ltd**

**Shoalhaven Starches**
**Bolong Road, Bomaderry**