

ENVIRONMENTAL ASSESSMENT

MODIFICATION APPLICATION PURSUANT TO SECTION 4.55(2) OF THE ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979

PROPOSED MODIFICATION TO PROJECT APPROVAL MP 06_0228 SHOALHAVEN STARCHES EXPANSION PROJECT PROPOSED NEW SPECIALITY PRODUCT PROCESSING FACILITY, NEW GLUTEN DRYER AND OTHER ASSOCIATED WORKS

Lot 21 DP 1000265, Lot 201 DP 1062668, Lot 241 DP 1139535,
Lot 141 DP 1069758, Lot 1 DP 838753, Lot 1 DP 385145,
Lot B DP 334511 and Lot 143 DP 1069758
22, 24, 171 and 220 Bolong Road, Bomaderry

Prepared for
Shoalhaven Starches Pty Ltd

June 2018

Environmental Assessment

Project	Modification Application Pursuant to Section 4.55(2) of the Environmental Planning & Assessment Act 1979 Proposed Modification to Project Approval MP 06_0228 Shoalhaven Starches Expansion Project. Proposed New Speciality Product Processing Facility, New Gluten Dryer and Other Associated Works
Address	Lot 21 DP 1000265, Lot 201 DP 1062668, Lot 241 DP 1139535, Lot 141 DP 1069758, Lot 1 DP 838753, Lot 1 DP 385145, Lot B DP 334511 and Lot 143 DP 1069758 22, 24, 171 and 220 Bolong Road, Bomaderry
Our ref:	17/96
Prepared by	Toni Wearne
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Draft	5 th June 2018
Final	14 th June 2018

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in respect of

PROJECT TO WHICH PART 3A APPLIES

Proponent Name: Shoalhaven Starches Pty Ltd

Proponent Address: Bolong Road, Bomaderry

Land to be developed: Address Bolong Road, Bomaderry

Lot No., DP/MPS, Vol/Fol etc. Lot 21 DP 1000265, Lot 201 DP 1062668, Lot 241
DP 1130535, Lot 141 DP 1069758, Lot 1 DP 838753,
Lot 1 385145, Lot B DP 334511 and Lot 143 DP 1069758

Project Development: Shoalhaven Starches Expansion Project (MP 06_0228)

Proposed Modification to Project: Proposed New Speciality Product Processing Facility,
New Gluten Dryer, and Other Associated Works

Environmental Assessment

An Environmental Assessment is attached

Certification

I certify that I have prepared this environmental assessment and to the best of our knowledge

- It has been prepared in accordance with Section 4.55 of the *Environmental Planning and Assessment Act 1979*,
- The information contained in the Environmental Assessment is neither false nor misleading.

Signature:



Name:

S. D. Richardson

Date:

14th June 2018

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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 approval.

Shoalhaven Starches now propose to undertake modifications to the approved Project to:

- The construction of a new industrial building to the west of Abernethy's Creek (plans MN6531-002, MN6531-003 and MN6531-004). This new industrial building will contain the following activities:
 - The Company also wish to explore the production of a range of specialised products as an extension to their existing product line. The plant and equipment associated with the processing of these specialty products will be housed within this new industrial building.
 - The conversion of two existing Gluten Dryers (Nos. 1 and 2) into starch production.
 - The construction of a new Gluten Dryer, to replace capacity lost by the conversion of Dryers Nos. 1 and 2 to starch. This new Product Dryer will be housed in this new industrial building.
- The installation of a third Flour Mill, Mill "C" within the existing Flour Mill "B" building to increase the proportion of flour that is manufactured on the site (plans MN244-002K, MN244-003K, MN244-005J).

- To undertake modifications to the existing Flour Mills “A” & “B”, to modify the type of ventilation used within these mills from a vacuum to a pressurization system (plans MN244-003F, MN244-004F, MN244-005F, MN244-006F, MN244-007F and MN244-011F).
- It is also proposed to construct an addition to the northern elevation of the recently constructed Starch Dryer No. 5 building to house a bag house for this dryer (plans MN6531-002, MN6531-003 and MN6531-004).
- The construction of an Additional Sifter for the Interim Packing Plant. It is proposed to install a large sifter in the feed stream to the existing starch packer to enable Shoalhaven Starches to meet customer requirements for smaller particle sized dry product (plan MN6531-014).
- The construction of a coal-fired Co-generation plant to the south of the existing Boiler House complex to increase power supply to meet the requirements of this Modification Proposal. This co-generation plant will include the installation of a new coal fired boiler (No. 8) (plans MN6531-005, MN6531-006, MN6531-007, MN6531-008 and MN6531-009).
- The relocation of the existing Boiler No. 7 to the northern side of the Boiler House complex (necessitated by the construction of the new co-generation plant and Boiler No. 8) (plans MN6531-005, MN6531-006, MN6531-007, MN6531-008 and MN6531-009).
- The construction of lime silos and associated pipe bridge to the east of Proposed Boiler No. 8 (plans MN6531-005, MN6531-006, MN6531-007, MN6531-008 and MN6531-009).
- It is proposed to upgrade electrical supply to the Shoalhaven Starches site to enable increased power supply to meet the requirements for the modification proposal:
 - Construct a new indoor electrical substation on the northern side of Bolong Road (No. 171). The existing 26 off street car parking spaces located on the northern side of Bolong Road (adjacent to the BOC CO₂ Plant) will be relocated to the east to accommodate the new HV substation (plans MN6531-010 and MN6531-011).
 - Shoalhaven Starches also propose to construct an extension to an existing electrical sub-station (2nd storey extension) that is located within the main factory site (plan MN6531-013).
- The construction an additional rail intake pit to assist in the efficient unloading of grain products (plan MN6531-012).
- Finally this modification also proposes to regularise the non-enclosure of transfer pumps of existing fermenter tanks, molecular sieve pumps and the relocation of structures on the Shoalhaven Site approved under Modification Approvals Mod 3 and Mod 12. The approved layout of the Electrical Substation, Cooling Towers and Emergency ISO Tank Container

Storage located within the main Shoalhaven Factory site has had to be reconfigured due to operational requirement (plan MN6476-002B).

The modified proposal will result in an increase in the total amount of flour processed on the site from the previously approved amount of 20,000 tpw under the Project Approval to 25,400 tpw. These increases in starch and gluten production will have a corresponding increase in Dried Distillers Grain Syrup (DDGS) from the current approved position of 6,400 tonnes per week to 7,500 tonnes per week.

Consequently, this will result in an increase in wastewater volume. Under the Project Approval, 8.1 ML of waste waters were directed to the Water Treatment system per day or 56.7 ML per week. Under this Modification Proposal it is estimated that waste water from the increased production processes will increase to 10 ML per day or 70 ML per week. It is proposed to dispose of the treated waste waters by irrigation onto Starch's Environmental Farm. An assessment of the Water Treatment System has been undertaken to ensure that it will be able to accommodate this increase in waste water volume.

The Shoalhaven Starches Expansion Project has been 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 transition arrangements for Part 3A projects and concept plans means that future modifications will be 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 Environmental Assessment has been undertaken following consultation with relevant Government agencies, including:

- The Department of Planning and Environment;
- Shoalhaven City Council;
- EPA;
- The Australian Department of Defence;.
- Department of Primary Industries - Office of Water.

This Environmental Assessment addresses issues raised following this consultation.

The EA is supported by expert assessments addressing:

- Noise Impacts – the EA is supported by a Noise Impact Assessment prepared by Harwood Acoustics which includes recommendations to ensure that the modified proposal will achieve the noise design goals as outlined under the Environmental Protection Licence that applies to the site.

- Air Quality Impacts and including Odours – the EA is supported by an Air Quality Impact Assessment prepared by GHD. This report notes that although there may be a marginal increase in odour impacts as a result of the modification overall, the proposal should be acceptable from an air quality perspective. GHD state the odour criteria is met at all sensitive receptors and it is considered highly unlikely that the increase in odour would be detected at sensitive receptors. Air quality impacts are predicted by GHD to comply with the criteria at all sensitive receptors. Furthermore, GHD indicate Shoalhaven Starches have implemented reasonable and feasible mitigation measures on site to reduce the potential air quality impacts from the new boiler.
- Preliminary Hazard Analysis (PHA) prepared by Pinnacle Risk Pty Ltd that assesses and compares the risks associated with the proposal and finds that such risks are acceptable when compared against the Department of Planning & Environment's risk criteria. The PHA includes recommendations to ensure that risks associated with the proposal are further reduced.
- A Geotechnical, Site Contamination and Acid Sulphate Soils Assessment prepared by GHD Pty Ltd. These assessments detail specific management measures to be undertaken during the construction of the works associated with this modification, particularly with works which are located within close proximity to the banks of Abernathy's Creek or the Shoalhaven River.
- Traffic and Car Parking Assessment prepared by Bitzios Consulting (Bitzios) that identifies that there are no access, traffic or parking impacts associated with the proposal – either during operation or construction stages – that would significantly impact on the efficiency and/or safety of the local traffic environment or existing on-site operations. The existing Bolong Road / Railway Street intersection and all access locations operate well within acceptable limits and traffic increases as a result of Modification 16 are not expected to have any adverse impact on the road network in the vicinity of the site. This existing carparking at the Starches Complex is considered to be sufficient to cater for both permanent and temporary car parking demand associated with the proposed modifications in this application.
- Flood Assessment prepared by WMA Water that demonstrate the proposed works slightly decrease the amount of flood waters from entering the northern floodplain across the river bank. Subsequently there is an increase in the peak level in the 1% and 0.5% AEP immediately upstream and to the east of the proposed works. However, these increases in the 1% and 0.5% AEP events are largely within the confines of land owned by Shoalhaven Starches. Downstream of the proposed works on Bolong Road there is a reduction in peak

levels of less than 0.1 m as the proposed works reduce slightly the amount of flood waters crossing through the site and thus flood levels are slightly lowered.

- An Assessment of the current Effluent Treatment System has been prepared by BPO Environmental Success (BPO). The report indicates that based on the predicted average loading values the effluent treatment system (ADI-BDF reactor) will accommodate the increase in waste waters. BPO further indicate that although operation at a higher loading will require careful management to maintain optimal operating conditions these peaks can be managed. BPO provide recommendations to effectively manage such peaks.

Following an assessment of the key issues associated with this proposal, this Environmental Assessment concludes that the development as modified will be substantially the same development as the Project as approved. The proposal is considered suitable for the site and this locality.

The Minister's approval is sought for this modification application.

1.0 INTRODUCTION

1.1 BACKGROUND TO PROJECT

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 was considered a ‘transitional Part 3A Project’ for the purposes of Schedule 6A of the Environmental Planning & Assessment Act.

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.

As outlined in a previous modification (Modification 12 for the Beverage Grade Ethanol Plant proposal), the expected increase in demand for ethanol to meet the demand arising from the NSW Government’s mandate to increase the blending of ethanol in the total volume of petrol sold in NSW has not occurred. This is due largely from a failure of the mandate to be imposed on petroleum suppliers.

As a result, Shoalhaven Starches have been investigating alternative markets for products used in the manufacture of ethanol and Shoalhaven Starches now propose to undertake further modifications to the Shoalhaven Starches Expansion Project Approval (MP06_0228) as listed below. Cowman Stoddart Pty Ltd has prepared this Environmental Assessment on behalf of Shoalhaven Starches Pty Ltd for the following modifications.

- The Company proposes to utilise grain, that is currently approved to directly feed the fermentation process in the ethanol production process, to instead increase the amount of flour that is produced on site to in effect increase starch and gluten production. The Company will seek approval to install a third Flour Mill “C” within the existing Flour Mill “B” building to further increase the proportion of flour that is manufactured on the site, as opposed to that which is transported to the site. It will also be proposed to undertake modifications to the existing Flour Mills “A” and “B” on the site, by modifying the type of ventilation used within the existing Flour Mills from a vacuum to a pressurization system.

- The construction of a new industrial building that will be located between the remaining “Moorhouse” Maintenance Building and adjoining the recently constructed Starch Dryer No. 5 building to the west of Abernethy’s Creek. This new industrial building will contain the following activities:
 - The Company wish to explore the production of a range of specialised products as an extension to their existing product line. The specialty products will comprise a range of modified gluten products for the food industry; and modified starches for both paper manufacturing as well as food production. The plant and equipment associated with the processing of these specialty products will be housed within this new industrial building
 - The resultant increase in starch and gluten production will require the conversion of two existing Gluten Dryers (Nos. 1 and 2) into starch production; and the construction of a new Gluten Dryer, to replace the capacity lost by the conversion of Dryers Nos. 1 and 2 to starch. This new Product Dryer will also be housed in this new industrial building,
- It is also proposed to construct an addition to the northern elevation of the recently constructed Starch Dryer No. 5 building to house a bag house for this dryer.
- The company seek to install a large sifter in the feed stream to the existing starch packer. To fit the large sifter into the packing plant building the roof in the immediate area of the sifter will need to be extended.
- It is proposed to construct a coal-fired Co-generation plant to the south of the existing Boiler House complex that will generate 15MW of electrical power. This Co-generation plant will include the installation of a new coal fired boiler (No. 8). This Co-generation plan will partly replace power that was to be generated from the Co-generation plant approved to the west of the site under the Project Approval. The construction of this new Co-generation plant and Boiler No. 8 will necessitate the relocation of the existing Boiler No. 7 to the northern side of the overall Boiler House complex. The need for this Co-generation plant arises due to the increasing cost of natural gas compared to coal. This modification proposal also includes the construction of two lime silos to the immediate south of the boiler house. The EPA are proposing to change the limits on the emissions for the coal fired boilers and as a consequence Shoalhaven Starches will need to provide lime injection to meet future EPA requirements. The proposed lime injection system consists of two storage silos and associated equipment for injecting the powdered lime into each of the coal fired boilers.

- The Company also seeks to upgrade electrical supply to the site to enable increased power supply to accommodate the requirements for this modification proposal. It is proposed to:
 - Construct an indoor electrical substation on the northern side of Bolong Road (No. 171). The existing 26 off street car parking spaces located on this site will be relocated to the east to accommodate this development; and.
 - Construct a second storey extension to the existing electrical sub-station that is located within the main factory site.
- Shoalhaven Starches also propose to construct an additional rail intake pit to enable more efficient unloading of grain. Presently the existing intake pit will only allow the unloading of half a wagon of grain at a time. The provision of an additional intake pit will allow an entire wagon to be unloaded at one time increasing efficiency.
- This modification proposes also seeks to regularise the non-enclosure of transfer pumps of existing fermenter tanks and molecular sieve pumps. Although the enclosure of this existing plant was required under the Project Approval, further acoustic assessment prepared by Harwood Acoustics demonstrates these measures are not required.
- This proposal also seeks to regularise the relocation of structures on the factory site approved under Modification Approvals Modification 3 and Modification 12. The approved layout of the Electrical substation, Cooling Towers and Emergency ISO Tank Container Storage located within the main site has had to be reconfigured to that originally approved due to operational requirements.

The modified proposal will result in an increase in the amount of flour processed on site, and therefore starch and gluten production, but will not involve any increase in production of ethanol volumes produced on site beyond the approved 300 ML per annum.

It is proposed to utilise grain that is currently approved for use in the ethanol production to be instead processed into flour, resulting in an increase in starch and gluten production on site at the expense of ethanol production. As a result, the 6,720 tonnes per week of grain, that is currently approved to feed the ethanol production process will be redirected into flour processing.

The increase in flour processing (5,200 tonnes per week of flour) will necessitate the installation of a third flour mill on-site, Flour Mill “C”.

Under the current Project Approval a total of 20,000 tonnes of flour is processed on site per week. Flour Mill “A” currently produces 7,700 tonnes of flour per week, while Flour

Mill “B” is approved to produce 8,500 tonnes of flour per week. Combined these two existing Flour Mills produce 16,200 tonnes of Flour per week, leaving 3,800 tonnes of flour transported to the site by rail per week.

The introduction of a third Flour Mill “C” will enable an increase in the amount of flour that will be able to be produced on site by 5,200 tonnes per week.

It is also proposed to increase the importation of flour from off-site from 3,800 tonnes per week to 4,000 tonnes per week, an increase of 200 tonnes per week.

These modifications will result in total on-site flour processing of 25,400 tonnes per week, an increase on the current approved 20,000 tonnes per week.

The increases in starch and gluten production will have a corresponding increase in Dried Distillers Grain Syrup (DDGS) from the current approved position of 6,400 tonnes per week to 7,500 tonnes per week.

The proposed modifications will also result in an increase in the amount of waste water which will need to be treated and disposed of from the approved 56.7 ML per week to a proposed amount of 70 ML per week. The EA is supported by an assessment which demonstrates the capacity of the existing waste water treatment plan to accommodate this increase in effluent.

Plan details of the proposal form **Annexure 2** to this EA.

2.0 THE SITE AND SURROUNDING LOCALITY

2.1 LOCAL AND REGIONAL CONTEXT

The Shoalhaven Starches factory complex is situated upon various allotments of land along Bolong Road, Bomaderry, within the City of Shoalhaven. 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 site) has an area of approximately 12.5 hectares.

The works associated with this modification proposal are situated within the factory site on the southern side of Bolong Road on Lots 21 DP 1000265, Lot 201 DP 1062668, Lot B DP 334511, Lot 1 385145, Lot 143 DP1069758 and Lot 1 DP 838753 Bolong Road, Bomaderry. One element of the proposal is sited on the northern of Bolong Road on Lot 241 DP 1130535 and Lot 141 DP1069758 **Figure 1** is a site locality plan.

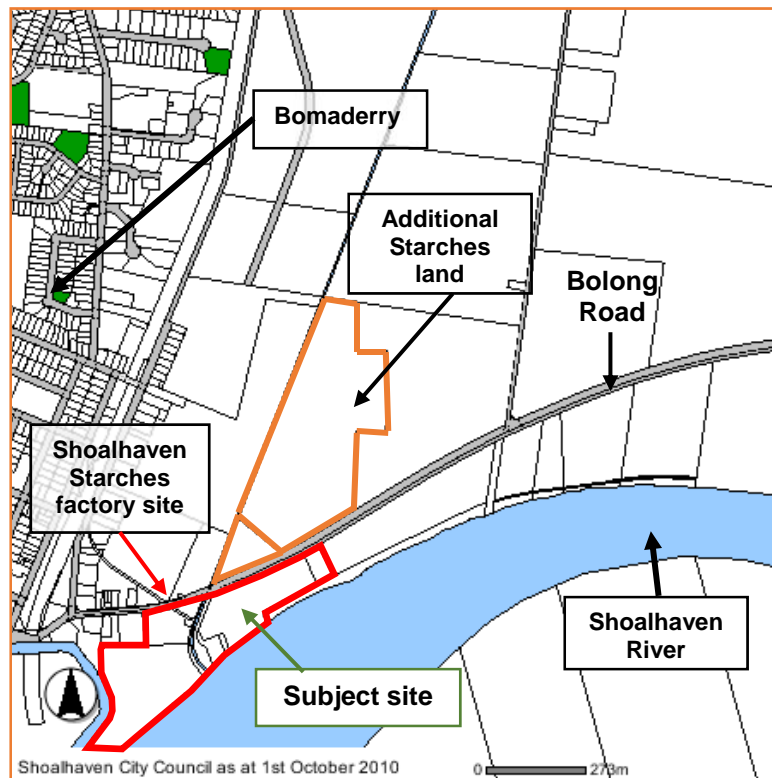


Figure 1: Site Locality Plan.

All of the lots associated with these modifications, except one (Lot 141 DP 1069758), are zoned IN1 (General Industrial) zone under the provisions of SLEP 2014. Lot 141 DP 1069758 is zoned RU2 Rural Landscape.

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. Burruga (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 Shoalhaven Paper Mill (now owned by Shoalhaven Starches). 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.

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 spray irrigation lines and wet weather storage ponds. These 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).

Figures 2 and 3 are aerial photographs of the locality and the site respectively. **Figure 4** shows the proposed locations of the various modifications proposed for the Shoalhaven Starches site.

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.



Figure 2: Aerial photograph of the locality.

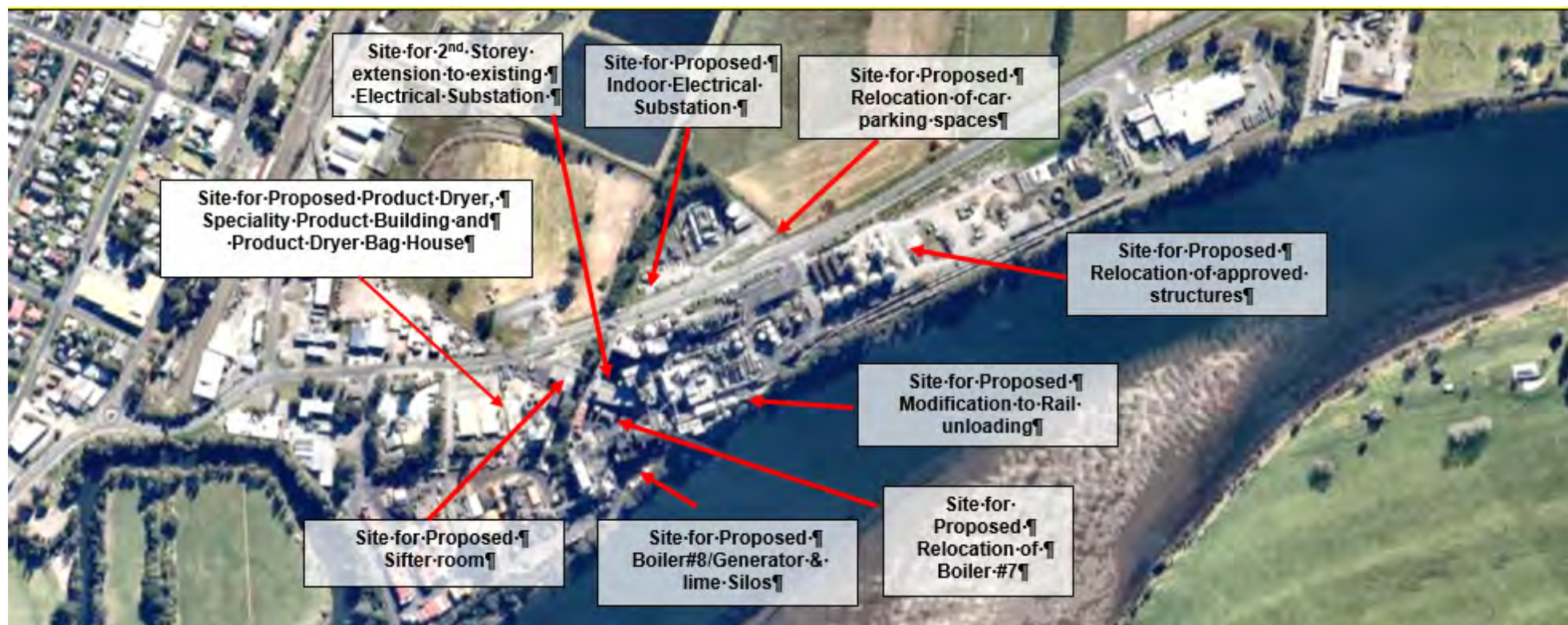


Figure 3: Aerial photograph of site showing location of proposed modifications.

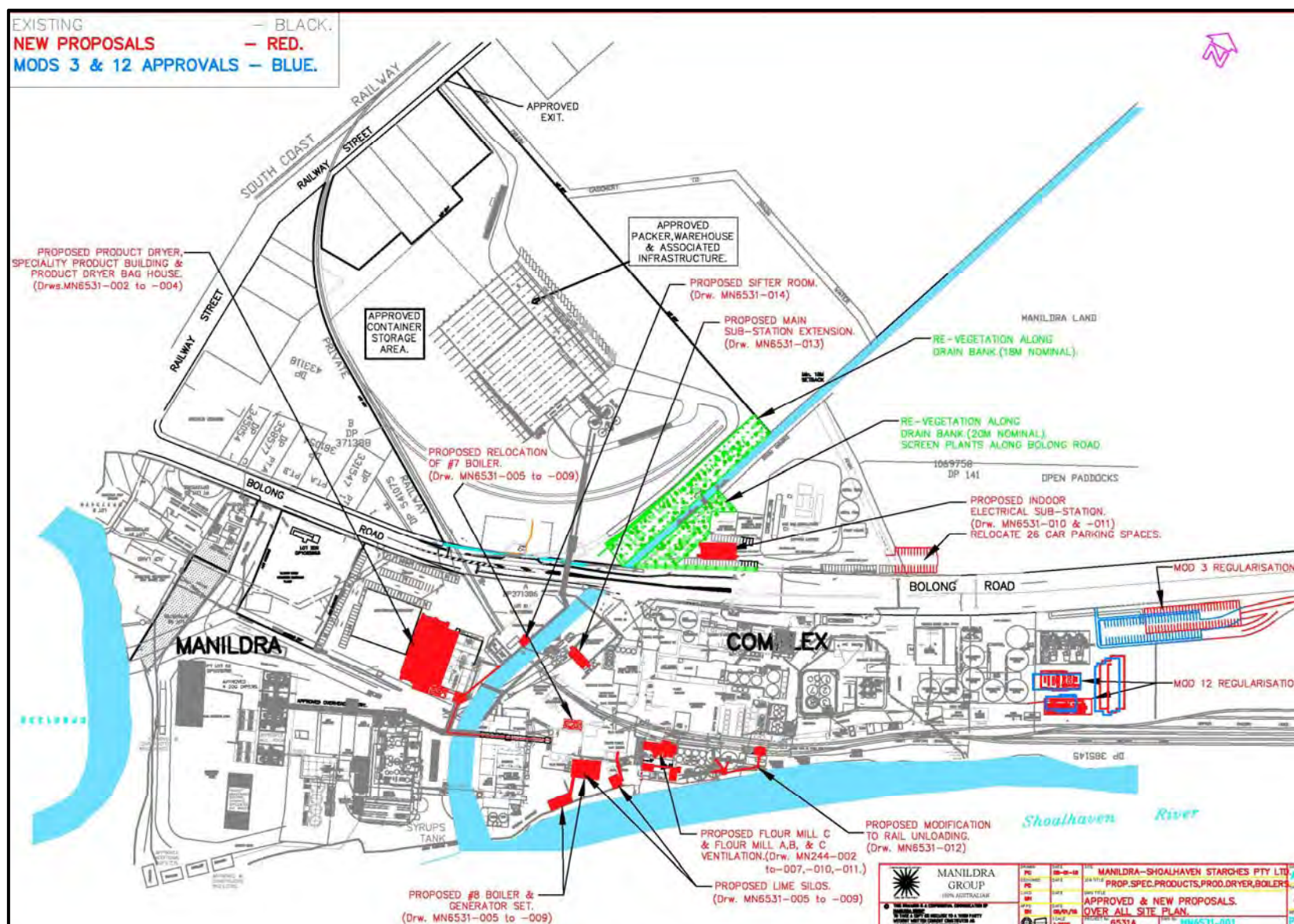


Figure 4: Location of Proposed Modifications.

3.0 BACKGROUND

3.1 PRODUCTION PROCESSES

The production process at the Shoalhaven Starches plant has developed 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 will 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. Starch is used for fermentation and distillation to produce ethanol.

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 waste 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 and beverage grade ethanol. 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 DDGS (Dried Distillers Grains Syrup), dried and sold as a high protein cattle feed with the remaining water used for irrigation. The waste water resulting from the ethanol production is treated in the wastewater treatment plant 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 farm land is used for fodder crops, pasture and cattle grazing.

The 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 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.

In addition, as part of the Project Approval, Shoalhaven Starches were required 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 waste water within the factory processes, with the remainder irrigated onto the Company's Environmental Farm.

The Project Approval 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 CO₂ 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 (6,000L). Proponent – Argyle Prestige Meats Ltd at 220 Bolong Road (former Dairy Farmers factory site).

4.0 STATUTORY SITUATION

4.1 PART 3A OF THE EP&A ACT

The previous Part 3A to the Environmental Planning & Assessment Act 1979, and *State Environmental Planning Policy (Major Development)* in 2005, provided an assessment regime for state significant development.

Following the 2011 election, the NSW Government introduced a new regime for state significant development and had the effect of repealing Part 3A. These changes created an alternative assessment system which allows the NSW Government to assess and determine projects which are of State significance.

The approved Shoalhaven Starches Expansion Project however had been termed a *Transitional Part 3A Project* under the amended EP&A legislation.

These circumstances were clarified in Planning Circular PS 11-021 issued by the Department of Planning & Infrastructure on the 30th September 2011. This Circular confirmed that Part 3A continues to apply to certain projects subject to transitional provisions identified in Schedule 6A of the Act.

Schedule 6A of the *EP&A Act* made provisions for such projects. Essentially a *Transitional Part 3A Project* includes:

- (a) *an approved project (whether approved before or after the repeal of Part 3A),*
- (b) *a project for which environmental assessment requirements were notified or adopted before the repeal of Part 3A,*
- (c) *a project that is the subject of a Part 3A project application and that the regulations declare to be a transitional Part 3A project.*

As the Shoalhaven Starches Expansion Project was approved on the 28th January 2009 this project was considered a *Transitional 3A Project*.

Clause 3 of Schedule 6A provided for the continuation of Part 3A and Transitional Part 3A projects. Essentially it stated that Part 3A continued to apply to and in respect of *Transitional Part 3A* projects.

4.2 END OF TRANSITIONAL PART 3A PROVISIONS/ STATE SIGNIFICANT DEVELOPMENT

As of the 1st March 2018 the transitional arrangements for former Part 3A projects have been discontinued. The discontinuation of the transition arrangements for Part 3A projects and concept plans means that future modifications will be assessed through the State

Significant Development (SSD) pathway. For any project or concept plan transitioning to SSD, the test for future modifications under Part 4 will apply to the project or concept plan at the time it becomes SSD, not as it was originally approved.

In accordance with the provisions of State Environmental Planning Policy (State and Regional Development) 2011 development is declared to be State Significant development for the purposes of the EP&A Act if:

- a) *the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and*
- b) *the development is specified in Schedule 1 or 2 of the State Environmental Planning Policy (State and Regional Development) 2011*

Schedule 1 of the State and Regional Development SEPP 2011 details general development that is assessed as State Significant Development.

Clause 3 of Schedule 1 pertains to Agricultural Produce Industries and Food and Beverage Processing as outlined below:

3 Agricultural produce industries and food and beverage processing

Development that has a capital investment value of more than \$30 million for any of the following purposes:

- (a) *abattoirs or meat packing, boning or products plants, milk or butter factories, fish packing, processing, canning or marketing facilities, animal or pet feed production, gelatine plants, tanneries, wool scouring or topping or rendering plants,*
- (b) *cotton gins, cotton seed mills, sugar mills, sugar refineries, **grain mills** or silo complexes, edible or essential oils processing, breweries, distilleries, **ethanol plants**, soft drink manufacture, fruit juice works, canning or bottling works, bakeries, small goods manufacture, cereal processing, margarine manufacturing or wineries,*
- (c) *organic fertiliser plants or composting facilities or works.*

Clause 3(b) indicates that industries which include ethanol plants and grain mills which have a capital investment of \$30 million are assessed as SSD. The Shoalhaven Starches Expansion Project involves both ethanol production and the milling of grain to produce flour for starch and gluten production. The estimated capital investment value of the industries which operate under the Shoalhaven Starches Expansion Project exceeded & 30 million.

The Shoalhaven Starches Expansion Project would be considered State Significant Development.

The Minister for Planning is the consent authority for SSD applications. SSD applications are assessed by the Department of Planning and Environment. In some cases, the Minister may delegate the decision making function to Department staff.

However, if an SSD proposal is not supported by the relevant Council(s), or the Department has received more than 25 public objections, the Department's recommendation is referred to the Independent Planning and Assessment Commission (PAC) for determination.

4.3 SECTION 4.55 MODIFICATION PROPOSALS

Section 4.55(2) of the Environmental Planning and Assessment Act 1979 provides for the modification of development consents as follows:

- S.4.55(2) 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 5) 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.*

The Modifying an Approved Project Guideline, produced as part of the *Draft Environmental Impact Assessment Guidance Series* by the NSW Department of Planning and

Environment in June 2017, provides the following 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.”

Comments:

The Shoalhaven Starches plant manufactures a wide range of wheat based products for food and industrial markets and produces a range of products for the food, beverage, confectionary, paper and motor transport industries including: starch, gluten, glucose and ethanol. The Project Approval MP06_0228 for the Shoalhaven Starches Expansion Project encapsulated previous approvals for the site into one overall approval for the site

As noted previously for any project or concept plan transitioning to SSD, the test for future modifications under Part 4 will apply to the project at the time it becomes SSD, not as it was originally approved.

The Shoalhaven Starches Expansion Project transitioned to SSD on the 1st March 2018 when the transitional provisions of Part 3A were removed. At that point the focus of much of the production at the Shoalhaven Starches plant had been changing from ethanol to flour processing. Many modifications had already been approved which focus on increased processing of flour, starch and gluten products. Such approved modifications included:

- The approved Modification 8 Application authorised alterations to an existing flour mill that had been previously approved by MP 07_0021
- The approved Modification 9 Application authorised changes to the packing plant that had been previously approved under Project 06_0228. A previous increase in dry product is a result of a diversion of liquid starch from ethanol to dry starch required additional storage area within this building compared to that originally proposed with the SSEP. The original SSEP Project Approval did not impose limits on the amount of dried product that could be produced from the site.
- The approved Modification 10 Application authorised the construction of an additional new flour mill at the factory.

Although the amount of flour that will be processed at the Shoalhaven Starches site will increase, the proposed modifications do not seek to increase the amount of raw material (grain) processed but plan to redirect the grain from ethanol production into flour processing. (Flour processing, starch and gluten production and ethanol production are processes which are already approved at the site). As such the proposal will redirect the processing of approved raw material from one process which is approved for the site to another approved process. As such, it is considered that the proposed development 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 a significant expansion of the 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 riverbank stability; flood impacts, noise impacts, and air quality.

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 are all proposed to facilitate the redirection of grain and flour from ethanol to gluten / starch production.

The cogeneration plant, Boiler No. 8 and upgrades to the electrical supply are required to facilitate the energy requirements for both the approved and proposed production processes and will improve consistent supply to the overall factory operations.

The installation of a third Flour Mill, Mill “C”, the construction of a new industrial building, installation of associated plant for speciality product production, the conversion of two existing Gluten Dryers (Nos. 1 and 2) into starch production and the construction of a new Gluten Dryer are all proposed to facilitate the proposed flour/gluten product production.

Other modifications will improve the efficiency and environmental performance of operational processes approved under the Shoalhaven Starches Expansion Project. Such modifications include:

- modification of flour mill ventilation;
- the addition of a baghouse for Starch Dryer No. 5;
- the construction of an additional sifter for the Interim Packing Plant;

- the construction an additional rail intake pit to assist in the efficient unloading of grain; and
- the construction of a lime injection system which consists of two storage silos and associated pipe bridges for injecting powered lime into each of the coal fired boilers products.

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

The redirection of raw material to an alternate approved production process may not be precisely the same use as that for which consent was originally granted but it still represents development that is substantially the same in so far that both production processes already occur on-site.

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 represent an increase in production in the terms of processing of flour and starch / gluten production. These modifications will result in total on-site flour processing of 25,400 tonnes per week, an increase on the current approved 20,000 tonnes per week. The increases in starch and gluten production will have a corresponding increase in Dried Distillers Grain Syrup (DDGS) from the current approved position of 6,400 tonnes per week to 7,500 tonnes per week.

However, the proposal includes the diversion of grain that would have been otherwise utilised in ethanol production. In this regard, the proposal will therefore not result in an increase in ethanol production above the approved volume of 300 ML per annum.

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 footprint of Shoalhaven Starches factory. All of the proposed modifications (except the new electrical substation) are located within the main Shoalhaven factory site. As such these modifications represent a form of in-fill development. The proposed development will have a limited 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 EA is supported by expert assessments addressing:

- Noise Impacts;
- Air Quality Impacts and including Odours;
- Preliminary Hazard Analysis;
- Geotechnical, Site Contamination and Acid Sulphate Soils Assessment;
- Traffic Impact Assessment; and
- An assessment of the current waste water treatment system to ascertain its capacity to accommodate the modifications.

The Noise Impact Assessment prepared by Harwood Acoustics demonstrates that the level of noise emission from the modification to this approved proposal will be within the noise design goals derived from Environment Protection Licence No. 883 noise limits.

The Air Quality Impact Assessment prepared by GHD, states the odour criteria is met at all sensitive receptors and air quality impacts are predicted by GHD to comply with the criteria at all sensitive receptors.

The Preliminary Hazard Analysis prepared by Pinnacle Risk Pty Ltd finds that the risks associated with the proposal are acceptable when compared against the Department of Planning & Environment's risk criteria. Societal risk, area cumulative risk, environmental risk and transport risk are also assessed by Pinnacle as acceptable.

The Geotechnical, Site Contamination and Acid Sulphate Soils Assessment prepared by GHD Pty Ltd concludes that the stability of the river bank will not be adversely affected by the presence of the three structures as located in the plans of the proposed modification.

The site contamination and ASS assessments detail specific management measures to be undertaken during the construction of the works associated with this modification.

Traffic and Car Parking Assessment prepared by Bitzios Consulting identifies there are no access, traffic or parking impacts associated with the proposal – either during operation or construction stages – that would significantly impact on the efficiency and/or safety of local traffic or existing on-site operations.

The EA is supported by an assessment of the current waste water treatment system by BPO Environmental Success (BPO) which indicates that based on the predicted average loading values the treatment system (ADI-BDF reactor) will accommodate the increase in waste waters.

The above expert assessments demonstrate that the environmental impacts of the proposed modifications will be limited and will meet approved environmental criteria for the development.

None of the proposed modifications represent an additional and distinct land use as all proposed modifications facilitate and improve the existing approved production processes. Consequently, despite the increases in site flour processing, and in starch and gluten production, 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(2) of the Act in this instance.

4.4 LOCAL PLANNING PROVISIONS

Shoalhaven Local Environmental Plan (SLEP) 2014

All of the lots associated with these modifications, except one (Lot 141 DP 1069758), are zoned IN1 (General Industrial) zone under the provisions of SLEP 2014 (refer **Figure 5**).

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.

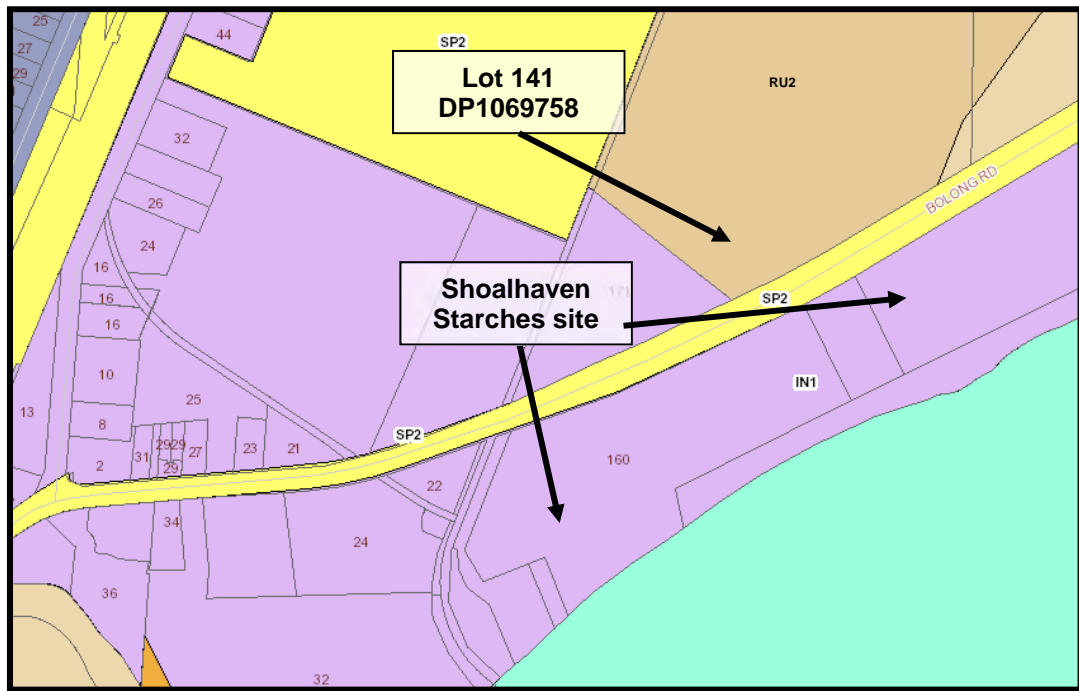


Figure 5: Zoning provisions applying under Shoalhaven LEP 2014.

Industry is a permissible use within this zone. The proposal is permissible subject to Council's consent (see **Table 1** below).

Table 1

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.

Lot 141 DP 1069758, upon which approximately 23 car spaces will be relocated from the adjoining site, is zoned RU2 Rural Landscape under the provisions of SLEP 2014.

The objectives of the RU2 zone are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource*
- *To maintain the rural landscape character of the land*
- *To provide for a range of compatible land uses, including extensive agriculture.*

The proposal is consistent with these objectives as the proposal, in relation to this lot, involves the provision of 23 car parking spaces in a small corner of this site. The area used by the car parking spaces is a small portion of the total area of the lot. The proposal will not unduly impact on the rural landscape character of the land. Placed in the south-western corner of the lot the proposal will not impact on the agricultural production of the land as it does not fragment this resource.

It is our view that the proposal is a permissible use within this zone as the relocation of these car parking spaces represents a modification necessary to provide plant for an existing “rural industry” (refer **Table 2**).

Table 2
Land Use Permissibility – RU2 Zone (Shoalhaven LEP 2014)

Permitted without consent	Extensive agriculture; Forestry; Home occupations
Permitted with consent	Agriculture; Air transport facilities; Airstrips; Animal boarding or training establishments; Boat building and repair facilities; Boat sheds; Building identification signs; Business identification signs; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Charter and tourism boating facilities; Community facilities; Crematoria; Depots; Dual occupancies (attached); Dwelling houses; Eco-tourist facilities; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Food and drink premises; Freight transport facilities; Funeral homes; Group homes; Hazardous industries; Helipads; Home-based child care; Home businesses; Home industries; Information and education facilities; Marinas; Markets; Mooring pens; Moorings; Offensive industries; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Roads; Roadside stalls; Rural industries ; Tourist and visitor accommodation; Veterinary hospitals; Water recreation structures; Water supply systems
Prohibited	Hotel or motel accommodation; Pubs; Serviced apartments; Any other development not specified in item 2 or 3

The Shoalhaven LEP defines a Rural Industry as

“the handling, treating, production, processing, storage or packing of animal or plant agricultural products for commercial purposes, and includes any of the following:

- (a) **agricultural produce industries,***
- (b) livestock processing industries,*
- (c) composting facilities and works (including the production of mushroom substrate),*
- (d) sawmill or log processing works,*
- (e) stock and sale yards,*
- (f) the regular servicing or repairing of plant or equipment used for the purposes of a rural enterprise”.*

Agricultural Produce Industries are defined as

*“a building or place used for the handling, treating, processing or packing, for commercial purposes, of produce from agriculture (including dairy products, seeds, fruit, vegetables or other plant material), and includes wineries, **flour mills**, cotton seed oil plants, cotton gins, feed mills, cheese and butter factories, and juicing or canning plants, but does not include a livestock processing industry”*

The installation of a third Flour Mill on the Shoalhaven Starches Factory site as part of this modification necessitates the construction of an indoor electrical substation on the northern side of Bolong Road (No. 171) to serve the increased power supply requirements associated with the Modification Proposal. The construction of the substation necessitates the relocation of the car parking spaces. The proposal is a permissible use within this zone as the relocation of these car parking spaces represents a necessary modification to allow the construction of plant or equipment used for the purposes of a rural enterprise/industry. The proposal is therefore permissible subject to Council's consent as it represents a modification to an existing rural industry.

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 3** below:

Table 3
Shoalhaven LEP 2014 Provisions

SLEP 2014 Clause	Provisions	Comments
4.3 Height of Buildings	<p>(1) <i>The objectives of this clause are as follows:</i></p> <ul style="list-style-type: none"> (a) <i>to ensure that buildings are compatible with the height, bulk and scale of the existing and desired future character of a locality,</i> (b) <i>to minimise visual impact, disruption of views, loss of privacy and loss of solar access to existing development,</i> (c) <i>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.</i> <p>(2) <i>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.</i></p> <p>(2A) <i>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.</i></p>	<p>The proposal will involve the erection of a range of structures with heights above ground level ranging from 7 m to 43.3 m.</p> <p>Although there is no maximum height specified for the subject land, part (2a) of Clause 4.3 of SLEP 2014 states no building is to be in excess of 11 metres.</p> <p>As such a submission for an exception to development standards under Clause 4.6 of the SLEP 2014 has been prepared and is attached under Annexure 3.</p>
4.6 Exceptions to development standards	<p>(1) <i>The objectives of this clause are as follows:</i></p> <ul style="list-style-type: none"> (a) <i>to provide an appropriate degree of flexibility in applying certain development standards to particular development,</i> (b) <i>to achieve better outcomes for and from development by allowing flexibility in particular circumstances.</i> <p>(2) <i>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.</i></p> <p>(3) <i>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:</i></p> <ul style="list-style-type: none"> (a) <i>that compliance with the development standard is unreasonable or unnecessary in the circumstances of the case, and</i> (b) <i>that there are sufficient environmental planning grounds to justify contravening the development standard.</i> 	<p>The proposal will involve the erection of a range of structures with heights above ground level ranging from 12.5 m to 43.3 m that will exceed the 11 metre maximum as specified in (2A) of Clause 4.3 Height of Buildings of the SLEP 2014.</p> <p>The proposed development will be erected within the surrounds of the Shoalhaven Starches factory site.</p> <p>As the proposed works will be built within the existing industrial complex it is not expected that the new development will have an undue effect due to its height.</p> <p>A submission for an exception to development standards has been prepared and is attached to the SEE under Annexure 3.</p>

Table 3 (continued)

SLEP 2014 Clause	Provisions	Comments
4.6 continued	<p>(4) Development consent must not be granted for development that contravenes a development standard unless:</p> <p>(a) the consent authority is satisfied that:</p> <p>(i) the applicant's written request has adequately addressed the matters required to be demonstrated by subclause (3), and</p> <p>(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</p> <p>(b) the concurrence of the Director-General has been obtained.</p> <p>(5) In deciding whether to grant concurrence, the Director-General must consider:</p> <p>(a) whether contravention of the development standard raises any matter of significance for State or regional environmental planning, and</p> <p>(b) the public benefit of maintaining the development standard, and</p> <p>(c) any other matters required to be taken into consideration by the Director-General before granting concurrence.</p> <p>(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:</p> <p>(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</p> <p>(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.</p> <p>Note. When this Plan was made it did not include all of these zones.</p> <p>(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).</p>	

Table 3 (continued)

SLEP 2014 Clause	Provisions	Comments
4.6 continued	<p>(8) <i>This clause does not allow development consent to be granted for development that would contravene any of the following:</i></p> <p>(a) <i>a development standard for complying development,</i></p> <p>(b) <i>a development standard that arises, under the regulations under the Act, in connection with a commitment set out in a BASIX certificate for a building to which State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004 applies or for the land on which such a building is situated,</i></p> <p>(c) <i>clause 5.4,</i></p> <p>(ca) <i>clause 6.1 or 6.2</i></p>	
5.5 <i>Development within the coastal zone</i>	<p>(1) <i>The objectives of this clause are as follows:</i></p> <p>(a) <i>to provide for the protection of the coastal environment of the State for the benefit of both present and future generations through promoting the principles of ecologically sustainable development,</i></p> <p>(b) <i>to implement the principles in the NSW Coastal Policy, and in particular to:</i></p> <p>(i) <i>protect, enhance, maintain and restore the coastal environment, its associated ecosystems, ecological processes and biological diversity and its water quality, and</i></p> <p>(ii) <i>protect and preserve the natural, cultural, recreational and economic attributes of the NSW coast, and</i></p> <p>(iii) <i>provide opportunities for pedestrian public access to and along the coastal foreshore, and</i></p> <p>(iv) <i>recognise and accommodate coastal processes and climate change, and</i></p> <p>(v) <i>protect amenity and scenic quality, and</i></p> <p>(vi) <i>protect and preserve rock platforms, beach environments and beach amenity, and</i></p> <p>(vii) <i>protect and preserve native coastal vegetation, and</i></p> <p>(viii) <i>protect and preserve the marine environment, and</i></p> <p>(ix) <i>ensure that the type, bulk, scale and size of development is appropriate for the location and protects and improves the natural scenic quality of the surrounding area, and</i></p>	<p>The subject land is located within the coastal zone.</p> <p>The proposal is not considered to adversely affect the coastal zone as:</p> <ul style="list-style-type: none"> • The proposal does not affect or impinge on public access to or along the coastal foreshore. • The proposed development is situated within an existing industrial development and is considered to be suitable development given its type, location and design. The development is also consistent with the zoning objectives for the land. • The development will not lead to overshadowing of foreshore areas. The site is situated on the northern side of the Shoalhaven River. • The scenic qualities of the area will not diminish. Visual impact is further addressed in Section 8.5 of this EA. • The proposal will not lead to adverse impacts on threatened fauna and flora.

Table 3 (continued)

SLEP 2014 Clause	Provisions	Comments
5.5 continued	<ul style="list-style-type: none"> (x) ensure that decisions in relation to new development consider the broader and cumulative impacts on the catchment, and (xi) protect Aboriginal cultural places, values and customs, and (xii) protect and preserve items of heritage, archaeological or historical significance <p>(2) Development consent must not be granted to development on land that is wholly or partly within the coastal zone unless the consent authority has considered:</p> <ul style="list-style-type: none"> (a) existing public access to and along the coastal foreshore for pedestrians (including persons with a disability) with a view to: <ul style="list-style-type: none"> (i) maintaining existing public access and, where possible, improving that access, and (ii) identifying opportunities for new public access, and (b) the suitability of the proposed development, its relationship with the surrounding area and its impact on the natural scenic quality, taking into account: <ul style="list-style-type: none"> (i) the type of the proposed development and any associated land uses or activities (including compatibility of any land-based and water-based coastal activities), and (ii) the location, and (iii) the bulk, scale, size and overall built form design of any building or work involved, and (c) the impact of the proposed development on the amenity of the coastal foreshore including: <ul style="list-style-type: none"> (i) any significant overshadowing of the coastal foreshore, and (ii) any loss of views from a public place to the coastal foreshore, and (d) how the visual amenity and scenic qualities of the coast, including coastal headlands, can be protected, and (e) how biodiversity and ecosystems, including: <ul style="list-style-type: none"> (i) native coastal vegetation and existing wildlife corridors, and (ii) rock platforms, and 	

Table 3 (continued)

SLEP 2014 Clause	Provisions	Comments
5.5 continued	<p>(iii) water quality of coastal waterbodies, and</p> <p>(iv) native fauna and native flora, and their habitats, can be conserved, and</p> <p>(f) the cumulative impacts of the proposed development and other development on the coastal catchment.</p> <p>(3) Development consent must not be granted to development on land that is wholly or partly within the coastal zone unless the consent authority is satisfied that:</p> <p>(a) the proposed development will not impede or diminish, where practicable, the physical, land-based right of access of the public to or along the coastal foreshore, and</p> <p>(b) if effluent from the development is disposed of by a non-reticulated system, it will not have a negative effect on the water quality of the sea, or any beach, estuary, coastal lake, coastal creek or other similar body of water, or a rock platform, and</p> <p>(c) the proposed development will not discharge untreated stormwater into the sea, or any beach, estuary, coastal lake, coastal creek or other similar body of water, or a rock platform, and</p> <p>(d) the proposed development will not:</p> <p>(i) be significantly affected by coastal hazards, or</p> <p>(ii) have a significant impact on coastal hazards, or</p> <p>(iii) increase the risk of coastal hazards in relation to any other land.</p>	
5.10 Heritage Conservation	<p>(1) The objectives of this clause are:</p> <p>(a) to conserve the environmental heritage of Shoalhaven; and</p> <p>(b) to conserve the heritage significance of heritage items and heritage conservation areas including associated fabric, settings and views; and</p> <p>(c) to conserve archaeological sites; and</p> <p>(d) to conserve Aboriginal objects and Aboriginal places of heritage significance.</p> <p>(2) Development consent is required for any of the following:</p>	There are no heritage items within the subject land. And the subject site is not located within a heritage conservation area.

Table 3 (continued)

SLEP 2014 Clause	Provisions	Comments
5.10 continued	<p>(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):</p> <ul style="list-style-type: none"> (i) a heritage item, (ii) an Aboriginal object (iii) a building, work, relic or tree within a heritage conservation area, <p>(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,</p> <p>(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 discovered, exposed, moved, damaged or destroyed,</p> <p>(d) disturbing or excavating an Aboriginal place of heritage significance,</p> <p>(e) erecting a building on land:</p> <ul style="list-style-type: none"> (i) on which a heritage item is located or that is within a heritage conservation area; (ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance, <p>(f) subdividing land:</p> <ul style="list-style-type: none"> (i) on which a heritage item is located or that is within a heritage conservation area, or (ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance. 	
7.1 Acid sulfate soils	<p>(1) The objective of this clause is to ensure that development does not disturb, expose or drain acid sulfate soils and cause environmental damage.</p> <p>(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.</p>	GHD have undertaken an assessment of acid sulphate soils with respect to this modification proposal (Annexure 9). This issue is further addressed in Section 8.8 of this EA.

Table 3 (continued)

SLEP 2014 Clause	Provisions	Comments												
7.1 continued	<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. Works by which the watertable is likely to be lowered.</td></tr><tr><td>3</td><td>Works more than 1 metre below the natural ground surface. 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. 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> <p>(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.</p> <p>(4) Despite subclause (2), development consent is not required under this clause for the carrying out of works if:</p> <p>(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</p> <p>(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.</p> <p>(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):</p>	Class of Land	Works	1	Any works.	2	Works below the natural ground surface. Works by which the watertable is likely to be lowered.	3	Works more than 1 metre below the natural ground surface. Works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface.	4	Works more than 2 metres below the natural ground surface. Works by which the watertable is likely to be lowered more than 2 metres below the natural ground surface.	5	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.	
Class of Land	Works													
1	Any works.													
2	Works below the natural ground surface. Works by which the watertable is likely to be lowered.													
3	Works more than 1 metre below the natural ground surface. Works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface.													
4	Works more than 2 metres below the natural ground surface. Works by which the watertable is likely to be lowered more than 2 metres below the natural ground surface.													
5	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.													

Table 3 (continued)

SLEP 2014 Clause	Provisions	Comments
7.1 continued	<p>(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,</p> <p>(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).</p> <p>(c) minor work, being work that costs less than \$20,000 (other than drainage work).</p> <p>(6) Despite subclause (2), development consent is not required under this clause to carry out any works if:</p> <p>(a) the works involve the disturbance of less than 1 tonne of soil, and</p> <p>(b) the works are not likely to lower the watertable.</p>	
7.3 Flood Planning	<p>(1) The objectives of this clause are as follows:</p> <p>(a) to minimise the flood risk to life and property associated with the use of land,</p> <p>(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,</p> <p>(c) to avoid significant adverse impacts on flood behaviour and the environment.</p> <p>(2) This clause applies to:</p> <p>(a) land identified as "Flood Planning Area" on the Flood Planning Area Map, and</p> <p>(b) other land at or below the flood planning level.</p> <p>(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:</p> <p>(a) is compatible with the flood hazard of the land, and</p> <p>(b) will not significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties, and</p> <p>(c) incorporates appropriate measures to manage risk to life from flood, and</p>	<p>The Flood Planning Area Map that accompanies the SLEP 2014 identifies the subject land as being flood prone land.</p> <p>The application is supported by a flood assessment undertaken by WMA Water (Annexure 7). This issue is discussed further in Section 8.4 of this EA.</p>

Table 3 (continued)

SLEP 2014 Clause	Provisions	Comments
7.3 continued	<p>(d) will not significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses, and</p> <p>(e) is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding, and</p> <p>(f) will not affect the safe occupation or evacuation of the land.</p> <p>(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 clause.</p> <p>(5) In this clause: flood planning level means the level of a 1:100 ARI (average recurrent interval) flood event plus 0.5 metre freeboard.</p>	
7.4 Coastal Risk Planning	<p>(1) The objectives of this clause are as follows:</p> <p>(a) to avoid significant adverse impacts from coastal hazards,</p> <p>(b) to ensure uses of land identified as coastal risk are compatible with the risks presented by coastal hazards,</p> <p>(c) to enable the evacuation of land identified as coastal risk in an emergency,</p> <p>(d) to avoid development that increases the severity of coastal hazards.</p> <p>(2) This clause applies to the land identified as "Coastal Risk Planning Area" on the Coastal Risk Planning Map.</p> <p>(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:</p> <p>(a) will avoid, minimise or mitigate exposure to coastal processes, and</p> <p>(b) is not likely to cause detrimental increases in coastal risks to other development or properties, and</p> <p>(c) is not likely to alter coastal processes and the impacts of coastal hazards to the detriment of the environment, and</p> <p>(d) incorporates appropriate measures to manage risk to life from coastal risks, and</p>	<p>The Coastal Risk Planning Map that accompanies the SLEP 2014 does <u>not</u> identify the subject land as a "Coastal Risk Planning Area".</p> <p>The provisions of this clause therefore do not apply to the subject site.</p>

Table 3 (continued)

SLEP 2014 Clause	Provisions	Comments
7.4 continued	<p>(e) <i>is likely to avoid or minimise adverse effects from the impact of coastal processes and the exposure to coastal hazards, and</i></p> <p>(f) <i>provides for the relocation, modification or removal of the development to adapt to the impact of coastal processes and coastal hazards, and</i></p> <p>(g) <i>has regard to the impacts of sea level rise.</i></p> <p>(4) <i>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.</i></p> <p>(5) <i>In this clause:</i> coastal hazard <i>has the same meaning as in the Coastal Protection Act 1979.</i></p>	
7.5 Terrestrial Biodiversity	<p>(1) <i>The objective of this clause is to maintain terrestrial biodiversity, by:</i></p> <p>(a) <i>protecting native flora and fauna,</i></p> <p>(b) <i>protecting the ecological processes necessary for their continued existence, and</i></p> <p>(c) <i>encouraging the recovery of native flora and fauna, and their habitats.</i></p> <p>(2) <i>This clause applies to land:</i></p> <p>(a) <i>identified as “Biodiversity—habitat corridor” or “Biodiversity—significant vegetation” on the Terrestrial Biodiversity Map, and</i></p> <p>(b) <i>situated within 40m of the bank (measured horizontally from the top of the bank) of a natural waterbody.</i></p> <p>(3) <i>Before determining a development application for development on land to which this clause applies, the consent authority must consider:</i></p> <p>(a) <i>whether the development is likely to have:</i></p> <p>(i) <i>any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and</i></p> <p>(ii) <i>any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and</i></p>	<p>The Terrestrial Biodiversity Map that accompanies the SLEP 2014 does <u>not</u> identify the subject land as including areas of Biodiversity - habitat corridor and/or Biodiversity - significant vegetation.</p> <p>Given the industrial nature of the site the proposal will not have any adverse impacts on the ecological value of the land.</p> <p>There is no vegetation of importance located on the land.</p>

Table 3 (continued)

SLEP 2014 Clause	Provisions	Comments
7.5 continued	<p>(iii) any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and</p> <p>(iv) any adverse impact on the habitat elements providing connectivity on the land, and</p> <p>(b) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.</p> <p>(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:</p> <p>(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or</p> <p>(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</p> <p>(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.</p> <p>(5) For the purpose of this clause:</p> <p>bank means the limit of the bed of a natural waterbody.</p> <p>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 bare 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.</p>	
7.6 Riparian land and watercourses	<p>(1) The objective of this clause is to protect and maintain the following:</p> <p>(a) water quality within watercourses,</p> <p>(b) the stability of the bed and banks of watercourses,</p> <p>(c) aquatic and riparian habitats,</p> <p>(d) ecological processes within watercourses and riparian areas.</p> <p>(2) This clause applies to all of the following:</p> <p>(a) land identified as “Riparian Land” on the Riparian Lands and Watercourses Map,</p>	<p>The Riparian Lands and Watercourses Map that accompanies the SLEP 2014 identify a class 1 watercourse, (Shoalhaven River) adjacent to the southern boundary of the Starches factory site and a Category two watercourse Abernethy’s Creek flowing through the factory site (north -south)</p>

Table 3 (continued)

SLEP 2014 Clause	Provisions	Comments
7.6 continued	<p>(b) land identified as “Watercourse Category 1”, “Watercourse Category 2” or “Watercourse Category 3” on that map,</p> <p>(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.</p> <p>(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider:</p> <p>(a) whether or not the development is likely to have any adverse impact on the following:</p> <p>(i) the water quality and flows within the watercourse,</p> <p>(ii) aquatic and riparian species, habitats and ecosystems of the watercourse,</p> <p>(iii) the stability of the bed and banks of the watercourse, (iv) the free passage of fish and other aquatic organisms within or along the watercourse,</p> <p>(v) any future rehabilitation of the watercourse and its riparian areas, and</p> <p>(b) whether or not the development is likely to increase water extraction from the watercourse, and</p> <p>(c) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.</p> <p>(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:</p> <p>(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or</p> <p>(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or</p> <p>(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.</p> <p>(5) For the purpose of this clause: bank means the limit of the bed of a watercourse.</p>	<p>The site is industrial land with no existing vegetation and is beyond the influence of normal fluvial geomorphic processes. The works will have no impact on water quality.</p> <p>As such the development will not have any adverse effect on water quality, flows within the watercourse, aquatic and riparian species or habitats and ecosystems of the watercourse.</p> <p>A geotechnical assessment of the proposed modifications has been undertaken in relation to riverbank stability. This is further outlined in section 8.9 of the EA.</p>

Table 3 (continued)

SLEP 2014 Clause	Provisions	Comments
7.6 continued	<i>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 bare 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.</i>	
7.7 Landslide risk and other land degradation	<p>(1) <i>The objective of this clause is to maintain soil resources and the diversity and stability of landscapes, including protecting land:</i></p> <ul style="list-style-type: none"> (a) <i>comprising steep slopes, and</i> (b) <i>susceptible to other forms of land degradation.</i> <p>(2) <i>This clause applies to the following land:</i></p> <ul style="list-style-type: none"> (a) <i>land with a slope in excess of 20% (1:5), as measured from the contours of a 1:25,000 topographical map, and</i> (b) <i>land identified as "Sensitive Area" on the Natural Resource Sensitivity—Land Map.</i> <p>(3) <i>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:</i></p> <ul style="list-style-type: none"> (a) <i>the geotechnical stability of the site, and</i> (b) <i>the probability of increased erosion or other land degradation processes.</i> <p>(4) <i>Before granting consent to development on land to which this clause applies, the consent authority must be satisfied that:</i></p> <ul style="list-style-type: none"> (a) <i>the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or</i> (b) <i>if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or</i> (c) <i>if that impact cannot be minimised – the development will be managed to mitigate that impact.</i> <p>(5) <i>In this clause, topographical map means the most current edition of a topographical map, produced by Land and Property Information, a division of the Department of Finance and Services, that identifies the Council's local government area and boundary.</i></p>	The proposed works do not involve land with a slope in excess of 20% or areas identified as sensitive land. Under these circumstances the provisions of this clause will not apply to this proposal.

Table 3 (continued)

SLEP 2014 Clause	Provisions	Comments
7.8 Scenic protection	<p>(1) <i>The objective of this clause is to protect the natural environmental and scenic amenity of land that is of high scenic value.</i></p> <p>(2) <i>This clause applies to land identified as "Scenic Protection" on the Scenic Protection Area Map.</i></p> <p>(3) <i>In deciding whether to grant development consent for development on land to which this clause applies, the consent authority must:</i></p> <p style="padding-left: 40px;">(a) <i>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</i></p> <p style="padding-left: 40px;">(b) <i>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</i></p> <p style="padding-left: 40px;">(c) <i>consider the siting of the proposed buildings.</i></p>	<p>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.</p> <p>The provisions of this clause therefore do not apply to the subject site.</p> <p>However the development site is adjacent to the northern bank of the Shoalhaven River which is identified as being within a Scenic Protection area. The visual impact associated with this proposal is discussed in Section 8.5 of this EA.</p>
7.9 HMAS Albatross airspace operations	<p>(1) <i>The objectives of this clause are as follows:</i></p> <p style="padding-left: 40px;">(a) <i>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,</i></p> <p style="padding-left: 40px;">(b) <i>to protect the community from undue risk from that operation.</i></p> <p>(2) <i>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.</i></p> <p>(3) <i>The consent authority may grant development consent for the development if the relevant Commonwealth body advises that:</i></p> <p style="padding-left: 40px;">(a) <i>the development will penetrate the Limitation or Operations Surface but it has no objection to its construction, or</i></p> <p style="padding-left: 40px;">(b) <i>the development will not penetrate the Limitation or Operations Surface.</i></p>	<p>The Department of Defence (DoD) were consulted with respect to this proposal (see Annexure 1). At the time of preparing this EA no response had been received from the DoD to this consultation.</p>

Table 3 (continued)

SLEP 2014 Clause	Provisions	Comments
7.9 continued	<p>(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.</p> <p>(5) In this clause:</p> <p>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.</p> <p>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.</p>	
7.15 Development in the vicinity of extractive industries and sewerage treatment plants	<p>(1) The objective of this clause is to protect the operational environment of certain industries operating on the land to which this clause applies.</p> <p>(2) This clause applies to land identified as "Extractive Industry" and "Sewage Treatment Plant" on the Buffers Map.</p> <p>(3) Development consent must not be granted to the carrying out of development on land to which this clause applies unless the consent authority has:</p> <p>(a) made an assessment of the impact of noise, odour and other emissions from any industry carried out on that land, and</p> <p>(b) considered the potential impact of noise, odour and other emissions associated with that industry on any activities that will be associated with the development, and</p> <p>(c) considered any opportunities to relocate the development outside that land, and</p> <p>(d) has considered whether the development would adversely affect the operational environment of that industry.</p>	<p>The Buffers Map that accompanies the SLEP 2014 identifies the subject land is located within the vicinity of a sewerage treatment plant.</p> <p>The SEE is supported by an Air Quality Modelling (Annexure 6) and a Noise Impact Assessment (Annexure 5) that make recommendations for the development.</p>

4.5 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT

The existing Shoalhaven Starches factory site and Environmental Farm has an Environmental Protection Licence (EPL) under the Protection of the Environment Operations Act 1997 (POEO Act) (EPL No. 883). 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 will necessitate the terms/provisions of this licence to be also reviewed.

5.0 THE MODIFICATION PROPOSAL

5.1 THE PROPOSED MODIFICATION

This Modification Proposal involves the following modifications:

5.1.1 Modifications to Flour Mills

Proposed Flour Mill “C”

As described in Modification 12 for the Beverage Grade Ethanol Plant proposal, the expected increase in demand for ethanol to meet the demand arising from the NSW Government’s mandate to increase the blending of ethanol in the total volume of petrol sold in NSW has not occurred due largely from a failure of the mandate to be imposed on petroleum suppliers.

As a result, Shoalhaven Starches have been investigating alternative markets for products that would otherwise be used in the manufacture of ethanol.

The Company therefore proposes to utilise grain that is currently approved to directly feed the fermentation process in the ethanol production process; to instead be diverted to be processed into flour that is produced on site and then processed into starch and gluten.

As a result, the 6,720 tonnes per week of grain, equivalent to 5,400 tonnes per week of flour, that is currently approved to feed the ethanol production process will be redirected into flour processing and starch/gluten production.

This increase in flour production will necessitate the installation of a third flour mill on-site. The proposed Flour Mill “C” will be located within the existing Flour Mill “B” building to further increase the proportion of flour that is able to be processed on the site, reducing the proportion of flour that is required to be transported into the site for production purposes.

At present Flour Mill “A” produces 7,700 tonnes of flour per week, while Flour Mill “B” is approved to produce 8,500 tonnes of flour per week. Combined, these two existing Flour Mills produce 16,200 tonnes of Flour per week, leaving 3,800 tonnes of flour that is transported to the site by rail.

Flour Mill “C” will enable an increase in flour to be able to be produced on site by 5,200 tonnes per week.

It is also proposed to increase the importation of flour from off-site from 3,800 tonnes per week to 4,000 tonnes per week, a slight increase of 200 tonnes per week.

This will result in a total on site flour processing of 25,400 tonnes per week, an increase on the current approved 20,000 tonnes per week

These increases in starch and gluten production will have a corresponding increase in Dried Distillers Grain Syrup (DDGS) (which is essentially a by-product of the starch / gluten production) from the current approved position of 6,400 tonnes per week to 7,500 tonnes per week.

Figure 6 provides a flow chart detailing the approved inputs and outputs associated with the overall approved operations at the Shoalhaven Starches site; and including the proposed changes to these inputs and outputs because of this Modification Proposal.

The installation of an additional new Flour Mill “C” within the Flour Mill “B” building will further enable subsequent spare capacity at the Company’s Manildra Flour Mill to be devoted to the production of higher grade flour therefore further increasing export opportunities for the Company.

Modification to Ventilation System of Existing Flour Mills

The Company will also seek approval to undertake modifications to the existing Flour Mills “A” and “B” on the site, by modifying the ventilation systems within the existing Flour Mills from a vacuum to a pressurization system.

It is proposed to replace the natural induced draft ventilation system with a forced ventilation system.

The forced ventilation system will comprise of a fan enclosure mounted on the roof of the respective buildings:

- Mill A building air requirement: 1,810 m³/min (based on the dust collector filtration fan capacity); and
- Mill B building air requirement (includes the Mill C capacity): 2,890 m³/min.

The existing Mill A building was constructed in 2010 and includes acoustic louvers on three walls fitted with food standard filtration panels. The total filter area for the building is approximately 30 m². As part of the Mill B installation, a large proportion of these vents were sealed to create a fire wall between the Mill A building and the Mill B building (to meet fire engineering building safety requirements).

The proposal is to install a forced ventilation system to both Mill A and Mill B buildings, with fan rooms mounted on the roofs of each mill, ducted through air ducts on the northern face of Mill B and the eastern face of Mill A.

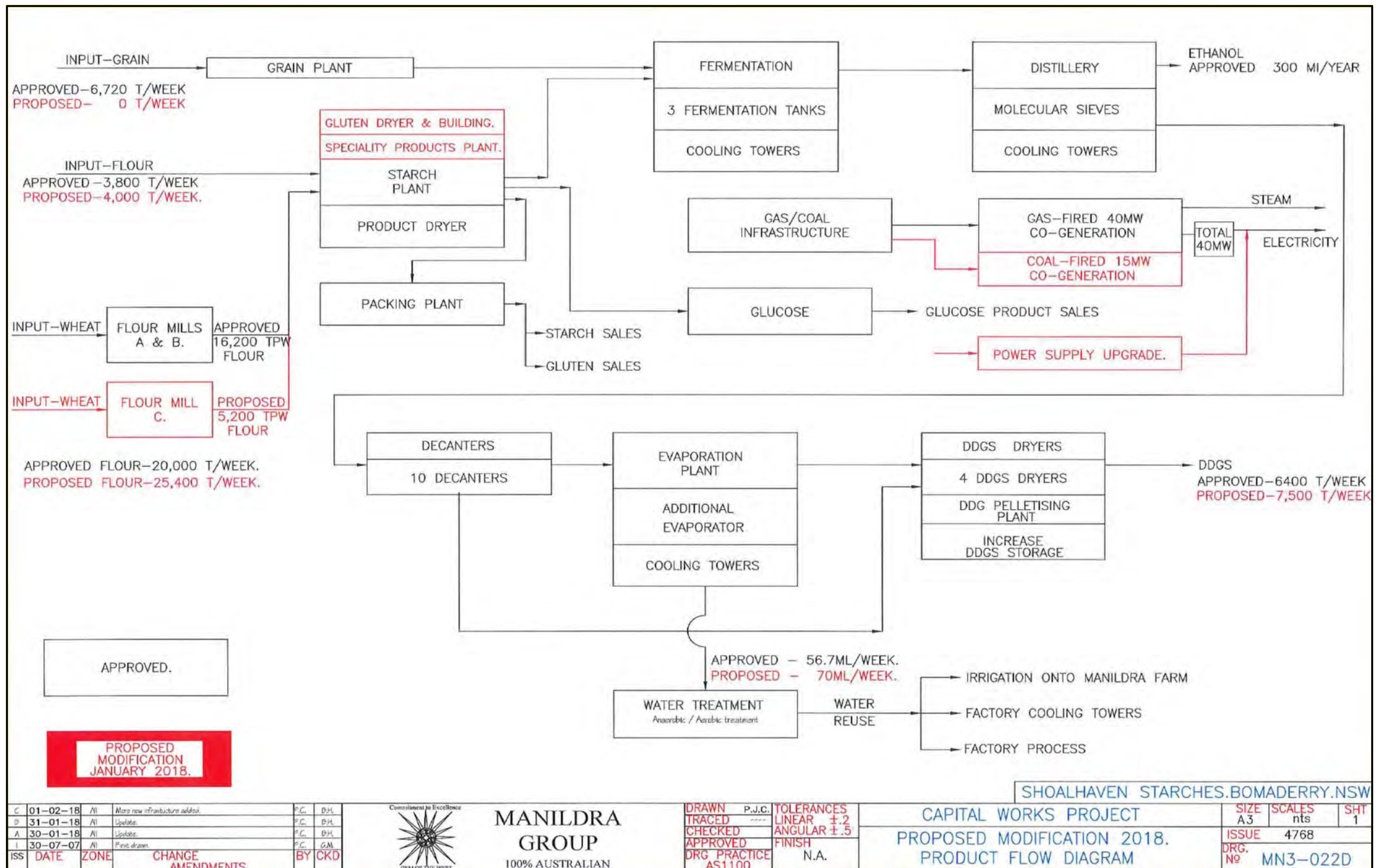


Figure 6: Flow chart detailing the approved and proposed inputs and outputs associated with the overall approved operations at the Shoalhaven Starches Site

The fan rooms are designed to include appropriate filtration of the air to meet food manufacturing requirements.

The fans will be centrifugal type and the ducting will be designed to deliver the appropriate amount of air to each level in each of the mill buildings.

From a process perspective, the use of positive pressure in the building will assist in minimising dust escape into the building and maintain a higher level of cleanliness and good manufacturing practice.

The installation of the pressurisation ventilation system will require housing to be attached to the eastern elevation of Flour Mill “A”, and the northern elevation of Flour Mill “B”. This housing will rise up a section of these elevations and connect to proposed housing that will sit on the roofs of both Mill buildings. Filter exhausts with silencers will be provided as a component of this ventilation. Ventilation will also be provided to Proposed Flour Mill C.

The housing on Flour Mill “A” will have a height above ground level of 35.25 m; while the housing on top of the roof of Flour Mill “B” will have a height above ground level of 39.6 metres

5.1.2 Proposed Modifications to Existing Dryers and New Gluten Dryer

To accommodate the increase in starch and gluten production, the Company proposes to convert two existing Gluten Dryers (No. 1 and 2) within their factory into starch dryers. It is therefore proposed to construct a new Gluten Dryer (No. 8) to replace the drying capacity lost by the conversion of Dryers No. 1 and 2 to starch production.

The conversion of the two gluten dryers (1 and 2) will require some changes to the existing gluten and starch processes that deliver the wet products (ie. the gluten and starch are in water) to the dryers. The following changes describe dryer number 2 (for information):

- Reinstall the chute between the dryer blender and the starch decanter number 2 so that starch can be fed to the dryers;
- Remove/blank off the gluten feed pipework/fishtail assembly;
- Remove the existing connections for the product blowline to the gluten packing silos;
- Reinstall the connection to the existing blowline to the starch packing silos;
- Change the pulley/belt arrangement on the existing blower to suit the blowline to the starch packing silos; and
- The transfer screw conveyor and rotary seal speeds on the dryers conveying equipment will need to be adjusted to suit starch.

The new Gluten Dryer (No.8) will be housed within the proposed new building that will adjoin the Specialty Product building described below and will be sited between this new building and the remaining “Moorhouse” maintenance building.

This new Dryer Building will have dimensions of 12.3 m by 43 m, comprising a footprint of 529 m²; and a height above ground consistent with the new Specialty Products Building that it will adjoin.

Flour will be transferred from the existing flour storage systems to a silo in the new building. The flour will be transferred via a 300 m long blowline. The silo will be fitted with a top-mounted bag filter as per standard designs.

The flour and water will be mixed within a large dough mixer. The wet dough is then transferred to a tricanter. This machine separates the wet feed into wet starch, wet gluten and waste/pentosans (polysaccharides) which will be sent to the ethanol plant for processing.

The wet gluten from the tricanter will be screened. The screened wet gluten will flow to the new gluten dryer whilst the waste liquid from the screening stage will also be sent to the ethanol plant for processing.

The wet gluten will flow to the wet gluten hopper and then a screw press. Free moisture will drain from the screen sides and base of the hopper. A conical screw will squeeze and extrude the gluten before discharging into the gluten feed hopper.

De-watered gluten will then be pumped (via a progressive cavity positive displacement type pump) at constant rate into the disintegrator through a fishtail feeder, which extrudes a thin sheet of material over the full disintegrator width and feeds it into a re-circulating stream of hot air and dry powder. The wet material will be dispersed and coated with dry powder before being dried and transported around the ring duct by the drying air.

At the dryer manifold, an adjustable blade allows a predetermined fraction of circulating material to be selectively removed from the system, whilst oversize and semi-dried material is returned to the disintegrator. The disintegrator is a fixed beater impact mill, which breaks down agglomerates and disperses the circulating mass into the drying airstream. This combination of manifold and disintegrator gives screen-less grinding and even moisture distribution to the product.

Gluten is then separated from the exhaust air stream in a reverse jet baghouse filter, complete with a pre-separator section, which ensures that material is quickly removed from the hot airstream when it is dry (to minimise thermal degradation).

Dried material will be discharged through a system of screw conveyors and rotary valves, allowing control of the recycle of coarse material from the pre-separator and fine material from the baghouse filter, or a combination of the two, with the remainder being discharged as final product to the milling system.

An induced draught fan at the baghouse filter outlet will draw process air and gluten through the drying system and will maintain circulation within the ring duct. The air will flow to atmosphere via a stack.

The dryer air is drawn through filters to remove foreign objects. It is heated by hot condensate, steam (10 barg) and then a gas fired burner (to approximately 185°C).

After the air passes through a hot air box (used to collect large objects such as product clumps), the air and gluten combine and flow up through the dryer.

Product gluten from the dryer will be held in a buffer hopper, with a variable speed screw discharge, designed to eliminate surges and maintain a constant feed rate to the milling system. Material discharged from the buffer hopper will be passed over a magnet to remove ferrous material and transferred to the classifier mill by an induced draught pneumatic conveyor (using filtered ambient air).

The aspirated grinding mill will incorporate an internal classifying wheel with independent drive. Through varying the speed of this wheel, oversize particles will be deflected back into the mill for further grinding. Milled product will then be transported to the final collection within a second pneumatic conveyor.

Finished product gluten will be separated from the mill exhaust by a dedicated reverse jet baghouse filter and discharged by a rotary valve.

The ground product is then conveyed via a blowline to the existing packaging area. The product is either stored in a buffer bin or sent to truck loadout.

The product gluten is filled into bags, eg. 1 te bulkabags, at dedicated existing bag filling stations. The bags are stored in 20 foot containers until being loaded onto trucks or trains for delivery to the market.

5.1.3 Specialty Products Building

The Company also wish to explore the production of a range of specialised products from their existing product lines. The specialty products will comprise a range of modified gluten products for the food industry; and modified starches for both paper manufacturing as well as food production.

The plant and equipment associated with the production of the specialty products will be situated within a new industrial building that will be situated between the remaining “Moorhouse” maintenance building and adjacent to the recently constructed Product Dryer No. 5 located on the western bank of Abernethy’s Creek.

Situated immediately to the south and north of the proposed new building will be 15 silos that will contain starch, gluten and specialty products that are to be processed on site. Three product silos will be located within the proposed Speciality Products Building. Tanks located in bunded storage in this area will contain liquid starch and chemicals.

The new building will have a height that will match the recently constructed product dryer building with a height of up to 26.3 m and a footprint with an area of 817 m². The silos will have maximum heights above ground level of up to 33.5 m. Roofing over the silos on the northern elevation will have a maximum height of 35 m.

This aspect of the modification proposal seeks to provide greater flexibility and range of products produced at the factory.

In general the production process in this building will involve dry starch (containing approximately 12 wt% moisture) being conveyed from Starch Dryer 5 via a screw conveyor to the modified starch process. This new process will be installed within the new industrial building. The starch feed quantity will be measured via a loss-in-weight feeder.

5.1.4 Bag House for Starch Dryer No. 5

Shoalhaven Starches propose to replace the secondary cyclones in Starch Dryer 5 with a bag house. The objectives of this work is to improve dryer efficiency and improve air emissions from this Dryer. The bag house will separate approximately 500 kg per hour of starch (12% moisture content) from the airstream (250,000 m³/minute air flow)

This bag house will be housed within a proposed extension to the recently completed Starch Dryer No. 5 building. This extension will be located on the northern side of the existing Starches Dryer building and will have a footprint with dimensions of 20 m by 12 m (a floor footprint area of 240 m²) and a height above ground level of 36 m.

5.1.5 Additional Sifter for the Interim Packing Plant

It is proposed to install a large sifter in the feed stream to the existing starch packer to enable Shoalhaven Starches to meet customer requirements for smaller particle sized dry product.

The proposal involves product (starch) being blown to silo 18 via pneumatic transfer lines from other parts of the factory (approximately 35 m³/min of air along with 25 tonnes per

hour of product). The existing receiving silo has a dust collector which is designed to extract 150 m³/min.

The product will then be transferred via a screw conveyor from the base of the silo at a rate of 20 tonnes per hour to the larger (new) sifter.

The product will then be sifted at 425 micron within a plansifter. This type of sifter is installed elsewhere on the site. The sifter will have a design capacity of 30 tonnes per hour.

The product will be collected at the base of the new sifter and transferred into a magnetic separator and then to the packer hopper to be packed in 25 kg bags (as per the existing practice).

To fit the large sifter into the packing plant building the roof in the immediate area of the sifter will need to be extended and a walkway on top of the packing plant will need to be relocated. The roof in the vicinity of the sifter will have a maximum height of 15 m. The sifter room will have dimensions of 6.2 m x 5.5 m.

5.1.6 Coal Boilers and Co-Generation Plant

Black coal is used at the Shoalhaven Starches site. The coal size is 10 to 25 mm and contains approximately 15% ash.

Trucks deliver the coal to the existing large coal stockpile on the western side of the Shoalhaven Site.

It is reclaimed from the larger coal stockpile using a frontend loader and trucked via site roads to a smaller coal stockpile adjacent to the boiler house. A frontend loader reclaims the coal from this smaller stockpile, when needed, and feeds the coal into an existing hopper and denseveyors (pneumatic transfer machines) that transfer the coal to each of the boilers. Compressed air is used within the denseveyors to transfer the coal to the boiler feed bins.

The coal is used in Boilers 5 and 6. Currently, Boilers 2 and 4 are being converted back to coal use.

All the coal-fired boilers are designed for limited attended operation in compliance with the requirements of AS2593, however, they are operated as attended boilers.

Each of the four existing coal boilers (2, 4, 5 and 6) has an existing feed bin which is level controlled. The coal is gravity fed onto a grate for delivery into each boiler. A door at the coal inlet to each boiler can be closed (manually) to stop the coal and hence the source of fuel, eg. in the event of an emergency.

To accommodate the need for additional power supply to enable the increase in starch and gluten production, the Company will also seek to construct a new coal-fired Co-generation plant to the south of the existing Boiler House complex. This Co-generation plant will include the installation of a new coal fired boiler (No. 8). The construction of this new co-generation plant and boiler (No. 8) will necessitate the relocation of the existing Boiler No. 7 to the northern side of the overall Boiler House complex.

It is proposed that the new coal-generator plant will generate a total of 15 MW of power on the site. The original Project Approval included the construction of a Gas-powered Co-generation plant that was to be situated on the western boundary of the factory site. This gas power co-generation plant was anticipated to generate 40 MW of power for the site. The 15 MW of power generated by the proposed coal powered Co-generation plant associated with this Modification Proposal, will be incorporated into the overall 40 MW that was originally envisaged to be created by the gas-powered Co-generation plant. As a result, this proposal will not generate any more power on-site than what was originally approved under the original Project Approval.

The existing Boiler No. 7 is a low-pressure boiler which produces saturated steam for the production processes within the factory.

The proposed Coal Fired Co-generation plant will require high pressure (super-heated) steam to be generated to power the turbine that generates electrical power by the proposed Co-generation plant. The proposed Boiler No. 8 will be designed to generate high pressure superheated steam to drive the turbine within the co-generation plant.

The new Co-generation plant building will have dimensions of 17 m by 7.2 m, comprising a footprint of 122.4 m²; and will have a height above ground level of 13 metres. The building containing Boiler No. 8 will have a height of 17 m and dimensions of 21 m x 14.5 m with a proposed footprint of 304.5 m². Boiler No. 8 will have a stack of 40 m in height. This is consistent with the existing stack height of the boiler house which is located to the immediate north-east of the proposed Boiler No. 1.

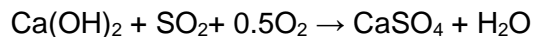
The relocated Boiler No. 7 will be housed within an extension to the existing boiler complex and comprise a footprint of dimensions of 14 m by 8 m, and area of 112 m². The relocation of Boiler 7 will also include a stack with a height above ground level of 26.8 m, which is equivalent to the existing stack height.

To meet the new EPA requirements for sulphur oxides (SO_x) emissions, flue gases from Shoalhaven Starches coal fired boilers will be required to implement flue gas desulphurisation technology. The proposed technology is called dry sorbent injection

(DSI), which is the injection of hydrated lime (Ca(OH)_2) into the ductwork between the economiser and the bag house to reduce the SO_x emissions.

The lime will be delivered to site via a truck and pneumatically conveyed into the silos (x 2). The silos will be fitted with a baghouse filter to prevent dust being emitted to atmosphere. The silos will have a footprint of 10 m x 9 m and an overall height of 25 m.

The lime will be metered from the silos into a blowline. It will then enter the relevant ducting where the following reaction will take place:



CaSO_4 , ie. gypsum, is a naturally occurring mineral and is used as a fertilizer and is also the main constituent in many forms of plaster, blackboard chalk and wallboard.

The solid calcium sulphate is then collected in the downstream bag house filters with fly ash and re-used at the Company's Environmental Farm.

It is estimated that the lime usage will be approximately 320 kg/hr. It is expected that the storage facility will have a capacity of 120 te to give approximately two weeks of operation without needing to be refilled.

5.1.7 Electrical Modifications

The Modification Proposal involves two significant modifications:

Electrical Project 1:

The Shoalhaven Starches site is currently fed from an Endeavour Energy 33 kV outdoor substation located adjacent to the two main 33/11 kV transformers and the main 11 kV switchroom. With the ongoing expansion of the site, a third 33/11 kV transformer will be required to maintain the integrity of the incoming power supply.

This proposal is to install the third transformer in the location of the existing 33 kV outdoor substation. An indoor 33 kV substation will be built to Endeavour Energy requirements on the northern side of Bolong Road to supplement the existing outdoor substation and suitable for the supply of three main 33/11 kV transformers. The location of this substation is adjacent to the existing BOC carbon dioxide plant and setback 8 metres from Bolong Road. This structure will have dimensions of 26.2 m x 12 m and a height of 7 metres. Landscape screening will be planted between this building and Bolong Road.

Electrical Project 2:

The existing main 11kV switchboard has a capacity of 50 MVA. The power supply to the site needs to be improved past the current capacity.. The scope of this project is to install

a second main HV switchboard in a new switchroom located above the existing main switchroom. One of the two supplies to the existing main switchboard will be relocated to supply the new switchboard. The existing ring main feeds from the main switchboard will be reconfigured to enable supply from any ring main from either the old or new main switchboard. This second storey extension to the switchroom will increase the height of this building to 12.5 m, with dimensions of 15 m x 7 m.

5.1.8 Rail Intake Pit

At present when rail wagons are unloading grain, given the size of the existing in-take pit, only part of a wagon can unload at any one time. It is proposed to provide an additional intake pit will allow the whole of a wagon to be unloaded at the one time enabling the unloading process to be completed quicker and more efficiently.

The proposal will involve:

- The installation of an additional intake pit adjacent to the existing intake pit;
- A new bucket elevator (height 43 m) that will transport grain to the existing silos; and
- Associated transfer conveyors and chutes to enable the grain to be taken from the new intake pit up the bucket elevator and distributed to the existing silos.

Existing Grain Intake System Details:

Grain (wheat) trains are unloaded, wagon-by-wagon, during a 6.5-hour window on a one train per day basis.

Each wagon has four gates for unloading. The unloading system comprises a hopper wide enough for only three gates to open, ie. the wagon is tipped into the hopper with only three gates open. The wagon is then shunted along approximately two metres where the last gate is opened and the remainder of grain in the wagon is unloaded.

Two inclined screw conveyors convey grain out of the hopper and to a vertical bucket elevator. The elevator conveys grain to the first of three drag chain conveyors mounted at the silo top level. The first conveyor can tip grain into the largest silo 101 via a slide gate mounted mid-way along. If grain is not fed to silo 101, it continues on to a traversing conveyor. This traversing conveyor can tip grain into silo 103, the next (third) drag chain or to silo 102. Grain that is delivered to the third drag chain can feed into silos 104 or 105.

The existing storage capacities are: Silo 101 is 2,200 te, and silos 102, 103, 104 and 105 are each 1,500 te.

Proposed Grain Intake System Details:

A duplicate pit will be installed beside the existing pit. This will allow a wagon to be fully tipped (unloaded) without shunting. Two gates on each wagon will tip into a single hopper. Two new screw conveyors will transfer grain from the new hopper.

Grain will be conveyed to a new bucket elevator erected at the base of silo 103. The new bucket elevator will include belt temperature sensors.

The new bucket elevator will feed grain to silos 101, 102, 103 or the existing final drag chain conveyor (via distributors and spouts). The existing drag chain can then feed to silos 104 or 105. This would only occur if the existing grain unloading system feeds to silos 101, 102 or 103.

The intake system will be started by an operator at the commencement of unloading of the train and will remain running until unloading is completed. Selection of the storage destination can be made by the operator at any time in the unloading process.

The throughput of the new rail intake system is approximately 500 te/hr. The existing operations involve a train every day, ie. 40 of the current wagons equals 2,340 te per day (16,380 te per week).

The future operations may include one rake of 92 te wagons which, at 40 wagons, allows 3,680 te. Therefore, for 3 trains per week (11,040 te) plus 3.5 services (7 per fortnight) of the current wagons (8,190 te) equals 19,230 te per week, ie. similar to the existing grain intake to the site.

The proposed intake pit will have a depth of 3.95 m below the ground level. To enable the removal of the grain from the intake pit and to distribute it to the relevant silos new unloading infrastructure will be required in the form of a new bucket elevator and associated conveyors and chutes. The proposed bucket elevator will have an overall height of 43.3 m.

Plan details of the proposal form **Annexure 2** to this EA.

5.1.9 Regularisation of the Non-Enclosure of Existing Plant.

An Independent Environmental Audit of the Shoalhaven Starches Plant was undertaken by GHD (dated 21st April 2017).. This audit found that operations at the site were non-compliant with the recommended noise controls from an Acoustical Assessment prepared by The Acoustic Group Pty Ltd in June 2008 that supported the original Project Approval.

In particular, the enclosure of Fermenter tanks' transfer pumps and molecular sieve pumps and compressors, as required under Schedule 2, Condition 2A (a) of Project Approval, have not been undertaken.

In a letter to the NSW Department of Planning and Environment dated 22nd February 2018, Shoalhaven Starches advised that the proposed compressors to the Molecular Sieves have not been installed. To address this issue Shoalhaven Starches engaged the services of Harwood Acoustics (HA) to conduct a Noise Validation Assessment and to provide Acoustic Advice on the recommended noise controls derived from the Acoustic Assessment prepared by the Acoustic Group. HA provided a report titled "*Shoalhaven Starches Previously Recommended Noise Controls Acoustical Advice*", dated 16 February 2018.

Noise measurements conducted by HA on the Fermenter Tank transfer pumps and Molecular Sieve pumps demonstrated all pumps were well below the noise limits described in the Shoalhaven Starches Environmental Protection Licence 883 at all receptor locations. HA concluded that the previously recommended noise controls are not required for these specific items of plant, due to the original predictions not considering attenuation from future (now existing) structures (as the details of those structures were not known at the time). The NSW Department of Planning and Environment responded in a letter dated 26th March 2018 and advised that an application for a modification which seeks to regularise the non-enclosure of this existing plant should be made.

As such this modification proposal also seeks to regularise the non-enclosure of the existing Fermenter Tank transfer pumps and Molecular Sieve pumps.

Documentation relevant to this modification has been provided within **Annexure 11** to this EA. This documentation includes:

- Letter from Shoalhaven Starches to Department of Planning and Environment dated 22nd February 2018;
- Letter from Department of Planning and Environment to Shoalhaven Starches to dated 26th March 2018;
- Acoustic report prepared by Harwood Acoustics titled "*Shoalhaven Starches Previously Recommended Noise Controls Acoustical Advice*" dated 16 February 2018;
- Acoustical Assessment prepared by The Acoustic Group Pty Ltd in June 2008.

5.1.10 Regularisation of the Relocation of Plant and facilities approved under Modification 3 and Modification 12.

The proposal also seeks to regularise the relocation of structures approved under Modification 3 and Modification 12. The approved layout of the Electrical Sub-station, Cooling Towers and Emergency ISO Tank Container Storage, located on the eastern edge of the main Shoalhaven Factory site, has had to be reconfigured due to operational requirements as detailed in **Figure 7** below.

The cooling towers which were originally located to the immediate south of the Evaporator have been moved further to the south into the approximate approved location of the electrical substation. The electrical substation has been moved to the north and is now located in the approved location footprint of the cooling towers. The substation has been moved closer to the Evaporator to reduce electrical cabling costs. The relocation of these structures necessitated the Emergency ISO Tank Container Storage to be moved further east to allow sufficient space for the relocated cooling towers.

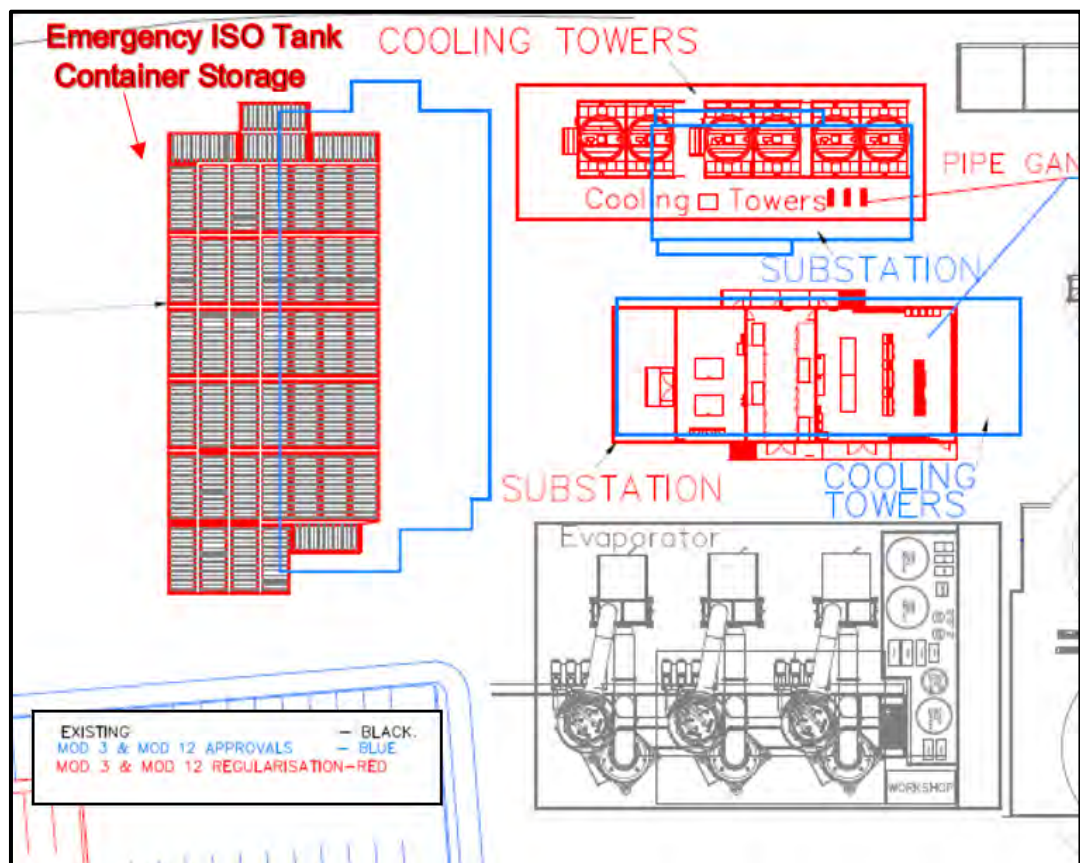


Figure 7: Reconfiguration of approved structures.

In addition, the 60 space car park approved under Modification 3 has been moved further to the east to accommodate the approved layout of the evaporator and the proposed

footprint change of the Emergency ISO Tank Container Storage. The approved layout and the layout which Shoalhaven Starches seeks to be regularised are detailed within drawing MN6476-002B within the plans of the Proposed Modifications (**Annexure 2**).

5.2 ENERGY AND UTILITIES

Energy

The existing plant has the capacity to produce approximately 200 t/h of process steam. The boilers are currently fuelled by coal, natural gas, biogas and woodchip.

The site currently uses approximately 39 MVA of electricity.

The Company also currently utilises 190 Terajoules of Natural Gas.

The total requirements for the plant resulting from the proposed Modifications associated with this application is estimated at additional 16 MVA of power.

Water Consumption

The proposed modifications will result in the following approximate water consumption rates:

- Council Treated – 1,725,526 KL p.a;
- Council Raw – 1,875,651 KL p.a;
- Recycled RO – 2,321,314 KL p.a.

According to Shoalhaven Starches there will not be any significant changes to water consumption.

6.0 CONSULTATION

During the preparation of this EA consultation has been undertaken with:

- Department of Planning and Environment;
- EPA;
- Australian Department of Defence;
- NSW Office of Water;
- Shoalhaven City Council.

Shoalhaven Starches have consulted with staff from the Department of Planning & Environment with respect to this proposal. The Secretary of the Department of Planning has issued requirements for this EA in an email dated 14th March 2018. These requirements form **Annexure 1** to this EA.

Written consultation has been undertaken separately with the Shoalhaven City Council, the EPA, NSW Office of Water and the Australian Department of Defence.

Responses from Shoalhaven City Council and EPA received at the time of preparing this EA are also included in **Annexure 1** to this EA.

Department of Planning & Environment

The following is a summary of the matters raised by the Department in their email dated 14th March 2018 which related to the proposed modifications to be addressed in this EA (refer **Table 4**).

Table 4
Department of Planning & Environment SEARs

<i>DoPE Issue</i>	<i>Comments</i>
• Air quality including odour	Refer to Section 8.3 of EA.
• Noise	Refer to Section 8.2 of EA.
• Preliminary hazard analysis	Refer to Section 8.1 of EA.
• Traffic, access and parking	Refer to Section 8.6 of EA.
• Flooding	Refer to Section 8.4 of EA.
• Waste water treatment	Refer to Section 8.10 of EA
• Visual impact	Refer to Section 8.5 of EA.
• Acid Sulphate Soils	Refer to Section 8.8 of EA.
• Contamination	Refer to Section 8.7 of EA.
• Riverbank stability	Refer to Section 8.9 of EA.

In addition to the above requirements the Department requested that the EA include simple list of all proposed modifications with a cross reference to figures showing the location of each modification.

Comment:

A simple list of the proposed modifications is provided in the Executive Summary and Introduction sections of the EA. A detailed description of the proposed modifications is provided in Section 5 of the EA. **Figures 3** and **4** detail the location of each modification.

EPA

In an email dated 2nd March 2018 the EPA raised the following issues as a matter that would need to be addressed as part of this modification proposal:

Air Impacts

It is recommended that an air quality impact assessment be prepared in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2016). This needs to include specific assessment of impacts from odour and other principal air pollutants arising from the proposal. As required by the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2016) the required air quality impact assessment needs to be cumulative based (incorporating current plant and equipment configuration/operation, approved but yet to be constructed plant and equipment and proposed plant and equipment the subject of the modification) and must be undertaken to present a worst case scenario prediction of air quality impacts from the premises. In this respect, the previous air quality impact assessments (final version), including odour inventories and assessment methodology for past modifications for the Shoalhaven Starches site, in particular MOD 13 and MOD 11 should likely be used in the formulation of the required air quality impact assessment for proposed MOD 14.

If any exceedances of the relevant air quality assessment criteria are identified, the air quality impact assessment report should detail all reasonable and feasible mitigation measures that will be implemented to ensure compliance.

Further, the EPA understands that proposed MOD 14 will also be seeking to move one of the DDG dryers approved under MOD 11 from the approved location on the western side of the factory plant, to an alternative location on the eastern side of Abernethys Creek. The air quality impact assessment report must detail whether this proposed location change will result in additional odour impacts from the premises and should clearly detail any changes that have been included in the odour assessment modelling such as building wake effects in comparing the two DDG dryer locations.

Comment

An Air Quality Impact Assessment which addresses the above issues has been prepared by GHD. This is provided as **Annexure 6**. The results outlined in this report are detailed in Section 8.3 of this EA.

Noise Impacts

It is recommended that a noise impact assessment be prepared in accordance with the Noise Policy for Industry (EPA, 2017). The noise impact assessment should assess whether the proposal will comply with the noise limits for EPL 883, and provide details of all reasonable and feasible mitigation measures that may need to be implemented to ensure compliance. Please note the EPA in consultation with Shoalhaven Starches is currently in the final processes of updating the noise descriptor used to express the limits in EPL 883 (changing from L_{A10} to L_{Aeq}). As such, it is recommended that the noise impact assessment be reflective of the updated noise descriptor limits which are likely to be finalised in EPL 883 shortly.

In addition, any potential construction noise and vibration impacts should be assessed in accordance with the Interim Construction Noise Guideline (DECC, 2009) and should the assessment methodology (quantitative or qualitative) should be clearly identified in the report.

Comment

A Noise Impact Assessment has been prepared by Harwood Acoustics (HA) (**Annexure 5**). HA advise “that the level of noise emission from the modification to this approved proposal will be within the noise design goals derived from Environment Protection Licence 883 noise limits at each receptor location based on noise control recommendations made in Section 6 of this report”. Noise Impacts are discussed further in Section 8.2 of this EA.

Soil Contamination

It is noted in the scoping report that a site contamination assessment is proposed to be undertaken at the site. It is recommended that the assessment should include details on what action will be taken if contaminated soil was found on site.

Comment

A Contamination Assessment has been prepared by GHD for the proposed modifications (**Annexure 9**). See Section 8.7 of the EA.

Water Pollution

Consideration of environmental controls that will be put in place in to ensure that any construction works undertaken on the site will not contravene section 120 of the POEO Act (prohibition of the pollution of waters). Any sediment and erosion controls should be applied in accordance with the Blue Book (Landcom, 2004).

Dust Management

Consideration of any dust management practices that will need to be in place during construction site is required to reduce the potential for the pollution of air and waters and to minimise the impact on the amenity of the surrounding community.

Comment:

The EA is supported by a stormwater management plan prepared by Allen Price & Scarratts (**Annexure 12**). A Soil and Sedimentation Management Plan will be provided prior to the

commencement of Construction. Mitigation measure will be put in place until the end of construction to ensure that water quality is not impacted and dust from the site is managed.

The Project Approval for the site requires all reasonable and feasible measures to minimise dust generation and in particular ensure that trucks entering and leaving the site have covered loads, and that trucks do not track dirt onto public road networks.

Waste Management

Consideration to the management of all wastes generated during the project, including the potential disturbance/removal of acid sulphate soils. The wastes must be managed in a manner that prevents the pollution of waters and air. Waste must be classified in accordance with the POEO Act and Waste Classification Guidelines (EPA, 2014) and must be taken to a place which can lawfully receive them in accordance with the requirements of the POEO Act. In addition, should any waste be imported to the site for construction purposes, consideration should be given to whether a Resource Recovery Order/Exemption applies”.

Shoalhaven Starches already have an adopted and approved Waste Management Plan approved under condition 41 of the original Project Approval. It is anticipated that any approval for this Modification Application will be subject to this Waste Management Plan being revised to reflect the works associated with this Modification Proposal.

In a further email dated 2nd March 2018 Stefan Press of the EPA advised the following in reference to the earlier email:

“I have just realised that I have referred to the latest proposed Shoalhaven Starches modification as MOD 14 in my recent correspondence to you both concerning the EPA’s environmental assessment requirements. Obviously MOD 14 relates to the old paper mill site and which is currently on public exhibition at present and so assume the proposed modification will likely be MOD 15? So for clarity, the environment assessment requirements provided below relate to this latest proposed MOD and which the EPA understands to include the proposed changes at the premises as outlined in Stephen’s emails of 9 and 27 February 2018 which are also attached for clarity/completeness”

Comment:

This Modification actually represents Modification 16. Modification 14 concerns the use of the former Paper Mill Site and Modification 15 involves the proposed CO₂ Plant to be located at the former Dairy Farmers Factory Site. It is acknowledged that the comments from the EPA were in reference to this latest modification (Modification16) (refer **Table 5**).

Table 5
EPA Environmental Assessment Requirements

<i>DoPE Issue</i>	<i>Comments</i>
• Air quality including odour and dust management	Refer Section 8.3 of EA.
• Noise	Refer Section 8.2 of EA.
• Visual impact	Refer Section 8.5 of EA.
• Acid Sulphate Soils	Refer Section 8.8 of EA.
• Contamination	Refer Section 8.7 of EA.
• Flooding	Refer Section 8.4 of EA.

Shoalhaven City Council

The following matters have been raised by Shoalhaven City Council in an email dated 14th May 2018 as matters that should be addressed in the EA (refer **Table 6**):

Table 6
Issues Raised by Shoalhaven City Council

<i>SCC Issue</i>	<i>Comments</i>
Traffic & Transport Comments/Requirements <ul style="list-style-type: none"> A Traffic Impact Assessment (TIA) is required with consideration of the identified traffic and transportation issues, particularly confirming the car parking requirements for the proposed development and the ongoing needs of the site/s. 	<p>The EA is supported by a Traffic Impact Assessment prepared by Bitzios Consulting (Annexure 8). Traffic issues are discussed in Section 8.6 of this EA.</p>
Development Engineering Comments/Requirements: <ul style="list-style-type: none"> Stormwater runoff from the proposed development needs to be addressed and where and how the stormwater discharges. 	<p>The EA is supported by a Stormwater Assessment prepared by Allen Price and Scarratts (Annexure 12).</p>
Environmental Health Comments/Requirements: <ul style="list-style-type: none"> Compliance is required with the recommendations of the Noise Impact Assessment by Harwood Acoustics Pty Ltd (dated December 2017). 	<p>The Noise Report dated Dec 2017 was provided for Modification 14: <i>The Use of the Former Paper Mill Site in Conjunction with Shoalhaven Starches Factory Operations</i>. This report refers to different modifications and a different section of the Shoalhaven Starches site as such the recommendations in this report will not be relevant to this modification application.</p> <p>A Noise Impact Assessment prepared by Harwood Acoustics assesses the noise impacts associated with the modification proposal within this application and recommends relevant mitigation measures.</p>

Table 6 (continued)

SCC Issue	Comments
Environmental Health Comments/Requirements:	Council's typical noise assessment requirements are addressed in this Noise Impact Assessment as it is carried out in accordance with the Noise Policy for Industry 2017 methodology and assessed against the noise limits contained within EPL 883.
Flooding Comments/Requirements: <ul style="list-style-type: none"> The sites are categorised as high hazard floodway and high hazard flood storage. A detailed flood compliance assessment report is required on how the proposal will achieve all relevant objectives, performance criteria and/or acceptable solutions of Shoalhaven Development Control Plan 2014, as prescribed in Section 5.1 and 5.2 of Chapter G9. 	The EA is supported by a Flood Compliance Report prepared by WMA Water (Annexure 7). Flooding issues are discussed further in Section 8.4 of this EA.
<ul style="list-style-type: none"> It appears that the flood levels shown on page 8 of the scoping submission dated 8 February 2018 is not accurate. The 1% AEP event flood level for the properties at 22 and 24 Bolong Road is 5.7m AHD. 	The Flood Compliance Report has been prepared on the information provided in the flood certificate provided by SCC dated , 5 April 2018. This certificate lists the 1% AEP level as 5.7 m AHD.
<ul style="list-style-type: none"> Given the proposed riverbank stability works adjacent to Shoalhaven River, a setback of a minimum 11.5m is required for all permanent structures. All shipping containers and fencing in the south-east of the proposed development area are to be relocated to comply with this setback from the riverbank. 	<p>A Geotechnical Report (dated May 2018) and addendum letter (dated 30th May 2018) addressing the impact on riverbank stability has been provided by GHD in relation to the proposed modifications (Annexure 9). These documents show that the permanent structures proposed will not impact on stability of the riverbanks of the Shoalhaven River in their proposed locations.</p> <p>The shipping containers referred to by Council are not relevant to this modification. However, a separate report has been prepared by GHD to address this matter and has been provided as Annexure 13 for Council's consideration.</p>
Building Comments/Requirements: It is assumed that any application will be referred to NSW Fire & Rescue for comment.	Noted

At the time of preparing this EA responses have not been received from the Australian Department of Defence or the NSW Office Of Water.

7.0 RISK ASSESSMENT OF POTENTIAL ENVIRONMENTAL IMPACTS

The purpose of this section of the EA is to provide a risk assessment of the potential environmental impacts associated with the project. 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 EA and summarises the relative change in environmental impacts associated with the proposed modification.

Table 7
Risk Assessment

<i>Issue</i>	<i>Relative Change in Environmental Impact</i>	<i>Additional Management or Mitigation Measures Required</i>	<i>Significance of Issue with this Modification Proposal</i>
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 odour assessment and reduction as part of the project. GHD have been engaged by Shoalhaven Starches to undertake an Air Quality Impact Assessment (AQIA) with respect to this Modification Proposal. A copy of GHD's assessment is included as Annexure 6 to this EA.	GHD advised that Shoalhaven Starches have implemented reasonable and feasible mitigation measures on site to reduce the potential air quality impacts from the new boiler. No additional management or mitigation measures are proposed by the AQIA prepared by GHD.	Air quality including odour impacts have been identified by the SEARs and are further addressed in Section 8.3 of this EA.
Transport & Traffic	The SEARs for this project identified a traffic assessment is required to be undertaken in relation to this proposed modification. The EA is supported by a traffic impact assessment prepared by Bitzios Consulting (Bitzios) (Annexure 8). Bitzios conclude: “..there are no significant traffic or transport impacts associated with the proposed development expansion to preclude its approval and relevant conditioning on traffic or transport planning grounds.”	The Traffic Assessment prepared by Bitzios does not make any specific recommendations in relation to this modification proposal.	Traffic issues are further addressed in Section 8.6 of this EA.
Site Contamination	<i>Site Contamination</i> The EA is supported by a Contamination Assessment prepared by GHD (Annexure 9). Based on information provided in the previous Coffey reports, interviews and observations made during a site walkover; GHD advise the likelihood for widespread contamination within the proposed development areas is considered low.	Due to the history of industrial activities and indirect shallow investigations GHD recommend that precautions be taken with any subsurface penetrations, In particular if any are required in the vicinity of the chemical storage bund (e.g. southern side of Site 1), coal storage areas, ash/coal waste (e.g. Site 3) and locations where fill was observed (ie. Sites 4 and 6). GHD advise the Coffey 2017 report also noted some chemical additives used in the boiler	These issues has been identified by the SEARs. Site contamination is addressed in Section 8.7 of this EA.

Table 7 (continued)

Issue	Relative Change in Environmental Impact	Additional Management or Mitigation Measures Required	Significance of Issue with this Modification Proposal
<p><i>Site contamination</i></p> <p><i>continued</i></p>		<p>houses, potentially affecting Site 3. Soils should be handled with caution as per the requirements of material safety data sheets of chemicals/substances that may be routinely used in the vicinity of the development sites.</p> <p>An abandoned UST is located in the vicinity of Site 1. Although widespread contamination was not identified, localised petroleum hydrocarbon impact may exist within backfill sands surrounding the UST. Additionally, the UST may be intercepted during excavation of foundations. Therefore, removal of the UST may need to be considered.</p> <p>There was limited information for Site 5. Although GHD stated this was not considered to preclude proposed development, they advised precautions during ground penetration activities should be undertaken within these areas.</p>	
Acid Sulphate Soils	<p><i>Acid Sulphate Soils</i></p> <p>The EA is supported by an Acid Sulphate Soils Assessment also prepared by GHD (Annexure 9). GHD state acid sulfate soils could be encountered within alluvial soils underlying the fill materials at depths below 3m. Disturbance of ASS is likely to occur at Sites requiring CFA piles and the new rail unloading pit at Sites 3 and 4, respectively.</p>	<p>GHD recommend that should development involve the excavation of soils to depths greater than 3 m at any of the proposed development sites and/or dewatering that could result in lowering of the water table then an acid sulfate soil management plan (ASSMP) should be developed and actioned.</p>	<p>Acid Sulphate Soils is addressed in Section 8.7 of this EA.</p>

Table 7 (continued)

<i>Issue</i>	<i>Relative Change in Environmental Impact</i>	<i>Additional Management or Mitigation Measures Required</i>	<i>Significance of Issue with this Modification Proposal</i>
Noise	<p>Shoalhaven Starches are licensed under the POEO Act (Environment Protection Licence No. 883) which sets noise limits for the operation of the overall factory complex. Noise goals have been designed for the site to ensure existing noise levels are not increased by additional plant. The noise goals for any new plant are 10 dBA below the EPL noise limits and range between 28 and 32 dBA depending upon the residential receptor location.</p> <p>The EA is supported by a Noise Impact Assessment prepared by Harwood Acoustics Pty Ltd. A copy of this assessment is included in Annexure 5 to this EA. Noise Impacts are further addressed in Section 8.2 of this EA.</p> <p>Harwood Acoustics conclude in summary that noise emission from the modification proposal will comply with the design noise goal limits imposed on the overall Shoalhaven Starches factory complex by the EPL for the site providing noise control recommendations proposed by Harwood Acoustics are implemented.</p>	<p>The Noise Impact Assessment prepared by Harwood Acoustics makes recommendations in relation to the fan noise levels from the various modifications associated with this proposal and this is discussed in Section 8.2.4 of the EA.</p>	<p>This issue has been identified by the SEARs.</p> <p>Noise impacts are further addressed in Section 8.2 of this EA.</p>
Hazards	<p>The SEARs for this project have identified that a Preliminary Hazard Analysis (PHA) is required to be undertaken in relation to this proposed modification which in effect updates the existing PHA with the new processes and additional equipment.</p> <p>Pinnacle Risk Management have been engaged to undertake a PHA in relation to this project.</p> <p>The risks associated with the proposed modifications have been assessed by Pinnacle and have been found to be acceptable when compared against the DoP risk criteria.</p>	<p>Pinnacle makes the following recommendations in relation to this modification proposal.</p> <ul style="list-style-type: none"> For all explosion vents that vent directly to atmosphere for the modifications, finalise the explosion vent modelling when the design details are known. Review the option for installing initial screening, e.g. a magnetic separator, at the new intake pit to lower the likelihood of foreign objects entering the new bucket elevator and the downstream existing silos. 	<p>This issue has been identified by DGRs as Key Issue.</p> <p>A PHA has been prepared for the Modification Proposal by Pinnacle Risk Pty Ltd and forms Annexure 4 to this EA.</p>

Table 7 (continued)

<i>Issue</i>	<i>Relative Change in Environmental Impact</i>	<i>Additional Management or Mitigation Measures Required</i>	<i>Significance of Issue with this Modification Proposal</i>
<i>Hazards continued</i>	Pinnacle also conclude that societal risk, area cumulative risk and environmental risk are also acceptable.	<ul style="list-style-type: none"> • Ensure that all the proposed explosion vents are directed to a safe location to avoid injury to personnel or propagation to other adjacent equipment. • It is recommended that the floor of the new switchroom be fire-rated given the risk of a fire in the existing switchroom below. This will also help prevent a fire in the new switchroom propagating to the existing switchroom below. 	
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. The Modification Application is supported by a Flood Compliance Report prepared by WMA Water ("WMA") (Annexure 7).	No additional management or mitigation measures proposed	Flood impact maps for the 1% AEP, 0.5% AEP and PMF / Extreme events are provided within the Flood Compliance Report as Figures 3 to 5. WMA state the proposed works slightly decrease the amount of floodwaters from entering the northern floodplain across the river bank. Thus, immediately upstream and to the east of the proposed works there is an increase in peak level in the 1% and 0.5% AEP events but minimal impact in the PMF / Extreme event. WMA note however the increase in level in the 1% and 0.5% AEP events is largely within the confines of land owned by Shoalhaven Starches.

Table 7 (continued)

<i>Issue</i>	<i>Relative Change in Environmental Impact</i>	<i>Additional Management or Mitigation Measures Required</i>	<i>Significance of Issue with this Modification Proposal</i>
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 prepare in accordance with the original Project Approval. Ash from the new and relocated boilers, will continue to be used on the Environmental Farm for road maintenance and construction.	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.
Site Stormwater Management	A Stormwater Assessment has been prepared by Allen Price and Scarratts to address the stormwater provisions for the proposed modifications (Annexure 12).	No additional management or mitigation measures proposed.	Not a key issue.
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. Furthermore the appearance, scale and height of the development will be similar to existing structures located on the site. The proposed new indoor electrical substation will be screened from Bolong Road by landscaping.	The proposed new indoor electrical substation, which will be located on the northern side of Bolong Road will be screened from the road frontage by vegetation. No additional management or mitigation measures proposed	This is a key issue identified by this EA. The visual impacts associated with this proposal are addressed in Section 8.5 of this EA.
Flora and Fauna	The proposed works associated with this modification will all be located within the factory site which is devoid of vegetation. 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. The proposal will not require any additional vegetation to be disturbed. No change in environmental impacts from that originally identified in EA.	No additional management or mitigation measures proposed.	Not a key issue.

Table 7 (continued)

Issue	Relative Change in Environmental Impact	Additional Management or Mitigation Measures Required	Significance of Issue with this Modification Proposal
Heritage and Archaeological Issues	<p>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 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 this part of the site or this project. The proposed works will have no additional impact in terms of indigenous or non-indigenous heritage.</p> <p>No change in environmental impacts from that originally identified in EA.</p>	No additional management or mitigation measures proposed.	Not a key issue.
Effluent Irrigation and Storage	<p>The total flour processed on the site as a result of this proposal will be increased from the previously approved amount of 20,000 tpw to 25,400 tpw. Consequently wastewater volumes will be altered. Under the Project Approval, 8.1 ML of waste waters were directed to the Water Treatment system per day or 56.7 ML per week. Under this Modification Proposal it is estimated that waste water from the increased production processes will increase to 10 ML per day or 70 ML per week.</p> <p>The treatment and management of wastewater from the site is therefore an issue that will need consideration as part of the Environmental Assessment.</p> <p>An assessment has been undertaken by BPO Environmental Success (BPO) to determine the capacity of the farm to accommodate the increase in treated effluent irrigation.</p> <p>BPO estimate that the proposed expansion will create additional 15-18% of load into the wastewater treatment plant with an average flow of 10,000 m³/d. Waste water</p>	<p>BPO provide the following recommendations to effectively manage operation at a higher loading:</p> <ul style="list-style-type: none"> Careful management of sludge inventory within the reactor at times of higher load will need to be undertaken so as to prevent solids carryover to the downstream membrane processes caused by an increased gas production The digester will require an increased alkalinity supplementation in order to maintain optimum operating conditions within the reactor during these periods. Process efficiencies within the factory should be assessed and reviewed in order to identify the main sources of hydraulic and organic load peaks. The peaks can then be effectively managed by additional telemetry. This will reduce 	Effluent Irrigation and Storage is addressed in Section 8.10 of this EA.

Table 7 (continued)

Issue	Relative Change in Environmental Impact	Additional Management or Mitigation Measures Required	Significance of Issue with this Modification Proposal
<i>Effluent Irrigation and Storage</i> <i>continued</i>	from the Shoalhaven plant are disposed of by irrigation onto the Environmental farm after treatment by the via an ADI-BDF reactor. BPO conclude: <i>"based on predicted average loading rates, the ADI-BVF® reactor will accommodate the increase in waste water volumes. During peak loads the reactor will require careful management to maintain optimum operating conditions for the biochemical reaction":</i>	the risk of overloading of the ADI-BVF® reactor.	
Wastewater Treatment	Water Discharges The Shoalhaven Starches Factory and Environmental Farm are licensed premises under the Protection of the Environment Operations Act. Wastewater discharges from the site are licensed by the DEC (EPL 883). 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. Under the terms of the Company's EPL water waste streams associated with the plant include: <ul style="list-style-type: none"> • river water passed through the boiler condensers and the primary side of the heat exchangers; • boiler water treatment plant regeneration waters; and • pH adjusted glucose plant ion exchange unit regeneration waters. All these must be discharged from the cooling water discharges.	No additional management or mitigation measures.	Not a key issue.

Table 7 (continued)

<i>Issue</i>	<i>Relative Change in Environmental Impact</i>	<i>Additional Management or Mitigation Measures Required</i>	<i>Significance of Issue with this Modification Proposal</i>
<i>Wastewater Treatment</i> <i>continued</i>	<p>The limiting conditions in relation to these discharges include:</p> <ul style="list-style-type: none"> • The volume of water discharged from the cooling water discharges must not exceed 100,000 kilolitres per day. • The waste waters discharged at both points shall not exceed a temperature of 32°C. • This Modification Proposal will not involve any changes to these discharges waters. 		

Following the above risk assessment of the potential environmental impacts of the proposed modification the key issues for assessment (and including that identified by the DGRs for this project) are:

- Preliminary hazard analysis;
- Noise impacts;
- Air quality (including odour) impacts;
- Visual impact;
- Traffic;
- Flood
- Site contamination;
- Acid sulphate soils.

8.0 KEY ISSUES

8.1 PRELIMINARY HAZARD ANALYSIS

This Modification Application is supported by a Preliminary Hazard Analysis prepared by Pinnacle Risk Management Pty Ltd ("Pinnacle"). A copy of this PHA forms **Annexure 4** to this EA. This section of the EA is based upon the findings of this assessment.

The risks associated with the proposed modifications have been assessed by Pinnacle Risk Management and compared against the DoP risk criteria.

The results are as follows and show compliance with all risk criteria.

Table 8
Assessment of Modifications against Risk Criteria

<i>Description</i>	<i>Risk Criteria</i>	<i>Risk Acceptable?</i>
Fatality risk to sensitive uses, including hospitals, schools, aged care	0.5×10^{-6} per year	Yes
Fatality risk to residential and hotels	1×10^{-6} per year	Yes
Fatality risk to commercial areas, including offices, retail centres, warehouses	5×10^{-6} per year	Yes
Fatality risk to sporting complexes and active open spaces	10×10^{-6} per year	Yes
Fatality risk to be contained within the boundary of an industrial site	50×10^{-6} per year	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	50×10^{-6} per year	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	10×10^{-6} per year	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	50×10^{-6} per year	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	50×10^{-6} per year	Yes

Pinnacle conclude that societal risk, area cumulative risk and environmental risk are acceptable.

The primary reasons for the low risk levels from the modifications according to Pinnacle are that significant levels of impact from potential hazardous events are contained on-site.

Pinnacle makes the following recommendation in relation to this modification proposal.

1. *For all explosion vents that vent directly to atmosphere for the modifications, finalise the explosion vent modelling when the design details are known.*
2. *Review the option for installing initial screening, e.g. a magnetic separator, at the new intake pit to lower the likelihood of foreign objects entering the new bucket elevator and the downstream existing silos.*
3. *Ensure that all the proposed explosion vents are directed to a safe location to avoid injury to personnel or propagation to other adjacent equipment.*
4. *It is recommended that the floor of the new switchroom be fire-rated given the risk of a fire in the existing switchroom below. This will also help prevent a fire in the new switchroom propagating to the existing switchroom below.*

8.2 NOISE IMPACTS

The area surrounding Shoalhaven Starches is a mix of commercial, industrial and residential premises with vacant land, owned by the Manildra Group, to the north.

The nearest residential locations to the complex are as follows:

- Location 1 – Nobblers Lane, Terara approximately 1400 metres to the south-east;
- Location 2 – Riverview Road, Nowra approximately 940 metres to the south-west;
- Location 3 – Meroo Street, Bomaderry approximately 620 metres to the north-west;
- Location 4 – Coomea Street, Bomaderry approximately 675 metres to the north-west.

The above locations are listed in the order shown in the Environmental Protection Licence (number 883) for the site.

This Modification Application is supported by a Noise Impact Assessment prepared by Harwood Acoustics (HA). A copy of the Noise Impact Assessment prepared by Harwood Acoustics forms **Annexure 5** to this EA. This section of the EA is based upon the findings of this assessment.

8.2.1 Acoustic Criteria

NSW Department of Planning and Environment

Existing Project Approval

Project Approval for Application No. 06_0228, provided by the Minister for Planning, dated January 2009, Schedule 2, Condition 2, 'Terms of Approval' states:

“The proponent shall carry out the project generally in accordance with the:

- a) EA and associated site plans (see Appendix 2);*
- b) Statement of commitments; and*
- c) Conditions of this 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.

Environment Protection Licence 883

Shoalhaven Starches operates under Environment Protection Licence 883 issued by the NSW Office of Environment and Heritage.

Section L5 ‘Noise Limits’ of this licence states:

“L5.1 the L_{A10} (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.

HA notes the EPA and Shoalhaven Starches are currently in the process of updating the Environment Protection Licence Noise Limits contained in Section L5 to better reflect the current Noise Policy for Industry assessment criteria, referred to within the 2018 Policy as the Project Noise Trigger Levels.

The noise descriptor will be amended from L10, 15 minute to an energy average Leq, 15 minute, otherwise the noise limit levels will remain the same.

At the request of the Department of Planning in its email dated 14 March 2018, the new Leq descriptor will be used in this assessment as the EPL will be updated shortly.

The Shoalhaven Starches complex, neighbouring properties and nearby residential locations are shown on the attached site plan in **Figure 8**.



**Figure 8: Location of closest receptors to subject site as per EPL
(Harwood Acoustics).**

Shoalhaven Starches Noise Management Plan

The Project Approval for the Shoalhaven Starches Expansion Project required the preparation of a Noise Management Plan to address and manage noise emissions 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 associated with the expansion project. Section 3 of the plan lists noise limits from the Environmental Protection Licence 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.”

Shoalhaven City Council

Shoalhaven City Council in its email dated 14 May 2018, states:-

“Environmental Health Comments/Requirements:

Compliance is required with the recommendations of the Noise Impact Assessment by Harwood Acoustics Pty Ltd (dated December 2017).”

The Noise Report dated December 2017 was provided for *Modification 14: The Use of the Former Paper Mill Site in Conjunction with Shoalhaven Starches Factory Operations*. This report refers to different modifications and a different section of the Shoalhaven Starches site. The recommendations in this report are therefore not be relevant to this modification proposal.

Council’s noise assessment requirements are addressed in the assessment prepared by HA which has been carried out in accordance with the Noise Policy for Industry 2017 methodology and assessed against the noise limits contained within EPL 883.

EPA Construction Noise Guideline

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 8.2.3 of this EA.

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 has 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 9** below.

Table 9
Rating Background Levels

Noise Measurement Location	Time Period	Rating Background Level
135 Terara Road, Terara March 2012	Day (7:00 am to 6:00 pm)	33 dBA
55 Terara Road, Nowra February 2015	Day (7:00 am to 6:00 pm)	36 dBA
Cambewarra Road, Bomaderry July 2010	Day (7:00 am to 6:00 pm)	40 dBA
Shoalhaven Village Caravan Park, Nowra March 2012	Day (7:00 am to 6:00 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 10** below.

Table 10
L_{eq} Noise Management Levels from Construction Activities

Receptor Location	Noise Management Level	How to Apply
Location 1 (Terara)	43 dBA (33 + 10)	<p>The noise affected level represents the point above which there may be some community reaction to noise.</p> <ul style="list-style-type: none"> 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 the noise affected level. 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 (Nowra)	50 dBA (40 + 10)	
Locations 3 & 4 (Bomaderry)	48 dBA (38 + 10)	
	Highly noise affected 75 dB(A)	<p>The highly noise affected level represents the point above which there may be strong community reaction to noise.</p> <ul style="list-style-type: none"> 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: <ol style="list-style-type: none"> times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences) if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

Project Specific Noise Criteria

When all the above factors are considered, Harwood Acoustics indicate the most relevant noise criteria for this Modification Proposal as follows:

Operational Phase (Environment Protection Licence noise limits less 10 dB):

- 28 dBA (L10, 15 minute) at locations in Terara on the south side of the Shoalhaven River;
- 28 dBA (L10, 15 minute) at locations in Nowra on the south side of the Shoalhaven River;
- 32 dBA (L10, 15 minute) at locations in Meroo Street, Bomaderry;
- 30 dBA (L10, 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.

8.2.2 Modification Proposal - Operational Noise Emission

Plant and Equipment Source Noise Levels

The main components of the modification proposal with respect to noise generation are in the concept design stage and manufacturer's sound data for individual items of plant and equipment are not yet known.

According to HA the main components of the proposal with respect to noise generation, are as follows:

- Product (Gluten) Dryer;
- Specialty Product Processing Facility;
- Co-generation Plant (coal fired Boiler No. 8);
- Associated Lime Silos;
- Ventilation Fans for Flour Mills "A, B & C"; and
- Grain Intake Additions.

HA has carried out several noise assessments at Shoalhaven Starches and they advise the majority of plant and equipment associated with this proposal is similar to existing plant and equipment on site.

Table 11 below provides a schedule of overall 'A' frequency weighted sound power levels, in decibels re: 1 pW, of noise sources associated with the proposed modification.

Table 11
L_{eq} Sound Power Levels – Plant and Equipment

Description	L_{eq}, 15 minute Sound Power Level (dBA)
External Plant and Equipment	
Screw Conveyor (Grain intake)	89
Paddle/Chain Conveyor (Grain intake)	86
Bucket Elevator Motor (Grain intake)	88
Baghouse Pulse (Gluten Dryer, Starch Dryer & Speciality Product Building)	100
Supply Air Fans (Flour Mills "A & B")	98
Exhaust Fans Flour Mill C	98-100
Lime Silo (Truck filling)	95
Silo Motors (Speciality Product Building)	82
Fermentation Transfer Pump (existing)	90-92
Molecular Sieve Compressor/ Pumps (existing)	90-92

Table 11 (continued)

<i>Description</i>	<i>L_{eq, 15 minute} Sound Power Level (dBA)</i>
Internal Plant and Equipment	
Turbine (generator set)	110
ID Fan (Gluten Dryer and Boiler No. 8)	94
OFA Fan (Gluten Dryer and Boiler No. 8)	83
SA Fan (Gluten Dryer and Boiler No. 8)	83
Centrifuge (Gluten Dryer)	88
Disintegrator (Gluten Dryer)	88
Small Motors Screw Conveyors (Specialty Product Building & Boiler No. 8)	87
Mixers (Specialty Product Building)	104
Dispersion Dryer (Specialty Product Building)	107
Hammer / Pin Mill (Specialty Product Building)	112
Blowers (Specialty Product Building)	100
Sieving Equipment / Sifters (Specialty Product Building & Sifter Room in Packing Plant)	94

As well as measurements taken of individual items of plant across the site over many years, HA has taken noise measurements inside the recently commissioned Starch Dryer No. 5 and existing Gluten Dryer No. 6. These measurements have also been used to assist in the noise modelling undertaken as the proposed Specialty Product Building and Product Dryer will be similar to these existing noise sources.

Within each of these existing buildings, some of the noisier items of plant, such as the hammer mill, ID Fan, etc have been installed within acoustic enclosures or separate rooms.

HA has advised that where required this will be the case in the proposed new buildings and noise control design will be finalised as part of the Design Noise Verification process prior to commencing construction.

According to HA there are additional components of the modification which are not considered to produce significant noise emission that will not appreciably increase overall noise generation from the Site at distant receptor locations.

These include:

- Conversion of existing Gluten Dryers 1 and 2 to Starch Dryers;
- Relocation of Boiler No. 7;

- Extension of the main substation;
- Construction of a switch room; and
- Relocation of the car park.

These noise sources are either existing and their relocation, with noise controls maintained, will not increase overall noise emission from the site; or they will not produce significant noise. Therefore, HA has given no further consideration to these components of the modification in the noise impact assessment.

Noise Level Predictions

Predicted Noise Levels

The predicted noise levels at each receptor are shown in **Table 12** below.

Table 12
Predicted Noise Levels at Receptor Locations

Description	Predicted Noise Level $L_{10, 15 \text{ minute}}$ (dBA) at Receptor Location			
	Location 1	Location 2	Location 3	Location 4
External Plant	< 20	23	22	22
Speciality Product Facility	< 20	23	29	27
Product (Gluten) Dryer	< 20	< 20	25	23
Sifter Room	< 20	< 20	< 20	< 20
Co-generation Plant	< 20	< 20	< 20	< 20
Combined	23	27	31	30
Design Noise Goal ($L_{10, 15 \text{ minute}}$)	28	28	32	30
Complies	Yes	Yes	Yes	Yes

The above calculations and predictions consider distance loss to each receptor as well as the following:

- Constructions of buildings as per recommendations made in Section 6.1 of the Noise Impact Assessment;
- Barrier attenuation from existing site structures for various items of plant and equipment;
- Sound levels and sound pressure levels based on indicative plant and equipment as detailed in Section 4.1 of the Noise Impact Assessment;
- Ground absorption to receptor R1 only.

8.2.3 Construction Noise Emission

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

Table 13 below shows a schedule of sound power levels for typical construction equipment.

Table 13
Construction Equipment – L_{eq} Sound Power Levels

<i>Description</i>	<i>L_{eq} Sound Power Level (dBA)</i>
Auger Piling (CFA Rig)	113
Mobile Crane (Diesel)	110
30 Tonne Excavator	110
Concrete Truck Pump	105
Dump Truck	110
Grinder	105
Power Saw	101

Table 14 below shows the predicted level of potential noise emission from construction activities at each of the receptor locations.

Table 14
Predicted Noise Levels at Receptor Locations – Construction Phase

<i>Description</i>	<i>Predicted Noise Level $L_{eq, 15 \text{ minute}}$ (dBA) at Receptor Locations</i>			
	<i>Location 1</i>	<i>Location 2</i>	<i>Location 3</i>	<i>Location 4</i>
Construction Activity*	37-41	41-45	48-52	46-50
Acceptable Noise Limit ($L_{eq, 15 \text{ minute}}$)	43	50	48	48
Complies	Yes	Yes	No + 4 dB (during piling)	No + 2 dB (during piling)

*Construction Activity Range provided with and without piling activity.

Predictions include an increase in truck movements during the construction phase. HA advise noise generated by the increase in construction worker personal vehicle movements will not be perceptible at the residential receptor locations.

8.2.4 Recommended Noise Controls

HA advise that as the majority of components of the modification are in the concept design stage noise controls are based on the assumed sound levels of typical plant and equipment as outlined in Section 4.1 of the Noise Assessment. A final design will be undertaken at the time of Design Noise Verification process or during construction and commissioning as required.

Recommendations are made within the Noise Impact Assessment to reduce the level of noise emission to within acceptable noise limits. These recommendations are outlined below:

New Industrial Building Construction

The following applies to the main industrial building housing the product dryer and specialty product processing facility

- *Walls*

The walls of the new industrial building (housing the specialty product processing facility and product dryer) should have a minimum weighted sound reduction index (R_w) 24. In this instance calculations are based on 'Kingspan' Architectural Wall Panelling system AWP 80.

- *Roof / Ceiling*

The roof and ceiling of the new industrial building should have a minimum weighted sound reduction index (R_w) 23. In this instance calculations are based on 'Kingspan' Architectural Roof Panelling system 'K-Dek (KS 1000 KD)'.

- *Ventilation Penetrations*

There should be no acoustically untreated penetrations in the walls or roof. Any doors to the building must remain closed at all times the plant is in operation. If natural ventilation is required, sections of the northern and eastern walls only may be fitted with acoustic louvres.

The required insertion loss of acoustic louvres will depend on the maximum surface area of louvered sections required to facilitate adequate ventilation.

As an example, based on a maximum 20 m² of louvered sections on each of the floors, other than the top floor, acoustic louvres should have minimum insertion losses shown in **Table 15** below:

Table 15
Example Acoustic Louvre Sound Transmission Loss

<i>Description</i>	<i>Minimum Insertion Loss (dB) at Octave Band Centre Frequencies (Hz)</i>							
	63	125	250	500	1k	2k	4k	8k
Acoustic Louvre (Based on Fantech SBL2 Louvre)	5	10	14	22	27	25	21	17

A larger area may result in a higher required insertion loss and consequently a deeper blade depth. HA advise a final assessment should be made prior to the issue of a Construction Certificate once the location and size of any openings for ventilation are finalised.

According to HA the level of attenuation required by the building structures is dependent on the level of internal noise emission from all plant and equipment combined.

The recommendations made above are based on internal noise level measurements made within the existing Starch Dryer No. 5 and Gluten Dryer No. 6. Once the details of all noise sources are finalised the required construction materials of the building can be finalised.

HA advise that through a combination of external building materials and internal acoustical treatment of individual items of plant, if and as required, the noise design goals can be achieved at each receptor location.

Sifter Room

HA states the proposed sifter room to be located at the existing packing plant building should be constructed using materials with a minimum weighted sound reduction index (R_w) 23, for example the same materials as recommended above.

Any openings in the sifter room should be restricted to the eastern or southern facades only and kept to a minimum. Depending on the need for openings to this room for ventilation, acoustic louvres may be required.

Alternatively the sifter room may be constructed from standard corrugated sheet steel (e.g. *Colorbond*) with a minimum R_w rating of 19 and the plant and equipment acoustically treated within the room so that the design noise goals are met at each receptor. According to HA Any acoustical treatment of this room will not be onerous to ensure the noise design goals are met.

Roof Mounted Fans

The roof mounted ventilation fans for the respective flour mills will each be fitted with a silencer. However, selections of silencer make and model have not been finalised at this stage.

HA advise the silencer should be designed and selected so that the level of noise emission from each fan does not exceed:

- 65 dBA when measured at a distance of 3 metres from the discharge end of the fan or silencer.

According to HA, this can easily be achieved through judicious selection of silencers and will be confirmed prior to construction, or during commissioning as required.

Boiler No. 8 and Co-generation Set

Co-generator Set:

The predicted noise levels in the Noise Impact Assessment assume the turbine used in the Co-generation plant, which will be housed in the generator set building, has a minimum sound power level of 110 dB.

Based on this assumption, HA recommends the generator set building should be constructed from materials with a minimum weighted sound reduction index R_w of 35.

For example:

- Proprietary wall panelling system such as *Kingspan* with an internal wall and ceiling lining of minimum 9 mm thick fibre cement sheet on steel frame or furring channel; or
- Aerated concrete panel (eg. Hebel power panel); or
- Any alternative with a minimum R_w 35.

Alternatively, HA suggests the turbine may be acoustically treated or enclosed within the building and the building constructed from a material with a minimum R_w 24.

HA advised compliance with the project specific noise goals can be achieved for the modification without onerous mitigation measures.

A final assessment will be undertaken at the time of Design Noise Verification process to determine the requirement for building elements, or acoustical treatment required to ensure the noise design goals are met.

Boiler No. 8

Based on the assumed noise generation of plant and equipment associated with Boiler No. 8, the noise sources should be acoustically treated or enclosed using materials with a minimum weighted sound reduction index R_w of 23 to meet the design noise goals at each receptor.

Rail Grain Intake

According to HA the predicted level of noise emission from noise generating plant and equipment associated with the rail grain intake expansion is within the design noise goals at each receptor without the need for additional noise controls.

Construction Noise

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

“During construction, the Proponent shall prepare and implement all reasonable and feasible measures to minimise the construction noise impacts of the project.”

It can be seen from **Table 14** that the construction noise management levels are likely to be met at each receptor location during general construction activity, with the exception of piling. During piling there is potential for the noise management levels to be exceeded on some occasions. HA advised that is not considered a significant exceedance during day time hours for short and sporadic duration.

However, HA notes a Construction Noise Management Plan may be provided in accordance with NSW EPA's Interim Construction Noise Guideline and to satisfy Condition 13 of the Project Approval.

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

Existing Pumps And Compressors

As part of the application for the Shoalhaven Starches Expansion Project (SSEP) approval, reference 06_0228, an Environmental Assessment Report (EAR) was prepared in 2008 by Cowman Stoddart Pty Ltd, for the proposed ethanol production upgrade including proposed odour reduction and waste water treatment measures for existing Shoalhaven Starches operations.

The EAR included a Statement of Commitments, the commitments contained within the EAR relating to noise were derived from an Acoustical Assessment, reference 38.3849.R52:ZJM, prepared by The Acoustic Group Pty Ltd in June 2008 (AA).

The recommended noise controls in the AA and EAR included, among others, reducing noise emission from the transfer pumps servicing the fermenters and the pumps and compressors servicing the molecular sieves.

Harwood Acoustics previously undertook an assessment of the need for these previously recommended noise controls in light of the location and operation of these particular items of plant amid the current facility. Reference 1802008E-L2, dated 20 February 2018. Full details of the assessment can be seen in that Report.

The Report concluded that the level of noise emission from the operation of these pumps as they currently operate is well below the noise limits set by Environment Protection Licence 883.

Consequently, HA advise there is no need to implement the previously recommended noise controls for these items of plant.

The Noise Impact Assessment prepared by Harwood Acoustics concludes:

“An assessment of the potential noise impact from the proposed construction and operation of modifications to MP06-0228, Shoalhaven Starches Expansion Project, Proposed New Specialty Processing Facility, New Gluten Dryer and other associated works at Shoalhaven Starches on Bolong Road, Bomaderry, NSW has been undertaken.

Calculations show that the level of noise emission from the modification to this approved proposal will be within the noise design goals derived from Environment Protection Licence 883 noise limits at each receptor location based on noise control recommendations made in Section 6 of this report.

A final assessment of required noise controls will be undertaken at the time of the Design Noise Verification process prior to construction, to ensure the noise design goals are met at all receptors.

The level of noise emission from the construction phase of the project will be within the noise management levels set by the NSW EPA's Interim Construction Noise Guideline with the exception of piling activity on some occasions.

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

8.3 AIR QUALITY (INCLUDING ODOUR IMPACTS)

This Modification Application is supported by an Air Quality Impact Assessment (AQIA) prepared by GHD. A copy of GHD's assessment forms **Annexure 6** to this EA. This section of the EA is based upon the findings of this assessment.

The SEARs for this Modification Proposal require an assessment of the associated off-site odour and air quality impacts. The AQIA prepared by GHD provides:

- A revised emissions inventory for odorous and non-odorous sources on site. A comparative analysis of the emissions inventory has been undertaken with the last major air quality assessment for the site (Modification 13).
- A level 2 air quality assessment of odour and air quality in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA 2016). Dispersion modelling was undertaken in CALPUFF v5.
- A comparison of predicted odour and air quality results against the EPA criteria and against the previous modification results.

8.3.1 Odour Assessment

8.3.1.1 Odour Concentration

Odour 'strength' or concentration is measured in odour units (OU), where 1 OU represents the concentration of a sample that can just be detected by 50% of people in a controlled situation where there is no background 'ambient' odour.

8.3.1.2 EPA Criterion for Odour

EPA has defined an odour criterion and the Odour Guideline specifies how it should be applied in dispersion modelling to assess the likelihood of nuisance impact arising from the emission of odour.

Table 16 details odour criterion for the assessment of odours:

Table 16
Odour Criterion for the Assessment of Odour

Population of Affected Community	Odour Performance Criteria (Nose Response odour certainty units at 99th percentile)
Single Residence ($\leq \sim 2$)	7
~ 10	6
~ 30	5
~ 125	4
~ 150	3
Urban (~ 2000)	2

GHD state the NSW Approved Methods specifies a criterion of two odour units at the 99th percentile over a short term averaging nose-response time of one second for a complex mixture of odorous air pollutants in an urban area (population greater than 2000 or with schools and hospitals). The criterion is applied at the location of the nearest sensitive receptor or likely future location of sensitive receptor.

According to GHD, 5 OU is commonly taken as a conservative measure of the odour level which can be distinguished against the ambient background level of odour, and which if offensive, could result in complaint. 1 OU generally cannot be detected in a non-laboratory situation (ie. where the ambient background odour levels reduce the detectability of a given odorant).

As the CALPUFF dispersion model (utilised in this assessment), when operating in micrometeorological mode can only predict concentrations over an averaging period of one hour, a ratio between the one second peak concentration and 60 minute average concentration has been applied by GHD to the source odour emission rates. In this manner, the predicted one hour odour levels predicted in CALPUFF represent the corresponding one second short-term levels required to be compared to the DEC criterion.

8.3.1.3 Source identification

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, GHD have modelled the identified sources of odour collectively as odour.

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

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

GHD note that a number of other minor odour sources contribute to the remainder of the plant's odour impact. These have been detailed in Appendix B of the AQIA Assessment.

8.3.1.4 Dispersion Modelling

Odour dispersion modelling was conducted by GHD using the US EPA regulatory Gaussian Puff Model CALPUFF Version 5.8. GHD advise this model is also a recognised

regulatory model in NSW. Where the modelling of odour dispersion is in complex terrain (as is the case at the Shoalhaven site), CALPUFF is recommended for use under NSW Guidelines. CALPUFF is especially suited for modelling light to calm wind conditions.

8.3.1.4 Predicted Odour Impacts

The predicted odour levels for the modification proposal as calculated by GHD, as well as the previous Modification 13 results are shown below in **Table 17**.

Table 17
Predicted Peak Odour Impact at Nearby receptors
(99th percentile, short term averaged)

<i>Receptor</i>	<i>Range (m)</i>	<i>Nearest Odour Source</i>	<i>Direction</i>	<i>2009 EPA approved base case Odour Criterion</i>	<i>Odour Impact (OU) 99th Percentile nose response time</i>	
					<i>Mod 13</i>	<i>Mod16</i>
R1 Bomaderry	150	Packing Plant	W	6	3.3	3.5
R2 North Nowra	1,300	Factory	SW	3	2.5	2.6
R3 Nowra	700	Factory	S	5	4	4.6
R4 Terara	1,300	Factory	SE	5	3.7	3.7

Table 17 shows the predicted odour levels show a slight (0.1 OU) increase at receptors R1 and R2 and a 0.6 OU increase at receptor R3. No increase is predicted at receptor R4. GHD advise the increase is attributed to the new sources in the southern part of the site and the addition of new buildings.

Despite these increases, according to GHD, the results show that the impact assessment odour criteria are achieved at all sensitive receptors.

8.3.2 Air Quality Assessment

In addition to odour emissions, the operation of the Shoalhaven Starches plant also has the potential to generate emissions of particulate matter and products of combustion. Potential non-odorous air quality impacts from the site include dust and products of combustion. GHD have assessed the following pollutants against the relevant criteria:

- Total suspended particles (TSP);
- Fine particulate matter less than 10 micron equivalent aerodynamic diameter PM₁₀;
- Fine particulate matter less than 2.5 micron equivalent aerodynamic diameter PM_{2.5}.

- Products of combustion including carbon monoxide, oxides of nitrogen (NO_x), sulfur dioxide (SO₂), hydrogen chloride (HCL), heavy metals (Type I & II), total volatile organic compounds (VOC), polycyclic aromatic hydrocarbons (PAHs) and hydrogen fluoride (HF).

GHD have sourced the air quality impact assessment criteria for these pollutants from the Approved Methods and the acceptable criterion is detailed in **Figure 9** below:

Pollutant	Averaging period	Criterion
Particulate Matter PM ₁₀	24 hours	50 µg/m ³
	Annual	30 µg/m ³
Particulate Matter PM _{2.5}	24 hours	25 µg/m ³
	Annual	8 µg/m ³
TSP	Annual	90 µg/m ³
	15 minutes	100 mg/m ³
Carbon monoxide (CO)	1 hour	30 mg/m ³
	8 hours	10 mg/m ³
Sulfur dioxide (SO ₂)	10 minutes	712 µg/m ³
	1 hour	570 µg/m ³
	24 hours	228 µg/m ³
Nitrogen dioxide (NO ₂)	1 hour	246 µg/m ³
	Annual	62 µg/m ³
Hydrogen fluoride (HF)	90 days	0.25 µg/m ³
	30 days	0.4 µg/m ³
	7 days	0.8 µg/m ³
	24 hours	1.5 µg/m ³
Hydrogen Chloride (HCL)	1 hour	0.14 mg/m ³
Polycyclic aromatic hydrocarbon (PAH)	1 hour	0.0004 mg/m ³
Type 1 metals		
Antimony	1 hour	0.009 mg/m ³
Arsenic	1 hour	0.00009 mg/m ³
Cadmium	1 hour	0.000018 mg/m ³
Lead	Annual	0.5 µg/m ³
Mercury	1 hour	0.0018 mg/m ³
Type 2 metals		
Beryllium	1 hour	0.000004 mg/m ³
Chromium	1 hour	0.00009 mg/m ³
Manganese	1 hour	0.018 mg/ m ³
Nickel	1 hour	0.00018 mg/ m ³

Figure 9: Air Quality Impact Assessment Criteria – Other Pollutants.

8.3.2.1 Emissions inventory

The baseline air quality model includes all existing and proposed odour sources at the Shoalhaven Starches plant up to Modification 13. The sources associated with these modifications have been discussed in the most recent cumulative air quality assessment undertaken in 2017 (*Shoalhaven Starches Mod 13 Air Quality Assessment Updated Cumulative Air Quality Assessment*, GHD 2017).

Figure 10 below provides the emissions inventory for particulate matter. Pollutants from combustion in the site boilers and turbines are presented in **Figure 11**.

Discharge Point	Emission Control	TSP, g/s	PM ₁₀ , g/s
Boiler No. 1	Gas-fired	0.027	0.027
Boiler No. 2	Cyclone and fabric filter	0.03	0.03
Boiler No. 4	Cyclone and fabric filter	0.05	0.06
Boiler No. 5/6	Cyclone & Fabric filter	0.23	0.24
Gluten dryer No. 1	Fabric filter	0.015	0.0003
Gluten dryer No. 2	Fabric filter	0.015	0.001
Gluten dryer No. 3	Fabric filter	0.02	0.02
Gluten dryer No. 4	Fabric filter	0.02	0.02
Starch dryer No. 1	Wet-scrubber	0.59	0.18
Starch dryer No. 3	Wet-scrubber	0.04	0.013
Starch dryer No. 4	Wet-scrubber	1.2	0.31
Starch dryer No. 5	Cyclone	0.39	0.12
Spray dryer	Fabric filter	0.48	0.14
Flour Mill	Fabric filter	0.03	0.009
DDG Pellet Plant	Fabric Filter	0.25	0.25
Packing Plant (proposed)	Fabric Filter	0.016	0.016
Flour Mill B	Fabric Filter	0.004	0.004
Flour Mill C (proposed)	Fabric Filter	0.001	0.001
Gluten dryer No. 6	Fabric filter	0.02	0.02
Gluten grinder	Fabric filter	0.02	0.02
Co-generator turbine No. 1 (proposed)	Gas-fired	0.1	0.1
Co-generator turbine No. 2 (proposed)	Gas-fired	0.1	0.1
Boiler No. 8 (including co-gen turbine)	Cyclone & Fabric filter	0.16	0.16
New gluten dryer	Fabric Filter	0.02	0.02
Silos associated with speciality products building	Fabric Filter	0.051	0.051

Figure 10: Emission Inventory – Particulate matter (Source GHD).

Discharge Point	Boiler No. 1	Boiler No. 2	Boiler No. 4	Boiler No. 5/6	Boiler No. 8	GD6	GD7	SD5	Turbine No. 1 & 2
Status	Existing	Existing	Existing	Existing	Proposed	Existing	Existing	Existing	Proposed
Fuel type	Natural gas	Coal	Coal	Coal	Coal	Natural gas	Natural gas	Natural gas	Natural gas
Stack height (m)	25	39	39	54	39	35	29	33.5	30
Exhaust temp. (°C)	180	138	138	150	150	73	68	56	160
Stack diameter (m)	0.9	0.63	1.16	2.05	0.65	1.7	1.7	2.4	0.5
Exhaust velocity (m/s)	25	19.9	5.8	16.8	16.8	18.9	22.4	15	25
Oxygen (%)	ND	ND	ND	8.7	ND	ND	ND	ND	ND
Moisture (%)	ND	ND	ND	5.2	ND	ND	ND	ND	ND
Exhaust Flow rate (Nm³/s)	ND	4.5	8.4	27.9	ND	ND	ND	ND	ND
Emission rates (g/s)									
Carbon monoxide	8.78E-02	2.95E-01	5.71E-01	2.42E+00	1.65E+00	2.99E-01	2.27E-01	1.62E-01	0.3
Sulfur dioxide	4.03E-03	2.46E+00	4.76E+00	2.02E+01	1.38E+01	4.48E-03	3.40E-03	2.42E-03	0.012
Oxides of nitrogen	6.21E-01	1.84E+00	3.56E+00	1.51E+01	1.03E+01	7.02E-01	5.33E-01	3.80E-01	2.0
Total VOC	2.01E-02	1.80E-02	3.49E-02	1.48E-01	1.01E-01	ND	ND	ND	0.0042
Heavy metals (type 1)	7.52E-06	1.87E-04	3.61E-04	1.53E-03	1.05E-03	ND	ND	ND	ND
Heavy metals (type 2)	1.45E-05	2.34E-04	4.52E-04	1.92E-03	1.31E-03	ND	ND	ND	ND
HCL	-	2.92E-02	5.65E-02	2.40E-01	1.64E-01	ND	ND	ND	ND
PAH	2.33E-06	9.77E-06	1.89E-05	8.01E-05	5.47E-05	ND	ND	ND	4.4E-05
FL	-	7.72E-02	1.49E-01	6.33E-01	4.32E-02	ND	ND	ND	ND

Figure 11: Emission inventory – Products of Combustion (Source GHD).

8.3.2.2 Dispersion modelling

The air quality dispersion modelling was conducted by GHD using the US EPA regulatory Gaussian puff model CALPUFF Version 5.8.

8.3.2.3 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 PM₁₀ impacts are significant. GHD advise the PM_{2.5} emissions from some sources on site are not known, however guidance is available for estimates of PM_{2.5} from boilers in the NPI. NPI emission factors for coal boilers with a baghouse states that PM_{2.5} emissions are half of PM₁₀ emissions and the ratio of PM_{2.5} to PM₁₀ in gas fired boilers is the same.

A summary of the maximum incremental predicted levels at each receptor site is presented in **Table 18**. The worst case predicted incremental PM₁₀ level is at R1 with a level of 8.8 µg/m³.

Table 18
Maximum Predicted Ground Level PM10, PM2.5 and TSP Concentrations

Pollutant	Averaging Period	Criteria µg/m ³	Predicted Incremental Ground Level Concentration (µg/m ³)			
			Bomaderry (R1)	North Nowra (R2)	Nowra (R3)	Terara (R4)
PM ₁₀	24 Hour	50	8.8	4.8	7.7	6.6
PM ₁₀	Annual	25	0.9	0.5	0.8	1.2
PM _{2.5}	24 Hour	25	4.4	2.4	3.8	4.4
PM _{2.5}	Annual	8	0.4	0.2	0.4	0.4
TSP	Annual	90	1.8	0.9	1.6	2.3

In accordance with the Approved Methods a contemporaneous assessment has been undertaken by GHD for the year 2004. Predicted 24 hour PM_{2.5} and PM₁₀ values from the site in 2004 have been added to the 24 hour measured values at Wollongong for every day in the year. According to GHD, the results show full compliance with the PM_{2.5} and PM₁₀ 24 hour criteria.

8.3.2.4 Products of Combustion

The primary pollutants in coal and gas fired boiler emissions are oxides of nitrogen (NO_x), formed by the high temperatures in the combustors, sulfur dioxide (SO₂), formed from the

sulfur content of the fuel, VOCs, hydrogen chloride, polycyclic aromatic hydrocarbons (PAH), carbon monoxide (CO) and hydrogen fluoride (HF) all formed by incomplete combustion of the fuel.

GHD have assessed all pollutants against their 'worst case' 1 hour criteria from the Approved Methods as these were found to be closest to the criteria in the previous air quality assessments.

GHD found predicted levels for SO₂, carbon monoxide, hydrogen fluoride and hydrogen chloride comply with the criteria.

The predicted levels for nitrogen dioxide exceed the criteria at sensitive receptor R3. However GHD note, the predicted levels assume that 100% of NO will be converted to NO₂ as per Method 1 (Section 8.1.1) of the Approved Methods. GHD advise this is considered extremely conservative as in reality, only a fraction of the NO will be converted to NO₂.

Therefore, GHD have undertaken a more detailed assessment for all receptors using Method 2 (Section 8.2.2) of the Approved Methods. Method 2 is based on NO reacting with ozone in the atmosphere to form NO₂. Background ozone data was sourced from Kembla Grange for the year 2004. Under this method the NO₂ levels are predicted to comply with the criteria at all sensitive receptors.

VOCs

The maximum predicted (99.9 percentile, 1-hour average) ground level aggregate VOC concentration, at and beyond the factory site boundary, was 0.0058 mg/m³, which is lower than the respective EPA principal toxic air pollutant criteria for all the VOC compounds.

The maximum predicted (99.9 percentile, 1-hour average) ground level total VOC, at the most exposed sensitive receptor (R3), was 0.0018 mg/m³, which is lower than the respective EPA principal toxic air pollutant criteria for all the VOC compounds.

PAH

The maximum predicted (99.9 percentile, 1-hour average) ground level total PAH concentration, at and beyond the factory site boundary, was 0.0000028 mg/m³, which is lower than the EPA PAH criterion of 0.0004 mg/m³. The maximum predicted (99.9 percentile, 1-hour average) ground level total PAH, at the most exposed sensitive receptor (R3), was 0.00000093 mg/m³, which is 0.2% of the criterion.

Type 1 Metals

The maximum predicted (99.9 percentile, 1-hour average) ground level heavy metal type 1 concentration, at the most exposed sensitive receptor (R3), was 0.0000177 mg/m³ which is lower than the respective air quality criteria for all constituents.

The EPA criteria also require consideration of the maximum predicted ground level concentration at and beyond the site boundary of the factory.

The maximum predicted level of type 1 metals at the site boundary is 0.000054 mg/m³ which is also below the worst case criteria for all constituents, except for cadmium. The maximum predicted (99.9 percentile, 1-hour average) ground level cadmium concentration at the site boundary is 0.0000012 mg/m³, which complies with the criterion.

Type 2 metals

The maximum predicted (99.9 percentile, 1-hour average) ground level heavy metal type 2 concentration, at the most exposed receptor (R3), was 0.000022 mg/m³, which is lower than the respective air quality criteria for all constituents, except for beryllium at 0.000004 mg/m³. The maximum predicted (99.9 percentile, 1-hour average) ground level beryllium concentration at the most exposed sensitive receptor (R3) was 2.36E-07 mg/m³, which complies with the criterion.

The maximum predicted type 2 metals level at the site boundary is 0.000067 mg/m³ which is also below the worst case criteria except for beryllium. The maximum predicted (99.9 percentile, 1-hour average) ground level beryllium concentration at the site boundary is 0.0000007 mg/m³, which exceeds the criteria at the site boundary.

The AQIA prepared 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 proposed changes include undertaking modifications to the flour mill B building, construction of a new industrial building, addition of a new boiler and gluten dryer, relocation of the existing boiler no. 7 and changes to existing dryers.

A marginal increase was observed in predicted odour impacts as a result of the modification. The odour criteria is met at all sensitive receptors and it is considered highly unlikely that the increase in odour would be detected at sensitive receptors.

Air quality impacts are predicted to comply with the criteria at all sensitive receptors. Manildra have implemented reasonable and feasible mitigation measures on site to reduce the potential air quality impacts from the new boiler.

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

8.4 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. The Modification Application is supported by a Flood Compliance Report prepared by WMA Water ("WMA") (**Annexure 7**). This section of the EA is based upon the findings of this assessment.

The construction of any works on the floodplain will cause a loss of temporary floodplain storage and a loss of hydraulic conveyance. The resulting increase in flood levels depends upon the magnitude of these losses. According to WMA as parts of the proposed plant are on piers and/or raised above the 1% AEP flood level and the floodplain storage area of the Shoalhaven River floodplain is of the order of 100 km², the loss of temporary floodplain storage due to the proposed works is too small to be evaluated.

WMA indicate the main issue from a flooding perspective is therefore the construction of plant as it will impede flow from the Shoalhaven River crossing the site to enter the northern floodplain (ie. reduce the hydraulic conveyance through the site and potentially raise flood levels elsewhere). The loss of hydraulic conveyance depends on the extent of the restriction to a flow path caused by the works.

Prior to construction of the Shoalhaven Starches plant there would have been significant flow through the site during a flood, as there is across any river bank. However, since approximately 1960 the ongoing construction of the plant has effectively blocked the flow path through the site. This issue has been investigated in WMA's October 2000 report titled "*Further Development within the Manildra Starches Plant off Bolong Road, Bomaderry - Hydraulic Assessment*". In summary an agreement was reached at that time that any future development within the intensively built-up area, as indicated on the **Figure 12** below (taken from that report), would not require hydraulic modelling to quantify the hydraulic impacts and cumulative effects.

WMA have therefore separated flood impact assessment of the proposed plant the following two categories according to their site locations.

1. Proposed Plant within the intensively built up area as detailed within the red dotted line in **Figure 12**:
 - a) pipeline from product dryer bag house;
 - b) relocation of No. 7 boiler;
 - c) main substation extension;
 - d) No. 8 boiler and generator set;

- e) lime silos;
 - f) flour mill C and flour mill A, B and C ventilation;
 - g) modification to rail unloading.
- Proposed plant outside the intensively built up area a
- a) product dryer, specialty product building and pro
 - b) sifter room;
 - c) indoor electrical sub-station;
 - d) relocation of 26 car parking spaces.



Figure 12: Extent of intensely built up Area within Shoalhaven Starches Site.

Compliance with Chapter G9: Development on Flood Prone Land (DCP 2014)

WMA have provided an assessment of the proposed modifications against the relevant, performance criteria of Section 5.1 of Chapter G9 of the Shoalhaven Development Control Plan.

Sections 5.2 and 5.3 has not been addressed in the Flood Compliance Report as the works do not involve fill, or subdivision of lands. Assessment against the provisions of Section 5.1 of Chapter G9 is outlined in the **Table 19** below.

Table 19
Performance Criteria - General (Section 5.1 of DCP)

Performance Criteria	Response
<i>P1: Development or work on flood prone land will meet the following:</i>	
<i>The development will not increase the risk to life or safety of persons during a flood event on the development site and adjoining land.</i>	Up to 5 additional workers from will be on the site at any one time as a result of the proposed works. Thus the proposed development will increase the number of workers from Shoalhaven Starches who may be subject to flood risk. Shoalhaven Starches already has a Flood Plan to ensure safety of personnel, to minimise flood damages and to assist with recovery. This plan will be updated to ensure that it accounts for the additional workers and new plant on the site.
<i>The development or work will not unduly restrict the flow behaviour of floodwaters</i>	Refer Hydraulic Impact Assessment below
<i>The development or work will not unduly increase the level or flow of floodwaters or stormwater runoff on land in the vicinity. 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.</i>	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.
<i>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.</i>	A separate structural report will be provided.
<i>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.</i>	A separate structural report on the potential failure of existing buildings and stored equipment and product will be provided.
<i>Potential damage due to inundation of proposed buildings and structures is minimised.</i>	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.
<i>The development will not obstruct escape routes for both people and stock in the event of a flood.</i>	The proposed works will not occupy escape routes or cause workers to become trapped
<i>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.</i>	Refer Hydraulic Impact Assessment below.
<i>The development will not adversely affect the integrity of floodplains and floodways, including riparian vegetation, fluvial geomorphologic environmental processes and water quality.</i>	The works will be constructed on land that is partly designated as high hazard floodway in the 1% AEP event (from flood certificate provided by Council). 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.

Hydraulic Assessment

As noted above a large number of the proposed works are within the agreed upon *intensively built up area*. As such the loss of flow conveyance due to construction of the works in this area will be minimal as the existing access corridors (which become flow paths during a flood) through the site will always remain. For this reason, no hydraulic impact assessment has been undertaken for the works described as within the *intensively built up area*.

Of the four work items located outside the agreed upon *intensively built up area* item d) the relocation of 26 car parking spaces, will involve no buildings, minimal earth works, and all cars will be removed prior overtopping of the river bank. Thus, WMA assert the hydraulic impact of this work is nil.

Hydraulic modelling of items a), b) and c) has been undertaken by WMA as described below.

As items b) sifter room and c) indoor electrical sub-station are relatively small and generally "shielded" by existing plant to the south (the generally direction of flow from the Shoalhaven River is from south to north) WMA have determined the impacts of these structures to be small. However, WMA notes item a) product dryer, specialty product building and product dryer bag house is much larger and restricts an existing flow path through the site.

The hydraulic effects (change in flood levels, flows or velocities) of the remaining three modifications that are located outside of the identified *intensively built up area* – item a) product dryer, specialty product building and product dryer bag house, item b) sifter room and item c) indoor electrical sub-station, were analysed by WMA using the TUFLOW hydraulic model established for the Shoalhaven Starches 2013 *Shoalhaven River Flood Study*. This model was calibrated to match the historical flood level data for the 1974, 1975, 1978 and 1988 floods and used to provide updated design flood levels for the Shoalhaven River downstream of Nowra.

The modelling process compares the peak flood levels in each grid cell for the *Existing* and *Proposed* scenarios. The *Existing* scenario represents the existing floodplain including all proposed but un-built approved Shoalhaven Starches structures. The *Proposed* scenario reflects the existing floodplain but including the proposed plant [items a), b) and c)] as described above.

The comparison between the *Existing* and *Proposed* scenarios is termed a flood impact map. More frequent events, smaller than the 1% AEP, have not been modelled for the Flood Compliance Report as WMA advise the northern river bank of the Shoalhaven River is not overtopped to any significant extent until an event larger than the 5% AEP.

Thus, in these small more frequent events there would be nil impact on peak flood levels of the proposed works. WMA indicated that larger events than the 1% AEP will occur, but these events are obviously extremely rare and are not used for flood related planning determinations by Councils except when their failure has potential catastrophic consequences (such as dam failure).

Flood impact maps for the 1% AEP, 0.5% AEP and PMF / Extreme events are provided within the Flood Compliance Report. WMA state the proposed works slightly decrease the amount of floodwaters from entering the northern floodplain across the river bank. Thus, immediately upstream and to the east of the proposed works there is an increase in peak level in the 1% and 0.5% AEP events but minimal impact in the PMF / Extreme event. WMA note however the increase in level in the 1% and 0.5% AEP events is largely within the confines of land owned by Shoalhaven Starches.

Downstream of the proposed works on Bolong Road there is a reduction in peak level of less than 0.1m. This occurs because the proposed works reduce slightly the amount of flood waters crossing through the site and thus flood levels are slightly lowered.

8.5 VISUAL IMPACTS

The Scenic Character and Environment

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 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 nature.

The most relevant vantage points from where the overall factory site is visible 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.

Burruga (Pig) Island – Burruga 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 both 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.

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 Burruga (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.

Visual Impact of Proposal

This modification proposal involves a number of individual components which are located in different locations around the Shoalhaven factory Site. Most of the proposed modifications are located within the main Shoalhaven Factory site.

These modifications include:

- Relocation of No.7 boiler. The relocated Boiler No. 7 will be housed within an extension to the existing boiler complex and comprise a footprint of dimensions of 14 m by 8 m, and area of 112 m². The relocation of Boiler 7 will also include a stack with a height above ground level of 26.8 m, which is equivalent to the existing stack height;
- Main substation extension. This addition will increase the overall height to a maximum height of 12.5 m and will increase the footprint of the existing substation. The proposed extended building will have dimensions of 15 m x 7 m and a footprint of 105 m²;
- No. 8 boiler and the Co-generation plant. The new Co-generation plant building will have dimensions of 17m by 7.2 m, comprising a footprint of 122.4 m²; and will have a height above ground level of 13 metres. The building containing Boiler No. 8 will have a height of 17 m and dimensions of 21 m x 14.5 m with a proposed footprint of 304.5 m². Boiler No. 8 will have a stack of 40 m in height. This is consistent with the existing stack height of the boiler house which is located to the immediate north east of the proposed Boiler No. 1;
- Lime silos. Two lime silos will be constructed to the immediate south of the boiler house. The silos will have a footprint of 10 m x 9 m and will have an overall height of 25 m;
- Flour Mill C & Flour Mill A, B & C ventilation. The proposal includes the installation of a third flour mill on-site, Flour Mill “C” within the existing Flour Mill “B” building. The installation of the pressurisation ventilation system for the existing flour mills will require housing to be attached to the eastern elevation of Flour Mill “A”, and the northern elevation of Flour Mill “B”. The housing on Flour Mill “A” will have a height above ground level of 35.25 m; while the housing on top of the roof of Flour Mill “B” will have a height above ground level of 39.6 metres;
- Modification to rail unloading. To enable the removal of the grain from the intake pit and to distribute it to the relevant silos new unloading infrastructure will be required in the form of a new bucket elevator and associated conveyors and chutes. The proposed bucket elevator will have an overall height of 43.3 m;
- Specialty Product Building. The new building will have a height that will match the recently constructed product dryer building with a height of up to 26.3 m and a footprint

with an area of 817 m². The silos will have maximum heights above ground level of up to 33.5 m. Roofing over the silos on the northern elevation will have a maximum height of 35 m;

- Product dryer. The new Gluten Dryer (No. 8) will be housed within the proposed new building that will adjoin the Specialty Product building described below and will be sited between this new building and the remaining “Moorhouse” maintenance building;
- Product dryer bag house. This bag house will be housed within a proposed extension to the recently completed Starch Dryer No. 5 building. This extension will be located on the northern side of the existing Starches Dryer building and will have a height above ground level of 36 m; and
- Sifter room. It is proposed to install a large sifter in the feed stream to the existing starch packer. The roof in the vicinity of the sifter will have a maximum height of 15 m.

The proposed new indoor electrical sub-station and associated relocation of 26 car parking spaces are located on the northern side of Bolong Road adjacent to the Manildra Gas facility. The proposed indoor electrical substation will have dimensions of 26.2 m x 12 m with a proposed footprint of 314.4 m². This building, which will have an overall height of 7 m and will be set back 8 metres from the northern side of Bolong Road. This will be screened from Bolong Road frontage by landscaping.

The proposed works associated with this modification reflect a character and scale that is consistent with the existing structures at Shoalhaven Starches and the site in general. The visual impact of these works from the identified vantage points (refer **Figure 13**) is described as follows:

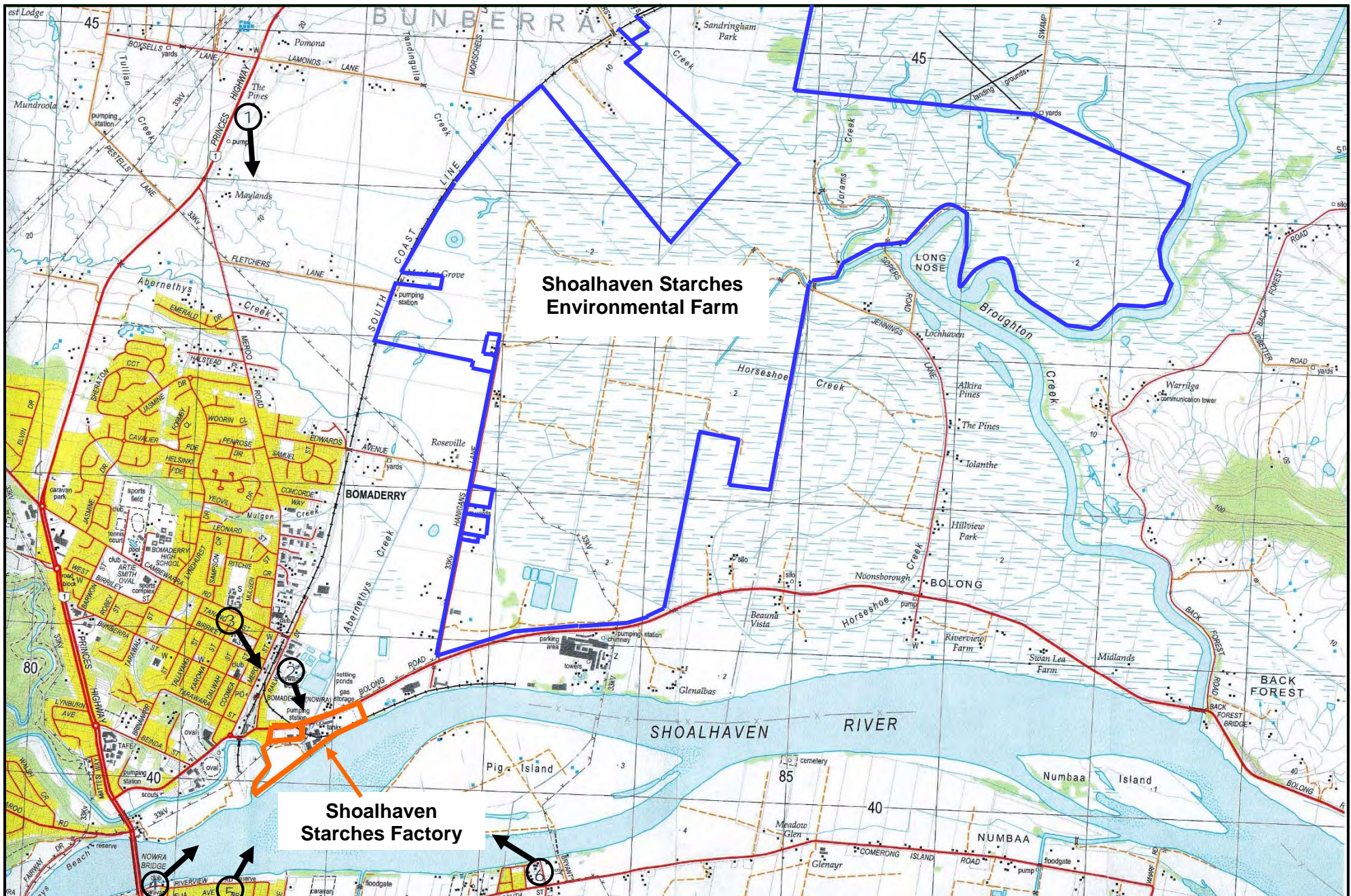


Figure 13: Vantage Points for Plates.

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 1**). 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 developments associated with this modification will not adversely impact on views from these vantage points.



Plate 1: View of Shoalhaven Starches Factory from Princes Highway (within vicinity of Boxsells Lane). Factory stack barely visible from this vantage point.

Bolong Road

The existing factory site is clearly visible from Bolong Road by vehicles approaching from the east, and along the frontage of the site refer (**Plate 2**).

Works associated with this modification will mainly involve structures of a similar bulk and scale as existing structures within this part of the site.



Plate 2: View of Shoalhaven Starches factory site
(and boiler house location) from Bolong Road.

Note: The location of the new Co-generation plant, lime silos and Boiler No. 8
are shielded from view by existing development such as in this case
the Interim Packing Plant and Dryer No. 5 building.

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 3**).

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. Although the new stacks and other structures such as the bucket elevator will be visible from this vantage point this view will be in context of existing similar types of structures.



Plate 3: View of Shoalhaven Starches factory site from corner of Meroo Road 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 4**).



Plate 4: View of Shoalhaven Starches factory site from Nowra Bridge over the Shoalhaven River.

The site is largely obscured by riverside vegetation. The existing and proposed stacks associated with the boilers are and will protrude above the canopy of the vegetation along the river, as does the existing flour mill, the existing boiler house and other starch plant. Although it is likely some of the proposed works will intrude into the existing skyline, it will not be out of context in terms of the existing factory development when viewed from this vantage point.

Riverview Road

The main vantage point from where the proposed works could be visible will be from residences along Riverview Road directly south of the site (refer **Plate 5**). This view is from a distance of about 750 metres. Riverside vegetation along both the northern and southern banks of the river softens much of the site from view. The proposed works are generally situated within context of the existing structures at the Shoalhaven Starches factory site. The proposed works will therefore not be out of context with existing development that will be visible from this vantage point.



Plate 5: 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 6**.



Plate 6: View of Shoalhaven Starches factory site from village of Terara.

The existing boiler stack is clearly visible from this vantage point. From this vantage point the proposed modifications will be viewed as part of the existing factory complex and will be viewed within this context.

Cambewarra Lookout

Cambewarra Lookout is situated about 7 km to the northwest 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. Screening vegetation is also proposed along the northern side of Bolong Road in the vicinity of the proposed new indoor electrical substation.

8.6 TRAFFIC AND PARKING

This Modification Application is supported by a Traffic Impact Assessment prepared by Bitzios Consulting (Bitzios). In undertaking their assessment Bitzios has referenced previous assessments that have been undertaken in relation to the Shoalhaven Starches site. This assessment has reviewed the potential construction and operational aspects of the proposal. A copy of Bitzios' report forms **Annexure 8** to this EA. This section of the EA is based upon and provides a summary of the main findings of this assessment.

8.6.1 Site Access

Bitzios advise the Shoalhaven Starches factory and supporting facilities are accessed via several points from Bolong Road. Bitzios note heavy rail access is also available to the site via the private rail spur line which extends from Bomaderry Train Station. **Figure 14** below shows the locations of the accesses to the site.



Figure 14: Site access locations (Bitzios).

The Modification Proposal will not alter the method or location of delivery/removal of resources, products or waste from/to the Shoalhaven Starches site according to Bitzios. Any additional heavy vehicles accessing the site due to this proposed modification will use existing access points approved for use by each relevant vehicle type.

Bitzios note that some additional heavy vehicles may be temporarily required to access the site due to construction works. While it is expected that existing access locations would be sufficient to accommodate all construction traffic it is recommended by Bitzios that a Construction Traffic Management Plan (CTMP) be prepared to managed construction traffic operations.

Parking

Permanent Staff Parking

In accordance with the staffing levels provided in the “Shoalhaven Starches, Bomaderry Access & Parking Assessment” (SSBAPA) prepared by Anton Reisch Consulting (ARC) dated April 2017, 311 staff are employed across the Shoalhaven Starches site. However, Bitzios note that as the factory operates 24 hours a day with varying time shifts there are typically a maximum of 157 employees on-site between the hours of 8.00 am and 2.00 pm. Shoalhaven Starches have advised that this number can increase to 185 employees for short periods when new infrastructure comes on line. In addition, Shoalhaven Starches have indicated that an additional 30 contract staff can also be on site at any one time. As such permanent parking provision for 215 staff is required.

The SSBAPA indicated permanent parking provision must accommodate one parking space for each of the Shoalhaven Starches employees and contract staff as access to the site by alternate transport is limited.

The Proposed Modification will result in the employment of five (5) additional permanent personnel on site at any-one time. As such permanent parking spaces for 220 staff are required.

Construction Staff Parking

Shoalhaven Starches advised that construction works for the previously approved packing plan may occur simultaneously as the construction works required for Modification 16. Bitzios note that in accordance with the *Shoalhaven Starches Packing Plant Construction Traffic Management Plan* prepared by ARC in May 2016, a temporary car park is to be constructed on the packing plant site with access to Railway Street. Bitzios advise that as such construction vehicles for works other than Modification 16 will not have any impact on existing starches parking.

The car parking requirement for construction workers involved in this modification is to be calculated on the maximum number of construction workers on site due to the proposed works. Although a total of 160 construction staff will be employed to undertake the proposed modifications the number of construction staff on-site will change each month

as different works are completed over a 12 month period. The total number of staff on site varies each month from 30 construction staff to 80 construction staff. The maximum number of 80 construction staff on site will only occur in three months of the 12 month construction period. This is shown below in **Figure 15** which details the Construction Manpower required for Modification16. This information was provided from Shoalhaven Starches.

	Construction Manpower	Construction Duration (month)	1	2	3	4	5	6	7	8	9	10	11	12
Flour Mill Ventillation	5	1	5											
Flour Mill C	30	4									30	30	30	30
GD 1&2 to Starch	5	1										5		
GD8	30	6				30	30	30	30	30	30			
Modified Starch	20	6	20	20	20	20	20	20						
SD5 Baghouse	10	2	10	10										
Boiler & Cogen	30	6			30	30	30	30	30	30				
HV Substation	10	3	10	10	10									
Grain Rail Intake	10	3	10	10	10									
Sifter Room	5	1									5			
Hydrated Lime	5	2	5	5										
	160		60	55	70	80	80	80	60	60	65	35	30	30

Figure 15: Construction Manpower Timeline (Shoalhaven Starches).

Bitzios indicate that in accordance with Section 1.3.3 of the SSBAPA, the rate of 0.6 parking spaces per each construction employee should be used as the calculation for the formal parking demand for construction employees.

The justification for using included the following:

- *It is unlikely that all personnel for all construction works taking place simultaneously will be on-site at the same time;*
- *It is expected that some vehicles for construction works would park in informal locations near the works locations; and*
- *A small amount of carpooling by construction workers is expected*

Therefore, the required number of carparking space for Construction staff is 48 spaces:
80 construction staff x 0.6 = 48 spaces

Table 20 below outlines the required and existing car parking provision for the Shoalhaven Starches site.

Table 20
Car Parking Demand and Provision

<i>Car Parking Type</i>	<i>Existing Demand</i>	<i>Modification 16 Staff</i>	<i>Parking Rate</i>	<i>Total Demand</i>	<i>Provision</i>	<i>Excess Shortfall</i>
Permanent	215	5	1 per staff	220	280	+60
Construction		80	0.6 per staff	48	100	+52
Total	215	85		268	380	+112

As shown in **Table 20** the existing parking provision on site at Shoalhaven Starches exceeds the parking demands for both permanent and temporary construction staff. The existing car parking is therefore sufficient to cater for both the existing permanent and temporary car parking demands and those generated as a result of Modification 16.

Traffic Generation

Permanent Traffic Generation

According to Bitzios the majority of product associated with this modification is transported by rail and as such the expanded operations are not expected to generate significant additional permanent heavy vehicle traffic.

The proposed coal fired, co-generation plant will result in additional heavy vehicles transporting coal, fly ash and hydrated lime entering and exiting the site via the western access (Gate 13). The conversion of the Gluten Dryers 1 and 2 to starch is also expected to occasionally result in a small number of heavy vehicle movements transporting the product to storage. The additional heavy vehicle movements generated from the proposed modification is outlined **Table 21** below:

Table 21
Additional Heavy Vehicle Trips due to Modification 16

<i>Material/Product</i>	<i>Additional Weekly Heavy Vehicles</i>	<i>Additional Daily Heavy Vehicles</i>	<i>Additional Heavy Vehicle Trips</i>
Coal	34	5	10
Fly Ash	9	2	4
Hydrated Lime	2	1	2
Starch	–	5	10
Total		13	26

As shown above in **Table 21** the proposed modification is expected to generate up to 13 additional heavy vehicle accessing the site per day or a total of 26 heavy vehicle trips per day. Bitzios have assumed that approximately 10% of the daily trips occur during peak

hours. As such it is expected this Modification will generate a maximum of 3 additional heavy vehicle trips during peak hours.

Shoalhaven Starches have advised that it is expected the proposed modifications will result in an additional five (5) permanent staff members on the site simultaneously. Assuming staff arrive and leave in the peak hours this will result in the generation of an additional five (5) light vehicle trips during peak hours.

Given the above Bitzios state it is not expected that the permanent traffic generated by the proposed modification will have any adverse impacts on the surrounding road network.

Construction Traffic Generation

Although Shoalhaven Starches have advised that a total of 160 workers will be involved in the construction of the works proposed under Modification 16, these works will be constructed over a 12 month period. With various aspects of the proposal constructed over different stages within that 12 month period Shoalhaven Starches have anticipated that a maximum of 80 construction staff at one time will be on the site due to this modification.

In accordance with the Shoalhaven Starches, Bomaderry, Access and Parking Assessment light vehicle traffic generated by Shoalhaven Starches is equal to 0.5 peak hour trips per parking space. As outlined above eighty construction staff will require 48 car parking spaces. As such construction traffic for this modification is estimated by Bitzios to generation approximately 24 peak hour light vehicle trips. Bitzios note this is a conservative estimate as construction traffic peaks may not align with network peak traffic times

Railway Crossing Impacts:

The site is accessed by heavy rail freight services by a private rail spur crossing Bolong Road. This proposal essentially involves the replacement of grain coming into the site with wheat for flour production. There will be a slight increase in flour directly imported to the site by train by about 200 tonnes per week. This is the equivalent of about 3 wagons per week. As such it will not involve any additional heavy rail movements but will involve a small increase in the number of wagons attached to existing trains importing flour into the site.

Improvements to the rail intake pit are also expected to result in a reduction in tipping time for the grain intake. As such Bitzios advise that Modification 16 may result in more reliable rail movements to and from the site with Shoalhaven Starches more likely to meet planned rail possession windows.

Traffic Impacts

Impacts from Permanent Traffic

Shoalhaven Starches have advised that it is expected the proposed modifications will result in the generation of an additional five (5) light vehicle trips during peak hours.

Given the above Bitzios state it is not expected that the permanent traffic generated by the proposed modification will have any adverse impacts on the surrounding road network.

Construction Traffic Impacts

According to Bitzios, the traffic volumes associated with the construction phase are not expected to have an adverse impact on the surrounding road network given the following

- In accordance with SIDRA analysis conducted by ARC, as outlined in the *Shoalhaven Starches, Bomaderry, Access and Parking Assessment (2017)* and the *Shoalhaven Starches, Bomaderry MP06_0028 Modification Traffic Impact Assessment (2017)* the Bolong Road/Railway Street intersection and all accesses operated well within acceptable performance limits in terms of LOS, delay and queuing;
- Increases in queuing at accesses as a result of development or construction traffic will be contained onsite and thus have no impact on the surrounding road network;
- The duration of the proposed construction works range from one (1) to six (months and will be undertaken over a twelve (12) month period. As such construction traffic will have no lasting impact on the network.

Conclusion

The Traffic Impact Assessment prepared by Bitzios concludes:

“... We conclude that there are no significant traffic or transport impacts associated with the proposed development expansion to preclude its approval and relevant conditioning on traffic or transport planning grounds.”

8.7 SITE CONTAMINATION

The Modification Application is supported by a Phase 1 Contamination and Acid Sulphate Soils Assessment prepared by GHD (**Annexure 9**). In order to assess site contamination for the various modifications GHD divided the Shoalhaven site into site areas as detailed in **Table 22** below:

Table 22
GHD Site Identification

GHD Site ID	Proposed Modifications
Site 1	<ul style="list-style-type: none"> Construction of specialty product building which will house a new Gluten Dryer and the plant and equipment associated with the production of speciality foods. Sifter room in the NE corner of the site close to the western bank of Abernathy's Creek. Construction of Baghouse to Starch Dryer No. 5.
Site 2	<ul style="list-style-type: none"> Relocation of existing Boiler #7 to the northern side of the overall Boiler House Complex.
Site 3	<ul style="list-style-type: none"> Construction of a coal fired Co-generation plant to the south of the existing Boiler House Complex. Construction of a new coal fired Boiler No 8. Structures including lime silos and generator set.
Site 4	<ul style="list-style-type: none"> Modification to rail unloading, which includes: <ul style="list-style-type: none"> ➤ A new intake pit positioned to the east of and adjacent to the existing pit. The pit will be approximately 3.9 m deep. ➤ Second conveyor with associated bucket lift and chutes connect to grain silos.
Site 5	<ul style="list-style-type: none"> Construction of new indoor electrical sub-station to northern side of Bolong Road.
Site 6	<ul style="list-style-type: none"> Proposed car park of 26 spaces.
Site 7	<ul style="list-style-type: none"> Proposed 2nd storey extension to main substation. Structure is aboveground and anticipated to have minimal ground disturbance.
Site 8	<ul style="list-style-type: none"> Proposed ventilation for Flour Mills A, B and C. These are above ground structures and built upon existing structures. Limited ground penetration anticipated. Install a third Flour Mill C within existing Flour Mill B building.
Site 9	<ul style="list-style-type: none"> Conversion of two existing Gluten Dryers (Nos. 1 and 2) to starch dryers, within existing starch plant production building. No ground penetration anticipated.

Previous Coffey environmental reports on investigations undertaken within or near the currently proposed development sites were reviewed by GHD for this assessment. The following is a summary of previous reports that provide information on contamination and ASS for the particular sites:

- Sites 4 and 8 – Coffey 2007 report conclusions:
 - Low likelihood of contamination. Subsurface investigations including environmental sampling and testing were undertaken in areas nearby Sites 4 and 8.
 - Low probability of ASS in upper 2 m but may be encountered at depths below 2 m.

- Sites 2 to 4 and 6 to 9 – Coffey 2008 report conclusions:
 - Low likelihood of contamination based on desktop review. Limited subsurface investigations within the proposed development areas. USTs potentially storing petroleum products were noted near Bolong Road. The report did not provide their location.
 - Low probability of ASS but may occur in lenses. ASSMP was recommended.
- Site 8 – Coffey 2016 report conclusions:
 - Potential sources of contamination was identified in fill soils. Based on results of fill material in other parts of the site, the likelihood of contamination was assessed to be low.
 - Low probability of ASS in upper 2 m but may be encountered at depths below 2 m.
- Site 3 – Coffey 2017 report conclusions:
 - The report noted potentially hazardous chemical additives may have been stored and used in the boiler house(s). However, due to paved areas surrounding the boiler houses, the potential for contamination was considered low.
 - Due to limited intrusive investigations at the site, the report recommended that precautions should be taken when disturbing and managing surplus soils.
 - Potential for the presence of acid sulfate soils to be located in the vicinity of the proposed development areas.
- Site 1 – Starch Dryer No. 5 Environment Assessment (Cowman Stoddart, 2015) report discussion and conclusions:
 - Workshop (immediately west of proposed development area): mechanical repairs, and manufacture of tractors and front end loaders. Floor of workshop appeared to be in good conditions with only minor cracking.
 - An Underground Storage Tank (UST) with a capacity of 300 gallons was installed in the vicinity of the proposed development area. The UST stored petrol and used for refuelling vehicles. The UST was abandoned in situ by way of fill with concrete approximately 30 years ago. Anecdotal evidence indicated that the tank had not leaked. Intrusive investigations in the vicinity of the UST did not identify petroleum hydrocarbon impact; and therefore concluded a low likelihood for contamination associated with the UST.
 - Other potential areas of environmental concern reported included fill of unknown quality and origin and weathering of hazardous building materials.
- Site 5 – no available reports.

8.7.1 Observations and Interviews

Site 1 – Product Dryer Building and Warehouse

The proposed Site 1 development area is located on the northern, western and southern sides of Starch Dryer No. 5 and extends west to the maintenance workshop GHD found the area to be near level and occupied by concrete pavement and gravel hardstand. No evidence of contamination or contaminating activities were observed by GHD within the proposed development area.

The southern area was used for storage of various acids and sodium hydroxide in IBC containers. The chemicals were stored within a concrete paved area. GHD found no apparent evidence of historical spillages which was consistent with anecdotal information provided to GHD by John Studdert, a Manildra employee for 17 years. Mr Studdert indicated that this area was formerly occupied by the Moorehouse Building.

The maintenance area is located to the west of Site 1 and includes a store and contractor mechanical engineers workshop. The maintenance store includes spare parts and small quantities (~ 20 L) of oil, thinners, cleaners, detergents, grease, etc. Oil was also stored in 205L steel drums. Some oil was observed by GHD on the concrete floor of the maintenance stores building. GHD noted the concrete floor appeared to be in good condition, however advised that joints between concrete slabs were up to 1 cm wide, which may allow surplus spills to seep into underlying ground.

GHD advise the store manager indicated no large spills have occurred. Incidental spills are soaked up using spill kit absorbents. The northern development area adjoined a carpark (north) and undercover wheat starch store

Mr Studdert indicated to GHD that prior to ownership by Manildra, this area was a steel fabrication workshop. No other activities other than wheat starch storage had occurred in this area.

Mr Studdert indicated during earthworks for the recently constructed Starch Dryer No. 5 no evidence of contamination such as oil staining, odours or Asbestos Containing Material (ACM) was encountered. Below the gravel hardstand, soils encountered were reported to be consistent with those observed during previous Coffey investigations for the Starch Dryer No. 5 development.

Site 2 – Proposed Relocation of No. 7 Boiler

The proposed Site 2 development is located adjacent to the existing boilers, substation No. 4 and internal access road. At the time of site visit by GHD the site was asphalt paved and occupied by three shipping containers. The asphalt pavement was in fair to good condition. No apparent evidence of contamination observed by GHD.

Mr Studdert indicated this area had been asphalt passed for over 17 years and the adjoining buildings were the original plant buildings. The buildings were understood to have been constructed on original natural ground and that no fill has been placed in the area.

Site 3 – Proposed No. 8 Boiler / Generator Set / Lime Silos

The proposed Site 3 development is located on the southern side of the existing boiler house. The existing boiler house forms part of the original plant structures constructed approximately 30 years ago. The boilers are coal, gas and woodchip fired. Coal and woodchip are stored in stockpiles south of the proposed development and adjacent to the Shoalhaven River. Mr Studdert indicated to GHD that the coal ash from the boilers was washed then transported to the farm.

At the time of site visit by GHD, surface water was ponded due to recent rain over parts of the paved or gravel surfaces. The ground surface appeared impaired, comprising mostly woodchip and coal dust/fragments to give it its black colour. Some fill may exist below the woodchip.

No chemical storage was observed in the general vicinity of Site 3, however 25 kg bags of water softener salt were noted. Mr Studdert indicated that the softener is a form of sea salt and used in the boiler water. No apparent evidence of contamination was observed by GHD.

Site 4 – Proposed modification to rail unloading pit

The proposed development of the extension to the grain unloading pit will require excavations for the unloading pit and foundations for the conveyor bucket elevator. The proposed intake pit will be positioned on the eastern side of the existing intake pit, within the rail corridor.

The railway infrastructure forms part of the original plant and is used to transport flour, wheat and mill feed. The trains are pulled by diesel locomotives. Mr Studdert indicated to GHD that there have not been any reported diesel spills associated with the locomotives. The rail corridor comprised a single operational track. Within Site 4, the four foot section of shoulders was asphalt paved.

The proposed foundation area for the conveyor bucket occupies a relatively small area adjacent to the existing grain silo (north and west) and Shoalhaven River (south). The general foundation area appears to have been filled. GHD state the fill may have been generated during the construction of adjoining silos.

No apparent evidence of contamination was observed by GHD in either of these areas.

Site 5 – Proposed indoor electrical sub-station

This site is currently used as a gravel hardstand carpark and demountable office building

The gravel hardstand comprised crushed rock sourced from a local quarry. Apart from the gravel, GHD advised they understand no other fill has been placed at this site. North and east of the site there is a gas plant which was built over 20 years ago. Mr Studdert indicated that no other activities have been undertaken at the site, and prior to being developed was used as farming land.

Site 6 – Relocation of 26 car parking spaces

The proposed carpark area will be located east of an earthen drain within an open paddock area. The site divided by a chain wire fence, which is orientated north-south. The western bank of the drain appeared to have been filled with concrete and topsoil evident. Ash may have also been placed in the vicinity of the drain, however no evidence of ash was observed by GHD. The drain receives stormwater from Bolong Road. A drainage valve and temporary bunded area within the adjacent farmland allows containment of process water overflows from the main plant area.

Apart from the fill, no apparent evidence of contamination was observed by GHD.

Site 7 – Construction of Extension to Main Substation

The area of the proposed substation extension adjoins an asphalt paved access way and GHD advise it appeared to be in relatively good condition. The current substation footprint comprises coarse grained gravel. GHD note transformers are present and can contain PCB oil. Mr Studdert confirmed that one transformer was replaced in 2007 and the other in 2011. At the time of replacement, the oil was tested and did not contain PCBs. No information was available regarding PCBs in oil prior to this time. No oil releases from transformers have occurred onsite.

Site 8 – Proposed ventilation for Flour Mills A, B and C

This area is occupied by the existing Flour Mills A and B and the proposed ventilation works do not involve ground disturbance. Limited ground disturbance is anticipated for Flour Mill C.

Site 9 - Conversion of two existing Gluten Dryers (Nos. 1 and 2) to starch dryers

This will involve the conversion of two existing Gluten Dryers (Nos. 1 and 2) to starch dryers, within the existing starch plant production building. No ground penetration anticipated.

8.7.2 Conclusion and Recommendations

Based on information provided in the previous Coffey reports, interviews and observations made during their site walkover; GHD advise the likelihood for widespread contamination within the proposed development areas is considered to be low.

In relation to contamination GHD make the following recommendations:

- *Due to the history of industrial activities and indirect shallow investigations we recommend that precautions be taken with any subsurface penetrations. In particular if any are required in the vicinity of the chemical storage bund (e.g. southern side of Site 1), coal storage areas, ash/coal waste (e.g. Site 3) and locations where fill was observed (i.e. Sites 4 and 6). The Coffey 2017 report also noted some chemical additives used in the boiler houses, potentially affecting Site 3.*
- *Soils should be handled with caution as per the requirements of material safety data sheets of chemicals/substances that may be routinely used in the vicinity of the development sites.*
- *An abandoned UST is located in the vicinity of Site 1. Although widespread contamination was not identified, localised petroleum hydrocarbon impact may exist within backfill sands surrounding the UST. Additionally, the UST may be intercepted during excavation of foundations. Therefore, removal of the UST may need to be considered.*
- *There was limited information for Site 5. Although not considered to preclude proposed development, precautions during ground penetration activities should be undertaken within these areas.*
- *If any evidence of contamination is identified during construction stages (e.g. soil discolouration, chemical odour, unusual odour, waste, asbestos containing material, staining etc.), then work should cease and a suitably qualified environmental practitioner should be engaged to assess the potential for risk to human health or environment and provide advice on proper management. We recommend preparation of a generic unexpected finds procedure which can be implemented in the event contamination is encountered during construction.*
- *Soil assessment for waste classification or resource recovery would also be required for any excess construction spoil generated during construction that requires offsite disposal or reuse*

8.8 ACID SULFATE SOILS

The GHD report referred to in Section 8.7 above (**Annexure 9**) also addressed the issue Acid Sulphate Soils.

A review of acid sulphate soil potential was also conducted as part of the previous investigations undertaken by Coffey's and which are discussed in Section 8.7 above.

GHD recommend that if the proposed development involve the excavation of soils to depths greater than 3 m at any of the proposed development sites and/or dewatering that could result in lowering of the water table then an acid sulfate soil management plan (ASSMP) should be developed and actioned.

8.9 GEOTECHNICAL AND RIVERBANK STABILITY

Geotechnical Issues and Riverbank stability were addressed in the GHD report referred to in Section 8.7 above (**Annexure 9**). This section of the EA is based on the findings in that report:

Site 1 – Product Dryer Building and Warehouse

Observations

The various structures proposed are located on the western side of Abernethy's Creek. The main structures are relatively remote from the nearest point of the creek bank. The sifter room and pipework associated with the new structures are close to the top of the western creek bank. GHD's observations of the creek bank did not reveal any obvious change to the creek banks since the previous observations by Coffey. Construction of concrete paving has occurred over the near level area to the west of the creek bank as part of the Starch Dryer No. 5 development. No evidence of erosion or slumping of the bank was observed by GHD

Recommendations by GHD

Site 1 – Product Dryer Building and Warehouse. Only the minor structures including the sifter room developed along the top of the bank have the potential to disturb the ground or locally load the top of the bank. These structures may be founded on shallow footings positioned at least 2m from the top of bank or alternatively may be supported on deep footings below the zone of influence of the creek bank. In this case these structures will not influence the stability of the creek bank. The larger structures for this part of the development are more remote from the creek bank and will be founded on deep piles to rock, and therefore will have no influence on the stability of the creek bank.

Site 2 – Proposed Relocation of No. 7 Boiler

Observations

This site is remote from the Shoalhaven River bank and Abernethy's Creek and according to GHD development will have no influence on the river or creek bank stability.

Recommendations by GHD

Site 2 – Proposed re-location of No. 7 Boiler. *This site is remote from the Shoalhaven River bank and Abernethy's Creek and development will have no influence on the river or creek bank stability.*

Site 3 – Proposed No. 8 Boiler / Generator Set / Lime Silos

Observations

The proposed Lime Silos, No. 8 Boiler and Generator Set are located in relatively close proximity to the northern bank of the Shoalhaven River. The river bank at this location has significant tree growth comprising mainly coral trees and no significant recent slumping or erosion of the bank has occurred in this area.

Recommendations by GHD

Site 3 – Proposed No. 8 Boiler/Generator Set/Lime Silos. *These structures are relatively close to the Shoalhaven River Bank. The Silos and structures with heavy or concentrated loads will be supported on deep piles to rock. At this stage non displacement piles (CFA) are advised. If displacement piles (driven piles) are proposed then we would recommend stability analysis be undertaken to assess the effects on the stability of the river bank. The effects of vibration should also be assessed if driven piles are proposed. Monitoring of the river bank in this area by weekly observations during the construction period should be undertaken.*

Site 4 – Proposed modification to rail unloading pit

Observations

The proposed extension to the rail unloading pit and piped connection to the proposed grain elevator are located in an area where rock revetment protection of the river bank has occurred.

Monitoring of the rock revetment has been undertaken since construction in 2009 and only minor lateral and vertical displacement has occurred. The major structures in this area, including the existing grain silos are supported on piles terminating in the underlying bedrock.

No surface features indicative of ground movement were observed in this area during recent site observations by GHD.

Recommendations by GHD

Site 4 – Extension to train unloading pit, and pipeline to silo and grain elevator. *These structures should not influence the stability of the river bank at this location. The pit extension is relatively remote from the river bank and is adding only minor load to the ground. The pit may require pile support to rock due to soft ground in this area. The grain elevator has limited space to provide additional foundations - it assumed that the elevator will be structurally*

tied to the existing structure or will be supported on a deep footing system to rock.

Site 5 – Proposed indoor electrical sub-station

Observations

This site is located on the eastern side of Abernethy's Creek and is set back about 20 m from the nearest point of the bank where there is a riparian corridor. In view of this setback and the current profile of the eastern bank of the creek, according to GHD the development will have no influence on the stability of the creek bank.

Recommendations by GHD

Sites 5, 6 and 7 – *These sites are sufficiently remote from the Shoalhaven River and Abernethy's Creek not to influence the stability of the river or creek banks.*

Site 6 – Relocation of 26 car parking spaces

Observations

This site is located to the east of Abernethy's Creek and according to GHD due to its remoteness from the creek the development will have no influence on the stability of the creek bank.

Recommendations by GHD

Sites 5, 6 and 7 – *These sites are sufficiently remote from the Shoalhaven River and Abernethy's Creek not to influence the stability of the river or creek banks.*

Site 7 – Construction of Extension to Main Substation

Observations

This site is located to the east of the eastern bank of Abernethy's Creek over a near level area.

The creek bank, at this location, has not experienced any significant slumping or erosion and the proposed site for the extension to the main substation is sufficiently remote from the bank not to influence the stability of the bank.

Recommendations by GHD

Sites 5, 6 and 7 – *These sites are sufficiently remote from the Shoalhaven River and Abernethy's Creek not to influence the stability of the river or creek banks.*

Site 8 – Proposed ventilation for Flour Mills A, B and C

Observations

This area is occupied by the existing Flour Mills A and B and the proposed ventilation works do not involve ground disturbance. Limited ground disturbance is anticipated for Flour Mill C. The site for these proposed works is sufficiently remote from the Shoalhaven River bank not to influence the stability of the banks. Any heavily loaded additions to the flour mill structures will require support by a deep pile footings to rock.

Recommendations by GHD

Site 8 – *The proposed ventilation works will involve minimal disturbance to the ground and existing structures are supported on piles to rock. Any new heavily loaded structures will require a deep piled footing system with all piles terminated in the bedrock. Based on the proximity of the structures to the river bank and provide all of the main building structures are supported on piled footings to rock, we confirm that these works will not influence the stability of the river bank.*

Site 9 - Conversion of two existing Gluten Dryers (Nos. 1 and 2) to starch dryers

Observations

This will involve the conversion of two existing Gluten Dryers (Nos. 1 and 2) to starch dryers, within the existing starch plant production building. No ground penetration is anticipated. GHD advise the site for these proposed works is sufficiently remote from the Shoalhaven River bank and the eastern bank of Abernethy's Creek not to influence the stability of the river or creek banks.

Recommendations by GHD

Site 9 – *The proposed conversion of two existing Gluten Dryers (Nos. 1 and 2) to starch dryer will occur within existing starch plant production building, therefore no ground penetration is anticipated.*

Shoalhaven Council Requirements

In an email dated 14th May 2018 Shoalhaven Council stipulated the following requirement in relation to Riverbank Stability:

Given the proposed riverbank stability works adjacent to Shoalhaven River, a setback of a minimum 11.5m is required for all permanent structures.

In response to this issue GHD provided an addendum letter dated 30th May 2018 in addition to their Geotechnical report.

The Modification Proposal includes some permanent structures which are to be located closer to the Northern bank of the Shoalhaven River than the 11.5 m specified by Council. These modifications include the Lime Silos, the Co-Generator Set, and Boiler No. 8.

Based on their extensive knowledge of the subsurface conditions within the Manildra Plant, including a recent geotechnical investigation of the Lime Silos site GHD advise the following in relation to the effects of these proposed structures on the stability of the river bank:

The proposed structures mentioned above will all be founded on deep piled footing systems, with all piles terminated in weathered rock well below the river bank and bed levels. This will transfer the loads from the structures onto weathered rock, so that the structures will not apply any loading to the soils between the structures and the river bank.

It is assumed that the piles will be non-displacement piles such as CFA or cased bored piles to minimise application of temporary loads to the soil during construction.

Given the above GHD conclude that the stability of the river bank will not be adversely affected by the presence of the three structures as located in the plans of the proposed modification.

8.10 WASTE WATER IRRIGATION

The proposed modifications will result in an increase in the amount of waste water which will need to be treated and disposed, from the approved 56.7 ML per week to a proposed amount of 70 ML per week.

An assessment has been undertaken by BPO Environmental Success (BPO) (**Annexure 10**) to determine the capacity of the Waste Water Treatment Plan (WWTP) of the Shoalhaven Starches Environmental Farm to accommodate this increase in effluent. The report also provides recommendations to ensure the WWTP will be able to maintain optimal operating conditions.

BPO estimate that the Modification proposal will create additional 15 - 18% of load into the WWTP with an average flow of 10,000 m³/d. Waste water from the Shoalhaven Starches site is disposed of by irrigation onto the Environmental farm after treatment by the via an ADI-BDF reactor. BDO advise that ADI-BVF reactors are typically designed to operate at a Hydraulic Retention time (HRT) of 7 - 10 days and an Organic Loading Rate (OLR) of 0.5 – 1.0 kg COD/m³/day, depending on the digestibility of the feedstock.

The typical values for these two parameters measured at the Shoalhaven Starches operations over the last 12 months have been summarised by BDO below in **Figure 16**.

BDO note the performance of the ADI-BVF® reactor over the last 12 months has achieved 96% COD removal, which continues to outperform the design target of 90% COD removal

Parameter	Unit	Current Value	New Value	Design value
Flow	ML/d	8.4	10.0	9 – 12.8
HRT - Average	days	10.7	9.0	7 – 10
HRT - 90 th percentile	days	9.2	7.8	7 – 10
OLR – Average	kg COD/m ³ /day	0.6	0.7	0.5 – 1.0
OLR – 90 th percentile	kg COD/m ³ /day	0.9	1.1	0.5 – 1.0

Figure 16: Current and Prediction Process Parameters (BDO)

The new predicted process values shown in **Figure 16** are based on the assumption that the variability of the wastewater flows and organic load will remain the same after the expansion as it is now.

According to BDO based on the predicted average loading values the effluent treatment system (ADI-BDF reactor) will accommodate the increase in waste waters.

BPO note that operation at a higher loading will require careful management to maintain optimal operating conditions as the 90th percentile of the Organic loading rate will be above the design range. The response of the reactor to peak loads will depend on the duration and the extent of the peaks. BPO state the above-design peaks at Shoalhaven Starches operations have predominantly been isolated events with less than 3 days duration and advise if this peaking nature is retained, the digester is likely to handle the excess loads well.

BPO provide the following recommendations to effectively manage operation at a higher loading:

- *Careful management of sludge inventory within the reactor at times of higher load will need to be undertaken so as to prevent solids carryover to the downstream membrane processes caused by an increased gas production*
- *The digester will require an increased alkalinity supplementation in order to maintain optimum operating conditions within the reactor during these periods.*
- *Process efficiencies within the factory should be assessed and reviewed in order to identify the main sources of hydraulic and organic load peaks. The peaks can then be effectively managed by additional telemetry. This will reduce the risk of overloading of the ADI-BVF® reactor.*

BPO conclude:

“In conclusion, based on predicted average loading rates, the ADI-BVF® reactor will accommodate the increase in waste water volumes. During peak loads the

reactor will require careful management to maintain optimum operating conditions for the biochemical reaction”:

8.11 STORMWATER

A stormwater management plan has been prepared by Allen Price and Scarratts (APS) which details the proposed stormwater management measures to be incorporated into the proposed modifications (**Annexure 12**).

9.0 STATEMENT OF ADDITIONAL COMMITMENTS

Section 8.0 of the EA for the Shoalhaven Starches Expansion Project prepared by our firm provides a Statement of Commitments agreed to by Shoalhaven Starches Pty Ltd outlining environmental management, mitigation and monitoring measures to be implemented to minimise potential impacts associated with the Shoalhaven Expansion Project and having regard to the findings of the EA.

The only additional commitments arising from this modification proposal include the following:

9.1 PRELIMINARY HAZARD ANALYSIS

Table 23 outlines recommended additional management procedures and design considerations that Shoalhaven Starches commits to implementing and incorporating into practices that would prevent and / or minimise risk scenarios from occurring.

Table 23
Preliminary Hazard Analysis

<i>Preliminary Hazard Analysis</i>
<p>Shoalhaven Starches commits to implementing the recommendations of the PHA prepared by Pinnacle Risk as follows:</p> <ul style="list-style-type: none">• <i>For all explosion vents that vent directly to atmosphere for the modifications, finalise the explosion vent modelling when the design details are known.</i>• <i>Review the option for installing initial screening, e.g. a magnetic separator, at the new intake pit to lower the likelihood of foreign objects entering the new bucket elevator and the downstream existing silos.</i>• <i>Ensure that all the proposed explosion vents are directed to a safe location to avoid injury to personnel or propagation to other adjacent equipment.</i>• <i>It is recommended that the floor of the new switchroom be fire-rated given the risk of a fire in the existing switchroom below. This will also help prevent a fire in the new switchroom propagating to the existing switchroom below.</i>

9.2 NOISE

Table 24 outlines the recommended additional noise mitigation measures and design considerations that Shoalhaven Starches commits to implementing and incorporating into the design, construction and operation of the proposed modifications.

Table 24
Noise Mitigation Measures

Measures and Design Considerations								
Shoalhaven Starches commits to implementing the recommendations of the Noise Impact Assessment prepared by Harwood Acoustics for this modification proposal as follows:								
<i>New Industrial Building Construction</i>								
<i>The following applies to the main industrial building housing the product dryer and specialty product processing facility.</i>								
<u>Walls</u>								
<i>The walls of the buildings (housing the specialty product processing facility and product dryer) should have a minimum weighted sound reduction index (R_w) 24. In this instance calculations are based on 'Kingspan' Architectural Wall Panelling system AWP 80.</i>								
<u>Roof / Ceiling</u>								
<i>The roof and ceiling of the new industrial building should have a minimum weighted sound reduction index (R_w) 23. In this instance calculations are based on 'Kingspan' Architectural Roof Panelling system 'K-Dek (KS 1000 KD)'.</i>								
<u>Ventilation Penetrations</u>								
<i>There should be no acoustically untreated penetrations in the walls or roof. Any doors to the building must remain closed at all times the plant is in operation.</i>								
<i>If natural ventilation is required, sections of the northern and eastern walls only may be fitted with acoustic louvres.</i>								
<i>The required insertion loss of acoustic louvres will depend on the maximum surface area of louvered sections required to facilitate adequate ventilation.</i>								
<i>As an example, based on a maximum 20 m² of louvered sections on each of the floors, other than the top floor, acoustic louvres should have minimum insertion losses shown in below:-</i>								
<i>Example Acoustic Louvre Sound Transmission Loss</i>								
Description	Minimum Insertion Loss (dB) at Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
Acoustic Louvre*	5	10	14	22	27	25	21	17
* Based on Fantech SBL2 louvre								

Measures and Design Considerations

A larger area may result in a higher required insertion loss and consequently a deeper blade depth. A final assessment should be made prior to the issue of a Construction Certificate once the location and size of any openings for ventilation are finalised.

The level of attenuation required by the building structures is dependent on the level of internal noise emission from all plant and equipment combined.

The recommendations made above are based on internal noise level measurements made within the existing Starch Dryer No. 5 and Gluten dryer No. 6 on each of the floor levels.

Once the details of all noise sources are finalised the required construction materials of the building can be finalised.

Through a combination of external building materials and internal acoustical treatment of individual items of plant, if and as required, the noise design goals can be achieved at each receptor location.

Sifter Room

The proposed sifter room to be located at the existing packing plant building should be constructed using materials with a minimum weighted sound reduction index (R_w) 23, for example the same materials as recommended in Section 6.1 above.

Any openings in the sifter room should be restricted to the eastern or southern facades only and kept to a minimum. Depending on the need for openings to this room for ventilation, acoustic louvres may be required.

Alternatively the sifter room may be constructed from standard corrugated sheet steel (e.g. Colorbond) with a minimum R_w rating of 19 and the plant and equipment acoustically treated within the room so that the design noise goals are met at each receptor.

Any acoustical treatment of this room will not be onerous to ensure the noise design goals are met.

Roof Mounted Fans

The roof mounted ventilation fans for the respective flour mills will each be fitted with a silencer. However, selections of silencer make and model have not been finalised at this stage.

Silencer should be designed and selected so that the level of noise emission from each fan does not exceed:-

- 65 dBA when measured at a distance of 3 metres from the discharge end of the fan or silencer.

This can easily be achieved through judicious selection of silencers and will be confirmed prior to construction, or during commissioning as required.

Boiler No. 8 and Co Generation Plant

Generator Set

The predicted noise levels in Table 4 of this Report assume the turbine used in the Co-generation plant, which will be housed in the generator set building, has a minimum sound power level of 110 dB.

Measures and Design Considerations

Based on this assumption, the generator set building should be constructed from materials with a minimum weighted sound reduction index R_w of 35.

- *Proprietary wall panelling system such as Kingspan with an internal wall and ceiling lining of minimum 9 mm thick fibre cement sheet on steel frame or furring channel; or*
- *Aerated concrete panel (e.g. Hebel power panel), or*
- *Any alternative with a minimum R_w 35.*

Alternatively, the turbine may be acoustically treated or enclosed within the building and the building constructed from a material with a minimum R_w 24.

We are confident that compliance with the project specific noise goals can be achieved for the modification without onerous mitigation measures.

A final assessment will be undertaken at the time of Design Noise Verification process to determine the requirement for building elements, or acoustical treatment required to ensure the noise design goals are met.

Boiler No. 8

Based on the assumed noise generation of plant and equipment associated with Boiler No. 8, the noise sources should be acoustically treated or enclosed using materials with a minimum weighted sound reduction index R_w of 23, as detailed in Section 6.1, to meet the design noise goals at each receptor.

Rail Grain Intake

The predicted level of noise emission from noise generating plant and equipment associated with the rail grain intake expansion is within the design noise goals at each receptor without the need for additional noise controls.

Construction Noise

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

“During construction, the Proponent shall prepare and implement all reasonable and feasible measures to minimise the construction noise impacts of the project.”

It can be seen from Table 6 that the construction noise management levels are likely to be met at each receptor location during general construction activity, with the exception of piling. During piling there is potential for the noise management levels to be exceeded on some occasions. This is not considered a significant exceedance during day time hours for short and sporadic duration.

However, a Construction Noise Management Plan may be provided in accordance with NSW EPA’s Interim Construction Noise Guideline and to satisfy Condition 13 of the Project Approval.

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

9.3 AIR QUALITY (INCLUDING ODOUR)

Table 25 outlines the recommended additional air quality measures and design considerations that Shoalhaven Starches commits to implementing and incorporating into the design, construction and operation of the proposed modifications.

Table 25
Air Quality Measures

<i>Measures and Design Considerations</i>
Specific mitigation measures are not recommended Air Quality Impact Assessment prepared by GHD. However, Shoalhaven Starches commits to implementing the following mitigation measures in relation to Air Quality: <ul style="list-style-type: none">• <i>Lime dosing systems to reduce SO₂ and hydrogen fluoride emissions from boiler 8. The addition of hydrated lime is to be applied at a rate which reduces SO₂ concentrations at the flue outlet to below 600 mg/m³.</i>

9.4 VISUAL IMPACT

As outlined in Section 8.5 of this EA it is our view that the proposed works will not create a significant adverse visual impact due principally to the location of the proposed works within the vicinity of existing structures of a similar height, bulk and scale as those works which are proposed. Shoalhaven Starches however commit to the following additional measures as outlined in **Table 26** to assist in screening and further minimising visual impacts arising from the proposed works.

Table 26
Visual Impact

<i>Measures and Design Considerations</i>
Shoalhaven Starches commits to where appropriate and possible, the proposed works associated with this modification 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. In addition, Shoalhaven Starches will provide screening landscaping to the south of the proposed new indoor electrical sub-station along the frontage of Bolong Road.

9.5 TRAFFIC

Shoalhaven Starches commit to the following additional measures as outlined in **Table 27** to assist in minimising traffic impacts arising from the proposed modification.

Table 27
Traffic Impacts

Measures

Bitzios conclude the Traffic Impact Assessment by noting there are no significant traffic or transport impacts associated with the proposed development expansion to preclude its approval and relevant conditioning on traffic or transport planning grounds as:

- the existing Shoalhaven Starches site provides a total of 280 permanent car parking bays across four (4) location and a temporary car park with capacity for 100 vehicles. This existing carparking is considered to be sufficient to cater for both permanent and temporary car parking demand with or without the proposed Modification 16;*
- the existing Bolong Road / Railway Street intersection and all access locations operate well within acceptable limits and traffic increases as a result of Modification 16 are not expected to have any adverse impact on the road network in the vicinity of the site; and*
- Modification 16 is not expected to have any adverse impacts on the surrounding road network in relation to the Bolong Road railway crossing at the heavy rail site access.*

As such no specific mitigation recommendations are made in the Traffic Impact Assessment. However Shoalhaven Starches commits to the following recommendation:

- Construction work hours will be in accordance with Schedule 3 Condition 11 of the Shoalhaven Starches Project Approval MP06_0228 as follows:*

Table 1: Construction and Operation Hours for the Project

Activity	Day	Time
Construction	Monday – Friday	7:00 am to 6:00 pm
	Saturday	8:00 am to 1:00 pm
	Sundays and Public Holidays	Nil

9.6 SITE CONTAMINATION

Shoalhaven Starches commit to the following additional measures as outlined in **Table 28** to manage potential site contamination issues arising from the proposed modification.

Table 28
Site Contamination

Measures
<p>Shoalhaven Starches commits to the following recommendations of the site contamination assessments assessment prepared by GHD:</p> <ul style="list-style-type: none"> • <i>Due to the history of industrial activities and indirect shallow investigations we recommend that precautions be taken with any subsurface penetrations. In particular if any are required in the vicinity of the chemical storage bund (e.g. southern side of Site 1), coal storage areas, ash/coal waste (e.g. Site 3) and locations where fill was observed (i.e. Sites 4 and 6). The Coffey 2017 report also noted some chemical additives used in the boiler houses, potentially affecting Site 3.</i> • <i>Soils should be handled with caution as per the requirements of material safety data sheets of chemicals/substances that may be routinely used in the vicinity of the development sites.</i> • <i>An abandoned UST is located in the vicinity of Site 1. Although widespread contamination was not identified, localised petroleum hydrocarbon impact may exist within backfill sands surrounding the UST. Additionally, the UST may be intercepted during excavation of foundations. Therefore, removal of the UST may need to be considered.</i> • <i>There was limited information for Site 5. Although not considered to preclude proposed development, precautions during ground penetration activities should be undertaken within these areas.</i> • <i>If any evidence of contamination is identified during construction stages (e.g. soil discolouration, chemical odour, unusual odour, waste, asbestos containing material, staining etc.), then work should cease and a suitably qualified environmental practitioner should be engaged to assess the potential for risk to human health or environment and provide advice on proper management. We recommend preparation of a generic unexpected finds procedure which can be implemented in the evident contamination is encountered during construction</i> • <i>Soil assessment for waste classification or resource recovery would also be required for any excess construction spoil generated during construction that requires offsite disposal or reuse.</i>

9.7 ACID SULPHATE SOILS

Shoalhaven Starches commit to the following additional measures as outlined in **Table 29** to assist in minimising impacts arising from the proposed modification.

Table 29
Acid Sulphate Soils

Measures
<p>Shoalhaven Starches commits to the following recommendations of the acid sulphate soils assessment prepared by GHD:</p> <ul style="list-style-type: none">• <i>Acid sulfate soils could be encountered within alluvial soils underlying the fill materials at depths below 3m. Disturbance of ASS is likely to occur at Sites requiring CFA piles and the new rail unloading pit at Sites 3 and 4, respectively. Should the proposed development involve the excavation of soils to depths greater than 3m at any of the proposed development sites and/or dewatering that could result in lowering of the water table then an acid sulfate soil management plan (ASSMP) should be developed and actioned.</i>

9.8 RIVER BANK STABILITY

Shoalhaven Starches commit to the following additional measures as outlined in **Table 30** to assist in minimising riverbank stability impacts arising from the proposed modification.

Table 30
River Bank Stability Mitigation Measures

<i>Measures and Design Considerations</i>
<p>Shoalhaven Starches commits to implementing the recommendations of the Geotechnical, Site Contamination and Acid Sulfate Soil Assessment prepared by GHD as follows:</p> <p>Based on information provided in the previous Coffey reports and observations made during their site walkover, GHD provided the following recommendations in relation to Riverbank Stability:</p> <ul style="list-style-type: none"> • Site 1 – Product Dryer Building and Warehouse. <i>Only the minor structures including the sifter room developed along the top of the bank have the potential to disturb the ground or locally load the top of the bank. These structures may be founded on shallow footings positioned at least 2m from the top of bank or alternatively may be supported on deep footings below the zone of influence of the creek bank.</i> • Site 3 – Proposed No. 8 Boiler/Generator Set/Lime Silos. <i>The Silos and structures with heavy or concentrated loads will be supported on deep piles to rock. At this stage non displacement piles (CFA) are advised by GHD. If displacement piles (driven piles) are proposed then GHD recommend stability analysis be undertaken to assess the effects on the stability of the river bank. The effects of vibration should also be assessed if driven piles are proposed. Monitoring of the river bank in this area by weekly observations during the construction period should be undertaken.</i> • Site 4 – Extension to train unloading pit, and pipeline to silo and grain elevator. <i>The pit may require pile support to rock due to soft ground in this area. The grain elevator has limited space to provide additional foundations - it assumed by GHD that the elevator will be structurally tied to the existing structure or will be supported on a deep footing system to rock.</i> • Site 8 – Proposed ventilation for Flour Mills A, B and C. <i>The proposed ventilation works will involve minimal disturbance to the ground and existing structures are supported on piles to rock. Any new heavily loaded structures will require a deep piled footing system with all piles terminated in the bedrock.</i>

9.9 WASTE WATER TREATMENT

Table 31 outlines the recommended additional waste water treatment measures.

Table 31
Waste Water Treatment Measures

<i>Measures and Design Considerations</i>
<p>Shoalhaven Starches commits to implementing the recommendations of the Effluent Disposal System Capacity Assessment prepared by BPO Environmental Services for this modification proposal as follows:</p> <p>BPO provide the following recommendations to effectively manage operation of the Effluent treatment system at a higher loading:</p> <ul style="list-style-type: none">• <i>Careful management of sludge inventory within the reactor at times of higher load will need to be undertaken so as to prevent solids carryover to the downstream membrane processes caused by an increased gas production</i>• <i>The digester will require an increased alkalinity supplementation in order to maintain optimum operating conditions within the reactor during these periods.</i>• <i>Process efficiencies within the factory should be assessed and reviewed in order to identify the main sources of hydraulic and organic load peaks. The peaks can then be effectively managed by additional telemetry. This will reduce the risk of overloading of the ADI-BVF® reactor.</i>

10.0 CONCLUSION

In 2009 the Minister for Planning issued Project Approval for an application made by Shoalhaven Starches to increase its ethanol production capacity at its existing ethanol plant located at the Shoalhaven Starches Plant at Bomaderry. This Project Approval enables Shoalhaven Starches to increase its ethanol production in a staged manner at its Bomaderry Plant from the current approved 126 million litres per year to 300 million litres per year.

The Project Approval also consolidated all previous approvals including Project Approval MP 07_0021 (the Flour Mill) into the one Project Approval.

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

As the estimated increase in demand for ethanol did not occur Shoalhaven Starches have been forced to investigate new alternative markets for products used in the manufacture of ethanol which has consequently led to a refocussing on Flour and Starch products. This is the main reason for the proposed modifications.

Shoalhaven Starches now propose to undertake modifications to the Project Approval::

- The installation of a third Flour Mill, Mill "C" within the existing Flour Mill "B" building;
- Modifications to the existing Flour Mills "A" and "B", to modify the type of ventilation used within these mills from a vacuum to a pressurization system;
- Construction of a new industrial building/complex to the west of Abernethy's Creek. This new industrial building/complex will contain the following activities:
 - The conversion of two existing Gluten Dryers (Nos. 1 and 2) into starch production.
 - The construction of a new Gluten Dryer, to replace the capacity lost by the conversion of Dryers Nos. 1 and 2 to starch. This new Product Dryer will be housed in this new industrial building.
 - The Company also wish to explore the production of a range of specialised products as an extension to their existing product line. The plant and equipment associated with the processing of these specialty products will be housed within this new industrial building.
- An addition to the northern elevation of the recently constructed Starch Dryer No. 5 building to house a bag house for this dryer;
- Construction of an Additional Sifter for the Interim Packing Plant;

- Construction of a coal-fired co-generation plant to the south of the existing Boiler House complex to increase power supply to meet the requirements of this Modification Proposal. This co-generation plant will include the installation of a new coal fired boiler (No. 8);
- The relocation of the existing Boiler No. 7 to the northern side of the overall Boiler House complex (necessitated by the construction of the new co-generation plant and boiler No. 8);
- The construction of lime silos and associated pipe bridge to the east of Proposed Boiler No. 8;
- Construction of a new indoor electrical substation on the northern side of Bolong Road and associated relocation of 26 existing off-street car parking spaces;
- Extension of the existing electrical sub-station (2nd storey extension) that is located within the main factory site;
- Construction an additional rail intake pit to assist in the efficient unloading of grain products; and
- Regularisation of the non-enclosure of existing transfer pumps, fermenter tanks and molecular sieve pumps and the relocation of structures on the Shoalhaven Site approved under Mod 3 and Mod 12.

The Company proposes to utilise grain that is currently approved for use in the ethanol production process to increase the amount of flour that is produced on site to in effect increase starch and gluten production processing. As a result, the 6,720 tonnes per week of grain, that is currently approved to feed the ethanol production process will be redirected into flour processing. It is also proposed to increase the importation of flour from off-site from 3,800 tonnes per week to 4,000 tonnes per week, an increase of 200 tonnes per week.

These modifications will result in total on-site flour processing of 25,400 tonnes per week, an increase on the current approved 20,000 tonnes per week. The increases in starch and gluten production will have a corresponding increase in Dried Distillers Grain Syrup (DDGS) from the current approved position of 6,400 tonnes per week to 7,500 tonnes per week.

The proposed modifications will also result in an increase in the amount of waste water which will need to be treated and disposed of from the approved 56.7 ML per week to a proposed amount of 70 ML per week. An assessment of the Effluent treatment system by BPO Environmental Success concludes the existing treatment system will accommodate the increase in waste water volumes.

Despite the increases in site flour processing, and in starch and gluten production it is our view that the development is substantially the same as that which is currently approved. None of the proposed modifications represent an additional and distinct land use as all proposed

modifications facilitate and improve approved production processes and as such this application is made pursuant to Section 4.55 of the Environmental Planning & Assessment Act 1979.

The preparation of this Environmental Assessment has been undertaken following consultation with relevant Government agencies, including:

- The Department of Planning and Environment;
- Shoalhaven City Council;
- EPA;
- The Australian Department of Defence; and
- Department of Primary Industries- Office of Water

This Environmental Assessment has been prepared to address issues raised by these government agencies.

The EA is supported by expert assessments addressing:

- Noise Impacts – the EA is supported by a Noise Impact Assessment prepared by Harwood Acoustics which includes recommendations to ensure that this proposal will achieve the noise limits as outlined under the Environmental Protection Licence that applies to the site.
- Air Quality impacts including odours – the EA is supported by an Air Quality Impact Assessment prepared by GHD. This assessment concludes that the emission parameters modelled and their impacts at ground level are predicted to comply with the criteria at all sensitive receptors.
- Preliminary Hazard Analysis (PHA) prepared by Pinnacle Risk Pty Ltd that assesses and compares the risks associated with the proposal and finds that such risks are acceptable when compared against the Department of Planning & Environment's risk criteria.
- Traffic and Car Parking Assessment prepared by Bitzios Consulting that identifies that there are no access, traffic or parking impacts associated with the proposal – either during operation or construction – that would significantly impact on the efficiency and/or safety of the local traffic environment or existing on-site operations. The trip generation of the proposal during both during construction and operation would be minor and is not expected to adversely impact the local road network.
- Flood Assessment prepared by WMA Water that demonstrates there is an increase in peak level in the 1% and 0.5% AEP events but minimal impact in the PMF / Extreme event. WMA note however the increase in level in the 1% and 0.5% AEP events is largely within the confines of land owned by Shoalhaven Starches.

- A site Contamination and Acid Sulphate Soils Assessment prepared by GHD. These assessments detail specific management measures to be undertaken during the construction of the works associated with this modification.

Following an assessment of the key issues associated with this proposal, this Environmental Assessment concludes the development as modified will be substantially the same development as the approved project. It is considered that the proposal is suitable for the site and this locality.

The Minister's approval is sought for this modification application.

ANNEXURE 1

Requirements for EA

**issued by
Secretary of the Department of Planning
and other Government Agencies**

**22, 24, 171 and 220
Bolong Road, Bomaderry**

ANNEXURE 2

Plan Details of Proposed Modifications

**22, 24, 171 and 220
Bolong Road, Bomaderry**

ANNEXURE 3

**Clause 4.6 Written Request
of Shoalhaven LEP 2014**

**prepared by
Cowman Stoddart Pty Ltd**

**22, 24, 171 and 220
Bolong Road, Bomaderry**

ANNEXURE 4

Preliminary Hazard Analysis

**prepared by
Pinnacle Risk Management Pty Ltd**

**22, 24, 171 and 220
Bolong Road, Bomaderry**

ANNEXURE 5

Environmental Noise Impact Assessment

**prepared by
Harwood Acoustics**

**22, 24, 171 and 220
Bolong Road, Bomaderry**

ANNEXURE 6

Air Quality Impact Assessment

**prepared by
GHD**

**22, 24, 171 and 220
Bolong Road, Bomaderry**

ANNEXURE 7

Flood Compliance Report

**prepared by
WMA Water**

**22, 24, 171 and 220
Bolong Road, Bomaderry**

ANNEXURE 8

Traffic Impact Assessment

**prepared by
Bitzios Consulting**

**22, 24, 171 and 220
Bolong Road, Bomaderry**

ANNEXURE 9

**Geotechnical, Contamination and
Acid Sulphate Soils Assessment
and
Addendum Letter addressing Riverbank Stability**

**prepared by
GHD**

**22, 24, 171 and 220
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ANNEXURE 10

Effluent Disposal System Capacity Assessment

**prepared by
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ANNEXURE 11

Documentation Supporting Regularisation of Non-Enclosure of Existing Plant

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ANNEXURE 12

Stormwater Assessment

**prepared by
Allen Price and Scarratts**

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ANNEXURE 13

River Bank Stability – Slope Stability Assessment South-east Container Storage Area

**prepared by
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