Shoalhaven Starches Expansion Modification 23

Gas Fired Co-Generation Plant
State Significant Development Modification Assessment
(MP06_0228-Mod-23)

April 2022

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Subtitle: State Significant Development Modification Assessment (MP06_0228-Mod-23)

Cover image: Example Gas Fired Co-Generation Plant (Source: Cowman Stoddart Pty Ltd)

Glossary

Abbreviation	Definition
Applicant	Shoalhaven Starches Pty Ltd
BDAR	Biodiversity Development Assessment Report
Council	Shoalhaven City Council
Department	Department of Planning and Environment (DPE)
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EP&A (ST&OP) Regulation	Environmental Planning and Assessment (Savings, Transition and Other Provisions) Regulation 2017
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environment Protection Licence
FRNSW	Fire and Rescue NSW
LEP	Local Environmental Plan
Minister	Minister for Planning
MW	Megawatt
NRAR	Natural Resources Access Regulator, DPE
Planning Secretary	Secretary of the Department
RTS	Response to Submissions
SEPP	State Environmental Planning Policy
SRTS	Supplementary Response to Submissions
SSEEP	Shoalhaven Starches Ethanol Expansion Project (06_0228)
TfNSW	Transport for NSW

Contents

1 Introduction

This report provides the NSW Department of Planning and Environment's (the Department's) assessment of an application to modify the State significant development (SSD) consent for the Shoalhaven Starches Ethanol Expansion Project (06_0228, as modified). The modification application seeks consent to construct and operate a 60 megawatt (MW) gas fired co-generation plant at the Shoalhaven Starches factory in Bomaderry.

The application was lodged on 7 October 2021 by Shoalhaven Starches Pty Ltd (the Applicant) pursuant to section 4.55(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.1 Background

The Applicant has operated a factory at Bomaderry in the Shoalhaven local government area (LGA) since 1979 (see **Figure 1**). The factory receives wheat grain from mills in western NSW which is processed to produce flour, gluten, glucose, starch and ethanol for food, beverage, hand sanitiser, paper and fuel products. The factory is a 24 hour operation and has approximately 300 employees.

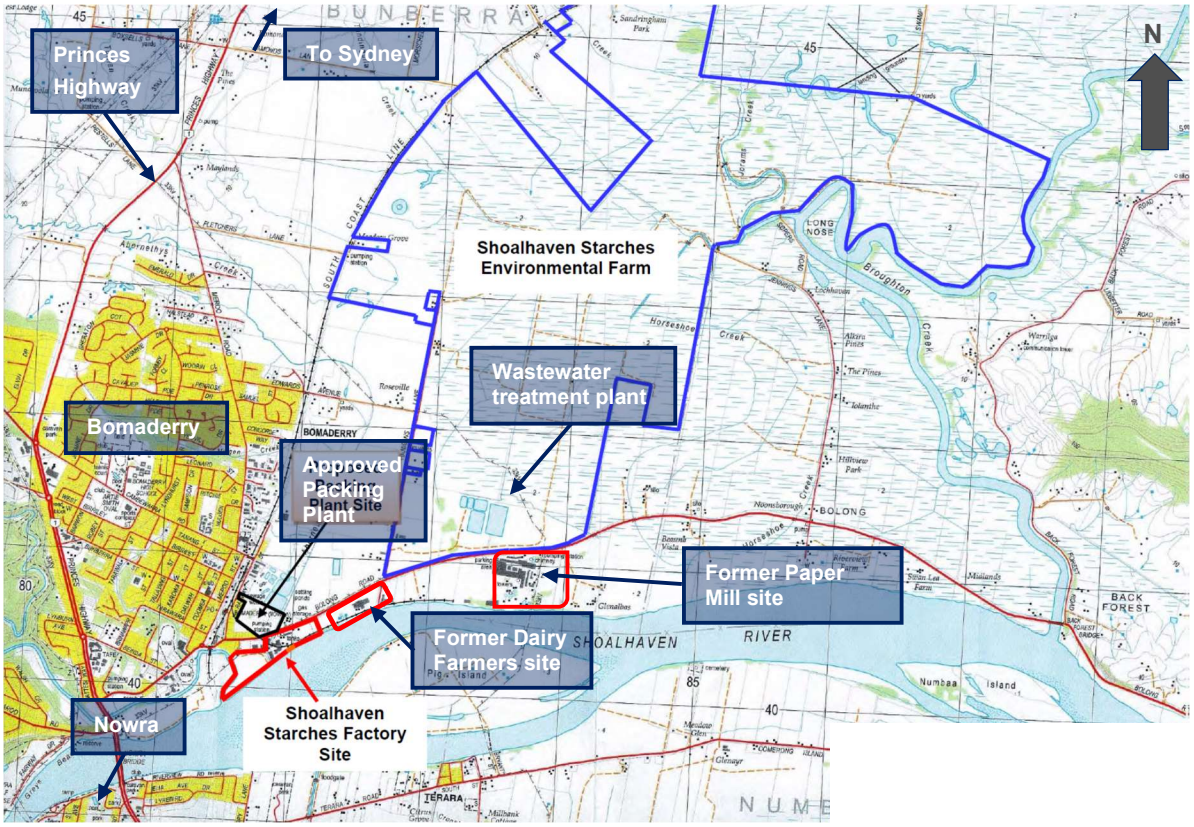

Figure 1 | Regional Location

1.2 Subject Site

The factory is located on the eastern fringe of Bomaderry and 2 kilometres (km) to the north-east of Nowra (see **Figure 2**). The factory is surrounded by other industrial premises, including a metal fabrication factory, meat packaging works and industrial and agricultural suppliers. The nearest residences are in Bomaderry, 300 metres (m) to the north-west.

Shoalhaven City Council's sewage treatment works is located 180 m to the north of the factory and Bomaderry railway station is located 500 m north-west. Shoalhaven Starches has a private rail spur line, which extends from the railway station across Railway Street and Bolong Road into the factory site, extending for approximately 750 m along the northern bank of the Shoalhaven River.

The Shoalhaven Starches factory encompasses the former Dairy Farmers complex and the former Shoalhaven Paper Mill, located east of the main factory on Bolong Road.

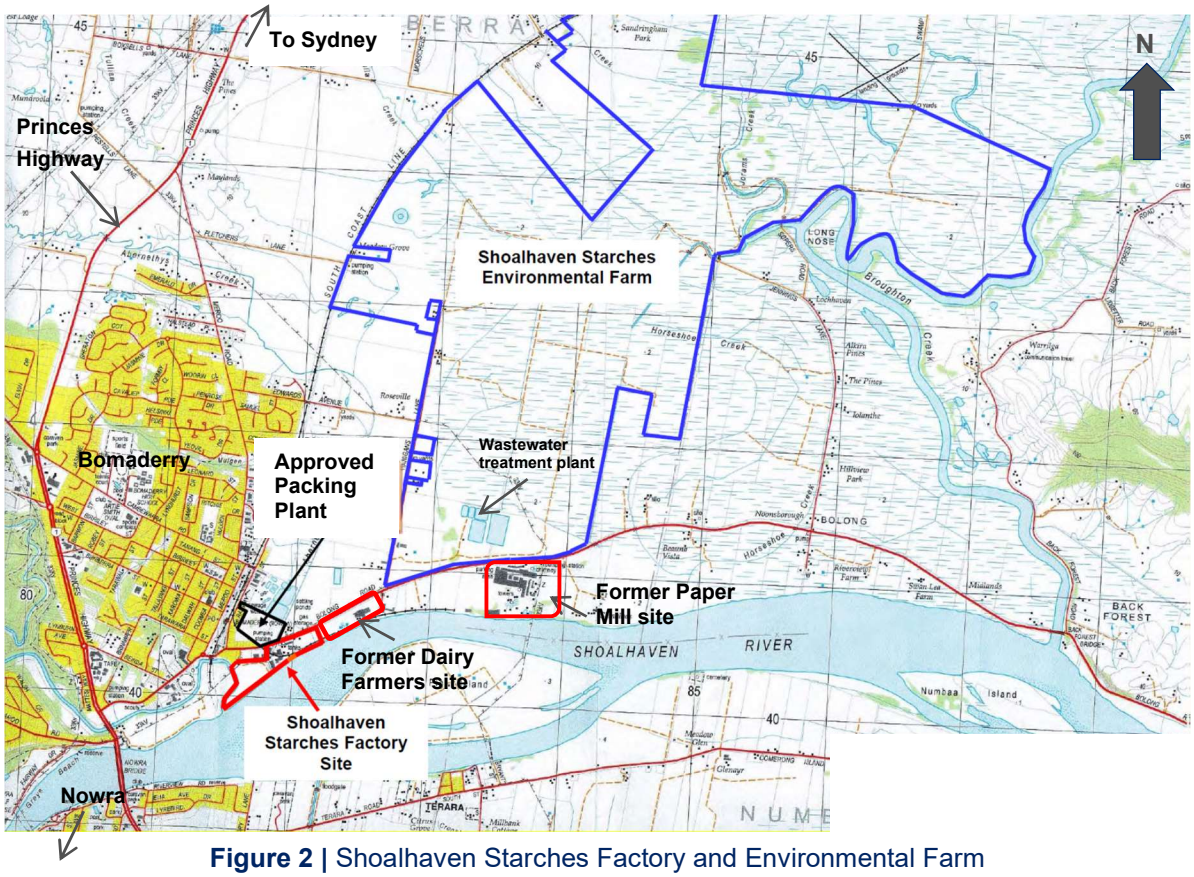

Figure 2 | Shoalhaven Starches Factory and Environmental Farm

The Applicant has recently obtained approval for several modifications to the factory which have enabled increases in ethanol and flour production and dried distillers grain (DDG) products. These changes have increased the electrical power demand of the factory so the Applicant proposes to construct a 60 megawatt (MW) gas fired co-generation plant to replace smaller approved, but not yet built, co-generation plants.

1.3 Approval history

Prior to 2009, the Applicant operated its factory under multiple, separate planning approvals issued by Shoalhaven City Council (Council) and the Minister for Planning (Minister).

Shoalhaven Starches Ethanol Expansion Project (06_0228)

In January 2009, the then Minister for Planning approved the Shoalhaven Starches Ethanol Expansion Project (SSEEP) under the now repealed Part 3A of the EP&A Act. The SSEPP approval consolidated all previous planning approvals for the site with the aim of simplifying regulation and compliance.

The SSEPP involved:

- staged increases of ethanol production from 126 megalitres a year (ML/yr) to 300 ML/yr following successful implementation of mandatory odour controls
- implementation of mandatory odour controls including a wastewater treatment plant and biofilter
- installation of additional infrastructure at the dried distillers grain (DDG) plant, ethanol and starch plants, a new packing plant, rail siding and product and wastewater pipelines.

By June 2012, the Applicant had installed the mandatory odour controls and the Department approved the increase in ethanol production (as prescribed in the conditions) to the maximum volume permitted being 300 ML/yr, subject to conditions, including quarterly odour monitoring and annual odour audits. However, demand for ethanol in fuels has not increased as predicted and ethanol production levels at the factory are currenlty around 225 ML/yr.

Given the reduced market demand for ethanol, the Applicant has progressively installed infrastructure over the last few years, to allow optimisation of flour products and increased production of beverage grade ethanol for alcohol products. This has required several modifications to the SSEEP approval, including a new starch dryer, flour mill and a beverage grade ethanol distillery at the factory. More recently, the Applicant obtained approval to produce hand sanitiser grade ethanol and on-site production of hand sanitiser products.

Modifications to 06_0228

The Minister has approved 21 modifications to the SSEEP since 2009. Most of the modifications were approved by the former Planning Assessment Commission (PAC) or Independent Planning Commission (the Commission) under the Minister's delegation. **Table 1** summarises the modifications.

Table 1 | Summary of Modifications

Mod No.	Summary of Modifications	Approval Authority	Type	Approval Date
1	• removed dried distillers grain (DDG) pelletising plant from the list of mandatory odour controls • implement alternate odour controls.	PAC	s75W	30 Sept 2011
2	• install two additional fermenter tanks, evaporator, beer column, heat exchangers, substation and compressors.	PAC	s75W	14 Sept 2012
3	• relocate 60 space staff car park to the former Dairy Farmers site	PAC	s75W	9 Oct 2012
4	• relocate the approved DDG pelletising plant, increases its footprint and height	PAC	s75W	24 Mar 2014
5	• modify the design, footprint and odour controls on the DDG pelletising plant.	PAC	s75W	16 Sept 2015
6	• demolish a disused industrial building • construct a temporary car park.	PAC	s75W	25 Nov 2015

7	• relocate Starch Dryer No. 5 and increase the footprint.	PAC	s75W	18 Jan 2016
8	• extend the existing flour mill, increase production from 265,000 to 400,000 tonnes per annum (tpa).	PAC	s75W	1 Mar 2016
9	• increase the size of the approved packing plant • construct a container storage area • extend and duplicate the rail spur line • install product pipes under Bolong Road and a small bag packer at the DDG pellet plant.	PAC	s75W	8 Mar 2017
10	• construct a new flour mill B and increase flour production from 400,000 tpa to 842,400 tpa.	PAC	s75W	18 April 2017
11	• reduce number of approved dryers, relocate dryers, construct maintenance building, biofilters and container storage area.	PAC	s75W	1 Sept 2017
12	• increase production of beverage grade ethanol • install rectification columns, cooling towers, substation, tanks, extend rail sidings	PAC	s75W	1 Sept 2017
13	• increase steam production from three existing boilers by converting to coal fired boilers	PAC	s75W	18 Jan 2018
14	• incorporate the former Shoalhaven Paper mill into the project approval	PAC	s75W	27 April 2018
15	• construct a carbon dioxide plant to capture and treat waste gas for resale.	IPC	s75W	7 Aug 2018
16	• construct a new flour mill and gluten dryer, specialty products building, boiler and coal-fired cogeneration plant • convert two gluten dryers to starch dryers.	IPC	s4.55(2)	18 June 2019
17	• relocate baghouse, install lifts for starch dryer. • use woodchips as boiler fuel source.	IPC	s4.55(1A)	23 October 2020
18	• produce 120 ML/yr of hand sanitiser grade ethanol and manufacture 1.5 ML/yr of hand sanitiser product	IPC	s4.55(1A)	4 September 2020
19	• increase beverage grade ethanol production, construct new distillery and storage tanks	Department	s4.55(1A)	8 March 2021
20	• install two additional liquid carbon dioxide storage vessels at the Supagas plant	Department	s4.55(1A)	26 October 2021

21	•	modifications to packing plant	Department	s4.55(1A)	Under Assessment
22	•	increase beverage grade ethanol production to 450 ML and install new distillery columns	Department	s4.55(2)	SEARs issued
24	•	amendments to gluten dryer 8	Department	s4.55(1A)	15 February 2022

Shoalhaven Starches Gas Pipeline Project (10_0108 & 10_0144)

On 30 October 2021, the then Planning Assessment Commission approved the Shoalhaven Starches Gas Pipeline Project (10_0108) under the now repealed Section 75J of the EP&A Act and a concept approval (10_0144) under the now repealed Section 75O and 75P of the EP&A Act. The approval involved the construction of a 5.5 km long private gas pipeline to connect the Shoalhaven Starches factory directly to the Eastern Gas Pipeline (EGP).

On 30 April 2021, an order made by the then Minister for Planning and Public Spaces' delegate was published in the Gazette declaring 10_0108 to be a State significant infrastructure (SSI) approval and 10_0144 to be an approval for a staged infrastructure application (SIA) under clause 5 of Schedule 2 of the EP&A (Savings, Transitional and Other Provisions) Regulation 2017 (EP&A (ST&OP) Regulation).

A request to modify these approvals to relocate the approved location of the associated Gas Pressure Reduction Station (GPRS) and to increase the diameter of the pipeline was approved by the Minister's delegate on 21 January 2022. A further modification to 10_0108 is currently being prepared by the Applicant to relocate the low-pressure gas pipeline from the new location of the GPRS to the site.

Council Issued Consents

Separate to the SSEEP approval, the Applicant sought and obtained development consents from Council for works associated with the factory. This has included:

- construction and operation of an interim packing plant at the factory (RA 11/1002)
- demolition of the dimethyl ether plant (DA 13/1713)
- construction of two additional grain silos for buffer storage (DA 14/2161).

Council also granted consent to the Applicant for road and site access upgrades, consistent with the SSEEP approval. These included:

- upgrades to site access points on Bolong Road, including the Dairy Farmers site access (DA 10/1843)
- widening the access point to the interim packing plant (DA 11/1855).

Two other Council issued consents apply to land adjacent to the factory and owned by the Applicant. These include the Algae Demonstration Facility and the Meat Processing Plant, both located at the former Dairy Farmers site.

2 Proposed modification

2.1 Proposed Modification

The modification is described in full in the Statement of Environmental Effects (SEE) included in **Appendix A** and is illustrated on **Figure 3** to Figure 5. The modification seeks to construct and operate a 60 MW gas fired co-generation plant at the Shoalhaven Starches factory in Bomaderry.

Table 2 | Components of the Modification

Aspect	Description
Gas fired co-generation plant	• two natural gas turbines of 30 MW each, with a combined power of 60 MW • two heat recovery steam generators • concrete building to house the co-generation plant and steam generators at 20.5 m high • two exhaust stacks at 45 m high and two bypass stacks at 30 m high (measurement taken above ground level) • four water tanks, 21.6 m high • a gas compressor to increase the pressure of gas supply to the turbines • electrical sub-station
Replace approved plant	• approved 15 MW coal fired co-generation plant will not be constructed • approved 40 MW gas fired co-generation plant will not be constructed
Existing boilers	• fit existing boilers 2, 4, 5 and 6 with natural gas burners and cease using coal and woodchips in these boilers • retain existing gas fired boilers 1, 3, 7 and 8 (currently under construction) on standby for use during maintenance of the co-generation plant • continue operating boilers 5/6 using gas to supplement supply
Relocate approved plant	• slight realignment of an approved pipe bridge connecting the co-generation plant to the factory • relocate the approved, but yet to be built, DDG 6 Dryer to the south of the existing DDG 4 Dryer • relocate approved, but yet to be built, 6 cooling towers adjacent to the DDG 4 Dryer
Hours of operation	• 24 hours, 7 days, consistent with existing factory
Employment	• 80 construction jobs, 10 operational jobs
Capital investment	• $114 million

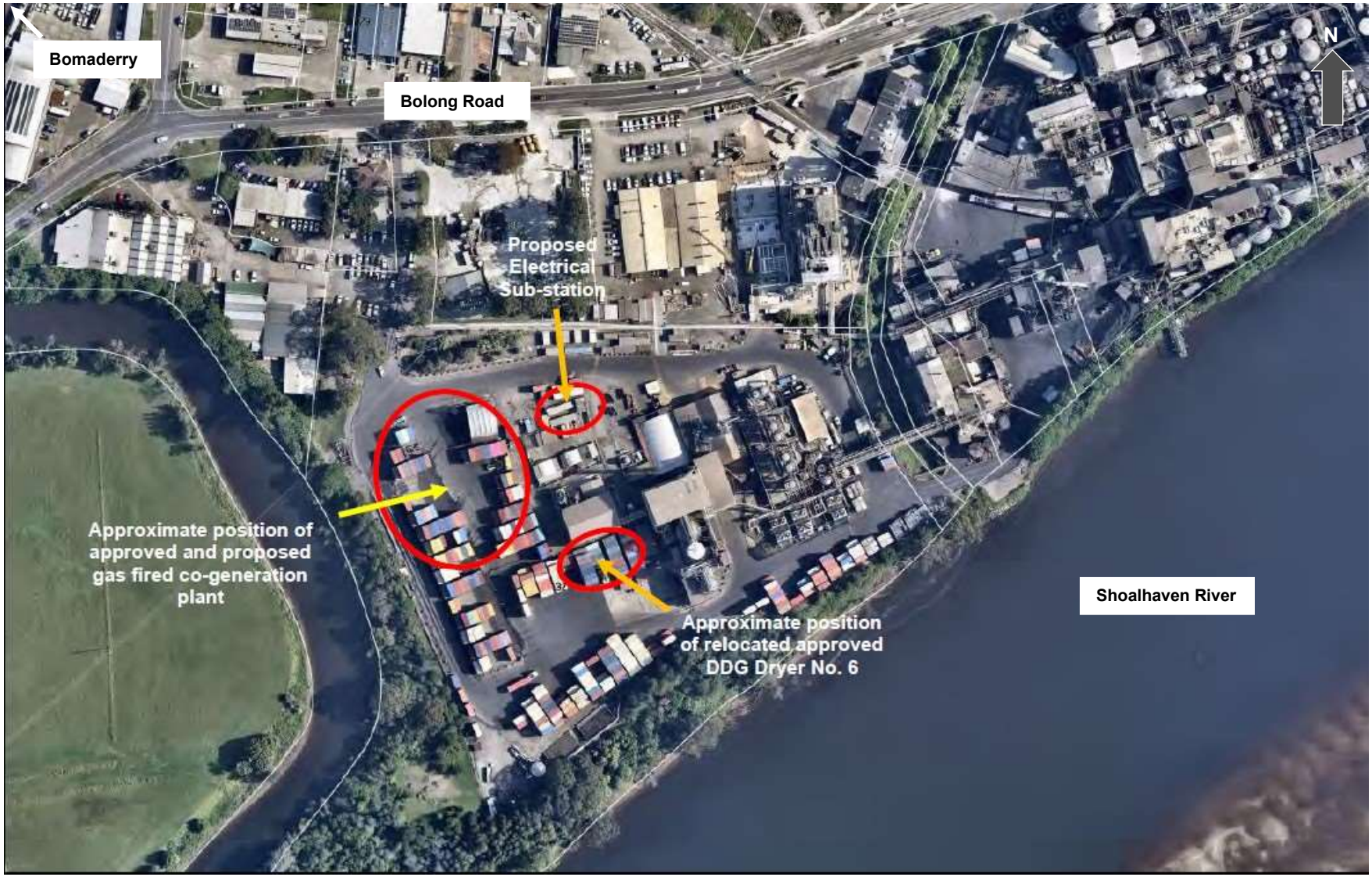

Figure 3 | Location of Co-generation Plant and Relocated DDG Dryer 6

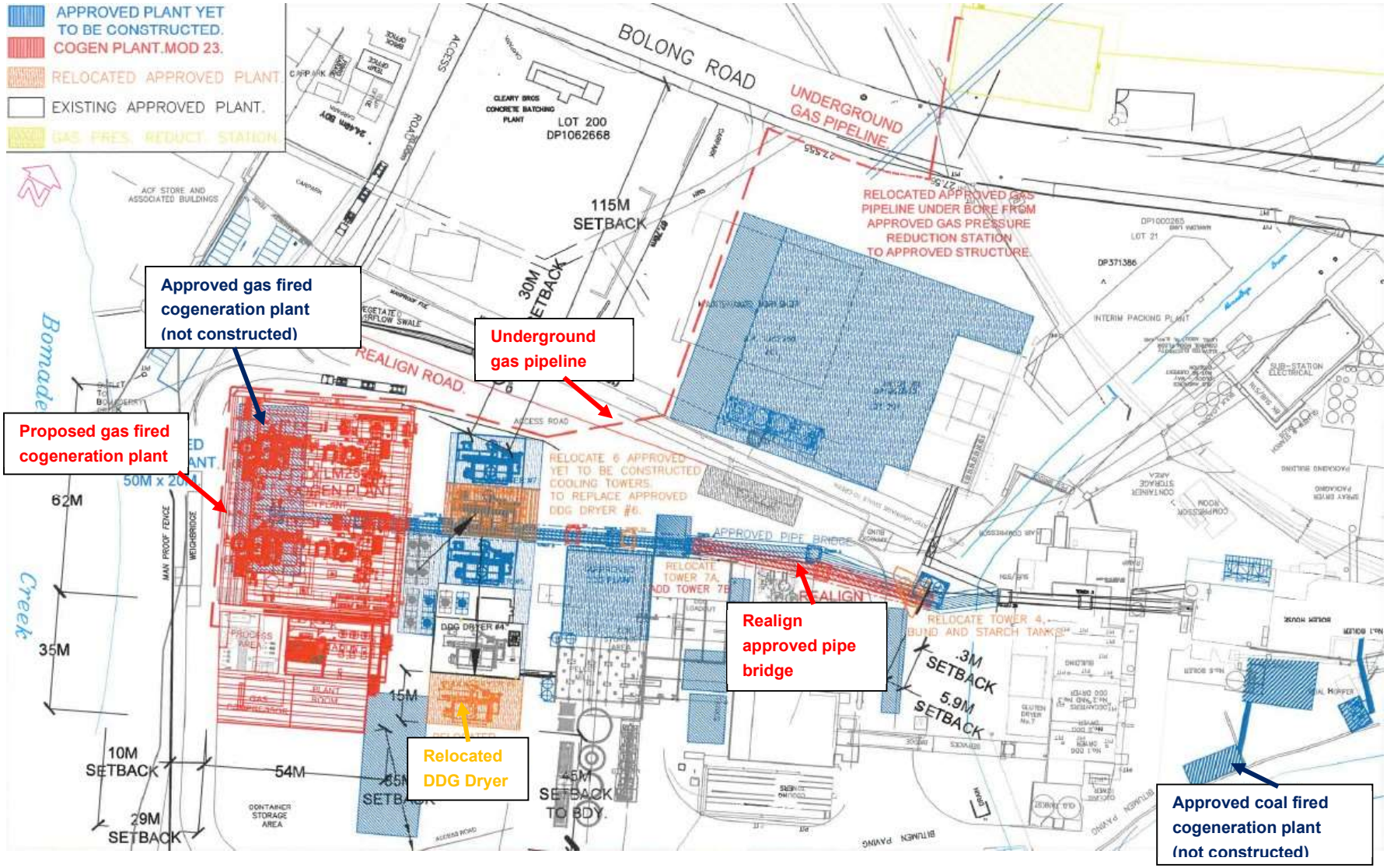

Figure 4 | Location of Proposed Co-generation Plant (red shading) and Relocated DDG Dryer (orange shading)

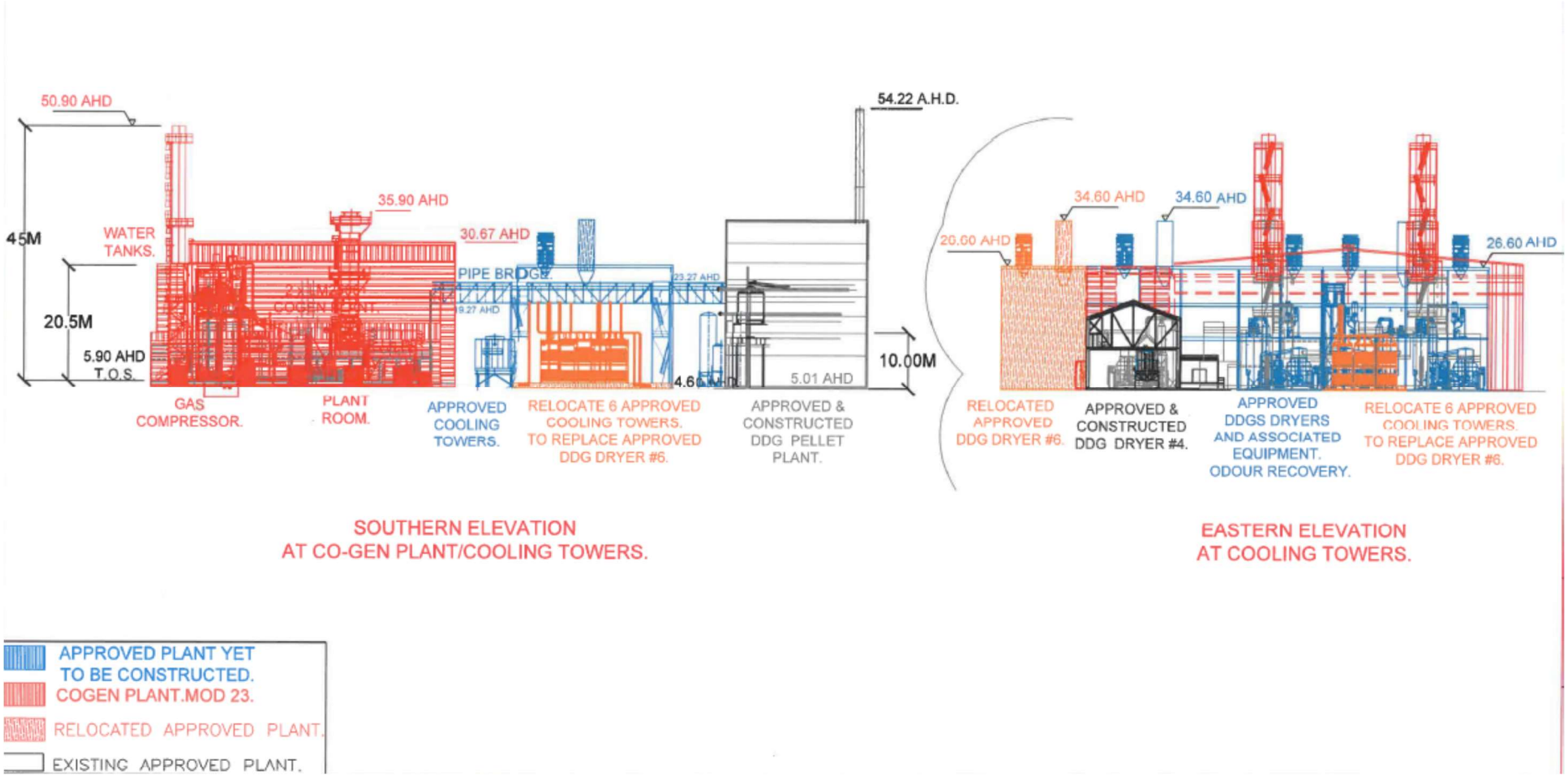

Figure 5 | Co-generation Plant – Elevations

2.2 Applicant's Justification for the Proposed Modification

The Applicant has recently obtained approval for several modifications to the Shoalhaven Starches factory involving increases in ethanol and flour production and dried distillers grain (DDG) products. These modifications have increased the electrical power requirements for the factory, with the approved 40 MW gas fired and 15 MW coal fired plants no longer sufficient to meet the power demand. The proposed 60 MW plant will provide sufficient power for these increased factory operations.

The proposed gas fired co-generation plant has the dual purpose of providing direct power supply as well as steam generated from waste heat from the turbine exhausts. This co-generation (steam and electricity) would substantially reduce the volume of electricity purchased from the grid.

3 Statutory context

3.1 Scope of Modifications

The Department has reviewed the scope of the modification application and considers the application can be characterised as a modification as the proposal:

- the primary function and purpose of the approved development would not change as a result of the proposed modification
- any potential environmental impacts would be minimal and appropriately managed through the existing or modified conditions of consent
- the modification is of a scale that warrants the use of section 4.55(2) of the EP&A Act.
- is substantially the same development as last modified under the former section 75W of the EP&A Act
- would not involve any further disturbance outside the already approved disturbance areas for the development.

Therefore, the Department is satisfied the proposed modification is within the scope of section 4.55(2) of the EP&A Act and does not constitute a new development application (DA). Accordingly, the Department considers that the application should be assessed and determined under section 4.55(2) of the EP&A Act rather than requiring a new DA to be lodged.

3.2 Consent Authority

The Minister for Planning (Minister) is the consent authority for the application under section 4.5(a) of the EP&A Act. Under the Minister's delegation of 9 March 2022, the Director, Industry Assessments, may determine the application under delegation as:

- the application has not been made by a person who has disclosed a reportable political donation under section 10.4 of the EP&A Act
- there has been less than 15 public submissions (other than a council) in the nature of objections, and
- Council has not made a submission by way of objection under the mandatory requirements for community participation listed under Schedule 1 of the EP&A Act.

3.3 Part 3A Transition to State Significant Development

This project was originally approved under the former section 75J of the EP&A Act and was a transitional Part 3A project under Schedule 2 of the Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017 (EP&A (ST&OP) Regulation).

On 7 September 2018, an order made by the Minister's delegate was published in the Gazette declaring the development that was a Part 3A project to be State significant development under clause 6 to Schedule 2 of the EP&A (ST&OP) Regulation. As a result, the project approval is taken to be a State significant development consent under Part 4 of the EP&A Act and may be modified under section 4.55 of the EP&A Act.

3.4 Biodiversity Conservation Act 2016

Clause 30A(2)(c) of the Biodiversity Conservation (Savings and Transitional) Regulation 2017 specifies that if the determining authority is satisfied a modification will not increase the impact on biodiversity values, a biodiversity development assessment report (BDAR) is not required.

The modification does not propose any development outside of the existing Shoalhaven Starches factory footprint. The co-generation plant would be located in the same area already approved for construction of a smaller co-generaiton plant. The area comprises of hard stand and is currently used to store shipping containers. The Department consides the modification would not impact on biodiversity values.

For the reasons discussed above, the Department's assessment concludes a BDAR is not necessary for the proposed modification.

4 Engagement

4.1 Department's Engagement

In accordance with clause 10 of Schedule 1 to the EP&A Act and clause 118 of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation), the Department exhibited the application for 14 days from 22 October 2021 to 4 November 2021. Notice of the application was published on the Department's website.

Landowners near the site and previous submitters on the original application were notified of the modification application and invited to make a submission. The modification application was also referred to Shoalhaven City Council, Environment Protection Authority, Roads and Maritime Services & Transport for NSW, Fire and Rescue NSW, the Department's Water Group and the Australian Department of Defence.

4.2 Key Issues – Public Submissions

During the exhibition period, the Department received a total of 3 submissions from the public. Of the 3 submissions, one supported and two objected to the proposal (one of the objections was originally lodged as 'comments' but later changed to an objection).

The submission supporting the proposal noted its support for Australia producing more of its own fuel (ethanol).

The submissions objecting to the modification did so on the basis of the greenhouse gas (GHG) emissions from using gas as an energy source. The submissions:

- noted the catastrophic impacts of climate change and considered the proposal unacceptable on environmental, economic and social grounds
- noted the modification is at odds with the NSW Government's 2030 commitment to reduce carbon emissions
- recommended the Applicant consider using renewable energy sources instead of gas.
- raised questions about the methods used and conclusions made in the GHG assessment and the risks to jobs if the supply of gas is compromised.

The Department has considered the issues raised in the public submisisons in **Section 5.2** of this report.

4.3 Government Advice

Advice was received from four government authorities including Shoalhaven City Council, Environment Protection Authority, Transport for NSW and the Department's Water Group (DPE Water). A summary of this advice is provided below.

Shoalhaven City Council (Council) did not object to the modification. Council reviewed the odour and noise assessments noting these predicted compliance with the relevant criteria at sensitive receptors. Council did not recommend any updated conditions.

Council reviewed the flood compliance report and noted the development would not change the 1% AEP flood level outside of the factory site. Council recommended conditions for construction on flood prone land including engineer's certification requirements, locating hazardous substances above the 1% AEP flood level and preparation of a flood evacuation plan.

Council noted the Applicant should confirm sewer and water asset locations in the vicinity of the proposed gas pipeline before any trenching or underboring works.

The **Environment Protection Authority** (EPA) reviewed the air and noise assessments and requested further technical information to fully understand the impacts of the modification. The EPA requested consideration of potential annoying noise characteristics from the co-generation plant, justification for the emission estimates used in the air quality modelling and an assessment of compliance with the Protection of the Environment Operations (Clean Air) Regulation 2021.

Transport for NSW (TfNSW) noted the proposed works for the pipeline under Bolong Road would require approval from Council under Section 138 of the *Roads Act 1993* and concurrence from TfNSW. TfNSW did not recommend any conditions. Sydney Trains commented as part of the TfNSW advice, raising no concerns about the pipeline underboring as the rail spur line in this location is privately owned (Shoalhaven Starches owns the line).

The **Department's Water Group** (DPE Water) and Natural Resources Access Regulator (NRAR) found no issues associated with water and therefore had no comments.

Fire and Rescue NSW (FRNSW) were consulted but did not provide a response.

4.4 Response to Submissions (RTS)

On 28 January 2022, the Applicant submitted a Response to Submissions (RTS) report responding to the issues raised in submissions. The RTS was made publicly available on the Department's website and referred to the EPA for comment. The RTS included:

- a revised air quality assessment
- a revised environmental noise assessment
- a response to the public submissions with clarifications on the greenhouse gas assessment

The **EPA** reviewed the revised air and noise assessments and requested further noise assessment information. The EPA requested three dimensional (3D) modelling of noise generated by the co-generation plant and noted the need for a site-wide model to fully understand the noise impacts of the modification and any future changes at the factory site. Following a meeting between the Department, the Applicant and the EPA, the Applicant agreed to provide a 3D noise model of the co-generation plant for the purpose of this modification and has committed to providing a full site-wide noise model for future modifications (noting the model would take around 3 months to complete).

The EPA was satisfied with the revised air quality assessment and provided recommended conditions. These included limitations on additional boilers operating concurrently with the co-generation plant, changes to air emission limits based on the modelling provided and monitoring and verification reporting following conversion of the coal and wood chip boilers to using gas.

The Department received further correspondence from the two **public** objectors following their review of the RTS. These submissions re-iterated the importance of seeking alternative and renewable energy sources for the proposal and refuted the Applicant's statements that renewable sources are not suitable for meeting the steam and energy needs of the factory. The submissions reviewed the clarifications on the GHG assessment and noted the modification would increase GHG emissions, when the use of renewable energy would reduce emissions to near zero. The submissions maintained the true impacts and consequences of increased GHG emissions are not accounted for in the assessment.

4.5 Supplementary Response to Submissions (SRTS)

On 16 March 2022, the Applicant provided a SRTS which included a revised environmental noise assessment including a 3D model of the co-generation plant and relocated DDG dryer and cooling towers. The SRTS was made publicly available on the Department's website.

On 1 April 2022, the EPA provided final comments on the revised environmental noise assessment and recommended conditions for noise verification monitoring.

5 Assessment

The Department has assessed the merits of the proposed modification. During this assessment, the Department has considered the:

- SEE, RTS and SRTS provided to support the proposed modification (see **Appendix A**)
- Department's assessment report for the original application and subsequent modification application(s) (see **Appendix A**)
- submissions from the public and advice from State government authorities and Council (**Appendix A**)
- relevant environmental planning instruments, policies and guidelines
- requirements of the EP&A Act, including the objects of the EP&A Act.

The Department considers the key assessment issues are:

- air quality and odour
- greenhouse gas
- noise.

The Department's assessment of other issues is provided in **Table 4**.

5.1 Air Quality and Odour

Background

The modification would alter air emissions from the factory as the gas-fired co-generation plant and conversion of the existing coal fired boilers to gas would change the type and quantity of emissions generated. The Applicant has implemented a range of air quality and odour controls since the 2009 project approval and aims to ensure air quality and odour impacts do not increase with subsequent modifications. The nearest sensitive receivers are the residences located in Bomaderry, 300 m to the north-west of the proposed co-generation plant.

The Environment Protection Licence (EPL) for the factory includes limits for air emissions with over 20 monitoring points located on various stacks and discharge points throughout the site including the gluten and starch dryers, dried distillers grain (DDG) plant, boilers, effluent storage dams and biofilters. The results of monitoring for the 2020-21 annual report showed boilers 5/6 were complying with the EPL air emission limits for total solid particles (TSP), volatile organic compounds (VOCs), oxides of nitrogen (NO_x) and sulfur dioxide (SO_2). There were four complaints about odour during the 12 month reporting period. Odour emissions are largely driven by the processing components of the gluten and starch dryers, DDG plant and the ethanol plant.

Predicted Air Quality Impacts

The SEE included an Air Quality Assessment (AQA) which was updated in the RTS to address comments from the EPA. The EPA requested detailed specifications for the co-generation plant to confidently predict emissions and requested clarifications on which boilers would continue to be used in conjunction with the co-generation plant.

The AQA estimated emissions from the modification and cumulative emissions from the factory for comparison with impact assessment criteria. The air quality model was scaled to the maximum

approved ethanol production rate of 300 ML/yr to provide a worst-case assessment, noting the factory is currently producing around 225 ML/yr. A maintenance scenario was also modelled, when one gas turbine would be offline and additional boilers would operate to produce energy and steam.

The AQA predicted particulate matter concentrations (PM_{10} and $PM_{2.5}$) would be below the impact assessment criteria at all residential receivers. There would be a minor exceedance of the 24-hour PM_{10} criteria at an adjacent commercial receiver on two occasions per year, with a cumulative concentration of 50.8 ug/m^3 compared to the criteria of 50. The exceedance is primarily attributable to high background concentrations, with the modified factory contributing between 4% to 8% of the total.

The modification was predicted to substantially reduce the emissions of combustion pollutants, SO_2, nitrogen dioxide (NO_2) and carbon monoxide (CO), due to the conversion of boilers from coal to gas. Modelling predicted SO_2, NO_2 and CO would be well below the impact assessment criteria when considered cumulatively with background levels. Emissions of polycyclic aromatic hydrocarbons (PAHs), VOCs and metals were all well below the impact assessment criteria for principal toxic air pollutants due to the removal of coal.

Predicted Odour Concentrations

The AQA modelled odour emissions using a baseline model that was established for the site, capturing all approved modifications up to and including MOD 21 (currently under assessment). The model includes all odour sources, including approved components that have not yet been constructed (such as new gluten and product dryers). The key component of this modification that would alter odour emissions is the conversion of boilers from using coal and woodchips to using gas.

The AQA predicted odour concentrations at the nearest residential receivers would range between 3 – 5 odour units (OU) which is consistent with existing emissions from the factory. The predictions are consistent with the EPA's odour impact assessment criteria for residential areas, which ranges from 2 to 7 OU, depending on population density. There is expected to be a minor reduction in odour emissions due to the removal of coal and woodchips from use in the boilers. **Figure 6** shows the predicted odour contours for the modification (shown in green) compared with the approved factory, up to and including MOD 21 (pink and aqua show odour results from two different monitoring events).

Odour concentrations at commercial receivers were predicted to be above the EPA impact assessment criteria for residences, but consistent with odour concentrations from the existing factory. Odour at the nearest commercial receivers, located immediately adjacent to the factory, ranged from 7 to 12 OU. The AQA noted these levels would not cause significant odour impacts, given the industrial nature of the receivers.

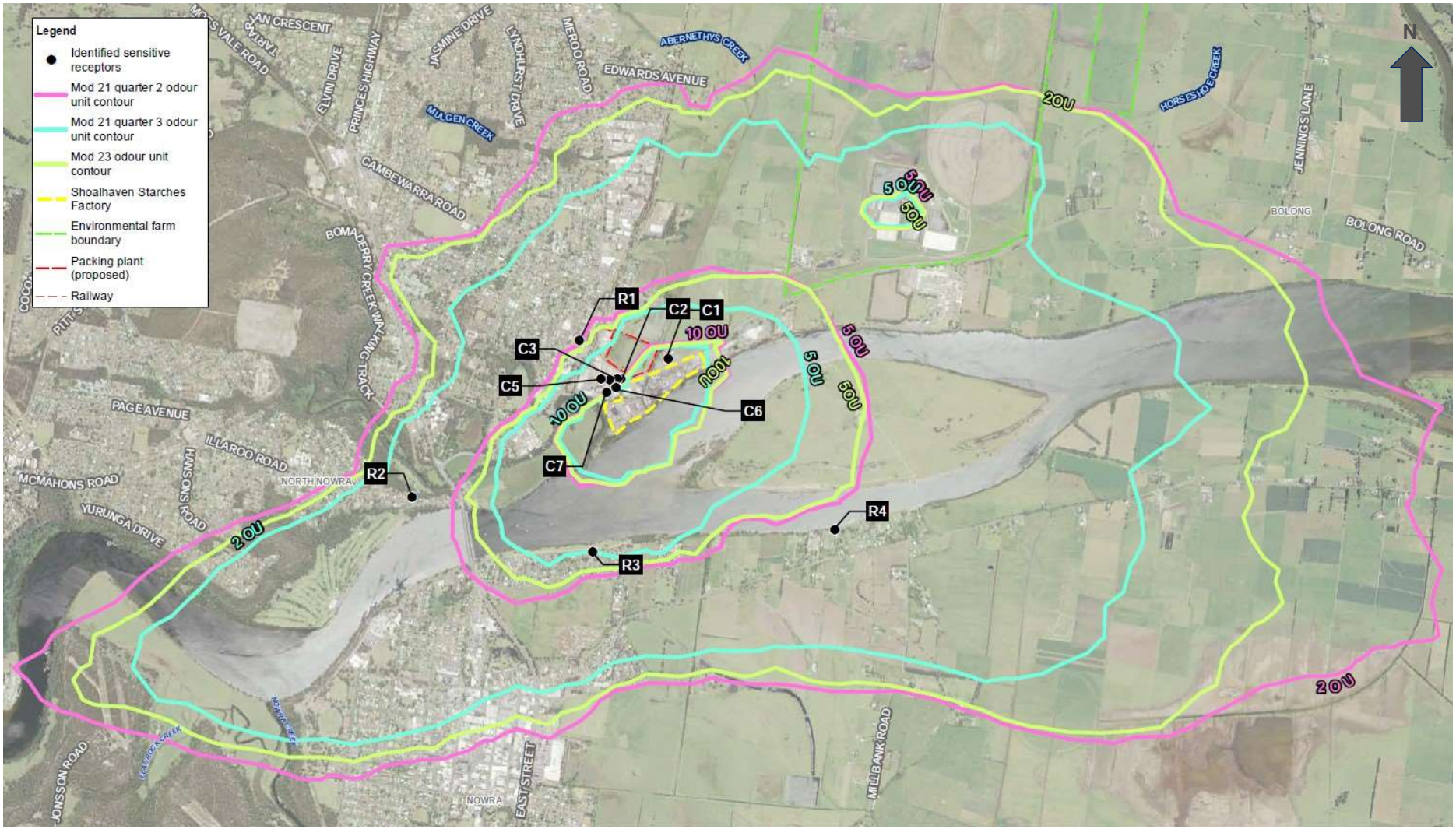

Figure 6 | Predicted Odour Concentrations (Mod 23 and Existing Factory)

Asessment and Recommendation

The Department reviewed the revised AQA in consultation with the EPA. The EPA confirmed the AQA had adequately addressed the issues raised and recommended conditions for emission limits, on-going monitoring and verification reporting.

The Department notes the conversion of boilers from using coal and woodchips to using gas would result in a reduction in emissions of SO_2, NO_2, CO and principal toxic air pollutants. Emissions from the factory would be well below the impact assessment criteria with the exception of a minor exceedance of the 24-hour PM_{10} criteria at an adjacent commercial receptor. The Department notes that the modified factory would contribute only a small percentage to the total concentration and would be unlikely to result in adverse impacts at this receiver. Concentrations at all residential receivers would be well below the criteria. Odour predictions would be similar to the existing factory and are consistent with the impact assessment criteria.

The AQA has demonstrated that the modified factory would not result in adverse air quality impacts and the conversion of existing boilers to using gas would result in minor improvements in air emissions from the factory. The existing consent includes conditions requiring emissions from the boilers to comply with the limits in the EPL. The EPA would update the EPL conditions to be consistent with the predictions made in the AQA, which are lower than the current limits. The EPA also recommended a condition limiting the use of the boilers when the co-generation plant is in maintenance and this recommendation has been incorporated into the modified conditions.

There are existing conditions covering the approved coal fired co-generation plant and coal-fired boilers. The conditions for the coal-fired boilers are still relevant until the boilers are converted to gas, so they have been retained in the consent. An additional condition is recommended to clarify that the 15 MW coal fired co-generation plant and 40 MW gas-fired co-generation plant are no longer approved.

In relation to odour, the consent requires quarterly monitoring of key emission sources at the factory and an annual odour audit. Given the minimal change in odour emissions due to the modification, no further conditions are required to manage odour.

The Department's assessment concludes the removal of coal from use in boilers and the proposed (but not built) coal-fired co-generation plant would result in a minor reduction in air emissions from the factory. The proposed 60 MW gas-fired co-generation plant would not result in any adverse air quality impacts and cumulative emissions from the factory would be below relevant criteria. The Department has recommended some minor changes to the existing conditions for air quality management.

5.2 Greenhouse Gas

Background

The modification would alter the greenhouse gas (GHG) emissions from the factory due to the proposed conversion from coal to gas for energy generation.

GHG Emissions from the Modification

The Applicant provided a GHG assessment for the modification, comparing current emissions (measured in 2020) with two scenarios:

1. Increased production (to the approved level of 1,300,000 tonnes of flour per year) without the gas-fired co-generation plant

2. Increased production (to the approved level of 1,300,000 tonnes of flour per year) with the gas-fired co-generation plant.

Current emissions from the factory are measured and reported annually in accordance with the *National Greenhouse and Energy Reporting (NGER) Act 2007* (NGER Act). This includes scope 1 (direct emissions from on-site combustion of gas, coal, biogas and diesel) and scope 2 (indirect emissions from the purchase and consumption of grid electricity). The 2020 emissions are based on annual flour production of 866,625 tonnes (being 66% of the maximum approved production rate).

Table 3 compares GHG emissions from existing operations (2020) with the two assessment scenarios.

Table 3 | GHG Emissions, Existing and Proposed

Activity	Existing 2020	Scenario 1 – Increased production without co-generation plant	Scenario 2 – Increased production with co-generation plant
Flour Production (tonnes/year)	866,625	1,300,000	1,300,000
Scope 1	351,973	450,836	436,400
Scope 2	247,016	361,876	35,478
Total (t CO_2-e/a)[1]	**598,989**	**812,712**	**471,878**

[1] tonnes of carbon dioxide equivalent / annum (t CO_2-e/a)

The largest contributor to existing emissions is the combustion of coal, which contributes 269,854 t CO_2- e/a, equivalent to 45% of total emissions. Recent modifications have approved increases to flour production, up to 1,300,000 tonnes/year. At this increased rate of production, and with the Applicant maintaining its existing and approved energy generation systems, emissions would increase to 812,712 t CO_2-e/a. The majority of this increase is attributable to the increased consumption of gas and grid electricity. With the proposed co-generation plant providing the majority of the factory's energy and steam requirements, emissions would reduce to 471,878, with the reduction coming from the removal of coal and the substantial reduction in grid electricity required to produce steam. The GHG assessment noted the modification would contribute 0.09% to Australia's annual GHG emissions total.

Issues Raised in Submissions

Two public submissions objecting to the modification raised concerns about the GHG emissions from using gas as an energy source. The submissions recommended the Applicant consider using renewable energy instead of gas and questioned the methods in the GHG assessment, including the consideration of annual emissions instead of whole-of-life emissions, no comparison with renewable energy alternatives, the exclusion of fugitive gas emissions from the calculations and the conclusion that emissions would be minor in the context of Australia's total emissions.

The public submissions also raised broader concerns about the modification being at odds with the NSW Government's commitment to reducing GHG emissions, the modification locking in future demand

for gas supply projects that have considerable environmental impacts and the catastrophic impacts on climate change from any additional carbon emissions.

The EPA did not raise any concerns about greenhouse gas emissions.

Assessment and Recommendation

The Department has considered the issues raised in public submissions and the GHG assessment in the context of the existing factory operations and total NSW and Australian emissions. The Department notes the assessment was prepared in accordance with accepted guidelines and notes the Applicant measures and reports annual GHG emissions in accordance with the NGER Act.

The modification is predicted to reduce total emissions from the factory, when considering the maximum approved flour production rates. The largest reduction in emissions comes from the removal of coal from use in the existing boilers and the reduced consumption of grid electricity, as the co-generation plant would produce both steam and electricity. Total predicted emissions from the factory would be 471,878 t CO_2-e/a compared with 598,989 t CO_2-e/a from existing operations. The predictions would be verified through the obligation to annually report emissions in accordance with the NGER Act. Emissions from the modified factory represent 0.36% of NSW emissions (130 million tonnes/annum) and 0.09% of Australian emissions (510 million tonnes/annum).

Fuel production (including extraction, processing and distribution) and combustion accounts for 80% of NSW emissions, with coal the most significant contributor. **Figure 7** shows the emission contributions of different fuel types. The most significant emissions reductions can be achieved by reducing coal combustion. The modification would reduce coal combustion on the site to zero and substantially reduce purchased electricity, most of which is currently generated by coal combustion. While the modification would increase gas consumption, the Department considers the Applicant has provided adequate justification of the need to use gas to maintain 24 hour operations. The Applicant has also indicated that it would re-asess its fuel supply within 10 years, and notes the co-generation plant is designed to allow for a mix of hydrogen (a low emissions fuel) and gas, should hydrogen become commericaly viable in the future.

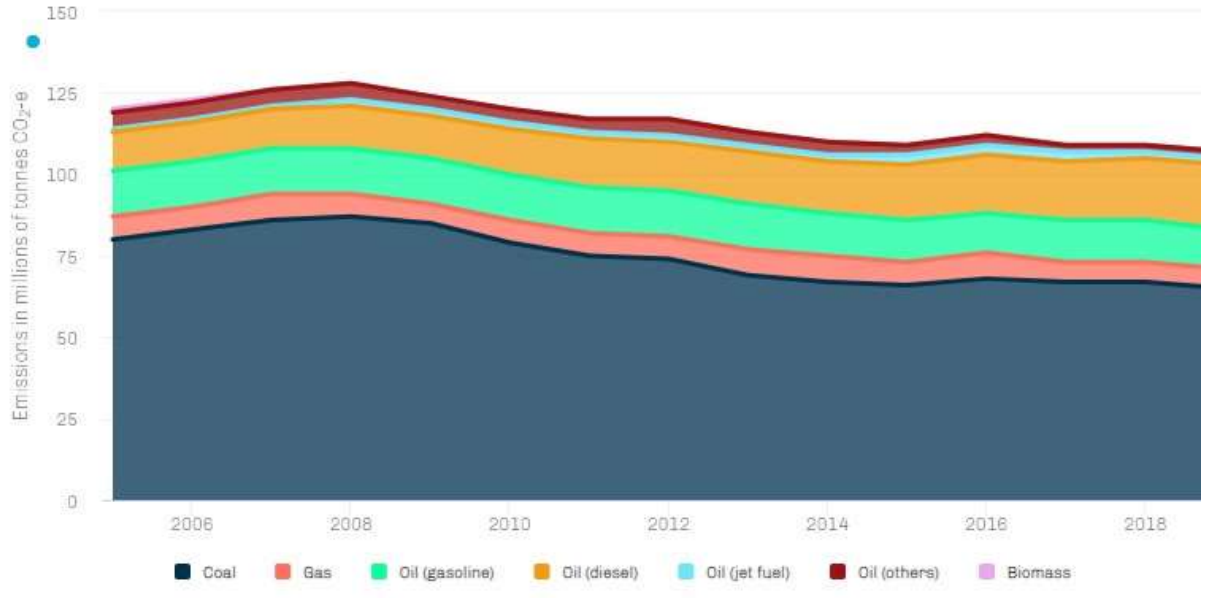

Figure 7 | NSW GHG Emissions by Fuel Type

The Department considers the Applicant has provided an adequate GHG assessment which concludes the modification would reduce overall emissions from the factory compared to existing operations. The co-generation plant would provide the majority of the factory's steam and energy requirements, reducing its long-term reliance on coal for use in the boilers. The modification would also reduce other pollutants generated by the combustion of coal including sulfur dioxide, nitrogen dioxide and carbon monoxide. The Department's assessment concludes the modification would reduce GHG emissions from the factory and no specific conditions are required given the Applicant has continued obligations to measure and report annual emissions under the NGER Act.

5.3 Noise

Background

The modification has the potential to increase noise from the site, including noise with different characteristics, such as low-frequency and tonal noise. The modification involves the construction of two gas turbines inside a concrete building, with four exhaust stacks. The co-generation plant would be located in the western part of the site where a smaller gas-fired co-generation plant was approved, but not built. This part of the site is approximately 300 m from the nearest residences in Bomaderry. The modification also involves relocating the approved DDG 6 dryer and six cooling towers slightly further north than the approved location.

The SEE included an Environmental Noise Assessment which was updated in the RTS and again in the SRTS to address comments from the EPA. The noise assessment modelled noise emissions from the co-generation plant and relocated DDG dryer and cooling towers and considered cumulative noise impacts from the whole site for comparison with existing noise limits.

The development consent and EPL include noise limits for residential receivers in Bomaderry to the west, Nowra to the south-west and Terara to the south. These limits have been in place since the SSEEP was approved in 2009. There have been numerous modifications to the factory since then, with the Applicant identifying the need for new plant to have a design goal of 15 decibels below the noise limits. This is necessary to ensure any new equipment does not increase noise from the whole site above the noise limits. The most recent noise monitoring conducted for the 2020-21 annual report confirmed noise from factory operations is complying with the noise limits and there were no noise complaints over the 12 month reporting period. Noise was not raised as an issue in any public submissions on the modification.

Noise Modelling

The EPA requested the noise assessment include noise emission data for the co-generation plant, consideration of cumulative impacts and analysis of the potential for annoying noise characteristics such as low frequency, intermittent or tonal noise. Further information was also requested on construction phase impacts.

The revised noise assessment provided in the SRTS included 3D modelling to predict the noise levels at receivers during worst-case operating conditions (involving two of the four exhaust stacks operating at once). The modelling used noise measurement data from the manufacturer and took account of noise shielidng provided by the concrete building that would house the co-generation plant. Analysis of the manufacturer's data indicated that low-frequency, intermittent and tonal characteristics were below the base levels in the EPA's Noise Policy for Industry 2017 (NPfI), and do not require a modifying factor adjustment for the assessment.

The modelling predicted noise from the co-generation plant and the relocated DDG 6 dryer and cooling towers would comply with the design goal of 15 decibles below the noise limits. The cumulative noise emissions from the factory were predicted to comply with the noise limits at receivers in Bomaderry, Nowra and Terara. The maximum predicted noise level from the factory is 42 decibels [dB(A)] at the closest residences in Meroo Street, Bomaderry compared with a noise limit of 42 dB(A). Noise levels in Terara were predicted to be 37 dB(A) compared to a limit of 38.

The predictions assumed specific controls would be in place, including minimum standards for the walls, roofs, louvres and doors on the building and limiting the number of openings on the facades. The Applicant proposes to include these specifications in a noise design verification report, prepared prior to construction.

Construction Noise

The ENA considered construction noise impacts at the nearest residences, considering the key activities of piling, concrete pouring and building construction. The assessment concluded there is potential to exceed the noise management levels (NMLs) by up to 10 decibels (dB) at the closest receptors in Bomaderry, with noise levels of up to 58 dB(A) during hammer piling, compared with a NML of 48 dB(A). For general construction activities, noise levels of 52 dB(A) are predicted. The Applicant indicated that piling activities would occur for a four week period and residences would be consulted about preferences for respite periods or a shorter construction timeframe. All construction activities would be undertaken during standard day time working hours and in accordance with a construction noise management plan.

Assessment and Recommendation

Following a detailed review of the revised noise assesment, the EPA advised there is potential for the noise limits to be exceeded, particularly during noise enhancing weather conditions, or at residences not identified as the nearest sensitive receivers. The EPA recommended any approval include a noise compliance report to verify the co-generation plant is meeting the predictions made in the noise assessment and to identify additional measures to be implemented if exceedances are identified. The EPA advised it was satisfied with the construction noise assessment.

The Department reviewed the noise assessment, the EPA's comments and the Applicant's Annual Report, concluding the modification would meet existing noise limits, provided specific design criteria are met. The Department notes six-monthly noise monitoring indicates the existing factory is complying with the noise limits and there were no noise complaints over the 2020-21 reporting period.

The Department notes the EPA's concerns about the modification potentially exceeding the noise limits, as the 3D model was limited to the co-generation plant only, and the site-wide 3D model is not yet complete. The site-wide 3D noise model will provide a comprehensive picture of noise contributions from the whole site and will be the appropriate mechanism for determining if additional noise controls are required on certain items of plant and equipment across the factory.

The Department considers the noise assessment has demonstrated the co-generation plant can be designed to meet the noise limits. The consent requires a design noise verification report prior to construction of any modification and noise validation monitoring once the modification is operating. The conditions also require the Applicant to implement additional reasonable and feasible mitigation measures, if monitoring indicates the noise limits are being exceeded. The Department considers these conditions are adequate for ensuring noise from the co-generation plant complies with the noise limits.

The Department has considered the potential for noise impacts during construction and concludes the short-term impacts can be managed in accordance with a construction noise management plan detailing consultation with residences and respite periods. The consent includes a requirement for a construction noise management plan to be updated for each modification.

The Department's assessment concludes the modification would not result in adverse noise impacts and the existing conditions for pre and post construction noise verification would ensure the co-generation plant and relocated DDG dryers comply with the noise limits in the consent and EPL.

5.4 Other Issues

The Department's assessment of other issues is provided in **Table 4**.

Table 4 | Assessment of Other Issues

Issue	Findings	Recommendations
Visual	• The modification includes buildings and exhaust stacks that are similar in height to the previously approved co-generation plants. It also involves relocation of approved structures within the site. • The proposed co-generation plant building is 20.5 m high with two exhaust stacks at 45 m high and two bypass stacks at 30 m above ground level. • The proposed structures are located in the south-western part of the site and would be partially shielded by other industrial structures when viewed from Bolong Road. • The proposed structures would be visible from parts of the Princes Highway to the north and from the residential area of North Nowra and Terara around 1.5 km to the south-west and south. • The SEE included a visual assessment concluding there would be minimal visual impacts as the proposed structures are consistent in scale and height to existing structures on the site. • The SEE also included justification for varying a development standard within the Shoalhaven LEP 2014, which includes a height limit of 11 m. • The Department notes that Council and public submitters did not raise any concerns about the height limit or visual impacts of the modification. • The Department considered the proposed structures in the context of the industrial zoning and the surrounding structures, such as the boiler stack at 53 m and flour mill at 34 m. • There would be some visibility of the exhaust stacks for passing motorists on Bolong Road. Views from North Nowra and Terara would be more distant and partially screened by intervening vegetation. • The Department considers the height of the proposed structrues would have minimal impact on visual amenity and would blend with the existing industrial character of the site and adjacent industrial areas of Bomaderry. • The Applicant consulted the Department of Defence (DoD), providing the air quality assessment for the gas	Manage via existing conditions requiring: • the control of lighting and use non-reflective building materials • provision of as-constructed details to Airservices Australia for structures above 30 m height. Require the Applicant to: • notify Airservices Australia prior to construction of structures above 30 m height.

Issue	Findings	Recommendations
	exhaust stack. DoD confirmed the plume from the stack would not infringe on the operational boundaries of the HMAS Albatross, located 10 km from the site. DoD requested the Applicant provide 'as constructed' details for the stack and notify them prior to construction and on completion of the works. • The consent includes conditions for managing visual impacts including the control of lighting, use of non-reflective building materials, and the requirement to provide as-constructed details to Airservices Australia for structures above 30 m. • These conditions also apply to the modification. The Department has recommended an additional condition requiring the Applicant to notify Airservices Australia prior to construction of structures above 30 m. • The Department is satisfied these conditions are adequate for managing the minor visual impacts of the modification.	
Hazards and risk	• Modifications to factory processes and equipment have the potential to increase hazards and risks at the factory. • Pinnacle Risk Management Pty Ltd (Pinnacle) prepared a Preliminary Hazard Analysis (PHA) to assess the potential hazardous events and corresponding risks associated with the modification, particularly the co-generation plant, gas and electrical supply infrastructure and the boilers. • The PHA was prepared in accordance with the Department's Hazardous Industry Planning and Advisory Paper (HIPAP) No.6 – Hazard Analysis. The PHA evaluated the level of risk to off-site land uses and compared this with the Department's land use safety risk criteria (detailed in HIPAP No. 4). • The Department's hazards and risk specialist reviewed the PHA and considered the risk analysis approach was appropriate based on the type and location of the modification. • The Department notes the PHA found that hazardous events would not exceed the criteria for the adjacent industrial land uses and demonstrated the modification would meet the risk criteria in HIPAP No. 4. Also, the modification would include comprehensive safeguards and design requirements to ensure the risk to surrounding land uses is minimised. • The Department's assessment concluded the modification would satisfy all relevant risk criteria, provided all proposed safeguards and mitigation measures are adopted and maintained. • The consent requires the Applicant to update the existing hazards studies and plans for the factory to include modifications. No further conditions are required.	Manage via existing conditions requiring: • updates to the existing hazard studies and plans for the factory, to include the modification.
Traffic	• The modification would result in reduced traffic movements to and from the site as coal, fly ash and hydrated lime would no longer be required for the coal-	Require the Applicant to: • obtain approval for construction of the

Issue	Findings	Recommendations
	fired boilers. This would remove 112 truck movements to and from the site per week. • The modification requires works under Bolong Road for the gas pipeline to connect to the gas pressure reduction station on the northern side of Bolong Road. • TfNSW noted these works would require a Section 138 approval under the *Roads Act 1993,* issued by Council, with concurrence from TfNSW. • The Department's assessment concludes the modification would result in a slight improvement in traffic impacts and has recommended the Applicant obtain approval for the pipeline construction under Bolong Road in accordance with the *Roads Act 1993*.	pipeline under Bolong Road in accordance with the *Roads Act 1993*.
Flooding	• The Applicant provided a flood compliance report (FCR) to assess potential impacts on flood levels, flows and velocities, given the site's location in an area of high hazard and floodway. • The FCR concluded there would be no change in the 1% Annual Exceedance Probability (AEP) flood event outside of the factory site due to the modification. • In considering Council's Development on Flood Prone Land DCP 2014 (DCP), the FCR noted that structural reports would be provided to demonstrate the new buildings and plant are built to withstand flooding. • Council reviewed the FCR and recommended conditions requiring a structural engineer's report to certify the structures are designed with flood compatible materials and certain components are above the 1% AEP flood level. Council also recommended a flood evacuation plan be prepared. • The Department considers the modification would have minimal impact on flooding and notes there are existing conditions requiring structural engineer's reports and a flood management plan including evacuation procedures. The existing conditions have been modified to include the recommendations of Council.	Requie the Applicant to: • provide a structural engineer's report for buildings and structures to certify relevant components are built above the 1% AEP, they are built from flood compatible materials and can withstand the forces of flood waters.
Riverbank stability	• The Applicant provided a review of subsurface conditions in the vicinity of the proposed co-generation plant and assessed potential imnpacts on the riverbank stability of Bomaderry Creek. • The review noted the co-generation plant would be set back 29 m from Bomaderry Creek and would be supported on piles driven into bedrock. The results of a stability analysis concluded that construction of the co-generation plant would have little or no influence on slope instability at Bomaderry Creek. • The Department reviewed the riverbank stability analysis and note that DPE Water did not provide any comments. The Department considers the modification would have a negligible impact on riverbank stability. • There are existing conditions for protecting the stability of the Shoalhaven River bank, and these would be modified to remove reference to the co-generation plant that was previously approved, as the proposed co-generation plant replaces the previously approved plant.	Modify the existing conditions to remove reference to the previously approved co-generation plant.

Issue	Findings	Recommendations
	• The Department's assessment concludes the modification would have minimal impact on riverbank stability.	

6 Evaluation

The Applicant is proposing to modify the consent to replace two approved co-generation plants with a new 60 MW gas-fired co-generation plant. The modification also involves conversion of the existing coal and woodchip fired boilers to gas, construction of supporting infrastructure and relocation of approved but not yet constructed equipment.

The modification was publicly exhibited for 14 days and received three submissions from the public and advice from four government agencies. Two public submissions objected to the modification on the basis of greenhouse gas emissions and the impacts on climate change. Government agencies did not object and provided recommended conditions covering air quality, noise and flooding.

The Department has assessed the proposed modification in accordance with the relevant requirements of the EP&A Act. The Department considers the proposed modification is appropriate on the basis that:

- it would not significantly increase the environmental impacts of the approved factory, with air emissions slightly decreasing as a result of the conversion from coal to gas
- the modification would meet the increased energy and steam requirements of the factory and would reduce greenhouse gas emissions due to the removal of coal and reduced consumption of purchased electricity.

The Department has recommended additional conditions for air quality monitoring, noise verification and flooding. Conditions are also included to remove the previously approved 40 MW gas-fired co-generation plant and 15 MW coal-fired co-generation plant, as they would be replaced by the 60 MW gas-fired co-generation plant.

The Department is satisfied that the modification should be approved, subject to the recommended modifying instrument of consent.

7 Recommendation

It is recommended that the Director, Industry Assessments, as delegate of the Minister for Planning:

- **considers** the findings and recommendations of this report
- **determines** that the application MP06_0028-Mod-23 falls within the scope of section 4.55(2) of the EP&A Act
- **forms the opinion** under clause 30A(2)(c) of the Biodiversity Conservation (Savings and Transitional) Regulation 2017 that a BDAR is not required to be submitted with this application as the application will not increase the impact on biodiversity values on the site
- **accepts and adopts** all of the findings and recommendations in this report as the reasons for making the decision to approve the modification
- **agrees** with the key reasons for approval listed in the draft notice of decision
- **modifies** the consent 06_0228
- **signs** the attached approval of the modification (**Appendix C**).

Recommended by:

13 April 2022

Deana Burn
Specialist Planner
Industry Assessments

Recommended by:

14 April 2022

Joanna Bakopanos
Team Leader
Industry Assessments

8 Determination

The recommendation is **Adopted** by:

28 April 2022

Chris Ritchie
Director, Industry Assessments
Energy & Resource Assessments

as delegate of the Minister for Planning

Appendices

Appendix A – List of Documents

The Department has relied upon the following key documents during its assessment of the modification. These documents are available at the following link:

https://www.planningportal.nsw.gov.au/major-projects/projects/modification-23-gas-fired-co-generation-plant

Modification Application

- Statement of Environmental Effects Proposed Modification to Approved Gas Fired Co-Generation Plant prepared by Cowman Stoddart dated September 2021.

Submissions and Advice

- Available at the above link.

Response to Submissions

- Response to Submissions, prepared by Cowman Stoddart dated 23 November 2021
- Response to Public Submissions, prepared by GHD dated 23 November 2021
- Response to EPA – Noise, prepared by Harwood Acoustics dated 20 January 2022 and Revised Environmental Noise Assessment dated 20 January 2022
- Response to EPA – Air Quality, prepared by GHD dated 19 January 2022 and Revised Air Quality Assessment dated 19 January 2022
- Further Response to Public Submissions, prepared by GHD dated 22 February 2022

Supplementary Response to Submissions

- Further Response to EPA - Noise, prepared by Harwood Acoustics dated 16 March 2022 and Revised Environmental Noise Assessment dated 16 March 2022

Department's Assessment Report for SSD 06_0228

- https://www.planningportal.nsw.gov.au/major-projects/projects/shoalhaven-starches-expansion

Appendix B – Community Views for Draft Notice of Decision

The key issue raised by the community and considered in the Department's Assessment Report and by the decision maker relates to greenhouse gas emissions.

Issue	*Consideration*
Greenhouse Gas Emissions • Impacts of climate change • Use of gas instead of renewable energy sources • At odds with NSW Government's 2030 commitment to reduce carbon emissions • Questioned the methodology and conclusions of the greenhouse gas assessment	*Assessment* • The Applicant provided a greenhouse gas (GHG) assessment that was prepared in accordance with relevant guidelines • The GHG assessment concluded the modification would reduce overall emissions from the factory compared to existing operations. Emissions would reduce from 598,989 t CO_2-e/a to 471,878, with production increased to the maximum approved level. • The co-generation plant would provide the majority of the factory's steam and energy requirements, reducing its long-term reliance on coal for use in the boilers. • The modification would also reduce other pollutants generated by the combustion of coal including sulfur dioxide, nitrogen dioxide and carbon monoxide. • The Department's assessment concluded the modification would reduce GHG emissions from the factory and no specific conditions are required given the Applicant has continued obligations to measure and report annual emissions under the NGER Act.

Appendix C – Notice of Modification

The recommended modification instrument is available on the Department's website at:

https://www.planningportal.nsw.gov.au/major-projects/projects/modification-23-gas-fired-co-generation-plant

Appendix D – Consolidated Consent

The consolidated consent for 06_0228 is available on the Department's website at:

https://www.planningportal.nsw.gov.au/major-projects/projects/modification-23-gas-fired-co-generation-plant