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# Scoping Report and SEARs Application Restart of Redbank Power Station and Use of Biomass (excluding native forestry residues from logging) as a Fuel

## Verdant Earth Technologies Limited

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**We declare that:**

The statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates, and the information contained in the statement is neither false nor misleading.

| Report version | Authors | Date | Reviewer | Approved for issue | Date |
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| Draft (v1) | R. Loemker | 25/10/2022 | Dr M. Jackson | Dr M. Jackson | 26/10/2022 |
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# Executive Summary

This scoping report has been prepared for a proposed development at Redbank Power Station, located at 112 Long Point Road West, Warkworth (Lot 450 DP 1119428). Verdant Earth Technologies Ltd (Verdant) are proposing to restart Redbank Power Station and use biomass as a fuel for conversion into electricity.

The Redbank Power Station is an approved baseload power station located at 112 Long Point Road West, Warkworth (Lot 450 DP 1119428). Originally commissioned in July 2001, the Redbank Power Station was designed to use beneficiated dewatered coal tailings (BDT) left over from coal processing to create electricity. The power station uses FiCirc® fluidised bed combustion technology and a single 151MW steam turbine and associated equipment to produce electricity. The power station is designed to burn low value fuels such as coal tailings and is a preferred technology for energy generation from biomass.

The technology has demonstrated excellent performance and a low emissions profile.

The power station was approved in 1994 (DA183/93) and the development consent was modified in 1997. Tailings were transferred by conveyor from the Warkworth mine to the power station as a source of fuel. The power station also relied on supplementary fuel in the form of Run of Mine (ROM) coal to assist in electricity generation. Due to the unavailability of coal tailings from Warkworth mine, the power station has been in care and maintenance since October 2014.

Verdant Earth Technologies Limited (the Applicant) has acquired the power station and is seeking approval to restart the plant using biomass (excluding native forestry residues from logging) ("**Redbank Biomass"**) as a sustainable fuel to produce near net zero $CO_2$ emissions and enable the power station to continue to produce "green" electricity after 2031 (the Proposal).

In recognition of the concerns of some sectors of the community in relation to the use of native forestry waste residues, Verdant has been working to address these concerns by developing alternate sources of biomass fuel and an alternate biomass fuel strategy.

Following the success of this strategy, Verdant is pleased to confirm it is not seeking approval to use and will not use native forestry bio-material waste from logging activities.

Verdant will also relinquish the current approval to use coal tailings as a fuel at Redbank.

It is proposed that Redbank will be fueled with ecologically sustainable biomass (in compliance with all relevant legislative requirements and excluding native forestry residues from logging) to deliver net zero $CO_2$ power generation including from:

- Purpose grown energy plantations;
- Perennial grasses;
- Energy crops;
- Waste biomass from invasive species control;
- Waste biomass from approved clearing activities such as for major infrastructure developments, in accordance with a land management (native vegetation) code, from approved civil infrastructure, road clearing works, right of ways and related approved projects;
- Agricultural waste biomass products or residues;
- End of life waste woody biomass manufactured and produced into a fuel to specification ("**Domestic Biomass**") (subject to EPA approval as an eligible waste fuel); and
- Other sources of eligible waste fuels.

Note that at the initial startup of the power station, and following boiler maintenance and restart of the boilers, a start up supplementary fuel (diesel or a similar fuel) will be used to achieve the temperature required to use biomass as fuel. Once the boiler is operating at the design temperature, the Redbank Power Station will use only approved biomass as fuel.

The Proposal would use up to 700,000 tonnes of dry equivalent biomass per annum (approximately 850,000 tonne per annum at 25% moisture) as a feedstock fuel for conversion into electricity. Feedstock for the Redbank Power station will be developed in two stages.

The first stage would involve the start-up of operations using biomass sourced primarily from approved land clearing operations (from existing civil and road works), biomass from invasive species as defined by Local Land Services NSW and potentially a limited amount of purpose grown biomass.

The second stage would involve the introduction or increased use of purpose grown biomass which will be further increased over a period of 2-4 years from approval, and, if approved and declared an eligible waste fuel by the NSW EPA, the introduction and use of Domestic biomass.

Verdant will where appropriate seek a separate RRO or RRE and seek to be gazetted as required by relevant legislation.

Ash generated by the Proposal will be regularly, tested and transported off-site for beneficial use as a soil amendment in agriculture in accordance with EPA requirements. Trucks used to deliver biomass to the site would be backloaded with the ash for removal to an approved site for reuse within the ash from burning biomass orders and exemptions 2014.

To enable the power station to use biomass as a primary fuel source, some modifications to the plant and operations will be required. These changes are summarised below:

- Maintenance, repair and recommissioning works within the power station to permit recommencement of electricity generation;
- Delivery of biomass in B-doubles (42-44 tonnes per load) via Long Point Road predominately between 6am and 10pm seven days per week. The existing conveyor from the Warkworth mine for transfer of coal tailings into the plant will remain in the first instance.;
- Two 28m long weighbridges to be installed along the (western) inbound lane into the site and the (eastern) outbound lane out of the site;
- Conversion of the power station to enable the use of up to 700,000 tonnes dry equivalent per annum of biomass as feedstock fuel for electricity generation with near net zero $CO_2$ emissions equivalent;
- Construction of a 160m sealed road at the rear of the site to enable to delivery of biomass to the fuel storage area;
- Establishment of a new fuel delivery area adjacent to the existing stockpiling area directly south of the existing power plant. The system would incorporate two dual-lane drive over truck unloaders, two additional conveyors that supply two radial telescopic conveyors to unload the biomass. One telescopic conveyor will direct fuel to the existing fuel storage area (i.e. the area approved for storage of coal tailings), and the second to two moving floor bulk unloader bins, which directly feed existing Conveyor 76. Swales to be provided around biomass stockpile area to minimise movement of biomass fuel from the designated storage area;
- Use of the existing Conveyors 34 and 35 to supply Boilers 1 and 2 respectively with biomass fuel. An extension to Conveyor 76 and removal of the crusher house is required to enable the even transfer of fuel via Conveyors 34 and 35 to Boilers 1 and 2;

- Modifications to two reversing conveyors within the power station to transfer the biomass into each of six fuel silos that will store the biomass. These silos previously stored ROM coal for delivery into the plant's fluidised bed combustion chambers;
- Construction of a three-sided shed in the fuel storage area to provide weather protection for fuel, with dimensions approximately 77m long, 45m wide and 18.5m high at the apex;
- Modifying of the 'trouser legs' of the six fuel silos within the power station to enable the more efficient flow of biomass into the plant's fluidized bed combustion chambers;
- Ash generated from the combustion process will be sampled, tested and potentially used as a fertiliser in accordance with the EPA's *The Ash from Burning Biomass Order* 2014. The existing ash slurry system previously used to transfer coal tailings ash back to Warkworth mine will remain in place, though it will not be used and may be removed at a later date; and
- Other work, including landscaping, fire detection and suppression systems, and refurbishment of internal elements of the power station as required. This will also include the purchase of a water access licence, reconnection to the electricity grid, development of a spare parts inventory and purchase and storage of a fuel invention for the power station.

When fully operational the Proposal will supply the grid with approximately 1 million megawatt hours of 24/7 dispatchable or baseload electricity per year, equivalent to supplying around 200,000 homes. The Proposal will also drive significant progress towards the NSW Government's Net Zero Plan Stage 1: 2020-2030, the foundation for NSW's action on climate change and goal to reach net zero emissions by 2050.

The facility is located on land zoned RU1 under the *Singleton Local Environmental Plan* 2013. The proposed development is permissible as a 'electricity generating works' with consent in RU1 zoning under Clause 2.36 of the *State Environmental Planning Policy (Transport and Infrastructure)* 2021.

The proposed project is considered a State Significant Development (SSD) under Clause 20(a) of Schedule 1 of *State Environmental Planning Policy (Planning Systems)* 2021 as it involves a development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, distillate, waste, hydro, wave, solar or wind power) that has a capital investment value of more than $30 million.

Therefore, the project requires assessment under Part 4 of the *Environmental Planning and Assessment Act* 1979 and the consent authority for the development will be the Independent Planning Commission. An Environmental Impact Statement (EIS) will need to accompany the development application. An amended licence from the NSW EPA under Schedule 1 of the *Protection of the Environment Operations Act* 1997 will be required.

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# 1. Introduction

This scoping report has been prepared for a proposed development at Redbank Power Station (Redbank/the facility/the Site/the Power Station) located at 112 Long Point Road West, Warkworth (Lot 450 DP 1119428). Verdant Earth Technologies Ltd (Verdant) are proposing to restart Redbank and utilise up to 850,000 tonnes (at 25% moisture content) of biomass as a substitute fuel for conversion into electricity.

Redbank was originally commissioned in July 2001 as an electricity generating facility. It was designed to operate on low value fuels and operated on beneficiated dewatered coal tailings (BDT) and Run of Mine (ROM) coal from the Warkworth Mine, to generate electricity. Due to high export prices in the coal market, Redbank was deprived of good quality tailings and could not access sufficient quality supplies to operate the plant.

The power station has been in care and maintenance since October 2014. Verdant Earth Technologies Limited has acquired Redbank and is planning to restart the plant. Verdant is seeking a new approval to restart Redbank Power Station, using biomass (excluding native forestry residues from logging) as a feedstock fuel for its operations and to remove Condition 22 on the existing consent regarding expiry (under DA183/93).

In recognition of the concerns of some sectors of the community in relation to the use of native forestry waste residues, Verdant has been working to address these concerns by developing alternate sources of biomass fuel and an alternate biomass fuel strategy.

Following the success of this strategy, Verdant is pleased to confirm it is not seeking approval to use and will not use native forestry bio-material waste from logging activities.

Verdant will also relinquish the current approval to use coal tailings as a fuel at Redbank.

It is proposed that Redbank will be fueled with ecologically sustainable biomass (in compliance with all relevant legislative requirements) to deliver net zero $CO_2$ power generation including from:

- Purpose grown energy plantations,
- Perennial grasses,
- Energy crops,
- Waste biomass from invasive species control,
- Waste biomass from approved clearing activities such as for major infrastructure developments, in accordance with a land management (native vegetation) code, from approved civil infrastructure, road clearing works, right of ways and related approved projects,
- Agricultural biomass waste products or residues,
- Domestic Biomass (subject to EPA approval as an eligible waste fuel); and
- Other sources of eligible waste fuels.

Recommissioning the Redbank Power station would occur in two stages.

Note that at the initial startup of the power station, and following boiler maintenance and restart of the boilers, a start up supplementary fuel (diesel or a similar fuel) will be used to achieve the temperature required to use biomass as fuel. Once the boiler is operating at the design temperature, the Redbank Power Station will use only approved biomass as fuel.

The first stage would involve the start-up of operations using biomass sourced primarily from approved land clearing operations (from existing civil and road works), biomass from invasive species as defined by Local Land Services NSW and potentially a limited amount of purpose grown biomass.

The second stage would involve the introduction or increased use of purpose grown biomass which will be increased over a period of 2-4 years from approval, and, if approved and declared an eligible waste fuel by the NSW EPA, the introduction and use of Domestic biomass.

Verdant will seek separate RRO and RRE where appropriate and as required by relevant the legislation.

Ash generated by the Proposal will be regularly tested and transported off-site for beneficial use as a soil amendment in agriculture in accordance with EPA requirements. Trucks used to deliver biomass to the Site would be backloaded with the ash for removal to an approved site for reuse.

Restarting of Redbank to operate as an electricity generation facility on biomass would create an estimated 382 full-time equivalent (FTE) jobs, with the majority of these in the Hunter Region and the Singleton LGA. Restarting of Redbank will also create or support a large number of direct and indirect jobs in the fuel supply line over the plant's life. When fully operational the power plant would produce into the grid approximately 1 million megawatt hours of baseload electricity per year, equivalent to supplying around 200,000 homes.

The existing plant consists of two fluidised bed combustion steam generator units of FiCirc® design and a single 151MW steam turbine, and the associated balance of plant equipment. Maintenance, repair and recommissioning works are required within the power station to permit recommencement of electricity generation and adjustments to the existing plant and equipment will be needed, along with a set of conveyors, to allow the use of waste wood residue in place of coal at the facility.

Other work, including landscaping, fire detection and suppression systems, and refurbishment of internal elements of the power station are also required. This will also include the purchase of a water access licence, reconnection to the electricity grid, development of a spare parts inventory and purchase and storage of a fuel invention for the power station.

Overall, the facility will potentially accept up to 850,000 tonnes 25% moisture content per year of biomass as fuel for conversion into electricity.

Specification compliant biomass will be received at the facility via B-double, which will be directly unloaded into one of two drive-on truck unloaders. Materials will then be transported on two additional conveyors that supply radial telescopic conveyors that will unload the biomass to the existing fuel storage area (i.e. the area approved for storage of coal tailings). A pair of bulk fuel unloader walking floor bins directly transfer the stored biomass into the power station via a modified version of the existing fuel conveyor system.

The facility is located on land zoned RU1 under the *Singleton Local Environmental Plan* 2013. The proposed development is permissible as a 'electricity generating works' with consent in RU1 zoning under Clause 2.36(1)(b) of the *State Environmental Planning Policy (Transport and Infrastructure)* 2021.

The proposed project is considered a State Significant Development (SSDD) under Clause 20(a) of Schedule 1 of *State Environmental Planning Policy (Planning Systems)* 2021 as it involves a development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, distillate, waste, hydro, wave, solar or wind power) that has a capital investment value of more than $30 million. Therefore, the project requires assessment under Part 4 of *the Environmental Planning and Assessment Act* 1979 and the consent authority for the development will be the Independent Planning Commission. An EIS will need to accompany the development application. A licence from the NSW EPA under Schedule 1 of the *Protection of the Environment Operations Act* 1997 will be required.

The proposed development is well located at an established power plant with existing technology in place. The site has been previously cleared and disturbed to establish the power plant, and the nearest dwellings are over 1km away to the east. Impacts on residents are expected to be low.

Verdant Earth Technologies Limited is committed to complying with all laws that affect its operations and understands that development approval and appropriate licensing is required prior to the proposed development occurring.

## 1.1 Applicant details

The proponent details in relation to the proposed development are:

- Full name(s): Verdant Earth Technologies Limited
- Postal address: GPO BOX 2537, Sydney NSW 2001
- ABN: 65 624 824 791
- Nominated contact: Mr Mike Haywood - General Manager Sustainable Energy
- Contact details: mhaywood@verdantearth.com.au
- Site owner(s): Verdant Earth Technologies Limited

## 1.2 Purpose of report

The proponent is seeking the Secretary's Environmental Assessment Requirements (SEARs) with respect to the proposed development.

The proponent is seeking the SEARs to assess the proposed project under Clause 20(a) of Schedule 1 of *State Environmental Planning Policy (Planning Systems)* 2021 as it involves a development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, distillate, waste, hydro, wave, solar or wind power) that has a capital investment value of more than $30 million.

The capital investment value of the proposed project exceeds $30M and is therefore considered State Significant Development (refer to CIV report in Appendix 2).

The aim of this scoping report is to provide the Department of Planning and Environment (DPE) with information about the proposed development with respect to preparation of Environmental Impact Statement (EIS) that is require pursuant to Part 2, Schedule 2 of the *Environmental Planning and Assessment Regulation* 2000:

> '*…before preparing an environmental impact statement, the responsible person must make a written application to the Director-General* (now the Secretary) *for the environmental assessment requirements with respect to the proposed statement'.*

This scoping report has been undertaken in accordance with the DPE's *State Significant Development Guidelines - Preparing a Scoping Report* (2021).

## 1.3 Objectives of the proposed development

Restarting Redbank and re-purposing it to use biomass as a fuel will create low emissions green power for residents of NSW. The proposed development will deliver green baseload power to the electricity grid and will be the first major project of its type in NSW to help drive progress towards the NSW Government's goal of net zero greenhouse gas emissions by 2050.

Verdant is working to develop Redbank into a globally leading green generation project delivering self-sustaining negative $CO_2$ power through the use of purpose grown energy crops delivering net zero fuel for 24/7 power and long-term carbon sinks.

Redbank will provide secure reliable power, permanent jobs and major economic stimulus with an opportunity to develop on-site batteries and hydrogen production. In addition, the purpose grown biomass program will provide additional job opportunities and economic stimulus to the regions.

The Redbank project will serve as a flagship green project and will deliver educational and demonstration opportunities for the promotion of green electricity generation and sustainable waste management practices.

### 1.3.1 Addressing electricity shortfalls

The proposed development would provide green baseload 'dispatchable' power 24 hours a day, seven days a week, unlike many other alternative renewables. The reliability of the electricity grid is a matter of public importance to NSW. With increasing installation of variable renewable energy resources such as wind and solar power plants the requirement for dispatchable electricity is becoming more critical to maintaining stability and supply.

Without adequate growth in renewable firming generation to offset the impacts of retiring coal-fired power plants, electricity prices are likely to increase and supply to be less reliable. The proposed development would enable cuts in emissions whilst responding to increased electricity demand and assist in reducing the reliability gap.

Liddell power station produces around 8,000 GWh of electricity or enough power for approximately one million average Australian family homes. Production from the Liddell power station meets approximately 35% of the electricity needs of New South Wales. Given the upcoming closure of the 1,800 MW Liddell Power Station in April 2023, additional baseload power capacity is crucial to maintain stability in the energy market. Using biomass to fuel Redbank would reduce the risks of supply interruptions during peak summer periods and assist in maintaining stable prices.

When the Northern Power Station in South Australian and Hazelwood power station in Victoria closed in 2016/2017, energy prices spiked and rolling blackouts occurred throughout South Australia and Victoria.

Redbank operation with the use of biomass would be Australia's third largest 100% green baseload power generator with near zero $CO_2$ emissions.

## 1.4 Key features of the site and surrounds

The Site is located in the Singleton Local Government Area, within the Hunter Valley, NSW.

The Site is positioned in a suitable location approximately 10 km to the west of Singleton, 10 km northeast of Bulga and 8 km northwest of Mount Thorley. Four open cut coal mines are within 2.2 to 7 km of the Site. The surrounding region also includes rural and agricultural properties and industrial areas. The Singleton Army base is located approximately 10 km to the southeast of the Site. Directly to the south of the proposed development Site is a railway easement, transmission line easement and the Golden Highway (refer to Figure 1.1, Figure 1.2 and Figure 1.3).

The nearest dwellings are over 1km distance toward the east. The closest National Park is Wollemi National Park approximately 11km to the west of the facility. Other National Parks in the region include Mount Royal and Barrington Tops National Parks to the north, Yengo National Park to the south, Goulburn River National Park to the west and Belford National Park to the east.

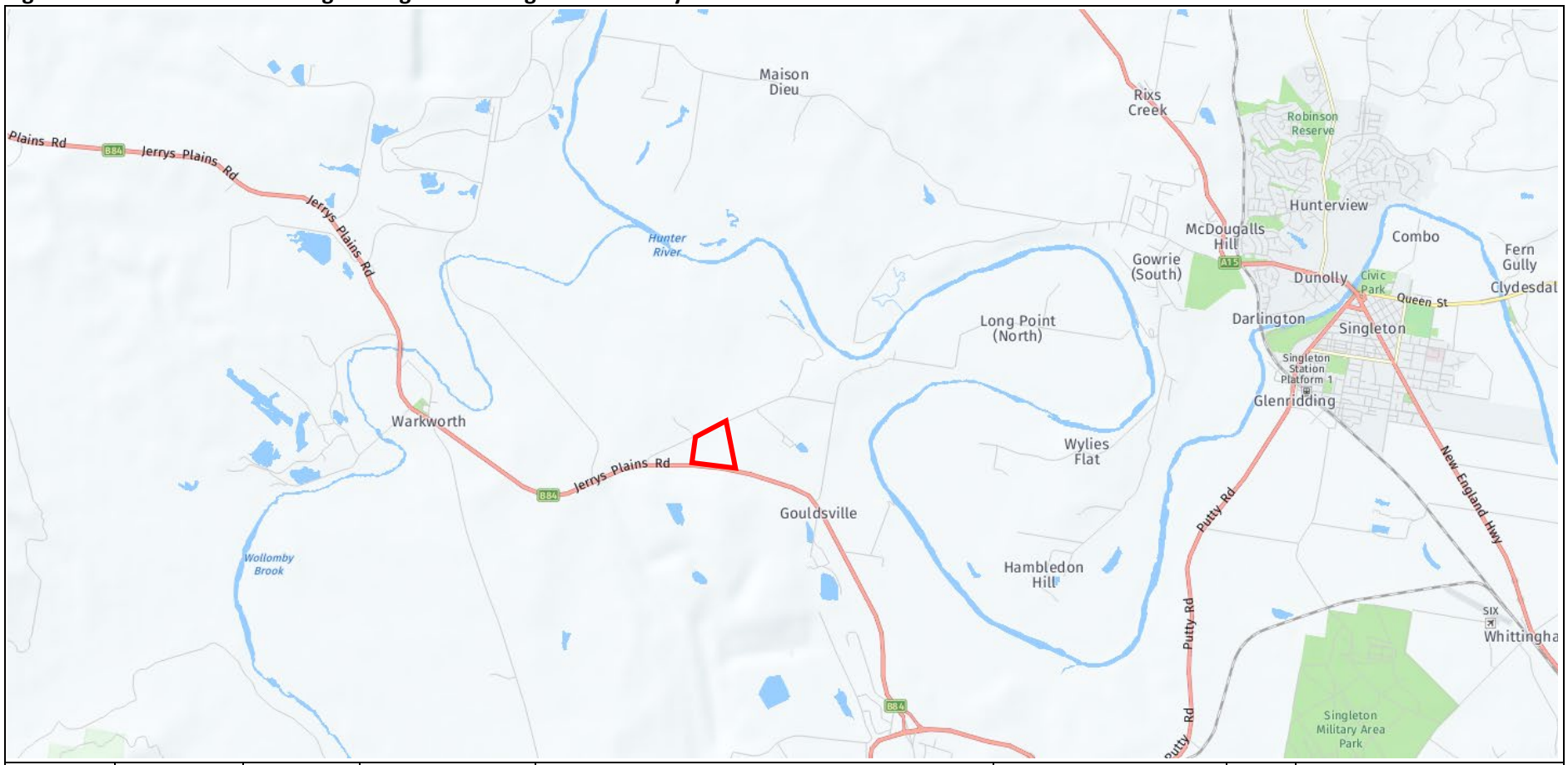
The lot itself is about 18 hectares, and the existing power station comprises approximately 10 hectares on the east side of the lot on relatively flat land with a north-easterly aspect. Average gradients of the Site are in the

order of 1-2%. The immediate surrounding landscapes are a mixture of uncleared bushland and cleared land and native pastures for grazing.

The Site currently contains existing power station infrastructure and technology to support the proposed development including:

- Multiple buildings including offices, warehouses, and turbine hall;
- Road access and carparks;
- Stockpile area and conveyor belts;
- Sediment basin, detention basin and wastewater storage basin;
- Two separate existing access points to the Site from Long Point Road West; and
- Power generation infrastructure (boiler, cooling tower, stack and turbo generator).

**Figure 1.1. Site location showing the regional setting. Lot boundary shown in red.**




| Date | Revision | Drawn By | Site description |
|---|---|---|---|
| 20/07/2022 | Revision A | R. Loemker | 112 Long Point Road West, Warkworth (Lot 450 DP1119428) |
| | | | |
| | | | |
| | | | |

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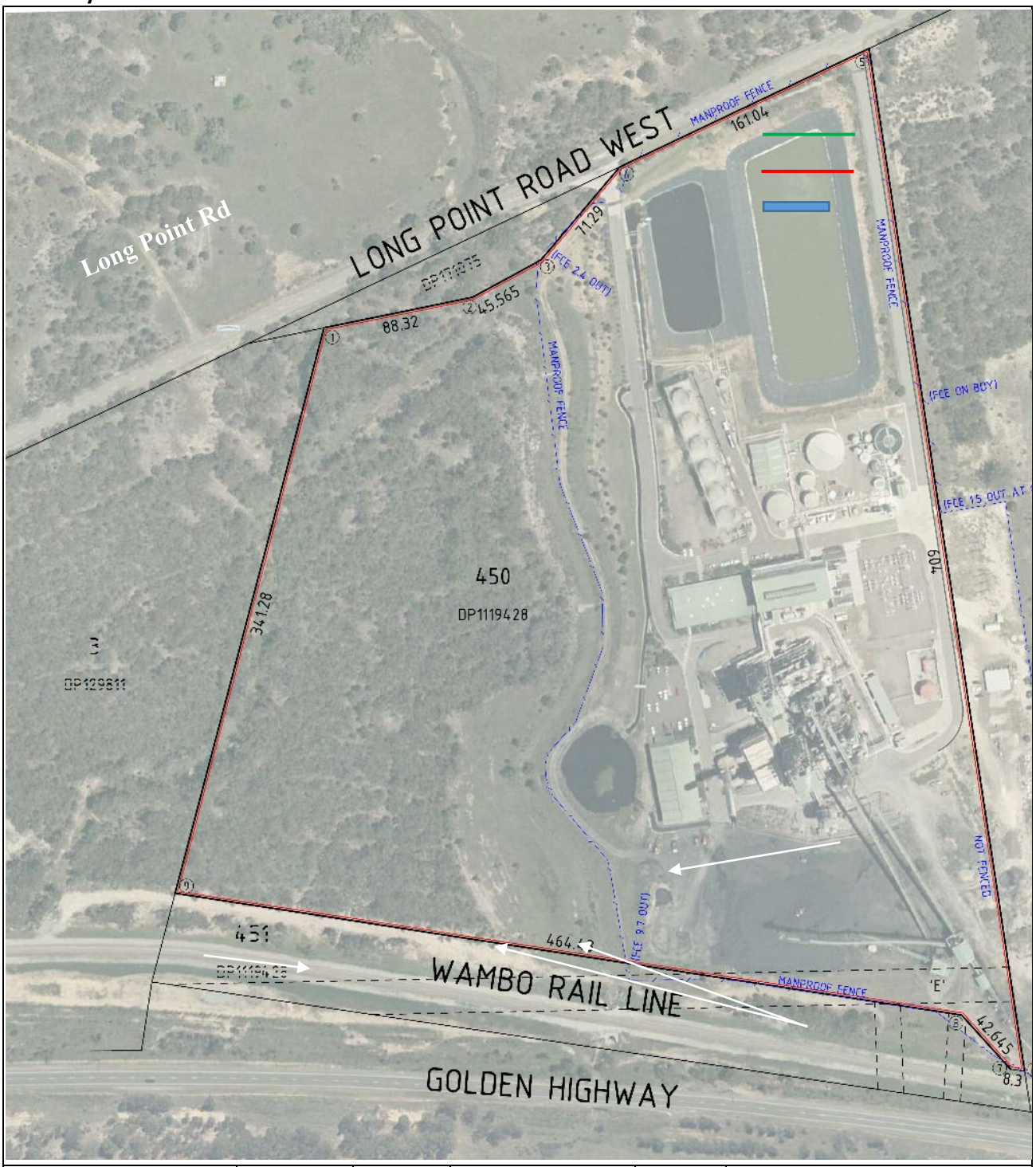
| Client | Verdant Earth Technologies Limited |
|---|---|
| Project | Redbank |
| Title | Site location |
| Scale | Per image |
| Source | Nearmap |

**Figure 1.2. Aerial view of the Site and the immediate surrounding area. Lot boundary shown in red.**


| Date | Revision | Drawn By | Site description | Jackson Environment and Planning Pty Ltd | | Client | Verdant Earth Technologies Limited |
|---|---|---|---|---|---|---|---|
| 20/07/2022 | Revision A | R. Loemker | 112 Long Point Road West, Warkworth (Lot 450 DP1119428) | **Strategy \| Infrastructure \| Compliance \| Procurement**<br>**A:** Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060<br>**E:** admin@jacksonenvironment.com.au<br>**T:** 02 8056 1849<br>**W:** http://www.jacksonenvironment.com.au | | Project | Redbank |
| | | | | | | Title | Aerial view |
| | | | | | | Scale | Per image |
| | | | | | | Source | Nearmap |

**Figure 1.3. Aerial view of the Site at 112 Long Point Road West, Warkworth (Lot 450 DP1119428). Lot boundary shown in red.**




| Date | Revision | Drawn By | Site description | Client | Verdant Earth Technologies Limited |
|---|---|---|---|---|---|
| 08/06/21 | Revision A | E. Larson | 112 Long Point Road West, Warkworth (Lot 450 DP1119428) | Project | Redbank |
| 15/10/21 | Revision B | M. Jackson | | Title | Access to site and operational areas |
| | | | | Source | Near Maps |

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## 1.5 Site history and existing approvals

The facility was originally assessed as designated development (electricity generating station) under Part 4 of the *Environmental Planning and Assessment* Act 1979 and approved under DA183/93 to construct and operate a fluidised bed combustion power plant, fuelled from coal washery tailings supplied by the Warkworth and Lemington Mines.

The development application was submitted to Singleton Shire Council and accompanied by an EIS to demonstrate that appropriate consideration was given to the impact that the development, and to address the NSW Department of Planning impact assessment requirements.

The original EIS was lodged in December 1992. An amended EIS was prepared in November 1993 to assess any additional potential impacts associated with locating Redbank Project adjacent to the Warkworth Mine at a site approximately 5 kilometres east of the site proposed in the original EIS. The development consent (DA183/93) was granted by Singleton Council on 23 March 1994 and on 15 April 1994 was appealed to the NSW Land and Environment Court with Greenpeace Australia the third-party objector. On 10 November 1994 the appeal was dismissed, and the development consent (DA183/93) granted by Singleton Council.

A subsequent modification to that consent was granted by the NSW Land and Environment Court on 27 March 1997 pursuant to the prepared statements of Roy Alper and Thor Hibbler containing information pertaining to the modification (circa February 1997).

Table 1.1 identifies the key components of the development consent as modified in 1997.

**Table 1.1. Key elements of original approvals.**

| Aspect | 1994 approval | 1997 modification approval |
|---|---|---|
| Power generation | Nominal rating of 120 megawatts (MWe) (gross), approximately 1000MW net output | Nominal rating of 120 megawatts (MWe) (gross), approximately 1000MW net output |
| Fuel Type | Coal washery tailing supplied from the Warkworth and Lemington mines, augmented as necessary by existing tailing dams and supplemental fuel. | Coal washery tailing supplied from the Warkworth mine, augmented as necessary by existing tailing dams and supplemental fuel. |
| Fuel amount | 700,000 tonnes per annum. | 700,000 tonnes per annum. |
| Fuel haulage | Slurry pipeline from the Warkworth and Lemington washeries (and, as needed, from the Warkworth and Lemington tailing dams) to the site. Washery on Redbank site. | Overland conveyor for transport of beneficially dewatered tailings from the Warkworth mine (and, as needed, from the Warkworth tailing dams) to the site. Supplemental fuel would be trucked a short distance to the Project site, where it would be stored and used as necessary to supplement the tailing fuel. Washery facility located at the Warkworth mine. |
| Plant | Two atmospheric-pressure, hybrid bubbling/ circulating bed type boilers of the "FiCirc" design and turbo-alternator generating at 11 kilovolts (kV). | Two atmospheric-pressure, hybrid bubbling/ circulating bed type boilers of the "FiCirc" design and turbo-alternator generating at 11 kilovolts (kV). |
| Grid connection | Connection to the Shortland electrical system would be via a new 132 kV electrical interconnect line of less than one kilometre (km) in length. | Connection to the Shortland electrical system would be via a new 132 kV electrical interconnect line of less than one kilometre (km) in length. |
| Stream diversion | Diversion works for Sandy Hollow Creek and the Eastern Tributary | Diversion works for Sandy Hollow Creek and the Eastern Tributary |

Figure 1.4 and Figure 1.5 show two perspective photos (south and west sides respectively) of the existing power plant. An oblique aerial image of the site is provided in Figure 1.6.

**Figure 1.4. View of the south side of Redbank.**


**Figure 1.5. View of the west side of Redbank.**

**Figure 1.6. Oblique aerial image of Redbank Power Station from the south.**

### 1.5.1 Deemed refusal appeal through the NSW Land and Environment Court (2021/22)

An application was made to Singleton Council to modify the existing development consent to enable the use of waste wood residues as fuel under Section 4.56 of the *Environmental Planning and Assessment Act* 1979 on 3 November 2020.

A Class 1 appeal was brought by Hunter Development Brokerage Pty Limited trading as HDB Planning and Design against the deemed refusal by Singleton Council of an application to modify a development consent to permit waste wood residue to be utilised as a fuel source in an existing electrical generating power plant.

The Land and Environment Court dismissed the appeal on 3 June 2022, on the basis that the proposal was not considered to be substantially the same as the original development. As a result, the Court had no power to grant consent.

### 1.5.2 Designated Development application

To mitigate planning approval and delay risks during the appeal of the Section 4.56 modification application in the NSW Land and Environment Court case, Verdant prepared a scoping report seeking the Secretary's Environmental Assessment Requirements (SEARs) for a Designated Development application under Clause 18(1c) of Schedule 3 of the *Environmental Planning and Assessment Regulation* 2000. On 10 August 2021 the DPIE issued SEARs 1596 to assist with the preparation of an Environmental Impact Statement.

The EIS and development application was structured to enable the Hunter and Central Coast Planning Panel, as the consent authority, to conduct a full and thorough merit assessment of the proposal. It is noted that all

requirements of the DPIE as outlined in SEARs 1596 were addressed to enable the Hunter and Central Coast Planning Panel to consider and determine the application.

The application was lodged for assessment with Singleton Council on 8th June 2022. Singleton Council advised they do not have the resources to assess the application. The Department of Planning and Environment advised that the project can be assessed as State Significant Development (SSD) if the capital investment value exceeds $30 million. To trigger the requirements for SSD, the designated development application will be amended to include plant restart costs. This scoping report has been prepared as directed by DPE to enable the provision of a new set of SEARs, to enable the application to be amended and resubmitted as an SSD application for assessment by DPE and determination (if required) by IPC.

### 1.5.3 State Significant Development application

The proposed development (and the subject to this scoping report) will trigger the requirement for State Significant Development (SSD) under Clause 20(a) of Schedule 1 of *State Environmental Planning Policy (Planning Systems)* 2021 as it involves a development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, distillate, waste, hydro, wave, solar or wind power) that has a capital investment value of more than $30 million.

This scoping report will provide DPE with a basis for issuing a new set of SEARs so the application can be amended, assessed and determined through the SSD pathway.

## 1.6 Existing and continuing uses rights

The conditions of the existing consent DA183/93 (as modified) allowing the primary operations and functions of Redbank will remain. However, the development application and supporting EIS will request that a new approval is granted that incorporates relevant conditions from the previous consent and permits:

- The use of Redbank Biomass as a fuel (ie: excludes native forestry residues from logging);
- The continuing use of Redbank Biomass post 2031 when the operation of the 1994 consent (and as modified in 1997) expires; and
- The use of coal and coal tailings will be removed.

The existing development consent and the 1997 modification would be surrendered once the proposed development is approved, and Redbank would then operate under a single modern development consent.

## 1.7 Development that is required for the project but will be subject to a separate assessment

Additional licences and permits would be required from the NSW EPA.

A water access licence (WAL) will need to be obtained with sufficient water capacity (~3,300 ML/year) for the needs of the proposed development.

Verdant is seeking development approval to allow the use of Redbank Biomass fuels that comply with specifications from the market. Any development consent that may be required by suppliers of biomass fuel is a matter for the suppliers and not the applicant.

Under Clause 93 of the *Protection of the Environment Operations (Waste) Regulation* 2014 (Waste Regulation), a specific RRO/E will be required to lawfully permit the use of certain biomass materials defined as 'eligible

waste fuels' to be used in electricity generation in the project. Restart of the Redbank Power station would occur in two distinct stages.

The first stage would involve the start-up of operations using biomass sourced primarily from approved land clearing operations (from existing civil and road works), biomass from invasive species as defined by Local Land Services NSW and potentially a limited amount of purpose grown biomass.

The second stage would involve the introduction or increased use of purpose grown biomass which will be increased over a period of 2-4 years from approval, and, if approved and declared an eligible waste fuel by the NSW EPA, the introduction and use of Domestic biomass.

Specific RRO/E will be obtained for each source of fuel as applicable and Redbank will apply to be a gazetted site.

No other development approvals are required to undertake the proposed development.

## 1.8 Proposed new consent and surrender of DA183/93 and the 1997 modification

Verdant Earth are seeking a new Development Approval and to surrender the existing consents (DA183/93 and as modified in 1997). The current conditions of approval, where relevant, would be adopted into the new approval. Existing Condition 22 in the new approval would be removed. Post the new approval, the life of consent condition will allow the proposed development to continue to use sustainable sourced Redbank Biomass in a manner that is not time bound.

## 1.9 Capital investment value of project

Downer EDI Limited (Downer) was requested by Verdant to provide an appraisal of the budget for the execution of the works required to refurbish and recommission Redbank Power Station and bring the Power Station back online. The scope for bringing Redbank Power Station back online was defined by Hunter Energy and Downer has performed a pricing review on the scope elements nominated by Hunter Energy. The Power Station Refurbishment and Recommissioning Budget Appraisal report prepared by Downer (dated 11th June 2019) and is provided in Appendix 1.

A Capital Investment Value estimate (Appendix 2) has been prepared for this scoping report. A summary of the estimated project costs is provided in Table 1.2 below. This includes the estimated cost of the refurbishing and recommissioning of the Power Station as per the Downer report.

**Table 1.2. Estimated project costs.**

| Ref | Description | $ (ex. GST) |
|---|---|---|
| 1.0 | **Refurbishment / Recommissioning** | |
| 2.0 | Refurbishment / recommissioning costs (excl. conversion) | $15,790,434 |
| 3.0 | On Costs | $6,104,207 |
| 4.0 | Escalation to October 2022 | $3,612,616 |
| 5.0 | **Biomass Conversion** | |
| 6.0 | Weighbridge | $583,898 |
| 7.0 | Infrastructure to New Fuel Delivery Area | $2,871,123 |
| 8.0 | Modification to 2 Reversing Conveyors | $873,436 |
| 9.0 | Silo Bottom incl. Augers | $4,640,954 |
| 10.0 | Additional Lighting | $676,500 |
| 11.0 | Electrical, Instrumentation & Control (EI&C) Equipment | $180,250 |
| 12.0 | Truck Unloaders | $2,349,902 |
| 13.0 | Radial Stackers | $1,186,934 |
| 14.0 | Civil Works | $418,470 |
| 15.0 | Materials Handling (2 Loaders and 3 Excavators) | $1,404,968 |
| 16.0 | Storage and Feeding Bins | $978,485 |
| 17.0 | Fire Services & Bushfire | $356,432 |
| 18.0 | Freight | $200,000 |
| 19.0 | Permits & Studies | Incl. |
| 20.0 | Existing Basin | Excl. |
| 21.0 | As-builts, Training and Manuals, Maintenance | Excl. |
| 22.0 | Power Supply from Power Plant | Excl. |
| 23.0 | Preliminaries, Overheads & Margin (12%) | $2,006,562 |
| 24.0 | **Indirect Costs** | |
| 25.0 | Professional fees (Lump Sum provided by client circa 5%) | $3,547,331 |
| 26.0 | Contingency (5%) | $3,487,121 |
| 27.0 | Authority Fees | Excl. |
| 28.0 | Client Costs (Restart Costs) | $11,351,361 |
| 29.0 | Escalation (5% p.a from December 2022 to assumed midpoint of construction December 2023) | $3,487,121 |
| 30.0 | GST | Excl. |
| 31.0 | **Total Project Budget** | **$66,108,104** |

# 2. Strategic Context

## 2.1 Land use

The development is located on land zoned as RU1 Primary Production under the *Singleton Local Environmental Plan* 2013 (refer to Figure 2.1).

The proposed development is permissible development on land zoned as RU1 Primary Production under the *Singleton Local Environmental Plan* 2013. Whilst the LEP prohibits development that may be classified as a 'electricity generating works', this development is considered permissible with consent under Clause 2.36 of the *State Environmental Planning Policy (Transport and Infrastructure)* 2021 as:

> *(1) Development for the purpose of electricity generating works may be carried out by any person with consent on the following land—*
>
> > *(a) in the case of electricity generating works comprising a building or place used for the purpose of making or generating electricity using waves, tides or aquatic thermal as the relevant fuel source—on any land,*
> >
> > *(b) in any other case—any land in a prescribed rural, industrial or special use zone.*

A prescribed rural, industrial or special use zone includes RU1 Primary Production zoning under Clause 2.35 of the *State Environmental Planning Policy (Transport and Infrastructure)* 2021.

And further, under Clause 2.36(5) of the *State Environmental Planning Policy (Transport and Infrastructure)* 2021:

> *(5) Development for the purpose of, or resulting in, a change of fuel source of an existing coal or gas fired generating works by a proportion of more than 5 per cent in any 12 month period may only be carried out with consent.*

## 2.2 Local / regional community

The Site is positioned in a suitable location approximately 10 km to the west of Singleton, 10 km northeast of Bulga and 8 km northwest of Mount Thorley. The village of Warkworth lies approximately 4 km to the west, and Gouldsville 2.5 km to the northeast. The immediate surrounding area is covered with moderately dense regrowth woodland interspersed with patches of open grassland. Current land uses surrounding the Site are dominated by a mixture of coal mining and agriculture.

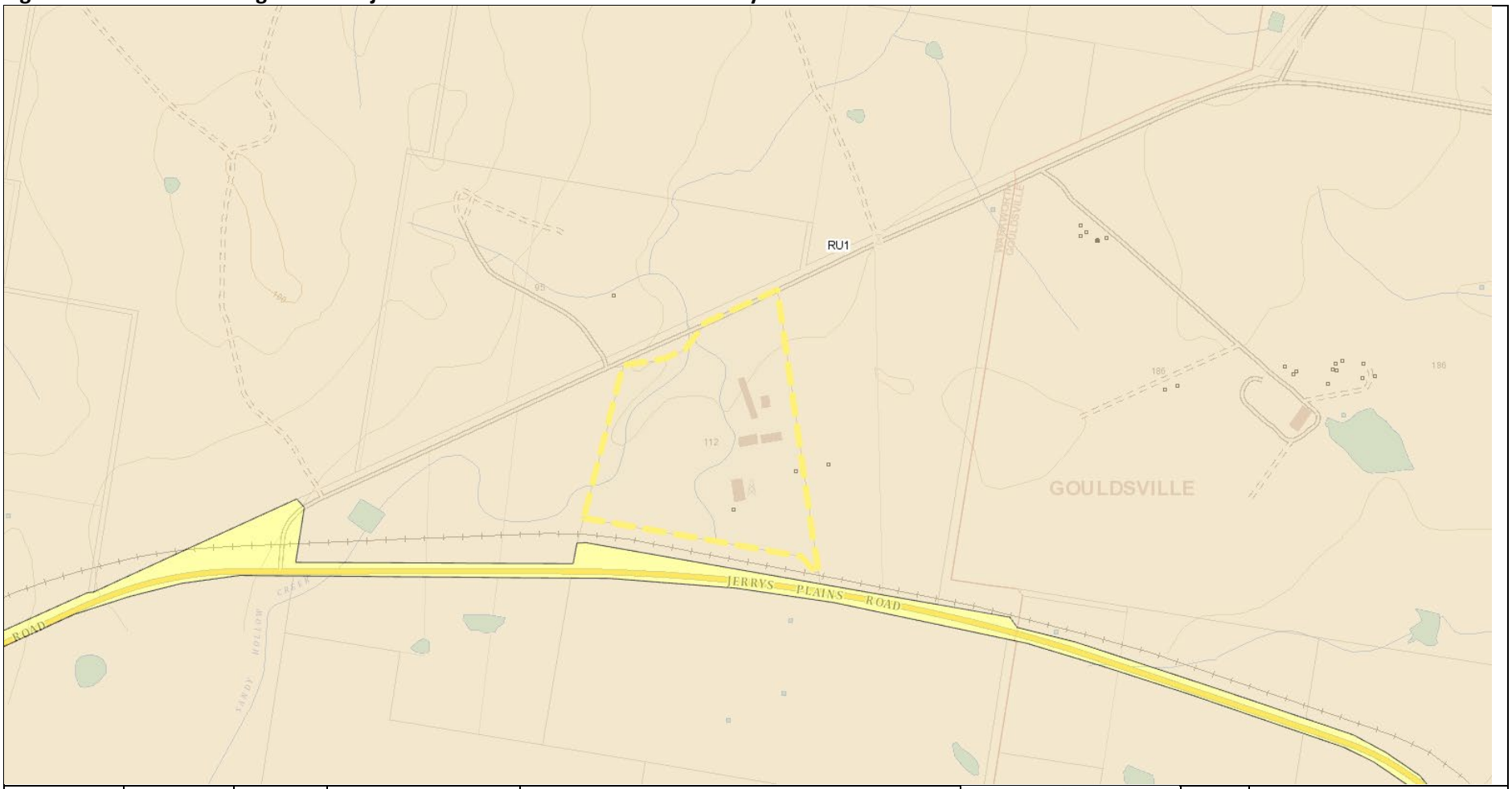
Operating collieries near to the Site include:

- Warkworth Mine immediately to the south;
- Wambo Colliery to the west; and
- Lemington Mine to the northwest.

The Singleton Army base is located approximately 10 km to the southeast of the Site. Directly to the south of the proposed development Site is a railway easement, transmission line easement and the Golden Highway.

The nearest dwellings are over 1km distance toward the east. The closest National Park is Wollemi National Park approximately 11km to the west of the facility. Other National Parks in the region include Mount Royal and Barrington Tops National Parks to the north, Yengo National Park to the south, Goulburn River National Park to the west and Belford National Park to the east.

**Figure 2.1. Land use zoning of the subject site. Site boundaries are shown in yellow.**




| Date | Revision | Drawn By | Site description | Jackson Environment and Planning Pty Ltd | Client | Verdant Earth Technologies Limited |
|---|---|---|---|---|---|---|
| 20/07/2022 | Revision A | R. Loemker | 112 Long Point Road West, Warkworth (Lot 450 DP1119428) | Strategy \| Infrastructure \| Compliance \| Procurement<br>A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060<br>E: admin@jacksonenvironment.com.au<br>T: 02 8056 1849<br>W: http://www.jacksonenvironment.com.au | Project | Redbank |
| | | | | | Title | Land zoning |
| | | | | | Scale | As shown |
| | | | | | Source | NSW DPE |

## 2.3 Justification of the project

### 2.3.1 Energy from Waste Infrastructure Plan 2021

The NSW Government supports thermal energy recovery as a residual waste management option where it can deliver positive outcomes for the community while protecting human health and the environment.

The *Energy from Waste Infrastructure Plan* 2021 (EfW Infrastructure Plan) guides strategic planning for future thermal energy from waste facilities to ensure infrastructure is located in areas that best address NSW's waste management needs until 2041, and where it maximises efficiencies for waste innovation, management and energy recovery.

The EfW Infrastructure Plan aims to provide certainty and transparency to industry and the community on how the NSW Government will facilitate the establishment and operation of energy from waste infrastructure to manage genuine residual waste.

The plan asserts that a mix of potential infrastructure solutions are needed to meet the State's residual waste needs and identifies that over the next 20 years, waste volumes in NSW are forecast to grow from 21 million tonnes in 2021 to nearly 37 million tonnes by 2041.

The *Protection of the Environment Operations (General) Amendment (Thermal Energy from Waste) Regulation* 2022 (Thermal Energy from Waste Regulation) became law on 8 July 2022. The amendment now forms part of the *Protection of the Environment Operations (General) Regulation* 2021 (the POEO Regulation) to provide a legal basis for the EfW Infrastructure Plan.

The Thermal Energy from Waste Regulation was implemented to ensure that energy from waste is only used to manage genuine residual waste.

The Thermal Energy from Waste Regulation proposes changes to energy from waste in NSW to:

- Improve certainty to communities and industry around acceptable locations and facilities;
- Apply the precautionary principle where there is a greater risk of harm to human health due to proximity to high population areas (now and into the future), and in areas where there are regular exceedances to air quality standards from existing sources; and
- Maximise efficiencies in infrastructure, waste management, innovation and energy recovery; and ensure that energy from waste plays a sustainable role as NSW transitions towards a circular waste and resource recovery framework.

As outlined in the EfW Infrastructure Plan, the Thermal Energy from Waste Regulation (subject to limited exceptions) restricts new energy from waste operations and infrastructure to four designated precincts:

- West Lithgow Precinct;
- Parkes Special Activation Precinct;
- Richmond Valley Regional Jobs Precinct; and
- Southern Goulburn Mulwaree Precinct.

Outside these areas, energy from waste will only be permitted if the facilities use waste, or waste-derived feedstock to replace less environmentally sound fuels to generate energy at the site, and where that energy is used to power industrial and manufacturing processes on-site.

The Thermal Energy from Waste Regulation also defines thermal treatment of waste for energy recovery and listed activities that are excluded from that definition.

All energy from waste proposals are still required to comply with environmental and planning laws, including the EfW Policy.

Facilities that only thermally treat lower risk 'eligible waste fuels' as listed in Part 3 of the EfW Policy and defined in the *Eligible Waste Fuels Guidelines* (2022), including biomass and residues (also referred to as biomaterial), are excluded from the EfW Infrastructure Plan. The EfW Infrastructure Plan acknowledges that these types of energy from waste facilities will continue to be permitted across NSW if they comply with planning and environmental legislation and policies.

### 2.3.2 NSW Waste and Sustainable Materials Strategy 2041

This strategy updates NSW's previous strategy: the *Waste Avoidance and Resource Recovery Strategy* 2014–2021.

NSW *Waste and Sustainable Materials Strategy 2041*: Stage 1 – 2021-2027 outlines the actions NSW will take over the next six years – the first phase of the strategy – to deliver on a set of long-term objectives. The strategy is driven by $356 million in funding to help deliver priority programs and policy reforms, including:

- Phasing out problematic single-use plastic items;
- Financial incentives for manufacturers and producers to design out problematic plastics;
- Having government agencies preference recycled content and invest in research and pilots for recycling innovation;
- Introducing tighter environmental controls for energy from waste in NSW, with further consideration of planning and infrastructure needs underway;
- Mandating the source separation of food and garden organics for households and selected businesses; and
- Incentivising biogas generation from waste materials.

Specific targets focus on the environmental benefits and economic opportunities in how we manage our waste, and includes the following:

- Reduce total waste generated by 10% per person by 2030;
- Have an 80% average recovery rate from all waste streams by 2030;
- Significantly increase the use of recycled content by governments and industry;
- Phase out problematic and unnecessary plastics by 2025;
- Halve the amount of organic waste sent to landfill by 2030;
- Reduce litter by 60% by 2030 and plastics litter by 30% by 2025; and
- Triple the plastics recycling rate by 2030.

To complement this strategy, NSW also released the following documents:

- *NSW Plastics Action Plan*, which sets out how we will phase out problematic plastics, tackle litter from plastic items like cigarette butts, and support innovation and research;
- *NSW Waste and Sustainable Materials* Strategy*: A guide to future infrastructure needs*, which sets out the investment pathway required for NSW to meet future demand for residual waste management and recycling.

The proposed development will assist in creating additional markets for uncontaminated wood and timber from the urban waste stream and help to deliver targets in this strategy.

### 2.3.3 NSW Government's Net Zero Plan Stage 1: 2020 – 2030

The *Net Zero Plan Stage 1: 2020-2030* is the foundation for NSW's action on climate change and goal to reach net zero emissions by 2050. It outlines the NSW Government's plan to grow the economy, create jobs and reduce emissions over the next decade.

The plan aims to enhance the prosperity and quality of life of the people of NSW, while helping the state to deliver a 35% cut in emissions by 2030 compared to 2005 levels. The plan will support a range of initiatives targeting electricity and energy efficiency, electric vehicles, hydrogen, primary industries, coal innovation, organic waste and carbon financing.

As part of the plan, the NSW Government has set as their top priority is to drive the uptake on proven emissions reduction technologies that grow the economy, create new jobs or reduce the cost of living. The NSW Government's first priority is to provide a pathway to deploy those technologies at scale over the next decade. To do this, the NSW Government will remove unnecessary barriers to entry for those technologies and make co-investments to address the high upfront capital costs that may stand in the way of their take-up.

Furthermore, the NSW Government has set a target of net zero emissions from organic waste by 2030. To deliver on this goal, the NSW Government will establish world-leading landfill diversion policies to apply to the waste industry. It will:

- Facilitate the development of 'waste to energy' facilities in locations that have strong community support, provided those facilities meet strict environmental standards; and
- Update regulatory settings to ensure residual emissions from the organic waste industry are offset.

These policies strongly support the re-purposing of existing energy generation infrastructure to create low emissions green power for residents of NSW. The proposed project will deliver green baseload power to the electricity grid and will be the first major project of its type in NSW to help drive progress towards the NSW Government's goal of net zero greenhouse gas emissions by 2050.

## 2.4 Sustainability

### 2.4.1 Environmental

In recognition of the concerns of some sectors of the community in relation to the use of native forestry waste residues, Verdant has been working to address these concerns by developing alternate sources of biomass fuel and an alternate biomass fuel strategy.

Following the success of this strategy, Verdant is pleased to confirm it is not seeking approval to use and will not use Native forestry bio-material waste from logging activities (being excluded biomaterial as set out in subsection (a)(vi) and (a)(vii) under the definition of "native forest biomaterial" in section 138 of the *Protection of the Environment Operations (General) Regulation* 2022.

Verdant will also relinquish the current approval to use coal tailings as a fuel at Redbank.

It is proposed that Redbank will be fueled with ecologically sustainable biomass (in compliance with all relevant legislative requirements and excluding native forestry residues from logging) to deliver net zero $CO_2$ power generation including from:

- Purpose grown energy plantations;
- Perennial grasses;
- Energy crops;

- Waste biomass from invasive species control;
- Waste biomass from approved clearing activities such as for major infrastructure developments, in accordance with a land management (native vegetation) code, from approved civil infrastructure, road clearing works, right of ways and related approved projects;
- Agricultural waste biomass products or residues;
- End of life waste woody biomass manufactured and produced into a fuel to specification ("**Domestic Biomass**") (subject to EPA approval as an eligible waste fuel); and
- Other sources of eligible waste fuels.

The Proposal would use up to 700,000 tonnes (dry equivalent) of biomass as a feedstock fuel for conversion into electricity. Recommissioning the Redbank Power station would occur in two distinct stages.

Note that at the initial startup of the power station, and following boiler maintenance and restart of the boilers, a start up supplementary fuel (diesel or a similar fuel) will be used to achieve the temperature required to use biomass as fuel. Once the boiler is operating at the design temperature, the Redbank Power Station will use only approved biomass as fuel.

The first stage would involve the start-up of operations using biomass sourced primarily from approved land clearing operations (from existing civil and road works), biomass from invasive species as defined by Local Land Services NSW and potentially a limited amount of purpose grown biomass.

The second stage would involve the introduction or increased use of purpose grown biomass which will be increased over a period of 2-4 years from approval, and, if approved and declared an eligible waste fuel by the NSW EPA, the introduction and use of Domestic biomass.

### 2.4.2 Economic benefits

The Redbank project is predicted to generate over 1,000 jobs and deliver 383 long term FTE jobs during operations. It will contribute $897m in economic benefits to NSW with $756m in benefits and 855 jobs going directly to the Hunter Region. Modern Bioenergy needs fuel daily, creating large numbers of long-term jobs. The social and economic multiplier effects both locally and across NSW are substantial. When fully operational the power plant will produce 24/7 dispatchable power and would produce approximately one million megawatt hours of electricity per year, equivalent to supplying around 200,000 homes.

### 2.4.3 Social benefits

The socio-economic benefits of the Redbank project such as employment creation, population growth, economic diversity, downward pressure on electricity prices and more reliable supply of renewable energy are high and have a positive consequence.

The Singleton area has, over the past decade experienced lower population growth and is forecast to experience lower population growth over the next two decades. As a result, it is harder to support existing businesses and the provision of existing social infrastructure. This has the potential to compound. The Redbank project will help alleviate this by providing jobs and economic stimulus. The project will also deliver educational and demonstration opportunities for the promotion of green electricity generation and sustainable waste management practices. In addition, the Redbank project can pave the way for a sustainable bio-energy industry in Australia providing the solution to delivering 24/7 reliable dispatchable power and assisting to deliver net zero by 2050. The proposed development will also provide additional opportunities for synergies with the agricultural and resource recovery industries.

## 2.5 Important features

The Site currently contains existing power station infrastructure and technology to support the proposed development including:

- Multiple buildings including offices, warehouses, and turbine hall;
- Road access and carparks;
- Stockpile area and conveyor belts;
- Sediment basin, detention basin and wastewater storage basin;
- Two separate existing access points to the Site from Long Point Road West; and
- Power generation infrastructure (Boiler, cooling tower, stack and turbo generator).

The existing connection to the Shortland electrical system is via a 132 kV electrical interconnect line less than one kilometre (km) in length connecting with Shortland's existing 132 kV line from Singleton to Kurri Kurri. No further modifications to the electricity line are proposed.

## 2.6 Key risks

No areas of sensitive biodiversity, flooding or other environmental constraints are located on the land area slated for the proposed development. A riparian area (Sandy Hollow Creek) sits to the west on the lot but is located outside of the area of construction and operation. Part of the facility is categorised as bushfire hazard "vegetation buffer". Adequate area for an asset protection zone will be incorporated into the proposed development.

A fuel storage building is proposed to provide a weatherproof enclosure for the on-site storage of Domestic Biomass Fuels (DBF). This will enable the receipt, storage and continuous supply of DBF with the correct moisture content into the power station, independent of weather conditions. It is proposed that the fuel storage building will be constructed once the DBF fuel is approved for use and subject to an additional Development consent.

## 2.7 Cumulative impacts

Upcoming future major projects in the surrounding area, which may contribute to or be contributed to by the potential impacts of the project include:

- Singleton Bypass - timing for construction of the proposed development has not been confirmed and is subject to approval and funding availability (estimated three years to complete). The NSW Government has committed $92 million towards the proposed development and allocated $2.7 million in 2019-2020 to continue development of the proposed development; and
- The Hunter Gas Pipeline (HGP) – a critical component for delivering gas from Northern Australia via the Wallumbilla Gas Hub near Roma in Queensland and Narrabri to Newcastle in NSW. This pipeline will supply gas to the major domestic and industrial markets of NSW, namely the Hunter Region and Sydney Basin. A five-year extension was approved in October 2019 to commence construction by October 2024.

The proposed development is not considered to make a significant contribution to cumulative negative impacts due to the mitigation measures and the ultimate transition from coal and closing down of coal powered power plants that Redbank would essentially replace.

There are numerous long-term cumulative benefits of the proposed development. When fully operational the proposed development will supply the grid with approximately 1 million megawatt hours of baseload

electricity per year, equivalent to supplying around 200,000 homes. The proposed development will also drive significant progress towards the NSW Government's *Net Zero Plan Stage 1: 2020-2030,* the foundation for NSW's action on climate change and goal to reach net zero emissions by 2050.

# 3. Project Description

Verdant Earth Technologies Limited are planning to restart Redbank and enable the use of 100% biomass as a new fuel for electricity generation. The Proposal would use up to 700,000 tonnes of dry equivalent biomass per annum (approximately 850,000 tonne per annum at 25% moisture) as a feedstock fuel for conversion into electricity.

Pursuant to the Federal *Renewable Energy (Electricity) Regulations* 2001, "Biomass" is defined as "… *An organic material other than fossilised biomass*". Redbank Biomass is biomass but excludes native forestry residues from logging.

Redbank will be fueled with ecologically sustainably sourced biomass (in compliance with all relevant legislative requirements and excluding native forestry residues from logging) to deliver net zero $CO_2$ power generation from:

- Purpose grown energy plantations;
- Perennial grasses;
- Energy crops;
- Waste biomass from invasive species control;
- Waste biomass from approved clearing activities such as for major infrastructure developments, in accordance with a land management (native vegetation) code, from approved civil infrastructure, road clearing works, right of ways and related approved projects;
- Agricultural waste biomass products or residues;
- End of life waste woody biomass manufactured and produced into a fuel to specification ("**Domestic Biomass**") (subject to EPA approval as an eligible waste fuel); and
- Other sources of eligible waste fuels.

Recommissioning the Redbank Power station would occur in two distinct stages.

Note that at the initial startup of the power station, and following boiler maintenance and restart of the boilers, a start up supplementary fuel (diesel or a similar fuel) will be used to achieve the temperature required to use biomass as fuel. Once the boiler is operating at the design temperature, the Redbank Power Station will use only approved biomass as fuel.

The first stage would involve the start-up of operations using biomass sourced primarily from approved land clearing operations (from existing civil and road works), biomass from invasive species as defined by Local Land Services NSW and potentially a limited amount of purpose grown biomass.

The second stage would involve the introduction or increased use of purpose grown biomass which will be increased over a period of 2-4 years from approval, and, if approved and declared an eligible waste fuel by the NSW EPA, the introduction and use of Domestic biomass.

The fuel will be sourced generally within an average 300 km radius of the facility including fuel from approved clearing activities, invasive native species and purpose grown biomass. Contracts for supply of biomass for use in the Power Station will be established from time to time, and suppliers will be required to 1) ensure that the biomass material meets an approved specification required for the power station and 2) to meet all requirements under any relevant RRO/E issued by the NSW EPA. It is proposed that processing including drying, chipping and screening and will be performed off-site.

## 3.1 Project area and existing plant and equipment

The proposed development is to be located at 112 Long Point Road West, Warkworth (Lot 450 DP 1119428). The lot itself is approximately 18 hectares, and the existing power station comprises approximately 10 hectares on the east side of the lot. The existing facility includes the following infrastructure that will be utilised:

- Multiple buildings including offices, warehouses, and turbine hall;
- Road access and carparks;
- Stockpile area and conveyor belts;
- Sediment basin, detention basin and wastewater storage basin;
- Two separate existing access points to the Site from Long Point Road West; and
- Power generation infrastructure, including:
    - Boiler Island Plant;
    - Turbine Island;
    - Fuel handling plant and equipment including conveyors, moving floor bins, and front-end loaders;
    - Water treatment facility;
    - Air pollution control plant;
    - Switchyard;
    - Cooling water system; and
    - Firefighting system.

Most of this plant and equipment is existing and approved under the original consent. Maintenance, repair and recommissioning of the existing and approved plant and equipment is required within the power station to permit recommencement of electricity generation.

Additional plant and equipment will be required under the proposed development as described in the next section.

## 3.2 Conceptual physical layout and design of the project

Specification compliant biomass will be received at the facility via B-double, which will be directly unloaded into one of two drive-on truck unloaders. Materials will then be transported on two additional conveyors that supply radial telescopic conveyors that will unload the biomass to the existing fuel storage area (i.e. the area approved for storage of coal tailings). Biomass will be transported via conveyor into bulk fuel unloader walking floor bins and then directly transferred into the power station's fuel conveyor system. This process will occur in the former coal storage area on the southern side of the power station.

Minor modifications would be required to existing conveyors and fuel feed system to allow transfer of the biomass from the existing fuel storage area into each of six fuel silos that will store the biomass. These silos previously stored coal tailings for delivery into the plant's fluidized bed combustion chambers.

It is noted that once the use of DBF is approved, it is proposed that a three-sided shed in the fuel storage area be constructed to provide weather protection for all fuels, with dimensions approximately 77m long, 45m wide and 18.5m high at the apex. This shed will be the subject of a separate development consent.

Figure 3.1. provides a layout of the proposed development.

It is envisioned deliveries will be accepted between 6am and 6pm six days per week (Monday to Saturday) although there may be the occasional out of hours delivery to meet operational needs. It is noted that all fuels will be tested and validated to ensure that fuels used meet a Specific RROE granted by the NSW EPA.

## 3.3 Additional infrastructure

Additional infrastructure required to be constructed includes:

- Sealed asphalt access (over existing disturbed areas) approximately 160m in length for B-Double access to drive-on bulk fuel unloaders;
- Two (2) single lane weighbridges (28m length each) constructed on the existing road for entry and exit access ways;
- Two (2) dual lane drive-on bulk fuel unloaders;
- Two (2) radial arm telestackers / conveyors;
- Two (2) walking floor bulk unloader bins;
- Timber wall on the southern edge of the fuel storage area;
- Various retrofits and modifications to the existing conveyors and fuel silos; and
- Subject to EPA declaring the use of DBF as an eligible waste fuel a three-sided shed in the fuel storage area to provide weather protection for fuel, with dimensions approximately 77m long, 45m wide and 18.5m high at the apex.

Figure 3.2 shows the proposed biomass fuel receival, fuel handling and stockpiling area.

## 3.4 Weighbridge operations and internal roads

Two 28m long single lane weighbridges will be placed internally along the existing entrance road and the exit roads which will enable the accurate recording of gross and tare weights of biomass received at the facility.

**Figure 3.1. Proposed site layout and infrastructure. Refer to Appendix 3 for high resolution plan.**

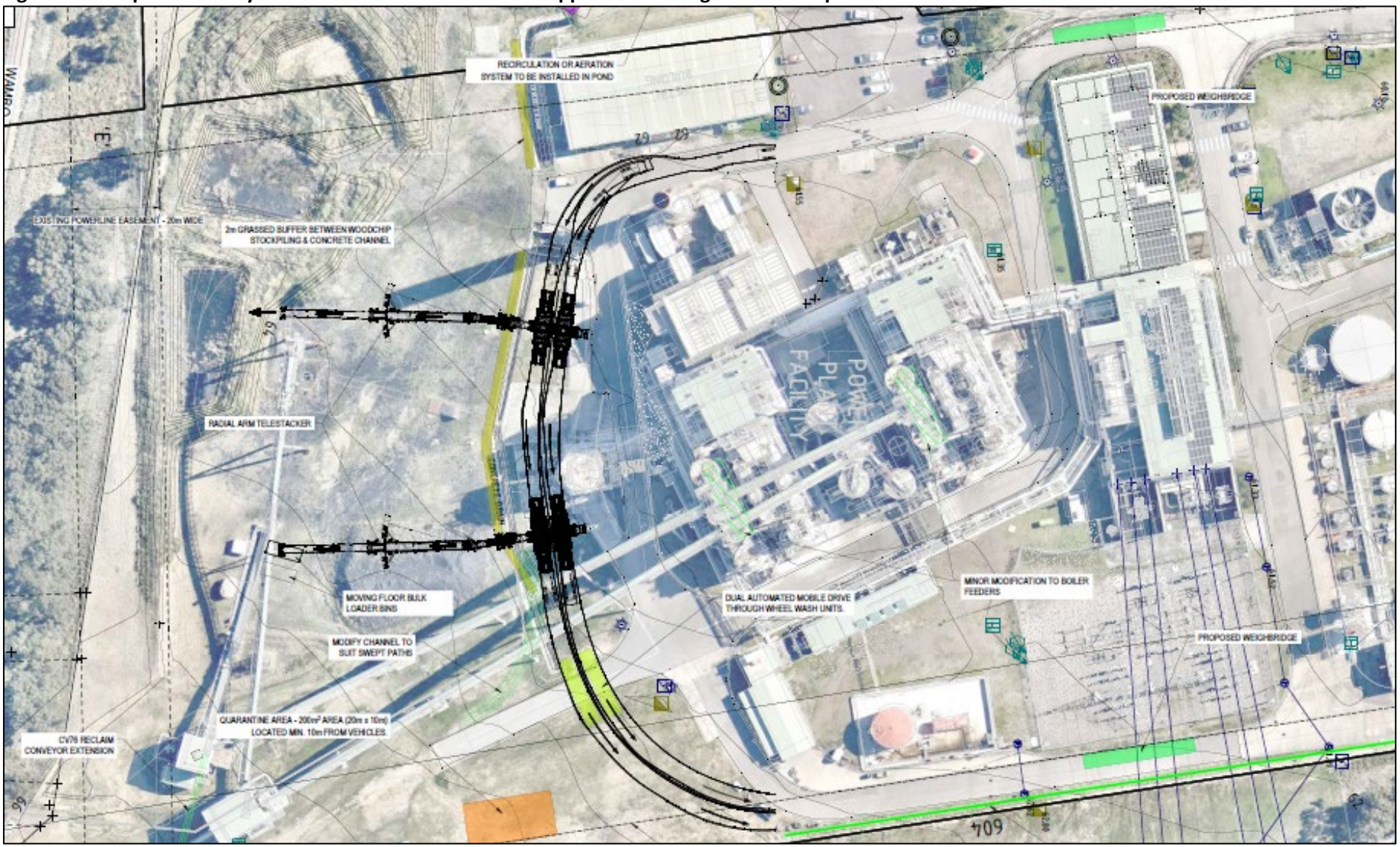
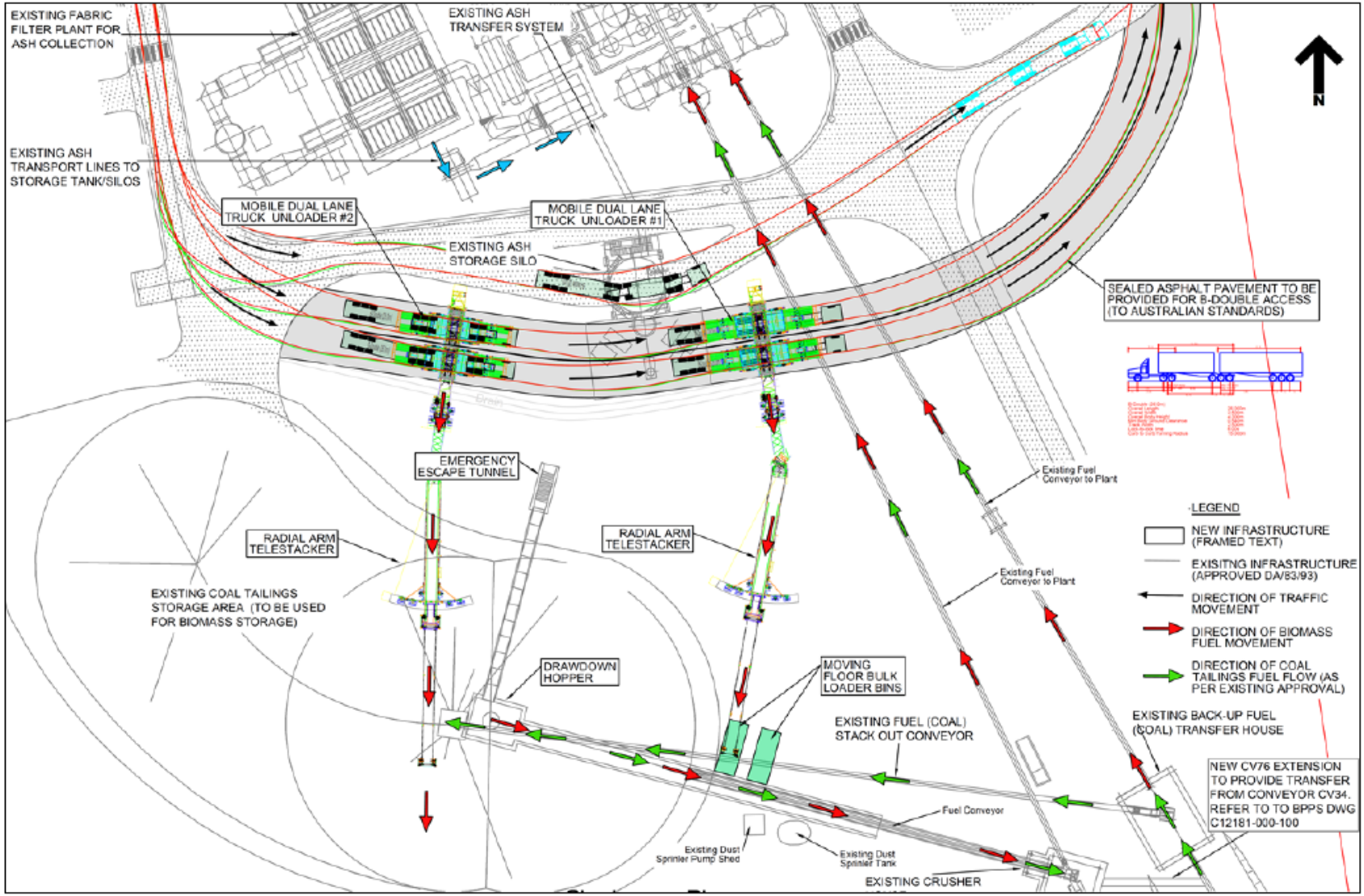


**Figure 3.2. Proposed biomass fuel receival, fuel handling and stockpiling area.**



## 3.5 Truck movements

The power station will accept approximately 850,000 tonnes of biomass at a 25% moisture content per annum in mostly B-Double rated semi-trailer configurations averaging 42-44 tonnes per load. To meet operational needs feedstock deliveries will occur 24/7; however deliveries will be prioritised to 12-hour shifts on Monday through Sunday between 6am and 10pm.

It is estimated that 200 movements (100 trips) per day would be needed to haul the required biomass using primarily B-double trucks.

The key roads providing access for the Site and for the haulage routes heading north and south are the Golden Highway (Jerry Plains Road) and Long Point Road West.

Figure 3.3 and Figure 3.4 show the site access and circulation routes for light and heavy vehicles, respectively.

**Figure 3.3. Proposed site access and light vehicle circulation routes.**

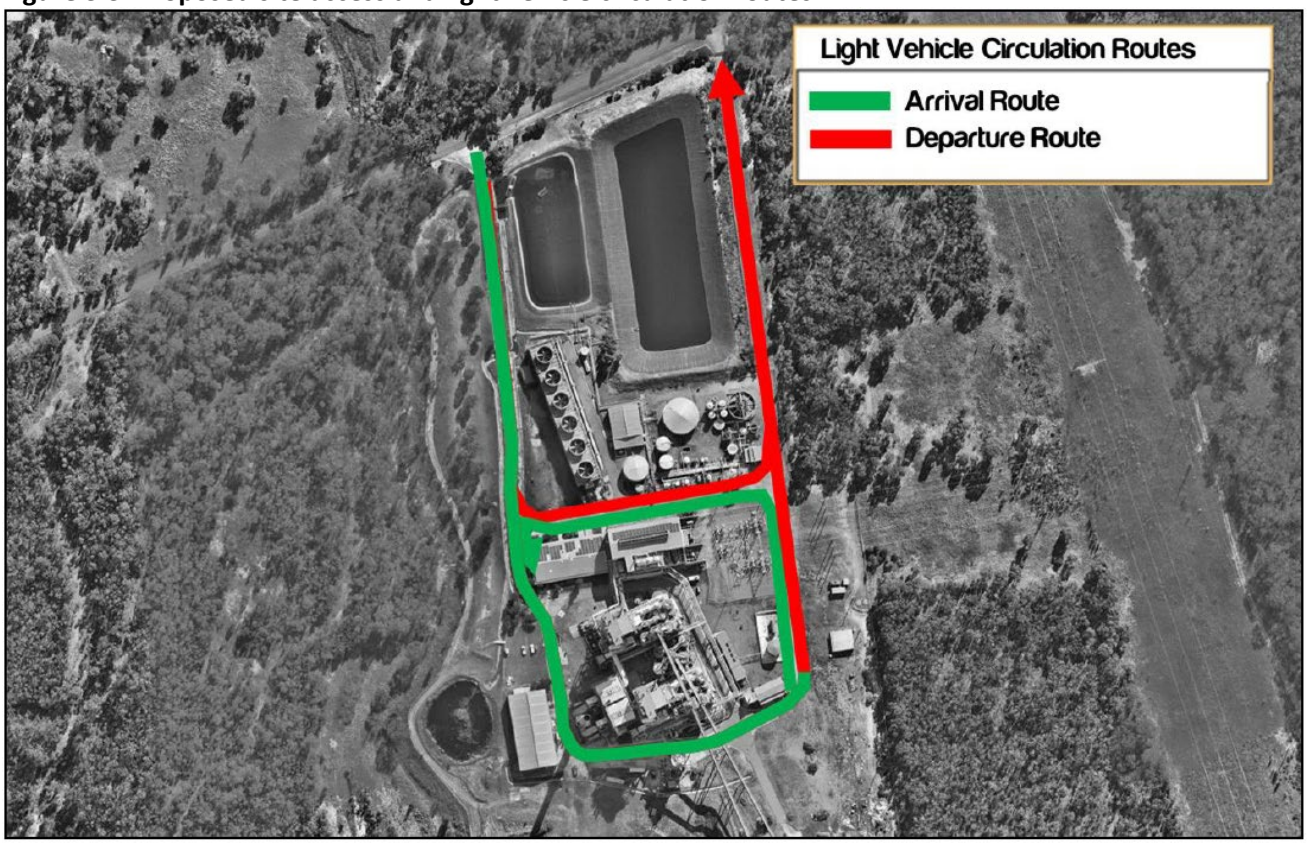
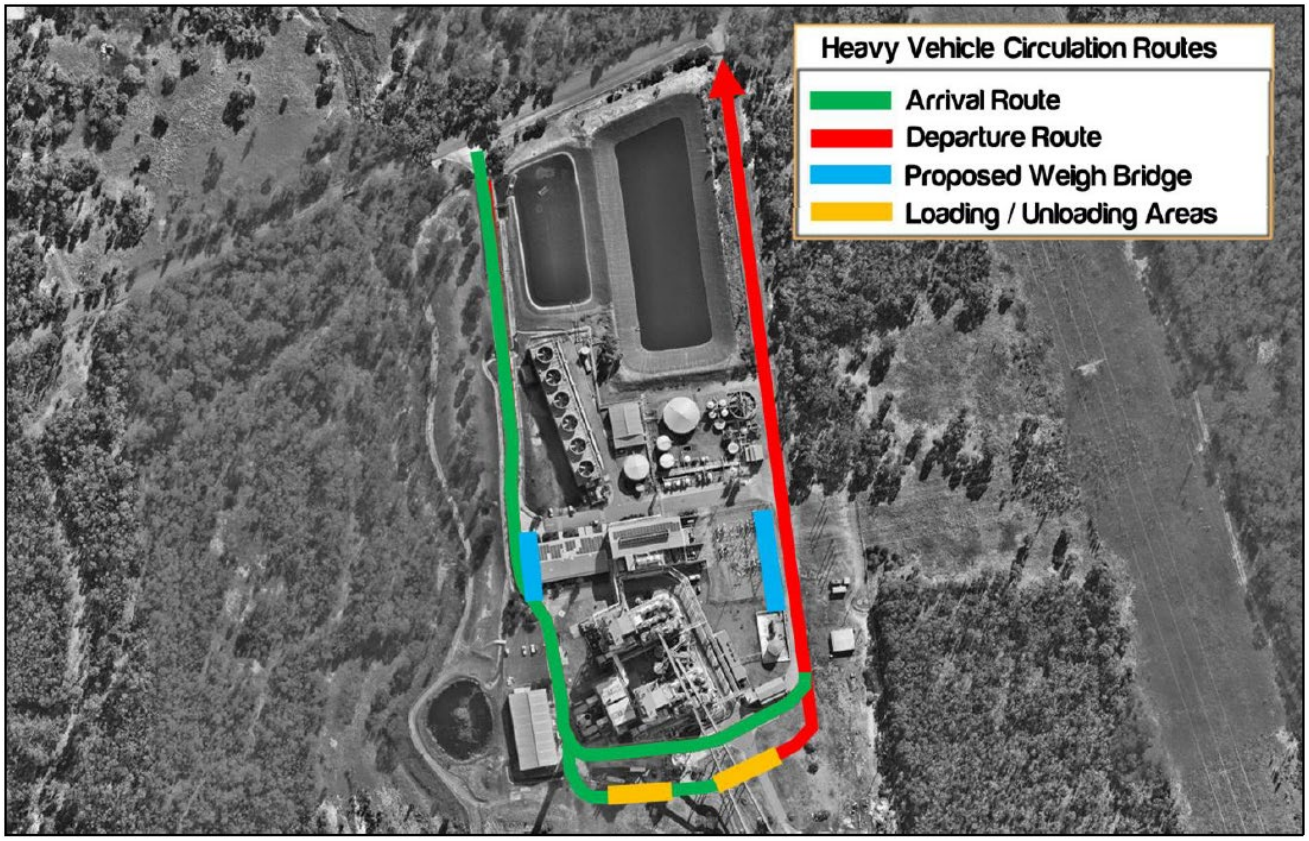



**Figure 3.4. Proposed site access and heavy vehicle circulation routes.**



## 3.6 Modifications to existing plant and equipment

The facility also requires modifications of materials handling systems of the power station to enable the use of up to 850,000 tonnes per annum of biomass as fuel for electricity generation. The modifications are necessary as biomass is much less dense than coal, has a lower calorific value, and tends to arch or bridge over outlet openings and cause blockages. Additional conveyor volume capacity is required, and some modification to silos and transfer systems.

To transport the necessary quantity of biomass fuel to the boilers, it is necessary to use both conveyors CV34 and CV35 simultaneously. Conveyor CV34 (previously the tailings conveyor) will be used to feed boiler 1, and CV35 (previously the supplementary fuel conveyor) will be used to feed boiler 2.

In summary, the changes involve the following:

- Use of the existing Conveyors 34 and 35 to supply Boilers 1 and 2 respectively with biomass fuel. An extension to Conveyor 76 and removal of the crusher house is required to enable the even transfer of fuel via Conveyors 34 and 35 to Boilers 1 and 2;
- Modifications to two reversing conveyors within the power station to transfer the biomass into each of six fuel silos that will store the biomass. These silos previously stored ROM coal for delivery into the plant's fluidised bed combustion chambers;
- Modification of the 'trouser legs' of the six fuel silos within the power station to enable the more efficient flow of biomass into the plant's fluidized bed combustion chambers;
- The existing dust collection equipment associated with the fuel handling system will be reused and where the new transfer points are proposed, new dust filter systems will be provided;
- Existing equipment that is not required for biomass firing will be left in-situ or stored on the Site to enable future re-use; and
- On approval of the use of DBF verdant will seek planning approval to construct a fuel storage building.

Other work, including landscaping, fire detection and suppression systems, and refurbishment of internal elements of the power station are also required. This will also include the purchase of a water access licence, reconnection to the electricity grid, development of a spare parts inventory and purchase and storage of a fuel invention for the power station.

A diagrammatic overview of plant changes is shown in Figure 3.5 illustrating the proposed changes to the conveyor and biomass delivery system to accommodate biomass fuel unloading and delivery to the silos that feed the boilers.

A plan view of the proposed changes to the fuel delivery and handling system are shown in Figure 3.6.

Elevation views of the proposed changes shown in Figure 3.7, Figure 3.8 and Figure 3.9.

**Figure 3.5. Modified conveyor and feed system to accommodate the use biomass at the power station. Process and plant changes proposed are shown in the purple box. Dust collection and management equipment is shown in the green box. Existing equipment shown in black (Source: B&PPS, 2021).**

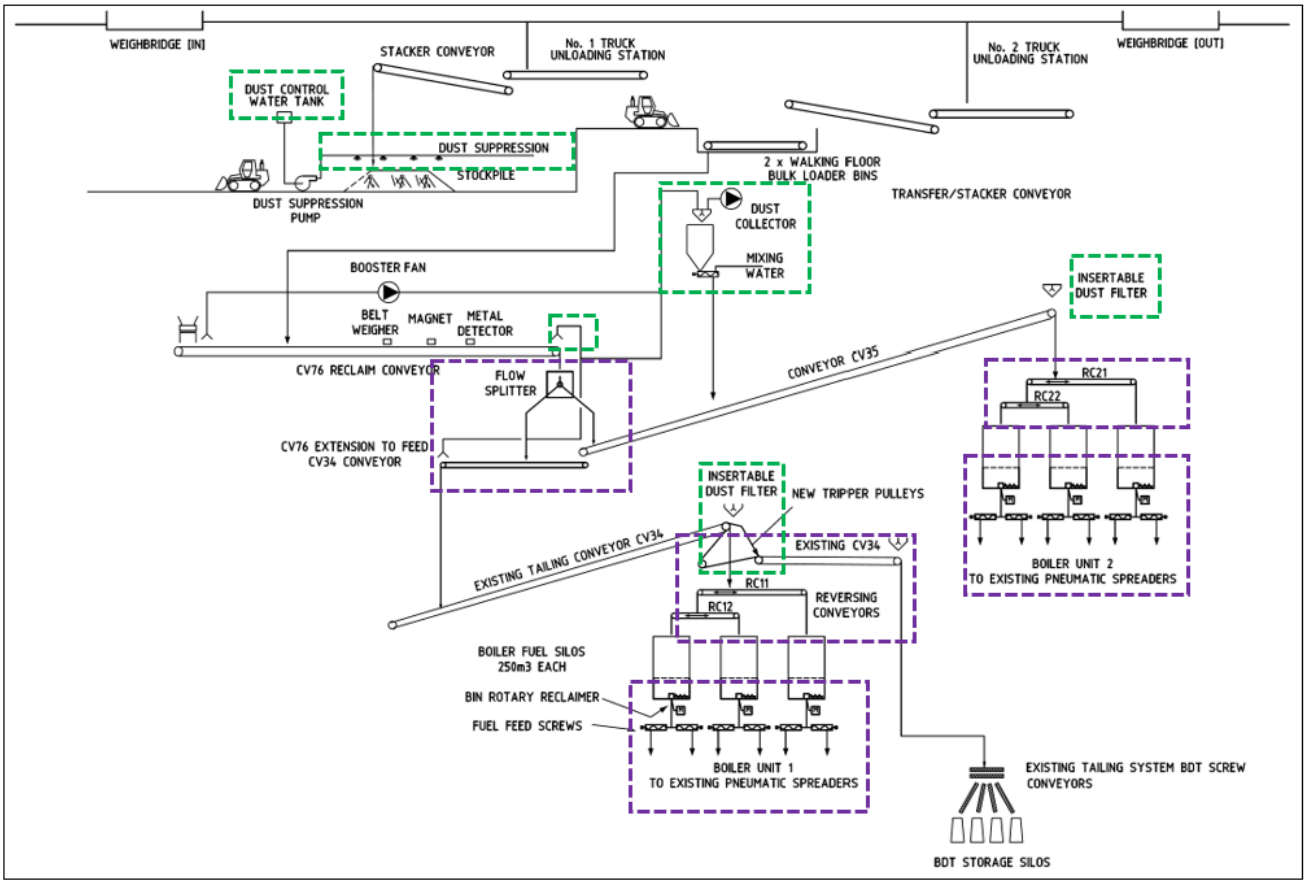


**Figure 3.6. Proposed changes to the fuel delivery and handling system (shown in green). Refer to Appendix 3 for high resolution plan.**

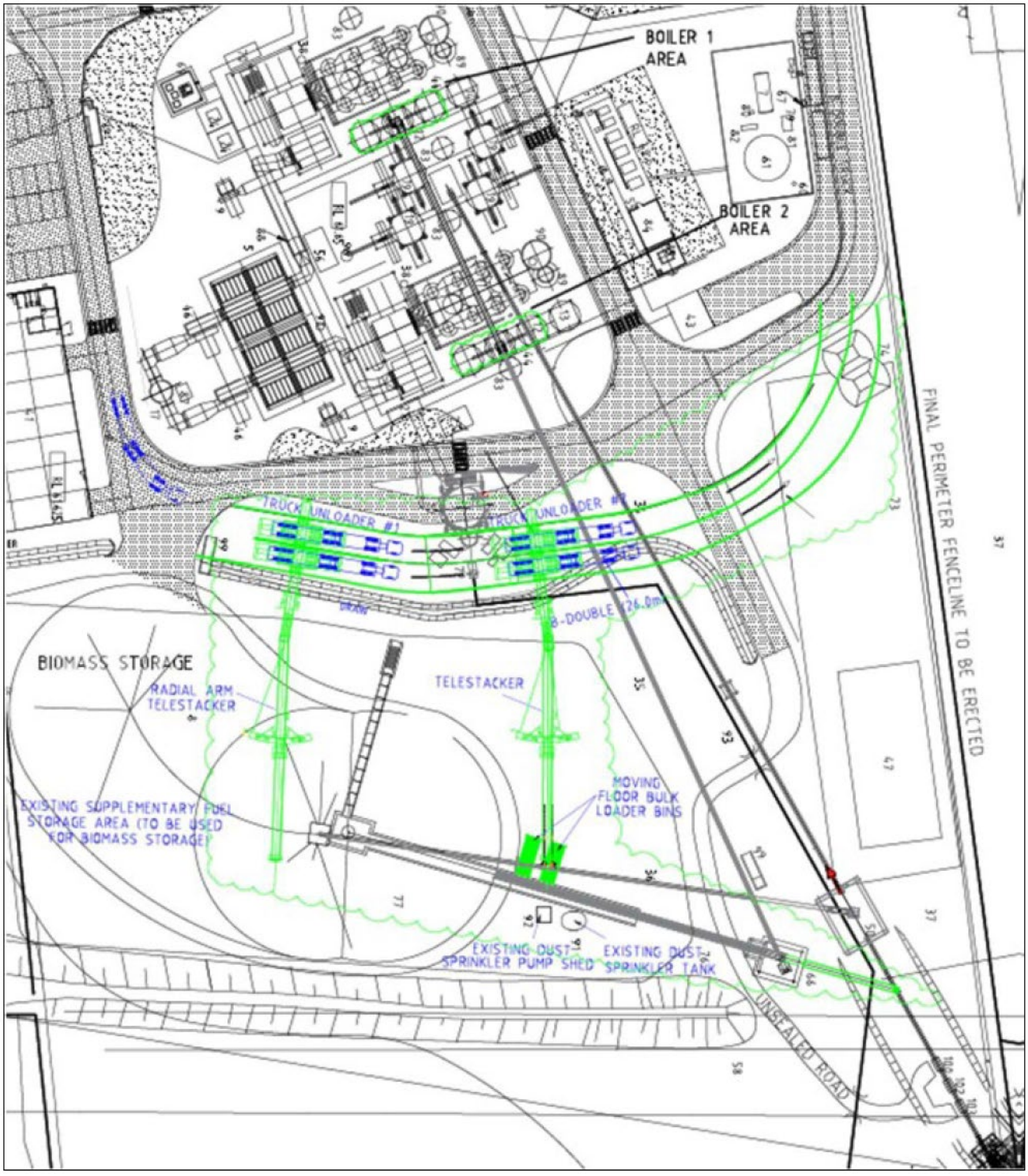


**Figure 3.7. Biomass receival and handling showing additional plant/equipment in green. East elevation view. Refer to Appendix 3 for high resolution plan.**

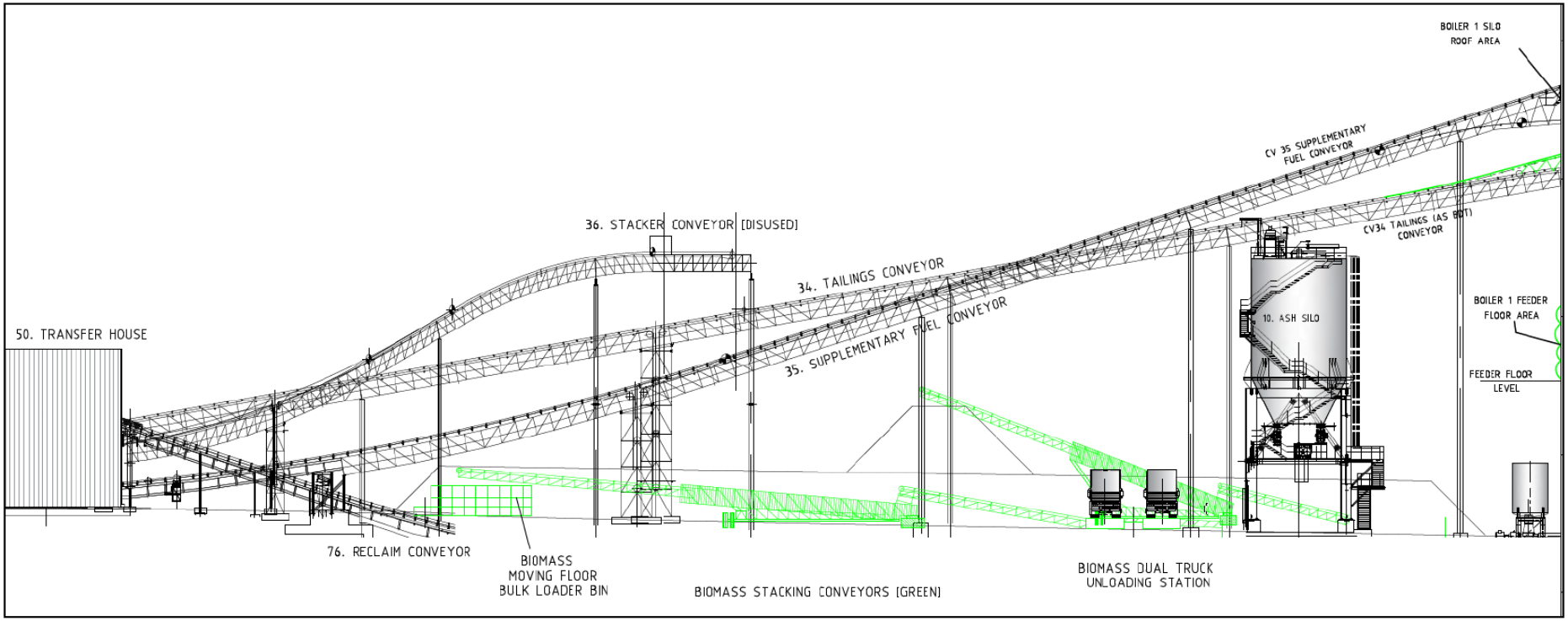


**Figure 3.8. Biomass receival and handling showing additional plant/equipment in green. South elevation view. Refer to Appendix 3 for high resolution plan.**

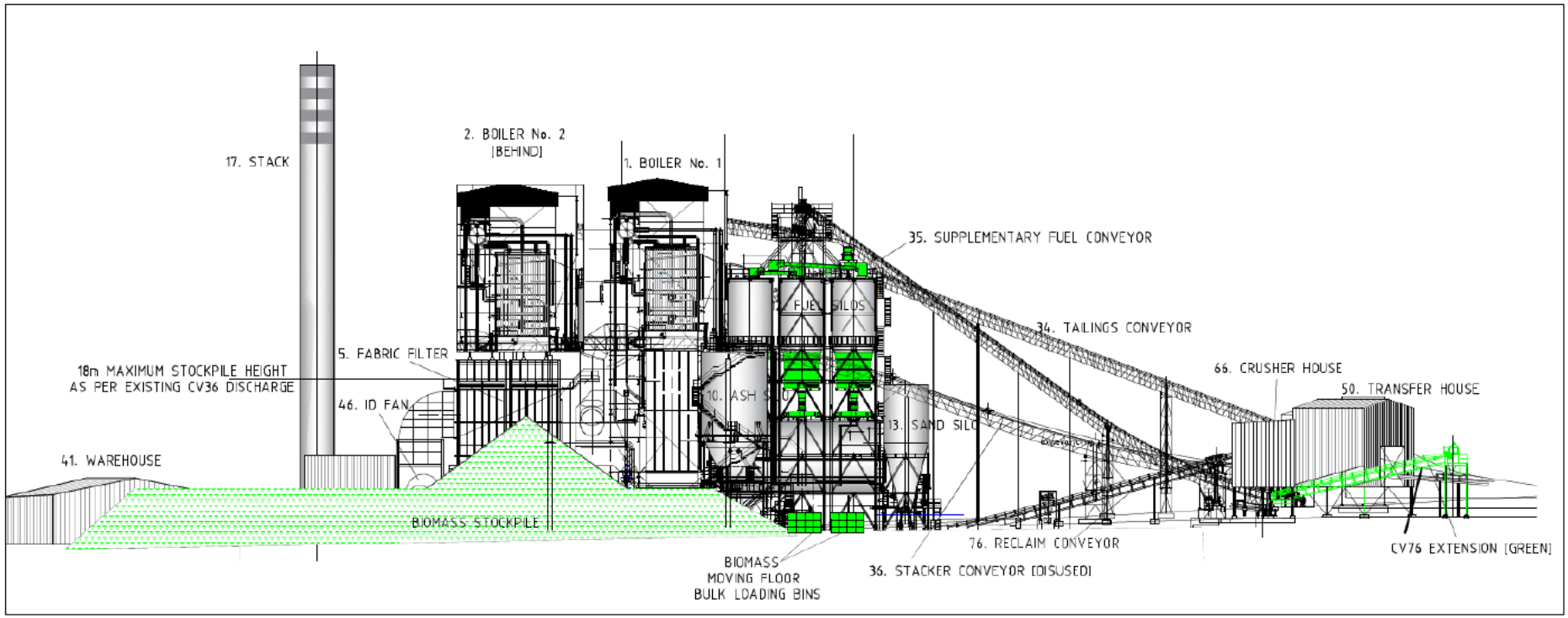
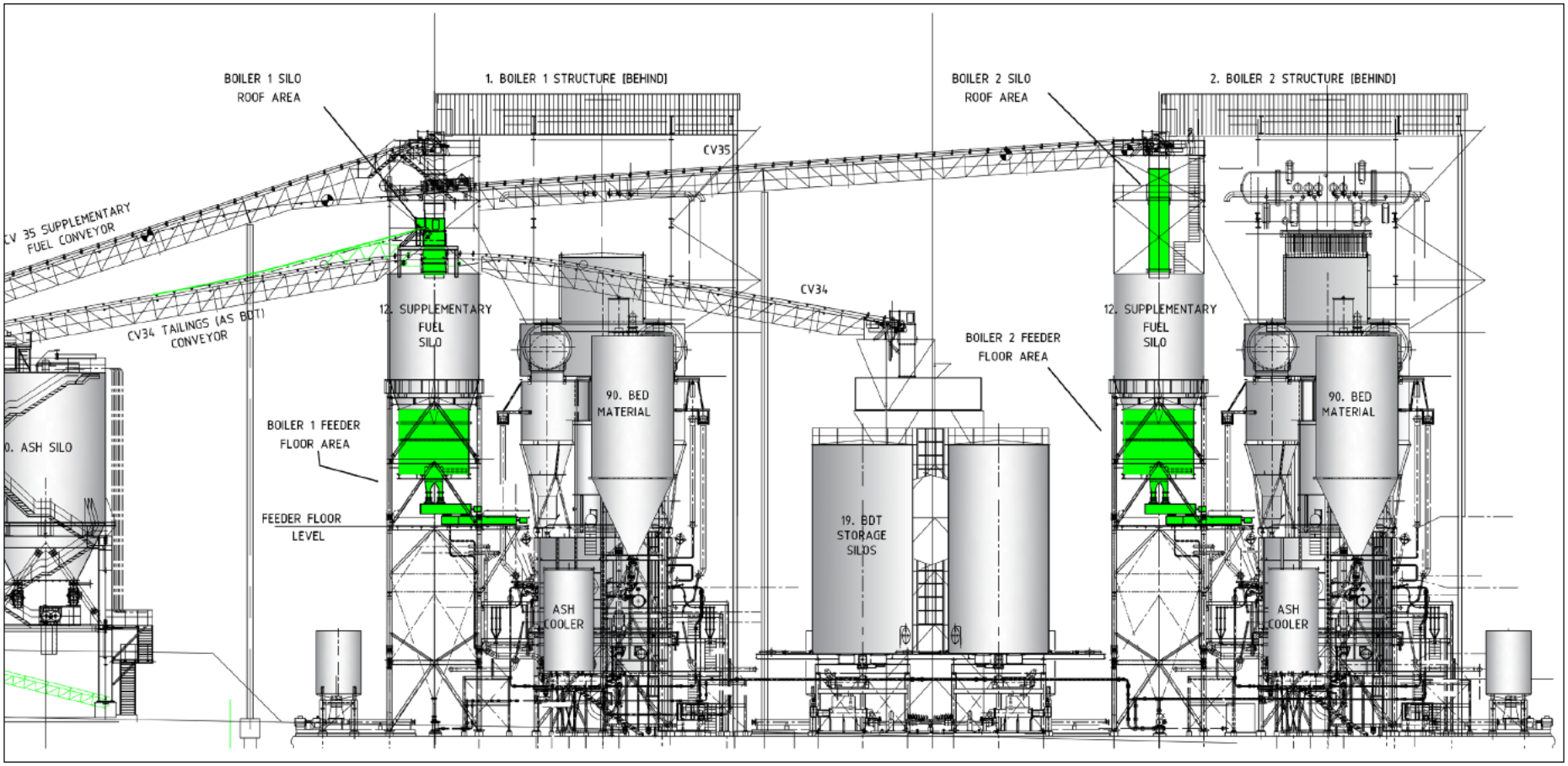


**Figure 3.9. Boiler plant area proposed plant/equipment changes in green. East elevation view. Refer to Appendix 3 for high resolution plan.**



## 3.7 Modified ash management arrangements

Ash generated from the combustion process will be sampled, tested, and potentially used as a fertiliser in accordance with the EPA's *The Ash from Burning Biomass Order* 2014. This ash will be stored in the existing storage silo for this purpose in the plant and will be trucked off-site for reuse.

The existing ash slurry system previously used for coal tailings ash that transferred ash back to Warkworth mine will initially remain in place but may be removed at later date. For the proposed development, it will not be used.

## 3.8 Utility requirements

### 3.8.1 Water

Water is required for the cooling towers in amounts similar to when BDT coal was used as fuel. The existing stormwater detention basins are often used for supply when adequate rainfall is available.

A water access licence (WAL) will need to be obtained with sufficient water capacity (~3,300 ML/year) for the needs of the proposed development.

The raw water storage pond has a volume of 6,000 cubic metres which equates to 6ML. This water is used in the power plant and a significant volume of raw water is used to cool the steam to condense it. The steam is ultra-high-quality demineralised water, and this form of water is simply recycled as it is expensive to make demineralised water.

Daily demand for raw water is 8,407.2 kl, or 8.4 ML/day. Annual demand is 3,069 ML/year.

### 3.8.2 Power

All power requirements are provided for at Redbank. The existing configuration includes a turbo-alternator power generating unit at 11 kilovolts (kV). The existing connection to the Shortland electrical system is via a 132 kV electrical interconnect line less than one kilometre (km) in length connecting with Shortland's existing 132 kV line from Singleton to Kurri Kurri. No further modifications are proposed.

### 3.8.3 Sewerage

All sewerage requirements are met on site, no additional sewerage connections or disposal is required.

## 3.9 Operational hours and access

The power plant will continue to operate on a 24/7 basis in accordance with the existing approval.

It is envisioned most deliveries will be accepted between 6am and 10pm seven days per week although the site operates 24/7 and therefore deliveries of feedstock materials will be managed to ensure feedstock availability to meet the operational needs of the power station.

## 3.10 Biomass fuel types and sources

The biomass to be combusted by Redbank will be sourced from the following areas however the list is not meant to be conclusive but illustrative and should not be a limiting factor for the sources of biomass that Redbank would propose to target for use as feedstock fuel.

Woody or biomass materials from approved land clearing works, including material cleared in accordance with a land management (native vegetation) code under the *Local Land Services Act* 2013 (Part 5A, Division 5), and from approved civil infrastructure, road clearing works, right of ways and related approved projects.

It is further noted that the fuels to be used in the power station will be a mix of standard fuels[1] and eligible waste fuels[2].

- Subdivision clearing;
- Industrial estate clearing;
- Road maintenance;
- Road constructions;
- Failed private estates and stands;
- Clean woody biomass from disaster waste cleanups from:
    - Floods;
    - Bushfire;
    - Earthquakes; and
    - Storm Damage.
- Purpose Grown Biomass Crops;
- Quick rotation crops, e.g.:
    - Mallee's; and
    - Certain Gums (DPI Trials).
- Perennials Grasses such as:
    - Sorghum;
    - Bana Grass; and
    - Miscanthus.

  Invasive species or native scrub as defined by NSW Local Land Services.;
- Invasive non-native weeds, shrubs and trees:
    - Olives;
    - Prickly Pear;
    - Bitou Bush and Bone seed; and
    - Lantana.
- Agricultural residues such as:
    - Cereal straw;
    - Non-cereal straw;
    - Hay and silage;
    - Sugarcane residues;
    - Sorghum residues;

[1] A standard fuel is defined in Part 1 of Schedule 2 of the *Protection of the Environment Operations (Clean Air) Regulation* 2022 as 'an unused and uncontaminated solid, liquid or gaseous fuel that is — (c) a wood or wood-derived fuel'.

[2] An eligible waste fuel is defined as a 'waste or waste-derived materials considered by the EPA to pose a low risk of harm to the environment and human health due to their origin, low levels of contaminants and consistency over time' as per NSW EPA (2022) *Eligible Waste Fuel Guidelines*.

    - Rice hulls; and
    - Cotton gin trash.
- Domestic Biomass Fuel (currently a non eligible waste fuel)[3]:
    - Combustible woody biomass fractions from the Construction and Demolition Industries (C&D);
    - Combustible woody Biomass fractions from the Commercial and Industrial Waste Sector (C&I); and
    - Discarded railway sleepers.

Perma pine (CCA) treated softwoods are excluded to avoid contamination with copper, chrome and arsenic, preservatives.

Given that the biomass being considered as a fuel source have few other market applications, it is expected that the proposed development to have nil short-term or long-term competition impacts in the marketplace for residuals.

In the case of eligible waste fuels, it is anticipated that suppliers of this form of biomass to Redbank will occur under a Specific Resource Recovery Order and Exemption (Specific RRO/E). As part of this process, Verdant will regularly verify that the supply of fuels is consistent with the NSW EPA's *Eligible Waste Fuels Guidelines* and that there are no higher order uses or markets for the material. This will ensure that the proposed development has no impact on current or future potential higher order uses of the material.

[3] It is noted that Domestic Biomass Fuel (DBF) is not currently prescribed as an 'eligible waste fuel' under current EPA guidelines, though the applicant will seek to demonstrate this prior to its use through a post-approval Specific Resource Recovery Order and Exemption application under Clause 93 of the *Protection of the Environment Operations (Waste) Regulation* 2014.

## 3.11 Quantities of biomass to be received and stored at the facility

The net electrical output from the power station will not change when firing waste wood residue fuel, however waste wood residue fuel will have the effects on the plant performance as provided in Table 3.1.

Up to 850,000 tonnes per annum at 25% moisture of biomass sourced to specification from the market as fuel will be required for electricity generation.

A capacity of 3 days storage will be required, equal to a stockpile in the order of 24,000 $m^3$. At an assumed density of 320kg/$m^3$ in a stored pile of wood chips (25% moisture content), this would equal approximately 7,680 tonnes.

The boiler fuel storage consists of three (3) silos for each of the two boilers. Based on steady unit operation and six (6) silos averaging a nominal 4.5 hours of storage (depending on the fuel storage density), this equals an approximate rate of 225$m^3$/hour of biomass for 40 minutes per silo for continuous reclaim and silo when operating at full load.

All biomass will be stored in the existing supplementary fuel storage areas on the southern side of the power plant.

**Table 3.1. Comparison of previous plant performance versus the proposed development using biomass.**

| | Units | 1994 Consent | 1997 Consent | Proposed Development |
|---|---|---|---|---|
| **Fuel Type** | - | Coal tailings | BDT | Waste wood residue |
| **Reference fuel moisture** | % | dry basis[1] | 25 | 25 |
| **Net Plant Output (reference)** | MW | 100 | 128 | 128 |
| **Fuel gross specific energy** | GJ/te | 13 (dry) | 21 (wet) | 15.21 (wet) |
| **Fuel energy consumption (annual)** | GJ/annum | 12.7 million | 12.7 million | 12.7 million |
| **Approximate fuel consumption** | Te/annum | 975,000 (dry) | 600,000 (wet) | 835,000 (wet) |
| **Approximate fuel consumption** | Te/annum | 975,000 | 450,000 | 626,000 |
| **Calculated efficiency (GSE basis)** | % | 22.7% | 29.9% | 27.2% |

[1]Dry basis means bone dry (with no moisture).

## 3.12 Stages and timing

Recommissioning of Redbank would occur in two distinct stages:

The first stage would involve the start-up of operations using biomass sourced primarily from approved land clearing operations (from existing civil and road works), biomass from invasive species as defined by Local Land Services NSW and potentially a limited amount of purpose grown biomass.

The second stage would involve the introduction or increased use of purpose grown biomass which will be further increased over a period of 2-4 years from approval, and, if approved and declared an eligible waste fuel by the NSW EPA, the introduction and use of Domestic biomass.

The Phases/Sequencing of the project include:

- Phase 1: Re-commissioning and construction of plant modifications/upgrades;
- Phase 2: Application for Specific RROE (forest and sawmill residue);
- Phase 3: Variation to EPL 11262;
- Phase 4: Full operation;
- Phase 5: Application for Specific RROE (uncontaminated wood waste);
- Phase 6: Variation to EPL 11262.

The construction phase will occur over approximately 6 to 10 months. Minimal truck movements (including all deliveries of equipment and materials) are expected during construction of the proposed facility. Movements will primarily be related to delivery of materials and movements on-site for a short-term period. Some light vehicles for construction workers travelling to and from the Site are also expected.

The construction works would be undertaken in accordance with the *Interim Construction Noise Guideline* (DECCW 2009) and would typically occur during the standard working hours between:

- 0700 to 1800 hrs Monday to Friday; and
- 0800 to 1300 hrs on Saturdays.

## 3.13 Analysis of feasible alternatives

### 3.13.1 Feasible alternatives

During previous operations Redbank has only sourced BDT and ROM from the Warkworth Mine. Due to high export prices in the coal market, Redbank was deprived of good quality tailings and could not access sufficient quality supplies to operate the plant.

Given that the existing consent is set to expire in 2031, the ability of the power station to use more available fuel types suitable with the existing technology would revive a currently stranded asset and provide reliable baseload renewable power to the electricity grid.

The existing plant consists of fluidised bed combustion steam generator units of FiCirc® design and a steam turbine. The plant is highly efficient and well-suited to waste wood residue combustion and demonstrated excellent performance and emissions profiles with a wide range of fuels, including waste wood residue fuel in many other parts of the world.

The proposed development would thus support the DPI strategy to help develop a biomass electricity generating industry in NSW and Local Land Services have programs to assist the farming industry to manage their land with native vegetation that acts as an invasive species most of which is felled and burnt in the field

the Redbank Power station are proposing to source a volume of that material for recovering and utilisation of that energy rather than current practise of wasting it .

The biomass proposed for combustion at the facility are allowed as a standard or non standard fuel or under the EfW Policy as they are considered low-risk to the environment and human health due to their origin, composition and consistency. Referred to as 'eligible waste fuels', use of these fuels in a responsible and appropriate manner are supported by the NSW EPA through the EfW Policy and the *NSW Eligible Waste Fuel Guidelines*.

Whilst retrofitting other existing coal fired power stations to use biomass is possible, re-purposing the existing Redbank has been identified as the most efficient and effective alternative for developing baseload power infrastructure in NSW using sustainable biomass (given the technology is specifically designed for this purpose). The proposed development will involve use of a stranded asset valued at $720M, enable the state of NSW to more rapidly decarbonize the electricity sector and make progress towards the NSW Government's net zero emissions target by 2050.

### 3.13.2 Consequences of not carrying out the development

In the event the proposed development is not approved, an immediate opportunity for supporting the transition to renewable energy ( solar and wind) with 24/7 green baseload power would be lost.

A significant number of permanent and temporary jobs in the Hunter Region and greater NSW would not be realised. In total there would be an opportunity cost of over 1,000 jobs including 385 full-time equivalent (FTE) jobs with the majority of these in the Hunter Region and the Singleton LGA .

A key priority for the Hunter Region will be developing and investing in renewable energy technology to enable substantial cuts in emissions whilst responding to increased electricity demand from population growth. Without adequate growth in renewable generation to offset the impacts of retiring coal-fired power plants, electricity prices are likely to increase, and supply will be less reliable.

Additionally, the phasing out of the Hunter Region's concentration of coal fired power stations will have a lasting impact on the regional economy and community.

Should the proposed development be rejected, contribution to the transition to a less carbon intensive economy or greater diversification of employment opportunities in the Singleton and Hunter Regions will be harder to achieve.

### 3.13.3 Analysis of alternatives

Electricity generation in NSW is overwhelmingly at present sourced from black coal. About 76.5% (53,500 GWh) of current electricity demand is provided by coal-fired power plants in NSW and will need to be replaced progressively as coal fired power is phased out. Whilst renewables have grown considerably over the past decade, increasing by 221%, it still currently only provides about 19% of overall electricity generation.

Whilst coal's importance is diminishing it continues to be the largest generation source. The extent of the challenge of replacing coal fired electricity with renewables is clearly evident.

One of the most important strategic issues facing NSW is its future energy supply including the availability of reliable baseload and renewable electricity generation. Economic growth in NSW is expected to lead to sustained growth in electricity demand that if left unchecked will potentially lead to a capacity shortfall in the future.

As NSW requires a rapid pathway forward to meet these challenges, the DPI has produced North Coast Residues report which identifies that a significant amount of forestry biomass is available in NSW to support the development of large-scale bioenergy generation systems.

Redbank's fluidised bed technology is highly efficient and suitable for a transition to biomass. Of the eight major coal fired power plants in NSW, three of them were either closed or demolished by 2019. Redbank is the newest, commissioned in 2001. The surviving coal-fired power plants are older and use dated technology.

Retrofitting the existing Redbank is considered a viable, suitable and a fast pathway forward that would revive a currently stranded asset and provide reliable baseload renewable power to the electricity grid at a fraction of the cost of building a new power station or alternatively retrofitting other outdated coal-fired power stations.

# 4. Statutory Context

Table 4.1 summarises the relevant statutory requirements for the project.

**Table 4.1. Statutory considerations for the Redbank Power Station project.**

| Considerations | | Summary of consideration |
|---|---|---|
| **Power to grant consent** | | The proposed development will trigger the requirement for State Significant Development under Clause 20(a) of Schedule 1 of *State Environmental Planning Policy (Planning Systems)* 2021 as it involves a development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, distillate, waste, hydro, wave, solar or wind power) that has a capital investment value of more than $30 million.<br><br>In accordance with Part 4 of the *Environmental Planning and Assessment Act* 1979 consent authority for the development will be the Independent Planning Commission under delegation from the NSW Minister of Planning. |
| **Permissibility** | | The proposed development is permissible development on land zoned as RU1 Primary Production under the *Singleton Local Environmental Plan* 2013. Whilst the LEP prohibits development that may be classified as a 'electricity generating works', this development is considered permissible with consent under Clause 2.36 of the *State Environmental Planning Policy (Transport and Infrastructure*) 2021 as:<br><br>*(1) Development for the purpose of electricity generating works may be carried out by any person with consent on the following land—*<br>*(a) in the case of electricity generating works comprising a building or place used for the purpose of making or generating electricity using waves, tides or aquatic thermal as the relevant fuel source—on any land,*<br>*(b) in any other case—any land in a prescribed rural, industrial or special use zone.*<br><br>A prescribed rural, industrial or special use zone includes RU1 Primary Production zoning under Clause 2.35 of the *State Environmental Planning Policy (Transport and Infrastructure)* 2021.<br><br>And further, under Clause 2.36(5) of the *State Environmental Planning Policy (Transport and Infrastructure*) 2021:<br><br>*(3) Development for the purpose of, or resulting in, a change of fuel source of an existing coal or gas fired generating works by a proportion of more than 5 per cent in any 12 month period may only be carried out with consent.* |
| **Other Approvals** | **Concurrence approval** | ***Protection of the Environment Operations Act* 1997**<br>The facility currently possesses an existing EPA licence (EPL 11262) under clause 17 of Schedule 1 for 'electricity generation' works. The facility will also require licensing for 'energy recovery' under clause 18 of Schedule 1 of the *Protection of the Environment Operations Act* 1997.<br><br>Energy recovery (clause 18) applies to the following activities: |

| Considerations | | Summary of consideration |
|---|---|---|
| | | *"energy recovery from general waste", meaning the receiving from off site of, and the recovery of energy from, any waste (other than hazardous waste, restricted solid waste, liquid waste or special waste).*<br><br>*"energy recovery from hazardous and other waste", meaning the receiving from on site or off site of, and the recovery of energy from, hazardous waste, restricted solid waste, liquid waste or special waste.* |
| | | ***Coal Mine Subsidence Compensation Act 2017***<br>The Site is located within the Patrick Plains Mine Subsidence District (MSD). Section 91 of the Environmental Planning and Assessment Act 1979 specifies that all development within an MSD (excluding exempt development) is considered 'integrated development', and approval from Subsidence Advisory NSW is required. Compliance with *Development Guideline 2 – Potential subsidence risk non-active workings* (Subsidence Advisory NSW, May 2018) is a requirement for development within an MSD that has been assigned Guideline 2. |
| | | ***Protection of the Environment Operations (Waste) Regulation 2014***<br>Wood and wood derived waste including biomass from agriculture, forestry and sawmilling residues, and uncontaminated wood waste are defined by the EfW Policy as 'eligible waste fuels.'<br>Eligible waste fuels, further outlined in the NSW EPA's Eligible Waste Fuel Guidelines 2016, may be thermally treated using a range of treatment technologies, provided a Resource Recovery Order and Exemption (RRO/E) has been granted by the EPA. The origin, composition and consistency of these wastes must ensure that emissions from thermal treatment will be known and consistent over time. Under Clause 93 of the Waste Regulation, a specific RRO/E will be required to lawfully permit the use of waste wood residues materials defined as 'eligible waste fuels' to be used in electricity generation in the project. |
| | **Bilateral agreement** | The bilateral agreement between the Commonwealth of Australia and the State of New South Wales relating to environmental assessment (the assessment bilateral agreement), allows the Commonwealth Minister for the Environment to rely on specified environmental impact assessment processes of the State of New South Wales in assessing actions under the *Environment Protection and Biodiversity Conservation Act* 1999. Biodiversity matters under the EP&BC Act will be considered as part of the EIS. |
| | **Approvals that would have been required if the project was not an SSD project** | In accordance with Section 4.41, the *Environmental Planning and Assessment Act* 1979, the following authorisations are not required for State significant development that is authorised by a development consent granted after the commencement of Division 4.7:<br>• An approval under Part 4, or an excavation permit under section 139, of the *Heritage Act* 1977;<br>• An Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act* 1974,<br>• A bushfire safety authority under section 100B of the *Rural Fires Act* 1997,<br>• A water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the *Water Management Act* 2000. |

| Considerations | | Summary of consideration |
|---|---|---|
| **Pre-existing Conditions** | | ***Water Management Act* 2000**<br>• Water sharing plan and availability and access to water |
| | | ***Coal Mine Subsidence Compensation Act* 2017**<br>• Patrick Plains Mine Subsidence District<br>• *Development Guideline 2 – Potential subsidence risk non-active workings* (Subsidence Advisory NSW, May 2018) |
| **Mandatory Matters for consideration** | **Consideration under the Act and Regulation** | ***Environmental Planning and Assessment Act* 1979**<br>• Relevant objects of the Act<br>• Relevant environmental planning instruments<br>• Development control plans |
| | **Considerations under Environmental Planning Instruments** | ***State Environmental Planning Policy (Transport and Infrastructure)* 2021**<br>• Relevant objects of the SEPP<br>• Key planning provisions |
| | | ***State Environmental Planning Policy (Planning Systems)* 2021**<br>• Relevant objects of the SEPP<br>• Key planning provisions |
| | | ***State Environmental Planning Policy (Resilience and Hazards)* 2021**<br>• Departmental guidelines including:<br>  ○ Applying SEPP 33 (identify relevant requirements)<br>  ○ HIPAP No.3 – Risk Assessment (identify relevant requirements)<br>  ○ HIPAP No.12 – Hazards – related Conditions of Consent |
| | | ***State Environmental Planning Policy (Industry and Employment)* 2021**<br>• Relevant objectives of the Policy<br>• Division 2 Control of advertisements |
| | | ***Singleton Local Environmental Plan 2013***<br>• Objectives and land uses for RU1 zone<br>• Land Use Permissibility |
| | **Considerations under other legislation** | ***Biodiversity Conservation Act* 2016**<br>The likely impact of the proposed development on biodiversity values as assessed in the biodiversity development assessment report. |
| | | ***Protection of the Environment Operations (Waste) Regulation* 2014**<br>• *Ash From Burning Biomass Order* 2014<br>• EfW Policy / *Eligible Waste Fuels Guidelines* |
| | **Development Control Plans (DCPs)** | ***Singleton Development Control Plan***<br>• Objectives<br>• Relevant Provisions of Development Control Plan |

# 5. Community Engagement

## 5.1 Engagement carried out to date

An EIS has previously been prepared pursuant to Secretary's Environmental Assessment Requirements 1596 for the use up to 850,000 tonnes of waste wood residues as a supplementary fuel for conversion into electricity. SEARs 1596 was issued by the NSW Department of Planning, Industry and Environment on 10 August 2021.

The SEARs included the requirement to consult with key government agencies, Council and local residents and properties. The consultation program included outreach to local residents and businesses within 5km of the Proposal Site. A number of local and regional community and environmental groups were also identified for engagement.

A number of community education and engagement tools were prepared and delivered. The tools used for the different stakeholder groups are summarised Table 5.1 below. A range of print, online, media and online meetings were chosen to maximise participation, increase understanding and maximise engagement during this phase of the project.

**Table 5.1. Community education and engagement tools used as part of the community consultation project.**

| Stakeholder group | Tools used to engage group, build understanding, and seek feedback | Outcome sought |
|---|---|---|
| **Neighbours within 5km of Redbank** | • Introductory letter via mail/letterbox drop<br>• Fact sheet via mail / letterbox drop<br>• Web site<br>• Online public meeting (x1) | Build relationship, build understanding, document issues and feedback on additional mitigation measures proposed |
| **Interested Organisations** | • Introductory letter via mail / email<br>• Fact sheet via mail / email<br>• Web site<br>• Online public meeting (x1) | Build understanding, document issues and feedback on additional mitigation measures proposed |
| **Government Stakeholders** | • Introductory letter via email<br>• Fact sheet (via email) | Build relationship, build understanding, document issues and feedback on additional mitigation measures proposed |

## 5.2 Community views

The consultation program highlighted that there is concern in the local community over potential impacts on air quality, human health and road safety. There are regional concerns over the potential impacts to NSW native forests and biodiversity from harvesting timber for fuel. And there are wider community and organisational concerns over potential impacts to climate change through greenhouse gas emissions.

A summary of the results of the community consultation and engagement program is provided below:

- 64 households and businesses within 5km of the proposed development received a fact sheet and a letter introducing the proposed development, including an invitation to an online community meeting. Two residents provided specific feedback;

- There were a total of 10 attendees at the public online zoom meeting including the 2 presenters, 2 from Verdant Earth and 6 from the community. Questions and comments were accepted, and time was allocated during the presentation to address questions and comments directly and specifically when possible; and
- 14 different local and regional organisations received the fact sheet and a letter introducing the proposed development and invitation to the online community meeting. Specific feedback was received from 2 organisations.
- 15 government agencies (as listed in the SEAR 1596) were provided additional opportunity to provide feedback. No further specific feedback was received outside of that already received in the SEARs.

Feedback from those community engagement activities informed the following summary of general community understanding of the project:

- Community understanding of the proposed development was considered variable, ranging from low to moderate;
- Media reports and online information posted by organisations includes concerns over deforestation and greenhouse gas emissions contributing to climate change;
- Potential effects on harvesting forests for fuel, increasing logging and deforestation of NSW forests and the further depletion of biodiversity was of concern in organisations around NSW;
- A common perception was that the project will worsen air quality and greenhouse gas emissions over that which occurs from burning coal, with potential for significant environmental and health impacts;
- There were community concerns over air quality emissions affecting human health and local crop/produce production, including reduced land values as a result;
- The use of roads and B-Doubles to transport fuel raised significant concerns over road safety, particularly surrounding Jerrys Plains Road right turn onto Gouldsville Road; and
- There was some misunderstanding that the proposed development would burn treated wood and contaminated waste material that would have significant emissions.

Supporting the consultation efforts were a range of specialist reports that aimed to address the concerns that are raised by the community. These include assessments on the following matters:

- Stormwater and drainage;
- Soil and water impact assessment;
- Noise and vibration;
- Air quality;
- Transport and traffic;
- Biodiversity;
- Life Cycle Assessment;
- Economic impact assessment;
- Human health risk assessment;
- Community consultation; and
- Social Impact Assessment.

## 5.3 Engagement to be carried out

As this proposed development is largely unchanged from that proposed in the EIS development pursuant to SEARs 1596, and that the only amendment to the project scope is internal refurbishment works to restart the power station, and that there are no new impact matters identified, re-doing the community consultation is considered unnecessary and would place significant delays on the project.

Verdant acknowledge that the EIS for an SSD project must be exhibited for at least 28 days. The exhibition of the EIS will provide an opportunity for the community to provide feedback. All feedback received during exhibition of the EIS will be considered.

If the Proposed Development receives planning approval, Verdant will continue to engage with the stakeholders and the community during the construction phase. Verdant will develop and lead a construction community engagement program.

The construction program will respond to community and stakeholder expectations on ongoing involvement, the details of the approved Proposed Development and the terms of its approval. Verdant will continue to be the single point of contact about the Proposed Development for all stages of the development.

Ongoing education and community engagement has been identified as a very important process that will need to be maintained post approval. Working closely with the community will be important to demonstrate and prove how the facility is being managed to protect the community and the environment. Regular engagement with neighbours and the community will help build trust and confidence over time.

The following community engagement activities in Table 5.2 are recommended post approval.

**Table 5.2. Planned approach for ongoing community engagement post approval.**

| Community engagement activity | Stakeholder group reached | Frequency / measure | Engagement sought |
|---|---|---|---|
| **Community Consultative Committee with independent chair** | Representatives of Singleton Council, NSW EPA, the Verdant Earth, and two community representatives approved by Council. | Condition 32 of existing DA183/93 requires "the applicant is to set up a community consultative committee prior to the commissioning of the plant."<br><br>It is recommended that this committee would continue. | The committee is to consider any impacts which the power plant may have on residences and the local environment as a result of its operations.<br><br>The committee is to meet as required by Council. |
| **Publication of ongoing environmental monitoring** | • Neighbours/businesses<br>• residents<br>• organisations<br>• Broader Hunter community | • Publication of results from environmental monitoring of the site on a monthly basis (including noise and air quality)<br>• Results published on the Verdant Earth website | • Provision of information on independent monitoring results for review by the community |

| Community engagement activity | Stakeholder group reached | Frequency / measure | Engagement sought |
|---|---|---|---|
| **School and Community Group tours** | • Primary and high school children<br>• Members of key community groups | • Minimum of 3 on-site tours or events per year | • Direct engagement with the community through inspection of the site and operations<br>• Build community understanding of the transition to renewables its contribution to the environment / net zero objectives in NSW. |

The development is expected to assist in hastening the transition to renewables and to stimulate economic activity whilst protecting environmental quality and human health with stringent monitoring and management. Assuming the proposed development is approved, licensing through the NSW EPA, monitoring and validation of performance is required. Ongoing education and community engagement will be important to maintain post approval. Working closely with the community will be important to demonstrate and prove how the facility is being managed to protect the community and the environment.

# 6. Proposed Assessment of Impacts

## 6.1 Matters requiring further assessment

### 6.1.1 Access - access to property

The key roads providing access for the Site and for the haulage routes heading north and south are the Golden Highway (Jerry Plains Road) and Long Point Road. The primary intersection providing access for the Site is the Golden Highway and Long Point Road West.

Biomass would be hauled by road (primarily using B-Doubles). Deliveries may occur 24 hours, 7 days per week however most deliveries will occur between 6am and 10pm Monday through Sundays. Up to 200 truck trips (100 return trips) would be required at 42 tonnes per load. As the same B-doubles used for delivery of biomass would be backfilled for removal of residual ash from the Site, and equate to 4 trucks per day, ash removal does not result in additional truck movements. Up to 30 operational and maintenance staff would be employed per day shift (6:00am – 6:00pm) and 5 staff per night shift.

It is expected that the additional traffic generated by the proposed development would have no significant impact on the operation of the Golden Highway and Long Point Road West intersection. The intersection is predicted to continue to operate at good levels and with spare capacity.

A Traffic Impact Assessment (TIA) will be prepared for the proposed development using SIDRA modelling to assess the relevant traffic implications and potential impacts on the local road to and from the Site.

### 6.1.2 Air – particulate matter/atmospheric emissions

The use of biomass as a fuel will result in a positive change to the air quality impacts associated with Redbank. The most significant source of operational air emissions for the power station will be through biomass combustion products and emissions from the main stack. An initial assessment of the proposed development identified that approximately 112 tonnes of biomass would be burned per hour, assuming a nominal fuel moisture content of 25%. For the majority of the nominated pollutants there will likely be a positive impact in regard to reduced concentrations by using biomass compared with coal. The data also indicates that the proposed use of biomass would result in a reduction in greenhouse gas emissions of approximately 98% compared to the currently approved fuel (coal tailings).

An Air Quality Impact Assessment (AQIA) will be undertaken for the EIS to assess air quality impacts from the proposed fuel sources. Other potential air quality impacts that will be assessed include dust from the management of biomasss receival and storage. This includes a comparison of both the stack emissions and the greenhouse gases to assess predicted emissions against current air quality requirements.

### 6.1.3 Air – Greenhouse gas emissions

The scientific evidence for climate change, and its impacts, and the need for policies consistent with the goal of the Paris Agreement, are clear and not disputed. The NSW Department of Planning, Industry and Environment (DPIE) released their Net Zero Plan Stage 1: 2020-2030, detailing the initial strategies for the state to meet net zero emissions by 2050 by delivering a 35% cut in emissions by 2030 compared to 2005 levels. As reported in the Net Zero Plan, the majority of emissions in NSW are derived from electricity generation (51 $MtCO_{2\text{-}e}$).

Biomass for fuel may have an initial small, temporary effect on terrestrial carbon stock, counterbalanced by the immediate benefit from displacing coal. As the project develops to rely on purpose grown biomass it will create carbon sinks and long-term sources of net zero fuel eliminating any carbon deficit and leading to world leading negative $CO_2$ profile generation. The proposed development would thus support decarbonisation of the NSW grid and contribute to NSW's goal of Net Zero by 2050.

Using bioenergy now in conjunction with other renewables, is an important measure to achieve net zero. Biomass is a storable, dispatchable energy source that can support the rapid expansion of intermittent renewables (e.g. solar and wind), providing grid stability and balancing.

The proposed AQIA will include an assessment of the potential contribution from the proposed development to greenhouse gases however this is expected to result in a net positive benefit.

### 6.1.4 Amenity – odour

Relative to biomass, the sulphur content of coal is high and produces significantly higher emissions and ground level concentrations of sulfur dioxide ($SO_2$) a colorless gas that has a strong odour.

The predicted ground level concentrations of $SO_2$ from wood waste residue combustion is expected to be well below odour detection thresholds, therefore odour impacts are unlikely to occur. The predicted ground level concentrations of $SO_2$ from coal combustion are also expected to be below odour detection thresholds however, firing with biomass, can achieve up to a 97% reduction in ambient concentrations of $SO_2$.

Some studies report odour thresholds from coal combustion may exceed odour thresholds for sensitive individuals. The predicted ground level concentrations from wood waste residue combustion, on the other hand, remain well below even the lowest reported odour detection thresholds for sensitive individuals.

The facility will not accept putrescible waste materials.

The AQIA will consider nearby sensitive receivers and the cumulative effect of odour impacts in from the combustion of biomass.

### 6.1.5 Amenity – noise and vibration

The proposed development only requires minor modifications to the power plant to allow the firing of biomass, therefore the noise generated by the plant itself is expected to be unchanged. Additional noise sources will result from the change in fuel use due to an increase in truck movements to transport fuel to the power station and greater use of plant on-site for the unloading of fuel and loading of fuel for firing. This equipment includes mobile front-end loaders, bulk unloaders, conveyors and silo augers.

A Noise Impact Assessment (NIA) will be prepared for the project. The NIA will use historical data gathered during operation of the power plant prior to its closure, and sound power levels of additional equipment (i.e., equipment not previously required for coal firing operations) to model the potential noise impacts on nearby residential receivers under neutral and noise enhancing weather conditions.

### 6.1.6 Amenity – visual

The immediate surrounding area is covered with moderately dense regrowth woodland interspersed with patches of open grassland. Current land uses surrounding the Site are dominated by a mixture of coal mining and agriculture. Operating collieries near to the Site include:

- Warkworth Mine immediately to the south;
- Wambo Colliery to the west; and
- Lemington Mine to the northwest.

The Site currently contains power station infrastructure including:

- Multiple buildings including offices, warehouses, and turbine hall;
- Road access and carparks;
- Stockpile area and conveyor belts;
- Sediment basin, detention basin and wastewater storage basin; and
- Power generation infrastructure (Boiler, cooling tower, stack and turbo generator).

The most dominant visible element of the power station is the 59m high stack. The proposed fuel storage building, whilst 18.5m high, is unlikely to be visible from public viewpoints.

Overall, the Site is only visible from the entrance via Long Point Road and from the rear of the Site via the Golden Highway. There appears to be no direct line of sight between sensitive dwelling locations surrounding the Site with the slight exception 90 Gouldsville Road, Gouldsville, where the top part of the stack is visible, albeit in the distance. The potential for obtrusive visual impacts of the proposed lighting on this viewpoint is negligible, given the significant degree of screening toward the Site. The negligible level of obtrusive visual impact would extend toward both night and daytime views toward the facility.

A Visual Impact Assessment (VIA) will be prepared for the proposed development. The VIA will include an assessment of landscape character and visual setting and assessment of the potential visual impacts associated with the proposed development.

### 6.1.7 Biodiversity - terrestrial flora and fauna

The existing Site is cleared and highly disturbed due to the construction and operation of the approved Redbank. The Site is mapped as containing non-native vegetation on the Greater Hunter Native Vegetation Mapping (v4.0) layer available on the SEED mapping portal for NSW.

Surrounding the Site are areas of dry sclerophyll forests classed as Hunter-Macleay Dry Sclerophyll Forests Map Unit: Narrow-leaved Ironbark/ Bull Oak/ Grey Box shrub/ grass open forest of the central and lower Hunter.

A search of the *Environment Protection and Biodiversity Conservation Act* 1999 Protected Matters database shows there are six (6) endangered or critically endangered communities, twenty-seven (27) threatened species and thirteen (13) migratory species that may occur in the larger region surrounding the Site, but these areas are all outside of the footprint of the proposed development. No EPBC matters are located on the Site.

The Sandy Hollow Creek riparian corridor is located to the west of the Proposal. The creek is also mapped on the Biodiversity Values Map (Non-EPI). This waterway is outside of the area of construction and operation of the Proposal and would not be impacted by the proposed development.

Singleton Council provides an online mapping system that shows Central Hunter Grey Box-Ironbark Woodland mapped over the Proposal Site. This vegetation community is listed as an EEC under Schedule 2 of the *Biodiversity Conservation Act* 2016. However, this mapping is incorrect as the Site has been historically cleared and developed under the existing consent. There is no EEC located in the footprint of the Proposal.

No clearing of native vegetation would occur during construction and operation of the proposed development.

Based on the nature of the proposed works and the limited works to recommission the existing plant and equipment, the proposed development is unlikely to impact threatened species, populations, ecological communities or migratory species.

Construction disturbance including excavation, stockpiling, dismantling plant/equipment and construction of the upgraded access will be short term and limited to the existing disturbed industrial site. Operations will also be limited to the existing disturbed site. Based on the nature of the proposed works and the limited works to recommission the existing plant and equipment any negative impact on threatened flora and fauna within the proposed development Site is considered unlikely.

The proposed development is unlikely to significantly impact threatened species, populations, ecological communities or migratory species within the meaning of the *Environment Protection and Biodiversity Conservation Act* 1999.

A desktop review will be undertaken to assess the potential impacts of the proposed development to biodiversity in consideration of the *Commonwealth Environment Protection and Biodiversity Conservation Act* (1999) and the *NSW Biodiversity Conservation Act* 2016. A biodiversity assessment waiver report will be prepared for the proposed development.

### 6.1.8 Hazards and risks – biosecurity

Verdant Earth is proposing to use biomass as a new fuel source for Redbank.

A Biosecurity Management Plan will be prepared to assess the biosecurity risk of transporting and handling the biomass and provide any required mitigation measures to comply with all applicable legislation and guidelines with respect to potential Biosecurity impacts.

### 6.1.9 Economic - natural resource use / opportunity cost / Life Cycle Assessment

The proposed development is expected to result in environmental savings to climate change, fossil fuel depletion, photochemical oxidation, acidification eutrophication, particulate matter, water scarcity, and land use impacts. It has been estimated that the production of electricity from biomass at Redbank will save 1,069 $kgCO_{2\text{-}eq}$ for every MWh generated, a reduction of 96% from the a 'business-as-usual' approach. This equates to an annual saving of 1,106 $ktCO_{2\text{-}eq}$.

The majority of this saving is due to the absorption of carbon through the growth of biomass which ultimately forms the fuel which enter the combustion process. The physical emissions of carbon dioxide from the power station can be no greater than and is negated by this earlier absorption resulting in net zero power. Natures energy solution.

A Life Cycle Assessment (LCA) will be prepared to assess the full 'cradle-to-grave' environmental impacts and benefits of products and processes associated with the proposed development. The LCA will consider the environmental flows (i.e. impacts) at each stage of the life cycle and aims to avoid shifting impacts from one life cycle stage to another or from one environmental impact to another.

### 6.1.10 Hazards and risks – bushfire and fire safety

The proposed development falls within the Bushfire Vegetation Buffer zone on the Singleton Council Bushfire Prone Land Map. The storage of biomass in the fuel silos and feedstock hoppers are considered dangerous due to the presence of combustible dust generated by attrition of the chipped wood in handling and storage. This equates to approximately 1,890m$^3$ (508.8 tonnes) of Dangerous Goods Class 4.2 storage, assumed Packing Group (PG) III.

A Bushfire Assessment Report (BFAR) will be prepared to assess the bushfire construction and planning requirements. In the event of a serious bushfire threat to the Site, it is essential to ensure adequate ingress and egress, and the provision of defendable space are afforded in the design.

A Fire Safety Study (FSS) will also be prepared in accordance with HIPAP No.2 will be prepared to determine the adequacy of existing fire protection system for the modified plant and provide upgrades where identified.

### 6.1.11 Hazards and risks – hazardous and offensive development

A preliminary risk screening will be required to be carried out in accordance with *State Environmental Planning Policy (Resilience and Hazards)* 2021, providing a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should the preliminary screening indicate that the project is "potentially hazardous" a Preliminary Hazard Analysis (PHA) must be prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis* (DoP, 2011) and *Multi-Level Risk Assessment* (DoP, 2011).

### 6.1.12 Hazards and risks – land contamination

In January 2015, a pre-purchase due diligence site contamination assessment was prepared for Redbank. It involved an extensive soil sampling program across the site, sampling from 68 bores and surface waters. The assessment undertook soil sampling per relevant NSW guidelines included the workshop area, diesel storage facility, diesel supply lines, generators, chemical storage, coal storage, stockpiling areas, and a series of dams. A search was conducted of all records pertaining to Section 58 of the Contaminated Land Management Act 1997 and revealed that the Site is not encumbered by any notices from the NSW EPA with regard to contaminated land. No sites in the vicinity of the Site were encumbered by any notices.

The pre-purchase due diligence Environmental Site Assessment (ESA) used open space public recreation guidelines to characterise any pollution found. The ESA found contamination at two locations.

- Near the on-site fuel bowser where soils were slightly contaminated with hydrocarbons;
- In the sediments that were inside the water quality pond, and which have since been removed by Verdant following its purchase of the site.

Previous stockpiling of sediments had occurred and also demonstrated sediments enriched with mildly elevated hydrocarbons – not unexpected from a sediment pond capturing sediments from coal stockpile runoff.

The potential sources of contamination within the Site are chemicals and diesel stored in above ground storage tanks, sediment from the onsite dams, combustion of material within the boilers and the general operations of the site.

All other sampling and testing complied with the relevant site accepted criteria for the proposed use of the site. The ESA report demonstrates a clean, low risk site with low levels of existing contamination which poses a negligible risk of pollution of surface waters.

A preliminary site assessment will be carried out as part of the EIS.

### 6.1.13 Hazards and risks – waste

Wastes will be generated by site construction activities and will be managed in accordance with a Construction Environmental Management Plan for the site.

The power station would require minor modifications of materials handling systems to enable the use of biomass for fuel. 99.7% of the material from the retrofit plus other waste generation during the demolition / construction phase is expected to be recycled. The overall recycling rate during operations is expected to be about 85.4% overall.

Ash would be generated at about a rate of 42,500 tonnes / year and is expected to be beneficially reused under *The Ash From Burning Biomass Order* 2014. Should the plant revert back to the burning of beneficiated dewatered tailings and run-of-mine coal in the operation of the Power Station, the resulting ash would be handled as per and beneficially reused as per *The Coal Ash Order* 2014.

In the unlikely event the ash from either scenario does not comply with the general RRO/Es, the ash would be temporarily landfilled, and a Specific RRO/E applied for from the NSW EPA to enable the beneficial reuse of ash in appropriate applications to ensure that human health and the environment are protected at all times.

A Waste Management Plan will be required to support the EIS and will assesses how the waste generated during construction and received during operation will be dealt with in the most environmentally sustainable way. The Waste Management Plan will provide:

- A description of the waste streams that would be accepted at the site including maximum daily, weekly and annual throughputs;
- A detailed description of waste processing operations (including flow diagrams for each waste stream) including a description of the technology to be installed, resource outputs, and the quality control measures that would be implemented;
- Details of how waste would be handled on site, and transported to and from the site, including details of how the receipt of non-conforming waste would be dealt with;
- Details of the waste tracking system for incoming and outgoing waste;
- Details of the waste management strategy for construction and ongoing operational waste generated; and
- The measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW *Waste and Sustainable Materials Strategy* 2041.

### 6.1.14 Social – health and wellbeing

A Phase 1 Social Impact Assessment (scoping and initial assessment) has been carried out in accordance with The Department of Planning and Environment's *Social Impact Assessment Guideline for State Significant Projects* (2021), to determine the size and scale of likely social impacts of the proposed development. A summary of the findings from the scoping and initial assessment is presented in the Social Impact Assessment Worksheet in Appendix 4. The summary identifies the potential social impacts associated with the principal

issues of concern and provides an assessment of the significance of each impact with consideration given to the management and/or mitigation measures to be implemented.

The principal issues of concern relate to:

- Economic;
- Air quality, including greenhouse gas emissions;
- Traffic and road safety;
- Noise; and
- Health and wellbeing.

A detailed Social Impact Assessment (SIA) will be carried out in accordance with Social Impact Assessment Guidelines to demonstrate that the proposed development is not likely to have a significant impact on social issues as part of the proposed development and will be incorporated into the EIS (Phase 2 Report).

Th risk to human health from the proposed development is considered negligible taking into consideration individual exposure pathways and combined multiple pathway exposures derived from the proposed development within the community. Emissions from the proposed development are expected to have a negligible impact on water quality in rainwater tanks used for drinking water and on crops and produce grown in the area.

A Human Health Risk Assessment (HHRA) will be prepared for the proposed development to assess the potential impacts on the community health of populations located off-site due to potential changes in air quality from proposed development operations.

The HHRA will assess inhalation and other pathways, including pollution to soil, crops, produce and water tanks from deposition of particulates and chemicals, and the potential effects on human health.

### 6.1.15 Water – water quality

The facility has a licence condition requiring it to report activities arising from its participation in the Hunter River Salinity Trading Scheme. The source of salt produced in this industrial process originates from salty water extracted from the river.

Wastewater is generated at a rate of 6.6 kL/hour and comes from reject water from the reverse osmosis plant on the site. Influent to the reverse osmosis plant has been first clarified and filtered to remove solids and chemicals that can be precipitated.

There are no anti-scaling agents used to clean the boiler which would then be present in wastewater. Because ultra-high quality deionised water is made on-site using an RO plant, magnetite is added to the demineralised water to ensure it doesn't leach metals from the boiler.

Therefore, the wastewater contains only brine from the treatment process. All solids, metals and other contaminants are removed from the waste stream by thickening and pressing and then disposed of lawfully.

Occasionally water is discharged using salinity credits under the trading scheme when flow rates permit.

The wastewater (brine) discharged from the Site is licensed. It is dosed to adjust its pH prior to any discharge.

All non-salt contaminants are removed from the process prior to treatment in the reverse osmosis (RO) plants and they are not found in the RO reject water, i.e., brine, which is discharged from the site.

The source of salt in the water is largely from elevated salt levels present in raw water harvested from the Hunter River. An insignificant mass of salt would arise from treating runoff from the Site itself where salt present is the result of atmospheric deposition.

The proposed fuel storage building will further assist in excluding rainwater from coming into contact with the fuels, and will avoid leachate being generated, which would otherwise need treatment on site. It is proposed that this building be constructed once DBF is approved for use and will be subject to separate development consent.

### 6.1.16 Water – hydrology

The existing stormwater drainage system includes 7.5 ML of storage via the raw water pond and the water quality pond. Additional drainage features of the Site include surface drainage and a piped network that diverts runoff from the boiler island to the water quality pond after first being treated in a sediment and oil trap.

Subsoil drains are located at regular intervals underneath the original stockpile area and drain directly into a concrete lined channel. Subsoil drains are embedded in free draining gravel. An existing concrete lined channel intercepts runoff from the original stockpile area and subsoil drains under the original stockpile and direct it to a sediment and oil trap which then discharges into an existing water quality pond. The sediment and floating oil traps are simple but effective method of removing coarse sediment and floating oil and grease. They are cleaned periodically by bob cat.

The water quality pond is a best management practice with a surface area of about 1,600 $m^2$ and an average depth estimated to be at least 1m. It has peripheral macrophytes, a baffle wall to stop short circuiting of the catchment which has an incoming stormwater pipe close to the outlet. The water quality pond will be aerated to ensure that it maintains high levels of dissolved oxygen. This is to address a risk that the water quality pond will receive elevated levels of BOD.

The water quality pond accepts runoff from the stockpile storage area and the boiler island. This would be the dirtiest parts of the existing and proposed operation with all other elements being bunded and separated from stormwater to facilitate only controlled discharges.

The Site is operated so that 4 ML metres of raw water is available to provide nominally 12 hours water supply to cover the risk of a power outage or failure at the river side pumps.

The raw water storage is then operated with 2 ML headroom.

Raw water storage overflows or spills via a weir near the site entry gate. The raw water storage overflows into a swale that travels west and joins Dights Creek. Dights Creek has been diverted around the operational area of the Site and this was approved under the previous development application. Where the creek was diverted it remains in a stable well vegetated state, free from visible erosion and without obvious weed infestation.

Dights Creek is in a stable and well vegetated state downstream of the point of discharge. The previous diversion works have successfully created a modified but otherwise natural and stable riparian environment.

The upstream catchment has been severely modified by mining. Approximately two thirds of the catchment was disconnected due to mining and approximately the last 1/6th of the catchment is fully cleared for farming. Any remnant aquatic ecosystems within this catchment will be highly disturbed and severely modified by past development.

The existing facility has no significant contamination, all chemicals held onsite will be bunded and contained, and there is an existing stormwater capture reuse/treatment system that will continue to be used and managed during operation of the Proposal.

## 6.2 Matters requiring no further assessment

Table 6.1 summarises the matters that require no further assessment and the justification for excluding these matters.

**Table 6.1. Summary of matters requiring no further assessment.**

| Matters requiring no further assessment | Justification |
|---|---|
| **Water – water availability** | Raw water is defined as either water extracted from the Hunter River or stormwater runoff from the power station site which drains into the raw water storage pond.<br><br>As the power station combusts fuel to generate heat, the heat is used to boil water and generate steam which drives turbines to create electricity. A significant volume of raw water is used to cool the steam to condense it. The steam is ultra-high-quality demineralised water, and this form of water is simply recycled as it is expensive to make demineralised water.<br><br>Raw water is used to cool the steam once it has passed through the turbine without coming into direct contact with the steam via a heat exchanger. As a result, a significant volume of raw water is lost, through evaporation in the process as it is used to cool and condense the steam.<br><br>The facility will typically require 366.3 kL of raw water per hour to cool the steam. The 90th percentile demand increases to 368.1 kL/hour, and the maximum demand is 380.2 kL/hour. 16 kL/hour is returned to the raw pond giving a net hourly withdrawal rate of 350.3 kL/hour.<br><br>As a base load power station, it is intended to operate 24-hours, 365 days per year. Planned shutdowns to carry out maintenance would occur periodically. Mean hourly water consumption to derives a daily demand for raw water of 8,407.2 kl/day (8.4 ML/day). Annual demand is therefore approximately 3,069 ML/year.<br><br>A water access licence (WAL) will need to be obtained from Hunter Water with sufficient water capacity (~3,300 ML/year) for the needs of the proposed development.<br><br>The raw water storage pond has a volume of 6,000 cubic metres which equates to 6ML. The raw water storage is filled with water extracted from the Hunter River and is operated so that there is always a nominal level of 4ML of raw water available in the storage. |
| **Heritage – Aboriginal / Non-Aboriginal** | The Redbank Power Station is an existing development. The proposed development does not require expansion into undisturbed areas and does not require extensive excavation for the Proposal. Therefore, it is unlikely unexpected or unidentified Aboriginal heritage items would be uncovered during construction and operation of the Proposal.<br><br>The extensive previous ground disturbance and establishment of the existing facility suggests that the proposed development is unlikely to harm any known Aboriginal object or items of cultural heritage value. No further archaeological survey or testing is proposed but the minor excavation associated with the weighbridges, access and fencing should be undertaken with caution.<br><br>There would be no long-term impacts on Aboriginal heritage sites or items resulting from this proposal.<br><br>An Unexpected Aboriginal Cultural Heritage Items procedure will be prepared and implemented in the event of an unexpected find of an Aboriginal heritage item (or suspected item) to avoid or minimise any potential impact on Aboriginal heritage items during construction of the proposed works. |

### 6.2.1 Priority assessments for the EIS

Based upon the results of the preliminary environmental analysis, the following broad qualitative risk ratings were assigned for each environmental attribute.

- High – Traffic and access, hazards and risks, and air quality;
- Moderate – Biodiversity, biosecurity, noise and vibration, hydrology, soils and water, social and human health;
- Low – Greenhouse gas, visual amenity, economic; land contamination; and
- None – Water availability; heritage – aboriginal

The detailed scope of these assessments will be considered following the receipt of the SEARs for the proposed development. An EIS with supporting technical assessments will be prepared, based upon contemporary government guidelines and in accordance with the SEARs issued for the proposed development.

Appendix 5 provides a scoping summary table which groups the matters requiring further assessment in the EIS by the level of assessment required, and identifies:

- Whether any cumulative impact assessment is required, and the likely level of this assessment (e.g. standard or detailed);
- Whether any specific community engagement will be carried out on the matter during the preparation of the EIS; and
- The relevant government plans, policies and guidelines that will be considered during the assessment of the impacts of the project on the matter.

# Appendix 1 – Refurbishment and Recommissioning Budget Appraisal Report

# Appendix 2 – Capital Investment Value Estimate

# Appendix 3 – Detailed Site Plans

# Appendix 4 – Social Impact Assessment Worksheet

# Appendix 5 – Scoping Summary Table

**Table A.1. Scoping summary table.**

| Level of assessment | Environmental aspect | Cumulative Impact | Engagement | Relevant government plans, policies and guidelines |
|---|---|---|---|---|
| **Detailed** | Access | Yes | Specific | • Guide to Traffic Management – Part 3 Traffic Studies and Analysis (Austroads, 2013)<br>• NSW Bicycle Guidelines (RTA, 2003)<br>• Guide to Traffic Generating Developments Version 2.2 (RTA, 2002)<br>• Guide to Traffic Management Part 12: Traffic Impacts of Project (Austroads, 2020)<br>• Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections Austroads, 2021)<br>• Australian / New Zealand Standard – Parking Facilities Part 1: off-street car parking (AS2890.1:2004) |
| **Detailed** | Air – particulate matter / Amenity –odour / Air – Greenhouse gas emissions | Yes | Specific | • The Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA 2016)<br>• NSW's Sustainable Design Guidelines (Version 3.0) (Transport for NSW, 2013)<br>• Greenhouse Gas Inventory Guide for Construction Projects (Transport for NSW, 2012).<br>• Technical framework: Assessment and management of odour from stationary sources in NSW (Department of Environment and Conservation NSW 2006) |
| **Detailed** | Amenity – noise and vibration | Yes | Specific | • Construction Noise Strategy (Transport for NSW, 2012)<br>• Interim Construction Noise Guideline (Department of Environment, Climate Change and Water, 2009) |

| Level of assessment | Environmental aspect | Cumulative Impact | Engagement | Relevant government plans, policies and guidelines |
|---|---|---|---|---|
| | | | | • NSW Industrial Noise Policy (Environment Protection Authority, 2000)<br>• NSW Road Noise Policy (Environment Protection Authority, 2011)<br>• Assessing Vibration: A Technical Guideline (Department of Environment and Conservation, 2006)<br>• Environmental Noise Management Assessing Vibration: A Technical Guideline (Department of Environment and Conservation, 2006) |
| **Standard** | Amenity – visual | No | General | • Refer to scoping report for further discussion on approach to assessment |
| **Detailed** | Biodiversity | No | Specific | • Biodiversity Assessment Method 2020 |
| **Standard** | Hazards and risks – Biosecurity | No | General | • Pest Risk Assessment for Use in Industry Biosecurity Plans (2013) |
| **Detailed** | Economic - natural resource use / opportunity cost Life Cycle Assessment | No | Specific | • Social Impact Assessment Guidelines for State Significant Projects (Department of Planning Industry and Environment, 2021) |
| **Detailed** | Hazards and risks – bushfire and fire safety | No | Specific | • Fire Safety Guideline – Fire safety in waste facilities (Fire and Rescue NSW 2020) |

| Level of assessment | Environmental aspect | Cumulative Impact | Engagement | Relevant government plans, policies and guidelines |
|---|---|---|---|---|
| | | | | • Fire Safety Guideline – Access for fire brigade vehicles and firefighters (Fire and rescue NSW 2019)<br>• Australian / New Zealand Standard – Fire hydrant installations – System design, installation and commissioning (AS2419.1:2005)<br>• National Construction Code 2019 |
| **Detailed** | Hazards and risks – hazardous and offensive development | No | Specific | • Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (DoP 2011)<br>• International Standard (ISO / IEC 31010) Risk Management – Risk Assessment Technique<br>• Australian Code for the Transport of Dangerous Goods by Road and Rail (7th edition) (National Transport Commission, 2007)<br>• Code of Practice for the Safe Removal of Asbestos 2nd edition (National Occupational Health and Safety Commission, 2005)<br>• Storage and Handling of Dangerous Goods Code of Practice (WorkCover, 2005). |
| **Standard** | Hazards and risks – contaminated lands | No | General | • Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning and Environment Protection Authority, 1998) |

| Level of assessment | Environmental aspect | Cumulative Impact | Engagement | Relevant government plans, policies and guidelines |
|---|---|---|---|---|
| **Detailed** | Hazards and risks – waste | Yes | Specific | • Waste Classification Guidelines (DECCW, 2009)<br>• Standards for Managing Construction Waste in NSW (NSW EPA, 2019)<br>• Fire Safety Guideline – Fire safety in waste facilities (Fire and Rescue NSW 2020) |
| **Detailed** | Social – health and wellbeing | Yes | Specific | • Social Impact Assessment Guidelines for State Significant Projects (Department of Planning Industry and Environment, 2021) |
| **Detailed** | Water – hydrology and water quality | No | Specific | • Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004)<br>• Managing Urban Stormwater: Soils and Construction Volume 2 (Department of Environment and Climate Change, 2008)<br>• Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (Department of Environment and Climate Change, 2008)<br>• Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC / ARMCANZ, 2000)<br>• Using the ANZECC Guidelines and Water Quality Objectives in NSW (Department of Environment and Conservation, 2006).<br>• Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom 2004) and Volume 2 (A. Installation of Services; B. Waste Landfills; C. Unsealed Roads; D. Main Roads; E. Mines and Quarries) (DECC 2008) |

| Level of assessment | Environmental aspect | Cumulative Impact | Engagement | Relevant government plans, policies and guidelines |
|---|---|---|---|---|
| **No further assessment required** | Hazards and risks – contaminated land | - | - | • Refer to scoping report for further discussion on approach to assessment |
| **No further assessment required** | Non-Aboriginal heritage | - | - | • Refer to scoping report for further discussion on approach to assessment |
| **No further assessment required** | Aboriginal heritage | - | - | • Refer to scoping report for further discussion on approach to assessment |