



ENVIRONMENT PROTECTION ACT 1970
SECTION 19B

WORKS APPROVAL

RECOVERED ENERGY AUSTRALIA PTY LTD

Holder of Works Approval: 215915

Issued: 21/01/2020

Last Amended: 29/06/2020

ACN: 634 037 817

Registered Address: MORROWS PTY LTD
'FRESHWATER PLACE' LEVEL 13
2 SOUTHBANK BOULEVARD
SOUTHBANK VIC 3006

Premises Address: 28 ALEX FRASER DRIVE
LAVERTON NORTH VIC 3026

Scheduled Categories: A08 Waste to Energy
K01 Power stations

Description: To construct a waste to energy facility (gasification), to thermally treat non-hazardous residual municipal solid waste.

Amended by order of VCAT reference no. P236 /2020

Tim Eaton
Executive Director
Delegate of the Environment Protection Authority

PREAMBLE

Works Approvals

Who we are: The Environment Protection Authority (“EPA”) is an independent statutory authority established under the *Environment Protection Act 1970* (“the Act”). Our purpose is to protect and improve our environment by preventing harm to the environment and human health.

Why we issue works approvals: EPA is responsible for preventing or controlling pollution (including noise) and improving the quality of the environment. This responsibility includes regulating activities that may present a danger to the environment. One of the tools available to EPA is issuing works approvals for scheduled premises to prevent or minimise risk to the environment.

Section 19A of the Act requires the occupier of a “scheduled premises” to obtain works approval to construct or install plant and equipment in order to discharge, handle, treat or dispose of waste to the environment. These types of premises are defined in the *Environment Protection (Scheduled Premises and Exemptions) Regulations 2007* (“the Regulations”).

When we issue works approvals: EPA will issue a works approval when satisfied that an applicant has put in place measures to protect the environment. Works approvals allow construction of works to occur and set control measures to minimise a site’s environmental risk. EPA can amend a works approval in response to changes in standards and site activities. Works approval holders must submit reports if required by a condition of the approval.

Works Approval information and obligations

For the purposes of this works approval “You” means the works approval holder identified on the first page of this works approval at the “premises” identified on the first page and represented in Schedule 1.

If you object to any of the works approval conditions, you may have the decision reviewed by applying in writing to the Registrar, Planning and Environment Division, Victorian Civil and Administrative Tribunal (“VCAT”), 7th Floor, 55 King Street, Melbourne within 21 days of the date of issue. An application fee may be applicable when lodging an appeal with VCAT. Contact VCAT on (03) 9628 9777 for further details on fees associated with an appeal. A copy of the appeal should also be forwarded to the Manager, Development Assessments Unit, Environment Protection Authority, GPO Box 4395, Melbourne, 3001, within 7 days of lodgement of the appeal.

Interested (third) parties may also appeal against the works approval within 21 days of the date of issue. The Tribunal will notify you if such appeals are received. If an appeal is lodged, you must not go ahead with the works until the appeal is resolved.

Compliance: You must comply at all times with the Act and all policies and regulations administered by EPA. Strict penalties apply for non-compliance with any part of your works approval.

Works Approval structure

Structure: Your works approval has:

- Works conditions - setting out requirements for construction or installation;
- Schedule 1A - locality plan of your premises;
- Schedule 1B - plan of premises (provided by you).
- Some types of works approvals also contain Schedule 1C - final landfill contour plan

CONDITIONS

General Conditions

- WA_G1 Subject to the following conditions, this approval allows the construction of the following works and associated equipment – waste to energy facility capable of treating 200,000 (+/-20%) tonnes per annum of household residual Municipal Solid Waste (MSW), consisting of the following key components:
- 1) a fully enclosed negatively pressured arrival hall;
 - 2) a fully enclosed negatively pressured waste bunker with a capacity of storing 2,400 tonnes of residual waste, at any given time, which includes:
 - (a) a leachate management system; and
 - (b) ability for sampling and inspection of waste received at the facility and the removal of materials falling outside the waste acceptance criteria from the waste feedstock prior to its entry into the process lines;
 - 3) provision of quarantine facilities for rejected and recovered materials, including hazardous waste and e-waste, with fit-for-purpose environmental controls;
 - 4) three process lines, each consisting of two gasifiers, a secondary combustion chamber, a gasifier solid residue recovery and handling system, and a heat recovery system (boiler) with a fly-ash solids recovery and handling system;
 - 5) a flue gas and emission control treatment system for each gasification line which:
 - (a) meets Best Available Techniques (BAT) (defined by Article 3(10) of Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (IED 2010/75/EU));
 - (b) complies with international Best Available Techniques (BAT) review for waste incineration facilities, and follows the guiding BAT principles of the European Commission, Commission Implementing Decision (EU) 2019/2010 of 12 November 2019, establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for waste incineration (BATC 2019) and the European Commission Integrated Pollution Prevention and Control Reference Document on Best Available Techniques for Waste Incineration (BREF 2019);
 - (c) at a minimum includes a filter baghouse, a selective non-catalytic reduction system (SNCR) including the injection of urea, acid gas scrubber with semi-dry lime injection, and an activated carbon injection system;
 - (d) the filter baghouse design is to be sufficient for retrofit of catalytic filter bags for removal of additional dioxins and furans if the activated carbon injection is insufficient to reduce relevant indicators to the maximum extent achievable;
 - (e) allows for ease of upgrade to achieve more stringent limits, if required in the future, and so far as is reasonably practicable, makes provision for incorporation of future emissions controls as may be recommended by the BREF or BATC as amended from time to time, which do not result in significant efficiency impacts of the initial design;
 - (f) meets the requirements and procedures (including applicable emission limits) of each of the IED 2010/75/EU, Schedule E of State Environment Protection Policy

(SEPP) (Air Quality Management) No. S 240 (21 December 2001), and which is capable of:

- (i) operating within the BAT-AEL ranges contained in BAT 25, BAT 27, BAT 28, BAT 29, BAT 30 and BAT 31 of BATC 2019 under transient, part load, and start up and shut down operating conditions as defined in the IED 2010/75/EU; and
 - (ii) meeting the lower end of the BAT-AEL ranges for new plant contained in BAT 25, BAT 27, BAT 28, BAT 29, BAT 30 and BAT 31 of BATC 2019 during commissioning and under all other operating conditions;
- (g) meets a minimum temperature of 850°C for more than two seconds under all transient, part load, and start up operating conditions as defined in the IED 2010/75/EU
- (h) includes a secondary oxidation chamber capable of maintaining a flue gas residence time of >2 secs at a minimum temperature of 1,100°C and a maximum temperature of 1,350°C after the last point of combustion air injection under all other operating conditions;
- (i) does not produce any emissions to water under non-emergency operating conditions; and
- (j) which does not include any bypass ducts within the flue gas treatment path, excluding:
- (i) bypass to atmosphere required for emergency safety reasons; or
 - (ii) tertiary air recirculation;
- 6) a Continuous Emissions Monitoring System to be installed on each flue in the multiflue stack capable of measuring pollutants:
- (a) including: carbon monoxide, total dust, total organic carbon, total volatile organic carbon, hydrogen chloride, hydrogen fluoride, sulphur dioxide, oxides of nitrogen expressed as NO₂, ammonia, and mercury;
 - (b) in all operating scenarios, including steady state, unsteady state, all transient, part load, and start up and shut down operating conditions as defined in the IED 2010/75/EU;
- 7) a Continuous Operating Monitoring System to be installed on each flue in the multiflue stack capable of measuring stack gas: temperature, volumetric flow rate; pressure; moisture content; oxygen concentration; and carbon dioxide concentration; a backup diesel generator that is sized to operate induction fans and control systems of all three process lines;
- 8) monitoring equipment capable of otherwise measuring indicators, substances and or parameters:
- (a) in accordance with condition WA_W1(6)(b) of this Works Approval; and
 - (b) otherwise in accordance with BAT 4 of BATC 2019;
- 9) a backup diesel generator that is sized to operate induction fans and control systems of all three process lines;
- 10) a boiler for each gasification line with a minimum thermal efficiency of 80%
- 11) A gasifier solid residue recovery and handling system for each gasification line which includes a water quench bath which:
- (a) Provides for the maintenance of an air-tight seal between the gasifier and the surrounding environment; and
 - (b) Does not produce or result in emissions to water under non-emergency operating conditions;
- 12) A power plant which recovers heat or electricity generated from the process as far as practicable and is designed to a minimum R1 energy efficient of 0.73 (calculated in accordance with EPA guideline 1559);

- 13) Provision for future incorporation of a Continuous Emissions Monitoring System capable of measuring PM_{2.5} and PM₁₀, if this becomes viable; and
- 14) provision for future incorporation of options (including physical space on the site, external to the facility itself) to improve material recovery from the waste feedstock prior to gasification, including but not limited to the electromagnetic separation of ferrous metals and e-waste containing ferrous metals, if this becomes viable.

WA_G2 The works must be constructed in accordance with the application accepted on 23 July 2019 with additional information supplied between 23 July and 21 January 2020, (“the application”), except that, in the event of any inconsistency arising between the application and the conditions of this approval, the conditions of this approval shall apply.

WA_G3 This approval will not take effect until any permit which is required under the Planning and Environment Act 1987 has been served on the Authority by the applicant.

WAG4.1.1 This approval expires:
 (a) on the issue or amendment of a licence relating to all works covered by this approval;
 (b) when EPA advises in writing that all works covered by this approval have been satisfactorily completed and no licence is required; or
 (c) 21 January 2024 unless the works have been commenced by that date to the satisfaction of EPA.

Works Conditions

WA_W1

Before commencing construction of any works, you must provide to EPA the following plans or reports. The reports with any accompanying plans and specifications prepared under sections (1) through (9) of this condition must be endorsed by a suitably qualified EPA- appointed auditor (or alternative expert approved by the EPA in writing).

- 1) a waste composition report detailing the final specification of the intended feedstock, including:
 - (a) that only waste which would otherwise be disposed of to landfill will be accepted at the facility;
 - (b) the physical and elemental characteristics of the intended residual municipal solid waste feedstock, including calorific value, particle size and chemical parameters and any deviations from that detailed in section 6 of the works approval application;
 - (c) Specification of all material, including recyclable material, hazardous material, e-waste, prescribed industrial waste, which is to be removed from the feedstock;
 - (d) A final waste acceptance criteria that will inform residual waste supply agreements to ensure waste streams received at the facility are within the operational and design specifications for the facility; and
 - (e) A proposed waste audit procedure to demonstrate compliance with the waste acceptance criteria and design specifications by audits conducted on a quarterly basis, then, after two consecutive quarterly audits demonstrating compliance with the waste acceptance criteria and design specifications, twice a year;
- 2) A report of the final detailed designs and schematics of the works optimised to treat the intended feedstock specified in WA_W1(1), including:
 - (a) An updated heat and chemical mass balance based on the intended feedstock;
 - (b) An updated R1 efficiency calculation based on the intended feedstock;
 - (c) Demonstrating compliance with requirements set out in condition WA_G1, WA_W8, WA_W12, WA_W13 of this approval;
 - (d) An accompanying waste management acceptance plan that considers:
 - i) Waste acceptance of residual MSW only;
 - ii) Waste acceptance procedures consistent with BATC 2019 including inspection and analysis of waste received at the facility and the removal of materials falling outside the waste acceptance criteria from the waste feedstock prior to its entry into the process lines;
 - iii) Provision of waste for procurement by means of 'waste arising' contracts to be pursued and utilised where available;
 - iv) Contingency for waste that contains or is contaminated with recyclable material, hazardous material, e- waste, prescribed industrial waste, or other waste falling outside the final specification of the intended feedstock; and
 - v) Regular review identifying options available for improving material recovery from the waste feedstock prior to gasification, at a minimum of five-yearly intervals and to the satisfaction of EPA;
- 3) A report detailing the handling of waste recovered or rejected from the waste feedstock, including measures in respect of quarantined hazardous waste, prescribed industrial waste and e-waste;
- 4) A report of the final detailed designs and schematics of the works demonstrating:
 - (a) Each of the applicable efficiency measures contained in BAT 20 of BATC 2019, including but not limited to reduction of flue-gas flow, minimisation of heat loss, optimisation of boiler design, low-temperature flue-gas heat exchangers, steam pressures above 45 bar and 400° C and incorporating a flue gas condenser(which may be integrated in the boiler design); and

- (b) Good engineering practice and compliance with all relevant Australian or European equivalent engineering, occupation, health, and safety (OH&S) standards;
- 5) a report detailing computational fluid dynamics (CFD) modelling demonstrating that:
 - (a) all combustion gases, after the last injection of air, are elevated to a minimum temperature of 1,100° C and below a maximum temperature of 1,350° C with a residence time of at least two seconds before exiting the syngas combustion chamber;
 - (b) the injection point of urea and the injection point of recirculated flue gas maximises NOx reduction;
 - (c) all combustion gases are reduced to 200°C, or below, at the outlet of the boiler with optimum residence time to minimise the de novo synthesis of dioxins/furans; and
 - (d) Safe combustion and discharge of process gas flows from natural draft in the stack during other than normal operating conditions;
 - 6) A report of the final detailed designs and schematics of the flue gas cleaning system, including:
 - (a) An accompanying emissions monitoring and assessment plan including:
 - i) Flue gas emission monitoring program for normal operating conditions compliant with frequency and standards of the IED 2010/75 and BATC 2019;
 - ii) flue gas emission monitoring program for Other Than Normal Operating Conditions compliant to include the reporting of CEMS and COMS data during such conditions;
 - iii) commissioning monitoring methodology for demonstrating compliance with State Environment Protection Policy (Air Quality Management), Directive 2010/75/EU of the European Parliament and of the Council, dated 2010, of the treated flue gas by the completion of commissioning;
 - iv) monitoring of the following indicators: Condensable particulate matter, PM2.5 and PM10, Polycyclic Aromatic Hydrocarbons, Polychlorinated biphenyls, Volatile Organic Compounds, Polyhalogenated dibenzo- dioxins/furans, Chlorinated polycyclic aromatics and Chlorinated monocyclic aromatics;
 - v) continuous monitoring of those pollutants identified in condition WA_G1(6) of this Works Approval;
 - vi) Monitoring of substances and parameters as otherwise required by BAT 4 of BATC 2019;
 - vii) Where any emissions to water occur, monitoring of those emissions at the frequencies specified in BAT 6 of BATC 2019;
 - viii) Monitoring of the content of unburnt substances in gasifier bottom ash/slag at the frequencies specified in BAT 7 of BATC 2019; and
 - ix) an accompanying commissioning monitoring and sample plan, prepared in accordance with EPA Publication no. 440.1 'A Guide to the Sampling and Analysis of Air Emissions and Air Quality', dated 2002, including, but not limited to, sampling and measurement procedures and frequencies;
 - 7) a report of the final detailed designs and schematics of the odour management controls which:
 - (a) demonstrates implementation of best practice to minimise odour emissions;
 - (b) includes computational flow dynamic modelling of airflows within and exiting the waste arrival hall prior to, during, and after opening of the fast-acting door for waste deliveries to demonstrate the efficacy of the negative pressure odour management control system;
 - 8) a report of the final detailed designs and schematics of the noise attenuation controls, including:
 - (a) demonstrating implementation of best practice to minimise noise emissions.

- 9) a report of a full plant and operations risk assessment, including hazard operability study (HAZOP) that considers all process and environmental risks for operation (normal and other than normal operating conditions);
- 10) a plan for providing public reporting of monitoring results on a website related to the project, or through a website agreed to by EPA, that must include:
 - (a) reporting of all periodic monitoring results at a minimum frequency of quarterly;
 - (b) reporting of continuous emission monitoring results in real time or as near as practicable;
 - (c) reporting gasifier bottom ash/slag monitoring results and the results of any monitoring of emissions to water by the end of the calendar month in which the monitoring is carried out; and
 - (d) reporting of compliance status of air emissions against licence limits at a minimum frequency of daily;
- 11) a report of the final detailed designs and schematics of the fire mitigation controls, informed by a fire risk study and endorsed by a suitably qualified fire safety engineer;
- 12) an updated air quality impact assessment based on the final detailed design of the facility;
- 13) an updated human health risk assessment based on the final detailed design of the facility
- 14) a residual waste management plan which details the management and disposal of boiler fly ash, air pollution control system solid residues, and gasifier bottom ash/slag, provides for the separation of ferrous and non-ferrous metals from bottom ash/slag where practical and which includes provision for the disposal of residual wastes to landfill only where no other treatment or reuse option is available and to a maximum of 3% of feedstock by weight;
- 15) a baseline conditions report of describing soil, surface, and groundwater at the premises and its boundary;
- 16) a construction environment management plan, prepared in accordance with EPA Publication no. EPA Publication 480 ***“Environmental Guidelines for Major Construction Sites”***, as amended from time to time.

- WA_W2 You must not commence construction of the works for which reports are required by condition WA_W1 until written EPA approval of those reports has been received.
- WA_W3 Where any reports specified in condition WA_W1 and approved by EPA differ from the application, the works must be constructed in accordance with those approved reports.
- WA_W4 You must notify EPA when the construction of the works covered by this approval has been commenced.
- WA_W5 You must notify EPA when the construction of the works covered by this approval has been completed.
- WA_W7 You must not commission or operate the works without the written approval of EPA.
- WA_W8 You must install:
- 1) For each flue in the multi-flue stack, a device capable of sampling in stack:
 - (a) long-term mass concentrations of polychlorinated dibenzodioxins (PCDD) and polychlorinated dibenzofurans (PCDF), for periods of up to 1 month for each flue;
 - (b) short-term mass concentrations of PCDD and PCDF;
 - 2) for each syngas combustion chamber, at least one auxiliary burner or auxiliary fuel injection that is automatically switched on when the temperature of the combustion gases after the last injection of air falls below 850°C;
 - 3) a system to prevent waste feed if:

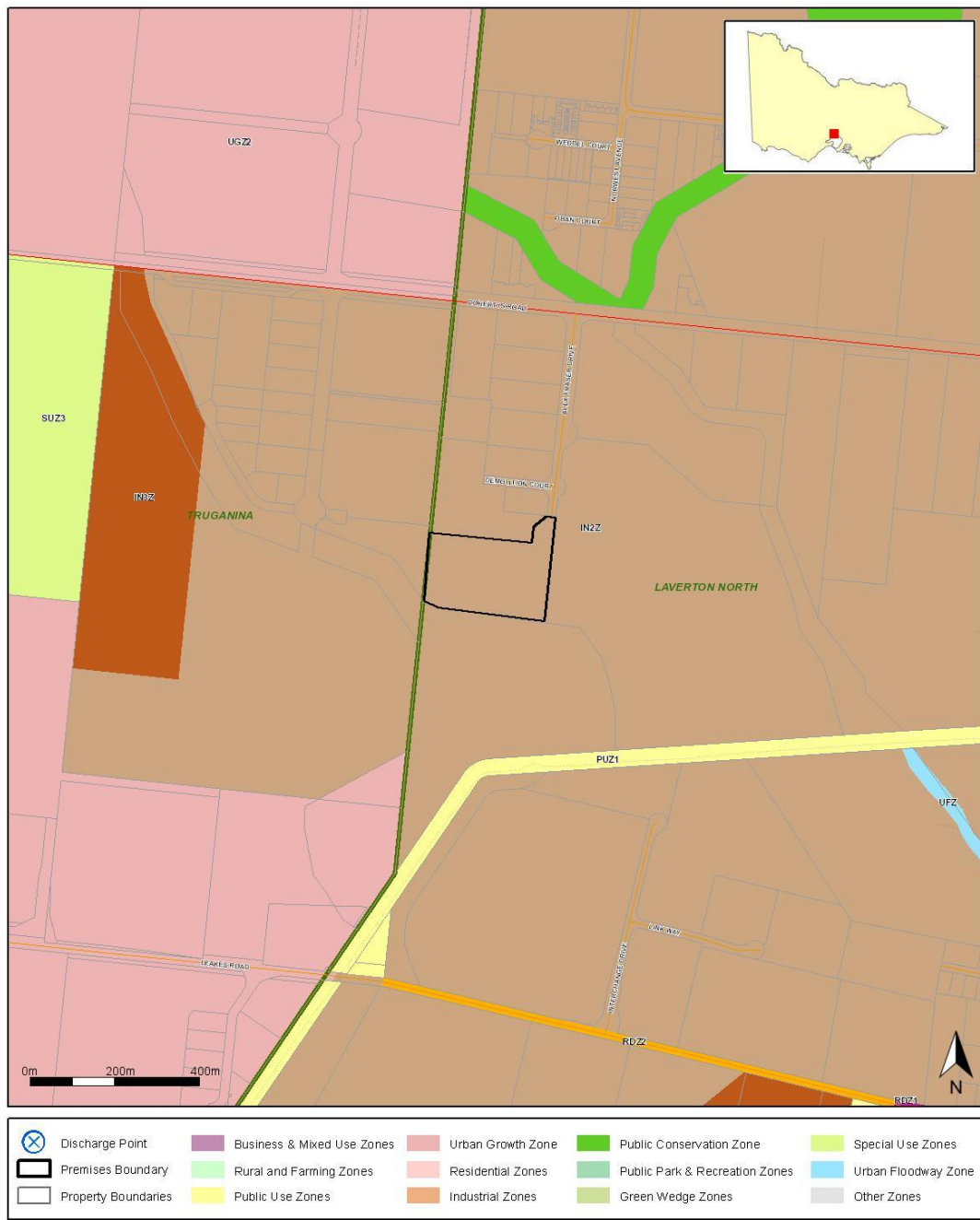
- (a) temperatures of the syngas combustion chamber (at least 850°C with a residence time of at least 2 seconds) at start-up has not been reached;
- (b) combustion temperature of the syngas combustion chamber (at least 850°C with a residence time of at least 2 seconds) is not maintained; or
- (c) Continuous Emissions Monitoring Systems show that any emission limit value is exceeded due to disturbances or failure of the waste gas cleaning devices.

- WA_W12 You must install all exhaust stacks so that provisions for sampling are included in accordance with EPA Publication 440.1 ***“A Guide to the Sampling and Analysis of Air Emissions and Air Quality”***, as amended from time to time. You must install all stacks and sampling platforms to allow for testing of exhaust gases in accordance with Australian Standard 4323.1/1995 revised 2014.
- WA_W13 You must install the Waste to Energy plant, chemical storage and ash and other residual waste storage in a bunded area or areas, each of which is constructed in accordance with EPA Publication 1698 ***“Liquid storage and handling guidelines”***, as amended from time to time.
- WA_W15 During construction, unacceptable noise (including vibration) must not be emitted beyond the boundaries of the premises.
- WA_W16 During construction, stormwater discharged from the premises must not be contaminated with any waste or residues.
- WA_W17 All construction activities must be undertaken in accordance with EPA Publication 480 ***“Environmental Guidelines for Major Construction Sites”***, as amended from time to time.
- WA_W18 During construction, you must undertake an environmental monitoring program that enables you and EPA to determine compliance with condition(s) WA_W15, WA_W16, and WA_W17.
- WA_W19 During construction, you must ensure that all activities are carried out in accordance with the information provided in the Works Approval application.

Reporting Conditions

- WA_R1 At least four months before the commencement of any commissioning; you must provide to EPA the following documents:
- 1) A summary report of the site Environmental Management System (EMS) prepared in accordance with ISO 14001 or Regulation (EC) NO 1221/2009 and the BATC2019 and make available for inspection all documents and procedures which form part of the EMS;
 - 2) A detailed commissioning plan confirming performance in accordance with the audited reports required under condition WA_W1 and including acceptance criteria for use of clean untreated timber for plant during hot commissioning;
 - 3) A waste management contingency plan for planned and unplanned shutdowns, that considers:
 - (a) Alternative waste management options;
 - (b) Alternative waste odour control contingency measures;
 - (c) Arrangements or systems to inform relevant stakeholders about any shutdown (e.g. power companies, the EPA, community, and local councils);
 - 4) A waste disposal and reuse plan prepared consistently with the residual waste management plan required by condition WA_W1(14) of this Works Approval and which includes the location of landfills or appropriately licensed facilities that will accept the facility's bottom ash, boiler ash, and air pollution control residue;
 - 5) A quality assurance and control procedure including testing of the various solid residue fractions to confirm: organic content, pollutants including Dioxins & Furans and comparison to EPA Industrial Waste Resource Guidelines no IWRG631 'Solid Industrial Waste Hazard Categorisation and Management', dated 2009, and/or other appropriate published standards and include, but is not limited to, such details as sampling and measurement procedures and frequencies;
- WA_R4 Before the commencement of any commissioning, you must provide, to the satisfaction of EPA, a report that includes:
- 1) construction verification report prepared by a suitably qualified EPA-appointed auditor (or alternative expert approved by the EPA in writing) demonstrating that the facility has been built in accordance with the works approval and all endorsed reports provided under WA_W1;
- WA_R5 You must not commence operation of the works until written EPA approval of the plans and reports required by condition(s) WA_R1 and WA_R4 has been received.

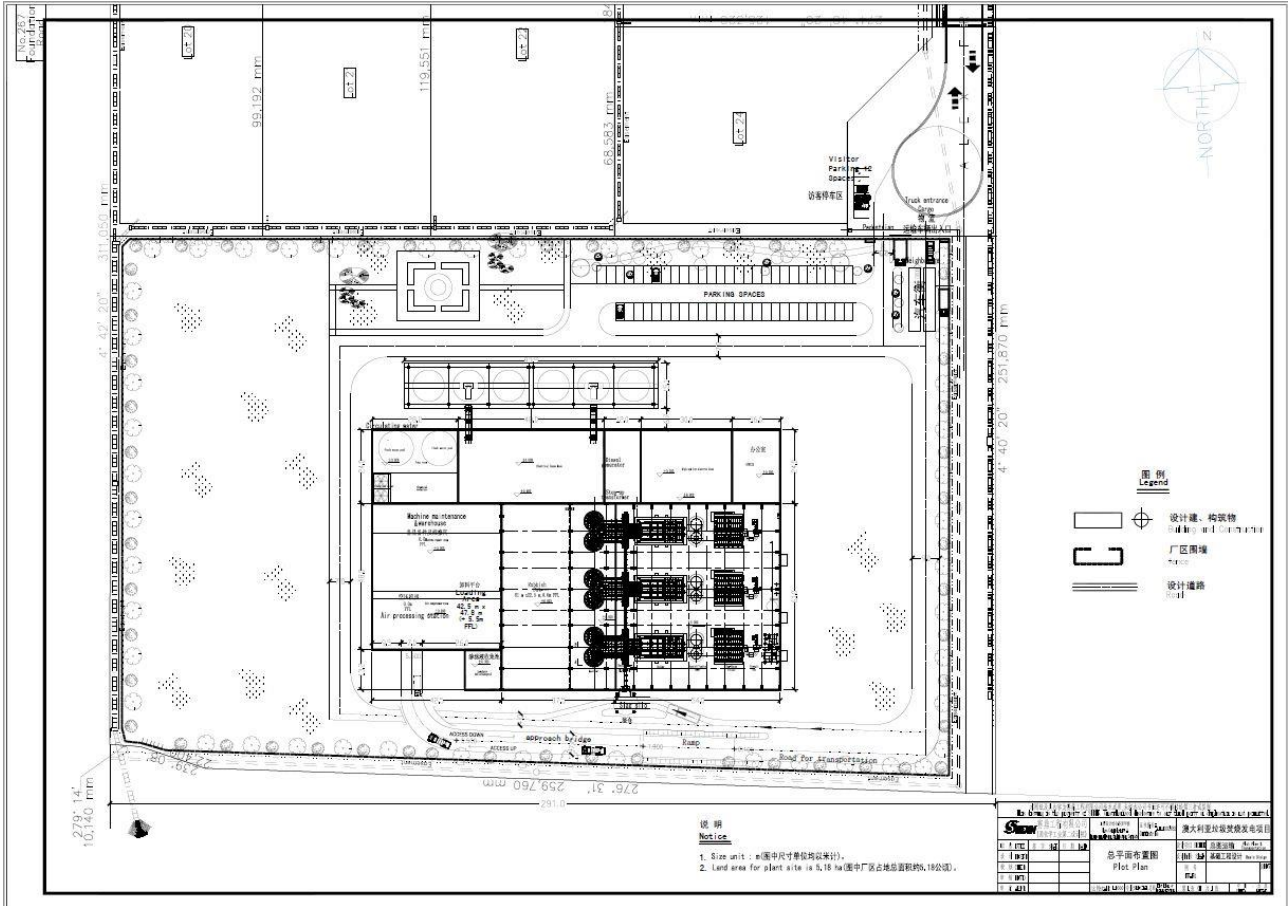
SCHEDULE 1A – LOCALITY PLAN



Works Approval:	215915
Company Name:	RECOVERED ENERGY AUSTRALIA PTY LTD
ACN:	619 571 489
Premises Address:	28 ALEX FRASER DRIVE, LAVERTON NORTH VIC 3026
Issued:	21/01/2020
Last Amended:	29/06/2020

Before relying on the information in this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances.

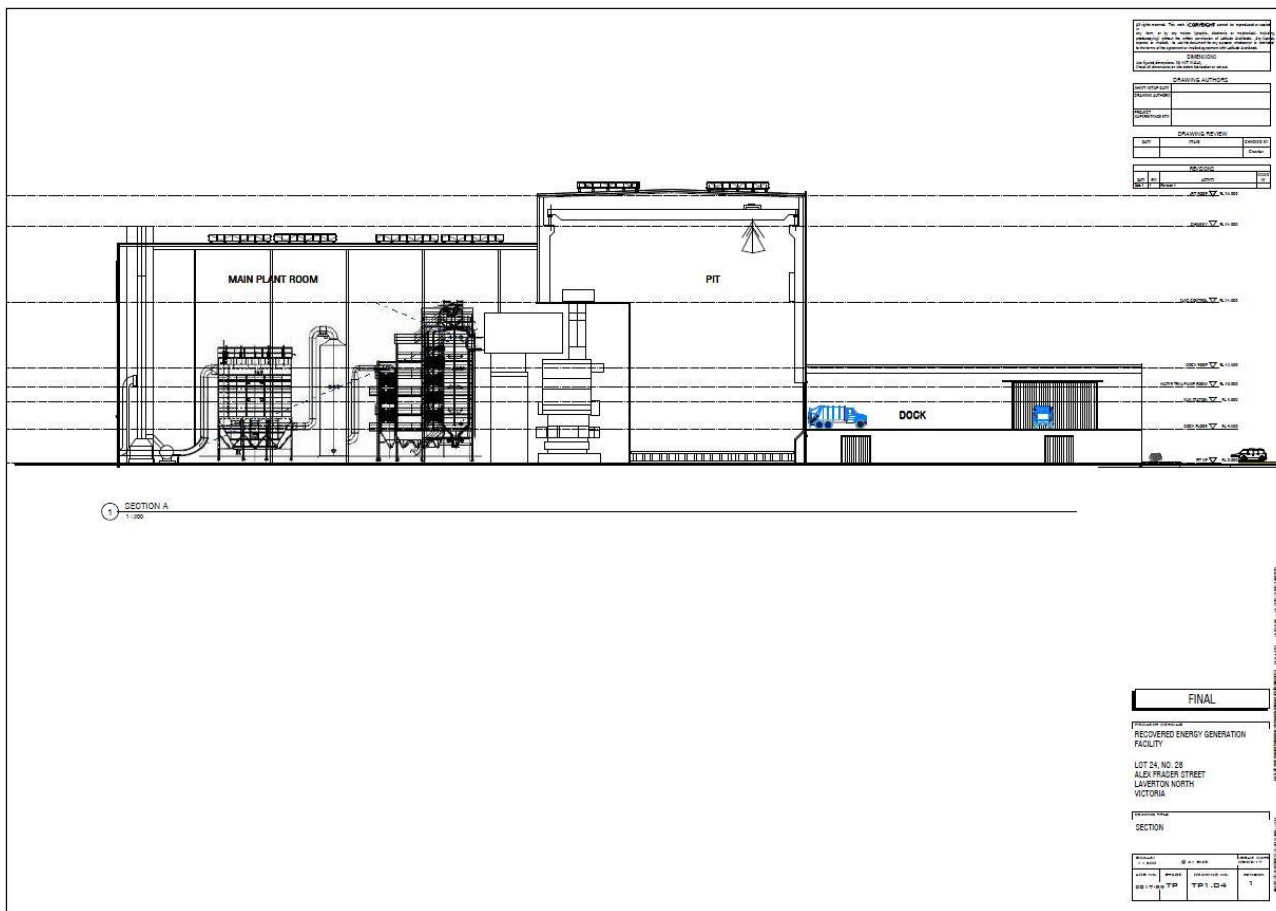
SCHEDULE 1B – PREMISES PLAN



Works Approval:	215915
Company Name:	RECOVERED ENERGY AUSTRALIA PTY LTD
ACN:	619 571 489
Premises Address:	28 ALEX FRASER DRIVE, LAVERTON NORTH VIC 3026
Issued:	21/01/2020
Last Amended:	29/06/2020

Before relying on the information in this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances.

SCHEDULE 1B – PREMISES PLAN



Works Approval:	215915
Company Name:	RECOVERED ENERGY AUSTRALIA PTY LTD
ACN:	619 571 489
Premises Address:	28 ALEX FRASER DRIVE, LAVERTON NORTH VIC 3026
Issued:	21/01/2020
Last Amended:	29/06/2020

Before relying on the information in this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances.