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14 March 2018

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PROPOSED SOLID RECOVERED FUEL FACILITY AUGMENTATION AT THE WOODLAWN ECO-PRECINCT – ODOUR ASSESSMENT REPORT

Dear Amandeep,

As requested, The Odour Unit Pty Ltd (**TOU**) has undertaken an odour assessment for the proposed Solid Recovered Fuel (**SRF**) Facility augmentation at the Woodlawn Eco-Precinct. It is understood that the proposed SRF Facility will be constructed adjacent to the existing Power Station at the Woodlawn Eco-Precinct.

The following letter-style report is an odour assessment for the proposed SRF Facility augmentation at the Woodlawn Eco-Precinct (hereafter referred to as **the Assessment**).

1. Relevant Background

Veolia Australia and New Zealand (**Veolia**) own and operate the Woodlawn Bioreactor, MBT Facility and Crisps Creek Intermodal Facility (**IMF**). The IMF services the Woodlawn Bioreactor and MBT Facility by transferring containers of compressed waste from Sydney by rail-to-road for processing. The Woodlawn Bioreactor MBT Facility is approved to accept a maximum throughput of 1.13 million tonnes per annum (**Mtpa**) of putrescible waste.

In comparison to the Woodlawn Bioreactor which is a landfill operation, the MBT Facility is a resource recovery operation which processes the incoming waste to extract recyclable materials or compost. The MBT Facility is approved for a maximum processing capacity of 280,000 tpa. As an augmentation to the MBT Facility, Veolia proposes to construct and operate a new building that will further process the waste

outputs from the MBT process. This new building will house an SRF Facility and result in outputs with high calorific value for co-processing as a fuel source.

2. Odour Assessment approach

The Assessment undertaken for the proposed SRF Facility at the Woodlawn Eco-Precinct is based on a qualitative, desktop approach that is aimed at reviewing all relevant technical information and proposed process operations as to form an expert opinion on the likely odour outcomes. The documentation used for the Assessment include:

- *Section 2 Project Elements - Existing MBT Design RDF Augmentation of the Project Synopsis Report* completed by Veolia and dated 16 August 2016;
- *Modification to enable the construction of a Solid Recovery Fuel (SRF) facility adjoining the Mechanical Biological Treatment facility within the Woodlawn Eco-Precinct* prepared by SG Haddad Advisory and CW Strategic Planning Services dated June 2017;
- Relevant technical documentation supplied by Veolia, including:
 - Allgaier Drying Biomass Rolling Bed Dryer WB-T - General Information;
 - Process flow diagrams;
 - Site layout drawings; and
- Verbal and email correspondence between TOU and Veolia.

More specifically, the Assessment approach entailed the following:

1. A review of the SRF Facility process operations;
2. An identification of all potential odour emission sources associated with the SRF Facility;
3. Characterisation of the potential odour emission source/s, and the associated level of risk of that source, at causing off-site odour impact beyond the Woodlawn Eco-Precinct site boundary; and
4. An examination of the required validation stages to verify the expected odour outcomes and, if required, the possible mitigation options that can be implemented as to reduce the odour risk/s to acceptable levels.

The above is considered to be a systematic and suitable alternative approach to assessing the potential odour emissions from the SRF Facility augmentation at the Woodlawn Eco-precinct, given the lack of process-specific odour emissions data available to the Assessment at the time of writing.

3. SRF Facility Proposal Overview

A site location plan drawing of the proposed SRF Facility augmentation at the Woodlawn Eco-Precinct is presented in **Figure 1**. As part of the planning requirements for the proposed SRF Facility, Veolia is applying to modify its MBT Facility development approval (MP 06-0239) for the:

- Construction of an SRF Facility adjacent to the existing Power Station located at the Woodlawn Eco-Precinct;
- The processing of up to 50,000 tpa of residual waste output from the existing MBT Facility;
- The storage of baled SRF product in shipping containers adjacent to the SRF Facility building; and
- The fortnightly transport of up to 55 containers of SRF product by road to the IMF and the return of up to 55 empty containers.

As indicated above, the proposed SRF Facility is expected to process up to 50,000 tpa of residual waste outputs from the existing MBT Facility. Of this total, approximately 35,000 tpa (65%) is expected to be extracted as suitable SRF product, with the remainder 15,000 tpa (35%) diverted to the Woodlawn Bioreactor. The SRF product will be transported fortnightly to the IMF for transport by rail to Port Botany, New South Wales.



Figure 1 – Site location plan of the proposed SRF Facility at the Woodlawn Eco-Precinct

4. Proposed SRF Facility Process Operations Overview

The proposed SRF Facility will be located to the east of the existing Power Station at the Woodlawn Eco-Precinct, as shown in the site layout plan in **Figure 2**. In general terms, the proposed SRF operation will involve the following key process steps:

1. Residual waste outputs from the MBT Facility will be collected and transported by covered trucks to the SRF Facility;
2. An air separator/classifier, designed to separate light and heavy fractions. This process will enable the removal of heavy non-combustible items for disposal at the Woodlawn Bioreactor;
3. A high-speed shredder, designed to reduce the size fraction of the incoming residual waste output stream from the MBT Facility;
4. If required, a rolling bed dryer, designed to reduce the moisture content of the SRF product to the required market expectations (i.e. approximately 15% or less on a weight basis); and
5. A baler and wrapper, designed to compress, compact and containerise the SRF product for ease of handling and transportation. The baled SRF product will be loaded into a container via a loading ramp ready for transport by either road or rail via the IMF.

A process flow diagram illustrating the SRF Facility operations is provided in **Figure 3**, with the SRF drying process shown in **Figure 4**. The numbering of each of the above process steps is linked to the labels shown in **Figure 3**. **Figure 5** provides a three-dimensional elevation view of the proposed SRF Facility.

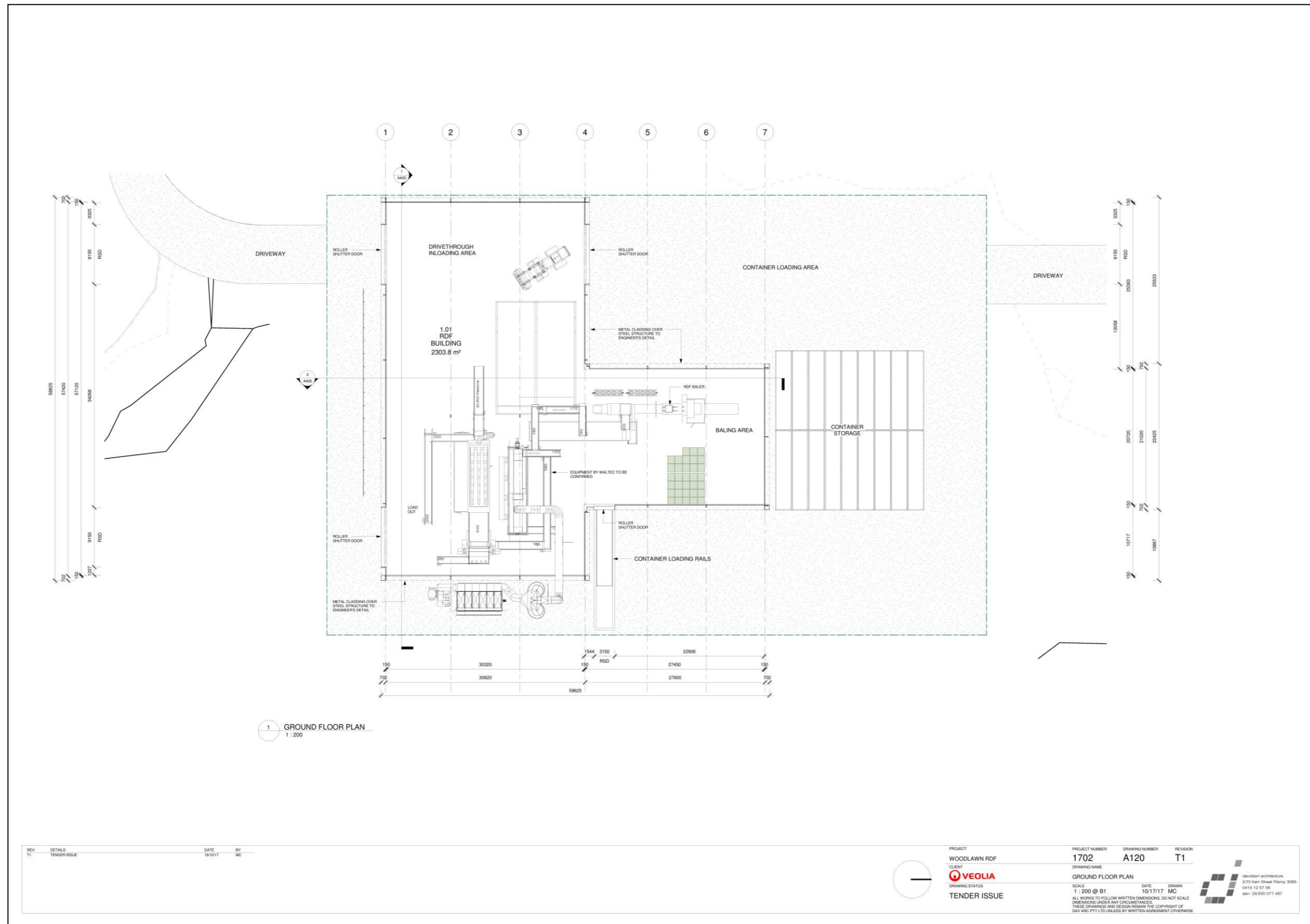


Figure 2 – Proposed SRF Facility Site Layout Plan

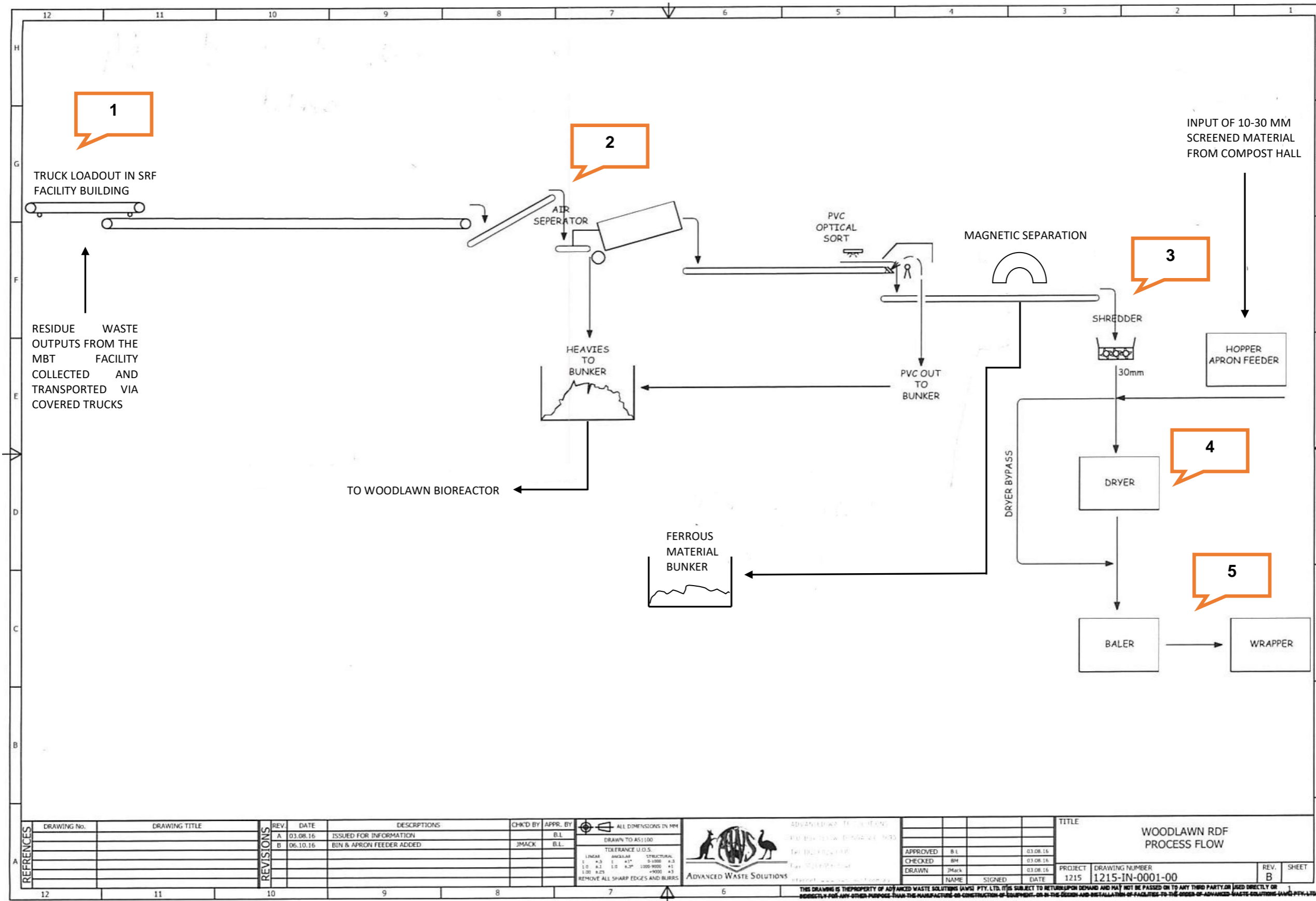


Figure 3 – Proposed SRF Facility process flow diagram

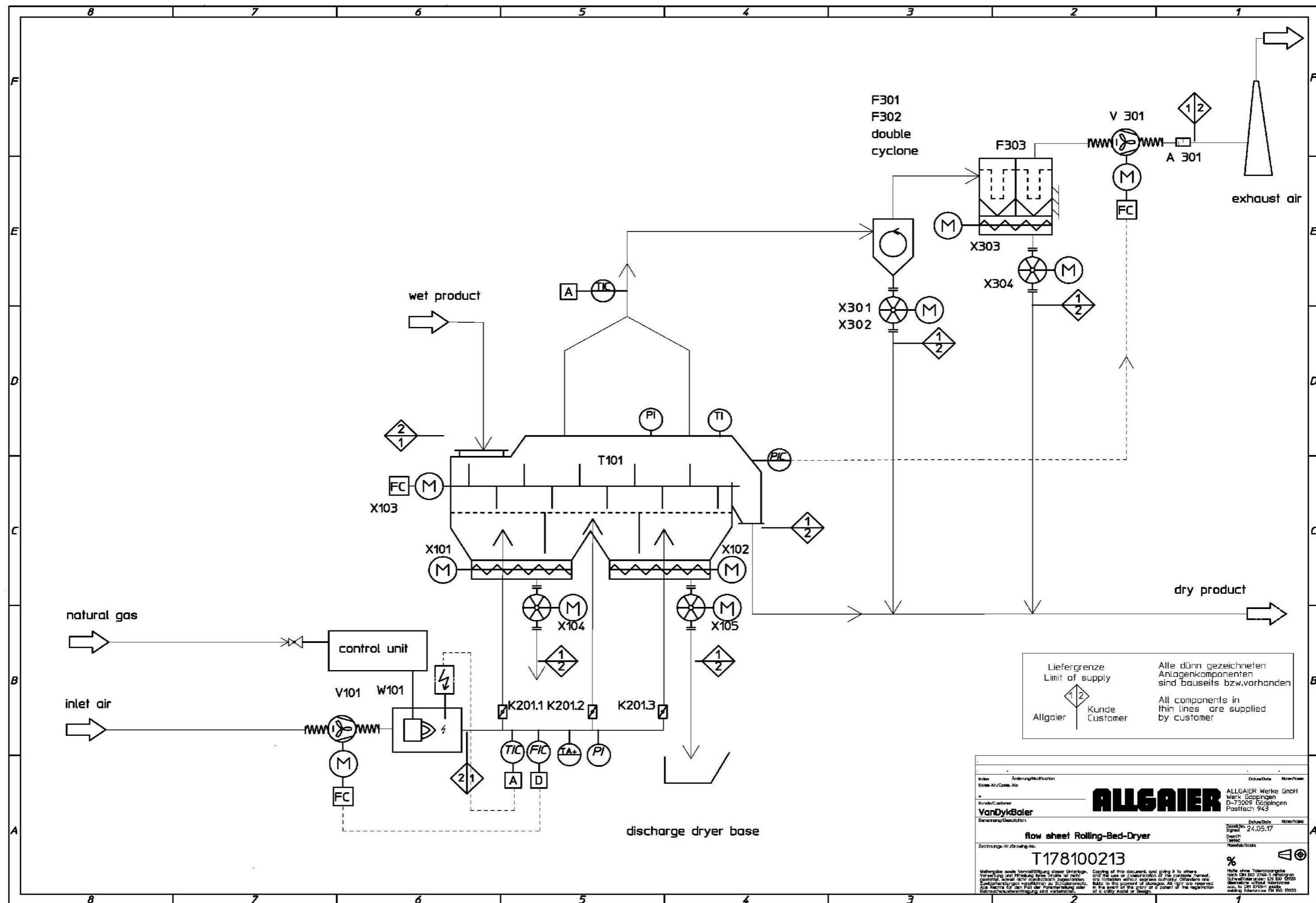


Figure 4 – Proposed SRF Facility: SRF drying process flow diagram

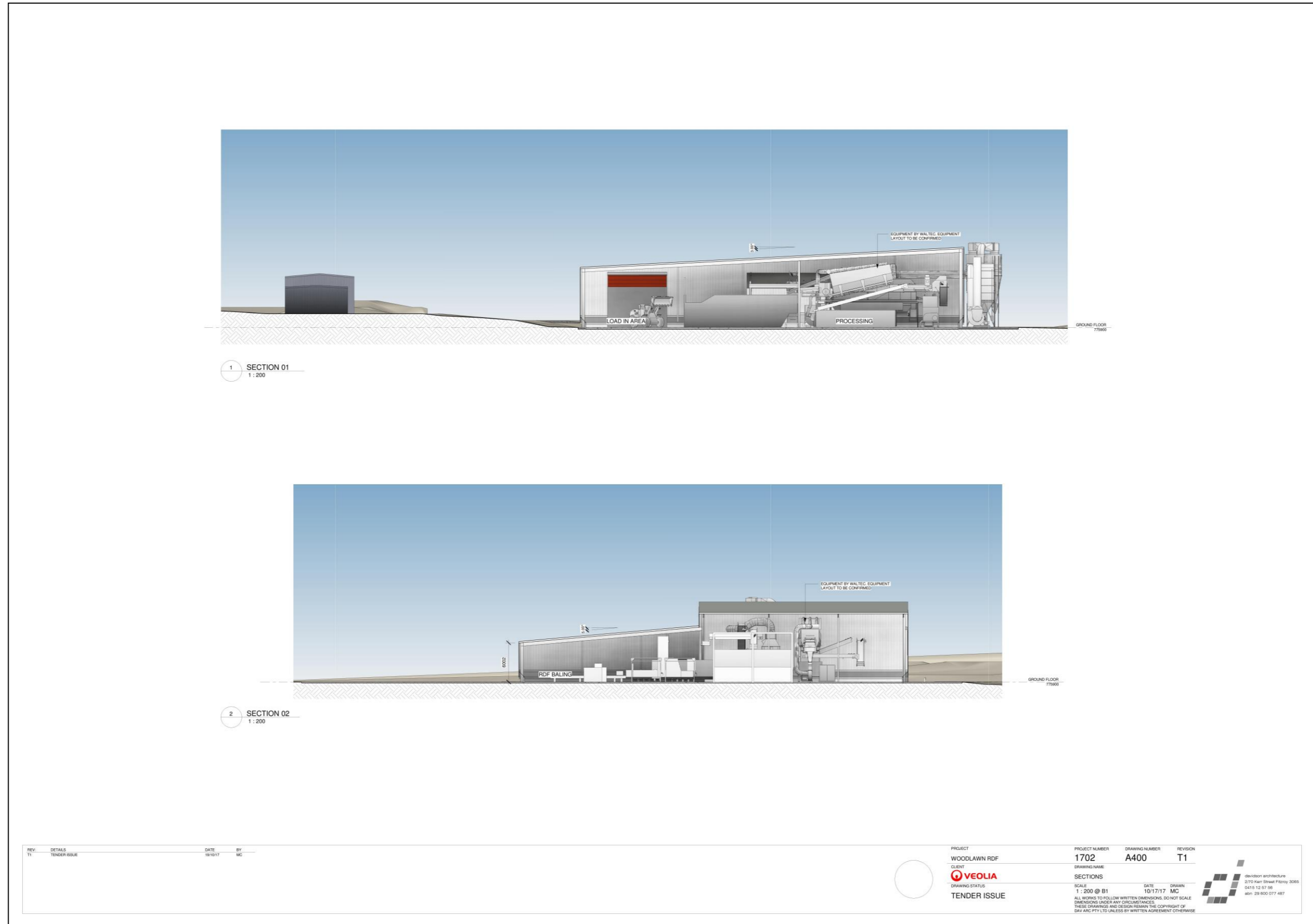
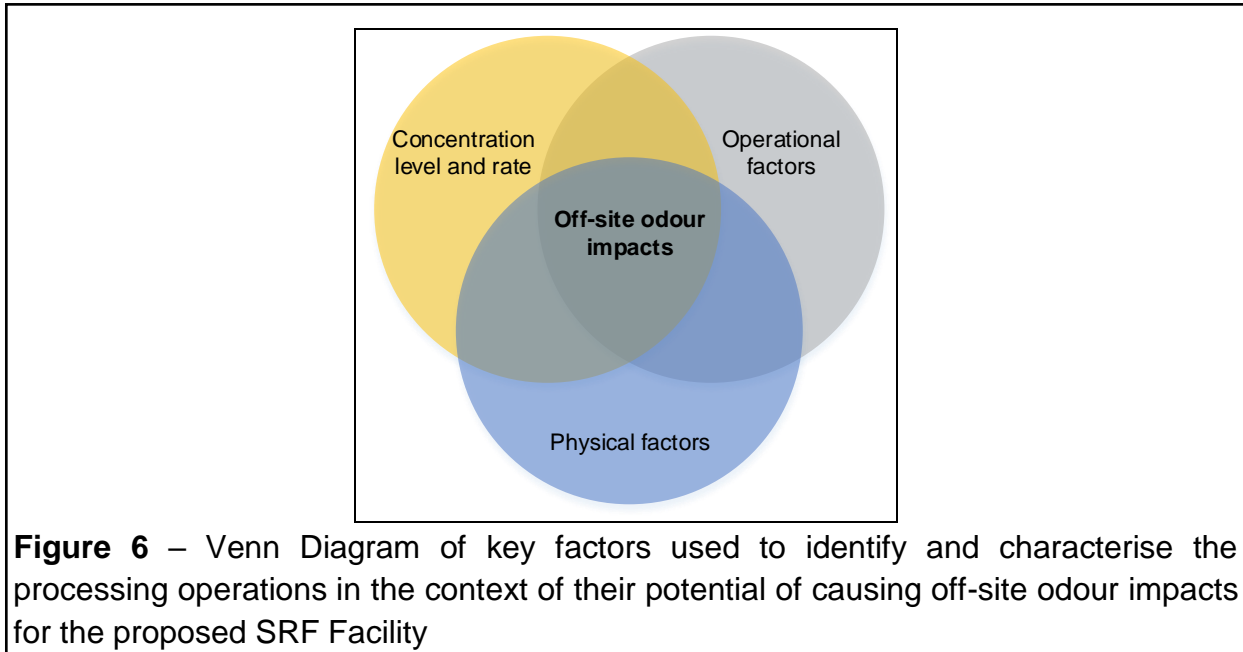


Figure 5 – Three-dimensional elevation drawing of the proposed SRF Facility

5. Odour emission sources identification and characterisation

The Assessment utilised an identification and characterisation process to qualitatively determine the associated odour risk from each process step in the SRF Facility. The identification and characterisation process considered several factors that have the potential to individually or collectively result in off-site odour impacts. These factors, and how they are linked to odour emission generation potential, are illustrated in a Venn diagram as shown in **Figure 6**.



As can be seen in **Figure 6**, the physical, operational, and concentration level and rate emitted from an odour emission source at the SRF Facility can individually or collectively influence the associated risk level of that source at causing off-site odour impact. A brief description of each of the factors outlined in **Figure 6** is provided below.

Physical Factors

For the SRF Facility, the physical factors that were considered to influence the odour emission potential include:

- The design, location and configuration of the emission discharge source;
- The nature of the operation (e.g. air separation, shredding, drying); and
- The thermodynamics of the process operations including discharge conditions of the SRF dryer exhaust stream.

Operational Factors

For the SRF Facility, the operational factors that were considered to influence the odour emission potential include:

- Quality of residual waste output material from the MBT Facility; and
- Processing frequency and duration (i.e. whether the process operation and associated emission are intermittent or continuous).

Concentration level and rate

The level of odour present and the rate at which it is being emitted or generated are key factors in determining the likeliness that an emission source will lead to off-site impacts. In simple terms, the rate at which an odour is released determines the extent to which it will be detectable at a distance, and not necessarily the odour concentration at the source. As an example, a highly odorous emission with a low volumetric emission rate (such as a single passive landfill vent stack or fugitive emission pathway) will appear to be substantial when assessed at the source, yet its emission rate may be relatively low, when compared to a low concentration source with a high-volume emission rate (such as the release from a pond or odorous solid surface, or from a large ventilation discharge stack). These characteristics were considered when ranking or prioritising the potential odour emission sources associated with the proposed SRF Facility.

Concept Site Model

Based on the above identification and characterisation process, a conceptual site model is presented in **Figure 7** which outlines all expected major and minor odour emission sources at the proposed SRF Facility.

Major Odour Emission Source

The Assessment has determined that the major odour emission source at the SRF Facility will likely be **Process Step 4** i.e. the SRF drying process (see **Section 4** for details). The reasoning for this is outlined as follows:

- The drying process will lead to the evaporation of moisture from the SRF material, which in turn may volatilise odorous compounds particularly from organic material that has not been separated or removed before drying. It is noted however that the SRF drying process will be optional and its requirement

dependent on the moisture content from the potential market for the SRF product;

- The drying process is expected to result in the generation of a moderate volumetric flow of exhaust air discharge to atmosphere; and
- The expected odour emission rate of the dryer exhaust airstream was unable to be determined at the time of writing, due to a lack of readily available and representative odour emissions data. As such, when factoring in the previous two points, this adds a level of uncertainty thereby increasing the potential risk associated with **Process Step 4**.

Notwithstanding the above reasons, as evident from **Figure 4**, the SRF dryer exhaust airstream will be treated via a double-cyclone system to remove particulate matter before discharge via a dedicated exhaust stack. This double-cyclone system is expected to significantly minimise the level of odour from the dryer exhaust airstream – an expectation that will need to be validated (see **Section 6**).

Minor Emission Sources

All other odour emission sources at the SRF Facility are categorised to have a minor odour risk potential, including:

- **Process Step 1** - the conveying of the waste output material from the MBT Facility involves no chemical, physical or biological process except for the transportation of material from one area to another via covered trucks. As such, this is not considered to result in the emission of problematical levels of odour;
- **Process Step 2** - the air separator stage will be undertaken within the SRF Facility building. Based on the expected quality of the residue waste output from the MBT Facility (refer to the previous point), and given that the air separate stage will be contained in the SRF Facility building, **Process Step 2** is not expected to generate and release a level of odour that is likely to be problematical;
- **Process Step 3** - the shredding stage will utilise a high-speed shredder unit which is expected to reduce the duration of processing, and therefore the rate of emission, when compared with a low-speed shredder. This process will also be contained in the SRF Facility building. As such, **Process Step 3** is not expected to generate and release a level of odour that is likely to be problematical; and

- **Process Step 5** - the baler and wrapper stage are essentially the packaging of the fully processed SRF product for containerised storage. Given that the end-product of the SRF process will be dry and containerised, it is not expected to generate and release a level of odour that is likely to be problematical.

It is important to note that the expected odour outcomes for **Process Steps 1, 2, 3** and **4**, as discussed above, will differ if the residue waste outputs from the MBT Facility are of sub-optimal quality (i.e. the residue waste outputs from the MBT process are characterised by a higher than expected level of moisture and organics contamination). Under this 'worst-case' scenario, a majority of the SRF Facility process operations (i.e. **Process Steps 1 to 4**) will need to be managed in a fully enclosed building and serviced by a suitably designed odour control system. As will be later discussed, this matter will be addressed in the odour validation assessment that is to be undertaken once the SRF Facility is constructed and commissioned (see **Section 7 & 8** for further details). Veolia has advised the Assessment that the residue waste output from the MBT process is expected to be low in moisture content and organic contamination, supporting the expected outcomes discussed in the Assessment.

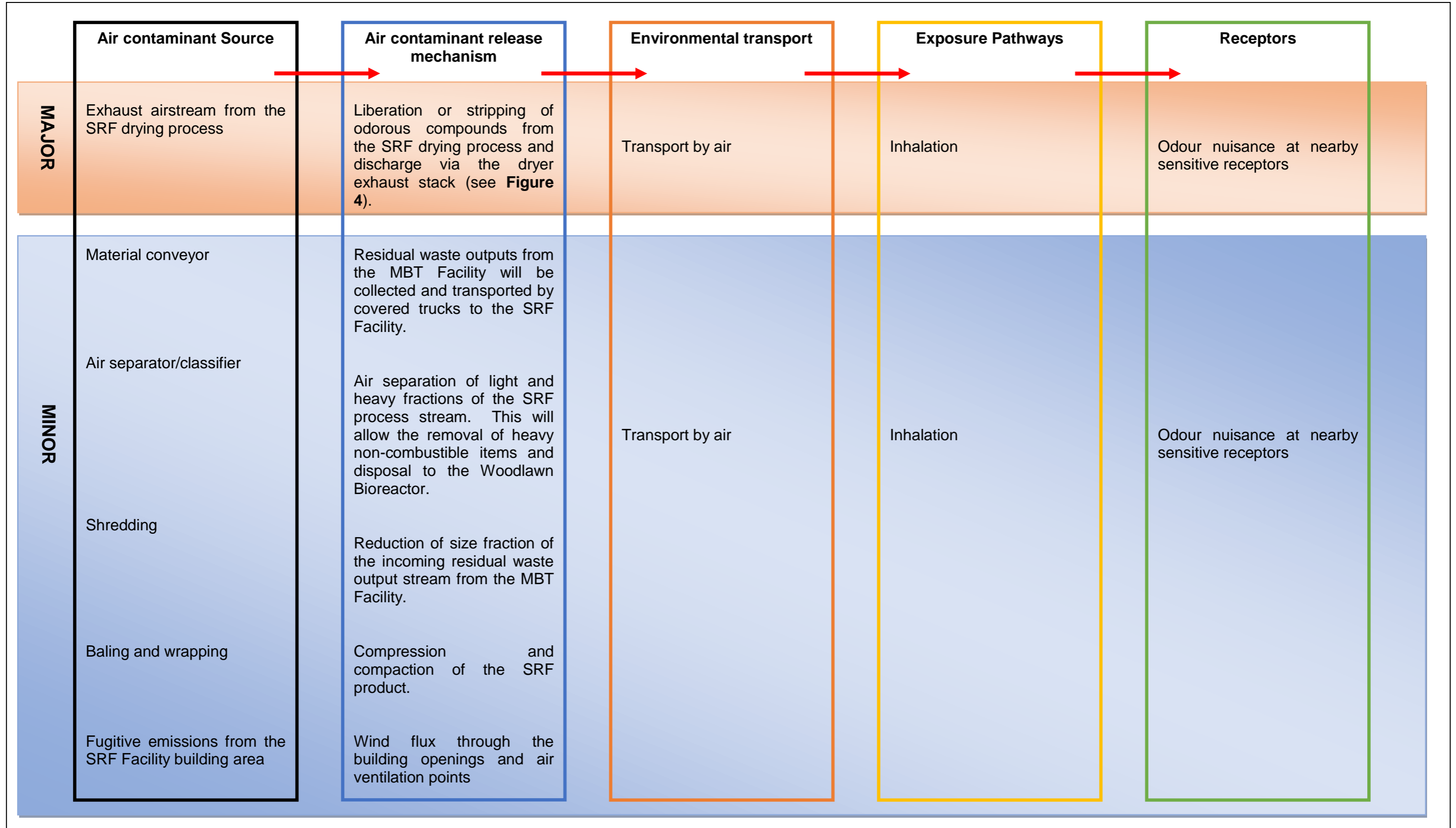


Figure 7 – Conceptual site model identifying all major and minor odour emission sources associated with the proposed SRF Facility

6. The Assessment Findings

Based on the information used in the Assessment, the overall finding is that proposed SRF Facility will likely have a low odour emission profile for the following key reasons:

- The material that will be handled, processed and transported in the SRF process is expected to be relatively dry in quality and contain a low level of organic contamination (the MBT Facility is designed to maximise organic recovery from the incoming waste material);
- The SRF drying process exhaust airstream, categorised to be the only major potential odour emission source from the SRF process operation, will be treated via a two-stage cyclone system prior to atmospheric discharge. The two-stage cyclone system is expected to have a positive effect from an odour emissions viewpoint;
- The SRF drying process will be optional and its requirement dependent on the moisture content from the potential market for the SRF product; and
- The SRF process will be highly automated and controlled, with most of the operations being undertaken in a dedicated building.

7. The Assessment Recommendations

Based on the findings of the Assessment, the following recommendations are made:

1. Upon completion and commissioning of the SRF Facility augmentation, an odour validation assessment will need to be undertaken for the purposes of:
 - a. Undertaking a review of the SRF process operations as to determine the actual odour emission generation levels. Such a review will involve odour sampling and testing of key sources including, but not limited to:
 - All air ventilation points (both passive and mechanical) servicing the SRF Facility building (the locations of which are yet to be determined); and
 - The SRF dryer exhaust airstream.
 - b. Evaluating the need for further odour mitigation (either in the form of engineered controls and/or modified management practices) as to minimise the odour risks associated with the SRF process operations.

Should the outcomes of the odour validation assessment determine that further odour mitigation is required in the form of an engineered odour control measure, a dedicated odour control system, likely to be in the form of a biofilter system, can be designed and installed at the SRF Facility as required

8. Concluding Remark

Overall, based on the findings in the Assessment, the proposed SRF Facility at the Woodlawn Eco-Precinct is not expected to pose a level of odour risk that is likely to be attributable with leading to off-site odour impact at sensitive receptors in the nearby community. However, given the lack of process-specific odour emissions data available to the Assessment at the time of writing, the recommendations made in the Assessment will need to be implemented in full as a means of verifying all expected odour outcomes relating to the SRF Facility and evaluate the need for further odour mitigation.

The Odour Unit Pty Ltd



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