GOVERNMENT OF WESTERN AUSTRALIA

Environmental Protection Authority

EPA REFERRAL FORM

Referral of a Proposal to the Environmental Protection Authority under Section 38 of the *Environmental Protection Act 1986*.

PURPOSE OF THIS FORM

Section 38 of the *Environmental Protection Act 1986* (EP Act) makes provision for the referral to the Environmental Protection Authority (EPA) of a proposal (significant proposals, strategic proposals and proposals under an assessed scheme) by a proponent, a decision making authority (DMA), or any other person.

The purpose of this form is to ensure that EPA has sufficient information about a proposal to make a decision about the nature of the proposal and whether or not the proposal should be assessed under Part IV of the EP Act. Information provided in the referral form must be brief (no more than 30 pages), sharp and succinct to achieve the purposes of this form.

This form does not prevent the referrer from providing a supplementary referral report. Should a referrer choose to submit a supplementary referral report please ensure the following.

i. Information is short, sharp and succinct.
ii. Attachments are below eight megabytes (8 MB) as they will be published on the EPA's website (exemptions apply) for public comment. To minimise file size, "flatten" maps and optimise pdf files.
iii. Cross-references are provided in the referral form to the appropriate section/s in the supplementary referral report.

This form is to be used for all proposals[1] which can be referred to the EPA under section 38 of the EP Act; i.e. referrals from: **proponents** of proposals (significant proposals, strategic proposals, derived proposals, proposals under an assessed scheme); **DMAs** (significant proposals); and **third parties** (significant proposals).

This form is divided into several sections, including; Referral requirements and Declaration; Part A - Information of the proposal and proponent; and Part B Environmental Factors. Guidance on successfully completing this form is provided throughout the form and is also available in the EPA's *Environmental Assessment Guideline for Referral of a Proposal under s38 of the EP Act (EAG 16)*.

Send completed forms to
Office of the Environmental Protection Authority
Locked Bag 10, East Perth WA 6892

or

Email: Registrar@epa.wa.gov.au

Enquiries
Office of the Environmental Protection Authority
Locked Bag 10, East Perth WA 6892
Telephone: 6145 0800
Fax: 6145 0895
Email: info@epa.wa.gov.au
Website: www.epa.wa.gov.au

Referral requirements and Declaration

The following section outlines the referral information required from a proponent, decision making authority and third party.

(a) Proponents

Proponents are expected to complete all sections of the form and provide GIS spatial data to enable the EPA to consider the referral. Spatial GIS data is necessary to inform the EPA's decision.

The EPA expects that a proponent will address Part B of the form as thoroughly as possible to demonstrate whether or not the EPA's objectives for environmental factors can be met.

If insufficient information is provided the EPA will request more information and processing of the referral will commence once the information is provided or the EPA decides to make a precautionary determination on the available information.

Proponent to complete before submitting form	
Completed all the questions in Part A (essential)	☐ Yes ☐ No
Completed all the questions in Part B	☐ Yes ☐ No
Completed all other applicable questions	☐ Yes ☐ No
Included Attachment 1 – any additional document(s) the proponent wishes to provide	☐ Yes ☐ No
Included Attachment 2 – confidential information (if applicable)	☐ Yes ☐ No
Enclosed an electronic copy of all referral information, including spatial data and contextual mapping but clearly separating any confidential information	☐ Yes ☐ No
Completed the Declaration	☐ Yes ☐ No
What is the type of proposal being referred? ** a referred proposal seeking to be declared a derived proposal*	☐ significant ☐ strategic ☐ derived* ☐ under an assessed scheme
Do you consider the proposal requires formal environmental impact assessment?	☐ Yes ☐ No
If yes, what level of assessment? *API = Assessment of Proponent Information* *PER = Public Environmental Review*	☐ API Category A ☐ API Category B ☐ PER

NB: The EPA may apply an Assessment on Proponent Information (API) level of assessment when the proponent has provided sufficient information about:

- the proposal;
- the proposed environmental impacts;
- the proposed management of the environmental impacts; and
- when the proposal is consistent with API criteria outlined in the *Environmental Impact Assessment (Part IV Division 1 and 2) Administrative Procedures 2012*.

If an API A formal level of assessment is considered appropriate, please refer to Environmental Assessment Guideline No. 14 *Preparation for an Assessment on Proponent Information (Category A) Environmental Review Document EAG 14* (EAG14).

Declaration

I, ……., *(full name)* declare that I am authorised on behalf of…… (being the person responsible for the proposal) to submit this form and further declare that the information contained in this form is true and not misleading.

Signature		Name (print)	
Position		Organisation	
Email			
Address	Street No.	Street Name	
	Suburb	State	Postcode
Date			

(b) Decision-making authority

The EPA expects decision-making authorities to complete applicable sections of Part A of the form and provide the proponent an opportunity to provide additional information in Part B of the form where appropriate.

Wherever possible the DMA should obtain relevant spatial information from the proponent and provide this to the EPA with the referral.

DMA to complete before submitting form	
Completed all the questions in Part A (essential)	☐ Yes ☐ No
Provided Part B to the proponent for completion	☐ Yes ☐ No
Completed all other applicable questions	☐ Yes ☐ No
Included Attachment 1 – any supporting information	☐ Yes ☐ No
Enclosed an electronic copy of all referral information, including spatial data and contextual mapping	☐ Yes ☐ No
Completed the below Declaration	☐ Yes ☐ No
Do you consider the proposal requires formal environmental impact assessment?	☐ Yes ☐ No
What is the type of proposal being referred?	☐ significant proposal ☐ significant proposal under an assessed scheme

Declaration

I, ……., *(full name)* submit this referral to the EPA for consideration of the environmental significance of its impacts.

Signature		Name (print)	
Position		Organisation	
Email			
Address	Street No.	Street Name	
	Suburb	State	Postcode
Date			

(c) Third Party

Third parties are asked to have consideration for the Significance Test outlined in Part A Section 1.5 of this form before referring a significant proposal to the EPA. The EPA will only consider proposals that are likely, if implemented, to have a significant effect on the environment.

Third parties are to provide sufficient information to clearly identify the significant proposal, the proponent, and their reasons for referring the proposal. This can be done by completing as much of Part A of the form as possible, taking into consideration the information available. Third parties may wish to fill in Part B of the form to advance their own views of the significance of the environmental impacts and the need for EPA assessment.

In most cases the EPA will seek additional information from the proponent. This will be to confirm or amend the identity of the proponent, the proposal, and to allow the proponent opportunity to provide its views on the significance of the environmental impacts and the need for EPA assessment.

Third Party to complete before submitting form	
Complete all applicable questions in Part A and B	☑ Yes ☐ No
Completed the Declaration	☑ Yes ☐ No
Do you consider the proposal requires formal environmental impact assessment?	☑ Yes ☐ No

Declaration

I, … Phillip Owen Bayley ……., *(full name)* submit this referral to the EPA for consideration of the environmental significance of its impacts.

Signature 		Name (print) Phillip Bayley	
Email	bayley@iinet.net.au		
Position	Consultant	Organisation	Bayley Environmental Services
Address	30	Thomas Street	
	South Fremantle	WA	6162
Date	4 February 2015		

PART A: Information on the proposal and the proponent

All fields of Part A must be completed by the proponent and/or decision-making authority for this document to be processed as a referral. Third party referrers are only expected to fill in the fields they have information for.

1 PROPONENT AND PROPOSAL DESCRIPTION

1.1 The proponent of the proposal

Proponent and/or DMA to complete	
Name of the proponent	Goldmark Leather Pty Ltd
Joint Venture parties (if applicable)	
Australian Company Number(s) (if applicable)	110 234 225
Postal Address *(Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State)*	PO Box 711 Joondalup WA 6919
Key proponent contact for the proposal *Please include: name; physical address; phone; and email.*	Paras Shah (Director) 0402 329 009 pbshah@goldmarktrading.com
Consultant for the proposal (if applicable) *Please include: name; physical address; phone; and email.*	

1.2 Proposal

Proposal is defined under the EP Act to mean a "project, plan, programme policy, operation, undertaking or development or change of land use, or amendment of any of the foregoing, but does not include scheme". Before completing this section please refer to Environmental Protection Bulletin 17 – Strategic and derived proposals (EPB 17) and Environmental Assessment Guideline for Defining the Key Characteristics of a proposal (EAG 1).

Proponent and/or DMA to complete	
Title of the proposal	North Dandalup Hides Facility
What project phase is the proposal at?	☐ Scoping ☐ Feasibility ☐ Detailed design ☑ Other - Development application
Proposal type *More than one proposal type can be identified, however for filtering purposes it is recommended that only the primary proposal type is identified.*	☐ **Power/Energy Generation** ☐ Hydrocarbon Based – coal ☐ Hydrocarbon Based – gas ☐ Waste to energy ☐ Renewable – wind ☐ Renewable – wave ☐ Renewable – solar ☐ Renewable – geothermal

Proponent and/or DMA to complete	
	☐ **Mineral / Resource Extraction** ☐ Exploration – seismic ☐ Exploration – geotechnical ☐ Development ☐ **Oil and Gas Development** ☐ Exploration ☐ Onshore – seismic ☐ Onshore – geotechnical ☐ Onshore – development ☐ Offshore – seismic ☐ Offshore – geotechnical ☐ Offshore – development ☐ **Industrial Development** ☑ Processing ☐ Manufacturing ☐ Beneficiation ☐ **Land Use and Development** ☐ Residential – subdivision ☐ Residential – development ☐ Commercial – subdivision ☐ Commercial – development ☐ Industrial – subdivision ☐ Industrial – development ☐ Agricultural – subdivision ☐ Agricultural – development ☐ Tourism ☐ **Linear Infrastructure** ☐ Rail ☐ Road ☐ Power Transmission ☐ Water Distribution ☐ Gas Distribution ☐ Pipelines ☐ **Water Resource Development** ☐ Desalination ☐ Surface or Groundwater ☐ Drainage ☐ Pipelines ☐ Managed Aquifer Recharge ☐ **Marine Developments** ☐ Port ☐ Jetties ☐ Marina ☐ Canal ☐ Aquaculture ☐ Dredging *If other, please state below:*

Proponent and/or DMA to complete	
	☐ **Other** _____
Proponent and/or DMA to complete	
Description of the proposal – describe the key characteristics of the proposal in accordance with EAG 1.	
Timeframe in which the proposal is to occur (including start and finish dates where applicable).	
Details of any staging of the proposal.	
What is the current land use on the property, and the extent (area in hectares) of the property?	
Have pre-referral discussions taken place with the OEPA? If yes, please provide the case number. If a case number was not provided, please state the date of the meeting and names of attendees.	
DMA (Responsible Authority) to complete	
For a proposal under an assessed scheme (as defined in section 3 of the EP Act, applicable only to the proponent and DMA) provide details (in an attachment) as to whether: • *The environmental issues raised by the proposal were assessed in any assessment of the assessed scheme.* • *The proposal complies with the assessed scheme and any environmental conditions in the assessed scheme.*	

1.3 Strategic / derived proposals

Complete this section if the proposal being referred is a strategic proposal or you are seeking the proposal to be declared a derived proposal. Note: Only a proponent may refer a strategic proposal and seek a proposal to be declared a derived proposal.

Proponent to complete	
Is this referred proposal a strategic proposal?	☐ Yes ☐ No
Are you seeking that this proposal be declared a derived proposal?	☐ Yes ☐ No
If you are seeking that this proposal be declared a derived proposal, what is the Ministerial Statement number (MS #) of the associated strategic proposal?	MS #: _____

1.4 Location

Proponents and DMAs must provide spatial data. Please refer to EAG 1 for more detail.

Proponent, DMA and Third Party to complete	
Name of the Local Government Authority in which the proposal is located.	Murray
Location: a) street address; lot number; suburb; and nearest road intersection; or b) if remote the nearest town; and distance and direction from that town to the proposal site.	Lot 1675 on Plan 206160 South Western Highway, North Dandalup 720m south of SW Hwy/Money Rd 5km south of ND townsite
Have maps and figures been included with the referral (consistent with EAG 1 where appropriate)? *The types of maps and figures which need to be provided (depending on the nature of the proposal) include:* • *maps showing the regional location and context of the proposal; and* • *figures illustrating the proposal elements.*	☑ Yes ☐ No
Proponent and DMA to complete	
Have electronic copies of spatial data been included with the referral? ***NB:** Electronic spatial (GIS or CAD) data, geo-referenced and conforming to the following parameters:* • *GIS: polygons representing all activities and named;* • *CAD: simple closed polygons representing all activities and named;* • *datum: GDA94;* • *projection: Geographic (latitude/longitude) or Map Grid of Australia (MGA);* • *format: ESRI geodatabase or shapefile, MapInfo Interchange Format, Microstation or AutoCAD..*	☐ Yes ☐ No

1.5 Significance test and environmental factors

Proponent, DMA and Third Party to complete	
What are the likely significant environmental factors for this proposal?	☐ Benthic Communities and Habitat ☐ Coastal Processes ☐ Marine Environmental Quality ☐ Marine Fauna ☐ Flora and Vegetation ☐ Landforms ☐ Subterranean Fauna ☐ Terrestrial Environmental Quality ☐ Terrestrial Fauna ☐ Hydrological Processes ☐ Inland Waters Environmental Quality ☑ Air Quality & Atmospheric Gases

Proponent, DMA and Third Party to complete	
	☑ Amenity ☐ Heritage ☐ Human Health ☐ Offsets ☐ Rehabilitation and Decommissioning
Having regard to the Significance Test (refer to Section 7 of the *EIA Administrative Procedures 2012*) in what ways do you consider the proposal may have a significant effect on the environment and warrant referral to the EPA?	*Please outline in two paragraphs or less.* *Two neighbouring houses are located 430m and 450m from proposed facility, within the EPA's recommended minimum 500m buffer distance.*

1.6 Confidential information

All information will be made publically available unless authorised for exemption under the EP Act or subject to the Freedom of Information Act 1992.

Proponent to complete	
Does the proponent request that the EPA treat any part of the referral information as confidential? *Ensure all confidential information is provided in a separate attachment in hard copy.*	☐ Yes ☐ No

2 REGULATORY CONSIDERATIONS

This section applies to the Local, State and Commonwealth regulatory considerations for the referred proposal.

2.1 Government approvals

2.1.1 State or Local Government approvals

DMA to complete	
What approval(s) is (are) required from you as a decision-making authority?	
Is rezoning of any land required before the proposal can be implemented? If yes, please provide details.	☐ Yes ☐ No

2.1.2 Regulation of aspects of the proposal

Complete the following to the extent possible.

Proponent to complete	
Do you have legal access required for the implementation of all aspects of the proposal? *If yes, provide details of legal access authorisations / agreements / tenure.* *If no, what authorisations / agreements / tenure is required and from whom?*	☐ Yes ☐ No

Outline both the existing approvals and approvals that will be / are being sought as a part of this proposal.

Proponent to complete			
Aspects* of the proposal	Type of approval	Legislation regulating this activity	Which State agency /entity regulate this activity?
Abstraction / Dewatering	***Licence***	***RIWI Act 1914***	***DoW***
Discharge	***Works Approval and Licence***	***EP Act 1986 – Part V***	***DER***
Clearing	***Native Vegetation Clearing Permit***	***EP Act 1986 – Part V***	***DER***

**e.g. mining, processing, dredging*

2.1.3 Commonwealth Government *Environment Protection and Biodiversity Conservation Act 1999* approvals

Refer to the assessment bilateral agreement between the Commonwealth of Australia and the State of Western Australia for assistance on this section.

Proponent to complete	
1. Does the proposal involve an action that may be or is a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)?	☐ Yes ☐ No *If no continue to Part A section 2.3.4.*
2. What is the status of the decision on whether or not the action is a controlled action?	☐ Proposal not yet referred ☐ Proposal referred, awaiting decision ☐ Assessed – controlled action ☐ Assessed – not a controlled action
3. If the action has been referred, when was it referred and what is the reference number (Ref #)?	Date: _____ Ref #: _____

Proponent to complete	
4. If the action has been assessed, provide the decision in an attachment. Has an attachment been provided?	☐ Yes ☐ No
5. Do you request this proposal to be assessed under the bilateral agreement?	☐ Yes ☐ No

Complete the following to the extent possible for the Public Comment of EPBC Act referral documentation.

Proponent to complete	
6. Have you invited the public to comment on your referral documentation?	☐ Yes ☐ No
7. How was the invitation published?	☐ newspaper ☐ website
8. Did the invitation include all of the following?	
(a) brief description of the action	☐ Yes ☐ No
(b) the name of the action	☐ Yes ☐ No
(c) the name of the proponent	☐ Yes ☐ No
(d) the location of the action	☐ Yes ☐ No
(e) the matters of national environmental significance that will be or are likely to be significantly impacted	☐ Yes ☐ No
(f) how the relevant documents may be obtained	☐ Yes ☐ No
(g) the deadline for public comments	☐ Yes ☐ No
(h) available for public comment for 14 calendar days	☐ Yes ☐ No
(i) the likely impacts on matters of national environmental significance	☐ Yes ☐ No
(j) any feasible alternatives to the proposed action	☐ Yes ☐ No
(k) possible mitigation measures	☐ Yes ☐ No
9. Were any submissions received during the public comment period?	☐ Yes ☐ No
10. Have public submissions been addressed? If yes provide attachment.	☐ Yes ☐ No

2.1.4 Other Commonwealth Government Approvals

Proponent, DMA and Third Party to complete			
Is approval required from other Commonwealth Government/s for any part of the proposal?		☐ Yes ☑ No *If yes, please complete the table below.*	
Agency / Authority	Approval required	Application lodged?	Agency / Local Authority contact(s) for proposal
		☐ Yes ☐ No	
		☐ Yes ☐ No	

3. SUPPORTING INFORMATION

Please attach copies of any relevant information on the proposal, supporting evidence and / or existing environmental surveys, studies or monitoring information undertaken and list the documents below.

Proponent, DMA and Third Party to complete			
(1)	Development Application – North Dandalup Hides Facility	Bowman & Associates Pty Ltd	Development Application and Environmental Summary Report
(2)	North Dandalup Hides Facility – Prediction of Odour Impacts	Environmental Alliances Pty Ltd	Odour modelling report
(3)	Odour Assessment Review	Environ Australia Pty Ltd	Expert review of odour modelling report
(4)	Proposed Animal Hide Processing Facility – Submission to Shire of Murray	Bayley Environmental Services	Submission to Shire of Murray on behalf of neighbouring land owner, Mrs Joan Money.

PART B: ENVIRONMENTAL FACTORS

The purpose of Part B is to assist the EPA to determine the significance of the likely environmental impacts of the proposal in accordance with the EPA's *Environmental Assessment Guideline for Environmental factors and objectives* (EAG 8) and *Environmental Assessment Guideline for Application of a significant framework in the EIA process* (EAG 9). Referrers completing Part B should refer closely to EAG 8 and EAG 9.

The EPA has prepared *Referral of a Proposal under s38 of the EP Act EAG No.16 - Appendix A* (Appendix A) to assist in identifying factors and completing the below table. Further guidance can be found in the guidance and policy documents cited in Appendix A under each factor.

How to complete Part B
For each environmental factor, that is likely to be significantly impacted by the implementation of the proposal, make a copy of the table below and insert a summary of the relevant information relating to the proposal. The table can be broken down into more than one table per factor, if the need arises. For example the hydrological processes factor can be presented in two separate tables, one for surface water and one for groundwater, or similarly one for construction and one for operations.

For complex proposals a supplementary referral report can be provided in addition to the referral form. If this option is chosen the table must still be completed (summaries are acceptable) to assist the Office of the EPA with statistical reporting and filtering proposals for processing.

Proponents expecting an API level of assessment must provide information in accordance with the EPA's *Environmental Assessment Guideline for Preparation of an API-A environmental review document* (EAG 14).

For each of the significant environmental factors, complete the following table (Questions 1 – 10).

Proponent to complete. DMA and Third Party to complete to the best of their knowledge.		
1	Factor, *as defined in EAG 8*	Air quality Amenity
2	EPA Objective, *as defined in EAG 8*	To maintain air quality for the protection of the environment and human health and amenity To ensure that impacts to amenity are reduced as low as reasonably practicable. (all other answers below are common to both factors)
3	Guidance - what established policies, guidelines, and standards apply to this factor in relation to the proposal?	EPA Guidance 3 – Recommended minimum separation of 500m from fellmongeries to residences.
4	Consultation - outline the need for consultation and the outcomes of any consultation in relation to the potential environmental impacts, including: • *anticipated level of public interest in the impact;* • *consultation with regulatory agencies; and* • *consultation with community.*	

Proponent to complete. DMA and Third Party to complete to the best of their knowledge.		
5	Baseline information - describe the relevant characteristics of the receiving environment. *This may include: regional context; known environmental values, current quality, sensitivity to impact, and current level of cumulative impacts.*	Neighbouring houses are located 430m and 450m north of the proposed facility.
6	Impact assessment - describe the potential impact/s that may occur to the environmental factor as a result of implementing the proposal.	Odour of hides during unloading, loading and processing.
7	Mitigation measures - what measures are proposed to mitigate the potential environmental impacts? The following should be addressed: • *Avoidance - avoiding the adverse environmental impact altogether;* • *Minimisation - limiting the degree or magnitude of the adverse impact;* • *Rehabilitate – restoring the maximum environmental value that is reasonably practicable; and* • *Offsets – actions that provide environmental benefits to counterbalance significant residual environmental impacts or risks of a project or activity.*	Operational measures are proposed (including closure of doors and ventilation of shed) that are unlikely to be consistently implemented or to significantly reduce odour emissions.
8	Residual impacts – review the residual impacts against the EPA objectives. *It is understood that the extent of any significant residual impacts may be hard to quantify at the referral stage. Referrers are asked to provide, as far as practicable, a discussion on the likely residual impacts and form a conclusion on whether the EPA's objective for this factor would be met if residual impacts remain. This will require:* • *quantifying the predicted impacts (extent, duration, etc.) acknowledging any uncertainty in predictions;* • *putting the impacts into a regional or local context, incorporating knowable cumulative impacts; and* • *comparison against any established environmental policies, guidelines, and standards.*	Significant odour impacts are likely to be experienced by neighbours. Modelling presented by proponent is flawed. Even assuming modelling is accurate, some impact is expected to occur.
9	EPA's Objective – from your perspective and based on your review, which option applies to the proposal in relation to this factor? *Refer to EAG 9*	☐ *meets the EPA's objective* ☐ *may meet the EPA's objective* ☑ *is unlikely to meet the EPA's objective*
10	Describe any assumptions critical to your conclusion (in Question 9). *e.g. particular mitigation measures or regulatory conditions.*	

In circumstances where there was some uncertainty on the level of significance of a particular factor it is recommended that a brief summary (no longer than 1 - 2 paragraphs) is provided on the steps taken to determine why a factor was not considered to be significant.

Bowman & Associates Pty Ltd

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Waste Management Specialists

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DEVELOPMENT APPLICATION

NORTH DANDALUP HIDES FACILITY

ANIMAL HIDE PROCESSING (FELLMONGERING) FACILITY

SOUTH WESTERN HIGHWAY, SHIRE OF MURRAY

November 2014

DISCLAIMER

In order to provide structure to the conclusions derived in this document certain assumptions have been made. These assumptions are based on the Consultants informal enquiries, knowledge and experience from working in the waste management industry.

The content contained herewith has been compiled in good faith using normal industry practices employed by Environmental Engineers and Environmental Scientists. Bowman & Associates Pty Ltd accepts no liability for loss or damages incurred by any individual or organisation due to reliance on the included content.

This document and its contents cannot be used for any other purpose or reasons other than those agreed between the Client and Bowman & Associates Pty Ltd without first obtaining written consent from Bowman & Associates Pty Ltd.

DOCUMENT CONTROL

VERSION	DATE RELEASED	PREPARED BY	APPROVED BY	AUTHORISED SIGNATURE
DRAFT	2.11.2014	B Bowman	B Bowman	
FINAL	12.11.2014	B Bowman	B Bowman	

DOCUMENT DISTRIBUTION

VERSION	TYPE	FORMAT	ISSUED TO	ORGANISATION
DRAFT	Electronic	pdf	Paras Shah	Goldmark Leather
DRAFT	Electronic	pdf	Rhys Bloxsidge	Shire of Murray
FINAL	Electronic	pdf	Paras Shah	Goldmark Leather
FINAL	Electronic	pdf	Rhys Bloxsidge	Shire of Murray
FINAL	Electronic	pdf	Peter Ventouras	Toscana (WA) Pty Ltd

FILE NAME

141112 BB Development Application - Goldmark Hides Facility.docx

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TABLES

FIGURES

DRAWINGS

APPENDICES

ACRONYMS

DER	Department of Environment Regulation
LPG	Liquid Petroleum Gas
NDHF	North Dandalup Hides Facility
WA	Western Australia

UNITS OF MEASURE

°C	Degrees Celsius
Ha	Hectare
kL	Kilolitres
km	Kilometres
L	Litre
m	Metre
mm	Millimetre

DEFINITIONS

Buffer Distance - The required distance between the boundary of the proposed site and sensitive land uses.

Decomposition - The breakdown of organic waste materials by micro-organisms.

Groundwater - Subsurface water stored in the pores of soils or rocks which may be available for use.

Prescribed Premises - Premises prescribed for the purposes of Part V of the EP Act.

Surface Water - Surface water is water situated in all natural and constructed waterways or channels whether flow is intermittent or not.

1 INTRODUCTION

Goldmark Leather Pty Ltd (Goldmark Leather, Proponent) proposes to establish a hide curing facility in the Shire of Murray. The North Dandalup Hides Facility (NDHF) will accept up to 5,000 cow hides per week, generating 35,000 L of process waste water, a brine with high salt concentrations.

The facility will initially process up to 3,000 hides per week, with operations increasing over time to the facility capacity of 5,000 hides per week.

Goldmark Leather intends to lease the property from the current owners Toscana (WA) Pty Ltd and work alongside the owners to fulfil all necessary requirements to carry out the business.

The cattle hides will be acquired from various abattoirs state-wide. Hides will be delivered as green hides (unsalted) direct from the abattoirs. Upon receipt the hides will be salt cured in large drums similar in configuration to concrete mixers. Once salted these hides will be classified in various grades and weights, then packed on pallets ready to export. Process water will be collected for storage and off-site disposal.

Careful assessment of potential emissions has resulted in appropriately designed construction and operational management features of the proposed facility to limit the potential for environmental emissions in the form of odour, dust, noise, surface water, ground water and vermin.

Once operating at full capacity, the facility will process approximately 1,000 cattle hides a day. The anticipated workforce at that time will be between 10 and 20 employees.

The site at North Dandalup has been identified as an appropriate location. The existing infrastructure at the site is capable of accommodating business expansion and the site is ideally situated to receive hides from South West abattoirs.

1.1 GOLDMARK LEATHER

Goldmark Leather is a Western Australian Company built on many years of experience in the international tannery and animal hide materials markets. Goldmark Leather presently receives hides from a number of Western Australian Abattoirs for processing at a third party facility in Naval Base (City of Kwinana).

Goldmark Leather contact details are as follows:

Business Registration Details
ACN: 110 234 225
ABN: 42 930 907 137

Key Contact
Paras Shah – Director
Phone: 0402 328 009
Email: pbshah@goldmarktrading.com

Postal Address
Goldmark Leather Pty Ltd
PO Box 711
Joondalup WA 6919

Goldmark Leather is an exporter of cattle hides being in the leather industry for just over twelve years. Goldmark Leather currently has two Tanneries in Africa situated in Uganda and Kenya where it

produces wet blue hides. Producing wet blue hides is two steps further advanced in the hide tanning process than drum salting the cattle hides.

In Western Australia Goldmark Leather has been exporting cattle hides for the past eight years and with growth and diversity in its market Goldmark Leather now intends to set-up its own premises for drum salting of hides.

Goldmark Leather's established customer base is vast with many customers being with the company for more than five years. Goldmark Leather exports either drum salted hides from Western Australia or wet blue hides from Africa to various Asian Countries, Far East and Europe.

To keep up to date with market and customer requirement changes Goldmark Leather attends trade fairs whereby meeting not only its customers but also machinery specialists to learn and understand the best possible ways to process cattle hides.

1.2 PLANNING FRAMEWORK

The proposed facility is located in the Shire of Murray on land zoned under the Shire of Murray *Town Planning Scheme No. 4* with the proposed use subject to approval by the Shire of Murray. Accordingly the Proponent seeks approval from the Shire of Murray to establish the hide curing facility.

A Works Approval application is currently being assessed by the Department of Environment Regulation (DER). The hide curing process is classified by the DER as Category 83 – Fellmongering: Premises on which animal skins or hides are dried, cured or stored.

1.3 ZONING

The site is currently zoned as 'Rural' by the Shire of Murray. Under the current *Town Planning Scheme No. 4,* fellmongering would constitute a noxious industry with discretionary 'SA' approval permitted. The site zoning is considered appropriate for use as prescribed premises.

2 SITE DETAILS

2.1 PROPERTY LOCATION AND OWNERSHIP

The 286 Ha property is owned by Toscana Pty Ltd and known as Lot 1675 on Plan 206160, South Western Highway, North Dandalup. The street address of the property is 4756 South Western Highway, Fairbridge. Refer **Appendix A** for a copy of the property Title.

The proposed NDHF will be established in an existing shed situated immediately within the property approximately 300 m west of the South Western Highway, The location of the shed and surrounding hardstand area, relative to the site cadastral boundaries is shown on **Drawing NDHF-001**.

2.2 EXISTING INFRASTRUCTURE

The NDHF will incorporate the northern half of an existing shed structure, as shown of **Drawing NDHF-002**. The Northern half of the shed is 56 m long and 31 m wide, providing a floor space of up to 1,736 m^2 for hide processing activities.

The shed is constructed with precast concrete panels forming the perimeter walls to a height of 2 m, with cladding forming the remainder of the walls and roof. The northern and southern portions of the shed are separated by a dividing wall of similar construction. Interior lighting is provided by translucent roof panels. There is currently no water, electrical or other services connected to the shed structure.

Stormwater from the shed roof is currently collected in a guttering system, accumulated in downpipes and diverted through underground stormwater pipes to the west. As part of the development stormwater from the roof of the shed will be collected in tanks for use in the hides facility.

To the north and west of the shed are existing gravel tracks and grassed areas.

2.3 ENVIRONMENTAL SETTING

The proposed works to establish and operate the NDHF will have no impact on the surrounding natural environment. Hide processing activities will be confined to the shed interior and all process waste water will be collected and removed from site.

2.3.1 CLIMATE

The Karnet Bureau of Meteorology (BoM) weather station (Station Number 009111), 20 km to the northeast of the site was selected as providing the closest approximation of conditions at North Dandalup of those stations with climate statistics available.

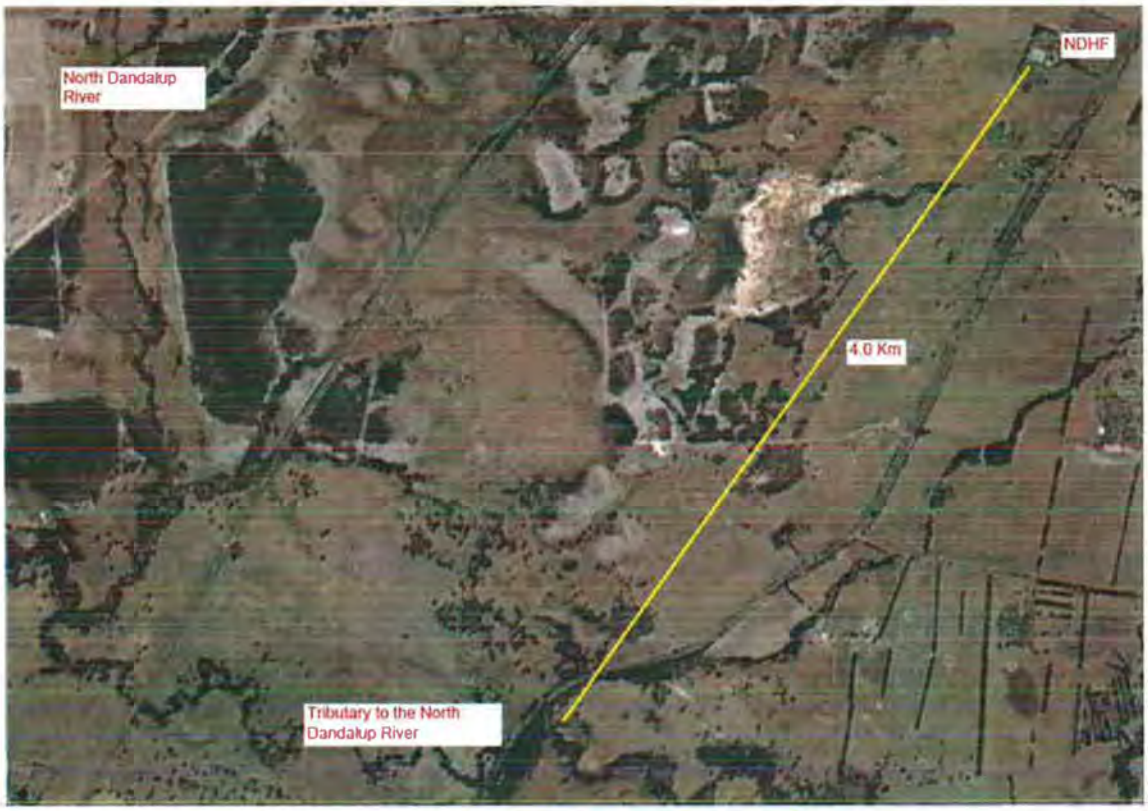
Local temperatures reach a mean maximum of 30.7 °C in the summer and 15.4 °C in the winter, with mean minimums of 15.8 °C and 6.2 °C for summer and winter respectively. Annual rainfall is typically 1,160 mm.

Prevailing wind conditions at the site are typically morning easterlies and afternoon westerlies and south westerlies.

2.3.2 SURFACE WATER

Surface runoff from the hardstand areas at the site is presently diverted to a natural land depression leading to the southwest. This land depression becomes a tributary of the North Dandalup River 4.0 km to the southwest. Refer **Figure 1** for location of the North Dandalup River tributary.

Figure 1: Nearest Surface Water



The nearest Public Drinking Water Source Area is Lake Banksiadale located 13 km up gradient to the south east of the site.

2.3.3 GEOLOGY

The soil profile beneath the gravel hardstand consists of sandy laterite gravels over kaolin clays and silts. The gravel hardstand has been constructed using up to 500 mm of compacted clayey sand fill material to provide the 2% fall and 200 mm of basecourse gravel with drainage channels on the upslope perimeters to ensure surrounding surface water and any perched near-surface groundwater collects and drains away from the hardstand.

2.3.4 FLORA AND FAUNA

The shed and surrounding hardstand is cleared of all vegetation and provides no habitat for native plants or animals.

2.3.5 ENVIRONMENTALLY SENSITIVE AREAS

There are no Environmentally Sensitive Areas in the proposed works area for the site. The nearest Environmentally Sensitive Area under the Clearing Regulations is a stand of trees 340 m to the northwest of the site.

2.3.6 BUFFER DISTANCES AND NEIGHBOURING PREMISES

The Environmental Protection Authority guidance note, *Separation Distances between Industrial and Sensitive Land Uses No. 3* recommends a buffer distance between fellmongering and sensitive land uses of 500 m. The nearest residential property to the proposed facility is 430 m to the north. The single dwelling can be seen on **Figure 2** and is located on the north side of Money Road.

Figure 2: Nearest Sensitive Land Use

2.3.7 CONTAMINATED LAND

No reported, confirmed or suspected contaminated land sites have been identified within 4 km of the NDHF site.

2.3.8 ABORIGINAL AND EUROPEAN HERITAGE

No indigenous or heritage sites have been identified on the site. The nearest indigenous heritage site is located 2 km to the southwest of the site (Site ID 4326). The registered site consists of scattered artefacts, with poor location identification and no restrictions on access.

3 PROPOSAL DETAILS

3.1 FACILITY ACCESS

Access will be through the existing property entrance at the South Western Highway. The existing 300 m long access track will be upgraded to an 8.4 m paved road in accordance with Area 7 Road Classification d) as described in the Shire of Murray 1996, *Subdivisional Road Construction Standards*.

3.2 PROPOSED THROUGHPUT

The NDHF will initially receive approximately 3,000 hides per week from abattoirs processing beef cattle. Over time the hide throughput is expected to nearly double to 5,000 cow hides per week. There is room within the facility to process other hide types or additional cow hides.

3.3 ENVIRONMENTAL LICENCE

The facility will receive hides for curing, sorting and export. The appropriate classification under the *Environmental Protection Regulations 1987* is Category 83 - Fellmongering.

3.4 MATERIALS THAT WILL NOT BE PROCESSED

Other than green animal hides, no waste products or controlled wastes will be processed at NDHF.

No tanning of hides will be undertaken at NDHF. No tanning chemicals or tannery-type liquid wastes will be used or generated at the NDHF.

The management of the incoming hide materials is discussed in detail in **Section 4**.

3.5 DESIGN CONSIDERATIONS

The NDHF is designed to process incoming animal hides into cured hides appropriate for use by tanneries domestically and abroad.

The facility will be appropriately equipped for:

- Receiving and inspecting incoming green hides,
- Loading hides into mixing drums with curing salt,
- Mixing the hides until they are appropriately cured,
- Sorting the cured hides and palletising the hides for distribution,
- Containing all waste liquid from the curing process within the site,
- Loading pallets of hides into shipping containers,
- Safely storing and removing solid animal wastes from the site, and
- Safely storing and removing process waste water from the site.

The facility has been designed with surplus capacity for future processing of either a greater volume of cow hides or a diverse variety of other animal hides.

3.6 PROPOSED WORKS

To make the existing shed and external areas fit for purpose the following modifications are proposed. The works described below can be seen on **Drawing NDHF-002**.

3.6.1 CONCRETE HARDSTAND

A concrete hardstand will be established to the north of the shed for the unloading of hides and the storage of wrapped pallets of curing salt.

3.6.2 FRESH WATER TANKS

Tanks will be installed to capture runoff from the shed for use in the hides facility. Surplus stormwater that overflows from the tanks will be returned to the existing stormwater management system.

3.6.3 LIQUID WASTE STORAGE TANKS

In the north eastern corner of the hardstand area, a 58,500 L enclosed rubber lined steel holding tank will be installed inside a secondary containment bund. The tank will be sealed at the base with filling and discharge undertaken from the top of the tank.

To the west of the shed an additional bunded and sealed 20,000 L tank will be installed as provision for future use of the western part of the shed. This tank will also be rubber lined and filled and emptied from the top.

The function of the tank bunds will be to capture and contain any spillage or overflow from the tanks.

3.6.4 SHED CONCRETE SLAB

A cast-in-situ concrete slab with a rectangular drainage channel shall be constructed inside the shed. The proposed slab finished levels can be seen on **Drawing NDHF-003**.

The shed concrete slab shall be designed with appropriate strength to support the hide mixing drums and drainage platform. The type of cement and concrete strength used in the shed concrete slab will be designed to resist salt corrosion.

Drive over bunds shall be installed at all shed entrances to ensure process liquids are confined to the shed interior.

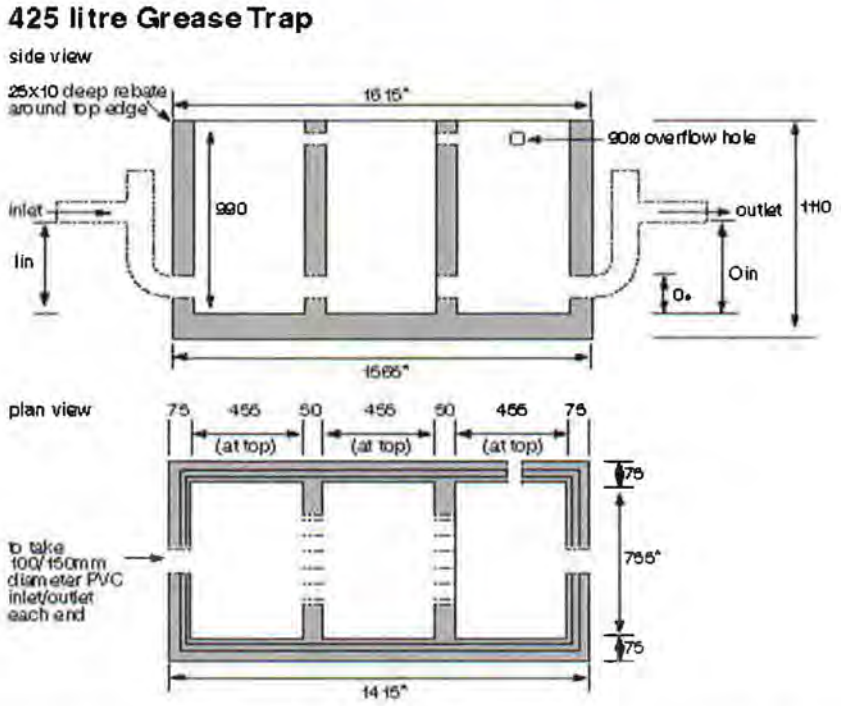
3.6.5 PROCESS WASTE WATER COLLECTION SYSTEM

A system of in-floor drains, as shown in **Drawing NDHF-003** and **Drawing NDHF-004** will be installed to collect the waste water extracted from the hides during the curing process.

The drains have been designed with 1:80 gradients to ensure good drainage through the collection system. Removable perforated stainless steel baffles will be installed periodically along the drains to trap solids and facilitate daily cleaning.

All drains from the processing area terminate into a multiple grease trap system, where the liquid will be pumped into a large tank for storage until it can be transferred off site. The grease traps are designed to trap grease and suspended materials generated from the hide treatment process. **Figure 3** shows the design of a typical grease trap. As the grease traps will be in trafficable areas they will be fitted with concrete covers with cast iron non-rock removable lids providing an excellent seal to prevent the escape of any odour that may be present.

Figure 3: Typical 425 L Grease Trap



For the processing (eastern) part of the shed a series of three grease traps will provide 1,275 L of liquid waste storage capacity striping fats and solids from the process waste water. For the western part of the shed a single 425 L grease trap will be installed with surplus waste water pumped into a 20,000 L tank by an automated pump. One grease trap in this location is considered sufficient as no liquid intensive activities are planned for the western part of the shed.

This system has provision for future expansion if the throughput of the facility significantly increases over time.

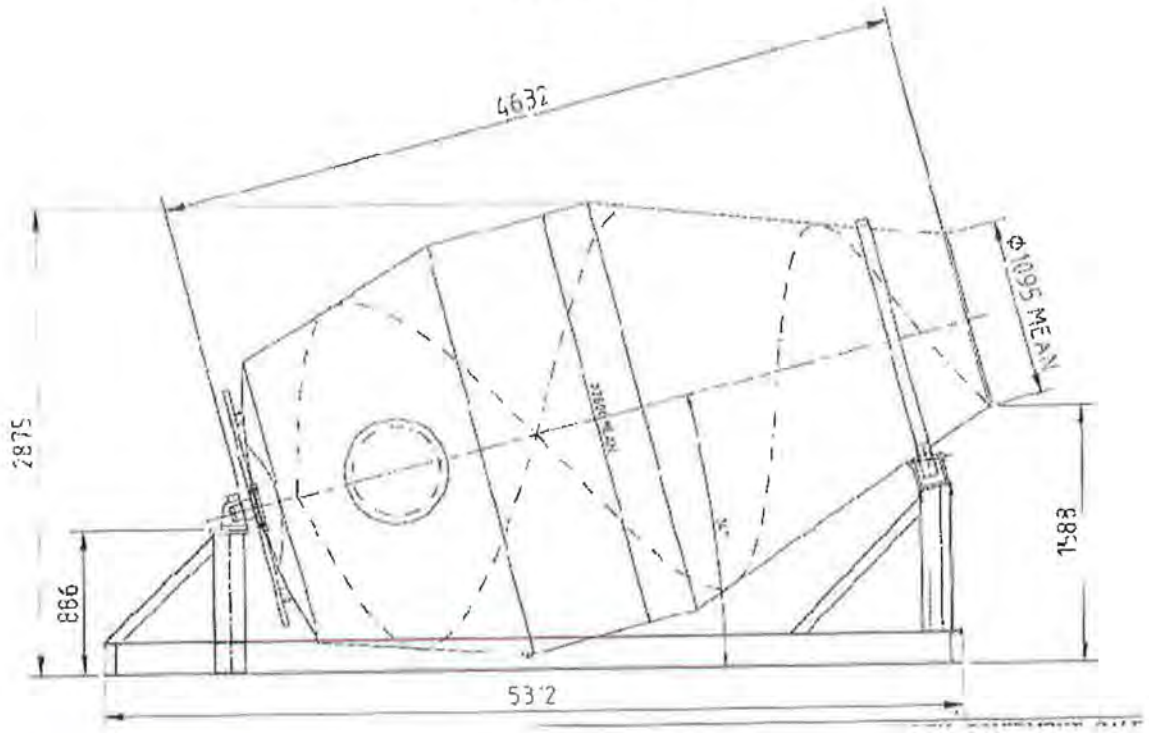
3.6.6 PUMPING SYSTEM

An automatic pumping system, consisting of a pump with an automatic float switch and appropriate piping will be installed in grease trap systems to deliver the process waste water to the storage tanks.

3.6.7 HIDE CURING DRUMS

A series of five agitating drums will be installed along the eastern wall with a further five drums installed along the southern wall of the processing shed as can be seen on **Drawing NDHF-002**. Hides, 200 per drum, along with salt for curing will be placed in each mixing drum and slowly agitated. Detail of the mixing drum can be seen in **Figure 4**.

Figure 4: Curing Drum



3.6.8 LOADING DOCK

At the western door a retaining wall to create a loading dock will be constructed, **Drawing NDHF-002**. The dock will be appropriate for the loading of cured hides into shipping containers mounted on a semi-trailer.

3.6.9 SERVICES INSTALLATION

Appropriate electrical, lighting, water and data services will be installed to operate the equipment on site.

3.6.10 FIRE EXTINGUISHERS

Fire extinguishers will be installed in easily accessible locations inside and outside the shed, compliant with *Australian Standard 2444 Portable fire extinguishers and fire blankets - Selection and location*.

3.6.11 VENTILATION

Roof ventilation will be installed near the hip of the shed roof to aid the extraction and disbursement of odorous air from within the shed. The location of the roof ventilation can be seen on **Drawing NDHF-005** and an example of the proposed wind ventilator is shown in **Figure 5**.

Figure 5: Typical Roof Ventilation

3.6.12 SECURITY FENCING

The facility will be completely enclosed by a 1.8 m high chain wire security fence with lockable access gates. The proposed fencing is considered appropriate for preventing access to the site by animals or unauthorised personnel.

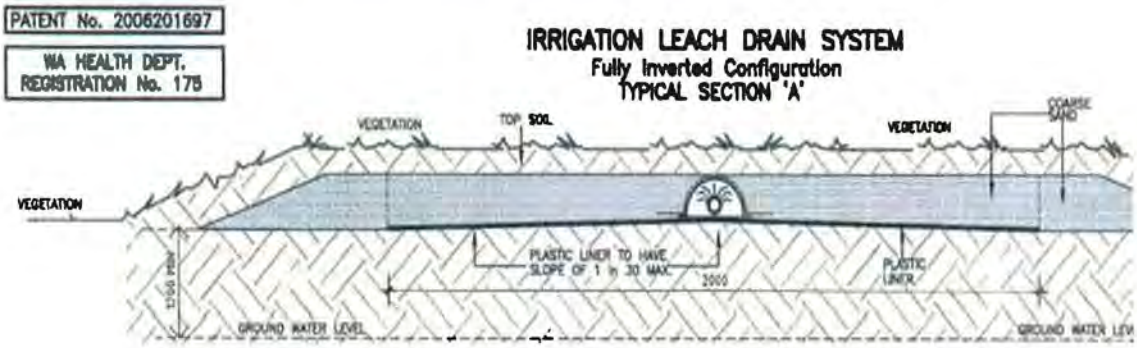
3.6.13 OFFICE BLOCK AND ABLUTIONS

A pair of 11 m long by 2.4 m wide demountable buildings, one office block and one ablutions block is proposed and will be installed to the northwest of the shed. These can be seen on **Drawing NDHF-002**.

3.6.14 SEPTIC SYSTEM

A phosphorous retentive septic system is proposed for the treatment of sewage. The treatment system will be constructed in accordance with the Shire of Murray 2014, *Guidelines for the Installation of an Apparatus for the Treatment of Sewage*. The Department of Health 2009, *Approved Alternative Leach Drains* proposes a system supplied by Filtrex Innovative Waste Water Solutions. The system consists of a conventional septic tank and leach drains.

Figure 6: Department of Health Approved Leach Drain



The Proponent will discuss the requirements of the septic system with the Shire's Environmental Health officer

3.6.15 CAR PARKING

Up to twenty car parking bays have been proposed for staff and visitors to the facility. These can be seen on **Drawing NDHF-002**.

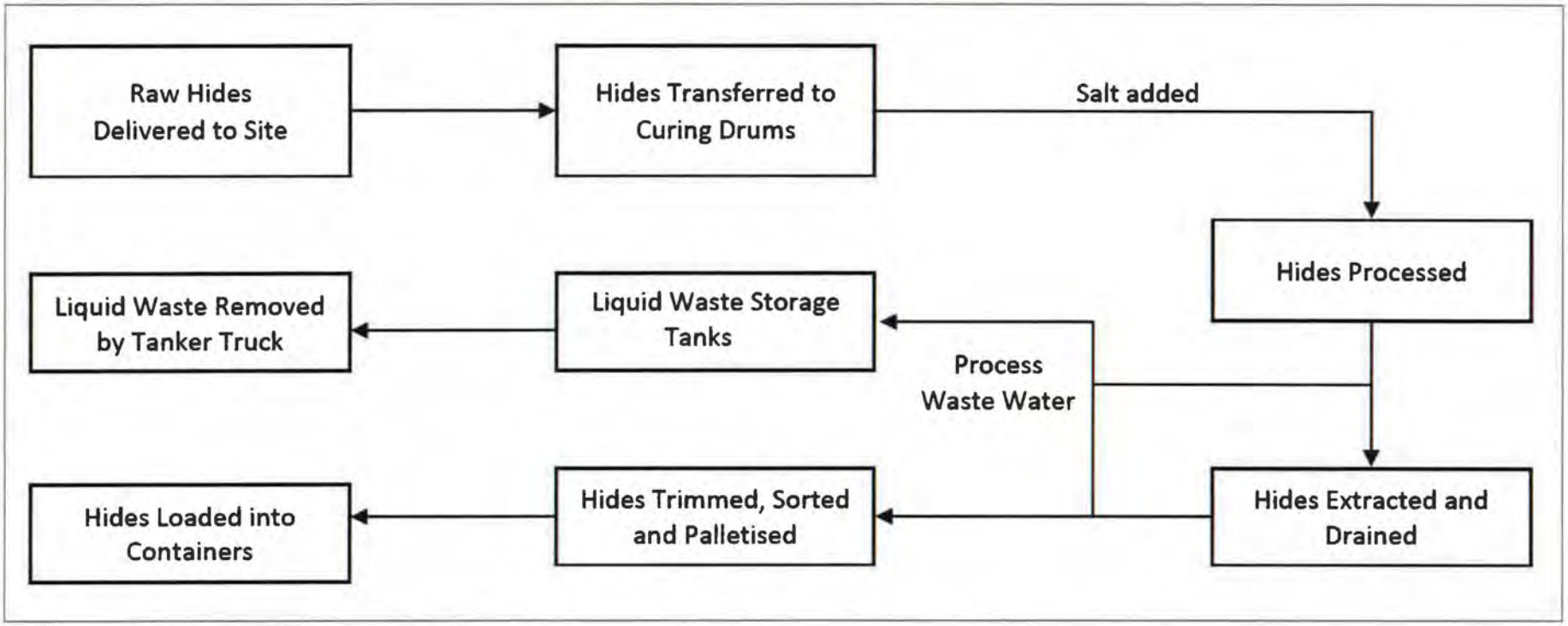
3.6.16 MISCELLANEOUS

Other minor site features including signage, lighting, line marking, shed doorways, cladding and surface levelling will be modified as appropriate to make the site functional.

4 PROCESS DESCRIPTION

4.1 MATERIAL FLOW CHART

Figure 7: North Dandalup Hides Facility Materials Flow Chart



4.2 WORKING HOURS

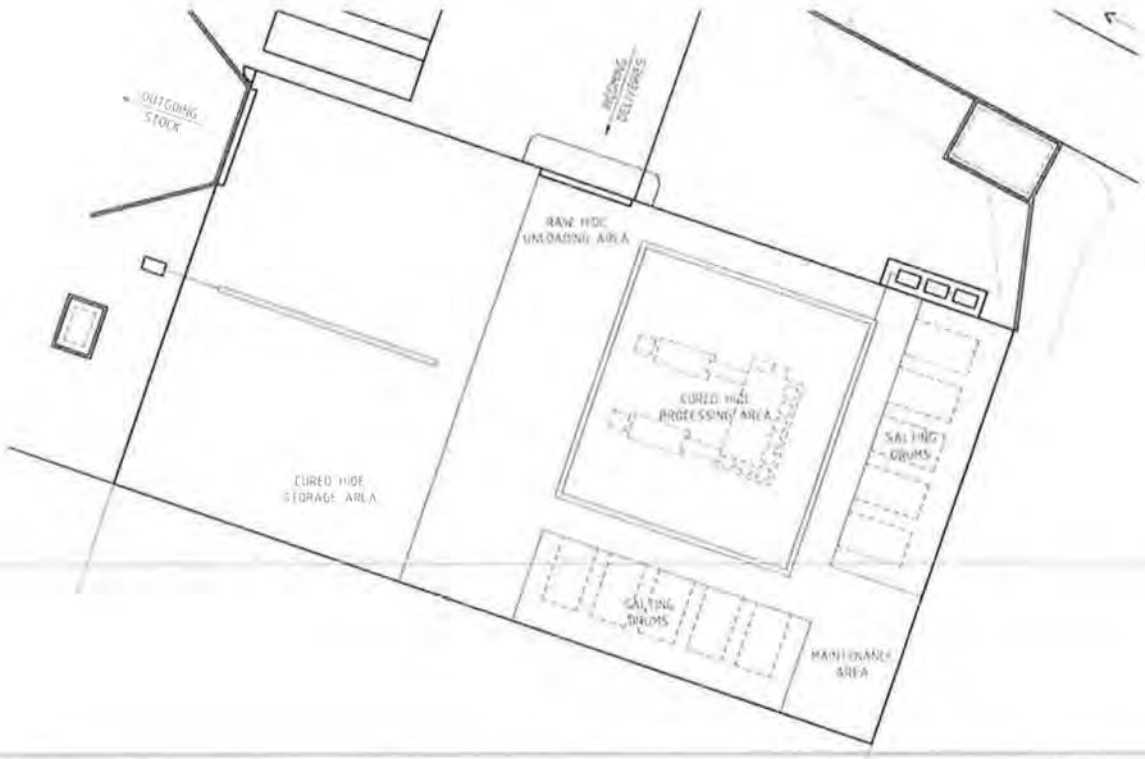
The intended standard hours of operation will be:

- 7.00 am to 5.00 pm Monday to Friday, and,
- 7.00am to 12.00pm on Saturdays.

4.3 PROCESSING PLANT LAYOUT

The processing plant consists of ten mixing drums, an elevated platform for the draining of hides and two hide processing tables as seen in **Figure 7**.

Figure 8: Processing Plant Layout



4.4 GREEN HIDES DELIVERED TO SITE

Hide deliveries to site will be pre-arranged with customers to ensure the number, type, quality and quantity of hides to be delivered are known and can be verified when the delivery truck is unloaded.

Hides will be delivered to the facility in solid bins and unloaded from the delivery truck using a forklift. The truck will be parked on the concrete hardstand area outside the shed.

Figure 9: Typical Hide Delivery Bin

4.5 HIDES TRANSFERRED TO CURING DRUMS

The bins containing the green hides will be immediately transferred to the curing area inside the shed where the contents of the bins will be inspected for consistency with expected condition and emptied onto a chute to load an empty curing drum. Each curing drum is able to hold up to 200 hides. A curing mixture of Sodium Chloride (98%), Sodium Floride (1%) and Boric Acid (1%) will be added to the drums and the drums gently rotated to mix the hides as they cure.

4.6 HIDE CURING

The curing salt mixture dries the hides, drawing the moisture out using the osmotic gradient between the salt and the liquid in the hides. The process limits the potential for putrefaction by bacteria of the hides during storage and transport. The curing process is designed to prevent the decomposition of the organic material in the animal skin. Hides will be processed for up to 24 hours in the curing drums before decanting, sorting, trimming and palletising.

4.7 HIDE EXTRACTION AND DRAINAGE

Each hide will release approximately 7 L of water during the curing process. The wastewater is defined as brine waste and is effectively salty water that has drawn out of the hides by the salt. At full capacity the facility will generate approximately 7,000 L of brine waste per day.

Fins in the mixing drums enable the hides and the process waste water to be ejected by running the drum in reverse. Hides are tipped into a steel transfer box with a mesh bottom and deposited on an elevated sorting and drainage platform located in the centre of the process area.

Liquid exiting the mixing drums drains into a rectangular collection drain located in the concrete floor. Process waste water drains into a series of three precast grease trap holding tanks connected in series to provide a combined capacity of 1,275 L. An automated pump with a float switch in the final grease trap will pump the process waste water into the 58,500 L storage tank.

4.8 HIDE TRIMMING, SORTING AND PALLETISING

Individual hides are manually disentangled from the draining hide mass and slid down a chute to an inspection and trimming bench. The heads and tails are trimmed from the hides and then the hides are inspected for size and folded so that there is no moisture loss from the hide after it is placed on the pallets. There is no air-drying of the hide.

Once stacked on the pallets the skins are secured with pallet strapping and stored in the western portion of the shed for loading into shipping containers and removal to export or local markets. The trimmings (heads & tails) are packed into bulka bags for export in shipping containers. Each bulka bag is lined with sheets of plastic of 5 mm thickness to assist with rigidity; each bulka bag is sealed prior to storage and transport.

Figure 10: Bulka Bags

Figure 11: Cured Hides Stacked on Pallets

4.9 SHIPPING OF CURED HIDES

On a regular basis shipping containers mounted on semi-trailers are reversed up to the loading dock located at the west side door of the building. The container is firstly lined with plastic sheeting and pallets of cured hides are loaded in the shipping container for transport off site to markets.

Figure 12: Filling a Shipping Container

4.10 LIQUID WASTE STORAGE AND REMOVAL

Liquid waste from the curing process will accumulate in the grease traps and automatically pumped into the lined and sealed 58,500 L storage tank. The pump and grease traps will be inspected regularly to ensure the system is functioning appropriately with no blockages or malfunctions.

On a regular basis the waste water within the storage tank will be emptied and transported off site by a licensed liquid waste contractor.

Volumes of liquid generated in the western half of the shed are expected to be minimal. Any collected liquid waste will be removed from the western grease trap or storage tank as required.

4.11 TRANSPORT MOVEMENTS

When at full capacity and processing 1,000 cattle hides per day it is expected that there will be approximately three incoming truck movements per day. At full capacity one delivery each of pallets and salt will be required per week. Outgoing truck movements will be one semi-trailer per day to transport the outbound 20 foot container of cured hides and approximately one semi tanker of brine waste per week. There will also be passenger vehicle movements for up to twenty staff. Transport movements are summarised in **Table 1**.

Table 1: Transport Movements

Vehicle Type	Total Vehicles per Week	
	At 3,000 Hides per Week	At 5,000 Hides per Week
Staff	72	120
Green Hide Delivery	9	15
Salt and Pallet Delivery	1	2
Outbound Cured Hides	3	5
Waste Water Removal	0.6	1
Total Vehicles Arriving per Week	**85.6**	**143**
Average Vehicles Arriving per Operating Hour	**1.9**	**3.2**

4.12 MAINTENANCE

Infrastructure controlling the containment and storage of liquid waste on site will be inspected weekly for wear, leaks or damage. A detailed checklist of the liquid waste collection system components (drains, pipes, grease traps, pump, piping, connections, couplings, valves, lids, secondary containment bunds and holding tanks) will be reviewed each week and a record of inspection outcomes maintained.

4.13 FORKLIFT LPG STORAGE

Full and empty forklift gas bottles will be stored in a secure cage with appropriate placarding on the concrete hardstand area outside the shed.

4.14 SOLID WASTE DISPOSAL

Accumulated hair, fat, hide trimmings and other solid wastes from the site operations stored in bulka bags will be periodically transported to an appropriately licensed landfill facility for disposal.

4.15 HOUSEKEEPING

The working floor within the facility will be cleaned down at the end of every working day. Solids collected on the floor or trapped by the drain baffles will be removed into large bulka bags for storage inside the shed. Bulka bags will be stored on top of pallets, away from wet areas and sealed when not being actively filled.

The collection drains will be scraped with a squeegee to push the process waste water towards the grease traps. The automatic pump will remove waste water from the grease traps and deliver to the bunded storage tank.

A spill kit consisting of absorbent socks, pillows, waste bags and alike will be maintained on site for dealing with both hydrocarbon and process waste water spills. Refer **Figure 13**.

Figure 13: Typical Spill Kit

4.16 RECORD KEEPING

Accurate recording of hide volumes delivered, hide volumes exported and liquid waste volume removed for offsite treatment will allow for the accurate calculation of the true volume of liquid released by the processed hides when the facility is operational. Monitoring the volume of liquid generated per hide may enable more hides to be processed without increasing the liquid waste storage capacity, or identify unexpected liquid loss from the system.

4.17 COMPLAINT AND RESPONSE REGISTER

Goldmark Leather is committed to being a responsible neighbour. Although odour and noise emissions from the site are expected to be undetectable at the nearest potential receptors, neighbouring premises will be notified about the facility and provided with contact details for the Site Manager. Should an odour or noise complaint be received from a neighbouring receptor or any other person, the complaint will be investigated by facility staff, and appropriate remedial action will be taken with feedback given to the complainant.

A record of complaints, investigation, action taken and feedback will be maintained on site.

5 ENVIRONMENTAL RISK ASSESSMENT AND REVIEW

A risk assessment was performed on the design of the hides facility to determine the environmental risks associated with the proposed facility design and operational procedures.

Risk to sensitive receptors was assessed using a risk ranking table, **Table 2**, accounting for probability and consequence.

Table 2: Risk Ranking

Risk Ranking Table					
	Probability				
Consequence	A	B	C	D	E
1	1	2	4	7	11
2	3	5	8	12	16
3	6	9	13	17	20
4	10	14	18	21	23
5	15	19	22	24	25

The Risk Rating Number will determine the degree of risk associated with a particular environmental risk.

High Risk	1 to 5
Medium Risk	6 to 16
Low Risk	17 to 25

Risk = Probability x Consequence	
Probability	**Consequence**
A: Common or repeating occurrence	**1.** Long term damage, catastrophe, toxic release off site with detrimental effect and huge financial loss, environmental disaster. Long term hazardous impact on community.
B: Known to occur or has happened at numerous similar sites	**2.** Soil, water, or air adversely affected in long term, economic and financial loss. Medium term non-hazardous impact on neighbouring properties.
C: Could occur infrequently	**3.** Soil, water, or air adversely affected in short term. Short term, non-harmful impact on neighbouring properties.
D: Not likely to occur	**4.** Could affect environment but release contained and managed on site. No impact on neighbouring properties.
E: Practically impossible	**5.** No environmental impact, no harm, no contamination.

Risks are assessed taking into account the designed control measures incorporated in this Development Application and summarised in **Table 3**.

Table 3: Risk Assessment

Impact Type	Description of Risk	Design Control Measures	Probability	Consequence	Risk Rating Number
Odour	Odour detected at neighbouring premises.	Large distance to nearest neighbour (430 m). Hides are loaded into drums upon delivery and salted. Swift containment of hides post-delivery. Simple machinery is easily repaired for minimal downtime. Processing of hides within an enclosed shed. Roof mounted ventilation to disburse any odour into atmosphere 6 m above ground level. Curing process prevents organic decomposition and reduces odour generation potential. Collection of process waste water in enclosed tanks. Odour complaint assessment and response mechanism. Good housekeeping measures to keep storage and mixing areas clean and tidy.	C	3	13 – Medium Risk
Noise	Adverse noise impacts to neighbouring premises.	Large distance to neighbours. No night time operations. Equipment maintained in good working order. Process undertaken within enclosed shed.	D	4	21 – Low Risk

Impact Type	Description of Risk	Design Control Measures	Probability	Consequence	Risk Rating Number
Surface Water	Escape of process waste water into surrounding environment.	Process waste water is collected on impermeable concrete shed floor and directed into floor drains. Shed floor is bunded at doorways to prevent the loss of process water. Waste water is collected in a series of grease traps and pumped into lined tanks with a secondary containment bund. Waste water is removed from site regularly. Regular inspection and cleaning of waste water containment system. Established contingencies for system malfunctions or spills. Process water is relatively benign salty brine.	D	3	17 – Low Risk
Vermin	Vermin infestation.	Facility design is easily cleaned. Good housekeeping policies with daily cleaning of solid and liquid wastes. No food source on site for vermin.	C	5	22 – Low Risk
Dust	Windblown fine particles impact neighbouring premises.	Large distance to nearest neighbour (430 m). Areas with frequent vehicle movement are sealed. Compacted gravel hardstand has a low potential for dust generation. Low frequency of heavy vehicle movements. No earthmoving activities.	D	5	24 – Low Risk

Impact Type	Description of Risk	Design Control Measures	Probability	Consequence	Risk Rating Number
Groundwater	Contamination of Groundwater by process waste water.	All process waste water is collected on impermeable concrete shed floor and drains. Waste water is directed to a series of grease traps and pumped into a lined tank with a secondary containment bund. Waste water is removed from site regularly. Regular inspection and cleaning of waste water containment system. Established contingencies for system malfunctions or spills. Process water is relatively benign salty brine.	E	3	20 – Low Risk
Light	Light impacts on sensitive receptors or surrounding premises.	No night time operations. No use of light intensive equipment.	E	5	25 – Low Risk
Hydrocarbons	Discharge of hydrocarbons to the environment.	No hydrocarbons stored on site, except LPG. Forklifts on site run on LPG. Spill kit available on site if any leaks are identified on trucks and plant. Appropriate spills response procedure in place.	E	5	25 – Low Risk
Hazardous Chemicals	Discharge of hazardous chemicals to the environment.	No storage of hazardous chemicals on site. All hides delivered to site are inspected to ensure they are not contaminated with foreign materials.	E	5	25 – Low Risk

The risk assessment has shown that almost all environmental emissions risks at the site are of low rating with the risk of odour being a medium rating. The proposed management systems are considered appropriate to control any potential odour emissions from the facility. With the design features proposed and the effective management of site operations it is considered that there are no environmental risk factors that would prohibit the establishment of the NDHF.

5.1 PREDICTION OF ODOUR IMPACTS

The risk analysis indicates that odour would be a medium risk emission from the facility. To further investigate the potential impacts of odour a specialist odour consultant, Envall Environmental Alliances Pty Ltd (Envall) was engaged. The report *North Dandalup Hides Facility, Animal Hide Processing (Fellmongering) Facility, South Western Highway, Shire of Murray, Prediction of Odour Impacts* is attached as **Appendix B**.

In summary Envall's methodology is based on the DER guidance notes, *Air Quality Modelling Guidance Notes* 2006 and *Odour Methodology Guideline* 2002. The assessment concludes that predicted odours at the nearest residence are at least 72% of the most constraining criterion therefore well below acceptable odour impacts. The report also states that the assumptions used in the modelling were considerably conservative being:

- Both doors on the facility assumed to be continually be open whereas the intention is to keep the large doors closed when not being accessed, and
- Odour emissions have been modelled using emissions from a wet blue tannery which are much more odorous than odours from a fellmongering facility.

6 MANAGEMENT PLANS

With correct operation and adherence to the process management practices described in this document, the NDHF is expected to produce no significant impact on the surrounding environment. Procedures and mechanisms have been developed for managing odour, noise and water to limit the potential for environmental impact.

Following are a series of short management plans that will be incorporated into a facility operational management plan once the facility is constructed and site layout and curing process is confirmed.

6.1 ODOUR MANAGEMENT PLAN

Odour at NDHF may evolve from the decomposition of organic material in the hides being processed. By its nature the hide salting and curing process prevents the decay of the hides, limiting the potential for odorous emissions.

All hide processing activities are confined to the interior of the shed. Hides delivered to site are immediately placed into curing drums, limiting their air exposure time and subsequent potential for odour generation. No green hides are to be stockpiled prior to treatment. All hides delivered to site will immediately be placed into curing drums.

Daily cleaning of shed surfaces will limit the build-up of organic materials that may cause odour. All process and wash down waste water is contained in sealed tanks. The doors of the shed will be closed at all times except during transport movements. Roof ventilation will be fitted to the ridge of the roof to aid ventilation of the shed and dispersion of any odorous air high up into the atmosphere. Should an automatic pump suffer an electrical or mechanical failure or become blocked, hide curing drums will not be emptied until the pump operation is restarted.

Feedback mechanisms for odour detection will be in place to ensure any complaints may be rapidly addressed. Should the Proponent become aware of offensive odour emanating from the facility,

either reported by its own staff or reported by a third party, the following actions will be undertaken.

- Ensure all green hides delivered to the site are within the enclosed building,
- Check that all waste water pumps, pits and drains are fully operative,
- Ensure floor drains are not blocked and are free draining,
- Cease the removal of cured hides from the mixing drums until the source of odour is identified and the cause rectified, and
- Record any remedial actions undertaken and advise the person raising the concern of any actions taken.

It is expected that the design features and operational practices described above will maintain a low odour risk rating for the facility.

6.2 DUST MANAGEMENT PLAN

The potential for dust generation is limited due to the concrete hardstand and low volume of vehicle movements. No earthmoving activities are required to be undertaken during the operation of the facility. Areas with frequent vehicle movement will be sealed if dust generation is regularly experienced. Compacted gravel hardstand areas inherently have low potential for dust generation.

The operational practices proposed are sufficient to limit potential dust emissions from the site.

6.3 NOISE MANAGEMENT PLAN

The operation of the NDHF will have machinery and equipment that have the potential to generate noise.

Table 4: Plant List

Plant	Number	Predicted Noise Level per Item (dB (A) at 1 m)
LPG Forklift	1	83
Mixing Drums	10	80

The mixing drums are electrically operated. Broadband alarms will be considered as replacements for beeper alarms on the LPG powered forklift if noise complaints related to beeper alarms are received. Truck movements will have minimal impact on noise.

All process operations on site will be undertaken with the shed doors closed and during the facility's normal operating hours being 7:00 am to 5:00 pm Monday to Friday and 7.00 am to 12.00 pm Saturdays. Machinery will be kept in good working order with regular servicing and maintenance.

Given the large separation distance to the nearest residence (430 m), the attenuation characteristics of the enclosed shed, the background noise from the Southwest Highway situated 300 m to the east and the nature of the activities to be undertaken on site, the risk of offsite noise emission impacts is considered to be minimal.

6.4 WATER MANAGEMENT PLAN

The risk of environmental emission of process waste water is limited by the proposed design and management features of the facility.

All process waste water is contained by the impermeable concrete floor of the shed, collected and stored in rubber lined storage tanks. The storage tanks are to be located within bunded areas constructed with a concrete floor slab and four concrete walls.

The liquid management system will be regularly inspected and monitored during operation. The two risk areas identified are spillage and pump failure. The following contingency measures will be in place to deal with mechanical failures or spills of process water.

6.4.1 SPILLAGE OUTSIDE CONTAINMENT SYSTEM

Should process waste water be spilled outside of the containment system the following actions will be undertaken:

- Nearby stormwater drains or grates will be blocked with a temporary absorbent boom,
- Sand will be used to soak up the liquid, and
- Sand will be removed from site via the solid waste bulka bags and disposed of at an appropriately licensed landfill.

6.4.2 PUMP FAILURE IN GREASE TRAPS

Should an automatic pump suffer an electrical or mechanical failure or become blocked the following actions will be undertaken:

- Hide curing drums will not be emptied until the pump operation is restarted,
- Supply of spare parts will be onsite for all plant items including pumps, and
- Replacement pump may be required if the permanent pump is not able to be repaired promptly.

Operating the NDHF is considered to present a low risk of environmental emissions to surface water or groundwater.

6.5 VERMIN MANAGEMENT PLAN

The design and operational features proposed for the NDHF limit the potential for vermin issues to develop. All surfaces are cleaned of organic materials daily. The organic residues resulting from the curing process do not represent a food source for rodents or other vermin.

Processed hides and associated materials are shipped from the facility on a regular basis.

6.6 FIRE AND EMERGENCY PLAN

In the event of a fire in the processing shed, staff may attempt to extinguish the fire using fire extinguishers and/or hoses, only if it is safe to do so. Fresh water only will be used for fire fighting. Process waste water will not be used to fight fires.

All NDHF staff will be appropriately trained in the correct emergency response to fire or medical emergencies at the facility.

6.7 OTHER CONSIDERATIONS

Other emission types and sources that were considered, but determined to be not applicable to this site are outlined below:

- Activities proposed for the NDHF will not produce litter,
- Light emissions will not be produced by the NDHF,
- Liquid waste (other than process waste water) is not stored or processed at the site,
- Hydrocarbons, except LPG for the operation of the forklift, will not be stored on site, and
- Hazardous materials will not be stored at the facility.

7 COMMUNITY CONSULTATION

Goldmark Leather has established a solid working rapport with the Shire of Murray throughout the site selection, initial consultation and development application processes.

Given the isolation of the facility and low risk of nuisance emissions for surrounding properties, Goldmark Leather does not believe additional consultation beyond that performed with the Shire for the purposes of obtaining development approval is warranted.

Should this proposed development proceed, Goldmark Leather will seek to establish a relationship with the neighbouring premises to ensure that any site nuisance issues are rapidly dealt with.

8 CONCLUSION

Goldmark Leather is able to process green hides from the Western Australian cattle industry into cured skins in an environmentally safe manner. This proposal poses minimal risk of harmful environmental emissions. The design features and operational management practices described in this proposal are appropriate for the level of risk.

Granting of a Development Application for the construction and operation of the facility as described is considered to be appropriate.

The key environmental factors that have been assessed in designing the NDHF are summarised below:

Odour - Appropriate design and operational management procedures have been established to minimise the risk of odour generation during the acceptance and processing of hides.

Dust - The design and proposed procedures to operate the site do not pose a significant risk of generating dust emissions.

Noise - Site activities are limited to the daytime operation of vehicles and machinery with most activities confined to indoors. Activities conducted on site are not considered to be a significant risk of nuisance noise.

Water - All process waste water is collected in an impermeable drainage channel and stored in lined tanks. No process waste water is discharged from the facility.

Vermin - Design, process and management features minimise the risk of vermin infestation in the NDHF. Good housekeeping, regular maintenance and vigilant management will serve to maintain the facility as vermin free.

Septage - A phosphorous retentive septic system is proposed for the treatment of sewage.

Site Security - A 1.8 m high chain wire security fence with lockable access gates will surround the facility.

9 REFERENCES

Department of Environment 2004, *A Guide to the Exemptions and Regulations for Clearing Native Vegetation*

Department of Environment Regulation 2013, *A Guide to Licensing*

Department of Health 2009, *Approved Alternative Leach Drains*

Department of Water 2009, *Water Quality Protection Note 51 - Industrial Wastewater Management and Disposal*, Western Australia

Envall Environmental Alliances Pty Ltd 2014, *North Dandalup Hides Facility, Animal Hide Processing (Fellmongering) Facility, South Western Highway, Shire of Murray, Prediction of Odour Impacts*

Environment Australia 2001, *National Environmental Protection Measure for Ambient Air Quality* Australian Government Department of Sustainability, Environment, Water, Population and Communities

Environmental Protection Act 1986 (as amended), Western Australia

Environmental Protection Authority 2005, *Guidance for the Assessment of Environmental Factors – Separation Distances between Industrial and Sensitive Land Uses*, No. 3, June 2005, Western Australia

Environmental Protection (Noise) Regulations 1997, Western Australia

Shire of Murray 2014, *Town Planning Scheme No. 4,* Department of Planning, Western Australia

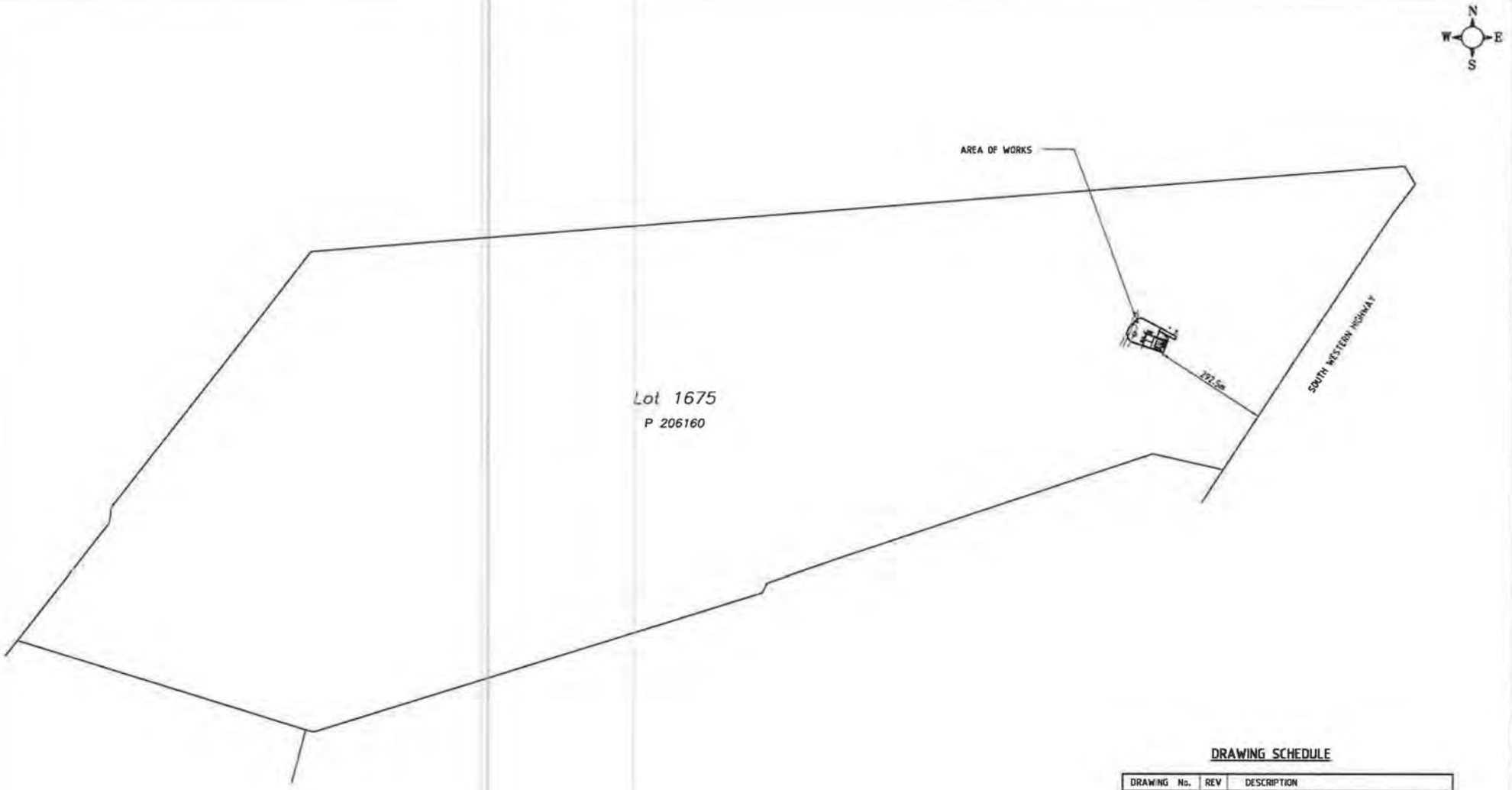
Shire of Murray 1996, *Subdivisional Road Construction Standards*

Shire of Murray 2014, *Guidelines for the Installation of an Apparatus for the Treatment of Sewage*

Standards Australia 2001, *Portable fire extinguishers and fire blankets - Selection and location*

10 DRAWINGS

Drawing 1.	**NDHF-001**	**Site Plan**
Drawing 2.	**NDHF-002**	**General Works Layout Plan**
Drawing 3.	**NDHF-003**	**Building Setout Layout Plan**
Drawing 4.	**NDHF-004**	**Waste Water Treatment Details**
Drawing 5.	**NDHF-005**	**Roof Ventilation**
Drawing 6.	**NDHF-006**	**Building Elevations**
Drawing 7.	**NDHF-007**	**Truck Access Layout Plan**



DRAWING SCHEDULE

DRAWING No.	REV	DESCRIPTION
NDHF-001	D	SITE PLAN
NDHF-002	D	GENERAL WORKS LAYOUT PLAN
NDHF-003	D	BUILDING SETOUT LAYOUT PLAN
NDHF-004	D	WASTE WATER TREATMENT DETAILS
NDHF-005	D	ROOF VENTILATION LAYOUT PLAN
NDHF-006	D	BUILDING ELEVATIONS
NDHF-007	D	TRUCK ACCESS LAYOUT PLAN

SURVEYOR DETAILS:

AUSURV SURVEYORS

(08) 9283 5511 www.ausurv.com.au

25 GWEY STREET MANDURAH, W.A. 6210

FOR WORKS APPROVAL & DEVELOPMENT APPLICATION

11 NOVEMBER 2014

LOCAL AUTHORITY: Shire of Murray

SCALE 50 0 100 250 (metres)

1:5,000 (A1), 1:10,000 (A3)

Bowman and Associates Pty Ltd

ABN: 22 112 399 514

Mail: PO Box 2059, Rosemgnt WA 6148

Office: 6640 Bacilar Drive, Success WA 6164

Phone: (08) 9414 9670

Web: www.bowmanassociates.com.au

Project	Location	Drawing Title		
North Dandalup Hides Facility	Lot 1675 Plan 206160, South Western Hwy, North Dandalup	Site Plan		
Date Drawn	**Design By**	**Drawn By**	**Checked By**	**Client**
11/11/2014	A.D.	S.B.Y.	B.B.	Goldmark Leather Pty. Ltd.

Drawing Number	Revision	Drawing Size
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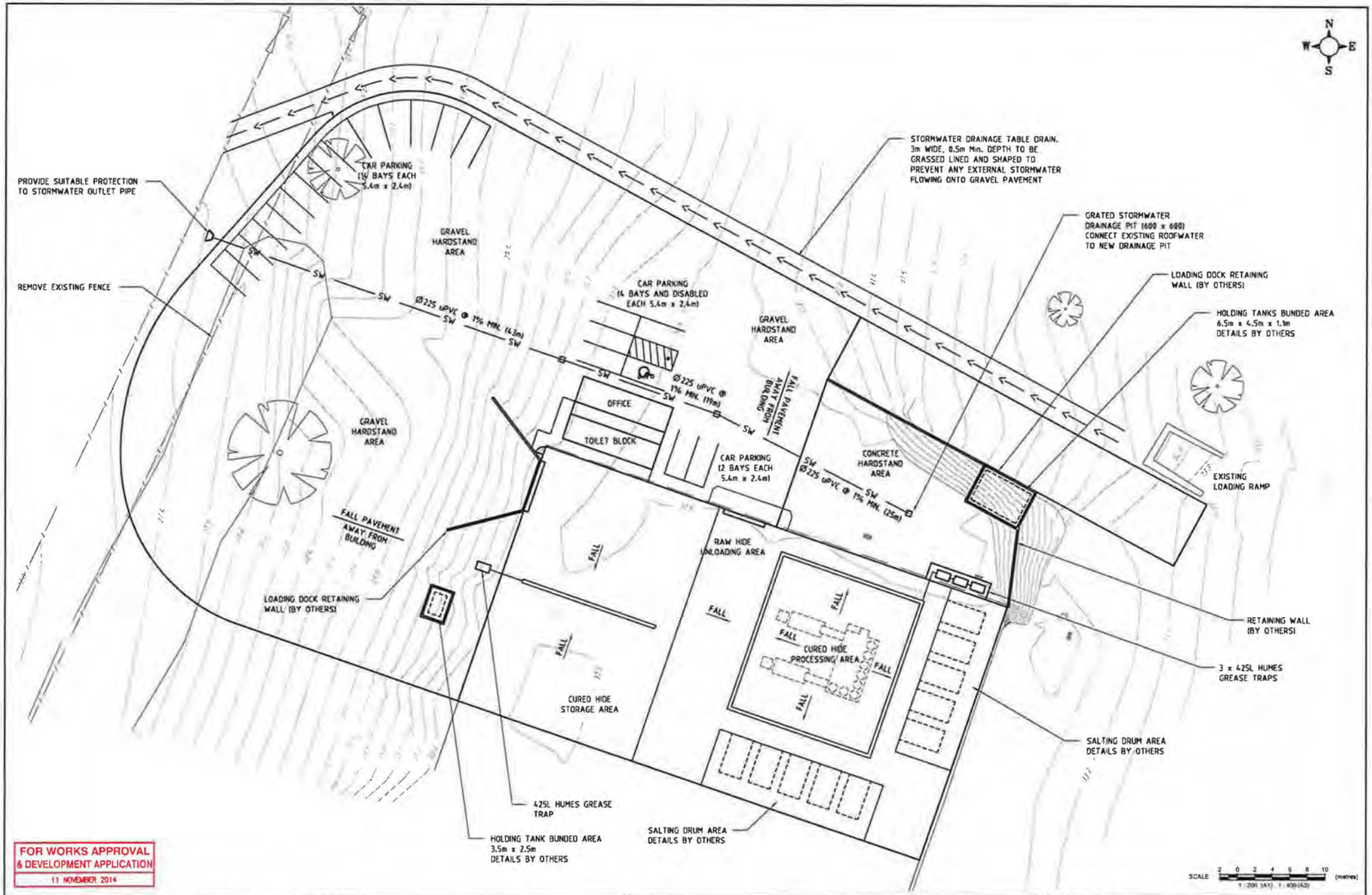

FOR WORKS APPROVAL & DEVELOPMENT APPLICATION
11 NOVEMBER 2014

Bowman and Associates Pty Ltd
ABN: 22 112 399 514
Mail: PO Box 2059, Rossmoyne WA 6148
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Project	Location	Drawing Title
North Dandalup Hides Facility	Lot 1675 Plan 206160, South Western Hwy, North Dandalup	General Works Layout Plan

Date Drawn	Design By	Drawn By	Checked By	Client	Drawing Number	Revision	Drawing Size
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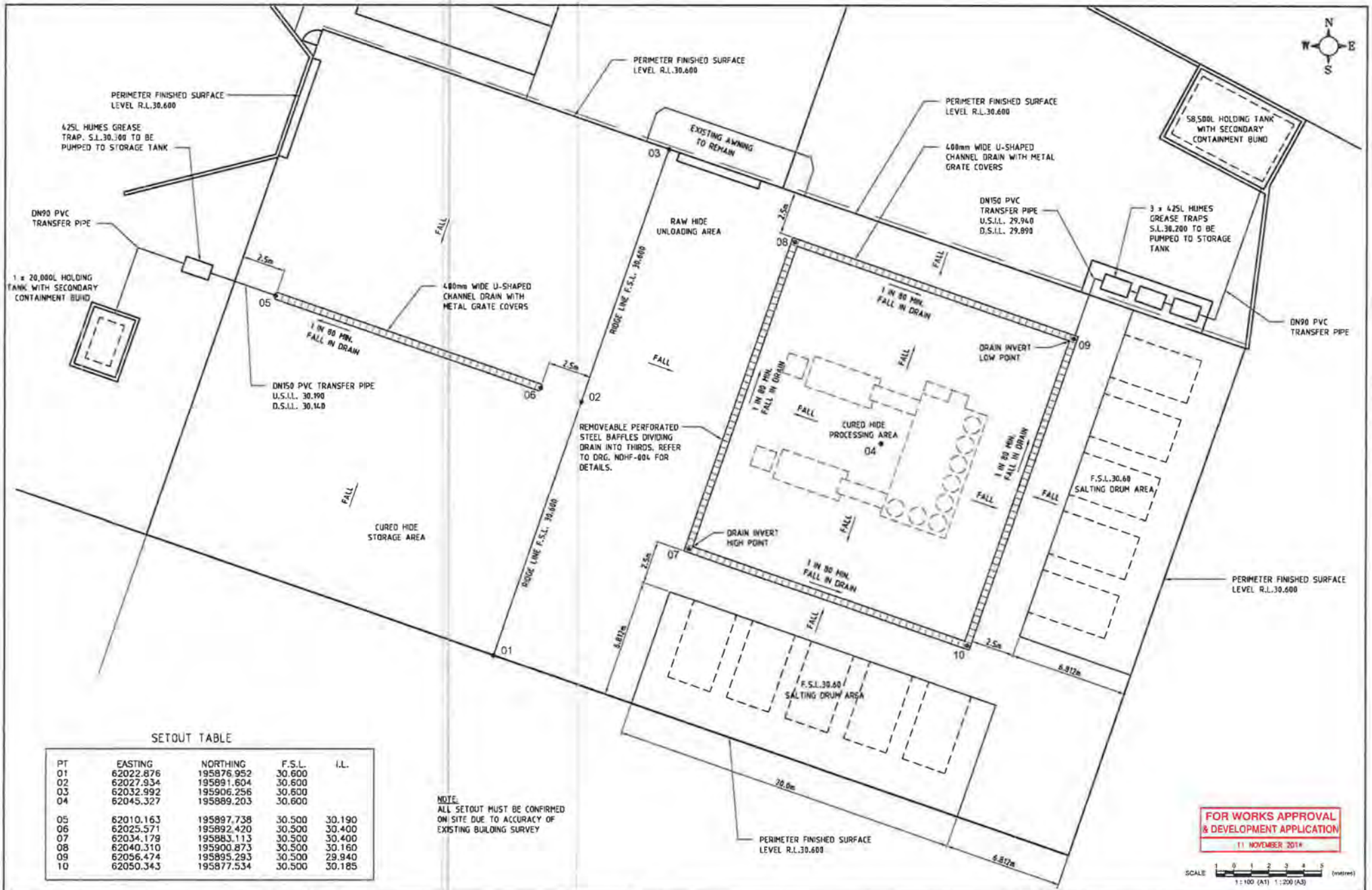

SETOUT TABLE

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03	62032.992	195906.256	30.600	
04	62045.327	195889.203	30.600	
05	62010.163	195897.738	30.500	30.190
06	62025.571	195892.420	30.500	30.400
07	62034.179	195883.113	30.500	30.400
08	62040.310	195900.873	30.500	30.160
09	62056.474	195895.293	30.500	29.940
10	62050.343	195877.534	30.500	30.185

NOTE:
ALL SETOUT MUST BE CONFIRMED ON SITE DUE TO ACCURACY OF EXISTING BUILDING SURVEY

FOR WORKS APPROVAL & DEVELOPMENT APPLICATION
11 NOVEMBER 2014

SCALE 1:100 (A1) 1:200 (A3) (metres)

Bowman and Associates Pty Ltd
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Web: www.bowmanassociates.com.au

Project	Location	Drawing Title
North Dandalup Hides Facility	Lot 1675 Plan 206160, South Western Hwy, North Dandalup	Building Setout Layout Plan

Date Drawn	Design By	Drawn By	Checked By	Client	Drawing Number	Revision	Drawing Size
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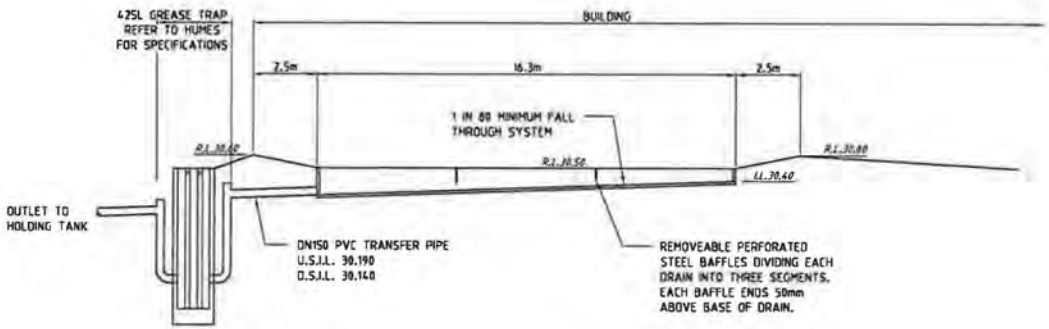

WESTERN CHANNEL DRAIN SECTION
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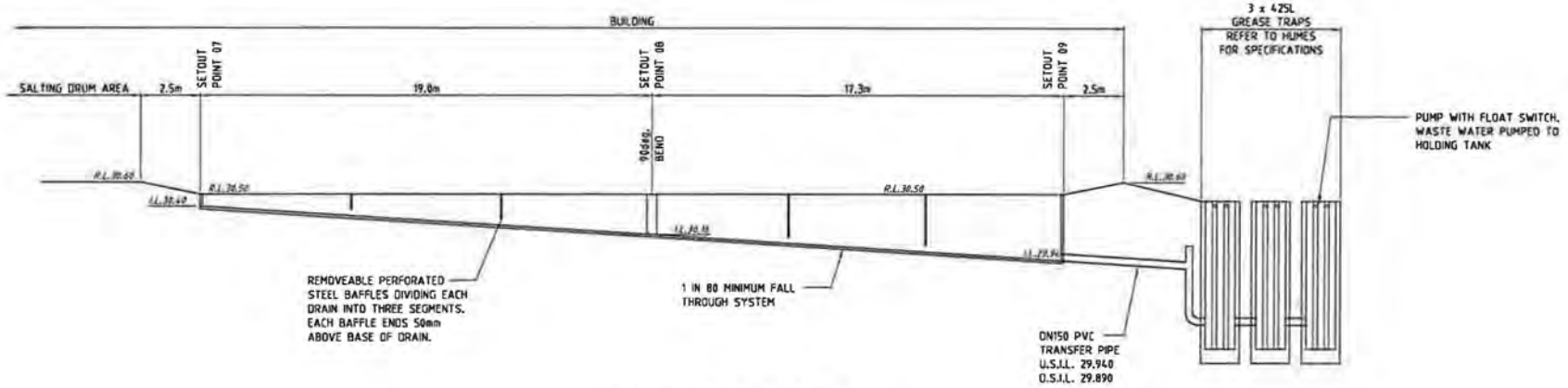

EASTERN CHANNEL DRAIN SECTION
NOT TO SCALE

FOR WORKS APPROVAL
& DEVELOPMENT APPLICATION
11 NOVEMBER 2014

Bowman and Associates Pty Ltd
ABN: 22 112 399 514
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Phone: (08) 9414 9670
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Project	Location	Drawing Title
North Dandalup Hides Facility	Lot 1675 Plan 206160, South Western Hwy, North Dandalup	Waste Water Treatment Details

Date Drawn	Design By	Drawn By	Checked By	Client	Drawing Number	Revision	Drawing Size
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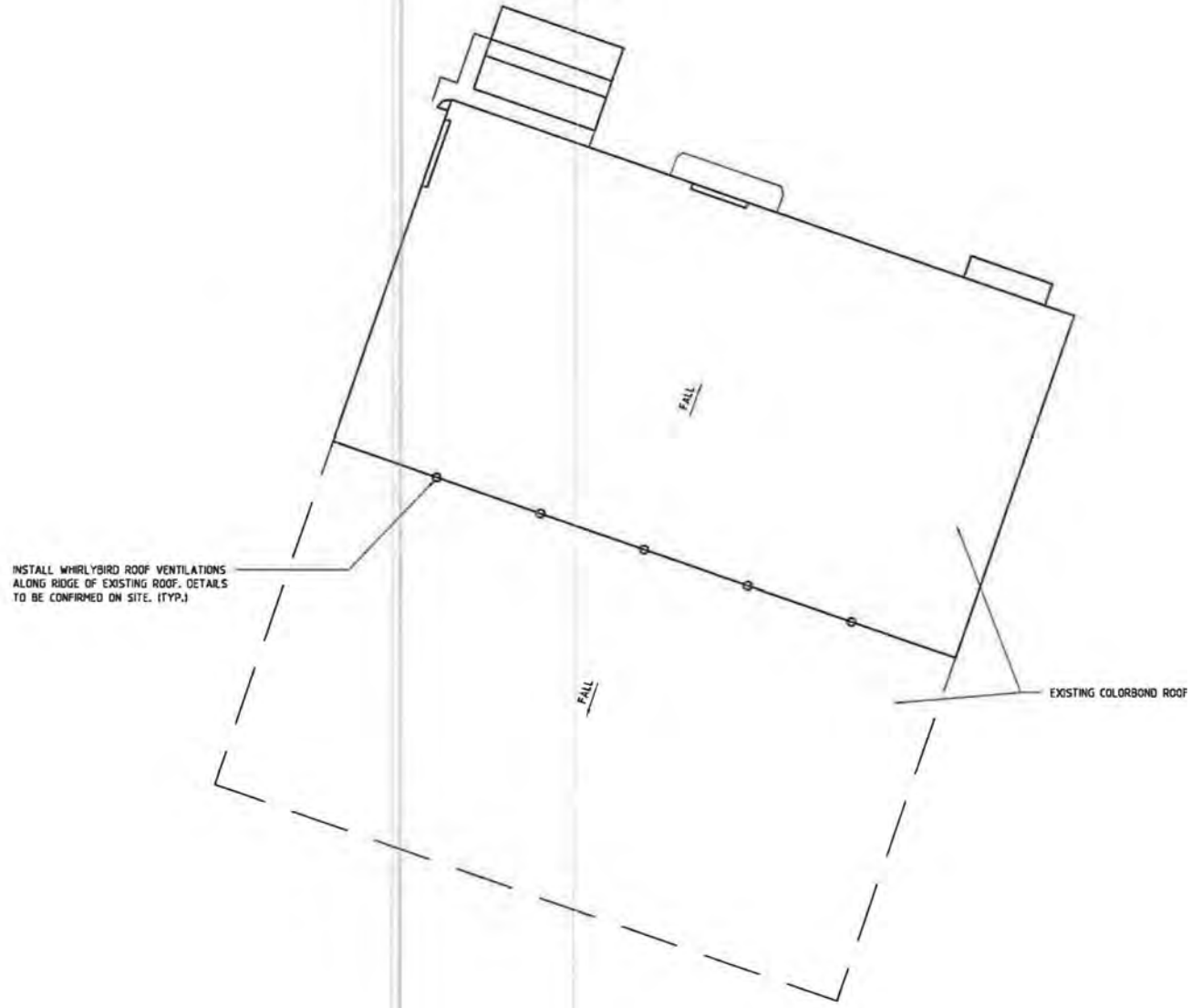

N
W E
S

NOTE:
ALL SETOUT MUST BE CONFIRMED ON SITE DUE TO ACCURACY OF EXISTING BUILDING SURVEY

FOR WORKS APPROVAL & DEVELOPMENT APPLICATION
11 NOVEMBER 2014

SCALE 2 0 2 4 6 8 10 (metres)
1:200 (A1) , 1:400 (A3)

Bowman and Associates Pty Ltd
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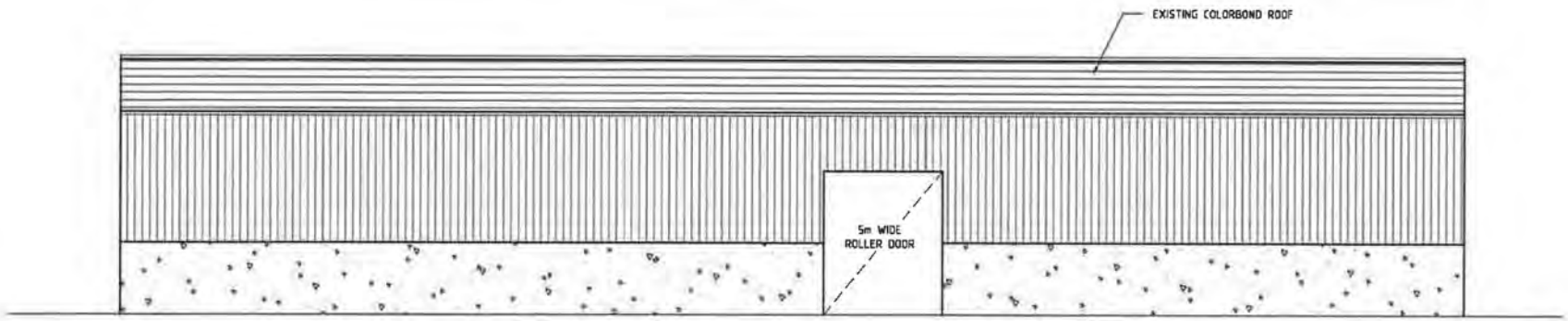
Office: 8/640 Beeliar Drive, Success WA 6164
Phone: (08) 9414 9670
Web: www.bowmanassociates.com.au

Project	Location	Drawing Title
North Dandalup Hides Facility	Lot 1675 Plan 206160, South Western Hwy, North Dandalup	Roof Ventilation Layout Plan

Date Drawn	Design By	Drawn By	Checked By	Client	Drawing Number	Revision	Drawing Size
11/11/2014	A.D.	S.B.Y.	B.B.	Goldmark Leather Pty. Ltd.	NDHF - 005	D	A1



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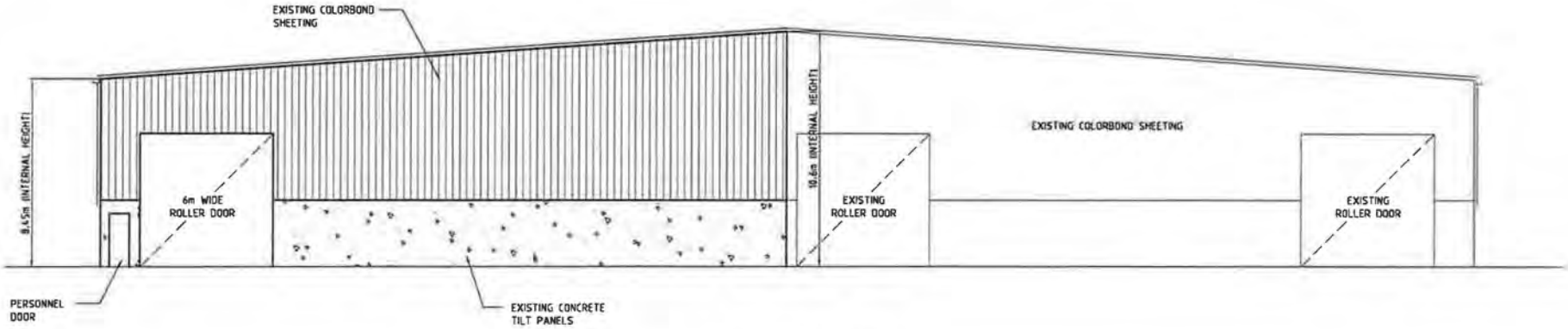

WESTERN ELEVATION
SCALE 1 : 100 (A1)

FOR WORKS APPROVAL
& DEVELOPMENT APPLICATION
11 NOVEMBER 2014

SCALE 1 0 1 2 3 4 5 (metres)
1 : 100 (A1), 1 : 200 (A3)

Bowman and Associates Pty Ltd
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Office: R/640 Beeliar Drive, Success WA 6164
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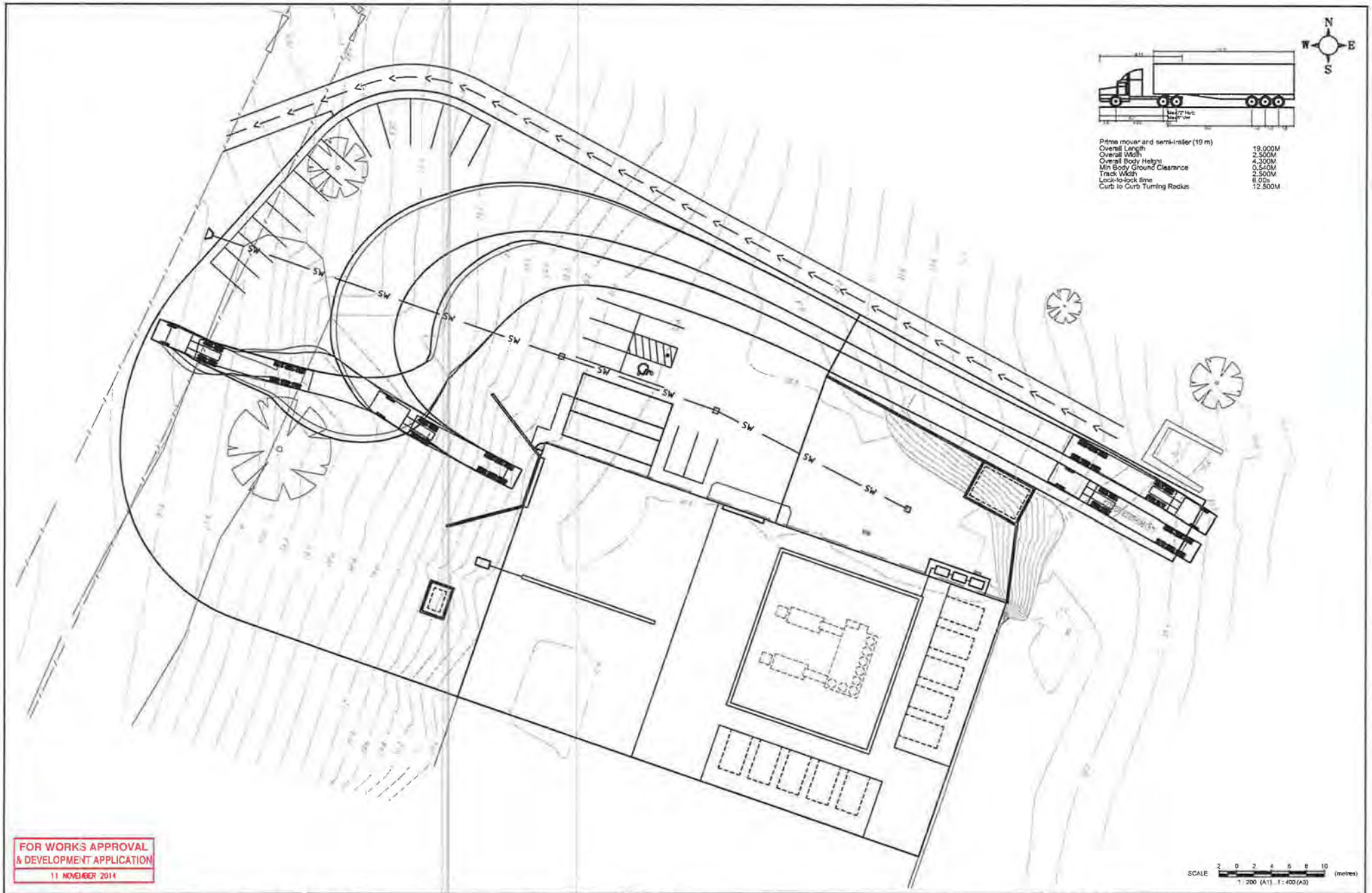
Web: www.bowmanassociates.com.au

Project	Location	Drawing Title
North Dandalup Hides Facility	Lot 1675 Plan 206160, South Western Hwy, North Dandalup	Building Elevations

Date Drawn	Design By	Drawn By	Checked By	Client	Drawing Number	Revision	Drawing Size
11/11/2014	A.D.	S.B.Y.	B.B.	Goldmark Leather Pty. Ltd.	NDHF - 006	D	A1



FOR WORKS APPROVAL
& DEVELOPMENT APPLICATION
11 NOVEMBER 2014

Bowman and Associates Pty Ltd
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Mail: PO Box 2059, Innaloo WA 6018
Office: 8/648 Beaufort Drive, Scarborough WA 6019
Phone: (08) 9414 9670
Web: www.bowmanassociates.com.au

Project	Location	Drawing Title
North Dandalup Hides Facility	Lot 1675 Plan 206160, South Western Hwy, North Dandalup	Truck Access Layout Plan

Date Drawn	Design By	Drawn By	Checked By	Client	Drawing Number	Revision	Drawing Size
11/11/2014	A.D.	S.B.Y.	B.B.	Goldmark Leather Pty. Ltd.	NDHF - 007	D	A1

11 APPENDICES

Appendix A **Property Title**

Appendix B **North Dandalup Hides Facility Prediction of Odour Impacts**

104L
Perth Batch
J088637

WESTERN AUSTRALIA

REGISTER NUMBER	
1675/DP206160	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
1	13/12/2004

DUPLICATE CERTIFICATE OF TITLE

VOLUME 2163 FOLIO 556

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 1675 ON DEPOSITED PLAN 206160

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

TOSCANA (WA) PTY LTD OF 5 MARRI CRESCENT, LESMURDIE
(T H132151) REGISTERED 9 JUNE 1999

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. THE LAND THE SUBJECT OF THIS CERTIFICATE OF TITLE EXCLUDES ALL PORTIONS OF THE LOT DESCRIBED ABOVE EXCEPT THAT PORTION SHOWN IN THE SKETCH OF THE SUPERSEDED PAPER VERSION OF THIS TITLE.
2. B937751 EASEMENT TO MINISTER OF WATER SUPPLY, SEWERAGE AND DRAINAGE. SEE SKETCH ON VOL 2163 FOL 556. REGISTERED 17.6.1980.
3. G923137 EASEMENT TO ELECTRICITY CORPORATION. SEE SKETCH ON VOL 2163 FOL 556. REGISTERED 9.10.1998.

Warning: A current search of the certificate of title held in electronic form should be obtained before dealing on this land. Lot as described in the land description may be a lot or location.

----------END OF DUPLICATE CERTIFICATE OF TITLE----------

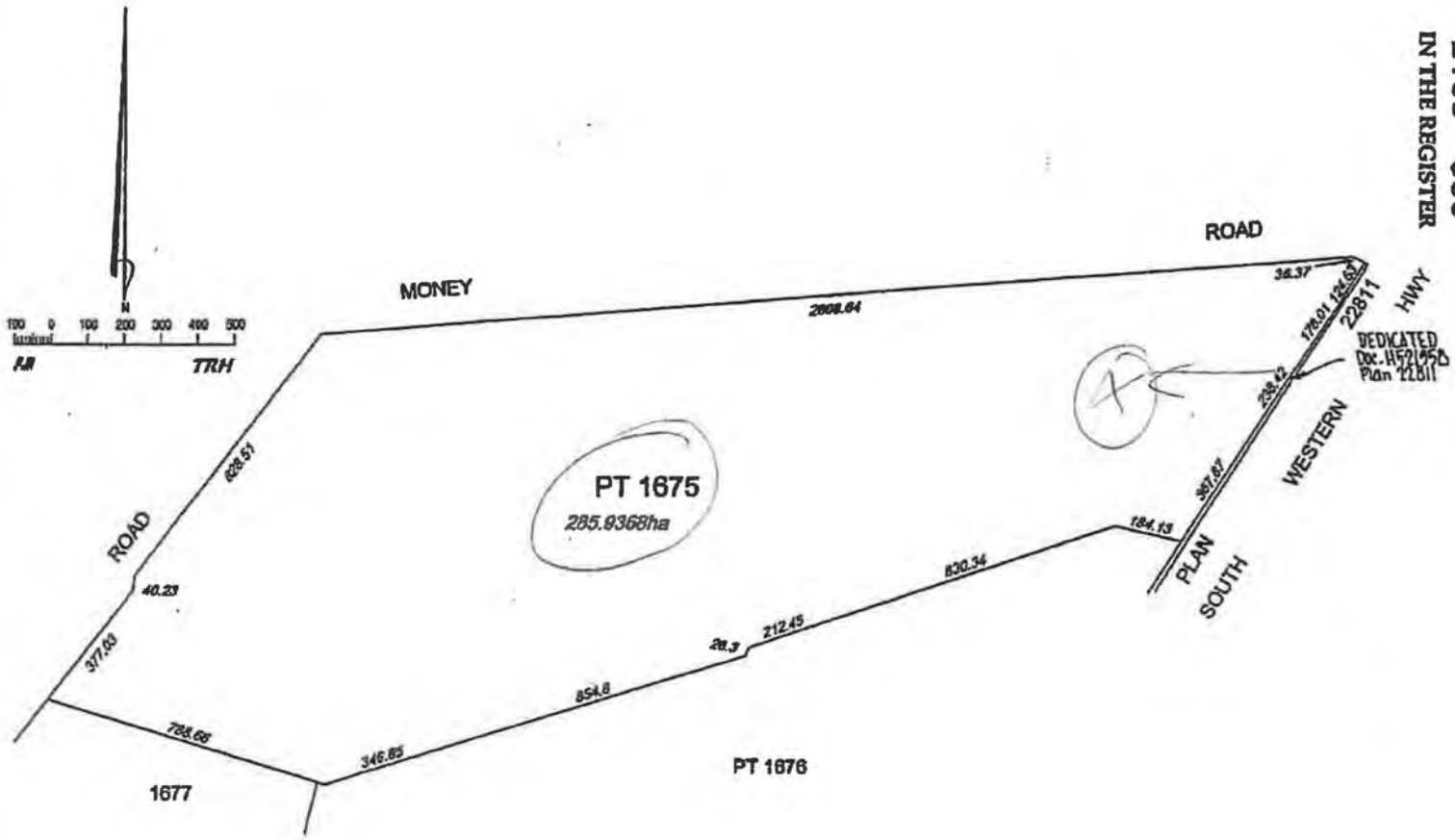
STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 2163-556.
PREVIOUS TITLE: ~~1208-504.~~
PROPERTY STREET ADDRESS: 4756 SOUTH WESTERN HWY, FAIRBRIDGE.
LOCAL GOVERNMENT AREA: SHIRE OF MURRAY.

Lot 1675 House # 4756.
South West Hwy
North Dandalup. (Fairbridge).

THIRD SCHEDULE

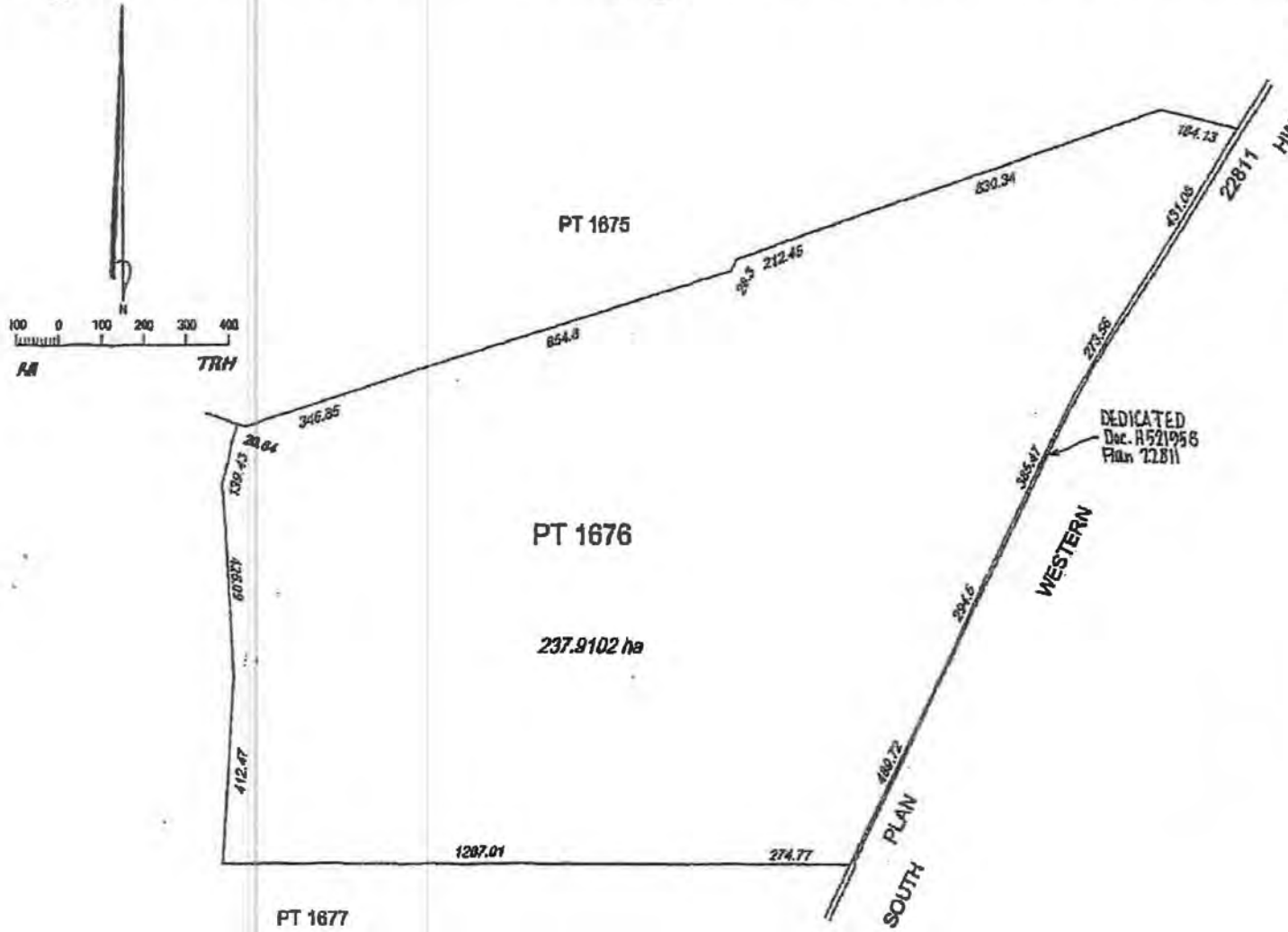


Superseded - Copy for Sketch Only

THIRD SCHEDULE

90774

VOLUME 2163 FOLIO 557
IN THE REGISTER



NORTH DANDALUP HIDES FACILITY

ANIMAL HIDE PROCESSING (FELLMONGERING) FACILITY, SOUTH WESTERN HIGHWAY, SHIRE OF MURRAY

PREDICTION OF ODOUR IMPACTS

Prepared for

Bowman & Associates Pty Ltd

by

ENVALL

Environmental Alliances Pty Ltd

November 2014

Disclaimer and Limitation

Environmental Alliances Pty Ltd (ENVALL) will act in all professional matters as a faithful adviser to the Client and exercise all reasonable skill and care in the provision of its professional services.

This report has been prepared on behalf of the Client and is subject to, and issued in accordance with, the agreement between the Client and ENVALL. ENVALL accepts no liability or responsibility whatsoever for it in respect of any use of, or reliance upon, this report by any third party.

This report is based on the scope of services agreed with the Client, budgetary and time constraints requested by the Client, the information supplied by the Client (and its agents), methodologies consistent with the preceding and, where applicable, our understanding and interpretation of current regulatory requirements.

ENVALL has not attempted to fully verify the accuracy or completeness of the written or oral information supplied for the preparation of this report. While ENVALL has no reason to doubt the information provided, the report is complete and accurate only to the extent that the information provided to ENVALL was itself complete and accurate.

This report does not intend to give legal advice, which can only be given by qualified legal advisors.

Copying of this report or parts of this report is not permitted without the authorisation of the Client or ENVALL.

Client: Bowman & Associates Pty Ltd

Job No: L4301	Version	Prepared by	Reviewed by	Submitted to Client	
Status				Copies	Date
Draft Report	1a	DP	JP	*.pdf	5/11/2014
Final Report	1b	DP	-	*.pdf	10/11/2014

Environmental Alliances Pty Ltd
Tel: (08) 9343 0554
Fax: (08) 9343 0079
ABN: 75 103 600 620

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1. INTRODUCTION

Goldmark Leather is proposing to establish an animal hide processing (fellmongering) facility at North Dandalup. The expected initial capacity is for approximately 3,000 cow hides per week, increasing to up to 5,000 hides per week.

The proposal constitutes a prescribed premises under Part IV of the Western Australian *Environmental Protection Act 1986*. This implies that a Works Approval under the Act is required prior to constructing and operating the facility.

This document describes an odour assessment to support the application for a Works Approval and other regulatory approvals.

Details of the proposal are described in the "Works Approval Application - North Dandalup Hides Facility - Animal Hide Processing (Fellmongering) Facility - South Western Highway, Shire Of Murray" prepared by Bowman and Associates (October 2014). These are not repeated in this document except those aspects that are relevant for the odour assessment.

2. SURROUNDING ODOUR-SENSITIVE LAND USES

2.1 EPA'S "GUIDANCE FOR THE ASSESSMENT OF ENVIRONMENTAL FACTORS - SEPARATION DISTANCES BETWEEN INDUSTRIAL AND SENSITIVE LAND USES"

The EPA's "Guidance for the Assessment of Environmental Factors - Separation Distances between Industrial and Sensitive Land Uses" (EPA 2005) recommends a separation distance of 200 to 300 metres to sensitive premises for a non-sulphide-based "Tannery" – described as for "treatment and drying of animal skins, leather and artificial leather – small premises, non-sulphide", "depending on size & wastewater treatment & disposal system".

It is important to recognise that this guideline is generic and intended to prevent adverse environmental impacts from up to the largest of such facilities that may be typically constructed.

Typical fellmongers/tanneries have on-site treatment of waste water with final disposal via ponds and irrigation and/or evaporation. The ponds often cause substantial odour emissions. A key point of difference between this proposal and a typical fellmonger/tannery is that the liquid waste effluent is stored in a covered tank prior to disposal off-site.

Therefore, it is reasonable to expect that the required separation distance for this proposal will be considerably less than the EPA's generic distance recommended for fellmongers.

2.2 NEAREST RESIDENCES

The nearest residence is approximately 430 m to the NNW of the proposed hides processing building (see Figure 1). This is outside the 200 to 300 metres recommended in the above-mentioned EPA Guidance document.

Figure 1 Location of proposed North Dandalup Fellmonger

2.3 OTHER LAND USES

The South-West Highway is approximately 300 m east of the hides processing building.

It is understood that the DER does not apply ambient odour (residential) criteria to public roads since the period of passing traffic exposure is too short to cause adverse effects.

3. OPERATING HOURS

As described in the Works Approval application, all process operations on site will be undertaken with the shed doors closed and during the facility's normal operating hours being 7:00 am to 5:00 pm Monday to Friday and 7.00 am to 12.00 pm Saturdays.

4. FACILITY LAYOUT

The key aspects of the operation relating to prevention of excessive odour emissions are:

- All hide processing activities are confined to the interior of the northern half of the shed. The shed is internally partitioned to the roof along the central NW-SE axis. The southern half of the shed is used for equipment storage and kept closed.
- Hides delivered to site are immediately placed into curing drums.
- No green hides are to be stockpiled prior to treatment.
- Daily cleaning of shed surfaces will limit the build-up of organic materials that may cause odour.
- All process and wash down waste water is contained in sealed tanks.
- The doors of the shed will be closed at all times except during transport movements.
- Roof ventilation[1] will be fitted to the ridge of the roof to aid ventilation of the shed and dispersion of any odorous air high up into the atmosphere.
- Should an automatic pump suffer an electrical or mechanical failure or become blocked, hide curing drums will not be emptied until the pump operation is restarted.

Therefore, for this study it has therefore been assumed that the only substantial source of odours is from the hides processing building.

The layout of the facility is shown in Figure 2.

[1] 5 x 0.7 m diameter "whirlybirds" – see NDHF-005 (Roof).dwg.

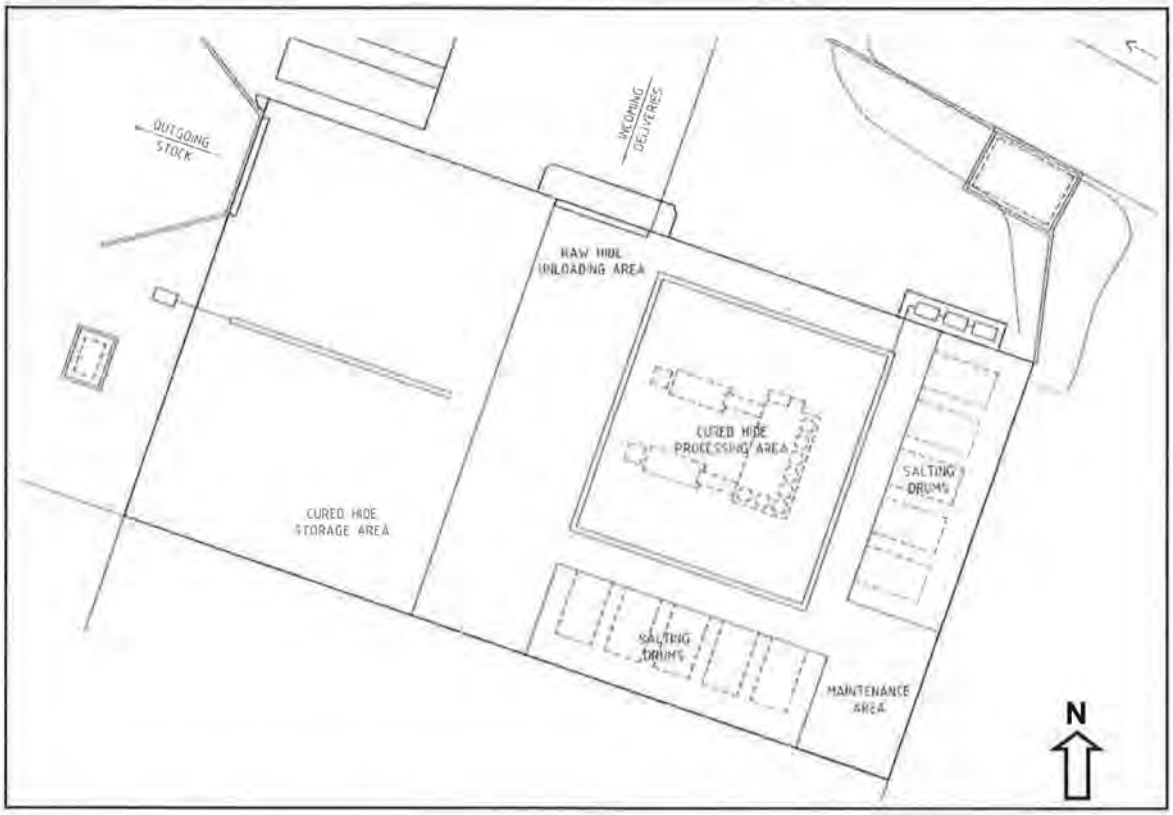

Figure 2 Layout of hides processing building

It is notable that:

- the Outgoing Stock door is on the north-west facing wall and the Incoming Deliveries door is on the north-east facing wall - these are the only openings in the building; and
- the building will be moderately shielded for winds from the from the west clockwise through north to the east due to surrounding trees (Figure 1).

5. ODOUR IMPACT ASSESSMENT METHODOLOGY

The approach recommended by the Department of Environmental Regulation (DER) to assess air quality impacts from industrial proposals is modelling the dispersion of air emissions as described of "Air Quality Modelling Guidance Notes" (DEP 2006) and comparing the predictions to criteria for acceptable impacts. With respect to odour more specifically, the DER has published an "Odour Methodology Guideline" (DEP 2002).

The criteria currently used by the DER to assess acceptable odour impacts from new proposals is[2]:

- for sources other than wake-free stacks: C99.9,1hr=8ou[3] and C99.5,1hr=2.5ou; and

[2] D Griffiths *pers com* 19/10/2012.

- for wake-free stacks: C99.9,1hr = 1.6 ou and C99.5=0.5ou.

The criteria applies at "odour-sensitive premises" which includes "residential, hospitals, hotels, caravan parks, schools, aged care facilities, child care facilities, shopping centres, play grounds, recreational centres etc" (DEC 2002).

Since the odour emissions for this proposal are from a building (i.e. "other than wake-free source"), the relevant odour criteria are:

- C99.9,1hr=8ou; and
- C99.5,1hr=2.5ou.

6. ESTIMATION OF ODOUR EMISSIONS FROM PROPOSAL

The odour emission rate from the building will be a function of the ventilation rate and internal odour concentration.

6.1 VENTILATION RATES

To estimate the ventilation rate:

- the effective openings through each wall (infiltration areas) were estimated using the methodology and assumptions described in Warren Spring (1980); and
- the actual hourly building ventilation rate was determined from the infiltration area of each wall and the prevailing wind speed and direction using the procedure developed by Swami and Chandra (1987), described in Appendix 1.

6.1.1 Infiltration area of each wall

The infiltration area for each wall was based on the following considerations.

- the building is largely sheet-metal construction and therefore not considered to be "air-tight". The estimated equivalent leakage area was based on the factor of 0.1 m^2 per metre of wall for "cladding" in Warren Spring (1980). This does not include an allowance for gaps in roof cladding, however for a roof pitch < 45°, this can be ignored (Warren Spring 1980); and
- the estimated gap around the truck doors when closed is 0.05 m.

6.1.2 Rooftop ventilation

The ventilation rate through the roof was based on nominal rated flow rate data for 5 x 0.7 m diameter ventilators[4]. The roof ventilation rate is, however, negligible compared to the flow through the doors when open, and still relatively small compared to the flow through building gaps when the doors are closed. The flow rate through the rooftop ventilation will be dominated at times by external winds or when these are low and the doors closed, by the temperature gradient. This is very complex to simulate and given the small fraction of this rate compared to the ventilation attributable to the

[3] Also used by EPA.

[4] See NDHF-005 (Roof).dwg.

building doors and walls, this was assumed to be constant at the nominal rated flow rate as shown below:

Rooftop ventilation rate = 5 x 100 m^3/hr = 500 m^3/hr = 0.14 m^3/s.

6.1.3 Operating assumptions

It was assumed that both truck doors will be continuously open during the working hours. This was done to ensure considerable conservatism in the odour emissions estimates[5];

6.1.4 Internal flow regime

It was assumed that the ventilation through the building will be through its entire cross-section. In reality, since the hides processing tanks are in the eastern end of the building and the doors are near the north-west corner, the actual air flow will be short-circuited across the north-west corner of the building – away from the main odour sources. Therefore to some extent, the odour will tend to "pool" in the eastern end of the building rather than being completely exhausted.

6.1.5 Estimated infiltration areas

The total estimated infiltration areas for each wall of the hides processing building are shown in Table 1.

[5] This should not be interpreted as suggesting that the doors should be left open.

Table 1 Estimated infiltration areas for hides processing building

Wall	Wall Length (m)	Wall Height (m)	Door Width (m)	Door Height (m)	Doors area when open/ operating m^2)	Door gaps[a] (m^2)	Roof/ wall/ cladding gaps[b] (m^2)	Effective gaps adjustment for internal wall [c]	Total open area when doors open/ operating (m^2)	Total open area when doors closed (m^2)
North	56	8.5	5.0	4.8	24	0.98	5.6	1	30.6	6.6
East	31	8.5	NA	NA	NA	NA	3.1	1	3.1	3.1
South	56	8.5	NA	NA	NA	NA	5.6	0.71	4.0	4.0
West	31	8.5	6.0	6.0	36	1.2	3.1	1	40.3	4.3

[a] Based on 5 cm gap around each of 4 doors.

[b] Based on 0.1 m^2 per metre for wall cladding (Warren Spring 1980).

[c] Assuming same gapping of internal wall as external wall (Warren Spring 1980).

These data together with the prevailing winds were used in a calculation procedure developed by Swami and Chandra (1987) to estimate ventilation flows through the hides processing building. The results are illustrated in Figure 3 and Figure 4.

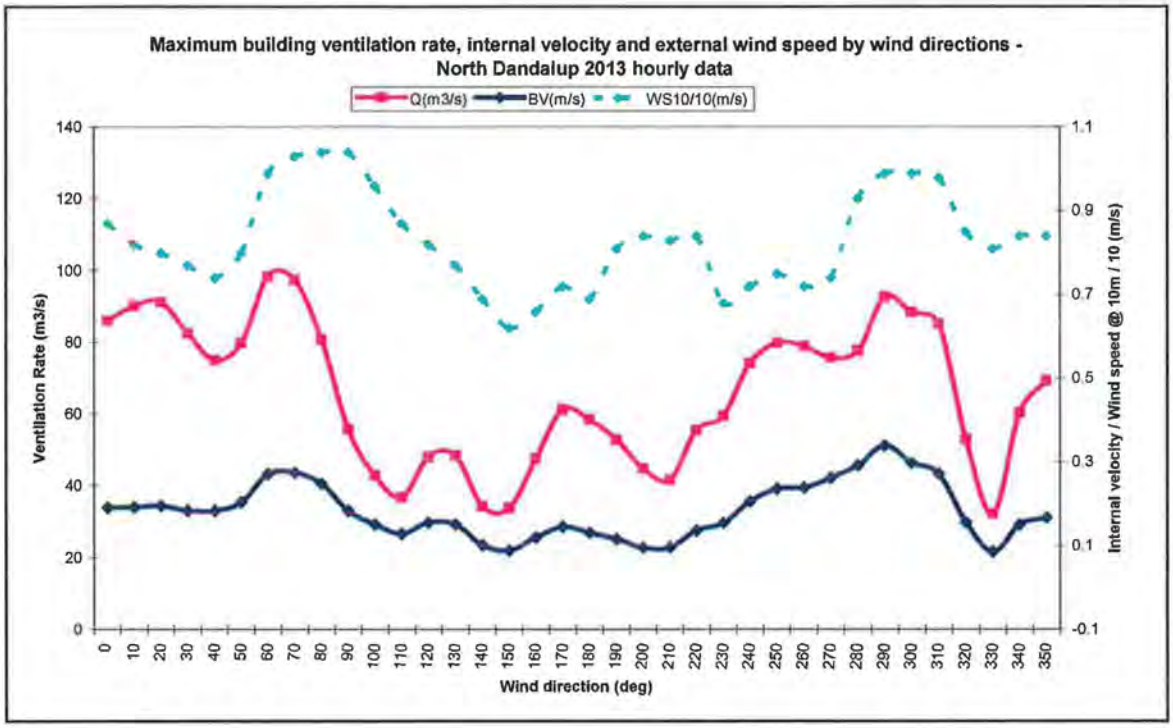

Figure 3 Maximum building ventilation rate (Q), internal velocity (BV) and external wind speed (WS10) by wind directions using North Dandalup 2013 hourly data

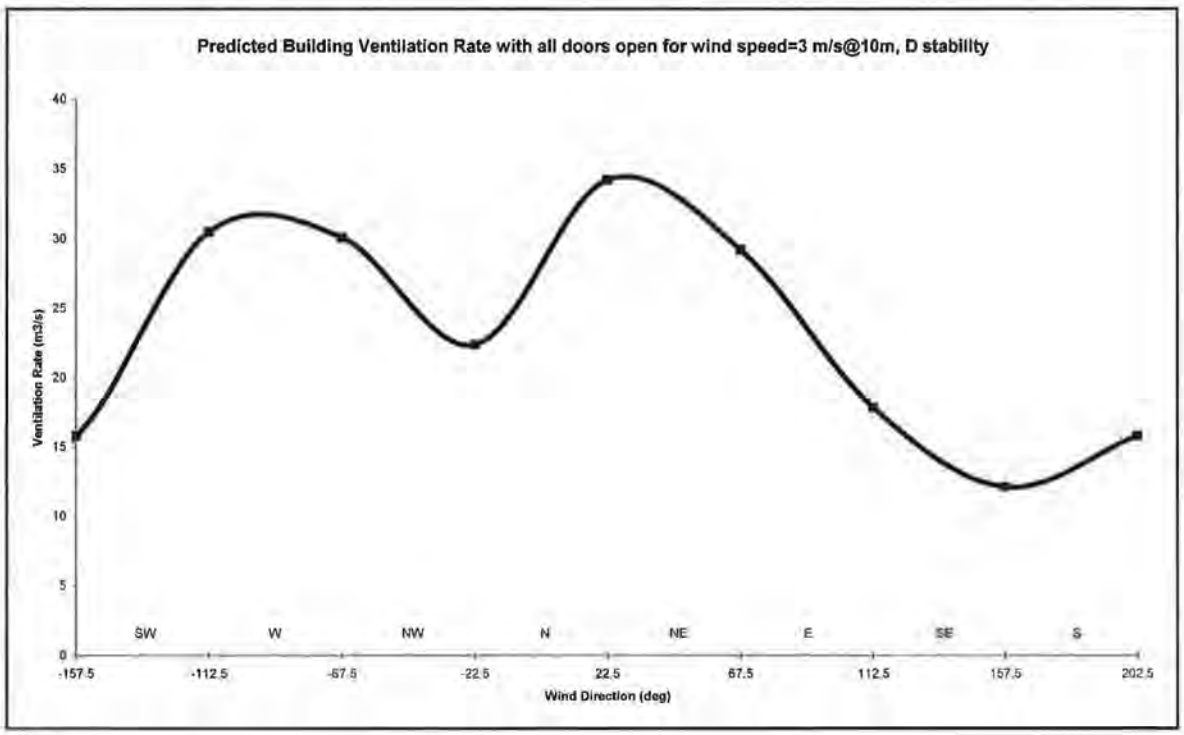

Figure 4 Predicted Building Ventilation Rate with all doors open for wind speed=3 m/s@10m, D stability

Figure 3 shows the maximum hourly ventilation rate by wind direction over the course of the year based on the North Dandalup winds assuming the doors continuously open during operating hours. The calculated ventilation rates are between approximately 30 to 100 m^3/s. These ventilation rates will be a function of the highest winds speeds that occur from each direction during operating hours.

Figure 4 shows the calculated building ventilation rate for standardised conditions of wind speed of 3 m/s, D (neutral) stability with the doors open. These show a ventilation rate of between 12 to 22 m^3/s, with the higher ventilation rates corresponding to incoming winds perpendicular to the open doors, which is to be expected.

By way of context, the average infiltration rate measured from sampling cross-section velocities through the doors of a much larger Perth waste handling building[6] with open doors on each wall with a total area 2½ times the area of the hides building doors, was 60 m^3/s. From this, it is considered that the estimated ventilation rates from the hide processing building are reasonable for the purposes of this report.

6.2 SHED ODOUR CONCENTRATIONS

The internal odour shed concentrations for the proposal were estimated from a sampling program undertaken for a wet blue tannery in New Zealand (PDP 2013).

[6] Malaga, Perth, 12 separate occasions over 9 years.

It should be noted that wet blue tanning involves the use of sulphide-based reducing agents and is hence much more odorous than the salt based process used in this proposal. This is reflected in the default buffer distances for a wet-blue tannery being 1,000-2,000 m versus that for a fellmonger being 200-300 m (EPA 2005). This actually implies that wet-blue tannery emissions are more than an order of magnitude higher than from a fellmonger, albeit the effluent handing systems are a key factor.

Odour samples for the PDP (2013) report were taken from above the chemical baths (expected highest odours) and in the bin area of the tanning building (expected typical odour). These were analysed in accordance with AS/NZS 4323:3 (2001). The odour concentrations measured were 665 ou and 114 ou respectively.

For this proposal, the internal odour concentration was assumed to be 700 ou. This is double what could otherwise be justified on the basis of the average odours measured in the wet-blue tannery and is therefore a conservative estimate. By way of context, an odour concentration of 700 ou is less than has been measured for metropolitan municipal waste handling facility buildings (e.g. indicative range 950[7] to 2,300[8] ou).

Summary statistics for the estimated hourly odours emissions are shown in Table 2.

Table 2 Summary statistics for the estimated hourly odours emissions

Statistic	Odour Emission Rate Total ($ou.m^3/s$)
Minimum	553
Maximum	68,922
Average	11,420

An example weekly profile of the odour emissions is shown in Figure 5. Note that the odour emission rate will be a function of wind direction (not shown in Figure) as well as wind speed.

[7] Malaga, Perth.

[8] Subiaco, Perth.

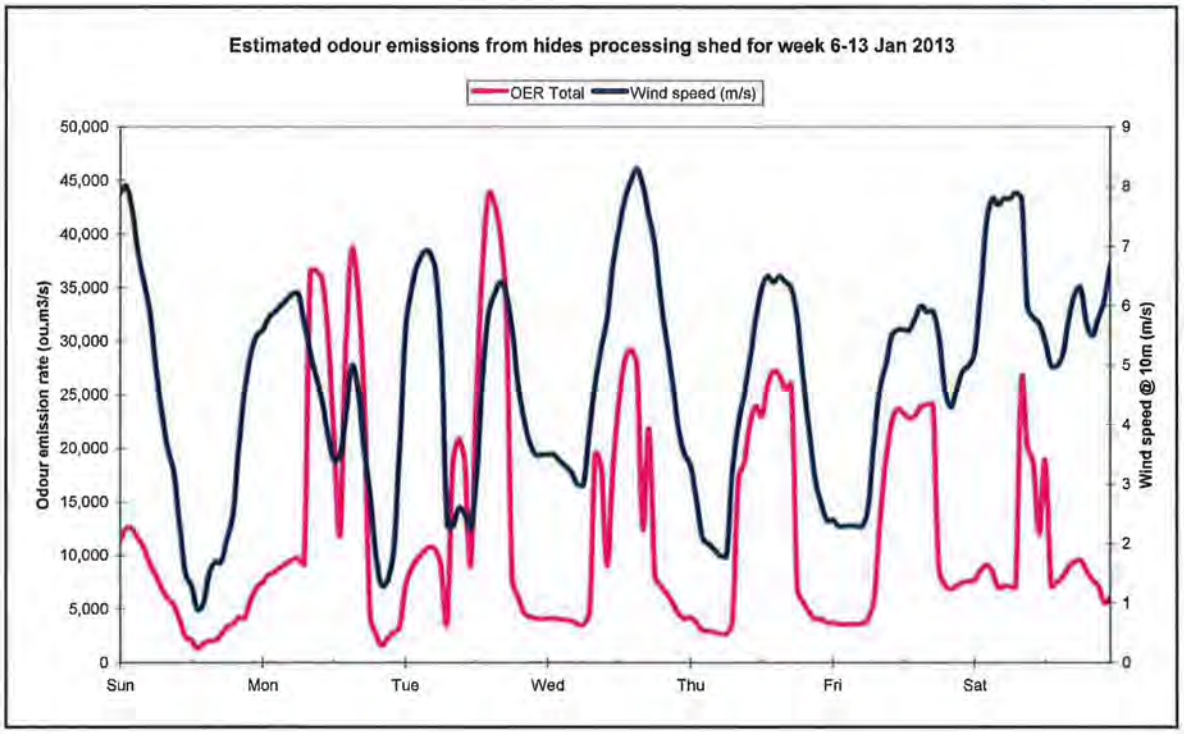

Figure 5 Estimated hourly odour emissions (OER) over one week

7. DISPERSION MODELLING

7.1 MODEL

The CALPUFF model (Version 6.42) was used for the dispersion modelling of odours from the proposed WTS.

This model has been adopted by the U.S. Environmental Protection Agency (US EPA) in its "Guideline of Air Quality Models" as the preferred model for assessing long range transport of pollutants and their impacts on Federal Class I areas and on a case-by-case basis for certain near-field applications involving complex meteorological conditions. More specifically to this study, the Guideline (amongst other reasons) provides for the use of CALPUFF on a case-by-case basis for air quality estimates involving complex meteorological flow conditions, where steady-state straight-line transport assumptions are inappropriate.

Odour dispersion from a near ground-level source is lowest, and hence downwind odour concentrations highest, during light wind conditions, which alternative Gaussian dispersion models such as AUSPLUME handle poorly.

7.2 DISPERSION ASSUMPTIONS

Key assumptions used for modelling included:

- uniform roughness length of 0.15 m – the surrounding area is mostly cleared pasture land. For conservatism, no account has been taken of enhanced dispersion from the surrounding tree-lines;
- as a model sensitivity test, two options for dispersion coefficients have been used-

(a) calculated from micrometeorological parameters – this will produce more AERMOD-like predictions, and

(b) using PG coefficients (tpg=10 mins) – this will produce more ISC/Ausplume-like predictions;

- assumption of flat terrain;
- receptor grid domain of 1.5 x 1.5 kms with an interval of 50 m;
- emissions from the building was defined as a volume source, with initial sigma y and sigma z specified as one-quarter of the building width and height respectively and release height at one-half the height of the doors.

Details of other CALPUFF settings used for modelling odours from the proposal are shown in Appendix 3.

7.3 ANNUAL METEOROLOGICAL DATA

For this study, the CALPUFF model was run in "two-dimensional" mode. This permits the use of meteorological data from only a single surface station. In this mode, CALPUFF assumes a spatially uniform meteorological field, however the essential features of a puff model such as simulating stagnation during calm wind conditions, and enabling curved trajectories and variable dispersion and stability conditions over multiple hours of transport, are retained.

For modelling the dispersion of odours from the hides processing building, site specific AERMOD-compatible surface and upper air meteorological data files were developed using the CSIRO's TAPM model (which is briefly described in Appendix 2).

The annual wind rose and matrix based on these data is shown in Figure 6.

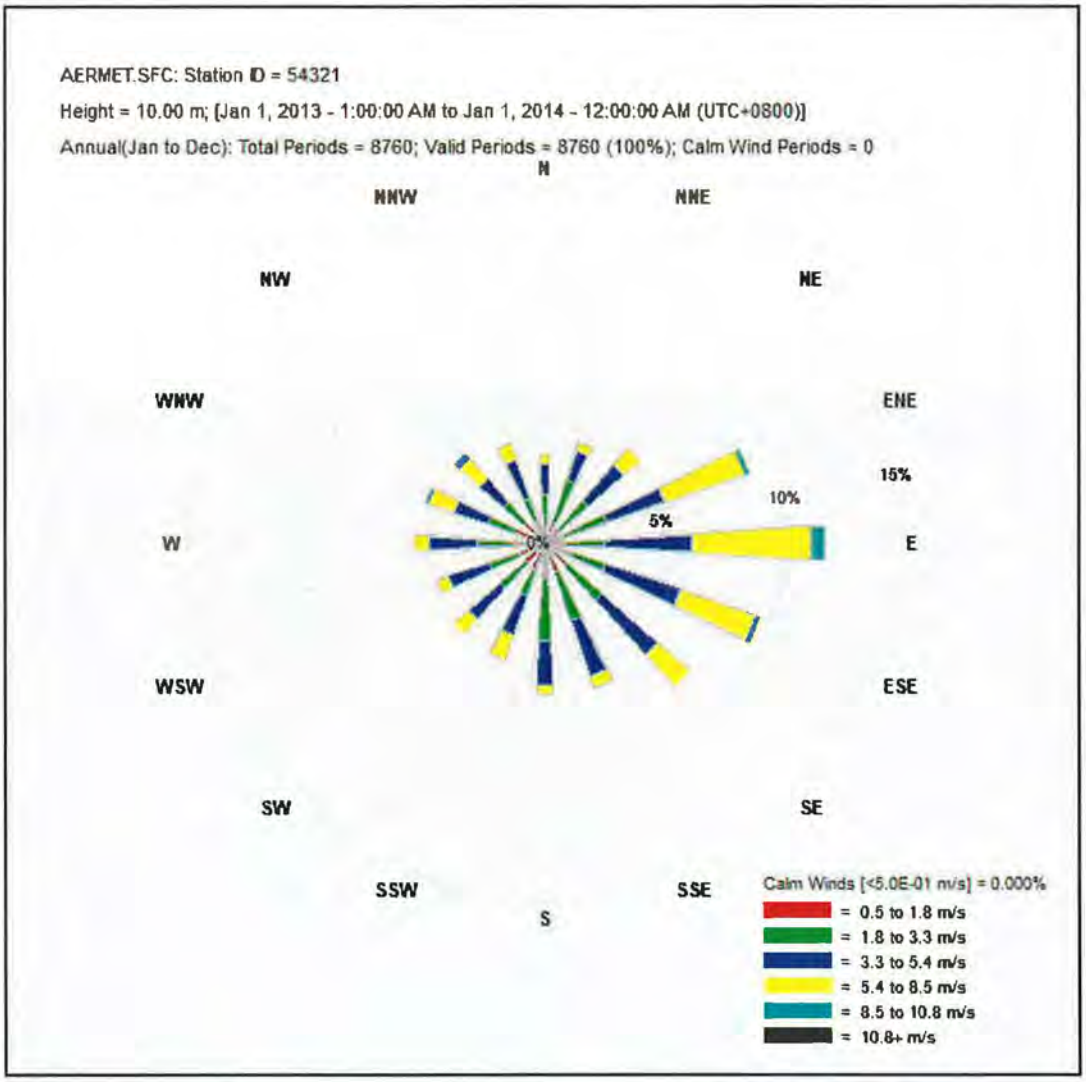

Figure 6 Wind speed and direction frequency occurrence rose for North Dandalup 2013

Further details and analysis of the surface meteorological data are provided in Appendix 3.

7.4 PREDICTED AMBIENT ODOUR CONCENTRATIONS COMPARED TO CRITERION

The CALPUFF model uses the hourly meteorological data and odour emission rates to calculate the ambient odour concentrations at each receptor across a grid for each hour of the year. This gives 8,760 1-hour average concentration values at each receptor.

The predicted odour levels from the hides processing building for the relevant criteria:

- C99.9,1hr=8ou; and
- C99.5,1hr=2.5ou;

using two alterative dispersion options available in the model are shown in Figure 7, viz:

(a) dispersion coefficients calculated from micrometeorological parameters (solid contours); and

(b) dispersion calculated using PG coefficients (dashed contours).

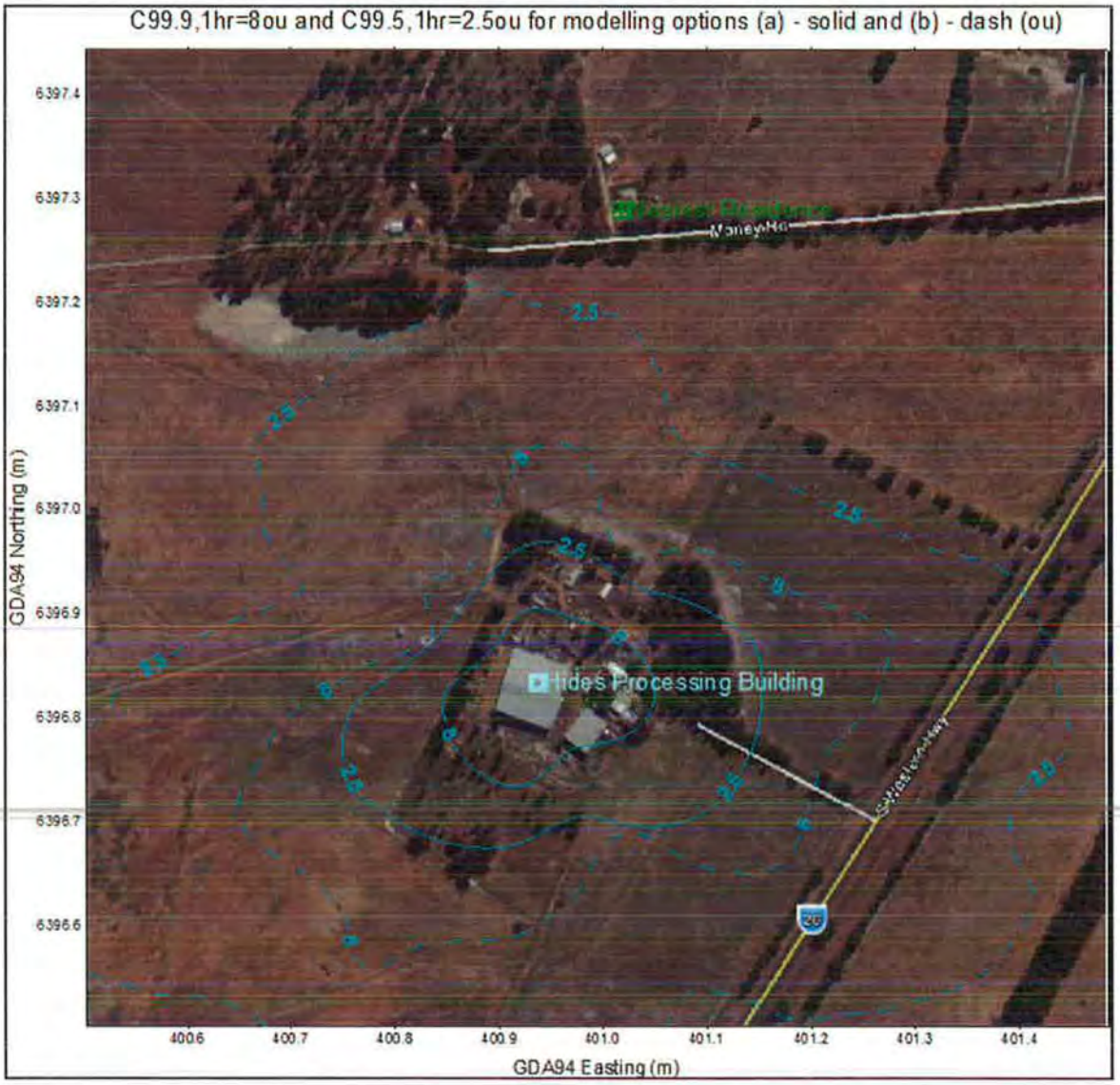

Figure 7 Predicted odour levels from proposed fellmonger compared to criterion for odour sensitive premises

Similarly, the predicted odour levels at the nearest residence are shown in Table 3.

Table 3 Predicted odours at nearest residence against criteria

Criteria	(a) dispersion coefficients calculated from micrometeorological parameters		(b) dispersion calculated using PG coefficients	
	Predicted odour concentration (ou)	Predicted odour concentration as percentage of criterion (%)	Predicted odour concentration (ou)	Predicted odour concentration as percentage of criterion (%)
C99.9,1hr=8ou	0.73	9.1	2.9	36
C99.5,1hr=2.5ou	0.43	17	1.8	72

This shows that the predicted odours are:

(a) 9.1% and 36% of the criteria for the modelling option with dispersion coefficients calculated from micrometeorological parameters; and

(b) 17% and 72% of the criteria for the modelling option with dispersion calculated using PG coefficients.

Therefore, the predicted odours at the nearest residence are below the criteria for acceptable odour impacts. It needs to be emphasised that the modelling has incorporated the following considerably conservative assumptions:

- it has been assumed that both doors in the sheds processing building a fully open during all operating periods whilst it is proposed that the doors will actually be kept closed when not in use for loading/unloading; and
- the odour concentrations have been derived from the maximum measured in a wet blue tannery building, which will be higher than for a fellmongering building.

Modelling results should always be qualified in that atmospheric dispersion models represent a simplification of the many complex processes involved in determining ground level concentrations of pollutants. Model uncertainty is composed of model chemistry/physics uncertainties, data uncertainties, and stochastic uncertainties. In addition, there is inherent uncertainty in the behaviour of the atmosphere, especially on shorter time scales due to the effects of random turbulence. It is therefore always desirable to verify the results from air dispersion modelling using ambient measurements, particularly where predictions are within a factor of two of criteria levels.

Should there be a requirement to further reduce odour emissions (considered very unlikely), fairly simple options that could be considered are:

- increase wind shielding of the building by planting surrounding vegetation;
- improve sealing of the building by filling gaps; and
- use of refrigerated transport for green hides.

This report has not addressed odours from atypical operation that may result from equipment failures. The most obvious risk of higher-than-expected odour impacts would be from a prolonged holding of liquid or solid wastes. It is anticipated that an Environmental Management Plan (or similar) will be prepared that outlines contingency measures to avoid these types of circumstances.

8. SUMMARY AND RECOMMENDATIONS

This report presents the predicted odour levels compared to the DER criterion at odour sensitive premises for a proposed fellmonger (hides processing) operation located in North Dandalup.

The odour emissions have been estimated from sampling of a wet-blue tannery building.

A procedure based on wind pressure coefficients has been used to estimate ventilation rates through the hides processing building.

The US EPA CALPUFF model has been used to predict odour dispersion based on meteorological data from the CSIRO's TAPM prognostic model.

It needs to be emphasised that the modelling has incorporated the following considerably conservative assumptions:

- it has been assumed that both doors in the hides processing building a fully open during all operating periods, whilst it is proposed that the doors will actually be kept closed when not in use for loading/unloading; and
- the odour concentrations inside the hides processing building have been derived from the maximum measured in a wet-blue tannery building, which will be higher than for a fellmongering operation.

Even with the above conservative assumptions, the odour concentrations at the nearest residence are predicted to be, at most, 72% of the most constraining criterion.

It is therefore concluded that odours from the proposal will meet the DER's criterion for acceptability.

9. REFERENCES

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10. GLOSSARY OF TERMS

"°C" means degrees Celsius.

"BoM" means Bureau of Meteorology.

"Cpp.p,1hr=Nou" means the annual "pp.p" percentile, 1-hour average odour concentration of "N" odour units. The 99.9 percentile concentration is the 9th highest concentration in a year. The 99.5 percentile concentration is the 44th highest concentration in a year.

"DEC" means Department of Environment and Conservation (WA).

"DER" means Department of Environmental Regulation (WA), formerly DEC.

"hr" means hour.

"km" means kilometres.

"Km" means kilometres.

"m/s" means metres per second.

"m" means metres.

"m^2" means square metres.

"m^3/s" means cubic metres per second.

"m^3/hr" means cubic metres per hour.

"m^3" means cubic metres.

"min" means minute.

"$ou.m^3$" means odour units multiplied by the associated volumetric flow with units of m^3. When used as the emissions term in a dispersion model, the predicted ambient concentrations per cubic metre cause the volume units to cancel out to give odour units (the dimensionless ratio of the odour concentration to the odour threshold concentration).

"ou" means odour units. An odour unit is a dimensionless ratio defined as the volume which an odorous sample would occupy when diluted to the odour detection threshold, divided by the volume of the odorous sample.

"Percentile" means the division of a distribution into 100 groups having equal frequencies.

"s" means seconds.

"US EPA" means United States Environmental Protection Agency.

Appendix 1 Building Ventilation

The underlying mechanisms determining natural ventilation and internal flow patterns are extremely complex and ideally require wind tunnel testing, extensive on-site measurements or highly sophisticated modelling (current techniques are nodal/zonal models or CFD).

Natural ventilation is induced by differences in air pressure across the building. The essential principle is that building walls obstruct airflow and so create wind pressure differences between windward and leeward walls.

Much building pressure data is available worldwide, primarily obtained by the civil engineering community for determining wind loads, and is expressed in the form of a pressure coefficient cp defined as:

$$Cp = \frac{p - pr}{0.5\rho U_z^2}$$ **Equation 1**

Where-

$Cp =$	Pressure coefficient (at any point on an external wall)	
$p =$	Local building pressure (measured by a pressure tap flush with the building surface)	(Pa)
$pr =$	Reference free stream static pressure	(Pa)
$\rho =$	Air density	(kg/m^3)
$U_{ref} =$	Wind speed at a reference height above ground	(m/s)

An example "face averaged" wind pressure coefficients around a block structure for a wind direction normal to a wall for exposed and sheltered locations is shown in Figure 8.

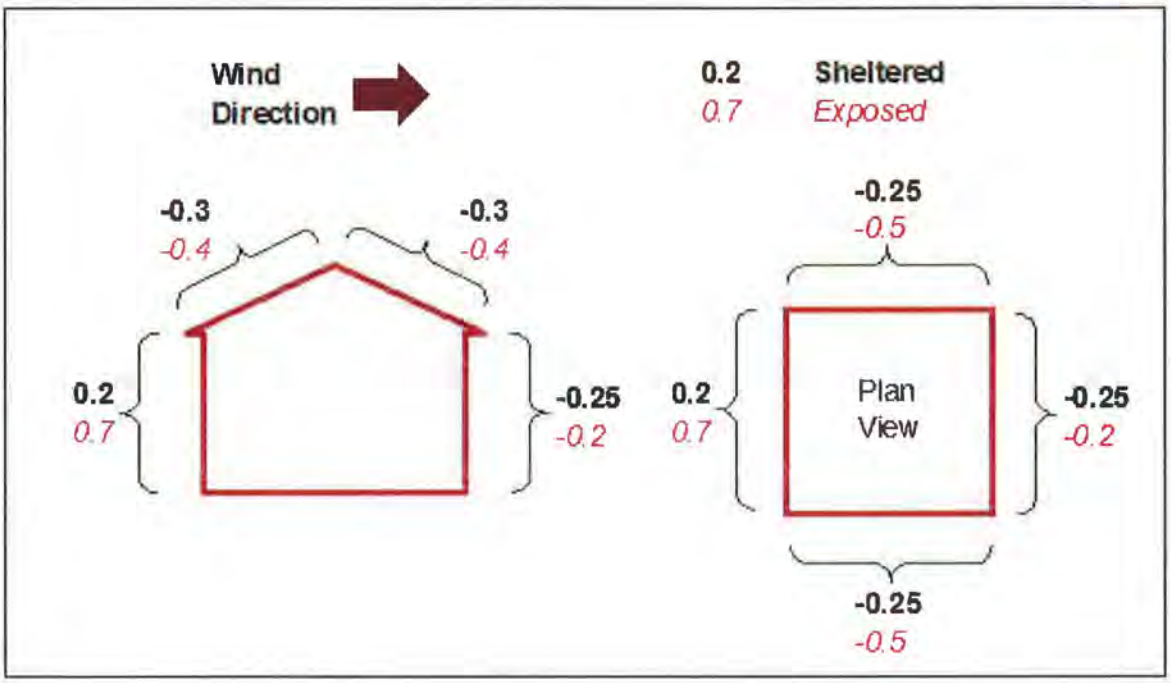


Figure 8 Example of "face averaged" wind pressure coefficients around block structure for wind direction normal to wall for exposed and sheltered locations

Ref: http://www.veetech.org.uk/Tutorials/tutorial_2_driving%20_forces_.htm (based on data from *data of Bowen and Wiren)*

Cp data has been largely collected by wind engineers using boundary layer wind tunnels (where the natural variation of wind speed with height above ground is correctly simulated) to obtain data on scale models of solid (i.e. non porous) buildings.

Swami and Chandra (1987) reviewed these data to develop an empirical model for estimating natural (wind-driven) ventilation through buildings, which has been used for this assessment.

As with any model of a complex phenomenon, there are some simplifications including that the model:

- does not account specifically for roof slope effects – typical slopes are, however, incorporated in the empirical data;
- applies only to rectangular, box-shaped structures;
- does not include "stack effects" due to inside and outside temperature differences (noting that these are small for well-ventilated buildings);
- does not take into account pressure drop inside the building due to partitions;
- assumes airflow is due to mean pressure difference alone and fluctuating pressure effects are ignored. This is a reasonable assumption at high flow rates (10 air changes per hour and above). For low wind speeds, fluctuating pressures can cause airflow greater than that would be predicted by the procedures hence the model incorporates a minimum air change (described later); and

- will produce least accurate estimates of Cp for unconventional roof structures and openings near the extremities of the walls.

Importantly, the model does, however, take into account building dimensions relative to wind direction, wind angles on each wall and openings on one to all of the four walls. The effects of obstructions (eg nearby buildings) on blocking wind impacts is also taken into account although the effect of obstructions on altering the wind field (eg "tunnelling") are not taken into account.

It was considered that the model's limitations were not substantial for modelling ventilation through the proposed building, whilst use of this model offered a considerable advantage over the simpler ventilation models based only on wind speed and opening area of a windward facing wall.

The pressure coefficient for each wall is estimated by:

$$Cp = Cp_A Ln\left[\begin{array}{l} 1.248 - 0.703\sin(\frac{\theta}{2}) - 1.175\sin(\theta)^2 + 0.131\sin(2G\theta)^3 + \\ 0.769\cos(\frac{\theta}{2}) + 0.071G^2\sin(\frac{\theta}{2})^2 + 0.717\cos(\frac{\theta}{2})^2 \end{array}\right] \qquad \textbf{Equation 2}$$

Where-

Cp = Pressure coefficient (at any point on an external wall)

Cp_A = Surface averaged pressure coefficient (0.6)

θ = Wind attack angle relative to normal from the wall

G = Ln(W/D) where W is width of wall and D is width of perpendicular walls

The effect of an obstruction on the pressure coefficient of the windward-facing wall is:

$$AD = 1.26EXP(-3AR)\left[1.039\sin(\theta - 47)/SF - 0.0476(\sin(\theta - 47)/SF)^2 - 0.684(\sin(\theta - 47)/SF)^3\right] \qquad \textbf{Equation 3}$$

Where-

AR = Angle between obstruction to building bearing, and wind (ABS(AR)<45°) (radians)

SF= Spacing factor (a/W) where a is distance from obstruction to building and W is width of building

The normalised flow coefficient is the sum of the positive weighted coefficients for each aperture (resolved by iteration):

$$CQ = \sum_{i=1,n}\left[Cd_i \left(\frac{A_i}{A_e}\right) \frac{(Cp_i - Cp_l)}{|Cp - Cp_l|^{0.5}} \right] + ve\_only$$ **Equation 4**

Where-

CQ =	Flow coefficient	
Cd_i =	Area of ith aperture	(m^2)
A_e =	Total area of all apertures	(m^2)
Cp_i =	Pressure coefficient of ith aperture	(m)
Cp_l =	Internal pressure coefficient (unknown)	(m/s)
Cd_i =	Discharge coefficient of ith aperture = 0.62 (recommend)	
n =	Number of apertures	

The building volumetric flow is then:

$$Q = U_z A_e \frac{CQ}{(1+CQ)}$$ **Equation 5**

Where-

Q =	Flow volume	(m^3/s)
U_z =	Wind velocity at aperture height	(m/s)

The implementation of the model was checked by:

- The Cp for winds ±45° of normal of any unobstructed wall should always be positive while on the directly opposing wall should always be negative.
- Cp must be within the range | 0 to 1 | and generally between | 0.2 to 0.9 |
- The effect of the adjacent building (obstacle to east-facing wall) was to reduce the building ventilation rate for winds normal to the east wall (easterlies) by about 0.5. This seems consistent with the guidance for the effect of obstacles on house ventilation given in the report, as below:

Shielding Class	Correction Factor	Description
I	1.0	No obstruction or local shielding whatsoever.
II	0.88	Light local shielding with few obstructions (e.g. a few trees or a shed in the vicinity).
III	0.74	Moderate local shielding; some obstructions within two house heights (e.g. thick hedge or fence and nearby buildings).
IV	0.57	Heavy shielding; obstruction around most of perimeter building or trees within five building heights in most directions (e.g. well developed dense tract houses).
V	0.31	Very heavy shielding, large obstruction surrounding perimeter within two house heights (e.g. typical downtown area).

- The ventilation for a nominal square building predicted from the Swami and Chandra (1987) model was compared to that using an on-line model (see http://www.veetech.org.uk/PHP%20Programs/phpaida.php) for an unobstructed wind normal to a wall. The results are shown in Figure 9. The models are parameterised a little differently therefore they could not be given exactly the same inputs. The relationship in the predicted ventilation appears reasonable with Swami and Chandra (1987) predicting about 60% higher. A potential over-prediction is considered more desirable than a potential under-predation, since this will cause the estimated odour emissions to also be higher, so this result was considered acceptable.

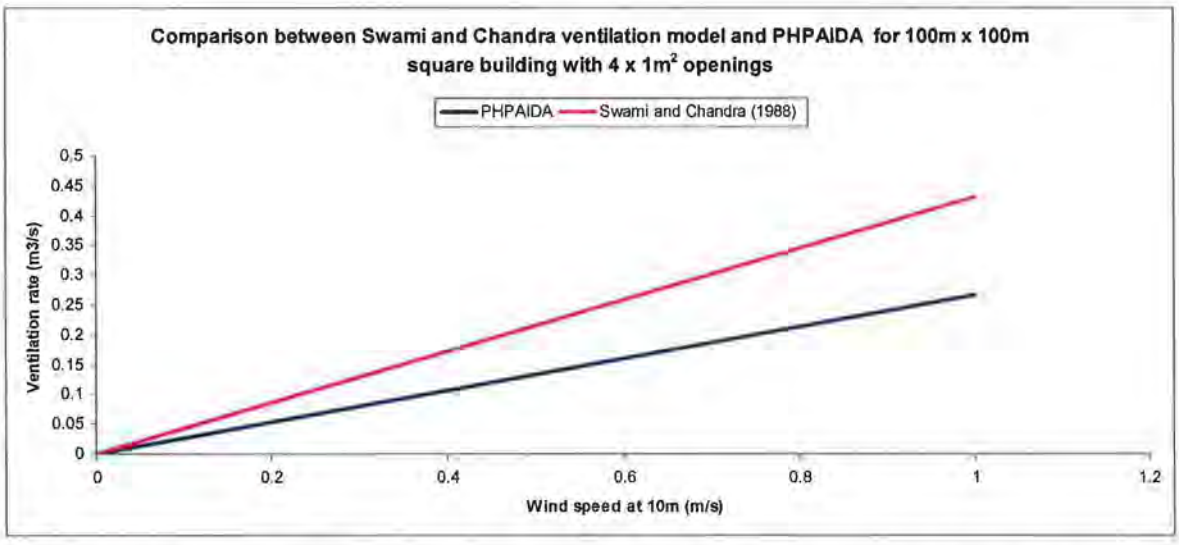


Figure 9 Comparison between Swami and Chandra ventilation model and PHPAIDA

Appendix 2 TAPM-predicted meteorology

Prognostically derived surface and upper air meteorological data (from TAPM) are frequently used in dispersion modelling where no local observational meteorological data exists or where the network is sparse. This method of coupling derived meteorological with observational data has been used in modelling the dispersion of pollutants for this study.

The Air Pollution Model, or TAPM, is a three dimensional meteorological and air pollution model produced by the CSIRO Division of Atmospheric Research. Briefly, TAPM solves the fundamental fluid dynamics and scalar transport equations to predict meteorology and pollutant concentrations. It consists of coupled prognostic meteorological and air pollution concentration components, eliminating the need to have site-specific meteorological observations. The model predicts airflow important to local scale air pollution, such as sea breezes and terrain induced flows, against a background of larger scale meteorology provided by synoptic analyses.

TAPM incorporates the following databases for input to its computations:

- Gridded database of terrain heights on a longitude/latitude grid of 30 second grid spacing, (approximately 1 km). This default dataset was supplemented by finer resolution data at 9 second spacing (~300m) for this study.
- Australian vegetation and soil type data at 3 minute grid spacing, (approximately 5 km).
- Rand's global long term monthly mean sea-surface temperatures on a longitude/latitude grid at 1 degree grid spacing, (approximately 100 km).
- Six-hourly synoptic scale analyses on a longitude/latitude grid at 0.75-degree grid spacing, (approximately 75 km), derived from the LAPS analysis data from the Bureau of Meteorology.

The TAPM V4 set-ups used to generate surface and upper wind data for CALMET was as follows:

- Grid dimensions were 25 x 25 cells with nests at 30 km, 10 km, 3 km, 1 km and 300 m;
- Data period 1/1/2013 to 31/12/2013 (as a recent typical year); and
- No incorporation of surface wind observations.

Appendix 3 Summary of distributions in meteorological data used for odour dispersion modelling

Stability distributions

Stability is a useful indicator of the turbulence characteristics of meteorological data use for modelling.

A simple scheme is that originally proposed by Pasquill (1961) and modified by Turner (1960). The basis of the "PG" stability categorisation is to define stability according to one of six stability classes conventionally defined as classes A, B, C, D, E and F. Class A at one extreme, represents extremely unstable (convective) conditions, Class F at the other extreme represents extremely stable (inversion) conditions and class D in-between is neutral.

The annual PG stability distribution for the North Dandalup meteorological data converted using the Golder (1972) relationships, which is indicative of the dispersion calculated within CALPUFF if the micrometeorology scheme (based on turbulence parameters) for determining dispersion is selected, are shown in Table 4. These are compared to an annual meteorological data set produced by the DEC for Caversham as a reasonably similar site.

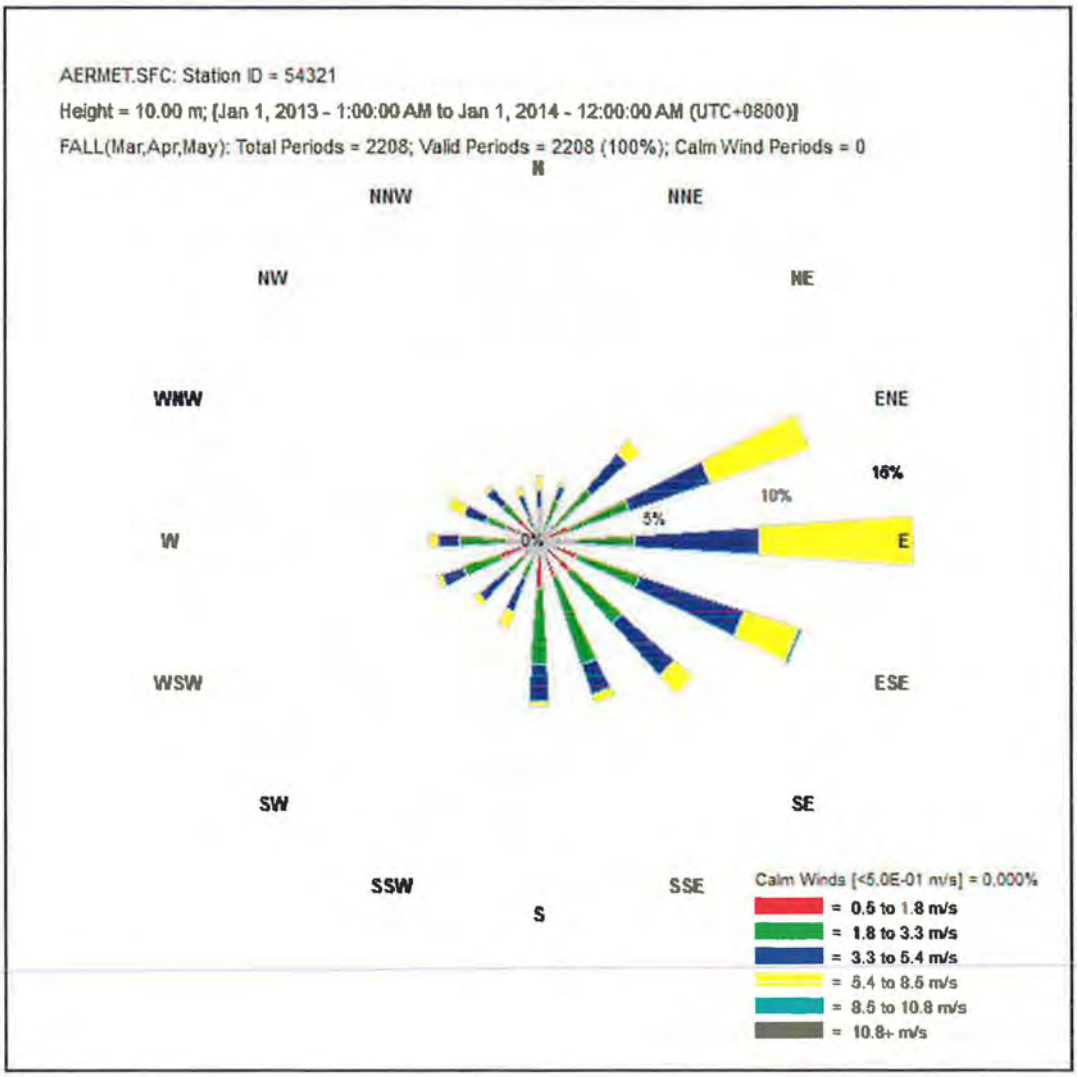
The North Dandalup data shows more D class compared to C class, and more E class compared to F class, than for Caversham. These differences appear reasonable when it is considered that North Dandalup has higher wind speeds (closer to scarp and lower roughness) than Caversham.

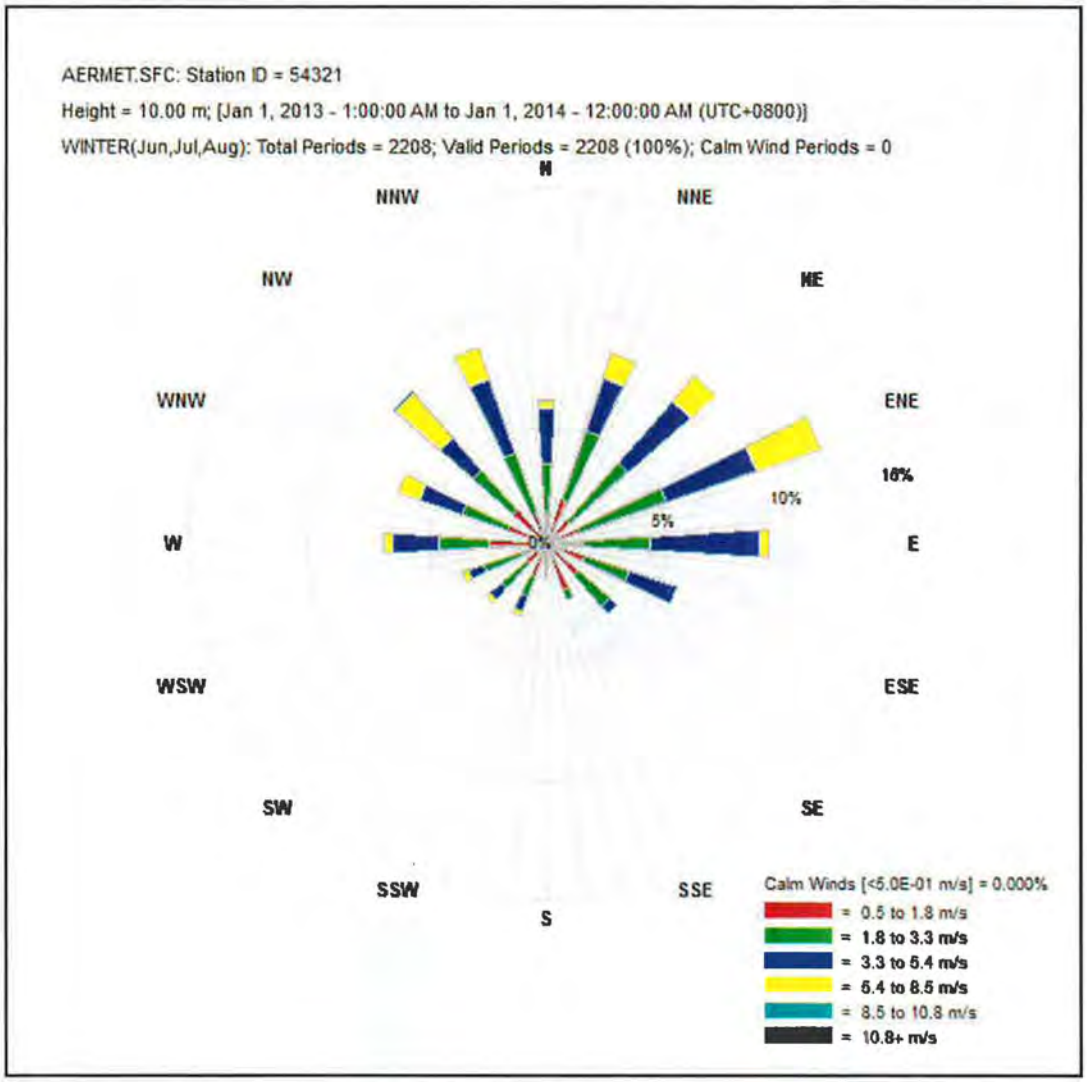
Table 4 Stability distribution for North Dandalup meteorological data

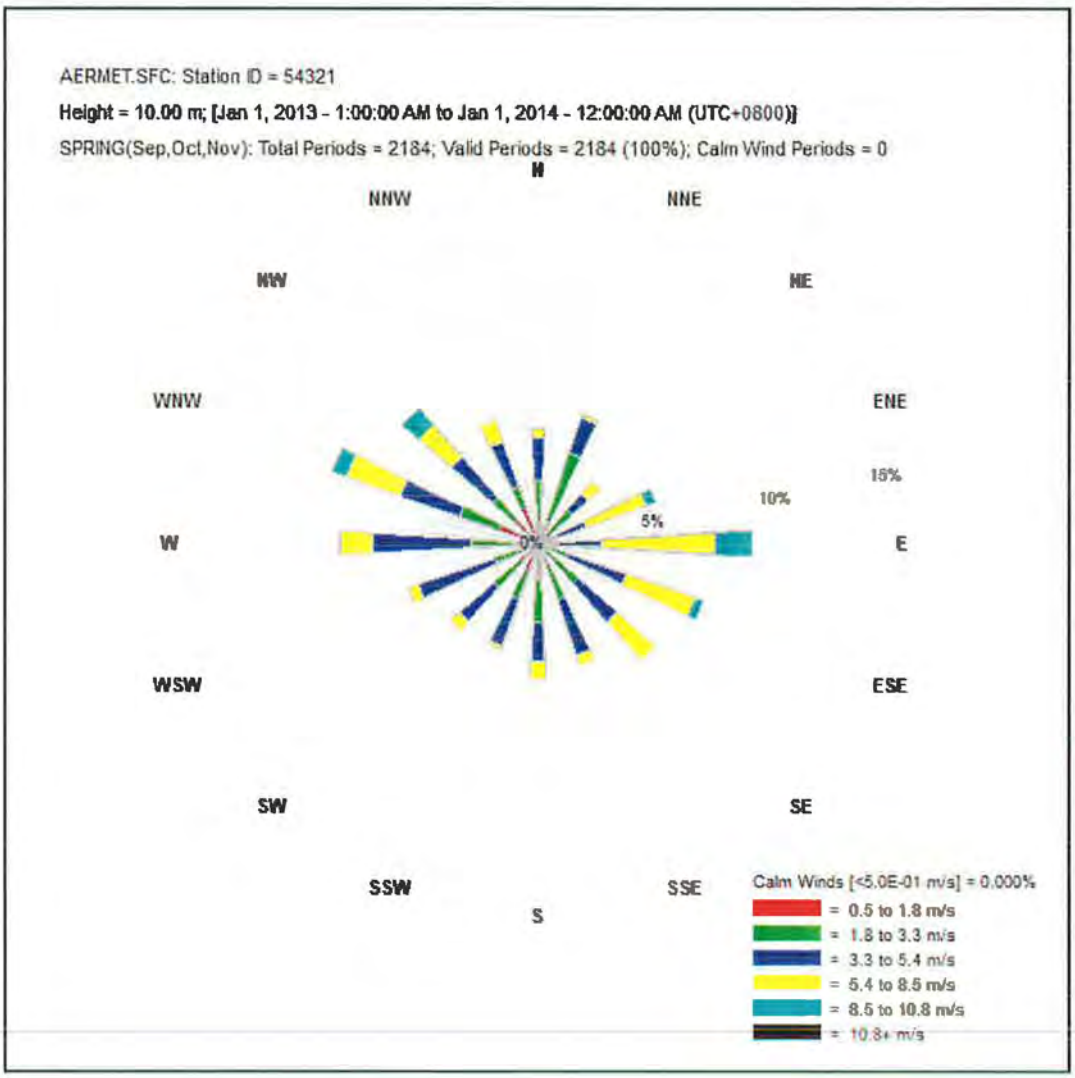
Stability Class	Frequency (%)	
	Caversham[(a)] 1994 (DEC)	North Dandalup 2013 from TAPM converted using Golder (1972) scheme
A	3.95	3.4
B	8.31	8.7
C	27.95	17.2
D	21.53	22.7
E	13.32	29.1
F	24.94	18.9

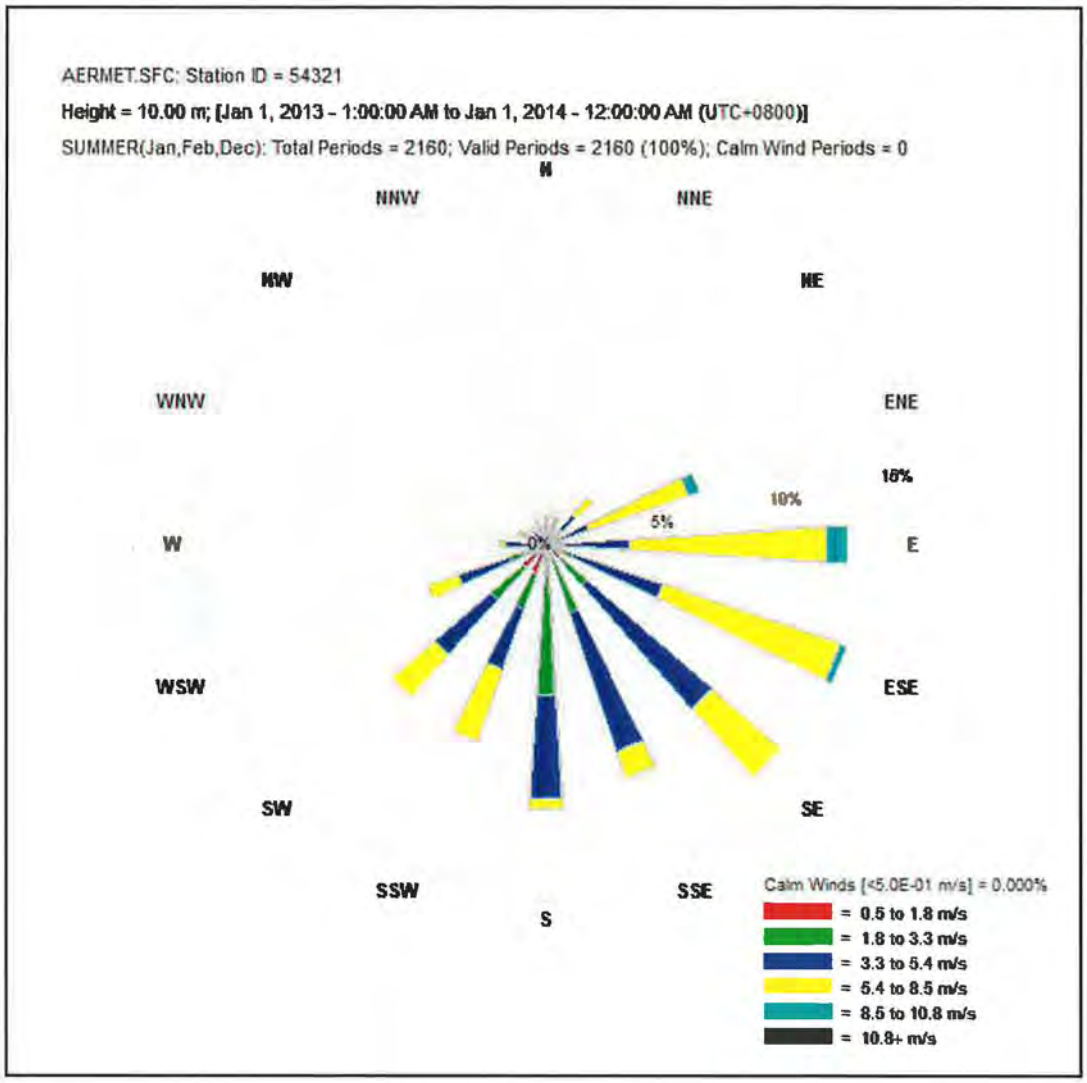
[(a)] Included for comparison with a reasonably similar location.

Wind Roses by Season

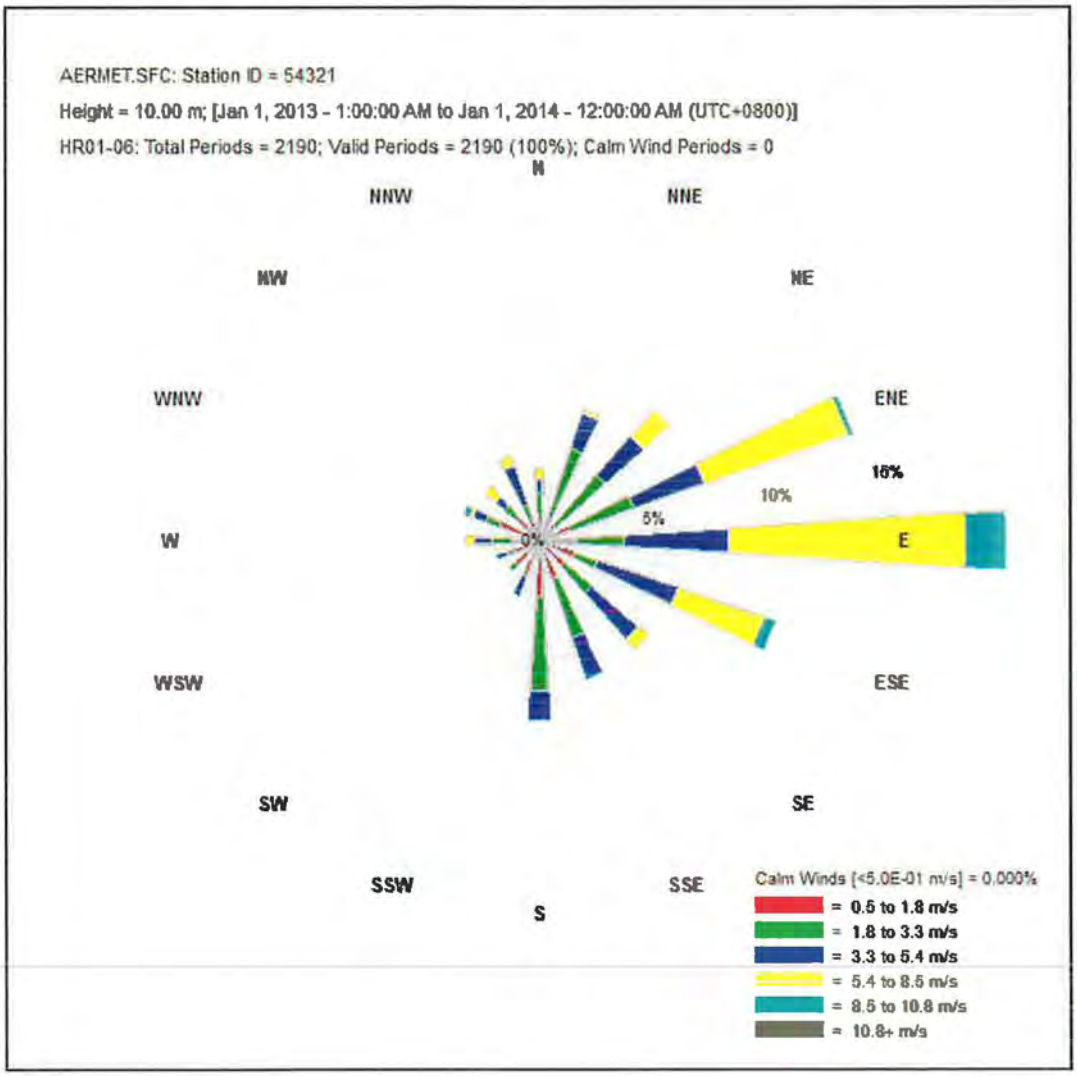


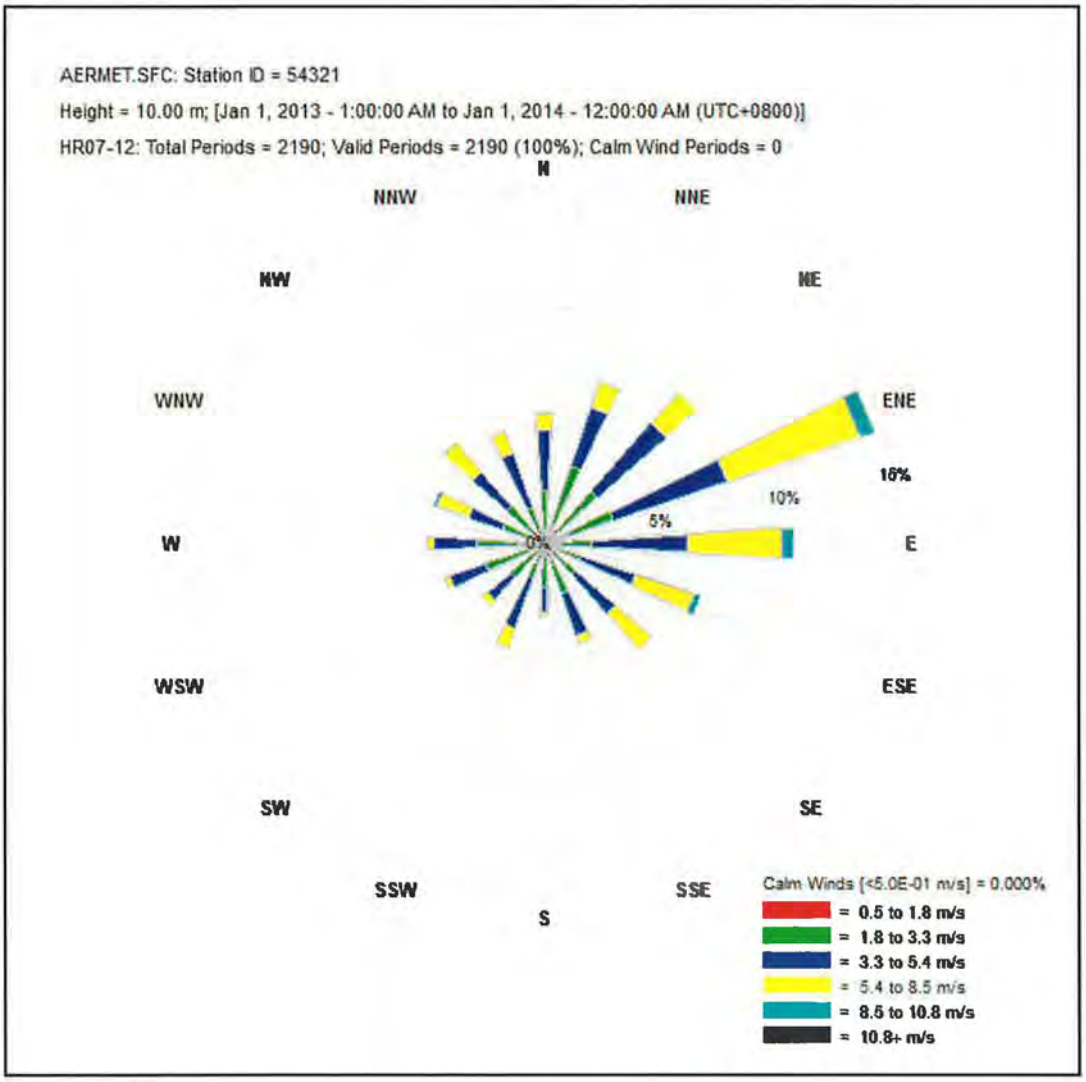

AERMET.SFC: Station ID = 54321
Height = 10.00 m; [Jan 1, 2013 - 1:00:00 AM to Jan 1, 2014 - 12:00:00 AM (UTC+0800)]
WINTER(Jun,Jul,Aug): Total Periods = 2208; Valid Periods = 2208 (100%); Calm Wind Periods = 0
N
NNW
NNE
NW
NE
WNW
ENE
15%
10%
5%
0%
W
E
WSW
ESE
SW
SE
SSW
SSE
S
Calm Winds [<5.0E-01 m/s] = 0.000%
= 0.5 to 1.8 m/s
= 1.8 to 3.3 m/s
= 3.3 to 5.4 m/s
= 5.4 to 8.5 m/s
= 8.5 to 10.8 m/s
= 10.8+ m/s

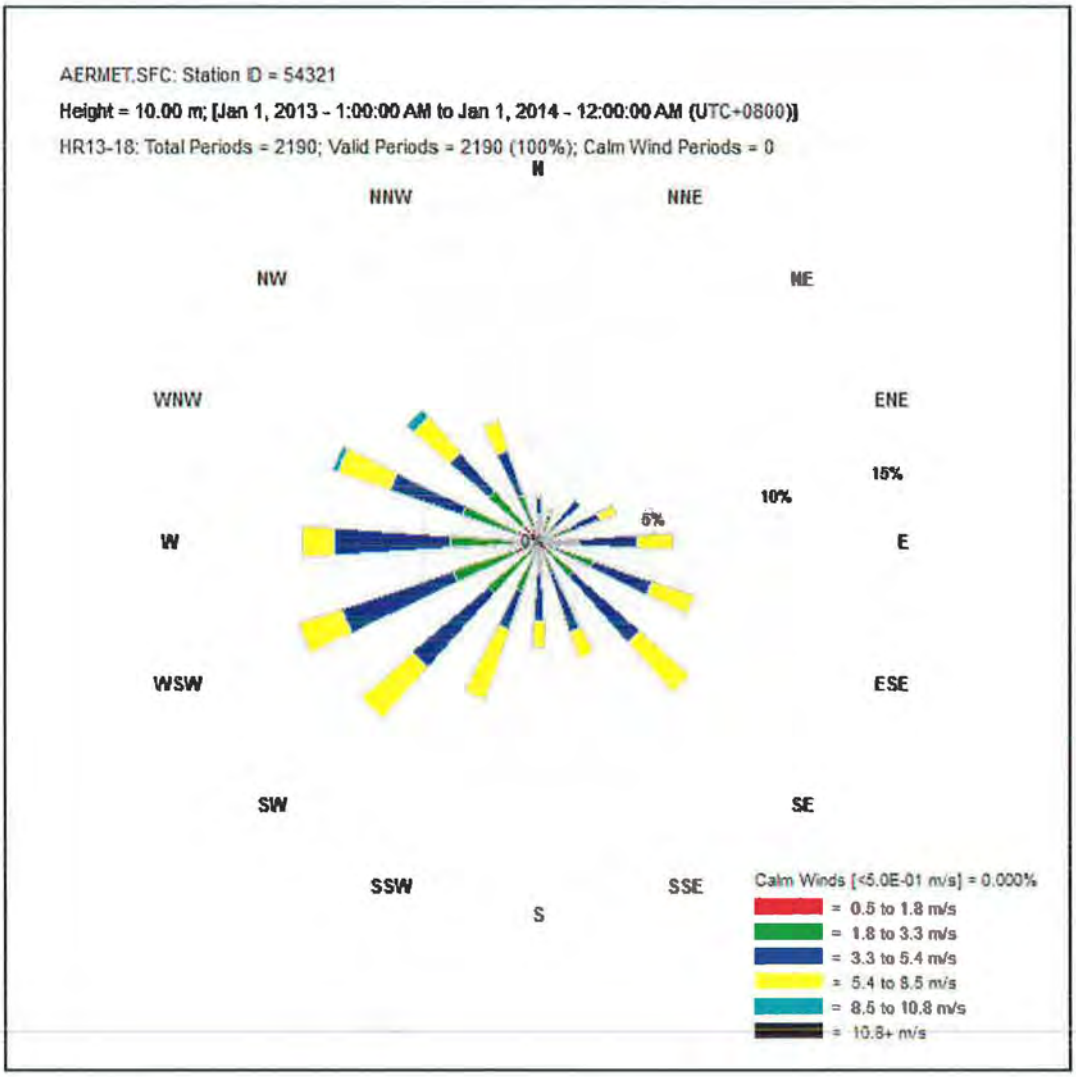

AERMET.SFC: Station ID = 54321
Height = 10.00 m; [Jan 1, 2013 - 1:00:00 AM to Jan 1, 2014 - 12:00:00 AM (UTC+0800)]
SPRING(Sep,Oct,Nov): Total Periods = 2184; Valid Periods = 2184 (100%); Calm Wind Periods = 0
N
NNW
NNE
NW
NE
WNW
ENE
W
E
WSW
ESE
SW
SE
SSW
SSE
S
15%
10%
5%
0%
Calm Winds [<5.0E-01 m/s] = 0.000%
= 0.5 to 1.8 m/s
= 1.8 to 3.3 m/s
= 3.3 to 5.4 m/s
= 5.4 to 8.5 m/s
= 8.5 to 10.8 m/s
= 10.8+ m/s

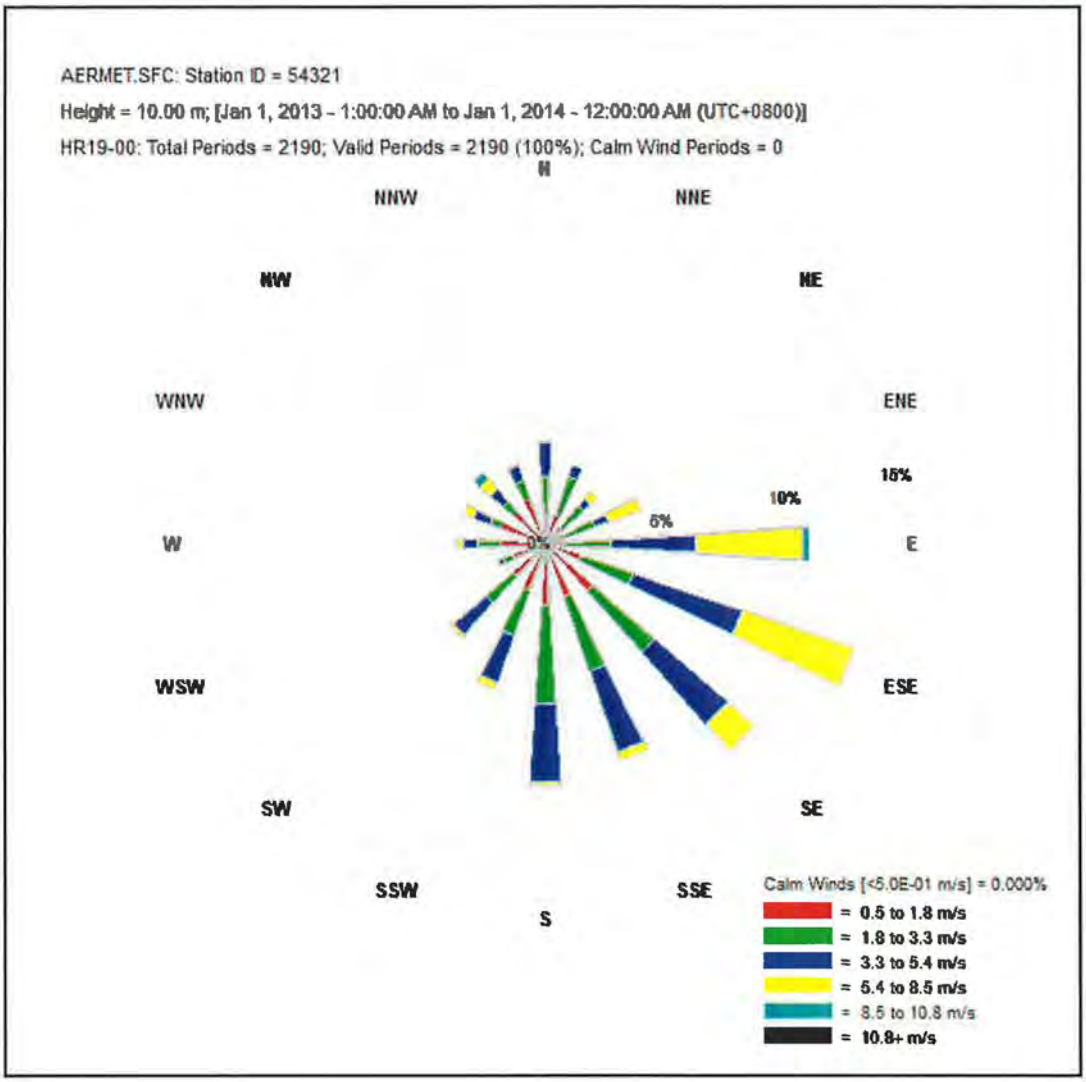

AERMET.SFC: Station ID = 54321
Height = 10.00 m; [Jan 1, 2013 - 1:00:00 AM to Jan 1, 2014 - 12:00:00 AM (UTC+0800)]
SUMMER(Jan,Feb,Dec): Total Periods = 2160; Valid Periods = 2160 (100%); Calm Wind Periods = 0
N
NNW
NNE
NW
NE
WNW
ENE
15%
10%
5%
0%
W
E
WSW
ESE
SW
SE
SSW
SSE
S
Calm Winds [<5.0E-01 m/s] = 0.000%
= 0.5 to 1.8 m/s
= 1.8 to 3.3 m/s
= 3.3 to 5.4 m/s
= 5.4 to 8.5 m/s
= 8.5 to 10.8 m/s
= 10.8+ m/s

Wind Roses by Time of Day




AERMET.SFC: Station ID = 54321
Height = 10.00 m; [Jan 1, 2013 - 1:00:00 AM to Jan 1, 2014 - 12:00:00 AM (UTC+0800)]
HR07-12: Total Periods = 2190; Valid Periods = 2190 (100%); Calm Wind Periods = 0
N
NNW
NNE
NW
NE
WNW
ENE
10%
5%
0%
W
E
WSW
ESE
SW
SE
SSW
SSE
S
Calm Winds [<5.0E-01 m/s] = 0.000%
= 0.5 to 1.8 m/s
= 1.8 to 3.3 m/s
= 3.3 to 5.4 m/s
= 5.4 to 8.5 m/s
= 8.5 to 10.8 m/s
= 10.8+ m/s


AERMET.SFC: Station ID = 54321
Height = 10.00 m; [Jan 1, 2013 - 1:00:00 AM to Jan 1, 2014 - 12:00:00 AM (UTC+0800)]
HR13-18: Total Periods = 2190; Valid Periods = 2190 (100%); Calm Wind Periods = 0
N
NNW
NNE
NW
NE
WNW
ENE
15%
10%
5%
0%
W
E
WSW
ESE
SW
SE
SSW
SSE
S
Calm Winds [<5.0E-01 m/s] = 0.000%
= 0.5 to 1.8 m/s
= 1.8 to 3.3 m/s
= 3.3 to 5.4 m/s
= 5.4 to 8.5 m/s
= 8.5 to 10.8 m/s
= 10.8+ m/s


AERMET.SFC: Station ID = 54321
Height = 10.00 m; [Jan 1, 2013 - 1:00:00 AM to Jan 1, 2014 - 12:00:00 AM (UTC+0800)]
HR19-00: Total Periods = 2190; Valid Periods = 2190 (100%); Calm Wind Periods = 0
N
NNW
NNE
NW
NE
WNW
ENE
15%
10%
5%
W
E
WSW
ESE
SW
SE
SSW
SSE
S
Calm Winds [<5.0E-01 m/s] = 0.000%
= 0.5 to 1.8 m/s
= 1.8 to 3.3 m/s
= 3.3 to 5.4 m/s
= 5.4 to 8.5 m/s
= 8.5 to 10.8 m/s
= 10.8+ m/s

Appendix 4 CALPUFF model set-up parameters

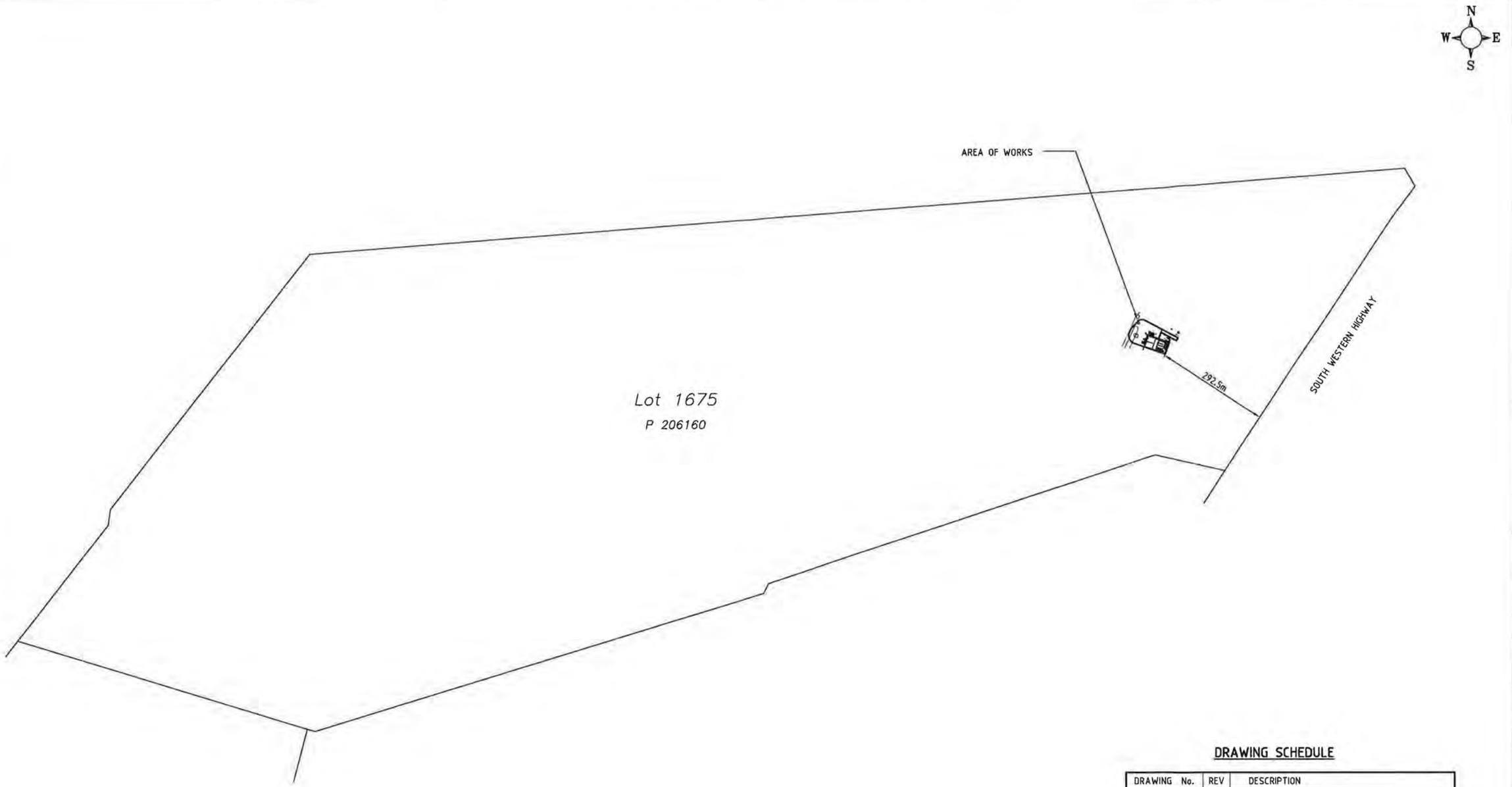
Note: File is for source ID: M:\L4301\Cal\Puf\Calpuff.INP (micrometeorological option)

```
CALPUFF.INP     2.0             File version record
L4301 Goldmark Leather North Dandalup odour annual

---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
! PRFDAT =M:\L4301\CAL\MET\L4301EAL.PFL    !
! SFCDAT =M:\L4301\CAL\MET\L4301E.SFC    !
! PUFLST =M:\L4301\CAL\PUF\CALPUFF.LST   !
! CONDAT =M:\L4301\CAL\PUF\CALPUFF.CON      !
! VOLDAT =M:\L4301\CAL\EMIS\GMBUILD.SRC     !
! AUXEXT =AUX      !
! LCFILES = F !
! NMETDOM =    1    !
! NMETDAT =    0    !
! NPTDAT =    0    !
! NARDAT =    0    !
! NVOLDAT =    0    !
!END!
! METRUN =    1   !
! IBYR   =  2013   !
! IBMO   =  0   !
! IBDY   =  0   !
! IBHR   =  0   !
! IBMIN  =  0   !
! IBSEC  =  0   !
! IEYR   =  0   !
! IEMO   =  0   !
! IEDY   =  0   !
! IEHR   =  0   !
! IEMIN  =  0   !
! IESEC  =  0   !
! ABTZ= UTC+0800 !
! NSECDT =  3600   !
! NSPEC =  1    !
! NSE =  0    !
! ITEST =  2    !
! MRESTART =  0    !
! NRESPD =  0    !
! METFM =  5    !
! MPRFFM =  2    !
! AVET = 60. !
! PGTIME = 10. !
! IOUTU =  2    !
! IOVERS =  2    !
!END!
! MGAUSS =  1    !
! MCTADJ =  0    !
! MCTSG =  0    !
! MSLUG =  0    !
! MTRANS =  1    !
! MTIP =  1   !
! MRISE =  1   !
! MBDW =   2   !
! MSHEAR =  1   !
! MSPLIT =  0   !
! MCHEM =  0    !
! MAQCHEM =  0    !
! MLWC =  1    !
! MWET =  0    !
! MDRY =  0    !
! MTILT =  0    !
! MDISP =  2    !
! MTURBVW =  3   !
! MDISP2 =  3   !
! MTAULY =  0   !
! MTAUADV =  0   !
! MCTURB =  1   !
! MROUGH =  0   !
```

```
! MPARTL =  1  !
! MPARTLBA =  1  !
! MTINV =  0  !
! MPDF =  1  !
! MSGTIBL = 0  !
! MBCON = 0  !
! MSOURCE = 0  !
! MFOG =  0   !
! MREG =  0   !
!END!
! CSPEC =          ODOR !
!         ODOR  =          1,              0,          0,              0   !
!END!
! PMAP = UTM  !
! FEAST  = 0.000  !
! FNORTH = 0.000  !
! IUTMZN =  50   !
! UTMHEM = S  !
! RLAT0 = 0N  !
! RLON0 = 0E  !
! XLAT1 = 0N  !
! XLAT2 = 0N  !
! DATUM = WGS-84  !
! NX =  31   !
! NY =  33   !
! NZ =  7   !
! DGRIDKM = .05 !
! ZFACE = .0, 20.0, 40.0, 80.0, 160.0, 320.0, 640.0, 1280.0 !
! XORIGKM = 400.2 !
! YORIGKM = 6396.0 !
! IBCOMP =  1   !
! JBCOMP =  1   !
! IECOMP =  31   !
! JECOMP =  33   !
! LSAMP = T !
! IBSAMP =  1   !
! JBSAMP =  1   !
! IESAMP =  31   !
! JESAMP =  33   !
! MESHDN =  1  !
!END!
!  ICON =  1   !
!  IDRY =  0   !
!  IWET =  0   !
!  IT2D =  0   !
!  IRHO =  0   !
!  IVIS =  0   !
! LCOMPRS = T !
!  IQAPLOT =  1   !
! IPFTRAK =  0   !
! IMFLX =  0  !
! IMBAL =  0  !
! INRISE =  0  !
! ICPRT =  1   !
! IDPRT =  0   !
! IWPRT =  0   !
! ICFRQ =  3   !
! IDFRQ =  1   !
! IWFRQ =  1   !
! IPRTU =  5   !
! IMESG =  2   !
!         ODOR =      1,          1,          0,          0,          0,          0,
0   !
! LDEBUG = F !
! IPFDEB =  1  !
! NPFDEB =  1  !
! NN1 =  1   !
! NN2 =  10  !
!END!
! NHILL =  0   !
! NCTREC =  0   !
! MHILL =  2   !
! XHILL2M = 1.0 !
! ZHILL2M = 1.0 !
! XCTDMKM = 0 !
! YCTDMKM = 0 !
! END !
```

```
!END!
!END!
!  RCUTR = 30.0 !
!    RGR = 10.0 !
! REACTR = 8.0 !
!   NINT =  9  !
!   IVEG =  1  !
!END!
!END!
! MOZ =  0   !
!  BCKO3 = 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00
!
! MNH3 =  0   !
! MAVGNH3 =  1   !
!  BCKNH3 = 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00
!
! RNITE1 = .2 !
! RNITE2 = 2.0 !
! RNITE3 = 2.0 !
! MH2O2 =  1   !
!  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
!  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
!  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
!  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00
!
! NDECAY =  0   !
!END!
! SYTDEP = 5.5E02 !
! MHFTSZ =  0   !
! JSUP =  5   !
! CONK1 = .01 !
! CONK2 = .1 !
! TBD = .5 !
! IURB1 =  10  !
! IURB2 =  19  !
! ILANDUIN =  30  !
! Z0IN = .15 !
! XLAIIN = .5 !
! ELEVIN = .0 !
! XLATIN = -999.0 !
! XLONIN = -999.0 !
! ANEMHT = 10.0 !
! ISIGMAV =  0  !
! IMIXCTDM =  1  !
! XMXLEN = 1.0 !
! XSAMLEN = 1.0 !
! MXNEW =  99   !
! MXSAM =  99   !
! NCOUNT =  2   !
! SYMIN = 1.0  !
! SZMIN = 1.0  !
! SZCAP_M = 5.0E06 !
! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370, 0.370, 0.370, 0.370, 0.370, 0.370!
! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!
! CDIV = .0, .0 !
! NLUTIBL =  4  !
! WSCALM = .5 !
! XMAXZI = 3000.0 !
! XMINZI = 50.0 !
! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !
! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !
! PTG0 = 0.020,   0.035 !
!  PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !
! SL2PF = 10.0 !
! NSPLIT =  3  !
!  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !
! ZISPLIT = 100.0 !
! ROLDMAX = 0.25 !
! NSPLITH =  5  !
! SYSPLITH = 1.0 !
! SHSPLITH = 2.0 !
! CNSPLITH = 1.0E-07 !
! EPSSLUG = 1.0E-04 !
! EPSAREA = 1.0E-06 !
! DSRISE = 1.0 !
! HTMINBC = 500.0 !
! RSAMPBC = 10.0 !
```

```
! MDEPBC =  1  !
!END!
!  NPT1 =  0  !
!  IPTU =   5  !
!  NSPT1 =  0  !
!  NPT2 =  0  !
!END!
!  NAR1 =  0   !
!  IARU =   5  !
!  NSAR1 =  0  !
!  NAR2 =  0   !
!END!
!  NLN2 =  0   !
! NLINES =  0  !
!  ILNU =   1  !
!  NSLN1 =  0  !
! MXNSEG =  7  !
! NLRISE =  6  !
! XL = .0 !
! HBL = .0 !
! WBL = .0 !
! WML = .0 !
! DXL = .0 !
! FPRIMEL = .0 !
!END!
!  NVL1 =  0   !
!  IVLU =   5  !
!  NSVL1 =  0  !
!  NVL2 =   1   !
!END!
!  NREC =  1   !
!END!
! X =     401.018,   6397.288,       0.000,       2.000!
```



DRAWING SCHEDULE

DRAWING No.	REV	DESCRIPTION
NDHF-001	D	SITE PLAN
NDHF-002	D	GENERAL WORKS LAYOUT PLAN
NDHF-003	D	BUILDING SETOUT LAYOUT PLAN
NDHF-004	D	WASTE WATER TREATMENT DETAILS
NDHF-005	D	ROOF VENTILATION LAYOUT PLAN
NDHF-006	D	BUILDING ELEVATIONS
NDHF-007	D	TRUCK ACCESS LAYOUT PLAN

SURVEYOR DETAILS:

AUSURV SURVEYORS
(08) 9583 5511 www.ausurv.com.au
25 DAVEY STREET MANDURAH, W.A. 6210 mandurah@ausurv.com.au

FOR WORKS APPROVAL & DEVELOPMENT APPLICATION
11 NOVEMBER 2014

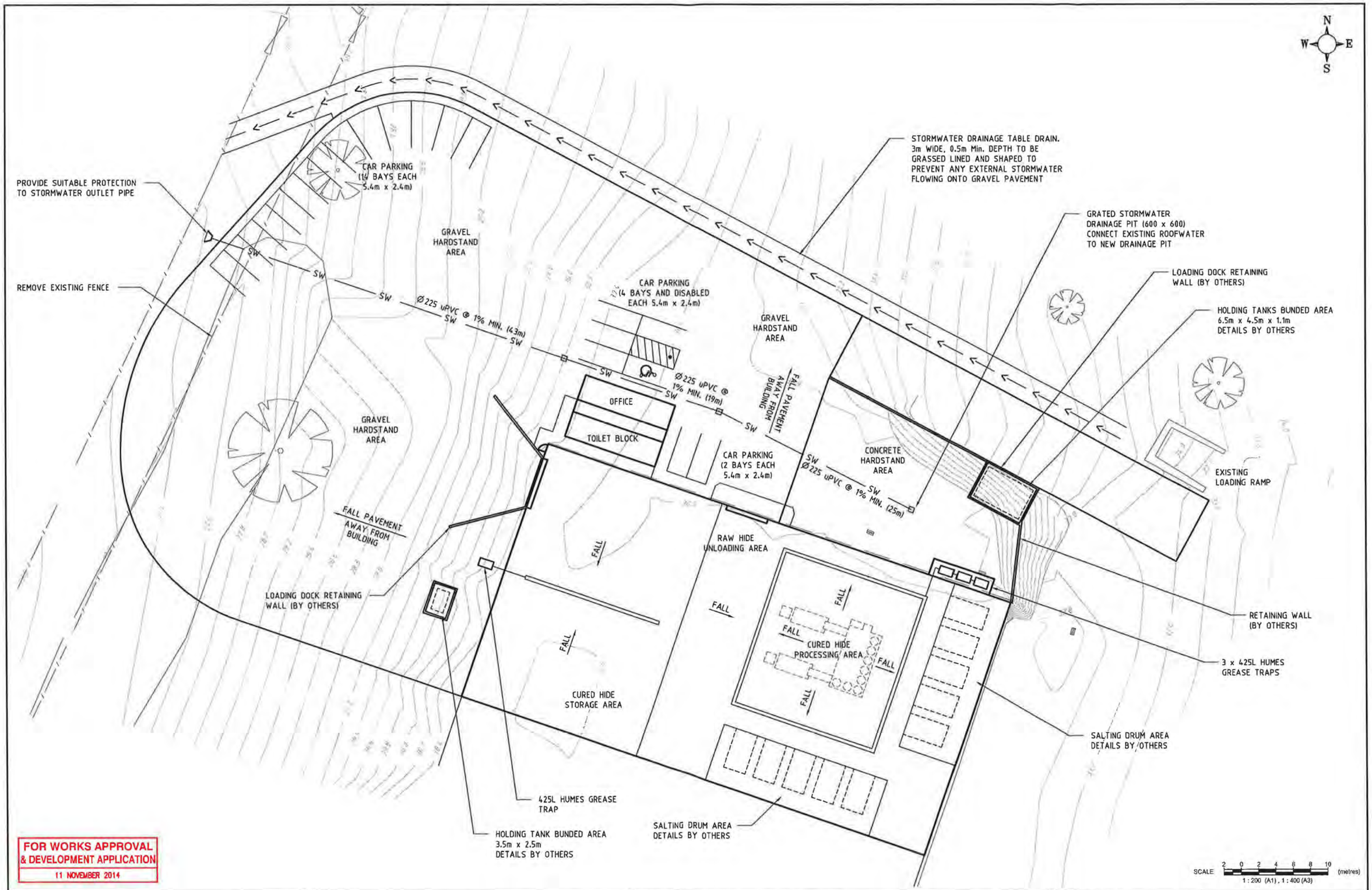
LOCAL AUTHORITY: Shire of Murray

SCALE 50 0 100 250 (metres)
1 : 5,000 (A1), 1 : 10,000 (A3)

Bowman and Associates Pty Ltd
ABN: 22 112 399 514
Mail: PO Box 2059, Rossmoyne WA 6148
Office: 8/640 Beeliar Drive, Success WA 6164
Phone: (08) 9414 9670
Web: www.bowmanassociates.com.au

Project	Location	Drawing Title
North Dandalup Hides Facility	Lot 1675 Plan 206160, South Western Hwy, North Dandalup	Site Plan

Date Drawn	Design By	Drawn By	Checked By	Client	Drawing Number	Revision	Drawing Size
11/11/2014	A.D.	S.B.Y.	B.B.	Goldmark Leather Pty. Ltd.	NDHF - 001	D	A1



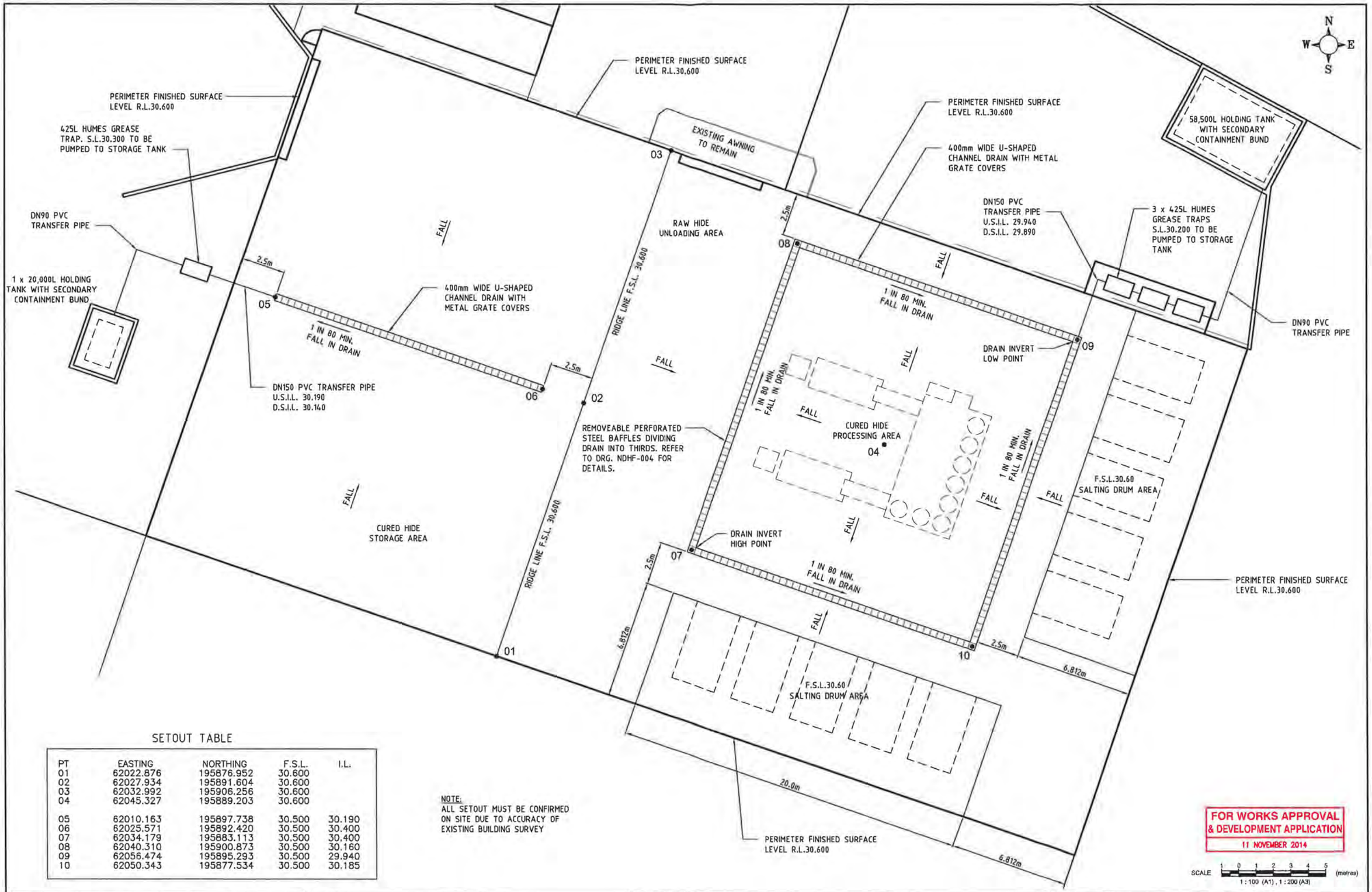
FOR WORKS APPROVAL & DEVELOPMENT APPLICATION
11 NOVEMBER 2014

SCALE 2 0 2 4 6 8 10 (metres)
1 : 200 (A1), 1 : 400 (A3)

Bowman and Associates Pty Ltd
ABN: 22 112 399 514
Mail: PO Box 2059, Rossmoyne WA 6148
Office: 8/640 Beeliar Drive, Success WA 6164
Phone: (08) 9414 9670
Web: www.bowmanassociates.com.au

Project	Location	Drawing Title
North Dandalup Hides Facility	Lot 1675 Plan 206160, South Western Hwy, North Dandalup	General Works Layout Plan

Date Drawn	Design By	Drawn By	Checked By	Client	Drawing Number	Revision	Drawing Size
11/11/2014	A.D.	S.B.Y.	B.B.	Goldmark Leather Pty. Ltd.	NDHF - 002	D	A1



SETOUT TABLE

PT	EASTING	NORTHING	F.S.L.	I.L.
01	62022.876	195876.952	30.600	
02	62027.934	195891.604	30.600	
03	62032.992	195906.256	30.600	
04	62045.327	195889.203	30.600	
05	62010.163	195897.738	30.500	30.190
06	62025.571	195892.420	30.500	30.400
07	62034.179	195883.113	30.500	30.400
08	62040.310	195900.873	30.500	30.160
09	62056.474	195895.293	30.500	29.940
10	62050.343	195877.534	30.500	30.185

NOTE:
ALL SETOUT MUST BE CONFIRMED ON SITE DUE TO ACCURACY OF EXISTING BUILDING SURVEY

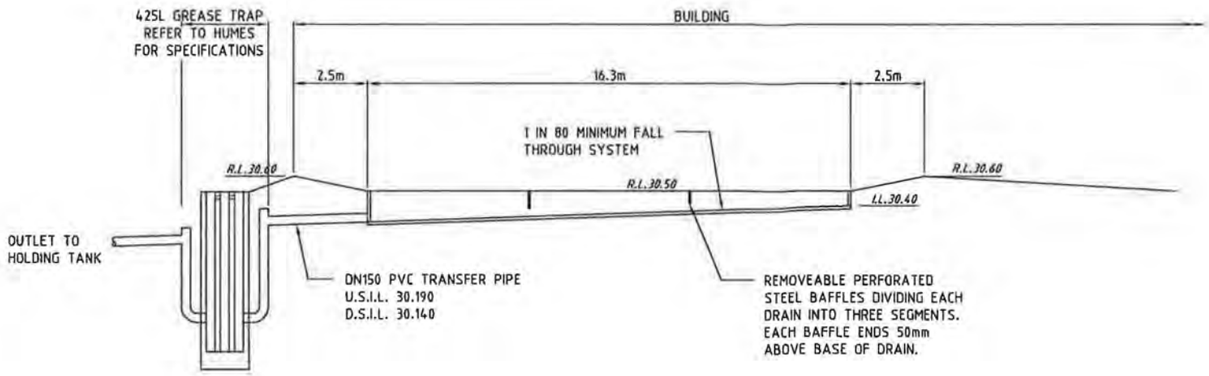
FOR WORKS APPROVAL & DEVELOPMENT APPLICATION
11 NOVEMBER 2014

SCALE 1 0 1 2 3 4 5 (metres)
1 : 100 (A1), 1 : 200 (A3)

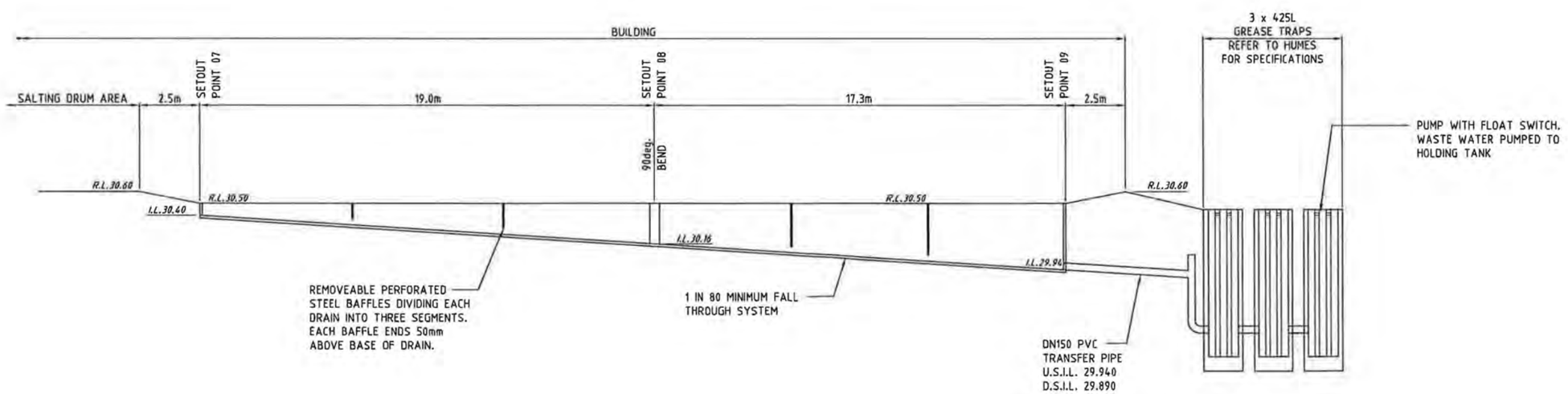
Bowman and Associates Pty Ltd
ABN: 22 112 399 514
Mail: PO Box 2059, Rossmoyne WA 6148
Office: 8/640 Beeliar Drive, Success WA 6164
Phone: (08) 9414 9670
Web: www.bowmanassociates.com.au

Project	Location	Drawing Title
North Dandalup Hides Facility	Lot 1675 Plan 206160, South Western Hwy, North Dandalup	Building Setout Layout Plan

Date Drawn	Design By	Drawn By	Checked By	Client	Drawing Number	Revision	Drawing Size
11/11/2014	A.D.	S.B.Y.	B.B.	Goldmark Leather Pty. Ltd.	NDHF - 003	D	A1



WESTERN CHANNEL DRAIN SECTION
NOT TO SCALE



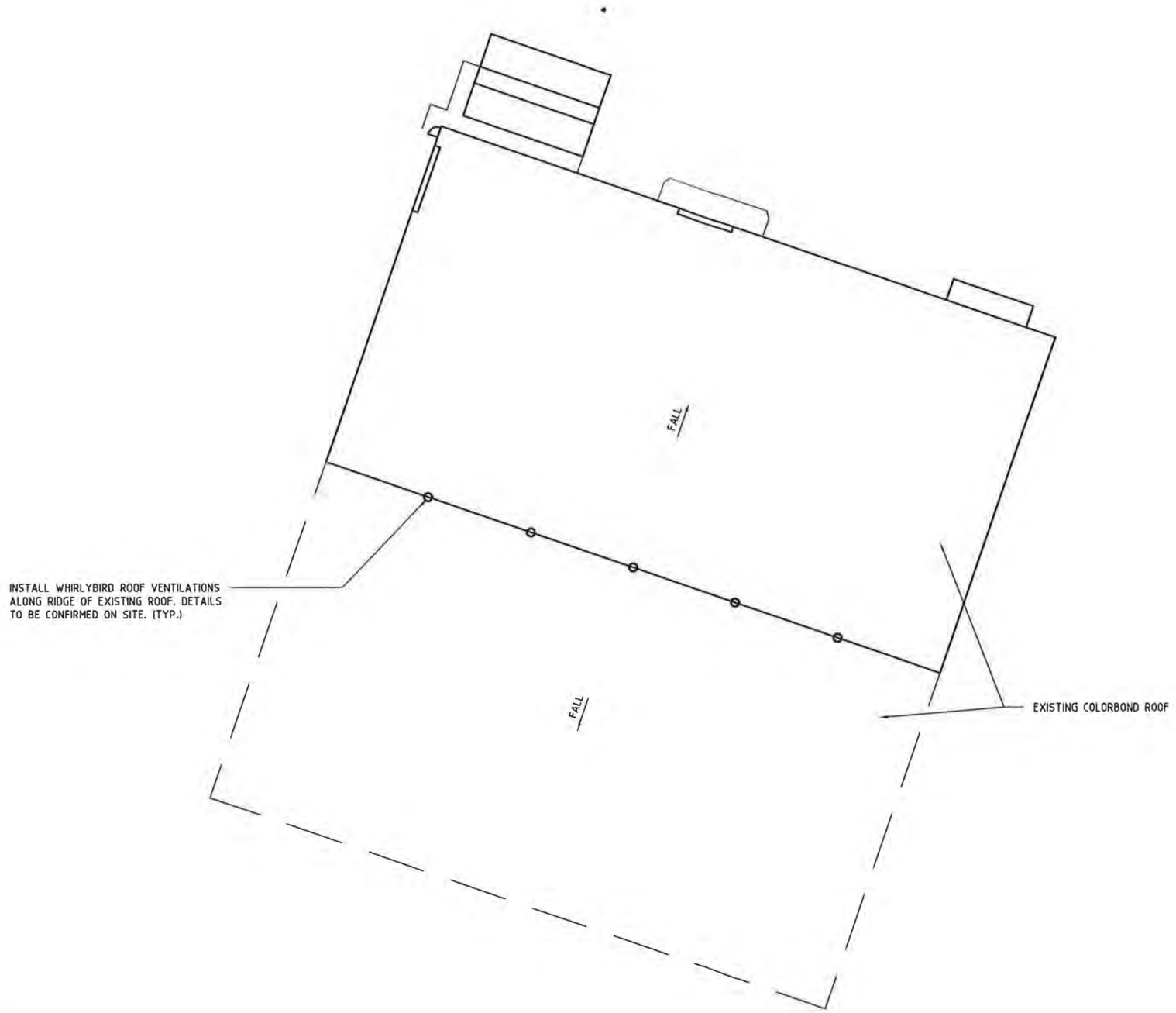
EASTERN CHANNEL DRAIN SECTION
NOT TO SCALE

FOR WORKS APPROVAL & DEVELOPMENT APPLICATION
11 NOVEMBER 2014

Bowman and Associates Pty Ltd
ABN: 22 112 399 514
Mail: PO Box 2059, Rossmoyne WA 6148
Office: 8/640 Beeliar Drive, Success WA 6164
Phone: (08) 9414 9670
Web: www.bowmanassociates.com.au

Project	Location	Drawing Title
North Dandalup Hides Facility	Lot 1675 Plan 206160, South Western Hwy, North Dandalup	Waste Water Treatment Details

Date Drawn	Design By	Drawn By	Checked By	Client	Drawing Number	Revision	Drawing Size
11/11/2014	A.D.	S.B.Y.	B.B.	Goldmark Leather Pty. Ltd.	NDHF - 004	D	A1



NOTE:
ALL SETOUT MUST BE CONFIRMED ON SITE DUE TO ACCURACY OF EXISTING BUILDING SURVEY

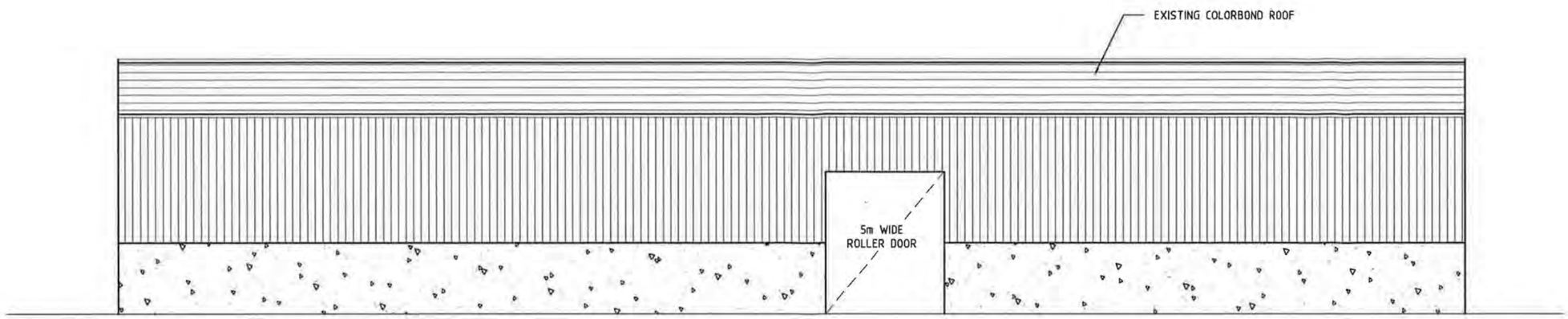
FOR WORKS APPROVAL & DEVELOPMENT APPLICATION
11 NOVEMBER 2014

SCALE 2 0 2 4 6 8 10 (metres)
1 : 200 (A1) , 1 : 400 (A3)

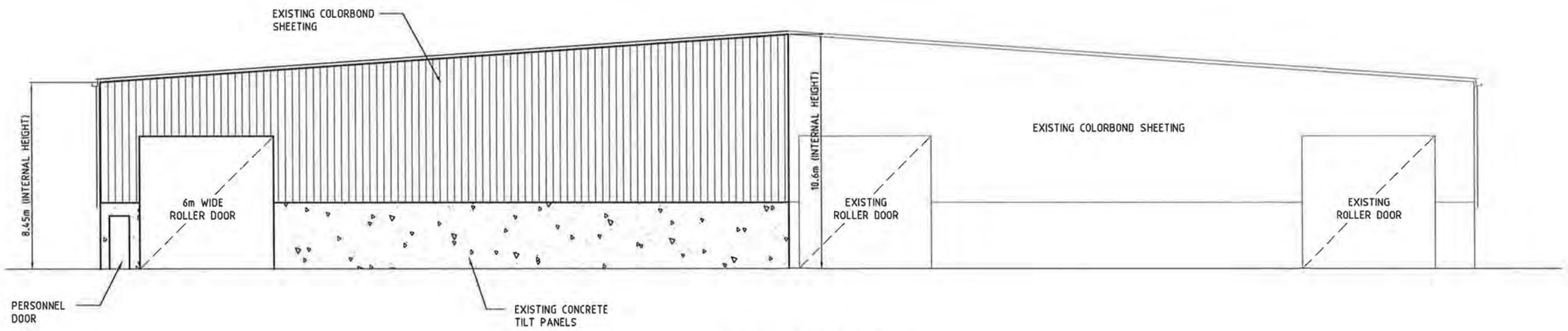
Bowman and Associates Pty Ltd
ABN: 22 112 399 514
Mail: PO Box 2059, Rossmoyne WA 6148
Office: 8/640 Beeliar Drive, Success WA 6164
Phone: (08) 9414 9670
Web: www.bowmanassociates.com.au

Project	Location	Drawing Title
North Dandalup Hides Facility	Lot 1675 Plan 206160, South Western Hwy, North Dandalup	Roof Ventilation Layout Plan

Date Drawn	Design By	Drawn By	Checked By	Client	Drawing Number	Revision	Drawing Size
11/11/2014	A.D.	S.B.Y.	B.B.	Goldmark Leather Pty. Ltd.	NDHF - 005	D	A1



NORTHERN ELEVATION
SCALE 1 : 100 (A1)



WESTERN ELEVATION
SCALE 1 : 100 (A1)

FOR WORKS APPROVAL & DEVELOPMENT APPLICATION
11 NOVEMBER 2014

SCALE 1 0 1 2 3 4 5 (metres)
1 : 100 (A1) , 1 : 200 (A3)

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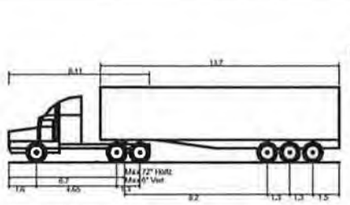
Project	Location	Drawing Title
North Dandalup Hides Facility	Lot 1675 Plan 206160, South Western Hwy, North Dandalup	Building Elevations

Date Drawn	Design By	Drawn By	Checked By	Client	Drawing Number	Revision	Drawing Size
11/11/2014	A.D.	S.B.Y.	B.B.	Goldmark Leather Pty. Ltd.	NDHF - 006	D	A1



Prime mover and semi-trailer (19 m)

Overall Length	19.000M
Overall Width	2.500M
Overall Body Height	4.300M
Min Body Ground Clearance	0.540M
Track Width	2.500M
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500M

N W E S

SW

FOR WORKS APPROVAL
& DEVELOPMENT APPLICATION
11 NOVEMBER 2014

SCALE 2 0 2 4 6 8 10 (metres)
1 : 200 (A1) , 1 : 400 (A3)

Bowman and Associates Pty Ltd
ABN: 22 112 399 514
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Web: www.bowmanassociates.com.au

Project	Location	Drawing Title
North Dandalup Hides Facility	Lot 1675 Plan 206160, South Western Hwy, North Dandalup	Truck Access Layout Plan

Date Drawn	Design By	Drawn By	Checked By	Client	Drawing Number	Revision	Drawing Size
11/11/2014	A.D.	S.B.Y.	B.B.	Goldmark Leather Pty. Ltd.	NDHF - 007	D	A1

Odour Assessment Review

Prepared for:
J.I. Money & Co

Prepared by:
ENVIRON Australia Pty Ltd

Date:
27 January 2015

Project Number:
AS110764

ENVIRON

Prepared by:		**Authorised by:**	
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VERSION CONTROL RECORD

Document File Name	Date Issued	Version	Author	Reviewer
Review Of Odour Report-N Dandalup Tannery.Docx	18 December 2014	Draft	M Sowden	B Bell
AS110764 - Review of Odour Report-N Dandalup Hides Facility.docx	27 January 2015	Final	B Bell	B Bell

Contents

1 Introduction

ENVIRON Australia Pty Ltd (ENVIRON) was commissioned by Bayley Environmental Services on behalf of J.I. Money & Co. to review the Odour Assessment report prepared by Environmental Alliances Pty Ltd (Envall) for a proposed Hides Facility (Fellmongery). The Envall report was part of a larger development application report submitted to the Shire of Murray. In this development application, Goldman Leather Pty Ltd (Proponent) proposed to establish a hide curing facility in the Shire of Murray.

Based on the Envall report, it is proposed that the North Dandalup Hides Facility (NDHF) will accept up to 5,000 cow hides a week. These hides will be acquired from various abattoirs state-wide and be delivered as green hides (unsalted) direct from the abattoirs. Upon receipt the hides will be salt cured in large drums (similar to concrete mixes) for up to twenty four hours. They will then be trimmed and classified in various grades and weights before being packed for export. Approximately 35 kL of process waste water will be generated each week and stored in a sealed tank. Wastewater and hide offcuts will be removed from site regularly and taken to existing external waste disposal sites.

Bayley Environmental Services has advised ENVIRON that it understands that the hides will not be cleaned at the abattoir to remove traces of fat/flesh and blood prior to transport. Odour is likely to be generated primarily via decomposition (European Commission, 2003) and therefore the management of the proposed facility and wastes will be a key aspect of the likely odour emissions.

The Environmental Protection Authority (EPA) Guidance for the Assessment of Environmental Factors No. 3 is titled Separation Distances between Industrial and Sensitive Land Uses (EPA, 2005). This guidance document specifies a buffer distance of 500 m for Fellmongering (where animal skins or hides are dried, cured or stored). It also specifies a buffer distance of 200 m to 300 m for small non-sulphide tanneries that treat and dry animal skins, leather and artificial leather. The Envall report referenced the small non-sulphide tannery buffer distance and concluded that the nearest residence, located approximately 430 m to the north-northwest of the proposed NDHF, was beyond the buffer distance recommended by the EPA Guidance 3. However, both the Envall and Goldman Leather Pty Ltd documents refer to the proposed project as a Fellmongery and it is therefore considered that the 500 m buffer distance associated with Fellmongering should have been be used rather than the smaller buffer distance associated with small non-sulphide tanneries. The use of the Fellmongery buffer distance means that the nearest residence would be within the buffer zone. The EPA Guidance 3, states:

> *"Where the separation distance is less than the generic distance, a scientific study based on site- and industry-specific information must be presented to demonstrate that a lesser distance will not result in unacceptable impacts."*

Such studies would typically include an air quality assessment such as that presented in the Envall report.

In reviewing the air dispersion modelling documented in the Envall report, ENVIRON's approach has been to determine if an alternative approach would have yielded a significantly different conclusion which was: "*that odours were unlikely to be of any significant concern*".

Table 3 of the Envall report tabulates that at the nearest receptor the predicted odour concentrations (99.5 percentile) could reach 72% of the one hour 2.5 ou criteria.

In order to evaluate the conclusions from the modelling, it is necessary to understand the different components of and inputs to the model namely:

- Model choice;
- Meteorology;
- Source parameterisation; and
- Source strength.

Each of these factors is discussed in the following sections.

2 Introduction

2.1 Model choice

The US-EPA uses a rough rule of thumb of a factor of two for the model accuracy (US EPA , 2012) in determining if a model can be approved in place of a regulatory model. This means that at any point in time and location, the concentrations from a model being tested should match within a factor of two (i.e. between ½ and double) the results obtained from the regulatory model. This factor is reflected in the report (Table 3) where two modelling parameters have been compared (micrometeorology and PG coefficients) giving results of 0.73[1] vs 0.43 ou and 2.9 vs 1.8 ou (i.e., a factor of 1.7 and 1.6 respectively).

Calpuff is a regulatory model that is typically used for long distance dispersion modelling and situations where there are light winds and complex meteorology. AERMOD is the USA approved model that is generally applied to near field dispersion modelling studies. As such ENVIRON would probably have used AERMOD for the study but as both models are US EPA approved, it is not considered that the selection of model would have had a significant impact on the results.

2.2 Meteorology

The Envall report identifies the BOM operated Karnet meteorological site approximately 20 km to the north as the closest meteorological station. However the Envall report does not use these data for the modelling but instead uses meteorology generated by The Air Dispersion Model (TAPM). TAPM generated meteorological data are compare to the BOM site situated at Caversham much further away, citing potential matches as indicative of good data.

ENVIRON believes that the use of the TAPM generated meteorology is not acceptable for this type of modelling study and its use could result in a significant under-prediction of the odour concentrations. TAPM has a demonstrated tendency to under-predict the frequency of light winds. For non-buoyant emission sources, such as those from the proposed development, the highest concentrations are associated with light winds. As such an under-prediction of these light winds generally results in an under-prediction of the maximum concentrations.

Figure 1 and **Figure 2** show the morning and afternoon wind roses derived from the TAPM data and the three nearest BOM sites (Karnet, 2014; Dwellingup, 2014; Mandurah, 2014). Visibly apparent in the roses are:

- the lack of calms in the TAPM data;
- a slight reduction in percentile of low wind speeds; and
- absence of very high wind speeds and an increase in percentiles in the “average wind speeds”.

There is generally a good correlation with the wind direction across the TAPM and BOM data sets.

[1] Note Envall report appears to swap the row and column headers, ENVIRON assumed the subsequent text not the table headers are accurate.

To estimate the impact of calm winds on predicted concentrations the US EPA screening model, Screen3, was run to compare the impact of changing stability classes. Dispersion models use the concept of atmospheric stability where the weather conditions are ascribed to six stability conditions. These vary from F moderately stable (low wind speed, night) to unstable (class f) (air rises vertically) and has an impact on the dispersion properties. **Figure 3** shows the impact changing from slightly unstable conditions (class C) (typical daytime) to moderately stable conditions (class F) which is predicted to increase the ground level concentrations by about seven times (at 400 m downwind from source).

In its modelling guidance (DOE, 2006) it states that TAPM generated meteorology should not be used to model emissions from non-buoyant low level emission sources. Therefore the use of TAPM generated meteorology in the air dispersion modelling is likely to result in an under-prediction of the maximum concentrations.

2.3 Source parameterisation

Envall modelled the odour emissions as a volume source with the doors open. In contrast the operating conditions specify that the plant will vent from the ceiling ventilation outlets. However, given that the dispersion of the emissions will be influenced by the building itself, it is not considered likely that the different source characteristics would have any significant impact. Screen3 was again used to estimate this impact and as depicted in **Figure 4**, there are no significant differences expected in changing source types modelled as expected.

2.4 Source strength

Odour can be defined as the “perception of smell” (Govt of India, 2008; DEP, 2002). Unlike conventional air pollutants, odours arise from potentially multiple overlapping compounds that bring a non-linearity into the sense of smell. Odour is typically measured by a panel which determine a threshold concentration where half the population recognises an odour and the number of dilutions required to achieve that point represents the odour units. The nature and strength of the odour may change with dilution or interaction with other compounds. Typically odour measurements are set for target compounds such as ammonia or hydrogen sulphide against odour panel measurements. If an unknown compound (odour) is present in the field testing it may invalidate field measurements.

The Envall report uses odour measurements obtained from a wet-blue tannery and applied these to the proposed NDHF. The wet-blue tannery uses a sulphur based process in the operations which has the potential to emit strong sulphate odours (Pattle Delamore Partners LTD, 2013). In contrast the NDHF proposal coats the hides with dry salt which draws moisture out of the hide and helps preserve it. The preservative properties of salt should prevent decomposition of the hide thereby reducing odour emissions.

Odour can be generation from this process including from:

- Acceptance of poorly cleaned hides (with residual fat/flesh);
- Long transportation distances in hot conditions;
- Poor operational procedures which neglecting or delay clean-up operations;
- Formation of organic breakdown products in grease traps and waste water; and
- Insufficient salt being added to pickle the hides.

Most of these can be controlled by operational procedures such as using reputable abattoirs, inspections prior to receiving the hides, short commutes and/or refrigerated trucks. The wastewater and grease traps represent the largest potential odour source. The Envall report does not describe potential odour sources in detail and simply states that using the wet-blue odour measurements are a conservative assumption in comparison to the proposed project. Consideration of the buffer distances for sulphide based tanneries (1,000 m to 2,000 m) and fellmongeries (500 m) defined in EPA Guidance 3 supports the Envall position that the odours from the wet-blue tannery are expected to be greater than those from the proposed plant. However the odour concentrations that may occur from the proposed NDHF have not been specifically quantified by the Envall report and these can be affected by a number of factors as outlined above.

ENVIRON concurs with Envall that the emissions estimates used within its report are likely to be conservative.

3 Conclusions

The closest residence to the proposed NDHF is within the buffer zone specified within the EPA Guidance 3 for fellmongeries and in this case the EPA Guidance 3 specifies that a scientific study using more on-site and industry-specific information be undertaken. The Envall report represents such a study.

In the absence of further information such as a detailed process description and the condition of the hides that will be received at the proposed NDHF, it is difficult to fully assess the potential odour emissions and therefore the potential impacts. No emissions information specific to the type of process proposed is provided but ENVIRON agrees with the Envall report that provided good housekeeping is implemented the odour emissions modelled are likely to be conservative. However, the effect of the conservative nature of the emissions on the modelling outcomes are likely to be offset to some extent by the possible non-conservative outcome resulting from the use of TAPM generated meteorology within the air dispersion model.

The likely extent of the conservative nature of the emissions and non-conservative outcome due to using TAPM generated meteorological data and how these may offset each other cannot be quantified based on the information provided. Therefore, it is difficult to conclude if the proposed NDHF will result in odour concentrations above the guidelines at the closest residence based on the data that are available.

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4 Limitations

ENVIRON Australia prepared this report in accordance with the scope of work as outlined in our proposal to Bayley Environmental (on behalf of J.I. Money and Co) dated 9 December 2014, in accordance with our understanding and interpretation of current regulatory standards, and based on information presented in the Envall report.

The conclusions presented in this report represent ENVIRON's professional judgment based on information made available during the course of this assignment and are true and correct to the best of ENVIRON's knowledge as at the date of the assessment.

ENVIRON did not independently verify all of the written or oral information provided to ENVIRON during the course of this investigation. While ENVIRON has no reason to doubt the accuracy of the information provided to it, the report is complete and accurate only to the extent that the information provided to ENVIRON was itself complete and accurate.

This report does not purport to give legal advice. This advice can only be given by qualified legal advisors.

Figures

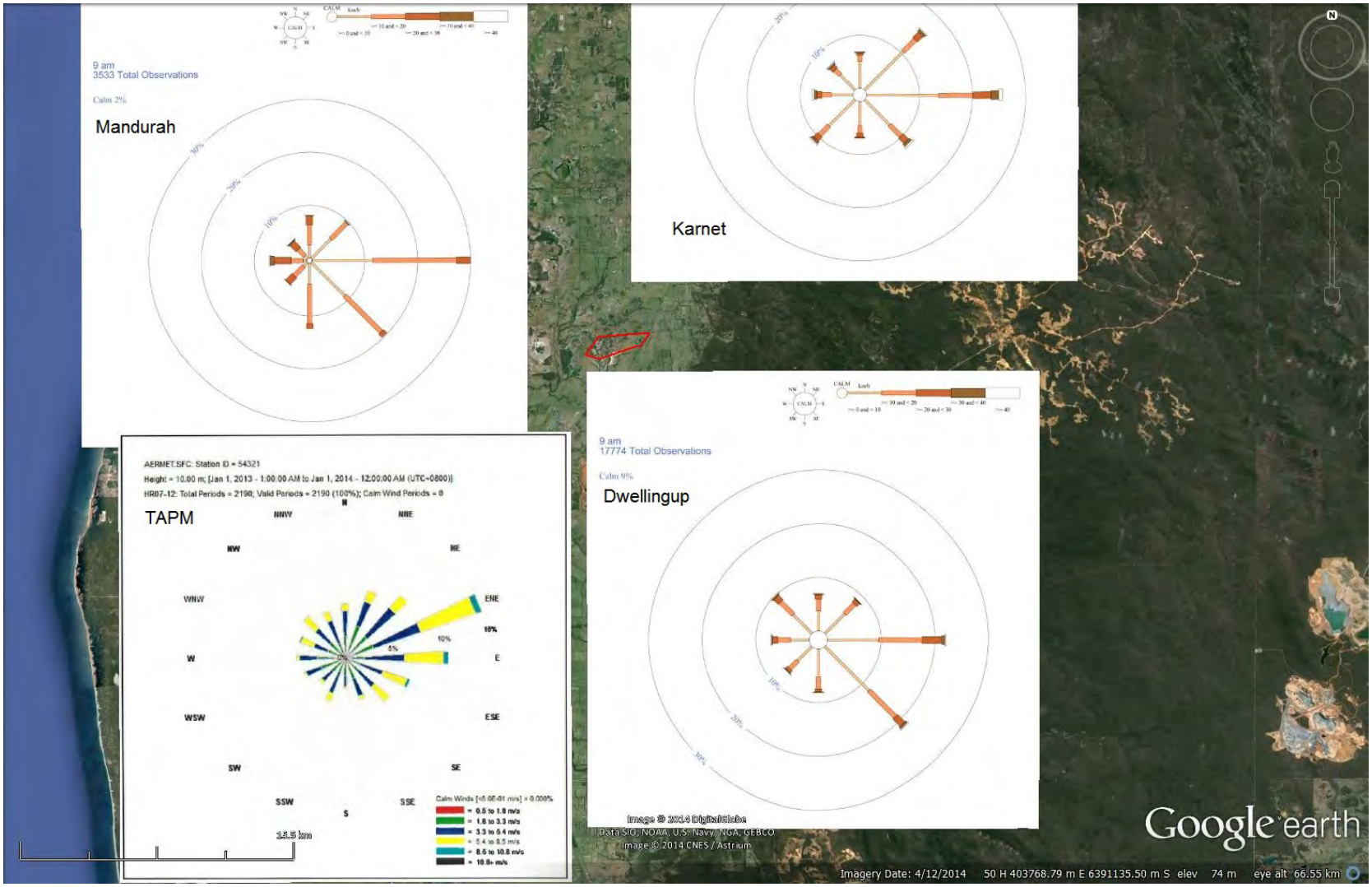

Figure 1 Wind Roses 9AM

Note: With the exception of the TAPM plot these wind roses are centred over the meteorological site

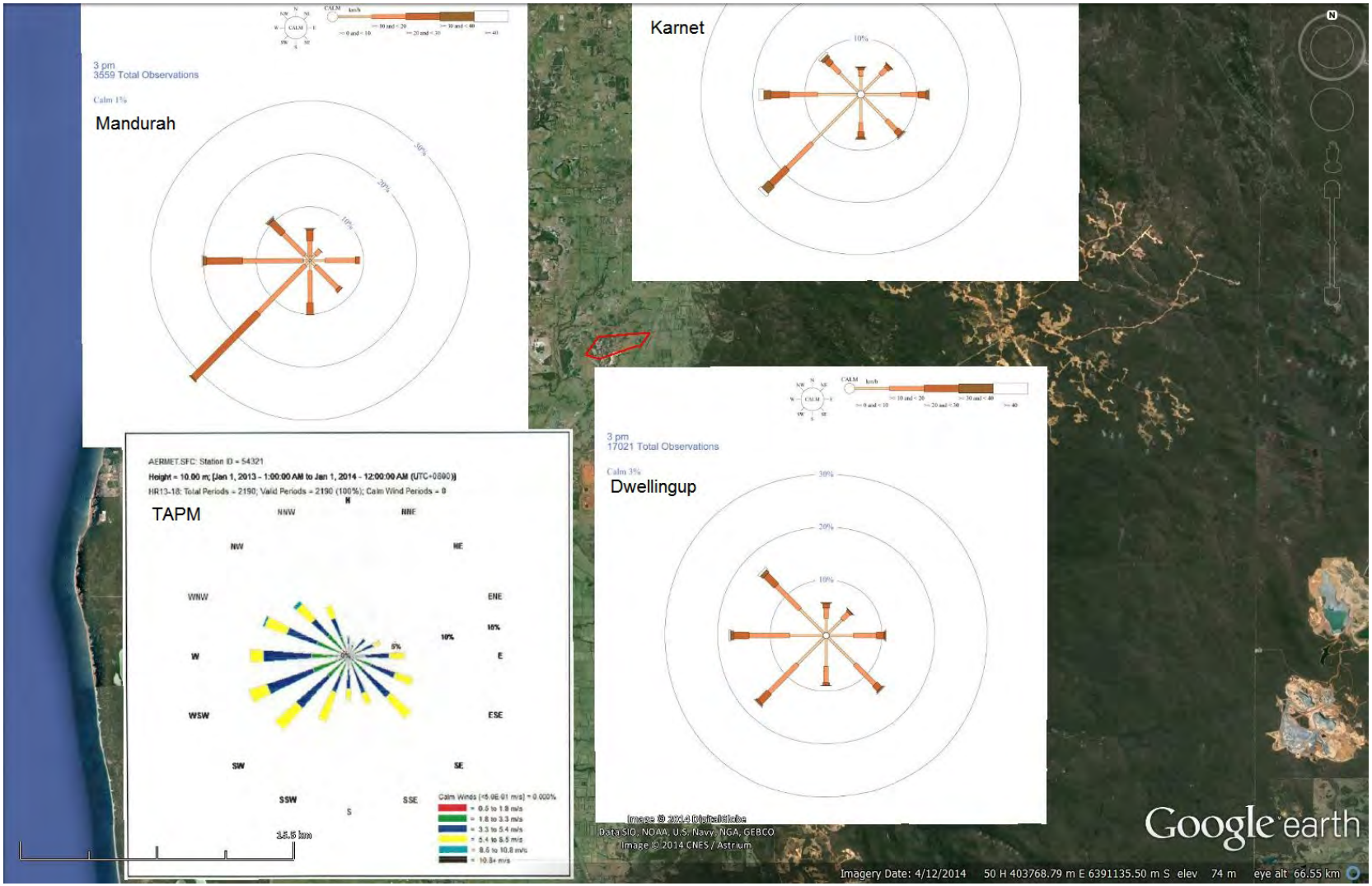

Figure 2 Wind Roses 3PM

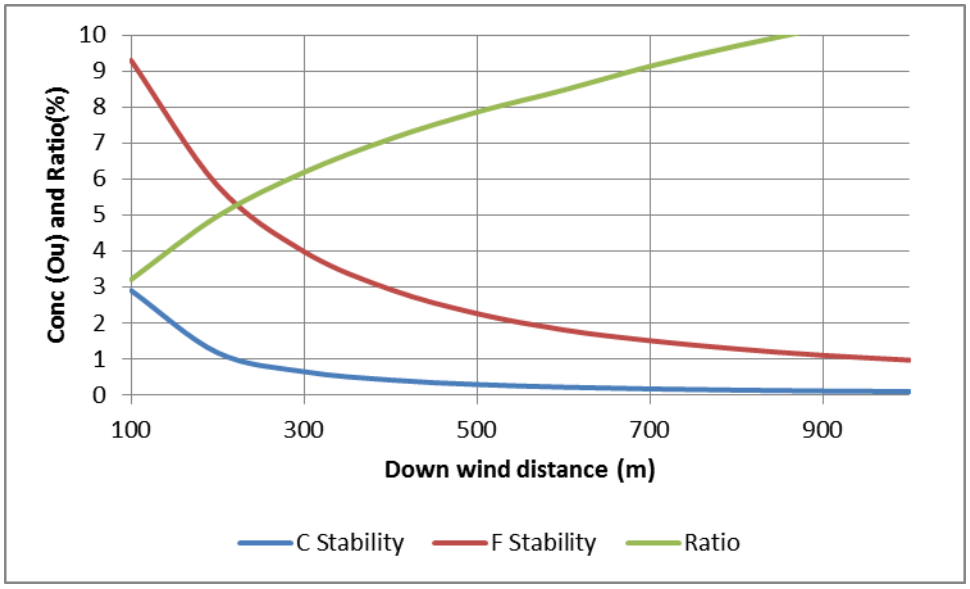

Figure 3: Screen3, Impact of changing stability

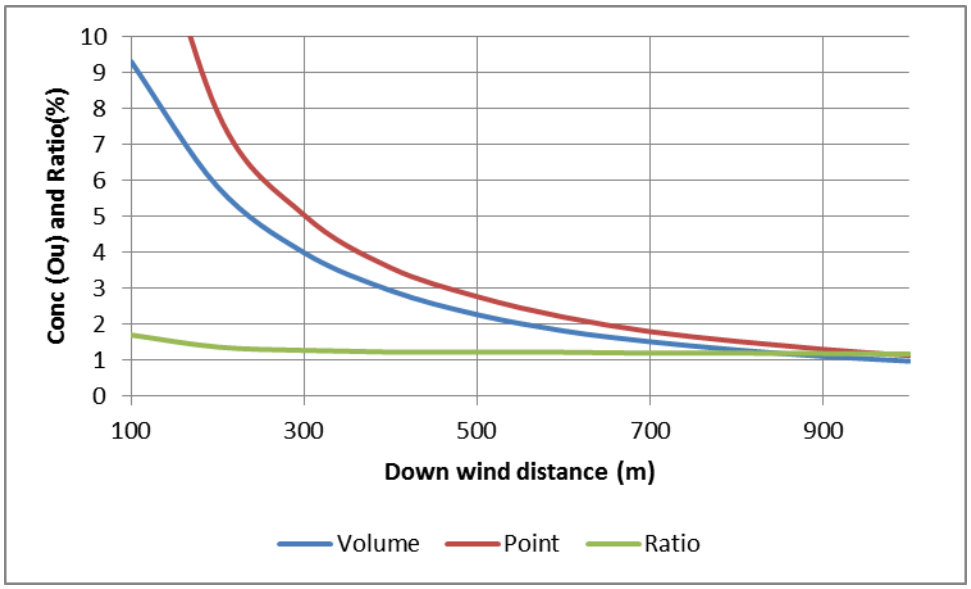

Figure 4: Screen3, Impact on changing source type

Note: Predicted concentration has been scaled to match the reported odour concentration. (Same scaling was used in all four graphs)

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Our Ref: J14036

27 January 2015

Chief Executive Officer
Shire of Murray
PO Box 21
PINJARRA WA 6208

Dear Sir

Proposed Animal Hide Processing Facility
South Western Highway, North Dandalup

Bayley Environmental Services was engaged by Mrs Joan Money of Money Rd, North Dandalup in December 2014 to review and make a submission on the proposal by Goldmark Leather Pty Ltd to establish an animal hide processing facility (fellmongery) at Lot 1675 South Western Highway, North Dandalup. Mrs Money is the owner of the adjacent property to the north, on which two houses are located 430m and 450m from the proposed fellmongery. One of the houses is occupied by Mrs Money and her partner, the other by an employee.

The focus of this submission is on the Development Application prepared by Bowman & Associates Pty Ltd (2014) and, in particular, on Appendix B, an odour modelling report prepared by Environmental Alliances Pty Ltd (Envall). As part of the review, Mr Brian Bell of Environ Australia, an experienced air quality modeller, was engaged to review the Envall report in terms of its methodology, assumptions and conclusions. The report by Environ Australia is attached in Appendix A.

The Envall report employs numerical odour modelling based on assumptions regarding the odour source, meteorological conditions and plant operations to conclude that the facility will produce odours at the adjacent residences that are below the EPA criteria for odour nuisance. The overall finding of this review is that the Envall report contains a number of errors and inadequacies including the modelling methodology, the choice of model, the odour source and the meteorological conditions, that make it unreliable as a basis for concluding that the odour from the plant will be within acceptable limits. The remainder of this submission examines these issues in detail.

EPA Guidelines and DER Advice

The Envall report misquotes (on p.1 and again on p.10) the EPA's *Guidance for the Assessment of Environmental Factors No.3: Separation Distances Between Industrial and Sensitive Land Uses* as stating that the recommended buffer distance for fellmongeries from residences is 200 to 300 metres. In fact, the minimum separation recommended for fellmongeries in EPA Guidance No. 3 is 500 metres. Both houses on Mrs Money's property are less than the recommended minimum distance from the proposed fellmongery.

The Envall report also states (p.4) that "The approach recommended by the Department of Environmental Regulation (DER) to assess air quality impacts from industrial proposals is modelling the dispersion of air emissions as described in "Air Quality Modelling Guidance Notes" (DEP 2006)…". In fact, the DER recommends against using dispersion modelling for determining odour separation distances due to the difficulties of quantifying inputs and assessing impacts (P. Taylor, Manager, DER Air Quality Branch, pers. comm.). Instead, the DER recommends that separation distances be determined based on the EPA Guidance and industry best practice.

Choice of Air Dispersion Model

Envall used the CALPUFF numerical model to simulate the dispersion of odour from the fellmongery. CALPUFF is best suited to long-range dispersion studies, as well as certain near-field situations involving complex meteorology. In short-range situations such as this, the USA model AERMOD is considered more suitable. However, the choice of model is overshadowed by the above advice from the DER that numerical modelling is not recommended at all as a means of assessing odour separation distances.

Meteorological Input Data

Envall used an artificial meteorological data set derived from the CSIRO Air Pollution Model (TAPM) as input to the model, rather than using actual meteorological data from one of the nearby Bureau of Meteorology stations at Karnet, Dwellingup, Mandurah or Caversham. Environ, in its review of the Envall report, stated that:

> "Environ believes that the use of the TAPM-generated meteorology is not acceptable for this type of modelling and its use could result in a significant under-prediction of the odour concentrations. TAPM has a demonstrated tendency to under-predict the frequency of light winds. For non-buoyant emission sources, such as those from the proposed development, the highest concentrations are associated with light winds. As such an under-prediction of these light winds generally results in an under-prediction of the maximum concentrations."

The Environ criticism is supported by the DER which, in its modelling guidelines (DoE, 2006), specifically states that TAPM-generated meteorology data should not be used to model emissions from non-buoyant, low-level emission sources (such as this one).

Figures 1 and 2 of the Environ review (Appendix A) show morning and afternoon wind roses derived from the TAPM data and the three nearest BoM sites (Karnet, Dwellingup and Mandurah). The figures clearly show the significant under-representation in the TAPM dataset of light southerly winds, which are the winds of main concern to the houses directly to the north. Therefore the use of TAPM-generated meteorology data is likely to result in a significant under-prediction of the impacts of odour from the proposed fellmongery on Mrs Money's houses.

Odour Source Characterisation

The Envall report does not present any data on odour generation from fellmongeries such as the one proposed. Instead it uses a single odour sample from a tannery in New Zealand: that of Wallace Corporation in Waitoa. Envall asserts that the NZ plant, being a tannery rather than a fellmongery, will be much more odorous than the proposed fellmongery and is therefore a highly conservative basis for the modelling.

There are several problems with this approach:

- The plants are not comparable. The NZ plant is purely a tannery and does not incorporate any hide curing using salt or brine. Hides received at the tannery are placed immediately into the tanning process.

- The tanning odours from the NZ plant are likely to consist mainly of hydrogen sulphide from the tanning and de-hairing operations. The odours from the proposed North Dandalup plant will be mostly volatile organic compounds (VOCs) such as mercaptans, among the most odorous substances known, from decomposition of hides before they are cured.

- The NZ plant is fitted with an air extraction system that captures all emissions from the tanning baths and directs them through a biofiltration unit.

- The single sample was taken adjacent to (not above, as stated by Envall (2013)) the tanning baths; however there is no indication whether this sample is representative of typical emissions, what operational state the plant was in at the time and whether the air extraction system was operating.

- The NZ data gives no indication of the composition of the sample. Different odours behave differently at different concentrations. There is no certainty that VOCs at 2.5 times their odour threshold will be perceived the same as hydrogen sulphide at 2.5 times its odour threshold.

In summary, there is almost no similarity between the NZ tannery and the proposed North Dandalup fellmongery in either the processes used, the gases emitted or the odours likely to arise. Despite this, the Envall report makes the assumption that the data from the NZ plant will result in a conservative estimate of odour emissions from the North Dandalup plant. There is no rational basis for this assumption.

Plant Operational Procedures

Envall cites several operational procedures that will, it is claimed, reduce the emission of odours from the fellmongery. In practice, most if not all of these are likely to be either non-applicable or irrelevant. These include:

- Envall models the fellmongery with the loading bay doors open but claims that the doors will be closed at all times except during truck loading, thus leading to a reduction (or an over-estimate) in odour emissions. It is difficult to imagine that staff at the plant will tolerate working in a sealed metal shed on hot summer days surrounded by animal hides. This suggests that the doors will be open for much of the time, at least in summer.

- Regardless of whether the doors are normally open, the odorous gases will not simply disappear – if the doors are closed, the gases will accumulate in the shed until the doors are opened, leading to a pulse of high odour emissions. This could arguably be worse than a constant low-level emission.

- The same applies to the Envall statement that odours "…will tend to "pool" in the eastern end of the building rather than being completely exhausted." They may pool temporarily, but sooner or later they will escape.

- The Bowman & Associates report notes that rooftop ventilators will be installed to "…aid the extraction and disbursement of odorous air from within the shed." This directly contradicts the earlier assertion that odours will be contained by keeping the doors closed. The height of the ventilators (stated as 6m above ground) is unlikely to be significant for a non-buoyant plume over the distances involved.

Odour Impacts

Odour is expressed in terms of odour units (OU). One OU is defined as the minimum concentration of a gas at which half of the population can distinguish it from the background. Criteria for acceptable odour are based on the strength, duration and frequency of the odour. In this situation, the applicable DER criteria are that the one-hour average odour concentration at sensitive premises should be less than:

- 8 OU for 99.9% of the time; and
- 2.5 OU for 99.5% of the time.

Envall predicts, according to the model, that the one-hour average odour intensity at Mrs Money's houses will be less than 2.9 OU for 99.9% of the time and less than 1.8 OU for 99.5% of the time. Conversely, this implies that the odour intensity over one hour will be more than 2.9 OU for 0.1% of the time and more than 1.8 OU for 0.5% of the time. Therefore, it can be deduced that Mrs Money's houses will be subjected to odours from the fellmongery at 2.9 times the odour threshold for an hour or more for an average of nearly nine hours per year, and at 1.8 times the threshold for an hour or more for an average of 43 hours per year.

Mrs Money and her partner have lived on her property at North Dandalup for many years. While they are accustomed to the sights, sounds and smells of the rural landscape, the proposed fellmongery cannot be considered a typical part of the rural landscape. As such, it could be argued that no odour of this type is acceptable.

Conclusion

The report by Envall in support of the proposed fellmongery is flawed to the extent that it cannot be regarded as an adequate justification for the proposal. Specifically:

- It uses a methodology (air dispersion modelling) that is not supported by the DER for assessing the adequacy of odour buffer distances.

- It uses a model that is regarded as unsuitable by the DER for short-range dispersion studies.

- It uses a meteorological data set that is regarded as unsuitable by the DER for non-buoyant, low-level emission sources, and which demonstrably under-estimates the occurrence of light winds in the direction of Mrs Money's houses.

- It bases its emissions data on a single odour reading from a New Zealand plant that contains none of the process proposed in the North Dandalup Plant, with no evidence that it is in any way representative of the proposed plant.

- It quotes proposed operational measures that are unlikely either to be implemented or to have a significant effect on emissions.

Despite these shortcomings, the Envall report shows that Mrs Money can expect to be exposed to odours from the plant for significant periods of time.

For these reasons Mrs Money requests that you either refuse planning permission for the plant, or at least to require a more detailed assessment of the likely odour impacts based on an accepted methodology using verifiable data from a representative source.

Yours sincerely
BAYLEY ENVIRONMENTAL SERVICES

PHIL BAYLEY

Appendix A Environ Australia review of Envall Report