



Waterbird Creek Structure Plan

Amenity Impact Assessment

Greater Shepparton City Council

03 July 2023

→ The Power of Commitment



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1. Introduction

GHD was engaged by Greater Shepparton City Council (GSCC) to undertake an Amenity Impact Assessment (AIA), in relation to dust and odour, for the proposed Waterbird Creek Precinct (here in now referred to as The Precinct).

This AIA considers the current and future impacts on the transition of land uses for urban purposes within the Precinct caused by ongoing operations of industries including but not limited to; Shepparton Alternative Route, commercial uses along Goulburn Valley Highway west of the Precinct, Shepparton Aerodrome to the north of the Precinct, Kialla South Growth Corridor including the Shepparton Harness Greyhound Racing Precinct south of River Road. The assessment area included the Precinct itself and features within a 2 km radius of the Precinct boundary.

GHD has undertaken the AIA incorporating dust and odour impacts within the context of EPA Victoria guidelines. GHD notes that acoustic impacts including that of the Shepparton Aerodrome have been assessed separately by another Consultant.

As part of the AIA, GHD has undertaken a separation distance assessment with respect to air quality. The purpose of a separation distance assessment is to provide sufficient separation between sensitive land uses (such as residences) and land uses that have the potential to generate emissions of dust, odour and/or air emissions so that on the occasion of an emission event, any off-site adverse amenity is minimised. The report draws upon Clause 53.10 of the Victorian Planning Provisions (VPP) 'Uses with Adverse Amenity Potential' and the EPA separation distance guideline, Publication 1518 dated March 2013 and the Draft Publication 1949 dated March 2022, as part of this assessment.

1.1 Purpose of this report

The primary purpose of the AIA is to provide a preliminary assessment of sources of adverse amenity impacts including dust, odour and air emissions against relevant regulations. This is required to make informed decisions about land use and amenity/reverse amenity issues as part of a future planning scheme amendment that proposes to change planning controls affecting land within the Precinct.

1.2 Scope of works

The following scope of work was undertaken for this assessment:

- Information request and review, including complaint history data, planning permits, precinct development plans
- Site visit to visually assess the existing environment and surrounding industries
- Surrounding industries analysis. Based on the site visit findings, industries with potential amenity impacts were mapped and further investigated.
- Default separation distance assessment
- Meteorological analysis
- Directional buffer assessment
- Complaints history analysis
- Risk assessment, incorporating the constraints identified in the previous assessment components
- Mitigation recommendations
- Reporting

1.3 Limitations

This report has been prepared by GHD for Greater Shepparton City Council and may only be used and relied on by Greater Shepparton City Council for the purpose agreed between GHD and Greater Shepparton City Council as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Greater Shepparton City Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1.4 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Greater Shepparton City Council and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

Accessibility of documents

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

1.4 Assumptions

The following assumptions were made in the preparation of this report:

- The assessment relates to amenity impacts for dust, odour and air emissions only.
- This assessment has utilized both EPA Separation distance guidelines namely; EPA Publication 1518 and Draft EPA Publication 1949.
- The surrounding industries site boundaries are based off publicly available information provided by the Victorian State Government Department of Environment, Land, Water and Planning (DELWP).
- Information on existing businesses has been obtained through publicly available information and site observations. No consultation has been made with existing businesses as part of this study.
- The most site representative available meteorological data is from the Bureau of Meteorology (BoM) automatic weather station (AWS) located at Shepparton Airport.
- Assumption has been made that all industries identified operate in accordance with the GED.

2. Site overview

2.1 Location and existing features

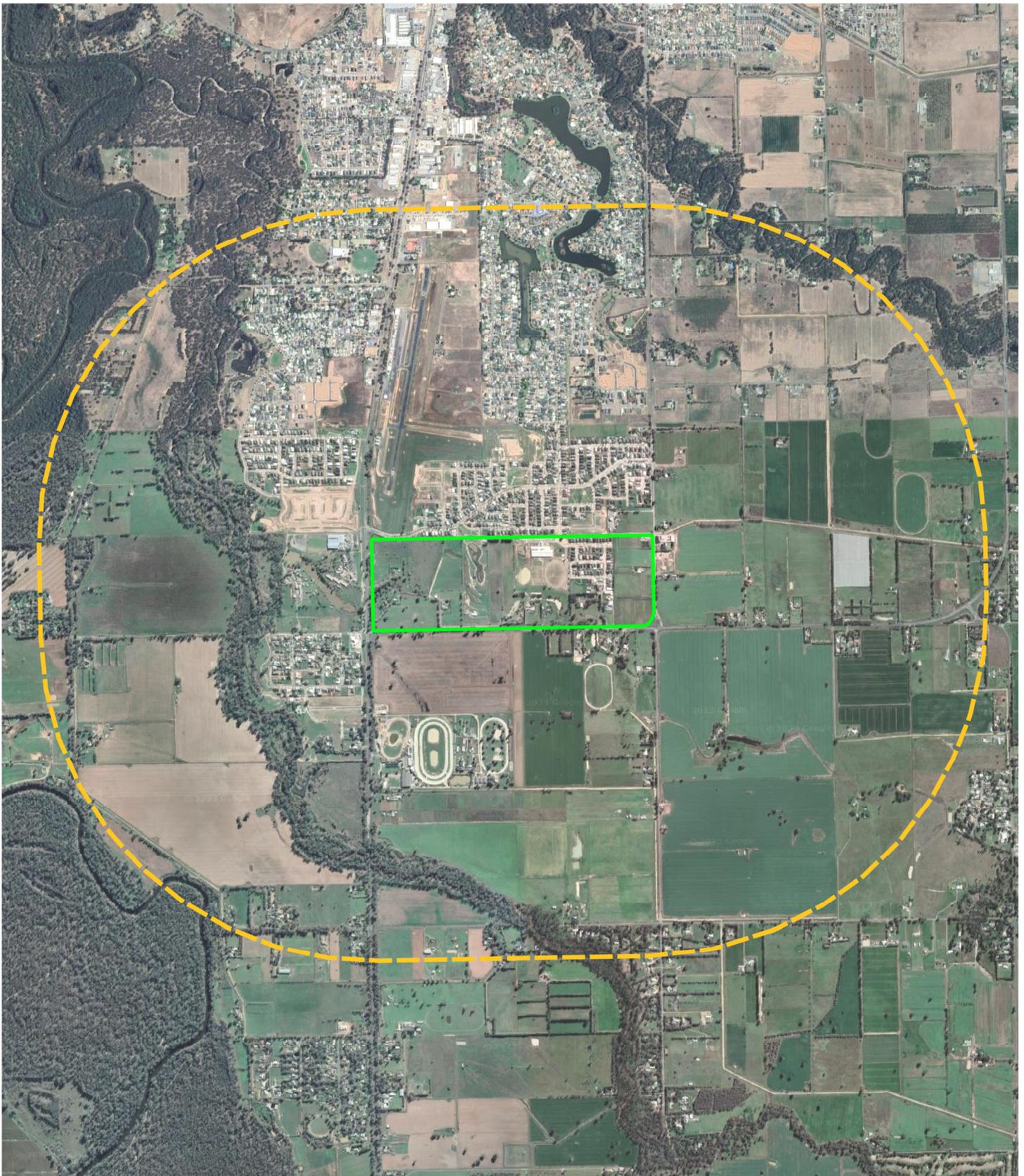
The Precinct is located directly south of Shepparton, in the suburb of Kialla. The precinct is approximately 93 hectares of land, bordered by the Goulburn Valley Highway to the west, Archer Road to the East and River Road to the south. The Precinct is zoned under Rural Living Zone, Urban Floodway Zone, Special Use Zone 10 and General Residential Zone 1.

Land uses within the Precinct are predominately for both rural and general residential living consisting of houses and sheds. The special use zone land facilitates a school that hosts both primary and secondary school students.

GHD understands that the Greater Shepparton Housing Strategy 2011 (GSHS) guides the long term identification and provision of residential land within Greater Shepparton. The implementation of the GSHS included framework plans and identified residential Investigation Areas in the Planning Scheme to guide future residential development, subject to further investigations. In the GSHS, land to the north of Waterbird Creek was identified for Low Density residential purposes, subject to the preparation of all necessary background reports, and land to the south of the Creek was identified for Rural Living purposes. Undeveloped parcels to the north and south of the Creek are currently zoned Rural Living Zone with a minimum subdivision size of 8 hectares.

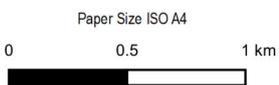
With the development of the Kialla Lakes residential estate to the north, Council is reviewing the identification of the land in the GSHS for Low Density purposes. Council now intends to prepare a structure plan, which would apply to the Precinct.

The Precinct site boundary and 2 km radius are shown in Figure 1.



Legend

- █ Waterbird Precinct
- █ Precinct 2km Buffer



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Waterbird Creek Precinct

FIGURE 1

2.2 Surrounding land use

The Precinct is located in the middle of Kialla. Most of the land surrounding the Precinct to the north is General Residential Zone 1 and Transport Zone 4 land, and to the east is an Urban Growth Zone. South of the Precinct is majority Farming Zone 2 and Special Use Zone 4 land. The west of the Precinct is mixture of Special Use Zone 7, Neighbourhood Residential Zone 1 and Urban Floodway Zone land. The plan zone is displayed in Figure 2.

Existing land uses surrounding the Precinct are as follows:

To the north of the Precinct:

- Consists of mainly general residential dwellings
- Amongst the residential dwellings is a scattering of small parks and commercial use buildings/industries
- The Shepparton Aerodrome is located to the north, zoned as Transport Zone 4

To the east of the Precinct:

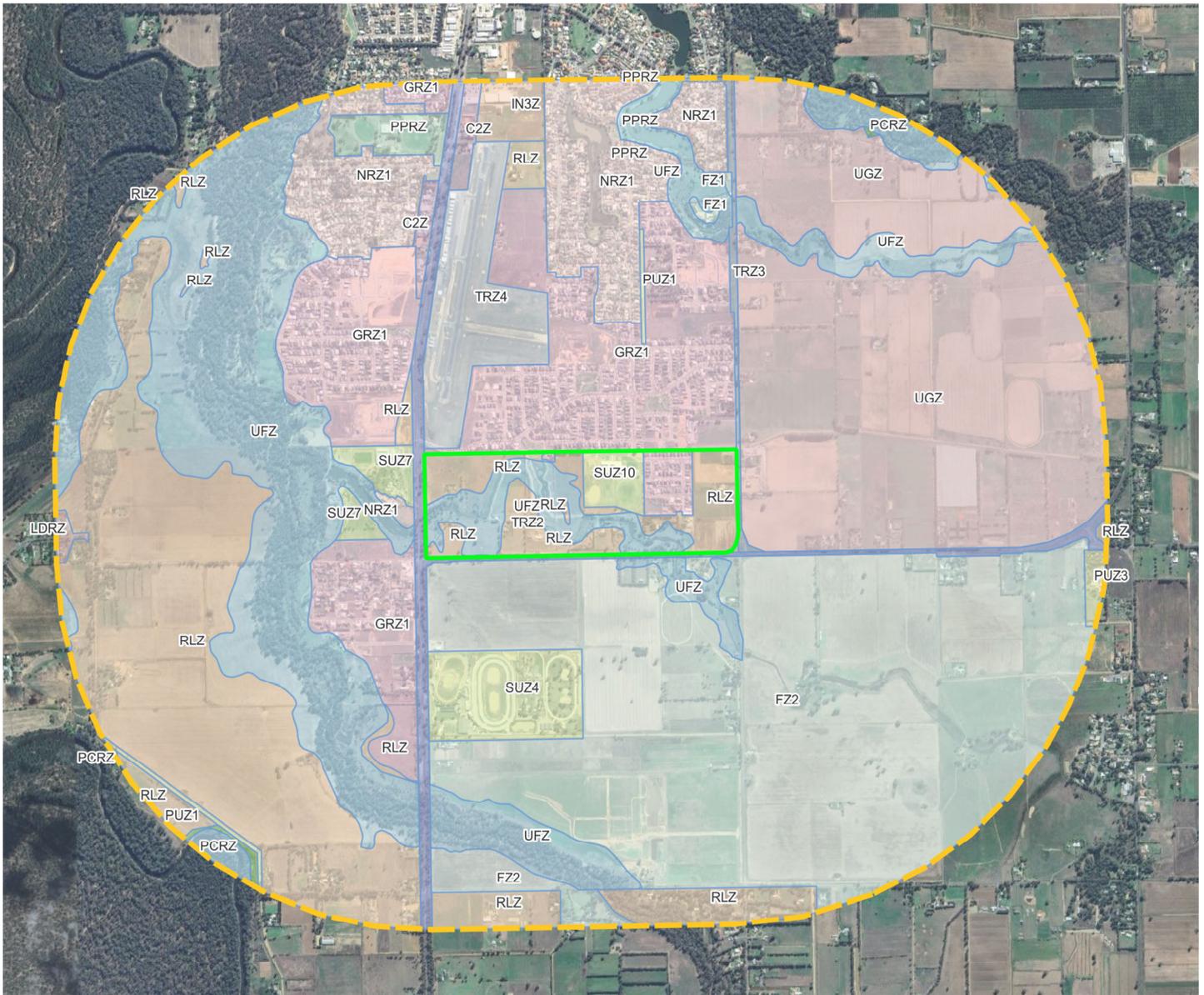
- Land use to the south consists of small clusters of rural residential type dwellings alongside big open fields

To the south of the Precinct:

- The south of the Precinct consists of a large area of empty land
- A very small cluster of rural residential type dwellings
- Further south is the Shepparton Greyhound Racing Club

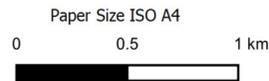
To the west of the Precinct:

- The west has a cluster of commercial use buildings
- The remainder of the land is used as a floodway area



Legend

- Waterbird Precinct
- Precinct 2km Buffer
- Intersection copy**
- COMMERCIAL 2 ZONE
- FARMING ZONE - SCHEDULE 1
- FARMING ZONE - SCHEDULE 2
- GENERAL RESIDENTIAL ZONE - SCHEDULE 1
- INDUSTRIAL 3 ZONE
- LOW DENSITY RESIDENTIAL ZONE
- NEIGHBOURHOOD RESIDENTIAL ZONE - SCHEDULE 1
- PUBLIC CONSERVATION AND RESOURCE ZONE
- PUBLIC PARK AND RECREATION ZONE
- PUBLIC USE ZONE - HEALTH AND COMMUNITY
- PUBLIC USE ZONE - SERVICE AND UTILITY
- RURAL LIVING ZONE
- SPECIAL USE ZONE - SCHEDULE 10
- SPECIAL USE ZONE - SCHEDULE 4
- SPECIAL USE ZONE - SCHEDULE 7
- TRANSPORT ZONE 2 - PRINCIPAL ROAD NETWORK
- TRANSPORT ZONE 3 - SIGNIFICANT MUNICIPAL ROAD
- TRANSPORT ZONE 4 - OTHER TRANSPORT USE
- URBAN FLOODWAY ZONE
- URBAN GROWTH ZONE



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Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 55

Plan Zone

FIGURE 2

2.3 Sensitive receptors

The definition of a sensitive receptor or sensitive land use is defined by EPA¹ (2022, p. 46) as:

‘Any land use that requires a focus on protecting human health and wellbeing, local amenity and aesthetic enjoyment.’ Examples* of such sensitive land uses include but not limited to, *‘dwellings, hospitals, aged care facilities, education centres, childcare centres, places of worship, corrective institutions’*.

It is further defined in EPA Publication 1961 (2022, p. 8) as:²

“A land use where it is plausible for humans to be exposed over durations greater than 24 hours, such as residential premises, education and childcare facilities, nursing homes, retirement villages, hospitals.”

The nearest existing sensitive receptors are currently located within the eastern portion of the Precinct and directly to the north of the Precinct.

¹ EPA Publication 1949, Separation distance guideline (2022)

² EPA Publication 1961. Guideline For Assessing and Minimising Air Pollution (2022)

3. Relevant policies and guidelines

3.1 Environment Protection Amendment Act 2018 (amendment to Environment Protection Act 2017)

EPA Victoria released a new legal framework on 1 July 2021, with the intention for this framework to drive environmental improvements in industrial operations. The cornerstone of the Environment Protection Amendment Act 2018 (EPA Act) is the general environmental duty (GED), which requires Victorians to understand and minimise their risks of harm to human health and the environment, from pollution and waste. EPA will work with industry to help them understand how to fulfil their obligations, by providing guidance, advice and other support.

Complying with the GED is about taking reasonable proactive steps and employing good environmental work practices. Compliance with the GED can be through following responsibilities under OHS laws, meeting industry standards, adopting industry better management practices, and following other relevant legislation related to the environment. In effect, the GED makes it clear that it is the individual businesses' responsibility to reduce risk to the environment and to protect it.

3.2 Environment Reference Standard

The EP Act's environment protection framework includes the Environment Reference Standard (ERS). This identifies environmental values, air indicators and objectives that set the benchmark for the quality of the air environment needed to protect environmental values. The environmental values identified include:

- Life, health and wellbeing of humans
- Life, health and well-being of other forms of life, including the protection of ecosystems and biodiversity
- Local amenity and aesthetic enjoyment
- Visibility
- The useful life and aesthetic appearance of buildings, structures, property and materials
- Climate systems that are consistent with human development, the life, health and well-being of humans, and the protection of ecosystems and biodiversity

The ERS is a reference standard, not a 'compliance standard' for businesses i.e. it relates to ambient air and not any individual facility. The ERS replaces SEPP (AQM) and generally adopts the objectives in the National Environment Protection Measure (Ambient Air Quality) (NEPM AAQ) with some modifications.

The following air quality indicators, and respective objectives, relevant to this assessment are outlined below:

- Particles as PM₁₀ (maximum concentration)
 - 50 µg/m³ for an averaging period of one day
 - 20 µg/m³ for an averaging period of one year
- Particles as PM_{2.5} (maximum concentration)
 - 25 µg/m³ for an averaging period of one day
 - 8 µg/m³ for an averaging period of one year
- Odour

An air environment that is free from offensive odours from commercial, industrial, trade and domestic activities.

3.3 EPA Publication 1961 Guideline for assessing and minimising air pollution in Victoria (2022)

As part of the new Victorian Environment Protection Act 2017 (EP Act), EPA Victoria has produced a new air quality guideline namely, Guideline for assessing and minimising air pollution in Victoria (EPA Publication 1961), This guideline forms part of Victoria's environmental protection framework that establishes the state of knowledge to protect the environmental values of the ambient air environment. The guideline describes the General Environmental Duty (GED) which requires anyone engaging in any activity that may give rise to risks of harm to human health or the environment from pollution or waste to minimise those risks, so far as reasonably practicable.

As such, emitters of pollution to air have a responsibility to put in proportionate controls to eliminate or minimise risks to human health or the environment. Being proportionate and preventative requires duty holders to:

- Understand their risks
- Actively seek out ways to eliminate or minimise these risks, so far as reasonably practicable
- Ensure any risks remaining after the implementation of all controls are within acceptable limits

The purpose of the guideline is to provide a framework to assess and control risks associated with air pollution.

The guideline outlines a risk management approach that involves a repeating cycle of four steps, namely:

1. Identifying hazards

This involves identifying, and if necessary, quantifying emission sources. This also involves characterising the receiving environment including local topography, meteorology, background air quality and nearby sensitive land uses.

2. Assessing risks

A three-tiered approach to the assessment of risks from air pollution is outlined, namely:

- Level 1 assessment: qualitative or semiquantitative assessment, used to assess risks from activities that either have intrinsically low risks, or have common, well-understood risks that can be controlled without extensive assessment.
- Level 2 assessment: involve the use of dispersion modelling or monitoring with predicted concentrations benchmarked against air pollution assessment criteria (APAC).
- Level 3 assessment: detailed risk assessment, used when a simple comparison of a pollutants concentration to an APAC cannot adequately assess risks.

3. Implementing controls

Emitters should demonstrate how existing or proposed risk controls minimise risks so far as reasonably practicable.

4. Checking controls

To evaluate performance, emitters should have clearly documented environmental performance objectives that can be monitored and reported on.

3.4 Threshold/separation distances

Two classes of threshold/separation distance guidelines are relevant in the context of planning in Victoria, as follows:

- Clause 53.10: Where there is an industrial use proposed on a land parcel, then the particular provisions of Clause 53.10 apply for specified uses with adverse amenity potential. If the threshold distance is not to be met or no threshold distance is specified for a use in the table then the proposed industry must be referred to the Environment Protection Authority under Section 55 of the Act.
- EPA Victoria's Separation Distances Guideline (Draft Publication 1949, 2022): Referred to for existing industries and when the above outlined condition is met. Clause 53.10 of the Victorian Planning Provisions (VPP) 'Uses with Adverse Amenity Potential'.

3.4.1 Clause 53.10

The Planning Policy framework seeks to ensure that planning resolves and does not create land use conflicts. This is typically achieved by providing separation distances between potentially conflicting land use zones that may result in incompatible uses.

Clause 53.10 of the Victorian Planning Provisions (VPPs) seeks to define those types of industries and warehouses, which if not appropriately designed and located, may cause offence or unacceptable risk to the neighbourhood.

The clause sets out the threshold distance that is the minimum distance from any part of the land of the proposed use of or buildings and works for specified uses that have adverse amenity potential.

The table to the Clause 53.10 includes three columns that refer to the type of production or use or storage (purpose), which may result in adverse amenity potential and includes the threshold distance in metres and notes:

- **Note 1** is where the threshold distance is variable, dependent on the process to be used and the materials to be processed or stored.
- **Note 2** is where an assessment of risk to the safety of people located off the land may be required.

Clause 53.10 does not itself trigger the need to obtain a permit, however Clause 66.02 – 7 (use and development referrals) requires that an application is referred to the EPA as the determining referral authority, if the proposal is to use land for an industry or warehouse for a purpose listed in the table to Clause 53.10 shown with a Note 1, or if the threshold distance is not met.

3.4.2 EPA Separation distances (Publication 1518 and Draft Publication 1949)

The EPA Victoria Draft *Separation Distance Guideline*, 2022, Publication 1949 (which supersedes EPA Publication 1518) provides advice on recommended separation distances between industrial land uses that emit odour or dust, and sensitive land uses.

The purposes of the guideline can be summarised as:

- Provide clear direction on which land uses require separation
- Inform and support strategic land use planning decisions and the consideration of licences, permits, registrations and applications for new or expanding developments
- Prevent new sensitive land uses from impacting on existing industrial land uses
- Prevent new or expanded industrial land uses from impacting on existing sensitive land uses
- Identify compatible land uses that can be established within a separation distance area

In the case of an existing industrial use, EPA recommends separation distances should be considered when preparing a planning scheme, planning scheme amendment, or planning permit application. Therefore, this is the relevant guideline for this assessment.

Recent advice from EPA regarding Draft Publication 1949 noted that the separation distances are not a substitution for pollution controls. The industry should still be minimising risks of odour and dust so far as reasonably practical based on the current state of knowledge in that sector, (i.e., meeting the GED for that sector.) Therefore, the separation distance is not a substitution for pollution controls and complying with the GED.

The purpose of the EPA separation distance guideline is to provide recommended minimum separation distances between odour or dust emitting industrial land uses and sensitive land uses. The guideline is to support land use and development decisions that:

- Protect the community from human health and amenity risks associated with unintended offsite odour and dust impacts generated by industry
- Protect industry from inappropriate land use and development nearby that may constrain operations

In the case of the Precinct, the EPA recommended separation distance guideline (Publication 1949 and Publication 1518) will apply to existing industries in and surrounding the Precinct. GHD met with the EPA on 28 February 2023 to discuss GHD's methodology. In that meeting GHD confirmed with EPA that they would prefer that both EPA Publications 1518 and Draft 1949 are considered in the assessment.

The buffers are to be scribed as per Publication 1949 Method 2 (Rural method). This method is applicable when the nearest sensitive land use is not in an urban area/township with a property boundary of at least 4,000 m². The separation distance is to be measured from the activity boundary of the industry to the activity boundary of the sensitive land use, i.e. the activity boundary of the industry is a convex polygon containing the activities of the industry.

3.5 EPA Publication 1943

Section 13.7 of EPA Publication 1961 describes a nuisance dust risk assessment and directs the user to the *EPA Publication 1943 Guidance for Assessing Nuisance Dust*. Nuisance dust is different to the air pollutants of particulate matter such as PM₁₀ which are assessed under the health criteria within EPA Publication 1961. Nuisance dust generally comprises larger dust particles which create visible impacts when emitted.

The purpose of Publication 1943 is to:

- “Provide methods for assessing the impacts of nuisance dust on human health and wellbeing, including site specific risk assessment methods” (EPA 2022)
- “Provide guidance on what to include in any report relating to the assessment of nuisance dust in Victoria” (EPA 2022)

The agent of change has the responsibility to assess the risk of nuisance dust, with the following responsibilities:

- Consider their obligations under the GED including the implications of the proposal on human health and amenity
- Avoid land use conflict
- Ensure potential impacts on nearby land uses are appropriately mitigated and managed

EPA Publication 1943 uses four-steps to assess the risk of nuisance dust impacts from an emission source, as follows:

- Step 1: Dust source hazard potential
- Step 2: Exposure pathway effectiveness
- Step 3: Receiving environment sensitivity
- Step 4: Overall risk of dust impacts (combining steps 1 to 3)

The publication allocates a quantitative value to the outcome of each assessment step, to obtain an overall level of risk encompassing each aspect. The allocations are selected for several components contributing to the risk factor in each step, using the examples given by EPA.

3.6 EPA Publication 1883

Publication 1883 *Guidance for assessing odour* provides information on how to assess the risk posed by odour emission sources and to understand the receiving environment where effects might occur. This guidance is focused on the assessment of odour under the provisions of the EP Act, including the GED, which requires all Victorians to take precautionary and reasonable actions to avoid hazards causing harm. The guideline is primarily intended for government, the planning sector, practitioners and specialists, who need to understand offensive odours that are associated with a development proposal, investigation or study where an odour assessment is required. Risk assessment is related to whether the risk of harm can be easily understood through the assessment framework. The publication provides a framework for three levels of risk assessment, according to the odour impact potential of an industry or site. Publication 1883 is to be utilised once an assessment of the separation distance has been undertaken to assess for any potential constraints. The three levels of assessment include:

- Level 1 – Gateway assessment of emissions duration, wind direction and cumulative odour sources
- Level 2 – Source-Pathway-Receptor assessment

- Level 3 – Detailed risk assessment that could include:
 - Comparisons with similar operations or case studies
 - Risk assessment using field odour surveillance data
 - Complaint assessment
 - Community odour surveys/questionnaires and odour diaries

3.7 EPA Publication 1881

EPA Publication 1881 *Guidance for Field Odour Surveillance* details the methods for conducting odour surveys in the field. The document is intended to be used in conjunction with EPA Publication 1883 to assess the risk of odour impacts to sensitive receptors.

4. Surrounding industries analysis

4.1 Site visit and industry identification

A site visit of the Precinct and 2 km surrounding areas was undertaken on 9 March 2023. The purpose of the visit was to identify any industries that may have the potential to emit odour, dust or air emissions. The site visit was undertaken along streets within the Precinct and surrounding the Precinct including River Road, Archer Road, Sanctuary Drive and Shepparton-Seymour Road.

This was supplemented by research using aerial imagery from Google Earth and Google Street View and research of the National Pollutant Inventory (NPI)³ database and the EPA website for licenced facilities⁴.

GHD conducted the following searches:

- NPI database – one industry was identified:
 - Shepparton MS: Natural Gas Transmission Meter station and classed under Gas Supply. The gas meter station is run by APA VTS Australia Pty Limited and located along Archer Road, Kialla VIC approximately 1100 m from the precinct boundary. For the 2021/2022 reporting year, Shepparton MS is listed to emit 800 kg of Total Volatile Organic Compounds.
- EPA permissions – two industries were identified to hold registrations, both of which are small waste and resource recovery centres which accepts end-of-life vehicles, parts from dismantlement and vehicle maintenance from different means of transport (including off-road machinery). Registration permissions indicate that operations of the facilities are classified as low-risk activities.
 - David Hastings located at 1 Dean Nook, Kialla VIC 3631
 - Remhar Pty Ltd located at 229 River Road, Kialla VIC 3631

From GHD's site visit, the following industries listed in Table 1 were identified to have the potential to emit odour, dust and/or air emissions, within the Precinct and within 2 km radius of the Precinct. A 2 km radius was chosen as the number of existing sensitive uses nearby would limit any new heavy industry that requires a larger buffer (which are normally reserved for IN2Z areas) from operating in the vicinity. Further, only one category in Draft Publication 1949 requires a buffer distance of greater than 2 km, namely "paper and paper pulp manufacture" which requires a separation distance of 5 km. As no industry under this category is located in Waterbird Creek, a 2 km radius will identify all relevant industries.

For each identified industry, Table 1 shows the company, type of operation, street address, primary concern (dust, odour, air emissions), and location of the industry with respect to the Precinct. Refer to Figure 3 for locations of the industries that have been identified. These industries will then be assessed to determine whether they require a separation distance in Section 5.

Auto facilities, service stations, general factories and warehouses have not been included, as they do not attract an odour/dust separation distance under the EPA Publications 1518 and 1949, hence are a low risk to air quality impact and not considered further in this AIA.

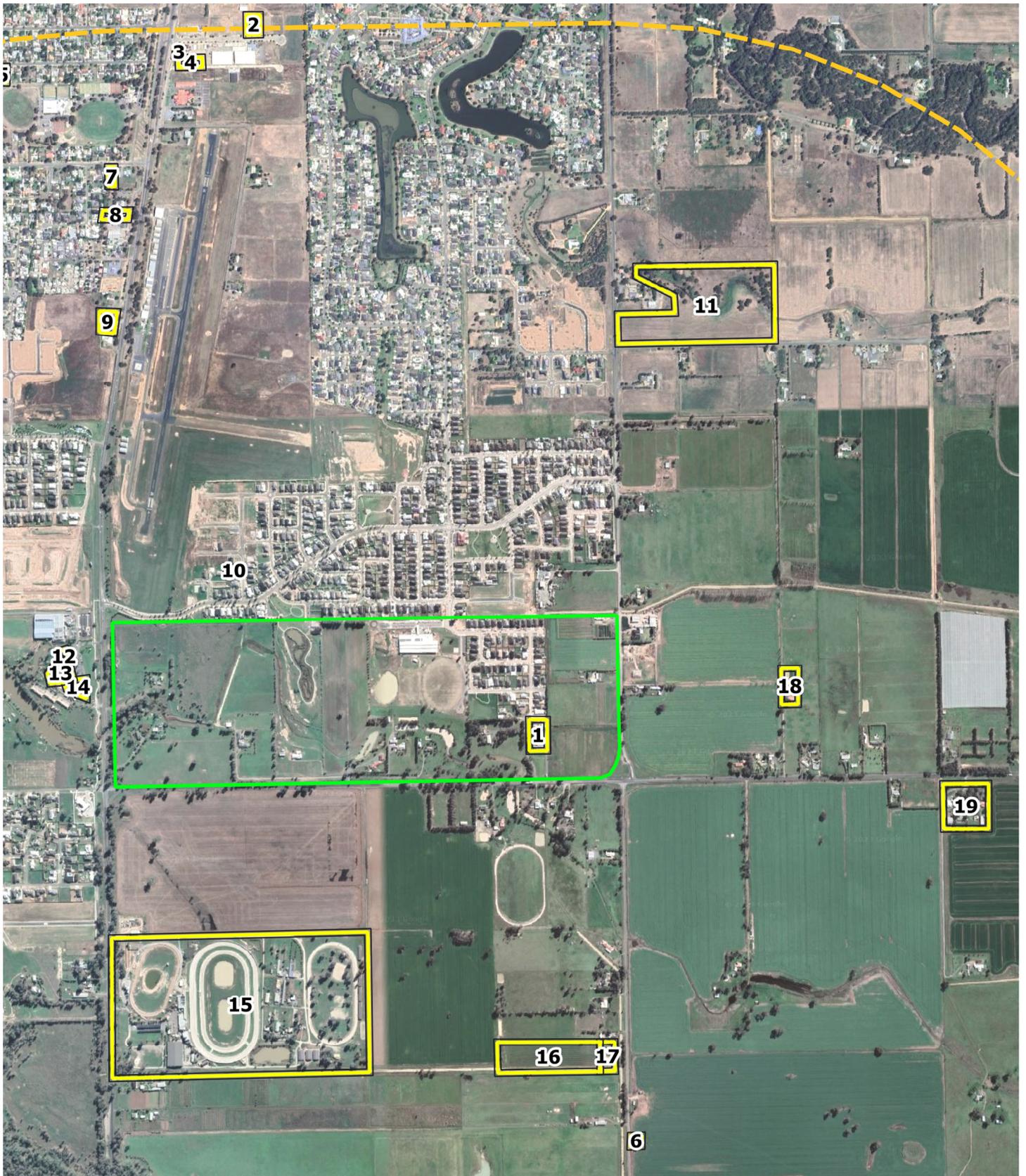
During the site visit conducted by GHD, no odour or dust was observed to be emanating from any of the industries within and surrounding the Precinct.

³ If the substances emitted by an industry exceed the relevant emission threshold (as specified in legislation), then that industry is required to report their emissions to the NPI database, which is available to be viewed by the general public.

⁴ The EPA website for licenced facilities allows the licences of scheduled premises to be searched for and viewed by the general public.

Table 1 *Identified Industries*

ID	Industry Name	Address	Operations	Operating hours	Primary concerns
1	All Type Caravans Service and Repairs	8 Maley Court, Kialla 3631	Caravan repair shop	Unknown	Odour
2	Australian Fruit Solutions	8 Gash Ct, Kialla VIC 3631	Farm	Unknown	Odour
3	Inspired Architectural Windows & Doors	7922 Goulburn Valley Hwy, Kialla VIC 3631	Window supplier	9 am – 5 pm	Dust
4	Neatline Homes	7920 Goulburn Valley Hwy, Kialla VIC 3631	Modular Home Builder	9 am – 5 pm	Dust
5	T'G Canines	33 Vickers St, Kialla VIC 3631	Pet groomers	Unknown	Odour
6	Shepparton MS	Archer Road, Kialla VIC	Gas Meter Station	Unknown	Odour
7	Kialla Glass and Leadlights	1A Raftery Rd, Kialla VIC 3631	Glass repair and glazing shop	9 am – 5 pm	Odour
8	PJs 4x4	7851 Goulburn Valley Hwy, Kialla VIC 3630	Auto parts store	8:30 am – 5:30 pm	Odour
9	Harry's Tyre Centre	7821 Goulburn Valley Hwy, Kialla VIC 3631	Mechanic	8:30 am – 5 pm	Odour
10	Tunetech Suspension	7 Gilmour Crescent, Kialla 3631	Motorcycle repair shop	9 am – 5 pm	Odour
11	Gardens on Archer	535 Archer Rd, Kialla VIC 3631	Plant Nursery	9 am – 5 pm	Odour
12	Chocolate Apple Factory	7717 Goulburn Valley Hwy, Kialla VIC 3631	Chocolate Factory	10 am – 5 pm	Odour
13	Riverside Gardens Garden Centre and Mini Golf	7715 Goulburn Valley Hwy, Shepparton VIC 3630	Garden centre	9 am – 5 pm	Odour
14	Pot-Werx	7713 Goulburn Valley Hwy, Kialla VIC 3631	Pottery	9:30 am – 4 pm	Dust
15	Shepparton Harness Racing Club	7580 Goulburn Valley Hwy, Kialla VIC 3631	Greyhound animal racing	Unknown	Odour
16	Kialla Wines and Vineyard	780 Archer Rd, Kialla VIC 3631	Vineyard	10 am – 3 pm	Odour
17	Kialla Automotive	780 Archer Rd, Kialla VIC 3631	Mechanic	8 am – 5 pm	Odour
18	Remhar Pty Ltd	229 River Road, Kialla VIC 3631	Automotive scrap collection	NA	Dust
19	David Hastings	1 Dean Nook, Kialla VIC 3631	Automotive scrap collection	NA	Dust



Legenda

- █ Waterbird Precinct
- Precinct 2km Buffer
- Identified Industries



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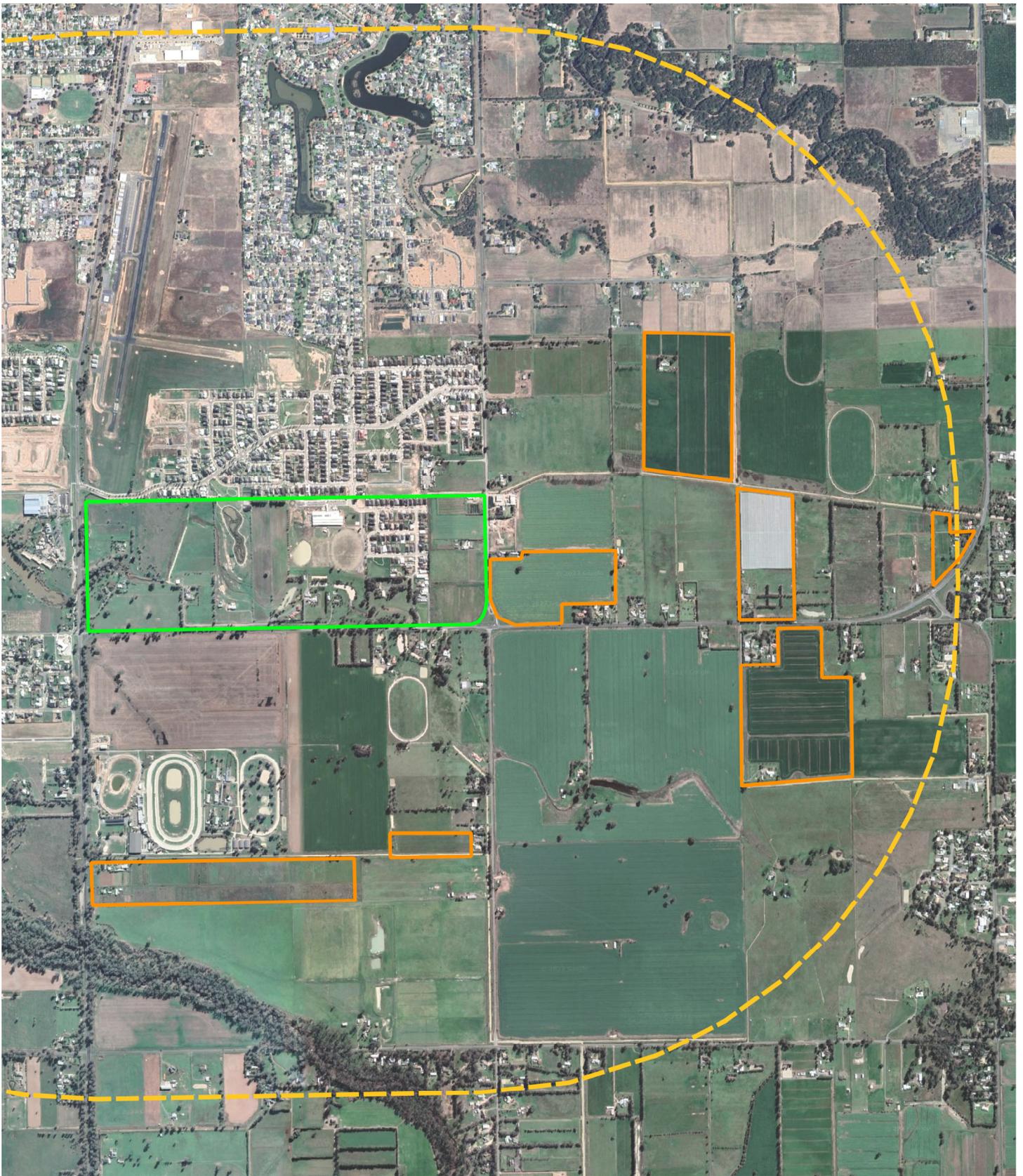
Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 55

Identified Industries

FIGURE 3

4.2 Agriculture

As discussed in Section 2.2, parcels of land within and surrounding the Precinct are currently used for agricultural farms including row crops and orchards (as shown in Figure 4). As part of farm management, chemical sprays may be used to prevent pests and disease on crops/produce. The chemical sprays used have the potential to produce droplets which can remain suspended in the air. In the presence of winds, these droplets can be blown away from the targeted areas which is known as 'spray drift'. The deviation of chemicals can have an effect on human, animal and produce health when drifting to untargeted areas. It is noted that the agricultural farms identified in Figure 4 have been identified based on aerial imagery and not through direct contact with the farm owners. Chemical sprays may not be used at some of these farms.



Legend

- █ Waterbird Precinct
- █ Precinct 2km Buffer
- █ Agricultural areas

<p>Paper Size ISO A4</p> <p>0 0.00025 0.0005 km</p> <p>Map Projection: Transverse Mercator Horizontal Datum: GDA2020 Grid: GDA2020 MGA Zone 55</p>			<p>Greater Shepparton City Council</p> <p>Waterbird Creek Amenity Impact Assessment</p> <p>Agricultural Areas</p>	<p>Project No. 12601656</p> <p>Revision No. -</p> <p>Date. 01/05/2023</p>
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FIGURE 4

4.3 Transport

This section concerns air quality impacts on proposed residential properties within the Precinct from transport emissions. Routes of interest include Goulburn Valley Highway, Shepparton Alternative Route and Euroa-Shepparton Road as shown in Figure 5. The Shepparton Alternative Route – River Road is a state freight route and a major connecting route with regional Victoria, NSW and southern Queensland. A summary of vehicles per day and percentage classification are listed in Table 2 for each route. Traffic volume data has been extracted from the Department of Transport and Planning “Traffic Volume” dataset.

Table 2 Vehicle summary on transport routes within the Precinct

Route name	Route between	Vehicles/day	Heavy Vehicle (%)	Large Heavy Vehicle (%)
Goulburn Valley Freeway	River Road and Goulburn Valley Freeway	4,000	6%	21%
Goulburn Valley Highway	Raferty Road and River Road	3,800	1%	5%
Wyndham Street	High Street and Goulburn Valley Highway	13,000	0%	6%
River Road (Shepparton Alternative Route)	Central Kialla Road and Goulburn Valley Highway	2,200	2%	26%
Doyles Road (Shepparton Alternative Route)	Channel Road and Central Kialla Road	2,500	3%	27%
Euroa-Shepparton Road	River Road and Euroa-Shepparton Road	667	1%	9%

4.3.1 Shepparton Aerodrome

The Shepparton Aerodrome is located to the north of the Precinct. There are two active runways:

- 18-36 Runway which is a sealed width of 18 m
- 09-27 Runway which is a gravel pavement with a length of 423 m and width of 30 m

Charters and flying training operations are run on site with various charter/training companies operating.

GHD understands that the Australian Noise Exposure Forecast (ANEF) has undertaken mapping from the aerodrome to determine impacts of aircraft noise to surrounding areas. As mapping has shown noise level contours to extend to a portion of the Precinct, the aerodrome has been considered as part of this assessment in terms of dust, odour and air quality impacts.

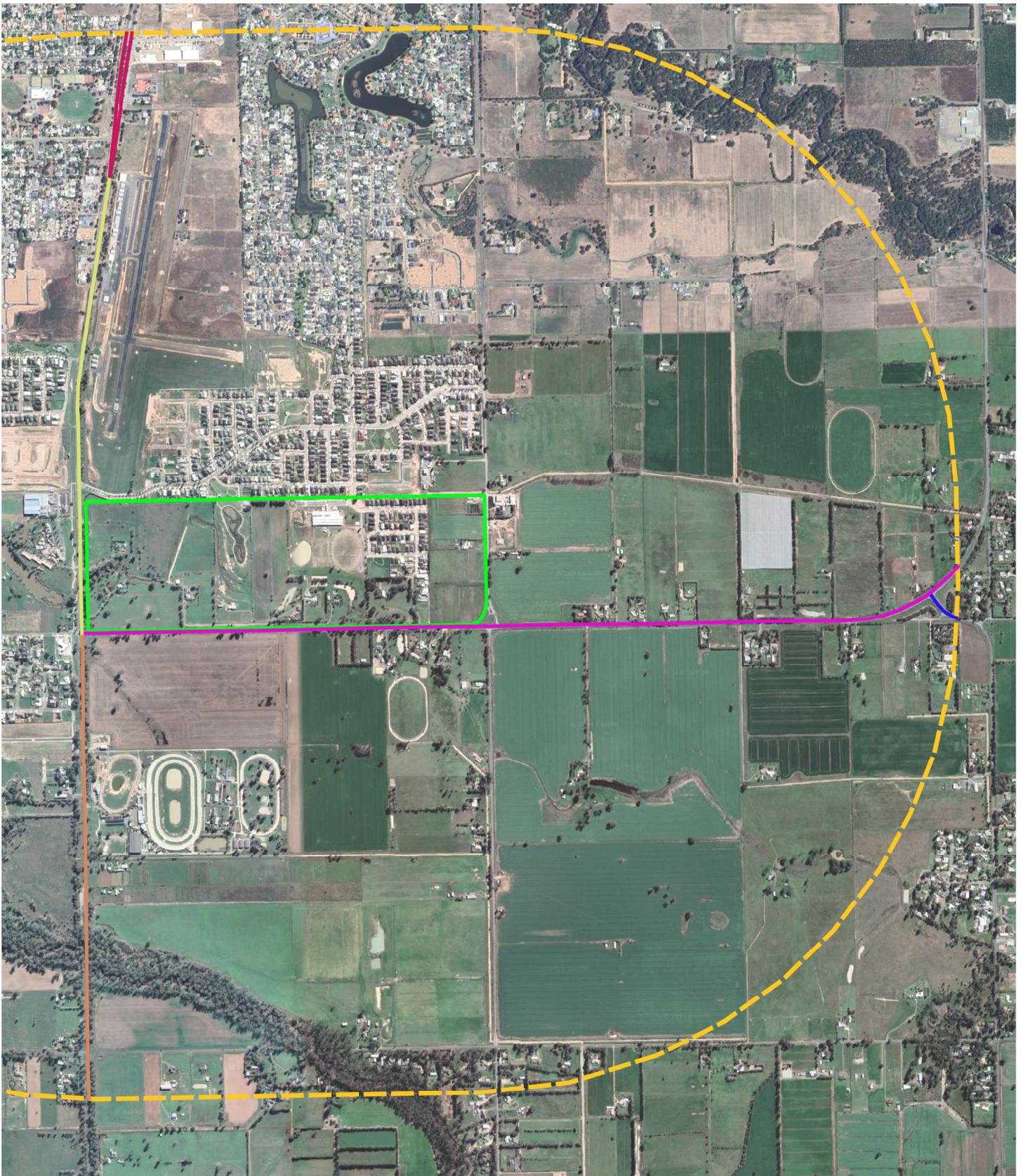
The operational air emissions from an airport include:

- Airport operations - including aircraft movements (landing, take-off cycle) and related equipment.
- Transportation attributed to the airport - private transport and freight to and from the airport, as well as car parking at the airport.

Pollutants released from these two source groups are predominantly released from the combustion of fossil fuels (avgas, diesel and petrol) in private, freight or aviation vehicles. This combustion process emits nitrogen oxides, carbon monoxide, ozone, dust particles (PM10 and PM2.5) and Volatile Organic Compounds (VOCs) to air. The runway and surrounding pavement are sealed therefore dust emissions are unlikely.

To accurately assess the air quality impacts from the aerodrome, air quality dispersion modelling would be required to establish the ground level concentrations of the relevant pollutants at all nearby receptors in accordance with EPA Publication 1961. This is beyond the scope of this assessment. However, from GHD’s experience air quality impacts beyond the air pollution assessment criteria outlined in Publication 1961 would be unlikely for a small aerodrome such as the Shepparton aerodrome. GHD is aware of air dispersion modelling undertaken for Melbourne Airport which demonstrated compliance with all air quality criteria at the airport boundary.

Further, EPA Publication 15818 and Draft 1949, do not contain recommended separation distances for aerodrome/aviation activities. From GHD's site investigation undertaken on 9 March 2023 no odour or dust generation from the aerodrome was observed. Therefore, the risk of odour, dust and air quality emissions from the Shepparton Aerodrome is considered to be low.



Legend

- | | | | |
|---------------------|---------------------|-------------------------|----------------|
| Waterbird Precinct | Roads | EUROA-SHEPPARTON ROAD | RIVER ROAD |
| Precinct 2km Buffer | CENTRAL KIALLA ROAD | GOULBURN VALLEY FREEWAY | WYNDHAM STREET |
| | DOYLES ROAD | GOULBURN VALLEY HIGHWAY | |



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Transport Routes

FIGURE 5

4.4 Kialla South Growth Corridor

South of the Precinct, the Kialla South Growth Corridor has the following key elements which is relevant to this AIA:

- Commercial accommodation (caravan park)
- Low density and rural residential living areas
- Expansion of recreational equine facilities
- A new village centre to include café, general store and feed store.

The draft PSP is provided in Figure 6

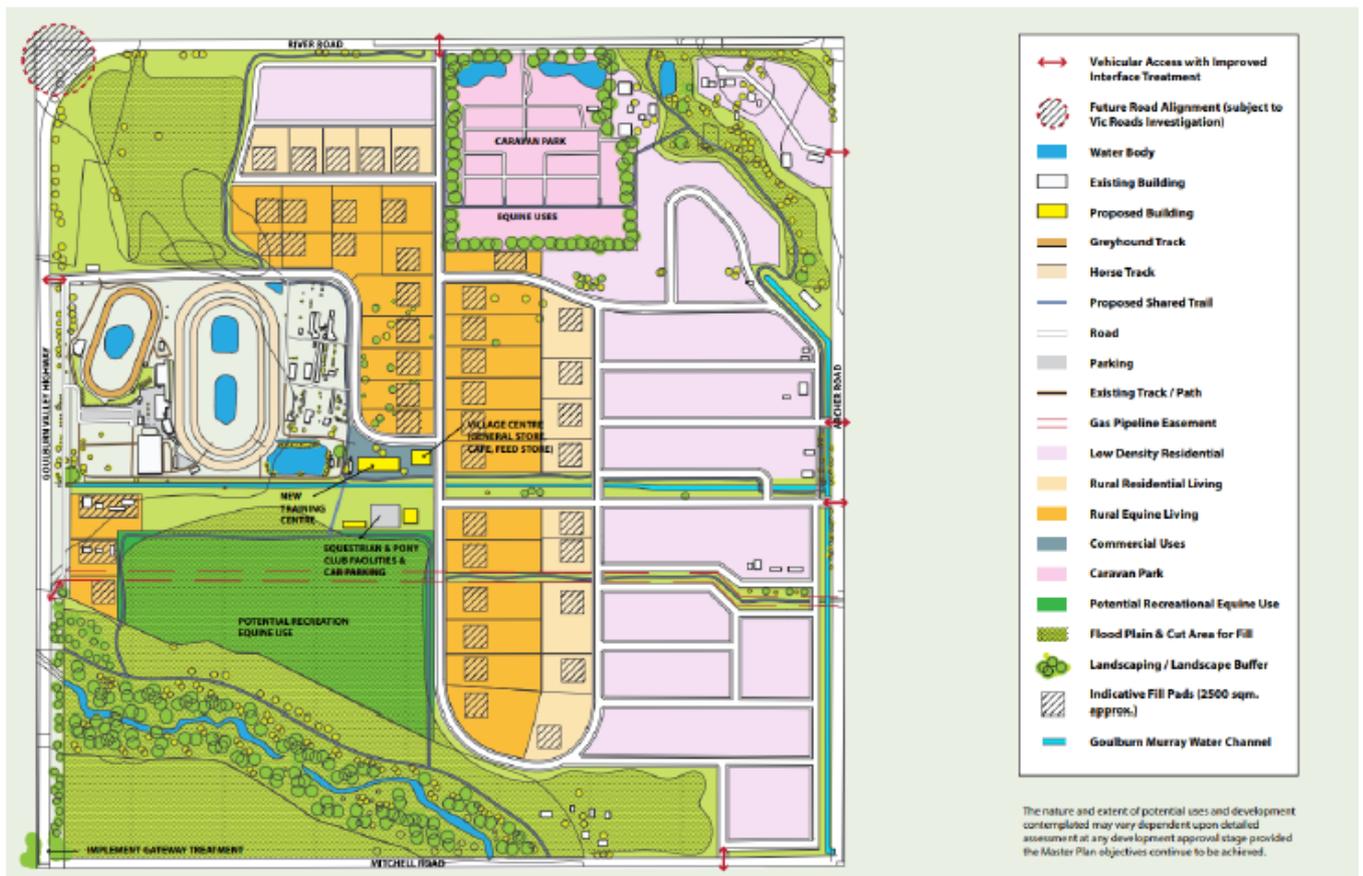


Figure 6 Feasibility Study and Master Plan 2017

As part of the Kialla South Growth Corridor, the Shepparton Harness Racing Club operates at 7580 Goulburn Valley Hwy, Kialla. Races are conducted approximately 40 times per year, usually at night-time. The club facilitates both horse and greyhound racing. There is the potential for odour emissions from waste materials such as manure, washdown water and dust emissions from any unpaved surfaces. The facility will be required to mitigate their odour and dust impacts with the following likely controls to form part of any management plan for the facility:

- Frequent (daily) removal of solid/ liquid waste
- Temporary storage of waste would be in storage bins with lids
- The bins will be kept clean when not in use
- Stables washed down on daily basis
- Wash down water likely to be drained to subsurface drains and foul water drains

4.5 Complaint history

The past performance of surrounding industry is a good indicator of the level of off-site amenity protection needed. EPA Victoria has provided a list of all odour, dust and air complaints within the area between 2012 to 2022. A summary of all received complaint data has been included in Table 3.

Eight complaints have been recorded within residential areas. From the complaint descriptions, odour and dust related events are unlikely to be related to any industry. Two complaints were made in relation to a livestock feedlot located along Mitchell Road which is greater than 5 km from the Precinct. Thus, it can be concluded that there is no current dust/odour nuisance to the Precinct.

Table 3 Complaint data

Date	Pollution type		Complaint	GHD comment
Residential				
20/07/2022 15:30	Odour	Waranga Drive	Kerosene smell. It has been a consistent problem.	Residential area, doesn't appear to be any industries here
11/07/2022 10:35	Odour	Mitta Court	Strong gassy sewerage smell coming from sewerage blow off stack Seems to be a daily issue, seems to actually be getting worse.	Residential area with no known industries possibly a sewerage main
03/02/2022 8:32	Dust/particles	Egret Drive	Dust from construction, earthworks	Likely from residential construction rather than an industry.
02/02/2022 16:59	Dust/particles	Egret Drive	Dust coming from a subdivision development. Red dust.	Likely from residential construction rather than an industry
15/04/2021	Dust	Rocklands Crescent	NA	Residential area with no known industries
16/11/2020	Dust	Serpentine Avenue	NA	Complaint location within Precinct area. There are no notes from complaint and cannot be attributed to any industry in the area.
18/10/2014	Odour	Waranga Drive	Caller advised there is a strong burning smell of a timber electrical smells. There does not appear to be any smoke visible in the air."	Residential area with no known industries
30/12/2013	Dust	Quail Street	NA	Residential area with no known industries
Livestock				
23/02/2022 9:06	Dust/particles	Mitchell Road Kialla East 3631	Reporting dust and odour from the feedlot. Is worse when there is no wind. However also gets it when there is a southerly wind. Only happens in the late afternoon and at night and in the early mornings.	This site is greater than 5km from the Precinct.
20/02/2022 8:06	Odour	Mitchell Road Kialla East 3631	Odour and dust coming from a new feedlot. Caller has video evidence.	

5. Separation distance assessment

GHD undertook a review of the identified land uses as identified in Section 4 to assess the relevant separation distances as outlined in EPA Publication 1518 and Draft 1949. It is noted that separation distances are typically applicable for industries where production/manufacture is occurring at the site. Warehouses/storage facilities typically do not attract a separation distance.

A detailed explanation of the industries requiring a separation distance is provided in Section 5.1, with a summary provided in Table 4.

5.1 Summary

The land uses that were identified as requiring a separation distance are outlined in Table 4.

No industries were identified within the Precinct to require a separation distance. Several industries were identified outside the Precinct to require a separation distance.

The recommended separation distances are plotted on an aerial image in Figure 7. From Figure 7 it can be seen that the industries with the largest separation distances were identified to be Australian Fruit Solutions, Remhar and David Hastings which all have a recommended separation distance of 500 m. However as Australian Fruit Solutions is located approximately greater than 500 m from the Precinct, none of the recommended separation distance extend to the Precinct.

The three industries: Harry's Tyre Centre, Tunetech Suspension and Kialla Automotive all have separation distances of 100 m, which do not extend to the Precinct.

Table 4 Recommended separation distances for identified industries

Industry	Operations	Address	Adopted separation distance Publication 1518 (m)	Adopted separation distance Publication 1949 (m)	Distance from Precinct (m)
Food Processing					
Australian Fruit Solutions	Farm	8 Gash Ct, Kialla VIC 3631	NA	500 m ¹	1979 m
Spray Painting					
Harry's Tyre Centre	Mechanic	7821 Goulburn Valley Hwy, Kialla VIC 3631	NA	<100 L/day: 100 m	979 m
Tunetech Suspension	Motorcycle repair shop	7 Gilmour Crescent, Kialla 3631			157 m
Kialla Automotive	Mechanic	780 Archer Rd, Kialla VIC 3631			889 m
Materials recovery and recycling facility					
Remhar	Automotive scrap collection	229 River Road, Kialla VIC 3631	Case by case	500 m	546 m
David Hastings	Automotive scrap collection	1 Dean Nook, Kialla VIC 3631			1090 m
1A 500 m buffer has been applied for Australian Fruit Solution based on Western Australia Department of Water and Environmental Regulation (DWER) Odour emissions guideline.					

5.2 Industry descriptions

5.2.1 Australian Fruit Solutions

Operations

Australian Fruit Solutions is located at 8 Gash Ct, Kialla. Specific operations at this facility are unknown, however based on observations made during the site visit conducted by GHD it is presumed operations include fruit picking, crushing and disposing of fruit waste.

Sources

Potential odour sources are expected to occur from:

- Transportation of fruit
- Crushing and milling of fruit
- Disposal of fruit waste

No dust emissions are expected to occur at this site.

Separation Distance

Australian Fruit Solutions does not report to the NPU and, EPA Publication 1518 and Draft 1949 does not outline a recommended separation distance for the processing of fruit. Instead, GHD has referred to the Western Australia Department of Water and Environmental Regulation (DWER) Odour emissions guideline which outlines a 500 m separation distance for food processing. Therefore, a 500 m separation distance has been applied to Australian Fruit Solutions. This separation distance does not extend to the Precinct.

5.2.2 Automotive services

Three automotive services were identified within the 2 km radius of the Precinct:

- Harry's Tyre Centre
- Tunetech Suspension
- Kialla Automotive

Operations

These facilities are classified as mechanical repair shop that specialises in automotive services including but not limited to:

- Car, Trailer and 4WD Tyres
- Wheel Balance
- Wheel Alignment
- 4WD accessories
- Vehicle services
- Mechanical Repair
- Roadworthy
- Brake Service & Repairs

Sources

Potential odour sources are expected to occur from:

- Car, motorbike and 4WD repairs
- Spray painting
- Tyre supply and import/export

No dust emissions are expected to occur at this site.

Separation distances

All automotive services identified appear to be to be local services and classified under the “Spray Painting” category. Although specific throughput is unknown, it is assumed for small scale spray painting to be undertaken as part of automotive services, therefore a 100 m separation distances has been applied for the listed industries. This separation distance does not extend to the Precinct for any of the three industries.

5.2.3 Automotive material recovery

Two automotive material recovery industries were identified within the 2km radius of the Precinct:

- Remhar
- David Hastings

Operations

These facilities are classified as materials recovery and recycling facility which accepts end-of-life vehicles, parts from dismantlement and vehicle maintenance from different means of transport (including off-road machinery).

Sources

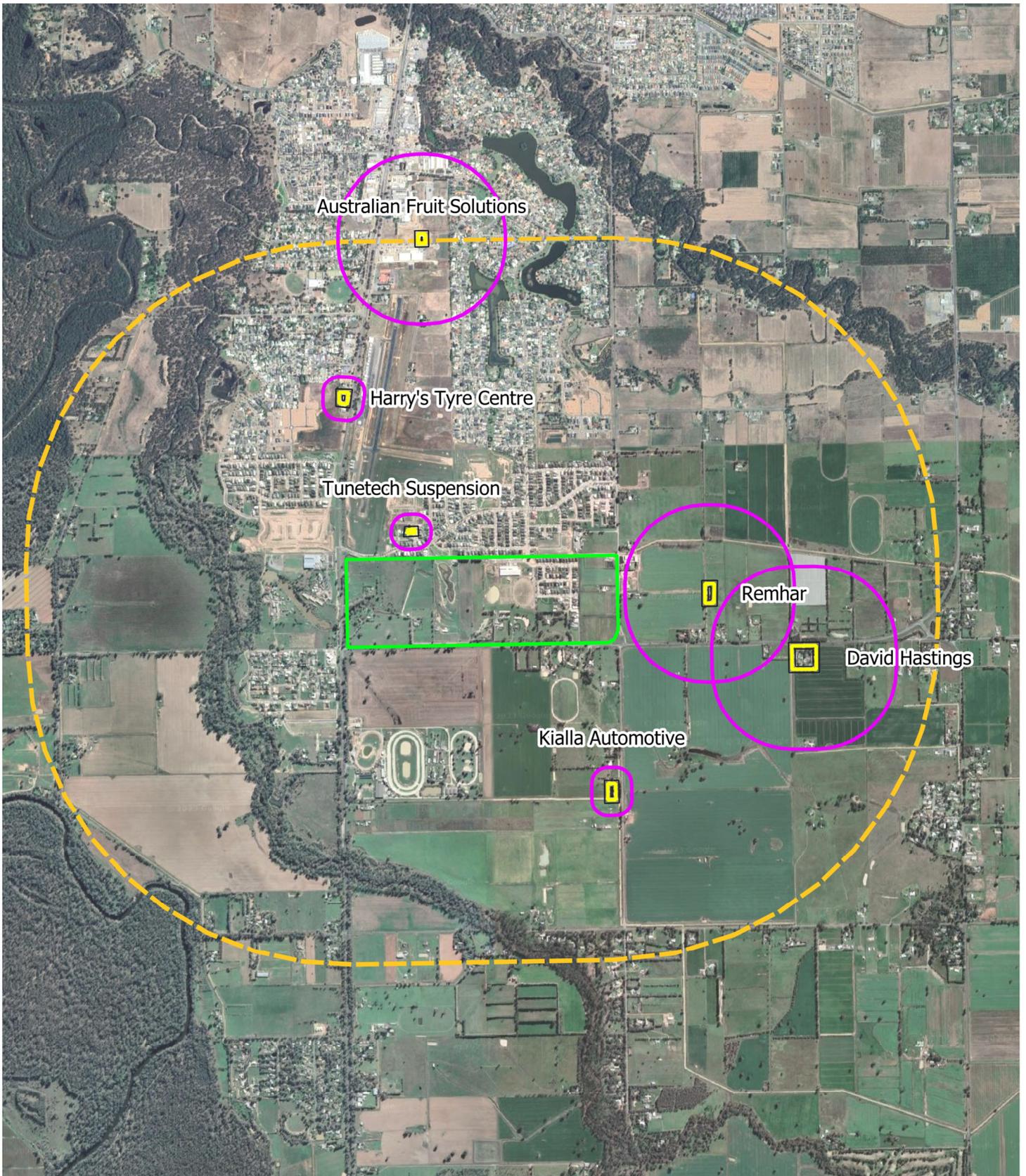
Potential dust sources are expected to occur from:

- Transport and storage of materials

No odour emissions are expected to occur at these sites.

Separation distances

All automotive material recovery industries identified appear to be to be local services and classified under “Materials recovery and recycling facility” category. Although specific receiveal is unknown, it is assumed for metal scraps to be accepted at the site, therefore a 500 m separation distances has been applied for the listed industries. This separation distance does not extend to the Precinct for any of the two industries.



Legend

- █ Waterbird Precinct
- Industries with Recommended Separation Distances
- Precinct 2km Buffer
- Recommended Separation Distances

<p>Paper Size ISO A4</p> <p>0 0.00025 0.0005 km</p> <p>Map Projection: Transverse Mercator Horizontal Datum: GDA2020 Grid: GDA2020 MGA Zone 55</p>			<p>Greater Shepparton City Council</p> <p>Waterbird Creek Amenity Impact Assessment</p> <p>Recommended Separation Distances</p>	<p>Project No. 12601656</p> <p>Revision No. -</p> <p>Date. 01/05/2023</p>
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FIGURE 7

Document Path: I:\ghdnet\ghd\AU\Melbourne\Projects\31112601656\GIS\Maps\Working\12601656_Waterbird_site.qgz
 Print Date: 01/05/2023
 ©2023. While GHD has taken care to ensure the accuracy of this product, GHD and DATA CUSTODIAN(S), make no representations or warranties about its accuracy, completeness or suitability for any particular purpose. GHD and DATA CUSTODIAN(S) cannot accept liability of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred as a result of the product being inaccurate, incomplete or unsuitable in any way and for any reason.
 Data Source: Google Earth Imagery 2023. Created By: yjm

5.3 Agriculture

A number of row crop / orchard farms are located to the east, south east and south of the Precinct. There are none found within the precinct. There is no separation distance specified in EPA Publications 1518 and Draft 1949 for spray drift.

The Agriculture Victoria department provides a definition of a buffer zone:

- “An area left designated as a no spray zone between a sensitive area and a crop being sprayed is known as a buffer zone. A buffer zone often forms a strip of unsprayed paddock, but may also contain a vegetative barrier within it” (Agriculture Victoria, 2019⁵).

This buffer distance, or buffer zone, is however not quantified as it “will vary a great deal and may be different from day to day”.

There are a number of different guidance documents in relation to spray drift within Australia, as outlined below.

5.3.1 New South Wales

The NSW Department of Primary Industry (DPI) provides a discussion around downwind buffer zones from the position of the spray applicant (DPI, 2019⁶):

- “Maintain a downwind buffer”
- “This may be incrop, for example keeping a boom's width from the downwind edge of the field”

A ‘boom’, or equivalent, in an orchard is likely to be less than tree height and row separation that would be less than broad-acre booms in use.

5.3.2 Queensland

Planning Guidelines, Separating Agricultural and Residential Land Use

The Queensland Natural Resources document ‘Planning Guidelines, Separating Agricultural and Residential Land Uses’⁷ and provides advice on agricultural chemical spray drift in relation to development assessments. The document notes that there is insufficient knowledge to settle on a single distance for a buffer zone and that evidence indicates that buffer zones need to be chemical/formulation specific, based on supporting data. However, it is further noted that from a planning perspective, it is not practical to base buffer area dimensions on individual chemicals or formulations.

Therefore, based on available research on chemical spray drift, the following is outlined:

- A minimum width of 300 m where open ground conditions apply
- A minimum width of 40 m where a vegetated buffer element can be satisfactorily implemented and maintained

Guide to Planning for Healthy Agriculture in Queensland

The Queensland Farmers’ Federation document ‘Guide to Planning for Healthy Agriculture in Queensland’ provides land use advice in relation to locating future housing, industry and infrastructure near agricultural uses. The document does not outline specific separation distances for spray drift. However, implementation strategies and checklists are provided in relation to a number of areas such as managing existing land use conflicts.

⁵ <https://agriculture.vic.gov.au/farm-management/chemicals/spraying-agricultural-chemicals/resources-for-managing-spraydrift>

⁶ <https://www.dpi.nsw.gov.au/biosecurity/weeds/weed-control/herbicides/spray-drift>

⁷ **Planning Guidelines Separating Agricultural and Residential Land Uses (psu.edu)**

5.3.3 Western Australia

The Guidelines for Separation of Agricultural and Residential Land Uses (Western Australian Government) specifies that a 40 m separation distance may be used between an orchard and sensitive land use “where a vegetative buffer has been adequately designed, implemented and maintained” (Department of Health, WA). In replacement of a vegetative buffer, the guideline also says that a “suitably designed constructed buffer with 50 per cent porosity and of sufficient height” may be used. The guideline recommends that the height of the physical barrier must be twice the height of the spray release height.

The guideline also states that ‘natural geographical features (watercourses and ridge lines), public open spaces and road reserves can be used to meet the required separation distances. Areas reserved for public open spaces should not be designed for recreational use (for example playgrounds, community facilities) until agricultural activities are ceased.’

5.3.4 Australian Capital Territory

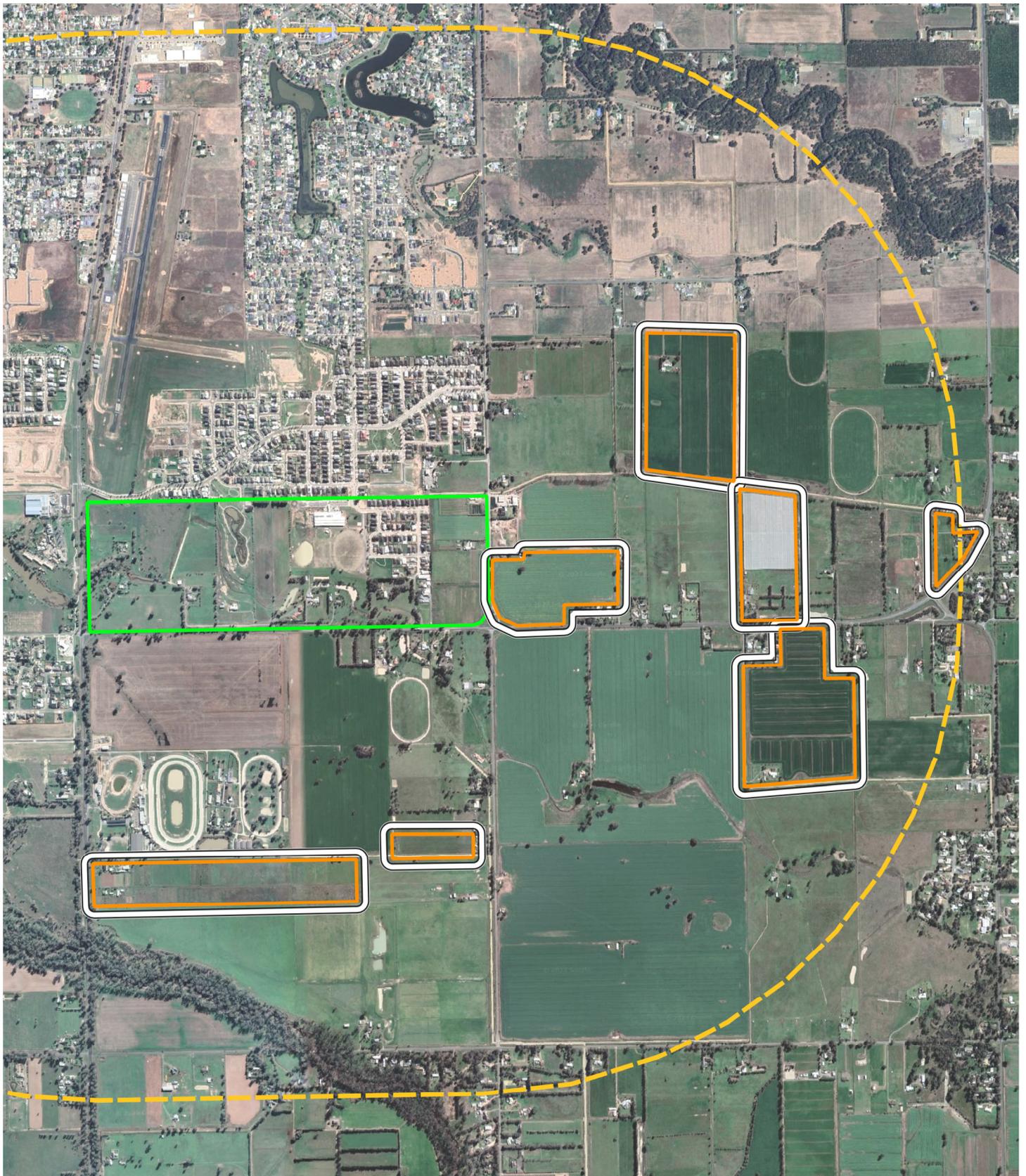
In addition to the WA guidance, the ACT Government *Separation Distance Guidelines for Air Emissions, 2018* specifies separation distances for the category “agricultural chemical spray drift”:

- 300 metres for open grounds conditions
- 40 metres for vegetated buffer

5.3.5 Application to Precinct

Given that the Precinct will include residential areas, separation distances should also be considered from agricultural farms within and surrounding the Precinct as per the above advice. A 40 m separation distance has been applied to the identified agricultural farms, as shown in Figure 8. From Figure 8 it can be seen that the 40 m separation distance applied to one agricultural farm located to the east of the Precinct, results in a very small constraint to the eastern edge of the Precinct.

However, it is noted that as the types of chemical sprays and locations they are being used is unknown, it is difficult to assess the risk from these sites. Should a 40 m buffer not be met from an orchard farm to future sensitive use, then it is recommended that a solid fence (a higher than a standard residential fence) be implemented between the orchard and residences. In the event both of these options are not possible then further work is recommended to be undertaken to gain an understanding of the types of chemical sprays, the locations they are being used, frequency of spraying and application, meteorology implications and the future plans of the agricultural farms in order to assess the risk to the Precinct.



Legend

- Waterbird Precinct
- Agricultural areas
- Precinct 2km Buffer
- Agricultural SD buffer

<p>Paper Size ISO A4</p> <p>0 0.00025 0.0005 km</p> <p>Map Projection: Transverse Mercator Horizontal Datum: GDA2020 Grid: GDA2020 MGA Zone 55</p>			<p>Greater Shepparton City Council</p> <p>Waterbird Creek Amenity Impact Assessment</p> <p>Potential Spray Drift Agricultural Areas with 40m Separation Distance</p>	<p>Project No. 12601656</p> <p>Revision No. -</p> <p>Date. 01/05/2023</p>
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FIGURE 8

5.4 Transport

5.4.1 Vehicle emissions

The EPA has identified motor vehicles as being a major source of urban air pollution. In Melbourne in 2006, motor vehicle emissions contributed the following levels of pollutants to the overall air quality⁸:

- 72 per cent of all carbon monoxide (CO) emissions
- 70 per cent of all nitrogen oxides (NO_x) emissions
- 28 per cent of all volatile organic compounds (VOC) emissions
- 31 per cent of all emissions of PM_{2.5}
- 27 per cent of all emissions of PM₁₀
- 6 per cent of all sulphur dioxide (SO₂) emissions

The EPA conducted a four-year review⁹ of air quality near major roads in Melbourne (including the Westgate Freeway) and Geelong in 2006. That study concluded:

- Particles measured as PM₁₀ and PM_{2.5} generally remained below intervention (criteria) levels
- In general, particle levels were similar to or slightly above background levels
- Carbon monoxide, nitrogen dioxide and sulphur dioxide were below intervention (criteria) levels
- Carbon monoxide, nitrogen dioxide and sulphur dioxide were similar to background site monitored
- Benzene levels were at intervention (criteria) levels
- Benzene levels were above background levels
- Within a short distance from the road, the air quality objectives are generally met, for example, the level of PM₁₀ declined by 50% within 20 m of the roadside
- Improved fuel standard and vehicle design is expected to improve air quality near roads despite increased vehicle usage

Further, there is currently a parliamentary inquiry into the Health Impacts of Air Pollution in Victoria, with one of the focus areas being vehicle emissions. The report prepared as part of the inquiry notes that heavy vehicles, diesel vehicles and idling of vehicles have the largest impact on air quality. Various recommendations are outlined in the inquiry related to diesel vehicle emissions standards, guidelines to assist with the location of facilities (such as childcare centres) and methods to reduce vehicle idling.

In the absence of local policy, the policy outlined by the Brisbane City Council can be utilised as a guide. The Brisbane City Council planning scheme includes a transport air quality corridor planning scheme policy that provides guidance on best-practice built form and landscape design elements to:

1. Minimise the impacts of air pollution from vehicle traffic on the health and wellbeing of users of a child care centre, multiple dwelling, residential care facility or retirement facility
2. Maximise wind movement around buildings and the dispersion of traffic air pollutants
3. Minimise the impacts of air pollution from a tunnel ventilation stack on the health and wellbeing of occupants of sensitive uses

⁸ EPA Victoria (2006) Publication 1025: *Environmental Report - Review of air quality near major roads*. Retrieved from: <https://www.epa.vic.gov.au/-/media/epa/files/publications/1025.pdf>

5.4.2 Application to the Precinct

Although none of the categories strictly apply to the Waterbird Creek development site, the first category can be used as a general principal to minimise impacts of air pollution from vehicle traffic (specifically from Shepparton Alternative Route and Goulburn Valley Highway). It is widely recognised that traffic pollutants reduce as distance from the road kerb increases. Thus, setting back sensitive development as far as practicable from Shepparton Alternative Route and Goulburn Valley Highway will provide the best outcome for the health and well-being of occupants. Brisbane City Council recommend separation distances for the different traffic route types which are based on best available air quality roadside monitoring data and air quality modelling predictions.

The Brisbane City Council policy outlines the following acceptable outcome which can be applied to Shepparton Alternative Route and Goulburn Valley Highway:

- Development for a multiple dwelling, residential care facility, rooming accommodation where accommodating six people or more, or retirement facility.
- A set back distance separating the sensitive use from the kerb in accordance with recommended separation distances for the different traffic route types. A minimum of 30 m is recommended for a motorway, 20 m for a high-volume traffic route and 10 m for an intermediate volume traffic route.

The western portion of the Precinct is bordered by Goulburn Valley Highway and Shepparton Alternative Route to the south. If Shepparton Alternative Route and Goulburn Valley Highway are considered to be high-volume traffic routes then a 20 m set back from the kerb to sensitive uses would be sufficient.

Where the development cannot meet the recommended separation distance from the kerb, the policy includes an alternative to install ducted mechanical ventilation with the supply of clean outdoor air. Where the ventilation outdoor air intakes cannot be sufficiently separated from the kerb, a third alternative for achieving clean air for building occupants is provided. This involves installing particle filtration in combination with ducted mechanical ventilation.



Legend

- Waterbird Precinct
- 20m Setback



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Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 55

Transport Routes 20m Set Back

FIGURE 9

5.5 Kialla South Growth Corridor

Within the “Agricultural” section in Publications 1518 and Draft 1949 there are no applicable categories for Racing Clubs. The categories are largely related to stock such as cattle, sheep, pigs and goats rather than to horses and greyhound. However, the closest category would be a stock sale yard where cattle and or sheep or other stock are temporarily confined for sale, transport or processing with a 500 head per week capacity requiring a 500 m separation distance. This distance is met to the Precinct from the Racing club. Given the available separation and the periodic limited use of the racing club it can concluded that odour and dust generation associated with the racing club will be minimal. Therefore, based on the proposed masterplan, development of the Kialla South Growth Corridor will have no direct impact to the Precinct.

6. Meteorological analysis

The local meteorology largely determines the pattern of off-site impact. The characterisation of local wind patterns requires accurate site-representative hourly recordings of wind speed and direction over a period of at least 12 months (one year).

GHD has access to high quality meteorological data (five years at hourly intervals) from the Automatic Weather Station (AWS) operated by Bureau of Meteorology (BoM) at Shepparton Airport (Station ID 81125). The meteorology dataset has been provided from 2017 to 2021.

6.1 Long term pattern in wind

The effect of wind on dispersion patterns can be examined using the general wind climate and atmospheric stability class distributions. The general wind climate at a site is most readily displayed by means of wind rose plots, giving the incidence of winds from different directions for various wind speed ranges.

The features of particular interest in this assessment are: (i) the prevailing wind directions and (ii) the relative incidence of more stable light wind conditions under 2 m/s and (iii) good dispersion condition winds over 5 m/s.

A wind rose representing trends over the entire data period is shown in Figure 10 and shows the following features:

- The average measured wind speed over the entire monitoring period was 3.7 m/s
- Wind speeds greater than 6 m/s occur 15.7% of the time
- Calm winds comprised 9.1% of the monitoring period
- The predominant wind direction is from the south-southwest
- Easterly winds were less frequent than other wind directions, occurring approximately 1% of the monitoring period. In contrast, westerly winds occur approximately 7% of the monitoring period
- High wind speeds (>6 m/s) are relatively predominately from the south to southwest directions
- Low wind speeds (less than 2 m/s) predominantly occur from the northeast and south-southwest directions

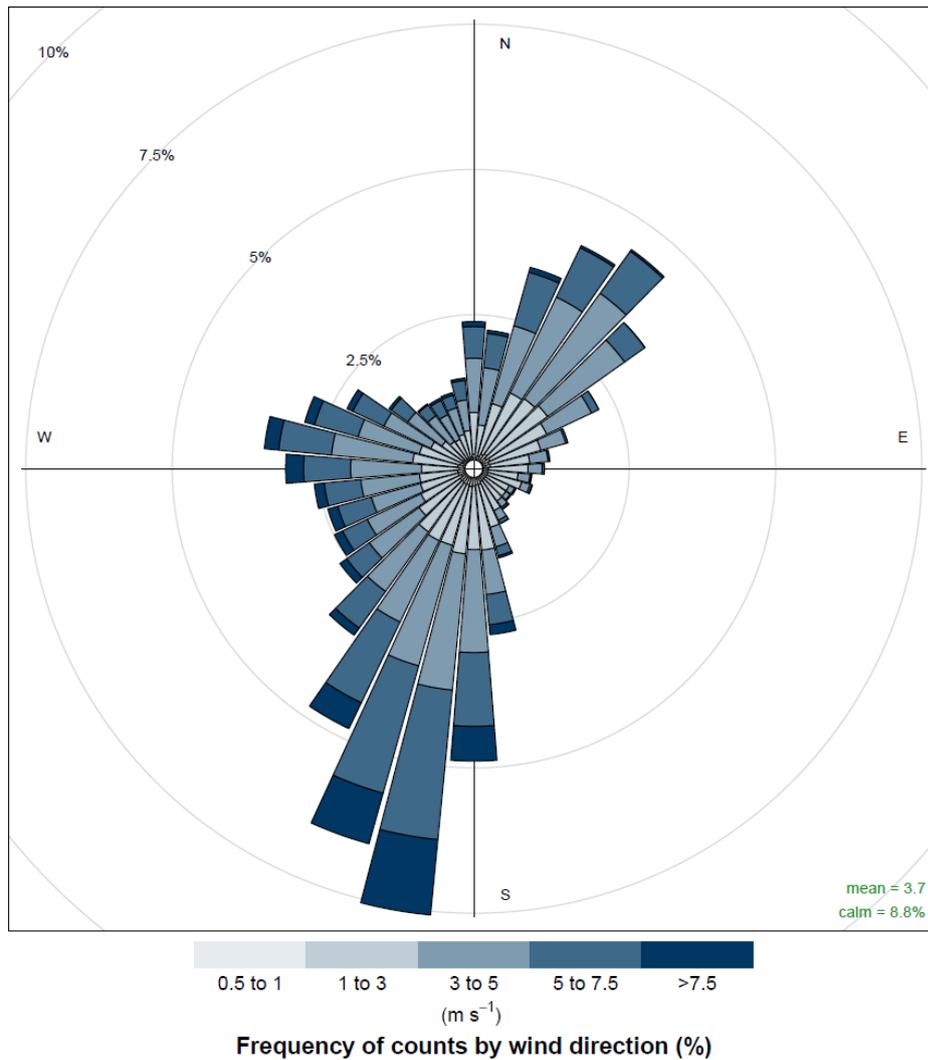


Figure 10 Annual wind rose for Shepparton Airport

6.2 Seasonal pattern in wind

Seasonal variations in wind direction and wind speed are shown in Figure 11 and demonstrate the following:

- There is a strong contrast in wind direction between summer and winter, with winds predominantly southerly in summer reflecting sea breeze effects and predominantly northeasterly in Winter
- The incidence of light (0.5-2 m/s) winds is greatest in Winter
- The incidence of high (>6 m/s) wind speeds is greatest in Summer
- Spring and autumn receive similar wind direction and wind speed patterns. Both have a relatively high frequency of southerly and north-easterly winds

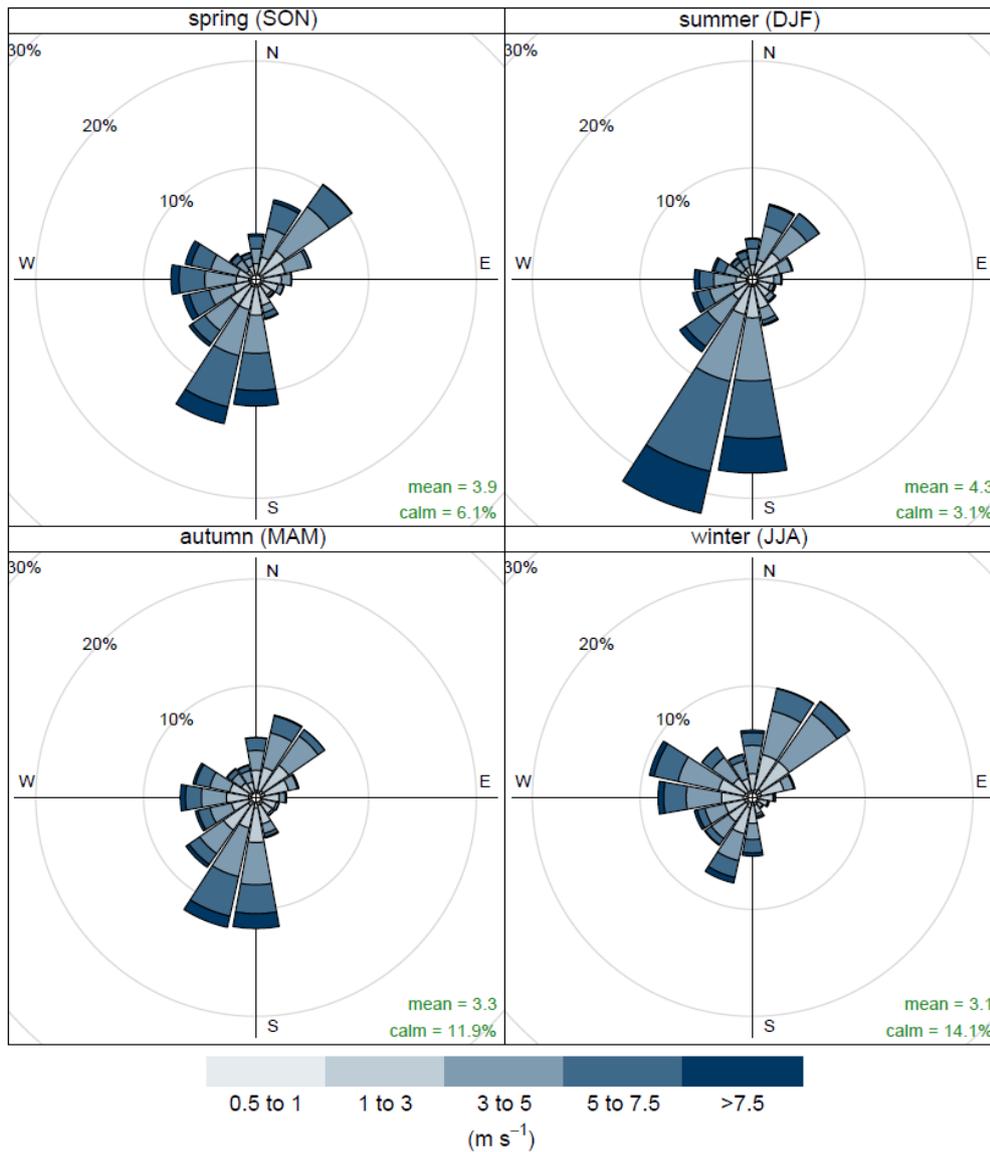


Figure 11 Seasonal wind roses for Shepparton Airport

6.3 Implications for the Precinct

For dust it is the stronger wind speeds (greater than 5 m/s) that are most of interest which result in greatest offsite dust impacts. The greatest incidence of winds greater than 5 m/s occur from the south-southwest placing receptors to the north-northeast most at risk. In terms of the Precinct no industries with potential to generate dust are located upwind. Further it is summertime when dust impacts occur more prominently when materials and unsealed surfaces dry out. When considering strong winds in summertime it can be seen that they predominantly blow south-southwest, not placing any industries upwind of the Precinct. Therefore, it can be concluded that the risk of strong winds resulting in dust impacts to the Precinct is low.

For odour it is the low wind speeds (less than 2 m/s) that are most of interest which result in greatest offsite odour impacts. The greatest incidence of winds less than 2 m/s occurs from the south-southwest and northeast. From these two directions, there have been no identified industries with potential to generate odour upwind from the Precinct. Therefore, it can be concluded that the risk of low winds resulting in odour impacts to the Precinct is low.

7. Directional buffer

7.1 Methodology

Section 5.2 and 6.2 of the EPA Publication 1949 outlines the requirements to vary a default buffer distance. This section details Stage 3 of the decision-making process for both odour and dust separation distances. When an alternative separation distance is being considered, a risk assessment is prepared to determine the variability of the default buffer. One key assessment factor that may influence the variation of or determine the acceptability of a buffer distance is local meteorology. This allows for site specific variation to the default buffer to account for the effects local meteorology has on dispersion. Section 5.3.7 of EPA Publication 1949 provides detail where meteorology is an important consideration for odour emission impacts.

EPA Publication 1883 allows for relative dispersion modelling in the form of meteorological modelling to help understand dispersion patterns from sources, such as the shape of emission contours. EPA states that such a tool may be applied using the minimum separation distance as an input to determine its shape by keeping the total area contained by the separation distance constant.

GHD has developed an approach to provide directionally-dependent buffers on the basis of the dispersive ability of the atmosphere, as assessed using atmospheric dispersion modelling (Clarey & Pollock, 2004).

Where site-representative meteorological data is available, the direction of good and poor dispersion can be identified. Further, if the dataset is configured into the dispersion modelling format then dispersion modelling (using the EPA regulatory model AERMOD) can be conducted using a nominal air source emission rate to assess the directional change in the buffer extent from a default radial buffer¹⁰. The directional buffer adapts the default radial buffer to take account of the directions of good and poor dispersion – sourced from the meteorological data representative of local conditions.

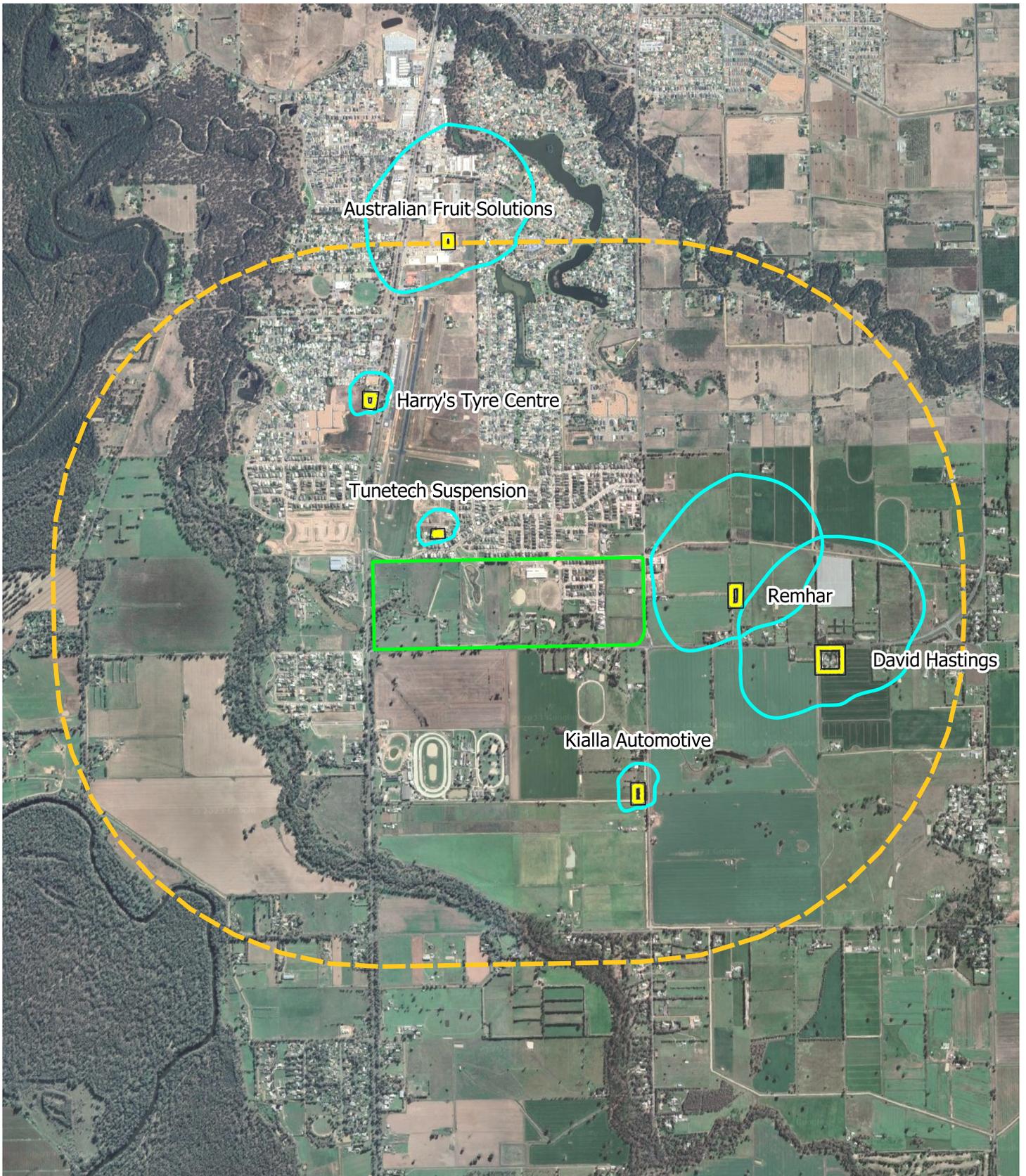
In the directions of poor dispersion, the buffer is extended and in the directions of good dispersion the buffer is retracted. The effect is to produce the same degree of protection from exposure to impact as the default buffer but shaped by the local meteorology to represent a more realistic site specific buffer in the event of an emission event.

This analysis further assists in assessing the likely risk of odour and dust impact from the site.

7.2 Results

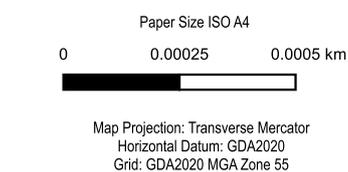
Directional buffers are plotted in Figure 12 for industries identified in Section 5.1. From the figure it can be seen that none of the industries identified outside of the Precinct have a directional duffer that extends to the Precinct. The directional buffers tend to extend on the northeast-southwest axis as consistent with the wind directions shown in Section 6.

¹⁰ Clarey P, Pollock T “Integrating Separation Distances with Dispersion Modelling” Enviro 04, 28 Mar – 1 April 2004, Darling Harbour, Sydney



Legena

- Waterbird Precinct
- Identified Industries
- Precinct 2km Buffer
- Directional Buffers



Greater Shepparton City Council
Waterbird Creek Amenity Impact Assessment

Project No. 12601656
Revision No. -
Date. 09/05/2023

Recommended Separation Distances

FIGURE 12

8. Future land use planning considerations

8.1 Key findings and development constraints

8.1.1 Industry

Six industries within the assessment area (2 km radius from the Precinct boundary) were identified as requiring a separation distance based on the EPA Publications 1518 and Draft 1949.

The application of separation distances from EPA Publications 1518 and Draft 1949 found that the Precinct was not constrained by any of the identified industries.

The industries with the largest separation distances was identified to be Australian Fruit Solutions which has a recommended separation distance of 500 m. However as Australian Fruit Solutions is located approximately 2 km from the Precinct, the recommended separation distance does not extend to the Precinct. A 500 m recommended separation distance was also identified for two automotive material recovery industries, Remhar and Daniel Hastings. Both recommended separation distances do not extend to the Precinct.

The remaining three industries: Harry's Tyre Centre, Tunetech Suspension and Kialla Automotive all have separation distances of 100 m, which do not extend to the Precinct.

Directionally dependent buffers were developed to account for the local meteorology and the dispersive ability of the atmosphere for all industries with a recommended separation distance. The application of the directional buffer found that the Precinct was not constrained.

8.1.2 Agriculture

A number of row crop/orchard farms were identified to be located to the east and south of the Precinct. Use of chemical sprays at these farms have the potential to result in "spray drift" which can be harmful to surrounding sensitive land uses. A review of relevant guidance indicates that a 40 m separation distance with a vegetated buffer is recommended from the orchards to sensitive uses. A 40 m separation distance was applied to agricultural farms which slightly constrained the eastern border of the Precinct.

8.1.3 Transport

As part of the Precinct, if residential housing is proposed to be located east of Goulburn Valley Highway and north of Shepparton Alternative Route may therefore be subject to air quality impacts resulting from vehicle emissions.

It is widely recognised that traffic pollutants reduce as distance from the road kerb increases. Thus, setting back sensitive development as far as practicable from Goulburn Valley Highway and Shepparton Alternative Route will provide the best outcome for the health and well-being of occupants.

The Brisbane City Council policy outlines that a set back distance separating the sensitive use from the kerb (for a high-volume traffic route) of 20 m. A 20 m set back was applied to Goulburn Valley Highway and Shepparton Alternative Route, which resulted in a slight constraint of the western edge and southern edge of the Precinct.

8.1.4 Kialla South Growth Corridor

The closest separation distance category for a horse and greyhound racing club would be a stock sale yard where cattle and or sheep or other stock are temporarily confined for sale, transport or processing with a 500 head per week capacity requiring a 500 m separation distance. This distance is met to the Precinct from the Racing club. Given the available separation and the periodic limited use of the racing club it can be concluded that odour and dust generation associated with the racing club will be minimal. Therefore, based on the proposed masterplan, development of the Kialla South Growth Corridor will have no direct impact to the Precinct.

8.2 Recommended mitigation measures

8.2.1 Industry

Given there were no constraints identified to the Precinct from surrounding industries no mitigation measures are required concerning the identified industries.

8.2.2 Agriculture

A separation distance of 40 m should be utilised as a setback strategy (e.g. open space design adjacent to orchards to provide a reduction in risk through setback distances to sensitive uses) is commonly adopted and recommended as part of this study locating sensitive uses outside the recommended buffer.

GHD recommends that GSCC contact the agricultural uses placing buffer constraints on the Precinct in order to understand current and future operations.

Where setbacks are not feasible built form mitigation is recommended in the form of a solid fence (a higher than a standard residential fence) be implemented between the orchard and residences.

In the event both (set-back and built form mitigation) options are not possible then further work is recommended to be undertaken to gain an understanding of the types of chemical sprays, the locations they are being used, frequency of spraying and application, meteorology implications and the future plans of the agricultural farms in order to assess the risk to the Precinct.

8.2.3 Transport

A set-back distance separating the sensitive use from the kerb (for a high-volume traffic route) of 20 m is recommended for Goulburn Valley Highway and Shepparton Alternative Route.

Where the development cannot meet the recommended separation distance from the kerb, alternatives include built form mitigation such as installing ducted mechanical ventilation and particle filtration at sensitive uses.

8.3 Recommended planning controls

A summary of the identified setback distances which extend into the Precinct are shown in Figure 13 (namely, the 10 m setback distance from Goulburn Valley Highway and Shepparton Alternative Route and the 40 m setback from orchards).

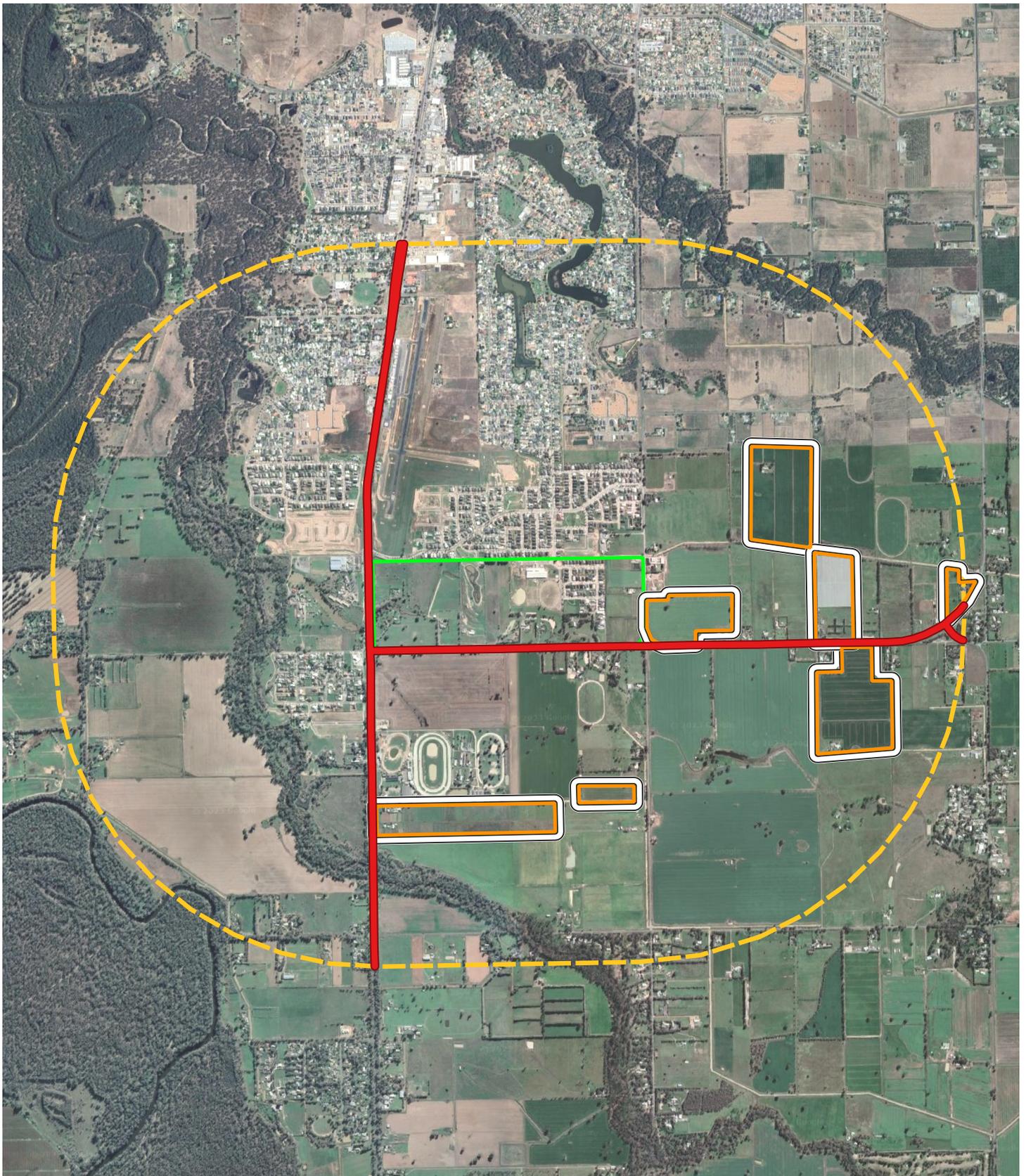
To assist in mitigating the potential for adverse amenity within Precinct, the following planning controls are recommended to be incorporated within the PSP or via proposed zoning controls (or schedule within).

Setback distances

No sensitive uses (as defined in section 2.3) are to be located within the setback distances shown in Figure 13.

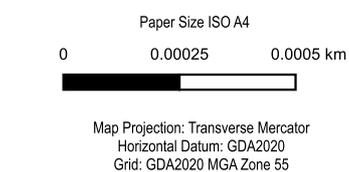
Transitioning of land use

If existing land use with a specified separation distance has formally indicated that it will transition out of an area over a specified timeframe, then this provision can be used to sequence any proposed sensitive use development within the existing separation distance.



Legena

- Waterbird Precinct
- 40 m Spray Drift Separation Distance
- Precinct 2km Buffer
- Agricultural areas
- 10m Transport Route Set Back



Greater Shepparton City Council
Waterbird Creek Amenity Impact Assessment

Project No. **12601656**
Revision No. **-**
Date. **09/05/2023**

Set Back Distances Which Extend into the Precinct

FIGURE 13



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