Executive summary

The State Government of Victoria has identified the Fisherman’s Bend Urban Renewal Area (FBURA) as a key urban renewal area within the Central City Zone. GHD was engaged by Places Victoria (Places) to prepare a Buffer Assessment Report that presents a suitable approach to development at Fishermans Bend. This assessment aims to identify and report on all existing relevant default amenity buffers and barriers internal to the FBURA and within the surrounding area. The focus of the assessment is to identify any potential risks to the future development of the FBURA, as well as the impact of the introduction of sensitive uses on existing industrial uses and the consideration of reverse amenity provisions. In particular the focus will be on industries that have the potential to constrain the FBURA due to odour, dust, noise or lighting sources. GHD has also identified any potential mitigation measures that may be appropriate, and also identified any future planning scheme requirements and potential measures that may be relevant during the transition phase (staging) of the development.

Default and Directional Buffers

In the case of an existing industrial use, the EPAV1 recommend buffer (now termed separation) distances should be established in the planning scheme. This can be done by means of an overlay or specific planning framework. Without their implementation by these tools the default buffers remain recommendations only and cannot be enforced. A buffer (separation) distance is a planning instrument used to provide separation of sensitive land uses (i.e. residential, schools, hospitals and recreation reserves) from existing industrial premises with the potential for off-site emissions (odour or dust) that can cause disamenity in the event of an upset/malfunction.

GHD has determined all the recommended default buffers for the identified potential odour and dust emitting sources (refer to Figure 7). This buffer analysis shows that there are a number of potential buffer constraints to the FBURA including Kraft Foods, PrintLinx facility (dependent on throughput), Symex, Delta and Port Phillip Resource Recovery Centre (PPPRRC), Detmold, Port Melbourne and the Pronto and Hanson Concrete batching plants.

From the directional buffer assessment the default buffers can be retracted and extended in the directions of good and poor dispersion (refer to Figure 16 below). A large extension of the default buffer occurs to the south, while the default buffer is retracted in the north, west and east. Figure 16 shows eight key constraining industries. The EPA complaint history indicates that there have been no dust complaints attributed to dust constraining industries within the FBURA or from any existing residences south of the FBURA. There has also been no odour complaints regarding Symex from the existing residents but there have been odour complaints from within the FBURA (current industrial area). Detmold has an existing proximity to residential uses and registered odour complaints, while odour from Kraft may be an issue for routine as well as upset scenarios.
Note Symex have commenced the transitioning phase of their site by selling their property indicating that they will close in the foreseeable future. This will have a significant impact on future buffer requirements (the buffer for Symex would no longer be required). However until operations on site cease there is a potential for an odour impact to nearby existing and future residents.

A number of Major Hazard Facilities (MHFs) were identified surrounding the FBURA Precinct. There were no MHF sites identified within the FBURA Precinct. The separation distance from the identified MHF facilities to the FBURA is adequate not to result in any constraints to the development.

Potential Development Constraints

The significant potential odour, dust, noise and lighting constraints to the FBURA development were identified to be:

- **Odour sources:** Symex, Detmold, Port Phillip Resource Recovery Centre and Kraft Foods.
- **Dust sources:** Pronto Concrete Batching Plant, Hanson Concrete Batching Plant, Port Melbourne Metals Metal Transfer Station, Delta Group Transfer Station and Port Phillip Resource Recovery Centre. Steel and Independent cement handling facilities including ship unloading and potentially Holden (dependent on site operations).
- **Noise sources:** Concrete batching plants, DSTO, Port Phillip Resource Recovery, Port Melbourne Metals, Kraft Foods, Webb Dock, Melbourne Shooting Complex, various factories, warehouses, and container services facilities sourced from workshops and logistics related activities, which involve trucks, forklifts, cranes, metal clanging and stockpiling. Traffic noise mainly associated with West Gate Freeway, CityLink Tollway, the Flinders Street Local Truck bypass and existing light rail corridors within the Montague precinct, and proposed light rail within the FBURA. Helicopter noise due to the operation of the Helipad at Pier 35 Marina could also potentially cause a significant noise impact. Proposed uses, such as café/restaurants/clubs open at night, also have the ability to impact on residential amenity.
- **Lighting sources:** The port (wharves and parking zones), shipping, traffic on elevated roadways and bridges, local traffic, local adjacent operations such as Independent Cement and the cityscape.

The potential for future industries to pose air quality constraints on the FBURA is remote, in part because of the residential areas of Docklands and Capital City zoned land at Fisherman’s Bend will constrain any industry requiring a significant buffer. Also for the existing Industrial 1 Zoning (located outside the urban renewal area, north of the Winaway Precinct), it is normally reserved only for small industrial facilities and warehouse type businesses for uses such as retail, trade supplies and offices.

The expectations of residents and other sensitive uses are likely to be somewhat different in a capital city context to those of people living in suburban and rural environments. However, a history of complaints to the EPA regarding some of the existing sources of disamenity within and around the FBURA indicate that it could be expected that there would be amenity concerns during a transition period.

The most common amenity issue within a built up capital city environment (i.e. once the FBURA is built) is noise. Noise sources can include people, air conditioners, vehicles, music, clubs restaurants and light rail. Construction activities associated with new buildings or renovations can also be an ongoing issue.

Mitigation Measures

Potential odour and dust mitigation strategies to the FBURA were identified to be land-use planning controls, staged development and the control of odours/dust at source.

Noise and vibration mitigation strategies include: controls at the source, transmission controls, land-use controls and receiver controls. Controls at the source involve intervention strategies for reducing the noise produced by industry and plant. Transmission controls include noise barriers and involve reducing the noise along its path from source to receiver. Land use strategies can include separation strategies and utilising the natural topography of FBURA. Receiver controls involve the design and layout of residences and sensitive land areas. Potential noise mitigation measures within a built up capital city environment (i.e. once the FBURA is built) could include managing the hours of operation of the offending activity, fines for emitting excessive noise, withholding liquor licences, slowing traffic and constructing sound barriers near major thoroughfares and construction management plans.

Strict adherence to the limits set out in AS 4282 is recommended to protect the development from the effects of possible future lighting complaints. Street, building exterior and public space lighting should adhere to a lighting plan that seeks to limit spill, upward directed light pollution and glare.

In order to manage the conflicts between uses, there must be a balance between selecting those measures that sufficiently mitigate amenity impacts, and avoiding over regulation and impacting on the ability to achieve other objectives such as urban growth and environmental sustainability.

Key Recommendations

Possible future key actions for Places Victoria/ Victorian Government and/or a competent consultant engaged by Places Victoria/ Victorian Government:

- Contact key industries and EPA to fully understand the nature of the sources;
- De-rate buffers where appropriate, some buffers identified in this assessment have the possibility of a reduction due to lesser throughputs or emissions compared with larger facilities. This would require cooperation from the industries;
- Vary (i.e. reduce) buffers in the case of ‘transitioning of the industry’; the relevant industry buffers may be reduced with agreement of the industries and EPA as the industries will be transitioning out of the area over a designated timeframe;
- Conduct odour/dust impact assessments for those constraining industries under routine operations, and/or a site specific buffer assessment. A buffer that accounts for: (i) meteorology, and (ii) plausible upset scenarios has been developed by GHD7 to assess the odour exposure of proposed sensitive land uses. This might be appropriate to apply to those industries likely to remain (e.g. Kraft). This would require cooperation from the industries and EPA;
- Undertake a detailed noise and vibration survey within and surrounding the FBURA, to characterise the baseline noise and vibration environment, as well as identify potential high risk areas and establish noise and vibration criteria based on applicable standards.

Following the baseline study, further assessment of potential high risk operations/industries could be conducted to identify cost-effective mitigation measures and possible recommendations for ensuring compliance and amenity preservation;

---

1 Lewis A, Pollock T. “A Method to Determine Site-Specific Buffer Distances for Upsets/Malfunctions in Industrial Premises” Environ 06, 9 -11 May 2006 Melbourne
• Develop a lighting plan for the FBURA to integrate the lighting to be installed in public, street and private developments;
• Develop a staged development/implementation plan for the development of the FBURA to the extent possible as the area is predominately in private ownership; and
• Review and assess the strategic plan in the context of the above, and to further develop mitigation strategies / planning and design controls to help FBURA transition from industrial to mixed use. This could include development controls such as a staged development approach, buffer overlays (interim protection while industries still exist) acquisition of problem sites by government to aid transition, incentives to relocate or mitigate emissions, and commercial uses within buffers.
Table index

Table 1 Precinct Size ................................................................. 5
Table 2 Existing Planning Zones and Overlays within and nearby the FBURA .......... 6
Table 3 Existing and Future Sensitive Receptors in the Lorimer Precinct ................. 9
Table 4 Existing and Future Sensitive Receptors in the Montague Precinct ............. 10
Table 5 Existing and Future Land Uses in the Wirraway Precinct ............................ 10
Table 6 Existing and Future Land uses in the Sandridge Precinct .............................. 11
Table 7 Identified Industries within the FBURA Precinct ....................................... 14
Table 8 Identified Industries Surrounding the FBURA Precinct ............................... 17
Table 9 Default Buffers for Industries within the FBURA Precinct’s ......................... 25
Table 10 Default Buffers for Industries surrounding the FBURA Precinct ............... 29
Table 11 MHI- Licenced and Registered Facilities ................................................. 37
Table 12 Identified Odour sources within the FBURA Precinct .............................. 47
Table 13 Identified Industries Surrounding the FBURA Precinct ............................ 48
Table 14 Directional Variation in Buffer in Response to Local Meteorology – Port Melbourne ................................................................. 57
Table 15 Identified Dust sources within the FBURA Precinct ............................... 63
Table 16 Identified dust sources surrounding the FBURA Precinct .......................... 65
Table 17 Directional Variation in Buffer in Response to Local Meteorology – Port Melbourne ................................................................. 71
Table 18 Identified Primary Noise Sources within the FBURA Precinct ................... 81
Table 19 Identified Primary Noise Sources nearby FBURA ..................................... 84
Table 20 SEPP N-2 Noise Limit .............................................................................. 89
Table 21 SEPP N-2 Outdoor Venue Prescribed Operating Times ............................. 89
Table 22 SEPP N-2 Indoor Venue Prescribed Operating Period .............................. 89
Table 23 Investigation Thresholds for New Passenger Rail Infrastructure or Change in Land use near a Planned Rail Corridor ................................................................. 90
Table 24 Investigation Thresholds for Change in Land Use near an Existing Rail Corridor ................................................................. 90
Table 25 Investigation Thresholds for Redevelopment of Existing Passenger Rail Infrastructure ................................................................. 91
Table 26 Typical Recommended Design Internal Noise Levels .............................. 92
Table 27 Recommended Internal Railway Noise Criteria ......................................... 93
Table 28 Vibration Dose Value (VDV) Ranges and Probabilities for Adverse Comment to Intermittent Vibration (m/s^2) .................................................................................. 94
Table 29  Guidance on the Effects of Vibration Levels .............................................................. 95
Table 30  Guidance Values for Short Term Vibration on Structures ......................................... 95
Table 31  Relative noise emission levels of conventional surfacings in Australia .................... 99
Table 32  Change in acoustic performance due to aging ............................................................ 100
Table 33  Factors to consider in design of traffic calming schemes (Austroads, 2005) ............... 100
Table 34  Lighting Effects in the Lorimer Precinct ................................................................. 110
Table 35  Lighting Effects in the Sandridge Precinct ............................................................... 111
Table 36  Lighting Effects in the Wirraway Precinct ............................................................... 111
Table 37  Lighting Effects in the Montague Precinct .............................................................. 112

Figure index

Figure 1  FBURA Precinct .............................................................................................................. 4
Figure 2  Fishermans Bend Minister Declared Urban Renewal Area ............................................ 8
Figure 3  Map of Industries within FBURA .................................................................................. 16
Figure 4  Map of Industries Surrounding the FBURA ................................................................. 21
Figure 5  Default Buffers within FBURA ...................................................................................... 27
Figure 6  Default Buffers Surrounding FBURA ............................................................................ 31
Figure 7  Overall Buffer Constraints on FBURA ........................................................................ 34
Figure 8  Annual Wind Rose for Port Melbourne .......................................................................... 40
Figure 9  Seasonal Wind Roses for Port Melbourne ..................................................................... 41
Figure 10  Annual Stability Rose for Port Melbourne ................................................................. 43
Figure 11  Seasonal Stability Roses for Port Melbourne ............................................................... 44
Figure 12  Fishermans Bend – Summary of Odour Complaints ..................................................... 54
Figure 13  Directional Buffer for Odour sources ......................................................................... 58
Figure 14  Fishermans Bend – Summary of Dust Complaints ....................................................... 68
Figure 15  Default Buffers for potential Dust Sources ................................................................. 72
Figure 16  Overall Directional Buffer Constraints on FBURA ..................................................... 74
Figure 17  Areas covered by SEPP N-1 (EPA Victoria, 2011) ......................................................... 88
Figure 18  Fishermans Bend – Summary of Noise Complaints ..................................................... 98
Figure 19  Noise Barrier Features (NSW DoP, 2008) ................................................................. 102
Figure 20  Noise Barrier Features (NSW DoP, 2008) ................................................................. 102
Figure 21  Sample of Building Layout Strategies 1 (NSW DoP, 2008) ............................................ 103
Figure 22  Sample of Building Orientation Layout Strategies 2 (NSW DoP, 2008) ....................... 104
Figure 23  Sample of Balustrade/Balcony Design Strategies (NSW DoP, 2008) ......................... 105
Figure 24  Nuisance Lighting Sources ........................................................................................ 109

Figure 25  Potential Nuisance Light Sources ............................................................................. 110

Appendices

Appendix A – Land Use Maps
Appendix B – WorkSafe Safety Separation Distance
### Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQMS</td>
<td>Air Quality Monitoring Station, capable of recording wind speed, wind direction, temperature and wind variability.</td>
</tr>
<tr>
<td>Background Noise Level</td>
<td>For a day, evening or night period means the arithmetic average of the $L_{90}$ levels for each hour of that period for which the commercial, industrial or trade premises under investigation normally operates. The background level shall include all noise sources except noise from commercial, industrial or trade premises which appear to be intrusive at the point where the background level is measured.</td>
</tr>
<tr>
<td>dB</td>
<td>Unit of measurement for Sound Pressure Level known as a decibel.</td>
</tr>
<tr>
<td>dBA</td>
<td>'A-weighted' decibel measurement. Developed in the 1930s as a way to represent the sound frequency sensitivity of the human ear.</td>
</tr>
<tr>
<td>Default buffer (separation) distance</td>
<td>The minimum distance as specified in EPA guidelines from the source of an industry emission (dust or odour) required to minimise impact in the event of a process malfunction at the source. Buffer distances are specified for a range of industries and the distance is selected based on EPA experience with upsets/malfunctions for those industries.</td>
</tr>
<tr>
<td>DPDC</td>
<td>Department of Planning and Community Development.</td>
</tr>
<tr>
<td>Drainage flows</td>
<td>The flow of air down drainage lines (river valleys, stream lines etc). Outside daylight hours these flows generally have high stability, so that any contaminant released into such flows will be poorly dispersed.</td>
</tr>
<tr>
<td>EPA</td>
<td>Environment Protection Authority.</td>
</tr>
<tr>
<td>Encumbered land</td>
<td>Land that is constrained for development purposes.</td>
</tr>
<tr>
<td>FBURA</td>
<td>Fishermans Bend Urban Renewal Area</td>
</tr>
<tr>
<td>Fugitive emissions</td>
<td>Emissions of gases or vapours due to leaks and other unintended releases of gases. The sources of fugitive emissions can be myriad and are hard to capture.</td>
</tr>
<tr>
<td>GHD</td>
<td>GHD Pty Ltd.</td>
</tr>
<tr>
<td>Heat curing</td>
<td>The toughening of a polymer (plastic) by cross-linking the chains brought about through heat.</td>
</tr>
<tr>
<td>Hazardous facilities</td>
<td>Facilities that have the potential to cause harm to the environment or to human health due to a wide variety of factors.</td>
</tr>
<tr>
<td>Interim criteria</td>
<td>Criteria relating to that specific point in time.</td>
</tr>
<tr>
<td>$L_{90}$ (Time)</td>
<td>The arithmetic average of the sound pressure level that is exceeded for 10 per cent of the time specified. This is considered representative of the average maximum noise.</td>
</tr>
<tr>
<td>$L_{C90,T}$</td>
<td>C-weighted or Linearsound pressure level for a specified octave band that is exceeded for 10 per cent of the time interval considered.</td>
</tr>
<tr>
<td>$L_{C10,T}$</td>
<td>C-weighted or Linearsound pressure level for a specified octave band that is exceeded for 90 per cent of the time interval considered.</td>
</tr>
<tr>
<td>MHF</td>
<td>Major Hazard Facility; A facility with the potential to cause harm to the environment or to human health in a severe way (including loss of life).</td>
</tr>
<tr>
<td>Nuisance</td>
<td>A negative effect of a process or action that has the potential to cause inconvenience or annoyance to a person.</td>
</tr>
<tr>
<td>OU</td>
<td>Odour units, whereby one odour unit corresponds with the concentration of an odrant or blend of odrants that can be detected by 50% of a panel of people selected to be representative of the general population.</td>
</tr>
<tr>
<td>PEM</td>
<td>Protocol for Environmental Management, as incorporated in the State Environment Protection Policy (Air Quality) for Victoria, which sets out a methodology to assess potential impacts from mining and extractive industries.</td>
</tr>
<tr>
<td>PoMC</td>
<td>Port of Melbourne Corporation.</td>
</tr>
<tr>
<td>Reverse amenity issues</td>
<td>Reverse amenity refers to the situation where sensitive land uses threaten to encroach into the buffer of an existing industry premises.</td>
</tr>
<tr>
<td>Sensitive land uses</td>
<td>Buildings, amenity areas and outdoor spaces where routine or normal activities could be disrupted by adverse effects from process discharges or side-effects.</td>
</tr>
<tr>
<td>Sensitive Receiver</td>
<td>A sensitive receiver can be defined as any dwelling; caretakers house; library; educational institution; religious facility; childcare centre; kindergarten; hospital; surgery or other medical institution including an institutional home; commercial and/or retail activity (such as any, hotel, motel, caravan park or tourist establishment).</td>
</tr>
<tr>
<td>Sound Pressure Level (SPL)</td>
<td>The Sound Pressure level is the change in air pressure above and below the average atmospheric pressure (amplitude) cause by a passing pressure wave; this is then converted to decibels and can be abbreviated as SPL or $L_p$.</td>
</tr>
<tr>
<td>Sound Power Level (PWL)</td>
<td>This is defined as the average rate at which sound energy is radiated from a sound source and is measured in watts (W). The Sound Power Level can be abbreviated as PWL or $L_p$.</td>
</tr>
</tbody>
</table>
1. Introduction

1.1 Objective

The State Government of Victoria has identified the Fisherman's Bend Urban Renewal Area (FBURA) as a key urban renewal area within the Central City Zone. It is currently utilised for primarily light industry and logistics related businesses, but offers potential as a strategically important urban renewal opportunity in close proximity to the Melbourne CBD.

GHD was engaged by Places Victoria (Places) to prepare a Buffer Assessment Report that presents a suitable approach to development at Fishermans Bend. Places are responsible for coordinating the preparation of an overarching Strategic Framework Plan and Development Contributions Plan to guide future development in the FBURA.

The Strategic Framework Plan will set the direction for future urban development in the FBURA. It would identify:

- The strategic directions and shared vision for the FBURA;
- Areas suitable for urban development and the broad form of development that is appropriate; and
- The strategic infrastructure (physical and social) required to support urban development.

1.2 Scope of Assessment

The purpose of this Buffer Assessment is to inform the Strategic Framework Plan and related Development Contributions Plan for the FBURA.

This assessment aims to identify and report on all existing relevant known default buffers and barriers internal to the FBURA and within the surrounding area. The focus of the assessment is identify any potential risks to the future development of the FBURA including the impact of sensitive uses on existing industrial uses and the consideration of reverse amenity provisions. In particular the focus will be on industries that have the potential to constrain the FBURA due to odour, dust, noise or lighting sources.

GHD has identified potential mitigation measures that may be appropriate, including compatible/complementary land uses in the western end of FBURA to respond to the Port of Melbourne and also identify any future planning scheme requirements and potential measures that may be relevant during the transition phase (staging) of the development of the FBURA.

In preparation of the Buffer Report consideration will also be given to:

- Understanding the existing meteorological patterns in the area and the effect these may have on odour and dust emissions;
- Understanding of the relevant State and Local statutory requirements (including the recently released Draft Guideline on Recommended Separation Distances for Industrial Residual Emissions);
- Understanding of the Port Capacity Project’s proposed development at Webb Dock and to minimise the potential impacts of FBURA on the port’s ability to continuously operate;
- Understanding that the development of the FBURA would occur incrementally over time, the importance of managing the transition of industrial land to residential uses and the likely impacts of short term non-compatible uses;

EPA Victoria Publication 1518 dated March 2013
Information provided by stakeholders is preliminary information only, should not be relied upon and is subject to change and to verification.

• Understanding of amenity perceptions as well as measurable amenity impacts including design solutions in responding to buffer considerations;
• Drawing on solutions already investigated in adjoining precincts, including Southbank and Docklands, to capitalise on existing work; and
• Presenting the outputs of the Buffer Assessment in a form that would be able to feed into the preparation of the Development Contributions Plan and Strategic Framework Plan.

Note that in this report the terms ‘buffer distance’ and ‘separation distance’ are used interchangeably – the former was used in the old guideline, but has been replaced by the latter in the new guideline.

1.3 Methodology

Our project methodology follows the following structure:

• Review of previous work;
• Assessment of all known default buffers;
• Identify Major Hazard Facilities;
• Establish site-representative meteorology;
• Desktop odour review;
• Desktop dust impact review;
• Desktop noise impact review;
• Desktop lighting impact review;
• Identify proposed future sensitive receptors;
• Identify potential risks to future development in FBURA;
• Identify mitigation measures to minimise inappropriate placing of sensitive land uses in FBURA; and
• Identify future planning scheme requirements during transition phase.

1.4 Limitations and Assumptions

This report has been prepared by GHD for Places Victoria and may only be used and relied on by Places Victoria. GHD otherwise disclaims responsibility to any person other than Places Victoria arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

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 the composite plan provided by Places as of 3rd June 2013. GHD disclaims liability arising from any change to this composite plan.

GHD has prepared this report on the basis of information provided by Places Victoria and project stakeholders EPA and PoMC who provided information to GHD which GHD has not independently verified or checked. 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. GHD disclaims liability for the identification of all relevant industries and any subsequent industries that were overlooked.
2. Precinct Description

2.1 Precinct Location

Fishermans Bend is located on a peninsula south west of Melbourne’s CBD. It is geographically bound by the Yarra River to the north and west, and Hobsons Bay to the south. South Melbourne bounds the area to the east and Port Melbourne to the south.

Project borders were identified in September 2011 by the Department of Planning and Community Development (DPCD). This assessment focuses on four distinct precincts within the project border as shown in Figure 1. For the purposes of this assessment, these four precincts will be collectively referred to as the FBURA Precinct. The FBURA Precinct covers an area of approximately 240 hectares.

The Lorimer Precinct, coloured red in Figure 1, is within the municipality of the City of Melbourne. The remaining three precincts, the Montague, Wirraway and Sandridge Precincts, are located within the municipality of the City of Port Phillip.

The precincts are split by the Westgate Freeway that runs generally east west through the Fishermans Bend Precinct.

Table 1

<table>
<thead>
<tr>
<th>Precinct</th>
<th>Approximate Area</th>
<th>Municipality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montague</td>
<td>43 hectares</td>
<td>City of Port Phillip</td>
</tr>
<tr>
<td>Lorimer</td>
<td>27 hectares</td>
<td>City of Melbourne</td>
</tr>
<tr>
<td>Sandridge</td>
<td>85 hectares</td>
<td>City of Port Phillip</td>
</tr>
<tr>
<td>Wirraway</td>
<td>89 hectares</td>
<td>City of Port Phillip</td>
</tr>
</tbody>
</table>

2.2 Existing Planning and Land Use Characteristics

2.2.1 Existing Land Uses

The existing land use in the Fishermans Bend Precinct is predominantly industrial and business with a small amount of residential.

Due in part to the history of industrial land use in the Fishermans Bend Precinct, there is varying risk of land contamination. Golder Associates completed a Land Contamination Study on behalf of Places Victoria in 2012.

This report states that the near surface stratigraphy for the Fishermans Bend Precinct is anticipated to consist of the Port Melbourne Sand and Coode Island Silt capped by a layer of fill over much of the area. It is anticipated that there may be contaminants throughout the Fishermans Bend Precinct. Groundwater is generally shallow, ranging from around one metre to three metres below the surface.

There is large and active ownership by developers, particularly Goodman and MAB.

In the Montague Precinct, there is some smaller office industry and a number of automotive premises. Places Victoria has reported that the number of people employed in the precinct is in the order of nine thousand.

There are major freight transport routes along Wirraway and Williamstown Road and the Fishermans Bend Precinct contains vital access to Webb Dock and for other port related traffic. Road reserves are generally wide to support large vehicle access. There are Westgate Freeway crossings at Salmon and Ingles Streets as well as Westgate Freeway access points at Todd Road and Montague Street. There is a light rail line along Montague Street and one bus service to the area.

2.2.2 Existing Planning Controls

The existing planning controls in each precinct were reviewed to obtain an understanding of the prominent land uses within the FBURA and assist in the identification of future sensitive receptors. The FBURA is under the jurisdiction of two different Planning Schemes, the Port Phillip and the Melbourne Planning Scheme. The Lorimer Precinct is subject to planning controls within the Melbourne Planning Scheme, while the Montague, Wirraway and Sandridge Precincts are subject to planning controls within the Port Phillip Planning Scheme.

The planning zones and overlays for each of the four precincts are summarised in Table 2. The table also identifies zones and overlays in areas directly adjacent to the FBURA. This will help establish a broader understanding of land uses within the area and sensitive receptors in the vicinity of the FBURA.
2.2.3 Capital City Zone and FBURA Vision

The FBURA has been identified as an inner-urban area suitable for large scale urban renewal, incorporating a mix of densities and land uses. To facilitate the renewal of this area in an efficient and co-ordinated manner, on 5 July 2012, most of the FBURA was rezoned to Capital City Zone via a Ministerial Amendment (C102). The area included is shown in Figure 2. The Lorimer Precinct is located in CCZ4 (Melbourne Planning Scheme) and the Montague, Wirraway and Sandridge precincts are all located in CCZ1 (Port Phillip Planning Scheme) (Table 2).

The intent of the Capital City Zone is to aid the achievement of a new vision for the FBURA, which emphasizes the development of a mixed use precinct with a residential and commercial focus. The purpose of the CCZ4 and CCZ1 as outlined in the Planning Schemes is to:

- Provide for medium to high residential density and a variety of dwelling types which are well-located to services and public transport;
- Provide for a range of residential, commercial and industrial, recreational, business and leisure uses within a mixed use environment; and
- Encourage employment uses and the continued operation of existing uses.

It is envisaged that the FBURA will be an extension of the city with a mix of land uses including residential, commercial, retail, industrial, recreation, education, entertainment and community. It will be a place where people can live, work and recreate all in the one area with a range of living, employment and recreational opportunities.

Rezoning the area to Capital City Zone, has also given authority for planning decisions in the area to the Minister for Planning as Responsible Authority for ‘major’ development applications within the precinct. The two municipalities of Melbourne and Port Phillip remain as the Responsible Authority for non-major applications.

<table>
<thead>
<tr>
<th>Zone</th>
<th>Overlay</th>
<th>Adjacent Zone</th>
<th>Adjacent Overlays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandridge Precinct</td>
<td>Development Contributions Plan Overlay – Schedule 1 (DCP01)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Montague Precinct</td>
<td>Development Contributions Plan Overlay – Schedule 2 (DCP02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wirraway Precinct</td>
<td>Development Contributions Plan Overlay – Schedule 2 (DCP02)</td>
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</tr>
</tbody>
</table>
2.3.2 Existing and Future Sensitive Land Uses within the FBURA

Current zoning and the proposed vision for the FBURA indicates an intended future land use change from industrial uses (which are currently predominant in the area) to mixed use. As most of the land within the FBURA is privately owned, creating this mix of uses over the coming years while ensuring pockets of industrial uses do not occur in proximity to future sensitive receptors provides a challenge. To assist in identifying options to manage the change and mitigate potential amenity impacts during the transition phase, the location of existing and future sensitive receptors in the FBURA are identified and outlined for each precinct in the following subsections.

Lorimer Precinct

The Lorimer Precinct is directly opposite the West Gate Freeway and the recently developed Yarra’s Edge Precinct. The primary objective is for it to develop as a precinct of mixed uses and mixed density with high density development occurring along the West Gate Freeway and City Link. Sensitive receptors that need to be taken into consideration during the development of the precinct can be seen in Table 3.

<table>
<thead>
<tr>
<th>Existing Sensitive Receptors</th>
<th>Future Sensitive Receptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>No sensitive uses currently within the site but neighbours the Yarra Edge Marina, Residential area (townhouses and apartments) and a number of open spaces</td>
<td>Residential</td>
</tr>
<tr>
<td>0 ha of Public Open Space (POS)</td>
<td>Parkland along Lorimer Street</td>
</tr>
<tr>
<td>Residential</td>
<td>Key activity node (includes Potential Community/Education Cluster) along Lorimer Street</td>
</tr>
<tr>
<td>Parkland along Lorimer Street</td>
<td>Low Density Development – 0 ha of POS</td>
</tr>
<tr>
<td>Low Density Development – 0 ha of POS</td>
<td>Medium Density Development 4.7 ha of POS</td>
</tr>
<tr>
<td>Medium Density Development 4.7 ha of POS</td>
<td>High density development 4.7 ha POS</td>
</tr>
</tbody>
</table>

There are no existing ‘sensitive land uses’ within the Lorimer Precinct, however, directly adjacent is the Yarra’s Edge Precinct, which has residential, Public Park and Recreational areas. While it is unlikely to be directly affected by future development in the Lorimer precinct, given that similar land use mix is likely, its presence still needs to be taken into consideration.

As can be seen in Table 3 there are expected to be a number of future sensitive land uses identified within the Lorimer Precinct. Appropriate buffering needs to be implemented to ensure these land uses are not impacted by existing industrial uses that are currently in the area during any stage of the areas development.

Montague Precinct

More advanced planning has occurred within the Montague Precinct, with the Montague Precinct Structure Plan recently released. The objective of the plan is to encourage the development of a mixed use precinct with the mix of uses being established from the outset. It is intended that the precinct will have:

- A vertical mix of land uses;
- A mix of residential housing options; and
- A mix of the density of development.

---

2.3 Sensitive Land Uses

The definition of a sensitive receptor or sensitive land use is defined by the EPA as ‘any land uses which require a particular focus on protecting the beneficial uses of the air environment relating to human health and well-being, local amenity and aesthetic enjoyment, for example residential premises, child care centres, pre-schools, primary schools, education centres or informal outdoor recreation sites’.

Note that this definition has recently been enlarged from that in the previous EPA buffer guideline in that ‘informal recreation sites’ are now included whereas the previous definition had an exclusion (‘...and other similar uses involving the presence of individual people for extended periods except in the course of their employment or for recreation’). However, the workplace continues to be excluded as a sensitive land use.

2.3.1 Sensitive Land Uses Surrounding the FBURA

Current residential zoned land is adjacent to the FBURA Precinct south of Williamstown Road. These residents are currently adjacent to Industrial 1 zoned land and have an existing tram corridor (route 109) running through the residential zone, while the residents to the east along Todd Road are adjacent to the Webb Dock precinct.
It is intended that there will be low density development around the eastern and southern boundaries of the precinct to ensure consistency with the adjacent residential areas. The following table identifies existing and future sensitive receptors within the precinct.

**Table 4 Existing and Future Sensitive Receptors in the Montague Precinct**

<table>
<thead>
<tr>
<th>Existing Sensitive Receptors</th>
<th>Future Sensitive Receptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential (Corner of Montague and Gladstone Street, Corner Gladstone and Boundary Street and Corner of City Road and Boundary Street, Townhouses/apartments South of City Road and along Boundary street and M2 use residential, retail and office buildings along Montague Street (from City Road to Thiedethwaite street and along Burchurist street)</td>
<td>School and community hub (corner of Montague Street and Gladstone Street)</td>
</tr>
<tr>
<td>SAE Institute (Creative Media College) -0.36 ha Dedicated to schools (Existing Land budget)</td>
<td>Clustering of restaurants, cafes and retail at street level (Burchurist street and the Corner of City Road and Montague Street)</td>
</tr>
<tr>
<td>0 ha POS</td>
<td>Open space (Burchurist street, Ferrars Street, Murro Street, Woodgate street and along Gladstone Street)</td>
</tr>
<tr>
<td>3.45 ha Public Park and recreation (Existing Land Budget)</td>
<td>Residential (Area from Munro Street to Westgate freeway Apartments, with some commercial uses at street level)</td>
</tr>
<tr>
<td>3.9 Ha public open space (Infrastructure assessment)</td>
<td>Low density development scenario 6.1 ha of POS</td>
</tr>
<tr>
<td>Presence of historic quarry along the northern boundary closest to the Western Highway – potential contamination</td>
<td>Medium density development scenario 6.1 ha of POS</td>
</tr>
<tr>
<td>Low density development scenario – 9.4 ha POS</td>
<td>High Density development scenario 10.8 ha of POS</td>
</tr>
</tbody>
</table>

A number of sensitive land uses currently exist in the Montague Precinct including an education facility (Creative Media College) and residential land. The scale of residential land within the precinct is mixed, with some high density apartments and low density houses. The Precinct also lies adjacent to a sensitive residential zone to the north, which is predominantly comprised of low density housing.

**Wirraway Precinct**

The Wirraway/Plummer precinct will also be of mixed use and mixed density, with low density Wirraway Precinct low density housing. The Wirraway/Plummer precinct will also be of mixed use and mixed density, with low density Wirraway Precinct low density housing. The Wirraway/Plummer precinct will also be of mixed use and mixed density, with low density Wirraway Precinct low density housing. The Wirraway/Plummer precinct will also be of mixed use and mixed density, with low density Wirraway Precinct low density housing. The Wirraway/Plummer precinct will also be of mixed use and mixed density, with low density Wirraway Precinct low density housing. The Wirraway/Plummer precinct will also be of mixed use and mixed density, with low density Wirraway Precinct low density housing. The Wirraway/Plummer precinct will also be of mixed use and mixed density, with low density Wirraway Precinct low density housing.

**Sandridge Precinct**

The predominant sensitive land use in the Wirraway Precinct is Public Open Space (POS), with a number of Public Park and Recreation areas including the JL Murphy Reserve and also the Melbourne Grammar Sports oval. These uses are highly sensitive, however have so far been able to co-exist with surrounding industrial and business uses.

The precinct is adjacent to an existing residential area, which is predominantly low density. This needs to be taken into consideration when determining different height densities within the precinct.

A number of future sensitive land uses have also been identified in the precinct. The implementation of appropriate development and design controls will be required to ensure these land uses are developed in a manner that results in a co-ordinate precinct that has appropriate land uses within proximity of each other.

**Table 5 Existing and Future Land Uses in the Wirraway Precinct**

<table>
<thead>
<tr>
<th>Existing</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melbourne Grammar Sports Oval (end of Todd’s Road)</td>
<td>Residential</td>
</tr>
<tr>
<td>Parkland (Williamstown Road, Corner of Prohasky Street)</td>
<td>Parkland and Melbourne Grammar sports fields (corner of Todd Road and Williamstown road and along Williamstown road between Salmon street and Graham Street)</td>
</tr>
<tr>
<td>JL Murphy Reserve</td>
<td>Key activity node (includes potential Community/Education Cluster) - Corners of Salmon Street and Fennell Street</td>
</tr>
<tr>
<td>6.92 ha dedicated to sport facility</td>
<td></td>
</tr>
<tr>
<td>11.98 ha dedicated to Public Park and Recreation</td>
<td></td>
</tr>
</tbody>
</table>

| Existing POS 24.4 ha (Infrastructure assessment) | Potential community/education cluster along Farnell Street in the middle of Graham and Salmon streets. |
| Adjacent to a residential area (Opposite side of Williamstown Road) | Low density development scenario – 24.4 ha POS |
| Presence of historic quarry along the northern boundary closest to the Western Highway – potential contamination | Medium density development scenario – 24.4 ha POS |
| Low density development scenario 34 ha POS | High density development scenario 34 ha POS |

The predominant sensitive land use in the Wirraway Precinct is Public Open Space (POS), with a number of Public Park and Recreation areas including the JL Murphy Reserve and also the Melbourne Grammar Sports oval. These uses are highly sensitive, however have so far been able to co-exist with surrounding industrial and business uses.

The precinct is adjacent to an existing residential area, which is predominantly low density. This needs to be taken into consideration when determining different height densities within the precinct.

A number of future sensitive land uses have also been identified in the precinct. The implementation of appropriate development and design controls will be required to ensure these land uses are developed in a manner that results in a co-ordinate precinct that has appropriate land uses within proximity of each other.

**Table 6 Existing and Future Land uses in the Sandridge Precinct**

<table>
<thead>
<tr>
<th>Existing</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Melbourne Cricket Ground</td>
<td>Residential</td>
</tr>
<tr>
<td>Adjacent to a residential area (Opposite side of Williamstown Road)</td>
<td>Parkland (along Williamstown Road border by Woodruff St, Bridge St and Ingles street)</td>
</tr>
<tr>
<td>3.45 ha Public Park and recreation (Existing Land Budget)</td>
<td>Key activity node around Ingles and Boundary Street</td>
</tr>
<tr>
<td>3.9 Ha public open space (Infrastructure assessment)</td>
<td>Potential community/education cluster – Corner of Farnell and Bridge St</td>
</tr>
<tr>
<td>Presence of historic quarry on the western side of the precinct – potential contamination</td>
<td>Potential community/education Cluster corner of precinct near south Wharf on edge bordered by Westgate Freeway</td>
</tr>
<tr>
<td>Low density development scenario – 3.9 ha public open space (POS)</td>
<td>Low density development scenario – 9.4 ha POS</td>
</tr>
<tr>
<td>Medium density – 7.0 ha POS</td>
<td>High Density – 9.4 ha POS</td>
</tr>
</tbody>
</table>
The primary existing sensitive land use in the Sandridge Precinct is Public Open Space with the Port Melbourne Cricket Ground and a number of Public Park and Recreation areas. These sensitive land uses also have been identified as future sensitive land uses, as well as residential, key activity nodes and community/education clusters.

While the presence of existing sensitive uses indicates that they can co-exist with the industrial uses also in the area, appropriate buffering and controls will need to be implemented to ensure a smooth transition of uses of the coming years. Controls need to be implemented to project existing sensitive uses and ensure new sensitive uses are located appropriately.

Adjacent to the Sandridge Precinct is a residential area. While it is unlikely to be directly affected by development that takes place in the Sandridge Precinct, appropriate consideration needs to be given to density and scale of development in areas closest to these adjoining residential areas.

2.4 Fishermans Bend Urban Renewal Area Vision

Redevelopment of the Fishermans Bend precinct represents the key part of the State Government’s vision for an expanded CBD which offers high density living beyond the existing Hoddle Grid, Docklands and Southbank. A clear understanding of the current buffer issues is important to inform planning decisions about where and how development and density within the Fishermans Bend precinct can and should be directed, particularly during its transition from a primarily industrial area.

Places Victoria has provided GHD a ‘composite plan’ for the development of the FBURA. The composite plan (which sets out a spatial vision the FBURA) includes a density plan, street network plan, green space plan, public transport plan, activity centres and education facilities.

The density plan shows a mixture of low, medium and high density living with a progressive mix from high to low density from north to south in the Wirraway, Sandridge and Montague Precincts, while the Lorimer Precinct has mostly high to medium density.

The green space plan shows a number of existing and planned green space zones with a green space zone planned in most precincts. In Wirraway a green space is planned for the far western end of the FBURA where the current Melbourne Grammar Sportsground is located. Additional green space land is proposed between the West Gate Freeway and Woodboard Road. The existing JL Murphy Reserve will also be kept. In the Sandridge Precinct the Port Melbourne Cricket Ground will be kept while an additional green space zone is proposed between Bridge Street and Bertie Street. There will be no green space zones in the Lorimer Precinct, while there is planned green space along the tram line and depot in the Montague Precinct and between Ferrars Street and Douglas Street.

There are three education precincts proposed located in the Wirraway, Sandridge and Montague Precincts. There are two large activity hubs proposed, one in Wirraway the other in Sandridge. There are also five smaller activity hubs proposed, one located in Wirraway, Sandridge and Montague, with two in Lorimer.

The transport plan indicates that there is currently a tram/light rail investigation corridor along Fennel and Plummer Streets with two stops, one at Salmon Street and the other at Ingles Street. A further tram/light rail investigation corridor is proposed along Ingles Street.

3. Identification of Relevant Existing Industries

3.1 Fishermans Bend Industry Overview

Port Melbourne / Fishermans Bend precinct is primarily home to numerous advanced manufacturing organisations specialising in research and design in the aerospace and automotive sectors. The significant organisations in this category are:

- Aerostaff;
- Air International;
- Australian Aerospace and Defence Innovations;
- Boeing’s Phantom Works;
- Defence Science and Technology;
- General Motors Holden;
- GKN Aerospace;
- Hawker de Havilland;
- Toyota; and
- RMIT University Sir Lawrence Wackett Centre for Aerospace Design.

Other major operations in the area include:

- Freight and Logistics;
  - Linfox;
  - Patrick Stevedoring; and
  - Toll Group;
- Food;
- Kraft;
- Construction;
- Fishermans Bend is home to distribution facilities that provide up to 70% of Melbourne’s cement;
- Small and Medium Business;
- Fishermans Bend is home to at least 800 businesses with 50 employees or less in the wholesale trade, business services, manufacturing, retail trade, transport, postal and storage, construction, information media and telecommunications and administration services.

3.2 Industry Identification

A site inspection of the proposed FBURA development site and the surrounding area was conducted by GHD on 8 January 2013 for a previous assignment. This was supplemented in this review by aerial photography using Google Earth and Google Street View. Various existing industries with the potential for odour, dust, general air, noise and light emissions were identified both within FBURA and in proximity to FBURA. These are detailed in the following sub-sections.
3.2.1 Industries within the FBURA

The identified industries within the four FBURA precincts are listed below in Table 7. The table identifies the company, their operations, address, type of potential sources of emission and the primary concern for this assessment. Refer to Figure 3 for map locations of these identified industries within the four FBURA precincts. Note only major sites have been identified in the figure. Auto facilities and general factories and warehouses have not been included.

Table 7 Identified Industries within the FBURA Precinct

<table>
<thead>
<tr>
<th>Company</th>
<th>Operations</th>
<th>Address</th>
<th>Potential Sources</th>
<th>Primary Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lorimer Precinct</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto Dealerships/Repairs (Volvo, Land Rover, Subaru)</td>
<td>Car and truck sales and repairs</td>
<td>Various</td>
<td>Trucks, cars, spray painting</td>
<td>Noise, Odour</td>
</tr>
<tr>
<td>Hanson</td>
<td>Concrete Batching Facility</td>
<td>Boundary Street, Port Melbourne</td>
<td>Trucks, stockpiling, concrete batching process</td>
<td>Dust, Noise</td>
</tr>
<tr>
<td>Factories and warehouses</td>
<td>Various factories and warehouses</td>
<td>Various</td>
<td>Trucks, manufacturing and logistics activities</td>
<td>Noise</td>
</tr>
<tr>
<td>Pronto</td>
<td>Concrete Batching Facility</td>
<td>Rogers Street, Port Melbourne</td>
<td>Trucks, stockpiling, concrete batching process</td>
<td>Dust, Noise</td>
</tr>
<tr>
<td>Wirraway Precinct</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AusCarts Racing</td>
<td>Indoor Go-karts track</td>
<td>50 Salmon Street, Port Melbourne</td>
<td>Go-karts</td>
<td>Noise</td>
</tr>
<tr>
<td>Detmold Flexibles</td>
<td>Printing Works</td>
<td>187 Williamstown Road, Port Melbourne</td>
<td>Inks, printing and packing machinery, Air emissions</td>
<td>Odour</td>
</tr>
<tr>
<td>Melbourne Indoor Paintball</td>
<td>Paintball facility</td>
<td>25 Salmon St, Port Melbourne</td>
<td>Paint guns</td>
<td>Noise, Odour</td>
</tr>
<tr>
<td>Factories and warehouses</td>
<td>Various factories and warehouses</td>
<td>Port Melbourne Industrial Estate and various others</td>
<td>Trucks, manufacturing and logistics activities</td>
<td>Noise</td>
</tr>
<tr>
<td>Port Melbourne Containers</td>
<td>Servicing Containers</td>
<td>37 Prohasky Street, Port Melbourne</td>
<td>Trucks, cranes</td>
<td>Noise, Lighting</td>
</tr>
<tr>
<td>Sandridge Precinct</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto Dealerships/Repairs</td>
<td>Car and truck sales and repairs</td>
<td>Various</td>
<td>Trucks, cars, spray painting</td>
<td>Noise, Odour</td>
</tr>
<tr>
<td>Delta Group</td>
<td>Refuse transfer station</td>
<td>577 Plummer St, Port Melbourne</td>
<td>Trucks, building materials</td>
<td>Dust, Noise</td>
</tr>
</tbody>
</table>
Industries within the FBURA with the potential for air, noise or light emissions

Legend

- Fishermans Bend's Precincts
- Industries

Paper Size A4 1:14,000

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Places Victoria
Fishermans Bend Buffer Assessment

Figure 3
### 3.2.2 Industries Surrounding the FBURA

The identified industries surrounding the four FBURA precincts are listed below in Table 8. The table identifies each company, their operations, address, potential sources on site and the emission type of primary concern for this assessment. Refer to Figure 4 for map locations of identified industries surrounding the FBURA precincts. Note only major sites have been identified in the figure. Auto facilities and general factories and warehouses have not been included.

#### Table 8 Identified Industries Surrounding the FBURA Precinct

<table>
<thead>
<tr>
<th>Company</th>
<th>Operations</th>
<th>Address</th>
<th>Potential Sources</th>
<th>Primary Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACI Operations Pty Ltd</td>
<td>Glass Manufacturing</td>
<td>2 Booker St, Spotswood</td>
<td>Glass, machinery</td>
<td>Air emissions, Dust, Noise</td>
</tr>
<tr>
<td>Aerostaff Australia</td>
<td>Research and design in the aerospace and automotive sectors</td>
<td>32 Network Dr, Port Melbourne</td>
<td>Steel cutting and manipulation</td>
<td>Air emissions, Noise</td>
</tr>
<tr>
<td>Albright &amp; Wilson</td>
<td>Phosphates product manufacture</td>
<td>2a Francis St, Yarraville</td>
<td>Phosphate product manufacture</td>
<td>Odour</td>
</tr>
<tr>
<td>Auto Businesses</td>
<td>Auto Repair panel beating</td>
<td>Various</td>
<td>Cars, spray painting</td>
<td>Odour, Noise</td>
</tr>
<tr>
<td>Boeing Aereostuctures</td>
<td>Aircraft Assembly</td>
<td>226 Lorimer St, Port Melbourne</td>
<td>Aircraft Assembly equipment, engines</td>
<td>Air emissions, Noise</td>
</tr>
<tr>
<td>Boral</td>
<td>Plastiboard manufacturing</td>
<td>251 Salmon Street, Port Melbourne</td>
<td>Plastiboard and machinery</td>
<td>Dust</td>
</tr>
<tr>
<td>Brandon Molasses</td>
<td>Blackship sugar cane molasses handling facility</td>
<td>80 MacKenzie Road, Footscray</td>
<td>Molasses, trucks, machinery</td>
<td>Odour, Noise</td>
</tr>
<tr>
<td>Caltex Australia Petroleum</td>
<td>Petrol Storage</td>
<td>Caltex Newport Terminal 411</td>
<td>Petrol Storage Tanks</td>
<td>Odour, Air emissions</td>
</tr>
<tr>
<td>Cement Australia</td>
<td>Cement product depot</td>
<td>469 Lorimer St Port Melbourne</td>
<td>Trucks, cement</td>
<td>Dust, Noise</td>
</tr>
<tr>
<td>Department of Science and Technology Support for Australia’s defence and national security</td>
<td>Science and technology support</td>
<td>500 Lorimer St, Port Melbourne</td>
<td>Aerospace and automotive equipment</td>
<td>Noise, Lighting, Odour, Air emissions, Noise</td>
</tr>
<tr>
<td>DP World</td>
<td>Container Terminals</td>
<td>Coode Island</td>
<td>Containers, ships, cranes, trucks</td>
<td>Noise, Lighting</td>
</tr>
<tr>
<td>Ecogen Energy Pty Ltd</td>
<td>Newport Power Station</td>
<td>350 Douglas Parade, Newport</td>
<td>500 MW gas-fired Power generator</td>
<td>Air emissions, Noise</td>
</tr>
<tr>
<td>Engineering Services</td>
<td>Research and design in the aerospace and automotive sectors</td>
<td>Various</td>
<td>Aerospace and automotive equipment</td>
<td>Noise, Air emissions</td>
</tr>
<tr>
<td>Factories and warehouses</td>
<td>Numerous factories and warehouses</td>
<td>Various</td>
<td>Trucks</td>
<td>Noise</td>
</tr>
<tr>
<td>Futuris</td>
<td>Automotive Interiors</td>
<td>80 Turner Street, Port Melbourne</td>
<td>Paints and glues, metal and plastic</td>
<td>Odour, Air emissions</td>
</tr>
<tr>
<td>Grainco Ltd</td>
<td>Grain elevator</td>
<td>Enterprise Road, West Melbourne</td>
<td>Grain handling</td>
<td>Dust, Noise</td>
</tr>
<tr>
<td>Herald and Weekly Times</td>
<td>Printing facility</td>
<td>127 Todd Rd, Port Melbourne</td>
<td>Inks, printing machines</td>
<td>Odour, Noise</td>
</tr>
<tr>
<td>Holden’s Global V6 Engine plant</td>
<td>Engine manufacturer</td>
<td>191 Salmon St, Port Melbourne</td>
<td>Engine manufacturing, engines,</td>
<td>Air emissions, Noise</td>
</tr>
<tr>
<td>Independent cement</td>
<td>Cement and lime distributor and depot</td>
<td>750 Lorimer St, Port Melbourne</td>
<td>Trucks, stockpiling, cement</td>
<td>Dust, Noise, Lighting</td>
</tr>
<tr>
<td>Kraft Foods</td>
<td>Food production</td>
<td>Salmon Street, Port Melbourne</td>
<td>Vegemite food distributors and depot</td>
<td>Odour, Noise</td>
</tr>
<tr>
<td>Logistic Services</td>
<td>Container operations</td>
<td>Various</td>
<td>Trucks</td>
<td>Noise</td>
</tr>
<tr>
<td>Marisel Terminals Coode Island Pty Ltd</td>
<td>Bulk storage facility</td>
<td>42-52 MacKenzie Rd, West Melbourne</td>
<td>Storage of propylene oxide and benzene</td>
<td>Odour, Air emissions, Lighting</td>
</tr>
<tr>
<td>Melbourne International Karting Complex</td>
<td>Go karts complex</td>
<td>Go karts complex</td>
<td>50 Salmon Street, Port Melbourne</td>
<td>Go karts, Noise</td>
</tr>
<tr>
<td>Melbourne International Shooting Club</td>
<td>Shooting Club</td>
<td>Shooting Club</td>
<td>120 Todd Rd, Port Melbourne</td>
<td>Guns shooting, Noise</td>
</tr>
<tr>
<td>Metal Fabrication Works</td>
<td>Sheet metal fabrication</td>
<td>Various</td>
<td>Steel and machinery</td>
<td>Dust, Odour</td>
</tr>
<tr>
<td>Mobil Oil Australia</td>
<td>Petrol storage</td>
<td>Yarraville Terminal 411</td>
<td>Petrol storage</td>
<td>Odour, Air emissions</td>
</tr>
<tr>
<td>OneSteel</td>
<td>Metal Building Supplies</td>
<td>90 Turner St, Port Melbourne</td>
<td>Steel, trucks</td>
<td>Noise</td>
</tr>
<tr>
<td>Patrick Stevedore</td>
<td>Container Terminals</td>
<td>Coode Island and 3-5 Dockside Rd Port</td>
<td>Containers, ships, cranes, trucks</td>
<td>Noise, Lighting</td>
</tr>
<tr>
<td>Company</td>
<td>Operations</td>
<td>Address</td>
<td>Potential Sources</td>
<td>Primary Concern</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
<td>---------</td>
<td>-------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Webb Dock</td>
<td>Automotive and container terminal</td>
<td>50 Williamstown Road, Port Melbourne</td>
<td>Trucks, cranes, cars, ships</td>
<td>Lighting, Noise</td>
</tr>
<tr>
<td>PrintLex</td>
<td>Printing industry</td>
<td>706 Lorimer Street, Port Melbourne</td>
<td>Printing inks and printing machinery</td>
<td>Odour, Noise</td>
</tr>
<tr>
<td>P&amp;O Ports</td>
<td>Container Terminals,</td>
<td>Coode Island, West Melbourne</td>
<td>Containers, ships, cranes trucks</td>
<td>Noise, Lighting</td>
</tr>
<tr>
<td>Small and medium businesses</td>
<td>Numerous factories and warehouses</td>
<td>Portside Business Park, Bridge side Business Park, Lorimer Business Park, Dockside Business Park, Port-It-at-Turner Business Park</td>
<td>Trucks, forklifts, etc.</td>
<td>Noise</td>
</tr>
<tr>
<td>SP Ausnet</td>
<td>Terminal station</td>
<td>Terminal station, Port Melbourne</td>
<td>Power terminal station</td>
<td>Noise</td>
</tr>
<tr>
<td>Steel Cement</td>
<td>Cement depot</td>
<td>469-591 Lorimer Street, Port Melbourne</td>
<td>Trucks, cement</td>
<td>Dust, Noise</td>
</tr>
<tr>
<td>Stothaven Coode Island</td>
<td>Terminals bulk storage facility</td>
<td>Coode Island, West Melbourne</td>
<td>Bulk liquid hazardous chemical storage facility</td>
<td>Odour, Air emissions, Lighting</td>
</tr>
<tr>
<td>Sugar Australia</td>
<td>Sugar refinery</td>
<td>265 Whitehall St, Yarraville</td>
<td>Sugar refining</td>
<td>Odour, Air emissions</td>
</tr>
<tr>
<td>Terminals Pty Ltd</td>
<td>Terminals bulk storage facility</td>
<td>54-62 Mackenzie Road, West Melbourne (Coode Island)</td>
<td>Storage of acrylonitrile and propylene oxide, flammable and toxic chemicals (e.g. benzene and ethyl acrylate) combustible and corrosive chemicals</td>
<td>Odour, Air emissions, Lighting</td>
</tr>
<tr>
<td>The Shell Co of Australias Limited</td>
<td>Petrol storage</td>
<td>Shell Newport Terminal 91-119 Craig St, Spotswood</td>
<td>Petrol storage tanks</td>
<td>Odour, Air emissions</td>
</tr>
<tr>
<td>Toll Shipping</td>
<td>Container terminal</td>
<td>120-150 Williamstown Road, Port Melbourne</td>
<td>Trucks, cranes</td>
<td>Lighting, Noise</td>
</tr>
</tbody>
</table>
Industries surrounding the FBURA with the potential for air, noise or light emissions

Figure 4
3.3 Transport related sources

Additional sources of odour, dust, general air, noise and lighting impacts maybe produced from the following transport associated (mobile) activities surrounding and within the FBURA:

<table>
<thead>
<tr>
<th>Source</th>
<th>Potential Sources</th>
<th>Primary Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westgate Freeway</td>
<td>Cars and trucks (Traffic on elevated roadways and bridges)</td>
<td>Air emissions, Noise, Lighting</td>
</tr>
<tr>
<td>CityLink Tollway</td>
<td>Cars and trucks (Traffic on elevated roadways and bridges)</td>
<td>Air emissions, Noise, Lighting</td>
</tr>
<tr>
<td>Port of Melbourne</td>
<td>Ships and trucks (wharves and parking zones), cranes and forklifts</td>
<td>Air Emissions, Noise, Lighting</td>
</tr>
<tr>
<td>Rail Freight Facilities</td>
<td>Trucks and cranes</td>
<td>Noise</td>
</tr>
<tr>
<td>Local Traffic</td>
<td>Cars and Trucks (traffic)</td>
<td>Air emissions, Noise, Lighting</td>
</tr>
<tr>
<td>Helipad at Pier 35 Marina</td>
<td>Helicopters</td>
<td>Noise</td>
</tr>
<tr>
<td>Tramline (existing and proposed)</td>
<td>Trams</td>
<td>Noise</td>
</tr>
</tbody>
</table>

3.4 Potential for Future Development

Several vacant premises were observed during the review of existing industries. The potential for future industries that may cause constraints on the proposed FBURA development due to air, noise or lighting emissions is remote. In part this is because the FBURA has been zoned Capital City Zone which is reserved for mixed use (including residential) while the land to the north of the Lorimer is zoned for Docklands development (both these zones are invoked for protection from future industrial development in Clause 52.10).

Also the Business 3 Zoning north of the Winiray Precinct is normally reserved only for small industrial facilities and warehouse-type businesses, and for uses such as retail, trade supplies and offices. These zones are sometimes sited in order to provide a buffer between industrial zoned land (designed to accommodate facilities requiring larger buffers) and residential areas.

4. Relevant Buffer Guidelines and Assessment of all known Default Buffers

4.1 The importance of separation distances

When there is an inadequate separation distance between an industry and sensitive land uses, remedial action to alleviate off-site impacts may be uneconomic. As a consequence, the viability of the industry is jeopardised and the off-site effects are not alleviated. Provision of adequate separation distances seeks to avoid these potential lose/lose situations.

Two classes of buffer / separation distance guidelines are relevant in the context of planning in Victoria. Where there is an industrial use proposed on a land parcel, then the provisions of Clause 52.10 in the State section of planning schemes apply. In effect, if the industry is specified in the Table to the Clause, then the corresponding threshold distance to the nearest Residential Zone, Business 5 Zone, Capital City Zone or Docklands Zone (the latter two are relevant here) must be met, otherwise a planning permit must be sought.

In the case of an existing industrial use, the EPA1 recommend that buffer (now termed separation) distances should be established in the planning scheme. This can be done by means of an overlay or specific planning framework. Without their implementation by these tools the default buffers remain recommendations only and cannot be enforced. A separation distance is a planning instrument used to provide separation of sensitive land uses (i.e. residential, schools, hospitals and recreation reserves) from existing industrial premises with the potential for off-site emissions (odour or dust) that can cause disamenity in the event of an upset/malfunction. Under routine operations SEPP (AQM) objectives should be met and odour/dust impacts should be confined on-site by the implementation of environmental management practices. Unlike routine emissions, unintended emissions are often intermittent or episodic and may originate at or near ground level. Separation distances seek to avoid the consequence of upset industrial residual air emissions.

The purpose of the EPA separation distance guidelines are to provide recommended minimum separation distances between odour or dust emitting industrial land uses and sensitive land uses. Accordingly the relevant sections of the guideline for this assessment are to:

- Provide clear direction on which land uses require separation;
- Inform and support strategic land use planning decisions;
- Prevent new sensitive land uses from impacting on existing industrial uses;
- Prevent new or expanded industrial land uses from impacting on existing sensitive land uses; and
- Identify compatible land uses that can be established within a separation distance area.

The buffers are to be scribed as per EPA Guidelines Method 1 (Urban method). This method requires that the separation distance be measured from the activity boundary of the industry to the property boundary of the sensitive land use, i.e. this activity boundary of the industry is a convex polygon containing the activities of the industry.

---

1 Victorian Planning Provisions, Clause 52.10 “Uses with Adverse Amenity Potential”

2 EPA Victoria Publication 1518 dated March 2013
In the case of the FBURA development the situation is complicated for the fact that surrounding land uses might place on the proposed development. The impact of a proposed development might have on its surroundings, and (ii) the potential constraints that existing land uses place on the proposed development.

All issues need to be assessed when considering: (i) the potential impacts that a proposed land use separation for protection from the above impacts include:

- State Environment Protection Policy Air Quality Management (SEPP-AQM);
- State Environment Protection Policy (Control of Noise from Commence, Industry and Trade) No. N-1;
- Land Use Planning Near Major Hazard Facilities, WorkSafe, 2010; and
- Victoria Planning Provisions (VPPs), Department of Planning and Community Development.

Noise, vibration and Major Hazard Facilities are covered in the subsequent sections of this assessment.

4.2 Separation Distance in the planning context

All issues need to be assessed when considering: (i) the potential impacts that a proposed development might have on its surroundings, and (ii) the potential constraints that existing land uses place on the proposed development.

In the case of the FBURA development the situation is complicated for the fact that within the FBURA there remain existing industries that require separation from the proposed development, some components of which qualify as sensitive land uses. Individual industries located within the FBURA that require significant separation distances may be able to extend their operation lifetime by judicious phasing of the construction of these components in each precinct that qualify as sensitive land uses. The constraints posed by industrial premises located outside the FBURA onto the sensitive land use components in each precinct may also be able to be managed by phasing of the construction of these components, but only if it is clear that the industry intends to relocate in the future. Where the industry is well located and is viable, then the planning of the affected precincts should ensure that the sensitive land use components do not compromise the required separations of these industries.

The separation guidelines also state that under the VPPs industrial land uses have rights which enable the industry to operate, provided they comply with relevant regulations. In this case when a strategic land use plan is being developed for a precinct transitioning from industrial to sensitive land use, the planning authority should consult with potentially affected industries in order to develop a phased implementation plan that allows for the smooth transition of land uses over a period of time.

Also stated in the separation guidelines are that the recommended separation distances can also be varied (i.e. reduced) for site specific cases. One of the criteria for varying the separation distances is the case of “transitioning of the industry”. In this case the FBURA is planned to transition from industrial to sensitive land use and thus the relevant industry buffers may be reduced with agreement of the industries and EPA as the industries will be transitioning out of the area over a designated timeframe.

4.3 Default Separation Distances

In this case, the EPA Victoria (EPAV) recommended separation distance guidelines that apply to existing industries in the vicinity of the subject site are the relevant current guidelines to apply with respect to the future planning of sensitive land uses at the FBURA precinct.

EPA has recently published6 recommended separation distances for selected industry categories (EPA Guidelines) that replace the earlier buffer guideline. Separation distances can be used to define zones of land off-site from the industry premises which are constrained from development for sensitive land uses.

Note that many of the default buffers presented in this assessment have been scribed from the industry’s site boundary and not the activity boundaries as required in the EPA’s separation guidelines. Further refinement of these buffers to account for the potential environmental impacts could be resolved through discussions with the individual site operations at the appropriate time.

4.3.1 Default Buffers within the FBURA Precinct

Table 9 identifies the recommended buffer distances as specified in the Victorian EPA guidelines for those industries with the potential for off-site emissions (odour or dust) within the four precincts of the FBURA. GHD has also recommended buffer distances it considers appropriate for those industries not specifically defined in the Victorian EPA guidelines. Refer to Figure 5 for the scribing of the default buffers for all relevant industries within the four FBURA precincts. Auto facilities have not been included due to the sheer number of them within the four precincts.

Table 9 Default Buffers for Industries within the FBURA Precinct’s

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry Class</th>
<th>EPA Default Buffer (m)</th>
<th>GHD recommended Buffer (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latimer</td>
<td>Auto Dealerships</td>
<td>Auto Repair</td>
<td>N/A</td>
</tr>
<tr>
<td>Hansen</td>
<td>Concrete Plant</td>
<td>Concrete Plant</td>
<td>100</td>
</tr>
<tr>
<td>Pronto</td>
<td>Concrete Plant</td>
<td>Concrete Plant</td>
<td>100</td>
</tr>
<tr>
<td>Nirasway</td>
<td>Printing</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Melbourne Indoor Paintball</td>
<td>N/A</td>
<td>N/A</td>
<td>None</td>
</tr>
<tr>
<td>Sandridge</td>
<td>Auto Repair</td>
<td>N/A</td>
<td>100</td>
</tr>
<tr>
<td>Delta Group</td>
<td>Transfer Station</td>
<td>250</td>
<td>250</td>
</tr>
</tbody>
</table>

6 EPAV 2013 “Recommended separation distances for industrial residual air emissions” Pubn. 1518, March 2013
<table>
<thead>
<tr>
<th>Company</th>
<th>Industry Class</th>
<th>EPA Default Buffer (m)</th>
<th>GHD recommended Buffer (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Phillip Resource Recovery Centre</td>
<td>Transfer Station</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Symex Holding</td>
<td>Vegetable oil and fat production using solvents</td>
<td>500&lt;sup&gt;1&lt;/sup&gt;</td>
<td>500</td>
</tr>
<tr>
<td>Montague</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto Businesses</td>
<td>Auto Repair</td>
<td>N/A</td>
<td>100&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Port Melbourne Metals</td>
<td>Transfer Station</td>
<td>250&lt;sup&gt;2&lt;/sup&gt;</td>
<td>250</td>
</tr>
</tbody>
</table>

1 Recommended addition under Panel beaters – EGIS 20002
2 To be pro-rated based on throughput
3 Category is for production of greater than 200 tonnes per year
4 Victorian EPA determines a buffer on a case by case basis for metal recycling; GHD has applied the recommended buffer for a transfer station
### 4.3.2 Buffer Constraints within the FBURA

**Lorimer**

The two main constraints within the Lorimer Precinct are posed by the concrete batching plants and auto repair businesses - each attracting a 100 m buffer. Figure 5 shows that a significant portion of the eastern section of the precinct is encompassed by the 100 m buffers for the concrete batching plants and from the Symex site within the Sandridge Precinct.

**Wirraway**

The main constraint in the Wirraway Precinct arises from the Detmold Flexibles printing facility which attracts a default buffer of 500 m. Figure 5 shows that a significant portion of the western section of the precinct is encompassed by the 500 m buffer. Note if Detmold is a small to medium printing facility then the 500 m buffer can be de-rated. The default buffer may be de-rated (reduced) using the throughput if known. A de-rated buffer may be applied to industrial air discharges where the throughput from the operation is significantly lower when compared to larger examples in the same category. For this example the 500 m buffer is for a large printing facility emitting greater than 100 kg per day of VOC’s (Volatile Organic Compounds), if however the VOC emissions are less than 100 kg/day then a buffer reduction can be performed based on the amount of VOC emissions that are emitted.

It can also be seen from the figure that a number of residences are already well within the 500 m buffer for Detmold, thus it is important to gauge whether or there have been any complaints to EPA regarding this site. This will be assessed further in the odour desktop review.

**Sandridge**

The main constraints within the Sandridge Precinct arise from: (i) the Delta Group’s transfer station, Port Phillip Resource Recovery transfer station, (ii) Symex Holdings – edible oil manufacturing and (iii) the auto repair businesses. The transfer stations attract a buffer of 250 m, while Symex attracts a 500 m buffer and auto repair shops a 100 m buffer. Figure 5 shows that most of the Sandridge Precinct is encompassed by the default buffers. In particular the Symex site poses the largest constraint on the FBURA and will be a significant issue for the development of the FBURA. Note Symex have commenced the transitioning phase of their site by selling their property. However until operations on site cease there is a potential for an odour impact to nearby existing and future residents.

It can also be seen from the figure that a number of residences to the south of the precinct are already well within the 500 m buffer for Detmold, and to a smaller degree within the 250 m buffer for Symex. In gauging whether a variation from the default buffer can be supported, it is important to determine whether there have been any complaints to EPA regarding this site. This will be assessed further in the odour desktop review.

**Montague**

The two main constraints within the Montague Precinct are the metal transfer station and auto repair businesses attracting a buffer of 250 m and 100 m respectively. Figure 5 shows that once again the Symex site (located in the adjoining Sandridge precinct) encompasses a large portion of FBURA land in the western section of this precinct, while the Port Melbourne metals transfer station encompasses land within the centre of the precinct.

### 4.3.3 Default Buffers surrounding the FBURA Precinct

Table 10 identifies the recommended buffer distances as specified in the Victorian EPA guidelines for those industries surrounding the precincts of the FBURA. GHD has also recommended buffer distances it considers appropriate for those industries not specifically defined in the Victorian EPA guidelines using other relevant State guidelines. Refer to Figure 6 for the schematics of the default buffers for all relevant industries surrounding the four FBURA precincts. Auto facilities have not been included due to the sheer number of them within the four precincts. GHD has also determined the available separation distance to FBURA from each of the identified sources.

**Table 10 Default Buffers for Industries surrounding the FBURA Precinct**

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry Class</th>
<th>EPA Default Buffer (m)</th>
<th>GHD recommended Buffer (m)</th>
<th>Available Separation distance to FBURA Precinct (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Businesses</td>
<td>Auto Repair</td>
<td>N/A</td>
<td>100(^1)</td>
<td>&gt;150</td>
</tr>
<tr>
<td>ACI Operations Pty Ltd</td>
<td>Glass, glass products and rock wool manufacturing</td>
<td>500</td>
<td>500</td>
<td>1,850</td>
</tr>
<tr>
<td>Albright &amp; Wilson</td>
<td>Fertiliser Production</td>
<td>1000</td>
<td>1000</td>
<td>1,850</td>
</tr>
<tr>
<td>Boeing</td>
<td>Aircraft Assembly</td>
<td>N/A</td>
<td>-</td>
<td>800</td>
</tr>
<tr>
<td>Boral</td>
<td>Plasterboard and plaster article manufacture</td>
<td>100</td>
<td>100</td>
<td>500</td>
</tr>
<tr>
<td>Brandon Molasses</td>
<td>Blackstrap sugar cane molasses handling facility</td>
<td>N/A</td>
<td>-</td>
<td>1,650</td>
</tr>
<tr>
<td>Calhan Australia &amp; Petroleum</td>
<td>Storage of petroleum and hydrocarbon products</td>
<td>250</td>
<td>250</td>
<td>1,700</td>
</tr>
<tr>
<td>Cement Australia</td>
<td>Cement Handling</td>
<td>250(^2)</td>
<td>250</td>
<td>1,150</td>
</tr>
<tr>
<td>DSTO</td>
<td>Science and technology support for Australia’s defence and national security</td>
<td>N/A</td>
<td>-</td>
<td>650</td>
</tr>
<tr>
<td>Futures</td>
<td>Automotive interiors</td>
<td>N/A</td>
<td>100(^2)</td>
<td>350</td>
</tr>
<tr>
<td>Grainco Ltd</td>
<td>Grain elevator</td>
<td>250</td>
<td>250</td>
<td>900</td>
</tr>
<tr>
<td>Herald and Weekly Times</td>
<td>Printing facility</td>
<td>500(^3)</td>
<td>500</td>
<td>600</td>
</tr>
<tr>
<td>Holden’s Global V6 Engine plant</td>
<td>Engine manufacturer</td>
<td>500(^3)</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Independent cement</td>
<td>Cement and lime distributor and depot</td>
<td>250(^2)</td>
<td>250</td>
<td>270</td>
</tr>
<tr>
<td>Kraft Foods</td>
<td>Food production</td>
<td>250(^2)</td>
<td>250</td>
<td>70</td>
</tr>
<tr>
<td>Company</td>
<td>Industry Class</td>
<td>EPA Default Buffer (m)</td>
<td>GHD recommended Buffer (m)</td>
<td>Available Separation distance to FBURA Precinct (m)</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------------------------</td>
<td>------------------------</td>
<td>-----------------------------</td>
<td>----------------------------------------------------</td>
</tr>
<tr>
<td>Marstel Terminals</td>
<td>Storage of petroleum and hydrocarbon products</td>
<td>250</td>
<td>250</td>
<td>1,790</td>
</tr>
<tr>
<td>Coode Island Pty Ltd</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metal Fabrication Works</td>
<td>Sheet metal fabrication</td>
<td>N/A</td>
<td>-</td>
<td>&gt;300</td>
</tr>
<tr>
<td>Mobil Oil Australia</td>
<td>Storage of petroleum and hydrocarbon products</td>
<td>250</td>
<td>250</td>
<td>1,500</td>
</tr>
<tr>
<td>Phase</td>
<td>Concrete batching facility</td>
<td>100</td>
<td>100</td>
<td>500</td>
</tr>
<tr>
<td>PrintLinx</td>
<td>Printing industry</td>
<td>500</td>
<td>500</td>
<td>400</td>
</tr>
<tr>
<td>Steel cement</td>
<td>Cement distributor and depot</td>
<td>250</td>
<td>250</td>
<td>1,200</td>
</tr>
<tr>
<td>Stothaven Coode Island Pty Ltd</td>
<td>Storage of petroleum and hydrocarbon products</td>
<td>250</td>
<td>250</td>
<td>1,850</td>
</tr>
<tr>
<td>Sugar Australia</td>
<td>Sugar refinery</td>
<td>N/A</td>
<td>-</td>
<td>1,700</td>
</tr>
<tr>
<td>Terminals Pty Ltd</td>
<td>Storage of petroleum and hydrocarbon products</td>
<td>250</td>
<td>250</td>
<td>1,950</td>
</tr>
<tr>
<td>The Shell Co of Australia Ltd</td>
<td>Storage of petroleum and hydrocarbon products</td>
<td>250</td>
<td>250</td>
<td>1,850</td>
</tr>
</tbody>
</table>

1. GHD has applied the cement manufacturing category as the nearest relevant category for cement handling and storage; the smallest throughput category was applied.
2. Recommended addition under Panel beaters – EGIS 20002.
3. For large facilities emissions greater than 100 kg per day, if emissions are less than this then the buffer can be de-rated.
4. In lieu of relevant Victorian guidelines the South Australian Buffer guidelines were sourced for vehicle production for greater than 2,000 vehicles a year.
5. The most relevant category in the Victorian guidelines is under food production ‘malt works’ as the main ingredient for Vegemite is yeast extract which is a by-product of beer manufacturing.
4.3.4 Buffer Constraints impacting the FBURA from the Surrounding Area

From Figure 6 it can be seen that only two industries pose a default buffer constraint to the FBURA those being Kraft and PrintLinx. The figures indicate that the default 500 m buffer for PrintLinx extends east into the Lorimer Precinct some 100 m, while the Kraft facility’s 250 m buffer extends some 180 m into the northern section of the Wirraway Precinct.

The 250 m buffer for Kraft has been taken from the most relevant category in the Victorian guidelines under food production ‘malts works’ as the main ingredient for Vegemite is yeast extract which is a by-product of beer manufacturing. There is no specific buffer that applies to the Kraft site from the Victorian guidelines or any other state. Further analysis of the site operations to define upset scenarios may modify the buffer size. Discussion should also be had with EPA as to what they consider an appropriate separation distance.

Note that the buffer for PrintLinx (printing works) has the potential to be de-rated. For this example the 500 m buffer is for a large printing facility emitting greater than 100 kg per day of VOC’s (Volatile Organic Compounds), if however the VOC emissions from PrintLinx are less than 100 kg/day then a buffer reduction can be conducted based on the amount of VOC emissions that are emitted.

Also note that the default buffer for Holden has been scribed from the envelope of potential sources namely the new global V6 engine plant and not the entire site boundary as was done for the other industries. This was done as the area enclosed by the site boundary is very large and a buffer scribed from the site boundary would encompass large portions of the FBURA unnecessarily. GHD is of the opinion that all buildings except for the new V6 plant on the Holden site are disused. The application of a 500 m buffer for Holden is conservative as the South Australian guidelines are for vehicle manufacturing which includes a paint/body shop, the site at Port Melbourne only manufactures engines; thus the 500 m buffer may be reduced with further analysis of site operations and complaint history.

4.3.5 Overall Constraints on FBURA using EPA Recommended Buffers

In general a buffer is scribed from the envelope of potential sources namely the new global V6 engine plant and not the entire site boundary as was done for the other industries. This was done as the area enclosed by the site boundary is very large and a buffer scribed from the site boundary would encompass large portions of the FBURA unnecessarily. GHD is of the opinion that all buildings except for the new V6 plant on the Holden site are disused. The application of a 500 m buffer for Holden is conservative as the South Australian guidelines are for vehicle manufacturing which includes a paint/body shop, the site at Port Melbourne only manufactures engines; thus the 500 m buffer may be reduced with further analysis of site operations and complaint history.

Within the FBURA there are a number of industries that will constrain portions of developable land, with the most prominent of these being Symex and Delta in the Sandridge Precinct and Detmold in the Wirraway Precinct. Figure 7 below shows the overall default buffer constraints on the FBURA Precincts.

For those industries identified by GHD but not within a listed category in the EPA guidelines the next most appropriate measure to determine if they have the potential to constrain the future development of the FBURA is to assess the available separation distance from the industry to the FBURA. From Table 10 it can be seen that the available separation distances to the FBURA is quite large for the industries that might require a larger separation distance. For example Sugar Australia’s separation is 1,700 m, Brandon Molasses 1,650 m, Boeing 800 m and DSTO 650 m. Metal fabrication facilities may require a smaller buffer in the order of less than 250 m; however the available separation to FBURA is greater than 300 m. Therefore all identified industries not attracting buffers have sufficient separation between the FBURA and their site. Hence amenity impacts or reverse amenity from the FBURA development are unlikely.

Also when considering the available separation, it is worth assessing the current separation available from the existing industries to existing receptors (residential areas). None of the identified industries surrounding the FBURA currently impact any of the existing residential areas. However, large swaths of existing residences are encompassed within the default buffers from the Symex, Detmold and Delta facilities.

Under the VPPs industrial land uses have rights which enable them to operate provided they comply with relevant regulations. One way of assessing if there is a potential issue is to check the odour complaint history from the residents within these buffers.

However, it is important to remember that the buffers are for upset operations only; routine emissions must meet SEPP (AQM) guidelines. Also, the new separation distances apply to recreational areas such as parks ‘informal outdoor recreation sites’ which may constrain the development of parks and green space land and during staged transitioning from industrial to sensitive land use.

Further work is recommended be conducted to investigate the reduction of buffer sizes via de-rating for those industries identified to have the potential to reduce their default buffers based on throughput. This would require co-operation of the industries to provide operational information that may potentially be sensitive or classified. The de-rating may assist in reducing the default buffers for:

- Detmold; and
- PrintLinx.

As explained earlier the potential for future industries with the potential to pose air quality constraints on the FBURA is remote, in part because of the residential areas of Docklands and Capital City zoned land at Fisherman’s Bend will constrain any industry requiring a significant buffer. Also for the existing Industrial 1 Zoning to the north, it is normally reserved only for small industrial facilities and warehouse type businesses for uses such as retail, trade supplies and offices (buffers < 300 m) in order to provide a buffer between larger IN2 facilities to residential areas.
4.4 Buffers in a Capital City Context

The expectations of residents and other sensitive users living in a high density city environment are somewhat different to those of people living in suburban and rural environments. People living in higher density urban environments may not be as sensitive to amenity impacts as their suburban neighbours, and this is particularly so in a capital city context.

4.4.1 Potential Key issues in the future FBURA

A key issue in the future FBURA once built will be to provide a good degree of residential amenity without compromising its commercial viability. Capital city environments offer different opportunities compared to the relative serenity of the outer suburbs including nightlife, experiences, culture and around-the-clock operations.

The most common amenity issue within a built up capital city environment is noise. Noise sources can include people, air conditioners, cooling towers, emergency service vehicles, cars, trucks, church bells, maintenance activities, early morning garbage trucks, loud music, parties, clubs, restaurants and light rail. Construction activities associated with new buildings or renovations can also be an ongoing issue.

Odour issues are not so prevalent in built up city environments with possible concerns being sewer vents and rubbish bins.

Dust issues within a city environment can include car/truck emissions, combustion processes and wood smoke which all contribute to smog in winter and autumn. Construction dust is also an ongoing issue for new or renovated building work.

Light source issues can be potentially from port and shipping operations, traffic, the cityscape and general nightlife activities.

4.4.2 Potential Mitigation Measures

Potential mitigation measures in a capital city context would include:

- Managing the hours of operation of the offending activity;
- Design buildings without open balconies; separate noisy activities from residential uses through the design of buildings with improved acoustic treatment with rubbish collection points inside i.e. the basement;
- Fines for emitting excessive noise;
- Withholding liquor licences;
- Slowing traffic and constructing sound barriers near major thoroughfares;
- Construction management plans;
- Promote cycling and public transport options to reduce car use;
- Prompt waste management collections;
- Dust management plans;
- Install motion sensitive lighting i.e. turn off lighting when not required;
- Ensure bulbs are covered and light faces down;
- Install low watt bulbs; and
- Clearer articulation of the capital city issues could be conducted by the developer and/or council to increase resident awareness and acceptance of the realities of living in a high density mixed use environment.

5. Major Hazard Facility Identification

GHD understands that there may be a potential for hazardous facilities to impact the FBURA. GHD has checked with WorkSafe’s Major Hazard unit to identify facilities under this designation within and surrounding the FBURA and to identify any safety separation distance if applicable.

5.1 What is a Major Hazard Facility (MHF)

A Major Hazard Facility (MHF) is an industrial site that stores, handles or processes large quantities of hazardous chemicals and dangerous goods, including petroleum products. Examples include:

- Oil refineries;
- Chemical manufacturing sites;
- Gas-processing plants;
- LPG facilities; and
- Some warehouses and transport depots.

MHFs require stringent design, operation and regulation so that a serious incident, with effects outside the site, is unlikely. It is the responsibility of the operators of a MHF to reduce the risk to the surrounding area so far as is reasonably practicable where it cannot be eliminated. Also it is important that land use planning minimises exposure of people close to a MHF.

To operate a MHF in Victoria a licence must be granted by WorkSafe Victoria. The licensing process includes assessment, clarification and verification of a Safety Case and other relevant information. WorkSafe then has information about the nature and extent of risks that may potentially affect the surrounding land and is able to provide advice to authorities responsible for planning.

5.2 Planning Considerations

Planning authorities should seek WorkSafe’s advice to the development and implementation of appropriate planning zones and determination of planning applications. This advice utilises the concepts of individual and societal risks, which can be expressed quantitatively or qualitatively. WorkSafe’s advice on these risk concepts is based on a review of the Safety Case and any other relevant information that allows a reasonable estimate of areas of land affected by potential incidents at a MHF.

WorkSafe believes it is appropriate to present the extent of risk areas around a MHF as planning advisory areas:

1. Inner planning advisory area - the individual risk of fatality from potential foreseeable incidents is greater than or equal to $1 \times 10^{-7}$ per year (one chance in 10 million years); and
2. Outer planning advisory area - the consequence of a credible incident is not likely to cause a fatality but persons present may suffer some adverse effects or have difficulty responding to an emergency that may result in injury or harm.

WorkSafe’s advice on proposed land use or developments within these areas takes account of:

- The numbers, occupancy and vulnerability of persons likely to be present at the proposed development;

7 Land Use Planning Near Major Hazard Facilities, WorkSafe, 2010
5.3 MHFs surrounding the FBURA

Victoria has approximately 45 MHF sites, which must comply with stringent legal requirements, including preparation of a Safety Case, to ensure they are operated safely. Table 11 outlines the existing MHFs in the surrounding suburbs of the FBURA. There were no MHF sites identified within the FBURA Precinct. From the table it can be seen that the closest MHF site is the Mobil Oil Australia facility in Yarraville some 1.5 km from the FBURA precinct.

<table>
<thead>
<tr>
<th>Company</th>
<th>Address</th>
<th>Distance to FBURA (km)</th>
<th>Direction from FBURA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caltex Australia Petroleum Pty Ltd</td>
<td>411 Douglas Parade, Newport</td>
<td>1.7</td>
<td>West</td>
</tr>
<tr>
<td>Mobil Oil Australia Pty Ltd</td>
<td>29 Francis Street, Yarraville</td>
<td>1.5</td>
<td>Northwest</td>
</tr>
<tr>
<td>Shell Company of Australia Ltd</td>
<td>Burleigh Street, 5050</td>
<td>2.2</td>
<td>West</td>
</tr>
<tr>
<td>Stolthaven Coode Island Pty Ltd</td>
<td>42-52 MacKenzie Road, West Melbourne</td>
<td>2.1</td>
<td>Northwest</td>
</tr>
<tr>
<td>Terminals Pty Ltd</td>
<td>70-78 MacKenzie Road, West Melbourne</td>
<td>1.7</td>
<td>Northwest</td>
</tr>
</tbody>
</table>

5.4 Advice available from WorkSafe

WorkSafe is progressively providing maps to each authority responsible for planning. These maps show the planning advisory areas for the MHF in their area affected by low frequency-high consequence events. When read in conjunction with the planning considerations discussed previously, the maps should allow authorities responsible for planning to understand this general advice without the need for additional information.

An example of this safety separation distance map for Coode Island is provided in the WorkSafe attachment in Appendix B. From the Appendix it can be seen that the FBURA is well outside of the outer planning advisory area for Coode Island’s MHFs.

5.5 Development Constraints

A number of Major Hazard Facilities (MHFs) were identified surrounding the FBURA Precinct. There were no MHF sites identified within the FBURA Precinct. The separation distance from the identified MHF facilities to the FBURA is adequate not to result in any constraints to the development. GHD is of the opinion that the FBURA will be outside of the outer planning advisory areas for all identified MHFs.

5.6 Further Work

Further safety separation distance assessments could be sought by Places Victoria from WorkSafe for all identified MHF sites nearby the FBURA identified to confirm that the FBURA will be outside of the outer planning advisory areas for all identified MHFs.

WorkSafe recognises that the planning considerations discussed previously may require further interpretation on specific planning proposals close to a MHF. There is the potential for risks arising from the MHFs identified to impact the area of the proposed FBURA development, either directly or due to the potential for knock-on effects. These sites typically have licences to operate a MHF from statutory planning bodies through the submission of a Safety Case, which sets out how the facility will be operated safely. GHD could review the Safety Cases of those sites to determine whether the offsite risks have been assessed for the proposed development area against the relevant risk criteria.

A number of sites are within the outer planning advisory areas for Coode Island’s MHFs.

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6. Site Representative Meteorology

6.1 Wind Pattern

Local wind climate largely determines the pattern of off-site odour and dust impact. The characterisation of local wind patterns requires accurate site-representative hourly recordings of wind direction and speed over a period of at least a year.

GHD has access to high quality meteorological data (9 years at 30 minute intervals) at the original location of the port control tower. Other stations located in or near the CBD are mounted on 10 m masts and are generally influenced by nearby building wakes. The Port Melbourne data was obtained at height of approximately 50 m, which is clear of wake influences, and accordingly is the only reliable data source for this assignment at Fishermans Bend. GHD has applied a correction factor to reduce the 50 m wind data down to 10 m to be representative of a standard 10 m mast.

The data has been analysed to determine the derived parameters of stability category and mixing height.

GHD selected the year November 1998 – November 1999 as the most representative year i.e. average rainfall – not too dry or wet compared to the long term average rainfall for Melbourne.

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 and (iii) good dispersion conditions winds over 5 m/s.

6.1.1 Annual Pattern in Wind

The average wind rose for the entire data period is shown in Figure 8 and shows the following features:

- The predominant annual average wind directions are from the north and south comprising of 37% of incident winds;
- The most frequent winds are on a north-south axis, reflecting the northerly winds due to influence of the Kilmore gap in the north and the extension of winds to the south due to the alignment of the Maribyrnong river valley;
- When winds are light and atmospheric conditions are stable, the near-surface air flows are guided by the valley sides;
- The incidence of westerly component winds (~5.5%) is substantially higher than easterlies occurring <1% of the time;
- The annual average wind speed measured was 3.3 m/s, and
- The observed wind speed distribution indicates that the largest proportion of high wind speeds (> 5 m/s) are from the north, while the largest proportion of light winds (<2 m/s) are also from the north. This indicates that the good dispersion conditions (winds >5 m/s) would blow dust particles to the south more than any other direction, while for poor dispersion conditions dispersion (winds <2 m/s) odour is likely to disburse to the south more than any other direction. Those industries north of the FBURA have the greatest potential to cause constraints to the precinct.

6.1.2 Seasonal variation in Wind Pattern

The seasonal wind roses in Figure 9 below show that:

- During winter, northerly winds are the most dominant due to pre-frontal northerlies and cool air drainage flows towards Port Phillip Bay from the hills and mountains from the surrounding land in the north. They comprise ~35% of incident winds;
- During summer the influence of the sea breeze is evident as a result of sea breezes experienced in the late afternoon and evening from the coast combined with the synoptic sub-tropical ridge migrating to the south of this location during the warmest months of the year. The predominant wind direction is now southerly, and, including SSW and SSE winds, comprises of 43% of total summer winds;
- Spring and autumn are transitional periods. During these months both summer and winter patterns are observed as well as an increase in the frequency of synoptic westerlies;
- The seasonal incidence of high winds (>6 m/s) is greatest in winter, and lowest in summer;
The incidence of light (<2 m/s) winds is greatest in winter, followed by autumn;
As with the annual wind rose, there is a lack of easterly winds in all seasons although
winds south of east can occur in summer, and
The direction and high proportion of light winds in winter is a mixture between north and
northeast. These drainage flows are likely to be associated with high stability, and can be
expected to define the directions of poorest dispersion towards the FBURA.

**6.2 Pattern of Atmospheric Stability**

In the Pasquill/Gifford atmospheric stability scheme, stability is classified into six classes A
through F. A, B and C stability classes represent strongly, moderately and slightly unstable
atmospheres respectively. Under unstable conditions dispersion of emissions from near-
ground sources is good due to convectively vertical turbulent mixing. The stability category D
denotes neutral atmospheric conditions (strong winds in moderate temperatures or lighter
winds on overcast to partly cloudy days). Categories E and F denote slightly and moderately
stable atmospheres when dispersion is poorest, as vertical mixing of air is suppressed.
Stable atmospheric conditions occur in the absence of strong gradient winds, and mostly on
nights with clear skies. They are often associated with ground-based radiation forced
temperature inversions, sometimes with fog, mist or frost.
Neutral stability (D class) conditions occur most frequently and along with the prevailing wind
direction can indicate the most common direction for potential impact. Under night-time E and F
class conditions, emissions from ground based sources; result in a downwind plume that is
detectable to a greater distance than during the day.

**6.2.1 Annual Average Directional Pattern in Atmospheric Stability**

Figure 10 shows the stability rose for the entire data period. Noting that a neutral atmosphere
(D) is normally the dominant stability state of the atmosphere, at Port Melbourne D class
conditions occur at 49.7% incidence while the A, B and C class contribute unstable 17.5% of the
time and the stable E and F conditions occur at a 32.8% incidence. The figure shows that the
majority of stable winds are from the north (~7%) and south (~2%). In other words, as expected,
the down-valley cool air drainage flow is the dominant stable flow direction.
### 6.2.2 Seasonal Variation in Atmospheric Stability

Figure 11 shows the following seasonal variation trends in atmospheric stability:

- In summer, the peak occurrence of stable winds is from the south and southeast this would reflect the incidence of the late afternoon sea breeze;
- In winter, stable winds predominate from the north;
- In autumn, stable winds predominate from the north; and
- In spring, stable winds predominate from the north.
7. Desktop Odour Review

7.1 Overview

In conducting this assessment those industries requiring buffers based on their potential for off-site odour impact that are located either in or in the vicinity of the FBURA have been identified. The potential for an odour impact within FBURA is reliant on odour emissions from a premises coinciding with:

- A wind direction placing elements of FBURA directly downwind;
- The occurrence of a ‘spike’ in odour emissions from the premises; and
- The occurrence of ‘poor dispersion’ conditions.

These factors can at least in part be determined for the candidate industry premises, and the likelihood of their concurrence can be estimated.

In conducting the assessment, emphasis is placed on establishing each industry’s past performance with respect to off-site odour impact as gauged by the incidence of complaints lodged with local council or EPA.

The default buffers are normally applied as a radial distance scribed from the envelope of potential odour sources at the premises as detailed in Section 4. In effect, a radial buffer distance is resorted to in situations where there is no information on the local meteorology, (i.e. the directions of good and poor dispersion are unknown). When site-representative meteorology is available then these directions of good and poor dispersion can be assessed, and the default buffer can respectively be retracted and extended. When this is done, the directional buffer formed serves to provide the same degree of protection from upset odour events independent of the direction of the sensitive land use from the emitting premises.

GHD has developed a methodology to determine directional buffers using the regulatory dispersion model AUSPLUME 6.0 and a 12 month, hourly meteorological data file that is representative of the site. A technical paper giving details of the technique was presented at Enviro 04. GHD has applied directional buffers in a wide range of planning scenarios and the analysis has been accepted at Planning Panel and VCAT hearings.

7.2 What is odour?

Odour as defined by the Victorian EPA is as follows: “An odour is perceived when chemicals in gas form stimulate the human olfactory system (your nose). The human nose has hundreds of receptors, each coded by unique DNA to detect different odours, and therefore accounting for why different people have different sensitivity and reactions to smell. Scientists also suggest that the sense of smell is intimately associated with the formation of memories. Reactions to odours can be very subjective. A smell may be pleasant to one person and unpleasant to someone else. This can make the objective assessment of odour difficult to achieve.”

7.3 Victorian Odour Criterion

The SEPP (AQM) requires that no person pollute the atmosphere to make it offensive to the senses of human beings. For new or expanded industrial premises the SEPP (AQM) requires that Design Criteria (DC) specified for a wide range of pollutants be met at the 99.9th percentile level. The DC is normally expressed as a concentration that must not be exceeded in the environment. Where a pollutant’s DC is based on toxicity then the DC must be met both within and outside the premises boundaries. However when the DC is based on odour threshold (i.e. the pollutant is an odorant), then the DC need only be met at and beyond the premises site boundary.

The DC for mixed odors is specified in Schedule A to the SEPP (AQM), where under ‘unclassified’ indicators the DC for ‘general odour’ is set to 1 odour unit (OU). Part C to Schedule C of the SEPP (AQM) requires that the predicted maximum concentration of pollutant should not exceed the 9th highest in the 100 highest table of model results – or the 99.9th percentile level.

However, in the last revision of SEPP (AQM) in December 2001 an odour limit relaxation was allowed for intensive animal husbandry in rural areas (i.e. piggeries, broiler farms, cattle feedlots) where the criterion was set to 5 OU at 99.9th percentile (see footnote 9 to Schedule A of SEPP (AQM)).

The legislation does not restrict the emission of odour beyond the boundaries of the premises. The restriction only applies to odour that is offensive or adversely affects local amenity or aesthetic enjoyment (beneficial uses set out in the SEPP) of the air environment. To this end, a discharge of offensive odour from a premises that is not impacting on humans is unlikely to be a breach of the Act or breach of standard licence or notice conditions.

7.3.1 What is Offensive Odour?

The Environment Protection Act does not define the term ‘offensive to the senses of human beings’. The SEPP expands the concept of beneficial uses to include impacts to local amenity or aesthetic enjoyment. People experience odours differently, so only the individual being affected can claim that the odour is offensive (affecting their amenity or aesthetic enjoyment). EPA can, therefore, only trigger an investigation into an odour complaint when odour is reported by a community member as being offensive. Offensive odour affects the general life, health and wellbeing of an individual as a result of the intensity, character, frequency and duration of the odour. The basis for acting against offensive odours may vary according to where the odour occurs. As an example, the normal agricultural odours present in a rural environment may not be considered offensive in an open paddock, but may be considered offensive in a residential area.

7.4 Potential Risk Odour Sources

The greatest potential to odour exposure is during the poorest dispersion conditions (light stable winds). These occur most frequently during the cooler months - winter and autumn, and before sunrise or after sunset. The industries with the potential to emit odour that operate overnight will have a greater potential to impact the FBURA.

Odour exposure resulting in disamenity can be defined as: offensive odour that affects the general life, health and wellbeing of an individual as a result of the intensity, character, frequency and duration of the odour.

7.4.1 Within FBURA

Identified Industries

Table 12 summarises the identified potential odour sources within the FBURA Precinct.
Melbourne Indoor Paintball
Melbourne Indoor Paintball facility is a paintball centre with potential emissions to air being odorous VOCs from paint. The facility would have vents and stacks leading to the roof which would treat emissions via a filter or wet scrubber.

Port Phillip Resource Recovery Centre
The Port Phillip Resource Recovery Centre accepts general household rubbish for disposal and materials for recycling. General household rubbish has the potential to be odorous due to the decay of organic waste, similar to the smell often noticed in household rubbish bins.

Symex (Recently changed name to Pental)
SYMEX is an oleochemical manufacturer (edible oils) including oleine, stearine, glycerine and distilled fatty acids derived from fats and oils such as tallow and coconut oil. Symex also produce White King and janola products. Odour is a likely emission to air during the manufacturing process. The manufacturing process and use of fats and oils would most likely be controlled and vented. In the event of a process upset, the off-site impact is likely to be odour.

GHD notes that as reported in The Age\(^9\) there is currently a proposal to redevelop the Symex site to build 258 triple story townhouses. This indicates that Symex have commenced the transitioning phase of their site by selling their property. However until operations on site cease there is a potential for an odour impact to nearby existing and future residents.

### 7.4.2 Industries Surrounding FBURA

#### Identified Industries

Table 13 below summarises the identified potential odour sources surrounding the FBURA Precinct.

<table>
<thead>
<tr>
<th>Company</th>
<th>Operations</th>
<th>Address</th>
<th>Potential Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lorimer Precinct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto Dealerships/Repairs</td>
<td>Car and truck sales and repairs</td>
<td>Various</td>
<td>Trucks, cars, spray painting</td>
</tr>
<tr>
<td>(Volvo, Land Rover, Subaru)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winway Precinct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detmold Flexibles</td>
<td>Printing Works</td>
<td>187 Williamstown Road, Port Melbourne</td>
<td>Inks, printing and packing machinery.</td>
</tr>
<tr>
<td>Melbourne Indoor Paintball</td>
<td>Paintball facility</td>
<td>25 Salmon St, Port Melbourne</td>
<td>Paint guns</td>
</tr>
<tr>
<td>Sandridge Precinct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto Dealerships/Repairs</td>
<td>Car and truck sales and repairs</td>
<td>Various</td>
<td>Trucks, cars, spray painting</td>
</tr>
<tr>
<td>Port Phillip Resource Recovery Centre</td>
<td>Accept general household rubbish materials for recycling</td>
<td>Corner of White and Boundary Streets, South Melbourne</td>
<td>Rubbish and recyclable materials</td>
</tr>
<tr>
<td>Symex Holding</td>
<td>Edible oil manufacturer.</td>
<td>14 Woodruff Street Port Melbourne</td>
<td>Oil manufacturing, stacks, machinery.</td>
</tr>
<tr>
<td>Montague Precinct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto Businesses/Repairs</td>
<td>Car and truck sales and repairs</td>
<td>Various</td>
<td>Trucks, cars, spray painting</td>
</tr>
</tbody>
</table>

**Operations and nature of odour**

A brief company overview, description of the manufacturing process and the likely nature of odour generated is described below. GHD did not have information regarding the specific operations at each site or the normal operating hours.

**Auto Dealerships/Repairs**

Potential emissions to air would be odorous VOCs from solvents, fuel emissions from standing cars such as diesel and petrol emissions of (VOCs, CO, NO\(_x\), and SO\(_2\)) and spray painting of vehicle panels. Most auto repair centres have spray booths with vents and stacks leading to the roof which would treat emissions via a filter or wet scrubber.

**Detmold**

Detmold is a commercial printing company where some amount of heat curing may take place. Emissions to air such as PM\(_{10}\) and VOCs could occur during the general printing process. The use of solvent-based inks and cleaning solutions to remove excess ink would most likely be controlled and vented. In the event of a process upset, the off-site impact is likely to be odour.

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Standing cars such as diesel and petrol emissions of (VOCs, CO, NOx and SO2) and spray painting of vehicles. Most auto repair centres have spray booths with vents and stacks leading to the roof which would treat emissions via a filter or wet scrubber.

**Boeing Aerostructures**

Boeing Aerostructures manufactures composite aircraft components, conducts research and development, design, testing, fabrication and assembly activities of aircrafts and engines. Potential emissions to air would be odorous VOCs from solvent uses, fuel emissions from standing engines (VOCs, CO, NOx and SO2) and spray painting. The facility should have vents and stacks leading to the roof which would treat emissions via a filter or wet scrubber.

**Department of Science and Technology Organisation (DSTO)**

DSTO provides science and technology support for Australia’s defence and national security. On site at Port Melbourne the potential odour emissions would be emitted from general aerospace and automotive operations such as metal fabrication with emissions of VOCs. The facility should have vents and stacks leading to the roof which would treat emissions via a filter or wet scrubber.

**Herald and Weekly Times**

Herald and Weekly Times are a large commercial printing company where some amount of heat curing may take place. Emissions to air such as PM10 and VOCs could occur during the general printing process, the use of solvent based inks and cleaning solutions to remove excess ink would most likely be controlled and vented. In the event of a process upset, the off-site impact is likely to be odour.

**Holden’s Global V6 Engine plant**

Holden’s Global V6 Engine plant manufactures and assembles operation of six-cylinder engines and component manufacturing facilities. GHD understands that majority of the site is now unused including the foundry operations for metal melting works. This new V6 engine plant will have all odours vented and treated before emitting to the air.

**Kraft Foods**

Kraft manufacture a range of food products at their Port Melbourne plant, which are grouped to four main production ‘lines’ namely;

- Vegemite;
- Cheeses (formerly manufactured on-site, now prepared and packed);
- Snacks (pasta, etc); and
- Salads (liquid, viscous and ‘oily’) lines.

Each production line divides into three main areas; preparation, fill and out-pack. In terms of significant odour emissions to air there are only two areas of concern namely;

- Vegemite preparation; and
- Cheese drying by the “Glatt” fluidised bed dryer.

Raw yeast feed stock is the main ingredient of Vegemite and is a product of fermentation of molasses. There is a significant component of soluble alcohols (principally ethanol) which are volatile and highly odorous. It is the release of these components during the delivery, washing, sieving and separation of the raw yeast that gives rise to substantial odour emissions through the building roof line ventilation system. Odours would be hooded and diverted to a dedicated fan while other equipment relies on the general building ventilation to remove emitted odour.

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### Operations and nature of odour

A brief company overview, general manufacturing process and the likely nature of odour generated is described below. GHD is did not have information regarding the specific operations at each site and normal operating hours.

### Auto Dealerships/Repairs

Potential emissions to air would be odorous VOCs from solvent uses, fuel emissions from standing cars such as diesel and petrol emissions of (VOCs, CO, NOx, and SO2) and spray painting.
Metal Fabrication Works

Metal fabrication works involve fabrication of products in mild steel, stainless steel and aluminium. The workshop would generally consist of precision machinery such as sheet metal cutting and folding equipment, as well as metal punching, plasma cutting and spray painting facilities.

Metal fabricators manufacture a large range of items such as:
- Electrical cabinets;
- Tanks and vessels;
- Fume extraction and ventilation duct work;
- Architectural features and handrails;
- Pipe work;
- Guarding;
- Staircases and platforms;
- Handrails and balustrades; and
- Customised tradespersons vehicle canopies and tool boxes.

Emissions generated during steel fabrication process are likely to include metal dust, odour from paint solvents and metal fumes from welding. The potential for nuisance dust and odours are normally controlled by wet scrubbers and fabric filters.

PrintLinx

PrintLinx is a commercial printing company where some amount of heat curing may take place. Emissions to air such as PM_{10} and VOCs could occur during the general printing process, the use of solvent based inks and cleaning solutions to remove excess ink would most likely be controlled and vented. In the event of a process upset, the off-site impact is likely to be odour.

Brandon Molasses

Brandon Molasses operate bulk storage and handling facility for blackstrap sugar cane molasses. Odour emissions can arise from ship unloading, road tanker loading and the storage tanks.

Marstel Terminals Coode Island Pty Ltd

Marstel Terminals provide bulk liquid services (storage, transport, bulk handling, packing and distribution). Storage includes acrylonitrile and propylene oxide, flammable and toxic chemicals (e.g. benzene and ethyl acrylate) and combustible and corrosive chemicals. Odour emissions can arise from ship unloading, road tanker loading and from the storage tanks.

Stolthaven Coode Island

Stolthaven provide bulk liquid services (storage, transport, bulk handling, packing and distribution). Storage includes acrylonitrile and propylene oxide, flammable and toxic chemicals (e.g. benzene and ethyl acrylate) and combustible and corrosive chemicals. Odour emissions can arise from ship unloading, road tanker loading and from the storage tanks.

Terminals Pty Ltd

Terminals provide bulk liquid services (storage, transport, bulk handling, packing and distribution). Storage includes acrylonitrile and propylene oxide, flammable and toxic chemicals (e.g. benzene and ethyl acrylate) and combustible and corrosive chemicals. Odour emissions can arise from ship unloading, road tanker loading and the storage tanks.

(e.g. benzene and ethyl acrylate) and combustible and corrosive chemicals. Odour emissions can arise from ship unloading, road tanker loading and the storage tanks.

ACI Operations Pty Ltd – Glass manufacturing

ACI Operations is a glass manufacturer that has the potential to emit odours during the manufacturing process. The facility should have vents and stacks leading to the roof which would treat emissions via a filter or wet scrubber.

Albright & Wilson - Phosphate Production

Albright & Wilson manufacture phosphates for the food & beverage processing industry at its Yarraville site. Odour and dust emissions are generated during the phosphate manufacturing process.

Caltex Australia

The Newport Caltex Terminal is a fuel distribution terminal for petrol, diesel, and aviation fuel. The terminal houses large refined product storage tanks used for bulk storage of fuel products arriving from refineries and from overseas/interstate (via ship). Fuel emissions such as VOCs, benzene and toluene are likely to cause odorous emissions.

Mobil Oil Australia

The Yarraville Terminal is ExxonMobil's fuels distribution terminal for petrol, diesel, and aviation fuel and heating oil in Victoria. Ethanol-blended petrol is also supplied from the terminal. The terminal houses large refined product storage tanks with a storage capacity of 120 million litres. These tanks are used for bulk storage of fuel products arriving from Mobil’s Altona Refinery and Shell’s Geelong Refinery (via pipeline) and from overseas/interstate (via ship). At the tank truck fill stand, up to eight trucks can be loaded simultaneously with various fuels stored in the terminal. Fuel emissions such as VOCs, benzene and toluene are likely to cause odorous emissions.

Sugar Australia – Sugar refinery

Sugar Australia’s Yarraville Refinery in Melbourne is Australia’s longest-established sugar refinery. The Yarraville Refinery can produce up to 300,000 tonnes per annum. Raw sugar for the Yarraville refinery is sourced from Queensland where it has been milled from Australian-grown sugar cane. The main sugar refining processing steps at Yarraville are: dissolving and heating to 82 ºC, clarification by phosphatation, deep bed filtration, decolourisation over granular activated carbon, crystallisation, separation of crystals from syrup by centrifuging, drying, crystal size classification by sieving, and then packaging.

A substantial amount of refined sugar is delivered to customers in bulk road tankers in both crystal and liquid form. The site receives bulk raw sugar from wharf facilities on the Maribyrnong River. Typical odour emissions can arise from ship unloading, road tanker loading and the storage tanks.

Shell

The Newport Shell Terminal is a fuel distribution terminal for petrol, diesel, and aviation fuel. The terminal houses large refined product storage tanks used for bulk storage of fuel products arriving from refineries and from overseas/interstate (via ship). Fuel emissions such as VOCs, benzene and toluene are likely to cause odorous emissions.
7.5 EPA licenced sites to discharge to Air (Odour)
EPA has provided GHD a list of all licenced premises permitted to discharge to air within and surrounding the Fishermans Bend/ Port Melbourne industrial precinct (suburbs including Newport, Spotswood, West Melbourne and Yarraville). The following lists those industries with a licence to discharge to air (odour) and which are required to meet amenity conditions (no offensive odours discharged beyond the site boundary) within the FBURA precinct:
- Symex Holdings – Schedule D08 Edible Oil; and
- Detmold – Schedule J01 Printing Works.

Over the 2011/12 financial year (the most recent annual performance statements available from EPA), Detmold complied with all its environmental performance conditions. However for the same period Symex received a number of odour complaints regarding fatty odour from the facility.

Those industries licenced to discharge to air and meet amenity conditions (no offensive odours discharged beyond the site boundary) which are located outside of the four FBURA precincts are:
- Boeing – Schedule L01-General Emissions to Air;
- Holden – Schedule I02 Metal Melting Works;
- Mobil Oil Australia Schedule G04 – Bulk Storage;
- Albright & Wilson (Australia) Limited schedule G01 – Chemical Works;
- Sugar Aust Pty Ltd schedule D06 – Food Processing Works;
- ACI Operations Pty Ltd schedule H05 – Glass Works;
- The Shell Co of Australia Limited schedule G04 – Bulk Storage;
- Caltex Australia Petroleum Pty Ltd schedule G04 – Bulk Storage;
- Ecogen Energy Pty Ltd schedule K01 – Power Stations;
- Terminals Pty Ltd schedule G04 – Bulk Storage;
- DP World Australia Limited schedule A03 – Sewage Treatment; and
- Stolthaven Coode Island Pty Ltd is scheduled by the Regulations as G04 – Bulk Storage.

Over the 2011/12 financial year (the most recent annual performance statements available from EPA) all of the licensed sites met their air and amenity (odour) environmental performance conditions. However, for the same period Symex received a number of odour complaints regarding fatty odour from the facility.

The map of complaints provided by EPA indicated that the odour complaints attributed to Symex (whilst still in operation) were mostly from the current residents to the south of the site (south of Williamstown Road). The opposite amenity issues arise for the Detmold facility. All odour complaints attributed to Symex (whilst still in operation) were unilateral and objectionable and this may result in an increased percentage of complaints from these new residents.

7.6 EPA Odour Complaint History
EPA has provided GHD a map and list of all odour complaints in the Fishermans Bend area between mid-2008 and June 2011. A summary of complaints received and verified by EPA is provided in Figure 12.

To verify the odour complaints to determine whether or not they can be attributed to any of the sources within the Fishermans Bend area, GHD requested the EPA to provide the location, time and date of each complaint. Using the EPA’s Footscray AQMS as the nearest current operational air quality monitoring station, GHD retrieved the wind speed and wind direction for each complaint in order to validate (or exclude) the complaints by assessing if the wind direction places elements of the complainant site directly downwind of a particular source.

This validation led to a number of complaints being attributed to sources within the Fishermans Bend Precinct. The primary sources of concern are:
- Symex with 13 complaints; and
- Detmold with 6 complaints.

Symex
The map of complaints provided by EPA indicated that the odour complaints attributed to Symex are all within the current industrial area (i.e. the FBURA). None of the odour complaints have been made by the existing residents to the south of the site (south of Williamstown Road).

However, once the FBURA begins development the potential for reverse amenity issues arise. As there are currently a number of odour complainants within the FBURA precinct, the placement of new residents nearby the Symex site (within the 500 m buffer) may place them within the likely zone of potential odour impact under routine operations (greater than 1 OU).

As there are no odour complaints from the current residents to the south of Williamstown Road, this may indicate that the off-site odour impact from Symex is not a concern at long distances but only nearby the site. It may also be the case that the existing residents have acclimatised to the occasional exposure – for these residents, in effect it has become part of the background palette of ambient odour and thus they do not complain. This situation may not be replicated with the development of new residential areas within FBURA; new residents may find odour from Symex (whilst still in operation) unusual and objectionable and this may result in an increased percentage of complaints from these new residents.

Detmold
The opposite amenity issues arise for the Detmold facility. All odour complaints attributed to the site are located outside the FBURA precinct to the south of the site within the existing residential
area. This indicates that there is a current odour issue and the placement of new receptors nearby may cause additional odour complaints.

The other sites with complaints nearby include the paintball centre, Sugar Australia and Mobil Yarraville. These remaining complaints cannot be attributed to any source decisively.

7.7 Potential Odour Constraints to the FBURA Development

7.7.1 Within FBURA

The significant potential odour constraints within the FBURA to the future development are:

- Symex: Edible oil manufacturer (Sandridge) requiring a 500 m buffer. An analysis of EPA Annual Performance Statements and complaint history indicates a number of complaints attributed to the Symex site;
- Detmold: Printing Works (Wirraway) requiring a 500 m buffer without any de-rating. An analysis of EPA complaint history indicates a number of complaints also attributed to Detmold; and
- Port Phillip Resource Recovery Centre - Waste Facility (Sandridge) requiring a 250 m buffer.

Section 4 showed that most of the FBURA Precinct is encompassed by default buffers. In particular the Symex site poses the largest constraint on the FBURA and will be a significant issue for the development of the FBURA whilst still operational. However, from the odour complaint analysis it can be seen that there have been no registered complaints from any of the residences within the recommended 500 m. This suggests that the odour from the Symex site may not be an issue downwind.

As discussed in Section 4 the 500 m buffer for Detmold also constrains a large portion of FBURA land but may be reduced based on throughput or the amount of VOC’s emitted per year. However, the odour complaint history indicates that residences within the default buffer have made complaints regarding odour.

Noting that the buffers are for upset conditions only; EPA would need to investigate and enforce Detmold and Symex to meet the odour criterion for routine operations (no odour generated off-site). The development of the FBURA would be constrained by these buffers until further investigations are conducted by EPA.

7.7.2 Surrounding FBURA

The potential odour constraints to the FBURA development from the industries surrounding the FBURA area are:

- Kraft Foods – Vegemite production (available separation distance to FBURA ~70 m, requiring a buffer of at least 250 m). As discussed in Section 4, this buffer intrudes some 180 m into the northern portion of the Wirraway Precinct.

From GHD’s previous experience on other projects, it is likely that a significant source of odour surrounding the FBURA would be the Kraft Foods facility. On numerous occasions under the right wind conditions, GHD has detected odour from this premise hundreds of metres (greater than 200 m) downwind (odour levels greater than 5 OU).

Five OU is commonly taken as a conservative measure of the odour concentration that can be clearly detected against background levels and which could potentially give rise to complaint.

On numerous occasions odour has been detected driving on the Westgate Freeway past the Kraft facility by GHD staff members. Even on the day of GHD’s site visit (when dispersion was good) odour was detected along Turner Street.

Note that the odour detected from Kraft is from routine emissions. It should be noted that the EPA guidelines allow buffers to be used to minimise odour impact only in the event of a process upset/malfunction or extreme weather conditions. The implication is that emissions under routine operations should be controlled so that there is no adverse impact off-site. However, it is apparent that Kraft exceeds the odour criterion under routine operations and has yet to treat the significant potential odour sources on-site.

To the extent that existing residents to the south of the FBURA Precinct is likely within the zone of potential odour impact from Kraft under routine operations (greater than 1 OU), it may be the case that they have acclimatised to the occasional exposure – for these residents, in effect it has become part of the background palette of ambient odour and do not complain. This situation may not be replicated with the development of new residential areas within the FBURA closer to the Kraft facility – new residents may find odour from Kraft unusual and objectionable and this may result in an increased percentage of complaints from these new residents.

Note GHD has conducted an odour assessment for Kraft in the past but are limited in providing details of that assessment due to the confidential nature of assessment. Places Victoria may wish to obtain Kraft’s cooperation to further investigate the odour impact generated.

7.8 Directional Buffer for Odour Sources

Where site-representative meteorological data is available the directions of good and poor dispersion can be identified as shown in Section 6. Furthermore, if the 12 month dataset is configured to AUSPLUME format (deriving atmospheric stability category and mixing height), then dispersion modelling can be conducted using a nominal source emission rate (odour) to determine the directional change in extent from a default buffer.

This was performed using the Port Melbourne meteorological dataset, and adopting a nominal 10 m x 10 m area source with a nominal emission rate. The 99.5% contour that provides the same enclosed area as a 100 m radius circle (i.e. 31,415 m²) was selected and is presented in Table 14. From Table 14 it is seen that the extent of the contour is greater than the all-direction mean of 100 m in the southerly sector – out to 155 m. Similarly, the extent of the contour to the west is significantly less than 100 m, down to 55 m. The contour effectively gives the departure from the fixed 100 m radius that would be required if an equal exposure to disamenity was to be given in the event of an upset/malfunction at any of the potential odour emitting sites.

The angular change in buffer distance is given as a function of direction in Table 14. This information has also been used to demonstrate the effect on the 100 m buffer when applied to the envelope of a potential odour source. As seen in Figure 13 the directional buffers are scribed for each of the identified odour emitting industries in Section 4 that attract a default buffer distance. Note that the directional buffers were applied only to those industries identified to severely constrain the development of the FBURA.
### Table 14  Directional Variation in Buffer in Response to Local Meteorology – Port Melbourne

<table>
<thead>
<tr>
<th>Direction Sector (Degrees)</th>
<th>Range (m)</th>
<th>Percent (%) of mean range</th>
<th>Direction Sector (Degrees)</th>
<th>Range (m)</th>
<th>Percent (%) of mean range</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
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<td>S</td>
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<td>NNE</td>
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<td>SSW</td>
<td>202.5</td>
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<td>66</td>
<td>SW</td>
<td>225</td>
<td>98</td>
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<tr>
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<td>72</td>
<td>WSW</td>
<td>247.5</td>
<td>54</td>
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<td>270</td>
<td>55</td>
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<td>ESE</td>
<td>112.5</td>
<td>101</td>
<td>WNW</td>
<td>292.5</td>
<td>108</td>
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<tr>
<td>SE</td>
<td>135</td>
<td>112</td>
<td>NW</td>
<td>315</td>
<td>114</td>
</tr>
<tr>
<td>SSE</td>
<td>157.5</td>
<td>143</td>
<td>NNW</td>
<td>337.5</td>
<td>110</td>
</tr>
</tbody>
</table>
7.8.1 Constraint on FBURA posed by Directional Buffers

Figure 13 shows the directional buffers for the Symex, Detmold and Kraft facilities. Each buffer has been retracted and extended respectively in the directions of good and poor dispersion.

**Symex**

There is a large extension to the default buffer to the south extending an additional 275 m over the existing residences, while in contrast, the default buffer is retracted in the north by 95 m, west by 225 m and east by 100 m. The directional buffer constrains less land within the FBURA particularly in the Sandridge and Montague Precincts. Places may wish to adopt this buffer when developing land use planning controls or planning a staged development plan whilst the site continues to operate. Note as described earlier Symex have commenced the transitioning phase of their site by selling their property. However until operations on site cease there is a potential for an odour impact to nearby existing and future residents.

**Detmold**

Again there is a large extension of the default buffer to the south extending an additional 275 m over the bay, while the default buffer is retracted in the north by 95 m, west by 225 m and east by 100 m. The retraction of the default buffer constrains less land within the FBURA particularly west of the Detmold site within the Wirraway Precinct. Places may wish to adopt this buffer when developing land use planning controls or a staged development plan.

The directional buffer for Detmold has been assessed using the worst case 500 m default buffer, however as discussed earlier the buffer may be de-rated based on throughput/ emissions emitted. For example, if a de-rated radial buffer was to be applied, then the directional buffer would be reduced in all directions, in particular towards the west of the site un-restricting additional land within the FBURA.

**Kraft**

As the Kraft facility is located north of the FBURA the directional buffer extends further south due to the direction of poor dispersion. There is a large extension of the default buffer to the south extending an additional ~140 m over the FBURA, while the default buffer is retracted in the north, west and east within the existing industrial zoned area. The directional buffer constrains more land within the FBURA in the Wirraway Precinct. Places may wish to adopt this buffer when developing land use planning controls or planning a staged development plan.

**Other Potential Constraints**

A directional buffer from PrintLinx and Herald and Weekly Times (HWT) may potentially constrain the FBURA. However GHD is of the opinion that the default 500 m buffers applied to these sites are too large and should be reduced based on throughput. This would reduce the size of the directional buffer to cause no buffer constraints to the FBURA. Also note that the directional buffer for PrintLinx would contract the default buffer in the easterly directions away from the Lorimer Precinct.

Note that the directional buffers have been generated for all hours of the day as the actual operational hours of the facilities were unknown. If the operational hours are known for a given industry premises, the directional buffer may be re-run for those hours which may produce a marginally different shaped buffer due to the exclusion of the right-time poorest dispersion conditions.

7.8.2 Complaint history and directional buffers

Figure 13 indicates that additional existing residents would be within the zone of potential upset odour events from Symex, however given that there are no complaints registered within this zone it may be the case that Symex has not had any upset/malfunction odour issues recently. This doesn’t mean from time to time odour won’t be generated but indicates that under routine operations odour has not been an issue for the existing residents downwind of the site.

However, once the FBURA begins development the potential for reverse amenity issues arise, as there are currently a number of odour complainants currently within the FBURA precinct, the placement of new residents nearby the Symex site what still operational (within the 500 m directional buffer within the FBURA) may place them within the likely zone of potential odour impact under routine operations (greater than 1 OU) which may lead to complaints.

All odour complaints attributed to the Detmold site are located outside the FBURA precinct to the south of the site within the existing residential area within the directional buffer. This indicates that there is a current odour issue and the placement of new receptors within the directional buffer may cause additional odour complaints.

For the Kraft facility placement of sensitive land uses within the directional buffer may lead to an increase in odour complaints from the newcomers as they may find the odour generated unusual. Mitigation strategies would need to be developed and applied to develop sensitive land uses within this buffer and for the other directional buffers.

7.9 Potential Odour Mitigation Strategies to the FBURA

It is assumed that the development of the FBURA will occur incrementally over time, and therefore it is important that management of the transition of industrial land to residential uses is likely to result in short term impacts of non-compatible uses.

7.9.1 Recommended Odour Mitigation Strategies

**Land-use Planning Controls**

Separating odour-producing activities from sensitive areas i.e. setbacks strategy (e.g. open space design adjacent to odour sources to provide odour reduction through setback distances to residential uses). The recommended and directional buffers would assist in implementing this strategy.

**Staged development**

Maintain the recommended separation distance between residents and industry while industry is still operational within FBURA to the extent possible as the area is predominately in private ownership. The recommended and directional buffers indicate what portion of land would be constrained for development or lead to amenity issues.

An initial development stage of the FBURA could target and remove those industries likely to cause a constraint before sensitive uses are built nearby which would free up a large portion of land.

GHD recommends that Places contact those affected industries to develop a staged implementation plan that allows for a smooth transition of land use from industrial to residential over a period of time.

**Control of Odours at Source**

Reduce the odour output of the source via odour treatment (requires EPA enforcement via PANs (Pollution Abatement Notices) and PINs (Penalty Infringement Notices)). For those industries identified to cause a constraint to the FBURA, it is the EPA’s responsibility to enforce
8. Desktop Dust Review

8.1 Overview

In conducting this assessment, those industries requiring buffers based on their potential for off-site dust impact that are located either in or in the vicinity of the FBURA were identified. The potential for a dust impact is reliant on dust emissions from a premises coinciding with:

- A wind direction placing elements of FBURA directly downwind;
- The occurrence of a ‘spike’ in dust emissions from the premises;
- Either the occurrence of ‘good dispersion’ conditions i.e. strong winds able to erode exposed dusty surfaces; and
- Or the occurrence of ‘poor dispersion’ i.e. light stable winds for mechanically generated dust sources.

These factors for the candidate industry premises and the likelihood of their concurrence can be estimated.

Again, as with the odour impact review, GHD has also modified the recommended buffers to take account of local meteorology, forming directional, non-radial buffers that more uniformly distribute the potential off-site dust impact in the event of an upset.

In conducting the assessment, emphasis was placed on establishing each industry’s past performance with respect to off-site dust impact as gauged by the incidence of complaints lodged with council or EPA. Information was sought from EPA.

The dust impact assessment review follows the same approach as outlined in the odour impact review, with the following differences:

- Dust impact can arise from the re-suspension of particles that had been deposited earlier either within or outside the premises of the dust source (requiring good dispersion – strong winds);
- Alternately, if dust emissions are being generated by process units within the premises, the impact of those emissions would be assessed (being a maximum in poor dispersion – light stable winds).

8.2 What is dust?

Dust particles may be solid matter or liquid droplets (aerosol). Particle sizes are measured in micrometres (or micron, \( \mu m \)) which equals 1/1000 of a millimetre. Particle levels are measured in terms of the total mass of particles in a cubic metre of air, in units of micrograms per cubic metre (\( \mu g/m^3 \)).

Coarse particles (> 40 \( \mu m \)) typically drop out of the air column forming a deposit on horizontal surfaces. These deposits can pose a nuisance and buffers are sized to avoid this impact. Fine particles remain suspended in the air column and are typically categorised into:

- total suspended (TSP) (< 40 \( \mu m \));
- inhalable (< 10 \( \mu m \)), and
- inspirable (< 2.5 \( \mu m \)) fractions.

Small dust particles can penetrate into the lung to cause harm. Particles can aggravate existing lung and heart diseases, and sometimes premature death. Airborne particles have also been associated with decreases in lung function, worsening of asthma and alteration in the body’s
defence and lung clearance mechanisms. Sensitive members of the population include the elderly, children and people with existing lung or heart disease. Particles can result from combustion of all types (e.g. wood smoke, engine emissions). They are emitted from industrial processes, motor vehicles, domestic fuel burning and industrial and domestic incineration. Dust particles can also be lifted into the air as cars and trucks travel on roads, especially unpaved roads. Natural sources of particles include bushfires, windblown dust and salt spray from the oceans.

8.3 Victorian Dust Criteria

Victorian EPA in SEPP-AQM provide dust concentration design criteria for; PM\(_{2.5}\), PM\(_{10}\) and TSP. Of these, the PM\(_{2.5}\) criterion (80 µg/m\(^3\), 1 hour average, 99.9% percentile) is generally the most stringent. TSP has the criterion 330 µg/m\(^3\), 3 minute average, 99.9% percentile.

Air-shed air quality goals relating to dust are also specified in SEPP – Ambient Air Quality (AAQ). The current 24-hour average for PM\(_{2.5}\) is 25 µg/m\(^3\). There are also advisory reporting standards for PM\(_{10}\), which are 25 µg/m\(^3\) (24-hours) and 6 µg/m\(^3\) (one year).

Separate dust criteria for non-point sources of dust are also specified in the Mining and Extractive Industries Protocol for Environmental Management (PEM), these being:

- PM\(_{10}\) at 60 µg/m\(^3\), 24 hour average;
- PM\(_{2.5}\) at 30 µg/m\(^3\), 24 hour average; and
- Nuisance deposited dust, 4 g/m\(^2\)/month (including background).

8.4 Potential Dust Sources

Unlike odour, it is good dispersion conditions (winds over 5 m/s) that increases the potential for off-site dust emissions for those premises where erodible surfaces are present, or where coarse fraction dust has deposited from previous emissions. The potential dust sources are listed in Table 15.

8.4.1 Within FBURA

Identified Sources

Table 15 below summarises the identified potential dust sources within the FBURA Precinct.

<table>
<thead>
<tr>
<th>Company</th>
<th>Operations</th>
<th>Address</th>
<th>Potential Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leimel Precinct</td>
<td>Concrete batching facility</td>
<td>Boundary Street, Port Melbourne</td>
<td>Trucks, stockpiling, concrete batching process</td>
</tr>
<tr>
<td>Hanson</td>
<td>Concrete batching facility</td>
<td>Rogers Street, Port Melbourne</td>
<td>Trucks, stockpiling, concrete batching process</td>
</tr>
<tr>
<td>Pronto</td>
<td>Concrete batching facility</td>
<td>Rogers Street, Port Melbourne</td>
<td>Trucks, stockpiling, concrete batching process</td>
</tr>
<tr>
<td>Wirraway Precinct - None</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sandridge Precinct</td>
<td>Refuse transfer station</td>
<td>577 Plummer St, Port Melbourne</td>
<td>Trucks, building materials</td>
</tr>
<tr>
<td>Delta Group</td>
<td>Refuse transfer station</td>
<td>577 Plummer St, Port Melbourne</td>
<td>Trucks, building materials</td>
</tr>
</tbody>
</table>

Operations and nature of dust

A brief company overview, general manufacturing process and the likely nature of dust generated are described below. GHD did not have information regarding the specific operations at each site or their normal operating hours.

Hanson Concrete Batching Plant

A typical concrete batching plant contains silos, storage bins, a conveyor system with a fabric filter connected to hopper, concrete truck parking area and raw feed stockpiles.

Typical operations for a concrete batching plant will not vary substantially, with cement delivered by road tanker and pneumatically transferred to silos. Sand and aggregate are transferred by truck from the on-site stockpiles in a damp condition to in-ground bins. Transfer from the bins is metered onto a bin conveyor and transferred to the loading tower via a covered conveyor and then into an agitator. Cement and water are mixed with the aggregate in the agitator, and batches are checked before loading into delivery trucks through a rubber loading sock.

There is potential for dust emissions to occur from fines in spillage on the road and yard, fugitives from bunkers and conveyors, aggregate stored in stockpiles and fabric filters.

Pronto Concrete Batching Plant

As above, there is potential for dust emissions to occur from the road and yard, fugitive emissions from bunkers and conveyors, aggregate stored in stockpiles and fabric filters.

Delta Group

Delta Group in Port Melbourne is a refuse transfer station for building materials including timber and metal which are salvaged from demolition sites across Victoria. Dust emissions are likely to be created in the drop off and crushing of materials.

Port Phillip Resource Recovery Centre

The Port Phillip Resource Recovery Centre accepts general household rubbish for disposal and materials for recycling. General material for recycling has the potential to emit dust particles during drop-off and the crushing process.

Port Melbourne Metals

Port Melbourne Metals accepts, processes and supplies scrap metal of all grades of recycled ferrous and non-ferrous metals to industrial customers throughout Melbourne and Victoria. Scrap metal has the potential to emit dust particles during the drop-off and crushing process.
### 8.4.2 Surrounding FBURA

#### Identified Sources

Table 16 summarises the identified potential dust sources surrounding the FBURA Precinct.

**Table 16 Identified dust sources surrounding the FBURA Precinct**

<table>
<thead>
<tr>
<th>Company</th>
<th>Operations</th>
<th>Address</th>
<th>Potential Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Melbourne / Fishermans Bend</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boral</td>
<td>Plasterboard manufacturing</td>
<td>251 Salmon Street, Port Melbourne</td>
<td>Plasterboard and machinery</td>
</tr>
<tr>
<td>Cement Australia</td>
<td>Cement product depot</td>
<td>465 Lorimer St Port Melbourne</td>
<td>Trucks, cement</td>
</tr>
<tr>
<td>Holden’s Global V6 Engine plant</td>
<td>Engine manufacturer</td>
<td>191 Salmon St, Port Melbourne</td>
<td>Engine manufacturing, engines</td>
</tr>
<tr>
<td>Independent cement</td>
<td>Cement and lime distributor and depot</td>
<td>750 Lorimer St, Port Melbourne</td>
<td>Trucks, stockpiling, cement</td>
</tr>
<tr>
<td>Metal Fabrication Works</td>
<td>Sheet metal fabrication</td>
<td>Various</td>
<td>Steel and machinery</td>
</tr>
<tr>
<td>Piave</td>
<td>Concrete batching facility</td>
<td>262 Salmon St, Port Melbourne</td>
<td>Trucks, stockpiling, concrete batching process</td>
</tr>
<tr>
<td>Steel cement</td>
<td>Cement depot</td>
<td>469-501 Lorimer Street, Port Melbourne</td>
<td>Trucks, cement</td>
</tr>
<tr>
<td>Coode Island</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Granco Ltd</td>
<td>Grain elevator</td>
<td>Enterprise Road, West Melbourne</td>
<td>Grain handling</td>
</tr>
<tr>
<td>Spotwood/Yarraville/Newport</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACI Operations Pty Ltd</td>
<td>Glass manufacturing</td>
<td>2 Booker St, Spotwood</td>
<td>Glass, machinery</td>
</tr>
<tr>
<td>Albright &amp; Wilson</td>
<td>Phosphates product manufacture</td>
<td>2a Francis St, Yarraville</td>
<td>Phosphate product manufacture</td>
</tr>
<tr>
<td>Sugar Australia</td>
<td>Sugar refinery</td>
<td>265 Whitehall St, Yarraville</td>
<td>Sugar refining</td>
</tr>
</tbody>
</table>

#### Operations and nature of dust

A brief company overview, general manufacturing process and the likely nature of dust generated is described below. GHD did not have information regarding the specific operations at each site and normal operating hours.

**Boral**

Boral Port Melbourne is a plasterboard manufacture. The potential for dust emissions would be from the manufacturing process which utilises gypsum.

**Cement Australia**

Cement Australia is bulk cement handling facility. Fugitive dust emissions are likely from the unloading process.

**Holden’s Global V6 Engine plant**

Holden’s Global V6 Engine plant manufactures and assembles operation of six-cylinder engines and component manufacturing facilities. GHD understands that majority of the site is now unused including the foundry operations for metal melting works. There is still a potential for dust emissions to be created from metal. This new V6 engine plant will have all dust particles vented and treated before emitting to the air.

**Independent cement**

Independent Cement is a specialist supplier of cement, cement blended products, and agricultural lime to a wide variety of industries, major retail outlets, and agricultural markets throughout Victoria and New South Wales. The site in Port Melbourne is a bulk cement handling facility. Fugitive dust emissions are likely from the unloading and loading process.

**Metal Fabrication works**

Metal Fabrication works involve the fabrication of products in mild steel, stainless steel and aluminium. The workshop would generally consist of precision machinery such as sheet metal cutting and folding equipment, as well as metal punching, plasma cutting and spray painting facilities. Metal Fabricators manufacture a large range of items such as:

- Electrical cabinets;
- Tanks and vessels;
- Fume extraction and ventilation duct work;
- Architectural features and handrails;
- Pipe work;
- Guarding;
- Staircases and platforms;
- Handrails and balustrades; and
- Customised tradesman vehicle canopies and tool boxes.

Emissions generated during the steel fabrication process are likely to include metal dust, odour from paint solvents, and metal fumes from welding. The potential for nuisance dust and odours are normally controlled by wet scrubbers and fabric filters.

**Piave**

Piave is a concrete batching facility. There is potential for dust emissions to occur from the road and yard, fugitives from bunkers and conveyors and aggregate stored in stockpiles.

**Steel cement**

Steel cement is a subsidiary of Independent cement. The site in Port Melbourne is a bulk cement handling facility. Fugitive dust emissions are likely from the unloading process.
Grainco Ltd
Grainco is a grain handling facility. Fugitive dust emissions are likely from the unloading and loading process.

ACI Operations Pty Ltd
ACI Operations is a glass manufacturer that had the potential to emit dust during the manufacturing process. The facility would have vents and stacks leading to the roof which would treat emissions via a filter or wet scrubber.

Albright & Wilson - Phosphate Production
Albright & Wilson manufacture phosphates for the food & beverage processing industry at its Yarraville site. Dust particle emissions are possibly generated during the phosphate manufacturing process such as raw phosphate.

Sugar Australia – Sugar refinery
Sugar Australia’s Yarraville Refinery in Melbourne is Australia’s longest-established sugar refinery. The Yarraville Refinery can produce up to 300,000 tonnes per annum. Raw sugar for the Yarraville refinery is sourced from Queensland where it has been milled from Australian-grown sugar cane. A substantial amount of refined sugar is delivered to customers in bulk road tankers in both crystal and liquid form. The site receives bulk raw sugar from wharf facilities on the Maribyrnong River. Typical dust emissions can arise from ship unloading and road tanker loading.

Transport Dust emissions
Additional sources of particulate emissions are contained in vehicle exhaust from the following transport related sources surrounding and within the FBURA:
- Westgate Freeway (car and truck exhaust);
- CityLink Tollway (car and truck exhaust);
- Port of Melbourne (Ship exhaust); and
- Local Traffic (car and truck exhaust).

Motor vehicles are the major source of urban air pollution. In Melbourne in 2006, motor vehicle emissions contributed the following levels of pollutants to the overall air quality:
- 31 per cent of all emissions of PM2.5;
- 27 per cent of all emissions of PM10.

8.4.3 Other potential dust sources

Dust during construction of Webb Dock
The proposed Webb Dock Port Capacity Project includes construction of large areas of hardstand, development of the land just to the west of the FBURA and construction of a significant length of road. This work has the potential to generate a significant volume of dust from excavations, erosion of excavated surfaces and stockpiles of soil and road construction materials. The main issues during construction from an air quality perspective are dust and the emission of combustion particles by heavy construction equipment. The latter can be controlled by ensuring the equipment used on the project is fitted with appropriate filters and emission control systems. Appropriate mitigation management measures should be implemented by Webb Dock including a range of “good practice” procedures. These will include relevant measures listed in EPA Publication 480 “Environmental Guidelines for Major Construction Sites”. These include:
- limiting the extent of open excavation;
- regular watering of exposed soil surfaces;
- covering stockpiles of soil and recently placed material;
- management of construction in relation to weather (avoiding excavation in periods of strong winds); and
- real-time dust monitoring used to identify periods with high dust levels, as a basis for controlling dust impacts.

8.5 EPA Licenced sites to discharge to Air (Particles)
EPA has provided GHD a list of all licenced premises permitted to discharge to air within and surrounding the Fishermans Bend/Port Melbourne industrial precinct (suburbs including Newport, Spotswood, West Melbourne and Yarraville). The following lists those industries with a licence to discharge to air (dust/particles) surrounding the FBURA precinct.
- Steel Cement – Schedule H01 Cement Works;
- Holden – Schedule I02 Metal Melting Works;
- Albright & Wilson (Australia) Limited schedule G01 - Chemical Works;
- Sugar Aust Pty Ltd) schedule D06 – Food Processing Works; and
- ACI Operations Pty Ltd schedule H05 – Glass Works.

There were no licenced facilities permitted to discharge particles to air within the FBURA.

8.6 Dust Complaint History
EPA has provided GHD a map showing the approximate locations and list of all dust complaints in the Fishermans area between mid-2008 and mid-2011. The number of dust complaints received by EPA has increased over the period, with over 18 complaints lodged between August 2008 and June 2011. A summary of complaints received and verified by EPA is provided in Figure 14.

Figure 14 Fishermans Bend – Summary of Dust Complaints
To verify the dust complaints to determine whether or not they can be attributed to any of the sources within Fishermans Bend area, GHD requested the EPA to provide the location and time and date of each complaint. Using the EPA’s Footscray AQMS as the nearest current operational air quality monitoring station, GHD retrieved the wind speed and wind direction for each complaint in order to validate the complaints by assessing if the wind direction places the complainant’s residence directly downwind of a particular source.

This validation process led to number of complaints that could be attributed to sources within the Fishermans Bend Precinct. The primary dust sources of concern were:

- Steel and Independent Cement handling facility with 9 complaints;
- Boral Plasterboard – complaints made but none decisive; and
- Port Melbourne Containers - complaints made but none decisive.

The map of complaints provided by EPA indicated that the dust complaints attributed to the Steel and Independent Cement handing facilities are all within the current industrial area (north of the proposed FBURA) nearby the cement facilities. All of the identified dust complaints are within the existing industrial areas, and none of the dust complaints have been made by the existing residents to the south of the site (south of Williamstown Road).

However, once the FBURA begins development the potential for reverse amenity issues arises. As the FBURA is progressively developed to residential the available separation distance from sensitive receptors to industries such as the cement handing facilities will decrease which will result in residents being closer and therefore experiencing a greater potential to be exposed to dust.

Currently the FBURA is an industrial area where people work but do not reside. There may be occurrences where workers are exposed to dust levels above the criterion from some industries under routine operations. However it may be the case that they have acclimatised to the occasional exposure – for these workers in effect it has become part of the background ambient conditions and does not occasion complaint. This situation may not be replicated with the development of new residential areas within FBURA – new residents may find exposure to dust unusual and objectionable and this may result in an increased percentage of complaints from these new residents.

The other sites with complaints nearby include the Boral Plasterboard cement Australia’s and Port Melbourne containers. The remaining complaints cannot be attributed to any source decisively.

### 8.7 Potential Dust Constraints to the FBURA Development

#### 8.7.1 Within FBURA

The potential dust constraints within the FBURA to the FBURA development are:

- Pronto Concrete Batching Plant (Lorimer);
- Hanson Concrete Batching Plant (Lorimer);
- Port Melbourne Metals Metal Transfer Station (Montague);
- Delta Group Transfer Station (Sandridge); and
- Port Philip Resource Recovery Centre (Sandridge).

From section 4 it can be seen that all these sites constrain the FBURA with their default recommended buffers. From the dust complaint analysis it can be seen that none of the dust complaints can be sourced to these industries. That’s not to say that from time to time dust under upset conditions won’t be generated but it is unlikely that the industries will constrain the FBURA development during their routine operations.

#### 8.7.2 Surrounding FBURA

The potential dust constraints to the FBURA development from the industries surrounding the FBURA area are:

- Steel and Independent cement handling facilities including ship unloading; and
- Holden – only if metal melting works still occur on site (use of the foundry). GHD’s understanding is majority of the site is now unused including the foundry operations. If only the new V6 plant is operational then no dust constraints would be imposed on the FBURA.

From the dust complaint analysis it can be seen that the number of complaints can be sourced to the industrial area surrounding the FBURA precipit due to activities such as the cement handing facilities. The placement of sensitive uses in the vicinity of those industries within the areas of complaint may result in further dust complaints and a constraint to the FBURA development.

It is the responsibility of the EPA to enforce that dust criteria are met and that no off-site dust impacts occur under routine operations from industries. As the sites default buffers do not constrain the FBURA, the EPA must investigate any complaints and enforce industries to mitigate dust emissions on site.

#### 8.7.3 Other

The residential areas of Port Melbourne are located to the east of Webb Dock and south of the FBURA Precinct. Dust emissions are not expected to be significantly influenced by day-to-day emissions from vehicles travelling to and from Webb Dock, as the dispersion over that distance will reduce the effects to a relatively minor contribution.

Emissions from the vehicles travelling on the Westgate Freeway and CityLink would contribute to the background dust levels within and surrounding the FBURA. From GHD’s experience this is unlikely to exceed SEPP –AQGM levels nor constrain the FBURA development. However, further work to determine the magnitude of these impacts could involve the modelling of vehicle emissions on these roads using the AUSROADS model.

### 8.8 Directional Buffer for Dust Sources

Where site-representative meteorological data is available the directions of good and poor dispersion can be identified as shown in Section 6. Furthermore, if the 12 month dataset is configured to AUSPLUME format (deriving atmospheric stability category and mixing height), then dispersion modelling can be conducted using a nominal source emission rate (dust) to determine the directional change in extent from a default buffer.

This was performed for the using the Port Melbourne meteorological dataset, and adopting a nominal 10 m x 10 m area source with a nominal emission rate. The 99.5% contour that provides the same enclosed area as a 100 m radius circle (i.e. 31,415 m²) was selected and is presented in Table 17. From Table 17 it is seen that the extent of the contour is greater than the all-direction mean of 100 m in the southerly sector – out to 155 m. Similarly, the extent of the contour to the west is significantly less than 100 m, down to 55 m. The contour effectively gives the departure from the fixed 100 m radius that would be required if an equal exposure to disamensity was to be given in the event of an upset/malfunction at any of the potential dust emitting sites.
The angular change in buffer distance is given as a function of direction in Table 17. This information has also been used to demonstrate the effect on the 100 m buffer when applied to the envelope of a potential dust source. As seen in Figure 15 the directional buffers are scribed for each of the identified odour emitting industries in Section 4 that attract a default buffer distance. Note that the directional buffers were only applied to those industries with the potential to constrain the FBURA.

**Table 17** Directional Variation in Buffer in Response to Local Meteorology – Port Melbourne

<table>
<thead>
<tr>
<th>Direction Sector (Degrees)</th>
<th>Range (m)</th>
<th>Percent [% of mean range]</th>
<th>Direction Sector (Degrees)</th>
<th>Range (m)</th>
<th>Percent [% of mean range]</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>0</td>
<td>81</td>
<td>S</td>
<td>180</td>
<td>155</td>
</tr>
<tr>
<td>NNE</td>
<td>22.5</td>
<td>68</td>
<td>SSW</td>
<td>202.5</td>
<td>124</td>
</tr>
<tr>
<td>NE</td>
<td>45</td>
<td>66</td>
<td>SW</td>
<td>225</td>
<td>98</td>
</tr>
<tr>
<td>ENE</td>
<td>67.5</td>
<td>72</td>
<td>WSW</td>
<td>247.5</td>
<td>54</td>
</tr>
<tr>
<td>E</td>
<td>90</td>
<td>80</td>
<td>W</td>
<td>270</td>
<td>55</td>
</tr>
<tr>
<td>ESE</td>
<td>112.5</td>
<td>101</td>
<td>WNW</td>
<td>292.5</td>
<td>108</td>
</tr>
<tr>
<td>SE</td>
<td>135</td>
<td>112</td>
<td>NW</td>
<td>315</td>
<td>114</td>
</tr>
<tr>
<td>SSE</td>
<td>157.5</td>
<td>143</td>
<td>NNW</td>
<td>337.5</td>
<td>110</td>
</tr>
</tbody>
</table>

Note: Directional buffers only apply to those emissions that are carried off-site by the ambient wind - so that buffers for fine dust produced by both the cement handling facilities and the concrete batching plants can be influenced by the directional effect of local meteorology.

A distinction can also be made for fugitive erodible sources – dust entrained in strong wind (greater than 5 m/s) as opposed to dust emissions from process sources where the emission rate is independent of local wind conditions. If a directional buffer were to be modelled for fugitive erodible sources such a buffer would have a different shape and would apply to an area sources of unpaved surfaces. Thus buffers for dust re-suspension will be different to buffers based on poor dispersion. There were no erodible dust sources from the identified industries requiring this type of buffer distinction.
**Directional Buffers for Dust Sources**

**Legend**
- Fishermans Bend
- Dust Source Industries
- Directional Buffers

**Places Victoria**
Fishermans Bend Buffer Assessment

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**Figure 15**

**Map Projection:** Transverse Mercator
**Horizontal Datum:** GDA 1994
**Grid:** GDA 1994 MGA Zone 55

**Data source:** DSE, Aerial Imagery, 2009, DSE VicMap (July 2012), Created by: nraska
8.8.1 Constraint of Directional Buffers on FBURA

Figure 15 shows the directional buffers with the retracted and extended distances of good and poor dispersion for the identified constraining dust facilities within and surrounding the FBURA.

Within FBURA

The directional buffer has been scribed for the concrete batching plants within the Lorimer Precinct, the Port Melbourne Metals transfer station in the Montague Precinct, Delta Group transfer station and Port Phillip Resource Recovery Centre (PPRRRC) within the Sandridge Precinct.

From the figure it can be seen that the directional buffers from the concrete batching plants within the Lorimer Precinct extend further south into the FBURA constraining additional land within the Sandridge Precinct, while contracting to the north, east and west constraining less land in those directions within the Lorimer Precinct.

The Delta Group’s and PPRRC’s 250 m directional buffers contract to the north, east and westerly constraining less land within the FBURA Sandridge Precinct compared to the default buffer however the directional buffer encompasses additional existing residences to the south of the FBURA. It is important to assess the dust complaint history within this buffer zone to establish if there are any potential issues from these sites. The provided EPA complaint history indicates that there have been no dust complaints from within the FBURA precinct (currently industrial) or from any of the existing residences to the south of the precinct. This indicates that these industries have not caused a significant upset/ malfunction at their site to generate off site complaints within the zone of poor dispersion (within the directional buffer).

The directional buffer for the Port Melbourne metals facility contracts the default buffer in the north, east and westerly directions un-constraining portions of land within the Montague Precinct that was earlier constrained by the default buffer. However there is an additional constraint to the precinct to the south.

Places may wish to adopt these buffers when developing land use planning controls or a staged development plan.

Surrounding FBURA

The directional buffers for the Independent and Steel cement facilities do extend further south but remain outside of the FBURA Precinct. Thus there is no constraint posed by these facilities by the default or directional buffers. The complaint history however does suggest that there may be a dust issue nearby the sites with a number of dust complaints from within the existing industrial area.

Other Potential Constraints

Holden is not considered to be a dust issue as GHD understands it no longer uses the foundry at its site (however this should be confirmed by Places). As discussed earlier the intermediate 500 m may be reduced.

Note that the directional buffers have been generated for all hours of the day as the actual operational hours of the facilities were unknown. If the operational hours are known the directional buffer may be re-run for those hours which may produce a marginally different shaped buffer due to the exclusion of the night-time poorest dispersion conditions.

8.8.2 Overall Directional Buffer Constraints on FBURA

Note that Figure 16 shows the combined overall directional buffer constraints on the FBURA for both the odour and dust sources.
8.9 Potential Dust Mitigation Strategies to the FBURA

It is assumed that the development of the FBURA would occur incrementally over time, and therefore the management of the transition of industrial land to residential uses are likely to result in short term impacts of non-compatible uses.

8.9.1 Recommended Dust Mitigation Strategies

Land-use Planning Controls

Separating dust-producing activities from sensitive areas i.e. setbacks strategy (e.g. open space design adjacent to dust sources to provide dust reduction through setback distances to residential uses). The recommended and directional buffers would assist in implementing this strategy.

Staged development

Maintain the recommended separation distance between residents and industry while industry is still operational within FBURA to the extent possible as the area is predominately in private ownership. The recommended and directional buffers indicate what portion of land would be constrained for development or lead to amenity issues.

An initial development stage of the FBURA could target and remove those industries likely to cause a constraint before sensitive uses are built nearby which would free up a large portion of land.

Again GHD recommends that Places contact those affected industries to develop a stage implementation plan that allows for a smooth transition of land use from industrial to residential over a period of time.

Control of Dust emissions at Source

Two available measures to control or reduce the dust emissions at source include:

- Use of BPEM (Best Practice Environmental Management) measures for each industry to mitigate dust on site; and
- Reduce the dust output of the source via dust mitigation measures (may require EPA enforcement via PANS and PINs).

8.9.2 Potential Mitigation Constraints to the FBURA

- Land-use Controls mitigation strategy through setback distances could compromise land value and land utilisation;
- Purchasing the constraining industries within the FBURA before may not be possible with contracts and leasing arrangements; and
- Established existing industries with private ownerships – Control at Source mitigation strategy would be a challenge without EPA enforcement as cooperation with industry would be required.

8.10 Future Key Actions for FBURA Development

Recommended future key actions:

- Places should contact those affected industries to develop a staged development plan to the extent possible as the area is predominately in private ownership. This should include land use planning controls to allow for a smooth transition from industrial to residential;
9. Desktop Noise Review

9.1 Overview

The industries identified in Section 3, as well as transportation activities, may generate potential environmental noise and vibration impacts into the FBURA precinct without the implementation of specific mitigation measures.

The purpose of this assessment is to undertake a desktop noise impact review to identify key noise issues associated with development within the FBURA.

A desktop noise impact assessment review has been conducted based on the following scope of work:

- Identification of potential noise sources within and surrounding the existing Fisherman’s Bend precinct and discussion of the noise characteristics associated with different types of industrial operations as well as transportation noise.
- A review of the relevant noise and vibration guidelines and standards potentially applicable to the site, including but not limited to:
  - AS 2107:2000 “Acoustics – Recommended design sound levels and reverberation times for building interiors”;
- A review of potential noise impacts associated with the identified sources.
- General recommendations to optimise the use and development of the subject site.
- Identification of requirements for further assessment work at the subject site.

9.2 What is Noise

Noise is generally defined as unwanted sound which may be hazardous to health, interfere with speech, and could potentially be disturbing, irritating or annoying. Noise could be generated from various sources, such as industrial/commercial premises, musical instruments, and transport operations.

Noise sources can contain certain characteristics, such as tonality, impulsiveness, intermittency, irregularity or dominant low-frequency content. There is evidence to suggest that it can cause greater annoyance than other noise at the same noise level (NSW INP, 2000).

9.2.1 Tonal Noise

Tonal noise as defined by the NSW Industrial Noise Policy (INP) is as follows: “A noise containing a prominent frequency and characterised by a definite pitch”. Tonal noise is generally generated from rotating parts or equipment such as compressor, fan blades, engine pistons, etc.

9.2.2 Impulsive Noise

Impulsive noise as defined by the NSW INP (2000) is as follows: “A noise having a high peak of short duration or a sequence of such peaks”. Impulsive noise could be generated from sudden activities, such as gunshots, punch press, heavy material dropped at height, blasting, pulse cleaning system, etc.

9.2.3 Intermittent Noise

Intermittent noise as defined by the NSW INP (2000) is as follows: “A noise level where is suddenly drops to that of the background noise several times during the assessment period, with a noticeable change in noise level of at least 5 dB”. Intermittent noise could be generated from machinery that operate in cycles, such as vehicles and rail pass by.

9.2.4 Dominant Low-Frequency Noise (Infrasound)

Low-frequency noise as defined by the NSW INP (2000) is as follows: “A noise containing major components within the low frequency range (20 Hz – 250 Hz) of the frequency spectrum”. Low frequency noise could be generated from typical large diesel engines in trains, ships and power plants, since the noise characteristic emanating from these sources is hard to muffle and spreads easily in all directions.

Overall, some or all of the above noise characteristics may occur as a result of the various range of industrial and transportation activities within and nearby the FBURA precinct. The potential primary noise sources within and nearby the FBURA precinct have been identified in section 9.3.

9.3 Existing Potential Primary Noise Sources

A preliminary review of the existing Fisherman’s Bend precinct through aerial photography has indicated that there are existing potential noise sources within the vicinity of the area.

Identification of existing potential noise sources within the FBURA vicinity has been conducted for the four different FBURA’s precincts, as well as nearby the FBURA. Note only major sites have been identified in the figure. Auto facilities and general factories and warehouses have not been included.

9.3.1 Lorimer Precinct

The Lorimer precinct comprises a mixture of industrial and commercial premises. Some of the identified major industrial and commercial facilities, which may have a potential for noise impacts include:

- Pronto concrete batching plant (Rogers Street, Port Melbourne);
- Hanson concrete batching plant (Boundary Street, Port Melbourne);
- Melbourne City Volvo dealership (Ingles Street, Port Melbourne);
- Pronto concrete batching plant (Rogers Street, Port Melbourne);
- Subaru dealership (Lorimer Street, Port Melbourne); and
- Numerous commercial/logistics offices and warehouses.

Other than from the above industries, ambient noise environment within the Lorimer precinct would also potentially be dominated by the traffic noise associated with West Gate Freeway and CityLink Tollway. The West Gate Freeway and CityLink Tollway bound the southern and the western boundaries of the precinct respectively.

Local traffic noise such as Ingles Street and Lorimer Street would also contribute to the local ambient noise environment.

9.3.2 Wirraway Precinct

The Wirraway precinct comprises a mixture of industrial and commercial premises. Some of the identified major industrial and commercial facilities, which may have a potential for noise impacts include:
Other than from the above industries, ambient noise environment within the Wirraway precinct would also potentially be dominated by the traffic noise associated with West Gate Freeway. West Gate Freeway bounds the northern boundary of the precinct. Local traffic noise such as that associated with Salmon Street, Plummer Street and Williamstown Road would also have the potential to contribute local ambient noise environment.

### 9.3.3 Montague Precinct
Currently, there are various private light industries/commercial businesses within the Montague precinct. The following have been identified and considered as potential primary noise sources within the precinct:
- Various auto mechanical businesses, including repairs, services and workshops;
- Factories and warehouses;
- Light rail corridor associated with tram route 109 (across the precinct);
- Light rail corridor associated with tram route 96 (to the east of the precinct);
- Southbank Tram Depot (Normanby Road, South Melbourne);
- Port Melbourne Metals (Normanby Road, South Melbourne);
- West Gate Freeway (to the north of the precinct); and
- Traffic noise associated with City Road and Montague Street.

Local traffic noise such as Normanby Road and Johnston Street would also have the potential to contribute local ambient noise environment.

### 9.3.4 Sandridge Precinct
The Sandridge precinct comprises a mixture of industrial and commercial premises. Some of the identified major industrial and commercial facilities, which may have a potential for noise impacts include:
- KONE Elevators (Bridge Street, Port Melbourne);
- Specsavers Head Office (Graham Street, Port Melbourne);
- Bureau Veritas Australia (Williamstown Road, Port Melbourne);
- FoxHay Timber and Hardware (Graham Street, Port Melbourne);
- CC’s Light and Sound (Williamstown Road, Port Melbourne);
- Bob Jane Corporation (Williamstown Road, Port Melbourne);
- Bunnings Warehouse (Bridge Street, Port Melbourne);
- Detmold printing (Williamstown Road, Port Melbourne);
- Port of Melbourne Containers (Prohasky Street, Port Melbourne);
- Bambra Press (Rocklea Drive, Port Melbourne);
- AusCarts Racing – Indoor Go karting (Salmon Street, Port Melbourne);
- Industrial Hydraulic Services (Plummer Street, Port Melbourne);
- Australian Furniture Timber (Plummer Street, Port Melbourne);
- National Tiles Co (Graham Street, Port Melbourne); and
- Numerous other factories, warehouse and logistic activities.

Other than from the above industries, ambient noise environment within the Sandridge precinct would also potentially be dominated by the traffic noise associated with West Gate Freeway. West Gate Freeway bounds the northern boundary of the precinct. Local traffic noise such as that associated with Williamstown Road, Plummer Street and Ingles Street would also have the potential to contribute local ambient noise environment.

### 9.3.5 Nearby FBURA
Industrial activities surrounding the FBURA would also have the potential to create noise impacts onto the proposed FBURA. In particular, the following industries have been identified:
- ACI Operations Pty Ltd (Booker Street, Spotswood);
- Aerostaff Australia (Network Drive, Port Melbourne);
- Boeing Aerosstructures (Lorimer Street, Port Melbourne);
- Boral (Salmon Street, Port Melbourne);
- Brandon Molasses (MacKenzie Road, Footscray);
- Ecogen Energy Pty Ltd – Newport Power Station (Douglas Parade, Newport);
- Cement Australia (Lorimer Street, Port Melbourne);
- Department of Science and Technology Organisation (DSTO) (Lorimer Street, Port Melbourne);
- DP World (West Swanston Terminal/MacKenzie Road, West Melbourne);
- Logistics Engineering Services (Salmon Street, Port Melbourne);
- Futurs Automotive Interiors (Turner Street, Port Melbourne);
- Westgate Port Services (Enterprise Road, West Melbourne);
- Herald and Weekly Times (Todd Road, Port Melbourne);
- Independent Cement (Lorimer Street, Port Melbourne);
- GM Holden’s Global V6 Engine Plant (Salmon Street, Port Melbourne);
- Steel Cement (Lorimer Street, Port Melbourne);
- Kraft Foods (Salmon Street, Port Melbourne);
- Melbourne International Karting Complex (Cook Street, Port Melbourne);
- Melbourne International Shooting Club (Todd Road, Port Melbourne);
- One Steel (Turner Street, Port Melbourne);
7.3.6 Summary of Identified Potential Primary Noise Sources

Table 18 and Table 19 below summarise the above-identified potential primary noise sources within and surrounding the FBURA precincts. GHD has determined the existing separation distances to FBURA precinct from each of the identified sources nearby the FBURA (refer to Table 19).

GHD has also provided indicative a Noise Impact Risk ranking for the FBURA development. The Noise Impact Risk is categorised into three levels, namely; “Low”, “Medium” and “High”, to reflect the type of industries and magnitude of impacts they may generate.

Table 18 Identified Primary Noise Sources within the FBURA Precinct

<table>
<thead>
<tr>
<th>Company/Infrastructure</th>
<th>Operations</th>
<th>Address</th>
<th>Potential Noise Sources</th>
<th>Noise Impact Risk for FBURA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lorimer Precinct</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pronto</td>
<td>Concrete-batching facility</td>
<td>Rogers Street, Port Melbourne</td>
<td>Trucks, stockpiling, concrete batching process</td>
<td>High</td>
</tr>
<tr>
<td>Hanson</td>
<td>Concrete-batching facility</td>
<td>Boundary Street, Port Melbourne</td>
<td>Trucks, stockpiling, concrete batching process</td>
<td>High</td>
</tr>
<tr>
<td>Auto Dealerships</td>
<td>Car and truck sales and repairs</td>
<td>Various</td>
<td>Delivery trucks, cars and workshop activities</td>
<td>Low</td>
</tr>
<tr>
<td>Factories and warehouses</td>
<td>Various factories and warehouses</td>
<td>Various</td>
<td>Trucks, manufacturing and</td>
<td>Medium</td>
</tr>
</tbody>
</table>

Table 19 Identified Primary Noise Sources within the FBURA Precinct

<table>
<thead>
<tr>
<th>Company/Infrastructure</th>
<th>Operations</th>
<th>Address</th>
<th>Potential Noise Sources</th>
<th>Noise Impact Risk for FBURA</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Gate Freeway</td>
<td>Arterial Road</td>
<td>-</td>
<td>Traffic noise</td>
<td>High</td>
</tr>
<tr>
<td>CityLink Tollway</td>
<td>Arterial Road</td>
<td>-</td>
<td>Traffic noise</td>
<td>High</td>
</tr>
<tr>
<td>Winray Precinct</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autocars Racing</td>
<td>Indoor Go karts track</td>
<td>50 Salmon Street, Port Melbourne</td>
<td>Vehicular noise</td>
<td>Medium</td>
</tr>
<tr>
<td>Australian Furniture Timber</td>
<td>Timber retailer</td>
<td>371 Plummer Street, Port Melbourne</td>
<td>Manufacturing process and logistic activities</td>
<td>Medium</td>
</tr>
<tr>
<td>Samba Press</td>
<td>Printing facility</td>
<td>6 Rocklea Drive, Port Melbourne</td>
<td>Delivery trucks and printing process</td>
<td>Low</td>
</tr>
<tr>
<td>Detmold</td>
<td>Printing facility</td>
<td>187 Williamstown Road, Port Melbourne</td>
<td>Delivery trucks and printing process</td>
<td>Medium</td>
</tr>
<tr>
<td>Factories and warehouses</td>
<td>Numerous factories and warehouses</td>
<td>Port Melbourne</td>
<td>Trucks, cranes, forklifts</td>
<td>Medium</td>
</tr>
<tr>
<td>Industrial Hydraulic Services</td>
<td>Hydraulic equipment manufacturer, services and marketer</td>
<td>371 Plummer Street, Port Melbourne</td>
<td>Manufacturing process and various logistics activities</td>
<td>Medium</td>
</tr>
<tr>
<td>National Tiles Co</td>
<td>Tiles retailer</td>
<td>525 Graham Street, Port Melbourne</td>
<td>Various logistic activities</td>
<td>Medium</td>
</tr>
<tr>
<td>Port Melbourne Containers</td>
<td>Servicing Containers</td>
<td>37 Prohasky Street, Port Melbourne</td>
<td>Trucks, cranes and</td>
<td>High</td>
</tr>
<tr>
<td>West Gate Freeway</td>
<td>Arterial Road</td>
<td>-</td>
<td>Traffic Noise</td>
<td>High</td>
</tr>
<tr>
<td>Plummer Street</td>
<td>Arterial Road</td>
<td>-</td>
<td>Traffic Noise</td>
<td>High</td>
</tr>
<tr>
<td>Montague Precinct</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto Businesses</td>
<td>Car and truck sales and repairs</td>
<td>Various</td>
<td>Trucks, cars and workshop activities</td>
<td>Medium</td>
</tr>
<tr>
<td>City Road</td>
<td>Arterial Road</td>
<td>-</td>
<td>Traffic Noise</td>
<td>High</td>
</tr>
<tr>
<td>Factories and warehouses</td>
<td>Numerous factories and warehouses</td>
<td>Various</td>
<td>Delivery trucks, workshop and various logistic activities</td>
<td>Medium</td>
</tr>
<tr>
<td>Montague Street</td>
<td>Arterial Road</td>
<td>-</td>
<td>Traffic noise</td>
<td>Medium</td>
</tr>
<tr>
<td>Port Melbourne Metals</td>
<td>Metal Recycling facility</td>
<td>201 Normanby Road, South Melbourne</td>
<td>Various logistic and workshop activities</td>
<td>High</td>
</tr>
</tbody>
</table>
### Traffic Noise Sources and Impact Risk

<table>
<thead>
<tr>
<th>Company/Infrastructure</th>
<th>Operations</th>
<th>Address</th>
<th>Potential Noise Sources</th>
<th>Noise Impact Risk for FBURA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southbank Tram Depot</td>
<td>Trams</td>
<td>Normanby Road, South Melbourne</td>
<td>Trams movements and maintenance activities</td>
<td>Medium</td>
</tr>
<tr>
<td>Tram line and stations (route 96 and 109)</td>
<td>Trams</td>
<td>Montague Street Light Rail</td>
<td>Trams movements</td>
<td>Medium</td>
</tr>
<tr>
<td>West Gate Freeway</td>
<td>Arterial Road</td>
<td>-</td>
<td>Traffic noise</td>
<td>High</td>
</tr>
<tr>
<td>Sandridge Precinct</td>
<td>Auto Businesses Car and truck sales and repairs, Various</td>
<td>Various</td>
<td>Delivery trucks, cars and workshop activities</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Bob Jane Corporation Car tyre services</td>
<td>473 Williamstown Road, Port Melbourne</td>
<td>Car workshop activities</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Bureau Veritas Australia Conformity assessment and certification services</td>
<td>435 Williamstown Road, Port Melbourne</td>
<td>Various workshop activities</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Bunnings Warehouse Homeware retailer</td>
<td>501 Williamstown Road, Port Melbourne</td>
<td>Car and delivery trucks</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>CC’s Light and Sound Retailer</td>
<td>473 Williamstown Road, Port Melbourne</td>
<td>Logistic and workshop activities</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Delta Group Recycled Timber</td>
<td>Refuse transfer station</td>
<td>577 Plummer St, Port Melbourne</td>
<td>Logistic activities and recycling process</td>
</tr>
<tr>
<td></td>
<td>FoxHay Timber and Hardware</td>
<td>Retailer</td>
<td>Graham Street, Port Melbourne</td>
<td>Logistic and workshop activities</td>
</tr>
<tr>
<td></td>
<td>Fowles timber and carpet</td>
<td>Timber and carpet retailer</td>
<td>55 White Street, South Melbourne</td>
<td>Logistic activities</td>
</tr>
<tr>
<td></td>
<td>Fulton Hogan Depot</td>
<td>Truck depot</td>
<td>101 Boundary Street, South Melbourne</td>
<td>Heavy vehicles</td>
</tr>
<tr>
<td></td>
<td>KONE Elevators Ply</td>
<td>Elevator repairs and manufacturer</td>
<td>350 Bridge St, Port Melbourne</td>
<td>Manufacturing process and logistic activities</td>
</tr>
<tr>
<td></td>
<td>Port Phillip Resource Recovery Centre</td>
<td>Accepts general household rubbish materials for recycling</td>
<td>Corner of White and Boundary Streets, South Melbourne</td>
<td>Recycling process and activities</td>
</tr>
<tr>
<td></td>
<td>Specsavers Head</td>
<td>Eye glasses</td>
<td>520 Graham St, Port Melbourne</td>
<td>Manufacturing</td>
</tr>
</tbody>
</table>

### Table 19 Identified Primary Noise Sources nearby FBURA

<table>
<thead>
<tr>
<th>Company/Infrastructure</th>
<th>Operations</th>
<th>Address</th>
<th>Potential Noise Sources</th>
<th>Available Separation Distance to FBURA Precinct (m)</th>
<th>Noise Impact Risk to FBURA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>Manufacturing facility</td>
<td>Melbourne</td>
<td></td>
<td>process and logistic activities</td>
<td></td>
</tr>
<tr>
<td>Symex Holding</td>
<td>Oleochemical manufacturer - chlorine, cleareine, glycerine and distilled fatty acids derived from fats and oils such as tallow and coconut oil. Also produce White King and jamaica products.</td>
<td>14 Woodruff Street Port Melbourne</td>
<td>Manufacturing process and logistic activities</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Various logistic Services</td>
<td>Container operations</td>
<td>Various</td>
<td>Vehicular movements</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>West Gate Freeway</td>
<td>Traffic noise</td>
<td>Arterial Road</td>
<td>-</td>
<td>Traffic Noise</td>
<td>High</td>
</tr>
<tr>
<td>Plummer Street</td>
<td>Traffic noise</td>
<td>Arterial Road</td>
<td>-</td>
<td>Traffic Noise</td>
<td>High</td>
</tr>
</tbody>
</table>

---

GHD | Report for Places Victoria - Fishermans Bend Buffer Assessment, 31/30261/221808 | 83 | 84 | GHD | Report for Places Victoria - Fishermans Bend Buffer Assessment, 31/30261/221808
<table>
<thead>
<tr>
<th>Potential Noise Sources</th>
<th>Available Separation distance to FBURA Precinct (m)</th>
<th>Noise Impact Risk to FBURA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melbourne International Karting Complex</td>
<td>Go karts complex 50 Salmon Street, Port Melbourne Go karts</td>
<td>180 High</td>
</tr>
<tr>
<td>Melbourne International Shooting Club</td>
<td>Shooting Club 120 Todd Rd, Port Melbourne Guns shooting</td>
<td>310 High</td>
</tr>
<tr>
<td>OneSteel Metal Building Supplies</td>
<td>90 Turner St, Port Melbourne Workshop and logistic activities</td>
<td>400 Medium</td>
</tr>
<tr>
<td>Patric Stevedores</td>
<td>Container Terminals, Coode Island and 3-5 Dockside Rd Port Melbourne Containers, ships, cranes trucks</td>
<td>670 Medium</td>
</tr>
<tr>
<td>PrintLinx Printing industry</td>
<td>705 Lorimer Street, Port Melbourne Printing machinery</td>
<td>500 Low</td>
</tr>
<tr>
<td>P&amp;O Ports</td>
<td>Container Terminals, Coode Island, West Melbourne Containers, ships, cranes trucks</td>
<td>1,200 Medium</td>
</tr>
<tr>
<td>Small and medium businesses</td>
<td>Numerous factories and warehouses</td>
<td>Trucks, logistics, etc.</td>
</tr>
<tr>
<td>Logistics Engineering Services</td>
<td>Research and design in the aerospace and automotive sectors</td>
<td>Aeropace and automotive workshop activities</td>
</tr>
<tr>
<td>Steel cement</td>
<td>Cement depot 469-591 Lorimer Street, Port Melbourne Trucks, stacking, logistics</td>
<td>230 Low</td>
</tr>
</tbody>
</table>
9.5.1 Environmental Noise Criteria


Noise from industry in Metropolitan Melbourne and/or Victoria’s Major Urban Area (as shown on Figure 17) is managed using the State Environmental Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (Victorian Government, 1989). Hence, the noise level criteria for industrial noise impact to the sensitive receptors within the FBURA would be determined following the procedures outlined in SEPP N-1.

Figure 17 Areas covered by SEPP N-1 (EPA Victoria, 2011)

SEPP N-1 manages the impact of noise on residential and other noise-sensitive uses and should be applied when siting or designing new or expanded industry or plant and when government authorities assess applications for the industry.

SEPP N-1 sets the maximum noise level allowed in a noise-sensitive area from commercial/industrial premises depending on the time of day, land use zoning and existing background noise levels. The first step in determining the noise limit is to calculate the prescribed upper noise limit (Zoning Level or Zoning Limit) for the particular land use as opposed to noise sensitive areas (i.e. residential zoned land around the site). Once the zoning level has been determined, the background noise level (refer to Glossary) is assessed to determine whether the background levels are neutral (i.e. not significantly higher than the zoning levels) or otherwise.

In accordance with Part VI of SEPP N-1, “noise sensitive area” is defined as “part of the land within the apparent boundaries of any piece of land which is within a distance of 10 metres outside the external walls of any dwelling or residential building” (Victorian Government, 1989). Therefore, it can be defined that the sensitive receiver distance is the shortest distance between the noise emitter and the location at 10 m away from the dwelling or residential building façade.

### Existing Potential Primary Vibration Sources

Primary vibration sources within and nearby the FBURA were identified to be sourced from the following activities:

- Occasional light rail movements along route 96 and 109;
- Local heavy traffic movements (especially from heavy vehicles); and
- Some industrial activities.

### Legislation, Guidelines and Standards

The noise regulations and standards outlined within this section are considered to be applicable to the FBURA Project.

### Potential Noise Sources

<table>
<thead>
<tr>
<th>Company/Infrastructure</th>
<th>Operations</th>
<th>Address</th>
<th>Potential Noise Sources</th>
<th>Available Separation distance to FBURA Precinct (m)</th>
<th>Noise Impact Risk to FBURA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toll Shipping</td>
<td>Container terminal</td>
<td>120-150 Williamstown Road, Port Melbourne</td>
<td>Various logistic activities</td>
<td>120</td>
<td>Medium</td>
</tr>
<tr>
<td>Webb dock</td>
<td>Automotive and container terminal</td>
<td>50 Williamstown Road Port Melbourne</td>
<td>Dock and port operations, such as trucks, cranes, cars, ships</td>
<td>260</td>
<td>High</td>
</tr>
<tr>
<td>Westgate Port Services</td>
<td>Port facility</td>
<td>Enterprise Road, West Melbourne</td>
<td>Port operations, such as trucks, cranes, cars</td>
<td>1,200</td>
<td>Low</td>
</tr>
<tr>
<td>Helipad at Pier 35 Marina</td>
<td>Helipad</td>
<td>Pier 35 Marina</td>
<td>Helicopter noise</td>
<td>1,140</td>
<td>Low to Medium (depending on helicopter route)</td>
</tr>
<tr>
<td>West Gate Freeway</td>
<td>Arterial Road</td>
<td>-</td>
<td>Traffic noise</td>
<td>Adjacent</td>
<td>High</td>
</tr>
<tr>
<td>CityLink Tollway</td>
<td>Arterial Road</td>
<td>-</td>
<td>Traffic noise</td>
<td>Adjacent</td>
<td>High</td>
</tr>
<tr>
<td>Port of Melbourne</td>
<td>Port facility</td>
<td>Port Melbourne</td>
<td>Port operations, such as trucks, cranes, cars</td>
<td>400</td>
<td>High</td>
</tr>
<tr>
<td>Rail Freight Facilities</td>
<td>Melbourne Freight Terminal</td>
<td>Footscray Road, West Melbourne</td>
<td>Freight trains</td>
<td>1,600</td>
<td>Low</td>
</tr>
<tr>
<td>Light rail corridor</td>
<td>Yarra trains</td>
<td>Route 96 and 109 trains</td>
<td>Tram noise</td>
<td>Adjacent</td>
<td>Medium</td>
</tr>
</tbody>
</table>
If the background level is neutral, the noise limit adopted is the zoning level. If, on the other hand, the background level is found to be significantly lower or higher than the zoning level then the noise limit is reduced or increased respectively.


GHD assumes that there is a potential for music entertainment venues, such as cafes, bars, etc to be proposed as part of the FBURA future development plan.

Noise impact from musical entertainment venue is managed using the State Environmental Protection Policy (Control of Music Noise from Public Premises) No. N-2 (Victorian Government, 1989). SEPP N-2 manages the impact of music noise on residential and other noise-sensitive uses and should be applied when siting or designing new or expanded musical entertainment venue and when government authorities assess applications for the development.

The noise limit at nearby sensitive receivers prescribed under the SEPP N-2 has been summarized in Table 20 below.

### Table 20 SEPP N-2 Noise Limit

<table>
<thead>
<tr>
<th>Type of Receiver</th>
<th>Day/Night</th>
<th>Operating Limit</th>
<th>Operating Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor Venues</td>
<td>Indoor</td>
<td>58 LAeq</td>
<td>65 LAeq</td>
</tr>
<tr>
<td>Outdoor Venues</td>
<td>Outdoor</td>
<td>60 LAeq</td>
<td>65 LAeq</td>
</tr>
</tbody>
</table>

* The allowable operating times for the outdoor venues is prescribed in Table 21. The operating period for the indoor venues vary according to the number of operations per week and the day of the week on which an operation occurs (refer to Table 22).

The allowable operating times and operating periods for the above venues have been prescribed under the SEPP N-2 and are summarised in Table 21 and Table 22 below.

### Table 21 SEPP N-2 Outdoor Venue Prescribed Operating Times

<table>
<thead>
<tr>
<th>Venues</th>
<th>Operating Times</th>
<th>Number of Operations Per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor Venues</td>
<td>12 PM to 11 PM</td>
<td>One</td>
</tr>
</tbody>
</table>

### Table 22 SEPP N-2 Indoor Venue Prescribed Operating Period

<table>
<thead>
<tr>
<th>Venues</th>
<th>Number of Operations Per Week</th>
<th>Day</th>
<th>Operating Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor Venues</td>
<td>One</td>
<td>Friday</td>
<td>9 AM to 12 PM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Saturday</td>
<td>10 AM to 12 PM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sunday</td>
<td>11 AM to 10 PM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
<td>9 AM to 11 PM</td>
</tr>
</tbody>
</table>

9.5.2 Noise Criteria from Passenger Rail Infrastructure Noise

Review of the composite plan for the FBURA indicates that there is a potential Metro Rail Station to be built within the FBURA. Recent Victorian Government publication of ‘Passenger Rail Infrastructure Noise Policy’ (Victorian Government, April 2013) provides policy in managing rail noise impacts from three rail infrastructure scenarios, namely:

- Improved passenger rail infrastructure;
- New passenger rail infrastructure; and
- Changes to land use near existing and planned rail corridors.

Table 23 to Table 25 below detail the summary of the investigation thresholds of the above proposed infrastructure scenarios.

### Table 23 Investigation Thresholds for New Passenger Rail Infrastructure or Change in Land Use near a Planned Rail Corridor

<table>
<thead>
<tr>
<th>Time</th>
<th>Type of Receiver</th>
<th>Investigation Threshold(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Residential dwellings and other buildings where people sleep including aged person homes, hospitals, motels and caravan parks</td>
<td>60 L胺 or 80 L胺ext</td>
</tr>
<tr>
<td>Night (10 PM to 6 AM) dB(A) External</td>
<td>Noise sensitive community buildings including schools, kindergartens, libraries</td>
<td>55 L胺 or 80 L胺ext</td>
</tr>
</tbody>
</table>

### Table 24 Investigation Thresholds for Change in Land Use near an Existing Rail Corridor

<table>
<thead>
<tr>
<th>Time</th>
<th>Type of Receiver</th>
<th>Investigation Threshold(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night (10 PM to 6 AM) dB(A) External</td>
<td>Residential dwellings and other buildings where people sleep including aged person homes, hospitals, motels and caravan parks</td>
<td>65 L胺 or 85 L胺ext</td>
</tr>
</tbody>
</table>
### Table 25 Investigation Thresholds for Redevelopment of Existing Passenger Rail Infrastructure

<table>
<thead>
<tr>
<th>Time</th>
<th>Type of Receiver</th>
<th>Investigation Threshold(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>dB(A) External</td>
<td></td>
</tr>
<tr>
<td></td>
<td>People sleep including aged person homes, hospitals, motels and caravan parks</td>
<td></td>
</tr>
<tr>
<td>Day (6 AM to 10 PM) or dB(A) External</td>
<td>Residential dwellings and other buildings where people sleep including aged person homes, hospitals, motels and caravan parks</td>
<td>65 $L_{eq}$ and change in $L_{eq}$ of 3 dB(A) or more or 85 $L_{max}$ and change in $L_{max}$ of 3 dB(A) or more</td>
</tr>
<tr>
<td>Night (10 PM to 6 AM)</td>
<td>Noise sensitive community buildings including schools, kindergartens, libraries</td>
<td>60 $L_{eq}$ and change in $L_{eq}$ of 3 dB(A) or more or 85 $L_{max}$ and change in $L_{max}$ of 3 dB(A) or more</td>
</tr>
</tbody>
</table>

### 9.5.3 Noise Control Guidelines for Helicopters

With regards to the existing helipad situated at Pier 35 Marina, this section discusses the relevant noise control guidelines.

EPA Victoria Publication 1254 – Noise Control Guidelines (EPA Vic, October 2008) provides noise level criteria for helicopter noise. The stipulated noise criteria comprise of three separate components, which should be satisfied at the nearest noise sensitive receivers’ building. The three components are:

- The measured $L_{Aeq, T}$ (measured over the entire daily operating time of the helipad) shall not exceed 55 dB(A) for a residence;
- The measured maximum noise level $L_{Amax}$ shall not exceed 82 dB(A) at the nearest residential premises; and
- Operation outside the hours between 7 am and 10 pm shall not be permitted except for emergency flights.

EPA Victoria has noted that the above levels will generally be achieved by a buffer distance of 150 m between the landing site and the residential premises for helicopters of less than two tonnes all-up weight, and 150 m for helicopters of less than 15 tonnes all-up weight.

### 9.5.4 Construction Noise Criteria

A part of the proposed FBURA’s new developments and infrastructures, construction noise would need to be managed. The EPA Noise Control Guideline (Publication 1254) (EPA Victoria, 2008) makes provision for the control of construction noise. These guidelines place no restriction on construction noise during normal working hours (07:00 to 18:00 Monday to Friday, and 07:00 to 13:00 Saturday), but require that:

- Construction noise not exceed background (LA90) by more than 5 dB(A) outside normal working hours (for project construction exceeding 18 months duration); and
- Construction noise to be inaudible inside a habitable room of any residential premises between 22:00 and 07:00.

The EPA Noise Control Guideline (Publication 1254) makes an allowance for unavoidable construction works through the night provided that residents are notified of the intended work, its duration and times of occurrence.

The EPA Noise Control Guideline (Publication 1254) and EPA Environmental Guidelines for Major Construction Sites (Publication 480) provide mitigation measures that need to be considered.

### 9.5.5 Internal Noise Levels

The FBURA is proposed to have a strategic mix of well-designed housing types, local gathering places, community facilities, offices, shopping and entertainment venues. The maximum external noise intrusion into the indoor spaces of the building is recommended to comply with Australian Standard AS 2107-2000 “Acoustics – Recommended design sound levels and reverberation times for building interiors” (AS 2107: 2000). Table 26 below details some of the typical recommended internal spaces noise levels from the external noise intrusion. Any external wall elements of the building shall be designed to comply with the recommended internal noise levels below. Internal spaces not mentioned in Table 26 shall be designed to comply with AS 2107:2000.

### Table 26 Typical Recommended Design Internal Noise Levels

<table>
<thead>
<tr>
<th>Designated Area</th>
<th>Recommended Design Internal Noise Levels $L_{Aeq}$ dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Satisfactory</td>
</tr>
<tr>
<td>Houses and Apartments (near minor road)</td>
<td></td>
</tr>
<tr>
<td>Bedroom</td>
<td>30</td>
</tr>
<tr>
<td>Living Room, Dining Room</td>
<td>30</td>
</tr>
<tr>
<td>Lobby, Foyer, Corridor</td>
<td>45</td>
</tr>
<tr>
<td>Houses and Apartments (near major road)</td>
<td></td>
</tr>
<tr>
<td>Bedroom</td>
<td>30</td>
</tr>
<tr>
<td>Living Room, Dining Room</td>
<td>35</td>
</tr>
<tr>
<td>Lobby, Foyer, Corridor</td>
<td>45</td>
</tr>
<tr>
<td>Hotels and Motels</td>
<td></td>
</tr>
<tr>
<td>Sleeping Areas (near minor road)</td>
<td>30</td>
</tr>
<tr>
<td>Sleeping Areas (near major road)</td>
<td>35</td>
</tr>
<tr>
<td>Foyers</td>
<td>45</td>
</tr>
<tr>
<td>Toilets</td>
<td>45</td>
</tr>
<tr>
<td>Educational Buildings</td>
<td></td>
</tr>
<tr>
<td>Conference Rooms</td>
<td>35</td>
</tr>
<tr>
<td>Laboratories, Corridor</td>
<td>45</td>
</tr>
<tr>
<td>Lecture Theatres</td>
<td>35</td>
</tr>
<tr>
<td>Libraries (General areas)</td>
<td>40</td>
</tr>
</tbody>
</table>
Table 27 Recommended Internal Railway Noise Criteria

<table>
<thead>
<tr>
<th>Designated Area</th>
<th>Recommended Design Internal Noise Levels L_{eq,1hr} dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Satisfactory</td>
</tr>
<tr>
<td>Office Areas</td>
<td>40</td>
</tr>
<tr>
<td>Teaching Spaces (Primary)</td>
<td>35</td>
</tr>
<tr>
<td>School)</td>
<td></td>
</tr>
<tr>
<td>Teaching Spaces (Secondary</td>
<td>35</td>
</tr>
<tr>
<td>School)</td>
<td></td>
</tr>
<tr>
<td>Indoor Sports Buildings</td>
<td></td>
</tr>
<tr>
<td>General Indoor Sports</td>
<td>45</td>
</tr>
<tr>
<td>Office Buildings</td>
<td></td>
</tr>
<tr>
<td>General Office Areas</td>
<td>40</td>
</tr>
<tr>
<td>Private Office</td>
<td>35</td>
</tr>
<tr>
<td>Board Rooms</td>
<td>30</td>
</tr>
<tr>
<td>Lobbies, Corridor</td>
<td>45</td>
</tr>
</tbody>
</table>

Note that AS 2107:2000 is not intended for use in evaluating occupancy noise, transient or variable noises, such as:

- Aircraft noise (see AS 2021);
- Construction noise such as jackhammers and pile-drivers (see AS 2436);
- Railway noise;
- Crowd noise, e.g. from parades and sporting events; and
- Emergency vehicle warning devices.

**Internal Noise Criteria from Rail Noise**

Should there be potential residential development constructed within the FBURA that is subject to future heavy rail noise impact, this section details the internal noise criteria for rail noise.

There is currently no internal noise assessment criteria documented by a Victorian Authority in assessing specifically train noise impact. However, train noise impact assessment is generally based on the criteria nominated by Department of Planning requirements in New South Wales Government, which nominate criteria for residential development in accordance with their publication ‘Development near rail corridors and busy roads – Interim guideline (NSW DoP, 2008). Residential type development requires internal noise level of 40 dB(A) L_{eq,1hr} daytime in living and sleeping areas, and 35 dB(A) L_{eq,1hr} night time in sleeping area as shown in Table 27.

### Table 27 Recommended Internal Railway Noise Criteria

<table>
<thead>
<tr>
<th>Designated Area</th>
<th>Recommended Internal Noise Levels L_{eq,1hr} dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day/Evening time (7 AM to 10 PM)</td>
</tr>
<tr>
<td>Living and Sleeping</td>
<td>40</td>
</tr>
</tbody>
</table>

**9.5.6 Specific Noise Characteristics**

Where a noise source contains certain characteristics, such as tonality, impulsiveness, intermittency and irregularity, there is evidence to suggest that it can cause greater annoyance than other noise at the same noise level. The Victorian Government, through SEPP N-1, sets out the corrections to be applied for tonal, impulsive, and intermittent noise.

**9.5.7 Low Frequency Noise**

In the absence of a Victorian guideline, the NSW Industrial Noise Policy (NSW INP, 2000) is considered to address noise sources with inherent dominant infrasound or very low frequency noise characteristics. Industrial operations, such as Newport Power Station, can have the potential to generate low frequency noise components below 200 Hz. The procedure for the initial screening to determine if a more detailed assessment is required is as follows:

- If the dB(Linear) measurement exceeds the dB(A) measurement by more than 15 dB, a one-third octave band measurement in the frequency range 20 to 200 Hz should be carried out.

The correction specified in the INP is to be added to the measured or predicted noise levels at the receiver before comparison with the criteria. Correction of 5 dB is to be applied if the difference between the measurements of C-weighted and A-weighted levels over the same period is 15 dB or more

**9.5.8 Vibration Criteria**

This section discusses the vibration criteria applicable to the FBURA development.

**Human Comfort Vibration Criteria**

The British Standard BS 6472:2008 - Guide to Evaluation of Human Exposure to Vibration in Buildings Part 1: Vibration sources other than blasting (BS 6472, 2008) is commonly referred to in Australia to assess ‘human comfort criteria’ for residential building types. Typically, construction, rail as well as some industrial activities generate ground vibration of an intermittent nature. Intermittent vibration is assessed using the Vibration Dose Value (VDV). The BS 6472:2008 human comfort peak VDV ranges for daytime and night time periods are shown in Table 28.

**Table 28 Vibration Dose Value (VDV) Ranges and Probabilities for Adverse Comment to Intermittent Vibration (ms^{-1.5})**

<table>
<thead>
<tr>
<th>Location</th>
<th>Low Probability of Adverse Comment</th>
<th>Adverse Comment Possible</th>
<th>Adverse Comment Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential buildings 16 hours day</td>
<td>0.2 to 0.4</td>
<td>0.4 to 0.8</td>
<td>0.8 to 1.6</td>
</tr>
<tr>
<td>(07:00 to 23:00 hrs)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential buildings 6 hours night</td>
<td>0.1 to 0.2</td>
<td>0.2 to 0.4</td>
<td>0.4 to 0.8</td>
</tr>
<tr>
<td>(23:00 to 07:00 hrs)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:

- a) Below these ranges adverse comment is not expected.
- b) Above these ranges adverse comment is very likely.

These values represent the best judgement available at the time the standard was published and may be used for both vertical and horizontal vibration, providing that they are correctly weighted. As there is a range of values for each category, some judgement is required.

The assessment of response to vibration in BS 6472:2008 is based on VDV. Guidance peak particle velocity (PPV) values are also provided in British Standard BS 5228.2:2009 - Code of Practice for noise and vibration control on construction and open sites: Part 2 Vibration (BS 5228.2, 2009) as shown in Table 29. PPV is likely to be more routinely measured based on the more usual concern over potential building damage.
DIN 4150.3:1999 presents guideline values for the maximum absolute value of the velocity project.

For receptors, the vibration criteria stipulated under DIN 4150.3:1999 have been adopted for this vibration measurement for vibration in buildings – Part 2: Guide to damage levels from ground-borne German Standard DIN 4150.3:1999 – damage caused by vibration. Guidance on limiting vibration is attained by reference to the Currently, there is no Australian Standard that set the criteria for the assessment of building Structural Damage Vibration Criteria

Currently, there is no Australian Standard that sets the criteria for the assessment of building damage caused by vibration. Guidance on limiting vibration is attained by reference to the German Standard DIN 4150.3:1999 – Structural Vibration – Part 3: Effects of vibration on structures (DIN 4150.3, 1999) and British Standard BS 7385:2:1993 – Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground-borne vibration (BS 7385:2, 1993). In comparison, DIN 4150.3:1999 provides more stringent vibration criteria as opposed to BS 7385:2:1993. Due to the close location of the vibration sensitive receptors, the vibration criteria stipulated under DIN 4150.3:1999 have been adopted for this project.

DIN 4150.3:1999 presents guideline values for the maximum absolute value of the velocity “at the foundation and in plane of the highest floor of various types of building. Experience has shown that if these values are complied with, damage that reduces the serviceability of the building will not occur. If damage nevertheless occurs, it is to be assumed that other causes are responsible.” Measured values exceeding those listed in Table 30 “… does not necessarily lead to damage; should they be significantly exceeded, however further investigations are necessary.”

<table>
<thead>
<tr>
<th>Type of Structure</th>
<th>1 Hz to 10 Hz</th>
<th>10 Hz to 50 Hz</th>
<th>50 Hz to 100 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings used for commercial purposes,</td>
<td>20</td>
<td>20 to 40</td>
<td>40 to 50</td>
</tr>
<tr>
<td>industrial buildings, and buildings of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>similar design</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dwellings and buildings of similar design</td>
<td>5</td>
<td>5 to 15</td>
<td>15 to 20</td>
</tr>
<tr>
<td>and/or occupancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structures that, because of their</td>
<td>3</td>
<td>3 to 8</td>
<td>8 to 10</td>
</tr>
<tr>
<td>particular sensitivity to vibration,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cannot be classified under lines 1 and 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and are of great intrinsic value (e.g. listed buildings under preservation order)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The term vi refers to vibration levels in any of the x, y or z axes.

**Where frequencies are above 100 Hz the values given in this column may be used as minimum values.

Structural Damage Vibration Criteria

Currently, there is no Australian Standard that sets the criteria for the assessment of building damage caused by vibration. Guidance on limiting vibration is attained by reference to the German Standard DIN 4150.3:1999 – Structural Vibration – Part 3: Effects of vibration on structures (DIN 4150.3, 1999) and British Standard BS 7385:2:1993 – Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground-borne vibration (BS 7385:2, 1993). In comparison, DIN 4150.3:1999 provides more stringent vibration criteria as opposed to BS 7385:2:1993. Due to the close location of the vibration sensitive receptors, the vibration criteria stipulated under DIN 4150.3:1999 have been adopted for this project.

DIN 4150.3:1999 presents guideline values for the maximum absolute value of the velocity “at the foundation and in plane of the highest floor of various types of building. Experience has shown that if these values are complied with, damage that reduces the serviceability of the building will not occur. If damage nevertheless occurs, it is to be assumed that other causes are responsible.” Measured values exceeding those listed in Table 30 “… does not necessarily lead to damage; should they be significantly exceeded, however further investigations are necessary.”

**Table 30 Guidance Values for Short Term Vibration on Structures**

<table>
<thead>
<tr>
<th>Line</th>
<th>Type of Structure</th>
<th>Guideline Values for Velocity vi (mm/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Buildings used for commercial purposes, industrial buildings, and buildings of similar design</td>
<td>20, 20 to 40, 40 to 50</td>
</tr>
<tr>
<td>2</td>
<td>Dwellings and buildings of similar design and/or occupancy</td>
<td>5, 5 to 15, 15 to 20</td>
</tr>
<tr>
<td>3</td>
<td>Structures that, because of their particular sensitivity to vibration, cannot be classified under lines 1 and 2 and are of great intrinsic value (e.g. listed buildings under preservation order)</td>
<td>3, 3 to 8, 8 to 10</td>
</tr>
</tbody>
</table>

*The term vi refers to vibration levels in any of the x, y or z axes.

**Where frequencies are above 100 Hz the values given in this column may be used as minimum values.

9.6 Potential Noise and Vibration Impacts

9.6.1 Noise Impact

The nature of noise sources from industrial and transportation activities would include continuous, tonal to intermittent and impulsive characteristics depending on sites. This section discusses the nature of the noise impact from different types of major noise sources within and nearby the FBURA.

**Industrial Noise**

As mentioned before, noise characteristic emanating from industrial activities may vary depending on the nature of the industry. In general, outdoor as well as roof-top mechanical plant and equipment from an industry could generate continuous noise emission to the surrounding vicinity. These plant and equipment may generally operate 24-hour per day, however depending on the type of industry, they may only operate at a specific period of the day. The extent of the noise impact from outdoor mechanical plant and equipment would be determined based on the mechanical layout installation (direction of openings, etc.), operating duration, equipment type, etc.

The noise emission from rotating mechanical plant and equipment could also have tonal characteristic in nature. Any unbalanced impact during the course of the rotating movement could potentially cause vibration where its energy is transmitted through surfaces into the air and could be heard as tones at particular frequency.

Noise within the Lorimer precinct would potentially be sourced from concrete batching plants. The emitted noise could be intermittent in nature. Moreover, there could potentially be other noise sources associated with the concrete batching facility, such as stockpiling and truck movements.

Noise from major industries within the Fishermans Bend, such as DSTO, Port Phillip Resource Recovery, Port Melbourne Metals, Kraft Foods, Webb Dock, Melbourne Shooting Complexes and others, would require further noise investigation to determine the potential impact to the FBURA.

Noise from various factories, warehouses, and container services facilities within and surrounding the FBURA is sourced from workshops and logistics related activities, which involve trucks, forklifts, cranes, metal clanging, stockpiling, and many others. These would also result in different characteristic of noise, from intermittent and impulsive, to continuous.

Heavy vehicle movements within the FBURA, as a result of the existing industrial operation, would also affect the local traffic noise within the precinct.

Overall, the noise generated by various types of industries within and nearby the FBURA could cause cumulative noise impacts to the FBURA. Hence, it is critical to determine the extent of these impacts when undertaking more detailed noise assessment of FBURA precinct.

**Transportation Noise**

In relation to transportation noise impact, parts of the FBURA ambient noise environment are likely to be dominated by traffic noise, mainly associated with West Gate Freeway and CityLink Tollway. Any FBURA development that is proposed to be situated nearby these roadways would potentially result in exposure to high noise levels that require substantial local acoustic treatment to preserve any sensitive receiver’s amenity.

Noise from freeway/tollway and major roads could involve low frequency engine braking noise from heavy vehicles that could cause annoyance to the surrounding sensitive receivers.
In addition, June 2008 media release from the Minister for Roads and Ports talked about ‘New Baypass to reduce Williamstown Road Truck Traffic’ (Supply Chain Victoria, 2008). This involves a construction of new Plummer Street Local Truck bypass, connecting to West Gate Freeway, to reduce traffic and congestion on local road along Williamstown Road. Plummer Street is currently situated within the proposed Sandridge and Wirraway precincts of the FBURA. The Plummer Street bypass construction work began in January 2007 and has been completed in 2008. Traffic noise associated with heavy vehicles along Plummer Street, including that from engine braking, would have the potential of local impact to these FBURA precincts.

GHD acknowledges that other than the existing light rail corridors within the Montague precinct, review of the composite plan for the FBURA indicates that there is a potential Metro Rail Station to be built within the FBURA precinct.

Rail noise usually generated from the noise emitted by the engine of trains, wheel rolling/friction, wheel passing rail joints and train horn/tram bell. These noise sources may contain certain characteristics, such as intermittency (horn/bell, squeaky noise from wheel rolling/friction, etc.) and dominant low-frequency noise (in the case of trains) that may cause amenity disruption to the surrounding sensitive receivers. However, in determining the overall noise exposure to a particular sensitive receiver or a development, it will depend on the type of trains/trams and the frequency of trains/trams passing by.

Potential noise impact from the adjacent rail/road operation may cause sleep disturbance, hearing issues, social activities, work activities and discomfort to human hearings. Helicopter noise due to the operation of the Helipad at Pier 35 Marina could potentially cause significant noise impact to the FBURA. Engine and rotor blade noise of the helicopter could produce low frequency noise with intermittent and tonal in nature. It is recommended that further investigation be conducted to determine the potential noise impact to the FBURA, based on flight path, schedule of operations, types of helicopters.

9.6.2 Vibration Impact

With regards to vehicle movements, typical vibration from heavy trucks passing over normal road surface generate low vibration levels in the range of 0.01 – 0.2 mm/s at the building’s footings located 10-20 m from the roadway. The rattling of windows or the like is sometimes more likely to be caused by airborne low-frequency noise radiation (infrasonic) from truck exhaust or bodies. Also train/tram passing along the rail corridor will induce ground borne vibration transmitted through the subsoil which may cause intermittent vibration nuisance to the surrounding sensitive receivers, depending on the distance between the rail line and the sensitive receivers. If not addressed, potential vibration impacts arising of rail operations may include sleep disturbance, discomfort due to excessive vibration exposure, and damage to infrastructure.

Although depending on the nature of industries, the level of vibration impacts from industries could generally be considered as minimal.

9.7 Noise Complaint History

EPA has provided GHD a map and list of all noise complaints in the Fishermans Bend area between mid-2008 and mid-2011. The number of noise complaints received by EPA has fluctuated over the period, with over 26 complaints lodged between July 2008 and June 2011. A summary of complaints received and verified by EPA is provided in Figure 18. To further analyse the noise complaints and their origin, GHD requested the EPA to provide the location, time and date, and reason of each complaint. However, EPA has categorised previous noise complaints into three types, namely:

- Noise complaints relating to a construction site (10 complaints);
- Noise complaints relating to dock activity (7 complaints); and
- Noise complaints relating to general activities (10 complaints).

Noise complaints from construction site could be sourced locally or nearby the sensitive receptor, and temporary in nature. Hence, these complaints cannot be decisively attributed to any source. Based on the above information, it is not possible to identify particular noise sources within the Fishermans Bend area that potentially caused complaints. Further investigation would be required to validate the complaints based on community consultation, noise monitoring, etc.

9.8 Noise Mitigation Strategies

The noise mitigation strategies could generally be divided into four different areas, namely (from the most preferred to least preferred rankings) (NSW INP, 2000):

- Land-use Controls (separating the location of noise-producing activities from sensitive areas);
- Control at Source (reduce the noise output of the source to provide protection surrounding environment);
- Control in Transmission (reduce noise level at the receiver but not necessarily the environment surrounding the source, e.g. noise barrier, etc.); and
- Receiver Control (localised acoustic treatment at sensitive receiver).

9.8.1 Land-use Controls

There are several strategies involved in using the Land-use Control measures.

Figure 18 Fishermans Bend – Summary of Noise Complaints

To further analyse the noise complaints and their origin, GHD requested the EPA to provide the location, time and date, and reason of each complaint. However, EPA has categorised previous noise complaints into three types, namely:

- Noise complaints relating to a construction site (10 complaints);
- Noise complaints relating to dock activity (7 complaints); and
- Noise complaints relating to general activities (10 complaints).

Noise complaints from construction site could be sourced locally or nearby the sensitive receptor, and temporary in nature. Hence, these complaints cannot be decisively attributed to any source. Based on the above information, it is not possible to identify particular noise sources within the Fishermans Bend area that potentially caused complaints. Further investigation would be required to validate the complaints based on community consultation, noise monitoring, etc.
• Setbacks strategy (e.g. Open space design adjacent to noisy industries, busy roads and/or railway corridors to provide noise reduction through setback distances to residential uses);
• Setback distances between the noise source and the noise sensitive receiver could be one of the treatments in reducing the noise exposure level at the proposed FBURA development. Setback strategy would also be effective in mitigating ground-borne vibration impact from nearby rail corridor or other vibration sources;
• Building locations and height controls. For example, higher rise buildings could be located adjacent to primary noise sources to provide noise shielding effect to residential uses or the overall FBURA;
• Expansion of cycle and pedestrian facilities, to discourage the use of motor vehicles and encourage the use of bicycles, scooters or walking, which would result in less noise emission within the area; and
• Impose acoustic control planning conditions on new developments. This could be in the form of council’s planning permit conditions for specific acoustic treatment on noise sensitive developments.

9.6.2 Control at Source

There are several strategies involved in using the Control at Source measure.

• Promoting the use of low pavement surfaces on new roads. The type of road surface has a significant effect on the level of noise generated by the tyre/road interface. Austroads Technical Report “Austroads Review Report: Traffic Noise/Long-life Surfacing” (Austroads, January 2011) provides relative noise emission levels of conventional road surfacings in Australia, based on studies conducted by (Campbell & Isles, 2001), (Parnell, 2006) and (Samuels, 2001) (refer to Table 31).

In general, seal surfacings would not be recommended for low noise surfacings purposes as they tend to generate higher traffic noise levels compared to asphalt surfacings. Similarly to concrete surfacings, they tend to generate higher noise levels than asphalt surfacings. However, there are a number of surface treatments that could be applied to reduce road noise levels, such as tyning or hessian dragging in a longitudinal direction to improve pavement unevenness (Austroads, January 2011).

Moreover, ageing of pavement and its construction quality could affect the noise performance. Austroads Research Report: “Austroads Research Report: Modelling, Measuring and Mitigating Road Traffic Noise. AP-R277/05” (Austroads, 2005) has mentioned that “it should also be noted that the noise generation characteristics of surfacings changes over time in particular as the wear, weathering and roughness of the road changes. In addition, noise generated from open graded asphalt pavement types will also increase as the voids within the surface become clogged over time. As an example, (Dash, Bryce, Moran, & Samuels, 2001) indicate that the clogging of surface voids in open-graded asphalt may lead to noise level increases of around 4 dB(A).” Table 32 details the change in acoustic performance of road pavement due to ageing.

### Table 31 Relative noise emission levels of conventional surfacings in Australia

<table>
<thead>
<tr>
<th>Surfacing type</th>
<th>Traffic Noise</th>
<th>Individual vehicles pass-by noise</th>
<th>Trucks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>+4.0</td>
<td>+4.0</td>
</tr>
<tr>
<td>Size 14 single/single seal</td>
<td>+4.0</td>
<td>+4.0</td>
<td>+4.0</td>
</tr>
<tr>
<td>Size 7 single/single seal</td>
<td>+1.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Portland cement concrete (PCC)</td>
<td>+3.0</td>
<td>+1.0 to +3.5</td>
<td>+1.0 to +1.0</td>
</tr>
<tr>
<td>Cold overlay</td>
<td>+2.0</td>
<td>+2.0</td>
<td>+2.0</td>
</tr>
<tr>
<td>Dense Graded Asphalt (DGA)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Portland Cement Concrete (PCC)</td>
<td>-0.5 to -3.0</td>
<td>-0.1</td>
<td>-5.7</td>
</tr>
<tr>
<td>Stone Mastic Asphalt (SMA)</td>
<td>-2.0 to -3.5</td>
<td>-2.2</td>
<td>-4.3</td>
</tr>
<tr>
<td>Open Graded Asphalt (OGA)</td>
<td>0 to -4.5</td>
<td>-0.2 to -4.2</td>
<td>-4.9</td>
</tr>
</tbody>
</table>

### Table 32 Change in acoustic performance due to aging

<table>
<thead>
<tr>
<th>Surface</th>
<th>Noise level variation dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mcm sprayed seal</td>
<td>+4</td>
</tr>
<tr>
<td>Dense Graded Asphalt (DGA)</td>
<td>+1</td>
</tr>
<tr>
<td>Open Graded Asphalt (OGA)</td>
<td>-4</td>
</tr>
</tbody>
</table>

### Table 33 Factors to consider in design of traffic calming schemes (Austroads, 2005)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance between devices</td>
<td>Distance between traffic calming devices should promote constant speed along the road. Acceleration followed by braking and swerving can increase community annoyance where devices are spaced too far apart.</td>
</tr>
<tr>
<td>Height of device</td>
<td>Raised devices, such as mid-block platforms and speed humps have strong traffic calming effects. However, the height of the device can limit its effectiveness. A 3 cm increase in height can provide the equivalent noise increase of moving the device 40 m closer to the noise receiver.</td>
</tr>
<tr>
<td>Chicanes</td>
<td>Chicanes can reduce speed annoyance, however they do not reduce the sense of danger that a calming device should achieve. This is mostly a result of noise generated by swerving and acceleration.</td>
</tr>
<tr>
<td>Roundabouts</td>
<td>Roundabouts generally provide the greatest benefit in noise reduction. Noise from roundabouts appears to create less community annoyance than other traffic calming devices.</td>
</tr>
<tr>
<td>Mid-block platforms</td>
<td>Mid-block platforms are not effective at reducing speed annoyance. Squeaking noise, caused mainly by the vertical displacement of the device, tends to increase noise annoyance at sensitive receivers. This can be reduced by keeping the device height lower than 75 mm.</td>
</tr>
</tbody>
</table>
The barrier should be installed in a manner such that it covers the noise sources from direct line-of-sight to the sensitive receptors. In general, the barrier should provide sufficient screening to avoid direct line-of-sight between the shielded noise sources and the protected sensitive receptors. Noise barriers would not be effective in reducing noise impacts if the line of sight from the noise source to the residence is not reduced. Hence, it may not be practical to install a noise barrier for elevated sensitive receivers.

9.8.3 Control in Transmission

The noise reduction strategy used to control in noise transmission generally involves the installation of noise barriers. Noise barriers may include an existing feature, such as:

- An elevated road or a natural slope (e.g. earth mound);
- A purpose designed feature such as a solid boundary fence;
- A purpose designed feature of the building, such as a partially enclosed carport; and
- A purpose designed building which acts as a barrier block.

Figure 19 and Figure 20 below illustrate different noise barrier configurations, sourced from NSW Department of Planning “Development near rail corridors and busy roads – Interim guideline” (NSW DoP, 2008).
9.8.4 Receiver Control

There are several strategies involved in using the Receiver Control measure:

- Building orientation layout. This involves configuring the development’s floor plan to have sleeping areas/habitable areas facing away from the noise sources. Figure 21 and Figure 22 illustrate samples of building orientation layout strategies to minimise local noise intrusion, which is sourced from NSW Department of Planning “Development near rail corridors and busy roads – Interim guideline” (NSW DoP, 2008);

Figure 21 Sample of Building Layout Strategies 1 (NSW DoP, 2008)

- Minimise lightweight external wall construction facing the dominating noise sources;
- Thicker glazing construction for the window façade;
- Minimise window size and maximise masonry external wall construction;
- Minimise the use of openable window construction;
- Configure any discharge/intake duct grill layout (above ceiling level) facing away from the noise sources;
- Balustrade/balcony design/configuration to avoid direct line of sight from the balcony to the noise sources (this shall be confirmed following the design of the development and landscape layout). Figure 23 below illustrates samples of balustrade/balcony design strategies to minimise local noise intrusion, which is sourced from NSW Department of Planning “Development near rail corridors and busy roads – Interim guideline” (NSW DoP, 2008); and
- Installation of foam rubber pad along the required building foundation plate, where necessary, depending the magnitude of the potential exposed vibration across the building structures.

Figure 22 Sample of Building Orientation Layout Strategies 2 (NSW DoP, 2008)
9.9 Potential constraints to the mitigation strategies

The following details the identified potential key constraints for noise mitigation measures in the FBURA.

- Established existing industries with private ownerships – Control at Source mitigation strategy may be a challenge;
- Land-use Controls mitigation strategy through setback distances could compromise land value and land utilisation;
- While noise from industries and transportation are typically addressed separately, cumulative impacts may be a concern for precinct users, in terms of perception;
- Noise control in transmission, through the installation of noise barriers, could have some limitations as follows:
  - Noise barriers are not effective to reduce transmission to receivers on a hillside or high rise buildings overlooking a road;
  - Noise barriers generally creates perceptions such as view restriction, confinement feeling, loss of air circulation, loss of sunlight and lighting and could potentially increase local crime due to visual shielding; and
- Noise control at individual receivers may involve substantial acoustic treatment along with the associated cost.

9.10 Recommended Further Work and Investigation

This section discusses some recommended future key actions, in principle, to address potential noise and vibration impact to the FBURA.

- Undertake a detailed noise and vibration survey in the subject area, including on-site attended and unattended noise and vibration monitoring to determine the characteristics of the existing background/ambient noise and vibration levels. Based on the measurements and detailed FBURA development design layout, noise and vibration impacts from existing operations could be assessed against the applicable Standards and Statutory Requirements;
- Based on the noise survey results, confirm noise specific criteria for FBURA development;
- Review masterplans and/or proposed layouts and land use distribution of the FBURA and identify high risk areas;
- Where needed, prepare a detailed noise and vibration impact assessment of the proposed FBURA precinct. This may include noise modelling of some of the potential high risk operations/industries within or in the vicinity of the FBURA, such as tollway/highway noise potentially impacting on proposed adjacent developments; and
- Based on the monitoring/modelling results and knowledge of the subject area, identify cost-effective mitigation measures and possible recommendations for ensuring compliance and amenity preservation.
10. Desktop Lighting Review

10.1 Overview

GHD have based the FBURA development lighting impact review study on Australian Standard AS 4282. The objective of AS 4282 is to provide a common basis for assessment of the likely obtrusive effects that adversely affect amenity involving the provision of outdoor lighting. GHD have considered two basic aspects, namely the effects of external lighting on the proposed precinct as well as possible effects in reverse, from the FBURA onto neighbours.

With any outdoor lighting installation, the light within the boundaries of the property on which the lighting system is installed is unlikely to be contained. Some light may spill outside the property boundaries, either directly or by reflection. The assessment of when the spill light becomes obtrusive to the amenity of others is difficult as both physiological and psychological effects are involved. AS 4282 provides guidance with respect to lighting spill. Guidelines to assist with this determination are provided in AS 4282.

The potential obtrusiveness of lighting installations includes elements such as:

- assumed residential uses in each precinct;
- the light falling on surrounding properties;
- the brightness of luminaires in the field of view of nearby residents;
- the zoning of the area abutting the Port of Melbourne location: there is a greater potential for complaints where the area is zoned for residential development; and
- the glare to users of adjacent transport systems and the effects on astronomical observations.

10.2 Technical Basis

Elements that must be taken into account when assessing visual amenity and lighting obtrusiveness include:

- The level of “other” lighting existing in the area.
- The times that the lighting in question operates.
- The type of lighting technology available to light the activity.
- The use of readily available and easily understood technical data on the lighting installations which can easily be verified at both design and assessment stages.

Public lighting, typically street lighting, has been excluded from AS 4282 because such lighting is provided to facilitate all-night safety and security for the public at large. Nevertheless, GHD has considered public lighting effects in this review.

10.3 Potential Light Sources

The FBURA is subject to spill light from a number of potential sources such as:

- The port (wharves and parking zones);
- Shipping;
- Traffic on elevated roadways and bridges;
- Local traffic;
- Local adjacent operations such as Independent Cement; and
- The cityscape.

Figure 24 and Figure 25 show the nuisance lighting sources with the potential to affect the FBURA.
BUFFER DISTANCE TO PORT LARGE ENOUGH TO MINIMISE NUISANCE LIGHTING EFFECTS

SPILL LIGHT FROM INDUSTRY

ELEVATED HIGHWAY NUISANCE

VEHICLE HEADLIGHTS

VEHICLE HEADLIGHTS

Nuisance Lighting Sources

Data source: DSE, Aerial Imagery, 2009, DSE VicMap (July 2012), Created by nraska

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**10.4 Design and Assessment Parameters for Desktop Study**

Lighting parameters on which obtrusiveness assessments are based are:
- Illuminance in the vertical plane (Ev);
- Luminous intensity emitted by luminaires (l).

Two sets of limiting values are given in AS 4282. The first with higher values is for application before a nominated or curfew hour and the second, with lower values, is for application after the curfew hour.

GHD has carried out the desk top lighting impact review based on:
- Considering the Fisherman’s Bend Urban Renewal Area as smaller manageable zones rather than as a monolithic site;
- Simplified representations of sources; and
- Only major area lighting installations have been considered. Minor light fittings have not been considered.

**10.5 Effects of external lighting on the proposed precinct**

Table 34 shows the potential effects of lighting on the Lorimer Precinct of the FBURA.

<table>
<thead>
<tr>
<th>Source</th>
<th>Time of Use</th>
<th>Lamp/Source Type</th>
<th>Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicular Traffic:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bolte Bridge ramps</td>
<td>24/7</td>
<td>Vehicle headlights</td>
<td>Intermittent nuisance directed towards sensitive “wedge”.</td>
</tr>
<tr>
<td>Vehicular Traffic:</td>
<td>24/7</td>
<td>Vehicle headlights</td>
<td>Intermittent nuisance directed generally towards precinct</td>
</tr>
<tr>
<td>West Gate Fwy</td>
<td>24/7</td>
<td>Vehicle headlights</td>
<td>Intermittent nuisance directed towards precinct</td>
</tr>
<tr>
<td>Port: Webb dock and wharf</td>
<td>24/7</td>
<td>High Mast, HID</td>
<td>Potential for excessive spill light nuisance.</td>
</tr>
</tbody>
</table>

Recommended additional analysis/review includes:
- Volume of potential buildings affected by vehicular headlights and the type of shielding that may be required;
- Measure of spill light generated from Port operations; and
- Measure of spill light generated from Independent Cement and other nearby operations.

After additional analysis/review, recommendations can be made requiring actions by owners of offending light sources or the construction of shielding structures or other forms of controls.

Table 35 shows the potential effects of lighting on the Sandridge Precinct of the FBURA.

<table>
<thead>
<tr>
<th>Source</th>
<th>Time of Use</th>
<th>Lamp/Source Type</th>
<th>Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Cement Elevated</td>
<td>24/7</td>
<td>High mast, floodlight, area lights.</td>
<td>Potential for spill light nuisance. Relatively distant.</td>
</tr>
</tbody>
</table>

Table 36 shows the potential effects of lighting on the Wirraway Precinct of the FBURA.

<table>
<thead>
<tr>
<th>Source</th>
<th>Time of Use</th>
<th>Lamp/Source Type</th>
<th>Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicular Traffic:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bolte Bridge ramps</td>
<td>24/7</td>
<td>Vehicle headlights</td>
<td>Intermittent nuisance directed towards sensitive “wedge”.</td>
</tr>
<tr>
<td>Vehicular Traffic:</td>
<td>24/7</td>
<td>Vehicle headlights</td>
<td>Intermittent nuisance directed generally towards precinct</td>
</tr>
<tr>
<td>West Gate Fwy</td>
<td>24/7</td>
<td>Vehicle headlights</td>
<td>Intermittent nuisance directed towards precinct</td>
</tr>
<tr>
<td>Port: Webb dock and Toll shipping</td>
<td>24/7</td>
<td>High Mast, HID</td>
<td>Potential for excessive spill light nuisance.</td>
</tr>
<tr>
<td>Shipping</td>
<td></td>
<td>Intermittent, various</td>
<td>Intermittent nuisance but infrequent.</td>
</tr>
</tbody>
</table>

GHD | Report for Places Victoria - Fishermans Bend Buffer Assessment, 31/30261/221808 | 111
Recommended additional analysis/review includes:

- Volume of potential buildings affected by vehicular headlights and the type of shielding that may be required.
- Measure of spill light generated from Webb dock and Toll operations.
- Measure of light generated by shipping and ferry operations.

After additional analysis/review, recommendations can be made requiring actions by owners of offending light sources or the construction of shielding structures or other forms of controls. Table 37 shows the potential effects of lighting on the Montague Precinct of the FBURA.

**Table 37 Lighting Effects in the Montague Precinct**

<table>
<thead>
<tr>
<th>Source</th>
<th>Time of Use</th>
<th>Lamp/Source Type</th>
<th>Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build up and breakdown operations at Exhibition Centre</td>
<td>24/7 (varies)</td>
<td>Headlights, portable floodlights.</td>
<td>Intermittent nuisance directed generally towards precinct.</td>
</tr>
<tr>
<td>Vehicular Traffic: West Gate Fwy</td>
<td>24/7</td>
<td>Vehicle headlights</td>
<td>Intermittent nuisance directed generally towards precinct.</td>
</tr>
</tbody>
</table>

Recommended additional analysis/review includes:

- Volume of potential buildings affected by vehicular headlights and the type of shielding that may be required.

After additional analysis/review, recommendations can be made for input into buffer zones or shielding structures or other forms of controls.

### 10.6 Effects of external lighting from the FBURA onto neighbours

The FBURA development does abut existing residential areas across Williamstown road, Lorimer Street and on three sides of the Montague Precinct. This latter precinct is close to existing residential towers as is the Lorimer Precinct.

Strict adherence to the limits set out in AS 4282 is recommended to protect the development from the effects of possible future complaints.

Street, building exterior and public space lighting should adhere to a lighting plan that seeks to limit spill, upward directed light pollution and glare.

### 10.7 Discussion

The nightscape that will eventually be provided by the FBURA development represents an opportunity to deliver both a vibrant and pleasant living environment and an aesthetically coherent and pleasing precinct.

Achievement of this ideal will require management of nuisance lighting from both within the FBURA and the surrounding zones. A lighting plan should be drawn up at the earliest possible stage to integrate the lighting to be installed in public, street and private developments.

### 11. Planning and Land Use Strategies to Manage Amenity Impacts

#### 11.1 Managing Land Use Conflicts

This report has highlighted a number of locations where existing industries and other uses may have a detrimental impact on the amenity of sensitive uses. The composite plan envisages mixed use, whereby sensitive uses would be located within prescribed separation (buffer) areas of existing industries. This presents a two-fold problem: (1) a risk to future newly developed sensitive uses of being subjected to unacceptable odour, noise, dust or lighting impacts during either routine or upset events on in certain other circumstances; and (2) the encroachment of sensitive uses on the buffer areas of existing industries may result in unachievable or unreasonable requirements on the industries to mitigate the impacts at the source.

It is important to note, that in a high density city environment, the expectations of residents and other sensitive uses are somewhat different to those of people living in suburban and rural environments. People living in higher density urban environments may not be as sensitive to amenity impacts as their suburban neighbours, and this is particularly so in a capital city context.

However, a history of complaints to the EPA regarding some of the existing sources of disamenity within and around the FBURA indicate that it could be expected that there would be amenity concerns during a transition period. In order to manage the conflicts between uses, there must be a balance between selecting those measures that sufficiently mitigate amenity impacts, and avoiding over regulation and impacting on the ability to achieve other objectives such as urban growth and environmental sustainability.

#### 11.2 Options for Planning and Land Use Controls

There are two different types of controls that could be implemented to help transition the FBURA from its current predominant use, industry, to a mix density area with a mix of land uses. Firstly, through careful strategic planning of land uses, which drives where different types of land uses can be located and secondly, through the implementation of design controls which place specific requirements on developments in particular areas. The following potential development and design controls have been identified.

**Strategic Planning**

- Staged development approach to the extent possible as the area is predominantly in private ownership; so that sensitive uses are not developed within buffer areas until the industry adequately reduces the off-site impacts or relocates out of the FBURA;
- Buffer overlay – which would remain until industry or other source leaves the FBURA (interim protection), and which alerts new residents to the amenity issue, and which may require new sensitive uses to mitigate through implement of design controls;
- Acquisition of problem sites by government to aid transition, or other business and financial incentives offered to industries that either relocate out of the FBURA or mitigate through best practice design at the source of the impact; and
- Locating commercial and business (i.e. less sensitive) uses within the specific buffer areas – this could apply spatially at a horizontal level as well as a vertical level.
12. Summary and Recommendations

12.1 Key Findings and Development Constraints

This report has highlighted a number of locations where existing industries and other uses may have a detrimental impact on the amenity of sensitive uses. The composite plan envisages mixed use, whereby sensitive uses would be located within prescribed separation (buffer) areas of existing industries. This presents a two-fold problem: (1) a risk to future newly developed sensitive uses of being subjected to unacceptable odour, noise, dust or lighting impacts during either routine or upset events on in certain other circumstances; and (2) the encroachment of sensitive uses on the buffer areas of existing industries may result in unachievable or unreasonable requirements on the industries to mitigate the impacts at the source.

In the case of an existing industrial use, the EPAV1 recommend buffer (now termed separation) distances should be established in the planning scheme. This can be done by means of an overlay or specific planning framework. Without their implementation by these tools the default buffers remain recommendations only and cannot be enforced. GHD has assessed all the recommended default buffers for the identified potential odour and dust emitting sources (refer to Figure 7). This buffer analysis shows that there is adequate provision to separate the proposed residential component (in the FBURA) from all existing industries surrounding the FBURA, with the exception of the Kraft Foods facility and potentially the PrintLinx facility (dependent on throughput). Within the FBURA there are a number of industries that will constrain portions of developable land, with the most prominent constraining industries being Symex, Delta and PPRRC in the Sandridge Precinct, Detmold in the Wirraway Precinct, Port Melbourne Metals in the Montague Precinct and the Proto and Hanson Concrete batching plants in the Lorimer Precinct.

The potential for future industries to pose air quality constraints on the FBURA is remote, in part because of the residential areas of Docklands and Capital City zoned land at Fisherman’s Bend will constrain any industry requiring a significant buffer. Also for the existing Industrial 1 Zoning to the north, it is normally reserved only for small industrial facilities and warehouse type businesses for uses such as retail, trade supplies and offices.

The expectations of residents and other sensitive uses are likely to be somewhat different in a capital city context to those of people living in suburban and rural environments. However, a history of complaints to the EPA regarding some of the existing sources of disamenity within and around the FBURA indicate that it could be expected that there would be amenity concerns during a transition period.

From the buffer assessment and odour complaint history analysis, the potential odour constraints within the FBURA to the future development were identified to be Symex (edible oil manufacturer), Detmold (printing works) and Port Phillip Resource Recovery Centre (waste facility). The potential odour constraints from the industries surrounding the FBURA area were identified to be Kraft Foods (Vegemite production).

From the buffer assessment and dust complaint history analysis the potential dust constraints within the FBURA development were identified to be the Pronto Concrete Batching Plant, Hanson Concrete Batching Plant, Port Melbourne Metals Metal Transfer Station, Delta Group Transfer Station and Port Phillip Resource Recovery Centre. The potential dust constraints from the industries surrounding the FBURA were identified to be the Steel and Independent cement handling facilities including ship unloading.

Design controls
- Implementation of height controls (i.e. near stacks);
- Directional lighting / baffling etc controls; and
- Noise protection and acoustic sensitive design.
From the directional buffer assessment the default buffers can be retracted and extended in the directions of good and poor dispersion (refer to Figure 16). A large extension of the default buffer occurs to the south, while the default buffer is retracted in the north, west and east. The EPA complaint history indicates that there have been no dust complaints attributed to industries within the FBURA or from any existing residences south of the FBURA. There has also been no odour complaints regarding Symex from the existing residents but there have been odour complaints from the current industrial area (future FBURA). Detmold has existing proximity to residential uses and registered odour complaints, while odour from Kraft may be an issue for routine as well as upset scenarios.

Note Symex have commenced the transitioning phase of their site by selling their property indicating that they will close in the foreseeable future. This will have a significant impact on future buffer requirements (the buffer for Symex would no longer be required). However until operations on site cease there is a potential for an odour impact to nearby existing and future residents.

Emissions from the vehicles travelling on the Westgate Freeway and CityLink would contribute to the background dust levels within and surrounding the FBURA. Based on GHD’s previous experience this is unlikely to exceed SEPP – AQM levels nor constrain the FBURA development, as usually there is a sharp decrease in emissions the further away from the road source (within tens of metres). However, further work to determine the magnitude of these impacts could involve the modelling of vehicle emissions on these roads using the AUSROADS model.

A number of Major Hazard Facilities (MHFs) were identified surrounding the FBURA Precinct. There were no MHF sites identified within the FBURA Precinct. The separation distance from the identified MHF facilities to the FBURA is adequate not to result in any constraints to the development.

The desktop noise review has involved identification and examination of the likely primary noise and vibration sources within FBURA and in the surrounding areas for their potential to impact the amenity of the FBURA. These sources include concrete batching plants, DSTO, Port Phillip Resource Recovery, Port Melbourne Metals, Kraft Foods, Webb Dock, Melbourne Shooting Complex, various factories, warehouses, and container services facilities sourced from workshops and logistics related activities, which involve trucks, forklifts, cranes, metal clanging and stockpiling. Proposed uses, such as café/restaurants/clubs open at night, also have the ability to impact on residential amenity.

In relation to transportation noise impact, the ambient noise environment is likely to be dominated by traffic noise, mainly associated with West Gate Freeway, CityLink Tollway also the Plummer Street Local Truck bypass and existing light rail corridors within the Montague precinct, and proposed light rail within the FBURA. Helicopter noise due to the operation of the Helipad at Pier 35 Marina could also potentially cause significant noise impact to the FBURA.

All relevant noise and vibration legislation and guidelines applicable to the proposed FBURA development has also been discussed in the review. Relevant legislations and guidelines includes EPA environmental noise assessment policy, rail and road noise impact guidelines, helicopter noise guideline, indoor noise levels and vibration assessment guidelines for human comfort and structural damage.

GHD have based the FBURA lighting impact review study on Australian Standard 4282. No significant nuisance lighting sources have been identified within the FBURA precincts; however local isolated sources of nuisance light do exist. The FBURA is subject to spill light from a number of potential sources such as the port (wharves and parking zones), shipping, traffic on elevated roadways and bridges, local traffic, local adjacent operations such as independent cement and the cityscape.

The most common amenity issue within a built up capital city environment (i.e. once the FBURA is built) is noise. Noise sources can include people, air conditioners, cooling towers, emergency service vehicles, cars, trucks, church bells, maintenance activities, early morning garbage trucks, loud music, parties, clubs restaurants and light rail. Construction activities associated with new buildings or renovations can also be an ongoing issue.

12.2 Mitigation Measures

There are a number of planning strategies and controls that could be implemented to help transition the FBURA as outlined in this report. These include land use separation (both spatially and vertically) though structure planning and zone controls, staging of development, development design measures to mitigate impacts at either the source or at the receiver, relocation incentives for industry, and acquisition by Government of problem sites.

Potential odour and dust mitigation strategies to the FBURA were identified to be land-use planning controls, staged development and the control of odours/dust at source.

Potential odour and dust mitigation constraints to the FBURA may result in compromised land values and land utilisation. Using land-use controls through setback distances and the control at source mitigation strategy without EPA enforcement would be a challenge as cooperation with industry would be required particularly as the existing established industries are privately owned.

Noise and vibration mitigation strategies include: controls at the source, transmission controls, land-use controls and receiver controls. Controls at the source involve intervention strategies for reducing the noise produced by industry and plant. Transmission controls involve noise barriers and involve reducing the noise along its path from source to receiver. Land use strategies can include separation strategies and utilizing the natural topography of FBURA. Receiver controls involve the design and layout of residences and sensitive land areas.

There are limitations associated with the noise and vibration mitigation strategies, such as the potential of existing cumulative noise impact effects, land utilisation and land value objectives. Also there would be limitations associated with higher costs associated with treatments at the receivers.

Strict adherence to the limits set out in AS 4282 is recommended to protect the development from the effects of possible future lighting complaints. Street, building exterior and public space lighting should adhere to a lighting plan that seeks to limit spill, upward directed light pollution and glare.

Potential noise mitigation measures within a built up capital city environment (i.e. once the FBURA is built) could include managing the hours of operation of the offending activity, the design of buildings to separate noisy activities from residential uses, fines for emitting excessive noise, withholding liquor licences, slowing traffic and constructing sound barriers near major thoroughfares and construction management plans.

In order to manage the conflicts between uses, there must be a balance between selecting those measures that sufficiently mitigate amenity impacts, and avoiding over regulation and impacting on the ability to achieve other objectives such as urban growth and environmental sustainability.

12.3 Key Recommendations

All issues need to be assessed when considering the potential impacts a proposed development might have on its surroundings, and the potential impacts that surrounding land uses might have on the proposed development. Under the VPPs industrial land uses have rights which enable the industry to operate, provided they comply with relevant regulations. In
this case when a strategic land use plan is being developed for a precinct transitioning from industrial to residential land use, the planning authority should consult with potentially affected industries in order to develop a stage implementation plan that allows for the smooth transition of land uses over a period of time.

The separation guidelines recommend separation distances can be varied (i.e. reduced) for site specific cases. One of the criterions for varying the separation distances is the case of "transitioning of the industry". In this case the FBURA is planned to transition from industrial to residential and thus buffers may be reduced with agreement of the industries and EPA as they will be transitioning out of the area over a specified time frame.

Future key actions for odour/dust constraints would be to contact those affected industries to develop a staged plan to allow for a smooth transition to the extent possible, de-rating of buffers where applicable, odour/dust impact assessments for those constraining industries under routine operations, mitigation measures to be enforced, and a site specific buffer assessment to assess the exposure to proposed sensitive land uses. It is recommended that further assessments would need to be undertaken to fully understand the extent and impact of noise and vibration created by industries and traffic in the district. This would enable a more complete characterisation of the nature of noise and vibration impacts, which would eventually lead to effective and efficient noise and vibration controls, if required.

The nightscape that will eventually be provided by the FBURA development represents an opportunity to deliver both a vibrant and pleasant living environment and an aesthetically coherent and pleasing precinct. Achievement of this ideal will require management of nuisance lighting from both within the FBURA and the surrounding zones. A lighting plan should be drawn up at the earliest possible stage to integrate the lighting to be installed in public, street and private developments.

GHD recommends that planning controls be drafted to help the FBURA transition and to minimise potential conflicts. These would include development controls such as a staged development approach to the extent possible, buffer overlays (interim protection while industries "transitioning of the industry". In this case when a strategic land use plan is being developed for a precinct transitioning from industrial to residential land use, the planning authority should consult with potentially affected industries in order to develop a stage implementation plan that allows for the smooth transition of land uses over a period of time.

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GHD recommends that planning controls be drafted to help the FBURA transition and to minimise potential conflicts. These would include development controls such as a staged development approach to the extent possible, buffer overlays (interim protection while industries "transitioning of the industry". In this case when a strategic land use plan is being developed for a precinct transitioning from industrial to residential land use, the planning authority should consult with potentially affected industries in order to develop a stage implementation plan that allows for the smooth transition of land uses over a period of time.

The separation guidelines recommend separation distances can be varied (i.e. reduced) for site specific cases. One of the criterions for varying the separation distances is the case of "transitioning of the industry". In this case the FBURA is planned to transition from industrial to residential and thus buffers may be reduced with agreement of the industries and EPA as they will be transitioning out of the area over a specified time frame.

Future key actions for odour/dust constraints would be to contact those affected industries to develop a staged plan to allow for a smooth transition to the extent possible, de-rating of buffers where applicable, odour/dust impact assessments for those constraining industries under routine operations, mitigation measures to be enforced, and a site specific buffer assessment to assess the exposure to proposed sensitive land uses. It is recommended that further assessments would need to be undertaken to fully understand the extent and impact of noise and vibration created by industries and traffic in the district. This would enable a more complete characterisation of the nature of noise and vibration impacts, which would eventually lead to effective and efficient noise and vibration controls, if required.

The nightscape that will eventually be provided by the FBURA development represents an opportunity to deliver both a vibrant and pleasant living environment and an aesthetically coherent and pleasing precinct. Achievement of this ideal will require management of nuisance lighting from both within the FBURA and the surrounding zones. A lighting plan should be drawn up at the earliest possible stage to integrate the lighting to be installed in public, street and private developments.

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Appendix A – Land Use Maps


Appendix B WorkSafe Safety Separation Distance

Land use planning near land hazard facilities

Sum

This information will assist planning and relevant authorities or responsible authorities to propose or recommend new developments or changes in land use surrounding an MHF. If suitability is not determined, WorkSafe’s responsibilities to ensure exposure to risks from potential low frequency consequence incidents at existing major hazard facilities (MHF) is not increased by new developments or changes in land use surrounding them.

Background

An MHF is an industrial facility where significant quantities of certain types of dangerous goods may be present. These are defined in the Occupational Health and Safety Regulations 2007 (OHS Regulations). It is safe to live or work close to an MHF because stringent design, operation and regulating of such facilities mean that a serious incident, with people of the site, is unlikely. However, incidents in Australia and overseas have illustrated the possible widespread community effects on people surrounding a site. It is therefore important that land use planning minimises exposure of people to an MHF.

More

To operate an MHF in Victoria a licence must be granted by WorkSafe Victoria. The licensing process includes assessment, certification and verification of a Safety Case (prepared as a requirement of the OHS Regulations) by WorkSafe. Other relevant information. Following this licensing process, WorkSafe has information about the nature and extent of risks that may potentially affect the surrounding land and is able to provide advice to authorities responsible for planning and development.

There is no statutory requirement for planning or responsible authorities to contact WorkSafe on any proposed use of land close to an MHF. However, authorities with potential to be affected by an MHF to a proposed land use, should contact WorkSafe. The WorkSafe may have previous risks at an MHF. It is the

Individual risk is expressed as the acceptable risk per year or for a given number of years. This measure does not consider the number or nature of a major hazard facility which could be affected.

Societal risk is a measure of the likelihood of fatal casualties. This measure does not consider the number of a major hazard facility which could be affected.

WSV 1383
WorkSafe's advice on pilot within these areas takes:
- the numbers, occupant, likely to be present at any time,
- the ability of those present to safely respond to any F
- potential societal risks on impact on development li

surrounding the MHF.

WorkSafe generally advises on land use or developmen
- land use or developments, a from low density industral
warehousing or otherwise l

industrial use. This may be affected by consequece incidentl
people to safety responses.

- land use or developments for residential, business likely
to be present are not at poten
tial emergency situation is it in unacceptable societial p

proposals.

- planning scheme amendments that have potentially affect
significanty greater num
number of areas of land use.

Such referrals should be ve
quantitative assessment
considerations for the pro

by a qualitative or quanti

effectiveness of such spc

considerations.

Further in:
For further inform Wor Vic
Advisory Service9 or 
worksafe.vic.gov.au.