

**Blackwattle Bay**  
State Significant Precinct

---

# Attachment 41:

## Health Impact Assessment

June 2021





# Blackwattle Bay Precinct Health Impact Assessment

Final Draft Report

---

**Client:** Infrastructure NSW

**Date:** 21 May 2021

**Contact:**

Steve Rossiter  
steve.rossiter@elton.com.au  
02 9387 2600

---

**SYDNEY  
02 9387 2600**

Level 27, 680 George Street  
Sydney NSW 2000

---

www.elton.com.au  
consulting@elton.com.au  
Sydney | Brisbane | Canberra | Darwin | Melbourne | Perth  
ABN 56 003 853 101

**Elton Consulting is part of the WSP Group.**

---

|                    |  |
|--------------------|--|
| <b>Prepared by</b> | Max White, Bill Bolton, Sarah Jones, Sophie le Mauff |
| <b>Reviewed by</b> | Steve Rossiter                                       |
| <b>Date</b>        | 21 May 2021  |
| <b>Version</b>     | Final Draft  |

---

# Contents

|  |           |
|--|-----------|
| <b>EXECUTIVE SUMMARY</b>                     | <b>5</b>  |
| <b>1 INTRODUCTION</b>                        | <b>8</b>  |
| 1.1 Study Requirements                       | 8         |
| 1.2 Report structure                         | 9         |
| <b>2 PROJECT DESCRIPTION</b>                 | <b>10</b> |
| 2.1 Study Area                               | 10        |
| 2.2 The Proposal                             | 11        |
| <b>3 HEALTH IMPACT ASSESSMENT</b>            | <b>14</b> |
| 3.1 Level of Assessment                      | 15        |
| <b>4 HEALTH AND THE BUILT ENVIRONMENT</b>    | <b>16</b> |
| 4.1 Public space                             | 16        |
| 4.2 Physical activity                        | 17        |
| 4.2.1 Active travel                          | 17        |
| 4.3 Social infrastructure                    | 18        |
| 4.4 Air pollution                            | 19        |
| 4.4.1 Vehicle emissions                      | 20        |
| 4.4.2 Industrial air pollution               | 20        |
| 4.5 Noise pollution                          | 21        |
| 4.6 Land contamination                       | 21        |
| 4.7 Mental health                            | 22        |
| 4.7.1 Social isolation                       | 23        |
| <b>5 METHODOLOGY OVERVIEW</b>                | <b>24</b> |
| 5.1 Process steps                            | 24        |
| 5.1.1 Scoping                                | 24        |
| 5.1.2 Identification                         | 24        |
| 5.1.3 Assessment                             | 24        |
| 5.1.4 Recommendations                        | 25        |
| 5.1.5 Evaluation                             | 25        |
| 5.2 Community and stakeholder engagement     | 25        |
| <b>6 SCOPING</b>                             | <b>26</b> |
| 6.1 Key health impact issues                 | 26        |
| 6.2 Parameters                               | 27        |
| <b>7 COMMUNITY PROFILE AND HEALTH STATUS</b> | <b>28</b> |
| 7.1 Community profile                        | 28        |
| 7.1.1 Existing population                    | 28        |
| 7.1.2 Population Health Data                 | 31        |
| 7.1.3 Existing sensitive receptors           | 34        |
| 7.2 Future residents                         | 36        |

|                |   |           |
|----------------|---|-----------|
| 7.2.1          | Future population profile   | 36        |
| <b>8</b>       | <b>ASSESSMENT</b>   | <b>38</b> |
| 8.1            | Base case comparison  | 39        |
| 8.2            | Public space  | 41        |
| 8.2.1          | Initial guidance questions  | 41        |
| 8.2.2          | Key considerations  | 43        |
| 8.2.3          | Public space assessment summary                                     | 43        |
| 8.3            | Active transport  | 45        |
| 8.3.1          | Initial guidance questions  | 45        |
| 8.3.2          | Key considerations  | 46        |
| 8.3.3          | Active transport assessment summary                                 | 46        |
| 8.4            | Social infrastructure   | 47        |
| 8.4.1          | Initial guidance questions  | 47        |
| 8.4.2          | Key considerations  | 49        |
| 8.4.3          | Social infrastructure assessment summary                            | 49        |
| 8.5            | Air pollution   | 51        |
| 8.5.1          | Initial guidance questions  | 51        |
| 8.5.2          | Key considerations  | 52        |
| 8.5.3          | Air pollution assessment summary                                    | 55        |
| 8.6            | Noise pollution   | 56        |
| 8.6.1          | Initial guidance questions  | 56        |
| 8.6.2          | Key considerations  | 57        |
| 8.6.3          | Noise pollution assessment summary                                  | 59        |
| 8.7            | Land contamination  | 60        |
| 8.7.1          | Initial guidance questions  | 60        |
| 8.7.2          | Key considerations  | 61        |
| 8.7.3          | Land contamination assessment summary                               | 62        |
| <b>9</b>       | <b>HEALTH EQUITY</b>  | <b>64</b> |
| <b>10</b>      | <b>SUMMARY OF RECOMMENDATIONS AND NEXT STEPS</b>                    | <b>66</b> |
| 10.1           | Summary of assessment   | 66        |
| 10.2           | Recommendations   | 67        |
| 10.3           | Monitoring  | 68        |
| <b>11</b>      | <b>REFERENCES</b>   | <b>69</b> |
| <b>FIGURES</b> |   |           |
|                | Figure 1: Blackwattle Bay Study Area                                | 10        |
|                | Figure 2: Precinct Plan   | 11        |
|                | Figure 3: SLHD and Sydney City (South & West) Local Health District | 31        |
|                | Figure 4: Demographic profiling catchment                           | 36        |
| <b>TABLES</b>  |   |           |
| Table 1        | Summary of recommendations  | 6         |

|          |   |    |
|----------|---|----|
| Table 2  | Study Requirements  | 8  |
| Table 3  | Level of Assessment   | 15 |
| Table 4  | Key community characteristics of Study Area and Comparison Areas 2016                               | 29 |
| Table 5  | Modelled estimates of health risk factors: Sydney City (South and West), SLHD and NSW, 2011-13      | 32 |
| Table 6  | Modelled estimates of prevalence of selected chronic conditions (SLHD) Age standardised %, 2011-13  | 33 |
| Table 7  | Modelled estimates of chronic disease, Sydney City (South and West) (ASR per 100 [95% CI]), 2011-13 | 34 |
| Table 8  | Sensitive receptors   | 35 |
| Table 9  | Future population   | 37 |
| Table 10 | Pre and post development comparison of key health contributors                                      | 39 |
| Table 11 | Summary of impacts  | 66 |
| Table 12 | Summary of recommendations  | 67 |

## **APPENDICES**

|                              |    |
|------------------------------|----|
| Appendix A: Assessment Tools | 73 |
|------------------------------|----|

# Executive Summary

## Purpose

Health Impact Assessment (HIA) is a systematic approach to addressing the potential health costs and benefits of a project, plan or policy. HIA is a predictive tool: it forecasts or anticipates future conditions and how they may influence health. HIA considers both positive and negative impacts and works towards identifying solutions or mitigations to any potential negative health impacts that may be likely to occur. HIA considers health impacts at a population, rather than an individual level. It also focusses on how those impacts may be distributed or differentially experienced by key population groups.

This assessment is both informed by and informs the developing Precinct Master Plan for Blackwattle Bay.

## Study Requirements

State Significant Study Requirements for the (then) Bays Market District were issued by the (then) NSW Department of Planning and Environment in April 2017 to (the then) UrbanGrowth NSW. The Health Impact Assessment (Section 27) requirements include:

*Using the NSW Government's 'Health Impact Assessment: A Practical Guide' for guidance, prepare a Health Impact Statement for the proposal, including the following steps:*

- » *Using the data from Population Demographics Study in section 24 prepare a community profile*
- » *Based on the community profile identify and document potential health impacts resulting from the development*
- » *Include information provided in Section 16. Noise and Pollution*
- » *Assess the significance of impacts and prioritise*
- » *Develop action-oriented recommendations to address the identified impacts.*

The specific study requirements and how they are addressed in this HIA is documented in the table in Section 1.1 of this report.

## Methodology

The methodology for this HIA is informed by the following key references:

- » NSW Health (2007), *Health Impact Assessment: A practical guide*, University of New South Wales, Centre for Health Equity Training, Research and Evaluation (this is a required resource identified by the Study Requirements)
- » EnHealth (2017), *Health Impact Assessment Guidelines*, World Health Organisation Collaborating Centre for Environmental Health Impact Assessment and the School of Public Health, Curtin University.

## The Precinct Master Plan

Key features of the Precinct Plan include:

- » New homes, jobs and services close to the CBD including:
  - > approximately 5,713 ongoing jobs
  - > approximately 2,795 residents
  - > 1,546 dwellings.
- » A continuous waterfront promenade – the missing link in an otherwise 15km foreshore walk from Woolloomooloo to Rozelle
- » New active transport connections to bring the neighbourhood closer to the harbour through new and improved pedestrian and cycling links
- » Improved public transport options and minimised vehicle usage strategies including:

- > Minimising car parking spaces with limited on-street parking.
- > Ferry wharf
- > Opportunity for buses to service through site link
- > Connections to the existing light rail
- > Access to a future Sydney Metro West Station in Pymont
- » New parks and green space with 30,000 m<sup>2</sup> of new open space
- » An authentic, and world class new SFM at the heart of Blackwattle Bay
- » An authentic place that builds on Indigenous and industrial stories and celebrating the local character.

**Future community**

The Study Area will undergo substantial population growth by 2036. The Study Area, which currently has no permanent residents, is expected to be home to a community of around 2,795 residents in 2036.

**Actions**

The base case comparison shows that if the urban renewal of Blackwattle Bay proceeds there are likely to be significant positive health impacts resulting from the project. It is important to note that the base case comparison assumes that key amenities like parks, pedestrian and cycling infrastructure, streetscape, community facilities, etc. will be delivered. Overall this initial base case comparison shows that there is strong potential for the project to improve on current conditions in relation to key health contributing elements.

The below actions are recommended in this HIA to address the identified health impacts. In addition to these actions, ongoing monitoring of the development, sources of health risks and population health during and after construction is recommended.

**Table 1 Summary of recommendations**

| Potential impacts            | Recommendations  |
|------------------------------|--|
| <b>Public space</b>          | <ol style="list-style-type: none"> <li>1. Consider incorporating the following in the design:                             <ul style="list-style-type: none"> <li>» Universal design/inclusive design principles</li> <li>» CPTED principles.</li> </ul> </li> </ol>  |
| <b>Active transport</b>      | <ol style="list-style-type: none"> <li>2. Consider including the following in the design:                             <ul style="list-style-type: none"> <li>» Rest points and amenities</li> <li>» Universal/inclusive design principles</li> <li>» CPTED principles</li> <li>» Connectivity to key land uses</li> <li>» Wayfinding measures.</li> </ul> </li> </ol>  |
| <b>Social infrastructure</b> | <ol style="list-style-type: none"> <li>3. Existing stakeholder groups and potential facility users (including water-based recreation groups and existing residents) be engaged in the design development process for the proposed community centre/club house.</li> <li>4. Ongoing engagement with the full range of stakeholder groups will be required to ensure any planned community facility achieves maximum potential community benefit.</li> </ol> |
| <b>Air pollution</b>         | <ol style="list-style-type: none"> <li>5. In accordance with the findings of the SLR Air Quality Assessment and Health Risk Assessment (2021), sensitive receptors including residential uses, public open spaces and child care centres should be appropriately located and</li> </ol>  |



|                               |  |
|-------------------------------|--|
|                               | <p>buffered from the Western Distributor and areas identified as locations of likely exceedances.</p> <ol style="list-style-type: none"> <li>6. Any child care facility, including any outdoor play areas, should comply with both child care regulations and air quality standards.</li> <li>7. If Hymix continues to operate, lower floors of buildings closest to the Hymix facility should be non-residential with residential uses located as far as possible away and higher floors.</li> <li>8. A Construction Management Plan be prepared at development application stage that examines air pollution impacts of the construction process, including earthworks and transportation, including potential impacts on existing surrounding uses.</li> </ol>  |
| <p><b>Noise pollution</b></p> | <ol style="list-style-type: none"> <li>9. Implement the acoustic shielding measures from the SLR <i>Noise and Vibration Assessment</i> (2021) and Department of Planning (2015) <i>Apartment Design Guide</i>.</li> <li>10. Include traffic calming measures as described in the SLR <i>Noise and Vibration Assessment</i> (2021).</li> <li>11. Consider land uses in order to locate high noise generating uses (i.e. commercial, licensed premises) away from residential areas.</li> <li>12. Any residential buildings located at Blackwattle Bay should consider existing noise emissions from industrial uses and be set back and designed as appropriate to mitigate noise impacts.</li> <li>13. Landscape planning consider the role of quiet spaces within the landscape as mitigation for noise pollution and that landscape plans focus on maximising green space in the urban environment.</li> </ol> |
| <p><b>Contamination</b></p>   | <ol style="list-style-type: none"> <li>14. The findings and recommendations of the Environmental Site Assessment and Site Wide Remedial Concept Plan be implemented, with contamination to be addressed at the development application stage including with a Remediation Environmental Management Plan and Work Health and Safety Management Plan.</li> <li>15. Appropriate ongoing monitoring measures be put in place as per the recommendations of the Site Wide Remedial Concept Plan.</li> </ol>   |

# 1 Introduction

Blackwattle Bay is the first of The Bays Precinct destinations to progress to the more detailed stages of planning. It is, therefore, an important test case for Infrastructure NSW in setting the standard for planning one of Sydney's most important urban renewal projects. The NSW Government has recognised the potential for significant physical and social implications of the project. Those implications include a potentially wide range of health impacts. Like any major redevelopment project some of those health impacts may be positive and some may be negative. There is an opportunity at this stage of the planning process to ensure that more detailed planning enables the maximisation of those potentially positive health impacts and the mitigation of the potentially negative impacts. The process through which the health impacts are identified, evaluated, mitigated and monitored is a Health Impact Assessment (HIA). HIA is the subject of this report and a requirement for the Blackwattle Bay project to advance through the planning system.

## 1.1 Study Requirements

The *State Significant Precinct Study Requirements* (April 2017) for, what was then known as the Bays Market District, requires the completion of a Health Impact Statement. The requirements state:

*Using the NSW Government's 'Health Impact Assessment: A Practical Guide' (The HIA Guide) for guidance, prepare a Health Impact Statement for the proposal, including the following steps:*

1. *Using the data from the Population Demographic Study in Section 24 (of the study requirements) prepare a community profile*
2. *Based on the community profile identify and document potential health impacts resulting from the development*
3. *Include information provided in Section 16 Noise and Pollution*
4. *Assess the significance of impacts and prioritise*
5. *Develop action-oriented recommendations to address the identified impacts.*

Like any discipline, HIA has its own distinct terminology. The Study Requirements nominate a 'Health Impact Statement'. The terminology most commonly used in practice and referred to in the in the key reference document the *HIA Guide*, is Health Impact Assessment (HIA). This report will adopt the HIA Guide terminology and refer to the work undertaken and reported here as a HIA. The *HIA Guide* refers to different levels of HIA: desk based, rapid, intermediate, and comprehensive. The level of assessment was identified through the process based on engagement with key stakeholders including the Sydney Local Health District and the City of Sydney. The level of assessment is explained further in Section 3 of this report.

The following table indicates where in the report the State Significant Study Requirements issued by the (then) NSW Department of Planning and Environment in April 2017 have been addressed.

**Table 2 Study Requirements**

| Study Requirement  | Document Reference | Comment  |
|--|--------------------|--|
| 27.1 Using the NSW Government's 'Health Impact Assessment: A Practical Guide' for guidance, prepare a Health Impact Statement for the proposal, including the following steps: | Sections 3 and 5   | This HIA has used the NSW Government's 'Health Impact Assessment: A Practical Guide' for guidance, as well as other relevant contemporary and best practice guidelines |

| Study Requirement  | Document Reference | Comment  |
|--|--------------------|--|
| Using the data from Population Demographics Study Section 7 in section 24 prepare a community profile        |                    | Section 7 utilises projections developed as part of the Population and Economic Analysis prepared by Profile.id (2020) |
| Based on the community profile identify and document potential health impacts resulting from the development | Sections 6 and 8   | Section 6 provides a scoping of potential health impacts, and Section 8 provides a detailed assessment of each impact. |
| Include information provided in Section 16. Noise and Pollution  | Sections 6 and 8   | Sections 6 and 8 consider the potential health impacts of noise and pollution, using findings from specialist studies  |
| Assess the significance of impacts and prioritise  | Section 8          | Section 8 assesses the significance of each impact.  |
| Develop action-oriented recommendations to address the identified impacts.                                   | Sections 8 and 10  | Section 8 identifies recommended measures to address identified impacts, also summarised in Section 10.                |

## 1.2 Report structure

The report is structured as follows:

- » A description of the project
- » An overview of HIA
- » A review of relevant health and the built environment literature focussing on recently published research on the health implications of public open space, physical activity, social infrastructure, air pollution, noise, land contamination and mental health
- » Scoping which sets the parameters of the HIA
- » Identification including data on the existing population and projected population forecasts
- » Assessment which will include a base case comparison as well as looking at the consequence, likelihood and significance of key health impact issues
- » Recommendations focusing on key health impact mitigation
- » A brief section on evaluation which focusses on the requirements of a future collaborative process for evaluation.

# 2 Project Description

The Blackwattle Bay SSP Investigation Area ('Study Area') encompasses the land and water area, known as Blackwattle Bay, between Bank Street and the Glebe foreshore shown in Figure 1. The land is located within the City of Sydney local government area (LGA).

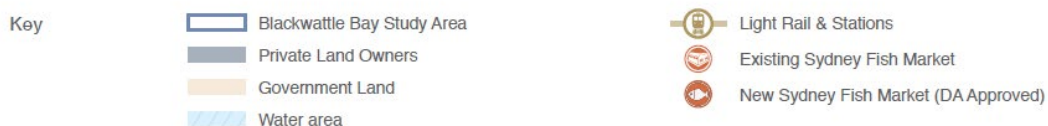
## 2.1 Study Area

The land within the Study Area is approximately 10.4 hectares (ha) in size. It is largely government owned land containing the existing Sydney Fish Market, recreation and boating operations and facilities. There are three privately owned sites including a concrete batching plant operated by Hymix, seafood wholesaler Poulos Brothers and private developer Celestino which owns further wholesaling facilities. The Blackwattle Bay land area wraps around the southern and eastern edges of Blackwattle Bay and is bounded by Bridge Road to the south and Bank Street to the east. The Western Distributor motorway / Anzac Bridge viaduct is located adjacent to the eastern boundary before traversing over the northern section of the site. The water area of Blackwattle Bay is approximately 21 hectares.

**Figure 1: Blackwattle Bay Study Area**



Blackwattle Bay Study Area



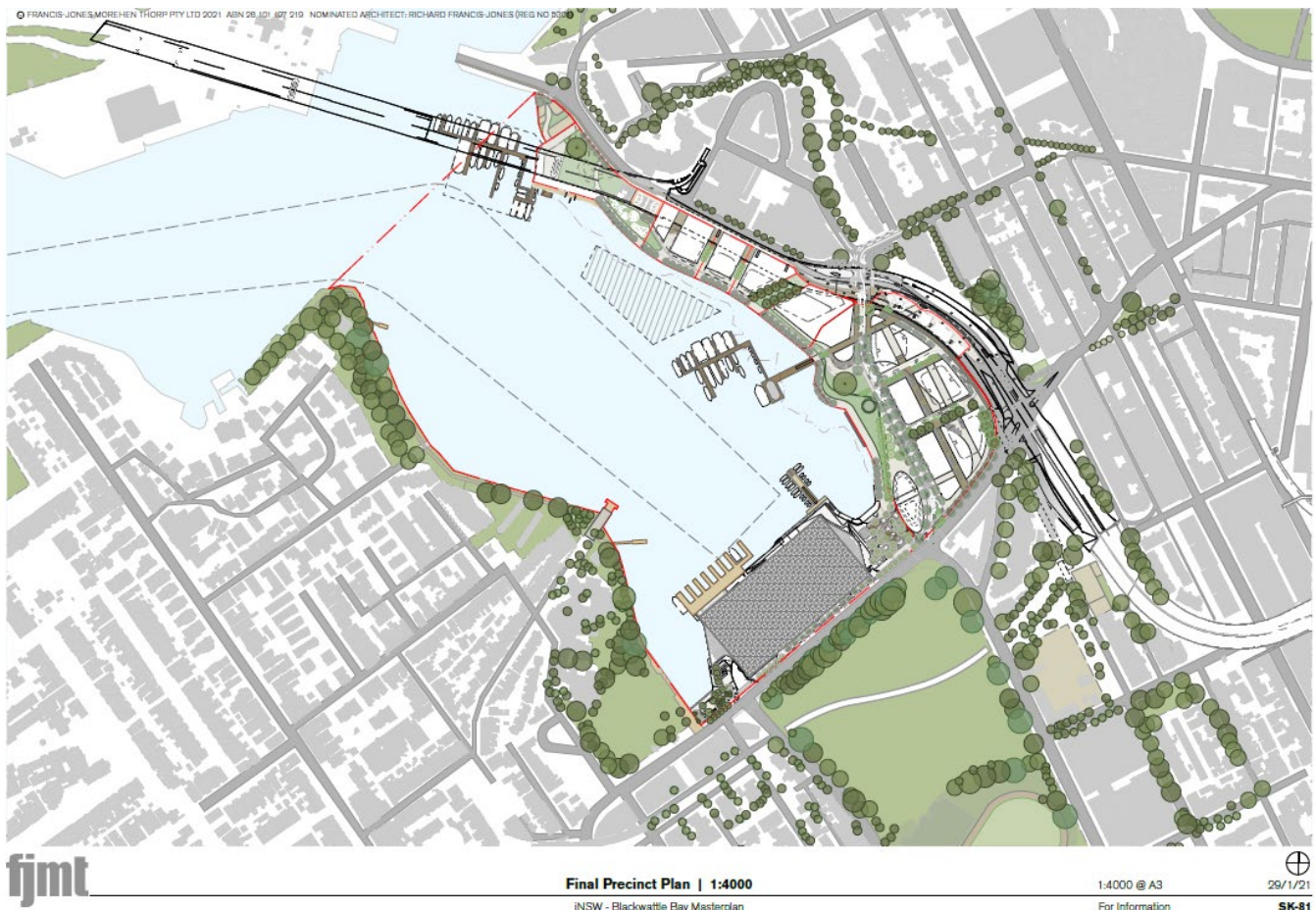


## 2.2 The Proposal

The SSP Study is proposing to rezone Blackwattle Bay with a new planning framework and planning controls to enable its future urban renewal.

The rezoning proposal is based on the Blackwattle Bay Precinct Plan ('Precinct Plan') which provides a conceptual layout to guide the development of planning controls for the precinct and has informed this report. The Precinct Plan is shown in Figure 2 below.

**Figure 2: Precinct Plan**



Source: FJMT

The Precinct Plan provides overarching guidance about how the area should be developed based on community and stakeholder input, local character and place, current and future demographics, economic and social trends, cultural and environmental considerations, and urban renewal aspirations and needs regarding land use, community recreation, transportation, housing, and jobs. Key characteristics of the Precinct Plan include:

- » New homes, jobs and services close to the CBD including:
  - > approximately 5,713 ongoing jobs
  - > approximately 2,795 residents
  - > 1,581 dwellings.
- » A continuous waterfront promenade – the missing link in an otherwise 15km foreshore walk from Woolloomooloo to Rozelle
- » New active transport connections to bring the neighbourhood closer to the harbour through new and improved pedestrian and cycling links

- » Improved public transport options and minimised vehicle usage strategies including:
  - > Minimising car parking spaces with limited on-street parking.
  - > Potential ferry wharf
  - > Opportunity for buses to service through site link
  - > Connections to the existing light rail
  - > Access to a future Sydney Metro West Station in Pyrmont.

A number of master planning principles, identified with input from the community during August 2017, are highly relevant to health and wellbeing. These include:

- » Improving access to the bay, foreshore and water activities
- » Pursuing climate change resilience
- » Prioritising movement by walking, cycling and public transport
- » Linking the district to the City, Glebe Island and White Bay
- » Integrating housing, employment and mixed uses suitable to living on the city's edge
- » Maintaining and enhancing water-based uses and activities
- » Creating an inviting place this is unique in character and socially inclusive
- » Expanding the range of active, recreational and community facilities
- » Planning for the community's education, health, social and cultural needs.

The range of social infrastructure proposed to be provided as part of the Blackwattle Bay Precinct includes

- » 400sqm of community centre (meeting and activity space) including boat house/club house to accommodate the existing dragon boat and kayak users. This facility will include boat storage space. It is important that any meeting or activity space provided in this facility is available for general community use and is not restricted to boat users only. Community centre space may also be used for the provision of community and allied health service provision on an outreach basis.
- » 1,200sqm of creative and studio floorspace at 1-3 Bank Street Up to 138 child care spaces in the likely form of commercial facilities
- » Potentially community and cultural spaces within the Elliptical Building of a total area of 1,800sqm
- » Commercial space will be available for GP use depending on market demand.
- » A total of 3 hectares of public open space including:
  - > A waterfront promenade of approximately 1.1 kilometres within the Blackwattle Bay Precinct
  - > Bank Street Open Space, Miller Street Reserve, Entry Plaza, Waterside Park, Urban Park (east of New Sydney Fish Market), Local Park (west of New Sydney Fish Market).
  - > 2 outdoor sports courts
  - > 1 play space.

There is the potential for some of the proposed amenities to provide health and wellbeing benefits to both planned and existing populations. The essence of urban renewal is that it involves change within or adjacent to existing, established communities. Change is usually associated with some form of impact which may be positive or negative (or positive for some groups and negative for others). There is the clear potential for some of those proposed amenities outlined above to provide health and wellbeing benefits to both planned and existing populations.

A key focus of this HIA will be on ensuring those potential health impacts are appropriately identified and that there is a reasonable evidence base to support them. Once identified, significant focus will be on the development

of robust mitigation strategies that reflect that holistic and integrated view of health. The focus on mitigation involves maximising positive impacts or benefits and minimising negative ones.

### 3 Health Impact Assessment

Health impact assessment (HIA) is a systematic approach to addressing the potential health costs and benefits of a project, plan or policy. HIA is a predictive tool: it forecasts or anticipates future conditions and how they may influence health. HIA considers both positive and negative impacts and works towards identifying solutions or mitigations to any potential negative health impacts that may be likely to occur. HIA considers health impacts at a population, rather than an individual level. It also focusses on how those impacts may be distributed or differentially experienced by key population groups.

Guiding principles for HIA (identified in enHealth, 2017) include:

- » Participation – particularly in relation to the right of those who are affected to be involved in the decision making process
- » Equity – focusing on the distribution of health impacts and identification of those groups who may be more vulnerable to adverse impacts and how mitigation strategies may improve outcomes for those groups
- » Sustainable development – emphasising a short and long term view of health impacts and consideration of future generations. Sustainable development also recognise the key role that community resilience has in communities’ ability to support and manage change
- » Ethical use of evidence – requiring the use of transparent and rigorous processes to synthesise and interpret evidence. Recommendations are evidence based and developed impartially. HIA should not set out to either support or refute any proposal but make recommendations on the basis of the best available and credible evidence.
- » Comprehensive approach to health – emphasising a broad interpretation of health and the consideration of physical, mental and social wellbeing.

Following from this last principle, HIA takes a holistic view of health. Health is viewed as more than just the absence of illness. It considers the ‘determinants of health’ (popularised by the World Health Organisation [WHO]). These determinants include housing, transport, air quality, community infrastructure, noise and open space that affect the quality of people’s living environment and how that environment impacts peoples’ health. The ‘determinants of health’ addresses the context in which people live including their housing, their neighbourhood, the natural environment, the social environment, their capacity to move around, and their access to services. HIA, therefore, addresses many of the issues, and their interdependencies, in complex urban redevelopment projects like Blackwattle Bay.

Given this social determinants of health focus, HIA is broad and many of the impacts considered fall beyond what has been traditionally viewed as ‘health’. The *HIA Guide* suggests that HIA should consider both ‘tight’ and ‘broad’ views of health. A ‘tight’ view reflects a biomedical model of health and considers disease and quantitative health data to determine the disease implications of a proposal. It is considered a more epidemiological approach. A ‘broad’ view reflects a social or wellness model and has more of a focus on qualitative data including interviews, focus groups and community consultation activities. It is considered a more sociological approach.

To be effective, HIA requires strong cross sectoral collaboration. For projects like Blackwattle Bay, the NSW Department of Health, through the Local Health District, will be a key stakeholder. Other agencies such as the City of Sydney, and potentially Education, Transport and others may also have a role to play.

Development projects provide both an opportunity for improving, and a risk to, public health. Well planned development can provide communities with additional community infrastructure, services, open space and housing choice. In some cases development projects can remediate contaminated areas effectively improving the safety and health of local environments. Alternatively, development projects can also have negative impacts including diminishing open space, greater demands on community infrastructure and services, overshadowing, and traffic generation.

Urban redevelopment projects like Blackwattle Bay provide additional challenges in that health impacts on new and existing adjacent communities need to be considered. Best practice in urban renewal requires consideration of how the potential benefits provided by an urban redevelopment project can be shared among both new and



existing communities. Similarly, consideration should also be given to how potential disbenefits are distributed among new and existing communities and how they can be mitigated.

### 3.1 Level of Assessment

The *HIA Guide* refers to four levels of HIA:

- » Desk based
- » Rapid
- » Intermediate
- » Comprehensive.

The *HIA Guide* (p.15) suggests consideration of a number of factors in determining the level of HIA required. These factors include:

- » Scale of the proposal – the greater the size and importance of the proposal in terms of potential health risks and benefits, the more comprehensive the HIA should be
- » The significance of the impacts – The greater the magnitude of potential positive and negative impacts, and the higher the uncertainty, the more comprehensive the HIA should be
- » External interest – the greater the political, professional and/or public interest, the more comprehensive
- » Timing – the more urgent, the less comprehensive
- » Window of opportunity – the more closed the window of opportunity (timing, political, public interest) the less comprehensive
- » Organisational capacity – the more staff and/or external expertise available, the more comprehensive
- » Resources – the more funds available and the more data on health issues and impacts available, the more comprehensive.

Further guidance from the *HIA Guide* is provided in Table 1, which shows 'Level of HIA and number of depth of impacts to assess'.

**Table 3 Level of Assessment**

| <b>Desk based</b>                                     | <b>Rapid</b>  | <b>Intermediate</b>  | <b>Comprehensive</b>  |
|---|---|--|---|
| No more than three impacts, assessed in less detail   | No more than three impacts, assessed in more detail           | Three to ten impacts, assessed in detail   | All potential impacts, assessed in detail                       |
| Provides a broad overview of potential health impacts | Provides a more detailed overview of potential health impacts | Provides a more thorough assessment of potential health impacts, and more detail on specific predicted impacts | Provides a comprehensive assessment of potential health impacts |
| Example: Local playground proposal                    | Example not provided in HIA Guide                             | Example: Foreshore Environmental Management Plan   | Example: Freeway development proposal                           |

The level of assessment for the Blackwattle Bay project was determined to be intermediate. This determination was identified through a stakeholder engagement process explained in the Methodology section of this report.

## 4 Health and the Built Environment

The connection between human health and the built environment is well established. The Sydney Local Health District (2016) recognises the influence of the built environment on health and states that a “clear relationship has been drawn between the built environment and chronic diseases such as overweight and obesity, type 2 diabetes, and heart disease”. The Sydney Local Health District continues, identifying a number of built environment features that promote physical activity, reduce health inequities and contribute to the sustainability agenda. These include “active travel (such as walking and cycling), efficient public transport systems, energy-efficient housing, availability of green space, location of recreation facilities, parks and public buildings, availability of healthy food and reduced carbon-based pollution”.

This chapter identifies some of the key features of the built and social environment that are important elements of the Blackwattle Bay Precinct and are known to have a significant impact on population health. This chapter will identify some general findings from the research on these elements to provide an evidence base for assessing the Blackwattle Bay Master Plan and identifying specific health impacts in later chapters.

### 4.1 Public space

Public open space in the form of parks, trails and green space plays a vital role in promoting good health and wellbeing. Public open space plays a critical role in urban environments. It is the space where people recreate, interact and engage in community life. Kent and Thompson (2019:172) write that:

*As our cities grow and densify, the provision of public open spaces of adequate quality and quantity will be key. These are the spaces that give new and changing communities the opportunity to connect, and our biophysical environment the chance to absorb the impacts of urban life.*

Hartig et al (2014, cited in Braubach et al, 2017) suggest four interacting pathways through which public open space, and specifically green space, can affect health and wellbeing:

- » Improved air quality
- » Enhanced physical activity
- » Stress compensation
- » Greater social cohesion.

Braubach et al (2017) report that urban green space “can promote mental and physical health and reduce morbidity and mortality in urban residents by providing psychological relaxation and stress alleviation, stimulating social cohesion, supporting physical activity and reducing exposure to air pollutants, noise and excessive heat.”

Wood et al (2017) found in a study conducted in Perth that while the physical activity benefits of parks and public open space was well established, “the provision of parks in local neighbourhoods and within walking distance is important also for positive mental health”. Braubach et al (2017) support this conclusion citing a range of research that demonstrates the restorative qualities of green space which can “trigger positive effects for persons with high stress levels by shifting them to a more positive emotional state”.

In highly urban settings like Blackwattle Bay, that incorporates significant public land, public open space is a key issue that has the potential to provide a range of health and wellbeing benefits for existing and future populations.

#### **Semi-private and communal space**

While new higher density apartment dwellings continue to be popular among young professionals and empty nesters, recent demographic information suggests that apartments are also becoming an increasingly popular dwelling choice for families with young children. Housing affordability in major cities like Sydney means that more young families are viewing apartments as their only achievable option for home ownership or affordable rental in Sydney.

While this housing type suits many, research conducted in Melbourne by Warner and Andrew (2019) found that parents living with children in higher density developments can suffer negative impacts on their social connections and social capital (the networks and connections in their community that can be utilised for mutual benefit). Warner and Andrew's research highlighted the importance of both the immediate living environment and the wider community environment for the development of social capital. The lack of space within the dwelling and the poor quality of communal space in buildings were found to be inhibitors to social interaction and engagement with other families; something taken for granted in a setting where dwellings are larger.

The lack of space for social gathering within buildings places greater emphasis on creating a public space environment that enables local residents to engage with each other. Warner and Andrew (2019:10) found:

*Given parents' frequent use of parks with their children, it would make sense for local government to promote social connections by providing infrastructure in existing settings. For example, more seating, barbecue facilities and shelters could be installed to encourage extended (rather than superficial) interaction between residents who do not necessarily have the space to invite people back to their dwellings. Indeed, providing parks of good quality (i.e. well maintained and provide good recreational facilities) encourages longer visits by inner-city residents, in turn promoting social activities and leading to more extensive social ties.*

## 4.2 Physical activity

There is a growing evidence base confirming the effect that the urban environment has on physical activity, which in turn affects the prevalence of a number of non-communicable and chronic diseases. NSW Health (2018) reports that chronic diseases have overtaken infectious diseases as the leading causes of ill health in Australia. Obesity is rapidly becoming the major health burden for NSW with unprecedented levels of overweight and obesity across Australia. Being overweight or obese are major risk factors for chronic diseases including heart disease some cancers and type 2 diabetes.

Benton et al (2016) identify a number of studies that found a significant positive association between features of the built environment and physical activity levels. Features of the built environment that have been shown to correlate with physical activity levels include mixed land use, population density, street connectivity, and physical infrastructure, including footpaths.

Sallis et al, (2016), in a study of 14 global cities, found that activity-friendly characteristics (connected streets, services and amenities within walking distance, public transport, and public parks) contributed to physical activity and therefore reduced the prevalence of non-communicable diseases. Sallis et al (2016) also found that living in the most activity-friendly environments helped the average resident to achieve approximately 50% of their minimum physical activity recommended guidelines. These results suggest that designing urban environments to support physical activity could have large health impacts.

Sallis et al (2016:2215) concluded:

*Design of urban environments has the potential to contribute nearly 90 minutes per week of physical activity, which is 60% of the 150 minutes per week recommended in physical activity guidelines ... Building, retrofitting, and maintenance of physical activity supportive features in cities worldwide to increase residential density, provide good transport service, and ensure access to parks would be expected to substantially increase physical activity in the population on a permanent basis and contribute to meeting the UN's goals to reduce non-communicable diseases.*

Beyond physical health benefits, physical activity is also linked to overall community wellbeing through the encouragement of social interaction and engagement in community life. Physical activity is a recognised stress relief and the most popular forms of activity, such as walking, enable people to engage in community life.

### 4.2.1 Active travel

The built environment can support or discourage physical activity and active travel. Key features of the built environment that affect the capacity for active travel include the nature and connectivity of the street network,

the provision of walking and cycling infrastructure, the density of the area and the location of destinations within reasonable active travel distances, and the safety, quality and amenity of the area including any specific walking and cycling infrastructure.

Promoting active travel (walking or cycling for transport) has recently gained attention as a public health strategy to enable people and populations to accumulate more daily physical activity. Baldwin et al (2017) note that:

*Active travel is cheap or free, accessible to most, and a pragmatic way to embed activity into daily life. Active travel, or its constituent active commuting (walking or cycling to work) have been associated with reduced risk of all-cause mortality and adverse cardiovascular outcomes, a more favourable body composition and greater wellbeing in adults.*

A number of studies have reported that positive health effects of being more physically active are related to living in higher density, mixed use neighbourhoods where shops, parks and schools are within walking distance. Studies have found that the key about higher density residential areas' ability to encourage active travel is not the density per se but the tendency for these neighbourhoods to also have connected streets and have shops, services and community facilities within walking distance (City Futures, 2012).

The NSW Health *Healthy Eating and Active Living Strategy 2013-2018* emphasises key elements of the built environment:

*The built environment comprises physical design, patterns of land use, and the transport system; each influencing access to opportunities to be physically active for adults and children. Strategies in the built environment that are important for physical activity include those that:*

- *Facilitate and encourage walking, reduced traffic speed and volume*
- *Promote access to recreation facilities*
- *Incorporate mixed land use*
- *Provide open and green space*
- *Incorporate proximity to key destinations*
- *Increase density and diversity of housing.*

The Blackwattle Bay Precinct has the potential to address all or most of these key built environment design features. The Precinct is an opportunity to ensure that the design of the physical environment supports and encourages physical activity for any potential, and existing surrounding, residents as well as workers and visitors. The inclusion of a continuous waterfront promenade in Blackwattle Bay providing a key link in the regional walking and cycling infrastructure is a key amenity that has the potential to create significant health benefits.

## 4.3 Social infrastructure

The *Pyrmont Peninsula Place Strategy: Social Infrastructure Assessment* (NSW DPIE, 2021) describes social infrastructure as the assets or physical spaces where people can participate in social, recreational and cultural life. The strategy defines social infrastructure as including:

- » Community facilities including community centres, libraries, education, child care, health and emergency services
- » Cultural spaces including theatres and performance spaces, museums and galleries, creative arts centres, artists studios and maker spaces
- » Open space including sports space, parks, natural space, linkages, waterways and civic or urban spaces
- » Recreation facilities including sports fields, aquatics, outdoor courts, indoor recreation, play spaces, youth precincts, outdoor gyms, community gardens and water recreation.

Successful community facilities are key community focal points and destinations. They are vital places within their communities, contributing to residents' and workers' health, wellbeing and quality of life. Community facilities are places that attract and cater to a wide range of users and meet a broad range of community needs. In the urban

renewal context community facilities can act as 'bridging infrastructure' by creating links and connections between new and existing communities.

Particularly with community centres, a key trend involves a move towards multipurpose facilities that are designed and built to maximise flexibility of use, so they can accommodate a wide range of programmed uses and a diverse range of user groups. Many community centres function as 'third places' – informal public gathering spaces that enable people to sit, relax, meet, gather and interact. They are places that encourage social connections and are essential to the creation of a sense of community. Community centres are addressing the communal yearning for 'places to spend time, where you don't have to spend money'. They are busy, safe, and interesting places where you can feel like you are part of a community, but not have to pay for the privilege.

In relation to the Green Square urban renewal project, but with equal relevance to Blackwattle Bay, the City of Sydney (2015) stated that:

*Social infrastructure and services play a critical role in supporting community connectedness and the development of social capital, particularly where a community is rapidly growing and changing, and the social impacts of the urban renewal process and associated population growth need to be effectively addressed.*

This HIA will take a broad view of social infrastructure to include some of the 'hard' or community facility, building and spaces elements identified above but also 'soft' infrastructure. 'Soft' social infrastructure includes services, programs and activities including community and cultural events that help to address community needs and to build a sense of community. For example, research by Warner and Andrew (2018) based on interviews with families with children living in higher density urban environments, found that "organised groups and activities facilitated the development of social connections among families in high-rise development" with 'mothers' groups' and similar activities seen as important ways to connect with others and build the supportive network of social capital within their communities. Warner and Andrew (2018:3) report that "The importance of social capital, and social connectedness, to the health and wellbeing of parents and children is known. It can reduce feelings of isolation and loneliness and the associated psychological and health issues".

Community facilities, and the programs and services that operate from them, are important to creating and reinforcing a sense of place and community and building the stocks of social capital within a community. Well designed and managed community facilities and public spaces can host a diversity of activities, provide a range of services and cater to a wide demographic in a way that is flexible and adaptable to changing community needs.

For Blackwattle Bay consideration has been given to the nature of social infrastructure provided. In addition to local facilities, the nature of Blackwattle Bay, which functions as a key tourist and visitor location, means that there is an opportunity to consider regional and 'destinational' facilities. Community facility planning has considered accommodation of existing users on the site, including the active recreation groups, and explored how community facilities and community and cultural events may be used to promote integration between the new development of Blackwattle Bay and the established communities of Glebe, Ultimo and Pyrmont.

## 4.4 Air pollution

The relationship between air pollution and human health impacts has been shown to be statistically significant by a variety of epidemiological and controlled studies (Keywood et al, 2016). Particulate matter (microscopic solid or liquid particles suspended in the air)<sup>1</sup> can result in decreased lung function, increased respiratory symptoms, increased chronic obstructive pulmonary disease, increased cardiovascular and cardiopulmonary disease, and increased mortality. Cong Liu et al (2019) report that the toxicity, exposure levels and related health concerns regarding particulate matter are well documented. Their study found consistent associations between short term

---

<sup>1</sup> Particulate matter, also known as particle pollution or PM, is a term that describes extremely small solid particles and liquid droplets suspended in air. Particulate matter can be made up of a variety of components including nitrates, sulphates, organic chemicals, metals, soil or dust particles, and allergens (such as fragments of pollen or mould spores). Particle pollution mainly comes from motor vehicles, wood burning heaters and industry. (NSW Health, <https://www.health.nsw.gov.au/environment/air/Pages/particulate-matter.aspx> )

exposure to particulate matter and cardiovascular and respiratory mortality in more than 600 cities across the world.

#### 4.4.1 Vehicle emissions

One of the greatest sources of air pollution in urban areas is motor vehicles. The burning of fossil fuels releases compounds such as nitrogen oxides, sulphur dioxide, carbon monoxide, volatile organic compounds and fine particulate matter. These have been shown to have detrimental effects on our health. The nature of urban renewal and the focus on development in established areas of the city means that new residential areas may be contemplated nearby major roadways with significant traffic loads. Given this setting consideration needs to be given to the health impacts of residential development in close proximity to busy roadways.

There is increasing evidence internationally and in Australia linking a higher risk of asthma and allergies with exposure to traffic-related air pollution. While there are no universally agreed safe thresholds for exposure to traffic pollution, research has found that the health risk is highly correlated with the extent of exposure. A study by Bowatte, et al, (2017) found Australians aged 45-50 who lived less than 200 metres from a major road had a higher risk of asthma, wheeze and lower lung function over a five-year period than those who lived more than 200 metres from a major road. Bowatte et al (2015) also found that traffic-related air pollution exposure during middle age is associated with increased risk of allergic sensitization, asthma, and lower levels of lung function, even at relatively low levels of exposure, and that it may exacerbate existing disease conditions.

A recent international study conducted by Monash University (Cong Liu, 2019) examined air pollution and mortality data from 652 cities across 24 countries and concluded that increases in total deaths are linked to exposure to inhalable particles or particulate matter. The study also found that even low levels of air pollution can increase the risk of death. Christidis et al (2019) reported on several large epidemiological studies linking exposure to fine particulate matter to mortality and noted that 'the relationship persists' even in settings with relatively low concentrations.

Children are particularly vulnerable to traffic-pollution exposure because their lungs are still developing and they often spend more time outside than adults. A 2015 study (cited by Walter, et al, 2019) found that every two microgram per cubic metre incremental increase in chronic exposure to particulate matter from car exhausts in early childhood, increased the risk of developing asthma in later childhood by 14 per cent. In addition, early childhood exposure to traffic-related air pollution well below the World Health Organization guidelines increases the risk of sensitization and asthma among children (Bowatte et al, 2014).

Importantly for Blackwattle Bay, the proposed plans do not involve any form of development that will contribute to the worsening of air pollution in the area. It can be argued, with the removal of one concrete batching plant (previously located on Bridge Road) air pollution may be improved. The key health impact issue for Blackwattle Bay regarding air pollution will be the proximity of any proposed residential uses to the Western Distributor motorway. This will require careful consideration of potential health impacts and possible mitigation measures including the location and design of any residential buildings.

#### 4.4.2 Industrial air pollution

The nature of urban renewal, in association with fragmented land ownership, means that projects like Blackwattle Bay, can result in new uses, such as residential, being introduced into areas that formerly, or currently, include industrial uses. In some cases, as is likely to be the case at Blackwattle Bay, some of those industrial uses, including at least one of the two existing concrete plants, may remain for some time (one plant has been relocated from the site as a result of the New Sydney Fish Market development). One of the consequences of this is understanding the potential health impacts of, and possible mitigation strategies for, introducing residential populations into areas where they may be existing industry-related air pollution that could remain for an undefined period of time.

Bertoldi et al identified associations between exposure to cement plant emissions and health impacts, mainly for respiratory and cardiovascular diseases, with stronger associations for children. A systematic review of the academic literature focussed on the impact of cement plant emissions and nearby residential populations was



conducted by Raffetti et al (2018). This study found that cement plant exposure was associated with higher risk of respiratory system and lung function decline; and an excess risk of cancer incidence and mortality in both children and adults. Raffetti et al (2018) do caution that their review has a number of limitations including shortcomings in original study designs, use of questionnaires to gather data, difficulty in being specific about the source of pollution in some cases, and the introduction of improved environmental regulations that limit emissions.

While there are limitations in the data, a cautious approach should still be taken to minimise residential exposure, and exposure of sensitive receptors such as children, to cement plant emissions. The issue of co-existence with potentially polluting existing uses is a health impact concern. Further study will be required of the existing industrial uses on the site and the timing of any decommissioning that may occur.

## 4.5 Noise pollution

Cardiovascular disease, which includes high blood pressure, heart disease and stroke, has been clearly linked with long term exposure to environmental noise (European Commission, 2015:11). Hearing impairment as a result of noise exposure is estimated by the World Health Organisation to impact 10% of the global population.

The Australian Government Department of Health study *The Health Effects of Environmental Noise* (2018) reports that, although still a significant concern, the focus of studies on noise disturbance has shifted from the effect of noise on hearing and cardiovascular health to “a broader effect on wellbeing, quality of life and amenity”. The European Commission (2015:11) found:

*In addition to hearing problems, the non-auditory health impacts of noise exposure, including annoyance, sleep disturbance, heart disease and cognitive impairment, are all causing increasing concern. Annoyance, which could be thought of as trivial, can in fact lead to anger, stress and exhaustion and, because of the large number of individuals affected, is estimated to be the second most important cause of health impacts due to environmental noise.*

Disturbance or annoyance from traffic-related noise can adversely impact physical functioning, quality of sleep, psychological wellbeing, self-perceived health, and health-related quality of life (Von Lindern et al, 2016). All of these impairments can occur, and can endure for many years, without necessarily inducing severe illness or death. Given this, the World Health Organisation has included ‘subjective annoyance’ as part of its noise impact assessment guidelines and regulation has emerged that considers how “environmental conditions affect not only physical health but also social, economic, cultural and psychological wellbeing” (von Lindern et al, 2016: 92).

This approach to noise views disturbance and annoyance as outcomes that are important as a health impact in their own right and as contributors to a wide range of potential health issues. The traffic-related noise of the Western Distributor will be a key consideration in the HIA, particularly as it relates to any proposed residential uses in the Blackwattle Bay Precinct.

## 4.6 Land contamination

Land contamination occurs when chemical substances or waste are present in the soil at levels above what would be expected to occur naturally. This may represent a potential or actual risk to human health. Land contamination often occurs as a result of current or historical activities at, or adjacent to, a site.

The Blackwattle Bay area was home to many ‘noxious industries’ throughout the 1800s. The City of Sydney reports that “tanneries, abattoirs and timber yards began to take over the area’s waterfront (from the 1820s). A dominant industrial use in Glebe until the 1970s was timber yards” (City of Sydney, 2014).



Floating wharf launch in Blackwattle Bay, 11 August 1924, Wikimedia Commons, Oxyman

Much of the Glebe waterfront is also reclaimed land. It was common practice in inner urban areas to level new sites and limit potential floods by importing soils, sometimes from industrial sites. Controls on the contents of the land fill at that time were not onerous and there is potential for the fill to contain contaminants imported from elsewhere.

Discovering contaminants in soil does not automatically mean a site is dangerous to health. Land contamination is a common issue that is dealt with frequently in urban renewal projects. In a HIA it is crucial to understand the history of the site and what contaminants are likely to be present, if any. On this basis, an assessment of potential health impacts can be made. This assessment will consider the proposed future land uses with residential uses and any form of child care or children's services being seen as particularly sensitive. The HIA will also consider what remediation works may be possible to lessen any contamination risk that currently exists on the site and potentially improve the overall safety of the site compared to current conditions.

## 4.7 Mental health

The connection between the built environment and physical health has been well established. More recently, the significance of mental health in this relationship has become increasingly recognised. Mental health is now regarded as a leading cause of disability and the promotion of mental wellbeing is an important preventative approach for the avoidance of mental illness (Wood et al, 2017:63).

From a healthy built environment perspective, positive mental health is not only the absence of mental illness, but includes positive functioning, satisfying personal relationships, positive affect, pleasure and happiness. The World Health Organisation (2004) described positive mental health as the "foundation for wellbeing and effective functioning for both the individual and the community" and as the state "which allows individuals to realise their abilities, cope with the normal stresses of life, work productively and fruitfully, and make a contribution to their community".

Social connection is increasingly recognised as an important contributor to health and wellbeing (Warner and Andrews, 2019:1). Social relationships have a recognised protective effect on health and wellbeing while social



isolation is a predictor of morbidity and mortality (Braubach et al, 2017:192). From a healthy built environment perspective, this has often been viewed in relation to the role of the public domain in promoting social connections among people. Wood et al (2017) cite research showing that opportunities to forge new social connections is a by-product of the provision of local park space and that "local parks can facilitate the development of social ties, which have been shown elsewhere to be a protective factor for mental wellbeing". Additionally, there is an increasing field of research and resources that focus on how the design of the residential environment, particularly for higher density apartment buildings, can promote social connection and interaction (Happy City, 2015).

### 4.7.1 Social isolation

The Australian Institute of Health and Welfare (2019:49) report that one in four Australians are currently experiencing loneliness. Relationships Australia (2018) found that disconnection from community is a key risk factor for developing loneliness. The overall magnitude of effect of social connection can be benchmarked against other well-established lifestyle risk factors. Holt-Lunstad (2017) reports that lacking social connection carries a risk that is comparable, and in many cases, exceeds that of other well-accepted risk factors, including smoking, obesity, physical inactivity, and air pollution.

There is also evidence (cited by Holt-Lunstad, 2017) that social connection influences a variety of mental and physical health outcomes. For example, those who are isolated are at increased risk for depression, cognitive decline, and dementia. Social isolation and loneliness also adversely influence activities of daily living that influence functional status among older adults. There is also substantial evidence that social relationships can have a direct influence on health-relevant physiology such as blood pressure, immune functioning, and inflammation.

There is now substantial evidence documenting how being socially connected significantly reduces risk for premature mortality, and lacking social connection significantly increases risk. These risks are potentially even greater than the risks associated with many factors that currently receive substantial public health attention and resources such as obesity, physical inactivity, air pollution (Holt-Lunstad, 2017).

From a community perspective, Australians are not known for their strong sense of neighbourhood support. The Australian Psychological Society (2018) found that:

- » A third of Australians (34%) have no neighbours they see or hear from on a monthly basis. Nearly half of Australians (47%) have no neighbours they can call for help.
- » Our relationships with our neighbours are not close, with 70% of people saying they have no neighbours they would talk to about private matters.

Research conducted by the City of Sydney to inform their *Social Sustainability Policy* found that less than half of residents surveyed were satisfied with feeling part of the community, with 51% reporting they were neutral, unsatisfied or very unsatisfied. Only just over half of respondents thought they could get help from neighbours if needed.

There are a variety of macro (master plan level) and micro (building level) design treatments that have been found to foster greater social interaction and help people to feel part of a broader community. However, physical design has limitations in addressing complex health issues such as mental health and social isolation. Research suggests the value of well planned and implemented community and cultural development programs, that can build on a sound physical base, and play a key role in assisting with the formation of a strong sense of community, the promotion of resilience, and the facilitation of informal networks of support.

## 5 Methodology overview

The methodology for the HIA is informed by the following key references:

- » NSW Health (2007), *Health Impact Assessment: A practical guide*, University of New South Wales, Centre for Health Equity Training, Research and Evaluation (this is a required resource identified by the Study Requirements)
- » EnHealth (2017), *Health Impact Assessment Guidelines*, World Health Organisation Collaborating Centre for Environmental Health Impact Assessment and the School of Public Health, Curtin University

As highlighted earlier, the NSW *HIA Guide* was identified in the Study Requirements as the required guiding reference for this HIA. The more recent EnHealth guidelines have also been used to ensure that as much contemporary practice as possible is incorporated into this HIA.

### 5.1 Process steps

Based on these guidelines the methodology for this project included the following key stages:

#### 5.1.1 Scoping

Scoping involves setting the parameters of the HIA. It involves choosing the appropriate level of assessment. A key step in this phase of the project was undertaking a Scoping Workshop with Infrastructure NSW, Sydney Local Health District and the City of Sydney. At that workshop it was determined that an intermediate level of assessment was suitable for this project. The *HIA Guide* defines an intermediate level of assessment as including:

- Three to ten impacts assessed in detail
- A thorough assessment of potential health impacts
- Detail on specific predicted impacts.

The outcomes of the Scoping Workshop are described more fully in the next section of the report.

#### 5.1.2 Identification

The *HIA Guide* describes the identification stage of the process as developing a community / population profile and collecting information to identify potential health impacts. The profile identifies demographic structure, socio-economic and health status and identify groups in the population that may require special consideration.

#### 5.1.3 Assessment

As an initial assessment, this HIA has included a base case comparison. This comparison looks at some of the key health and wellbeing contributors, identified through the research, and provides a broad assessment of their presence (or absence) in Blackwattle Bay now and compares this to their likely presence or absence in the post-development Blackwattle Bay.

Beyond this, and in more detail, assessment also involves determining the relative importance of the potential health impacts identified during scoping and consideration of:

- Consequence - a measure of magnitude of the impact usually considered in terms of number of people likely to be affected and the scale of the impact
- Likelihood – an indication of how likely a particular impact is likely to occur ranging from rare/remote to almost certain
- Significance – a combination of consequence and likelihood.

Recognised HIA tools used to assess consequence, likelihood and significance have been utilised for this project and are included in Appendix B to this report.

### **5.1.4 Recommendations**

Recommendations are included in the Assessment section and are aligned directly to the identified impacts.

### **5.1.5 Evaluation**

A detailed evaluation methodology has not been included in this report. In line with best practice a recommendation of this HIA is to develop a collaborative evaluation approach involving key stakeholder groups including Sydney Local Health District, City of Sydney, local resident groups, community organisations, businesses, landowners and other key stakeholders.

## **5.2 Community and stakeholder engagement**

This initial report has been informed by input from the City of Sydney and the Sydney Local Health District through participation in the scoping workshop as well as a review of existing community engagement information undertaken over a number of years for the wider Bays Precinct planning process. Engagement with community members was recently undertaken in 2020 by Infrastructure NSW. Infrastructure NSW conducted consultation on the Blackwattle Bay planning scenarios during May and June 2020.

Feedback from community and stakeholder consultation highlight the importance of open, green spaces and providing active transport opportunities and links. One participant shared that walking and riding bikes is “healthier and less stressful”. Comments made about sport and recreation noted the vital role they play for community health and wellbeing, acting as a social hub and allowing for a healthy and active society. While some expressed a preference for larger, naturalised open space destinations linked to the waterfront, others preferred a variety of space sizes and more of them. Regardless, it was noted that “greenery helps the soul”.

However, concerns were raised that the Blackwattle Bay site is affected by noise and air pollution and that residential development would be challenged in achieving the required internal amenity in terms of noise minimisation and air quality.

## 6 Scoping

Scoping is a key step in planning and designing the HIA. Scoping sets the parameters, identifies the appropriate level of assessment, chooses which impacts will be assessed, and identifies the type and sources of the evidence base to support the assessment. As mentioned in the methodology, for the Blackwattle Bay HIA, scoping included some preliminary research, analysis of the proposed master plan, review of background information including previous consultation outcomes and a Scoping Workshop with Infrastructure NSW, Sydney Local Health District and the City of Sydney.

### 6.1 Key health impact issues

A challenge for HIA for complex projects is the number of potential health issues and the best approach to effectively assessing them. Two broad approaches are possible: to cover all issues but, due to practical resourcing constraints and time available, the analysis would be relatively high level; or to prioritise key health impact issues through the scoping process and focus on those key issues in a reasonable level of detail. Based on discussion at the Scoping Workshop, the second more in depth analysis of prioritised issues, has been adopted for this HIA.

The Scoping Workshop identified the following key health impact issues that should be focussed on in the Blackwattle Bay HIA:

- » **Public space including green space and recreation** – the analysis will examine the full range of potential health impacts of public space and especially the value of green space in urban environments. For the Blackwattle Bay Precinct, public open space also includes the water of the bay which can be both an important recreational and visual amenity contributing to both physical and mental health.
- » **Active transport** – planning concepts for Blackwattle Bay will be examined to identify the extent to which they contribute to or impede the use of active transport. The assessment will include the multiple potential health impacts of physical activity, social connectivity and mental health that walking and cycling can promote. Active transport connections will be examined and considered in relation to wider population benefits beyond the site and potentially beyond the specific area of influence to include broader district and regional impacts. A key active transport inclusion in the Blackwattle Bay Precinct is the proposed waterfront promenade.
- » **Social infrastructure** - a broad definition of social infrastructure will be taken to include community facilities, human services and community and cultural development activities. Consideration will be given to the community that may be included on the site, the social infrastructure needs of the existing surrounding communities and whether there are any potential community integration benefits of social infrastructure (hard or soft).
- » **Air quality** – air quality will be one of the key health impact issues to be considered particularly as residential uses are proposed on the site. Analysis of air quality data especially in relation to proximity to the Western Distributor and existing industrial uses will be an important issue to examine. Mitigation measures in line with best practice in apartment design will be considered particularly in relation to residential uses, noting that air quality may also affect the location of other uses on the site such as child care.
- » **Noise pollution** - noise will be one of the health impact issues to be considered particularly as residential uses are proposed on the site. Analysis of noise data particularly in relation to proximity to the Western Distributor will be a key issue to examine. Mitigation measures in line with best practice in apartment design will be considered. Noise will be considered from an annoyance and disturbance perspective and how noise may potentially impact quality of life and mental health.
- » **Contaminated land** – potential health impacts related to the reuse of contaminated land will be examined. This will likely have greater significance in relation to residential uses and other sensitive receptors that may occur on the site. Contamination issues also have the potential to influence future land use decisions and may impact the location, nature and presence of sensitive uses such as child care or community gardens.

While the key health impact issues identified above will be the specific ones examined, the HIA will examine these issues from a number of perspectives. For example, mental health, social interaction and engagement, social isolation, activation, cultural recognition and a range other quality of life issues will be examined in relation to the key health impacts identified above. For issues such as social infrastructure, public open space, active transport and others consideration will also be given to the ability of the Blackwattle Bay Precinct to enable existing (health related) uses such as water-based recreation to continue and be enhanced on the site.

The Study Requirements' emphasis on air and noise pollution have been framed to ensure that the health impacts of locating residential uses in proximity to the Western Distributor motorway, other major roadways, and any remaining industrial uses are considered as a key focus of this HIA.

## 6.2 Parameters

This HIA relies on findings from several technical studies in other specific disciplines for information, particularly in relation to noise, air and contamination information:

- » SLR, *Air Quality Assessment*, February 2021
- » SLR, *Noise and Vibration Assessment*, February 2021
- » SLR, *Health Risk Assessment*, March 2021
- » Ramboll, *Site Audit Report*, January 2021
- » JBS&G, *Site Wide Remedial Concept Plan*, January 2021
- » JBS&G, *Environmental Site Assessment*, January 2021.

Although health impact issues related to the construction phases of the project may be identified and documented in the HIA, it is beyond the scope of this assessment to develop detailed construction mitigations. It is assumed a detailed Construction Management Plan will be required to support future works. The HIA may be able to identify health related impacts and issues that should be considered in any future Construction Management Plans but the detailed management of construction impacts will be not be undertaken as part of the HIA scope.

# 7 Community profile and health status

The assessment phase includes two tasks. The first is to create a profile of the population affected, which includes information on the demographics, baseline health status, and social, economic, and environmental conditions that are important to health. The second task is to analyse and characterise effects on health and its determinants for the proposal and for any alternatives under consideration relative to the baseline and to each other.

## 7.1 Community profile

The Study Area is surrounded by the suburbs of Glebe to the west, Pyrmont to the north-east and Ultimo to the south-east. Each of these areas is distinct, with communities of varying needs. In 2016, there were approximately 40,500 residents living in the Glebe/Forest Lodge, Pyrmont and Ultimo area.

Due to the presence of the University of Technology and the University of Sydney in nearby Ultimo and Chippendale, Ultimo has a significantly higher proportion of university students and a very young median age in comparison to the City of Sydney average. Both Glebe and Pyrmont have median ages slightly above that of the City of Sydney LGA, with Glebe traditionally being home to an ageing population. However, the proportion of young and school aged children is higher in Glebe than the LGA average, as is the rate of university attendance. Both Pyrmont and Ultimo have a low proportion of young children, school children and those aged 25-34.

### 7.1.1 Existing population

The key characteristics of the current residents of the Study Area are provided in Table 5. Key points of interest include:

- » The study area shows a similar proportion of babies and pre-schoolers to the broader City of Sydney. This is significantly less than the average for Greater Sydney
- » There is a slightly higher proportion of primary school aged children in the study area than in the City of Sydney, but once more this is significantly less than Greater Sydney
- » Young workforce (25-34 year olds) and parents and homebuilders (35-49 year olds) are highly represented in the study area and in the City of Sydney, at significantly higher proportions than Greater Sydney
- » Older age groups (all groups from 50 years and over) are reasonably equally represented in both the study area and the City of Sydney, with the older age groups (60 years and over) less represented than in Greater Sydney
- » There is a lower proportion of Australian born residents in the study area compared to the City of Sydney and a significantly lower proportion than Greater Sydney
- » Single and group households are significantly more represented in the study area and the City of Sydney than in Greater Sydney
- » There is a significantly higher proportion of couples without children in the study area than in both the City of Sydney and in Greater Sydney.
- » Compared to the rest of the City of Sydney, the proportion of babies and preschool aged children is relatively similar, however there is a larger proportion of school aged children and of people attending tertiary education.
- » The personal and household weekly incomes are lower in the Study Area than in the City of Sydney. The average household weekly income is also lower in the Study Area than in Greater Sydney. This is due to incomes being significantly lower in Ultimo, because of the high proportion of students living in this suburb,

in close proximity to key university facilities. Approximately 60% of the population in Ultimo is studying at university or another tertiary institution (compared to approximately 22% in Pyrmont and 34.6% in Glebe).

- » A majority of dwellings in the Study Area, and particularly in Pyrmont and Ultimo, are high density e.g. flats or apartments (90% or more). The proportion of high-density dwellings is significantly lower in Glebe.
- » Approximately half of residents own one car or more, which is slightly higher compared to the City of Sydney. The average number of cars per dwelling is slightly lower in the Study Area compared to City of Sydney, and especially lower in Ultimo.

**Table 4 Key community characteristics of Study Area and Comparison Areas 2016**

|   | Pyrmont                   | Ultimo                     | Glebe                           | Study Area | City of Sydney               | Greater Sydney            |
|---|---------------------------|----------------------------|---------------------------------|------------|------------------------------|---------------------------|
| <b>Age groups</b>                               |                           |                            |                                 |            |                              |                           |
| Babies and Preschool age (0-4) %                | 4.7                       | 2.3                        | 3.4                             | 3.5        | 3.3                          | 6.4                       |
| Primary Schoolers (5-11) %                      | 3.5                       | 1.5                        | 4.1                             | 3.0        | 2.5                          | 8.8                       |
| Secondary Schoolers (12 - 17) %                 | 2.1                       | 1.5                        | 3.9                             | 2.5        | 1.9                          | 6.9                       |
| Tertiary education and independence (18 - 24) % | 10.3                      | 37.9                       | 13.2                            | 20.5       | 16.7                         | 9.6                       |
| Young workforce (25-34) %                       | 31.8                      | 32.1                       | 23.3                            | 29.1       | 33.1                         | 16.1                      |
| Parents and homebuilders (35 - 49) %            | 23.8                      | 14.4                       | 20.2                            | 19.5       | 21.7                         | 21.1                      |
| Older workers and pre-retirees (50-59) %        | 10.3                      | 4.3                        | 11.9                            | 8.8        | 9.0                          | 12.2                      |
| Empty nesters and retirees (60 - 69) %          | 8.3                       | 3.6                        | 11.3                            | 7.7        | 6.5                          | 9.5                       |
| Senior (70 - 84) %                              | 4.7                       | 2.1                        | 7.1                             | 4.6        | 4.3                          | 7.5                       |
| Elderly aged (85 and over) %                    | 0.5                       | 0.4                        | 1.5                             | 0.8        | 0.9                          | 2.0                       |
| <b>Indigenous population (%)</b>                | 1.0                       | 0.6                        | 2.3                             | 1.3        | 1.2                          | 1.5                       |
| <b>Country of birth</b>                         |                           |                            |                                 |            |                              |                           |
| Australia born %                                | 36.8                      | 17.6                       | 54.7                            | 36.4       | 39.4                         | 57.1                      |
| Three top responses                             | China<br>England<br>Korea | China<br>Thailand<br>Korea | England<br>China<br>New Zealand |            | China<br>England<br>Thailand | China<br>England<br>India |
| <b>Language spoken at home</b>                  |                           |                            |                                 |            |                              |                           |
| English only spoken at home %                   | 49.3                      | 23.7                       | 65.6                            | 46.2       | 51.5                         | 58.4                      |
| <b>Education (currently attending)</b>          |                           |                            |                                 |            |                              |                           |

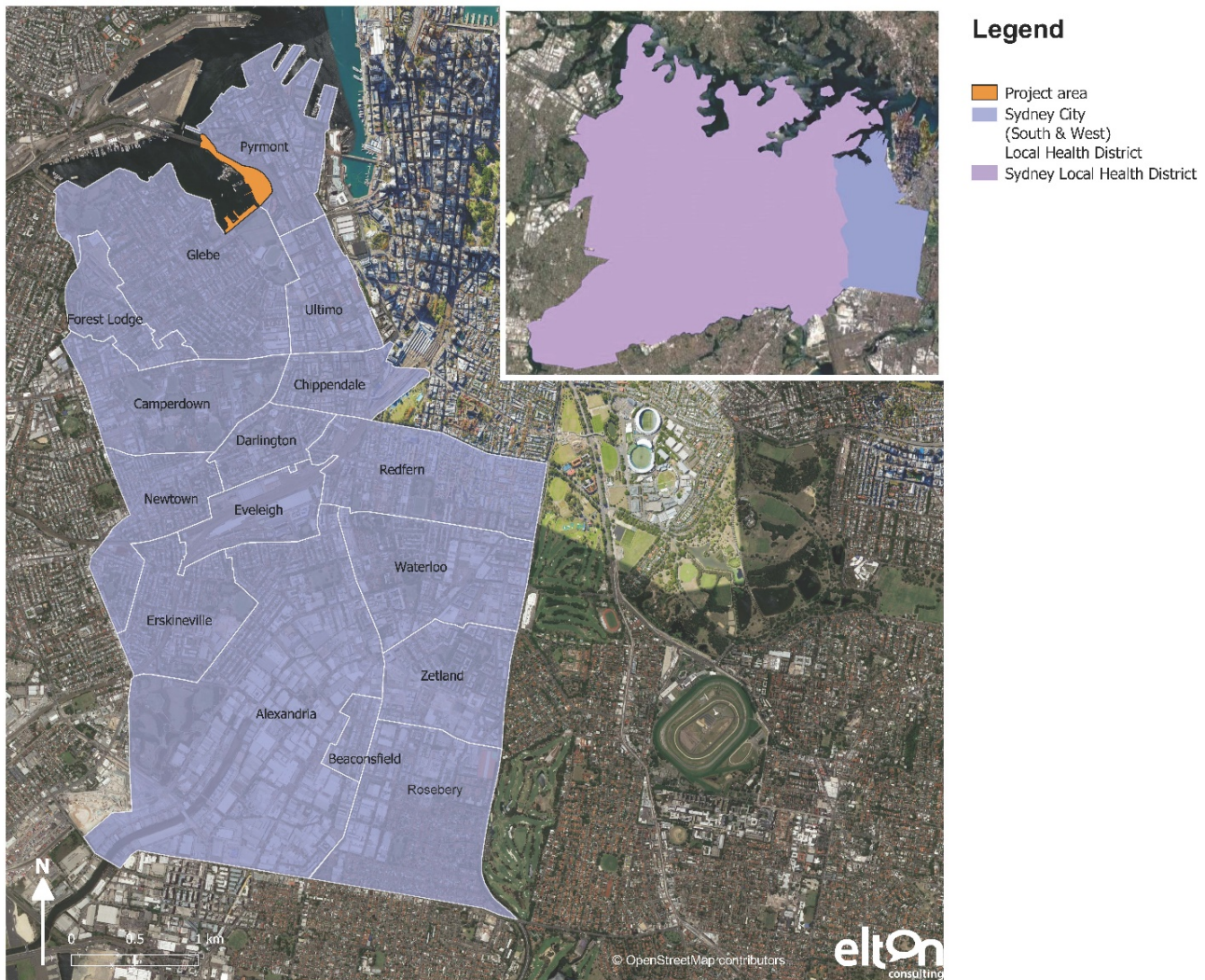
|  | <b>Pyrmont</b> | <b>Ultimo</b> | <b>Glebe</b> | <b>Study Area</b> | <b>City of Sydney</b> | <b>Greater Sydney</b> |
|--|----------------|---------------|--------------|-------------------|-----------------------|-----------------------|
| Preschool %                                  | 3.2            | 0.6           | 2.9          | 2.2               | 1.8                   | 5.5                   |
| Primary school %                             | 10.5           | 2.1           | 10.5         | 7.7               | 5.8                   | 25.6                  |
| Secondary %                                  | 6.5            | 2.1           | 9.9          | 6.2               | 4.6                   | 19.8                  |
| Technical or further education institution % | 11.3           | 6.3           | 5.4          | 7.7               | 7.5                   | 6                     |
| University or tertiary institution %         | 22.2           | 60.6          | 34.6         | 39.1              | 37.4                  | 19                    |
| <b>Income</b>                                |                |               |              |                   |                       |                       |
| Personal weekly income                       | \$1,111        | \$386         | \$834        | \$777             | \$953                 | \$719                 |
| Household weekly income                      | \$2,280        | \$1,230       | \$1,579      | \$1,696           | \$1,926               | \$1,750               |
| <b>Family composition</b>                    |                |               |              |                   |                       |                       |
| Single or lone person households %           | 28.8           | 31.6          | 38.6         | 33.0              | 37.3                  | 21.6                  |
| Group households %                           | 14.2           | 28.2          | 12.1         | 18.2              | 15.5                  | 4.7                   |
| Family households %                          | 57             | 40.2          | 49.3         | 48.8              | 47.2                  | 73.6                  |
| Out of family households:                    |                |               |              |                   |                       |                       |
| Couples with children %                      | 26.5           | 22.1          | 28.1         | 25.6              | 22.9                  | 49.5                  |
| Couples without children %                   | 59             | 59.8          | 51.3         | 56.7              | 63.1                  | 33.4                  |
| Sole parent and other family %               | 14.6           | 18.1          | 20.6         | 17.8              | 14.1                  | 17.0                  |
| Average person per household                 | 2.18           | 2.36          | 2.07         | 2.18              | 2.0                   | 2.8                   |
| <b>Dwelling structure</b>                    |                |               |              |                   |                       |                       |
| High density (flats or apartments) %         | 92.1           | 90.6          | 41.8         | 74.8              | 77.1                  | 28                    |
| <b>Car ownership</b>                         |                |               |              |                   |                       |                       |
| Average number of cars per dwelling          | 0.9            | 0.5           | 0.9          | 0.76              | 0.8                   | 1.7                   |



## 7.1.2 Population Health Data

The Blackwattle Bay Precinct is within the Sydney Local Health District (SLHD) and more specifically in the Sydney City (South & West) Local Health District, both shown by Figure 3.

**Figure 3: SLHD and Sydney City (South & West) Local Health District**



Some of the key health status indicators reported by the SLHD in their *Strategic Plan 2018-2023* (2018) include:

- » An increase in the prevalence of diabetes or high blood glucose (60% increase from 2002), although the percentage incidence is still below the NSW average
- » 32% of residents consume alcohol at levels posing long term risk to health (slightly above the NSW average of 30%). However, the level of alcohol consumption at dangerous levels in SLHD is declining
- » 16% of the population currently smoke (slightly above the NSW average of 15%). However, the level of smoking in SLHD is declining
- » 38% of the population who are overweight or obese. This is well below the NSW average of 53% but the trend for obesity and overweight in SLHD is increasing
- » 35% of people aged 16 years and over do not get sufficient physical activity. This is well below the NSW average of 43% but the trend for adequate physical activity in SLHD is decreasing.
- » The incidence of deaths from circulatory disease (125 per 100,000 people) is below the state average of 153 and the incidence in SLHD is decreasing

- » The incidence of deaths from cancer (147 per 100,000 people) is below the state average of 162 and the incidence in SLHD is decreasing.

The SLHD reports that despite rates for key indicators like obese and overweight and sufficient physical activity being lower than the state, these issues are still significant concerns from a population health perspective. Although addressing these health issues is multifaceted, increased access to high quality walking environments is considered to be one of the important elements that can encourage an active and healthier lifestyle.

## Sydney South West<sup>2</sup>

Key health characteristics of the population in the Sydney South West area are provided in Tables 3 and 4. Sydney South West is a sub-district within the broader SLHD and is the smallest area for which public health data is available. The Sydney South West area contains the suburbs of Chippendale, Darlington, Alexandria, Beaconsfield, Eveleigh, Redfern, Waterloo and Zetland, Rosebery, Newtown, Erskineville, the University of Sydney, Ultimo, Pyrmont, Forest Lodge and Glebe, as described in the Health Profile Sydney City South West dated 2015 and prepared by the SLHD. There is no data available for a smaller geographical area. This data should therefore be considered with caution, noting that the proposal site only represents a small portion of the Sydney South West Area.

Tables 3 and 4 below summarise a selection of key health indicators that are relevant to this HIA, for the Sydney South West area in comparison with the SLHD.

### Health risk factors

As shown by Tables 3 and 4, modelled estimates of the prevalence of health factors in Sydney South and West are lower compared to NSW. While they are generally similar to SLHD, the prevalence of obesity is lower in Sydney South West compared to SLHD. The prevalence of risk alcohol consumption and overweight is relatively similar across all three areas.

Overweight is the most prevalent health risk factor across all three areas, which is consistent with trends previously described, while risk alcohol consumption is the least prevalent risk factor.

**Table 5 Modelled estimates of health risk factors: Sydney City (South and West), SLHD<sup>3</sup> and NSW, 2011-13**

|                            | Sydney City (South and West) % | SLHD % | NSW % |
|----------------------------|--------------------------------|--------|-------|
| Current Smokers            | 11.8                           | 12.9   | 16.2  |
| Risk Alcohol Consumption   | 4.8                            | 4.6    | 4.8   |
| Psychologically Distressed | 8.1                            | 10.2   | 10.5  |
| Overweight                 | 33.5                           | 33.4   | 34.6  |
| Obese                      | 14.8                           | 20.1   | 26.4  |

<sup>2</sup> SLHD and Primary Health Network, Sydney City (South and West) Statistical Local Area Health Profile, 2015

<sup>3</sup> IWS is the terminology used in the Sydney City (South and West Statistical Local Areas) Health Profile. It refers to SLHD. Both terms refer to the same geographical area. For clarity purposes we have used 'SLHD' throughout our report.

## Prevalence of chronic diseases

The prevalence of Type 2 Diabetes and mental/behavioural disorders is similar in Sydney South West and NSW and lower compared to SLHD. The prevalence of nearly all selected chronic conditions is higher in Sydney South West compared to SLHD (except Type 2 diabetes), and generally more similar to NSW rates.

The most prevalent chronic condition across all three areas is musculoskeletal diseases followed by respiratory system diseases.

**Table 6 Modelled estimates of prevalence of selected chronic conditions (SLHD) Age standardised %, 2011-13**

|                                  | Sydney City (South and West) % | SLHD % | NSW % |
|----------------------------------|--------------------------------|--------|-------|
| Type 2 Diabetes                  | 5.8                            | 7.4    | 5.8   |
| Mental and Behavioural Disorders | 13.1                           | 12.4   | 13.1  |
| Circulatory System Diseases      | 18.1                           | 17.8   | 17.8  |
| Respiratory System Diseases      | 26.0                           | 24.4   | 27.4  |
| Musculoskeletal Diseases         | 27.2                           | 26.1   | 28.1  |

As shown by Table 5, the estimated prevalence of fair or poor self-assessed health and arthritis is lower in Sydney South West compared to SLHD and NSW. However, the prevalence of asthma and hypertension is higher in Sydney South West compared to SLHD.

The occurrence of respiratory system disease is a key issue for consideration. The Blackwattle Bay proposal will not itself increase air pollution. In fact, as the development is planned to involve the cessation of one of the existing concrete batch facilities there is the potential for existing air pollution to be reduced. This, in conjunction with increased landscaping and canopy cover, may create health benefits for the surrounding community, of which the table above shows approximately 26% suffer from respiratory system disease. Conversely, what these figures also show is that approximately 1 in 4 people in the NSW population (27.4%) suffer from respiratory disease. This is a potential health impact issue in relation to introducing residential uses on to the site, particularly close to the Western Motorway. This could have the potential to trigger health conditions or exacerbate existing conditions, as explained above. This is assuming that the prevalence of respiratory disease among new residents would be similar to that of the NSW average (27.4%).

**Table 7 Modelled estimates of chronic disease, Sydney City (South and West) (ASR per 100 [95% CI]), 2011-13**

|   | Sydney City (South and West) – part of Sydney LGA % | SLHD % | NSW % |
|---|---|--------|-------|
| Fair or poor self-assessed health, > 15 years | 9.7   | 14.3   | 14.3  |
| Asthma  | 8.0   | 7.2    | 9.6   |
| Chronic Obstructive Pulmonary Disease         | 2.2   | 2.3    | 2.6   |
| Hypertension, > 18 years                      | 11.0  | 10.7   | 10.5  |
| Arthritis                                     | 12.9  | 13.9   | 15.3  |

Based on this data, the Sydney City (South and West) area appears to be reasonably healthy based on a comparison to other areas. Prevalence for most conditions appears to be similar or below that of NSW. Those few conditions that appear to be the key health issues for Sydney City (South and West) include:

- » Overweight and obesity
- » Circulatory system disorders
- » Respiratory system disorders
- » Musculoskeletal diseases.

### 7.1.3 Existing sensitive receptors

Based on a range of socio-economic indicators and health determinants, a number of potentially more vulnerable or disadvantaged, and therefore more at risk, groups can be identified.

#### Aboriginal and/or Torres Strait Islanders

The proportion of Aboriginal and/or Torres Strait Islanders was lower in the Study Area compared to City of Sydney. However, it is larger in Glebe than all other comparison areas.

#### Non-private housing

The proportion of non-private housing is an indication of the socio-economic status of an area. As shown by Table 6, the proportion of state housing is larger in the Study Area compared to Greater Sydney, with a significantly larger proportion in Glebe compared to Pyrmont and Ultimo.

#### Employment

The unemployment rate is an indication of the socio-economic status of an area. It is lower in the Study Area compared to Greater Sydney but higher than City of Sydney. This is most likely explained by the higher proportion of students living in the Study Area, particularly in Ultimo, with no employment.



**Table 8 Sensitive receptors**

|  | <b>Pymont<br/>%</b> | <b>Ultimo<br/>%</b> | <b>Glebe<br/>%</b> | <b>Study<br/>Area %</b> | <b>City of<br/>Sydney<br/>%</b> | <b>NSW<br/>%</b> |
|--|---------------------|---------------------|--------------------|-------------------------|---------------------------------|------------------|
| Aboriginal and/or Torres Strait Islanders                | 1.0                 | 0.6                 | 2.3                | 1.4                     | 1.2                             | 1.5              |
| State housing authority as landlord (occupied dwellings) | 4.9                 | 5.1                 | 18.0               | 9.3                     | 7.6                             | 4.2              |
| Unemployed people  | 5                   | 13                  | 6.7                | 8.1                     | 6                               | 6                |
| People requiring assistance for core activities          | 1.8                 | 1.2                 | 4.7                | 2.6                     | 2.4                             | 4.9              |
| People who provided unpaid assistance                    | 5.9                 | 3.9                 | 8.9                | 6.2                     | 5.7                             | 9.0              |

Table 6 shows:

- » The proportion of people requiring assistance is larger in the Study Area compared to City of Sydney but lower than Greater Sydney. It is more significantly larger in Glebe than in Pymont and Ultimo.
- » However, noting that 6.3% of the City of Sydney surveyed identified as a person with disability<sup>4</sup>, it is likely that the proportion of people with disabilities in the Study Area is larger than that identified by Table 6. In addition, those who identified by City of Sydney as a person with a disability, were three times more likely to report 'poor' or 'fair' mental health outcomes compared to all City of Sydney residents.
- » Similarly, the proportion of people who provided unpaid assistance is larger in the Study Area compared to City of Sydney, and more particularly in Glebe, which is consistent with the previous finding.
- » In relation to homelessness, and while there are no official numbers, street counts undertaken by the City of Sydney indicate a relatively stable number in the past 10 years, with a peak in 2016. Wentworth Park in Glebe is also identified as one of the 'homeless hotspots', where a number of organisations are involved in addressing homelessness.
- » Unemployment in all three suburbs surrounding the Bays Market District was higher than the City of Sydney average in 2011, with Ultimo having significantly higher unemployment than Glebe and Pymont.
- » A relatively high proportion of the Glebe community rents social housing, while many students across Glebe and Ultimo have likely low incomes, which is reflected in low median weekly household incomes in both suburbs.

The *Noise and Vibration Assessment* (SLR, 2021) also identifies nearby schools as potentially sensitive receptors (Sydney Secondary College, Glebe).

It should also be noted that given the type of development and the likely cost, it is not necessarily the case that the future population of the Blackwattle Bay Precinct will share all of the characteristics of the existing, surrounding communities.

### Socio-Economic Indexes for Areas

Socio-Economic Indexes for Areas (SEIFA) have been developed to rank areas in Australia according to relative socio-economic advantage and disadvantage. They indicate the collective socio-economic characteristics of the people living in an area.

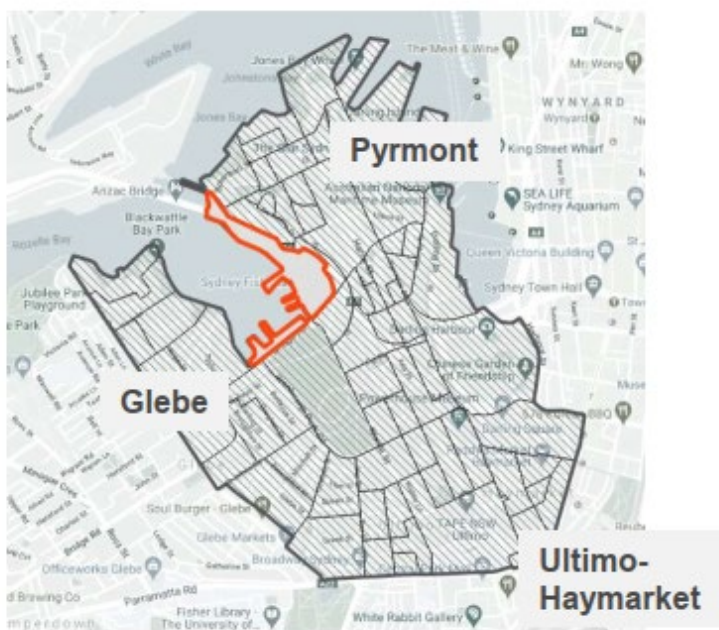
<sup>4</sup> City of Sydney, *A City for All Inclusion (Disability) Action Plan 2017-2021*

The areas directly adjacent the water at Blackwattle Bay, Jones Bay, Pyrmont Bay and the western portion of Glebe have a relatively lower incidence of disadvantage compared to other areas further east and south. Parts of Ultimo and Glebe though may have higher relative disadvantage.

## 7.2 Future residents

Profile.id prepared a detailed demographic and employment analysis of the Blackwattle Bay catchment, including population and dwelling forecasts to 2036. The Blackwattle Bay catchment includes the SA1s shown in Figure 4 below.

**Figure 4: Demographic profiling catchment**



Source: profile.id

The assumptions used include:

- » Increase in Study Area population from 0 in 2016 to 2,795 in 2036. This forecast is based on an increase of 1,546 dwellings in net terms between 2024 and 2032.
- » Average household size is expected to decrease from at 1.99 in 2026 to 1.90 in 2036.
- » Expected to attract a range of markets including both younger adult age groups attracted by the inner city lifestyle and older working adults and retirees, attracted by waterfront property with close proximity to the new Sydney Fish Market and the range of transport options and waterfront trails.
- » Age increases in the 25-39 age bracket by 2036 – result of people migrating to the Study Area in those age groups, and the ageing of people in their 20s. There are also significant increases in the 50 to 64 age group.

### 7.2.1 Future population profile

Key demographic characteristics have been applied to the proposed development to create an indicative profile of future residents, based on a scenario of 1,546 dwellings and an estimated average household size of 1.99 in 2026 and 1.90 in 2036.

Based on a supply of 1,546 dwellings, there could be a total of 3,553 future residents.

Table 10 applies the demographic characteristics of the Study Area to the future 2,795 residents (in 2036). It applies age profile assumptions that are consistent with the Profile.id report however it uses service age groups as opposed to five year age groups as used by Profile.id. It is important to understand how service age groups evolve over time, as they each represent a specific stage of life, expectations and needs, particularly in relation to social infrastructure and services.

**Table 9 Future population**

| <b>Forecast Blackwattle Bay Study Area (2036)</b> |       |       |
|---|-------|-------|
| <b>Age Structure</b>                              |       |       |
| 0-19 years  | 10.5% | 294   |
| 20-39 years                                       | 42.1% | 1,176 |
| 40-64 years                                       | 36.4% | 1,016 |
| 65 years and over                                 | 11.1% | 309   |
| <b>Income</b>                                     |       |       |
| Low income households                             | 15%   | 231   |
| High income households                            | 25%   | 386   |
| <b>Household type</b>                             |       |       |
| Lone person households                            | 28.3% | 459   |
| Couples without children                          | 32.8% | 473   |
| Couples with children                             | 13.6% | 216   |

## 8 Assessment

The assessment task begins with a base case comparison. This examines key health contributors in a pre and post-development Blackwattle Bay. This is a high level and preliminary analysis, but assists in gaining a preliminary understanding of whether the proposed development of Blackwattle Bay is generally improving or detracting from community health and wellbeing.

This chapter also includes a detailed assessment of the potential health impacts identified and prioritised through the scoping process. These are: air pollution, noise pollution, land contamination, social infrastructure, public open space, and active transport.

The assessment of health impacts will consider:

- » The health impact or activity
- » The relevant determinant of health
- » Source of information, evidence or data
- » The nature of the inherent impact (generally positive or negative)
- » Timing of impacts – short, medium or long term
- » The consequence or magnitude of potential impacts ranging from minimal to catastrophic
- » Likelihood of impacts ranging from rare/remote to almost certain
- » Groups, communities and population bearing differential impacts including consideration of any vulnerable groups
- » Mitigations or recommendations
- » The nature of the residual impact.

The assessment will also consider both inherent and residual impacts. Inherent impacts are those that result from a project before actions are taken to alter or mitigate the impact. Inherent impacts are pre-mitigation impacts. Residual impacts are those that are remaining or the level of impact remaining after mitigation. It is important to distinguish between the two and note that some inherent risks may be considered significant or have a significant consequence prior to mitigation, but after mitigation may be considered of less or little consequence.



## 8.1 Base case comparison

A base case comparison compares key health impact issues in the current state (pre-development) to the proposed state (post-development) and makes an assessment of the nature of change including whether that change is likely to have a positive or negative health impact.

**Table 10 Pre and post development comparison of key health contributors**

|  | <b>Existing situation – Pre Development</b> | <b>Proposed – Post Development</b>   | <b>Outcome – likely health impact</b> |
|--|---|--|---------------------------------------|
| <b>Open space</b>                            | None  | 3 hectares of total study area, including Waterfront Promenade (minimum 10 metre width), Bank Street Open Space, Miller Street Reserve, Entry Plaza, Waterside Park, Urban Park (east of New Sydney Fish Market), Local Park (west of New Sydney Fish Market).   | Positive                              |
| <b>Pedestrian and cycling infrastructure</b> | None  | Waterfront promenade of 1.1 kilometres linking to existing regional bike and pedestrian network  | Positive                              |
| <b>Street connectivity</b>                   | Poor  | Greater connections will be created to surrounding communities   | Positive                              |
| <b>Streetscape</b>                           | Poor  | Extensive streetscape and public domain improvements will be included in the Precinct  | Positive                              |
| <b>Trees and landscape</b>                   | Poor  | Extensive streetscape and public domain improvements will be included in the Precinct  | Positive                              |
| <b>Population density</b>                    | None  | Increased with approximately 2,795 new residents   | Mixed                                 |
| <b>Community facilities</b>                  | None  | A new community centre and clubhouse designed to accommodate existing water recreation users and general community use. The potential for arts and creative space at 1-3 Banks Street. Investigations and discussions are also under way regarding a regional cultural use in the Elliptical Building near the mouth of Blackwattle Bay. | Positive                              |
| <b>Outdoor recreation space</b>              | None – although nearby at Wentworth Park    | Increased with outdoor recreation included at Bank Street Open Space. This area includes two multipurpose courts and an outdoor fitness area.  | Positive                              |

|  | Existing situation – Pre Development   | Proposed – Post Development  | Outcome – likely health impact   |
|--|--|--|--|
|  |  | Improved facilities for water-based recreation including clubhouse and storage at Bank Street  |  |
| <b>Activity and vibrancy</b>                                       | Some – associated with existing Fish Markets   | Will be significantly increased through New Sydney Fish Market, promenade, retail and restaurant development, parks, playgrounds, events and activities  | Positive   |
| <b>Existing practices</b>  | Long standing fishing and boating practices<br><br>Existing water recreation users   | Fishing and boating practices will change<br><br>The practices of existing water recreation users will change.<br><br>Opportunity for improved facilities with new clubhouse and storage facilities. | Positive<br><br>Safer loading and unloading of fishing fleet including physical separation of operations from visitors.  |
| <b>Air quality and odour</b>                                       | Existing concrete batch plants and major roadways most significant existing sources of air pollution<br><br>Some odour associated with existing Fish Markets | Relocation of concrete batch plants likely to improve air quality. Timing of removal of both is unclear<br><br>Will be improved with new Sydney Fish Market  | Removal of one concrete plant and development of New Sydney Fish Market is likely to improve local air quality and odour<br><br>Positive                                 |
| <b>Contaminated land</b>   | Present but managed  | Potential for higher levels of remediation   | Positive   |
| <b>Residential uses in proximity to industry and major roadway</b> | None   | Potential impacts on future residents if not properly mitigated  | No negative impact if recommendations for location and design to mitigate air pollution are addressed.<br><br>Residential use may add to safety and vibrancy of Precinct |

The base case comparison shows that if the urban renewal of Blackwattle Bay proceeds there are likely to be significant positive health impacts resulting from the project. It is important to note that the base case comparison assumes that key amenities like parks, pedestrian and cycling infrastructure, streetscape, community

facilities, etc. will be delivered. Overall this initial base case comparison shows that there is strong potential for the project to improve on current conditions in relation to key health contributing elements.

The following sections examine specific potential health impacts identified in the scoping phase as priorities.

These impacts are:

- » Public space
- » Active transport
- » Social infrastructure
- » Air pollution
- » Noise pollution
- » Land contamination.

## 8.2 Public space

Public space is essential to the promotion of both physical activity and mental health. Well-designed public environments can play a key role in community health but there are key factors in relation to safety, connectivity, quality and amenity that have a significant influence. Giles-Corti et al (2015) in a review of a wide range of academic research conclude that:

*Providing access to a network of proximate, accessible and high quality public open spaces with a variety of supportive infrastructure catering to the needs of multiple user groups is good for physical and mental health. There is consistent evidence that neighbourhoods with well-designed public open space are associated with increased levels of physical activity in all age groups. Well used public open space encourages more users, and enhances natural surveillance thereby creating safer parks and neighbourhoods.*

### 8.2.1 Initial guidance questions

The following guidance questions are based on the built environment questions in the enHealth (2017) guidance as well as the NSW Health *Healthy Urban Development Checklist* (2009).

| Questions   | Response/ Considerations   |
|---|--|
| Will the development enhance/detract from existing public open spaces?                                    | The site does not currently include any formally defined public open spaces. The Precinct shows a total of 3 hectares in multiple locations including the Waterfront Promenade (minimum 10 metre width), Bank Street Open Space, Miller Street Reserve, Entry Plaza, Waterside Park, Urban Park (east of New Sydney Fish Market), and a Local Park (west of New Sydney Fish Market). |
| Is there local open space within a reasonable walking distance (400-500 metres) of most homes?            | Planned open spaces will be within 400 metres of the area where residential development is being considered for the site.  |
| Will the development encourage/discourage healthy forms of physical activity such as walking and cycling? | Walking and cycling will be significantly enhanced through provision of the Waterfront Promenade providing a key walking and cycling link between Rozelle and Balmain with Ultimo and Pyrmont.   |
| Will the development enhance/detract from social connections? For example,                                | The provision of a range of new public spaces will enhance the opportunity for social connection in the Precinct. Open spaces are  |

| Questions   | Response/ Considerations  |
|---|---|
| having public spaces that invite people to be active, to be outside and to be social  | planned in a way that they transition from the more festival and visitor spaces located near the New Sydney Fish Markets to more intimate and local open spaces as you move towards Bank Street.  |
| Will water-based recreation activities be affected by the proposal?   | <p>Water-based recreation will be affected by the proposal. Existing practices will likely require change as a result of new marina construction and commercial watercraft traffic.</p> <p>Enhanced facilities for water-based recreation will be provided through club house and storage space.</p>  |
| Are pedestrian areas (such as public plazas, squares, pathways, trails, shopping areas, etc.) universally accessible (designed to accommodate the widest range of potential users)?                               | All public space and pedestrian areas will be constructed to comply with accessibility requirements.  |
| Do parks and open spaces include places to rest, quiet areas, places for gatherings, drinking fountains, shaded areas, public toilet facilities and pathways that connect to the greater area?                    | Quiet and contemplative spaces are recognised as an important inclusion in this HIA. Open spaces are planned in a way that they transition from the more active and visitor-oriented spaces located near the New Sydney Fish Markets to more intimate, quieter and local community-focussed open spaces as you move towards Bank Street.  |
| Is outdoor gym and training equipment provided along pathways to encourage use of pathways for planned recreation (in addition to providing opportunity for more vigorous forms of incidental physical activity)? | Equipment for fitness and training activities are proposed in the Bank Street Open Space and also as part of the Waterfront Promenade. This supplements a network of outdoor fitness equipment including existing areas at Wentworth Park.  |
| Are public open spaces connected via a network of footpaths, trails and public transport?   | Outdoor spaces will be provided at key nodes along the Waterfront Promenade, which will connect to existing and future pedestrian links and surrounding nodes including residential precincts, village centres and the future Metro. A series of cycle paths will also be provided along the promenade or connect to it.  |
| Is there a public transport stop within easy walking distance (approximately 400-500 metres or up to 800-1000 metres for a railway station) of key public open spaces?  | The Proposed Pymont Metro Station is confirmed in close proximity to the Blackwattle Bay Precinct.  |
| Does public open space planning support a range of experiences and potential users? Are there opportunities for active and passive recreation, reflection, learning, play, adventure, gathering, and celebration? | <p>The combination of existing and future open space will provide a mix of passive and active recreation, including water-based activities.</p> <p>Open space planning ensures that there will be opportunities for future residents of the Precinct, but also existing residents and users of the broader Precinct. Open space planning also recognises the 'destinational' nature of the precinct and the large visitor population.</p> |

## 8.2.2 Key considerations

Health research evidence suggests that there should be an emphasis on green space in the planning of the public space for Blackwattle Bay. Kondo et al (2018) cite a range of research which shows that, particularly in urban environments, the provision of green space, as opposed to hard surfaced landscaped areas, creates greater health benefits. Kondo et al (2018:21) reported that they found that green space exposure in urban environments had a positive impact on attention, mood, violence, heart rate, physical activity and mortality. In citing research with specific application to Blackwattle Bay, Kondo et al, report on a 2016 study by Gidlow et al who found improved restoration in people who took a 30 minute walk in green environments and blue environments (near water) as opposed to purely urban environments.

In high density areas, open spaces must also respond to an increased diversity of populations, socio-demographic and cultural profiles and needs. They must therefore be adaptable and multipurpose, which would typically require a needs-based approach (Byrne and Sipe, 2010). In the case of Blackwattle Bay, urban densities will increase, and the area will also continue to attract non-residential populations, including visitors travelling to the area for different purposes, for example the main purpose may be to use the new promenade or to visit the new Fish Markets. The influx of visitors is identified by Ives et al (2014) as a justification for investing in green space infrastructure. Balancing the needs of the local community and visitors to the area will therefore be an important consideration.

Wood et al (2017) provide empirical evidence to support the merits of providing a range of green spaces and infrastructure through the provision of parks of different sizes and functions, with the diversity of spaces being found to contribute to both the greenness of the area but also the mental wellbeing of residents. Wood et al's research included the finding of a positive association between the provision of smaller, pocket parks and positive mental health. Other research shows positive association between larger parks and participation in active recreation (Ives et al, 2014).

The approach to the provision of public space in the Blackwattle Bay Precinct responds to these key research themes. The Precinct is planned to provide a range of public spaces that transition from larger, visitor and event focussed space closer to the New Sydney Fish Markets; to quieter, more community-oriented space as you move toward Bank Street.

### Outdoor recreation

Cranney et al (2016:26) cite a range of research and conclude that outdoor gyms have the "potential to increase park use and active recreation" and that they "add purpose to public open space and provide free physical activity opportunities for people of all ages and fitness levels". In a study over 12 months of outdoor gym equipment in Maroubra, Cranney et al (2016) found significant increases in 'moderate to vigorous physical activity'.

The Blackwattle Bay Precinct Plan promotes walking, jogging and cycling as key activities and identifies a number of recreation-based outdoor spaces. This include bike and pedestrian paths, outdoor multipurpose courts, playgrounds and outdoor fitness equipment. This adds to the diversity of amenities that promote physical activity and social connection among a wide range of local residents, workers and visitors.

## 8.2.3 Public space assessment summary

| Issue                   | Description  |
|-------------------------|--|
| Health impact           | Provision of public open space   |
| Determinant/s of health | Physical activity<br>Social connection   |
| Source of information   | Literature review – academic research<br>Participation data – Sport and Recreation |

|   |  |
|---|--|
|   | Stakeholder engagement   |
| Nature of (inherent) impact                     | Positive   |
| Timing of impact                                | Long-term  |
| Consequence (if not mitigated)                  | Major  |
| Likelihood (if not mitigated)                   | Almost certain   |
| Risk assessment (prior to mitigation)           | Very high (positive)   |
| Groups affected – differential impacts          | Potential benefits extend to significantly wider community of Inner Western and Inner Sydney. Completion of waterfront promenade provides a 'missing link' in existing regional bike and pedestrian network  |
| Precinct Plan response                          | <ul style="list-style-type: none"> <li>» Three hectares of total study area of 10.4 hectares equates to approximately 29% of study area</li> <li>» The Precinct Plan includes the Waterfront Promenade (minimum 10 metre width), Bank Street Open Space, Miller Street Reserve, Entry Plaza, Waterside Park, Urban Park (east of New Sydney Fish Market), and a Local Park (west of New Sydney Fish Market).</li> <li>» A continuous publicly accessible Waterfront Promenade throughout the entirety of the precinct that provides a critical missing piece in the regional pedestrian and cycling network. The promenade, as planned, is a minimum of 10 metres wide, expanding at certain locations and nodes to 30 metres.</li> </ul> <p>Bank Street Open Space will be a critical public open space that is focussed on local, community needs rather than on visitors and events. Bank Street should include green space, sports courts for basketball and other courts sports, fitness equipment, a skate facility and play space. It should be a multi-generational and inclusive space that provides a balance between active and passive recreation.</p> |
| Additional mitigations or recommendations       | <p>Further health benefits could be obtained through consideration of:</p> <ul style="list-style-type: none"> <li>» Universal design/inclusive design principles</li> <li>» CPTED principles.</li> </ul>   |
| Nature of residual impact                       | Positive   |
| Risk assessment (if full mitigation undertaken) | Very high (positive)   |

Balancing the needs of the future Blackwattle Bay residential community and of visitors to the area will be an important consideration of future detailed planning for the site, particularly in relation to public spaces. Careful consideration must be given to who will be using which spaces, and which facilities might be required where. Future public spaces will also need to complement existing public spaces that exist in the broader area, to ensure that the overall provision of spaces is diverse and responds to a range of uses. Accessibility to and connectivity between these spaces, and between these spaces and other key land uses including dwellings, social infrastructure, public transport and key pedestrian/cycling links will be crucial to maximise future use and community benefit.

## 8.3 Active transport

The NSW Health *Healthy Eating and Active Living Strategy 2013-2018* (2013), states that:

*Active transport is of special interest as it is physical activity that can be built into everyday living. A built environment that provides easy, accessible connections between buildings, walkways, cycle paths and public transport nodes; and transport infrastructures that link residential, commercial and business areas, is important to support active transport and physical activity.*

Blackwattle Bay, as a transformative urban renewal project, is an opportunity to significantly improve active travel opportunities not only within the site but within the inner western area of Sydney.

### 8.3.1 Initial guidance questions

The following guidance questions are based on the built environment questions in the enHealth (2017) guidance, the NSW Health *Healthy Urban Development Checklist* (2009), and the National Heart Foundation *Healthy Spaces and Places* (2009) guidance.

| Questions  | Response/ Considerations  |
|--|---|
| Will the development encourage/discourage active transport including walking and cycling?  | Walking and cycling will be encouraged through the Waterfront Promenade providing a key walking and cycling link, as well as other cycling and walking links throughout the development area.<br><br>The Precinct Plan includes key linkages and connections to key activity nodes in the surrounding community including village centres, residential precincts and key public transport nodes such as Metro.  |
| Will proposed walking and cycling infrastructure connect key destinations and promote walking and cycling for transport?   | The proposed Waterfront Promenade will connect key parts of the broader area, including Rozelle and Balmain with Ultimo and Pyrmont. It will connect to the New Sydney Fish Market, which is a key destination near the City as well as Wentworth Park.   |
| Will the amenity, attractiveness and safety of walking and cycling infrastructure promote its usage?   | The next stages of planning will include detailed work around the design of the walking and cycling infrastructure. This report encourages the incorporation of quality urban design and Crime Prevention through Environmental Design (CPTED) principles. All infrastructure will need to be compliant with relevant standards.<br><br>The location of active retail uses and residential apartments overlooking the Waterfront Promenade provides strong natural surveillance enhancing the safety of the key form of walking and cycling infrastructure. |
| Are pathways, trails, and other active travel infrastructure universally accessible (designed to accommodate the widest range of potential users)?                                 | The next more detailed levels of planning will include detailed work around the design of the walking and cycling infrastructure but this report encourages the incorporation of universal design and accessible and inclusive principles, and supports the future infrastructure to be DDA compliant.  |
| What supporting infrastructure will be included to support walkers and cyclists? (including lighting, water fountains, signage, seating, shelter, toilets, end of trip facilities) | The next stages of planning will include detailed work around the design of amenities around active transport infrastructure. This also needs to be a cohesive approach and give consideration to other amenities provided in existing and future public spaces.  |



Does the active travel infrastructure link with the public transport network? Are there secure bike storage facilities available?

The proposed Waterfront promenade and pedestrian and cycling links will link to the Metro. The provision of secure bike storage facilities will need to be considered during the next more detailed level of planning.

### 8.3.2 Key considerations

Key determinants that promote active travel include connectivity between key destinations, safety (including road safety/vehicle conflict and personal feelings of safety) and amenity (the pleasantness of the travel route). The Waterfront Promenade proposed to run through the Blackwattle Bay Precinct will be a key link in the regional bicycle and pedestrian network. The Promenade will provide an off-road connection between Rozelle and Balmain (and suburbs to the west) with Ultimo and Pyrmont and eventual connection to the CBD and Woolloomooloo. Consultation undertaken to date for the Bays Precinct and Blackwattle Bay indicates a high level of community support for the Waterfront Promenade as both a regional and local active travel connection and key amenity for the precinct.

Winters et al (2018) report that there is growing evidence that “bicycle-specific infrastructure including off-street bike paths” increase the incidence of bicycling.

### 8.3.3 Active transport assessment summary

| Issue                                  | Description  |
|--|--|
| Health impact                          | Provision of active transport infrastructure and associated amenities  |
| Determinant/s of health                | Physical activity<br>Social connection<br>Safety<br>Quality of life<br>Physical and mental health  |
| Source of information                  | Literature review – academic research<br>Stakeholder engagement  |
| Nature of (inherent) impact            | Positive   |
| Timing of impact                       | Long-term  |
| Consequence (if not mitigated)         | Major  |
| Likelihood (if not mitigated)          | Almost certain   |
| Risk assessment (prior to mitigation)  | Very high (positive)   |
| Groups affected – differential impacts | Potential benefits extend to significantly wider community of Inner Western and Inner Sydney. Completion of promenade provides a ‘missing link’ in existing regional bike and pedestrian network |
| Precinct Plan response                 | » New active transport connections that connects to City of Sydney’s existing and future routes: the continuous publicly accessible Waterfront Promenade throughout the entirety of the          |

| Issue   | Description  |
|---|--|
|   | <p>precinct that provides a critical missing piece in the regional pedestrian and cycling network.</p> <ul style="list-style-type: none"> <li>» The Precinct Plan includes the Waterfront Promenade (minimum 10 metre width).</li> </ul>   |
| Additional mitigations or recommendations       | <p>Further health benefits could be obtained through consideration of:</p> <ul style="list-style-type: none"> <li>» Rest points and amenities</li> <li>» Universal/inclusive design principles</li> <li>» CPTED principles</li> <li>» Connectivity to key land uses</li> <li>» Wayfinding measures.</li> </ul> |
| Nature of residual impact                       | Positive   |
| Risk assessment (if full mitigation undertaken) | Very high (positive)   |

Active transport infrastructure and connections will be key to ensure that the precinct is accessible by foot, cycling and by public transport. It will also be crucial to ensure a permeable, walkable and safe precinct, and due consideration will need to be given to universal design and DDA compliance as well as CPTED principles. Adequate wayfinding will also be required. Shared infrastructure, and potentially separate pedestrian and cycling infrastructure, will be investigated to ensure both groups' safety and comfort.

In addition, linking in with existing or future cycling and walking infrastructure within the City of Sydney and Inner West Council would be required and important to the creation of an integrated active transport network.

## 8.4 Social infrastructure

Social infrastructure planning and provision contributes to the development of healthy and sustainable communities by ensuring that population growth is supported by a network of facilities and services that are accessible, affordable and responsive to local community needs. NSW Health (2009) found that investment in social infrastructure is considered to be "essential for the health, well-being and economic prosperity of communities. It plays an important role in bringing people together, developing social capital, maintaining quality of life, and developing the skills and resilience essential to strong communities".

Social infrastructure can also be a mechanism (along with a range of physical planning, design and policy approaches) that can help to create links between new and existing communities. The potential for overall health benefit can be significantly maximised when positive health outcomes can be extended to existing, surrounding communities. Planning for social infrastructure should give consideration to the area's wider needs and provision should attempt to address existing as well as projected needs. New facilities can encourage existing, surrounding residents into a new area to assist with integration and the breaking down of physical and social barriers.

### 8.4.1 Initial guidance questions

The following guidance questions on social and cultural consideration are listed in the enHealth *HIA Guidelines* (2017) and the NSW Health *Healthy Urban Development Checklist* (2009).

| Questions   | Response/ Considerations   |
|---|--|
| Will the development result in an increase or decrease in the provision of social infrastructure?   | The development will provide an increase in community facilities through the provision of a shared use community centre and clubhouse for water-based recreation, and potentially additional spaces within the Elliptical Building. There is also an opportunity for arts and creative space at 1-3 Bank Street.   |
| Will the new population have access to adequate social infrastructure either within the proposed development or in the wider area?        | <p>The planned community centre/club house is designed to meet the needs of new residents for meeting and activity space, as well as provide clubhouse and storage facilities for water recreation users.</p> <p>Other forms of social infrastructure including schools and health services will be accessed through existing facilities and services.</p>   |
| Have facilities been planned to recognise and complement wider, district needs as well as the needs of the immediate resident population? | Social infrastructure studies have considered the needs of any new population in the Blackwattle Bay in the context of the existing network of the wider district.   |
| Has social infrastructure been planned to consider needs of, and encourage use by, both new and existing communities?                     | Community facilities for Blackwattle Bay have been planned to primarily address potential new residents but this has also considered existing community needs and identified gaps in the provision of community space. As an example, the community centre/club house is only required to be 250 square metres to meet the needs of the new Blackwattle Bay residential population but is being planned as a 400 square metre facility to help address existing demands for meeting and activity space.  |
| Will any existing users of the site be displaced or disadvantaged by the development?   | No. Existing water recreation users will have access to a new clubhouse/community space and storage facilities as part of the proposed community centre.   |
| Will existing cultural and social norms be affected by the project?   | It is possible that some of the existing practices of water recreation users, boat owners, fishers, etc. may be affected by the development of the Blackwattle Bay Precinct. These effects may be both positive and negative and would need to be more clearly established through additional community engagement.  |
| Will the changes result in changes to the cost to access existing amenities, services and facilities?                                     | No. It is likely that access to the proposed community facilities will be consistent with the current fees and charges for City of Sydney community facilities.  |
| Are there existing gaps in the provision of social infrastructure that the project will affect either positively or negatively?           | <p><i>The Social Sustainability Study</i> (Elton Consulting, 2021) identified existing shortfalls as community floorspace, creative and arts spaces, child care, open and green spaces and courts, outdoor gyms and indoor recreation and play opportunities in general.</p> <p>The Blackwattle Bay Precinct will include a community centre, cultural and creative spaces, open and play spaces, as well as opportunities for child care and outdoor recreation. Other forms of social infrastructure will be provided in other parts of the wider Bays Precinct.</p> |

| Questions  | Response/ Considerations  |
|--|---|
| Will any planned social infrastructure be a shared resource that is accessible to both new and existing communities? | Yes. The proposed community centre will be accessible to all community members including existing, adjacent communities.  |
| Will the design and management of community facilities encourage a broad range of activity choices?                  | At this stage, precise ownership and management models have not been determined. It is envisaged that the proposed community centre will operate in a way that is consistent with the City of Sydney’s general approach to community facility management including provision of a wide range of community events and activities to address broad and diverse community needs. |

### 8.4.2 Key considerations

Health impacts can include changes to people’s ‘way of life’ and their existing social and cultural practices. These changes can leave people feeling alienated within their communities and result in stress, anxiety and a sense of loss. Social infrastructure is one way that the needs of existing user groups can be addressed. The planned community centre/club house facility is intended to address the needs of both new residents and existing water-based recreation users who are long term users of Blackwattle Bay and have expressed some concern about being displaced from the area.

Existing area residents of Glebe, Ultimo and Pyrmont are also key existing stakeholders in the planning and development of Blackwattle Bay. As previously stated, leading practice in urban renewal aims to ensure that benefits of any redevelopment are shared among both new and existing communities. Social infrastructure is a key means through which these shared benefits can be achieved. The new community facility has considered existing community needs and identified gaps for multipurpose meeting and activity space and factored this into the planning of the proposed new community centre/club house. Ongoing engagement with the full range of stakeholder groups will be required to ensure any planned community facility achieves maximum potential community benefit.

Engagement undertaken by INSW with NSW Health indicated that there are no requirements for a NSW Health facility on site. There will likely be demand created for approximately 3 general practitioners to operate, most likely within a private medical facility/space.

**It is recommended that:**

- 1. The recommendations from the *Social Sustainability Study* be implemented in relation to community, recreation and cultural facilities.**
- 2. Existing stakeholder groups and potential facility users (including water-based recreation groups and existing residents) be engaged in the design development process for the proposed community centre/club house.**

### 8.4.3 Social infrastructure assessment summary

| Issue                   | Description                            |
|-------------------------|--|
| Health impact           | Social infrastructure                  |
| Determinant/s of health | Social connection<br>Physical activity |

| Issue   | Description  |
|---|--|
| Source of information                           | Literature review – academic research<br><i>Social Sustainability Study</i> (Elton Consulting)<br>Stakeholder engagement<br>Community engagement outcomes  |
| Nature of (inherent) impact                     | Positive   |
| Timing of impact                                | Long-term  |
| Consequence (if not mitigated)                  | Major  |
| Likelihood (if not mitigated)                   | Almost certain   |
| Risk assessment (prior to mitigation)           | Very high (positive)   |
| Groups affected – differential impacts          | Potential benefits to both existing residents and site users (water recreation groups) and any new residents.  |
| Precinct Plan response                          | <ul style="list-style-type: none"> <li>» The Precinct Plan includes both a boat house/club house facility with boat storage located under the Bank Street Open Space and directly off the Waterfront Promenade. While this facility is intended to serve the needs of the existing dragon boat and kayak communities, it is also intended to be shared, multipurpose facility that is available for wider community activities and programs</li> <li>» The existing buildings at 1-3 Bank Street are seen as an opportunity for a combination of both community and cultural uses. The Precinct Plan envisages a range of arts and creative uses to be accommodated in this space including studios, maker space, gallery and exhibition space and performance and event space.</li> </ul> |
| Additional mitigations or recommendations       | <ul style="list-style-type: none"> <li>» Existing stakeholder groups and potential facility users (including water-based recreation groups and existing residents) be engaged in the design development process for the proposed community centre/club house</li> <li>» Ongoing engagement with the full range of stakeholder groups will be required to ensure any planned community facility achieves maximum potential community benefit</li> </ul>   |
| Nature of residual impact                       | Positive   |
| Risk assessment (if full mitigation undertaken) | Very high (positive)   |

Social infrastructure has the potential to be a form of ‘bridging infrastructure’ that can assist with the integration of new and existing communities.

The community facility space included in the Blackwattle Bay Precinct Plan has been scoped to address existing community needs beyond just that of residential development within the site area. While the provision of land and ultimately the community facility building are key parts of the physical planning process, more work will be

required on the ownership, management and programming of the space to ensure that the intended community health benefits are achieved.

While the Precinct Plan includes the community facility (community centre/club house) and the potential for arts and creative space at 1-3 Bank Street, social infrastructure demands will extend beyond this and include health and education facilities that will be provided off site. Monitoring will need to ensure that community needs for the full range of social infrastructure are being addressed over time.

## 8.5 Air pollution

Air pollution is a health impact that has the potential to have a significant effect if not properly planned for and mitigated. The key issue is the proximity of residential dwellings to the Western Distributor and what can be done through the placement and design of those residential buildings to minimise any potential, possible harm from motor vehicle emissions and other vehicle related air pollution. Given the potential significance of this issue, Infrastructure NSW commissioned a specific technical study, a *Health Risk Assessment*, to examine the health impacts of particulate matter and nitrogen dioxide on future residents.

The *Health Risk Assessment* (SLR, 2021:42) found that residents of the planned Blackwattle Bay Precinct would be subject to lower pollution exposures (to particulate matter and nitrogen oxide) than existing residential areas to the south, southeast and north of the study area. Although introducing a residential population into an area where there was previously none, will create exposure to pollutants, the study found that this exposure was considered to be at safe levels and was less than the exposure levels experienced by the surrounding existing communities, providing an "average net health benefit".

The *Health Risk Assessment* did identify several locations within Blackwattle Bay where an unacceptable increase in mortality from long-term exposure could occur. The assessment found that this was only likely to be an issue if a large population of people were to live in those particular locations. The assessment identified those locations where a greater than 10 in 100,000 population increase is likely to exist and recommends that additional management measures in building design should be considered. The assessment also notes that 'the vast majority' of these locations are retail and commercial locations rather than residential ones.

### 8.5.1 Initial guidance questions

The following guidance questions on air quality are listed in the enHealth *HIA Guidelines* (2017):

| Questions  | Response/ Considerations   |
|--|--|
| Will there be a significant decrease in the levels of air quality?   | <p>The development itself will not significant adversely impact air quality. Some vehicle emissions could be expected from both the commercial uses (including continuing emissions from the relocated Sydney Fish Market) and to a lesser extent any residential use on the site.</p> <p>Planning for the Precinct has resulted in the discontinuation of one of the existing concrete batch plants operating on site as well as an increase in landscaping. These changes are likely to have a positive impact on air quality.</p> |
| Are there any aspects of the proposal that could generate emissions? | <p>While a residential component in Blackwattle Bay will generate additional vehicle traffic, it is likely to be relatively minor. Trends in vehicle emissions (outlined below) suggest that any increases are unlikely to be significant.</p> <p>Commercial uses are usually greater traffic generators than residential uses. An increase in commercial and retail space is likely to result in some traffic generation.</p>   |
| Will there be any increase in respiratory                            | <p>Introducing residential uses onto the site, where no population lived before, will necessarily mean that human exposure to pollutants on the site will be greater in</p>  |

|   |   |
|---|---|
| <p>health disease (e.g. asthma) from any changes in air quality?</p>  | <p>the future due purely to the existence of a new population. The SLR <i>Health Risk Assessment</i> (2021) found that the incidence of respiratory health disease will be less in the Blackwattle Bay site than in existing residential areas to the south, south east and north of the study area.</p> <p>Recommendations from the <i>Health Risk Assessment</i> regarding building placement, design and management should be incorporated into the Blackwattle Bay Precinct Plan.</p> |
| <p>Will wind direction result in changed levels of pollution in local areas?</p>  | <p>The development of the Blackwattle Bay Precinct has been found in the <i>Air Quality Study</i> and <i>Health Risk Assessment</i> (SLR, 2021) to not contribute to the altering of levels of pollution in the local area in any discernible way.</p>  |
| <p>Will particulate matter or odours be released from the development?</p>  | <p>The Sydney Fish Market will release odours. The health impacts of this will be minimal. The <i>Air Quality Assessment for the Fish Markets</i> (SLR, 2019) found that 'cooked seafood odours' were generally only detectable within 10 to 15 metres from the boundary.</p> <p>Particulate matter is unlikely to be released by the Blackwattle Bay development itself but existing uses (the Western Distributor) will be a source of particulate matter emission.</p>                 |
| <p>How do the predicted air quality levels compare with accepted standards?</p>   | <p>The <i>Air Quality Study</i> (SLR, 2021) found that existing quality is within recognised standards. The <i>Health Risk Assessment</i> (SLR, 2021) found that air quality on the site will be better than that of surrounding, existing communities.</p>   |
| <p>Are there any sensitive communities (e.g. children, elderly) in the area likely to be affected by the development?</p> | <p>Children and young people in any proposed residential dwellings in Blackwattle Bay as well as existing residents in surrounding communities are likely to be the most sensitive receptors of air quality impacts. Health figures shown earlier also indicate that approximately 1 in 4 people in NSW suffer from respiratory system disease. These figures could be assumed to apply to any incoming residential population.</p>   |

While useful as a guide, these types of questions are focused more on the generation of air pollution from the development of Blackwattle Bay. While this is important, the most significant concern regarding air quality and health impacts is the possible location of residential dwellings in proximity to both the Western Distributor and existing industrial uses.

## 8.5.2 Key considerations

### Residential uses

Previously cited research (Bowatte et al, 2017) found an increase in asthma, wheeze and poor lung function in people aged 45-50 who lived within 200 metres of a major road. The research warrants a high degree of caution regarding the location of residential uses in proximity to the Western Distributor.

While the potential health risk is a key issue, the research and data also suggest that changes to vehicles and fuels may alter the nature and significance of air pollution related health impacts.

According to *Trends in Motor Vehicles and their Emissions* (NSW Environment Protection Authority, 2014), cars built from 2013 onwards emit only 3% of the NO<sub>x</sub> emissions compared to vehicles built in 1976, and diesel trucks built from 2011 onwards emit just 8% of the particles emitted by vehicles built in 1996. The NSW Environment Protection Authority (2018:2) conclude "In spite of the increase in vehicle kilometres travelled (VKT), the strong reduction in vehicle emission rates has resulted in significant reductions in total fleet emissions, and these



reductions are projected to continue over the next 10-20 years". So, while vehicle travel may increase, it is not necessarily the case that emissions will also increase.

Notwithstanding, the *Air Quality Assessment* (SLR, 2021) found that Nitrogen Dioxide exceedances were predicted to occur along the façades of all proposed buildings. However, the assessment found that these exceedances predominantly affected lower floors where the proposed use is commercial or retail for the facades facing the Western Distributor or Hymix. The Air Quality Assessment, therefore, recommends additional mitigation measures to address these issues and these have been incorporated into the proposed Planning Framework.

Beyond vehicle exhaust emissions, the NSW Environment Protection Authority (2018:11) also report that non-exhaust particulate matter accounts for more than half of all total motor vehicle particulate matter. Non-exhaust emissions from road traffic refers to particles released into the air from brake wear, tyre wear, road surface wear and resuspension of road dust during on-road vehicle usage. The Air Quality Expert Group (2019) found non-exhaust emissions arise regardless of the type of vehicle and its mode of power, and contribute to the total ambient particulate matter burden associated with human ill-health and premature mortality. They conclude that while legislation has been effective at driving down emissions of particles from the exhausts of internal-combustion-engine vehicles, the non-exhaust emissions proportion of road traffic emissions has increased.

As was the case for Nitrogen Dioxide emissions, the *Air Quality Assessment* (SLR, 2021) found that exceedances in particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) occurred along the façade of all proposed buildings. However, the assessment found that exceedances primarily affected lower floors for those building facades facing the Western Distributor, and recommends that only commercial and retail uses be proposed in these sections of the development.

This finding is based on a scenario where the Hymix Concrete facility is no longer operational. If Hymix were to remain, the modelling shows that 10 of 629 receptors of residential floors will be affected for PM<sub>10</sub> and 41 of 629 for PM<sub>2.5</sub>.

Overall pollutant levels are, through the *Air Quality Assessment* and *Health Risk Assessment*, projected to be acceptable. However, the studies clearly show that some areas within Blackwattle Bay are more susceptible to pollutant exceedances than others. The Precinct Plan should ensure it responds to the air quality modelling regarding location, treatment and management of buildings and facades. Allowance should be made for the trends in motor vehicle emissions, with improvements to both engines and fuel, however, particulate matter will continue to be an issue. Given what the research indicates about proximity to roadways and prolonged exposure, a precautionary approach is required. In this situation, residential building design should be informed by the NSW Department of Planning *Apartment Design Guide* (2015) and air quality analysis undertaken to ensure that building elements such as openable windows and open balconies were not creating air flows that may result in exceedances in air pollution and placing inhabitants at risk.

The SLR *Air Quality Assessment* (2021) refers to design considerations included in the NSW Department of Planning guidance, *Development Near Rail Corridors and Busy Roads*, which includes:

- » Minimising the formation of urban canyons that reduce dispersion. Having buildings of different heights interspersed with open areas, and setting back the upper storeys of multi-level building to help avoid urban canyons
- » Incorporating an appropriate separation distance between sensitive uses and the road using broad scale site planning principles such as building siting and orientation. The location of living areas, outdoor space and bedrooms and other sensitive areas (such as childcare centres or public open spaces) should be as far as practicable from the major source of air pollution. While the *Air Quality Assessment* identifies an adequate buffer to be of 20 metres, other research referred to above (Bowatte et al, 2017) describes a separation of 200 metres as appropriate for older people, which may be an additional consideration for future design.
- » Ventilation design and openable windows should be considered in the design of development located adjacent to roadway emission sources. When the use of mechanical ventilation is proposed, the air intakes should be site as far as practicable from the major source of air pollution
- » Using vegetative screens, barriers or earth mounds where appropriate to assist in maintaining local ambient air amenity. Landscaping has the added benefit of improving aesthetics and minimising visual intrusion from an adjacent roadway.

From a HIA perspective, an application of the precautionary principle, the buffering of residential uses from the Western Distributor, both vertically or horizontally, is required.

**Given this the key recommendation related to air pollution and residential uses on the site is:**

- 1. In accordance with the findings of the SLR *Air Quality Assessment and Health Risk Assessment (2021)*, sensitive receptors including residential uses, public open spaces and child care centres should be appropriately located and buffered from the Western Distributor and areas identified as locations of likely exceedances.**

### **Vulnerable groups**

The research suggests that among the most sensitive receptors for air pollution are children. Children are particularly vulnerable to traffic-pollution exposure because their lungs are still developing and they often spend more time outside than adults. A 2015 study (cited by Walter, et al, 2019) found that every two microgram per cubic metre incremental increase in chronic exposure to particulate matter from car exhausts in early childhood, increased the risk of developing asthma in later childhood by 14 per cent.

Noting that the Social Sustainability Study identifies future needs for child care centres in Blackwattle Bay, the proximity to the Western Distributor suggests that any child care centre, especially with an outdoor play area, should be provided with adequate buffering distances.

**It is recommended that:**

- 2. Any child care facility, including any outdoor play areas, should comply with both child care regulations and air quality standards.**

### **Industrial air pollution**

The *Bays Market District Stage One – Existing Environment Interim Air Quality Assessment* (SLR, 2017:30) reported that “continued operation of the Hymix concrete batching plant has the potential to result in elevated particulate concentrations and nuisance dust impacts at the future residential receptors with the Investigation Area”. The SLR *Interim Air Quality Assessment* continues to recommend “a detailed assessment of the potential air quality impacts from concrete batching plants located in the vicinity of the Investigation Area be performed”.

The Hanson concrete batching facility has been relocated as part of the New Sydney Fish Market development. This will assist in the reduction of existing air pollution at the site. As there is no certain pathway or timeline for any possible future decommissioning of the Hymix concrete plant (a privately owned facility), a precautionary approach is suggested regarding the potential for residential uses in proximity to the Hymix site is required.

**It is recommended that:**

- 3. If Hymix continues to operate, lower floors of buildings closest to the Hymix facility should be non-residential with residential uses located as far as possible away and higher floors.**

### **Dust and other particulates**

The *Air Quality Assessment of the New Sydney Fish Markets* (SLR, 2019) assessed the potential for off-site dust impacts. The results of this assessment indicate that dust impacts due to construction works for the New Sydney Fish Markets can be adequately managed with the implementation of site-specific mitigation measures, and that the residual impacts are likely to be low for construction and earthworks activities and negligible for track out activities.

The potential for off-site air quality impacts due to operation phase activities was also assessed (SLR, 2019) using a qualitative risk-based approach. SLR found that “provided appropriate mitigation measures are implemented as part of the detailed design stage the relevant air quality criteria ... will not be exceeded as a result of the operation of the development”.

**It is recommended that:**

- 4. A Construction Management Plan be prepared at development application stage that examines air pollution impacts of the construction process, including earthworks and transportation, including potential impacts on existing surrounding uses.**

### Green space

While the location of residential uses is a key mitigation against air and noise pollution, there are other planning and design interventions that could mitigate some impacts of air quality if residential uses were to be included (some of these mitigations are likely to also be useful whether residential is included on the site or not). Midouhas et al (2019) report that air pollution and greenspace are inversely related and that there is a growing evidence base that “green space can contribute to the reduction of air pollution in urban settings”. Research suggests that green space may mitigate against the potentially harmful effects of air and noise pollution and heat on the cardiovascular system (Kondo et al, 2018:13).

As is documented elsewhere in this HIA, the inclusion of green space in urban environments has a wide range of health benefits including mitigation against air pollution, noise and heat as well as creating environments that have a range of physical and mental health benefits. Inclusion and investment in green space in the Blackwattle Bay Precinct is, therefore, seen as an important and comprehensive mitigation strategy to maximise positive health outcomes from the Blackwattle Bay Precinct.

**It is recommended that:**

- 5. Master planning considers the role of urban green space as mitigation for air pollution and focus on maximising green space in the urban environment.**

### 8.5.3 Air pollution assessment summary

| Issue                                  | Description   |
|--|---|
| Health impact                          | Air pollution   |
| Health factors                         | Quality of life<br>Physical activity<br>Respiratory health<br>Cardiovascular health   |
| Source of information                  | Literature review – academic research<br>SLR <i>Draft Health Risk Assessment</i> (2021)<br>SLR <i>Draft Air Quality Assessment</i> (2021)<br>Stakeholder engagement |
| Nature of (inherent) impact            | Negative for sensitive receptors including residential uses   |
| Timing of impact                       | Long-term   |
| Consequence (if not mitigated)         | Major   |
| Likelihood (if not mitigated)          | Likely  |
| Risk assessment (prior to mitigation)  | Very high   |
| Groups affected – differential impacts | Occupiers of residential dwellings particularly children, elderly people and anyone with existing respiratory problems.   |

| Issue  | Description  |
|--|--|
|  | Pregnant women<br>Greatest issues likely for those closest pollutant sources   |
| Proposed master plan and how it responds to the impact | Air pollution impacts are likely to be mostly addressed during detailed design including design of dwellings, to protect users of the site.  |
| Additional mitigations or recommendations              | Residential uses located in response to findings of the SLR <i>Air Quality Assessment</i> and <i>Health Risk Assessment</i> (2021) including locating sensitive receptors including residential uses as far as possible from major pollutant sources (especially the Western Distributor and Hymix Concrete facility), and considering non-residential uses for lower floors.<br><br>Residential uses should be buffered from pollutant sources by commercial/retail uses where possible as well as located at higher locations in buildings according to the SLR findings.<br><br>Landscape treatments should be designed to minimise air pollution impacts on residential, commercial, retail and public spaces.<br><br>A Construction Management Plan be prepared that examines air pollution impacts of the construction process, including earthworks and transportation, including potential impacts on existing surrounding uses<br><br>Landscape planning consider the role of urban green space as mitigation for air pollution and that landscape plans focus on maximising green space in the urban environment |
| Nature of residual impact                              | Acceptable   |
| Risk assessment (if full mitigation undertaken)        | Medium (will require ongoing monitoring)   |

Air quality is identified as a priority potential health impact for Blackwattle Bay. A precautionary approach is required given the potential significance of impacts and risk to human health. This involves more detailed air quality monitoring and a more site-specific approach to the collection of air quality data.

There are numerous examples throughout Sydney of residential apartment buildings being developed adjacent to busy roadways. With appropriate design, setbacks, and building orientation, impacts on air quality from adjacent roadways can be significantly reduced. Blackwattle Bay may be an opportunity to demonstrate how residential development adjacent to major roadways can be achieved in a way that creates a quality design outcome to ensure the achievement of quality of life and health and wellbeing outcomes for future residents.

## 8.6 Noise pollution

While noise can have a direct impact on cardiovascular health and hearing impairment, recent research has also focussed on its significant impact on wellbeing and quality of life. The World Health Organisation recognises 'annoyance' created by noise as a legitimate and potentially significant health impact issue.

### 8.6.1 Initial guidance questions

The following guidance questions on noise and vibration are listed in the enHealth *HIA Guidelines* (2017):

| Questions  | Response/ Considerations  |
|--|---|
| Are there any parts of the process likely to generate noise and vibration that would permeate outside the area of the development? | The construction process will likely generate significant noise and vibration. A detailed analysis of construction impacts is beyond the scope of this HIA. A detailed Construction Management Plan will be required to address noise and vibration impacts.  |
| Will any noise or vibration be generated during the evenings, night time or early mornings?  | It is likely that the New Sydney Fish Market will generate noise during early mornings (with deliveries, unloading, etc.) and during night time and evenings with restaurants, functions, etc. A detailed analysis of the noise impacts of the Fish Markets has been undertaken in the preparation of the development application for that project. Marina uses may also generate noise during early mornings, and to some degree use of public spaces.   |
| Will there be noise or vibration emanation from transportation activities associated with the development?                         | <p>Boating uses associated with the Fish Markets and marina could be sources of noise. These should be assessed and controlled as part of the relevant development approvals process.</p> <p>Deliveries to the Fish Markets will also be noise generators. These should be assessed and controlled as part of the development approvals process.</p> <p>The existing industrial uses on the site are also noise generating and this needs to be considered in the long-term planning of Blackwattle Bay.</p> <p>While not part of the Blackwattle Bay Precinct development, the existing Western Distributor is a significant source of noise pollution that is directly adjacent to Blackwattle Bay and the site of any possible residential uses.</p> |

While useful as a guide, these types of questions are focused more on the generation of noise and vibration pollution from the development of Blackwattle Bay. While this is important, the most significant concern regarding noise and vibration impacts is the possible location of residential dwellings in proximity to the Western Distributor.

### 8.6.2 Key considerations

The previously cited research by von Lindern (2016) and others identifies the role of annoyance and disturbance caused by traffic noise in residential context as contributors to a wide range of social, cultural, economic, and psychological wellbeing impacts.

The SLR *Noise and Vibration Assessment* (2021) identifies the Western Distributor, Pyrmont Bridge Road and Bridge Road, as well as the Hymix plant, as the most significant sources of noise for the Study Area. By removing existing buildings currently located on the boundaries of these roads and the existing Fish Market, there will be an increase in noise levels for internal parts of the site. Re-building high buildings, such as the proposed multi-storey towers close to the Western Distributor, will mitigate this impact, however “will require careful design and internal layout configuration in order to ensure that the noise requirements of the City of Sydney DCP (and the Apartment Design Guideline) can be achieved”.

#### Residential uses

Given the available data on noise and air pollution, a key consideration is apartment building design in Blackwattle Bay. The *Noise and Vibration Assessment* concludes that “non-habitable spaces and circulation routes are planned for spaces overlooking the Western Distributor or Bridge Road within any residential towers that are proposed on the northern boundary of the site”. Residential design should be guided by the relevant objectives of the NSW

Department of Planning (2015) *Apartment Design Guide*. It is noted that the *Apartment Design Guide* is guidance and not a requirement. Relevant objectives related to noise mitigation include:

4B-1 – All habitable rooms are naturally ventilated

4B-3 – The number of apartments with natural cross ventilation is maximised to create a comfortable indoor environment for residents

4E-1 – Apartments provide appropriately sized private open space and balconies to enhance residential amenity

4H-1 – Noise transfer is minimised through the siting of buildings and building layout

4J-1 – In noisy or hostile environments the impacts of external noise and pollution are minimised through the careful siting and layout of buildings

4J-2 – Appropriate noise shielding or attenuation techniques for the building design, construction and choice of materials are used to mitigate noise transmission

4M-1 – Building facades provide visual interest along the street while respecting the character of the local area

4U-3 – Adequate natural ventilation minimises the need for mechanical ventilation.

The SLR report concludes that, should all recommended measures be implemented, “there are no existing noise conditions which would preclude future residential development on the site from achieving compliance with the established policy and guideline requirement noise levels”.

**It is recommended to:**

- 1. Implement the acoustic shielding measures from the SLR *Noise and Vibration Assessment (2021)* and Department of Planning (2015) *Apartment Design Guide*.**
- 2. Include traffic calming measures as described in the SLR *Noise and Vibration Assessment (2021)*.**
- 3. Consider land uses in order to locate high noise generating uses (i.e. commercial, licensed premises) away from residential areas.**

**Non-residential uses**

The existing Hymix industrial (concrete batching facility) are operating under existing consents. The SLR *Noise and Vibration Assessment (2021)* identifies the industrial noise associated with the Hymix facility as one of the most significant existing noise sources along with traffic noise. However, the spatial scale of this noise source is more limited, with the Assessment confirming that for most residential areas of the Precinct, road traffic noise impacts would be greater than industrial noise. Notwithstanding this, inclusion of residential buildings at Blackwattle Bay should consider existing noise emissions from industrial uses and be setback and designed as appropriate to mitigate noise impacts. This may include higher levels of façade attenuation than that required to mitigate road traffic noise.

The other potential noise source is the New Sydney Fish Markets which, especially considering its hours of operation, could become a noise issue for residents on the site. The SLR *Noise and Vibration Assessment (2021)* identifies that noise levels from new Sydney Fish Market are not anticipated to result in any exceedances of the Project Noise Trigger Levels for industrial noise.

**It is recommended that:**

- 4. Any residential buildings located at Blackwattle Bay should consider existing noise emissions from industrial uses and be set back and designed as appropriate to mitigate noise impacts.**

**Green space**

Modification of both the noise source and the main receptive environment (in this case residential buildings) is a key focus of noise pollution mitigation. However, public open space is also a key consideration. While public open space also needs to be buffered from excessive and unpleasant noise, it can also play a role as a direct mitigation.



Von Lindern et al (2016) states that stress caused by disturbance becomes chronic when environmental demands persistently tax an individual’s capacity to cope. This inability to cope is exacerbated in environments where there is no opportunity or place “for the individual to adequately restore the various resources that have been depleted” (von Lindern et al, 2016:93). For the Blackwattle Bay Precinct this means provision of places of ‘refuge’ for residents, workers and others who may require a break from the continual noise of the surrounding city. Particularly in higher density residential neighbourhoods in busy parts of the city, the inclusion of quiet spaces for recuperation, contemplation and relaxation is an important mitigating factor for the promotion of mental health and the reduction of stress.

Spaces for quiet and recuperation are likely to be even more important in a Precinct like Blackwattle Bay, given its proximity to a major roadway, as well as being a significant tourist and visitor attraction. As such, and consistent with the overall vision, the Precinct will be lively and vibrant, full of people and activity. While this has great benefits, the relative constancy of activity and its associated noise may not provide the ideal environment for residents of the Precinct who may require quiet space for some relief from the noise and activity. Given this the landscape design and overall master plan should include a range of public spaces, appropriately scaled and designed that would enable residents who are seeking some calm and quiet in order to regenerate their coping capacity. The SLR *Noise and Vibration Assessment* (2021) further identifies that there will be health benefits associated with the provision of quiet passive and active open spaces, if shielded from noise sources including traffic noises.

**It is recommended that:**

- 5. Landscape planning consider the role of quiet spaces within the landscape as mitigation for noise pollution and that landscape plans focus on maximising green space in the urban environment.**

### 8.6.3 Noise pollution assessment summary

| Issue                                  | Description   |
|--|---|
| Health impact                          | Noise pollution   |
| Health factors                         | Quality of life<br>Annoyance<br>Stress, anxiety<br>Rest, relaxation, recuperation   |
| Source of information                  | Literature review – academic research<br>SLR Draft <i>Noise and Vibration Assessment</i> (2021)<br>Stakeholder engagement |
| Nature of (inherent) impact            | Negative  |
| Timing of impact                       | Long-term   |
| Consequence (if not mitigated)         | Moderate  |
| Likelihood (if not mitigated)          | Likely  |
| Risk assessment (prior to mitigation)  | Medium  |
| Groups affected – differential impacts | Occupiers of residential dwellings  |



|   |   |
|---|---|
|   | <p>Visitors to Precinct including users of public open spaces</p> <p>Greatest issues likely for those closest to Western Motorway</p>   |
| Proposed Precinct and how it responds to the impact | <p>Noise impacts are likely to be mostly addressed during detailed design of dwellings, to protect residents from external noise sources, as well as road design, to ensure traffic calming measures.</p> <p>The proposed tall towers along the Western Distributor will shield internal areas, including open spaces, from main noise sources.</p>   |
| Additional mitigations or recommendations           | <p>Mitigation likely to be mostly limited to properties themselves: design of any residential uses in accordance with Apartment Design Guidelines considering design and orientation of balconies, operable windows, etc.</p> <p>Relevant noise controls and hours of operation considerations implemented in assessment of New Sydney Fish Markets development application.</p> <p>Inclusion of quiet public spaces designed to be buffered from noise and activity in Landscape Plan for Blackwattle Bay.</p> |
| Nature of residual impact                           | Negative  |
| Risk assessment (if full mitigation undertaken)     | Low (for internal residential areas)  |

## 8.7 Land contamination

Land contamination is a reasonably common issue in urban renewal projects. It is an issue that if left unmitigated can have significant negative health impacts. However, comprehensive remediation can also create a land quality and health outcome that is greater than the existing situation.

### 8.7.1 Initial guidance questions

The following guidance questions on land and soil are listed in the enHealth *HIA Guidelines* (2017):

| Questions  | Response/ Considerations   |
|--|--|
| Will any demolition or construction activities be likely to disturb or release any hazardous materials such as asbestos? | Yes. The review of the existing contamination reports suggested that asbestos is present throughout the site. It also found evidence of petroleum hydrocarbons, lead, benzene and other metal contaminants   |
| Will any contaminated sites be involved in the development process?  | Yes. The existing contamination reports found that both land and groundwater were contaminated   |
| Are there any sections of the community that may be more exposed or more sensitive to the above releases?                | Children may be particularly susceptible to health risk from contaminated soil. Beyond standard remediation measures, consideration will need to be given to the suitability of uses such as child care on the site. Pregnant women may also be at increased risk. |

Will there be any decomposition of disposed materials on the site that could result in air or water pollution?

The site includes an area of historical landfill. Further study is required to identify the nature of the fill, the presence of hazardous materials and the effectiveness of any recommended remediation strategies

## 8.7.2 Key considerations

The *Environmental Site Assessment* (JBS&G, 2021) identifies several potential sources of contamination across the site including:

- » Fill used during land reclamation including imported waste from nearby historical industrial facilities
- » General imported fill materials and industrial land uses
- » Ash/slag type waste materials associated with historical wood and coal fired boilers/metal smith workshops
- » Sources associated with former and current land and marine industrial operations and maintenance and infrastructure
- » Presence of marine sediments and deposits and/or ground gases.

Potential contaminants include heavy metals and polycyclic aromatic hydrocarbons, petroleum hydrocarbons, asbestos, pesticides/herbicides, polychlorinated biphenyls, organotin compounds, ground gases, acid sulfate soils. A detailed list is available in the *Environmental Site Assessment*.

Potential contamination could have impacted soils, sediments, groundwater, surface water and vapours. If not mitigated, this could impact existing and future residents, workers, visitors and generally all users of the site, including construction workers.

The Assessment concludes that a Site Wide Remedial Concept Plan should be prepared for the Site to identify suitable management plans and procedures and to demonstrate that contamination issues can be addressed to make the site suitable for the proposed uses.

A *Site Wide Remedial Concept Plan* (SWRCP) has been prepared (JBS&G, 2021) and identifies remediation and management solutions to ensure that the risk is reduced to an acceptable level. A series of solutions are proposed and include on and off-site treatment, containment with use of a barrier/capping, and removal to an approved site or facility or other management strategy.

The SWRCP concludes that subject to all these measures being successfully implemented, the Study Area "can be made suitable for the range of intended uses as proposed and [...] the risks posed by contamination can be managed in such a way as to be adequately protective of human health and the environment". This requires the preparation of a Remediation Environmental Management Plan and Work Health and Safety Management Plan which are not yet available, and a range of validation and monitoring reports after completion of the works.

The SWRCP was audited (Ramboll, *Site Audit Report*, 2021) with Ramboll concluding that the SWCP provides an adequate framework, noting that some areas may require a case by case assessment through additional investigations.

### It is recommended that:

- 1. The findings and recommendations of the Environmental Site Assessment and Site Wide Remedial Concept Plan be implemented, with contamination to be addressed at the development application stage including with a Remediation Environmental Management Plan and Work Health and Safety Management Plan.**
- 2. Appropriate ongoing monitoring measures be put in place as per the recommendations of the Site Wide Remedial Concept Plan.**

### 8.7.3 Land contamination assessment summary

| Issue   | Description   |
|---|---|
| Health impact                                       | Land contamination  |
| Health factors                                      | Childhood health and development<br>Maternal health<br>Cancer<br>Respiratory illness  |
| Source of information                               | Literature review – academic research<br><i>Environmental Site Assessment</i> (JBS&G, 2021)<br><i>Site Wide Remedial Concept Plan</i> (JBS&G, 2021)<br><i>Site Audit Report</i> (Ramboll, 2021)<br>Local historical information regarding previous uses<br>Stakeholder engagement |
| Nature of (inherent) impact                         | Negative with potential for positive with appropriate remediation   |
| Timing of impact                                    | Long-term   |
| Consequence (if not mitigated)                      | Major   |
| Likelihood (if not mitigated)                       | Possible  |
| Risk assessment (prior to mitigation)               | Very high due to some potential unacceptable risk for human health  |
| Groups affected – differential impacts              | Children are known to absorb some contaminants more readily than adults<br>Pregnant women may also be at increased risk.  |
| Proposed Precinct and how it responds to the impact | Ongoing investigations and management plans are being undertaken.<br>Contamination is likely to be mostly addressed during detailed design and development application requirements.  |
| Additional mitigations or recommendations           | Analysis of contamination implications<br>Design of effective remediation plan<br>Implementation of monitoring measures   |
| Nature of residual impact                           | Positive – appropriate remediation has the potential to lessen any possible existing health risk and provide an overall positive health outcome   |
| Risk assessment (if full mitigation undertaken)     | Low   |

Effective and comprehensive remediation, through the development of the Blackwattle Bay Precinct (at the development application stages), is an opportunity to address and potentially improve any existing health risk for contaminated land in the area.

Redevelopment of contaminated land is usual practice in urban renewal projects. Best practice remediation practices should be employed to ensure positive health benefits from the Blackwattle Bay Precinct redevelopment.

## 9 Health Equity

One of the core principles of HIA identified in enHealth *Health Impact Assessment Guidelines* (2017) is equity. The Guidelines describe equity as “the distribution of health impacts and identification of those groups who may be more vulnerable to adverse impacts and how mitigation strategies may improve outcomes for those groups”.

Equity in health implies that everyone should have a reasonable opportunity to attain their full human potential and not be unfairly disadvantaged because of their gender, age, cultural background or socio-economic status. Health in equity does not aim to eliminate all health differences between population groups, but rather to reduce where possible those factors that can be considered to be unfair and avoidable. Health equity recognises that some groups experience health impacts differentially and therefore it may be necessary to treat some groups differently in order to create relatively equal health outcomes.

The health research suggests that groups that may be particularly vulnerable to specific forms of health impacts include children and older people. For example, research suggests that children are particularly vulnerable to air pollution while older adults are susceptible to social isolation. These vulnerable groups may exist in both new and existing, surrounding communities. Mitigation measures for these issues need to consider the potential for greater impact on vulnerable groups and how these potential impacts can be differentially and effectively mitigated.

Beyond this, the Community Profile information in Section 7.1 of this report suggests there are some potentially vulnerable groups living within the area of influence of the Blackwattle Bay Precinct. Those groups include:

- » Aboriginal and Torres Strait Islander people
- » Social housing residents
- » Unemployed people
- » People experience disadvantage.

The Australasian Collaboration for Health Equity Impact Assessment (Mahoney et al, 2004) identify a number of questions to ask in relation to health equity:

- » Are health impacts likely to be differentially distributed by socio-economic status, ethnicity, gender, geography or some other factor?
- » Are these differential impacts fair?
- » Are these differential impacts avoidable?
- » Do the benefits of changing the policy, practice (or project) to mitigate differential impacts outweigh the costs of doing so?

It is important to note that the two most significant potential negative health impacts identified for the Blackwattle Bay project are air and noise pollution. Importantly, the majority of the impact from air quality and noise are not generated through the proposed development of Blackwattle Bay but are the result of existing road infrastructure (e.g. Western Distributor) and the possible risks of locating new residential development in proximity to it. Some groups may also be more vulnerable to this type of pollution with research suggesting that children, older people, people with existing respiratory problems may be more sensitive. Existing data shows that these groups are currently represented in the local area, and future residents may also be from these groups.

Although air and noise are important issues, and may impact existing vulnerable groups, these impacts are largely existing and are not significantly worsened by the proposed development of the Blackwattle Bay Precinct. The development of Blackwattle Bay does put more people into an environment that does have some risks, but the Technical Reports (Air Quality and Noise) identify mitigation strategies that can be implemented to reduce impact

One of the equity issues for the Blackwattle Bay Precinct is whether some of the health impacts generated, including some of the positive ones, are equally distributed or available to vulnerable groups in the new or existing population.

As an example, one of the potential health benefits of the development of the Blackwattle Bay Precinct is the encouragement of greater physical activity through the provision of new pedestrian and cycling infrastructure and

greater connectivity of the Precinct to the surrounding suburbs. While overall, this is a significant positive health impact of the project for both existing and new populations, there may be differential benefits for different population groups.

Bell et al (2015), in a review of evidence of physical activity and inequity, found that physical activity and its associated health outcomes are “socially distributed”. ‘Social distribution’ means that:

*Those who are more advantaged (typically individuals with higher education levels, higher incomes, higher status occupations, living in more affluent neighbourhoods, and less likely to be from a cultural or ethnic minority group) are more likely to be regularly physically active and less likely to experience adverse health outcomes associated with inactive lifestyles than their less advantaged peers (Bell et al, 2015:4).*

Bell et al (2015:6) also report that indigenous Australians are less likely to be physically active than non-indigenous Australians.

Research suggests that one contributing factor to lower physical activity levels in disadvantaged communities is that the physical environment in those communities is seen as unsafe, lacking amenity and not conducive to walking, cycling and physical activity. Blackwattle Bay is an opportunity to address this by providing a high quality, physical activity supportive environment nearby to residents experiencing socio-economic disadvantage.

For the benefits of Blackwattle Bay to be realised and positively impact existing residents who may be considered vulnerable, particular attention will need to be paid to physical and social access to the amenity of the Blackwattle Bay Precinct. Physical connectivity is obviously critical and is a challenge (particularly with Ultimo and Pyrmont) given the nature of the existing road network.

Social access and inclusion will also be a key issue with a multi-dimensional approach likely required to ensure that existing local residents (especially those who may be socio-economically disadvantaged) feel like they are welcome in the new Precinct and that the amenities provided (e.g. the Waterfront Promenade, parks, fitness equipment) are also available for their use. This is also important for people with disabilities, in order to make sure that places and spaces are accessible by all, including play spaces.

This multi-dimensional approach will likely require ongoing community engagement as an important and necessary measure to ensure that the needs of more vulnerable groups, existing and future, are identified and properly addressed. Initiatives could include:

- » Programs through the New Sydney Fish Market and possibly in partnership with existing organisations like OzHarvest where surplus produce from the market could be made available to local community members including homeless people and social housing residents.
- » Programs promoting physical activity amongst Indigenous residents.
- » No or low-cost access to spaces that enable and encourage physical activity. In the Blackwattle Bay Precinct this includes not only the Waterfront Promenade but also the proposed outdoor gym and exercise equipment that provides a no cost opportunity for health and fitness for local residents including social housing residents.
- » Providing meeting and training space, for example in relation to affordable, healthy cooking, in the new Fish Markets.

# 10 Summary of recommendations and next steps

This section summarises key likely impacts, before and after mitigation, and discusses monitoring measures.

## 10.1 Summary of assessment

**Table 11 Summary of impacts**

| Potential impacts            | Inherent            |                 |  |   | Residual                                 |                      |
|------------------------------|---------------------|-----------------|--|---|--|----------------------|
|                              | Direction of impact | Risk assessment | Groups most affected   | Cumulative effects  | Residual impact                          | Quality of evidence  |
| <b>Public space</b>          | Positive            | Very high       | Wider community  | None<br>Development will create additional demand for other forms of public open space including playing fields         | Very high                                | Strong               |
| <b>Active transport</b>      | Positive            | Very high       | Wider community  | Important wider impact of completion of regional network  | Very high                                | Strong               |
| <b>Social infrastructure</b> | Positive            | Very high       | Existing residents<br>Water-based recreation groups<br>New residents | None<br>Development will create additional demand for other forms of social infrastructure including schools and health | Very high                                | Strong               |
| <b>Air pollution</b>         | Negative            | Very high       | Children<br>Elderly<br>Respiratory illness sufferers                 | Small contribution from BWB   | Medium (will require ongoing monitoring) | Strong               |
| <b>Noise pollution</b>       | Negative            | Moderate        | Residents<br>Visitors  | Small contribution from BWB   | Low                                      | Reasonable           |
| <b>Contamination</b>         | Negative            | Very high       | Children   | Existing problem that could be improved   | Low                                      | Reasonable and to be |



## 10.2 Recommendations

The recommendations listed in Section 8 are summarised below for each category of impact.

**Table 12 Summary of recommendations**

| Potential impacts            |   |
|------------------------------|---|
| <b>Public space</b>          | <ol style="list-style-type: none"> <li>1. Consider incorporating the following in the design: <ul style="list-style-type: none"> <li>» Universal design/inclusive design principles</li> <li>» CPTED principles</li> </ul> </li> </ol>  |
| <b>Active transport</b>      | <ol style="list-style-type: none"> <li>2. Consider including the following in the design: <ul style="list-style-type: none"> <li>» Rest points and amenities</li> <li>» Universal/inclusive design principles</li> <li>» CPTED principles</li> <li>» Connectivity to key land uses</li> <li>» Wayfinding measures.</li> </ul> </li> </ol>   |
| <b>Social infrastructure</b> | <ol style="list-style-type: none"> <li>3. Existing stakeholder groups and potential facility users (including water-based recreation groups and existing residents) be engaged in the design development process for the proposed community centre/club house</li> <li>4. Ongoing engagement with the full range of stakeholder groups will be required to ensure any planned community facility achieves maximum potential community benefit</li> </ol>  |
| <b>Air pollution</b>         | <ol style="list-style-type: none"> <li>5. In accordance with the findings of the SLR Air Quality Assessment and Health Risk Assessment (2021), sensitive receptors including residential uses, public open spaces and child care centres should be appropriately located and buffered from the Western Distributor and areas identified as locations of likely exceedances.</li> <li>6. Any child care facility, including any outdoor play areas, should comply with both child care regulations and air quality standards.</li> <li>7. If Hymix continues to operate, lower floors of buildings closest to the Hymix facility should be non-residential with residential uses located as far as possible away and higher floors.</li> <li>8. A Construction Management Plan be prepared at development application stage that examines air pollution impacts of the construction process, including earthworks and transportation, including potential impacts on existing surrounding uses.</li> </ol> |
| <b>Noise pollution</b>       | <ol style="list-style-type: none"> <li>9. Implement the acoustic shielding measures from the SLR <i>Noise and Vibration Assessment</i> (2021) and Department of Planning (2015) <i>Apartment Design Guide</i>.</li> <li>10. Include traffic calming measures as described in the SLR <i>Noise and Vibration Assessment</i> (2021).</li> </ol>   |

|                      |  |
|----------------------|--|
|                      | <ol style="list-style-type: none"> <li>11. Consider land uses in order to locate high noise generating uses (i.e. commercial, licensed premises) away from residential areas.</li> <li>12. Any residential buildings located at Blackwattle Bay should consider existing noise emissions from industrial uses and be set back and designed as appropriate to mitigate noise impacts.</li> <li>13. Landscape planning consider the role of quiet spaces within the landscape as mitigation for noise pollution and that landscape plans focus on maximising green space in the urban environment</li> </ol> |
| <b>Contamination</b> | <ol style="list-style-type: none"> <li>14. The findings and recommendations of the Environmental Site Assessment and Site Wide Remedial Concept Plan be implemented, with contamination to be addressed at the development application stage including with a Remediation Environmental Management Plan and Work Health and Safety Management Plan.</li> <li>15. Appropriate ongoing monitoring measures be put in place as per the recommendations of the Site Wide Remedial Concept Plan.</li> </ol>   |

### 10.3 Monitoring

Evaluating whether the HIA has influenced the decision making process (and the subsequent proposal) is an important component of HIA. As with any intervention, evaluation is required to see if it has worked. Evaluation of the HIA process is also useful to answer why the HIA worked (or not).

Monitoring the implementation of the proposal is critical to ensure that any recommendations that decision-makers agreed to, actually occur. Longer term monitoring of the health of populations is sometimes a component of larger proposals. This long term monitoring can be used to see if the predictions made during the appraisal were accurate, and to see if the health, or health promoting behaviours, of the community have improved.

# 11 References

- Air Quality Expert Group (2019), *Non-Exhaust Emissions from Road Traffic*, Prepared for the Scottish, Welsh and Northern Ireland Governments, [https://uk-air.defra.gov.uk/assets/documents/reports/cat09/1907101151\\_20190709\\_Non\\_Exhaust\\_Emissions\\_typeset\\_Final.pdf](https://uk-air.defra.gov.uk/assets/documents/reports/cat09/1907101151_20190709_Non_Exhaust_Emissions_typeset_Final.pdf)
- Australian Government Department of Health (2018), *The Health Effects of Environmental Noise*, enHealth, Canberra, [https://www1.health.gov.au/internet/main/publishing.nsf/Content/A12B57E41EC9F326CA257BF0001F9E7D/\\$File/health-effects-Environmental-Noise-2018.pdf](https://www1.health.gov.au/internet/main/publishing.nsf/Content/A12B57E41EC9F326CA257BF0001F9E7D/$File/health-effects-Environmental-Noise-2018.pdf)
- Australian Institute of Health and Welfare (2019), *Australia's Welfare 2019: In Brief*, Cat. no. AUS 227., Canberra: AIHW.
- Australian Psychological Society (2018), *Australian loneliness report: A survey exploring the loneliness levels of Australians and the impact on their health and wellbeing*. Melbourne: APS, <https://psychweek.org.au/wp/wp-content/uploads/2018/11/Psychology-Week-2018-Australian-Loneliness-Report-1.pdf>
- Baldwin, H., Bellew, W., Humphries, J., Gale, J., Merom, D., Rissel, C. and Bauman, A. (2017), *Active travel in Metropolitan NSW 2000-2015 — Trend analysis using multiple data sources*. Prepared for the Centre for Population Health, NSW Ministry of Health. Sydney; Physical Activity Nutrition Obesity Research Group, May 2017
- Ball, K., Carver, A., Jackson, M., and Downing, K. (2015), *Evidence Review: Addressing the Social Determinants of Inequities in Physical Activity and Related Health Outcomes*, Centre for Physical Activity and Nutrition Research, Deakin University, for the Victorian Health Promotion Foundation
- Benton, J., Anderson, J. and Hunter, R., and French, D. (2016), The effect of changing the built environment on physical activity: A quantitative review of the risk of bias in natural experiments, *International Journal of Behavioural Nutrition and Physical Activity*, Vol. 13, Article number: 107 (2016)
- Bertoldi, M., Borgini, A., Tittarelli, A., Fattore, E., Cau, A., Fanelli, R., Crosignani, P. (2012), Health effects for the population living near a cement plant: An epidemiological assessment, *Environment International*
- Bowatte, G., Lodge, C., Lowe, A.J., Erbas, B., Perret, J., Dennekamp, L., Marks, M.J., Matheson, Giles, G., Morrison, S., Thompson, B., Thomas, P., Hui, J., Perret, J., J., Abramson M., Walters, H., Matheson, M., Dharmage, S.C., (2014), Traffic-related air pollution exposure is associated with allergic sensitization, asthma, and poor lung function in middle age, *Journal of Allergy and Clinical Immunology*
- Bowatte, G., Lodge, C., Knibbs, L, Lowe, A.J., Erbas, B., Perret, J., Abramson, M.J., Matheson, M., Dharmage, S.C., (2014), The influence of childhood traffic-related air pollution exposure on asthma, allergy and sensitization: a systematic review and a meta-analysis of birth cohort studies, *European Journal of Allergy and Clinical Immunology*
- Bowatte, G., Erbas, B., Lodge, C., Knibbs, L, Lyle C., Gurrin, L., Marks, G., Thomas, P., Johns, D., Giles, G., Hui, J., Dennekamp, M., Perret, J., Abramson, M, Walters, E., Matheson, M., Dharmage, S., (2017), Traffic-related air pollution exposure over a 5-year period is associated with increased risk of asthma and poor lung function in middle age, *European Respiratory Journal*, 50:1602357, DOI: 10.1183/13993003.02357-2016
- Braubach, M., Egorov, A., Mudu, P., Wolf, T., Thompson, C., and Martuzzi, M. (2017), Effects of Urban Green Space on Environmental Health, Equity and Resilience, in Kabisch, N. (eds.), *Nature Based Solutions to Climate Change Adaptation in Urban Areas*, Theory and Practice of Urban Sustainability Transitions, DOI 10.1007/978-3-319-56091-5\_11
- Byrne, J., Sipe, N. (2010), Green and open space planning for urban consolidation – A review of the literature and best practice, Urban Research Program, Griffith University, Issues Paper 11

- Christidis, T., Erickson, A., Pappin, A., Crouse, D., Pinault, L., Weichenthal, S., Brook, J., van Donkelaar, A., Hystad, P., Martin, R., Tjepkema, M., Burnett, R. and Brauer, M. (2019), Low Concentrations of Fine Particle Air Pollution and Mortality in the Canadian Community Health Survey, *Environmental Health*, 18:84, <https://doi.org/10.1186/s12940-019-0518-y>
- City Futures Research Institute (2012), *Healthy Built Environment Literature Review*, University of New South Wales, [www.cityfutures.be.unsw.edu.au](http://www.cityfutures.be.unsw.edu.au)
- City of Sydney (2014), *History of Glebe Foreshore Parks*, <https://www.cityofsydney.nsw.gov.au/learn/sydneys-history/people-and-places/park-histories/glebe-foreshore-parks>, Accessed 18 September, 2019
- City of Sydney (2015), *Green Square Draft Infrastructure Strategy and Plan*, [https://www.cityofsydney.nsw.gov.au/\\_data/assets/pdf\\_file/0004/195646/Green-Square-Town-Centre-Infrastructure-Strategy-2006-DRS.pdf](https://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0004/195646/Green-Square-Town-Centre-Infrastructure-Strategy-2006-DRS.pdf)
- Cong Liu, M.S. (2019), Ambient Particulate Air Pollution and Daily Mortality in 652 Cities, *The New England Journal of Medicine*, 381:705-715, DOI: 10.1056/NEJMoa1817364
- Giles-Corti, B., Foster, S., Koohsari, M., Francis, J. and Hooper, P. (2015), The Influence of Urban Design and Planning on Physical Activity, in Barton, H., Thompson, S., Burgess, S. and Grant, M. (eds), *The Routledge Handbook of Planning for Health and Wellbeing*, Routledge Handbooks
- Cranney, L., Phongsavan, P., Kariuki, M., Stride, V., Scott, A., Hua, M., and Bauman, A. (2016), Impact of an Outdoor Gym on Park Users' Physical Activity: A natural experiment, *Health and Place*, 37, (2016), 26-34
- EnHealth (2017), *Health Impact Assessment Guidelines*, World Health Organisation Collaborating Centre for Environmental Health Impact Assessment and the School of Public Health, Curtin University
- Environmental Investigation Services (2017), *Contamination Investigation – The Bays Precinct*, Commissioned by UrbanGrowth NSW
- Government of Western Australia Department of Health (2011), *Health Risk Assessment (Scoping) Guidelines*, WA Health
- Happy City (2015), *Happy Homes Report*, Vancouver, British Columbia, Canada, <https://thehappycity.com/project/happy-homes/>
- Holt-Lunstad, J. (2017), The Potential Public Health Relevance of Social Isolation and Loneliness: Prevalence, Epidemiology, and Risk Factors, *Public Policy & Aging Report*, Volume 27, Issue 4, 2017, Pages 127–130, <https://doi.org/10.1093/ppar/prx030>, <https://academic.oup.com/ppar/article/27/4/127/4782506>
- Ives, C., Oke, C., Cooke, B., Gordon, A., Bekessy, S. (2014), *Planning for green open space in urbanising landscapes*, Final report for Australian Government Department of Environment, RMIT University
- Kent, J. and Thompson, S. (2019), *Planning Australia's Healthy Built Environments*, Routledge, New York
- Keyword MD, Emmerson KM, Hibberd MF (2016), Ambient air quality: Health impacts of air pollution. In: *Australia State of the Environment 2016*, Australian Government Department of the Environment and Energy, Canberra, <https://soe.environment.gov.au/theme/ambient-air-quality/topic/2016/health-impacts-air-pollution> , DOI 10.4226/94/58b65c70bc372
- Kondo, M., Flueher, J., McKeon, T., and Branas, C. (2018), Urban Green Space and Its Impact on Urban Health, *International Journal of Environmental Research and Public Health*, 2018, 15, 445, doi:10.3390/ijerph5030445
- Mahoney, M., Simpson, S., Harris, E., Aldrich, R., Stewart-Williams, J. (2004), *Equity Focused Health Impact Assessment Framework*, Australasian Collaboration for Health Equity Impact Assessment (ACHEIA)
- Midouhas, E., Kokosi, T. and Flouri, E. (2019), Neighbourhood-level air pollution and greenspace and inflammation in adults, *Health and Place*, 58, 102
- National Heart Foundation (2009), *Healthy Places and Spaces: A national guide to designing places for healthy living*, Collaboration with Planning Institute of Australia and Australian Local Government Association

- NSW Department of Planning and Environment (2015) *Apartment Design Guide: Tools for improving the design of residential apartment development*, <https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/apartment-design-guide-2015-07.pdf?la=en>
- NSW Environment Protection Authority (2018), EPA fines Doyalson Concrete Plant for Air Pollution, <https://www.epa.nsw.gov.au/news/media-releases/2018/epamedia180322-epa-fines-doyalson-concrete-plant-for-air-pollution>
- NSW Health (2009), *Healthy Urban Development Checklist: A guide for health services when commenting on development policies, plans and proposals*, <https://www.health.nsw.gov.au/urbanhealth/Publications/healthy-urban-dev-check.pdf>
- NSW Health (2018), *Healthy Built Environments*, <https://www.health.nsw.gov.au/urbanhealth/Pages/default.aspx>  
Page accessed 13 September, 2019
- NSW Department of Planning and Environment (2017) *Social Impact Assessment Guideline: For State significant mining, petroleum production and extractive industry development*
- NSW Environment Protection Authority (2014), *Trends in Motor Vehicles and their Emissions*, Technical Paper TP01, Advisory Committee on Tunnel Air Quality, [https://www.chiefscientist.nsw.gov.au/\\_data/assets/pdf\\_file/0007/54790/Road-Tunnels\\_TP01\\_Trends\\_inMotor\\_Vehicles\\_and\\_Their\\_Emissions.pdf](https://www.chiefscientist.nsw.gov.au/_data/assets/pdf_file/0007/54790/Road-Tunnels_TP01_Trends_inMotor_Vehicles_and_Their_Emissions.pdf)
- NSW Environment Protection Authority (2018), *Trends in Motor Vehicles and their Emissions*, Technical Paper TP01, Advisory Committee on Tunnel Air Quality, [http://www.chiefscientist.nsw.gov.au/\\_data/assets/pdf\\_file/0007/192490/TP01\\_Trends-in-Motor-Vehicles-and-Their-Emissions.pdf](http://www.chiefscientist.nsw.gov.au/_data/assets/pdf_file/0007/192490/TP01_Trends-in-Motor-Vehicles-and-Their-Emissions.pdf)
- Relationships Australia (2018), *Is Australia experiencing an epidemic of loneliness?: Findings from 16 waves of the Household Income and Labour Dynamics of Australia Survey*, <https://www.raq.org.au/sites/raq/files/An%20epidemic%20of%20loneliness%202001-2017%20research%20report.pdf>
- Sallis, J., Cerin, E., Conway, T., Adams, M., Frank, L., Pratt, M., Salvo, D., Schipperijn, J., Smith, G., Cain, K., Davey, R., Kerr, J., Lai, P-C, Mitáš, J., Reis, R., Sarmiento, O., Schofield, G., Troelsen, J., Van Dyck, D., De Bourdeaudhuij, E., Owen, N. (2016), Physical activity in relation to urban environments in 14 cities worldwide: a cross-sectional study, *Lancet* 2016; 387: 2207–17
- SLR Global Environmental Solutions (2017), *Bays Market District Stage One – Existing Environment Interim Air Quality Assessment*, prepared for Urban Growth NSW, Report number: 610.17553-R01
- SLR Global Environmental Solutions (2019), *The New Sydney Fish Market, Stage 2 – Main Works (SSD 8925), Air Quality Assessment*, Prepared for UrbanGrowth NSW Development Corporation, Report Number: 610.17533
- Sydney Local Health District (2016), *Building Better Health: Health considerations for urban development and renewal in the Sydney Local Health District*, <https://www.slhd.nsw.gov.au/planning/pdf/BuildingBetterHealth.pdf>
- Sydney Local Health District (2018), *Sydney Local Health District Strategic Plan 2018-2023*, NSW Health
- Von Lindern, E., Hartig, T., and Lercher, P. (2016), Traffic-related exposures, constrained restoration and health in the residential context, *Health and Place*, 39 (2016), 92-100
- Walter, C., Schneider-Futschik, E., Irving, L. (2019), Child Care Centres and Car Exhaust: A dangerous mix, *Pursuit*, University of Melbourne, <https://pursuit.unimelb.edu.au/articles/childcare-centres-and-car-exhaust-a-dangerous-mix>
- Winters, M., Branion-Calles, M., Therrien, S., Fuller, D., Gauvin, L., Whitehurst, D., and Nelson, T. (2018), Impacts of Bicycle Infrastructure in Mid Sized Cities: Protocol for a natural experiment study in three Canadian cities, *BMJ Open*, 8:e019130. Doi 10.1136/bmjopen-2017-019130
- Wood, L., Hooper, P., Foster, S. and Bull, F. (2017), Public Green Spaces and Positive Mental Health – investigating the relationship between access, quantity and types of parks and mental wellbeing, *Health and Place*, 48 (2017), 63-71

World Health Organisation (2004), *Promoting Mental Health: Concepts, emerging evidence, Practice – Summary Report*

# A Appendix A: Assessment Tools

## Consequence

Consequence refers to the magnitude of the impact on health of the community at risk. Health consequences can be expressed in qualitative or quantitative terms. The table below is based on the Government of Western Australia (2011) *Health Risk Assessment (Scoping) Guidelines*.

**Table A1: Consequence Categories**

| Level | Consequence Category | Health Consequence   |
|-------|----------------------|--|
| 1     | Minimal              | <ul style="list-style-type: none"> <li>No chronic health effect requiring medical treatment</li> <li>No acute health effect requiring hospitalisation</li> <li>No non-permanent injuries requiring hospitalisation</li> <li>No fatality</li> <li>No permanent disability</li> <li>No evacuation</li> </ul>   |
| 2     | Minor                | <ul style="list-style-type: none"> <li>Chronic health effect requiring medical treatment – 0-1% of population at risk</li> <li>No acute health effect requiring hospitalisation</li> <li>Non-permanent injuries requiring hospitalisation for 1-5 persons</li> <li>No fatality</li> <li>No permanent disability</li> <li>No evacuation</li> </ul>  |
| 3     | Moderate             | <ul style="list-style-type: none"> <li>Chronic health effect requiring medical treatment – 1-2% of population at risk</li> <li>Or Acute health effect requiring hospitalisation of 1-2% of population at risk</li> <li>Non-permanent injuries requiring hospitalisation for 1-2% of population at risk</li> <li>No fatality</li> <li>No permanent disability</li> <li>No evacuation</li> </ul>   |
| 4     | Major                | <ul style="list-style-type: none"> <li>Chronic health effect requiring medical treatment – 2-5% of population at risk</li> <li>Or Acute health effect requiring hospitalisation of 2-5% of population at risk</li> <li>Non-permanent injuries requiring hospitalisation for 2-5% of population at risk</li> <li>1-5 permanent disabilities</li> <li>1 fatality</li> <li>Or evacuation is necessary</li> </ul>                              |
| 5     | Catastrophic         | <ul style="list-style-type: none"> <li>Chronic health effect requiring medical treatment – 5-15% of population at risk</li> <li>Or Acute health effect requiring hospitalisation of 5-10% of population at risk</li> <li>Non-permanent injuries requiring hospitalisation for 5-10% of population at risk</li> <li>Greater than 5 permanent disabilities</li> <li>Greater than one fatality</li> <li>Or evacuation is necessary</li> </ul> |



## Likelihood

Likelihood is the probability or frequency of a consequence occurring. The Government of Western Australia Department of Health (2011) writes that likelihood considers the probability and frequency of:

- » The health hazard occurring
- » The population exposed
- » The population groups affected.

The table below shows HIA likelihood categories based on a combination of the Western Australian Department of Health Guidelines and NSW Department of Planning and Environment (2017) *Social Impact Assessment Guideline*.

**Table A2: Likelihood Categories**

| Level | Likelihood            | Likelihood of Occurrence                                       |
|-------|-----------------------|--|
| 1     | Rare/remote           | May occur in exceptional circumstances. Less than 5%           |
| 2     | Unlikely              | Could occur at some time. 6-30%                                |
| 3     | Possible/occasionally | Might occur at some time. 31-60%                               |
| 4     | Likely                | Will probably occur in most circumstances. 61-90%              |
| 5     | Almost certain        | Can be expected to occur in most circumstances. 90% or greater |

## Significance

Significance, as a combination of consequence and likelihood, is often assessed using a risk assessment matrix. The matrix below shows HIA likelihood categories based on a combination of the Western Australian Department of Health Guidelines and NSW Department of Planning and Environment (2017) *Social Impact Assessment Guideline*.

**Table A3: Risk assessment matrix**

| Likelihood            | Consequences |          |          |           |              |
|-----------------------|--------------|----------|----------|-----------|--------------|
|                       | Minimal      | Minor    | Moderate | Major     | Catastrophic |
| <b>Almost certain</b> | Low          | Medium   | High     | Very high | Very high    |
| <b>Likely</b>         | Low          | Low      | Medium   | Very high | Very high    |
| <b>Possible</b>       | Very low     | Low      | Low      | High      | Very high    |
| <b>Unlikely</b>       | Very low     | Very low | Low      | Medium    | High         |
| <b>Rare/ remote</b>   | Very low     | Very low | Very low | Low       | Medium       |

