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Land Use Planning for Equitable Health Outcomes (LUPEHO) – A preliminary review of two land use planning instruments (as applied to Western Sydney)

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For:

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The Western Sydney Health Alliance (WSHA)

WSHA brings together agencies at all three levels of Government under the Western Sydney City Deal, one of eight such City Deals across Australia to support major developments. The Alliance comprises eight local Councils (Blue Mountains, Camden, Campbelltown, Fairfield, Hawkesbury, Liverpool, Penrith and Wollondilly) two Local Health Districts (Nepean Blue Mountains LHD and the South Western Sydney LHD), two Primary Health Networks (the Nepean Blue Mountains PHN and the South Western Sydney PHN) and community sector agencies (Sector Connect). The area described by the eight Council local government areas is collectively termed the Western Parkland City.

https://wshealthalliance.nsw.gov.au/

Centre for Health Equity Training, Research and Evaluation (CHETRE)

CHETRE was established in 1998 to meet research and development needs in health equity within South Western Sydney. CHETRE was a founding member centre of the Centre for Primary Health Care and Equity when it was formed in 2005. CHETRE's mission is to 'co-create intelligence for better health' in and beyond South Western Sydney. CHETRE aims to provide leadership and expertise in training, research and evaluation for health equity.

Through collaboration with its partners, CHETRE develops, supports and evaluates projects, programmes and policies to reduce inequities in health. CHETRE's leadership and expertise are recognised locally and globally. We engage in major activities related to the broad determinants of health, but are also engaged with local health alliances and community groups.

https://chetre.org/

The Healthy Urban Environments (HUE) Collaboratory

The HUE Collaboratory exists to improve the health of Australians living in urban environments. We achieve this by facilitating partnerships between those who shape and have an impact on cities. These partnerships undertake research and activities to build our understanding of how urban environments can deliver better, more equitable health outcomes. We will use this understanding to inform government policy and practice in the planning and development of urban areas.

https://www.thesphere.com.au/work/healthy-urban-environments

https://www.hue-collaboratory.sydney/

https://twitter.com/urban_healthy

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Table of Contents

List of indicators iii

List of tables iv

List of figures iv

List of appendix tables iv

List of appendix figures iv

Executive summary v

(1) Revising the scope of land use planning instruments to include health and equity dynamics across best practice principles. vii

Introduction 1

Methods 1

Limitations 5

Review of healthy planning guidelines 6

Australian healthy planning guidelines 6

International healthy planning guidelines 7

Summary 8

Review of land use planning instruments at NSW State and local government levels 9

State Environmental Planning Policies (SEPPs) 9

Local Environmental Plans (LEPs) 12

Benchmarking a healthy Western Parkland City 15

01 Healthy eating 15

02 Physical activity 17

03 Housing 17

04 Transport and connectivity 19

05 Quality employment 21

06 Community safety and security 24

07 Open space and natural features 25

08 Social infrastructure 27

09 Social cohesion and connectivity 28

10 Environment and health 29

11 Environmental sustainability and climate change 32

12 Mental health 32

Priority groups 34

Conclusions 39

Recommendations 40

Revising the scope of land use planning instruments to include health and equity dynamics across best practice principles 40

Advocating for broader consideration of health across planning instruments 40

Advocating for wider recognition of diverse indicators representing social determinants of health and equity 41
References 42
Appendices 45

List of indicators

Indicator 1a: Meet recommended daily consumption (vegetable) (%) (2019) ……16

Indicator 1b: Meet recommended daily consumption (fruit) (%) (2019) ……16

Indicator 2a: Insufficient weekly physical activity (%) (2019) ……17

Indicator 3a: Persons living in crowded* dwellings (%) (2016) ……..18

Indicator 3b: Low income households with housing stress# (%) (2016) ……...18

Indicator 4a: People who often have difficulty or cannot get to places needed (SR, Australia=100) (2014) ……...20

Indicator 4b: Dwellings with no motor vehicle (%) (2016) ……...20

Indicator 5a: Smoothed* unemployment rate (%) (Jun 2021) ……21

Indicator 5b: Persons in labour force who travelled to work using active transport# only (%) (2016) ……..22

Indicator 6a: People who feel very/safe walking along in local area after dark (SR, Australia=100) (2014) ……...24

Indicator 6b: Liquor offences (2-year trend % change) (Jun 2019-Jun 21) ……..25

Indicator 7a: Amount of public land with grass coverage per capita (m^2) (2016) ……26

Indicator 7b: Amount of public land with tree coverage per capita (m^2) (2016) ……..26

Indicator 8a: Local community directory that caters to diverse groups (2020-21) ……27

Indicator 9a: People who participated in volunteer work (%) (2016) ……..28

Indicator 9b: People who strongly/disagree with acceptance of other cultures (SR, Australia=100) (2014) ……...29

Indicator 10a: SA1 experiencing ≥ 3°C Urban Heat Island effect (%) (2016) ……..30

Indicator 10b: Number of days NEPH exceeded accepted standard (2021) ……...31

Indicator 11a: Council / State has implemented a sustainability / climate change strategy ..32

Indicator 12a: Intentional self-harm: hospitalisations (per 100,000)* (2017-19) ……..33

Indicator 12b: High or very high psychological distress (%)[1] (2019) ……34

List of tables

Table 1: Healthy planning guidelines and their considerations of equity 6

Table 2: State Environmental Planning Policies and their considerations of healthy planning principles 10

Table 3: Local Environmental Plans and their considerations of healthy planning principles 13

Table 4: Humanitarian visa grantees as proportions of permanent migration and temporary visa holders 36

List of figures

Figure 1: Smoothed unemployment rate, SA2s in metropolitan Sydney, June 2021 23

List of appendix tables

Table A1: List of search terms used for reviewing LEPs 45

List of appendix figures

Figure A1: Percentage of mesh block with grass coverage, metropolitan Sydney, 2016 48

Figure A2: Percentage of mesh block with tree coverage, metropolitan Sydney, 2016 49

Figure A3: Urban heat island effect in °C per mesh block, metropolitan Sydney, 2016 50

Executive summary

The Western Sydney Health Alliance (WSHA) commissioned UNSW Sydney's Centre for Health Equity Training, Research and Evaluation (CHETRE) to collaboratively conduct a research project with the Sydney Partnership for Health, Education, Research and Enterprise's Healthy Urban Environments (HUE) Collaboratory that:

1. Reviews the development of healthy planning principles in Australia and internationally;
2. Assesses how State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs) applicable to the Western Parkland City align with and operationalise 12 healthy planning principles
    - Healthy eating
    - Physical activity
    - Housing
    - Transport and connectivity
    - Quality employment
    - Community safety and security
    - Open space and natural features
    - Social infrastructure
    - Social cohesion and connectivity
    - Environment and health
    - Environmental sustainability and climate change
    - Mental health; and
3. Proposes a set of indicators that assist the WSHA to benchmark and monitor health equity outcomes in the Western Parkland City.

Findings

Guidance review

Across the Australian and international healthy planning guidelines reviewed, most covered relatively similar content in terms of planning principles that would promote healthy outcomes.

Equity was considered in the three Australian healthy planning guidance documents reviewed, and explicitly defined in two documents. Of the 14 international guides, seven considered equity as a guiding principle, and only three defined equity. Detail on how planning principles intertwine with equity and disadvantage was limited in the guidance reviewed.

Planning instrument review

On average, each SEPP addressed three to four of the 12 themes. Across the 14 SEPPs reviewed, the most common alignment with the healthy planning principle themes were those concerning physical infrastructure. In contrast, behaviour-oriented themes were less likely to have received much SEPP attention.

Very few of the SEPP clauses that aligned with the 12 healthy planning principle themes considered the issue of equity within their guidance. Specifically, only three SEPPs included clauses that provided guidance on the importance of equity. The discontinued Design and

Place SEPP was the only one of the 14 SEPPs reviewed where some of its clauses considered issues concerning equity that corresponded with more than one healthy planning principle theme. The Housing SEPP was the only SEPP to acknowledge that specific groups may experience additional barriers in access, with all other corresponding clauses more likely to highlight equitable access across *all* groups.

All eight LEPs reviewed aligned with most (between eight and ten) of the healthy planning principle themes. The only exceptions where no LEPs aligned with healthy planning principles were the themes of 06 Community safety and security, and 12 Mental health. Of the former, it may be due to most local governments additionally having separate community safety and crime prevention policies and strategies.

Very few of the LEP clauses that aligned with the 12 healthy planning principle themes considered the issue of equity within their guidance. Specifically, only two LEPs included clauses that provided guidance on the importance of equity.

The findings demonstrated that healthy planning was more likely considered within land use planning instruments at the local rather than the state level. Designed to have broader coverage within geographically more defined areas, LEPs were able to more specifically consider and address healthy planning principles than their state counterparts. While the number of clauses that corresponded with themes concerning physical and built infrastructure still far outweighed those concerning behaviour and social wellbeing, each LEP was able to take guidance from the Standard Instrument to devise contextually appropriate actions that aligned with (primarily physical) health promotion.

Benchmarking

In all, 22 indicators that correspond to the 12 healthy planning principle themes as detailed above were developed for this benchmarking exercise. There was regional variation in the presentation of these indicators at the LGA level.

The analysis showed the Western Parkland City region was relatively uniform and positive concerning overweight (but not obesity), persons living in crowded dwellings, amount of public land with grass coverage and tree coverage per capita (m^2), local community directory that caters to diverse groups, Council/State having implemented a sustainability/climate change strategy, and mental health.

Less positive but relatively uniform indicators across the region were (LHD- and PHN-only data): high or very high psychological distress, meeting recommended daily consumption of fruit, and insufficient weekly physical activity. SWSLHD/PHN data suggested populations were not meeting recommended daily consumption of vegetables, whereas NBMLHD/PHN populations were. Liquor offences (two-year trend % change) were also relatively stable across the region.

LGAs were uniformly less positive across the following: low income households with housing stress, people who often have difficulty or cannot get to places needed, dwellings with no motor vehicle, persons in labour force who travelled to work using active transport, people who feel safe or very safe walking alone in local area after dark, people who participated in volunteer work, SA1 experiencing ≥ 3°C Urban Heat Island effect, and number of days NEPH (light scattering or reduction due to atmospheric particulate matter) exceeded accepted standard.

There was relatively equal split variation in smoothed unemployment rate and people who disagree or strongly disagree with acceptance of other cultures.

Data for the 22 indicators were compared across seven identified priority groups. Data availability was poor, and tentative findings are presented that suggest some state and local inequities across: Indigenous Australians (worse outcomes against planning principles), culturally and linguistically diverse communities (positive outcomes against planning principles), older Australians (positive outcomes against planning principles), younger Australians (generally worse outcomes). Refugees and migrants, children under 14, and differently-abled people had limited or no data available.

Conclusions

The lack of guidance on achieving equitable healthy outcomes is translated to the land use planning instruments reviewed, at both the NSW State (SEPPs) and local government (LEPs) levels of the Western Parkland City. Our review shows a similar lack of clarity over how equitable access—though acknowledged as important among all and not just specific priority groups—is to be provided. LEPs were observed to be more explicit about ensuring such equitable access among their respective councils' communities. This is perhaps no surprise, given the more direct role councils have in local planning issues, including how such land use planning instruments may be applied in conjunction with other social and community planning programs. This is especially relevant given that the role of land use planning is primarily infrastructure and service provision, while social and community programming is needed to facilitate access and encourage their uptake. This latter role is not currently within the scope of the land use planning instruments reviewed in this project.

Indicators were benchmarked that are comparable across LGAs, Local Health Districts and Primary Health Networks. However, focus priority groups revealed a dearth of data concerning these communities at a fine geographic level. This absence may impact governments' mitigative and advocacy roles in ensuring equitable health outcomes across their communities, limited by ethical concerns over confidentiality, and a lack of resourcing over its collection.

Overall, the research has shown the variable consideration of healthy planning principles and indicators in State and local (Western Parkland City) planning instruments.

We recommend, from the findings, three potential ways of moving forward.

(1) Revising the scope of land use planning instruments to include health and equity dynamics across best practice principles.

- Legislators of planning instruments, including local councils themselves and State agencies with responsibility for instruments, revise the framing of these planning documents into the future. These instruments should be revised under the NSW *Environmental Planning and Assessment Act* to more clearly articulate their connection to health, wellbeing and equity. That revising should be based on whether or not, and how, the instruments address the best practice principles that connect land use with health and equity.

(2) Advocating for broader considerations of health across planning instruments

- Clear and strategic—both short and long term—advocacy for the broader considerations of health in these planning instruments and better indicators

for benchmarking equity. This may be done, for instance, by the various planning teams within councils, by Local Health Districts and Primary Health Networks, and by advocacy groups such as the Western Sydney Health Alliance and other collaborative partnerships.

(3) Wider recognition of diverse indicators representing social determinants of health and equity

- There is currently little data available at a fine-enough grain level to assist councils in assessing and monitoring changes experienced by the different population groups. This may be partially overcome with the introduction of the *Data Availability and Transparency Act 2022* in April 2022, which may see particular registered institutions gain access to more nuanced datasets for authorised uses, including datasets and data items that were previously restricted, protected or confidentialised. Councils, health organisations, alliances and partnerships may also advocate for the broader collection of such data—or the release of administrative data—by health service providers and service managers.

Introduction

Over the last two decades, there have been significant developments in both the knowledge of, and policy in, urban planning for promoting better population health outcomes. In view of this, the Western Sydney Health Alliance (WSHA) commissioned UNSW Sydney's Centre for Health Equity Training, Research and Evaluation (CHETRE) to collaboratively conduct a research project with the Sydney Partnership for Health, Education, Research and Enterprise's Healthy Urban Environments (HUE) Collaboratory that:

1. Reviews the development of healthy planning principles in Australia and internationally;
2. Assesses how two current land use planning instrument types applicable in the Western Parkland City—namely State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs)—align with and operationalise healthy planning principles; and
3. Proposes a set of indicators that assist the WSHA to benchmark and monitor how the Western Parkland City—comprising the eight local government areas of Blue Mountains, Camden, Campbelltown, Fairfield, Hawkesbury, Liverpool, Penrith and Wollondilly—meet healthy planning principles, including to identify gaps in existing, publicly accessible datasets.

Collectively, these three project objectives address the central aim of providing the WSHA with information and advice on best practice land use planning for the delivery of positive health outcomes for all sections of the community in the Western Parkland City. This report was developed with input from council representatives from the 'Liveability and Connections' working group of the WSHA.

Methods

This research was undertaken across three stages between November 2021 and October 2022.

Stage 1: Healthy planning principles

A review of Australian and international healthy planning guidelines was conducted, specifically to assess how the concept of 'equity' is considered and addressed. The guidelines were searched using the Google internet search engine, primarily using the keywords "healthy planning", "healthy planning principle*", and "healthy planning guide*". The search was conducted in April 2022 and guidelines were reviewed in May 2022. Only guidelines published since 2012 and by government agencies, peak bodies, and international non-government agencies were included.

A total of three Australian and 14 international guidelines were reviewed. A summary of the findings of this review is included as Table 1 on page 6.

Stage 2: Land use planning instrument analysis

A review of NSW State and local government level land use planning instruments—namely SEPPs and LEPs—was conducted between May and August 2022. It explicitly excludes

non-statutory planning documents such as Community Strategic Plans, Local Strategic Planning Statements and Development Control Plans.

The 11 themes set out in NSW Health's Healthy Built Environment Checklist[1] were used as a starting point for the review. A twelfth theme was added to assess how these land use planning instruments consider and/or respond to mental health. Collectively, the 12 themes assessed are:

1. Healthy eating
2. Physical activity
3. Housing
4. Transport and connectivity
5. Quality employment
6. Community safety and security
7. Open space and natural features
8. Social infrastructure
9. Social cohesion and connectivity
10. Environment and health
11. Environmental sustainability and climate change
12. Mental health

The 13 SEPPs currently accessible from the NSW Department of Planning and Environment website[2] are included in the review. As this project commenced before the development of the *Design and Place SEPP* was discontinued in April 2022, a decision was made by the WSHA and the researchers to include it as part of this analysis. In all, the 14 current and discontinued (in italics) SEPPs reviewed are:

- Housing [epi-2021-0714]
- Transport and Infrastructure [epi-2021-0732]
- Primary Production [epi-2021-0729]
- Biodiversity and Conservation [epi-2021-0722]
- Resilience and Hazards [epi-2021-0730]
- Industry and Employment [epi-2021-0723]
- Resources and Energy [epi-2021-0731]
- Planning Systems [epi-2021-0724]
- Precincts – Eastern Harbour City [epi-2021-0726]
- Precincts – Western Parkland City [epi-2021-0728]
- Precincts – Central River City [epi-2021-0725]
- Precincts – Regional [epi-2021-0727]
- Codes [epi-2008-0572]
- *Design and Place public consultation draft [s2021-341.d12]*

Together, the 14 current and discontinued SEPPs reviewed represent a suite of consolidated NSW State-level planning instruments following a reform process to simplify and modernise the NSW planning system. This process commenced in early 2020, with the first of the reformed SEPPs (Housing) coming into effect on 26 November 2021, and the others on 1 March 2022[3].

Each SEPP document was read through in detail, and clauses that related to any of the 12 healthy planning themes and their key questions were highlighted and noted down in a

[1] NSW Ministry of Health (2020)
[2] https://www.planning.nsw.gov.au/policy-and-legislation/state-environmental-planning-policies/consolidated-state-environmental-planning-policies
[3] NSW Ministry of Health (2020)

reference table for analysis. A textual search (on “equit*”, “equal*”, “disad*”, and “prior*”) was also conducted to cross-check which (if any) of these clauses mentioned, considered and/or addressed issues concerning equity.

The most up-to-date LEP for each of the eight Western Parkland City local government areas was downloaded from the NSW legislation website[4] and reviewed. These are:

- Blue Mountains LEP 2015 [epi-2015-0829]
- Camden LEP 2010 [epi-2010-0514]
- Campbelltown LEP 2015 [epi-2015-0754]
- Fairfield LEP 2013 [epi-2013-0213]
- Hawkesbury LEP 2012 [epi-2012-0470]
- Liverpool LEP 2008 [epi-2008-0403]
- Penrith LEP 2010 [epi-2010-0540]
- Wollondilly LEP 2011 [epi-2011-0085]

Up to three key terms were devised for each of the key questions of the 12 above-mentioned healthy planning themes (see Table A1). These were then used to systematically search through each of the eight LEPs. Clauses that related to these principles and key questions were highlighted and noted down in a reference table for analysis. As per the SEPP analysis, a textual search (on “equit*”, “equal*”, “disad*”, and “prior*”) was also conducted to cross-check which (if any) of these clauses mentioned, considered and/or addressed issues concerning equity.

Summaries of the findings of these SEPP and LEP reviews are included as Table 2 and Table 3 below; detailed findings are included separately in a supplementary report.

Stage 3: Western Parkland City profiling and benchmarking

The 12 abovementioned healthy planning themes were used as the basis for formulating appropriate indicators, to:

- propose a benchmark profile of the Western Parkland City in relation to healthy planning;
- identify current data gaps; and
- make recommendations regarding if and/or how these gaps may be filled.

To facilitate broader-level thinking and guide effective decision-making, up to two indicators were formulated in response to the key questions posed under each of the 12 healthy planning themes so as to keep the proposed list concise and accessible. This follows a recent Australian Treasury approach to measuring economic, social and wellbeing outcomes[5]. Each indicator was selected to demonstrate and monitor potential change as a result of land use planning. A mix of quantitative and qualitative indicators was formulated as appropriate with input from council representatives from the WSHA Liveability and Connections working group.

Only publicly accessible (including via subscription services such as the Australia Bureau of Statistics’ TableBuilder Pro platform) datasets were considered when formulating the indicators. These datasets include:

1. HealthStats NSW, NSW Government; http://www.healthstats.nsw.gov.au/

[4] https://legislation.nsw.gov.au/browse/inforce
[5] Australian Treasury (2023)

2. Public Health Information Development Unit (PHIDU), Torres University; https://phidu.torrens.edu.au/social-health-atlases/data
3. Small Area Labour Market Estimates, Labour Market Information Portal, https://lmip.gov.au/default.aspx?LMIP/Downloads/SmallAreaLabourMarketsSALM/Estimates
4. 2016 Census of Population and Housing (Counting Persons, Place of Usual Residence), Australian Bureau of Statistics; https://www.abs.gov.au/statistics/microdata-tablebuilder/tablebuilder
5. Recorded crime reports, NSW Bureau of Crime Statistics and Research; https://www.bocsar.nsw.gov.au/Pages/bocsar_crime_stats/bocsar_latest_quarterly_and_annual_reports.aspx
6. NSW Planning Portal, NSW Government; https://www.planningportal.nsw.gov.au/opendata/dataset/
7. Websites of the eight local governments
8. New South Wales Air Quality Monitoring Network (NSWAQMN), https://www.dpie.nsw.gov.au/air-quality/air-quality-data-services/data-download-facility

Where available, data was reported for all eight local government areas, two Local Health Districts, and two PrimaryHealth Networks that comprise the WSHA, as well as for the State of NSW for comparison. Where appropriate, thematic maps were produced at the finest geographical scale to highlight potential spatial diversity within jurisdictions. Where relevant, these were measured against State and/or national benchmarks to highlight how different factors of social determinants of health may play a role in influencing these outcomes across diverse regions.

We note especially that each data source is updated at different frequency. As such, each indicator may also be updated at different times to reflect the change in outcomes over time. Of special note, however, is the release of the 2021 Census of Population and Housing Data by the Australian Bureau of Statistics, which commenced in August 2022, continuing through October 2022 before a final release by mid-2023. As the full release was not yet available while this research was being conducted, the 2016 Census was used to benchmark the indicators. Future editions of the indicators will use the 2021 Census and other updated data sources, to be published at a later date.

We define [in]equity as the unfair and avoidable differences between and within populations[6]. For this research, we focussed on whether equity was explicit in planning guidelines and then policies. We also focussed on priority population groups as well as the social determinants of health.

This stage aims to report on the means and extent to which the outcomes of healthy planning are reflected within and across the Western Parkland City. It also identifies gaps in existing datasets, including those concerning particular priority groups whose health outcomes may be additionally influenced by various social determinants of health. These priority groups include:

- Indigenous Australians
- Refugees and migrants
- Culturally and linguistically diverse communities
- Socioeconomically disadvantaged communities
- Older people aged 65 or older

[6] Harris et al. (2020)

- Young adults aged 15-24 years
- Children 0-14 years
- Differently-abled people

Findings concerning the eight priority groups are included in this report, while the detailed data tables are published separately in a supplementary report[7].

Limitations

There are some limitations to the analysis that require consideration. Overall, this was a tightly scoped study whose parameters were bounded by the particular plans under scrutiny, and the data sources.

This research focused only on two land use planning instruments applicable to the Australian state of NSW (SEPPs) and its local government areas (LEPs) and how they considered and facilitated human health as a land use planning authority. Specifically, the review is concerned with how the legislated planning instruments facilitate health promotion from a land use perspective. As such, it does not reflect how these plans may be interpreted during implementation, nor does it consider any other corresponding and complementary processes—such as Community Strategic Plans, or Local Strategic Planning Statements, to name a couple—strategies, or policies that may be used concurrently for the purpose of health promotion. It also does not account for other measures like legislated minimum standards that work to safeguard and protect our health. In future research, the role(s) and inter-relationship(s) between these different instruments may be considered in conjunction with the land use planning instruments reviewed in this project. This is especially important given that the consideration of health equity across different priority groups was often not translated into guidelines and actions in these instruments.

The research focussed on the text of LEPs. However, LEPs may be implemented via visual spatial plans. The textual analysis we undertook cannot be applied to visual mapping data. Therefore, the analysis is limited to the representation of concepts in the written LEP instrument. Actual implementation was not the focus, which has limitations in terms of actual delivery of plans for health and equity outcome.

Further, the indicators were proposed for indicative purposes and based on publicly available data availability. There are also significant gaps concerning data across all priority groups. Those gaps make it difficult to assess potential inequities between populations, including among these priority groups.

Future research may address these limitations. That research may, for instance, focus on a wider range of plans that incorporate a broader scope of land use planning and the implementation of spatial plans. Additional indicators and measures could be developed that have the specific purpose of interrogating spatial plans and their implementation.

[7] Liu et al. (2023)

Review of healthy planning guidelines

A review of Australian and international healthy planning guidelines published since 2012 was conducted to assess if and how these address the question of equity. Three Australian and 14 international guidelines were reviewed in total. The outcomes of this review are presented in Table 1 below using a 'traffic-light' system, where the three colours represent:

Equity was both considered/mentioned and defined within the guidelines
Equity was considered/mentioned but not defined within the guidelines
Equity was neither considered/mentioned nor defined within the guidelines

Australian healthy planning guidelines

Three Australian healthy planning guidelines published since 2012 were sourced and reviewed. The three guidelines followed two different approaches: two as guiding principles on how specific spaces may be designed to better health outcomes[8], as well as how these principles may be assessed and monitored over time as part of health and environmental impact and risk assessments[9]; the other was in the form of a checklist that details how healthy planning may be approached systematically by highlighting key areas and themes for consideration[10].

Table 1: Healthy planning guidelines and their considerations of equity

Guideline title (Year)	Organisation	Jurisdiction
Australian		
Healthy Built Environment Checklist: A guide for considering health in development policies, plans and proposals (2020)	NSW Ministry of Health	New South Wales
Healthy by Design SA – A guide to planning, designing and developing healthy urban environments in South Australia (2012)	National Heart Foundation of Australia	South Australia
Health Impact Assessment Guidelines (2017)	enHealth	Australia

All three guidelines noted the concept of 'equity' as an important guiding principle in healthy planning. Two of these provided a definition of equity, which largely revolve around ensuring fairness and justice in resource distribution based on need[11]. The *Health Impact Assessment Guidelines*[12] went on to note the importance of added attention in impact assessments—which are mainly used in the land-use context in Australia as part of environmental assessments of infrastructure projects, but can also be applied to assessing plans and policies—to vulnerable groups whose health impacts may be more adversely affected due to various health determinants and other health status differences. The most recent of these three guidelines—the *Healthy Built Environment Checklist*[13]—noted that 'equitable access' should be ensured, though no guidance on what that should look like in practice, or how that may be considered and/or achieved, was provided.

[8] National Heart Foundation (2012)
[9] enHealth (2017)
[10] NSW Ministry of Health (2020)
[11] enHealth (2017); National Heart Foundation (2012)
[12] enHealth (2017)
[13] NSW Ministry of Health (2020)

International healthy planning guidelines

Fourteen international healthy planning guidelines published since 2012 were sourced and reviewed. These included three that are city-specific[14], three that are state-specific (all within the US)[15], six that are country-specific[16], and two by the World Health Organization[17].

Table 1: Healthy planning guidelines and their considerations of equity (con't)

Guideline title (Year)	Organisation	Jurisdiction
International		
Healthy Built Environment Linkages Toolkit: making the links between design, planning and health, Version 2.0 (2018)	BC Centre for Disease Control	Canada (Vancouver)
Healthy Urban Planning Checklist, Third Edition (2017)	London Healthy Urban Development Unit	UK (London)
Birmingham Healthy City Planning Toolkit (2021)	Birmingham City Council	UK (Birmingham)
Minnesota Healthy Planning: How-To Guide (2012)	Minnesota Department of Health	USA (Minnesota)
How to Create and Implement Healthy General Plans: A toolkit for building healthy, vibrant communities (2012)	ChangeLab Solutions	USA (California)
Healthy planning guide (2021)	ChangeLab Solutions	USA (California)
State of Evidence: The Built Environment And Health 2011-2015 (2012)	Public Health Innovation and Decision Support, Population & Public Health, Alberta Health Services	Canada
The Green City Guidelines: Techniques for a healthy liveable city (2011)	Michelle de Roo (landscape and urban designer)	Germany
Integrated Planning Guide for a healthy, sustainable and resilient future, Version 3.0 (2019)	Health in All Policies Team, Community & Public Health	New Zealand
Spatial Planning for Health: An evidence resource for planning and designing healthier places (2017)	Public Health England	UK
National Design Guide - Planning practice guidance for beautiful, enduring and successful places (2021)	Ministry of Housing, Communities and Local Government	UK
Healthy Development Checklist (2017)	Riverside University Health System - Public Health	USA
Healthy cities: good health is good politics (2015)	World Health Organization (WHO)	-
Integrating health in urban and territorial planning: a sourcebook (2020)	World Health Organization (WHO)	-

[14] BC Centre for Disease Control (2018); Birmingham City Council (2021); London Healthy Urban Development Unit (2017)
[15] ChangeLab Solutions (2012; 2021); Minnesota Department of Health (2012)
[16] de Roo (2011); Health in All Policies Team, Community & Public Health (2019); Ministry of Housing, Communities and Local Government (2021); Public Health England (2017); Public Health Innovation and Decision Support, Population & Public Health (2012); Riverside University Health System - Public Health (2017)
[17] WHO (2015; 2020)

The inclusion of equity among these international guidelines was less common than the Australian guidelines reviewed, with only half (seven) noting equity as an important principle of healthy planning. Further, only three of these seven went on to provide a definition on how equity should be operationalised in practice. Like those of the Australian examples, these guidelines typically defined the concept of equity around the notion of fairness in access, with only one highlighting that particular population groups may be more socioeconomically disadvantaged from enjoying equitable health outcomes and/or potentials[18].

Like the Australian guidelines, there was a similar division in approach to promoting healthy planning principles, with more of the international guidelines reviewed taking the guiding principle (eight) than the checklist or toolkit (six) approach. All three city-specific guidelines took the checklist or toolkit approach; the state-specific guidelines were more likely to take a guiding principle approach; likewise were the country-specific guidelinesmore likely to take a guiding principle approach; while both international guidelines came in the form of toolkits.

Summary

Across the Australian and international healthy planning guidelines reviewed, most covered relatively similar content in terms of planning principles that would promote healthy outcomes. In no particular order, these largely involve access to:

- Safe, green, blue and other open spaces for physical and mental relaxation;
- Community and social infrastructure for active and passive physical activities;
- Affordable healthy food options;
- Infrastructure and services that promote social cohesion and community harmony and safety;
- Policies and plans that promote environmental health, for maintaining environmentally safe living communities; and
- Quality, affordable housing that provides suitable and comfortable shelter.

Collectively, these principles should act as enablers that promote healthy living and, as the *Healthy Built Environment Linkages Toolkit*[19] noted, allow people to "reach their full health potential". Whether and how such enabling opportunities may be afforded to different priority groups, however, seemed less readily considered, as indicated by the general lack of inclusion and definition of equity within these guidelines.

[18] BC Centre for Disease Control (2018)
[19] BC Centre for Disease Control (2018)

Review of land use planning instruments at NSW State and local government levels

The review of State and local government-level land use planning instruments followed the healthy planning principles as set out in the *Healthy Built Environment Checklist* by the NSW Ministry of Health (2020). We chose the *Healthy Built Environment Checklist* over other guidelines reviewed because of its detailed differentiations across different themes, each of which was further sub-divided into additional key questions for considerations. This allowed for a more nuanced assessment and review of the land use planning instruments.

State Environmental Planning Policies (SEPPs)

A review of the 14 current and recently discontinued NSW State Environmental Planning Policies (SEPPs) was conducted to assess whether and how these state-level land use planning instruments align with the 12 healthy planning principle themes as detailed above. A further level of analysis was also conducted to assess if and how the concept of 'equity' is considered and addressed within these land use planning instruments. The outcomes of these reviews are presented in Table 2. The number of clauses of each SEPP that aligned with the 12 healthy planning principle themes are summarised (see the supplementary report for details of the specific clauses), with the outcome of the 'equity'-focused analysis presented using a 'traffic-light' system, where the three colours represent:

All corresponding clauses within the SEPP considered/mentioned/addressed equity
Some corresponding clauses within the SEPP considered/mentioned/addressed equity
No corresponding clauses within the SEPP considered/mentioned/addressed equity

There were great variations across the SEPPs reviewed in relation to whether and how they aligned with the healthy planning principle themes. On average, each SEPP addressed between three to four of the 12 themes. Notably, the Primary Production SEPP did not align with any of the 12 themes; in contrast, the Precincts – Western Parkland City SEPP aligned with the most themes (seven), followed closely by the Transport and Infrastructure SEPP, Precincts – Central River City SEPP, and the discontinued Design and Place SEPP (six themes each).

Across the 14 SEPPs reviewed, the most common alignment with the healthy planning principle themes were those concerning physical infrastructure: 03 Housing and 11 Environmental sustainability and climate change (eight SEPPs each), with the least common alignments being on themes concerning behavioural and social wellbeing: 01 Healthy eating (zero SEPPs), 09 Social cohesion and connectivity and 12 Mental health (two SEPPs each). This disparity is perhaps not unexpected, given that the role of land use planning instruments is to provide guidance and clarifications on matters concerning land use rather than specific community and social outcomes that could occur on sites. Further, both housing and environmental sustainability have also had a longer history of regulation (at State, national and international levels) that details specific compliance and restrictions concerning the types and duration of land uses. The high number of clauses that align with the 03 Housing theme also reflect the wide diversity of housing types—and to a lesser extent, tenures—especially from a regulatory compliance perspective, particularly within the Codes SEPP. There were similar crossovers with regulatory compliance concerning the theme 11 Environmental sustainability and climate change, ranging from domestic access to

(and production of) renewable energy, wildlife habitat protection, land clearing, resource management, and hazard reductions.

Table 2: State Environmental Planning Policies and their consideration of healthy planning principles

	Housing	Transport and Infrastructure	Primary Production	Biodiversity and Conservation	Resilience and Hazards	Industry and Employment	Resources and Energy
01 Healthy eating							
02 Physical activity	4	8					
03 Housing	33						
04 Transport and connectivity	9	9					
05 Quality employment						3	
06 Community safety and security							
07 Open space and natural features		4		1			
08 Social infrastructure	5						
09 Social cohesion and connectivity		9					
10 Environment and health		2		3	5	3	2
11 Environmental sustainability and climate change		10		22	7	5	4
12 Mental health	3						
No. themes addressed	5	6	0	3	2	3	2

Note: Numbers included in the table denote the number of clauses within each SEPP that correspond to each of the 12 healthy planning principle themes.

In contrast, behaviour-oriented themes were less likely to have received much SEPP attention, where policies have traditionally played lesser roles in regulating but rather in encouragement or facilitation. For example, there were notably no alignments among any of the 14 SEPPs reviewed with 01 Healthy eating. As the LEP review discussed below, however, access to and the siting of fresh food outlets, for example, are more likely to be under local than State government jurisdiction, particularly concerning local zonings. As such, planning instruments play a role in facilitating ease of access to fresh food outlets—essentially the positioning, accessibility and built form of outlets—but would have less influence over people's choice to patronise such fresh food outlets, ability to pay for healthier produce, and choose healthy eating options.

A similar observation may also be made for theme 06 Social cohesion and connectivity, addressed in two SEPPs only (Transport and Infrastructure, and the discontinued Design and Place), which may more likely be facilitated by local-level policies and community programs. Likewise for 12 Mental health, only two SEPPs (Housing, and Design and Place)

partially addressed mental health. Within the Housing SEPP, mental health was only indirectly addressed by clauses that highlighted the need for privacy. Within the discontinued Design and Place SEPP, mental health was indirectly addressed by clauses that highlighted the importance of comfort and inclusiveness in designing public spaces and amenities. As such, considerations of mental health were still very much lagging behind within the current NSW State land use planning instruments. From a land use perspective, mental health may also be connected to green open space as well as time spent travelling to and from work.

Table 2: State Environmental Planning Policies and their considerations of healthy planning principles (con't)

	Planning systems	Precincts – Eastern Harbour City	Precincts – Western Parkland City	Precincts – Central River City	Precincts – Regional	Codes	*Design and place*
01 Healthy eating							
02 Physical activity	5						*4*
03 Housing	3	9	14	16	4	190	*4*
04 Transport and connectivity		2	1	1			
05 Quality employment		11	13	12	5		
06 Community safety and security		3	1	1			
07 Open space and natural features			2	2	1		*2*
08 Social infrastructure	1	10	2		1		
09 Social cohesion and connectivity							*7*
10 Environment and health							
11 Environmental sustainability and climate change			7	5			*9*
12 Mental health							*2*
No. themes addressed	3	5	7	6	4	1	*6*

Note: Numbers included in the table denote the number of clauses within each SEPP that correspond to each of the 12 healthy planning principle themes.

Considerations of equity among SEPPs

Following the textual searches, it was clear that very few of the SEPP clauses that aligned with 12 healthy planning principle themes considered the issue of equity within their guidance. Specifically, only three SEPPs included clauses that provided guidance on the importance of equity.

Within the Housing SEPP, only three of the 33 clauses that corresponded to the 03 Housing theme considered issues concerning equity. These were all in relation to the provision of

affordable housing that may be accessible to "a socially diverse residential population, representative of all income groups"[20], with a specific clause focussing on "very low, low and moderate income households, or a combination of the households"[21].

Within the Precincts – Western Parkland City SEPP, only one of the two clauses that corresponded to 08 Social infrastructure considered issues concerning equity. This was referred to in one clause, that "Equitable access to services and facilities is to be promoted for all groups and individuals in the community"[22].

The discontinued Design and Place SEPP was the only one of the 14 SEPPs reviewed where some of its clauses considered issues concerning equity that corresponded with more than one healthy planning principle theme. Specifically, concerning the theme 02 Physical activity, where one clause states that the consent authority must ensure that public spaces are "located to maximise equitable access by the public"[23]. The same clause may equally apply to theme 09 Social cohesion and connectivity, and another clause highlights that "comfortable, inclusive and healthy places" must be considered through the delivery of "beauty and amenity to create a sense of belonging for people"[24].

Collectively, the only considerations of equity across the 14 SEPPs reviewed concerned access across diverse population groups, primarily to built infrastructure. The Housing SEPP was the only SEPP to acknowledge that specific groups may experience additional barriers in access, with all other corresponding clauses more likely to highlight equitable access across *all* groups.

Local Environmental Plans (LEPs)

A review of the current LEPs of the eight Western Parkland City local government areas—based on specific key term searches (Table A1)—was conducted to assess whether and how these local-level land use planning instruments align with the 12 healthy planning principle themes as detailed above. A further level of analysis was also conducted to assess if and how the concept of 'equity' is considered and addressed within these land use planning instruments. The outcomes of these reviews are presented in Table 3. The number of clauses of each LEP that aligned with the 12 healthy planning principle themes are summarised (see the supplementary report for details of the specific clauses), with the outcome of the 'equity'-focused analysis presented using a 'traffic-light' system, where the three colours represent:

All corresponding clauses within the LEP considered/mentioned/addressed equity
Some corresponding clauses within the LEP considered/mentioned/addressed equity
No corresponding clauses within the LEP considered/mentioned/addressed equity

In contrast to the great variations across the 14 SEPPs in relation to whether and how they aligned with the healthy planning principle themes, all eight LEPs reviewed aligned with most (between 8 and 10) of the healthy planning principle themes. The only exceptions where no LEPs aligned with healthy planning principles were the themes of 06 Community safety and security, and 12 Mental health. Of the former, it may be due to most local governments additionally having separate community safety and crime prevention policies and strategies;

[20] (Chapter 2 / Part 1 / 15 / (b))
[21] (Chapter 2 / Part 1 / 15 / (c))
[22] Chapter 6 / Part 6.5 / 6.26 / (4)
[23] Part 2 / 17 / (a) / (i)
[24] Part 2 / 12

safety and security (with the exceptions of fire safety in relation to the Building Codes, or the siting of correctional facilities) are also not specified within the current Standard Instrument – Principal Local Environmental Plan[25] that instructed the drafting of the LEPs currently in force. As such, community safety and security may not be considered land use issues covered under land use planning instruments. Likewise, there is a similar lack of guidance within the Standard Instrument concerning mental health and how it may be impacted by land uses.

Table 3: Local Environmental Plans and their considerations of healthy planning principles

	Blue Mountains	Camden	Campbelltown	Fairfield	Hawkesbury	Liverpool	Penrith	Wollondilly
01 Healthy eating	3	3	10	1	2	2	3	3
02 Physical activity	13	10	24	11	7	20	11	12
03 Housing	26	3	5	7	4	3	8	2
04 Transport and connectivity	15	5	12	10	2	15	7	5
05 Quality employment	8	4	8	5	4	7	8	6
06 Community safety and security								
07 Open space and natural features	4		2		2			
08 Social infrastructure	15	9	12	10	8	10	11	7
09 Social cohesion and connectivity		2	1			2		1
10 Environment and health	11	11	14	15	13	11	19	16
11 Environmental sustainability and climate change	13	8	7	9	9	9	13	7
12 Mental health								
No. themes addressed	9	9	10	8	9	9	8	9

Note: Numbers included in the table denote the number of clauses within each LEP that correspond to each of the 12 healthy planning principle themes.

Of all other healthy planning principle themes, all eight LEPs reviewed included clauses that corresponded with most of these. The only exceptions where the themes were only partially corresponded to by some but not all eight LEPs were that of 07 Open space and natural features (3 LEPs), and 09 Social cohesion and connectivity (4 LEPs).

Comparing the findings summarised in Table 2 and Table 3, it was clear that healthy planning was more likely considered within land use planning instruments at the local rather than the state level. Designed to have broader content coverage within geographically more defined areas, LEPs were able to more specifically consider and address healthy planning principles than their state counterparts. While the number of clauses that corresponded with themes concerning physical and built infrastructure still far outweighed those concerning behaviour and social wellbeing, each LEP was able to take guidance from the Standard

[25] https://legislation.nsw.gov.au/view/html/inforce/current/epi-2006-155a

Instrument to devise contextually appropriate actions that aligned with (primarily physical) health promotion.

Of note, however, is the greater attention LEPs were able to place on social and community wellbeing than SEPPs, as indicated by the higher number of clauses across the eight LEPs that corresponded with the themes 08 Social infrastructure and 09 Social cohesion and connectivity. These were themes for which most SEPPs did not have any corresponding clauses recorded. For 08 Social infrastructure, these clauses especially corresponded to the key questions *08b respond to existing and projected community needs and current gaps in facilities and services*, and were clearly detailed through different parts of the Land Use Table section of each LEP in terms of provisions by zoning type. For the Blue Mountains LEP 2015, additional specifications were detailed for specific village precincts, further highlighting LEPs' responsiveness to local contexts and needs. While the number of clauses that corresponded to the theme 09 Social cohesion and connectivity was far lower in comparison, these largely corresponded with the key questions *09c encourage local involvement in planning and community life*, and *09d minimise social disadvantage and promote equitable access to resources*, highlighting the importance of different local inputs.

Considerations of equity among LEPs

Following the textual searches, it was clear that very few of the LEP clauses that aligned with 12 healthy planning principle themes considered the issue of equity within their guidance. Specifically, only two LEPs included clauses that provided guidance on the importance of equity.

Within the Campbelltown LEP 2015, clauses that corresponded with four healthy planning principle themes considered the issue of equity to varying extents. These themes were 02 Physical activity, 04 Transport and connectivity, 08 Social infrastructure, and 09 Social cohesion and connectivity. All these correspondences referred to the detailed description included in the Land Use Table, for Zone RE1 Public Recreation, specifically in ensuring "sufficient and equitable distribution of public open space to meet the needs of the local community."

Within the Liverpool LEP 2008, clauses that corresponded with two healthy planning principle themes considered the issue of equity, also to varying extents. These themes were 02 Physical activity, and 09 Social cohesion and connectivity. Like the Campbelltown LEP 2015, these clauses also referred to the Land Use Table detailed descriptions for Zone RE1 Public recreation. The only exception was the additional inclusion of one clause, "to promote the efficient and equitable provision of public services, infrastructure and amenities"[26] as one of the 16 aims of the plan. This, or similarly worded, aim was not found among the other seven LEPs reviewed.

[26] 1.2 / (2) / (f)

Benchmarking a healthy Western Parkland City

To facilitate the WSHA in profiling the application and outcomes of healthy planning principles throughout the Western Parkland City, an exercise was undertaken to:

1. Propose a set of indicators to reflect on these healthy planning principles that may be further refined after further consultations; and
2. Use existing open-access datasets to populate these proposed indicators for benchmarking and to facilitate periodic updating.

In all, 21 indicators that correspond to the 12 healthy planning principle themes as detailed above were developed for this benchmarking exercise. Each of these 22 indicators further correspond to the key questions raised in the *Healthy Built Environment Checklist* (NSW Ministry of Healthy 2020), to demonstrate the purposive outcomes of the land use and planning interventions in question.

Most of these 21indicators were benchmarked against the NSW State level for the general population (or against a Standardised Ratio for Australia where indicated), with a five-point 'traffic-light' system[27] used to indicate if the specific geography in discussion (i.e. the Local Government Area (LGA), Local Health District (LHD), or Primary Health Network (PHN)) performed better or worse than these NSW or Australian benchmarks:

Noticeably better than the NSW average (or Standardised Ratio for Australia)
Better than the NSW average (or Standardised Ratio for Australia)
Similar to the NSW average (or Standardised Ratio for Australia)
Worse than the NSW average (or Standardised Ratio for Australia)
Noticeably worse than the NSW average (or Standardised Ratio for Australia)

01 Healthy eating

The *Healthy Built Environment Checklist*[28] posed four key questions in relation to healthy eating. These concern the promotion of and facilitating access to fresh and affordable healthy food options, the discouragement of unhealthy eating habits, and the preservation and promotion of local food production (ensure freshness as well as to minimise the distance our food travels to promote environmental sustain). The two indicators developed in response to these key questions demonstrate the purpose of promoting access to healthy food options: that people may more easily meet, or exceed, the recommended daily consumption of fresh fruit and vegetables. Data was sourced from the NSW Government website, HealthStats NSW. Both of these indicators may be updated annually.

For adults, two daily serves of fruit and five to six daily serves of vegetables are recommended as healthy consumptions[29].

For both indicators, there is a general lack of data available at the LGA level. As such, only regional level data—at the LHD and PHN levels—could be included for comparison. Notably, very low percentages meet the recommended daily consumption of both fruit and vegetables. For NSW, only 6.3% met the recommended daily consumption of vegetables in 2019, while 40.6% met the recommended daily consumption of fruit. Across the Western Parkland City, residents in the South Western Sydney LHD and PHN generally fared worse than their Nepean Blue Mountains LHD and PHN counterparts and the NSW average,

[27] These values are not based on any scientific measures of statistical significance but an observed reflection of proximity to the NSW average or Standardised Ratio for Australia.
[28] NSW Ministry of Healthy (2020)
[29] https://ncci.canceraustralia.gov.au/prevention/diet/fruit-consumption

having recorded lower proportions of the population meeting the recommended daily consumptions. There were, however, higher proportions of the Nepean Blue Mountains LHD and PHN populations that met the recommended daily consumption of vegetables.

Indicator 1a: Meet recommended daily consumption (vegetables) (%) (2019)

	% who meet recommended daily consumption of vegetables
Blue Mountains	
Camden	
Campbelltown	
Fairfield	
Hawkesbury	
Liverpool	
Penrith	
Wollondilly	
SWSLHD	3.7
SWSPHN	3.7
NBMLHD	8.4
NBMPHN	8.4
NSW	6.3

Source: HealthStats NSW

Indicator 1b: Meet recommended daily consumption (fruit) (%) (2019)

	% who Meet recommended daily consumption of fruit
Blue Mountains	
Camden	
Campbelltown	
Fairfield	
Hawkesbury	
Liverpool	
Penrith	
Wollondilly	
SWSLHD	35.5
SWSPHN	35.5
NBMLHD	34.2
NBMPHN	34.2
NSW	40.6

Source: HealthStats NSW

These comparatively lower levels of fresh fruit and vegetable consumptions may reflect a lack of access to local fresh fruit and vegetable retailers, or a lack of affordable options locally. The comparatively higher consumption of vegetables in the Nepean Blue Mountains LHD and PHN, however, may contrastingly reflect the consumption of fresh produce grown at home or in community garden plots, as well as having several weekly farmers' and growers' markets in the region.

02 Physical activity

The *Healthy Built Environment Checklist*[30] posed three key questions in relation to physical activity. These concern the promotion of physical activity, including the use of active transport, and having access to open spaces and recreational facilities. The indicator developed in response to these key questions demonstrate the proportion of population who have enough physical activity. Data was sourced from the NSW Government website, HealthStats NSW, and the Public Health Information Development Unit (PHIDU) of Torrens University Australia. Both of these indicators may be updated annually.

NSW Health defines a sufficient level of physical activity for adults as 150 minutes or more of moderate or vigorous activity a week, or 150 minutes of activity over five or more sessions a week. Data for this indicator was only available at the regional level for comparison. For NSW in 2019, almost two-fifths of adults (38.5%) did not meet sufficient levels of physical activity. The proportions of populations in the South Western Sydney LHD and PHN, and Nepean Blue Mountains LHD and PHN, that did not meet sufficient levels of physical activity were comparatively higher. This is despite the availability of plentiful natural green spaces throughout both regions in addition to any local green and recreational infrastructure. The high proportions of insufficient physical activity may, instead, reflect the vast geographies of these regions, and the reliance on the private car as the main mode of transport for getting to and from such infrastructure.

Indicator 2a: Insufficient weekly physical activity (%) (2019)

	% who have Insufficient weekly physical activity
Blue Mountains	
Camden	
Campbelltown	
Fairfield	
Hawkesbury	
Liverpool	
Penrith	
Wollondilly	
SWSLHD	47.6
SWSPHN	47.6
NBMLHD	42.3
NBMPHN	42.3
NSW	38.5

Source: HealthStats NSW

03 Housing

The *Healthy Built Environment Checklist*[31] posed four key questions in relation to housing. These concern the promotion of housing that supports human and environmental health, that is affordable, adaptable, accessible, and suitable to a diversity of needs. The two indicators developed in response to these key questions demonstrate the affordability and suitability of dwellings in meeting population needs. Data was sourced from PHIDU, which compiles them

[30] NSW Ministry of Healthy (2020)
[31] NSW Ministry of Healthy (2020)

from the Australian Census of Population and Housing, and may be updated every five years.

Indicator 3a: Persons living in crowded* dwellings (%) (2016)

	% of Persons living in crowded* dwellings
Blue Mountains	3.3
Camden	3.7
Campbelltown	10.7
Fairfield	4.1
Hawkesbury	2.1
Liverpool	4.9
Penrith	3.9
Wollondilly	4.3
SWSLHD	
SWSPHN	13.7
NBMLHD	
NBMPHN	6.0
NSW	9.1

Source: PHIDU

Note: * Crowded dwelling is defined as “dwellings requiring extra bedrooms”.

Indicator 3b: Low income households with housing stress# (%) (2016)

	% of Low income households experiencing housing stress#
Blue Mountains	24.9
Camden	31.1
Campbelltown	34.5
Fairfield	36.9
Hawkesbury	29.4
Liverpool	38.3
Penrith	33.1
Wollondilly	24.0
SWSLHD	
SWSPHN	34.8
NBMLHD	
NBMPHN	29.4
NSW	29.3

Source: PHIDU

Note: # Low income households are defined as those with income in the two lowest quintiles. Housing stress defined as households spending 30+% of income on housing costs.

The Australian Bureau of Statistics follows the Canadian National Occupancy Standard to determine the suitability of housing to needs[32]. The Standard takes into account both the number of residents and bedrooms, and the mix of age and gender to determine suitability.

[32] https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/2901.0Chapter36002016

At the 2016 Census, 9.1% of the NSW population was classified, according to this Standard, as living in a crowded dwelling, where at least one additional bedroom is required to meet their household's needs. Across the Western Parkland City, where data is available for the eight LGAs and the two PHNs, the region generally fared better than the NSW average. Most LGAs had less than 5% of their population living in crowded households, reflecting the availability of relatively larger dwellings across the region. The only exception was Campbelltown, where 10.7% lived in crowded dwellings. This may be due to the relatively larger household sizes of particular communities that live in Campbelltown LGA, such as larger young families and some households of refugee and migrant backgrounds who may be more financially constrained.

An indicator of housing affordability is the proportion of households experiencing housing stress. Housing stress is defined following the internationally accepted '30/40 rule' that reflects households with income in the two lowest quintiles that spend 30% or more of that income on housing costs[33]. In NSW in 2016, almost one-third (29.3%) of low income households experienced housing stress. Across the Western Parkland City, the Hawkesbury LGA reported a similar proportion to that of NSW (29.4%), while there were fewer low income households in the Blue Mountains (24.9%) and Wollondilly LGAs (24.0%) who experienced housing stress. The remaining five LGAs all reported higher, including noticeably higher, proportions of low income households experiencing housing stress. This reflects the relatively high housing costs, especially in Liverpool (38.3%) and Fairfield LGAs (36.9%) where almost two-fifths of low income households experienced housing stress.

04 Transport and connectivity

The *Healthy Built Environment Checklist*[34] posed three key questions in relation to transport and connectivity. These concern the promotion of active and public transport options, and reduced reliance on private motor vehicle use. The two indicators developed in response to these key questions reflect these aspects by highlighting the proportion of households without access to any private motor vehicles, and people who expressed difficulty in getting to places that they needed, such as to access essential services. Data was sourced from PHIDU, and may be updated periodically.

Based on results of the Australian Bureau of Statistics' General Social Survey and compiled by PHIDU, the first indicator measures the proportion of population that experience difficulty getting to places they needed (including all transport modes). This is a Standardised measure, with the Australian national average set at 100; as such, any score above 100 means greater degrees of difficulty, while any score below 100 means lower degrees of difficulty. In 2014 (the latest data available published by PHIDU), there were more NSW residents who faced difficulty getting to places than the Australian national average (SR=108). Across the Western Parkland City, residents of three LGAs (Campbelltown, Fairfield, and Liverpool) reported experiencing extreme difficulty getting to places. There was also an above average proportion of Penrith's residents who experienced difficulty getting to places (SR=105). The residents of the Blue Mountains, Camden, and Wollondilly, in contrast, reported below average degrees of difficulty in getting to places.

[33] See, for example, Yates (2007)
[34] NSW Ministry of Healthy (2020)

Indicator 4a: People who often have difficulty or cannot get to places needed (SR, Australia=100) (2014)

	People who often have difficulty or cannot get to places needed
Blue Mountains	94
Camden	91
Campbelltown	121
Fairfield	163
Hawkesbury	99
Liverpool	136
Penrith	105
Wollondilly	89
SWSLHD	
SWSPHN	130
NBMLHD	
NBMPHN	102
NSW	108

Source: PHIDU

Indicator 4b: Dwellings with no motor vehicle (%) (2016)

	% of dwellings with no motor vehicle
Blue Mountains	6.4
Camden	2.3
Campbelltown	7.6
Fairfield	10.4
Hawkesbury	3.9
Liverpool	7.7
Penrith	6.1
Wollondilly	2.4
SWSLHD	
SWSPHN	7.6
NBMLHD	
NBMPHN	6.0
NSW	9.2

Source: PHIDU

Taking the second indicator—the proportion of dwellings without a private vehicle—into account, these patterns of transport difficulties may be clarified. In 2016, around one-tenth of households in NSW did not have a private vehicle (9.2%). The proportions recorded across the Western Parkland City were much lower comparatively, with the lowest being in Camden, Hawkesbury and Wollondilly. Such proportions may reflect the relative lack of public and active transport options, thus a continued reliance on private transportation. In contrast, Fairfield was the only LGA where an above average proportion of households (10.4%) reported not having a private vehicle. This may be due to a major railway line traversing the south-east of the LGA, which includes several train stations, such as Cabramatta and Fairfield, with express services to the Sydney CBD and nearby Liverpool, in addition to a bus transitway connecting the central suburbs of the LGA to the major

commercial hubs of Liverpool and Parramatta. It may also reflect the high proportion of recent migrant and refugee settlements within the LGA, where financial constraints may have prevented affording a private vehicle. At the very least, these dynamics reflect the high degree of difficulty experienced by Fairfield residents in getting to places needed.

05 Quality employment

The *Healthy Built Environment Checklist*[35] posed three key questions in relation to quality employment. These concern improving access to appropriate job and training opportunities. The two indicators developed in response to these key questions reflect the level of unemployment, as well as the proportion of residents who could get to work by using active transport modes only. Data was sourced from the National Skills Commission's Small Area Labour Markets (SALM) reports and the Australian Census of Population and Housing, and may be updated quarterly or five-yearly respectively.

In the June quarter of 2021, the NSW population reported an unemployment rate of 6.0%. The level of unemployment across the Western Parkland City varied greatly, with residents in four LGAs—the Blue Mountains, Camden, Penrith, and Wollondilly—reporting lower levels of unemployment, while there were higher levels of unemployment in the other four LGAs. The latter included Fairfield, which in the same reporting quarter reported an unemployment rate of 12.6%, more than twice the NSW average. The varying levels of unemployment reflect a diversity of factors, including the availability and types of local job opportunities, ease of access to these job opportunities, and other social factors. These regional differences are visualised in Figure 1.

Indicator 5a: Smoothed* unemployment rate (%) (Jun 2021)

	Smoothed* unemployment rate
Blue Mountains	3.8
Camden	4.0
Campbelltown	8.3
Fairfield	12.6
Hawkesbury	7.2
Liverpool	8.3
Penrith	5.2
Wollondilly	3.7
SWSLHD	
SWSPHN	
NBMLHD	
NBMPHN	
NSW	6.0

Source: SALM

Note: * Smoothed rate represents an average of the preceding 12 months. Excludes individuals who may be temporarily away from work, including the recipients of the COVID-19 pandemic measure of JobKeeper payments

[35] NSW Ministry of Healthy (2020)

The availability of local job opportunities may be reflected in the second indicator: the proportion of workers who travelled to work via the active transport modes of bicycling or walking only. This indicator reflects job opportunities that may be relatively close to workers' homes, including ones that may be relatively easily accessible on foot or via cycling. In 2016, 4.6% of NSW workers walked or cycled to work only. The proportions observed across the Western Parkland City were comparatively lower, between 1% and 3% across the eight LGAs. Such low proportions reflect the comparatively vast geographic spaces of the City, as well as the relatively low density of many suburbs. Primarily residential suburbs present few local job opportunities, including ones that could be easily accessible via active transport.

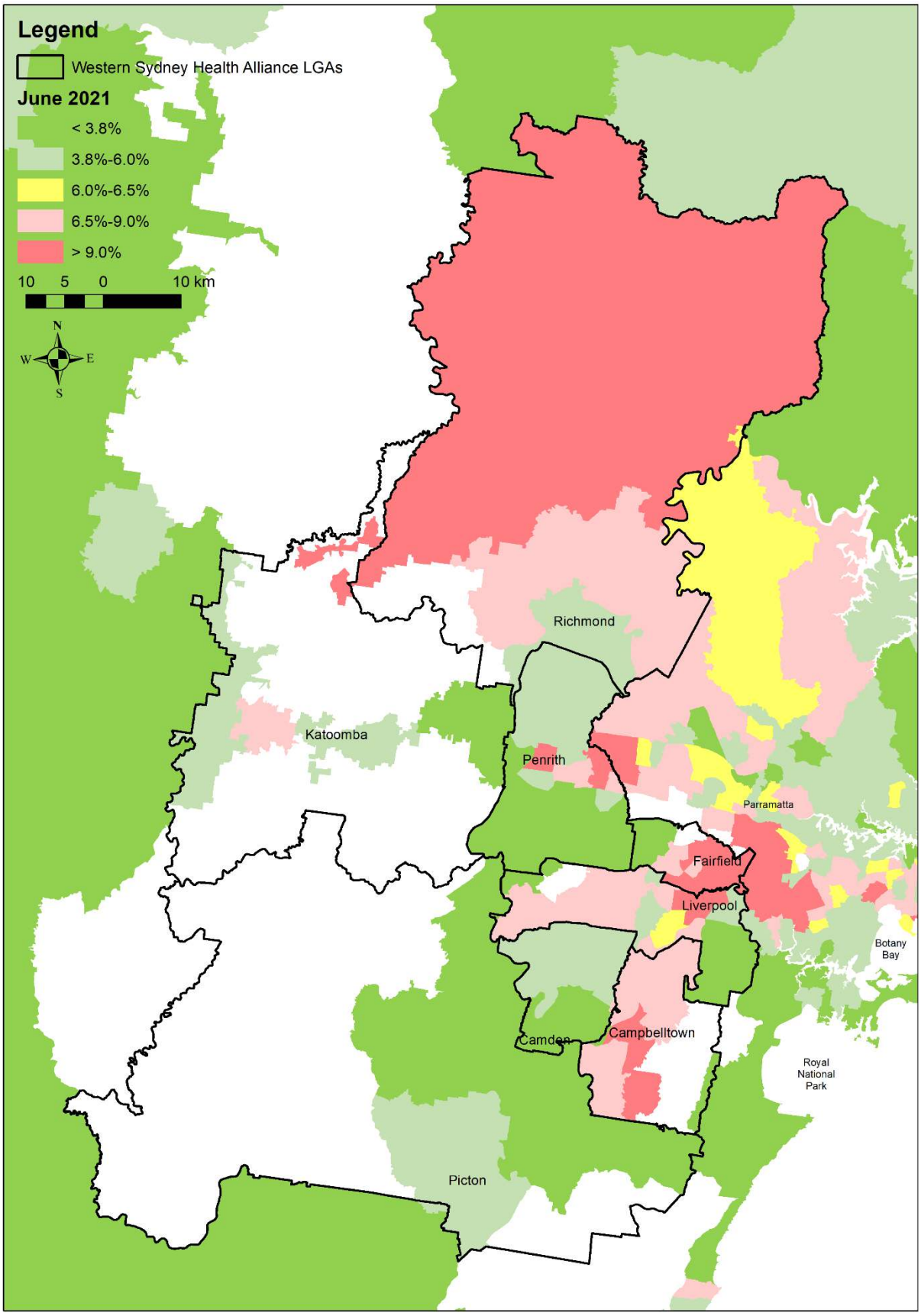
Indicator 5b: Persons in labour force who travelled to work using active transport# only (%) (2016)

	% of Persons in labour force who travelled to work using active transport# only
Blue Mountains	2.9
Camden	1.1
Campbelltown	1.3
Fairfield	1.9
Hawkesbury	2.2
Liverpool	2.2
Penrith	1.6
Wollondilly	1.5
SWSLHD	
SWSPHN	
NBMLHD	
NBMPHN	
NSW	4.6

Source: ABS 2017

Note: # Active transport is defined here as bicycling and/or walking only.

Figure 1: Smoothed unemployment rate, SA2s in metropolitan Sydney, June 2021



Source: SALM

06 Community safety and security

The *Healthy Built Environment Checklist*[36] posed two key questions in relation to community safety and security. These concern crime prevention, a sense of security, and addressing alcohol-related risks. The two indicators developed in response to these key questions reflect the residents' sense of safety walking in their neighbourhood, and the extent of alcohol-related offences. Data was sourced from PHIDU and the NSW Bureau of Crime Statistics and Research's quarterly recorded crime reports, and may be updated periodically.

Based on the Australian Bureau of Statistics' General Social Survey and compiled by PHIDU, the first indicator reflects on residents' sense of safety, specifically in relation to how safe they feel walking after dark within the neighbourhood. This is a Standardised measure, with the Australian national average set at 100; as such, any score above 100 denotes an above average sense of safety, while any score below 100 denotes a below average sense of safety. In 2014 (the latest data available published by PHIDU), NSW residents reported a slightly above average sense of safety walking in their neighbourhood after dark (SR=102). This sense of safety, however, was generally much lower across the Western Parkland City, with more residents of most LGAs and the two PHNs reporting lower senses of safety. Of particular note are Campbelltown (SR=68) and Fairfield (SR=64), where only around two-thirds of residents reported feeling safe walking around their neighbourhood alone after dark. In contrast, the residents of Hawkesbury (SR=99), Wollondilly (SR=103) and the Blue Mountains (SR=106) reported average or above average sense of safety. This may be due to the relatively lower density of these areas, leading to a perception of lesser likelihood of encountering unsafe situations or harassment.

Indicator 6a: People who feel very/safe walking alone in local area after dark (SR, Australia=100) (2014)

	People who feel very/safe walking alone in local area after dark
Blue Mountains	106
Camden	96
Campbelltown	68
Fairfield	64
Hawkesbury	99
Liverpool	74
Penrith	76
Wollondilly	103
SWSLHD	
SWSPHN	77
NBMLHD	
NBMPHN	88
NSW	102

Source: PHIDU

The second indicator, sourced from the NSW Bureau of Crime Statistics and Research, reflects the trend on liquor offences across the eight LGAs and in NSW within a two-year time period. According to the Bureau, liquor offences include the public consumption of

[36] NSW Ministry of Healthy (2020)

alcohol by minors and/or in an alcohol-free zone, as well as licensing offices, and supplying alcohol to juveniles. Between June 2019 and June 2021, the Bureau of Crime Statistics and Research noted that the rate of liquor offences in NSW was stable. This was also the case across most of the Western Parkland City, with the only exceptions (aside from Wollondilly LGA where the rates and trend were not calculated due to small population size) being the Blue Mountains and Fairfield, where at least a 25% increase of such offences were recorded. These increasing trends may reflect actual increases in these offences, and/or increased vigilance in policing. The latter reason may be less likely in the Blue Mountains, with most other recorded crime categories recording a stable or downward trend across the same time period. In Fairfield across the same time period, there were, however, a few more recorded crime categories that reported upward trends, including intimidation, stalking and harassment, which may be related to alcohol use.

Indicator 6b: Liquor offences (2-year trend % change) (Jun 2019-Jun 21)

	Liquor offences (2-year trend % change)
Blue Mountains	+125.9
Camden	Stable
Campbelltown	Stable
Fairfield	+135.3
Hawkesbury	Stable
Liverpool	Stable
Penrith	Stable
Wollondilly	n/c
SWSLHD	
SWSPHN	
NBMLHD	
NBMPHN	
NSW	Stable

Source: NSW BOCSAR 2021

Note: n/c denotes not calculated due to small population size.

07 Open space and natural features

The *Healthy Built Environment Checklist*[37] posed four key questions in relation to open space and natural features. These concern the provision of natural and manmade green and blue spaces, ensuring public access, promoting quality streetscapes, and the engendering of a sense of cultural identity and place. The two indicators developed in response to these key questions primarily reflect the first key question, by linking existing data on vegetation coverage to an international minimum standard. Data was sourced from the NSW Planning Portal; there is no information on the frequency of this dataset being updated.

In 2018, the NSW Government, through the Central Resource for Sharing and Enabling Environment Data in NSW (SEED) project, published a spatial dataset that recorded the urban vegetation cover (by vegetation type) of the Sydney Greater Metropolitan Area. The data is available at a very fine, mesh block level for the year 2016. This dataset was processed using ESRI ArcMap, where the total vegetation coverage by type was aggregated

[37] NSW Ministry of Healthy (2020)

for each of the eight Western Parkland City LGAs, and a square meterage per capita index was then calculated. The index was then compared to the minimum public green space per capita recommended by the WHO[38], of 9m^2, or ideally ⩾50m^2. As the dataset did not cover the entire State of NSW, and therefore a State-based calculation was not possible, comparisons were instead benchmarked to the ideal WHO recommendation. The two indicators developed refer to two different vegetation coverage—grass, and tree—both of which provide different degrees of urban cooling, rain runoff mitigation, and amenity qualities.

Indicator 7a: Amount of public land with grass coverage per capita (m^2) (2016)

	m^{2}of public land with grass coverage per capita
Blue Mountains	408.5
Camden	106.6
Campbelltown	127.0
Fairfield	31.5
Hawkesbury	366.3
Liverpool	63.9
Penrith	84.9
Wollondilly	260.0
SWSLHD	
SWSPHN	
NBMLHD	
NBMPHN	
NSW	

Source: NSW Planning Portal, the NSW Urban Vegetation Cover to Modified Mesh Block 2016 dataset

Indicator 7b: Amount of public land with tree coverage per capita (m^2) (2016)

	m^2 of public land with tree coverage per capita
Blue Mountains	810.5
Camden	59.9
Campbelltown	535.4
Fairfield	36.7
Hawkesbury	964.8
Liverpool	76.9
Penrith	146.2
Wollondilly	1491.7
SWSLHD	
SWSPHN	
NBMLHD	
NBMPHN	
NSW	

Source: NSW Planning Portal, the NSW Urban Vegetation Cover to Modified Mesh Block 2016 dataset

[38] WHO (2012)

Across the Western Parkland City in 2016, all LGAs with the exception of Fairfield had enough public land with grass and/or tree coverage to exceed the WHO ideal recommendation of 50m^2 per capita. Fairfield, the densest of the eight LGAs, also had enough public green spaces to far exceed the WHO's minimum recommendation of 9m^2. Most notably, the most rural of the eight LGAs—the Blue Mountains, Hawkesbury, and Wollondilly—that include vast areas of agricultural land and national parks, had the highest amount of public green space per capita. Grass and tree coverage as percentages of each mesh block is visualised in the Appendices as Figure A1 and Figure A2. Interactive versions of the maps may be viewed online here: https://arcg.is/jOPa8 and https://arcg.is/08fvS80.

08 Social infrastructure

The *Healthy Built Environment Checklist*[39] posed five key questions in relation to social infrastructure. These concern recognising and promoting infrastructure that supports diverse populations, developing infrastructure that responds to community needs, and efficient planning and delivery of such infrastructure. The indicator was developed in response primarily to the first key question, the recognition and promotion of social infrastructure (including government- and privately-provided services) that cater to diverse populations. Data was sourced from the local community directories of each Local Government website, and may be updated annually.

Indicator 8a: Local community directory that caters to diverse groups (2020-21)

	No. of diverse groups catered to by the local community directory
Blue Mountains	7
Camden	6
Campbelltown	7
Fairfield	7
Hawkesbury	7
Liverpool	7
Penrith	7
Wollondilly	1
SWSLHD	
SWSPHN	
NBMLHD	
NBMPHN	
NSW	

Source: Local government websites

This indicator reflects whether the local community directories promoted services that specifically catered to the seven identified priority groups of Indigenous Australians, culturally and linguistically diverse communities, older Australians, younger Australians, refugees and migrants, children under 14, and differently-abled people. The numbers indicate how many priority groups were catered to. Six LGA community directories creating special collations of services for seven different priority groups. The only group that often

[39] NSW Ministry of Healthy (2020)

missed out was those of lower socioeconomic background, which was only catered for by Fairfield LGA (which, in contrast, did not promote any special collations for Indigenous Australians). The Camden local community directory promoted special collations of services to six priority groups (excluding those of lower socioeconomic backgrounds, and young adults). Wollondilly was the only LGA that did not have special collations of services that catered to one priority group only. It should be noted, however, that some services that catered to the priority groups did exist among the general listings; the absence of special collations, however, may make it more difficult for residents to search for such support.

09 Social cohesion and connectivity

The *Healthy Built Environment Checklist*[40] posed five key questions in relation to social cohesion and connectivity. These concern providing environments that promote social interactions, sense of community and attachment, encourage local involvement, and avoid community division and dislocation. The two indicators developed in response to these key questions reflect residents' involvement in civic life, and their perceptions of social cohesion and interactions. Data was sourced from PHIDU, and may be updated five-yearly.

The first indicator reflects resident involvement and participation in civic life. Based on the Australian Census of Population and Housing, it highlights the proportion of the population who participated in volunteering activities in the previous 12 months. Across NSW, around one-fifth (18.1%) of the population volunteered in the previous 12 months. Across the eight Western Parkland City LGAs, there was great diversity in the level of such civic participation. One-quarter (25.3%) of Blue Mountains' residents reported having volunteered within the previous 12 months, while only 8.9% of Fairfield residents reported having done so. Overall, most of the eight LGAs reported volunteering at levels similar to or below the NSW average. Such diversity may reflect the lack of local volunteering opportunities, difficulties in accessing these opportunities, and/or other real and perceived barriers (e.g. out-group acceptance) that prevented higher levels of civic participation.

Indicator 9a: People who participated in volunteer work (%) (2016)

	% of people who participated in volunteer work
Blue Mountains	25.3
Camden	15.2
Campbelltown	13.2
Fairfield	8.9
Hawkesbury	18.4
Liverpool	11.0
Penrith	13.3
Wollondilly	18.5
SWSLHD	
SWSPHN	12.4
NBMLHD	
NBMPHN	17.2
NSW	18.1

Source: PHIDU

[40] NSW Ministry of Healthy (2020)

The second indicator reflects social cohesion and acceptance. Based on the Australian Bureau of Statistics' General Social Survey and collated by PHIDU, this indicator of unacceptance of other cultures reflects the integration of cultural diversities within our societies. This is a Standardised measure, with the Australian national average set at 100; as such, any score above 100 denotes a higher degree of unacceptance, while any score below 100 denotes a lower degree of unacceptance. In 2014 (the latest data available published by PHIDU), NSW residents demonstrated a higher level of cultural acceptance than Australia more broadly (SR=100). There was great diversity of cultural acceptance across the eight Western Parkland City LGAs, with high and very high levels of acceptance reported in four LGAs, while in the other four there were equally high and very high levels of unacceptance. The disparity approximately reflects the degree of cultural diversity within each of the LGAs, so that the more culturally diverse the local population was (e.g. Fairfield and Liverpool), the higher levels of acceptance (or lower levels of unacceptance). In contrast, for areas where the population was relatively more homogenous (e.g. Wollondilly) the levels of unacceptance were relatively higher.

Indicator 9b: People who strongly/disagree with acceptance of other cultures (SR, Australia=100) (2014)

	People who strongly/disagree with acceptance of other cultures
Blue Mountains	86
Camden	103
Campbelltown	94
Fairfield	58
Hawkesbury	107
Liverpool	65
Penrith	105
Wollondilly	111
SWSLHD	
SWSPHN	77
NBMLHD	
NBMPHN	102
NSW	90

Source: PHIDU

10 Environment and health

The *Healthy Built Environment Checklist*[41] posed five key questions in relation to environment and health. These concern safeguarding air and water quality, minimising noise, odour and light pollution, and mitigating natural and manmade hazards. The two indicators developed in response to these key questions reflect each geography's exposure to manmade hazards, specifically the heat island effect and poor air quality, which are acknowledged and growing concerns for the region by academia, government and non-government sectors alike[42]. Data was sourced from the NSW Planning Portal; there is no information on the frequency of this dataset being updated.

[41] NSW Ministry of Healthy (2020)
[42] Climate Council (2021); NSW Department of Planning and Environment (n.d.); Santamouris et al. (2017)

In 2019, the NSW Government published a spatial dataset that recorded the urban heat island effects experienced across the Sydney Greater Metropolitan Area. The data is available at very fine, mesh block and Statistical Area 1 (SA1) levels for the year 2016, and shows an estimated surface temperature of each mesh block/SA1. This dataset was processed using ESRI ArcMap, where the estimated surface temperatures were categorised and grouped by SA1. In lieu of any standardised categorisation of urban heat island effects, an effect of 3°C or more is used here as the first indicator, a noted average difference of temperature between cities and rural areas[43].

From the table below, it is observed that there were high proportions of each LGA's SA1s (with the exception of the Blue Mountains) where the urban heat island effect exceeded 3°C in 2016. This was especially so for Camden, Campbelltown, Fairfield and Liverpool LGAs, where nearly all SA1s experienced urban heating to this degree, with Penrith not far behind. In the more rural LGA of Wollondilly, urban heating was still experienced by more than four-fifths of all SA1s, likely the outcome of the topography of the Sydney Basin[44]. The similarly rural but higher altitude LGAs of Blue Mountains and Hawkesbury in Sydney's northwest, in contrast, have comparatively lower proportions of their SA1s experiencing urban heat island effects. When examined using further differentiation, it was observed that the urban heat island effect is more pronounced in other parts of metropolitan Sydney, especially in the Central River City and Eastern Harbour City, with notably more areas (and higher proportions of each LGA) experiencing extreme heat island effects of +9°C or more (Figure A3). An interactive version of the map may be viewed online here: https://arcg.is/0L8HKD.

Indicator 10a: SA1 experiencing ≥ 3°C Urban Heat Island effect (%) (2016)

	% of SA1s experiencing ≥ 3°C Urban Heat Island effect
Blue Mountains	33.5
Camden	997
Campbelltown	98.1
Fairfield	99.4
Hawkesbury	68.1
Liverpool	98.8
Penrith	95.7
Wollondilly	84.8
SWSLHD	
SWSPHN	
NBMLHD	
NBMPHN	
NSW	

Source: NSW Planning Portal, NSW Urban Heat Island to Modified Mesh Block 2016 dataset

A second indicator concerning air quality was developed using annual data downloaded from NSW Department of Planning and Environment's open data website, collated by the NSW Air Quality Monitoring Network (NSWAQMN). It collates air quality information measured at 66 air quality monitoring stations across 33 regions throughout NSW—including 25 throughout metropolitan Sydney—with hourly, daily, monthly, and annual data across a

[43] https://www.planning.nsw.gov.au/Policy-and-Legislation/Resilience-and-natural-hazard-risk/Urban-heat
[44] See, for example, McKenzie (2022)

range of air pollutants. The variable NEPH (a measure of light scattering or reduction due to atmospheric particulate matter) was selected as the second indicator as it reflects both change in visibility and air quality, and is one of the standard measures of poor air quality. The indicator notes the number of days during the calendar year of 2021 where an above standard NEPH was measured at the monitoring stations located in each of the Western Parkland City LGAs.

It was observed that air quality throughout the Western Parkland City, and metropolitan Sydney, was generally poor in 2021, with more monitoring stations in the metropolitan regions recording higher exceedance days than the rest of the State. Within the Western Parkland City, only the Oakdale (Wollondilly LGA, 10 exceedance days), Bringelly (Liverpool LGA, 20 exceedance days), and Camden (Camden LGA, 21 exceedance days) recorded fewer exceedance days than the NSW average. All other monitoring stations recorded higher numbers of exceedance days. Comparing all metropolitan Sydney monitoring stations, those in the Western Parkland City on average recorded higher numbers of exceedance days than those in other parts of metropolitan Sydney (34.5 days vs 27.2 days). There were particularly high exceedance days recorded at Liverpool (Liverpool LGA, 51 exceedance days) and Campbelltown West (Campbelltown LGA, 53 exceedance days), the highest in metropolitan Sydney after Macquarie Park (Ryde LGA, 66 exceedance days). These stations are all located near industrial sites and may, therefore, relate to the comparatively higher incidences.

Indicator 10b: Number of days NEPH exceeded accepted standard (2021)

	Number of days NEPH exceeded accepted standard
Blue Mountains	
Camden	21 (Camden)
Campbelltown	53 (Campbelltown West)
Fairfield	
Hawkesbury	40 (Richmond)
Liverpool	20 (Bringelly) 51 (Liverpool)
Penrith	45 (Penrith)
Wollondilly	36 (Bargo) 10 (Oakdale)
SWSLHD	
SWSPHN	
NBMLHD	
NBMPHN	
NSW	26*

Source: NSWAQMN

Note: NEPH is a visibility and atmospheric particulate matter measure. The NSW standard[45] advises a daily measure of 3.0 NEPH or higher as poor air quality. Measures are based on data collected at Air Quality Monitoring Stations indicated in brackets.

Note: * calculated average across all 33 monitoring stations that recorded NEPH.

[45] https://www.environment.nsw.gov.au/topics/air/understanding-air-quality-data/glossary-of-air-quality-terms#neph

11 Environmental sustainability and climate change

The *Healthy Built Environment Checklist*[46] posed four key questions in relation to environmental sustainability and climate change. These concern the promotion of community resilience, considering and meeting environmental sustainability objectives, and the adoption of mitigative measures. The indicator developed in response to these key questions reflects each jurisdiction's readiness to meeting climate change and sustainability objectives. Data was sourced from each jurisdiction's website, and may be updated periodically.

The indicator developed reflects whether each governmental jurisdiction has implemented a sustainability and/or climate change strategy in response to their respective, local challenges. It was clear that all eight Western Parkland City LGAs and the NSW State Government had developed strategies in response to climate change and sustainability concerns. For most LGAs (and the NSW Government), these are highly related issues that are, then, often addressed by the same rather than separate strategies. Most councils had also developed accompanying action plans, usually within the same strategy documents, to inform implementation.

Indicator 11a: Council/State government has implemented a sustainability/climate change strategy

	Whether Council/State government has implemented a sustainability/climate change strategy
Blue Mountains	Y
Camden	Y
Campbelltown	Y
Fairfield	Y
Hawkesbury	Y
Liverpool	Y
Penrith	Y
Wollondilly	Y
SWSLHD	
SWSPHN	
NBMLHD	
NBMPHN	
NSW	Y

Source: Local/State government websites

12 Mental health

Extending the *Healthy Built Environment Checklist*[47] healthy planning principle themes, a twelfth theme—mental health—was included to recognise the diverse health outcomes of planning issues. In contrast to the indicators developed under the other 11 healthy planning principle themes, which responded directly to the key questions posed under each theme, the two indicators developed for this twelfth theme reflect different actualisations of mental health outcomes, in self-harm and feeling of distress. It should be noted, however, that these outcomes may not always be directly attributable to but may be exacerbated by land use

[46] NSW Ministry of Healthy (2020)
[47] NSW Ministry of Healthy (2020)

planning practices (e.g. lack of local opportunities, lack of service accessibility). Data was sourced from the NSW Government website, HealthStats NSW, and may be updated periodically.

The first indicator reflects the incidences of intentional self-harm, and includes a range of deliberate actions of injuring and hurting oneself. It is an accepted, key monitoring indicator of suicide prevention[48] despite acknowledgement that most people who self-harm do not go on or intend to end their lives. This is a standardised measure, calculated as the number of hospitalisation incidences per 100,000 population. For the population of NSW in 2018-2019, this rate was 90.7 hospitalisations per 100,000 population. Comparing to data of the same period, the populations of South Western Sydney LHD and PHN fared far better in mental health, with a noticeably lower hospitalisation rate (60.9/100,000). In contrast, the populations of Nepean Blue Mountains LHD and PHN reported higher rates of intentional self-harm hospitalisations than the NSW average (98.4/100,000).

Indicator 12a: Intentional self-harm: hospitalisations (per 100,000)* (2017-19)

	Intentional self-harm: hospitalisations (per 100,000)[1]*
Blue Mountains	87.0
Camden	52.5
Campbelltown	79.7
Fairfield	50.2
Hawkesbury	91.4
Liverpool	80.8
Penrith	103.0
Wollondilly	60.4
SWSLHD	60.9
SWSPHN	60.9
NBMLHD	98.4
NBMPHN	98.4
NSW	90.7

Source: HealthStats NSW

Note: * LGA data for 2017-19; LHD, PHN & NSW data for 2018-19

Data at the LGA level was averaged across the three-year period of 2017-2019 due to the comparatively smaller populations. The populations of most Western Parkland City LGAs reported far lower hospitalisation rates than the NSW average, the only exceptions being Hawkesbury (91.4/100,000) and Penrith (103.0/100,000). These higher rates may be reflective of service access and other opportunities as described above, and/or broader, non-land use planning related structural factors such as discrimination.

The second indicator reflects the experience of psychological distress, which encompasses a range of mental health conditions including depression, nervousness and psychological fatigue[49]. Data is sourced from the NSW Population Health Survey, using the international standard Kessler Psychological Distress Scale 10 Plus measure, and published by

[48] https://www.aihw.gov.au/suicide-self-harm-monitoring/data/intentional-self-harm-hospitalisations
[49] https://www.aihw.gov.au/reports/australias-health/australias-health-2018/contents/indicators-of-australias-health/psychological-distress

HealthStats online. For 2019, 17.7% of the NSW population reported experiencing high or very high levels of psychological distress. In the absence of data at the LGA level, it was observed across the South Western Sydney LHD and PHN, and Nepean Blue Mountains LHD and PHN, that there were higher reported levels of psychological distresses in the region. For all of these geographies, around one-fifth of the populations reported high or very high levels of psychological distress. As noted above, such high levels may be related to (but not necessarily attributed to) the lack of local opportunities, potentially resulting in financial and other distresses; these higher levels may also reflect other, non-land use planning structural factors.

Indicator 12b: High or very high psychological distress (%)[1] (2019)

	% experiencing high or very high psychological distress
Blue Mountains	
Camden	
Campbelltown	
Fairfield	
Hawkesbury	
Liverpool	
Penrith	
Wollondilly	
SWSLHD	19.7
SWSPHN	19.7
NBMLHD	20.8
NBMPHN	20.8
NSW	17.7

Source: HealthStats NSW

Priority groups

One of the aims of the benchmarking exercise is to identify data gaps that constrain the effectiveness of potential indicators that can track and monitor the progress of land use planning's impacts on health. This gap identification extends to the question of equity, whether different population groups may experience diverse health outcomes as a result of land use planning. As such, data for the same 21indicators were sourced for seven identified priority groups, and the collated results are presented separately in a supplementary report[50]. It should, however, be noted that not all of the 21 indicators may have a socioeconomic element, rather some may strictly be spatial indicators that impact all socioeconomic and/or priority groups. Indicator 10a urban heat island effect is one such example as it reflects and impacts on the geographic area, although it should be acknowledged that some priority groups may be more likely to reside in dwellings that may be less well equipped, or they themselves may have less capacity, to respond to the outcomes.

When observed holistically, it is clear that there are significant gaps concerning data across all priority groups. Those gaps make it difficult to assess potential inequities between populations, including among these priority groups. This is especially the case for the

[50] Liu et al. (2023)

relatively smaller geographies of LGAs. These data gaps may be due to two reasons, among others:

1. Data was not collected by the relevant authorities. This may be because of organisational disinterest or error, or a lack of resourcing. There may also be concerns over the validity of the data, especially if it relies on periodic manual entries and is thus more likely to encounter errors.
2. Disaggregated data concerning particular priority groups may be restricted from publication due to confidentiality concerns. Current regulations and policies, as well as ethical practice, may have prevented fine-level data from being released because individuals may be easily re-identified, therefore compromising their privacy.

In the subsections that follow, we highlight the health outcomes of each priority group, using the same 21 indicators, based on the limited data that is available.

Indigenous Australians

Across the seven priority groups included in this benchmarking exercise, there was noticeably more data available—and at finer geographic scales—for Indigenous Australians than most other groups (Table S4). This partly reflects the added policy attention on this population group, in response to an acknowledged disparity in health outcomes that Indigenous Australians experience compared to other Australians generally[51]. Such a disparity is also reflected in our set of indicators, where data was available, which shows that Indigenous Australians in NSW, and across the Western Parkland City, generally experienced worse outcomes across multiple healthy planning principle themes. At the State level, these include lower proportions who meet the recommended daily consumption of fruit and vegetables, higher proportions who have insufficient levels of physical activity, and notably worse mental health. While there was a lack of data across these themes at finer geographic levels, it should be acknowledged that some drivers of such disparate outcomes may not be geographically specific. There is extensive research on Indigenous Australians experiencing worse mental health than other population groups, especially as an outcome of colonisation and prolonged mistreatment[52]. Such impacts may be experienced across multiple rather than specific geographies. The lower consumption of fresh fruit and vegetables may be due to the now entrenched poverty that many Indigenous households experience[53], which is also related to the acknowledged psychological trauma of colonisation discussed above.

Looking at finer level data (at the LGA scale), Indigenous households were also more likely to live in crowded dwellings (except in the Blue Mountains, Camden and Wollondilly LGAs, the least dense LGAs in the Western Parkland City). This may, partly, be related to the experiences of poverty described above, but also acknowledged differences in family and household structures that may not be easily, or appropriately, measured using a standardised indicator[54]. Likewise regarding the indicator concerning travelling to work using active modes of transport, where there were lower proportions of Indigenous workers across the Western Parkland City who did so, this may be reflective of the general lack of local job opportunities, as well as other factors beyond land use controls such as discrimination.

[51] See, for example, AIHW (2022); Durey & Thompson (2012)
[52] See, for example, Jorm et al. (2012)
[53] See, for example, Hunter et al. (2004); Morrisey (2003); Sila & Dugain (2019)
[54] See, for example, Dunstan et al. (2020); Morphy (2004)

Refugees and migrants

In contrast to the already scarce data coverage on Indigenous Australians across different geographic scales, there was a notable absence of data concerning the health (and healthy planning) outcomes of refugees and migrants (Table S5),. the only exception being if special collations of services that cater specifically to refugees and/or migrants were promoted on local community directories published by local governments. The two reasons for lack of data coverage discussed above certainly apply, especially the concerns over data confidentiality given the relatively small humanitarian support Australia as a whole provides to refugees and asylum seekers. The granting of humanitarian visas, for example, only comprises a very small proportion of all permanent migration to Australia annually; this figure is further dwarfed by the very high numbers of temporary visa holders (excluding visiting holiday makers; Table 4).

Table 4: Humanitarian visa grantees as proportions of permanent migration and temporary visa holders

	Humanitarian visas	Permanent migration*	As % of permanent migration	Temporary visas#	As % of temporary visas
2011–12	13,756	198,754	6.9%	2,629,295	0.5%
2012–13	20,022	210,022	9.5%	2,736,970	0.7%
2013–14	13,768	203,768	6.8%	2,830,535	0.5%
2014–15	13,759	202,856	6.8%	2,872,463	0.5%
2015–16	17,555	207,325	8.5%	2,949,414	0.6%
2016–17	21,968	205,576	10.7%	3,072,935	0.7%
2017–18	16,250	178,667	9.1%	3,054,881	0.5%
2018–19	18,762	179,085	10.5%	3,132,519	0.6%
2019–20	13,171	153,537	8.6%	2,420,859	0.5%
2020–21	5,947	165,999	3.6%	826,132	0.7%

Source: Department of Home Affairs 2022

Note: * includes skilled migrants, family reunions, and other special eligibility visa holders, plus humanitarian visa holders; # includes student visa holders, crew and transport visa holders, working holiday and other temporary skilled employment visa holders, etc. and excludes holiday makers

Culturally and linguistically diverse communities

A similar coverage is observed of data concerning culturally and linguistically diverse communities to those of Indigenous Australians (Table S6). Data sourced from HealthStats NSW distinguishes communities from English-speaking (ESB) and Non-English speaking backgrounds (NESB). It was observed that communities of ESB generally enjoyed better health outcomes than their NESB counterparts. Focussing on healthy eating, there were higher proportions (at the NSW state level) of ESB communities that met recommended daily consumptions of fruit and vegetables than their NESB counterparts; likewise physical activity, where a lower proportion of NSW residents of ESB reported having insufficient levels of physical activities compared to those of NESB. There were similar proportions of communities across the Western Parkland City LGAs, regardless of whether they were of ESB or NESB, who travelled to work locally via active transport modes (except in the Blue Mountains and Hawkesbury LGAs, where higher proportions of NESB were able to travel to work via active modes of transport). NSW communities of ESB, however, enjoy

comparatively better mental health than their NESB counterparts, with a lower proportion reporting experiences of psychological distress.

Socioeconomically disadvantaged communities

There was a general lack of data on socioeconomically disadvantaged communities—defined as Statistical Areas Level 2 in the lowest quintile of the Australian Bureau of Statistics' Socio-Economic Indexes of Australia – Index of Relative Socioeconomic Disadvantage—at fine (LGA, LHD or PHN) geographic levels, with most data relating to the benchmarking indicators available only at the NSW state level (Table S7). Despite this limitation, it was clear that these communities experienced comparatively worse health outcomes than their more advantaged counterparts. Of the indicators where data was available—daily consumption of fruit and vegetables, having sufficient physical exercise, living in inappropriate/unaffordable housing conditions, feeling safe, civic participation, and mental health—the outcomes were noticeably worse for socioeconomically disadvantaged communities than the general population. These may reflect the financial and other constraints such communities face in meeting their needs, constraints that are long acknowledged in academic and grey literature[55]. Despite this long acknowledgement, Fairfield LGA was the only Western Parkland City local government that included a special collation of services that targeted socioeconomically disadvantaged communities.

Older Australians

A similar coverage is observed of data concerning older Australians to those of Indigenous Australians (Table S8). Data sourced from HealthStats NSW distinguishes older Australians across the two different age groups of 65-74 years, and 75 years or older. It was observed that older Australians across both age groups enjoyed better health (and healthy planning) outcomes than the general community. There were higher consumptions of fruit and vegetables, and noticeably better mental health. While across the Western Parkland City LGAs there were generally lower proportions of those older Australians in the labour force who travelled to work using active transport modes, this was not the case in Hawkesbury and Penrith LGAs, potentially reflecting more common opportunities for older people remaining or re-joining the workforce. Of the eight Western Parkland City LGAs, only Wollondilly LGA did not publish a special collation of services catering to older Australians.

Young adults

Young adults, defined here as those aged 15-24 years, are often highlighted as a priority group due to being more socioeconomically constrained from having had less time in the workforce to build up assets and resources. They may also have more constrained social and other networks. Such constraints are reflected in the limited data, primarily at the NSW state level, that could be sourced for the indicators (Table S9). This was especially the case for experiences of comparatively worse mental health, with much higher rates of hospitalisation due to intentional self-harm (at the State, LHD and PHN levels), as well as a high proportion reporting experiences of psychological distress (29.6% in NSW, compared to

[55] See, for example, Davidson et al. (2020); de Leeuw et al. (2021)

17.7% for the general population). This is, however, also a generation that is placing more emphasis on self-care, as reflected in the lower proportion who did not get sufficient levels of physical activity, and the higher proportion who meet the recommended daily consumption of fruit. There was also a higher use of active transport modes for work at the State level—potentially out of both self-consciousness as well as financial constraints—but less so across the Western Parkland City except in the Blue Mountains LGA. In response to the acknowledged socioeconomic constraints and observed disparity in health outcomes, most Western Parkland City LGAs (except Camden and Wollondilly) provided special collations of services that targeted young adults in the community directories.

Children

In this report, we defined children as those aged between 0 and 14 years. Unlike the other age-specific priority groups highlighted in this report, there were children-specific health data collections in many health-focused or other data sources. These children-specific datasets, however, often used similar but not the same categorisation or methodology, and as such the data reported is not directly comparable to data included here for the other priority groups. For consistency, we tried to source children-specific data for the same indicators to facilitate across-group comparisons.

Partly because of collation of special, children-specific datasets, there was little comparable data for the indicators we have included in this report (Table S10). This was particularly the case for the finer geographic scales of LGA as well as LHD and PHN. Of the little data available, there was State-level data on meeting the recommended daily consumption of vegetables (with children aged 5-15 years faring slightly worse than their adult counterparts) and fruits (with children aged 5-15 years faring far better than their adult counterparts). There was likewise comparable data for intentional self-harm hospitalisation at the State level, with children aged 5-14 years having fared far worse than their adult counterparts. Children also reportedly had lower levels of physical activity than their adult counterparts, at both the State and LHD levels. The only indicator where LGA-level data was available concerned the special collation of children services in local community directories, which all eight Western Parkland City LGAs provided.

Persons with a Disability

As with people of refugee and migrant backgrounds discussed above, there was an almost complete absence of data concerning persons with a disabiility across our 21 benchmarking indicators (Table S11). The differing needs and experiences of physical, mental and social health outcomes of differently-abled people were, therefore, not able to be differentiated using these indicators despite growing evidence of such disparities[56]. Outside of special data linkage projects, there is, however, growing recognition of, and recommendations to fill, such data gaps[57] to better reflect the disparities of needs and outcomes.

[56] See, for example, Reppermund et al. (2019)
[57] Fortune et al. (2021)

Conclusions

Our review of 17 Australian and international guidelines on healthy planning revealed different levels of considerations when it came to ensuring equitable access to interventions and outcomes. While several highlighted that 'equitable access' should be ensured, few provided definitions on what equity means from a planning perspective; even fewer provided guidance on how it may be achieved.

This lack of guidance on achieving equitable healthy outcomes is translated to the land use planning instruments, at both the NSW State level (SEPPs) and local government level (LEPs) of the Western Parkland City. Our review of 14 SEPPs and 8 LEPs against NSW Health's *Healthy Built Environment Checklist*[58] shows a similar lack of clarity over how equitable access—though acknowledged as important among all and not just specific priority groups—is to be provided.

On this, LEPs were observed to be more explicit about ensuring such equitable access among their respective councils' communities. This is perhaps no surprise, given the more direct role councils have in local planning issues, including how such land use planning instruments may be applied in conjunction with other social and community planning programs. This is especially when the role of land use planning is primarily infrastructure and service provision, while social and community programming is needed to facilitate access and encourage their uptake. This latter role is not currently within the scope of the land use planning instruments reviewed in this project.

With the *Healthy Built Environment Checklist* in mind, a set of indicators was proposed to assist local governments within the Western Parkland City to reflect on and monitor healthy planning outcomes, noting particularly how such measures may facilitate changes and improvements over time[59]. This set of indicators shows contrasting outcomes across the Western Parkland City, from access to fresh food and opportunities for physical activities, to social connectivity and experiences of climate change.

This benchmarking exercise also attempted to highlight how social determinants of health may influence divergent outcomes across different priority groups. The focus on these priority groups revealed a dearth of data concerning these communities at a fine geographic level. This absence may impact governments' mitigative and advocacy roles in ensuring equitable health outcomes across their communities, limited by ethical concerns over confidentiality, and a lack of resourcing for data collection.

[58] NSW Ministry of Health (2020)
[59] See, for example, Giles-Corti et al. (2022); Kent et al. (2022)

Recommendations

This final chapter provides a summary of our findings highlighted throughout this report, and suggests three potential ways of moving forward given these findings, including addressing some of the barriers and challenges identified along the way.

Revising the scope of land use planning instruments to include health and equity dynamics across best practice principles

The report highlights the potential relevance of land use planning instruments such as SEPPs and LEPs in considering health and health equity. Further, it highlights the inadequacy of the current versions of these instruments in providing guidance on how improvements in health outcomes and the recognition of health inequities may be achieved. The predominance of red categorisation in both Table 2 and in Table 3, which highlights the lack of mentioning and/or consideration of equity issues, is a clear visualisation of this. This is despite our analysis showing that Australian healthy planning principles were more likely than their international counterparts to have mentioned the importance of recognising different social determinants of health and provided guidance for more equitable outcomes (see Table 1).

In highlighting these shortcomings within the current planning instruments in NSW, we recommend that legislators of planning instruments, including local councils themselves and State agencies with responsibility for instruments, revise the framing of these planning documents into the future. That revision should be based on whether or not, and how, the instruments address the best practice principles that connect land use with health and equity. These instruments should be revised under the NSW *Environmental Planning and Assessment Act* to more clearly articulate their connection to health, wellbeing and equity.

It should, however, be recognised that some considerations to overcoming these shortcomings may already be incorporated in other related planning documents, such as Community Strategic Plans and Local Strategic Planning Statements as noted above. In future updates, we also recommend highlighting how these various planning instruments may be better cross-referenced with each other, to maximise the potential of them being considered and operationalised concurrently rather than separately. This is especially the case in the four healthy planning principle themes of 06 Community safety and security, 07 Open space and natural features, 09 Social cohesion and connectivity, and 12 Mental health, where most or all LEPs reviewed did not correspond with to any great extent or at all. Each of these have clear land use responsibilities (such as the siting of open spaces), the outcomes of which may be greatly enhanced by social inclusion policies and inputs (e.g. accessible entryways, tactile signage, and sensory gardens to name a few).

Advocating for broader consideration of health across planning instruments

There are obvious limitations on land use planning's influence on human and environmental health without other corresponding policies and programs that enrich their usability; as each council's LEPs was drafted based on a legislated template, their coverage is, therefore, restricted by this top-down guidance. In future reviews of such instrumental templates, we recommend clear and strategic—both short and long term—advocacy for the broader consideration of health in these planning instruments. This may be done, for instance, by the various planning teams within councils, by Local Health Districts and Primary Health

Networks, and advocacy groups such as the Western Sydney Health Alliance and other collaborative partnerships. In such cases, updated templates supported by the latest data may more easily facilitate the discussion and operationalisation of healthy planning principles at the local and regional levels.

Advocacy may extend to the State-level planning instrument (SEPPs). As Table 2 highlights, most of the 13 current SEPPs are thematically focussed; more importantly, only two paid some consideration to health and health equity, each corresponding to one specific healthy planning principle theme only (03 Housing for the Housing SEPP, and 08 Social infrastructure for the Precincts – Western Parkland City SEPP). The only State-level instrument reviewed that showed health considerations in more than one area was the discontinued Design and Place SEPP, in providing guidance for equitable facilitation of physical activities, and in social cohesion and connectivity. These shortcomings were, to a small extent, addressed by two LEPs (Campbelltown and Liverpool) that demonstrated health considerations, but the impacts could be much broader if councils, alliances and Joint Organisations can advocate for the reconsideration and/or legislation of the Design and Place SEPP.

Advocating for wider recognition of diverse indicators representing social determinants of health and equity

Acknowledging that Australia is a diverse, multicultural society, and especially so in the culturally and socioeconomically diverse Western Parkland City, there also needs to be more recognition for diverse social determinants of health and equity. While some provisions for the consideration of such diversities were included in the State (SEPPs) and local (LEPs) level land use planning instruments, there is little data available at a fine-enough grain level to assist councils in assessing and monitoring changes experienced by the different population groups. This is reflected by the largely blank cells of the Tables S4-10. This may hinder councils' and health organisations' ability in understanding the effectiveness of their land use, social and community planning efforts, including their capacity to build business cases for introducing and/or extending successful programs. This lack of data availability may be partially overcome with the introduction of the *Data Availability and Transparency Act 2022*[60] in April 2022, which may see particular registered institutions gain access to more nuanced datasets for authorised uses, including datasets and data items that were previously restricted, protected or confidentialised. It also links with the WHO's recently released agenda for urban health research priorities, which highlights the needs for evidence of both under-researched thematic areas and of population priority groups[61]. Availability may, however, still be limited by whether and how the data was collected in the first place. Councils, health organisations, alliances and other partnerships may also advocate for the broader collection of such data—or the release of administrative data—by health service providers and service managers, such as Local Health Districts and Primary Health Networks.

[60] https://www.legislation.gov.au/Details/C2022A00011
[61] WHO (2022)

References

ABS (2017) *TableBuilder Pro*, Australian Bureau of Statistics, Canberra.

AIHW (2022) *Indigenous health and wellbeing*. Australian Institute of Health and Welfare, Canberra. https://www.aihw.gov.au/reports/australias-health/indigenous-health-and-wellbeing

AIHW (2023) *Reducing the burden due to overweight (including obesity) and physical inactivity*. Cat. No: PHE 323. Australian Institute of Health and Welfare, Canberra.

Australian Treasury (2023) *Measuring What Matters: Consultation Pack – Second Phase*. April 2023. Australian Government. https://treasury.gov.au/consultation/measuring-what-matters-2023

BC Centre for Disease Control (2018) *Healthy Built Environment Linkages Toolkit: making the links between design, planning and health, Version 2.0*. Population & Public Health team.

Birmingham City Council (2021) *Birmingham Healthy City Planning Toolkit*, London Healthy Urban Development Unit.

ChangeLab Solutions (2012) *How to Create and Implement Healthy General Plans: A toolkit for building healthy, vibrant communities*.

ChangeLab Solutions (2021) *Healthy planning guide: Strategies to promote healthier communities*.

Climate Council (2021) *Untouchable playgrounds: Urban heat and the future of Western Sydney*. https://www.climatecouncil.org.au/urban-heat-island-effect-western-sydney/

Davidson, P., Bradbury, B., Wong, M. & Hill, P. (2020) *Poverty in Australia 2020 – Part 2: Who is affected and why*, Australian Council of Social Service.

de Leeuw, E., Fatema, K., Sitas, F., Naidoo, Y., Treloar, C., Phillips, J., Dorsch, P. & Goldie, C. (2021) *Work, income and health inequality: A snapshot of the evidence*, Australian Council of Social Service.

de Roo, M. (2011) *The Green City Guidelines: Techniques for a healthy liveable city*.

Department of Home Affairs (2022) *Australian Migration Statistics, 2020-21*. Australian Government

Dunstan, L., Hewitt, B. & Nakata, S. (2020) Indigenous family life in Australia: A history of difference and deficit, *Australian Journal of Social Issues*, 55(3): 323-338.

Durey, A. & Thompson, S. (2012) Reducing the health disparities of Indigenous Australians: Time to change focus, *BMC Health Services Research*, 12: 151.

enHealth (2017) *Health impact assessment guidelines*. July.

Fortune, N., Madden, R. & Clifton, S. (2021) Health and access to health services for people with disability in Australia: Data and data gaps, *International Journal of Environmental Research and Public Health*, 18(21): 11705.

Giles-Corti, B., Vernez Moudon, A., Lowe, M., Adlakha, D., Cerin, E., Boeing, G., Higgs, C., Arundel, J., Liu, S., Hinckson, E., Salvo, D., Adams, M., Badland, H., Florindo, A., Gebel, K., Hunter, R., Mitáš, J., Oyeyemi, A., Puig-Ribera, A., Queralt, A., Santos, M., Schipperijn, J.,

Stevenson, M., Van Dyck, D., Vich, G. & Sallis, J. (2022) Creating healthy and sustainable cities: what gets measured, gets done, *The Lancet*, 10(6): e782-e785.

Harris, P., Baum, F., Friel, S., Mackean, T., Schram, A. & Townsend, B. (2020) A glossary of theories for understanding power and policy for health equity, *Journal of Epidemiology & Community Health*, 74(6): 768-798.

Health in All Policies Team, Community & Public Health (2019) *Integrated Planning Guide for a healthy, sustainable and resilient future*. Version 3.0. Christchurch, New Zealand: Canterbury District Health Board.

Hunter, B., Kennedy, S. & Biddle, N. (2004) Indigenous and other Australian poverty: Revisiting the importance of equivalence scales, *Economic Record*, 80(251): 411-422.

Jorm, A., Bourchier, S., Cvetkovski, S. & Stewart, G. (2012) Mental health of Indigenous Australians: A review of findings from community survey, *Medical Journal of Australia*, 196(2): 118-121.

Kent, J., Harris, P. & Thompson, S. (2022) What gets measured does not always get done, *The Lancet*, 10(9): e1235.

Liu, E., Yang, H. & Harris, P. (2023) *Land Use Planning for Equitable Health Outcomes (LUPEHO) – Supplementary tables*. The Health Urban Environments Collaboratory, Maridulu Budyari Gumal (Sydney Partnership for Health, Education, Research and Enterprise) and the Centre for Health Equity Training, Research and Education, UNSW Sydney.

London Healthy Urban Development Unit (2017) *Healthy Urban Planning Checklist*. Third Edition. April.

McKenzie, L. (2022) Remaking public space for cooler, greener outcomes: a case study from Western Sydney, in Y. Yang and A. Taufen (Eds) *The Routledge Handbook of Sustainable Cities and Landscapes in the Pacific Rim*, Routledge, London, pp. 589-603.

Ministry of Housing, Communities and Local Government (2021) *National Design Guide - Planning practice guidance for beautiful, enduring and successful places*. January

Minnesota Department of Health (2012) *Minnesota Healthy Planning: How-To Guide*. September.

Morphy, F. (2004) *Indigenous household structures and ABS definitions of the family: What happens when systems collide, and does it matter?*, Working Paper No. 26/2004, ANU Centre for Aboriginal Economic Policy Research (CAEPR), Canberra.

Morrisey, M. (2003) Poverty and Indigenous health, *Health Sociology Review*, 12(1): 17-30.

National Heart Foundation (2012) *Healthy by Design SA - A guide to planning, designing and developing healthy urban environments in South Australia*.

NSW BOCSAR [Bureau of Crime Statistics and Research] (2021) Recorded Crime Reports. https://www.bocsar.nsw.gov.au/Pages/bocsar_crime_stats/bocsar_latest_quarterly_and_annual_reports.aspx

NSW Department of Planning and Environment (n.d.) *Urban heat*. https://www.planning.nsw.gov.au/Policy-and-Legislation/Resilience-and-natural-hazard-risk/Urban-heat

NSW Ministry of Healthy (2020) *Healthy Built Environment Checklist: A guide for considering health in development policies, plans and proposals*. NSW Government.

Public Health England (2017) *Spatial Planning for Health: An evidence resource for planning and designing healthier places*. June.

Public Health Innovation and Decision Support, Population & Public Health (2012) *State of Evidence: The Built Environment and Health 2011-2015*. December. Alberta Health Services.

Reppermund, S., Heintze, T., Srasuebkul, P., Reeve, R., Dean, K., Smith, M., Emerson, E., Snoyman, P., Baldry, E., Dowse, L., Szanto, T., Sara, G., Florio, T., Johnson, A., Clements, M., McKenzie, K. & Trollor, J. (2019) Health and wellbeing of people with intellectual disability in New South Wales, Australia: A data linkage cohort, *BMJ Open*, 9(9): e031624.

Riverside University Health System - Public Health (2017) *Healthy Development Checklist*.

Santamouris, M., Haddad, S., Fiorito, F., Osmond, P., Ding, L., Prasad, D., Zhai, Z. & Wang, R. (2017) Urban Heat Island and Overheating Characteristics in Sydney, Australia. An Analysis of Multiyear Measurements, *Sustainability*, 9(5): 712.

Sila, U. & Dugain, V. (2019) *Income poverty in Australia: Evidence from the HILDA survey*, OECD Economics Department Working Papers, No. 1539, OECD Publishing, Paris.

World Health Organization (2012) *Health Indicators of Sustainable Cities in the Context of the Rio+20 UN Conference on Sustainable Development*.

WHO (2015) *Healthy cities: good health is good politics: toolkit for local governments to support healthy*. World Health Organization, October

WHO (2020) *Integrating health in urban and territorial planning: a sourcebook*. World Health Organization, May

WHO (2022) *Setting global research priorities for urban health*. World Health Organization, October.

Yates, J. (2007) *Housing affordability and financial stress*, National Research Venture 3 Research paper 6. Australian Housing and Urban Research Institute, Melbourne.

Appendices

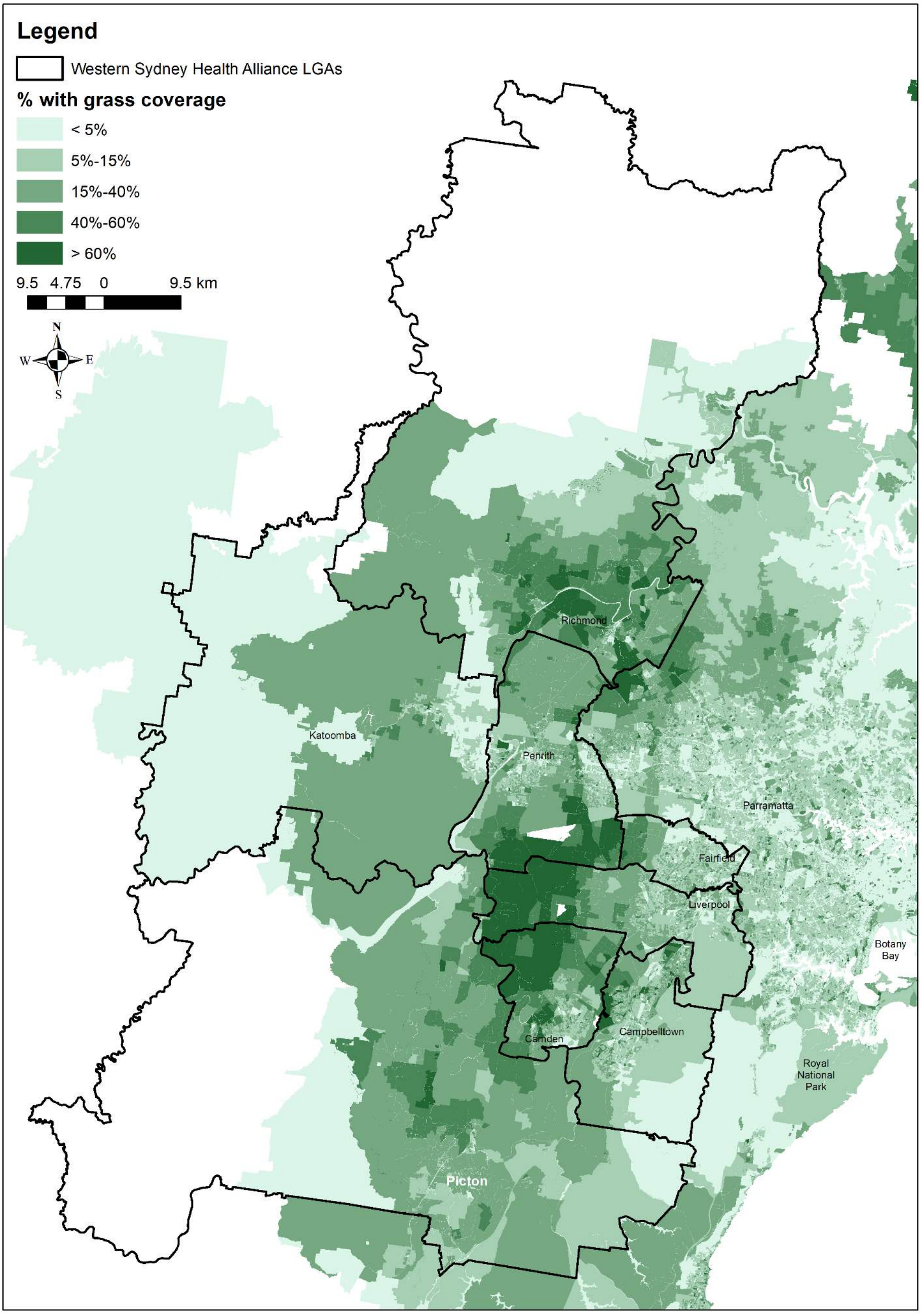
Table A1: List of search terms used for reviewing LEPs

Theme	Key term 1	Key term 2	Key term 3
01 Healthy eating			
01a. promote access to fresh, nutritious and affordable food and drink	Fresh food	Affordable food	Healthy food / Nutritious food
01b. discourage over-consumption of unhealthy food and drink including alcohol	Unhealthy food	Unhealthy eating	Alcohol
01c. preserve food growing (agricultural) areas	Food growing area	Agricultural areas	Urban agriculture
01d. support local food production	Local food	Community gardening	Growers' / Farmers' markets
02 Physical activity			
02a. encourage physical activity	Physical activity	Walkable / Walkability	(Easy access to) public transport
02b. promote opportunities for walking, cycling and other forms of active transport	Walking	Cycling	Active transport
02c. promote access to quality open spaces, including green space and recreational facilities	Open space(s)	Green space(s) / Park	Recreational facilities
03 Housing			
03a. encourage housing that supports human and environmental health	Human health	Environmental health	Crowding / Privacy
03b. encourage dwelling diversity	Dwelling diversity	Housing diversity	Housing choice
03c. promote affordable housing	Affordable housing	Home ownership	Housing affordability
03d. ensure housing is adaptable and accessible	Adaptable housing	Accessible housing	Universal / accessible design
04 Transport and connectivity			
04a. reduce car dependency and encourage active transport	Car dependency	Active transport	Walking / Cycling
04b. improve public transport services	Public transport	-	-
04c. encourage infill development and integrate new developments into existing ones, including key destinations and active transport infrastructure	Infill / brownfield / greyfield development	Integrate new development	Mixed use development
05 Quality employment			
05a. improve the location of jobs in terms of housing and community options	Location of jobs	Commuting times	Employment hub
05b. increase access to a range of quality employment opportunities	Employment opportunities	Job opportunities	-
05c. increase access to appropriate job training	Job training	Vocational training	-

Theme	Key term 1	Key term 2	Key term 3
06 Community safety and security			
06a. consider crime prevention and a sense of security	Crime prevention	Sense of security / safety	Lighting
06b. address risks associated with alcohol use	Alcohol use	Alcohol outlets	Alcohol-free zone
07 Open space and natural features			
07a. provide access to green and blue open spaces and natural areas	Green open spaces	Blue open spaces	Natural areas
07b. ensure that public open spaces are safe, accessible, attractive and easy to maintain	Safe open spaces	Accessible open spaces / Proximity	Easy to maintain / Natural and built shade / Drinking water fountains / Smoke-free / clear sight lines
07c. promote quality streetscapes that encourage activity	Quality streetscapes	-	-
07d. engender a sense of cultural identity, sense of place and incorporate public art	Sense of cultural identity	Sense of place	Public art
08 Social infrastructure			
08a. provide access to a range of facilities to attract and support a diverse population	Facilities: schools, community centres, libraries, healthcare facilities (hospitals, community health centres, general practitioners), childcare centres, recreational facilities, local shops, pharmacies, post offices, banking facilities	Diverse population	-
08b. respond to existing and projected community needs and current gaps in facilities and services	Community needs	-	-
08c. provide for early delivery of social infrastructure	Early delivery	Social infrastructure	-

Theme	Key term 1	Key term 2	Key term 3
08d. promote an integrated approach to social infrastructure planning	Social infrastructure planning	-	-
08e. maximise efficiencies in social infrastructure planning and provision	Social infrastructure planning	-	-
09 Social cohesion and connectivity			
09a. provide environments that will encourage social interaction and connection	Social interaction	Social connection	Social cohesion
09b. promote a sense of community and attachment to place	Sense of community	Sense of attachment to place	-
09c. encourage local involvement in planning and community life	Local involvement	Community engagement	-
09d. minimise social disadvantage and promote equitable access to resources	Social disadvantage	Equitable access	-
09e. avoid community severance, division or dislocation	Community severance	Community division	Community dislocation
10 Environment and health			
10a. help improve air quality	Air quality	Air pollution	Ozone
10b. help improve water quality, safety and supply	Water quality / Microbial contamination	Water safety	Water supply
10c. minimise disturbance and health effects caused by noise, odour and light pollution	Noise	Odour / Landfill sites	Light pollution
10d. consider the potential for hazards (both natural and manmade) and mitigate them	Natural hazards	Manmade hazards	Industrial sites
10e. consider pest management strategies when determining the location of new urban development	Pest management	New urban development	Water bodies
11 Environmental sustainability and climate change			
11a. meet environmental sustainability objectives	Environmental sustainability	Coastal areas	Urban heat islands
11b. consider climate change mitigation	Climate change mitigation	Infrastructure choices	Waste management technologies
11c. adopt measures to adapt to climate change	Adapt to climate change	Coastal communities	Farming communities
11d. promote community resilience	Community resilience	-	-
12 Mental health			
12. Mental health	Mental health	-	-

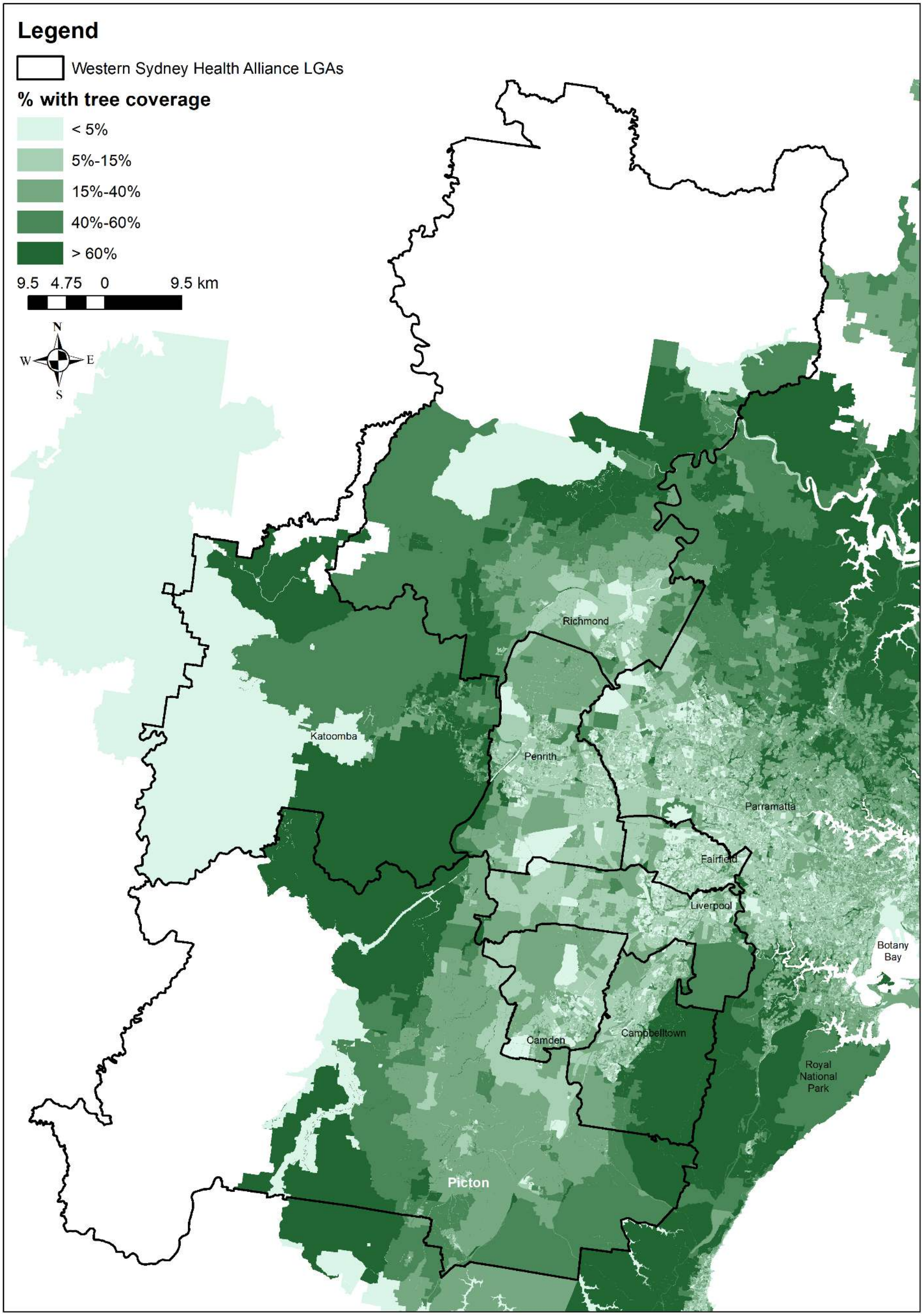
Figure A1: Percentage of mesh block with grass coverage, metropolitan Sydney, 2016



Source: NSW Planning Portal, the NSW Urban Vegetation Cover to Modified Mesh Block 2016 dataset

Note: An interactive version may be viewed online here: https://arcg.is/jOPa8.

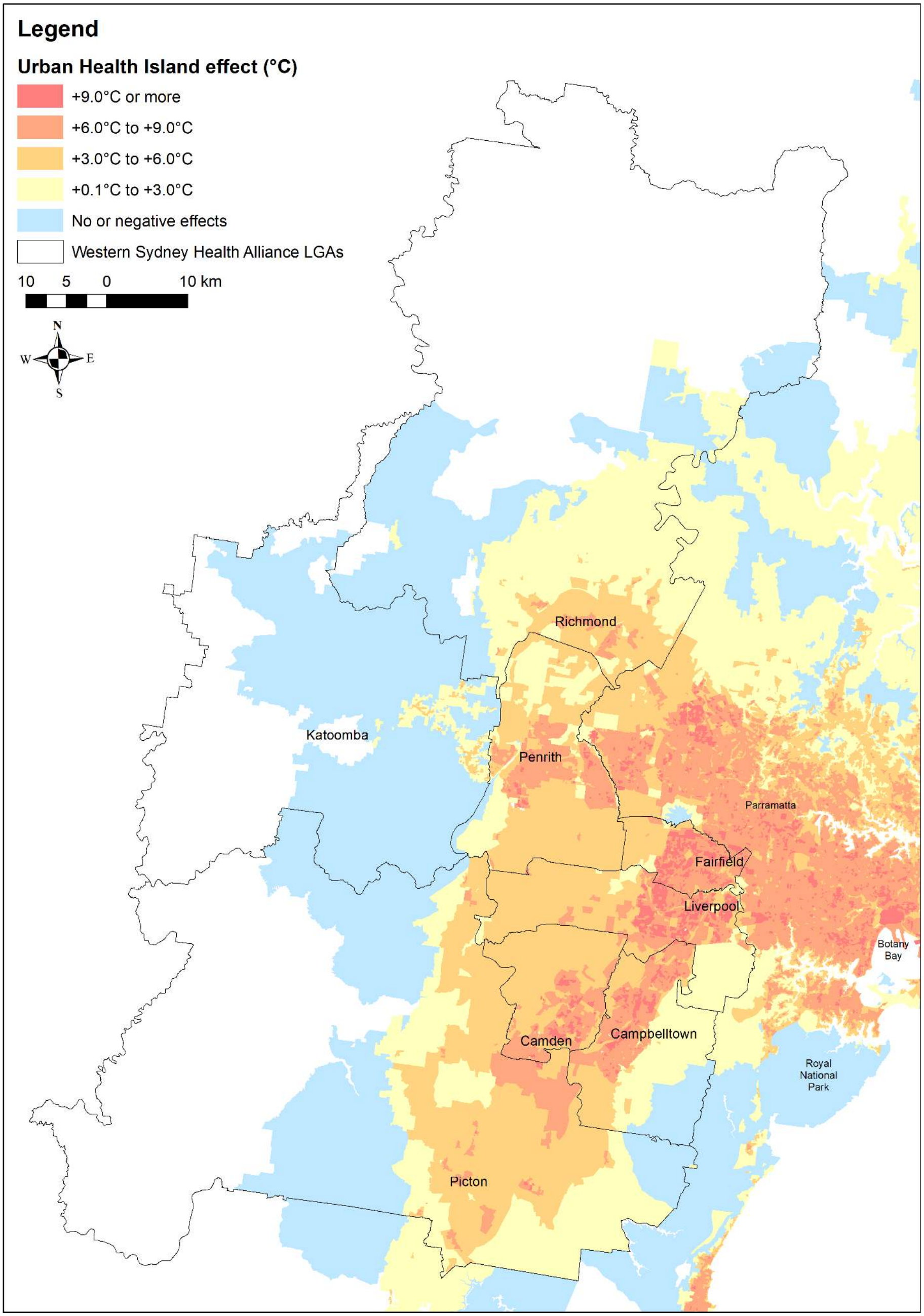
Figure A2: Percentage of mesh block with tree coverage, metropolitan Sydney, 2016



Source: NSW Planning Portal, the NSW Urban Vegetation Cover to Modified Mesh Block 2016 dataset

Note: An interactive version may be viewed online here: https://arcg.is/08fvS80

Figure A3: Urban heat island effect in °C per mesh block, metropolitan Sydney, 2016



Source: NSW Planning Portal, NSW Urban Heat Island to Modified Mesh Block 2016 dataset

Note. An interactive version may be viewed online here: https://arcg.is/0L8HKD