

Transport  
for NSW

# Data for Places

A practitioner's guide to  
applying place-based data for  
effective place management

Version 1.1: 28 September 2023



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# Acknowledgement of Country

Transport for NSW acknowledges the traditional custodians of the land on which we work and live.

We pay our respects to Elders past and present and celebrate the diversity of Aboriginal people and their ongoing cultures and connections to the lands and waters of NSW.

Many of the transport routes we use today – from rail lines, to roads, to water crossings – follow the traditional Songlines, trade routes and ceremonial paths in Country that our nation's First Peoples followed for tens of thousands of years.

Transport for NSW is committed to honouring Aboriginal peoples' cultural and spiritual connections to the lands, waters and seas and their rich contribution to society.



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## Document control

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Version	Amendment notes
1.0	Final Version (12/09/2023)
1.1	Updated Version (28/09/2023)

# 1. Introduction to Data for Places

This document has been developed to guide you, as a practitioner or place owner, through the application of data in the management and monitoring of your place.

A step-by-step process for applying place-based data, built upon the framework provided by the NSW Smart Places Playbook, is outlined in this guide.

It includes considerations and guidance as well as templates and tables of suggested resources. The guide also sets out relevant scenarios which illustrate the utilisation of the Data for Places process and includes the associated data catalogues and local and global examples.

It is recommended that you review the entire guide prior to developing a plan for the collection, acquisition or application of data for the effective management of your place. This is guidance only and practitioners must ensure that they also comply with the relevant standards and legislation.

## 1.1 Context

Smart places use data insights to make places more liveable, sustainable and economically vibrant, and to make things easier and better for the people who live, work and visit the place.

All smart places:

- embed sensors and communications technology in infrastructure and the natural environment
- use the sensors and technology solutions to capture, safely store, aggregate and share government data
- generate information and insights and communicate these to drive decisions.

In NSW, we use the term ‘smart place’ instead of smart city, to recognise a smart place can be metropolitan or regional, and can be a neighbourhood, a local government area or a region in terms of scale.

Taking a place-based approach to using data involves having a plan to capture and/or generate and analyse data about the place, like transport, tourism, environment, health and business data. The data could be sourced from public and private sources and could be self-generated or acquired.

## 1.2 About the Guide

This Practitioner’s Guide (the Guide) has been developed to help you use data to manage and monitor places and public spaces.

It includes a step-by-step process for applying place-based data, using the NSW Smart Places Playbook framework:

1. Discover

2. Design
3. Create
4. Manage and review.

The Guide provides templates and suggested resources and sets out relevant scenarios to illustrate processes. It includes the associated data catalogues and local and global examples.

We recommend you review the entire guide before you start collecting, acquiring or applying data for the effective management of your place.

This is guidance only and practitioners must ensure that they also comply with the relevant standards and legalisation.

### 1.3 Smart Places resources

The [SmartNSW Roadmap 2022-2027](#) is an ambitious plan to help the NSW Government deliver great places and outcomes for people using technology and data solutions. The Roadmap includes 14 actions for the NSW Government which will make it easier for agencies, local councils and place makers across NSW to adopt smart solutions to improve their operations and services.

This Guide sits within a suite of technical guidance documents. Please read it in conjunction with the [Smart Places Playbook](#), which sets the foundations for successful smart places projects and provides links to relevant case studies, policies and standards.

### 1.4 Contributions

It's important to acknowledge that this Practitioner's Guide builds on the excellent work of others, including:

- [The London Office of Technology and Innovation's](#) outcomes-based methodology for data projects
- The [Data Management lifecycle and data valuation chain](#) (adapted from C. Mawer 2015) in the NSW Government Data Strategy (April 2021)
- The [Data Value Chain from](#) Open Data Watch
- The [Best Practice Guide](#) from OPENAIR
- Learnings from the Office of the 24 Hour Economy Commissioner's '[Data After Dark](#)' project exploring night time economy data.

Transport for NSW would also like to thank the organisations that supported development of this Guide and related case studies.



## 1.5 Definitions

*Note: Where possible, these definitions have been adapted from the Glossary of the [NSW Government Data Strategy \(April 2021\)](#).*

Term	Definition
<b>Data</b>	Data is a broad term, the definition of which is heavily impacted by context. Data generally refers to facts and figures that can be represented as numbers, text, graphics, sound or video, as well as how these are interpreted. Data can also take different forms e.g., digital and can pertain to a range of topics or areas e.g., people, systems and the environment. Data can further be broken down by type or purpose, for example transactional and operational data.
<b>Dataset</b>	A dataset is an identifiable collection of information or data and associated metadata.
<b>Closed data</b>	Restricted and only accessible to its owner, custodian or holder.
<b>Open data</b>	<p>According to the Australian Bureau of Statistics (ABS), open data is data that is made available with no restriction on access or use (excluding possible copyright or licensing requirements).</p> <p>As per the NSW Government Open Data Policy, data is open to the extent that its management, release and characteristics meet the following principles of openness:</p> <ul style="list-style-type: none"> <li>• Open by default, protected where required</li> <li>• Prioritised, discoverable and usable</li> <li>• Primary and timely</li> <li>• Well managed, trusted and authoritative</li> <li>• Free where appropriate</li> <li>• Subject to public input.</li> </ul> <p>Open data should be both technically available and usable and have licensing frameworks in place to facilitate its release and use.</p>
<b>Proprietary data</b>	Proprietary data refers to information or data that is owned and controlled by a specific individual, organisation, or entity. It is considered private and confidential, typically not available or accessible to the general public. Proprietary data is protected by intellectual property rights, such as copyrights, trademarks, or patents which grant exclusive rights to the owner and restrict others from using, reproducing, or disclosing the data without proper authorisation.
<b>Aggregate data</b>	Aggregate data is data which is produced by grouping information into categories and combining values within these categories. Depending on the characteristics of the initial dataset, and the level of aggregation, aggregate data may be de-identified, if it is no longer possible to reasonably identify specific individuals or locations.
<b>Metadata</b>	Data or information that describes, defines and adds meaning to other data, to support its interpretation, management and use.

Term	Definition
<b>Insights</b>	Meaningful and actionable findings emerging from processed data, that can be leveraged to optimise decision-making processes.
<b>Platform</b>	A system or group of technologies.
<b>Sensor</b>	A device which detects or measures a physical property and records, indicates or otherwise responds, including converting that detection into data. For example, sensors can monitor temperature, motion, pressure, light, smoke and other environmental inputs.
<b>Artificial Intelligence</b>	Intelligent technology, programs and the use of advanced computing algorithms that can augment decision-making by identifying meaningful patterns in data.
<b>De-identified data</b>	Data that no longer contains, or never included, identifiers about a person, such that their identity is no longer apparent or reasonably ascertainable from the data. Re-identification needs to be either impossible, or extremely difficult
<b>Data sharing</b>	The exchange of data between entities. Restrictions and controls imposed are contingent upon the data’s sensitivity and privacy impact.
<b>Personal information</b>	Information or an opinion (including information or an opinion forming part of a database and whether or not recorded in a material form) about an individual whose identity is apparent or can reasonably be ascertained from the information or opinion (per the Privacy and Personal Information Protection Act 1998 (NSW) (“PIIP Act”), section 4).
<b>Sensitive data or information (NSW)</b>	<p>According to the NSW Government Information Classification, Labelling and Handling Guidelines (2020), sensitive information is information where compromise of the confidentiality of the information may be expected to cause limited damage to an individual, organisation or government.</p> <p>Sensitive information includes:</p> <ul style="list-style-type: none"> <li>• Personal information</li> <li>• Health information</li> <li>• Information which could be subject to legal privilege</li> <li>• Commercial-in-confidence information</li> <li>• Law enforcement information</li> <li>• NSW Cabinet information</li> </ul>



## 2. Applying Data for Places

Data can be an extremely valuable tool in the successful management of places. It can reveal past performance of a place and help plan for its future. When using place-based data, it is important to have a specific problem to solve and a desired outcome(s) in mind. A problem statement helps to avoid wasting time, money and resources searching for datasets and/or installing sensors that provide no extra insights. A clear idea of the desired outcome enables identification of existing data or tools that could be adapted and allows for productive conversation with suppliers and data owners about how to achieve ambitions. See Table 1 below.

Table 1 Productive conversation considerations

Start with this	Not this
<p>We want to be able to respond and alert our community to flood events more rapidly.</p>	<p>We want to add sensors to our riverbanks and local waterways.</p>
<p>We want to attract more people to visit our retail and leisure district and generate economic benefits in the evening, while feeling safe, welcome and having fun.</p>	<p>I want to gather all the socio-economic data that I can on my retail and leisure district.</p>
<p>We want to reduce the impact of heat on key active transport routes within our council area, making it safer and more comfortable for residents to walk and cycle on hot days.</p>	<p>We want to install temperature sensors across the entire council.</p>

A step-by-step process for applying data for places is outlined below. This is based on the framework provided by the NSW Smart Places Playbook. See Figure 1 below.

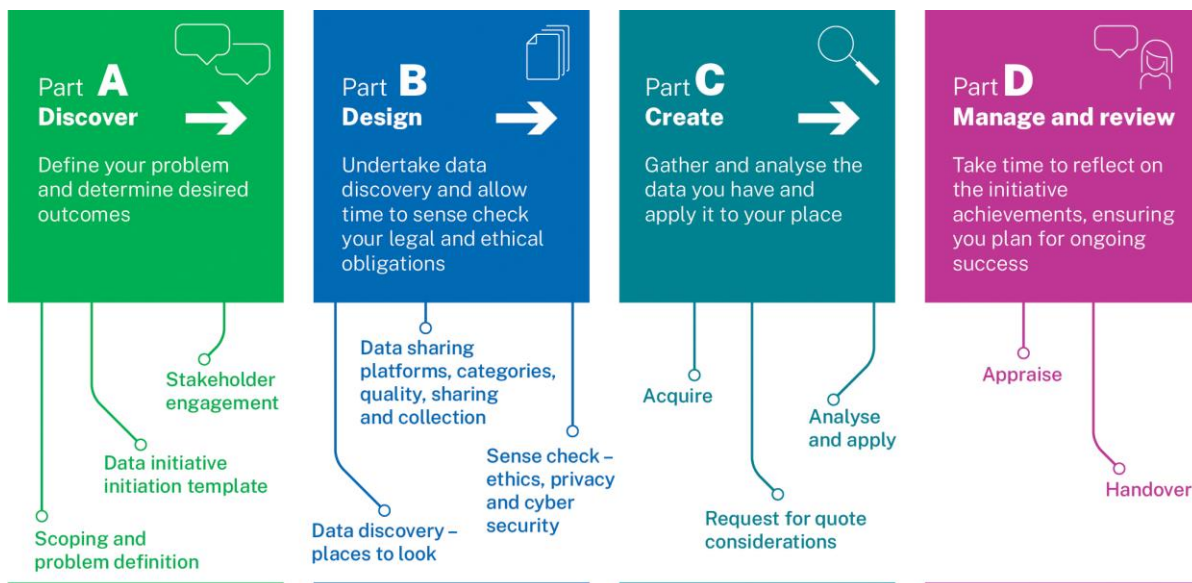


Figure 1 Applying Data for Places Process

## 2.1 Part A – Discover

### 2.1.1 Scoping and problem definition

The template below is provided as a framework to enable you to gather your thoughts and ideas prior to embarking on a Data for Places initiatives. You may not initially have answers to all questions in the template, but you should consider how and when you will answer them as you develop an initiative. A copy of this template can also be found in [Appendix 1](#).

#### Data for Places Initiative Initiation Template

**There is a problem with [state problem]**

Consider: *What is the specific issue that your project addresses? Where does it occur? Is it a specific place? Does the problem occur during a specific time period? Does this problem impact upon a particular community or group? Is it related to the underlying infrastructure that helps your city or town function? How much does this problem cost your organisation or community in terms of time or money? You can refer to [Digital NSW Guidance](#) on how to define a problem.*

**This matters to [stakeholders] because...**

Consider: *Who else cares about this problem? Who will be impacted? How will this improve your place for them?*

**It matters to the Council / place owner because...**

Consider: *What function does this place serve for the Council / place owner and the community? What costs are currently incurred because this problem exists? How does it relate to strategic priorities?*

**We will know the project is successful when...**

*Consider: What does ‘good’ look like for your place? Being clear on the change you want to see in your place can provide the motivation to get a project done, help unite different partners who may have differing views on the underlying problems and prevent teams from jumping to potentially false assumptions about what solutions will work. Be specific here as it will help you understand what information you should be collecting for success.*

**To achieve success** [person, role organisation] **would need to know** [what information]. **Knowing this then they could do** [possible intervention].  
*Consider: What do you need to know about your place to determine the best course of action? What do you already know? Where are the gaps? Can you fill these gaps? Consider framing it as an ‘if/then’ (see example table below).*

<b>If [specific group of people or systems]</b>	<b>had access to [Information]</b>	<b>THEN they could [Action]</b>
Urban designers and park managers	areas of the retail and business district that are the hottest for the longest over the course of the day	direct resources to these areas to plant more street trees and implement other cooling measures and bring down the overall urban heat island effect for their retail or business district area.
Automated flood gate system	live/real-time river levels and predicted rainfall	open overflow waterways pre-emptively to avoid flooding.
Event managers	the number and average age of people attending a yearly event held within councils’ public open space	ensure that the facilities for future events meet expected demand and that any reasonable adjustments for a particularly young or elderly crowd are provided, e.g., additional accessibility measures.

### **Key personnel**

*Clearly define the key people who will be responsible for governance and management of the Data for Places project. Assigning responsibilities to specific roles ensures that there are people within the organisation who are identifiable for the part they play in ensuring the long-term success of the project. Do not leave roles unclear or ambiguous.*

- **Initiative sponsor:** *Should be a senior executive who has accountability for the place and the data collected and applied. Responsibilities include approving policies, protocols and guidelines and ensuring legal, regulatory and policy requirements are met. The initiative sponsor will approve significant changes throughout the lifetime of the project.*
- **Initiative owner:** *Will exercise overall responsibility for the initiative. Responsibilities include enforcing rules on behalf of the initiative sponsor and the day to day management of the initiative, including the information/data assets.*

- **End user:** Who will be using the information gathered? How will they be using this information? What is their expected level of technical capability?
- **Key stakeholders / working group:** The initiative may impact a range of people across an organisation. Identifying roles and responsibilities for everyone from ICT to asset management teams will be important.

**Sense check: just because you can do this project, should you?**

*Consider: Who might be harmed or feel unwelcome by collating information on your place? Who might be excluded from the questions you are posing? Is any of the information being collected considered personal information and is it directly relevant or necessary to achieve success?*

**The resources available for this project include...**

*Consider: What skills do you have within the organisation that you can draw upon? Will you need to hire/contract specific data skills? Do you have a budget allocated? What do your stakeholders know about your place? Can they share information?*

**The ongoing costs for this project are [costs] and will be funded through...**

*Consider: How long does your project need to run for, or is there a need for ongoing monitoring of your place? Or a snapshot in time? What are your expected ongoing costs, including any hardware management or data management? (See Appendix 2).*

**[Team or role within council/place] will be responsible for the ongoing management of this project.**

*Consider: You are initiating the place-based project, but long-term responsibility may lie with another team or individual within Council or another organisation. Consider who is responsible for the ongoing and regular management of your place. Are they able to take on responsibility for any data flows or data products developed? Do they have a budget to maintain sensing equipment? Do they have the resources to support user uptake for the information or service you are developing?*

**Others who are addressing this type of problem are...**

*Consider: Scan your environment. What have other place owners done to tackle your particular problem or subject area? What was their approach? What can you learn from them? Can you adapt or leverage any of their work for your place?*

## 2.1.2 Stakeholder engagement

To harness the potential of new technologies to meet the needs of the community, smart places should be built for people and designed with people. When designing, creating or managing public spaces and infrastructure you should consider the six principles set out in the NSW [Smart Places Customer Charter](#):

1. co-create smart places
2. respect the local character
3. advance digital inclusivity

4. keep information safe
5. create an open and fair environment
6. deliver benefits that last.

You should include a stakeholder engagement plan as part of your project. This Guide does not outline specific stakeholder engagement tools, as there is excellent advice on stakeholder engagement provided in the [Smart Places Playbook](#).

## 2.2 Part B – Design

### 2.2.1 Data discovery

An important part of a successful Data for Places project is to find and bring together information that is fit for purpose and helps answer the key questions set out in Part A – Discover.

#### Places to look

There are five main places you can look when undertaking data discovery:

1. **Data within your organisation:** This can include information from sensors or Internet of Things (IoT) technology, data collected by other parts of your organisation (asset management, event data), or data already purchased by your organisation. You may have a data catalogue that you can easily search, or you may need to go in search of it yourself.
2. **Open data:** Open data is primarily data from public entities, academic institutions or non-profits and is usually accessible via data portals or platforms.
3. **Closed public held data:** Public entities may also hold closed or private data that is available if you meet specific requirements. You would need to request access and may need to establish a data sharing agreement.
4. **Proprietary data:** This is data that is collected, processed and/or displayed by private sector organisations that you can access, usually for a fee, with licensing and data sharing agreements. (Note: it's important to assess the purchase cost of the proprietary data against the relative benefit provided.)
5. **Primary data:** Lastly, you may consider gathering your own data, via surveys (desk-based or on-ground) or installing sensors and IoT technology. This can add considerable time, cost and potentially risk to your project, therefore you should be clear on the need for this.

#### Definition

The **Internet of Things** (IoT) refers to physical devices that are connected to the internet, collecting and sharing data. It is the global network of infrastructure, vehicles, wearable devices, home appliances, medical technologies and other objects that are embedded with electronics, software, sensors and actuators, enabling these 'things' to share and exchange data to perform their functions more efficiently and effectively.

Table 2 below displays common data sharing portals. You can think of a data portal as a library catalogue of available data, the data may not be stored by the ‘library’ you are searching, but it can point you in the direction of the ‘library’ that does store or license that particular dataset. This is not an exhaustive list of all data sharing portals available but can be used as a starting point. Note: descriptions taken from the associated websites.

**Legend for Table 2:**






All data open	Combination of open & closed data	All data closed
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Table 2 Common data sharing portals

Source	Description*
<b>NSW Government</b>	
<a href="#">NSW Open Data Portal</a>	The official data portal for the NSW government, providing access to a wide range of datasets from various government departments and agencies.
Environmental Data Portal, <a href="#">SEED</a>	Central Resource for Sharing and Enabling Environmental Data (SEED) in NSW.
<a href="#">API.NSW</a>	A directory of publicly available NSW Government APIs. It enables the public to directly connect to government data, promoting innovation and supporting the NSW Governments Open Data Policy to provide open management and trusted information.
<a href="#">Transport for NSW Open Data Hub</a>	This platform focuses on transportation-related data in NSW. It provides access to datasets related to public transport, roads, cycling, freight and other transport-related information. Note: users are required to register for account.
<a href="#">Transport for NSW – Data and Research</a>	This website provides a consolidation of open data resources, insights and visualisations from Transport for NSW.
<a href="#">NSW Bureau of Crime Statistics and Research (BOCSAR)</a>	The Bureau is a statistical and research agency within the Department of Communities and Justice. They provide a collection of crime, court derived and custody datasets. Most are updated annually or quarterly. They also have a data visualisation tool available termed the NSW Crime Tool.
<a href="#">Spatial Collaboration Portal</a>	Provides a secure platform to share NSW spatial datasets. Allows local, state and federal agencies to deliver spatial data, asset management and visualisation services to all NSW citizens.



Source	Description*
<a href="#">NSW Flood Portal</a>	Delivered by the NSW State Emergency Service (SES) and the NSW Department of Planning and Environment. The portal shares key flood data.
<a href="#">NSW Planning Portal</a>	Managed by the NSW Department of Planning and Environment, this platform offers access to spatial planning data, including zoning information, development applications and land parcel information.
<a href="#">Bureau of Meteorology</a>	The Bureau of Meteorology (BOM) provides open access to most weather and climate data for the entire country, offering a range of datasets, including historical weather records, current forecasts and radar images.
<a href="#">HealthStats NSW</a>	This platform provides access to health-related datasets in NSW, including information on demographics, health indicators, hospital admissions and mortality rates.
<a href="#">NSW BioNet</a>	Managed by the NSW Office of Environment and Heritage, BioNet is a biodiversity and conservation data portal that offers access to information on species, ecosystems, vegetation and conservation efforts in NSW.
<a href="#">NSW WaterInsights</a>	WaterInsights shows what water is present in storage and aquifers, what is allocated to licences, what has been used and what is available for use. It also identifies the purposes for which water is used, the prices and volumes of water trading, operational plans and the rules by which water is managed.
<a href="#">NSW Education Data Hub</a>	The Centre for Education Statistics and Evaluation undertake analysis of education programs and outcomes across early childhood, schools, technical training and higher education.
<a href="#">Land.IQ</a>	LandIQ brings multiple land use data types into one single platform, making it easy to search more than eight million lots and properties to test the impact of different land use scenarios. It is currently only available to NSW Government agencies, with plans to expand availability to NSW Local Government in the short to medium term.
<b>Federal</b>	
<a href="#">Australian Government Open Data Portal</a>	This is the central portal for open government data in Australia. It provides access to datasets from federal, state and local government agencies on diverse topics such as demographics, health, education, environment and transportation.

Source	Description*	
<a href="#">Australian Bureau of Statistics (ABS)</a>	<p>The ABS is the national statistical agency of Australia and offers a comprehensive range of statistical data on the economy, population and social indicators.</p>	
<a href="#">Geoscience Australia</a>	<p>As the national geospatial and geological agency, Geoscience Australia offers access to geospatial data, maps, satellite imagery and geological information, with datasets related to geology, geography and natural hazards.</p>	
<a href="#">Australian Institute of Health and Welfare (AIHW)</a>	<p>The AIHW provides a wide range of health and welfare-related data and statistics, with access to datasets on topics such as population health, healthcare services, Indigenous health and mental health.</p>	
<p><b>Research and Academia</b></p>		
<a href="#">Research Data Australia</a>	<p>Research Data Australia is an online portal that provides access to a wide range of research datasets from Australian universities, government agencies and other research institutions.</p>	
<a href="#">AURIN data catalogue</a>	<p>AURIN is a collaborative national network of leading researchers and data providers across the academic, government and private sectors. They provide an online workbench with access to multidisciplinary datasets from over 100 different data sources. You may need to request access to specific datasets.</p>	

## Data categories

Table 3 provides an overview of the broad categories of data that may be useful for understanding and analysing different aspects of place. It is important to note that this is not an exhaustive list of all data available for place-based projects, but a good basis to begin with. Also remember that these categories are not isolated silos but interconnected elements that collectively contribute to a holistic understanding of a place. Combining and analysing data from multiple categories can facilitate evidence-based decision-making, foster collaboration across sectors and enable the development of targeted strategies tailored to the unique needs and challenges of each place.

Table 3 Datasets useful for managing places

Category	Type	Description	Purpose	Challenges	Potential Source/ Provider
Economic	Transaction Data	Collected by banks at point of sale	For insights on expenditure patterns by time, category and place	<ul style="list-style-type: none"> <li>• Data cost</li> <li>• Restrictive license conditions</li> <li>• May not allow insights to the geographic level required</li> </ul>	<ul style="list-style-type: none"> <li>• Banks</li> <li>• Credit card providers</li> </ul>
	Point-of-sale data	Spend data that is aggregated from point-of-sale equipment then provided via a third party	For insights on expenditure patterns by time, category and place	<ul style="list-style-type: none"> <li>• Data cost</li> <li>• Restrictive license conditions</li> <li>• May not allow insights to the geographic level required</li> </ul>	<ul style="list-style-type: none"> <li>• Third party providers</li> </ul>

Category	Type	Description	Purpose	Challenges	Potential Source/ Provider
	Labour force data	Includes indicators such as employment rates, industry composition and average incomes	Local economic context	Granularity may vary across regions and may not reflect current economic conditions	<ul style="list-style-type: none"> <li>Australian Bureau of Statistics (ABS) Data</li> <li><a href="#">NSW Employment Projections</a></li> <li>Local council</li> <li>Local Chamber of Commerce</li> </ul>
	Business type and operating hours	Indicators on number and type of businesses, may include opening hours	Local economic context	<ul style="list-style-type: none"> <li>Data may not reflect current conditions</li> <li>The business names on the Australian Business Register may not reflect trading names</li> </ul>	<ul style="list-style-type: none"> <li>Google Places API</li> <li>Australian Business Register</li> <li>Direct from local businesses</li> <li>Liquor license data -Liquor and Gaming</li> <li>Australian Bureau of Statistics (ABS) Data -CABEE (Count of Australian Business Entry and Exits)</li> </ul>

Category	Type	Description	Purpose	Challenges	Potential Source/ Provider
Demographic	Population characteristic	Describes the characteristics of a population residing in a specific area, such as age, gender, race, ethnicity, income, education level, marital status and geographic location	To understand the characteristics of the local population	Federal government data is only updated every five years with the census	<ul style="list-style-type: none"> <li>• ABS Data, including Census Data and Community Profiles</li> </ul>
	Population projections	Projected estimates of future population size and composition	To understand the expected changes in the local population over time	Data accuracy and assumptions for projections	<ul style="list-style-type: none"> <li>• Population projections – <a href="#">NSW Department of Planning and Environment</a></li> </ul>
	Visitors	Who is visiting a particular location. May include demographic information as well as travel mode, origin and destination	To understand the demographics of visitors to a place	<ul style="list-style-type: none"> <li>• Data collection methods</li> <li>• Data accuracy</li> <li>• Privacy concerns</li> </ul>	<ul style="list-style-type: none"> <li>• Mobile phone data from telecoms companies</li> <li>• Aggregated mobile phone app data from third party providers</li> <li>• Psychometric data from private providers</li> <li>• On-the-ground surveys</li> </ul>

Category	Type	Description	Purpose	Challenges	Potential Source/ Provider
Mobility	Psychographic	Data that describes attitudes, values, interests and personality traits of individuals or groups	To understand the sentiment and priorities of people visiting a place	<ul style="list-style-type: none"> <li>• Privacy concerns</li> <li>• data cost</li> <li>• Restrictive license conditions</li> <li>• May not allow insights to the geographic level required</li> </ul>	<ul style="list-style-type: none"> <li>• Market research firms</li> <li>• Social media platforms</li> <li>• On-ground surveys</li> </ul>
	Mobile phone data	Collected using the location of mobile phones in relation to mobile phone towers	To understand who is moving to and through a place. Can be used to identify where they are coming from, what type of visitor they are (leisure, worker or resident) and dwell time.	<ul style="list-style-type: none"> <li>• Privacy concerns</li> <li>• Data cost</li> <li>• Restrictive license conditions</li> <li>• May not allow insights to the geographic level required</li> </ul>	<ul style="list-style-type: none"> <li>• Mobile phone data from telecoms companies</li> <li>• Aggregated mobile phone app data from third party providers</li> </ul>
	Mobile phone application (app) data	Collected from the location services collected via apps on mobile phones	To understand local and regional movement patterns	<ul style="list-style-type: none"> <li>• Privacy concerns</li> <li>• Data cost</li> <li>• Restrictive license conditions</li> <li>• May not allow insights to the geographic level required</li> </ul>	<ul style="list-style-type: none"> <li>• Aggregated mobile phone app data from third party providers</li> </ul>



Category	Type	Description	Purpose	Challenges	Potential Source/ Provider
	On-the-ground sensors	A camera or sensor that detects and collects movement	For localised insights	<ul style="list-style-type: none"> <li>Sensors must be installed at specific locations, with costs associated with the collection, ingestion, analysis and storage of the data, as well as ongoing maintenance costs for the sensor equipment</li> <li>Need to ensure that data gathering techniques do not infringe on personal freedoms</li> </ul>	<ul style="list-style-type: none"> <li>Installation of sensors by third parties</li> <li>Installation of purchased sensors by councils/place owners</li> </ul>

Category	Type	Description	Purpose	Challenges	Potential Source/ Provider
	Transport and accessibility data	Includes information on transportation infrastructure, road network, public transit routes, pedestrian and cycling networks and parking availability	To understand transportation and accessibility patterns to appreciate the ease of movement for residents and visitors	<ul style="list-style-type: none"> <li>Data availability for specific modes of transportation</li> <li>Data consistency</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Public Transport Accessibility Level</a> Transport for NSW</li> <li><a href="#">Opal Trips – All modes</a> Transport for NSW</li> <li><a href="#">Household Travel Survey</a> Transport for NSW</li> <li>Note: there are a number of other transport related datasets available at <a href="https://opendata.transport.nsw.gov.au/">https://opendata.transport.nsw.gov.au/</a></li> </ul>
Health and wellbeing	Public Health	HealthStatsNSW provides information on a wide range of health-related statistics and indicators for NSW. Tip: you might also want to look to research organisations looking at public health who may be willing to share data or partner with you.	Information on population health	Significant privacy and security concerns with accessing and applying this data - depending on the granularity.	<ul style="list-style-type: none"> <li><a href="#">HeathStatsNSW</a></li> <li>Academic research organisations, universities and health research facilities</li> </ul>

Category	Type	Description	Purpose	Challenges	Potential Source/ Provider
Environment	Weather	Data related to atmospheric conditions, such as temperature and rainfall	To understand local weather patterns	<ul style="list-style-type: none"> <li>Data availability</li> <li>Data accuracy</li> <li>Update frequency</li> </ul>	<ul style="list-style-type: none"> <li>BOM</li> <li>Locally installed sensors</li> </ul>
	Air quality	Data on the level of pollutants in the air, such as PM2.5 and ozone	To monitor and improve air quality	<ul style="list-style-type: none"> <li>Data availability</li> <li>Location of monitoring sites</li> </ul>	<ul style="list-style-type: none"> <li>Air quality data <a href="#">NSW Department of Planning and Environment</a></li> <li>Locally installed sensors</li> </ul>
	Blue infrastructure	Information on the location and quality of water bodies, such as lakes and rivers	To assess water resources and ecosystems	<ul style="list-style-type: none"> <li>Data availability</li> <li>Data coverage</li> </ul>	<ul style="list-style-type: none"> <li>Water management authorities</li> <li>Spatial Services NSW Collaboration Portal</li> </ul>
	Waste and recycling rates	Data on the amount of waste generated and recycling rates	To monitor waste management and recycling efforts	<ul style="list-style-type: none"> <li>Data collection</li> <li>Data accuracy</li> <li>Update frequency</li> </ul>	<ul style="list-style-type: none"> <li>Local waste management authorities</li> <li>NSW EPA</li> </ul>
	Biodiversity	Data on the variety and abundance of species within an ecosystem	To understand and conserve biodiversity	<ul style="list-style-type: none"> <li>Data collection</li> <li>Species identification</li> </ul>	<ul style="list-style-type: none"> <li>Conservation organisations</li> <li>Academic research institutions</li> <li>SEED</li> </ul>

Category	Type	Description	Purpose	Challenges	Potential Source/ Provider
Safety and Policing	Green infrastructure	Information on natural or man-made green spaces, such as parks and forests	To understand urban green spaces and ecosystems	<ul style="list-style-type: none"> <li>• Data availability</li> <li>• Data coverage</li> </ul>	<ul style="list-style-type: none"> <li>• Asset information from council parks and recreation departments</li> </ul>
	Incidence of crime or anti-social behaviour	Data on reported incidence of crime or disruptive behaviour	For insights into public safety and law enforcement	<ul style="list-style-type: none"> <li>• Data accuracy</li> <li>• Reporting variations</li> </ul>	<ul style="list-style-type: none"> <li>• BOSCAR</li> </ul>

Category	Type	Description	Purpose	Challenges	Potential Source/ Provider
Land Use	Remote sensing data, including aerial imagery	Information and imagery collected about the earth's surface from sensors and instruments on board satellites, aircraft or other platforms. It involves the collection of data through the detection and measurement of electromagnetic radiation reflected, remitted or scattered by objects or the Earth's atmosphere.	To enable the analysis of spatial or temporal changes on the Earth's surface including on land cover, vegetation health and climate patterns	<ul style="list-style-type: none"> <li>• Data availability</li> <li>• Data resolution</li> <li>• Data cost</li> </ul>	<ul style="list-style-type: none"> <li>• GeoScience Australia (the national agency for geoscience and geospatial information in Australia)</li> <li>• Digital Earth Australia (led by Geoscience Australia)</li> <li>• Terrestrial Ecosystems Research Network (a collaborative network of researchers and institutions)</li> <li>• Spatial Services NSW Collaboration Portal</li> <li>• Other commercial providers</li> </ul>
	Land use and zoning data	Describes how land is utilised and regulations governing its use in a particular area	To understand current and future possible uses of land	Data relevance	<ul style="list-style-type: none"> <li>• NSW Planning Portal</li> </ul>

Category	Type	Description	Purpose	Challenges	Potential Source/ Provider
Culture and heritage	Cultural and heritage data	Cultural events and traditions, cultural heritage sites and historical landmarks	To understand the cultural and historical context of a place to preserve and showcase its local identity	There may be many different and organisations and datasets that should be engaged with to get an accurate picture of a place	<ul style="list-style-type: none"> <li>Indigenous organisations and community groups</li> <li>Local historical societies</li> <li>Office of Environment and Heritage</li> <li>State Library</li> </ul>
Infrastructure	Public facilities	Location of public services and infrastructure, including schools, hospitals and healthcare centres, parks and recreational areas	To understand the public service available to the local community	Data may not reflect real world conditions	<ul style="list-style-type: none"> <li>NSW Department of Education (Data.NSW)</li> <li>NSW Ministry of Health and Bureau of Health Information (Data.NSW)</li> <li>Local Council</li> </ul>
	Utilities	Information on the location and capacity of utilities infrastructure	To understand the provision of utilities and capacity for further growth	The location of utilities can be considered sensitive data, so it may not be shared publicly to a level of accuracy	<ul style="list-style-type: none"> <li>Spatial Services NSW Collaboration Portal – Features of Interest</li> <li>Federal Department of Infrastructure, Transport, Regional Development and Communications</li> </ul>



## Data quality

Data quality is how 'fit for purpose' the data is for your situation. It is important to consider the quality and relevance of any data you are using in assessing your place. Assessing the quality of the data enables you to ascertain its reliability, accuracy, completeness and consistency. You should understand where the information is coming from, how it has been validated and any potential biases or limitations.

**Accuracy:** The 'correctness' of the data based on the agreed 'source of truth' is referred to as accuracy. There may be multiple sources which provide information on the similar metrics, therefore it's important to elect a primary data source, noting that other data sources could then be used to confirm the accuracy of the primary.

**Accessibility:** Assess the availability and accessibility of the data. Many proprietary datasets come with strict data sharing requirements that may limit your ability to share meaningful insights with stakeholders. Evaluate the data format, data integration requirements and any technical or legal constraints associated with accessing and using the data for your project.

**Consistency:** Consistency refers to the coherence and uniformity of the data across different sources or over time. Look for inconsistencies that may introduce confusion and make it challenging to compare or combine data.

**Frequency and timeliness:** Consider the frequency, time frame or duration for which the data is available. Does the data capture the correct time-period for your analysis and decision-making process?

**Granularity:** Granularity refers to the level of detail or resolution in the data. Assess if granularity meets the specific needs of your project. Fine-grained data provides more detailed insights, but it is likely to come with higher costs and can also raise privacy concerns. Coarser-grained data may offer broader trends but might lack specific nuances.

**Relevance:** Assess how pertinent the data is to your specific question or place. Does it measure the community, place or time period you are interested in?

**Validity:** This relates to whether the data format meets the defined standards or business rules. It also includes the format of the metadata. This is important for interoperability and avoiding errors.

## Other considerations

**Collection:** Consider if the data collection methods and processes are appropriate and reliable. Does the data accurately represent what it claims to represent?

**Cost:** Consider the financial or resource investment required to obtain and manage the data. Costs vary with storage (bigger datasets cost more to store),

processing (bigger datasets costs more to process), and maintenance. Costs rise with increasing granularity, frequency and history.

**Data Privacy and ethics:** Ensure that the data has been collected and shared in compliance with applicable privacy regulations and ethical standards. Guidance on NSW privacy laws can be found here [Information and Privacy Commission – NSW Privacy Laws](#).

**Misinterpretation:** Data may be misinterpreted due to insufficient domain expertise, operational inaccuracies in analysis, inexperience in insights interpretation, unclear definitions or poor data quality.

#### See also

[The Australian Bureau of Statistics \(ABS\) Data Quality Framework](#) that provides the standards for assessing and reporting the quality of statistical information.

### Data sharing and collection

Data sharing between organisations is an important element for successful place projects and plays a vital role in the effective utilisation of place-based data. It enables government agencies, researchers and stakeholders to collaborate, leverage diverse datasets and collectively address complex challenges. Data sharing involves the exchange or provision of datasets, information or insights between different entities in a controlled and secure manner. Data sharing can take various forms, such as open data portals, data partnerships, research collaborations or interagency sharing arrangements.

Best practices for data sharing:

- a) Develop formal **Data Sharing Agreements** or Memorandums of Understanding (MoUs) that outline the terms, purpose, scope and responsibilities of data sharing partnerships.

#### Definition

**Data Sharing Agreements** are agreements between two or more parties that are providing and receiving data and set out the terms and conditions for sharing and using data. These agreements set out the rights, responsibilities and obligations of the parties involved and ensures that data is handled appropriately and in compliance with applicable laws and regulations. These agreements typically include the purpose of sharing the data, a detailed description of the data, the ownership and intellectual property rights of the data, restrictions around data usage and protocols for sharing data.

[Data.NSW is currently preparing a data sharing agreement template for government agencies.](#)

- b) Encourage a culture of data sharing by promoting the benefits and value of collaboration. Provide incentives, training and support to stakeholders to facilitate effective data sharing practices.

- c) Implement robust data protection measures, including access controls, encryption and anonymisation techniques, to ensure privacy and security are maintained throughout the data sharing process.

### See also

The NSW Information and Privacy Commission has set out guidance on data sharing and privacy. It explains the key considerations that agencies should address before they share data. [Data Sharing and Privacy \(July 2020\)](#).

- d) If you are collecting or creating a dataset as part of your Smart Places project, you need to consider how this information can be used, re-used and shared with other parties. You should determine if there is an existing **data standard** for the information you are intending to collect, and promote the use of common data standards, formats and metadata to enhance data interoperability and facilitate seamless integration.

### Definition

A **data standard** is a set of guidelines, specifications or rules that define how data should be structured, formatted, represented and exchanged within a specific domain or industry. It establishes a common language and structure that allows multiple datasets to be combined and compared. Through using existing data standards, you can improve data quality, streamline data integration processes, enhance the ability to share data and enable efficient and accurate data analysis.

### For example

#### Developing a Data Standard – The General Transit Feed Specification (GTFS)

The GTFS is a widely adopted data standard for sharing public transportation schedules, routes and related geographic information. It was initially developed by Google in collaboration with transit authorities to facilitate the integration and display of transit information in mapping applications. It has since become an industry-standard format used by numerous transit agencies, software developers and platforms worldwide.

Having this common data standard makes it easier for developers and platforms to incorporate accurate and standardised transit information into applications and services across multiple geographies.

There are several NSW Government resources related to data analysis and sharing that may be helpful in your place project:

- The [Data Analytics Centre \(DAC\)](#) in the Department of Customer Service collaborates with government agencies to solve complex stakeholder-oriented problems by providing services of data science, data sharing, data governance and data infrastructure. DAC's mission is to build world class capabilities in whole-of-government data analytics to improve outcomes for the NSW community.

- The [NSW Data Governance Toolkit](#) is designed to help improve policies, processes, structures, roles and responsibilities to ensure that an organisation's data is managed effectively and that it can meet its current and future business requirements.
- The [NSW Smart Places Customer Charter](#) gives customers a voice and provides for the protection of data, transparency, accessibility and equity in smart places.
- [NSW Open Data Policy](#) requires NSW Government agencies to start from a position of data openness, promoting the release of data unless there are security or privacy implications.
- The requirements set out by the [NSW Information and Privacy Commission](#) regarding privacy and access to government held information, including a public sector agency guide for [Data Sharing and Privacy \(July 2020\)](#) and a guidance on [NSW Privacy Laws](#).
- If the initiative uses AI, you should follow the [NSW AI Assurance Framework](#).
- If you are a **data owner** and wish to share information with others, it is important to check [Data.NSW's checklist for data owners](#).
- If you are a **requesting access to data**, see [the data sharing checklist for data requestors](#)

Standards Australia also offers this document: [Data and Digital Standards Landscape \(July 2022\)](#) and Dashboard: [Data and Digital Dashboard](#) which details the relevant data and digital standards.

### See also

The Connected Places Catapult, the UK's innovation accelerator for cities, transport, and place leadership, has developed resources for data sharing. Their [City Data Sharing Toolkit](#) includes tools, approaches and resources for local authorities sharing on-personal data.

## 2.2.2 Sense check

Embarking on a data project requires careful consideration of the ethical, legal and regulatory requirements that you **must** comply with. Take the time to reflect on these requirements, and ask yourself '**Just because I can, should I?**'. If the initiative uses AI, you should follow the [NSW AI Assurance Framework](#) (note: the AI Assurance Framework is mandatory for all NSW Government projects which contain an AI component or utilise AI-driven tools).

### Ethics and privacy

Data collected must be treated safely and securely. You must be transparent about and accountable for the data that is collected, how it is managed, used, stored, and disposed of, and who has access. There are both ethical considerations and privacy legislation to comply with. Ethical considerations form the foundations of responsible data practices. Keep the following questions in mind:

- a) Has the data been suitably anonymised and de-identified to minimise the risks of re-identification and unauthorised access? Could the combination

of this data lead to the re-identification of a particular person or business?

- b) Do I need to collect all this information? You should minimise the collection of sensitive or personally identifiable information to reduce privacy risks.
- c) Does this data perpetuate existing biases or unfair profiling? Be mindful of potential negative impacts on already marginalised individuals or communities.
- d) Who would potentially be harmed or excluded by using this data? Who is left out of your data? For example, mobile phone data will not capture children and may omit the elderly.
- e) Am I being transparent and accountable? Have I provided clear and accessible information about data collection, storage, use and sharing practices?

### **See also**

The [NSW Smart Places Data Protection Policy](#) brings together legislation and policies relevant to the full lifecycle of smart places data and information. It will help you to uphold best practice and adhere to related policies and relevant laws, including the [NSW Privacy and Personal Information Protection Act 1998](#).

## **Cyber security**

Maintaining robust cyber security practices is critical to safeguarding data integrity, protecting privacy and mitigating the risk of unauthorised access or data breaches. It is important to be aware of the [NSW Cyber Security Policy](#), which outlines the mandatory requirements for sensitive and classified information. Further guidance is provided in the [Information Classification, Labelling and Handling Guidelines](#) for the application of security classification to prevent government information assets from potential security breaches.

Also consider the [NSW IoT Policy](#), where smart technology is used to collect primary data, which then has implications on security architecture. If data is being shared and stored within cloud servers, consider the [NSW Cloud Policy](#).

## **2.3 Part C – Create**

### **2.3.1 Acquire, analyse and apply**

#### **Purchasing data**

It is important to clearly set out the requirements for the use, storage and collection of data in procurement and contractual documents. The template below provides a list of questions and requirements you may wish to include in your Request for Quotation from a data or technology supplier.

#### **Template 2: Request for Quote considerations**

**Suggested requirements and questions for a Request for Quote for a data product or data service. This is likely to be set out in procurement documentation such as a Statement of Requirements.**

Note: This is guidance only. It is important to seek the advice of a suitably qualified procurement specialist.

**Objectives:** Set out the purpose of the data acquisition, the specific questions you wish to have answered and any specific requirements or challenges related to the project.

**Data requirements:** Set out the type of data needed, including the specific variables, attributes or parameters required. Define the data formats, structure and any specific data standards that need to be followed.

**Data quantity:** Indicate the desired volume or quantity of data required, such as the number of records, the timeframe covered and the granularity or scale at which the data is required to be.

**Data delivery:** Define the preferred method of data delivery, such as electronic files, APIs or online platforms. Specify the preferred file formats, data structure and any technical specifications or compatibility requirements. If there are any specific security or encryption protocols to adhere to during data transmission, note them. You may also want to specify the data system used within your organisation to ensure compatibility.

**Data Usage and Licensing:** Clarify the intended use of the data and any associated licensing requirements. Specify if the data can be used for commercial purposes, shared with third parties or if there are any restrictions on data usage. Include any necessary provisions for data privacy, confidentiality or compliance with relevant regulations, such as data protection laws.

**Data ownership:** If you are entering into an agreement with a provider to collect data on your behalf, make sure that you are clear on the ownership of that data. Provided you have the appropriate security and technical capabilities, it is preferable for the council / place owner to retain control over any data collected. This avoids the vendor trying to sell your own data back to you at a later date, or the vendor on-selling it.

**Data quality:** Request information on how the data that is provided or collected will be calibrated and tested to ensure it is fit for purpose.

**Data Linkages:** The ability to acquire data that is linkable with other data at a suitable granularity with enough history is an important requirement to be considered. There are technical and legal considerations for a data vendor to review before confirming data that you are acquiring can be linked with data.



**Pricing and Payment Terms:** Request a detailed pricing proposal from vendors, including any upfront costs, subscription fees, data access fees or ongoing maintenance charges. Specify the desired payment terms, such as payment schedule, invoicing procedures and accepted payment methods.

**Vendor Qualifications and Experience:** Request information about the vendor's qualifications, experience and track record in providing similar data services. This can be included in the assessment criteria. Ask for references or case studies demonstrating their expertise in delivering high-quality data solutions. You may also want to request specific warranty periods.

**Project Handover:** Include requirements for documentation at the end of the project, including details on any product warranties, location of any hardware, design schematics and datasets.

### Definition

**Application Programming Interfaces (APIs):** A set of rules and instructions for how software can interact with a dataset. APIs allow flexibility in how information within a dataset is accessed, typically so that users can select only a specific, relevant subset of the information. APIs are usually connected to datasets that are updated in real-time.

## Analyse and apply

Work with your data analysts or data provider to analyse the data and draw meaningful insights to help you answer your key questions.

Apply what you've learnt to your place:

- a) **Review** the insights provided by the data analysis and discuss their implications for addressing the challenge and making informed decisions. Apply the insights gained to drive action, improve processes, optimise resource allocation or implement changes.
- b) Continuously **monitor and evaluate** the impact of the applied insights or decisions. Collect feedback and measure the outcomes to assess the effectiveness of the solutions implemented.
- c) Where possible, **share insights** with stakeholders to help them understand and address the defined challenge.

## 2.4 Part D – Manage and Review

Appraising and effectively handing over the management of a Data for Places initiative is a critical process that ensures continuity, sustainability and long-term value.

### Appraise

Assess the success of the project including:

- a) Determine if the project met its stated objectives and identify any gaps

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- b) Gather stakeholder feedback
- c) Review the quality and reliability of the data collected
- d) Finalise project documentation.

### Handover

You should have identified a team or role that will take ongoing management of the initiative as part of Part A – Discover. If it is intended that the data gathering or application continues, you should have a plan for the resources and personnel required, including:

- a) Identify who will assume responsibility for the ongoing management of the project
- b) Clearly define required roles and responsibilities, including division of tasks
- c) Facilitate knowledge transfer process from those who will be handing over the project
- d) Establish a data management plan, including ownership, storage and access rights
- e) Identify any funding required to support data purchase, collection, processing and storage.

## 3. Data for Places Scenarios

A set of scenarios where place-based data can be useful in making decisions and supporting better places is outlined below. These three Data for Places scenarios have been developed based on extensive stakeholder engagement with place owners on common challenges and place-based problems to solve. Therefore, the chosen relatable topics aim to demonstrate how a place owner might approach a place problem through the application of data. Each scenario follows the process set out in Section 2. Applying Data for Places, using the initiative template provided (see Appendix 1). A sample selection of potential data sources has also been included, as well as possible applications for the insights and analysis generated by the project.

### 3.1 Activated and Vibrant Places

This scenario addresses economic uplift and management of a place spanning across the 24 hours of the day. It explores the questions and datasets that may help to assess the health and vitality of a place across a range of metrics.

**Persona:** Javier is an Economic Development Officer responsible for allocating budget to local activation initiatives to support high streets and the town centre. Javier aims to make the best investment decisions to improve the overall socio-economic health of the economic areas within his inner-Sydney Council.

#### 3.1.1 Discover

**There is a problem with:** Javier is concerned with place activation in his inner-city Sydney Council. He has a limited budget and wants to make the best decision to increase visitation to help local businesses thrive, provide local

services and leisure space for his community and ensure that these areas are safe and welcoming.

**This matters to** business owners **because** they want to build successful and profitable businesses to support themselves and their families.

**This matters to** retail, hospitality and other service workers **because** they want secure employment in a safe space.

**This matters to** the community **because** they want safe and vibrant places to visit that meet their needs.

**This matters to** police and emergency services **because** they want to ensure the precincts are safe and welcoming for the community, particularly in the evening.

**It matters to Council because** they have a limited budget to spend on place activation and they want to spend it wisely. Council wants active places that stimulate economic improvement for local business owners and for Council's rate base. This project supports the Council's strategic aim of increasing activity in the town centre and local high streets.

**We will know the project is successful when** the investments made by Javier contribute to thriving economic precincts. This will be measured by the number of visitors to the area and the level of spend. Emergency services incidents will also be a measure of success. Javier wants people to feel safe and welcome, to find an activity that meets their needs and to get to and from a location safely.

**To achieve success this project would need to know** the current level of footfall in the area, the amount of spend and the number of emergency services incidents. **Knowing this then** Javier can set a baseline, identify areas that require support and plan projects and then assess their success.

### **Key personnel**

**Project sponsor:** Executive Director, Economic Development

**Project owner:** Javier, Project Manager, High Streets and Town Centres

**End user:** Primarily council project officers, with high level insights provided to businesses and the community.

### **Sense check: just because you can do this project, should you?**

Javier must ensure that any datasets that are purchased or collected are anonymised and aggregated and that they cannot be combined to re-identify an individual or business.

**The funding for this project is coming from** the Economic Development team.

**The ongoing costs for this project are** ongoing data purchase, data storage and processing and data analysis and visualisation. **It will be funded** by the Economic Development team.

The Economic Development Manager **will be responsible for the ongoing management of this project.**

## Others who are addressing this type of problem are:

### **Safer Streets Solution – Bayside Council**

#### CHALLENGE

Bayside Council's community expressed concern for illegal and antisocial behaviour which was happening in public spaces within the Sandringham precinct. The site at Dolls Point Carpark at Depena Reserve was experiencing slow customer turnover and there was difficulty enforcing parking infringements.

Bayside Council decided to take a proactive approach. They wanted to improve public safety and reduce antisocial behaviour. With technology and automation, they are delivering safer places in partnership with the Local Area Command.

No 'turn-key' solution exists in the market, which means that bespoke development and delivery was required. The site has specific conditions such as wind, solar, access to power and 5G, which all have an impact on the infrastructure requirements and data collection and application approach.

#### SOLUTION

Bayside Council installed CCTV technology using video analytics hardware. The technology monitors parking bays in the carpark and identifies offending vehicles, by recognising licence plates and capturing the required evidence for infringements. The system is effectively the equivalent of having a parking patrol officer stationed in the area 24 hours a day, seven days a week.

Council has considered state legislation and how the live feed is shared with the local area command. This included being purposeful about what is captured, how it is analysed and machine learning by the cameras. Currently, only raw feeds are ingested into the platform and no facial recognition technology is deployed. A Memorandum of Understanding was created with the St George Local Area Command (LAC) to facilitate data sharing.

The supporting analytics system allows Council to effectively have the equivalent of a parking patrol officer stationed in the Reserve 24 hours a day, seven days a week.

#### OUTCOME

The project has delivered improvements to parking issues and antisocial behaviour, with a 75 per cent reduction in repeat offenders parking illegally. The project is also expected to deliver a return on investment on the technology with the initial outlay projected to be repaid within 36 months of installation.

### **Micro Precincts – Wynyard Activation, Department of Planning and Environment**

#### CHALLENGE

The Department of Planning and Environment sought to create micro-precincts throughout Sydney CBD to drive citizens to the CBD to re-energise specific areas following the impacts of the COVID-19 pandemic. They wanted a consistent way to measure the success of these micro-precinct activation events.

#### SOLUTION

Using readily available datasets, including Opal transport data, pedestrian data and Google Mobility Data, the team developed a dashboard to measure the success of activation events for the Wynyard micro-precinct. Trialling a solution on a small scale, the dashboard compared activity at several activation events against a baseline to generate a measure of success.

#### OUTCOME

The dashboard was used to assess the effectiveness of the Wynyard micro-precinct activation, recording an 81 per cent increase in average busyness between 9am and 7pm for one activation event, compared to baseline. It also provided important key event statistics that can be used to track success of the event activation over time. This approach to measuring activation events can now be scaled up for use across a variety of micro-precinct activation events across Sydney CBD.

#### **Data after Dark, Office of the 24-Hour Economy Commissioner**

##### CHALLENGE

The Office of the 24-Hour Economy Commissioner (O24HEC) required a way to assess, compare and contrast the health of night-time spaces across NSW. They needed a consistent set of metrics and better access to information on the health of the night-time economy to inform policy development and program interventions and support local government to grow a vibrant night-time economy.

The project is supported by funding from the NSW Smart Places Acceleration Program.

##### SOLUTION

The O24HEC took an outcome driven approach to the 'Data after Dark' project, splitting it into a problem definition and solution design phase, and a data gathering and data product build stage.

The O24HEC's first task was to determine a set of questions or metrics that can be used across night-time spaces. Partnering with WSP and Urbis, the project developed a set of key metrics, possible datasets to answer these questions, and the design for a Minimum Viable Product to share this information with users.

The O24HEC partnered with the Data Analytics Centre (DAC) at the Department of Customer Service to deliver the second phase of the project. The DAC has been tasked with securing the required public and proprietary data and building a prototype data product or tool to share key insights and

information. Drawing on spend data, footfall data, business composition, demographic data and public transport data.

### OUTCOMES

Through taking a staged approach, the O24HEC can test the solution with users along the way. The Data after Dark prototype developed by the DAC will be used to assess the utility of the data being provided, the relevance of the insights drawn from these datasets and the functionality of the data product.

Data after Dark will first share data and insights with NSW Government and local government within Greater Sydney and will soon expand to cover local governments across the Six Cities. It will provide a way to examine, analyse and compare activity across important nighttime spaces in NSW.

## 3.1.2 Design

### Data discovery

Javier determined that sensors were not relevant for this project, as he was concerned with long term trends and activity in his economic precincts. He does not need real time data to provide a real-time picture of activity.

Javier set out the key questions he would like to answer to inform his project. He identified data within the council, from publicly available government sources and proprietary data that could potentially answer these questions (see Table 4).

For Javier and his stakeholders, a dashboard format that clearly presents key socio-economic data on the night-time economy over time is the most useful way to ingest and apply information. The council already has a data visualisation platform that can be adapted to share and visualise insights.

Table 4 Key questions and data sources for Activated and Vibrant Places

Category	Questions	Possible data sources (greyed data is likely to have a fee)
Economic	<b>Spend</b> <ul style="list-style-type: none"> <li>How much are people spending in the town centre between what hours?</li> </ul>	<ul style="list-style-type: none"> <li>direct banking data</li> <li>aggregated banking data</li> <li>directly from local businesses (note privacy considerations)</li> </ul>
	<b>Workers</b> <ul style="list-style-type: none"> <li>How many people does each precinct employ? In what categories?</li> </ul>	<ul style="list-style-type: none"> <li>ABS Census data</li> <li>directly from local businesses (note privacy considerations)</li> </ul>

Category	Questions	Possible data sources (greyed data is likely to have a fee)
Demographic	<p>Business type and opening hours</p> <ul style="list-style-type: none"> <li>• What type of businesses and entertainment venues make up the town centre?</li> <li>• When are they open?</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Google Places API</b></li> <li>• Australian Business Register</li> <li>• Direct from local businesses</li> <li>• Liquor license data - Liquor and Gaming</li> </ul>
	<p>Local population</p> <ul style="list-style-type: none"> <li>• Who lives within the local area? What are the averages ages? Common occupations? Socio-economic status?</li> </ul>	<ul style="list-style-type: none"> <li>• ABS Census data</li> <li>• Council data</li> </ul>
Mobility	<p>Visitors</p> <ul style="list-style-type: none"> <li>• What type of people are visiting? When? And why?</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Mobile phone</b></li> <li>• <b>App data</b></li> <li>• <b>Psychometric data</b></li> <li>• On-the-ground surveys</li> </ul>
	<p>Pedestrian counts</p> <ul style="list-style-type: none"> <li>• How many people are visiting and when?</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Mobile phone data</b></li> <li>• <b>Mobile phone app data</b></li> <li>• On-the-ground surveys</li> <li>• Local pedestrian count sensors</li> </ul>
	<p>Public transport timetables and routes</p> <ul style="list-style-type: none"> <li>• How accessible are the areas by public transport? At what times?</li> </ul>	<ul style="list-style-type: none"> <li>• Transport for NSW</li> </ul>
	<p>Origin</p> <ul style="list-style-type: none"> <li>• Where are people coming from to visit?</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Mobile phone data</b></li> <li>• <b>Mobile phone app data</b></li> <li>• On-the-ground surveys</li> </ul>
<p>Wayfinding</p> <ul style="list-style-type: none"> <li>• How easy is it to navigate by foot?</li> </ul>	<ul style="list-style-type: none"> <li>• Council infrastructure data</li> </ul>	



Category	Questions	Possible data sources (greyed data is likely to have a fee)
	<b>Accessibility</b> <ul style="list-style-type: none"> <li>Does the place accommodate people with different abilities?</li> </ul>	<ul style="list-style-type: none"> <li>Council infrastructure data</li> <li>On-the-ground surveys</li> </ul>
Health & wellbeing	<b>Visitor sentiment</b> <ul style="list-style-type: none"> <li>What are people saying about the place?</li> </ul>	<ul style="list-style-type: none"> <li>On-the-ground surveys</li> <li>Psychometric data</li> <li>Social media data</li> </ul>
Environment	<b>Weather</b> <ul style="list-style-type: none"> <li>How does the weather correlate with people counts and spend patterns?</li> </ul>	<ul style="list-style-type: none"> <li>BOM</li> </ul>
Safety and policing	<b>Incidence of crime or anti-social behaviour</b> <ul style="list-style-type: none"> <li>How safe is the area? And at night?</li> </ul>	<ul style="list-style-type: none"> <li>NSW BOCSAR data</li> <li>Reports to council</li> </ul>
	<b>Lighting</b> <ul style="list-style-type: none"> <li>Are areas well-lit at night? How does this impact perceived or actual safety?</li> </ul>	<ul style="list-style-type: none"> <li>Council infrastructure team</li> </ul>
Other	<b>Events</b> <ul style="list-style-type: none"> <li>What events are scheduled?</li> <li>How do these events impact spend or people movement?</li> </ul>	<ul style="list-style-type: none"> <li>Council events and activation team</li> <li>Local street-press</li> <li>Tourism data</li> </ul>

### 3.1.3 Create

Javier will work with his internal data analyst to undertake procurement for proprietary data, setting out their requirements clearly, and then combining internal and proprietary data to answer key questions.

Based on the information acquired, Javier may:

- Direct advertising funding to promote areas that have low activity and/or spend
- Allocate funding for street works and lighting in areas that have low visitation and/or high crime incidence

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- Target business grants to those areas with low activity or spend
- Develop place-based activation including local art displays, markets, temporary road closures and street parties.

### 3.1.4 Manage and Review

Javier wishes to continue this project to get a long-term view of the success of place activation. He will appraise his project, setting out how he met the project objectives and use this information to secure ongoing funding. He will identify the resources required to continue this project, including data purchase and the support of a data analyst.

#### Another useful example:

##### **Parkes Elvis Festival**

##### CHALLENGE

The Parkes Elvis Festival has been running for over 30 years. Parkes Shire Council need to deliver a festival that meets the needs of the older demographic that typically attend the festival, and they have taken a novel approach to understand micro-climate and visitor comfort.

##### SOLUTION

As part of council land management, Parkes Shire Council installed ground digital sensors to monitor soil moisture, inform watering patterns and ensure efficient use of resources for council owned public open spaces.

These spaces are also used to host the Elvis Festival.

##### OUTCOME

When looking for ways to monitor the health and safety of festival attendees, the Council events team realised that they could use this sensor information to assess the micro-climate of the Elvis Festival. The micro-climate of the festival is particularly important given the average age of the festival attendees (over 60) and the costumes worn (synthetic jumpsuits). This information has been used to inform the time of year the festival should be held and the impact of cooling interventions on the festival.

This is an example of environmental scanning within an organisation discovering a valuable, available and free dataset that can be used for a novel application.

## 3.2 Healthy and Accessible Places

This scenario looks at how people move around and into a place, considering datasets that may help to better manage people movement, encourage active transport and assess the accessibility of public transportation to and within a place.

**Persona:** Satu works in the planning department of an inner-city council. They have been tasked with implementing a 15-minute neighbourhood policy, which aims to create a liveable and sustainable place where residents can access work, essential services and amenities within a 15-minute walk, bike ride or public transport journey from their homes. To implement this approach, Satu needs to understand current proximity and connectivity, and identify areas that would benefit the most from interventions to increase walkability, cyclability or public transport access.

### 3.2.1 Discover

**There is a problem with:** Satu does not know if their inner-city Council meets the definition of a 15-minute neighbourhood – where most daily necessities and services, such as work, shopping, education, healthcare and leisure can be easily reached by a 15-minute walk or bike ride.

**This matters to residents because** as it supports a healthy, active lifestyle, healthy streets with reduced pollution and congestion from vehicles and boosts local economic activity.

**It matters to Council because** it wants to support a healthy community, with a healthy local economy that meets the needs of residents and ratepayers. It is also part of the state's Future Transport Strategy.

**We will know the project will be successful when** Satu can identify council areas that would benefit from additional cycling or walking infrastructure, areas that have a lack of services and entertainment and employment centres.

**To achieve success this project would need to know** the number of residents across the council area, location of services, entertainment and employment centres and active transportation routes. **Knowing this then** Satu can identify gaps and focus council resources on these areas.

**Key personnel:**

**Project sponsor:** Executive Director, Planning and Building Services.

**Project owner/Data custodian:** Satu, Regeneration Project Officer

**Data user:** Council project and policy staff

**Sense check: just because you can do this project, should you?**

The datasets assume a certain level of mobility and accessibility and may exclude residents who use wheelchairs or other mobility aides. This must be kept in mind when developing policy and program interventions. Satu must also ensure they consult and co-design with the community on what they think 'daily necessities' are and get their opinions on what is missing from the local area, rather than relying primarily on quantitative datasets.

**The funding for this project is coming from** the Planning and Building Services team.

**The ongoing costs for this project are** nil as this is a one-off data project to identify gaps.

The planning team **will be responsible for the ongoing management of this project**, including data storage and management.

**Others who are addressing this type of problem are:**

### **Walks Near Me**

#### **CHALLENGE**

The NSW Government aims to encourage the community to get out, enjoy and take advantage of the incredible quality and diversity of public spaces and places in NSW. [Walks Near Me](#) is a free platform that includes a digital map to help people find places to visit and learn about, including parks, beaches, libraries, museums, along with events and more, across the state. On Walks Near Me, you can create your own walking itineraries, save them and share them with your friends and family.

#### **SOLUTION**

The first challenge Walks Near Me tackled was to develop a statewide data set of public space locations in NSW as a spatial mapping gap in this land-use category was identified. This data set would have many benefits and use cases and would support the project by showing public space locations across the state.

To help address this data gap, the Department of Planning, Industry and Environment in 2020 used the best available data from the existing Department of Customer Services statewide Point of Interest (POI) dataset which is contributed to by local councils, to select and aggregate public space POIs. This information helped to create a new 'Public Spaces' dataset layer now available on the [NSW Planning Portal Spatial Viewer](#), which is publicly available. This dataset also includes an Open Space sub-layer and a Public Facilities sub-layer as categories of public space. The Public Spaces dataset used on Walks Near Me has over 21,000 data points and includes over 30 categories of places, from parks, playspaces, swimming pools, libraries to museums and more.

In addition to this Public Spaces dataset [Walks Near Me](#) uses the Australian Tourism Data Warehouse (ATDW) dataset categories that relate to public space locations as well as event categories. ATDW data on the map include over 10 categories, such as National Parks and Reserves, historical and heritage sites, galleries, lower-cost community events, markets, workshops and more.

Walks Near Me allows users to both learn more about public spaces by providing unique content and stories, and also to plan their own walking itineraries. To create a walking itinerary, the user selects a location in the search panel, add filters and distance, and then selects places they want to visit by adding them to their walk. The data points from both the POI and ATDW are updated regularly to the platform, this keeps the data as current as possible such as for local events.

#### **OUTCOME**

Walks Near Me has been delivered by Transport for NSW, Cities and Active Transport team, in partnership with the Department of Customer Service, NSW Government Digital Channels team. The project has had input from many state agencies and local government partners to create unique place stories and other content. The long-term ambition is to become a central platform for state and local government across NSW to share event and public space data through the mapping function so that the community can easily access and use the information to plan their own walks or learn more about local places. The Department of Customer Service Digital Channels team built the Walks Near Me platform to ensure all datasets can be shared across government digital projects, making Walks Near Me an exemplary project for government data sharing.

## **Smart and Cool Places in NSW**

### **CHALLENGE**

In Western Sydney, the average temperatures are rising because of climate change. Temperatures have reached a maximum of 48.9°C. Heatwaves are very dangerous. They cause more deaths in Australia than any other natural disaster. They hit the most vulnerable people in our communities the hardest. Extreme heat increases hospital admissions and places strain on our health system.

When it's hot, we use more electricity to cool our buildings. This increases our impact on the environment.

Also, long periods of extreme heat can damage our infrastructure and other services. Cities can get even hotter than other places because of the 'heat island' effect. This happens when hard surfaces like roads hold onto heat and make the temperature rise. In NSW, almost 90% of people live in towns or cities.

### **SOLUTION**

This project is a NSW-specific pilot, to establish an National Heat Vulnerability Observatory (NaHVO).

The NaHVO will have standard methods for reporting and measuring overheating locally. It will also identify opportunities to cool down Australia's cities. By establishing consistent processes, NaHVO will enable collaboration between stakeholders, and support evidence-based decisions for specific locations.

Smart and Cool Places Phase 1 will develop a digital capability in NSW to increase the state's resilience to urban overheating. The project will inform how this work can be scaled to all communities in NSW.

### **OUTCOME**

The NaHVO aims to provide in-depth data and consistent processes for reporting and measuring overheating. It will also identify opportunities to cool

down Australia’s cities. This project will develop the foundations for the NaHVO, with initial launches in 2 NSW towns (Dubbo and Maitland). In Phase 2, it is planned be expanded to other NSW cities and towns.

### 3.2.2 Design

#### Data discovery

Satu first works with their planning and environment colleagues to find data and reports already held within the department. Utilising existing datasets is both cost effective and allows any insights to be directly comparable to other analysis by the council.

Through this process, Satu identifies data gaps and looks beyond the council to fill these gaps. The list of possible data sources and question can be found in Table 5.

Table 5 Key questions and data sources for Healthy and Accessible Places

Category	Information	Possible data sources (greyed data is likely to have a fee)
Economic	<b>Employment areas</b> <ul style="list-style-type: none"> <li>Where are the employment areas?</li> <li>How many people do they employ?</li> </ul>	<ul style="list-style-type: none"> <li>ABS Census data</li> <li>Council sources</li> </ul>
	<b>Services</b> <ul style="list-style-type: none"> <li>Where are services and other social infrastructure located? E.g., schools, GP practices, gyms, hair salons</li> </ul>	<ul style="list-style-type: none"> <li>Australian Business Register</li> <li>Council sources</li> <li>Google Places API</li> <li>On-ground surveys</li> </ul>
	<b>Entertainment areas</b> <ul style="list-style-type: none"> <li>Where are bars, restaurants and cafes located?</li> </ul>	<ul style="list-style-type: none"> <li>ABS Census data</li> <li>Council internal data</li> <li>Google Places API</li> <li>On-ground surveys</li> </ul>
Demographic	<b>Population</b> <ul style="list-style-type: none"> <li>Who lives where?</li> </ul>	<ul style="list-style-type: none"> <li>ABS Census data</li> </ul>
	<b>Access to services</b> <ul style="list-style-type: none"> <li>Do the existing services meet the needs of the population?</li> <li>What areas are lacking access to services? How</li> </ul>	<ul style="list-style-type: none"> <li>Population and Economic data</li> <li>Community surveys</li> </ul>

Category	Information	Possible data sources (greyed data is likely to have a fee)
Mobility	<p>many people live in these areas?</p> <ul style="list-style-type: none"> <li>What services are lacking?</li> </ul>	
	<p>Footpaths and cycle paths</p> <ul style="list-style-type: none"> <li>Where are footpaths located? How do they connect?</li> <li>Where are the cycle paths?</li> <li>What are the primary routes?</li> <li>How many people use these routes</li> </ul>	<ul style="list-style-type: none"> <li>Asset data, Transport for NSW</li> <li>Google Places API</li> <li>Council infrastructure team</li> <li>Council transport team</li> </ul>
	<p>Public transport</p> <ul style="list-style-type: none"> <li>What are the routes and timetables of local public transportation?</li> </ul>	<ul style="list-style-type: none"> <li>Opal data, Transport for NSW</li> </ul>
	<p>Wayfinding</p> <ul style="list-style-type: none"> <li>How easy is it to navigate by foot or bicycle? Are there signs and wayfinding tools?</li> </ul>	<ul style="list-style-type: none"> <li>Council transport and infrastructure teams</li> </ul>
	<p>Accessibility</p> <ul style="list-style-type: none"> <li>How accessible are the footpaths and cycle paths for differently abled people?</li> </ul>	<ul style="list-style-type: none"> <li>Council transport and infrastructure teams</li> <li>Local surveys</li> </ul>
Environment	<p>Shade and heat</p> <ul style="list-style-type: none"> <li>How shady and cool are main footpaths and cycle paths?</li> </ul>	<ul style="list-style-type: none"> <li>Council infrastructure team</li> <li>Urban tree canopy via remote sensing data, including aerial imagery.</li> <li>Local surveys</li> </ul>

### 3.2.3 Create

The resulting spatial analysis of the datasets gathered by Satu, and their team will enable insight on:

- Priority areas for footpath upgrades and new cycle infrastructure
- Priority areas for new public transport infrastructure
- Gaps in local services.

### 3.2.4 Manage and Review

The resulting report and recommendations from this research project will contribute to the evidence base for the council's Local Environmental Plan, as well as informing the local infrastructure plan and investment plan.

#### **Another useful example:**

##### **Envisioning in 3D – Pilot for Camden Council**

###### **CHALLENGE**

Planning decisions are often made using 2-dimensional plans and 2-dimensional GIS systems. When the community are asked to consider proposed development plans, it is often based on '2D', flat plans. This process leaves people having to imagine the 3D finished form.

A 3D model will remove these inefficiencies and provide more robust planning decisions. It will also allow for greater transparency and participation in the planning process.

###### **SOLUTION**

The Envisioning in 3D system seeks to work with existing systems and the NSW Spatial Digital Twin. This system will make a planning tool to help make plans more quickly.

This project centres on the built environment. It uses accessible digital technology to inform planning assessment decisions and planning proposals. Future updates are planned to include the IoT sensor data, such as pedestrian counters and transport data. This will provide even more detailed context to future planning.

Camden Council undertook a successful proof of concept to produce a virtual 3D model of the Oran Park Town Centre in 2019. Building on this, the council will now implement a 3D model for the entire local government area.

The Envisioning in 3D modelling system will help Camden Council make faster and more informed planning decisions.

###### **OUTCOMES**

This tool helps the council planners see and tweak neighbourhood plans with ease. It also helps the people in the community understand, participate in and make smart choices development proposals.



### 3.3 Sustainable and Resilient Places

This scenario considers how data analytics might be used to improve environmental outcomes and visitor comfort for a place. It considers what datasets might be useful in measuring the heat and health of a place and how they might be used in long-term management.

**Persona:** Billie is an environmental officer who has been tasked with addressing the impact of the Urban Heat Island (UHI) effect on the main thoroughfares across her council. The goal is to implement strategies and measures to reduce the UHI effect, improve pedestrian comfort and enhance the overall sustainability and liveability of the city.

#### 3.3.1 Discover

**There is a problem with** rising temperatures and an increase in hard-stand surfaces has exacerbated the UHI effect across council, particularly in heavily trafficked pedestrian areas. The increasing heat has made it less appealing and safe for pedestrians and cyclists, particularly the elderly, children and the vulnerable. Billie has a limited budget to spend on green infrastructure and other 'cooling' interventions, so she wants to make the best use of the available funds to make the most difference to the greatest number of people.

**This matters to** residents, visitors and workers **because** they want to be able to walk and cycle in comfort during the summer months.

**It matters to Council because** they want to promote active travel options, particularly in and around the town centre. This project aligns with their Active Travel Strategy and contributes to the ambitions set out in their Environment Strategy and response to climate change.

**We will know the project will be successful when** Billie can build a business case to install green infrastructure and other cooling interventions in routes around the town centre that are the most frequented by pedestrians and cyclists and/or provide the best connectivity to key attractions and services.

**To achieve success this project would need to know** the main arterial cycle and pedestrian routes, level of green cover and average and peak temperatures in specific locations (particularly in summer). **Knowing this then** the council can determine priority areas for green infrastructure and other cooling interventions.

**Key personnel:**

**Project sponsor:** Executive Director, Environment

**Project owner:** Billie, Environment Project Officer

**Data user:** Council environment team, council infrastructure team, with high level insights shared publicly.

**Sense check: just because you can do this project, should you?** This project may involve the collection of data in the public realm., No personal or identifying information should be collected as part of this project.

**The funding for this project is coming from** existing budget within the Environment team, with contributions from the council Infrastructure team.



**The ongoing costs for this project are** sensor maintenance, data processing and storage, and data analysis and visualisation, which **will be funded** by the council Infrastructure team.

The project will be handed over to the infrastructure team who **will be responsible for the ongoing management of this project**, including regular sensor maintenance and any required repairs.

**Others who are addressing this type of problem are:**

### **FloodSmart Parramatta**

#### CHALLENGE

The Upper Parramatta River is prone to flash flood events, harming homes and businesses and posing a threat to life. These flooding events can happen very quickly and lead to rapid water rises. The City of Parramatta needed a rapid and real-time way to issue flood warnings to the community.

#### SOLUTION

As they needed rapid information, the City of Parramatta installed 28 river level sensors and rain gauges which provide information on current conditions, updated every 15 to 20 minutes. They combine this data feed with water forecasts from the Bureau of Meteorology, and the data is run through a flood model that predicts where and when flooding may occur.

#### OUTCOME

This information is used in an automated flood warning system that sends out emails, texts and voicemails to registered users.

As this project has delivered on its intended task, the City of Parramatta is able to explore additional ways of applying and using the information collected, including long-term environmental monitoring of the river system and predictive models. This project also serves as a useful demonstrator of the utility of real-time data.

### **Buying digital technology – Parkes Shire Council**

#### CHALLENGE

NSW regional councils are responsible for the delivery of water supply and sewerage services to residents. They need a way to monitor water usage and issues bills. Parkes Shire Council recently needed to secure a private provider to help them perform these functions.

They went to market to get a competitive product that met their needs. Several providers submitted tenders, with varying costs and caveats regarding data ownership.

#### SOLUTION

Parkes Shire Council was presented with two options. One was a provider who was more expensive but allowed council to retain ownership of all of the information on water usage and cost by their residents. The second provider was cheaper, and whilst they provided access to the water usage data for council, they controlled access and retained ownership of the data.

In the short term and focusing on this one task, it may appear that the cheaper option was the best way to go. However, Parkes considered how valuable this water usage information might be for future projects or policies, particularly with increasingly unpredictable and extreme climatic conditions. They determined that the long-term benefit of retaining ownership of the data outweighed the short-term cost saving.

#### OUTCOME

They also wanted to avoid ‘vendor lock in’, foreseeing issues in selecting a new provider in the future if Council required information on historic water use.

This case study illustrates the importance of considering the long-term benefit of data ownership and being careful to understand the contract stipulations regarding data collection and ownership.

### 3.3.2 Design

#### Data Discovery

Billie should explore the publicly available temperature and humidity datasets to determine if they are fit for purpose. If they are not fit for purpose, she may wish to explore installing temperature sensors along key pedestrian routes. She should consider both the installation and ongoing costs of these sensors when appraising value for money. She should also consider who will manage these sensors in the long term and resources available for data processing, analysis and visualisation. Table 6 outlines possible data sources for Billie.

Table 6 Key questions and data sources for Sustainable and Resilient Places

Category	Information	Possible data sources (greyed data is likely to have a fee)
Economic	N/A	
Demographic	Population <ul style="list-style-type: none"> <li>Who lives where?</li> <li>Are there sections of the population more vulnerable to UHI, where do they live?</li> </ul>	<ul style="list-style-type: none"> <li>ABS Census data</li> </ul>
	Health Data <ul style="list-style-type: none"> <li>What are the trends in heat related illnesses, hospital</li> </ul>	<ul style="list-style-type: none"> <li>HealthStats NSW</li> <li>Research organisations</li> </ul>

Category	Information	Possible data sources (greyed data is likely to have a fee)
	admissions or mortality rates related to extreme heat?	
Mobility	<b>Footpaths</b> <ul style="list-style-type: none"> <li>Where are footpaths located?</li> <li>What are the main routes?</li> </ul>	<ul style="list-style-type: none"> <li>Google Places API</li> <li>Council infrastructure team</li> <li>People and cyclist counters</li> </ul>
	<b>Cycleways</b> <ul style="list-style-type: none"> <li>Where are the cycle paths?</li> <li>What are the main routes?</li> </ul>	<ul style="list-style-type: none"> <li>Asset data, Transport for NSW</li> <li>Google Places API</li> <li>Council infrastructure team</li> <li>Local surveys</li> </ul>
Environment	<b>Shade and green infrastructure</b> <ul style="list-style-type: none"> <li>What is the tree canopy like across my council?</li> <li>Where are the parks and green spaces?</li> <li>How do shady areas correlate with the main footpaths and cycle paths?</li> </ul>	<ul style="list-style-type: none"> <li>Internal council resources</li> <li>Urban tree canopy via remote sensing data, including aerial imagery.</li> <li>On-ground sensors for location specific data</li> </ul>
	<b>Temperature</b> <ul style="list-style-type: none"> <li>What are the average and peak temperatures along cycle ways and footpaths?</li> </ul>	<ul style="list-style-type: none"> <li>BOM</li> <li>Remote sensing data</li> <li>On-ground sensors for location specific data</li> </ul>

### 3.3.3 Create

After processing and analysis of the data collected for this project, Billie can make data informed decisions on:

- Priority areas for new green infrastructure, based on level of pedestrian/cycling count and average daily summer temperatures.

The information can also inform strategies and policies by providing information on:

- Long term climatic trends in the local area
- Progress towards climate ambitions.

### 3.3.4 Manage and Review

If the project included the installation of sensors, it is important that Billie identifies a team or role within council to provide ongoing management, with appropriate resources to deliver that maintenance and management.

### Another useful example:

#### **Smart Irrigation Management for Parks and Cool Towns (SIMPACT)**

##### CHALLENGE

Green spaces such as trees, gardens and parks help keep our cities cool. This is very important as our planet gets hotter due to climate change. However, these green spaces are threatened by more frequent and intense drought and extreme heat.

At the heart of Sydney, Olympic Park's Bicentennial Park represents more than 42 hectares of parkland. The area is maturing into one of Sydney's most dynamic places to live, work and play, and has a vision to be Sydney's beating green heart. As the Central River City in and around Olympic Park continues to densify, places like Bicentennial Park will need to be resilient and well managed for a rapidly growing population.

##### SOLUTION

SIMPACT is creating and testing a new digital tool to improve irrigation for Bicentennial Park. This will make the park cooler and greener for everyone to enjoy. The project is focusing on making the park a 'cool island', with far reaching thermal benefits for communities downwind from the park.

This project has set up over 50 devices to measure temperature and humidity. There are also 13 weather stations and over 200 'smart-soil' devices installed across the park.

Together, these sensors will record soil moisture and air temperature information and combine it with local weather forecasts. AI will then predict when and for how long different sections of the park need to be watered. The system will work with recycled water and uses the soil moisture outcomes to learn over time the most efficient irrigation regime.

Live data about the park's conditions is also shared online, so that visitors can easily locate the coolest parts of the park.

The SIMPaCT system is designed to easily scale up or down in complexity. This allows replicating the system in any other urban irrigation project, from parks to botanic gardens, sport fields and more.

##### OUTCOMES

The project aims to improve:

- water use efficiency and environmental benefits
- the experience for residents and park visitors, with a cool refuge during hot summers and a smart park they can enjoy all year round

- operational benefits, with reduced risk of asset failures and streamlined maintenance processes.

## 4. Appendices

### 4.1 Appendix 1 – Data for Places initiative template

**There is a problem with** [state problem]

Consider: *What is the specific issue that your project addresses? Where does it occur? Is it a specific place? Does the problem occur during a specific time period? Does this problem impact upon a particular community or group? Is it related to the underlying infrastructure that helps your city or town function? How much does this problem cost your organisation or community in terms of time or money? You can refer to [Digital NSW Guidance](#) on how to define a problem.*

**This matters to** [stakeholders] **because...**

Consider: *Who else cares about this problem? Who will be impacted? How will this improve your place for them?*

**It matters to the council / place owner because...**

Consider: *What function does this place serve for the council/place owner and the community? What costs are currently incurred because this problem exists? How does it relate to strategic priorities?*

**We will know the project is successful when...**

Consider: *What does ‘good’ look like for your place? Being clear on the change you want to see in your place can provide the motivation to get a project done, help unite different partners who may have differing views on underlying problems and prevent teams from jumping to potentially false assumptions about what solutions will work. Be specific here as it will help you understand what information you should be collecting for success.*

**To achieve success** [person, role organisation] **would need to know** [what information]. **Knowing this then they could do** [possible intervention].

Consider: *What do you need to know about your place to determine the best course of action? What do you already know? Where are the gaps? Can you fill these gaps? Consider framing it as an ‘if/then’. (see example table below)*

If [specific group of people or systems]	had access to [Information]	THEN they could [Action]
Urban designers and park managers	areas of the retail and business district that are the hottest for the longest over the course of the day	direct resources to these areas to plant more street trees and implement other cooling measures to these areas and bring down the overall urban heat island effect for their retail or business district area
Automated flood gate system	live/real-time river levels and predicted rainfall	open overflow waterways pre-emptively to avoid flooding
Event managers	the number and average age of people attending a yearly	ensure that the facilities for future events meet expected demand and that any reasonable adjustments for a

If [specific group of people or systems]	had access to [Information]	THEN they could [Action]
	event held within councils' public open space	particularly young or elderly crowd are provided, e.g., additional accessibility measures.

### Key personnel

Clearly define the key people who will be responsible for governance and management of the data for places project. Assigning responsibilities to specific roles ensures that there are people within the organisation who are identifiable for the part they play in ensuring the long-term success of the project. Do not leave roles unclear or ambiguous.

- **Initiative sponsor:** Should be a senior executive who has accountability for the place and the data collected and applied. Responsibilities include approving policies, protocols and guidelines and ensuring legal, regulatory and policy requirements are met. The identified senior executive will approve significant changes throughout the lifetime of the project.
- **Initiative owner:** Will exercise overall responsibility for the initiative. Responsibilities include enforcing rules on behalf of the project sponsor and the day to day management of the initiative, including the information/data assets.
- **End user:** Set out who will be using the information gathered, how will they be using this information and what is their expected level of technical capability?
- **Key stakeholders / working group:** The initiative may impact a range of people across an organisation. Identifying roles and responsibilities for everyone from ICT to asset management teams will be important.

### Sense check: just because you can do this project, should you?

Consider: Who might be harmed or feel unwelcome by collating information on your place? Who might be excluded from the questions you are posing? Is any of the information I'm collecting considered personal information and is that directly relevant or necessary to achieve success?

### The resources available for this project include...

Consider: What skills do you have within the organisation that you can draw upon? Will you need to hire/contract specific data skills? Do you have a budget allocated? What do your stakeholders know about your place? Can they share information?

### The ongoing costs for this project are [costs] and will be funded through...

You should consider how long your project needs to run for, is this ongoing monitoring of your place or a snapshot in time? What are your expected ongoing costs, including any hardware management or data management? (see Appendix One).

[Team or role within council/place] will be responsible for the ongoing management of this project.



*You are initiating the place-based project, but long-term responsibility may lie with another team or individual within council or another organisation. Consider who is responsible for the ongoing and regular management of your place. Are they able to take on responsibility for any data flows or data products developed? Do they have a budget to maintain sensing equipment? Do they have the resources to support user uptake for the information or service you are developing?*

**Others who are addressing this type of problem are...**

*Scan your environment. What have other place owners done to tackle your particular problem or subject area? What was their approach? What can you learn from them? Can you adapt or leverage any of their work for your place?*

## 4.2 Appendix 2 – Cost considerations

It is important to consider the ongoing data costs to support a place-based project. These can be grouped into two broad categories:

- costs associated with hardware and sensors that collect data
- data management costs associated with the processing, storage, analysis and visualisation of data.

### 1. Hardware

Prior to installing any new remote sensing devices or technology in your place, you should consider ongoing maintenance costs and responsibilities at the outset. Installing a network of sensors will have:

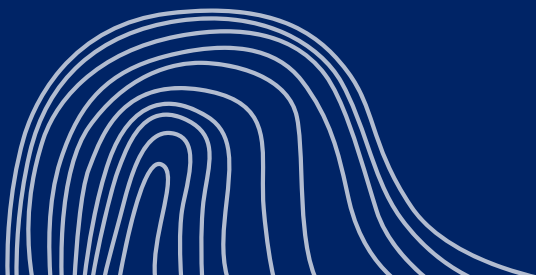
- Routine maintenance costs. It is important to keep sensors clean and calibrated so that the data collected is reliable and to extend the asset life of the sensor. The cost of maintenance will depend on the frequency of maintenance visits required, the type of sensors installed and any site requirements e.g., working at height, working in water and other safe operation considerations.
- System support – collecting, processing and storing the information collected by these sensors. There are likely to be two types of costs, these being the integration and storage of data into your data platform and the processing and visualisation of the data for insights.
- Issues identification and repairs – there are likely to be issues that arise over the lifetime of your sensors, such as battery issues, breakage or vandalism. A portion of the budget should be set aside for repairs over the lifetime of the sensors.

### 2. Data management

- Data purchase. If management of your place relies on data from a third party you should consider how and if you will secure funds to support this ongoing purchase.
- Data storage. Consideration needs to be given to the cost of data storage and management. Large datasets may require significant storage capacity and there may be associated costs for maintaining and securing the data. Determine whether you need to invest in infrastructure, cloud storage or data management systems to handle the data efficiently. Assess the ongoing costs of data storage, backup and data governance.
- Data analysis and visualisation. You must consider who will be responsible for turning your data into insights. This requires quality

assurance checks, data processing, analysis and visualisation. Some datasets may require additional efforts and resources to clean, pre-process, integrate or transform the data before analysis. Assess the required computational resources, software tools or expertise needed to effectively analyse the data. Consider both the direct costs (e.g., software licenses, computing resources) and indirect costs (e.g., personnel, training) associated with data processing and analysis.

- Security and privacy. Depending on the type and scale of data used, there are associated costs with completing a Security Risk Assessment (SRA), Penetration Testing (PEN test), Privacy Impact Assessment (PIA) and other requirements.



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