

# A Quick Guide to Building a GIS

*for your public safety agency*



# Introduction

Across Australia and across the globe, public safety personnel are increasingly recognising the importance of Geographic Information System (GIS) technology to support the public safety mission - to protect local communities, prevent and prepare for the worst and provide support to those who need it most.

Within the complex and unpredictable Australian environment, creating, maintaining, and managing an effective information system is critical to the mission of emergency operations. Developing a GIS infrastructure that is custom-built to the needs of each individual agency is integral to the process of successful harnessing the power of location intelligence.





# How to use this guide

In this booklet, we will break down the process of building a custom-GIS system, provide practical advice on how to get started, and share tips on how to find the right solution mix to best serve the needs of your community.

Whether you are new to GIS or an experienced user, we will start off with describing the fundamental concepts and principles universal to a successful public safety GIS.

The tabbed sections, beginning on page 9, are where the action starts. Each tab represents a crucial phase in building your GIS - from assessing needs and planning the system, through to implementation and system management.

# Understanding the basics

A GIS is an information system that understands location.

Much more than a map, a GIS is intuitive and interactive, harnessing the power of location intelligence. At the core of it all, there are two universal characteristics that make GIS a unique information system:

## 1. GIS is layer centric

Map projects are built with layers of data able to be stored in a standard relational database management system (RDBMS). In this way, a GIS combines the visual benefit of a map with the information from a database.

Data can include:

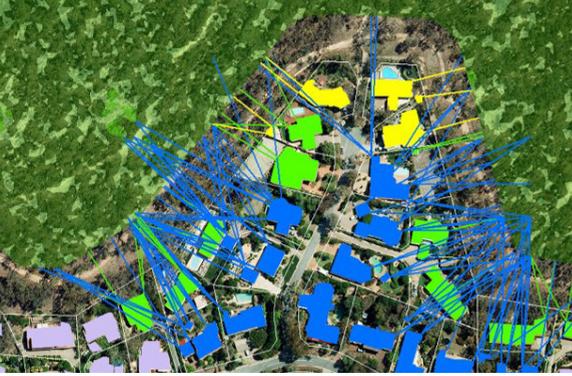
- **Base maps**
- **Roads/Infrastructure**
- **Land use/Land cover**
- **Environment**
- **Weather information**
- **Vehicle locations**

## 2. GIS is more than a map!

GIS sorts different types of data by their common geography – this is where we see an instinctive analytic capability. As information is organised by specific locations, relationships between otherwise disparate datasets are revealed. At the incident-level, GIS provides situational awareness that enhances evidence-based decision-making.

### Remember:

- A custom-built GIS infrastructure integrates and organises all kinds of data appropriate to an emergency situation
- On any day, data can be collected once and continually used as a fluid, ever-growing source of information
- Successful GIS work is a team activity – requiring support from all levels



Integrating LiDAR imagery and geospatial technology to assess the bushfire risk to properties based on slope density, building structure and vegetation density, presented in a colour-coded, automated format.

# GIS is a team sport

## Seek support and identify benefits

Like many systems, GIS implementation requires executive-level support. To gain the necessary cut-through for required support, start by identifying departmental benefits and implementing a small, scalable GIS infrastructure with the capability to grow. If we look at GIS as a team sport, there has to be a head coach, and that coach needs a good assistant coach.

Head Coach (The Chief)	Assistant Coach (Technical Analyst)
Policy direction	Efficient operations
Budget support	Training
Accountability	Performance measurement

## Other agencies can help

You will likely find many departments and agencies in your community that benefit from GIS. Knowing who else in your community uses GIS and has data to share is essential to leveraging the full capability of collaborative location intelligence. By leveraging off existing relationships and building new ones to establish a support network, you will find that sharing information and experiences are key to building a GIS.

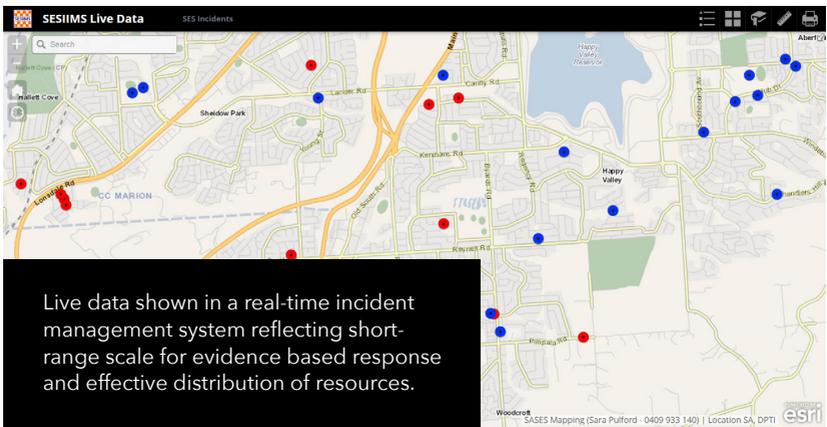
## Collaboration with other departments is key

- Identify and engage all stakeholders
- Maximise sustainability of technology investments
- Support data development
- Avoid duplication of efforts

# GIS must work for you and your mission

Across the board, we can see that GIS supports many different public safety jobs and functions. For example, you may have seen GIS used to plan a station location or support response with location information, maps, and incident data.

Planning	Preparedness	Response	Recovery
<ul style="list-style-type: none"> <li>• Inspections</li> <li>• Community Risk Assessment</li> <li>• Hazard Analysis</li> <li>• Vulnerability Assessment               <ul style="list-style-type: none"> <li>- Hazards</li> <li>- Risks</li> <li>- Values</li> </ul> </li> <li>• Program Planning</li> <li>• Public Information</li> <li>• Scenario Development</li> <li>• Map Documents               <ul style="list-style-type: none"> <li>- Station Maps</li> <li>- Briefing Maps</li> <li>- Map Books</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Inventory/Asset Management</li> <li>• Capability Assessment</li> <li>• Deployment Analysis</li> <li>• Preplanning</li> <li>• Targeted Mitigation</li> <li>• Training and Exercises</li> <li>• Management, Analysis, and Budget Support</li> <li>• Executive Dashboard</li> <li>• Public Information</li> </ul>	<ul style="list-style-type: none"> <li>• CAD, AVL, and Routing</li> <li>• Mobile/Field Intelligence</li> <li>• Multidisciplinary Coordination</li> <li>• Search and Rescue</li> <li>• Incident/Resource Management</li> <li>• Personnel/Asset Tracking and Staging</li> <li>• Evacuation/ Shelter/Mass Care</li> <li>• Public Warning and Notification</li> <li>• Command and Control</li> <li>• EOC/DOC Management</li> <li>• Environmental Hazards</li> <li>• Hazmat Analysis/ Tracking</li> </ul>	<ul style="list-style-type: none"> <li>• Damage Assessment</li> <li>• Logistics</li> <li>• Infrastructure Restoration</li> <li>• Public Information</li> <li>• Lifeline Restoration</li> <li>• Mitigation Assessment</li> <li>• Economic and Community Recovery</li> <li>• Debris Removal</li> <li>• Reentry</li> </ul>



# The checklists

Whatever your expectations are for implementing a GIS for your public safety department, using this checklist will help you stay on track.

## Assess

The first step is to assess your agency's GIS needs. Start with researching how other agencies have used GIS effectively – once you know the options, you will begin to determine which uses are most relevant to your agency's planning and operational needs.

## Plan

The planning step is an integral part of the discovery process on the journey to building a GIS. This is where you will learn about what resources already exist in your community, matching these to your highest-priority needs.

## Use

Using GIS for public safety involves bringing all the right components together to successfully deploy a GIS tailored to your agency's goals. By collaborating with other agencies and departments, along with learning from existing resources, you and your team can make the most of a system custom-built to your needs.

## Manage

Managing your GIS is the final – and possibly most important – step in the success of this system. Demonstrating achieved results and gaining support from across the organisation will begin to spread awareness of your program. Here, a GIS department can evaluate and refine the GIS infrastructure to develop a long-term plan.



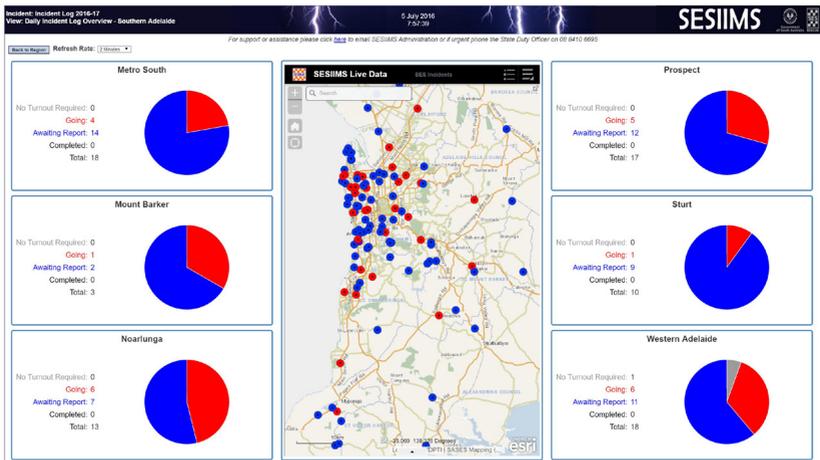
Utilising 3D imagery to conduct vegetation assessment to better communicate bushfire risk to individuals and properties in danger.

# Assessing needs

To discover how GIS can be used to support your agency's planning and operations, you must first determine your agency's particular needs.

The main goal in this step is to create a wish list of all the ways your agency can benefit from a well-designed GIS system and ensure that your department's strategic and financial plan supports the implementation of meeting these needs.

**Remember: Refer back to the chart on page 6 of this guide for examples of different kinds of GIS applications fire and public safety agencies find useful.**



WebEOC-based incident management system displayed in an operations dashboard to provide differing views of needs assessment - from state-wide right down to street level.

# Checklist for assessing needs:

Once you have developed a comprehensive list of the ways in which GIS can benefit your agency, you will begin to figure out where to start with your GIS project.

- Identify available data sources and gaps where data development is required
- Identify GIS expertise and required training
  - GIS analyst/technician
  - Data/Training sources
  - Other agencies using GIS
- Network with GIS user groups in your area to leverage lessons learned

# Strategic planning

When looking at the strategic plan for your GIS, understanding the greatest needs of your organisation and the greatest interests to your staff is the very first step. In this phase, remember to think about:

## **The problems that GIS could solve for your department:**

- Map books
- Incident-level situational awareness
- Pre-incident planning
- Response-time analysis
- Incident command and control

## **Where the biggest gaps may lie in your current infrastructure:**

- Data
- GIS software
- Hardware
- Expertise and technical training

## **The most significant obstacles that may become road-blocks:**

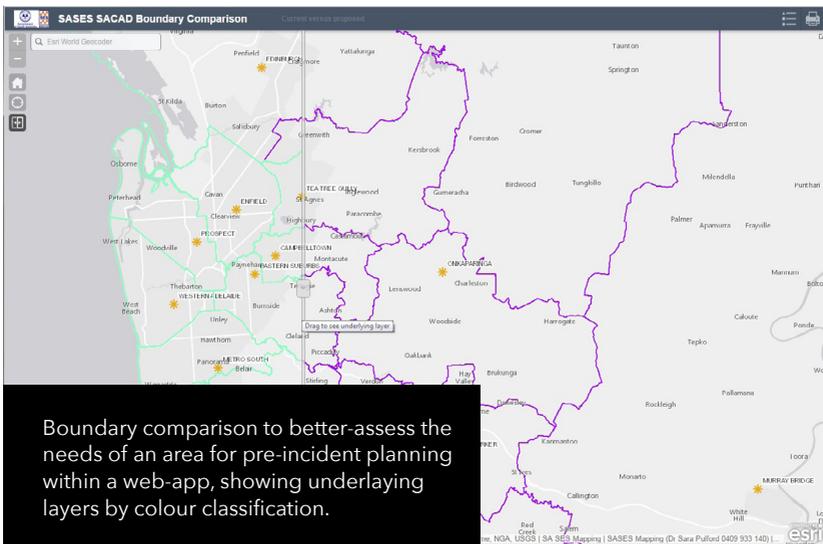
- Staffing and budget cuts
- Lack of communication and collaboration
- Lack of policies and governance for information and data sharing
- How the needs of your agency and the benefits of GIS may intersect:
- Sharing costs and maximising cost benefit
- Gaining GIS capabilities to support common problems throughout multiple agencies
- Building bridges for increased communication and collaboration throughout agencies and neighbouring jurisdictions

# Checklist for planning a GIS:

- Print out data/application matrix from the web tools
- Prioritise applications based on needs
- Start small – aiming for quick wins!
- Develop a long-term plan built on your vision and focused on sustainability
- Socialise your plan with your team – both internal and external stakeholders

**Remember: Discover the most likely early wins!**

Once you have developed your list of GIS needs, it is time to scope out what access you have to GIS resources, including data, software, training, and expertise. This will highlight what new resources are needed to bridge the gap.



# Using GIS practically

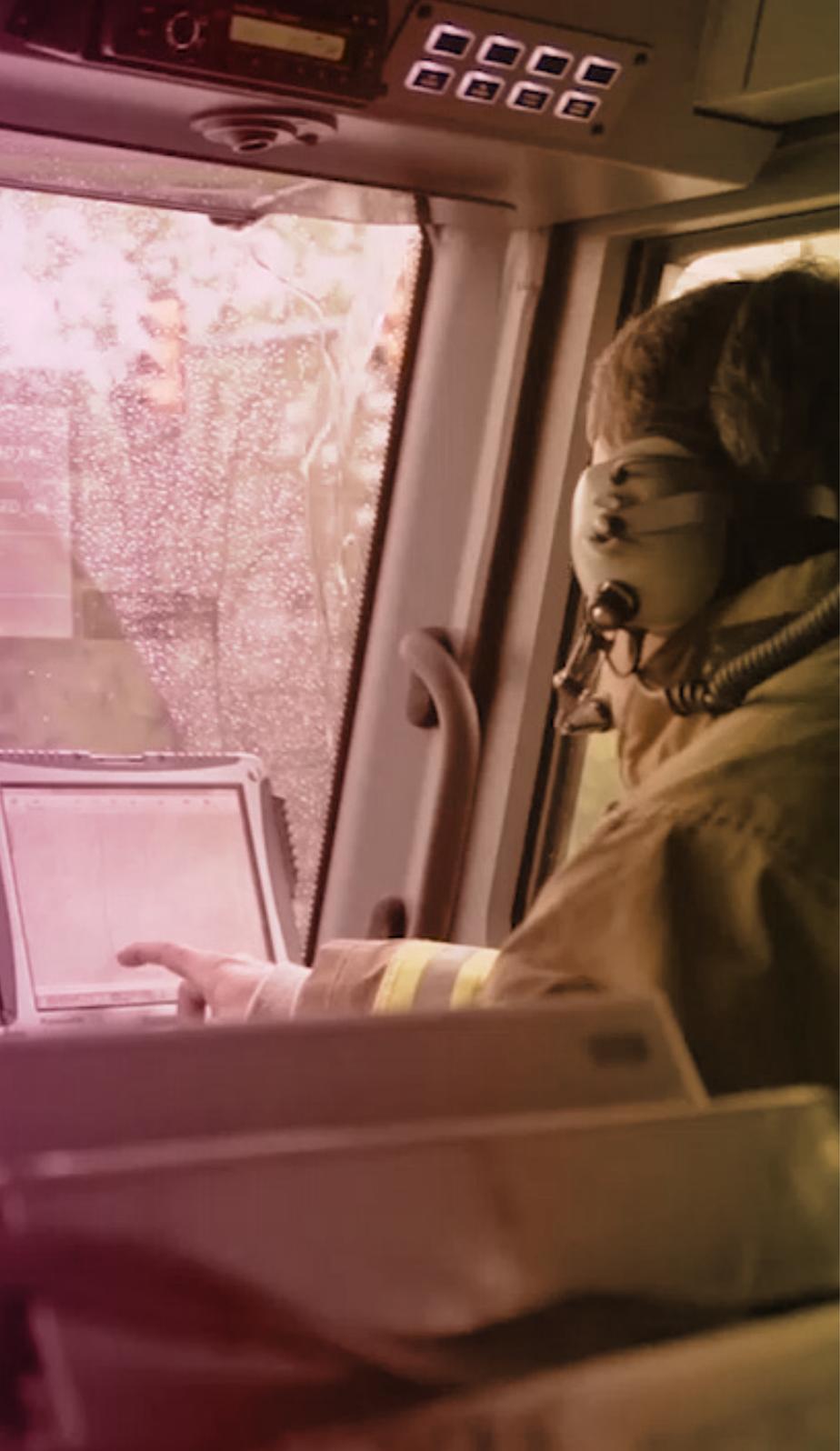
- **Consider your requirements in the context of your jurisdiction's GIS program**
- **Look for common priorities among other government agencies and focus on opportunities to leverage existing resources**
- **Look for ways to help outside agencies by sharing your GIS work and data sources**

Once you have designed your implementation plan, you are ready to move toward implementing and using GIS.

- **Software** - Acquire the appropriate GIS software to meet immediate and long-term needs
- **Training** - Build the technical capacity of existing staff
- **Data** - Find and assemble the data and information
- **Making a map** - Build your GIS project and develop products

**Effective Collaboration = Improved Outcomes**

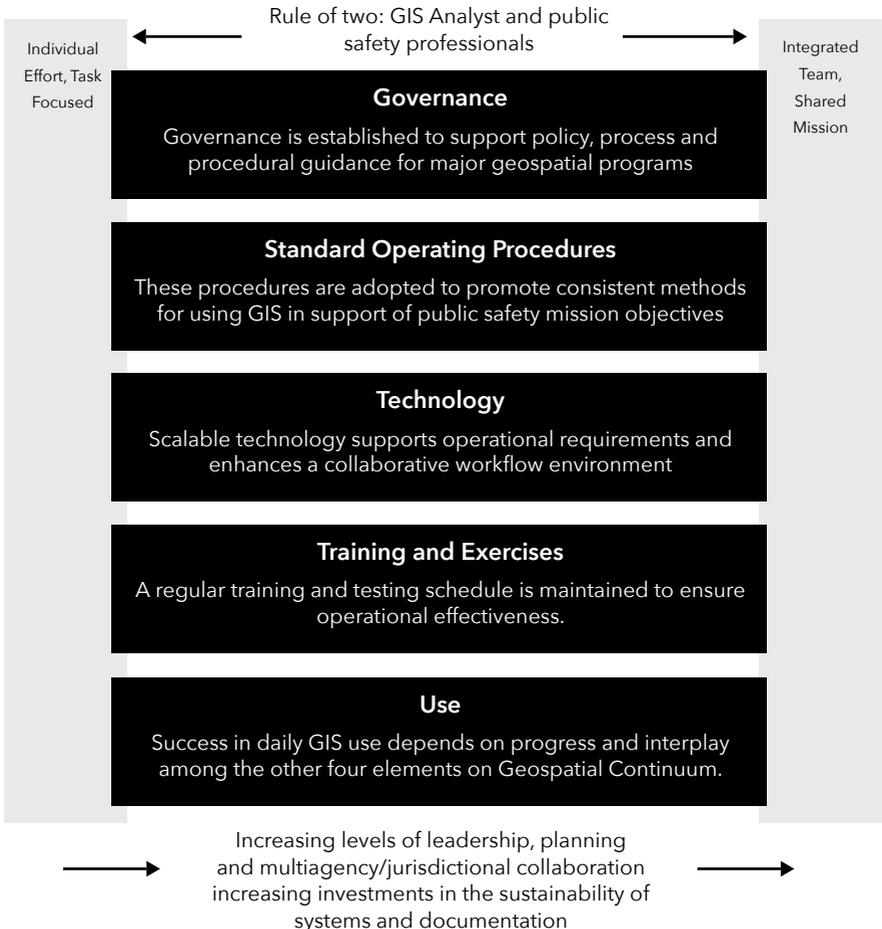




# Managing GIS effectively

## Public Safety Geospatial Continuum

Geospatial Continuum is designed to assist emergency response agencies and policy makers in planning and implementing effective public safety GIS solutions. It provides an outline of the five key variables needed for successfully deploying GIS to support the public safety mission.



# Checklist for managing GIS:

## Good governance is key

- Demonstrate benefits and return on investment (ROI)
- Develop next-step projects
- Gain support and feedback
- Begin to institutionalise GIS throughout the department

## GIS maintenance

The last step in building a GIS is to put a plan in place for ongoing maintenance.

Here is a check list of the basic functions for maintaining your GIS:

- Data management to ensure that all current and new data is of high quality and reliability
- Building capacity through GIS acquisition, training, and support
- Standard operating procedures - ensuring rules of use in your agency encourage mutual aid and information sharing
- System maintenance to keep your technology up-to-date

*Still not sure where to start or need some support along the way?*

Have a chat with one of our GIS experts or checkout how other public safety agencies from across the globe have revolutionised emergency response and recovery using GIS technology.

**Visit [esriaustralia.com.au/GIS-publicsafety](http://esriaustralia.com.au/GIS-publicsafety)**

