![Bentley Advancing Infrastructure]

Sydney Airport Optimizes Multi-discipline Collaboration with Infrastructure Facilities Management System

Bentley Technology Delivers a Single Source of Truth for Effective Information Mobility among Project Teams

Project Summary

Organization:
Sydney Airport

Solution:
Government

Location:
New South Wales, Australia

Project Objective:
- Implement a high-quality airport infrastructure facilities management system using innovative engineering and geospatial applications.
- Dynamically share data and enable self-service for project stakeholders to eliminate data redundancies and improve operational efficiency.

Products used:
ProjectWise®, Bentley Geo Web Publisher, MicroStation®, Bentley Descartes, Bentley Map, Bentley Map Mobile, Bentley Pointools, ProjectWise Web Explorer, Bentley Geo Web Map Viewer, Bentley Navigator, and ProjectWise WorkSite

Fast Facts
- The airport design team used Bentley Map to map the facilities' assets, and to produce on-demand thematic models for use in various airport databases.
- ProjectWise serves as the primary data storage for facilities design and business-related content, providing a single source of truth for the system.
- Bentley Geo Web Publisher provides a self-service portal giving stakeholders quick, easy access to design and geospatial data.

ROI
- The AIFMS provides a secure information environment and eliminates data redundancy, saving an estimated 12,395 resource hours per year.

Occupying 2,239 acres with more than 400 buildings, three terminals, three runways, and associated taxiways, Sydney Airport is one of Australia's most important pieces of infrastructure, generating economic activity equivalent to 6.4 percent for New South Wales and providing 306,700 jobs. The airport's design team is responsible for maintenance, documentation, and guardianship of civil, architectural, airfield design, and services databases, as well as leasing documents, airspace protection, and numerous presentation drawings.

On a monthly basis the airport's designers generate dozens of complex, time-consuming maps and facility drawings required to meet corporate and regulatory requirements. To manage compliance with operational safety measures and ensure stakeholder collaboration throughout all phases of facility design, construction, and maintenance, the department needed to streamline workflows and facilitate production of accurate drawings and information—then update, publish, share, and disseminate efficiently. Using Bentley technology, the design team created a self-service facilities management system that provides quick and easy access to layout and geospatial data, and improves information mobility among its employees, consultants, and stakeholders.

Geospatially Coordinated, Intelligent 3D Assets

The airport design team deployed Bentley Map as a GIS platform to map the ever-changing airport facilities' assets and capture data intelligence to provide the foundation for Sydney's Airport Infrastructure Facilities Management System (AIFMS). Using the array of technologically-advanced GIS and topology capabilities powered by Bentley's mapping software allowed the team to model the facilities as intelligent, real-word 3D representations and assign attributes to uniquely identify and locate every asset. Each of the 15,000 doors, tenancies, and assets within terminals, car parks, and ancillary buildings were identified by a unique number. Working in a collaborative, federated environment and using a map-based interface with project, document, and workflow management applications helped define a consistent approach to classifying and defining the information for all objects. This ensured the AIFMS not only met the different departments'

requirements, but that it was consistent with the naming conventions across the project, so information would be easily stored and retrieved.
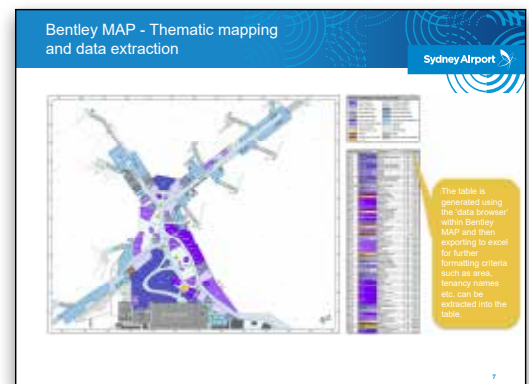
AIFMS provides a secure environment with no data redundancy, increasing efficiencies in operations and maintenance for both stakeholders and the design office.

For example, with more than 8,500 doors in the international terminal alone, it was essential not only for airport staff to know which doors they could enter, but also for security purposes, to be able to identify and locate these doors quickly and efficiently. By mapping all the airport doors with attached criteria on the GIS platform on an ongoing basis, the organization can now use the Web to find any door—by door number or door type—with confidence that the information is accurate and up to date.

ProjectWise Delivers a Single Source of Truth

The entire AIFMS is based on a combination of server applications (ProjectWise, Bentley Geo Web Publisher, SQL Server), desktop applications (MicroStation, Bentley Descartes, Bentley Map, Pointools), Web applications (ProjectWise Web Explorer, Bentley Geo Web Map Viewer), and mobility applications (Bentley Map Mobile, Navigator, and ProjectWise WorkSite [formerly Field Supervisor]). The

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purpose of the system is to manage the engineering design and geospatial content, and provide a portal for information mobility and access, while facilitating collaboration among project teams, internal department stakeholders, and external agencies involved in managing the airport facilities.

AIFMS is designed as a comprehensive program with all databases housed on the ProjectWise server. Capturing, defining, storing, and managing facility design standards in ProjectWise enables streamlined processes in a controlled and secure environment ensuring regulatory compliances. The team created standard project templates for numerous processes and used ProjectWise to automate workflows for the work requests, content creation, storage, registrations, and approvals. "ProjectWise allows us to create workflows, manage all our databases, as well as point-cloud data, all our CAD standards, and project templates," explained Kim Cohen, geospatial manager for Sydney Airport.

Using ProjectWise provides onsite/offsite access to facility data in multiple formats and allows integration with various user applications. As the primary data storage and application service center for facilities design and related business content, ProjectWise effectively eliminated data silos and redundancies and enabled effective data sharing and collaboration to deliver the AIFMS as a single source of truth.

Organization-wide Graphical Portal
Sydney Airport's digital print room houses over 7,500 drawings covering seven disciplines. While the introduction of CAD significantly increased the accuracy and efficiencies in preparing and amending the drawings, the output was still a manual, static drawing or PDF. Bentley Geo Web Publisher provides a live graphical portal to the entire organization, allowing users to access, identify, locate, and analyze information, including links to lease plans and as-built data, and has proved to be an efficient collaboration platform between the airport design team and other departments.

Bentley's GIS Web application provides dynamic access to design office contents and can capture data and updates from the field using Bentley Map Mobile and other mobile applications. It can hyperlink related documents, and because it is a self-service portal, enables stakeholders to fulfill their own requests in digital form. "Now they have a live portal where they can do their own analysis and own data searching," explained Cohen.

Numerous airport departments are using Bentley Geo Web Publisher in team meetings to facilitate decision making by displaying tenancies and discussing issues using the redline tool to highlight the problem areas rather than preparing PDFs prior and disseminating them to attendees. Concerns can be graphically represented and addressed in real time. Directly integrating with ProjectWise, Bentley Geo Web Publisher has helped breakdown prior data silos by facilitating data sharing and collaboration, ensuring data accuracy and reliability within the AIFMS.

Information Mobility Delivers Savings
Leveraging Bentley applications with mobile applications enabled the airport to streamline workflow and registration processes to ensure compliance with airspace height restrictions. Second worldwide only to Dubai in the number of cranes erected in the Sydney basin, the airport registers over 100 cranes per month for a total of 1,200 cranes per year. Registrations and approvals are needed for each crane to ensure appropriate markings and lightings, and that the cranes do not cause interference with radar and navigation equipment. By creating a workflow in ProjectWise and using Bentley Map, documentation is automatically sent to appropriate agencies and exact location of the crane is identified and marked. The active crane symbols are dynamically published in the Bentley Geo Web Publisher portal enabling airspace protection users to quickly find, display, and update the cranes' parameters. Bentley Map also produces an i-model for Bentley Map Mobile that can be uploaded to tablets for field access and verification by the safety inspectors. Stated Cohen, "The entire approval process, prior to Bentley Map, would take two hours per crane. We are now down to 15 minutes to half-an-hour per crane, so it's a significant time savings."

Similarly, the team designed a new mobile solution for wildlife management allowing field inspectors to quickly record wildlife counts, dispersals, and bird strikes on a tablet. The field observations are uploaded to the central database when the user connects to the airport network in their office and published to the Web for display and reports generation for wildlife observations. This mobile process saves six hours per day compared to the previous manual recording and input of data, and the Bentley Geo Web Publisher link allows the operations managers to dynamically analyze the data and assist in decision making for strategizing on wildlife policies.

Streamlined Efficiencies
The implementation of the AIFMS already has yielded high returns and increased efficiencies. Thematic maps that were a previous drain on resources and took days to complete can now be created on demand in minutes. A streamlined workflow saves over 1,800 hours annually on airspace registrations, with an additional 1,000 hours saved by improved efficiencies using Geo Web Publisher for quick analysis and mobile applications for field staff. With self-service portals, stakeholders can fulfill their own requests in digital form saving paper and printing costs, as well as time and resources previously required to handle enquiries. By providing accurate current data, the AIFMS minimizes design revisions, significantly reducing design office costs.

Using Bentley applications for its AIFMS, the design team estimates total savings will be 12,395 hours per year, equivalent to 6.9 staff members. As a single source of truth, the system eliminates data duplication and redundancies and will continue to optimize operations as it is extended to other airport services, amenities, and processes in the future.