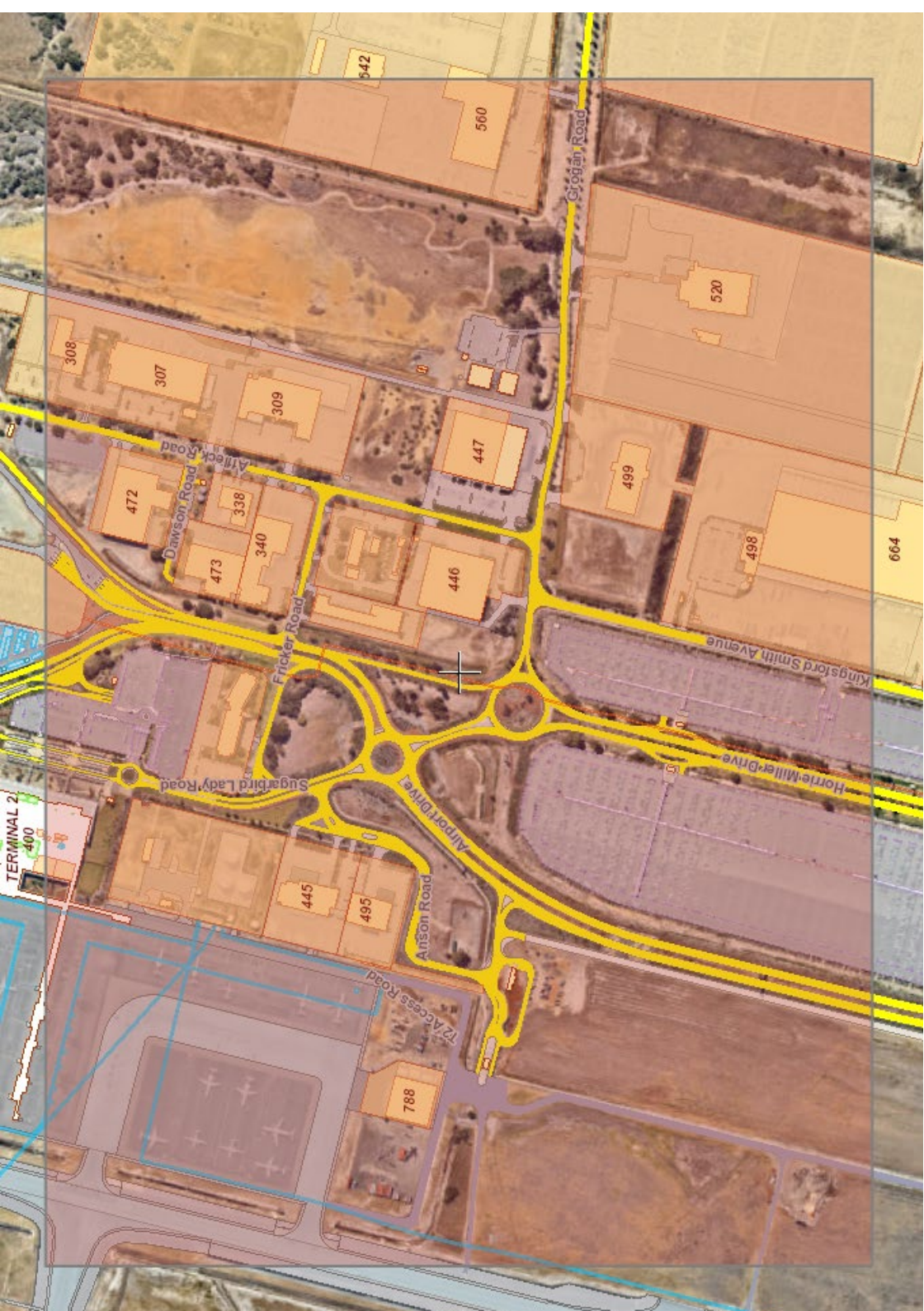


Airport Operating Standard

Spatial Design Requirements





TERMINAL 2

642

500

Fricker Road

520

308

307

309

447

499

Dawson Road

472

338

340

446

498

473

Fricker Road

Kingsford Smith Avenue

664

Sugard Lady Road

Horie Miller Drive

445

495

12 Access Road

Anson Road

788

400

400

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Introduction

Airport Operating Standards have been produced by Perth Airport to ensure safe operations at Perth Airport. The ***Spatial Design Requirements*** standard applies to all contractors and service providers under the terms of any service agreements or other contracts where information is to be provided in CAD/GIS format.

The ***Spatial Design Requirements*** standard sets the standardised format required for spatial data for Perth Airport and to ensure that the requirements documented in this standard are relevant and capable of practical implementation by all staff, contractors and service providers.

This Standard and the procedures described within may be amended from time to time by PAPL on recommendation of the Perth Airport Design team. PAPL will endeavour to provide sufficient notification of changes to contractors and service providers; however, it is the responsibility each operator/service provider to keep informed of any amendments.

The Standard includes:

- Responsibilities
- CAD requirements
- GIS requirements
- As constructed site survey requirements
- 3D models

The Standard is designed to be read in conjunction with the ***Perth Airport Operating Protocol*** which is available via the Corporate page on the Perth Airport website www.perthairport.com.au and the ***Spatial Data Standard*** procedure **PAPL-DO-STA-Spatial Data Standard** which is available via the Perth Airport Spatial Data team.

Responsibilities

Perth Airport Pty Ltd (PAPL)

PAPL is responsible for producing this Standard and consulting with stakeholders as necessary to determine operating requirements and necessary restrictions.

PAPL (Spatial Data team) has the day-to-day responsibility for implementation of this standard. The team manager is responsible for arranging, checking, and validation that electronic data provided conforms to PAPL requirements as well as arranging storage of electronic data into PAPL CAD and GIS systems.

PAPL Project Managers are responsible for delivery of final CAD data from the service provider to the Spatial Data team for approval of the format.

Contractors and Service Providers

Contractors and Service Providers are responsible for ensuring that data is presented to PAPL in the manner described in this Standard as and when requested by PAPL.

CAD Data Requirements

Perth Airport is a MicroStation CAD site and as such prefers all information is provided in this format.

The use of the Perth Airport “seed file” is mandatory to ensure correct units, global origin, and layer naming standards when using MicroStation. To overcome problems associated with geo referencing (co-ordinates), scale, symbology and rotation, the file format is preferred to be MicroStation 3D (dgn).

AutoCAD (dwg) files may be acceptable, if they are coincident with existing Perth Airport information and are approved as such by PAPL Spatial Data team.

It is the service providers responsibility to ensure data is in a format acceptable to PAPL. PAPL will not undertake to correct non geospatially aligned data.

If using CAD programs other than Bentley MicroStation, the product version needs to be verified as compatible with Perth Airports software.

Bentley Design File

A “seed file” can be provided by PAPL to the contractor on request. Perth Airport have standard Seed files for both Civil, Architectural, and other disciplines. All are set in PCG94 map coordinates.

All working Units to be utilised are as used in the Seed File:

- Master Units: Metres
- Sub Units: Millimetres.

If files are to be provided back to PAPL in AutoCAD, the Model space must be in metre working units and PCG94 co-ordinate space.

CAD File Symbology

CAD Files should be broken up by level names, with separate levels for all types of data used in the file.

- services (such as Gas, Water, Power)
- above ground assets (Buildings, Signs, Roads)
- building internals (Walls, Furniture, Services)
- attributes, symbols, labels, dimensions

GIS Data Requirements

Perth Airport is a ESRI ArcGIS site and as such requires all information is provided in this format.

ESRI ArcGIS v10.6+ Map Packages, a map document with all referenced data sources and display formatting to create a single compressed mpk file, is preferred if more than one dataset has been created.

ESRI File Geodatabase is preferred format. However, ESRI Shape File sets are acceptable but must include *.SHP, *.SHX, *.DBF and *.PRJ files as a minimum.

Data Format

PAPL has an extensive range of existing GIS datasets. When new surveys or data are being sourced or provided to PAPL, it is essential that the databases match existing formatting. Project managers, contractors and service providers should ensure they are aware of the required formatting.

Example database files can be requested from Spatial Data team to assist in formatting.

Topology Standards

The primary difference between CAD and GIS is topology.

In a CAD environment, the objects (lines, polylines, points, etc.) have no relationships between them. Topology brings these objects together into logical groups to form real world models.

As PAPL primarily uses GIS as the source of our data, all CAD data is required to meet some basic topology rules, primarily for polygon and polyline structures.

- Polygons of the same layer are required to be clean, not self-intersecting or overlapping. Shared boundaries must be consistent have no gaps and masks should not be used.
- Polylines and all data should be snapped correctly to adjoining line work and broken at intersections, ensuring no overshoot or undershoot errors.

Data Types

VECTOR DATA (Point, Polyline and Polygons)	
File type:	ESRI File Geodatabase, ESRI Shape File (must include *.SHP, *.SHX, *.DBF and *.PRJ files as a minimum)
Attribute Table:	<p>Attribute fields must be clearly and logically named.</p> <p>Attribute fields must be properly formatted for correct data type. i.e., Date or Text or Number/ Integer.</p> <p>All unwanted attribute information is to be deleted when exporting from GPS or CAD products, provide only the relevant fields.</p>
File name:	<p>File name should include Project name</p> <p>Use the date for document version control. Date shall be in yyyyymmdd format at the end of the file name (e.g.: FileName_YYYYMMDD)</p>
Metadata:	Please complete one metadata form to accompany each Feature Class or Shapefile being submitted. Refer to Metadata Standards Section for details.
Layer Files:	Layer files with cartographic symbology to be provided, matching any maps plans produced for reports.
RASTER DATA (Landsat, Geophysics, Orthophoto, Aerial Photo)	
File type:	<p>Preferably JPEG2000 (.JP2) or</p> <p>Enhanced Compression Wavelet (.ECW) or</p> <p>GeoTIFF(.TIF, .TIFF) or</p> <p>ESRI GRID (ASCII or Binary)</p>
Compression: (if supported by selected raster file format)	<p>Lossless compression (or no compression) should be used for most raster datasets.</p> <p>Lossy compression methods may be appropriate for some kinds of raster data (primarily data that is used for display purposes rather than for analysis).</p>
File name:	<p>File name should include Project name</p> <p>Use the date for document version control. Date shall be in yyyyymmdd format at the end of the file name (e.g.: FileName_YYYYMMDD)</p>
Metadata:	Please complete one metadata form to accompany each Feature Class or Shapefile being submitted. Refer to Metadata Standards Section for details.

Coordinates

All coordinates for CAD and GIS data should be in PCG94 (Perth Coastal Grid 1994). This is a special map projection zone based on the GDA94 Datum.

A known projection file in a standard mapping coordinate system may be supplied as an alternative to PCG94 after approval from PAPL Spatial Data team. This is to ensure compatibility with Perth Airports existing spatial data.

Existing survey control co-ordinates can be supplied by PAPL when requested.

Metadata Standards

PAPL requires that a metadata form is completed to accompany each of the individual datasets that is provided.

The metadata form is explained in table below.

DATASET DESCRIPTION	
Title	Title of the dataset
Data Created	Date on which the dataset was created
Date Last Updated	Date on which the dataset was last updated
Abstract	A brief narrative summary about the content of the dataset
Point of contact 1	Person and his/her details who is supplying the data
Point of Contact 2	Person details who is receiving the data at Perth Airport
Lineage	Describe how the dataset was created, the sources, accuracy and processes that were used
Datum/Coordinate System	Name of the datum and coordinate system, if the data includes geographic or projected coordinates
Restrictions	Any restrictions on access to or use of the dataset

3D Models

All 3D CAD Models created for projects on the Perth Airport Estate are to be made available to PAPL. Format for the delivery of the models is to be confirmed with PAPL prior to commencement. These need to be compatible with Bentley MicroStation software, Industry Foundation Classes (IFC) data model, or Bentley i-models.

File formats for BIM Models at a minimum 3 formats shall be provided:

- The original native authoring file including any object libraries and project set-up files (Revit).
- Industry Foundation Classes (IFC) data model or Bentley i-models.
- CAD 3D exports (MicroStation DGN or AutoCAD DWG)
- A set of PDF 3D exports as a Visualisation of the data models for non-technical staff.



As-Constructed Site Survey Requirements

All information provided is to show proof of being based on surveyed or field measured data. This can be met by showing survey control used and point registering and numbering or revisions reflecting field measurement.

Design drawings marked "as constructed" will not be accepted.

- All services are to be surveyed in situ before backfilling takes place. The survey and subsequent drawing is to contain the correct location, obvert or invert level, size and type of material used e.g. PVC
- Information relating to removed or altered infrastructure is to be recorded on surveyed data and existing drawings.
- All data is to be geospatially correct with respect to existing Perth Airport detail. Any data referenced into existing databases is to match the airport co-ordinate system and import correctly positioned in relation to those databases.
- Civil/survey-based CAD/GIS files are to use metres as the base units and match global origins of existing files. MicroStation seed files are available from PAPL on request.
- Architectural based CAD/GIS files are to be geospatially coincident with existing PAPL data.
- All pavement detail is to contain finished levels.
- All pits are to be accurately surveyed including size, level of lid and, in the case of drainage and sewer, the invert level.
- All above ground detail is to be comprehensive. Buildings, overhead roofing, pavement, paving, fencing, lighting, landscaping, building accessories (stairs, air conditioners, meter boxes, down pipes etc.) and any other infrastructures are to be provided.
- Where aircraft movement markings are installed the markings must be accurately surveyed.

Further Enquiries & Contacts

Further enquiries

If you have any questions in relation to this standard, please contact:

Head of Perth's New Runway & Infrastructure

Perth Airport Pty Ltd

PO Box 6

Cloverdale, Western Australia, 6985

Phone: (618) 9478 8820

Fax: (618) 9478 8889

For proposed changes to this standard, please email document.controller@perthairport.com.au.

Important contact

Spatial Data & Systems Coordinator

Phone: 9478 8437

Definitions and Acronyms

Term	Definition
ArcGIS	Specialist user software for updating GIS data.
CAD	Computer Aided Design software
DGN	Bentley MicroStation software design file extension
DWG	Auto CAD software drawing file extension
GIS	Geographic Information System
PCG94	Perth Coastal Grid (1994). It is a projected coordinate system based on the GDA94 datum
RVT	Autodesk Revit software BIM file extension
Topology	The way in which constituent parts are interrelated or arranged.



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