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GEODATA COAST 100K 2004

Product User Guide

National Mapping Division,
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For up to date information on *GEODATA COAST 100K 2004* refer to the Geoscience Australia website:
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About this product user guide
This product user guide sets out the fundamental concepts and characteristics of *GEODATA COAST 100K 2004*. The guide begins with general information and provides more details in later sections. The overview of data content and structure will allow you to make immediate use of the data.

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Contents

1 User information

1.1 User support/contact information

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1.2 Geoscience Australia - National Mapping Division

Geoscience Australia is the national agency for geoscience research and spatial information. It serves government and supports the community through its output areas of geoscience for urban centres, oceans and coasts, and regional and rural areas.

The National Mapping Division within Geoscience Australia undertakes national mapping, remote sensing maritime boundary and land information coordination activities in support of Australia's economic and social development.

2 About GEODATA COAST 100K 2004

2.1 GEODATA COAST 100K 2004 components

Your *GEODATA COAST 100K 2004* data package has four components which combine to give you a complete data product. The components are:

- **Product user guide**
  This guide describes the structure and content of *GEODATA COAST 100K 2004*.
- **Data Quality Statement file**
  The Data Quality Statement file carries data quality information relevant to the data.
- **Data Quality Table**
  This table contains data quality information about each feature instance in the data.
- **Data files**
  The number of files will vary with the application format of the data.

2.2 The GEODATA COAST 100K 2004 product

GEODATA COAST 100K 2004 is a vector representation of the topographic features depicting Australia's coastline, and State and Territory borders. It provides a fundamental layer on which you can build a wide range of applications. It can be combined with resource and environmental datasets, satellite imagery and demographic data to solve your geographic problems.

The level of detail in the source mapping means *GEODATA COAST 100K 2004* is particularly suited to regional, State-wide and national applications. Typical applications include:

- Management of natural resources including vegetation surveys, sand dune stabilisation, water quality analysis and assessment of mineral resources;
- Conservation of the environment including fish habitat management, pollution control and environmental monitoring;
- Coastal zone planning;
- Coastal and marine studies;
- Shallow water vegetation mapping;
- Emergency services support including contingency planning, command and control; and
- Standardised reference database of coastline and State borders.

The coastlines component of the *GEODATA COAST 100K 2004* product is primarily sourced from the 1:100 000 scale National Topographic Map Series produced by Geoscience Australia and the Royal Australian Survey Corps. Two 1:100 000 scale sheet areas over Brisbane were produced by the Queensland Department of Lands. Data covering Tasmania were derived from Geoscience Australia maps and the Department of Environment and Planning. The coastline of Western Australia was captured by the Department of Land Administration.

The positions of State and Territory borders were mainly derived from survey coordinate data and the 1:100 000 scale topographic series. The coordinate data were supplied by the various State and Territory survey agencies and Geoscience Australia. Where State borders follow natural features, data were captured from 1:100 000 scale mapping produced by Geoscience Australia or the Royal Australian Survey Corps.

Please note that the use of survey data in *GEODATA COAST 100K 2004* does not imply that the data are suitable for any legal interpretation of State/Territory borders.

2.3 The GEODATA standard

All GEODATA products are:

- **GIS compatible:**
  Every GEODATA product is designed to be immediately useful within GIS. You save the expense of bringing the data up to standard. For vector products, this means the adoption of a suitable data model and exacting standards for topological integrity;
- **Nationally consistent:**
  Each GEODATA product adheres to a consistent, national specification. As a consequence, each product offers consistency in the treatment of features and attributes, the criteria for feature selection, the positional and attribute accuracy, and the data point density;
- **Quality assured:**
  All products undergo independent quality assurance, including tests on vital aspects such as topological integrity, completeness, and positional and attribute accuracy;
- **Comprehensively documented:**
  Comprehensive documentation accompanies all GEODATA products, allowing you to determine whether a particular product is suitable for your application and to ensure you realise maximum value from the data.
- **Regularly maintained:**
  Through timely revisions and upgrades, all GEODATA products remain up-to-date and relevant to changing customer requirements.

2.4 Coordinate system

GEODATA COAST 100K 2004 data is available in geographical coordinates (latitude and longitude) in decimal degrees using the Geocentric Datum of Australia (GDA94).

3 Data loading

3.1 Application formats

The *GEODATA COAST 100K 2004* data is supplied in three application formats:

- ArcInfo Export;
- ArcView Shapefile; and
- MapInfo mid/mif.

3.2 Description of files

The downloaded *GEODATA COAST 100K 2004* package contains the following files.

Table 1: *GEODATA COAST 100K 2004* files – ArcInfo export format (e00)

Documentation files	
File name	**File content**
30408_user_guide.pdf	This user guide
Data files	
ArcInfo Export (*.e00) **File name**	**File content**
aut_lut.e00	Secondary attribute table for the authority of the source material. The values are used in the Data Quality Table.
bor_lut.e00	Secondary attribute table for State classification
coa_lut.e00	Secondary attribute table for Coastline type
sta_lut.e00	Secondary attribute table for State description
Folder: australia	
cstauscd.e00	Coastline data for Australia. (line, polygon)
cstausmd.e00	Survey monument points – Australian state and territory borders (point)
cstaus_q.e00	Data Quality Table
cstausad.dqs	Data Quality Statement
Folder: new_south_wales (The Australian Capital Territory and Jervis Bay Territory are included in the New South Wales tile)	
cstnswcd.e00	Coastline data for New South Wales. (line, polygon)
cstnswmd.e00	Survey monument points - NSW border (point)
cstnsw_q.e00	Data Quality Table
cstnswad.dqs	Data Quality Statement
Folder: northern_territory	
cstntcd.e00	Coastline data for the Northern Territory (line, polygon)
cstntmd.e00	Survey monument points - NT border (point)
cstnt_q.e00	Data Quality Table
cstntad.dqs	Data Quality Statement
Folder: queensland	
cstqldcd.e00	Coastline data for Queensland (line, polygon)
cstqldmd.e00	Survey monument points - QLD border (point)
cstqld_q.e00	Data Quality Table
cstqldad.dqs	Data Quality Statement
Folder: south_australia	
cstsacd.e00	Coastline data for South Australia (line, polygon)
cstsamd.e00	Survey monument points - SA border (point)
cstsa_q.e00	Data Quality Table
cstsaad.dqs	Data Quality Statement
Folder: tasmania (Tasmania has no "*md" survey monument layer as it shares no land border with other states[1])	
csttascd.e00	Coastline data for Tasmania (line, polygon)
csttas_q.e00	Data Quality Table
csttasad.dqs	Data Quality Statement
Folder: victoria	
cstviccd.e00	Coastline data for Victoria (line, polygon)
cstvicmd.e00	Survey monument points - VIC border (point)
cstvic_q.e00	Data Quality Table
cstvicad.dqs	Data Quality Statement
Folder: western_australia	
cstwacd.e00	Coastline data for Western Australia (line, polygon)
cstwamd.e00	Survey monument points - WA border (point)
cstwa_q.e00	Data Quality Table
cstwaad.dqs	Data Quality Statement

[1] Technically a land border does exist between Tasmania and Victoria. Straddling the declared parallel line of latitude of 39° 12' S separating the two states is Boundary Islet. This rocky outcrop in Bass Strait measures approximately 85 metres east-west by 160 metres north-south.

Table 2: *GEODATA COAST 100K 2004* files – ArcView shapefiles and MapInfo mid/mif formats

File name	ArcView Shapefile Extension	MapInfo mid/mif Extension	File content
aut_lut	.dbf	.dbf	Secondary attribute table for the authority of the source material. The values are used in the Data Quality Table.
bor_lu	.dbf	.dbf	Secondary attribute table for State classification
coa_lut	.dbf	.dbf	Secondary attribute table for Coastline type
sta_lut	.dbf	.dbf	Secondary attribute table for State description
Folder: australia			
cstausmd_p	.shp	.mid ; .mif	Survey monument data for Australian borders (point)
cstauscd_l	.shp	.mid ; .mif	Coastline data for Australia (line)
cstauscd_r	.shp	.mid ; .mif	Coastline data for Australia (polygon)
cstaus_q	.dbf	.dbf	Data Quality Table (DBF format)
cstausad.dqs	.shp	.mid ; .mif	Data Quality Statement (Text file)
Folder: new_south_wales (The Australian Capital Territory and Jervis Bay Territory are included in the New South Wales tile)			
cstnswmd_p	.shp	.mid ; .mif	Survey monument data for NSW border (point)
cstnswcd_l	.shp	.mid ; .mif	Coastline data for New South Wales (line)
cstnswcd_r	.shp	.mid ; .mif	Coastline data for New South Wales (polygon)
cstnsw_q	.dbf	.dbf	Data Quality Table (DBF format)
cstnswad.dqs	.shp	.mid ; .mif	Data Quality Statement (Text file)
Folder: northern_territory			
cstntmd_p	.shp	.mid ; .mif	Survey monument data for NT border (point)
cstntcd_l	.shp	.mid ; .mif	Coastline data for Northern Territory (line)
cstntcd_r	.shp	.mid ; .mif	Coastline data for Northern Territory (polygon)
cstnt_q	.dbf	.dbf	Data Quality Table (DBF format)
cstntad.dqs	.shp	.mid ; .mif	Data Quality Statement (Text file)
Folder: queensland			
cstqldmd_p	.shp	.mid ; .mif	Survey monument data for QLD border (point)
cstqldcd_l	.shp	.mid ; .mif	Coastline data for Queensland (line)
cstqldcd_r	.shp	.mid ; .mif	Coastline data for Queensland (polygon)
cstqld_q	.dbf	.dbf	Data Quality Table (DBF format)
cstqldad.dqs	.shp	.mid ; .mif	Data Quality Statement (Text file)
Folder: south_australia			
cstsamd_p	.shp	.mid ; .mif	Survey monument data for SA border (point)
cstsacd_l	.shp	.mid ; .mif	Coastline data for South Australia (line)
cstsacd_r	.shp	.mid ; .mif	Coastline data for South Australia (polygon)
cstsa_q	.dbf	.dbf	Data Quality Table (DBF format)
cstsaad.dqs	.shp	.mid ; .mif	Data Quality Statement (Text file)
Folder: tasmania (Tasmania has no "*md" survey monument layer as it shares no land border with other states)			
csttascd_l	.shp	.mid ; .mif	Coastline data for Tasmania (line)
csttascd_r	.shp	.mid ; .mif	Coastline data for Tasmania (polygon)
csttas_q	.dbf	.dbf	Data Quality Table (DBF format)
csttas.dqs	.shp	.mid ; .mif	Data Quality Statement (Text file)
Folder: victoria			
cstvicmd_p	.shp	.mid ; .mif	Survey monument data for VIC border (point)
cstviccd_l	.shp	.mid ; .mif	Coastline data for Victoria (line)
cstviccd_r	.shp	.mid ; .mif	Coastline data for Victoria (polygon)
cstvic_q	.dbf	.dbf	Data Quality Table (DBF format)
cstvicad.dqs	.shp	.mid ; .mif	Data Quality Statement (Text file)
Folder: western_australia			
cstwamd_p	.shp	.mid ; .mif	Survey monument data for WA border (point)
cstwacd_l	.shp	.mid ; .mif	Coastline data for Western Australia (line)
cstwacd_r	.shp	.mid ; .mif	Coastline data for Western Australia (polygon)
cstwa_q	.dbf	.dbf	Data Quality Table (DBF format)
cstwaad.dqs	.shp	.mid ; .mif	Data Quality Statement (Text file)

4 Data characteristics and concepts

4.1 GEODATA COAST 100K 2004 *essential characteristics*

Truth-in-labelling
GEODATA COAST 100K 2004 is accompanied by sufficient information to enable you to assess whether the data are fit for use in your application. The information will also assist you to use the data to their maximum potential. Data quality information is provided from three sources:

- **This Product User Guide**
  Sections in the User Guide cover positional accuracy and topological integrity.
- **The Data Quality Statement**
  This information, specific to each tile, is included as a text file in each data transfer.
- **The Data Quality Table**
  This table contains data quality information which is linked to each feature instance in the data.

These resources and their content are described in more detail in Chapter 6 - Data quality information.

Resolution of coordinates
The horizontal coordinates of the data are given to a resolution of 0.00001 degrees in geographical coordinates (approximately 1 metre on the ground).

Area of tile coverage
The geographic area covered by each file of spatial data is described as a tile. *GEODATA COAST 100K 2004* is available as a single national tile and as separate tiles for each State and the Northern Territory. The Australian Capital Territory and Jervis Bay Territory are included in the New South Wales tile.

A State/Territory tile is bounded on the landward side by State/Territory borders and on the seaward side by the tile edge feature. In most cases the tile edge feature is coincident with the outer edge of the relevant 1:100 000 scale map sheet, extended to include island inserts. To close-off the Sea polygon a tile edge feature has been added so that it joins the point of intersection of the State border and coastline with the nearest offshore map sheet corner.

When a single national tile is supplied, the tile edge is coincident with the relevant 1:100 000 scale map sheet, extended to include island insets.

Because of the large number of island polygons off the coast of Western Australia some GIS applications have difficulty loading the data. To avoid this problem the sea feature in this tile has been broken into four polygons. This has been achieved by inserting a tile edge feature from the seaward edge of the tile to the coastline. The following Figure indicates the extent of each tile.

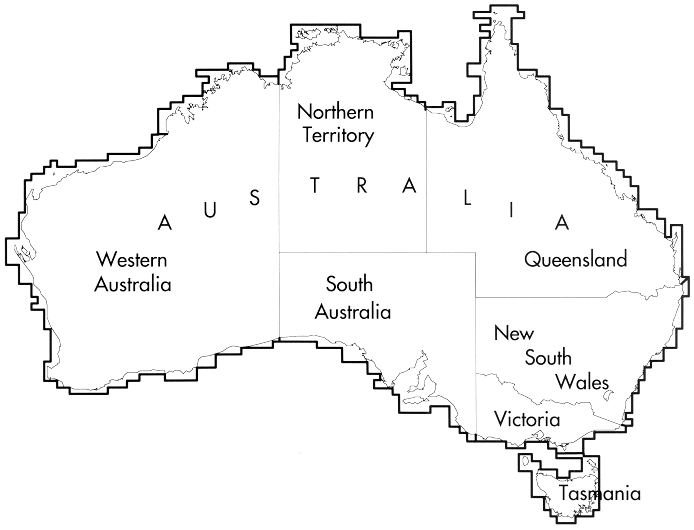

Figure 1: *GEODATA COAST 100K 2004* tile edge extents

Topological integrity

GEODATA COAST 100K 2004 data are tested to ensure that they comply with the rules for topological integrity set out below. The data must comply with these rules, and others, to specified levels set out in the Data Quality Statement in Chapter 6. Generally the compliance rate is 99.5% or 95% with a 99% confidence. This means that the data may be accepted, even if they contain a small number of errors.

- The data have a node/chain structure. Within a linear network layer or a polygon layer, all linear features are broken by a node at intersections or at the point where an attribute of the feature changes. This is demonstrated in the following diagram.

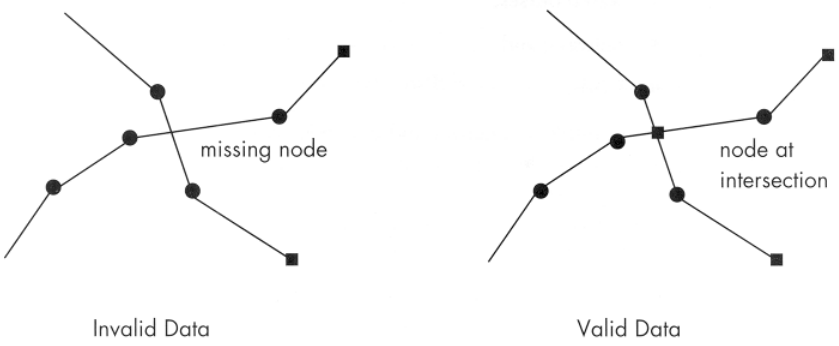

Figure 2: Linear intersections

- Every linear feature instance has a node at each end.
- All polygons are completely closed.
- Every polygon feature contains a polygon label point.
- Polygons in the same layer cannot overlap.
- Within a layer there are no coincident features.
- When two features in separate layers share the same physical position on the source material, they have exactly coincident spatial objects. The same feature instance may occur twice in the data supplied to you. When this occurs the repeated feature instance has exactly the same coordinates.
- There are no undershoots. This possible error is illustrated below.

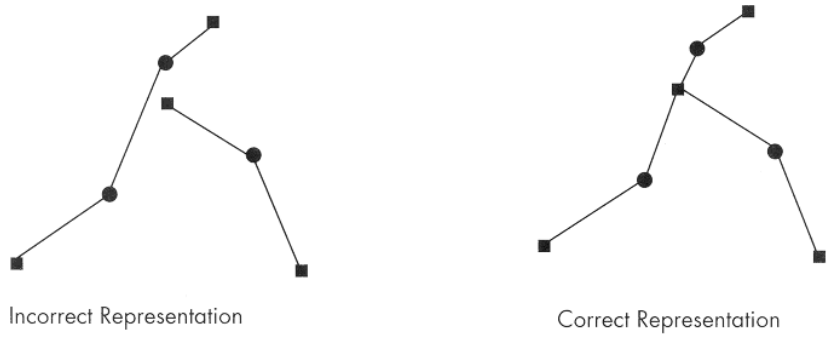

Figure 3: Undershoots

- The spatial data have no overshoots, broken lines or other artefacts of the data capture process. These possible errors in the data are illustrated below.

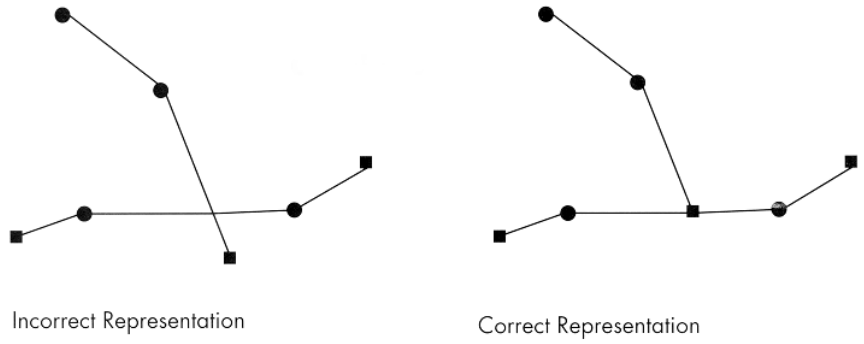

Figure 4: Overshoot

Figure 5: Broken lines

Figure 6: Data spikes

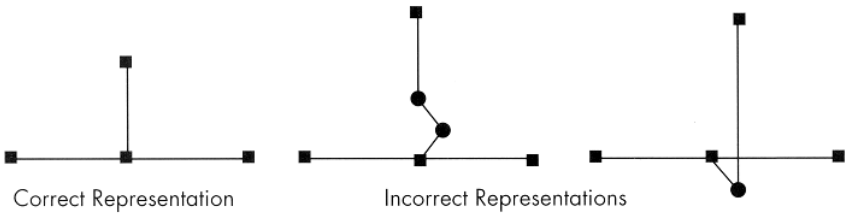

Figure 7: Artefacts in data

Point density reduction
Point density is controlled so that the locational information is conveyed by the minimum number of points while still retaining the smooth shape of the source information.

The following specifications apply for data point reduction for *GEODATA COAST 100K 2004*:

- The minimum length of a line segment is 20 metres; and
- The maximum length of a line segment is 50 metres.

To avoid the collapse of small polygons, polygon feature instances with fewer than 20 vertices are exempt from these rules.

Unique feature identifier
Each entity in *GEODATA COAST 100K 2004* has an attribute code which is unique to that entity. This attribute, known as the unique feature identifier (UFI), is nationally unique and allowance has been made for up to 100 million entities. The UFI has two applications. It is used to facilitate the supply of 'change only' updates of the data, and is a tag that can be used to keep an historical log of changes to *GEODATA COAST 100K 2004*.

Edge-matching
Edge matching is the process of digitally aligning contiguous linear features which cross adjacent maps and tiles. It ensures that the coordinates of a feature's intersection with the tile edge are coincident in the digital data for the adjacent tiles. It also ensures that there are no discontinuities within a tile where a feature crosses the boundary between adjacent 1:100 000 scale source maps. Edge-matching of spatial data therefore creates a 'seamless' database, allowing the application of linear network analyses such as length of coastline calculations.

Approximately 360 maps at 1:100 000 scale were used as the source material for the digital representation of the Australian coastline. As these maps were produced over a long period and to different specifications, there were difficulties in matching some of the features in the digital data. Features that, in reality, are contiguous may not join on adjacent maps. For example, the coastline of a mangrove island that runs to the edge of a new map may not match an adjacent older map because the extent of the mangrove island has grown since the older map was published.

All features which cross the edge of the tile are broken with a node which is exactly coincident with the edge of the tile. Features which cross the boundaries of the source maps within a tile are also broken with a node because the data quality attribute will always change at this point.

Source map edge-matching
The edges of every source map were checked with the edges of adjacent maps for positional and attribute matching. If a feature at the map edge was displaced less than 20 metres, the feature on the most reliable map sheet remained fixed and the feature on the least reliable map sheet was positionally adjusted to achieve a smooth join. If the displacement was greater than 20 metres, additional source material was accessed and, if necessary, the feature revised. Data quality information on the revised feature indicates any revision.

Tile edge-matching
The edges of adjoining tiles were checked for the correct positional and attribute matching of features. If there was any positional mismatch, this was adjusted with the same procedures used for source map edge-matching.

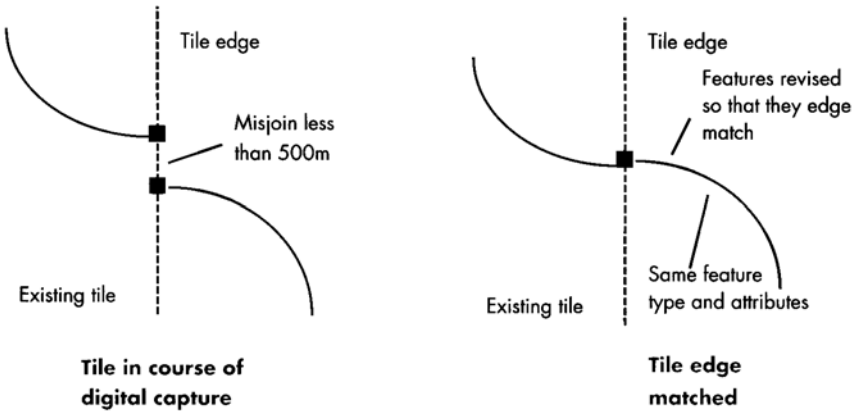

Figure 8: Edge-matching of source maps

Depiction of the coastal environment and State border
The following figure illustrates how feature classes are used in *GEODATA COAST 100K 2004* to represent the coastal environment and State border.

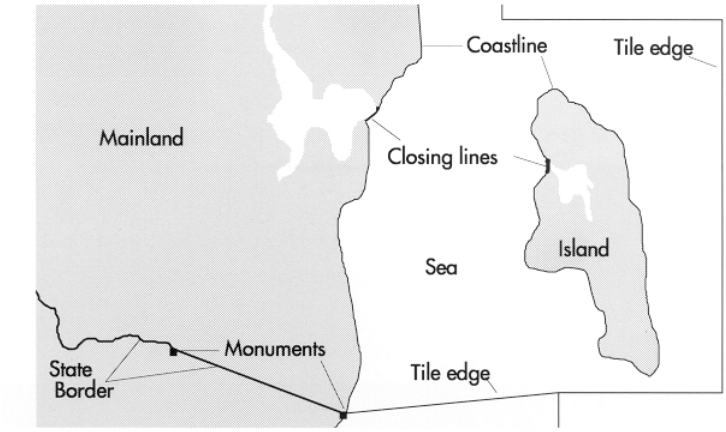

Figure 9: The coastal environment and State border

4.2 GEODATA COAST 100K 2004 *data concepts*

Each feature in *GEODATA COAST 100K 2004* is defined by a spatial object and an attribute object. These features fit into the hierarchy of theme and layer. At the highest level, associated features are grouped into themes. Themes are subdivided into layers according to the spatial objects used to represent the features.

Vector data
Vector data describes spatial data in which the location of a real world phenomenon is defined by points and straight lines (vectors) between these points. The vector data model used for GEODATA also includes polygons - areas bounded by straight lines.

Feature-based data
The GEODATA vector products use a feature-based data model described by the following definitions. These are used to describe data that represent phenomena in the real world:

- **Entity:** A real world phenomenon which cannot be divided into phenomena of the same type.

- **Feature instance:** A single occurrence of a feature which has a unique set of spatial and attribute object values.
- **Attribute:** A descriptive characteristic of a feature. Attributes can be spatial (or locational) and aspatial (or non-locational).
- **Attribute value:** A value assigned to an attribute, either for a feature instance or its attributes.
- **Feature class:** A group of feature instances defined by a set of rules and having common attributes and relationships that are the properties of the corresponding real world phenomena.
- **Entity class:** A group of entities of the same kind, matching the members of a feature class.

The structure of a feature instance in the feature based data model can be summarised as:
feature instance = [*spatial object* + *attribute object*]

Spatial object
Spatial objects are the locational attributes of the feature. In GEODATA, they comprise the special cases of points, chains and polygons. Spatial objects have a spatial address which consists of one or more couplets (x, y) or triplets (x, y, z).

Point
A *point* is a geometric representation defined by a single (x, y) coordinate couplet or a (x, y, z) triplet. Three special points are used.

- **Entity point**
  An *entity point* is used to locate point entities, or area entities represented by a point because of the scale of the source material and/or scale of the final GEODATA product.

- **Polygon label point**
  A *polygon label point*, contained within every polygon feature instance, locates information about that polygon. It is linked to the bounding chains of the polygon. In proprietary GIS software packages, this point type is sometimes known as a centroid.

- **Node**
  A *node* is a junction of two or more feature instances or an end point of a feature instance. Nodes may carry attribute information.

Chain
A *chain* is a spatial object composed of a sequence of non-intersecting line segments which is bounded by nodes at each end. Chains may carry topological information such as a reference to the polygons to the left and right (with respect to the direction of digitising) and reference the start and end nodes.

A line segment is a straight line between two consecutive vertices in a chain. Each vertex is defined by a single (x, y) coordinate couplet.

Figure 10: Chain spatial object

Polygon
A *polygon* is a bounded, continuous region consisting of an interior area, and an outer boundary defined by a set of chains. A polygon may also contain one or more non-nested inner boundaries also defined by sets of chains.

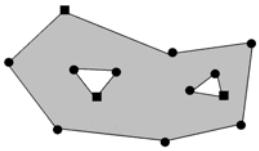

Figure 11: Polygon spatial object

The entity and its spatial object
The spatial object used to depict a feature depends on the size of the entity with respect to the scale of the source material and/or the final GEODATA product. For example, a small lake would be represented as an entity point whereas a large lake would be represented by a polygon. For this reason, a class of feature may be depicted by more than one type of spatial object.

Attribute object
An *attribute object* identifies the class of feature and the non-locational properties of the feature. The following two examples illustrate the possible content of the attribute object:

Attribute	Attribute value
Feature	Coastline
Coastline Type	4
State	5
Unique Feature Identifier	AE00018037
Data Quality Pointer	AE000280

Attribute	Attribute value
Feature	Island
Name	WHITSUNDAY ISLAND
Island Group Name	WHITSUNDAY GROUP
State	5
Unique Feature Identifier	AE00022744
Data Quality Pointer	AE000602

Figure 12: Examples of attribute objects

It is possible for a feature's attribute object to consist of more than one set of attribute tables. The above attribute tables are known as *primary attribute tables*. Additional descriptive information about a feature instance can be provided by a *secondary attribute table*.

For example, the value for the State attribute in the following Wild Duck Island example is the link to the relevant row of information in a secondary attribute table called 'State' which gives the value of 'QLD' for the State code of 5.

Primary attribute table

Attribute	Attribute value
Feature	Island
Name	WHITSUNDAY ISLAND
Island Group Name	WHITSUNDAY GROUP
State	5
Unique Feature Identifier	AE00022744
Data Quality Pointer	AE000602

Secondary attribute table - State

State	Description
1	ACT
2	JBT
3	NSW
4	NT
5	QLD
6	SA
7	TAS
8	VIC
9	WA

Figure 13: Primary and secondary attribute table relationship

5 Data structure and content

5.1 Data structure

The spatial object and attribute object as previously defined are the primitive components of GEODATA. When combined, these objects define a feature instance. Features are grouped to form a hierarchy which is used for the capture and transfer of the data.

Theme
The digital spatial data contained in GEODATA are primarily derived from existing map production material. The data on the source material are captured as features and these features may be grouped into themes - each containing logically related geographic information. The theme is the highest level of data grouping in the GEODATA structure. *GEODATA COAST 100K 2004* is composed of a single theme.

Layer
Each theme may consist of one or more layers. A layer is a grouping of features which have compatible spatial objects. GEODATA may contain four types of layers:

- **Linear network layer**
  Linear layers contain linear features such as watercourses. These layers are composed of nodes and chains.
- **Polygon layer**
  Polygon layers contain area features represented by polygons, such as lakes and reefs.
- **Point layer**
  Point layers contain features that are represented by entity points, such as buildings or aircraft facilities.
- **Point/linear layer**
  Point/linear layers contain a combination of entity point and chain features such as road networks with bridges and river networks with waterfalls and locks.

5.2 Data layer

Coastlines layer

The following Figure illustrates how feature classes are used in *GEODATA COAST 100K 2004* to represent the coastal environment and State border.

Table 2: Content of Coastlines layer

Layer	Layer type	Feature	Attributes	Spatial object	Attribute source
COASTLINES	Polygon	Coastline	Coastline, Type, State	Chain	100K scale topographic maps produced by Geoscience Australia, the Royal Australian Survey Corps and State mapping agencies. Also supplemented by survey monument data from Geoscience Australia and State survey agencies.
		Island	Island Name, Island Group Name, State	Polygon	
		Mainland	State	Polygon	
		Monument	Name	Node	
		Sea		Polygon	
		State Border	Border type	Chain	
		Tile Edge		Chain	

In addition to the attributes shown in this table, there are two more attributes attached to every feature instance: the unique feature identifier and the data quality pointer.

Special features

Coastline feature
Coastline feature instances represent the position of Mean High Water (MHW), the seaward edge of coastal mangroves, inlet closing lines and those parts of the coastline defined as indefinite. The coast at MHW was originally determined from aerial photography flown at, or very near, the time of MHW.

Mangrove coastline is defined as being on the seaward edge of coastal mangroves. This position may approximate Mean Low Water. Some edition 1 source maps show the coastline on the landward side of mangroves. To maintain consistency in the data, the seaward edge of mangroves has been digitised as coastline in these circumstances.

The mouths of narrow inlets and rivers have been closed off by straight closing lines. The closure point essentially represents the break between mainly riverine waters (rivers, bays, harbours, inlets) and mainly marine waters. The overall intent in considering the placement of closing lines was to preserve the general shape of the coastline.

Indefinite coastline is that part of the coastline where MHW could not be determined from the source material. It includes cliff overhangs and exposed sand bars.

Monument feature
Parts of some of the State/Territory borders are marked on the ground by survey monuments. The construction of these monuments range from wooden pegs to substantial cairns. Monuments usually represent the agreed position of the border, although disputes may exist in some cases.

There are instances where the actual position of monumented survey points identifying the locations of State and Territory borders do not coincide with their original gazetted coordinate locations. The refinement of coordinates locating State and Territory borders is an ongoing task of State/Territory and Commonwealth survey agencies. Both the New South Wales/Queensland (see http://www.abc.net.au/nsw/stories/s1106599.htm) and the South Australian/Victorian borders, are currently being resurveyed by their respective survey agencies to more precisely establish the position of the original border markings.

Further information on the NSW border with Queensland and Victoria can be found in the following documents available in PDF format from the NSW Department of Lands - Land and Property Information Division website ;

1. Boundary Definition NSW/Queensland Border (2000)
2. Guideline for the Determination of the State border between NSW and Victoria along the Murray River (Edition 3 – 2001)

Survey coordinate data locating the position of the monuments forming State and Territory borders have been obtained from Geoscience Australia's National Geodetic database, and from State survey agencies. The density and distribution of monuments varies significantly from place to place.

The most recent available survey coordinates locating the monuments more accurately are used in *GEODATA COAST 100K 2004*. However, these coordinates must always be regarded as only an approximate description of the actual location of a State/Territory border.

Please note: The use of survey data in GEODATA COAST 100K 2004 does not imply that the data are suitable for any legal interpretation of State/Territory borders.

A legal border is one that is defined by monumentation, ie. the actual position of a monument, and is accepted by the State/Territory authorities or courts of law as locating a border.

State border feature
Practically all straight sections of State borders have been determined by the use of survey monument coordinate data. The availability of more recent and accurate monument coordinate data may result in *GEODATA COAST 100K 2004* border information being at variance to that shown on the source map material.

Where the location of State borders is defined as following natural features, the border *in GEODATA COAST 100K 2004* is as depicted on the source map material. Natural features determining the position of State borders include the Murray River and McPherson Ranges.

The location of State borders that have not been accurately defined on the ground or agreed upon are attributed as 'undefined'. Their location is that which is generally accepted by the relevant authorities.

The following diagram shows the location of significant lengths of the different types of State border.

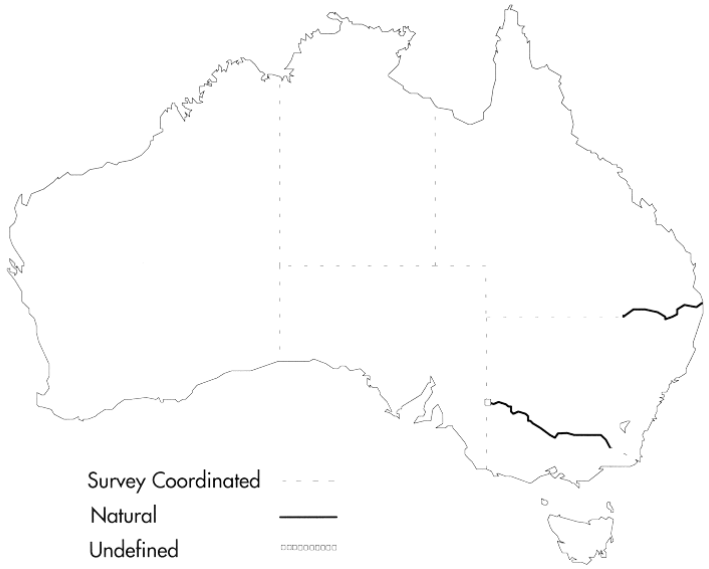

Figure 14: Location of State border attribute types

Island feature
All Australian islands shown on the source material are included in *GEODATA COAST 100K 2004*. Australian external territories, and islands inside the tile edge which belong to Papua New Guinea, are excluded. Small islands which are less that 100 metres from the mainland and are in river mouths or bays are shown as part of the mainland.

Mainland feature
The mainland is the contiguous area of Australia within the State/Territory coastline. For State/Territory tiles, it is partly bounded by the State border feature. Note that the mainland feature also encloses some estuarine areas due to the use of closing lines.

For the purposes of *GEODATA COAST 100K 2004*, this feature includes Tasmania.

Sea feature
The sea feature is a polygon bounded by the coastline and tile edge features. The sea feature off the Western Australia coast contains a large number of islands and this results in a very high number of features which make up the polygon boundary. This can cause problems for some GIS applications. To avoid these problems the sea has been derived into a number of smaller polygons in this region.

Tile edge feature

The tile edge feature is used to define the seaward edge of the geographical area supplied in the data transfer. In most cases the tile edge feature is coincident with the outer edge of the relevant 1:100 000 scale map sheet, extended to include island insets.

To close-off the Sea polygon in a State/Territory tile, a tile edge feature has been added to the data. This feature has been placed so that it joins the point of intersection of the State border and coastline with the nearest offshore map sheet corner. Figure 1 on page 13 illustrates the tile edge.

5.3 Data dictionary

Characteristics which are common to all features:

- **Unique Feature Identifier (UFI)**
  An attribute code that is unique to that instance.
- **Data Quality Pointer**
  This attribute points to a record in the Data Quality Table which holds information on the quality aspects of the feature. The contents of this secondary attribute table are set out in the data quality information within Chapter 6.

Attribute table

Table 3: Attribute table of *GEODATA COAST 100K 2004*

Feature	Description	Object	Attribute	Attribute values	Selection criteria
COASTLINE (coastline)	A line depicting the boundary between land and sea. The line follows the main outline of the land, the seaward edge of mangroves and closes off narrow inlets and rivers at their mouths.	Chain	COASTLINE TYPE (coast_type)	1 = *Definite*: a line depicting the coast at Mean High Water (MHW) as shown on topographic maps. The position was originally determined from aerial photography which was flown at, or very near, the time of MHW. Large piers and break waters were not included as part of the coastline. 2 = *Indefinite*: the part of the coastline where MHW cannot be determined from the source material. It is used where the coastline is underneath the overhang of cliffs or compromised of exposed sand bars. 3 = *Closing line*: a straight line	Closing lines: the mouths of narrow inlets and rivers are generally closed off when they are less than 500m wide. The overall intent in considering the placement of closing lines was to preserve the general shape of the coastline. Small islands which are less than 100m from the mainland and are in river mouths or bays are shown as part of the mainland.

Feature	Description	Object	Attribute	Attribute values	Selection criteria
				closing off narrow inlets and river mouths. It essentially represents the break between mainly riverine (rivers and inlets) and mainly marine (oceans and seas) waters. 4 = *Mangrove*: the seaward edge of coastal mangroves. This position may approximate Mean Low Water (MLW).	
			STATE (state_code)`	1 = *Australian Capital Territory* 2 = *Jervis Bay Territory* 3 = *New South Wales* 4 = *Northern Territory* *5* = *Queensland* 6 = *South Australia* 7 = *Tasmania* 8 = *Victoria* 9 = *Western Australia*	
ISLAND (island)	An area of dry or relatively dry land surrounded by the sea.	Polygon	ISLAND NAME (island_name)		All Australian islands surrounded by the sea and within the tile edge are included. Islands outside the tile edge,
			ISLAND GROUP NAME (group_name)		

Feature	Description	Object	Attribute	Attribute values	Selection criteria
			STATE (state)	1 = *Australian Capital Territory* 2 = *Jervis Bay Territory* 3 = *New South Wales* 4 = *Northern Territory* *5* = *Queensland* 6 = *South Australia* 7 = *Tasmania* 8 = *Victoria* 9 = *Western Australia*	external territories and islands inside the edge, but belonging to Papua New Guinea, are excluded.
MAINLAND (mainland)	The are of Australia inside the State/Territory coastline. For the purposes of COAST-100K, this feature includes Tasmania.	Polygon	STATE (state)	1 = *Australian Capital Territory* 2 = *Jervis Bay Territory* 3 = *New South Wales* 4 = *Northern Territory* *5* = *Queensland* 6 = *South Australia* 7 = *Tasmania* 8 = *Victoria* 9 = *Western Australia*	
MONUMENT (monument)	A marked (monumented) survey point identifying on the ground the position of State/Territory borders. The most up-to-date available coordinates of these monuments have been used. These coordinates may not coincide with the border's original gazetted locations. However, the monuments have been generally accepted by the relevant State/Territory authorities or courts of law as indicating the location of the border.	Node	NAME (name)		
SEA (sea)	The water area surrounding the Australian continent (including Tasmania) and its offshore	Polygon			

Feature	Description	Object	Attribute	Attribute values	Selection criteria
	islands. Included term is ocean.				
STATE BORDER (state_border)	Boundary defining the division of the Commonwealth of Australia into State/Territory administrations.	Chain	BORDER TYPE (border_type)	1 = *Survey coordinated*: the position of a border that has been marked on the ground by survey monuments (see monument feature). The survey coordinates of these monuments are from the National Geodetic Database and State survey agencies. This attribute is thus used to denote the straight line between coordinated monuments or between coordinated monuments and specified natural features which locate the position of a border. 2 = *Natural*: borders which have been gazetted/declared as following a natural feature, and have not been or are unable to be marked on the ground and coordinated, eg. a natural border such as a river bank or the centre of a river. 3 = *Undefined*: a border that has not been surveyed or accurately defined or agreed upon, eg. the Victorian/South Australian border on the Murray River. The position selected for COAST-100K is the one generally accepted by the relevant authorities. 4 = *Gazetted*: borders that have been gazetted/declared and have not been or cannot be marked on the ground.	Survey information incorporated in COAST-100K may not be identical to the border shown on the source maps. All land borders are recorded in COAST-100K. the News South Wales/Jervis Bay Territory border which crosses Jervis Bay is included for completeness. *A survey coordinate description does not imply the data are suitable for any legal interpretation of State/Territory borders.*

Feature	Description	Object	Attribute	Attribute values	Selection criteria
TILE EDGE (tile_edge)	The line defining the seaward limits of the data in the data transfer.	Chain			In general, the tile edge is coincident with the outer edge of the 1:100 000 map series coverage (extended to include island insets). To close off the tile when the data is supplied as individual State tiles, a tile edge feature is added which runs from the nearest offshore map sheet corner to a point where the State border meets the coastline. Because of the large number of island polygons off the coast of Western Australia some GIS applications have difficulty loading the data. To avoid this problem the sea feature in this tile has been broken into four polygons. This has been done by running a tile edge feature from the seaward edge of the tile to the coastline in three places.

6 Data quality information

6.1 Data Quality Statement

The Data Quality Statement is a text file that accompanies every transfer of a *GEODATA COAST 100K 2004* tile. It contains information specific to the tile covered by the data file. It includes information relating to tile identification, transfer format, coordinate systems, feature occurrence counts, data capture methods and point density. The content of this information may vary with the format in which you are supplied *GEODATA COAST 100K 2004*.

6.2 Product quality information

Lineage
This section contains information on the lineage of the spatial data in this product. Lineage is the history of the spatial data; the source of the data, how they were captured, prepared, revised etc.

History of the Coastline and State Border Mapping Program
In 1985, as a result of the Commonwealth's international obligation to precisely define Australian Territorial Limits, a program to digitally map the Australia Baseline and Coastline was commenced by the then Division of National Mapping (NATMAP). The *GEODATA COAST 100K 2004* product has been derived from the digital data captured during this program.

When data capture commenced, coastline and baseline information were captured concurrently. The coastline - defined as Mean High Water (MHW)- is closely related to the baseline and in many places (eg. along cliffs), coastline and baseline are identical. Baseline is defined as the location of the Lowest Astronomical Tide (the lowest water level which can be expected to occur under normal meteorological conditions), and proclaimed straight lines which endorse large bays and groups of islands.

Coastline digital data were derived from 1:100 000 scale reproduction material. The position of the coastline for the reproduction material has been determined using photography flown at, or near, the time of MHW.

Data were captured using manual digitising methods and AUTOMAP software. In 1991, coastline and baseline data were converted to GeoVision format. Both the coastline and additional State border information were then upgraded to conform with GEODATA specifications.

Geoscience Australia and the Royal Australian Survey Corps were the two main producers of the 1:100 000 scale National Topographic mapping series. Exceptions to this were two 1:100 000 scale sheet areas over Brisbane produced by the Queensland Department of Lands as part of the national 1:100 000 topographic coverage. Data covering Tasmania were derived from maps produced by NATMAP (now Geoscience Australia), and the Tasmanian Department of Lands (now Department of Environment and Planning). The coastline of Western Australia was captured by the Department of Lands and Surveys (now Department of Land Administration) from production material supplied by NATMAP.

Border information was sourced from survey monument data as well as the 1:100 000 scale topographic series. State borders coordinate data were supplied by various State and Territory survey agencies and Geoscience Australia. Where State borders follow natural features, data were captured from 1:100 000 scale mapping produced by Geoscience Australia of the Royal Australian Survey Corps.

Methods used to produce source material
Three sources of information were used to produce *GEODATA COAST 100K 2004*: topographic maps, government gazettals and coordinates of survey monuments.

State borders (where they follow natural features) and coastline data were captured from 1:100 000 scale topographic maps.

The topographic maps are based on overlapping aerial photographs that have been rectified to eliminate distortions caused by tilt of the aeroplane and camera during flight. The photographs were placed in a stereo plotter in which the operator could see a three-dimensional image. Using this image, the operator traced features, such as roads and streams onto drafting film. A compilation of the linework produced was then checked on the ground, corrections made, and additional information added.

The compilations were then pre-punched on a large format register punch. Reference grids and graticules were registered to the compilations on a separate layer of stable base drafting film. Each compilation was printed down on scribbling material as a guide for the cartographer to manually scribe the detail according the map specifications. Map detail was displaced if necessary to avoid overprinting and to ensure a cartographically acceptable product. Masks were cut on 'peelcote' type material to provide infill for area features, such as lakes, built-up areas etc.

A colour proof of the linework was used as a guide to type positioning on a clear film overlay. Type was added to the proof on completion of the overlay. The proof was thoroughly checked for accuracy, completeness and correct registration of detail. After proof corrections were carried out, the final reproduction material used for platemaking by the printer was produced. A few maps were produced using digital cartographic methods (computer data editing, plotting etc.) and photo-processing.

Where State borders are not defined by natural features or gazetted coordinates, they were derived from survey coordinates of monuments which mark the border on the ground. The coordinates were derived from survey observations consisting of azimuths, angles and distances connecting the points. These observations are a mixture of data from the original survey, more recent surveys re-establishing the original marked boundary, and single connections from nearby trigonometric stations to existing marks on the boundary. Remaining sections of State border were captured from source maps.

Where borders do not follow natural features or are not monumented on the ground, gazetted coordinates were used (eg. Victoria/Tasmania border).

Methods used to capture and structure the data
Coastline and State border data derived from maps were produced using a digitising table. It has electronic sensors that allow the user to establish a correlation between any point on the table and the map. The four corners of each map are 'registered' to the table and a cursor is then used to 'trace' features shown on the map. The table, and its associated software system, then transforms this into coordinates. Other survey coordinate data were supplied by the State authorities in hardcopy and digital form.

The files resulting from the digitisation processes were then built into a database production system for the feature coding, structuring and attributing of the data. As the database was built, the data were separated into specified layers and fully topologically structured. The point density of the data was filtered according to specified parameters. Overshoots and undershoots were corrected and the presence of gaps in the data checked by software.

Feature attributing was carried out using manual and automatic routines and unique feature identifiers were attached to facilitate 'change-only' update of features. Once the appropriate topology for each layer was generated and attributing completed, ORACLE RDBMS routines were run to test for valid and invalid values and for inconsistent combinations of attributes. Verification plots of the entire data base were produced for checking of completeness, accuracy and mutual correlation.

Total Quality Management
Procedures throughout the entire production process are designed to ensure that the data are produced right - first time, every time. The Total Quality Management system guarantees quality from the product planning stage, right through to product delivery to the client.

To ensure that the product meets the customers' needs, Geoscience Australia uses market research in the product development stage and incorporates customer feedback. Geoscience Australia's commitment to truth-in-labelling for GEODATA products (complete information on data quality) helps customers to use the data appropriately.

A detailed technical specification is developed for each GEODATA product. The technical specification is a controlled document. This means that only correct and current copies of the specification are available within Geoscience Australia. The technical specification is the basis for the development of production procedures and other documentation such as the Product User Guide.

Post-production verification and testing
After the production team completes work the data are dispatched for post-production verification and testing. A separate cell has been set up totally independent of the production areas to carry out the verification and testing. Whereas the production areas use Provec and GeoVision to produce the data, this verification and testing cell tests the correctness of the data using the ArcInfo GIS. The data are statistically sampled and tested to ensure compliance with all aspects of the technical specification. Aspects tested include topological integrity, completeness, positional accuracy, attribute accuracy and filtering.

Statistical sampling procedures are used to ensure that the data pass pre-determined conformance tests. For some tests, such as polygon closure, a zero failure tolerance is set. For other tests sufficient samples are tested to ensure that an error rate of less than 0.5% to 5% is permitted in the data.

If any data do not satisfy the conformance criteria they are sent back to the production area for reprocessing.

Positional accuracy
The positional accuracy of spatial objects is an estimate of the degree to which the planimetric coordinates and elevations of a feature instance agree with the true values or values accepted as being true. The measure of accuracy given for *GEODATA COAST 100K 2004* is the standard deviation.

Planimetric accuracy
A well-defined point is one which can be accurately identified on the source material and in the digital data. Most commonly the points used in tests are nodes at intersections. Geoscience Australia has carried out both error budget analysis and independent testing to verify the positional accuracy of the data.

GEODATA COAST 100K 2004 data comply with the following statement of planimetric accuracy: 'The summation of errors from all sources results in data with a standard deviation of 50 metres for well-defined points'.

Alternative and equal ways of expressing this error are:

- Not more than 10% of well-defined points are in error by more than 80 metres.
- In the worst case, a well-defined point is out of position by 150 metres.

An estimate of the standard deviation of planimetric error of each feature instance is given in the Data Quality Table. The value for point and linear features is generally 50 metres. A value of 9999 is used when the positional accuracy of the feature is not definable or not applicable. For example, the coordinates of a connector feature do not carry any meaning with respect to positional accuracy and so the value given is 9999.

Cartographic generalisation
Some of the feature instances digitised from the map production source material may have been subject to cartographic generalisation. Entities may be located on the earth's surface in such a way that they cannot be separated at the scale of the map. To ensure cartographic clarity, one feature is held in the correct position and the rest are displaced. The source material used for digitising does not indicate which feature has been displaced in the generalisation process. At the time of map compilation, a hierarchy of was used to determine which features were held in the correct position. Coastline was at the top of the hierarchy and it was therefore almost always in the correct position when it conflicted with features lower on the list.

The only time the coastline was likely to be displaced was where it is part of an island that is very close to the mainland. If generalisation was required, the coastline of the island would have been displaced in this instance.

Where a State border follows a watercourse, the border has been digitised so that it is coincident with the watercourse. This is despite the fact that the border may have been displaced slightly on the printed map so as not to obscure the watercourse feature. The watercourse itself may have been displaced if it was very close to a road or railway. A typical displacement in this case would be 20 metres.

Methods used to verify planimetric accuracy
The planimetric accuracy attainable in the GEODATA Topographic Vector data will be composed of errors from two sources:

- The positional accuracy of the source material; and
- Errors due to digitising.

This specification cannot prescribe a figure for the planimetric accuracy of the existing source material (repromat) used for capture of GEODATA as it has already been produced. There is an expectation that the source data complies with the following statement.

Not more than 10% of well-defined points will be in error by more than 0.5mm measured on the source material.

Statistically, this relates to a standard deviation on the map (S_{map}) of 0.31 mm.

The errors due to the digitising process depend on the accuracy of the digitising table set-up or the scanner resolution, systematic errors in the equipment, errors due to software and errors specific to the operator. An accepted standard for digitising is that the line accuracy should be within half a line width. The majority of features in GEODATA have a line width of 0.2 mm or greater. The half line width is taken as 0.1 mm and this is interpreted as one standard deviation (S_{data}) for the distribution of errors. The total statistical error from the source material and digitising process (S_{total}) discussed above is given by:

$$S_{total} = \sqrt{S_{map}^2 + S_{data}^2}$$

$$S_{total} = \sqrt{(0.31)^2 + (0.1)^2}$$

$$S_{total} = 0.33 \text{ mm}$$

This represents an error of 33 metres on the ground for *GEODATA COAST 100K 2004*.

A more conservative estimate of 50 metres for the standard deviation is used in any data quality information on this product.

Alternative and equal ways of expressing this error are:

- Not more than 10% of well-defined points are in error by more than 80 metres.
- The worst case error for the data is 150 metres.

In addition to this error budget analysis, the *GEODATA COAST 100K 2004* data were compared to the large scale mapping to check the planimetric accuracy. Well-defined points were identified in the *GEODATA COAST 100K 2004* data and 1:25 000 scale maps. This approach was limited to the areas in which this large scale mapping was available. The comparison of coordinates of 100 well-defined points resulted in a standard deviation of radial error of 21 metres, well within the figure determined by error budget analysis.

Attribute accuracy

Attribute accuracy is a measure of the degree to which the feature codes and their attribute values are correct. For this product attribute accuracy is a measure of the degree to which the attribute values of features agree with the information on the source material. The allowable error in attribute accuracy ranges from 0% to 5%, at a 99% confidence level.

Description of testing procedure used

Where less than 1% of attribute errors are permissible the entire population is tested. Where a less stringent limit is set for allowable errors, a random subset of the relevant features is generally tested. The sample size is determined from statistical tables using the known population size of the relevant feature.

The following table sets out the checks on the data and gives the test sample size and the allowable error.

Table 4: Attribute testing for *GEODATA COAST 100K 2004*

Attributes tested	Test sample size	Allowable error
Attribute values other than for UFI and Data Quality Pointer are within the valid ranges as specified in the Data Dictionary	full population	1%
Features have the correct feature code	full population	1%
The 'state' attribute of mainland and islands is correct	full population	0.5%
Islands have the correct island name	statistical subset	5%
Islands have the correct group name	statistical subset	5%

Logical consistency

Logical consistency is a measure of the degree to which data comply with the technical specification. Validating logical consistency may involve tests to check that table and file names are as set out in the Data Dictionary. Also included are graphical tests which check such things as intersections, polygon closure, minimum sizes of polygons and topological relationships.

The allowable error in logical consistency ranges from 0% to 5%, at a 99% confidence level.

Description of testing procedure used

The logical consistency of the data is tested using a mixture of UNIX scripts and ArcInfo commands. This checking is independent of the GeoVision production system.

Where less than 1% logical consistency errors are allowed the entire population is tested.

Where a less stringent limit is set, a random subset of the relevant features is tested. The sample size is determined from statistical tables using the known population size of the relevant feature.

The following table sets out the checks on the data and gives the test sample size and the allowable error for each check.

Table 5: Logical consistency checking for *GEODATA COAST 100K 2004*

Logical consistency check	Test procedure	Test sample size	Allowable error
Table names in the file are valid	UNIX script	full population	0.5%
Layer names and numbers in the file are valid	UNIX script	full population	0.5%
Network names and numbers in the file are valid	UNIX script	full population	0.5%
Field names in the file are correct	UNIX script	full population	0.5%
Linear features have more than one coordinate pair	UNIX script	full population	0.5%
Centroids and point features have only one coordinate pair.	UNIX script	full population	0.5%
Planimetric coordinates given in latitude and longitude are listed to a maximum of five decimal places	UNIX script	full population	0.5%
The ArcInfo coverages can be generated, with attributes attached, and can be 'built'	ArcInfo program	full population	0.5%
There are no coincident line segments in a single coverage, or intersecting arcs without a node, or double digitised points.	ArcInfo program and UNIX script	full population	1%
There are no label errors in polygon coverages, i.e. every polygon has one and only one polygon label point.	ArcInfo program	full population	0.5%
There are no pseudo nodes, i.e. nodes separating arcs with the same attributes excepting the UFI.	ArcInfo program	full population	2%
There are no overshoots, i.e. arc overhangs at intersections.	ArcInfo program	full population	1%
There are no undershoots in polygon coverages, i.e. arcs failing to meet at intersections.	ArcInfo program	full population	0.5%
In polygon coverages there are no collapsed polygons or small polygons that do not exist on the map	ArcInfo program	full population	1%
No arcs separate polygons with identical attributes, except for the UFI number, i.e. abutting polygons do not have the same attributes	ArcInfo program	full population	1%
Line segments are greater than 20 metres long	UNIX script	full population	5%
Line segments are less than 8 000 metres long	UNIX script	full population	5%
At line intersections there are no artefacts such as spikes or deviations visible at 1:50 000 scale	on-screen	statistical subset	5%
There are no spot elevations in the sea	on-screen	full population	1%
Unique feature identifiers (UFIs) are valid	ArcInfo program and filing index	full population	1%
All features have a valid data quality pointer	ArcInfo program	full population	2%
In the data quality table the data quality pointer values are unique.	on-screen	full population	0.5%
The Data Quality Statement file is correct.	on-screen	full population	1%
Closing lines consist of only one segment.	ArcInfo program	full population	1%
The tile edge is correctly densified.	on-screen	full population	1%
The attributes of map number, edition and authority are correct.	on-screen	statistical subset	1%

Completeness
Completeness is a measure of the degree to which all features listed in the technical specification have been captured, in accordance with the selection criteria, definitions and other rules specified. The primary data source has been mainly NTMS 1:100 000 scale map production material, with supplied survey coordinates from relevant State authorities. Only features listed in the *GEODATA COAST 100K 2004* data dictionary have been captured from the map source material.

Description of testing procedure used
The completeness of the data is tested by overlaying symbolised plots of the digital data on the source material and carrying out a visual comparison.

It is allowable for up to 1% of features to be missed in data capture. A random subset of the relevant features is tested, the sample size being determined from statistical tables using the known population size of the relevant feature.

Table 6: Completeness checking for *GEODATA COAST 100K 2004*

Completeness check	Test procedure	Test sample size	Allowable error
All features on the source material that should be shown as per the selection criteria are shown	plot	statistical subset	1%

6.3 Data Quality Table

The Data Quality Table is a look-up table which contains data quality information about each feature instance in the dataset. There is Data Quality Table per data file. The link between the table and each feature instance is the Data Quality Pointer and is shown in the figure below.

Attribute	Attribute value
Feature (FEAT_CODE)	Coastline
Coastline Type (COAST_CODE)	1
State (STATE_CODE)	3
→ Data Quality Pointer (Q_INFO)	AE000664
Unique Feature Identifier (UFI)	AE00006566

Data quality pointer	Feature reliability	Attribute reliability	Planimetric accuracy	Elevation accuracy	Map number	Edition number	Authority
→ AE000664	01/01/1981	01/03/2004	50	9999	9028	1	10
AE000665	01/01/1981	01/03/2004	50	9999	9232	1	10
AE000666	01/01/1981	01/03/2004	50	9999	9332	1	10
AE000667	01/01/1981	01/03/2004	50	9999	9333	1	10

Figure 15: Attribute and data quality pointer relationship

The attribute content of this table is described in the following table (aut_lut.e00 or aut_lut.dbf)

Table 7: Description of attributes within the Data Quality Table

Attribute	Description
DATA QUALITY POINTER (*q_info*)	An index value held in the data quality pointer attribute. This is the link field to the primary attribute table.
FEATURE RELIABILITY (*feat_rel*)	Date of photography, field verification or other event which verified the existence of the feature. Only month and year information are significant. The default will be the first day of the respective month. If the month us not known then the default is 1 January of that year. If unknown, a date of 01/01/1901 is recorded.
ATTRIBUTE RELIABILITY (*att_rel*)	Date on which attribute information of the feature was last verified. If one attribute of the feature is amended it is assumed that all attributes have been verified. The default will be the first day of the respective month. If the month us not known then the default is 1 January of that year. If unknown, a date of 01/01/1901 is recorded.
PLANIMETRIC ACCURACY (*plan_acc*)	The accuracy of the horizontal position in metres of a feature on the map sheet used as source material. If a planimetric accuracy for the feature is not applicable, relevant or cannot be reliably quoted then this field shall contain 9999.
ELEVATION ACCURACY (*elev_acc*)	The accuracy of the elevation in metres of a feature on the map sheet used as source material. This information is not relevant to *GEODATA COAST 100K 2004* and the field will always contain 9999.
MAP NUMBER (mapno)	The map number of the 1:100 000 NTMS sheet in which the feature is located.
EDITION NUMBER (edition)	The edition number of the source material. If not edition number is shown on the source material then it is assumed to be a first edition. If the source material is unpublished or the data are survey coordinates or closing lines, the '0' is recorded.
AUTHORITY (authority)	The producer of the source material. The following codes have been used: 1. Australian Capital Territory, Department of Environment, Land and Planning. 3. New South Wales, Land Information Centre, Department of Conservation and Land Management. 4. Northern Territory, Department of Lands and Housing. 5. Queensland, Department of Lands. 6. South Australia, Department of Lands. 7. Tasmania, Department of Environment and Planning. 8. Victoria, Department of Finance, Survey and Mapping Division. 9. Western Australia, Division of Mapping and Surveying, Department of Land Administration. 10. Geoscience Australia, Department of Industry, Tourism and Resources. 11. Royal Australian Survey Corps, Department of Defence.

Appendix A: Metadata

Note: This dataset description is metadata (data about data) which describes the actual dataset in accordance with the ANZLIC (Australia New Zealand Land Information Council) Core Metadata Guidelines Version 2.

Dataset citation

ANZLIC unique identifier: ANZCW0703006621

Title: GEODATA COAST 100K 2004

Custodian

Custodian: Geoscience Australia

Jurisdiction: Australia

Description

Abstract:

GEODATA COAST 100K 2004 is a vector representation of the topographic features depicting Australia's coastline, and State and Territory borders. It provides a fundamental layer on which you can build a wide range of applications.

The coastlines component is primarily sourced from the 1:100 000 scale National Topographic Map series produced by Geoscience Australia and the Royal Australian Survey Corps. The coastline represents the position of the Mean High Water, the seaward edge of coastal mangroves, inlet closing lines and those parts of the coastline defined as indefinite.

ANZLIC search words:

- BOUNDARIES Administrative Mapping
- MARINE Coast Mapping

Geographic extent name:

AUSTRALIA EXCLUDING EXTERNAL TERRITORIES - AUS - Australia - Australia
Note: The format for each Geographic extent name is: Name - Identifier - Category - Jurisdiction (as appropriate) See GEN Register

Geographic bounding box:

North bounding latitude: -9°
South bounding latitude: -44°
East bounding longitude: 154°
West bounding longitude: 112°

Data currency

Beginning date: Not Known

Ending date: 2004-04-01

Dataset status

Progress: Complete

Maintenance and update frequency: Not Planned

Access

Stored data format:
Digital: ArcInfo

Available format type:
Digital: ArcInfo Export
Digital: ArcView Shapefile
Digital: MapInfo mid/mif

Access constraints:
The data are subject to Copyright. Data files may be downloaded from Geoscience Australia's website at http://www.ga.gov.au/products. A licence agreement is required.

Data quality

Lineage:
The coastline component of the *GEODATA COAST 100K 2004* product is primarily sourced from the 1:100 000 scale National Topographic Map Series produced by Geoscience Australia and the Royal Australian Survey Corps. Two 1:100 000 scale sheet areas over Brisbane were produced by the Queensland Department of Lands. Data covering Tasmania were derived from maps produced by NATMAP (now Geoscience Australia - National Mapping Division) and the Tasmanian Department of Lands (now Department of Environment and Planning). The coastline of Western Australia was captured by the Department of Lands and Surveys (now Department of Land Administration) from reproduction material supplied by NATMAP. The positions of the State and Territory borders were mainly derived from survey coordinate data and the 1:100 000 scale topographic series. The coordinate data were supplied by various State and Territory survey agencies and Geoscience Australia. Where State borders follow natural features, data were captured from 1:100 000 scale mapping produced by Geoscience Australia or the Royal Australian Survey Corps.

NOTE: The use of survey data in *GEODATA COAST 100K 2004* does not imply that the data are suitable for any legal interpretation of State/Territory borders.

Positional accuracy:
GEODATA COAST 100K 2004 data complies with the following statement of horizontal accuracy: "The summation of errors from all sources results in data with a standard deviation of 50 metres for well defined points". Alternative and equal ways of expressing this error are: Not more than 10% of well-defined points are in error by more than 80 metres; and In the worst case, a well defined point is out of position by 150 metres.

Attribute accuracy:
For the *GEODATA COAST 100K 2004* product, attribute accuracy is a measure of the degree to which the attribute values of features agree with the information on the source material. The allowable error in attribute accuracy ranges from 0.5% to 5% at a 99% confidence level. Where less than 1% of attribute errors are permissible the entire population is tested. Where a less stringent limit is set for allowable errors a random subset of the relevant features in the tile is generally tested. The sample size is determined from statistical tables using the known population size of the relevant feature. A full description of the checks on the data, the test sample size and the allowable error are provided in the Product User Guide supplied with the data.

Logical Consistency:
For the *GEODATA COAST 100K 2004* product, logical consistency is a measure of the degree to which data complies with the technical specifications. The data were tested using a mixture of UNIX scripts and ArcInfo commands which were independent of the production system. Graphical tests were used to check such things as intersections, polygon closure, minimum size of polygons and topological relationships. A full description of the checks on the data, the test procedure, test sample size and the allowable error are provided in the Product User Guide supplied with the data.

Completeness:
Only features listed in the *GEODATA COAST 100K 2004* data dictionary have been captured from the map source material. The completeness was tested by overlaying symbolised plots of the data on the source material and carrying out a visual comparison.

Contact information

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Metadata information

Metadata date: 2004-09-01

Additional metadata

Metadata reference XHTML: http://www.ga.gov.au/meta/ANZCW0703006621.html

Metadata reference XML: http://www.ga.gov.au/meta/ANZCW0703006621.xml

Size of dataset: 21.9 - 28 MB depending on the format

Scale/resolution: 1:100 000

Projection/datum: Geographical coordinates using the Geocentric Datum of Australia 1994 (GDA94)

Glossary

Attribute
A descriptive characteristic of a feature. An attribute has a defined set of attribute values.

Attribute object
The attribute object holds the non-locational or semantic information about the feature instance.

Australian Geodetic Datum 1966 (AGD66)
This datum was adopted in 1966 and is defined by the parameters of the Australian National Spheroid and the coordinates of the Johnston Geodetic Station. This datum is used for the determination of coordinates for some Geoscience Australia products. Superseded by the Geocentric Datum of Australia (GDA94).

Chain
A line composed of a sequence of non-intersecting line segments bounded by nodes. Chains reference the polygons to the left and right of the chain.

Connector feature
An artificial linear feature used to connect a linear network across an area feature.

Data Quality Statement
A text file which carries information about the quality of the spatial data contained in each tile of a data transfer.

Datum
A mathematical surface from which heights or positions are referenced.

Entity
A real world phenomenon which cannot be divided into phenomena of the same type.

Entity class
A group of entities of the same kind, matching the members of a feature class.

Entity point
An entity point is used to locate point entities represented by a point because of the scale of the source material.

Feature
A feature is the cartographic or digital representation of a class of entity.

Feature class
A feature class is a group of feature instances defined by a set of rules and having common attributes and relationships that are the properties of the corresponding real world phenomena.

Feature instance
A single occurrence of a feature which has a unique set of spatial and attribute object values.

Generalisation
A process which may involve the selection, displacement, simplification, exaggeration or aggregation of features from their true position for the sake of cartographic clarity.

GEODATA
Geoscience Australia's brand of high quality digital data products for use in Geographic Information Systems (GIS).

Geodetic datum

A datum defines the basis of a coordinate system. A local or regional geodetic datum is normally referred to an origin whose coordinates are defined. The datum is associated with a specific reference ellipsoid which best fits the surface (geoid) of the area of interest. A global geodetic datum is now related to the centre of the earth's mass, and its associated spheroid is a best fit to the known size and shape of the whole earth. The position of a point common to two different surveys executed on different geodetic datums will be assigned two different sets of geographical coordinates.

Geographical coordinates
A position given in spherical coordinates commonly known as latitude and longitude.

Geographic Information System (GIS)
A spatial database which is manipulated via a set of spatial operators or commands.

Latitude
The latitude of a feature is its angular distance on a Meridian, measured northwards or southwards from the terrestrial Equator.

Layer
The features in a theme are subdivided into one or more layers on the basis of the spatial objects used to represent the features. Linear networks, polygons and point features are placed in separate layers.

Linear network
A layer consisting of linear features which are connected and which form a pathway along which movement is possible.

Longitude
An angular distance measured east or west from a reference meridian (usually Greenwich) on the earth's surface.

MHW
Mean High Water

National Topographic Map Series (NTMS)
A civilian map series comprising a set of consistent topographic maps nationwide, at scales of 1:100 000 and 1:250 000.

NATMAP
Geoscience Australia's brand for its popular topographic map range.

Node
A point that is a junction of two or more chains or which is the end point of a chain. Connectivity of chains is indicated by the sharing of nodes at their intersections.

Node/chain structure
The structuring of linear features in a layer so that they consist of chains broken by nodes at intersections or at the point where an attribute of the feature changes.

Point
A geometric representation defined by a single (x,y) coordinate pair or an (x,y,z) triplet.

Polygon
A continuous area defined by a set of bounding chains. There is only one external polygon and there may be one or more internal, non-nested inner boundaries.

Polygon label point
A point within a polygon feature instance used to locate labels or information about that polygon. This point is sometimes known as a centroid.

Positional accuracy

Statistical estimate of the degree to which planimetric coordinates and elevations of features agree with their real world values.

Primary Attribute Table
A data table which contains information directly related to the feature instance.

Repromat
Colour-separated reproduction material on a stable base used for the printing of maps.

Secondary Attribute Table
Additional descriptive information about a feature instance which is related to the feature instance by way of information in the primary attribute table.

Segment
A direct line between a pair of points or a point and a node.

Spatial object
The spatial object holds the locational information of a feature instance. It is composed of either a point, chain or polygon.

State border
Boundary defining the division of the Commonwealth of Australia into State/Territory administrations.

Survey monument
A marked survey point identifying on the ground the position of State/Territory borders.

Theme
The information contained in map production material can be divided into themes which contain logically related geographic information. Each theme is capable of being used as a dataset in its own right.

Tile
The area of a spatial database included in a data transfer.

Tile edge
An artificial linear feature which indicates the boundaries of the tile. The tile edge closes off polygon features which are situated in more than one tile.

Topological integrity
The measure of how well spatial data conform to the sophisticated data structure required for GIS, especially with respect to connectivity and adjacency.

Unique Feature Identifier (UFI)
An attribute code which is unique to each entity and is attached to every feature instance. It is primarily used to facilitate 'change only' updates.

Vector Data
Vector data uses points and straight lines (vectors) to describe features on, or characteristics of, the earth's surface. Vector data can also include polygons, which are areas enclosed by a number of vectors. To record additional information, data attributes can be attached to individual vector features.

Vertex
The connecting point of two line segments.

WGS84
World Geodetic System 1984. A geocentric datum developed by the United States Department of Defense for use with GPS. For most practical purposes it is equivalent to GDA94.