PRODUCT DESCRIPTION

Vicmap Elevation

DTM 20m, DTM 10m

Spatial Information Infrastructure
Information Business Technology
Department of Sustainability and Environment

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CONTENTS

1. PRODUCT DESCRIPTION ................................................................................................................................................................. 1
   CUSTODIAN ...................................................................................................................................................................................... 1
   JURISDICTION ................................................................................................................................................................................... 1
   CONTACT INFORMATION .................................................................................................................................................................... 1
   DESCRIPTION .................................................................................................................................................................................... 2
   PRODUCTION AND/OR ACQUISITION METHODS ................................................................................................................................. 4
   SOURCE .......................................................................................................................................................................................... 5
   GENERALISATIONS WITHIN THE DATA ........................................................................................................................................ 5
   DATA CREATION DATES ..................................................................................................................................................................... 5
   MAINTENANCE AND UPDATE FREQUENCY .................................................................................................................................. 5
   STANDARDS AND SPECIFICATIONS ............................................................................................................................................... 6
   LEGISLATIVE REQUIREMENTS ...................................................................................................................................................... 6
   FUTURE PLANS .................................................................................................................................................................................. 6
   DATA SCHEMA ................................................................................................................................................................................ 6
   DATA DICTIONARY ............................................................................................................................................................................. 7
   BUSINESS REQUIREMENTS .............................................................................................................................................................. 8
   AREAS OF APPLICATION ............................................................................................................................................................. 9

2A. QUALITY OF VICMAP ELEVATION DTM 20M AND DTM 10M ........................................................................................................ 10
   LINEAGE/HISTORY ......................................................................................................................................................................... 10
   DATA QUALITY STATEMENT ........................................................................................................................................................... 11
   SPATIAL ACCURACY ........................................................................................................................................................................ 12
   FEATURE AND ATTRIBUTE ACCURACY (THEMATIC ACCURACY) .................................................................................................. 12
   COMPLETELESS ............................................................................................................................................................................... 12
   LOGICAL CONSISTENCY ................................................................................................................................................................. 12
   POST-PRODUCTION VALIDATION ................................................................................................................................................ 12

2B. MINIMUM QUALITY STANDARD .................................................................................................................................................... 12
   PROPOSED/REQUIRED QUALITY ASSURANCE APPLICATIONS ..................................................................................................... 12

3. METADATA .................................................................................................................................................................................... 13

4. PRICING ........................................................................................................................................................................................ 13

5. ACCESS ....................................................................................................................................................................................... 13

GLOSSARY ......................................................................................................................................................................................... 14

APPENDIX A ...................................................................................................................................................................................... 21
   EXTENT OF DTM 10M PRODUCT ................................................................................................................................................. 21

APPENDIX B ..................................................................................................................................................................................... 22
   LOCATION OF HIGH RESOLUTION SOURCE DATA .................................................................................................................................. 22
1. PRODUCT DESCRIPTION

CUSTODIAN

Spatial Information Infrastructure
Information Business Technology
Department of Sustainability and Environment

JURISDICTION

State of Victoria

CONTACT INFORMATION

Custodian

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Supply Enquiries

Vicmap Products are available through:

- for purchase of small packets/areas of selected products online, go to www.land.vic.gov.au/vicmapdata
- for larger quantities of Vicmap, refer to one of our Data Service Providers, listed at www.land.vic.gov.au/vicmapdsp

E-Mail Enquiries

vicmap.info@dse.vic.gov.au

Internet site for information

DESCRIPTION

Geographic Extent
Vicmap Elevation DTM 20m coverage extends across the whole of Victoria and extends 10 kilometres into bordering states.

- Vicmap Elevation DTM 10m coverage is **not statewide** as shown in Appendix A.

Content

Vicmap Elevation contains several datasets:

- 10-20 Contours & Relief represents Victoria’s elevations in the form of contours, spot heights and surface features including cliffs, embankments and rock outcrops among others. The 10-20 metre contours and spot heights are the source datasets used to create Vicmap DTM 20m and DTM 10m.

- 1-5 Contours & Relief is an elevation dataset sourced from Melbourne Metropolitan Board of Works surveys conducted in the 1974 and 1980s. This dataset enables a more detailed contour overlay of the Melbourne metropolitan area.

- DTM 20m and DTM 10m; digital terrain model (DTM).

This product description details the DTM 20m and DTM 10m products only. For more information on the other Elevation products please see their respective product descriptions and metadata entries.

Vicmap Elevation contains two DTM products which are a raster representation of Victoria’s elevation.

1. DTM 20m with a spatial resolution (pixel size) of 20m including a lakes mask.
2. DTM 10m with a spatial resolution of 10m including a lakes mask

- The spatial resolution dictates the scale at which they can be used for.

A map is included in Appendix B to provide users with the location of high resolution source data.
Structure
Both DTM 20m and DTM 10m are raster datasets where each pixel represents the average elevation of the pixel. They may be supplied in various file formats. Each dataset is stored as a 32bit floating raster.

Features
- Both DTMs are constructed from source data of various resolutions, accuracies and ages to produce an improved DTM containing increased detail in localised areas. This source data includes Vicmap Elevation, Vicmap Hydro and other higher resolution datasets.
- The DTMs are hydrologically enforced and correctly defines the natural surface drainage and hydrological flow.
- A separate lake mask has been produced which enables users the choice of using the DTMs representing lake/reservoir bed information (where exists) or representing the lakes or reservoirs at full supply level. The lake mask is also hydrologically enforced.
- The process of generating the DTMs identified numerous errors in the source Vicmap products. These errors, where resolved have been corrected in the source data to improve Vicmap Elevation and Vicmap Hydro.
- Seamless storage of data (non-tiled) of Victoria’s landmass.
- A map showing location of high resolution source data.
- Not all elevation datasets used to produce the DTMs are available in their original high resolution format.

Reference Systems
The datum used in the construction and maintenance of Vicmap Elevation DTM 20m and DTM 10m is the Geocentric Datum of Australia. Data is held in Vicgrid94 (eastings / northings) computed in terms of the GDA at 01 January 1994 (GDA94).

Related Datasets
Product is part of the State of Victoria’s framework information. VGIS framework information datasets have been delivered into the following Vicmap Products, identified below:
- Vicmap Address,
- Vicmap Admin,
- Vicmap Crown Land Tenure,
- Vicmap Elevation - 10-20 Contours & Relief
- Vicmap Elevation - 1-5 Contours & Relief
- Vicmap Elevation - DTM 10m
- Vicmap Elevation - DTM 20m
- Vicmap Features,
- Vicmap Hydro,
- Vicmap Imagery - Aerial Photography 2005-08
- Vicmap Imagery - Satellite,
- Vicmap Planning,
- Vicmap Position,
- Vicmap Property,
- Vicmap Lite,
- Vicmap Topographic,
- Vicmap Transport,
- Vicmap Vegetation
PRODUCTION AND/OR ACQUISITION METHODS

Original Construction of the Datasets

1. Data Acquisition, Validation and Preparation

Vicmap Elevation and Vicmap Hydro are the two primary Vicmap source datasets along with high resolution datasets provided by State and Local Government, Water Authorities, Catchment Management Authorities and Private Industry. This data does not only include elevation data but also hydrological information for rivers, streams and lakes.

All data is prepared and validated for inclusion to the DTM. This includes:

- checking that a data source has the required attributes, and topology
- aligns appropriately to other data sources i.e. watercourses and contours
- that hydrological data contains flow direction and stream connectivity
- identifying gross errors for height values.
- ensuring all contours are correctly edge matched.
- comparison of heights across datasets

2. DTM Generation

The DTM generation was completed by processing river basins (catchments), with each basin being further tiled to 40km square tiles. The methodology used both ANUDEM and TIN processes. The creation of specialized datasets, like the generation of height attributed ridge lines and stream networks assisted in controlling the DTM when using ANUDEM.

The DTM surface of lakes and reservoirs represents a full supply level except where lake bed information is available. This is generally only for the larger lakes and reservoirs. A lakes mask has been produced for users wishing to use a DTM with all lakes and reservoirs being represented at full supply level. Both versions, however still remain hydrologically enforced.

Throughout the DTM generation the output was regularly checked to identify and resolve errors then the DTM regenerated. Vicmap data errors, where applicable, were changed in the original source data.

3. Quality Assurance

On completion of each basin the DTM undergoes a series of quality assurance (QA) checks. These checks include:

- the comparison of a generated TIN and the final DTM derived from ANUDEM
- the flow of major streams and rivers
- identify any non-lake sinks and fill
- checks against original contour datasets
- edge matching of neighbouring basins for height values and hydrological flow.

DTMs were recreated if required to resolve the errors found.
SOURCE

Content had been supplemented and/or verified with information supplied by:

- Local Government
- Melbourne Water
- Catchment Management Authorities
- National Aeronautical and Space Agency (NASA)
- Sunrise 21
- Department of Sustainability and Environment
  - Forests
  - Water Sector
  - Coordinated Imagery Program
- Not all elevation datasets used to produce the DTMs are available in their original high resolution format.

GENERALISATIONS WITHIN THE DATA

A separate lake mask has been produced which enables users the choice of using the DTMs representing lake/reservoir bed information (where exists) or representing the lakes or reservoirs at full supply level.

DATA CREATION DATES

Vicmap Elevation DTM 20m and DTM 10m consists of a wide variety of input source data varying in currency from 1974 to 2006.

MAINTENANCE AND UPDATE FREQUENCY

Currently there is no ongoing program to routinely maintain Vicmap Elevation DTM 20m and DTM 10m. However, significant errors produced through the DTM generation process could be resolved depending on the severity of the impact to the surrounding area.

To further improve/update the DTM products, high resolution elevation datasets or significant updates to Vicmap source data are required. Currently, high resolution datasets are acquired through user demand under license for inclusion into the DTM products.

As the DTMs are generated based on river basins, sufficient newer or updated datasets located within a single basin must be available prior to creating a new DTM. Therefore maintenance/updates are undertaken on an as-needs basis.
STANDARDS AND SPECIFICATIONS

Conformity is sought with relevant proportions of existing and draft standards and specifications. For example

- Relevant Australian (AS/NZS) Standards
- ISO 19100 series as they become adapted by Standards Australia and the user community.
- The outputs of working groups under the auspices of ICSM, ANZLIC and other industry organisations.

Where these standards have been found to be deficient or non-existent to Spatial Information Infrastructure requirements suitable modifications will have been made.

LEGISLATIVE REQUIREMENTS

- This dataset has not been constructed as the requirement of any Commonwealth or State legislation.
- The use and distribution of Vicmap Elevation must comply with the Information Privacy Act 2000 (Victoria) and the Privacy Act 1988 (Commonwealth)

FUTURE PLANS

- Several datasets derived from the DTMs are currently being considered. Such datasets may include Slope, Aspect, Hypsometric Tint.
- Integration with other Vicmap Digital data sets (Vicmap Hydro, Property and others). As part of Spatial Information Infrastructure’s spatial data framework strategy, work will continue to make all Vicmap products more closely aligned, particularly in terms of vertical topology.
- The Victorian Geospatial Information Strategy (VGIS) will provide through the Information Infrastructure Initiative (III) a basis for further development and closer alignment of the State’s key data sets, for example the promotion of the Victorian Spatial Data Directory, use of metadata, metadata tools, pricing and custodianship.
- ‘Anomaly Advice Notices’ (Internet-based forms for feedback) are being developed. Work is being undertaken to further encourage client input and the processing of such information including: clearer and easier-to-use advice notices and facility for electronic submission.

DATA SCHEMA

Data Structure

Vicmap Elevation DTM 20m and DTM 10m are a derived raster representing the elevation of Victoria derived from a variety of source datasets. It is composed of an array (rows and columns) of square pixels each representing an equal area defined by the length of the sides of the pixels. The pixel size for Vicmap Elevation DTM 20m is 20 meters and for DTM 10m is 10 meters. Each dataset is stored as a 32bit floating raster.

The pixels are contained in a grid or image file. Depending on the grid or image format, an additional header file may be required to correctly locate the DTM. This varies depending on the software application being used.

The value of the pixel represents the average height across the individual pixel. The combination of these pixels produces a surface representing height.
Spatial Data Integrity

Vicmap Elevation DTM 20m and DTM 10m are hydrologically correct when used in its native projection and format. Reprojecting, changing format or resampling causes changes in the DTM and therefore the DTM may not remain hydrologically correct. The best option is to reproject other vector datasets to Vicgrid94 and reproject the end result back to required projection.

DATA DICTIONARY

The data dictionary applicable to the Vicmap Elevation model is also located on the Victorian Government website www.land.vic.gov.au/spatial.

<table>
<thead>
<tr>
<th>68% Accuracy</th>
<th>See Root Mean Square Error.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASCII Data</td>
<td>Data which is stored in an ASCII or Text format where each line represents a record. Usually will have a set of coordinates to accompany each line.</td>
</tr>
<tr>
<td>Bilinear Interpolation</td>
<td>A resampling method that uses a weighted average of the four nearest cells to determine a new cell value. This will smooth the resulting DTM and is used for resampling continuous datasets.</td>
</tr>
<tr>
<td>Cubic Convolution</td>
<td>A technique for resampling raster data in which the average of the nearest 16 cells is used to calculate the new cell value. This will smooth the resulting DTM and is used for resampling continuous datasets.</td>
</tr>
<tr>
<td>Date of Acquisition</td>
<td>The date on which the elevation data was captured</td>
</tr>
<tr>
<td>DTM</td>
<td>A Digital Terrain Model (DTM) is a representation of continuous elevation values over a topographic surface by a regular array of z-values, which represents the earth’s terrain</td>
</tr>
<tr>
<td>Image, Grid, Raster</td>
<td>A dataset composed of rows and columns of data cells</td>
</tr>
<tr>
<td>Nearest Neighbour</td>
<td>A technique for resampling raster data in which the value of each cell in an output raster is calculated using the value of the nearest cell in an input raster. This technique is often used for the resampling of thematic raster data.</td>
</tr>
<tr>
<td>Resampling Kernel</td>
<td>Mathematical filtering model or pixel array used to modify the values of a DTM.</td>
</tr>
<tr>
<td>Resolution</td>
<td>A measure of the amount of detail that can be seen in a DTM.</td>
</tr>
<tr>
<td>Root Mean Square Error (RMSE)</td>
<td>Indicates how accurate a dataset is both horizontally and vertically by measuring the difference between the outputs to an input (base). The lower the error the more accurate the data. This is sometimes known as accuracy at 68% Confidence Level.</td>
</tr>
<tr>
<td>Source Data</td>
<td>Dataset representing the original elevation files. These may be vector, raster or ASCII files.</td>
</tr>
<tr>
<td>Shuttle Radar Topography Mission (SRTM)</td>
<td>The Shuttle Radar Topography Mission (SRTM) obtained elevation data on a near-global scale to generate the most complete high-resolution digital topographic database of Earth</td>
</tr>
<tr>
<td>Triangulated Irregular Network (TIN)</td>
<td>A vector data structure that partitions geographic space into a contiguous, no overlapping triangles. The vertices of each triangle are data points with x, y and z values. TINs are used to store and display surface models.</td>
</tr>
<tr>
<td>Type</td>
<td>The method which the elevation data was captured. These may include LiDAR, Photography, RADAR, etc.</td>
</tr>
<tr>
<td>Vector Data</td>
<td>Spatial data in which the location of features is defined in the terms of points, lines and polygons (vector).</td>
</tr>
</tbody>
</table>
BUSINESS REQUIREMENTS

Usage or Availability Restrictions

Product/s will be provided under the terms and conditions of an annual licence.

Licence Restrictions/Conditions

Vicmap products will be supplied under licence with a once off annual licence fee determined by the coverage. Details are recorded in a Schedule appended to the Licence. The Licensee may use the Data only for internal business use. There is no transfer of title or ownership in the Data, and the copyright and intellectual property in the Data remains the property of the State.

Access Constraints

Subsidies are available under specific circumstances. - Contact Spatial Information Infrastructure for details.

Exclusion of Liability

Spatial Information Infrastructure makes every effort to provide and maintain accurate, complete, useable and timely digital land information. However, some product versions may be preliminary in nature and presented prior to final review and approval by the Director of SII. The data and information are provided with the understanding that they are not guaranteed to be correct or complete. Users are cautioned to consider carefully the provisional nature of the data before using it for decisions that concern personal or public safety or the conduct of business that involves substantial monetary or operational consequences. Conclusions drawn from or actions undertaken on the basis of this data are the sole responsibility of the user.

Spatial Information Infrastructure does not warrant that this Product Description and the data are free from errors or omissions. Also, Spatial Information Infrastructure shall not be in any way liable for any loss, damage or injury suffered by the licensed user of the data of this Product Description or any other person or organisation consequent upon or incidental to the existence of errors or omissions in the data or this Product Description.

Privacy Statement

This Vicmap product is protected by copyright under the *Copyright Act 1968 (Commonwealth)*. The dataset is appropriately labelled with copyright information and the removal or degradation of this labelling is an offence under the *Copyright Amendment (Digital Agenda) Act 2000 (Commonwealth)*.

Vicmap data fields relate solely to parcels of land.

Where any use of this land data is linked or related to other data causing the identification of an individual the user must comply with appropriate state or federal legislation.
Supply Format
- Native format – ESRI Grid,
  - 32bit Floating

Supply format will be by negotiation with your supplier. Other formats available upon application and may include:
- ESRI files including
  - Interchange File, (e00)
  - ASCII
- TIFF
- XYZ ASCII, either tab, space or comma delimited

Media Format
- CD-ROM
- DVD
- Email (less than 10Mb)
Other media formats available upon application.

Projections
- Native projection- Vicgrid94
  - Geocentric Datum of Australia – 1994 Adjustment (GDA94)
  - Eastings and Northings
  Others on request

Vicmap Elevation DTM 20m and DTM 10m are hydrologically correct when used in it's native projection and format. Reprojecting, changing format or resampling causes changes in the DTM and therefore the DTM may not remain hydrologically correct. The best option is to reproject other vector datasets to Vicgrid94 and reproject the end result back to required projection.

AREAS OF APPLICATION
- Catchment hydrological modelling
  - Catchment definition
  - Stream modelling
  - Floodplain modelling
  - Climate change analysis

- Salinity modelling and prediction
  - Salinity Modelling
  - Wetness Index
- Landscape modification analysis
- Erosion Risk
- Communication modelling
- Ortho-rectification of imagery
- Terrain visualisation

Note: Many applications will require the input of user specific data, eg. Watercourse lines, planning polygons, land use information etc.
2A. QUALITY OF VICMAP ELEVATION DTM 20M AND DTM 10M

LINEAGE/HISTORY

Vicmap Elevation DTM 20m and DTM 10m products have been developed as a joint project through the National Action Plan for Salinity and Water in conjunction with DSE and Sinclair Knight Merz.

The methodology utilizes a combination of ArcInfo TIN and ANUDEM processes to ensure that stream enforcement is achieved while maintaining a DTM which closely conforms to the original input data. The following is a summary of the flow or processes used to create both DTMs. More information on the methodology can be found in the chapter titled *Original Construction of the Datasets*.

1. Data Acquisition, Validation and Preparation
2. DTM Generation
3. Quality Assurance

Existing contour, DTMs, and water data of various accuracies and resolutions were sourced from both the private and public sector and includes:

- Vicmap Elevation
- Vicmap Hydro
- LiDAR and Photogrammetry derived DTMs and contours.
- Survey Marks Enquiry Service
- Reservoir Supply Levels
- Lake Heights
- Shuttle Topography Radar Mission (SRTM)

Currently there is no ongoing program to routinely maintain Vicmap Elevation DTM 20m & DTM 10m. However, significant errors produced through the DTM generation process could be resolved depending on the severity of the impact to the surrounding area. For more information on the maintenance of this product please refer to the chapter titled *Maintenance And Update Frequency*. 
DATA QUALITY STATEMENT

Fitness for Purpose

- Although some higher order accuracy occurs in pockets, the data is primarily derived from mapping compiled at 1:480 and 1:500 (metropolitan Melbourne), 1:2,500, 1:10,000 and 1:25,000 scales. Use of the data is therefore logically suited to applications at the same or smaller scale to that of the source. Any enlargement or extrapolation of the data will result in proportionally increased visual displacement and/or errors of the same order of magnitude in any analytical outcomes.

- The quality of Vicmap DTM 20m and DTM 10m and its source data is compliant with its technical specifications and rules associated with its technical specifications and rules associated with the capture, dependant on scale and limitations brought about by topography and visual impedance due to vegetation cover.

- Vicmap Elevation DTM 20m and DTM 10m are hydrologically correct when used in its native projection and format. Reprojecting, changing format or resampling causes changes in the DTM and therefore the DTM may not remain hydrologically correct. The best option is to reproject other vector datasets to Vicgrid94 and reproject the end result back to required projection.

- Additional high resolution datasets has significantly improved accuracy and quality of the DTMs in selected areas.

- The currency of the data is based upon the date of the source data used. The collection period for source elevation data is 1974 to 2006.

Proposed / Required Quality Assurance Applications

SII is continually improving and extending the quality and content of the base. SII will continue to undertake and improve its Quality Assurance processes to ensure that they conform to Australian and International Standards, and continue to improve the quality of the data within the Products.

The following procedures are undertaken as normal update/maintenance routines, to ensure conformity of the data to Specification:

- Virus check software for digitally supplied input data;
- Automated quality routines, reflecting business rules for data population, to ensure data consistency;
SPATIAL ACCURACY

Positional Accuracy

The spatial accuracy for Vicmap Elevation DTM 20m and DTM 10m is inherited from the spatial accuracies of its many source datasets. The most consistently used and therefore the base for positional accuracy is the Vicmap Elevation 10-20 Contours & Relief. Therefore the positional accuracy for Vicmap Elevation DTM 20m and DTM 10m is 12.5m horizontally and 5m vertically or better.

FEATURE AND ATTRIBUTE ACCURACY (THEMATIC ACCURACY)

The vertical accuracy associated with the DTMs is +/-5m or better. Reprojecting, changing format or resampling causes changes to the height values in the DTM.

COMPLETENESS

Vicmap Elevation DTM 20m has a seamless storage of data (non-tiled) of Victoria’s main landmass.

Vicmap Elevation DTM 10m has partial coverage over Victoria’s main landmass as shown in Appendix A.

DTMs have only been generated for islands with sufficient elevation data available to support the DTM 20m and DTM 10m products.

LOGICAL CONSISTENCY

The DTM values across initial basin tiles have been constructed to ensure smooth consistent elevation values is achieved.

Post-Production Validation

Quality assurance (QA) procedures have been built in to the initial methodology to identify and correct any anomalies found. Additional QA has been undertaken to:

- ensure that all basin tiles merge together correctly by
  - checking pixel origins of each tile
  - checking for smooth join of elevation data (edge matching)
  - checking vertical accuracy of DTM
- hydrology flows are correct
- correct projection is assigned.

2B. MINIMUM QUALITY STANDARD

Proposed/Required Quality Assurance Applications

Once prepared and passed all required quality assurance checks, no further validation procedures are required.
3. METADATA

Metadata at Page 0, and Page 1 levels has been created using a compliant metadata entry tool, and has been added to the Victorian Spatial Data Directory (VSDD). VSDD entries may be viewed via Spatial Information Infrastructure’s website at www.land.vic.gov.au/spatial or via the Australian Spatial Data Directory site at http://asdd.ga.gov.au.


4. PRICING

Under the Government pricing policy, data is supplied to customers on an annual access right to use basis for an annual licence fee. The licence fee is aimed to recover the cost of maintenance and thus ensure product continuity. The pricing of the data is dependent on the volume of data required, measured by geographical area and intensity of use of the data, measured by the number of user-seats/terminals upon which the data may be simultaneously used/viewed. The Government pricing policy also contains provision for subsidies and credits.

- Credits may be granted on licence fees in recognition for substantive contributions to the data set by licensed users.
- Subsidies may be applied to meet community or social objectives determined by government or arising from agreed outcomes.

5. ACCESS

Small packet/small geographical area Vicmap data can be accessed directly from the Land Channel website on www.land.vic.gov.au/vicmapdata. Customers wishing to access larger areas or with special requirements should contact a Data Service Provider (DSP).

To facilitate more widespread and ready access, Vicmap data is distributed by Data Service Providers, with Department of Sustainability and Environment (DSE) taking a wholesale role. The objective of this approach is to promote industry development, allowing DSE to focus on production and development while DSPs focus on marketing and sales. There is a small group of users who obtain Vicmap products directly from DSE, generally as a result of an existing contractual arrangement or agreement. Multiple DSPs have been engaged to provide a competitive market. DSP’s are listed on the Land Channel website on www.land.vic.gov.au/vicmapdsp

All digital data issued to customers is subject to licence conditions. A copy of the terms and conditions of the Licence can be viewed on the Land Channel website at www.land.vic.gov.au/spatial under Products and then under Licence for use of Vicmap

In general, the User Licence allows licensees to use the data within their own business but does not permit data to be provided to third parties. There is no transfer of intellectual property in the data to customers.

Commercial or DSP licences are separate to user licences.
GLOSSARY

Address
The conventional form by which the location of a property is described.
Definition from Draft AS4271.Y 'Geographic Information – Data Dictionary Part Y: Cadastre'

AGD66
Australian Geodetic Datum 1966

AMG
Australian Map Grid. A cartesian coordinate system based on the Universal Transverse Mercator projection on the Australian Geodetic Datum. The unit of measure is the metre.

Area Feature
A feature which is portrayed as a region or surface. An area feature is bounded by one or more polygons.

AS2482

Attribute
A particular characteristic or property of an entity. Attributes can be spatial (or locational) and aspatial (or non-locational).

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

AT
A Crown special description for a localised administrative area identified and surveyed by the State’s early government surveyors as a further breakdown to a larger urban area, eg AT HAWTHORN, PARISH OF BOROONDARA.

Attribute Value
The value assigned to an attribute for a specific feature instance.

BEST
Bureau of Emergency Services Telecommunications. A committee set up by the Government of Victoria to investigate and establish a centralised computer aided emergency services dispatching system.

CAD
Computer-Aided Design is the production of drawings, specifications, parts lists, and other design-related elements using special graphics- and calculations-intensive computer programs. CAD systems originally merely automated drafting but now often include three-dimensional modelling and computer-simulated operation of the model.

Cadastre, Cadastral Base
A public register usually recording the quantity, value and ownership of land parcels in a country or jurisdiction.

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.

Crown Land
All land owned and held by the State.

Crown Land Management
The group within Land Victoria, DSE responsible for policy, strategy and management associated with all use of Crown Land. Crown Land Management maintains the Crown Land tenure database and co-ordinates land use planning and native title issues.

Data
The base level of information stored in electronic databases. Generally, “raw” data has not been value-added.

DEM or DTM
A Digital Elevation Model (DEM) or Digital Terrain Model (DTM) is a representation of continuous elevation values over a topographic surface by a regular array of z-values, which represents the earth’s terrain.

Entity
A real world phenomenon not divided into phenomena of the same kind.

Feature instance
An abstraction of an entity. The description of a feature instance encompasses only selected properties of that entity. Feature instances can also be referred to as features.

Feature Type
A class of real world phenomena with common properties.
A group of feature instances defined by a set of rules and having common attributes and relationships that are properties of the corresponding real world phenomena. Within the Oracle tables that comprise Vicmap Digital Property, classes may refer to “link” tables, which establish direct relationships between the point and/or line and/or polygon structures that may be used as spatial objects.

The feature structure of the feature based data model can be summarised as:

\[
\text{feature instance} = \{\text{spatial object} + \text{attribute object}\}
\]

Where:

- **Spatial Object** is the addition of all of the locational attributes of the feature instance and may comprise geometrical objects such as points, lines and polygons. Spatial objects carry a spatial address that consists of one or more couplets \((x, y)\) or triplets \((x, y, z)\) of coordinates. In the feature based data model topological relationships will be carried as part of the spatial object whenever the transfer formats support them.

- **Attribute Object** is the addition of non-locational information about a feature instance. These data identify the feature class and the aspatial attributes of a specific instance of the feature type. The attribute object is composed of one or more attributes.
GDA94
The Geocentric Datum of Australia 1994 is based on the Australian Fiducial Network (AFN) which fits into a global geodetic framework. The AFN comprises eight highly accurate survey marks across Australia each with a permanently tracking Global Positioning System (GPS) receiver. It has been established by AUSSII for geodetic surveying and scientific purposes.

GeoCASE
The modelling tool is a proprietary computer-aided software engineering product called GeoCASE. It is based on the entity–relationship (E–R) model extended to suit an object-oriented approach to representing the real world.

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

Spatial Object
The addition of all of the locational attributes of the feature instance and may comprise geometrical objects such as points, lines and polygons. Spatial objects carry a spatial address that consists of one or more couplets (x, y) or triplets (x, y, z) of co-ordinates. In the feature based data model topological relationships will be carried as part of the spatial object whenever the transfer formats support them.

Attribute Object
The addition of non-locational information about a feature instance. These data identify the feature class and the aspatial attributes of a specific instance of the feature type. The attribute object is composed of one or more attributes.

ICSM
Intergovernmental Committee on Survey and Mapping. ICSM's role is to provide leadership through coordination and cooperation in surveying, mapping and charting. ICSM's core function is to coordinate and promote the development and maintenance of key national spatial data including geodetic, topographic, cadastral, street addressing, tides & sea level, and geographical names. ICSM carries out its role by meeting its objectives in the areas of:

III
Information Infrastructure Initiative – a national funding program to improve the quality of information infrastructure.

IUF : “Incremental Update Format”
A system whereby maintenance updates are provided as change only, add/modify/delete incremental update files, between nominated dates/times.

Land Registry
The group within Spatial Information Infrastructure responsible for providing systems for Victoria’s property market including; the Land Titles Office, Valuer Generals Office, Surveyor Generals Office and Landata.

Spatial Information Infrastructure
A body within Strategic Planning & Projects, Department of Sustainability & Environment, responsible for spatial policy for the State and for providing and maintaining a statewide spatial infrastructure, including the Victorian Geodetic Framework and Vicmap Digital.

Layer
Subdivision of a theme into one or more layers of data on the basis of topological relationships. Linear networks, polygons and point/line features are placed in separate layers.
Linear Network
A theme layer consisting of linear features which are connected forming a pathway along which movement is possible.

Metadata
Metadata, defined as ‘information about information’, provides fundamental information management tools at three levels:
  - Discovery: enabling users to locate and evaluate information.
  - Management: enabling custodians to better manage their spatial information.
  - Utilisation: enabling users to access and manipulate information by means of automated / distributed systems.

Node
A point that is a junction of two or more chains or which is the end point of a chain.

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

Oracle
Relational Data Base Management System used by the Spatial Information Infrastructure and Logica CMG to store and manage Vicmap Digital data.

Parcel
The smallest area of land capable of sale without further approval to subdivide. It may consist of more than one piece.

The smallest unit of land able to be transferred within Victoria’s cadastral system – usually has one proprietor or owner – is described by its parcel description (either lot/plan or allotment/section/parish). Parcel description are not unique, ie. two parcels can have the same parcel descriptions.

Parish
A Crown description for a larger administrative area identified and surveyed by the State’s early government surveyors as a means of rational sub-division, settlement and alienation of Crown Land, eg PARISH OF ULUPNA.

Persistent Feature identifier (PFI)
Unique Feature Identification (each feature is uniquely identified for change management) is managed through the use of two identifier attributes; namely the Persistent Feature identifier (PFI) and the Unique Feature Identifier (UFI).
See also Unique Feature Identifier(UFI)

Polygon
A set of chains used to define the boundaries of an area. There is one external polygon and there may be one or more internal, non-nested polygons.

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

Land, usually contiguous, under one ownership, and of a common class and tenure. (Where "contiguous" sometimes ignores intervening roads and reserves).

Definition from Draft AS4271.Y ‘Geographic Information – Data Dictionary Part Y: Cadastre’

The description applied to land under common occupation particularly for the purpose of rating, billing or habitation. Properties are typically described by street address or a 'rate assessment number' allocated by an authority, eg. local government or utility. A property can consist of one parcel (eg. a suburban house block); many parcels (eg. a farm); or part of a parcel (eg. a shop in a development). Council’s view of property is usually seen as being definitive and is described by a Council Property Number (CPN).

Definition from ‘LAND CHANNEL – VICMAP DISPLAY – GLOSSARY’

Reserve

Land set aside for a specific use.

Definition from Draft AS4271.Y ‘Geographic Information – Data Dictionary Part Y: Cadastre’

RNDB

The VicRoads Road Network Data Base.

Road

A corridor of land set aside for access purposes.

Definition from Draft AS4271.Y ‘Geographic Information – Data Dictionary Part Y: Cadastre’

Rural addressing

Systematic allocation of address to properties in rural areas which have not been previously addressed. Requires Localities to be defined, roads to be named and numbers to be allocated based upon distance from a predefined 'start' of the road. Approximately 60,000 properties in Victoria are yet to be numbered.

Definition from ‘LAND CHANNEL – VICMAP DISPLAY – GLOSSARY’

Within the State of Victoria, Local Councils, under the provisions of the Local Government Act, allocate street address.

SDE

Spatial Data Engine – an ESRI product

Software used by Spatial Information Infrastructure to manage the spatial component of it’s Unified Data Store, which includes copies of the whole of the Vicmap Digital product suite.

SDM

Spatial Data Manager – a product of Sinclair, Knight & Merz.

Software used by SKM to manage the spatial component of Vicmap Digital Property

SDMB

State Digital Map Base – the first whole of State digital map base of Victoria formed from Melbourne Metropolitan Board of Works digital data and the digitising of hard copy maps. Constantly updated and improved and became the basis of Vicmap Digital products.

SDRN

The State Digital Road Network database.

SDTS

The United States Spatial Data Transfer Standard. This standard is to be the basis of the new Australian Standard for the transfer of spatial digital data.
Segment
A direct line between a pair of points, or a point and a node.

Sinclair, Knight & Merz (SKM)
A mapping and land information company chosen by Spatial Information Infrastructure to maintain Vicmap Transport

Sliver
Long, thin triangle or polygon of very small area formed by overlaying of almost-coincident lines. Often a result of twice-digitising the same linear feature.

Spatial Object
The spatial object holds the locational information of a feature instance. For BEST/SDRN Vector Data, it is composed of a point, node, line or polygon.

Street address
Allocated by Councils to describe their properties. Consists of a House Number, a Road Name, and a Locality or Suburb.

Title
A certified document sealed by the Registrar-General certifying that an estate of freehold land is vested in the registered proprietor subject to registered encumbrances, liens, estates, or interests endorsed thereon.

Theme
The information contained in the map production material can be divided into themes which contain logically-related geographic information, each theme capable of being used as a data set in its own right. Vicmap Transport contains a single theme: "Roads".

Tile
A discrete spatial unit that defines a specific area of the database, eg a 1:25000 map sheet area. Tiles are normally unique areas which when combined will form the total area covered by the database.

Township
A localised administrative area used in the formal sub-division and identification of Crown Land and in determination of general location, eg TOWNSHIP OF KIATA. Township boundaries are formally defined under the Land Act through Government gazettal. They usually defined areas originally identified and surveyed for the establishment and settlement of towns, where smaller parcels of land (allotments) were marked for alienation or reservation as housing, education, recreation, infrastructure and related sites.

Unique Feature identifier (UFI)
Unique Feature Identification (each feature is uniquely identified for change management) is managed through the use of two identifier attributes; namely the Persistent Feature identifier (PFI) and the Unique Feature Identifier (UFI).
See also Persistent Feature Identifier (PFI)
Valency

Valency in the context of this document refers to the number of chains attached to a node, eg a node which has three chains attached would be referred to as a valence-3 node.

VICGRID

Coordinate system adopted by Spatial Information Infrastructure as the basis for Victorian GIS databases. VICGRID is derived from Lambert’s conformal conic projection of latitudes and longitudes on AGD66 with standard parallels of latitude at 36° S and 38° S and a central meridian of longitude at 145° E. Co-ordinates are in metres. The origin of VICGRID coordinates is 2,500,000 metres west and 4,500,000 metres south of the intersection of the parallel of latitude 37° S and the central meridian.

VICGRID94

Coordinate system adopted by Spatial Information Infrastructure as the basis for Victorian GIS databases. VICGRID94 is derived from Lambert’s conformal conic projection of latitudes and longitudes on GDA94 with standard parallels of latitude at 36° S and 38° S and a central meridian of longitude at 145° E. Co-ordinates are in metres. The origin of VICGRID coordinates is 2,500,000 metres west and 2,500,000 metres south of the intersection of the parallel of latitude 37° S and the central meridian.

VGIS

The objective of the Victorian Spatial Information Strategy (VGIS) is to contribute to Victoria’s development, wealth creation and environment protection by:

- developing and maintaining a comprehensive spatial information resource — the infrastructure; and
- driving, to the fullest extent, the value and capability of this spatial information resource into Victoria’s information systems and processes — the benefit.

Vicmap Digital

Vicmap Digital is a set of spatially related data products made up from individual datasets. They are the underlying foundation to Victoria’s primary mapping and geographic information systems. Vicmap products are produced and managed by Spatial Information Infrastructure, Department of Sustainability and Environment. Further Information- www.land.vic.gov.au/spatial

WGS 84

World Geodetic System 1984. A geocentric datum used for the determination of geographic coordinates.
APPENDIX A

Extent of DTM 10m Product

[Map of Victoria showing the extent of DTM 10m product]
APPENDIX B

Location of High Resolution Source Data