Digital Twin Victoria

Shaping our digital future

eComply Framework
Site Context Guidelines

V1.2 – August 2024

VICTORIA State Government | Department of Transport and Planning

Contents

1. Background & Purpose

1.1 About eComply

Digital Twin Victoria in partnership with Australian start-up Archistar have delivered digital assessment technology designed to enable builders, building designers to test their 3D building designs against planning codes, making building compliance easier and faster for everyone in the process.

After industry trials and the release of the first commercial solution Digital Twin Victoria has developed an open framework aiming to encourage the adoption of digital building processes and the growth of digital assessment tools.

The framework presents data specifications and computational methodologies to assess building compliance for Victoria's Small Lot Housing Code. The framework can be used by those developing digital solutions, offering data services, or those trying to understand how eComply solutions function.

eComply is one piece of the Digital Twin Victoria program, an investment by the Victorian Government in digital twin technology and spatial innovation to help revolutionise how we plan and manage our built and natural environments.

1.2 Document Purpose

The purpose of this document the Site Context Guidelines is to define a data specification to establish a digital representation of a residential development sites. The audiences of this document include:

- Land surveyors drafting site context products for eComply solutions.
- Computational designers developing eComply assessments.

The digital site context is made up of digital data representing cadastral, planning, elevation data, and BIM models representing the neighbouring infrastructure. The specification has been drafted for design standards from Victoria's Small Lot Housing Code.

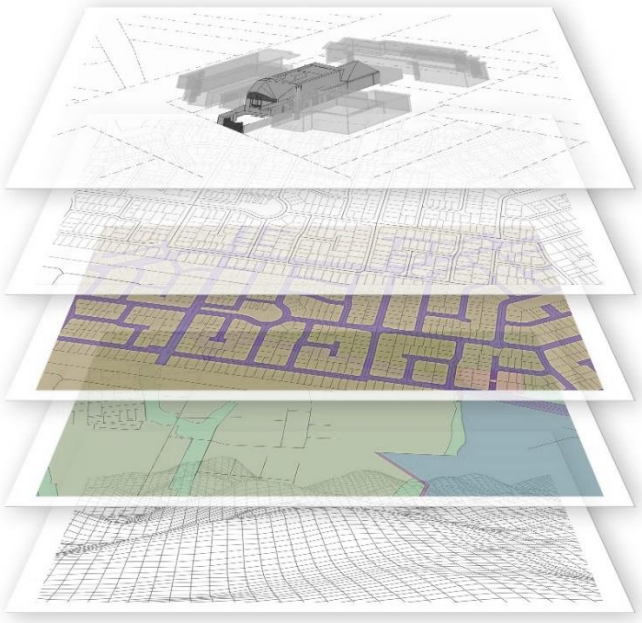

Figure 1 – The digital site context consists of multiple data layers representing the local urban context including digital boundaries, terrain, and the built form.

1.3 Applying the Guidelines

The methodologies within the Guideline can be used to develop commercial tools or digital data products.

1.4 Companion Documents

The eComply Framework consist of the following documents:

ID	Document	Description
1	BIM Drafting Guidelines	Guidelines for building designers to model 3D building information supporting eComply building compliance assessment.
2	Site Context Guidelines (This Document)	Guidelines for land surveyors to provider site context datasets – the 'digital twin' of the development site.
3	Assessment Practice Note	Computational practices to analyse and assess building compliance against residential design standards

2. Site Context Specifications

2.1 General Data Specifications

2.1.1 File Formats

eComply solution providers may support all or a subset of the following file format specifications.

Geospatial vector file formats provided in:

- GIS formats such as Shapefile, FileGDB, Geopackage.
- CAD formats such as DXF, and DWG.

CAD datasets must be georeferenced and configured to support the data requirements outlined within this document. An example list of CAD layers has been provided in the appendix.

Elevation / terrain to be provided in

- triangular irregular network or
- digital elevation grid formats.

3D model specifications are provided in the BIM Drafting Guidelines.
Make note of reduced requirements for tagging and classification in section 2.3.2 of this document.

2.1.2 Geolocation

Datasets provided in georeferenced using Geocentric Datum of Australia 2020 (GDA2020). Either referenced as GDA2020 (Latitudes and Longitudes) or as MGA2020 projection coordinates (Eastings, Northings and Zone). eComply solutions will define the appropriate coordinate system for the area being assessed.

Heights provided in Australian Height Datum (AHD).

Note: The positional accuracy (and completeness) of datasets impacts the reliability of eComply computations. Any cadastral or elevation datasets representing registered title boundaries must be sourced from a licensed land surveyor. Positional accuracy recommendations are provided throughout the document.

2.2 2D Vector Datasets

2.2.1 Dataset Summary

A summary of vector datasets leveraged by eComply solutions.

ID	Mand-atory	Dataset	Geometry	Description
VLB	Yes	Lots	2D Vector - Polygon	Land allotment boundaries for the development site
VBC	Yes	Interfaces	2D Vector - Polyline	Linework representing lot boundary faces with orientation definitions and land use interface definitions
VRD	No	Roads	2D Vector – Polyline	Linework demonstrating road reserve boundaries.
VPZ	No	Planinng_ Zones	2D Vector – Polygon	Planning Zone information with additional restriction information from the scheme

General guidelines

- Follow the drafting methodology set out in Land Use Victoria's Single CAD Format File (SCFF) but utilise the dataset specifications from this document.
- Complex lot boundaries may not be supported by eComply solutions due to the need to model 3d envelopes from boundaries. A complex boundary contains more than two vertices.

- Linework must be connected, closed, and snapped within each dataset and between datasets (with exception of externally sourced datasets such as planning zones).

2.2.2 Dataset Specifications

Vector data is provided as GIS or CAD formats to the following specification.

Land Title Boundaries (Lots)

eComply solutions use digital land title boundaries to represent the proposed or existing land allotments. The boundaries are referenced in computations such as set-back calculations and envelope modelling.

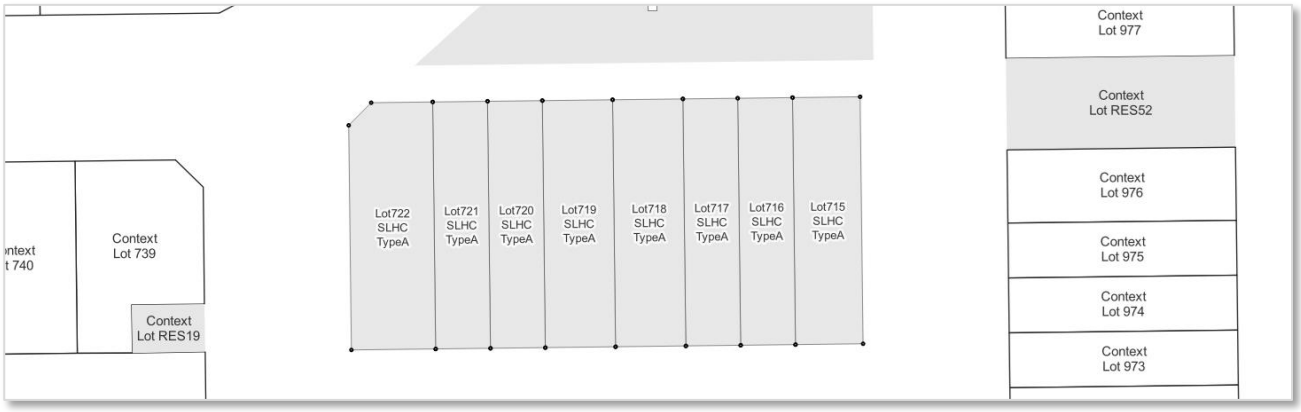

Figure 2 – Land Title Boundaries for Submission Lots and Context Lots

ID	Layer Naming & Drafting Notes	*Data Attributes*	*Values*
VLB (GIS)	**Dataset Name** – Lots **Geometry** - Drafted as polygon geometry (closed). Do not include any offsets, easements, or text annotations. **Data Lineage / Sourcing** – Lot boundaries may be sourced from urban designers, licensed land surveyors, or existing digital products. *Only boundaries provided by licensed land surveyors can be used to simulate compliance results by an official permit assessment i.e., by a building surveyor.* Lot boundaries from urban designers or existing digital cadastral products may not be representative of the field surveyed boundaries and should be acknowledged as an accuracy limitation within any eComply tool. Follow ICSM guidelines for cadastral spatial accuracy requirements. **Siting Code** – Nominated planning code. Information for Small Lot Housing Code is found within title restrictions (s173 agreement, MCP) or nominated by the land developer.	**F_ID** Feature ID (integer)	Number Examples 1 2 3
		Lot_No Lot Number (character 12)	Text Examples 1 RES
		Plan_No Plan Number (character 9)	Text Examples LP1234
		SPI Lot Identifier (character 18)	Text Examples 1\LP1234 RES\LP1234
		SitingCode Assessment Code (character 10) Relating to Small Lot Housing Code site restrictions for types A,B,C used in planning assessments	Fixed Text Values SLHC_TypeA SLHC_TypeB CTC_Type1 CTC_Type2 CTC_Type3 (Empty)
		Status Lot Status (character 12)	Fixed Text Values Submission (To be submitted on) Context

ID	**Layer Naming & Drafting Notes**	***Data Attributes***	***Values***
			(Neighbouring)
VLB1 (CAD)	Submission Lots (CAD) **Layer Name Structure** – Lots$Submission${Code}${Typology} e.g. Lots$Submission$SLHC$TypeA Lots$Submission$SLHC$TypeB **Description** – Lots to be assessed by eComply solutions. Code nominated and Typology. **Geometry** - Drafted as closed land allotment polygon geometry (closed). Do not include any offsets, easements, or text annotations. See data lineage notes in GIS layer. See comparable Single CAD Format File (SCFF).	n/a	Code SLHC *(Small Lot Housing code)* CTC *Cairnlea Townhouse Code* Code Typology TypeA TypeB Type1 Type2 Type3 Comparable SCFF Layers: LOT-CREATED RESTRICTION-CREATED
VLB2 (CAD)	Context Lots (CAD) **Layer Name** – Lots$Context **Description** – Lots for neighbouring land titles surrounding the development proposal sites. **Geometry** - see VLB1 See data lineage notes in GIS layer. See comparable Single CAD Format File (SCFF)	n/a	Comparable SCFF Layers: LOT-EXISTING / CREATED / AFFECTED RESERVE-EXSITING / CREATED / AFFECTED STAGE-LOT-EXSITING / CREATED / AFFECTED COMMON-PROPERTY-EXSITING / CREATED / AFFECTED
VLB3	Lot ID **Layer Name** – Lots$ID **Description** – Lot and plan identification for lots provided in other layers. **Geometry** – Annotation / Point		Comparable SCFF Layers: TEXT-LOT-ID TEXT-STAGE-LOT-ID TEXT-COMMON-PROPERTY-ID TEXT-RESERVE-ID

Interface Boundaries (Interfaces)

The interface boundaries define the orientation of lot boundary face and the land use of neighbouring lots. For example, rear laneway, or side street. Interfaces are leveraged to define setbacks, site access, and fencing requirements.

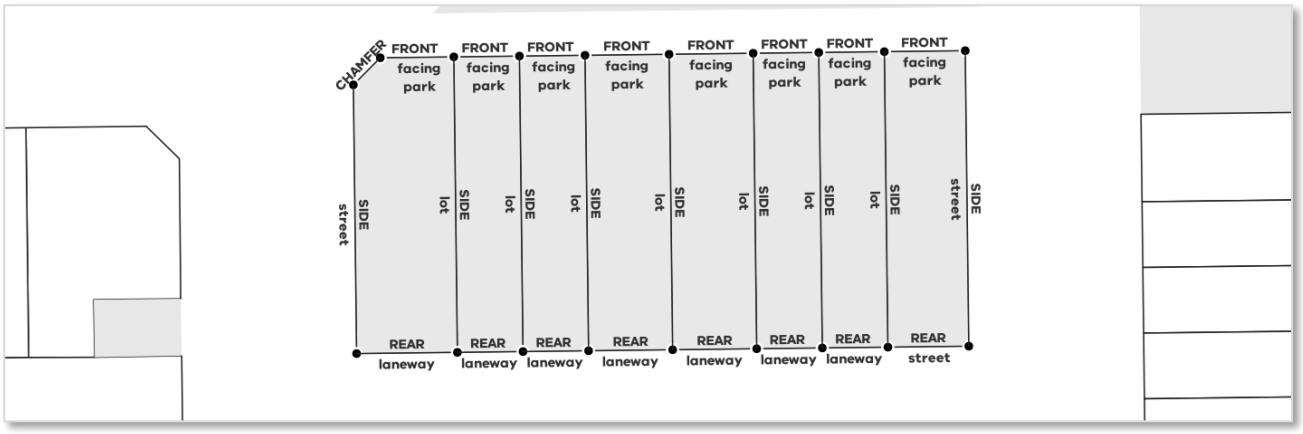

Figure 3 – Boundary with labelled 'side' and 'land use' conditions

ID	Layer Naming & Drafting Notes	Data Attributes	Values
VBC (GIS)	**Dataset Name** – Interfaces **Data Lineage / Sourcing –** The interface must be drafted from on the lot boundary polygons used for eComply assessments. Not required for context lots. **Geometry** - Drafted as polyline geometry. Individual boundary segments running the length along each front, rear, side, splay (chamfer) boundary. Aligning and snapped to lot boundaries for each boundary side with orientations Front, Side, Rear, Chamfer (cut corner). The boundary segment is created once between the two lots and should either represent the relationship between lots (i.e., side = rear & interface = lots). The interfaces definitions are weighted relative to the submission lot. Therefore, a boundary between a 'submission' lot and a park would be defined as a park.	**F_ID** Feature ID (integer)	Number Examples 1 2 3
		Side Boundary Side (character 10) Describes the segment in relation to the desired house orientation.	Fixed Text Values Front, Side, Rear, Chamfer
		Interface LandUse Interface (character 20) Describes the conditions on the adjacent lot of the boundary. Facing park is used when a park is on other side of street.	Fixed Text Values Park Street Lot Lane Declared Road Facing Park Street Laneway
VBC (CAD)	Interfaces (CAD) **Layer Name Structure** – Lots$Interfaces${Side}${Interface} e.g. Lots$Interfaces$Rear$Lot Lots$Interfaces$Front$Facing_Park **Description** – Layers comprising all interface segments that fit the classification for side and context. One layer per interface combination. **Geometry** – Drafted from assessment lot boundaries in polyline format – see drafting noted above. See data lineage notes in GIS layer.		Side Front Side Rear Chamfer Interface Park Street Lot Lane Declared_Road Facing_Park Street Laneway

Road Reserve (Road)

Defines the lot representing the road reserve. Optional layer.

ID	Drafting Notes	*Data Attributes*	*Values*
VRD (GIS)	**Dataset Name** – Roads Land lot representing the road reserve. **Data Lineage / Sourcing –** (see Lots - VLB). Declared Road status can be determined by checking VicRoads map of declared roads – or alternatively reviewing precinct. **Geometry** – Drafted as polygon or polyline– matching existing lot cadastral boundaries	**F_ID** Feature ID (integer)	Number Examples 1 2 3
		Type Road Classification (character 20)	Fixed Text Values Declared_Road Street Laneway Other
		Name Road Name (character 20) For visualisation only	Text Examples Ridge Road Right of way (empty)
VRD1 (CAD)	**Roads (CAD)** **Layer Name Structure** – Roads${Classification} e.g. Roads$Laneway Roads$Declared_Road **Description** – Layers comprising all roads that fit the classification. **Geometry** – See associated GIS layer See data lineage notes in GIS layer. See comparable Single CAD Format File (SCFF)	**n/a**	Classification Declared_Road Street Laneway Other Comparable SCFF Layers: ROAD-EXISTING / CREATED / AFFECTED
VRD2	**Road_Name (CAD)** **Description** – Annotations of Road names **Geometry** – Annotation / Point	**n/a**	

Planning Zone

Planning zones define the extent of land use zone and restrictions for Victoria's planning scheme. The zones define design standard restrictions such as building height limitations.

ID	Drafting Notes	*Data Attributes*	*Values*
VPZ (GIS)	**Dataset Name** – Planning_Zones Geographic planning zones sourced from VicMap. Describing the	**F_ID** Feature ID (integer)	Number Examples 1 2 3

ID	Drafting Notes	Data Attributes	Values
	geographic extent of the gazetted planning zone. **Data Lineage / Sourcing –** This information is sourced from the Victorian government. The proposed data model is the minimum required elements from the VicMap Planning dataset. The Victorian government dataset can be augmented by the supplier to include specific restrictions found in the planning zone scheme and schedule documents relating to the zone. This information can be sourced via Planning Schemes Online **Geometry** – Polygon	**LGA** Local Government Area (character45)	Text Examples City of Casey Brimbank City Council
		Zone Zone_Code (character10)	Text Examples GRZ1 UGZ13
		Height Height Restriction (m) (integer) Sourced from planning zone documents for zone and lga	Number Examples 8 10
		Stories Maximum Stories (integer) Sourced from planning zone documents for zone and lga	Number Examples 3 5
VPZ (CAD)	**Planning (CAD)** To provide CAD versions usable by eComply data must be sourced from Victoria and translated in the following format. The following is a suggested structure only. **Layer Name Structure** – Zone${Zone}${Height}${Levels} e.g. Zones$GRZ1 Zones$UGZ11$10$3	n/a	n/a

2.3 Elevation & 3D Datasets

2.3.1 Datasets

A summary of elevation and 3D datasets leveraged by eComply solutions.

ID	Mandatory	Dataset	Geometry	Description
EV1	No	Terrain	TIN / Grid	Elevation data representing the natural ground level for the development site and neighbourhood
BB1	No	Buildings	BIM / IFC	3D building models for the local neighbourhood impacted by the development

General guidelines

- Elevation datasets must be consistent with cadastral data.
- To encourage timely performance of computations the resolution specifications should not be exceeded, or datasets geographic extent expand far outside the development area.
- eComply solutions may not always support elevation / terrain datasets

2.3.2 Dataset Specifications

Topography (Terrain)

The terrain depicts the surface level as a surveyed ground levels or proposed levels for a development site. eComply solutions use the terrain represent the surface level in measurements.

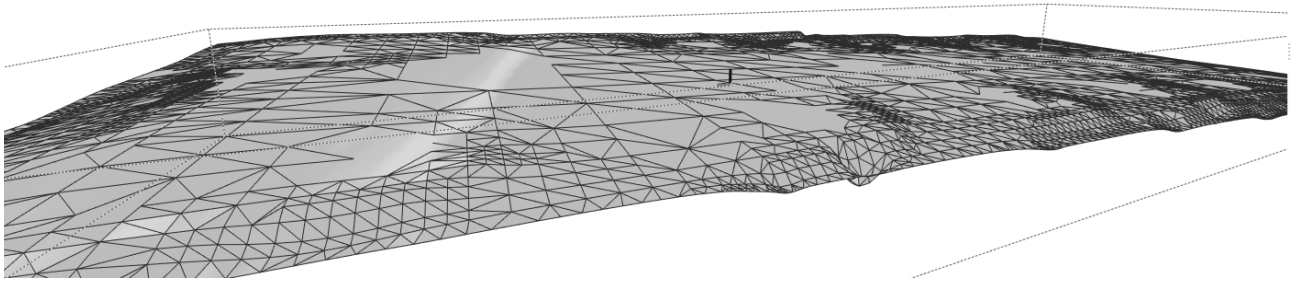

Figure 4 – Terrain for the development site based off an as-constructed survey

ID	Drafting Notes	*Specification*	*Values*
EV1	**Dataset Name** – Terrain **Data Lineage / Sourcing** – Elevation data may be sourced from civil engineers, licensed land surveyors, or existing digital products. *Only elevation data provided by licensed land surveyors can be used to simulate compliance results by an official permit assessment i.e., by a building surveyor.* Elevation data from civil engineers or existing digital cadastral products may not be representative of the final or existing surface level and should be acknowledged as an accuracy limitation within any eComply tool. The elevation data should match the ICSM DEM Classification 'Special' "Surveys required for engineering and infrastructure design" **Geometry -** Elevation data provided in Triangulated Irregular Network (TIN) format based on irregular points, or gridded points.	**Horizontal (XY) Resolution**	< 1m2
		Horizontal Accuracy Accuracy recommendations for data based on land survey	+/- 0.3m
		Vertical (Z) Resolution	< 0.3m
		Vertical (Z) Accuracy Accuracy recommendations for data based on land survey	< 0.1m

Neighbourhood Buildings (Buildings)

The existing built form on neighbouring lots is surveyed and provided in a BIM format. The level of detail (LOD) requirements for BIM models in comparison to models assessed by eComply. Reference the BIM Drafting Guidelines for drafting requirements.

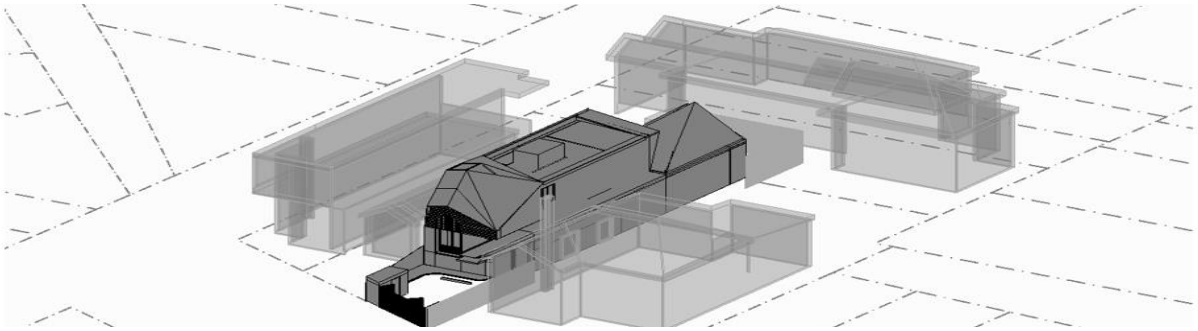

Figure 5 – BIM models for neighbouring lots

ID	Drafting Notes	*Construction Object*	*IFC Class & Tagging*
BB1	**Dataset Name** – Buildings **Data Lineage / Sourcing** – The buildings must be surveyed and modelled. The buildings surveyed should correspond to the building definitions in the Building Regulations 2018 – classes 1, 2, 10. Models include walls, roof, windows, any structure with a wall-on-boundary, and secluded private open space must be nominated. Reference the BIM Drafting Guideline for drafting methodologies and classification. The AHD heights of windows is recorded to position the models correctly. Buildings must be sited onto their lot boundary within the BIM model to demonstrate their position relative to the lot with a georeferenced point (including elevation) on either the LHS or RHS of the lot frontage.	**Walls** Any Wall or Fence	**Classification**: IfcWall
		Windows Any external window. Mark as Habitable via parameter.	**Classification:** IfcWindow **Parameter:** IsHabitable (Y/N) WindowSillAHD (123)
		Private Open Space Any secluded or private open space modelled as a space.	**Classification:** IfcSpace **Parameter:** IsPrivateOpenSpace (Y)
		Site Boundary Lot boundary for building	**Classification:** IfcSite

3. Managing Site Context

Digital Twin Victoria recommends eComply solutions include the following functionality for managing site context information:

Functionality	Recommendation
Data Import	Import georeferenced vector and 3D data
Version Management	As the cadastral information will regularly change throughout a development lifecycle the site context information should allow multiple versions to be imported.
Metadata	The version, data sources, lineage, and known limitations should be communicated to users so they are aware the reliability of the digital compliance assessments. For example, if cadastral data comes from existing digital cadastre products it is not a trustworthy representation of a title boundary and the limitation must be known by the user.
Site template extracts	A building designer should be able to extract the site context to their BIM authoring software to site their building.
Siting of Neighbourhood BIM models	Neighbourhood BIM models should be able to be positioned with confidence based off the site surveys of licensed land surveyors.

4. Appendix

4.1 CAD layers based on feature classifications

CAD layer names based on the original Archistar Comply implementation with the following structure.

Mandatory	Dataset / Layer	Geometry	Description
Yes	Lots$Submission$SLHC$TypeA	Polygon	Submission lots for SLHC
Yes	Lots$Submission$SLHC$TypeB	Polygon	Submission lots for SLHC
Yes	Lots$Interfaces$Front$Park	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Front$Street	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Front$Lot	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Front$Lane	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Front$Declared_Road	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Front$Facing_Park	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Front$Street	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Front$Laneway	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Side$Park	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Side$Street	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Side$Lot	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Side$Lane	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Side$Declared_Road	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Side$Facing_Park	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Side$Street	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Side$Laneway	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Rear$Park	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Rear$Street	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Rear$Lot	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Rear$Lane	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Rear$Declared_Road	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Rear$Facing_Park	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Rear$Street	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Rear$Laneway	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Chamfer$Park	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Chamfer$Street	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Chamfer$Lot	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Chamfer$Lane	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Chamfer$Declared_Road	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Chamfer$Facing_Park	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Chamfer$Street	Polyline	Boundary definition for side and interface
Yes	Lots$Interfaces$Chamfer$Laneway	Polyline	Boundary definition for side and interface

Mandatory	Dataset / Layer	Geometry	Description
No	Lots$Context	Polygon	Lots for neighbouring site
No	Roads$Declared_Road	Polygon	Road reserve classified by hierarchy
No	Roads$Street	Polygon	Road reserve classified by hierarchy
No	Roads$Laneway	Polygon	Road reserve classified by hierarchy
No	Roads$Other	Polyline	Unknown roads
No	Lot$ID	Annotation	Lot and Plan IDs
No	Roads$Name	Annotation	Road Names
No	Zones$GRZ2$11.5$3	Polygon	Example Only: Planning Zone for Casey City Council with Height limitations from planning schedule
No	Zones$UGZ3	Polygon	Example Only: Planning Zone for Casey City Council where no addition specifications apply

5. Document Control

Contact for Enquiries

Please address any questions regarding this document to:

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Document History

Version	Date	Author	Summary of changes
1.1	20 12 2023	Luke Bassett	Document Release
1.2	13 08 2024	Steve Fleming-Parsley	Updated contact email