Fit For Purpose 2D Cadastres as the foundation for 3D Cadastral Modelling and Digital Twins. Comparing different solutions from Australia and Indonesia.

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SUMMARY

The transition from 2D cadastral databases to 3D cadastral modelling in most jurisdictions faces a severe lack of the height data required for 3D representation of Titles. Many jurisdictions are now creating 3D Cadastral Data Models and are requiring height data relative to a standard datum that can define 3D height extents on new Strata/Stratum/Apartment/Condominium Titles. BIM models will take that to the highest level of detail but they are not widely available as yet.

Existing 3D titles have been created intuitively by defining title extents by existing structures like walls & floors with generic consideration of the associated Rights, Restrictions and Responsibilities (RRRs) like building structural integrity, access, and servicing. This has proven to be an effective method to manage the complexity of 3D Titles for individual buildings but does not provide the geometry for 3D cadastral database modelling.

The first step in progressing towards a useful Digital Twin is to model these historical 3D spaces using a Fit for Purpose (FFP) strategy. No jurisdiction can afford to survey millions of existing 3D Titles so the challenge is to provide a cost-effective solution now that is scalable as better data becomes available.

Standard datums and geodetic reference zones are the supporting infrastructure to any strategic modelling of 2D and 3D cadastres. Developed economies are well down this path but developing land systems like Indonesia have progressed this in some locations but the extensive data management challenge means that local access to accurate coordinated survey control points with heights is not always available. This requires a pragmatic FFP desktop approach to collecting data to model 3D cadastres from existing plan records with data from any available imagery or other (affordable) technologies (scanning, LIDAR,

etc,).

FFP height determinations can be applied by using desktop or other estimates of floor heights to produce 3D models related to standard datums or simply relative to the ground.

In a 2D FFP solution, precision is not a priority. The best location attributes achievable and the spatial relationship with surrounding titles are paramount. This initially applies to parcel boundaries, but as we progress to 3D titles the same need exists for building extents. How cadastral databases are to be spatially upgraded and integration with various 3D modelling applications is a critical consideration of the methodologies implemented.

The priority is to create a FFP model where all 3D entities are reasonably recognisable by all stakeholders and will identify all those entities for registration in a land administration database for taxation and other needs. This is a representative model, not a boundary definition so spatial integrity is a minor consideration.

This type of solution can be achieved now. The presentation will outline practical solutions of different levels of FFP 3D modelling from the Northern Territory in Australia and Indonesia.