

Capturing Legal and Physical Boundary Differences in 3D Space – A Case Study of Trinidad and Tobago

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Trinidad and Tobago

Aim and Objectives

- **Aim:** To investigate the relative costs and times required for acquisition of the necessary data for the construction of a 3D cadastre

Objectives:

- Determine the different types of boundaries that exist in the cadastre
- Determine the methodologies that can most efficiently acquire the different boundaries for the 3D cadastre
- Determine the relative amounts of each boundary and each methodology that would provide the most efficient way of creating the 3D cadastre

No actual dollar costs are determined but the proportion of effort and time allocated to preparation of the 3D cadastre are determined.

Types of Boundaries

- General tangible boundaries
- Fixed intangible boundaries related to tangible boundaries
- Intangible boundaries not related to tangible boundaries

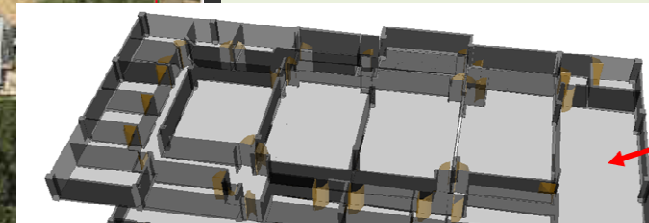
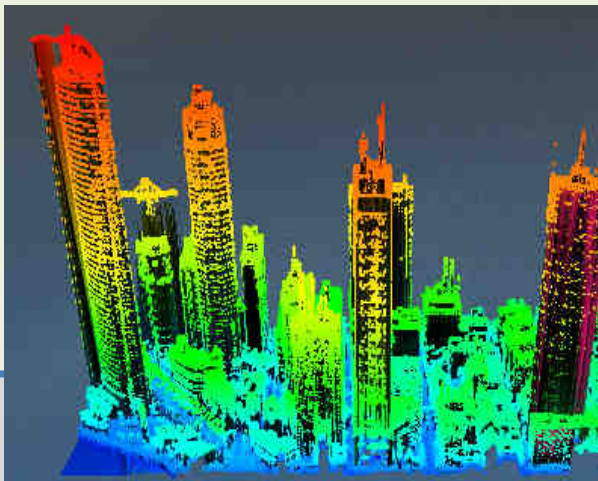


Intangible boundaries can be located by the physical features that are sometimes put up to represent them. Where physical features are not constructed the intangible boundaries must be measured on the ground.

Data Capture for Physical Boundaries

Technology to simplify the acquisition of physical data:

- laser scanning,
- LIDAR and satellite imagery, and
- aerial photography for Building Information Management (BIM)

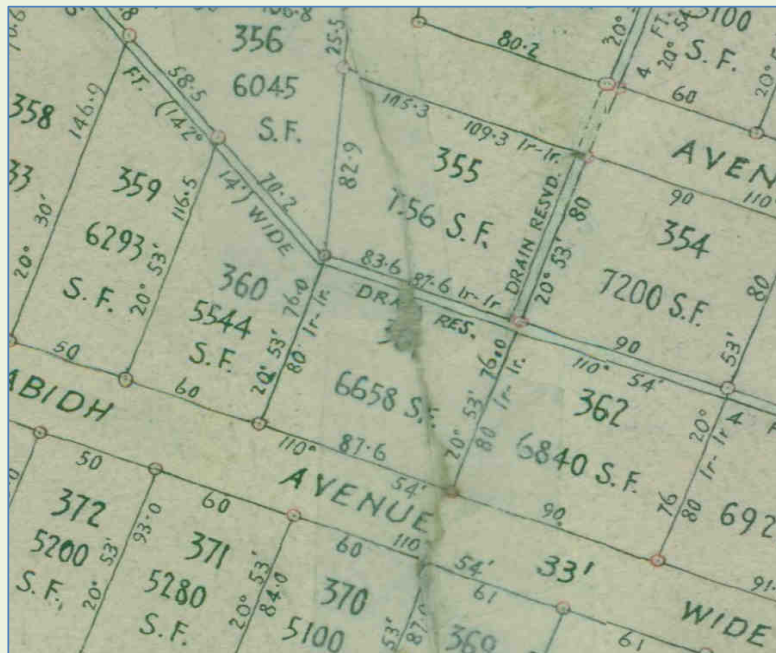


Address ID	3614
Strata Plan #	2013-583
Strata Lot #	32
Volume	1164
Folio	265
Right Type	Owner
Restriction	No Extension to Bldg.
Unit Entitlement	8
Use	Commercial
Value	\$1,285,000
Surveyed Area	200

Laser scanning can be used to acquire internal features in a building that relate to boundaries. LIDAR captures vast amounts of data from which the required data must be extracted.

Data Capture for Intangible Boundaries

- Redefinition surveys:
locate intangible boundaries with respect to physical features



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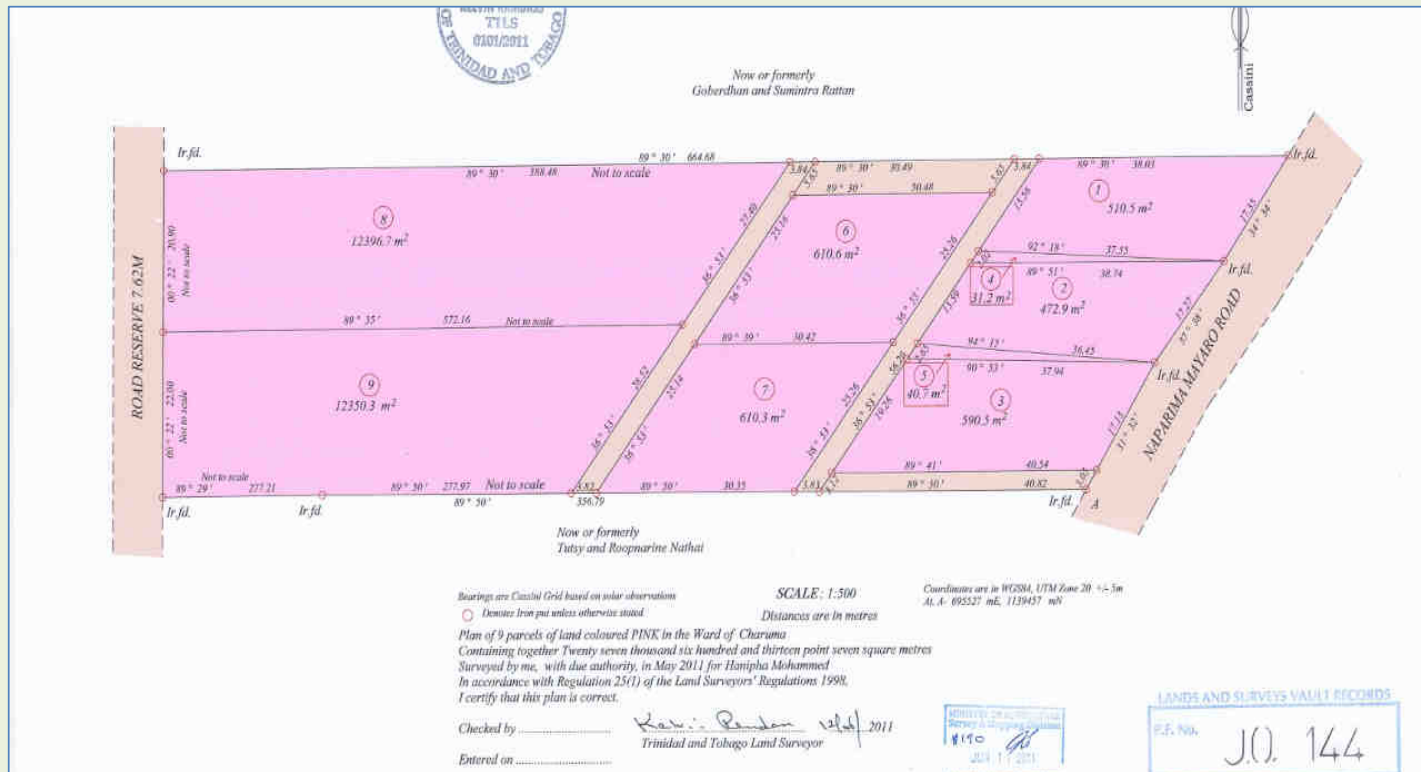
Case Study



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Fixed Boundaries



In Trinidad and Tobago, boundaries are not coordinated but are placed relative to existing boundaries. This is more important than being absolutely coordinated.

Fixed Boundaries

In many instances the parcels are not yet developed, or are occupied contrary to the legal boundaries so the physical features do not assist in locating the boundaries.



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Fixed Boundaries and Physical Boundaries

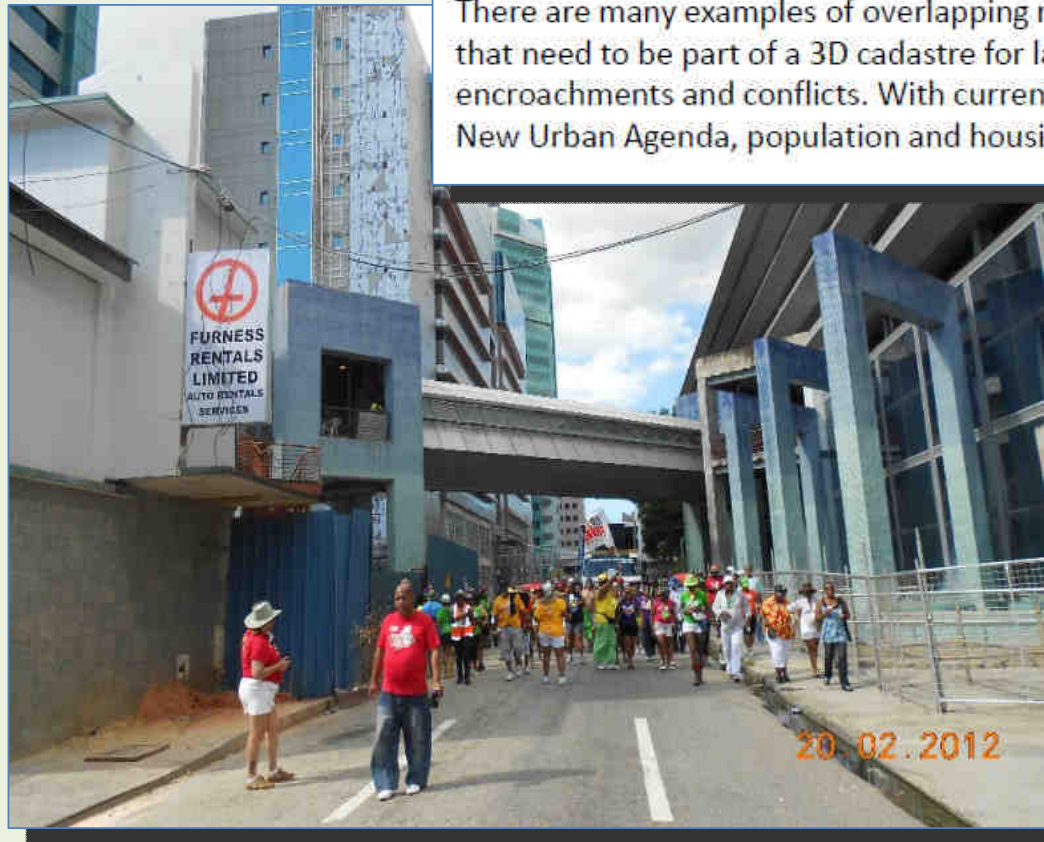
The current cadastre is an index to locate the information on the actual plans so the lines are approximate, very approximate in some instances.



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3D Boundaries

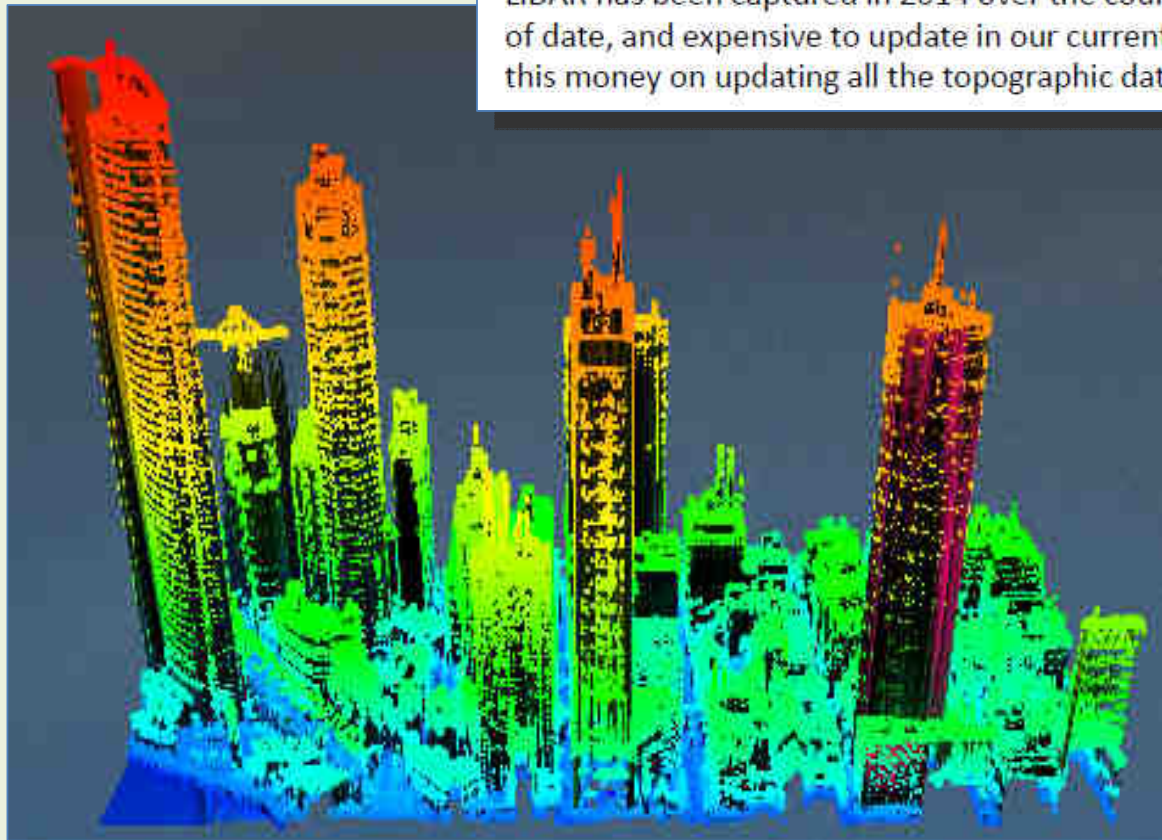
There are many examples of overlapping rights, particularly in the urban environment, that need to be part of a 3D cadastre for land management purposes and for discerning encroachments and conflicts. With current focus on the upcoming Habitat III on the New Urban Agenda, population and housing in the urban area is a priority.



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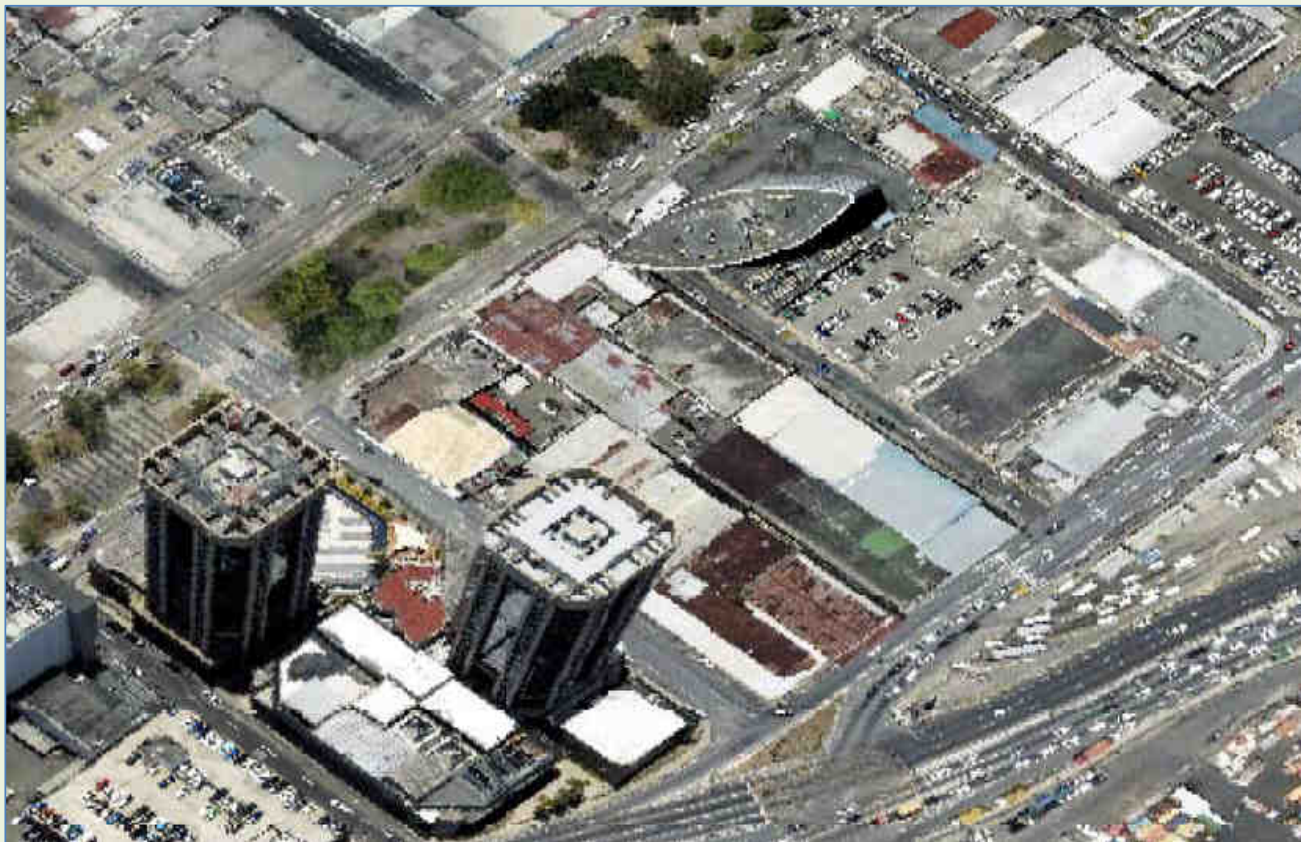
LiDAR Data

LiDAR has been captured in 2014 over the country but with development, is quickly out of date, and expensive to update in our current economy. Is it necessary to expend all this money on updating all the topographic data?



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LiDAR Data in Sample Area



Case Study Area in Port of Spain:

3-Block area where much of the strata development occurs

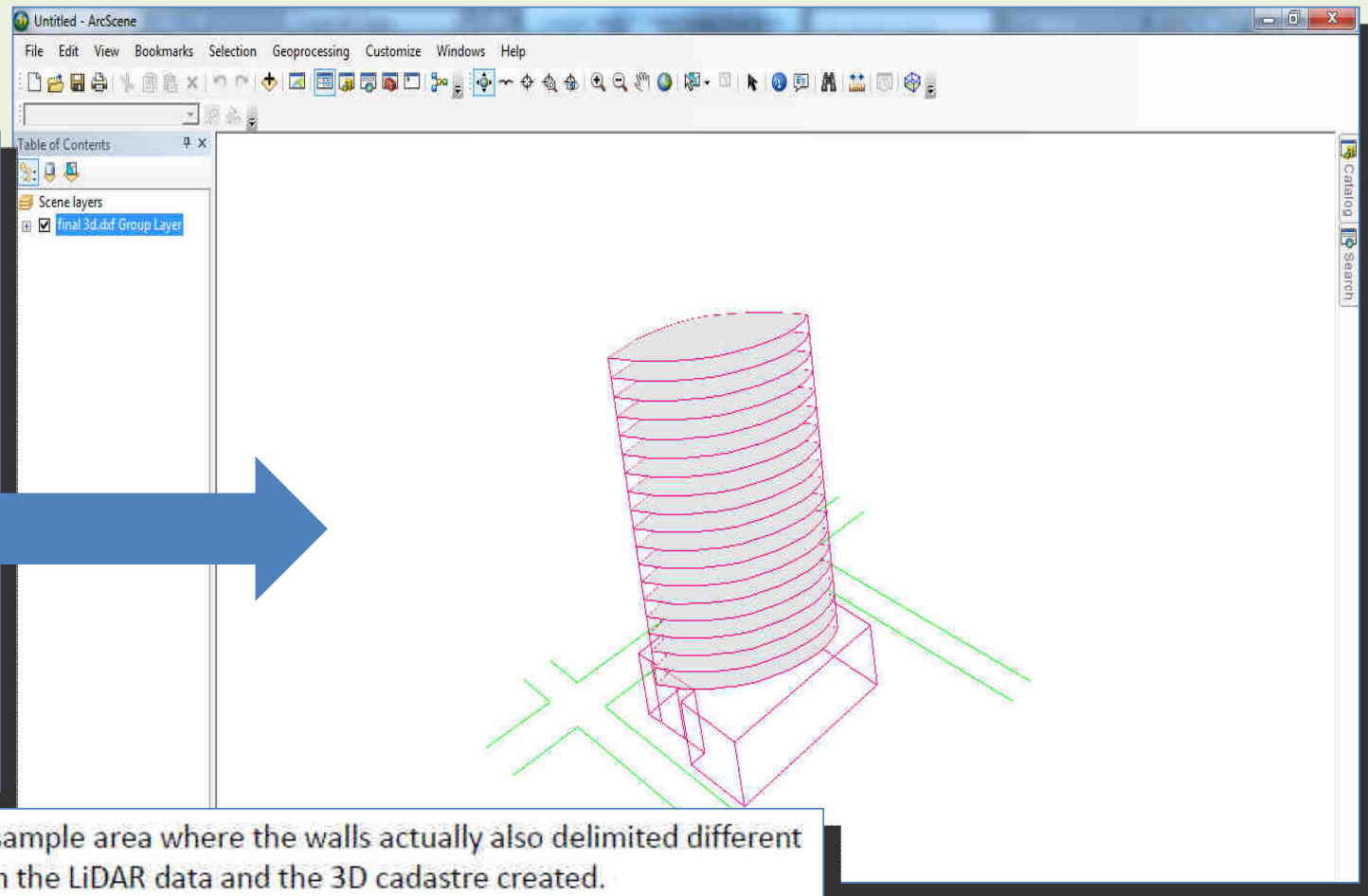
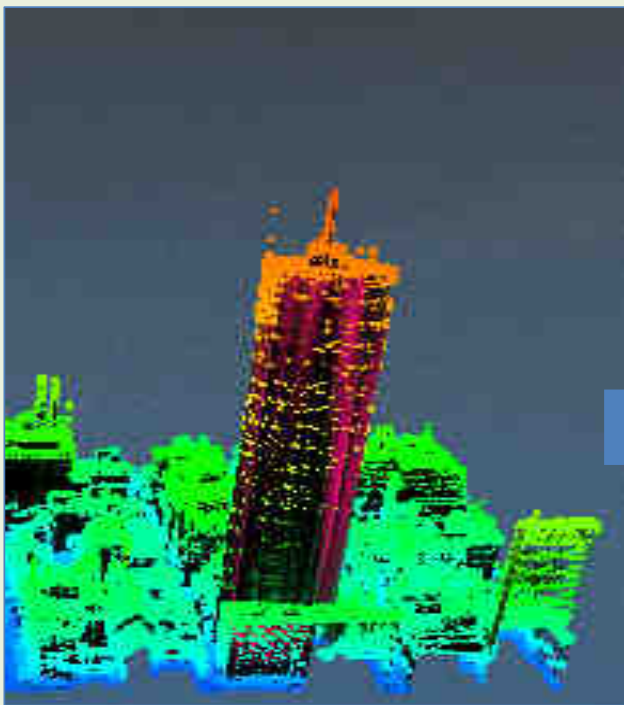
Cadastral Information System

- 3 blocks contain 16 individual land units or parcels,
- 3 multi storey buildings and 16 additional single or two storied buildings.
- 2 of those 3 multi-storey buildings belong to the state and house government ministries – 3D not necessary
- 1 parcel private and floors leased
- Therefore 1/16 parcels require 3D



An assessment of the parcels required to be placed in the 3D cadastre found that not all the high rise buildings should go into the 3D cadastre and in fact were unnecessary to be shown and in fact may conflict with the visualisation of the actual boundaries which in many instances should be extruded upwards from the existing parcel boundaries without the intricacies of juts and indentations of building walls.

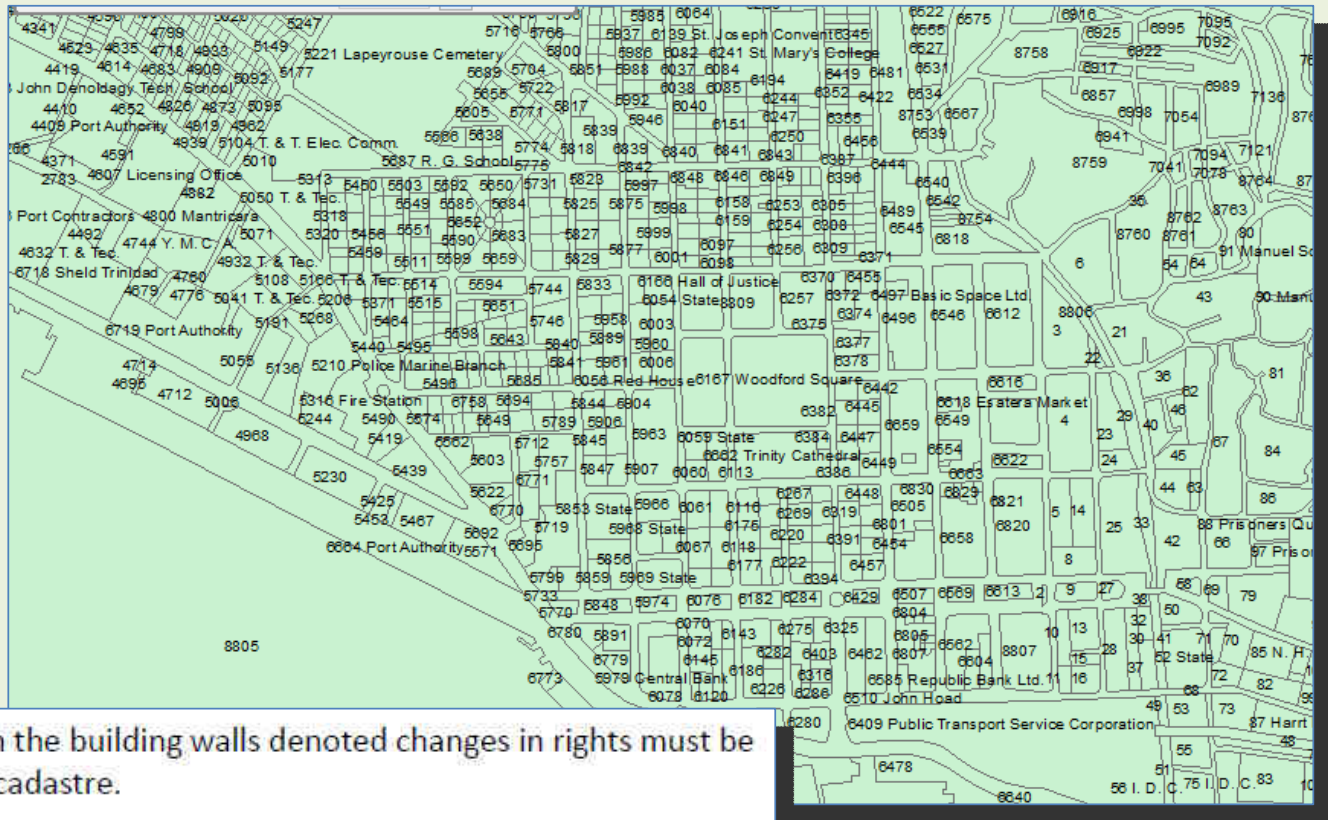
3D Cadastre Constructed



The one building in the sample area where the walls actually also delimited different rights was captured from the LiDAR data and the 3D cadastre created.

Conclusions

- Costs and times for 3D cadastre over whole CBD of city 1/16 of whole
- Further studies required for residential high rise areas



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