VALUE AUSTRALIA

A tool for analysing and visualising land valuation in different development scenarios

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The Power of Valuation Data

Value Australia will create scalable, efficient, secure and accurate tools that can respond to a variety of land and property types and uses across Australia, with **export market potential**.

- The automated valuations will tackle industry identified shortcomings including:
- sub-optimal and inconsistent urban and regional planning,
- forgone tax revenues,
- disputed valuations,
- inconsistent lending and insurance risk decisions (as highlighted in the Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry), and
- the inability to easily **capture land value uplift** to fund infrastructure.

Valuation Services Are Expensive and Out-of-Date

Fast, secure and accurate land and property valuations are critical for land management, planning, finance and risk decisions.

Property valuation services to the banking and finance sector cost over $350 million pa..

It is estimated that more than 75% of valuation costs are wage related.

This labour intensive approach is:

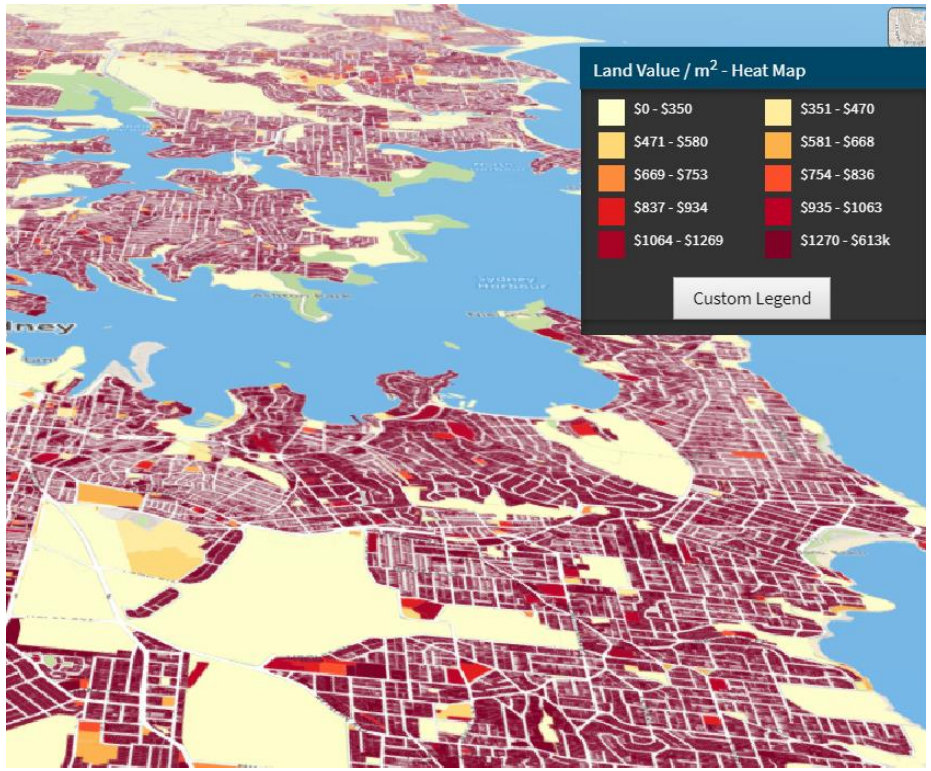
- Residential property focused
- Expensive
- Slow and laborious
- Subjective
- Often out-of-date

Understanding Land Value Uplift

Value capture has attracted much attention as a source of revenue to fund major urban infrastructure.

Currently, understanding value capture is:

- Expensive, driven by consulting reports
- Black box
- Data quality
- Limited ability to examine scenarios



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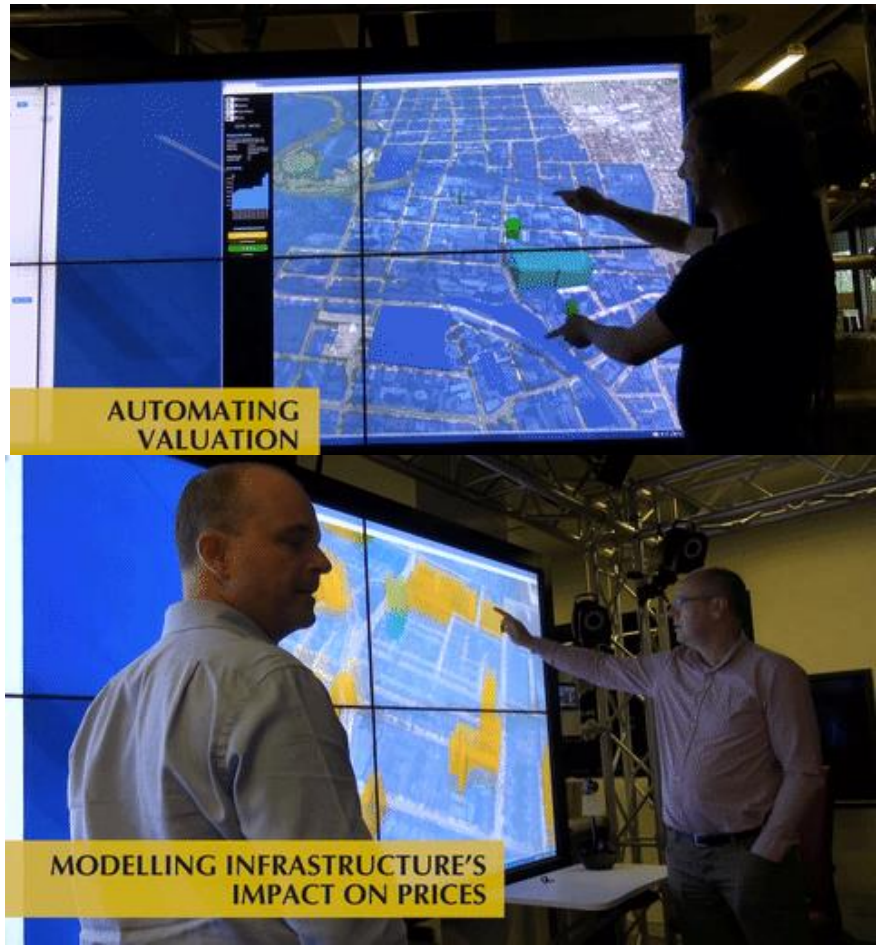
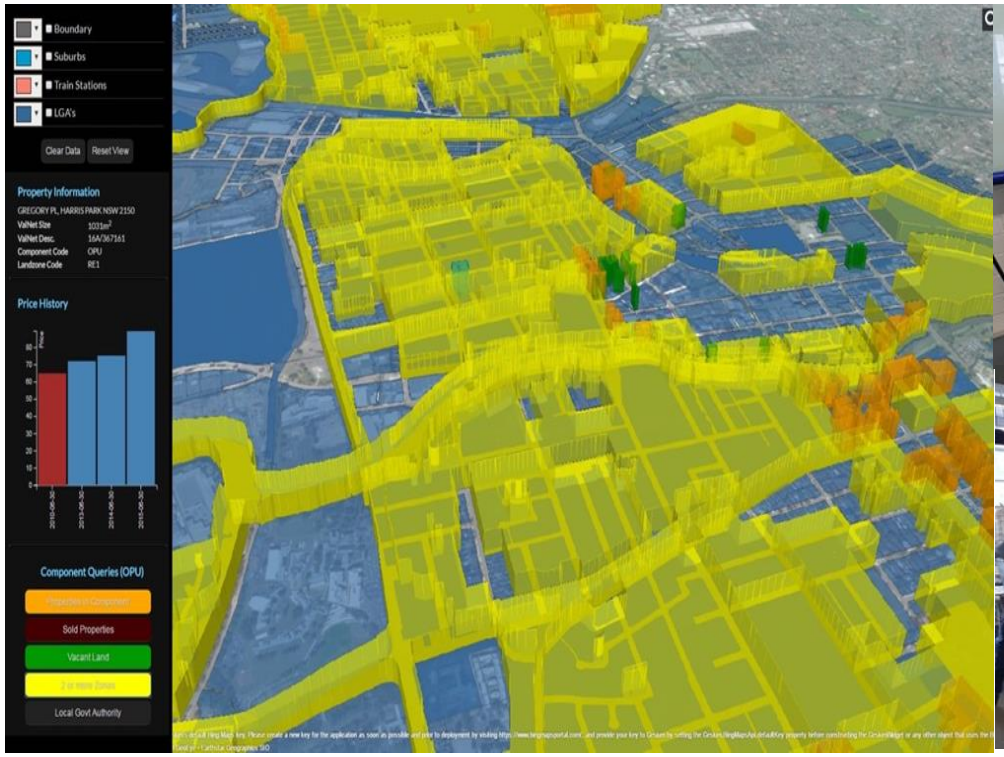
Value Australia

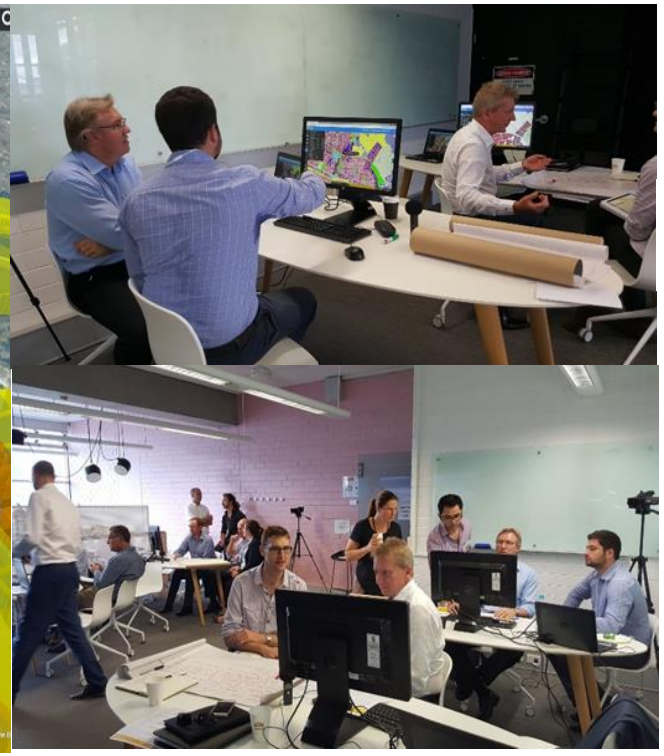
Value Australia will create more accurate and timely valuations to homebuyers, investors, businesses and governments, whilst reducing costs and risks.

Combining research, extensive data assets and using artificial intelligence this CRCP will deliver secure digital valuation models and tools that cover a broad range of land and property types across Australia and overseas.



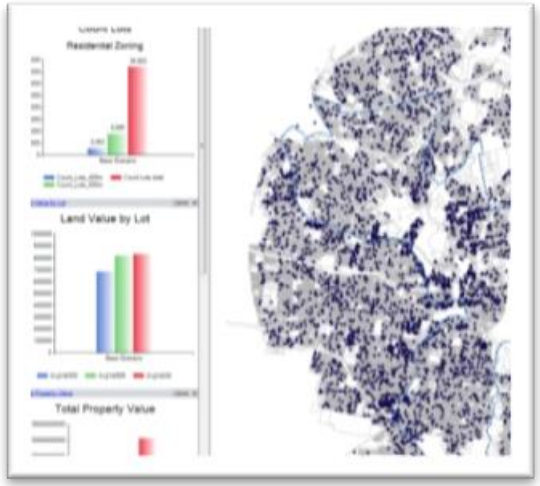
RAISE Project Collaboration

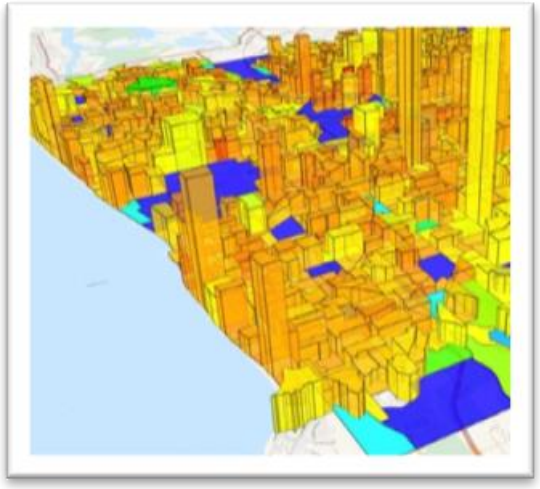




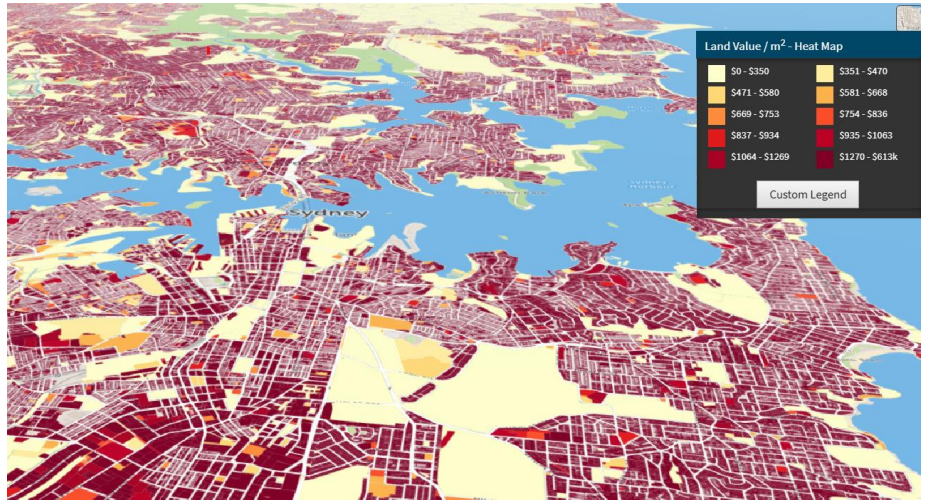
Exploring the Power of Valuation Data

- Develop open, cloud-based architecture to combine data, models, and visualisation.
- Develop an interactive scenario explorer 'toolkit'.
- Explore collaborative visualisation methods.
- Apply toolkit to automated valuation modelling.
- Apply toolkit to land value uplift modelling.





RAISE Valuation – Greater Sydney Area



RAISE Sydney – Data Sources

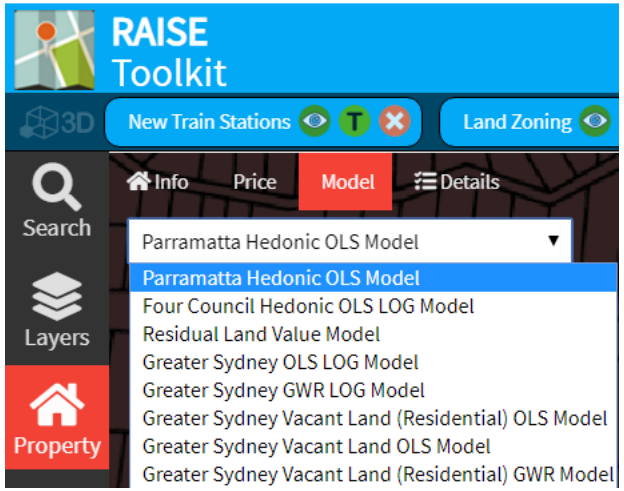
Data Source	Data Derived
Valnet Data-Property NSW	VG assessed land value, property & land dealing records (2001-2018)
APM AVM	Property transaction records (transaction time, sold price, land area size, property type, property structural attributes); APM AVM value
ABS Census	Digital boundaries and demographics (Income, Employment rates, Aged population, Migration)
NSW Department of Planning & Environment (DPE)	Land zoning, FSR, Maximum building heights
NSW Land & Property Information (LPI)	Cadastral and digital topographic database; LPI valuation components; Property characteristics, Points of Interest, Roads, Electric Transmission Lines.
NSW Department of Education (DET)	School locations and catchments
NSW Bureau of Crime Statistics and Research (BOCSAR)	Crime data (breaking and entering dwelling)
NAPLAN	School performance compared to national average
PSMA Australia	Geoscape (building footprints, building heights, materials)

RAISE Sydney – Valuation Models

Property Valuation OLS/GWR Model (Domain Property Sales)

Vacant Residential Land OLS/GWR Model (Valnet Vacant Residential Land Dealings)

Land Valuation OLS Model (VG Assessed Value)



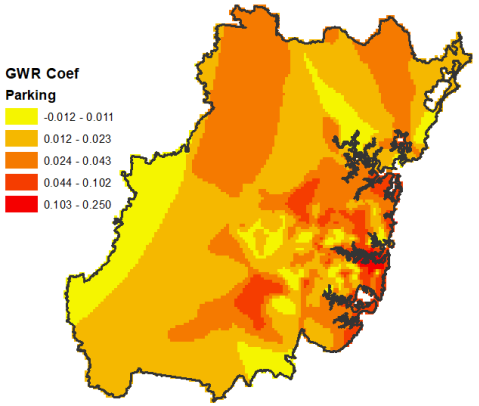
RAISE Sydney – Property Valuation GWR Model

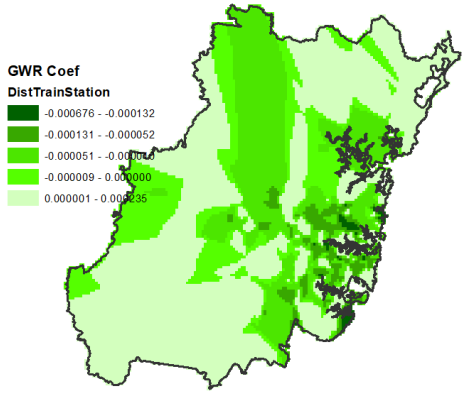
50,000+ sales record of residential properties in 2017 (Domain Property Sales)

13 variables selected in the GWR model:

Model	R Square	Adjusted R Square	AICc	Residual Squares
GWR Model	0.937	0.935	-7610	132.1

Variable	Description	Min	Max	Mean	Std. Deviation
House	Property Type-House (Yes=1)	-0.204	0.639	0.302	0.137
Semi	Property Type-Semi (Yes=1)	-0.135	0.528	0.194	0.094
Bedrooms	No. of Bedrooms	0	0.28	0.294	0.051
Baths	No. of Baths	-0.047	0.275	0.912	0.041
Parking	No. of Parking	-0.011	0.235	0.036	0.032
House_Land	House*LandSize	0	0.001	0.0002	0.0002
DistPrimSC	Distance to Primary Schools	-0.0002	0.0003	0	0.0001
DistTrainST	Distance to Train Stations	-0.001	0.0002	-0.00003	0.00006
DistSwimPl	Distance to Swimming Pools	-0.0005	0.0002	-0.0002	0.0001
DistTranLI	Distance to a High Voltage Electrical Transmission Line	-0.0002	0.0007	0.00003	0.0001
FAM_Inc	Weekly Family Income	-0.0001	0.0005	0.0001	0.00008
Main0_50	Within 50m of a Main Road (Yes=1)	-0.193	0.109	-0.022	0.036





GWR Valuation Model Coefficient Raster

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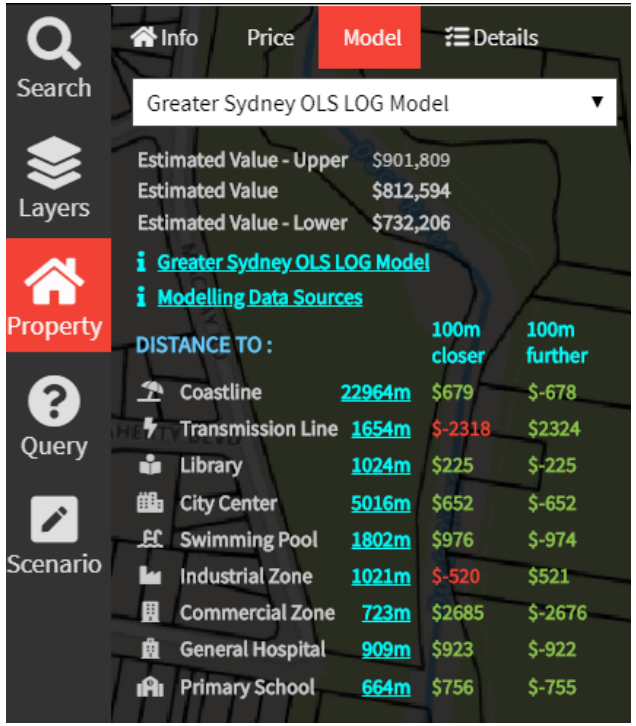
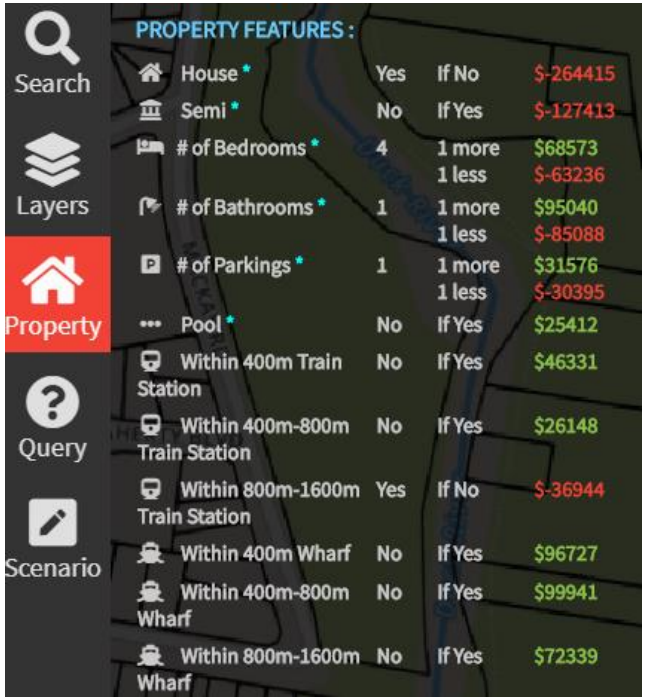
RAISE Sydney – What/If Scenarios Screenshots





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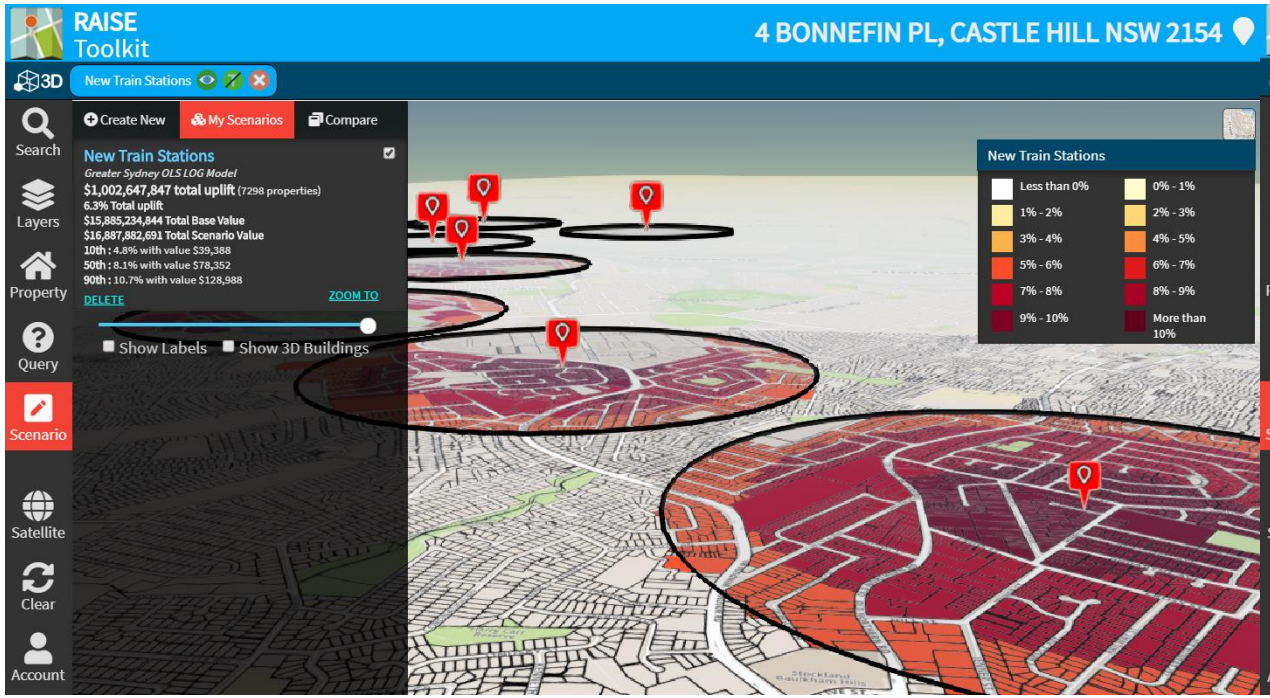
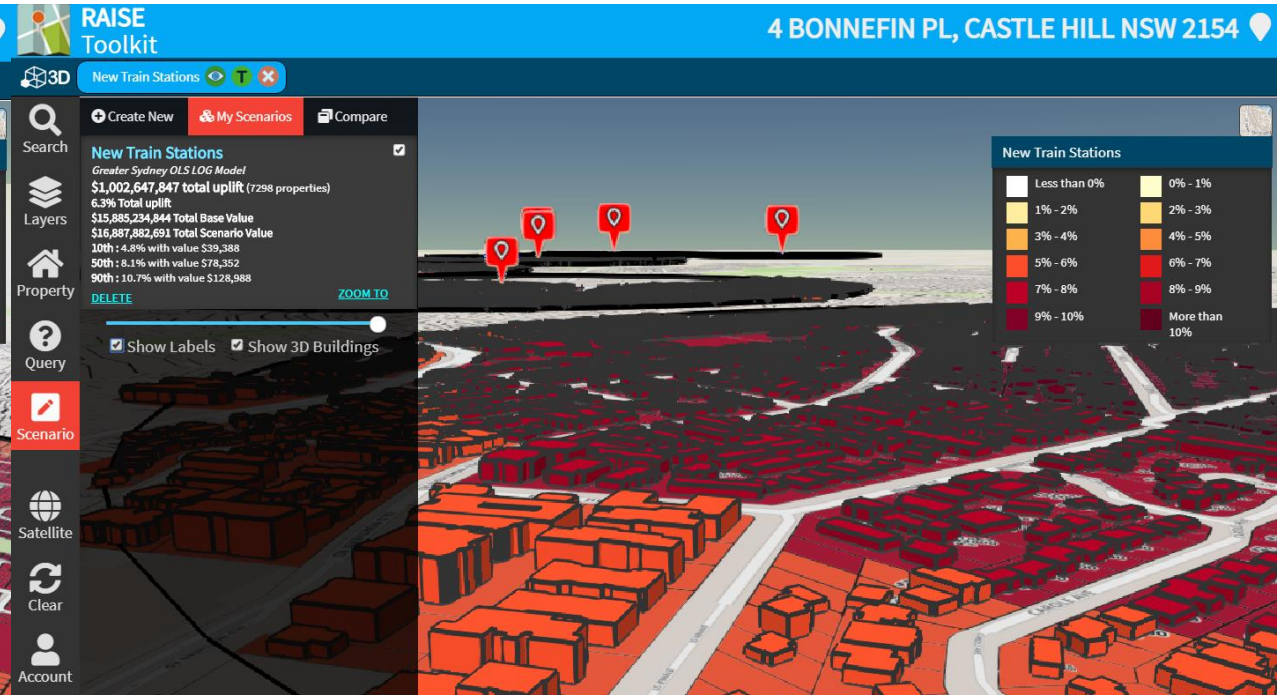
RAISE Sydney – Value Uplift Scenario Screenshots





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Project Overview and Roadmap

RAISE 1

Western Sydney

- Automated Property & Land Valuation
- Scenario exploration: Value uplift from transportation infrastructure

RAISE 2

Greater Sydney and Brisbane City Council

- Automated Property & Land Valuation
- Scenario exploration: Value uplift from transportation infrastructure
- Scenario exploration: Value uplift from changing planning controls
- Community Version

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Urban, peri-urban and regional Australia

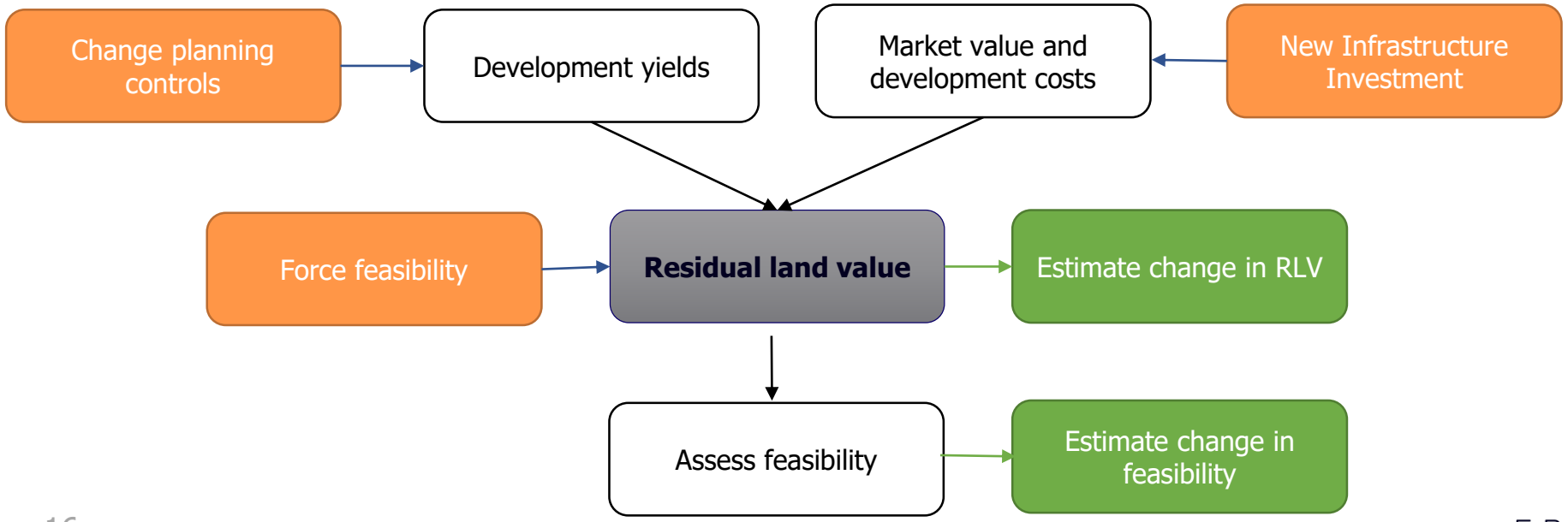
- Automated mass appraisal of land and property valuation
- Infrastructure Value Capture
- Rezoning Value Capture
- Economic Feasibility Assessment of Property development

2016 2017 2018 2019

RAISE Rezoning Tool – Development Feasibility Model

RAISE Rezoning Tool – Conceptual Framework

- Predict the effects of planning controls on RLV
- Predict the effects of development assumptions on RLV
- Predict the effects of planning controls on ‘development feasibility’
- Predict the effects of development assumptions on ‘development feasibility’
- Predict the effects of infrastructure projects on ‘development feasibility’



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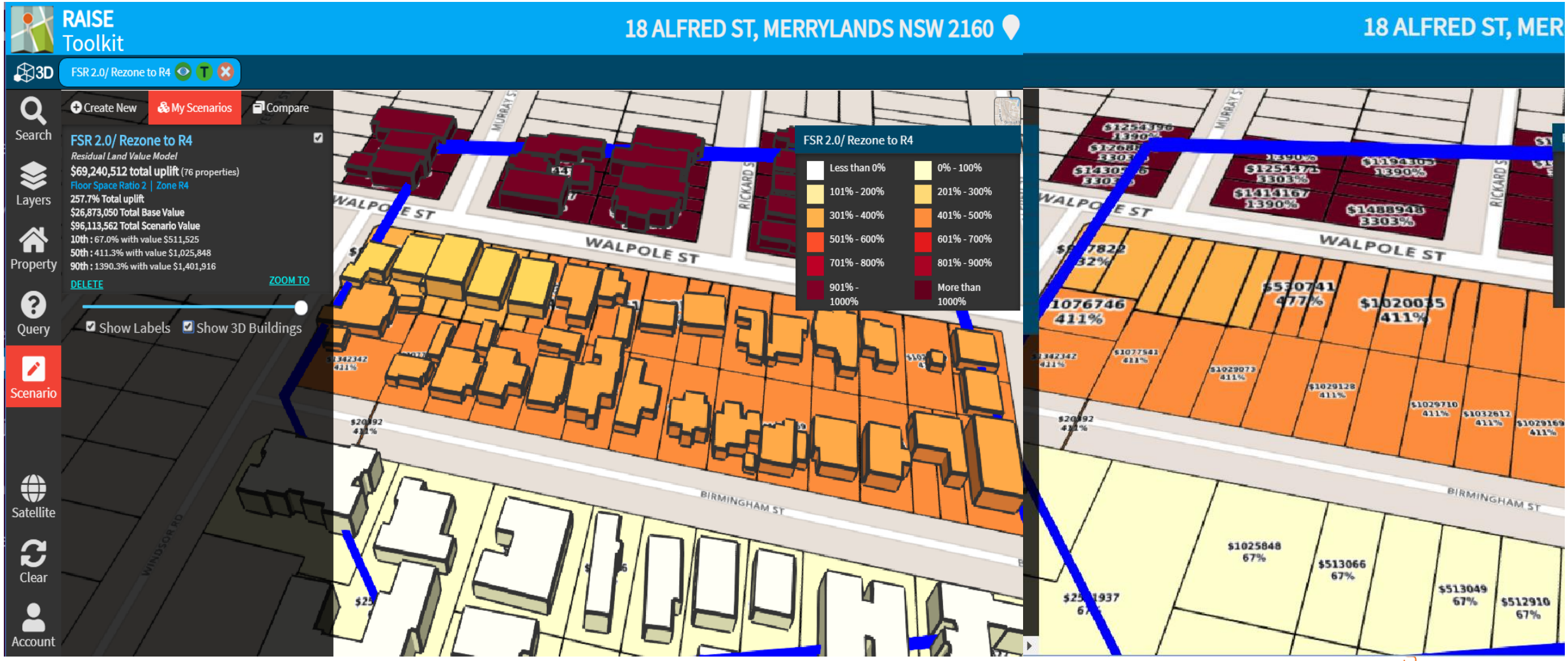
RAISE Rezoning Tool – Development Scenarios



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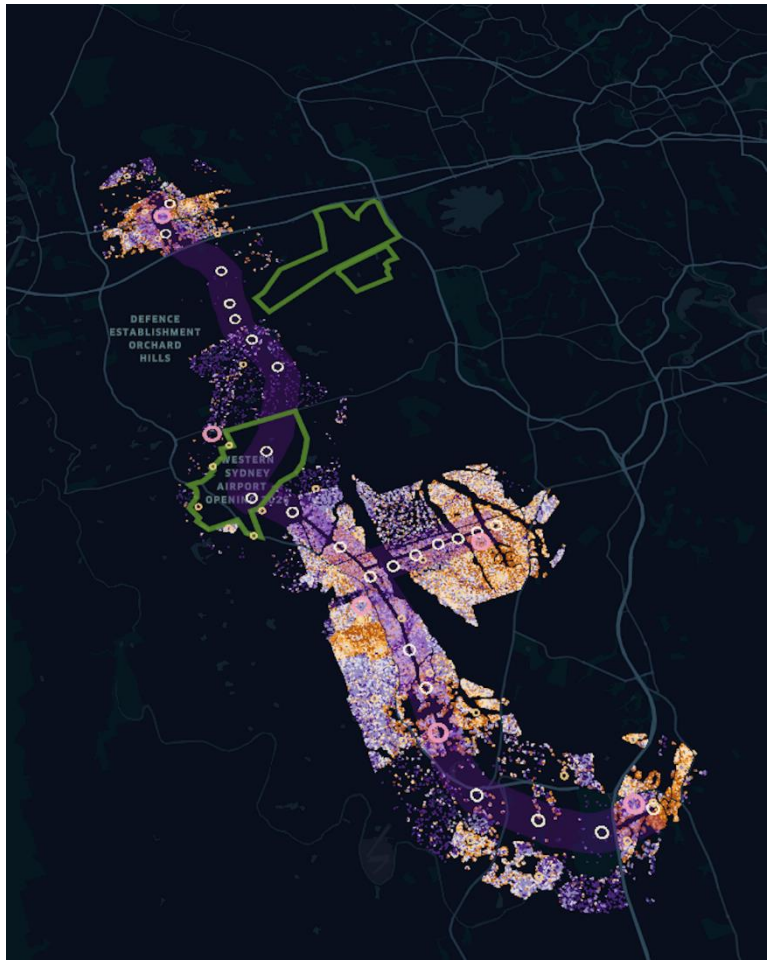
URBAN AI

We are developing a predictive model for property prices, and testing these values on a potential future market based in and around the **Western Sydney Aerotropolis.**

We have created an **algorithmically generated future '2036' city** at the Western conurbation as a test-bed for future property valuation.

Additional assumptions of the future western Sydney can be codified, and valued as additional scenarios.

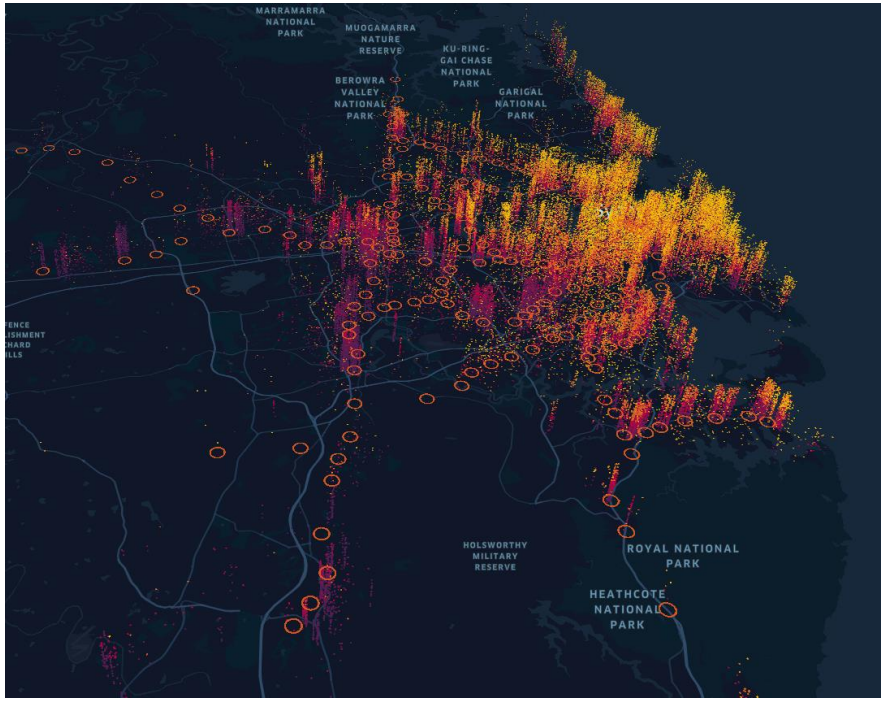


URBAN AI

The UrbanAI is powered by a rich set of past property values - over **3 million property sales transactions** for Greater Sydney

Beyond time and price, over 50 additional attributes inform the model, such as:

- Property attributes (bedrooms, houses *vs.* units, viewsheds, *etc.*)
- Locational attributes (proximity to a coastline, *etc.*)
- Transport access attributes (public *vs.* private transport access to employment, education, amenities, *etc.*)
- Planning constraints (zoning, flood overlays, *etc.)*



Concluding thoughts

- **Big data, ML and AI** can be used to generate **land value model predictions**
- **Open data and model transparency** can **support land valuation process**
- **Rapid Analytics** can be use for exploring **What if? Future city scenarios**
- Data driven tools such as RAISE, should be used to **support infrastructure sequencing** and future city planning.
- **Training and Education** – absolutely critical we train the next generation of city planners, policy-makers with skills in smart cities, big data, ML, AI, city analytics….

Relevance to Growth Areas