

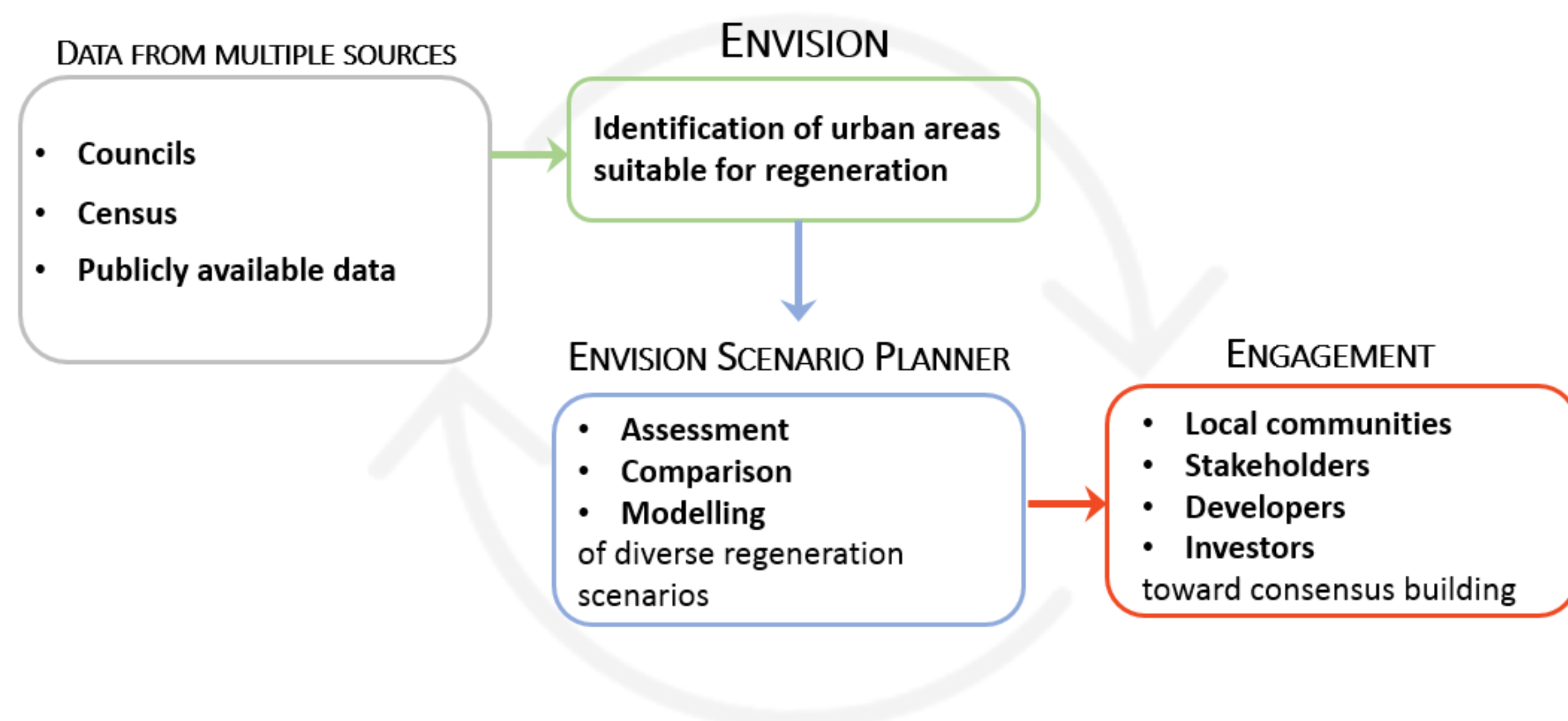
Challenges and potentials of the use of geospatial tools for evidence-based decision-making in New Zealand's cities

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Cities are facing many challenges as they seek to accommodate an increasing population, without degrading the local environment and also seeking to improve liveability, health and wellbeing. Decision-support tools are increasingly used in urban planning to help decision-making through the **modelling of trade-offs and effects of urban regeneration**.

For New Zealand's cities, we developed geospatial tools (ENVISION and ESP) to support decision-making in relation to residential, institutional and commercial redevelopment. The tools provide urban practitioners with a **deeper understanding of environmental and socio-economic effects** of 'business as usual' or alternative redevelopment scenarios.



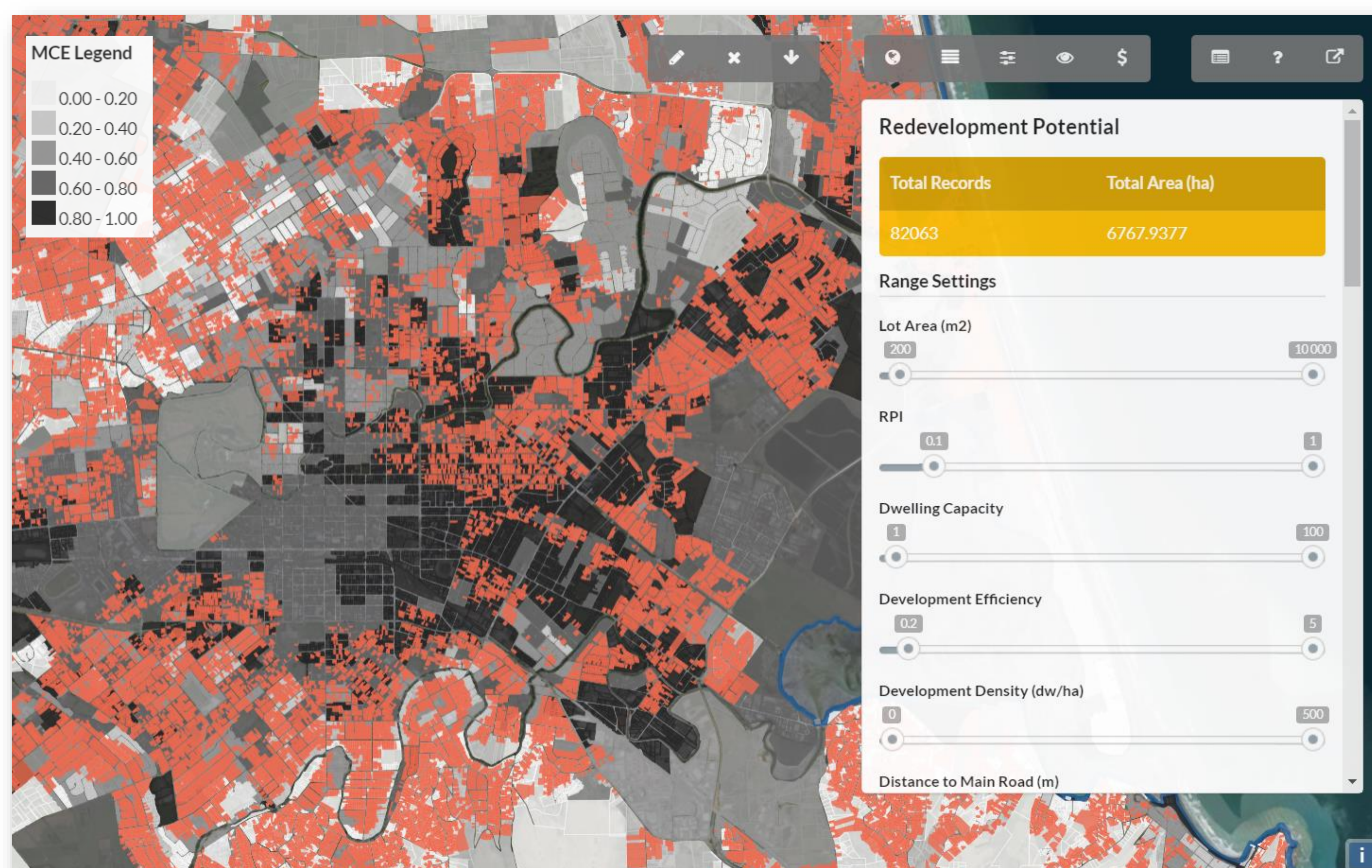
The suite of tools (ENVISION and ESP), their spatial data sources and stakeholder engagement

The research developed tools ENVISION and ESP are funded by the National Science Challenge 11 and free to use by local authorities.

Where to regenerate?

ENVISION is a geospatial web-based tool to:

- identify urban areas across the city suitable for specific regeneration strategies, through user-defined multi-criteria evaluation (MCE);
- identify land parcels prone for redevelopment, considering a Redevelopment Potential Index (RPI), site-specific infrastructure, amenities, and constraints;
- assess financial viability for diverse regeneration scenarios (at neighbourhood scale)



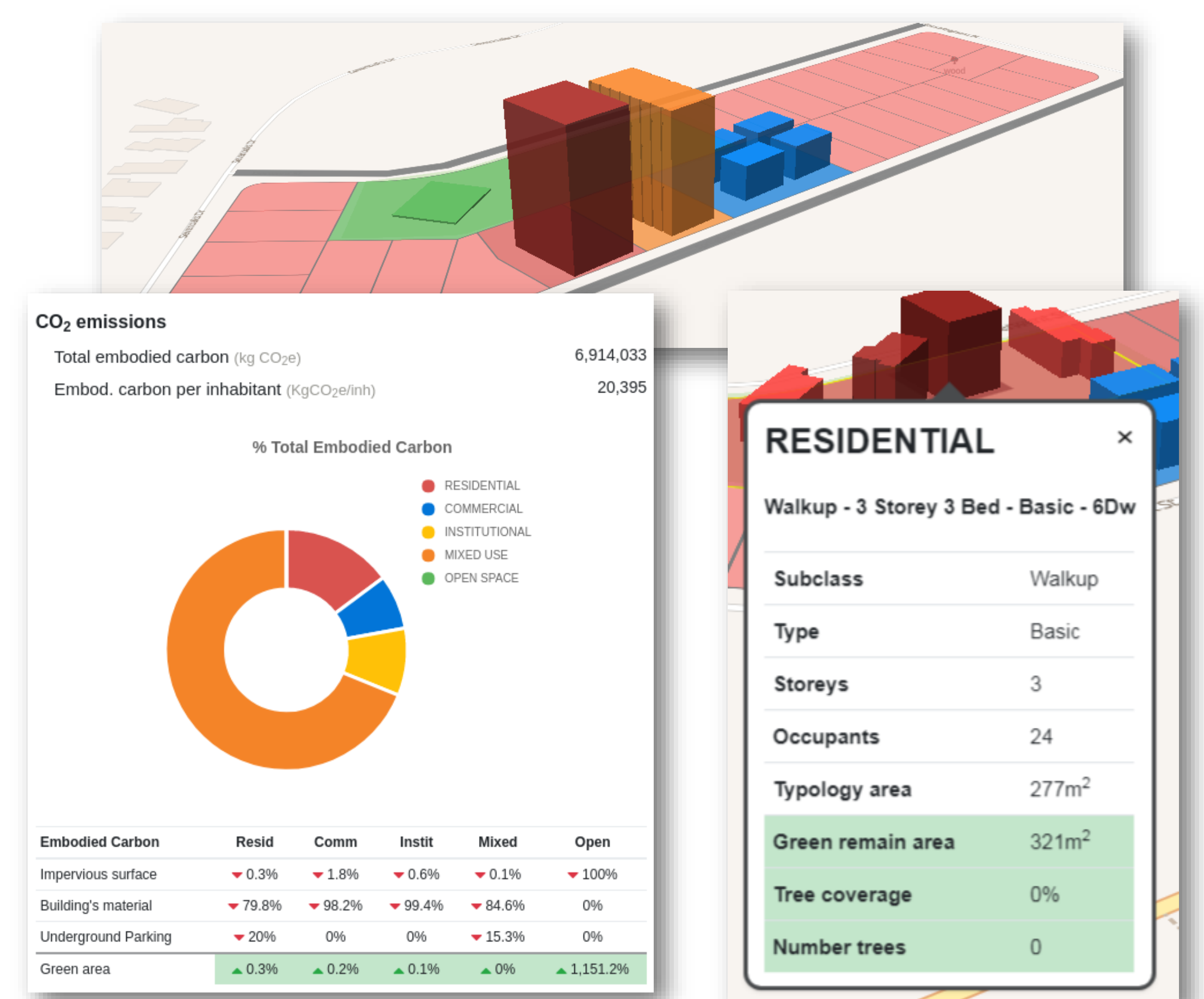
Screenshot of suitable land parcels (in red) for a regeneration scenario identified through ENVISION

How to regenerate?

Envision Scenario Planner (ESP) is a geospatial, web-based tool, which enables the modelling, visualisation and assessment of environmental and socio-economic costs and benefits of regeneration scenarios at neighbourhood scale.

Urban practitioners can **model and compare alternative regeneration scenarios** for an urban neighbourhood, such as:

- **Urban intensification** through land amalgamation and allocation of high density typologies, interspersed with green spaces providing environmental and socio-economic benefits;
- **Minimization of a city's carbon foot print** through carbon sequestration of open spaces, energy- and water-efficient buildings and allocation of cycle-ways;
- **Balancing environmental and economic costs** through buildings and open spaces enabling water capture and energy generation;
- **Exploration of economic feasibility** through evidence-based cost and benefit assessment of redevelopment



Screenshots of ESP: scenario visualisation and example assessment reports

To make evidence-based decisions, however, a wide range of spatial data and information is required and the outcomes of planning tools can heavily depend on the underlying data availability and quality. **Key challenges** are:

Data collation

- Stakeholder fragmentation along the data life-cycle
- Ownership and access issues / data sensitivity
- Culture of data sharing
- Trust in data quality
- Batch access to data
- Data discovery & metadata
- Multiple data sources / types

Data integration

- Resources
- Fit-for-purpose spatial data
- Dynamic data / temporal resolution
- Multiple data types / formats
- Scale issues
- Alignment of information (expert review, trust, aggregation etc.)
- Selection of data among alternatives

Use of ESP/ENVISION

- Tools fit local needs
- Translation of plans to modelling scenarios
- Stakeholder engagement
- Trade-off between national frameworks & local context
- Tailored support
- Adopted practicalities vs. cutting-edge research
- Innovation potential vs. constraints
- Multi-user design

Identified challenges with respect to data collation, data integration and the use of the tools

New Zealand's urban planning community faces challenges regarding the **availability and accessibility of fit-for-purpose (spatial) data**. There are visible differences in data availability, the use and understanding of essential data, and the ability to integrate them into tools for urban planning; yet, the main challenge appears to be rooted in cultural structures beyond single case study sites.

Our research highlights the benefits of being able to use both data- and information-rich planning support tools to tackle urban challenges. **Next, we advocate for a more open approach towards data sharing and the use of planning tools.**