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ACTIVE TRANSPORT ANALYTICS MODEL

Model Introduction, Overview and Roadmap

January 2022

github.com/atam-analytics

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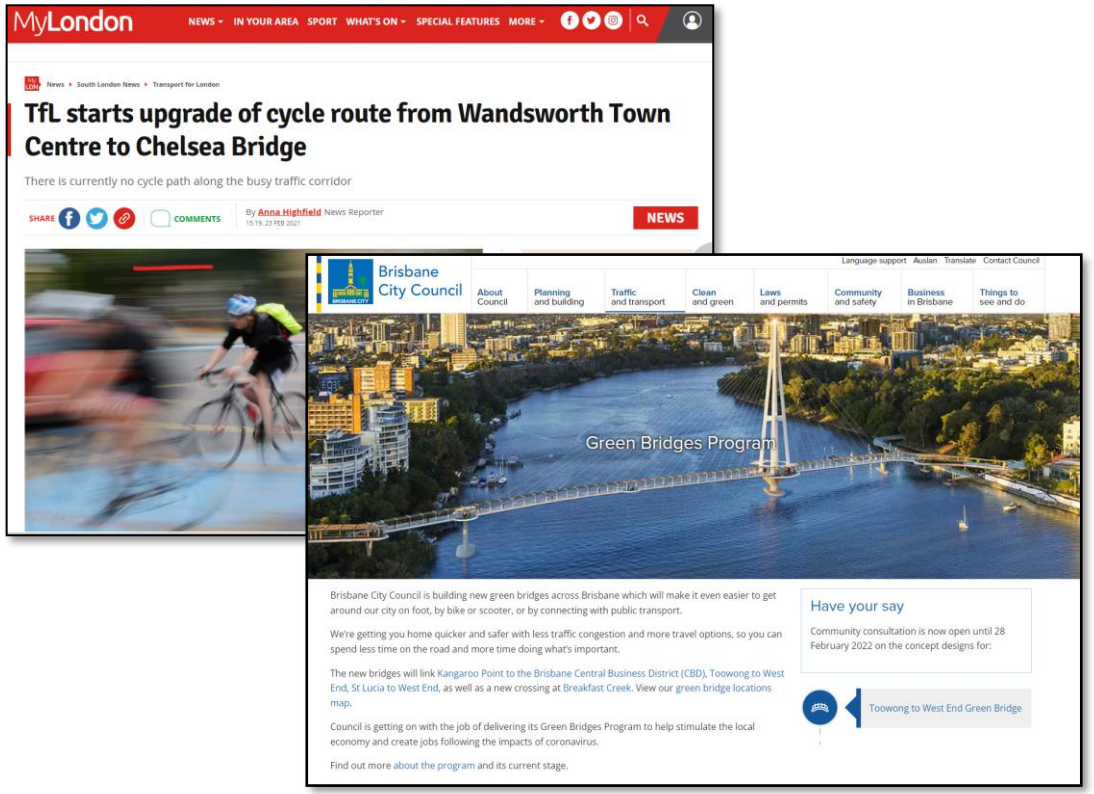
ACTIVE TRANSPORT ANALYTICS MODEL

- Active Transport Analytics Model (**"ATAM"**) is a new strategic transport modelling and data visualization framework for Active Transport (**"AT"**) (i.e. cycling and walking modes) as well as emerging micro-mobility modes
- Proof of Concept (**"POC"**) model developed for cycling in Brisbane, QLD Australia
- Model structure and outputs – key features:
  - **Networks** – detailed networks, which consider factors such as safety to AT users, are a model input. Networks can be curated from sources including OpenStreetMap (**"OSM"**) and other open data. Future scenario network changes can be tested for project appraisal.
  - **Demand** – demand matrices are an input and base year demand can be estimated from available sources such as household travel surveys, counts, Strava data, mobility data or other strategic model outputs. Future demand could be estimated based on demographic projections or demand matrices could be re-assigned from other strategic modelling tools.
  - **Outputs** – key outputs that ATAM can produce include: (i) volumes by link, (ii) journey times (by route and Origin-Destination **("OD")** matrix), (iii) analysis of trips using a particular link (i.e. Select Link Analysis **("SLA")**)
- ATAM is built on open-source tools and does not require proprietary transport modelling software packages
  - The core model functionality uses open-source tools - Python, Jupyter notebooks and QGIS (Tableau Public has been used to visualize data as well). No proprietary transport modelling software packages are required.
  - Brisbane POC demo/example model code and data is openly available on GitHub (https://github.com/atam-analytics/atam) and serves as an example to implement the ATAM modelling framework in other regions
- Next steps – improvements to the Brisbane POC model, develop POC models for other cities globally, build awareness and example use cases, feedback & improvement

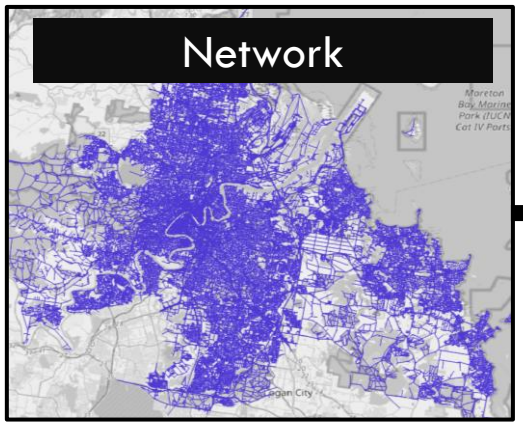
ATAM HAS BEEN CREATED TO FILL THE GAP FOR MODELLING OF ACTIVE TRANSPORT AND EMERGING MICRO-MOBILITY MODES, WHICH ARE SUSTAINABLE FORMS OF TRANSPORT

- Most government agencies responsible for transport planning and investment decisions have more mature modelling tools for road and public transport-focused planning; active transport modelling has often lacked dedicated analytical tools
- Modelling of active transport has some differing requirements and considerations to other modes e.g. different route choice factors (road safety, gradient/elevation, etc.), more detailed networks required, however networks are not usually congested. These potentially give raise to different modelling approaches.
- In software development, new open-source packages and tools are being developed and improved by the community
- Globally there are trends towards to reducing emissions and reaching net zero targets. Active and micro-mobility modes are more sustainable and assist in achieving these targets.
- In the past years, cities around the globe have embraced micro-mobility (e.g. e-Bikes and e-Scooters), however these are often not modelled in existing strategic transport analysis tools



ATAM USES NETWORK AND DEMAND INPUTS, UNDERTAKES AN ASSIGNMENT, AND PRODUCES MULTIPLE OUTPUTS FOR PLANNING AND ANALYSIS

Network



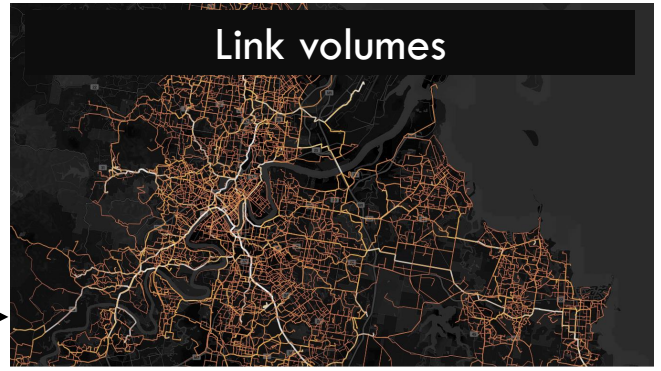
Demand

Base year demand is estimated from available data sources

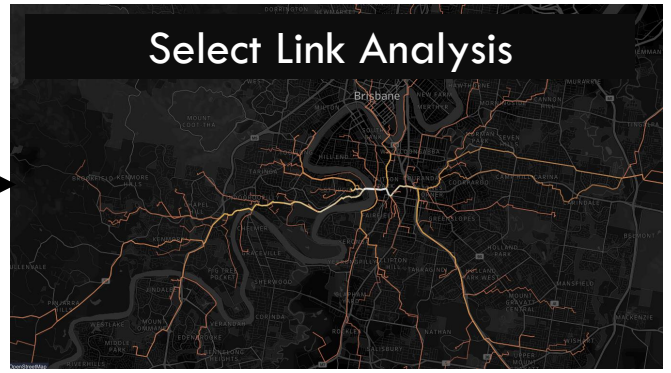
Route Choice

Network assignment undertaken for each demand OD pair

Link volumes



Select Link Analysis

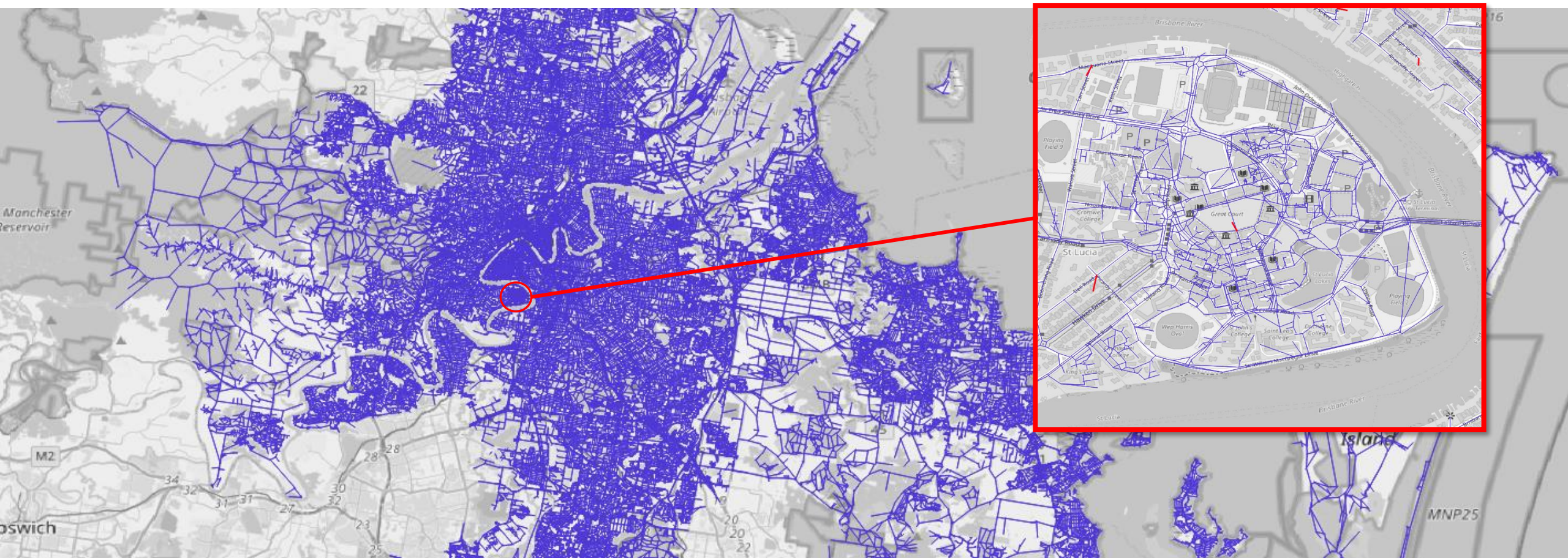


Raw output files

Path files, link outputs, time/cost matrices, CSV format

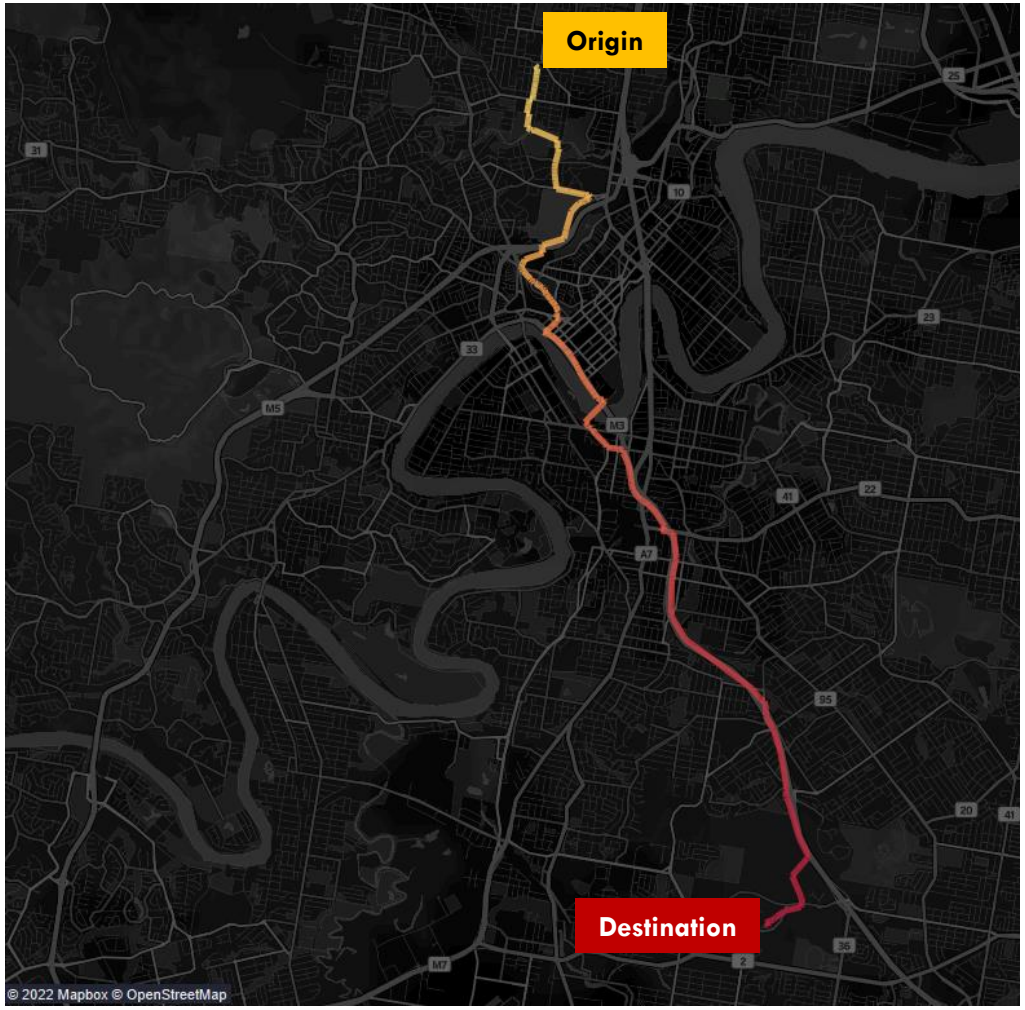
ATAM USES DETAILED NETWORKS WHICH CONSIDER FACTORS SUCH AS ROAD HIERARCHY AND SAFETY FOR CYCLISTS

ATAM networks can be curated from sources such as OSM and open data, and which consider factors which are assumed to effect route choice such as (i) safety to AT users, and (ii) elevation/gradient (future improvement).

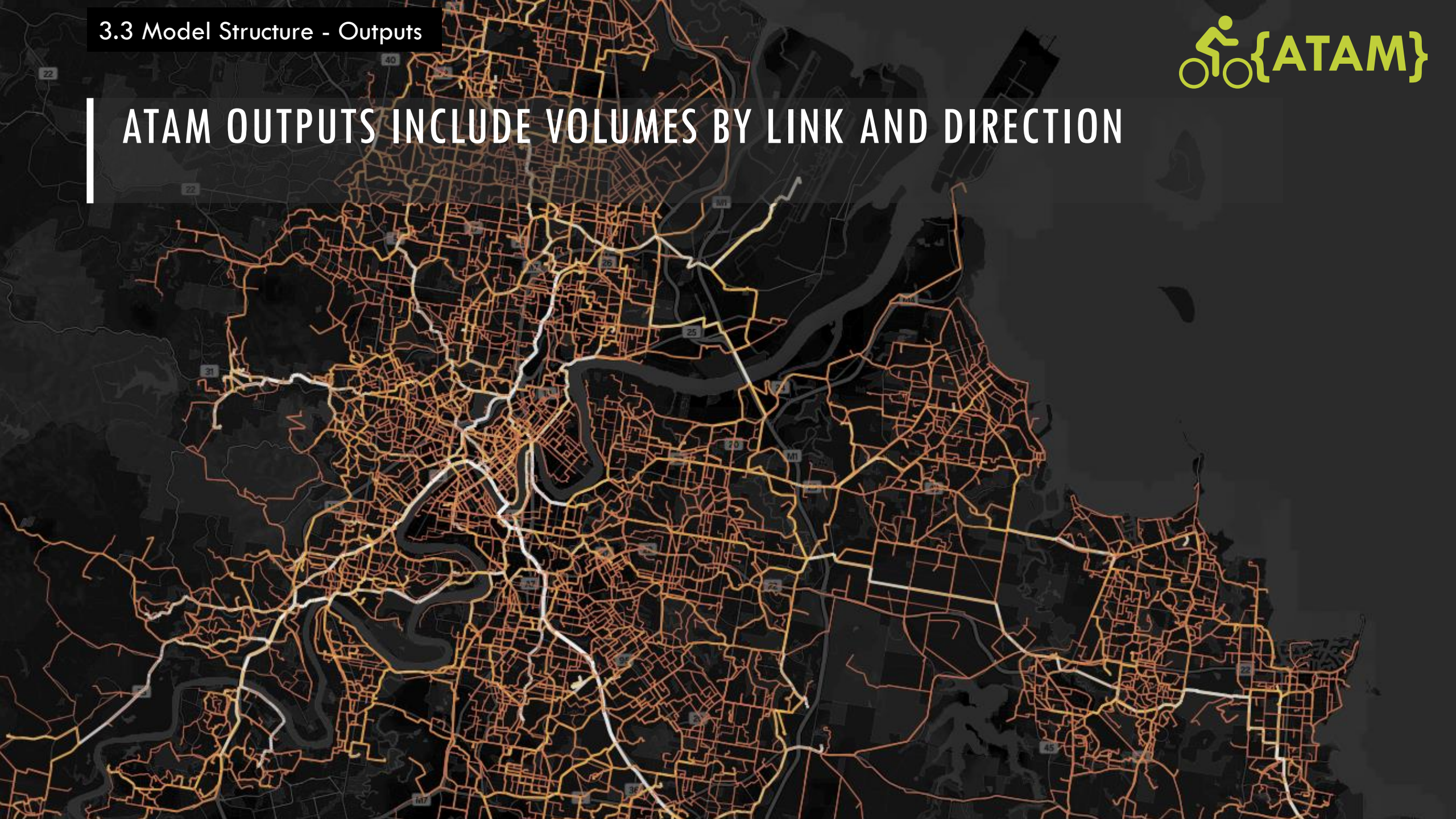


DEMAND MATRICES ARE ASSIGNED TO THE NETWORK

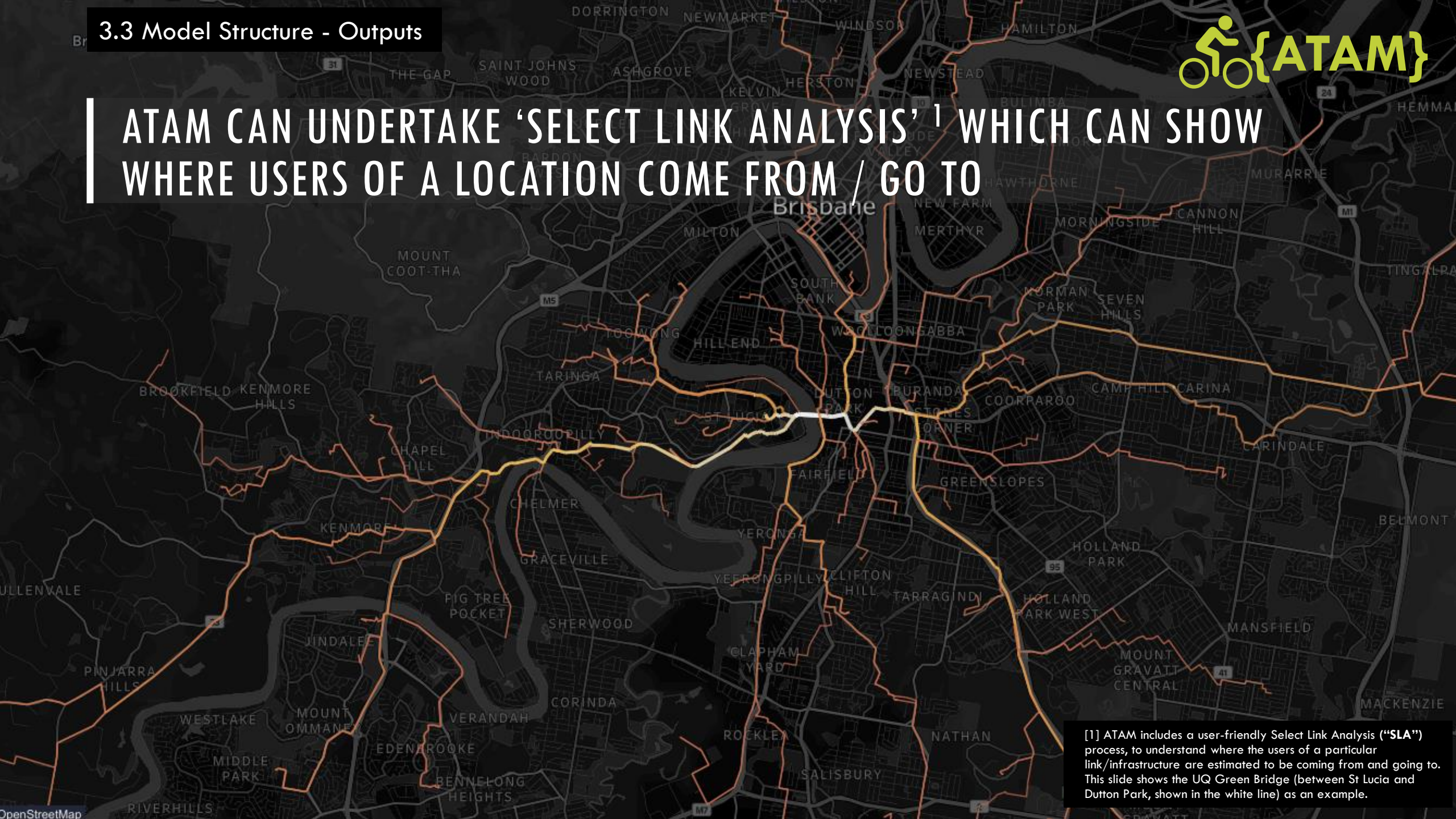
- Base year demand matrices are an input and can be estimated from multiple sources.
  - Queensland Travel Survey open data has been primarily used for the Brisbane POC (Brisbane City Council cyclist volume survey data to be used for future matrix refinement)
  - Strava's 'Global Heatmap' could be used for validation across the full network (available globally)
  - Demand could be assigned from other strategic modelling tools
- Future demand could be estimated based on demographic projections or other strategic modelling outputs, etc. and assigned in the same manner.
- Shortest path network assignment is undertaken using the Python NetworkX (example visualization shown right). Route choice is based on a generalised cost formulation considering link lengths, road hierarchy / road safety factors, and other factors in future. Active transport networks are assumed to not be capacity-constrained and costs do not change based on volume.



ATAM OUTPUTS INCLUDE VOLUMES BY LINK AND DIRECTION

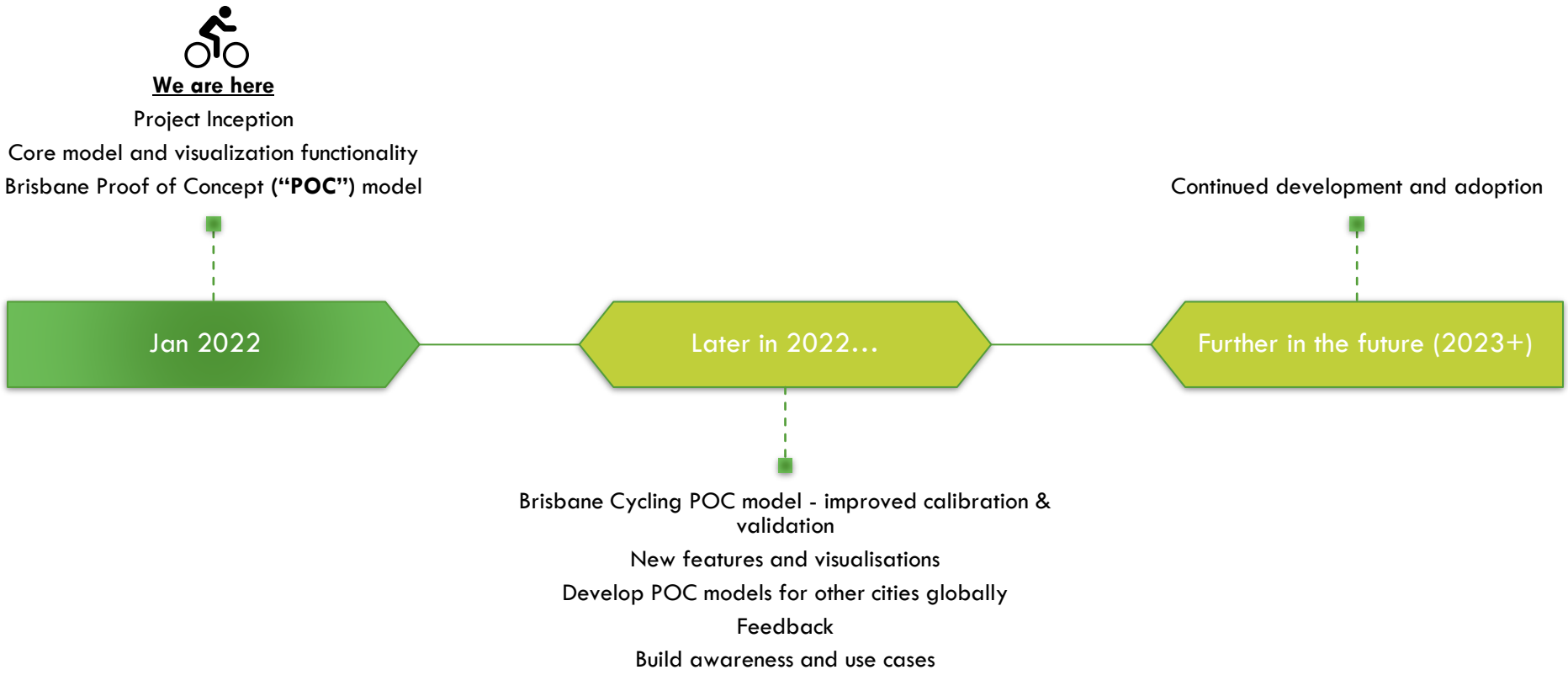


ATAM CAN UNDERTAKE 'SELECT LINK ANALYSIS' [1] WHICH CAN SHOW WHERE USERS OF A LOCATION COME FROM / GO TO



[1] ATAM includes a user-friendly Select Link Analysis (**"SLA"**) process, to understand where the users of a particular link/infrastructure are estimated to be coming from and going to. This slide shows the UQ Green Bridge (between St Lucia and Dutton Park, shown in the white line) as an example.

NEXT STEPS / FUTURE ROADMAP FOR ATAM



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