SOUTH WEST SYDNEY RAIL LINK EXTENSION

An Accessibility-Oriented Case for City Shaping Infrastructure

UDIA NSW **Research and Policy** August 2022

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ABOUT UDIA NSW

Established in 1963, the Urban Development Institute of Australia NSW (UDIA) is the peak industry body representing the leading participants in urban development in NSW. We have around 450 members spanning all facets of the industry including developers, consultants, local government, and state agencies. We maintain a strong focus on housing supply and the successful delivery of greenfield and brownfield precincts across Greater Sydney. Our advocacy is based on creating liveable, affordable, and connected smart cities.

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EXECUTIVE SUMMARY

The proposed South West Rail Link (SWRL) Extension provides a great opportunity to better link the West with the West and further support the Aerotropolis as the new city in Greater Western Sydney.

This key City Shaping project will improve access from the Aerotropolis (Bradfield) to the Leppington (Strategic Centre) and the Edmondson Park and Glenfield, which is a major station interchange that provides direct rail access to Sydney Airport and to the broader Sydney rail network. It also provides the opportunity to deliver new Transit Oriented Design (TOD) station centres and the planning foundation to provide a new rail line south towards Campbelltown and Macarthur

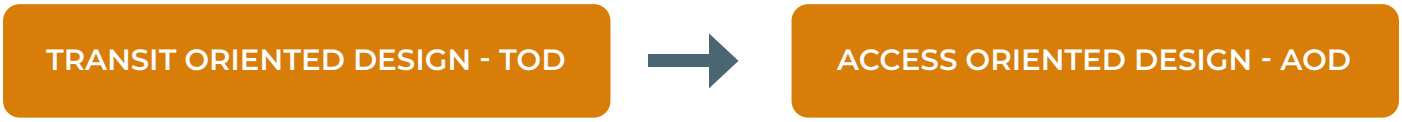
In delivering the SWRL Extension, we must learn from the mistakes made with the West Sydney Airport Metro (WSA Metro), which failed to provide the optimal number of stations to improve access over the long term to connect with the Aerotropolis and the lack of integrated land use planning to achieve city shaping momentum and maximum growth. The failure of Leppington to emerge as a Strategic Centre also serves as a reminder of the challenges in achieving integrated development, despite having access to a heavy rail line since 2015 and being rezoned in 2013.

Based on our research in collaboration with Professor David Levinson at the University of Sydney, **UDIA contends that cities and centres must be built on access, as way to bring jobs and homes closer and opportunity to maximise public transport use.** UDIA has identified three new station centres that could be provided on the SWRL Extension at Rossmore, South Creek, and Bringelly Road, which could emerge as next generation accessible centres building on, but extending, the land use outcomes, which is currently being delivered successfully at Edmondson Park.

We call for a new business case process for major rail lines in NSW that better recognises the enormous city shaping value offered by having integrated land uses, which thrive on being close to public transport. From here, we recommend the use of the Access Oriented Development modelling recommended by Professor Levinson, using TOD principles at the proposed mixed use station centres, to provide for targeted locations to support the 184,000 dwellings needed in the Western Parkland City over the next 20 years. The use of digital planning tools can help plan for future growth, based on a quick road-test of design options and rapid business cases, to prioritise funding for enabling infrastructure.

We urge the Government to work closely with industry on the future planning of key station centres, to provide market-tested outcomes and an urban form which can be embraced by investors that leads to growth outcomes. Better integration of land use planning with the business case, based on a “beyond the corridor” approach which integrates the operational rail corridor with adjoining land as part of the delivery of the rail infrastructure project. This will lead to better community and place outcomes, and will reinforce the viability of the rail project.

The NSW Government needs to improve the way rail lines are delivered to support growth, provide a location for housing supply, increase public transport use, and better link the West with the West, which is centred on the new Nancy Bird Walton Airport and the Bradfield Aerotropolis.



INTRODUCTION

New South Wales (NSW) is in the middle of a housing supply and affordability crisis. We have failed to consistently build enough of the right kinds of homes needed to continually put downward pressure on affordability. Sydney is Australia's global city and to compete internationally, Government must focus on Sydney's global competitiveness. Ranked the second least affordable city in the world, behind only Hong Kong (*Demographia 2022*), action is needed to boost both housing supply and the accessibility to jobs and amenities for residents.

To resolve this, NSW needs to take full advantage of the future transport hub opportunities available in Greater Western Sydney, with a notable example being the proposed South-West Rail Link (SWRL) Extension, linking the Nancy Bird Walton Airport and Aerotropolis to Leppington and through to Glenfield.

UDIA is strongly embedded in Greater Western Sydney with our members and our NextGen West advocacy program, which we are currently rolling out in collaboration with Business Western Sydney. The NextGen West program targets six key policy areas, including the key city shaping infrastructure needed to connect the West with the West.

Historically, NSW has not taken full advantage of city shaping opportunities for key transport infrastructure in Greater Sydney, instead it has focused on siloed business cases for transport with a focus on travel time savings and a failure to integrate land use planning. This has led to under-delivering precincts around transport hubs, such as Macquarie Park and the Bays Precinct, which is currently subject to a master planning process and due to be rezoned by 2024/25.

The solution is to robustly integrate the land use and transport planning process through a focus on the impact of transport infrastructure on the accessibility of jobs, social opportunities, health services and other amenities, as opposed to the current mostly singular focus on travel time savings. A relevant opportunity for this approach to be used, is the SWRL Extension, connecting the Aerotropolis to Leppington, the Sydney airport at Mascot and the rest of the T2 Inner West & Leppington Line. In its' Draft Blueprint for the Western Parkland City, the Western Parkland City Authority (WPCA) identified the connection to Leppington as a priority to improve access from the Aerotropolis to South West Sydney. Funds from the Commonwealth and NSW Governments is being used to develop a business case for a south-eastern extension of the WSA Metro / Western Sydney Airport project from the current southern terminus at Bradfield to Glenfield. The business case is scheduled to be completed in 2024.

UDIA NSW has also undertaken collaborative research into the opportunity this rail link represents and the benefits that accompanying the rail link with the right land use planning could provide to the city. We support a new metro connection from Bradfield (Aerotropolis) to Leppington and the extension of this metro line further east to Glenfield with three new stations.

Our research with Professor Levinson investigated potential TOD opportunities along the SWRL Extension corridor through accessibility focussed analysis (Refer to Appendix A). The results show that the link to Leppington and the adoption of TOD development approaches would have a dramatic positive impact on accessibility of jobs and amenities across Western Sydney's key communities.

URBAN AI - A UDIA CITY LIFE LABS R&D PROJECT

The Urban AI research project, undertaken by UDIA in collaboration with UNSW, Giraffe Technology, Landcom, Charter Keck Cramer, Ethos Urban, and Cox Architecture, demonstrated the benefits of good land use planning around metro stations. Completed in October 2020, the applied research project has developed an application which allows rapid computational development of mixed-use TOD cities, responding to constraints and parameters. Urban AI is intended as a complementary platform to the Urban Pinboard, which is a 3D communication platform for co-design and engagement about future cities, and together they are the cornerstones of UDIA NSW's Future City digital advocacy tool kit.

What is it?

Grasshopper technology allows fast manipulation of synthetic city design in the context of constraints (Refer to Figure 1).

Our vision was to develop a future cities rapid scenario testing tool to better plan for TOD centres integrated with rail assessments. The tool needed to be able to rapidly manipulate urban form, create a base level residual land value analysis and a powerful algorithm, which can model the most efficient placement of infrastructure, and accurately calculate the economic return on development along the north-south rail corridor. It was developed in 2019-20 as part of UDIA City Life Labs R&D funding, and as part of further development of Urban Pinboard in 2018, which provides a 3D visualisation platform.

Key partners in the project included:

- Giraffe Technologies
- Cox
- University of NSW
- Charter Keck Cramer
- Ethos Urban
- Landcom

Figure 1 – 3D visualisation platform for city planning

URBAN AI - A UDIA CITY LIFE LABS R&D PROJECT

What problem does it solve?

Land use planning and large-scale infrastructure investment planning all benefit from comprehensive scenario testing, but as quality scenario tests are timely and costly, there is a limit to how much they are integrated into the decision-making process (Refer to Figure 2). This results in less evidence, less transparency, and greater delays in the making of decisions that are critical to the future of our cities. The benefit of Urban AI is that it facilitates this analysis in one place, with rapid scenario testing and huge data outputs.

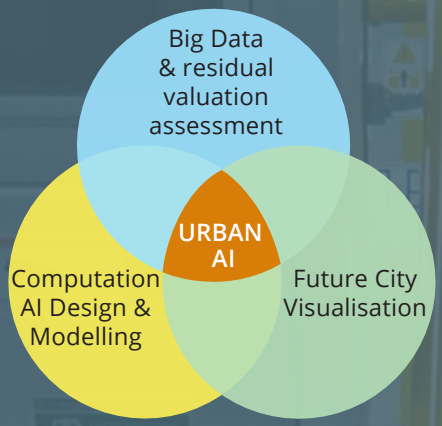


Figure 2 – Computational Design

How it works:

Urban AI uses machine learning to construct predictive models and visualise in 3D the urban morphology of the future city which can identify where and when to build new transport infrastructure. It is delivered using three key technology tools:

- **Future City Visualisation** - Urban AI, an adaptable digital city tool which can run rapid scenario tests on the future of the city, providing analysis and 3D visualisation in real time. Modelling is based on existing constraints and planning and the geospatial analysis can ingest as many layers as are available to better understand the potential of the future city (Refer to Figure 3).

- **Computational Design and modelling** - Urban AI uses computational design to generate and visualise scenarios for future large-scale urban growth (Refer to Figure 4). Machine learning (ML) derived algorithms interact with the computationally designed urban form to provide analysis and forecasting capability. These functionalities allow for the rapid scenario testing of planning and investment decisions with an impact on the shape of the future city, improving the amount of evidence available and leading to better decisions and outcomes for the city and future residents.

- **Big Data & Residual Valuation Assessment** – Market dwelling sales evidence is available including physical information, ie. land size, no. of bedrooms, age, etc. Urban AI has added geospatial attributes to each sale to further analyse and predict values, ie. distance to stations, employment, shopping, schools, the beach, etc. Machine learning then analyses multi layered AI algorithms to determine the value of a future city dwelling (Refer to Figure 5). A residual land valuation stake model is then applied to understand the upside value of the future city.

Planning of the North South Rail Corridor, due to many of the constraints described above, has failed to sufficiently take its city-shaping impacts into account, resulting in missed opportunities and a risk of 'suburban carpet' forming, negatively impacting connectivity and economic growth in the western city.

The planning and decision making around the total number and specific location of stations along the Western City's North South Rail Corridor is critically important for the future economic and social landscape of Western Sydney and Sydney's competitiveness as a global city.

The pilot project for Urban AI focused on TOD opportunities for the rail corridor. The project sought to use the functionality described above to scenario test the number of metro stations on the route and their location, examining the impact on the surrounding urban form and the corridor as a whole, leading to a better outcome for the future residents of the Western City. Scenario testing is provided in Figure 6.

Currently, the alignment between property value uplift and infrastructure investment is opaque and difficult to determine. This has led to negative infrastructure contributions arrangements that prevent development and disincentivise needed infrastructure investment. Using a predictive model for property value change from the delivery of new metro/rail infrastructure, Urban AI can provide critical evidence that would allow for better policy settings around value capture and infrastructure contributions.

Figure 7 shows the total impact for the various TOD scenarios and shows much greater housing supply and diversity, together with a broader spread of jobs. The residual land value is more than double the base case, delivering for all stakeholders.

The ability of Urban AI to rapidly adjust, re-generate, and analyse the potential future urban form based on new inputs and feedback, means that it enables a robust and transparent approach to engagement in the decision-making process, both with the development industry and with other stakeholders. Taking advantage of this would go a long way to making sure stakeholders' needs are recognised and considered, while dramatically reducing the time it takes to gather feedback from stakeholders and make appropriate adjustments.

In our submission on the Place Infrastructure Compact, UDIA NSW identified up to nine stations from Macarthur to Tallawong to provide the basis for a TOD approach around the metro stations which would create an additional 60,000 jobs and 83,000 dwellings within 800m of a station over the base case.

The project used jobs and dwellings forecasts to 2056 to show that the proposed rail line made the case for ensuring that it is connected to the north and continued past Bringelly to the south, with a TOD-oriented approach to land use planning around each of the stations. A larger scale connection to Parramatta is also needed to create the best outcome for the city, but the Leppington connection offers a low cost – high value opportunity to connect the West with the West and between both airports.

This report builds on the findings of these research projects to examine the potential benefits of the SWRL Extension and to argue for the adoption of an integrated master planning and business case approach that focuses on accessibility, instead of travel time savings and uses technology to enable rapid modelling of urban development scenarios.

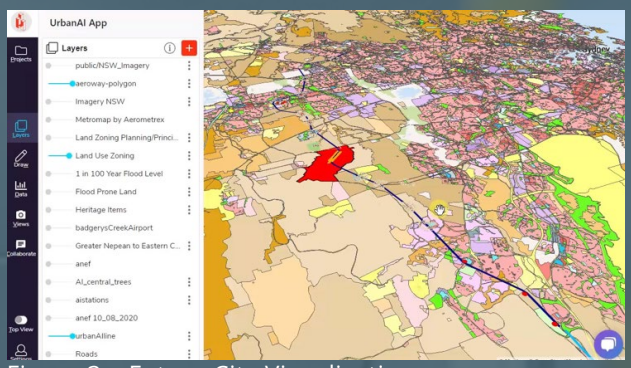


Figure 3 – Future City Visualisation

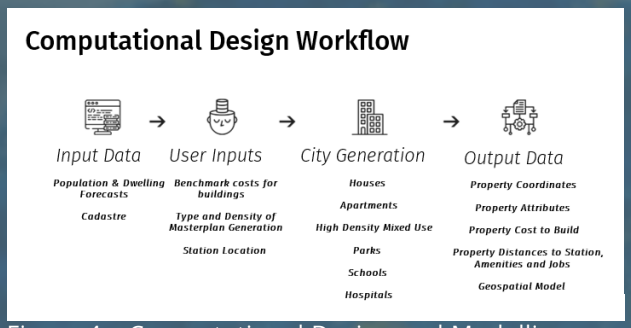


Figure 4 – Computational Design and Modelling

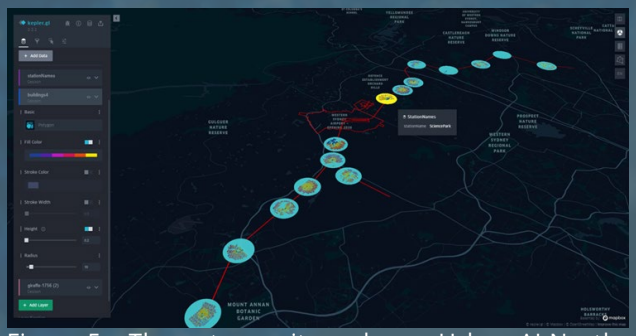


Figure 5 – The outcome it produces: Urban AI North South Rail Corridor Pilot Project in Western Sydney

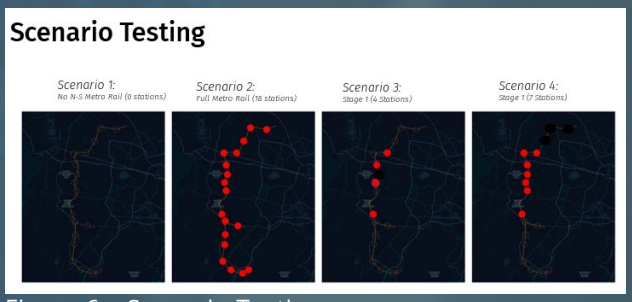


Figure 6 – Scenario Testing

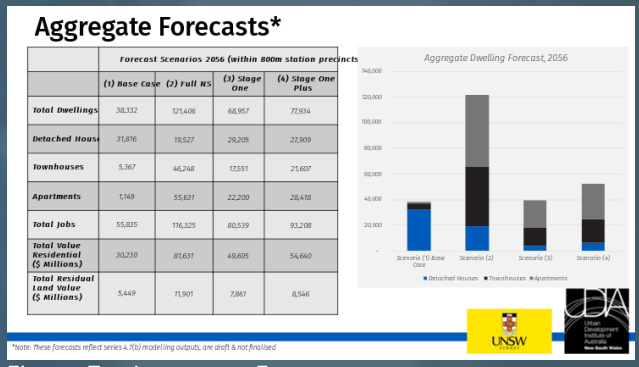


Figure 7 – Aggregate Forecasts

A NEW APPROACH TO TRANSPORT BUSINESS CASES

THE CURRENT APPROACH: A STRONG FOCUS ON TRAVEL TIME SAVINGS

The traditional approach to transport business cases in NSW has focused on the operational requirements of a rail transport project, which has a strong emphasis on the travel time savings metric i.e., 20 minutes travel time between Point A and Point B. This approach typically results in a lesser number of stations, which generate additional dwell times, in favour of achieving the travel time objective.

Extra stations can also add significant costs to a rail project, and some past rail projects (Epping to Chatswood and Sydney Airport Line), now have a lesser number of stations from the original concept design to achieve better cost benefit ratios and funding commitments. The sole focus on the travel time metric is extremely narrow and undermines the ability to deliver a city shaping project fit for purpose over the medium to long term with integrated transport and land use planning outcomes.

In our 2020 submission on the Sydney Metro West Environmental Impact Statement, UDIA requested Government provide a metro station at Camellia-Rosehill to maximise public transport access to this growth precinct, which has potential to house up to 25,000 people. Camellia-Rosehill is located right between the proposed Olympic Park and Parramatta metro stations, which are six kilometres apart. This is a significant distance between two major metro stations, and it represents a lost opportunity to achieve better access in the Central River City, consistent with 30-minute city principles.

Whilst our proposal was not supported, Government recently made a commitment to extend the Parramatta Light Rail to link the Camellia-Rosehill precinct to Olympic Park and Parramatta to improve access in the Central River City and the Camellia Town Centre. Refer to Figure 8 for a screen shot of the Urban Pinboard future city analysis.

A similar outcome has occurred with the Western Sydney Airport Metro (WSAM) which has major distances between proposed rail stations (St Marys, Luddenham, and Orchard Hills). It represents another lost opportunity to target growth and provide housing choice for up to 500,000 people who will move into the Western Parkland City over the next 20 years. In our Western Sydney Place Infrastructure Compact submission (2020), we identified that three (3) additional stations could be provided over and above the five (5) stations that are now being delivered.

Figure 8 – Computational Design and 3D visualisation for Camellia-Rosehill

THE CURRENT APPROACH: INFRASTRUCTURE DELIVERY AND LAND USE PLANNING

Another concerning aspect of the current transport planning process is that the infrastructure design, which is centred on operational efficiencies etc, occurs before the land use planning process, which usually starts after the rail line commences operation. This results in a further lost opportunity to integrate transport outcomes from the onset and creates "bolt on" and sometimes ineffectual land use planning process that cannot capture the maximum access benefit provided by the rail line investment and deliver place outcomes.

An example of misaligned transport design and land use planning is evidenced with the North West Rail Link, which opened in 2019. This major city shaping rail project is still a long way from achieving integrated development at the key stations after three years of operation. This has left large areas of development ready land next to existing stations, which could otherwise have been used to provide jobs closer to where people live. This also occurred with the Leppington Strategic Centre, which still has no development despite having a rail line since 2015 and being rezoned in 2013.

THE CURRENT APPROACH: GOVERNANCE

To properly integrate land use planning and transport infrastructure planning, challenges around governance typically arise.

Under the present system, infrastructure projects are budgeted and planned in silos. This has several effects, but one of the most significant is, that if expenses exceed expectations, the project is often adjusted to fit the budget within the project silo. This can lead to highly impactful missed opportunities, with a common example being a reduction in the number of stations on a rail project leading to potential local transport hubs and TOD opportunities not being progressed. These opportunities need to be fully embraced for NSW to deliver enough housing of diverse typologies and to combat the housing supply and affordability crisis.

Also, if one department or agency has complete ownership of the process, that department or agency is likely to focus on elements that align to its core purpose – transport agencies operating in a silo would over-emphasise transit-based challenges and solutions, while planning would emphasize land use potentially at the cost of transport network opportunities.

A NEW APPROACH: ACCESSIBILITY

The solution to the lack of integration of transport and land use planning is to focus on how a transport project and corresponding transport hub master plans can improve accessibility – the ability of a person to reach another place, service, or person or be reached by them.

The Levinson research paper *Governing for Access* (May 2022) showed that an accessibility-oriented approach focussed on development where it is desirable and infrastructure where it is needed, such as where existing demand is unmet or where there is potential for future development. This approach would resolve most issues preventing our urban transport hubs from being fully realised places, delivering the density and amenity needed to take advantage of the city-shaping opportunity provided by transport infrastructure. It would also resolve issues where infrastructure that has less city shaping impact is prioritised over transport infrastructure critical to unlocking new centres, or opportunities to create new centres are missed entirely in favour of reducing travel times.

These findings are also supported by the Urban AI project, undertaken by UDIA and research partners in 2020, which showed the significant benefits of a TOD approach to land use planning and high density around metro station transport hubs.

The Urban AI project also pioneered how urban form decisions and outcomes could be rapidly modelled using 3D geospatial and computational design technology. This technology should be integrated into the infrastructure planning process to accelerate how different scenarios of transport and land use planning can be explored and evaluated.

UDIA Recommends:

1. That transport infrastructure and land use and precinct planning is integrated to achieve an Accessibility Oriented Design outcome that will provide up to three stations on the SWRL Extension (Rossmore, South Creek, and Bringelly Road).

2. That Sydney Metro prepares the business case for the SWRL Extension with a strong focus on accessibility instead of just travel time savings, where TOD outcomes are given higher weighting to achieve better place outcomes.

A NEW APPROACH: GOVERNANCE

Ownership and governance of the land use and transport planning process should be managed jointly by the relevant bodies. In the case of the SWRL Extension, WPCA, NSW Department of Planning and Environment (DPE), and Sydney Metro should be directly involved and report into the Minister for Planning, the Minister for Western Sydney, and the Minister for Transport.

This would increase the quality of decision making and ensure no part of the process is being over or under-emphasized. To ensure there is still clarity around decision making, one agency/department and one Minister should be designated to lead the project. For the SWRL Extension, this should be the Minister for Western Sydney, accompanied by either DPE or WPCA.

UDIA has undertaken significant research into governance done well. An example of a successful implementation of governance with a similar approach to that described above is the NSW Growth Centres Commission (NSW GCC). The NSW Government established the NSW GCC in 2005 to co-ordinate the release of land for residential, employment and other urban development in Sydney's North-West and South-West Growth Centres. The NSW GCC reported to the Minister for Planning, and their powers were constituted under the *Growth Centres State Environmental Planning Policy* (SEPP) 2006, giving them the authority to lead on the master planning of the key precincts within the growth centres.

The SEPP gave the NSW GCC the authority to coordinate and direct agencies to deliver on infrastructure and prepare plans and policies to address issues such as biodiversity certification and the protection of Cumberland Plain Woodland habitats. The NSW GCC achieved success by collaborating closely with councils and industry and coordinating state utilities and transport agencies. This collaboration and coordination role created an integrated delivery of housing and infrastructure that reduced costs, improved outcomes, and sped up the delivery of jobs and housing. International examples of this form of governance include Tokyo – which has a single federal Ministry of Land, Infrastructure, Transport and Tourism; Singapore transport infrastructure is delivered by the Urban Redevelopment Authority jointly with the Land Transport Authority and the Housing Development Board and the Dutch decision making uses the Polder Model of consensus between government and industry.

UDIA Recommends:

3. Governance over the land use and transport planning process to be led and coordinated by a lead minister and department/agency, with all other relevant State and local agencies, and ministers having full visibility and involvement.

A NEW APPROACH: A FOCUS ON BEYOND THE OPERATIONAL CORRIDOR

We contend that a new approach to the business case process for major rail projects should occur which has a broader focus which includes accessibility and looks beyond the operational rail corridor. This will capture the opportunities offered by land use planning to deliver better amenity and place outcomes.

A beyond the operational corridor focus should be a core principle to the business case process for a rail project that sits alongside other business case objectives which focus on the travel time metric, design efficiencies and project budget savings.

This will ensure that integrated land use outcomes are central to the outcome of a rail project and as a first step in delivering more comprehensive business case process. This process could seek out land use opportunities at the early stages to achieve maximum station access and TOD outcomes.

At any rate, greater collaboration must occur with the lead transport agency and key stakeholders including DPE, the relevant local council, and major landholders, especially those with a large, consolidated landholding.

Rhodes and Edmondson Park stations are examples where proper strategic planning has provided market opportunities and development outcomes at strategic locations next to a rail station. This should be the standard approach to achieving integrated planning and transport outcomes in the business case process.

Another straightforward solution to this challenge is to have budgetary constraints considered across the whole infrastructure program, or at least across key portfolios of projects. This would allow for more robust prioritisation to occur, preventing the situation in which a less important project proceeds, while more important opportunities in a larger project are missed due to siloed budgetary approaches. This should reduce the number of missed key city-shaping opportunities and result in better accessibility and overall outcomes for transport projects and the community.

UDIA Recommends:

4. That Sydney Metro adopts a "beyond the operational corridor" approach with the preparation of the business case for the SWRL Extension project.

5. That a structured market sounding process is undertaken as part of business case processes to determine the potential for additional development outcomes around potential stations sites to ensure the capture of development (and thus patronage) outcomes.

6. That budgetary concerns be considered across the whole infrastructure program for Western Parkland City, instead of constraining individual projects.

THE LEPPINGTON CHALLENGE AND OPPORTUNITY

Leppington was identified as a Strategic Centre in the 2006 South West Growth Area Structure Plan as a location for jobs and homes centred on the proposed Leppington Station Interchange. The North Leppington precinct, in which the Strategic Centre is located, was rezoned in 2013.

In 2015 the Leppington rail station and interchange and a 1000 space commuter car park was completed; another north-side commuter car park was later added in mid-2022. Both State Government and Camden and Liverpool councils have also undertaken investigations into the road network under various funding schemes including Special Infrastructure Contributions, the Housing Acceleration Funding and from the relevant council's general revenue.

Despite the investment, Leppington has failed to attract any land redevelopment in accordance with the planning vision, despite having a station interchange and Figure 9 shows a recent aerial photo which depicts the current town centre which is occupied by rural residential and market gardens.

Figure 9 – Leppington Aerial View (Source: Nearmap Early 2022)

The Town Centre still has no short-term delivery pathway, which is due to a fragmented landownership (with over 150 owners in a 500 m radius of the station) and no favourable planning system to support growth. UDIA is also aware that some developers have obtained development consents for proposed apartment projects but have not taken this forward still hoping to speculate and achieve higher returns. Based on experience with other Town Centres, such as Green Square, full development of Leppington may take time, as proper market testing and project feasibility of any new plans must occur before implementation.

Figure 10 – Edmondson Park Town Centre

UDIA is also aware that there is a large amount of residual Government land originally acquired for the SWRL, that subject to further investigation of the SWRL Extension project, could be used to ensure there is a pathway for development and to generate a "highest and best return" outcome, led by a key government delivery agency. This is what occurred with the Edmondson Park Town Centre where Landcom played an integral role in shaping and delivering a TOD outcome (Refer to Figure 10 above).

The responsibility for the Town Centre now rests with Camden Council, who took over from DPIE in late 2019. Camden Council in association with Liverpool City Council is presently working on a revised town centre precinct plan and planning proposal which is planned for public exhibition in late 2022. We support strong engagement with the development industry, to provide a market-tested precinct plan that achieves growth and the planning vision for the Centre. Council should also investigate site planning provisions that encourage amalgamations through Floor Space Ratio incentives.

UDIA Recommends:

7. That Camden and Liverpool councils engage with the development industry on the drafting of the precinct plan for the Leppington Town Centre to provide planning provisions that achieves the following:

   a) market-tested and TOD based outcomes;

   b) the right role and function of the Town Centre aligned with the Aerotropolis as the planned primary CBD in South West Sydney; and

   c) the amalgamation of fragmented land to encourage redevelopment due to bonuses and incentives through planning based incentives.

FRAGMENTED LAND

Fragmented land impacts the ability for an urban centre to form quickly, especially around a transport hub. The development of the Oran Park and Edmondson Park Town Centres has proceeded at a rapid rate due to the consolidated landholdings from which to achieve quicker development outcomes.

If not considered and addressed early, fragmented ownership makes it difficult for a developer to acquire multiple sites to provide a feasible development. This occurs through increased holding costs over a prolonged period to achieve a viable amalgamated development site. It is also difficult for utility agencies to provide infrastructure to support growth, which is typically linear, which again requires multiple site acquisitions to achieve a desired outcome.

A collaborative master plan for transport hubs in alignment with the infrastructure business case and infrastructure contributions plan will allow for these impacts of fragmented ownership to be overcome. The business case for the SWRL Extension needs to recognise the opportunities for effective integrated land use planning outcomes offered where large landholdings exist.

UDIA Recommends:

8. That Sydney Metro assesses the potential of existing large land holdings as part of the business case for the SWRL Extension, to generate integrated land use and planning outcomes.

PRECINCT PLANNING

Transport hubs should be master planned with a collaborative approach, bringing in councils and landowners working with State government agencies and industry on integrated planning outcomes and especially when infrastructure business case and infrastructure contributions

are determined. In the case of the SWRL Extension, the master plan should address the close accessibility link that will exist between Bringelly and Leppington, with key amenities able to be distributed between them.

In our policy paper titled *"Greater Sydney Precinct and Urban Renewal Delivery," 2022*, we identified that the precinct planning and urban renewal process in Greater Sydney is a complex, convoluted, slow and inconsistent process. This is leading to multiple iterations of place strategies for a single precinct, unclear priorities, community frustration and a lack of confidence to invest. This is resulting in a failure to deliver the housing and places that Greater Sydney needs and deserves, at a time when Sydney faces a housing supply and affordability crisis.

In 2021, UDIA identified another nine critical enabling infrastructure items in our *Building Blocks Greater Western Sydney 2021* which could support over 60,000 dwellings. The premise for this report was to achieve integrated infrastructure delivery to support growth and a pipeline of development ready land.

Unfortunately, we continue to see poor infrastructure coordination at growth precincts, which is currently occurring with the Glenfield precinct, which was rezoned in mid-2021 but cannot proceed until a key regional road is delivered by Transport for NSW (TfNSW).

Greater Sydney needs a fast, high quality and reliable process for precinct planning, which will give confidence to industry and the community and deliver a consistent pipeline of housing. Further to our *Greater Sydney Precinct and Urban Renewal Delivery 2022* report, UDIA calls on the NSW Government and DPE to implement our recommendations to improve precinct planning in Sydney (Refer to Appendix B).

UDIA Recommends:

9. That one key agency/department and minister leads on the integrated precinct planning process for station centres, which covers early land acquisitions, infrastructure business cases and contributions framework.

THE SOUTH WEST RAIL LINK OPPORTUNITY

Professor Levinson and the University of Sydney have undertaken an accessibility analysis of the proposed SWRL Extension under certain land use configurations (Refer to Appendix A). The research determined the accessibility of jobs for people living in Camden, Campbelltown, Fairfield, Liverpool, and Penrith, forecasted to 2056, and highlighted the impact from the SWRL Extension and with Access Oriented TOD land use planning.

Table 1 provides a comparison of Person Weighted Accessibility by Public Transport to Jobs in Greater Sydney from Western Sydney Local Government Areas (LGA). In this table we have presented Baseline and WSA Metro and Leppington Extension scenarios Accessibility Analysis for Western Sydney report.
On average, each person in the five LGAs would be able to access an additional 15,173 jobs within 30 minutes, if the SWRL Extension is delivered and accompanied by Access Oriented TOD land use planning, an additional 62,347 jobs will be within 45 minutes.

The largest increase in access to jobs will occur in Fairfield, with the average resident gaining access to 27,609 jobs within 30 minutes, with Liverpool ranked second increasing by 19,700 jobs. For the 45 minute cohort, the story is similar but clearly stronger, with the average Fairfield resident gaining access to an additional 173,732 jobs.

Table 1 presents a conclusion on the number of jobs that will be unlocked with new employment hubs, social centres, community facilities, health services, and other amenities that will be delivered under an AOD approach with the SWRL Extension and further land use intensification of the WSAM (+324,181 jobs) and with the SWRL Extension on its own (+279,729 jobs).

The DPE review of the SWGA also provides an opportunity to further match land use and infrastructure to confirm the Aerotropolis (Bradfield) as the principal CBD in South West Sydney, with a rail connection to strong TOD centres providing a denser residential land use pattern fit for its' long term future based on 30-minute city principles and better connecting the West to the West. Further recognising that the original Structure Plan identified up to three new town centres along the Bringelly Road Corridor west of Leppington.

Over time, the access framework for the SWGA should seek to replicate the transport and development density outcomes achieved in many parts of the Eastern Harbour and Central River Cities. This would enable the achievement of many of the strategic planning outcomes sought in the Western Parkland City.

OTHER TRANSPORT INITIATIVES TO ACHIEVE GREATER ACCESS IN THE SOUTH WEST

This report recognises other current and future public transport initiatives that could result in greater public transport access in the South West region of Sydney. These include:

- Rapid Bus – Under the Western Sydney City Deal, the NSW Government is proposing rapid bus services from the metropolitan centres of Penrith, Liverpool, and Campbelltown to Western Sydney International (Nancy-Bird Walton) Airport before it opens in 2026, and to the Aerotropolis. Recognising that TfNSW is presently working on the Fifteenth Avenue Strategic Transport project to link the Aerotropolis with the Liverpool CBD. This project will enhance public transport use to each CBD north of Bringelly Road and will complement the proposed SWRL Extension.

- Future Metro expansions to link the Liverpool CBD – The long term proposal by Liverpool City Council to link the Liverpool CBD with the Bankstown CBD and further connections to the Aerotropolis to provide fast rail access for up to 30,000 existing and future residents in the Austral Leppington precinct with both CBDs.

This report does not undermine the strategic objectives of these key transport initiatives, which will complement the SWRL Extension. Further work by State and local government must firstly investigate the viability of the above transport initiatives and then integrate them with current and future transport projects to achieve maximum public transport access to the Aerotropolis and key metropolitan centres in Sydney.

LGA	0-15 Minutes	0-30 Minutes	0-45 Minutes	0-60 Minutes
Scenario 1: Baseline 2021 Conditions				
Camden	727	6,747	19,591	35,138
Campbelltown	765	7,705	28,400	77,504
Fairfield	1,584	20,242	93,127	230,363
Liverpool	1,935	15,639	54,108	142,189
Penrith	986	9,108	31,951	91,638
Western Sydney Avg.	**1,295**	**12,874**	**50,127**	**129,116**
Scenario 2: WSA Metro - Uniform				
Camden	1,196	14,144	48,523	88,323
Campbelltown	1,670	15,552	63,149	188,000
Fairfield	2,830	40,337	206,204	572,247
Liverpool	4,479	30,895	117,383	470,929
Penrith	2,485	20,880	74,702	228,217
Western Sydney Avg.	**2,717**	**24,643**	**100,645**	**316,563**
Scenario 3: WSA Metro - AOD				
Camden	1,586	16,264	57,297	111,731
Campbelltown	1,671	15,441	64,058	190,559
Fairfield	2,830	40,337	206,204	572,263
Liverpool	4,514	31,216	118,805	474,618
Penrith	2,759	22,827	81,732	251,528
Western Sydney Avg.	**2,862**	**25,573**	**104,446**	**327,969**
Scenario 4: WSA Metro and Leppington Extension - Uniform				
Camden	1,200	14,232	49,803	98,173
Campbelltown	1,671	16,234	73,697	230,852
Fairfield	2,948	47,834	265,943	982,456
Liverpool	4,488	32,435	133,699	538,212
Penrith	2,485	20,881	74,775	230,803
Western Sydney Avg.	**2,738**	**26,350**	**116,176**	**408,045**
Scenario 5: WSA Metro and Leppington Extension - Access-Oriented Development				
Camden	2,271	16,959	71,294	208,350
Campbelltown	1,672	16,244	75,412	235,155
Fairfield	2,948	47,851	266,859	984,719
Liverpool	5,283	35,339	156,408	618,701
Penrith	2,759	22,831	82,107	256,117
Western Sydney Avg.	**3,179**	**28,047**	**127,647**	**453,297**

Table 1 - Comparison of Person-Weighted Accessibility by Public Transport to Jobs in Greater Sydney from Western Sydney LGAs. (Baseline 2021 and WSAA Metro and Leppington Extension Access-Oriented Development)

INFRASTRUCTURE FUNDING

CONTRIBUTIONS: TIMING AND MISALIGNMENT

Funding for rail lines and other key pieces of infrastructure can be difficult and can create significant delays and challenges.

Often the infrastructure is required to be complete before development of the land can begin. This creates a misalignment in which contributions are often too late, or upfront costs for developers are too high, or both. This misalignment can lead to massive delays, suboptimal land use solutions, missed opportunities, less housing, and worse access to amenities. A situation that is currently occurring along key part of the North West Metro Rail Line.

The approach to infrastructure funding should, to the best extent possible, focus on maximising, dwellings delivered, infrastructure delivered, and accessibility unlocked. Optimising the land use and the infrastructure required through a wholistic and collaborative master planning process, will enable the establishment of sensible infrastructure contributions that are more cost effective and do not undermine project feasibility.

Determining contributions alongside the master plan and infrastructure business case, will ensure that early clarity for landowners and developers. The master plan should also consider required land acquisitions, with steps to acquire the land taken early to mitigate the impact of rising costs over time.

INFRASTRUCTURE CONTRIBUTIONS REFORM

In mid-September 2022, DPE confirmed that they are deferring the Infrastructure Contributions Reform Package (ICRP), with no indication on whether it will proceed in the short to medium term. The deferral of the ICRP means that a potential funding source for regional infrastructure has been lost which will affect the sustained rollout of growth infrastructure in Sydney's greenfield areas. Government should therefore look at alternative ways of allowing development to occur matched with appropriate provision of infrastructure.

A solution previously suggested by UDIA recommended a Works in Kind (WIK) Credit system where unused credits from past developer led development projects are transferred to future development projects within the same contributions area such as the SWGA. Whilst this occurs informally between some developers, DPE should develop a more formal system to better rollout and open new development pathways.

The business case process for the SWRL Extension, and other future rail projects, provides an opportunity to further develop a formal WIK mechanism that fosters the delivery of station precincts based on market tested investigations.

UDIA Recommends:

10. That DPE develops a WIK Credit system to open new integrated development pathways

CONCLUSION

NSW is facing a housing supply and affordability crisis. An important part of resolving this crisis is the delivery of diverse housing supply in great urban centres based on 30 minute city principles, with key opportunities around new transport hubs. Sydney is Australia's global city and therefore, to compete internationally, Government must focus on improving Sydney's liveability and affordability to be globally competitive.

The South West Rail Link Extension is a key city shaping infrastructure project that presents Government with a critical opportunity to increase accessibility in Sydney's high-growth LGAs, deliver the housing diversity and density we need.

Based on our research with Professor David Levinson at the University of Sydney, UDIA contends that cities and centres must be built on access to bring jobs and homes closer and the opportunity to maximise public transport use. UDIA has identified three new station centres that could be provided on the SWRL Extension at, Rossmore, South Creek, and Bringelly Road to support further opportunity for integrated outcomes close to the Aerotropolis.

The SWRL Extension business case needs to be committed to by Government (State and Federal), along with a master plan for the TOD centres and aligned infrastructure contribution schemes. The business case should evaluate the SWRL Extension based on the accessibility uplift, considering the new master plan, not just on travel time savings with no consideration of land use, which makes a city for the people.

We urge the Government to work closely with industry on the future planning of key station centres that leads to integrated growth outcomes. We also support the use of digital planning tools to deliver better planning outcomes with prioritised infrastructure solutions.

The NSW Government needs to improve the way rail lines are delivered to support growth, provide a location for housing supply, increase public transport use, support the Aerotropolis as the new City Centre in the Wester Parkland City and better link the West with the West.

APPENDIX A – UNIVERSITY OF SYDNEY REPORT – CITIES SHOULD BE BUILT FOR ACCESS

Accessibility Analysis for Western Sydney

David M Levinson, Professor, University of Sydney and Hema Rayaprolu

July 1, 2022

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1 Introduction

1.1 Background

The Western Sydney Airport Metro (North-South Rail link) connecting, St Marys to Macarthur via the new Western Sydney Airport and Bradfield as currently planned, will fail to deliver on its full potential for houses, employment and placemaking in the region without additional stations and associated Access-Oriented Development (AOD) planning.

The Government of New South Wales is currently considering two additional transport connections to the airport:

- A rail connection between the Western Sydney Airport and Leppington.
- The Fifteenth Avenue Smart Transit (FAST) corridor linking Liverpool CBD and the Western Sydney Airport.

An industry campaign is coming together to support both these options along with the appropriate urban planning. This report analyses the accessibility implications of the first of those connections.

1.2 Accessibility

The only reason to locate anywhere, is to be near some people, places, and things (opportunities) and be far from others. Access quantifies the ability to reach, or be reached by, people, places and things. Physical infrastructure networks like roads and railway lines exist to connect within and between places faster than travel without them. Transport agencies often plan networks as if the land use were a given, and regulators plan and zone development as if the network were unchangeable. Since the efficiency of a transport network depends on the land use pattern and the efficiency of the land use pattern depends on the network configuration, systems which coordinate these may be more efficient than those where they are planned independently.

UDIA NSW has been working with collaboration partners to undertake Research and Development for over 5 years, for the development of technology tools to better understand the planning of globally competitive cities. Given the importance of integrating Transport and Urban Planning, UDIA wishes to measure the accessibility in different configurations of this integration.

1.3 Outline of Report

This report first details 5 scenarios for testing the value of a rail connection between the Western Sydney Airport, Leppington, Liverpool, and ultimately points east. There are 2 network options, each with two land use configurations. It then presents the results of those analyses.

2 *Scenarios*

The work measures the accessibility[1] created by a number of transport and land use configurations.

As we are considering the long-term consequences of proposed future infrastructure and land development, we want to have as comprehensive a network as possible, allowing us to test the effects of the proposed lines. The future default conditions thus include the Future Transport 2056 (FT2056) network excluding the Fifteenth Avenue Rapid Bus (FAST) Corridor, the Sydney Metro West Extension from Parramatta to the Western Sydney Airport, and the Leppington Extension. The Western Sydney Airport (WSA) Metro running north-south from the Airport to St. Marys and beyond to Tallawong, and south to Macarthur is assumed open. The Leppington Extension is then added back to Scenarios 4 and 5 below to allow us to test its impact. Two land use scenarios are also tested.

There are many possible service configurations, depending on the technology mix and assumption of other existing public transport services. Here we assume the Western Sydney Airport Metro line runs from Tallawong to Macarthur at metro (4-minute) headways. In the scenarios where the Leppington Extension is opened, service is assumed to continue from the City and Southwest Metro, extended through Bankstown to Liverpool CBD, continuing to run through Leppington to the Western Sydney Airport Terminal Station at 4-minute headways. Other service configurations would give minor variations in results, but would be unlikely to change the major conclusions.

The analyses in this report considered five scenarios:

1. Baseline 2021 Conditions
2. WSA Metro – Uniform
3. WSA Metro – AOD
4. WSA Metro and Leppington Extension – Uniform
5. WSA Metro and Leppington Extension – AOD

Definitions:

- WSA Metro - Western Sydney Airport Metro (North-South Line from Northwest Metro at Tallawong to Macarthur). Stations on the Western Sydney Airport (North-South) Metro line include:
  - St Marys

[1] *Accessibility* here is defined as the number of jobs that are reachable from a point by public transport within a time threshold (e.g. 15-, 30-, 40-, or 60-minutes). The travel time by public transport is measured from origin to destination, so includes the time required to walk to access the public transport system, and the time required for egress at the destination end of a trip, as well as the in-vehicle time, and the time required waiting for transfers, if transfers are part of the shortest path by public transport between an origin and destination. These numbers are shown in maps. The results are averaged for each (and for all) local government areas, using population-weighting, giving *person-weighted access* (or *PWA*).

  - Orchard Hills
  - Luddenham
  - WS Airport Business Park
  - WS Airport Terminal
  - WS Aerotropolis (Bradfield)
  - Bringelly Road
  - Oran Park
  - Narellan
  - Macarthur.

- Leppington Extension - Extension of Existing Sydney Trains Line as a Metro from Leppington to the Western Sydney Airport including new stops at Rossmore, South Creek, and Bringelly Road and serving under construction stations at Bradfield (Aerotropolis) and Western Sydney Airport, with frequencies at 1 train every 4 minutes (15 trains per hour). The service is assumed to be converted to using Sydney Metro technology, though whether it is trains or Metro does not affect the accessibility analysis here. Metro Trains are through run from WSA Terminal to the Leppington Extension, back to Liverpool.[2] Stations on the Leppington Extension line include:

  - Leppington
  - Rossmore East
  - Rossmore West (South Creek)
  - Bringelly Road
  - WS Aerotropolis (Bradfield)
  - WS Airport Terminal.

- FT2056 - Future Transport 2056 (Complete Network) Map, including all of the above unless noted (Western Sydney Metro extension from Westmead to Western Sydney Airport and the Fifteenth Avenue Smart Transit corridors are notably excluded from the analysis here). Based on Future Transport 2056 report from Transport for NSW, and detailed by project team previously as part of the Liverpool Sustainable Urban Mobility Study. This is shown in Figure 1.

[2] A mixed system, requiring transfers between a Sydney Trains service and Metro would reduce total access.

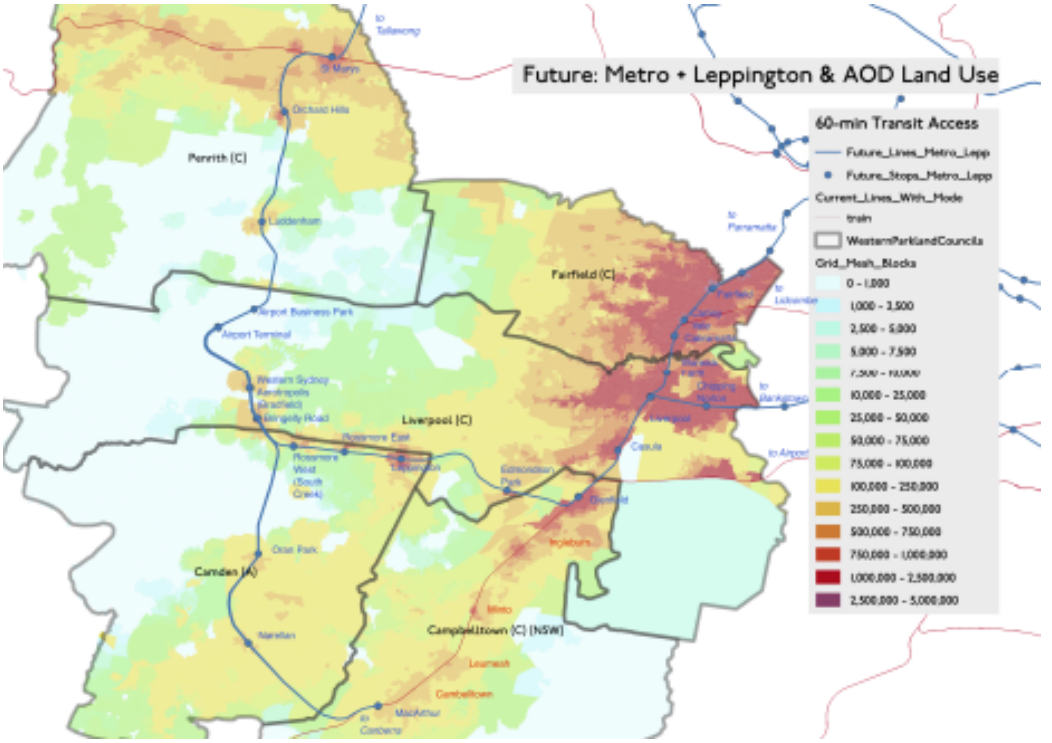

Figure 1: Scenario 5: 60-Minute Transit Access Results

- Base Year - Population and Employment from the 2016 Census. These densities are mapped in the appendix in Figure 3 and Figure 4.
- ForecastID - Population based on forecasts from ForecastID for the most detailed geographic unit and most future time period provided. Jobs are from CoDesign provided by the Liverpool Council (unpublished). These are for various future years depending on location, typically 2041. ForecastID does not break down forecast growth into detailed spatial units, so we do that in the next two items below.
- Uniform - Land use distribution where new development (that identified in ForecastID above and beyond base year population and employment) is uniformly spread across undeveloped parts of the LGA. These densities are mapped in the appendix in Figure 5 and Figure 6.
- Access-Oriented Development (AOD) - Land use distribution where new development in a given LGA is concentrated in Access-Oriented Development (all new development is within 800m of stations) for LGAs with new rail stations, otherwise uniform for LGAs without new rail stations. These densities are mapped in the appendix in Figure 7-Figure 10.

3 *Results*

The initial five Scenarios we examined are listed below, and the results are enumerated in Table 1. An illustration of Scenario 5 is given in Figure 1.[3]

[3] All five scenarios are shown in the Appendix in Figure 11- Figure 15.

1. Baseline 2021 Conditions
2. WSA Metro – Uniform
3. WSA Metro – AOD
4. WSA Metro and Leppington Extension – Uniform
5. WSA Metro and Leppington Extension – AOD

To interpret Table 1, let's look at the first row. The first part of the table reports the results of Scenario 1, the first row for the LGA of Camden. The number of jobs reachable within 15 minutes by public transport is 727, within 30 minutes is 6,747, within 45 minutes is 19,591, and within an hour is 35,138. Logically, that 60-minute access is always higher than 45-minute access is always higher than 30-minute access is always higher than 15-minute access. We see that 30-minute access is around ten times greater than 15-minute access. Similarly 45-minute access is around three times greater than 30-minute access, and 60-minute access being in the order of three times greater than 45-minute access. Access by public transport is measured from the origin to the destination, which requires walking from home to a public transport stop (bus stop or train station), waiting for the transit vehicle, riding on transit, alighting the vehicle, and walking to the destination. We have assumed people time their departure to avoid waits at the stop. Thus, the 15-minute access measure is dominated by the time required to walk to and from transit, while for the higher time thresholds, the transit service itself becomes a greater component of the entire trip travel time.

We observe that the Leppington Extension of the Southwest Trains Line to the Airport at Metro frequencies, with the WSA Metro increases access by public transport to jobs compared to the WSA Metro alone by about 14% overall in Liverpool (117,383 to 133,699) (Scenario 2 to Scenario 4) for 45-minute access, 17% overall in Campbelltown, and 29% in Fairfield. Changes in Camden and Penrith are minimal.

We also observe that concentrating all growth as Access-Oriented Development (AOD) at transit stations adds significant gains in access over conventional dispersed development, with large gains in

Table 1: Comparison of Person-Weighted Accessibility by Public Transport to Jobs in Greater Sydney from Western Sydney Local Government Areas. Results for Different Time Thresholds, Areas, and Scenarios

LGA	0-15 Minutes	0-30 Minutes	0-45 Minutes	0-60 Minutes
Scenario 1: Baseline 2021 Conditions				
Camden	727	6,747	19,591	35,138
Campbelltown	765	7,705	28,400	77,504
Fairfield	1,584	20,242	93,127	230,363
Liverpool	1,935	15,639	54,108	142,189
Penrith	986	9,108	31,951	91,638
Western Sydney Avg.	1,295	12,874	50,127	129,116
Scenario 2: WSA Metro – Uniform				
Camden	1,196	14,144	48,523	88,323
Campbelltown	1,670	15,552	63,149	188,000
Fairfield	2,830	40,337	206,204	572,247
Liverpool	4,479	30,895	117,383	470,929
Penrith	2,485	20,880	74,702	228,217
Western Sydney Avg.	2,717	24,643	100,645	316,563
Scenario 3: WSA Metro – AOD				
Camden	1,586	16,264	57,297	111,731
Campbelltown	1,671	15,441	64,058	190,559
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Camden	1,200	14,232	49,803	98,173
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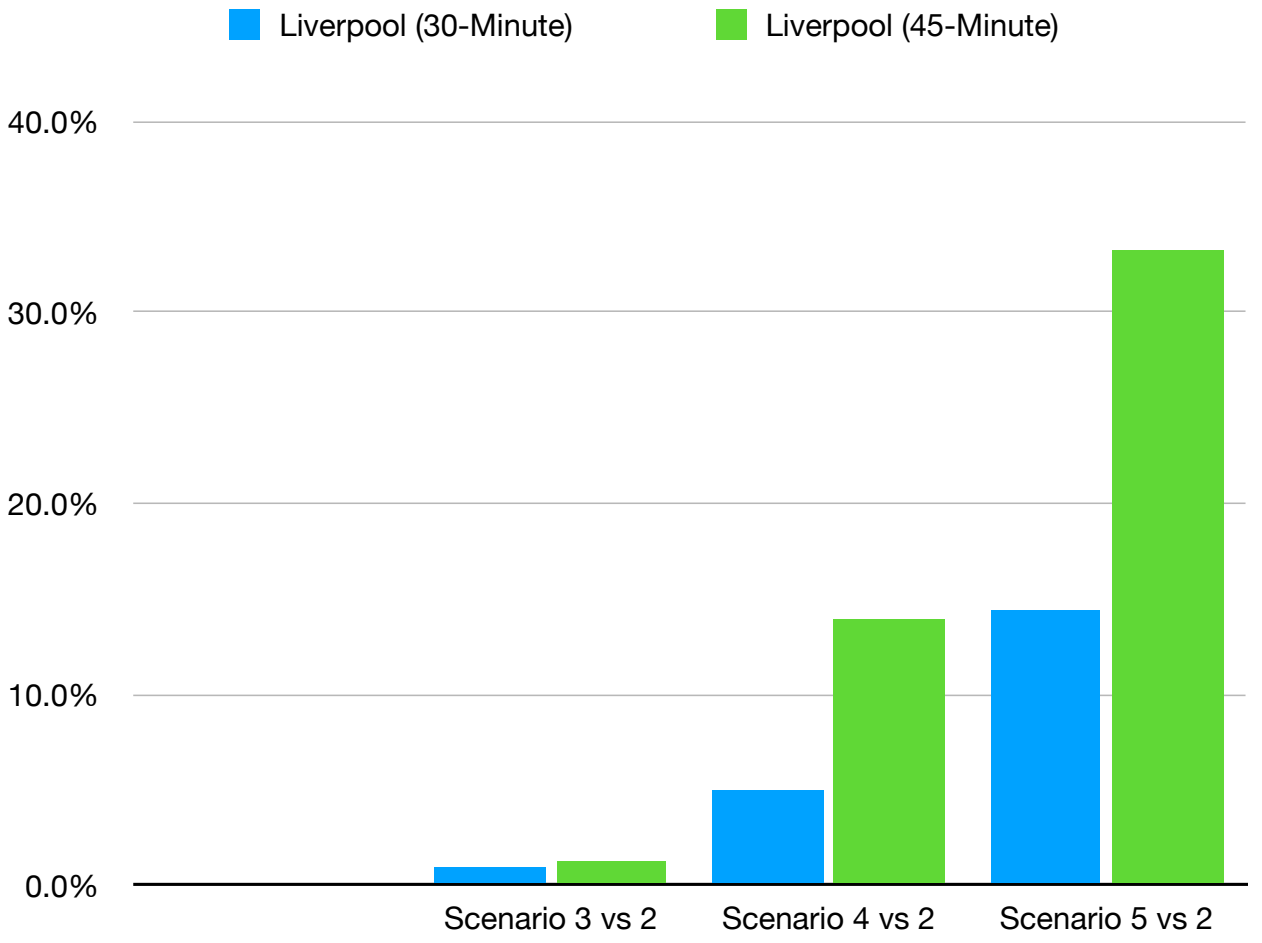
Liverpool	5,283	35,339	156,408	618,701
Penrith	2,759	22,831	82,107	256,117
Western Sydney Avg.	3,179	28,047	127,647	453,297

access. For Camden (Scenario 4 vs Scenario 5) at 45-minutes we see a 43% increase in access, 2% for Campbelltown, less than 1% for Fairfield, 17% for Liverpool, and 10% for Penrith.

The gains from AOD and the additional network investments are synergistic. For instance in Liverpool, with the WSA Metro, adding AOD makes a small difference in accessibility, but with the Leppington Extension, the access benefit from AOD is large (Scenario 5 - Scenario 4 is much greater than Scenario 3 - Scenario 2 in Liverpool for the 45-minute threshold), as shown in Figure 2. Each LGA differs, based on their relative development opportunities and location with respect to the proposed infrastructure.

Figure 2: Comparison of Scenarios for Liverpool LGA. The Leppington Extension adds significant access (Scenario 4 vs 2), combining it with Access-Oriented Development (Scenario 5 vs 2) adds significantly more.



4 *Conclusions*

Accessibility will play a key role in shaping Sydney for global competitiveness. Building key transport links and optimising urban planning between the Western Sydney Airport and Leppington will produce better outcomes for the people of Western Sydney.

These results show the accessibility gains that can come to Western Sydney from extending the rail public transport network from its current terminus at Leppington to the Western Sydney Airport, creating not only a new east-west access to the airport (potentially tying in to the Southwest Metro which is likely to be extended to the Liverpool CBD), but also creating nodal activity points to concentrate future development in a way that expands access and creates value.

5 *Appendix*

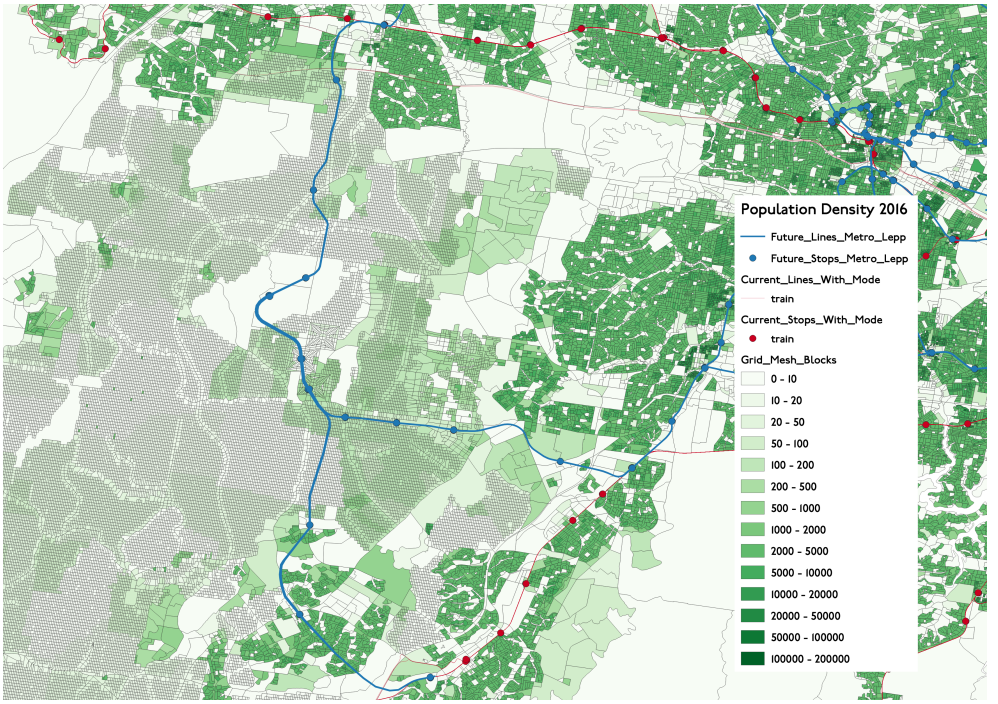


Figure 3: Population Density in 2016. Population density in *persons*/km^2.

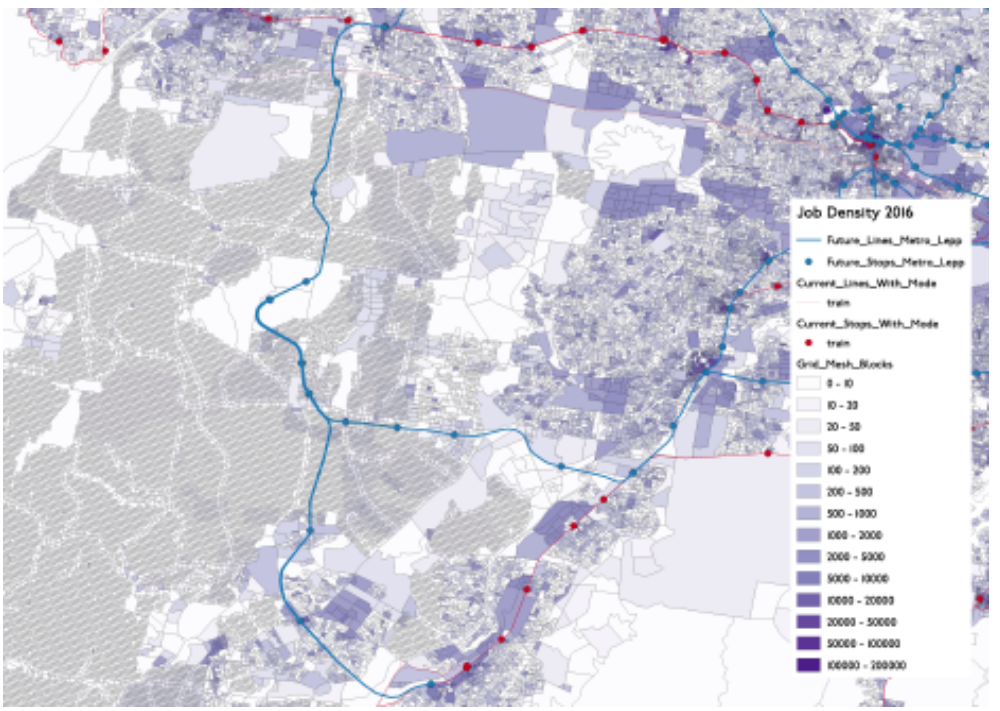


Figure 4: Job Density in 2016. Job density in *jobs*/km^2.

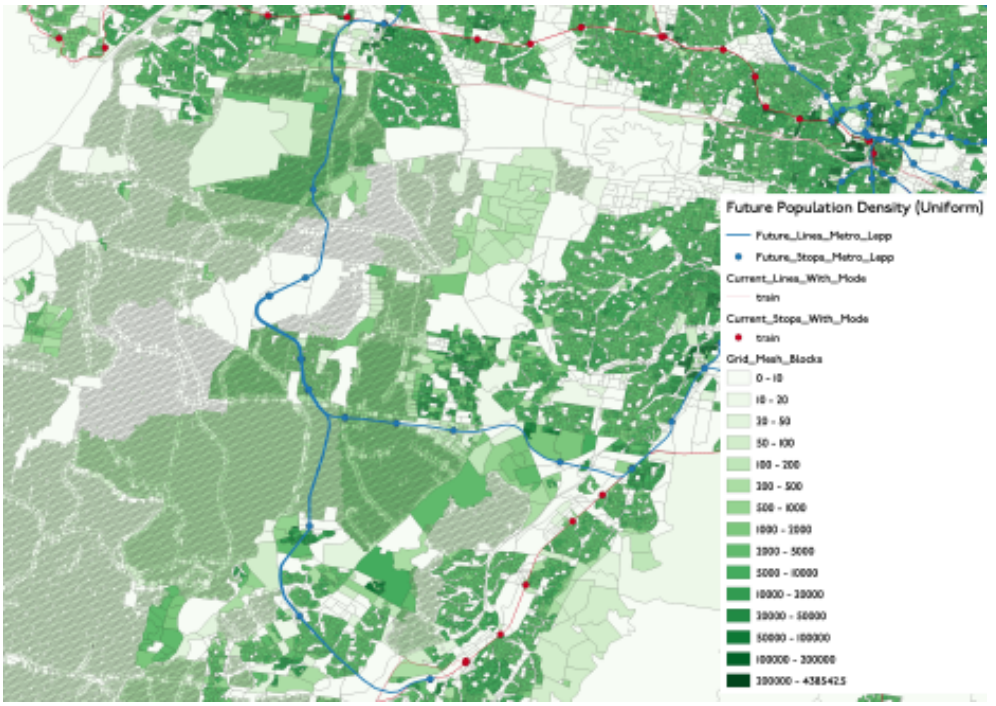


Figure 5: Population Density: Uniform Distribution of Future Growth. Population density in $persons/km^2$.

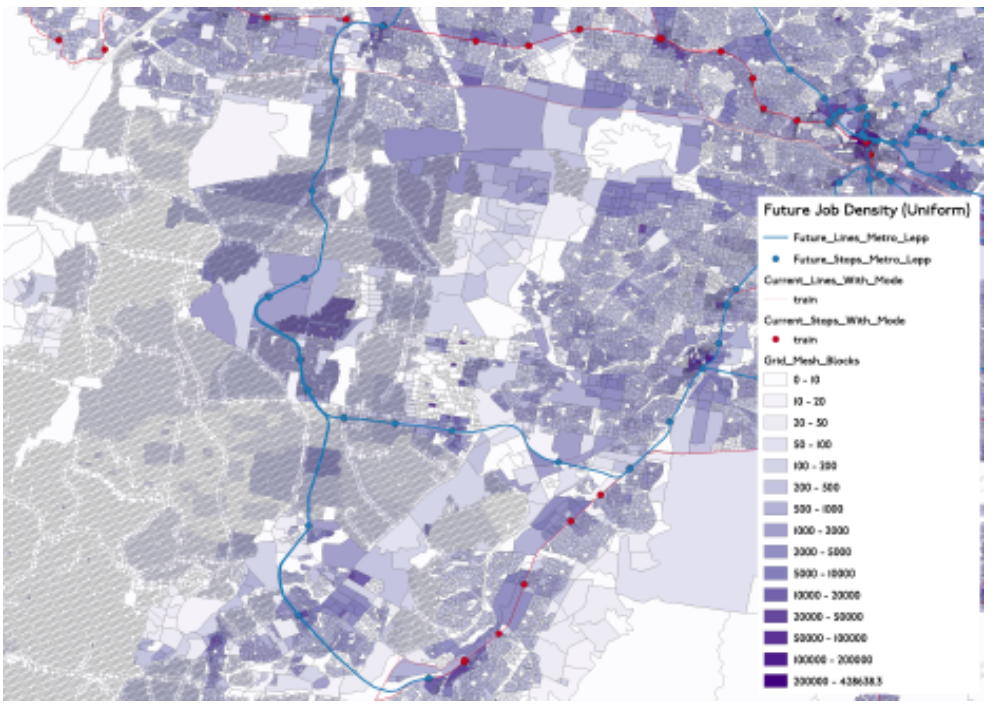


Figure 6: Job Density: Uniform Distribution of Future Growth. Job density in $jobs/km^2$.

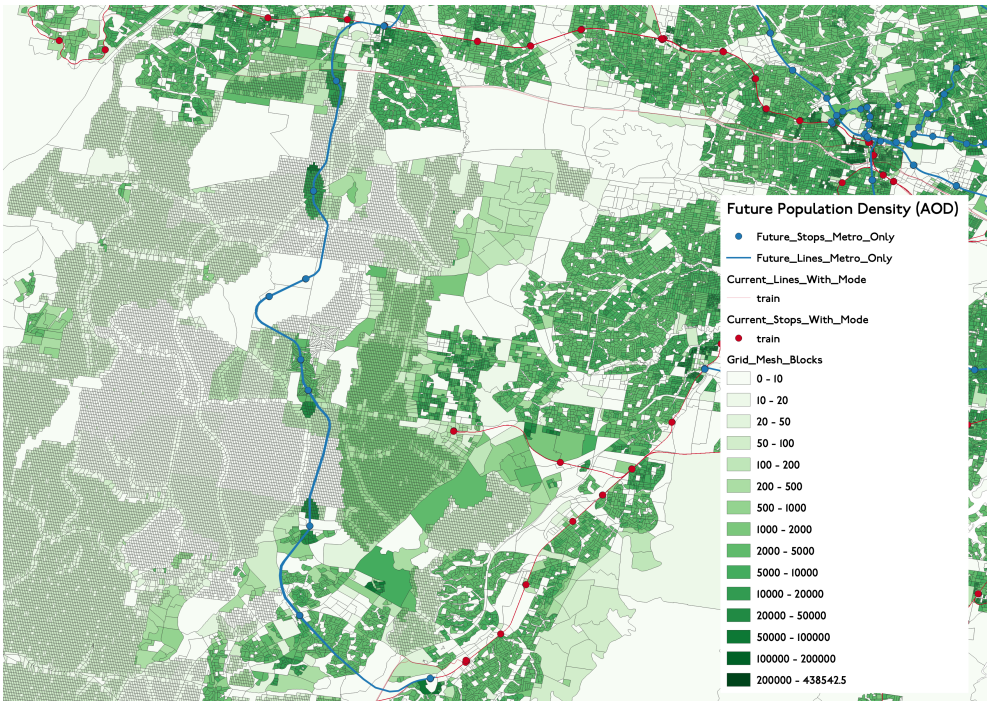


Figure 7: Population Density in Access-Oriented Development Scenario. AOD around WSA Metro stations only. Population density in *persons*/km^2.

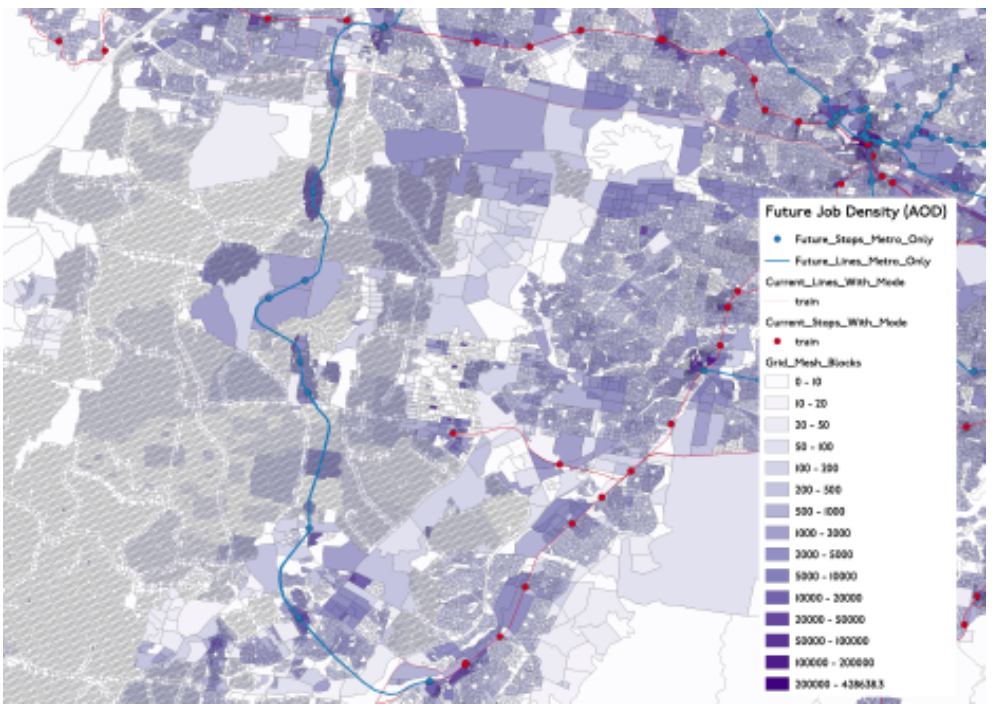


Figure 8: Job Density in Access-Oriented Development Scenario. AOD around WSA Metro stations only. Job density in *jobs*/km^2.

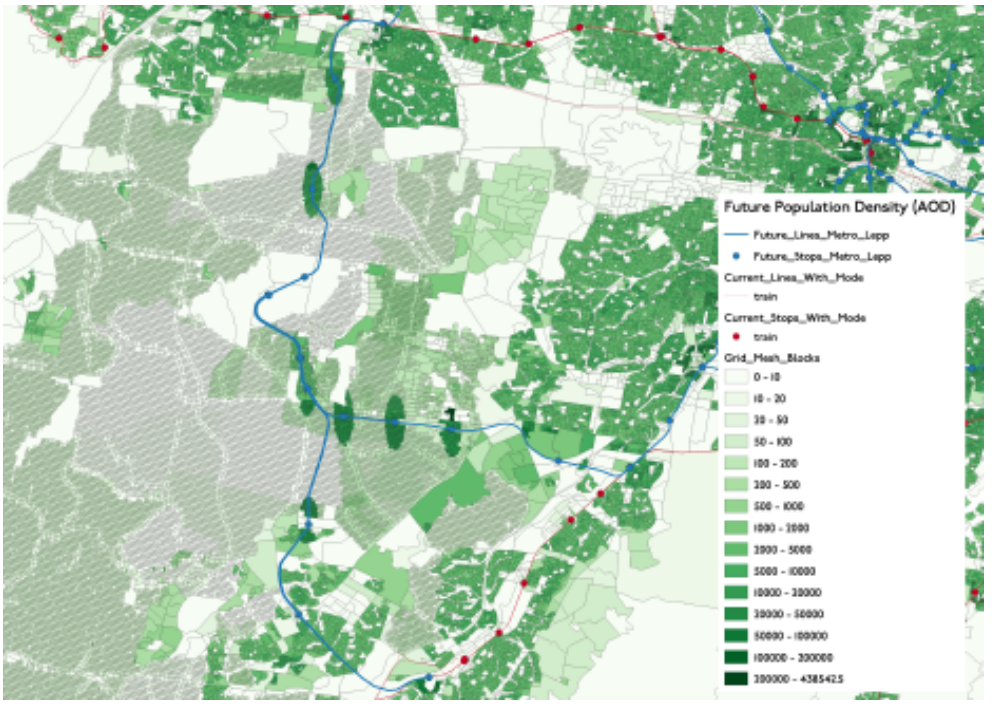


Figure 9: Population Density in Access-Oriented Development Scenario with WSA Metro plus Leppington Extension to Airport. Population density in *persons/km*^{2}.

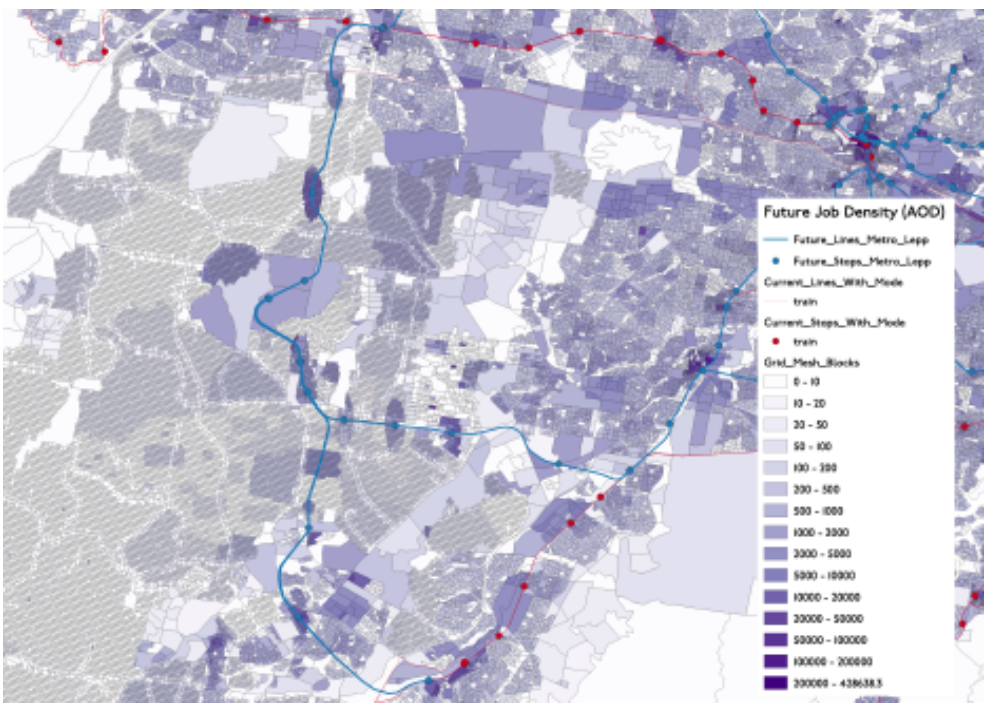


Figure 10: Job Density in Access-Oriented Development Scenario. AOD around WSA Metro plus Leppington Extension to Airport. Job density in *jobs/km*^{2}.

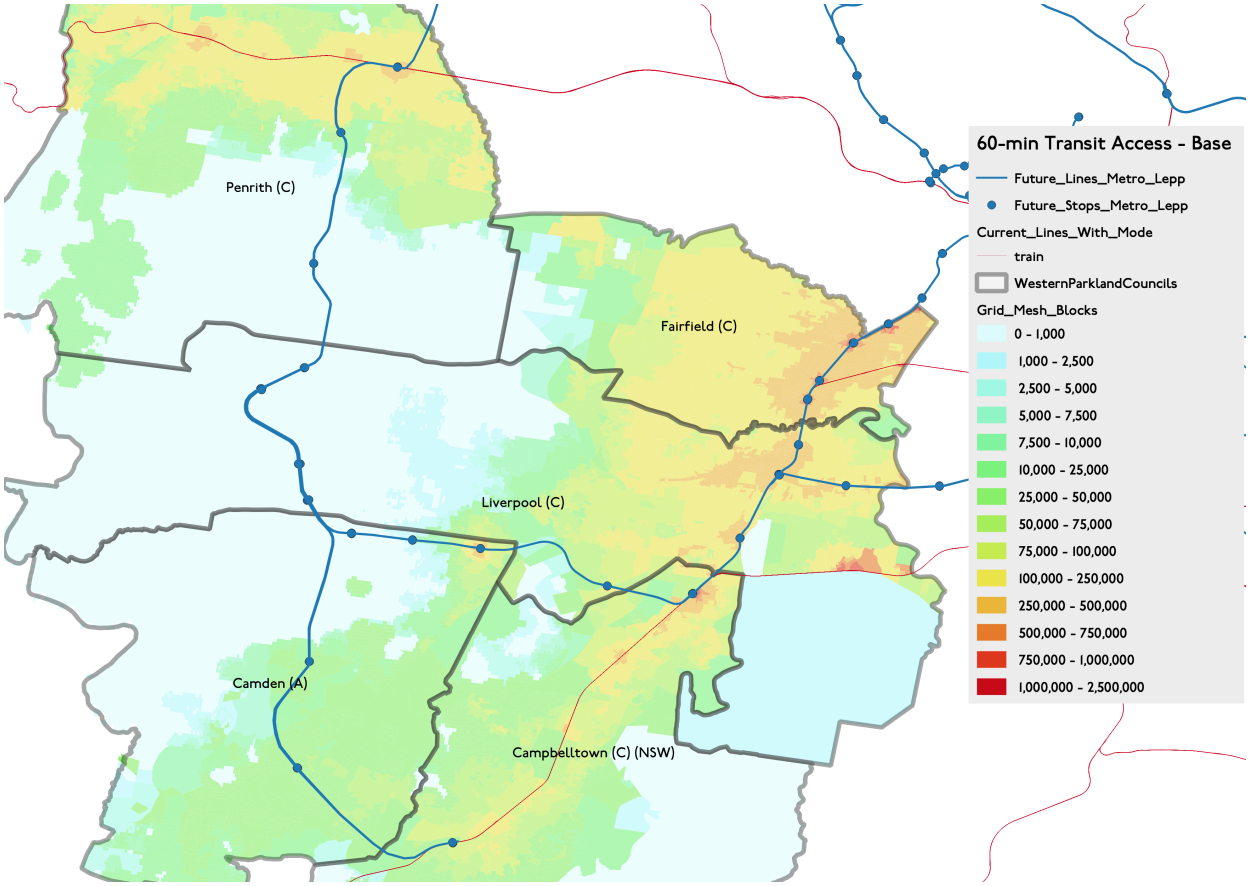


Figure 11: Scenario 1: 60-Minute Transit Access Results

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