



ENGINEERS
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Future Transport 2056

Engineers Australia submission

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About Engineers Australia

The Institution of Engineers Australia (Engineers Australia) is the not-for-profit professional association for engineers. Established in 1919, Engineers Australia is constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community.

Engineers Australia is the trusted voice of the profession. We are the global home for engineering professionals renowned as leaders in shaping a sustainable world.

Introduction

Engineers Australia welcomes Transport for NSW's draft plans for future transport in NSW out to 2056. Engineers Australia has long advocated, and will continue to advocate, for long term planning and land use that integrates innovative and fit-for-purpose infrastructure.

Infrastructure is an investment in the future. It is a primary driver of both economic and social prosperity. Effective, well planned and efficient infrastructure connects both business and people, enriching lives and providing the necessary foundations for future economic growth.

Developing long term infrastructure that provides this bedrock must have long term vision, be well planned, well communicated, and necessary for the community. It must be free from political expediency and engineered with the community in mind.

To effectively deliver long term projects requires government, industry and the public to work collectively. Transport infrastructure in particular requires specific professional knowledge that rests with engineers.

Engineers make things happen

The NSW population is expected to reach over 11 million¹ by 2056 and Sydney's population is expected to reach 8 million² during the same period. Complex issues around liveability, employment and transport will therefore need attention. In circumstances where infrastructure development was barely adequate to begin with, high population growth causes downstream infrastructure problems.

Engineering expertise is required to assist in addressing these issues. It is critical in providing sound judgement during the journey to achieving an ambition of becoming an innovative, technically progressive and globally competitive state.

Innovation and technical progress do not just happen; realising an ambition to have an effective, world leading transport network depends on human capital in numerous fields, often working in interdisciplinary arrangements.

Engineering professionals should not be seen just as providing technical skills and industry sector knowledge. Engineers also have an ability to apply engineering practices and approaches to enhance system-wide processes and organisational structures.

¹ Transport for NSW, *Future Transport 2056*, 2017. Available at: <https://future.transport.nsw.gov.au>

² Australian Bureau of Statistics, 2013, *Population projections, Australia 2012 (Base) to 2021*, cat.no. 3222.0. Available at: [http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/3222.0main+features72012%20\(base\)%20to%202101](http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/3222.0main+features72012%20(base)%20to%202101)

With technology central to the future transport plans of NSW, ensuring that the various sectors interrelate effectively is crucial. Systems such as Mobility as a Service (MaaS), autonomous vehicles moving both freight and people, last mile freight transport systems, smart motorways and integrated mass transport will require not just the physical adaptations to roads, rail and ports, but the amalgamation of technology and physical assets in new ways that cannot, at this point of time, be seen.

At the centre of this paradigm will be the engineers that will mesh the processes and structures together.

The challenges for NSW successfully delivering a technologically innovative and integrated transport network across the whole state, and in some instances beyond its borders, over 40 years are enormous.

Ensuring that regional and rural NSW can move people and freight effectively into and out of a growing Sydney, and onwards to established and growing international markets, will take new levels of thinking. Connecting the ever-growing Sydney basin to each of its new central gateways, while ensuring that new and existing spaces are used effectively to move the ever-increasing numbers of people, will need innovation and long term planning.

Innovative ideas are the beginning of this advancement, but it is the engineers who translate these ideas into practical solutions. Engineering capability will be indispensable for Transport for NSW to achieve the vision of a transport network that is world leading and adaptable for the people of NSW up to and beyond 2056.

Engineering skills pipeline

Government as an informed buyer

Engineering expertise is essential in making informed decisions across the lifecycle of projects including:

- Infrastructure economics and access pricing and policy advice
- Infrastructure demand forecasting
- Design
- Safety
- Project and program management
- Integrated logistics support
- Risk management
- Sustainability advice and management.

Capitalising on the skills and knowledge of engineering professionals to make more informed decisions requires governments to be able to access the appropriate volume and type of engineering expertise when needed. However, the number of engineering professionals employed by government has declined significantly over the last two decades, and the downsizing of the sector and inadequate engineering expertise available to government can be huge.

It takes time to develop a professional engineer and governments can play a role in skills pipeline management. Agreements such as between Engineers Australia and the Asset Standards Authority to develop a diploma in Engineering is an example of how industry and

government can work to arrest the shortfall in engineering capacity with government services. However, it takes time to bring qualified and experienced engineers into the labour force.

Secondly, much of the work to be done on infrastructure will continue to be outsourced to private enterprise. This occurs in many forms, including normal tender agreements or the use of Public Private Partnerships (PPP). It is at this level where oversight of engineering work by government is important; government needs high quality engineering expertise to set scopes of work, assess proposals and manage delivery.

Competition for talent

Practically all public sector engineering construction is the construction of infrastructure, mainly in cities and major population centres, and the transport links between them. The public sector is now emerging from a period of below average growth in engineering construction on infrastructure. Last year public sector infrastructure construction nationwide increased by 6.3 per cent, and in the year ending 30 June 2017 construction nationally grew by 10.7 per cent.

Three quarters of public sector engineering construction completed in 2016-17 across the country was on roads (43.2%), telecommunications facilities (16.9%) and on railways (13.2%). The pattern for NSW is that these three sectors are the focus of the future transport plan.

Yet while NSW is currently a stand out in its focus of infrastructure spending, this will not always be the case. Future projections of population growth over the 40 year period have Victoria and Melbourne³ either matching or exceeding NSW's population targets. Other cities and states will also see significant increases in populations requiring those jurisdictions to take action on greater infrastructure spending or risk becoming failing states. Engineering services will grow in demand and, as with any professional service, engineers will move to where the work is.

If NSW can develop a sufficient supply of well qualified professional engineers, it will ensure that the various projects within the future of transport plan can be designed, built and maintained over the coming decades without labour-related cost and time blowouts.

The draft plans for transport in NSW highlight new projects and some rejuvenation of existing infrastructure. However, maintaining the new assets included in the draft, as well as ongoing maintenance of current assets, will need to be factored into the thinking of Transport for NSW.

The new infrastructure envisaged in the draft plans requires engineers who can ensure that the new technologies embodied in it can serve NSW productively well into the future, and that it is effectively managed using contemporary digital management and monitoring systems to derive maximum value from future capital investments.

To ensure this means developing the pipeline of engineers across the spectrum of the infrastructure being established. It means having the workforce capacity on the ground where it is needed, when it is needed, to deliver projects while at the same time having the long term knowledge to be able to link local projects with the state-wide network.

The trend towards short term employment is detrimental to building the state-based engineering capacity and the engineering capacity to bring new ideas to the network.

³ Australian Bureau of Statistics, 2013, *Population projections, Australia 2012 (Base) to 2021*, cat.no. 3222.0. Available at: [http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/3222.0main+features82012%20\(base\)%20to%202101](http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/3222.0main+features82012%20(base)%20to%202101)

This will be especially important in the coming years as new innovations in transport are established. Automated or self-drive cars, which are quickly coming on line overseas, for example, will require engineers with up to date knowledge of the systems that operate these vehicles and how the current and new infrastructure can handle ever increasing numbers of these vehicles.

Considering the length of time required for an engineer to work their way from university entry to graduation and into productive levels in the workforce, there will always be a need for engineers with the knowledge to be brought in to fill the knowledge gaps.

Skilled migration is important inasmuch as it allows for qualified and competent engineers with requisite knowledge to fill the gaps. However, skilled migration should not be seen as the stand-alone solution to any knowledge or skills deficit. A major factor is that the competition for talent described above within Australia is also played out at the global level.

Further, developing local engineering workforces not only provides local knowledge to the labour force but also provides for long term employment when long term plans are in place. Ensuring that draft plans are well executed and rolled out efficiently will safeguard the knowledge that local engineers will bring and guarantee the longevity of the transport plan.

A plan for the whole of NSW

Cities are the economic generators of states because they are the focus of financial, technological and service industries. Cities are more and more becoming the trading centres of states and countries, competing with and against each other.

Connectivity with and within cities is becoming central to planning needs. Moving workers from home to work is becoming a longer journey and requires infrastructure that can match distance with time so that productivity is not lost because of journey time.

As city populations grow there is a greater need for decentralisation of populations outside of metro areas and into smaller regional cities and towns. This in turn puts greater pressure on infrastructure services both within and between these centres.

Engineers Australia advocates driving productivity growth through infrastructure development. But many parts of Australia suffer from an infrastructure deficit and a key contributing factor is that typically infrastructure planning lags land use development. In these circumstances the lack of infrastructure is a drag on productivity. To contribute to productivity growth, infrastructure provision should occur simultaneously with land use development.

To succeed in growing new, and transitioning existing, regional cities and towns, integrated land use and infrastructure planning ahead of population growth is essential. Unless this occurs, we will simply repeat the mistakes of the past and not achieve effective decentralisation.

NSW has commenced a substantive program of investment that is a major departure from past trends. This purports to be state-wide, but the focus is squarely on transport in Sydney. Although the projects being undertaken are large, implementation is planned over many years emphasising just how challenging the physical and financial aspects are. It is uncertain if these investments are sufficient to cater for the surge in population expected in the next 12 years.

Infrastructure planning and the institutional frameworks in which it occurs are especially important. For too long these institutions have been fragmented; planning has lagged behind

urban and regional land use and has been conducted within poor silos with little community engagement.

Political involvement with technical aspects of infrastructure planning has led to sub-optimal outcomes.

Communities need to be comprehensively engaged to ensure the provision of high quality infrastructure is delivered to support their needs. This is especially true in regional areas of NSW. Working collaboratively at the early stages of a project with local engineers will help governments, both state and local, prepare plans that will work within the community.

As an example, Engineers Australia examined the Future Transport 2056 draft as it related to Newcastle. Central to that examination were the future plans for Newcastle, given the city's importance as a gateway city. The following was found:

- The Future Transport 2056 draft makes no mention of the costs to the community of operating road transport, costs such as pollution and time delays which cars cause to road freight and which are not met by users. This is a classic omission in car-centred societies and ought to be rectified given several of the "sustainability" strategies proposed.
- The draft includes a long list of projects and plans which will be initiated or investigated over a 20-year period, most of which are known and have been tabled previously. Of particular concern is the piece-meal approach to regional highway corridor improvement which will occur over many decades.
- The Golden Highway and the New England Highway west from their common junction near Singleton are assumed to evolve in their exiting corridors. A single merged corridor could run west of Singleton to west of Muswellbrook most likely as a dual carriageway motorway, possibly built with private sector contribution. Both these roads are of high transport significance for the whole north-west of NSW.
- The draft omits several very important projects which would have high benefits to the City of Newcastle. Two omissions are the Fassifern to Hexham rail freight line and a third freight rail track between Fassifern and Hornsby. These combined would bring massive development and transport benefits to Newcastle and a fast express train service between Newcastle and Hornsby.
- The most critical actions which need to proceed urgently are: securing viable extension corridors west from Wickham Station for the light rail and then westwards and south-westwards, and working with Councils to knit the parking tasks into an active public transport strategy and plan.
- Develop an Integrated Regional Transport Plan (IRTP) for each region of the state similar to the South East Queensland IRTP.

Early engagement with local engineers provides for insights into community needs and wants.

Moving the draft into a long term plan will be vitally important in ensuring that the transport network in 2056 matches the vision set in 2017. This will require close community engagement, working closely with industry and land use planning strategies that will see links between centres delivered in a seamless way.

NSW's infrastructure development has historically been stop-start in nature. Intermittency harms long term planning, lowers productivity and economic growth and affects skills retention at all levels and in all regions. It means that when a project ends the workforce disperses instead of building on its experience in new projects. For regional NSW this has can have long term effects to local economies.

Streamlining infrastructure planning over the longer term will see minimal disruption and increase economic development in all parts of the state.

Conclusion

Engineers Australia is encouraged by the development of the Future Transport 2056 draft strategy.

Engineers Australia believes that land use and infrastructure planning should be undertaken in an integrated way. It should be done through consultation with communities, over the longer term rather than in short term piecemeal and reactive ways, and avoid outcomes that are driven by political rather than community needs.

Future planning for development of transport to harness new technology and adapting to changing demographics as the population of NSW changes over the coming decades should help foster increasing productivity and better social conditions.

It is hard to imagine the NSW of the future because changes wrought by technology and innovation occur rapidly. Governments need to be flexible and adaptable to changes in transport so that NSW is not left behind as new technology develops.

Improving and developing transport infrastructure is an ongoing issue. Efficient and modern transport infrastructure increases productivity through improved travel times for commuters and for freight.

Modern infrastructure should not be seen as a cost, rather as a positive investment in the future; connecting businesses and communities increases economic growth and provides for higher living standards for the community.

Cities are the economic generators of states because they are the focus of financial, technology and service industries. Cities are more and more becoming the trading centres of states and countries competing against and trading with each other.

Moving people throughout the Sydney region through a multitude of varying transport modes, from ride share to heavy rail, will need to have co-ordinated approaches and integrated networks that will rely on engineering capacity and knowledge.

Sydney's expanding population will provide regional centres with opportunities to increase their populations as affordability factors push people out of the city. For regional centres, especially those that are close to Sydney, their growth will provide opportunities for new and updated transport networks including opportunities for new freight services.

The Western Sydney Airport will become the new focus of businesses that are associated with a major transport and freight hub including logistics, freight and aeronautics. Jobs will be created in this region and new housing will spring up along the fringe of the city.

Infrastructure is the key enabler of any forward thinking strategy and the provision of that infrastructure must be done as part of long term plans that have a focus on community needs rather than political expediency.

In the decades ahead NSW faces the challenges of moving people and providing efficient freight services for a population expected to expand to over 11 million by 2056, transforming the NSW economy through innovation to meet these challenges will be essential.

As NSW moves to become more globally competitive, generating engineering capacity will help to foster innovation and, from that, more jobs and better investment capacity.

Contact details

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