TRANSPORT AND PUBLIC WORKS COMMITTEE

Members present:

Mr SR King MP (Chair)
Mr CE Boyce MP
Mr RI Katter MP
Mrs JR Miller MP
Mr BJ Mellish MP
Mr TJ Sorensen MP

Staff present:

Ms D Jeffrey (Committee Secretary)
Ms M Telford (Assistant Committee Secretary)

PUBLIC HEARING—INQUIRY INTO TRANSPORT TECHNOLOGY

TRANSCRIPT OF PROCEEDINGS

MONDAY, 29 OCTOBER 2018

Brisbane

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The committee met at 10.58 am.

CHAIR: Good morning. I declare open the public hearing for the committee's inquiry into transport technology. I would like to acknowledge the traditional owners of the land on which our parliament stands. My name is Shane King. I am the member for Kurwongbah and chair of the committee. The other committee members with me here today are Mr Ted Sorensen, who is the deputy chair and member for Hervey Bay; Mr Robbie Katter, the member for Traeger; Mr Bart Mellish, the member for Aspley; and Mrs Jo-Ann Miller, the member for Bundamba.

The committee's proceedings are proceedings of the Queensland parliament and are subject to the standing rules and orders of the parliament. The committee will not require evidence to be given under oath, but I remind witnesses that intentionally misleading the committee is a serious offence. You have previously been provided with a copy of instructions to witnesses, so I will take those as read. The proceedings are being recorded by Hansard and you will be provided with a copy of the transcript. To assist with clarity, could you please identify yourself when you first speak and speak clearly and at a reasonable pace? I also note that there are not many microphones. You may have to move the relevant microphone to allow yourself to speak.

The purposes of today's hearing is to assist the committee with its inquiry. Media may be present and will be subject to the chair's direction at all times. The media rules endorsed by the committee are available from committee staff if required. All of those present today should note that it is possible that you might be filmed or photographed during the proceedings. I ask everyone present to turn mobile phones off or on to silent mode. I also ask that, if witnesses take a question on notice today, they provide the information to the committee by 4 pm on Monday, 5 November 2018.

The committee intends to hold further hearings on the inquiry with information to be updated to the committee's web page as it becomes available. This hearing is the first of these hearings.

BRADSHAW, Mr Martin, General Manager (TransLink), Department of Transport and Main Roads

MAHON, Mr Andrew, General Manager (Transport Regulation), Department of Transport and Main Roads

MITCHELL, Mrs Julie, Deputy Director-General (Policy, Planning and Investment), Department of Transport and Main Roads

NOONAN, Ms Sally, Chief Economist, Department of Transport and Main Roads

RICARDO, Ms Fiona, Policy Director (Mobility as a Service), Department of Transport and Main Roads

ROSE, Ms Suzanne, Executive Director (Service Policy), Department of Transport and Main Roads

WALSH, Mr Dennis, General Manager (Land Transport Safety), Department of Transport and Main Roads

YONG, Mr Mathew, Acting Manager, Department of Transport and Main Roads

CHAIR: I now welcome representatives from the Department of Transport and Main Roads. Thank you for your assistance and your attendance here today. Would anyone like to make a short opening statement, please?

Ms Noonan: Yes, thank you, chair. Good morning, committee members. Thank you very much for the opportunity for the Department of Transport and Main Roads to address you today. As you are aware, over the next 30 years Queensland will experience significant change. Alongside economic growth and demographic change, emerging technologies and trends are likely to cause a profound transformation to Queensland's transport system.

The Department of Transport and Main Roads—TMR—recognises that technologies like electric vehicles, EVs, cooperative and automated vehicles and drones as well as customer-driven trends such as mobility as a service as well as personalised transport and the sharing economy are set to rapidly change transport over the coming decades. Through the smart use of these technologies and trends, TMR can position the transport system to achieve the best transport outcomes for Queenslanders, creating an integrated system that anticipates rather than merely responds to customer needs. These technologies present a range of benefits now and as they evolve.

Alternative transport fuels, such as electricity and hydrogen, will significantly lower emissions associated with negative environmental and health outcomes, improve our fuel security by reducing our dependence on foreign imports, increase the overall sustainability of our communities and create new industries and jobs. Cooperative and automated vehicles are expected to improve transport access options for people with disabilities and older Queenslanders as well as improve safety, efficiency and convenience, saving individuals and businesses time and money.

The changes that we are expecting in the transport sector are changes that industry and governments around the world are putting their minds to. This is a global phenomenon and we need to be prepared for it. TMR is monitoring these global trends and is actively working to ensure that Queenslanders are well prepared for the upcoming changes. For example, currently, TMR is developing a 30-year future focused whole-of-system transport strategy that will enable Queenslanders to reap the benefits of current and future emerging trends and technologies.

In recognition of growing support for EV technology and to encourage further local uptake, last year, the Queensland government launched The future is electric: Queensland's electric vehicle strategy. A core initiative of this strategy is the establishment of Queensland's electric superhighway. The Queensland electric superhighway is designed to allow Queenslanders and tourists to travel by EV from the Gold Coast to Cairns and from Brisbane to Toowoomba. Since the launch of the first Queensland electric superhighway sites in the second half of last year, the sale of battery electric vehicles has increased at a faster rate in Queensland than it has across the nation as a whole. In Queensland, there has been a 164 per cent increase in the uptake of EVs as opposed to 113 per cent for the rest of the nation.

To prepare for and accelerate the deployment of advanced vehicle technologies with improved safety, mobility and environmental benefits, Queensland is delivering a number of nationally significant trials of cooperative and automated vehicles. TMR has also conducted modelling and developed scenarios to test how automated vehicles and other emerging technologies may affect our transport system over the coming decades. The results of these studies will help Queensland prepare for and maximise the benefits of the upcoming change.

TMR recognises that the transport industry is and will continue to be influenced by emerging trends and technologies. Some of these trends and technologies, particularly increased automation, will affect employment within the transport industry. That is why TMR is actively working towards identifying occupations that are likely to be affected, providing businesses with transition planning and exploring possible partnerships with education and training providers to ensure that adequate reskilling opportunities are available for affected employees. As these impacts are likely to be occurring in other places of the world, we have the opportunity to learn from those experiences and adapt their learnings to the Queensland circumstance and Queensland communities. We can then work with industry to put in place strategies to ensure future jobs for Queenslanders.

The Queensland government is committed to partnering with industry and the community to grow jobs in a strong economy. New transport technologies are already growing new Queensland industries and jobs. For example, with Queensland government support, Brisbane based company Tritium has grown to be a global leader in EV technology, with EV chargers deployed in 26 countries and a workforce of 200. More broadly, as the Premier highlighted last month, Queensland is now the largest vehicle manufacturer in Australia. The Queensland government, working in partnership with industry, has enabled this transport sector to emerge as a national leader.

To conclude, emerging transport technologies and trends offer enormous benefits, including improved safety and accessibility, reduced carbon pollution and associated negative environmental and health outcomes, improved fuel security, increased efficiency and lower transport costs, and the

creation of new industries and jobs. We are working with our partners across government, industry and the community to ensure that the safety, accessibility, efficiency and sustainability of Queensland's transport system is retained and improved so that Queenslanders can ultimately reap the benefits afforded by these new and emerging technologies. Thank you, chair, and committee members. We are happy to take further questions.

CHAIR: Okay. Thank you very much for that. Member for Traeger?

Mr KATTER: I have three questions. The first question relates to emerging trends. I cannot help thinking about ridesharing. I was pretty heavily involved in that. To be quite frank, I thought it was handled pretty poorly and some things were forgone. I think it is a pretty good example to reflect on in terms of going forward. It was a new trend. It was new technology. I reflect on things such as the regulated taxi industry having 20 per cent of its fleet dedicated to the disabled. Now, there is not that component in ridesharing. I should not say that there is nothing, but there is no regulation around that. Also, I do not know if it was mandated, but there was a drive to have hybrid vehicles in the taxi industry. Again, that is now not regulated. I think the social components have been overridden by an economic agenda, or strategy. I did not hear you mention 'economic considerations' which can be the default place where we land on all of this. You can talk about everything, but populism or the economy overrides it. For example, a portion of disabled people—let us say 10 per cent of people—do not have access to taxis now because taxis cannot compete with rideshare. You will have these negative consequences. That is the first one.

The second one is biofuels, which probably ties in with my third point. If you want bang for your buck in terms of your effort, you probably focus on the metropolitan areas where you will capture the majority of the population. I imagine that those considerations here are completely different from how they are going to be applied in Mount Isa, or in some of those far-flung western areas where you are not capturing a lot of people. You are not going to get a lot of bang for your buck for your effort. I argue that biofuels would be one where you could really align your agricultural aspirations with all of those other things.

That ties in with my third point, which is that rural and regional focus and how would you accommodate that. I imagine you could do some pretty good stuff in the metropolitan areas, but it would be interesting to see how any of that would apply—if at all—to rural and regional areas.

Ms Noonan: Thank you very much for the questions. I might take them in a different order, because there is a lot that we can cover in that space. I might cover off broadly on biofuels and also the rural and regional focus. I will touch on the accessibility issue, but then I will pass to my colleagues in the regulation space who can talk a little bit more about that in detail, if you are comfortable with that approach.

Mr KATTER: Yes.

Ms Noonan: With respect to biofuels, I will answer that first. As you might be aware—and I am sure you are aware—the Queensland government has developed a Queensland biofuels 10-year road map. A dedicated unit has been established within the Department of State Development, Manufacturing, Infrastructure and Planning that is working specifically to grow the biofuels sector and address some of those issues around the environmental consequences of fuel and also to look at opportunities for self-sufficiency from a state perspective as well as local employment.

As you might be aware, with respect to the regional dimension of the biofuels industry, in 2016 the Queensland government was successful in attracting Southern Oil Refining to Gladstone to look at producing 400 million litres of renewable fuel each year at its Gladstone refinery. That is still in its very early days, but that has been an opportunity to look at employment in a regional context and to provide a new regional industry.

Also flowing from that Queensland biofutures 10-year road map the Queensland government has supported a number of programs, including the Biofutures Industry Development Fund, which assists industrial biotech industries to secure financing for large scale production. There is the Biofutures Commercialisation Program, where national and international biofutures partners are sought to prototype or upscale innovative biotech research and development. There is the Biofutures Acceleration Program, which attracts and supports the development of new biorefinery projects in Queensland. Recently, there has been announced a new—it is yet to be opened—biofutures waste to bioenergy program, which is a $5 million fund to support innovative bioenergy projects.

In terms of some of the other impacts in a regional sense, of those programs and projects that I have outlined, to date, support has been provided to Dalby Bio-Refinery, which plans to expand its existing biorefinery to produce ethanol. That could have application more broadly across the state. There is MSF's sugar plans to develop a new biorefinery to produce ethanol and electricity at the

Atherton Tablelands. There is also Renewable Developments Australia and its plans to build a biorefinery to produce ethanol and renewable energies, which is happening in the Pentland-Charters Towers region.

That is a little bit specifically about biofuels. On the issues more generally about how these opportunities are going to be experienced and how we are considering the options and benefits that transport technologies provide regional areas, you might be aware that, currently, the Department of Transport and Main Roads is developing a series of regional transport plans. These transport plans have involved a high degree of consultation, engagement and partnership at that local level—so local governments working hand in glove with state agencies, including the Department of Transport and Main Roads.

We are looking at developing a series of RTPs that cover the Far North, North-West, Northern and Central-West. The Mackay-Isaac-Whitsunday RTP has already been released. It was released last year as a draft consultation document. That can give you a little bit of a flavour of what these regional transport plans look like. There is also the Fitzroy, South-West, Darling Downs and SEQ, which will cover the north coast, metropolitan and south coast.

These documents are not just about the here and now in terms of what the transport system looks like, but they are an opportunity to look into the future as well. How are these new technologies going to provide opportunities for these regional areas on a very specific case-by-case basis? What is happening in the region? What are the region's characteristics? What are the social issues? What are the economic issues? What are the environmental issues and how do we tailor a future-looking transport system that actually meets that local community's needs? That is really the work that is being progressed through the RTPs. I am hoping that has covered off on the two issues around biofuels and rural and regional quite broadly.

With respect to the accessibility issue before I pass to my colleagues, I bring to your attention the fact that you might be aware that the Queensland Department of Transport and Main Roads has recently this year—and I think, as you pointed out very appropriately, there have been a lot of learnings from the technology disruption experience and we are taking those on board with respect to accessibility in particular—appointed a general manager attached to the director-general's office who is specifically looking in a dedicated way to accessibility issues and how we can do better in that space. He has developed an accessible transport network, so really looking at engaging broadly across the sector and with other levels of government and the community to ensure that we are wholly mindful of accessibility issues in all of the work that we do. Thank you for the questions and I will pass over to my colleagues who might want to add something in that regulation space.

Ms Rose: I could probably speak briefly around the personalised transport side of things. In terms of the reforms relating to the personalised transport industry, there were four key objectives in a policy sense. They were focused on strengthening safety standards, providing passengers with greater choice and flexibility, driving innovation and improving passenger service standards by reducing red tape, and ensuring accountability and clearly defined obligations. The reforms were conducted in three stages and the third stage is around comprehensive monitoring and evaluation and the department has been developing a framework in that respect. That framework is about ensuring the reforms strike the right balance and continue to deliver personalised transport services to the community. It is also about ensuring that any further changes that might be necessary are adopted initially and effectively. That is the point we are at at the moment in terms of the department—that is, reflecting on the learnings of that and those learnings could certainly be adopted more broadly across the department.

Just one point that I think is worth clarifying in terms of the accessibility of the taxi fleet and rideshare, those requirements are governed or regulated by the Commonwealth government. That is something that we are keeping a close eye on in terms of the industry in Queensland and the sustainability of our wheelchair accessible fleet is something that we are looking at under stage 3 of those reforms because that is making sure that our vulnerable customers do have access to good levels of service.

Mr KATTER: So you do not know where that is at at the moment?

Ms Rose: In terms of?

Mr KATTER: You do not have data or evidence. As I understand it, there was a requirement for them to have 16 per cent or 20 per cent of their fleet and the taxis for use by the disabled. If they talk about 40 per cent encroachment by rideshare where they do not have that obligation, you would have to think that there would be a diminution, but you are saying you do not have a visual on that yet?

Ms Rose: No. Certainly we have not reduced any requirements on the taxi industry in terms of the licences that were specifically required to be provided in terms of wheelchair accessible vehicles, so they still continue. Making sure that that part of the fleet is sustainable into the longer term is something that we are looking at under the reforms under that stage 3 that I just talked about.

Mr KATTER: Going back to the same question, I understand what you are saying now and I appreciate that response but probably in a broader sense it would be nice to see some recognition. Whatever side you fall on with the rideshare versus taxi, I think it is fair to say that economic pressures will impact on any strategy you have and should be a consideration. I was probably as much after a response on that than how you are looking at the disabled part, which is important of course.

Ms Noonan: I am happy to respond to that further part. In formulating the 30-year Queensland transport strategy that I talked about, we are looking at some really key values around what is it that is important—that is, where does transport sit in our community and where does it sit in our economy? Safety is always going to be No. 1 for our department. We are looking at accessibility, financial sustainability, the opportunity in an economic sense that transport provides, including around freight for example, and the issue of environmental sustainability. We really have, if you like, a quadrupled bottom line that we are looking at. Economic development is clearly a part of what we do, as is looking for improving outcomes for Queenslanders in broadly the areas of social outcome, economic outcome and environmental outcome. That is what we are all about and you will see that very strongly when the draft Queensland transport strategy is released for public consultation. When that is released it is an opportunity in that it will be provided for public consultation. There is an opportunity for the broader Queensland community to engage in the conversation and to provide some comments and feedback around where areas could be strengthened. It is really important that this is something that speaks to a broad cross-section of Queenslanders and values of the Queensland community.

In addition to the work that we are doing around the Queensland transport strategy, there is also a Queensland freight strategy that is under development and at a very advanced stage. There is a Queensland Freight Ministerial Council that Minister Bailey chairs which has a lot of engagement with the freight industry and other economic players in the transport industry. That definitely is a very important component of what we are all working towards.

Mr MELLISH: In terms of automated vehicles and connected vehicles—and it might be a question for you, Ms Noonan—people understand broadly automated vehicles. Firstly, could you elaborate a little bit on connected vehicles and what the thinking is around that?

Ms Noonan: Thank you very much for the question. I am very fortunate to have some experts at the table who have been involved hands on in terms of some of the trials and the technology in particular. I might pass to my colleague Dennis Walsh if you are happy for that.

Mr Walsh: Thank you for the question. The difference between automated vehicles and connected vehicles is that connected vehicles exchange messages with other vehicles and also with our roadside infrastructure. They use a form of wi-fi communication that enables information to be exchanged that is generally related to safety critical situations, and that information is relayed 10 times a second. It gives advice about how the driver can keep safe and alert about changes in traffic conditions. This technology is not currently available routinely in vehicles in Australia. It has been rolled out progressively in Japan, Korea and 17 countries in Europe. There is a C-Roads pilot occurring in Europe at the moment and over 20 states in the United States are also trialling this technology.

It does not take away the control of the vehicle from the driver. It provides information for them to take an action generally related to a safety action, so it is normally related to a hazardous situation that might occur. We have a number of applications that we are looking at piloting here in Queensland in Ipswich in our pilot. Those warnings could include slow or stopped vehicles ahead, congestion ahead, vehicle/pedestrian conflicts where the pedestrian might not be entirely visible and red-light warnings et cetera. I have an explanatory note here I am happy to share with the committee which indicates the levels of automation and also what connected vehicles also do.

CHAIR: That would be useful if we could get that tabled.

Mr Walsh: If the committee would like, I could step through the different technologies. On the front page we have six levels—zero to five—in terms of level of automation.

Mr MELLISH: Is this a DTMR sort of level or is this an international level?

Mr Walsh: No, this is an international standard. This is the commonly held SAE standard which is the standard association internationally. In level 0 there is no automation, so that is fully human control. In level 1 the driver completes the majority of the tasks. You can see down the bottom of the

page the pictures that give you a bit of a sense of the differentiator, so that is where you still have hands-on control by the driver. Partial automation is level 2 and that is where most of the more modern vehicles on the market are at at this point in time. That is where you still need the eye on the road. Sometimes the vehicle will undertake manoeuvres of its own accord, but you still legally have to have your hands on the steering wheel.

Conditional automation—level 3—is not currently available in the marketplace, albeit some people may sometimes drive level 2 vehicles at the level 3 standard. At level 3 the vehicle is competent to do some tasks on its own and it would be safe under those conditions for the driver not to have their hands on the steering wheel. Level 4 is the first level of highly automated driving, and that is where you can rely on the vehicle to stop safely itself. There are very few vehicles internationally that are at this level at this point in time. Full automation is level 5 which is where the vehicle is in control all of the time 24/7. In that context, the level 2 vehicles that we are seeing on our network at the moment are vehicles that we describe as advanced driver-assistance systems. That is the common terminology by the auto manufacturers.

The next page is an example of the use cases that we will be undertaking in our pilot with connected vehicles. This is the first use case of the electronic emergency brake light warning. You commonly would have experienced when you are travelling in a traffic stream and suddenly the vehicles brake in front of you for no apparent reason. You have very little time to react. This will actually relay messages from the vehicle that is braking at the front of the queue to other vehicles behind to give them fair warning of that braking manoeuvre in advance of being in a hazardous situation. Advanced red-light warning is where a driver has been inattentive and they may be driving through a red light unwittingly. The vehicle will alert them to that potentiality and give them a warning to brake and stop before the red light.

With regard to in-vehicle speed, a lot of current vehicles have in-vehicle speed messages, commonly in new vehicles. This particular application will pick up our variable speed limits from our motorway systems so that people can also get that information as well. In terms of road hazard warning, if there is something hazardous on the network this will give you full warning of that hazard on the network. We know about this from our traffic systems at the moment. This will broadcast that information into the vehicle so that people on that route in that vicinity will be aware of that hazard. With regard to slow and stopped vehicles, that is a similar concept where a vehicle is slowing or has stopped unexpectedly.

With regard to turning warning through vulnerable road users at signalised intersections, there are occasions when pedestrians still get hurt or injured as a result of people turning through the pedestrian crossing, so this will give an alert around the presence of pedestrians. Roadworks warning—I think that is self-explanatory—and back of queue, which I mentioned before. They are the connected messages that drivers will have to respond to.

If you go to the third page of that document this is where the future is emerging internationally where automated vehicles and connected vehicle type messaging will come together into a connected and automated vehicle. That means when those messages or warnings are broadcast in the future there may be an automated response by the vehicle if the driver does not respond soon enough. That is why we talk about connected and automated vehicles together.

Mr MELLISH: I suppose this is the million dollar question. How long will it take to get from level 3 to level 4 and from level 4 to level 5? How do you see that impacting on future transport infrastructure construction, predominantly roads? Hypothetically, if we were to get to level 5 next week, would that impact the types of infrastructure we are building in the next 20 years as opposed to if it takes another 20 years to get to level 5?

Mr Walsh: That is a good question. I suppose it really does depend on how these technologies evolve. It is early days. The level 3 vehicles may appear on the market in the next few years. Most people are seeing level 5 vehicles as being at least a decade or longer away except for in particular circumstances where you might have a cordoned off area, a highly controlled environment, where the vehicle is not conflicting with other users.

In terms of how it might transform our transport system, firstly, the technology and the digital and the road infrastructure needs to support these vehicles in a lot of cases. For connected vehicles that means that a lot of the roadside infrastructure that we have for our intelligent transport systems would need to be upgraded to be able to communicate the information we know now into the vehicles. That means roadside beacons would be put in place. We have a lot of locations where we have roadside equipment, so it would mean upgrading that type of digital infrastructure. Highly accurate

positioning information is required to support these technologies. That is not an issue for Queensland specifically. That is an issue nationally. The federal government announced last year—and have funded—a space based augmentation system, which gives you highly accurate positioning down to a centimetre level. That technology will evolve over the next few years and will have its challenges, particularly across the sort of topography and the vastness of a state like Queensland. There are certainly some challenges ahead in terms of our rural and regional areas.

There is also the issue of communications and how that will occur between the vehicles and roadside infrastructure. That communications has been allocated by the Australian Communications and Media Authority. It is a bandwidth called 5.9 gigahertz. Queensland was instrumental in securing that bandwidth for these purposes. There are other technology options. We will need to understand how industry adopts and deploys those technologies.

There are a number of other platform issues in terms of technology platforms that are required for the connected vehicles, but for automated vehicles that is largely going to be driven by the auto manufacturers. The auto manufacturers will develop those technologies using largely sensors, so they have lasers, cameras and radar. Those sensors all have limitations. Most people in the industry understand now that overcoming those limitations of those sensors will require a connectedness as well because you cannot see beyond the line of sight of those sensors whereas the connected vehicle communications that I talked about before can see around corners and exchange messaging up to 300 metres. It has that situational awareness beyond what the vehicle does.

In terms of our own infrastructure to support that, most impacts are expected to be in terms of line marking and signing. These vehicles do use those various sensors to try to understand the road environment. It is very complex, so they need to get fairly consistent line marking and signage, particularly around speed limits and line marking. We know that large parts of our network do not have line marking at all and a large part of our network does not have sealed pavement, either. In those situations we are yet to see how industry responds to deal with those challenges. They will be largely with industry and we will be assisting where we can in those trials and understanding the information that they need to glean from our network.

In terms of the broader transport policy and planning impacts around automated vehicles and how they are likely to affect the transport system, we have done some modelling. I will make a couple of comments and then I might hand back to Sally because her area has undertaken that modelling. I think there is a big challenge in this transition period from traditional vehicles to more highly automated vehicles. We are working through those issues at a national level to understand how we best manage that. Certainly with automated vehicles or highly automated vehicles, at this point in time because of the various complexities of the driving task, it is not safe to share the road with other road users without a high level of control. That will change as the technology gets more reliable. In terms of the longer term planning impacts, I will hand back to Sally.

Ms Noonan: Probably the key issue that we are looking at in that context—and Dennis has really outlined the technical side of it—is some of the behavioural issues around what could happen in a future scenario where autonomous vehicles are the main method of road based transport. The key issues that we are really focusing on are the ownership models. For example, if you have a situation where individuals own their own autonomous vehicle so that the vehicle can be used for them to travel and maybe do other activities at the same time, it really changes the perception of the value of time. There may be a tendency for people to be willing to spend more time in autonomous vehicles than they currently are. There may be a tendency for the vehicles to be used more frequently. There might be some really practical issues around parking and congestion.

For example, with an autonomous vehicle, someone who currently drives their car into town and parks it may not need a car-parking space as they would send their vehicle back home or somewhere else to park and then it would need to make a return trip. You will have a greater level of congestion if there is a greater number of hours or kilometres travelled by an autonomous vehicle than there would have been by an individually owned conventional vehicle. Those sorts of issues are issues that we are starting to look at, and we have done some scenario planning around the propensity for sharing vehicles. Rather than actually owning a private autonomous vehicle, is there more of an attraction in being able to access, say, a fleet vehicle when you need it rather than worrying about home garaging and individual ownership?

The third scenario that we are looking at is around the sharing of trips: the propensity for us to change our behaviour and being willing to get into an autonomous vehicle with other individuals who we may or may not know. This could have implications in terms of better managing congestion if there is more efficiency around the use of vehicles. There is a whole lot of issues potentially around vehicle

design, security and safety. How do we actually feel about getting into a vehicle with other people? Those scenarios that look at sharing a fleet or a vehicle with other people could have really profound benefits with respect to congestion—better land use, for example. They are the sorts of issues that we are examining under some of those scenarios that Dennis mentioned.

Mr MELLISH: I have a couple of quick follow-up questions. Mr Walsh, you mentioned the ACMA bandwidth we have secured. My question is around whether other states have that and if it is something that the federal government needs to be driving or encouraging states to purchase or secure that bandwidth so that in 20 years time, when it is four times the cost, they do not have a sudden billion dollar bill to purchase that bandwidth? My second question, which is unrelated to that, is: you mentioned interaction with other road users is the main challenge that needs to be overcome. As this is trialled more on mainstream road infrastructure, does that mean that busways, transitways or dedicated lanes will be the way to introduce that initially before it is put out more broadly?

Mr Walsh: The bandwidth has been secured for the whole of the country, so it is available for all states. It is a valuable asset. The thing that distinguishes the bandwidth allocation is that it is available in these vehicles at no cost to users. There is a cost to put the initial equipment into the vehicle, so that will be a decision by industry. We have seen that happening in other countries. Toyota recently announced that all new vehicle models into the US will have this technology in their vehicle from 2021 onwards, which is very encouraging. For us, this is about getting better road safety outcomes. We lost 247 lives last year and over 6,000 people were hospitalised. These technologies as we see it will aid the driver in making better decisions. Then, as automation matures, these technologies will take away some of those tasks with which people make errors at the moment so we get a better safety outcome.

In terms of initial deployment, we have seen that the pilots so far have occurred in highly controlled environments. Generally speaking, other road users are excluded from the trial area. That is obviously not necessarily a sustainable, long-term solution where the vehicles have to share the infrastructure with other road users. There is a lot of testing occurring in that area. I might defer to our General Manager (Transport Regulation), Andrew Mahon, to talk about how that is being addressed at a national level in terms of regulation and making sure we get safe operation of these vehicles.

Mr Mahon: There are a couple of areas I might quickly cover for you to give you a bit of background. First is the trials that have been going on in our state and other jurisdictions. As Dennis said, they have been largely controlled. They have been in environments where they are not interacting with pedestrians or other traffic while the technology is still in its early days. We are willing to make sure that all safety aspects are considered in those early trials. We have done four of those in different locations across the state with a particular company called EasyMile. We are currently working with local governments in South-East Queensland who are looking to trial that further in different locations. There has been media recently about a trial on Karragarra Island which is something on which we are working with the proponents and the councils around what that might look like. Those are in the early days and they are very basic in terms of what they are trying to achieve and demonstrate. Again, safety is the highest consideration there.

In relation to the national work that is going on in terms of the legislative parameters around automated vehicles and their deployment across the country, the National Transport Commission is leading that national work in terms of putting out regulatory impact statements and considerations of future legislation that might be required. At the moment they are aiming for around 2020, but that may change along the way. It is quite a complex area. Of course, all the considerations that need to be taken will mean that that will be a complicated process over the next couple of years. Queensland is obviously a key player in that and I, myself, am a state rep in relation to the work that is going on in that space.

The principles behind that legislative process are around a safety assurance scheme. By that I mean a number of safety principles need to be considered as far as approval for these types of vehicles are concerned to not only come into the country but be registered and deployed on the roads in the future. As Dennis said earlier, some of this technology is still a fair way away. There has been a lot of media around what these technologies can do, and certain companies will obviously promote their technologies. The reality of what we are seeing is that level 3 automation is still a little way away from being deployed on the roads and certainly level 4 and 5 automation is still some time away.

What is really important to understand here is that there is likely to be a completely different framework about how we manage vehicles being imported and deployed on the roads. It is a bit of a watershed moment, if you like. It is sort of like that transition from horse and cart to motor vehicle. We are now in that phase of transitioning from motor vehicle to autonomous vehicles. That requires a fair

amount of consideration about trying to get these legislative parameters right. I would expect what we will likely see is a staged approach. 2020 is not that far away, and what the industry is doing in terms of the work they are putting into that type of technology will also drive the need for different timings around how we deploy that sort of legislative process in the future.

CHAIR: I want to change tack a bit and talk about drones. In what capacity are you currently using drones within the department? Is there any research into using them for freight and passenger movement in the future?

Mrs Mitchell: The department uses drones for asset inspections. They are incredibly useful to remotely monitor our bridges. We use robotic trucks to go into small culverts that we would not be able to get a person into. We can look at towers that are otherwise inaccessible or accessible only with a large amount of cost. We have also been looking at traffic management, an eye in the sky and what it is telling us. That is as far as our actual use of drones goes. It is more an extension of a hobby dronist, just off-the-shelf drones with high-quality gear added. Other departments are using them as well for checking out things on the Barrier Reef, biological and ecological process mapping and things like that.

As far as the actual use of drones for freight, obviously there has been a lot of hype about what is occurring in that space. We estimate that they will be used for delivering first- and last-mile small packages in the future, and it is probably not that far off. They are primarily controlled by CASA, as they are the authority that looks after airspace. If they are to deliver parcels they will have to interface with the road corridor, obviously, to people's front doors. Andrew can probably talk a little bit more about the regulation for that and where we are going in that space. It is quite a challenge for us. I think it is still some time off before we see drones carrying people. I know there has been talk about it in Dubai. I understand they already deliver mail from top of building to top of building. Once again, one of our primary interests is the safe interaction with vehicles below and not falling on them. I also understand there is a lot of pollution in the air as far as small drones go.

A Queensland company has developed an air traffic control system for drones. To deploy that technology they reverse-engineer the drones as they come onto the market. There is a whitelist and a blacklist, and if you are on the blacklist or you are not on any list, then as soon as you try and take that drone off the ground it will be sent back home again or it will just land again. They are using that at the moment around Sydney Harbour. A lot of wedding photography goes on in that area. They are actually hitting structures like the Sydney Harbour Bridge and they are landing on roads. We are not seeing that with general-use drones for hobbyists, but we may have to use that sort of technology in future to protect our assets or to see what is going on. I think that small drones interacting with more legitimate transport-task drones is going to be an issue for us in the future. Andrew might tell you a bit about how we are dealing with some of those things.

Mr Mahon: As Julie mentioned, drones are managed from a regulatory perspective largely by CASA because they are a flight vehicle; however, if they interact with traffic and our road corridors it is a different story. There are offences around collisions with vehicles and that type of thing. We do need to have a look more closely at what impacts this might have in the future, given their uptake and general interest in the community. We also have land based drones. We have given approval for a couple of trials that both Domino's Pizza and Australia Post have done in relation to land based drones. They are not always flight based. Those little robot-looking devices are used on footpaths, crossing roads and all that sort of thing, so we have given approvals for a couple of trials in that space. Both have been in central Brisbane. They have been quite successful around what they have discovered. It is a fairly extensive learning exercise at this stage, but companies like Australia Post are certainly looking very closely at how they might manage the future of parcel delivery, particularly small parcels.

From a regulatory sense, as I mentioned, CASA largely deals with the flight element of it, but current regulatory provisions would cover interactions in current road environments. We need to look more at how this might work in the future and if they will use road corridors, for example, as their preferred route or whatever the case may be, so there is more work to do in that space.

Mr SORENSEN: Steve Bracks was at Hervey Bay recently, and he said that passenger drones would be operating by about 2023. You have a 30-year plan. Passenger drones are going to be flying around within 30 years. If you watch what is happening in China and places like that where they have already built these drones, and Dubai as well, we need to build our high-rise buildings to take drones in the future. When you look around the world today you see a lot of buildings with a helicopter pad built not on top, but on the sides of buildings. They are being built, I believe, for drones in the future.

I think we really have to get out there and look at what is going to happen in the future, because they are coming whether we like it or not. There will be passenger drones flying around and you will not need to build a road for them to travel on. It will all be automated. You will just hit a button, put in your address and you will go.

What are we looking at in the future? Australia Post is already delivering emergency things to hospitals through drones. It is going to happen whether we like it or not. When we were kids looking at Dick Tracy comics and talking into our watches we thought it was all imaginary, but it is happening. The Jetsons years are here and it is not going to go away. What is in the future?

Ms Noonan: I might answer that question and invite any colleagues who would like to add to my comments. I think you are onto something there. Definitely it is something that we are considering in terms of the 30-year Queensland transport strategy. I think one of the really exciting things around drone technology and Queensland in particular is that we account for 30 per cent of the drone industry in Australia. We are seen as a leader in this space, so with industry we are really providing a lot of focus on the issue and the questions you are putting forward. In particular, you may be aware that Boeing, which has a significant presence in Queensland in a number of locations—including Oakey, Amberley and Townsville—has embarked on some partnerships with a range of different industry providers and is employing 131 people to specifically look at this issue around what drone technology can provide in the Queensland context from both a freight perspective and potentially human transport. There is a huge amount of effort and resources being put into this.

As I have said, Queensland has the largest sector with respect to investigating drone opportunities and it is certainly something that we are monitoring. We are engaging with industry. Queensland is the only state in Australia to have a drone strategy, so from a whole-of-government perspective there is a lot of effort being put into this area looking at issues around privacy, for example, looking at issues around safety, working with CASA. As Julie Mitchell outlined, there is a lot that we are already doing in terms of sensors, monitoring and videoing. The Queensland Police Service is also really up there in terms of showing some leadership in this space. A lot of effort is being applied, and certainly I think the scenarios you are outlining are well and truly exercising our minds.

Mrs Mitchell: Dennis has talked about technology issues with regard to sensors for autonomous vehicles on the road. Andrew has talked about regulatory issues with regard to the same and that they are deemed safe. All of those things apply to drones as well as the actual technology. What we have found is that we get a lot of hype in the media with regard to how advanced the technology actually is. In my view, if I see it advertised that there is a successful trial, it is probably still about five years away. I am not going to hold my breath for drones that are used for passenger relay. I think that the primary issue at the moment is payload. They are being used to distribute emergency parcels and things like that. They are very light and they can carry very light things at the moment.

When we are talking about an actual person, we are talking about someone who is prepared to put their whole life in the hands of the technology that is required for an autonomous vehicle with the limitations of the development of all the sensors, radars, LiDARs et cetera. Then we need a legislative regime and the investigation of that to make sure they are not going to fall from the sky onto pedestrians, for example. We need to be really assured that they are going to stay up there, that they know what they are doing and that they are going to land in the right place. We still have some distance to go on that. I think we will see them delivering light parcels before we see them in a commercial perspective. Australia Post and Amazon have spoken about it. I think about two years ago we saw that Amazon was going to do that in Australia. I do not know whether we have seen a parcel delivered yet. It is usually a little bit further away than what they say.

Mr KATTER: As someone who represents rural and regional areas, I would be pretty cranky if there was not some sort of consideration or recommendation in the report with regard to that. I am not trying to be a Luddite, but it is not practical in these areas. There may be inadvertent effects that may only affect a small number of people but they could be significant. I will give you an example. When the road was sealed from Gregory to Burketown—which is a very remote part of Queensland. Only 100 to 150 people live there—the comment was made at council, 'Do you know what's great about that? There's a lot of people now buying cheap two-wheel drive vehicles, and now they can get to Mount Isa to shop. It will open up their world a bit.'

You might say this is great technology, it is very efficient and we will have people sharing stuff, which is all great and I would agree with that, but then Toyota would say that we are reducing autonomous vehicles and suddenly your service fee at Burketown is $5,000 on your old Corolla. It just slips into this malaise where, 10 years down the track, everyone in Burketown has spent $5,000,

they cannot afford their vehicles, and it diminishes their access to the coast, Townsville or Mount Isa. I would just ask that there be some very definite consideration of those issues and how there might be inadvertent effects on the cost of transport in those areas.

Ms Noonan: It is really at the forefront of our minds particularly from a Queensland perspective, as colleagues have outlined, where we are part of many national conversations. Queensland is the most decentralised state in Australia, and we never lose sight of that. Generally there are regional transport plans which give an opportunity for a voice at that very local level but, as you have pointed out, there are some practical issues that will only come to rise under certain conditions, and those conditions are going to vary greatly from community to community. For example, I might mention very briefly issues around freight transport.

As you know, freight transport is such a heterogeneous industry. It is not a homogeneous industry. The impact that technology is going to have on the freight industry is going to be complex. There will be opportunities; for example, I think in the submission we talk about platooning. That is not going to be universal across the freight industry. It will work for some subsections but it will not work for everything. I think it is really important that we continue to have those discussions at the local level through the regional transport plan process and that we continue to engage with industry groups.

I mentioned the Ministerial Freight Council. There is a ministerial level committee on electric vehicles too, which gives an opportunity to give voices to different communities on different issues. We have a network of regional offices throughout the whole of Queensland for Transport and Main Roads. Continue to have those conversations, but realise that the unique complexity around Queensland is something that we always continue to have at the forefront of our minds. I am conscious of the time, Chair.

CHAIR: We do appreciate your time today. We will have to close the hearing; our time has expired. We do have many more questions that we will forward as questions on notice to the department. No doubt during the course of this inquiry we will have you back again, but having the answers to those questions will help us to tailor and fine-tune things. Thank you all very much for your time today. I do not know whether we could extend the time for the questions on notice. It will not be Monday, 5 November, because there is a comprehensive list of questions that we have come up with during this process. We will be in touch. Thank you all for your time today. I declare this hearing closed.

The committee adjourned at 12.03 pm.