Torrens to Darlington Alternative Proposal

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Summary

The Torrens to Darlington link is the final section of the North-South corridor to be completed and a very important piece of infrastructure for our city and state, but there are many serious flaws with the government's existing plans for this project, including:

- **Extreme cost**, with current estimates putting the cost at $15.4 billion. That's several billion dollars more than it should cost to complete this motorway, and grossly out-of-proportion to the cost of other sections of the motorway completed to date.
- **Few entries and exits**, meaning poor access to/from several important arterial roads and poor access to the airport, especially from the north. This is not only inconvenient but also likely to cause traffic problems at some entries and exits.
- **Poor long-term planning**, with no provision being made for a future motorway connection to the South Eastern Freeway. The government's plans would make it very difficult and expensive to build that connection in the future, leaving us with a disjoint motorway network.
- **Misleading claims** that 480 properties would be saved by building tunnels, when the net number of properties saved is only about 150 under the original plan and 110 under the recently updated plan (as of January 2023).
- **Long construction times**, with the project not expected to be completed until 2030 at the earliest, and very little short-term relief for motorists before that time.
- **Not fit for purpose** as a primary freight route, with vehicles carrying dangerous goods (such as fuel tankers) being prohibited from using the tunnels.
- **Requires rebuilding the tram overpass**, when it should be possible to avoid most of this expense.
- **Leaves significant deficiencies in South Road unaddressed**, such as
    - The lack of bicycle lanes along most parts of South Road that would be bypassed by the northern and souther tunnels.
    - The level crossing at the Cross Road intersection and limited right-turn capacity at that intersection.
    - Probably insufficient capacity at other key intersections to handle long-term growth in traffic.

The good news is that the people of South Australia do not need to accept this overpriced, inferior solution, as there is a much more affordable option available which solves these problems, delivering a much better outcome for the people of Adelaide and South Australia. This document describes this alternative solution, which involves:

- Building the motorway without tunnels in a way that saves several billion dollars compared to the government's plans, without requiring many more properties to be acquired. It will also be faster to construct.
- Keeping the local residents happy through a combination of good design and a generous (though still very affordable) compensation scheme for everyone who lives near the new motorway. Many residents would rather receive this money than have tunnels built.
- Minimising noise impacts with a combination of noise walls and quiet asphalt pavement, resulting in noise levels that are comparable to and may even be less than the existing South Road.
- Preserving heritage buildings by either designing the road in such a way as to avoid them, or, in a few cases, moving them out of the way (it is possible to move an entire masonry building in one piece, as explained below).

- Providing more entries and exits in places where they are needed to provide fast and convenient access to all intersecting arterial roads along the route, and the best possible access to the airport.
- Including provision for a future motorway link to the South Eastern Freeway by building the interchange as part of this project, saving the state a large amount of money in the long run.
- Improving the property acquisition process to give property owners more time to move out and better compensation, while still delivering fairness and good value for money for the taxpayer.
- Providing near-term relief to motorists through much more substantial and effective improvements to alternative routes. This will be easily affordable with a fraction of the money saved by not building tunnels, and will provide additional long-lasting benefits to Adelaide's transportation network, especially in the western suburbs.
- Fixing many problems with South Road that would not be fixed under the government's plans, including the lack of bicycle lanes.

This document also shows how the tunnels plan doesn't even achieve one of its main aims, which was to save almost 500 properties from demolition. It's now just an expensive way to demolish almost the same number of properties as a motorway built without tunnels.

For a more detailed look at the problems with the government's plan, read on. To skip ahead to the details of this alternative proposal, click here.

Note that this document uses the term "government's plan" to refer to the Hybrid Tunnels plan currently proposed by the transport department. It is not an attack on the current SA government, as the plan was mostly not their doing anyway. It simply refers to the fact that the transport department is part of the government and therefore the Hybrid Tunnels plan is the one the government is currently proposing.

Problems With The Government's Plan

Cost

The government's current proposal involving tunnels would cost billions of dollars more than the open motorway alternative. They originally estimated **$9.8 billion** for this project, and the cost has since blown out to **$15.4 billion**. By comparison, building the project without tunnels, in the simpler way suggested here, would cost less than half this amount.

This means that tunnels would be a huge waste of taxpayers' money that could be directed into other infrastructure projects that our city needs. It is equivalent to wasting **thousands of dollars per South Australian** (ask yourself whether you would be willing to be $4000 out-of-pocket to have tunnels built instead of an open motorway). With South Australia's government debt at an all-time high and more infrastructure spending needed to support population growth, we cannot afford such wasteful spending, when there is a much cheaper option available.

For comparison, this is what the other sections of the North-South Motorway have cost:

- Northern Connector, 15.5km long, built from 2016 to 2019, cost **$867 million** ($56 million per kilometre).
- South Road Superway, 4.8 kilometres long (including 2.8 kilometres of elevated motorway), built from 2010 to 2013, cost **$842 million** ($175 million per kilometre).
- Regency to Pym, 1.8 kilometres long, built from 2018 to 2021, cost **$354.3 million** ($197 million per kilometre).
- Torrens to Torrens, 4 kilometres long (including 3 kilometres of lowered motorway), built from 2015 to 2018, cost **$801 million** ($267 million per kilometre of motorway).
- Darlington Upgrade, 3.3 kilometres long (including 2.5km of mostly lowered motorway), built from 2017 to 2020, cost **$754.5 million** ($302 million per kilometre of motorway).

All these projects cost less than a billion dollars each. The most expensive of these, the Northern Connector, was only **5.63%** of the estimated cost of the government's Torrens to Darlington tunnels plan. Even comparable projects built in inner suburban areas, like Torrens to Torrens, were much less expensive per kilometre than the government's Torrens to Darlington plan, which would cost an estimated $1.44 billion per kilometre.

Looking at it another way - if the 8.5km stretch of motorway between the Port River Expressway and the Torrens River could be built for only $2 billion (which is $235 million per kilometre, with much of it built in similarly dense suburbs and a significant portion of it elevated), then why should a 10.5km stretch of motorway cost more than seven times this amount?

Access

The proposed layout of entries and exits would provide no convenient access to/from some quite important arterial roads that cross the corridor. One would need to drive a considerable distance along South Road to access them, which would be a disadvantage for residents and businesses in nearby suburbs and anyone travelling to destinations in the area.

Henley Beach Road and **Sir Donald Bradman Drive** are two major east-west arterial roads providing access to the airport, city and western suburbs. They should have convenient access from the north and south. The government's plan would provide access from the south via the James Congdon Drive intersection (though that is less direct than the access proposed here and

would involve one additional set of traffic lights), but their plan provides no convenient access to/from the north. The nearest on/off ramps on the northern side would be north of the Port Road intersection, with three major traffic light intersections (Ashwin Parade, Grange Road and Port Road) in between. It's ironic that the words "Airport Link" appeared on some of their literature, given that there would be no convenient access to the airport from the north, and substandard access from the south.

Residents and businesses in the northern and western suburbs should expect better than this. A modern city must have convenient, fast access to the airport, and it's expected that a motorway like the north-south corridor should provide this. This alternative proposal has these two roads sharing a set of on/off ramps due to their close proximity, providing much better access to the city, airport and western suburbs from the north and south than the government's plan would provide.

Cross Road is another major east-west arterial road, and it should at least have access from the south (but it could utilise the Anzac Highway on/off ramps on the northern side). The government's existing plan gets this the wrong way around, with on/off ramps on the northern side but not the southern side. But the bigger problem with the government's plan is that tunnelling under this intersection would make a future motorway link to the South Eastern Freeway very difficult to build, as will be discussed below.

Daws Road is another significant east-west arterial road that should have its own on/off ramps on the northern side of the intersection (for traffic to/from the north), otherwise traffic from the nearby area would need to travel at least three kilometres north, to the on/off ramps north of Cross Road or Anzac Highway, before it could get onto the motorway.

These deficiencies in the government's plan would not only cause inconvenience, but may also cause **congestion at the few available entries and exits** and the intersections leading to them, and more traffic on South Road. In particular, the motorway entry just north of Port Road (shown in the image to the right) is a traffic disaster waiting to happen, as it is likely to clog up with the large amount of traffic from everywhere north of Richmond Road that would have to use it. It has a single, very short merging lane and will cause traffic on the motorway to slow down as many vehicles merge on all at once, given that the government's plan provides no northbound entry and southbound exit between the Richmond Road entry/exit and Port Road ones. Accidents would probably result.

The motorway entry north of Port Road will become a choke point for traffic under the government's plan.

Future motorway connections

We will eventually need a direct, non-stop connection between the North-South Motorway and the South Eastern Freeway. It should be obvious that leaving this 6.5km gap in Adelaide's motorway network is not a viable long-term solution. Population growth in the hills will place increasing demands on the already congested intersection at Glen Osmond, and other intersections along Portrush Road and Cross Road, and freight traffic (both local and interstate) also needs a convenient route between the two motorways. Yet the government's plans make no allowance for this, because the north-south motorway would be in a tunnel at the point where this new motorway would need to connect to it (which would be at or near the Cross Road intersection). This would be a disastrous mistake that would be extremely expensive to fix, if it were even possible.

Entries and exits can be built in tunnels if the tunnels were designed with this in mind, but are extremely expensive to retrofit (basically requiring a section of tunnel to be rebuilt to incorporate the necessary merging lane and additional structural support - which may require cutting to the surface, disturbing whatever happens to be above, and closing the road for a year or more while this is done). Even if a tunnel were designed with stub entries and exits for future connections, it's still much more expensive to construct an interchange with tunnels than on the surface. Yet it's highly unlikely that the government's plan includes such stubs.

Inability to carry dangerous goods

Motorway tunnels in other states prohibit the carriage of dangerous goods through them (for example, see this sign on the approach to the Legacy Way tunnel in Brisbane). The department has confirmed in private correspondence that this would also be the case in the Torrens to Darlington tunnels, meaning that any truck carrying dangerous goods (such as fuel tankers, trucks carrying chemicals, etc) would continue to use our arterial roads, with all the associated noise and traffic impacts. This would not be a good outcome for nearby residents or for the efficient movement of freight. This is not good enough for a motorway that is meant to be the backbone of freight transportation in Adelaide.

Misleading claims about property acquisition

Tunnels were meant to greatly reduce the need for property acquisition. The transport department repeatedly claimed that their preferred "hybrid tunnels" option would save **480 properties** from acquisition, and used it as a key point to justify their choice (even stating "480 **homes**" on occasion). **This figure is very misleading at best**, as I will explain below, and it also ignores one inconvenient fact about their preferred option, which is discussed below.

It is easy to compare this proposal to the government's plan and count the number of properties that would be required by one but not the other in various locations. This map outlines the property acquisition footprint of the government's proposal and this alternative proposal, allowing the properties to be counted relatively easily. I would encourage everyone who is doubtful to do this, as I have done here. The numbers are as follows. (See this document for the source of the property acquisition lines for the government's proposal.)

Properties that this alternative proposal would require, but the government's plan wouldn't:

- 125 properties between Ashley Street, Torrensville and Sir Donald Bradman Drive. This includes land for Hilton Hotel relocation and St George's college expansion.

- 143 properties between Pleasant Avenue, Glandore and Norrie Avenue, Clovelly Park. This doesn't include 69 additional properties that would be needed for the Cross Road interchange and motorway stub along Cross Road, because a fair comparison to the government's plan should not include that (because the government's plan would not have this feature, so it should be compared with an open motorway plan that lacks this feature).

This adds up to only **268 properties** that are actually saved by the hybrid tunnels option, when comparing to an open motorway. This is a long way short of the figure of 480 properties that has been repeatedly quoted by the transport department.

But this isn't the end of the story, because the government's proposal requires additional properties in several places where an open motorway wouldn't need them, particularly near tunnel entrances. This is because the tunnel entrances need a very wide strip of land compared to the amount that would be required for an open motorway like what was built in the Croydon area (the Torrens to Torrens project).

Section of the approach to the southern tunnel from the south, as shown on a drawing displayed at a community information session in February 2023 (this is a photo of that drawing). The tunnel entrance is off the left of this image, but observe how much wider the road gets as it approaches it, compared to the existing Darlington motorway shown on the right of this image.

Properties that the government's plan would require, but this alternative proposal wouldn't:

- 5 (or maybe 6) properties north of the Torrens River, including four houses on the western side of South Road and a warehouse or two on the eastern side. Also a reserve would be significantly reduced in size. Though the tunnel entrance would be further south, the government would need this land to curve the motorway around before crossing the Torrens River (but this alternative proposal solves this problem in a different way, while still preserving the Hindmarsh Cemetery).
- 11 commercial/industrial properties between the Torrens River and West Thebarton Road (along the eastern side of South Road), including some very large ones.
- 34 properties between Sir Donald Bradman Drive and Richmond Road (not including those that would be needed to widen Richmond Road). This includes some large commercial/industrial properties. If all the properties between Main Terrace and Deacon Avenue are to be acquired, as shown in the latest version of their plans, this number would increase to 54.
- 55 properties (entirely residential) in Glandore, between Anzac Highway and Glengarry Avenue. Note that the slip lanes near the Anzac Highway intersection (in this alternative proposal) require four houses that aren't also required in the government's proposal, but it would save more significant properties - specifically, the vet, pizzeria and Home Ideas Centre, which won't be needed because the intersection is kept narrower in this proposal.
- 53 properties in Clovelly Park, between Norrie Avenue and the southern end of York Avenue. These are almost all houses.

This adds up to **158 properties**. This means that the hybrid tunnels option gives a **net saving of only about 110 properties**, which are almost entirely commercial/industrial properties. This alternative plan takes great care to avoid acquiring the largest commercial and industrial properties, so almost all of these are small to medium-sized properties. The number of homes that would be needed is very similar for both proposals, and may even be slightly more for the government's proposal than for the alternative presented here (especially if you leave out the Cross Road interchange and motorway stub).

Note also that these numbers don't count the section between Richmond Road and Anzac Highway, where the government's plan would sacrifice an additional 45 properties to save the Tennyson Centre. This is left out because it's less consequential to the decision to build tunnels or not build tunnels, as this middle section could be built either way with or without tunnels.

Totals

The total number of properties required for each proposal (including the section between Richmond Road and Anzac Highway) is approximately:

- 349 properties for the government's proposal
- 413 properties for this alternative proposal.

This is a net saving of only 64 properties. But even a net saving of 110 properties looks pretty insignificant compared to the 349 properties that the government's proposal would actually require. This alone should make anyone question whether the tunnels are worth it.

Update

The transport department's response to this was to claim that they did not mislead the public, and that their quoted figure of 480 properties was accurate for the first version of their plan. They told me that the way they counted properties included each individual tenancy, where there were multiple dwellings or businesses on a single property. In response to this, I have done another count, in which I did my best to count each residential or commercial tenancy in cases where there were multiple on the same property. The numbers came out as follows.

- Properties required by this alternative proposal but not by the government's one: **374**.
- Properties required by the government's proposal but not by this alternative one: **176**.

So we can see that even when counting each individual tenancy, the government's plan still gives a net saving of only **198** properties, which is still a long way short of the 480 they claimed would be saved. Granted, that figure was based on the old version of their plan, but even using that version would not give a net saving anywhere near 480 properties with this method of counting (it would be closer to half that number). (As before, I didn't include the section between Richmond Road and Anzac Highway in this count - doing so would reduce the net saving to about 140 properties, thanks to the large number of properties that the government would need to acquire to save the Tennyson Centre).

It's possible that some larger properties were counted multiple times because of their size, as if they were counting the number of original allotments in cases where those allotments had been merged into one larger property (usually a business property). But this isn't really compatible with the idea of counting the number of tenancies, and in any case, it would cut both ways, as we can see from the area figures below. The land area of property acquisitions required by this open motorway proposal is only one third more than what the government's plan requires.

The only other explanation, then, is that the transport department's figure was based on an open motorway design that is much more hungry for land than the one proposed here. This would be

strange, given that this proposal is based on the existing sections of motorway and the amount of land they required, and allows more than enough land to fit the width of motorway and South Road (including a four-lane motorway in some sections) - see the “width considerations” section below.

Given that the transport department never made their alternative designs publicly available, it’s impossible for us to verify their claims about how many properties they would have required. Until they publish those alternative designs, we have strong reason to doubt what they’re telling us about the number of properties that tunnels would save. At the core of the issue, there is a lack of transparency from the department about the alternatives they considered and how much effort they put into making these alternatives work, both in terms of cost and land required. If the open motorway alternative that they considered required much more land than this proposal, then one must question whether they were serious about making an open motorway work, or whether had already decided that they wanted to build tunnels.

Areas

Another way we can compare the two proposals is by the area of acquired land. The map contains another set of outlines that excludes South Road, so that an approximate total area figure for property acquisitions can be calculated (though the lines don’t exclude back streets because that would be too tedious):

- Government’s plan: 43.3 hectares
- This alternative plan: 58.2 hectares

So when measuring by area, the land saved by building tunnels is only about 25% of what would be required for the open motorway proposed here. And there are some properties outlined in the government’s proposal that I haven’t even included, that would reduce the difference even further.

Width considerations

These numbers compare the government’s plan to this alternative proposal, which avoids some property acquisitions by using a narrow footprint through Edwardstown (this saves about 5 properties), and by using an elevated motorway near the Torrens River (this saves about 25 properties). Even so, no reasonable open motorway plan built in the style of the Torrens to Torrens project could require significantly more properties than the one proposed here.

To show that this alternative proposal is realistic in its estimate of land required for the motorway and South Road, the image to the right (source) shows that a Torrens-to-Torrens-style motorway can fit within a 61 metre corridor, and a significant chunk of the Torrens to Torrens project (between Hawker Street and Torrens Road) fits within a 63 metre corridor. The corridor shown on the map for this alternative proposal is at least 65m wide except for two short sections in

Width measurement of Torrens to Torrens motorway. Source: https://www.google.com/maps/@-34.8930886,138.5684968,116m/data=!3m1!1e3 Captured 19 March 2023.

the Edwardstown area where it narrows down to 58m, as mentioned above, to save a few properties. In many places, ample space of 70m or more is provided. The government's own plan shows that even entries and exits can fit within a 68m corridor, as that's the space they've managed to squeeze them into just south of Grange Road. Therefore, the estimated width of land required (and property acquisition footprint) for this alternative proposal is realistic.

Long construction times

Under the government's plans, the tunnels would not open to traffic until 2030 at the earliest, but it would probably be later than that. They would not offer much meaningful relief to traffic congestion before then, and may even make it worse. This alternative proposal, by comparison, includes much more substantial improvements to the Marion Road corridor to deliver relief for traffic sooner, for a fraction of the money saved by not building tunnels. Construction of the motorway would also proceed much faster, but probably start later due to the property acquisition and planning work that would need to be done, meaning that a completion date of 2029-2030 could be expected.

Poor outcome for cyclists

Large sections of South Road that lack bicycle lanes would not get them under the government's plan, because those sections would remain largely as they are. The best that the government's plan can offer is cycling routes utilising parallel back streets, but these routes would be convoluted and a very poor substitute for cycling lanes along South Road. See cycling infrastructure below.

Need to rebuild the tram overpass

The tramway overpass at Glandore was designed to accommodate a motorway passing under it, and has the necessary distance to accommodate three lanes each way between the pylons (though the stairway and elevator on the western side will need to be rebuilt and platform extended). Still, the department has come up with a design that requires rebuilding part of this overpass to relocate some of the pylons, which is quite wasteful considering that this overpass is only about 20 years old.

Design issues

I have already mentioned the problem of excessive traffic at certain entries and exits above, but there are other design issues with the government's plan.

- The northbound exit to James Congdon Drive and South Road only includes a single lane for turning left onto South Road (image here). They seem to think that most traffic will want to go onto James Congdon Drive and forget the fact that access to the airport and western suburbs via Sir Donald Bradman Drive or Henley Beach Road would require a left turn here, because the next northbound exit is all the way up at Grange Road. The worst part is that this left-turning lane is on a bridge, meaning that it would be very expensive to widen it in the future, if that is needed.
- The southbound exit to Richmond Road and South Road merges onto South Road too close to the intersection, giving you insufficient space to change lanes twice if you want to turn right to Richmond Road.
- The design of the section between Barwell Avenue and the southern portal of the northern tunnel is very complex, with lots of bridges adding significantly to the cost.

- The James Congdon Drive entry/exit are only about 500m from the Anzac Highway entry/exit (at the points where they merge onto or diverge from the motorway), which is a bit closer than ideal given the volume of traffic that will use these entries and exits. Traffic entering the motorway will conflict with traffic exiting, with quite a short distance in which to change lanes.

Other problems

Compared to the open motorway alternative, tunnels don't provide the same opportunity to upgrade and landscape South Road along the sections that the tunnel would bypass. Any work done to these parts of South Road would be an additional cost as opposed to a natural consequence, and would be severely constrained by available space.

Another disadvantage of the government's plan, compared to this proposal, is that it would not remove the railway crossing at the Cross Road intersection. That intersection would also have very limited capacity going forward to handle the increased demand for turning movements that the motorway will put on it. The department has acknowledged the long-term need to rebuild this intersection and grade-separate the rail line, but of course it isn't part of their Torrens to Darlington plan, making it another cost that would need to be paid in the future. It would be much better (and cheaper) to fix it now as part of an open motorway solution.

Thinking long term, tunnels are costly to modify and nearly impossible to widen, should this ever need to be done in the future, whereas an open motorway can be upgraded (and this can be done while keeping it open, unlike tunnels). Though this would not be needed for several decades, it pays to think long-term and not only about our present or short-term future needs.

Questioning The Rationale

The reasons for preferring the tunnels option, according to the department, basically boil down to two things.

The first is the claimed need to acquire an additional 480 properties to build the road without tunnels. This claim is highly questionable for a start, as discussed above, and ignores the additional properties that would be required for tunnel entrances. Building the road without tunnels will require about an additional 110 properties to be acquired, with these mostly being commercial and industrial properties, as the number of homes is about the same if not slightly less. While these additional property purchases do represent an additional cost, it is still a much better deal than building tunnels, and if property purchasing is done well, giving the owners good compensation and plenty of time to move out, then the need to purchase these properties should not be a problem. The cost to purchase these 110 properties would need to be $45 million each, on average, before it could equal even a third of the government's $15.4 billion cost estimate for their hybrid tunnels solution. If $45 million per property sounds like a ridiculously high estimate (which it is), then the cost of purchasing these properties cannot be used as an argument for building tunnels.

The second is concerns about the impacts on nearby residents and on the community. Of course, the government's plan only involves tunnels for about half of the total distance, so too bad for the unlucky ones who happen to live near a non-tunnelled section, they would just have to put up with these impacts.

But are these impacts as severe as the government and department claim? To find out, I went and spoke with some people who live near the already-completed Torrens to Torrens section of the motorway, and a few who live near the Regency to Pym section. I spoke to about fifteen people in this area, some of whom live right next to the road, and some up to 200m away. Most of them said that the noise now is less severe than it was before, with one person even saying that it's "ten times better". The rest of them said the noise is "probably better" or "definitely not any worse", or that it's "hard to say whether it's better or worse", with only two people claiming that it is worse than before. As far as access goes, most of them said that it is a significant improvement, though one person was annoyed at needing to go through another set of traffic lights to get to the city. In regard to other impacts, two of them said they were sad to see some of the neighbours go when their properties were purchased, and one was disappointed to lose a deli nearby. But despite this, there was a strong consensus that the project was an improvement for them.

Nevertheless, this alternative proposal includes a compensation scheme for nearby residents, to alleviate concerns about impacts such as noise, access, and impacts on the community. Combined with good design that improves the look and feel of South Road and provides several new parks as part of the project, this should alleviate community concerns about the project. In fact, it is likely that most residents would prefer to receive this compensation and have an open motorway built rather than receive nothing and have tunnels built.

Alternative Proposal

This alternative proposal entails building the entire motorway as an open motorway, like the existing Torrens to Torrens and Regency to Pym sections of the motorway. It uses a simpler design to minimise costs and construction times, and crucially, includes a compensation scheme for nearby residents, so that the project will have their support. It includes entries and exits in the right places to make the road more convenient and useful for local residents and businesses and the broader Adelaide community, and also includes provision for a future motorway connection to the South Eastern Freeway, with the interchange being built at Cross Road in preparation for this (though the project could be built without this interchange, including it will be more cost-effective in the long run).

The motorway would be built mostly at surface level, like the existing motorway between Regency Road and Torrens Road, but there would be one short lowered section between Henley Beach Road and Sir Donald Bradman Drive, and one short elevated section near the Torrens River. A mixture of overpasses and underpasses is suggested at the various intersections along the route, but these are merely suggestions and may be tweaked. Residents near an overpass or elevated section would be given a larger amount of compensation.

South Road will continue to exist as an arterial road on both sides of the motorway (the northbound lanes on the western side and the southbound lanes on the eastern side), just like in the Torrens to Torrens and Regency to Pym projects (the existing sections of the motorway north of Grange Road). It exists to service the needs of local businesses and the local community, and to provide a link between motorway entries and exits and nearby east-west arterial roads. However, it is also an arterial road in its own right, with about equal traffic-carrying capacity as South Road has now (which will be in addition to the capacity of the motorway). And this new South Road will have fewer traffic lights and much less congestion than the existing South Road, providing increased convenience and reduced delays for local residents, and convenient access to the motorway.

The proposed design can be seen on this map. The map is a guide to the suggested layout of the motorway and other aspects of the project, and by necessity it is not as detailed as what the transport department can produce. However, it is helpful to follow along on the map as the details are explained below, starting at the northern end, and the details of the proposal should become clear enough.

The lines on the map are colour-coded, and mean the following:

- Green: Motorway at or near ground level.
- Blue: Lowered motorway or underpass, including a portion of the ramp down into it.
- Yellow: Elevated motorway or overpass, including a portion of the ramp up onto it.
- Dark green (narrower line): Motorway entries and exits, connecting the motorway to South Road.
- Black: Arterial roads or service roads at or near ground level.
- Yellow-orange: An overpass carrying an arterial road or street (not a motorway), including a portion of the ramps leading up to it.
- Orange: An overpass carrying a railway (with attach pedestrian/bicycle path), including ramps leading up to it.
- Grey: An overpass (or maybe, in some places, an underpass) for pedestrians and cyclists, including the ramps up to it.

Area annotations are as follows:

- Green: New park
- Purple: Other area annotation.

You can zoom into the map and click on a line or area annotation to see a description of it. This will help make its meaning clearer. You can also switch from satellite view to map view and back again using the square at the bottom of the pane on the left hand side.

Northern Section: Grange Road to Anzac Highway

Starting at Grange Road, the motorway will come up from the existing underpass under Grange Road and continue at or near ground level for a short distance and then rise up to an elevated road just before Adam Street. This elevated road allows for the restoration of a right-turn lane from South Road to Adam Street, passing under the elevated motorway (this will be a give-way, not a traffic-light intersection). A U-turn facility may also be provided at this location.

The motorway continues as an elevated motorway between Adam Street and Ashwin Parade. This is needed here because the road is squeezed between the Brickworks shopping centre on one side and the Hindmarsh Cemetery and West Thebarton Hotel on the other. Elevating the motorway also permits it to make a sufficiently gentle curve without veering off into Langman Reserve or the industrial/commercial properties on the eastern side of South Road, as it would in the Government's plan. The elevated motorway is mostly in a commercial/industrial area, with few nearby homes. Those homes that are near the elevated motorway will receive increased compensation because of this. This elevated motorway will not be as high as the Superway, but more similar to the height of the Cross Road overpass.

After passing over the Ashwin Parade intersection, the motorway comes down to surface level on the western side of South Road (meaning that its centre is on the western side of where South Road is now - it will still be in the middle of the completed South Road), and continues at surface level until it nears Henley Beach Road, where it drops down into an underpass. It switches from the western to the eastern side of South Road just before that intersection, avoiding impacting the Thebarton Theatre and Thebarton council office building, and some other heritage properties further south. St George College would be impacted, but the proposal is for the government to purchase land on the eastern side of the college (shown on the map) and build new buildings for the college on that land (this would include re-aligning Taylors Lane and School Lane to avoid going through this land).

After passing under the Henley Beach Road intersection, the motorway continues as a lowered motorway along the eastern side for some distance, before switching back to the western side just before Sir Donald Bradman Drive. This is to avoid demolishing the old warehouse on the corner of Sir Donald Bradman Drive and South Road. However, it will require moving the Hilton Hotel, thus preserving this old heritage building (see Preserving Heritage Buildings for more details on this). This also allows another lane or two to be added to Sir Donald Bradman Drive through this intersection, because the hotel was the main obstacle to that.

After passing under Sir Donald Bradman Drive, the motorway comes to surface level and continues at surface level until the Richmond Road intersection, where it rises up to pass over that intersection. Building the motorway at-grade allows it to pass over Keswick Creek with a simple small bridge - no costly rerouting of the creek will be needed.

James Congdon Drive will pass over the motorway and South Road on a narrow bridge (with only one lane each way), and be extended to connect to Richmond Road. It will no longer connect to

South Road (except for southbound traffic, which can still connect via a slip-lane). The reasons for this are as follows. Firstly, James Congdon Drive is currently used mainly by traffic from South Road that wants to access the northern part of the ring route on its way to the northern and northeastern suburbs. But when the motorway has been built, it will be quicker for this traffic to travel further along the motorway, exit just before Grange Road and turn right onto Manton Street. This significantly reduces the amount of traffic that will want to use James Congdon Drive. Nevertheless, it will still be possible to access it by turning right onto Sir Donald Bradman Drive and then left onto James Congdon Drive, which will be almost as quick and will remove a set of traffic lights from South Road. However, a right-turn overpass from South Road to James Congdon Drive would achieve a similar thing and is another possibility, as is simply not putting any overpass there (restricting the intersection to left turns only), which is obviously the cheapest option and should be considered. Any of these options should be cheaper than lowering the motorway and diverting Keswick Creek as a result, and allows the motorway entry/exit to be further north, near Sir Donald Bradman Drive, where they rightly belong (which also moves them a more comfortable distance from the Anzac Highway entry/exit, for greater safety and ease of traffic flow on the motorway).

Continuing south, the motorway passes over the Richmond Road intersection. An overpass is suggested here because it is probably cheaper and there are fewer houses in the immediate vicinity - and those houses that are nearby will receive some extra compensation (in addition to the standard amount given for homes near the motorway) because of this. The motorway will then continue south at surface level, to meet the Gallipoli Underpass under Anzac Highway. Building the road at surface level here will avoid the need to reroute Brown Hill Creek under a lowered motorway, and also avoid the cost and traffic disruption associated with needing to significantly rework the approaches to the Gallipoli Underpass. It should be noted that the government's plan involves diverting the motorway around the Tennyson Centre, demolishing about 40 homes and commercial properties on the other side. However, this would produce a messy outcome with the Tennyson Centre standing pretty much alone on that side, and a trail of destruction for almost a kilometre on the other side. It would be preferable to keep the road straight here, avoiding any awkward bends in the motorway or South Road, even if it costs a slight bit more to demolish the Tennyson Centre. The tenants of that building could be accommodated by constructing a new purpose-built facility nearby, with the old LeCornu site being the ideal place for this, and other options potentially available by purchasing a warehouse or two in the nearby vicinity (maybe even using a leftover portion of a large parcel of land that was purchased for the motorway).

Anzac Highway Intersection

The bridge structure at the Anzac Highway intersection will be retained, but the intersection itself will need to be modified, both in the government's plan and in this plan, to accommodate the additional through-traffic on South Road, and additional turning traffic that would be expected because of the motorway. The reason for the additional through traffic is that the motorway would occupy the underpass, meaning that most traffic that enters or leaves South Road in the nearby area will need to go through the intersection instead of going through the underpass as it does now.

The transport department previously proposed a right-turn overpass here to remove that movement from the intersection, freeing up space and time for the other movements. Now they suggest basically keeping the existing intersection design but adding a couple of extra through-lanes for north-south traffic in each direction, and removing the non-stop left-turn slip lane from Anzac Highway to South Road southbound, replacing it with dual signalised left-turning lanes.

However, the existing right-turn facility from Anzac Highway to South Road, which the government's plan would keep, would probably run into capacity limitations in the long run.

It should be noted that the right-turn from Anzac Highway to South Road is the main reason for the intersection being as wide as it is (as measured from east to west), because space is needed for a few cars to queue in the middle of the intersection (between the two halves of South Road). If this feature were removed, the intersection could be made narrower.

So the suggestion here is to do exactly that:

- Remove the right turning lanes from Anzac Highway.
- Provide a new way to turn right from Anzac Highway to South Road, by turning left onto a slip road after the intersection and then turning left onto South road, using new slip roads explained below.
- Removal of the right-turning lanes means that Anzac Highway can now have four straight lanes in each direction (if this isn't needed right now, it can be added in the future).
- Replace the two sets of traffic lights with a single big intersection. Traffic will never stop in the middle.
- The three right-turning lanes for turning right from South Road to Anzac Highway would be moved much closer to the underpass. This frees up space to their left for three straight lanes going north and south (though a few buildings would still need to be demolished and some backyards purchased to accommodate the northbound ones).
- The single left-turn slip lane and merge for turning from Anzac Highway to South Road southbound can also be retained, but it will need to be moved to the east a few metres.
- U-turns on South Road can still be accommodated during the green arrow phase (this facility will be more important after the motorway is built).

The unique feature of this design is the slip lanes that allow traffic to turn right from Anzac Highway to South Road by turning left and then left again (see the map). These are one-way single-lane roads that utilise a portion of existing streets (which will be significantly realigned and upgraded) to provide a way for traffic to turn left after having gone through the intersection, to get onto South Road just before the intersection. They will merge onto South Road with an added lane (which becomes the leftmost of the three straight lanes through the intersection), so that traffic doesn't need to stop when making this movement. Though it will involve going through the intersection twice, the second time should not involve much if any waiting, as the lights would be expected to go green for South Road at about the time that traffic from the cycle just completed on Anzac Highway arrives.

These slip roads will require a few homes to be purchased and residents of these streets compensated for the traffic impacts and changes in access patterns on their street (with it being converted to a one-way street). Tyson St and Grosvenor St would connect to these slip roads.

This design provides much greater capacity for right turns from Anzac Highway to South Road, which will be important once the motorway has been completed, because of traffic that will want to turn right here to enter the motorway. It's likely that the government's plan underestimates the need for this, and would see queues forming in the right-turning lane from the beginning. Additional capacity for through traffic on Anzac Highway (with a fourth lane) and a little additional time for other movements are other benefits of this design. It has a higher capacity while requiring less land than the government's design.

Traffic turning right from Anzac Highway via these slip roads will end up in the left lane, but will only need to make one lane change (getting into the middle lane) to enter the motorway, because after the intersection, the right lane will go onto the motorway and the middle lane will fork, going both straight and onto the motorway.

Southern Section: Anzac Highway to Tonsley Boulevard

After passing under Anzac Highway, the motorway comes back to surface level and continues at surface level for another kilometre. This will hopefully allow it to pass under the tram overpass without needing to rebuild it or any of its pylons (the government's plan would require a portion of this overpass to be completely rebuilt, and any lowered motorway would probably require pylons to be rebuilt). However, the stairway and elevator on the western side would need to be demolished and rebuilt further west, and the tram station platform extended to meet it. With this out of the way, the motorway should be able to fit through the approximately 26 metre gap between the pylons, which is at least as much space as it has through the Gallipoli Underpass. South Road will easily fit through the gaps on each side. Thus we can hopefully avoid the expense of rebuilding the tram overpass.

The motorway then continues south along the western side of South Road and switches to the eastern side just before the Cross Road intersection, where an interchange will be built for a future motorway connecting to the South Eastern Freeway (how that motorway is to be built would be the subject of future planning). The interchange will be built mostly below ground level, as shown by the blue lines on the map (blue means lowered motorway). However, there will be one overpass for turning right (northbound to eastbound - shown in yellow on the map), and a rail overpass (shown in orange on the map). The arterial roads (black on the map) will all be at surface level, with the north-south motorway passing under the South Road - Cross Road intersection. The railway will be completely grade-separated from all roads, removing the level crossing at this intersection. (This will mean the loss of Emerson station, but nearby residents will be compensated for this and other impacts of these changes, and additional secure bike storage will be provided at Edwardstown and Clarence Park stations, which are both very close by and will be accessible via the bike path that will run along the new bridge. And trains will benefit from having one less stop.) The noise of the level crossing will be removed, and some green spaces will be created, with two new parks in the corners of the interchange.

The motorway comes back to surface level after this interchange and continues south at surface level most of the way to Daws Road. The road narrows as it passes through Edwardstown, to minimise the impact on properties there, particularly some large commercial and industrial properties. This is achieved by eliminating the space between the motorway and South Road on each side of it, with nothing more than a concrete barrier to separate them (no lanes are sacrificed on the motorway or South Road). This will both reduce costs and minimise the impacts on properties in the area. This long (2.3km) stretch of surface-level motorway will be relatively cheap to build, with the additional advantage that businesses in this area will retain visibility and exposure

to passing traffic on South Road and the motorway. The alignment avoids impacting Castle Plaza (including the car park and buildings therein) and the Bunnings in Edwardstown, and also avoids impacting two large factories on the other side of the road. Other large commercial properties on the eastern side would have their car parks impacted but escape demolition. All the commercial/industrial properties that would face demolition are quite small by comparison, and there is a large parcel of empty land just north of Castle Plaza to which many businesses could relocate.

One notable feature of this part of the motorway is the bridge connecting Raglan Avenue to Edward Street. This link road connects to these other roads with roundabouts at each end, and passes over South Road and the motorway on a two lane (one each way) bridge. Meanwhile, Raglan Avenue and Edward Street connect to South Road in a way that permits left turns only, but by using the overpass, all turning movements to/from South Road (including U turns) are possible, and without any traffic lights to introduce delays. It also has high capacity for east-west traffic between Raglan Avenue and Edward Street, facilitating this movement with minimal delay. This design is both better and cheaper than a ground-level intersection with the motorway passing under/over it, and also requires less width in the South Road corridor (additional width for right-turning lanes would otherwise be required). As with other overpasses, those living nearby would receive additional compensation.

Continuing south, the motorway switches back to the western side of South Road just before crossing Daws Road (thus avoiding an electrical substation on the corner). At the Daws Road intersection, an overpass is suggested instead of an underpass because there appears to be some kind of drain or creek passing under South Road in this vicinity, and also because an overpass will probably be cheaper, and this is mostly an industrial area. The only nearby houses are to the southwest, and they will receive additional compensation.

The remainder of the motorway south of Daws Road is built at ground level, until it connects with the existing motorway just before Tonsley Boulevard. As in the government's plan, a surface-level connection with the existing motorway avoids the need to dig out the approach to the existing underpass, as this would require shutting down the motorway and disrupt traffic for some time (besides being more expensive).

Entries and Exits

Having entries and exits in the right places for convenient access to important arterial roads is vitally important for a motorway project such as this. The government has so far done well with most other portions of the north-south corridor, putting entries and exits in the right places to access important roads such as Port Road, Grange Road, Regency Road and Grand Junction Road in the north, and Marion Road and Ayliffes Road in the south. It would be a shame to mess this up in the last and most critical section of the corridor, but unfortunately the government's current plans for the Torrens to Darlington section do not live up to the standard set by earlier projects.

This alternative proposal would live up to that standard, with entries and exits strategically placed to provide the best access to the most important arterial roads, while also working well on the motorway, providing drivers with plenty of distance to merge and change lanes where necessary. It is important that an exit from the motorway not appear too soon after the previous entry onto it, because that would cause a problem known as "weaving", in which traffic entering the motorway conflicts with traffic that wants to exit. For this reason, two arterial roads that are close together

(such as Henley Beach Road and Sir Donald Bradman Drive) can't both have a full set of entry and exit ramps, unless the entry and exit are grade-separated from each other with a bridge (as is done in part of the Darlington project) - but this adds cost and complexity and requires more land. Therefore, it is necessary to choose which roads will get the entries and exits based on overall importance in the transportation network. Also, exits from the motorway need to be a sufficient distance from traffic lights on South Road to give traffic time to merge and change lanes before the intersection.

Entries and exits are shown on the map as dark green lines connecting the motorway to South Road on either side. They are not drawn exactly to scale, and are only intended to give a rough idea of where the entries and exits are intended to be. All entries and exits connect to South Road (merging/diverging to/from the right lanes of South Road), rather than connecting directly to an east/west arterial road. When we refer to entries and exits as servicing a particular east/west arterial road, we mean that they connect to South Road in the vicinity of the intersection with that east/west arterial road, to provide access to it from the motorway.

Starting at the northern end, there will be a southbound entry and northbound exit between Grange Road and the Torrens River. This entry and exit pairs with the existing entry and exit on the northern side of Port Road to provide full access to Port Road and Grange Road from both directions. These are two very important roads that need access to/from the motorway, and because they are so close together they share a set of entries and exits, as they also would in the government's plan.

Further south, there will be a northbound entry and southbound exit just north of Henley Beach Road, to provide access to/from Henley Beach Road and Sir Donald Bradman Drive for people travelling to/from the north. These are important arterial roads that needs access to/from the north, while access to/from the south will be provided via the entry and exit on the southern side of Sir Donald Bradman Drive. This is because, as explained above, these roads are too close together for both of them to get a full set of entries and exits, so they must share a set of entries and exits (much like Port Road and Grange Road do). This entry and exit also provides an alternative route to the city for people from the north, which will relieve congestion that would otherwise occur at the Port Road entry/exit.

There will be a southbound entry and northbound exit just south of Sir Donald Bradman Drive, to provide access to/from Sir Donald Bradman Drive and Henley Beach Road for traffic to/from the south (the other half of the shared entries and exits mentioned above). This provides an alternative route to the city for traffic from the South, helping to relieve congestion that would otherwise occur at the Anzac Highway entry/exit and intersection.

Unlike the government's plan, this proposal doesn't have any entry/exit for Richmond Road or James Congdon Drive, because it would be too close to the entries and exits for Sir Donald Bradman Drive (on one side) and Anzac Highway (on the other). Richmond Road is a much less important road than these other two roads, and can easily be accessed from these other entries and exits with only one or two additional sets of traffic lights along the way. It seems that the main reason for the government's plan having an entry/exit here is that the position of their tunnel entry requires it, but the overlapping entries/exits in their plan would be complex and occupy a significant amount of land.

The next set of entries and exits is for Anzac Highway, which gets a full set because of its importance as a major arterial road (the busiest intersecting one along the entire route), providing

access to/from the City, Glenelg and many south-western suburbs. However, it's notable that the entry and exit on the southern side of this intersection is quite a distance from the intersection, being closer to Cross Road than to Anzac Highway. The reasons for this are twofold, but have a lot to do with the motorway interchange at Cross Road, given the relatively close proximity of this interchange to Anzac Highway. To prevent weaving and hazardous lane changes on the motorway, this entry and exit joins the outside lanes of the motorway just south of where the interchange ramps join the inside lanes. If the Anzac Highway entry/exit were further north, it would be possible for someone merging on from the motorway interchange to cut across three lanes of traffic in a short distance and exit to Anzac Highway, but this design prevents such a dangerous manoeuvre. If, on the other hand, the interchange ramps connected to the outside lanes of the motorway, then traffic entering at the interchange would conflict with traffic exiting to Anzac Highway, with too short a distance in which to change lanes. Having these ramps enter/exit the motorway on opposite sides solves this problem. The second reason is that having this entry/exit closer to Anzac Highway would require an additional lane on the motorway where it passes under the tram overpass, but the pylons of the overpass don't provide sufficient room for this.

The situation at Cross Road is somewhat complex, because there are the motorway interchange ramps connecting to the eastern part of Cross Road, and also an entry/exit connecting to South Road just south of the intersection. The interchange ramps provide access to/from the eastern part of Cross Road from all directions (but when a future motorway is built, these interchange ramps will connect to the motorway and not connect directly to Cross Road). The northbound exit and southbound entry that connect to South Road just south of this intersection are important for providing access to the western part of Cross Road, and also to the eastern part once the future motorway has been built.

There is no northbound entry or southbound exit on the northern side of Cross Road because it would conflict with the entry/exit for Anzac Highway. Even though it would be possible to provide such an entry/exit if we overlap them with the Anzac Highway ones using bridges, it would be undesirable because it would put more traffic through the Gallipoli Underpass. The concern is that the Gallipoli Underpass can only accommodate three lanes of traffic in each direction, which may not be enough once traffic from the motorway interchange is added just south of there (once an east-west motorway has been connected to that interchange). Some traffic from the south will leave the north-south motorway at this interchange and help balance the traffic coming onto it, but not completely. Therefore, to relieve the strain on the underpass, we force traffic to/from the south to go through the Anzac Highway intersection (which will have enough capacity for this), and enter just north of it, where a fourth lane will be added to cope with the additional traffic on the motorway (see number of lanes below). This entry/exit is only 1.5km further north than ones at Cross Road would be, so they are still relatively convenient for local traffic. This does mean that traffic from anywhere north of Daws Road would need to cross Anzac Highway before it could get onto the motorway, but with the new South Road having only two sets of traffic lights along the way (one at Cross Road and one at Anzac Highway), this would still be a quick and hassle-free journey.

The next entry/exit is at Daws Road. It is a northbound entry and southbound exit, just north of the intersection, to provide motorway access (to/from the north) to all the surrounding area, via Daws Road and Oaklands/Springbank roads. A northbound exit and southbound entry is not provided on the southern side of Daws Road, because while it would be possible, it's just a little closer than ideal to the entry/exit further south (see the following paragraph), and also because it's preferable to encourage traffic to/from the south to use Marion Road or Ayliffes/Goodwood Road to access the motorway, to avoid funnelling too much traffic through the narrower parts of the Darlington interchange (particularly where the original Southern Expressway joins on, and the three-lane

section under Tonsley Boulevard), as there may also be concerns in the long run about the capacity of these parts of the motorway.

The last entry/exit is another northbound entry and southbound exit, just north of the Tonsley Boulevard intersection. This pairs with the existing southbound entry and northbound exit that was built as part of the Darlington upgrade, just south of the Ayliffes Road intersection. This northbound entry and southbound exit provide motorway access to Sturt Road (and the Marion area) and Shepherds Hill Road (and the Eden Hills and Blackwood areas), and to the Flinders area, to/from the north. This makes it a very important entry/exit.

Number of Lanes

In the government's plan, the motorway would have only three lanes in each direction, but in this proposal a fourth lane is added in some sections, specifically:

- Between the entry/exit on the southern side of Grange Road and the entry/exit on the northern side of Henley Beach Road.
- Between the entry/exit on the southern side of Sir Donald Bradman Drive and the entry/exit on the northern side of Anzac Highway.
- Between the Cross Road interchange and the entry/exit on the northern side of Daws Road.

The purpose of these added lanes is to provide additional capacity along these sections of the motorway and reduce problems caused by merging and diverging traffic, by providing an extra lane for the traffic to merge into, which then diverges at an exit further up the road. This is a well-known and widely-used design feature on motorways interstate, and also on a section of the South Eastern Freeway (between Crafers and Stirling) and the North-South Motorway (between Grand Junction Road and the Port River Expressway and in the Darlington interchange).

The motorway-motorway interchange at Cross Road will have two lanes each way for every turning movement, to handle future traffic volumes on the east-west motorway that would connect here, but these lanes would be underutilised in the short term. Therefore, the merging and diverging of these interchange ramps will not affect the number of lanes on the north-south motorway to begin with, but in the long run, the lanes will be repainted to the following configuration:

- Coming from the south, four lanes until interchange exit ramp.
- Left lane peels off to the new motorway eastbound, and second-from-left lane forks, leaving two lanes turning to the east and three lanes continuing north.
- After passing under the Cross Road intersection, the left lane peels off at the exit to South Road (for Anzac Highway), leaving two lanes continuing straight.
- Then the motorway interchange ramp from the east merges on from the right, making four lanes, with the rightmost lane merging left shortly up the road, bringing it back down to three lanes, which can pass under the tram bridge and through the Gallipoli Underpass, before being joined again by a fourth lane at the Anzac Highway entry ramp to the north.

This number of lanes is mirrored in the southbound direction.

Note that this future east-west motorway would connect not only to the South Eastern Freeway, but also to Portrush Road, giving access to the the eastern and north-eastern suburbs (and while this would add some traffic to Portrush Road, it would also take traffic off Portrush Road, especially trucks). This means that, at the interchange with the north-south motorway, a large amount of traffic from the south will turn east, just as a large amount from the east would join the north-south motorway to go north, giving a degree of balance in the amount of traffic exiting and entering the north-south motorway at this interchange, though probably not perfect balance. This should help

alleviate concerns about the traffic impact that this east-west link would have on the north-south motorway, bearing in mind that the additional lanes in this proposal are also intended to help address these concerns.

As for South Road, it will have two lanes each way in most places, but with a third lane being added where an exit from the motorway merges onto it. This added lane then continues through the intersection (or in some places, such as at Anzac Highway, makes a right turn at the intersection), then on the other side of the intersection, the third lane either merges back down to two or peels off at an entry to the motorway (and the middle lane forks, going both straight and onto the motorway).

It may be prudent to design some bridges with space to accommodate an additional lane where this is easy enough to do, so that a future upgrade of the motorway can be done with less cost and disruption.

Rationale for the Design

This design intends to integrate simplicity and lateral thinking to come up with a solution that is cost-effective and fair to nearby residents and to the people of South Australia (who have to pay for it), and solves many of the problems with the government's design. It acknowledges that some impacts are inevitable and therefore includes a system of compensation for nearby residents instead of attempting to eliminate those impacts through expensive infrastructure. At the same time it is fairer than the government's proposal, which includes no compensation for nearby residents along any part of the corridor (including non-tunnelled sections).

An at-grade motorway, similar to the Regency to Pym project, was chosen for most sections because it is significantly cheaper than a lowered (trenched) motorway. It requires no excavation, no expensive retaining walls (and no chance of this occurring), no expensive culverts for creeks that pass under it, no pumps for drainage, and makes it much easier to handle services and stormwater and sewer infrastructure that pass under it. Besides being cheaper, it is also much faster to construct a surface-level motorway, resulting in less disruption for traffic and for nearby residents and businesses. This also means that the project can be completed sooner, or that we can give residents and businesses who are affected by property acquisition more time to more out.

An at-grade motorway does have additional noise impacts, but these seem to be not too severe, based on the outcome of the Regency to Pym project. Noise walls can be used to mitigate this in residential areas, and quiet rubberised asphalt surfaces can deliver a further reduction in noise, and should be used along the entire length of the corridor (see Noise Abatement). Noise from trucks and other traffic accelerating and decelerating will be reduced by moving most traffic to the non-stop motorway and eliminating many traffic lights along South Road. Combining these factors, the noise may end up being less severe than it is now for most residents along the corridor.

This design only includes bridges at major roads that cross the motorway. Specifically, these are Ashwin Parade/West Thebarton Road, Henley Beach Road, Sir Donald Bradman Drive, James Congdon Drive, Richmond Road, Anzac Highway, Cross Road, the Raglan Avenue to Edward Street connector, and Daws Road. It does not include bridges for minor roads such as Barwell/Everard Avenue or Celtic Avenue. This is because adding such bridges would add significant cost, both for the bridge itself and for the raising or lowering of the motorway on the approaches to it. It is not worth this cost to provide bridges for these minor roads, when an intersection at which the motorway can be crossed (and a U-turn performed) is less than a minute's

drive up South Road, and there are also alternative routes in/out of those neighbourhoods via east-west arterial roads that do have bridges over the motorway. Any inconvenience will be more than compensated for by the removal of congestion-related delays on South Road, and the speed of travel along the motorway, with the result that most trips to and from these neighbourhoods will be either unaffected or faster than they are now. It should also be remembered that the lack of a bridge only affects right turns to/from South Road, while left turns are unaffected, so only half of all trips (either the outward or return trip, but not both) will be affected, on average, and the trip which is unaffected will invariably be faster than it is now. Fewer intersections along South Road also mean fewer sets of traffic lights to slow you down, both when entering/exiting South Road and when driving along it. All these factors mean that the impacts on local residents should be fairly minor if not positive, and the compensation scheme exists to compensate for impacts like this.

Cycling and Pedestrian Infrastructure

In between major road intersections, there are bridges for pedestrians and cyclists to cross the motorway and South Road. Because these bridges cross both roads, they allow the pedestrians and cyclists to cross without needing to wait at traffic lights, and also don't interrupt the movement of vehicles. The result is reduced delays and increased safety for all road users, especially compared to the existing South Road, which requires cyclists to make a hazardous crossing in heavy traffic, or to wait at traffic lights which may not be conveniently located. These bridges would be similar to the one in the image below (which is the overpass built as part of the Regency to Pym project).

These bridges are positioned to align with east-west cycling routes that utilise back streets to avoid arterial road traffic, providing a safer route for cyclists and integrating into Adelaide's BikeDirect network (with a few changes/additions required in some cases, but a better result overall). In some cases, streets are blocked off where they meet South Road, to accommodate the pedestrian/cyclist bridge. This arrangement benefits cyclists in another way - by greatly reducing vehicle traffic on that road. This essentially removes South Road as a barrier to the east-west movement of cyclists along these routes.

These are the locations where pedestrians and cyclists will be able to cross the motorway, starting at the northern end (follow along on the map, looking for grey lines that mark pedestrian/cycling overpasses or underpasses):

- Grange Road / Manton Street intersection
- Near Adam Street, by crossing South Road and passing under the elevated motorway.
- Torrens River, using the existing walking/cycling path that passes under the bridge.
- Anywhere under the elevated motorway, by simply crossing South Road.
- The Ashwin Parade / West Thebarton Road intersection.

- Overpass or underpass connecting North Parade to August Street, creating an east-west cycling route linking North Parade with George Street via August Street and Neville Road.
- Henley Beach Road intersection.
- Overpass connecting Roebuck Street to King Street, creating an east-west cycling route from Marion Road (with a slight dog-leg) to Railway Terrace.
- Sir Donald Bradman Drive intersection.
- James Congdon Drive bridge, with a pedestrian and cycling path attached, connecting to the cycling path that follows the old Adelaide-Glenelg rail corridor. If no road bridge is to be built here, a pedestrian/cycling bridge will still be provided.
- Richmond Road intersection.
- Overpass or underpass connecting Barwell Avenue to Everard Avenue.
- Anzac Highway intersection.
- Tram overpass, with existing pedestrian and cycling path.
- Overpass connecting Gertrude Street to Byron Road.
- New railway bridge over the Cross Road intersection, with a pedestrian and cycling path attached, connecting the cycling path that runs along the side of the Seaford rail line. Cyclists using this path currently need to cross two main roads to get through here, but this bridge will create a continuous cycling path and be a vast improvement, one which the government's plan would not come close to providing.
- Cross Road intersection.
- Overpass or underpass connecting Messines Avenue to Avenue Road. This will provide a convenient link to Edwardstown station for those living to the east. In the long run a more direct connection from Messines Avenue to Maxwell Avenue is desirable, either by rebuilding Edwardstown Station slightly to the north or by building a pedestrian and cycling bridge or underpass, which could also connect to the station platform. In the short run, cyclists can go around the station via the pedestrian crossings provided.
- The Raglan Avenue to Edward Street connector, with cycling lanes and a footpath provided.
- Overpass or underpass connecting Woodlands Terrace to Rozelle Avenue. However, an alternative overpass/underpass connecting Dunorlan Road to Marion Street should also be considered.
- Daws Road intersection.
- An overpass connecting York Avenue to Merriton Avenue via a new park, thus creating a cycling route from Marion Road (via Waterman Terrace and Celtic Avenue) to Fiveash Drive (via Merriton Avenue, Thurles Street and Day Drive).
- Tonsley Boulevard intersection.

Most of these crossings are less than 800m apart, with many of them being less than 600m apart. The longest distance between crossings in 950m between Daws Road and the Woodlands Terrace / Rozelle Avenue overpass, but this distance would be shortened if the overpass were built at Dunorlan Road / Marion Street instead. Note, however, that this distance is comparable to the longest distance between crossings in the Regency to Pym project, which is about 800m (between Regency Road and the Pym Street overpass). These plans can be tweaked and additional overpasses added if necessary.

For cyclists riding north-south, this project will provide continuous bicycle lanes in both directions along the entire length of South Road from Grange Road to Tonsley Boulevard, connecting at each end to the cycling lanes that were built as part of the Torrens to Torrens and Darlington projects. These connect the cycling path along the Southern Expressway through to Grand Junction Road and beyond.

It is notable that the government's plan would not provide cycling lanes along large sections of South Road that currently lack them, where the tunnels would leave South Road basically as it is, with no room to add bicycle lanes. The transport department intends to work with councils to provide parallel cycling routes through back streets, but this is a very poor substitute for bicycle lanes along South Road, with many T-junctions and dog legs and some places where there simply isn't a parallel street anywhere near South Road. Keen cyclists will never be satisfied with this, as they want the fastest, most direct route that can only be provided by bicycle lanes along South Road. To be fair, there are cyclists who would prefer a route through the back streets, and such routes should be provided in any case, but they are not a substitute for bicycle lanes along South Road. And would cyclists like to risk their lives on a South Road without bicycle lanes, with dangerous goods trucks rolling past because they can't use the tunnels? Unlikely.

In summary, this proposal would deliver a far better outcome for cyclists riding along the corridor and also in most cases for cyclists riding across the corridor, whether compared to the existing South Road or to the government's plans for it.

Noise Abatement

There are two main methods of noise mitigation employed in this proposal: noise walls and quiet asphalt surfaces. In some places, lowering of the motorway provides additional noise abatement, but this is effectively just a noise wall that is built below ground level. In these places, a noise wall will also be built alongside South Road to reduce noise impacts to nearby properties from South Road. A third noise abatement method is the use of tall buildings near the road as noise barriers, but this method is less widely applicable than the other two.

There are two main scenarios for noise walls, depending on the side of the motorway a property is on. Firstly, on the side where properties were demolished to make room for the motorway, a noise wall will be built along the rear or side boundaries that were not previously exposed to South Road. In most cases this will be a continuous wall and provide good noise mitigation for nearby homes. Some streets that join South Road may even be blocked off to permit the wall to be fairly continuous (with only a small opening for pedestrians) as was done in some parts of the Regency to Pym project (only if local residents want it, of course).

Secondly, there is the other side of the motorway, where no demolition occurred and the properties bordering South Road are ones that already bordered South Road. Obviously we can't build a noise wall along this side because these properties have frontage on South Road and need direct access to it. However, there are a couple of options. The first is to build a noise wall between the motorway and South Road on that side, thus leaving residents exposed to South Road noise only (which they already were). This has a similar effect to lowering the motorway, but is much less expensive. The second option is to give property owners the option to have smaller walls and gates built at the front of their properties, at government expense, similar to those that were built along Portrush Road (between Greenhill Road and Magill Road) when it was widened in the 90s. A combination of these options may be used depending on the needs in different places.

Noise walls may also be built along the sides of overpasses and elevated portions of the motorway, depending on the need. However, they might not be needed, because elevated roads often have less noise impact on nearby properties than surface-level roads, because there is no direct line-of-sight from the noise source (where tyres contact the road surface) to listening ears below, and the concrete crash barriers on each side can have significant noise mitigating effects by

themselves. Most of the noise is directed upwards, where there are no listeners. Where noise walls are built along elevated roads, they are often transparent to reduce their visual impact.

Where nearby properties are commercial or industrial, noise walls usually won't be built along that side of the road. They are intended mainly to protect residential properties.

The second main noise mitigation technique is the use of a quiet asphalt pavement along the entire motorway and South Road, and on other road surfaces that are paved or resurfaced as part of this project (such as the Raglan Avenue to Edward Street overpass and the slip roads near the Anzac Highway intersection). Quiet asphalt, which contains crumb rubber from old tyres, can give a significant noise reduction in addition to the noise reduction provided by noise walls (and will be much quieter than the existing noisy surface of South Road and most other arterial roads in Adelaide). This is a relatively cheap way to reduce noise at the source, which is always preferable to blocking it with noise walls (though the two will be used in combination, not as substitutes for each other). It may also have the benefit of enhanced durability.

The third noise mitigation technique is to have tall (two or three storey) buildings lining the road, acting as a noise wall. Obviously, this can only be done where there is land to do it, or where such buildings already exist. In the case where there is land available (which may be a leftover portion of a property that was purchased to construct the motorway), the government may sell the land with an encumbrance that requires the new owner to build to a sufficient height and in the right position to create an effective noise barrier.

Because taller noise barriers are more effective than shorter ones, a two storey building will be significantly more effective than a three metre high wall at stopping noise, and a three storey building will be even better - provided that they connect at the boundaries to create a continuous barrier. Buildings can also be more aesthetically pleasing than noise walls. To make this noise abatement method more widely applicable in residential areas, the government could offer 10% above market value to purchase the properties adjacent to the new road, and where there are willing sellers, redevelop this land with rows of three-storey townhouses built parallel to the new road, connected so as to create a continuous noise barrier (the windows facing the road would be double-glazed, to make these homes quiet inside). Note that this would not be compulsory acquisition, so it could only happen where there are enough willing sellers next to each other (they will be offered 10% above market value plus stamp duty waived on their next purchase). As for cost, the government may make a profit on this once the townhouses have been sold, or at least come close to breaking even, so it should be a cost-effective way to provide superior noise protection to residents living behind these rows of townhouses. As an alternative to townhouses, the government could sell this land for commercial development, with an encumbrance requiring that the land be developed with buildings built so as to create an effective noise barrier.

Combining the two main techniques (noise walls and quiet road surfaces) will create a motorway that may even be quieter than the existing South Road for most nearby residents, without the expense of tunnelling or lowering the motorway into the ground. Adding the third technique (tall buildings near the road) will give even better noise mitigation in places where it can be done.

Preserving Heritage Buildings

One significant concern about the open motorway option was its potential impact on heritage buildings. This design shows how it's possible to preserve significant old buildings even where they occur in close proximity to each other on opposite sides of the road, such as the Queen of Angels

church which is only 200m from the Thebarton Council Office building and Thebarton Theatre. This is done while still keeping the motorway reasonably straight.

However, there are other places where heritage buildings are too close together on opposite sides to preserve both of them by simply diverting the road. This is where the second solution comes into play, which is to move those buildings out of the way of where the motorway will need to be. It is possible to move old buildings (even heavy stone buildings) in one piece, and there are companies that specialise in doing this (such as Mammoth Movers). It is done by picking the building up from its foundations (usually by digging underneath it and inserting temporary steel supports and then putting the whole thing on wheels) and transporting it to a new site a short distance away.

There are two buildings identified as needing to be moved, with their relocation sites shown in purple on the map. These are the Hilton Hotel and Avoca Hotel. In both cases, there are modern extensions that would be demolished, and then the original structure will be picked up and moved to the relocation site identified in the map (which involves purchasing and demolishing a few houses nearby), and then new extensions can be built on the new site to replace those that were demolished. Alternatively, the building may be moved with the extensions attached, if this is possible. Either way, the hotels can be preserved and eventually reopened to customers (the business owners would of course be compensated for this disruption, or have their businesses purchased outright if that is a better option, in which case the government would then sell these businesses again after the relocation has been completed).

Other heritage buildings are marked in purple as “area annotations” on the map. There may also be heritage buildings that haven’t been identified on the map; if so, they can be preserved in one of the two ways suggested here.

Landscaping and New Parks

Some properties that will be acquired are only partly used for the road, with significant portions that won’t be needed for the road. In some of these cases, new parks will be created on the remaining portions of land, as has been done in some places along the Torrens to Torrens and Regency to Pym projects. Some very nice parks were created there, which have become greatly appreciated by the community. These show one of the many ways in which a motorway project like this can benefit local residents.

A new park created as part of the Torrens to Torrens project, on Flanders Street in Croydon Park. The motorway and South Road are on the other side of the wall, which does a good job of reducing the noise

level, making it a pleasant addition to this neighbourhood which previously lacked a park (the nearest one is 450 metres away).

Besides the creation of new parks, the whole of South Road will be freshly landscaped as part of this project, with trees, plants, new footpaths etc. For an example of what this can look like, take a look at the photos below from the Regency to Pym project. Even though the verge of South Road in the Torrens to Darlington section will in many places be narrower than what is shown in these photos, good quality plantings can still be done in a narrower space. This will be a vast aesthetic improvement compared to the current state of South Road.





Compensation of Nearby Residents

To address community concerns about noise and other impacts, nearby residents should receive some compensation, depending on how close they are to the new road. This is not a replacement for good design to mitigate such impacts, but an additional measure to keep the local community happy. This is quite affordable, costing only about 2.35% of the total estimated cost of the government's plan. It is a relatively small expenditure that can save the state a large amount of money by avoiding the cost of tunnels. For details about this compensation scheme, see Appendix B.

Improved Property Acquisition Process

See Appendix C for some improvements that can be made to the land acquisition process and amounts of compensation given to make it better for property owners and tenants.

Cost Estimate

The cost of this alternative proposal is conservatively estimated to be $7 billion, though it may end up being less than this. This is less than half of the $15.4 billion estimated for the government's proposal involving tunnels, giving us an $8.4 billion saving if this estimate proves accurate. The reasoning behind this estimate is as follows:

- This proposal involves a similar style of motorway to the Torrens to Torrens and Regency to Pym projects (though more like the latter than the former), so they are good benchmarks to use for calculating cost. The Torrens to Torrens section included about 2.5km of lowered motorway and 3.2km of property purchases, and it cost a total of $801 million. Construction started around 2015-2016 and the motorway was opened to traffic in 2018. To build the same thing eleven years later (between 2026 and 2029, the time frame we are looking at for Torrens to Darlington) would probably cost about 1.3 to 1.4 billion dollars based on an inflation rate of about 5% per year (which is higher than the actual inflation rate over this period, but we're being conservative).
- Torrens to Darlington is about four times the length of the Torrens to Torrens project, so multiplying the above figure by four, you get something between $5.2 billion and $5.6 billion. We'll take the larger figure.
- The compensation scheme for nearby residents and the improved property purchasing procedure would add about $500 million to the price. This brings the total to $6.1 billion.
- Torrens to Darlington involves some larger properties needing to be purchased, but the cost of these is still not even close to being a deal-breaker or even enough to make a big difference to the total cost of the project. Torrens to Torrens included 3.2km of property purchases (multiplying this by 4 gives 12.8km), so the above figure already allows for properties being more expensive in the Torrens to Darlington section, given that it only involves about 9.4km of property purchases (because a short stretch near the Torrens River would be elevated, and a short stretch near Anzac Highway is already owned by the government, having been purchased for the Gallipoli Underpass project). Nevertheless, because property prices in general have gone up at higher than the rate of inflation, we'll round the above figure up to $7 billion (the extra $900 million should be enough to account for higher property purchasing costs, given that property purchasing is still a minority component of the project's total cost).
- Torrens to Torrens was done almost entirely below-grade, but this proposal involves a mostly at-grade motorway, like the Regency to Pym project, giving very significant cost

savings which may amount to $1 billion or more. But to be conservative, we'll assume a cost saving of only $500 million, bringing the total back down to $6.5 billion.

- Torrens to Torrens included four road bridges, one railway bridge with a bike path attached, and one pedestrian bridge. By comparison, this proposal includes fewer road bridges per kilometre and only one railway bridge (though it is longer than the railway bridge in the Torrens to Torrens project). There are more pedestrian bridges, and some of the road bridges need to span more lanes, but the cost should still be lower than for a Torrens to Torrens equivalent.
- The short stretch of elevated motorway won't make much difference to the cost, considering that the existing Superway cost only $842 million despite being over four times the length of the short stretch proposed here (and that was the cost of the entire project, albeit more than ten years ago now), and we would have needed an overpass or underpass at Ashwin Parade anyway (which has been included in the cost already). So let's just say this balances out the savings on bridges mentioned in the previous point.
- This project also includes the motorway-motorway interchange at Cross Road which will probably add about $500 million to the cost, compared to building the motorway without it. Note that some components (such as the railway bridge and intersection underpass) have already been included in the cost estimate, as they would be needed anyway. This brings the total back up to $7 billion, but given that this interchange is a feature that the government's plan doesn't have, it is fairer to use the $6.5 billion figure when comparing the cost to the government's plan.
- Alternative route improvements also aren't included, because they are valuable on their own and will continue to deliver value on their own after the motorway is built. And for a fair comparison with the government's proposal, they shouldn't be included.

Conclusion

In light of all the information presented here, it is obvious that the government's tunnels plan suffers from lack of long-term planning and would impose a high cost burden on South Australian taxpayers while delivering a road that is in many respects inferior to the alternative presented here. I have shown how it is possible to build a better road for less money while also keeping the local community happy. The money saved can be returned to taxpayers or directed into other projects such as the link to the South Eastern Freeway. The result will be a road network that is much better able to meet the present and future needs of our city.

Appendix A: Alternative Route Improvements

Marion Road to East Avenue Corridor

To deliver relief for traffic congestion in the short term, the government should fast-track a number of improvements to the Marion Road - Holbrooks Road - East Avenue corridor to significantly improve the capacity of this alternative route, helping to ease traffic congestion on South Road and giving motorists a good alternative route while the motorway is under construction. The intention is to deliver a high-capacity arterial road linking Port Road and Grange Road to the Southern Expressway, allowing traffic to easily bypass all the congested parts of South Road. The locations of these improvements are marked on this map, and involve the following changes.

Holbrooks Road, East Avenue & Grange Road: This is a terrible pair of intersections and should have been fixed a long time ago. North-south traffic often has to wait multiple cycles to get through, and capacity is very limited. The fix involves realigning the ends of both roads to meet at a single intersection, with two straight lanes in each direction for north/south traffic and two dedicated lanes for turning right onto Grange Road in both directions. There should also be two lanes for turning right from Grange Road to Holbrooks Road (but not from Grange Road to East Avenue, as there is much less traffic wanting to make that turn).

This requires the purchase of some properties along the eastern side of Holdbooks Road and western side of East Avenue on the approaches to this intersection, but should not require the purchasing of any properties along Grange Road, except perhaps for a very minimal amount of land along the southern side of Grange Road (hopefully with no demolitions required), to make room for the dual right-turning lanes.

Marion Road, Holbrooks Road & Henley Beach Road: Make these roads meet at a single intersection, probably by realigning the southern end of Holbrooks Road. This would require about 30 homes to be purchased and nearby residents compensated for having the road realigned closer to them. It should be possible to provide three straight lanes north/south through the intersection as part of these changes, by purchasing a small portion of the car parks on either side of Marion Road and a few front yards on the southern approach.

Also widen Holbrooks Road to two lanes each way along its entire length, which should be possible to do without acquiring any additional property (besides what is needed for the approaches to the intersections at the end) - in fact, it is already done along a significant portion of its length.

These changes, combined with the changes above, will create a high-capacity arterial road linking Marion Road to Port Road, and will also provide much greater capacity for traffic to bypass the congested part of South Road and get to/from the motorway via Grange Road.

Marion Road & Sir Donald Bradman Drive: Given the shape of the roads leading to this intersection and the presence of buildings on the corners, it makes sense to purchase properties along the northern side of Sir Donald Bradman Drive near this intersection and widen it to three lanes each way through this intersection, plus two right-turning lanes each way for turning onto Marion Road. Simultaneously, several houses along the eastern side of Marion Road, and a portion of the car park for the VIP Home Services building, should be purchased to widen Marion Road to three lanes each way, plus two right turning lanes each way, on the approaches to this

intersection. (Lost parking space will be replaced by a new car park to the south of the VIP building, in the blocks purchased for widening Marion Road). This will provide enough capacity on both roads to satisfy demand for several decades.

Marion Road, Cross Road & Anzac Highway: These two intersections are currently a major bottleneck on the Marion Road corridor, and need to be fixed. Marion Road needs a third straight lane in each direction through this entire busy stretch, and two dedicated lanes for turning right onto Anzac Highway (in both directions). There should also be two dedicated right-turning lanes from Marion Road to Cross Road eastbound and a lengthened left turning lane and slip lane for traffic going the opposite direction (Cross Road to Marion Road southbound). A tram overpass or underpass of both roads would further improve traffic flow, but this doesn't need to be built at the same time as this widening project. Properties will need to be purchased along the eastern side of Marion Road for this widening project.

Marion Road, Raglan Avenue & Bray Street: A minor widening of this intersection, enabled by purchasing a small amount of land including a few front yards along the northern side of Raglan Avenue and Bray Street (probably not requiring any demolitions), to provide a dedicated right-turning lane on Raglan Avenue and Bray Street (for right turns from these roads to Marion Road), in addition to two straight lanes each way going east/west. This will enable the sequencing of the lights to devote more time to Marion Road through-traffic. No widening of Marion Road should be necessary here.

Remainder of the corridor: Fortunately, the other major intersections along Marion Road (the Daws/Oaklands Road intersection and the Sturt Road intersection) already have good capacity to handle additional Marion Road through-traffic. However, the Sturt Road intersection currently carries too much traffic turning to/from Sturt Road to travel between the Southern Expressway and Diagonal Road, which is the reason for the change suggested below. It could also do with an additional right-turning lane from Marion Road to Sturt Road westbound, but that is probably not an urgent priority.

Southern Expressway entry/exit for Diagonal Road: A northbound exit from the Southern Expressway and southbound entry to the Southern Expressway, both connecting to the intersection of Diagonal Road and Seacombe Road. This intersection will be moved to the west a little, with several homes being purchased to do this. The purpose of this new entry/exit is to provide more direct access to Diagonal Road so that traffic from the Southern Expressway does not need to go via Marion Road and Sturt Road to get to it (and to Westfield Marion). This will take traffic off those parts of Marion Road and Sturt Road, enabling the Marion/Sturt Road intersection to handle a greater volume of through-traffic, which is a key part of the Marion Road corridor improvements, providing a higher-capacity alternative route for South Road. It also makes Diagonal Road, Morphett Road and even Tapleys Hill Road more attractive alternative routes for traffic to/from the southern suburbs, which will help free up Marion Road to take more traffic away from South Road.

The combination of these changes will provide a first-class high-capacity arterial road all the way from the Southern Expressway to Port Road, enabling traffic to bypass all the congested parts of South Road and access the north-south motorway via Grange Road. And these projects could be completed much sooner than the motorway, providing near-term relief for motorists and a good alternative route during construction of the motorway.

City Ring Route - Western side

The western side of the city ring route (R1) officially goes via Richmond Road to South Road and then James Congdon Drive. However, in practice, a lot of traffic goes via Railway Terrace to James Congdon Drive. But this is a bottleneck and should be improved, so that more traffic can avoid South Road, especially during construction of the motorway. So the following improvements are suggested.

Richmond Road & Railway Terrace: Improving the capacity of this intersection, especially for right-turn movements from Richmond Road to Railway Terrace (with dual right-turning lanes), is important for providing a better ring route around the city that avoids South Road. This should be done as an urgent priority (the government's plans also include an upgrade of this intersection). It will probably be sufficient in the short to medium term to have only a single westbound through-lane on Richmond Road, meaning that only one right-turning lane would need to be added, so it might be possible to squeeze this into the existing Richmond Road corridor without any buildings being demolished.

Railway Terrace & James Congdon Drive: This intersection is less of a problem, but it may still be a good idea to lengthen the dual right-turning lanes on the approach from Railway Terrace. There appears to be land reserved for this on the eastern side of Railway Terrace, and enough room under the bridge (the southbound lanes would pass through the gap that is currently occupied by a left-turning slip lane).

Springbank Road to Fullarton Road Corridor

The department should consider making further improvements to the Springbank Road to Fullarton Road corridor, now that the major bottlenecks at the Fullarton/Cross Rd intersection and Springbank/Goodwood Rd intersection have been fixed. Improvements at other bottlenecks along this route could help take a little bit of traffic off South Road and off other roads that are alternatives to South Road (such as Goodwood Road).

Appendix B: Compensation of Nearby Residents

Nearby residents will receive compensation, depending on how close they are to the new road. This compensation is for possible impacts such as noise, visual impacts, impacts on access across South Road, and any other impacts that the project may have on the local community. This is not a replacement for good design and reasonable measures to mitigate these impacts, but an additional measure to ease concerns and keep the local community happy.

This compensation consists of two components:

- An amount based on property value and distance from the completed motorway, paid to the owners of residential properties.
- An additional amount paid to the resident (who could be a tenant or an owner-occupier), amounting to 30% of the payment mentioned in the first point. This payment will be made in instalments, starting at the commencement of major works and finishing at their conclusion.

These payments are not just for noise and aesthetic impacts (which we expect to be largely mitigated by noise walls, quiet asphalt and landscaping), but also for changes to access across the motorway (both for vehicles and pedestrians), changes to the look and feel of the area near the road, and other, less tangible community impacts. Though we would hope that the new road improves many of these factors, compensation is still given to help the project gain community acceptance. We want local residents to feel like they are getting a good deal, not just barely enough.

We should also bear in mind that this plan (compared to the tunnels plan) will benefit nearby residents several ways, including:

- Improved access to the motorway with more entries and exits in convenient locations.
- Less traffic on South Road, especially truck traffic (including dangerous goods trucks which wouldn't be able to use tunnels).
- Less congestion at intersections along South Road and improved traffic flow on roads that cross South Road.
- Quite a number of traffic lights on South Road will be removed, reducing travel times along South Road, both for vehicles and cyclists.
- The new road will look much better than the existing one, with good landscaping all the way along, and new parks being created in some places.
- Cycling lanes and will be added to South Road along the entire route, including parts that currently lack cycling lanes and where the government's proposal would not add them (due to South Road remaining as it is in those sections under their plan).
- As taxpayers and residents of this state, they will benefit from the lower cost of this proposal compared to the government's proposal (and this benefit alone is worth over four thousand dollars per person).

This compensation scheme applies to residential properties only, because commercial and industrial properties don't tend to be negatively affected by proximity to a main road - if anything, they benefit.

Details of compensation scheme

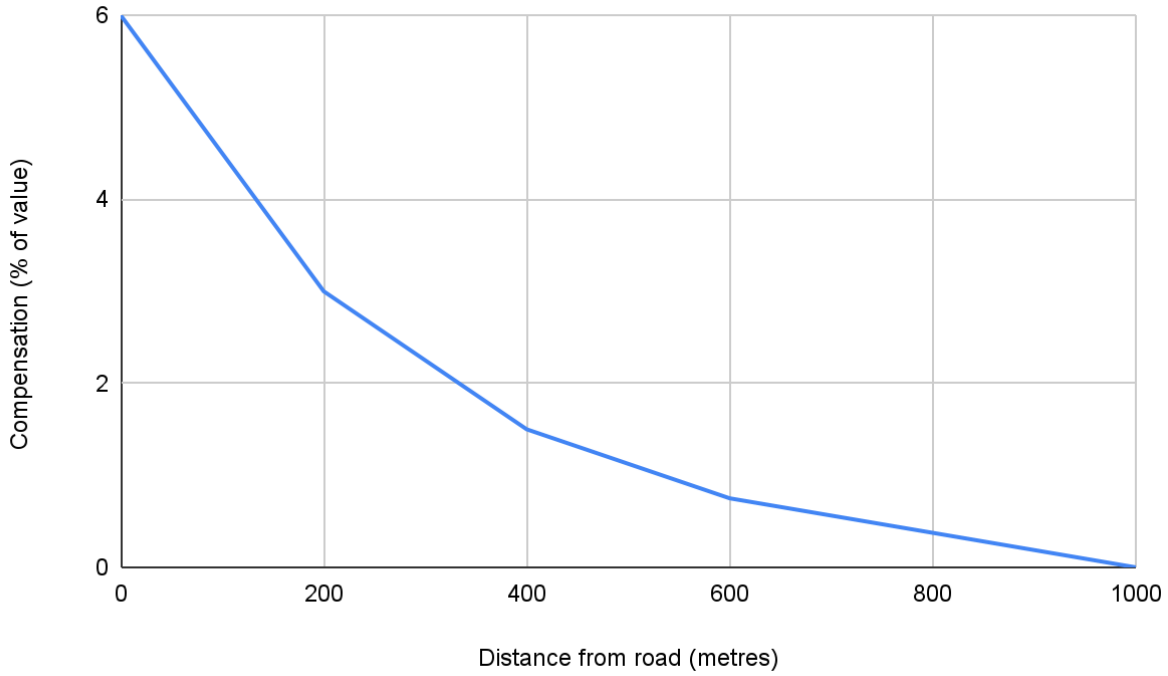
Property owners will be compensated a small percentage of the property's value, with this percentage depending on how far their properties are from the new road. The calculation will be done based on the centroid of the property (which is a mathematically defined central point on the

property). A larger residential property with multiple dwellings may be divided into units and the calculation done separately for each unit.

Compensation is calculated as a percentage of property value, according to the distance of the property's centroid from the new road, with linear interpolation for distances in between, as shown in the graph below.

- 6% of value for a property with centroid 0m from the road (in reality, no property is exactly zero metres from the road, but this is the starting point for the formula).
- 3% of value for a property with centroid 200m from the road.
- 1.5% of value for a property with centroid 400m from the road.
- 0.75% of value for a property with centroid 600m from the road.
- Nothing for a property with centroid more than 1km from the road.

Property valuations are obtained from the Office of the Valuer-General, which maintains the database of valuations that are used to calculate council rates and land tax.



Under this scheme, those who own a house worth $700,000 would receive $36,750 of compensation if their property is centred 50m from the completed road. This is a fairly decent amount given that they were already very close to South Road. Occupants of such a house would receive a payment of $11,025 (divided into several separate instalments), adding up to $47,775 of compensation for owner-occupiers.

These suggested percentages (and those given below) are only suggestions, and could be tweaked depending on what is deemed appropriate and fair.

Calculating Compensation Near Lowered/Elevated Motorway

The percentages given in the graph above are for a motorway at ground level. Where the motorway is elevated 6m or more above ground level, the numbers will start at 8% for a distance of zero metres and then go down by half for each of the remaining distances (4% for 200m, 2% for 400m, and 1% for 600m). Where the motorway is lowered more than 6m below ground level, the

amount of compensation will be reduced to 4% for 0m distance, and decreasing by half after that (2% for 200m, 1% for 400m, and 0.5% for 600m).

Because the motorway varies in height along its route, the “average height of the motorway” used to calculate compensation for a particular property is determined as follows:

1. The motorway is divided into 200m segments, and each segment is assigned a height above ground level based on the highest point above ground level along that section.
2. For each property, we take the five closest segments and give them each a weighting that is proportional to the inverse of the distance from the segment to the property’s centroid.
3. Using the weights calculated in step 2, we calculate the weighted average of the motorway’s height above ground level for the five closest segments, using the heights assigned to each segment in step 1.
4. We take that weighted average height of the motorway above (or below) ground level and use it to calculate the percentage compensation applicable to that property.

For heights between 6m below and 6m above ground level, we linearly interpolate between the percentages of compensation applicable for a lowered, ground-level or elevated motorway, to calculate a fair percentage based on the average height of the motorway calculated in step 3 above.

Cost Estimates

See the spreadsheet for detailed calculations using the formula given above. The calculations are based on a ground-level motorway, as the lowered and elevated portions are assumed to balance each other out. Using some reasonable assumptions about property values, average block sizes, and the proportion of properties that are residential, the cost of compensating residential property owners on both sides of the road along the entire 10.7km stretch comes to approximately $278 million. Adding the 30% compensation for property occupants, the total cost comes to $362 million (these numbers should not be considered precise). This sounds like a lot, but it’s only about 2.35% of the $15.4 billion that the government has estimated for their tunnels proposal, and if it means that we can build the road without tunnels, saving 50%, then it’s well and truly worth it. Note that this includes compensation along sections that were not planned to be tunnelled anyway, and that the government doesn’t currently plan to compensate nearby residents anywhere along the corridor, nor were nearby residents compensated along the already-completed sections of motorway.

Setting a Precedent

Some people will be concerned that compensating nearby residents will set a precedent whereby people will expect compensation for all future road projects built near them. However, this would only apply to major projects that have significant impacts on the nearby community, such as building a new arterial road where none previously existed, or converting an arterial road to a motorway. In each case the government would need to set the compensation at a level that is considered appropriate given the impacts.

It is reasonable and fair for the government to compensate the community for the impacts of projects like this. The result will be a win-win in that the government will be able to get things built more easily and at a more reasonable price for the benefit of the entire city while also having the support of the local community.

In any case, fear of setting a precedent should never be a reason to spend billions of dollars more than we need to.

Appendix C: Property Acquisition Process

Here are some suggestions for improving the property acquisition process to make it fairer for owners and occupants.

Compensation

For owners

When sale of a property is involuntary, as it is when the government acquires property for the purpose of road construction, the owner should be given more than they would have received from a voluntary sale of the property - that is, more than its market value. This is only fair, because of the fact that they did not choose to sell at that time. They may have plans for it, or there may be other factors that mean that the property is worth more to them than its market value. In fact, it is normal for people to place more value on something than the market would - this is called "consumer surplus" and is a key factor motivating people to purchase things (including property) in the first place.

It is not enough to simply compensate them for the cost and inconvenience of moving. This should be done (and is done), but this only covers their expenses, it doesn't compensate them for the fact that they were displaced from their property involuntarily.

Until very recently, it seems that the government only offered owners the market value of their property (plus costs of moving and some other expenses like stamp duty). A recent change to the Land Acquisition Act means that home owner-occupiers are now entitled to a "Solatium payment" of 10% of property value, in addition to the market value of the property, but this payment is capped at $50,000 and doesn't apply at all to non-residential properties or to residential properties that are being leased out. This solatium payment is a step in the right direction, but it should apply to all properties, without the $50,000 cap, because of the fairness principle mentioned above and because:

- Residential properties may be leased out only on a temporary basis, with the owner still intending to live in it in the future, and so they may value it as their own home.
- The same could also apply to business properties, and owners may have plans for those properties that mean that they value them more highly than the market would.

While the owner could argue their case in regard to these points, and perhaps receive more compensation as a result, it is much better to have a system that is transparent and generous from the outset, not one that people need to fight to get a fair outcome.

As for whether 10% is a high enough solatium payment, one way to find out is through the offers for voluntary sale mentioned in the noise abatement section. If offering owners the same amount as what they would receive from compulsory acquisition is enough to get most of them to sell voluntarily within the time frame given, then the solatium payment is high enough. However, if it is not enough to attract most owners to sell voluntarily, then a strong case can be made that the government isn't paying people enough for compulsory acquisition, and should be paying more. If, for example, the solatium payment were increased to 15%, it would only make a 4.5% difference to the amount of money that the government pays, while it would make a 50% difference to the amount of "extra" money that the owner would receive. In other words, it makes the offer 50% more attractive to the owner, for a relatively small cost. Therefore, a higher solatium payment is worth considering.

For occupants

The DIT's land acquisition web site talks about compensation for residential tenants, though it is very vague about how much they should expect. At a minimum, one would expect that the costs of moving would be covered (both for rental tenants and for owner-occupants). Given that some tenants may have been there for quite a while, they should also receive something for dislocation from their home and neighbourhood, in addition to being compensated for the cost and inconvenience of moving. There should be a base amount that the government is transparent about, as a minimum that residential tenants can expect - probably equivalent to about ten to fifteen weeks of rent. Owner-occupiers should also be treated as tenants of their own properties in this respect, and receive the same payment (based on a fair estimation of rental value).

The same web site also makes it clear that business tenants are paid for the cost of relocation, or paid the entire value of their business if this is less than the cost of relocation. While this is good, it would be better if they were also given a little extra to compensate them for the fact that this relocation was not a voluntary decision by them.

Justification

While some may consider these payments overly generous, it is important that the government does the right thing to gain community support for their projects, and not be forced to spend exorbitant amounts of money on solutions like tunnels in order to avoid spending the relatively small additional amounts that would be required to compensate people properly.

Note that these additional expenses could be avoided by proactively purchasing properties as they become available on the market, years in advance of a project commencing. If previous governments had planned things better they could have done this.

Process and Timelines

The longer occupants are given to move out of their property, the better. The ideal length of time would be two years, or three for businesses, which would give them enough time to build replacement premises if that's what they want to do (rather than being forced to make do with whatever is on the market). If the time frame needs to be shorter than ideal, then additional compensation should be considered. For the time frame of the Torrens to Darlington project, it should be possible to give occupants three years to move out. Delaying the project by a year won't make much difference, especially given the faster construction time of this at-grade motorway alternative.

Owners should be allowed to sell at any time from the date they are notified, with the option to lease the property back from the government for the remaining time while they find or build their new homes or business premises. The lease should be flexible, with the tenant having the option to terminate it at any time.

For businesses who choose to build instead of buy or rent a replacement building, the government should work with local councils to expedite the approvals process and even rezone land if it's necessary and appropriate to do so.

For large, complex properties, such as schools, where only a portion of the property may need to be acquired, the government may need to acquire other neighbouring properties on their behalf in

order to replace lost buildings or car parking space (probably by constructing new ones) before the existing buildings are demolished. They should work with the owner of the affected property throughout this process, to know what they need and provide a good outcome for them. This will need to be done at least in the case of St George College, and maybe in other cases too.

Partial purchases

In some cases, only a portion of the property (such as part of the front or back yard) needs to be purchased, and demolition can be avoided. In these cases, residents or businesses will be fairly compensated for the loss of that land, including the cost of rebuilding fencing and compensation for the inconvenience resulting from this (e.g. loss of parking space), and will also be given the option of selling the entire property for full market value (plus having stamp duty waived on their next purchase, and moving costs covered), in which case the department will in due course sell the remaining portion of the property to another willing purchaser.