I am a resident of the Northern Beaches and strongly opposed to the Beaches Link and Gore Hill Freeway Connection.

I am not opposed to a transport tunnel as such and believe that we need transport solutions for the Northern Beaches. The best transport solution will be a train tunnel that carries a metro line. That will be a solution that meets the needs of the future by not increasing traffic volumes in the city and by reducing pollution. The government has not adequately explored the possibilities of building a viable metro line since there are easy solutions available. These should be fully explored before committing to a road tunnel.

The Beaches Link road tunnel is too large. It is six lanes wide and can carry an enormous volume of traffic. The problem with this is it demands commensurately wide roads leading into the tunnel. These feeder roads will carve wide rivers of traffic which connects distant suburbs together but divides close suburbs from each other. The use of major arterial roads as a traffic solution has been tried in Moscow and Beijing where these problems have significantly impacted on the lifestyle of residents. The Beaches Link threatens to recreate Moscow on Middle Harbour.

A smaller road tunnel which scatters traffic throughout the Northern Beaches work better to keep the integrity of suburbs together. Scattering traffic is done by taking drivers to where they want to go rather than dropping them on major transport arteries and having them fight with all the other traffic as they travel extra distance to their destination. Arterial roads on the Northern Beaches will only lead to congestion and a decline in the quality of life.

The tunnel has a number of design flaws. Its steepness is a major problem and one that has not been adequately mitigated against. The design has very steep slopes towards and away from Middle Harbour. These will cause traffic travelling downhill to use their brakes all the way down then as soon as they start up the other side, all traffic will hit the accelerator hard, creating a massive cloud of pollution on the uphill slope. Cars and trucks will be fighting to overtake each other at 80km/h with slower vehicles that are unable to climb the hill so well being woven between. This will make the drive a very unpleasant experience.

There are no side tunnels to turn off the Beaches Link along the whole length of the tunnel. If there were some exits at Northbridge, Cremorne, Mosman and Balmoral, it will not only bring benefit to residents living in these suburbs and reduce traffic along Military Road, but will also reduce the traffic load for the Northern Beaches by letting anyone who accidentally enters the tunnel get off as soon as possible. There will be lots of these people every day. I know because I have been caught in tunnels around Sydney that I never wanted to enter and when I share my experience, everyone says the same has happened to them.

All the entrances and exits to the Beaches Link tunnel have been poorly designed.

Referring to Figures 4.2, 4.3, 4.5 and 4.6 of Appendix V and Figures 5.1 and 5.17 of Chapter 5, the entrance to the tunnel from Warringah Freeway and the Western Harbour Tunnel is particularly badly designed. There is only one point that you can enter the Beaches Link and that is at Ernest St/Anzac Park, no matter whether you are coming from the Harbour Bridge/Harbour Tunnel or Western Harbour Tunnel.

There are two different streams to enter the Beaches Link depending on which direction you access it but both of these enter the Beaches Link at exactly the same place at Ernest St/Anzac Park. This means that if you miss this one entrance, you cannot get onto the Beaches Link by simply changing lanes. You have to turn off the Warringah Freeway entirely. You then need to do some slick turning

around in the side streets to get yourself back onto Warringah Freeway going in the right direction and to the right place in order to get back to the entrance at Ernest St/Anzac Park or the one at Artarmon on the Gore Hill Freeway. This could be fixed simply by having more exits and entrances along the route in Northbridge, Cremorne, Mosman and Balmoral, so that if you miss one entrance, you simply travel in the right direction to the next.

Compare the Beaches Link entrance design with the multiple entrances to the two highways on the Harbour Bridge and the Harbour Tunnel. As you travel south down Gore Hill Freeway and Warringah Freeway towards the CBD, if you are in the wrong lane or miss the turnoff, there are multiple places further down that you can turn to correct your mistake. It gives people lots of choice and lots of opportunities to correct mistakes. That is the freedom drivers need. No one is perfect when driving, particularly on such a complicated stretch of road, but we don't want to be punished for our mistakes. We want things to be relaxed and easy and this means that the design has to take into account the fact that drivers cannot be paying attention to turnoffs all the time that they are juggling speeding traffic and big trucks. Mistakes are going to happen and the road must be designed to take this into account.

Warringah Freeway will be widened where the Beaches Tunnel starts at Ernest St/Anzac Park to around 25 lanes. That is too wide. There are jokes on the internet about roads in China that are 100 lanes there. That's only 4 times the width of this one. A road that is 25 lanes wide is obviously poorly designed and when you look into what is happening, it is obvious that there is no need for it to be so wide.

The reason for having so many lanes is that each lane has a single function. It might be the lane that enters the Beaches Link from the Western Harbour Tunnel or the lane that enters Beaches Link from the Harbour Bridge, or the lane that goes from the Harbour Bridge to the Gore Hill Freeway. This is not a smart way to design a road. Instead of having a lane that does one thing and nothing else, all the lanes should be as multipurpose as possible. For an understanding of how this works, just look at how previous generations have designed the Harbour Bridge and lead onto it. The lanes are so multipurpose that they are not even dedicated to going one direction but switch during the day as the primary direction of traffic changes. 25 lanes is more than 3 times as wide as the Harbour Bridge. It is more than 1.5 times wider than the Harbour Bridge, Harbour Tunnel and Western Harbour Tunnel added together – that's all the roads that lead to that point. It is crazy wide. You don't need it so wide. You need to go back to the drawing board and see how you can design it better.

To make your 25 lane wide road requires that you destroy part of Cammeray Golf Course. It looks like the designers just could not be bothered designing more efficiently simply because there is free land to be sacrificed to the road project. This land might come to the project for free but it is valuable. Cementing over a golf course is simply turning one of the heat and pollution controlling areas close to the city centre into a heat and pollution producing area. At such an enormous size, it will also further distance residents of Crows Nest from those in Cammeray, so will create social issues as well as environmental issues. But all these issues are totally unnecessary. What needs to happen is you need to come out with a better design.

There is a further design flaw with the entrance to the tunnel at Ernest St/Anzac Park and that is with flooding. The EIS tells us that floodwater will collect at Anzac Park, reaching a maximum height of seven metres. This water will be held back from the road by the sound barrier. This is an unbelievably dangerous solution.

18.4.3 States: “The depth of ponding in ANZAC Park would occur to a maximum of 2.1 metres and 3.5 metres during a 10% and 1% AEP event, respectively, which is sufficient to result in hazardous flooding conditions to persons and property.

“Floodwaters that collect in ANZAC Park would pond against the noise wall that runs along the western side of the Warringah Freeway to a maximum depth of about three metres during a 1% AEP event. If the noise wall were to fail under this weight of water, then floodwater would inundate the Miller Street off-ramp to a maximum depth of about two metres and extend across the northbound carriageways of the freeway….

“Floodwaters that collect in ANZAC Park would build up to a level that overtops the noise wall that is located along the western side of the Warringah Freeway, where it would pond across the full width of the freeway before surcharging across its eastern side and into Cammeray Golf Course. ANZAC Park would be inundated to a maximum depth of seven metres, while the carriageways of the Warringah Freeway would be inundated over a length of about 350 metres and to a maximum depth of five metres.”

This modelling assumes:

1. That a sound barrier is an appropriate dam wall.

2. That the failure of the sound barrier when acting as a dam for a wall of water 2.1m, 3.5m and 7m high will cause water to slowly move forward, resulting in no damage other than flooding.

Sound barricades are not an effective material to make a dam wall. They could easily fail and this will cause a tsunami of water seven metres high to flow from Anzac Park into the entrance to the Beaches Link and Western Harbour Tunnel, killing everyone in it for kilometres in each direction and potentially killing people and causing massive economic destruction in surrounding suburbs.

We have seen similar things happen at one of BHP/Vale’s mines in Brazil which killed a number of people and caused billions of dollars of damage. That dam was built to a much higher standard than the water catchment at Anzac Park, using proper technology to build the dam wall, not sound barriers, and BHP has had over 100 years experience building tailings dams. If their dam can fail, this water catchment strategy also has a high probability of failure, and the risk of failure for this project is too high to be acceptable.

Not only is part of Cammeray Golf Course being sacrificed for the 25 lane widening of Warringah Freeway, it is also being taken over to build office buildings and a carpark. See Figure 4.4 of Appendix V. Why Cammeray Golf Course has to be used as the location for a Service Centre and car park is not properly explained. The Harbour Bridge did not need to destroy Cammeray Golf Course to build a Service Centre. The Harbour Tunnel did not need to destroy Cammeray Golf Course to build a Service Centre. Why does the Beaches Link need to destroy Cammeray Golf Course to build a Service Centre? What is so special about the Beaches Link? How have roads changed so much in the past 100 years that we now need buildings on the road to manage them? These questions are not answered in the EIS.

There are not only Service Centre buildings on Cammeray Golf Course. There are also Service Centre buildings being built on Balgowlah Golf Course. And on Trefoil Creek. And along Gore Hill Freeway. What on earth is happening that we suddenly need 4 sets of Service Centres built for this one road? All the other roads I know are just roads. They just get the regular servicing when they get a pot hole. What is so special about the Beaches Link? I don’t get it and think it needs to be explained. Why do

we need so many Service Centres built on golf courses, each with their own massive car park and why they can't store their earthmoving equipment in an industrial zone like happens for all other roads?

Turning now to the Balgowlah entrance, we see the same poor design. See Figures 4.15, 4.19 and the visualisation on page 122 of Appendix V, as well as Figures 5.21 and 5.22 of Chapter 5.

Burnt Bridge Creek Deviation is being expanded from the current 4 lanes to 12 lanes at the entrance. That is three times as wide as the current road. If we look carefully at the sums, we see that the entrance is actually two roads added together. Burnt Bridge Creek Deviation has 4 lanes and Beaches Link at this point also has 4 lanes. 4+4=8. Here instead 4+4=12. The entrance is 1.5 times as wide as both roads. Why? When roads merge or separate, the number of lanes should be less than the total of both roads because lanes are shared in part. Here instead we are generating extra lanes. It is just sloppy design.

How can we afford to have such sloppy design? The answer is obvious. Just like the entrance to Beaches Link at Ernest St/Anzac Park, at Balgowlah there is a golf course. Free land! It looks like it does not matter how much land you take, it is all free, but it still comes at a cost. Bad design leads to the generation of a heat and pollution producing centre and it serves to cut Balgowlah into two halves. We pay for it in a lower quality of life.

We don't even get an efficient transport solution. The golf course is sacrificed to build an "access road" to the tunnel. This 4 lane road is built so that traffic can turn 180 degrees as soon as it leaves the tunnel. Cars travel along the tunnel and as soon as they leave it, they turn 180 degrees and go back in the direction they came from. Why? It is a very odd solution. You don't see that one on the Harbour Bridge. Leave the Harbour Bridge and you travel away from it. You don't do a U-turn and head back towards it. The Beaches Link however has 4 lanes of traffic doing a U-turn to head back in the direction of the tunnel.

In order to do this 180 degree turn, vehicles have to pass through two sets of traffic lights. The first set of traffic lights is before you even leave the Beaches Link tunnel. That is because for some unknown reason, the traffic coming out of the tunnel has to cut across traffic going into the tunnel. Who designed it so that cars from underground rise up to the level of cars on the ground and then they meet together at a traffic light. The tunnel is underground. It is below the traffic on the ground. That is the clue. You keep the traffic below the traffic on the surface until they pass each other. Better still, you have exits along the route that take people where they actually want to go rather than forcing them onto enormous congested arterial roads.

The exit has traffic lights before you even leave the tunnel. When these are red, traffic will build up in the tunnel. All the cars will be on the big hill going out of the tunnel. You have designed a hill start for everyone on one of the biggest slopes in Sydney, the largest artificial road slope. All the cars that stop for the traffic lights will be on this big slope that goes down to Middle Harbour and stopped there in the tunnel waiting for the lights to go green.

The cars then come out, do their 180 degree turn and hit traffic lights once more on Sydney road. They have not even left the Beaches Link and already have to deal with two sets of red lights. Go through those lights, turn right to Seaforth and you hit another set of traffic lights at the intersection of Sydney Rd and Burnt Bridge Creek Deviation. These lights currently allow 3 cars to pass going straight along Sydney Rd of an afternoon, 4 cars if one goes partly through on a red light. This is already a heavily congested intersection. This intersection will have cars going to Seaforth that currently travel over the Spit Bridge and enter turn to Seaforth without going through traffic lights. It

will also have more traffic turning back to go over the Spit Bridge towards the CBD, traffic that has used the tunnel to avoid congestion on Military Rd.

The whole Balgowlah exit could be much better designed. Think in 3D. Think about getting people to where they want to go. Give drivers options and choices. Narrow the 12 lane exit by having the exit and the entrance separated by a distance of 500m. There are so many ways to do a better design.

One point of collateral damage at the Balgowlah exit at Burnt Bridge Creek Deviation is Burnt Bridge Creek. This creek effectively ceases to be a flowing stream as a result of dewatering for the tunnel. Below the ground, groundwater is reduced by 11m.

Appendix N Annexure F 2.2 States: “It is noted that Burnt Bridge Creek has been substantially degraded over the years largely due to the pressures generated from urban areas including a dense sewage system network and many stormwater outlets discharging to the creek. It is expected that increased stormwater runoff has contributed to the loss of coarse and fine grained sediments from the channel, leaving a scoured bedrock bed and eroded mud banks. This has resulted in Burnt Bridge Creek suffering from poor water quality, extensive weed infestation, erosion of creek banks, build-up of sediment and reduced biodiversity.”

5.2.6 States: “the [Burnt Bridge Creek] waterway was previously realigned during construction of Burnt Bridge Creek Deviation in 1982.”

17.3.7 States: “A key outcome of the Balgowlah Golf Course stormwater harvesting project is the golf course no longer extracts water from Burnt Bridge Creek for irrigation. As such, creek water remains as environmental flows, which re-creates the natural creek conditions.”

22.4.1 States: “The Balgowlah precinct contains the Burnt Bridge Creek Deviation and Sydney Road corridors. Despite the amount of road infrastructure in this precinct, it has a distinct leafy character including well vegetated streetscapes and a large area of open space in the form of the Balgowlah Golf Course.

“The precinct generally slopes from south to north, towards Burnt Bridge Creek riparian corridor. Balgowlah Golf Course has a level change of approximately 20 metres across the site. The golf course forms a large area of open space in the centre of the precinct with stands of mature trees spread across the course and along the course boundaries adjoining residential developments. Dense vegetation also occurs along the Burnt Bridge Creek riparian corridor.”

The description of Burnt Bridge Creek as “substantially degraded” is totally inaccurate and covers up the negative impact that the project will have on this area. The creek was realigned in 1982 and as such, the vegetation there has been returning to a natural state for 40 years. The area has a distinct leafy character with dense vegetation and stands of mature trees.

The creek water remains as environmental flows, which re-creates the natural creek conditions. The creek flows over natural rocks along a natural looking course. The area is cool and well shaded. The land of the golf course lies below Burnt Bridge Creek Road, providing a stretch of quiet natural scenery from which cars can hardly be seen or heard. The area is one of the most beautiful urban riparian corridor landscapes in the Northern Beaches.

To give perspective on what 40+ of tree growth means, if the project can replicate the current natural conditions once construction is finished according to the current forecast of around 2028, the bushland will not return to its current state until 2068. By this time, according to current life

expectancy rates, most people currently over 40 years old will be dead. These people will never live to see the bush return to its current situation. Anyone currently 30 years old will need to wait until they are 77 to see the bush return to its current situation. That is a very long time, equal to almost half the 100 lifespan of the project as modelled in the EIS.

However, this project simply cannot replicate the current situation. Burnt Bridge Creek is currently in no way degraded to the level that it will be degraded following the commencement of construction of this project. The trees and bush, once cut cannot regrow as lush as now, due to the lack of ground water that the project causes. The taller trees that will be cut down for construction are in fact much older than 40 years. The project will take this lush riparian corridor with graceful trees and a gurgling stream flowing over rocks and turn it into a bare grassed valley with a generally dry, deep concrete stormwater drain running through it. It will be a major loss of visual amenity and natural environment for the Northern Beaches area. The environment will never again be as good as it is now.

In Chapter 19 Hydrodynamics, the Secretary's environmental assessment requirements – hydrodynamics, the section on Water – Hydrology, part 3b, it states, “The Proponent must assess (and model if appropriate) the impact of the construction and operation of the project and any ancillary facilities (both built elements and discharges) on surface and groundwater hydrology in accordance with the current guidelines, including: extent of drawdown, barriers to flows, implications for groundwater dependent surface flows, ecosystems and species, groundwater users and the potential for settlement.” This issue is not properly addressed in the EIS.

From the EIS, we can ascertain the following information:

App N 5.5.11 States: “In the vicinity of Balgowlah Golf Club observed groundwater levels at Bore B128 are around two to three metres below ground level, which indicates there is potential for interaction between the creek and the groundwater in this location where the creek is unlined.”

17.4.5 States: “The drawdown beneath Burnt Bridge Creek is estimated to be up to five metres. There would be maximum of 79 per cent reduction in baseflow at the end of construction.”

App O 6.5 States: “Maximum water table drawdown beneath Burnt Bridge Creek, North Balgowlah is predicted to be up to six metres. The predicted reduction in baseflow is estimated to be a maximum 16.8 kilolitres per day (a 96 per cent reduction) after about 100 years of operation. Baseflow impacts at Burnt Bridge Creek during the operational phase have the potential to be considerable”

App O 4.2 States: “Burnt Bridge Creek is a freshwater, first order stream receiving multiple inflows of stormwater. Upstream, the waterway consists of a natural bedrock and mud substrate, while downstream it is a highly modified bedrock entrenched channel with rock fill on the on the embankments.”

App O 6.4 States: “Settlement is not expected to have noticeable impacts on Flat Rock Creek or Burnt Bridge Creek form and geomorphology as the creek drainage infrastructure along both these creeks would be designed as culverts and would mitigate some of predicted settlement impacts.”

App P 6.2.1 States: “The extension of the existing transverse drainage structure under Burnt Bridge Creek Deviation in combination with minor works within the inbank area of the watercourse immediately downstream of the road crossing has the potential to increase flow velocities by up to 1 m/s…

“While the project has the potential to alter the duration of inundation within the Balgowlah Golf Course when compared to present day conditions, the nature of the flow in this area would be altered significantly due to the proposed changes in landform.”

App O 5.2.2 States: “The removal of riparian vegetation at Burnt Bridge Creek has the potential to impact bank stability and surface water quality if mitigation measures are not implemented.”

App O 6.5 States: “The predicted impact to the baseflow of Quarry Creek, Flat Rock Creek and Burnt Bridge Creek has the potential to be considerable.”

App N 7.2 States: “The predicted groundwater drawdown in the vicinity of Flat Rock Creek and Quarry Creek has the potential to impact the groundwater dependent ecosystems (Coastal Sandstone Gully Forest, Sandstone Riparian Scrub and Coastal Sandstone Gully Forest) at that location.”

Where Burnt Bridge Creek currently flows through Balgowlah Golf Course, it has bedrock as its base and walls of the creek are earthen in most places except where stone blocks have been used on steep portions. The stream is slow flowing and includes a dam which supplies water for the golf course. The creek is unlined so that water seeps into the ground making the whole water table less than two metres deep, zero in the area around the creek. The abundant supply of water has made the riparian corridor lush and supports the large trees in the area.

The project modifies the creek. It removes the dam and turns it into a concrete culvert in this area and the whole of the lower reaches. This is to prevent creek water entering the ground. The water table will drop to 5m below ground during construction and 6m during operation. No water from the creek will enter the ground. Water velocity in the creek will increase by 1m/s. The amount of water in the creek will drop by 79% during construction and 94% during operation, making it effectively dry except during rainfall when it becomes a fast flowing stormwater drain. Instead of the dam allowing sedimentation to sink and be caught in the area, it will flow directly into Manly Lagoon and the sea.

The impact of the removal of all river water and ground water to 6m depth will significantly alter the area from a lush riparian landscape into a dry landscape. Without sufficient water, all the trees along the watercourse will die.

Burnt Bridge Creek will be moved east approximately 20m. This land is higher than the current creek bed (the creek is currently at the lowest point). The creek is currently around 5m below the Burnt Bridge Creek Road and 2m below the golf course. After the move, it will be 3-4m below the golf course. This will mean a fence will probably be required to separate recreational land from the creek. Burnt Bridge Creek Road is currently higher than the golf course, creating a low noise, low visual impact natural looking area on the golf course next to the creek. After the project, the road will be almost at level with the ground in the recreational area.

It will be a dry, treeless area with a deep cement stormwater drain flowing through it. The stormwater drain will be separated from the recreational land by a fence. The road will be at nearly the same height as the land, creating a noisy, visually unappealing situation for anyone in the park. It turns the current beautiful, peaceful and natural park into a highly urbanised, noisy, cement environment.

The exit at Wakehurst Parkway is also badly designed. It is an enormous 6 lanes wide, which together with various road dividers, makes the road at that point 4-5 times wider than now. You need to ask yourself when you find that your plans are making roads 4-5 times wider, whether you

could do better. The answer is obviously yes. The exit and entrance do not need to be at exactly the same point. This would reduce the width of the road at the exit and entrance by at least two lanes. You could get even more efficiency if you feathered the exit along the route for 500m-1km, which is a technique already applied in tunnels and highways.

The width of Wakehurst Parkway is critical because this road is different from other major roads in Sydney in that it runs along the top of a very narrow ridge between two sensitive and environmentally important catchment areas, Garigal National Park on one side and Manly Dam Reserve on the other. Widening the road according to your plans will cause the road to be wider than the ridge, see Figures 4.26 and 4.27 of Appendix V. In these figures, it shows that the road will be supported over the bush by two methods – the first is a sheer wall, leading to a high drop to the bush, the second is earthworks that raise the land around the road so that it slopes more gradually to the bush. Both these techniques will be extremely destructive to the bushland.

The wall method will mean that the road will be visible above the bush. Lights from cars and street lights will shine all across the bush, right down to Manly and Bantry Bay. This will significantly damage the bushland around the road as a habitat for both nocturnal and diurnal animals. The slope method will mean that large areas up to the width of the entire road will be destroyed as a natural environment and instead turned into artificial slopes. This will destroy a large amount of the top of Manly Dam Reserve and impact on the whole reserve.

The extreme width of the road and narrowness of the ridge means that water treatment for runoff will be inadequate.

Appendix O 4.1.6 States: “During storm events [Manly] creek is likely to experience high velocity flows.”

17.3.1 States: “Manly Dam…has gradients steeper than 10 degrees and soils have very high to severe erosion potential”

17.4.3 States: “Once sediments enter waterways, they can directly and indirectly impact on the aquatic environment. If not appropriately managed, direct impacts would include reducing light penetration (limiting the growth of macrophytes), clogging fish gills, altering stream geomorphology, smothering benthic organisms and reducing visibility for fish. Indirect impacts of increased sediments occur over the longer term and include accumulation and the release of attached pollutants such as nutrients and heavy metals.”

17.5.3 States: “Runoff from upgraded road pavement would typically contain pollutants such as sediments, litter, nutrients, oils and greases, petrochemicals and heavy metals, which could potentially impact on water quality when discharged into receiving waterways and sensitive receiving environments (Trefoil Creek, Manly Creek, Manly Dam, Burnt Bridge Creek and Flat Rock Creek)… The modelling results for the main locations where stormwater would be discharged (ie Gore Hill Freeway Connection, surface connections at Balgowlah and the realigned and upgraded Wakehurst Parkway) indicate that while the project would not meet the design targets in all locations, it would still meet or improve the existing water quality. On this basis impacts on surface water quality are expected to be minimal.”

Appendix O Glossary of terms and acronyms states: “Swale: A shallow, grass-lined drainage channel.”

Appendix O 6.2.1.4 States: “The pavement drainage system for Wakehurst Parkway has been designed to discharge to water quality basins or treatment swales before draining into the natural

creeks that ultimately discharge to Bantry Bay in Middle Harbour or Manly Dam. At the northern and southern ends of the project area, pavement runoff would be discharged into the existing council drainage system.

“The proposed water quality controls consist of two permanent basins, 18 swales and two in line gross pollutant traps…

“The project operational water quality design targets (provided in Table 6-3) would not be achieved at the Wakehurst Parkway as this would require additional land acquisition, clearing of native vegetation and fencing requirements near publicly accessible areas. It would also require higher treatment efficiency controls such as biofiltration swales which would not be possible due to topographical constraints.”

Appendix O Table 6-6 States: “Total suspended solids (kg/year) Existing conditions: 11,000; With project and proposed controls: 5,460; % reduction: 86 (Note: % reduction represents the percentage reduction when comparing the project with and without the proposed controls)”

Appendix O Table 8-2 States: “Rainfall Parameters…

“85th percentile to be adopted for sensitive areas (ie catchments draining to Quarry Creek, Flat Rock Creek, Trefoil Creek, Manly Creek and Manly Dam). 80th percentile to be adopted at all other locations…

“Rainfall depth (mm) – five-day
“80th – 29.7mm
“85th – 38.8mm ”

The project makes Wakehurst Parkway 3.5 times wider than the current road (calculated from Table 6-6), increasing stormwater runoff. To treat the stormwater, the project plans to use two permanent basins, 18 swales and two in line gross pollutant traps to treat stormwater. Swales are shallow, grass-lined drainage channels. The ones for this project are designed for rainfall events reaching a maximum rainfall of 38.8mm over a five day period. They cannot be made larger because it would require additional land acquisition, clearing of native vegetation and fencing requirements near publicly accessible areas. It would also require higher treatment efficiency controls such as biofiltration swales which would not be possible due to topographical constraints.”

Rainfall in 2020 was above design specification 13 times in the year. This is greater than once every month on average. In a 5 day period in February, seven times as much rain as could be processed by the water treatment infrastructure fell. Every time that rainfall is more than the stormwater processing system is designed for, pollutants such as sediments, litter, nutrients, oils and greases, petrochemicals and heavy metals will flow out of them, directly into the environment, reducing light penetration (limiting the growth of macrophytes), clogging fish gills, altering stream geomorphology, smothering benthic organisms and reducing visibility for fish.

Month	Days	Total rainfall (mm)	Exceed design
Jan	17-21	98	253%
Feb	6-10	278.3	717%
Mar	4-8	92.4	238%
Mar	15-18	45.8	118%
Mar	26-30	73.8	190%
May	22-26	63.4	163%

Jul	11-15	40.8	105%
Jul	25-29	127.2	328%
Aug	8-11	41.4	107%
Oct	24-26	112	289%
Dec	14-16	46	119%
Dec	19-22	47.8	123%
Dec	29-31	113.6	293%

Note: Rainfall data from Terrey Hills except for February when Sydney data was used.

The project has 18 swales along Wakehurst Parkway. At each of these 18 points along the road, water is channelled into a concentrated area. When they fail, water pours out and down the steep slopes of Manly Dam and Bantry Bay water catchment areas at high velocity, severely eroding soil throughout the receiving waterways and sensitive receiving environments.

Road runoff under the project is 3.5 times the current level. The amount of water that pours from the swales is 3.5 times current road runoff and will be concentrated into 18 locations. This makes the damage to the environment much worse than the current modest road where the water disperses quickly. When swales fail, the impact they have on the environment is worse than if they had not been built.

The size of the swales cannot be increased. The problem is the width of the road which is out of all proportion to the narrow ridge it runs along.

Swales are grass lined and only effective if the grass is alive. The grass will die in droughts, turning the swales into muddy stormwater channels when it rains, discharging even more solid waste into the environment.

The grass will introduce weeds into all the water courses throughout the area in Manly Dam catchment area and Garigal National Park.

The proposed water treatment areas will repeatedly fail and cause serious environmental damage to the area.

One of the criteria from the secretary for the project in Chapter 19, under Water – Hydrology, Criteria 1 states “The Proponent must describe (and map) the existing hydrological regime for any surface and groundwater resource (including reliance by users and for ecological purposes and groundwater dependent ecosystems) likely to be impacted by the project, including rivers, streams, wetlands and estuaries as described in Appendix 2 of the Framework for Biodiversity Assessment – NSW Biodiversity Offsets Policy for Major Projects (OEH, 2014).”

Yet, when you try to find information on what will happen to Bantry Bay, there is nothing. This will be a place that will be majorly impacted by runoff from Wakehurst Parkway, but there is no modelling to what damage will happen to the bush, waterways, aboriginal engravings and the water of the bay. This criterion is not properly answered in the EIS.

17.2.3 Figure 17-1 *Catchments, waterways and hydrodynamic and water quality monitoring locations* identifies Bantry Bay as a catchment and waterway that will potentially be impacted by the project.

17.3.1, 17.3.5, 17.3.8 and 17.3.9 do not mention the Bantry Bay water catchment area as an existing hydrological regime for any surface and groundwater resource likely to be impacted by the project,

do not describe existing water quality conditions, do not analyse it as a sensitive receiving environment and do not assign it environmental values.

There is no evidence in the EIS that the project managers understand what impact the project will have on the Bantry Bay water catchment area nor that they have taken proper provisions to mitigate negative outcomes. The only information that the EIS has on the impact on Bantry Bay are a few statements about management believing that everything will work out well for the environment. There is no evidence to support this belief.

16.5.2 states that “Contaminant migration caused by drawdown from the tunnel has the potential to degrade water quality more than 40 metres from the tunnel.” EIS only looks at the impact of the effect of this on the two groundwater dependent ecosystems, at the upper reaches of Flat Rock Creek and Quarry Creek in the vicinity of the Willoughby Leisure Centre and Bicentennial Reserve. What is overlooked is that in sites elsewhere with contaminated soils, such as at Artarmon, Willoughby, Northbridge, Balgowlah, and Wakehurst Parkway, movement of contaminates may move into the soil and affect the environment at a slow rate and over a long period of time, gradually killing the bushland along the tunnel route.

16.6.2 looks at Part 9 – 41 of the rules for water supply works located near sensitive environmental areas in the Greater Metropolitan Region Water Sharing Plan. It says, “The project is outside the required distance for the following sensitive environmental areas: 40 metres from a lagoon or escarpment”. This is not true of Wakehurst Parkway where there are a number of escarpments along the top of this environmentally sensitive region which are within 40 metres of the project.

The EIS talks about a “Stage 1 contamination investigation report” where ground water monitoring was carried out at selected locations. These location only look at the impact on ground water quality for human consumption. What is not looked at is the impact on drawdown and runoff contamination from Wakehurst Parkway on Garigal National Park and Manly Dam Reserve.

The EIS talks says that the excavation works along Wakehurst Parkway will likely expose areas of soil contamination. With the inability to prevent water runoff from entering the bushland on either side of Wakehurst Parkway once the road is widened, contaminated soil will be washed into the waterways through the bushland, harming native species such as climbing galaxia fish which have been in the region for 60 million years and are now not found elsewhere in the Sydney region.

In Chapter 18, the Secretary's environmental assessment requirements – flooding section 2j states “The Proponent must assess (and model where required), the impacts on flood behaviour during construction and operation for a full range of flood events up to the probable maximum flood (taking into account sea level rise and storm intensity due to climate change) including: Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses” yet there is no mention of the impact of siltation, destruction of riparian vegetation and a reduction in the stability of river banks or watercourses. This criterion is not properly addressed in the EIS.

In 18.6.3 it only talks about erosion and detrimental impact on river banks and watercourses where it states: “Increases in the rate of flow in the receiving drainage lines could result in a lowering of the stream bed through a process of headwater erosion, as well as a possible widening of the watercourse through a process of bank erosion. The lining of channels and the concentration of flow could also result in localised scour in the receiving drainage lines at the downstream limit of the drainage works.”

This statement does not look at the impact of the project to the whole environment of the catchment areas affected. These impacts will probably be large and extend over several kilometres of water courses, potentially all the way to increased sedimentation at the beach at Queenscliff.

In Chapter 18, the Secretary's environmental assessment requirements – flooding section 4 states "The EIS must assess and model the effect of the proposed development (including fill) on current flood behaviour for the 1 in 200 and 1 in 500 year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change," yet despite Table 18-1, the issue of flood behaviour for 1 in 200 and 1 in 500 year flood events is not addressed in 18.6.5. This criterion is not properly addressed in the EIS.

One of the issues with Wakehurst Parkway is the question of street lighting. On the one hand, there is no environmental assessment of the impact of street lighting, nor are street lights included on any of the figures in Chapter 5 or Appendix V. in 5.1.1 Beaches Link, Table 5-2 Key features of the Beaches Link component Key project, it states "Operational facilities and ancillary infrastructure provided by the project would include: Signage, tolling, fire and life safety systems, lighting, emergency evacuation and emergency smoke extraction infrastructure." Talking with people managing questions about the project, they were clear that lighting meant lighting along Wakehurst Parkway.

If Wakehurst Parkway is unlit, there will be safety issues. The tunnel is brightly lit. At night, cars would leave that tunnel into near complete darkness. With six lanes of merging traffic, 40 tonne fully laden articulated construction trucks travelling along the road at 80km/h right next to a shared pedestrian and bike path with no divider between it and the road, without lighting, accidents are certain to happen. However lighting will significantly impact upon the bush and in particular the fauna that live in the area. This is home to pygmy possums and a rare type of monitor lizard. As the rest of the country degrades environmentally, these well preserved parts of original bushland will increase in value and it is important not to destroy them needlessly when there are better solutions.

The plan has to be clear on whether or not there will be lighting along Wakehurst Parkway. Either way, the situation will not be as good as it is now and will either result in the deaths of people or of the fauna in the region.

Overall, I am not opposed to a tunnel as such. I support a train tunnel. If we have to have a road tunnel, then it should be properly designed. It needs to be small but efficient. Not 6 lanes wide underground and not 25 lanes wide at Crows Nest. Such a road is a monstrous scar on Sydney. If we had a proper train line to the Northern Beaches, we would not have the demand for so much roadway. The problem of traffic jams will fix itself. The tunnel that you are proposing will cause more traffic, making it hard to get to work in the morning and hard to park around the beaches on the weekends. It is not a proper transport solution.