

Submission 3

This submission supplements my first submission which objects to the Project on the basis that it has the potential to adversely affect the health and well being of children.

1. Risk of harm from non-occupational exposure to respirable crystalline silica dust, blown from the stockpiles of freshly cut sandstone spoil outside the acoustic shed

1.1 Review of scientific literature

SafeWork Australia recognises that non-occupational exposure to silica dust can occur around industrial sites (quartz crushing, agate grinding, ceramics, use of slate pencils, mining and milling of sandstones, silica flour milling): <https://www.safeworkaustralia.gov.au/book/about-crystalline-silica>

Risks of non-occupational exposure to RCS is an area that has been identified as requiring further investigation and consideration: Bhagia LJ, *Non-occupational exposure to silica dust*, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3683189/#ref20>

“Communities **living immediately adjacent** to these sites are **potentially** exposed to **elevated** concentrations of respirable crystalline. The onset of silica disease is a function of the concentration of respirable silica particles and the duration of the exposure. Silicosis can arise from long duration exposures at low concentrations (either as simple chronic silicosis or complicated chronic silicosis), from shorter exposure at higher concentrations (accelerated silicosis) and as acute silicosis (very short duration exposure to very high concentration) (NIOSH 2002): <http://superquarry.org.au/wp-content/uploads/2011/02/Bridge-2009-environmental-silicosis-risk045.pdf>

The toxicity of silica appears to be related to the age of the inhaled particles (Vallyathan et al. 1988), a conclusion confirmed by Guidotti and Koehncke (1998) who showed that **a relationship between freshly fractured particles and toxicity exists**, with exposure to particles within six hours of fracturing having a higher biological activity. **Freshly fractured silica particles are considered to have a greater potential to damage cells.**”

"The risk associated with peak sites is exacerbated in situations where the community (**including sensitive sub-groups**) would be exposed to **freshly fractured** silica particles especially in the presence of iron. **A typical example of this situation would be downwind of a quarry where rock is blasted and crushed**".

Bhagia LJ also notes that particles from quarrying and sand blasting are also more **fibrogenic** and harmful.

Cases have been reported where patients, including an 11 year old boy, developed silicosis, even though the patients had not worked directly in an industry producing RCS, but because they have inhaled RCS by living close to such industries.

1.2 Risk of harm to children in Cammeray and Northbridge

Even if the OHS rules are complied with inside the tunnel, there is the the risk of harm from non-occupational exposure to respirable crystalline silica (RCS) for children/the Community as:

- the project permits the stockpiling outside the acoustic shed (up to 4500 cubic metres at Cammeray Oval and up to 500 cubic metres at a legacy landfill site at Flat Rock Reserve at Northbridge) in an urban dense area near sensitive users.
- the EIS states that the majority of land-based spoil generated by the Project would be **crushed sandstone** from tunnelling.
- Spoil will be tunnelled overnight (from 6pm to 9am) and the EIS permits spoil to be stockpiled outside overnight until trucks begin to pick it up at 9am. (Spoil can also be tunnelled and stockpiled outside of course during working hours.)
- **the spoil will include fine particles from freshly cut sandstone (ie cut within 6 hours) which poses increased health risks:** <http://superquarry.org.au/wp-content/uploads/2011/02/Bridge-2009-environmental-silicosis-risk045.pdf>
- this will occur over a 7- 8 year period - because the Western Harbour Tunnel and Beaches Link are overlapping projects - and therefore children living, going to school, and using playing schools, in close proximity to the construction sites will be subject to **repeated and regular exposures**. Sydney has a common pattern of sudden strong winds (often hot and dry) which will pick up and spread RCS dust from the crushed spoil.
- sports fields where children exercise are adjacent to the construction sites and numerous schools, preschools and child care centres are also in close proximity to the sites - less than 500m away: see maps below.

1.3 EIS acknowledges that the Proponent cannot control dust from stockpiles

The EIS acknowledges that the amount of dust generated will depend on weather conditions, and that “even with rigorous air quality management in place and the effective management practice measures described “.... there will be dust impacts which they cannot control: Chapter 12, page 5. Residents in the Cammeray and Northbridge area will be aware that there are frequent easterlies in the afternoon, southerly busters and dry westerlies.

The inability to control spoil from winds was also reported in the WestConnex Inquiry - there were:

'strong winds carr[ying] copious amounts of dust' with parents reporting that the dust 'was so extreme they needed goggles and face masks to deal with the pollution. Many locals attest to seeing the dust blowing off the construction sites'.

At the peak of the dust storm the air quality monitoring station at the school recorded particulate matter (airborne particles) **eight times** higher than the recommended air quality target'

The 2019/2020 WestConnex Construction Compliance Report notes that the exceedances (which were three times the maximum limit) at Campbell Road were attributable to the **high generation of dust from sandstone stockpiles within the adjacent New M5 site**. Presumably this was freshly excavated spoil and could have included RCS.

1.4 Exposures to tiny amounts of RCS causes harm

This is an extract from a presentation from Kate Cole, an occupational hygienist with tunnelling expertise, in a presentation made available by SafeWork Australia:

<https://www.safeworkaustralia.gov.au/media-centre/preventing-illness-and-disease-tunnel-construction-workers>

"I thought I'd use this picture from Work Health and Safety Queensland of a five cent coin to try to show just how much that legal limit or that workplace exposure standard is for silica dust. Now, this small amount of dust represents the workplace exposure standard, like the daily exposure, for silica dust at the moment in Australia."

Now I want you to cast your mind back to every single construction project that you've ever driven by and think about how much dust you actually saw coming out of that basement excavation, for example. It's probably a little bit more than what is showing on the screen."



Accordingly, there is a significant risk that sensitive users could be harmed by their exposure to small amounts of freshly crushed RCS dust, blown from the large mounds of spoil left outside the acoustic shed - particularly the huge amounts that can be left outside Cammeray Oval (up to 4,500 cubic metres).

1.5 RCS is dangerous because of its size

RCS:

- Is invisible

- can remain suspended in air many hours after larger dust particles have settled to the ground
- is small enough to reach the alveolar regions of the lung.

As noted above, it is even more dangerous when it is freshly fractured and fibrogenic (which it will be when it comes out of the tunnel).

2. Recommended separation distances between industries and sensitive users is not complied with

The tunnel is in essence a mine (3 million tonnes of spoil will be removed) and the EIS permits the stockpiling of large amounts of spoil outside the acoustic shed.

2.1 Guidelines recommend a 500 metre buffer

Separation distances of at least than 500 metres are recommended between industries that involve extracting, crushing and stockpiling rocks and minerals and sensitive users.

For example, the Victorian EPA has published *1518: Recommended Separation Distances for Industrial Residual Air Emissions – Guideline*, which applies to:

- off-site residual odour and dust emissions from industries which have the **potential** to impact on human health and wellbeing, local amenity and aesthetic enjoyment.
- **sensitive land users** - defined as “any land uses which require a particular focus on protecting the beneficial users of the air environment relating to human health and wellbeing, local amenity and aesthetic enjoyment, for example residential premises, **child care centres, pre-schools, primary schools, education centres or informal outdoor recreation sites**”.

For an industry involving quarrying, crushing, screening, stockpiling and conveying of rock, the Guideline recommends the minimum buffer is **500m** when **respirable crystalline silica** is involved.

2.2 The recommended separation distances or buffer zone have not been met

The recommended separation distance between the construction sites (which involves the crushing and stockpiling of rocks potentially producing respirable crystalline silica dust) and sensitive users is not met in this Project - see Maps below. For example, Cammeray Public School, Anzac Park Public School, Shore Oval, Green Park (and the KU Preschool), Cammeray Oval and Tennis Courts, Flat Rock Baseball Diamond, Bicentennial Netball Courts and Ovals are all within 500 metres, and others schools are within 600 metres eg Cammeraygal Public School.

2.3 The reason for the buffer zone

The Guideline recognises that **breaches of air standards are inevitable** and that this will adversely affect the health of sensitive users, and therefore out of precaution, a buffer or separation distance is needed between industrial users and sensitive users:

*“The guidelines contains a list of recommended minimum separation distances that aims to minimise the off-site impacts on sensitive land uses arising from **unintended** industry generated odour and dust emissions.”*

Please note that these are **minimum** recommended distances, and a larger distance may be appropriate.

2.4 NSW EPA

The NSW EPA, under the *POEO Risk-based licensing: Draft Guidance on using the risk assessment tool*, also indicates that relevant factors to consider are whether there are **no effective mitigation measures** in place (which is the case at least in relation to the **freshly** excavated spoil left outside the acoustic shed), the **hazard level** (which will be high, especially since the spoil will have been **freshly** excavated), and the fact that the area is **high density** with a **preponderance of sensitive receivers** (residences, schools, childcare centres, aged care facilities or hospitals, as well neighbouring businesses): see attached letter from the Children’s Hospital to the Premier concerning sensitive users.

3. Living within 500m of quarry sites makes lung health effects significantly worse

See the following study: [https://www.researchgate.net/publication/343790347 Lung Function and Respiratory Health of Populations Living Close to Quarry Sites in Palestine A Cross-Sectional Study](https://www.researchgate.net/publication/343790347_Lung_Function_and_Respiratory_Health_of_Populations_Living_Close_to_Quarry_Sites_in_Palestine_A_Cross-Sectional_Study)

“A cross-sectional comparative study was conducted among 79 exposed participants, who lived less than 500 m away from the quarry sites, and 79 control participants who lived more than 500 m away. All participants answered a questionnaire on dust exposure at home and health effects, as well as performed a lung function test in which both reported and measured health effects were investigated. People who live in close proximity to the quarry sites reported exposure to dust at home (98%), land destruction (85%), plant leaves covered with dust (97%), and an inability to grow crops (92%). The exposed group reported significantly higher **eye and nasal allergy** (22% vs. 3%), **eye soreness** (18% vs. 1%), **and dryness** (17% vs. 3%), **chest tightness** (9% vs. 1%), and **chronic cough** (11% vs. 0%) compared to the control group. **Lung function parameters were significantly lower among the exposed group compared to the control group.**”

Similar symptoms were experienced by residents next to the WestConnex Project, as confirmed in the WestConnex Inquiry: first-time diagnoses of asthma among children, worsening asthma or other respiratory symptoms, conjunctivitis and skin irritations, as well as dust allergies.

Accordingly, it can be anticipated that children living, going to school and exercising within 500 metres of construction sites will suffer from more severe respiratory illnesses.

4. RCS from OHS breaches can be easily tracked into the Community

As noted in submission 1 and 2, if this Project is approved without requiring the Proponent to properly identify and scope the dust and contamination risks, and mitigation to deal with them, there is a significant risk that workplace breaches will occur (as in the WestConnex Project). This is because because the Project will not be designed from the outset around dust and contamination risks, and insufficient funds will be allocated to safety measures. The EIS already contemplates that it will only implement dust measures “where reasonable and feasible”

Any RCS dust from OHS breaches within the tunnel can be easily tracked into the Community, including through mud tracking from trucks. This is clearly explained by Australian Tunnelling Society in the their presentation:

<http://www.ats.org.au/wp-content/uploads/2018/12/AQWG-Part-3-of-12-Silica-Dust-Awareness-Package-v0.21.pdf>

5. Recommendations

The Project should not be approved on the basis of its proximity to sensitive users, including young children living, going to school and exercising next to the construction sites where spoil will be stockpiled outside.

The EPA should refuse to grant the relevant licences needed to undertake the tunnelling activities for this Project or the Western Harbour Project (which raises the same issues of proximity to sensitive users).

There should be no stockpiling of spoil permitted outside of the construction shed.

If the Project goes ahead, the government should establish a **substantial compensation fund** for suffers of respiratory illnesses in the short term, and potential silicosis sufferers in future years.

The DPIE should also investigate whether there is a sufficient buffer or separation distance between the dredging activities and excavation of landfill (which has a significant risk of producing harmful gases) and sensitive land uses in accordance with these best practice guidelines. There are minimum separation distances also recommended for these activities.

Diane Staats

**Crystalline Silica and Contaminated Dust Risks and Proximity to Children
- Cammeray Major Construction Site for Beaches Link**

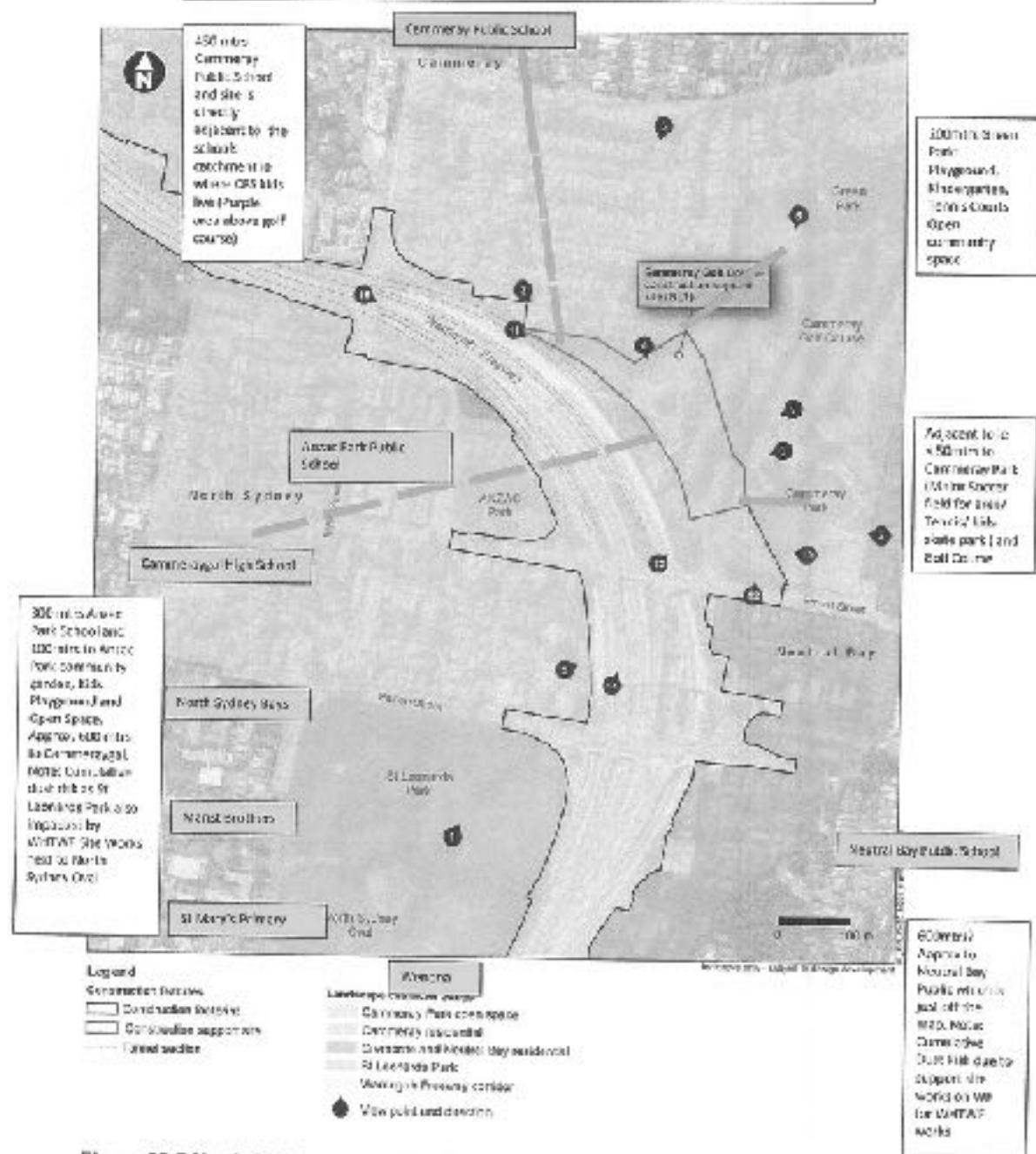
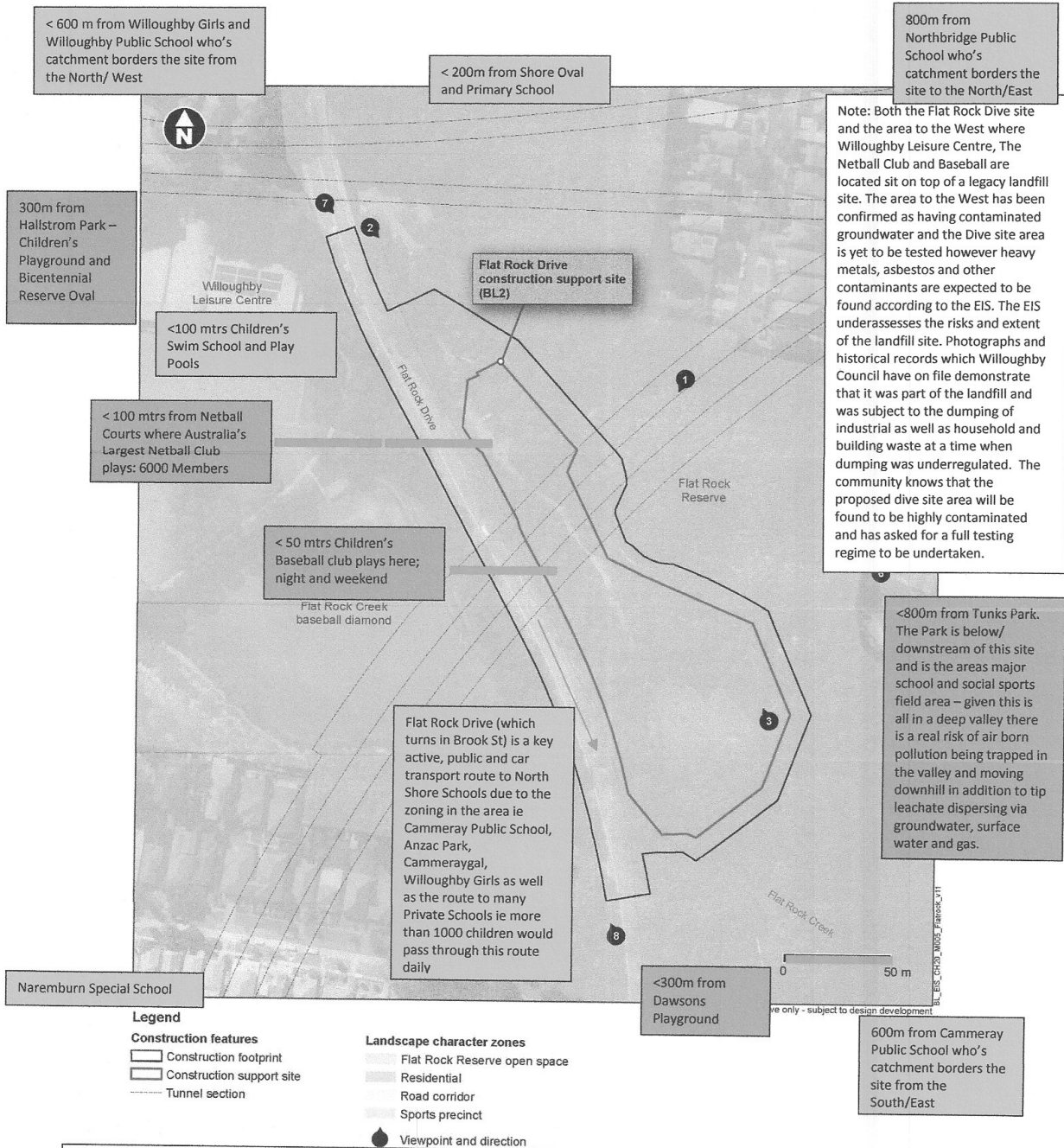


Figure 22-5 North Sydney precinct landscape character zones and viewpoints

Crystalline Silica and Contaminated Dust Risks and Proximity to Children

Flat Rock Gully Site



Industry Specialists State that harmful levels of construction dust such as silica can travel over long distances

Wind Speed	Travel Distance
5 km/h (3.1 mph)	0.9 km (.55 miles)
10 (6.2 mph)	1.8 (1.1 miles)
20 (12.4 mph)	3.7 (2.3 miles)
40 (24.8 mph)	7.4 (4.6 miles)
60 (37.3 mph)	11.1 (6.9 miles)
80 (49.7 mph)	14.8 (9.2 miles)

(Ref: <http://www.citicite.com/files/Uploads/1220/Dust%20Particulant%20Distance%20Travel%20and%20Impacts%20on%20Adj%20Properties,%20incl%20Resp%20&%20Allergic%20Immune%20Responses.pdf>)