MELBOURNE METRO RAIL PROJECT ENVIRONMENT EFFECTS STATEMENT INQUIRY AND ADVISORY COMMITTEE

MMRA TECHNICAL NOTE

TECHNICAL NOTE NUMBER:	075
DATE:	7 October 2016
PRECINCT:	All Precincts
EES/MAP BOOK REFERENCE:	EES Chapter 12 and Technical Appendix H – Air Quality
SUBJECT:	Response to the 'Matters for further consideration and/or clarification' request dated 12 September 2016 (iv) Air quality

NOTE:

1. This Technical Note has been prepared with the assistance of AJM to respond to issues raised by the Inquiry and Advisory Committee (**"IAC"**) in the 'Matters for further consideration and/or clarification' request dated 12 September 2016.

2. For ease of reference, this Technical Note sets out each relevant request made by the IAC followed by a response from MMRA.

Request:

3. The IAC has requested:

   Clarification on whether MMRA proposes to amend the EPRs to specifically describe and require air quality management measures as assumed by the air quality modelling.

Response:

4. MMRAs position in respect of amendments to the Air Quality EPRs is recorded in IAC Version 3. The amendments proposed as part of that

revision provide greater specificity concerning the matters that must be addressed within the Dust Management Plan but do not specify all of the potential management measures that may be implemented pursuant to that plan.

5. EPRs define the environmental outcomes to be achieved during the design, construction and operation of the Project regardless of the approach adopted. This performance based approach aims to ensure that significant impacts are appropriately mitigated, while allowing for a delivery model with sufficient flexibility to encourage innovation by the private sector to determine how any recommended EPRs would be achieved.

6. It is therefore not proposed to incorporate specific mitigation and management measures into EPRs. As Dr Bellair indicated during the course of his evidence, there may be a range of measures that could be adopted on any given work site to achieve acceptable outcomes.

7. If the EPRs were to prescribe particular mitigation measures, there is the potential that better ways of designing and delivering Melbourne Metro would not be pursued by contractors as formal changes to approvals would be required to vary from the prescribed measures, which would incur time delays and add cost. The flexibility in the means of meeting performance standards as set out in the EPRs is an important aspect of government procurement in achieving overall value for money.

8. It is noted, finally, that EPR AQ2 requires that construction activities be managed in accordance with EPA Publication 480. That publication does specify a range of potential mitigation measures that could be implemented on the various work sites (including many of those that informed the modelling undertaken as part of the Air Quality Impact Assessment).

Request:

9. The IAC has requested:

   Clarification on proposed modifications to the EPRs regarding air quality including monitoring and management measures to guard against asbestos fibre risk (when appropriate, as defined by detailed precinct-based risk assessment).

Response:

10. As noted above Version 3 of the EPRs included amendments to the Air Quality EPR AQ1. The amendment includes more detail about what the dust management plan should contain including description of the proposed air quality management systems and monitoring requirements for sensitive receptors.

11. Management of asbestos fiber risk would be covered by EPR C4 with the health, safety and environment management plan for hazardous substances. The EPR states that the plan must include (but not be limited to):

    a. Consideration of the risks associated with exposure to hazardous substances for employees, visitors and general public

    b. The identification of methods to control such exposure in accordance with relevant regulations, standards and best practice guidance and to the satisfaction of WorkSafe and EPA

    c. Method statements detailing monitoring and reporting.

12. No changes have been proposed to EPR C4 as it is considered that the risk from asbestos fibers would be captured by this EPR.

13. Asbestos is also a class 3 air quality indicator under SEPP(AQM). Any airborne emissions of asbestos fibres accordingly must, in accordance with EPR AQ3, comply with the stringent controls specified in SEPP(AQM) (as discussed further below).

Request:

14. The IAC has requested:

    Results of EPA correspondence (Memoranda between EPA and MMRA/AJM) as described by Mr Lakmaker's oral evidence, with respect to the applicability of the PEM: Mining and Extractive Industries, to a large urban area, in the immediate proximity of the Project and related implications for key potential airborne contaminants of concern (particulates, respirable crystalline silica and asbestos).

Response:

15. A meeting was held between EPA Victoria and MMRA/AJM on 16 October 2015. The purpose of the meeting was to discuss the air quality assessment methodology. On 14 October 2015, an agenda was sent to the EPA for discussion. The main points highlighted for discussion were.

    a. Selection of meteorological data year for use in the modelling.

    b. Adoption of monitoring data from Richmond and Footscray for use in estimating background concentrations for the assessment.

    c. The statistical criteria adopted for calculation of the background concentrations.

16. The agenda and minutes of the meeting are attached to this Technical Note (**Attachment A**).

17. In regard to the use of the Mining PEM, this subject was not explicitly discussed in the meeting. However, the justification for adoption of the Mining PEM (discussed in broad terms above), is addressed in detail in Appendix A to Technical Appendix H of the EES.

18. Moreover, using the Mining PEM criterion stands to reason. There is no other criterion endorsed by EPA Victoria for RCS or particulate matter emissions from area sources generally, nor for the extraction and movement of large volumes of spoil. The Mining PEM states that the criterion for RCS and particulate matter, as well as the other indicators to which the Mining PEM applies, 'have been developed based on the protection of human health.'[1] They accord with the applicable national ambient air quality objectives.

19. The AQIA assumes that people living in urban environments are just as vulnerable to the health effects of RCS and particulate matter emissions as people who live in peri-urban or regional areas that would more typically be exposed to air emissions from mining and extractive industry operations.

20. It should also be noted that EPA Victoria raised no concern with using the Mining PEM for these purposes through the Technical Reference Group or in its submission to the IAC. The approach was supported by Dr Bellair.

21. In respect to the IAC's query about asbestos emissions, area-based sources of asbestos emissions are not excluded from the SEPP AQM design criteria in the same way as RCS. The design criteria for asbestos in Schedule A of SEPP AQM accordingly apply in respect of all types of emissions from the Project. EPR AQ3 requires compliance with this criterion.

22. The AQIA has assumed that asbestos-containing material will be identified and managed to prevent emission of airborne asbestos fibres and exposure. It will therefore be important that there are measures in place to identify the potential for asbestos-laden spoil and for this material to be managed appropriately. EPR C4, operating in conjunction with EPRs AQ1, AQ2 and AQ3 adequately addresses this issue.

Request:

23. The IAC has requested:

    Clarification on the potential risk to human health from aspergillus spores in construction dust and soil, including reference to any evidence regarding existing background levels and the extent and duration of any change in levels caused by the construction of the Project.

[1] Mining PEM p.7

Response:

24. To assist in clarifying the above, some general context has been provided below, and then the response has been split into four parts as follows:

    Part 1: "Clarification on the potential risk to human health from Aspergillus spores"

    Part 2: "Risk arising from construction dust and soils"

    Part 3: "Information of any evidence regarding existing background levels …."

    Part 4: "The extent and duration of any changes in levels caused by the construction of the Project"

25. The response concludes by addressing the risk posed by the emission of *Aspergillus* spores in the context of the Project (and, in particular, within the Parkville Precinct).

General Context

26. *Aspergillus* is a fungus that forms cottony or wooly filaments commonly isolated from soil, plant detritus, water, food and the indoor air environment. They are also known as "rot fungi". In a human context, they are most commonly associated with the spoiling of foods. In the natural environment they contribute to the carbon cycle by breaking down wood and plant materials. *Aspergillus* species are resilient to adverse environmental conditions and grow very rapidly.

27. Dry conidia (i.e. spores) are easily dispersed in the air. *Aspergillus* spores are common components of fine particles suspended in the air where they drift on air currents. Under certain conditions spores germinate upon coming into contact with a solid or liquid surface. *Aspergillus* is observed to be powdery white, green, yellowish, brownish, or black colonies.

28. The ability to disperse widely in air currents and to grow almost anywhere when appropriate substrate, food and water are available, means that *Aspergillus* is commonly described as almost everywhere or "ubiquitous" in the environment in reviewed literature.

Consideration of the issue

Part 1:- "Clarification on the potential risk to human health from *Aspergillus* spores"

29. Because *Aspergillus* species and *Aspergillus* spores are found almost everywhere, most people are exposed to *Aspergillus* constantly. Accordingly, *Aspergillus* does not "normally" cause any health issues (National Organization of Rare Disorders, 2016).

30. Nevertheless, around 10 to 20 or so of the hundreds of species of *Aspergillus* are known to affect human health and cause infections, particularly where a person is already vulnerable on account of a low immune system, or who suffers from an immunological condition, or who is exposed to higher quantities compared to normal (such as a person who works in certain agribusinesses such as may be found within indoor poultry farms.).

31. Infection by *Aspergillus*, known as aspergillosis, is not a reportable disease in Australia (Australian Government Department of Health, 2016, Victorian Government, 2001), and hence definitive data on the prevalence of aspergillosis and other *Aspergillus*-related infections is not readily available.

Part 2:- "risk arising from construction dust and soils"

32. Emissions of *Aspergillus* spores into the air as a consequence of construction or excavation will generally occur in respect of the disturbance of relatively shallow soils rather than deeper soils. This is because *Aspergillus* is found in soils containing organic material.

33. The level of emissions will differ for any given project depending on the organic composition of the soil in question. Where excavation is undertaken in organic rich soils (such as in parks) the level of *Aspergillus* spores would likely be greater than where excavation is undertaken in organic deficient soils (such as those located underneath longstanding structures).

34. No specific information was found in the literature correlating *Aspergillus* in construction-related soils and dusts and potential adverse human health effects. Because of the widespread presence of *Aspergillus*, and the tolerance of the general population to exposure, aspergillosis is not an impact that is commonly associated with construction-related activities.

35. That said, invasive aspergillosis is a recognized complication associated with construction, demolition or renovation activities in or near hospital wards that accommodate immunocompromised patients. A literature review on this issue has been completed by Health Canada, 2001, which demonstrates that most of the cases arise as a consequence of *interior* construction works.

36. A few case studies were described by Health Canada where exterior construction and demolition was the identified source of *Aspergillus*, and in these cases the causation circumstances can generally be traced to inadequate or faulty ventilation within the health care buildings, or windows that could not be closed within the hospital thus allowing outside dust (and presumably *Aspergillus* spores) in.

37. Mitigation measures are relatively simple and easily adopted, with many health care organizations providing specific internal guidance on the

avoidance and mitigation of risks (such as Loddon Mallee Region Infection Control Resource Centre, 2005).

Part 3:- "reference to any evidence regarding existing background levels ...."

38. No evidence has been located regarding existing background levels in or around the MMRP alignment.

39. *Aspergillus* spores are not usually assessed as part of air quality impact assessments. This is because the EPA's air quality objectives and goals are set for substances most commonly linked to adverse health effects in the general population and in ambient air, such as airborne particulate matter (including PM_{10}), nitrogen dioxide, sulfur dioxide, lead and ozone.

40. Being ubiquitous in soils and the wider indoor and outdoor environment, background levels of *Aspergillus* spores in air are likely to vary widely in both the indoor and outdoor environment.

Part 4:- "The extent and duration of any changes in levels caused by the construction of the Project"

41. Any disturbance of soil is likely to contribute to increased *Aspergillus* concentrations in ambient air. This is not unique to the Project, as these circumstances would apply to any significant construction project.

42. Modeling has not been undertaken in respect of the extent or duration of changes in levels caused by the construction of the Project. This is because, amongst other things, the level of emissions will be dependent on the particular soil conditions encountered within each work site and will not necessarily be proportional to the quantity of spoil handled at each site (as is likely to be the case in respect of the emission of particulates).

The Risks Posed by the Emission of Aspergillus Spores During the Construction of Melbourne Metro

43. As in the case of any development project, it is likely that *Aspergillus* spores will be released into the air as a consequence of construction activities associated with Melbourne Metro.

44. Emissions are likely to occur within each precinct mostly as a consequence of relatively shallow excavation activities rather than deep tunneling works. The level of emissions will depend in part on the organic content of the soils in question.

45. The concentration of hospitals and healthcare providers within the Parkville Precinct means that segments of the population within that precinct may be more susceptible to impact than the general population.

46. The organic content of soils likely to be excavated within the Parkville Precinct, and in turn the level of emissions attributable to excavation works within the precinct, is likely to be relatively low given that excavation is proposed to occur largely within the road reserve.

47. That said MMRA recognises that it will be important to ensure that the emissions of *Aspergillus* spores, along with all other types of air quality indicators, are minimised.

48. The measures proposed in respect of the suppression and control of dust emissions will also be effective in limiting the emission of *Aspergillus* spores. These measures, which must be documented and implemented as part of the Dust Management Plan to be prepared under EPR AQ1, were described in the Air Quality Impact Assessment. MMRA is not aware of any additional measures that would be implemented to specifically address the emission of *Aspergillus* spores beyond the measures that must be implemented in respect of dust suppression.

49. It will also be important that effective communication occurs between the contractor and the relevant healthcare providers. This will allow the healthcare providers to implement measures to limit exposure within their premises. Such measures may include ensuring that ventilation systems are operating effectively, ensuring that certain windows are closed during periods of high activity, or locating particularly vulnerable patients within areas of lower exposure.

50. Given the level of construction activity that has occurred within the Parkville Precinct in recent times it is anticipated that the various institutions will have developed effective management systems in this respect.

51. The establishment of the Parkville Precinct Reference Group, and the targeted consultation that must occur under SC3, will ensure that effective consultation will occur in respect of Melbourne Metro works.

References:

Australian Government, Department of Health, 2016. Australian national notifiable diseases and case definitions, accessed 19/9/2016. http://www.health.gov.au/casedefinitions

Food and Drug Administration (FDA), 2012. Bad Bug Book, Foodborne Pathogenic Microorganisms and Natural Toxins. Second Edition.

Health Canada, 2001. Construction-related Nosocomial Infections in Patients in Health Care Facilities. Decreasing the Risk of Aspergillus, Legionella and Other Infections. Canada Communicable Disease Report, volume 2752.

Loddon Mallee Region Infection Control Resource Centre, 2005. Infection Control Principles for the Management of Construction, Renovation, Repairs and Maintenance within Health Care Facilities. A Manual for Reducing the Risk of Health Care Associated Infection by Dust and Water Borne Micro-organisms. 2nd Edition.

Max B; Salgado JM; Rodríguez N, Cortés S, Converti A; Domínguez JM, 2010. Biotechnological production of Citric Acid. Brazilian Journal of Microbiology, 41, 862-875.

National Organisation of Rare Disorders 2016, accessed 19/09/2016, http://rarediseases.org/rare-diseases/aspergillosis/

Victorian Government, 2001. Health (Infectious diseases) Regulations 2001. S.R. No41/2001.

Request:

52. The IAC has requested:

    Clarification as to the appropriateness of reliance on EPA standards in circumstances where it is acknowledged that those standards may not protect more vulnerable populations.

Response:

53. EPA air quality standards (including SEPP Air Quality Management (**"AQM"**) and SEPP Ambient Air Quality (**"AAQ"**)) have been developed to protect ambient air quality across the whole of Victoria and are informed by appropriate national guidelines. It is therefore appropriate that EPA air quality standards are relied upon for managing potential impacts to air quality arising from the construction or operation of the Project.

54. In addition, the standards have been set for the protection of human health across the whole population, which includes more vulnerable populations. The EPA requires that potential impacts are assessed at any nearby sensitive location and defines sensitive locations as "hospitals, schools or residences" (SEPP(AQM)). This is specifically addressed in EPR AQ1.

55. It is noted that in addition to the quantitative design criteria specified in Schedule A in respect of Class 1, 2 and 3 air quality indicators, there are a number of qualitative requirements that also apply to new sources of emissions. In this respect, clause 19 of SEPP(AQM) requires that a generator of a new or substantially modified source of emissions must apply best practice to the management of those emissions. Clause 20 goes on to require that a generator of class 3 indicators must reduce those emissions to the maximum extent achievable. These requirements are also reflected in the PEM (which applies to area based sources of emissions).

56. These requirements apply even in circumstances where the relevant design criterion are met and ensure that high levels of environmental performance are achieved (including within those precincts that contain hospitals and education facilities).

Request:

57. The IAC has requested:

    Advice on whether consideration has been given to undertaking individual impact assessments of air quality of each precinct.

Response:

58. A precinct based air quality impact assessment was undertaken as part of the EES and is documented in Chapter 12 and Technical Appendix H. This

assessment covered all precincts. The air quality impact assessment concluded that the project would be able to meet air quality criteria and that air quality impacts would be appropriately managed with typical mitigation measures to meet EPRs that would reduce dust and plant emissions (Technical Appendix H page 93).

59. In addition to the environmental risk assessment, dispersion modelling was carried out for three precincts where the Tunnel Boring Machines would be launched (Arden, Domain and Fawkner Park). This modelling indicated that air quality objectives for key dust classifications could be achieved at all off-site sensitive locations under typical background air quality conditions. Having regard to the individual characteristics of each precinct, and the intensity of proposed construction activities, it was also determined that compliance with air quality objectives could be achieved in the vicinity of all other construction sites. It was for this reason that additional modelling was not undertaken for the other precincts (i.e. because compliance had been demonstrated within the most adversely affected precincts).

60. The air quality EPRs require the Project to develop and implement air quality management measures to manage any potential air quality impacts that arise from construction in accordance with EPA standards and guidelines (including EPA Publication 480, Environmental Guidelines for Major Construction Sites (EPA 1996)).

61. Of particular relevance is EPR AQ1 which requires the Contractor to develop and implement plan(s) for dust management and monitoring, in consultation with EPA, to minimise the impact of construction dust.

62. EPR AQ1 recognises the individual characteristics of each precinct by specifically identifying the key sensitive locations. The plan(s) for dust management and monitoring will be specific to each precinct and informed by updated dispersion modelling, where appropriate.

CORRESPONDENCE:

No correspondence.

ATTACHMENTS:

A. Minutes of meeting between EPA and Jacobs on 16 October 2015 (personal information redacted)

Meeting Minutes

Level 6, 30 Flinders Street
Adelaide SA 5000 Australia
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Purpose	**Discussion of AQ assessment methodology adopted for MMR – construction dust**		
Project	Melbourne Metro Rail	**Project No.**	TBA
Prepared by	[redacted]	**Phone No.**	[redacted]
Location	Teleconference	**Date/Time**	16 October 2015
Participants	[redacted], EPA, Senior Applied Scientist - Air Emissions Management, Environmental Solutions [redacted] [redacted], EPA, Project Manager, Major Projects [redacted] [redacted], EPA, Team Leader [redacted] [redacted] (Jacobs) [redacted] (Jacobs)	**Apologies**	Nil.
Distribution	[redacted], [redacted], [redacted] (Jacobs)	**File**	EPA meeting 16 Oct 15_Minutes.docx

Notes		Action
1	Refer to attachment (emailed points of discussion, [redacted] 15/1015).	
2	[redacted]: The Baseline report was “substantial” and what we have proposed for the modelling was as expected / as asked for during the review of Baseline. The modelling assumptions are “reasonable and conservative”.	Construction dust modelling can go ahead as planned (see attachment).
3	[redacted]: The issue of emissions from fuel combustion by construction vehicles and machinery needs to be documented (whether or not this is modelled). [redacted]: Argument in baseline was that fuel combustion emissions from construction equipment negligible compared to surrounding traffic emissions. [redacted]: Accepted argument, but if fuel combustion emissions not modelled, needs some justification / risk assessment to support. [redacted]: There are traffic movements data (traffic consultants), potentially tie those data into the construction emissions. ([redacted] left meeting approx. 11:13 ESuT. Jacobs discussion continued with [redacted] and [redacted]).	Air quality team to investigate how road vehicle emissions will be documented in the construction report.

Notes		Action
4	[redacted]: The report will also need to set out emissions controls used in the modelling e.g. watering rates etc. distinguishing between assumptions and hard data e.g. is there good information on location of material tonnages moved, stockpiles etc.? [redacted]: Dust controls are set in the emissions inventory and these will be detailed in report; some are assumptions e.g. based on NPI manual emission factors. [redacted]: We have good information about material tonnages but assumptions will need to be made about some activity locations e.g. stockpile locations uncertain at this stage.	Jacobs to consider for AQIA report.
5	[redacted]: Will cumulative odour emissions be considered e.g. there are existing industries near Arden Street with odour sources including a mill. [redacted]: Odour modelling is not being undertaken for construction.	Jacobs to investigate further. Will need to document the potential odour impacts due to construction.
6	[redacted]: Cumulative dust assessment for Arden St., there is a concrete batch plant nearby, is that to be included? [redacted]: Emissions from batch plant to be included although at this stage unable to determine whether the existing batch plant will be used by the MMR project. [redacted]: Will the concrete batch plant require a works approval? [redacted]: Unknown.	Jacobs to include concrete batch plant emissions in dust modelling. Jacobs air quality to discuss with Jacobs PM / Env Planning Team - use of batch plant for the project? – requires Works Approval?

General comments for air team:

- Proceed with AERMOD construction dust modelling using assumptions set out in Attachment A.
- Review Baseline report and EPA feedback especially re: fuel combustion emissions during construction, odour emissions from construction, and concrete batch plant.

End of Minutes; [redacted] 16/10/15 12:00 ESuT.

Attachment A. Agenda

[redacted]

From: [redacted]
Sent: Wednesday, 14 October 2015 10:59 PM
To: [redacted]
Cc: [redacted]
Subject: RE: EPA and Air quality meeting

Hi [redacted],

Re: Please see below the main points for discussion with [redacted] around air quality modelling for Melb. Metro Rail, construction dust scenarios. Tomorrow if possible would be great, thanks.

Cheers,

[redacted]

=-=--

For [redacted]:

Jacobs is undertaking an AERMOD assessment of construction dust emissions for proposed Melb. Metro Rail construction sites. We would be grateful if you would please provide comment on the following assessment method:

We have been provided with 5 years of AERMOD met. files for use with the MMR project (2010-2014). The files were created in accordance with the EPA's AERMOD guidelines. From analysis of the wind data we have selected the case study year 2014, for the following reasons:

(1) The wind roses and wind speeds indicate 2014 is representative of typical conditions i.e. the wind roses 2010-2014 are very similar.
(2) Wind speeds for 2010-2014 are similar also, although 2013 does not seem to be representative due to some high speed northerly winds.
(3) While Melbourne's PM2.5 GLCs have been trending downwards over the past decade, (see EPA's 2014 NEPM- compliance report, published June 2015), there's a slight increase in PM2.5 from 2012-2014, so by selecting 2014 we are choosing a year with higher background for PM2.5.

Being mindful that the 2014 air quality data are affected by exceedences of PM10 and PM2.5 standards due to bushfire smoke, we propose to use the 70th percentile background data in accordance with the SEPP(AQM) – in fact we are using the 75th percentiles for this (conservative, high), as reported in EPA's NEPM compliance report for 2014.

A summary of background data being used for the MMR assessment is set out as follows:

- For assessment of max. 24h averages (note–maxima; i.e., not 6th highest):
  - Richmond 2014, 75th percentile PM10, = 20.9 microg./m3
  - Footscray 2014, 75th percentile PM2.5, = 7.9 microg./m3 (because no Richmond PM2.5 data)
- For assessment of ann. avg. averages:
  - Footscray 2014, annual median PM2.5, = 5.9 microg./m3; note we are using the median here (not the annual average), to avoid biasing the results due to bushfire smoke in the earlier months of 2014. Purpose is to model a 'typical year' not assess bushfire smoke in Melbourne.

Look forward to discussing with you.

Kind regards,

[redacted]

[redacted], Jacobs
Senior Atmospheric Scientist | ANZ Infrastructure & Environment
T: + 61 [redacted]
M: + 61 [redacted]

[redacted]

www.jacobs.com

From: [redacted]
Sent: Wednesday, 14 October 2015 5:14 PM
To: [redacted]
Subject: FW: EPA and Air quality meeting

Hi [redacted] – see instructions below. Please get in contact with [redacted].

She will organise a meeting. Details below

cheers

[redacted]
Project Manager
Major Projects

Environment Protection Authority Victoria
200 Victoria Street, Carlton VIC 3053 | GPO Box 4395, Melbourne VIC 3001 | DX 210082
☎ [redacted] | E [redacted] | www.epa.vic.gov.au

From: [redacted]
Sent: Wednesday, 14 October 2015 5:39 PM
To: [redacted]
Subject: EPA and Air quality meeting

Hi [redacted]

Could [redacted] please get in contact with [redacted] to arrange the meeting with [redacted] - [redacted] will also need to provide an outline of what he needs as [redacted] will need to prep [redacted]

Cheers
[redacted] | Planning and Environment Specialist
Melbourne Metro Rail Authority

Level 13, 121 Exhibition Street, Melbourne 3000
www.vic.gov.au/mmrailproject

M: [redacted] |T: [redacted] | E: [redacted]