

Mordialloc Bypass Project

Report of Dr Anthony Smith

1 Introduction

I have been engaged on behalf of the Major Road Projects Victoria to peer review the Groundwater Impact Assessment report contained in the Environment Effects Statement (**EES**) prepared for the Mordialloc Bypass Project (**Project**). I was originally instructed on behalf of VicRoads during the planning and development phase of the Project. However, I have subsequently been instructed on behalf of Major Road Projects Victoria (formerly Major Road Projects Authority) which has been responsible for the delivery of the Project since July 2018.

2 Qualifications and experience

Appendix A contains a statement setting out my qualifications and experience, and the other matters in accordance with Planning Panels Victoria's 'Guide to Expert Evidence'.

A copy of my curriculum vitae is provided in Appendix B.

3 Peer Review

Standards and guidelines

Peer review of the numerical groundwater model developed for the Project was undertaken in accordance with the recommendations of the Australian Groundwater Modelling Guidelines (Barnett et al. 2012) (Appendix A) including the recommended checklists for model reviews.

Implementation of scope

The peer review commenced with a conception meeting held on 27 March 2018 between the VicRoads project team and me to discuss the terms of reference for the groundwater review and to initiate the peer review. The general procedure for reviewing EES technical documents and reports during the peer review involved the following steps:

- Issue of review materials to the reviewer by VicRoads;
- Review of those materials by the reviewer and issue of a draft IPR to VicRoads as a letter report;
- Consideration of the draft IPR comments by the VicRoads project team and teleconference meeting with the reviewer to discuss and resolve key items from the review;
- Issue of revised EES content by VicRoads; and
- Consideration of the revised content by the reviewer and issue of a final letter report to conclude the IPR.

Table 1 below is a summary of the review materials and implementation and timing of review components.

Following finalisation of the EES documents, the review materials and responses listed in Table 1 were confirmed against the exhibited version of the Groundwater Impact Assessment, including Appendix C – Edithvale Wetland Water Balance Modelling (September 2018) and Appendix D – Numerical Groundwater Modelling Report (September 2018).

Table 1 Implementation and timing of IPR components

Project component	Review materials	Draft IPR	Final IPR
Groundwater modelling concept and method	“OSAR: Mordialloc Bypass groundwater model concept” dated 7 March 2018 (issued by VicRoads on 14 Mar 2018)	Draft letter report provided to VicRoads on 5 Apr 2018	Letter report provided to VicRoads on 12 Jul 2018
Existing conditions	Partial draft report (Sections 1 to 5) “EES - Technical Impact Assessment Report Mordialloc Bypass” dated December 2017 (issued by VicRoads on 14 Mar 2018)	Draft letter report provided to VicRoads on 27 April 2018	Letter report provided to VicRoads on 12 Jul 2018
Groundwater impact assessment and groundwater modelling	“Mordialloc Bypass Groundwater Impact Assessment”, including “Appendix E - Mordialloc Bypass Groundwater Modelling Report” dated 15 May 2018 (issued by VicRoads on 24 May 2018)	Draft letter report provided to VicRoads on 30 May 2018	Letter report provided to VicRoads on 12 Jul 2018
Wetland water-balance assessment	“Mordialloc Bypass Edithvale Wetland Water Balance Modelling” dated May 2018 (issued by VicRoads on 24 May 2018)	Draft letter report provided to VicRoads on 30 May 2018	Letter report provided to VicRoads on 12 Jul 2018

Key issues identified and addressed

Issues identified by me during the reviews of technical documents and reports were generally of three types, being either general comments, specific comments or editorial suggestions. Subsequently, all review comments have been addressed and I have no outstanding technical issues arising from the peer review. An overview of the main items addressed in the peer review is given below:

- Groundwater modelling concept and method –
 - Clarification of the direction of groundwater flow at the location of the proposed embankment relative to the location of Edithvale Wetlands;
 - Clarification of the cause of small drawdown of the water table beneath the proposed embankment as predicted by the preliminary groundwater modelling; and
 - Adjustment of the type of boundary condition used on the northern boundary of the preliminary groundwater model.
- Groundwater impact assessment –
 - Consolidation of the hydrogeological conceptualisation within a dedicated report section;
 - Clarification and revision of aspects of the conceptual hydrogeological cross section;
 - potentiometric surface of the Brighton Group aquifer,
 - drawn water-table gradients and groundwater flow directions,
 - extent of the saltwater interface inland from the coast,
 - Revision of groundwater pressure maps and consideration of effects from existing production bores; and
 - Additional description and interpretation of groundwater chemistry.

- Groundwater modelling –
 - Justification of the groundwater model’s Class 2 confidence level classification against the criteria of the Australian Groundwater Modelling Guidelines;
 - Clarification of the type of boundary condition used to represent Edithvale Wetland;
 - Analysis of the importance of Drain boundary conditions used in the modelling, including those located between the proposed embankment and Edithvale Wetlands;
 - Explanation of the calibration metric used for the model sensitivity analysis;
 - Expansion and formalisation of the predictive uncertainty analysis; and
 - Revision and additional explanation of the modelling scenarios to explore potential effects of climate change.

- Edithvale Wetland water balance –
 - Minor comments.

Summary

In my opinion the groundwater components of the Groundwater Impact Assessment for Mordialloc Bypass, as reviewed by me, are fit for purpose and do not contain significant technical flaws or errors. The approaches, methods and findings of the groundwater assessment components of the EES are considered justified and adequately supported through analysis of available existing information, hydrogeological conceptualisation of groundwater conditions and interaction with surface water, and predictive simulations of potential future conditions conducted using industry-standard modelling codes and methodologies.

Declaration

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Inquiry and Advisory Committee.



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Signed

Date: 06/02/2019

Appendix A Matters Raised by PPV's Guide to Expert Evidence

- (a) The name and address of the expert

Dr Anthony Smith, 63A Stock Road Attadale 6156 WA.

- (b) The expert's qualifications and experience

Dr Smith has a PhD in Environmental Science from Murdoch University in the field of modelling of groundwater and surface water interaction. He has 14 years research experience with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and 8 years' experience working as a groundwater consultant. Dr Smith has undertaken peer review roles for international journals, CSIRO and commercial clients. He has authored or contributed to 44 groundwater publications with 637 total citations. Further details are provided in Dr Smith's curriculum vitae in Appendix B.

- (c) A statement identifying the expert's area of expertise to make the report

Dr Smith has strengths in quantitative analysis and is a specialist in groundwater simulation and modelling. He has led and contributed to a range of groundwater projects relevant to the Groundwater Impact Assessment for Mordialloc Bypass, including interaction between groundwater and wetlands, water logging and salinisation in irrigated areas, seawater intrusion and submarine groundwater discharge. Further details are provided in Dr Smith's curriculum vitae in Appendix B.

Dr Smith was the independent peer reviewer for the regional groundwater modelling study and the groundwater impact assessment for the Edithvale and Bonbeach Level Crossing Removal Projects.

- (d) A statement identifying any other significant contributors to the report and where necessary outlining their expertise

This report, and the Peer Review Assessment informing this report, did not involve other contributors.

- (e) All instructions that define the scope of the report (original and supplementary and whether in writing or oral)

The scope for the groundwater peer review informing this report was defined in writing in the document entitled Mordialloc Bypass Groundwater Peer Review Brief, prepared by VicRoads (Metro Project Eastern) and attached as Appendix C.

In additional to the above terms of reference, the review of groundwater modelling was undertaken in accordance with the recommendations of the Australian Groundwater Modelling Guidelines (Barnett et al. 2012) including the guideline's checklists for model reviews.

Reference

Barnett et al, 2012, Australian groundwater modelling guidelines, Waterlines report, National Water Commission, Canberra.

- (f) The identity of the person who carried out any tests or experiments upon which the expert has relied on and the qualifications of that person

This report, and the Peer Review Assessment informing this report, did not rely on tests or experiments conducted by other persons.

- (g) A statement setting out any questions falling outside the expert's expertise

The Geotechnical Modelling Memo in Appendix A of Appendix D of the Groundwater Impact Assessment is outside of my direct area of expertise. The memorandum contains geotechnical calculations predicting the change in aquifer permeability beneath the bypass alignment due to loading of the subsurface by the proposed bypass embankment.

- (h) A statement setting out any key assumptions made in preparing the report

This review of the Groundwater Impact Assessment for Mordialloc Bypass has been undertaken assuming the geotechnical calculations of predicted permeability changes beneath embankments presented in Appendix A of Appendix D do not contain significant technical flaws or errors.

The Edithvale Wetland Water Balance Modelling report in Appendix C of the Groundwater Impact Assessment for Mordialloc Bypass relies on a water-balance model of Edithvale Wetland developed previously for the Edithvale and Bonbeach Level Crossing Removal Projects. My review of the Groundwater Impact Assessment for Mordialloc Bypass assumes the Edithvale Wetland water-balance model is the same version I reviewed in December 2017 for the Edithvale and Bonbeach Level Crossing Removal Projects.

- (i) A statement indicating whether the report is incomplete or inaccurate in any respect

None.

Appendix B CV of Anthony Smith

Anthony Smith has a PhD in Environmental Science (modelling of groundwater and surface water interaction) from Murdoch University, Western Australia and 20 years research and consultancy in the groundwater industry. He has a strong background in quantitative analysis and simulation and has lead and contributed to projects involving interaction between groundwater and surface water, mine dewatering and water supply, aquifer depressurisation for coal seam gas development, managed aquifer recharge feasibility and operation, groundwater sustainable yield assessment, water logging and salinisation in irrigated agriculture, seawater intrusion, density-coupled flow and transport modelling, and submarine groundwater discharge. Dr Smith began his current career as a groundwater modeller within a West Australian groundwater consultancy in 1996. He subsequently joined the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and spent fourteen years as a Research Scientist and Senior Research Scientist. Since moving back to consulting in 2011, Dr Smith has been Principal Groundwater Modeller at NTEC Environmental Technology and now at CDM Smith Australia Pty Ltd.

Qualifications

- PhD (Environmental Science), Murdoch University, Perth, Australia, 1999.
- BEnvSc (Hons 1), Murdoch University, Perth, Australia, 1991.
- Certificate of Civil Engineering, Wembley Technical College, Perth, Australia, 1984.

Employment

- 2013–2019, Principal Modeller, CDM Smith Australia.
- 2011–2013, Principal Groundwater Modeller, NTEC Environmental Technology.
- 2003–2011, Senior Research Scientist, CSIRO (Land and Water).
- 1997–2003, Research Scientist, CSIRO (Land and Water).
- 1996–1997, Groundwater Modeller, PPK Environment and Infrastructure.
- 1982–1987, Structural Draftsman, Western Australian Government and private.

Peer review experience

- Review of groundwater studies and groundwater models for commercial clients, including CSIRO.
- Manuscript reviews on behalf of international journals, including Nature, Advances in Water Resources, Journal of Hydrology, Hydrogeology Journal, Estuarine Coastal and Shelf Sciences, and Environmental Research Letters.
- Internal reviews of CSIRO research manuscripts, technical reports and client reports.

Publications

Anthony has authored or contributed to 44 publications with 637 total citations; see Google scholar: <http://scholar.google.com.au/citations?user=6JY3UPsAAAAJ&hl=en>

Appendix C Groundwater Peer Review Brief

Mordialloc Bypass Groundwater Peer Reviewer Brief

Prepared by VicRoads, Metro Projects Eastern
Date 6 March 2018

1. BACKGROUND

The Mordialloc Bypass provides a two-lane, two-way link between the termination of the Mornington Peninsula Freeway at Springvale Road in Aspendale Gardens and the Dingley Bypass in Dingley. Currently, the existing scope allows for connections via new junctions with three intersecting arterial roads at Governor Road, Lower Dandenong Road and Centre Dandenong Road.

The proposed Project corridor is approximately 9 kilometres in length, comprising 7.5 kilometres of new road construction within the road reservation and 1.5 kilometres of upgrade to the Mornington Peninsula Freeway.

The Victorian State budget 2017/2018 included \$300m to construct the Mordialloc Bypass with an estimated completion date of December 2021.

In September 2017, the Minister for Planning announced that an Environment Effects Statement (EES) was required for the Mordialloc Bypass. The EES will look at the potential environmental, social, economic and cultural heritage impacts of this project, and how these impacts will be managed. The process is currently underway with design development and the technical investigations. The EES submission public exhibition and independent panel review will occur in the second half of 2018.

The site of works is shown on the attached locality plan (Appendix A).

2. STUDY AREA

The study area for the Assignment covers the site of works (Appendix A) and key groundwater areas adjacent to the project, such as Edithvale Wetlands and Waterways wetlands.

3. ASSIGNMENT TASK

The Assignment objective is to review of the Mordialloc Bypass EES Groundwater Technical Study Report and its associated models and documents within the following deliverables:

- Advisory memos on each review component
- Draft review report (expanding on the above)
- Final review report (after VicRoads review)

4. SCOPE OF WORKS

The Assignment includes all works associated with the review of the following:

- The current methodology of the EES groundwater impact assessment undertaken by WSP (including comment on its ability to effectively assess groundwater risks);
- EES Groundwater – Existing Conditions report;

Mordialloc Bypass Groundwater Peer Reviewer Brief

- ESS Groundwater – Impact Assessment report (including cumulative impacts from the Level Crossing Removal project at Edithvale/Bonbeach stations);
- Groundwater models (likely to be two as there are two project options currently being assessed); and
- Water balance model for surface water entering the Edithvale-Seaford wetlands

5. SERVICES TO BE PROVIDED

Services to be provided include:

- Commentary and/or recommendations on the methodology for groundwater assessment
- Providing objective peer review of the Mordialloc Bypass Groundwater Technical Study, and associated models and documents
- Liaising with the WSP design team to request and clarify requirements of the assessment report and models
- Attendance of phone conferences regarding groundwater, including issues and opportunities raised during peer review

6. OTHER INFORMATION

The Geotechnical Technical Study developed by WSP can also be provided to inform the Peer Reviewer.

7. TIMING

Reviews of the various components are required as per Table 1. The majority of the review commentary is set to be aligned with the Technical Reference Group (TRG) meeting and review timeframes.

Table 1

Review component	Deliverable	Date available for review	Date for review completion
Current methodology of the EES groundwater impact assessment	Advisory memo	Available now	Two week from engagement of services
EES Groundwater – Existing Conditions report	Advisory memo	Available now	Two weeks from engagement of services
ESS Groundwater – Impact Assessment report	Advisory memo	24 April 2018	1 May 2018
Groundwater models	Advisory memo	TBC – Late March 2018	1 May 2018
Water balance model for surface water entering the Edithvale-Seaford wetlands	Advisory memo	TBC – Late March 2018	1 May 2018

The target timeframe for the completed final Review Report is 22 May 2018, with the draft report provided one week prior for VicRoads review.

Mordialloc Bypass Groundwater Peer Reviewer Brief

APPENDIX A Mordialloc Bypass study area

