

Before a Board of Inquiry
Northern Corridor Improvements Project

Under the Resource Management Act 1991 ('the Act')

In the matter of a Board of Inquiry appointed under section 149J of the Act to consider notices of requirement for designations and resource consent applications by the New Zealand Transport Agency for the Northern Corridor Improvements Project

Statement of evidence of Timothy John Dee for the New Zealand Transport Agency (Contaminated land)

Dated 20 April 2017

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**STATEMENT OF EVIDENCE OF TIMOTHY JOHN DEE
FOR THE NEW ZEALAND TRANSPORT AGENCY**

1 Qualifications and experience

- 1.1 My full name is Timothy John Dee.
- 1.2 I am a Senior Contaminated Land Specialist at Aurecon in Auckland. Within this role I provide technical leadership both for Auckland and the wider Australia and New Zealand team. I am responsible for the scoping and delivery of most Aurecon outputs in the field of contaminated land delivered from the Auckland office.
- 1.3 Over the past 11 years I have been involved in the investigation, assessment and remediation of soil and groundwater contamination. This has included assessments of environmental effects of most Hazardous Activities and Industries List ('**HAIL**') activities for a range of proposed developments including infrastructure, residential, commercial and industrial use. My work has involved all assessments of land contamination assessment, from site selection, baseline assessment, preliminary site investigation, detailed site investigation, contaminated site management plans, remedial action plans, site validation reporting, ongoing monitoring and management, community consultation and consenting. Some of the projects I have been involved with include:
- a Landfill and mining: Port Sunlight, Pikes Point East, Southdown Place, Barrys Point, McLaughlins Road, Crooks Road East Tamaki, Teghout Armenia;
 - b Industrial: MG Rover Longbridge, Ford Wiri, Calders and Grandidge Boston, 9 Manu Street, Total Langley, Brunner Mond Northwich, Omega Warrington, Jeld-Wen Doncaster, Ahead Lumber Mangatawhiri, Future Industrial Services Kirby;

- c Commercial: Over 20 assessments for proposed supermarkets in New Zealand, Marshall Aerospace Broughton, Westminster House Manchester, Giltrap Audi Grey Lynn.
- 1.4 I hold a Bachelor of Science with a Chemistry major from the University of Auckland. I also hold a Master of Science with honours from the University of Auckland in Chemistry. I am a Member of the Royal Society of Chemistry, through whom I have attained the award of Chartered Chemist. I am also a member of the New Zealand Institute of Chemistry and of the Waste Management Institute of New Zealand.
- 1.5 I have presented on the topic of land contamination assessment, including:
- a Presentation to Heads of Environment Protection Agencies Australia and New Zealand, Per- and polyfluoroalkyl substances (PFAS) Summit – PFAS A practitioner’s perspective in Europe, 4 April 2017, Melbourne.
 - b Presentation to Australasian Land and Groundwater Association Auckland branch – PFOS,¹ learning from Europe, Auckland NZ, August 2016;
 - c Presentation by webinar to Wasteminz ‘ALARP² and asbestos, a job for life?’ 27 September 2016;
 - d Coauthor to Network for Industrially Contaminated Land in Europe, Emerging Contaminants Working Group – PFOS, Investigation & Risk Assessment Sub-group Presentation, Manchester UK, 26 June 2015;
 - e Presentation to Brownfield Briefing, Site Investigation, London, United Kingdom. June 18, 2015 titled Getting Meaningful Information from your Site Investigation data.
- 1.6 My evidence relates to notices of requirement and resource consent applications lodged by the New Zealand Transport Agency (**‘Transport Agency’**) with the Environmental Protection Authority on

¹ Perfluorooctane sulfonate.

² As low as reasonably practicable.

14 December 2016 for the Northern Corridor Improvements Project ('Project').

2 Involvement with the Project

- 2.1 I am familiar with the area that the Project covers and the State highway and local roading network in the vicinity of the Project. Aurecon was first engaged to undertake an assessment of contaminated land as part of the preparation of the Assessment of Environmental Effects ('AEE'). To complete this assessment I scoped a Preliminary Site Investigation ('PSI') in accordance with the Contaminated Land Management Guidelines of New Zealand Volume 1, 2011. This identified several potential HAIL sites. In order to provide design advice on how the likely risk from these sites could be managed I then scoped and supervised the production of a Contaminated Site Management Plan ('CSMP'). The scope for both assessments was produced by me and I reviewed the reports for completeness and accuracy.
- 2.2 I am one of the reviewers of the *Assessment of Land Contamination Effects* (Technical Report) and Appendices, lodged in support of the Project. The author of the report is my former colleague Alan Woodger, who no longer works at Aurecon. Alan produced this report under my direction. The report is a summary of the PSI and CSMP with further detail on the effects which the CSMP is intended to mitigate.
- 2.3 For the AEE, PSI, CSMP and subsequent Detailed Site Investigation ('DSI') I was responsible for the scoping, coordination of information gathering, and technical review.

3 Code of conduct

- 3.1 I have read and am familiar with the Code of Conduct for Expert Witnesses in the current Environment Court Practice Note (2014), have complied with it in preparation of this evidence, and will follow the Code when presenting evidence to the Board. I also confirm that the matters addressed in this statement of evidence are within my area of expertise, except where I rely on the opinion or evidence of other witnesses. I have

not omitted to consider material facts known to me that might alter or detract from the opinions I express.

4 Scope of evidence

4.1 This evidence addresses the following matters:

- a The regulatory framework relating to contaminated land;
- b Assessment methodology;
- c Existing environment;
- d Effects assessment: Construction activities;
- e Effects assessment: Operation of Project;
- f Mitigation measures;
- g Response to section 149G(3) key issues report; and
- h Conclusions.

4.2 I understand that no submissions have raised issues relating to land contamination.

4.3 My evidence does not discuss the effects of the Project on Rosedale Landfill. These effects are discussed in the evidence of **Mr Amputch**.

4.4 In preparing this evidence, I have reviewed evidence by the following witnesses:

- a Mr Glucina, Transport Agency;
- b Mr Moore, Project Design;
- c Mr Hale, Construction;
- d Mr Amputch, Landfill;
- e Mr Ridley, Earthworks;
- f Mr Hughes, Stormwater;

g Mr Schofield, Alternatives; and

h Mr McGahan, Planning.

5 Executive summary

- 5.1 The PSI identified 45 HAIL sites in the vicinity of the Project alignment. The proposed works for the Project will intersect a number of these HAIL sites meaning there is potential for exposure of human health and environmental receptors to hazardous substances if the works are not managed appropriately.
- 5.2 A DSI has been completed since the Technical Report was lodged with the AEE. The DSI did not find any significant evidence of soil or groundwater contamination. The results of the DSI mean that:
- a No requirement for resource consents from existing discharges has been identified.
 - b The soil disturbance over HAIL sites would be a “controlled activity” under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.³
 - c The PSI is conservative in assuming a higher risk of contamination than likely exists.
- 5.3 Nevertheless, the DSI does not discount the possibility that some minor contamination may still be present.
- 5.4 The draft CSMP provides a framework for appropriate management of the risks from soil disturbance at contaminated sites should any be encountered during the course of earthworks along the Project corridor. The CSMP is required by proposed consent conditions CL.1 and CL.2, which require the CSMP to contain various management methods – as discussed in my evidence.

³ As I describe in my evidence at paragraph 6.6 resource consent has been applied for as a restricted discretionary activity because at the time of lodgment the DSI had not been completed.

5.5 I anticipate that the effects from soil and groundwater contamination will be less than minor with the implementation of the CSMP.

6 Regulatory framework

6.1 Within New Zealand Section 31 of the Resource Management Act ('**RMA**') tasks territorial authorities with the control of adverse effects arising from contaminated land, specifically:⁴

“the prevention or mitigation of any adverse effects of the development, subdivision, or use of contaminated land”

6.2 The RMA defines 'contaminated land' as:⁵

“land that has a hazardous substance in or on it that-
(a) has significant adverse effects on the environment; or
(b) is reasonably likely to have significant adverse effects on the environment”.

6.3 The National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health ('**NES (soil)**') was introduced in 2011 and is a nationally consistent set of planning controls and soil contaminant values. The NES (soil) is limited to considerations related to most human health effects from contaminated land with notable exclusions including construction workers and risks from vapours and gases.

6.4 The NES (soil) applies to land which currently or historically has been used for an activity or industry identified in the HAIL. In order to trigger an assessment under the NES (soil) one of the following four activities must be proposed for that land:

- a Removing or replacing a fuel storage system;
- b Sampling soil;
- c Disturbing soil; or

⁴ RMA, s31(1)(b)(ii)(a).

⁵ RMA, s 2.

- d Subdividing or changing use.
- 6.5 It should be noted that the NES (soil) does not address contaminated land as defined in the RMA, focussing instead on potential sources of contaminated land (HAIL sites), their likelihood to be present and threshold criteria against which an assessment of the possibility of an increased risk of an effect is triggered.
- 6.6 Earthworks and changes in land use activities will be part of the Project, so the NES (soil) applies.⁶ Resource consents for these activities have been applied for under the NES (soil) because at the time of lodging no DSI had been carried out.⁷ The PSI submitted with the Technical Report and the now complete DSI (included as **Annexure A** to my evidence), are relevant to assessment under the NES (soil).
- 6.7 In addition to the NES (soil), Auckland Council seeks to fulfil its obligations under Section 31 of the RMA through the Auckland Unitary Plan Operative in Part ('**AUP**'). In particular, section E30 of the AUP provides the Objectives, Policies and Rules related to the discharge of contaminants from contaminated land. These rules are designed to protect both human health and the environment with primary consideration being given to discharges to water.
- 6.8 As with the NES (soil), the AUP has a set of threshold criteria which trigger an assessment of the possibility of an increased risk of an effect. In both cases, exceeding the criteria does not necessarily mean there is a significant effect. As such, the threshold criteria can be considered conservative for the purposes of identifying contaminated land.
- 6.9 There was a risk that contaminants were already discharging into air, water or land from properties to be acquired as part of the Project (i.e. regardless of the Project).⁸ A further purpose of the DSI was to identify whether any resource consents under the AUP would be required (at a later stage) to authorise any of these existing discharges of contaminants from contaminated land.⁹ The DSI is now complete and identified no

⁶ Refer Section 1.3, Assessment of Land Contamination Effects (Technical Report).

⁷ Refer Section 1.3, Assessment of Land Contamination Effects (Technical Report).

⁸ Refer Section 1.3, Assessment of Land Contamination Effects (Technical Report).

⁹ Refer Section 1.3, Assessment of Land Contamination Effects (Technical Report).

significant evidence of soil or groundwater contamination. Therefore, no discharge consents under the AUP are required.

7 Assessment methodology

- 7.1 Both the NES (soil) and the AUP mandate that assessments of contaminated land must be in accordance with the Contaminated Land Management Guidelines of New Zealand. These are a set of five guidance documents of which Contaminated Land Management Guidelines No. 1 – Reporting on Contaminated Sites in New Zealand (Revised 2011) is the key document for the requirements in the production of a PSI and a CSMP in New Zealand.
- 7.2 The methodology for determining whether land is likely to be contaminated included:
- a A series of site visits comprising both walkovers where access was allowed and drive past when pedestrian access was not practical;
 - b A review of published geology, hydrogeology and hydrological information. A review of council property files within and adjacent to the Project alignment;
 - c Submission and review of a contaminated sites search to Auckland Council within a 500m radius of the Project alignment;
 - d Review of previous investigation documents either provided by the Transport Agency or discovered in the property files;
 - e A search of the historic land titles both within and adjacent to the Project alignment;
 - f A review of stereoscopic pairs of aerial photographs dating from 1940, 1960, 1970, 1983, 1986, 1988 and 1997 with additional single photograph imagery reviewed from the Auckland Council GIS, Google Earth and the National Library of New Zealand from 1959, 1973, 2002 and 2016;

- g An internet and media search including a review of Wellsford, J and P; 1986 *The Station – A concise history of the Albany basin 1840-1940*. This text was particularly useful in understanding the early industrial history of the area.
- 7.3 Information from these sources was used to create a conceptual model of the ground in the vicinity of the alignment including a profile of fill thickness. The information was also used to create a summary of the HAIL sites which may have occurred on the Project area. The combination of the conceptual ground model and the HAIL sites was then used to create a conceptual site model identifying the possible risks from each HAIL site.
- 7.4 Once these areas of risk had been identified they were considered in light of the proposed and historical construction of the State highway network. In particular the following criteria were used to determine which sites had the potential to pose greater risk during construction:
- a Likelihood of previous total excavation (e.g. topsoil removal from market gardens to enable road construction);
 - b Proximity to the Project corridor (HAIL sites which are unlikely to have had earthworks and are within the corridor are automatically greater risk sites, whereas sites beyond 50m of the route are automatically lower risk sites); and
 - c Possibility for below ground liquid phase sources greater than 500L or above ground liquid phase sources greater than 1,000L.
- 7.5 These criteria were used as a rational for focussing the attention of constructors and the CSMP on higher risk sites and are not intended to discount the possibility of risk from the other HAIL sites.
- 7.6 The CSMP was produced assuming that the conceptual site model presented within the PSI was accurate and that every identified HAIL site within an area of earthworks contains soil or groundwater contamination according to the nature of the past activity.

- 7.7 Due to the type and scale of the HAIL sites it is envisaged that traditional soil contamination management techniques supplemented by asbestos management controls will be sufficient. The CSMP provides an outline of what these controls should include for the constructor to adopt and detail with their specific methodology for approval of Auckland Council prior to the commencement of work in the HAIL site areas.
- 7.8 In addition to the above documents, Aurecon has completed a DSI providing targeted data from those HAIL sites identified within the conceptual site model and which may be disturbed by the construction programme. This DSI is attached to my evidence as **Annexure A**. No significant evidence of soil or groundwater contamination has been identified by this investigation.

8 Existing environment

- 8.1 Fill has been identified along the Project corridor at varying depths - the deepest identified fill was to 12 m. Some of the fill is known from previous technical reports (as provided by the Transport Agency and identified in property files) to be uncontrolled and from unknown sources. Fill could be in unexpected places as Kauri Gum diggers were prevalent in the area around Albany/Rosedale in the late 1800's/early 1900's.
- 8.2 Beneath any surficial fill or topsoil, the underlying geology is expected to comprise Puketoka Formation with the East Coast Bays Formation ('**ECBF**') underlying the alluvial material at depth. Depths of these units will vary across the Project corridor, however it can be expected that the depth to ECBF will be shallower in areas of elevated topography. More recent unmapped Holocene (<10,000 years old) alluvium can be expected in close proximity to surface water features and topographic low points.
- 8.3 The depth to groundwater will vary across the Project corridor but can be expected at shallower depths around watercourses, whereas the higher areas around Spencer Road and Sunset Road would likely exceed 5 to 10 m bgl.¹⁰ Groundwater depths from previous reports and from property files showed groundwater at various points along the Project corridor to range

¹⁰ Below ground level.

from 1.4-4.8 m bgl, while the Watercare treatment site has groundwater measuring at less than 1.0 m bgl.

- 8.4 There are three streams within the vicinity which cut through the Project area. There is potential that these could be affected by the HAIL activities along the Project corridor if not properly managed.
- 8.5 Forty-five separate HAIL sites were identified by the PSI from a variety of activities, as described in detail in the PSI report, including potential for:¹¹
- a Sheep dips;
 - b Orchards;
 - c Commercial printers;
 - d Fuel storage;
 - e Electricity substation;
 - f Electroplating;
 - g Cement manufacture;
 - h Motor vehicle workshops;
 - i Retail fuel outlets;
 - j Landfill (Rosedale Landfill excluded from consideration by this evidence, please refer to the evidence of **Mr Amputch**);
 - k Scrap metal dealer;
 - l Wastewater treatment;
 - m Refuse transfer station;
 - n Areas of soil filling; and
 - o Clandestine methamphetamine manufacture.

¹¹ Refer Section 4.4 and Appendix A – Preliminary Site Investigation, Assessment of Land Contamination Effects (Technical Report).

- 8.6 The activities which pose a greater risk and are in proximity to area of ground disturbance include:¹²
- a Constellation Drive Substation;
 - b Z Energy Service Station SH18;
 - c Caltex Service Station SH18 / Paul Matthews Road;
 - d Rosedale Closed Landfill;
 - e Fill for the causeway between the Watercare Ponds and for accessways around the Ponds; and
 - f Fill placed in various gullies, channels and streams.
- 8.7 The DSI that has been completed since the Technical Report was finalised has not identified any significant soil or groundwater contamination within the Project corridor. As such I consider that the risk from contamination across the Project alignment is very low, even without mitigation by the CSMP. Even so, I recommend the CSMP is prepared and followed as the scale of investigation is small compared with the scale of the work on the Project and the probability of an unexpected discovery remains high.

9 Effects assessment: Construction activities

- 9.1 Construction of the Project will require soil disturbance and surface seal removal. This creates the potential for contaminated material to:
- a Be inhaled by workers and members of the public;
 - b Be ingested by workers and neighbouring site users, and for it to come into contact with skin;
 - c Be discharged to stormwater or groundwater;
 - d Accumulate in impacted sediment;

¹² Refer Page 8, Table 1, Assessment of Land Contamination Effects (Technical Report).

- e Affect amenity values (e.g. odours); or
 - f Impact vegetation.
- 9.2 The findings of the DSI conclude that only minor hazards are likely to be present within the project area. With a CSMP the risks from these hazards can be significantly reduced to negligible levels.
- 9.3 The presence of contaminated material may also significantly affect suitability of material for re-use as structural or landscaping fill as part of the development works, and as a result may have consequences for handling and off-site disposal requirements. Health, safety, cost and programme risks associated with handling contaminated material can be reduced through completion of further investigations to characterise soil and groundwater conditions in advance of earthworks and construction commencing.
- 9.4 Some positive environmental effects of the proposed works are:
- a Characterisation of areas of potentially contaminated land which would otherwise not have been assessed;
 - b Identification of areas of historical contamination previously unknown, allowing controls to be implemented to protect human health and the environment; and
 - c The possible removal of contaminated material from the proposed development areas within the Project corridor.
- 9.5 Following the procedures in the CSMP will ensure adverse effects related to contaminated land from the proposed works are limited to transient effects including:
- a Limited exposure of construction workers to harmful substances;
 - b Limited exposure of vegetation to harmful substances; and
 - c Effects on amenity values such as odour.

- 9.6 No discharges of contaminants to water or land are anticipated as part of the Project. The CSMP has been prepared to prevent this occurring during the construction stage. The CSMP will contain controls to ensure any run-off generated from construction on contaminated land will be contained and disposed of off-site.

10 Effects assessment: Operation of Project

- 10.1 No effects on the end-user (the general public using the motorways, shared use paths and other amenities) are anticipated in the operation of the Project. This is because most contamination encountered should be removed as part of the works.
- 10.2 Where contamination is not removed during Project construction, the CSMP would require an ongoing monitoring and management plan to manage any residual risk.

11 Mitigation measures

- 11.1 Proposed Conditions CL.1 and CL.2 require an updated CSMP to be prepared prior to the commencement of excavation and site works.¹³ Compliance with the CSMP is important to ensure contamination effects are avoided and mitigated. A draft CSMP has been lodged with the application documents. Proposed conditions CL.1 and CL.2 require this to be updated and describe how land disturbance activities on contaminated sites will be managed, including:
- a Health and safety requirements (including use of appropriate personal protective equipment and decontamination);
 - b Protocols for accidental discovery;
 - c Methods for managing excavation and storage of soil (including erosion and sediment controls, dust and odour controls, surface water control and monitoring, imported fill requirements, and stockpile management);

¹³ Refer Appendix A – Proposed conditions, AEE.

- d Methods for classifying and managing transport, disposal (at an appropriate facility) and tracking of spoil and other material taken away from site;
- e How any spills and emissions will be managed; and
- f Site validation reporting requirements.

- 11.2 I note that the earthworks methodologies set out in the evidence of **Mr Ridley**¹⁴ do not apply to the management of earthworks within contaminated sites. Instead the management measures prescribed by the CSMP described in paragraph 11.1 above will apply to land disturbance (earthworks) on contaminated sites, including managing any run-off¹⁵ from earthworks on a contaminated site. The principles for managing earthworks within contaminated sites will be consistent with those for the rest of the Project.
- 11.3 In my opinion, with appropriate management through the CSMP, the effects from soil and groundwater contamination will be less than minor.

12 Response to section 149G(3) key issues report

- 12.1 Paragraph 40 of the key issues report recommends an expert in soil contamination matters review the AEE to determine the effects of the Project on contaminated land. It states that conditions are required to cover outstanding matters. It is not clear whether the Council thinks the proposed conditions offered are sufficient.
- 12.2 Proposed condition CL.1 provides that the CSMP must be submitted to the Auckland Council as part of the Construction Environmental Management Plan, which must be certified by the Council under condition CEMP.1.¹⁶ This process would involve Auckland Council in finalisation of the CSMP and enable a peer review at that time if it was considered necessary.

¹⁴ Refer sections 9 and 10 of **Mr Ridley's** evidence in chief (Earthworks).

¹⁵ E.g. by pumping off the run-off in accordance with the CSMP measures.

¹⁶ Refer Appendix A – Proposed Conditions, AEE.

12.2 Paragraph 84 of the key issues report states that management of contaminated land may be a key issue (depending on the outcomes of the DSI). As the DSI has not identified any significant contamination I do not consider that Chapter E30 of the AUP is relevant to the application, and further I have concluded that that any effects from contamination will be less than minor with management through the CSMP.

13 Conclusions

13.1 Forty-five HAIL sites have been identified in the vicinity of the Project alignment. The proposed works will intersect a number of these sites and there is potential for exposure of human health and environmental receptors to hazardous substances if the works are not managed appropriately. The draft CSMP provides a framework for appropriate management of the risks from these sites. I anticipate that the effects from soil and groundwater contamination will be less than minor with the implementation of the CSMP.



Timothy John Dee

20 April 2017

Annexure A – Detailed Site Investigation