

Before a Board of Inquiry
MacKays to Peka Peka Expressway Proposal

under: the Resource Management Act 1991

in the matter of: Notice of requirement for designation and resource consent applications by the NZ Transport Agency for the MacKays to Peka Peka Expressway Proposal

applicant: **NZ Transport Agency**
Requiring Authority

Statement of evidence of **Kerry Laing** (Contaminated land and groundwater) for the NZ Transport Agency

Dated: 5 September 2012

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TABLE OF CONTENTS

QUALIFICATIONS AND EXPERIENCE	2
SCOPE OF EVIDENCE	3
EXECUTIVE SUMMARY	4
BACKGROUND AND ROLE.....	7
Technical Report and Management Plan	7
EXISTING ENVIRONMENT.....	7
METHODOLOGY OF THE ASSESSMENT	9
Contamination Desk Study	9
Aerial photographs.....	10
Intrusive Investigations	11
Conclusion.....	12
CONTAMINATED LAND WITHIN THE PROJECT DESIGNATION BOUNDARIES.....	13
ASSESSMENT OF LAND AND GROUNDWATER CONTAMINATION EFFECTS	16
Assessment of effects during construction.....	17
Assessment of effects during operation.....	19
CONSENTS SOUGHT.....	19
MANAGEMENT OF CONTAMINATED SOIL AND GROUNDWATER DURING CONSTRUCTION	20
RESPONSE TO SUBMISSIONS	22
Greater Wellington Regional Council (684)	22
Kāpiti Coast District Council (682)	22
55 Rata Road	24
GWRC consent to discharge contaminants from contaminated sites (Kāpiti Road intersection, 124 – 154 Te Moana Road and 55 Rata Road)	25
RESPONSE TO SECTION 149G KEY ISSUES REPORTS	26
KCDC Key Issues Report	26
GWRC Key Issues Report	26
RESPONSE TO BOARD’S S92 REQUEST FOR FURTHER INFORMATION ...	26
PROPOSED CONDITIONS.....	28
CONCLUSIONS	30
ANNEXURE A – CONDITIONS REFERENCED IN THIS STATEMENT.....	32
ANNEXURE B – REVISED CONTAMINATED SITES AND GROUNDWATER MANAGEMENT PLAN (CSGMP)	35

STATEMENT OF EVIDENCE OF KERRY LAING FOR THE NZ TRANSPORT AGENCY

QUALIFICATIONS AND EXPERIENCE

- 1 My full name is Kerry Richard Laing.
- 2 I am the Principal Consultant of Kerrich Environmental Ltd, an independent environmental consultancy that I own and operate.
- 3 I am an environmental scientist and hold the qualifications of B.Sc, M.Sc (Hons) and Ph.D in chemistry and Certificates of Proficiency in planning from the University of Auckland.
- 4 I have 40 years' experience in many areas of environmental and resource management. My experience encompasses contaminated land, environmental audits and assessments, environmental management, hazardous substances and waste management, landfills, risk assessment and waste treatment/disposal and includes regulatory and policy development as well as consulting.
- 5 This experience includes 13 years in fertiliser and resin manufacture, 5 years with the Auckland Regional Council (hazardous industry and waste management), 5 years with Fletcher Challenge Forests and Fletcher Building products (internal environmental consultant), 13 years with Tonkin & Taylor (environmental and engineering consultants) and 3 years as director of Kerrich Environmental.
- 6 I am a member of the Waste Management Institute of New Zealand (WasteMINZ) and the WasteMINZ Contaminated Land Steering Group and also a member of the Resource Management Law Association of New Zealand (RMLANZ). I am an accredited independent hearings commissioner under the Ministry for the Environment's Making Good Decisions Programme. I am also a member of the EPA Hazardous Substances Decision-Making Committee.
- 7 I have been working in contaminated land for the last 20 years and have been involved in the preparation (author, technical reviewer or submitter) of most of the New Zealand contaminated land management guidelines over this period.
- 8 I have worked on numerous contaminated land projects over this time, involving all the commonly encountered contaminants. Projects have involved the consideration of risks to both the environment and human health. Relevant projects have included the Britomart Transport Centre and Quay Street tunnel, double tracking of the Auckland rail line, Project Aqua (Meridian Energy proposal for a 60km canal diverting water from the Waitaki River,

with 6 small hydropower stations), multiple asbestos, gasworks waste, horticultural and timber treatment sites and the Ministry for the Environment funded remediations of the Mapua and Tui mine sites.

- 9 My involvement in these projects has included undertaking and/or supervising contaminated land investigations, developing options for, and directing, remediation of contaminated land as well as preparing consent applications and supporting documentation and technical reviews of similar projects undertaken by work colleagues or other consultants.
- 10 My evidence is given in support of the Notice of Requirement (*NoR*) and applications for resource consent lodged with the Environmental Protection Authority (*EPA*) by the NZ Transport Agency for the construction, maintenance and operation of the Mackays to Peka Peka Expressway Project (*the Project*).
- 11 I am familiar with the area that the Project covers and the State highway and local roading network in the vicinity of the Project.
- 12 I am the reviewer of the Assessment of Land and Groundwater Contamination Effects, Technical Report 23¹, and the Contaminated Soils and Groundwater Management Plan,² which form part of the Assessment of Environmental Effects (*AEE*) lodged in support of the Project.
- 13 I have read the Code of Conduct for Expert Witnesses as contained in the Environment Court Consolidated Practice Note (2011), and I agree to comply with it as if this Inquiry was before the Environment Court. My qualifications as an expert are set out above. I confirm that the issues addressed in this brief of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

SCOPE OF EVIDENCE

- 14 My evidence will deal with the following:
 - 14.1 Executive Summary;
 - 14.2 Background and role;
 - 14.3 Existing environment;

¹ Prepared by Beca Infrastructure. To be read in conjunction with Drawings GIS-3320901-51 to GIS-33 20901-67 (see AEE, Volume 5: Plan Set).

² See AEE, Volume 4, Appendix K.

- 14.4 Methodology of the assessment;
- 14.5 Contaminated land within the Project designation boundaries;
- 14.6 Assessment of land and groundwater contamination effects;
- 14.7 Consents sought;
- 14.8 Management of contaminated land during construction;
- 14.9 Response to submissions;
- 14.10 Response to section 149G key issues reports;
- 14.11 Response to the Board's s92 request for information;
- 14.12 Proposed conditions; and
- 14.13 Conclusions.

EXECUTIVE SUMMARY

- 15 A contaminated land investigation was conducted of the Project area in accordance with the Ministry for the Environment Contaminated Land Management Guidelines.³
- 16 The purpose of the contamination investigation was to identify and characterise areas of soil and groundwater contamination along the route of the proposed Expressway and to determine the potential environmental effects of the Project in regard to any such contamination. The investigation involved the assessment of soil, groundwater and surface water contamination, human health risk to the general public and construction workers, resource consent requirements and soil classification for reuse or disposal.
- 17 The first stage of the investigation included a review of current and historical documents and records, analysis of historical aerial photographs and a walkover of the route.
- 18 The second stage involved intrusive investigations of a number of properties identified as potentially contaminated in the first stage. The investigations comprised test pits and hand augers and in one location boreholes. Soil and groundwater sampling and laboratory analyses were undertaken.

³ Ministry for the Environment Contaminated Land Management Guidelines No. 1. Reporting on contaminated sites in New Zealand (2003), and Contaminated Land Management Guidelines No. 5 Site investigation and the analysis of soils (MfE 2004).

- 19 The results were compared with appropriate criteria, guidelines and background values to evaluate the level of risk to human health and the environment.
- 20 The criteria adopted for the assessment of resource consent requirements, groundwater quality, surface water quality, human health risks and soil classification are as follows:⁴
- 20.1 In the Wellington Region, discharge of contaminants is controlled by the Regional Plan for the Discharges to Land for the Wellington Region, 1999 (Discharges to Land Plan) and the Regional Freshwater Plan for the Wellington Region, 1999 (Regional Freshwater Plan);
- 20.2 For the groundwater quality assessment, the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000) have been used;
- 20.3 For surface water quality assessment, the Ministry for the Environment (MfE) hierarchy of guidelines has been used;
- 20.4 For human health risk assessment, the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations, 2011 (the Soil NES) criteria have been used; and
- 20.5 For soil classification, MfE and regional guidance has been used.
- 21 The investigations indicated that human health guidelines for construction workers and the general public are exceeded at one location at one site (55 Rata Road). The risks are dermal contact and accidental ingestion or inhalation of contaminated dust for construction workers and inhalation of dust for the general public. Accordingly, a resource consent is required under Regulation 10 of the Soil NES for this aspect of the Project, and has been applied for.⁵
- 22 Three sites (55 Rata Road, Kāpiti Road intersection and 124-154 Te Moana Road) have been conservatively identified as contaminated under the Wellington Regional Council "Discharges to Land Plan". Environmental guidelines have been slightly exceeded at a limited number of locations at the three sites. The soils containing elevated levels of contaminants at 55 Rata Road should be excavated and disposed to landfill. Soils containing levels of contaminants slightly above background concentrations could be cement stabilised (where appropriate) and reused, but will most likely be disposed to landfill.

⁴ The assessment criteria are detailed in Technical Report 23 at pp 13-20.

⁵ NSP 12/01.002.

Discharge resource consent has been applied for the discharge of contaminants to land from contaminated sites at Kāpiti Road intersection, Te Moana Road and 55 Rata Road.⁶

- 23 In the absence of soil contamination at the land to be designated at Otaihanga Mountain Bike Park, no discharge resource consent is required for that site.
- 24 Environmental criteria for groundwater have been exceeded at the Otaihanga Mountain Bike Park (downstream from the former landfill), and there is evidence that this is likely due to leachate from the landfill. There are also higher levels of contamination in the leachate in the Landfill Drain. The risks to human health from contaminated groundwater and surface water in the drain are from dermal contact and ingestion. However, no activities in this area are proposed which would result in workers being exposed to groundwater or leachate.
- 25 Overall, the contaminated soils and groundwater identified in the investigations occur in small parts of localised areas of the Project. From these assessments I have concluded that the overall risks to human health and the environment from land contamination within the Project's designation boundaries are low and are typical of those found at similar sites throughout New Zealand.
- 26 A positive effect of the Project is that the more highly contaminated soil will be removed and disposed to landfill. The majority of the lower level contaminated soil (i.e. slightly above background concentrations) will generally lie beneath the Expressway and will represent minimal environmental or human health risk.
- 27 A comprehensive Contaminated Soils and Groundwater Management Plan (CSGMP) has been prepared.⁷ Adherence to the procedures it contains (which include preparation of Construction Health and Safety Plan), as well as those contained in the associated Construction Air Quality Management Plan and the Erosion and Sediment Control Plan⁸ and the NZTA's proposed conditions, will ensure that the low risk is adequately mitigated.
- 28 I have reviewed submissions lodged on the Project relevant to my area of expertise. Nothing raised in those submissions causes me to depart from the conclusions reached in my technical assessment of the Project.

⁶ NSP 12/01.030.

⁷ See AEE, Volume 4, Appendix K.

⁸ See AEE, Volume 4, Appendices G and H respectively.

BACKGROUND AND ROLE

29 My role and responsibilities in relation to the Project include the following.

Technical Report and Management Plan

30 In early 2012 I was engaged to undertake a review of the Assessment of Land and Groundwater Contamination Effects report being prepared by Beca Infrastructure (*Beca*). I also reviewed the associated documents, "MacKays to PekaPeka Expressway Contamination Desk Study" and the "Contaminated Soils and Groundwater Management Plan". Prior to lodgement with the EPA, I provided recommendations for additional work to be undertaken and for additions and amendments to the documents. I met and discussed the recommendations with the relevant Beca personnel and provided further advice on the additional work that was being undertaken. I reviewed and commented on the findings of the additional work and reviewed the final documents before their submission as part of the Project in April 2012.

Proposed conditions of consent

31 I have reviewed the relevant proposed conditions of consent (based on those for the related Transmission Gully project) and suggested amendments, prior to the Project application being lodged.

Further investigations

32 I have reviewed and provided advice on the further investigations proposed to be undertaken on potentially contaminated land, that were not able to be completed before submission of the Project and which would be appropriate to undertake at a later stage.

33 My evidence relies in part on the findings of other technical reports⁹ and the evidence of other experts involved in the Project, including **Mr Graham Levy** (hydrology and stormwater), **Mr Graeme Ridley** (erosion and sediment control), **Ms Ann Williams** (groundwater and hydrogeology), and **Ms Camilla Borger** (air quality).

EXISTING ENVIRONMENT

34 The proposed route generally follows the existing Western Link Road (WLR) Designation through land that is predominantly rural, but with sections of urban development at Paraparaumu, Raumati, Kāpiti and Waikanae. The route has been divided into four sectors which broadly define the urban and rural areas.

⁹ Technical Report 21: Assessment of groundwater effects;
 Technical Report 22: Assessment of hydrology and stormwater effects;
 Technical Report 24: Baseline water and sediment quality investigation report.

- 35 **Sector 1** runs from south of Poplar Avenue to Raumati Road and current land use is a mixture of residential housing and open bush recreational areas. The route follows approximately the existing WLR designation through Raumati towards the Kāpiti Road intersection. Several waterways (drains) cross this sector.
- 36 **Sector 2** runs along the existing WLR designation through the area of Paraparaumu from Raumati road to just north of Mazengarb Road. Current land use is a mix of rural and residential. The portion of the route from Raumati Road to Kāpiti Road passes through a semi-rural area. At Kāpiti Road there is significant residential development to the east of the Alignment and commercial/industrial businesses to the west. From Kāpiti Road to Fytfield Place, residential properties border the route to the east with interspersed residential and rural properties to the west. Several waterways cross Sector 2 including the Wharemauku Stream and tributary drains.
- 37 **Sector 3** runs approximately along the existing WLR designation through the Otaihanga and Waikanae area from just north of Mazengarb Road to just north of Te Moana Road. The current land use within this sector is predominantly rural with an area of residential development between Waikanae River and Te Moana Road. The alignment follows the existing WLR designation for the majority of the sector, but deviates into private land at the river crossing. Several waterways cross Sector 3 including the Mazengarb Drain, The Wastewater Treatment Plant Drain, the Landfill Drain, the Muaupoko Stream, the Waikanae river and the Waimeha Stream
- 38 **Sector 4** runs from Te Moana Road to Peka Peka Beach Road. The current land use within this sector is rural, with predominantly pasture and some areas of bush. Several water ways cross Sector 4 including the Waimeha Stream, the Ngarara Stream, the Ngarara Drain, the Kakariki Stream and the Paetawa Drain.¹⁰
- 39 The **regional geology, hydrology and hydrogeology**, described in Technical Report 23¹¹, is briefly summarised below.
- 40 The generalised geological sequence comprises sand dunes and peat swamps overlying sandy, gravelly alluvial deposits from the erosion of the mountainous greywacke terrain of the Tararua Ranges to the east. Fill from human activity is expected to overlie natural deposits at some locations.

¹⁰ Further detail on the existing environment is contained in Technical Report 23 at pp 11-13.

¹¹ Technical Report 23: Assessment of Land and Groundwater Contamination Effects pp7 – 9. More detail is in Technical Report 35, Assessment of Ground Settlement Effects, Volume 3 of the AEE.

- 41 The majority of the land is modified farmland except where it passes through the urban areas of Raumati, Paraparaumu and Waikanae. The land is characterised by a mix of low peat flats and sand dune formations. The interdunal areas are generally low lying and poorly drained, conducive to the formation of wetlands.
- 42 As with the wetlands, the water courses have been heavily modified by farm or urban development. In addition to the principal water courses there are many minor streams and drains that are crossed by the proposed Expressway.
- 43 A shallow unconfined aquifer extends to a depth of approximately 30m, which provides water for potable supply and irrigation. The shallow aquifer is in hydraulic connection with the Waikanae River and smaller streams in the area and the water table is generally present at less than a metre to a few metres below ground level.

METHODOLOGY OF THE ASSESSMENT¹²

- 44 The contaminated land and groundwater investigation was conducted using a staged approach, in accordance with the Ministry for the Environment (MfE) Contaminated Land Management Guidelines.¹³

Contamination Desk Study¹⁴

- 45 The initial phase of the investigation was a desktop study and compilation of a report using the following information sources:
- 45.1 Review of properties registered on the Selected Land Use Register (SLUR) held by Greater Wellington Regional Council and any associated information referenced.
- 45.2 Review of discharge resource consents issued within 200m of the proposed designation boundaries.
- 45.3 Review of information held by the Kāpiti Coast District Council (KCDC) including property files, building consent registers, resource consent registers, dangerous goods (hazardous substances) licence registers and underground tank location registers.
- 45.4 Review of historical aerial photographs available from NZ Aerial mapping and the National Library of New Zealand.

¹² The general methodology and sector investigation is further detailed in Technical Report 23 at pp 20-52.

¹³ Contaminated Land Management Guidelines No 1. Reporting on contaminated sites in New Zealand (MfE 2003) and Contaminated Land Management Guidelines No. 5 Site investigation and the analysis of soils (MfE 2004).

¹⁴ Technical Report 23, Appendix 5.

- 45.5 A walkover of the route of the proposed Expressway viewing land parcels from public roads.
- 45.6 A detailed site inspection, where possible, of sites identified as having the potential to be contaminated.
- 45.7 Review of Kāpiti Coast groundwater abstraction borehole information held by Beca.
- 46 This initial phase of work identified a number of potentially contaminated sites within the proposed designation boundaries and directly adjacent land outside the proposed boundaries, as listed below:
- 46.1 **Sector 1**
- 16 Leinster Road
 - 150 Raumati Road
- 46.2 **Sector 2**
- 55 Rata Road
 - 58 Kiwi Road
 - Land behind Manchester and Sheffield Streets (Kāpiti Road intersection) [including potential contamination from 102 Kāpiti Road]
 - 109 Kāpiti Road
- 46.3 **Sector 3**
- Otaihanga Mountain Bike Park
 - 124-154 Te Moana Road
- 46.4 **Sector 4**
- None.
- Aerial photographs**
- 47 Since the preparation of Technical Report 23 additional aerial photographs have been reviewed for the years 1942 (Sectors 1 -3, not available for Sector 4), 1973 and 1987. Current aerial photographs (Google maps 2012) along the route have also been considered. This now gives coverage of the route at approximately 15 year intervals (1942, 1956, 1973, 1987, 2001 and 2012). I consider this coverage to be adequate for the purpose of identifying potentially contaminated sites, given the relatively unchanging nature of land use along the WLR, now proposed Expressway designation. The review of aerial photographs additional to those referenced in Technical Report 23 has not resulted in the identification of any additional potentially contaminated sites.

Intrusive Investigations

- 48 Intrusive investigations were undertaken at selected locations of those listed above, along the route of the proposed Expressway. The intrusive investigations¹⁵ undertaken comprised the excavation of test pits and the completion of auger holes. In addition, samples of soil, groundwater and surface water were collected for chemical laboratory analysis. The intrusive investigations and sampling were carried out in general accordance with the MfE Guidelines¹⁶. Full details of the investigations including bore logs, sampling and monitoring details are provided on a sector specific basis in Appendices B and C of Technical Report 23.

Four sites not yet investigated

- 49 The following stormwater pond/wetland areas identified as having the potential to be contaminated were not investigated at this stage of the project (the exact location of these was uncertain at the time of the intrusive investigations described above), but with the expectation and requirement¹⁷ that this would be done prior to construction commencing:
- 49.1 16 Leinster Avenue: Rear of property used as a transport yard with dumped waste materials.
 - 49.2 150 Raumati Road: Area of bush/unused land with dumped waste to the south of Raumati Road.
 - 49.3 58 Kiwi Road: Former horticultural land.
 - 49.4 109 Kāpiti Road: In use as a firewood storage area, multiple sources of potential fill (miscellaneous small stockpiles) on site.
- 50 While these four sites have not yet been investigated, in conservatively assuming that these sites are found to be contaminated, they have been added to Table 2 (list of contaminated sites) in the revised version of the CSGMP attached to my evidence (see **Annexure B.**)¹⁸

¹⁵ Details of methodology given in Technical Report 23 pp 20-24 and site specific details in the relevant parts of Sections 6 and 7 of that Report.

¹⁶ Guidelines for assessing and managing petroleum hydrocarbon contaminated sites in New Zealand (1999) and Contaminated land management guidelines No.5 – Site investigation and analysis of soils (MfE, 2004).

¹⁷ See proposed NZTA condition G.33.

¹⁸ As it is considered unlikely that any of these sites will have contaminants not already covered by the procedures in the CSGMP, no changes to procedures have been made to that Plan (except for those dealing with contaminated groundwater and leachate at Otaihanga landfill).

Potential contamination from a previous service station at 102 Kāpiti Road

- 51 For this site there is no information currently available related to forecourt spills. If any spills had occurred, they could possibly have migrated across the site boundary and contaminated the soil on the route of the proposed Expressway. However, there is a slight slope on the site towards the west and thus it is likely that if any spill occurred it would have moved away from the route of the proposed Expressway. Another possibility is a leak from an underground tank that would contaminate the surrounding soil and groundwater. The movement of groundwater could transport the contamination to soil along the groundwater flow path.
- 52 However the general direction of groundwater flow is towards the coast and I have identified no feature in the vicinity that would result in any change to the expected flow direction. As the proposed Expressway is upgradient of 102 Kāpiti Road, contaminated groundwater (if any) would flow away from the proposed route. As a result, it has not been considered necessary to cover 102 Kāpiti Road in the CSGMP.

The potential presence of UXO in Queen Elizabeth Park (QEP)

- 53 At the time of the initial investigations, two possible alignments of the proposed Expressway were under consideration immediately south of Poplar Avenue. One of these alignments cut across the top (northeastern) corner of QEP. However, the alternative alignment has been selected and thus the proposed Expressway only crosses a very small area of QEP land in the vicinity of Poplar Ave. It is my understanding that the probability of UXO being present on this land is very low. As a result, procedures for identifying the presence of unexploded ordinance (UXO) and dealing with them are not required for this Project.¹⁹

Conclusion

- 54 I consider that the likelihood of finding significant unknown contamination within the designation boundaries is low. The uses at the four sites listed earlier typically only result in low to moderate levels of soil contamination. Any as yet unknown areas of contamination are also unlikely to have significant levels of contamination because any activities likely to result in significant contamination would be expected to be already included on the GWRC HAIL register.²⁰

¹⁹ I note that for the Transmission Gully Project, a Protocol for Unexploded Ordinance has been developed for work within the MacKays Crossing area of the route, which includes QEP land. If considered necessary, a similar Protocol could be adopted for this Project.

²⁰ The HAIL (Hazardous Activity and Industry List developed for the Ministry for the Environment Land Use Planning Guide for Hazardous Facilities, 2002) register records those sites on which an hazardous activity (i.e. using hazardous

CONTAMINATED LAND WITHIN THE PROJECT DESIGNATION BOUNDARIES

55 In this section of my evidence I will discuss the sites where intrusive investigations were carried out in each Sector of the Project and the extent of contamination found at each site.

Sector 2²¹

56 55 Rata Road:

56.1 Twenty seven soil samples and three surface water samples were tested for heavy metals, total petroleum hydrocarbons (TPH) and semi-volatile organic compounds (SVOC), based on the historical fuel storage and current use as a materials storage yard.

56.2 Contaminant concentrations exceeding background concentrations and the relevant environmental or human health guideline values were found at two locations adjacent to the northern drain (Drawing No: GIS-3320901-61).²² At TP 209 there was a strong hydrocarbon odour and black staining of the soil and the concentrations of BaP and TPH were found to be significantly above the guideline values. At TP 214 the BaP concentration was marginally above the environmental guideline risk criterion.

56.3 For other samples the laboratory detection limit (for the procedure used) was slightly above the environmental risk criterion and this risk could not be ruled out. When selected samples were re-tested for polycyclic aromatic hydrocarbons (PAH) with a lower detection limit, no concentrations were found above the environmental risk criterion. It is therefore considered likely that similar results would be found for other samples if re-analysed with the lower detection limit.

56.4 Zinc concentrations in the northern and southern drains upstream of the site were slightly above the ANZECC²³ guideline value, but no downstream concentrations of any of the tested parameters exceeded guideline values.

56.5 Although soil contamination posing a potential risk to the environment or human health has only been found at two of the sampling locations on the site, the whole of the land

substances) or hazardous industry is currently taking place or has taken place historically.

²¹ See also Technical Report 23 at pp 25-37.

²² See AEE, Volume 5: Plan Set.

²³ Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environmental and Conservation Council (2000)

parcel at 55 Rata Road has been conservatively classified as a contaminated site.

56.6 Due to the presence of contamination levels above environmental and human health guidelines levels, remedial action is required for this limited area of the site.²⁴

57 Kāpiti Road intersection:

57.1 Eleven soil samples were tested for heavy metals, total petroleum hydrocarbons (TPH) and semi-volatile organic compounds (SVOC), based on the possible dumping of unknown waste materials in the area.

57.2 Several samples contained concentrations of contaminants above background values whilst one contaminant (arsenic) exceeded the environmental guideline value (24 and 70 mg/kg at 0.2 and 0.5m depth respectively compared with the criterion of 12 mg/kg) at one location, TP109 (Drawing No: GIS-3320901-62).²⁵

57.3 For some samples the laboratory detection limit (for the procedure used) was slightly above the environmental risk criteria for total DDT isomers and BaP and this risk could not be ruled out. All shallow samples at the Kāpiti Road intersection were retested (at a lower detection limit) for DDT isomers, with all results below the environmental risk criterion. When selected samples were re-tested for polycyclic aromatic hydrocarbons (PAH) with a lower detection limit, no concentrations were found above the environmental risk criterion. It is therefore considered likely that similar results would be found for other samples if re-analysed with the lower detection limit.

57.4 Although soil contamination posing a potential risk to the environment or human health has only been found at one of the sampling locations on the site, the whole of the land parcel at the Kāpiti Road intersection has been conservatively classified as a contaminated site.

Sector 3²⁶

58 Otaihanga Mountain Bike Park:

58.1 The Mountain Bike Park is situated to the west and adjacent to the Otaihanga Landfill (now closed except for the

²⁴ The remedial action proposed is set out later in my evidence (under Management of Contaminated Land During Construction).

²⁵ See AEE, Volume 5: Plan Set.

²⁶ Refer also to Technical Report 23 at pp 38-51.

acceptance of treated sewage sludge, cleanfill and green waste). The boundary of the deposition of waste at the western edge of the landfill is not clearly defined in Council records. However, the historical aerial photographs reviewed show the fill being at some distance from the proposed designation. Thus the likelihood of waste being deposited, with consequent ground contamination, within the Mountain Bike Park and therefore within the designation is considered to be low. The Mountain Bike Park area is natural sand dune formations covered by aged pine forest.²⁷

- 58.2 Nonetheless, six soil samples were collected from the hydrogeological boreholes in the area between the landfill and the Mountain Bike Park (Drawing No: GIS-3320901-67).²⁸ These samples were tested for heavy metals and SVOCs, based on likely contaminant discharge from the landfill. Three groundwater samples were also collected and tested for heavy metals, SVOC, volatile organic compounds (VOC), nutrient suite, anion/cation and faecal coliform and E.coli based on likely contaminant discharges from a landfill.
- 58.3 The chemical analysis results of the soil samples showed that no contaminant tested for exceeded its background concentration or its environmental or human health guideline value.
- 58.4 There is evidence of contamination of groundwater by leachate from the landfill in each of the bores through elevated levels of ammoniacal nitrogen (above ANZECC criterion) and the presence of faecal coliform and E.coli. However, the elevated ammoniacal nitrogen could also be from dissolved ammonia formed through the natural degradation of peat which is present at this location. One bore shows levels of copper and zinc above the ANZECC criteria.
- 58.5 The laboratory detection limits for BaP (benzo(a)pyrene), pyrene, azinphos-methyl and dimethoate were above the relevant environmental risk criteria, which are very low. Even if present above the risk criteria, it is considered that the risk posed by these contaminants is likely to be low.
- 58.6 As part of the water quality investigations carried out, surface water and sediment samples were taken from the southern, central and northern wetlands in the Bike Park and the Landfill Drain. In the wetlands, one arsenic concentration and one dieldrin concentration in different sediment samples were

²⁷ Technical Report 23, p 40.

²⁸ AEE, Volume 5: Plan Set.

slightly above ANZECC guideline values and the concentrations of aluminium, manganese and zinc in the surface water samples were above ANZECC values. The testing of the Landfill Drain (designed to capture leachate and stormwater from the western portion of the landfill) showed that the water quality in the drain is poor.

- 59 124 – 154 Te Moana Road:
- 59.1 Twenty two samples were tested for heavy metals, a range of pesticides and PAH, based on previous horticultural activities at the site.
- 59.2 The chemical analysis results showed that one sample HA125 (Drawing No: Gis-3320901-63)²⁹ had a zinc concentration higher than background and the environmental criterion (510 mg/kg compared with 46 mg/kg).
- 59.3 Although soil contamination posing a potential risk to the environment or human health has only been found at one of the sampling locations on the site, the whole of the land parcel at the Te Moana Road site has been conservatively classified as a contaminated site.
- 59.4 As part of the parallel water quality investigations, surface water and sediment samples were taken from the Waimeha Stream which runs adjacent to the Te Moana Road site (Drawing No: GIS-3320901-55).³⁰ The sample was taken downstream from the 124-154 Te Moana Road site. The results of the water and sediment sampling showed that all contaminants were below the laboratory limits of detection or relevant guideline values indicating that any contaminants present on the site are not migrating into the stream.

ASSESSMENT OF LAND AND GROUNDWATER CONTAMINATION EFFECTS

- 60 My evidence above has outlined the relatively low levels of contamination found at only a few locations along the designation. I will now discuss the effects that may arise from that contamination during either the construction of the proposed Expressway or following completion.

²⁹ AEE, Volume 5: Plan Set.

³⁰ Ibid.

Assessment of effects during construction

61 55 Rata Road:

- 61.1 The results of soil analyses at one location for certain PAH compounds and TPH exceed the health guidelines for site workers, and the general public adjacent to the construction site. The potential risks to those working on the site are from accidental ingestion or inhalation of contaminated dust or dermal contact. The risk to members of the public living adjacent to or walking past the site is from inhalation of contaminated dust. However, the proposed dust control measures³¹ will ensure that there will be no effect on members of the public.
- 61.2 The absence of contamination in the adjacent drain has been interpreted as indicating no contamination of the groundwater migrating to this drain. The environmental risks from the soils contamination would result from discharge to groundwater or land or, more likely, to surface water during construction (contaminated sediment in the absence of mitigation measures). However, the proposed sediment control measures³² will ensure there will be no effect on surface water.

62 Kāpiti Road intersection:

- 62.1 Soil and groundwater contamination levels found at this site are not a human health risk. The environmental risks from the isolated arsenic contamination would result from discharge to groundwater or land or, more likely, to surface water during construction (contaminated sediment in the absence of mitigation measures).
- 62.2 I do not consider that any specific remedial action needs to be undertaken with respect to this exceedance of the guideline value, as the contamination is limited in extent and does not pose a hazard. However, as the arsenic concentration is above background levels, the soil must be regarded as contaminated and managed as specified in the Contaminated Soil and Groundwater Management Plan.³³

63 Otaihanga Mountain Bike Park:

- 63.1 No soil contamination has been found at the site, but contaminants are present in groundwater in concentrations above the ANZECC criteria (Ammoniacal-N, copper and zinc).

³¹ As described in the evidence of **Ms Camilla Borger**.

³² As described in the evidence of **Mr Graeme Ridley**.

³³ AEE, Volume 4, Appendix K.

The risks to human health from contaminated ground and surface water are from dermal contact and accidental ingestion and would only apply to site workers. The contaminants identified in groundwater are at much lower concentrations than the surface water.

- 63.2 No activities in this area are proposed which would result in workers being exposed to groundwater. Where works are to be undertaken (e.g. placing the culverts that will run beneath the proposed Expressway) that are near or below the groundwater level, the groundwater will be diverted away from the work area, which will be blocked off and dewatered, if necessary.
- 63.3 The main risk is from the elevated concentrations of faecal coliforms and E.coli in the Landfill Drain, through accidental ingestion and infection of any skin abrasions or cuts. For work required in the vicinity of the Landfill Drain, the work area will be isolated in a similar way to that indicated above.
- 63.4 If, after undertaking the above exclusion measures, contaminated groundwater or leachate is still present in any work area, workers will be wearing the relevant personnel protective equipment to ensure there is no exposure and standard safety procedures will be followed to prevent accidental ingestion. Given the procedures and the low exposure time of workers during the construction period to this groundwater or surface water, the risks will be minor.³⁴
- 63.5 The Landfill Drain is not easily accessible to the public from the Mountain Bike Park, and once the proposed Expressway is constructed, the only publicly accessible wetland/recreational area will be to the west of the Expressway. It is considered the risk to the public is low.
- 64 124 – 154 Te Moana Road:
- 64.1 The environmental criterion for zinc in soil was exceeded at one location and it is considered unlikely that there is groundwater contamination (absence of contamination in the adjacent Waimeha Stream). The potential environmental risks from zinc include discharge to groundwater or land or, more likely, to surface water during construction (contaminated sediment in the absence of mitigation measures).
- 64.2 I do not consider that any specific remedial action needs to be undertaken with respect to this exceedance of the guideline

³⁴ Revised CSGMP, Section 3.1 (Annexure B).

value, as the contamination is limited in extent and does not pose a hazard. However, as the concentration is above background levels, the soil must be regarded as contaminated and managed as specified in the Contaminated Soil and Groundwater Management Plan.

Assessment of effects during operation

- 65 Once the Expressway has been constructed and is in operation, the contamination identified by the investigations is unlikely to pose an adverse effect on human health or the environment. Soils containing levels of contaminants in excess of guideline values will have been excavated and disposed to landfill. Other soils remaining on sites will be clean or contain low levels of contamination below guideline values. The majority of the soils will be beneath the roadway.
- 66 The effects of the Expressway are considered unlikely to increase the environmental risk associated with the groundwater contamination at Otaihanga Mountain Bike Park. Groundwater modelling of the proposed Expressway in the vicinity of the Otaihanga landfill indicates no noticeable change in groundwater levels, gradients and flow as a result of the proposed construction. Human health risks associated with the contamination in the Landfill Drain will be lower, as this area will not be publicly accessible once the Expressway is in operation.

CONSENTS SOUGHT

KCDC consent

- 67 As the property at 55 Rata Road is on the GWRC Selected Land Use Register for the historical storage of fuel (a Hazardous Activities and Industries List site) at the site, the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (*the Soil NES*) apply. As the volume of soil disturbance is likely to be more than 25 m³ per 500m² (above the Permitted Activity volumes detailed in the Regulations), this will require a resource consent under the Soil NES. As the concentrations at TP 209 exceed the relevant soil contaminant standards in the Soil NES, the proposed activities around this location are classified as restricted discretionary and a consent has been applied for from the Kāpiti Coast District Council (KCDC).³⁵
- 68 Technical Report 23 contains the information that satisfies the requirements of Section 10(2) of the NES regarding the detailed site

³⁵ NSP 12/01.002.

investigation and which soil contaminants exceed the applicable standards.³⁶

69 Technical Report 23³⁷ and the Contaminated Soils and Groundwater Management Plan provide the details that satisfy the requirements of Section 10(3) of the NES, and in particular those related to:

- 69.1 The suitability of the land, given the amount and kind of soil contamination;
- 69.2 The approach to remediation and management methods to address the risk posed by the contaminants to human health;
- 69.3 The transport, disposal and tracking of soils and other materials taken away in the course of the activity.

GWRC consent

70 Given the elevated levels of PAH and TPH at two sampling locations, a conservative approach has been taken recommending that activities be controlled by a discharge of contaminants resource consent. This has been applied for under Rule 22 of the Discharges to Land Plan from Greater Wellington Regional Council (GWRC).³⁸

71 A similar approach has been followed with the minor arsenic contamination at the Kāpiti Road intersection and zinc contamination at 124 – 154 Te Moana Road for which resource consent from GWRC has also been applied for.³⁹

72 The land to be designated in the Otaihanga Mountain Bike Park is natural sand dunes covered with pine forest and is considered not to have ever been part of the landfill or contaminated by any other activity. Soil samples taken between the Mountain Bike Park and the landfill did not have any contaminant present above background levels or environmental or human health guidelines. In the absence of contamination, no consents are required.

MANAGEMENT OF CONTAMINATED SOIL AND GROUNDWATER DURING CONSTRUCTION

73 As described earlier in my evidence, the intrusive investigations have found only very limited soil or groundwater contamination at the sites identified as potentially contaminated.

³⁶ Technical Report 23, Sections 6 and 7.

³⁷ Technical Report 23, Section 12.

³⁸ NSP 12/01.030.

³⁹ NSP 12/01.030.

- 74 Standard mitigation methods will be used during construction, including:
- 74.1 Compliance with the consent conditions;
 - 74.2 Adherence to Construction Environmental Management Plan (CEMP)⁴⁰ management procedures to protect human health and prevent discharge of contaminants to land and discharge of contaminants to water, and to the procedures of the Construction Health and Safety Plan to be prepared by the Contractor;
 - 74.3 Use of dust suppression controls as per CEMP Appendix G⁴¹; and
 - 74.4 Use of erosion and sediment controls as per CEMP Appendix H⁴².
- 75 The Contaminated Soils and Groundwater Management Plan⁴³ addresses the potential adverse environmental and human health effects of the Project through the following key mitigation measures:
- 75.1 Appointment of a Contaminated Land Specialist, who will be on site during all excavation works with a range of specified responsibilities;
 - 75.2 A Construction Health and Safety Plan (CHSP), to be prepared by the Construction Manager, detailing procedures and protocols for mitigation of risks to construction workers and the general public during the excavation and handling of contaminated soils;
 - 75.3 Monitoring of activities and receptors likely to be affected by discharges;
 - 75.4 Management procedures for the excavation and handling/disposal of contaminated soils;
 - 75.5 Procedures for identifying and managing unexpected discoveries of contaminated soil and groundwater;
 - 75.6 Soil and groundwater testing; and

⁴⁰ CEMP Volume 4, Appendix K – Contaminated Soils and Groundwater Management Plan.

⁴¹ CEMP Volume 4, Appendix G – Construction Air Quality Management Plan.

⁴² CEMP Volume 4, Appendix H - Erosion and Sediment Control Plan.

⁴³ CEMP Volume 4, Appendix K.

75.7 Submission of a Site Validation Report at the completion of construction, detailing the procedures used to manage the contamination within the Project footprint.

- 76 As noted below, since lodgement the CSGMP has been amended to specifically address the potentially contaminated sites still to be investigated⁴⁴ and more specific procedures for contaminated groundwater and leachate in the vicinity of the Otaihanga landfill, including monitoring of groundwater quality.⁴⁵ The revised CSGMP is attached to my evidence as **Annexure B**.

RESPONSE TO SUBMISSIONS

- 77 In this section of my evidence I will respond to submissions which raise issues relevant to my area of expertise.

Greater Wellington Regional Council (684)⁴⁶

- 78 The GWRC submission is general in nature and contaminated soil is not one of the areas identified by GWRC as requiring further information.

Kāpiti Coast District Council (682)

- 79 In its submission, KCDC supports NZTA's approach to the assessment and management of contaminated soils but identifies several outstanding issues.⁴⁷
- 80 The primary concern is leachate, but also groundwater and surface water levels, and the effects that construction of the Expressway will have in this area. Matters relevant to my area of expertise are discussed below and related matters are addressed in the statements of evidence of **Graham Levy** (hydrology), **Ann Williams** (groundwater) and **Graeme Ridley** (erosion and sediment control).
- 81 KCDC's submission (para 90) states that there has been no discussion of the possibility of contaminants leaching from the soils into ground/surface water during pre-loading. In response, I understand that there will not be pre-loading in the construction yard area and thus there will be no additional leaching of contaminants. I am not aware of any other proposed activities that would have an effect on the generation of leachate. I understand

⁴⁴ See **Annexure B**, pp 3-4 and Table 2.

⁴⁵ See **Annexure B**, p 7 and section 4.2.

⁴⁶ "684" refers to EPA submission number.

⁴⁷ Submission at paras 87-97.

that other Project works in the area (including one culvert)⁴⁸ are intended to formalise the existing drainage from the landfill.

- 82 **Mr Ridley's** evidence addresses the potential discharge of sediment (including cement) in stormwater to the Landfill Drain and the controls that will be instituted to ensure that this is minimised and unlikely to have an effect. The controls may also reduce the concentrations of the leachate contaminants in the drain.
- 83 KCDC's submission states (para 92) that there has been no discussion on the potential impact of exceedances identified in sediment and surface water sampling of the three wetlands and the landfill drain, particularly if contaminants are remobilised due to changes in wetland treatment efficiencies. As noted above, there are no activities that are likely to change the generation of leachate and hence the concentrations in the landfill drain. Further, the stormwater discharge controls may reduce those concentrations. My understanding is that the flows into the wetlands will be such that mobilisation of existing sediments is very unlikely. If there is mobilisation, it is also unlikely that movement would be far before the sediment resettled and its effect would be no different from the current situation.
- 84 It should be remembered that the levels of contaminants recorded in the testing of shallow groundwater (and soils) are very low. It is my understanding from **Ms Williams** that contaminants in shallow groundwater may be slowed a small amount by travel through the more consolidated soils beneath the constructed Expressway and may therefore achieve some additional treatment.
- 85 Comment is made (para 93) that there is a discrepancy between the Contamination Desk Study⁴⁹, which indicates that there are four further sites that require investigation before construction, and the AEE which states (Table 27.1) that no other sites were recommended for investigation. For clarification, the AEE should have stated that the recommendation was with respect to the initial set of intrusive investigations.
- 86 I agree with the comment made by KCDC (para 94) that the CSGMP is "a living document that will require updating (with the necessary approval) throughout the project". This was always the intention, although this may not have been sufficiently clear in the application documentation. The first such update is included as **Annexure B** to this evidence.

⁴⁸ The proposed culvert (at chainage 8900) is to replace the existing small culvert in the middle wetland.

⁴⁹ Technical Report 23, Appendix F.

- 87 I consider that KCDC should be consulted during the process of revising the CSGMP, and have suggested that this could be achieved by including that requirement in the CSGMP (as now shown in the **Annexure B**, section 1.1).
- 88 With respect to the outcomes sought by KCDC (as listed in paras 95-97 of its submission):
- 88.1 I do not consider that the proposed Expressway alters the existing risk to human health from the leachate and contaminated groundwater in the vicinity of the landfill. I am satisfied with my current assessment of the risk and do not consider that further investigation and evaluation of risk is required.
- 88.2 I do not consider that a drainage and leachate management plan needs to be developed or certified for the landfill land.
- 88.3 I confirm that contaminant monitoring in the boreholes is proposed to be undertaken⁵⁰ and I consider it appropriate for KCDC to view that data.

55 Rata Road

- 89 Several submissions relate to the consent sought for 55 Rata Road, including the following:
- 89.1 Burrell (244) supports the NES consent application for this site.
- 89.2 Hare (150) expresses concerns that there are too many people in the area and disturbing contaminated soil will increase the likelihood of exposure to health risks which will have economic repercussions.
- 89.3 Pomare (309) does not provide any specific comments.
- 89.4 Gyles (289) opposes in part and provides a general comment that he would like more specific information about what contaminants and contaminated water may be.
- 89.5 Fawthorpe (318) opposes any publicly-funded activity which may have a damaging effect on human health.
- 89.6 Coe (362) opposes disturbing any land known to be contaminated.

⁵⁰ See revised CSGMP at section 4.2 (**Annexure B**).

- 89.7 Cooke-Willis (398) opposes the disturbance of contaminated soil where this may lead to health implications to individuals in the vicinity.
- 89.8 Dussler (575) opposes on the grounds that it is not necessary to disturb the soil and expose human health to such risks.
- 90 In response to Gyles (289), the information provided with the application specifically details the soil and groundwater contaminants, so it is unclear what additional information is being sought. In response to the other submissions, I note that there is an isolated pocket of contaminated soil on the site (55 Rata Road) which exceeds the Soil Contaminant Standard for the protection of human health. There is only a limited population in the vicinity of the site and the CSGMP contains control procedures that will minimise the potential off-site movement of contaminants (e.g. contaminated airborne dust or sediment. As a result, it is my opinion that there will be no human health effects from the exercise of the consent (if granted).
- 91 As discussed below (under Proposed Conditions), two new conditions are now proposed that relate more specifically to the land use consent required under the Soil NES for undertaking works on contaminated land (55 Rata Road).⁵¹ These conditions require the development of a site-specific Contaminated Soils Management Plan (Human Health), a draft of which is yet to be prepared.

GWRC consent to discharge contaminants from contaminated sites (Kāpiti Road intersection, 124 – 154 Te Moana Road and 55 Rata Road)

- 92 The majority of the same submitters noted above have either similarly supported or opposed this consent application.
- 92.1 Hare (150) comments that contaminants are a health hazard and persist for long periods of time, that runoff from contaminated sites is highly likely, that much of the surrounding land is either residential, farmland or lifestyle blocks, and that people grow food on these lands and contamination of the food supply is likely.
- 92.2 Pomare (309) does not provide any specific comments.
- 92.3 Gyles (289) opposes and provides a general comment that he would like more specific information about what the contaminants and contaminated water may be.
- 92.4 Fawthorpe (318) opposes on the basis that such a discharge is environmental pollution.

⁵¹ See also **Annexure A**, new conditions NES.1 and NES.2.

92.5 Coe (362) makes reference to diversion of waters.

92.6 Dussler (575) does not provide any specific comments.

93 In response, I note that the contamination found on these sites is very minor and I am confident that the control measures contained in the CSGMP will ensure that there is no migration of this minor contamination across the designation boundary.

RESPONSE TO SECTION 149G KEY ISSUES REPORTS

94 I have reviewed the Key Issues Reports prepared by KCDC (dated 8 June 2012) and GWRC (dated 11 June 2012) pursuant to section 149G(3) of the RMA. In this section of my evidence I will address Key Issues noted that are relevant to my areas of expertise.

KCDC Key Issues Report

95 The Report notes the consent required under the NES Regulations for 55 Rata Road and summarises the information that has been provided in consent application documents. As there is no further comment, I understand that KCDC considers the information provided to be of a satisfactory standard.

GWRC Key Issues Report

96 The Report notes (3.6.2) that the National Environmental Standard for Sources of Drinking Water is relevant to the proposal for a variety of reasons, including discharges from contaminated sites. In response, I note that the location of various drinking water supplies and the levels of contamination found on the investigated sites are such that there will be no effect on drinking water supplies from any remediation of earthworks on the contaminated sites.

RESPONSE TO BOARD'S S92 REQUEST FOR FURTHER INFORMATION

97 This section of my evidence relates to the section 92 RMA request for further information from the Board (dated 9 August 2012). In particular it responds to certain technical matters identified in Appendix One of the request pertaining to "Land and Water" issues on which further comment was sought. I will list the request relevant to my area of expertise, and then provide comment.

"Investigation of further potentially contaminated sites/historical activities by the use of additional aerial photos available at 10 year intervals"

98 This has been done as described earlier in my evidence (refer paragraph 47 above). I consider that viewing the records at 10 year intervals was not essential and the approximately 15 years interval chosen provides an adequate record. I note that doubling

the number of years reviewed did not identify any additional potentially contaminated sites.

"The CSGMP does not appear to address investigation or management of further potentially contaminated sites including • 16 Leinster Ave, 150 Raumati Road, 58 Kiwi Road and 109 Kāpiti Road identified in the desk study (Appendix F to Technical Report 23)"

- 99 As noted earlier in my evidence, appropriate investigations of those four sites prior to works commencing is required by proposed consent condition G.33 (see **Annexure A**). I propose an amendment to Condition G.33 so that the sites are now specifically listed.
- 100 Proposals for the investigation of the four sites listed above have already been developed.
- 101 Conservatively assuming that the four sites will be found to be contaminated, they have now been added to the CSGMP (revised Table 2).⁵² It is considered that the existing procedures in the CSGMP will be appropriate to deal with any contamination found on these sites (if any).

"• Potential contamination from a previous service station at 102 Kāpiti Road"

- 102 On the available information (as discussed earlier),⁵³ the potential for contamination from this site extending into the proposed designation is considered to be low and an investigation (or inclusion in the CSGMP) is not considered justified.

"• The potential presence of UXO in Queen Elizabeth Park (QEP)"

- 103 As discussed earlier, the proposed Expressway designation only covers a very small portion of the park land away from likely areas of UXO. As a result, procedures for dealing with the potential presence of UXO are not considered to be required in the CSGMP. If further information becomes available indicating a likely presence in this area, the protocols developed for NZTA for the Transmission Gully project would be adopted.

"• Surface water and groundwater contaminated by leachate from the Otaihanga landfill"

- 104 As lodged, the CSGMP is unclear that the procedures for dealing with unexpected discovery of contaminated groundwater would also apply to groundwater at Otaihanga landfill.

⁵² See **Annexure B**.

⁵³ Paragraphs 51-52.

- 105 As a result, the CSGMP has been amended to specifically address this and also to deal with possible exposure to leachate or surface water contaminated by leachate.⁵⁴

PROPOSED CONDITIONS

- 106 The proposed designation conditions require the works to be undertaken in general accordance with any of the management plans that comprise a suite under the overarching Construction Environmental Management Plan (*CEMP*)⁵⁵.
- 107 The proposed conditions for resource consents have a similar requirement with a more direct reference to the Contaminated Soils and Groundwater Management Plan.⁵⁶ (Copies of the relevant conditions are attached to my evidence as **Annexure A**, for ease of reference).
- 108 Proposed conditions G.15 – G.19 cover the general requirements for all of the management plans that make up the suite under the *CEMP*. The plans need to be kept up to date and consistent with the original purpose and objectives of the plans and the overarching *CEMP*.
- 109 Proposed conditions G.19(d) and G.32 refer specifically to the requirement for a CSGMP and supplement the information I have provided earlier regarding the Plan. Condition G.32 states that the purpose of that Plan is to highlight the minimum standards and identify the best practicable option for management of contaminated soil and groundwater for the Project.
- 110 The CSGMP is required to provide information regarding:
- “a) implementation and operational procedures including:
 - i. roles and responsibilities of the Contaminated Land Specialist;
 - ii. management of as yet un-investigated potentially contaminated sites;
 - iii. management of areas of known contamination;
 - iv. risk register records; and
 - v. a contingency action plan for unexpected discoveries;
 - b) soil and groundwater contamination monitoring requirements and testing and disposal procedures;
 - c) site validation report;
 - d) consent monitoring requirements; and
 - e) review procedures.”

⁵⁴ See **Annexure B**, Section 3.1.

⁵⁵ Proposed NZTA condition DC.7.

⁵⁶ Proposed NZTA conditions G.15, G.17, G.19, G.32 and G.33.

- 111 I consider the CSGMP as lodged⁵⁷ is in compliance with this condition, apart from more specific reference to the contaminated groundwater controls in the vicinity of the Otaihanga landfill.⁵⁸
- 112 Proposed condition G.33 contains a requirement for intrusive investigations of four additional sites identified as potentially contaminated (discussed earlier in my evidence). As noted above, I have proposed an amendment to G.33 that specifically identifies these sites.
- 112.1 Appropriate investigations are required to identify the level of contamination and what measures may be required to manage the potential effects from the discharge of contaminants on human health. In **Annexure A**, I have also suggested additional wording referring to the protection of “the environment” as well as human health (see G.33).
- 112.2 A report outlining the findings has to be submitted to the Manager at least 15 working days prior to the works commencing (on a particular site).
- 112.3 I have reviewed and endorsed the proposed scope of works for these investigations.
- 113 Two new conditions are now also proposed to deal more specifically with the land use consent sought from KCDC (NSP 12/0.002) for disturbing soil containing contaminants which may be a risk to human health (relating to 55 Rata Road). Those new conditions – proposed conditions NES.1 and NES.2 – are contained in **Annexure A**.
- 114 I support these proposed conditions, as the relevant Management Plans are comprehensive and contain all the necessary procedures to mitigate the low level of risk associated with contaminated land and ground water.
- 115 The risk to human health of construction workers from contaminated soil is related, principally, to the potential for exposure via ingestion of contaminated soil, inhalation of contaminated dust or adsorption through the skin of contaminated dust adhering to the skin. Standard procedures with respect to no hand to mouth activity and washing before eating, drinking or smoking will limit spoil ingestion. Dust control procedures detailed in the Construction Air Quality Management Plan⁵⁹ will be followed to minimise dust generation and will be complemented by monitoring of the air quality.

⁵⁷ AEE, Volume 4, Appendix K.

⁵⁸ Now provided for in the revised CSGMP, see section 3.1 in **Annexure B**.

⁵⁹ CEMP, Volume 4, Appendix G

- 116 The risk to the general public is primarily related to the inhalation of contaminated dust as they will have no direct access to the construction sites. Any exposure would be of limited duration, whilst an individual was in proximity to the works and as just mentioned procedures will be in place to minimise dust generation.
- 117 The risk to the environment from contaminated soil would be through the discharge of contaminated sediment from the construction areas during the works. The discharges of sediment will be controlled by the operation and maintenance of sediment retention devices and the procedures in the Erosion and Sediment Control Plan⁶⁰. Water quality will also be monitored.
- 118 The risk to human health of construction workers from contaminated groundwater or surface water is through dermal contact or ingestion. Procedures to eliminate or minimise these potential exposure routes will be included in the Construction Health and Safety Plan.
- 119 The risk to human health of the general public from contaminated groundwater or surface water is considered to be negligible as they will not be able to access construction areas.
- 120 The risk to the environment from contaminated groundwater or surface water is not expected to change as a result of any of the construction activities.

CONCLUSIONS

- 121 A contaminated land investigation was conducted of the Project area in accordance with the Ministry for the Environment Contaminated land Guidelines. Intrusive investigations have been undertaken of a number of properties identified as potentially contaminated. The investigations comprised test pit and hand augers and in one location boreholes. Soil and groundwater sampling and laboratory analyses were undertaken.
- 122 Three sites (55 Rata Road, Kāpiti Road intersection and 124-154 Te Moana Road) have been conservatively identified as contaminated under the Discharges to Land Plan. The contaminated soils and groundwater identified in the investigations occur in small parts of localised areas. The results have been compared with appropriate guidelines and background values to evaluate the level of risk to human health and the environment.
- 123 From these assessments I have concluded that the overall risk to human health and the environment from land contamination within the Project designation is low.

⁶⁰ CEMP, Volume 4, Appendix H.

- 124 A comprehensive Contaminated Soils and Groundwater Management Plan (CSGMP) has been prepared and I consider that adherence to the procedures it contains (and adherence to the Construction Health and Safety Plan), as well as those in the associated Construction Air Quality Management Plan and the Erosion and Sediment Control Plan, will ensure that the low risk is mitigated.
- 125 I am confident that the management of all contaminated soil associated with the Project can be successfully undertaken in accordance with the CSGMP. As discussed earlier, the CSGMP will be required to be implemented as a condition of the NZTA's proposed consent conditions.

A handwritten signature in blue ink, reading "K. P. Laing". The signature is written in a cursive style with a large, sweeping tail on the letter "g".

Kerry Laing
5 September 2012

ANNEXURE A – CONDITIONS REFERENCED IN THIS STATEMENT

(Proposed amendments to the conditions as lodged with the AEE shown as underlined and strike through)

Proposed designation condition⁶¹

Ref	Draft condition
DC.7	<p>All works shall be carried out in general accordance with any of the management plans required by these conditions. The draft management plans lodged with the Notice of Requirement that are listed below in this condition shall be updated and finalised by the contractor and submitted to the Manager for certification at least 15 working days prior to the commencement of construction of the relevant stage or stages:</p> <ul style="list-style-type: none"> a) Construction Noise and Vibration Management Plan b) Construction Air Quality Management Plan c) Construction Traffic Management Plan d) Hazardous Substances Management Plan e) Landscape Management Plan. <p><i>Advice Note: Relationship of Management Plans with the Construction Environmental Management Plan</i></p> <p><i>These management plans are part of a suite of plans that are required to manage the effects of construction of the Project on the environment, and that come under an overarching Construction Environmental Management Plan (CEMP). The CEMP will confirm final Project details, staging of Work, and detailed engineering design to ensure that the Project remains within the limits and standards approved under this designation and that the construction and operation activities avoid, remedy or mitigate adverse effects on the environment in accordance with the conditions of this designation, and any resource consents granted to assist the Requiring Authority in constructing the Project. The CEMP will also provide details of the responsibilities, reporting frameworks, coordination and management required for Project quality assurance; final detailed design; construction methodologies; timeframes and monitoring processes and procedures.</i></p> <p><i>The CEMP is required to be certified by the Greater Wellington Regional Council only, in accordance with the conditions of regional resource consents. Under those conditions, the CEMP is to be supplied to the Kāpiti Coast District Council for an initial consultation process, and then the final document is required to be supplied for information, and displayed in any site office.</i></p>

⁶¹ AEE, Chapter 32.

G.15	All works shall be carried out in general accordance with the management plans required by these conditions.
G.16	Any changes to management plans specified in Condition G.15 that may be sought by the consent holder shall remain consistent with the overall intent of the relevant management plan and shall be submitted to the Manager for certification at least 10 working days prior to any changes taking effect.
G.17	<p>The management plans may not include all details for every stage of works at the time the plan is submitted for certification to the Manager. If further details are to be provided for later stages of construction, the management plan shall specify which stages require further certification at a later date. Further details shall be submitted to the Manager at least 10 working days prior to works commencing in the relevant construction stage. Any changes to the relevant Management Plan that may be required as a result of further design details shall be submitted to be certified by the Manager at least 10 working days prior to works commencing in the relevant construction stage in accordance with the relevant condition(s).</p> <p>The further details submitted shall be consistent with the original purpose and objectives as outlined in the relevant conditions below.</p>
G.18	Where a management plan is required to be prepared in consultation with any third party, the management plan shall demonstrate how the views of that party (or parties) have been incorporated, and where they have not, the reasons why.
G.19	<p>The management of key environmental effects associated with the construction phase of the Project shall be detailed within environmental management plans that are included in the appendices to the CEMP (draft Plans were submitted with the applications). The finalised management plans shall be submitted to the Manager for certification at least 15 working days before the commencement of construction. Works shall not commence until the consent holder has received the Manager's written certification for the management plan(s).</p> <p>This suite of management plans consist of:</p> <ul style="list-style-type: none"> a) Erosion and Sediment Control Plan b) Groundwater (Level) Management Plan c) Settlement Effects Management Plan d) Contaminated Soils and Groundwater Management Plan e) Ecological Management Plan.

⁶² AEE, Chapter 33.2

(New) Proposed consent condition for disturbing soil containing contaminants which may be a risk to human health⁶³

Reference	Wording of Draft Conditions
	Conditions – Contaminated Soils Management Plan (Human Health)
NES.1	<p>The consent holder shall finalise, submit and implement through the CEMP, a Contaminated Soils Management Plan (Human Health) (CSMP(HH)) to be submitted to the Regulatory Manager, Kāpiti Coast District Council, for certification at least 15 working days prior to work commencing on any site identified as posing a risk to human health from the disturbance of contaminated soil. The purpose of this Plan is to identify the following:</p> <ul style="list-style-type: none"> a) the approach to the remediation or ongoing management of the piece of land, including— <ul style="list-style-type: none"> (i) the remediation or management methods to address the risk posed by the contaminants to human health; (ii) the timing of the remediation; (iii) the standard of the remediation on completion; (iv) the mitigation methods to address the risk posed by the contaminants to human health; (v) the mitigation measures for the piece of land, including the frequency and location of monitoring of specified contaminants. b) the adequacy of the site management plan or the site validation report or both, as applicable; and c) the transport, disposal, and tracking of soil and other materials taken away in the course of the activity.
NES.2	<p>Should the further investigations required to be undertaken by Condition G.33 result in levels of contaminants that exceed the limits in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health, then these sites will be included in the CSMP (HH) as required by NES.1.</p>

⁶³ Associated with KCDC land use consent for undertaking works on contaminated land (NSP 12/01.002).

**ANNEXURE B – REVISED CONTAMINATED SITES AND
GROUNDWATER MANAGEMENT PLAN (*REVISED CSGMP*)**

CEMP Appendix K

Contaminated Soils and Groundwater Management Plan

Revision History

Revision N°	Prepared By	Description	Date
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Table of Contents

1	Introduction	1
1.1	Purpose	1
1.2	Scope	1
1.3	Environmental performance standards	1
1.4	Environmental plans and maps.....	2
2	Environmental impacts summary.....	3
2.1	Site identification	3
2.2	Soils characterisation	3
3	Implementation and operation	4
3.1	Management plan for areas of known contamination.....	4
3.2	Contingency action plan for unexpected contamination and hazardous materials discovery	8
4	Contamination testing and monitoring requirements.....	11
4.1	Soil contamination testing and monitoring requirements.....	11
4.2	Otaihanga groundwater and surface water monitoring.....	12
4.3	Roles and responsibilities	12
4.4	Training	12
4.5	Site validation report	13
5	CSGMP review.....	13
6	References.....	14

Appendices

Appendix A - Contaminant Risk Register

1 Introduction

1.1 Purpose

This Contaminated Soils and Groundwater Management Plan (CSGMP) forms part of a comprehensive suite of environmental controls within the Construction Environmental Management Plan (CEMP) for the construction phase of the MacKays to Peka Peka Expressway (“the Project”). The CSGMP addresses the potential adverse environmental effects resulting from contaminated soil, surface water and groundwater at selected locations associated with the construction of the Project.

The principal purpose of this Plan is to highlight the minimum standards that must be complied with as well as best practicable options for management of contaminated soil, surface water and groundwater for the Project. It is intended as a guide for contractors on how to manage contaminated soil, surface water and groundwater at selected locations on site to minimise effects on health and safety and to reduce the impact on the environment.

The CSGMP will be updated, with the necessary approval, throughout the course of the Project to account for changes to construction techniques or the natural environment and consent conditions. A copy of any revisions of a material nature will be passed to Greater Wellington Regional Council (GWRC) and Kāpiti Coast District Council (KCDC) for comment.

1.2 Scope

The scope of this Plan is to:

- Detail the proposed contamination management strategy;
- Summarise contamination hotspots identified in Technical Report 23, Volume 3; and
- Identify appropriate control measures to minimise potential environmental and human health risks from soil, surface water and groundwater contamination associated with construction of the MacKays to Peka Peka Expressway.

1.3 Environmental performance standards

The management of contaminated soils, surface water and groundwater during the Project shall follow the objectives of the CEMP and be undertaken in accordance with the legislative requirements identified in Section 1.7 in the CEMP and relevant conditions of consent or designation granted for the Project.

1.4 Environmental plans and maps

This Plan has links to a number of other management plans which form the CEMP. A summary of the other management plans is included in Table 1.

This Plan refers to the Project team as carrying out works on behalf of and as contracted by the NZTA. The NZTA is the requiring authority and the consent holder.

Table 1 - Relevant Environmental Management Plans and Maps

Plan/map	Relevance	Location
Groundwater (Level) Management Plan (GWMP)	Monitoring and management of groundwater levels.	CEMP Appendix I, Volume 4
Hazardous Substances Management Plan (HSMP)	Spill management, storage and handling of hazardous substances to minimise contaminant discharges.	CEMP Appendix L, Volume 4
Erosion and Sediment Control Plan (ESCP)	Operation and maintenance of sediment retention devices for capture and treatment of sediment laden runoff from contaminated sites. Plan details monitoring of water quality.	CEMP Appendix H, Volume 4
Construction Air Quality Management Plan (CAQMP)	Implementation of dust control measures at contaminated sites and monitoring of air quality during construction.	CEMP Appendix G, Volume 4
Ecological and Landscape Management Plan (ECOLMP)	Monitoring of freshwater and marine ecology which could be affected by runoff from contaminated land.	CEMP Appendix M, Volume 4
Environmental Maps (GIS Layers)	Contaminated sites, construction footprint, Project alignment, receiving environment.	CEMP Appendix C, Volume 4

2 Environmental impacts summary

2.1 Site identification

The route has been divided into sectors which broadly define the different urban and rural areas of the Project. The sectors are shown on the plan in Sector Diagram, Part D, Chapter 7, Volume 2 of the AEE.

2.2 Soils characterisation

A contamination assessment has been conducted at selected locations along the proposed route of the Project, the full findings of which are detailed in Technical Report 23, Volume 3.

Technical Report 23, Volume 3 concluded that soil contaminant concentrations exceeded health assessment criteria for construction workers and members of the general public at one site. Soil contaminant concentrations in isolated samples exceeded relevant environmental assessment criteria at each of the sites investigated (4).

Groundwater and surface water at Otaihangā Mountain Bike Park contained leachate from the adjacent landfill.

Contamination management and monitoring will therefore be required for the Project.

The individual sampling locations at each site where contaminants pose a risk to human health or the environment are identified in the Contaminant Risk Register (**Appendix A**) described in the following section. The locations of confirmed contaminated sites along the route of the Expressway are listed in Table 2, along with potentially contaminated sites that have not been investigated but have conservatively been assumed to be contaminated.

Table 2: Contaminated Sites along the Route of the Expressway

Sector	Contaminated Site Location	Type	Activity	Contaminants Identified
1 (POP-RAU)	16 Leinster Avenue	Contractors Yard	Dumped waste and uncontrolled fill	Site not yet investigated. Assumed heavy metals, TPH
1(POP-RAU)	150 Raumati Road	Unoccupied land	Unknown dumping of waste	Site not yet investigated. Assumed heavy metals, TPH
2 (RAU-IHA)	55 Rata Road	Contractors Yard	Historical storage of hydrocarbons	TPH, PAH

2 (RAU-IHA)	58 Kiwi Road	Horticulture	Market gardening	Site not yet investigated. Assumed heavy metals, TPH
2 (KAP-MAZ)	109 Kāpiti Road	Firewood storage yard	Uncontrolled fill	Site not yet investigated. Assumed heavy metals, TPH
2 (KAP-MAZ)	Kāpiti Road Intersection	Unoccupied land	Unknown dumping of waste	Heavy metals
3 (MAZ-OT)	Otaihanga Mountain Bike Park	Landfill	Landfill drain	Leachate detected in surface water and groundwater
3 (WAI-TEM)	124-154 Te Moana Road	Horticulture	Market gardening	Heavy metals

Notes:

TPH – total petroleum hydrocarbons

PAH – polycyclic aromatic hydrocarbons.

3 Implementation and operation

3.1 Management plan for areas of known contamination

The known locations of contaminated soil are illustrated on Drawings EN-CL-004 to 006, Volume 5. Reference to this will allow preliminary evaluation of material disposal options before such material is excavated.

Pre-excavation procedure

Prior to any earthworks being undertaken at a known contaminated site, a pre-earthworks site meeting will be held and attended by the Project staff including the Construction Manager, the Environmental Manager, the Contaminated Land Specialist (CLS) and personnel involved with the earthworks to discuss the risks and site procedures for handling contaminated soils and groundwater and/or potentially contaminated soils and groundwater located along the route. The Construction Manager shall prepare a site specific Health & Safety Plan (CHSP) for the earthworks which shall cover exposure to contaminated soil, groundwater and dust for construction workers and the general public.

Risk register

A contaminant risk register provides a record of the risk arising from chemical contaminants and the approach to managing the risk. For each contaminant the risk register records:

- A description of the contamination risk;
- An assessment of the consequences and likelihood of the risk occurring;
- A risk rating; and
- An outline of the controls required.

The Risk Register for contamination management along the route of the Expressway, based on chemical laboratory analysis data from soil sampling, is given in **Appendix A**. The contaminants of concern are: polycyclic aromatic hydrocarbons (PAH)/total petroleum hydrocarbons (TPH)/heavy metals.

Site induction

All personnel working on the site during any intrusive ground works will be required to undergo a site environmental awareness induction in addition to the health and safety induction. Construction workers toolbox and tailgate meetings will include aspects of contamination control (soil, water and dust).

Erosion and sediment controls

Erosion and sediment controls will be installed prior to earthworks commencing in accordance with CEMP Appendix H, Volume 4. The following additional measures will be required at contaminated sites:

- Where the construction of earth bunds is required for directing water flow, these shall be constructed from clean materials, either imported fill or using soils from outside of the contaminated site. Topsoil from contaminated sites shall not be used in bund construction.
- Where sediment retention ponds capture runoff and sediment from contaminated sites, the decant mechanism shall be raised to prevent immediate discharge.
- Water samples shall be collected and analysed for contaminants as detailed in the Contaminant Risk Register (**Appendix A**) for the relevant upstream contaminated site.
- Retained water shall not be discharged from retention ponds unless contaminants are confirmed by chemical laboratory analysis to be below ANZECC guideline values for the appropriate protection level for the receiving water.
- Contaminated water may require disposal at an appropriately licensed facility or to sewer with consent from Kāpiti Coast District Council (KCDC).
- Prior to the removal of sediment during maintenance of the sediment retention ponds, the sediment shall be tested for contaminants as detailed in the Contaminant Risk Register (**Appendix A**) for the relevant upstream contaminated site.
- Contaminated sediment shall be managed in the same manner as other contaminated soil, the procedure for which is detailed below.

Excavation procedure

The CLS will be available on site during all excavation works in the areas identified as contaminated and will be responsible, based upon the demarcation of fill and natural ground, for defining which materials are cleanfill, contaminated fill or highly contaminated fill. The CLS, should where necessary, undertake further contamination testing for defining the different areas of contamination. At each confirmed contaminated site, the options for management of contaminated materials are as follows:

<u>55 Rata Road</u>	<ul style="list-style-type: none">■ Significantly contaminated materials must be excavated for disposal at a licenced landfill.
<u>Kāpiti Road Intersection</u>	<ul style="list-style-type: none">■ Contaminated materials may be excavated for disposal at a licenced landfill.
<u>124-154 Te Moana Road</u>	<ul style="list-style-type: none">■ Contaminated materials may be excavated for disposal at a licenced landfill.

Where contaminated material from any site is to be carted off-site to an appropriately licensed landfill, it must be loaded directly onto trucks and immediately dispatched.

The Environmental Manager or CLS will be responsible for compliance with all landfill disposal permit requirements prior to excavation works commencing.

The Project team shall maintain daily records of where excavations have occurred; the type and volume of material excavated and where the material has been disposed of, stored or stockpiled; the quantity of material disposed to landfill and off-site weighbridge documents.

The Project team shall establish the following controls:

- Access to the excavation area shall be restricted to authorised personnel, following appropriate site induction procedures.
- The likelihood of encountering groundwater will be assessed and contingency action to manage groundwater will be developed.
- Stockpiling of excavated material, with appropriate erosion and sediment controls, shall be limited to confirmed cleanfill.
- Off-site material disposal must be to a facility licensed to accept such material.

Contaminated dust controls

Dust suppression controls will be rigorously implemented during earthworks at contaminated sites (in particular at 55 Rata Road) as detailed in Section 5.4 of CEMP Appendix H, Volume 4 and Section 3 of CEMP Appendix G, Volume 4. Controls include but are not limited to:

- Reduction of vehicle speeds.
- Minimising drop heights from loaders.
- Considering timing of works including prevalent wind direction.
- Regular watering of haul roads.
- Revegetating/stabilising exposed surfaces as soon as possible.

Contaminated groundwater and surface water controls (Otaihangā Mountain Bike Park)

Leachate is present in the Landfill Drain separating the Mountain Bike Park from the landfill, and also present at lower concentrations in the groundwater in the area. Before construction activities are undertaken in any area adjacent to the landfill that may expose workers to the contaminated groundwater or surface water, procedures for the isolation of the work area will be implemented. A summary of the procedures, which will be detailed in the CEMP and in site specific Health and Safety Plans, is given below.

General groundwater controls include the following:

- Monitoring of groundwater elevation, flow (into an excavation) and quality, and also measure groundwater levels and quality in established project piezometers in the vicinity;
- Installation of trench stops to control groundwater flow;
- Construction of impermeable barriers such as clay (bentonite) cut-off walls or sheet piles (in locations where the water is found to be grossly contaminated) to prevent contaminants from entering excavations as required.
- Removal of groundwater from excavations by pumping and discharge into sucker truck or sewer. Permission will be required from KCDC for discharge to sewer.

If contaminated groundwater or surface water is still present in the work area, precautions will be taken to protect human health from the bacteria and low level contaminants in the surface water and groundwater. This includes but is not limited to the following:

- Avoid contact with water where possible.
- Where contact cannot be avoided, use PPE to prevent contact with water such as waterproof gauntlets, gumboots, waders etc.
- No eating or drinking on site. Wash hands before breaks and at the end of the day.
- Any skin abrasions to be washed immediately and treated to prevent infections.

- Any additional requirements in the Contractor (Site Specific) Health and Safety Plan.

Asbestos controls

Risks arising from suspected asbestos occur at localised areas within 55 Rata Road and Kāpiti Road Intersection. Excavations at these locations shall follow procedures detailed in this section of the plan and Section 3.2.

Should Asbestos Containing Material (ACM) be observed or suspected during the excavation works, all work shall cease and Guidelines for the Management and Removal of Asbestos (revised 1999) for the Department of Labour, and the Health & Safety in Employment (Asbestos) Regulations (1998) will be followed. Works can recommence once all ACM has been removed safely. Any such asbestos works (assessment, delineation, removal and verification) shall be undertaken by a specialist asbestos contractor.

Post-excavation procedure

Upon completion of excavation works, all plant and equipment shall be cleaned and decontaminated prior to leaving the contaminated site. Water from wheel washes shall be collected and disposed of to sewer with consent from KCDC. Particular care should be taken when cleaning equipment used at locations TP209 and TP214 at 55 Rata Road given that the contaminants in the soil pose a risk to human health. Loose soil on equipment should be brushed off onto a tarpaulin and the soils transferred to the truck containing the contaminated soils being transported to landfill.

Any fill imported to reinstate the site shall be tested for an appropriate suite of contaminants to demonstrate that it is acceptable as cleanfill.

3.2 Contingency action plan for unexpected contamination and hazardous materials discovery

This section outlines the steps to be taken if suspected contaminated soils, surface water, groundwater or hazardous materials are discovered during the wider excavation works. Contingency action will be similar to that for archaeological discovery (refer to the Project Accidental Discovery Protocol) and will be site specific and dependant on the extent and nature of the discovered contamination. The procedures outlined below provide the Project team with protocols to identify potential contamination and take appropriate action to avoid the dispersion of contaminants into the surrounding environment.

Contamination indicators or hazardous materials may include but are not limited to the following:

- Intact or broken drums and containers.
- Unusual odours.
- Discoloured or stained water seeps and soils.

- Petroleum hydrocarbon contaminated soil and/or free product.
- Liquid waste, putrescible waste, household refuse and any material that normally would be sent to a licensed landfill.
- Gas bubbles in standing/pooled water.
- Broken ACM sheets, pipes or fragments.
- Lack of, or stressed vegetation.

During the excavation works on site, the Environmental Management Team and CLS shall actively monitor for the conditions/materials specified above. In the event that one of these is identified, the Project team should take the following actions:

- Stop all earthworks within a 10m radius of the area where the suspect material/ emission/discharge has been recorded.
- Immediately notify the site supervisor.
- Cordon off the area as practicable with a suitable barrier.
- Work shall not resume or commence within a 10m radius of the area unless authorised by the Environmental Manager and CLS.

The site supervisor shall contact the Environmental Manager who will advise on the appropriate course of action in consultation with the CLS. The CLS shall:

- Notify the regulatory authority (GWRC), if required, that contamination has been discovered and contingency action is being implemented.
- Characterise the contamination by collecting samples for chemical laboratory analysis.
- If appropriate, advise the Project team to excavate the suspected contaminated material into a covered bin to allow works to continue with minimum delay.
- If excavation into a covered bin is inappropriate, advise construction work to proceed to an area clear of contamination indicators until material testing, as necessary, defines the material characteristics.
- When the material characteristics have been established, advise the site supervisor as to whether the materials may remain on site or whether materials should be directly loaded into trucks for disposal at a licensed landfill, assuming it can be accepted without prior stabilisation.
- Instruct relevant staff so that all appropriate information such as location and quantity of material and off-site weighbridge dockets are recorded.
- Record all details on an incident form, including GPS of location.

3.2.1 Groundwater controls

In construction areas where the works intersect groundwater and there is visual or olfactory indication of contamination of that groundwater, the groundwater will be tested to determine

whether it is contaminated. Where groundwater is found to be contaminated, the land in the vicinity within the designation will be tested to determine if it is the source of the groundwater contamination. If the ground is found to be contaminated, the procedures for contaminated land described in Section 3.2 will be followed.

General groundwater contamination controls (depending on the nature and scale of the problem) for discovery of unexpected groundwater contamination include the following:

- Monitoring of groundwater elevation, flow (into an excavation) and quality, and also measure groundwater levels and quality in established project piezometers in the vicinity;
- Installation of trench stops to control groundwater flow;
- Construction of impermeable barriers such as clay (bentonite) cut-off walls or sheet piles (in locations discovered as being grossly contaminated) to prevent contaminants from entering excavations as required.
- Removal of groundwater from excavations by pumping and discharge into sucker truck or sewer. Permission will be required from KCDC for discharge to sewer.

Groundwater that is suspected of being contaminated and needs to be removed from the excavations may require disposal at an appropriately licensed facility. Chemical analysis of the groundwater will be required to determine its contamination status.

Appropriate health and safety procedures (as for Otaihanga landfill groundwater in Section 3.1) will be followed in any work area that has residual contaminated groundwater present.

3.2.2 Stockpiling controls

Stockpiling of contaminated material should be avoided. If stockpiling of contaminated materials cannot be avoided, the following steps should be taken:

- Samples of the soil underneath the proposed stockpile area shall be collected for contamination testing to determine any baseline levels of contamination.
- The stockpiled material should be placed on plastic sheeting or similar to prevent contamination of underlying material.
- The stockpile shall be covered at all times to prevent dust and odour emissions and rainfall contact.
- A berm shall be installed around the stockpile to prevent runoff from leaving the area and stormwater from other areas entering the stockpile area.
- Stockpiles shall not be placed near drains or watercourses.
- At the end of the Project works, the area under the stockpile shall be reinstated.
- The soil underneath the stockpile areas shall be tested to verify that the stockpiling activities have not caused ground contamination.

4 Contamination testing and monitoring requirements

In order to determine the contamination status of materials removed from or remaining within a contaminated site, a monitoring programme is required. This will also allow assessment of the effects of disturbing and disposing of contaminated materials on the environment.

4.1 Soil contamination testing and monitoring requirements

Soil quality monitoring is required to cover three key aspects of the management of contaminated and potentially contaminated materials associated with the Project works, namely:

- *Verification testing*: targeted at the management of materials removed from site to a controlled/consented disposal site.
- *Validation testing*: targeted at documenting the concentrations of contaminants within the materials underlying the excavation works that remain in situ.
- *Discovery testing*: in response to “unknown” or unexpected contamination.

An explanation of the three types of testing is given below.

4.1.1 Verification testing

Contaminated soil assessments have been undertaken to give an initial indication of the broad distribution of soil class within identified contaminated sites for each sector. Once the earthworks and materials requirements are finalised, further information on soil condition may need to be provided to the landfill operator prior to disposal of any contaminated soils.

4.1.2 Validation testing

At any location where waste materials or contaminated soils are to be excavated, samples of material will be collected from the base and sides in proportion to the size of the excavated areas. The samples will be submitted for chemical characterisation according to the nature of the contamination as defined in the Contaminant Risk Register in Appendix A. This sampling and testing will provide information on any residual contamination of in situ soils underlying and surrounding the excavation works.

The testing of material being left in situ located at the subgrade layer may, in some locations, indicate that such materials are contaminated. It is noted that it is not intended that the works aim to remediate any such soils.

4.1.3 Discovery testing

If during the excavation works “unexpected” or “unknown” contamination is encountered (refer to Section 3.2), additional chemical testing may be warranted. Such a decision will be made in consultation with the CLS. This response is analogous to that required for archaeological discovery.

4.2 Otaihanga groundwater and surface water monitoring

It is considered that the proposed Expressway will not affect the generation of leachate from the landfill and thus will not affect the quality of the groundwater. Nevertheless it is proposed that monitoring of groundwater quality downgradient from the landfill will be undertaken during the period that the Expressway is constructed through the Mountain Bike Park and construction yard is developed and operated at the landfill. In addition surface water samples will be collected in the landfill drain.

Groundwater samples will be collected every six months from hydrogeological boreholes BH306 and BH307 (Drawing No. GIS-3320901-67). Surface water samples will be collected every four months from monitoring point OW2 (Drawing No. GIS-3320901-47, Technical Report 24, Appendix 24.G). The samples will be tested for the indicator parameters ammoniacal N, aluminium, copper and zinc, as these contaminants have been found to be present at concentrations above guideline values and are all relatively mobile.

4.3 Roles and responsibilities

Section 3.1 of the CEMP details the roles and responsibilities associated with managing the Project. Specifically the Environmental Manager and Construction Manager will take responsibility for the implementation of the CSGMP including training personnel in the required procedures, the coordination of monitoring work by contaminated sites specialists and decision making in the event of discovery of unexpected potentially contaminated material. The Environmental Manager is responsible for liaison with the GWRC.

A CLS will be engaged by the Project team to monitor, supervise and report on all works that may disturb contaminated land. Tasks include the following:

- Coordinate contaminated land assessments and testing;
- Advise on classification of excavated material for reuse and disposal;
- Coordinate contaminated groundwater management and disposal; and
- Train staff in contaminated land identification and control procedures.

4.4 Training

Environmental training for all staff will be undertaken as part of the site induction programme described in Section 3.3 of the CEMP.

4.5 Site validation report

At the end of the construction works, a Site Validation Report (SVR) will be prepared in general accordance with the *Contaminated Land Management guidelines: No. 1*, Ministry for the Environment, 2001. The SVR will provide a summary of the activities undertaken to manage contaminated soils during the construction works, including documentation of excavation locations, disposal records, and testing and monitoring results. The SVR will also provide, where relevant, details on any contaminants remaining in situ including any proposed long term management measures.

5 CSGMP review

This section describes how the CSGMP will be reviewed, including looking at the environmental controls and procedures to make sure that they are still applicable to the activities being carried out

The CSGMP will be reviewed by the Project team after confirmation of the resource consent and designation conditions and will be revised in accordance with these conditions. The CSGMP will be updated, with the necessary approval, throughout the course of the Project to reflect material changes associated with changes to construction techniques or the natural environment. Approval from GWRC will be required for any relevant revisions of a material nature to the CSGMP, for which GWRC has jurisdiction.

A management review of the CSGMP will be undertaken at least annually by the Project Management team and the NZTA Environmental Representative. The management review will be organised by the Environmental Manager and the Project team will be informed of any changes to this plan through the regular Project communications processes. The review will take into consideration:

- Any significant changes to construction activities or methods.
- Key changes to roles and responsibilities within the Project.
- Changes in industry best practice standards or recommended pollution controls.
- Changes in legal or other requirements (social and environmental legal requirements, NZTA objectives and relevant policies, plans, standards, specifications and guidelines).
- Results of: inspection and maintenance programmes, logs of incidents, corrective actions, and internal or external assessments.

The reasons for making changes to the CSGMP will be documented. A copy of the original CSGMP document and subsequent versions will be kept for the Project records, and marked as obsolete. Each new/updated version of the CSGMP documentation will be issued with a version number and date to prevent obsolete CSGMP documentation being used.

6 References

Kirkby, C. Construction Air Quality Management Plan: CEMP Appendix G, Volume 4 of the MacKays to Peka Peka Expressway Project AEE.

Ridley, G. Erosion and Sediment Control Plan: CEMP Appendix H, Volume 4 of the MacKays to Peka Peka Expressway Project AEE.

Smith, G. Assessment of Land and Groundwater Contamination Effects: Technical Report 23, Volume 3 of the MacKays to Peka Peka Expressway Project AEE.

APPENDIX A – Contaminant Risk Register

Risk Evaluation:

Likelihood of finding the contamination	Likely or Unlikely
Consequence	Minor: Low harm to environment or human health
	Moderate: Some harm to environment or human health
	Major: Severe harm to environment or human health
Risk	Low, Medium, High

Sample Location	Soils					Likelihood of Finding the Contamination	Consequence	Risk	Mitigation Controls Required
	Exceeds Background	Exceeds Environmental Risk	Exceeds Human Health Risk	Exceeds Construction Worker Health Risk	Non-natural Materials				
Sector 2 – (RAU-IHA) – 55 Rata Road, chainage 4900									
TP203	As, Cd, Cr, Cu, Pb, Ni, Zn	No	No	No	Yes, ACM	Likely	Minor	Low	Asbestos Containing Material (ACM) to landfill.
TP204	As, Cd, Cu, Pb, Ni	No	No	No	Yes, ACM	Likely	Minor	Low	Asbestos Containing Material (ACM) to landfill.
TP209	Cd, Cr, Cu, Pb, Ni, PAH, TPH	PAH	PAH, TPH	PAH, TPH	Yes	Likely	Moderate	Medium	Remove to landfill.
TP214	PAH	PAH	No	No	Yes	Likely	Moderate	Medium	Remove to landfill.

Sector 2 – (KAP-MAZ) – Kāpiti Road Intersection, chainage 6400-6800									
TP108	Cu, Pb	No	No	No	Yes, ACM	Likely	Minor	Low	Asbestos Containing Material (ACM) to landfill.
TP109	As	As	No	No	No	Likely	Minor	Low	Remove to landfill.
Sector 3 – (MAZ-OT) – Otaihanga Mountain Bike Park, chainage 8000-9200									
BH305-307 Ground water & surface water	Ammoniacal Nitrogen, faecal coliforms, Cu, Zn	Ammoniacal Nitrogen, faecal coliforms, Cu, Zn	No	No	N/A	Likely	Minor	Low	Avoid contact with water where possible. Use PPE such as waterproof gauntlets, waders and gumboots. Wash and treat any skin abrasions immediately to prevent infection.
Sector 3 – (WAI-TEM) – 124-154 Te Moana Road, chainage 11700-11800									
HA125	Zn	Zn	No	No	No	Likely	Minor	Low	Remove to landfill.