Section 92 Response Attachments

Attachment 5 - Contamination

Tonkin & Taylor

T&T Ref: 26145.402
12 December 2012

Watercare Services Limited
c/- Central Interceptor Project Team
AECOM
PO Box 4241, Shortland Street
Auckland 1140

Attention: Alia Cederman

Dear Alia

Further information request for Central Interceptor Main Project Works

As requested, this letter provides our response to the additional information relating to contaminated land that has been requested by Auckland Council for the Central Interceptor main project works consent application. T&T has undertaken this work according to our proposal dated 29 October 2012.

Information requested by Council is presented below in blue italics followed by our response in black text.

1. *Please provide clarification that the Site Management Plan (T&T, July 2012, provided as Technical Report I in Part D) (the SMP) covers both the Main works and CSO Collector sewers.*

   The T&T July 2012 SMP was prepared to cover both the main and combined sewer overflow (CSO) Collector sewer works for the Central Interceptor Project.

2. *Further to the above, please confirm whether the SMP is draft or final.*

   The SMP has been prepared in draft form for the purposes of the consent applications. The detailed design of the works has yet to be completed and a contractor has yet to be appointed. Therefore, it is expected that the SMP will continue to be revised.

   The ability to review procedures and make changes to the SMP is an important aspect of continually improving the effectiveness of the SMP as set out in Section 2 of the SMP. The history of revisions changes will be provided in Appendix B of the SMP.

   The SMP lodged with the consent application has been revised to address some of the additional information queries for the main project works. This revised version is attached to this letter. The revised SMP is referred to from here on as SMP (Rev 1). Future SMPs shall be identified accordingly.

3. *Please advise whether the results of ground contamination assessments for specific sites will be provided to Auckland Council prior to excavation working progressing on that particular site. If so this requirement should be included in the SMP.*

   It is proposed to provide results for specific sites to Auckland Council as they become available. This has been included in the revised SMP (refer Section 3.2.3 of SMP (Rev 1)) attached.

4. *The SMP states "Additional soil sampling and testing is proposed to be undertaken either prior to excavation or during the construction process by sampling and testing open excavations or stockpiles" (refer pg 5, section 3.2). Please advise how the effects of any contamination at the site on the environment and on workers will be managed if works are underway while soil sampling and testing is being carried out. It is acknowledged that the SMP identifies the "The advantages of establishing contamination levels and obtaining a waste manifest prior to any excavation starting on site..." (refer pg 5, section 3.2, last paragraph).*

   As discussed in paragraph 4 of Section 3.2.2 of the SMP(Rev 1) attached, if sampling is undertaken after construction works commence on sites which have not yet been characterised, all soils shall be treated as potentially contaminated while awaiting results and will be subject to the procedures set out in the SMP.

5. *Clarification is required on the soil handling management protocols in Table 3.3 (section 3.2.2, pg 7). It is considered that the management procedures to be followed for soil contaminant concentrations above cleanfill criteria but below NES SCS, should include the management procedures in sections 4 – 9, and not only sections 4 and 5, as documented in Table 3.3.*

   Table 3.3 in the attached SMP (Rev 1) has been updated to refer to sections 4, 5, 7, 8 and 9. Because contaminant concentrations are below the NES SCS for maintenance workers, and hence will not pose a human health risk to workers, procedures in Section 6 are not relevant.

6. *It is understood that in the event that soil contaminant levels are below the NES SCS for recreational and/or commercial/industrial land use, soils will potentially be re-used on site. Please provide an Assessment of Environmental Effects (AEE) to support the re-use of these soils on site, given that levels may exceed relevant discharge criteria in Schedule 10 of the Proposed Auckland Regional Plan: Air, Land and Water. The assessment should give consideration to the potential for discharge associated with placing soils below the groundwater table and also the placement of contaminated soils at the surface.*

   Watercare has advised that they do not intend to re-use excavated soils containing contaminant concentrations above the relevant Auckland Regional Plan: Air Land and Water (ALW Plan) permitted activity (PA) criteria. The soils are proposed to be removed and disposed to a landfill that can take the soil. Hence, an AEE for the re-use of these soils is not provided. Section 4.1 of SMP (Rev 1) has been revised accordingly.

7. *The SMP makes no reference to the potential for discovery of asbestos during excavation, and associated management and transport. It is noted that the Desk Study and Ground Contamination Assessment – Main Works (T&T, July 2012, Technical Report I, Part D) has found that asbestos is present at some of the construction sites investigated, at levels or in a form that are unlikely to affect human health. Please advise what procedures will be used for dealing with material that is suspected or confirmed as containing asbestos whilst undertaking the excavation, for the protection of worker health and safety. These procedures should be included in the SMP. For sites where asbestos is assessed to have a potential risk to human health, consideration should be given to the monitoring of airborne asbestos fibres.*

   Procedures for managing and handling asbestos containing material have been included in the attached SMP (Rev 1).

8. *The SMP refers to staff training and the identification of indicators of contamination (refer pg 12, section 8). Please confirm whether this will include training on the identification of signs of asbestos.*

   Yes, training on the identification of signs of asbestos will be provided and this is included in the attached SMP (Rev 1) Section 8.

9. *Please provide further clarification and detail of the process to be followed in the event of accidental discovery of contamination is required. This should address the health and safety of workers, the role of sampling and field testing and the decision-making process for stopping/resuming work.*

   Further information has been included in Section 8 of the attached SMP (Rev 1) to provide clarity on the process.

10. *The SMP makes mention of "suitable qualified Environmental Consultant to address specific contamination issues outlined in this report" (refer pg 2, section 2.1), with references to the Environmental Consultant in a number of sections. Please provide further clarification on the particular roles and responsibilities of the Environmental Consultant or Contaminated Land Specialist (CLS) in ensuring that the SMP is fully implemented. This should include consideration of the level of involvement of the CLS in overseeing/inspecting excavations.*

    Additional clarification is provided in the attached SMP (Rev 1), principally Section 2.1.

11. *Section 4.1, page 7 of the SMP states that there may be "temporary" stockpiling of contaminated soil on site.*

    a. *Please provide clarification on the meaning of "temporary" stockpiling.*

    b. *Please also provide clarification on the level of soil contamination in the soil potentially to be stockpiled (refer section 4.2, pg 7), as no stockpiling of soil with contaminant levels above the NES SCS is permitted.*

    c. *In the event that soils are stockpiled that have contaminant levels above background, but below NES SCS, please advise whether any measures will be used in addition to the measures in section 4.2 to isolate the stockpile from the ground surface to prevent the possibility of contaminant migration into the subsurface.*

    A temporary stockpile is a stockpile that is not intended to remain at the location permanently, i.e. beyond the period the site is used by Watercare for construction purposes for this project.

    Stockpiling of soil with contaminant concentrations above published background will be avoided where possible, however, this is not always practicable. Stockpiling of contaminated soils (even with contaminant concentrations above the NES SCS) may be required at certain times, hence procedures in Section 4.2 provide for this. The procedures will ensure that any potential and actual risk to the environment and human health will be minimised.

    Further clarification relating to stockpiling and methods to prevent contamination of the original ground surface is provided in the attached SMP (Rev 1) Section 4.2.

12. *Please provide further information on the level of staff training proposed (refer section 8, pg 12). Induction training alone is considered to be insufficient, and consideration of weekly training and daily toolbox meetings is required.*

    For a project this size, it is unlikely that there will be sufficiently high staff turnover to warrant the need to carry out daily toolbox meetings and weekly training relating to contamination aspects. Regular toolbox meetings will be held and contamination aspects will be included as a

regular agenda at these meetings. Further clarification on the toolbox meetings has been included in the attached SMP (Rev 1) Section 8.

13. *Please provide further detail on the procedures for identifying and removing underground structures such as underground storage tanks, and validating remaining in-situ soils (refer section 4.4, pg 8).*

Additional clarification is provided in Section 4.4 of the attached SMP (Rev 1).

14. *Please provide further detail on the decision making process for the disposal of dewatering discharges on contaminated sites, in relation to the results of testing undertaken (refer section 4.7, pg9).*

This is set out in Section 4.7 of the attached SMP (Rev 1).

15. *Please advise how it has been determined that the 12 construction sites are likely to have contaminant levels similar to or lower than the four investigated sites (refer section 14, pg 46 of Desk Study and Ground Contamination Assessment – Main Works), as the land-use and site history at the 12 sites is different to the four sites investigated.*

The inference was based on a qualitative assessment of potential risk using the information collated during the desk study and past investigations of sites with similar land uses. Site soils for some land uses, for example refuse/landfills and bulk fuel depots, are well known to contain elevated contaminant concentrations. The four investigated sites were identified as former refuse/ landfill sites, so higher contaminant levels in the soils at those sites were expected. The laboratory results for those sites indicate that contaminant levels at those sites were not significantly elevated. Contaminant levels for the other 12 construction sites, where no potentially contaminating historical activities were identified are likely to be similar or lower than the four investigated sites.

Nonetheless, further confirmatory testing (detailed site investigations) is proposed at the 12 uninvestigated construction sites and the testing results will determine the measures that need to be adopted during works.

Applicability

This report has been prepared for the benefit of Watercare Services Ltd with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

Tonkin & Taylor Ltd

Environmental and Engineering Consultants

Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
	
.....	.....
Lean Phuah	Gerard Bird
Senior Environmental Engineer	Project Director

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REPORT

Watercare Services Ltd

Central Interceptor Project
Site Management Plan (Rev 1)

Report prepared for:

WATERCARE SERVICES LTD

Report prepared by:

Tonkin & Taylor Ltd

Distribution:

WATERCARE SERVICES LTD	**1 copy**
Tonkin & Taylor Ltd (FILE)	**2 copies**

December 2012

T&T Ref: 26145.400

Table of contents

1 Introduction

This Site Management Plan (SMP) has been prepared to assist in managing the excavation, handling and disposal of any contaminated material encountered as part of the Central Interceptor Project. This SMP (Rev 1) is an updated version of the SMP lodged with the Central Interceptor main project works and CSO Collector Sewers consent applications. Although these consent applications are separate packages and separate consents will be granted, the general principles are the same for both projects. Therefore at this stage a single SMP has been prepared. It will be updated and finalised for each construction package prior to the start of works. The amendments in this revision address the queries which have been raised in the Council Section 92 requests for additional information and are shown in yellow highlighted text. A summary of SMP revisions is provided in **Appendix B**. Document control procedures are set out in Section 2.

This SMP has been prepared in accordance with our proposal dated 29 October 2012.

1.1 Background

The Central Interceptor Project involves the construction of a 13 km long main tunnel, 3 – 5 m diameter, with an invert depth of between 32 m and 110 m below ground surface. The tunnel will extend from Western Springs Park to the Mangere Wastewater Treatment Plant and will connect to the existing Watercare network at key connection points. Eight combined sewer overflow (CSO) collector sewers have been designed to extend out from the Central Interceptor tunnel into the local network. These collector sewers make connections with the local networks in parts of the Pt Chevalier, Waterview, Avondale, New Windsor, and Mt Albert suburbs. A range of pipe dimensions will be involved in these works, depending on location and the capacity needed to address overflow mitigation requirements.

A number of construction sites are required to facilitate completion of the project. Three major construction sites are proposed and will be located at Western Springs, May Road and Mangere (WS1 to WS3). These sites will be used for delivering construction materials and removing tunnel spoil for the main tunnel, including construction of permanent facilities. Smaller construction sites are proposed at a number of locations along the main tunnel route and the CSO collector sewer sites. Activities include shaft sinking launching or retrieving the microtunnel boring machine and construction of surface facilities. Activities at all construction sites will include possible removal of vegetation, earthworks, relocation of services, establishment of site access, construction yards and lay down areas and site reinstatement. Figure 1 in **Appendix A** shows the approximate location of the construction sites.

At the time of writing, the project has been developed to a concept design stage. It is likely that some design details or the concept proposed will change as the project moves through the detailed design process. All figures and dimensions referred to in this report are approximate.

For the purposes of this report, the following definitions are used to refer to the various relevant areas.

Construction site	Area of land that Watercare proposes to occupy during construction. The location of the construction sites are shown in drawings provided in the Drawing Set which accompanies the Assessment of Effects on the Environment (AEE) Reports (or the AEE Drawing Set).
Property	Area of land covered by the legal description in which the construction site is proposed to be located. For example, the property for the Western Springs Depot construction site is land covered by Lot 10 DP 168863 and is 8.72 hectare in area. For a number of construction sites, e.g. Lyon Ave and Whitney Street, the property extends across land covered by more than one legal description.

1.2 Objectives and scope

An assessment on the potential for ground contamination has been completed for the project. The assessment indicates that contaminated soils are generally unlikely to pose a human health risk to workers undertaking the works and the general public. However, they could contain contaminant concentrations that will require the works to be managed to minimise the potential and actual effects on the environment.

The objective of this SMP is to provide procedures for the excavation, handling and disposal of any contaminated or potentially contaminated soil that may be encountered during construction of the Central Interceptor project works.

The scope of this report is to provide procedures for:

- Identifying the presence of contaminants;
- Undertaking excavations in areas potentially containing contaminated soils;
- Managing and containing contaminated soils encountered during the development of the site;
- Controlling potential effects during the works such as odour, dust and tracked soil;
- Managing health and safety during the works; and
- Validating/monitoring the works, as necessary, to ensure appropriate disposal of surplus soil.

2 Plan and management control

2.1 Roles and responsibilities

Implementation of this SMP shall be the responsibility of Watercare. Watercare will appoint a Project Manager to oversee the construction work and a suitably qualified contractor to undertake the required works (the contractor).

Watercare will also appoint a suitably qualified and experienced practitioner (SQEP) as defined in the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 to address specific contamination issues outlined in this report. The SQEP shall be in regular contact with the Watercare Project Manager and/or contractor over the course of the project to ensure that the procedures set out in this SMP are being followed. In particular, the SQEP shall carry out the following work required by the SMP:

- identifying potential contaminated land once the microtunnelling and trenching work route for the main and CSO works is confirmed;
- carrying out confirmatory sampling and testing for the identified potentially contaminated land;
- inspecting the earthworks on an as required basis, dependent on the level of contamination expected in the area of works;
- defining suitable options for landfill locations to dispose of the contaminated soils from the project; and
- preparing the site validation report.

The contractor, in consultation with the SQEP, shall train all earthwork staff to ensure they are aware of and understand ways in which contamination can be identified on site (refer **Section 8**).

Watercare will ensure that a health and safety plan is produced and addresses, as a minimum, the issues outlined in this plan.

2.2 Distribution

At least one (master) copy of the SMP shall be held by Watercare. An up-to-date register of Plan Holders shall be maintained by the person responsible for the management and implementation of the document.

A copy of the SMP shall be kept onsite at all times. It is the responsibility of Watercare to distribute the SMP to site contractors carrying out the construction works.

2.3 Review and update

The SMP shall be reviewed prior to work commencing and as necessary to cater for changes in ground conditions and operation procedures. Any substantive variations to the SMP shall be provided to Watercare and Auckland Council for approval prior to implementation.

It is the responsibility of Watercare to distribute updated versions of the SMP and to ensure the correct copy of the report is onsite at all times.

2.4 Implementation

Responsibility for the implementation of the SMP lies with Watercare and the contractors undertaking the works.

3 Ground contamination

3.1 Actual and potential ground contamination

Ground contamination assessments have been completed and are documented in the following reports:

- T&T, July 2012, Desk study and ground contamination assessment – Main works Central Interceptor Project; and
- T&T, July 2012, Desk study and ground contamination assessment – Combined sewer overflows (CSO) points Central Interceptor Project.

The ground contamination assessments were targeted to the sites being designated by Watercare for construction because construction activities will disturb near-surface soils which could have been contaminated by current and/or historic HAIL activities.

A preliminary site investigation (PSI) assessment indicates that no known potentially contaminating activities have occurred at the following construction sites:

Main Works	**CSO works**
Norgrove Ave (L2S2 & CC3A1 – MH1)	Moa Reserve (CC1A2-MH2)
Whitney Street (L3S3)	Waterview Reserve (CC1B4-MH1)
Dundale Ave (L3S4)	Howlett and Waterview Walkway (CC1B5-MH2)
Haycock Ave (L3S5)	Seaside Reserve (CC1B-MH11)
Kiwi Esplanade (AS7 Option A)	Alan Wood Reserve (CC5- MH3 and CC5-MH4)

Hence, works at those sites will be subject to standard earthwork procedures.

However, potentially contaminating activities are known to have occurred at the other construction sites. Potential contaminants generally include metals, petroleum hydrocarbons and asbestos containing material.

Intrusive investigations or detailed site investigations (DSI) were carried out on four of the potentially contaminated construction sites (Mangere WWTP, May Road, Western Springs and Motions Road). Investigation results and development implications for the four investigated sites are provided in **Table 3.1**.

Table 3.1: Summary of analytical results and development implications

Site name	Soil concentrations			Soil disposal location	
	Above ALW Plan Permitted Activity criteria	Above published background	Above NES SCS [1]	Fill	Natural
Mangere WTP	Yes	Yes	No	Managed fill (Average depth across site of fill requiring disposal = 2.5 m)	Volcanic cleanfill, otherwise managed fill
May Road	No	Yes	No	Managed fill but presence of ACM may require all fill to be disposed to licensed landfill (Average depth across site of fill requiring disposal = 1 m)	Volcanic cleanfill, otherwise managed fill
Western Springs Main site	No	Yes	No	Managed fill (Average depth across site of fill requiring disposal = 0.8 m)	Cleanfill, subject to further testing, otherwise managed fill
Western Springs Secondary site	Yes	Yes	No	Managed fill (Likely depth across site of fill requiring disposal = 1 m)	Not able to be tested
Motions Road	Yes	Yes	No	Managed fill but presence of ACM may require all fill to be disposed to licensed landfill (Average depth across site of fill requiring disposal = 0.5 m)	Volcanic cleanfill, otherwise managed fill

Intrusive investigations or DSIs have not been carried out at the other remaining potentially contaminated construction sites (Rawalpindi Reserve, Mt Albert War Memorial Reserve, Lyon Ave,

[1] MfE, April 2011, National Environmental Standards (NES) Users Guide for Assessing and Managing Contaminants to protect human health - Soil Contaminant Standards (SCS)

Haverstock Road, Walmsley Park, PS25, Keith Hay Park, PS23, Ambury Park, Western Springs Depot, Miranda Reserve and Wingate Reserve). However, the desk study assessment (or PSI) shows that contaminant levels at these sites are unlikely to be at concentrations that would exceed human health criteria for recreational and/or commercial/industrial land use. Hence, the potential for risk to construction workers and general public is likely to be low. However, for some sites, contaminant concentrations could be above published background concentrations and/or the permitted activity acceptance criteria for the Auckland Regional Plan: Air Land and Water. Sampling and testing of soils will be required at these sites before work commences (refer **Section 3.2**) to establish contaminant levels and correct procedures for the sites.

The potential for contamination from the tunnelling works is extremely low because soils at the proposed tunnelling depths are likely to comprise natural ground. There is a low potential for works within the road corridors (such as during micro tunnelling and/or trenching) to encounter contaminated ground and/or groundwater (e.g. migration from neighbouring industrial or service station sites onto the adjacent road corridors). Additional work to check the potential for contamination (**Section 3.2.1**), confirmatory testing (**Section 3.2.2**) and management procedures (**Sections 4.0 to 9.0**) if contaminated materials are encountered are provided in this SMP for those works.

A flow chart summarising the process for evaluating and identifying whether or not land for the construction sites and the tunnelling/trenching will require characterisation of ground contamination prior to excavation, and whether the procedures in this SMP will apply, is provided in **Appendix C**.

3.2 Confirmation of ground contamination

3.2.1 Potential for contamination or Preliminary Site Investigation

As discussed in **Section 3.1** above, additional work to check the potential for contamination (referred to from here on as a Preliminary Site Investigation or PSI) may be necessary for works relating to the micro tunnelling and/or trenching activity. A PSI may also be required if additional construction sites are required or changes in the construction sites occur following detailed design. The PSI shall be undertaken by the SQEP and shall comprise:

- a site walkover over the micro tunnelling and/or trenching route including any new construction sites; and
- review of readily available published information including Auckland Council hazard maps, geological information and historical aerial photographs.

If the PSI identifies that an activity defined in the Ministry for the Environment's (MfE) Hazardous Activities Industrial List (HAIL) has occurred on the land subject to micro tunnelling, trenching or is a new construction site, then confirmatory soil sampling works or a detailed site investigation (DSI) as set out in **Section 3.2.2** shall be undertaken.

In the road reserve, for example, the PSI may identify the potential for contaminated soil to be encountered where the site has been filled or is adjacent to high risk commercial/industrial sites such as a service station. In this case, a DSI would be undertaken in the area of identified HAIL land. Details of the testing are set out in Section 3.2.2.

Where tunnelling is in natural ground and there is limited likelihood of encountering contaminated material, the PSI will reflect this scenario and a DSI will not be required.

3.2.2 Confirmatory soil sampling or detailed site investigation

As discussed in **Section 3.1** above, further sampling is required to characterise ground contamination across the areas of near surface ground disturbance for the main and CSO works where preliminary site investigations have identified HAIL activities but where testing has not yet occurred. This soil sampling and testing is proposed to be undertaken either prior to excavation or during the construction process by sampling and testing open excavations or spoil stockpiles.

Confirmatory soil sampling and testing may also be required on sites that have not been identified by the PSI to be potentially contaminated, if contaminated soil is suspected during the course of works (refer **Section 3.2.1**).

These confirmatory sampling works will establish the appropriate handling procedures and disposal locations.

Results of any soil testing will not be available for at least five working days. If soil testing is undertaken during the construction process, the excavated soil shall be treated as potentially contaminated while awaiting laboratory confirmatory results and relevant procedures set out in **Sections 4 to 6** shall be implemented. A waste manifest is required to be obtained from the Landfill Operator before surplus soils can be disposed of. Discussions with the landfill operator could take several days. Further testing (for leachability) may also be required if soil contaminant levels exceed their screening criteria. Disposal facilities typically require one sample per 500 m^3 of soil.

The advantages of establishing contamination levels and obtaining a waste manifest prior to any excavation starting on site are that the material can be directly loaded onto trucks and transported offsite. This minimises the need for additional environmental controls (e.g. to prevent dust generation from stockpiled material), frees up more area for construction purposes, and minimises associated effects on programme.

3.2.2.1 Sampling procedure

All sampling works to confirm if contamination is present shall be directed and undertaken by the SQEP in accordance with the MfE Contaminated Land Guidelines. The soil sampling strategy (including depth, sampling method, analytes) for the areas of excavation shall be based on the findings of the desk-based ground contamination assessment described in **Section 3.1** above including the additional work set out in **Section 3.2.1**.

3.2.2.2 Classification of soils

Laboratory results should be assessed against the following:

- The Auckland Regional Plan: Air Land and Water (ALW Plan) permitted activity (PA) criteria;

- The National Environmental Standards (NES) Soil Contamination Criteria[2] for commercial/industrial outdoor workers to conservatively establish if soils would pose a health risk to site workers (**Section 6**);
- The National Environmental Standards (NES) Soil Contamination Criteria[3] for recreational or commercial/industrial land use to determine if soils can be re-used on site; and
- Auckland cleanfill criteria to determine appropriate disposal locations.

These are listed in **Table 3.2.**

Table 3.2: Soil Contaminant Concentrations (mg/kg)

Contaminant	ALW Plan PA criteria [5]	NES SCS for commercial/industrial outdoor workers (unpaved) [1]	NES SCS for recreational land use[1]	Auckland Cleanfill Criteria [2]
Arsenic	100	70	80	12
Cadmium	7.5	1,300	400	0.65
Chromium	400 or published background, if higher	>10,000	>10,000	55 or published background, if higher
Copper	325 or published background, if higher	>10,000	>10,000	45 or published background, if higher
Lead	250	3,300	880	65 or published background, if higher
Nickel	105 or published background, if higher	3,000 [3]	600 [3]	35 or published background, if higher
Zinc	400 or published background, if higher	35,500 [3]	14,000 [3]	180 or published background, if higher
Benzo(a)pyrene. Equivalent	2.15	35	40	<LOR
Total Petroleum Hydrocarbon	500 [4]	500 [4]	500 [4]	<LOR

[2] MfE, April 2012. Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011

Contaminant	ALW Plan PA criteria [5]	NES SCS for commercial/industrial outdoor workers (unpaved) [1]	NES SCS for recreational land use [1]	Auckland Cleanfill Criteria [2]
(TPH) C7-C9				
TPH C10-C14	670/510 depending on land use	670 [4]	510 [4]	<LOR
TPH C15-36	> 20,000 [4]	> 20,000 [4]	> 20,000 [4]	<LOR

Notes:

<LOR = Less than Laboratory Limit of Reporting (screen level)

1 - NES for Assessing and Managing Contaminants in Soil to Protect human Health, Ministry for the Environment, 2011

2 - Refer TP153 Background Concentrations of Inorganic Elements within Auckland Soils, Auckland Regional Council, 2001

3 - NEPC, 1999. Guideline on the Investigation Levels for Soil and Groundwater

4- MfE, 1999 (Revised 2011), *Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand*, conservative scenario of sandy silt soil with contamination at 1-4m depth, used for comparison Site Management Practices

5- Auckland Regional Plan: Air Land and Water Permitted activity Rule 5.5.41 requirements

The soil testing results shall determine the management procedures that the contractor shall follow during works. These are shown on **Table 3.3**.

Table 3.3: Soil handling management protocols

Soil contaminant concentrations (refer Table 3.2)	Management procedures
Below Auckland Cleanfill Criteria and does not contain asbestos	Standard earthworks procedures and no additional environmental controls or precautions shall be required for the soil
Above Auckland Cleanfill Criteria but below NES SCS for Commercial/Industrial Outdoor Workers (unpaved) and does not contain asbestos	Follow management procedures in Sections 4, 5, 7, 8 and 9.
Above NES SCS for Commercial/Industrial Outdoor Workers (unpaved) or contains asbestos	Follow management procedures in Sections 4 - 9

3.2.3 Reporting

Results of the ground contamination confirmatory testing shall be provided to Auckland Council as they become available. If the testing shows that additional measures need to be implemented, the SMP shall be revised according to **Section 2.3** of this SMP.

4 Site Management Procedures

Site management procedures are outlined to ensure proper handling of contaminated materials and potentially contaminated materials throughout the project works area.

4.1 Earthwork procedures

The following general handling procedures should be followed where contamination is identified, is suspected, or has not been able to be confirmed (refer **Section 3.2**):

- Material excavated shall be reused on site where practicable, if soil contaminant concentrations are below the lower of the NES SCS for the site final land use or the ALW Plan permitted activity criteria (refer Table 3.2 above). If the soil is not able to be reused on the site, it shall be loaded by the contractor directly onto trucks for offsite disposal (refer **Section 5** for the soil disposal requirements), or temporarily stockpiled immediately adjacent to the excavation to prevent contamination of other areas. Stockpiling should be in accordance with **Section 4.2**.
- Trucks shall be loaded within the site where runoff and possible spills during loading can be controlled and contained.
- Trucks shall have their wheels either swept down or washed before they leave site. Each truck will have a tracking document signed onsite and collected at the receiving facility to track each load of material.
- Trucks shall have their loads covered by tarpaulins during transport of material to licensed landfill. These shall be affixed before leaving site.
- A permit/manifest shall be obtained by the contractor from the landfill destination prior to transportation. The contractor is responsible for obtaining this approval.
- All contaminated material removed from site shall be disposed of as per the procedures set out in Section 5.

4.2 Stockpiling of contaminated or potentially contaminated soil

If stockpiling of contaminated soil on site is required, it shall be managed by the contractor as follows:

- Sediment control measures shall encircle the stockpile, this may include:
  - earth bunds with a minimum height of 0.3m;
  - hay bales;
  - silt fences; and
  - proprietary products such as filter socks etc;
- If the stockpile is to remain for more than 1-2 days, the stockpile shall be covered with clean soil, geotextile or a polythene cover to prevent rainfall induced erosion and dust;
- The stockpile shall be fenced or otherwise secured so that the general public cannot access the stockpile; and

- The stockpile material shall be placed on sheeting or similar to prevent contamination of underlying clean material.

4.3 Imported material procedure

If any material is to be imported to the site for the purposes of filling, the material shall be sampled by the SQEP at a rate of 1 sample for every 100m^3 and analysed for contaminants including metals, total petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAH). It is preferable that the fill is tested at its source prior to its disposal at the site. However, if not, then the contractor shall stockpile the fill on site until test results are available.

Basecourse/hardfill does not require testing, provided it is sourced directly from a quarry. The contractor shall require all compounds in imported fill, other than fill directly from a quarry, to meet the cleanfill criteria provided in **Table 3.2.**

4.4 Procedure for removing and reporting on unforeseen structures

It is possible that subsurface structures with potential to cause ground contamination may be encountered during the works. Structures of concern are those associated with the storage, transfer or disposal of fuels, chemicals or wastes. These may include underground storage tanks (USTs) and their associated pipelines. If unforeseen structures of this type are encountered, the following actions shall be undertaken:

- Stop all earthworks within 5 m radius of the structure;
- Site workers shall immediately notify the site supervisor who will contact the Watercare project manager and Project SQEP;
- The SQEP will visually inspect the structure and advice regarding:
  - safe handling and disposal of the structure and contents, if any;
  - worker health and safety requirements; and
  - any notification requirements under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011 or other regulations;
- Once the contents and structure is removed, the SQEP shall inspect the soil and collect validation samples at the base and walls of the pit where the structure was removed from. Validation testing shall be for the contaminants that are likely to have been or were present in the structure and shall be in accordance with Ministry for Environment (MfE) guidelines[3];
- The pit shall only be backfilled with on-site soils, if appropriate or clean imported soil as authorised by the Watercare project manager or SQEP; and
- Any abandoned drainage lines shall be capped off with concrete and inspected by the SQEP prior to reinstatement.

[3] MfE, Revised 2011, Guidelines for assessing and managing petroleum hydrocarbon contaminated sites in New Zealand.

The contractor shall keep a record (location and description) of all identified structures of this type. These records shall be provided to the SQEP on request.

4.5 Dust control

From an environmental and human health perspective, dust generated during earthworks on a contaminated site has the potential to contain contaminants and, during windy conditions, may discharge offsite.

In order to control the generation of contaminated dust, the contractor shall:

- Limit the amount of contaminated soil to be excavated as much as practicable;
- Limit vehicle access onto contaminated areas;
- Utilise a water truck or portable water sprays in trafficked areas to dampen dust during dry and windy conditions;
- Cover stockpiled material awaiting laboratory testing and removal with geotextile to prevent dust generation;
- Visually monitor dust emissions in the vicinity of the excavation until exposed contaminated material has been covered by clean material; and
- Avoid work during windy conditions.

When utilising water to control dust, the contractor shall ensure that:

- The volume of water used for dust suppression does not exceed soil field capacity of the wetted areas;
- The application does not cause surface runoff that would discharge into natural water bodies; and
- The application of water does not induce soil erosion and soil pugging.

4.5.1 Sites with asbestos contamination

For sites where asbestos has been identified or could potentially be present, all excavation work shall be observed by a person certified under the Asbestos Regulations. Procedures in **Section 4.5** shall be followed in relation to dust management to minimise the generation of asbestos containing dust.

P2 dust masks shall be worn by workers during excavation of these areas. Half mask respirators with asbestos fibre filters shall also be available for workers and workers shall be required to wear them depending on review by the SQEP of the nature and extent of ACM present.

4.6 Stormwater and sediment control measures

During earthworks on contaminated sites, rainwater has the potential to come into contact with contaminated material and become contaminated itself. Contaminated sediment may also become entrained in the stormwater.

The contractor shall liaise with the SQEP and ensure that the stormwater and sediment control procedures specific to and appropriate for the potential contaminants in each area, are put in place prior to any groundbreaking works commencing. The procedures shall include as a minimum:

- Limiting the duration of exposure of contaminated ground as much as possible;
- Containment of any runoff during rainfall events within the excavation;
- Bund stockpiles as set out in **Section 4.2**;
- Implement sediment and erosion control measures as set out in the Erosion and Sediment Control Plan; and
- Controlled site exit points and dry brushing equipment shall be put in place to prevent soils being tracking offsite by vehicles.

4.7 Dewatering

The quality of any dewatering discharges on confirmed contaminated sites shall be tested prior to the disposal of the water to stormwater. If contaminant concentrations of the water meet the criteria set out in **Table 4.1** below, then the water shall be allowed to discharge to stormwater or a watercourse.

Table 4.1: Stormwater disposal trigger levels

Parameter	Water concentration[1] (mg/L)
Arsenic	0.14
Cadmium	0.0008
Chromium	0.04
Copper	0.0025
Nickel	0.017
Lead	0.0094
Zinc	0.031
Hydrocarbons	No sheen

Notes:

All values refer to soluble or dissolved concentrations

1 Guideline for the protection of freshwater species, 80% trigger level from *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC, 2000*

In the absence of confirmatory testing, the waste water shall be disposed to trade waste/sewer.

In addition, the SQEP shall be notified if any unusual/unexpected ground and groundwater conditions are encountered during the project works. The SQEP shall assess the need to test or treat the water, and advise on appropriate disposal methods.

4.8 Odour control

Odorous material is not expected to be encountered, however, if odorous material is uncovered during excavation works the following odour control measures shall be implemented to prevent a nuisance to neighbouring houses and to ensure the health of workers:

- All work in the immediate vicinity of odorous material shall cease and the exposed material shall be covered, for example with tarpaulin, polyethylene sheeting or a layer of clean soil to prevent further discharge of odour. The contractor shall then seek advice from the SQEP. The SQEP shall assess the potential for volatile compounds and advise on health and safety requirements. Assessment of volatility may include use of a Photoionisation Detector (PID) and soil sampling and testing;
- Wind conditions shall be assessed and if necessary work shall cease until conditions are more favourable for minimising discharge of odour;
- A ventilation or other mitigation system, for example odour suppression sprays, shall be established if natural dispersion is not adequate; and
- Health & safety procedures as set out in **Section** 6 shall be employed.

5 Soil Disposal

The contractor shall remove all contaminated soil to a managed disposal facility, such as Puketutu Managed Fill or a licensed landfill such as Redvale Landfill. The confirmation of contamination concentrations present in the soil, as determined by **Section 3.2**, shall determine the suitable disposal location. Acceptance must be confirmed by the landfill prior to disposal.

In general, material for managed fill disposal must be free of anthropogenic waste material such as metal, rubber, asbestos and plastic, although concrete is allowed if it contains no more than minimal reinforcing steel. Up to 5% organic material is allowed, including tree roots, branches and leafy vegetation. Material that does not meet managed fill acceptance criteria must be disposed of at a licensed landfill.

The contractor shall be required to keep records of the material disposed (weighbridge dockets, etc) and this information shall be provided to the SQEP on request.

6 Health and Safety Procedures

Watercare shall prepare and implement a Health and Safety Plan (HSP) in compliance with the Health and Safety in Employment Act, 1992, its amendments, and associated regulations, and other applicable legislation, regulations, codes and guidelines. The Health and Safety Plan shall address all potential hazards associated with the proposed works. General protocols related to the presence of potentially contaminated material are described in this section and shall be included in the HSP.

6.1 Site establishment

The following shall be put in place by Watercare prior to ground works commencing:

- The site will be fenced to restrict entry to authorised workers and prevent access by the general public. Appropriate warning signs (e.g. "*Restricted entry*", "*Danger open excavations*") shall be erected around the fenced site;
- Health and safety inductions shall be completed; and
- Health and safety facilities as required by the hazard management procedures, such as wash facilities, personal protection equipment stores and first aid points shall be provided.

6.2 General safety requirements

Watercare shall, as a minimum, implement the following measures:

- While the excavations remain open, entry to the site shall be restricted to authorised workers only;
- A health and safety officer (HSO) shall be appointed for the works. The role of the HSO shall be to ensure workers are wearing the correct protective equipment and respond to new hazards as they arise;
- All workers shall be inducted prior to carrying out works at the sites. The inductions shall describe the PPE requirements and outline the potential hazards of the contamination that is likely to be encountered at the construction sites;
- Contact with contaminated soil by workers is expected to be minimal because the potential for contamination has been identified as low in most of the sites and earthworks are proposed to be undertaken by mechanical methods. However, as a precautionary measure, any worker that is required to manually handle contaminated or potentially contaminated soil shall be required to wear disposable gloves. The resistance of the gloves to the contaminants encountered on site shall be confirmed prior to use;
- Dust masks shall be made available at the project area at all times. Workers shall use these if visible dust clouds are present within the project area or when excavating areas with asbestos contamination as discussed in **Section 4.5.1** above;
- Additional requirements such as safety glass, disposable or splash/water proof overalls, and/or half mask respirators with organic filters may be required depending on the nature of the contamination present on site and the scale and location of the works. the conditions

under which the need for additional requirements will be triggered shall be identified in the HSP; and

Hand to mouth contact (including eating, drinking and smoking) within the project area shall not be permitted except within a designated support zone(s).

6.3 Emergency procedures

It is the responsibility of the HSO to ascertain the availability of appropriate emergency services and equipment prior to the start of works. These will include:

- The location of the nearest telephone;
- Location of the nearest first aid kit; and
- Appropriate local medical emergency numbers.

The HSO shall be immediately notified of any injury or accident occurring at the site. If serious harm occurs, Occupational Safety and Health (OSH) must be notified immediately.

The following is a list of emergency numbers:

Emergency	111
Auckland Hospital	09 367 0000
Auckland Fire Department	09 302 5142
Auckland Police	09 302 6400
OSH Inspectors	0800 20 90 20
SQEP:	To be determined
Contractor:	To be determined

7 Monitoring Programme

The following sets out the monitoring programme to be carried out during earthworks.

7.1 Earthworks Control

Monitoring shall be undertaken by Watercare or its contractor and shall involve regular (minimum daily) inspections of earthworks areas for:

- Sediment control and compliance with plan;
- Water accumulation; and
- Dust generation.

Watercare or its contractor shall also visually inspect excavations for significant odours or discoloration or asbestos containing material (ACM) and notify the SQEP if any are observed.

7.2 Validation Testing

As full remediation is not being carried out, validation sampling and testing of excavated areas is not proposed.

As discussed in **Section 4.3**, validation testing of imported fill is required.

In addition, should unexpected contamination conditions be encountered the appointed SQEP shall inspect the material and provide additional advice regarding its safe handling and disposal and the requirement for the collection of any validation samples.

Validation sampling shall be undertaken by the SQEP and collected according to the "Ministry for the Environment *Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils* or other equivalent standards approved in writing by the Auckland Council.

8 Staff Training

Environmental training for all earthwork staff working on the project shall be undertaken as part of the site induction programme. All workers shall be made aware of the potential for contamination and understand ways in which contamination can be identified on site (refer **Section 2.1**). This is particularly important if sampling and testing of the material cannot be undertaken prior to excavations on the potentially contaminated sites or if contamination is encountered during the course of works on sites where potentially contaminating activities have not been identified, including works within the road corridor.

If any of the following are noted in the excavation, or the excavated soils, it is an indication that contamination may be present:

- A solvent or hydrocarbon odour (petrol, diesel, kerosene type odour, etc);
- Other abnormal odours not normally associated with soil;
- Discoloured soil (i.e. areas of soil with dark staining, abnormal or unnatural colouring);
- Soil with waste material or building debris (i.e. plastics, metal, bricks, timber etc) indicating the ground has been filled;
- An oily substance or sheen on the surface of soil, or on the surface of water in the excavation; and
- Fibrous material (ACM as fragments or free fibre).

If any of the above indications of contamination are identified, the following actions shall be taken:

- Stop all earthworks within 10 m radius of the area where the suspect material was encountered;.
- Site workers shall immediately notify the site supervisor and isolate the area by taping, coning or fencing the area;
- The site supervisor will contact the Watercare project manager and Project SQEP and implement the health and safety procedures in Section 6;
- The SQEP will visually inspect the material, take samples for confirmatory testing (**Section 3.2**), if required, and provide additional advice regarding its safe handling and disposal according to procedures in Section 4 and 5 above, including any additional worker health and safety requirements.
- If the SQEP considers it appropriate, the suspected contaminated material may be excavated into a covered bin to allow works to continue with minimum delay.
- Work shall not commence within a 10 m radius of the area unless authorised by the Watercare project manager or SQEP.

Toolbox meetings will be held regularly and attended by all contractor staff and subcontractors. Contamination aspects will be included as a fixed agenda item at the toolbox meetings. Regular reminders on identification of contamination and procedures in this SMP shall also be included during these meetings.

9 Validation Reporting

Validation is the process of confirming that the objectives and goals of this SMP have been achieved. A Site Validation Report (SVR) shall be prepared by the SQEP on completion of the earthworks and upon receipt of all necessary documentation. The report shall document:

- Variations from the strategies outlined in this plan and the reasons why variations were necessary;
- Provide results of validation testing of any imported soils to confirm they meet the acceptance criteria set out in **Table 3.2**;
- Confirm the excavation soil disposal volume and destination;
- Results of soil validation samples (if any);
- Evidence that groundwater and surface water was disposed in an appropriate manner; and
- Requirements for further work, if any.

The validation report shall comply with the Ministry for the Environment *Guidelines for Reporting on Contaminated Sites in New Zealand* (June 2001).

Information is required from the Contractor for inclusion in the SVR. The information requirements are:

- Copies of weigh bridge summaries for the disposal destination for contaminated soil;
- Documentation (for example copies of weigh bridge summaries or invoices) confirming the source of the material and location of placement of any materials imported to the site;
- Records of visits by council representatives;
- Details of any complaints related to contamination and how they were resolved; and
- Details of any health and safety incident related to the contamination and how they were resolved.

10 Applicability

This report has been prepared for the benefit of Watercare Services Ltd with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

Tonkin & Taylor Ltd

Environmental and Engineering Consultants

Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
.....	.....
Lean Phuah	Gerard Bird
Senior Environmental Engineer	Environmental Group Manager

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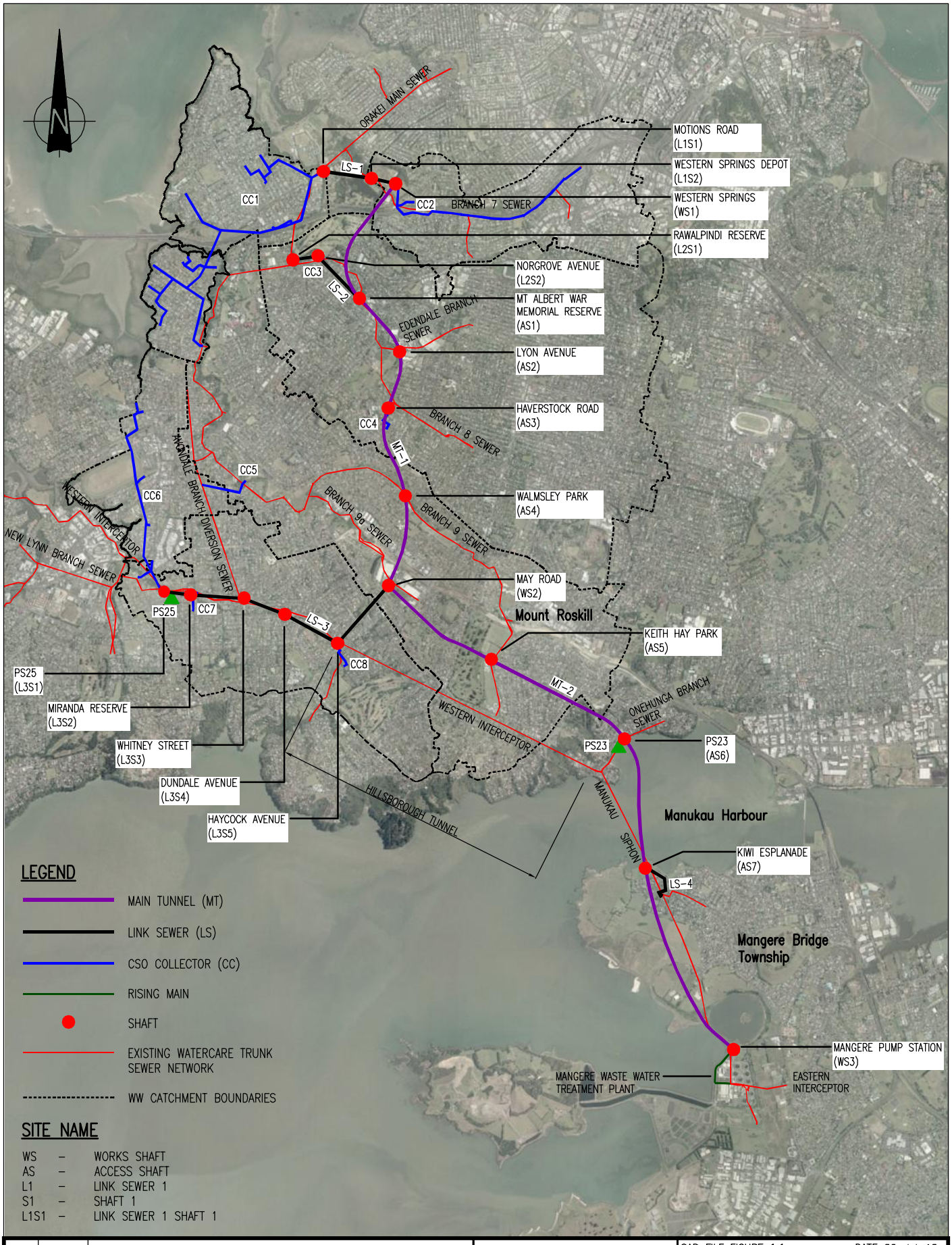
Appendix A: Figure



A	17/08/12
ISSUE	DATE

CENTRAL INTERCEPTOR
GENERAL
OVERALL SITE LAYOUT

AEE AUGUST 2012

water Care services limited

CAD FILE FIGURE 1.1 DATE 26-Jul-12

ORIGINAL SCALE A4 1:62500 A4

CONTRACT No. 0538

DRAWING No. FIGURE 1.1

ISSUE A

Appendix B: Summary of SMP revisions

Table B1: Summary of SMP Revisions

Revision	Prepared by	Date	Description
SMP	T&T	July 2010	Lodged for consent application.
SMP (Rev 1)	T&T	November 2010	This revision. Addresses additional information requested by the Auckland Council.

Appendix C: Process flow chart for evaluating contamination

Flowchart for Evaluating the need for contamination characterisation and applicability of the SMP