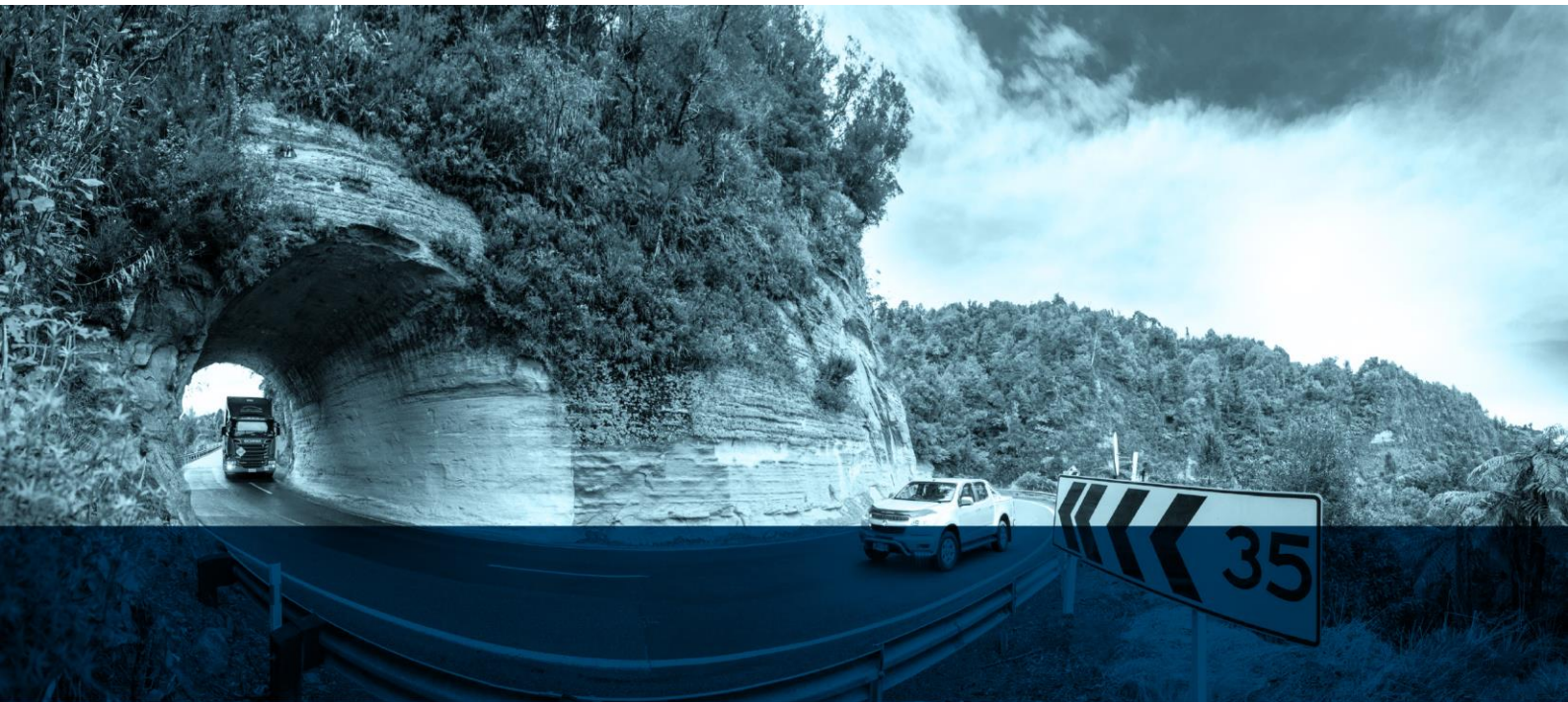





# Contaminated Land Management Plan

August 2018

Mt Messenger Alliance

MMA-PLN-CON-RPT-2891



Quality Assurance Statement			
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1.	May 2018	Updated for Council, following completion of DSI
2.	July 2018	Updated for Council Hearing
3.	August 2018	Updated following Council comments

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**Disclaimer**

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# Glossary

Acronym / Terms	Definition
ACM	Asbestos-containing material
AEE	Assessment of Environmental Effects
CEMP	Construction Environmental Management Plan
CLMP	Contaminated Land Management Plan Fulfils the requirements of a Site Management Plan as referred to in the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.
DSI	Detailed Site Investigation as referred to in the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011, and as outlined in the Ministry for the Environment Contaminated Land Management Guidelines No 1: Reporting on Contaminated Sites in New Zealand (updated 2011).
HAIL	Ministry for the Environment Hazardous Activities Industrial List
MfE	Ministry for the Environment
MMA	Mount Messenger Alliance
NES Soil	Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011
NPDC	New Plymouth District Council
PCBU	Persons conducting business or undertaking
PPE	Personal protective equipment
PSI	Preliminary Site Investigation as referred to in the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011, and as outlined in the Ministry for the Environment Contaminated Land Management Guidelines No 1: Reporting on Contaminated Sites in New Zealand (updated 2011).
TRC	Taranaki Regional Council

# 1 Introduction

This Contaminated Land Management Plan (CLMP) has been prepared for the NZ Transport Agency's Mt Messenger bypass Project (the Project).

## 1.1 Purpose and Objectives of the CLMP

The CLMP has been prepared to manage the potential for adverse effects relating to the disturbance of potentially contaminated land during the construction of the Project.

Specifically, the purpose of the CLMP is to:

- Ensure that the earthworks required as part of the Project are appropriately managed and that contaminated or potentially contaminated soils are identified, handled and disposed of in an appropriate manner;
- Provide procedures to manage potential ground contamination effects on human health and the environment during ground disturbance activities associated with proposed earthworks; and
- Support the resource consent application for ground disturbance works under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES Soil).

The CLMP has been prepared in general accordance with Ministry for the Environment (MfE) Contaminated Land Management Guideline No. 1: Reporting on Contaminated Sites in New Zealand (Revised 2011). Sampling procedures provided in the plan generally comply with the MfE Contamination Land Management Guidelines No.5 – Site Investigation and Analysis of Soils (Revised 2011).

The persons preparing this CLMP are suitably qualified and experienced practitioners as required by the NES Soil Regulations and defined in the NES Soil Users' Guide (April 2012).

The CLMP is an appendix to the Construction Environmental Management Plan (CEMP) for the Project. The construction methodology for the Project is detailed in the CEMP; and the Assessment of Effects on the Environment (AEE) for the Project.

## 1.2 Review and updates to the CLMP

This CLMP is a live document that will be reviewed and updated during the course of the Project to reflect changes, where that change affects the management of contaminated land as provided for in the CLMP, and is:

- associated with construction techniques and communication; or
- to cater for changes in the understanding of ground contamination and/or accepted best operational practice and/or regulations.

A review process is described in Section 6.

## 2 Roles and Responsibilities

### 2.1 Organisational Roles

A summary of the organisations likely to be involved in the earthworks and their roles and responsibilities under this CLMP is provided in Table 2.1.

**Table 2.1 – Key project organisational roles and responsibilities**

Role	Responsibilities
NZ Transport Agency	<ul style="list-style-type: none"> <li>Overall responsibility for project compliance and performance in relation to environment, quality assurance and incident management.</li> <li>Review of the CEMP and management plans, including this CLMP.</li> </ul>
Project Manager	<ul style="list-style-type: none"> <li>Responsible for site management and implementation of CLMP and compliance with consent conditions.</li> </ul>
Construction Manager	<ul style="list-style-type: none"> <li>Shall be responsible for undertaking works in accordance with requirements of the CLMP.</li> </ul>
Environmental Manager	<ul style="list-style-type: none"> <li>Responsible for provision of environmental advice during the works and liaison with the Contaminated Land Specialist to support the construction team in implementation of the CLMP.</li> <li>Undertake audits, as required.</li> </ul>
Contaminated Land Specialist	<ul style="list-style-type: none"> <li>Responsible for provision of ground contamination advice during the works, additional soil testing, if required, and works completion reporting.</li> <li>The Contaminated Land Specialist should meet the definition of a Suitably Qualified and Experienced Practitioner (SQEP) as defined in the MfE NES Soil User's Guide (April 2012).</li> </ul>
New Plymouth District Council	<ul style="list-style-type: none"> <li>Monitoring and compliance of consent conditions.</li> </ul>

### 2.2 Distribution

In accordance with the provisions of the Health and Safety at Work Act 2015, it is the responsibility of the persons conducting business or an undertaking (PCBU) to communicate to any persons carrying out work on the site, the likely extent of contamination, associated hazards and recommended procedures.

A copy of this CLMP shall be distributed to appropriate staff and subcontractors undertaking the ground disturbance works related to this project. During these works, a copy of the CLMP shall be kept onsite at all times.

## 3 Site Condition

The alignment will intersect a number of rural zoned properties. The details of these properties are provided in the Ground Contamination – Detailed Site Investigation (DSI)<sup>1</sup> with the alignment shown in Figure A 2 and A 3 (Appendix A).

### 3.1 Site History

Historical information relating to the Project area, from various sources, was reviewed and a partial site walkover was undertaken to confirm current and historic activities that have occurred along the alignment. The Ground Contamination – Preliminary Site Investigation (PSI) (AEE Technical Report 12) details the review and assessment of the potential for the current and historic activities to have resulted in ground contamination.

In summary, around 1890, the Government bought land north of Pukearuhe and opened it up for settlement and made a new road over Mt Messenger. The existing SH3 was formed not long after and was fully sealed by 1926.

The properties along the alignment, to the east of the existing SH3, have remained largely unchanged from the earliest available aerial photographs from the mid-1940s. The developed dry stock farms along the alignment have undergone some development over the years, namely the addition of several buildings/ structures at each of the farms and some water course modifications, while the bush blocks along the alignment have remained untouched and unchanged. No stockyards, livestock dip or spray race structures were identified along the alignment in the site information reviewed and site walkover inspection.

A number of environmental incidents have been recorded between 1999 and 2015 by Taranaki Regional Council (TRC), which relate specifically to activities on two of the farms along the alignment, 3072 Mokau Rd (Sec 9 SO 457513) and 2528 Mokau Road (Sec 16-19 and Pt Sec 13 Blk XII Mimi Survey District) as shown on Figures A 2 and A 3 (Appendix A). There have also been reports of fly tipping, dumping and spills associated with traffic incidents along SH3.

### 3.2 Geology and Hydrogeology

The published geology beneath the alignment is described by Edbrooke<sup>2</sup> as interbedded fine to very fine-grained sandstone and mudstone or siltstone of the Mount Messenger Formation.

The alignment traverses two catchments. These are the Tongaporutu Catchment in the north and the Mimi Catchment to the south. The boundaries of these catchments are defined by the high points of the alignment adjacent to the summit of Mount Messenger. Tributaries in

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<sup>1</sup> Mt Messenger Alliance, March 2018. Ground Contamination – Detailed Site Investigation.

<sup>2</sup> Edbrooke, S.W. (compiler) 2005. Geology of the Waikato area. Institute of Geological and Nuclear Sciences 1:250 000 geological map 4. 1 sheet + 68 p. Lower Hutt, New Zealand: Institute of Geological and Nuclear Sciences Limited. Lower Hutt, New Zealand.

the Tongaporutu Catchment feed north into a valley which forms the defined water course of the Waioiotawa Stream. Tributaries of the Mimi Catchment flow south to a low marsh/ wetland and form the defined water course of the Mimi River.

### 3.3 Potential for Contamination

The Ground Contamination – PSI (AEE Technical Report 12) identified that potentially contaminating activities have (or are likely to have been) undertaken at discrete locations along the alignment. A large portion of the alignment has not been subject to the potential contaminating activities.

Potentially contaminating activities as described by MfE Hazardous Activities Industrial List (HAIL) which have been identified along the alignment are:

- Waste disposal to land associated with potential farm dumps at the dry stock farms at the northern and southern ends of the alignment; and
- Fly tipping along existing SH3.

Figure A 2 and A 3 (Appendix A) shows the locations of the identified HAIL activities.

A DSI<sup>1</sup> to evaluate soil conditions to establish the presence of contamination, if any, associated with the HAIL activities at the site was undertaken in December 2017. This investigation included soil sampling which targeted locations in the vicinity of proposed land disturbance and where HAIL activities have been identified. All results were below both the adopted assessment criteria for the protection of human health and the environment as follows:

- NES Soil contaminant standard and associated hierarchy documents as referred to in MfE Contaminated Land Management Guideline No. 2, directed in the NES Soil Users Guide to assess human health risks. Based on the proposed use, the standard for commercial/ industrial land use has been adopted. The commercial/industrial worker land use standard has also been adopted for assessing risks to construction workers for metal contaminants. For hydrocarbons, the maintenance worker soil acceptance criteria from the MfE Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand; and
- An environmental discharge criteria is not specified by the New Plymouth District Council (NPDC) or TRC. As per common practice for regions in New Zealand without guidelines, we have adopted the Canadian Council of Ministers of the Environment (CCME) which provides protection of environmental values for commercial/industrial use to assess potential environmental impacts.

A conceptual model as defined by the MfE Contaminated Land Management Guidelines No 5: Site Investigation and Analysis of Soils (updated 2011) was developed for the Project. The conceptual site model shows that the HAIL activities are unlikely to have impacted soils at concentrations that would pose a risk to human or environmental receptors during or at completion of the Project works.

However, there remains the potential to encounter unexpected contamination during the proposed works. In such cases, potential risks to human health and the environment are

expected to be able to be managed during works through the implementation of appropriate controls so that any effects from contaminated land will be negligible. Such controls are detailed in Section 4 of this CLMP.

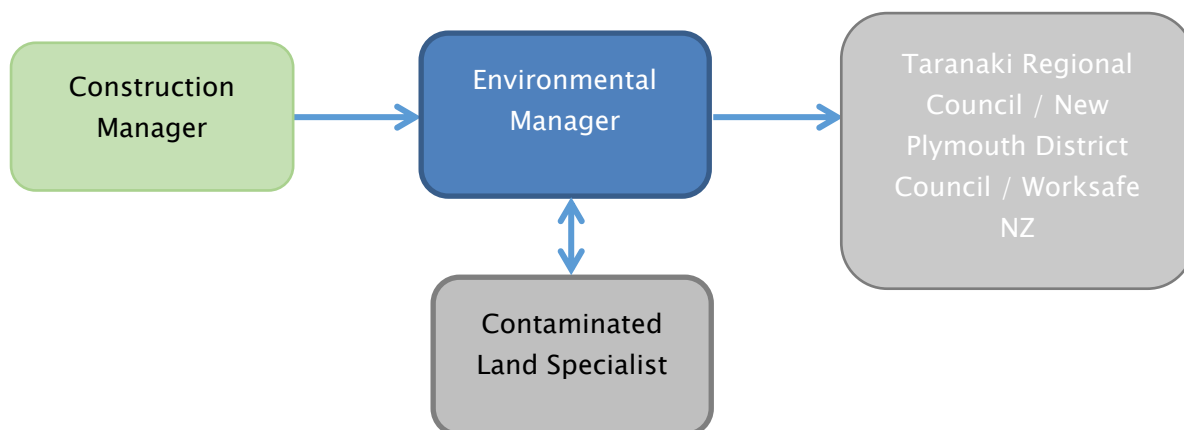
## 4 Site Management Procedures

The procedures presented in this CLMP are to be implemented and followed during ground disturbance activities, along with complying with the requirements of the CEMP and associated management plans.

### 4.1 Notification Process

In the event of a contamination-related incident, the following notification process is to be followed:

- The Construction Manager is to immediately take control of the situation and coordinate the efforts of all on site to minimise the impact and immediately notify the Environmental Manager;
- The Environmental Manager is to notify the Contaminated Land Specialist and NPDC as well as TRC and Worksafe NZ (if relevant); and
- The Contaminated Land Specialist will visually inspect the material, take samples for confirmatory testing, if required, and provide additional advice regarding its safe handling and disposal, including any additional worker health and safety requirements.



### 4.2 Site Establishment Procedures

The following contaminated land related procedures shall be implemented prior to any ground disturbance works commencing:

- Silt and sediment control measures in accordance with the CEMP, Construction Water Management Plan (CWMP) and / or relevant Specific Construction Water Management Plan (SCWMP).
- All workers shall be inducted prior to carrying out works at the site. The induction shall include the likelihood of contaminated soil, training relating to indicators of contamination, protocols for unexpected discovery of contamination, and personal protective equipment (PPE) requirements.



- The following emergency and PPE shall be ready on site in the event that unexpected contamination is found:
  - Tyvek, disposable gloves, P2 dust masks.
  - Spill kit.
  - First aid kit.

### **4.3 Excavated Materials and Spoil Management**

A large portion of the alignment has not been subject to potential contaminating activities, and the potential for such activities to have occurred is isolated to the northern and southern extents of the alignment as shown in Figure A 2 and A 3 (Appendix A). The bulk of cut material is proposed to be disposed of at a number of on-site disposal locations located within the Project designation boundary.

The results of the DSI<sup>1</sup> indicate that soils disturbed during the Project works are suitable for reuse on-site or disposal at on-site disposal locations located within the Project designation boundary. For off-site disposal, documentation (for example truck counts, weighbridge dockets, invoices or summary sheets) confirming the location of disposal shall be retained and reported on in the Works Completion Report (refer Section 5).

Should unexpected contamination be encountered (refer to Section 4.6 for the processes required), then that spoil may need to be:

- Disposed off-site at a location authorised to accept material of the type and nature of the unexpected contamination, as well as concentrations found, should additional soil sampling be undertaken; or
- Depending on the contaminants, soil could be managed on-site by capping (or other methods), to ensure that risks to human health and the environment will be less than minor. The capping requirements will depend on the nature of the unexpected contamination encountered but typically include:
  - A separation layer of a minimum of 100 mm of cleanfill material (i.e. topsoil, hardfill, concrete or similar).
  - A geotextile layer shall be placed between the existing fill material and the separation layer.
  - Areas of asphalt are considered capped.
  - The requirement for a long term management plan.

### **4.4 Sediment and Dust Control**

All ground disturbance should follow standard earthwork procedures. Erosion, sediment and dust controls shall be managed in accordance with the Councils' guidelines and other applicable legislation and as detailed in the CEMP and associated management plans (in particular the CWMP and / or SCWMP and the Dust Management Plan).

## 4.5 Imported Fill

If hardfill material is to be imported, this will be sourced directly from a licensed quarry and will not require testing. Additionally, topsoil sourced directly from a landscape supplier does not require testing.

If other soil needs to be imported, then any imported soil shall either:

- Be derived from a source which is previously verified in accordance with the methods described in the NES Soil regulations as being a piece of land to which the NES Soil regulations do not apply; or
- Have been adequately investigated (i.e. in accordance with MfE Contamination Land Management Guidelines No.5) by a suitably qualified Contaminated Land Specialist to meet the cleanfill definition. The type of testing done will depend on the potentially contaminating sources and may include metals, polycyclic aromatic hydrocarbons (PAH) organochlorine pesticides (OCPs) and asbestos content.
- It is preferable that the material is tested at its source prior to its importation. However, if this is not possible, the material shall be stockpiled on-site until test results are available.

Documentation confirming the source and volume of imported materials (for example truck counts, weighbridge dockets, invoices or summary sheets) shall be retained and reported on in the Works Completion Report (refer Section 5).

## 4.6 Unexpected Contamination

Typical indicators of contamination include:

- Odour (petroleum hydrocarbons, oil);
- Discoloured soil (black, green staining most common);
- Asbestos-containing materials (ACM), as fragments or free fibre; and
- Inclusions of deleterious materials including, but not limited to, those set out in Table B 2 of Appendix B.

If any of the above indications of contamination are identified during excavation, the following actions shall be taken by the Construction Manager:

- Stop all earthworks within a 10m radius of the area where the suspect material was encountered.
- Isolate the area by taping, coning or fencing the area.
- The Construction Manager shall contact the Environmental Manager (who will notify the Contaminated Land Specialist).
- The Contaminated Land Specialist will visually inspect the material, take samples for confirmatory testing, if required, and provide additional advice regarding its safe handling and disposal, including any additional worker health and safety requirements (Refer to Section 4.7 for sampling and reporting procedures).

- Work shall not commence within a 10m radius of the area unless authorised by the Environmental Manager or the Contaminated Land Specialist.
- If the Environmental Manager or Contaminated Land Specialist considers it appropriate, the suspected contaminated material may be excavated into a covered bin or similar to allow works to continue with minimum delay.

If there are any buildings (constructed before 1 January 2000) that need to be demolished or removed, the Health and Safety at Work (Asbestos) Regulations 2016 require a building survey to be undertaken to identify the presence of ACM in building materials. The survey must be undertaken by a competent person independent from the removalist before the demolition/removal work is undertaken.

Works involving the ACM must be undertaken in accordance with Health and Safety at Work (Asbestos) Regulations 2016 and may include the following additional controls:

- Additional signage and separation of work activities;
- Preparation of an Asbestos Removal Plan;
- Notification to Worksafe NZ;
- Supervision by a supervisor with an asbestos removal licence for the appropriate type of work;
- Disposal of all ACM contaminated spoil to a landfill approved to take ACM;
- Air monitoring for asbestos fibres in air; and
- Additional personnel and equipment decontamination procedures.

## 4.7 Soil Sampling

Should sampling be required during the disturbance works, as determined by the Contaminated Land Specialist (i.e. in relation to encountering unexpected contamination), the following shall guide the additional sampling and reporting requirements. Also refer to Section 4.6 for the process following identification of unexpected contaminants and to Section 4.3 for general options for disposal and reuse of contaminated material.

### 4.7.1 Soil sampling procedures

All sampling shall be undertaken by the Contaminated Land Specialist according to the requirements of the NES Soil and the MfE Contaminated Land Management Guidelines No.5 – Site Investigation and Analysis of Soils (Revised 2011). Asbestos in soil sampling (if required) shall be undertaken in general accordance with the New Zealand Guidelines for Assessing and Managing Asbestos in Soil, 2017 (NZ Asbestos Guidelines) or any updated guidance document.

Soil samples shall be collected according to the following procedure:

- The materials encountered shall be described in accordance with the NZ Geotechnical Society “Guideline for the classification and field description of soils and rocks for engineering purposes”.

- Freshly gloved hands shall be used to collect soil and the samples shall be placed immediately into laboratory supplied sample containers.
- Any equipment used to collect the samples shall be decontaminated between sample locations (i.e. using clean water and Decon 90, a phosphate-free detergent, rinses).
- Samples shall be shipped in a chilled container (as appropriate) to an IANZ certified laboratory under chain of custody documentation.

#### **4.7.2 Laboratory Testing Requirements**

The Contaminated Land Specialist shall identify potential contaminants on the basis of the site history, previously identified contamination, visual and olfactory observations. Testing may include metals, polycyclic aromatic hydrocarbons (PAH) organochlorine pesticides (OCPs) and asbestos content.

#### **4.7.3 Reporting and Data Evaluation**

The Contaminated Land Specialist shall evaluate new analytical results in light of:

- The NES Soil contaminant standards for commercial/industrial landuse.
- Environmental discharge criteria (if available).
- NZ Asbestos Guidelines, if required.
- Disposal locations acceptance criteria, if material is to be disposed of off-site.
- Background soil data if available (e.g. map data produced by Landcare Research New Zealand).

A report shall be prepared to document the sampling and testing work, findings and implications for the proposed soil disturbance work. The report will be provided to NPDC and the relevant Project team members will be informed of the findings through the regular Project communications processes.

### **4.8 Complaints Procedure**

A written record of all complaints received shall be maintained, investigated and responded to in accordance with the CEMP. Any contamination-related complaints and how they were resolved are to be reported on in the Works Completion Report (refer Section 5).

## 5 Works Completion Reporting

Verification/ validation is the process of confirming that the works were undertaken according to agreed procedures, and reporting on any incidents.

Verification observations shall be conducted by the Environmental Manager or Contaminated Land Specialist during the works to observe that the procedures outlined in this CLMP are being implemented. Given the limited potential for exposure to any residual contamination following completion of the works, it is proposed that soil validation samples will not be required to be collected.

The DSI (dated July 2018) found that the soils in areas sampled do not contain contaminants at a level that would present a risk to human health or the environment during or at the completion of works. However should unexpected contamination be encountered, reporting will be required as outlined in Section 4.7.3 of the CLMP. It is anticipated that this would be reported in stages.

Following the completion of construction, a Works Completion Report shall be prepared by the Contaminated Land Specialist and provided to NPDC. The details to be incorporated in the Works Completion Report are detailed in the following section.

### 5.1 Information Required for Works Completion Report

The following information is required to be included in the Works Completion Report:

- Confirmation that the ground disturbance works are complete;
- Confirmation that ground disturbance works were completed according to this CLMP and that there were no variations during the works. If there were any variations, then the Works Completion Report shall detail the nature of the variations;
- Documentation confirming the location of any off-site disposal in accordance with Section 4.3;
- Documentation confirming the source and volumes of imported material in accordance with Section 4.5;
- Records of any visits by contamination-related council representatives; and
- Confirmation that there were no contamination-related complaints or health and safety or environmental contamination-related incidents. If any of these occurred then details of each complaint / incident and how it was resolved are to be provided in the Works Completion Report.

If unexpected contamination is encountered:

- Details of unexpected contamination encounters / events and the action taken; and
- As-builts of capping of contaminated material retained onsite, if required.

## **6 CLMP Review**

### **6.1 Review process**

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

- Compliance with the Project consent / designation conditions, the CEMP and other management plans.
- Any significant changes to construction activities or methods that require the description of construction activities to be updated and/or any unanticipated more minor adverse effects resulting from the Project.
- Key changes to roles and responsibilities within the Project team.
- Changes in industry best practice standards.
- Results of inspections, monitoring and reporting procedures associated with the management of adverse effects during construction.
- Comments or recommendations from TRC / NPDC regarding the CEMP or management plans.
- Unresolved complaints and any response to complaints and remedial action taken to address the complaint.

The outcomes of any review will be provided to NPDC.

Where the CLMP is updated as part of a review, the on-site version shall be updated prior to any works associated with the amendment being implemented.

### **6.2 Minor amendment**

In accordance with the consent conditions, minor amendments may be made to the final CLMP at any time. Minor amendment is any amendment where the adverse environmental effect arising from the amendment is the same or less than the effect that would result in the absence of the amendment.

Any changes to the CLMP shall remain consistent with the overall intent of the original version of the final CLMP.

The Alliance shall provide NPDC with a copy of any amendment as soon as practicable and before any construction works associated with that amendment are implemented.

### **6.3 Material Amendment**

Material amendments to this CLMP, which would result in an adverse (beyond de minimis) effect on the environment above that anticipated in the final CLMP, may be made at any time subject to certification by NPDC.

Any amendment to the CLMP shall remain consistent with the overall intent of the original version of the final CLMP.

In the event of material amendment the amendment shall be submitted to NPDC for certification 20 working days before the commencement of works to which the amendment applies.

Works unaffected by the material amendment may continue during the certification process.



# Appendices

Appendix A: Figures	15
Appendix B: Excerpts from MfE Guide to Management of Cleanfills	16



# Appendix A: Figures

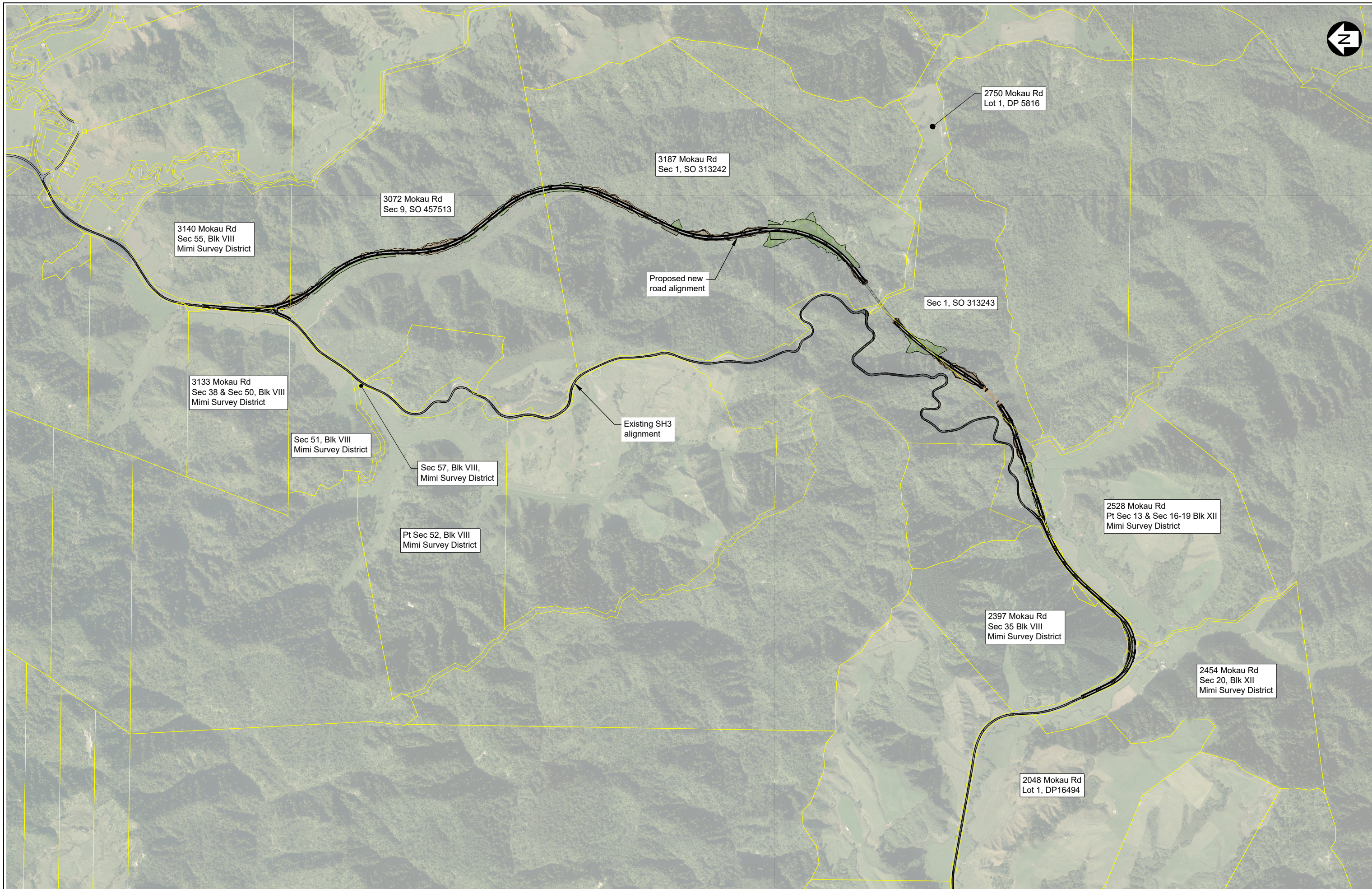
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*Figure A 1 – Overview Site Plans*

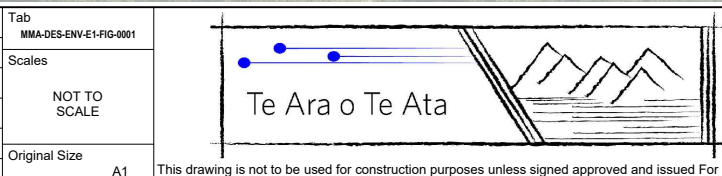
*Figure A 2 – DSI sample locations – Mangapepeke Valley*

*Figure A 3 – DSI sample locations – Mimi Valley*





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Rev	Revision Description	Drawn	Checked	Designed	Design Checked	Approved	Date
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**MT MESSENGER SH3 REALIGNMENT**

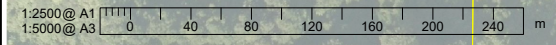
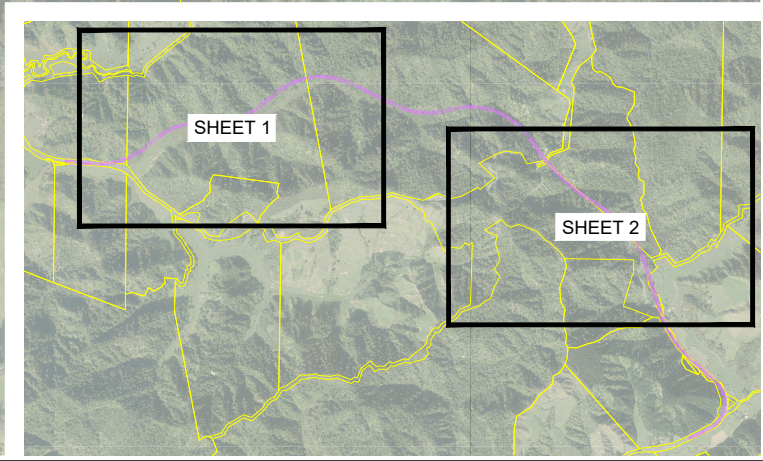
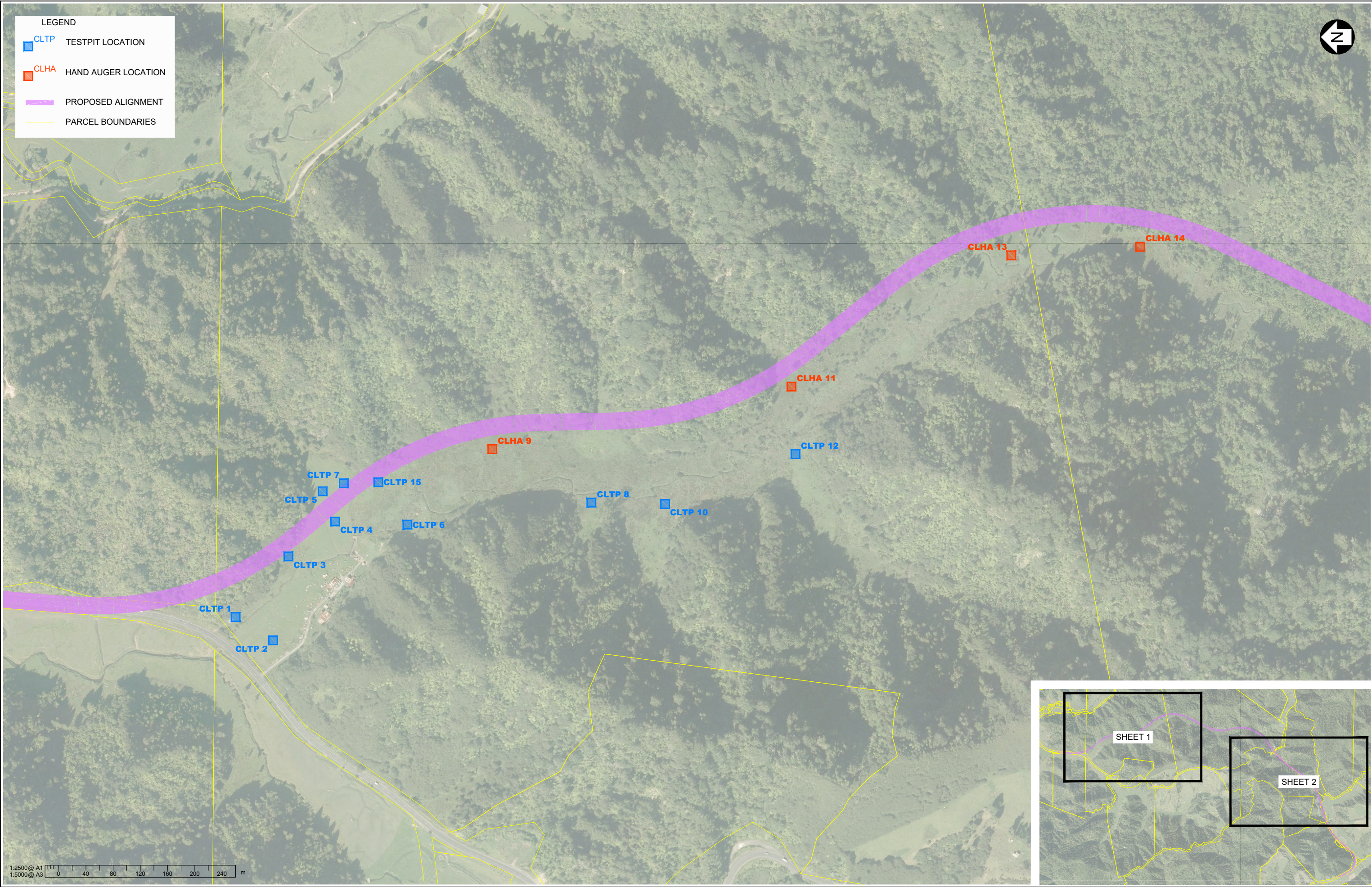
**ENVIRONMENTAL  
GROUND CONTAMINATION PSI  
OVERVIEW SITE PLAN**

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Status	<b>FOR INFORMATION</b>
Drawing Number	MMA-DES-ENV-E1-FIG-0001
Revision	<b>A</b>



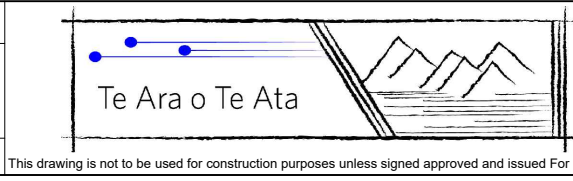
**LEGEND**

- CLTP TESTPIT LOCATION
- CLHA HAND AUGER LOCATION
- PROPOSED ALIGNMENT
- PARCEL BOUNDARIES



Rev	Revision Description	Drawn	Checked	Designed	Design Checked	Approved	Date
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**MT MESSENGER SH3 REALIGNMENT**

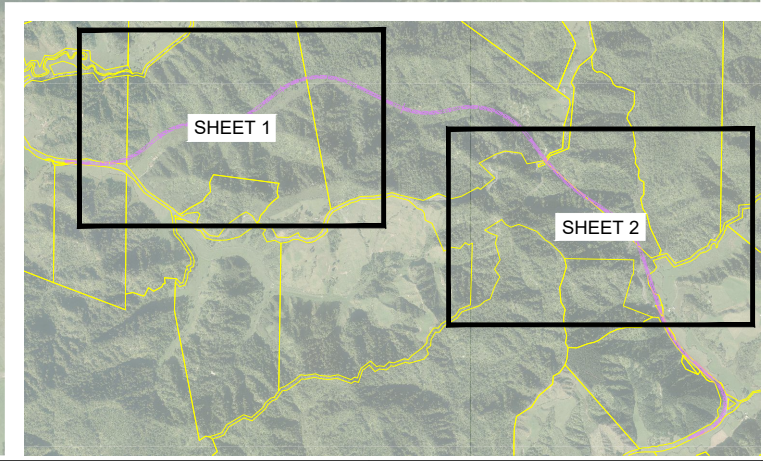
**ENVIRONMENTAL  
GROUND CONTAMINATION DSI  
INVESTIGATION SAMPLE LOCATIONS - SHEET 1**

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Status	<b>FOR INFORMATION</b>
Drawing Number	MMA-DES-ENV-E1-FIG-0012
Revision	<b>A</b>



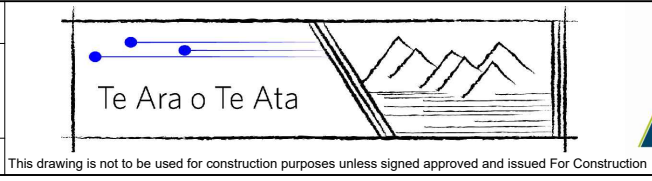
**LEGEND**

	CLTP TESTPIT LOCATION
	CLHA HAND AUGER LOCATION
	PROPOSED ALIGNMENT
	PARCEL BOUNDARIES



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**MT MESSENGER SH3 REALIGNMENT**

**ENVIRONMENTAL  
GROUND CONTAMINATION DSI  
INVESTIGATION SAMPLE LOCATIONS - SHEET 2**

Approved	<b>NOT FOR CONSTRUCTION</b>
Status	<b>FOR INFORMATION</b>
Drawing Number	MMA-DES-ENV-E1-FIG-0013
Revision	<b>A</b>



# Appendix B: Excerpts from MfE Guide to Management of Cleanfills

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Acceptable materials (Table B1)

Unacceptable materials (Table B2)

**Table B 1 – Acceptable materials**

Material	Discussion
Asphalt (cured)	Weathered (cured) asphalt is acceptable: After asphalt has been exposed to the elements for some time, the initial oily surface will have gone and the asphalt is considered inert.
Bricks	Inert – will undergo no degradation.
Ceramics	Inert.
Concrete – un-reinforced	Inert material. Ensure that other attached material is removed.
Concrete –reinforced	Steel reinforcing bars will degrade. However, bars fully encased in intact concrete will be protected from corrosion by the concrete. Reinforced concrete is thus acceptable provided protruding reinforcing steel is cut off at the concrete face.
Fibre cement building products	Inert material comprising cellulose fibre, Portland cement and sand. Care needs to be taken that the product <u>does not contain asbestos</u> , which is unacceptable.
Glass	Inert, and poses little threat to the environment. May pose a safety risk if placed near the surface in public areas, or if later excavated. The safety risk on excavation should become immediately apparent, so glass is considered acceptable provided it is not placed immediately adjacent to the finished surface.
Road sub-base	Inert.
Soils, rock, gravel, sand, clay, etc	Acceptable if free of contamination.
Tiles (clay, concrete or ceramic)	Inert.



**Table B 2 – Unacceptable waste**

Material	Discussion
Abrasive blasting sand/agents	May contain metals, paint and other contaminants.
Asbestos (including asbestos sheeting)	Potentially hazardous. Although an inert compound, future excavation could cause significant health effects.
Asphalt (new)	New asphalt or asphalt that has been ground or pulverised may release oily substances that could leach into the environment.
Bark	Degradable; leaches tannins.
Cables	Metal cables will degrade (see Metals).
Car bodies	Contain metals, oils, plastics, asbestos and other potential contaminants.
Carpet	Degradable. May also contain formaldehyde residue from flooring.
Cesspit/stormwater sump cleanings	Contain various metal contaminants and organics.
Containers	To avoid any potential confusion, all containers are considered unacceptable. Containers may degrade or be punctured, releasing their contents or the remnants of their contents. The containers themselves may be detrimental to the environment (see plastics and metal).
Cork tiles	Degradable.
Corrugated iron	Degradable steel and zinc.
Electrical equipment and insulation	For example, fluorescent light tubes could contain PCBs (also see Plastics).
Formica	Generally stable (it is a melamine-formaldehyde polymer), but may be bonded with urea formaldehyde. This is water soluble and may leach formaldehyde compounds into groundwater. Often attached to particleboard.
Foundry sand	Contains metals.
Greenwaste (e.g. grass clippings, tree trimmings)	Will degrade and release contaminants such as ammonia and nitrates into the soil and groundwater, and may generate gases such as methane and carbon dioxide. The resulting leachate may mobilise other contaminants in the fill.

Material	Discussion
Hardboard	Degradable; contains phenol resorcinol formaldehyde.
Household waste	Typically contains large amounts of putrescible and degradable waste that will degrade and cause odour problems, and create soluble compounds causing leachate. Also contains some hazardous components.
MDF (medium-density fibreboard - customwood)	Degradable; may use urea formaldehyde as a bonding agent. This is water soluble and may leach formaldehyde compounds into groundwater (see Particleboard). Some modern MDF boards use phenol formaldehydes and other resins that may be acceptable, but the board itself is unacceptable.
Medical and veterinary waste	Unsafe if excavated (health hazard); may generate leachate.
Metals	For example, structural steel, roofing, window frames, building components, etc; degradable, can leach into the ground or groundwater. Soluble metals may be toxic depending on the concentration.
Paint	Hazardous waste. Liquid paints may contain significant quantities of volatile organic carbon compounds. These will contaminate soils and groundwater, causing detrimental effects to the environment (e.g. killing aquatic life) and human health. Some paints contain metals. Water-based paints contain preservatives and biocides which may include mercury, or other compounds that can cause dermatological problems.