

From: "Andrew MacDonald" <ajmac@ihug.co.nz>
To: "Rebecca Cleghorn" <Rebecca.Cleghorn@arc.govt.nz>
Date: 20/07/2004 12:03:21 p.m.
Subject: Kowhai Timber

Hi Rebecca,

Minor changes have been made to the RAP to accommodate the requirements included in your letter of 16 July. The changes have been tracked on screen so that you can easily pick them out. The word file for the RAP is attached to this email.

Please let me know if you have any further questions.

Regards

Andrew MacDonald
Groundwater and Environmental Services
PO Box 190
Cambridge
Phone/Fax 07 8831612
Mobile 027 4874410

16 July 2004



Auckland
Regional Council
TE RAUHITANGA TAIAO

Andrew MacDonald
Groundwater and Environmental Services
P O Box 190
Cambridge

Dear Andrew

Remedial Action Plan for Kowhai Timber, Matakana

Thank you for providing the Auckland Regional Council (ARC) with further information towards the Remedial Action Plan (RAP) for Kowhai Timber (1990) Limited, located on Matakana Valley Road in Matakana.

Vodafone House, 21 Pitt Street
Private Bag 92 012, Auckland
New Zealand
DX CP 28 008 Pitt St
Telephone +64 9 366 2000
Facsimile +64 9 366 2155
www.arc.govt.nz

File Ref 1-30-0139

The ARC again notes the lack of groundwater information available for the site. While it is acknowledged that the risk of groundwater contamination from the specified area may be low due to the low permeability silts and clays at the site, this is unknown at present, and the ARC must stress that information such as the depth to groundwater, and contaminant levels in the groundwater are required, in order for the remediation at the site to be carried out as a permitted activity. This is particularly relevant due to the high contaminant levels found in some soil samples.

It is noted that in ARC's 2003 letter to the landowner about the planned programme of investigating timber treatment sites across the region, the need for a comprehensive soil and groundwater investigation of the site was raised.

Therefore, in order to provide confidence in the groundwater quality at the site, and to allow progress with the planned remediation, data should be included in the site validation report (SVR) to show the depth to groundwater within the remediation area, groundwater quality in relation to the contaminants of concern at the site, and that the natural soils occurring at depth below the remediation excavations are within the background range for contaminants found at the site. Please provide a revised RAP to show how these outstanding issues will be addressed during remediation.

Once an SVR and Management and Monitoring Plan are provided to the satisfaction of the ARC it will be possible to confirm whether the remediated area will meet the requirements of the recommended permitted activity rule. However, on the basis of the information submitted to date, the ARC will be unable to provide any such determination for the remainder of the site, including the unsampled areas under the concrete floors of the site buildings.

If you have any queries, or wish to discuss any of the issues raised in the above, please contact the undersigned on 366 2000 extn 8147.

Yours sincerely

Rebecca Cleghorn
Contaminated Sites Officer
Land and Water Quality

2003 ACHIEVEMENT AWARD WINNER



KOWHAI TIMBER (1990) LIMITED

REMEDIAL ACTION PLAN MATAKANA VALLEY ROAD, MATAKANA

**Prepared by:
Groundwater and Environmental Services
P O Box 190,
Cambridge
19 July 2004**

Table of Contents

1	Introduction.....	1
1.1	Summary of Contamination.....	1
1.2	Remediation Goals.....	2
1.3	Remediation Options and Alternatives.....	32
1.4	Preferred Option	43
1.5	Remediation of Lower Levels of Contamination	4
1.6	Groundwater Investigation	4
2	Remediation Work Plan.....	5
2.1	Extent and Location of Areas Requiring Remediation	5
2.2	Proposed Site Remediation Works	6
2.2.1	Contractor Selection and Briefing	6
2.2.2	Identification of areas to be remediated	6
2.2.3	Community Relations.....	6
2.2.4	Noise and Odour Control.....	6
2.2.5	Remediation Schedule	7
2.2.6	Excavation and removal of soil.....	7
2.2.7	Control of Sediment Runoff from Excavations.....	7
2.2.8	Validation of Remediation.....	7
2.2.9	Soil replacement	8
2.2.10	Proposed Long Term Site Management	8
2.3	Contingency Plan	8
3	Health and Safety and Environmental Protection Measures	9
3.1	Health and Safety	9
3.2	Control of Contaminant Migration	9
1	Introduction.....	1
1.1	Summary of Contamination.....	1
1.2	Remediation Goals.....	2
1.3	Remediation Options and Alternatives.....	2
1.4	Preferred Option	3
1.5	Remediation of Lower Levels of Contamination	4
2	Remediation Work Plan.....	5
2.1	Extent and Location of Areas Requiring Remediation	5
2.2	Proposed Site Remediation Works	6
2.2.1	Contractor Selection and Briefing	6
2.2.2	Identification of areas to be remediated	6
2.2.3	Community Relations.....	6
2.2.4	Noise and Odour Control.....	6
2.2.5	Remediation Schedule	7
2.2.6	Excavation and removal of soil.....	7
2.2.7	Control of Sediment Runoff from Excavations.....	7
2.2.8	Validation of Remediation.....	7
2.2.9	Soil replacement	8
2.2.10	Proposed Long Term Site Management	8
2.3	Contingency Plan	8
3	Health and Safety and Environmental Protection Measures	9

3.1	Health and Safety	9
3.2	Control of Contaminant Migration	9

Attachment A. Health and Safety Plan – 362 Matakana Valley Road Remediation

DISCLAIMER

No liability is assumed for misrepresentation of data or for items not visible, accessible or present at the time of investigations conducted by Groundwater and Environmental Services that may affect the validity and/or accuracy of the interpretation of environmental data.

Interpretations and conclusions presented herein are based on data presented in this report, information from others and experience on similar projects. The available data does not preclude the presence of materials at other locations at the site, which presently or in the future may be considered hazardous. Services in respect of this investigation have been performed in accordance with professional standards for investigations of contamination assessment. No guarantees are either expressed or implied.

This document and the information contained herein have been prepared for the use of Kowhai Timber (1990) Limited. Any reliance on this report by any other party shall be at such party's sole risk.

1 INTRODUCTION

Contamination by timber treatment chemicals has been identified around the CCA treatment plant at Kowhai Timber's property at 362 Matakana Valley Road. The nature of the detected contamination and details of the environmental investigations carried out to date at the property are provided in the September 2003 report by Groundwater & Environmental Services¹.

A summary of the chemical contamination found at the property is provided in the following sections, along with a description of the planned remediation actions and validation procedures. This remedial action plan was prepared in accordance with the Ministry for the Environment's Guidelines for Reporting on Contaminated Sites²

1.1 Summary of Contamination

The investigations carried out to date have identified areas on the property with timber treatment chemical contamination that exceeds the relevant guideline values³ for the protection of human health for unpaved/paved industrial commercial sites and for the protection of maintenance workers. The areas that exceed the guideline values have been correlated with past and present activities known to be associated with the presence of this type of contamination. The contamination is described briefly below.

Contamination by timber treatment chemicals (arsenic, chromium and copper) was measured in soils from around the treatment plant. Available information suggests that the majority of this contamination is likely to be the result of poor chemical handling, accidents and disposal practices by former owners of the site. Current site practices are unlikely to be contributing significantly to this contamination.

The arsenic levels in the zone south and southwest of the treatment plant (indicated on Figure 1) are significantly above the timber treatment guideline levels for the protection of human health. There is a potential risk to site workers from these arsenic concentrations if the material remains in place. This material also presents a risk of contamination of the adjacent stream that feeds into Matakana River.

¹ Groundwater & Environmental Services (September 2003). Soil Contamination Investigation, 362 Matakana Valley Road, Matakana. Report prepared for Kowhai Timber (1990) Limited.

² Ministry for the Environment (November 2003). Guidelines for Reporting on Contaminated Sites. Contaminated Sites Management Guidelines No. 1.

³ Ministry for the Environment & Ministry of Health (June 1997). Health and Environmental Guidelines for Selected Timber Treatment Chemicals.

Groundwater and Environmental Services

There is also evidence of contamination by timber treatment chemicals in the sediments of the adjacent stream. Higher contaminant levels at greater depths in the sediment imply that the majority of the contamination is related to past site activities. The sediment and soil contamination does not appear to be having a significant impact on the concentrations of contaminants in the stream water. Water samples taken when the stream was essentially stagnant did not reveal significant contamination in the area adjacent to the worst soil contamination.

The samples taken near the former location of the boric spray tunnel and the boric-treated timber storage areas did not reveal any significant contamination above relevant guidelines. A low concentration of PCP was however detected, indicating that some PCP may have been used on the site in the past. No other evidence of past PCP use has been found to date.

Previous investigations carried out in the area of a former underground storage tank⁴ on the property did not uncover any hydrocarbon contamination. On this basis, the risk of significant hydrocarbon contamination from the former storage tank is thought to be low.

The locations of the identified areas of contamination are shown on Figure 1.

1.2 Remediation Goals

The property is currently on the market as a going concern. The present owner is intending to remediate the identified contamination that is above the industrial/commercial guidelines prior to the sale of the property being completed.

The goals of the remediation plan for this property are:

1. To remediate the identified contamination resulting from timber treatment activities to levels below the guideline values for the protection of human health for both unpaved and paved industrial commercial sites (no management plan) and for the protection of maintenance workers;
2. To reduce the potential risk to the environment from contamination by timber treatment chemicals at the site by remediating the most highly contaminated materials; and
3. ~~To assess the nature and extent of any groundwater contamination~~To assess the depth to groundwater and the nature and extent of any groundwater contamination in the area of the timber treatment plant.

⁴ Pattle Delamore Partners Limited, June 1997. Report on Site Reconnaissance, Kowhai Timbers, Matakana. Report prepared for Mobil Oil (NZ) Limited.

1.3 Remediation Options and Alternatives

There are three main options for remediation of the chemical contamination observed at the property. These options are detailed below:

1. Leaving the contaminated material in-situ. This option involves leaving all of the contaminated material in place but capping it to prevent contact by site workers and infiltration of surface water. Capping the contamination would reduce the risk to the health of site workers presented by the contamination although some areas contain contaminants at levels above the generic guideline values for the protection of human health for both unpaved and paved industrial commercial sites (no management plan) and for the protection of maintenance workers. Under this option, a site-specific risk assessment would need to be carried out for the observed contamination and a management plan would need to be put in place to ensure both the integrity of the cover over the contaminated material and that maintenance workers were adequately protected. Capping of the contaminated areas would also prevent rainfall infiltration through the contaminated materials, reducing possible risks to the environment from the movement of contaminants.
2. Stabilisation or encapsulation on-site. In this option, contaminated material would be excavated from around the treatment plant and placed in a designated disposal area on site. The designated area would need to be of sufficient size to allow full encapsulation of the excavated material. The top of the contaminated material would be located at least 1 metre below the ground surface to avoid possible future disturbance by intrusive activities, erosion or flooding. As with any encapsulation site, the surface cover would be graded to shed water and capped using an engineered multi-layered cap. The location of the encapsulation site should be marked, surveyed and recorded. As-built plans should be included in the remediation validation report. Encapsulated material would also need to be prevented from interacting with groundwater beneath the site. The encapsulation area would need to be designated as suitable for passive activities only and would reduce the usable area of the property. Long term monitoring and control of this area would be required.
3. Excavation and removal to an approved disposal facility. Contamination at levels above the relevant guideline levels would be excavated from the identified areas and transported to a licensed landfill for disposal. No pre-treatment of the excavated material would be necessary to make it less hazardous for handling and transport, however appropriate health and safety procedures would be followed to avoid the generation of contaminated dust and contact with contaminated material by remediation workers. Depending on the disposal facility accepting the material, transport routes may be designated. Disposal at a licensed facility would be in accordance with the resource consents and acceptance procedures for that facility. Documentation showing final disposal of the material would be received from the facility and included in a validation report.

Groundwater and Environmental Services

1.4 Preferred Option

Taking into account the options, health and safety factors, costs, regulatory considerations and community acceptability, the recommended remediation option for this site is to excavate the identified contaminated material for disposal to a licensed landfill. Excavation and removal of the more highly contaminated material would allow the property to be more fully utilised and significantly reduce the potential risks to human health and the environment. Following the removal of the contaminated material, validation samples will be collected from the exposed sides and base of the excavation and analysed for contaminants of concern. Remaining contamination in excess of permitted levels will then be removed and additional validation samples taken.

1.5 Remediation of Lower Levels of Contamination

From a human health perspective, it is not necessary to remove contamination at levels below the guideline values for the protection of human health for unpaved/paved industrial commercial sites and for the protection of maintenance workers. There are unlikely to be any adverse effects on human health from exposure to this material. On this basis no remediation is proposed for areas with levels of contamination below the applied guideline values.

1.6 Groundwater Investigation

Following the remediation and validation sampling of the identified zone of highly contaminated soils, the groundwater conditions in the area of the timber treatment plant will be assessed. This assessment will include:

1. The determination of the depth to groundwater in the remediation area;
2. Sampling and analysis of groundwater for contaminants of concern; and
3. Inclusion of groundwater information in the site validation report.

2 REMEDIATION WORK PLAN

The planned phases of the excavation and off-site removal of contamination are outlined below:

- Select and brief contractor and staff;
- Locate and mark out areas to be remediated;
- Excavate and remove contaminated material from the identified areas;
- Transport the excavated material to a licensed landfill;
- Validate the remediated areas by sampling, analysis and visual inspection; and
- Replace removed soil with clean fill or soil if required.

A full description of the specific remediation activities proposed is provided in Section 2.2. All remediation activities will be subject to the provisions of the site health and safety plan for remediation discussed in Section 3.

2.1 Extent and Location of Areas Requiring Remediation

Prior to the redevelopment of this property, it is intended to remove material with contamination above the relevant guideline values from the area noted in Table 1 ~~Table 1~~ below. Descriptions of the materials encountered in the area to be remediated are also provided in the table. Initial estimates of lateral extent, depth range and volume of material to be remediated are also provided. Estimates have been made on the basis of the environmental information collected to date and assumptions about the spread of contaminants based on that information.

Figure 1 shows the layout of the timber treatment site and the remediation location described below. The remediation area includes all of the chemical contamination identified as being in excess of the relevant guidelines on the property at 362 Matakana Valley Road. Contamination at lower levels is not considered to require remediation for the current land use. Any change in land use to a more sensitive class would require a review of the environmental investigation data and remediation plan.

Table 1 Description of Proposed Remediation Area and Volume

Location	Description	Dimensions
Southeast of Timber Treatment Plant	Variable organic rich topsoil over sandy substrate. Chemical staining often visible. Contamination originates from disposal of treatment sump sludge and spills of chemicals during timber treatment.	Area: 270 m ² Thickness: 200 mm Volume: 54 m ³

Groundwater and Environmental Services

The estimate of the volume of material that would need to be removed from the site to complete the remediation of the identified chemical contamination on the property is **54 m³**. This estimate includes soils to an average depth of 200 mm across the identified area of high contamination.

The volume estimate is based on the assumptions about the extent and depth of contamination at the site. If the extent of chemical contamination above the applicable guideline value is found to be greater than initially estimated, the excavation area will be increased to include all of this material.

2.2 Proposed Site Remediation Works

The following sections describe the remediation activities that will be undertaken.

2.2.1 Contractor Selection and Briefing

The contractor selected to undertake the remedial works must have relevant experience. The consultant will review this experience to ensure that the contractor is competent to carry out the required work. There will be a briefing of the contractor's site staff prior to remediation to ensure that they are aware of the nature of the contamination and are familiar with and adhere to the site-specific health and safety procedures for remediation.

Procedures will be laid out for the identification and reporting of any additional contamination identified during remediation earthworks. These procedures will include marking off the area for inspection and decisions on remediation by a qualified environmental consultant. Steps will also be taken to mitigate any risks from the detected contamination and to prevent the spread of the material.

2.2.2 Identification of areas to be remediated

The area requiring remediation, noted in ~~Table 1~~~~Table 1~~~~Table 1~~, will be identified and marked out by a suitably qualified environmental consultant during a site familiarisation visit with the contractor prior to the excavation commencing. Identification and marking of the remediation area will be carried out using appropriate warning signs/tape and fencing if necessary.

2.2.3 Community Relations

Given the nature of industrial activities currently carried out at the site, the distance of the contaminated area from the site boundaries, and the rural nature of the surrounding area, no specific consultation with surrounding landowners or occupiers is proposed at this time.

2.2.4 Noise and Odour Control

The site itself currently supports frequent truck movements as well as the operation of timber handling and milling equipment. The operation of excavators and trucks for the remediation is unlikely to produce excessive amounts of noise beyond what could reasonably be expected in the normal course of site operations. Limits will be placed on the hours of work to prevent any noise nuisance to the closest neighbours.

Groundwater and Environmental Services

The levels of chemical contaminants detected on this property do not present a risk of nuisance odours. If significant odorous contamination were encountered during remediation, the excavation would be covered up pending evaluation by a suitably qualified consultant.

2.2.5 Remediation Schedule

Remediation activities will be restricted to the hours of 7 AM to 7 PM, Monday to Saturday

2.2.6 Excavation and removal of soil

The equipment that will be required for the remediation includes:

- A water supply for dust suppression;
- An excavator; and
- Covered trucks.

Under dry conditions, the remediation area will be lightly dampened down prior to work commencing. The area will continue to be kept damp whilst removing the contaminated material if there is a possibility of dust generation.

Contaminated material will be removed from the identified areas using an excavator. The removed material will be loaded onto a covered truck for transport to the selected disposal facility.

Remediation will extend beyond the designated area if further contamination is detected during remediation or validation. Appropriate warning signs/tape will be used to mark any further contamination identified prior to its removal.

Prior to leaving any designated remediation area, all trucks and excavation machinery will be inspected to ensure that no contaminated material is tracked from the remediation areas to other parts of the property. Any material adhering to a truck or excavator will be removed inside the excavation area (for the last truck-load, any material removed will need to be placed in that truck).

Landfill weighbridge receipts will be retained to provide proof of the volume of material disposed of. These will be attached to the remediation validation report.

2.2.7 Control of Sediment Runoff from Excavations

Sediment control measures will be sufficient to comply with the requirements of ARC Technical Publication 90. The proposed remediation area is adjacent to a stream and control of sediment runoff from any excavations will be a priority. All excavations involving the removal of contaminated material will be carried out so that surface water and sediment are retained within the excavation. Particular care will be taken to ensure that no surface water or sediment runoff from the excavations is permitted to enter the stream.

2.2.8 Validation of Remediation

The identified contaminated material will be removed by excavation to the prescribed extent and depth. At the completion of excavation, the exposed sides and base of the excavation will be

Groundwater and Environmental Services

sampled by a suitably qualified person to verify that remaining contaminant levels are below the applicable guideline values for the site. It is proposed that at least 8 validation samples will be taken from the base of the excavation and 8 from the walls at the edges of the excavation.

The excavation shall remain open until the results of the sample analysis have been checked. In the event that the validation sampling results exceed the applicable guideline values, additional material will be removed and further validation samples taken.

Remaining levels of contamination at the completion of all excavation will be logged and recorded in the site validation report.

Photographs of the extent of the excavations will be taken and attached to the validation report. Council representatives will also be given the opportunity to inspect excavation areas if required.

A report documenting the ~~results of the remediation, and the~~ results of the validation inspection and sampling, and the groundwater investigation results will be prepared. The report will include a plan showing the dimensions and locations of the remediated area from which contaminated material has been removed, ~~and the volumes of material removed, and the depth to groundwater beneath the area.~~

2.2.9 Soil replacement

Some imported soil or fill may be required to replace contaminated material excavated from the site. Any imported soil or fill used at the site will be checked to ensure that it is free from contamination and documentation relating to its origin will be included in the validation report.

2.2.10 Proposed Long Term Site Management

The intention is to remediate this site to the point where remaining levels of contamination in the identified area are below the timber treatment guideline values for the protection of human health for both unpaved and paved industrial commercial sites (no management plan) and for the protection of maintenance workers. Provided that the use of the site remains in the commercial/industrial category, no further site management plans should be required. In the event that there was a need to change the land use to a more sensitive classification, additional environmental investigation would be required.

2.3 Contingency Plan

In the event that remediation of contamination at the site to levels below the stated guideline values is not fully possible, an ongoing site management plan will be produced to control access and exposure to the contaminated material. This plan will be prepared in consultation with the relevant regulatory authorities.

3 HEALTH AND SAFETY AND ENVIRONMENTAL PROTECTION MEASURES

3.1 Health and Safety

All remediation activities will be subject to the provisions of a health and safety plan for intrusive activities involving contaminated materials. The health and safety plan is provided as Attachment A. Implementation of health and safety provisions will be by a suitably qualified person. The site manager will be briefed on the health and safety issues. All contractors and staff involved in the remediation activities will be required to have read and understood the provisions of this health and safety plan.

There will be no public access to the remediation area during site works.

Contractors and staff involved in the remediation activities will also be expected to be familiar with and adhere to standard health and safety procedures for the activities that they are involved in and for the equipment that they are using. The contractor must also adhere to the requirements of the Health and Safety in Employment Act 1992 and follow the 1994 OSH Health and Safety Guidelines for the Cleanup of Contaminated Sites.

3.2 Control of Contaminant Migration

Dust suppression measures to be taken prior to excavation and during handling and transport are outlined in Section 2.2.6 above. Adherence to these measures during remediation activities will prevent the migration of potentially contaminated dust to uncontaminated areas of the site.

Removed soil will be transported by covered truck to a licensed landfill for permanent disposal. Prior to leaving the excavation area, all trucks will be inspected to ensure no contaminated soil or other material is tracked off site or to other areas on site. Any material adhering to the truck will be cleaned off into the excavation area. These measures will ensure that no potentially contaminated dust or soil is deposited on other parts of the site or along the route to the landfill.

Attachment A Health and Safety Plan – Remediation

This plan covers specific risks associated with the remediation of the identified site contamination. Contractors involved in the remediation activities must be familiar with and follow standard health and safety procedures for the activities that they are involved in and equipment that they are using.

HAZARDS AND SAFETY PROCEDURES – REMEDIATION

Work operation or activity: Excavation, trenching, earth disturbing, earth moving, and site investigations dealing with contamination by the identified timber treatment chemicals.					
Hazard:					
Electrical	☐	Physical	☐	Noise	☐
Chemical	☒	Temperature	☐	Radiation	☐
Lighting	☐	Vibration	☐	Biological	☐
Ergonomic	☐	Miscellaneous	☐		
Hazard description: See attached chemical hazard information for arsenic and chromium.					
Eliminate:					
Yes	☐	How →	Solution: Hazard cannot be eliminated		
No	☒	↓			
Isolate:					
Yes	☐	How →	Solution: Hazard cannot be isolated.		
No	☒	↓			
Minimise:					
Yes	☒	How →	Solution: • Wear appropriate PPE during any activities involving actual or potential contact with the contaminated material. • Minimise the extent of soil exposed during any intrusive activities. • Minimise soil disturbance to the extent possible. • Avoid generation of dust and damp down area being worked on if it is likely that dust will be generated. • If dust is generated wear respiratory protection (e.g. dust mask) to avoid inhalation of potentially contaminated dust. • No eating, drinking or smoking during intrusive activities on site.		

Name:

Signed

Date:

Groundwater and Environmental Services

PO Box 190

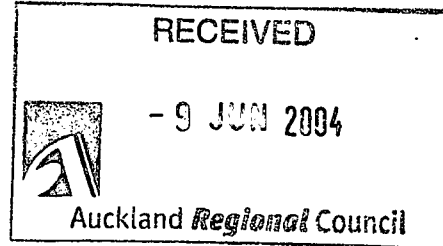
Cambridge

07 8831612 / 027 4874410

6 May 2004

Auckland Regional Council
Private Bag 92012
Auckland

ATTENTION: Rebecca Cleghorn



Dear Rebecca,

I have attached another copy of the RAP for the area behind the timber treatment plant at the Kowhai Timber site (Matakana Valley Road).

Sorry about the delay in getting this replacement to you.

Please let me know if you have any questions or comments.

Regards,

Andrew MacDonald
Groundwater and Environmental Services

KOWHAI TIMBER (1990) LIMITED

REMEDIAL ACTION PLAN MATAKANA VALLEY ROAD, MATAKANA

**Prepared by:
Groundwater and Environmental Services
P O Box 190,
Cambridge
1 March 2004**

Table of Contents

1	Introduction	1
1.1	Summary of Contamination	1
1.2	Remediation Goals	2
1.3	Remediation Options and Alternatives	2
1.4	Preferred Option	3
1.5	Remediation of Lower Levels of Contamination	4
2	Remediation Work Plan	5
2.1	Extent and Location of Areas Requiring Remediation	5
2.2	Proposed Site Remediation Works	6
2.2.1	Contractor Selection and Briefing	6
2.2.2	Identification of areas to be remediated	6
2.2.3	Community Relations	6
2.2.4	Noise and Odour Control	6
2.2.5	Remediation Schedule	7
2.2.6	Excavation and removal of soil	7
2.2.7	Control of Sediment Runoff from Excavations	7
2.2.8	Validation of Remediation	7
2.2.9	Soil replacement	8
2.2.10	Proposed Long Term Site Management	8
2.3	Contingency Plan	8
3	Health and Safety and Environmental Protection Measures	9
3.1	Health and Safety	9
3.2	Control of Contaminant Migration	9

Attachment A Health and Safety Plan – 362 Matakana Valley Road Remediation

DISCLAIMER

No liability is assumed for misrepresentation of data or for items not visible, accessible or present at the time of investigations conducted by Groundwater and Environmental Services that may affect the validity and/or accuracy of the interpretation of environmental data.

Interpretations and conclusions presented herein are based on data presented in this report, information from others and experience on similar projects. The available data does not preclude the presence of materials at other locations at the site, which presently or in the future may be considered hazardous. Services in respect of this investigation have been performed in accordance with professional standards for investigations of contamination assessment. No guarantees are either expressed or implied.

This document and the information contained herein have been prepared for the use of Kowhai Timber (1990) Limited. Any reliance on this report by any other party shall be at such party's sole risk.

1 INTRODUCTION

Contamination by timber treatment chemicals has been identified around the CCA treatment plant at Kowhai Timber's property at 362 Matakana Valley Road. The nature of the detected contamination and details of the environmental investigations carried out to date at the property are provided in the September 2003 report by Groundwater & Environmental Services¹.

A summary of the chemical contamination found at the property is provided in the following sections, along with a description of the planned remediation actions and validation procedures. This remedial action plan was prepared in accordance with the Ministry for the Environment's Guidelines for Reporting on Contaminated Sites²

1.1 Summary of Contamination

The investigations carried out to date have identified areas on the property with timber treatment chemical contamination that exceeds the relevant guideline values³ for the protection of human health for unpaved/paved industrial commercial sites and for the protection of maintenance workers. The areas that exceed the guideline values have been correlated with past and present activities known to be associated with the presence of this type of contamination. The contamination is described briefly below.

Contamination by timber treatment chemicals (arsenic, chromium and copper) was measured in soils from around the treatment plant. Available information suggests that the majority of this contamination is likely to be the result of poor chemical handling, accidents and disposal practices by former owners of the site. Current site practices are unlikely to be contributing significantly to this contamination.

The arsenic levels in the zone south and southwest of the treatment plant (indicated on Figure 1) are significantly above the timber treatment guideline levels for the protection of human health. There is a potential risk to site workers from these arsenic concentrations if the material remains in place. This material also presents a risk of contamination of the adjacent stream that feeds into Matakana River.

¹ Groundwater & Environmental Services (September 2003). Soil Contamination Investigation, 362 Matakana Valley Road, Matakana. Report prepared for Kowhai Timber (1990) Limited.

² Ministry for the Environment (November 2003). Guidelines for Reporting on Contaminated Sites. Contaminated Sites Management Guidelines No. 1.

³ Ministry for the Environment & Ministry of Health (June 1997). Health and Environmental Guidelines for Selected Timber Treatment Chemicals.

Groundwater and Environmental Services

There is also evidence of contamination by timber treatment chemicals in the sediments of the adjacent stream. Higher contaminant levels at greater depths in the sediment imply that the majority of the contamination is related to past site activities. The sediment and soil contamination does not appear to be having a significant impact on the concentrations of contaminants in the stream water. Water samples taken when the stream was essentially stagnant did not reveal significant contamination in the area adjacent to the worst soil contamination.

The samples taken near the former location of the boric spray tunnel and the boric-treated timber storage areas did not reveal any significant contamination above relevant guidelines. A low concentration of PCP was however detected, indicating that some PCP may have been used on the site in the past. No other evidence of past PCP use has been found to date.

Previous investigations carried out in the area of a former underground storage tank⁴ on the property did not uncover any hydrocarbon contamination. On this basis, the risk of significant hydrocarbon contamination from the former storage tank is thought to be low.

The locations of the identified areas of contamination are shown on Figure 1.

1.2 Remediation Goals

The property is currently on the market as a going concern. The present owner is intending to remediate the identified contamination that is above the industrial/commercial guidelines prior to the sale of the property being completed.

The goals of the remediation plan for this property are:

1. To remediate the identified contamination resulting from timber treatment activities to levels below the guideline values for the protection of human health for both unpaved and paved industrial commercial sites (no management plan) and for the protection of maintenance workers; and
2. To reduce the potential risk to the environment from contamination by timber treatment chemicals at the site by remediating the most highly contaminated materials.

1.3 Remediation Options and Alternatives

There are three main options for remediation of the chemical contamination observed at the property. These options are detailed below:

1. Leaving the contaminated material in-situ. This option involves leaving all of the contaminated material in place but capping it to prevent contact by site workers and

⁴ Pattle Delamore Partners Limited, June 1997. Report on Site Reconnaissance, Kowhai Timbers, Matakana. Report prepared for Mobil Oil (NZ) Limited.

infiltration of surface water. Capping the contamination would reduce the risk to the health of site workers presented by the contamination although some areas contain contaminants at levels above the generic guideline values for the protection of human health for both unpaved and paved industrial commercial sites (no management plan) and for the protection of maintenance workers. Under this option, a site-specific risk assessment would need to be carried out for the observed contamination and a management plan would need to be put in place to ensure both the integrity of the cover over the contaminated material and that maintenance workers were adequately protected. Capping of the contaminated areas would also prevent rainfall infiltration through the contaminated materials, reducing possible risks to the environment from the movement of contaminants.

+ consent

2. Stabilisation or encapsulation on-site. In this option, contaminated material would be excavated from around the treatment plant and placed in a designated disposal area on site. The designated area would need to be of sufficient size to allow full encapsulation of the excavated material. The top of the contaminated material would be located at least 1 metre below the ground surface to avoid possible future disturbance by intrusive activities, erosion or flooding. As with any encapsulation site, the surface cover would be graded to shed water and capped using an engineered multi-layered cap. The location of the encapsulation site should be marked, surveyed and recorded. As-built plans should be included in the remediation validation report. Encapsulated material would also need to be prevented from interacting with groundwater beneath the site. The encapsulation area would need to be designated as suitable for passive activities only and would reduce the usable area of the property. Long term monitoring and control of this area would be required.

+ consent

3. Excavation and removal to an approved disposal facility. Contamination at levels above the relevant guideline levels would be excavated from the identified areas and transported to a licensed landfill for disposal. No pre-treatment of the excavated material would be necessary to make it less hazardous for handling and transport, however appropriate health and safety procedures would be followed to avoid the generation of contaminated dust and contact with contaminated material by remediation workers. Depending on the disposal facility accepting the material, transport routes may be designated. Disposal at a licensed facility would be in accordance with the resource consents and acceptance procedures for that facility. Documentation showing final disposal of the material would be received from the facility and included in a validation report.

1.4 Preferred Option

Taking into account the options, health and safety factors, costs, regulatory considerations and community acceptability, the recommended remediation option for this site is to excavate the identified contaminated material for disposal to a licensed landfill. Excavation and removal of the more highly contaminated material would allow the property to be more fully utilised and significantly reduce the potential risks to human health and the environment.

Groundwater and Environmental Services

1.5 Remediation of Lower Levels of Contamination

From a human health perspective, it is not necessary to remove contamination at levels below the guideline values for the protection of human health for unpaved/paved industrial commercial sites and for the protection of maintenance workers. There are unlikely to be any adverse effects on human health from exposure to this material. On this basis no remediation is proposed for areas with levels of contamination below the applied guideline values.

2 REMEDIATION WORK PLAN

The planned phases of the excavation and off site removal of contamination are outlined below:

- Select and brief contractor and staff;
- Locate and mark out areas to be remediated;
- Excavate and remove contaminated material from the identified areas;
- Transport the excavated material to a licensed landfill;
- Validate the remediated areas by sampling, analysis and visual inspection; and
- Replace removed soil with clean fill or soil if required.

A full description of the specific remediation activities proposed is provided in Section 2.2. All remediation activities will be subject to the provisions of the site health and safety plan for remediation discussed in Section 3.

2.1 Extent and Location of Areas Requiring Remediation

Prior to the redevelopment of this property, it is intended to remove material with contamination above the relevant guideline values from the area noted in Table 1 below. Descriptions of the materials encountered in the area to be remediated are also provided in the table. Initial estimates of lateral extent, depth range and volume of material to be remediated are also provided. Estimates have been made on the basis of the environmental information collected to date and assumptions about the spread of contaminants based on that information.

Figure 1 shows the layout of the timber treatment site and the remediation location described below. The remediation area includes all of the chemical contamination identified as being in excess of the relevant guidelines on the property at 362 Matakana Valley Road. Contamination at lower levels is not considered to require remediation for the current land use. Any change in land use to a more sensitive class would require a review of the environmental investigation data and remediation plan.

Table 1 Description of Proposed Remediation Area and Volume

Location	Description	Dimensions
Southeast of Timber Treatment Plant	Variable organic rich topsoil over sandy substrate.	Area: 270 m ²
	Chemical staining often visible.	Thickness: 200 mm
	Contamination originates from disposal of treatment sump sludge and spills of chemicals during timber treatment.	Volume: 54 m ³

Groundwater and Environmental Services

The estimate of the volume of material that would need to be removed from the site to complete the remediation of the identified chemical contamination on the property is **54 m³**. This estimate includes soils to an average depth of 200 mm across the identified area of high contamination.

The volume estimate is based on the assumptions about the extent and depth of contamination at the site. If the extent of chemical contamination above the applicable guideline value is found to be greater than initially estimated, the excavation area will be increased to include all of this material.

2.2 Proposed Site Remediation Works

The following sections describe the remediation activities that will be undertaken.

2.2.1 Contractor Selection and Briefing

The contractor selected to undertake the remedial works must have relevant experience. The consultant will review this experience to ensure that the contractor is competent to carry out the required work. There will be a briefing of the contractor's site staff prior to remediation to ensure that they are aware of the nature of the contamination and are familiar with and adhere to the site-specific health and safety procedures for remediation.

Procedures will be laid out for the identification and reporting of any additional contamination identified during remediation earthworks. These procedures will include marking off the area for inspection and decisions on remediation by a qualified environmental consultant. Steps will also be taken to mitigate any risks from the detected contamination and to prevent the spread of the material.

2.2.2 Identification of areas to be remediated

The area requiring remediation, noted in Table 1, will be identified and marked out by a suitably qualified environmental consultant during a site familiarisation visit with the contractor prior to the excavation commencing. Identification and marking of the remediation area will be carried out using appropriate warning signs/tape and fencing if necessary.

2.2.3 Community Relations

Given the nature of industrial activities currently carried out at the site, the distance of the contaminated area from the site boundaries, and the rural nature of the surrounding area, no specific consultation with surrounding landowners or occupiers is proposed at this time.

2.2.4 Noise and Odour Control *How long will work take? Signs?*

The site itself currently supports frequent truck movements as well as the operation of timber handling and milling equipment. The operation of excavators and trucks for the remediation is unlikely to produce excessive amounts of noise beyond what could reasonably be expected in the normal course of site operations. Limits will be placed on the hours of work to prevent any noise nuisance to the closest neighbours.

The levels of chemical contaminants detected on this property do not present a risk of nuisance odours. If significant odorous contamination were encountered during remediation, the excavation would be covered up pending evaluation by a suitably qualified consultant.

Groundwater and Environmental Services

2.2.5 Remediation Schedule

Remediation activities will be restricted to the hours of 7 AM to 7 PM, Monday to Saturday

2.2.6 Excavation and removal of soil

The equipment that will be required for the remediation includes:

- A water supply for dust suppression;
- An excavator; and
- Covered trucks.

Under dry conditions, the remediation area will be lightly dampened down prior to work commencing. The area will continue to be kept damp whilst removing the contaminated material if there is a possibility of dust generation.

Contaminated material will be removed from the identified areas using an excavator. The removed material will be loaded onto a covered truck for transport to the selected disposal facility.

Remediation will extend beyond the designated area if further contamination is detected during remediation or validation. Appropriate warning signs/tape will be used to mark any further contamination identified prior to its removal.

Prior to leaving any designated remediation area, all trucks and excavation machinery will be inspected to ensure that no contaminated material is tracked from the remediation areas to other parts of the property. Any material adhering to a truck or excavator will be removed inside the excavation area (for the last truck-load, any material removed will need to be placed in that truck).

how?

Landfill weighbridge receipts will be retained to provide proof of the volume of material disposed of. These will be attached to the remediation validation report.

2.2.7 Control of Sediment Runoff from Excavations

Sediment control measures will be sufficient to comply with the requirements of ARC Technical Publication 90. The proposed remediation area is adjacent to a stream and control of sediment runoff from any excavations will be a priority. All excavations involving the removal of contaminated material will be carried out so that surface water and sediment are retained within the excavation. Particular care will be taken to ensure that no surface water or sediment runoff from the excavations is permitted to enter the stream.

silt fences minimum

2.2.8 Validation of Remediation

The identified contaminated material will be removed by excavation to the prescribed extent and depth. At the completion of excavation, the exposed sides and base of the excavation will be sampled by a suitably qualified person to verify that remaining contaminant levels are below the applicable guideline values for the site. It is proposed that at least 8 validation samples will be taken from the base of the excavation and 8 from the walls at the edges of the excavation.

✓OK

Groundwater and Environmental Services

The excavation shall remain open until the results of the sample analysis have been checked. In the event that the validation sampling results exceed the applicable guideline values, additional material will be removed and further validation samples taken.

Remaining levels of contamination at the completion of all excavation will be logged and recorded in the validation report.

Photographs of the extent of the excavations will be taken and attached to the validation report. Council representatives will also be given the opportunity to inspect excavation areas if required.

A report documenting the results of the remediation and the validation inspection and sampling will be prepared. The report will include a plan showing the dimensions and locations of the remediated area from which contaminated material has been removed and the volumes of material removed.

2.2.9 Soil replacement

Some imported soil or fill may be required to replace contaminated material excavated from the site. Any imported soil or fill used at the site will be checked to ensure that it is free from contamination and documentation relating to its origin will be included in the validation report.

2.2.10 Proposed Long Term Site Management

The intention is to remediate this site to the point where remaining levels of contamination in the identified area are below the timber treatment guideline values for the protection of human health for both unpaved and paved industrial commercial sites (no management plan) and for the protection of maintenance workers. Provided that the use of the site remains in the commercial/industrial category, no further site management plans should be required. In the event that there was a need to change the land use to a more sensitive classification, additional environmental investigation would be required.

2.3 Contingency Plan

In the event that remediation of contamination at the site to levels below the stated guideline values is not fully possible, an ongoing site management plan will be produced to control access and exposure to the contaminated material. This plan will be prepared in consultation with the relevant regulatory authorities.

3 HEALTH AND SAFETY AND ENVIRONMENTAL PROTECTION MEASURES

3.1 Health and Safety

All remediation activities will be subject to the provisions of a health and safety plan for intrusive activities involving contaminated materials. The health and safety plan is provided as Attachment A. Implementation of health and safety provisions will be by a suitably qualified person. The site manager will be briefed on the health and safety issues. All contractors and staff involved in the remediation activities will be required to have read and understood the provisions of this health and safety plan.

There will be no public access to the remediation area during site works.

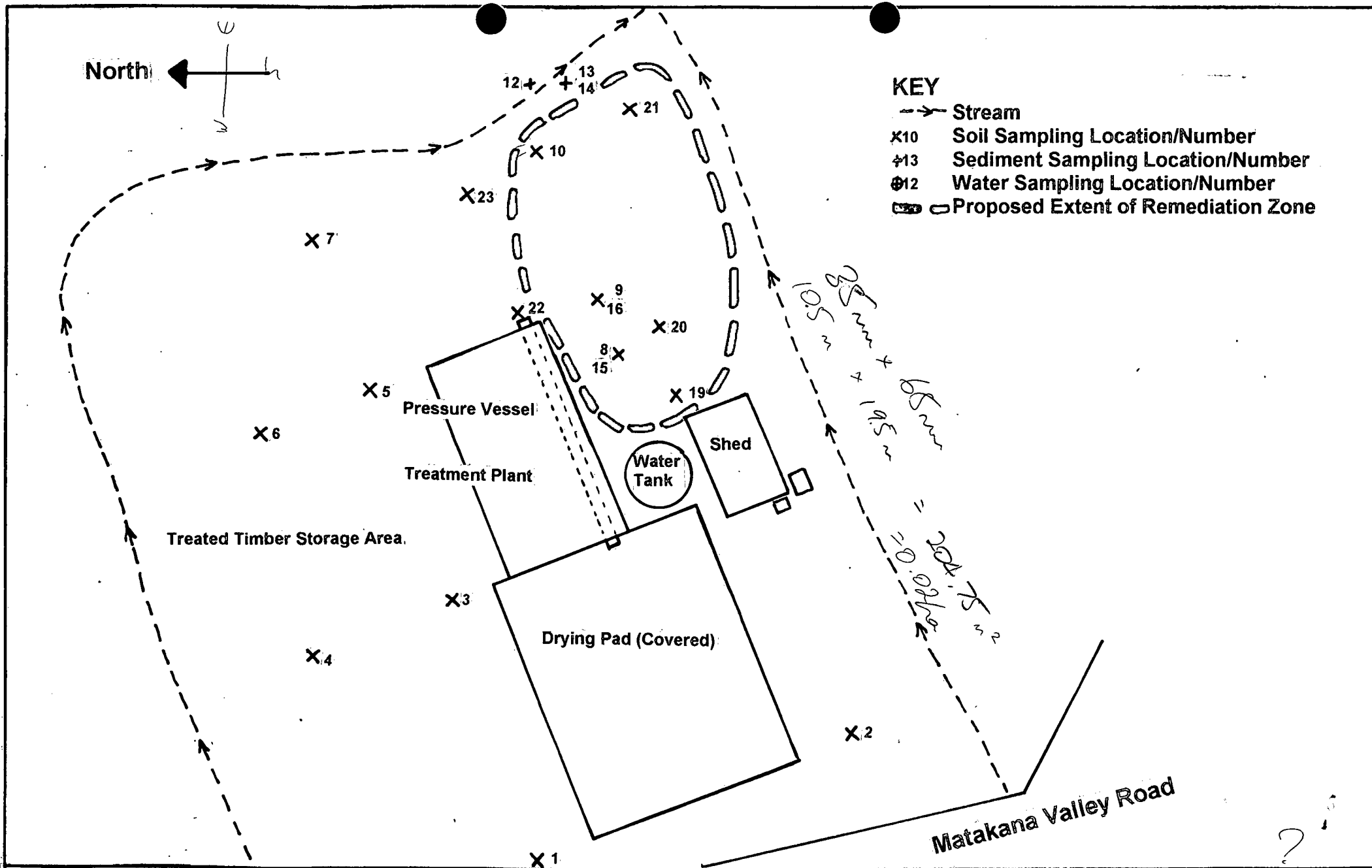
how?

Contractors and staff involved in the remediation activities will also be expected to be familiar with and adhere to standard health and safety procedures for the activities that they are involved in and for the equipment that they are using. The contractor must also adhere to the requirements of the Health and Safety in Employment Act 1992 and follow the 1994 OSH Health and Safety Guidelines for the Cleanup of Contaminated Sites.

3.2 Control of Contaminant Migration

Dust suppression measures to be taken prior to excavation and during handling and transport are outlined in Section 2.2.6 above. Adherence to these measures during remediation activities will prevent the migration of potentially contaminated dust to uncontaminated areas of the site.

Removed soil will be transported by covered truck to a licensed landfill for permanent disposal. Prior to leaving the excavation area, all trucks will be inspected to ensure no contaminated soil or other material is tracked off site or to other areas on site. Any material adhering to the truck will be cleaned off into the excavation area. These measures will ensure that no potentially contaminated dust or soil is deposited on other parts of the site or along the route to the landfill.



Groundwater &
Environmental Services

Figure 1: Proposed Extent of Remediation
Kowhai Timber

Approximate Scale 1:3000

DRAWN	CHECKED	SCALE	SHEET
TRACED	DATE Mar 04		SERIES OF
			REF