

Taranaki Regional Council  
Private Bag 713  
Stratford 4352  
Taranaki

31 July 2024

**Attention: Victoria McKay, Environmental Assurance Manager**

Dear Victoria,

**Dow Final Preliminary Site Investigation Review**

## 1 Introduction

Beca Limited (Beca) has been engaged by Taranaki Regional Council (TRC) to undertake technical review of a Preliminary Site Investigation (PSI) report prepared for 89 Paritūtū Road, Spotswood, New Plymouth (the Site) legally described as Lot 3 DP 8465, Lot 1 DP 9022, Lot 1 DP 9829, Lot 1 DP 10018 and Lot 2 DP 9829.

Draft versions of the PSI were initially reviewed with two rounds of feedback provided in April and June 2024. This review is of the following version:

- Preliminary Site Investigation, Paritūtū, New Plymouth prepared for Dow Chemical (NZ) Limited by Tonkin & Taylor Limited (T+T); Final Version 007 dated 11 July 2024 (the final PSI report).

The review has considered the requirements of Ministry for the Environment (MfE), 2021 Contaminated land management guidelines No. 1: Reporting on contaminated sites in New Zealand (CLMG 1) and No. 5: Site investigation and analysis of soils (CLMG 5).

## 2 Compliance with CLMG 1

Table 1 provides a checklist of required content from CLMG 1, noting it is specific to determining if the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (the NESCS) applies, and the PSI reviewed is considered to have a broader purpose.

Table 1: PSI Table of Contents (Source Appendix A of CLMG 1)

Content	Required	Required if relied on <sup>1</sup>	CLMG 5 section
<b>1. Introduction</b>			
• investigation objectives	<input checked="" type="checkbox"/>		2.1
• site identification (site name, address, legal description; site boundaries; a map reference and geographic coordinates)	<input checked="" type="checkbox"/>		3.3.1
• proposed site use		<input type="checkbox"/> 1	3.3.2
<b>2. Site description</b>			
• environmental setting		<input checked="" type="checkbox"/>	3.3.3
• site layout	<input checked="" type="checkbox"/>		3.3.4
• current site uses	<input checked="" type="checkbox"/>		3.3.5
• surrounding land uses	<input checked="" type="checkbox"/>		3.3.6
• geophysical surveys		<input checked="" type="checkbox"/> 2	5.1
• site inspection		<input checked="" type="checkbox"/>	3.3.8
<b>3. Historical site use</b>			
• summary of site history gained from:	<input checked="" type="checkbox"/>		3.3.7
– review of existing investigation reports		<input checked="" type="checkbox"/>	
– review of council information		<input checked="" type="checkbox"/>	
– review of aerial photographs		<input checked="" type="checkbox"/>	
– interviews		<input checked="" type="checkbox"/>	
– review of other historical information		<input checked="" type="checkbox"/>	
• preliminary sampling (if carried out)		<input type="checkbox"/> 3	3.3.9
– description (including diagram)			
– justification for sample location and analyte selection			
– results			
– comparison of results to guidelines			
<b>4. Risk assessment</b>			3.3.11
• evaluate the probability that pursuant to regulation 6 (3):	<input checked="" type="checkbox"/>		
– <i>an activity or industry described in the Hazardous Activities and Industries List (HAIL) is, or is not, being undertaken on the piece of land, or</i>			
– <i>an activity or industry described in the HAIL has, or has not, been undertaken on the piece of land, or</i>			
– <i>the likelihood of an activity or industry described in the HAIL being undertaken, or having been undertaken, on the piece of land</i>			
• evaluate the probability that pursuant to regulation 6 (3):	<input checked="" type="checkbox"/>		2.2
– <i>the likelihood that the soil is contaminated as a result of activity or industry occurring</i>			

<sup>1</sup> Any evidence relied upon to form an opinion/conclusion must be included in report, including sampling.

• description of the limitations of the data collected and the assumptions and uncertainties inherent in the data and models used	<input checked="" type="checkbox"/>		7.3.1
<b>5. Conclusions</b>	<input checked="" type="checkbox"/>		
<b>6. Recommendations</b> (if relevant to report purpose)		<input checked="" type="checkbox"/>	
<b>7. Report limitations</b>	<input checked="" type="checkbox"/>		2.1.2
<b>8. Suitably qualified and experienced practitioner (SQEP) certification of report</b> (refer to Appendix C of CLMG 1)	<input checked="" type="checkbox"/>		1.2
<b>9. References</b>	<input checked="" type="checkbox"/>		
<b>Appendices: relevant supporting information</b>	<input checked="" type="checkbox"/>		

Supporting information	Required	Required if relied on
Figures		<input checked="" type="checkbox"/>
Land titles		<input type="checkbox"/> 4
Historical site information relied upon (if not included in report body)	<input checked="" type="checkbox"/> 5	
Site photographs (if site inspection carried out)		<input checked="" type="checkbox"/>
Other supporting information		<input checked="" type="checkbox"/>
Statement of qualification as a SQEP	<input checked="" type="checkbox"/>	

## Footnotes:

- The future site use has not yet been decided.
- The geophysical investigation (ground penetrating radar [GPR]) completed in 2001 as part of TRC investigations has been added to Section 10.6 of the final PSI report, but GPR undertaken during the 2015 ERM site investigation is not mentioned. As a full geophysical survey (GPR and geomagnetic) of the site has recently been undertaken as the first stage of the site investigation, this is not considered a significant gap.
- Preliminary sampling was not undertaken during the PSI. Sampling will occur during the Detailed Site Investigation (DSI).
- Land titles were not relied upon in the PSI. Change of ownership is detailed in the PSI.
- A summary of historical information is provided in the PSI, but the historical reports have not been appended. It is acknowledged that it is not practicable to append the historical reports given the number of them. The summary of historical reports includes the contaminants of concern considered in previous investigations but does not include the historical analytical soil and groundwater data. T+T commented that inclusion of specific concentrations recorded as part previous testing or monitoring is not considered relevant for the objective of the PSI report given that the report has identified that potentially contaminating HAIL activities have been undertaken. Additionally, T+T stated site characterisation (with respect to ground contamination) is proposed to be undertaken as part of the DSI and considered that the provision of historical soil testing results could be misleading, as may not be representative of the nature/extent of contamination at present.

It is agreed that historical results cannot be used to indicate current subsurface conditions at the site, but they are useful for determining what contaminants need to be considered in each part of the site. It is also acknowledged that provision of historical data without the context of assessment against current human health and environmental assessment criteria is problematic. It has been discussed with Dow and T+T, and historical results will be considered in preparing the Sample and Analysis Plan for the DSI.

Risk assessment including comparison of detected concentrations against human health and environmental assessment criteria will be part of the DSI process.

It is considered that the final PSI report has been undertaken in general accordance with the sections of CLMG 1 and CLMG 5 relevant to PSIs.

### 3 Closure

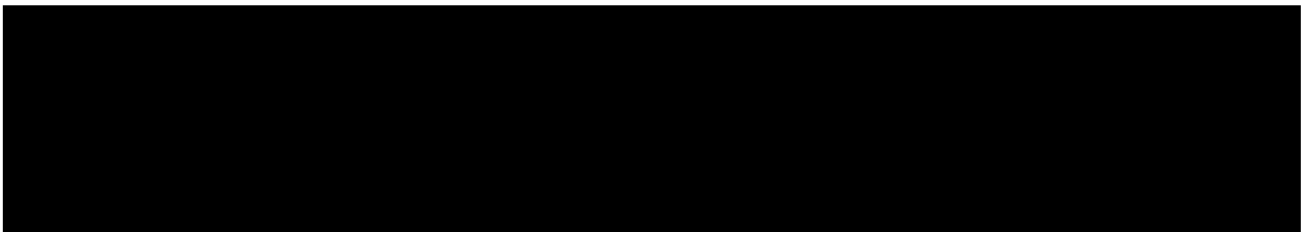
Taking into consideration the footnotes in Table 1, previous review comments have been closed out.

Please do not hesitate to contact the undersigned should you require clarification.

Yours sincerely



on behalf of  
**Beca Limited**



This letter has been prepared by Beca Ltd (Beca) solely for Taranaki Regional Council (Client). Beca has been requested by the Client to provide a technical review of a Preliminary Site Investigation report prepared for 89 Paritūtū Road, New Plymouth (Scope). The contents of this letter may not be used by the Client for any purpose other than in accordance with the stated Scope.

This letter is confidential and is prepared solely for the Client. Beca accepts no liability to any other person for their use of or reliance on this letter, and any such use or reliance will be solely at their own risk.

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The contents of this letter are based upon our understanding and interpretation of current legislation and guidelines (“Standards”) as consulting professionals, and should not be construed as legal opinions or advice. Unless special arrangements are made, this letter will not be updated to take account of subsequent changes to any such Standards.

This letter should be read in full, having regard to all stated assumptions, limitations and disclaimers.



# Preliminary Site Investigation

Paritūtū, New Plymouth

**Prepared for**

Dow Chemical (NZ) Limited

**Prepared by**

Tonkin & Taylor Ltd

**Date**

July 2024

**Job Number**

0021795.0200 v007



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## Document control

Title: Preliminary Site Investigation					
Date	Version	Description	Prepared by:	Reviewed by:	Authorised by:
03/11/2023	001	Draft for client review			
15/01/2024	002	Updates following client review			
08/02/2024	003	Updates following client review			
26/02/2024	004	Final updates following client review			
03/05/2024	005	Updates following independent peer review.			
03/07/2024	006	Updates following response to peer review comments – expanded executive summary.			
11/07/2024	007 (FINAL)	Updates following client review – executive summary headings.			

### Distribution:

Dow Chemical (NZ) Limited

1 copy

Tonkin & Taylor Ltd (FILE)

1 copy

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## Glossary and Acronyms

The table below provides a list of the commonly used basic terms and acronyms within the report. For the chemicals and chemical acronyms, a list is provided in **Table 10.1**.

Term	Description
<b>ACM</b>	Asbestos containing material.
<b>Andesite</b>	An extrusive igneous rock intermediate in composition between rhyolite and basalt. Tends to form outcrop “domes” in geologic materials.
<b>Chlorobenzenes</b>	Aromatic organic compound often used for pesticide formulation.
<b>CoC</b>	Contaminant(s) of Concern.
<b>DSI</b>	Detailed Site Investigation.
<b>Esterification</b>	The chemical reaction which takes place during the formation of an ester.
<b>Excipients</b>	Inert or ‘non-active’ ingredient (usually serving as the delivery medium) in an agricultural product.
<b>GMP</b>	Groundwater management plan.
<b>HAIL</b>	Hazardous Activities and Industries List <sup>1</sup> .
<b>NESCS</b>	National Environmental Standard for Assessing and Managing Contaminants in Soil.
<b>NESF</b>	National Environmental Standards for Freshwater.
<b>NPDC</b>	New Plymouth District Council.
<b>Phenoxies</b>	A common term for a grouping of selective herbicides within the phenoxy acetic/butyric and propionic acid herbicides groups.
<b>PSI</b>	Preliminary Site Investigation.
<b>RMA</b>	Resource Management Act.
<b>Surfactant</b>	Surface acting agent. Decreasing surface tension between a liquid and another liquid, solid or gas. Component of pesticides, or penetrants, which influence absorption, as well as independently used as cleaning agents, emulsifiers, and detergents.
<b>TRC</b>	Taranaki Regional Council.
<b>Triazines</b>	A grouping of broad-spectrum herbicides based around a triazine ring.

<sup>1</sup> <https://environment.govt.nz/assets/Publications/HAIL.pdf>

## Executive summary

### Introduction

Tonkin & Taylor Ltd (T+T) has been engaged by Dow Chemical (NZ) Ltd (Dow) to undertake a Preliminary Site Investigation (PSI) for the former agricultural chemical manufacturing site at Paritūtū, 89 Paritūtū Road, Spotswood, New Plymouth. This PSI has been undertaken to evaluate the potential for contamination to be present at the Paritūtū site and assess the need for further investigations and contaminated land related consents in accordance with the Remediation Roadmap. The Roadmap was specifically developed for the site's environmental remediation and presented to key stakeholders in November 2022.

To complete the PSI, multiple information sources, such as historical documentation, were gathered and reviewed. These included:

- New Plymouth District Council property files.
- Taranaki Regional Council records and pollution incidents.
- Documents from National Library of New Zealand.
- Historical aerial photographs.
- Environmental regulations and planning documents related to ground contamination.
- Dow and Corteva supplied documents.
- The public survey conducted in July 2023 and related interviews.

T+T also completed:

- Site walkovers.
- Engagement with mana whenua.

This PSI is current as to all information received and reviewed by June 2024. Any further information received after this date will be considered to inform the sampling and analysis plan and be integrated in the contextual information in reporting for the DSI.

## Results

### Site History

The Paritūtū site has been associated with agrichemical manufacturing operations since 1960. Prior to this, a Māori horticultural settlement named Ruataku was located at the site in the 1840s, which provided food for the nearby pā of Otaka, Ngamotu and Te Mahoe, which were linked by a foot track in the early-mid 1800s. This kainga was likely largely abandoned by the early 1900s.

The onsite infrastructure associated with the manufacturing operations formerly included multiple facilities for chemical manufacture and storage as well as an administration building, pilot plant, solid and liquid incinerators, maintenance/engineering areas, and research and development facilities. All production and packaging activities ceased by February 2021 and the demolition of most above-ground structures was completed by the close of 2022. Only a few structures remain on site, including the stormwater ponds and the unused former Dangerous Goods Compound.

Management and ownership changed over the years of operation, with Dow assuming ownership of the site in February 2023 and committing to undertake investigation and remedial works, as needed.

### Contamination Sources

Drawing from a range of sources, the PSI has identified that potentially contaminating Hazardous Activities and Industries List (HAIL) activities, as defined by the Ministry for the Environment, have been undertaken throughout the site's industrial history. The identification of HAIL activities is a

requirement of a PSI under New Zealand regulations. From the documented information reviewed, and validated inputs received via the community survey, the PSI identified that activities at the site have potentially resulted in soil and groundwater contamination. These include activities associated with chemical manufacture and other related operations, as well as the presence of workshops, substations, and other structures. There are a wide range of chemicals and contaminants of concerns (CoCs) associated with these activities. If the CoCs have been released to the environment via accidental spill or through loss of containment their effects in soil and groundwater may vary based on their mobility and fate in certain media. In addition, a high-level assessment of the mobility and fate of potential CoCs has been undertaken indicating that potential CoCs may have broken down over the site's long history.

### **Preliminary Conceptual Site Model**

The information gathered was used to develop a preliminary conceptual site model (CSM). A conceptual site model describes a site's environmental setting. It includes three main elements: **source(s)** of contamination, **pathway(s)** or means for people or the environment to be exposed to contaminants, and **receptor(s)**, which is the people, environment, or ecosystem which could be affected by a contaminant. The purpose of a CSM is to help identify if there is a risk to people or the environment from site contamination.

The preliminary CSM for the Paritūtū site indicates that there is a potential for contamination to exist in surface soils, underlying soils, and groundwater (shallow and deep) which may have the potential to affect human health, and/or the environment.

### **Site Specific Regulatory Requirements**

Because known and potentially contaminating activities included on the HAIL have been carried out on the site, the NESCS regulations apply to the site. In accordance with the NESCS, additional investigation is required to further assess contamination risks at the site.

Sampling required can likely be undertaken as a permitted activity under regulation 8(2), and the soil disturbance for test pits can likely be a permitted activity under regulation 8(3) provided the volume of soil disturbance is below 7,800 m<sup>3</sup>.

Investigative sampling within the Site of Significance to Māori (SASM), is considered likely to be undertaken as a Discretionary activity under SASM-R17 (operative) and resource consent is required within this area.

The main remediation works will likely require a Restricted Discretionary activity consent under Regulation 10 of the NESCS for soil disturbance. Soil disturbance (and/or removal of a fuel storage system(s)) in relation to the ultimate remedial works, is considered likely to be undertaken as a Restricted Discretionary activity under Regulation 10 of the NESCS. On this basis, a CSMP and RAP would be required for implementation during any soil disturbance works.

Moreover, consideration of asbestos and other potential contaminants is required under the current regulatory framework, including the Asbestos Regulations.

## **Conclusions**

Although numerous contamination investigations and reporting have been carried out at the site historically, T+T has identified data gaps which need to be addressed as part of the roadmap to remediation.

To address the identified data gaps, the next step is to undertake a Detailed Site Investigation (DSI), which will include soil and groundwater sampling and is designed to determine whether the potential pathways identified in the preliminary CSM pose an actual risk to people or the environment.

## 1 Introduction

T+T has been engaged by Dow Chemical (NZ) Limited (Dow) to undertake a Preliminary Site Investigation (PSI) for 89 Paritūtū Road, Spotswood, New Plymouth (the Paritūtū site). The location of the site is presented in **Figure 3.1** below.

This report has been prepared in general accordance with the requirements for a PSI referred to in the NESCS regulations<sup>2</sup>, and as outlined in the MfE Contaminated Land Management Guidelines<sup>3</sup>.

The persons undertaking, managing, reviewing, and certifying this investigation are suitably qualified and experienced practitioners (SQEP), as required by the NESCS and defined in the NESCS Users' Guide (April 2012).

This preliminary investigation was undertaken in accordance with our proposal of 27 February 2023.

Dow assumed ownership of the site in the first quarter of 2023 and has committed to undertaking a full detailed site investigation and remedial works, as required for the Paritūtū site.

T+T has undertaken this PSI to assess the former onsite activities which may have resulted in soil and groundwater contamination.

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<sup>2</sup> Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.

<sup>3</sup> Ministry for the Environment updated 2021, Contaminated land management guidelines No. 1: Reporting on Contaminated Sites in New Zealand.

## 2 Objective and scope of work

### 2.1 Objective

The objective of this PSI is to gather relevant information related to the Paritūtū site to determine its history and actual or potential sources of contamination. The gathered information will be used to inform investigations and outline possible remediation measures going forward.

### 2.2 Scope

The scope of work for this investigation comprised:

- Review of multiple sources of historical documentation including:
  - New Plymouth District Council property files.
  - Taranaki Regional Council records and pollution incidents.
  - Historical aerial photographs.
  - Ground contamination related environmental regulations and planning documents.
  - Dow and Corteva supplied documents.
- Site walkovers.
- Mana whenua engagement.
- Community engagement survey.
- Interviews with survey respondents and former employees.
- Development of a conceptual site model (CSM).
- Preparation of this report.

This report documents our findings and comments on the potential for ground contamination at the site, in the context of the remediation roadmap (**Appendix B**) including potential resource consent implications with regard to ground contamination.

### 3 Site description

The site is located in New Plymouth's northwesternmost suburb of Spotswood and is positioned at the northern end of Paritūtū Road, where it intersects with Centennial Drive.

The Paritūtū site has primarily been associated with agrichemical manufacturing operations since 1960, when the site was first established. The onsite facilities formerly included multiple facilities for chemical manufacture and storage as well as an administration building, pilot plant, solid and liquid incinerators, maintenance/engineering areas, and research and development facilities. **Table 3.1** provides an overview of the site description and **Figure 3.1**, below, shows the site location.



Figure 3.1: Site Location, with an approximate site boundary shown in orange.

**Table 3.1: Site identification**

Site Identification	
Street address	89 Paritūtū Road, Spotswood, New Plymouth, New Zealand
Legal description	Lot 3 DP 8465 Lot 1 DP 9022 Lot 1 DP 9829 Lot 1 DP 10018 Lot 2 DP 9829
Site owner	Dow Chemical (NZ) Limited
Site area	Approximately 16 ha
Zoning	General Industrial
Geographic coordinates (World Geodetic System, WGS84)	39 03 49.80 S, 174 01 27.34 E

### 3.1 Current site use

The site is located within the 'General Industrial Zone' under the New Plymouth Proposed District Plan (updated 2020).

Demolition of site infrastructure was undertaken from mid-2022, with demolition to ground level completed in December 2022. However, some above ground structures remain, including the Dangerous Goods Compound (with associated buildings), stormwater retention ponds, and concrete building footprints. The site has no manufacturing activities occurring. Dow continues to hold two resource consents for the Paritūtū site: one to discharge stormwater to the Herekawe Stream at Back Beach (expiring 2026) and another to discharge contaminants to air (expiring 2044).

#### 3.1.1 Surrounding land uses

The Paritūtū site sits at an elevation of up to 60 m above sea level and is bound by Centennial Drive to the north and the west. A steep cliff face is present west of the site, separating Centennial Drive from Back Beach below. Back Beach is a popular recreational area and forms part of the Ngā Motu Marine Protected Area and the wider Tapuae Marine Reserve, located approximately 175 m west of the site. Paritūtū Centennial Park (Paritūtū Rock) is present immediately north of the site, with Mataora Island and Pararaki Island beyond.

Residential housing is located immediately adjacent to the southern boundary, and a short distance from the southeastern boundary, the latter of which is separated by Paritūtū Road. Industrial properties occupy most the of the adjacent land to the east (beyond Paritūtū Road), including the OMV tank farm (immediately northeast) and Port Taranaki beyond (approximately 500 m to the northeast).

**Table 3.2: Surrounding Land Uses**

Direction	Surrounding Land Uses
North	Centennial Drive, Paritūtū Centennial Park, Paritūtū Rock, and the ocean beyond.
East	Paritūtū Road, industrial and commercial properties including a fuel tank farm, a metal works and industries associated with port activities.
South	Residential properties.
West	Centennial Drive, Paritūtū Centennial Park, and the ocean beyond.



## 4 Background

### 4.1 Site ownership and management

The Paritūtū site was an agrichemical formulation and packaging plant established in 1960. Specific site ownership history information has been compiled from the 1992 desktop assessment<sup>4</sup> and the 2014<sup>5</sup> interpretive groundwater report, and summarised below:

- In 1960 Ivon Watkins Limited leased the site from the Taranaki Harbour Board.
- In 1964 The Dow Chemical Company acquired a 49% shareholding in Ivon Watkins Limited and the company name changed to Ivon Watkins-Dow Limited (IWD).
- In 1967 the site was developed and extended to 13 ha.
- In 1973 The Dow Chemical Company acquired a 51% shareholding and IWD Limited became a subsidiary of The Dow Chemical Company.
- The site boundary was extended westward in 1975 to give the present-day site boundary occupying nearly 16 ha.
- In 1989, The Dow Chemical Company acquired the remaining shares.
- In 1990, DowElanco (NZ) Limited was formed when The Dow Chemical Company formed a 60:40 joint venture with Eli Lilly in 1989 to produce agricultural products.
- In 1991, during the tenure of DowElanco, the Taranaki Harbour Board's land holdings were transferred to Taranaki Regional Council (TRC), including the Paritūtū site. The Council owned the site and administered the lease for six years until DowElanco purchased the property in 1997.
- In 1998, DowElanco (NZ) Limited changed its name to Dow AgroSciences (NZ) Limited when Dow acquired 100% ownership in 1997. Following the 2015 merger of The Dow Chemical Company and E.I. du Pont de Nemours & Company, Dow AgroSciences (NZ) Limited was renamed Corteva Agriscience NZ Ltd and separated from the merged company as part of the agricultural business Corteva. Corteva Agriscience NZ Ltd continued to operate the Paritūtū site until its closure in 2020.
- All production and packaging activities were ceased by February 2021<sup>6</sup> and demolition of most above ground structures was completed by the close of 2022 (refer to **Section 3.1**).
- Dow Chemical (NZ) Ltd assumed ownership of the site in February 2023<sup>6</sup>.

### 4.2 Kaitiakitanga

Two hapū and two iwi have an association with the Paritūtū site. It is a shared interest area between Taranaki Iwi and Te Atiawa; Ngāti Tairi Hapū (Taranaki), Ngā Mahanga, and Ngāti Te Whiti Hapū (Te Atiawa) and both have associations with the Paritūtū site. It is understood urupā are located on the property, which was also a papakāinga (settlement) and a battle ground. The site also sits within a broader cultural landscape of significance within the Taranaki Region.

<sup>4</sup> 1992. Dow AgroSciences (NZ) Ltd. New Plymouth-Waireka Site – Environmental Assessment, Desktop assessment.

<sup>5</sup> 2014. ERM. 88 Paritutu Road, New Plymouth, New Zealand. Interpretive Groundwater Report.

<sup>6</sup> Anecdotal information from Dow.

## 5 Site layout

The site covers an area of approximately 16 ha, with the site surface comprising approximately 8 ha of grass and 8 ha of asphalt and building footprints. Prior to demolition numerous buildings were present, typically within the northern and central portions of the site. As stated in **Section 3.1**, demolition of most buildings across the site was completed by the end of 2022. A detailed map of the site buildings and layout is included in **Figure 1, Appendix A**.

There were formerly three distinct areas/levels present across the site. For continuity purposes and ease of reading, a similar site layout has been adopted for use in this report. The distinct areas (herein referred to as “portions”) are as follows (see **Figure 2, Appendix A**):

- **Northern portion:** This portion of the site comprises an approximate 2.5 ha area located north of Gate 3. Former buildings present within this portion of the site include offices (administration building), warehouses, and storage areas.
- **Central portion:** This portion of the site comprises an approximate 3.8 ha area located between Gates 2 and 3 and was formerly the main production and formulation area. Stormwater pond SV8000 is located in this portion on the western boundary.
- **Southern portion:** This portion comprises the majority of the site, encompassing an approximate 9.5 ha area located south of Gate 2. This portion of the site predominantly comprises vacant grassed land, however some buildings were/are present (e.g., former pilot plant, laboratories, tanks, and storage areas), in addition to other site features including three stormwater ponds (SV9000 and SV9100/SV9200), carparking and the Dangerous Goods Compound.

The ‘building numbers’ outlined in **Table 5.1** correspond to the buildings present during the site’s operational period and are referenced throughout this report. It is important to note that former uses of buildings (where known) have also been included in **Table 5.1** as some buildings changed use over the operational period. However, the ‘building numbers’ relate to the use of the respective buildings at the time of demolition (2022).

**Table 5.1: Paritūtū Site building identification**

Building No.	Most recent building use	Previous uses	Building No.	Most recent building use	Previous uses
01	Grounds (Gates etc)		37	Not Assigned	
02	Administration/Laboratories		38	Maintenance Oil Store	
03	Raw Material, Boilerhouse, Packaging and Waste Storage, Herbicide, and Insecticide Formulations	Surfactants Plant Phenoxy active ingredient synthesis	39	Spill Control Shed	
04	Herbicides Packing, Raw Material Storage	Protectants Plant, Wettable Powders Plant, Granules Plant	40	No detailed record after demolition (possible caretaker building; appears to have been demolished late 1960s)	
05	Maintenance Workshop and Store		41	Bulk Tank Compound (demolished 1988)	Approximate location of stormwater pond ('lagoon')
06	Finished Goods Warehouse, Cafeteria and Laundry		42	Bulk Tank Compound	
07	Packaging Storage	Spray Equipment Fabrication, Carpenter Workshop, Laboratory	43	Bulk Tank Compound	
08	Storage Room		44	Fire Water Tank	
09	Drawing Office/Process Engineering (removed in mid-1990s)		45	Fire Pump Shed	
10	Offices (removed mid 1990s)		46	No.5 Substation	
11	Equalisation Tank (Tradewaste)		47	Security Gatehouse	
12	Retention Tank (Tradewaste)		48	Commodity Herbicides Plant	Phenoxy Plant (active ingredient synthesis), Continuous Sulphonation Plant (former unnamed building over this area)

Building No.	Most recent building use	Previous uses	Building No.	Most recent building use	Previous uses
13	Disused TCP Plant (demolished 2014)		49	Sprinkler Station (Formulations)	
14	Cooling Tower Chemicals		50	Container Test Storage	
15	Product Development Laboratory	Organophosphate insecticide plant Triazine plant Solids R&D facility	51	Dangerous Goods Storage 2 (Lab)	
16	Stormwater Pond (SV9000, SV9100/SV9200)		52	Sprinkler Station (Phenoxy)	
17	Stormwater Pond (SV8000)		53	Process Water Tank	
18	Storage/Packaging	Vet medical manufacturing, Container printing	54	Paint Shop	
19	Equipment / Packaging Storage	Disused Laboratory, R&D Offices	55	Fork Truck Garage	
20	Disused Pilot Plant (demolished 2014)	Pilot plant, Laboratory, Library	56	No detailed record after demolition (Potential storage shed; demolished early 1990s)	
21	No detailed record after demolition <sup>1</sup>		57	Packaging Storage	Finished Goods Shelter
22	No detailed record after demolition <sup>1</sup>		58	Tradewaste Monitoring	
23	Not Assigned		59	Dangerous Goods Storage (Maintenance)	
24	Health Clinic		60	Brine Extraction Process	
25	Packaging Storage	Drum Processing	61	Brine Extraction (Storage Tanks)	
26	Office (Tanker Drivers) (demolished early 1990s)		62	Materials Flow Offices	
27	No.4 Substation		63	Site Services Offices (removed mid-1990s)	

Building No.	Most recent building use	Previous uses	Building No.	Most recent building use	Previous uses
28	Cooling Tower		64	High Temperature Incinerator	Solid Wastes High Temperature Incinerator
29	Dangerous Goods Store		65	Not Assigned	
30	Liquids Incinerator (demolished 2000)		66	Electric Fire Pump	
31	Town Main Booster Pump		67	Emergency Equipment Shed (demolished early 1990s)	
32	Sprinkler Station (Pilot Plant)		68	Hazardous Waste Storage	
33	Covered Stairway		69	Valve House (Brine Extraction)	
34	Not Assigned		70	Finished Goods Office	
35	Sprinkler Station (Engineering)		71	Valve House (Building 06)	
36	Dangerous Goods Storage 1 (Lab)				

<sup>1</sup>. Buildings 21 and 22 did not have detailed records over uses prior to demolition and site decommissioning, however they are considered likely to relate to small site offices, temporary portable offices or a caretaker shed in the vicinities of Buildings 4, 5 or 6.

## 6 Environmental setting

### 6.1 Topography and hydrology

The former main production areas (within the Northern and Central portions of the site) are situated on a plateau (approximately 60 m in elevation) with sharp breaks in slope to the north, south and west, the latter of which leads down to the road cutting for Centennial Drive. The southern break separates the Central portion of the site from a lower terrace (Southern portion of the site, approximately 55 m in elevation), which slopes further southward toward to the southern boundary.

The nearest surface water course is the Herekawe Stream, located approximately 370 m southwest of the site at its closest point and flows westward into the ocean. Controlled (consented) stormwater from the site is discharged to this stream.

### 6.2 Geology and hydrogeology

The geology and general groundwater system across the site is complex. Although a preliminary review of the groundwater system has been conducted<sup>7</sup>, further investigations are planned to improve the understanding of the hydrogeological system.

Published geological maps of the site show the surface geology as Holocene dune deposits (windblown sand)<sup>8</sup>. Paritūtū Rock (immediately north of the site) and the Sugar Loaf Islands (just offshore to the north-west) are classified as andesitic lava (volcanic plugs) of the Sugar Loaf Andesite Formation. Immediately south of the site the surface geology is identified as bedded sands and conglomerate overlain by andesitic lahar deposits (breccia) of the Maitahi Formation. It has been inferred that these Maitahi lahar deposits likely extend across the site, underlying the Holocene dune deposits, to abut against Paritūtū Rock<sup>9</sup>.

Previous studies onsite have described the geological sequence as interbedded sands, silts, and clays<sup>9</sup>. These studies have also identified an 'andesite high' in the western area of the site, where the sequence of interbedded sands, silts and clays is underlain by andesite rock. The exact geometry of this andesite high has not been determined, but it is found as shallow as 12 m below ground level (bgl) at BH10, before dropping off in all directions. The top surface of this andesite is highly weathered and has formed a clay layer. A similar clay has been identified at the bottom of some bores near the eastern edge of the site (BH16a, BH30). This clay has previously been interpreted as the weathered surface of andesite rock, suggesting that the andesite may extend across the Central portion of the site at depths below those reached during historical drilling in this area of the site, or a separate andesite high may be present in the east near BH16a and BH30. One borehole (BH46a) identified smooth, sub horizontal joints in the andesite, which could form a preferential flow path. Other boreholes only reached the top of the andesite, so were not able to assess the extent of fracturing.

<sup>7</sup> T+T, 2023. Proposed Revisions to the Groundwater Management Plan – 89 Paritūtū Rd, New Plymouth. Ref 21795.0210

<sup>8</sup> Townsend et al. (compilers) 2008, modified for Heron (custodian) 2018, 2020. Accessed through GNS web maps.

<sup>9</sup> ERM, 2014. 89 Paritūtū Road, New Plymouth, New Zealand. Interpretive Groundwater Report.

Previous reports indicate two aquifers are present at the site:

A perched shallow aquifer (the Shallow Aquifer) has been identified at the site. Groundwater gauging data indicates the Shallow Aquifer is discontinuous and generally confined to the southeastern area of the site, although the precise extent of the Shallow Aquifer has not been confirmed. There are some indications that a shallow perched aquifer may also be present in the northeastern section of the site, although additional intrusive investigations would be needed to confirm this. There is also limited shallow groundwater data in the centre of the site, and it is unclear whether the southeastern shallow aquifer and the northeastern shallow aquifer (if present) are connected. In the southeast, the Shallow Aquifer flows towards the south/southwest (counter to the regional flow direction). The flow direction in the northeast is not well understood. Shallow groundwater is typically found between 1.5-7.5 m bgl. The Shallow Aquifer is in sandy soil and is underlain by a clay layer approximately 2 m thick, which acts as an aquiclude (low-permeability layer). The total height of the water column in the Shallow Aquifer is typically less than 10 m. While the extent of the shallow aquifer off site is not known, it may be hydraulically connected to the Herekawe Stream.

- A deeper aquifer (the Deep Aquifer) is found across the site at between approximately 15-25 m bgl. This aquifer is within a mixture of sands, silts, and clays. Except where andesite has been identified in the west of the site, the base of the Deep Aquifer has not been encountered in previous investigations, so the aquifer thickness is unknown. The base may be the weathered andesite clay layer described above. The Deep Aquifer generally flows to the north, except in the western area of the site, where deep groundwater appears to flow to the west/southwest around the andesite high. Groundwater from the Deep Aquifer either drains into the underlying andesite (see below) or discharges to the marine coastal area to the northwest of the site (including seeps identified in the coastal cliffs).
- Previous investigations have indicated that there may also be a separate aquifer in the andesite. This is based on a single monitoring well (MW46A) that is screened in the andesite high near the western boundary of the site (see **Figure 8, Appendix A**). The water level in this monitoring well is typically approximately 10 m deeper than the water level in nearby monitoring wells screened in the sands/silts of the Deep Aquifer described in the previous paragraph. Detections of contaminants in MW46A indicate that there is some degree of connectivity with the Deep Aquifer, but the extent of connection is not well understood. Based on the information available, it is unclear whether there is a separate andesite aquifer, or if groundwater in the andesite is better characterised as part of the Deep Aquifer. For the purposes of this report groundwater in the andesite has been considered part of the Deep Aquifer rather than a separate aquifer.
- The aquifers are expected to be unconfined and linked, with groundwater from the Shallow Aquifer seeping down to the Deep Aquifer. It is possible that anisotropic geological conditions create variable flow directions.

The figures below (**Figure 6.1** and **Figure 6.2**) provide hydrogeological cross-sections of the Paritūtū site.

## Paritutu W-E Cross-section

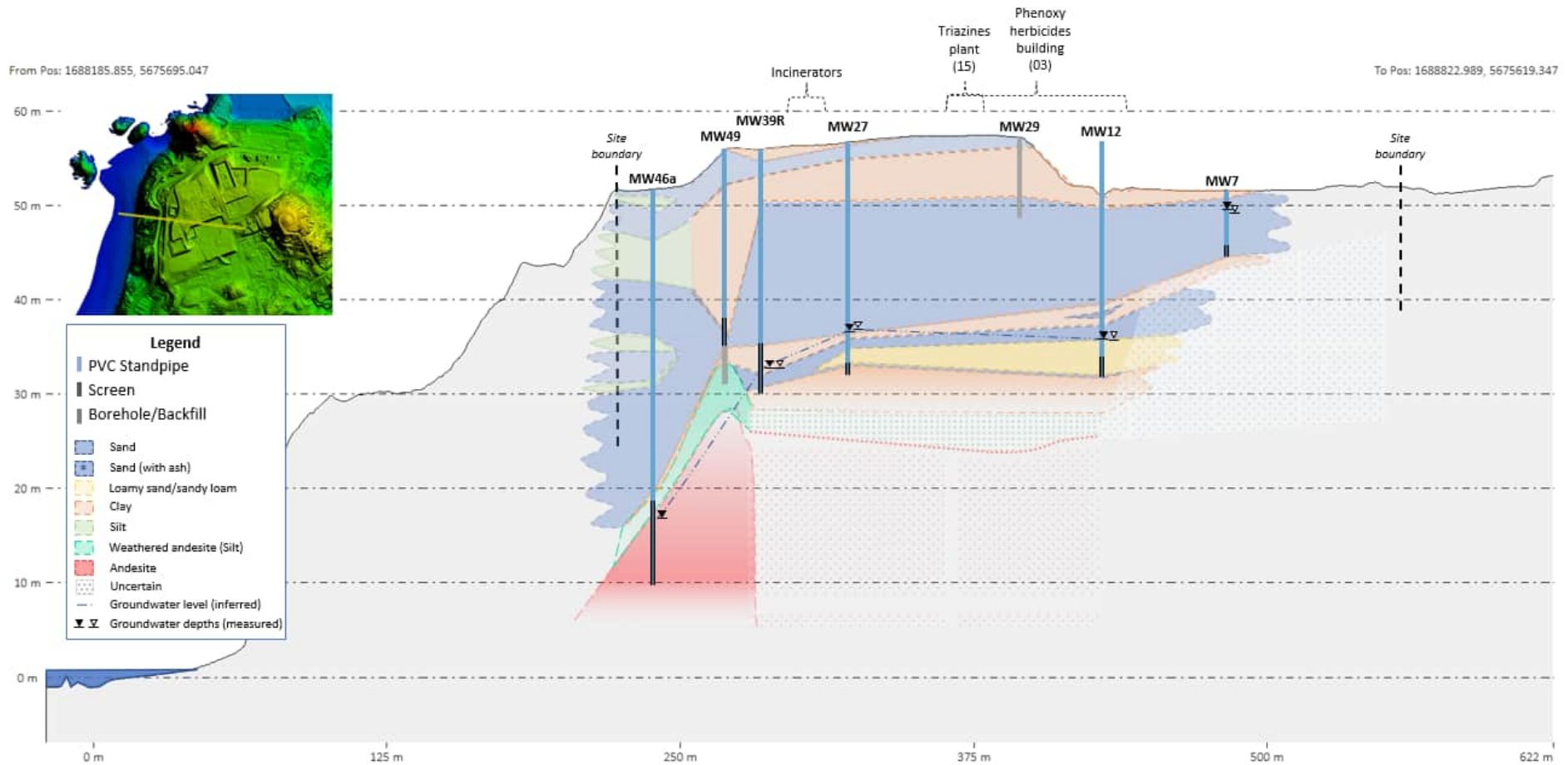


Figure 6.1: West to east hydrogeological cross-section of the Dow Paritutu site. Where groundwater depths are not displayed on the figure, groundwater was not encountered within the monitoring wells during the 2022 monitoring round. Note: open triangles indicate where water was noted during drilling and solid triangles are stabilised water levels.



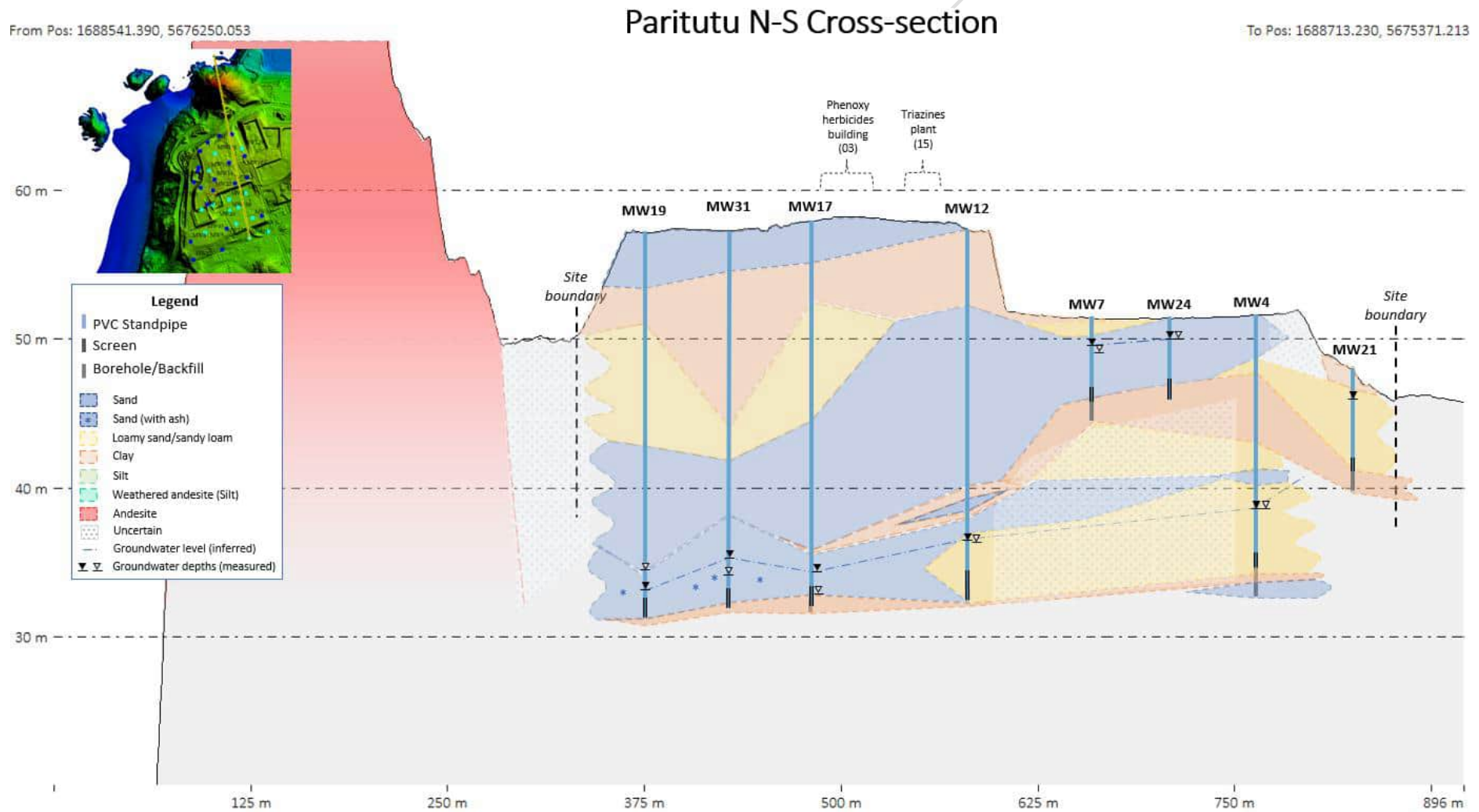


Figure 6.2: North to south hydrogeological cross-section of the Dow Paritutu site. Where groundwater depths are not displayed on the figure, groundwater was not encountered within the monitoring wells during the 2022 monitoring round. Note: open triangles indicate where water was noted during drilling and solid triangles are stabilised water levels.

## 7 Historical information review

In order to piece together a comprehensive history of the site, multiple sources of historical information have been reviewed. **Appendix C** provides a summary of the research record and references the documents, reports and information which have been reviewed to determine the history and the potential for contamination in areas across the site.

Given the complex history of the site, T+T were supplied with numerous documents and information relating to Dow, offsite activities, and the site. Only information relevant to onsite activities has been included within this report.

This PSI is current as to all information received and reviewed by June 2024. Any further information received after this date will be considered to inform the sampling and analysis plan and be considered in the contextual information in reporting for the DSI.

A series of Figures (**Figures 3 to 6**) which illustrate key site activities (e.g., site developments) during particular time periods are included in **Appendix A**. Additionally, based on the findings of this investigation (including the site history review), a digital map has been developed utilizing GIS software (ArcGIS Pro) which is intended to be viewed in conjunction with this report. Information included within the GIS map has also been tabulated and included in **Appendix A**.

Detail on the types of potentially contaminating activities identified through this investigation has been provided in the following sections.

### 7.1 Historical photographs

Historical photographs were obtained from various sources including Retrolens<sup>10</sup>, Alexander Turnbull Library<sup>11</sup>, Google Earth Pro, NPDC's GIS Viewer<sup>12</sup>, and documents received from Dow. Relevant features of the site are summarised from each photograph in **Table 7.1**. As mentioned in **Section 5** the site has been split into three distinct areas for ease of reporting: The Northern portion, Central portion and Southern portion. Copies of the aerial photographs are included in **Appendix D**.

**Table 7.1: Summary of aerial photograph review**

Date	Key site features (Northern portion)	Key site features (Central portion)	Key site features (Southern portion)
1949	Northern and Central portions comprise predominantly vacant, heavily vegetated land. Some small vegetation clearing appears visible over the Central portion.		The Southern portion comprises predominantly vacant, heavily vegetated land, however a rectangular area of vacant (cleared) grass is present in the southeast corner of the site. This area is likely to be associated with apparent pastoral land use associated with land south/southeast of the site.
1958	No significant changes observed.		
1965	Buildings 02, 06 and 07 appear to have been constructed within the	Buildings 03, 04, 05, and 08 appear to have been constructed within the	The Southern portion remains vacant and covered in scrub.

<sup>10</sup> <https://retrolens.co.nz/>

<sup>11</sup> <https://natlib.govt.nz/collections/a-z/photographic-archive>

<sup>12</sup> <https://www.npdc.govt.nz/services/maps-and-gis/>

Date	Key site features (Northern portion)	Key site features (Central portion)	Key site features (Southern portion)
	<p>Northern portion. Paved accessways/roadways have been laid. A carpark runs along the eastern side of Building 02.</p> <p>A fence runs around the former boundary of the site.</p>	<p>Central portion, with paved accessways/roadways laid. There appears to be drum storage along the western boundary of the site adjacent to Building 05. The drums appear to be stored on grassed areas adjacent to the former western boundary.</p> <p>Part of the Central portion remains vacant and covered in vegetation (scrub).</p>	
1967	<p>The Northern portion remains generally similar to the previous photo.</p>	<p>Grid lines have been cut through scrub in the undeveloped area of the Central portion. Some ground disturbance appears visible.</p> <p>Building 40 appears to have been constructed.</p>	<p>Grid lines have been cut through the scrub. Some ground disturbance appears visible.</p> <p>Offsite, directly south of the southeast boundary, residential houses are under development along Paritutu Road.</p>
1968 - 69	<p>The Northern portion of the site has been levelled. Hardstand surfacing has been extended towards the western boundary. Drum storage is observed on hardstand and on non-hardstand surfaces (adjacent to Building 06).</p>	<p>Similar to the Northern portion, the Central portion of the site has also been levelled.</p> <p>Some stockpiling (possibly construction materials and/or drum storage) appears present surrounding Building 05. Building 13 appears under construction within the Central portion.</p> <p>A pond ("lagoon") is present at the western boundary of the Central portion of the site. Given the location and orientation of a fence line which marks the former western boundary, the pond appears to have extended beyond the former site boundary (further westward).</p> <p>Building 40 appears to have been removed.</p>	<p>A steep slope and potential excavation are present at the boundary between Central and Southern portions. Several buildings (Buildings 18, 19 and 20) have been constructed or are under construction across a levelled section of the Southern portion. Hardstand (including roadways) are present surrounding the buildings; however, some accessways remain unpaved. Carparking along the edge of these unpaved roads is observed.</p> <p>Similar to the Northern and Central portions, stockpiled material is observed surrounding Building 19.</p> <p>South of the buildings, the remainder of the Southern portion comprises vacant land, with the exception of a clearly demarcated (and potentially paved) area present in the southeastern corner of the site. The previously constructed (and unpaved) accessway connects this corner of the site to the developed areas.</p>

Date	Key site features (Northern portion)	Key site features (Central portion)	Key site features (Southern portion)
1970	The Northern portion remains generally similar to the previous photo.	Buildings 08, 13, 15 and the Continuous Sulphonation Plant (prior to Building 48) have been constructed. Drum storage appears present adjacent to buildings (03, 04, 05) within the Central portion, including areas which appear unpaved.	The slope/excavation present within the Southern portion may have been partially infilled. However, this may be the result of improved image quality. Further storage of drums and/or building materials appears present surrounding buildings from the Southern portion of the site. Offsite, residential houses have been developed along the southern boundary.
1975	The western boundary of the site appears to have been extended further westward and appears consistent with the present-day site boundary. Storage of drums is evident across this portion of the site. The drums appeared to be stored on a mixture of grassed and hardstand areas.	Levelling works are being undertaken in the western extent of this portion. Building 42 appears under construction. Storage of drums is also evident across this portion. The drums appeared to be stored on hardstand areas (close to buildings) and non-hardstand areas (closer to the western site boundary). Building 30 has been constructed and hardstand surfacing appears to be present over this area. The pond ("lagoon") has been filled in and Building 41 has been built on top of the general location of the pond. The Dangerous Goods Compound appears under construction (including Building 29), with building material and drums being stockpiled here.	A paved carpark has been developed at the foot of the slope within the Southern portion, adjacent to Gate 1. Stockpiled material and drums are present across the southeast areas of the site, in particular with the southeast corner. Ground disturbance is present across the Southern portion of the site, presumed to be associated with ongoing construction works.
1984	Buildings 56 and 57 have been constructed.	Buildings 43, 46, 48 and 54 have been constructed. The general site appears much tidier with stockpiling/storage limited to buildings or designated (hardstand) areas (e.g., the Dangerous Goods Compound).	Buildings 11, 12, 44, 45 and 64 have been constructed. Building 16 appears to have been constructed, however smaller than that of present day. The materials stored at the southeast corner of the site have been removed, and the area appears to have been grassed. Grass cover has also increased throughout the southwest area of the site.

Date	Key site features (Northern portion)	Key site features (Central portion)	Key site features (Southern portion)
1991	The Northern portion remains generally similar to the previous photo, with the exception of Building 55 constructed and Building 56 removed.	The stormwater pond (SV8000/ Building 17) has been constructed. Building 41 has been removed.	The Southern portion remains generally similar to the previous photo.
2000	The Northern portion remains generally similar to the previous photo.	Stockpiled material and/or ground disturbance of a non-hardstand area immediately north of the Dangerous Goods Compound is evident.	Building 16 appears to have been extended and consistent with that of the present day. The Southern portion remains generally similar to the previous photo.
2007	The Northern portion remains generally similar to the previous photo.	Hardstand surfacing is now present over the areas associated with the former pond ("lagoon"). The hardstand surface covers an approximate 260 m <sup>2</sup> area, between Building 17 and the Dangerous Goods Compound (in the Southern portion of the site).	A line of trees has been planted at the head of the slope, and south of the Dangerous Goods Compound, as well as Southern and Eastern boundaries.
2011	Building 70 has been constructed.	The Central portion remains generally similar to the previous photo.	The Southern portion remains generally similar to the previous photo, with the exception of container storage north of the Dangerous Goods Compound.
2013	The Northern and Central portions remain generally similar to the previous photo.		Ground disturbance and/or stockpiled material/refuse is present immediately south of Building 19.
2014	The Northern portion remains generally similar to the previous photo.	Building 13 has been removed.	Building 20 has been removed.
2022	The site is in the process of being demolished, the majority of buildings across the site have been removed.		
2023	All the buildings have been removed from the Northern portion. Concrete footprints (associated with former structures) remain.	All the buildings have been removed from the Central portion, with the exception of the lower level of Building 03 (which remains for structural purposes) and Building 17 (Stormwater Pond, SV8000) Concrete footprints (associated with former structures) remain.	The last standing structures are Buildings 29 and 68 (Dangerous Goods Compound), as well as Building 58 (Tradewaste Monitoring) and Building 16 (Stormwater Pond, SV9000, SV9100/SV9200).

## 7.2 Site history

The Paritūtū site has primarily been an agrichemical manufacturing operation since 1960 when the site was first established. **Table 7.2** provides a summary of the operational site history and recorded environmental events sourced from reviewed documents. Site history information has been compiled from the 1992 desktop assessment (see **Section 4.1**), unless indicated otherwise in the below table. The environmental events will be addressed in more detail in the following sections. On an ongoing basis over the operation of the site chemicals would have been regularly moved on to site for production and off site for dispatch to retail.

**Table 7.2: Summary of operational site history and recorded environmental events**

Date	Highlight	Recorded Environmental Event
1960	Site established at Paritūtū Road occupying 8 ha. Phenoxy herbicide esterification (2,4-D) and formulation. Surface active agent range produced.	
1961	Production engineering moved from Buller Street to Building 07.	
1962	Phenoxy Herbicide Plant (Building 03) built to manufacture 2,4-D, 2,4,5-T and MCPA.	
1964	The Dow Chemical Company acquires 49% shareholding. Company becomes Ivon Watkins-Dow Limited.	
1967	Site development extends site to 13 ha.	
1969	TCP Plant built (Building 13) and manufacture of 2,4,5-T raw materials commenced. Solvents (methanol and xylene) stored in Underground Storage Tanks (USTs). Pilot Plant built (Building 20). Organophosphate Insecticide Plant built (Building 15). Continuous Sulphonation Plant built (prior to Building 48) to manufacture surfactants.	
1971	MCPB (herbicide) process built in Phenoxy Plant (Building 03).	
1972	Triazine herbicide (Atrazine, Simazine, Propazine) production commenced in Building 15.	MCPB explosion (November; Building 03). MCPB vessel over-pressured, rupturing a sight-glass on top of the vessel, resulting in a flammable vapour release which subsequently ignited from an unspecified ignition source. The explosion was contained within the Phenoxy Plant building.

Date	Highlight	Recorded Environmental Event
1973	The Dow Chemical Company acquires 51% ownership by purchasing Amchem's 2% shareholding.	
Until 1975		Anecdotal reporting of occasional product losses/releases to the tradewaste system prior to the phenoxy renovation project.
1975	<p>Continuous Sulphonation Plant closed down.</p> <p>Approval for major plant/site reconstruction, expansion, and modernisation.</p> <p>Stormwater pond (Building 17)/Dangerous Goods Compound (Building 29) built.</p> <p>Site boundaries extended westward resulting in a site area of nearly 16 ha.</p> <p>Herbicide powder and granule formulating shutdown, moved to contractor.</p>	
1976	<p>Liquid Wastes Incinerator built (Building 30).</p> <p>Formulations Plant expansion/modernisation (Building 03).</p>	
1976 – Early 1979	Operation of the liquid waste incinerator, disposing liquids containing by-product anisole and TCDD.	
1977	<p>Phenoxy Plant (Building 48) and Brine Extraction waste treatment facility (Building 60) built.</p> <p>Construction started in 1976.</p>	
1960-1980	The disposal of wastes onsite, including those contaminated with PCDD/F as a byproduct of the manufacture of herbicides 2,4,5-T alleged to have occurred.	
1982	<p>Solid Waste Incinerator built (Building 64).</p> <p>Hazardous waste storage (Building 68) constructed within Dangerous Goods Compound.</p>	Reported that solvents stored in the Dangerous Goods Compound leaked and "deteriorated the asphalt resulting in some soil contamination". Some remedial efforts undertaken, including installation of HDPE liner, and backfilling.
1983	Herbicide granules Plant built (Building 03).	
1986	TCP Plant renovation following release incident.	TCP Plant disk rupture (April). Unintended release to environment

Date	Highlight	Recorded Environmental Event
		<p>through a fractured rupture disk from Building 13.</p> <p>Ministerial Committee of Inquiry Investigation made publicly available<sup>13</sup>.</p>
<b>1987</b>	<p>Powders Plant built in Protectants Plant (Building 04).</p> <p>De-commissioning of the TCP process (Building 3) and 2,4,5-T process (Building 48), with equipment demolished.</p>	
<b>1988</b>	<p>The Dow Chemical Company acquires 100% shareholding.</p> <p>Powders Plant commenced operation.</p> <p>Transesterification of Triclopyr (herbicide) commenced (Building 48).</p>	
<b>1989</b>	<p>Triazines Plant closed down (Building 15).</p> <p>Underground storage tank removal (1989-1991).</p>	
<b>1990</b>	<p>DowElanco (NZ) Limited formed.</p>	
<b>1991</b>	<p>Final underground storage tank removed.</p>	
<b>1992</b>	<p>Solids Research &amp; Development facility built in old Triazines Plant (Building 15).</p>	
<b>1994</b>	<p>Solids incinerator (Building 64) upgraded to increase residence time. Cessation of use of the 'liquids' incinerator building for incineration (Building 30).</p>	
<b>1995-1996</b>	<p>Diversion of stormwater from the onsite roads in the vicinity of the incinerator to the new HDPE lined stormwater pond (SV92000).</p>	
<b>1997</b>	<p>Four save-all (bundled pit) locations used for disposal of tradewaste were lined with double skinned HDPE liner. Leak detection was also installed to prevent leakage to soil and groundwater. Below ground glazed earthenware tradewaste piping installed with internal lining to prevent any leakage.</p>	<p>Some leakages of the save-all liners noted during 1997.</p>

<sup>13</sup> Brinkman, G. L. (1986). Possible health effects of manufacture of 2,4,5-T in New Plymouth. Report of the Ministerial Committee of Inquiry to advise on the impact on the health of the residents in New Plymouth from the manufacture of pesticides.



Date	Highlight	Recorded Environmental Event
1998	<p>Termination of the production of phenoxy herbicides (2,4-D, MCPA and MCPB) and triclopyr. The Phenoxy Plant was shut down. These active ingredients were then imported for formulation into herbicide products.</p> <p>Introduction of the insecticide active ingredient Spinosad and start of the Spinosad plant.</p> <p>Repairs to the liners installed in save-alls (1997).</p>	
1999	<p>Closure of the powders side of the Powders/Protectants Plant (Building 04).</p>	
2000	<p>Demolition of the Liquids Incinerator (within Building 30).</p>	
2002	<p>Solid herbicide granule production ceased, and the Solids Plant (Building 15) was closed.</p> <p>Formulation of water-based glyphosate commenced.</p>	
2004	<p>Drum processing facility (Building 25) shutdown.</p>	
2005	<p>2,4-D esterification process re-starts in Building 48</p>	
2006	<p>Amination of MCPA amines re-commenced (Commodities Plant, Building 48).</p>	
2013	<p>Amine neutralisation of glyphosate ceased.</p> <p>Glyphosate remains stored onsite, however no longer produced.</p>	
2014	<p>The Pilot Plant (Building 20) and TCP Plant (Building 13) were demolished.</p>	
2015	<p>The esterification of 2,4-D ceased.</p>	
2019	<p>Corteva becomes owner of site.</p>	
2021	<p>Solid waste incinerator operations ceased.</p> <p>All chemical production operations cease.</p>	
2022	<p>Demolition of site infrastructure to ground level.</p> <p>Underground pipework sealed, and save-alls/ sumps filled with clean fill and concrete capped.</p>	<p>Building 19 was the last remaining ACM clad building on site.</p>

Date	Highlight	Recorded Environmental Event
2023	Ownership of the site is transferred to Dow Chemical (NZ) Ltd from Corteva AgriSciences NZ Ltd	

### 7.2.1 Products manufactured

A wide range of products have been manufactured and/or formulated at the site since 1960. During the 1960s and 1970s between 80 and 120 products were manufactured each year. Between the 1970s and 1990s up to 30 products were manufactured and/or formulated each year. A limited number of products were manufactured from the 1990s to when operations ceased in 2021.

Key products formerly manufactured and stored at the site are shown in **Table 7.3**.

**Table 7.3: Key products (and associated sub-groupings) manufactured and stored at the site**

Product Range	
<p><b><u>AGRICULTURAL CHEMICALS:</u></b>  Desiccants  Fertilizers  Fumigants  Growth Regulators  Fungicides  Insecticides (organophosphates)  Miticides  Non-selective Herbicides (Triazines)  Selective Herbicides (Phenoxy and aromatic acids)</p>	<p><b><u>ANIMAL HEALTH:</u></b>  Cattle Sprays  Sheep Dips  Stock Remedies  Veterinary Ethicals</p>
<p><b><u>RODENTICIDES</u></b>  N/A</p>	<p><b><u>GERMICIDES:</u></b>  Disinfectant Bases</p>
<p><b><u>WOOD PRESERVATIVES</u></b>  N/A</p>	<p><b><u>LUBRICANTS:</u></b>  Brake Fluids</p>
<p><b><u>SPECIALITY PRODUCTS:</u></b>  Polyurethane Paint/Varnish  Aluminium Paint  Spraying Equipment (pumps, nozzles, booms etc).</p>	<p><b><u>SURFACTANTS:</u></b>  Defoamers  Detergents  Emulsifiers  Shampoo Bases  Wetting Agents</p>

N/A – No sub-groupings of manufactured products were identified for rodenticides or wood preservatives.

There have been six manufacturing plants which have been used for production on site:

- Phenoxy.
- Formulations.
- Protectants.
- Triazines.
- Trichlorophenol (TCP).
- Surfactants.

A list of the active ingredients used/produced on site, which have been identified during a review of the documentation provided has been presented in **Appendix E**. We note an estimation of up to 250 raw materials (chemicals) have been used during the site's manufacturing history. On this basis the list of chemicals provided in **Appendix E** is not considered comprehensive.

#### 7.2.1.1 History of 2,4,5-T production

As mentioned above, numerous products were manufactured onsite. Of particular note is the manufacture of 2,4,5-T because of the resulting impurity 2,3,7,8-tetrachloro-*p*-dibenzodioxin (TCDD) a highly toxic and persistent organic contaminant. A summary of the key events, with respect to 2,4,5-T manufacture at the site is presented below in **Table 7.4**.

**Table 7.4: History of 2,4,5-T production**

Date	Event
1948	Ivon Watkins began manufacture of 2,4,5-T in New Plymouth on Buller Street.
1962	Production was moved from Buller Street to the Paritūtū site. Construction of the Phenoxy Herbicide Plant to manufacture 2,4,5-T.
Until 1969	Manufacture was based on imported trichlorophenol (TCP). After 1969, TCP was synthesised onsite, within the TCP Plant. TCDD was a byproduct of TCP production.
From 1973	Use of a solvent (believed to be xylene, however unconfirmed) reduced the TCDD impurity in the 2,4,5-T from 1 mg/kg to 0.1 mg/kg.
1975 to 1979	Liquid waste containing TCDD was processed in the liquids waste incinerator.
In 1978/9	IWD introduced changes to production to reduce the amounts of dioxins produced.
From 1980	Waste streams were processed in the liquid waste incinerator and new solid waste incinerator (from 1982).
1982	Estimated concentration of TCDD in 2,4,5-T was 0.01 mg/kg.
1986	Vapour release from failed rupture disk at the TCP Plant.
1987	Manufacture of 2,4,5-T ceases.
1990	The last 2,4,5-T product was deregistered in New Zealand in October 1990.

## 8 Council information

Information requests were lodged with both the New Plymouth District Council (NPDC) and the Taranaki Regional Council (TRC) for any records related to the site<sup>14</sup>. The records were reviewed, and relevant information has been included in the summary of reviewed information (**Section 10**), and presented in **Appendix I**.

### 8.1.1 TRC records

TRC manages a Register of Selected Land Uses (RSLU) for the Taranaki Region. TRC held information was obtained from this publicly available RSLU<sup>15</sup>. The site appears on the RSLU (0048-0), classified as a Chemical Processing/Manufacturing site, and confirmed as “1(b) Hazardous substances present – risk acceptable for land use”.

Previous investigations on the site have confirmed the presence of contaminated soil and groundwater.

### 8.1.2 NPDC records

NPDC records included:

- Tradewaste certificates, analysis and correspondence relating to the tradewaste consent 1992-2021.
- Dow AgroSciences (NZ) Ltd Monitoring Programme Annual Report 1998-2022, these reports were also supplied by Dow.
- Dow Oct 2021 Groundwater Management Report New Plymouth site 2020-21, these reports were also supplied by Dow.
- Offsite residential investigation reports (Record 36).

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<sup>14</sup> [Due](#) to the nature of the project T+T have been in close engagement with both TRC and NPDC and requests for documents were made directly to the respective council contacts.

<sup>15</sup> <https://www.trc.govt.nz/environment/hazards-and-protection/contaminated-land>

## 9 Interviews and community engagement

As part of the initial steps of the investigation process, a community information gathering survey was undertaken throughout July 2023, with follow up interviews conducted in August 2023. The objective of the survey was to gather information from persons with knowledge about the site during its operation, which could have led to potential contamination. The survey focussed on gathering information relevant to the desktop investigation for onsite activities. The engagement process went as follows:

- A survey was posted online (via the dedicated Paritūtū Project website created by T+T<sup>16</sup>) for three weeks, giving the public an opportunity to provide information related to the site. The survey questions are provided in **Appendix F**.
- Respondents who provided relevant information to onsite activities were contacted to provide further information.
- Follow up interviews were undertaken with those respondents who agreed to provide further information.
- Seven in-person interviews were scheduled in New Plymouth. The in-person interviews were undertaken in a rented shared space or at interviewees' houses.
- The interviewees were provided with a map of the site and discussions lasted from between 30 minutes to over an hour.
- Of the seven interviewees:
  - Six people were interviewed, one person did not show up and did not respond to further enquires.
  - Five were former employees that worked at the site spanning different decades, the earliest being from 1969 and the most recent stopped working at the site in 1993.
  - One person lived within a neighbouring property on the south boundary of the site during the 1970s.
- Additionally, three interviews were conducted over the phone and two requested email correspondence. One potential interviewee did not respond to emails or phone calls.
- The interviewees provided T+T with information that supported previously reviewed sources, and new information that had not been identified in previously reviewed documents.
- The information provided was recorded in note form and transcribed.

The following summarises the relevant information (some of which was not previously obtained during the document review) gained from the community engagement survey:

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<sup>16</sup> [Paritutu survey | Paritutu \(arcgis.com\)](#)

## Tradewaste System

- Throughout the 1960-70s industrial hygiene practices were not up to present day standards. Multiple interviewees mentioned that during this time, spills and leaks of materials were common and the response was to wash the material down towards the stormwater sumps and/or the save-alls using water.
- The save-alls were part of the site's tradewaste system installed across the site during its construction in the 1960s. The primary purpose of the save-alls was to intercept (and retain) solids and/or floatables (such as light solvents) from plant activities, before entering the tradewaste system and not stormwater. In some cases, these save-alls were used as vessels to neutralise waste.
- The typical construction of the tradewaste system, included asbestos piping, glazed earthenware, with concrete save-alls that were prone to overspilling if there was heavy rain.
- Parts of the tradewaste system were upgraded in the early 1990s, with the concrete save-alls lined with HDPE plastic.
- Given that material was often washed into/directed towards the tradewaste system from the production area, multiple interviewees indicated that the entirety of the tradewaste system was most likely contaminated. Particularly the systems connected to the former production areas (Buildings 03, 04, 13, 18, and 20).

## Drum Storage, Drum Burial, Exhumation, and Waste Disposal

- Multiple interviewees mentioned that during the 60s, 70s and early 80s, raw materials and drums were stored across many parts of the site on hard standing and grassed areas.
- In particular, between 1975 and 1982, following an investigation into the offsite disposal locations of former site drums, exhumed 200 L drums were brought back from the two Dow owned disposal sites at Waireka and Ngahoro and stored along the southwestern boundary. The drums were stored on grass and were often observed to be in poor condition and leaking.
- The Pilot Plant (Building 20) was set up to reprocess 2,4,5-T and 2,4-D from the exhumed drums. The recovered 200 L drums of waste products which were temporarily stored in the southwestern boundary were brought up to the Pilot Plant. Once processed, the drums were washed, and wash water was either poured on the grass areas surrounding the Pilot Plant or into the tradewaste system.
- Leaking, poor condition and crushed drums were also stored on the grassed area north of the Dangerous Goods Compound.
- Drums were stored in the Dangerous Goods Compound and leaks and spills occurred within this area. An interviewee reported the asphalt deteriorated and "melted" following a particularly large leak of unknown material.
- A large-scale investigation was undertaken to find and exhume the buried drums and disposed waste from site, however interviewees indicated that not all the drums were found during this investigation and it's likely some remain buried on site. In particular, within the southwest corner and within the area of the Dangerous Goods Compound.

### Storage Tanks

- Bulk storage tanks of Triazine herbicides were situated adjacent to Building 15, these were not bunded and often overflowed to ground during the late 1970s. The reaction vessel for triazines was hard to manage and occasionally foamed over, with simazine foam being blown away in strong winds.
- An underground storage tank (UST) containing xylene was situated east of Building 15. The xylene in the tank was used for processing and recycled back through the tank with potential by-product contamination being reprocessed into the tank.
- Multiple USTs were decommissioned and removed from the site in the late 1980s. Some were left in-situ and filled with concrete. Interviewees could not recall exact locations or how many USTs were removed.

### Other relevant information

- Building 03 contained a ring drier, turning “wet cake chemicals” into dry powder. Often the powder from the drier became airborne and fine dust coated the walls and concrete floors of the building. The dust was washed down occasionally using water and directed towards the save-alls/tradewaste system.
- A 0.5 m diameter underground pipe connected Buildings 03 and 13. The pipe was used as a “conveyor belt” to transfer dried powder/chemicals from Building 03 to Building 13.
- A resident mentioned that during the 70s, on windy and wet days the ground along the southwest boundary around the stored drums would be bubbling and foam would blow across the site landing on the grass and getting stuck in the boundary fence.

## 10 Summary of reviewed information

For ease of reporting, the reviewed information is presented in chronological order with respect to potential contamination (e.g., activities and environmental events). Reviewed information has been associated (where appropriate) with other spatially similar information and presented below as general areas of concern. Given that there are over 60 relevant records/documents combined with anecdotal evidence associated with onsite activities, the tables in the below section contain corroborated evidence from the reviewed information. The information source(s) is linked to the research record which can be found in **Appendix C**. The tables below summarise the activity, information source, time, potential contaminant of concerns (CoC), and other key commentary (including the extent of any investigations previously undertaken). Description of the CoCs is provided in **Table 10.1**.

As stated in **Section 7**, a GIS map has been developed to be viewed in conjunction with the information provided in the following sections. Static versions of the GIS map (**Figures 7, 7.1, 7.2 and 7.3**) and associated (tabulated) information are also provided in **Appendix A**.

**Table 10.1: Glossary of commonly referred to chemicals or chemical acronyms in this report**

Term	Description
<b>2,4-D</b>	2,4-Dichlorophenoxyacetic acid – a phenoxy herbicide
<b>2,4-DB</b>	4-(2,4-Dichlorophenoxy) butanoic acid – a phenoxy herbicide
<b>2,4-DCP</b>	2,4-Dichlorophenol – a chlorophenol
<b>2,6-DCP</b>	2,6-Dichlorophenol
<b>2,4,5-T</b>	2,4,5-Trichlorophenoxyacetic acid – a historical phenoxy herbicide
<b>2,4,5-TP</b>	2-(2,4,5-Trichlorophenoxy) propionic acid (commonly termed Fenoprop/Sylvex) – a historical phenoxy herbicide
<b>Glyphosate</b>	A broad-spectrum organophosphorus herbicide.
<b>MCPA</b>	2-methyl-4-chlorophenoxyacetic acid – a phenoxy herbicide
<b>MCPB</b>	2-methyl-4-chlorophenoxybutyric acid– a phenoxy herbicide
<b>MTBE</b>	Methyl- <i>tert</i> -butyl-ether
<b>OCPs</b>	Organochlorine pesticides. A group of insecticides now largely banned from use.
<b>Organophosphate / OPs</b>	A group of insecticides with high acute and chronic toxicity, acting through acetylcholinesterase inhibition.
<b>PAHs</b>	Polycyclic aromatic hydrocarbons
<b>PCBs</b>	Polychlorinated biphenyls
<b>PCDD/F</b>	Polychlorinated dibenzodioxins and furans. 2,3,7,8 substituted forms are considered a much higher risk due to acting on the aryl hydrocarbon receptor.
<b>PCOC</b>	<i>para</i> -Chloro- <i>ortho</i> -cresol (also termed 4-chloro-2-methylphenol)
<b>PCP</b>	Pentachlorophenol – a chlorophenol timber preservative
<b>PFAS</b>	Per and poly-fluorinated alkyl substances
<b>TCA</b>	2,4,5-Trichloroanisole (also referred to as anisole by-product)



Term	Description
TCDD	2,3,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin. Considered the most toxic of the PCDD/F
TCP	2,4,5-Trichlorophenol
TPH	Total petroleum hydrocarbons
VOCs	Volatile organic compounds

## 10.1 TCP Plant, Phenoxy Plants

The TCP Plant (Building 13) and the Phenoxy Plants (Building 03 and Building 48) form part of the primary production area of the site, within the Central portion. Numerous sources of information indicate potential contamination across this area, often associated with production of chemicals, and the management of by-products from the manufacturing processes (e.g., tradewaste).

**Table 10.2: Summary of reviewed information.**

Source (Year)	Potentially Contaminating Activity	Stated CoC	Key commentary/previous investigations
<b>Record 45 (1979)</b>	Possible chemical storage/spills associated with manufacturing process (particularly Building 13).	TCA, TCDD, xylene	The record mentions the TCP Plant as the source area of TCDD contaminated anisole. The record also mentions the use of drums of clay granules to soak up spillages from leaking drums within the TCP plant.
<b>Record 49 (1986)</b>	Chemical release at the TCP plant.	TCDD, TCA, TCP	Liquids and vapour released, with liquid confined to immediate vicinity of TCP plant. Wipe tests and soil samples collected downwind of release. Onsite sampling recorded concentrations of contaminants within the central and northern portions of the site. An "Area of visual contamination" is indicated on a site plan immediately adjacent to the northeast corner of the TCP Plant.
<b>Record 4 (2014), Record 49 (1986), Record 57 (1981), Anecdotal information (acquired 2023)</b>	Possible firefighting foam storage, training, and use.	PFAS	Building 52 is recorded as a sprinkler station for the phenoxy plant (Building 48). Anecdotal information records this as using a fire-fighting foam. No foam storage is recorded in the listed storage tanks in 1981, only the large firewater tank (Building 44).

Source (Year)	Potentially Contaminating Activity	Stated CoC	Key commentary/previous investigations
			One investigation into the TCP ruptured disk notes that the building had a water deluge system for fire/release control.
<b>Record 56 (1986-1989)</b>	Chemical storage/spills associated with manufacturing process (Building 03 and Building 13).	Phenoxies (namely 2,4-D and 2,4,5-T), Chlorophenols, TCDD.	Sampling of the concrete floor and underlying soil beneath both buildings. The document stated sample locations for Building 03 targeted cracks in the concrete which “would allow material to leak into the subsoil”. Soil testing results recorded contaminant concentrations within concrete and underlying soil. At Building 03 it was noted 2,4-D and 2,4,5-T were the major components present.
<b>Record 47 (2014), Record 55 (1988), Anecdotal information (acquired 2023)</b>	Possible chemical spills/leaks from tradewaste network (particularly associated with Buildings 03 and 13).	TCA	Limited sampling within excavation areas surrounding Building 13 (immediately west and south-west). Reported contaminant concentrations immediately below two blocked drains within soil. Visible evidence of contamination (“liquid stream oozing from a sand layer”) noted.
<b>Record 55 (1988)</b>	Possible chemical storage/spills associated with manufacturing process.	N/A	Potential contamination (“liquid with a very obnoxious smell was noted seeping from the ground”) beneath the floor of another area of the site (Building 15). The document suggested similar contamination beneath Building 03 and Building 48.

Source (Year)	Potentially Contaminating Activity	Stated CoC	Key commentary/previous investigations
<b>Record 4 (2014), Record 55 (1988), Record 57 (1981), Anecdotal information (acquired 2023)</b>	Possible chemical storage/spills from USTs and save-all overflows surrounding buildings (particularly Building 03, 13, and 48).	Various contaminants – (based on associated process areas) including iso-butanol, methanol, xylene (contaminated), chlorophenols, phenoxies, TCP-related compounds (raw materials).	Tanks located east of Building 03 were reported to have leaked. Limited validation testing of ground contamination was undertaken as part of a Soil Sampling Schedule following tank removals in 1989. The report stated “... recovery samples was around 50 %. Without sighting this data it is not possible to determine the former UST pits were adequately validated”. Analytes tested included methanol, ethanol, iso-butanol, n-butanol, butoxyethanol and xylene.
<b>Record 44 (1992)</b>	Chemical spills/leaks from tradewaste system and associated save-alls.	Sulphates.	The record noted irregular losses/releases to the tradewaste system prior to renovations (“Phenoxy renovation project”) in 1975. Concrete construction of some save-alls corroded by acidic and/or caustic solutions. Sulphates may have caused corrosion in the old Phenoxy Plant save-all and sewer line.
<b>Record 18 (1996)</b>	Possible storage/spill of chemicals.	N/A	During the drilling of “Borehole 16” (located east of Building 03), a “sweet” odour and black staining were noted from material, and “compacted sweet coal tar” at a depth of approximately 10 – 18 m bgl. Elevated water temperature was also recorded. Elevated Photo Ionisation Detector (PID) readings were recorded during the drilling of this borehole.
<b>Record 4 (2014)</b>	Possible storage/spill of chemicals.	Phenoxies, chlorophenols.	Soil testing at Boreholes 16a-c between 1994 and 1995 recorded contaminant concentrations within soil at depths up to 25 m bgl.

Source (Year)	Potentially Contaminating Activity	Stated CoC	Key commentary/previous investigations
<b>Record 4 (2014)</b>	Possible chemical spills/leaks from tradewaste system and associated save-alls.	Phenoxies, chlorophenols.	HDPE liner was applied to four 'save-all' pits, used for tradewaste disposal. Sections of the tradewaste network were lined with a "polyester resin".
<b>Record 6 (2015)</b>	Possible processes and/or storage of chemicals (including underground storage tanks and/or service lines) impacting groundwater.	Phenoxies and herbicides (bromoxynil), solvents (3&4-methylphenol), metals (copper and zinc).	MW16A, Bromoxynil detected during ground water quality assessment.
<b>Anecdotal information (acquired 2023)</b>	Possible chemical manufacture process impacting soil.	Solvents.	Anecdotal information – odour encountered from exposed soil below recently demolished switch room within Building 03.
<b>T+T report (2023)</b>	Use and manufacture that resulted in phenoxies (including 2,4,5-T) within concrete flooring and wall of the building. As this area was now subject to direct contact with water post demolition, the 2,4,5-T was desorbing and contaminating the pooling water.	2,4,5-T, 2,4-D and MCPA.	Concrete core and sediment sampling results indicate that both the sediment and the concrete represent likely sources for 2,4,5-T and other phenoxy herbicides leaching into pooled water in the footprint of Building 03. PCDD/F (predominantly TCDD/TCDF) were present in the sediment.
<b>Anecdotal information (acquired 2023)</b>	Possible spills/leaks from chemical storage within underground storage tanks.	Solvents, TCP, TCA, TCDD	A HDPE liner was placed below a grassed area on the eastern side of the TCP Plant at the time when underground storage tanks were demolished

## 10.2 Former pond ('lagoon')

Partway along the former western boundary of the Central portion of the site, a pond was present west of Building 05 for approximately 10 years between mid-1960 and mid-1970. This pond is understood to have received stormwater runoff from the primary manufacturing area (Central portion) of the site. Additionally, select information suggests certain dedicated service lines (water pipes) had been installed, and responsible for discharging stormwater directly from the buildings to the pond.

**Table 10.3: Summary of reviewed information.**

Source (Year)	Potentially Contaminating Activity	Stated CoC	Key commentary/previous investigations
<b>Anecdotal information (acquired 2023)</b>	Possible waste disposal or spills in the vicinity of the former pond.	Solvents (xylene).	Anecdotal information– mention of PVC plastic underground pipe adjacent to Building 63 which had been dissolved by contaminants.
<b>Anecdotal information (acquired 2023)</b>	Possible disposal of production wastes and operational spills and leaks.	N/A	Cyanuric chloride drums were depressurised, and site stormwater run-off was directed to the lagoon prior to the construction of the stormwater ponds SV9000 and SV9100.
<b>Record 55 (1988)</b>	Disposal of production wastes and operational spills and leaks.	N/A	Stormwater from “the manufacturing plant area” directed to a ‘pond’, with solvent like odours noted.
<b>Record 44 (1992)</b>	Disposal of production wastes and/or historic infilling.	N/A	A small unlined pond reportedly beneath Building 30 was used for ‘sludge’ disposal and catchment for select drain lines. A larger pond also existed on the western boundary of the site which collected stormwater run-off and not considered ‘highly contaminated’ as a result. Both ponds were infilled in 1975.
<b>Record 18 (1996)</b>	Possible waste disposal and/or historic infilling.	N/A	The report outlines observations made during drilling of Borehole 28 (undertaken in 1993, south of Building 41). Foaming and a slight odour were noted at approximately 2.5 m bgl.
<b>Record 4 (2014)</b>	Possible waste disposal and/or historic infilling impacting soil.	Phenoxies, chlorophenols.	Soil sampling from area surrounding MW39 (including delineation boreholes) between 1994 and 1995. Soil testing results recorded

Source (Year)	Potentially Contaminating Activity	Stated CoC	Key commentary/previous investigations
			contaminant concentrations, including from samples at depths up to 24.8 m bgl. Elevated Photo Ionisation Detector (PID) readings were recorded during drilling of borehole.
<b>Record 4 (2014)</b>	Possible waste disposal and/or historic infilling impacting groundwater.	Phenoxies, chlorophenols.	Contaminant concentrations recorded at select monitoring wells, including MW36, MW37, MW39 (see <b>Figure 8, Appendix A</b> ). Delineation monitoring wells installed in general area during between 1995 and 1997. Results from select monitoring wells said to “confirm earlier results”.
<b>Record 4 (2014)</b>	Possible chemical spills/leaks from tradewaste system and stormwater system.	N/A	Report stated HDPE liner applied to four ‘save-all’ pits, used for tradewaste disposal. The report states that a section of the stormwater pipe around BH39 was lined with a polyester resin.
<b>Record 4 (2014)</b>	Possible waste disposal and/or historic infilling impacting groundwater.	Phenoxies, chlorophenols.	Contaminant concentrations recorded within select monitoring wells (including MW36, MW37, MW39J, MW46, MW46a) between 2002 and 2007 (see <b>Figure 8, Appendix A</b> ).
<b>Record 6 (2015)</b>	Possible waste disposal and/or historic infilling impacting soil.	Phenoxies, Chlorophenols.	Contaminants identified within soil at MW109 and MW39R, including at depths up to 6.9 m bgl (see <b>Figure 8, Appendix A</b> ). Surficial contamination not recorded at MW39R; however, surficial contamination was recorded in the 1995 investigation (Record 4). MW39R (2015) is located less the two meters from MW39J (1995). Additionally, odours and elevated PID readings were noted during borehole excavation of MW39R.
<b>Record 6 (2015)</b>	Waste disposal and/or historic infilling impacting groundwater (deep).	Phenoxies and chlorophenols (including 2,4-DB; 2,4,5-TP; PCOC).	Contaminant concentrations recorded at MW39R. Concentrations of select analytes exceeded applicable guidelines (see <b>Figure 8, Appendix A</b> ).
<b>Record 4 (2014)</b>	Historic infilling.	N/A	The report outlines observations made between 1995 and 1997, during drilling of Borehole 39 (and associated delineation boreholes), and Borehole 50, all located around the general area

Source (Year)	Potentially Contaminating Activity	Stated CoC	Key commentary/previous investigations
			<p>of Building 41 (general area of former pond). Fill (refuse) materials encountered included metal, wood, wire, concrete rubble.</p> <p>Odours and/or “rainbow” sheening noted at Boreholes 30 and 39a, at depths up to 27 m bgl.</p>



### 10.3 Grassed area between carpark and stormwater pond (SV9000)

Along the southernmost end of the Central portion of the site, there is a steep drop in elevation at the edge of the primary manufacturing area. At the foot of this drop several site features (carpark, former brine extraction buildings, storage bund and tanks, solvent storage bund and tanks tradewaste tanks, and a stormwater pond) occupied an otherwise vacant area of the site. Tradewaste infrastructure and bulk storage is known to have occurred in this area of the site. Limited analytical data has been collected from this area of the site, however on multiple occasions historic drilling operations have noted anomalies within the boreholes, which indicates potential historic infilling over this area.

**Table 10.4: Summary of reviewed information**

Source (Year)	Potentially Contaminating Activity	Stated CoC	Key commentary/previous investigations
<b>Record 4 (2014)</b>	Possible waste disposal and/or historic infilling.	N/A	Indicative location only. Report stated, “three foundation bores drilled for firewater tank” during 1976. This is believed to be the same general location where a separate record (record 18, refer below) notes pieces of burnt timber were encountered. Noting the mana whenua history of the site, burnt timber may pre-date European colonisation.
<b>Record 55 (1988)</b>	Possible chemical spills from the manufacturing process areas and associated infrastructure.	N/A	The record mentions ‘obnoxious odours’ during excavations in other areas of the site. Observations suggest contamination may also exist in other areas, including the ‘brine extraction area’ (presumed to be either Building 60 or Building 61).
<b>Record 44 (1992)</b>	Possible chemical storage/spills.	Sulphates	Storage of tradewaste effluent (“acidic brines”) within a bulk tank and equalization tank (Building 61), the latter of which is used to “buffer any variation”.
<b>Record 18 (1996)</b>	Possible waste disposal and/or historic infilling.	N/A	The report outlines observations made during drilling of Borehole 8. A “piece of burnt wood” was noted at a depth of 5.8 m bgl. The report also noted this location was in close proximity to previous bore locations, namely “Bore No.2”, where “several pieces of burnt timber” were noted at a similar depth. Noting the mana whenua history of the site, burnt timber may pre-date European colonisation.
<b>Record 6 (2015)</b>	Possible waste disposal and/or historic infilling impacting soil.	PAHs	Limited sampling from within single soil borehole/monitoring well MW109 (see <b>Figure 8, Appendix A</b> ). Contaminant concentrations recorded within shallow soils (0.5 m bgl).

## 10.4 Dangerous Goods Compound

An approximate 3,000 m<sup>2</sup> bunded area is present within the northwest corner of the Southern portion of the site. Located within this area are Building 29 and 68, which along with the rest of the area are used to store dangerous goods and hazardous wastes. Additionally, select documents indicate this area of the site has been subject to infilling, with numerous materials (including potentially contaminated materials) being utilized.

**Table 10.5: Summary of reviewed information**

Source	Potentially Contaminating Activity	Stated CoC	Key commentary/previous investigations
<b>Record 45 (1979)</b>	Chemical storage (and possible spills) of stockpiled material associated the TCP Plant and liquid incinerator area.	TCA, TCDD, xylene	Limited soil sampling beneath the Dangerous Goods Compound, as well as sampling of drummed anisole and wipe tests of stockpiled material stored within compound. TCDD concentrations were recorded within all material sampled. The document mentions an impacted area of 1,500 square ft (approximately 150 m <sup>2</sup> ) within the Dangerous Goods Compound. The document outlines suggested options for managing the contaminated material, including burial of the waste with erection of a new building, ploughing the area monthly to facilitate aerobic degradation of the TCDD, and purchase of a solid's incinerator. The document notes xylene was present in the timber and sub-surface, which would increase the mobility of TCDD, but as this evaporated over time the by-product anisole would crystalize and increase the TCCD stability.
<b>Record 54 (1979), Record 4 (2014)</b>	Possible chemical storage/spills associated with material from TCP Plant	TCDD	Further testing for TCDD was undertaken comprising; surface wipes (10 samples), soil sampling (8 samples), and sampling of wood shavings (2 samples) within the by-product anisole storage compound (presumed to be the Dangerous Goods Compound). Testing results recorded contaminant concentrations within all material sampled.
<b>Record 57 (1981)</b>	Chemical storage (and possible spills) from storage tank within the dangerous goods compound.	N/A	Potential contamination associated with a contaminated methanol tank, which may have been located within the Dangerous Goods Compound. This may also refer to Building 41, which exists outside the Dangerous Goods Compound.

Source	Potentially Contaminating Activity	Stated CoC	Key commentary/previous investigations
<b>Record 4 (2014), Anecdotal information (acquired 2023)</b>	Chemical storage/spills over “deteriorated asphalt”.	N/A	Report refers to an earlier investigation (Record 44) which suggests solvents “deteriorated the asphalt seal resulting in some soil contamination”. The report notes an HDPE liner was lain beneath Building 68 following remediation of the area. Anecdotal) information suggests a large spill “melted” the asphalt and likely leaked to the underlying soil in this area. During a site visit an HDPE liner was observed on the exposed North bank within Building 68, it is unclear if this liner is the same liner referenced in the report, and/or is an extension of the liner which may exist beneath the concrete slab.
<b>Record 46 (1984)</b>	Chemical storage (and possible spills).	TCDD	Soil sampling from soils across the Dangerous Goods Compound (up to 0.2 m bgl). Contaminant concentrations were identified in surface samples. A depth profile in one location showed increasing TCDD with depth.
<b>Record 55 (1988)</b>	Chemical/material storage and associated spills. Potential historic infilling of contaminated material (drummed production waste, soil, and gravel).	N/A	The document mentions two areas of the site with known contamination, both having been covered with an HDPE liner and concrete. The document states sampling of gravel beneath Building 68 confirmed ground contamination. Crushed organophosphate drums believed to be buried in the compacted clay used to fill the area during construction.
<b>Record 44 (1992)</b>	Chemical storage/spills of production wastes.	Solvents	Production wastes unsuitable for off-site disposal were stored within the Dangerous Goods Compound. The wastes were generally stored in drums. Weathering of drums led to contents being spilt, consequently deteriorating the asphalt, and impacting soil. Contaminated soil remains beneath Building 68, which was used to store wastes prior to incineration.
<b>Record 19 (1996)</b>	Chemical storage/spills.	Phenoxies, chlorophenols	The document notes contamination is sourced (in-part) from the storage of chemicals over “inadequate” areas.
<b>Record 7 (2017)</b>	Chemical storage (and possible spills) and/or historic infilling.	Metals, VOCs, phenols, PAHs, volatile halogenated hydrocarbons,	Limited soil sampling within the Dangerous Goods Compound, targeting soils up to 1.0 m bgl. Ground Penetrating Radar (GPR) undertaken did not identify the targeted buried drums. Soil testing results indicate contamination within the northern area of the compound.

Source	Potentially Contaminating Activity	Stated CoC	Key commentary/previous investigations
		chlorobenzenes, PCBs, pesticides, phthalates, TPH	Sample locations were confined to accessible areas of the base of the compound. Building 68 was present at time of investigation and samples were not collected beneath it. No sampling was undertaken over the banks of the compound.
<b>Anecdotal information (acquired 2023)</b>	Chemical storage/spills and/or historic infilling.	TCA in xylene (containing high levels of TCDD).	Waste drums exhumed from Ngahoro/Waireka stored in Dangerous Goods Compound subsequently leaked. Waste drums from the TCP solvent extraction purification process was also stored here with some small leaks due to drum corrosion. Potentially beneath Building 68.

## 10.5 Liquids and solids incinerators

The liquids incinerator (Building 30) and solid wastes incinerator (Building 64) are located on either side on an access road which borders the Central portion of the site. Reviewed information sources indicate potentially contaminating activities have occurred over these areas, in relation to incineration of contaminated material, stockpiling of contaminated material within the building compounds, and/or spills associated with contaminated material storage/building processes.

**Table 10.6: Summary of reviewed information**

Source (Year)	Potentially Contaminating Activity	Stated CoC	Key commentary/previous investigations
<b>Record 57 (1981), Record 59</b>	Possible disposal (incineration) of contaminated material.	N/A	Steel vessels may have been cut up and incinerated. Such vessels may have included storage tanks (including USTs).
<b>Record 45 (1979)</b>	Possible storage of contaminated material.	TCA, TCDD and xylene	Document mentions the liquids incinerator as the source area of some contaminated material (assorted rubbish).
<b>Record 46 (1984)</b>	Possible chemical/material storage and associated spills.	TCDD	Two samples of surface soil collected within the liquid incinerator compound. Concentrations of TCDD were recorded within both samples.
<b>Record 52 (1985)</b>	Chemical/material storage and associated spills.	TCDD	Soil sampling surrounding liquid incinerator compound, located immediately north of the liquids' incinerator building. Concentrations of TCDD were recorded within all (six) samples. Odours and visual evidence of contamination noted over a section of the area investigated.
<b>Record 47 (1986)</b>	Storage of contaminated material.	TCA and TCDD	Sampling of excavated material (soil and concrete rubble) stockpiled in incinerator compound. Concentrations of TCA and TCDD were recorded in all samples.
<b>Record 58 (1985), Record 51 (1985), Record 48 (1986)</b>	Possible residual contamination from incinerator emissions	TCDD	Protocol and results for limited soil sampling targeting incinerator emissions. Soil sampling undertaken in 1985 did not record TCDD concentrations above the laboratory limit of reporting. However, analysis from a different laboratory did record concentrations within select samples.

Source (Year)	Potentially Contaminating Activity	Stated CoC	Key commentary/previous investigations
			It cannot be confirmed if identical samples were used across both laboratories. However, based on sampling dates (both during April 1985), and sample IDs, it is likely the same samples were used.
<b>Record 55 (1988)</b>	Chemical/material storage and associated spills.	N/A	The document mentions two areas of the site with known contamination, both having been covered with an HDPE liner and concrete. The document states sampling of gravel beneath Building 30 confirmed ground contamination.
<b>Record 44 (1992)</b>	Disposal (incineration) of contaminated material	N/A	Liquid and solid wastes disposal (incineration) undertaken on an as-required basis. Incinerated content included (solid) wastes exhumed from Ngahoro and other solid wastes generated by plant activities.
<b>Record 22 (1994)</b>	Possible residual contamination from incinerator emissions	PCDD/F (namely TCDD)	Contaminants emitted from the incinerator included PCDD/F. The concentrations of these contaminants were monitored as required by the discharge (to air) consent. Select monitoring data (1994-1995) has indicated concentrations complied with the consent limit.
<b>Record 43 (1988), Anecdotal information (acquired 2023)</b>	Residual contamination from incinerator ash	PCDD/F, metals	Comment that ash from the solid incinerator was stockpiled (location not specified) over recent years while analytical capability was upgraded. At the time of the reporting, disposal arrangements were being renegotiated with NDPC.  Anecdotal information indicates the ash was stored in sealed 200L drums at various times in Building 18, Building 19, and Building 68 prior to disposal.

## 10.6 Other areas (all portions)

In addition to the specific areas mentioned above, reviewed information suggests potentially contaminating activities have been undertaken across other areas of the site. The activities are largely similar to those mentioned above, and primarily relate to the chemical manufacturing activities undertaken on site as well as the management of raw materials and by-products (production wastes).

**Table 10.7: Summary of reviewed information**

Source (Year)	Potentially Contaminating Activity (Area)	Stated CoC	Key commentary/previous investigations
<b>Record 4 (2014), Record 55 (1988), Record 46 (1983), Record 53 (1983), Record 49 (1986)</b>	Chemical storage/spills near the northern boundary of the site.	N/A	Redundant/obsolete manufacturing vessels and equipment were reportedly stored near the north-west boundary of the site. Select (largely anecdotal) information suggests this may have included storage within a building (Building 56). Whilst not stated in the records, historical imagery shows materials stored on bare ground over this general area.
<b>Record 4 (2014), Record 55 (1988), Record 44 (1992), Record 59, Anecdotal information (acquired 2023)</b>	Possible chemical storage and/or spills associated with save-alls and the tradewaste system outside the central portion of the site.	Phenoxies, solvents, sulphur, solids ('sludge')	Predominantly across the Central portion (main production areas), however also within the Northern and Southern portions. Ground contamination may have occurred throughout the tradewaste sewer network, particularly where blockages, or deterioration have resulted in leakages. Reported vertical extent of potential contamination beneath tanks associated with the tradewaste (effluent) system between 2-4 m bgl. Tradewastes were captured within some save-all locations. Repairs to the integrity of save-alls were undertaken during early 1988. Phenoxy and chlorophenol concentrations have been recorded in groundwater bores within the northern portion of the site (MW20, MW41 and MW42) during select groundwater monitoring rounds.
<b>Record 4 (2014), Record 44 (1992), Record 47 (1986), Record 55 (1988), Anecdotal information (acquired 2023)</b>	Chemical storage (and possible spills) and/or historic infilling over the Southern portion of the site.	TCA, TCDD	In 1986, sampling of contaminated soil and demolition material behind "R&D" (Building 20). Recorded concentrations of TCA and TCDD. Anecdotal observations and select documents suggest drums stored in the south-eastern corner of the site and possibly buried within grassed areas of the southern portion. Excavation of a stormwater line unearthed "green

Source (Year)	Potentially Contaminating Activity (Area)	Stated CoC	Key commentary/previous investigations
			<p>bag shaker dust". Information from select documentation (Record 44) indicates this may be dusts from filter bag collectors.</p> <p>Demolition material reportedly used as fill in the Southern portion of the site.</p> <p>Drummed raw materials and production wastes reportedly stored immediately south/west of Buildings 18 and 19, including a washdown area for exhumed drums with runoff allowed to soak to ground.</p> <p>Buried production wastes (unsuitable for offsite disposal) south of Building 19.</p>
<b>Record 55 (1988), Record 44 (1992)</b>	Historic infilling adjacent to the western boundary of the site.	N/A	<p>Demolition material used as fill over an elevated section of the site, adjacent to the western boundary. Crushed drums may have also been used as fill material within the general area.</p> <p>Buried production wastes (unsuitable for offsite disposal) within the bank north of the Dangerous Goods Compound.</p>
<b>Record 55 (1988)</b>	Possible chemical spills from the manufacturing process areas and associated infrastructure.	N/A	Excavations in areas west and south of Building 15 exposed liquid with a very 'obnoxious' smell noted. Similar contamination may be present beneath the floor of select buildings in/around the main production area (refer to <b>Section 10.1</b> ).
<b>Record 4 (2014), Record 44 (1992), Record 57 (1981), Anecdotal information (acquired 2023)</b>	Chemical storage (and possible spills) associated with USTs.	Numerous (refer to Record 57), namely contaminated xylene, methanol, iso-butanol, iso-octanol, diesel	<p>Potential contamination associated with diminished structural integrity of two underground storage tanks.</p> <p>Reporting (Record 44) following removal of underground storage tanks stated all contaminated soil was removed for treatment. Limited validation testing of ground contamination following removal of USTs. Soil testing results could not be verified</p>
<b>Record 43 (1988)</b>	Residual contamination from site emissions across Southern portion (particularly the southeastern corner) - grassed area between Incinerators and Paritūtū Road (downstream of predominant wind direction).	PCDD/F	Sampling of surface soils across the site. Concentrations of PCDD/F were recorded in multiple samples. The report stated that, in areas now covered by an asphalt cap, elevated concentrations of PCDD/F may be present.



Source (Year)	Potentially Contaminating Activity (Area)	Stated CoC	Key commentary/previous investigations
<b>Record 57 (1981), Record 44 (1992), Record 4 (2014)</b>	Chemical storage and/or spills associated with the above-ground storage tanks.	Numerous (refer to Record 57), namely 2,4,5-T and 2,4-D esters, contaminated methanol	Various materials have been stored within above ground storage tanks. Where necessary, underground storage tanks were replaced by above ground tanks and located within bunded areas of the site.
<b>Record 13 (2001)</b>	Buried drums across the site containing potentially contaminating material from manufacturing processes.	Numerous, namely 2,4,5-T and 2,4-D esters, contaminated methanol	TRC undertook an investigation into alleged dump sites across New Plymouth. Part of the investigation included GPR surveys across three select areas of the Paritutu Site. The areas included "Site 1: adjacent to wellsite No 1" (MW1), "Site 2: adjacent to wellsite No 4" (MW4) and "Site 3. Adjacent to wellsite Nos 6 and 43" (MW6 and MW43). GPR scan lines were taken at 5 m spacings. The data collected from each location show normal undulating soil strata and no evidence of drum burial on site.
<b>Record 61 (2022, 2023)</b>	ACM in building materials, and surrounding soil.	ACM,	<p>The site transfer record details provision by Corteva of an asbestos register which listed asbestos containing material (ACM) in buildings 2, 3, 5, 7, 13, 18, 19, 24, 45, 46, 47, 48 and 58. ACM was also identified in underground pipes and the tradewaste flow meter pit cover. Corteva provided asbestos removal certification for all of the above identified sources of asbestos prior to demolition.</p> <p>Further works were carried out by Corteva in Building 19 due to the identification of asbestos in roofing material, which was then stored on the building footprint. This asbestos was verified as being removed. As part of the determination of any contamination from this additional asbestos at Building 19, soil tests from the perimeter of the building were collected and confirmed presence of asbestos, considered likely to be from legacy wear and tear of the building cladding. Asbestos in soil remains present at select locations surrounding the former building 19 and a perimeter fence has been erected around the former building footprint.</p>

## 11 Site walkover

Regular inspections are undertaken by T+T as part of the Dow legacy site management. The most recent site walkover was in October 2023. General photographs of the site are included in **Appendix G**.

Overall, key features noted during recent site walkovers are as follows:

- All the buildings have been demolished with the exception of:
  - The concrete buildings (Building 03) integral to the retaining walls of the raised process area, located in the Central portion of the site.
  - The Dangerous Goods Compound (Buildings 29 and 68).
  - Stormwater retention systems (Buildings 16 and 17).
  - Tradewaste flowmeter shed (Building 58) and adjacent below ground covered flowmeter pit.
  - Tradewaste under/over separator (SV1000) structure filled and capped on bank north of tradewaste Buildings 11 and 12.
- Demolition material (including wood, glass, and plastic) was observed across the former building areas of the site. However, potential asbestos-containing material (ACM) (among other demolition material) was observed surrounding the concrete base of Building 02, with potential ACM fragments observed adjacent to Buildings 64, 57, 46, and 19.
  - Along the retaining wall associated with Building 03, demolition material and sediment were observed falling from the gaps.
- A black (presumably plastic) liner and timber were observed along the western side of Building 03, between the top the retaining wall and the overlying concrete floor. A similar black liner was also observed beneath the concrete floor of the northernmost side of Building 64.
  - A black liner (potentially thicker) was also observed along the northern (interior) wall, within Building 68.
  - Segments of a black liner (or similar) were also observed protruding from beneath the building footprints of Building 44 and Building 20.
- The grassed areas of the site were in good condition being regularly mowed and weed controlled.
- Areas around the former Building 03 appeared to have demolition debris and sediment deposition in low areas of the concrete where rainwater was pooling. A strong solvent odour was evident within these areas.
- There was evidence of former storage of round drums on the concrete adjacent to Buildings 03 and 30, as rust staining and/or fragments of deteriorated (rusted) metal were observed.
- A strong localised solvent odour was also evident when inspecting the vicinity of former Building 04.
- A strong localised hydrocarbon odour was noted when inspecting the vicinity of the Brine extraction and tradewaste areas (Buildings 11, 12, 60, and 61).
- Three fill points were observed adjacent to Buildings 09, 15 and 30. The fill points had been welded shut. Anecdotally (via a site contact) these were process / town water pipes that could not be fully isolated and sealed until the end of site demolition.
- Pumps were servicing stormwater ponds SV9000/9100 and SV8000. Stormwater from the ponds is irrigated to the grassed area south of the Dangerous Goods Compound.

## 12 Potential for contamination

The site has had a long history of agrichemical manufacturing and formulation. From the reviewed information and corroboration of anecdotal information, the following sections outline the historical environmental events and potentially contaminating activities which may have led to contamination of the soil and groundwater at the site.

It is evident that industrial hygiene practices today have evolved considerably from those used at the site in the 1960s – 70s. From the 1980s onwards, and particularly when the RMA came into force in 1991, industrial hygiene practices at the site were improved greatly and incident reporting, health and safety, and recording practices were more apparent.

### 12.1 Potential for contamination

This investigation has identified that HAIL activities were (or are likely to have been) undertaken at this site. The activities, potential contaminants, and assessment of the potential magnitude of the effects are presented in **Table 12.1**.

Table 12.1: Potentially contaminating activities

Land use/activity	Potential contaminants	Likelihood, magnitude, and possible extent of contamination	Ministry for the Environment Hazardous Activities and Industries List (HAIL)
<p><b>Manufacture, storage, and/or spills of numerous chemicals across the site (including those associated with USTs, save-alls, and the tradewaste system), primarily across the main production areas (Central portion) of the site</b></p>	<p>Various – dependant on the particular process area, likely to include:</p> <p>Metals, Phenoxies, Aromatic acid herbicides, Chlorophenols and chloroanisoles, OCPS, OPS, Triazines, Solvents (particularly, methanol, iso-butanol, xylene) TPH, PCDD/F (TCDD), Sulphates.</p>	<p>Numerous lines of evidence acquired through this investigation indicate soils have been contaminated by former onsite manufacturing activities, and/or releases from the associated infrastructure. The limited investigations undertaken across the Central portion indicate ground contamination exists beneath buildings and associated infrastructure (such as tradewaste service lines). Given the age of investigations undertaken and the areas assessed, the extent/magnitude of any associated ground contamination cannot be accurately determined.</p> <p>Where present, associated ground contamination is likely to be focused within near surface soils across the main production area(s), and/or former chemical storage areas (such as the Dangerous Goods Compound).</p> <p>Additionally, deeper ground contamination is indicated to have occurred as the result of certain deteriorating sub-surface features (e.g., USTs, save-alls, tradewaste network, and the former lagoon/pond).</p> <p>Specific areas of contamination include near/beneath Buildings 03, 13, 15 and 48, where there is documented evidence of chemical spills and/or leaks.</p>	<p>A2 – <i>Chemical manufacture, formulation, or bulk storage</i></p> <p>A3 – <i>Commercial analytical laboratory sites</i></p> <p>A6 – <i>Fertiliser manufacture or bulk storage</i></p> <p>A9 – <i>Paint manufacture or formulation (excluding retail paint stores)</i></p> <p>A10 – <i>Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds</i></p> <p>A11 – <i>Pest control including the premises of commercial pest control operators or any authorities that can carry pest control where bulk storage or preparation of pesticide occurs, including preparation of positioned baits or filling or washing of tanks for pesticide application</i></p> <p>A12 – <i>Pesticide manufacture (including animal poisons, insecticides, fungicides, or herbicides) including the commercial manufacturing, blending, mixing, or formulating of pesticides</i></p> <p>A14 – <i>Pharmaceutical manufacture including the commercial manufacture, blending, mixing or formulation of pharmaceuticals, including animal remedies or the manufacturing of drugs with the potential for environmental discharges</i></p> <p>A17 – <i>Storage tanks or drums for fuel, chemical or liquid waste</i></p> <p>G2 – <i>Drum or tank reconditioning or recycling</i></p>

Land use/activity	Potential contaminants	Likelihood, magnitude, and possible extent of contamination	Ministry for the Environment Hazardous Activities and Industries List (HAIL)
<b>Incineration of contaminated materials (within dedicated solids and liquids incinerator compounds)</b>	PCDD/F, TCA, xylene, metals, PAHs.	Reviewed information suggests incineration of material since the mid-1970's has been undertaken on an as-required basis. Numerous documents indicate material incinerated included contaminated wastes, both solid (refuse) and liquid (such as contaminated manufacturing by-products). Limited soil sampling data does indicate contamination within soil at the site boundaries.	G5 – <i>Waste disposal to land</i> I – <i>Land subject to intentional or accidental release of a hazardous substance in sufficient quantity to be a risk to human health or the environment</i>
<b>Collection of potentially contaminated stormwater flows and/or wastes from the main production area of the site</b>	Unknown, contaminants may vary depending on the particular process area, however, may include: Phenoxies, Aromatic acid herbicides, Chlorophenols and chloroanisoles Solvents PCDD/F (TCDD).	Reviewed information suggests the presence of two ponds existing near the western boundary of the site, which are indicated to have primarily received stormwater (overland) flows. However, disposal of other potentially contaminated materials (sludges and drums) is believed to have occurred. Results from soil (and groundwater) sampling indicate contamination across this general area of the site (e.g., the former pond ("lagoon")). Given the age and extent of investigations which have been undertaken over this area (with particular regard to soil contamination), the extent/magnitude of any ground contamination cannot be accurately determined. We note soil results collected across the general area of the former pond ("lagoon") recorded elevated contaminant concentrations, with detections of such contaminants in soil at depths up to 25 m bgl.	G6 - Waste recycling or waste or wastewater treatment I – Land subject to intentional or accidental release of a hazardous substance in sufficient quantity to be a risk to human health or the environment
<b>Isolated historic infilling, including production wastes, timber, demolition material, and contaminated soil/gravel</b>	Unknown but a broad range of contaminants possible, particularly if fill materials were	Reviewed documentation indicates that infilling has been undertaken across multiple areas of the site. Based on the reviewed information, historic infilling is indicated to have occurred in multiple isolated areas within the Southern and Central portions of the site including grassed areas of the site (Southern portion), as well as within the Dangerous Goods	G5 – Waste disposal to land I – Land subject to intentional or accidental release of a hazardous substance in sufficient quantity to be a risk to human health or the environment

Land use/activity	Potential contaminants	Likelihood, magnitude, and possible extent of contamination	Ministry for the Environment Hazardous Activities and Industries List (HAIL)
	<p>sourced from manufacturing areas of the site or produced waste. Specific contaminants include those similar to that mentioned above, in addition to:</p> <p>Metals, PCP, PAHs, Asbestos.</p>	<p>Compound (specifically below Building 68), and the land immediately to the north. Based on the reviewed information, fill material may have included production wastes, raw materials, building materials, crushed barrels and/or contaminated soil/gravel. Depending on the nature of the fill materials used, surrounding soils and/or groundwater may have been impacted.</p>	
<p><b>Above ground storage of chemicals (including production wastes).</b></p>	<p>Various – dependant of the particular process area (refer above).</p>	<p>Based on the reviewed information, above ground storage of chemicals is indicated to have occurred in multiple isolated areas of the site (across all portions). Particular areas include the Dangerous Goods Compound (particularly Building 68), Building 41, Building 30, Building 19, Building 20, and the south-eastern corner of the site.</p>	<p>A17 – Storage tanks or drums for fuel, chemical or liquid waste I – Land subject to intentional or accidental release of a hazardous substance in sufficient quantity to be a risk to human health</p>
<p><b>Workshop/maintenance buildings</b></p>	<p>Metals, hydrocarbons, PCBs in addition to contaminants associated with chemical manufacture (refer above).</p>	<p>Potential spillages from the former (but unverified) workshops, which may have included refuelling areas (not confirmed) and a maintenance area (Building 05), and fork truck garage (Building 55). Additionally, anecdotal information indicates forklifts were commonly used to transport exhumed drums, and therefore may have accumulated (and tracked) contaminants associated with buried waste products (particularly if inadequate decontamination between uses).</p>	<p>I – Land subject to intentional or accidental release of a hazardous substance in sufficient quantity to be a risk to human health or the environment</p>

Land use/activity	Potential contaminants	Likelihood, magnitude, and possible extent of contamination	Ministry for the Environment Hazardous Activities and Industries List (HAIL)
<b>Substations and Transformer</b>	Metals, hydrocarbons (TPH/PAH), solvents, PCBs and asbestos.	Both existing and former substations are present within four isolated areas of the Central portion of the site, and one former transformer in the South portion of the site. Spills and leaks resulting from the general operational activities associated with these areas may have impacted surface soils. Contamination of deeper soils and/or local groundwater may have occurred depending on factors such as the volume of product released to ground. Investigation of potential ground contamination over these isolated areas has not been undertaken to date.	B2 – Electrical transformers, including the manufacturing, repairing, or disposing of electrical transformers or other heavy electrical equipment. B4 – Power stations, substations, or switchyards I – Land subject to intentional or accidental release of a hazardous substance in sufficient quantity to be a risk to human health or the environment
<b>Fire Fighting foam storage/training/ use</b>	PFAS	Anecdotal information reports the storage of firefighting foam in Building 52. Aqueous firefighting foams used in the 1970s - 1980s may contain C8 PFAS. Spillage or leaks from storage, as well as training and use in fire response could have led to contamination. Contamination of deeper soils and/or local groundwater may have occurred depending on factors such as the volume of product released to ground. Investigation of potential ground contamination has not been undertaken to date.	I – Land subject to intentional or accidental release of a hazardous substance in sufficient quantity to be a risk to human health or the environment
<b>Former structures (buildings and underground services) which may have incorporated lead-based paint and/or asbestos containing materials (ACM) in their construction.</b>	Lead, asbestos (fibres or fragments)	Former buildings located across the site since the 1960s may have included lead paint and/or asbestos roofing or cladding. Anecdotal information indicates sand blasting occurred periodically during maintenance of onsite structures. Accordingly, surface soils in the vicinity of the structures may have been contaminated by such materials during weathering, or demolition works, the latter of which being influenced by uncontrolled removal/demolition works. Contamination (if any) may be highest in near surface soils immediately surrounding the former buildings. ACM (in particular) was confirmed within construction material associated with Building 13, Building 19, and Building 20.	I – Land subject to intentional or accidental release of a hazardous substance in sufficient quantity to be a risk to human health or the environment

Land use/activity	Potential contaminants	Likelihood, magnitude, and possible extent of contamination	Ministry for the Environment Hazardous Activities and Industries List (HAIL)
		<p>Furthermore, anecdotal information indicates underground ACM pipes (firewater, town/process water) may be present across the site (particularly within the Southern portion). Asbestos contamination from buried pipes is generally low risk (e.g., not exposed to weathering) except where the uncontrolled disturbance of pipes has occurred.</p>	



## 12.2 Conceptual site model

A Conceptual Site Model (CSM) as defined by MfE in the Contaminated Land Management Guidelines<sup>17</sup>, sets out known and potential sources of contamination, potential exposure pathways, and potential receptors. For there to be an effect from the proposed activity there has to be a contamination source and a mechanism (pathway) for contamination to affect human health or the environment (receptor).

A preliminary conceptual site model has been developed for the site which takes into account the available information about the site, and our understanding of the potential effects on human health and the environment. Potential exposure is influenced by current or proposed land use, a proposed land use is not yet known however (based on the current land use and potential future remediation works) an industrial land use has been assumed for the site given this is the current listed land use.

The CSM is presented in **Table 12.2** and a graphical representation of the CSM is provided in **Appendix H**.

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<sup>17</sup> Ministry for the Environment, updated 2021, *Contaminated Land Management Guidelines No. 5 Site Investigation and Analysis of Soils*.

Table 12.2: Preliminary Conceptual Site Model

Source	Potential exposure pathways	Receptor	Pathway Assessment
<b>Groundwater contamination (Shallow and Deep Aquifer)</b>	Groundwater flow to cliff seeps (Deep Aquifer)	Recreational users	<b>Potentially Complete:</b> Further sampling would be required to inform impacts from site contamination.
		Shore biota	
		Public consuming biota	
	Groundwater flow to coastal marine area (Deep Aquifer)	Recreational users	<b>Potentially Complete:</b> Further sampling would be required to inform impacts from site contamination.
		Marine biota	
		Public consuming biota	
Groundwater flow to Herekawe Stream (Shallow Aquifer)	Recreational users	Recreational users	<b>Potentially Complete:</b> Limited testing undertaken. Contaminants detected at concentrations historically assessed as several orders of magnitude below site specific screening levels, unclear if contaminants are from the site or another upstream source.
	Public consuming biota	Public consuming biota	<b>Potentially Complete:</b> Limited testing undertaken. Contaminants detected at concentrations historically assessed as several orders of magnitude below site specific screening levels, unclear if contaminants are from the site or another upstream source.
<b>Stormwater contamination</b>	Stormwater directly discharged to Herekawe Stream	Recreational users	<b>Potentially Complete:</b> Further sampling would be required to inform impacts from site contamination.
		Freshwater biota	
		Public consuming biota	
<b>Ground Contamination (soil and concrete)</b>	Dermal contact Ingestion of contaminated materials (soil) Inhalation of volatile contaminants, dust, fibres Mobilisation during disturbance works (including discharge to surface water or groundwater)	Site users (those involved in ground disturbance works)	<b>Onsite receptors - complete:</b> (DSI required): The limited sampling that has been undertaken within certain areas of the site has confirmed contamination. Moreover, there has been limited soil sampling across the wider site. Uncertain contamination extent (both laterally and vertically). Limited recovery of some samples/results, with associated analytical data unavailable.
		Potential future site users (if contaminated soils are not managed appropriately to prevent future exposure pathways)	
		Terrestrial ecology	

Source	Potential exposure pathways	Receptor	Pathway Assessment
			<p>Limited soil sampling undertaken across some potential areas of concern (e.g., main process areas of the site), with the validity of contaminant concentrations unable to be determined (given age of investigations).</p> <p>Additionally, potential CoCs (e.g., asbestos in soil) have not been targeted during previous investigations.</p> <p>Potential ACM identified during the site walkover within the site boundary would reflect a potential pathway to site and future site users only.</p> <p>Highly reliant on future use of the site and remediation works.</p>
	<p>Inhalation of volatile contaminants, dust, fibres</p> <p>Mobilisation during disturbance works (including discharge to surface water or groundwater)</p>	Offsite - residents of surrounding properties and general public utilizing recreational areas	<b>Offsite receptors - incomplete currently:</b> The pathway would be complete if contaminated soils are not managed appropriately to prevent future exposure pathways.
	Vapour intrusion	Potential future site users	<b>Potentially Complete:</b> Vapour intrusion is considered most likely to present a potential risk to onsite receptors (via accumulation within onsite structures if contaminated soils are not managed appropriately to prevent future exposure pathways.
		Offsite - residents of surrounding properties and general public utilizing recreational areas.	<b>Incomplete:</b> Vapour intrusion is not considered to present a potential risk to offsite receptors.
	Excavated material disposed offsite (if required)	Offsite – receptors in vicinity of the disposal site, provided offsite disposal is required.	<b>Potentially Complete:</b> If offsite disposal is required there are potential receptors within the vicinity of the disposal site that could be affected if materials are not managed appropriately at the disposal site. There will be negligible human health effects if materials are disposed of to an appropriate receiving facility.

The preliminary CSM indicates that there is a potential for contamination to exist in surface soils, underlying soils, and groundwater (shallow and deep), which may present potential risks to receptors if future soil disturbance is proposed. Particular risks include those to site users, excavation workers, and downgradient environmental receptors. Further intrusive investigations involving soil sampling would be required to better inform actual and potential risks with respect to ground/groundwater contamination.

## 13 Data gaps

Several data gaps in the current understanding of contamination at the site have been identified, including:

- Relatively limited (and aged) soil sampling undertaken at the site, including in areas assessed as potentially at high risk of contamination (for example, around the main production facilities, including beneath recently demolished buildings). Specifically:
  - Limited soil sampling has been undertaken across the main production area of the site (e.g., beneath production buildings associated infrastructure). However, given the age of some (early) investigations, reported contaminant concentrations cannot be validated (e.g., no accompanying laboratory transcripts and varying laboratory methods of detection).
  - Where recent soil sampling has been undertaken, this has often been confined to the locations of soil boreholes, some of which were later converted into monitoring wells. As a result, lateral delineation of soil contamination has been largely limited to the locations of “delineation wells”.
  - Some investigative sampling (test pitting) was undertaken during a 2015 (shallow soil and groundwater) assessment. Seven test pits were positioned to target areas of the site used for drum storage and/or waste disposal. In addition to a limited number of test pit locations, these test pits targeted soils up to 2.3 m bgl depth, it is possible (particularly in the elevated areas of the site), that potential sources of contamination (e.g., buried wastes/drums) exist at depths beyond that targeted in this investigation. Observations from the test pitting (as detailed in the report) did not indicate evidence of buried waste material, with the exception of a single fragment of plastic encountered at a depth of approximately 0.9 m bgl, within a single test pit. Furthermore, findings of the PSI indicate the presence of historical infilling beyond the general areas of the site where test pits were positioned in this investigation, and at greater depths.
  - Investigative sampling was also undertaken across the Dangerous Goods Compound, during a 2017 upgrade of the surface, however, the investigation locations were limited to a depth of 1.0 m bgl. As stated in **Section 10.4**, reviewed documentation from the Dangerous Goods Compound indicates the area was “cleaned”, and “a HDPE liner was laid over the bunded area”. This information suggests that a demarcation layer (HDPE liner) is present above potentially contaminated soils, given such a layer was not noted in the previous investigation report, it may be possible contaminated soils are present in the area and exist at a depth greater than that targeted in this investigation (1.0 m bgl). Alternatively, reviewed documentation also suggests contaminated soil is present beneath Building 68, an area of the Dangerous Goods Compound which could not be assessed due to investigation locations being confined to generally accessible areas.

- As stated in multiple reports for the site, the understanding of the Shallow Aquifer onsite is not comprehensive. Questions remain as to the lateral extent, flow direction, and magnitude/extent of potential contamination associated with the shallow groundwater, particularly within the Northern and Central portions of the site.
- While a series of groundwater monitoring wells are positioned around the area of known (soil and groundwater) contamination near MW39R, the precise area of soil and/or groundwater contamination is not well defined. This includes the lateral and vertical boundaries, as well as the original contamination source.
- The geometry and physical characteristics of the underlying andesite unit are not well understood. This includes the source of the andesite, lateral extent beneath the overlying sequence of sands, silts, and clays, depth to top of the andesite across much of the site, and the nature of jointing in the unit (if any). Jointing (if present) may result in preferential pathways for contaminated groundwater to reach sensitive environmental receptors. It is also unclear whether groundwater in the andesite is part of the Deep Aquifer or should be considered a separate aquifer.
- Data gaps in relation to the hydrogeological understanding limit establishing if there is a complete pathway for contaminated groundwater to reach the offsite freshwater and marine receptors. Marine ecological inspections and freshwater biological monitoring completed by TRC in annual monitoring<sup>18</sup> indicate that, if the pathway is complete, it is not causing any adverse ecological impacts and consequently likely a negligible to low risk.
- Asbestos has been identified as a potential CoC, and identified within onsite structures, however, has not been targeted during previous investigations, with the exception of Building 19 where asbestos was identified within the surface soils. Surface soils surrounding Buildings 20 and 13 have not been sampled for asbestos. Validation samples may need to be collected over these (and similar) areas to ensure the presence of these materials over the site's history and/or their removal (during site demolition) has not impacted soils which remain on the site.
- PFAS has also been identified as a potential CoC, through anecdotal accounts of Building 52 (a sprinkler station) using fire-fighting foam. Additionally, reviewed documentation lists Building 44 as a firewater tank. Limited soil sampling has been undertaken around Buildings 52 and 44, with no sampling for PFAS having been undertaken. Validation samples may need to be collected over these areas to determine the nature and extent of ground contamination from these potential contamination sources.
- Findings of the PSI have indicated hardstand surfaces such as roads, car parks and pavements present onsite within the period of time coal tar was commonly incorporated into such products<sup>19</sup>. Furthermore, select documentation indicated the presence of coal tar within roading of the northern portion of the site. On this basis, coal tar constituents may be present within roading (and associated surfaces) onsite. Validation samples may need to be collected from within these surfaces to determine the nature and extent of potential contamination associated with coal tar.

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<sup>18</sup> Taranaki Regional Council, 2023. *Dow Chemical (NZ) Ltd Monitoring Programme Annual Report 2022-2023*. Technical Report 2023-71.

<sup>19</sup> Waste Management Institute New Zealand Incorporated (WasteMINZ), 2023. *Guidelines for Assessing and Managing Coal Tar Contamination in Roading*. [Coal tar in roading guidance. Version 1.0 December 2023.pdf \(wasteminz.org.nz\)](#).

## 14 Regulatory framework and resource consent requirements

Resource consents may be required to undertake a Detailed Site Investigation (DSI) which will include earthworks activities such as test pits and boreholes to sample soil. Therefore, a preliminary assessment of the potential resource consent requirements has been undertaken below.

Further detailed statutory analysis of the proposed activities will be required once the investigations have been planned and as part of the resource consent and Assessment of Effects on the Environment (AEE) preparation process.

### 14.1 Relevant RMA statutory documents

The following statutory planning documents are relevant to the site investigations:

- The Operative New Plymouth District Plan (ONPDP).
- The Proposed New Plymouth District Plan (PNPDP).
- Taranaki Regional Council Regional Freshwater Plan.
- Resource Management (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS)) Regulations 2011.
- Resource Management (National Environmental Standards for Freshwater (NESF)) Regulations 2020 (and 2023 amendments).

The rules that apply are determined by the site zoning and planning overlays. These are outlined in the table below.

**Table 14.1: Zoning and planning notations**

Zoning/planning notation	Comment
<b>NPDC Proposed District Plan</b>	
<b>General Industrial Zone</b>	Applies to the entire site
<b>Site of Significance to Māori</b>	Site 719 is located onsite. This is a Wahi Tapu site and mana whenua are Ngati Te Whiti.
<b>National Grid Subdivision Corridor</b>	This passes over the southeastern section of the site and along the western boundary of the site.
<b>Papawhere/Mt Moturoa viewshaft</b>	Applies to the entire site.
<b>Airport flight path surface</b>	Applies to the entire site.
<b>NPDC Operative District Plan</b>	
<b>Zone: Industrial C and A</b>	The majority of the site is zoned as Industrial C, with an area along the southern boundary zoned as Industrial A.
<b>Waahi Taonga/Sites of Significance to Māori</b>	Site 719 is located onsite.
<b>Urban viewshaft 3</b>	Applies to the entire site.
<b>High Voltage Electricity Lines</b>	These pass over the southeastern section of the site and along the western boundary of the site. Noting that at the time of this report issue these are being removed.

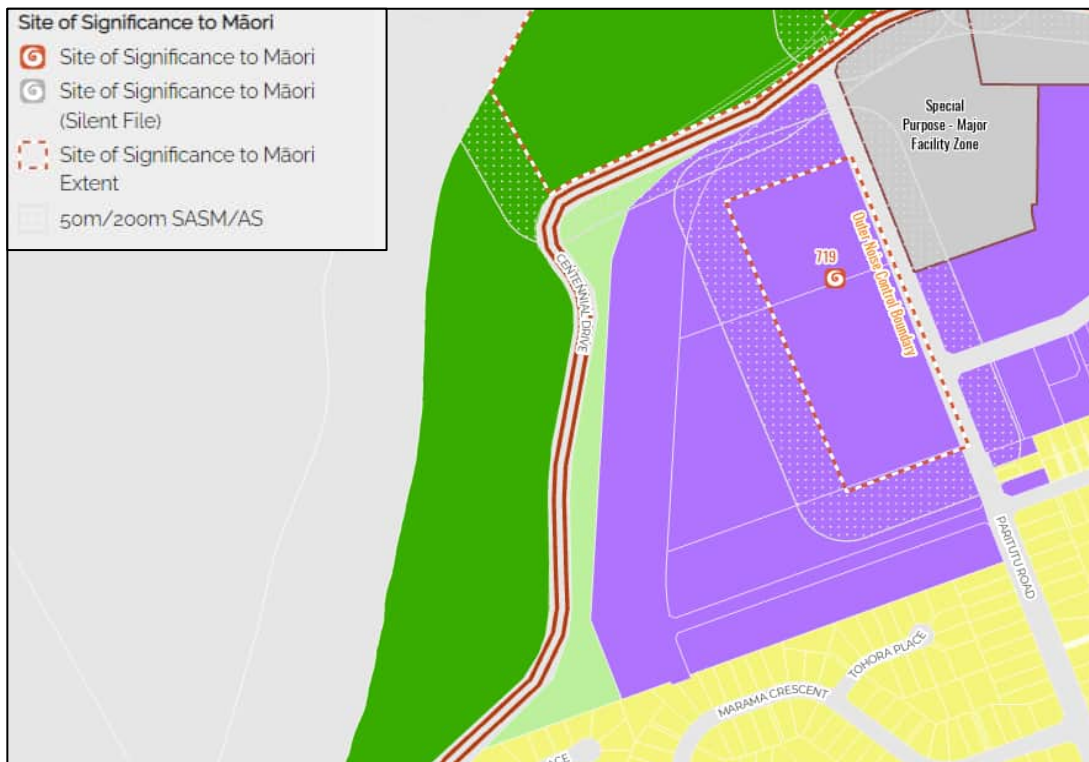


Figure 14.1: Sites of significance to Māori. Source: NPDC Proposed District Plan online maps

## 14.2 Taranaki Regional Council

A summary of the potential resource consent triggers is set out in **Table 14.2** below. Our assessment indicates that the earthworks associated with site investigations can likely be a permitted activity.

This table constitutes a preliminary assessment of resource consent requirements. The resource consent requirements will be confirmed once the site investigations have been planned.



**Table 14.2: Key potential resource consent requirements under the Regional Freshwater Plan**

Activity	Rule	Comment
<b>Earthworks for site investigations, namely test pits, and associated stormwater discharges</b>	Permitted activity rule 25	<b>Permitted</b> The earthworks will likely be less than 1 ha in area and 3,000 m <sup>3</sup> in volume. Given the lack of streams nearby a discharge to surface water is unlikely. The disturbed areas can be stabilised following the completion of the soil disturbance. Therefore, the earthworks can likely comply with the permitted activity conditions.
<b>Construction of a well<sup>20</sup>, bore<sup>21</sup>, or piezometer<sup>22</sup> for investigations</b>	Permitted activity rule 46	<b>Permitted</b> Any bores or wells can likely comply with the permitted activity conditions. This should be confirmed once the details of the well or bores is known.

### 14.3 New Plymouth District Council

A summary of the potential resource consent triggers is set out in **Table 14.3** and **Table 14.4** below. Our assessment indicates that resource consent will be required overall as a discretionary activity. Given earthworks will likely be within a site of significance to Māori consultation with mana whenua will be required to understand and assess potential cultural effects.

This table constitutes a preliminary assessment of resource consent requirements. The resource consent requirements will be confirmed at the time of preparing the relevant resource consent applications.

<sup>20</sup> The TRC Regional Freshwater Plan for Taranaki defines a well as “a hole dug, augered or drilled, tapping the water-table or springs to a depth of 20 metres or less below the ground surface”.

<sup>21</sup> The TRC Regional Freshwater Plan for Taranaki defines a bore as “a hole drilled into the ground and completed for the abstraction of water or hydrocarbons to a depth of greater than 20 metres below the ground surface”.

<sup>22</sup> The TRC Regional Freshwater Plan for Taranaki defines a piezometer as “means a stand-pipe in the ground constructed for monitoring purposes only.”

**Table 14.3: Key potential resource consent requirements under the PNPDP – Appeals version.**

Activity	Rule	Comment
Earthworks for site investigations, namely test pits	Permitted activity rule EW-R13.2 for earthworks in the General Industrial Zone (under appeal)	<b>Restricted discretionary activity</b> The 1,000 m <sup>3</sup> volume limit can likely be complied with. However, test pits may be up to 5 m deep which exceeds the permitted depth of excavations under EW-S2. Therefore, resource consent is likely required as a restricted discretionary activity under rule EW-R13.2.
Earthworks for site investigations, namely test pits, within a site of significance to Māori	Discretionary activity rule SASM-R17 (operative)	<b>Discretionary activity</b>
Earthworks for site investigations, namely test pits, within the National Grid Yard	Permitted activity rule NU-R33 (under appeal)	<b>To be confirmed</b> It needs to be confirmed whether earthworks will occur within the National Grid Yard to confirm if resource consent is required. The details of the earthworks (depth/diameter) are also required.

**Table 14.4: Key potential resource consent requirements under the operative District Plan (ONPDP)**

Activity	Rule	Comment
Earthworks for site investigations, namely test pits	Permitted activity rule IND49	<b>Restricted discretionary</b> The maximum cut depth limit of 3 m will likely be exceeded.

## 14.4 NESCS

### 14.4.1 Applicability

The NESCS came into effect on 1 January 2012. This legislation sets out nationally consistent planning controls in relation to managing soil with regard to human health.

The NESCS applies to activities on land where a HAIL activity has, or is more likely than not, to have occurred. Activities covered under the NESCS include soil disturbance, soil sampling, fuel systems removal, subdivision, and land use change.

The following table (**Table 14.5**), as provided in the NESCS Users Guide (April 2012), confirms the NESCS is applicable to the site.

**Table 14.5: NESCS Applicability**

NESCS Requirement	Applicable to site:
Is an activity described on the HAIL currently being undertaken on the piece of land to which this application applies?	No, the site is non-operational.
Has an activity described on the HAIL ever been undertaken on the piece of land to which this application applies?	Yes
Is it more likely than not that an activity described on HAIL is being or has been undertaken on the piece of land to which this application applies?	Yes
<b>If 'Yes' to any of the above, then the NESCS may apply. The five activities to which the NES applies are:</b>	
Is the activity you propose to undertake removing or replacing a fuel storage system or parts of it?	Potentially
Is the activity you propose to undertake sampling soil?	Yes
Is the activity you propose to undertake disturbing soil?	Yes
Is the activity you propose to undertake subdividing land?	No
Is the activity you propose to undertake changing the use of the land?	Potentially, the future use of the site has not been decided.
<b>Conclusion: The NESCS applies to the site.</b>	

Because known and potentially contaminating activities included on the HAIL have been carried out on the site, and the results of previous soil sampling investigation show that contaminant concentrations exceed background concentrations, **the NESCS regulations apply to the site**. In accordance with the NESCS, a DSI is required to adequately assess contamination risks to human health as part of the soil disturbance (among other potential activities) as part of the roadmap to remediation. Additional investigation is required to further assess contamination risks at the site.

The sampling, as part of the DSI, can likely be undertaken as a permitted activity under regulation 8(2), and the soil disturbance for test pits can likely be a permitted activity under regulation 8(3) provided the volume of soil disturbance is below 7,800 m<sup>3</sup>. However, controls will need to be in place to protect human health, the soil will need to be reinstated to an erosion resistant state within 1 month, the works must take < 2months, and structures designed to contain contaminated soils must not be compromised. The final resource consent requirements should be confirmed once the investigations are confirmed.

Once a DSI is complete, the main remediation works will likely require a **Restricted Discretionary** activity consent under Regulation 10 of the NESCS for soil disturbance. A Contamination Site Management Plan (CSMP) and a Remedial Action Plan (RAP) outlining how the works are proposed to be undertaken will be required to support the consent application. The CSMP would detail procedures to be followed to mitigate potential risks from soil contamination. The RAP would outline the remediation works to be undertaken based on the findings of the DSI. We anticipate that NPDC may agree to include the requirement for a CSMP and RAP as a condition of consent.

## **14.5 NESF**

The NESF freshwater restricts earthworks within 100 m of natural wetlands. We are not aware of any natural wetlands onsite, therefore, the NESF is unlikely to be relevant. Whether any natural wetlands are present onsite should be confirmed prior to site investigations being undertaken.

## **14.6 Other consents and approvals required**

### **14.6.1 Archaeological authority**

We have reviewed the Archaeological Associations 'ArchSite' database. There are no registered archaeological sites or features onsite that may be affected by the works. However, there are a number of sites in the surrounding area and as noted above, the District Plan identifies there to be a wāhi tapu site onsite.

We recommend early discussions with mana whenua, NPDC, Heritage New Zealand Pouhere Taonga and an archaeologist to better understand the nature of the site of significance onsite. Whether an archaeological authority is required for its modification or destruction can then be confirmed.

With all earthworks there is a risk of accidentally discovering archaeological material. Should there be such a discovery, works will be required to cease onsite, and an Archaeological Authority may be required from Heritage New Zealand Pouhere Taonga to recommence. From lodgement of an application, this process takes approximately eight weeks. To minimise potential programme delays it is advisable to obtain a proactive archaeological authority prior to works commencing. This will require an assessment from an archaeologist to determine the risk of uncovering archaeological features and consultation with mana whenua.

### **14.6.2 New Zealand Electrical Code of Practice for Electrical Safe Distances 2001**

Transpower completed the process of dismantling and removing the transmission towers and overhead wires surrounding the boundary of the site by the end of 2023. If earthworks are proposed in close proximity to the former transmission towers, we recommend that Transpower are contacted to confirm the proposed earthworks comply with the requirements of the New Zealand Electrical Code of Practice for Electrical Safe Distances 2001 (NZECP34:2001).

### 14.6.3 Health and Safety at Work (Asbestos) Regulations 2016

The management of asbestos in soils is regulated under the Health and Safety at Work (asbestos) Regulations 2016 (Asbestos Regulations). To achieve compliance with the Asbestos Regulations, Worksafe New Zealand has prepared an Approved Code of Practice (ACoP): Management and Removal of Asbestos (September 2016). The ACoP refers readers to the Asbestos in Soil Guidelines<sup>23</sup>. As outlined in the sections above, the PSI has identified asbestos as a potential CoC, with some investigation having identified impacts to soil from the use of ACM on site. On this basis, the Asbestos Regulations will apply to future ground disturbance works, where asbestos is present in soils.

The Asbestos in Soil Guidelines define the level of oversight and controls (including personal Protective equipment, decontamination etc.) that are required to be implemented dependent on the concentration of asbestos fibres/fines or fragments that are present in the soils. Soil sampling undertaken in May 2023 indicates the presence of asbestos in soil surrounding a former onsite structure (Building 19), at concentrations above human health criteria and will require Class B asbestos controls for any removal works.

In the absence of a sufficient quantity soil sampling data from remaining areas of the site, it is not possible to confirm the level of control that would be required. If asbestos in soil is present in these areas, and at concentrations above human health limits (as outlined in the Asbestos in Soil Guidelines), additional controls above standard earthworks controls and hygiene may be required to manage and mitigate potential risks. The findings of a DSI will provide further indication on the controls required to manage asbestos in soil. Where required, these controls will be outlined in a CSMP.

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<sup>23</sup> New Zealand Guidelines for Assessing and Managing Asbestos in Soil – BRANZ, November 2017.

## 15 Conclusions

T+T has undertaken this PSI to evaluate the potential for contamination to be present at the Paritūtū site and assess the need for further investigations and contaminated land related consents for the ultimate remediation of the site in relation to the Remediation Roadmap. This investigation has compiled information from a majority of sources including council information, prior investigations, historic documentation (e.g. monitoring plans), and aerial photographs. The investigation has identified that potentially contaminating HAIL activities have been undertaken throughout the site's history and have resulted in soil and groundwater contamination, these include (but are not limited to) activities associated with chemical manufacture and other related operations (e.g. incineration), historical infilling, as well as the presence of workshops, substations and other structures which may have incorporated potential CoCs in their construction or intended use(s).

The preliminary conceptual site model indicates that there is potential for effects to human health, and/or the environment, which will depend on the magnitude and extent of contamination (to be determined as part of a DSI).

Although numerous contamination investigations and reporting have been carried out at the site historically, our assessment has identified a number of data gaps which need to be addressed as part of the roadmap to remediation. Additionally, consideration of asbestos and other potential contaminants are required under the current regulatory framework, including the Asbestos Regulations.

Because known and potentially contaminating activities included on the HAIL have been carried out on the site, and the results of previous soil sampling investigation show that contaminant concentrations exceed background concentrations, **the NESCS regulations apply to the site**. In accordance with the NESCS, a DSI is required to adequately assess contamination risks to human health as part of the soil disturbance (among other potential activities) as part of the roadmap to remediation. Additional investigation is required to further assess contamination risks at the site.

Additional investigation is required to further assess contamination risks at the site in order that the combined site investigations constitute a DSI to a scale and degree of detail commensurate with the potential effects associated with future ground disturbance works at the site. As stated in **Section 14.4.1**, the onsite activities and respective activity statuses based on the findings of this investigation are as follows:

The sampling, as part of the DSI, can likely be undertaken as a permitted activity under regulation 8(2), and the soil disturbance for test pits can likely be a permitted activity under regulation 8(3) provided the volume of soil disturbance is below 7,800 m<sup>3</sup>. However, controls will need to be in place to protect human health as stated in **Section 14.4**.

Investigative sampling within the SASM in relation to a DSI, is considered likely to be undertaken as a Discretionary activity under SASM-R17 (operative) and resource consent is required within this area.

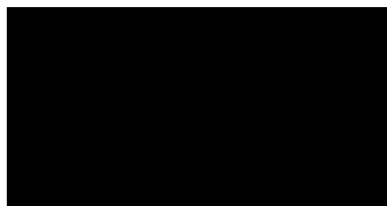
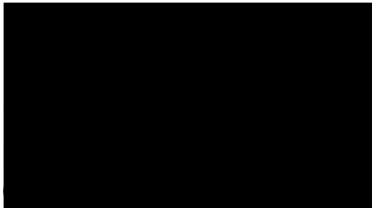
Once a DSI is complete, the main remediation works will likely require a Restricted Discretionary activity consent under Regulation 10 of the NESCS for soil disturbance. Soil disturbance (and/or removal of a fuel storage system(s)) in relation to the ultimate remedial works, is considered likely to be undertaken as a Restricted Discretionary activity under Regulation 10 of the NESCS. On this basis, a CSMP and RAP would be required for implementation during any soil disturbance works.

## 16 Applicability

This report has been prepared for the exclusive use of our client Dow Chemical (NZ) Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Tonkin & Taylor Ltd  
Environmental and Engineering Consultants

Report prepared by:



Authorised for Tonkin & Taylor Ltd by:

A handwritten signature in blue ink, appearing to read 'Sarah Schiess'.

.....  
Sarah Schiess  
Project Director

Report certified by a suitably qualified and experienced practitioner (SQEP) as prescribed under the NESCS and the NESCS Users Guide (April 2012):

A handwritten signature in black ink, appearing to read 'Dr Andrew Pearson'.

.....  
Dr Andrew Pearson  
Senior Environmental Consultant

11-July-2024  
\\ttgroup.local\corporate\Wellington\TT Projects\21795\21795.0230 - Paritutu Project 2024\IssuedDocuments\PSI Review\V007  
PSI\021795.0210\_Paritutu\_PSI\_FINAL\_11072024.docx

## SQEP Statement

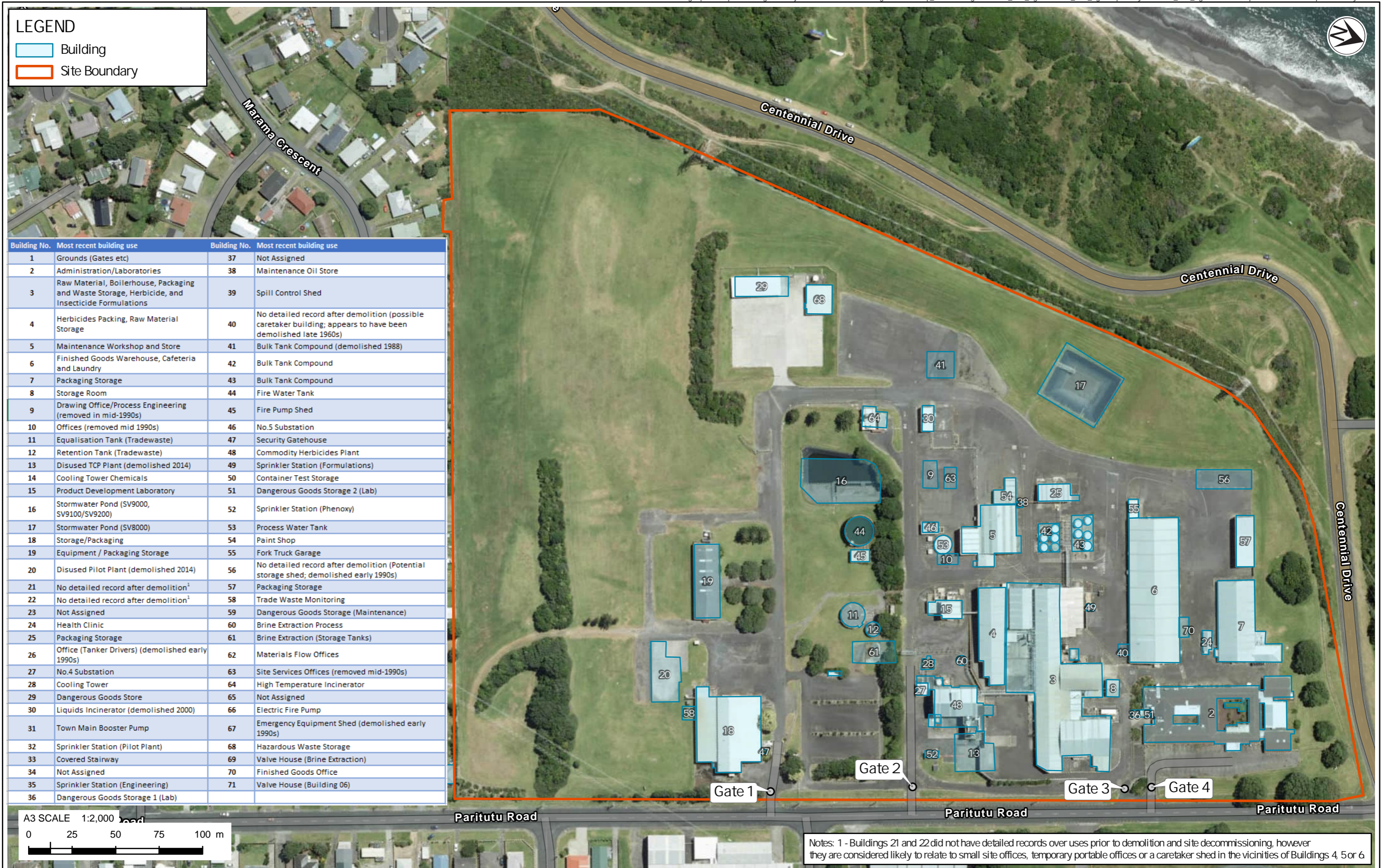
Andrew Pearson SEQP qualification: BSc (Hons) Toxicology, PhD Environmental Science, CEnvP general. Andrew is a senior environmental consultant with 18 years of experience in chemical risk assessment and over 10 years of experience in risk assessment of contaminated sites. Andrew has been a senior/lead chemical risk assessor for central government and at Tonkin + Taylor on a range of high-profile issues including the MV Rena grounding, emergence of PFAS, the 2019 Whakaari eruption, and land and marine contamination investigations. Andrew has contributed on working groups for development of ecological soil guideline values and an Aotearoa strategy for emerging contaminants, and also led development of a national guideline for investigating hexachlorobenzene contamination in grazed vineyards and an international guideline for rapid risk assessment. Andrew is on the joint WHO/FAO roster of technical experts for exposure assessment of dietary contaminants and is a recognised data assessor for assessment of pesticides under the Agricultural Compounds and Veterinary Medicines Act.



# Appendix A      Figures

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- **Figure 1. Site Location Plan**
- **Figure 2. Site Layout**
- **Figure 3. Key Site Activities 1960-1968**
- **Figure 4. Key Site Activities 1968-1970**
- **Figure 5. Key Site Activities 1970-2000**
- **Figure 6. Key Site Activities 2000-2014**
- **Figure 7. Potentially Contaminated Areas**
  - **Figure 7.0. Attribute table**
  - **Figure 7.1. Northern portion**
  - **Figure 7.2. Central portion**
  - **Figure 7.3. Southern portion**
- **Figure 8. Site and Monitoring Well Location Plan**



Building No.	Most recent building use	Building No.	Most recent building use
1	Grounds (Gates etc)	37	Not Assigned
2	Administration/Laboratories	38	Maintenance Oil Store
3	Raw Material, Boilerhouse, Packaging and Waste Storage, Herbicide, and Insecticide Formulations	39	Spill Control Shed
4	Herbicides Packing, Raw Material Storage	40	No detailed record after demolition (possible caretaker building; appears to have been demolished late 1960s)
5	Maintenance Workshop and Store	41	Bulk Tank Compound (demolished 1988)
6	Finished Goods Warehouse, Cafeteria and Laundry	42	Bulk Tank Compound
7	Packaging Storage	43	Bulk Tank Compound
8	Storage Room	44	Fire Water Tank
9	Drawing Office/Process Engineering (removed in mid-1990s)	45	Fire Pump Shed
10	Offices (removed mid 1990s)	46	No.5 Substation
11	Equalisation Tank (Tradewaste)	47	Security Gatehouse
12	Retention Tank (Tradewaste)	48	Commodity Herbicides Plant
13	Disused TCP Plant (demolished 2014)	49	Sprinkler Station (Formulations)
14	Cooling Tower Chemicals	50	Container Test Storage
15	Product Development Laboratory	51	Dangerous Goods Storage 2 (Lab)
16	Stormwater Pond (SV9000, SV9100/SV9200)	52	Sprinkler Station (Phenoxy)
17	Stormwater Pond (SV8000)	53	Process Water Tank
18	Storage/Packaging	54	Paint Shop
19	Equipment / Packaging Storage	55	Fork Truck Garage
20	Disused Pilot Plant (demolished 2014)	56	No detailed record after demolition (Potential storage shed; demolished early 1990s)
21	No detailed record after demolition <sup>1</sup>	57	Packaging Storage
22	No detailed record after demolition <sup>1</sup>	58	Trade Waste Monitoring
23	Not Assigned	59	Dangerous Goods Storage (Maintenance)
24	Health Clinic	60	Brine Extraction Process
25	Packaging Storage	61	Brine Extraction (Storage Tanks)
26	Office (Tanker Drivers) (demolished early 1990s)	62	Materials Flow Offices
27	No.4 Substation	63	Site Services Offices (removed mid-1990s)
28	Cooling Tower	64	High Temperature Incinerator
29	Dangerous Goods Store	65	Not Assigned
30	Liquids Incinerator (demolished 2000)	66	Electric Fire Pump
31	Town Main Booster Pump	67	Emergency Equipment Shed (demolished early 1990s)
32	Sprinkler Station (Pilot Plant)	68	Hazardous Waste Storage
33	Covered Stairway	69	Valve House (Brine Extraction)
34	Not Assigned	70	Finished Goods Office
35	Sprinkler Station (Engineering)	71	Valve House (Building 06)
36	Dangerous Goods Storage 1 (Lab)		

Notes: 1 - Buildings 21 and 22 did not have detailed records over uses prior to demolition and site decommissioning, however they are considered likely to relate to small site offices, temporary portable offices or a caretaker shed in the vicinities of Buildings 4, 5 or 6

NOTES:  
 Basemap Aotearoa New Zealand Hillshade - Alpha: Eagle Technology, Land Information New Zealand. Hybrid Reference Layer: Esri Community Maps Contributors, LINZ, Stats NZ, Esri, TomTom, Garmin, Foursquare, METANASA, USGS, World Imagery: LINZ, Taranaki RC, NZ Topographic Relief (Vector): Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors. Historic Aerials 2007 - 2022

3	Third version	JORB	CHSA	03/11/23
4	Fourth version	CHUT	CHSA	08/02/24
REV	DESCRIPTION	GIS	CHK	DATE

PROJECT No.		21795.0210	
DESIGNED	CHUT	FEB.24	
DRAWN	CHUT	FEB.24	
CHECKED	CHSA	FEB.24	
LOCATION PLAN		APPROVED	DATE

CLIENT	DOW CHEMICAL (NZ) LIMITED		
PROJECT	PARITUTU CONTAMINATED LAND ASSESSMENT		
TITLE	PARITUTU SITE BUILDING IDENTIFICATION		
SCALE (A3)	1:2,000	FIG No.	FIGURE 1.
REV			4

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PROJECT No.	21795.0210		
DESIGNED	CHUT	OCT.23	
DRAWN	CHUT	OCT.23	
CHECKED	CHSA	OCT.23	
APPROVED	DATE		

CLIENT	DOW CHEMICAL (NZ) LIMITED		
PROJECT	PARITUTU CONTAMINATED LAND ASSESSMENT		
TITLE	PARITUTU SITE LAYOUT		
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		REV	0

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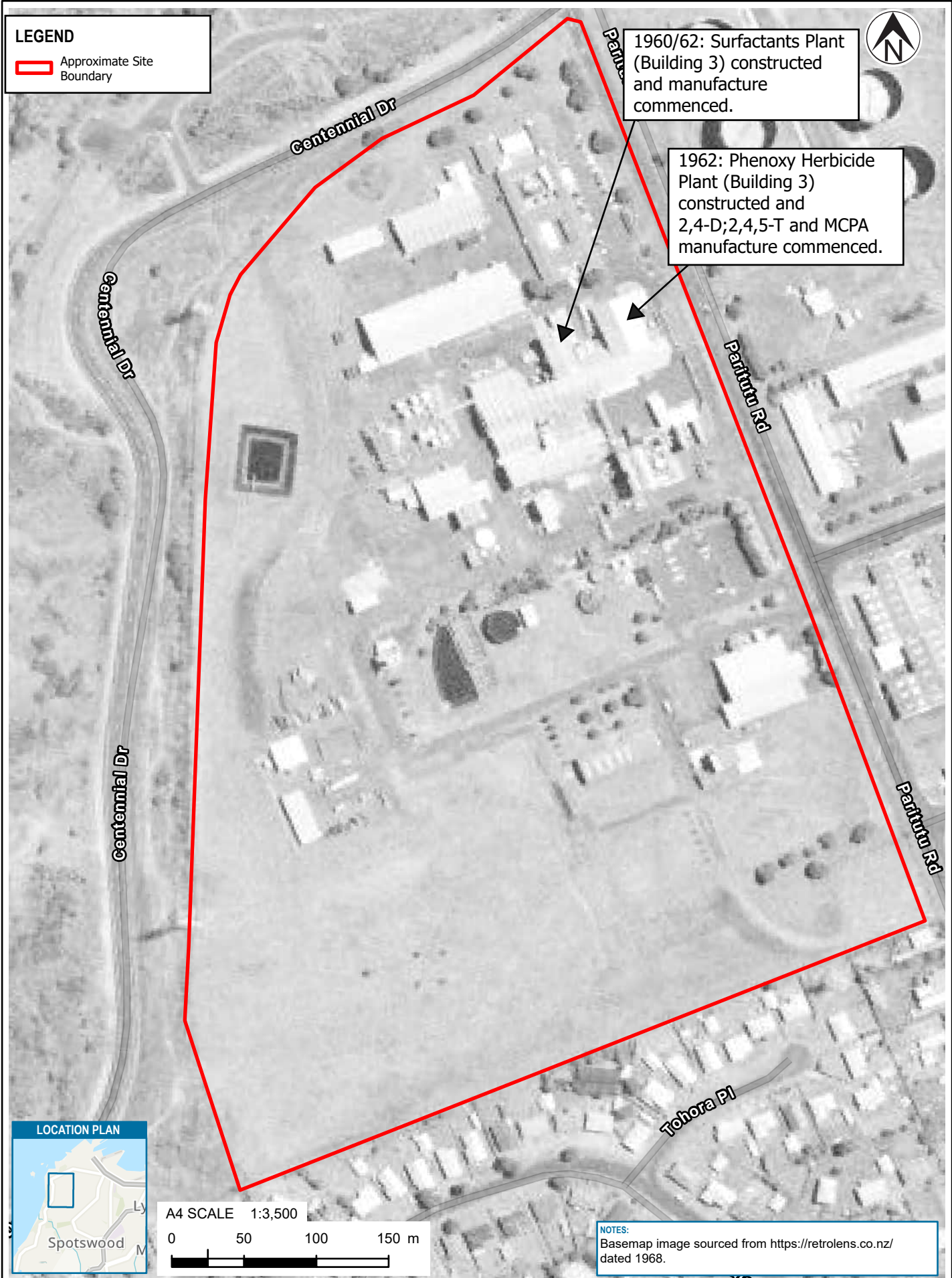
**LEGEND**

 Approximate Site Boundary



1960/62: Surfactants Plant (Building 3) constructed and manufacture commenced.

1962: Phenoxy Herbicide Plant (Building 3) constructed and 2,4-D; 2,4,5-T and MCPA manufacture commenced.



**LOCATION PLAN**

Spotswood

A4 SCALE 1:3,500

0 50 100 150 m

**NOTES:**  
Basemap image sourced from <https://retolens.co.nz/> dated 1968.

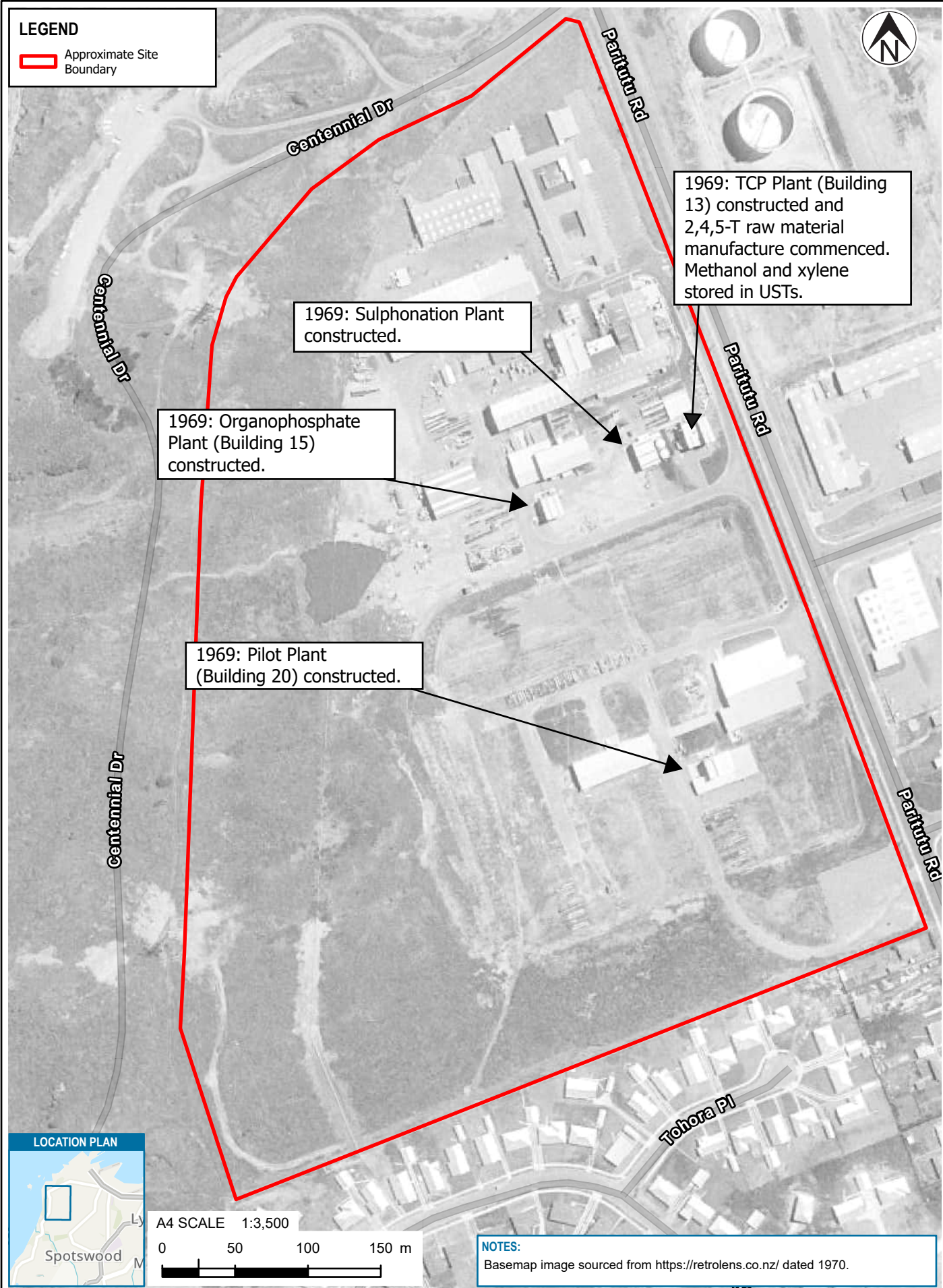
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PROJECT No.	21795.0210		
DESIGNED	CHUT	OCT.23	
DRAWN	CHUT	OCT.23	
CHECKED	CHSA	OCT.23	
APPROVED	DATE		

CLIENT	<b>DOW CHEMICAL (NZ) LIMITED</b>		
PROJECT	<b>PARITUTU CONTAMINATED LAND ASSESSMENT</b>		
TITLE	PARITUTU SITE KEY ACTIVITIES - 1960-1968		
SCALE (A4)	1:3,500	FIG No.	FIGURE 3.
		REV	0

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**LEGEND**

Approximate Site Boundary

1969: TCP Plant (Building 13) constructed and 2,4,5-T raw material manufacture commenced. Methanol and xylene stored in USTs.

1969: Sulphonation Plant constructed.

1969: Organophosphate Plant (Building 15) constructed.

1969: Pilot Plant (Building 20) constructed.

**LOCATION PLAN**

A4 SCALE 1:3,500

0 50 100 150 m

**NOTES:**  
Basemap image sourced from <https://retrolens.co.nz/> dated 1970.

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PROJECT No.	21795.0210		
DESIGNED	CHUT	OCT.23	
DRAWN	CHUT	OCT.23	
CHECKED	CHSA	OCT.23	

CLIENT	<b>DOW CHEMICAL (NZ) LIMITED</b>
PROJECT	<b>PARITUTU CONTAMINATED LAND ASSESSMENT</b>
TITLE	<b>PARITUTU SITE KEY ACTIVITIES - 1968-1970</b>

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**LEGEND**

Approximate Site Boundary

1971: MCPB Plant constructed within Phenoxy Plant (Building 3).  
 1972: MCPB explosion.  
 1976: Formulations Plant (Building 3) expanded.  
 1983: Herbicides Granules Plant (Building 3) constructed.

1975: Sulphonation Plant operations ceased.  
 1977: Phenoxy Plant (Building 48) and waste treatment (Building 60) system constructed.  
 1988: 2,4,5-T formulation ceased. Transesterification of triclopyr commenced.  
 1998: Plant operations ceased.

1986: Chemical leak (release) at TCP Plant, and subsequent renovation.  
 1987: TCP Plant operations ceased and equipment demolished.

1975: Storm water pond constructed.

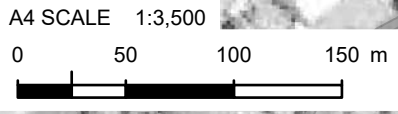
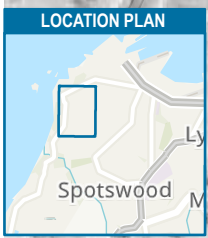
1972: Triazine manufacture commenced within Organophosphate Plant (Building 15).  
 1989: Triazines Plant decommissioned.  
 1992: Solids R&D facility (Building 15) constructed.

1987: Powders Plant constructed (Building 4).  
 1988: Powders Plant operations commenced.  
 1999: Powders Plant operations ceased.

1975: Dangerous Goods Compound (Building 29) late-1980s: Building 68) constructed.

1982: Solids waste incinerator (Building 64) constructed.

1976: Liquids incinerator (Building 30) constructed.  
 1994: Liquids incinerator operations ceased.



**NOTES:**  
 Basemap image sourced from <https://retrolens.co.nz/> dated 2000



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APPROVED	DATE		

CLIENT	<b>DOW CHEMICAL (NZ) LIMITED</b>		
PROJECT	<b>PARITUTU CONTAMINATED LAND ASSESSMENT</b>		
TITLE	PARITUTU SITE KEY ACTIVITIES - 1970-2000		
SCALE (A4)	1:3,500	FIG No.	FIGURE 5.
		REV	0

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CLIENT	<b>DOW CHEMICAL (NZ) LIMITED</b>	
PROJECT	<b>PARITUTU CONTAMINATED LAND ASSESSMENT</b>	
TITLE	PARITUTU SITE KEY ACTIVITIES - 2000-2007	
SCALE (A4)	1:3,500	FIG No. FIGURE 6.
		REV 0

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# LEGEND

Site Boundary

## Hail Areas

A2. Chemical manufacture, formulat on or bulk storage

A3. Commercial analyt cal laboratory sites

A14. Pharmaceut cal manufacture including the commercial manufacture, blending, mixing or formulat on of pharmaceut cals, including animal remedies or the manufacturing of illicit drugs with the potent al for environmental discharges

A17. Storage tanks or drums for fuel, chemicals or liquid waste

B2. Electrial transformers, including manufacturing, repairing or disposal of electrical transformers or other heavy electrical equipment.

B4. Power stat ons, substat ons or switchyards

D5. Engineering workshops with metal fabricat on

E1. Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condit on

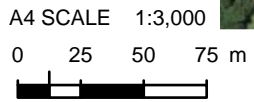
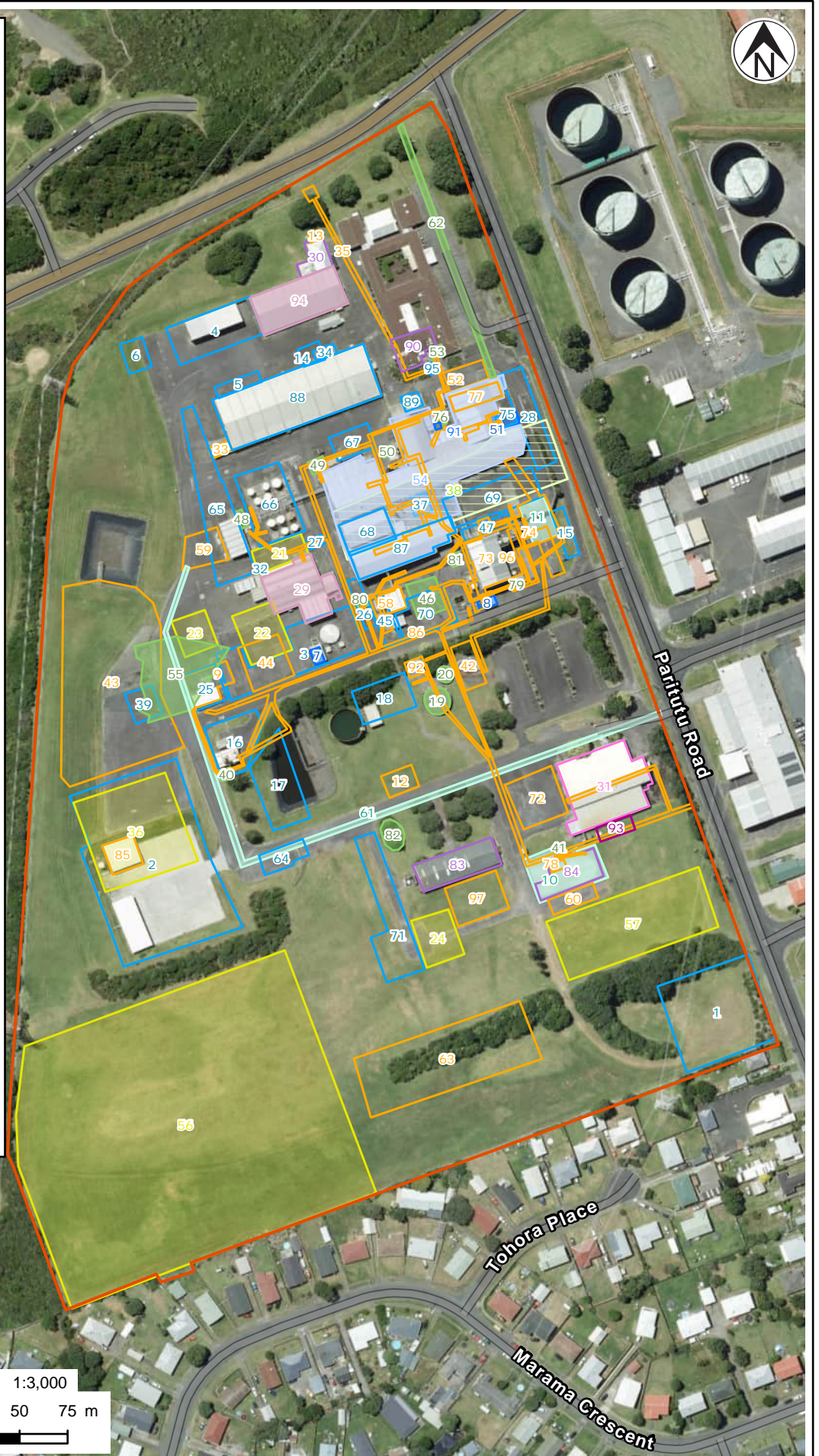
G1. Cemeteries

G5. Waste disposal to land (excluding where biosolids have been used as soil condit oners)

G6. Waste recycling or waste or wastewater treatment

I. Any other land that has been subject to the intent onal or accidental release of a hazardous substance in suf cient quant ty that it could be a risk to human health or the environment

I. Any other land that has been subject to the intent onal or accidental release of a hazardous substance in suf cient quant ty that it could be a risk to human health or the environment



PROJECT No.	21795.0210		
DESIGNED	CHUT	JUN.24	
DRAWN	CHUT	JUN.24	
CHECKED	CHSA	JUN.24	
APPROVED	DATE		

CLIENT	<b>DOW CHEMICAL (NZ) LIMITED</b>		
PROJECT	<b>PARITUTU CONTAMINATED LAND ASSESSMENT</b>		
TITLE	<b>HAIL AREAS - SITE</b>		
SCALE (A4)	1:3,000	FIG No.	FIGURE 7.
		REV	4



Activity ID	Title - Potential Activity	Comments	Prelim_Risk	Risk Comment	Confidence	HAIL_Category	Additional_HAIL_Category	HAIL_Status	Spatial_Accuracy	Accuracy Comment	Source (Record, Appendix C)
1	Drum storage	Former drum storage area in the southeast corner of the site.	Low to moderate	Contaminants dependent on specific contents stored. Concentrations dependent on factors such as integrity of vessels and whether underlying surface were unpaved.	Moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Records 4, 41, 44, 55
2	Drum storage	Former drum storage area within/near Dangerous Goods Compound. Spills in "Dangerous Goods Store" resulting in contaminated material beneath Building 68.	Moderate	Contaminants dependent on specific contents stored/spilt. Concentrations dependent on factors such as integrity of vessels and whether underlying surface were unpaved.	Moderate to high	A17. Storage tanks or drums for fuel, chemicals or liquid waste	G5. Waste recycling or waste or wastewater treatment	Contamination Confirmed	Moderate	Potentially outdated	Records 4, 55, anecdotal evidence
3	Drum storage	Former drum storage area adjacent to liquids incinerator.	Low to moderate	Contaminants dependent on specific contents stored. Concentrations dependent on factors such as integrity of vessels and whether underlying surface were unpaved.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste		Unverified HAIL	Moderate	Potentially outdated	Record 4
4	Drum storage	Known drum storage area. Description of building as "Finished Goods Shelter No 2".	Low to moderate	Chemicals stored within the shelter are likely to have been subject to less leakages.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Record 4
5	Drum storage	Former drum storage area immediately north of finished goods warehouse.	Low to moderate	Contaminants dependent on specific contents stored. Concentrations dependent on factors such as integrity of vessels and whether underlying surface were unpaved.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste		Unverified HAIL	Moderate	Potentially outdated	Record 4
6	Equipment storage	Storage area for redundant/obsolete manufacturing vessels and equipment, including within Building 56.	Moderate	Contaminants dependent on specific manufacturing areas. Concentrations dependent on factors such as integrity of vessels and cleanliness of equipment. Area may be partially unpaved.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low to moderate	Potentially outdated	Records 4, 46, 49, 53, 55
7	Substation	Substation No. 5	Low to moderate	Contamination may have resulted from spills and leaks.	Low to moderate	B4. Power stations, substations or switchyards		Verified HAIL	Moderate	Potentially outdated. Based on building footprint.	Record 4
8	Substation	Substation No. 4	Low to moderate	Contamination may have resulted from spills and leaks.	Low to moderate	B4. Power stations, substations or switchyards		Unverified HAIL	Moderate	Potentially outdated. Based on building footprint.	Record 4
9	Chemical storage/spills	Contaminated soil beneath liquid incinerator building. Stockpiling of contaminated material (refuse, soil/gravel in area).	Moderate to high	Contamination known to be present beneath building.	Moderate to high		I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Based on building and associated compound.	Records 4, 45, 46, 47, 52, 55
10	Asbestos and laboratory activities.	Laboratory demolished in 2014. Confirmed asbestos in buildings. Physical record of demolition.	Moderate	Contamination dependent on nature of demolition, condition of asbestos, and chemical storage/use during laboratory activities.	Moderate	E1. Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition	A3. Commercial analytical laboratory sites	Verified HAIL	Low to moderate.	Likely confined to building footprint, and immediately surrounding land area.	Record 4, (physical) demolition documents

11	Asbestos	Asbestos containing material identified for demolition (2014).	Moderate	Contamination dependent on nature of demolition, condition of asbestos, exposed soil over surrounding areas.	Low to moderate	E1. Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Verified HAIL	Moderate	Likely confined to building footprint, and immediately surrounding land area.	Physical demolition documents
12	Soakage area	Surfactants soak hole.	Unknown		Low	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment		Unverified HAIL	Uncertain		Anecdotal evidence
13	Save-all	Save-all location receiving residues from laboratory.	Moderate	Contaminants dependent on chemicals stored/used in laboratory	Low	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment		Unverified HAIL	Uncertain	Based on anecdotal information	Anecdotal evidence
14	Underground storage tank	Underground storage tank located immediately north of Finished Goods Warehouse and Cafeteria.	Low to moderate	Tanks removed between 1989 and 1991. Limited validation of soils beneath USTs.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Uncertain	Approximate location only	Records 4, 5, 55
15	Underground storage tank	Underground storage tank area may have leaked. May have contained TCP related compounds and/or contaminated solvents. HDPE liner placed below grassed area upon demolition of tanks and bund in 1990s.	Low to moderate	Tanks removed between 1989 and 1991. Limited validation of soils beneath USTs.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Uncertain	Approximate location only	Records 4, 55, 57, anecdotal evidence
16	Solids incinerator	Storage area associated with solids wastes incinerator.	Moderate	Stored material may have included drums and refuse.	Moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Records 4, 55
17	Drum storage	Drum storage area southeast of solids incinerator.	Low to moderate	Contaminants dependent on specific contents stored. Concentrations dependent on factors such as integrity of vessels and whether underlying surface were unpaved.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Record 4
18	Drum storage	Drum storage area east of fire water tank.	Low to moderate	Contaminants dependent on specific contents stored. Concentrations dependent on factors such as integrity of vessels and whether underlying surface were unpaved.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Record 4
19	Tradewaste	Tradewaste equalisation tank	Low to moderate	Tradewaste network has been subject to leaking. Known contamination associated with sewer lines.	Low	G6. Waste recycling or waste or wastewater treatment	Other	Verified HAIL	Moderate	Based on structure footprint.	Record 4
20	Tradewaste	Tradewaste retention tank	Low to moderate	Tradewaste network has been subject to leaking. Known contamination associated with sewer lines.	Low	G6. Waste recycling or waste or wastewater treatment	Other	Verified HAIL	Moderate	Based on footprint of structure	Record 4

21	Onsite burial	Historical burial area located north of Maintenance building.	Moderate to high	Contamination dependent on the nature of the fill materials used.	Low to moderate	G5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Record 4, 44
22	Onsite burial	Historical burial area located southwest of Maintenance building.	Moderate to high	Contamination dependent on the nature of the fill materials used.	Low to moderate	G5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Record 4, 44
23	Onsite burial	Historical burial area located north of liquids incinerator.	Moderate to high	Contamination dependent on the nature of the fill materials used.	Low to moderate	G5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Record 4, 44
24	Onsite burial	Historical burial area located southwest of disused laboratory.	Moderate to high	Contamination dependent on the nature of the fill materials used.	Low to moderate	G5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Record 4, 44
25	Underground storage tanks	Two (largely subsurface) liquid waste tanks within Building 30. Underground storage tank located immediately north of liquids incinerator building.	Low to moderate	Liquid waste tanks supplied to incinerators. One tank was demolished in 2000. The other was used until site closure and removed during building demolition. Tank cavities were back filled and capped with concrete. Tanks removed between 1989 and 1991.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Uncertain	Approximate location only	Records 4, 5, anecdotal information
26	Underground storage tank	Underground storage tank area located west of powders plant.	Low to moderate	Tanks removed between 1989 and 1991. Limited validation of soils beneath USTs.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Uncertain	Approximate location only	Records 4, 5, 55
27	Underground storage tank	Underground storage tank area. Located northeast of maintenance building.	Low to moderate	Tanks removed between 1989 and 1991. Limited validation of soils beneath USTs.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Uncertain	Approximate location only	Record 4
28	Underground storage tank	Series of underground storage tanks for various chemical (including solvents).	Moderate to High	Tanks removed between 1989 and 1991. Limited validation of soils beneath USTs. May have been subject to leaking. Odour noted when a nearby Monitoring Well (MW16) was drilled.	Moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated. Approximate location only.	Record 4, 55, 57, anecdotal evidence
29	Engineering workshop	Building within Central portion of the site described as "Maintenance" building.	Low	HAIL categorisation is conservative. Potential chemical storage/use associated with engineering activities within building.	Low	D5. Engineering workshops with metal fabrication	A17. Storage tanks or drums for fuel, chemicals or liquid waste	Unverified HAIL	Moderate	Limited to workshop area - if confirmed as workshop	Record 4, 26
30	Laboratory and chemical storage	Based on building description of "Laboratory/Storage". Chemical storage/use based on laboratory activities within the northeastern section of Building 07.	Unknown		Low	A3. Commercial analytical laboratory sites	A17. Storage tanks or drums for fuel, chemicals or liquid waste	Unverified HAIL	Moderate	Based on building footprint	Record 4, anecdotal evidence

	Pharmaceutical manufacture 31 /chemical storage	Chemical storage/use based on former vet medical manufacture. Area recently used for "storage/packaging".	Unknown		Low	A14. Pharmaceutical manufacture including the commercial manufacture, blending, mixing or formulation of pharmaceuticals, including animal remedies or the manufacturing of illicit drugs with the potential for environmental discharges		Unverified HAIL	Moderate	Based on building footprint	Record 4, 5
	32 Chemical (oil) storage	Based on name of building "Oil Store".	Low		Low	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low	Based on building footprint	Record 4
	33 Chemical spill/vehicle workshop	Based on description of building as Fork Truck Garage	Low to moderate	Workshop activities considered unlikely as they Building was primarily used for charging forklift batteries. Additionally, fork trucks were known to have been used to transport wastes, which may have resulted in contaminated equipment.	Low		I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Based on building footprint	Record 4
	34 Chemical storage	Potential chemical storage within/near building. Based on descriptions of 'despatch store' and 'finished goods warehouse and cafeteria'.	Low		Low	A17. Storage tanks or drums for fuel, chemicals or liquid waste		Unverified HAIL	Uncertain	Based on building footprint	Records 4, 26
	35 Tradewaste	Tradewaste sewer network coming from the Old Phenoxy Plant (Building 03) and discharge point at northern boundary. Subject to leaking.	Moderate to high	Network has been subject to leaking. Known contamination associated with sewer lines.	Moderate to high		I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low to moderate	Based on indicative pipe alignment.	Records 4, 55, anecdotal evidence
	36 Onsite burial	Potential "remaining" burial site of waste drums. Waste drums also stored in Dangerous Goods Compound - contained dioxins. Small leaks from drum corrosion.	Moderate	Contamination dependent on the nature of the fill materials used. Drums in Dangerous Goods Compound in poor condition and subject to leaking.	Low to moderate	G5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated.	Records 4, 44, anecdotal evidence
	37 Underground storage tank	Underground storage tank. Approximate location within Building 03.	Low to moderate	Tanks removed between 1989 and 1991. Limited validation of soils beneath USTs.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low	Potentially outdated. Approximate location only.	Records 4, 5, anecdotal information
	38 Potential Waahi Tapu area	Approximate location and extent of site known to be associated with Urupa (cemetery) and Pa (historic villages). HAIL categorisation is conservative.	Unknown		Low	G1. Cemeteries		Unverified HAIL	Moderate	Potentially outdated. Approximate location only.	Records 6, 36
	39 Chemical storage	Former Anisole Waste Storage Tank (AST)	Unknown	Disused bulk anisole storage tank. Deconstructed in the early 1990s.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Based on building footprint.	Records 4
	40 Save-all	Save-all location southwest of solids incinerator.	Low to moderate	Contaminants dependent on materials at solids incinerator.	Moderate to high	G6. Waste recycling or waste or wastewater treatment	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated. Approximate location only.	Record 4, 55, anecdotal evidence

41	Save-all	Save-all location immediately north of research lab library (former pilot plant).	Low to moderate	Contaminants dependent on chemicals stored/used in laboratory (and pilot plant).	Low to moderate	G6. Waste recycling or waste or wastewater treatment	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated. Approximate location only.	Record 4, 55, anecdotal evidence
42	Chemical spills	Potential contamination beneath structures associated with brine extraction area.	Moderate to high	Documentation suggest ground contamination beneath this building. Presumed to be associated with the tradewaste network.	Moderate	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment		Unverified HAIL	Moderate	Based on building footprint	Records 4, 55, anecdotal evidence
43	Historic infilling and stormwater collection	Building material appears to have been used as fill in this area, with some bore logs from drilling locations in this area indicate presence of fill (building materials).	Moderate	Identified as a "higher risk area" in previous reporting. Historic soil sampling has reported concentrations at depth.	High	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment		Contamination Confirmed	Uncertain	Approximate location/extent only	Records 4, 18, 50, 55
44	Chemical spills	Area surrounding Building 63, where solvent damage of an underground waterpipe may have occurred.	Unknown	Understood to have been replaced in 1970s due to corrosion. Mentioned potential contaminants are solvents and xylene.	Low	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	G6. Waste recycling or waste or wastewater treatment	Unverified HAIL	Low	General location is thought to be Building 63 (site services office).	Anecdotal evidence
45	Save-all	Location of underground save-alls near protectants plant and powders, triazines plant.	Low to moderate	Contaminants dependent on chemicals stored/used in associated plants.	Moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate to high	Approximate location understood to be located West/Southwest of powders plant.	Record 4, anecdotal evidence
46	Chemical spills	Potential spills/leaks associated with the waste water treatment (brine extraction) process, including a save-all.	Moderate	Waste water treatment process understood to have been demolished in 1990's.	Moderate	G6. Waste recycling or waste or wastewater treatment	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low to moderate	Potential contamination beneath the west bund of Building 48.	Record 55, anecdotal evidence
47	Chemical storage	Understood to be a bulk storage area for sulphur for old sulphonation plant. Located "behind retaining wall between top yard and Building 48".	Unknown		Low	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Uncertain	Approximate location only	Anecdotal evidence
48	Save-all	Save-all location adjacent to drum processing plant.	Low to moderate	Contaminants dependent on chemicals stored/used in associated plants.	Moderate	G6. Waste recycling or waste or wastewater treatment	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Approximate location only	Record 4, anecdotal evidence
49	Save-all	Save-all location northwest of Building 03, for herbicides formulations plant.	Moderate to high	Contaminants dependent on chemicals stored/used in associated plants.	Low to moderate	G6. Waste recycling or waste or wastewater treatment	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Approximate location only	Record 4, anecdotal evidence
50	Save-all	Save-all location north of Building 03, for surfactants/insecticides plant.	Moderate to high	Contaminants dependent on chemicals stored/used in associated plants.	Low to moderate	G6. Waste recycling or waste or wastewater treatment	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Approximate location only	Record 4, anecdotal evidence

51	Substation	Old substation area located immediately west of phenoxy plant.	Low to moderate	Contamination may have resulted from spills and leaks from substation and/or adjacent manufacturing activities.	Low to moderate	B4. Power stations, substations or switchyards	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low to moderate	Potentially outdated. Based on building footprint.	Record 4, anecdotal evidence
52	Save-all and chemical spills	Possible save-all and spill area located north of phenoxy plant.	Moderate	Anecdotal information of save-all overflows and spill area for phenoxies and solvents.	Low	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	G6. Waste recycling or waste or wastewater treatment	Unverified HAIL	Low	Based on anecdotal information	Anecdotal evidence
53	Save-all	Save-all location at southern boundary of laboratory/administration building.	Low to moderate		Low to moderate	G6. Waste recycling or waste or wastewater treatment	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low	Approximate location only	Record 4
54	Chemical manufacture	Phenoxy plant. Known areas of chemical storage/use.	High	Possible contamination (odour) from exposed soil when recently demolished. Building material impacted with (potentially) contaminated dust from manufacture processes.	Moderate to high	A2. Chemical manufacture, formulation or bulk storage	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Based on building footprints	Records 4, 26, 55, anecdotal evidence
55	Former stormwater pond ("lagoon")	Small unlined pond ("lagoon") which may have received anything spilled on site before modern SW ponds (SV-9000/9100) were built.	Moderate	Received stormwater from manufacturing areas. Allegations of cyanuric chloride drums depressurised with rifle shooting over this area.	High	G6. Waste recycling or waste or wastewater treatment	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low to moderate	Approximate location only	Records 4, 50, 55, anecdotal evidence
56	Onsite burial and drum storage	Multiple (potential) burial areas and drum storage areas in south west corner.	Moderate	Contamination dependent on the nature of the fill materials used, and specific contents stored. Concentrations dependent on factors such as integrity of vessels and whether surface areas were unpaved.	Low	G5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low	Approximate location/extent only	Anecdotal evidence
57	Onsite burial	Historical burial area located southeast of Building 20.	Moderate to high	Contamination dependent on the nature of the fill materials used.	Low to moderate	G5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low to moderate	Potentially outdated	Record 4, anecdotal evidence
58	Chemical spills/storage	Ground contamination from a xylene tank outside Building 15.	Moderate to high	Evidence of contamination noted during excavations.	Moderate	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	A17. Storage tanks or drums for fuel, chemicals or liquid waste	Unverified HAIL	Low to moderate	Located immediately west of Building 15	Record 55, anecdotal evidence
59	Drum storage	Storage of empty drums adjacent to Building 25 (described as "drum processing").	Low to moderate	Contaminants dependent on specific contents stored. Concentrations dependent on factors such as integrity of vessels and whether underlying surface were unpaved.	Low to moderate	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	A17. Storage tanks or drums for fuel, chemicals or liquid waste	Unverified HAIL	Moderate	Potentially outdated	Record 4, anecdotal evidence
60	Contaminated material storage	Excavated (contaminated) soil and rubble stored immediately south of Building 20.	Moderate	Material indicated to have been stored on hardstand area.	Low to moderate	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment		Contamination Confirmed	Low to moderate	Potentially outdated	Record 47, anecdotal evidence

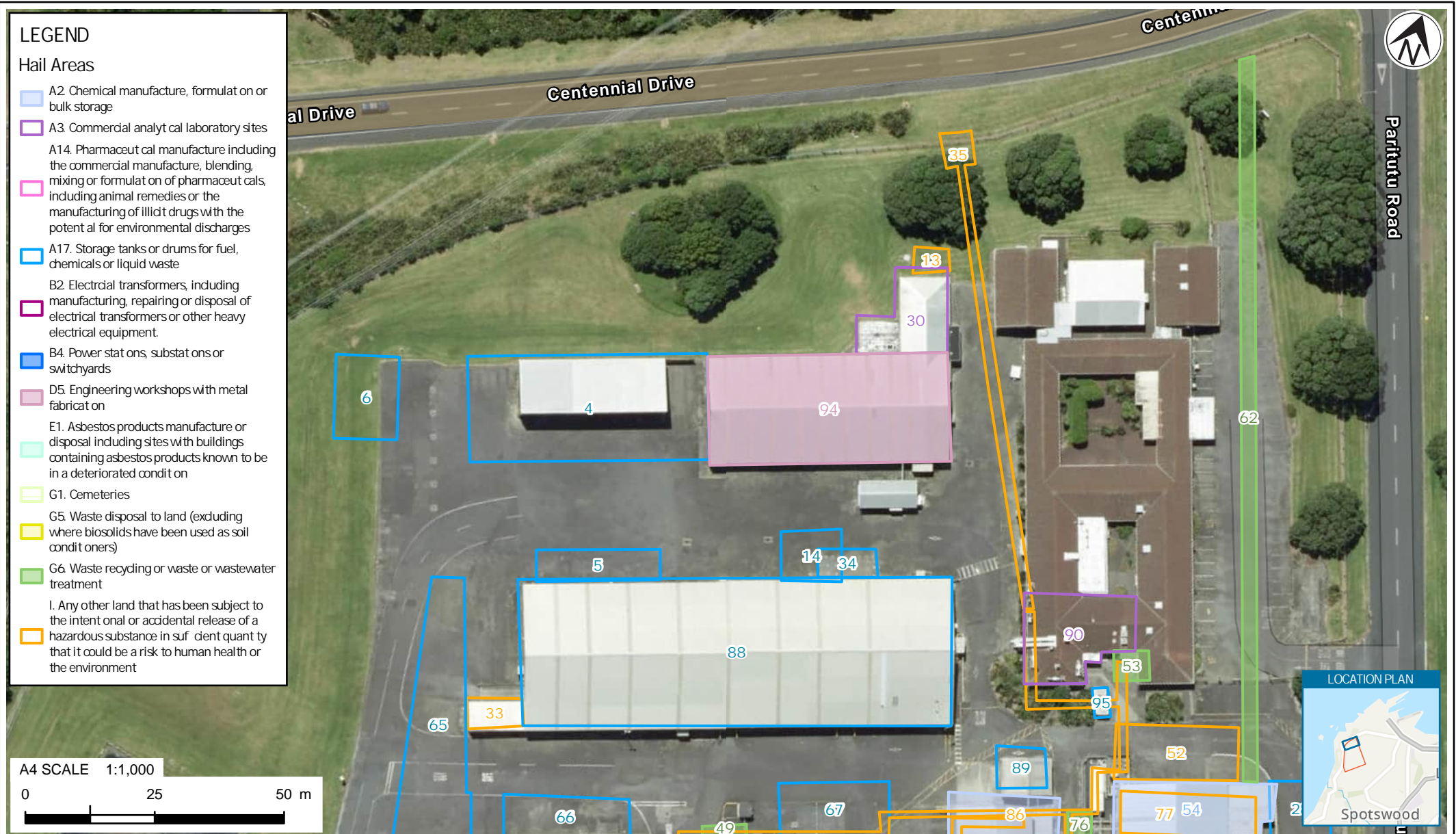
61	Asbestos	Underground asbestos water pipe- from Gate 1 to lagoon/sump area. Updated to plastic pipe in 1980s/1990s	Low to moderate	Dependent on nature of demolition (removal) and condition of pipe. Understood to constructed of fibrolite. Instead of leaving the site under Gate 1, the pipe may follow the trade waste network down to Building 20 and South of Building 18	Low	E1. Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low	Based on anecdotal information	Anecdotal evidence
62	Stormwater	Indicate layout of a stormwater network from the corner of the old phenoxy plant.	Low		Low	G6. Waste recycling or waste or wastewater treatment	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low	Based on anecdotal information	Anecdotal evidence
63	Historic infilling	Historic infilling utilising demolition (building) material near the southern boundary.	Low to moderate		Low to moderate	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment		Unverified HAIL	Low to moderate		Record 55
64	Drum storage	Former drum storage area east of the Dangerous Goods Compound.	Low to moderate	Contaminants dependent on specific contents stored. Concentrations dependent on factors such as integrity of vessels and whether underlying surface were unpaved.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Record 4
65	Drum storage	Drum and chemical storage area. Nearby building identified as Building 59 - "Dangerous Goods (P.P)"	Low to moderate	Contaminants dependent on specific contents stored. Concentrations dependent on factors such as integrity of vessels and whether underlying surface were unpaved.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Record 4, 26
66	Chemical storage	Above ground bulk chemical storage area (formulations tank farm).	Low to moderate		Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Record 4, 26
67	Drum storage	Former drum storage area north of formulations plant.	Low to moderate	Contaminants dependent on specific contents stored. Concentrations dependent on factors such as integrity of vessels and whether underlying surface were unpaved.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Record 4
68	Drum storage	Former drum storage area within Building 03.	Low to moderate	Contaminants dependent on specific contents stored. Concentrations dependent on factors such as integrity of vessels and whether underlying surface were unpaved.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Record 4
69	Drum storage	Former drum storage area south of old phenoxy plant.	Low to moderate	Contaminants dependent on specific contents stored. Concentrations dependent on factors such as integrity of vessels and whether underlying surface were unpaved.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Record 4
70	Drum storage	Former drum storage area southwest of powders plant.	Low to moderate	Contaminants dependent on specific contents stored. Concentrations dependent on factors such as integrity of vessels and whether underlying surface were unpaved.	Low to moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Record 4

71	Drum storage and historic infilling	Former drum storage area west/southwest of disused laboratory. Raw materials encountered during installation of a stormwater line.	Low to moderate	Contaminants dependent on specific contents stored. Concentrations dependent on factors such as integrity of vessels and whether underlying surface were unpaved. Materials believed to be sourced from protectants plant.	Moderate	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Potentially outdated	Record 4, 55
72	Chemical spills and drum storage	Drum storage and washdown area for exhumed drums.	Moderate to high	Cleaning (washdown) carried out on non-hardstand area, with wash water soaking to ground.	Moderate	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	A17. Storage tanks or drums for fuel, chemicals or liquid waste	Unverified HAIL	Moderate	Potentially outdated. Approximate location only.	Record 4, 55, anecdotal evidence
73	Chemical storage/spills	Possible contamination beneath Building 48 and associated infrastructure (including associated tradewaste network). Chemical storage within phenoxy plant.	Moderate to high	Contamination may be present beneath building.	Low to moderate	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	A17. Storage tanks or drums for fuel, chemicals or liquid waste	Unverified HAIL	Moderate	Based on building footprint and associated infrastructure	Records 4, 26, 55, anecdotal evidence
74	Chemical spills	Confirmed (TCDD) contamination beneath building and associated infrastructure (tradewaste network, and/or underground TCP Transfer line).	High	Previous soil sampling has recorded elevated concentrations within soil.	Moderate to high	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	A17. Storage tanks or drums for fuel, chemicals or liquid waste	Contamination Confirmed	Moderate to high	Potentially outdated	Record 4, 47, 55, anecdotal evidence
75	Chemical spills/storage	Bulk storage area located immediately east of old phenoxy plant.	Low to moderate		Low	A17. Storage tanks or drums for fuel, chemicals or liquid waste	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low		Record 55
76	Save-all	Save-all location at north of old phenoxy plant.	Moderate	Contaminants dependent on chemicals stored/used in phenoxy plant.	Low to moderate	G6. Waste recycling or waste or wastewater treatment	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low	Approximate location only	Record 4, 55, anecdotal evidence
77	Chemical spills	Area of old phenoxy plant subject to potential contamination (spills). Potentially beneath floor.	Moderate	Odours identified beneath floor over wider building footprint.	Moderate	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment		Unverified HAIL	Low		Record 55
78	Chemical spills	Area of pilot plant subject to potential contamination (spills). Potentially beneath floor.	Moderate		Low to moderate	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment		Unverified HAIL	Low		Record 55
79	Save-all	Save-all location immediately southeast of phenoxy plant.	Low to moderate	Contaminants dependent on chemicals stored/used in associated plants.	Low to moderate	G6. Waste recycling or waste or wastewater treatment	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low to moderate	Approximate location only	Record 4
80	Save-all	Save-all location immediately southwest of powders plant.	Low to moderate	Contaminants dependent on chemicals stored/used in associated plants.	Low to moderate	G6. Waste recycling or waste or wastewater treatment	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low to moderate	Approximate location only	Record 4



81	Save-all	Save-all location immediately west of phenoxy plant.	Low to moderate	Contaminants dependent on chemicals stored/used in associated plants.	Low to moderate	G6. Waste recycling or waste or wastewater treatment	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low to moderate	Approximate location only	Record 4	
82	Soakage area	Former stormwater manhole	Moderate	Previous reporting identified as a 'higher risk area'.	Low to moderate	G6. Waste recycling or waste or wastewater treatment	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low	Approximate location only	Record 4	
83	Laboratory and chemical storage	Based on building description as "disused laboratory".	Unknown		Low	A3. Commercial analytical laboratory sites		Unverified HAIL	Moderate	Based on building footprint	Record 4	
84	Laboratory and chemical storage/manufacture	Based on building description as 'Pilot Plant, Laboratory, chemical storage and Research lab library'. High purity TCP was developed in Building 20 for pharmaceutical purposes.	Unknown		Low	A3. Commercial analytical laboratory sites	A2. Chemical manufacture, formulation or bulk storage	Unverified HAIL	Moderate	Based on building footprint	Record 4, anecdotal evidence	
85	Chemical storage/spills	Contaminated soil beneath Building 68 within Dangerous Goods Compound.	Moderate to high	Area known to be contaminated, concentrations unconfirmed.	Moderate		I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Moderate	Based on building footprint	Record 4, 55	
86	Tradewaste	Indicative layout of the trade waste/sewer network across the site. Known to have contaminated soil near the TCP Plant.	Moderate to high	Previous soil sampling has recorded elevated concentrations within soil (near TCP plant).	Moderate		I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	G6. Waste recycling or waste or wastewater treatment	Unverified HAIL	Moderate to low	Based on indicative pipe alignment.	Record 55, 26, 23, 22.2
87	Chemical storage/spills	Chemical storage with building. Based on description of 'formulations plant'.	Low to moderate		Low	A17. Storage tanks or drums for fuel, chemicals or liquid waste		Unverified HAIL	Moderate	Based on building footprint	Record 26	
88	Chemical storage	Chemical storage with building. Based on description of 'despatch store'.	Low to moderate	Building used for storage of finished goods prior to leaving site.	Low	A17. Storage tanks or drums for fuel, chemicals or liquid waste		Unverified HAIL	Moderate	Based on building footprint	Record 26	
89	Chemical storage	Known chemical storage with building. Based on description of 'sample despatch store'.	Low to moderate		Low	A17. Storage tanks or drums for fuel, chemicals or liquid waste		Unverified HAIL	Moderate	Based on building footprint	Record 26	
90	Laboratory	Based on description of the area as 'Laboratory'	Low to moderate		Low	A3. Commercial analytical laboratory sites		Unverified HAIL	Moderate	Based on building footprint	Record 26, anecdotal evidence	

91	Substation	Old substation located immediately north of the Old Phenoxy Plant.	Low to moderate	Contamination may have resulted from spills and leaks from substation and/or adjacent manufacturing activities.	Low to moderate	B4. Power stations, substations or switchyards	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low to moderate	Potentially outdated. Based on building footprint.	Anecdotal evidence
92	Tradewaste	Approximate location of tradewaste under/over separator.	Moderate to high	Cleaned, backfilled and capped with concrete during demolition.	Low to moderate	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	G6. Waste recycling or waste or wastewater treatment	Unverified HAIL	Moderate	Based on approximate building footprint location.	Anecdotal evidence
93	Electrical transformer	Approximate location of transformer immediately south of Building 18.	Unknown	Contamination may have resulted from spills and leaks to ground.	Low	B2. Electrical transformers, including manufacturing, repairing or disposal of electrical transformers or other heavy electrical equipment.	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Unverified HAIL	Low	Precise location unknown	Anecdotal evidence
94	Engineering workshop	Based on former use of Building 07 for production of spray equipment.	Low to moderate	Contamination may have resulted from storage or use (spills) of chemicals from manufacturing (e.g. metal fabrication), or general workshop activities.	Low	D5. Engineering workshops with metal fabrication		Unverified HAIL	Moderate	Based on anecdotal information	Anecdotal evidence
95	Chemical storage	Based on description of area as 'Dangerous Goods Stores'. Known chemical storage area (Buildings 36 and 51).	Unknown		Low	A17. Storage tanks or drums for fuel, chemicals or liquid waste		Unverified HAIL	Moderate	Based on anecdotal information.	Anecdotal evidence
96	Firefighting foam (PFAS)	Based on anecdotal reporting and Building 52 being listed as a Sprinkler Station.	Unknown	Contamination could have resulted from spills and leaks, or from training or emergency use of the foam	Low	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment		Unverified HAIL	Moderate	Based on anecdotal information.	Anecdotal evidence
97	Contaminated material storage	Excavated (potentially contaminated) soil and rubble stored immediately south of Building 19.	Moderate	Contamination may have resulted from spills and leaks from substation and/or adjacent manufacturing activities.	Moderate	I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment		Unverified HAIL	Moderate to high	Potentially outdated	Anecdotal evidence, aerial image



**NOTES:**

World Imagery: LINZ, NZ Topographic - Basemap Only: Eagle, LINZ, StatsNZ, OSM  
Hybrid Reference Layer: Esri Community Maps Contributors, LINZ, Stats NZ, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, NZ Topographic - Reference Labels: Eagle, OSM

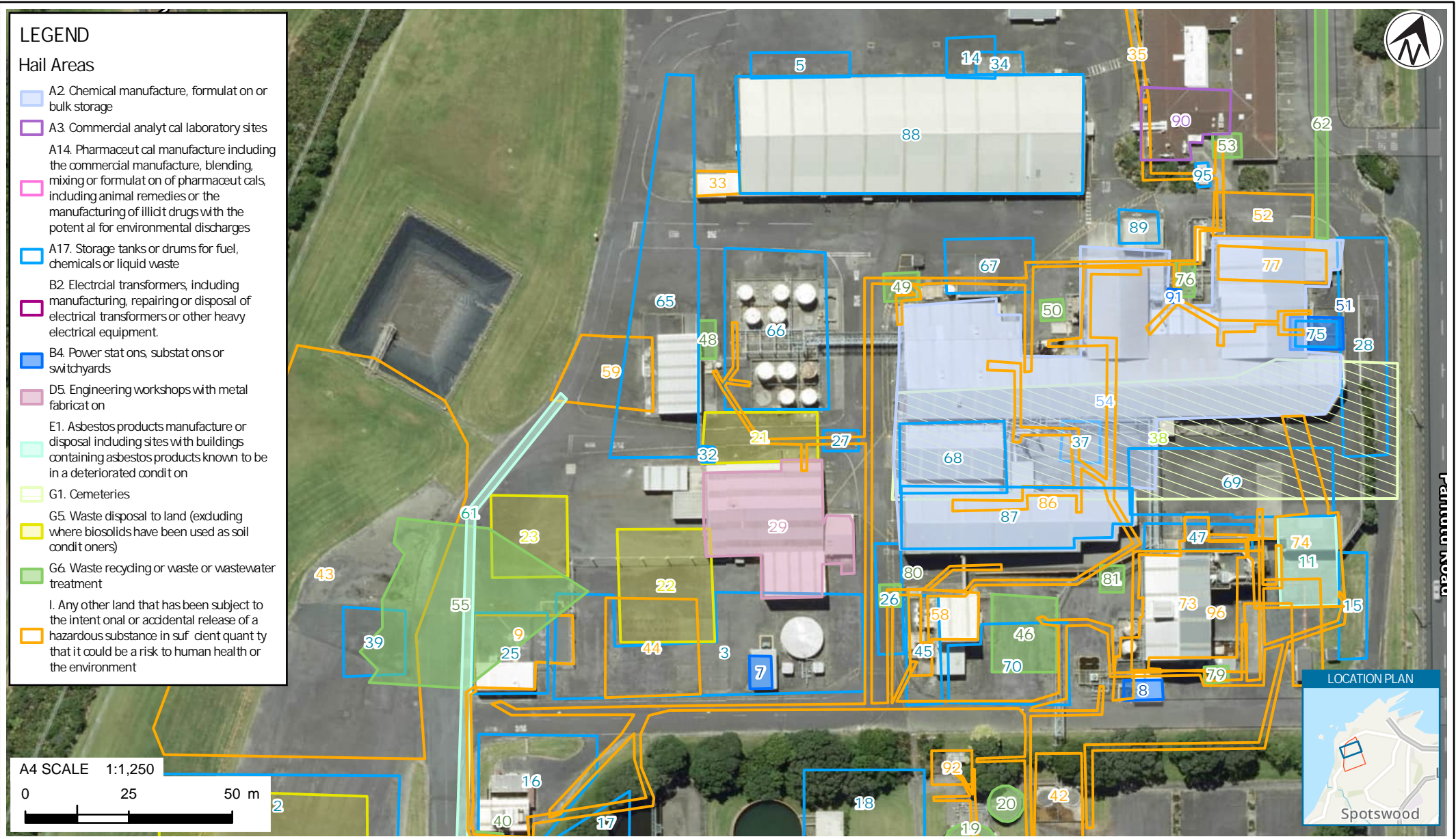
**REVISIONS**

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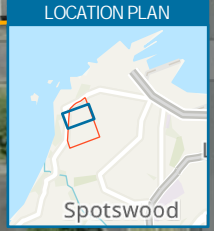
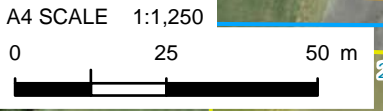
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4	CHUT		

<b>CLIENT</b>	<b>DOW CHEMICAL (NZ) LIMITED</b>
<b>PROJECT</b>	<b>PARITUTU CONTAMINATED LAND ASSESSMENT</b>
<b>TITLE</b>	<b>HAIL AREAS - NORTH</b>

APPROVED DATE

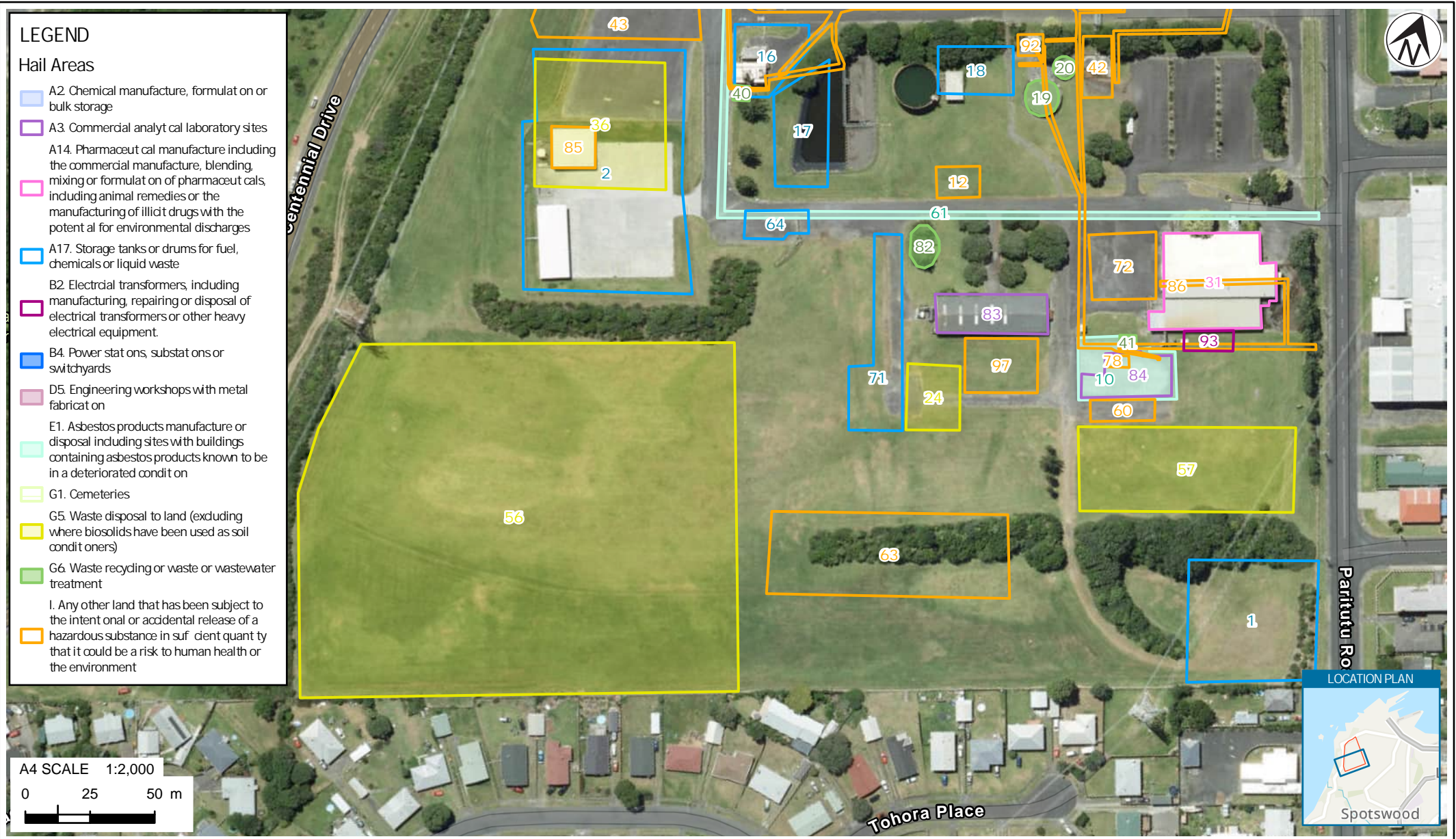


- ### LEGEND
- #### Hail Areas
- A2. Chemical manufacture, formulation or bulk storage
  - A3. Commercial analytical laboratory sites
  - A14. Pharmaceutical manufacture including the commercial manufacture, blending, mixing or formulation of pharmaceuticals, including animal remedies or the manufacturing of illicit drugs with the potential for environmental discharges
  - A17. Storage tanks or drums for fuel, chemicals or liquid waste
  - B2. Electrical transformers, including manufacturing, repairing or disposal of electrical transformers or other heavy electrical equipment
  - B4. Power stations, substations or switchyards
  - D5. Engineering workshops with metal fabrication
  - E1. Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition
  - G1. Cemeteries
  - G5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)
  - G6. Waste recycling or waste or wastewater treatment
  - I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment



NOTES:	REVISIONS	NO.	BY	PROJECT No.	21795.0210		
World Imagery: LINZ, NZ Topographic - Basemap Only: Eagle, LINZ, StatsNZ, OSM Hybrid Reference Layer: Esri Community Maps Contributors, LINZ, Stats NZ, Esri, TomTom, Garmin, Foursquare, METI/MASA, USGS, NZ Topographic - Reference Labels: Eagle, OSM	First version (22/09/23)	0	JORB	DESIGNED	JORB	JUN.24	
	Second version (29/09/23)	1	CHUT	DRAWN	CHUT	JUN.24	
	Third version (02/11/23)	2	JORB	CHECKED	CHSA	JUN.24	
	Fifth version (19/06/24)	4	CHUT				
				APPROVED		DATE	

CLIENT	<b>DOW CHEMICAL (NZ) LIMITED</b>		
PROJECT	<b>PARITUTU CONTAMINATED LAND ASSESSMENT</b>		
TITLE	<b>HAIL AREAS - CENTRAL</b>		
SCALE (A4)	1:1,250	FIG No.	FIGURE 7.2
REV	4		

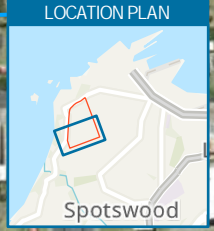


**LEGEND**

**Hail Areas**

- A2. Chemical manufacture, formulation or bulk storage
- A3. Commercial analytical laboratory sites
- A14. Pharmaceutical manufacture including the commercial manufacture, blending, mixing or formulation of pharmaceuticals, including animal remedies or the manufacturing of illicit drugs with the potential for environmental discharges
- A17. Storage tanks or drums for fuel, chemicals or liquid waste
- B2. Electrical transformers, including manufacturing, repairing or disposal of electrical transformers or other heavy electrical equipment
- B4. Power stations, substations or switchyards
- D5. Engineering workshops with metal fabrication
- E1. Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition
- G1. Cemeteries
- G5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)
- G6. Waste recycling or waste or wastewater treatment
- I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment

A4 SCALE 1:2,000  
 0 25 50 m



**NOTES:**

NZ Topographic - Basemap Only: Eagle, LINZ, StatsNZ, OSM Hybrid Reference Layer: Esri Community Maps Contributors, LINZ, Stats NZ, Esri, TomTom, Garmin, Foursquare, IVETI/ NASA, USGS, World Imagery, Maxar, NZ Topographic - Reference Labels: Eagle, OSM

**REVISIONS**

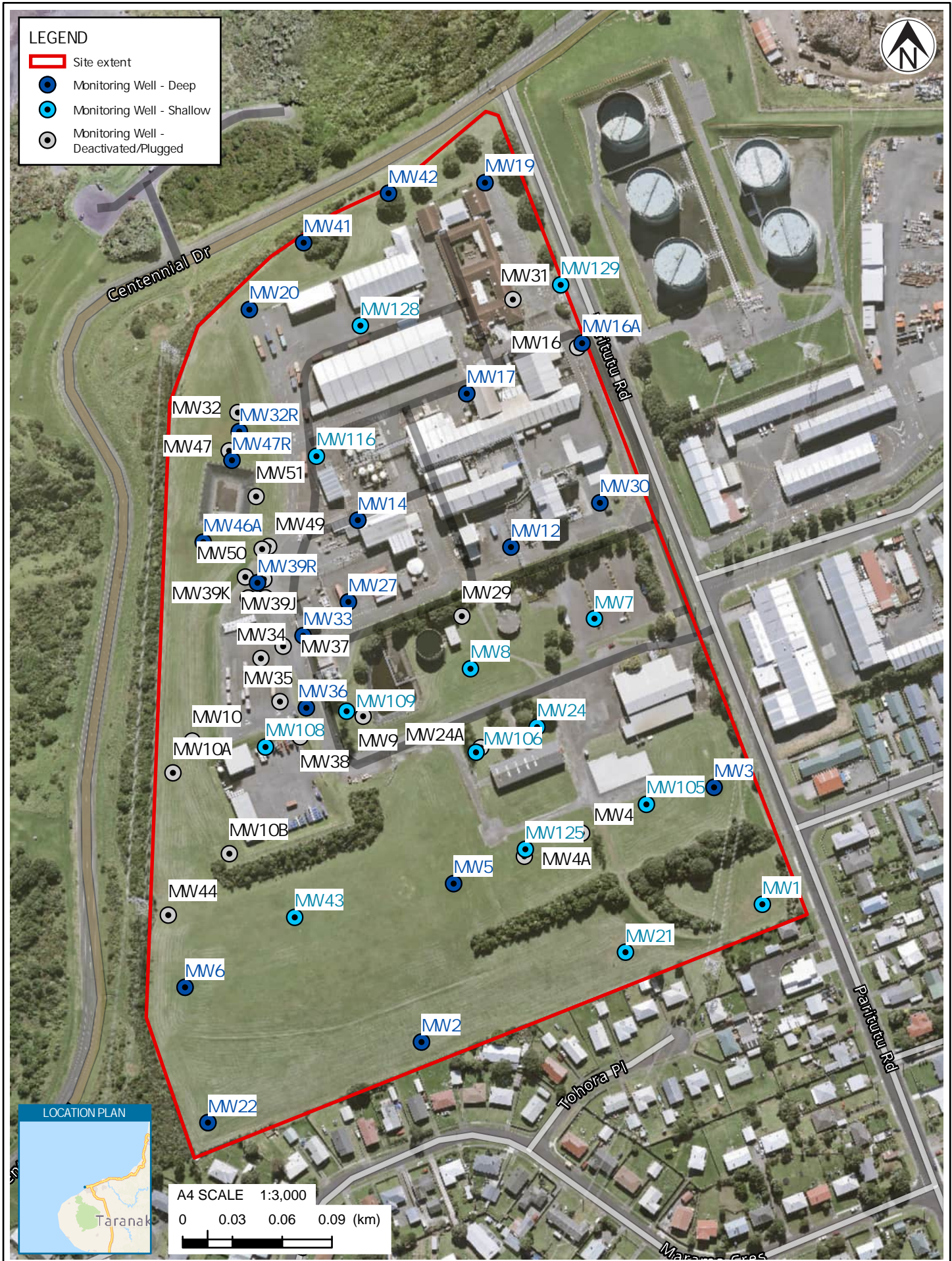
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PROJECT No.	21795.0210		
DESIGNED	JORB	JUN.24	
DRAWN	CHUT	JUN.24	
CHECKED	CHSA	JUN.24	

CLIENT	<b>DOW CHEMICAL (NZ) LIMITED</b>
PROJECT	<b>PARITUTU CONTAMINATED LAND ASSESSMENT</b>
TITLE	<b>HAIL AREAS - SOUTH</b>

APPROVED DATE

SCALE (A4) 1:2,000 FIG No. **FIGURE 7.3** REV 4



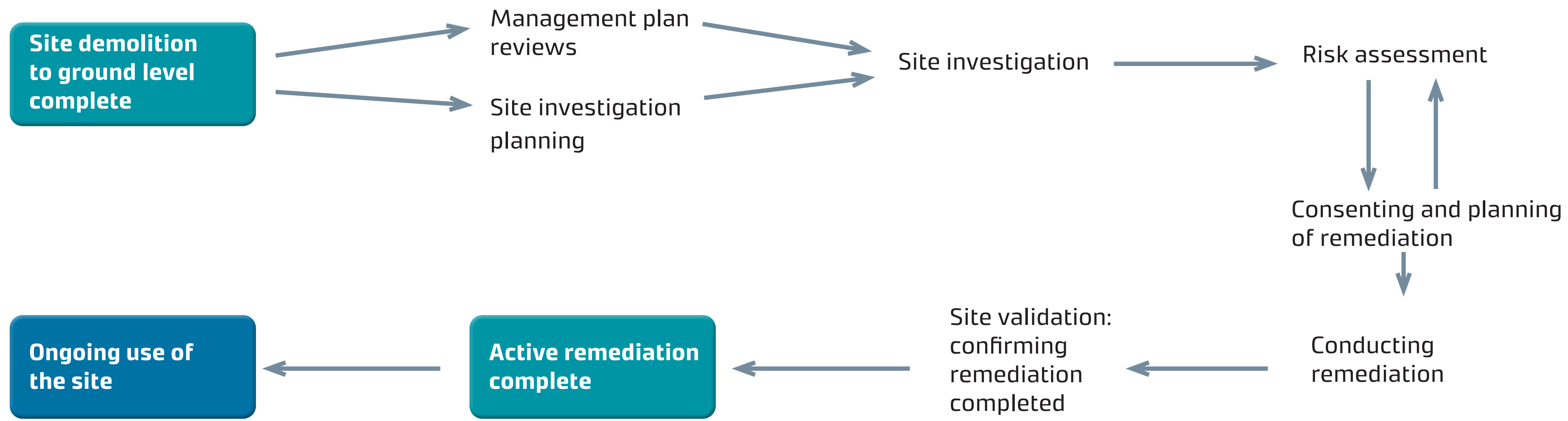
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DRAWN	BRAL	SEP.22
CHECKED		
APPROVED	DATE	

CLIENT	<b>DOW CHEMICAL (NEW ZEALAND) LTD</b>	
PROJECT	<b>PARITUTU ROAD, NEW PLYMOUTH</b>	
TITLE	<b>SITE AND MONITORING WELL LOCATION PLAN</b>	
SCALE (A4)	1:3,000	FIG No. FIGURE 8.
		REV 0

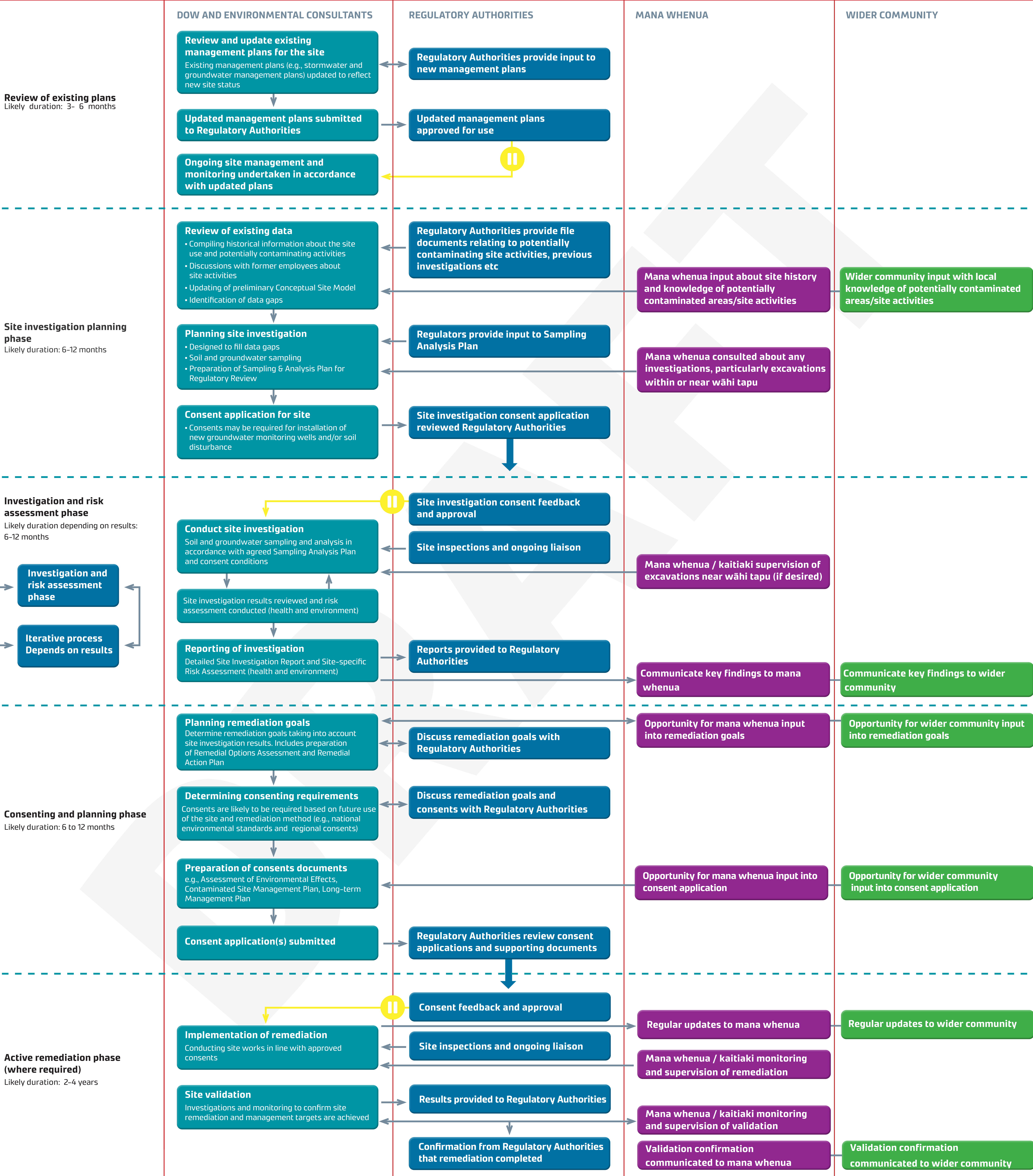
## **Appendix B      Remediation Roadmap**

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# DRAFT REMEDIATION ROAD MAP FOR DISCUSSION - OVERVIEW



## Demolition completed to ground level



## Active remediation completed

**Ongoing use of the site**  
 Long-term site management and monitoring as required



## **Appendix C      Research Record**

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Document number	Onsite/offsite	Document Name	Year	Author	Client	Summary of document purpose
1	Onsite	1. Groundwater Modelling Report - Electrical Resistivity_1996	1996	Groundwater Technology (NZ)	DowElanco (NZ) Limited	An Electrical Resistivity survey undertaken at Paritutu to delineate the lateral and vertical extent of the andesite.
2	Onsite	2. Groundwater Modelling Report_Paritutu_1996	1996	Groundwater Technology (NZ)	DowElanco (NZ) Limited	Collection of baseline GW quality data to include in a fate and transport model. Development of a groundwater flow model and development of a predictive fate and transport model for chlorophenol and Phenoxies.
3	Onsite	3. Site Specific Screening Levels_Groundwater_2012	2012	ERM	Dow AgroSciences (NZ) Ltd	Develop water quality site specific screening levels for chemicals detected in GW at the Paritutu site for which there were no ANZECC water quality guidelines for. The SSSLs were used to screen groundwater data collected as part of the sites GMP and identify CoC that could pose a risk to ecological receptors downgradient of the site.
4	Onsite	4. Interpretive Groundwater Report _2014	2014	ERM	Dow AgroSciences (NZ) Ltd	A single technical reference document to support discussion with future stakeholders. Provide a CSM and assessment of data gaps and provide a confident basis for scoping further investigation.
5	Offsite	5. offsite human health risk assessment_2014	2014	ERM	Dow AgroSciences (NZ) Ltd	To provide communication with stakeholders about the human health risks to offsite receptors.
6	Onsite	6. Shallow Soil and GW Environmental Site Assessment	2015	ERM	Dow AgroSciences (NZ) Ltd	Assessment of shallow soil and groundwater quality in the key potential contamination source areas and assesses the significance of the shallow soil and groundwater contamination with respect to human and environmental receptors.
7	Onsite	7. Soil Investigation of Dangerous Goods Compounds_2017	2017	ERM	Dow AgroSciences (NZ) Ltd	Assessment of shallow soil quality within the dangerous goods compound, informing disposal options.
8	Onsite	8. Groundwater flow and transport model_2018	2018	ERM	Dow AgroSciences (NZ) Ltd	To provide an understanding of the 3D groundwater flow. Identify potential environmental receptors. Conduct conservative estimates of long term contaminant fate and transport using indicators for phenoxy acids and chlorophenols.
9	Onsite	9. 2021.02.04_21795.GMEReport.ISSUED	2021	T+T	Dow AgroSciences (NZ) Ltd	Annual groundwater sampling in accordance with the groundwater monitoring plan (GMP).
10	Onsite	10. Paritutu Groundwater Report V2 FINAL	2022	T+T	Dow AgroSciences (NZ) Ltd	Annual groundwater sampling in accordance with the groundwater monitoring plan (GMP).
11	Offsite	11. PDP Marfell Park Environmental Investigation	2009	PDP	Taranaki Regional Council	Assessment of shallow soils at Marfell Park following discovery of drums and elevated TCDD residue, providing risk assessment to park users.
12	Both	12. Dioxin Concentrations Paritutu - PDP	2002	PDP	MfE and IESR	The study was to measure 2,3,7,8-TCDD concentration trends within surface soil within the residential areas to the east and south of the Dow Plant with some properties to the northeast.
13	Both	13. Investigation of alleged agricultural waste disposal sites in New Plymouth	2001	Taranaki Regional Council	N/A	Investigation into alleged dump sites to determine contamination associated with the sites, with findings used to inform an environmental risk assessment.
14	Onsite	Natural Biological Attenuation of Phenoxy Herbicides in Groundwater, Dow AgroSciences, Paritutu Site, New Zealand	2001	Gary Klecka (Dow)	Bioremediation Journal (Potentially) Dow Agrosciences (NZ) Ltd	Academic publication - natural attenuation of phenoxy herbicides at Paritutu.
15	Onsite	15. Dow Paritutu Site Overview	2023	Taranaki Regional Council/T+T	Dow AgroSciences (NZ) Ltd	High level background of site (ownership history, iwi association, previous investigations and consent information). An outline of remediation roadmap for the Paritutu site.
16	Offsite	16. A Study of 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) Exposures in Paritutu, New Zealand	2005	ESR	Dow AgroSciences (NZ) Ltd	Results of blood testing for residents (during production years) and contaminant pathway modelling. Soil contamination modelling.
16.1	Offsite	16.1 Summary of Paritutu Serum Dioxin Study	2005	ESR	Dow AgroSciences (NZ) Ltd	High level summary of blood testing for residents (during production years) and contaminant pathway modelling. Soil contamination modelling.
17.2	Offsite	17.2 Appendices associated with the TRC investigation (2001)	2001	Taranaki Regional Council	N/A	Appendix items V to IX for TRC investigation includes sampling results from; water, sediment, marine diversity and biota sampling/investigations. Dioxin testing of shellfish.
17.1	Offsite	17.1 Investigation of alleged agricultural waste disposal sites in New Plymouth	2001	Taranaki Regional Council	N/A	Investigation into alleged dump sites to determine contamination associated with the sites, with findings used to inform an environmental risk assessment. Duplicate of Record 13.
18	Onsite	18. New Plymouth Site Hydrogeology Survey Report	1996	DowElanco	DowElanco (NZ) Ltd, and affiliates	Summary report of initial hydrogeology characterisations and geology from bore logs, including some contamination observations and field parameters (temperature and conductivity).
19	Onsite	19. DowElanco Environmental Assessment Project - Media Release	1996	DowElanco		Media release and high-level summary of 1996 groundwater investigation which showed concentrations of phenoxy herbicides and chlorophenols in groundwater.
19.1	Onsite	19.1 DowElanco Environmental Assessment Project	1996	Groundwater Technology (NZ)	DowElanco (NZ) Limited	Extracts of information including groundwater results, site monitoring location plans, initial conclusions and recommendations.
20	Offsite	20. Investigation into PCBs and organochlorine discharges from sites in the New Plymouth District	1995	Taranaki Regional Council	Taranaki Regional Council	Referencing other PCB refuse sites across Taranaki. Does not included Paritutu site.
21	Onsite	21. Dow Oct 2021 Groundwater Management Report New Plymouth site 2020-21	2021	T+T	Dow	Groundwater results and reporting from monitoring undertaken in 2021
22	Onsite/Offsite	22. Trade Waste Consent - Dow Agrosciences - April 1991 to April 1997	1997	DowElanco (NZ) Limited TRC NPDC	DowElanco (NZ) Limited TRC NPDC	Combined resource of trade waste consenting for NPDC, variations to consent, record of volumes, sludge sampling, concerns of trade waste put in domestic waste, concerns of highly saline trade waste. Results for trade waste testing.
22.1		22.1. Resource Consents Monitoring Programme Annual Report 1994-95	1995	TRC	DowElanco (NZ) Limited	Annual monitoring report for the Paritutu site, prepared for the monitoring period of 1994-95, with respect to emissions and stormwater.
22.2	Onsite	22.2. Stormwater and sewer/trade waste plans from 1995	1995	DowElanco (NZ) Limited	DowElanco (NZ) Limited	Site plans for trade waste and stormwater networks at the site.
23	Onsite	23. Trade Waste Consent - Dow Agrosciences - April 1997 to March 1999	1999	DowElanco (NZ) Limited	DowElanco (NZ) Limited	Assorted documents which contained consents, Trade waste results (1998), trade waste network plans, stormwater discharge/standard operating procedures. Trade waste sampling protocol for chlorinated dibenzo-p-dioxins.
23.1	Offsite	23.1. A world compendium: The pesticide manual - Incorporating the Agrochemicals Handbook (Tenth Edition)	1994	British Crop Protection Council Royal Society of Chemistry	N/A	Pesticide handbook, chemical information, toxicology, applications, commercialisation. Triclopyr, Picloram, MCPB, MCPA, fluoxyppy, 2,4-D, clopyralid, spinosyn (highlighted)
24	Onsite	24. Trade Waste Consent - Dow Agrosciences - April 1999 to October 2000	2000	DowElanco (NZ) Limited NPDC	DowElanco (NZ) Limited NPDC	Documented trade waste results and correspondence
25		25. Trade Waste Consent - Dow Agrosciences - October 2000 to September 2012	N/A (Various)	N/A (Various)	N/A (Various)	Assorted documents including; trade waste discharge reports, testing, Chemical lists- t.2000L of Trojan insecticide repackaged, (not manufactured) in 2004, Trojan 150 g/L of gamma-cyhalothrin. Safety data sheet for "Trojan insecticide", copy of councillor complaint, and articles in 'Investigate' and 'Listener'.
26	Onsite	26. Trade Waste Consent - Dow Agrosciences - 2014	2014	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	Trade waste consent (renewal) application, active agents lists, locations of chemical storage areas, trade waste retention and batch release system details.

26.1	Onsite	26.1. Active ingredients managed onsite	2014	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	From Record 26, list of active ingredients managed onsite
27	Onsite/offsite	27. Investigation of Land Contamination - Redacted	N/A (Various)	N/A (Various)	N/A (Various)	Assorted documents, including: letters of concern to the council, detailed reporting on the dioxin study MoH (includes report) evaluation of the toxicity of dioxins and dioxin-like PCBs; A health risk appraisal of the New Zealand population, TRC report titled 'Alleged contamination by Dow AgroSciences (NZ) Ltd.
28	Onsite/offsite	28. Chemical Dumping	N/A (Various)	N/A (Various)	N/A (Various)	Assorted documents including; letter/email correspondence (including mention of site investigations), Memorandum of Lease 1962, Initial survey maps, subdivision plans. Council report on investigation of media article "The dumped it under Paritutu". Annette King Minister of Health 200 media response for blood dioxin tests. Waireka landfill monitoring - NPDC land use consent, construction. Investigation reports from release of TCDD at TCP Plant (1986).
29	Onsite/offsite	29. Complaint - Kennedy_Redacted	N/A (Various)	N/A (Various)	N/A (Various)	Assorted documents including; certificates of title. correspondence regarding development, releases, trade waste, Waireka establishment, letter of clean air compliance, Waireka disposal list. Confirmation of hormonal damage to vegetable plants - not tied to IWD.
30	Onsite	30. Complaint - Odour - 2002_Redacted	2001-2002	Dow AgroSciences (NZ) Ltd NPDC	N/A (Various)	Odour complaint - troubles with incinerator identified.
31	Onsite	31. Complaints - Noise - 2003_Redacted	2002-2003	NPDC	NPDC	Noise complaint - site alarm, triggered low pressure in sprinklers was cause.
32	Onsite/offsite	32. Development of Land Adjoining IWD Manufacturing Plant (1)	1991-1992	NPDC	NPDC	Extracts of information also within Record 29.
32.1	Offsite	The management of hazardous wastes disposal - A review of government systems	1992	N/A	N/A	High level government review of policy in 1992.
33	Offsite	33. Development of Land Adjoining IWD Manufacturing Plant	1991-1992	NPDC	NPDC	Duplicate of Record 32.
34	Onsite	34. Drainage Plan	1984-1985	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	Trade waste sewer and domestic waste sewer networks.
35	Onsite/offsite	35. Information Request - Gibbs 1_Redacted	1986	N/A (Various)	N/A (Various)	Assorted documents including, The use of 2,4,5-T in New Zealand: A report to the environmental council. Possible health effects of manufacture of 2,4,5-T in New Plymouth, reports of dump sites, shellfish study for TCDD.
36	Onsite/offsite	36. Information Request - Gibbs 2_Redacted	N/A (Various)	N/A (Various)	N/A (Various)	Assorted documents including, waahi tapu significance queries, health impacts, soil dioxin investigation (of residential properties) and a timeline of events (handwritten notes). Dioxin investigation - disease study in Paritutu and Moturoa.
37	Onsite	37. LIM06-88174	2006	NPDC	Ministry of Health (MoH)	Lim Request from MoH, including a list of building permits
38	Onsite	38. Management of Trade Waste	2005	Dow AgroSciences (NZ) Ltd	NPDC	Change of location for laboratory work from the Pilot Plant to Building 07. Mention of controls for wastewater, utilizing Building 07 Save-all.
39		39. Overseas Investment Certificate	1997	Govett Quilliam NPDC	Govett Quilliam NPDC	Certificates of title in relation to Overseas Investment Regulations 1995
40	Onsite/offsite	40. Trade Waste Consent - Dow Agrosciences - November 1970 to February 1991	N/A (Various)	N/A (Various)	N/A (Various)	Assorted documents including, details of trade waste releases, report on the failed rupture disk in TCP Plant (1986). Investigation of bursting disc failure by Department of Scientific and Industrial Research. Correspondence regarding Waireka dump leachate issues and removal.
41		41. DowAggriscience site layout	2014	ERM	Dow AgroSciences (NZ) Ltd	Site plan including suspected burial sites and drum storage areas. Identical plan included within Record 4.
42		42. Groundwater Monitoring Event Dow Agrosciences 2010 (physical document)				
43		43. Assessment of dioxins in the vicinity of a 2,4,5-t manufacturing facility in New Plymouth, NZ (physical document)	1998	CanTox Inc	Dow AgroSciences (NZ) Ltd	
44	Onsite	44. New Plymouth/Waireka environmental assessment project (physical document)	1992	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	Environmental assessment with the introduction of the RMA in 1992.
45	Onsite	45. Contaminated Anisole Compound and Contaminated Solid Waste	1979	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	Report from anisole contaminated bulk material (drums, timber and refuse) stored in the Dangerous Goods Compound. Includes discussions of potential solutions to dealing with contamination.
46	Onsite	46. Laboratory request form	1983-1984	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	1983: Soil sampling from the dangerous goods compound, scheduled for TCDD analysis. 1984: Soil sampling across site, scheduled for TCDD analysis.
47	Onsite	47. Soil from excavations for expansion tank and blowdown tank at TCP plant.	1986	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	Hand written notes and reported concentrations (TCA) from soil sampling following excavations along the western wall of the TCP plant. Excavated refuse material (concrete and other rubble) stored under tarpaulins in liquids incinerator compound. Excavated soil stored behind R&D.
48	Onsite/offsite	48. TCDD content of soils	1986	N/A	Dow AgroSciences (NZ) Ltd	Soil sampling with locations positioned at the site boundary ('A') and beyond the boundary ('B'), submitted for TCDD analysis.
49	Onsite and offsite	Trichlorophenol (TCP) process release, 15 April 1986 Department of Scientific and Industrial Research Report	1986	Department of Health	Dow AgroSciences (NZ) Ltd	Department of Health investigation report following TCP Plant release. Wipe tests and soil samples were collected from areas downwind of the TCP Plant. TCDD is expected to not have travelled far beyond the immediate vicinity, with a significant fraction of the release believed to be confined to the TCP process building.
50	Onsite	Untitled document	1989	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	A site plan showing soil sampling between 1979 to 1988 (analyte unknown, likely to be TCDD). Accompanied text mentions investigation required in "areas where rubble has been dumped following building construction/alteration", "location of buried crushed drums discarded during construction of the Dangerous Goods Compound".
51	Onsite	51. Lab Request Form	1985	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	Soil sampling with locations positioned at the site boundary ('A') and beyond the boundary ('B'), based on information from other documentation (Record 49). Samples submitted for TCDD analysis. Samples targeting stack emission dispersion based on a simulation.
52	Onsite	52. Lab Request Form	1985	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	Soil sampling from compound associated with liquids incinerator building, submitted for TCDD analysis.
53	Onsite	53. Lab Request Form	1983	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	Duplicate of Record 46. Soil samples at Ex manufacturing site for TCDD analysis.
54		54. Lab Request Form	1979	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	Soil samples collected from "anisole storage compound", submitted for TCDD analysis.
55	Onsite	55. IWD Manufacturing Site	1988	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	Report from Paritutu site which highlights potential areas of contamination, monitoring undertaken to date, and recommendations for further investigations and management (where identified).

56	Onsite	56. AST from old phenoxy plant (Building 3) and trichlorophenol plant (Building 13)	1986	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	Hand written notes and reported concentrations (total phenoxies and chlorophenols, TCDD) from the sampling of building floors and underlying soil from beath Building 03 and Building 13.
57	Onsite	57. IWD Storage Tank List	1981	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	Register of storage tanks contained onsite, including contents, capacity, plant (area), construction, and whether or not underground.
58	Onsite/offsite	58. Soil Sampling Protocol	1985	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	The proposed soil sampling methodology for TCDD analysis (presumably associated with Record 48 - based on figures presented within each document).
59	Onsite	59. Survey of Ivon Watkins-Dow LTD Manufacturing Site, Paritutu Road, New Plymouth, New Zealand	N.D.	Dow AgroSciences (NZ) Ltd	Dow AgroSciences (NZ) Ltd	An indicative sampling program for the site (incomplete document).
60	Onsite	Natural Biological Attenuation of Phenoxy Herbicides in Groundwater: Dow Agrosciences, Paritutu Site, New Zealand	2001	Gary Klecka (Dow)	Bioremediation Journal (Potentially) Dow Agrosciences (NZ) Ltd	Academic publication - natural attenuation of phenoxy herbicides at Paritutu. Duplicate of Record 14.
61	Onsite	62. Site Transfer Report	2023	Tonkin & Taylor Limited	Dow Chemical (NZ) Ltd	Report summarising documents supplied by Corteva Agriscience NZ Ltd (Corteva) regarding demolition of buildings at 89 Paritutu Road, New Plymouth (the site) prior to transfer of the site to Dow ownership.

## **Appendix D      Historical Aerial Photographs**

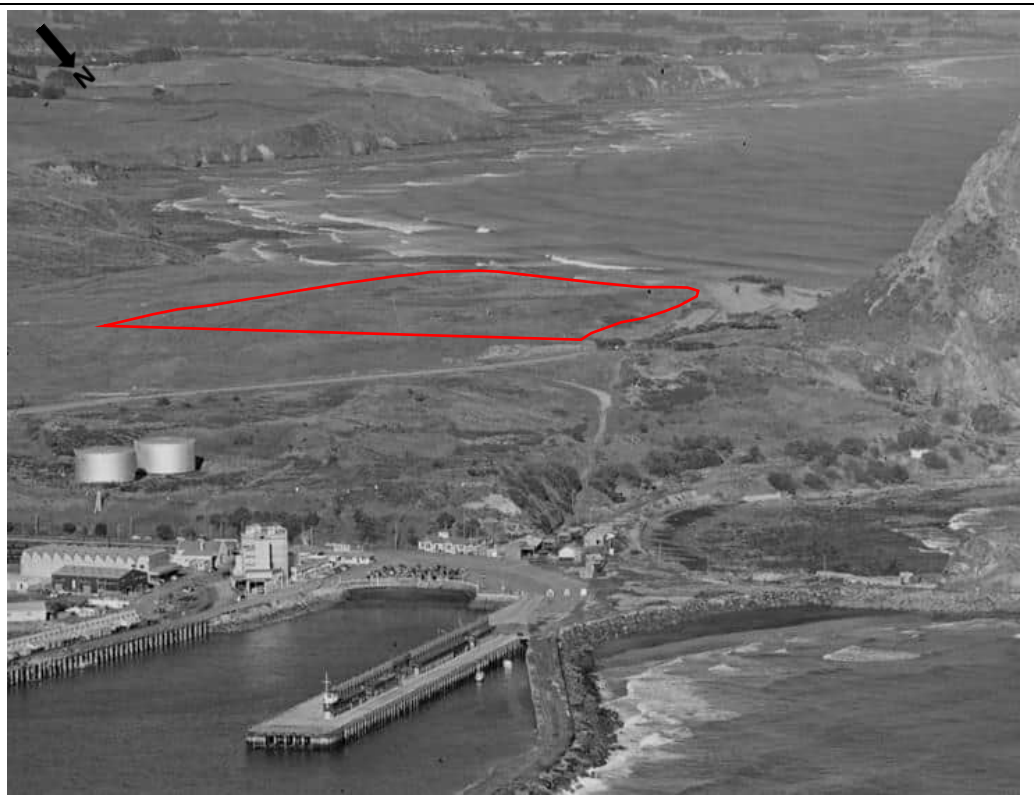
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**Date and source**      **Photograph showing orientation of image and approximate extent of the current site (red outline)**

**1949**  
Retrolens



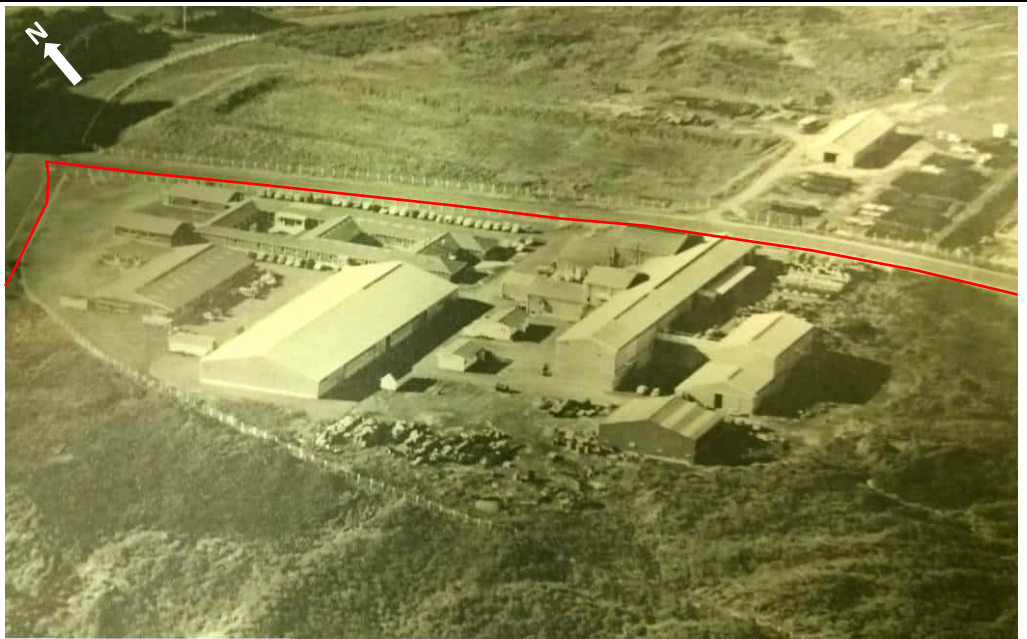
**1958**  
Alexander  
Turnbull  
Library



1965  
Alexander  
Turnbull  
Library



1965



1967





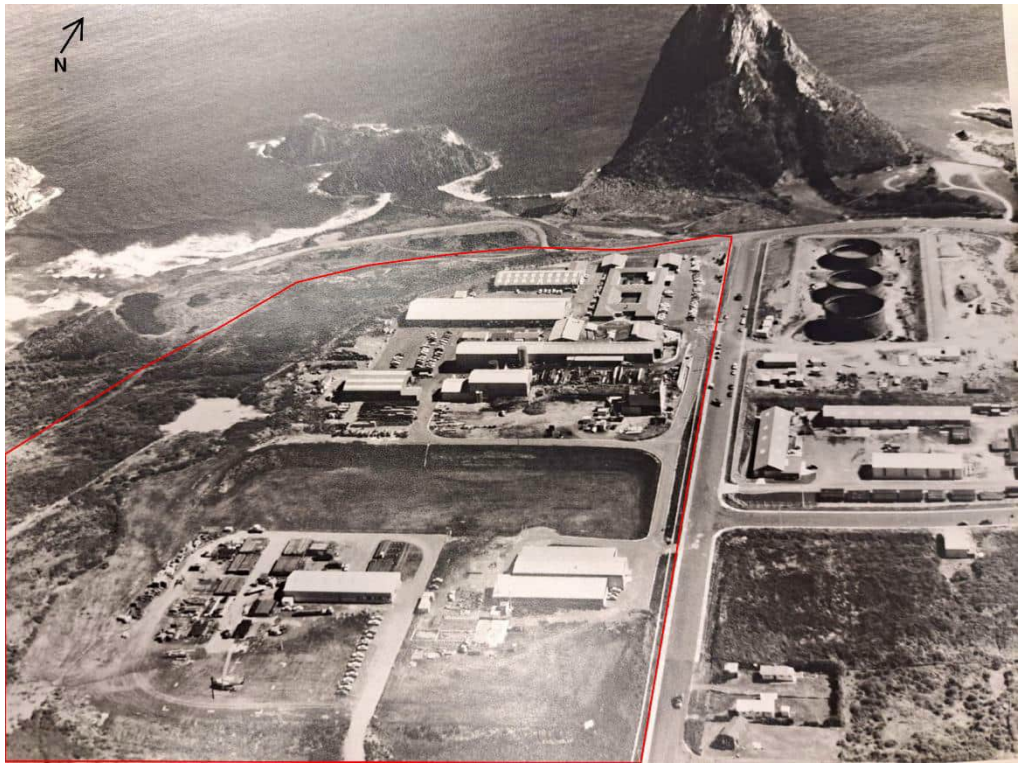
1968  
Retrolens



1968



1968-69



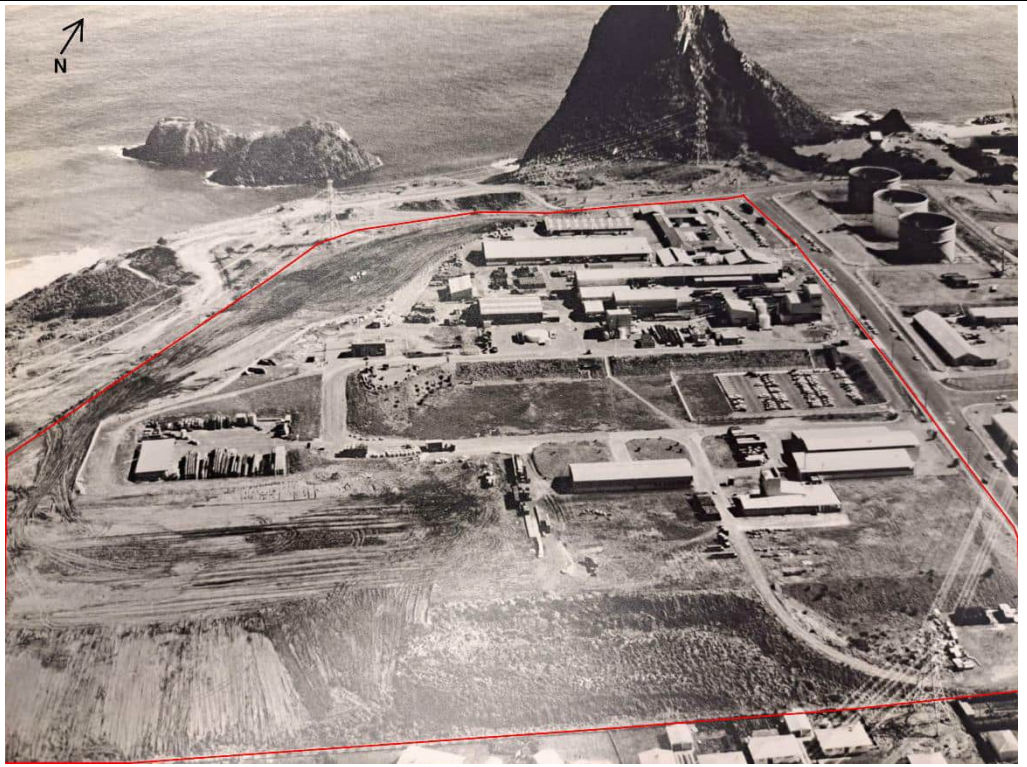
1970  
Retrolens



1975  
Alexander  
Turnbull  
Library



1975



**1984**  
Alexander  
Turnbull  
Library



**1991**



**2000**  
Retrolens



**2007**  
Google  
Earth Pro  
(sourced  
from TRC)



**2017**  
Google  
Earth Pro



**2022**  
Google  
Satellite



2023



# Appendix E Chemicals used/manufactured on site

## E1 List of active substances

Appendix E Table 1: Active substances historically manufactured, reformulated and/or packaged at Dow Paritūtū (pers. comms). Not all substances were produced in bulk

Fungicides	Herbicides		Insecticides	Other
<b>Dithiocarbamates:</b> <ul style="list-style-type: none"> <li>Dazomet</li> <li>Maneb</li> <li>Mancozeb</li> <li>Thiram</li> <li>Ziram</li> </ul>	<b>Aromatic acid:</b> <ul style="list-style-type: none"> <li>Aminopyralid</li> <li>Chloramben</li> <li>Clopyralid</li> <li>Dicamba</li> <li>Fluroxypyr-meptyl</li> <li>Picloram</li> <li>Triclopyr</li> </ul>	<b>Other:</b> <ul style="list-style-type: none"> <li>Amitrole</li> <li>Bensulide</li> <li>Bromoxynil</li> <li>Cacodylic acid</li> <li>Cyhalofop-butyl</li> <li>Dalapon</li> <li>Dichlobenil</li> <li>Dinitramine</li> <li>Dinoseb</li> <li>Diuron</li> <li>Endothal</li> <li>Florasulam</li> <li>Flumetsulam</li> <li>Glyphosate</li> <li>Haloxypop</li> <li>Linuron</li> <li>Metosulam</li> <li>MSMA</li> <li>Nitrofen</li> <li>Oxyfluorfen</li> <li>Paraquat</li> <li>Phenmediphan</li> <li>Propachlor</li> <li>Propyzamide</li> <li>Pyroxulam</li> <li>Sethoxydim</li> <li>Sodium chloroacetate</li> <li>Sodium chlorate</li> <li>Sulfallate</li> <li>Trichloroacetic acid</li> <li>Trifluralin</li> </ul>	<b>Organochlorine:</b> <ul style="list-style-type: none"> <li>DDT</li> <li>Heptachlor</li> <li>Lindane</li> </ul>	<b>Fertilizer:</b> <ul style="list-style-type: none"> <li>Iron EDTA</li> <li>Nitrapyrin</li> <li>NPK (Nitrogen, Phosphorus and Potassium)</li> </ul>
<b>Inorganics:</b> <ul style="list-style-type: none"> <li>Copper</li> <li>Phenyl mercury</li> <li>Sulphur</li> <li>Zinc</li> </ul>	<b>Phenoxy- acids:</b> <ul style="list-style-type: none"> <li>2,4-D</li> <li>2,4-DB</li> <li>2,4,5-T</li> <li>4-CPA</li> <li>Fenoprop/ 2,4,5-TP</li> <li>MCPA</li> <li>MCPB</li> <li>Mecoprop</li> </ul>		<b>Organophosphate:</b> <ul style="list-style-type: none"> <li>Bromophos</li> <li>Chlorpyrifos</li> <li>Coumaphos</li> <li>Crufomate</li> <li>Diazinon</li> <li>Dichlofenthion</li> <li>Dichlorvos</li> <li>Ethoprofos</li> <li>Fenchlorphos</li> <li>Fenitrothion</li> <li>Malathion</li> <li>Phorate</li> <li>Phosphamidon</li> <li>Trichlorfon</li> </ul>	<b>Sprout inhibitors and growth regulators:</b> <ul style="list-style-type: none"> <li>Chlorethephon</li> <li>Chlorpropham</li> <li>Maleic hydrazide</li> <li>Naphthaleneacetamide</li> <li>Propham</li> </ul>
				<b>Disinfectants and surfactants</b> <ul style="list-style-type: none"> <li>Alkylaryl polyoxyethylene glycol</li> <li>Benzalkonium chloride</li> <li>Polyvinyl polymer</li> <li>Sodium hydroxide</li> </ul>
<b>Other:</b> <ul style="list-style-type: none"> <li>Captan</li> <li>Chlorothalonil</li> <li>Dichlone</li> <li>Dichlozoline</li> <li>Fenarimol</li> <li>Fenbuconazole</li> <li>Myclobutanil</li> <li>Quinoxifen</li> <li>Quintozene</li> <li>Thiophanate-methyl</li> <li>Triforine</li> </ul>	<b>Triazine</b> <ul style="list-style-type: none"> <li>Atrazine</li> <li>Prometryn</li> <li>Propazine</li> <li>Simazine</li> <li>Terbutryne</li> </ul>		<b>Other</b> <ul style="list-style-type: none"> <li>Buprofezin</li> <li>Carbaryl</li> <li>λ-Cyhalothrin</li> <li>Cyhexatin</li> <li>Fenpyroximate</li> <li>Methoprene</li> <li>Methoxyfenozide</li> <li>Pyrethrins</li> <li>Spinetoram</li> <li>Spinosad</li> <li>Sulfoxaflo</li> <li>Tetradifon</li> </ul>	<b>Other</b> <ul style="list-style-type: none"> <li>Coumafuryl (rodenticide)</li> <li>Metaldehyde (molluscicide)</li> <li>Methyl bromide (fumigant)</li> <li>PCP (wood preservative)</li> <li>Rifamycin (antibiotic)</li> <li>2,4,6-Trichlorophenol (wood preservative)</li> </ul>



## E2 Active ingredients managed on site

Appendix E Table 2: Active ingredients historically manufactured, reformulated and/or packaged at Dow Paritūtū in 2014. Source: Renewal Application for Discharge of Tradewaste, (2014), Dow AgroSciences (NZ) Limited

Substance	Category	Formulated	Repacked	Assembled	Stored
2,4-D acid	Herbicide	X			
2,4-D ethyl hexyl ester	Herbicide	X			
2,4-DB	Herbicide	X			
Aminopyralid	Herbicide	X			
Buprofezin	Insecticide		X		
Chlorpyrifos	Insecticide	X			X
Chlorpyrifos-methyl	Insecticide	X			
Chlorpyrifos-butyl	Herbicide	X			
Clopyralid	Herbicide	X			
Dicamba	Herbicide	X			
Fenbuconazole	Fungicide				X
Fenpyroximate	Herbicide		X		
Florasulam	Herbicide	X			
Flumetsulam	Herbicide				X
Fluroxypyr	Herbicide	X			
Glyphosate	Herbicide	X			
Haloxyp-P-methyl ester	Herbicide	X			
Lambda-cyhalothrin	Insecticide				X
MCPA	Herbicide	X			
MCPA ethyl hexyl ester	Herbicide	X			
MCPB	Herbicide	X			
Mancozeb	Fungicide				X
S-Methoprene	Insecticide	X			
Methoxyfenozide	Insecticide		X		
Myclobutanil	Herbicide		X		X
Nitrapyrin	Fertiliser		X		
Oxyfluorfen	Herbicide	X			
Picloram	Herbicide	X			
Picloram iso-octyl ester	Herbicide	X			
Propyzamide	Herbicide				X
Pyroxsulam	Herbicide				X
Quinoxifen	Fungicide		X		
Spinetoram	Insecticide	X			

Substance	Category	Formulated	Repacked	Assembled	Stored
<b>Spinosad</b>	Insecticide	X			
<b>Sulfoxaflor</b>	Insecticide	X			
<b>Triclopyr butoxyethyl ester</b>	Herbicide	X			
<b>Triclopyr triethylamine</b>	Herbicide	X			
<b>Trifluralin</b>	Herbicide				X

Notes:

**Formulated** – Raw materials are formulated together into the finished product.

**Repacked** – Finished product is transported to site and repacked in new container(s).

**Assembled** – Finished product already packed into containers are transported to site and placed in different outer packaging.

**Stored** - Finished product in final packaging is transported to site and stored in the warehouse.

## E3 List of storage tanks

**Appendix E Table 3: List of IWD storage tanks and recorded contents in 1981. Source: IWD Storage Tank List, (1981), IWD.**

Plant	Content	Underground Storage Tank	Capacity (L)
<b>Formulations</b>	2,4,5-T Butyl Ester		47,000
	Triclopyr Butoxy Ethyl Ester		24,000
	2,4-D Butyl Ester		47,000
	2,4-D Amine Conc		53,000
	MCPA		73,000
	MCPB		73,000
	Gardemul C-55		8,200
	Empty		8,200
	Pegasol R-100		47,000
	Diesel Oil		47,000
	Empty		47,000
	Tordon 520 (Picloram)		47,000
	Hi Ester D		68,000
	Hi Ester T/Diesel		68,000
<b>Surfactants</b>	Bioquat 501 (Benzalkonium chloride)		13,000
	Obsolete	X	22,700
	Hydrochloric Acid		13,600
	Obsolete	X	22,700
	Mycosan S (Sulphur fungicide)		42,000
	Suds Tank		36,000
	Gardinol MLS (Fatty acid sulphate)		21,000
	Gardinol LEH30 (Fatty acid sulphate)		21,000

Plant	Content	Underground Storage Tank	Capacity (L)
	Gardinol NH (Fatty acid sulphate)		16,500
	Gardinol 4000 (Fatty acid sulphate)		16,500
<b>Protectants</b>	Empty	X	23,700
	(Former) Lepidex/Dursban (Triazophos/Chlorpyrifos)		13,700
<b>Triazines</b>	Propylene Glycol		19,000
	Xylene	X	11,400
	50% Caustic Soda		7,000
<b>Fire Water Services</b>	Fire Water		1,660,000
<b>TCP</b>	Methanol	X	34,000
	Wet Methanol	X	6,800
	50% Caustic Soda		12,700
	Contaminated Xylene	X	6,800
	Xylene	X	13,600
<b>Phenoxy Prep</b>	Overflow/Vent Tank	X	6,800
	Iso-butanol	X	14,000
	Iso-butanol	X	14,000
	n-Butanol	X	22,700
	Iso-butanol	X	6,800
	Empty	X	4,530
	Empty	X	4,530
	Iso-octanol	X	6,800
<b>Services</b>	Automotive diesel	X	5,000
	Regular Petrol		400
<b>Utilities (Boiler, Dangerous Goods, Process Water)</b>	Fuel Oil No. 5		45,600
	Contaminated Methanol		41,000

Plant	Content	Underground Storage Tank	Capacity (L)
	Process Water		181,800
<b>Vet Med – Boiler</b>	Fuel Oil No. 5		4,600
<b>Pilot Plant</b>	Empty		2,000
	Empty		2,000
<b>Services (Mobil Tank)</b>	Automotive diesel		4,600
<b>Boiler (Mobil Tank)</b>	Fuel Oil No. 5		45,600
<b>Vet-Med Boiler (Mobil Tank)</b>	Fuel Oil No. 5		4,600
<b>Incinerator (Mobil Tank)</b>	Fuel Oil No. 2 or Xylene		16,000
<b>Protectants (Mobil Tank)</b>	Certrex 47		23,700
<b>TCP (Mobil Tank)</b>	Xylene		13,600

E4 Summary of key chemical synthesis processes

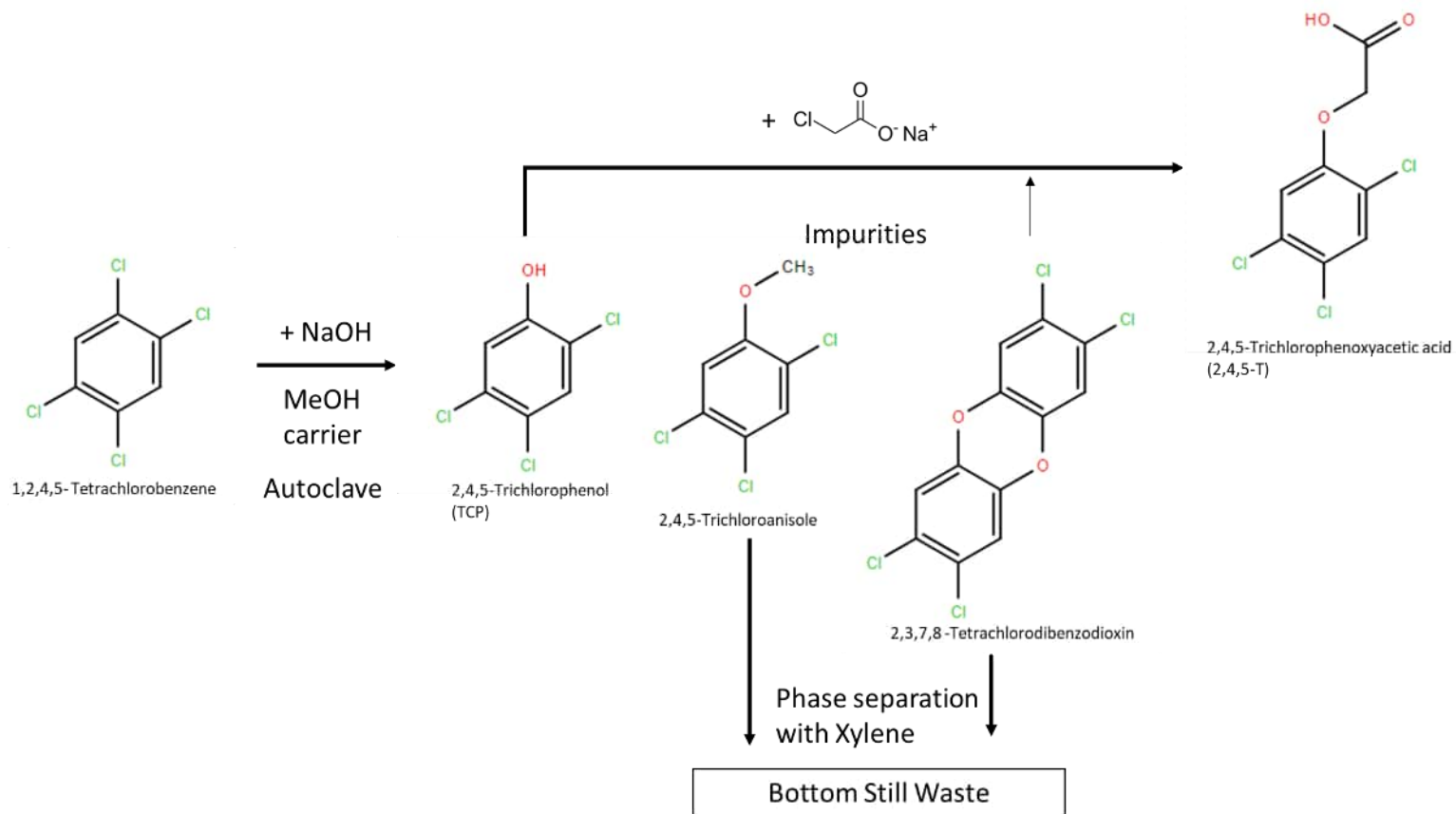


Figure Appendix E.1: Simplified synthesis pathway for 2,4,5-TCP and 2,4,5-T. The process also produced acidic brines as a waste. 2,3,7,8-TCDD was the major dioxin impurity, but other PCDD/F could also be inadvertently formed.

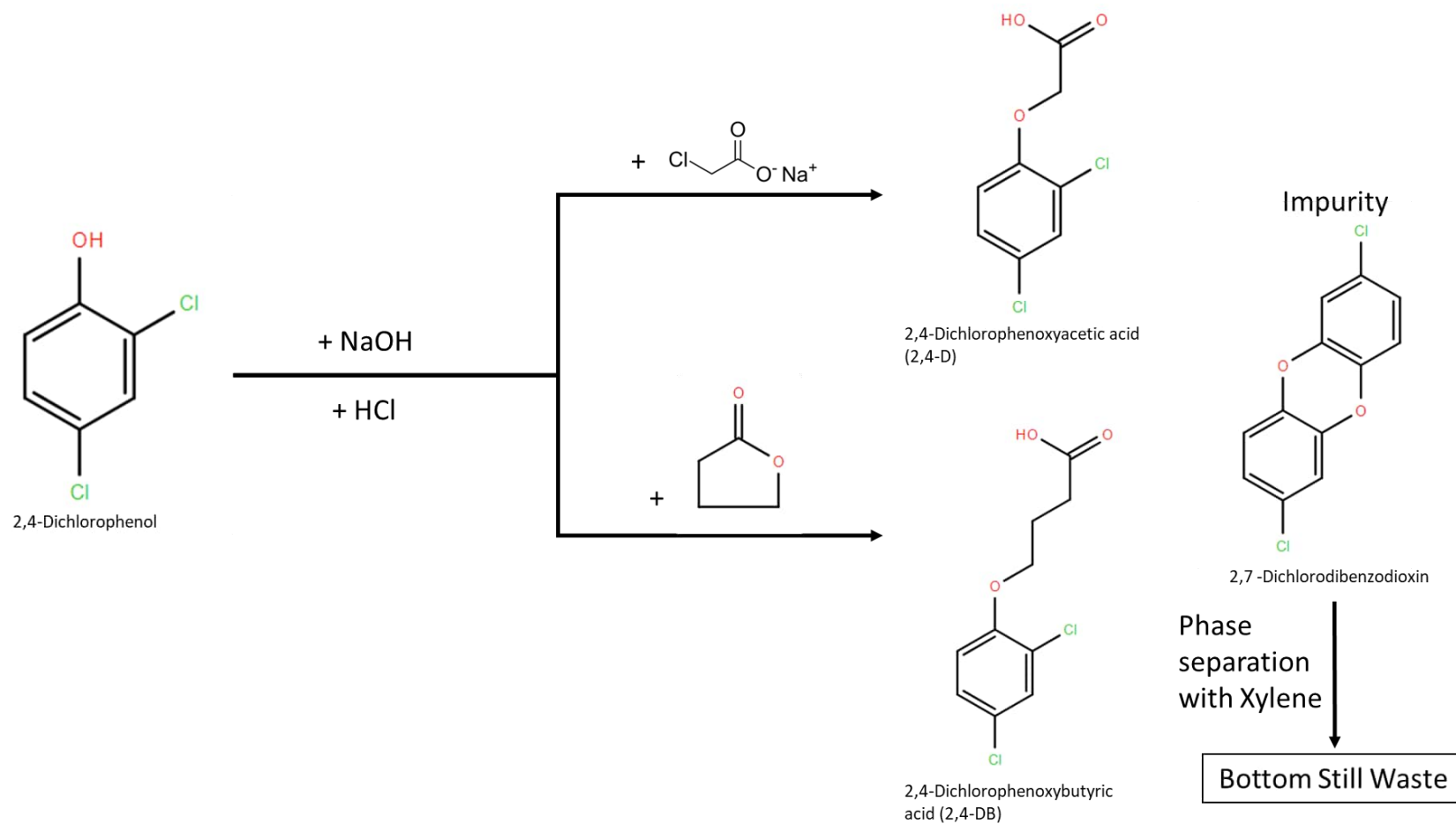


Figure Appendix E.2: Simplified synthesis pathway for 2,4- D. The process also produced acidic brines as a waste. Non- 2,3,7,8 substituted dioxins, for example 2,7-dichlorodibenzodioxin were the more common reported impurity in this process.

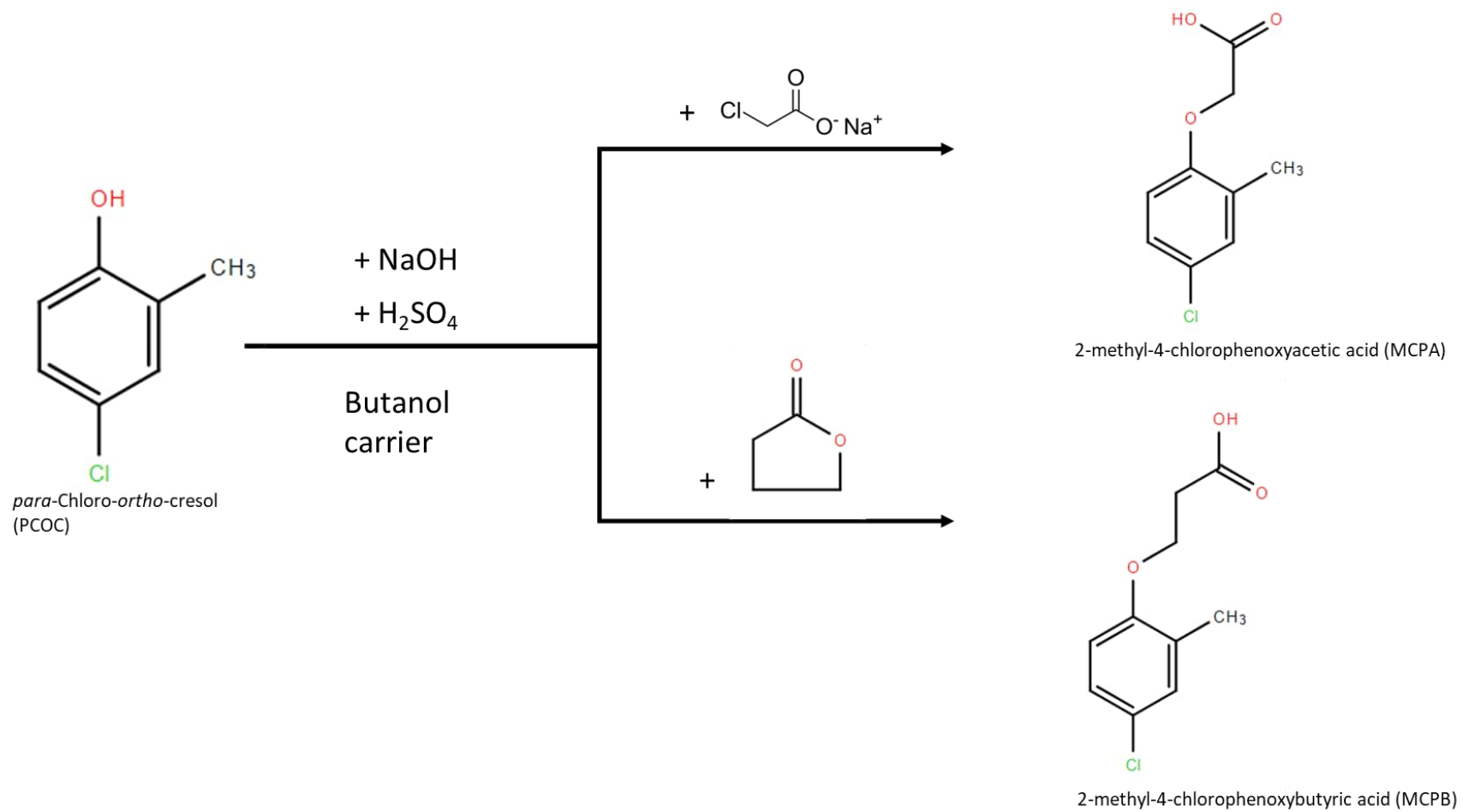


Figure Appendix E.3: Simplified synthesis pathway for MCPA and MCPB. The process also produced acidic brines as a waste.



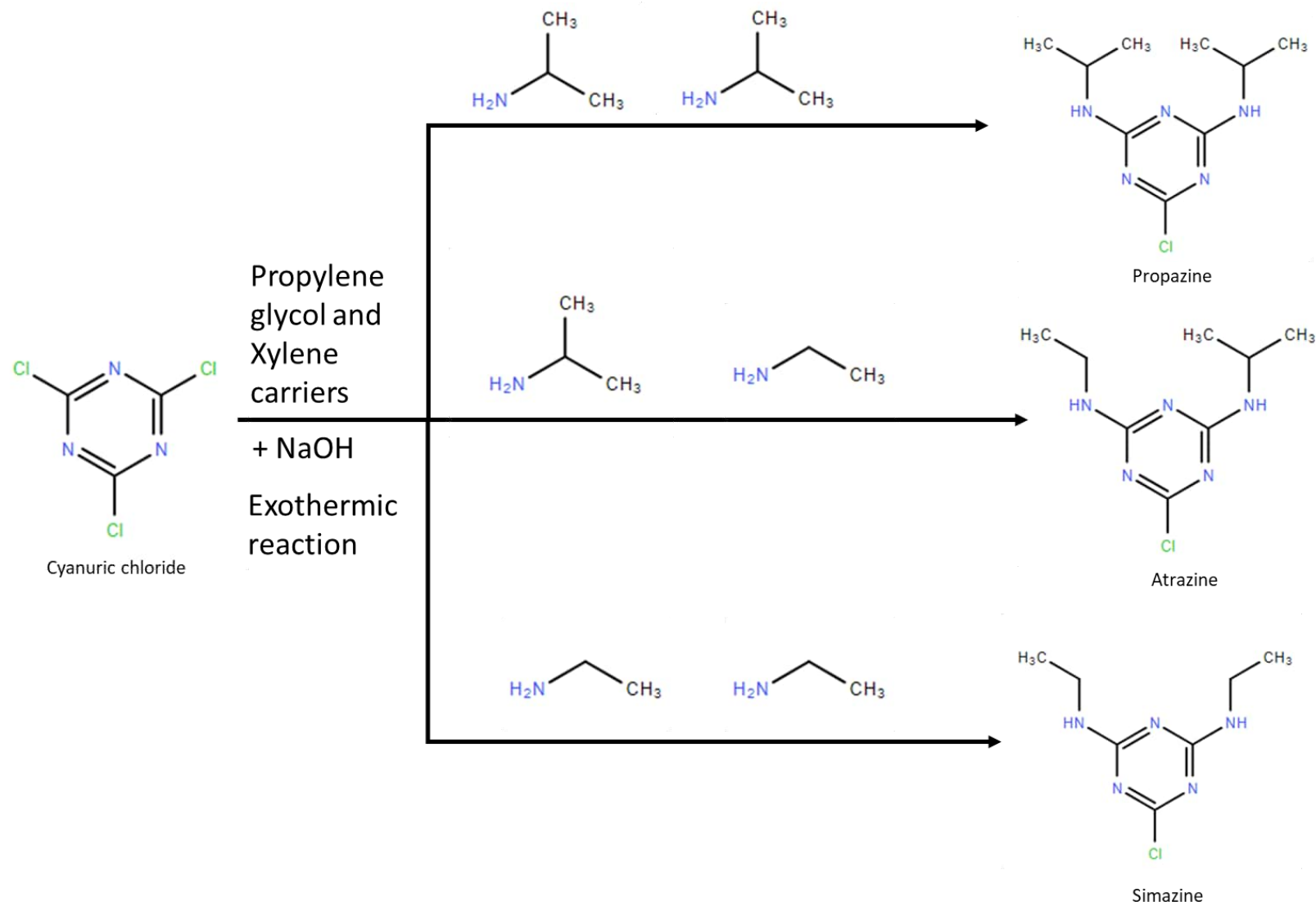


Figure Appendix E.4: Simplified synthesis pathway for Triazine herbicides. The process also produced acidic brines as a waste.

**Appendix F      Community Engagement Survey  
Questions**

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## Paritūtū Site – community information gathering survey

### Purpose

This initial short public survey serves two purposes at this stage of the project:

- To provide an early opportunity for the public to feel heard in relation to the Paritūtū site.
- To identify members of the wider community may also have information related to the Paritūtū site that hasn't been captured elsewhere.

### Questions

Questions and supporting text	Survey logic
<p>Dow Chemical (NZ) Ltd assumed ownership of the Paritūtū site in February 2023, and has committed to undertaking a full detailed investigation of the site, followed by remedial works, as required. A thorough and complete site investigation is essential to confirm contaminated areas and the level of contamination. The project is long-term and expected to take a number of years to complete.</p> <p>No future use of the site has been proposed at this stage. Future use will be the subject of further discussion with regulatory authorities, iwi/hapū, and the community as the site investigation evolves.</p> <p>As part of the initial steps of the investigation process, Dow is interested in hearing from people who were involved with the Paritūtū site during its operational period. This short survey aims to gather information solely related to Paritūtū Site activities (i.e. activities which took place within the Paritūtū Site boundary), which could have led to potential contamination.</p> <p>Please be aware that offsite activities are not within the scope of the investigation. More information about what's involved in the project can be <a href="#">found here</a>. If you have information you would like to share about offsite activities or other concerns, in the first instance please contact Taranaki Regional Council.</p>	Introductory text
<p>The responses to the survey will be used only for the purposes stated above and will not be shared with any external parties. Only Dow and Tonkin + Taylor will be able to see and review the responses. The information that is gathered will be summarised and used in the preparation of site reports that may be publicly shared. However, personal details or verbatim responses that could be attributed to an individual will not be included in any reporting.</p> <p>We may retain all the data we collect, including personal information (on both our active systems and our archive systems) for the duration of the project, which is likely to span some years.</p> <p>Please note that providing your contact information is <b>optional</b> for this survey. We are only asking for this information if you have relevant information about the Paritūtū site. This contact information will only be used by the Dow and Tonkin + Taylor project team, if we need to discuss your response further with you.</p> <p>Please do not send us sensitive personal information or include it in your survey response.</p> <p>You have the right to ask for a copy of any personal information we hold about you, and to ask for it to be corrected if you think it is wrong. If you'd like to ask for a copy of your information, or to have it corrected, please contact us at .</p>	Privacy statement

Questions and supporting text	Survey logic
<p>1. Please describe your association with the Paritūtū site. <i>Please identify how you were associated with the Paritūtū site, while it was in operation. For example, were you employed on the site, did you deliver products to or from the site, or were you a resident neighbouring the site?</i></p>	<p>Free text cell response. Compulsory box. <i>Clarifying text.</i></p>
<p>2. Are you aware of locations where significant spills/leaks of contaminating material may have occurred onsite at Paritūtū?</p>	<p>Yes/no question. If answering yes, go to question 3. If answering no, go to question 4.</p>
<p>3. You answered yes to the previous question. Please provide any details you may have about significant spills/leaks of contaminating material at the Paritūtū site. <i>For example, if known, please describe the locations of significant spills/leaks of contaminating material, approximate size of spill/leak, and chemicals involved.</i></p>	<p>Free text cell response. <i>Clarifying text.</i></p>
<p>4. Are you aware of locations where contaminated waste (e.g. waste drums) may have been buried onsite at Paritūtū?</p>	<p>Yes/no question. If answering yes, go to question 5. If answering no, go to question 6.</p>
<p>5. You answered yes to the previous question. Please provide any details you may have about contaminated waste that may have been buried onsite at Paritūtū. <i>For example, if known, please describe the locations of burial of contaminating material, approximate volume (or quantity of barrels), and chemicals involved.</i></p>	<p>Free text cell response. <i>Clarifying text.</i></p>
<p>6. Do you have any other information about activities onsite at Paritūtū that you think may be useful to the investigation?</p>	<p>Yes/no question. If answering yes, go to question 7. If answering no, go to question 8.</p>
<p>7. You answered yes to the previous question. Please provide details of any other information about activities onsite at Paritūtū that you think may be useful to the investigation.</p>	<p>Free text cell box.</p>
<p>8. If needed, would you be happy for a representative of Dow/the project team to contact you to discuss your answers further?</p>	<p>Yes/no question. Compulsory box. If answering yes, go to question 10. If answering no, go to end of survey.</p>
<p>9. Please provide your name if you wish to be contacted.</p>	<p>Free text cell box.</p>
<p>10. Please provide details on how best to contact you. <i>I.e. Phone number and/or email address.</i></p>	<p><i>Clarifying text.</i></p>
<p>Thank you for taking the time to complete this survey. We value the information you have provided. Dow Chemical (NZ) Ltd is committed to undertaking a full detailed investigation of the Paritūtū site, followed by remedial works as required.</p> <p>As a reminder, please be aware that offsite activities are not within the scope of our investigation. More information about what's involved in the project can be <a href="#">found here</a>. If you have information you would like to share about offsite activities or other concerns, in the first instance please contact Taranaki Regional Council.</p>	<p>Automatic response at survey completion.</p>

## **Appendix G      General Site Photos**

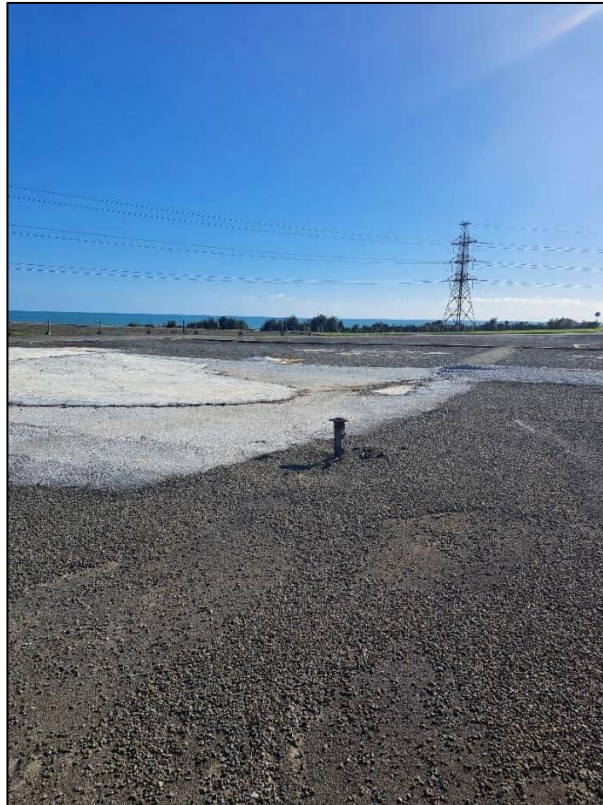
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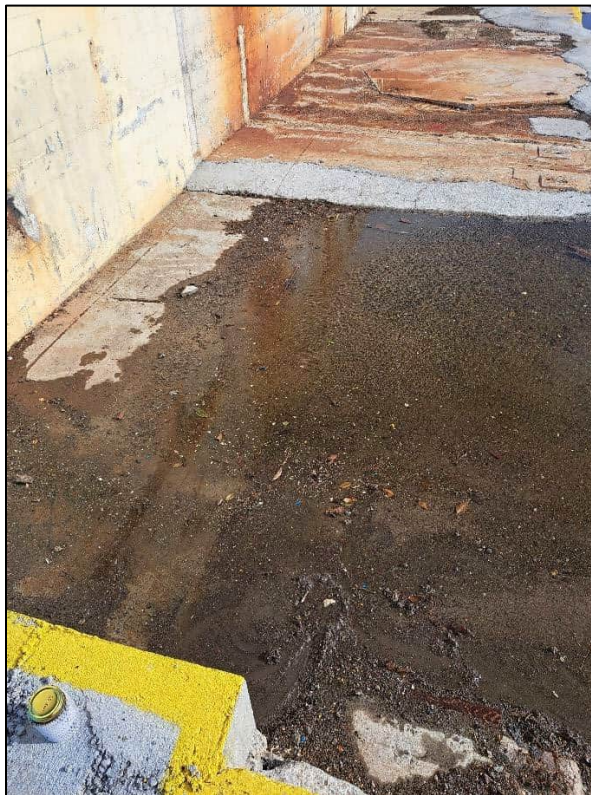
Photograph 1: Welded fill point for process water piping adjacent to Building 15.



Photograph 2: Welded fill point for process water piping adjacent to Building 09.



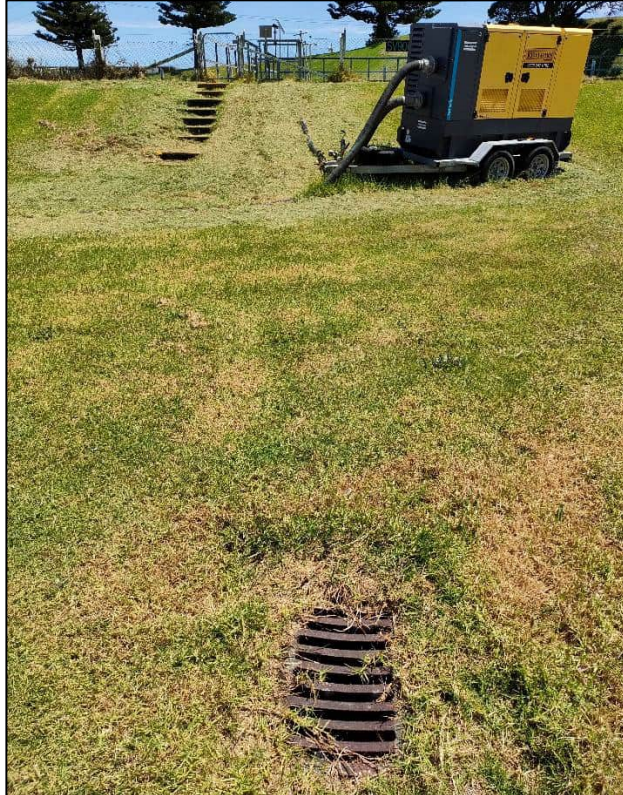
Photograph 3: Welded fill point for town mains water adjacent to Building 30.



Photograph 4: Demolition debris/sediment adjacent to Building 03.



Photograph 5: Former storage of round drums on the concrete adjacent to Building 03.



Photograph 6: Pumps servicing the stormwater ponds SV9000/9100.

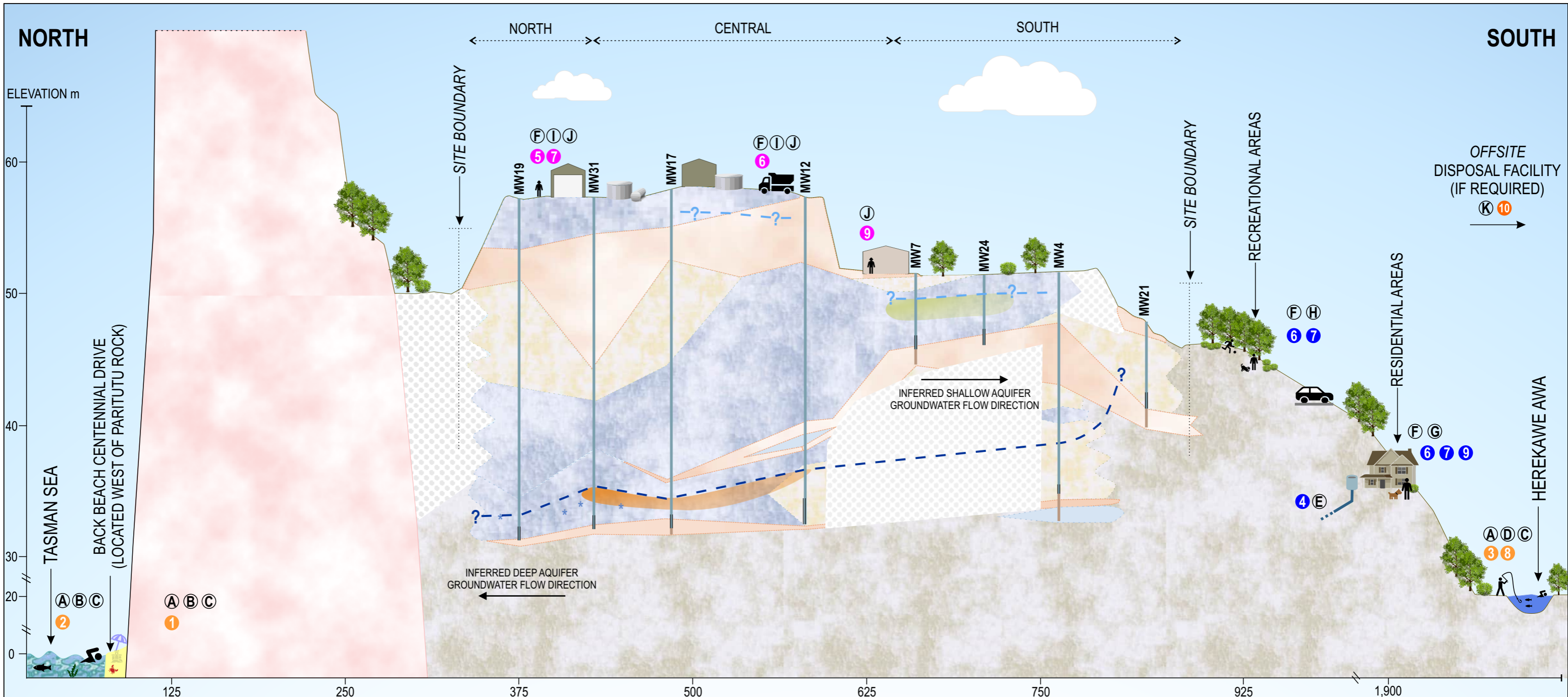




Photograph 7: View looking west showing the former footprint of Building 13, the retaining wall to the top yard behind Building 3.

## **Appendix H      Conceptual Site Model**

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**NOTES**

1. THIS CONCEPTUAL SITE MODEL IS NOT TO SCALE AND IS INTENDED TO DISPLAY EXPOSURE PATHWAYS ONLY.
2. WITH RESPECT TO THIS INVESTIGATION, THE SOURCE OF POTENTIAL CONTAMINATION IS FROM SITE ACTIVITIES LEACHING INTO THE SURROUNDING SOILS, STORM WATER AND GROUNDWATER.
3. POTENTIAL EXPOSURE PATHWAYS ARE COLOUR CODED TO INDICATE IF THE PATHWAY IS:  
INCOMPLETE: **BLUE**  
POTENTIALLY COMPLETE: **ORANGE**  
COMPLETE: **PINK**

**POTENTIAL EXPOSURE PATHWAYS (NOTE 3)**

- ① GROUNDWATER FLOW TO CLIFF SEEPS (VIA DEEP AQUIFER)
- ② GROUNDWATER FLOW TO COASTAL MARINE AREA (VIA DEEP AQUIFER)
- ③ GROUNDWATER FLOW TO HEREKAWE AWA (VIA SHALLOW AQUIFER)
- ④ GROUNDWATER FLOW TO NEARBY PROPERTIES (VIA SHALLOW AQUIFER)
- ⑤ DERMAL CONTACT, INGESTION OF CONTAMINATED MATERIALS (SOIL)
- ⑥ MOBILISATION DURING DISTURBANCE WORKS (INCL. DISCHARGE TO SURFACE OR GROUNDWATER)
- ⑦ INHALATION OF VOLATILE CHEMICALS, DUST, FIBRES
- ⑧ STORMWATER DISCHARGED DIRECTLY TO HEREKAWE AWA
- ⑨ VAPOUR INTRUSION
- ⑩ EXCAVATED MATERIAL DISPOSED OFFSITE (IF REQUIRED)

**POTENTIAL RECEPTORS**

- Ⓐ RECREATIONAL USERS
- Ⓑ SHORE/ MARINE BIOTA
- Ⓒ PUBLIC CONSUMING BIOTA
- Ⓓ FRESHWATER BIOTA
- Ⓔ ABSTRACTION OF GROUNDWATER (CONSIDERED INCOMPLETE)
- Ⓕ TERRESTRIAL ECOLOGY
- Ⓖ RESIDENTS OF SURROUNDING PROPERTIES (CONSIDERED INCOMPLETE WITH RESPECT TO VAPOUR INTRUSION)
- Ⓗ GENERAL PUBLIC UTILIZING RECREATIONAL AREAS
- Ⓘ SITE USERS (INVOLVED IN GROUND DISTURBANCE WORKS)
- Ⓙ POTENTIAL FUTURE SITE USERS (IF CONTAMINATED SOILS ARE NOT MANAGED APPROPRIATELY TO PREVENT FUTURE EXPOSURE PATHWAYS)
- Ⓚ RECEPTORS IN VICINITY OF THE DISPOSAL SITE, PROVIDED OFFSITE DISPOSAL IS REQUIRED (NEGLECTIBLE HUMAN HEALTH EFFECTS IF MATERIALS ARE DISPOSED OF TO AN APPROPRIATE RECEIVING FACILITY).

**LEGEND**

	LOAMY SAND/ SANDY LOAM		SAND		DEEP AQUIFER LEACHING
	ANDESITE		SAND (WITH ASH)		SHALLOW AQUIFER LEACHING
	UNCERTAIN		CLAY		DEEP AQUIFER
	UNKNOWN				SHALLOW AQUIFER

TITLE  
**CONCEPTUAL SITE MODEL (NTS)**  
 NORTH TO SOUTH

CLIENT, PROJECT  
**DOW CHEMICAL (NZ) LIMITED**  
 PARITUTU CONTAMINATED LAND ASSESSMENT



PROJECT No.	21795.0210
DRAWN	CLHE
APPROVED	
DATE	JUNE 2024

## Appendix I      Other information

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- RSLU

# Appendix I - Screenshot of information available on RSLU

Taranaki Regional Council

## Property Information

About Legend Layers Print Zoom To Point Draw / Measure More

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Home  
Refresh  
Left Arrow  
Right Arrow

Details
⌵
✕

Legal Description	LOT 3 DP 8465 LOT 1 DP 9022 LOTS 1 & 2 DP 9829 LOT 1 DP 10018
Land area (ha)	15.9685
Capital Value	7,530,000
Land Value	7,470,000
District Rates	105,161.51
Regional Rates	2,864.63
Total Rates	108,026.14
Valuation Date	Aug 2022

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▼ Groundwater Sampling Sites (1 of 1)

SITE_CODE	GND0442
EASTING	1,688,615.00
NORTHING	5,675,843.00

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▼ Selected Land Use (1 of 2)

RSLU_ID	0048-0
STATUS	1(b)-Haz Subs Present-Risk acceptable for land use
HIST_USE	Chemical Processing/Manufacturing
CUR_USE	Chemical Processing/Manufacturing
EASTING	1688578
NORTHING	5675416

100m
1688247.06 5675787.03 Meters | Scale 1:4514

## RSLU Detail Report For 0048-0

26 July 2024

Authorisation Number 0048-0  
Local Authority New Plymouth District

### Classifications

Anzsic Division Manufacturing  
Anzsic Subdivision Petroleum, Coal, Chemical and Associated Product Manufacturing  
Anzsic Group Other Chemical Product Manufacturing  
Anzsic Class Pesticide Manufacturing

### Location

Common Address 89 Paritutu Road  
River (Catchment) Tasman Sea (Tasman Sea)  
Map References P19:986-371 Global Positioning System  
VNZ Legal Desc LOT 3 DP 8465 LOT 1 DP 9022 LOTS 1 & 2 DP 9829 LOT 1 DP 10018  
Valuation Ref 11720 568 - 0

### Parameters

Classification	Chemical Processing/Manufacturing
Confirmation of Status	1(b)-Haz Subs Present-Risk acceptable for land use
HAIL	35
Land Use	Commercial/Industrial
RSLU Classification	Chemical Processing/Manufacturing

### General Comments

Entered By: D Busing  
Date: 12.7.93  
Updated By: W McLarin  
Date: 16.9.97 & 15/5/00

Known Owners and Occupiers:  
Dow AgroSciences (NZ) Ltd  
DowElanco NZ Ltd  
Ivon Watkins Dow Ltd.

Information on this Site:  
1993 Company investigating soil and groundwater on site.  
TRC Annual Reports 93-50, 94-53, 95-78, 96-74,97-88, 98-77,99-39.  
UIR 9596073 files.  
P 3/19/3 NPDC UST list indicates tanks are located here.

0016wll ground water monitoring bores

UIR 9596073 leakage of trade waste pipes.  
UIR 9596241 circulating tank overflow - 20 litres of sulphuric acid discharged.

Discharge Consents Issued By TRC or TCC:  
TRK 924020 Air permit, synthesis and formulation of detergents, surface active agents, insecticides, herbicides, fungicides, plant hormones, like organic compounds and associated processes.  
TRK 924107 Air discharge from an agrichemical formulation process (lapsed).  
TRK964020 Air discharge.  
TRK934108 Stormwater discharge.  
TRK960269 Waireka Research Station.  
TRK961229 Leachate discharge, Waireka Research Station.  
TRK964571 Waireka coastal structure.(surrendered)  
0016WLL groundwater monitoring bores.

Investigated for technical report 2001-42 "Investigation of alleged agrichemical waste disposal sites in New Plymouth"

26 July 2024

## **RSLU Detail Report For 0048-0**

Site F (IWD-1 south eastern corner of property) 2598663-6237173

Site U (IWD-2 south west area of property)

Site Zf (IWD-3 south eastern corner of site, north of site F)

Site Zg (IWD-4 western area, middle of site)

Dioxin concentrations in residential soil, Paritutu, New Plymouth, Paddle Delamore Partners Ltd, September 2002

There may be other records of incidents, consents or reports associated with this site held by Taranaki Regional Council.

[www.tonkintaylor.co.nz](http://www.tonkintaylor.co.nz)

