Milford Opportunities Project

SUMMARY REPORT - CONTAMINATED SITES ASSESSMENT

13 MAY 2024

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GLOSSARY

CLMG 1	Contaminated Land Management Guideline No. 1: Reporting on Contaminated Sites in New Zealand
CLMG 5	Contaminated Land Management Guideline No. 5: Site investigation and analysis of soils
CMMP	Contaminated Materials Management Plan
CoC	Chain of Custody
CSM	Conceptual Site Model
CSMP	Contaminated Site Management Plan
DOC	Department of Conservation
DSI	Detailed Site Investigation
ES	Environment Southland
H&S	Health and Safety
HAIL	Hazardous Activities and Industries List
IANZ	International Accreditation New Zealand
ILAC	International Laboratory Accreditation Cooperation
ILAC-MRA	ILAC Mutual Recognition Arrangement
IRB	International Risk Based
LINZ	Land Information New Zealand
LRIS	Land Resource Information Systems
m bgl	meters below ground level
MfE	Ministry for the Environment
MMP	Ongoing Monitoring and Management Plan
MOP	Milford Opportunities Project
MoW	Ministry of Works
N/A	Not applicable
ND	Not derived
NES	National Environmental Standards
NESCS	National Environment Standard for Assessing and Managing Contaminants in Soil to Protect Human Health
NL	No limit - derived value exceeds 10,000mg/kg

NZRB	New Zealand Risk Based
PoL	Piece of Land
PSI	Preliminary Site Investigation
PSSP	Project Site Safety Plan
QA/QC	Quality assurance and Quality Control
RAP	Remedial Action Plan
SCS (health)	Soil Contaminant Standards for Health
SDC	Southland District Council
SGV	Soil Guideline Value
SID	Safety in Design
SQEP	Suitable Qualified and Experienced Practitioner
SSL	Soil Screening Level
SVR	Site Validation Report
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxicity Equivalent – indication of the toxicity of a mixture of compounds
UPSS	Underground Petroleum Storage System

EXECUTIVE SUMMARY

WSP New Zealand Ltd (WSP) was commissioned by Milford Opportunities Project (MOP) to undertake a review of contaminated site assessments that have been undertaken in Te Rua-o-Te-Moko Fiordland National Park (the site).

Several Nodes have been earmarked for possible (re)development of infrastructure to enhance the visitor experience on the journey between Te Anau and Milford Sound Piopiotahi.

The objective of this summary report is to compile information from previously completed Preliminary Site Investigation (PSI) reports and HAIL Assessments regarding whether it is more likely than not that an activity or industry described in the Ministry for the Environment (MfE) Hazardous Activities and Industries List (HAIL) (MfE, 2011a) is being or has been undertaken on the site.

The findings have then been used to inform the scope of further required investigations and associated cost estimates. A summary of the conclusions and recommendations can be found in Table 1 below.

Table 1: Conclusions of summary report regarding further investigations and estimated cost.

Node	HAIL Category	PSI/DSI Scope Outline	Cost estimate
Node 1: Gateway	Green	N/A	N/A
Node 2: Eglinton Reveal	Green	N/A	N/A
Node 3: Te Huakaue (Knobs Flat)	Red	DSI to assess risks to human health and the environment for any ground disturbance in the locality of the defined Pieces of Land. Sampling and analysis of soils within near surface environment for heavy metals and, where applicable, hydrocarbon contaminants. Halo investigation around deleterious buildings to assess for asbestos and/or lead based paint. Surface and groundwater investigation associated with wastewater discharge	$15,000 – $25,000
Node 4: Ōtāpara Cascade Creek	Orange	PSI to further assess extent of possible HAIL activities on site, including site inspection.	$10,000
Node 5A: The Divide	Green	N/A	N/A
Node 5B: Whakatipu Trails head	Green	N/A	N/A
Node 6: Gertrude Valley	Green	N/A	N/A

Node	HAIL Category	PSI/DSI Scope Outline	Cost estimate
Node 7: Cleddau Cirque	Green	N/A	N/A
Short stop: The Chasm	Green	N/A	N/A
Visitor's Hub	Red	DSI's to assess risks to human health and the environment for any ground disturbance in the locality of the Pieces of Land defined in the sections above. DSIs likely to involve the excavation of test pits or window sample holes for soil sampling to depths up to 3.0m bgl along with surface sampling of halos around buildings for asbestos/lead-based paint assessment. Limited groundwater sampling and analysis from window sample holes should groundwater be encountered, and ground conditions indicate the need for initial assessment. Additional boreholes for groundwater monitoring may be warranted based on development proposals along with the findings of the soil sampling and analysis and/or initial groundwater assessment. Detailed groundwater investigations are not allowed for within these estimates.	$45,000 – $55,000
Freshwater Basin	Red		$35,000 – $40,000
Cleddau Delta	Red		$25,000 - $30,000
Deepwater Basin	Red		$35,000 - $40,000

1 INTRODUCTION

1.1 BACKGROUND

A summary review of contaminated site assessments has been undertaken on behalf of Milford Opportunities Project (MOP) in the Te Rua-o-Te-Moko Fiordland National Park (the site).

Several Nodes have been earmarked for possible (re)development of infrastructure to enhance the visitor experience on the journey between Te Anau and Milford Sound Piopiotahi. The site is split up into two areas: the Milford corridor, comprising seven different Nodes along the Milford-Te Anau Road, and Milford Sound Piopiotahi, which has four interlinking Nodes comprising Visitor's Hub, Freshwater Basin, Deepwater Basin, and Cleddau Delta.

1.2 OBJECTIVE

The objective of this summary report is to compile information from previously completed Preliminary Site Investigation (PSI) reports and HAIL Assessments regarding whether it is more likely than not that an activity or industry described in the Ministry for the Environment (MfE) Hazardous Activities and Industries List (HAIL) (MfE, 2011a) is being or has been undertaken on the site.

This summary will then inform the nature and extent of further intrusive investigations required and the likely costs associated with the identified work.

1.3 SCOPE OF WORK

To achieve the objectives the following scope of work was undertaken:

- Review of HAIL assessment and PSI report completed by WSP for MOP and PSI reports completed by e3Scientific (e3S) on behalf of Department of Conservation (DoC)
- Assessment of likely HAIL activities present at each Node/area of the site and associated contaminants of concern.
- Production of a Conceptual Site Model (CSM) for each area of the site where HAIL is noted.
- Assessment of qualitative risks to human health and the environment based on review of the HAIL/PSI findings.
- Assessment of likely consenting requirements for each Node/area of the site.
- Outline of likely further work and estimate of costs to complete.

2 SITE DETAILS AND ENVIRONMENTAL SETTING

2.1 SITE IDENTIFICATION

The sites are located within Te Rua-o-Te-Moko Fiordland National Park, along the Te Anau-Milford Highway or State Highway 94. The sites have been split into two parts: the Nodes along the Milford Corridor and the Nodes within Milford Sound Piopiotahi. Figures 2-1 and 2-2 have been extracted from the MOP Masterplan showing the proposed Nodes and development for these two areas respectively.

For further, more detailed, environmental information on each Node, the reader is referred to the HAIL assessment and PSI reports undertaken by WSP and e3Scientific, referenced in Section 3.1 below.

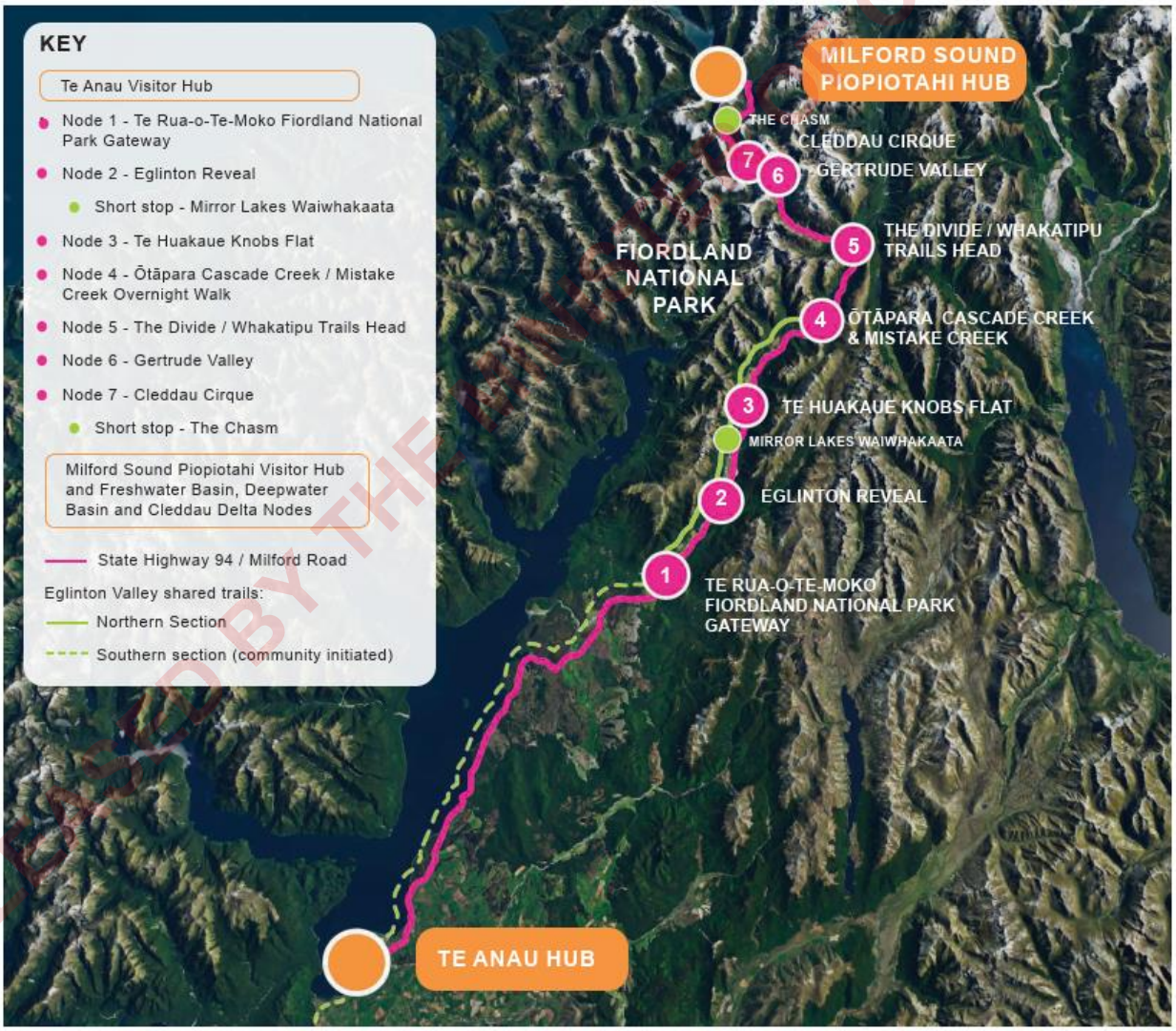

Figure 2-1: Site location plan showing the proposed Nodes along the Milford Corridor.

Figure 2-2: Site location plan for Milford Sound Piopiotahi.

3 DATA REVIEWED

3.1 OVERVIEW

Previous investigations have been undertaken on the Milford Corridor and within Milford Sound Piopiotahi.

A review of locations was undertaken along the Milford Corridor to determine whether potentially contaminating activities have more likely than not been undertaken within the proposed Nodes along the corridor. As part of this assessment the Environment Southland (ES) Hazardous Activities and Industries List (HAIL) database was consulted which recorded HAIL activities at Node 3, Te Huakaue/ Knobs Flat. As such a Preliminary Site Investigation (PSI) was completed for this Node by WSP as part of the preliminary assessment process for MOP (WSP, 2024b).

In 2022 the Department of Conservation (DoC) established a centre-led Contaminated Site Programme to prioritise the investigation, management and remediation of potentially contaminated sites within the conservation estate. As part of this programme, DoC engaged e3 Scientific (e3S) to conduct a series of PSIs covering the wider Milford Sound Piopiotahi area to gain a qualitative understanding of the risks posed by contaminants in soil to human health and the environment. Six PSIs were completed by e3S as part of this commission with each report covering a discrete area within Milford Sound Piopiotahi. In addition, e3S were commissioned to complete an assessment in the form of a Preliminary and Detailed Site Investigation (PSI/DSI) of the Little Tahiti Landfill, the area of which is under consideration for use as part of theMilford Opportunities Project.

The following reports were reviewed as part of the Milford Opportunities Transport and Infrastructure – Engineering Feasibility Assessment and have been used within this summary report:

- WSP: Te Huakaue/ Knobs Flat Preliminary Site Investigation, February 2024;
- e3S: Milford Sound Piopiotahi – Cleddau Village Preliminary Site Investigation, Department of Conservation, September 2022
- e3S: Milford Sound Piopiotahi – Ferry Terminal Preliminary Site Investigation, Department of Conservation, September 2022
- e3S: Milford Sound Piopiotahi – Freshwater Basin Preliminary Site Investigation, Department of Conservation, September 2022
- e3S: Milford Sound Piopiotahi – Deepwater Basin Preliminary Site Investigation, Department of Conservation, September 2022
- e3S: Milford Sound Piopiotahi – Cleddau Village Preliminary Site Investigation, Department of Conservation, September 2022
- e3S: Milford Sound Piopiotahi – Airport Preliminary Site Investigation, Department of Conservation, September 2022
- e3S: Little Tahiti Landfill Preliminary and Detailed Site Investigation, Department of Conservation, January 2022;
- e3S: Little Tahiti Remedial Options Stakeholder Consultation, Department of Conservation, May 2022

In addition, a PSI was obtained for the Milford Sound Lodge, however as the lodge is currently not part of the MOP Masterplan, WSP has considered this area as out of the scope for this summary report.

3.2 CONSENTING CONSIDERATIONS

An assessment has been made as to the applicability and requirements of the NES-CS Regulations (Ministry for the Environment, 2011), and the proposed Southland Water and Land Plan (pSWLP) (Environment Southland Regional Council Te Taiao Tonga, 2023) for each Node.

A summary of the requirements has been provided below.

3.2.1 NES-CS REGULATIONS

The NES-CS Regulations apply to the site if investigation results reveal that HAIL activities are occurring or have occurred on the site (Ministry for the Environment, 2011).

3.2.1.1 Land Use Change and Subdivision

Regulation 8(4) of the NES-CS states that subdividing or changing the use of a piece of land is a permitted activity while the following requirements are met:

a. A PSI of the land or piece of land must exist;
b. The report on the PSI must state that it is highly unlikely that there will be a risk to human health if the activity is done to the piece of land;
c. The report must be accompanied by a relevant site plan to which the report is referenced.
d. The consent authority must have the report and the plan.

To be a permitted activity, a change in use or future subdivision involving the pieces of HAIL land identified as probable or certain would require an assessment of risk associated with the proposed change. The PSI would need to confirm that it is highly unlikely that there will be a risk to human health if the activity is done to the piece of land. Depending on the nature of the proposed use, this may or may not be possible.

In the absence of a DSI, any subdivision or change in use to a piece of land which does consider it likely to be a risk to human health would be a fully discretionary activity under Regulation 11.

3.2.1.2 Soil Disturbance

Regulation 8(3) states that disturbing the soil of the piece of land is a permitted activity while the following requirements are met:

a. Controls to minimise the exposure of humans to mobilised contaminants must:
    i. be in place when the activity begins.
    ii. be effective while the activity is done.
    iii. be effective until the soil is reinstated to an erosion-resistant state.
b. The soil must be reinstated to an erosion-resistant state within 1 month after the serving of the purpose for which the activity was done.
c. The volume of the disturbance of the soil of the piece of land must be no more than 25 m3 per 500 m2.
d. Soil must not be taken away in the course of the activity, except that,—

i For the purpose of laboratory analysis, any amount of soil may be taken away as samples.

ii For all other purposes combined, a maximum of 5 m3 per 500 m2 of soil may be taken away per year.

e Soil taken away in the course of the activity must be disposed of at a facility authorised to receive soil of that kind:

f The duration of the activity must be no longer than 2 months:

g The integrity of a structure designed to contain contaminated soil or other contaminated materials must not be compromised.

Any soil disturbance or removal that does not meet the permitted activity criteria outlined in Regulation 8(3) would be a discretionary activity under Regulation 11 unless a DSI to quantify contaminant concentrations and risks to human health is completed.

Consent for ground disturbance works for the purposes of ground investigation may be required on site should sufficient material be disturbed. This is particularly pertinent if works are carried out concurrently with geotechnical investigations where deeper boreholes are considered. As works may be completed across a large area of Milford Sound Piopiotahi during these investigations, a global consent for all of the works may be a consideration. Consultation with a Planner should occur to determine the most appropriate course of action with respect to consenting for earthworks and/or investigations across the site.

3.2.2 PROPOSED SOUTHLAND WATER AND LAND PLAN

In October 2023, the new proposed Southland Water and Land Plan (pSWLP) was released (Environment Southland Regional Council Te Taiao Tonga, 2023). The rules relating to passive discharge from landfilling and contaminated sites are operative within this plan.

Passive discharges are regulated through the pSWLP. The rules relating to closed landfills and contaminated sites are operative.

Pertinent rules to the site include Rule 46 – Land contaminated by a hazardous substance:

a The discharge of contaminants from land contaminated by a hazardous substance onto or into land in circumstances which may result in contaminants entering water is a permitted activity provided:

i The hazardous substance in the discharge results from an activity authorised by a rule in this Plan or a resource consent granted by the Southland Regional Council; or

ii The discharge does not result in a breach of the trigger values for toxicants presented in Table 3.4.1 in the Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC) 2000 at the level of protection set in those guidelines for 80% of species, except for benzene where the level of protection is 90% of species (i.e. 1 milligram per litre), at the nearest of:

A 50 metres from the discharge; or

B The landholding boundary; or

C Any point immediately adjacent to a lake, river, artificial watercourse, modified watercourse, natural wetland, the coastal marine area, or water abstraction bore (excluding monitoring bores); and

iii The discharge does not result in a breach of the Drinking Water Standards for New Zealand 2005 (Revised 2008) in any bore utilised for potable supply, except where the ambient water quality naturally breaches those Standards, and the discharge does not result in any further degradation of the water quality.

b The discharge of soil from land contaminated by a hazardous substance onto or into land in circumstances which may result in those contaminants entering water is a permitted activity provided:

i The hazardous substance in the soil results from the application of a fertiliser or agrichemical to the land authorised by a rule in this Plan or a resource consent granted by the Southland Regional Council; or

ii The soil is being returned to the excavation or site from which it was taken.

c The discharge of contaminants or soil from land contaminated by a hazardous substance onto or into land in circumstances which may result in those contaminants entering water that does not meet one or more of the conditions of Rule 46(a) or (b) is a discretionary activity.

Discharge consenting may be required for stormwater management during any earthworks on site. In addition, regional consent may also be required for the disturbance of a contaminated site for investigation purposes. Both of these considerations would need to be looked at by a Planner with knowledge of the Regional Plan to determine the most appropriate course of action and determine the entity with whom consenting responsibility lies. This is outside the scope of this report.

4 SUMMARY OF DATA REVIEW

4.1 MILFORD CORRIDOR NODES

The HAIL assessment of the Milford Corridor Nodes (WSP, 2024a) and PSI for Te Huakaue Knobs Flat (WSP, 2024b) undertaken by WSP for the MOP were reviewed. A summary of the findings for each proposed Node along the Milford Corridor and recommended further investigations have been summarised below.

Each Node has been assessed and categorised in one of the following classifications to better inform further investigation requirements:

- GREEN: HAIL activities (current or past) are unlikely;
- ORANGE: HAIL activities (current or past) are possible; and
- RED: HAIL activities (current or past) are likely or known.

4.1.1 NODE 1: TE RUA-O-TE-MOKO (FIORDLAND NATIONAL PARK ENTRANCE)

The masterplan proposes to install a large drive through sign, marker or artwork signalling the entrance into Te Rua-o-Te-Moko Fiordland National Park. A shared trail might start off the Milford-Te Anau Rd. However, due to spatial constraints, no infrastructure will be developed at this Node.

When driving through the site the contrast between the open grasslands before and the dense native beech forest after the proposed 'Gateway' is noticeable. The area alongside the road comprises a generally flat, vacant landscape. No significant waterways or possible sources of contamination were noted.

4.1.1.1 HAIL ASSESSMENT AND RECOMMENDATIONS

It is considered highly unlikely that HAIL activities are currently or have been occurring on the site. As such, Node 1 has been classified as GREEN. No further contaminated land investigations are recommended at this stage of the project.

4.1.2 NODE 2: EGLINTON REVEAL

The Eglinton Reveal is a popular stopping point for visitors as a photo opportunity. The site lies on the valley flat with high mountains around. An informal walking track was noted towards the Upokororo Eglinton River, approximately 200m to the west. The area surrounding the road was generally flat with native beech trees surrounding the larger area up to the mountain ranges. A flat terraced area was noted east of the road.

It is understood that the Masterplan proposes that access into the national park would be managed from this point onwards. An entrance barrier will limit vehicle access and support facilities will be developed such as a car park, public toilets, etc. The establishment of several viewing areas and a river trail is proposed.

Furthermore, a new walking track is proposed along the Countess Range. Although not directly related to this node, the Countess Range track and hut proposal is located relatively nearby, so it has been addressed here. As no reason for contamination is suspected and no extensive ground disturbance is expected, no further HAIL assessment has been undertaken for the range.

4.1.2.1 HAIL ASSESSMENT AND RECOMMENDATIONS

It is considered unlikely that HAIL activities are currently or have been occurring on the site. As such, Node 2 has been classified as GREEN. No further investigations associated with potential land contamination are recommended at this stage of the project.

4.1.3 NODE 3: TE HUAKAUE KNOBS FLAT

A PSI has been undertaken by WSP on behalf of MOP at Te Huakaue Knobs Flat (WSP, 2024b).

The site is currently used as a bus service stop and campsite, operated by Eglinton Valley Camp, with accommodation cabins, non-powered and powered tent and campervan bays.

As part of the MOP feasibility phase, the site has been earmarked for possible redevelopment and expansion of the existing accommodation with amenity buildings and simple cabins. These are likely to comprise a commercial end use. The site is located along the Te Anau-Milford Highway (SH 94) and comprises a grassy flat surrounded by native beech trees.

4.1.3.1 HAIL ASSESSMENT

A desktop study along with a site walkover have identified HAIL activities that may have occurred historically or are currently occurring on the site. A summary of the HAIL activities with potential contaminants of concern is provided in Table 4-1 below.

Table 4-1: Summary of identified HAIL activities at Te Huakaue Knobs Flat.

HAIL category	HAIL Activity	Potential Contaminants of Concern
A17	Storage tanks or drums for fuel, chemicals or liquid waste.	Petroleum hydrocarbons (TPH, PAH, BTEX), heavy metals
E1	Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition.	Asbestos containing materials (ACM); Asbestos fines/Fibrous asbestos
F8	Transport depots or yards including areas used for refuelling or the bulk storage of hazardous substances.	Petroleum hydrocarbons (TPH, PAH, BTEX), Heavy metals
G3	Landfill sites.	Petroleum hydrocarbons (TPH, PAH, BTEX), Heavy metals
G6	Waste recycling or water or wastewater treatment.	Heavy metals; semi-volatile organic compounds (sVOCs), microbiological parameters including ammoniacal nitrogen.
I	Any other land that has been subject to the intentional or accidental release of hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Lead based paint on old buildings

4.1.3.2 CONCEPTUAL SITE MODEL

Using the identified potential HAIL activities or industries, a site-specific conceptual site model (CSM) was developed. A possible pollutant linkage between the contaminant source and receptor is defined as one that has the potential to represent unacceptable risks to human health or the environment. The CSM is presented in Figure 4-1. The Pieces of Land (PoL) identified in the PSI are presented in Figure 4-2.

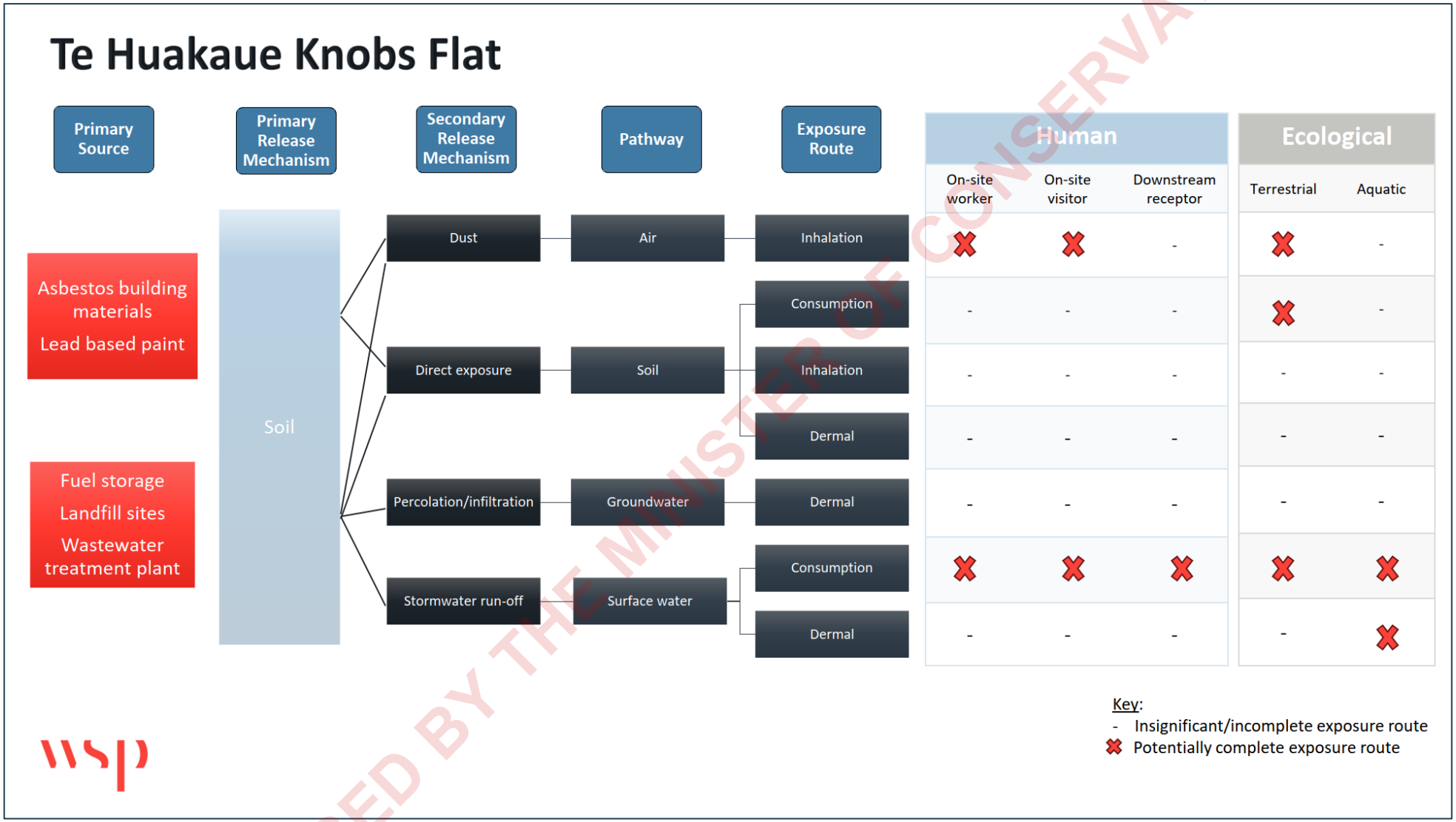

Figure 4-1: Conceptual Site Model for Te Huakaue Knobs Flat.

Figure 4-2: Pieces of Land with identified HAIL activities for Te Huakaue Knobs Flat.

4.1.3.3 RISK ASSESSMENT

As HAIL activities are known to have or be occurring on the site, Node 3 has been classified as RED.

An assessment of the risks to human health associated with potential contaminants of concern on the PoL concluded a low risk associated with the ongoing use of the premises for commercial accommodation. Risks to human health on the remainder of the site are low.

Further assessment of the risks to human health and the environment should be completed should ground disturbance and potential mobilisation of contaminants occur within the defined Pieces of Land.

4.1.3.4 CONSENTING CONSIDERATIONS

NES-CS REGULATIONS

Investigation results revealed that HAIL activities are occurring or have occurred on the site. As such, the NES-CS Regulations apply to the site (Ministry for the Environment, 2011).

LAND USE CHANGE AND SUBDIVISION

This PSI has concluded that it is highly unlikely for there to be a risk to human health associated with the use of the site for commercial accommodation or campsite. As such, providing no ground disturbance occurs, according to Regulation 8(4) of the NES-CS, subdividing the piece of land is a permitted activity.

Should a more sensitive land use be proposed, based on the findings there are potential risks associated with soil contaminants and as such a Detailed Site Investigation (DSI) would be necessary to further quantify these risks. In the absence of a DSI, future land use changes would be a discretionary activity under Regulation 11 of the NES-CS.

SOIL DISTURBANCE

Any soil disturbance or removal that does not meet the permitted activity criteria outlined in Regulation 8(3) (refer to Section 3.2 of this report) would be a discretionary activity under Regulation 11 unless a DSI to quantify contaminant concentrations is completed.

Likely conditions associated with the activity status would include the requirement for a DSI for the piece of land, prior to any ground disturbance on site in excess of permitted activity volumes.

PROPOSED SOUTHLAND WATER AND LAND PLAN

In October 2023, the new Proposed Southland Water and Land Plan (pSWLP) was released (Environment Southland Regional Council Te Taiao Tonga, 2023). The rules relating to passive discharge from landfilling and contaminated sites are operative within this plan.

The piece of land considered likely to be generating a passive discharge are contaminated soils which may remain following removal of the Underground Petroleum Storage System (UPSS).

Further assessment of the results pertaining to soil and groundwater contamination should be completed to assess the activity status of any discharge. In the absence of further investigation, soil disturbance would be considered a discretionary activity.

4.1.4 NODE 4: ŌTĀPARA CASCADE CREEK

Ōtāpara Cascade Creek is currently operated as a DOC campsite. The main camping areas are gravelled with toilet facilities noted. Several tents and self-contained campervans were seen on site. Cascade Creek flows south along the site with grasses and lupins on the banks. Steep mountain ranges were noted west of the site, emerging from the beech forest that surrounds the flat site.

The masterplan includes the expansion of the existing Cascade Creek campsite with additional spaces for tenting and camper vans. Several walking tracks will be developed, including a route linking up with The Divide.

4.1.4.1 HAIL ASSESSMENT

A review of historical aerials revealed Ōtāpara Cascade Creek was previously used as a Ministry of Works (MoW) campsite. Anecdotal evidence suggests that MoW campsites generally comprised prefabricated timber huts, that were moved along during the construction of the Milford Road. However, as some earthwork bunds were noted on the 1983 aerial and due to findings at the similar Knobs Flat campsite revealing the presence of underground petroleum storage tanks, HAIL activities may have occurred at Cascade Creek in the past.

As such, the site has been classified as ORANGE. The HAIL activities most likely to be considered present are summarised in Table 4-2 below.

Table 4-2: Summary of potential HAIL activities as Ōtāpara Cascade Creek.

HAIL category	Hail activity	Potential contaminants of concern
I	Any other land that has been subject to the intentional or accidental release of hazardous substance in sufficient quantity that it could be a risk to human health or the environment. Associated with accidental spillage during fuel storage/refuelling.	Fuel storage: Petroleum hydrocarbons (TPH, PAH, BTEX), heavy metals Stockpiled/landfilled materials, unlikely but plausible: Lead based paint on old buildings & asbestos (ACM/asbestos fines) in landfilled building waste

A conceptual site model has been developed to assess further investigation requirements.

4.1.4.2 CONCEPTUAL SITE MODEL

Using the identified potential HAIL activities or industries, a site-specific CSM was developed. The CSM is presented in Figure 4-3 below.

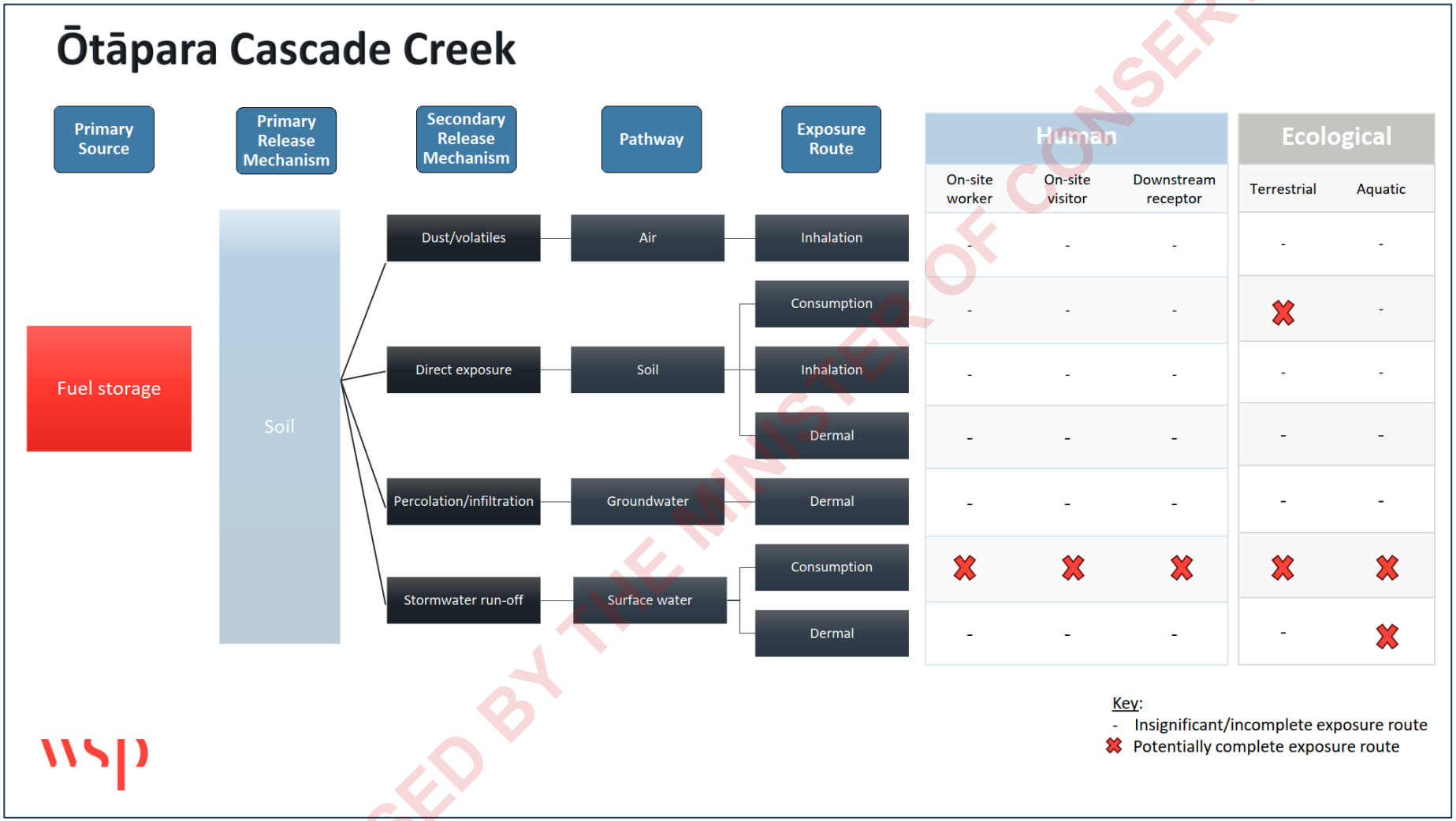

Figure 4-3: Conceptual Site Model for Ōtāpara Cascade Creek.

4.1.4.3 CONSENTING CONSIDERATIONS

It is recommended that a PSI is undertaken to further assess the applicability of the NESCS Regulations for any future soil disturbance, land use change or subdivision should it be proposed.

4.1.5 NODE 5A: THE DIVIDE

It is understood that Node 5 consists of two stops: The Divide and Whakatipu Trails Head. The Divide currently comprises a car park with shelter facilitating the start/end of several walking trails. The masterplan proposes to maintain the existing use of the facilities with possible redevelopment of several walking tracks. It is understood that no infrastructure development is proposed at this stage.

The site currently comprises a large, gravelled parking area. A shelter and information hub are located in the centre of the site with information boards on the surrounding ecology and environment.

4.1.5.1 HAIL ASSESSMENT AND RECOMMENDATIONS

It is considered highly unlikely that HAIL activities are currently or have been occurring on the site. As such, Node 5 – The Divide has been classified as GREEN. No further contaminated land investigations are recommended at this stage of the project.

4.1.6 NODE 5B: WHAKATIPU TRAILS HEAD

The second stop on Node 5 is the Whakatipu Trails Head. The site currently comprises a carpark at the start/end of multiple walking trails. The masterplan proposes to construct a shelter with living classroom for cultural education opportunities. Toilets will be built, and several walking tracks redeveloped.

4.1.6.1 HAIL ASSESSMENT AND RECOMMENDATIONS

The site has been classified as GREEN, due to it being unlikely that HAIL activities have been or are currently occurring. No further contaminated land investigations are recommended at this stage of the project.

4.1.7 NODE 6: GERTRUDE VALLEY

The site currently comprises a gravelled carpark facilitating an advanced walking track or viewing opportunity of the basin. Several notice boards inform the visitor on the surrounding environment, pest control and mountain safety awareness. Steep cliffs with waterfalls coming down encompass the valley. A creek flows along the eastern part of the site originating from the mountain ranges in the north of the valley and flowing southwards underneath the Milford Road. Evidence of past rockfall events and landslides was noted from the range east of the carpark. The NZAC Homer Hut is located in the northern part of the site.

The proposed development includes building a new shelter and toilets. A new, more accessible walking track with viewing platform is proposed. Some flood management measures might be required.

4.1.7.1 HAIL ASSESSMENT AND RECOMMENDATIONS

During the construction of the Homer Tunnel in 1935, the site comprised a MoW campsite. Often these campsites included prefabricated timber huts that got moved from site to site during the construction of the Milford Road. As such, it is considered likely that the buildings were completely removed from the site when no longer required. Due to the temporary nature of the campsite and small scale compared to other sites such as Te Huakaue/ Knobs Flat and Ōtāpara Cascade Creek, it is considered unlikely that contaminants of concern are present in sufficient quantities as to be considered HAIL.

As such, the site has been classified as GREEN and no further contaminated land investigations are recommended at this stage of the project.

4.1.8 NODE 7: CLEDDAU CIRQUE

The Cleddau Cirque is located off the second bend of the Milford Road, after the Homer Tunnel. The area is a popular stop-off point for visitors as short photo opportunity of the expansive views of the underlying valley. The site comprises a small gravel carpark with fencing indicating no further access. The large rock wall and associated Homer Tunnel were noted south-east of the site. A gravel stockpile was noted on the carpark.

The proposed development includes building a new shelter and expanding the carpark for a short bus stop.

4.1.8.1 HAIL ASSESMENT AND RECOMMENDATIONS

Historical aerials and the site walkover suggest the site was created a safe stop-over for visitors to take pictures. Due to the remote location of the site, it is assumed that the fill material for the construction of the carpark would originate from the surrounding area and likely comprise reworked natural materials. No concerning activities were noted on the aerials nor on site during the walkover, and as such the site has been classified as GREEN. No further investigations associated with contaminated land are recommended at this stage of the project.

4.1.9 SHORT STOP: THE CHASM

The Chasm is currently a short stop between the Homer Tunnel and Milford Sound Piopiotahi for viewing a series of waterfalls through water-sculpted rocks. The proposed development includes repurposing the carpark to service a hop on/hop off bus service and express coaches with a small area for short-term vehicle parking. Additional infrastructure may include a weather/bus shelter, interpretative displays, and toilet facilities. The site will be designed to accommodate an emergency evacuation area in the event of a disaster in Milford Sound Piopiotahi.

4.1.9.1 HAIL ASSESSMENT AND RECOMMENDATIONS

Historical aerials and anecdotal evidence suggest the site was created for use as a carpark to facilitate a walking track to the waterfalls. Due to the remote location of the site, it is assumed that the fill material for the construction of the carpark would originate from the surrounding area. A temporary campsite was noted in the 1938 aerial; however, it is considered to be at a sufficient distance of the site such that it is highly unlikely for there to be contaminants of concern in sufficient quantity as to be considered HAIL. As such the site has been classified as HAIL category GREEN. No further investigations associated with contaminated land are recommended at this stage of the project.

4.2 MILFORD SOUND PIOPIOTAHI HUBS & NODES

4.2.1 VISITOR'S HUB

The MOP Masterplan proposes to redevelop the current Milford Village into a visitor's hub that consolidates much of the infrastructure proposed within the reimagined Milford Sound Piopiotahi, including a new bus terminal, visitors centre, interpretive marine centre, hotel and staff accommodation and a range of outdoor experiences (MOP, 2021). Figure 4-4 below shows the preliminary proposed development plans for the visitor's hub.

Figure 4-4: Proposed development plan for visitor's hub as per the MOP Masterplan.

4.2.1.1 IDENTIFIED HAIL ACTIVITIES

The PSI undertaken by e3Scientific (e3S) for the Visitor's Hub area has been reviewed and information obtained has been summarised in the sections below (e3Scientific, 2022e). It should be noted that the PSI refers to this geographical area as Freshwater Basin, while the Masterplan names the same area as the Visitor's Hub.

As HAIL activities have been identified on the site, the Visitor's Hub has been classified as RED requiring further assessment to the risks to human health and the environment prior to development. A summary of the identified HAIL activities is provided in Table 4-3 below, with a location plan presented in Figure 4-5.

Table 4-3: Summary of identified HAIL activities.

HAIL ID	Location	HAIL Activity	Dates	Comment	Likelihood
SLUS-00000097	MPH Generator Shed	A17. Storage tanks or drums for fuel, chemicals, or liquid waste.	1950s – present	Diesel fired backup generator. Remediation undertaken but may not be complete.	Registered site (ES)
FWB1	Ex-Fire Station	F4. Motor vehicle workshops.	1930s (?) – 2000s	Fire station likely to be constructed when road crew where present, presence of inspection pit indicates vehicle maintenance occurred on site.	More likely than not.
SLUS-00000217	Allied Petroleum Self Service Station	F7. Service stations including retail or commercial refuelling facilities.	1960s – ongoing	Mobil sold to Allied Petroleum early 2000s, provision of fuel for visitor and local traffic.	Registered site (ES)
FWB2	MPL	A17. Storage tanks or drums for fuel, chemicals, or liquid waste.	1950s – present	After the Milford Highway was completed, it is likely that any coal or wood burners were replaced with diesel fired boilers.	Certain
FWB3					
FWB4					
FWB5	MPL and surrounding buildings	E1. Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition.	1930s – present	Asbestos has been identified as a building material at the hotel. During its lifetime it is more likely than not that the buildings have been in deteriorated conditions either through fire or long-term use.	More likely than not.
		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.	1900s – present	Potential discharge of degraded hazardous building materials (e.g., lead paint) to soil; 3m halo around all long-term structures in Milford Township.	Unverified

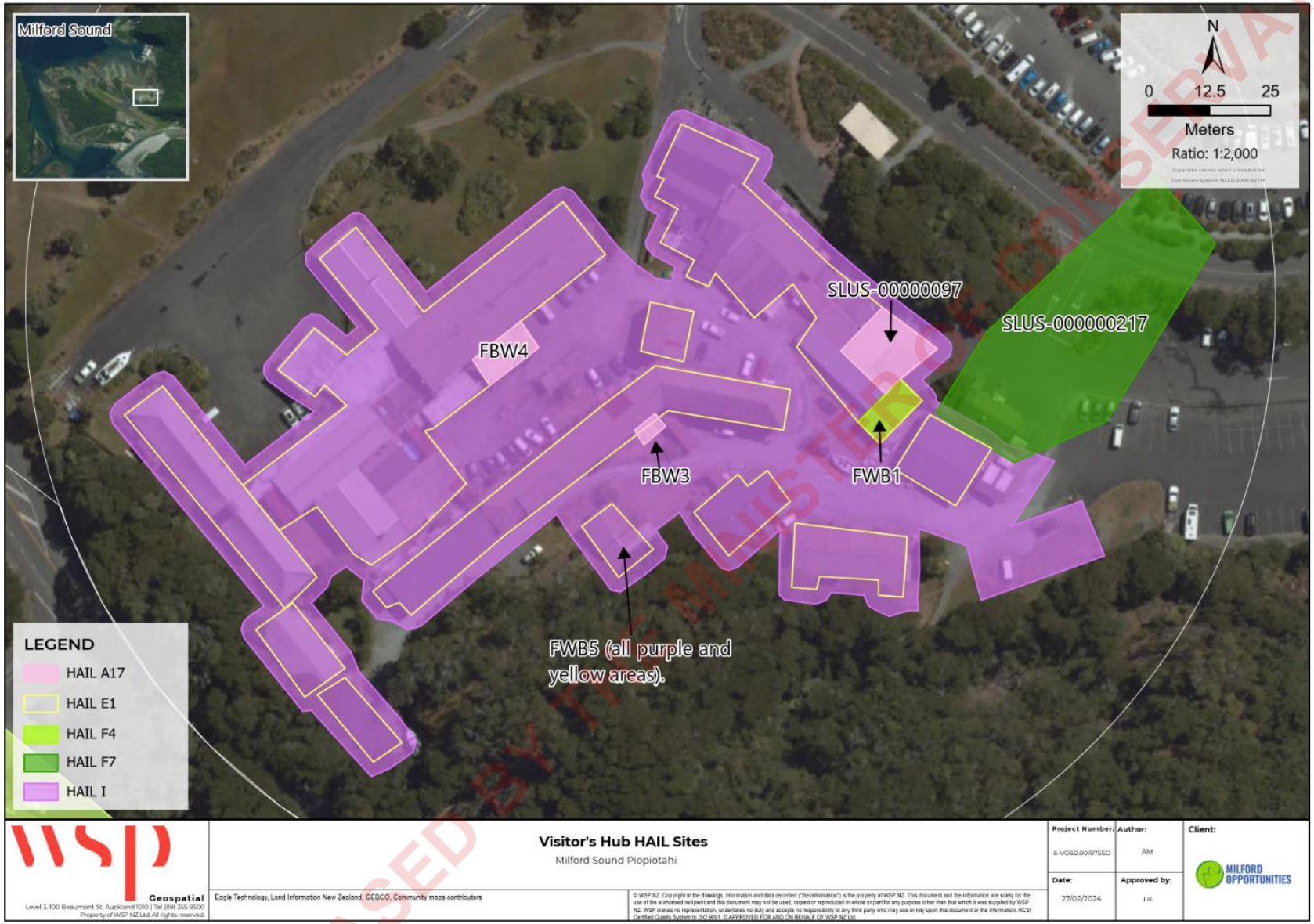

Figure 4-5: Site Location Plan Visitor's Hub with Identified HAIL Sites.

4.2.1.2 CONCEPTUAL SITE MODEL: VISITOR'S HUB

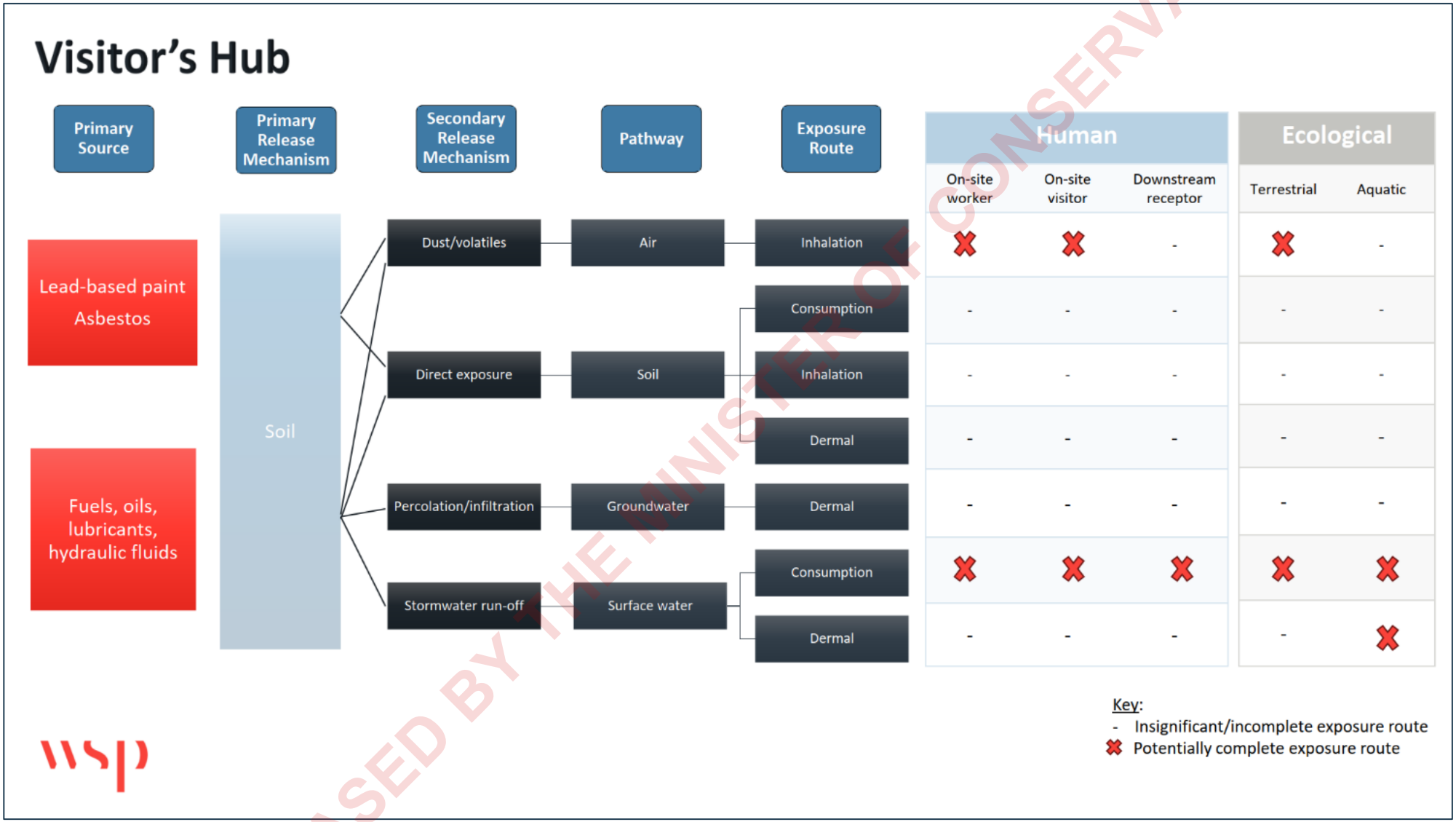

Figure 4-6: Conceptual Site Model for Visitor's Hub Milford Sound Piopiotahi.

4.2.1.3 CONSENTING CONSIDERATIONS

NES-CS REGULATIONS

Investigation results revealed that HAIL activities are occurring or have occurred on the site. As such, the NES-CS Regulations apply to the site (Ministry for the Environment, 2011).

LAND USE CHANGE AND SUBDIVISION

The PSI has concluded that it is highly unlikely for there to be a risk to human health associated with the ongoing use of the site as commercial/industrial (e3Scientific, 2022e). As such, according to Regulation 8(4) of the NES-CS, subdividing the piece of land is a permitted activity.

Should a more sensitive land use be proposed, based on the findings there are potential risks associated with soil contaminants and as such a Detailed Site Investigation (DSI) would be necessary to further quantify these risks. In the absence of a DSI, future land use changes would be a discretionary activity under Regulation 11 of the NES-CS.

SOIL DISTURBANCE

Any soil disturbance or removal that does not meet the permitted activity criteria outlined in Regulation 8(3) (refer to Section 3.2 of this report) would be a discretionary activity under Regulation 11 unless a DSI to quantify contaminant concentrations is completed.

The PSI concluded that for pieces of land within the site, any activity requiring soil disturbance should be managed under a contaminated site management plan or if a site management plan already exists, it should be updated to include any additional information from this report (e3Scientific, 2022e).

PROPOSED SOUTHLAND WATER AND LAND PLAN

The PSI concluded that the piece of land most likely to generate a passive discharge is SLUS-00000097, MPH's Generator Shed. An investigation undertaken by e3Scientific in 2019 included an assessment of the passive discharge against Rule 46 and found that the discharge met the permitted activity conditions. However, the report concluded that the conditions in the rule were not conservative enough for the environmental setting of the national park. An assessment was made against more conservative guidelines and concluded that the discharge would also not exceed those guideline values. The PSI states that further assessment of the groundwater quality is planned to provide additional data to validate the scale of effects from the discharge on the sensitive water body and aquatic taxa. No further results or assessments have been reviewed by WSP at this stage.

4.2.2 FRESHWATER BASIN NODE

The Freshwater Basin Node is located in a sheltered basin between the (Lady) Hine-te-awa Bowen Falls and Cleddau Deltas. The Node will be based around the existing boat terminal and jetties and will primarily be used as an experience Node for visitors with a short road link and separated boardwalk along the foreshore from the Visitor's Hub.

The Masterplan proposal includes possible modification or replacement of the existing boat terminal, construction of a natural hazard refuge, and development of several walking tracks (MOP, 2021). An overview of the proposed development plans can be found in Figure 4-7 below.

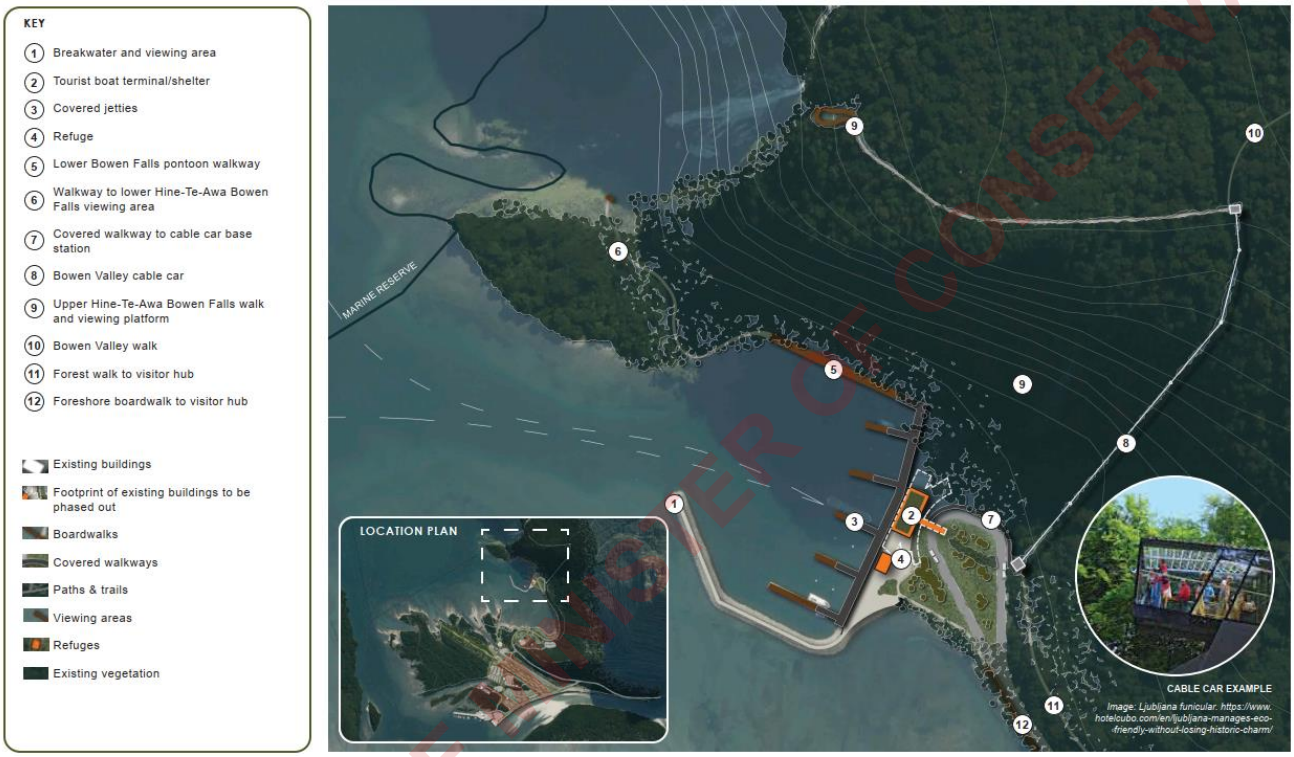

Figure 4-7: Proposed development plans for Freshwater Basin Node as per MOP Masterplan.

4.2.2.1 IDENTIFIED HAIL ACTIVITIES

A PSI has been undertaken by e3Scientific for the Ferry Terminal which is part of the Freshwater Basin Node in the Masterplan. The information provided in the sections below has been obtained after review of the abovementioned e3S PSI (e3Scientific, 2022d).

As HAIL activities have been identified on the site, the Freshwater Basin Node has been classified as RED requiring further assessment to the risks to human health and the environment prior to development. A summary of the identified HAIL activities and their locations has been provided in Table 4-4 and Figure 4-8 respectively.

Table 4-4: Identified HAIL activities at Freshwater Basin Node.

HAIL ID	Location	HAIL activity	Dates	Comment	Likelihood
FT1	Hydro scheme shed	A17. Storage tanks or drums for fuel, chemicals, or liquid waste. B2. Electrical transformers including the manufacturing, repairing, or disposing of electrical transformers or other heavy electrical equipment. B4. Power stations, substations, or switchyards.	1960s – present	400L diesel supplied backup generator for hydro scheme shed. Hydro scheme shed contains a generator, transformer, and other equipment for the generation of hydroelectric power.	Certain
		I. Any other land that has been subject to the intentional release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.	1960s – present	Potential discharge of degraded hazardous building materials (e.g. asbestos/lead-based paint) to soil; 3m halo around all long-term structures in Milford Township.	Unverified
FT2/SLUS-000000099	Allied Petroleum Marinestop	F7. Service stations including retail or commercial refuelling facilities.	1990s – ongoing	1x40,000L diesel tank with bowser and underground fuel supply to the jetties.	Registered site (ES)
FT3	Former above ground fuel supply facility.	F7. Service stations including retail or commercial refuelling facilities.	1960s – 1990s	Several large above ground storage tanks with a pump on the north side of the passenger terminal.	Certain
FT4	Ferry Terminal	A17. Storage tanks or drums for fuel, chemicals or liquid waste.	1990s – ongoing	Diesel fired boiler with 400L AST. Records show an underground fuel system, but this has not been sighted.	Certain
FT5				Records also indicate the presence of a former underground fuel compound. References in two documents of an underground fuel supply, potentially connected to the boiler (FT4). However, not verified by site workers. Further information required.	Possible

Figure 4-8: Site Location Plan Freshwater Basin with Identified HAIL Sites.

4.2.2.2 CONCEPTUAL SITE MODEL: FRESHWATER BASIN NODE

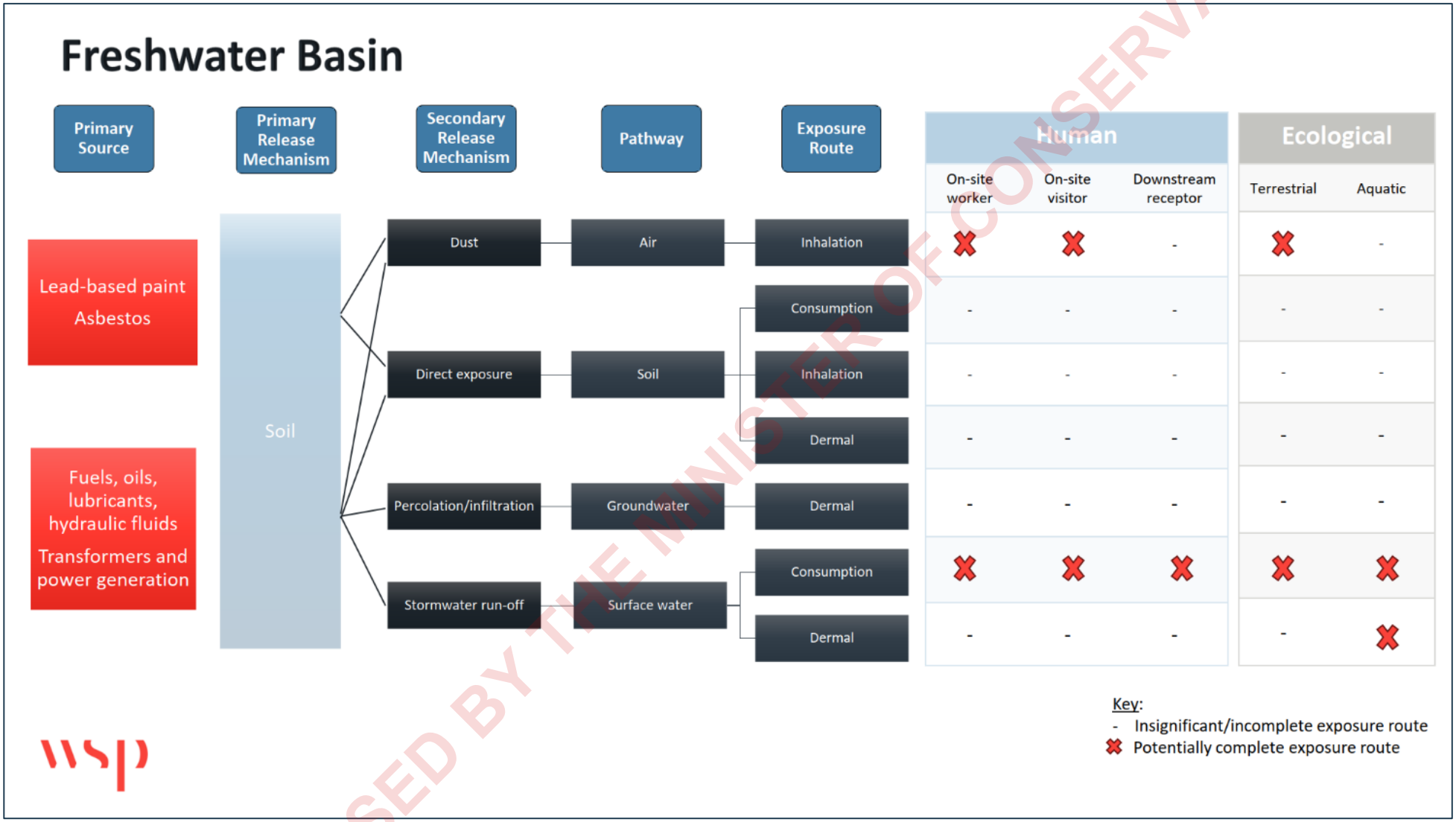

Figure 4-9: Conceptual Site Model for Freshwater Basin Milford Sound Piopiotahi.

4.2.2.3 CONSENTING CONSIDERATIONS

NES-CS REGULATIONS

Investigation results revealed that HAIL activities are occurring or have occurred on the site. As such, the NES-CS Regulations apply to the site (Ministry for the Environment, 2011).

LAND USE CHANGE AND SUBDIVISION

The PSI has concluded that it is highly unlikely for there to be a risk to human health associated with the ongoing use of the site as commercial/industrial (e3Scientific, 2022d). As such, according to Regulation 8(4) of the NES-CS, subdividing the piece of land is a permitted activity.

Should a more sensitive land use be proposed, based on the findings there are potential risks associated with soil contaminants and as such a Detailed Site Investigation (DSI) would be necessary to further quantify these risks. In the absence of a DSI, future land use changes would be a discretionary activity under Regulation 11 of the NES-CS.

SOIL DISTURBANCE

Any soil disturbance or removal that does not meet the permitted activity criteria outlined in Regulation 8(3) (refer to Section 3.2 of this report) would be a discretionary activity under Regulation 11 unless a DSI to quantify contaminant concentrations is completed.

The PSI concluded that for pieces of land within the site, any activity requiring soil disturbance should be managed under a contaminated site management plan or if a site management plan already exists, it should be updated to include any additional information from this report (e3Scientific, 2022a).

PROPOSED SOUTHLAND WATER AND LAND PLAN

The PSI concluded that the piece of land most likely to generate a passive discharge is FT2, Allied Marinestop fuel facility. Based on the results of previous investigations, the passive discharge of residual hydrocarbons in soil and groundwater is expected to meet the guidelines adopted in the pSWLP, and therefore in the absence of any information to the contrary, the discharge is a permitted activity (e3Scientific, 2022d).

4.2.3 CLEDDAU DELTA NODE

The Cleddau Delta Node is located between Freshwater and Deepwater Basins and was formed at the mouth of the Cleddau River prior to the channel being managed by the existing stop bank and the ground level of some areas being raised (MOP, 2021).

The MOP Masterplan proposes to remove the existing aerodrome runway for fixed wing flights to allow for spatial optimisation of Milford Sound Piopiotahi. This will free up additional space for other uses, such as a realigned road entry, bus terminal, publicly accessible view shafts/observation points and greater walking track connectivity across Cleddau Delta.

It is understood that currently three different proposals exist for the taxiway:

a Remove the runway to create space for alternative activities;

b Reuse the existing taxiway for bus access with a new taxiway on south side of existing runway;

c Leave the runway and taxiway as is.

From a contaminated land point of view, these options should be assessed depending on the quantities of soil disturbance, as further investigation may be required for soil disturbance in excess of permitted activity volumes.

Figure 4-10 shows an extract of the Masterplan showing the proposed development plans of Cleddau Delta.

Figure 4-10: Proposed development plan for Cleddau Delta as per MOP Masterplan.

4.2.3.1 IDENTIFIED HAIL ACTIVITIES

A review of two PSIs undertaken by e3Scientific for Cleddau Village (e3Scientific, 2022c) and the Airport (e3Scientific, 2022b) has revealed a historic landfill site and multiple fuel storage areas. Details of the identified HAIL activities are summarised in Table 4-5 below with a site location plan provided in Figure 4-11.

As HAIL activities have been identified on the site, the Cleddau Delta Node has been classified as RED requiring further assessment to the risks to human health and the environment prior to development.

It should be noted that the potential presence of PFAS has been identified as a data gap. Due to the small scale of the airport, no fire station being present on the aerodrome, and no known firefighting incidents or training to have occurred, the presence of PFAS is considered to be unlikely. However, as this remains a data gap, consideration of PFAS is recommended during further investigations.

Table 4-5: Summary of identified HAIL activities.

HAIL ID	Location	HAIL Activity	Dates	Comment	Likelihood
SLUS-00000247	Sinbad Drive Recreation area	G3. Landfill sites	1950s-1970s	Small domestic waste landfill mainly associated with the THC Hotel, received asbestos-containing materials after fire destroyed parts of the hotel.	Registered site (ES)
SLUS-00000319	The whole airport	F1. Airports including fuel storage, workshops, washdown areas, or fire practice areas.	1950s – present	Airport with refuelling compounds.	Registered site (ES)
AP1	Former south side refuelling compound including drums of fuel prior to the storage tanks.		1950s – 1984	A historic refuelling compound on the southside of the runway; included underground tanks and fuel storage in drums. Underground tanks were removed with the installation of the Mobil Aerostop on the northside of the runway.	Certain
AP2	Control tower	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.	1970s – present	A 3m halo around the building has been identified as due to the age of the building it is possible that lead paints were used.	Unverified

Figure 4-11: Site Location Plan Cleddau Delta with Identified HAIL Sites.

4.2.3.2 CONCEPTUAL SITE MODEL

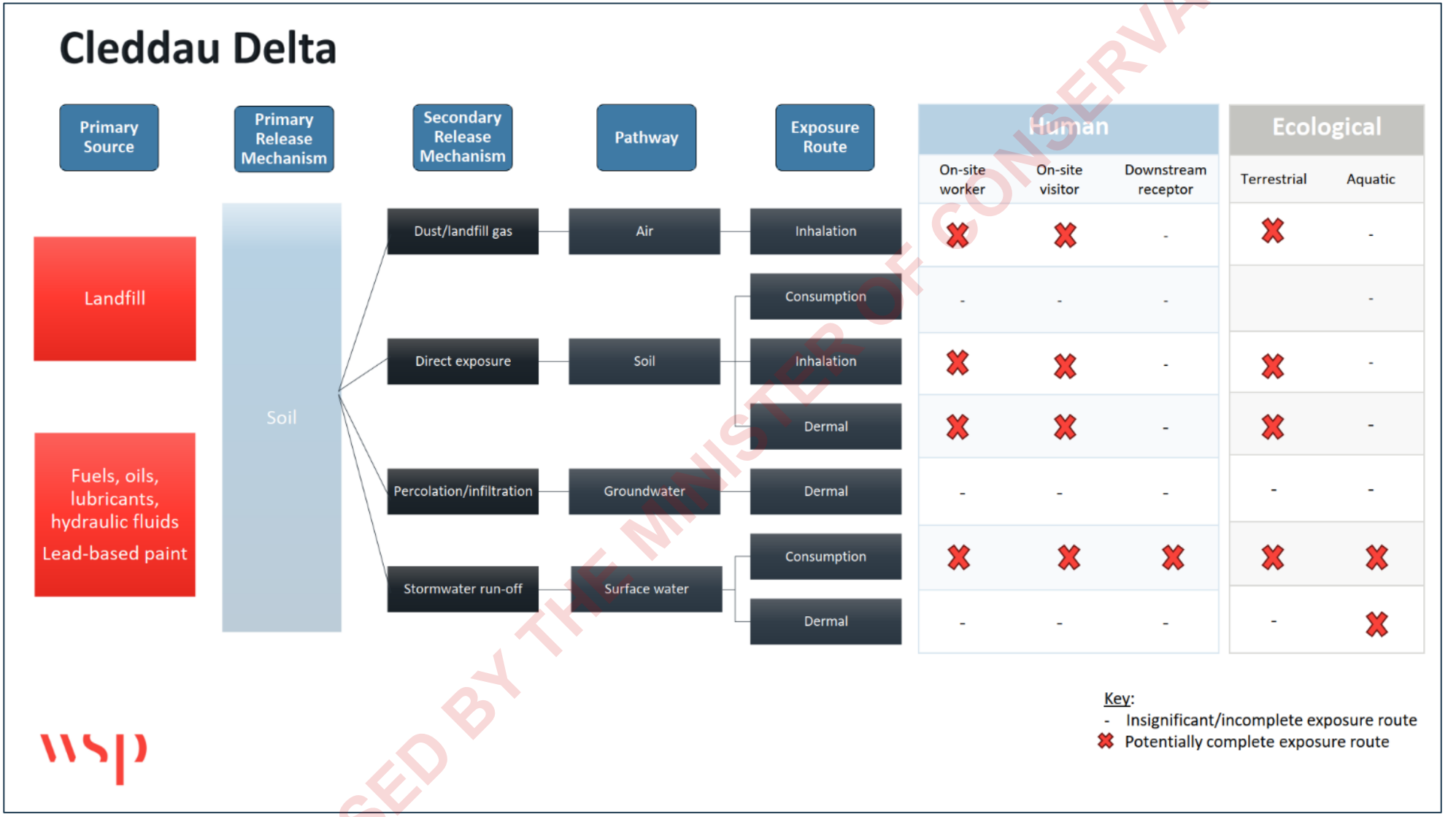

Figure 4-12: Conceptual Site Model for Cleddau Delta Node Milford Sound Piopiotahi.

4.2.3.3 CONSENTING CONSIDERATIONS

NES-CS REGULATIONS

Investigation results revealed that HAIL activities are occurring or have occurred on the site. As such, the NES-CS Regulations apply to the site (Ministry for the Environment, 2011).

LAND USE CHANGE AND SUBDIVISION

The PSIs have concluded that it is highly unlikely for there to be a risk to human health associated with the ongoing use of the site as commercial/industrial. As such, according to Regulation 8(4) of the NES-CS, subdividing the piece of land is a permitted activity.

Should a more sensitive land use be proposed, based on the findings there are potential risks associated with soil contaminants and as such a Detailed Site Investigation (DSI) would be necessary to further quantify these risks. In the absence of a DSI, future land use changes would be a discretionary activity under Regulation 11 of the NES-CS.

SOIL DISTURBANCE

Any soil disturbance or removal that does not meet the permitted activity criteria outlined in Regulation 8(3) (refer to Section 3.2 of this report) would be a discretionary activity under Regulation 11 unless a DSI to quantify contaminant concentrations is completed.

The PSIs concluded that for pieces of land where HAIL has been identified within the site, any activity requiring soil disturbance should be managed under a contaminated site management plan or if a site management plan already exists, it should be updated to include any additional information from this report.

PROPOSED SOUTHLAND WATER AND LAND PLAN

The Cleddau Village PSI concluded that the piece of land most likely to generate a passive discharge is SLUS-00000247, the ex-THC Hotel closed landfill. Because the landfill is likely to contain less than 15,000m^3 of waste and closed before 1970, it does not meet the definition of a *closed landfill* in the pSWLP.

A first investigation was conducted when the landfill was rediscovered and remediated. The first round of groundwater quality sampling reported contaminant concentrations exceeding the relevant guidelines, however follow-up sampling showed lower concentrations below the same guidelines. As such, it was concluded that a minor amount of leachate was being generated by the closed landfill, the permitted activity conditions were met, and no consent was required.

The PSI undertaken by e3Scientific re-evaluated the water quality data. The report concluded that current conditions of rule 46 of the pSWLP would be exceeded for both monitoring rounds and therefore further investigation is required to confirm the permitted activity status of the current discharge (e3Scientific, 2022c).

The PSI undertaken for the Airport concluded that the piece of land most likely to generate a passive discharge is the former Mobil Aerostop. However, this area has been investigated and tested against rule 46 by PDP in 2013 and was found to be a permitted activity under the conditions of the rule. In the absence of any information to the contrary, the discharge is considered to be a permitted activity.

4.2.4 DEEPWATER BASIN NODE

The Deepwater Basin Node is located adjacent to the existing outlet of the Cleddau River. The area currently comprises a marina for commercial fishing, kayak operations, a boat ramp with trailer park for recreational visitors and a wastewater treatment plant

The MOP Masterplan proposes to better incorporate the Deepwater Basin Node into the Milford Sound Piopiotahi visitor experience by constructing a new visitor viewing area and refuge. The heliport would also be relocated to this location. Figure 4-13 presents the proposed development plan for Deepwater Basin extracted from the MOP Masterplan (MOP, 2021).

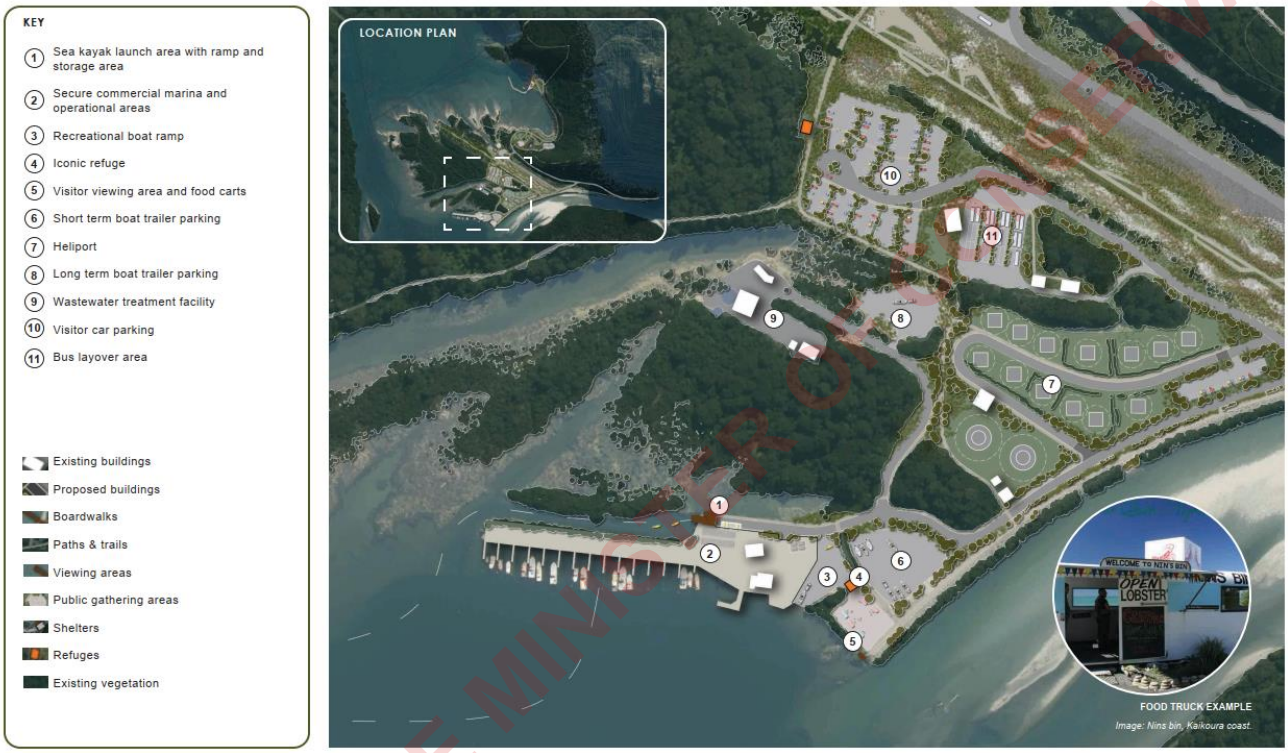

Figure 4-13: Proposed development plan for Deepwater Basin Node as per MOP Masterplan.

A PSI was undertaken in 2022 by e3Scientific for a part of the Deepwater Basin Node (e3Scientific, 2022a). A summary of the findings is presented in the following sections.

The northern part of Deepwater Basin, north of Gravel Pit Lane, has not been covered by this PSI, and is covered in the PSI for Cleddau Village (e3Scientific, 2022c). For consistency reasons, the reader is referred to the Cleddau Delta Node (Section 3.3.3) for further assessment of this area.

4.2.4.1 IDENTIFIED HAIL ACTIVITIES

As HAIL activities have been identified on the site, the Deepwater Basin Node has been classified as RED requiring further assessment to the risks to human health and the environment prior to development. A summary of the identified HAIL activities has been provided in Table 4-6 with a location plan in Figure 4-14.

Table 4-6: Identified HAIL activities at Deepwater Basin Node.

HAIL ID	Location	HAIL Activity	Dates	Comment	Likelihood
DWB1	Gravel Pit Lane (RealNZ)	A17. Storage tanks or drums for fuel, chemicals or liquid waste.	2012 – present	Two HAZCHEM stores, one with caustic cleaning chemicals, the other small volumes of petrol.	Certain
SLUS-20173159	Gravel Pit Lane (MSI)	A17. Storage tanks or drums for fuel, chemicals, or liquid waste. B2. Electrical transformers including the manufacturing, repairing, or disposing of electrical transformers or other heavy electrical equipment.	2012 – present	500L diesel tank and transformer 'T4'	Registered Site (ES)
DWB2	Gravel Pit Lane (MSTL)	A17. Storage tanks or drums for fuel, chemicals, or liquid waste.	2010 – present	Minor quantities or various chemicals including diesel (200L) and backup generator, weed control sprays, minor mechanical work and waste oil.	Certain
DWB3	Gravel Pit Lane (MSDA)	G6. Waste recycling or waste or wastewater treatment.	1990s – present	Wastewater treatment facility including minor storage of HAZCHEM including fuel storage (small mobile tank) for backup generator.	Certain
SLUS-00000806	Fisherman's Wharf, Deepwater Basin	F7. Service stations including retail or commercial refuelling facilities.	1980s – present	Bulk diesel storage in two 40,000L AGSTs with bowsers for land and marine vessel refuelling.	Registered site (ES)
DWB4	The White House	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.	1970s – present	Potential discharge of degraded hazardous building materials (e.g. asbestos/lead paint) to soil; 3m halo around all long-term structures in Milford Township.	Unverified

Figure 4-14: Site Location Plan Deepwater Basin with Identified HAIL Sites.

4.2.4.2 CONCEPTUAL SITE MODEL

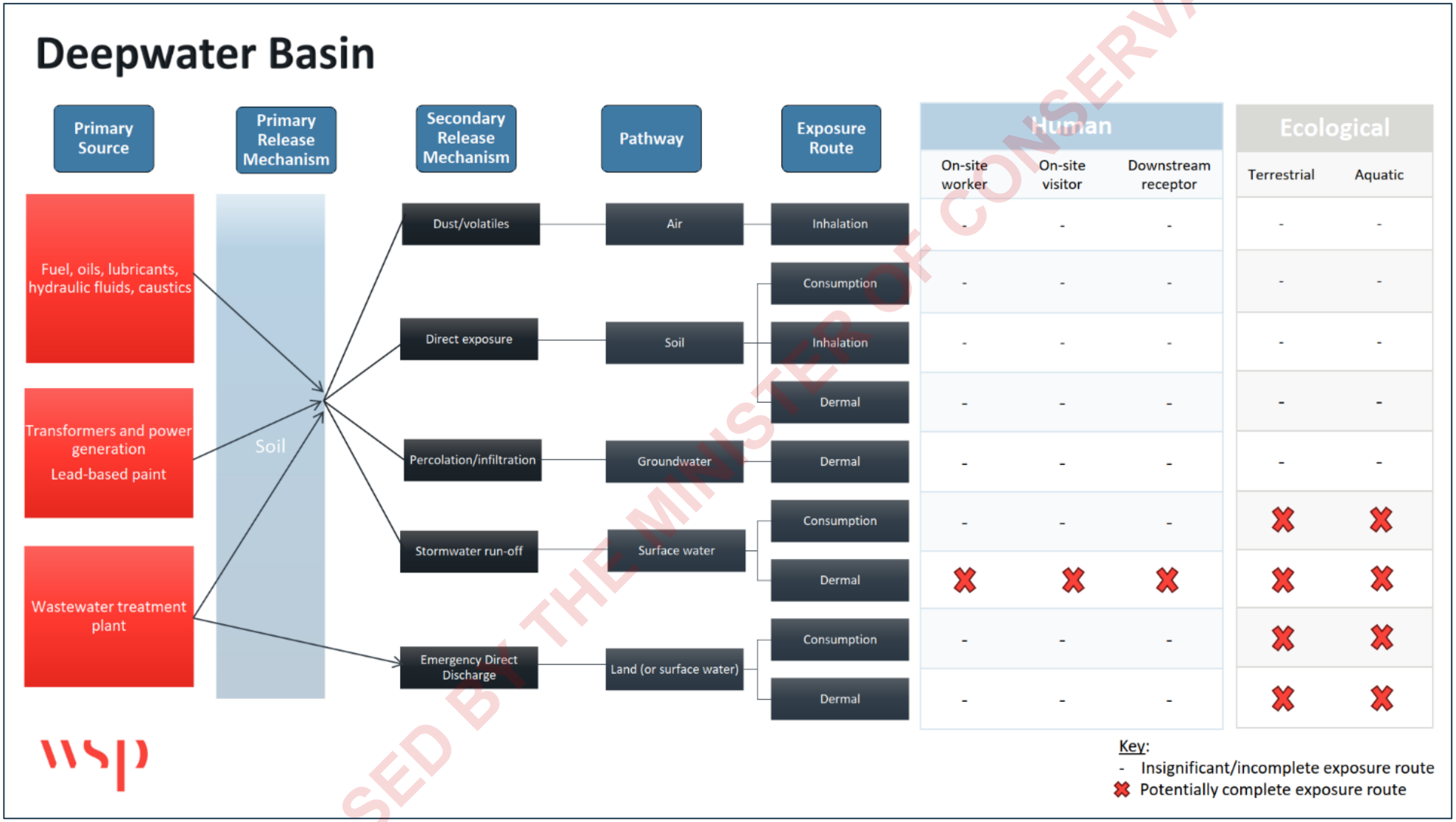

Figure 4-15: Conceptual Site Model for Deepwater Basin Node Milford Sound Piopiotahi..

4.2.4.3 CONSENTING CONSIDERATIONS

NES-CS REGULATIONS

Investigation results revealed that HAIL activities are occurring or have occurred on the site. As such, the NES-CS Regulations apply to the site (Ministry for the Environment, 2011).

LAND USE CHANGE AND SUBDIVISION

The PSI has concluded that it is highly unlikely for there to be a risk to human health associated with the ongoing use of the site as commercial/industrial (e3Scientific, 2022a). As such, according to Regulation 8(4) of the NES-CS, subdividing the piece of land is a permitted activity.

Should a more sensitive land use be proposed, based on the findings there are potential risks associated with soil contaminants and as such a Detailed Site Investigation (DSI) would be necessary to further quantify these risks. In the absence of a DSI, future land use changes would be a discretionary activity under Regulation 11 of the NES-CS.

SOIL DISTURBANCE

Any soil disturbance or removal that does not meet the permitted activity criteria outlined in Regulation 8(3) (refer to Section 3.2 of this report) would be a discretionary activity under Regulation 11 unless a DSI to quantify contaminant concentrations is completed.

The PSI concluded that for pieces of land within the site, any activity requiring soil disturbance should be managed under a contaminated site management plan or if a site management plan already exists, it should be updated to include any additional information from this report (e3Scientific, 2022a).

PROPOSED SOUTHLAND WATER AND LAND PLAN

The PSI concluded that there are no pieces of land which could be considered contaminated and causing a possible discharge that does not meet the permitted activity condition (e3Scientific, 2022).

4.2.5 MILFORD SOUND LODGE

The Milford Sound Lodge is currently not part of the MOP Masterplan. A PSI for the lodge has been undertaken by e3Scientific, however, as no development is currently proposed, WSP has not undertaken a review of the investigation.

4.2.6 LITTLE TAHITI

Detailed Site Investigations have previously been carried out by e3S at the Little Tahiti Landfill area. The findings from the DSI revealed that a range of contaminants are present on site including asbestos and heavy metals. Remediation Options have been considered by DoC and the site is earmarked for remediation. It is understood that appropriate remediation and site validation will be undertaken to ensure the site is suitable for any proposed land use change or soil disturbance and development.

No further assessment work is required under the Milford Opportunities Project with respect to remediation of this site under the current phase of scope.

5 FURTHER ASSESSMENT

Based on the findings of this document review, an assessment of likely further investigation work has been completed for each location where HAIL activities are considered likely to be present. The overview outlines a general scope at each hub, node or short stop for DSIs to determine risks to human health and the environment in general accordance with the MfE Contaminated Land Management Guidelines No5: Site Investigation and Analysis of Soils (Ministry for the Environment, 2021). As development plans have not as yet been determined for any of the sites, the design of investigations will need to be confirmed and finalised based on these plans.

Cost estimates for this work have not taken into consideration the need for other investigations such as geotechnical and/or natural hazard, which should they be completed concurrently, may reduce costs by making use of equipment and personnel as part of a combined investigation. In addition, no allowance at this stage has been made for the installation of boreholes for groundwater monitoring purposes. The requirement for groundwater contamination monitoring would be determined as part of the assessment process within the Detailed Site Investigations for each site area and take into consideration development proposals should they be available. Results where elevated contaminants of concern, particularly those from hydrocarbon sources, are noted within the DSI would then most likely require additional assessment of groundwater migration risk to sensitive receptors including the Milford Basin and Cleddau River. The scoping for such work would be made using the DSI results and would take into consideration development proposals and excavation depths.

5.1 MILFORD CORRIDOR NODES

Table 5-1 PSI/DSI Scope & Cost Estimate

Node	PSI/DSI Scope Outline	Cost estimate
Node 3: Te Huakaue (Knobs Flat)	DSI to assess risks to human health and the environment for any ground disturbance in the locality of the defined Pieces of Land. Sampling and analysis of soils within near surface environment for heavy metals and, where applicable, hydrocarbon contaminants and microbiological parameters. Halo investigation around deleterious buildings to assess for asbestos and/or lead based paint Surface and groundwater investigation associated with wastewater discharge.	$15,000 – $25,000
Node 4: Ōtāpara Cascade Creek	PSI to further assess extent of possible HAIL activities on site, including site inspection.	$10,000

5.2 MILFORD SOUND PIOPIOTAHI NODES

Table 5-2 DSI Scope & Cost Estimate

Hub	DSI Scope outline	Contaminants of Concern	DSI Cost estimate
Visitor's Hub	DSIs to assess risks to human health and the environment for any ground disturbance in the locality of the Pieces of Land defined in the sections above. DSIs likely to involve the excavation of test pits or window sample holes for soil sampling to depths up to 3.0m bgl along with surface sampling of halos around buildings for asbestos/lead-based paint assessment. Limited groundwater sampling and analysis from window sample holes should groundwater be encountered, and ground conditions indicate the need for initial assessment. Additional boreholes for groundwater monitoring may be warranted based on development proposals along with the findings of the soil sampling and analysis and/or initial groundwater assessment. Detailed groundwater investigations are not allowed for within these estimates.	Heavy metals; TPH, PAH, BTEX; Asbestos	$45,000 – $55,000
Freshwater Basin		Heavy metals; TPH, PAH, BTEX; PCBs; Asbestos	$35,000 – $40,000
Cleddau Delta		Heavy metals; TPH, PAH, BTEX; Asbestos	$25,000 - $30,000
Deepwater Basin		Heavy metals; TPH, PAH, BTEX; PCBs; Asbestos	$35,000 - $40,000

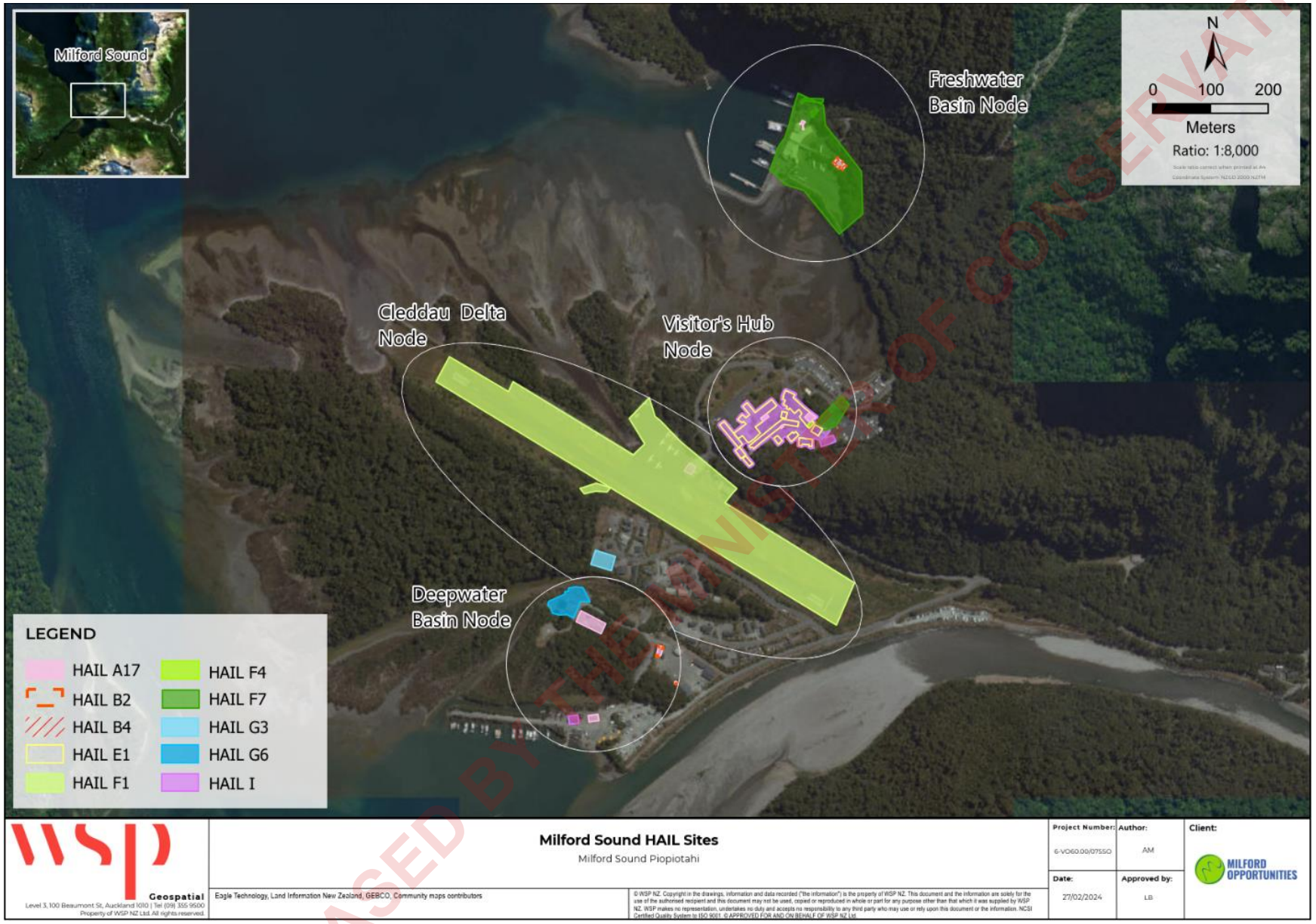

Figure 5-1: Overview of HAIL sites

6 REFERENCES

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