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15 February 2016

The Wellington Company
50 Manners Street
Te Aro
WELLINGTON 6011

Dear Sir/Madam

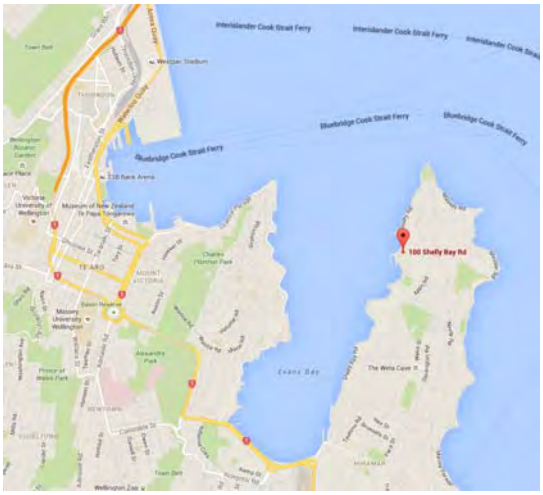
Former Shelly Bay RNZAF Base, Shelly Bay Road, Wellington

1.0 Introduction

1.1 Terms of Reference

This report has been prepared for The Wellington Company Ltd (TWC) by AECOM New Zealand Limited (AECOM), in accordance with the Scope of Works described in the AECOM proposal entitled *Shelly Bay Masterplan Validation and Concept Design Initiation: Tender for Professional Services* dated 5 November 2015. It documents a Preliminary Site Investigation (PSI) undertaken to establish the likely nature and extent of soil contamination at the proposed Shelly Bay residential/commercial development at Shelly Bay, Wellington (the site).

The general site location is shown below.



1.2 Site Description

The site is situated on the western shore of the Watts (Miramar) Peninsula, on Shelly Bay. The wider site encompasses an area of steep, forested hillside above Shelly Bay, dropping down to a narrow coastal strip which contains facilities associated with the former Royal New Zealand Airforce (RNZAF) Shelly Bay Base. Colloquially, these facilities are referenced as being located in North Bay or South Bay.

A public road, which changes from Shelly Bay Road to Massey Road within the site boundary, runs through the site and on the seaward side of the road between North and South Bay are the RNZAF former workshops, wharf and slipway structures.

The figure in **Attachment A** shows the layout of the site.

There are no immediate neighbours to the site, the nearest being those residents in the accommodation area of the south bay and in the former commanders house (located at 264 Shelly Bay Road). The former Mount Crawford Prison is located approximately 500 m above the site to the east.

1.3 Planning Context

Owing to the industrial nature of some of the site's current and former operations, the site has been identified as being on the hazardous activities or industries list (HAIL), as defined by the Ministry for the Environment (MfE). The planned change of land use from a former military base to a mixed residential/commercial development at the site is an *activity* subject to the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS). Under subclause 8(4) of

the NESCS, subdividing land or changing land use 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.

If the requirement in subclause 8(4) is not met, the activity reverts initially to a Controlled Activity under regulation 9 subclause 9(3).

TWC requested that AECOM complete a PSI as part of a package of work to assess the suitability of the site for a mixed residential/commercial development.

2.0 Objectives

The objectives of the PSI were to:

- Compile information on the potentially contaminating activities that may have been undertaken at or affected the site;
- Provide an assessment of the likelihood of risk to human health for the proposed mixed commercial/residential development.

3.0 Scope of Works

The PSI works were undertaken by AECOM between December 2015 and February 2016 and included;

1. Review of records provided by TWC in relation to previous land uses that could have had an impact on soil and groundwater quality at the site.
2. Targeted soil sampling at pre-selected locations, on 17 December 2015, during geotechnical works undertaken at the site as part of a Preliminary Geotechnical Assessment (PGA).[1]
3. A site walkover[2] undertaken on 17 December 2015 (including compilation of a photographic record) to identify potential sources of impact to soil.
4. A review of information held in the Greater Wellington Regional Council (GWRC) Selected Land Use Register (SLUR).
5. Review of records and selected aerial photographs held by Wellington City Council (WCC) Archives, on 22 January 2016, to determine previous land uses of the site and the surrounding area.
6. Review of selected historical aerial photographs available from Opus International Consultants to determine previous land uses of the site and the surrounding area.
7. Production of this PSI report.

Assessment of compliance of the site with environmental legislation, the presence of asbestos or asbestos containing building material and consideration of responsibility for previous contamination (if any), do not form part of the scope of works for this PSI.

4.0 Environmental Setting

According to the New Zealand Geological Map of the Wellington Area[3], the site is underlain by grey sandstone-mudstone sequences (collectively known as Greywacke) of the Rakaia terrane. The greywacke is overlain by a thin sequence of marine sediments and fill.

[1] Preliminary Geotechnical Assessment. Report prepared by AECOM New Zealand Limited for The Wellington Company dated 9 February 2016.
[2] Access to the seaward side of the site was not able to be gained by the AECOM environmental scientist. Photographs of this area were collected from the roadway.
[3] Begg JG (et al). Geology of the Wellington Area. Institute of Geological and Nuclear Sciences 1:250,000 Geological Map 10.

Investigations indicate that groundwater is present at the site between approximately 1.8 m and 1.9 m below ground level (bgl). Shallow groundwater is inferred to flow to the west towards Shelly Bay at the base of the sediments, at the interface with the greywacke basement.

The closest surface water body is Shelly Bay, located immediately west of the site.

5.0 Overview of Site History

The Wairarapa earthquake in 1855 raised several beach terraces above sea level on the Watts Peninsula. The resultant beaches at the site were selected as a suitable location for the re-location of the Submarine Mining Depot from Thorndon during the "Russian Scare" of 1885.

An area of approximately 76 hectares of Watts Peninsula was acquired by Proclamation No.55, New Zealand Gazette on 28 May 1886 (GAZ 1886 P864) by the New Zealand Defence Force (NZDF) for the "Construction of Defence Works at Watts Peninsula"[4]. The land holdings that form the wider site comprise five individual parcels of land legally described as follows:

- Section 1, SO 19026 - 1.7787ha
- Part Section 1, SO 37939 - 39.5965ha
- Part Section 2, SO 37939 - 25.8338ha
- Part Section 3, SO 37939 - 8.8923ha
- Part Section 3, SO 37939 - 0.2859ha

The site was used for military purposes but remained largely undeveloped until 1914[5] with the construction of munitions stores and a small tramway connecting the stores to the wharf at the site.

The site underwent major development in 1942 with reclamation of 2.7 ha of land, dredging, and the construction of ten naval magazines. The breastwork, wharves, slipway and boilerhouse were added in 1943. The reclamation also enabled substantial re-alignment of the coastal road.

From 1943 the wider site was used for the maintenance of navy support vessels based in Wellington. Associated activities included workshop operations, storage of munitions and fuel, vehicle washing and maintenance and firearms practice.

Occupancy of Shelly Bay was transferred to the RNZAF in 1946 and the site was occupied until 1995, however during the time of occupation a number of civilian influences were present at Shelly Bay. The breastwork and slipway have been leased to a series of civilian companies from 1947 to the present day.

A number of facilities have been decommissioned or removed, including fuel storage tanks, the coal fired boilerhouse and parts of the steam reticulation system. Structural instability also led to the closure of the main wharf area.

The site is now occupied by a number of artisans; film properties hire stores and a cafe.

A summary of the information on the wider site sourced from TWC records, WCC archive files, property files and the GWRC SLUR, is presented in a timeline in **Attachment B**.

A summary of the publically available aerial photographs covering the period 1948 to 2013 is presented in **Attachment C**.

A plan taken from Opus January 2008[6] and the GWRC SLUR are presented as **Attachment D** for reference of building names.

6.0 GWRC SLUR

The wider site is included on the GWRC SLUR as it is believed to have been, or has been, used for the following hazardous activity or industry listed on the HAIL:

C1 - Explosives and ordinances production, storage and use - Explosive or ordinance production, maintenance, dismantling, disposal, bulk storage or re-packaging;

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[4] Letter from Defence Headquarters to the City Solicitor (Letter dated 5 May 1981). Wellington City Council Archive Files.
[5] Shelly Bay Air Force Base Site Profile at Capital Defence. Document referenced in the Wellington Regional Council Documentation. http://capitaldefence.freewebhost.co.nz/prfles/other/sbay2.htm
[6] Shelly Bay – Character and Condition Assessment January 2008, Opus International Consultants Limited dated 31 Janaury 2008 ref 460528.

A17 - Chemical manufacture, application and bulk storage - Storage tanks or drums for fuel, chemicals or liquid waste.

The property appears on the SLUR as: Verified History of Hazardous Activity or Industry. The information included on the SLUR entry is included below

'This site has been used as an Air-Force base. General military camp facilities including workshops, paint stores, munitions stores, sewage pumping station, a rifle range and a shipway and repair yard were onsite. An underground storage tank was also on site but has since been removed. No tank pull report is held by Greater Wellington. There are unconfirmed notes on file suggesting a landfill on this site, but there is no indication of a location or likely contents if it exists. The site was decommissioned in 1995. Potential contaminants include explosives, lead, copper, antimony, solvents and metals and hydrocarbons. No detailed information is held for this site regarding the level of contamination, if any, that has occurred.'

A file note associated with the SLUR listing[7] notes that there are three polygons (areas where HAIL activities may have occurred) on the SLUR related to the previous activities undertaken at the site. These are described below. The polygon locations are shown in **Attachment E**.

Polygon Identified	***Activity Undertaken***	***Comments***
Polygon A	SERCO Paint store Fuel Supply building Shipway/Repair Yard	
Polygon B	Commanders House (no activity identified)	No hazardous activities were associated with this location specifically, however as this location was originally identified in the early versions of the SLUR the polygon remains.
No polygon identified	Sewage Pumping Station	No specific polygon associated with the presence of the sewage pumping station, however this activity is noted to have occurred at the site.
Polygon C	Riffle range and munitions store sites.	Outside the area of the site defined as part of the PSI.

7.0 Site Walkover

A site inspection was undertaken during site works on 17 December 2015 to observe current conditions and evidence of historic activities and included;

- Gaining an understanding of the general environmental setting of the site in respect of the site neighbours and proximity and condition of adjacent water bodies, particularly any areas of potential risk from environmental incidents.
- Record of physical evidence of historical contamination or structures that may indicate activities that could have resulted in contamination in the past, including the locations of current or former underground storage tanks, grease or oil traps, sumps or other interceptors and waste treatment areas.

A photographic record of current site conditions is included as **Attachment F**.

8.0 Soil Sampling

An AECOM environmental scientist was present during advancement of three test pits at the site. The test pit locations were chosen to assess geotechnical properties of soil. The locations of the test pits were;

- TP4 – located adjacent to the roadway near Building No. 8.

[7] Greater Wellington Regional Council File note 15 October 2008 (SN/05/059/02).

- TP5 – located across estimated hydraulic gradient from the boilerhouse and associated drainage separator.
- TP6 – located down estimated hydraulic gradient of the former laundry.

Nine soil samples were collected from the test pits during advancement. Soil samples were collected at changes in lithology in fill material at the site. The location of the test pits are shown on the plan in **Attachment F**.

Sub-samples of soils were screened in the field by placing a portion of each sample collected into a bag for analysis of headspace volatile organic compounds (VOCs) using a photo-ionisation detector (PID).

Soil samples were packaged and sent to Hill Laboratories Ltd in Hamilton under AECOM Chain of Custody procedures. Three soil samples TP04 0.5, TP5 0.5, TP6 0.7 were analysed for total petroleum hydrocarbon (TPH) concentrations and samples TP4 0.3, TP4 1.1, TP5 0.7 and TP5 1.1 and TP6 0.5 for metals (arsenic, cadmium, chromium, copper, lead, nickel and zinc).

Chain of custody documentation and analytical reports as received are presented as **Attachment G**.

8.1 Observations

No visual or olfactory evidence of impact by petroleum hydrocarbons was noted during the site works. Headspace VOC concentrations ranged between 0.0 ppm and 0.1 ppm.

Soils comprised greywacke fill material underlain by marine sands and greywacke basement. Groundwater was present at approximately 1.8 m bgl.

8.2 Analytical Results

Soil sample analytical results as received, together with selected environmental guideline criteria, are included in **Attachment H**.

Reported TPH concentrations were below laboratory method detection limits.

Metals concentrations were generally at or close to the Wellington background concentrations with the exception of arsenic concentrations of 34 mg/kg in the soil sample collected of fill from test pit 6 at 0.5 m bgl, compared to background range of < 2 mg/kg to 7 mg/kg.

9.0 Potential for Contamination

Records indicate that the site has been used for industrial and commercial activities since at least the 1940s, mainly associated with the operation of the RNZAF base including, the boilerhouse, workshop activities, the operation of the slipway and munitions storage in magazines. A summary of the potential hazardous activities and industries undertaken is as per **Attachment F.**

A plan included in **Attachment F** shows the areas of the site where impact to environmental media may have resulted from the hazardous activities carried out.

The main potential sources of contamination associated with the land uses comprise;

- Leaks and spills of hydrocarbon products to ground from the refuelling of vehicles and marine craft.
- Leaks and spills of hydrocarbon products associated with the storage and the maintenance of transport vehicles.
- Concentrations of metals and antifouling substances associated with the maintenance of marine craft and the operation of the slipway.
- Localised impact from the wastewater treatment plant in South Bay.
- Localised metals impact to soil from the use of lead paint, coal ash (if buried at the site) and munitions residues.

A survey of asbestos containing material has not been undertaken at the site as part of this investigation, however as the structures at the site pre-date the cessation of the use of asbestos in building materials (1990's), there is potential for impact to soil from the use and removal of asbestos containing material at the site. Investigations undertaken by Tonkin and Taylor have identified the presence of asbestos in the form of Chrysotile, Amosite and Crocidolite in the subsurface beneath Building No.8 workshops. No other environmental investigations of the site are known to AECOM.

With the exception of potential localised soil and groundwater impact around the wastewater treatment plant, the South Bay area mainly comprised residential facilities. On this basis, it is considered highly unlikely that there is a risk to human health from contaminants in soil and groundwater, under the current or proposed commercial/residential land use. This assessment does not cover the potential for asbestos in soils.

A boilerhouse and septic tank were located in North Bay. Other buildings in North Bay were mainly used for administrative purposes, including messes and a hospital. Notwithstanding the presence of localised impact associated with former activities, as indicated by elevated arsenic encountered within shallow fill at one location, it is considered that it is highly unlikely that there is a risk to human health under the current or proposed commercial/residential land use for much of North Bay. This assessment does not cover the potential for asbestos in soils.

AECOM were not able to investigate the seaward side of Shelly Bay Road where the record review has shown the presence of partially buried fuel storage tanks and industrial activities occurred. As such the likelihood of impact to soil and groundwater in this area is currently unknown.

10.0 Closure

We trust this PSI report meets your requirements. Please do not hesitate to contact us should you wish to discuss it.

Yours sincerely,

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Attachments
Attachment A: Site Layout
Attachment B: Timeline of Events
Attachment C: Aerial Photograph Review
Attachment D: Plans Showing Building Locations
Attachment E: Wellington Regional Council GIS Viewer Selected Land Use Register Polygons
Attachment F: Potential Contaminant Sources and Photolog
Attachment G: Laboratory Analytical Results and Chain of Custody Documentation: Soil Sample Analytical
Attachment H: Results Compare to Guideline Values

11.0 Limitations

This conclusion and all information in this Report is given strictly in accordance with and subject to the following limitations and recommendations:

AECOM New Zealand Limited (AECOM) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of The Wellington Company and only those third parties who have been authorised in writing by AECOM to rely on this Report.

It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this Report.

It is prepared in accordance with the scope of work and for the purpose outlined in the contract dated 7 December 2015.

Where this Report indicates that information has been provided to AECOM by third parties, AECOM has made no independent verification of this information except as expressly stated in the Report. AECOM assumes no liability for any inaccuracies in or omissions to that information.

This Report was prepared between 7 December 2015 and 12 February 2016 is based on the conditions encountered and information reviewed at the time of preparation. AECOM disclaims responsibility for any changes that may have occurred after this time.

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It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

Any estimates of potential costs which have been provided are presented as estimates only as at the date of the Report. Any cost estimates that have been provided may therefore vary from actual costs at the time of expenditure.

Map Legend

- **TP4** Test Pit Location
- Approximate line of reclamation fill

Notes
Contours are at 5m intervals, and derived from data captured as part of the Wellington City Rural Aerial Photography Project 2004.

ATTACHMENT A: SITE LAYOUT

ATTACHMENT B: TIMELINE OF EVENTS

Date	*Source*	*Information*
1886	Letter from Defence Headquarters to the City Solicitor (Letter dated 5 May 1981).	The base area is contained within an area of land that was set aside in 1886 for Defence Works by proclamation under the Public Works Act 1885. Notes that the existing formed road is largely formed on land reclaimed by Defence during World War II and only coincides with the legal road in isolated places.
1886	Capital Defence – Wellington Built Military Heritage http://capitaldefence.freewebhost.co.nz/prfles/other/sbay2.htm	The Submarine Mining Depot was relocated from Thorndon and Mahanga Bay to the site.
1907	Capital Defence – Wellington Built Military Heritage http://capitaldefence.freewebhost.co.nz/prfles/other/sbay2.htm	Responsibility for the Submarine Mining Depot at Shelly Bay transferred to the Navy.
1914	Capital Defence – Wellington Built Military Heritage http://capitaldefence.freewebhost.co.nz/prfles/other/sbay2.htm	Munitions stores were built and a small tramway constructed connecting the depot with "its wharf" – it not clear which Wharf this document is referring to.
1915	Capital Defence – Wellington Built Military Heritage http://capitaldefence.freewebhost.co.nz/prfles/other/sbay2.htm	Government Magazine built at Shelly Bay by Public Works Department.
1942	Shelly Bay Naval Depot Plans - Wellington City Archive	General plans prepared for the development of the site.
1942	Capital Defence – Wellington Built Military Heritage http://capitaldefence.freewebhost.co.nz/prfles/other/sbay2.htm	Excavations made for the magazines.
April 1942	Capital Defence – Wellington Built Military Heritage http://capitaldefence.freewebhost.co.nz/prfles/other/sbay2.htm	Contract let to construct the armament depot located on the hillside behind Shelly Bay. Involved the construction of ten magazine buildings, laboratory, office, garage and a house for an ordinance officer.
May 1942	Capital Defence – Wellington Built Military Heritage http://capitaldefence.freewebhost.co.nz/prfles/other/sbay2.htm	Reclamation work commenced in Shelly Bay and adjacent Northward Bay. Notes that the reclamation was done by excavating the adjacent hillside and using it as fill for reclamation works. Reclamation largely completed by the end of 1942.
October 1942	Capital Defence – Wellington Built Military Heritage http://capitaldefence.freewebhost.co.nz/prfles/other/sbay2.htm	Wharves started in October following dredging of the bay.
November 1943	Shelly Bay Character and Condition Assessment Opus January 2008.	Decision to house personnel on site. Initiation of the officers' quarters in South Bay.

ATTACHMENT B: TIMELINE OF EVENTS

Date	***Source***	***Information***
1 June 1944	Shelly Bay Character and Condition Assessment Opus January 2008.	Full complement of 200 personnel at the site but construction not completed.
May 1945	Shelly Bay Character and Condition Assessment Opus January 2008.	Base completed
April 1946	Capital Defence – Wellington Built Military Heritage http://capitaldefence.freewebhost.co.nz/prfles/other/sbay2.htm	Base transferred to the RNZAF.
21 April 1947	Letter to the town clerk from PMoF entitled Military Buildings on Road Reservation Areas.	Letter references temporary buildings erected on road reserve areas by the Public Works Department for the "respective fighting services during the war period have been removed with the exception of the following:" C. Naval Barracks, Shelly Bay. At present occupied by RNZAF. Letter notes that the Navy closed this section of Massey Road and carried out extensive reclamation, building and road deviation works for the purpose of providing a Naval Stores Depot. The new road formation has been formed mainly on the reclaimed section of land. The letter considers it necessary to re-locate the legal roadway.
July 1947	Shelly Bay Character and Condition Assessment Opus January 2008.	Barney Daniel won contract for shipwrights building and slipway.
16 November 1971	Letter from GI Cooper and WS Brambley Trustees for a Company being formed to be known as Shelly Bay Slipways Limited: Application for a Motors Spirits Retailers Licence Restricted to Marine Craft Only at Shelly Bay Wharf Wellington. Plan: Shelly Bay Slipways Limited Shelly Bay Wharf Wellington – Proposed marine refuelling facilities	Proposed marine refuelling facilities for dispensing super and regular grade petrol from wharf with 2 x 1000 gallon tanks located outside workshop. Letter notes the presence of a marine diesel pump installed "on the Slipway". The plan notes that the 2000 gallon marine diesel tank is semi buried with a concrete block pit and that the pumps are located on a jetty that is lower than the main wharf.
1979	Capital Defence – Wellington Built Military Heritage http://capitaldefence.freewebhost.co.nz/prfles/other/sbay2.htm	Largely used for administration for 300 personnel with approximately 150 people based at the site.
8 May 1981	Letter from City Solicitor (Mr Kerr) to the Town Clerk.	Reference to "reclaimed land". *I gather that some of the wharf and associated area are unauthorised harbour reclamation."*
11 June 1981(or 1983 writing is not clear)	Evening Post Article: the slipping of Shelly Bay.	Article notes: Ex-wartime launches used as civil aviation control craft for the flying boat base in Evans Bay and also finishing boats, pleasure craft and coasters that needed repairing were serviced at the Shelly Bay Slipway.

ATTACHMENT B: TIMELINE OF EVENTS

Date	*Source*	*Information*
1985	Capital Defence – Wellington Built Military Heritage http://capitaldefence.freewebhost.co.nz/prfles/other/sbay2.htm	Combined mess constructed.
1 July 1986	Memorandum to the Town Clerk from the Town Planning Committee	Memorandum to construct three stretches of rock slope protection (rip rap) to prevent coastal erosion. Notes that the improvement works – will "improve the present unsightly mess of demolition material which has been dumped there.
15 September 1987	Letter from Wellington Harbour Maritime Planning Authority Circular No. 13391 to the Chairman and Members of the Authority – Seawall in Shelly Bay – Ministry of Defence. Report by the Planner A W Stewart	Notes that during an inspection of the replacement of the sea wall at Shelly Bay – most of the concrete and brick building rubble had been removed. The letter also indicates that a few pieces of old steel and a piece of reinforcing mesh remain.
24 October 1990	Letter from Wellington City Council to the Secretatry for Defence.	Notes that the slipway facility at Shelley Bay (sic) is to be closed.
28 August 1992	Letter to Defence Force Headquarters NZ from Wellington Regional Council (Manager of Consents and Investigations) – Contained in WRC SLUR search.	Consideration being given to decommissioning various underground storage tanks at Shelly Bay.
11 January 1993	Application to Wellington City Council for Building Consent to remove "two petrol tanks"	Application to remove "existing fuel tanks and pumps".
30 June 1995	Capital Defence – Wellington Built Military Heritage http://capitaldefence.freewebhost.co.nz/prfles/other/sbay2.htm	Last official day of RNZAF on site.
9 February 1998	Wellington Regional Council fax to New Zealand Defence Force – dated 9 February 1998. Reference K/9/5/59) – Contained in WRC SLUR search.	Site contained underground storage tanks which have now been removed (no date listed). Unconfirmed notes on file regarding a landfill on site. Location and contents of fill unknown.
November 2001	Email to Wellington City Council from Unknown?: Shelly Bay Slipway Building Demolition of Lean-to Structures.	Application to demolish lean-to's constructed without the permission of NZDF containing Asbestos sheet wall lining on the Shelly Bay Slipway. SERCO quotation sought and accepted for the removal "of the asbestos content in an approved manner and to demolish the structures and remove all debris to the closest landfill". Demolition to occur 10-20 December 2001.

ATTACHMENT B: TIMELINE OF EVENTS

Date	***Source***	***Information***
15 October 2008	Greater Wellington Regional Council File Note entitled Changes to GISMO polygon layer, Shelly Bay Defence Land (SN/05/059/02)	Potential hazardous activities and industries undertaken include; • SERCO Paint Store • Fuel Supply Buildings • Sewage Pumping Station • Shipway/Repair Yard • Commanders House (no hazardous activities but area of original polygon so remains). • Munitions store sites and rifle range. Map attached 2002 Serco map.
Mid 2010	Capital Defence – Wellington Built Military Heritage http://capitaldefence.freewebhost.co.nz/prfles/other/sbay2.htm	One wing of the WW2 barracks was demolished due to an unsafe roof.

ATTACHMENT C: AERIAL PHOTOGRAPH REVIEW

Date/Source	***Key Site Features***	***Surrounding Land Features***
1947 Oblique Aerial Photograph Page 31 (00278:10:31)	Oblique angle photograph of South Bay, the Wharf area and North Bay. South Bay accommodation buildings developed. Buildings present over the area that currently houses the sewage treatment plant. North Bay building in the area of grass in front of the current café property (use unknown). Hospital, boilerhouse, gymnasium accommodations and mess present.	Magazines present on "Main Road" leading to the site of the current Massey Memorial.
1948 Aerial taken from http://capitaldefence.freewebhost.co.nz/prfles/other/sbay2.htm Site overview, scale unknown. Reference as "Overlooking Shelly Bay Air Force Base, Wellington" ref no 1/2-046266. Alexander Turnball National Library.	Oblique angle photograph showing the South Bay accommodation area and the Wharf area in the foreground with the North Bay buildings present in the area of the current café and the gymnasium.	Magazines present on Main Road.
1962 Supplied by TWC. Scale unknown.	Aerial showing North and South bays and Main Road. The site layout is as per the current layout with the exception of the following: - The combined mess is not present. - The garaging is not present in either the north or South Bay - Accommodation buildings present in the area of the sewage treatment plant. - The dangerous goods store is not present.	Magazines present on Main Road.
5 May 1968 Aerial Contact Print Sheet I/9 and I/10. Wellington City Council Archives Scale 1:3000 (AC108:1:61 and AC108:1:62)	Aerial showing North and South Bays and Main Road. - Accommodation buildings present in the area of the sewage treatment plant have been removed. - The building in the area in front of the café has been removed. - The coal bunkers are visible. The site layout is as per the current layout with the exception of the following: - The combined mess is not present. - The dangerous goods store is not present.	Magazines present on Main Road.
28 September 1975 Aerial Contract Print Sheet 1:124 and 1:125. Wellington City Council Archives 1:3000 (AC109:1:124 and AC109:1:125)	Aerial showing North and South Bays and Main Road. As for the 1968 aerial with the exception that a lean-to structure is present in the area between the Shipwrights Building and the Inner Wharf.	Magazines present on Main Road.

ATTACHMENT C: AERIAL PHOTOGRAPH REVIEW

Date/Source	*Key Site Features*	*Surrounding Land Features*
1996 Aerial Photograph – Wellington City Council website http://wellington.govt.nz/webmap/wccmap.html	Aerial showing North and South Bay, Main Road (with heavy vegetation) and the Wellington Prison. As for the 1975 aerial with the exception of; - The combined mess is present. - The dangerous goods store is present. - There is a concrete pad present directly adjacent to the dangerous good store. - The sewage treatment plant is present.	The Magazines are no longer visible on the aerial.
2004 Aerial Photograph – Wellington City Council website http://wellington.govt.nz/webmap/wccmap.html	Aerial showing North and South Bay, Main Road (no longer recognisable) and the Wellington Prison. As for the 1996 aerial with the exception of; - The lean-to structure has been removed and several white structures (possibly concrete) are in the area of the lean-to. Possibly indicating the presence of fuel storage tanks?	None relevant to the investigation.
2006 Aerial Photograph – Wellington City Council website http://wellington.govt.nz/webmap/wccmap.html	No significant change to features at the site. More storage of materials around the dangerous goods store.	None relevant to the investigation.
2009 Aerial Photograph – Wellington City Council website http://wellington.govt.nz/webmap/wccmap.html	No significant change to features at the site. More storage of materials around the dangerous goods store.	None relevant to the investigation.
2010 Aerial Photograph – Wellington City Council website http://wellington.govt.nz/webmap/wccmap.html	No significant change to features at the site.	None relevant to the investigation.
2013 Aerial Photograph – Wellington City Council website http://wellington.govt.nz/webmap/wccmap.html	Airmens accommodation removed from the site between 2010 aerial and this aerial.	None relevant to the investigation.

Site Character Matrix 2008

	1 Gymnasium and Cook Lounge	2 Bayview Annex	3 MTC/ Bayview Annex	4 Hospital	5 W/O and SNCO's Mess	6 Airmen's accommodation	7 Garages North Bay	8 Laundries and Boiler House	9 Submarine Mining Depot and Barracks	10 Transformer Building	11 Transfield Depot	12 Barrack Warden Store	13 Flammable Liquid Store	14 Shed 8-Stores and Workshop Building	15 Shipwrights Building	16 Shipwrights Office	16a Winch House	16b Boat Slipway	17 Outbuilding	18 Squash Court	19 Officer's Mess Quarters (HQ)	20 Library	21 South Bay Officer's Mess Garages	22 Officer's Quarters and Mess	23 Officer's Mess Games Room	24 Officers Mess Accommodation Annex	25 Magazines	26 Other Ranks Transit Hut	27 Officer's Mess Laundry	28 Base HQ and Officer's Accommodation	29 Dog Kennel Hut	30 Guard House
Heritage	Medium	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	Low	Low	Medium	Low	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	High	Medium	Medium	High	Medium	Medium	Medium	Low	Medium
Amenity	Low	Low	High	Medium	Medium	Medium	Low	Low	High	Low	Low	Low	Low	High	High	Low	High	Low	Low	Medium	Medium	Low	Low	High	Medium	Medium	Medium	Low	Low	Low	Low	Medium
Character (Heritage + Amenity)	Medium	Medium	High	Medium	Medium	Medium	Low	Medium	High	Low	Low	Medium	Low	High	High	Medium	High	Medium	Medium	Medium	Medium	Medium	Medium	High	Medium	Medium	High	Medium	Medium	Medium	Low	Medium
Interior													Low	High	High	Low	Medium	Medium		Low	Low								Low			Low
Detail													Low	Medium	Medium	Low	Medium	Medium		Low	Low								Medium			Medium
Condition													Poor	Poor	Critical	Critical	Critical	Critical		Poor	Poor								Poor			Poor
Repair Cost $													$ 26,059.00	$ 449,042.74	$ 282,876.14	$ 34,356.14	$ 33,400.81	$ 250,000.00		$ 42,650.74	$ 83,765.14								$ 32,057.00			$ 23,806.04
Repair Cost $$													N/A	$1,111,403.07	$ 593,610.74	$ 75,019.56	$ 97,025.25			$ 121,580.42	$ 212,610.45								$ 63,434.06			$ 39,330.12
Repair Cost $$$													N/A	$1,832,339.22	$ 668,625.24	$ 85,949.16	$ 106,525.40			$ 137,392.92	$ 504,180.30								$ 89,088.26			$ 55,933.24
TOTAL													Low	High	High	Low	Medium	Medium		Medium	Medium								Medium			Medium

GOOD	In good order
POOR	Decorative defects
CRITICAL	Structural degradation
MINIMUM TOTAL	$1,258,013.73
MEDIUM TOTAL	$2,314,013.65
MAXIMUM TOTAL	$3,480,033.72

as of 27/11/07


SHELLY BAY
AIR FORCE BASE
Wellington, New Zealand.
1. Gym and Cook lounge.
2. "Elephant House"
3. Combined Mess.
4. W/O's & SNCO's Mess.
5. W/O's & SNCO's Mess TV room.
6. MTC / Bayview Annex
7. Other ranks garages.
8. Airmen's Accommodation
9. Laundry and boiler house.
10. Coal bunker.
11. Base incinerator.
12. Junior Ranks Club (orig 1886 bldg)
13. SERCO workshop/offices.
14. SERCO paint store.
15. Fuel supply bldg.
16. Wharf - outer.
17. Wharf - inner.
18. Supply MT & AFCC
19. Slipway winch house.
20 Slipway/repair yard
21. Shipwrights shop.
22. Library.
23. Garages.
24. Base HQ and Officers Accomodation.
25. Officers Mess and accommodation.
26. Officers Laundry.
27. Sewage pumping station
28.
29. BCDR's Tied HQ & outbuildings.
30. Dog Kennels.
31. Guard House.
32. Officers Pad.
33. Magazines (numbered m1 - m10) (m10 is off the map).
34. Reservoir.
35. Rifle range.
Map traced 19/5/2002 from SERCO map.

ATTACHMENT E: WELLINGTON REGIONAL COUNCIL GIS VIEWER SELECTED LAND USE REGISTER POLYGONS

Extracted from Wellington Regional Council GIS Viewer: Extraction Date 19 January 2016.

No bores present within 1000 m of the site (Buffer Search 19 January 2016).

ATTACHMENT E: POTENTIAL CONTAMINANT SOURCES

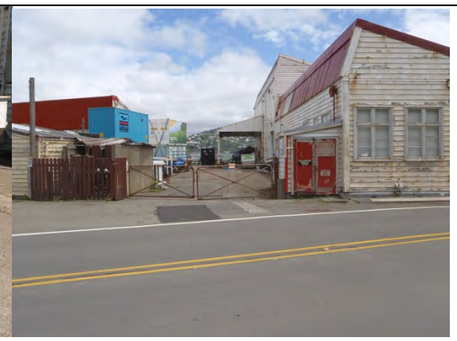
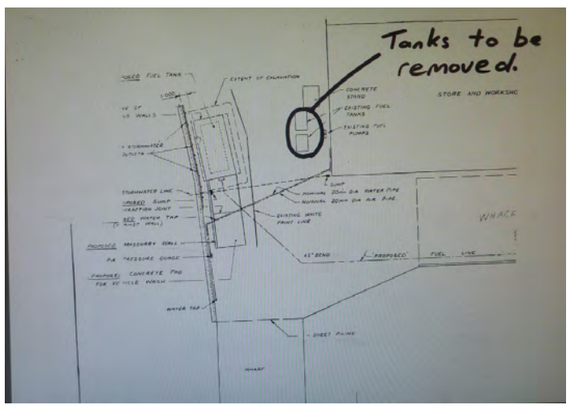
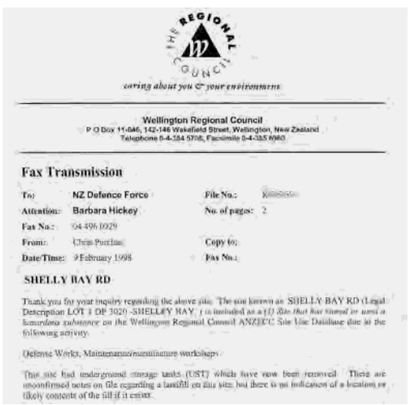
ATTACHMENT F: POTENTIAL CONTAMINANT SOURCES AND PHOTOLOG

Element	***Source of Information***	***Comment***	***Photograph***
Stormwater	Site Walkover	The boilerhouse condensate and blowdown previously entered the stormwater via an interceptor located adjacent to the boilerhouse facility. Photograph 1: Overview of the separator pit located adjacent to the boilerhouse. The stormwater manhole is noted in the middle of the picture. Photograph 2: Interceptor pit – no visual or olfactory evidence of impact of the water. Sediment in the interceptor may be impacted by metal contamination. Photograph 3: Inside the stormwater manhole located closest to the boiler house. No visual or olfactory evidence of impact noted on the water surface. ***Evaluation of potential for soil and groundwater impact***: No significant impact expected.	  
		Surface water run-off and small streams are evident on the hillside with all water draining from the slope collected in an interceptor channel at the foot of the slope. Photograph 4: Example of the interceptor channel at the base of the greywacke escarpment (North Bay). No visual or olfactory evidence of impact. Photograph 5: Example of the interceptor channel at the base of the greywacke escarpment (North Bay). No visual or olfactory evidence of impact. ***Evaluation of potential for soil and groundwater impact***: No significant impact expected.	 
		Stomwater collection at the rear of the Officers Mess and Accommodation building (South Bay). Photograph 6: Stormwater grate. ***Evaluation of potential for soil and groundwater impact***: No significant impact expected.	

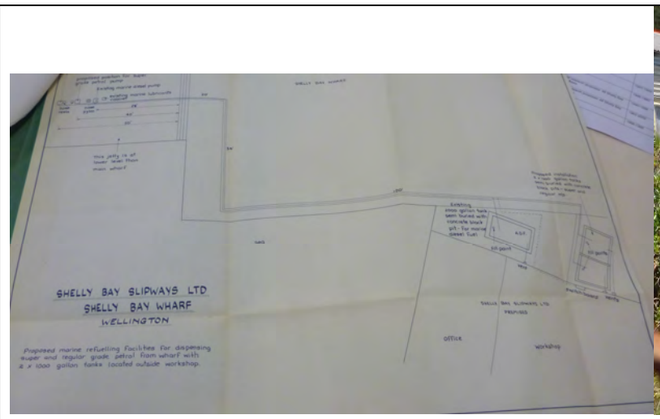
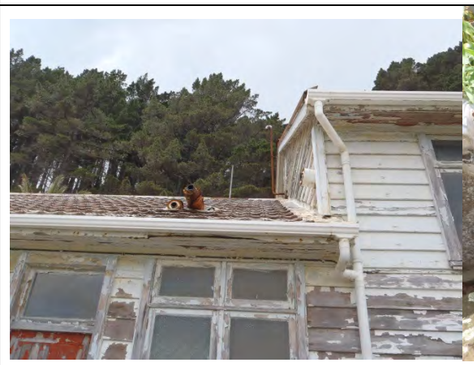
ATTACHMENT E: POTENTIAL CONTAMINANT SOURCES AND PHOTOLOG

Commanders House	Wellington Regional Council Selected Land Use Register	No evidence of current or historical hazardous activities. Photograph 7: Commanders House showing stormwater runoff from the hills above the site. ***Evaluation of potential for soil and groundwater impact***: No significant impact expected.	
Wastewater Pumping Station	Site walkover	A wastewater pumping station is a wooden building and associated underground structures operated by Wellington Water located at the south end of South Bay. Photograph 8: Building housing the pumping station equipment. Photograph 9: Wastewater retention structures. Access was unable to be made to the chambers present in the area to assess if biosolids were present. ***Evaluation of potential for soil and groundwater impact***: Biosolids may be present at the site and operational losses may have potential to create localised impact to soil and water in the vicinity of the plant.	 
Sewage/Septic	Opus January 2008	Opus January 2008 notes that wastewater from the Shipwrights Building drains to the Sea. Anecdotal evidence indicates that a disused septic tank is located at Building 6. A partially buried septic tank present adjacent to the Mess Building. Photograph 10: Septic tank located adjacent to the Mess Building. ***Evaluation of potential for soil and groundwater impact***: Considering the potential age and if maintenance of the facility is undertaken, significant impact to soil and groundwater is considered unlikely.	

ATTACHMENT E: POTENTIAL CONTAMINANT SOURCES AND PHOTOLOG

Current Dangerous Goods Storage Container	Geotechnical Investigation	A dangerous goods storage container is present in the area between Building No. 8 and the Shipwrights Building. No information on the contents of the container was sought as part of this investigation. Photograph 11: Dangerous Goods Storage Container (black in the centre of the photograph) Photograph 12: Overview of the area containing the Dangerous Goods Storage Container. ***Evaluation of potential for soil and groundwater impact***: The photograph does not show any significant staining associated with the dangerous goods storage container. It is considered unlikely that significant impact to soil or groundwater would be related to the storage container.	 
Dangerous Goods Store/Fuel Storage	Geotechnical Investigation / Opus January 2008.	The facility was not observed as part of the PSI, however information provided during the geotechnical investigation showed that the dangerous goods store (referred to as the fuel supply building and paint store) is a concrete block structure adjacent to Building No. 8. The fuel supply building contained a diesel tank (an above ground tank located in shallow pit) which was removed in 1995 when the base closed. Photograph 13: Overview of the Dangerous Goods Store area taken from Shelly Bay Road. Photograph 14: Inside the Dangerous Goods Store. ***Evaluation of potential for soil and groundwater impact***: The photograph does not show significant staining inside the Dangerous Goods Store. As the building is retaining water it is considered unlikely that significant impact to soil and groundwater would be associated with this structure.	 
Fuel Storage	Geotechnical Investigation Wellington City Council Archives Plan 0066_1_34.pdf (1993). Wellington Regional Council fax to New Zealand Defence Force – dated 9 February 1998. Reference K/9/5/59) – Contained in WRC SLUR search.	An above ground fuel storage tank was located inside the Dangerous Goods Store (details above). Photograph 15: Plan from Wellington City Archives file 0060:1:34 showing the location of the Dangerous Goods Store and "existing fuel tanks" it is not clear if the "existing tanks are below or above ground. No direct records are available to confirm if the removal of the "existing" tanks. A fax from Wellington Regional Council to the New Zealand Defence Force dated 9 February 1998 states that the site contained underground storage tanks which have now been removed. It is not clear if the tanks removed are related to these "existing tanks". ***Evaluation of potential for soil and groundwater impact***: It is not known from the records reviewed if the tanks are above ground or underground. If the tanks were located underground, soil and groundwater may have been impacted due to operational losses.	As for above photographs and below.  

ATTACHMENT E: POTENTIAL CONTAMINANT SOURCES AND PHOTOLOG

	Geotechnical Investigation (Photograph) Plan: Shelly Bay Slipways Limited Shelly Bay Wharf Wellington – Proposed marine refuelling facilities Letter from GI Cooper and WS Brambley Trustees for a Company being formed to be known as Shelly Bay Slipways Limited: Application for a Motors Spirits Retailers Licence Restricted to Marine Craft Only at Shelly Bay Wharf Wellington.	Wellington City Council records show the presence of an existing 2,000 gallon semi-buried diesel storage tank present in a concrete block bund. The document also includes an application dated 16 November 1971 for the installation of 2 semi-buried 1000 gallon super and regular motor spirits tanks. No direct records are available to confirm if the removal of the "existing" tank or whether the proposed tanks were installed. A fax from Wellington Regional Council to the New Zealand Defence Force dated 9 February 1998 states that the site contained underground storage tanks which have now been removed. It is not clear if the tanks removed are related to these tanks. Photograph 16: Plan from Wellington City Council archives of the location of the existing and proposed semi-buried tanks. Photograph 17: Photograph of the approximate area where the semi-buried tanks are/were thought to be located. ***Evaluation of potential for soil and groundwater impact***: soil and groundwater may have been impacted due to operational losses.	 
Asbestos	Site Walkover	Asbestos lagging may have been used in piping that transferred heat from the boilerhouse to the buildings at the base. The piping remains present at the site with sections showing various stages of aging/decay exposing lagging. Testing of the lagging material and an asbestos survey have not been undertaken as part of these works. Photograph 18: Pipping and lagging exiting the boilerhouse roof. Photograph 19: Pipe lagging exposed at the base of the greywacke escarpment (North Bay). ***Evaluation of potential for soil and groundwater impact***: An asbestos survey has not been completed for the site. There is potential for the structures already demolished to impact soil if the asbestos was not removed appropriately. If structures or the lagging is to be removed at the site there is potential for soil to be impacted by asbestos if not undertaken correctly. Groundwater is unlikely to be affected by asbestos.	 
	Site Walkover	Possible asbestos containing material present on the floor of the boilerhouse. Photograph 20: Possible asbestos containing material noted on the floor of the boilerhouse. ***Evaluation of potential for soil and groundwater impact***: An asbestos survey has not been completed for the site. There is potential for the structures already demolished to impact soil if the asbestos was not removed appropriately. If structures are to be removed at the site there is potential for soil to be impacted by asbestos if not undertaken correctly. Groundwater is unlikely to be affected by asbestos.	

ATTACHMENT E: POTENTIAL CONTAMINANT SOURCES AND PHOTOLOG

	Wellington City Archives Email to Wellington City Council from Unknown?: Shelly Bay Slipway Building Demolition of Lean-to Structures November 2001. 1996 Aerial Photograph – Wellington City Council website http://wellington.govt.nz/webmap/wccmap.html	Council records from 2001 show that asbestos sheeting was present in unauthorised lean-to's in the area of the Slipway. These lean-to's were demolished as they were deemed unsafe in December 2001. The letter indicates that SERCO (the base maintenance operators) were to remove the asbestos appropriately and send material to the closest landfill. Photograph 21: Wellington City Council 1996 aerial photograph showing the presence of the lean-to structures adjacent to the Shipwrights Building. ***Evaluation of potential for soil and groundwater impact***: There is potential for the structures already demolished to impact soil if the asbestos was not removed appropriately. Groundwater is unlikely to be affected by asbestos.	
	Anecdotal Evidence	AECOM understands that during works undertaken by Tonkin and Taylor in relation to the sea wall in the area of Building No. 8 that asbestos was found in loose and asbestos containing material namely Chrysotile, Amosite and Crocidolite. ***Evaluation of potential for soil and groundwater impact***: There is potential for the asbestos to be present in soil adjacent to the seawall in the area of Building No. 8 Groundwater is unlikely to be affected by asbestos.	No photograph available.
	Opus January 2008	Opus report that the interior of Building No. 8/HQ Building and the Laundry Building (adjacent to the Boilerhouse) may have asbestos present in the interior of the building. Opus also report that Super 6 roofing (containing asbestos) may be present on the Shipwrights Building. Photograph 22: Shipwrights Building looking northwest across the Slipway area. It appears that the roof of the structure is newly painted/new. This may have occurred following the Opus January 2008 report. ***Evaluation of potential for soil and groundwater impact***: An asbestos survey has not been completed for the site. There is potential for the structures already demolished to impact soil if the asbestos was not removed appropriately. If structures are to be removed at the site there is potential for soil to be impacted by asbestos if not undertaken correctly. Groundwater is unlikely to be affected by asbestos.	
Transformer/PCB's	Current Transformer Location: Site Walkover Historical Transformer Location: Plan Showing Naval Buildings in Relation to the Road Reserve Shelly Bay (Compiled from Survey Office Plan No. 18318 and Public Works Dept Plan No. W.D.O 1785). Pencil date	Two transformer locations were noted at the site, one historical transformer located to the east of the slipway adjacent to the library and one located adjacent to the current café. Photograph 23: Current transformer location in the area of the café. Photograph 24: Snapshot of the plan showing the historical transformer location. ***Evaluation of potential for soil and groundwater impact***: The transformers may have previously contained oils with polychlorinated biphenyls (PCB). No visual or olfactory evidence of staining was observed around the current transformer. There may be so localised impact around the transformer locations.	 
Leaded Paints		The presence on leaded paint on the buildings is possible and may have affected soil quality. Limited soil sampling suggests that there is not a significant risk from leaded paint associated with the former Airmen's Accommodation.	No photograph available.

ATTACHMENT E: POTENTIAL CONTAMINANT SOURCES AND PHOTOLOG

Liquid Waste	Site Walkover Opus January 2008	A fat trap is present at the rear of the combined mess building. Photograph 25: Fat trap at the rear of the combined mess. Photograph 26: Last chamber of the fat trap. Some residual fat remains. Opus January 2008 reports that an area of liquid residue contamination was present on the concrete floor in southwest corner of the Shipwrights Building. Access to this building was restricted during the PSI. No photograph of the staining is available. ***Evaluation of potential for soil and groundwater impact***: Significant impact to soil or groundwater is not expected related to the fat trap. The origin of the liquid residue "contamination" noted in the Opus January 2008 report is unknown, therefore the impact on soil and groundwater is unable to be quantified.	 
Boilerhouse/Pumphouses	Site Walkover	A coal fired boilerhouse is present in the north bay. There was no evidence in either Wellington City Archives or during the Site Walkover of boiler ash at the site. Minor hydrocarbon staining noted on the floor of the main boilerhouse room. Photograph 27: Boilerhouse interior taken from the main door. Photograph 28: Hydrocarbon staining on the main boilerhouse room floor. Photograph 29: Boilerhouse fireplace. Photograph 30: Boilerhouse and Laundry looking east over the former Airmans accommodation. ***Evaluation of potential for soil and groundwater impact***: Soil and groundwater impact may be present related to the burning of coal to fire the boiler and hydrocarbon staining on the concrete. No evidence of ash burial was found in records relating to the site or during the site walkover. Significant impact related to the operation of the boilerhouse is considered unlikely.	   

ATTACHMENT E: POTENTIAL CONTAMINANT SOURCES AND PHOTOLOG

Pumphouses for Heating	Site Walkover	Pumphouses located across the site to service the heating system. Photograph 31: Pumphouse located adjacent to the South Bay parade ground. Photograph 32: Pumphouse exterior – North Bay behind the mess buildings. Photograph 33: Pumphouse interior – North Bay behind the mess buildings Photograph 34: Pumphouse located adhacent to the Serco Paint Store. ***Evaluation of potential for soil and groundwater impact***: No significant impact expected.	   
Landfilling	Wellington Regional Council Selected Land Use Register Wellington Regional Council fax to New Zealand Defence Force – dated 9 February 1998. Reference K/9/5/59) – Contained in WRC SLUR search.	The records contained in the Selected land use register mentions a landfill present at the site, however no information is available to confirm the location. Anecdotal evidence suggest that a green waste landfill was located at the head of Magazine Road. Photograph 35: Fax noting the presence of a landfill at the site. ***Evaluation of potential for soil and groundwater impact***: No evidence of placement of domestic refuse or inert waste was noted in records reviewed and no evidence of landfilling (other than reclamation) was found. It is considered unlikely that significant impact related to landfilling at the site is present.	 THE REGIONAL COUNCIL caring about you & your environment Wellington Regional Council P O Box 11-646, 142-146 Wakefield Street, Wellington, New Zealand Telephone 0-4-384 5708, Facsimile 0-4-385 6960 **Fax Transmission** To: NZ Defence Force — File No.: Attention: Barbara Hickey — No. of pages: 2 Fax No.: 04 496 0029 From: Chris Purdue — Copy to: Date/Time: 9 February 1998 — Fax No.: **SHELLY BAY RD** Thank you for your inquiry regarding the above site. The site known as SHELLY BAY RD (Legal Description LOT 1 DP 3020 -SHELLEY BAY) is included as a *HAIL Site that has timed or until a hazardous substance on the* Wellington Regional Council ANZECC Site Use Database due to the following activity: Defense Works, Maintenance/installature workshops This site had underground storage tanks (UST) which have now been removed. There are unconfirmed notes on file regarding a landfill on this site, but there is no indication of a location or likely contents of the fill if it exists.
Magazines	Aerial photographs and historical information from Capital Defence	Not in area of audit. Materials used for the construction of the magazines is unknown.	No photographs available.

ATTACHMENT E: POTENTIAL CONTAMINANT SOURCES AND PHOTOLOG

Slipway	Site walkover Evening Post Article: the slipping of Shelly Bay. Opus January 2008	The facility was not observed as part of the PSI. Photographs were taken from outside the fenced area. Article notes: Ex-wartime launches used as civil aviation control craft for the flying boat base in Evans Bay and also finishing boats, pleasure craft and coasters that needed repairing were serviced at the Shelly Bay Slipway. Activities at the slipway have included the recovery of scrap metal, vehicle repair and trailer fabrication. Sediments may contain elevated levels of metals and hydrocarbons from industries undertaken in the area. Photograph 36: Slipway and finger pier taken from Shelly Bay Road. Photograph 37: Slipway concrete area looking southwest taken from Shelly Bay Road. Photograph 38: Slipway concrete area looking north taken from Shelly Bay Road. Photograph 39: Slipway cradle area looking south taken from Shelly Bay Road. ***Evaluation of potential for soil and groundwater impact***: Based on aerial photographs it appears that the working areas of the slipway have been concreted. It is therefore considered that localised impact to soil and groundwater may have occurred in localised area (such as the crane hydraulic fluids (if used). If dredging of the slipway area is required for the development, sediment may be impacted and require specialist disposal.	   
Generator/Refrigeration?	Site Walkover	Generator/Refrigerator present at the rear (east) of the mess facility in North Bay. Photograph 40: Southern exposure of the gas/refrigeration plant at the mess facility. Photograph 41: Northern exposure of the gas/refrigeration plant at the mess facility. ***Evaluation of potential for soil and groundwater impact***: No significant impact expected.	 

ATTACHMENT E: POTENTIAL CONTAMINANT SOURCES AND PHOTOLOG

Garaging	Site Walkover	Vehicle garages are located on the eastern boundary of North Bay and the northeast boundary of South Bay. Photograph 42: North Bay garaging. Photograph 43: South Bay garaging ***Evaluation of potential for soil and groundwater impact***: No significant impact expected.	 
Serco Paint Store	Site Walkover	The Serco Paint Store and Workshop is located directly to the east of Building 8. The facility was not inspected as part of the PSI, however it is expected that vehicle maintenance and the storage of paint was undertaken in this building. Photograph 44: Serco workshop facility. ***Evaluation of potential for soil and groundwater impact***: No significant impact expected.	
Current Site Activities		The interior of buildings were not inspected during the PSI and a survey of current use was not undertaken. The wider site is occupied by artists, sculptors, printmakers and Propeller Studios. With the exception of Propeller Studios (which has a Dangerous Goods Container – listed above), significant use of hazardous substances is not expected. Minor use of solvents, paints and printers ink is not expected to create a significant impact at the site. ***Evaluation of potential for soil and groundwater impact***: No significant impact expected.	No photographs available.

ATTACHMENT F: LABORATORY ANALYTICAL RESULTS AND CHAIN OF CUSTODY DOCUMENTATION

Hill Laboratories
BETTER TESTING BETTER RESULTS

R J Hill Laboratories Limited
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zealand

Tel +64 7 858 2000
Fax +64 7 858 2001
Email mail@hill-labs.co.nz
Web www.hill-labs.co.nz

ANALYSIS REPORT

Client:	AECOM Consulting Services (NZ) Limited	**Lab No:**	1518089	SPv1
Contact:	N Rowe	**Date Registered:**	19-Dec-2015	
	C/- AECOM Consulting Services (NZ) Limited	**Date Reported:**	13-Jan-2016	
	PO Box 3367	**Quote No:**	72191	
	WELLINGTON 6140	**Order No:**	60480847.1.02	
		Client Reference:	SB WC	
		Submitted By:	N Rowe	

Sample Type: Soil

		Sample Name:	TP4 0.3 17-Dec-2015	TP4 0.5m 17-Dec-2015	TP4 1.1m 17-Dec-2015	TP5 0.5 17-Dec-2015	TP5 0.7 17-Dec-2015
		Lab Number:	1518089.1	1518089.2	1518089.3	1518089.5	1518089.6
Individual Tests							
Dry Matter	g/100g as rcvd		-	92	-	92	-
Heavy Metals, Screen Level							
Total Recoverable Arsenic	mg/kg dry wt		5	-	4	-	4
Total Recoverable Cadmium	mg/kg dry wt		0.14	-	< 0.10	-	0.14
Total Recoverable Chromium	mg/kg dry wt		18	-	22	-	8
Total Recoverable Copper	mg/kg dry wt		29	-	16	-	7
Total Recoverable Lead	mg/kg dry wt		85	-	64	-	10.9
Total Recoverable Nickel	mg/kg dry wt		10	-	17	-	6
Total Recoverable Zinc	mg/kg dry wt		89	-	76	-	41
Total Petroleum Hydrocarbons in Soil							
C7 - C9	mg/kg dry wt		-	< 8	-	< 8	-
C10 - C14	mg/kg dry wt		-	< 20	-	< 20	-
C15 - C36	mg/kg dry wt		-	< 40	-	< 40	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt		-	< 70	-	< 70	-

		Sample Name:	TP5 1.1 17-Dec-2015	TP6 0.5 17-Dec-2015	TP6 0.7 17-Dec-2015		
		Lab Number:	1518089.7	1518089.8	1518089.9		
Individual Tests							
Dry Matter	g/100g as rcvd		-	-	90	-	-
Heavy Metals, Screen Level							
Total Recoverable Arsenic	mg/kg dry wt		2	34	-	-	-
Total Recoverable Cadmium	mg/kg dry wt		< 0.10	< 0.10	-	-	-
Total Recoverable Chromium	mg/kg dry wt		9	21	-	-	-
Total Recoverable Copper	mg/kg dry wt		3	17	-	-	-
Total Recoverable Lead	mg/kg dry wt		7.5	62	-	-	-
Total Recoverable Nickel	mg/kg dry wt		5	11	-	-	-
Total Recoverable Zinc	mg/kg dry wt		25	71	-	-	-
Total Petroleum Hydrocarbons in Soil							
C7 - C9	mg/kg dry wt		-	-	< 8	-	-
C10 - C14	mg/kg dry wt		-	-	< 20	-	-
C15 - C36	mg/kg dry wt		-	-	< 40	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt		-	-	< 70	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1, 3, 6-8
Total Petroleum Hydrocarbons in Soil	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	8 - 60 mg/kg dry wt	2, 5, 9
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	2, 5, 9

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Martin Cowell - BSc
Client Services Manager - Environmental Division

URS

AECOM

CHAIN OF CUSTODY AND SAMPLE RECEIPT DOCUMENTATION

FROM:	TO:
URS New Zealand Limited Lambton House, Level 4 160 Lambton Quay PO Box 3367 27277 Wellington 6140 ~~1~~ Ph: (04) 496 3863	**R J Hill Laboratories Limited** 1 Clyde Street Hamilton Ph: (07) 858 2000 URS Client: NGA WC

RESULTS ATTENTION: N. Rowe
PROJECT NO: SB
PURCHASE ORDER NO: TBC
SAMPLER(S): NR

LAB QUOTE NO:
- [x] 30443 Normal Priority
- [ ] 30833 High Priority
- [ ] 30481 Urgent Priority
- [ ] ____ Special Quote

RESULTS REQUIRED BY:

SAMPLE ID	MATRIX	DATE/TIME	COMMENTS	CONTAINERS	ANALYTES: TPH C7–C36	ANALYTES: Heavy Metals	ANALYTES: HOLD COLD
				SOIL JARS	SOIL JARS	SOIL JARS	
TP10-3	SOIL	17/12/15				✓	
TP4 0.5					✓		
TP4 1.1						✓	
TP4 2.0							✓
TP5 0.5					✓		
TP5 0.7						✓	
TP5 1.1						✓	
TP6 0.5						✓	
TP6 0.7	↓	↓			✓		
Total No. of Sample Bottles:				Including:		0	Blank or Duplicate Samples

CHAIN OF CUSTODY DATA

RELINQUISHED BY		RECEIVED BY		METHOD OF SHIPME
NAME: Natalie Rowe	DATE: 17/12/15	NAME: CIDS B	DATE:	URS RECEPTION
COMPANY: URS NEW ZEALAND LTD AECOM	TIME:	COMPANY: HILL Labs.	TIME:	HILLS DOCKET

SAMPLE RECEIPT DATA

PLEASE COMPLETE THIS SECTION (CIRCLE AS APPROPRIATE) AND RETURN FAX A COPY IMMEDIATELY AFTER RECEIVING SAMPLES)

ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER	YES / NO	PLEASE CONTACT THE LABORATORY	CUSTODY SEAL INTACT:	YES / NO / NA
			SAMPLES CHILLED:	YES / NO / NA Temp: 17.6°C
			LABORATORY BATCH NO:	

SPECIAL HANDLING/STORAGE OR DISPOSAL INSTRUCTIONS:

CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES

REPORTING

REPORT FORMAT: FAX ☐ LETTER ☐ EMAIL ☐ DISK ☐

EMAIL ADDRESS:

INTERNAL USE - URS WORK INSTRUCTIONS AND CHECKLIST OVERLEAF

ATTACHMENT H: SOIL SAMPLE ANALYTICAL RESULTS COMPARED TO GUIDELINE VALUES

Table 1: Shelly Bay - Soil Sample Analytical Results

	Sample Details and Analytical Results								**Wellington Background Concentrations for Comparative Purposes (Type 2 Greywacke)[3]**	**Oil Industry Guidelines: Tier 1 Soil Acceptance Criteria[1]**		
URS Sample Reference	TP4 0.3	TP4 0.5m	TP4 1.1m	TP5 0.5	TP5 0.7	TP5 1.1	TP6 0.5	TP6 0.7		All Pathways Soil Acceptance Criteria - Residential[2]		All Pathways Soil Acceptance Criteria - Commercial/Industrial[4]
Laboratory Sample Reference	1518089.1	1518089.2	1518089.3	1518089.5	1518089.6	1518089.7	1518089.8	1518089.9				
Date Sampled	17-Dec-15	17-Dec-15	17-Dec-15	17-Dec-15	17-Dec-15	17-Dec-15	17-Dec-15	17-Dec-15				
Sample Location	Test Pit 4 - West of Café Premises			Test Pit 5 - Southwest of the Boilerhouse and Separator			Test Pit 6 - Northwest of the Boilerhouse and Separator			Contamination depth Surface (<1m) / 1m-4m		Contamination depth Surface (<1m) / 1m-4m
Sample Depth (m below current surface)	0.3	0.5	1.1	0.5	0.7	1.1	0.5	0.7				
Sample Soil Type	SILT	Silty GRAVEL	Silty GRAVEL	SAND	SAND	Sandy GRAVEL	Silty GRAVEL	GRAVEL and SHELLS		SAND		SAND
Guideline Soil Type	Sandy SILT	SAND	SAND	SAND	SAND	SAND	SAND	SAND				
Sample of soil remaining or removed	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining				
Total Petroleum Hydrocarbons (TPH)												
C_7-C_9	-	< 8	-	< 8	-	-	-	< 8	-	120m / 120m	120m / 120m	120m / 120m
C_{10}-C_{14}	-	< 20	-	< 20	-	-	-	< 20	-	(470)x / (560)x	(470)x / (560)x	(1500)x / (1900)x
C_{15}-C_{36}	-	< 40	-	< 40	-	-	-	< 40	-	NA / NA	NA / NA	NA / NA
Total hydrocarbons (C_7 - C_{36})	-	< 70	-	< 70	-	-	-	< 70	< 30 - 190**	-	-	-
Heavy Metals - Total Recoverable										**Soil Contaminant Standards[5] (Residential 10%)**	**Soil Contaminant Standards[5] (High Density Residential)**	**Soil Contaminant Standards[5] (Commercial/Industrial)**
Arsenic	5	-	4	-	4	2	***34***	-	< 2-7	20	45	70
Cadmium	**0.14**	-	< 0.10	-	**0.14**	< 0.10	< 0.10	-	< 0.1-0.1	3	230	1300
Chromium (guideline is for Chromium III)	**18**	-	**22**	-	8	9	**21**	-	6-16	460	1500	>10000
Copper	**29**	-	16	-	7	3	17	-	3-25	> 10000	>10000	>10000
Lead (guideline is Inorganic Lead)	**85**	-	64	-	10.9	7.5	62	-	5.9-78.6	210	500	3300
Nickel	10	-	**17**	-	6	5	11	-	4-13	-	-	-
Zinc	89	-	76	-	41	25	71	-	24-105	-	-	-

Notes:
All results and criteria are expressed in mg/kg dry weight
Bold - exceeds the Wellington Background Concentrations
Italics - Exceeds the Residential (10% Produce)

1 Ministry for the Environment, 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (Oil Industry Guidelines)
2 Values taken from table 4.13 of the Oil Industry Guidelines.
3 Greater Wellington Regional Council (GWRC) August 2003. Determination of Common Pollutant Background Soil Concentrations for the Wellington Region. Table 3-3: For main soil type 2 - Greywacke
4 Values taken from table 4.14 of the Oil Industry Guidelines
5 Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. Table B2.

**Wellington Background Guidline values for total TPH are for the C7-C44 hydrocarbon range
Guideline value is for Chromium V1
Groundwater was encountered at approximately 1.8 m below ground level (bgl) at the site.