CITY OF HOBART

SUPPORTING INFORMATION
SUPPLEMENTARY ITEMS

CITY PLANNING COMMITTEE MEETING

OPEN PORTION OF THE MEETING

MONDAY, 11 NOVEMBER 2019
AT 5:00 PM
VENUE: LADY OSBORNE ROOM, TOWN HALL

TABLE OF CONTENTS

praxisenvironment

heritage

planning

archaeology

po box 338
north hobart
tasmania 7002

0418 303 184
info@prax.com.au

Statement of Historical Archaeological Potential and Archaeological Impact Assessment

Portion of the Ross Patent Slip &
Portion of the Battery Point Shipping Activity Areas
Napoleon Street, BATTERY POINT, TASMANIA

Brad Williams
Historical & Maritime Archaeologist

For Robert Vaughan

February 2019
(v2 September 2019)

Contents:

This document was written by Brad Williams (BA.Hons Archaeology, G.Dip Maritime Archaeology, MA Cultural Heritage Management) Historical Archaeologist, Heritage Consultant and Director of Praxis Environment – a division of Praxis Synergy Pty. Ltd.

Unless otherwise stated, the north point (or approximate) of maps and plans is to the top of the page.

Cadastral information depicted in this document must not be relied upon without verification by a Surveyor.

1. Introduction and rationale

This report has been commissioned by Mr. Robert Vaughan to accompany a development application to Hobart City Council (as planning authority) to examine any archaeological issues for the conversion of an existing boatshed at 30 Napoleon Street (part of 18-44 Napoleon Street, Battery Point C/T 39915/5, PID 7346696) for a parking area and the construction of a new boat shed adjacent to that existing.

The on-land portion of the subject site is part of the listing for the *Ross Patent Slip* site which is included on the Tasmanian Heritage Register (THR ID1902, CPR9880), and also includes part of the underwater/inter-tidal area that is included on the Tasmanian Heritage Register as part of the Battery Point Shipping Activity Areas (THR ID10541, CPR 6784) - therefore is subject to the provisions of the *Historic Cultural Heritage Act 1995.* The subject site is not included on Table E.13.1 of the *Hobart Interim Planning Scheme 2015* (HIPS15), however the on-land portion is included within the BPI Heritage Precinct, therefore is subject to the provisions of Part E.13.8 of the scheme (*Development Standards for Heritage Precincts*). Whilst these statutory heritage requirements do not explicitly require archaeological input into the development process (the subject site is not included in Table E.13.4, *Places of Archaeological Potential)*, the on-land portion of the subject site has an entry against Criterion C on the Tasmanian Heritage Register (research potential) which states:

> *The Ross Patent Slip Site has yielded (and still has the potential to yield) important information, of an archaeological nature, that may contribute to a greater understanding of Tasmania's history.*

And the underwater/inter-tidal area has the following entry against Criterion C on the Tasmanian Heritage Register (research potential) which states:

> *The surface and subsurface deposits of the Battery Point Shipping Activity Places are artefacts in the archaeological sense of being the tangible products of human behaviour. As such they have the potential to yield information that will contribute to a greater understanding of Tasmania's history. This site has the potential to explore sequences of construction and the shipbuilding industry during the 19th century, and changes in technology. Such tangible evidence has the potential to create new knowledge and to expand on existing knowledge. The potential information from this site may also contribute to wider research frameworks within or outside Australia.*

Although the provisions of Part E.13.8 of the HIPS15 do not specifically call in archaeological considerations, under Part E.15.3 the planning authority may request a *statement of archaeological potential, impact assessment and method statement* for any development of a place included on Tables E.13.1-2 *if considered necessary.* It is also expected that the Tasmanian Heritage Council will require some level of archaeological planning for any development of the site.

Accordingly, the brief for this project was to provide a statement of historical archaeological potential (SoHAP) for the site. If archaeological potential is identified, then to undertake an archaeological impact assessment and method statement. Accordingly, this document has been prepared with regard to the Tasmanian Heritage Council's Practice Note 2 – *Managing Historical Archaeological Significance in the Works Application Process*[1], and the Tasmanian Heritage Council's *Guidelines for Historical Archaeological Research on Registered Places*[2].

Figure 1.1 – A recent aerial image of the study area. Adapted from www.thelist.tas.gov.au

[1] http://www.heritage.tas.gov.au/media/pdf/2%20Practice%20note%20-%20Archaeology.pdf

[2] http://www.heritage.tas.gov.au/media/pdf/Archae%20ResGlines%20%20FINAL%20-%20June%202009.pdf

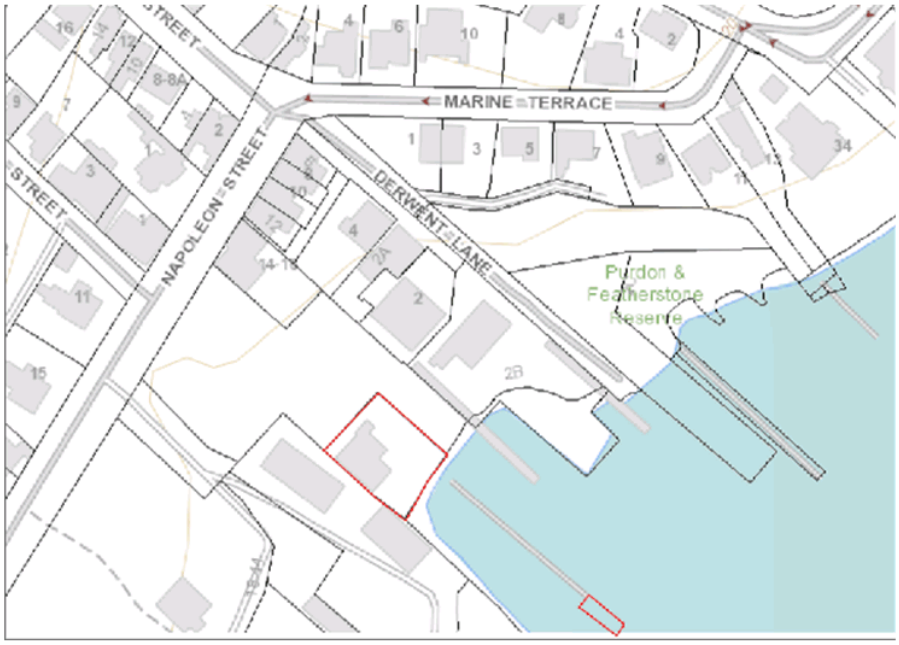


Figure 1.2 – Cadastral parcels surrounding the study area. Adapted from www.thelist.tas.gov.au

2. Archaeological methodology

Further to the THC's Practice Note 2 and Research Guidelines (as cited above), this statement of archaeological potential is derived from a process which identifies the potential of the site to yield archaeological remains, the significance of any remains, and their potential to yield meaningful information about the site, and which might contribute to relevant key archaeological and historical themes. The following briefly outlines the methodology followed:

Determining general archaeological potential: Through a desktop analysis of historical data and secondary sources, as well as non-invasive site observations, an understanding of the evolution of the site has been gained which has allowed an assessment of the archaeological potential (however significant) of any part of the site - resulting in substantiated predictions of the likelihood of finding *something* upon any particular part of the site.

This has been done by analysing primary source material, summarizing the developmental history of the site and developing a chronological narrative detailing an overview of the history of all known features to have ever existed on the site. Where possible, developmental overlays have been developed from historic maps, plans, photographs and other visual documentation. This overlay has been supported by other observations providing supplementary information, and also includes processes such as demolition and disturbance which may have removed or destroyed potential remains – and may have diminished the archaeological potential.

Assessing the significance and potential of any likely archaeological resources to yield meaningful information**:** Upon understanding the archaeological potential through desktop and site analysis, the next step was to understand its relationship to any aspect of the identified significance of the place – e.g. do the remains have the potential to demonstrate an aspect of the significance of the site or related key historic theme? The potential for any of the archaeological remains to demonstrate important aspects of the history of the site, whether in a state, regional or thematic context, is to be considered.

Understanding possible impact of development and formulation of management strategies**:** Based on any identified archaeological potential and significance of the site, consideration will be given as to whether the proposed development will impact upon any likely archaeological remains and if necessary broad management strategies will be proposed to manage any impact.

Table 1 (below) demonstrates the steps of this assessment:

Methodology for formulation of the statement of archaeological potential		
	If 'no'	**If 'yes'**
1. Archaeological potential. Are you likely to find something if you dig here? (i.e. a Statement of Archaeological Potential).	Further action may not be required, although a contingency plan may be required for unexpected finds.	The significance of the archaeological potential should be investigated.
2. Significance. Could anything you find here greatly contribute to our understanding of the site or related significant theme?	Further action may not be required.	The likely integrity of the archaeological remains should be investigated.
3. Integrity. Are any archaeological remains likely to be intact?	Further action may not be required, although a contingency plan is required for unexpected integrity.	The likelihood of significant archaeological remains is confirmed.
4. Impact Will proposed works impact upon the significant archaeological remains? i.e. an Archaeological Impact Assessment.	Further action may not be required, although a contingency plan may be required for unexpected impacts.	An Archaeological Method Statement will be required to detail how impact will be managed/mitigated.

3. Historical background of the subject site

3.1. Source material

For this initial assessment of archaeological potential, the depiction of the physical history of the site will be the main consideration – with other aspects of site history (i.e. social histories, economic history, associations *et. al.*) likely to be more useful in any post-investigation analysis of findings (i.e. artifact assessment), therefore beyond the scope of the current document. Similarly, the history of other townscape developments is beyond the scope of the current document however may be useful in further detailed analysis of future archaeological findings.

The following overview of the known physical development history of the site aims to aid in the prediction of the likely archaeological remains. This does not represent a comprehensive site history, and has been limited to a history of the physical development of the site as relevant to the archaeological resource.

Primary sources

Broadly, the primary sources consulted in the development of the statement of archaeological potential include:

- DPIPWE – Land Data Branch, historic map collection (basement).
- Tasmanian Archive and Heritage Office historic map series (PH & CSO series).
- National Archives of Australia Railway survey series (P1330).
- Allport Collection – State Library of Tasmania.
- State Library of New South Wales historic map series (CB series).

Secondary sources

The following works give are useful in understanding the wider shipbuilding and maritime activities undertaken nearby and adjacent to the study area and the wider Hobart waterfront area:

- Solomon, R. (1976): *Urbanisation: The Evolution of an Australian Capital.* Angus and Robertson Publishers.
- Mays, N. (2014): *Spirited, Skilled and Determined. The Boat and Ship Builders of Battery Point 1835-1935.* Published by the author.

- HDLC. Pty. Ltd. (2008): *Battery Point Slipyards Conservation Management Plan.* Hobart City Council).

- Tasmanian Heritage Register entries 10541 and 1092 (Battery Point Shipping Activity Areas Part 1 and Ross Patent Slip respectively) which provide detailed contextual histories for the subject site and surrounds.

- Vincent. *et. al.* (1995): *Historical Overview of the Battery Point Slipyards & Environs, Battery Point Slipyard, Napoleon Street, Conservation Plan* (Section 3).

3.2. Analysis of historical sources

As per the archaeological methodology detailed in Section 2, the initial assessment of archaeological potential relies on an understanding of the physical development of the study area, in order to gain an understanding of the location and types of structures and activities previously undertaken on the site, as well as other site formation processes such as deposition, fill, disturbance etc.

To be read in conjunction with the Tasmanian Heritage Register entry for the Ross Patent Slip site (and associated contextual history) – presented here as ATTACHMENT A, the following survey plans were drawn from various collections and were georeferenced across a wider area in order to gain a 'best-fit' overlay using the current street grid as well as extant buildings from that period as reference points and to depict the study area with a good degree of accuracy in relation to historic features. Commentary as to the expected accuracy of each plan is made below and further discussed in the individual assessment of each study area. Historical imagery in the form of photographs and artworks are also used to build the physical development history. The following survey plans were used in this assessment:

- Frankland's 1839 map of Hobart and surrounds (State Library of Tasmania, Allport Stack 912.94661MAP). Whilst this survey plan is not highly accurate in terms of precise building locations and footprints, is very accurate in depicting general areas of development and the street grid.

- Sprent's 1841-1845 map of Hobart and surrounds (www.thelist.tas.gov.au). This is considered to be one of the most accurate depictions of the layout of early Hobart buildings and the street grid, although it is limited to buildings (and parts of buildings) which were visible from public vantage points. This particular area is likely to have been surveyed by Sprent in 1842-3.

- Hobart Map 106 (c1890) which is not particularly detailed or accurate in terms of showing minor/domestic development, it does depict major public infrastructure and commercial/industrial sites.

- The 1908 Metropolitan Drainage Board survey of Hobart (State Library of Tasmania). These provide a very detailed and accurate depiction of Hobart at that time, however much of the waterfront area is missing from the surviving maps of that survey, e.g. Maps 1-3 are missing which encompass much of the Sullivans Cove and central Hobart area.

- 1922 Huon Railway survey. Although the study area is not near any railway, evidently part of the rail survey included transport infrastructure along the shoreline of the Derwent. This is a very detailed and probably highly accurate plan.

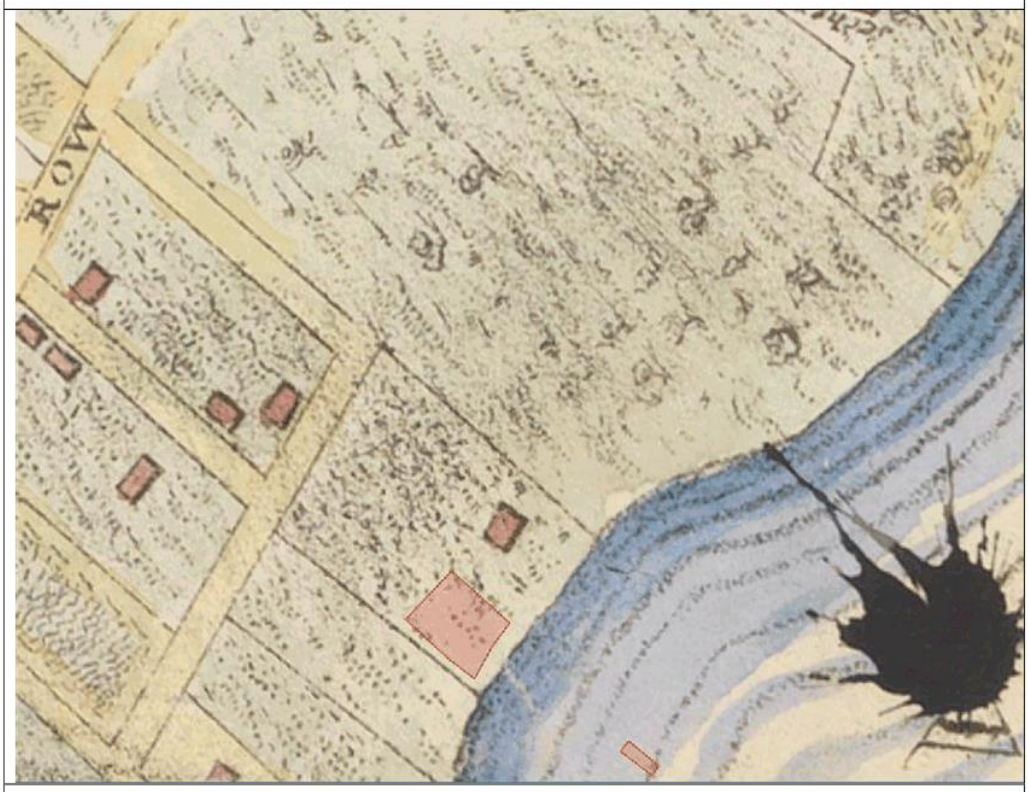
- The 1946 aerial photo run of Hobart (DPIWE).

- The 1967 Southern Metropolitan Planning Authority map, which is a very accurate and detailed map of the built infrastructure of the city.

- Various photograph collections, particularly from the Tasmanian Archive and Heritage Office (TAHO), State Library of Tasmania etc.

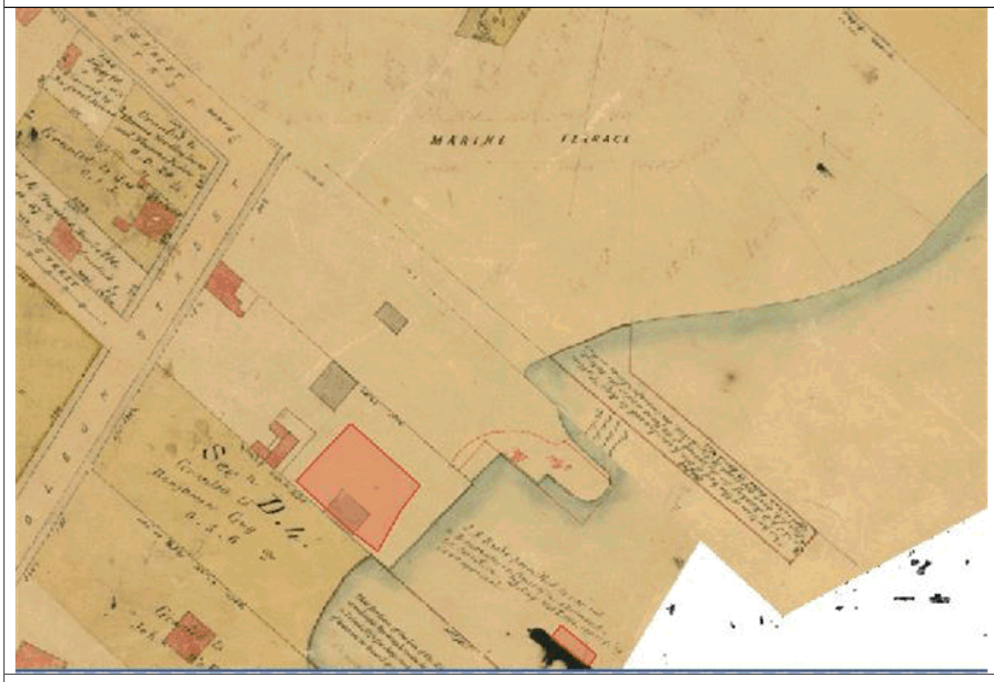
The following tables depict the subject site and specifically considers the possible archaeological resources on that site, as informed by georeferencing against each of the survey plans cited above (where relevant).

Figure 3.1 - 1839 Frankland survey, State Library of Tasmania, Allport Stack 912.94661MAP



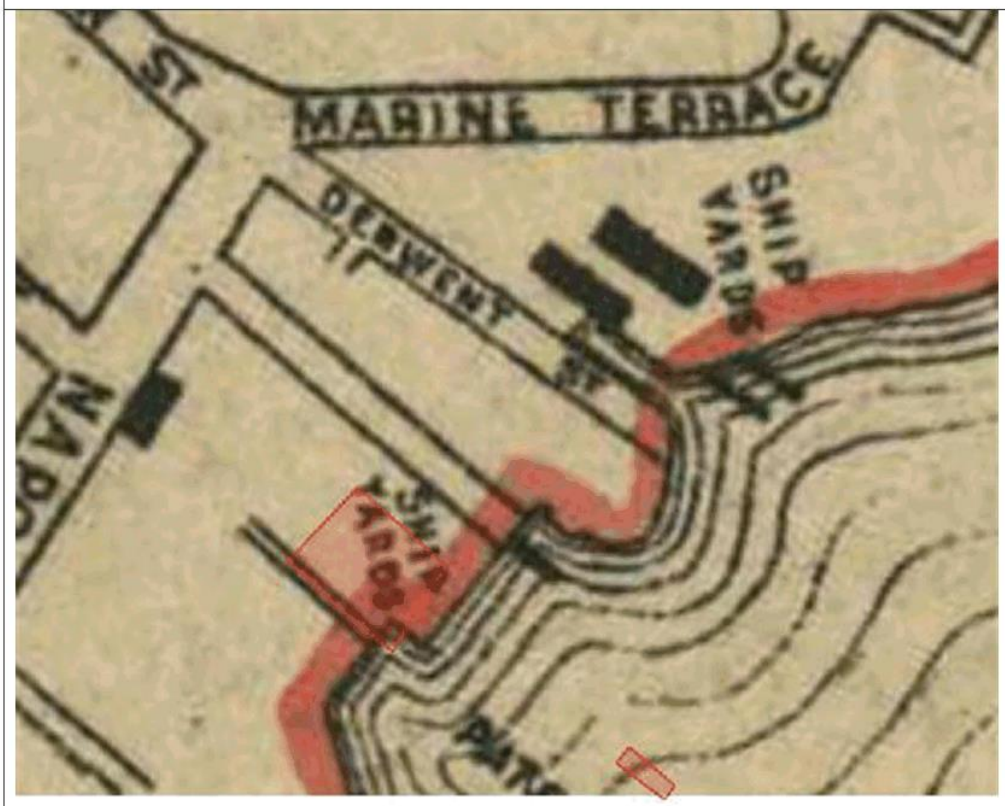
Frankland's 1839 map of Hobart and surrounds (State Library of Tasmania, Allport Stack 912.94661MAP) shows the study area as part of a larger site with a single building – the allotment running from what is now Napoleon Street to the water. Whilst this plan is known to not have a high level of accuracy, it does suggest that the study area was not the site of any development at that time. Shipbuilding and maritime activities in Battery Point had not commenced in any major way at that time, therefore it is likely that the study area was merely part of the waterfront yardspace of that building.

Figure 3.2 - 1845 Sprent survey, Libraries Tasmania



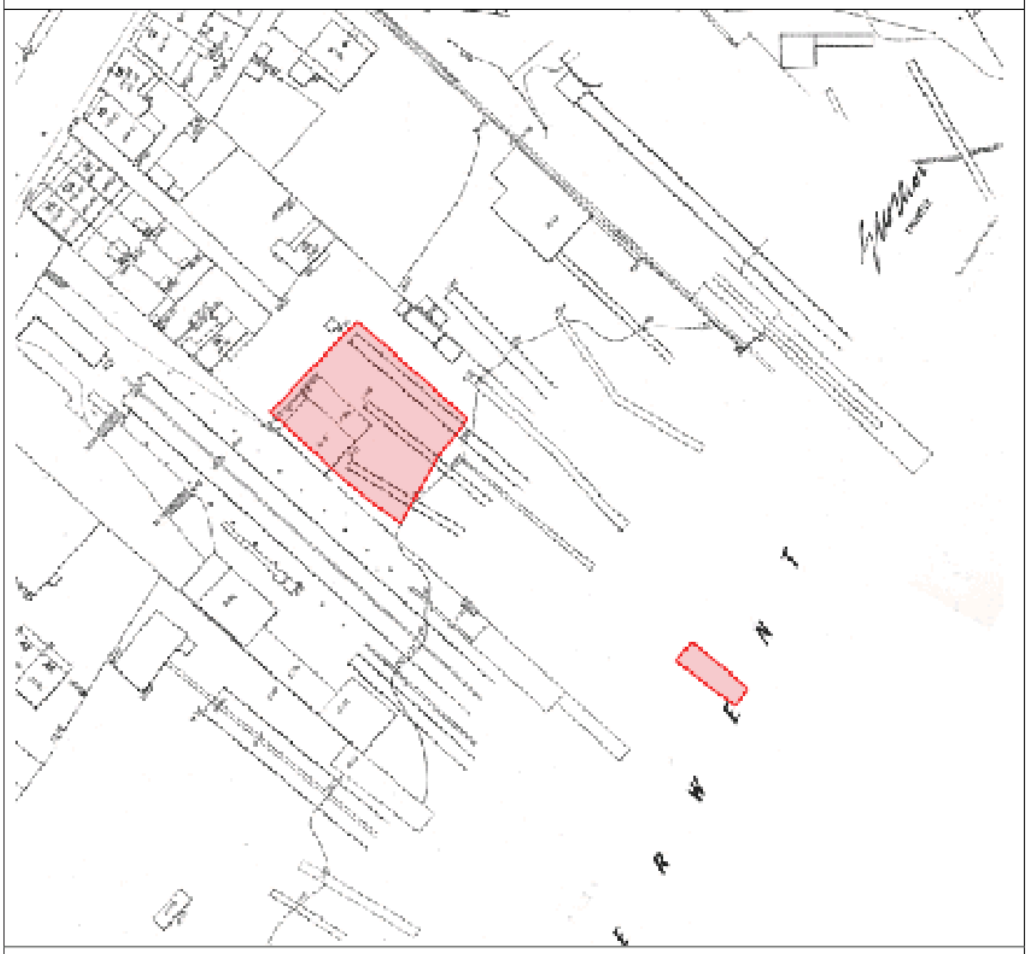
Sprent's 1845 map of Hobart and surrounds (www.thelist.tas.gov.au) is considered to be one of the most accurate depictions of the layout of early Hobart buildings and the street grid, although it is limited to buildings (and parts of buildings) which were visible from public vantage points. Nonetheless, this survey shows the subdivision of the larger allotments in the earlier surveys and an intensification of development of what would later become the Ross Patent Slip. The wider site appears to have had two masonry buildings and two timber buildings constructed by that time – one of those timber buildings is within the subject site in the location of the current boatshed. This survey also indicates some formalisation of the shoreline suggesting the lead-up to the intensification of maritime activity and use of the land-river interface. The study area itself appears to have had no development at that time.

Figure 3.3 – Hobart Map 106, c1890, DPIPWE



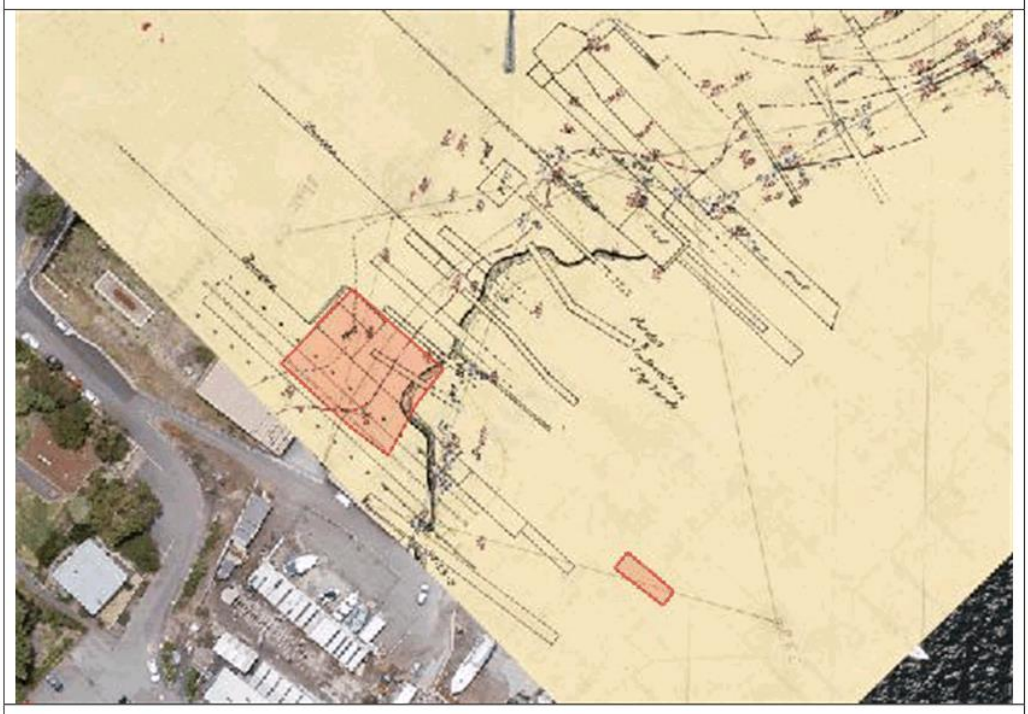
Following the suburbanisation of the surrounding Battery Point area largely a result of the subdivision of the Kermode Estate, by 1890 the streets surrounding the study area have been further formalised. The study area is noted as 'ship yards' although there is still no development marked within the study area it is possible that at that time there was minor infrastruture associated with shipyard activities within that area. Note that the building previously marked on the Sprent survey is not included in this map, however the focus of this survey appears not to have been on-shore infrastructure. The adjacent Ross Patent Slip is approximately shown.

Figure 3.4 - 1908 Metropolitan Drainage Board maps (Sheet 35, Libraries Tasmania TL.MAP 881.11).



The 1908 Metropolitan Drainage Board survey of Hobart (State Library of Tasmania) shows that by that time three slips had been established within the study area and that two sheds are depicted in the location of the current shed (larger than that shown on the earlier Sprent survey). The central slip as shown on this map approximately corresponds to the existing slip on the site. This survey also shows a long jetty extending off the site in a similar position to that which still exists.

Figure 3.5 – 1922 Huon Railway survey, National Archives of Australia, P1330:9536 (record 7812488-1).



The 1922 Huon Railway survey shows the study area in the same form as the 1908 survey with the three slips, jetty and the two sheds and a jetty on a similar line to that currently existing..

Figure 3.6 – 1946 aerial photograph survey, DPIPWE 1946 Hobart Run 1, 10893.

The 1946 aerial photograph of the area indicates that the three slips no longer remained, however the sheds and jetty were still extant at that time.

Figure 3.7 – 1967 Southern Metropolitan Planning Authority Map (Tasmanian Archive and Heritage Office).

The 1967 Southern Metropolitan Planning Authority map shows that the subject site was part of the Creese shipyard and depicts the sheds (smaller than previous depictions which is probably a drafting error) and the jetty.

The following figures depict the historically known major site features in relation to the current layout of the site (drawn from the most accurate known sources from above) – note that none of the sources above show any development in the underwater portion of the subject site:

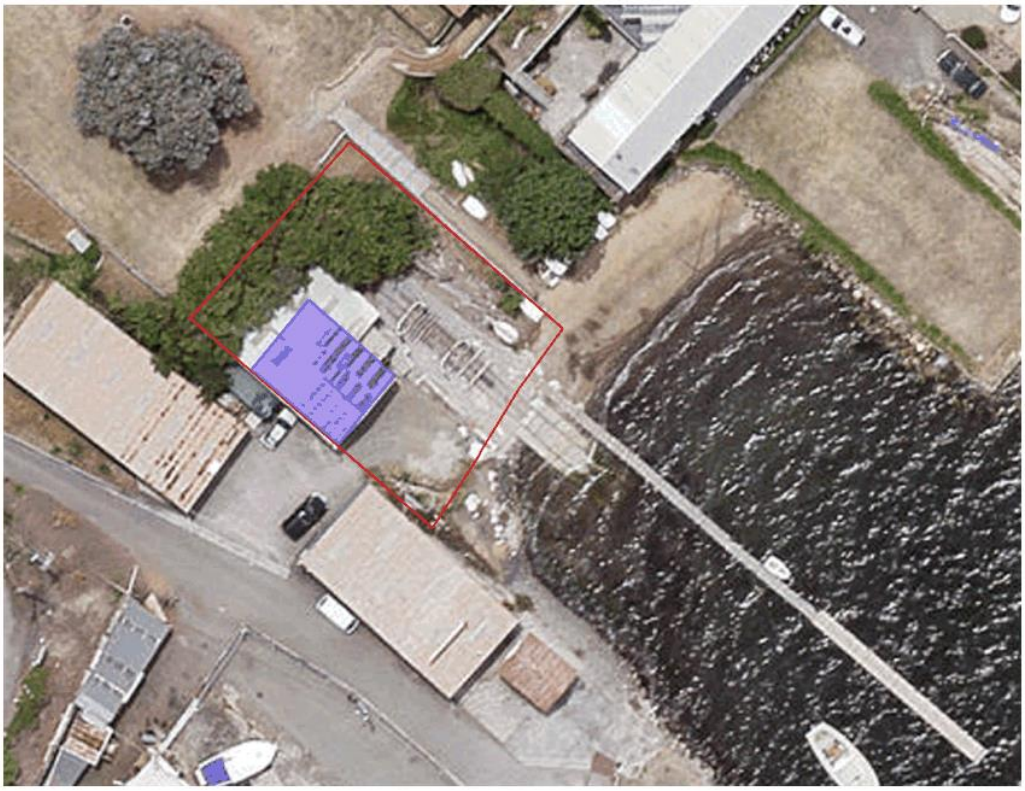


Figure 3.8 – Footprint of the building depicted on the Sprent survey in relation to current site features. Adapted from www.theliest.tas.gov.au

Figure 3.9 – Footprint of the features depicted on the 1908 Metropolitan Drainage Board survey and the 1922 Huon Railway survey in relation to current site features. Adapted from www.theliest.tas.gov.au

From the above historical overview of the environs of the study area, as well as the information contained within the Tasmanian Heritage Register entry, the following can be summarised:

- Subdivision and residential development occurred on/near the subject site during the 1830s and by 1846 there was a timber building within the subject site, on the location of the current sheds. It appears that shipbuilding activities had not commenced in the immediate area at that time.
- In 1866 the Ross Patent Slip was established near the subject site with the main line of slip just to the west of the subject site. The site was purchased by the Kennedy family in 1883. The slip itself was sold in 1903 and in 1920 the Kennedy's sold the land to Henry Jones. Prior to 1946 the site was sold to the Hobart Marine Board and was largely destroyed by fire in 1959. New sheds were built over the line of the slipway c1965.

- The subject site appears to have been used for smaller scale slip purposes from at least as early as c1900.
- Whilst the current shed is partially on the footprint of the pre-1846 building, there appears to have been an intervening phase of building on that site therefore the building is twentieth-century.
- By 1946 the use of the subject site as a slipyard had declined, with the slips dismantled. A jetty still remained leading off the site.
- The current slip was installed in the latter-half of the c20th on the site of an earlier slip and the current jetty follows the line of that earlier jetty.

4. Site observations

The site has a distinct slope from the neighbouring parkland to the north, to the waterline southward. The shed and a raised parking/turning area occupy the western (approx.) half of the site, whist the slip activity area occupies the eastern half. The shed is benched into the natural slope of the land (including the remnants of an early retaining wall) and the slip area generally follows the natural contour of the land, although it appears there have been some cutting, benching and retaining activities undertaken in this area. The area on the shoreward side of the shed appears to have been fairly recently filled and a retaining wall added.

An inspection of the existing infrastructure on subject site reveals that the existing slip is built on the footprint of the earlier middle-slip, as seen on Figure 3.9. That current slip is surrounded by a concrete pad and powered by a winch at the top of the slip near the shed. None of this infrastructure appears to be historic and is certainly related to the slip deriving from the latter half of the c20th. Note that observations and description of the shed itself were not part of the brief for this project.

Overall, site observations did not reveal any trace of the earlier slips at ground level or above.

Figure 4.1 – View across the slip site from the top of the site.

Figure 4.2 – View up the slip site from the top of the waterline.

Figure 4.3 – Modern fill and retaining wall benching the shoreward portion of the western part of the site.

In consideration of possible prior disturbance, as a heavily used industrial site it is likely that there has been a range of excavation and alteration of landform having previously been undertaken. As detailed above the lines of former slips appear to have had several instances of cutting, benching and retaining and although the landform of this area does still roughly follow the natural slope, it appears that here has been some (at least) shallow disturbance. Also, a search of *Dial Before you Dig* reveals that services (i.e. sewer and water lines) are limited to the very rear of the site[3] which would have resulted in some localised disturbance.

The following comments on the likely archaeological integrity of the site are made based on the background history of the site coupled with site observations and consideration of disturbance history:

- The location of the pre-1846 building possibly has some archaeological potential having been covered by the existing building.
- The area shoreward of the shed has been built up in recent years and would have no shallow archaeological potential. In any case, historically this area appears to have no archaeological potential.
- It appears that there has been shallow disturbance across the site in the areas known to be the sites of earlier slips.
- The current slip has probably obscured or destroyed any archaeological traces of the earlier 'middle' slip.
- The possibility of deeper archaeological remains of the two other slips cannot be discounted at this stage.

Specifically in relation to the three slips, which are considered to be the primary historical structural elements to which any archaeological remains might be associated, the following comments are made as to the archaeological potential of each area:

[3] Note that this information is not to be relied upon for pre-construction service location and it is advised that the proponent of the development make their own enquiries as to the accuracy of this statement.

Figure 4.4 – The location of each of the historical slips as per below:

Slip	Likely disturbance/integrity	Likely archaeological potential
1	Unknown, however any remains of this slip are likely to have been buried by later filling and retaining activity.	Possibility of deeper (e.g. 800-1200mm) remains of this slip beneath modern fill.
2	Any remains of the earlier slip have probably been disturbed by the construction of the current slip.	This area probably has low or no archaeological potential given the likelihood of disturbance.
3	Apart from some apparent shallow cutting/ benching/filling activity this area does not appear to have been subject to extensive disturbance.	This area probably has a higher archaeological potential given that disturbance is likely to have been shallow or minimal.
4.	The current jetty is likely to be at least the third such structure along this or similar alignment. The extent of disturbance of previous structures through demolition is not known.	This area may have some archaeological potential through evidence of earlier jetties, although the value of this is questionable given that the historical record does depict these structures in detail. There is the potential for this vicinity to yield artifacts relating to off-jetty discard or incidental deposits associated with slipyard activity.

5. Archaeological potential of the study area & archaeological policies

Figure 5.1 depicts an overlay of the pre-1846 building, the pre-1908 infrastructure in comparison to the existing built features of the subject site:

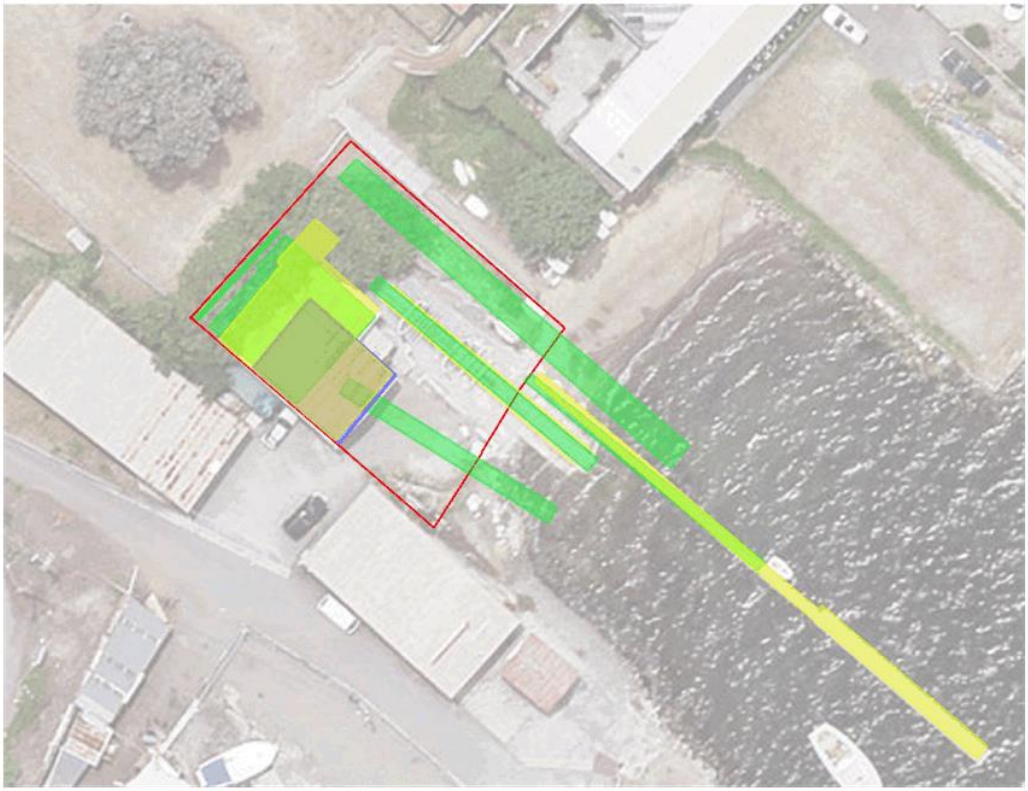


Figure 5.1 – Overlay of known site development (adapted from www.thelist.tas.gov.au).

Based on the commentary in Section 4, coupled with the overview of the development history of the site in section 3, the following archaeological zoning plan is proposed for the site:

Figure 5.2 – Areas of high archaeological potential (red) (adapted from www.thelist.tas.gov.au). The remainder of the site is not considered to have any significant archaeological potential.

Area	Likely archaeological potential	Policy
1	Potential to yield structural and artifactual deposits associated with the pre-1846 building (of unknown function and significance at this stage)	Any major excavation of this area will require a more detailed statement of archaeological potential to guide any required mitigation strategies.
2	Likely to yield structural remains of one of the earlier slips but has been deeply filled in more recent times.	Any excavation beyond 800mm deep will need to be monitored and any remains of the earlier slip recorded and managed accordingly.
3	Likely to yield shallow structural remains of one of the earlier slips with probably only minor disturbance.	Any excavations beyond 300mm deep will need to be monitored and any remains of the earlier slip recorded and managed accordingly.

4	May yield remnants of over-jetty discard or incidental deposits relating to slipyard activities.	Any development which requires major disturbance (e.g. dredging or major piling operations associated with substantial jetty replacement or extension) is to be preceded by an underwater archaeological survey to record any structure and to yield (or record) any significant artifacts.

6. The proposed development

A development has been proposed by Mr. Robert Vaughan for a redevelopment of the subject site, which includes:

- Conversion of the current boatsheds for use as parking (reflected on amended plans not included here).
- Construction of a two-storey boatshed on the rear (north-eastern) corner of the site.
- A 10-metre extension of the jetty.

Detail of the proposed development as assessed here is derived from JSA Consulting Engineers plans for the project entitled *Partial Demolition and New Boat Shed, 18-44 Napoleon Street, Battery Point,* Drawings 19E99-10 Revision E.

Excavation required for the proposal, which has the potential for archaeological impact is limited to the benching out of the rear portion of the site (i.e. the north-eastern corner and northern edge) to flatten that area for the floor of the shed. Figure 6.1 depicts the proposed site layout:

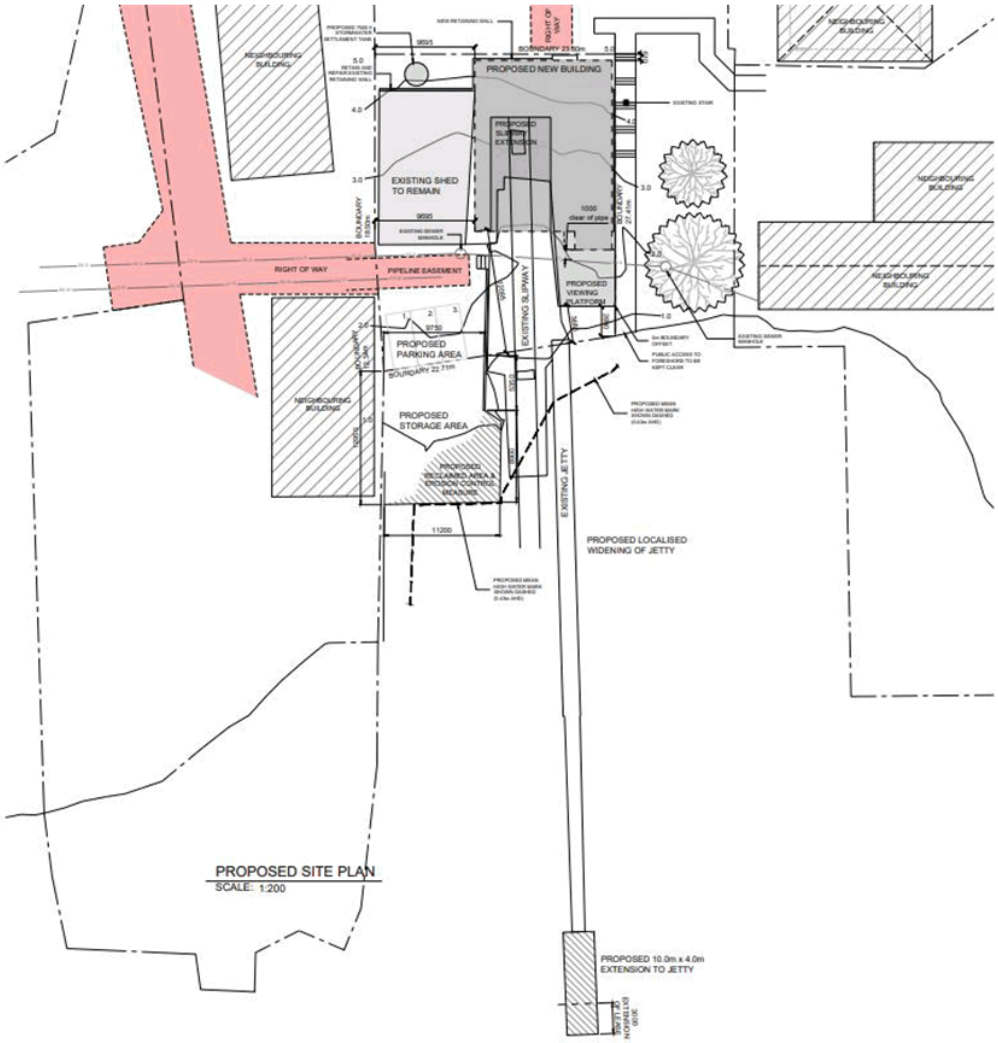


Figure 6.1 – Proposed site layout (the subject site outlined in red). M Fletcher Drawing A001.

Specifically, the proposed development requires the following excavation[4] which must be considered as to the possibility of archaeological impact:

- Excavation of a flat platform for the proposed new boatshed, specifically excavating to a maximum depth of a maximum of 1800mm on the rear of the site, down to 500mm at the front.
- The perimeter of the shed will have a 300x300 edge beam.

[4] Information supplied by Robert Vaughan, 17/2/19.

- A series of 600x600x300(deep) pad footings will support steel posts.
- A series of piles for the jetty extension.
- Note that no substantial excavation is required within the footprint of the existing shed (i.e. the area known to be the site of a pre-1845 building) with the exception of minor surface drainage works.

Overall, excavation to a depth of minimum 500mm will be required across the entire footprint of the proposed shed.

7. Archaeological impact assessment

As per the site observations in Section 4, and the likelihood as detailed in Section 5 that any archaeological remains are likely to be shallow and generally following the current contour of the land, it is likely that the footprint of the shed will have archaeological impact in that it will result in the total removal of any archaeological remains within the footprint of the proposed building.

The minor excavations required in the existing shed are unlikely to result in any archaeological impact and no excavations are proposed in front of the existing shed. The following table considers the excavation proposed in each area (as per Figure 5.2):

Area	Excavation required	Possible impact upon an archaeological remains
1	Minor excavation required for surface drains.	Unlikely to impact, as these excavations will be shallow and not exceed the depth of the current slab and slab bedding.
2	No excavation proposed in this area.	None.
3	Excavation up to 1800mm deep on the rear portion of the site, across approximately half the (on-land) length of the former slip.	Any archaeological remains are likely to be completely removed by the proposed works.
4	Piling for the new jetty extension.	Possible minor impact upon any seafloor deposits that may be associated with over-jetty discard or incidental debris associated with slipyard activities.

Accordingly, Section 8 will provide an archaeological method statement to mitigate the impact likely to arise from the proposal insofar as the possibility that any archaeological remains in Ares 3 might be impacted by the proposed works, and to yield the archaeological potential of the site via examination and recording of these archaeological remains.

8. Archaeological method statement

It is proposed that the excavations along the eastern boundary of the site (i.e. Area 3 on Figure 5.2) be monitored by a qualified historical archaeologist at the time of works.

Approach to works

On land

It is proposed that the archaeologist monitor the mechanical excavation of this area and that excavation be undertaken utilising a 900-1200mm wide flat edged bucket and the area be scraped to a maximum depth of 50mm at a time across the site (to the required depth) in order to ascertain the presence (or not) of any archaeological remains associated with the historic slip. If no significant remains are found (e.g. if the predicted disturbance is greater than initially thought and where sterile ground is encountered - then archaeological input will cease under the direction of the archaeologist.

Underwater

It is proposed that an underwater survey of the proposed jetty extension site be undertaken by a maritime archaeologist to identify the possibility or presence of any cultural deposits in this area. This will involve non-invasive survey (i.e. no dredging). It is expected that any cultural deposits will be obvious, given the expected rocky nature of the seabed in this location and minimal chance for any seafloor burial of cultural remains.

Where significant archaeological remains are encountered

On land

In areas where significant archaeological remains are encountered excavation will continue by hand (as per methodology below), to expose the remains in order to gain further understanding of their nature, and to thoroughly record them (as per methodology below). Mechanical excavation in those areas will only continue if the archaeologist is satisfied that this can occur without detriment, that required outcomes can be achieved and that excavation by hand is not necessary.

It is expected that the stratigraphic sequence will be relatively simple, that of post demolition (possibly including some disturbance), demolition and slip-use. Excavation of remains within the defined contexts in reverse order of deposition will occur and each unit/context thoroughly recorded (as per below) prior to removal to facilitate the development

It is proposed that all depositional strata be removed initially, as per above, with the aim of exposing and retaining any/all structural remains in-situ for holistic recording, prior to their removal ahead of the works excavation program. Overall, it is considered that recording any archaeological features is sufficient to yield archaeological potential, and that subject to that thorough recording, the removal of any archaeological remains to facilitate the development is an acceptable outcome.

Underwater

If any significant cultural deposits are found, then these will be surveyed and recorded. It is not proposed that these be raised, however if these are in the path of any particular piles, and it is not considered feasible to redesign so that piling impact is avoided, then the remains will be moved to a safe underwater location as nearby as practicable to avoid impact. That new location will also be recorded.

Cessation of archaeological input

Archaeological input will cease only when the archaeologist is satisfied that all significant remains have been investigated and thoroughly recorded, as per this method statement and any conditions of statutory approvals, or if sterile ground is encountered, and that adequate consultation has been undertaken with Heritage Tasmania to verify that all on-site archaeological requirements have been met (and archaeological conditions satisfied).

Recording

Any structure or significant cultural deposit encountered will be thoroughly photographically recorded, from ground-level and via drone.

Artifacts

It is not considered likely as an industrial site that any artifacts of relevance to the primary significance of the site will be found – the significant archaeological remains are likely to be limited to slip infrastructure itself.

Reporting requirements

Excavations and monitoring must be recorded to appropriate professional standards (for example Section 4.2 of the Tasmanian Heritage Council's Practice Note 2). A final report must include (at a minimum):

- An executive summary of findings
- Details of the methodology employed
- Detailed interpretations of findings
- Relevant annotated photographs
- Site plans at a scale of no less than 1:200
- Trench plans at a scale of no less than 1:50
- Photograph log

A copy of the final report, and project archive, will be deposited with Heritage Tasmania within 6 months of completion of the excavations.

Public benefit

The project report will be made publicly available, through appropriate repositories such as Hobart City Council, Heritage Tasmania, the State Library of Tasmania and the National Library of Australia (Trove).
It is not considered feasible to have any on-site public benefit events during the works program.

Site contamination and live services

It is the responsibility of the proponent of the development to investigate the possibility of site contaminants, and to either verify that no site contaminants are present, or to take required measures to deal with any known or likely contaminants during excavation works (noting that any necessary decontamination works may require archaeological input). Further, it is the responsibility of the proponent to ensure that any live services are identified and managed accordingly.

JSA CONSULTING ENGINEERS

19 September 2019

JSA Reference: 19L99-10-8

Your reference: PLN-19-237

RE: Engineer's Assessment of Proposed Reclamation

18-44 Napoleon St, Battery Point

A proposal for a new boatshed, jetty extension and reclamation works has been submitted to Hobart City Council for Development Application.

This statement relates to a review of the proposed reclamation works in relation to the Hobart Interim Planning Scheme 2015.

The reclamation works have been reviewed in context of E15.7.6 P2 and E15.7.6 P3.

E15.7.6 Development Dependent on a Coastal Location

P2 Dredging or reclamation must satisfy all of the following:	
(a) Be necessary to establish a new or expanded use or development or continue an existing use or development (IPAC5)	In the first instance the proposed works are intended to rectify prior dumping of material on the site, which is inappropriately designed. In the second instance the proposed reclamation is intended to provide a stable platform for storage of materials associated with the boat repair activities as outlined in the application. The use of the site will be expanded with the proposed development, which will include activities in both the new and existing boat sheds, making the existing shed unsuitable for storage. The outdoor reclaimed space on the site is proposed to be utilised by the Wooden Boat Guild of Tasmania for storage of their materials. The existing shed will be utilised for ongoing boat building activities associated with Creese's boatyard. The proposal expects the use of both sheds for active and productive expanded use, and as such the reclamation of land for outdoor storage space is required for the proposed development.
(b) Potential for foreshore erosion or seabed instability is minimised (c) impacts to coastal processes, including sand movement and wave action are mitigated (IPAC6)	The proposed works will include large boulders at the perimeter of the reclamation area, which is proposed to extend to near low water level. The works are in an area which is already highly modified with coastal structures of a similar nature. The image included below demonstrates that the proposed extent of reclamation is modest, and will be protected both by it construction materials, but also by its relative small size with respect to the two adjacent areas.

JSA CONSULTING ENGINEERS

	The proposed reclamation works by introduction of large size rock is to contain the minimal amount of reclamation that has been introduced by prior users of the site, and to mitigate any erosion of the site in the area.
(d) Limited and acceptable impact on aquatic flora, fauna and habitat	The proposed reclamation works will utilise large rock and intermediate fill. The structure will be representative of the materials currently utilised in the area, and will allow for similar habitat opportunity as the existing (modified) foreshore. The impact on aquatic flora, fauna and habitat during the works will be limited to the immediate location of the proposed works, since access is available over the parking area. Once the works are completed, then as per P3 (b) it is expected that the local species will recover. Associated Diving Services have been consulted in the development of the proposal and divers will be available to survey the site for any Spotted Handfish in the vicinity during the proposed works. Local divers have reported that there have not been any observation of the Spotted Handfish in recent years, but any works will be undertaken under supervision to ensure there are no detrimental impacts during the works.
(e) Risk of re-suspension of potentially-contaminated material	The location and design of the proposed reclamation works are designed to reduce any likelihood of re-suspension of potentially contaminated material, and will in fact reduce the impact compared with the current situation. The clean material proposed for the reclamation works will be bounded by large rock, which will separate the zone of wave action, from the boat yard precinct, providing a physical separation of the potentially contaminated material (by nature of boat building yard definition under HIPS 2015) and the foreshore..
(f) Extracted material will be adequately and appropriately disposed of	No material is proposed to be extracted.
P3 Coastal protection works initiated by the private sector must satisfy all of the following:	
(a) Be designed by a suitably qualified person (IPAC7)	Engineering detail for the works will be provided at building permit stage. These works will be designed by Matthew Horsham CPEng, NER RPEQ, an accredited Civil Engineer CC5865I under the Tasmanian Building Practitioner scheme
(b) minimise adverse effect upon coastal processes, including wave action and behaviour, sediment dynamics, current and tidal flows;	The proposed reclamation works will utilise large rock and intermediate fill. The structure will be representative of the materials currently utilised in the area, and will allow for similar habitat opportunity as the existing (modified) foreshore.

JSA CONSULTING ENGINEERS

(c) Cause no adverse impacts upon other parts of the coast, including increased risk of erosion;	The coastline has been significantly altered compared with the natural state, and the proposed reclamation will have minimal impact on structures compared with the neighbouring structures. As indicated in Figures 1 and 2, the adjacent structures will have the major impact on the wave processes, and this proposed reclamation will not cause any increased risk of erosion. This structure will be a minor feature on the foreshore.
(d) Minimise the potential for erosion as far as practicable	As outlined, the use of large rock will protect the proposed reclamation works. The existing jetty, and larger neighbouring structures have the more significant impact in relation to the wave processes. The design of the proposed structure will minimise the potential for erosion.
(e) Not unduly reduce existing visual amenity	The local area already contains a number of similar structures. The visual amenity of the proposed reclamation works will not be reduced compared with the amenity of the existing site. The visual amenity will be equal to or improved compared with the existing, which will tidy up and provide maintenance improvements on the current site.
(f) Provide habitat for flora and fauna as appropriate	The proposed reclamation works will utilise large rock and intermediate fill. The structure will be representative of the materials currently utilised in the area, and will allow for similar habitat opportunity as the existing (modified) foreshore. The structure of the new foreshore will include nooks and crevices which will be suitable habitat for shoreline species.
E16.5.1 – In addition to any other requirements the planning authority must require the following	
(a) is an appropriate mitigation response based on its location and exposure to the hazard;	As outlined in sections above, the reclamation works are designed to improve the existing site foreshore, providing stronger and more resilient stone boundary to the foreshore and a modest amount of land reclamation.
(b) will not increase the level of risk of the hazard for adjoining or nearby properties or public infrastructure;	The modest extent of reclamation will not increase risk to other users, since it is within the tidal zone, and will not cause displacement of flow to other properties.
(c) will ensure that the need for future remediation works is minimised;	The need for future maintenance works is minimised by the design of the structure, including large rock at the boundary.
(d) will protect any important natural features;	The key natural features assessed for this area are the potential habitat of the Spotted Handfish. As outlined above the design of the reclamation works will closely resemble the nature of the existing built foreshore structures. A similar habitat to existing will exist once the works are completed and the natural flora re-establish. The works will be supervised by divers to ensure that there are no Handfish in the area during the works. Works are designed and will be carried out in compliance with the DPIPWE Tasmanian Coastal Works Manual.
(e) will ensure that the health and safety of people is not placed at risk; and	As outlined at Figures 1 and 2 the structure is modest compared with existing structures in the vicinity and is located with a protected bay on the foreshore. The proposed reclamation is protected by the adjacent jetty and landmass. The health and safety of people will not be put at risk by this structure.
(f) will not impact on any public access to the coast where it is currently available.	Figure 1 indicates the existing routes for public access to the coast (in orange). These routes are not impacted in any way by the proposed development or coastal protection works, noting that the proposed jetty extension will increase the amenity for public use of

	the site. The jetty is currently a much used feature for public access, as noted by the winner of the Dark Mofo photography competition (Figure 4)

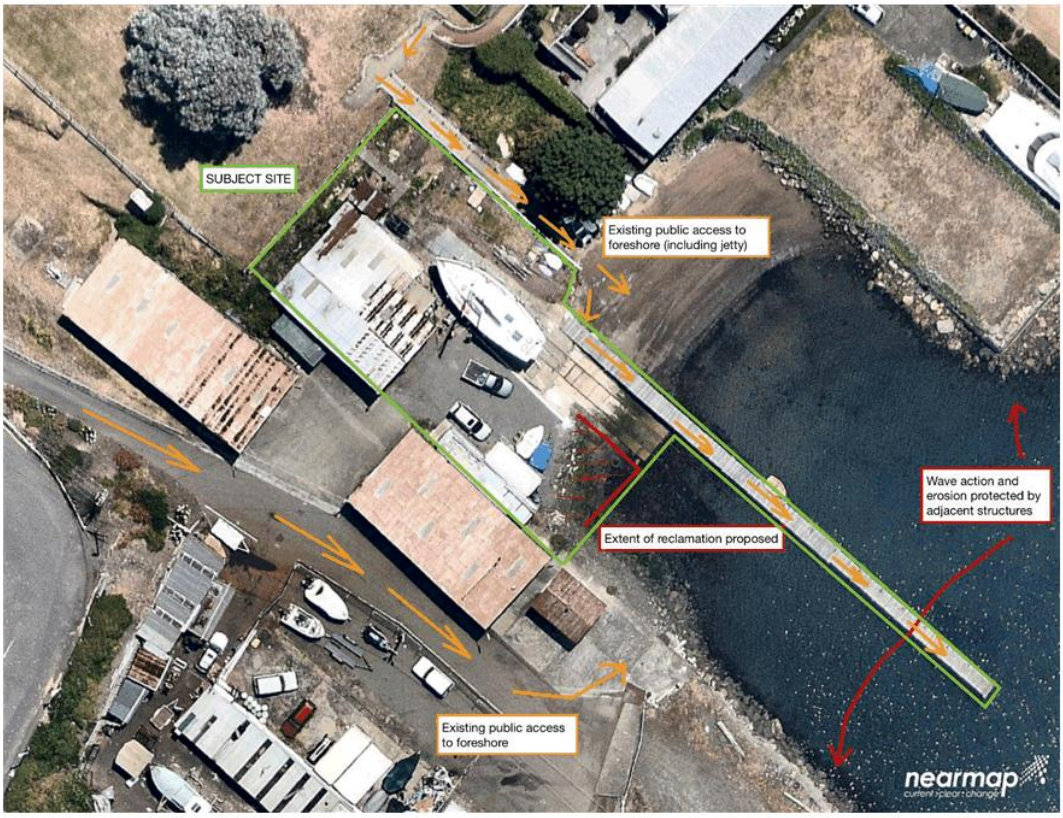


Figure 1: Subject Site with indication of existing site structures, proposed reclamation, neighbouring structures and public access ways

JSA CONSULTING ENGINEERS

Figure 2: Wide view image showing wave action impacted by larger structures but not by modest size of proposed reclamation works

JSA CONSULTING ENGINEERS

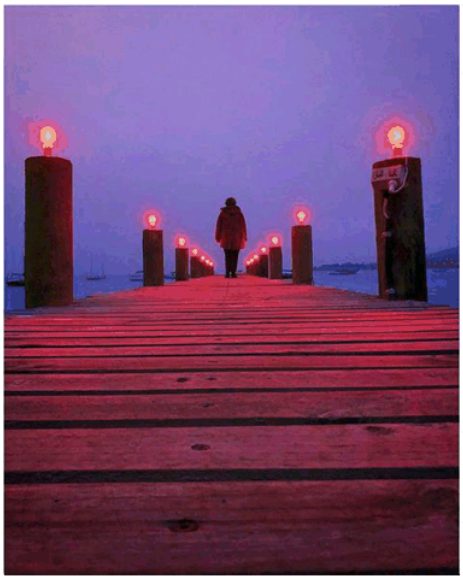


Figure 3: Winning photograph Dark Mofo Photography Competition, Battery Point Jetty by Katy Morgan
source: *The Mercury website*

As outlined the proposed reclamation structure has been reviewed in the context of the Hobart Interim Planning Scheme and is deemed to satisfy requirements.

Please contact Jane Sargison on 6224 5625 or jane@jsa.com.au if you require any further information.

Yours sincerely

Sargison

Dr Jane Sargison BE DPhil FIEAust CPEng NER CC6193N

Director

From: Fiona Keserue-Ponte <Fiona.Keserue-Ponte@covathinking.com>
Sent: Wednesday, 14 August 2019 11:10 AM
To: Christelle Seymour
Subject: RE: PLN-19-237 (18-44 Napoleon Street, Battery Point)

Hi Christelle,

This is an accurate summary of our conversation.

I also think that my recollection of what is required to meet the PCLC for this site is correct (it has been a while).

Please note, that the abbreviated report was per client request in order to minimise upfront costs, in the event the DA was not approved. I expressed clearly to the client that the level of report requested was likely to not satisfy Council requirements.

Cheers,
Fiona

Fiona Keserue-Ponte
Principal Environmental Scientist - CEnvP & CEnvP SC

COVA
Stronger Together

40 Molle Street, Hobart TAS 7000
O +61 3 6212 4414
M +61 417 523 625
E Fiona.Keserue-Ponte@covathinking.com
W covathinking.com

From: Christelle Seymour <seymourc@hobartcity.com.au>
Sent: Wednesday, 14 August 2019 11:04 AM
To: Fiona Keserue-Ponte <Fiona.Keserue-Ponte@covathinking.com>
Subject: PLN-19-237 (18-44 Napoleon Street, Battery Point)

Hi Fiona,
Thanks for the conversation just now.

I'll relay to our Development Appraisal Planner to communicate to Robert Vaughan the need for a full Environmental Site Assessment (ESA) as per the NEPM (2013) in order to meet the requirements of the Potentially Contaminated Land Code of the Hobart Interim Planning Scheme.

If I've understood our conversation correctly, you believe that you have sufficient information from sampling already conducted onsite to compile an ESA, and within that ESA you will be able to provide a statement that excavation won't adversely impact on human health or the environment, as long as the specific measures detailed in the excavation plan you intend on developing for the site are followed, is that right?

Man thanks,

Christelle Seymour
Environmental Health Officer | City Planning

Telephone (03) 6238 2893
Work days: Wed & Thurs
16 Elizabeth Street, Hobart, Tasmania, Australia, 7000 | hobartcity.com.au

---

REF: project 5268.001
Battery Point Boat Slip – Indicative Site Sampling
FKP
4 March 2019

Mr Robert Vaughan
30 Napoleon Street
Battery Point TAS 7004

by email to: sailglobal@gmail.com

ATTENTION: MR ROBERT VAUGHAN

Dear Mr Vaughan,

RE: BATTERY POINT BOAT SLIP – INDICATIVE SITE SAMPLING

1. Background

Hobart City Council has requested than an investigation into the potential for contamination be carried out and a report submitted in support of the development application (DA) that you have lodged for redevelopment on you property at 30 Napoleon Street, Battery Point (the Site). The proposed development will include construction of a new building on the eastern half of the Site, and repurposing of the existing building into an undercover car parking facility. It is understood that proposed Site works will include:

- Removal of parts of the existing building;
- Retaining the existing boat slip ramp and rails;
- Removing the existing winch and replacing with a new winch further up the slope, within the proposed new building;
- Excavating the likely contaminated soils beneath the winch, resulting from oil application;
- Excavating and levelling a building envelope for the new slip-yard building;
- Installing retaining walls upslope of the existing and new buildings; and
- Applying for approval to reuse any waste excavated soil (from the new footprint) as backfill behind new retaining walls to be installed behind the buildings.

It appears that a portion of the Site has previously been filled with materials and some of the Site includes reclaimed land. The Site has been used as a slip yard for a long period, and prior to that was historically used for boat construction as well as to unload fish catches.

COVA provided you with a proposal to undertake and report on a Preliminary Site Investigation of your Site. In order to take a risk-based approach to the work and your DA, you have requested that a very brief scope of work be undertaken instead.

2. Agreed Scope of Work

On 15 January 2019 the following scope of work was agreed to in order to streamline costs at this early stage:

- Provide an indicative plan of drilling locations (based on current knowledge and no further desktop information);
- Propose 3 drilling locations;

- Attend drilling, log profile and sample soils (2 samples per bore = total of 6 soil samples, plus 1 duplicate, 1 trip blank = 8 samples);
- No PID screening to be undertaken;
- Submit soil samples for testing for the contaminants of concern as per the Letter of offer dated 9/1/2019: test soils for:
    - total petroleum hydrocarbons and total recoverable hydrocarbons (TPH & TRH C_6-C_{40}),
    - polycyclic aromatic hydrocarbons (PAH),
    - 15 metals plus organotins (including tributyltin (TBT)), and
    - organochlorine and organophosphorus pesticides (OC and OP pesticides).
    -
- Tabulate analytical results against applicable assessment criteria, noting any exceedances;
- Provide a brief email (substituted with this letter), tabulated results and laboratory report for you to supply to Council for your DA.
- It was also noted that further site sampling investigations may be required.

Additional scope items:

Asbestos presence/absence and asbestos friability testing were added to the analytical suite after a sample of potential asbestos containing material (ACM) was unearthed.

It was agreed on 5 & 6 February 2019, that additional leachability testing needed to be undertaken due to a number of soil samples' total concentrations being in excess of clean fill criteria for offsite disposal. Given most of the soils tested were in the areas that will be excavated and disturbed as part of the redevelopment and construction of the new building, assessment of soil leachability was required in order to assess soil waste classification according to Information Bulletin 105 – *Classification and Management of Contaminated Soil for Disposal* (IB105).

3. Sampling

Details of Site sampling undertaken are provided below:

ITEM	DETAILS
Drilling	Tyron Smith Excavations; open flight auger
Date	21/1/2019
Sampler	Fiona Keserue-Ponte, CENVP SC #41034 (Certified Environmental Practitioner - Site Contamination certification under the EIANZ)
Bores	3 x soil bores were drilled to refusal or bedrock – refer to attached sketch for locations
Depths of bores	**NAP01**: 1.7m – refusal, unknown if boulder or bedrock

ITEM	DETAILS
	NAP02: 1.6m – refusal on weathered dolerite bedrock **NAP03**: 1.6m – refusal on apparent bedrock Borehole logs are attached.
Visible contamination noted / observations	**NAP01**: around 1.4m of fill with mixed solid wastes (bolts, small pieces of broken bricks, pottery fragments, etc.), including a fragment of confirmed ACM (sample ACM1 – non friable). **NAP02**: around 1m of fill with some solid wastes (nails, etc.). **NAP03**: around 0.7m of fill consisting of blue metals, mixed gravels and sand. No visible staining or visible contamination; no volatile or other contaminant odours were noted. Solid wastes in fill present an aesthetic and safety issue during excavation.
Soil Sampling	Soils were sampled with single use nitrile gloves. Samples were placed into laboratory-supplied jars and samples placed in a chiller box with ice. Samples were selected to characterise each soil horizon and in particular fill layers. Samples were either taken from the auger hole or from the open-flight auger, taking care to clean off any potential smeared soils, and sample the target horizon. Three samples were taken from each bore. A piece of potential asbestos containing material (ACM) was found in the fill of bore NAP01 and was placed in double zip-lock bags for testing. Sampling register is attached.

4. Sampling Results and Findings

Soils analyses, results and assessment against guidelines are discussed below.

ITEM	DETAILS
Samples Testing	Soil samples were tested for contaminants of concern typical of ship yards / boat maintenance areas: • 15 NEPM metals, plus organotins (including TBT) • TPH, TRH, PAH • OC / OP Pesticides

ITEM	DETAILS
	The potential ACM was tested for presence / absence of asbestos mineral fibres and for friability. Based on the initial round of results, leachability testing was also required for lead, TBT and PAHs, and one hold sample was tested for 15 metals and TBT. Laboratory reports are attached.
Sample Results Summary	A summary table of results is attached. Concentrations have been compared to several criteria: 1. ASC NEPM[1] Commercial / Industrial (HIL D, EIL): the Site is Zoned Particular Purposed – PPZ 7 – Battery Point Slip yards (attached). It is assumed that this is comparable to Commercial / Industrial site usage. **Note**: there are no guideline criteria for TBT in the ASC NEPM. 2. IB105: Levels 1, 2, and 3, total and leachable concentrations (under TCLP, pH5)
Sample Results – Preliminary Comments on Total Concentrations	**Metals (total concentrations in soil):** - Where ASC NEPM criteria are available for assessment of metals against human health HIL D, the concentrations meet site criteria for ongoing use. - Where ASC NEPM criteria are available for assessment of metals against Commercial / Industrial EILs / ESLs (ecological criteria), the concentrations meet site criteria with the exception of lead in sample NAP01B, taken in fill. The lead concentration is 2,060mg/kg against a generic EIL of 1,800mg/kg. Other metals such as copper and zinc might also exceed EILs, but no site-specific EILs have been determined in this limited assessment. - Several samples' metals concentrations for Ba, Mn, Pb, Hg and TBT exceed Level 1 clean fill and fall into Level 2 – low level contaminated waste. - Lead concentrations in two samples, exceed Level 2 and would classify as Level 3 – contaminated soil. **PAH and carcinogenic PAHs (as BaP TEQ)** were detected in most soil samples: - concentrations are below Human Health Investigation Levels (HILs) for Commercial / Industrial sites; - most concentrations exceeded the benzo(a)pyrene ecological investigation level (EIL) for Commercial / Industrial sites; - total PAH and benzo(a)pyrene concentrations exceeded Level 2 and would classify as Level 3 (contaminated waste soil) in half of the samples, and based on the arithmetic mean. **BTEXN and TRH concentrations** in soils were either below detection or below applied criteria. **No pesticides** were detected in any of the soil samples.

[1] National Environment Protection (Assessment of Site Contamination) Measure, 1999, amended 2013

ITEM	DETAILS
Sample Results – Preliminary Comments on Leachable Concentrations	**Leachability** was carried out on 7 soil samples, via TCLP procedure at pH5 (as required under IB105). Leachates were tested for PAHs, lead and TBT. **PAH and TBT leachable** concentrations were either below detection or within Level 1, clean fill material classification. **Lead leachable** concentrations in 4 of the 7 samples exceeded Level 2 and classify as Level 3 contaminated soils due to lead leachability. The arithmetic mean of the lead leachabilities for all samples is 0.85mg/L which is also within the Level 3 contaminated soils classification. It should be noted that laboratory leaching of samples was under pH 5 and seawater is typically around pH 7. Metals are typically less leachable under a neutral pH than under an acidic pH 5.
Comments on ACM results	**ACM1** sample was reported as containing both chrysotile and crocidolite asbestos but was noted as **non-friable**. The sample was encountered in the mixed fill material in borehole NAP01 at around 0.7 - 1m depth.

Notes / limitations	**Notes:**
	- The scope of this investigation and letter is necessarily limited.
	- QA/QC measures and assessments are not fully documented in this letter, due to the limited scope.
	- A duplicate sample was taken and compared to the primary sample. The duplicate was not a homogenised split. All analytes results showed good repeatability between the duplicate and primary samples, with the exception of several metals, including barium, copper and in particular lead. The poor repeatability of the lead result is believed to be due to the patchy distribution of lead which is likely due to contamination caused by historical slip yard ship maintenance works.
	- No sampling was undertaken beneath the existing winch. Oil contamination is likely to be present in shallow soils and will need to be excavated, tested (per IB105) and disposed of appropriately (according to the waste class).
	- No site-specific EILs were determined. Dolerite bedrock is present beneath the Site and may influence some heavy metals concentrations in the profile.
	- Site testing density does not meet the minimum density per AS4482.1-2005, referenced in ASC NEPM. According to these references the Site should be investigated to a minimum of 5 test locations to detect a circular hotspot of contamination, using a square grid. The spread of samples over 3 locations at different depths and in different materials is considered to provide a good indication of the contamination status of Site soils.
	- The Site is adjacent to more sensitive zonings, including:
	  - Open space parkland and foreshore access area to the northwest and north-east; and
	  - Environmental management zone along the foreshore.
	Risks to these have not been assessed.

5. Conclusions and Recommendations

Conclusions and recommendations based on the sampling results and observations are provided below. If the development is to proceed, it is recommended that an Excavated Soil Management Plan be developed and implemented to guide the management of excavated Site soils.

ITEM	CONCLUSIONS AND RECOMMENDATIONS
Limited conclusions	**In-situ soils** total concentrations reported: - **Meet human health** investigation and screening levels for Commercial / Industrial sites, if the soils are to remain undisturbed (i.e. for continued use); and - **Exceed ecological** investigation and screening levels for lead, possibly other metals such as copper and zinc, and for benzo(a)pyrene, if the soils are to remain undisturbed (i.e. for continued use). Given the sparse vegetation growth on Site, this is considered low risk, however growing of fruit or vegetables for consumption should be avoided due to the risk of plants uptake of heavy metals. For ongoing use, it is recommended that containment of soils be maximised to avoid accidental erosion. **ACM** The presence of ACM in fill presents a risk of soils are disturbed. If kept buried and undisturbed, the ACM presents only very low risk as it is non-friable. **Winch** The likely oil-impacted soils beneath the existing winch will need to be excavated, waste soils tested, classified and disposed offsite, and the remedial excavation validated and backfilled with clean / approved soils. **Building works / demolition** Any demolition / modification works should be informed by a building survey of potential hazardous materials (ACM, lead paint, etc.). **Waste Soils** The proposed redevelopment is likely to generate around 200 cbm of waste soils. Based on the total and leachable concentrations reported for the borehole soil samples, the waste soils are likely to be classified as Level 2 – low level contaminated soils, based on PAHs, heavy metals and TBT. Although individual samples have reported concentrations that are classifiable as Level 3 – contaminated soils, mixing of soils during excavations will necessarily result in natural dilution. The presence of ACM may present additional waste soil management issues. Only one fragment was noted, and no bulk soil sampling has been undertaken.
Recommendations	**Low level contaminated soils** can be managed as follows: - Left undisturbed in-situ and managed to prevent erosion; - Excavated and buried in an approved location (which could potentially be on Site, subject to EPA and Council approval); - Treated on Site and reused onsite, or at other suitable and EPA approved location;

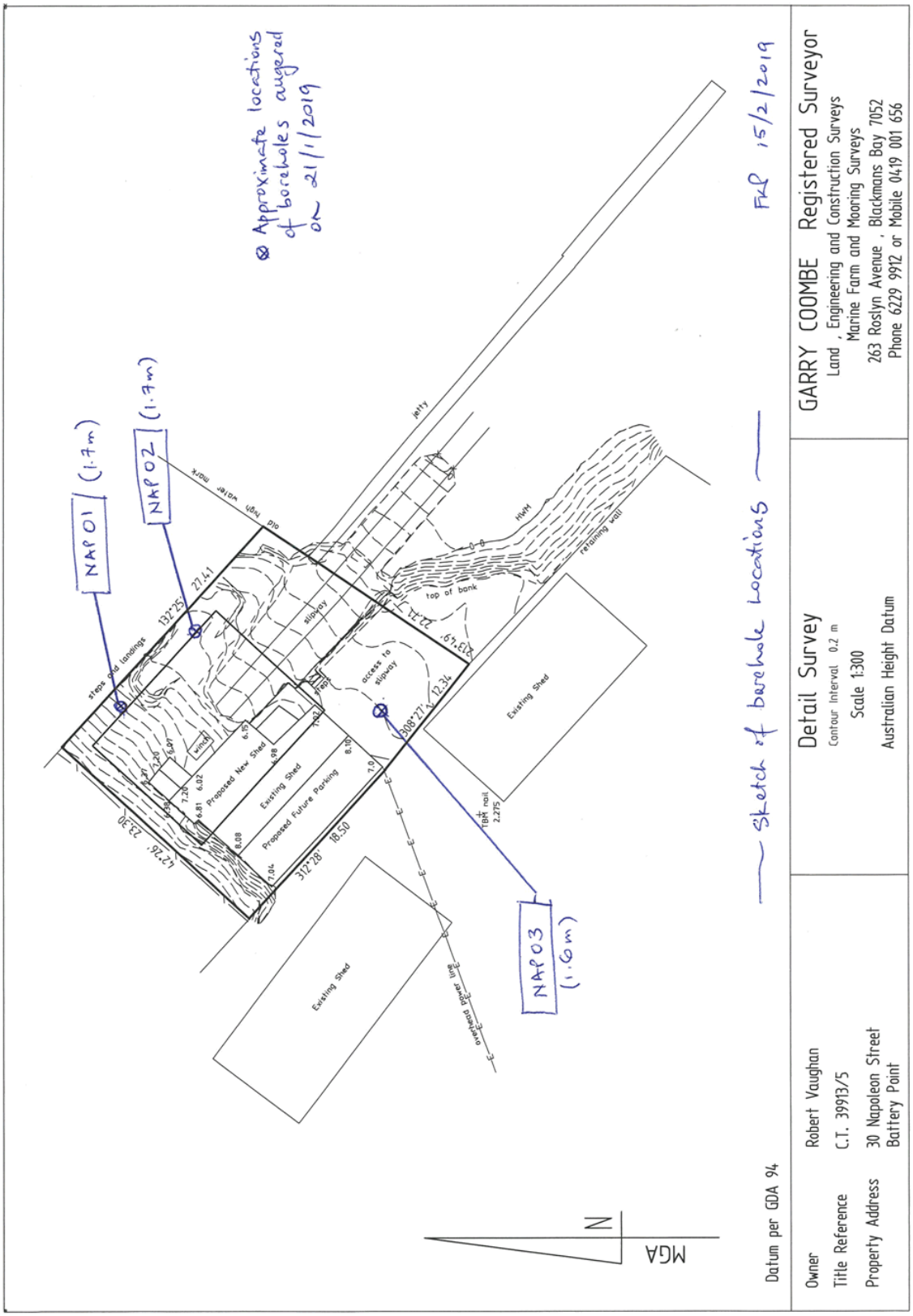
ITEM	CONCLUSIONS AND RECOMMENDATIONS
	- Excavated and disposed to a suitably licensed landfill; or - A combination of the above. **Excavated Soil Management Plan** It is recommended that an Excavated Soil Management Plan be developed to manage the risks associated with potentially contaminated waste soil being excavated from the Site during redevelopment works. The plan would provide the framework under which excavated soils can be: - Stockpiled and contained - Tested - Classified - Reused on Site subject to EPA approval - Disposed offsite under EPA approval (for any Level 2 or above not reused on Site) - Coordination of soil movements on Site during earthworks **Redeveloped Boat Slip** It is recommended that during redevelopment and design of the Site, reference should also be made to Section 3.18 of *Environmental Guidelines for Boat Repair and Maintenance*, issued by the then DEPHA in 2009.

Please don't hesitate to contact me with any queries.

Yours sincerely,

Fiona Keserue-Ponte
Principal Environmental Scientist
CENVP, CENVP SC #41034

Attachments:
1. Borehole Locations Sketch
2. Summary Tables of Results
3. Laboratory Reports
4. Zoning Map (The List)
5. Sample Register & Borehole Logs


Approximate locations of boreholes augered on 21/11/2019
NAP01 (1.7m)
NAP02 (1.7m)
NAP03 (1.6m)
Sketch of borehole locations
FAP 15/2/2019
GARRY COOMBE Registered Surveyor
Land, Engineering and Construction Surveys
Marine Farm and Mooring Surveys
263 Roslyn Avenue, Blackmans Bay 7052
Phone 6229 9912 or Mobile 0419 001 656
Detail Survey
Contour Interval 0.2 m
Scale 1:300
Australian Height Datum
Datum per GDA 94
Owner Robert Vaughan
Title Reference C.T. 39913/5
Property Address 30 Napoleon Street Battery Point
MGA
N
jetty
old high water mark
steps and landings
slipway
access to slipway
top of bank
HWM
retaining wall
Existing Shed
Proposed New Shed
Proposed Future Parking
winch
TBM nail 2.275
overhead power line
312°28' 18.50
308°27' 12.34
313°49' 22.22
132°25' 27.41
227°26' 23.30

SUMMARY RESULTS - SOIL (ALL)

5268.001 - Battery Point Boat Slip, 30 Napoleon Street, Battery Point

				Analyte Grouping	TRH					BTEXN					PAH		
				Analyte	C6-C10 minus BTEX (F1)	>C10-C16 minus Naphthalene (F2)	>C16-C34 (F3)	>C34-C40 (F4)	Sum (>C10-C40)	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Naphthalene	Benzo[a]pyrene	Carcinogenic PAHs (as BaP TEQ)	Total PAHs
				ASC NEPM HIL/HSL D (commercial / industrial)	250-NL (sand) 250-NL (silt) 310-NL (clay)	NL (all soil types)				3 (sand) 4-10 (silt) 4-20 (clay)	NL (all soil types)	NL (all soil types)	NL (all soil types)	NL (all soil types)		40	4,000
				ASC NEPM EIL/ESL (commercial / industrial)	215 (coarse / fine)	170 (coarse / fine)	1,700 (coarse) 2,500 (fine)	3,300 (coarse) 6,600 (fine)		75 (coarse) 95 (fine)	135 (coarse / fine)	165 (coarse) 185 (fine)	180 (coarse) 95 (fine)	370	1.4 (coarse/ fine)		
				TAS EPA - Level 1 (fill material)	65 (C6-C9)				1,000 (C10-C36)	1	1	3	14		0.08		20
				TAS EPA - Level 2 (low level contaminated soil)	650 (C6-C9)				5,000 (C10-C36)	5	100	100	180		2		40
				TAS EPA - Level 3 (contaminated soil)	1,000 (C6-C9)				10,000 (C10-C36)	50	1,000	1,080	1,800		20		200
Sample ID	Date Sampled	Site	Depth (m)	Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
NAP01-A	21/01/2019	Within new building footprint - northern corner	0.50		<10	<50	290	<100	290	<0.2	<0.5	<0.5	<0.2	<1	3.2	4.7	37.4
NAP01-B	21/01/2019	Within new building footprint - northern corner	1.50		<10	<50	390	180	570	<0.2	<0.5	<0.5	<0.2	<1	6.0	8.8	52.7
ACM1	21/01/2019	Within new building footprint - northern corner (fill)	1.00?		--	--	--	--	--	--	--	--	--	--	--	--	--
NAP02-A	21/01/2019	Within new building footprint - eastern corner	0.40		<10	<50	240	<100	240	<0.2	<0.5	<0.5	<0.2	<1	2.6	4.0	25.8
NAP02-B	21/01/2019	Within new building footprint - eastern corner	1.00		<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.2	<1	<0.5	1.2	1.2
NAP02-C	21/01/2019	Within new building footprint - eastern corner	1.50	tested after NAP02-B results received	--	--	--	--	--	--	--	--	--	--	--	--	--
NAP03-A	21/01/2019	Slipway access	0.50		<10	<50	210	<100	210	<0.2	<0.5	<0.5	<0.2	<1	4.1	6.0	52.0
NAP03-B	21/01/2019	Slipway access	1.00		<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.2	<1	<0.5	<1.2	<0.5
NAP03-C	21/01/2019	Slipway access	1.50	not tested	--	--	--	--	--	--	--	--	--	--	--	--	--
Summary Statistics				Number of Data Points	6	6	6	6	6	6	6	6	6	6	6	6	6
				Number of Detects	0	C	4	1	4	C	C	C	0	C	4	5	5
				Minimum	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.2	<1	<0.5	<1.2	<0.5
				Maximum	<10	<50	390	180	570	<0.2	<0.5	<0.5	<0.2	<1	6.0	8.8	52.7
				Arithmetic Mean (at LOR)	<10	<50	222	119	568	<0.2	<0.5	<0.5	<0.2	<1	2.81	4.31	28.26

SUMMARY RESULTS - SOIL (ALL)

5268.001 - Battery Point Boat Slip, 30 Napoleon Street, Battery Point

				Analyte Grouping	Heavy Metals																			Organotin Compounds	OC/OP	Asbestos		
				Analyte	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Hexavalent Chromium	Cobalt	Copper	Lead	Manganese	Molybdenum	Nickel	Selenium	Silver	Tin	Vanadium	Zinc	Mercury	Tributyltin	All OC/OP tested	Asbestos (presence / absence)	Friable Asbestos	Asbestos Type
				ASC NEPM HIL/HSL D (commercial / industrial)	3,000		500	300,000	900	3,600 Cr(VI)	3,600	4,000	240,000	1,500	60,000		6,000	10,000				400,000	730 (inorganic)					
				ASC NEPM EIL/ESL (commercial / industrial)	160					310-660 Cr(III)			85-1,200	1,800*			55-960					110-2,000						
				TAS EPA - Level 1 (fill material)	20	300	2		3	50	1	100	100	300	500	10	60	10	10	50		200	1	5				
				TAS EPA - Level 2 (low level contaminated soil)	200	3,000	40		40	500	200	200	2,000	1,200	5,000	1,000	600	50	180	500		14,000	30	70				
				TAS EPA - Level 3 (contaminated soil)	750	30,000	400		400	5,000	2,000	1,000	7,500	3,000	25,000	4,000	3,000	200	720	900		50,000	110	700				
Sample ID	Date Sampled	Site	Depth (m)	Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg Sn/kg	mg/kg	g/kg	--	--
NAP01-A	21/01/2019	Within new building footprint - northern corner	0.50		12	340	<1	<50	1	15	--	13	254	796	508	--	18	<5	--	--	65	564	2.00	43.2	<0.2	--	--	--
NAP01-B	21/01/2019	Within new building footprint - northern corner	1.50		16	1080	<1	<50	<1	13	--	19	262	2060	420	--	16	<5	--	--	103	874	7.70	<1.2	<0.2	--	--	--
ACM1	21/01/2019	Within new building footprint - northern corner (fill)	1.00?		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Yes	No	Ch+Cr
NAP02-A	21/01/2019	Within new building footprint - eastern corner	0.40		11	870	<1	<50	4	14	--	50	412	1780	2100	--	56	<5	--	--	103	958	2.80	33.4	<0.2	--	--	--
NAP02-B	21/01/2019	Within new building footprint - eastern corner	1.00		<5	220	<1	<50	<1	13	--	27	112	316	699	--	21	<5	--	--	103	171	0.70	18.6	<0.2	--	--	--
NAP02-C	21/01/2019	Within new building footprint - eastern corner	1.50	tested after NAP02-B results received	<5	60	<1	<50	<1	<2	--	17	127	18	418	--	10	<5	--	--	124	53	<0.1	0.7	--	--	--	--
NAP03-A	21/01/2019	Slipway access	0.50		<5	300	<1	<50	<1	10	--	14	288	775	303	--	16	<5	--	--	85	490	1.00	8.4	<0.2	--	--	--
NAP03-B	21/01/2019	Slipway access	1.00		<5	170	<1	<50	<1	15	--	36	58	24	378	--	20	<5	--	--	188	21	<0.1	<0.5	<0.2	--	--	--
NAP03-C	21/01/2019	Slipway access	1.50	not tested	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Summary Statistics				Number of Data Points	7	7	7	7	7	7		7	7	7	7		7	7			7	7	7	7	6	1	1	1
				Number of Detects	3	7	0	0	2	6		7	7	7	7		7	0			7	7	5	5	0	1	0	1
				Minimum	<5	60	<1	<50	<1	<2	--	14	58	18	303	--	10	<5	--	--	65	21	<0.1	<0.5	<0.2			
				Maximum	16	1080	<1	<50	4	15	--	50	412	2060	2100	--	56	<5	--	--	188	958	7.70	43.2	<0.2			
				Arithmetic Mean (at LOR)	8.42	484.28	<1	<50	1.42	11.70	--	25.14	216.14	824.14	689.42	--	22.42	<5	--	--	110.14	447.28	2.05	15.14	<0.2			

SUMMARY RESULTS - WATER (LEACHATE)

5268.001 - Battery Point Boat Slip, 30 Napoleon Street, Battery Point

Sample ID	Date Sampled	Site	Depth (m)	Analyte Grouping	Start pH	Final pH	PAH			Heavy Metals																			Organotin Compounds
				Analyte			Benzo(a)pyrene	Carcinogenic PAHs (as BaP TEQ)	Total PAHs	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Hexavalent Chromium	Cobalt	Copper	Lead	Manganese	Molybdenum	Nickel	Selenium	Silver	Tin	Vanadium	Zinc	Mercury	Tributyltin
				TAS EPA - Level 1 (fill material)																									
				TAS EPA - Level 2 (low level contaminated soil)			0.0005	0.0005 TEQ	(0.0005 TEQ)	0.5	35	1		0.1	0.5	N/A	N/A	10	0.5	25	25	1	0.1	0.5	N/A		25	0.01	50
				TAS EPA - Level 3 (contaminated soil)			0.005		N/A	5	350	4		0.5	5	N/A	N/A	100	5	250	20	8	1	5	N/A		250	0.1	500
Sample ID	Date Sampled	Site	Depth (m)	Units	TCLP	TCLP	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug-Sn/L
NAP01-A	21/01/2019	Within new building footprint - northern corner	0.50		5	5.8	<0.0005	<0.0005	<0.0005	--	--	--	--	--	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	<0.005
NAP01-B	21/01/2019	Within new building footprint - northern corner	1.50		5	6.1	<0.0005	<0.0005	<0.0005	--	--	--	--	--	--	--	--	--	2.6	--	--	--	--	--	--	--	--	--	<0.005
NAP02-A	21/01/2019	Within new building footprint - eastern corner	0.40		5	5.5	<0.0005	<0.0005	<0.0005	--	--	--	--	--	--	--	--	--	1.1	--	--	--	--	--	--	--	--	--	<0.005
NAP02-B	21/01/2019	Within new building footprint - eastern corner	1.00		5	5.2	<0.0005	<0.0005	<0.0005	--	--	--	--	--	--	--	--	--	0.2	--	--	--	--	--	--	--	--	--	0.079
NAP02-C	21/01/2019	Within new building footprint - eastern corner	1.50		5	5.1	<0.0005	<0.0005	<0.0005	--	--	--	--	--	--	--	--	--	<0.1	--	--	--	--	--	--	--	--	--	<0.005
NAP03-A	21/01/2019	Slipway access	0.50		5	5.7	<0.0005	<0.0005	0.0028	--	--	--	--	--	--	--	--	--	1.2	--	--	--	--	--	--	--	--	--	<0.005
NAP03-B	21/01/2019	Slipway access	1.00		5	5.1	<0.0005	<0.0005	<0.0005	--	--	--	--	--	--	--	--	--	<0.1	--	--	--	--	--	--	--	--	--	<0.005
Summary Statistics				Number of Data Points			7	7	7										7										7
				Number of Detects			0	0	1										5										1
				Minimum			<0.0005	<0.0005	<0.0005										<0.1										<0.005
				Maximum			<0.0005	<0.0005	0.0028										2.60										0.079
				Median			<0.0005	<0.0005	n/a										n/a										n/a
1.1	Grey shaded number signifies leachability concentration is within Level 3			Arithmetic Mean (at LOR)			<0.0005	<0.0005	n/a										0.85										n/a

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM1900808**	Page	: 1 of 12
Client	: **COVA THINKING PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MS FIONA KESERUE-PONTE	Contact	: Shirley LeCornu
Address	: 5, 40 MOLLE STREET HOBART TAS, AUSTRALIA 7001	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 6212 4400	Telephone	: +6138549 9630
Project	: Battery Point Slip	Date Samples Received	: 22-Jan-2019 10:45
Order number	: 5268.001	Date Analysis Commenced	: 23-Jan-2019
C-O-C number	: ----	Issue Date	: 05-Feb-2019 13:19
Sampler	: FIONA KESERUE-PONTE		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 10		
No. of samples analysed	: 8		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Diana Mesa	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Matt Frost	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Vanessa Phung	Approved Asbestos Identifier	Melbourne Asbestos, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP090 Organotin: The LOR for sample 'DUP' has been raised due to spectral interference.
- EP090 Organotin: The LOR for sample 'NAP01-B' has been raised due to matrix interference.
- EG035T: Mercury for EM1900808 #1, #2 and #3 has been confirmed by re-preparation and re-analysis.
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Ch' Chrysotile (white asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA156: Friability is assessed by crushing using finger pressure as defined under WorkSafe Australia regulations
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- EG035T: EM1900808 #1 Poor matrix spike recovery for mercury due to sample matrix. Confirmed by re-extraction and re-analysis.
- EP090 Organotin: Particular samples show poor surrogate recovery due to matrix interference. Confirmed by re-extraction and re-analysis.
- EP090 Organotin: Sample 'NAP01-B' shows poor matrix spike recovery due to matrix interference. Confirmed by re-extraction and re-analysis.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- ALS is not NATA accredited for the analysis of EA156 - Friability

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	NAP01-A	NAP01-B	NAP02-A	NAP02-B	NAP03-A
			Client sampling date / time	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00
Compound	CAS Number	LOR	Unit	EM1900808-001	EM1900808-002	EM1900808-003	EM1900808-004	EM1900808-006
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	11.2	18.4	10.4	19.8	8.1
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	12	16	11	<5	<5
Barium	7440-39-3	10	mg/kg	340	1080	870	220	300
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cadmium	7440-43-9	1	mg/kg	1	<1	4	<1	<1
Chromium	7440-47-3	2	mg/kg	15	13	14	13	10
Cobalt	7440-48-4	2	mg/kg	13	19	50	27	14
Copper	7440-50-8	5	mg/kg	254	262	412	112	288
Lead	7439-92-1	5	mg/kg	796	2060	1780	316	775
Manganese	7439-96-5	5	mg/kg	508	420	2100	699	303
Nickel	7440-02-0	2	mg/kg	18	16	56	21	16
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadium	7440-62-2	5	mg/kg	65	103	103	103	85
Zinc	7440-66-6	5	mg/kg	564	874	958	171	490
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	2.0	7.7	2.8	0.7	1.0
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Page	: 4 of 12
Work Order	: EM1900808
Client	: COVA THINKING PTY LTD
Project	: Battery Point Slip

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	NAP01-A	NAP01-B	NAP02-A	NAP02-B	NAP03-A
				Client sampling date / time	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00
Compound	CAS Number	LOR	Unit		EM1900808-001	EM1900808-002	EM1900808-003	EM1900808-004	EM1900808-006
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		**0.9**	**0.6**	**0.5**	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	NAP01-A	NAP01-B	NAP02-A	NAP02-B	NAP03-A
				Client sampling date / time	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00
Compound	CAS Number	LOR	Unit		EM1900808-001	EM1900808-002	EM1900808-003	EM1900808-004	EM1900808-006
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	0.5
Phenanthrene	85-01-8	0.5	mg/kg		4.7	2.3	1.7	<0.5	6.2
Anthracene	120-12-7	0.5	mg/kg		1.0	0.7	<0.5	<0.5	1.7
Fluoranthene	206-44-0	0.5	mg/kg		6.0	7.9	4.2	0.6	10.0
Pyrene	129-00-0	0.5	mg/kg		6.5	8.0	4.5	0.6	9.4
Benz(a)anthracene	56-55-3	0.5	mg/kg		3.1	4.8	2.3	<0.5	3.6
Chrysene	218-01-9	0.5	mg/kg		2.9	4.7	2.3	<0.5	3.3
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		4.2	7.2	3.3	<0.5	4.8
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		0.9	2.5	1.1	<0.5	1.9
Benzo(a)pyrene	50-32-8	0.5	mg/kg		3.2	6.0	2.6	<0.5	4.1
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		1.5	3.2	1.5	<0.5	2.6
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		0.5	1.0	<0.5	<0.5	0.6
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		2.0	3.8	1.8	<0.5	3.3
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		37.4	52.7	25.8	1.2	52.0
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		4.7	8.8	3.5	<0.5	6.0
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		4.7	8.8	3.7	0.6	6.0
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		4.7	8.8	4.0	1.2	6.0
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		180	240	140	<100	140
C29 - C36 Fraction	----	100	mg/kg		160	260	160	<100	100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		340	500	300	<50	240
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		290	390	240	<100	210
>C34 - C40 Fraction	----	100	mg/kg		<100	180	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		290	570	240	<50	210
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	NAP01-A	NAP01-B	NAP02-A	NAP02-B	NAP03-A
				Client sampling date / time	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00
Compound	CAS Number	LOR	Unit		EM1900808-001	EM1900808-002	EM1900808-003	EM1900808-004	EM1900808-006
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP090: Organotin Compounds									
Tributyltin	56573-85-4	0.5	µgSn/kg		43.2	<1.2	33.4	18.6	8.4
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		101	101	97.5	93.8	101
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		91.2	106	101	94.4	98.6
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		109	101	115	96.6	99.8
2-Chlorophenol-D4	93951-73-6	0.5	%		100	108	115	110	112
2.4.6-Tribromophenol	118-79-6	0.5	%		91.6	93.9	99.5	89.6	92.1
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		106	115	121	113	93.6
Anthracene-d10	1719-06-8	0.5	%		107	114	120	118	110
4-Terphenyl-d14	1718-51-0	0.5	%		98.2	108	119	123	106
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		79.8	57.4	64.4	63.7	73.4
Toluene-D8	2037-26-5	0.2	%		86.3	69.8	71.9	71.0	79.2
4-Bromofluorobenzene	460-00-4	0.2	%		92.6	83.1	78.9	78.6	87.9
EP090S: Organotin Surrogate									
Tripropyltin	----	0.5	%		42.3	25.8	33.7	112	26.3

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	NAP03-B	DUP	-----	-----	-----
			Client sampling date / time	21-Jan-2019 00:00	21-Jan-2019 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EM1900808-007	EM1900808-009	--------	--------	--------
				Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**35.0**	**34.2**	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	----	----	----
Barium	7440-39-3	10	mg/kg	**170**	**250**	----	----	----
Beryllium	7440-41-7	1	mg/kg	<1	<1	----	----	----
Boron	7440-42-8	50	mg/kg	<50	<50	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	----	----	----
Chromium	7440-47-3	2	mg/kg	**15**	**13**	----	----	----
Cobalt	7440-48-4	2	mg/kg	**36**	**57**	----	----	----
Copper	7440-50-8	5	mg/kg	**58**	**54**	----	----	----
Lead	7439-92-1	5	mg/kg	**24**	**9**	----	----	----
Manganese	7439-96-5	5	mg/kg	**378**	**450**	----	----	----
Nickel	7440-02-0	2	mg/kg	**20**	**21**	----	----	----
Selenium	7782-49-2	5	mg/kg	<5	<5	----	----	----
Vanadium	7440-62-2	5	mg/kg	**188**	**157**	----	----	----
Zinc	7440-66-6	5	mg/kg	**21**	**17**	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	----	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	NAP03-B	DUP	-----	-----	-----
				Client sampling date / time	21-Jan-2019 00:00	21-Jan-2019 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EM1900808-007	EM1900808-009	--------	--------	--------
					Result	Result	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	----	----	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	----	----	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	----	----	----
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	----	----	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	----	----	----
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	----	----	----
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	NAP03-B	DUP	-----	-----	-----
				Client sampling date / time	21-Jan-2019 00:00	21-Jan-2019 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EM1900808-007	EM1900808-009	--------	--------	--------
					Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	----	----	----
EP080: BTEXN									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	NAP03-B	DUP	-----	-----	-----
				Client sampling date / time	21-Jan-2019 00:00	21-Jan-2019 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EM1900808-007	EM1900808-009	--------	--------	--------
					Result	Result	----	----	----
EP080: BTEXN - Continued									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	----	----	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	----	----	----
EP090: Organotin Compounds									
Tributyltin	56573-85-4	0.5	µgSn/kg		<0.5	<0.6	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		104	104	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		101	96.9	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		99.0	101	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		108	110	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		88.5	84.1	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		112	107	----	----	----
Anthracene-d10	1719-06-8	0.5	%		120	122	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		129	126	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		69.9	55.1	----	----	----
Toluene-D8	2037-26-5	0.2	%		75.9	64.2	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		85.1	116	----	----	----
EP090S: Organotin Surrogate									
Tripropyltin	----	0.5	%		102	100	----	----	----

Analytical Results

Sub-Matrix: SOLID (Matrix: SOLID)			Client sample ID	ACM1	-----	-----	-----	-----
			Client sampling date / time	21-Jan-2019 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM1900808-010	--------	--------	--------	--------
				Result	----	----	----	----
EA156: Friable Materials								
ø **Friable Asbestos**	----	-	-	**No**	----	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos Detected	1332-21-4	0.1	g/kg	**Yes**	----	----	----	----
Asbestos Type	1332-21-4	-	--	**Ch + Cr**	----	----	----	----
Sample weight (dry)	----	0.01	g	**43.7**	----	----	----	----
APPROVED IDENTIFIER:	----	-	--	**V.PHUNG**	----	----	----	----
Synthetic Mineral Fibre	----	0.1	g/kg	**No**	----	----	----	----
Organic Fibre	----	0.1	g/kg	**No**	----	----	----	----

Analytical Results

Descriptive Results

Sub-Matrix: **SOLID**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples		
EA200: Description	ACM1 - 21-Jan-2019 00:00	Asbestos sheeting fragment approx 85 x 62 x 6mm.

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	38	128
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	33	139
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	54	125
2-Chlorophenol-D4	93951-73-6	65	123
2.4.6-Tribromophenol	118-79-6	34	122
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	61	125
Anthracene-d10	1719-06-8	62	130
4-Terphenyl-d14	1718-51-0	67	133
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124
EP090S: Organotin Surrogate			
Tripropyltin	----	35	130

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM1901494**	Page	: 1 of 7
Client	: **COVA THINKING PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MS FIONA KESERUE-PONTE	Contact	: Shirley LeCornu
Address	: 5, 40 MOLLE STREET HOBART TAS, AUSTRALIA 7001	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 6212 4400	Telephone	: +6138549 9630
Project	: Battery Point Slip	Date Samples Received	: 22-Jan-2019 10:45
Order number	: 5268.001	Date Analysis Commenced	: 06-Feb-2019
C-O-C number	: ----	Issue Date	: 13-Feb-2019 17:49
Sampler	: ----		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 7		
No. of samples analysed	: 7		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Diana Mesa	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP090S Organotin: Insufficient sample has been provided for standard analysis. Where applicable LOR values have been adjusted accordingly.
- This is a rebatch of EM1900808.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.

Page	: 3 of 7
Work Order	: EM1901494
Client	: COVA THINKING PTY LTD
Project	: Battery Point Slip

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	NAP01-A	NAP01-B	NAP02-A	NAP02-B	NAP02-C
			Client sampling date / time	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00
Compound	CAS Number	LOR	Unit	EM1901494-001	EM1901494-002	EM1901494-003	EM1901494-004	EM1901494-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	----	----	----	----	11.1
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	----	----	----	<5
Barium	7440-39-3	10	mg/kg	----	----	----	----	60
Beryllium	7440-41-7	1	mg/kg	----	----	----	----	<1
Boron	7440-42-8	50	mg/kg	----	----	----	----	<50
Cadmium	7440-43-9	1	mg/kg	----	----	----	----	<1
Chromium	7440-47-3	2	mg/kg	----	----	----	----	<2
Cobalt	7440-48-4	2	mg/kg	----	----	----	----	17
Copper	7440-50-8	5	mg/kg	----	----	----	----	127
Lead	7439-92-1	5	mg/kg	----	----	----	----	18
Manganese	7439-96-5	5	mg/kg	----	----	----	----	418
Nickel	7440-02-0	2	mg/kg	----	----	----	----	10
Selenium	7782-49-2	5	mg/kg	----	----	----	----	<5
Vanadium	7440-62-2	5	mg/kg	----	----	----	----	124
Zinc	7440-66-6	5	mg/kg	----	----	----	----	53
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	----	<0.1
EN33: TCLP Leach								
Extraction Fluid Number	----	1	-	1	1	1	1	1
Final pH	----	0.1	pH Unit	5.8	6.1	5.5	5.2	5.1
EP090: Organotin Compounds								
Monobutyltin	78763-54-9	1	µgSn/kg	----	----	----	----	<1
Dibutyltin	1002-53-5	1	µgSn/kg	----	----	----	----	<1
Tributyltin	56573-85-4	0.5	µgSn/kg	----	----	----	----	0.7
EP090S: Organotin Surrogate								
Tripropyltin	----	0.5	%	----	----	----	----	62.5

Page	:	4 of 7
Work Order	:	EM1901494
Client	:	COVA THINKING PTY LTD
Project	:	Battery Point Slip

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)				Client sample ID	**NAP03-A**	**NAP03-B**	-----	-----	-----
				Client sampling date / time	21-Jan-2019 00:00	21-Jan-2019 00:00	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**EM1901494-006**	**EM1901494-007**	--------	--------	--------
					Result	Result	----	----	----
EN33: TCLP Leach									
Extraction Fluid Number	----	1	-		**1**	**1**	----	----	----
Final pH	----	0.1	pH Unit		**5.7**	**5.1**	----	----	----

Page	: 5 of 7
Work Order	: EM1901494
Client	: COVA THINKING PTY LTD
Project	: Battery Point Slip

Analytical Results

Sub-Matrix: TCLP LEACHATE (Matrix: WATER)			Client sample ID	NAP01-A	NAP01-B	NAP02-A	NAP02-B	NAP02-C
			Client sampling date / time	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00	21-Jan-2019 00:00
Compound	CAS Number	LOR	Unit	EM1901494-001	EM1901494-002	EM1901494-003	EM1901494-004	EM1901494-005
				Result	Result	Result	Result	Result
EG005C: Leachable Metals by ICPAES								
Lead	7439-92-1	0.1	mg/L	**0.7**	**2.6**	**1.1**	**0.2**	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<5	<5	<5	**79**	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1.0	%	**32.5**	**21.4**	**29.0**	**27.2**	**25.0**
2-Chlorophenol-D4	93951-73-6	1.0	%	**74.2**	**49.7**	**67.6**	**61.4**	**60.0**
2.4.6-Tribromophenol	118-79-6	1.0	%	**94.7**	**66.9**	**80.6**	**78.2**	**69.1**
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1.0	%	**86.2**	**56.4**	**76.8**	**67.6**	**71.2**
Anthracene-d10	1719-06-8	1.0	%	**95.9**	**73.8**	**86.7**	**78.4**	**79.1**
4-Terphenyl-d14	1718-51-0	1.0	%	**101**	**91.0**	**89.8**	**80.0**	**81.3**
EP090S: Organotin Surrogate								
Tripropyltin	----	5	%	**61.8**	**25.0**	**44.6**	**77.8**	**78.5**

Analytical Results

Sub-Matrix: TCLP LEACHATE (Matrix: WATER)			Client sample ID	NAP03-A	NAP03-B	-----	-----	-----
			Client sampling date / time	21-Jan-2019 00:00	21-Jan-2019 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EM1901494-006	EM1901494-007	--------	--------	--------
				Result	Result	----	----	----
EG005C: Leachable Metals by ICPAES								
Lead	7439-92-1	0.1	mg/L	**1.2**	<0.1	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	----	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1.0	µg/L	**2.8**	<1.0	----	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	----	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	----	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	**2.8**	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	----	----	----
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<5	<5	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1.0	%	**31.3**	**25.5**	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%	**72.7**	**68.9**	----	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%	**89.2**	**85.1**	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1.0	%	**81.5**	**77.2**	----	----	----
Anthracene-d10	1719-06-8	1.0	%	**88.1**	**86.5**	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%	**89.4**	**90.2**	----	----	----
EP090S: Organotin Surrogate								
Tripropyltin	----	5	%	**30.3**	**82.3**	----	----	----

Surrogate Control Limits

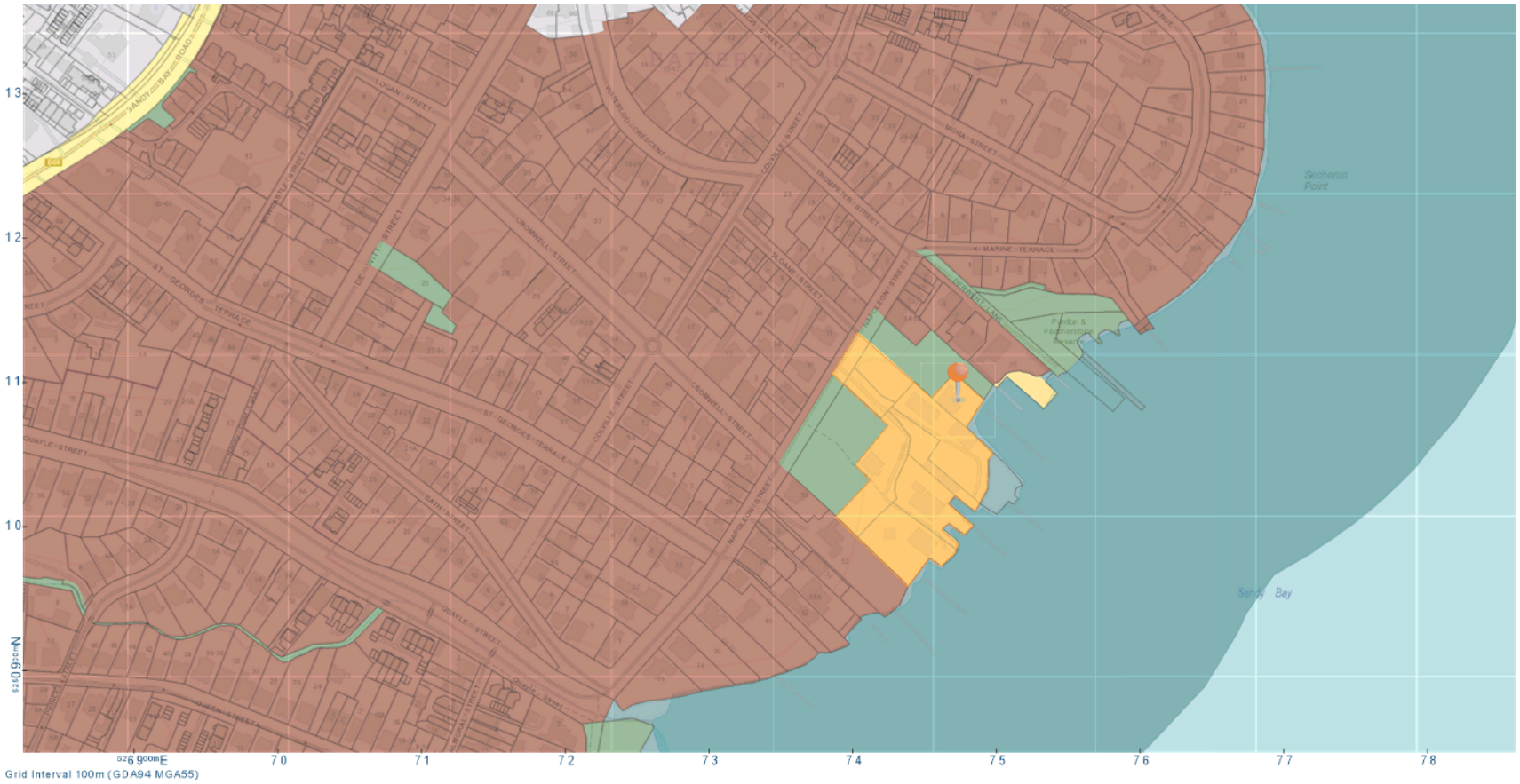
Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP090S: Organotin Surrogate			
Tripropyltin	----	35	130

Sub-Matrix: TCLP LEACHATE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	46
2-Chlorophenol-D4	93951-73-6	23	104
2.4.6-Tribromophenol	118-79-6	28	130
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	36	114
Anthracene-d10	1719-06-8	51	119
4-Terphenyl-d14	1718-51-0	49	127
EP090S: Organotin Surrogate			
Tripropyltin	----	24	116

www.thelist.tas.gov.au

LandTasmania

Generated at: 10:53 on 14-Febuary-2019 User: Public Page: 1 of 3



www.thelist.tas.gov.au

Tasmanian Government

Legend

Cadastral Parcels

Tasmanian Interim Planning Scheme Zoning

- 10.0 General Residential
- 11.0 Inner Residential
- 12.0 Low Density Residential
- 13.0 Rural Living
- 14.0 Environmental Living
- 15.0 Urban Mixed Use
- 16.0 Village
- 17.0 Community Purpose
- 18.0 Recreation
- 19.0 Open Space
- 20.0 Local Business
- 21.0 General Business
- 22.0 Central Business
- 23.0 Commercial
- 24.0 Light Industrial
- 25.0 General Industrial
- 26.0 Rural Resource
- 27.0 Significant Agricultural
- 28.0 Utilities
- 29.0 Environmental Management
- 30.0 Major Tourism
- 31.0 Port and Marine
- 32.0 - 39.0 Particular Purpose

Topographic

Tasmanian Government

Tasmanian Interim Planning Scheme Zoning (one feature)

Feature	
Zone Number	38
Zone	38.0 Particular Purpose
Scheme Code	116
Planning Scheme	Hobart Interim Planning Scheme 2015
Scheme Date	20/05/2015
Comments	PPZ 7 - Battery Point Slipyards
Disclaimer	While the data in this map are regularly updated, the relevant authority should be consulted prior to making decisions based on the data

Tasmanian Government

FIELD NOTES

PROJECT NAME	Preliminary Site Investigation	**PROJECT No.**	5268.001
SITE NAME	30 Napoleon Street Battery Point	**TASK**	Soil sampling
PERSONEL	Fiona Keserue-Ponte	**DATE**	21/1/2019
Abbreviations: **m** = metre **TPH / TRH** – Total Petroleum Hydrocarbon / Total Recoverable Hydrocarbons **15 metals** = NEPM suite of 15 metals **TBT** = tributyltin		**ppm** = parts per million **PAH** – Polycyclic Aromatic Hydrocarbons **OC / OP** = organochlorine, organophosphorus pesticides **n/a** = not applicable	

Sample ID (coords are on borehole logs)	Date sampled	Sampling location (context)	Sample depth (m)	Soil type (loam, sand, silt, clay, gravel, fill)	Texture (fine, coarse)	Moisture (Dry, Moist, Wet)	Colour / staining	Odour	Contamination Issues (staining, target, etc.)	Analytes
NAP01-A	21/1/19	North East of site	0.5	Gravelly loam	Coarse	Dry	Dark brown	No	Ship repairs	15 metals & TBT, PAH/TRH/OC/OP
NAP01-B	21/1/19	North East of site	1.5	Gravelly Clayey silt	Coarse	Moist	Beige/yellow	No	Ship repairs	15 metals & TBT, PAH/TRH/OC/OP
ACM1	21/1/19	In the fill profile of NAP01	0.8 (approx.)	ACM fragments	n/a	n/a	grey	n/a	Asbestos/fill	Asbestos presence +friability
NAP02-A	21/1/19	East of site	0.4	Loamy gravel	Coarse	Dry	Dark brown	No	Ship repairs + fill	15 metals & TBT, PAH/TRH/OC/OP
NAP02-B	21/1/19	East of site	1.0	Sandy clay	Fine	Moist	Dark brown	Organic odour	Ship repairs + fill	15 metals & TBT, PAH/TRH/OC/OP
NAP02-C	21/1/19	East of site	1.5	Clayey gravel	Coarse	Moist	Red-brown	No	Ship repairs + fill	15 metals & TBT, PAH/TRH/OC/OP

FIELD NOTES

Sample ID (coords are on borehole logs)	Date sampled	Sampling location (context)	Sample depth (m)	Soil type (loam, sand, silt, clay, gravel, fill)	Texture (fine, coarse)	Moisture (Dry, Moist, Wet)	Colour / staining	Odour	Contamination issues (staining, target, etc.)	Analytes
NAP03-A	21/1/19	Centre of site	0.5	Gravelly sandy clay	Coarse	Dry	Brown	No	Ship repairs	15 metals & TBT, PAH/TRH/OC/OP
NAP03-B	21/1/19	Centre of site	1.0	Sandy clay	Fine	Moist	Brown	No	Ship repairs	15 metals & TBT, PAH/TRH/OC/OP
NAP03-C	21/1/19	Centre of site	1.5	Sandy clay	Fine	Moist	Brown	No	Ship repairs	15 metals & TBT, PAH/TRH/OC/OP

FIELD LOG

PROJECT NAME	Preliminary Investigation	**PROJECT No.**	0568.001
LOCATION	30 Napoleon St, Battery Point	**EXCAVATION/CUTTING #**	NAP01

EXCAVATION COMPANY	**OPERATOR**	**COMMENCED DATE**	**COMPLETED DATE**
Tyron Smith Excavations	Tyron Smith	21/ 1 / 2019	21/ 1 / 2019
EXCAVATION METHOD	**WELL/LOG DIAMETER**	**SAMPLING METHOD**	
Open Flight Auger	Width: 0.45m	Grab sample, nitrile gloves, clean off surface smear	
SITE COORDINATES		**PROJECTION**	**DEPTH (m)**
E: 527475	N: 5251103	Zone 55	1.7m
SURFACE RL	**DATUM**	**COVA PERSONNEL**	**SHEET #**
N/A	N/A	Fiona Keserue-Ponte	1 OF 1

Depth (m)	Sample	PID (ppm)	Profile Description (loam, sand, clay, silt, gravel, shell, fill)	Residual or Fill	Moisture Content	Soil texture	Material & Notes particular characteristics: colour, odour, staining, foreign materials
surface							
0.25							
0.5	01-A	Not taken	Gravelly loamy fill	F	D	C	Dark brown loamy sandy gravel fill with bolts+small pieces of broken bricks and pottery fragments
0.75			Gravelly loamy fill				
1.0	ACM1	exact depth of ACM1 is unknown, was in the fill	Gravelly loamy fill				
1.25			Gravelly loamy fill				
1.5	01-B	Not taken	Mixing w/clayey/silt	F+R?	M	C	@ 1.4-1.5M transitioning into beige/yellow clayey silt, slightly moist
1.7		EOH	refusal				possibly on cobble-or bedrock-was very hard

SYMBOL EXPLANATIONS

Moisture Content: **D** - Dry, looks & feels dry **M** – Moist, no free water **W** – Wet, free water

Soil texture (predominant) **C** – Coarse **F** - Fine

Residual / Fill:: **R** – Residual, natural profile, placed/developed by natural processes
F – Fill, placed by human action

PID – Photoionisation detector
m – metre **ppm** – parts per million

FIELD LOG

PROJECT NAME	Preliminary Investigation	PROJECT No.	5268.001
LOCATION	30 Napoleon St, Battery Point	EXCAVATION/CUTTING #	NAP02

EXCAVATION COMPANY	OPERATOR	COMMENCED DATE	COMPLETED DATE
Tyron Smith Excavation	Tyron Smith	21/ 1 / 2019	21/ 1 / 2019
EXCAVATION METHOD	**WELL/LOG DIAMETER**	**SAMPLING METHOD**	
Open Flight Auger	Width:0.45m	Grab sample, nitrile gloves, clean off surface smear	
SITE COORDINATES		**PROJECTION**	**DEPTH (m)**
E: 527483	N:5251095	Zone 55	1.6m
SURFACE RL	**DATUM**	**COVA PERSONNEL**	**SHEET #**
N/A	N/A	Fiona Keserue-Ponte	1 OF 1

Depth (m)	Sample	PID (ppm)	Profile Description (loam, sand, clay, silt, gravel, shell, fill)	Residual or Fill	Moisture Content	Soil texture	Material & Notes particular characteristics: colour, odour, staining, foreign materials
surface							
0.4	02-A		Loamy gravel	F	D	C	Loamy gravelly fill, mixed nails, etc
1.0	02-B		Sandy clay	F	M	F	Dark brown moist, organic odour
1.5	02-C		Clayey gravel	R	M	C	Red gravel, weathered dolerite bedrock
1.6	End of hole						Refusal on bedrock
			End of Hole: 1.6 m				

SYMBOL EXPLANATIONS

Moisture Content: **D** - Dry, looks & feels dry **M** – Moist, no free water **W** – Wet, free water
Soil texture (predominant) **C** – Coarse **F** - Fine
Residual / Fill:: **R** – Residual, natural profile, placed/developed by natural processes
F – Fill, placed by human action
PID – Photoionisation detector
m – metre **ppm** – parts per million

FIELD LOG

PROJECT NAME	Preliminary Investigation	PROJECT No.	5268.001
LOCATION	30 Napoleon St, Battery Point	EXCAVATION/CUTTING #	NAP03

EXCAVATION COMPANY	OPERATOR	COMMENCED DATE	COMPLETED DATE
Tyron Smith Excavation	Tyron Smith	21/ 1 / 2019	21/ 1 / 2019
EXCAVATION METHOD	**WELL/LOG DIAMETER**	**SAMPLING METHOD**	
Open Flight Auger	Width: 0.45m	Grab sample, nitrile gloves, clean off surface smear	
SITE COORDINATES		**PROJECTION**	**DEPTH (m)**
E: 527470	N: 5251081	Zone 55	1.6m
SURFACE RL	**DATUM**	**COVA PERSONNEL**	**SHEET #**
N/A	N/A	Fiona Keserue-Ponte	1 OF 1

Depth (m)	Sample	PID (ppm)	Profile Description (loam, sand, clay, silt, gravel, shell, fill)	Residual or Fill	Moisture Content	Soil texture	Material & Notes particular characteristics: colour, odour, staining, foreign materials
surface							
0.5	03-A		Gravelly clayey sand	F	D	C	blue metal+ mixed gravel+sand fill – overall brown colour
0.7			Reworked silty clay				Beige/yellow reworked natural
1.0	03-B		Sandy clay	R?	M	F	Brown sticky moist sandy clay, reworked natural?
1.5	03-C		Sandy clay	R	M	F	Brown sticky moist sandy clay
1.6m	EOH		End of hole				Refusal – likely on bedrock
	DUP		DUP sample taken from NAP03-B				
			End of Hole: 1.6m				

SYMBOL EXPLANATIONS

Moisture Content: **D** - Dry, looks & feels dry **M** – Moist, no free water **W** – Wet, free water

Soil texture (predominant) **C** – Coarse **F** - Fine

Residual / Fill:: **R** – Residual, natural profile, placed/developed by natural processes
F – Fill, placed by human action

PID – Photoionisation detector

m – metre **ppm** – parts per million

REF: project 5268.001
Battery Point Boat Slip – Indicative Site Sampling
FKP
8 March 2019

Mr Robert Vaughan
30 Napoleon Street
Battery Point TAS 7004

by email to: sailglobal@gmail.com

ATTENTION: MR ROBERT VAUGHAN

Dear Mr Vaughan,

RE: BATTERY POINT BOAT SLIP – INDICATIVE SITE SAMPLING

SUMMARY COVER LETTER

1. BACKGROUND

This document is intended as a summary of the letter report issued for 30 Napoleon Street, Battery Point (the Site), titled:

- Battery Point Boat Slip – Indicative Site Sampling, dated 4 March 2019, by COVA Thinking Pty Ltd

Please refer to that letter report for further details of the works undertaken.

2. INVESTIGATION WORKS

The investigation works were undertaken to support a development application (DA) lodged for redevelopment of the Site, which will include construction of a new building on the eastern half of the Site, and repurposing of the existing building into an undercover car parking facility.

In January 2019, 3 soil bores were drilled to bedrock or refusal. 2 boreholes were drilled in the footprint of the proposed new building and 1 borehole downgradient of the existing building.

Soils were sampled by the undersigned who is a Certified Environmental Practitioner – Site Contamination (CEnvP SC). All samples were tested for an extended suite of contaminants of potential concern applicable to boat slips, including:

- 15 NEPM[1] metals, plus organotins (including TBT),
- TPH, TRH, PAH,
- OC / OP Pesticides, and
- One piece of potential ACM was tested for presence / absence of asbestos mineral fibres and for friability.

Since the initial plan was to excavate and dispose of any excess soils, waste classification assessment of the samples was also undertaken, which included leachability testing of 7 soil samples, via TCLP procedure at pH 5 (as required under IB105[2]). Leachates were tested for PAHs, lead and TBT.

The Site is Zoned Particular Purpose – PPZ 7 – Battery Point Slip yards. It is assumed that this is comparable to Commercial / Industrial site usage and soil results were assessed against available NEPM Commercial / Industrial (HIL D, EIL) criteria, in order to determine potential risks to human health and the environment from onsite soils.

[1] National Environment Protection (Assessment of Site Contamination) Measure, 1999, amended 2013 (NEPM)
[2] Information Bulletin 105 – *Classification and Management of Contaminated Soil for Disposal* (IB105)

3. FINDINGS

a. **Fill:** Mixed fill was noted during drilling of the two bores within the proposed new building footprint, including mixed solid wastes (bolts, nails, small pieces of broken bricks, pottery fragments, etc.), and a fragment of confirmed ACM (sample ACM1 – non-friable). Mixed gravels were noted in the third bore.

b. **Oil:** No testing was undertaken around the existing winch. The winch is to be decommissioned and replaced. It is likely that soils in the immediate vicinity of the winch would be impacted by excess lubricating oil.

c. **Human Health (Commercial / Industrial):**

- None of the soil samples reported concentrations in excess of human health criteria (where available), for soils to remain in situ.
- Solid sample ACM 1 was confirmed as non-friable asbestos containing material; although its depth is uncertain, it is believed to have come from a depth of over 0.5m. Only one piece was noted during drilling. Non-friable ACM buried under 0.5m of soils is not considered to present a human health risk while undisturbed.

d. **Environmental / Ecological (Commercial / Industrial):**

Exceedances of ecological criteria were reported as follows:

- One soil sample (NAP01B) reported a lead concentration is 2,060mg/kg against a generic ecological investigation level (EIL) of 1,800mg/kg.
- Most soil samples concentrations exceeded the benzo(a)pyrene EIL.

In situ soils should therefore be managed to minimise ecological risks and should not be planted with edible plants.

e. **Waste soils:**
In situ soils testing reported concentrations which could classify waste soils (if taken to landfill) as Level 3-contaminated soils, predominantly due to lead concentrations. Leachability was undertaken with pH 5 solution, as required by IB105. Metals are typically less leachable under a neutral pH (such as seawater) than under an acidic pH 5. In order to minimise the volume of waste soils, the proposed building will be moved further towards the foreshore. Options for management of waste soils on Site may be considered.

4. CONCLUSIONS AND RECOMMENDATIONS

It is considered that any residual ecological risks from in-situ low-level soil contamination and from excavation of Site soils during proposed building works, can be addressed by the implementation of an Excavated Soil Management Plan (ESMP) (to be developed), which would include regular inspections by a CEnvP SC during excavation works. The ESMP would include provisions to request approval from Council and/or the Waste Section of EPA Tasmania, for reuse onsite or offsite disposal of any waste soils classified as Level 2-Low Level Contaminated Soil, or Level 3-Contaminated Soil under IB105.

Please don't hesitate to contact the undersigned with any queries.

Yours sincerely,

Fiona Keserue-Ponte
Principal Environmental Scientist
CENVP, CENVP SC #41034

JSA CONSULTING ENGINEERS

Hobart City Council
Town Hall, Macquarie St
GPO Box 503
Hobart TAS 7001

17 April 2019
JSA Reference: 19R99-10-1

RE: 30 Napoleon Street, Battery Point

STORMWATER INFRASTRUCTURE – DRAINAGE REPORT

JSA Consulting Engineers have prepared a design of the stormwater system for the proposed development at 30 Napoleon Street, Battery Point.

STORMWATER DESIGN

The stormwater infrastructure has been designed to meet the acceptable solutions and requirements of the Stormwater Code of the Hobart Interim Planning Scheme 2015, with the following key elements.

1. *Acceptable Solution E7.7.1 A1. Stormwater from new impervious surfaces must be disposed of by gravity to public stormwater infrastructure.*

   Response:

   Existing runoff from the property is not collected in drainage infrastructure. Existing roofs do not have gutters, and runoff falls directly to ground surface. Runoff from the slipway is not collected and drains directly to the Derwent River. There is an existing stormwater pipe within neighbouring property to the south-west.

   The proposed stormwater infrastructure collects all runoff from proposed roof and hardstand areas. Stormwater from impervious surfaces is disposed of by gravity to the Derwent River via proposed lot connection and pipe outlet, as outlined on JSA stormwater plan H03.

2. *Acceptable Solution E7.7.1 A2. A stormwater system for a new development must incorporate water sensitive urban design principles for the treatment and disposal of stormwater if any of the following apply:*

   a) *the size of new impervious area is more than 600m²;*

   b) *new car parking is provided for more than 6 cars;*

   c) *a subdivision is for more than 5 lots.*

   Response:

   The stormwater system will not incorporate water sensitive urban design principles for the treatment and disposal of stormwater

   a) the size of new impervious area is 90.2m²;

   b) new car parking is provided for 1 car;

   c) no subdivision is proposed.

   Runoff from the slipway will be collected, treated and discharged to TasWater's sewer infrastructure.

3. *Acceptable Solution E7.7.1 A3. A minor stormwater drainage system must be designed to comply with all of the following:*

    a) *be able to accommodate a storm with an ARI of 20 years in the case of non-industrial zoned land and an ARI of 50 years in the case of industrial zoned land, when the land serviced by the system is fully developed;*

    b) *stormwater runoff will be no greater than pre-existing runoff or any increase can be accommodated within existing or upgraded public stormwater infrastructure.*

    Response:

    Proposed drainage infrastructure has been sized according to AS3500.3, with DN100 collecting roof runoff and DN150 lot connection to proposed outlet pipe to the Derwent River

4. *A major stormwater drainage system must be designed to accommodate a storm with an ARI of 100 years. Acceptable solution E7.7.1 A4*

    Response:

    Excess runoff generated from the site in a 1 in 100 year ARI event discharges directly to the Derwent River and does not discharge over neighbouring properties.

CONCLUSIONS

This document has outlined the stormwater drainage infrastructure to service the proposed development. The stormwater runoff from the site is collected and discharged via gravity to the Derwent River via a new outlet pipe and lot connection for the property.

Please contact Rachel Horner on 6224 5625 or rachel@jsa.com.au if you require any further information.

Yours sincerely,

Rachel Horner

Graduate Civil / Environmental Engineer