

24 October 2022

Aqualand B Development Holding Pty Ltd
Attn: Victor Kardash, Technical Director - Structures
Level 47, Tower 1, 100 Barangaroo Avenue
Barangaroo NSW 2000

By email: victor.kardash@aqualand.com.au

Dear Victor

**RE: INTERIM AUDIT ADVICE LETTER NO. 1 - EWDA-01 REVIEW OF
REMEDIAL WORKS PLAN, CENTRAL BARANGAROO**

1. INTRODUCTION

1.1 Background and Objective

As a NSW Environment Protection Authority (EPA) accredited Contaminated Sites Auditor, I am conducting an Audit (RS-090C) under the NSW *Contaminated Land Management Act 1997* (CLM Act) in relation to the Central Barangaroo development, having taken over this role from Graeme Nyland in June 2018. A Site Audit Report (SAR) and accompanying Section B Site Audit Statement (SAS) dated 31 July 2013 (GN439B-5) were previously prepared regarding a Remediation Action Plan (RAP) for the site prepared by JBS Australia Pty Ltd (JBS), dated May 2013 (Rev H). Attachment 1 illustrates the site locality and Attachment 2 illustrates the Section B Site Audit boundary (red line).

The portion of Barangaroo which previously contained part of a manufactured coal gasworks and which was previously declared by the NSW EPA as a Remediation Site (the Declaration Area) adjoins the southeast part of Central Barangaroo and includes portions of Hickson Road and Block 5 (shown in pink hatching on Attachment 2).

The RAP contemplated development of Central Barangaroo in the long term for high density residential usage in the east with open space areas in the west, with interim development for public open space. The residential development was proposed to be constructed over two basement areas to a depth of 10 m below ground level (mbgl) and the proposed southern basement was partially located with the Declaration Area in Block 5.

A proposed MOD 9 to the approved Barangaroo Concept Plan MP06_0162 was recently submitted and comprises a series of mixed-use buildings, new streets and public spaces overlying a common basement spanning Blocks 5, 6 and 7 in the east of the site, designed to a nominal depth of 15 mbgl.

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Audit Number: RS-090C

I previously prepared a letter dated 15 November 2021 to consider the applicability of the JBS RAP and Central Barangaroo SAS/SAR to the proposed MOD 9 to Barangaroo Concept Plan for Central Barangaroo in consideration of the requirements of former State Environmental Planning Policy No 55 - Remediation of Land (SEPP 55).

The Section B Site Audit reviewing the RAP identified a number of documents that are required to be prepared and reviewed by the Auditor prior to commencement of works, specified as conditions of the site audit, including:

1. A revised remedial works plan (RWP) to confirm the sequence of proposed remediation and validation tasks. Clarification is also required around the site acceptance criteria and relevant data sets and the proposed remedial extent (including vertically)
2. Materials Compliance Management Plan (MCMP)
3. Validation Sampling and Analysis Quality Plan (VSAQP)
4. Asbestos Management Plan (AMP).

A state significant development application (SSDA) has been submitted to seek approval for early works associated with the future mixed-use development within Central Barangaroo. This audit review has been undertaken to provide an independent review of the suitability and appropriateness of the RWP and associated documents prepared for the first stage of works, referred to as EWDA-01. The works proposed under EWDA-01 are described in Section 3.2 of this letter.

1.2 Scope of Work

This interim audit advice # 1 (IAA1) is based on a review of the documents listed below, as well as discussions with the client, Aqualand B Development Holding Pty Ltd (Aqualand), and the environmental consultant engaged for the works, EDP Consultants Pty Ltd (EDP).

The reports reviewed were:

- 'Remedial Works Plan EWDA-01, Central Barangaroo' dated 21 October 2022 (and previous versions dated 8 June and 30 September 2022), EDP (*the RWP*)
- 'Asbestos in Soil Management Plan EWDA-01 Central Barangaroo, Hickson Road, Millers Point NSW', dated 21 October 2022 (and previous versions dated 13 May and 30 September 2022), EDP (*the AMP*)
- 'Acid Sulfate Soils Management Plan, Central Barangaroo Early Works – Hickson Road Interface', dated 29 September 2022 (and previous version dated 13 May 2022), EDP (*the ASSMP*).

I have reviewed the key documents against the requirements of the following:

- Chapter 4 Remediation of Land in the Resilience and Hazards State Environment Planning Policy (SEPP) 2021 (formerly known as SEPP 55) and NSW Department of Urban Affairs and Planning and NSW EPA (1998) '*Managing Land Contamination, Planning Guidelines SEPP 55 - Remediation of Land*'
- NSW EPA (2017) '*Guidelines for the NSW Site Auditor Scheme (3rd Edition)*'
- NSW EPA (2020) '*Contaminated Land Guidelines: Consultants Reporting on Contaminated Land*'
- National Environment Protection Council (NEPC) '*National Environment Protection (Assessment of Site Contamination) Measure 1999*', as Amended 2013 (NEPM 2013).

2. SUMMARY OF REMEDIAL ACTION PLAN

2.1 Proposed Remediation

The remediation process documented in the RAP (May 2013, Rev H) was developed in consideration of the initial use of the site for open space and construction staging, and the final use for high density residential. An overview of the previously proposed remedial process is:

- Material unsuitable to remain on the site (e.g. tar) to be excavated and disposed off-site. Five tar impacted remediation areas were identified as unsuitable with respect to human health and the environment and are primarily located within proposed basement footprints. Removal of material to 10 mbgl was proposed (i.e. to the depth of the proposed basement). The Section B Site Audit noted the potential for additional 'hotspots' of tar/ hydrocarbon impacted material to remain on site outside proposed remediation and basement areas.
- Importation of material to create landform, with material placed into locations consistent with risk-based site acceptance criteria. Material to be imported to the site was to be assessed to determine where the soil can be used, either as growing media within 0.5 m of the ground surface and up to 1.5 m in the vicinity of large trees, or as general fill to be placed below growing media. The Section B Site Audit noted that for this process to be successful, there needed to be adequate characterisation, tracking and validation to ensure that the materials within the final landform are suitable for their location. In areas not subject to landscaping, existing pavement was required to be retained as a barrier for contact with open space users.
- Future development for residential usage, including excavation of two basements and construction of the southern basement (which extends into the adjoining Declaration Area) in accordance with specific design controls to be protective of potentially contaminated groundwater seepage. Given the differing remedial goals for Barangaroo Central (site suitability) and the Declaration Area (removal of the EPA declaration), the Section B Site Audit noted that additional remediation may be required for portions of the Declaration Area within the southern basement.

Risk-based site acceptance criteria were developed by JBS and discussed in the RAP and reviewed in the Section B Site Audit. An alternate/consolidated set of criteria were developed by Environmental Risk Sciences Pty Ltd (EnRiskS) in the role of expert audit support (presented in Appendix E of the Section B Site Audit).

The RAP proposed remediation of one area where asbestos fibres were detected within fill. The Section B Site Audit considered that there was a poor basis for the proposed remedial extent. The Section B Site Audit noted that the investigation methods adopted limit the ability to assess the composition of the fill material. It was considered that there was a high potential for undetected asbestos to be present in the fill, most likely associated with fragments of bonded asbestos-containing materials, as has been found to be the case on other parts of the Barangaroo project area. Given the likelihood that asbestos will be found during excavation of basements, development of an AMP was recommended for the future residential development. Management of identified asbestos via an unexpected finds protocol (UFP) was not considered appropriate.

In addition to the above, the RAP contemplated the requirement for ongoing monitoring and management of deep residual tar impact and for maintenance of pavement as required in paved recreational areas, to be incorporated into a long-term environmental management plan (LTEMP).

A RWP was provided in the RAP, however, it did not accurately reflect the proposed sequence of tasks, therefore the Section B Site Audit recommended revision of the RWP.

2.2 Proposed Validation

The RAP (and Section B Site Audit) provides details of the required soil validation including validation of excavations following removal of tar containing material, asbestos fibre impact and unexpected finds, pre-validation of any material which will be imported from other areas of Barangaroo (excluding the Declaration Area) and analysis of material imported from off-site. Materials management and tracking was required with the detailed procedures proposed to be documented in a MCMS.

In addition to soil validation, there is also a requirement for verification of other elements of the construction, in particular for construction of the southern basement. Risk-based site acceptance criteria were developed based on assumptions with regards to basement construction. Relevant design features for the southern basement identified in the RAP that will require validation are as follows:

- The air exchange rate within the basement car park is maintained at least at 4 volume changes per hour;
- Tar should be removed from the immediate vicinity of outer basement walls to the extent practicable, and basement designs and engineering controls should ensure that tar seepage into basements does not occur;
- Construction of compartments in the overall basement with each compartment adjacent to basement areas leaving a maximum of 2 exposed walls in contact with contaminated soil / groundwater;
- The basement groundwater retention walls system to comprise a secant pile wall, extending to and keyed into bedrock, with a reinforced concrete basement wall, constructed on the inside. A sealed plenum constructed immediately inside the reinforced concrete basement wall to include (a) passive ventilation to the atmosphere; and (b) dish drains that will drain any seepage;
- Basement design plans to include engineering controls to ensure that contaminated groundwater does not accumulate in compartments which are ventilated to basement airspaces;
- Basement levels should be maintained at lower pressure than occupied areas in accordance with AS1668.2 (Standards Australia 2002); and
- Sump rooms should be placed as far as possible from lift wells.

It is noted that the current development plan includes a secant pile wall along Hickson Road and the eastern portion of the southern boundary with an alternate basement groundwater retention wall system comprising a diaphragm wall proposed for the remaining boundaries. The adequacy of the basement groundwater retention wall system design to meet the objectives of the RAP will be considered in review of the RWP for a future stage of works.

The RAP proposed preparation of a VSAQP. The Section B Site Audit noted that this would need to clarify some issues (identified in Table 12.3 of the Section B Site Audit), as well as address validation of additional remediation areas identified through the Auditor's review, including at BH/MW69 (southern basement) and BH530 (northern basement).

3. REVIEW OF ADDITIONAL REMEDIATION PLANNING DOCUMENTS

3.1 Introduction

As per the conditions of the Section B SAS, additional remediation planning documents are required to be prepared and reviewed by the Auditor prior to commencement of works, including a revised RWP, MCMP, VSAQP and AMP.

A revision to the RWP was required by the Section B Site Audit to address the following:

- clarifying site assessment criteria and relevant data sets
- confirming the proposed remedial extent based on the above
- clarify the proposed depth of over-excavation (beyond 10 mbgl) if tar found at the base of remedial excavations
- confirming sequence of proposed remediation and validation tasks
- proposed design for open space areas in future residential development (e.g., extent of filling to be retained) if known
- in situ validation for tar occurrence along proposed basement alignment.

The required documentation has been prepared by EDP for EWDA-01 in the form of a RWP including MCMP and VSAQP elements. An asbestos management plan (AMP) and an acid sulfate soils management plan (ASSMP) are included as appendices to the RWP.

Additional RWP(s) are proposed to be prepared for future stages of the remediation works.

The following sections discuss the works proposed under the current DA and the relevant remediation and validation aspects, followed by the Auditor's review and summary of the required documentation.

3.2 Works Proposed under EWDA-01

EWDA-01 is for the construction of a secant pile retention wall along the Hickson Road (eastern) boundary and part of the southern boundary, and includes:

- Partial demolition of an existing shoring wall capping beam along Hickson Road;
- Construction of a new secant pile retention wall;
- Excavation of land related to the secant pile retention wall;
- Localised remediation related to the secant pile retention wall;
- Associated Archaeological Investigations in the area of excavation and works; and
- Sydney Metro / Hickson Road interfaces – perimeter retention wall interface works, and Hickson Road public domain interface works.

Refer to Attachment 3 for the location of the works.

3.3 Remediation and Validation Aspects Relevant to Current Works Proposed

EWDA-01 does not include the construction of any habitable structures and is limited to construction of the secant pile wall along the eastern and part of the southern site boundaries. Remediation and validation aspects relevant to the EWDA-01 works are:

- Materials management and tracking, including waste classification and disposal.
- Construction of secant pile wall keyed into bedrock
- Verification that there is no tar in vicinity of outer basement walls
- Analysis of material imported from off-site.

3.4 Evaluation of RWP and Associated Documents for EWDA-01

The Auditor has assessed the RWP and associated documents by comparison with the requirements of the RAP and the checklists included in NSW EPA (2020) *Contaminated Land Guidelines: Consultants Reporting on Contaminated Land*. The documents were found to address the required information, as detailed in Table 3.1, below.

Table 3.1: Evaluation of Remedial Works Plan

Remedial Works Plan Element	Auditor Comments
<p><i>Remedial Goal</i></p> <p>The objective of the RWP is to provide a technical specification that provides specific details of the work that must be completed to facilitate delivery of the remediation works prescribed by the JBS RAP, specifically for the scope of the EWDA-01, and to provide information regarding the proposed staging, sequencing and planning of remediation works.</p> <p>The overall objective of the JBS RAP is to make the site suitable, from a contamination perspective, for the proposed Stage 1 Public Domain and long-term residential land use (this includes areas outside the EWDA-01 boundary).</p>	<p>In the Auditor's opinion, this goal is considered appropriate and consistent with the recommendations made within the Section B Site Audit.</p>
<p><i>Discussion of the Extent of Remediation Required</i></p> <p>The remediation area is considered as the footprint of the EWDA-01 retaining structure as currently defined by the proposed secant pile wall. The extent of remediation is identified as the fill materials proposed for removal during the EWDA-01 retention wall and anchoring activities (and tar within bedrock if encountered, see below).</p>	<p>The scope of this RWP relates to the remediation completed under the EWDA-01 scope of works. The identified extent of remediation is limited however is acceptable as additional RWP(s) will be prepared for subsequent stages of the remediation works which will be reviewed by the Auditor.</p>
<p><i>Remedial Options Review and Preferred Option</i></p> <p>Several remedial options were discussed in the JBS RAP reviewed in the Section B Site Audit and further discussion on remediation options is not included in the RWP. The RWP reviews the preferred remedial options. For the EWDA-01 works the preferred remediation option is excavation and off-site disposal of all excavated fill.</p> <p>Material will be excavated and disposed off-site for construction of the secant pile wall. The RWP proposes vertical chase out of tar impacts if encountered within bedrock during the EWDA-01 works but does not include the requirement for lateral chase out beyond the external side of the secant wall. Any tar within the proposed basement excavation will be removed during the basement remediation, however, assessment of the risk posed by any residual tar adjacent to the external side of the secant wall is to be completed through a human health risk assessment. The RWP notes that "<i>The revised human health risk assessment, Construction Quality Assurance Plan (CQAP) documentation and any visual observations of the exposed secant wall during DA02 will be the primary lines of evidence to confirm no risk to internal basement users even if tar is in contact with the external face of installed walls</i>".</p> <p>The potential requirement for stabilisation of tar impacted waste prior to off-site disposal is considered in the RWP with a methodology for completing a stabilisation trial included. However, it is noted that stabilisation of waste is unlikely to be required prior to disposal.</p> <p>Excavation and off-site disposal of asbestos impacted fill is also proposed if encountered.</p> <p>The RWP notes that while a LTEMP was contemplated in the RAP, the RWP and proposed design intends on delivering the site without any long-term monitoring or management requirements. As such, the requirement for a LTEMP at this stage is unlikely.</p>	<p>The Auditor considers the preferred remediation option is appropriate based on the proposed works and is consistent with the remediation options assessed in the JBS RAP and reviewed in the Section B Site Audit. Revision of the risk assessment will be required should tar impacted material be identified in proximity to the external side of the secant pile wall.</p> <p>The requirement for a LTEMP will be considered based on the results of remediation, however, the Auditor agrees that the requirement for a LTEMP at this stage is unlikely.</p>
<p><i>Description of Remediation to be Undertaken</i></p> <p>The remediation methodology is outlined in Section 5.10 of the RWP. The remediation sequence involves:</p> <ul style="list-style-type: none"> • Site establishment including survey and ground marking of the EWDA-01 boundaries and delineation of the boundaries by means of jersey kerb, chain-wire fence or other delineating feature and hoarding. • Termination and relocation of inground services • Removal of concrete and road base within the EWDA-01 area and disposal to a recycling facility, including removal of the existing guide wall for the Barangaroo Metro site. All surrounding hardstand to be maintained. 	<p>The identified remediation sequence is appropriate.</p>

Remedial Works Plan Element	Auditor Comments
<ul style="list-style-type: none"> Excavation and construction of piling and rock anchors. The number, size and depth of piles is to be determined following completion of geotechnical assessments and on finalisation of the construction design. Secant piles are proposed at 1.4 m centres with an approximate diameter of 0.95 m. Rock anchoring is required as a temporary support to the retention wall prior to basement slab construction. Anchoring will be undertaken as excavation adjacent the secant wall progresses and the majority of anchors are outside the scope of the EWDA-01. Management of excavated material in accordance with a MCMS (Section 7 of the RWP) which documents procedures for waste classification, reuse, material tracking and material quality. 	
<p><i>Proposed Validation Criteria</i></p> <p>The proposed validation criteria are outlined in Section 5.3 of the RWP. Only soil criteria are included as relevant to the scope of the EWDA-01 works. The adopted criteria are based on a combination of health investigation levels and ecological investigation criteria from NEPM 2013 and site-derived risk-based criteria. EDP have adopted EnRiskS's Table 4 – Recalculated Criteria for Imported Fill, presented in the advice to the Auditor included in Appendix F of the Section B SAR for assessment of human health risks. The criteria apply to residual site soils remaining to the east of the perimeter retention walls (saturated and unsaturated).</p> <p>In addition to soil analytical data, the RWP notes that validation of the basement wall will require the completion of construction validation protocols to ensure the construction methodology meets the design requirements and RAP assumptions. The design elements applicable to DA-01 include the construction of a secant pile wall into bedrock and capping beam which must be verified through the requirements of a CQAP or procedures. Data, inspection test plans (ITPs) and verification tests as required in the CQAP will be collated with "as built" drawings to validate the construction of the secant wall and capping beam in accordance with the detailed design. This documentation will be presented in a validation report prepared for EWDA-01.</p> <p>Assessment of acid sulfate soils (ASS) is to be based on information provided in the Department of Agriculture and Water Resources National Acid Sulfate Soils Guidance; National acid sulfate soils sampling and identification methods manual 2018 (DAWR, 2018). The guidelines provide action criteria based on the percentage of oxidizable sulfur or Total Potential Acidity (TPA), for broad categories of soil.</p>	<p>The soil validation criteria adopted by EDP in the RWP are consistent with the criteria reviewed and approved in the Section B Site Audit and are considered appropriate for soils remaining at the site. The guidelines adopted for assessment of ASS are acceptable.</p> <p>The JBS RAP and Section B Site Audit contemplated preparation of a CQAP and provision of As Built or Issued for Construction drawings as validation requirements for building elements. This validation aspect is appropriate to be addressed by structural certification (not environmental consultant), however, the relevant building components and associated structural certifications should be addressed in the validation report. As documented in Section 10.3.4 of the Section B SAR, the basement construction assumption relevant to EWDA-01 comprises construction of a secant pile wall keyed into bedrock.</p>
<p><i>Proposed Validation Testing</i></p> <p>Waste Classification of Excavated Material:</p> <p>Assessment is to include use of in situ and ex situ soil analytical data as well as visual assessment. The procedures to be adopted for in situ and ex situ classification are included in the MCMS. In situ classification is to be completed in accordance with a sampling analysis and quality plan (SAQP) to be prepared by the environmental consultant and reviewed by the Auditor. The RWP proposes a sampling density of 1:250 m³ to allow the calculation of the 95% upper confidence limit (UCL) on the average as described in NEPM 2013. Samples are to be analysed for asbestos, metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs) and also subject to visual assessment by the environmental consultant to assess for asbestos, hazardous wastes (including coal tar), ASS or other unexpected finds. In situ materials will be placed in short-term temporary stockpiles for inspection.</p> <p>Due to the high moisture nature of piling material, temporary stockpiling of this material is proposed and ex situ classification.</p> <p>Materials that do not have an in situ pre-classification are to be stockpiled on site to allow sampling, analysis and subsequent classification by the environmental consultant. To supplement the existing in situ data, an ex situ validation frequency must be adopted to ensure a total analysis frequency of 1:250 m³.</p> <p>Samples are to be collected by the environmental consultant using a hand trowel, or in excavations deeper than approximately 1 m sonic</p>	<p>The RWP includes a MCMS to classify, track and manage excavated materials. The Auditor has reviewed the MCMS in the RWP and considers it to be adequate for the EWDA-01 remediation works. The detail included in the MCMS satisfies the the recommendations made within the Section B Site Audit.</p> <p>It is noted that further details on the sampling frequency and methodology for in situ sampling to be completed for material classification purposes, including for assessment of ASS, is to be documented in a separate SAQP for Auditor review, however the sampling frequency and analytical suite outlined in the RWP is appropriate for classification purposes.</p> <p>The Auditor notes that imported material must either be VENM, ENM or be classified under a Resource Recovery Exemption. The density of testing would need to be commensurate with the documentation</p>

Remedial Works Plan Element	Auditor Comments
<p>drilling and directly from the piling rig auger flight or the piling spoil stockpile. All samples will be collected using clean nitrile gloves, and drill heads will be cleaned if evidence of gross contamination or coal tar is observed in arisings, to ensure the minimisation of cross-contamination. Where samples are obtained from stockpiles, they are to be collected from approximately 0.3 m beneath the surface of the stockpile.</p> <p>Wastes are to be classified in accordance with NSW EPA (2014) Waste Classification Guidelines. A hold point is to be in place prior to removal of excavated soils off-site requiring completion of a stockpile ITP form by the environmental consultant to confirm visual observations and final waste classification.</p> <p>In-situ Validation of Retention Wall:</p> <p>To assess for tar impacted material that will remain adjacent to wall one sample is to be collected per 20 m length of wall, within 1-3 m of the wall external edge and per 1 m depth interval to natural material. Samples are to be analysed for asbestos, metals, TRH, BTEX, PAHs and visually inspected for tar impacted material. Sampling is to be completed using a sonic drilling rig.</p> <p>Assessment of Acid Sulfate Soils:</p> <p>An ASSMP is attached as an Appendix to the RWP and details the methodology for assessment and treatment of ASS. In-situ assessment of soil is to be undertaken to determine the soil condition with regards to ASS in accordance with the SAQP to be developed for in situ sampling for materials classification purposes. The SAQP is to be reviewed by the Auditor. Samples assessed for ASS are to be selected based on visual and olfactory evidence including waterlogged soils, silty sands or sands (mid to dark grey) or bottom sediments, peat or peaty soils, coffee rock horizons and / or soils with a sulfurous smell for example hydrogen sulfide or 'rotten egg' odour.</p> <p>Re-use of Excavated Material:</p> <p>Reuse of site-derived materials is not expected to be possible for EWDA-01 works, however, the MCMS in the RWP outlines the steps required should reuse of materials become possible on site, or if an off-site resource recovery potential is identified.</p> <p>Imported Material:</p> <p>Prior to the importation of any materials onto site, they must first be confirmed as fit for purpose. The RWP identifies materials imported to site in two categories: Engineering/ General Fill and Landscaping. Only material which meets the definition of virgin excavated natural material (VENM), excavated natural material (ENM) and recovered aggregates or as defined under relevant regulations and approved for import by NSW EPA and the Site Auditor, will be imported to site. No on site material (or material from the greater Barangaroo Site) is proposed to be reused during the EWDA-01 works, though during excavation, materials may be identified for later beneficial reuse. Imported materials are to be sampled at a minimum of 3 samples per source site and 1:250 m³ thereafter for non-VENM sources. Samples are to be analysed for asbestos, metals, TRH, BTEX, PAHs, OCPs, PCBs and any additional analysis required for compliance with specific resource recovery orders.</p> <p>Regular inspections of imported materials are to be undertaken by the environmental consultant to ensure that imported materials meet the description of the material classification documentation.</p> <p>A Hold Point is identified in the MCMS prior to importation of material which requires completion of an Importation and Placement Form by the environmental consultant.</p>	<p>provided and the consistency of the results.</p>
<p><i>Contingency Plan if Selected Remedial Strategy Fails</i></p> <p>The remedial strategy has a low risk of failure, as validation failure at the base of the excavation would lead to further excavation. If tar impacted material is retained adjacent to the retention walls, a human health risk assessment will be required, and any identified risks managed through ongoing site management controls.</p>	<p>In the Auditor's opinion, the remediation strategy has a low risk of failure. Residual tar impact is likely to be localised and would be retained beyond the secant pile wall. A revision of the human health risk assessment would be required if significant tar</p>

Remedial Works Plan Element	Auditor Comments
<p>The RWP includes a Remediation Works Contingency Plan (RWCP) in Section 8 which includes procedures for identification and management of expected and unexpected finds or events. These include identification and management of tar impacted material, asbestos impacted material, ASS, containment breach of soils and leachate and placement of inappropriate materials. A flow chart of actions to be implemented for unexpected finds is included in the RWP.</p>	<p>impacted material was identified adjacent to the wall.</p> <p>Contingency plans for dealing with tar impacted material, asbestos and ASS are specifically addressed in the RWP and appended AMP and ASSMP.</p> <p>The procedure for handling unexpected finds, which includes stopping work and identification of materials is appropriate and practical and can be implemented within the proposed remediation strategy.</p>
<p><i>Interim Site Management Plan (before remediation)</i></p> <p>The site is currently covered by hardstand and no interim site management is required.</p>	<p>The Auditor agrees that interim site management is not required.</p>
<p><i>Site Management Plan (operation phase) including stormwater, soil, noise, dust, odour and OH&S</i></p> <p>The RWP requires preparation of a site-specific Work Health and Safety (WHS) Plan and a site-wide Construction Environmental Management Plan (CEMP) prior to commencement of remediation works. Section 6 of the RWP outlines the environmental management considerations for remediation of EWDA-01 that are to be incorporated into the CEMP, in addition to typical controls required for construction sites. These include monitoring of ambient air for VOCs and asbestos fibres during excavation and material handling activities. The RWP also notes that the CEMP should include the validation process whereby compliance with the CEMP will be measured. A Hold Point is identified in the RWP which requires preparation of the CEMP and implementation of all site controls prior to commencement of EWDA-01 construction activities.</p> <p>Section 10 of the RWP outlines the information to be included in the WHS Plan.</p> <p>An AMP has been prepared for the management of potential asbestos impacted fill materials that may be encountered during the EWDA-01 works. The AMP assumes asbestos encountered will be bonded asbestos. The identification of friable asbestos would be managed as an unexpected find.</p> <p>The AMP applies during all works however the control measures in the AMP are to be applied if asbestos is detected during the works. The AMP includes triggers for implementation and cessation of asbestos controls during the works which involve excavation of soil to install the guide wall and drilling of soils to install the secant piles. If any form of non-friable asbestos is identified in excavated or drilled spoil, the immediate work area must be considered asbestos impacted and appropriate non-friable asbestos controls described in the AMP must be followed. For the guide wall excavation and secant pile will drilling, triggers to cease implementation of asbestos controls are as follows:</p> <ul style="list-style-type: none"> • Guide wall (or other trenches) -a minimum 5 m of further excavation in either direction which has not identified any further instances of asbestos. Verification of the absence of asbestos in the trench sidewalls and base to enable cessation of asbestos controls must be undertaken by a hygienist. • Secant pile wall – drill spoil from a two directly adjacent piles in either direction must not identify any further instances of asbestos (e.g. if pile 03 identifies asbestos, piles 01, 02, 04 and 05 at a minimum must be drilled under asbestos controls). Verification of the absence of asbestos in pile spoil to enable cessation of asbestos controls must be undertaken by a hygienist. <p>An ASSMP has been prepared to provide a framework for management of waste soils which are potentially acid sulfate generating and includes requirements for assessment, on site treatment, validation and disposal of ASS.</p>	<p>The Auditor considers that documentation of site management measures in a WHS Plan and a CEMP that considers the requirements of the AMP and ASSMP appended to the RWP should be adequate to mitigate risks to human health and the environment during the works. The proposed approach is consistent with the recommendations made in the Section B Site Audit with one exception.</p> <p>As discussed in Section 2.1 of this IAA, the Auditor considers there is a high potential for undetected asbestos to be present in the fill, however, the AMP does not propose implementation of asbestos control measures from the outset of the project, only if asbestos is detected. This approach is considered acceptable for EWDA-01 given the relatively low volume and batch nature of the works (guide wall excavation and drilling of soils for pile installation). The identified triggers for implementation and cessation of asbestos controls are considered acceptable.</p>

Remedial Works Plan Element	Auditor Comments
<p><i>Licence and Approvals</i></p> <p>Section 5.8 of the RWP documents the regulatory and planning requirements for the remediation works. The Barangaroo Site is listed as a State Significant Site within Schedule 3 of the State Environmental Planning Policy (Major Projects) 2005. Development approval for the project falls under the provisions of Part 3A of the NSW <i>Environmental Planning and Assessment Act 1979</i> (EP&A Act) and the remediation works are considered ancillary to other development. The consent authority is the Director General of the NSW Department of Planning and Infrastructure.</p> <p>The EWDA-01 remediation works do not require a licence under the NSW <i>Protection of the Environment Operations Act 1997</i> (POEO Act). It is noted in the RWP that any waters released during EWDA-01 are to be undertaken in accordance with the Environment Protection Licence (EPL) held by Barangaroo Development Authority (BDA – EPL #13336 or a EWDA-01 specific EPL as required. Water is expected to require treatment prior to discharge.</p> <p>All wastes generated and proposed to be disposed off-site shall be assessed, classified and managed in accordance with the NSW EPA (2014) Waste Classification Guidelines. An appropriately licensed landfill should be selected and the material tracked from the site to the landfill.</p> <p>All works undertaken at the site must be conducted in accordance with the AMP and relevant requirements of the NSW <i>Work Health and Safety Act 2011</i> (WHS Act) and NSW <i>Work Health and Safety Act Regulation 2017</i> (WHS Regulation). Under the AMP, all asbestos related remediation works to be undertaken by a licensed asbestos removal contractor (LARC) who must hold either a Class A (friable) or Class B (non-friable) Asbestos Removal Licence (as required). The AMP requires hygienists referred to in the AMP to hold an asbestos assessor’s licence.</p>	<p>Acceptable. The Auditor notes that the EPL #13336 is no longer current, therefore disposal of water would require separate approval for the EWDA-01 works.</p>
<p><i>Contacts/Community Relations</i></p> <p>Contacts are not provided in the RWP but should be incorporated into the WHS Plan and CEMP. The RWCP includes measures to be followed for complaints received from the public regarding odour, noise, vibration, dust or surface water runoff, however, specific measures to be implemented in relation to community consultation and engagement are not provided in the RWP.</p>	<p>Information on site contacts and community consultation/relations is not specifically discussed in the RWP. However, site contacts will be provided in the WHS and CEMP documentation once confirmed which is acceptable.</p>
<p><i>Staged Progress Reporting</i></p> <p>During remediation works, routine reports are expected to be required to monitor the progress of remediation and compliance with the MCMS. An audit of the MCMS and waste tracking register is proposed to be completed by the environmental consultant early in the project works, to ensure all required information is being recorded appropriately and adequate records retained.</p> <p>Following the completion of the remediation works, an interim site remediation and validation report is to be compiled detailing the remediation methodology undertaken and results for all validation assessment, classification or other sampling events conducted throughout the EWDA-01 remediation. An independent Site Audit, completed by a Site Auditor accredited by the NSW EPA, will be conducted to review:</p> <ul style="list-style-type: none"> • The interim validation report(s) that will be prepared for EWDA-01; and • Materials tracking and compliance reports. <p>The validation report will include any recommendations on the requirements for future monitoring or management. Validation for the EWDA-01 will be incorporated into a final validation report for Central Barangaroo.</p>	<p>Acceptable. Interim Audit Advice will be provided reviewing the remediation and validation works completed for EWDA-01 works to ensure they are completed in accordance with the requirements of the RWP and the JBS RAP.</p> <p>The final SAS and SAR will be prepared following completion of all stages of remediation and validation prior to occupation of staged areas within Central Barangaroo.</p>
<p><i>Long Term Environmental Management Plan</i></p> <p>The RWP noted that, if required, a LTEMP would be prepared to detail the on-going management and monitoring requirements for the Central Barangaroo development. However, the precise nature and extent of the</p>	<p>The JBS RAP anticipates that a LTEMP will be required to manage ongoing risk to future site users, however, the requirement for ongoing management will be considered by the Auditor based on the results of remediation. The</p>

Remedial Works Plan Element	Auditor Comments
<p>management requirements will not be known until remediation and construction works are completed and the validation data obtained.</p> <p>The LTEMP, if required, would be expected to be prepared following the completion of the final validation report for the Central Barangaroo development, though as the staging of the development of the LTEMP is not known, this may involve an interim LTEMP, amended over time to include the remaining portions for Central Barangaroo.</p>	<p>Auditor agrees with EDP that, based on the proposed design, the requirement for a LTEMP is unlikely.</p> <p>An interim LTEMP would be required for any interim validation and sign off of areas within the development that require ongoing management.</p> <p>An enforcement mechanism would be required for any LTEMP, if required.</p>
<p><i>Waste Management</i></p> <p>The MCMS includes details of procedures to be adopted for waste classification, materials tracking and disposal of material to, licensed facilities. The material tracking system will detail origin, destination and quality of all materials handled as part of the required remediation. The system will include tracking of: haulage vehicle registration numbers, estimated volumes, tip dockets, landfill recorded volumes and confirmed disposal classification of all materials. All materials handled will be tracked on the job specific Waste Tracking Register and Material Tracking Forms.</p>	<p>Acceptable. The detailed procedures included in the MCMS outlined in Section 7 of the RWP are considered adequate to manage risks associated with material handling.</p>

4. CONCLUSIONS AND RECOMMENDATIONS

The RWP and associated documents including the AMP and ASSMP have been prepared to provide additional detail with regard to the remediation and validation requirements for the initial stage of development works at Central Barangaroo referred to as EWDA-01 and comprising the installation of a secant pile wall keyed into bedrock along the eastern and part of the southern boundaries of the site. The Auditor has reviewed the documentation with consideration of the requirements of the JBS RAP and recommendations made in the Section B Site Audit that was prepared to document review of the JBS RAP. In the Auditor's opinion, the works described in the RWP and associated documents including the AMP and ASSMP are appropriate. If adequately implemented during the EWDA-01 works, the RWP should be able to ensure that the works support the future site suitability for the proposed land uses (following subsequent stages of remediation and development). Successful validation will be required to confirm this.

Based on review of the EWDA-01 RWP, the following documentation/activities are anticipated to be required to be reviewed by the Auditor to support validation and confirm works support the future site suitability for the proposed land use:

- A SAQP for the proposed in situ materials classification assessment
- Waste classification documentation based on in situ and any ex situ assessment
- A CQAP for construction of structural elements of the development that require validation/confirmation to support assumptions in the human health risk assessment
- An interim validation report following completion of the EWDA-01 works
- RWP for subsequent stages of the remediation and validation (e.g. for basement excavation and validation works to be completed under DA-02)
- Additional validation reports for staged remediation areas.

5. LIMITATIONS

This interim audit advice was conducted on behalf of Aqualand B Development Holding Pty Ltd for the purpose of assessing the suitability and appropriateness of a remedial works plan (RWP). This summary report may not be suitable for other uses.

The Auditor has relied on the documents referenced in Section 1 in preparing the Auditor's opinion. The consultants included limitations in their reports. This interim audit advice must also be subject to those limitations. The Auditor has prepared this document in good faith but is unable to provide certification outside of areas over which the Auditor had some control or is reasonably able to check. If the Auditor is unable to rely on any of those documents, the conclusions of this interim audit advice could change.

It is not possible to present all data which could be of interest to all readers of this interim audit advice. Readers are referred to the referenced reports for further data. Users of this document should satisfy themselves concerning its application to, and where necessary seek expert advice in respect to, their situation.

* * *

Consistent with the NSW EPA requirement for staged 'signoff' of sites that are the subject of progressive assessment, remediation and validation, I advise that:

- This advice letter does not constitute a Site Audit Report or Site Audit Statement.
- At the completion of the remediation and validation I will provide a Site Audit Statement and supporting documentation.
- This interim advice will be documented in the Site Audit Report.

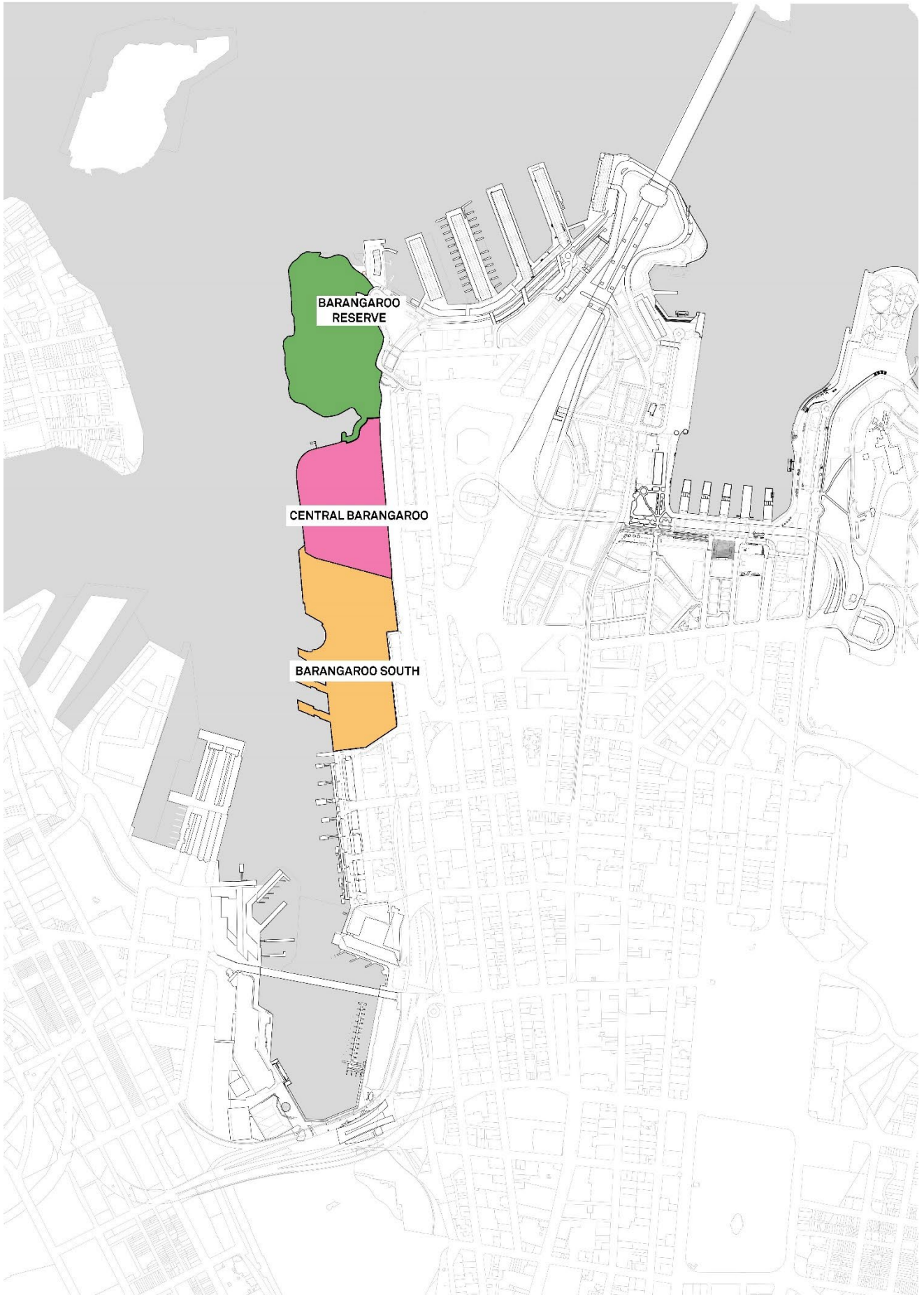
Yours faithfully
Ramboll Australia Pty Ltd



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Attachments: 1 Site Locality Plan
2 Section B Site Audit Boundary and Previous Site Layout
3 EWDA-01 Proposed Works Layout



Attachment 2: Section B Site Audit Boundary and Previous Site Layout



Source: Base Image www.nearmap.com (23-10-2011)

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0 12.5 25 50 m		
Scale: 1:1,500		
Datum: MGA94 Zone 56 - AHD		
A4		
G	Original Issue - R06	RF 27-3-2013
Rev	Description	Drn. Date:

	Soil Sample Locations (JBS May 2012)
	Historic Soil Sample Locations
	Approximate Site Boundary
	Barangaroo Central Residential Basements (10 m Depth)
	Overlap of Area Already Assessed (Headland Park)
	Inaccessible for soil and groundwater sampling
	Part of Declaration Area - Approximate Extent



Figure 5: JBS (2012a) Soil Sample Locations

Client: Barangaroo Delivery Authority
Project: Barangaroo - Central
Job No: 42021
File Name: 42021_05





- Legend**
- Site Area (approximate)
 - Approximate Future Basement Outline
 - Existing Metro Station Pile Wall (approximate)
 - Early Works DA Stage 1 Boundary
 - - - Proposed Secant Pile Wall

S:\009 BARANGAROO\SCPP\FIGURES MAY 2022 Views | Wednesday, 11 May 2022 11:25:52 AM | drawn by Mark White of www.edp.com.au

1:1050 AT A3 (APPROXIMATE)
 STAGE NEAR/FAR DECEMBER 2021
 REFERENCE: 13/104_1105_Overall Site Basement 1 Plan.dwg & WEA-DA-BAS-01(0) DA01 - SITE PLAN.pdf SUPPLIED BY CLIENT

V1	11/05/2022	initial draft	LDW		
VER	DATE	AMENDMENTS	DRW	CKD	



FIGURE 2			
EARLY WORKS DA STAGE 1 BOUNDARY			
Project Ref:	S-03937		
Project:	Aqualand Barangaroo, EWDA-01 - Acid Sulfate Soil Management Plan		
Location:	Central Barangaroo, Hickson Road, Barangaroo NSW		
Client:	Aqualand Projects Pty Ltd		
Easting: 333637		Northing: 6251819	Datum mAHd: UTM MGA 56H
			PRINT: A3 (L)

COMMERCIAL IN CONFIDENCE