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14 November 2018

Kim Gray
SGCH
Level 5,
38 Humphreys Lane,
Hurstville, NSW, 2220

Via email: Kim.Gray@sgch.com.au

Dear Kim,

Re: Interim Advice 1 – review of existing information for 11 Gibbons Street, Redfern, NSW

1 Introduction

St George Community Housing (SGCH) has appointed Kylie Lloyd of Zoic Environmental Pty Ltd (Zoic), a NSW EPA Auditor accredited (No. 0302) under the Contaminated Land Management (CLM) Act 1997, to conduct an Audit at 11 Gibbons Street, Redfern, NSW ("the site").

The aim of the engagement is to enable a site audit statement (SAS) and associated site audit report (SAR) to be prepared that confirms the suitability of the site for proposed redevelopment as community housing, in accordance with the NSW EPA (2017) Contaminated Land Management Guidelines for the NSW Site Auditor Scheme (3rd edition).

2 Scope of Audit and Nature of Interim Advice

NSW EPA (2017) describes the site assessment and audit process as:

1. *Consultant is commissioned to assess contamination*. The contaminated site consultant designs and undertakes the site assessment and, where required, all remediation and validation activities to achieve the objectives specified by the owner or developer; and
2. *Site auditor reviews the consultant's work*. The site owner or developer commissions the Auditor to review the consultant's work. The Auditor then prepares a SAR and SAS at the conclusion of the review, which are given to the owner or developer.

Therefore, the contaminated land consultant and other relevant parties should be satisfied that the work to be conducted conforms to all appropriate regulations, standards and guidelines and is suitable based on the site history and the proposed land use.

It is understood that the Audit is currently non statutory in nature. If Development Conditions are issued by Council, the Audit may become statutory in nature and require notification to NSW EPA.

3 Current Interim Advice

In preparing this interim audit advice, the Auditor has reviewed the following reports related to land contamination assessment:

- Consulting Earth Scientists (CES) (29 March 2018) Preliminary Site Investigation Report, 9-11 Gibbons Street, Redfern, NSW (Ref: CES180204-SGC-AD);
- JBS&G (28 June 2018a) Data Gap Investigation, 9-11 Gibbons Street, Redfern, NSW (Ref: 54877/115498 Rev 0);
- JBS&G (28 September 2018b) Remedial Action Plan, 9-11 Gibbons Street, Redfern, NSW (Ref: 54877/116480 Rev 0).

The purpose of the current IA is to document Auditor findings following the review of existing information related to site conditions and contamination status. This advice also outlines any data gaps identified in the existing information which should be addressed by the appointed consultant as either part of any further investigation works, or as part of any remedial or validation works that may be required at the site.

4 Summary of Investigations

There have been several iterations of investigations completed on the site, following the iterative process identified as part of SEPP55 requirements. These reports are summarised below.

4.1 Preliminary Site Investigation

The preliminary site investigation was completed by CES in March 2018 and comprised limited soil and groundwater sampling. In summary the works identified a history of commercial/industrial land use since 1943 to the present day. The site walkover identified a potential for hazardous building materials and chemical storage onsite. Anecdotal evidence suggested USTs were present in the southern building on site with the GPR survey also identifying two anomalies in the northern portion of the carpark.

The site is currently occupied by two industrial/commercial buildings and paved hardstand parking lot, with the northern and southern portion of the site divided by an approximately 4m high brick wall.

Results of intrusive assessment indicated exceedances of human health and ecological criteria in fill material (PAHs, TRH and Heavy metals) and natural soils (heavy metals). Groundwater exceedances were identified for PAH and heavy metals. Preliminary waste classification resulted in Hazardous and restricted solid waste for portions of the site.

The investigation identified hazardous building materials, fill materials, underground storage tanks and previous use of the site for commercial use. Potential impact from offsite sources was also identified as a potential contaminant source.

Further assessment of the identified areas of environmental concern was recommended which included the lateral and vertical extent of impacted soils, further sampling for waste classification, hazardous material assessment, confirmation of the presence/absence of USTs and groundwater assessment to determine flow directions.

4.2 Data gap assessment

To address data gaps related to previously identified areas of environmental concern and to enable conclusions to be drawn regarding the suitability of the land for future land uses the following works were completed JBS&G completed fieldwork comprising soil and groundwater sampling and analysis.

JBS&G's key findings included:

- Asbestos, lead paint, ozone depleting substances and synthetic mineral fibres were identified within site structures.
- Potential Fuel infrastructure in the northern portion of the site requires management/removal
- Fill was impacted with PAHs, TRH and heavy metals with the sources of hydrocarbon impact being attributed to ash/metalliferous slag as opposed to an hydrocarbon source.
- The elevated concentrations of PAHs, TRH and heavy metals identified site won fill material as not being suitable for utilisation as growing medium
- Groundwater conditions were considered indicative of typical inner Sydney industrial areas.
- Assessment of sub slab soil vapour conditions did not identify unacceptable risk was identified to not present a risk
- Subject to interim retention of existing site pavements JBS&G considered there to be no aesthetic concerns.
- Fill material has provisionally been classified as GSW with underlying natural material VENM apart from the hotspot at surrounding BH11 which has been classified as hazardous waste on the basis of arsenic concentration.
- Future management/remediation will need to address fuel infrastructure and anthropogenic inclusions within fill materials in the absence of pavements

5 Review of the Remedial Strategy

The remedial action plan (RAP) has been audited in accordance with the requirements outlined in EPA (2017) Contaminated Land Management Guidelines for the NSW Site Auditor Scheme (3rd edition), OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites and with consideration of the amended NEPC (1999) National Environment Protection (Assessment of Site Contamination) Measure, Schedule A and Schedules B(1)-B(9) by National Environment Protection Council, Adelaide (April 2013). A summary of the document review is presented in the following table.

Table 1: Summary of JBS&G (2018) RAP

Requirement	Consultant Consideration	Auditor Comment
Remediation Goal:	Section 4.1 of JBS&G (2018b) stated remediation objectives as follows: • Removal of potential contamination sources, including redundant fuel infrastructure • Close out any data gaps • Validation of the remedial/management works in	Considered to be appropriate

Requirement	Consultant Consideration	Auditor Comment
	accordance with the relevant NSW EPA Guidelines	
Extent of remediation required as outlined in RAP:	Section 4.2 of JBS&G (2018b) states the extent of remediation works comprises • the removal/decommissioning of the USTs and • management/remediation of impacted fill • arsenic impacted soils. It is understood the development design requires some excavation to achieve sub-grade levels and hence will influence the remediation extent.	This section should summarise the extent of contamination. The remediation extent is subject to additional investigation based upon removal of fuel infrastructure and any associated impacted fill material.
Discussion of possible remediation options:	Table 4.1 of JBS&G (2018b) discusses treatment options and their applicability to the site/development in the context of the potential sources and contaminant types. Options evaluated included: onsite treatment, offsite treatment, offsite disposal and on site containment.	The evaluation of options is appropriate.
Rationale for selected remedial option:	Table 4.1 of JBS&G (2018b) states for arsenic impacted soil at BH11 offsite removal was preferred given the elevated levels and unsuitability to remain on site. Fuel infrastructure and impacted soils offsite disposal was preferred based upon site constraints and odour considerations. For fill materials the preferred option was onsite containment with offsite disposal for material surplus to development. These were considered favorable due cost, resource consumption and waste generation.	The rationale for selected remedial option is considered to be appropriate
Basis for selected remediation criteria:	Section 7.5.1 of JBS&G (2018b) states assessment criteria will be derived from published criteria as presented in NEPM 2013 based on: • Table 1A(1) Health Investigation Levels for Soil Contaminants; • Table 1A(3) Soil Health Screening Levels for Vapour Intrusion; • Ecological Screening Levels (ESLs) from Table 1B(6) ESLs for TPH Fractions F1-F4, BTEX and • Benzo(a)pyrene in Soil under the recreation with minimal access to soils land use scenario; • Management Limits for TPH Fractions F1-F4 in Soil under the recreation with minimal access to soils land use scenario from table 1B(7); • Soil Quality Guidelines (site specific ecological investigation levels) for Urban	Please justify the use of SWA 2016/NSW Workcover 2016 as basis for asbestos criteria.

Requirement	Consultant Consideration	Auditor Comment
	• Residential/Public Open Space land uses – Schedule B5C, NEPC (2013); and • Definition of asbestos contaminated soil as provided to SWA 2016/NSW WorkCover 2016.	
Proposed testing to validate the site after remediation:	Section 7 of JBS&G (2018b) includes the validation plan for the remediation works. This includes evaluation of the data quality objectives for the validation, soil validation methodology, Laboratory analysis, validation criteria, reporting and long term environmental management plan.	Generally appropriate, it is noted EILs would likely need to apply to materials proposed to be retained above the cap.
Contingency plan for remediation:	Section 6 of JBS&G (2018b) includes a Contingency plan incorporating a UFP process. Contingency scenarios are detailed in the following section and included remedial strategy constraints, Validation failure on Boundary, Identification of additional fuel infrastructure, Material storage breach, identification of oily or tarry materials Chlorinated hydrocarbon impact, Emissions, severe weather.	Perhaps consider a scenario relating the asbestos noting Hazardous materials assessment has identified Asbestos in building to be demolished on site.
Interim site management plan prior to implementation of remediation (health, safety & environment):	None required	Appropriate
Site management plan for remediation works (environment)	Section 8 of JBS&G (2018b) detail site management practices to be employed for the remediation. This includes Erosion and sediment control, stockpile management, site access, excavation pump out, noise, vibration, air quality, Offsite transport, and odours,	The measures provided are considered to be appropriate.
Site management plan for remediation works (health & safety)	Section 8 of JBS&G (2018b) states a work, health and safety Management plan will be prepared by the contractor which will contain minimum procedural requirements during works.	The measures provided are considered to be appropriate.
Remediation schedule	No information provided	Please update as necessary
Hours of operation	Section 8.1 of JBS&G (2018b) states all remediation works shall be conducted with the standard City of Sydney Hours of construction and work, or as otherwise designated in the REF documentation. Sections 8.16.1 and 8.16.2 detail additional site specific elements related to contamination at the site.	Sufficient detail has been provided
Contingency plans for incidents:	No information provided	Please update as necessary

Requirement	Consultant Consideration	Auditor Comment
Licenses and approvals:	Section 4.2 of JBS&G (2018b) states works will comprise Category 2" as per the definition outlined in SEPP 55. As such, Council requires notification 30 days prior to the commencement of "Category 2" remediation works. Section 9 of JBS&G (2018b) details the interface of guidelines associated with the remediation works.	The information provided is considered to be appropriate
Contact persons	Section 8.13 of JBS&G (2018b) states site signage will be displayed detailing contact details of the contractor and project manager.	It is noted a number of contacts are yet to be appointed.
Community relations (where applicable)	Section 8.15 of JBS&G (2018b) states owners and occupiers in the adjacent areas should be notified as least seven days prior to the commencement of remediation works.	Considered to be appropriate
Staged progress reporting (where applicable)	None required	-
Long term site management plan	Section 7.6.2 of JBS&G (2018b) details the elements to be included in a long term EMP as the strategy for the site will likely result in passive long term management.	See comments

6 Auditor Comments

The Auditor has reviewed the CES and JBS&G against relevant guidelines made or approved by NSW EPA. The report/s largely meets the guideline requirements, however, the Auditor provides the following comments:

General

1. Please confirm timing for a site visit.
2. Please confirm ownership of the site.

CES Preliminary Site Investigation

3. Section 5 - Please make comment on the following items with regard to site history
    a. Summary of historical site photos (where available)
    b. Description of Manufacturing Industrial processes and location
    c. Inventory of chemicals and wastes and their location
    d. Product spill and loss history
    e. Discharges to land air & water
    f. Compliant history
    g. Local site knowledge
    h. Local Literature review

i. Permits, Licenses and Approvals

4. Section 5.1 it is noted there is no information relating to site users prior to 1991. Would a Heritage report be available which details the specific history of land use on the site ?;
5. Section 9.1 – It is noted development of site-specific ecological criteria was developed from a background sample described as sand which may not be entirely representative of conditions at the site. Future investigation should reconsider development of site-specific ecological criteria for appropriate assessment;
6. Section 12.1 – The groundwater elevations provided in Table 7 are noted to not be presented in mAHD.
7. Table 9 – It is noted the field triplicate for BH04 resulted in false positives for metals analysis due to sediment in the sample and laboratory analysis for Total Metals. Can it be confirmed all remaining data was analysed for Dissolved metals?
8. General – were samples filtered in the field for Dissolved Metal analysis? If not please advise the process employed for appropriate analysis.

JBS&G Data Gap Assessment

9. Section 3.3 – Please provide a copy of the Greencap Hazardous Materials Report.
10. Section 4.4 – The ANZECC 2000 has been superseded with the new ANZG 2018 guidelines and update relevant sections of the report as necessary;
11. Section 5.5 – Please consider preferential pathways may also be created during construction works (e.g. during piling) and incorporate into CSM.
12. Table 6.3 – How were the five soil vapour sampling points selected? was it based upon purge information/data?
13. Section 7.2 – Why are the adopted soil assessment criteria for Total Chromium and Pentachlorophenol based upon thresholds for Commercial/industrial land use in contrast to all other investigation levels which adopted high density residential criteria ?
14. Section 8.2.3 – How long was the breach of holding time for TCLP analysis ? what were the storage conditions of the samples in question? Were they on hold at the laboratory?
15. Section 8.3 – Was ACM assessed in accordance with procedures in NEPM 2013/ WA DOH 09 i.e sieving or spreading for inspection ? as only boreholes have been drilled upon the site what is the risk of asbestos in fill in areas not assessed ?
16. Section 9.3 –Were the wells purged dry with the low flow peristaltic pump? How was the oxygenation of the sampling minimised during sample collection?
17. Section 9.6 –Please include photographic logs to document evidence of the burnt furnace slag and ash within fill materials?
18. Section 9.6.3 – Will silica gel clean-up be used for future waste classification where hydrocarbons are elevated?
19. Section 10.5 – Existing site monitoring wells are required be surveyed to mAHD confirm direction of groundwater flow. Elevation data collected to date may suggest migration toward the west. Groundwater conditions between BH1 and MW01 is considered to represent a data gap. Upon confirmation of flow direction further assessment may be warranted to supplement vapour results at SV02.
20. Please update figures to include CES exceedances as well as JBS&G exceedances.

21. Appendix C – The borehole log for BH106 has a description missing between 0.6-2.0m depth, please amend as necessary.
22. Appendix C – Can commentary be provided on the concentration of ceramic fragments at BH104, it is noted fill materials were deeper in this area (~2m deep), although BH1 from CES 2018 noted fill at 1m depth consistent with the rest of the site.

JBS&G Remediation Action Plan

23. Section 3.5 - Areas under existing building footprints are also considered to represent data gaps. Please ensure areas are addressed as part of any data gap close out investigations.
24. Section 4.2 – Please provide relevant detail of extent of remediation. Reference to another section that summarises previous works is not sufficient. It is noted Figure 4 does not provide a detailed and accurate extent of remediation in consideration of the proposed development requirements i.e. excavation to achieve subgrade levels. In addition no figure has been included which clearly presents all assessment data which exceeded adopted criteria to derive the approximate remedial extents.
25. Section 5.3.3 – Please ensure stockpile impacted by petroleum hydrocarbons are managed to prevent runoff, this would include temporary stockpiles during rainfall events.
26. Sections 5.3.3 and 5.3.4 – Can JBS&G elaborate on what is meant by the term 'to the extent practicable' ? Please update the relevant sections of the RAP to include more specifics/detail as necessary.
27. Section 5.3.5 – Can JBS&G elaborate on what is meant by "some excavation of site fill material will be required to achieve construction sub-grade levels" and given the absence of significant excavation, provide the likely origin of site won fill material understanding this has not been definitively established as yet?
28. Section 5.3.6 – Please provide minimum thickness for concrete/asphalt/pavers proposed as part of the physical separation strategy and provide detail regarding design. For example are any current slabs going to be retained?.
29. Section 6.2.2 – under this scenario for potential off site migration please include a discussion on a duty to notify contamination to the EPA regardless of risk.
30. Section 7.0 – How will the proposed cap installation be verified? has a visual observation/ photographic log been considered to support laboratory data.
31. Section 7.3 – In instances where fieldwork may extend for multiple days ensure XRF unit is calibrated and checked daily.
32. Table 7.4 – As asbestos is to be analysed for presence/absence, will this alone from the basis for offsite disposal? would other assessment be completed for to assess site suitability?
33. Section 7.5.1 – it is understood asbestos assessment criteria under NEPM 2013 are derived from WA DOH 2009 not SWA 2016, NSW Workcover 2016. Please justify the inclusion and relevance of these guidelines.
34. Section 7.5.1 – it would be preferable to develop site specific ecological criteria in contrast to published background levels to assess site soils for use as a growing medium
35. Section 7.6.2 – New site auditor guidelines were enacted late 2017 please amend this section as required
36. Section 7.6.2 – Further to the items listed in 7.6.2 please ensure a survey plan also details any cap extent.

37. Section 9.5 – Please update the report to include meteorological conditions at the time of soil vapour sampling.
38. General – For material to be retained on site underneath a cap scenario, the potential for leachability will need to be addressed. Please consider for data close out investigations and/or provide further justification.
39. General – Please provide further information for purge volumes and associated flow rates for soil vapour sampling.
40. General – Can JBS&G please update the RAP to include commentary/sections on the following:
    a. Remediation schedule
    b. Contingency plan for incidents
41. General – As part of remediation all off site waste classification and corresponding waste tracking documentation needs to be provided to the Site auditor for review purposes
42. General – Further to the above, where fill is imported to site for backfill purposes all relevant documentation (certifications/report etc..) also need to be provided to the auditor for review.

We request that JBS&G provide responses to the above comments, together with an amended copy of the data gap assessment and RAP, as appropriate.

7 Closure

This interim advice does not constitute a SAS or a SAR, but rather is provided to assist the Client in the assessment and management of contamination issues at the site. The information provided herein should not be considered pre-emptive of the final Audit conclusions. It represents the Auditor's opinion based on the review of currently available information.

Should you have any queries or wish to discuss any points, please do not hesitate to contact the undersigned.

Yours sincerely,

Kylie Lloyd
Site Auditor
Zoic Environmental Pty Ltd

Matthew Rendell
Senior Audit Assistant
Zoic Environmental Pty Ltd

Attachments: Attachment A - Tables

Attachment A – Tables

Table A: Summary of Site Information

Title	Details
Street Address:	9-11 Gibbons Street, Redfern, NSW
Property Description:	Lots 1-11 DP 4209
Current Site Ownership:	**Unknown- please provide**
Geographical Coordinates:	Northeast: E 333514.47/ N 6248236.98 Northwest: E 333482.76/ N 6248241.24 Southeast: E 333495.83 / N 6248188.98 Southwest: E 333465.11/ N 6248193.14
Property Size:	1,556 m^2
Local Government Area:	City of Sydney Council
Zoning – Existing:	(E) Business Zone – Commercial Core, SEPP (State Significant Precincts) 2005
Zoning – Previous:	Not provided. However, the absence of this information is not considered to affect the outcome of this SAR.

Table B: Immediate Site Surrounds

The immediate site surrounds are summarised from CES 2018 report.

Title	Details
North:	Marian Street and high density mixed commercial/residential tower beyond
East:	William Lane and commercial premises fronting Regent Street beyond (café, computer repair store, printing store and medical centre), and Percy Jack automotive garage to the east of Regent Street
South:	High density residential tower, and Margaret Street beyond. BP branded service station is located 20m to the south east and the Australian Technology Park is located approximately 200m to the south west of the site.
West:	Gibbons Street and Gibbons Street Reserve beyond, after which is the Redfern Station and railway line;

Table C: General Site Condition

Title	Details
Topography and Drainage:	Section 2.4 in JBS&G (2018a) stated that the site was relatively flat and sloped slightly toward the south. The site was generally level with its surrounds. The ground surface in the northern carpark was observed to be split along the middle and graded to the southeast and northeast. Section 4. in CES (2018) adds that the regional topography slopes to the northwest and southwest with an approximate elevation of 26m AHD.

Title	Details
Boundary Condition (type & condition of fencing, soil stability & erosion):	Section of CES (2018) states boundary conditions include the site being bounded as follows: • North - asphalt footpath and a small section of concrete footpath; • West –concrete footpath; • South – brick/concrete wall; and • East – a narrow concrete footpath and asphalted William Lane.
Visible Signs of Contamination:	Section 11.4 of CES (2018) states no visual signs of hydrocarbon impact were observed. No ACM was observed on site or within boreholes. Section 2.2 in JBS&G (2018a) states no evidence of mass storage of waste, pesticides or asbestos was observed on the site surface.
Visible Signs of Plant Stress:	Section 4.3 in CES (2018) states the site is occupied by two commercial/industrial buildings and paved hardstand parking lot. No vegetation is present on site. Section 9.2.1 in JBS&G (2018a) states at the time of investigation the site was covered by building footprints and concrete/asphalt slab as such ecological effects were not observed.
Presence of Drums, Wastes and Fill Materials:	Section 2.2 in JBS&G (2018a) states minor spills and evidence of a spill trough was noted in Garage 1 of the CoS building in northern portion of the site. For the building in the southern portion of the site a previous Geophysics survey completed by CoS in 2017 identified a possible tank/waste oil pit however the GPR survey completed by CES could not confirm its presence. No evidence of mass storage of waste, pesticides or asbestos was observed on the site surface.
Odours:	Section 11.4 of CES (2018) states no hydrocarbon odours were noted within any soil bores.
Condition of Buildings & Roads:	Section 2.2 in JBS&G (2018a) statsd the asphalt paved car park was in generally good condition with a crack observed in the central portion. Interior buildings finishes were noted to be degrading i.e. peeling paint etc.
Quality of Surface Water:	Section 2.2 in JBS&G (2018a) states no surface water was present at site during the investigation
Flood Potential:	A section 10.7 certificate in Appendix A of CES 2018 states the land is not affected by a policy that development is restricted due to flooding.
Relevant Local Sensitive Environments:	Section 4.12 of CES (2018) states the following sensitive local environments are known to exist within a 500m radius of the site: • Gibbons Street Reserve located approximately 38 m west of the site; • Daniel Dawson Reserve located approximately 212 m south of the site; • Yellowmundi Park located approximately 302 m north of the site; • Vice Chancellors Oval located approximately 448 m southwest of the site; • Charles Keenan Reserve located approximately 457 m west of the site; and, • Reconciliation Park located approximately 477 m northeast of the site; It is noted as groundwater is likely to flow south/southwest Daniel David reserve is the only receptor downgradient of the site.
Other Relevant Information:	None identified

Table D: Site History

Title	Details
Previous Land Use & Chronological List:	• 1904-1991: Borough of Redfern • 1991 – present: City of Sydney Council

Title	Details
Land Titles:	Section 5.1 in CES (2018) states that between 1904 and 1991 the borough of Redfern owned the site upon which the City of Sydney council took ownership and used the site for commercial/industrial purposes.
Summary of Council Records:	Section 5.4 of CES (2018) states a section 149 certificate was obtained which revealed: • The land to which the certificate relates is not declared to be significantly contaminated land within the meaning of that act as at the date when the certificate is issued. • The land to which the certificate relates is not subject to a management order within the meaning of that act as at the date when the certificate is issued. • The land to which the certificate relates is not the subject of an approved voluntary management proposal within the meaning of that act at the date the certificate is issued. • The land to which the certificate relates is not the subject of an ongoing maintenance order within the meaning of that act as at the date when the certificate is issued. • As at the date when the certificate is issued, Council has not identified that a site audit statement within the meaning of that act has been received in respect of the land the subject of the certificate.
EPA Records:	Section 4.14 of CES (2018) states a review of the NSW EPA contaminated land register and POEO listings revealed no listings for the site. A number of listed sites were located in the vicinity however were located down hydraulic gradient with the exception of the railway corridor located 10m north east of the site. The Auditor confirmed this information in November 2018.
WorkCover Dangerous Goods Licenses/ USTs/ ASTs:	Section 5.3 of CES (2018) states a search of the Workcover NSW Dangerous Goods licensing was undertaken and identified no listings for the site. Section 4.3 of CES (2018) identifies that there is anecdotal evidence on the possible presence of underground storage tanks (USTs) in the building to the south of the site (as Identified by discussions with Mr Butler, occupant). This opinion is based on possible distortion identified under the slab inside the building. Section 13.6.3 CES (2018) that the GPR completed by CES did not identify a UST in the southern building although an in-ground pit present in the southern building. JBS&G confirms this pit was a waste oil pit. CES did identify anomalies in the norther half of the carpark. It is noted that JBS&G identifies in the RAP, that Greencap reports potential tanks or voids present beneath the floor slab of the Mowers Shed.
Summary of Aerial Photographs (on site and adjacent sites):	Section 5.3 of CES (2018) presents a review of historical aerial photographs with findings included below: • 1943 – 5 commercial/industrial buildings were observed on site. AN isolated structure is observed in the center of the site. Residential and commercial areas were observed to the north, east and south with Redfern rail station to the west. • 1951 – No significant changes observed on site. A construction area was observed to the west of the site. • 1955 – The site has been modified to 2 industrial/commercial buildings separated by a car park in the middle. Construction was continuing to the west of site. • 1961 – A warehouse was visible on the southern portion of the site. No significant changes were observed in the surrounding area. • 1965 – No significant changes were observed on site. Residential properties to the south were observed to be demolished.

Title	Details
	• 1970 - No significant changes were observed on site. Industrial properties were observed to the south with commercial/residential buildings observed to the west. • 1982 - No significant changes were observed on site. Previous structures to the west of site had been demolished and replaced by a car park and park. Buildings to the north had been demolished and replaced with two high-rise commercial/residential buildings. • 1991 - No significant changes were observed on site. No significant changes were observed in the surrounding area. • 2001 - No significant changes were observed on site. A cark park to the northwest has been replaced by a park. Commercial/residential development has occurred to the south of site • 2009 - No significant changes were observed on site. No significant changes were observed in the surrounding area. • 2016 – A covered area is now visible in the southwest corner of the parking lot on the site. No significant changes were observed in the surrounding area.
Summary of Historical Site Photos (where available):	No information provided. Information requested.
Description of Manufacturing / Industrial Processes and Location:	No information provided. Information requested.
Inventory of Chemicals and Wastes and their Location:	No information provided. Information requested.
Product Spill and Loss History:	No information provided. Information requested.
Discharges to Land, Air & Water:	No information provided. Information requested.
Complaint History:	No information provided. Information requested.
Sewer & Service Plans:	Section 5.5 of CES (2018) states Dial Before You Dig and utility mapping plans were presented in Appendix D and E respectively.
Local Site Knowledge:	No information provided. Information requested.
Local Literature Review:	No information provided. Information requested.
Permits, Licenses and Approvals:	No information provided. Information requested.
Other Relevant Information:	Section 5.6 of CES 2018 provided a summary of surrounding property land uses over time. It was stated this indicated that the site had been situated within a highly industrialised and commercialized area.

Table E: Subsurface Conditions

Title	Details
Geology Map Conditions	Section 2.5 in JBS&G (2018a) states based upon review of the 1:250 000 scale Sydney Geological Map identified the site is located in an area of Triassic Bringelly Shale, Minchinbury Sandstone and Ashfield Shale, part of the Wianamatta Group comprising Shale with some Sandstone beds.
Soil Map Conditions	Section 2.5 in JBS&G (2018a) states with reference to the ESPADE 2.0 tool the site is underlain by residual Tuggerah soils. These soil typical consist of gently undulating to rolling coastal dunefields. Limitations of soils of the Tuggerah group include extreme wind erosion hazard, non cohesive, highly permeable with very low fertility, localised flooding and permanently high water tables.

Title	Details
Acid Sulfate Soils:	Section 2.7 in JBS&G (2018a) states review of *Acid Sulphate Soil Risk Map – Botany Bay, Edition 2, 1997* indicates the site resides with an area of no known occurrence of Acid sulfate soils. Section 4.10 in CES (2018) states the 1:5000 acid sulfate soil map from City of Sydney LEP shows the site to be upon Class 5 land in a low probability risk zone.
Salinity:	Within the lot search report provided in Appendix A of CES 2018 indicated no information for dryland salinity was available for the site.
Soil Classification Method:	Not provided but it is considered to be likely to be based AS1726, USCS.
Ground Conditions Summary from boreholes records:	Appendix C in JBS&G (2018a) indicated: • Fill material encountered at all locations between 0.8 to 2.0mbgL • Fill was described as brown silty clay/sand with inclusion of gravel, glass, ceramics and brick. • Inclusions of ash, slag and coal were noted at BH101, BH102, BH103, BH104, BH105 • Natural materials underlying the fill material were either brown/red/grey silty sand or silty clay
Location of Fill Materials:	Section 2.7 in JBS&G (2018a) states fill materials were encountered in all locations at the site ranging from between 0.2 to 1.6 mbgl. All borehole reports are consistent with this statement.
Regional Hydrogeology:	Section 2.7 in JBS&G (2018a) states the site is identified to be located on Botany Sands Aquifer Management Area 2, where extraction of groundwater is prohibited for human consumption, consumption by animals, domestic purposes and any other purpose. The Botany Sand Beds Aquifer is reported as often less than 1-2 metres below the natural ground surface in low-lying areas, with the level varying in relation to rainfall and evaporation.
Summary of Monitoring Wells:	Appendix F in JBS&G (2018a) indicated: BH1- Screen ~3-10 mbgl within natural silty clay BH3 - Screen ~3-5.5 mbgl within natural silty sand/clay lithology BH4 – Screen ~3.5-7 mbgl within natural silty sand/clay lithology Appendix C in JBS&G (2018a) indicated: • BH106/MW02 – Screen 3-6 mbgl within natural silty sand/clay lithology • BH107/MW01 – Screen 3-6 mbgl within natural silty sand/clay lithology
Depth to Groundwater:	Section 3.4 in JBS&G (2018a) states a complex groundwater flow regime has been identified at the site with SWLs in wells ranging between 1.3 and 7.9mbgl.
Direction and Rate of Groundwater Flow:	Section 3.4 and 6.2.2 in JBS&G (2018a) provide consideration that groundwater is inferred to flow in a southerly direction.
Use of Water Abstraction:	Although not reported, CES (2018) includes a report that identified 52 groundwater monitoring wells installed within 1km of the site. One was listed for recreational use, and one did not have a purpose listed. The remaining were listed as being for monitoring purposes with water depths reported between 2.18 and 4m below ground level. Section 3.4 in JBS&G (2018a) states the site is identified to be located on Botany Sands Aquifer management Area 2 where extraction of groundwater for beneficial uses is prohibited.
Nearest Water Body:	Section 2.6 in JBS&G (2018a) states the nearest surface water body is Shea's Creek located approximately 1.4km to the southwest.
Direction of Surface Water Run Off:	Section 2.6 in JBS&G (2018a) states the site footprint comprises sealed asphalt hardstand and building footprints hence surface water is

Title	Details
	anticipated to migrate form via the onsite stormwater catchment infrastructure.
Background Water Quality:	Section 10.1.2 in JBS&G (2018a) states elevated concentrations of metals are considered to be reflective of regional conditions typical of an urban/industrial environment.
Preferential Water Courses:	Section 2.6 in JBS&G (2018a) states as the site consists of asphalt/hardstand generated surface is anticipated to enter the municipal stormwater system.
Summary of Local Meteorology:	Section 2.6 in JBS&G (2018a) states a review of climate data for the nearest BOM monitoring location revealed the following: • Average minimum temperatures vary from 8.1 ºC in July to 18.8 ºC in January and February; • Average maximum temperatures vary from 16.4 ºC in July to 26.0 ºC in January; • The average annual rainfall is approximately 1215.7 mm, with rainfall greater than 1 mm occurring on an average of 99.9 days per year; and • Monthly rainfall varies from 67.9 mm in September to 133.2 mm in June with the wettest periods occurring on average in January to June.

Table F: Summary of Works Completed

Date	Report Objectives, Scope and Outcomes
CES 29 March 2018 Preliminary Site Investigation Report 9-11 Gibbons Street, Redfern Ref (CES180204-SGC-AD)	The objectives of the investigation were to • Establish site conditions with respect to soils and groundwater • Confirm site suitability for the proposed high-density residential development • Provide a preliminary waste classification for site soils Works completed at the site consisted of: • Desktop study • Site inspection • Completion of a GPR survey for the site • Drilling 11 soil bores and installing three groundwater monitoring wells • Collecting soil and groundwater samples for laboratory analysis • Preparation of a PSI report In summary the works identified a history of commercial/industrial land use since 1943 to the present day. The site walkover identified a potential for hazardous building materials and chemical storage onsite. Anecdotal evidence suggested USTs were present in the southern building on site with the GPR survey also identifying two anomalies in the northern portion of the carpark. Results of intrusive assessment indicated exceedances of human health and ecological criteria in fill material (PAHs, TRH and Heavy metals) and natural soils (heavy metals). Groundwater exceedances were identified for PAH and heavy metals. Preliminary waste classification resulted in Hazardous and restricted solid waste for portions of the site. The investigation identified the following sources of contamination relevant to the site: • Hazardous building materials • Uncontrolled fill • USTs • On site activities • Off site sources

Date	Report Objectives, Scope and Outcomes
	Further assessment of the identified areas of environmental concern was recommended this included the lateral and vertical extent of impacted soils, further sampling for waste classification, hazardous material assessment, confirmation of the presence/absence of USTs and groundwater assessment to determine flow directions.
JBS&G 28 June 2018 Data Gap Investigation, 9-11 Gibbons Street Redfern NSW Ref (54877/115498)	The objective of the investigation was to undertake further investigations to address data gaps at the site, to enable conclusions to be drawn regarding the suitability of the land for future land uses, or make recommendations to enable such conclusions. As such, JBS&G identified the following data gaps: • Fill material classification • Potential presence of Underground storage tanks • Sub slab Vapour Intrusion Risk • Groundwater characterisation The following works were completed: • Preparation of an SAQP and development of the conceptual site model • Intrusive field sampling of soil (6 locations), groundwater (2 locations) and sub slab soil vapour (10 locations) with subsequent laboratory analysis • Evaluation of results against site specific health and ecological assessment criteria and documentation in an assessment report JBS&G's key findings included: • Hazardous materials assessment identified asbestos, lead paint, ozone depleting substances and synthetic mineral fibres within site structures. • Potential Fuel infrastructure in the northern portion of the site requires management/removal • CES 2018 finding were confirmed which included elevated concentration of PAHs, TRH and heavy metals above adopted health-based investigation thresholds. The sources of hydrocarbon impact were attributed to ash/metalliferous slag as opposed to a hydrocarbon source. • Reported concentration of PAHs, TRH and heavy metals above adopted ecological based investigation thresholds indicate site won fill material are not considered suitable for utilisation as growing medium • Groundwater conditions were considered indicative of typical inner Sydney industrial areas with elevated heavy metals identified in groundwater passing through the site. Hydrocarbon and VOC concentrations below adopted criteria were also identified in inferred up gradient location. No offsite migration issues were identified from groundwater at the site. • Assessment of potential soil vapour conditions identified the absence of unacceptable volatile contaminant risks associated with the site. • Subject to interim retention of existing site pavements JBS&G considered there to be no aesthetic concerns. • Fill material has provisionally been classified as GSW with underlying natural material VENM apart from the hotspot at surrounding BH11 which has been classified as hazardous waste on the basis of arsenic concentration. • Future management/remediation will need to address fuel infrastructure and anthropogenic inclusions within fill materials in the absence of pavements

CES (2018) and JBS&G (2018a) identified the following potentially contaminating activities and contaminants of concern associated with past and present activities across the site.

Table G: Summary of Potentially Contaminating Activities

Area	Activity	Potential Contaminants
Entire Site	Uncontrolled Filling	heavy metals (M8), total recoverable hydrocarbons (TRH), poly aromatic hydrocarbons (PAH), mono aromatic hydrocarbons (BTEXN), organochlorine pesticides (OCP), phenol, polychlorinated biphenyls (PCB) and asbestos
Northern portion – potentially 2 USTs Southern Portion – potentially 1 UST	USTs and associated infrastructure	Lead, TRH, BTEX, PAH
Arsenic Impacted Soils BH11	Unknown	Arsenic

The consultant has considered the contaminants of potential concern (COPC) in the following media:

- Soil
- Soil Vapour
- Groundwater

Table H: Sampling and Analysis Plan

Sampling Item	EPA Guidelines	Consultant Consideration	Auditor Comments
Data Quality Objectives (DQOs)	"Data Quality Objectives: Outline of the DQO Process" in Schedule B2 of NEPM (2013).	The 7 step DQOs for **investigation**, as summarised in Section 6 by JBS&G (2018), are as follows: • Step 1: Additional investigations are required to determine the severity and extent of contamination identified during the PSI to inform the remedial strategy for the site. • Step 2: Decisions are: Are there any unacceptable risks to likely future onsite receptors, issues with background \, chemical mixtures or aesthetics ?; is contamination migrating from site is a site management strategy required ? • Step 3: Inputs are development plans; laboratory data; field observations / measurements; existing data; QA/QC data; assessment criteria;. • Step 4: Boundaries are site; vertical depth 6mbgl; project duration;. • Step 5: Decision rules are meeting NEPM (2013) criteria; and answering question identified in step 2. • Step 6: Decision error limits based on AS4482.1-1995 for number of samples to make a decision • Step 7: Design for optimising data collection by addressing identified	The DQOs for **investigation** works to be appropriate

Sampling Item	EPA Guidelines	Consultant Consideration	Auditor Comments
		data and following internal sampling procedures.	
Sampling Pattern Rationale	The EPA (1995) Sampling Design Guidelines (Section 2.3) provides details on judgmental, random, systematic and stratified sampling pattern.	Section 6.1.7 in JBS&G (2018a) stated the sampling design was developed to supplement the existing data set to address the required decisions. This generated a targeted sampling pattern.	The sampling pattern to be appropriate.
Sampling Density Rationale:	EPA (1995) Sampling Design Guidelines	Section 6.1.7 in JBS&G (2018a) stated the following were advanced based upon AECs including: • AEC1 – BH6, BH10, and BH11 elevated heavy metals, TRH/BTEX in fill – 3 targeted locations • AEC2 – assessment of fill soils around potential USTs – 2 locations • AEC3 – soil vapour – 10 locations • AEC4 – downgradient impacts associated with USTs - 2 locations	The sampling density rational is considered to be appropriate
Locations Shown on Site Plan:	The OEH (2011) Guidelines for Consultants reporting on Contaminated Sites requires that sampling locations are shown on a site plan.	The locations are shown on Consultant Figures in Appendix A.	This requirement to have been met.
Sampling Depths	The OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites requires information on the depths of samples that were collected. NEPM (2013) Schedule B2.	Section 6.2.1 in JBS&G (2018a) stated soil samples were collected from soil surface or immediately underlying hardstand pavement, then approximately 0.5m intervals to a max depth of 4.6 mbgl. Sampling density was increased to where significantly different soil stratigraphy was encountered.	The sampling depths to be appropriate.
Selection of Samples for Analysis:	The OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites. NEPM (2013) Schedule B2	Table 6.3 in JBS&G (2018a) stated the analytical schedule for the different environmental media to be sampled.	The selection of samples for analysis was appropriate.

Sampling Item	EPA Guidelines	Consultant Consideration	Auditor Comments
Sample Splitting Techniques and Statement of QA/QC Sample Frequencies	NEPM (2013) Schedule B3 EPA (2017) Guidelines for the NSW Site Auditor Scheme OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites	Section 6.2.1 in JBS&G (2018a) stated soil samples were divided laterally into three samples with minimal disturbance to reduce the potential for loss of volatiles and placed in three clean glass jars and sample bags as appropriate. Soil samples were not homogenised in order to minimise the loss of volatiles. The collected groundwater samples were extracted from the groundwater wells after purging and the primary, blind duplicate and split duplicate sample containers were filled consecutively, one quarter at a time. Groundwater samples were not homogenised in order to minimise the loss of volatiles. Section 6.2.7 in JBS&G (2018a) stated field duplicates and triplicate soil samples were analysed at a rate of 1 per 20 samples. A single trip spike and trip blank accompanied each batch.	The sample splitting techniques were appropriate. The QA/QC sampling frequencies for the investigations generally comply with NEPM (2013) requirements. The Auditor considers this to be acceptable.
Analytical Methods:	EPA (2017) Guidelines for the NSW Site Auditor Scheme	Section 6.2.1 in JBS&G (2018a) stated Eurofins was used as the primary lab with Envirolab the secondary. Both laboratories were NATA accredited for the required analyses.	The analytical methods are appropriate.
Sample Container Selection:	NEPM (2013) Schedule B2 and B3	Section 6.2.1 in JBS&G (2018a) stated samples were immediately transferred into laboratory supplied sample jars and bags.	The sample container selection is appropriate.
Sampling Devices / Techniques	NEPM (2013) Schedule B2 and B3 DEC (2007) Groundwater Guidelines	Section 6.2.1 in JBS&G (2018a) stated soil sampling was generally completed via using push tubes. Soil samples were collected directly from pushtubes using dedicated nitrile gloves and immediate transfer into laboratory supplied sample jars and bags.	The sampling devices / techniques adopted are considered to be appropriate.
Decontamination Procedures:	Australian Standard AS4482.1 – 2005 NEPM (2013) Schedule B2 and B3	Section 6.2.5 in JBS&G (2018a) stated Fresh liners were used at each location advanced via push tube. Push tube sleeves were removed from the advancement casing and laid on the concrete hardstand for inspection, soil samples were collected directly from the push tube sleeve. A new pair of disposable nitrile gloves were used to collect each sample. Soil vapour and groundwater samples were collected using dedicated disposable sampling equipment which was disposed of after use.	The decontamination procedures are appropriate.
Sample Handling and Preservation Procedures:	NEPM (2013) Schedule B3 AS4482.1 and AS 4482.2	Section 6.2.1 in JBS&G (2018a) stated upon sample collection sample containers were transferred to a chilled	The procedures are appropriate.

Sampling Item	EPA Guidelines	Consultant Consideration	Auditor Comments
		Esky for preservation prior to shipment to the laboratory Section 6.2.3 in JBS&G (2018a) stated groundwater samples were filtered where necessary prior to transfer into sample bottles for placement in a chilled esky for preservation.	
Field Calibration and Screening Protocols	NEPM (2013) B2	Section 6.2.1 in JBS&G (2018a) stated a calibrated PID was used to screen for VOCs within the sampled material. Calibration records are provided in Appendix D.	The field calibration and screening protocols are considered to be appropriate.
Groundwater Monitoring Well Installation	NEPM (2013) Schedule B2 DEC (2007)	Section 6.2.2 in JBS&G (2018a) stated two boreholes were converted into monitoring wells in inferred downgradient locations on the site. Monitoring wells were constructed to a depth of 6mbgl targeting groundwater perching on top of the silty clays. The wells were constructed with 50mm PVC screen and casing, with the screen installed within the level of water strike. 2mm sand was placed in the annulus with a bentonite seal placed above the screened zone. The wells were finished at the surface with a gatic cover flush with ground surface.	The method of construction is considered to be appropriate for the COPC.
Groundwater Monitoring Well Development & Sampling	NEPM (2013) Schedule B2 DEC (2007)	Section 6.2.2 in JBS&G (2018a) stated after installation monitoring wells were developed to clear excess silt and sediment. Section 6.2.3 in JBS&G (2018a) stated immediately prior to sampling an interface probe was used to gauge wells, if LNAPL observed a bailer was used to collect sample in the absence of LNAPL the well was purged with low flow peristaltic pump using fresh tubing. Water quality parameters were measured until stabilization prior to sampling.	The Auditor considers the well development and sampling to be appropriate for the COPC.

Table E. SAQP and QA/QC Summary for Soil Vapour Sampling

Requirement	Guideline	Consultant Information	Auditor Comment
Location and number of sampling points	Section 9.4.1 NEPM B2 (2013)	Section 6.2.2 in JBS&G (2018a) stated ten soil vapour probes were installed on a generally systematic grid, skewed toward identified AEC's.	Generally considered appropriate to determine the potential vapour risk.
Depth of sampling point	Section 9.4.1 NEPM B2 (2013)	Section 6.2.4 in JBS&G (2018a) stated soil vapour probes were installed directly beneath the concrete slab at approximately 300-600mm depth.	It is noted no borehole logs were provided.

Requirement	Guideline	Consultant Information	Auditor Comment
Frequency of sampling	Section 9.4.1 NEPM B2 (2013) CRC Care Technical Report 13 (2009)	Section 6.2.4 in JBS&G (2018a) stated soil vapour sampling was conducted immediately post installation. A single round of soil vapour monitoring was conducted	**What were the metrological conditions during SV sampling**?
Sampling installation method	Section 9.4.2.2 NEPM B2 (2013)	Section 6.2.4 in JBS&G (2018a) stated soil vapour probes were installed via the following process: • Puncture of surface hardstand (concrete or asphaltic pavement) via rotary hammer drill, with a 20mm drill bit, through to the underlying soils; • 'Flossing' of the drill hole to remove excess concrete dust and/or soil; • Installation of a 300-600 mm nylon tube, fitted with steel mesh filter on the bottom and closed three-way on the accessible end, into the drill hole; • Sealing of the drill hole via application of air-drying clay covered by a concrete/bentonite slurry; • At the completion of the sampling, all soil vapour probes were removed and reinstated with concrete consistent with the surrounds.	Considered to be appropriate .
Sampling method	Section 9.5.1 & 9.5.2 NEPM B2 (2013)	Section 6.2.4 in JBS&G (2018a) stated soil vapour probes were sampled via the following process: • Purging of the drill hole via pumping through a calibrated GFM430 multi-gas detector during which concentrations of oxygen (O2), VOCs and carbon dioxide (CO2) were monitored until stabilization was interpreted to have occurred; • Once multi-gas detector parameters stabilised, application of a 'shroud' comprising an airtight container lined with isopropyl alcohol doused material to the base of the nylon tube, where sealed in place with the bentonite slurry; • Where VOC concentrations were significantly altered from the stabilised/purged concentration, this indicated a potential leak was present and isopropyl alcohol vapour was intruding into the nylon tube, the soil vapour probe was removed and reinstalled and the leak detection test was repeated. It is noted that in the event that significant (>1000 ppm) VOC concentrations exist with sub-slab soil vapour, the application of the isopropyl alcohol doused rag is not an effective quality control measure; • Based on the reported field purging data and with consideration to the inferred fuel infrastructure locations, five selected soil vapour probes were sampled. A 6.0 L sample of soil vapour was removed from the sub-slab vapour probe using a calibrated low flow air pump over a period of 60 minutes; • A glass tube containing carbon sorbent media was fixed to the end of the nylon tubing with a small section of ¼ inch silicon tubing, and the	Considered to be appropriate

Requirement	Guideline	Consultant Information	Auditor Comment
		low flow air pump was attached to the rear end of the carbon tube, such that the 6.0 L sample of soil vapour was drawn through the tube facilitating attachment of VOCs to the sorbent carbon media; • Subsequent to the 6.0 L soil vapour sample being drawn through the carbon tube, the tube was removed from the sub-slap soil vapour probe and sealed via application of two end caps, then stored for transportation to the laboratory; and	
Probe integrity / seal	Section 9.4.2.4 NEPM B2 (2013)	Section 6.2.4 in JBS&G (2018a) stated the following: • Sealing of the drill hole via application of air-drying clay covered by a concrete/bentonite slurry; • A shroud flooded with isopropyl alcohol was placed over the base of the nylon tube connected to the sampling measured using a calibrated instrument.	Considered to be appropriate
Tubing type	Section 9.4.2.4 NEPM B2 (2013)	Section 6.2.4 in JBS&G (2018a) stated Nylon tubing was used.	Considered to be appropriate
Sample volume and duration	Section 9.4.2.4 NEPM B2 (2013)	Section 6.2.4 in JBS&G (2018a) stated a 6.0 L sample of soil vapour was removed from the sub-slab vapour probe using a calibrated low flow air pump over a period of 60 minutes.	Considered to be appropriate
Purge method and biodegradation monitoring	CRC Care Technical Report 13 (2009)	Section 6.2.4 in JBS&G (2018a) stated purging of the drill hole via pumping through a calibrated GFM430 multi-gas detector during which concentrations of oxygen (O2), VOCs and carbon dioxide (CO2) were monitored until stabilization was interpreted to have occurred;	Considered to be appropriate
Purge volume	Section 9.4.2.4 NEPM B2 (2013)	Not provided	**Please provide further information regarding purge volume and associated flow rates.**
Sampling team	Section 19.10 NEPM B2 (2013)	Section 8.1 of JBS&G 2018a stated sampling was conducted by two staff members using standard operating procedures.	Considered to be appropriate
Decontamination procedures	Section 19.10 NEPM B2 (2013)	Section 6.2.5 of JBS&G (2018a) stated Soil vapour and groundwater samples were collected using	Considered to be appropriate

Requirement	Guideline	Consultant Information	Auditor Comment
		dedicated disposable sampling equipment which was disposed of after use.	
Chain of custody	Section 19.10 NEPM B2 (2013)	Signed chain of custody provided in Appendix H of JBS&G (2018a).	Considered to be appropriate
Sample splitting	Section 19.10 NEPM B2 (2013)	Section 6.2.6 of JBS&G (2018a) stated the collected soil vapour samples were extracted from soil vapour probes after purging. The soil vapour probe at location SV06 was left for a period of 1 hour after the primary soil vapour sample was extracted to allow for pressure equalization and then subsequently resampled to collect a blind duplicate. A split duplicate was not collected for soil vapour samples due to the inconsistency of analytical laboratory methods.	Considered to be appropriate
Duplicate frequency	Section 19.10 NEPM B2 (2013)	Section 6.2.6 of JBS&G (2018a) stated an intralab duplicate was analyzed	Acceptable noting limited sample size
Field blank	Section 19.10 NEPM B2 (2013)	Section 6.2.6 of JBS&G (2018a) stated an equipment and field blank were prepared for soil vapour sampling with corresponding analysis all below reporting limits.	Considered to be appropriate
Background samples	Section 19.10 NEPM B2 (2013)	Not conducted	Not applicable as no background samples were obtained.
Field instruments	Section 19.10 NEPM B2 (2013)	Landfill Gas Meter (1 x cal) Low flow air pump	Generally considered appropriate
Holding times	Section 19.10 NEPM B2 (2013)	Section 8.1 and Appendix E of JBS&G (2018a) stated samples were extracted and analyzed within holding times.	Considered to be appropriate
Lab and method accreditation	Section 19.10 NEPM B2 (2013)	Eurofins Air Toxics (Melbourne) – NATA 1254 & 14271	Considered to be appropriate
Detection limit	Section 19.10 NEPM B2 (2013)	Section 8.1 of JBS&G (2018a) stated limits of reporting were consistent and appropriate.	Considered to be appropriate
Data completeness	Section 19.10 NEPM B2 (2013)	Section 8.1 of JBS&G (2018a) stated all COCs were completed appropriately. QC results are considered acceptable and data from critical samples is considered valid.	Field notes for soil vapour sampling not included
Data comparability	Section 19.10 NEPM B2 (2013)	Section 8.1 of JBS&G (2018a) stated sampling was conducted by a team of two staff members using standard operating procedures in the same conditions throughout the works.	Considered to be appropriate
Data representativeness	Section 19.10 NEPM B2 (2013)	Section 8.1 of JBS&G (2018a) stated all sampling was conducted using standard procedures with	Considered to be appropriate

Requirement	Guideline	Consultant Information	Auditor Comment
		analysis extracted and conducted within holding times.	
Precision and accuracy D: %RPD MS: 70-130%R S: 50-150%R LCS: 70-130%R MB: <LOR	Section 19.10 NEPM B2 (2013)	D: 0%RPD S: 86-137%R LCS: 78-126%R MB: <LOR	Considered to be appropriate