TAFE NSW

Preliminary Site Investigation

TAFE NSW Construction Centre of Excellence
2-44 O'Connell Street, Kingswood, NSW

5 February 2021

59831/134229 (Rev 1)

JBS&G Australia Pty Ltd

www.jbsg.com.au

TAFE NSW
Preliminary Site Investigation

TAFE NSW Construction Centre of Excellence
2-44 O'Connell Street, Kingswood, NSW

5 February 2021

59831/134229 (Rev 1)
JBS&G Australia Pty Ltd

Table of Contents

List of Tables

List of Figures

Tables

Appendices

Abbreviations

Term	Definition
ACM	Asbestos Containing Materials
AF/FA	Asbestos fines and friable asbestos
AEC	Areas of Environmental Concern
AHD	Australian Height Datum
ASRIS	Australian Soil Resource Information System
ASS	Acid Sulfate Soils
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CLM Act	NSW Contaminated Land Management Act 1997
COC	Chain of Custody
COPC	Contaminants of Potential Concern
CSM	Conceptual Site Model
DBYD	Dial Before You Dig
DP	Deposited Plan
DQI	Data Quality Indicators
DQO	Data Quality Objectives
DSI	Detailed Site Investigation
EIL	Ecological Investigation Levels
EPA	NSW Environment Protection Authority
ESA	Environmental Site Assessment
ESLs	Ecological Screening Levels
GFA	Gross floor area
ha	Hectare
HILs	Health Investigation Levels
HSLs	Health Screening Levels
JBS&G	JBS&G Australia Pty Ltd
JRA	Job Risk Assessment
LEP	Local Environment Plan
LOR	Limit of Reporting
NATA	National Accreditation Testing Authority
OCP	Organochlorine Pesticides
OPP	Organophosphorous Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PID	Photoionisation Detector
POEO Act	NSW Protection of the Environment Operations Act 1997
PSI	Preliminary Site Investigation
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percentage Difference
SAQP	Sampling Analytical and Quality Plan
SWMS	Safe Work Method Statement
TAFE CCoE	TAFE NSW Construction Centre of Excellence
TRH	Total Recoverable Hydrocarbons
UCL	Upper Confidence Limit
VOC	Volatile Organic Compounds

Executive Summary

JBS&G Australia Pty Ltd (JBS&G) was engaged by TAFE NSW (TAFE, the client) to undertake a Preliminary Site Investigation (PSI) to support the State Significant Development Application (SSDA) SSD_ 8571481 relating to the development of an educational facility at the TAFE Nepean Kingswood Campus (the TAFE Kingswood Campus) located at 2 – 44 O'Connell Street, Kingswood NSW. The TAFE Kingswood Campus comprises a rectangular lot with an area of approximately 23 hectares. This PSI was undertaken within an L-shaped portion of the TAFE Kingswood Campus (herein referred to as 'the site') comprising an area of 9 hectares where the proposed built form and access roads will be located. . The site is legally identified as part Lot 1 in Deposited Plan (DP) 866081. The site location and site layout are shown in **Figure 1** and **Figure 2**, respectively.

The purpose of this report is to undertake a preliminary assessment of the potential for contamination based on current and historical site activities and to draw conclusions regarding the potential contamination status of the site to support the SSDA, as per the requirements of State Environmental Planning Policy 55 – Remediation of Land (SEPP 55).

Specifically, the SSDA seeks development consent for the construction and operation of the TAFE NSW Construction Centre of Excellence (TAFE CCoE) a multi-level, integrated educational facility designed to accommodate specialised training and education for construction-related TAFE NSW courses (the project). The TAFE CCoE will be a new learning environment with an emphasis on flexibility and adaptability, to encourage cross-disciplinary collaboration, industry engagement and educational excellence. On 27 February 2019, the NSW Government announced the delivery and associated funding for the CCoE.

The proposed development is classified as State Significant Development (SSD) on the basis that it falls within the requirements of clause 4, Schedule 19 of the State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP), being 'development for the purpose of a tertiary institution… that has a capital investment value of more than $30 million'.

The Minister for Planning, or their delegate, is the consent authority for the SSDA and this application is lodged with the NSW Department of Planning, Industry and Environment (NSW DPIE) for assessment.

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) issued for the project. Specifically, this report has been prepared to respond to item 13 'Contamination' to assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable for the proposed use in accordance with SEPP 55.

The PSI documented herein has been prepared in general accordance with guidelines made or approved by the NSW Environment Protection Authority (EPA) and DUAP/EPA (1998) Planning Guidelines for SEPP 55.

A concurrent geotechnical investigation was undertaken by JBS&G's geotechnical specialist subconsultant, Pells Sullivan Meynink (PSM), with a standalone report issued for those investigations.

The objectives of the investigation were to complete a preliminary assessment of the potential for contamination based on current and historical site activities and to draw conclusions regarding the potential contamination status of the site to support the SSDA, as per the requirements of SEPP 55.

The scope of works for the assessment included: a review of available site history and background information to identify potential areas of environmental concern (AECs) and associated contaminants of potential concern (COPC); review of the environmental setting including topography, geology and hydrogeology of the site and surrounding areas; a detailed site inspection

to identify potential AECs and confirm desktop findings; a limited soil investigation at 10 locations across the site and groundwater investigation at one groundwater monitoring well; development and documentation of a conceptual site model (CSM) based on the available information; and preparation of this PSI report in general accordance with relevant EPA made or endorsed guidelines.

Based on the engaged scope of work and subject to the limitations in **Section 11**, the following summarises the findings and conclusions of the assessment:

- The site history review identified that the site was historically used for rural residential and agricultural use including livestock grazing and market gardening prior to development as the TAFE Kingswood Campus with no significantly contaminating historical land uses identified.
- A search of the NSW EPA contaminated land register and NSW contaminated sites notified to the EPA did not identify any notices relating to the site, or any potential for migration of contamination to the site from adjacent properties.
- Based on review acid sulfate soil risk mapping, local topography and site observations, no further consideration of requirements in relation to assessment and/or management of ASS is necessary with regard to the proposed development.
- Concentrations of COPCs were not identified at levels posing an unacceptable risk to human/ecological receptors relating to the proposed development of the site.
- Brick and concrete fragments observed within surface soil to the south of Block P, to the north and east of Building D, and adjacent to the drainage line in the northern portion of the site which could pose an aesthetic issue if exposed.
- Based on the conditions encountered during the soil investigation and the lack of significant COPC concentrations in soil samples, and findings of the preliminary groundwater assessment, COPC migration to groundwater or off-site migration of contamination via surface water/groundwater is considered to be low.
- The risk from contamination at the site is low. However, fill is present at the site, and given the limited nature of intrusive investigations, implementation of an appropriate unexpected finds protocol for future development works would enable management of any unidentified contamination, if encountered.

Typical site management controls including protocols to manage unexpected finds should be implemented during any ground disturbance works associated with future site development.

1. Introduction

1.1 Background

JBS&G Australia Pty Ltd (JBS&G) was engaged by TAFE NSW (TAFE, the client) to undertake a Preliminary Site Investigation (PSI) to support the State Significant Development Application (SSDA) SSD_ 8571481 relating to the development of an educational facility at the TAFE Nepean Kingswood Campus (the TAFE Kingswood Campus) located at 2 – 44 O'Connell Street, Kingswood NSW. The TAFE Kingswood Campus comprises a rectangular lot with an area of approximately 23 hectares (ha). This PSI was limited to the extent of proposed development activities comprising an L- shaped portion of the TAFE Kingswood Campus (herein referred to as 'the site'). The site is legally identified as part Lot 1 in Deposited Plan (DP) 866081 and covers an area size of approximately 9.5 ha. The site location and site layout are shown in **Figure 1** and **Figure 2**, respectively.

The purpose of this report is to undertake a preliminary assessment of the potential for contamination based on current and historical site activities and to draw conclusions regarding the potential contamination status of the site to support the SSDA, as per the requirements of State Environmental Planning Policy 55 – Remediation of Land (SEPP 55).

Specifically, the SSDA seeks development consent for the construction and operation of the TAFE NSW Construction Centre of Excellence (TAFE CCoE) a multi-level, integrated educational facility designed to accommodate specialised training and education for construction-related TAFE NSW courses (the project). The TAFE CCoE will be a new learning environment with an emphasis on flexibility and adaptability, to encourage cross-disciplinary collaboration, industry engagement and educational excellence. On 27 February 2019, the NSW Government announced the delivery and associated funding for the CCoE.

The proposed development is classified as State Significant Development (SSD) on the basis that it falls within the requirements of clause 4, Schedule 19 of the State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP), being 'development for the purpose of a tertiary institution… that has a capital investment value of more than $30 million'.

The Minister for Planning, or their delegate, is the consent authority for the SSDA and this application is lodged with the NSW Department of Planning, Industry and Environment (NSW DPIE) for assessment.

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) issued for the project. Specifically, this report has been prepared to respond to item 13 'Contamination' to assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable for the proposed use in accordance with SEPP 55.

The PSI documented herein has been prepared in general accordance with guidelines made or approved by the NSW Environment Protection Authority (EPA) and DUAP/EPA (1998) Planning Guidelines for SEPP 55.

A concurrent geotechnical investigation was undertaken by JBS&G's geotechnical specialist subconsultant, Pells Sullivan Meynink (PSM), with a standalone report issued for those investigations.

1.2 Proposed Development

The proposed building of TAFE CCoE is to be constructed within the northeastern portion of the site, whilst the remainder of the site is proposed to be developed as vehicle access and parking. It is understood that the existing campus buildings within the site will be retained. The proposed development works will include:

- Site preparation works including tree removal and excavation;
- Construction of a 2-3 storey Construction Hub accommodating approximately 9,200m² of gross floor area (GFA). The building will include learning and workshop spaces, workspaces and areas for industry engagement;
- Provision of additional car parking; and
- Landscaping works.

The proposed development plans provided by the client are included as **Appendix A**.

1.3 Objectives

The objectives of the investigation are to complete a preliminary assessment of the potential for contamination based on current and historical site activities and to draw conclusions regarding the potential contamination status of the site to support the SSDA, as per the requirements of SEPP 55.

1.4 Scope of Work

To achieve the objectives of the investigation, the following scope of works was conducted:

- A review of available site history and background information to identify potential areas of environmental concern (AECs) and associated contaminants of potential concern (COPC), including:
  - Section 10.7 (2) & (5) certificates and other publicly available information obtained from council;
  - Records of stored dangerous goods held by SafeWork NSW;
  - Historical land title records;
  - Historical aerial photographs obtained from the NSW Spatial Services;
  - Publicly available EPA records held by NSW EPA, where readily available;
  - Publicly available heritage records held by NSW Heritage, and Australian Heritage database, where readily available; and
  - Licensed groundwater bores present within a 500 m radius of the site available online from Water NSW;
- Review of the environmental setting including topography, geology and hydrogeology of the site and surrounding areas;
- A detailed site inspection to identify potential AECs and confirm desktop findings;
- Limited soil investigation at 10 locations across the site and groundwater investigation at one groundwater monitoring well;
- Development and documentation of a conceptual site model (CSM) based on the available information; and
- Preparation of this PSI report in general accordance with relevant EPA made or endorsed guidelines.

2. Site Condition and Surrounding Environment

2.1 Site Identification

The site location is shown on **Figure 1** and the site layout is shown on **Figure 2**. The site details are summarised in **Table 2.1** and described in detail in the following sections.

Table 2.1: Summary Site Details

Lot/DP	Part Lot 1 in DP 866081
Address	2-44 O'Connell Street, Kingswood, NSW
Local Government Authority	Penrith City Council
MGA Coordinates (GDA94 MGA 56)	E: 290620 N: 6261420 (approximate centre of the site)
Site Zoning	Zone SP2 Infrastructure (Penrith Local Environmental Plan 2010)
Current Use	Agricultural/ rural residential and tertiary education establishment
Previous Use	Tertiary education establishment
Proposed Use	Tertiary education establishment
Site Area	9.5 ha

2.2 Site Description

A detailed site inspection was completed by one of JBS&G's qualified and experienced field scientists on 17 November 2020. Relevant site observations are discussed below, and a photographic log is included in **Appendix B**. The site layout is shown in **Figure 2**.

The site comprised an L-shaped parcel of land located within the broader TAFE Kingswood Campus, bound by Great Western Highway to the north, O'Connell Street to the west, vacant rural property to the south and Western Sydney University (WSU) Werrington Campus to the east.

The southern extent of the site comprised various campus buildings, carparks, landscaped areas and associated access roads whilst the northern extent remained grassed and undeveloped. The broader TAFE Kingswood Campus was fenced from the northern, western and southern boundaries and was freely accessible from the WSU Werrington Campus located to the east. The site was accessed via a secured gate from O'Connell Street.

Seven buildings were present on site, of which Buildings B, C, E, N, T and P were used for educational purposes, whilst Building D was used by campus administration/security for office and storage purposes. The building identifiers are shown on the proposed development plans provided in **Appendix A**. Five distinct asphalt paved carpark areas were located on site in the eastern section west of Building B, between Buildings C and E, west of Building D, south of Building N and west of Buildings P and T. The pavement was observed to be in good condition with minor cracking observed.

A stockpile containing mulch was observed in the southern portion of the site adjacent to building N, in addition to three above ground storage tanks (AST) likely used for rainwater collection. Wooden pallets, some metal, concrete slab and cottonseed oil containers were observed on the grassed area south of Building D. Brick and concrete fragments were observed within exposed surface soil to the south of Block P, to the north and east of Building D, and adjacent to the drainage line in the northern portion of the site.

Two unnamed ephemeral tributaries/drainage lines of Werrington Creek were located in the northern extent of the site oriented and flowing approximately southeast to northwest and east to west respectively. The drainage lines merge at a surface dam located adjoining the northwestern site boundary. A separate surface depression/drainage line was located parallel and to the south of the drainage line flowing east to west. A linear mound was observed extending from this drainage line to the north towards Great Western Highway.

The southern portion of the site sloped to the west towards O'Connell Street whilst the northern portion of the site sloped toward local drainage lines as described above.

At the time of the inspection there were no signs of underground waste storage (i.e. no surface gatic covers, breathers or associated infrastructure). In addition, there was no evidence of surface staining associated with chemical spills, no signs of distressed vegetation or other potential visual indicators of significant contamination issues at the site. No evidence of asbestos containing materials (ACM) waste/debris was observed on the ground surfaces.

2.3 Surrounding Land Use

Surrounding land uses are described following:

- North – Broader TAFE Kingswood Campus, Great Western Highway, WSU Werrington Campus and low-density residential properties beyond;
- East – WSU Werrington Campus followed by low density residential properties;
- South – Rural residential properties, followed by Werrington Creek, WSU Kingswood Campus and low density residential properties beyond; and
- West – O'Connell Street followed by low density residential properties.

2.4 Topography

A review of regional topographic data provided on SIX Maps[1] indicated that the site is situated at an elevation of approximately 45-55 m Australian Height Datum (AHD). The site was gently undulating and with minor slopes toward local drainage lines, shown on **Figure 2**.

2.5 Geology

Review of the Penrith 1:100 000 geological map (DME 1991[2]) indicates that the site is underlain by the Wianamatta Group Bringelly Shale, comprising carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone, rare coal and tuff.

Reference to the online ESPADE 2.0 tool hosted by the NSW Office of Environmental and Heritage (OEH 2017[3]) indicates that the site is located on Luddenham erosional soil landscape group. The landscape is characterised by undulating to rolling low hills on Wianamatta Group shales often associated with sandstone. Dark podzolic soils are fairly shallow with massive earthy clays on crests, moderately deep red podzolic soils on upper slopes and moderately deep yellow podzolic soils and prairie on lower slopes and drainage lines. Limitations of this soil landscape group are moderately reactive soils, water erosion hazards, localised steep slopes, localised mass movement hazards and localised impermeable highly plastic subsoil.

2.6 Acid Sulfate Soils

A review of the ESPADE acid sulfate soil risk mapping indicated that the site is located within an area of 'no known occurrence of Acid Sulfate Soils'. This classification relates to sites where ASS or Potential ASS (PASS) conditions are not known or not likely to occur.

Review of the Section 10.7 (2) & (5) Planning Certificates identified that the land is not affected by a policy adopted by the council that restricts the development of the land because of the likelihood of acid sulphate soils.

[1] https://maps.six.nsw.gov.au/, accessed 16 November 2020
[2] Penrith 1:100 000 Geological Sheet 9030, 1st Edition, 1991, Geological Survey of NSW, Department of Planning Industry & Environment (DPIE 1991), accessed 16 November 2020
[3] *ESPADE 2.0*, NSW Office of Environment and Heritage, Accessed 15 May 2019, OEH (2017)

When considering the local topography, the site is located approximately between 45-55 m AHD. Further, no visual or olfactory indicators of ASS were observed during the current intrusive investigations. On this basis, no further consideration of requirements in relation to assessment and/or management of ASS is necessary with regard to the proposed development.

2.7 Hydrology

As discussed in **Section 2.2**, two unnamed ephemeral tributaries/drainage lines of Werrington Creek were located in the northern extent of the site oriented and flowing approximately southeast to northwest and east to west respectively. The drainage lines merge at a surface dam located adjoining the northwestern site boundary and flows into Werrington Creek approximately 900m to the northwest of the site which in turn flows into South Creek approximately 2.4 km to the northeast of the site.

As discussed in **Section 2.2**, the southern portion of the site is predominantly sealed with asphaltic hardstands and building footprints with some landscaped areas. As such, surface water generated in these areas during periods of rainfall is anticipated to migrate from the site via surface water flow entering the local stormwater catchment system with subsurface infiltration and seepage.

The northern extent of the site is unsealed. Given the expected shallow clay soil and shale characteristics, infiltration into the local, shallow groundwater table is expected to be limited. During periods of heavy rainfall, excess surface waters are expected to flow overland into the onsite surface water bodies, or infiltrate into the shallow groundwater.

A review of the Section 10.7(2) and (5) Certificates (**Section 3.4**) indicated that all or part of the site is subject to flood related development controls. The Section 10.7(5) certificates note that:

- Development on the land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) (if such uses are permissible on the land) is subject to flood related development controls.
- Development on the land or part of the land for industrial or commercial purposes (if such uses are permissible on the land) is subject to flood related development controls. Development on the land or part of the land for purposes other than industrial or commercial, or for purposes other than those referred to above, will be considered on a merits based approach and flood related development controls may apply.

2.8 Hydrogeology

A search for registered groundwater bore information, undertaken on the Water NSW website[4] indicated thirteen groundwater bores were located within a 1500 m radius of the site and are summarised in **Table 2.2** below. Summary pages of groundwater bore information provided by Water NSW is presented in **Appendix C**.

[4] http://allwaterdata.water.nsw.gov.au/water.stm accessed 16 November 2020.

Table 2.1: Groundwater Bore Summary Details

Bore ID	Location	Intended Purpose	Depth (m bgs)	SWL (m bgs)	Lithological Summary
GW019680	0.42 m north of site	Waste Disposal	53.3	-	0 – 16.1 m – Clay 16.1 – 53.3 m – Shale
GW020069	0.42 m north of site	Waste Disposal	75.6	-	0 – 8.3 m – Clay 8.3 – 75.6 m – Shale
GW020547	0.43 m north of site	Waste Disposal	91.4	-	0 – 0.9 – Top Soil 0.9 – 9.1 m – Clay 9.1 – 91.4 m – Shale
GW060794	1.6 km south west of site	Stock, Domestic	78.1	-	0 – 6.2 m – Clay 6.2 – 78.1 m – Slate
GW103764	1.6 km south west of site	Irrigation	231.6	-	0 – 0.6 – Top Soil 0.6 – 6.4 m – Clay 6.4 – 123.4 m – Shale 123.4 – 216.4 – Sandstone 216.4 – 217.3 – Shale 217.3 – 231.6 – Sandstone
GW112643	1.6 km east of site	Monitoring Bore	6.0	-	0 – 1.0 – Fill 1.0 – 3.0 m – Sand 3.0 – 6.0 m – Clay
GW112644	1.6 km east of site	Monitoring Bore	6.0	-	0 – 1.0 – Fill 1.0 – 3.0 m – Sand 3.0 – 6.0 m – Clay
GW112645	1.6 km east of site	Monitoring Bore	6.0	-	0 – 1.0 – Fill 1.0 – 3.0 m – Sand 3.0 – 6.0 m – Clay
GW0113279	1.5 km west of site	Monitoring Bore	7.5	-	
GW113280	1.5 km west of site	Monitoring Bore	8.2	-	-
GW113281	1.5 km west of site	Monitoring Bore	2.85	-	-
GW113282	1.5 km west of site	Monitoring Bore	7.0	-	-
GW113283	1.5 km west of site	Monitoring Bore	2.8	-	-

2.9 Meteorology

A review of average climatic data for the nearest Bureau of Meteorology monitoring location (Penrith Lakes AWS[5]) indicates the site is located within the following meteorological setting:

- Average minimum temperatures vary from 5.3 ˚C in July to 18.7 ˚C in January;
- Average maximum temperatures vary from 18.0 ˚C in July to 31.2 ˚C in January;
- The average annual rainfall is approximately 705.4 mm with rainfall greater than 1 mm occurring on an average of 70.9 days per years; and
- Monthly rainfall varies from 29.8 mm in August to 122.6 mm in February, with the wettest period from November to March.

[5] http://www.bom.gov.au/climate/averages/tables/cw_067113.shtml, Commonwealth of Australia, 2020 Bureau of Meteorology, Product IDCJCM0028 Prepared at Thu 26 Nov 2020 and accessed by JBS&G on 2 December 2020.

3. Summary Site History

3.1 Aerial Photographs

Aerial photographs from 1943, 1956, 1961, 1970, 1984, 1991, 2002, 2010 and 2020, obtained from the NSW Spatial Services were reviewed. These have been included in **Appendix D**. A summary of the findings is presented below:

1943 The site comprised an undeveloped parcel of rural land which was mostly cleared and may have been used for grazing purposes. A residential dwelling was located in the central southern portion of the site with an adjacent area to the east of the dwelling possibly fenced for animal grazing or similar.
Great Western Highway and O'Connell Street were observed in their current alignment. The surrounding areas comprised scattered rural residential properties. Two large rectangular buildings were observed to the northwest of the site. What appeared to be orchards were visble to the south and east of the site, with the remainder of the surrounding land mostly cleared and potentially used for livestock grazing. A small surface water dam was adjacent to the western boundary of the northern extent of the site.

1956 The site remained generally unchanged from the 1943 aerial photograph. The fenced area adjacent the residential dwelliong appears to have been developed as an orchard. Drainage lines were apparent within the northern portion of the site consistent with the present day alignment. An unsealed access road/track was observed leading from the farmhouse to the northwest towards Great Western Highway.
Land to the northwest, near the corner of Great Western Highway and O'Connell Street had been developed for rural residential purposes.Land to the east and south had been developed further as orchards or market gardening An area of cleared ground or ground disturbance was visible to the north of the site site on the northern side of Great Western Highway.

1961 Three small structures, potentially a residential and sheds, were observed in the western portion of the site, whilst another structure, potentially a shed, was visible in the central eastern portion of the site. An unsealed access road/track was observed leading from the northeastern structure to the north towards Great Western Highway. Land to the north and south of the shed appeared to be used for market gardening.
Further development of land for rural residential purposes was visible to the northwest of the site at the corner of Great Western Highway and O'Connell Street, with land clearing visible to the west of O'Connell Street.

1970 Most of the site appeared to be used for market gardening.
The surface water dam north west of the site had been expanded with two large rectangular sheds constructed south of the dam. The area adjacent to the sheds appeared to be used for market gardening. Several access roads were observed within mostly cleared vacant land to the northwest, with a rural residential building visible in the western extent of this cleared land, on the eastern side of O'Connell Street.

1984 The previous site structures had been demolished and the site appeared to be vacant. Land to the north west of the site, west of O'Connell Street at the corner of Great Western Highway and O'Connell Street had been developed for residential purposes. There was considerably less land to the east and south of the site being used for market gardening.

1991 Construction of the TAFE Kingswood campus had commenced including within the western portion of the site and land north of the western portion of the site. Buildings B, C, D, E had been constructed. Additionally, four structures were located to the east of Building D and one structure was visible to the east of Building E. A structure, potentially a residential dwelling, and what appeared to be several small sheds and stored items

	were observed in the eastern portion of the site with an unsealed access road/track leading north toward Great Western Highway. The surface water dam located beyond the northwestern boundary of the site appeared to have been partially filled. Surrounding land remained largely changed from the 1984 aerial photograph.
2002	The structure observed to the east of Building E and the residential dwelling and sheds in the eastern portion of the site had been demolished. Buildings N, P and T and a car park in between these buildings had been constructed. The surface water dam appeared to have been altered and consistent with its current configuration. WSU Werrington Campus Buildings were visible east of the site.
2010	The site and surrounding areas remained largely changed from the 2002 aerial photograph.
2020	Four buildings located to the east of Building D had been demolished. Residential dwellings on land to the south had been demolished. Ground disturbance was observed on land north of the Great Western Highway.

3.2 Historical Land Title Records

Historical title records obtained for Lot 1 in DP 866081 are included in **Appendix E**.

A review of historical title information indicate that various parts of the TAFE Kingswood Campus were owned by private citizens since 1903 with owner occupations including gardener, farmer, market gardener, farmer, welder, timber merchant, carpenter and labourer. Various parts were progressively acquired by the Minister for Education (for the purpose of the Technical and Further Education Act 1974) between 1974 and 1988.

3.3 EPA Records

Search of the NSW EPA database was undertaken on 2 December 2020 **(Appendix F)** for the site and immediate surroundings. The search consisted of the:

- NSW EPA Protection of the Environment Act public register of licence, applications and notices (maintained under Section 308 of the Protection of the Environment Operations Act 1997 (POEO Act));
- NSW EPA contaminated land public register of record of notices (under Section 58 of the Contaminated Land Management Act 1997 (CLM Act)); and
- NSW contaminated sites notified to the EPA (under Section 60 of the CLM Act).

No prevention, clean-up or prohibitions notices and no transfer, variation, suspension, surrender or revocation of an environment protection licence (EPL) has been issued under the POEO Act for the site. A POEO licence was issued to Western Sydney Automotives located at 107 – 121 Great Western Highway, Kingswood, NSW 2747 (approximately 1 km to the west of the site) for hazardous, industrial or Group A waste generation or storage in 2000 and is no longer in force.

No notices have been issued under the CLM Act for the site or the immediate surrounds.

The site or the immediate surrounds are not on the list of NSW contaminated sites notified to the EPA.

3.4 EPA Per- and Poly- Fluoroalkyl Substances (PFAS) Register

A search of the EPA's PFAS register indicated that there were no records pertaining to the site. A record of the search is presented in **Appendix G**.

3.5 NSW Fair Trading Loose Fill Asbestos Insulation Register

A search of the NSW Fair Trading loose fill asbestos insulation register indicated that there were no records pertaining to the site. A record of the search is presented in **Appendix H**.

3.6 Australian and NSW Heritage Register

A search of the Australian and NSW Heritage databases was undertaken on 2 December 2020 and records are included in **Appendix I**. The search identified no items of national heritage significance affecting the site. A heritage item was identified on the NSW Heritage database comprising a road milepost/milestone fronting Lot 1 DP 866081. From review of imagery provided on Google Earth Street View, the milestone is not located on the site.

3.7 Dangerous Goods Search

A dangerous goods licence search of the stored chemical information database of SafeWork NSW for the site was undertaken on 27 November 2020. The SafeWork NSW response was not available at the time of preparation of this report.

3.8 Section 10.7 (2) & (5) Planning Certificates

Copies of the Section 10.7 Planning Certificates (2) and (5) were obtained for the site from Penrith City Council and are included in **Appendix J**. The planning certificates included the following information:

- The land is subject to the requirements under the Penrith Local Environmental Plan 2010;
- The land is zoned SP2 Infrastructure – Educational Establishment;
- The land is not affected by the Coastal Protection Act 1979;
- The land is not identified as bush fire prone land;
- The land does not contain items of environmental heritage;
- The land does not comprise of critical habitat;
- The land is not within a conservation area;
- The land is not proclaimed to be a Mine Subsidence District;
- The land is not affected by any road widening/realignment under the Roads Act 1993;
- The land is subject to flood related development controls;
- The land is not identified as biodiversity certified land under Part 8 of the Biodiversity Conservation Act 2016;
- The land is not subject to any orders under Trees Act 2006;
- The residential dwelling on the land is not identified in the Loose-Fill Asbestos Insulation Register; and
- The land is not subject to any matters under the CLM Act 1997.

3.9 Integrity Assessment and Summary of Site History

From review of historical aerial photographs and land titles, it appears that the site has historically been used for rural residential and agricultural use including livestock grazing and market gardening prior to development as the TAFE Kingswood Campus.

Based on the range of sources and the general consistency of the historical information, it is considered that the historical assessment has an acceptable level of accuracy with respect to the potentially contaminating activities historically occurring at the site.

4. Assessment of Potential Contamination

4.1 Potential Areas of Environmental Concern Based on Current Site Conditions

Based on the history review and observations made during the JBS&G inspection of the site, areas of environmental concern have been identified and are presented in **Table 4.1**.

Table 4.1: Areas of Environmental Concern (AECs) and Contaminants of Potential Concern (COPC)

Area of Environmental Concern (AEC)	Primary Contaminants of Potential Concern (COPC)
Imported and/or reworked fill materials used to create site levels (comprising material of unknown character and/or origin)	Heavy metals (As, Cr, Cd, Cu, Pb, Hg, Ni, Zn), total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs) and asbestos
Inappropriate demolition of former site structures	Heavy metals, PCBs, OCPs, asbestos
Former market garden use and associated application of pesticides	Heavy metals and OCPs
Natural material impacted as a result of migration of COPCs in overlying fill material.	Heavy Metals, PAHs, TRHs, BTEX, OCPs and PCBs
Groundwater	Heavy metals (As, Cr, Cd, Cu, Pb, Hg, Ni, Zn), TRH/BTEX, PAHs

4.2 Potentially Contaminated Media

Potentially contaminated media comprise:

- Fill Materials;
- Underlying Natural Soil; and
- Groundwater

A review of site historical information indicates that activities at the site are unlikely to have involved significant contaminating uses. The review identified the site was historically used for grazing/agricultural use and potential for cut and fill activities to have occurred at the site during various stages of development. Additionally, the site historically contained some structures and as such, there is potential for fill material to be potentially impacted with hazardous building materials due to inappropriate demolition of these structures.

Based on the potential leachability of COPCs within the surface soils/fill materials, the risk of vertical migration of contamination from the surface soils/fill material into the underlying natural soils and groundwater is considered low given the low permeability of silty clay fill profile identified at the site. Further, a review of the site history did not identify point sources and/or liquid contaminants at the site that are likely to pose a significant risk for the migration of contamination to underlying natural materials and groundwater.

4.3 Potential for Migration

Contaminants generally migrate from site AECs via a combination of windblown dusts, rainwater infiltration, groundwater migration, vapour convection/diffusion and surface water runoff. The potential for contaminants to migrate is a combination of:

- The nature of the contaminants (solid/liquid and mobility characteristics);
- The extent of the contaminants (isolated or widespread);
- The location of the contaminants (surface soils or at depth); and
- The site topography, geology, hydrology and hydrogeology.

The potential contaminants of concern identified as part of the site history review and site inspection are generally in solid form (e.g. heavy metals, asbestos, etc).

As discussed in **Section 2**, ground surfaces are a combination of sealed asphaltic pavements/building footprints and grassed areas. Therefore, there is limited potential for migration of solid contaminants from the site via windblown dust. As such, this is not considered to be a complete exposure pathway.

Surface water is expected to primarily leave the site via local stormwater catchment system, and infiltration of water into underlying soils is possible within the landscaped areas in the southern extent and northern extent which is grassed. Therefore, infiltration of water-soluble contaminants into the groundwater is considered be a potential offsite migration pathway. The potential migration of liquid and/or volatile contaminants through the subsurface is low given the absence of potential liquid/volatile contaminant sources at the site.

There is potential for contaminants to migrate through the soil and into groundwater. Identified COPC were likely present as solids, contaminants adsorbed to or present in fill, or had been potentially applied in liquid form, such as metals, hydrocarbons or pesticides. It is considered that metals, hydrocarbons or pesticides would typically be applied in a liquid (water base) form, which upon drying would typically leave COPC in a dry form that would be expected to adsorb to soil particles. Based on the type of COPC and the anticipated depth to groundwater it is considered that the potential for sub-surface migration processes are low.

Due to large areas of vegetation coverings, the potential for contaminants to migrate via surface water runoff from the site is considered be low, with the exception of paved areas in the southern extent of the site and it is anticipated runoff from those areas will be collected or absorbed into the unsealed areas of the site. There is also potential for contaminants to migrate from areas of bare ground, although limited, particularly during heavy rainfall events, which lead to surface water runoff via overland flow.

4.4 Potential Exposure Pathways

Potential human receptors of environmental impact include future site users (student, staff), visitors and construction/maintenance contractors engaged to work at the site who may potentially be exposed to COPCs through inhalation, direct contact and/or ingestion of impacted soils.

Exposure to windblown dusts may pose a potential risk to sensitive human receptors, however these are presently considered unlikely given the predominantly paved/vegetated site surfaces.

During redevelopment of the site, potential human receptors will include:

- Inhalation of potential COPC in dust generated from fill material of unknown origins; and/ or
- Potential dermal and oral contact to impacted soils as present at shallow depths and/ or accessible by future service excavations across the extent of the site; and/ or
- Surface water runoff.

The site contains areas covered by vegetation, presenting ongoing potential ecological receptors, although no vegetation stress relating to potential contamination from known AECs was observed during site inspection. Flora on site are potential receptors of shallow soil contamination if present. Possible off-site ecological receptors include potential surface water receptors (i.e. Werrington Creek approximately 900m to the northwest of the site).

5. Sampling and Analysis Plan

5.1 Data Quality Objectives

Data Quality Objectives (DQOs) were established for the investigation, as discussed in the following sections.

5.1.1 State the Problem

The site is proposed to be redeveloped for tertiary education purposes. As such, a PSI with limited sampling was required to characterise potential contamination at the site and to draw conclusions regarding the continued use of the land for commercial / industrial land use, or make recommendations to enable such conclusions for the site.

5.1.2 Identify the Decision

Based on the decision making process for assessing urban redevelopment sites in EPA (2017[6]), the following decisions must be made:

- Were there any unacceptable risks to likely future onsite receptors?
- Were there any issues relating to the local area background soil concentrations that exceed appropriate soil criteria?
- Were there any impacts of chemical mixtures?
- Were there any aesthetic issues present at the site?
- Was there any evidence of, or potential for, migration of contaminants from the site?
- Is a site management strategy required?

5.1.3 Identify Inputs to the Decision

Inputs to the decision are:

- Historical site information and inspection of the site to identify and/or confirm potential AECs and COPCs at the site;
- The collection and interpretation of environmental data through collection and analysis of limited soil and groundwater samples;
- Laboratory analysis of samples of potentially contaminated media for COPC; and
- Confirmation that data generated by sample analyses were of sufficient quality to allow reliable comparison to assessment criteria as undertaken by assessment of quality assurance / quality control (QA/QC).

5.1.4 Define the Study Boundaries

The study boundaries are limited to cadastral site boundaries as shown on **Figure 2**.

The vertical extent of the soil investigation was to a maximum depth of 2.8 m bgs, the depth of the deepest soil sample collected, and 8.5 m bgs for groundwater.

Due to the project objectives, seasonality was not assessed as part of this investigation. Data are therefore representative of the timing and duration of the current investigation.

[6] *Contaminated Land Management. Guidelines for the NSW Site Auditor Scheme (3rd Edition).* NSW EPA October 2017 (EPA 2017)

5.1.5 Develop a Decision Rule

Soil analytical data was assessed against EPA endorsed criteria including the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1), National Environment Protection Council (NEPC 2013).

The decision rules adopted to answer the decisions identified in Section **5.1.2** are summarised in **Table 5.1**.

Table 5.1: Summary of Decision Rules

Decision Required to be Made	Decision Rule
1. Were there any potentially unacceptable risks to onsite future receptors?	a) Soil analytical data was compared against EPA endorsed criteria. Statistical analyses of the data in accordance with relevant guidance documents was undertaken, if appropriate, to facilitate the decisions. The following statistical criteria was adopted with respect to soils: Either: the reported concentrations were all below the site criteria; Or: the 95% upper confidence limit (UCL) of the average concentration for each analyte was below the adopted site criterion; no single analyte concentration exceeded 250% of the adopted site criterion; and the standard deviation of the results was less than 50% of the site criterion. If the statistical criteria stated above was satisfied, the decision was No. If the statistical criteria were not satisfied, the decision was Yes.
	b) Groundwater analytical data was compared against EPA endorsed criteria. If the reported concentrations were all below the Site Criteria, the answer to the decision was No; If analytical concentrations were in excess of the Site criteria, further consideration of potential risks would be required to establish whether the results are indicative of background conditions. If this is not the case, then the answer to the decision is Yes.
2. Were there any issues relating to the local area background soil concentrations that exceed appropriate soil criteria?	If surface soils concentrations exceeded background concentrations, the decision was Yes. Otherwise, the decision was No.
3. Were there any chemical mixtures?	Were there more than one group of contaminants present which increase the risk of harm? If there was, the decision was Yes. Otherwise, the decision was No.
4. Were there any aesthetic issues?	If there were any unacceptable odours or soil discolouration, or large quantities of non-hazardous inert material, the decision was Yes. Otherwise, the decision was No.
5. Was there any evidence of, or potential for, migration of contaminants from the site?	Were the contaminant concentrations and contaminant types expected to impact groundwater based on assessment of data against ecological investigation levels? If yes, the decision was Yes. Otherwise, the decision was No.
6. Are there any unacceptable risks to likely future onsite receptors from hazardous materials that may be present within the structures on the site?	Are any future on-site receptors likely to be exposed to hazardous material present? If yes, the decision is Yes. Otherwise, the decision is No
7. Is a management strategy required?	If the answer to and of Decisions 1 to 6 was Yes, then the decision is Yes. Otherwise, the decision is No

5.1.6 Specify Limits of Decision Error

This step is to establish the decision maker's tolerable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data. Data generated during this project must be appropriate to allow decisions to be made with confidence.

Specific limits for this project have been adopted in accordance with the appropriate guidance from the NSW EPA, NEPC 2013 appropriate indicators of data quality (DQIs used to assess quality assurance / quality control) and standard JBS&G procedures for field sampling and handling.

To assess the usability of the data prior to making decisions, the data will be assessed against pre-determined Data Quality Indicators (DQIs) established for the project as discussed below in relation to precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCS parameters). The acceptable limit on decision error is 95% compliance with DQIs.

The DQIs and data assessment criteria are summarised in **Table 5.2**.

- Precision - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percent Difference (RPD) of duplicate samples.
- Accuracy - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this study is a measure of the closeness of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- Representativeness –expresses the degree which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
- Comparability - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- Completeness – is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study.
- Sensitivity – expresses the adopted soil analytical methods provided suitable limits of reporting (LORs) with respect to the adopted site assessment criteria.

Table 5.2: Summary of Quality Assurance / Quality Control Program

Data Quality Indicators	Frequency	Data Quality Criteria
Precision		
Blind duplicates (intra laboratory)	1 / 20 samples	<50% RPD
Blind duplicates (inter laboratory)	1 / 20 samples	<50% RPD
Laboratory Duplicates	1 / 20 samples	<50% RPD
Accuracy		
Surrogate spikes	All organic samples	70-130%
Laboratory control samples	1 per lab batch	70-130%
Matrix spikes	1 per lab batch	70-130%
Representativeness		
Sampling appropriate for media and analytes	All samples	-
Samples extracted and analysed within holding times.	-	organics (14 days), inorganics (6 months)
Trip spike	1 per sampling event	70-130% recovery
Trip blank	1 per sampling event	<LOR
Rinsate blank	1 per sampling event when non-disposable sampling equipment used/media	<LOR
Comparability		
Standard operating procedures for sample collection & handling	All Samples	All samples
Standard analytical methods used for all analyses	All Samples	All samples
Consistent field conditions, sampling staff and laboratory analysis	All Samples	All samples
Limits of reporting appropriate and consistent	All Samples	All samples
Completeness		
Sample description and COCs completed and appropriate	All Samples	All samples
Appropriate documentation	All Samples	All samples
Satisfactory frequency and result for QC samples	All QA/QC samples	-
Data from critical samples is considered valid	-	Critical samples valid
Sensitivity		
Analytical methods and limits of recovery appropriate for media and adopted site assessment criteria	All Analytes	All limits of reporting were less than the adopted site assessment criteria.

If any of the DQIs are not met, further assessment may be necessary to determine whether the non-conformance significantly affected the usefulness of the data. Corrective actions might include requesting further information from samplers and/or analytical laboratories, downgrading of the quality of the data or alternatively, re-collection of the data.

5.1.7 Optimise the Design for Obtaining Data

The NSW EPA sampling design guidelines (EPA 1995) does not provide specific guidance on the sampling density for sites larger than 5 ha, rather it recommends a stratified sampling approach based on consideration of the potential for contamination based on an understanding of potential AECs. However, given the preliminary nature of this investigation, and based on the requirement to co-locate contamination samples within geotechnical boreholes, therefore, limited sampling from six borehole locations (BH01-BH04, BH09 and BH10) advanced during the geotechnical investigation together with four hand auger locations (HA01-HA04) advanced by JBS&G via hand tools was undertaken.

Based upon the objectives of this preliminary investigation and the available historical site use information, the adopted sampling density was considered appropriate.

5.2 Soil Sampling Methodology

Intrusive soil sampling via boreholes was undertaken using a drill rig with solid flight auger in conjunction with the geotechnical site investigation. Soil samples were collected by JBS&G generally

from surface at 0-0.15 m, 0.3 m, 0.5 m and then at 0.5 m intervals to a maximum depth of 3 m or 0.5 m into natural materials (or prior refusal), whichever was the shallower.

Intrusive soil sampling via hand augers was undertaken by JBS&G in unpaved and accessible areas of the site. Samples were collected from surface at 0-0.15 m, 0.3 m, 0.5 m and then at 0.5 m intervals to a maximum depth of 1 m or 0.5 m into natural materials (or prior refusal), whichever was the shallower

Soil sampling locations are shown on **Figures 3**.

During the collection of soil samples, features such as seepage, discolouration, staining, odours and other indicators of contamination were noted on investigation logs presented in **Appendix K**. A calibrated PID was utilised to screen for volatile organic compounds (VOCs) within the sampled material. Calibration records are presented in **Appendix L**.

Soil samples for the contamination assessment were collected using a fresh, dedicated pair of nitrile gloves and immediately transferred to laboratory supplied sample jars and bags. The sample containers were then transferred to a chilled esky for sample preservation prior to and during shipment to the testing laboratory. A chain-of-custody form was completed and forwarded with the samples to the testing laboratory.

Based upon field observations, samples were analysed in accordance with the analytical schedule detailed in **Table 5.3**.

5.3 Groundwater Sampling Methodology

One groundwater well was installed at BH01 to a depth of 8.5 m bgs during the geotechnical investigation. The well was constructed from 50 mm unplasticised polyvinyl chloride (uPVC) screen and casing, combined with a lockable cap and completed as road box. The screen was installed such that the encountered water level was within the screened interval, allowing for the detection of Light Non-Aqueous Phase Liquids (LNAPLs), if present.

The well annulus was backfilled with a graded (2mm) sand to construct a 'filter pack' to limit soil clogging the well screen. A bentonite seal was installed above the screened interval to reduce the potential for surface water, perched water and/or liquid phase contaminants to enter the well from outside the screened interval.

After installation, the monitoring well was developed by PSM to remove excess silt and sediment resultant from the installation process. The well was then allowed to settle for a week prior to sampling.

The groundwater monitoring well was gauged with an oil/water Interface Probe (IP) which can detect Non-Aqueous Phase Liquids (NAPLs). The groundwater at each well was then purged with a Micropurge pump using a low flow sampling technique, fresh disposable Low Density Poly-ethylene (LDPE) tubing, to remove the standing water. During removal, physicochemical parameters (pH, electrical conductivity, dissolved oxygen, reduction-oxidation potential and temperature) were monitored until stabilisation. Groundwater samples were recovered after parameter stabilisation had occurred.

Collected groundwater samples were immediately filtered (as necessary) and transferred to laboratory supplied sample bottles. The sample containers were then transferred to a chilled iced box for sample preservation prior to and during shipment to the testing laboratory. A chain of custody form was completed and forwarded with the samples. Samples were analysed in accordance with the laboratory schedule (**Table 5.3**).

5.4 Decontamination

Samples were collected directly from the auger during borehole sampling. The hand auger and trowel were decontaminated between sampling locations by removing excess dirt using a brush,

rinsing in a mixture of phosphate-free detergent, followed by rinsing with potable water. A pair of new nitrile gloves were worn for collection of each new sample.

Groundwater samples were collected using disposable sampling equipment which was disposed of after use.

5.5 Laboratory Analysis

JBS&G contracted Eurofins Environment Testing (Eurofins) and Envirolab Services Pty Ltd (Envirolab) for all laboratory analysis of samples. Both laboratories are National Association of Testing Authorities (NATA) registered for the required analyses. In addition, the laboratories are required to meet JBS&G's internal QA/QC requirements.

The completed analysis schedule is summarised in **Table 5.3**.

Table 5.3 Analytical Schedule

Sample Type	No. of Sampling Locations	Analyses (exc. QA/QC)
Soil	10 sample locations	Heavy Metals (As, Cd, Cr, Cu, Hg, Ni, Pb, Zn) – 15 samples PAHs – 15 samples TRH/BTEX –15 samples OCP/PCB – 15 samples Asbestos – 10 soil samples (500 mL) + plus visual inspection Total organic carbon (TOC), Fe, Cation Exchange Capacity (CEC), % clay, pH – 2 samples
Groundwater	1 monitoring well	Heavy Metals (As, Cd, Cr, Cu, Hg, Ni, Pb, Zn) – 1 sample PAHs (low level) – 1 sample TRH/BTEX – 1 sample

In addition to the above analyses, for QA/QC purposes field duplicates and triplicates were analysed at a rate of 1/20 primary soil samples. A rinsate samples was obtained from non-disposable sampling equipment, plus a single trip spike and single trip blank accompanied each sample batch.

6. Assessment Criteria

6.1 Regulatory Guidelines

Development of site assessment criteria and the associated scope of investigation was undertaken with consideration to aspects of the following guidelines, as relevant:

- *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)*, National Environment Protection Council (NEPC 2013);
- *Contaminated Sites: Sampling Design Guidelines*, NSW EPA, 1995 (EPA 1995);
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines (ANZG 2018);
- *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme*, 3rd Edition, NSW EPA, 2017 (EPA 2017);
- *Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination*, NSW DEC, March 2007 (DEC 2007);
- *National Water Quality Management Strategy – Australian Drinking Water Guidelines 6 2011*, National Health and Medical Research Council, Updated August 2018, (NHMRC 2018);
- *Guidelines for Managing Risks in Recreational Water*, NHMRC, 2008 (NHMRC 2008);
- *Contaminated Sites: Guidelines on Duty to Report Contamination under the Contaminated Land Management Act 1997*, NSW EPA, September 2015 (EPA 2015); and
- *Consultants Reporting on Contaminated Land*, NSW EPA, April 2020 (EPA 2020).

6.2 Soil Assessment Criteria Selection

As per the decision process for assessment of urban development site (EPA 2017), a set of health and ecological assessment thresholds derived from NEPC (2013) was used for evaluation of site contamination data collected for this assessment. The site requires assessment for future use as a tertiary educational facility. Based on consideration of typical uses, and NEPC (2013), the data has been assessed against criteria for commercial/industrial land use. Aesthetics were also considered in the assessment of site suitability consistent with EPA (2017) and NEPC (2013).

The site assessment criteria are presented on **Table A** and summarised below.

Health Based Criteria:

- Table 1A(1) 'Health Investigation Levels for Soil contaminants' (HIL D); and
- Table 1A(3) Soil HSLs for Vapour Intrusion (HSL D).

Where laboratory results provided concentrations of contaminant groups (i.e. total chromium) for which assessment criteria refer to specific contaminants within the group, the lowest specific contaminant criteria were adopted for initial screening purposes. Total chromium was compared against the chromium (valence state 6) criterion of 500 mg/kg.

Ecological Screening Levels:

Ecological Screening Levels (ESLs) for the site were obtained from Table 1B(6) 'ESLs for TPH Fractions F1-F4, BTEX and Benzo(a)pyrene in Soil' under the 'commercial/industrial' land use scenario.

Site Specific Ecological Investigation Levels:

Site specific EILs were derived in accordance with the methodology outlined within NEPC (2013), using average physical parameters calculated from analytical data obtained from site soil samples for the site as follows:

- CEC – 22 meq/100g
- pH – 6.8 pH units
- % Clay – 11%

Management Limits:

Management limits for consideration of the formation of Light Non-Aqueous Phase Liquids (LNAPLs), fire and explosive hazards, and effects on buried infrastructure have been obtained from Table 1B(7) 'Management Limits for TPH Fractions F1-F4 in Soil' under the 'commercial/industrial' land use scenario. Based on site observations discussed in **Section 8.1**, a fine soil texture was adopted for comparison of results as the most conservative option based on observed site characteristics.

6.3 Waste Classification for Off-site Disposal

Waste classification will be carried out in accordance with the Waste Classification Guidelines (EPA 2014). Initially, the soils will be assessed against the special waste criteria, primarily for the presence of asbestos then, where soils are not pre-classified, comparison of initial total soil chemical analytical data will be undertaken to classify waste by chemical assessment without the TCLP testing. The following initial screening criteria will be used. Maximum values of specific contaminant concentrations (SCC) for classification without TCLP:

- Below Contaminant Threshold 1 (CT1) – General Solid Waste (GSW);
- Above CT1 and below Contaminant Threshold 2 (CT2) – Restricted Solid Waste (RSW); and
- Above CT2 – Hazardous Solid Waste.

Where soil sample analytical results indicated that contaminants are present at concentrations above either CT1 or CT2 thresholds, representative TCLP analysis may be undertaken to facilitate comparison of SCC together with leachable concentrations. Maximum values for leachable concentration and SCC when used together:

- Below SCC1 and TCLP1 – General Solid Waste (GSW);
- Above SCC1 and/or TCLP1 and below SCC2 and TCLP2 – Restricted Solid Waste (RSW); and
- Above either SCC2 and/or TCLP2 – Hazardous Solid Waste

6.4 Groundwater Investigation Levels

DEC (2007) instructs that groundwater investigation levels (GILs) be based on a consideration of groundwater's environmental values. Environmental values are defined in ANZG (2018) as "...particular values or uses of the environment that are important for a healthy ecosystem or for public benefit, health, safety or welfare which require protection from the effects of stressors".

NEPC (2013) presents six environmental values which are required to be considered in the assessment of contaminated groundwater including:

- Aquatic ecosystems;
- Aquaculture and human consumers of food;
- Agricultural water;
- Recreation and aesthetics;

- Drinking water; and
- Industrial water.

Current and projected contaminant concentrations in groundwater are required to be compared to the GILs at the points of existing and realistic future use for each relevant environmental value.

Beneficial reuse of groundwater is considered unlikely, however, as a conservative guideline, the health and aesthetics based Australian Drinking Water Guidelines (NHMRC 2018) for drinking water were adopted for the purposes of the assessment. In addition, conservative screening criteria, for the assessment of risk to construction/maintenance workers as a result of short term work involving interaction with groundwater at the site, has been adopted as 10 times the health values for Drinking Water published in (NHMRC 2018).

To assess the potential risk of contaminated groundwater migrating from the site to Werrington Creek, reference has been made to the ANZG (2018) default trigger values for 95 % protection of species. Where no high reliability values have been specified, low reliability and/or screening level values have been utilised for the purpose of site assessment and screening.

Groundwater analytical data for this assessment has also been compared against NEPC (2013) groundwater HSLs for vapour intrusion for commercial/industrial land use for clay soils.

7. Quality Assurance and Quality Control

7.1 QA / QC Results

The QA/QC results for soil samples collected at the site are summarised in **Table 7.1** and discussed in **Section 7.2** below. Detailed QA/QC results are included in the laboratory reports in **Appendix N** and QA/QC summary tables in **Appendix M**.

Table 7.1: Data Quality Indicator Assessment

Data Quality Indicator	Results	DQO met?
Precision		
Soil blind duplicates (intra laboratory)	Chemical samples 0-26% RPD Asbestos non-detection agreement with primary sample Soil duplicates were analysed at a rate greater than 1 in 20 samples.	Yes
Soil split duplicates (inter laboratory)	Chemical samples 0-33 % RPD Asbestos non-detection agreement with primary sample Soil duplicates were analysed at a rate greater than 1 in 20 samples.	Yes
Groundwater duplicates	Non collected	Partial[1]
Laboratory Duplicates	0-200 % RPD	Partial[1]
Accuracy		
Surrogate spikes	70-138% recovery	Partial[1]
Laboratory control samples	70-130% recovery	Yes
Matrix spikes	70-130% recovery	Yes
Representativeness		
Samples extracted and analysed within holding times.	All primary and duplicate samples were extracted and analysed within the nominated holding times.	Yes
Trip spike	70-130 % recovery	Yes
Trip blank	<LOR	Yes
Field/Rinsate blanks	N/A	Yes
Standard operating procedures for sample collection & handling	Field scientist used the same standard operating procedures throughout works.	Yes
Comparability		
Standard analytical methods used for all analyses	Standard analytical methods used.	Yes
Consistent field conditions, sampling staff and laboratory analysis	Standard operating procedures were conducted throughout the works. Field conditions remained the same throughout the works. The primary and secondary labs remained consistent throughout the investigation.	Yes
Limits of reporting appropriate and consistent	Soil limits of reporting were consistent and appropriate.	Yes
Completeness		
Soil description and COCs completed and appropriate	All bore logs and COCs were completed appropriately.	Yes
Appropriate documentation	All appropriate field documentation is included in the Appendices.	Yes
Satisfactory frequency and result for QC samples	The QC results are considered adequate for the purposes of the investigation.	Yes
Data from critical samples	Samples were analysed at locations were potential for contamination was observed.	Yes
Sensitivity		
Analytical methods and limits of recovery appropriate for media and adopted site assessment criteria	Analytical methods and limits of recovery were considered appropriate for media and adopted site assessment criteria for all soil analytes.	Yes

Notes:
1. See discussion of DQI exceedances in **Section 7.2.**

7.2 QA/QC Discussion

7.2.1 Precision

Soil Duplicate (intra-laboratory) Samples

Intra-laboratory duplicates were analysed at a rate of 1 per 15 primary samples for heavy metals, TRH/BTEX, PAH, PCB, OCP and asbestos, which met the DQIs for soil sampling (1 in 20). RPDs were within the acceptance criteria.

Soil Triplicate (inter-laboratory) Samples

Inter-laboratory duplicates were analysed at a rate of 1 per 15 primary samples for heavy metals, TRH/BTEX, PAH, PCB, OCP and asbestos, which met the DQIs for soil sampling (1 in 20). RPDs were within the acceptance criteria.

Groundwater Duplicate Samples

Groundwater intra-laboratory and inter-laboratory duplicate samples were not collected given the small dataset and the preliminary nature of the investigation. The sampling undertaken is considered adequate for the project objectives.

Laboratory Duplicate

Laboratory duplicate soil samples were analysed by the testing laboratory at a rate greater than 1 per 20 primary soil samples. The results of analysis for the laboratory duplicate soil sample were generally within the laboratory acceptance criteria of 0-30 %, except for total organic carbon (200%). However, the laboratory reported that the elevated RPD was within the NATA accredited laboratory acceptance criteria.

On this basis the DQIs for precision are considered to have been achieved for this investigation, noting that total organic carbon concentrations are not used to assess potential site contamination.

7.2.2 Accuracy

Surrogate spike recoveries were generally within the DQI range of 70-130 % with the exception of surrogate 2-Fluorobiphenyl recovery in water sample BH01 (138%). However, the recovery percentage was within the NATA acceptance limits of 50-150 % for surrogate spike recoveries.

Laboratory control sample (LCS) recoveries were reported within the acceptable range of 70 – 130%.

Matrix spike recoveries were reported within the acceptable range of 70-130 %.

7.2.3 Representativeness

Sampling appropriate for media and analytes

All soil sampling works completed during the investigation were conducted in accordance with JBS&G standard operating procedures.

Holding Times

The extraction and analysis of selected soil samples was completed within the recommended holding times for all COPCs.

Trip Spike

A trip spike was submitted with each sampling event during the soil and groundwater investigation. The trip spike recoveries were within the JBS&G acceptable limit of 70%-130%.

Trip Blank

A trip blank was submitted with each sampling event during the soil and groundwater investigation. There were no reported concentrations of BTEX above the laboratory LOR, achieving the nominated DQIs.

Decontamination and Calibration

All field equipment was decontaminated and calibrated appropriately as per the procedure identified in **Section 5.2.1**. One rinsate blanks were collected for the hand auger soil sampling event. Analyte levels were all below laboratory LOR, indicating decontamination procedures were adequate.

Records of field calibration and decontamination are provided in **Appendix L**.

7.2.4 Comparability

Experienced JBS&G field scientists undertook all sampling in accordance with standard JBS&G sampling methods.

All field documentation was appropriately completed. The nominated laboratories undertook all analysis in accordance with the relevant NATA accredited methods.

7.2.5 Completeness

Samples were transported under full chain of custody (COC) documentation. The COC documentation was completed and the selected analyses were correctly conducted.

All field documentation was completed appropriately including test pit logs, COCs, daily field logs and calibration and decontamination sheets (PID).

7.2.6 Sensitivity

Laboratory analysis methods for all contaminants adopted during the investigation used limits of reporting significantly less than the site assessment criteria to ensure the contaminant concentrations could be confidently identified as being less than the adopted site assessment criteria.

7.3 QA/QC Assessment

The field sampling and handling procedures across the site produced QA/QC results which indicate that the investigation data collected is of an acceptable quality.

The NATA certified laboratory results sheets indicate that the project laboratory was generally achieving levels of performance within its recommended control limits during the period when the samples of this program were analysed.

On the basis of the results of the field and laboratory QA/QC program, the soil and groundwater data are of an acceptable quality upon which to draw conclusions regarding the environmental condition of the site.

8. Results

8.1 Soil Observations

Soil sampling was conducted between 17 and 19 November 2020 at the sample locations shown on **Figure 3**. Borehole logs are included in **Appendix K**. A summary of soil conditions present at the site is provided as follows. A total of four boreholes advanced via hand auger (HA01-HA04) and six boreholes (BH01-BH04, BH09 and BH10) advanced via mechanical drill rig were used for the purposes of soil sampling.

Fill material encountered at the site primarily comprised silty clay with a low proportion of gravels, and anthropogenic inclusions were generally not observed with the exception of ash and plastic observed in HA03. Natural material at the site typically comprised a grey/brown/red clay underlain by grey weathered shale.

No odours, staining or ACM was observed throughout the soil profile at any of the investigation locations. PID readings (0.1-22.9ppm) from sampled soils indicated no significant sources of hydrocarbon/VOC contamination existing within site soils. Groundwater seepage was not observed within the boreholes advanced during the soil investigation. Further, no indicators of potential acid sulphate soils were observed during intrusive works at the site.

8.2 Soil Analytical Results

Detailed laboratory reports and chain of custody documentation are provided in **Appendix N**. Summarised soil laboratory results are presented in **Table A** and discussed in the following sections.

8.2.1 Heavy Metals

Concentrations of heavy metals in all analysed samples were reported to be below the adopted site assessment criteria.

8.2.2 TRH and BTEX

Concentrations of TRH in all analysed samples were reported below the laboratory LOR and/or less than the adopted site assessment criteria. Concentrations of BTEX in all analysed samples were reported below the laboratory LOR.

8.2.3 PAHs

All carcinogenic PAHs as benzo(a)pyrene (B(a)P) TEQ and total PAH concentrations in samples selected for analysis were below the laboratory LOR.

8.2.4 OCPs

Concentrations of OCPs in all samples selected for analysis were reported below the laboratory LOR.

8.2.5 PCBs

Concentrations of PCBs in all samples selected for analysis were reported below the laboratory LOR.

8.2.6 Asbestos

Visible ACM was not observed during the current investigation. Asbestos in soil analysis results identified no concentrations above the adopted assessment criteria in soil samples submitted to the laboratory for analysis.

8.3 Preliminary In-Situ Waste Classification

Summarised soil analytical data for waste classification are presented in **Table B** and are discussed below. Detailed laboratory reports and chain of custody documentation are provided in **Appendix N**. Statistical Analyses for the data set are provided in **Appendix O**.

All COPC concentrations have been reported below CT1 – General Solid Waste (GSW) criteria with the exception of nickel concentration marginally exceeding CT1 criterion (40 mg/kg) in samples BH04 1.5-1.6 (41 mg/kg), BH09 0.5-0.6 (42 mg/kg) and HA01 0.5-0.6 (41 mg/kg). Statistical analysis was undertaken for the nickel data set available for the site, which identified maximum concentrations less than 250% of CT1, standard deviation less than half of CT1 and 95% UCL less than CT1.

On this basis, the preliminary classification of fill material on site is General Solid Waste (GSW) (non-putrescible) in accordance with the EPA Waste Classification Guidelines (EPA 2014).

8.4 Groundwater Field Observations

A groundwater monitoring event (GME) sampling the new well (BH01/MW01) was conducted on 26 November 2020. Groundwater monitoring well location is provided on **Figure 3**. Details of depths to groundwater and other geospatial characteristics are summarised in **Table 8.2** below. A summary of groundwater conditions encountered during the GME is presented in **Table 8.3** and **Table 8.4** below.

Table 8.2 Groundwater Geospatial Details

Well Reference	Easting (MGA 56)	Northing (MGA 56)	Depth to Groundwater (m below top of casing)
BH01/MW01	290667.9	6261624	3.457

MGA coordinate and AHD values were provided by a registered surveyor, with the surveyor's report is provided as part of **Appendix J**.

Table 8.3 Groundwater Field Physicochemical Parameters

Well Reference	Dissolved Oxygen (mg/L)	Electrical Conductivity (µS/cm)	pH (units)	Oxidation Reduction Potential (mV)	Temperature (°C)
BH01/MW01	1.13	7585	6.94	-18.37	19.2

Review of the field parameters as presented above indicates that the groundwater is near neutral and mildly acidic, prevalent under oxidising conditions and characterised as saline.

Table 8.4 Groundwater Observations

Well Reference	Odour	Sheen	Turbidity	Light non-aqueous phase liquid (LNAPL)
BH01/MW01	No odour	No sheen	turbid	None observed

8.5 Groundwater Analytical Results

Detailed laboratory reports and chain of custody documentation are provided in **Appendix N.** Summarised groundwater analytical data for COPCs are presented in **Table C** and discussed in the following sections.

8.5.1 Metals

Heavy metal concentrations within the sample were all reported to be below the adopted site assessment criteria with the exception of the following:

- Copper concentration (0.004 mg/L) detected exceeding the ecological criterion (0.0014 mg/L); and
- Zinc concentration (0.14 mg/L) detected exceeding the ecological criterion (0.008 mg/L).

8.5.2 TRH and BTEX

TRH compounds were reported less than site assessment criteria with the exception of the following:

- F2 (TRH>C10-C16 less naphthalene) concentration was detected at a concentration exceeding the drinking water criterion (0.09 mg/L); and
- TRH>C10-C40 Fraction (Total) concentration (0.83 mg/L) detected exceeding the drinking water criterion (0.09 mg/L).

BTEX concentrations were reported below the laboratory LOR.

8.5.3 Polycyclic Aromatic Hydrocarbons

PAH compound concentrations were all reported to be below the laboratory LORs and/or less than the adopted site criteria within the analysed samples.

9. Site Characterisation

Based on the decision-making process for assessing urban redevelopment sites detailed in EPA (2017), the decisions required to be made are discussed below.

9.1 Are there any unacceptable risks to future onsite receptors?

In reference to the decision rules developed in **Section 5.1.2**, the following sections discuss potential risks posed to future on-site receptors from impacted media present at the site.

Representative samples of soil analysed for identified contaminants of concern were reviewed against established site assessment criteria. No COPCs in soil characterisation samples were reported at concentrations exceeding the adopted health based and ecological criteria.

Comparison of analytical results with the adopted site assessment criteria has not identified the occurrence of groundwater impacts presenting a significant risk to future site users. The reported copper and zinc concentrations are considered to most likely reflect background conditions within the hydrogeological setting of the site given that there were no elevated levels of heavy metals within soil samples collected at the site. TRH fractions including F2 (TRH>C10-C16 less naphthalene) and TRH>C10-C40 Fraction (Total) were detected at concentrations exceeding the drinking water criteria. It is noted that drinking water criteria were adopted as a conservative guideline during the current investigation and beneficial reuse of groundwater at the site is unlikely given that the proposed development will include reticulated water supply. Further, groundwater was identified to be saline, consistent with the encountered geology and therefore not considered suitable as a drinking water source.

Therefore, the reported COPC concentrations in groundwater is not considered to represent an unacceptable risk to future on-site receptors.

9.2 Background Soil Concentrations

In-situ natural soils were sampled and analysed for heavy metals, PAHs, TRH, BTEX, OCPs and PCBs. Heavy metals concentrations were reported to be within background concentrations provided in Olszowy et. al. (1995) and were below the adopted site criteria. Other organic contaminants were detected below the laboratory LOR and/or the adopted site criteria.

9.3 Chemical Mixtures

There were no potential chemical mixtures identified during the investigation that may pose an unacceptable contamination risk at the site with respect to future site users.

9.4 Aesthetic Issues

No odours or staining associated with potential contamination were noted during the investigation works completed at the site, and no visible ACM was observed at the site surface or in soils at investigation locations.

Brick and concrete fragments observed within surface soil to the south of Block P, to the north and east of Building D, and adjacent to the drainage line in the northern portion of the site which could pose an aesthetic issue if exposed.

9.5 Potential Migration of Contaminants

Based on the conditions encountered during the soil investigation, the lack of significant COPC concentrations in soil samples, and findings of the preliminary groundwater assessment, COPC migration to groundwater or off-site migration of contamination via surface water/groundwater is considered to be low.

9.6 Site Management Strategy

Based on the scope of works completed, including a desktop review and limited intrusive investigations, and the limitations presented in **Section 11**, there are considered not to be any contamination conditions at the site that represent an unacceptable risk with respect to the proposed development works. On this basis, a long term contamination management strategy is not required for the site. Typical site management controls including protocols to manage unexpected finds should be implemented during any ground disturbance works associated with future site development to enable management of any unidentified contamination if encountered.

10. Conclusions and Recommendations

10.1 Conclusions

Based on the scope of work and subject to the limitations in **Section 11**, the following conclusions are made:

- The site history review identified that the site was historically used for rural residential and agricultural use including livestock grazing and market gardening prior to development as the TAFE Kingswood Campus with no significantly contaminating historical land uses identified.
- A search of the NSW EPA contaminated land register and NSW contaminated sites notified to the EPA did not identify any notices relating to the site, or any potential for migration of contamination to the site from adjacent properties.
- Based on review acid sulfate soil risk mapping, local topography and site observations, no further consideration of requirements in relation to assessment and/or management of ASS is necessary with regard to the proposed development.
- Concentrations of COPCs were not identified at levels posing an unacceptable risk to human/ecological receptors relating to the proposed development of the site.
- Brick and concrete fragments observed within surface soil to the south of Block P, to the north and east of Building D, and adjacent to the drainage line in the northern portion of the site which could pose an aesthetic issue if exposed.
- Based on the conditions encountered during the soil investigation and the lack of significant COPC concentrations in soil samples, and findings of the preliminary groundwater assessment, COPC migration to groundwater or off-site migration of contamination via surface water/groundwater is considered to be low.
- The risk from contamination at the site is low. However, fill is present at the site, and given the limited nature of intrusive investigations, implementation of an appropriate unexpected finds protocol for future development works would enable management of any unidentified contamination, if encountered.

10.2 Recommendations

Typical site management controls including protocols to manage unexpected finds should be implemented during any ground disturbance works associated with future site development.

11. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquires.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

Figures

Figure 1 Site Location

NOTE: CONVERT TO PDF – DELETE THIS PAGE AND INSERT FIGURE IN PDF

Figure 2 Site Layout

NOTE: CONVERT TO PDF – DELETE THIS PAGE AND INSERT FIGURE IN PDF

Figure 3 Sampling Locations

NOTE: CONVERT TO PDF – DELETE THIS PAGE AND INSERT FIGURE IN PDF

Figure 4 Proposed Development Plan

NOTE: CONVERT TO PDF – DELETE THIS PAGE AND INSERT FIGURE IN PDF

Table A – Soil Analytical Results

Table B – Waste Classification Results

Table C – Groundwater Analytical Results

Appendix A Proposed Development Plans

Appendix B Photo Log

Appendix C Groundwater Bore Search

Appendix D Historical Aerial Photographs

Appendix E Historical Land Titles

Appendix F EPA Searches

Appendix G EPA PFAS Site Register

Appendix H NSW Fair Trading Searches

Appendix I Heritage Database Searches

Appendix J Section 10.7 Planning Certificate

Appendix K Bore Hole Logs

Appendix L Calibration and Decontamination Sheets

Appendix M QA/QC Summary

Appendix N Laboratory Certificates and COC Documentation

Appendix O Statistical Analyses

Document Distribution

Rev No.	Copies	Recipient	Date
A	1 x electronic copy	Sam Gibson Cadence Australia Via email: sgibson@cadenceaust.com	8/12/2020
0	1 x electronic copy	Sam Gibson Cadence Australia Via email: sgibson@cadenceaust.com	8/01/2021
1	1 x electronic copy	Sam Gibson Cadence Australia Via email: sgibson@cadenceaust.com	5/02/2021

Document Status

Rev No.	Author	Reviewer	Approved for Issue		
		Name	Name	Signature	Date
A	Sahani Gunatunge	John De Martin	Draft for client review		8/12/2020
0	Sahani Gunatunge Environmental Consultant	John De Martin Principal	John De Martin		8/01/2021
1	Sahani Gunatunge Environmental Consultant	John De Martin Principal	John De Martin		5/02/2021