

01 July 2022

Meriden School
c/CTPG
Attn: Robin Merrick

By email: robin.merrick@ctpg.com.au

Dear Robin

RE: INTERIM AUDIT ADVICE LETTER NO. 1 - REVIEW OF REMEDIATION ACTION PLAN FOR PROPOSED DESIGN AND CREATIVE ARTS BUILDING AND SOCIAL SCIENCES BUILDING, MERIDEN SENIOR SCHOOL CAMPUS

1. INTRODUCTION

As a NSW Environment Protection Authority (EPA) accredited Contaminated Sites Auditor, I am conducting a Site Audit (LW-027) under the NSW *Contaminated Land Management Act 1997* (CLM Act) in relation to the subject site. This initial review has been undertaken to provide an independent review of the suitability and appropriateness of a Remediation Action Plan (RAP) developed to support the construction of two separate school buildings on the Senior School Campus.

The buildings are referred to as the new Design and Creative Arts (DaCA) Building and the new Social Sciences (SS) Building and are to be completed in two separate stages. Meriden School intend to submit a State Significant Development Application (SSDA) for the two developments and have requested a Site Audit to ensure regulatory compliance in relation to management of contamination during the development process and to confirm site suitability for ongoing use as a secondary school. It is anticipated that a site audit statement (SAS) and supporting site audit report (SAR) will be made a condition of planning consent.

This interim letter is based on a review of the documents listed below, as well as discussions with Meriden School and Douglas Partners Pty Ltd (DP) who undertook the investigations and prepared the RAP.

The reports reviewed were:

- 'Report on Preliminary Site Investigation (Contamination), Proposed Development, 10-28 Redmyre Road, Strathfield', 13 February 2014, DP (DP, 2014a)
- 'Factual Report on Contamination Testing, Meriden Anglican School for Girls, 10-28 Redmyre Road, Strathfield', 2 June 2014, DP (DP, 2014b)

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- 'Report on Preliminary Site Investigation for Contamination, Proposed Meriden Centre of Music and Drama, 13 Margaret Street, Strathfield', 30 May 2019, DP (*DP, 2019*)
- 'Report on Detailed Site Investigation (Contamination), New DaCA building, Admin building and Refurbishment Works, 3 Margaret Street, Strathfield', 27 June 2022, DP (*the DSI*)
- 'Remediation Action Plan, New DaCA building, Admin building and Refurbishment Works, 3 Margaret Street, Strathfield', 27 June 2022, DP (*the RAP*)

I have reviewed the key documents against:

- Chapter 4 Remediation of Land in the Resilience and Hazards State Environment Planning Policy (SEPP) 2021 (formerly known as SEPP 55) and NSW Department of Urban Affairs and Planning and NSW EPA (2008) '*Managing Land Contamination, Planning Guidelines SEPP 55 - Remediation of Land*'
- NSW EPA (2017) '*Guidelines for the NSW Site Audit Scheme (3rd Edition)*'
- NSW EPA (2020) '*Contaminated Land Guidelines, Consultants Reporting on Contaminated Land*'
- National Environment Protection Council (NEPC) (2013) '*National Environment Protection (Assessment of Site Contamination) Measure*' (*NEPM, 2013*)

1.1 Location

The site details are as follows:

Street address:	3 Margaret Street, Strathfield, NSW 2135
Identifier:	Part Lot 101 in Deposited Plan (DP) 862040
Local Government:	Strathfield Council
Owner:	Meriden School
Site Area:	Approximately 1,200 m ² (DaCA Building) and 600 m ² (SS Building)
Zoning:	R3 - Medium density residential

The boundaries of the school campus are well defined by streets and adjoining properties. The development site boundaries within the campus are not well defined. The school campus layout and development site boundaries are shown on Attachment 1.

1.2 Adjacent Uses

The site is located within an area of mixed residential and commercial site use. The surrounding site use includes:

- North: Redmyre Road with residential and commercial site use beyond
- East: Commercial with residential above then The Boulevard with commercial land use beyond
- South and west: Margaret Street with residential and the Meriden School Primary campus to the south-west

There are no surrounding land uses with the potential to have contaminated the site. The closest surface water body is Powells Creek which is located approximately 600 m to the north of the site. Powells Creek flows into Parramatta River/ Homebush Bay, approximately 4 kilometres (km) to the north of the site.

A search of the WaterNSW website completed by DP in the PSI and the Auditor in June 2022 did not reveal any registered groundwater bores within 500 m of the site.

1.3 Site Condition

DP note in the RAP that the two site areas are currently occupied by existing school infrastructure including existing site buildings, demountable classrooms and grassed open areas (Attachment 1).

1.4 Proposed Development

The proposed development is understood to comprise construction of the new DaCA Building in the western section of the campus, in the location of a current open space, and the SS Building in the eastern portion of the campus, in the location of the current administrative building. The DaCA Building will be a three-storey building with a two-level basement. The SS Building is to comprise a three-storey building with a single basement level. Basement levels are understood to extend to approximately RL 8 to 11 m (ground level RL of ~15 to 16 m) relative to Australian Height Datum (AHD). The redevelopment will also comprise the construction of open-space landscaping and walkways around the new structures.

The proposed development is considered to fall within a secondary school exposure scenario.

2. SITE HISTORY

DP provided a summary of the site history in the DSI and the RAP based on historical aerial photographs from 1930, 1943, 1951, 1970, 1986, 1991, 1999, 2009, 2016 and 2018, site photographs, NSW EPA records and Certificates of Title.

The DP summary indicates that, prior to development as a school, the campus area was used for residential purposes. The senior campus was founded in 1929 and at the time comprised two residential properties located in the north along Redmyre Road. Surrounding residential properties were progressively purchased to expand the school grounds with purpose-built school structures built in the 1930s. Further expansion of the school occurred from 1960 onwards. The progressive development works were noted to comprise demolition of historic residential structures and early purpose-built school structures and replacement with modern school structures.

Potential impacts from previous land-uses were considered to be demolition of structures (including hazardous building materials such as asbestos containing materials (ACM)) and importation of uncontrolled fill which may include incinerator waste, which is known to have historically been used as imported fill in inner-city areas for general levelling and drainage purposes.

DP reported in the DSI that a review of the Section 10.7 Planning Certificate did not identify any notable records associated with the site. The site and adjacent areas were not listed within the EPA public registers as determined by a search of the registers completed by DP in May 2022.

2.1 Auditor's Opinion

In the Auditor's opinion, the site history provides an adequate indication of past activities. There were no indicators of significant industrial uses on-site and surrounds that would have the potential to contaminate the site. Previous site uses with the most significant potential to cause contamination include importation of uncontrolled fill and uncontrolled demolition of buildings containing hazardous building materials.

3. CONTAMINANTS OF CONCERN

DP provided a list of the contaminants of concern and potentially contaminating activities in the DSI and the RAP. These have been tabulated in Table 3.1.

Table 3.1: Contaminants of Concern

Activity	Potential Contaminants
Importation of fill	Metals / metalloids (As, Cd, Cr, Cu, Hg, Ni, Pb and Zn), total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), organochlorine pesticides (OCP), organophosphate pesticides (OPP), polychlorinated biphenyls (PCB), phenols, asbestos
Burial or use of incinerator ash as fill	Metals, TRH, PAH
Pesticides for pest control and building maintenance	OCP, OPP, metals
Hazardous building materials	Asbestos, synthetic mineral fibres (SMF), lead (in paint), PCB

3.1 Auditor’s Opinion

The Auditor considers that the analyte list used by DP adequately reflects the site history and condition. There has been no assessment by the consultants for the presence of per- and poly-fluoroalkyl substances (PFAS) but in the Auditor’s opinion there are no indications in the site history that they would be potential contaminants of concern.

4. STRATIGRAPHY AND HYDROGEOLOGY

Following a review of the reports provided, a summary of the site stratigraphy and hydrogeology was compiled as follows.

4.1 Stratigraphy

DP reviewed geological maps and reported that the site is underlain by Ashfield Shale of the Wianamatta group consisting of light to dark grey shale and laminite.

During the DP, 2014a investigation, 6 boreholes were completed within the senior campus, two to the immediate east of the proposed DaCA building location and four to the south of the proposed SS Building. During DP 2014b, seven additional boreholes were completed in the western portion of the site in the area of the existing building constructed in 2015 and the proposed DaCA Building. During the 2022 DSI, DP completed seven borehole locations in the area of the proposed DaCA Building and three locations in accessible areas adjacent to the location of the proposed new SS Building.

The sub-surface profile encountered during these investigations was relatively consistent and is summarised in Table 4.1.

Table 4.1: Stratigraphy

Depth (mbgl)	Subsurface Profile
0.0 to between 0.3 and 1.2	Fill is described in the DSI as comprising sandy clay, silty clay and silty sand with inclusions of gravel, sand, asphaltic concrete fragments, charcoal and ash. Fill in the area of the proposed DaCA Building encountered during DP, 2014b is described as silty clay, silty sand and sand topsoil to depths of 0.1 m to 0.15 m underlain by clay, sandy clay and silty gravel with gravel, ash, plastic, concrete, shale, sandstone, ironstone and ceramic tile to depths of 0.35 m to 0.5 m.
0.3 – 2.9	Silty clay, red-brown and yellow-brown mottled grey, pale orange-brown residual clays with inclusions of ironstone gravel to depths.
2.0 to 10.2	Bedrock described as shale or sandstone underlain by laminite from depths of approximately 4.0 m to maximum investigation depth of 10.2 mbgl.

mbgl – metres below ground level

DP report in the DSI that the site is located in an area of extremely low probability of occurrence of acid sulfate soils (ASS).

4.2 Hydrogeology

A groundwater well was installed on the campus during the DP 2019 investigation approximately 50 m to the south-east of the proposed DaCA building footprint. Groundwater standing water level (SWL) was recorded at 3.3 mbgl in this well in October 2018. Groundwater was not encountered during the DSI where the maximum investigation depth was 2.9 mbgl.

DP reported in the DSI that no registered groundwater wells were identified within the vicinity of the site and that based on topography groundwater is anticipated to flow towards the north towards Powell Creek.

4.3 Auditor's Opinion

The Auditor considers that the depth of fill and underlying stratigraphy have been adequately characterised for remediation planning purposes. The heterogeneity and extent of fill material has the greatest potential to impact the remediation of the site, especially in the area of the proposed SS Building where there has been limited assessment of subsurface conditions due to limited access. Further investigation to characterise fill material is not considered necessary prior to demolition and remediation given the access restrictions and limitations of borehole investigations.

The Auditor concludes that the shallow formation underlying the site is of low permeability and therefore the potential for significant groundwater contamination or migration of contamination is low. Given that significant leachable soil contamination has not been identified at the site (see Section 8), the Auditor is satisfied that further intrusive assessment of groundwater is not required at the site.

5. ENVIRONMENTAL QUALITY CRITERIA

The Auditor has assessed the results against Tier 1 criteria from NEPM (2013). Other guidance has been adopted where NEPM (2013) is not applicable, or criteria are not provided. Based on the proposed continued use as a secondary school, the human health criteria for 'residential' and 'public open space' and ecological criteria appropriate for 'urban residential and public open space' have been adopted.

5.1 Soil Assessment Criteria

Human Health Assessment Criteria

The Auditor has adopted human health assessment criteria from the following sources:

- NEPM (2013) Health Investigation Levels (HILs) for 'Public Open Space' (HIL- C) land use.
- NEPM (2013) Health Screening Levels (HSLs) for 'Low-High Density Residential' (HSL-A&B) land use. The HSLs assumed a clay soil type based on the encountered soil profile. Depth to source adopted was <1 m as an initial screen.
- NEPM (2013) Management Limits (MLs) for petroleum hydrocarbons for 'Residential and Open Space' land use and assuming coarse soil texture.
- NEPM (2013) HSLs for Asbestos Contamination in Soil for 'Public Open Space' (HSL- C) land use, or presence/absence of asbestos.

Ecological Assessment Criteria

The Auditor has adopted ecological soil assessment criteria from the following sources:

- NEPM (2013) Ecological Screening Levels (ESLs) for 'Urban Residential and Public Open Space' land use, assuming fine soil.

- NEPM (2013) Ecological Investigation Levels (EILs) for 'Urban Residential and Public Open Space' land use. Site specific EILs have been derived using the Interactive (Excel) Calculation Spreadsheet provided in the ASC NEPM Toolbox assuming the contamination is "aged", high traffic volume, 10% clay content and using site specific pH and cation exchange capacity (CEC) values. The pH and CEC values adopted were an average of values for two samples of silty clay fill analysed during the DSI (from BH8 and BH9) and were average pH of 7.7 (range 7.5 to 7.8) and CEC of 22.5 meq/100g (range 14 to 31).
- Canadian Council of Ministers of the Environment (CCME) (2010) *Canadian soil quality guidelines: carcinogenic and other polycyclic aromatic hydrocarbons (PAHs)* soil quality guideline (SQG) for benzo(a)pyrene for 'Residential' / 'Public Open Space' land use. The SQG has been adopted in place of the NEPM (2013) ESL as it is based on a larger and more up-to-date toxicity database than the low reliability NEPM (2013) ESL.

Soil Aesthetic Considerations

The Auditor has considered the need for soil remediation based on 'aesthetic' contamination as outlined in Section 3.6 *Aesthetic Considerations* of NEPM (2013) Schedule B1, which acknowledges that there are no chemical-specific numerical aesthetic guidelines. Instead, site assessment requires a balanced consideration of the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity.

5.2 Auditor's Opinion

The environmental quality criteria referenced by the Auditor are consistent with those adopted by DP with the exception of the following:

- DP applied a more conservative Tier 1 human health criteria for a low density residential land use to be protective of primary school children.

The Auditor notes that the site is a secondary school and is unlikely to be used by primary school aged children. Given the results obtained, the Auditor considers that these discrepancies do not affect the overall conclusions reached by DP and the Auditor and do not impact on the requirement for remediation.

6. EVALUATION OF SITE INVESTIGATION DATA

The Auditor has reviewed the site investigation information presented in the referenced reports. The data sources, scope of the investigation and summary of analytical data obtained is summarised in Table 6.1. Soil samples were analysed for a variety of contaminants including petroleum hydrocarbons, PAHs, asbestos and heavy metals. The majority of analysed samples were of the fill. The results obtained for fill material have been assessed against the environmental quality criteria and summarised in Table 6.2. Soil sampling locations are presented in Attachments 1-4.

Table 6.1: Summary of Investigations

Investigation	Field Investigations	Analytical Data Obtained
PSI for buildings constructed between 2015 and 2017 in the western and south-eastern portions of the site. (DP 2014a)	6 boreholes (BH1-BH6) to maximum depth of 7.0 mbgl. Two boreholes BH1 and BH2 were located to the east of the proposed DaCA building and BH3 was located to the south of the proposed SS Building (Attachment 2). Fill was encountered at all locations to depths of 0.6 and 0.9 mbgl in BH1 and BH2 and to 0.7 mbgl in BH3. Field screening of replicate soil samples collected from the boreholes was	4 x fill samples from BH1-BH4 analysed for metals, TRH/BTEX, PAHs, phenol, OCPs, PCBs and asbestos (presence/absence). 2 samples of natural soils were also analysed for the same analytes from BH5 and BH6. TCLP analysis was performed on three fill samples, including BH1 at 0.4 mbgl for BaP and lead. Leachable concentrations of BaP were <0.001 mg/L and lead were <0.2 mg/L.

Investigation	Field Investigations	Analytical Data Obtained
	completed using a calibrated Photoionisation Detector (PID). No elevated PID readings were reported. No odour or staining was reported.	
Factual contamination report for additional sampling for buildings constructed between 2015 and 2017 in the western and south-eastern portions of the site. (DP, 2014b)	7 boreholes (BH1-BH7) to maximum depth of 0.5 mbgl. The boreholes were located in the area of the proposed DaCA Building (Attachment 3). Fill was encountered at all locations to depths >0.5 m the maximum extent of investigation. Field screening of samples using a PID was completed. No elevated PID readings were recorded. A slight hydrocarbon odour was detected in fill at BH6 at 0.2 mbgl. The sample was not analysed for petroleum hydrocarbons.	14 x Fill samples analysed for PAH.
PSI for area in south of campus (DP, 2019)	Fill samples were collected from 8 locations; 5 boreholes (BH101-BH105) and from three test pits (TP106, TP108A and TP109) (Attachment 4). Fill was encountered to depths of between 0.25 and 1.2 mbgl. Field screening with a PID was not completed. It was noted that ACM was not observed and no odours or staining reported.	8 x Fill samples analysed for metals, TRH/BTEX, PAHs, 5 x phenol, 6 x OCPs, PCBs and 8 x asbestos (presence/absence).
DSI for proposed DaCA and SS Buildings (DP,2022)	Completion of 10 boreholes BH1-BH10, seven within the location of the proposed DaCA building and three in the area around the proposed SS Building (Attachment 1) to maximum depth of 10.2 mbgl. Fill was encountered to depths of between 0.3 and 1.2 mbgl. Refusal was encountered in BH10 at 0.5 m on a concrete slab. Field screening of samples using a PID was completed. No elevated PID readings were recorded. The DSI noted that no odours or staining were observed.	16 x Fill samples from 10 locations analysed for metals and PAH, 14 x TRH/BTEX, 5 x phenol, 6 x OCPs, 3 x OPPs, 8 x PCBs and 13 x asbestos (presence/absence). TCLP analysis was completed on 3 samples for arsenic, lead, mercury and nickel and 2 samples for total PAH and BaP. The results indicated the contaminants had low leachability.

Table 6.2: Evaluation of Soil Analytical Results for Fill – Summary Table (mg/kg)

Analyte	n	Detections	Maximum	n > Human Health Screening Criteria	n > Terrestrial Ecological Screening Criteria
Asbestos (presence/absence)	25	1	-	1 detection	-
BTEX	26	0	<PQL	0 above HSL A&B	0 above ESL (open space) (fine)
F1 (TRH C ₆ -C ₁₀ minus BTEX)	26	0	<25	0 above HSL A&B	0 above ESL (open space) 180 mg/kg

Analyte	n	Detections	Maximum	n > Human Health Screening Criteria	n > Terrestrial Ecological Screening Criteria
F2 (TRH >C ₁₀ -C ₁₆ minus naphthalene)	26	0	<50	0 above HSL A&B	0 above ESL (open space) 120 mg/kg
F3 (TRH >C ₁₆ -C ₃₄)	26	12	1100	0 above ML (urban residential) 3500 mg/kg	0 above ESL (open space) (coarse) 1300 mg/kg
F4 (TRH >C ₃₄ -C ₄₀)	26	3	250	0 above ML (urban residential) 10,000 mg/kg	0 above ESL (open space) (fine) 5600 mg/kg
Naphthalene	42	10	1.2	0 above HSL A&B 0-1 m, clay 5 mg/kg	0 above EIL (open space) 170 mg/kg
Benzo(a)pyrene (BaP)	42	34	32	-	2 above CCME SQG (open space) 20 mg/kg
Benzo(a)pyrene TEQ (BaP TEQ)	42	30	44	17 above HIL C 3 mg/kg	-
Total PAHs	42	35	350	2 above HIL C 300 mg/kg	-
Total Phenols	14	0	<PQL	0 above HIL C 40,000 mg/kg	-
Arsenic	28	22	250	0 above HIL C 300 mg/kg	1 above EIL (open space) 100 mg/kg
Cadmium	28	4	0.5	0 above HIL C 90 mg/kg	-
Chromium	28	28	20	0 above HIL C 300 mg/kg	0 above site-specific EIL (open space) 410 mg/kg
Copper	28	28	67	0 above HIL C 17,000 mg/kg	0 above site-specific EIL (open space) 240 mg/kg
Lead	28	28	500	0 above HIL C 600 mg/kg	0 above EIL (open space) 1,100 mg/kg
Mercury	28	14	1.9	0 above HIL C 80 mg/kg	-
Nickel	28	28	41	0 above HIL C 1200 mg/kg	0 above site-specific EIL (open space) 290 mg/kg
Zinc	28	28	190	0 above HIL C 30,000 mg/kg	0 above site-specific EIL (open space) 880 mg/kg
PCB	18	0	<PQL	0 above HIL C 1 mg/kg	-
OCP	16	0	<PQL	0 above HIL C	0 above EIL
OPP	7	0	<PQL	0 above HIL C	-

n number of samples
 - No criteria available/used
 NL Non-limiting
 <PQL Less than the practical quantitation limit

In assessing the results, the Auditor makes the following observations:

- Concentrations of BaP TEQ exceeded the Tier 1 HIL in 17 of the 42 fill samples analysed and total PAH in 2 of 42 samples analysed. BaP also exceeded the ecological criteria in 2 samples. The source of PAHs is considered to be charcoal and ash in fill material present in both development areas.

- Asbestos was detected as chrysotile asbestos in a fragment of 'matted material' in one sample during the DSI in BH8 in the footprint of the proposed DaCA Building with an estimated weight of 0.0027 g, however it was estimated at less than the reporting limit for the method (i.e. < 0.1 g/kg).
- Arsenic was detected above EIL in one sample (BH7 at 0.3 mbgl) in the footprint of the proposed DaCA Building. DP completed statistical analysis of results for arsenic which indicated the 95% upper confidence limit (UCL) of the data set was below the health-based assessment criteria.
- Concentrations of all other contaminants of concern were below Tier 1 assessment criteria for human health and the ecological receptors.
- Concentrations of contaminants of concern in samples of natural soils underlying the fill were below Tier 1 assessment criteria for human health and ecological receptors.

DP considered the results of the historical site investigations within the DSI and concluded that:

"the site is likely to be impacted by contamination in fill notably as PAH, metals and potential asbestos containing materials in soil. Notably the PAH contamination is considered associated with combustion by-products such as ash / charcoal historically used in inner-city developments as cheap fill (e.g., for general levelling purposes). Detection of asbestos in soil at one location is considered indicative of further potential impacts given the limited nature of the investigation and the investigation methods (i.e., boreholes) which are not ideally suited for identifying asbestos materials in soils. Based on the nature of the contaminants it is considered unlikely that any significant contamination of groundwater is present and therefore does not require further assessment at this stage".

DP recommended that a RAP be prepared to address the PAH, metals and asbestos contamination and outline data gap assessments for previously inaccessible areas below the current administrative building. They also recommended a hazardous building materials survey be completed prior to demolition of buildings and that further waste classification be completed for soils that require off-site disposal during the development works.

Based on the existing data set and TCLP analysis, DP indicated that, with the exception of fill material at BH9/0.9-1.0, contaminant concentrations, in conjunction with the TCLP results, indicate that fill material would have a preliminary waste classification of general solid waste.

Fill in the vicinity of BH9 was given a preliminary waste classification of restricted solid waste. However, DP note that *"given the previous and current detection of charcoal, ash etc. it may be possible to further assess any excavated soils with reference to the NSW EPA immobilisation order for ash materials (NSW EPA, 1999) which allows assessment of PAH concentrations in terms of the TCLP concentration alone. Therefore, subject to further assessment the classification of soils near BH9/0.9-1.0 may be potentially reduced."*

6.1 Auditor's Opinion

The Auditor has undertaken an initial review of the historical data, including data quality, and considers that the sampling undertaken is generally sufficient to characterise site conditions and that soil analytical results are consistent with the site history and field observations. However, it is noted that, based on the site history, and due to the limitations of the borehole investigations undertaken and adopted sampling methodology for assessment of asbestos, there is the potential for asbestos to be present in fill at a greater extent than indicated by the investigation results.

The investigation results indicate that the fill material present across both development sites is impacted by PAH, likely from ash and coke, and potentially asbestos. In the Auditor's opinion the development sites for both the DaCA Building and the SS Building have been adequately characterised for remediation planning purposes. There are data gaps in relation to soil conditions in the footprint of the SS Building due to the current administrative building limiting access for assessing subsurface conditions

in this area and in relation to the extent of asbestos in fill. These data gap are to be assessed following building demolition as outlined in the RAP (discussed in Section 9).

7. EVALUATION OF CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is a representation of the source, pathway and receptor linkages at a site. DP developed a CSM during the DSI and used it to inform decisions around investigation and management requirements. Table 7.1 provides the Auditors review of the final CSM used by DP to inform the remediation strategy.

Table 7.1: Review of the Conceptual Site Model

Element of CSM	Consultant	Auditor Opinion
Contaminant source and mechanism	Imported fill Burial or use of incinerator ash as fill Hazardous building materials	The sources of contamination have been adequately identified.
Affected media	Fill and soil	The affected media has been appropriately identified. The potential for contamination of natural soil, groundwater or soil gas is low based on the detected contamination and surrounding site uses.
Receptor identification	Current and future users of the school, including secondary school students, staff, visitors and site workers Construction and maintenance workers Adjacent site users (residential/commercial) Surface water Groundwater Terrestrial ecology	The human and ecological receptors have been appropriately identified.
Exposure pathways	Ingestion and dermal contact Inhalation of dust and / or vapours Surface water run-off Leaching of contaminants and vertical migration into groundwater Lateral migration of groundwater providing base flow to water bodies Inhalation, ingestion and ecological absorption	The identified potential exposure pathways are appropriate. The Auditor notes that based on the low volatility of the contaminants the potential for exposure via inhalation of vapours is unlikely. Based on the age of the contamination and low leachability, leaching and impact to groundwater and surface water is also considered unlikely.
Presence of preferential pathways for contaminant movement	Not discussed	Based on the nature of the contamination, non-volatile and low leachability contaminants, migration via preferential pathways is considered unlikely.
Potentially complete source-pathway-receptor (SPR) linkages requiring remediation or management	The RAP identifies all potentially complete SPR linkages, however, does not comment on which pathways are actual complete exposure pathways that need to be addressed through remediation.	Based on the low volatility and low leachability of the identified contaminants, the Auditor considers that complete exposure pathways are limited to inhalation of dust and asbestos fibres and ingestion and dermal contact with PAHs and metals. Exposure via inhalation of vapours or leaching of contaminants to groundwater and surface water are not considered complete exposure pathways.

Element of CSM	Consultant	Auditor Opinion
		There is a potential risk to ecological receptors if areas of the site are to be landscaped.
Evaluation of data gaps	Data gaps identified in the RAP are the extent of PAH impacted fill in the area of the SS Building and in the western portion of the proposed DaCA Building footprint due to these areas being inaccessible during investigation as they were covered by existing buildings. The presence and extent of asbestos in fill is also identified as a data gap.	While the extent of contamination has not been fully assessed due to inaccessibility, based on the site history and historical investigation data it is likely that the fill extends across the footprint of both proposed building sites. A data gap assessment is included in the RAP following demolition works to further quantify the extent of fill that requires remediation.

7.1 Auditor’s Opinion

The Auditor is of the opinion that the CSM was a reasonable representation of the contamination at the site although the Auditor notes that, based on the results of the site investigations, several of the exposure pathways identified as potentially complete in the RAP are unlikely to be complete. The main exposure pathways that require further management through remediation or management measures are considered by the Auditor to be:

- Ingestion and dermal contact with PAH and asbestos impacted fill by future site users and construction and maintenance workers.
- Inhalation of dust and asbestos fibres by future site users and construction and maintenance workers.
- Uptake of PAH and metals by terrestrial ecology.

The remediation and validation works reviewed herein (Section 8) are considered adequate to address the identified risks to human health and ecological receptors under the proposed use of the site as a secondary school.

8. EVALUATION OF PROPOSED REMEDIATION

8.1 Remediation Required

Based on the investigations previously completed by DP, the contaminants of concern that require remediation have been summarised in Table 8.1. Remedial works are proposed following removal and disposal of hazardous materials, demolition of the remainder of the buildings, lawful removal of material off-site and exposure of underlying soil.

An unexpected finds protocol and a program of sampling to address data gaps is included in the RAP that will address soil underlying current buildings and structures as outlined in Table 8.2.

Table 8.1: Remediation Required and Preferred Options

Description	Extent of Remediation Required	Preferred Options
Fill materials impacted with PAH and asbestos	To be determined through data gap assessment but likely to comprise the lateral extent of the footprint of the two development areas and the vertical extent being the depth to natural soil (between approximately 0.3 and 1.2 mbgl).	Excavation and off-site disposal in the area where basement excavation is required. Excavation and off-site disposal or capping and containment in areas outside the basement footprint to be determined based on the results of the data gap assessment.

8.2 Evaluation of RAP

The Auditor has assessed the RAP by comparison with the checklist included in NSW EPA (2020) *Consultants Reporting on Contaminated Land*. The RAP was found to address the required information, as detailed in Table 8.2, below.

Table 8.2: Evaluation of Remedial Action Plan

Remedial Action Plan	Auditor Comments
<p><i>Remedial Goal</i></p> <ul style="list-style-type: none"> Address potentially unacceptable risks to relevant environmental values from contamination; and Render the site suitable, from a contamination perspective, for the proposed development. 	<p>In the Auditor’s opinion, this goal is considered appropriate. It is noted that DP have assumed an end use that is protective of primary school students which is more conservative than that required for a secondary school and the Auditor considers secondary school use as the proposed end use.</p>
<p><i>Discussion of the Extent of Remediation Required</i></p> <p>The extent of remediation is outlined in the RAP as indicated in Table 8.1 above and is identified as comprising PAH contaminated fill, possible isolated metal contamination and asbestos contamination. The full extent of remediation is to be determined following a data gap investigation after demolition of site buildings/structures. The scope of the data gap assessment is outlined in the RAP.</p>	<p>The Auditor notes that concentrations of metals were reported below the Tier 1 assessment criteria and, based on the current data set, do not warrant remediation. The extent of remediation required to address PAH and asbestos impacted fill is to be determined during the data gap assessment following demolition/removal of site buildings and structures. Based on previous site data it is likely the impacted fill will extend across the footprint of the development areas.</p>
<p><i>Remedial Options</i></p> <p>Remedial options were assessed and included do nothing, excavation and off-site disposal and on-site management (cap and contain).</p>	<p>The Auditor considers that an appropriate range of options were considered.</p>
<p><i>Selected Preferred Option and Rationale</i></p> <p>The preferred option was discussed within the RAP. Based on the relatively shallow depth of fill, available space at the site (within an operating school campus) and the nature of contaminants, options for on-site or off-site treatment of soils are not considered to be practicable. Given that the site requires excavation for construction of a basement, excavation and off-site disposal of fill was the preferred remediation option. DP note that in the areas outside the basement footprint excavation of elevated concentrations of contaminants will be undertaken based on the results of the data gap investigation. A contingency measure of capping and on-site management is included in the RAP.</p>	<p>The Auditor considers the preferred option of excavation and off-site disposal to be appropriate but notes that the excavation of ‘hot spots’ of contamination in areas outside of the basement footprint is unlikely to be appropriate given the PAH contamination is characteristic of the fill unit across both development sites (and likely the remainder of the school). Depending on the outcome of the data gap investigation, it may be appropriate to remove all fill or otherwise cap and contain all retained fill and manage under an environmental management plan if validation data indicates the fill poses a risk to receptors.</p>
<p><i>Description of Remediation to be Undertaken</i></p> <ol style="list-style-type: none"> Data gap investigation involving test pitting in previously inaccessible areas Targeted excavation of fill with elevated concentrations of COPC from outside the basement footprint and off-site disposal Validation of retained fill as suitable for site use. Bulk excavation of fill from basement footprints and off-site disposal Validation of the excavation upon reaching natural soils 	<p>The Auditor considers the remediation strategy of excavation and off-site disposal is adequate to render the site suitable for its intended use. As noted above, the targeted excavation of ‘hot spots’ of contamination in areas outside of the basement footprint is unlikely to be appropriate given the PAH contamination is characteristic of the fill unit across both development sites.</p>
<p><i>Proposed Validation Criteria</i></p> <p>DP derived site specific health investigation levels (SSHILs) for BaP and total PAH of 12 mg/kg and 1200 mg/kg respectively using the NEPM (2013) HIL spreadsheet available from the ASC NEPM Toolbox1. The following site-specific inputs were considered:</p> <ul style="list-style-type: none"> Suitability of the data to characterise the PAH contamination 	<p>The Auditor has reviewed the SSHILs developed for BaP and total PAH and agrees with the assumptions adopted.</p> <p>The Auditor considers that the NEPM (2013) HIL/EIL criteria for Open Space (HIL/EIL C) are applicable for a secondary school use and are less conservative than the residential criteria adopted in the RAP. DP note that they have adopted the</p>

Remedial Action Plan	Auditor Comments
<ul style="list-style-type: none"> Nature of the PAH contamination: Aged based on the site history review and potential sources (i.e., incinerator ash / charcoal); leachability low based on toxicity characteristic leaching procedure (TCLP) results indicating low mobility associated with the contamination source in a bound matrix; source considered associated with ash / charcoal based on site history and a PAH fingerprint analysis; and soil type predominately fine grained, clayey soils (fill and natural). Site usage as a school deviates from the default HIL A scenario particularly for time spent on site as compared to a residential usage. <p>Assumptions for adopting different values for derivation of the SSHIL are documented in Appendix D of the RAP.</p> <p>The NEPM (2013) HIL/HSL A and EIL/ESL A criteria have been adopted for other contaminants including asbestos.</p>	<p>more conservative (HIL A) to be protective of primary school users, however, it is understood that primary school users are unlikely to access the areas. Given that SSHILs have been developed for the main contaminants of concern (PAH), the adoption of HIL A criteria is unlikely to impact the remediation validation.</p> <p>Criteria HSL A/B should be adopted for volatile contaminants, however, the existing data set indicates a low risk from volatile contaminants.</p>
<p><i>Proposed Validation Testing</i></p> <p><i>Data Gap Investigation:</i></p> <p>Visual inspection of the ground surface following slab removal</p> <p>Excavation of test pits and collection of soil samples at a rate of 1 location per 25 m² to 100 m² or a minimum of 3 samples for areas <500 m². For larger areas (>500 m²), systematic grid sampling in accordance with Table A in NSW EPA (1995), with a minimum of 5 samples.</p> <p>At each location screening of 10L bulk samples of each fill unit for ACM in the field and laboratory analysis of fill samples for metals, PAH and asbestos FA/AF (500ml sample) as a minimum.</p> <p><i>Excavations:</i></p> <p>Small to medium excavations (base <500 m²): Base - 1 sample per 25 m² to 50 m², with a minimum of 3 samples collected; and sides of excavation at 1 sample per 10 m to 20 m length or part thereof with a minimum of 1 sample per wall. Additional samples will be collected at depths of concern where there is more than one depth of concern, with a minimum of one sample per 1.5 m depth in fill.</p> <p>Large excavations (base ≥500 m²): Base on a grid at a density in accordance with Table A in NSW EPA (1995) or a minimum of 10 samples. In sub-areas with any specific signs of concern, a higher sampling density may be required; and sides of excavation: 1 sample per 20 m length or part thereof with a minimum of 1 sample per wall. Additional samples will be collected at depths of concern where there is more than one depth of concern, with a minimum of one sample per 1.5 m depth in filling.</p> <p><i>Waste Classification</i></p> <p>One sample per 25 m³ for stockpiles up to 200 m³, with a minimum of three per stockpile; and</p> <p>One sample per 50 m³ to 250 m³ for stockpiles greater than 250 m³, by applying statistical analysis with reference to EPA Victoria Soil Sampling (EPA Victoria, 2009), with a minimum of ten total samples.</p> <p><i>Imported Material:</i></p> <p>Requirement and frequency of sampling is to be determined by the Environmental Consultant depending on the source of the material, adequacy of the supporting documentation provided and inspection of material.</p> <p>Landscaping materials may potentially comprise a mixture of resource recovery materials. Where applicable, any</p>	<p>The validation testing regime is generally adequate. The Auditor notes that imported material must either be VENM, ENM or be classified under a Resource Recovery Exemption. The density of testing would need to be commensurate with the documentation provided and the consistency of the results.</p>

Remedial Action Plan	Auditor Comments
<p>imported material will be assessed for compliance with the relevant resource recovery orders in addition to the RAC. Any imported materials (excluding aggregates) will be assessed as per the rates set out in the applicable resource recovery orders, or otherwise as per the stockpile assessment rates outlined above.</p> <p>Any imported recycled aggregates must be sampled at a frequency of sampling of one sample per 25 m³, with a minimum of three samples per load.</p>	
<p><i>Contingency Plan if Selected Remedial Strategy Fails</i></p> <p>The remedial strategy has a low risk of failure, as validation failure would lead to further excavation. A contingency is provided for containment and capping of impacted fill if excavation and disposal is not feasible.</p> <p>The RAP also includes procedures for unexpected finds and asbestos in Appendix E.</p>	<p>It is noted that the contingency of capping and containment may be implemented if fill in areas outside the basement footprints cannot be validated and it is determined that excavation of all residual fill is not feasible. If this contingency is to be adopted, an update to the RAP as a remediation works plan (RWP) will be provided that documents the capping system to be installed and ongoing management requirements. The RWP should be reviewed and approved by the Auditor, prior to implementation.</p> <p>In the Auditor's opinion, the procedure for handling unexpected finds, which includes stopping work and identification of materials, is appropriate and practical and can be implemented within the proposed remediation strategy.</p>
<p><i>Interim Site Management Plan (before remediation)</i></p> <p>Not discussed in the RAP.</p>	<p>Currently contact with impacted fill is limited by existing hardstand or turfed areas and hence interim management is not required.</p>
<p><i>Site Management Plan (operation phase) including stormwater, soil, noise, dust, odour and OH&S</i></p> <p>The site management requirements are outlined in the Site Management Plan (SMP) in Appendix G of RAP. The RAP requires the remediation contractor to develop a construction environmental management plan (CEMP).</p>	<p>Adequate.</p>
<p><i>Remediation Schedule and Hours of Operation</i></p> <p>To be in accordance with those specified in the development consent conditions.</p>	<p>Adequate.</p>
<p><i>Contingency Plans to Respond to Site Incidents</i></p> <p>Contingency plans and an unexpected finds protocol are included in Appendix E of the RAP. Incident response procedures are included in the SMP in Appendix G.</p>	<p>The Auditor notes that the RAP provides management and contingency plans that are directly applicable for the proposed works.</p>
<p><i>Licence and Approvals</i></p> <p>The RAP indicates that the remediation works are Category 2 Remediation in accordance with NSW DUAP/EPA Managing Land Contamination, Planning Guidelines, SEPP 55 – Remediation of Land (NSW DUAP/EPA, 1998). Under Clause 4.13 of SEPP (Resilience and Hazards) 2021, the Council should be notified of the proposed commencement of the remediation work at least 30 days before commencement.</p> <p>The Asbestos Contractor is to hold a Class A licence for the removal of asbestos (issued by SafeWork NSW), on the basis that the asbestos identified at the site to date has the potential to include both friable and bonded asbestos, and that holding a Class A licence may reduce any potential delays.</p> <p>Removal of waste materials from the site shall only be carried out by contractors holding the appropriate license(s), consent or approvals to dispose of the waste materials according to the waste classification and with the</p>	<p>Appropriate.</p>

Remedial Action Plan	Auditor Comments
<p>appropriate approvals obtained from the EPA, where required.</p>	
<p><i>Contacts/Community Relations</i> Specific contacts are not provided in the RAP but a table is provided in the SMP in Appendix G to be completed on project award. The RAP notes that the Principal is responsible for implementing an appropriate communications plan.</p>	<p>Adequate. A CEMP is to be prepared and implemented by the remediation contractor on project award.</p>
<p><i>Staged Progress Reporting</i> The RAP does not specifically refer to staged remediation and validation of the site</p>	<p>The two development sites are to be completed separately. It is anticipated that a separate Section A SAS and supporting SAR will be prepared for each site.</p>
<p><i>Long Term Environmental Management Plan</i> The remediation strategy proposes off-site disposal of impacted fill, however, a contingency is included for capping and containment. The RAP notes that if the contingency is implemented there will be a requirement for ongoing management of contained material through an Environmental Management Plan (EMP) and that the EMP will be required to be made legally enforceable.</p>	<p>Adequate. As noted above, if the contingency strategy of capping and containment is adopted, a RWP should be prepared and reviewed by the Auditor. The RWP should also document the requirements of the EMP.</p>
<p><i>Waste Management</i> Any waste disposed off-site must be initially classified by the Environmental Consultant in accordance with the NSW EPA (2014) <i>Waste Classification Guidelines</i>. Disposal of waste must be to an appropriately licensed waste facility and tracked by the contractor from 'cradle to grave'. Copies of all consignment notes / disposal dockets (or similar) and Environment Protection Licences for receipt and disposal of the materials must be maintained by the Contractor as part of the site log and must be provided to the Environmental Consultant for inclusion in the validation report.</p>	<p>Adequate.</p>

8.3 Auditor’s Opinion

In the Auditors’ opinion, the proposed remediation works are appropriate. If adequately implemented, the RAP should be able to ensure that the site is suitable for the proposed land uses through the removal of fill impacted by PAH and asbestos. Successful validation will be required to confirm this.

9. CONCLUSIONS AND RECOMMENDATIONS

Based on the information presented in the reports, competent implementation of the RAP should ensure that the site is suitable for its proposed secondary school use via the excavation and offsite disposal of fill.

After successful implementation of the RAP and preparation of a validation report for each development site (the DaCA Building and the SS Building), it is anticipated that a Site Audit Statement and accompanying Site Audit Report will be prepared assessing the suitability of the site for the proposed use.

The Auditor makes the following recommendations:

- The RAP is to be implemented during redevelopment of the site, including Auditor comments in this IAA.
- The proposed DGI must be undertaken prior to remediation of the site commencing. The results of the DGI are to be presented to the Auditor and an amended RAP or RWP prepared if the remedial strategy changes. The amended RAP or RWP is to be provided to the Auditor for review.
- A validation report is to be prepared at the completion of remediation and redevelopment of the site documenting the results of inspections and testing undertaken in accordance with the RAP. The validation report is to be provided to the Auditor for review.
- A Section A SAS and accompanying SAR is to be prepared following remediation and validation assessing the suitability of the site for ongoing secondary school use. It is anticipated that the development will be staged with an SAS and SAR prepared for each development site (the DaCA Building and the SS Building).
- In the event that the contingency remediation strategy of capping and containment is adopted, a RWP is to be prepared documenting the capping system design and requirements of a long term EMP. The long term EMP will be required to maintain the integrity of the cap and manage risks associated with any potential future disturbance of fill material across the site. The RWP is to be reviewed and approved by the Auditor.
- To ensure legal enforceability of the EMP (if required), the Auditor recommends that preparation and implementation of the EMP is included as a condition of development consent.

10. LIMITATIONS

This interim audit advice was conducted on behalf of Meriden School for the purpose of assessing the suitability and appropriateness of a remedial action plan (RAP). This summary report may not be suitable for other uses.

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

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

* * *

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

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

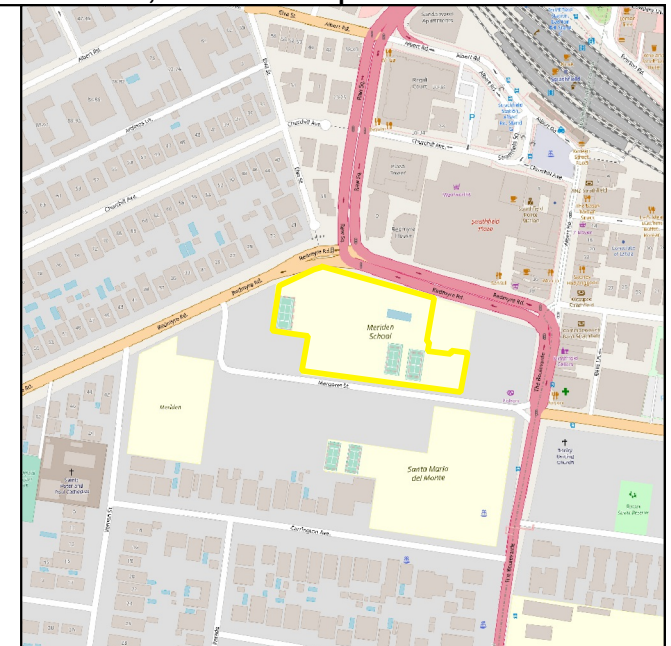
Yours faithfully
Ramboll Australia Pty Ltd



Louise Walkden
EPA Accredited Site Auditor 1903





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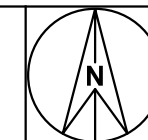
Attachments: 1 Site Boundary and DP, 2022 Sample Location Plan
2 DP, 2014a Sample Location Plan
3 DP, 2014b Sample Location Plan
4 DP, 2019 Sample Location Plan

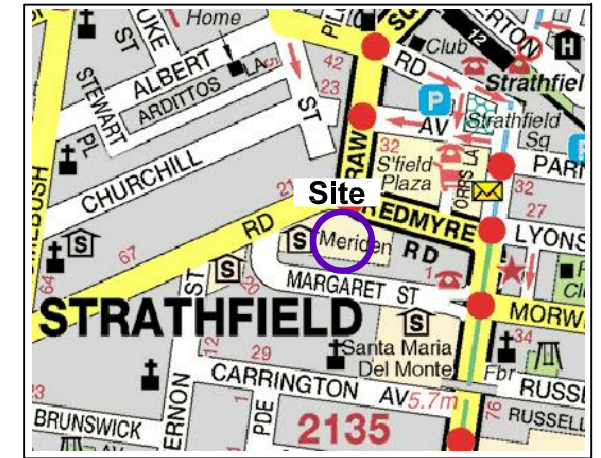


- Notes:
1. Drawing projection GDA94 / MGA zone 56
 2. Latest available aerial imagery sourced from metromap.com accessed 1/06/2022
 3. Test locations shown are approximate only

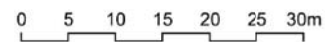
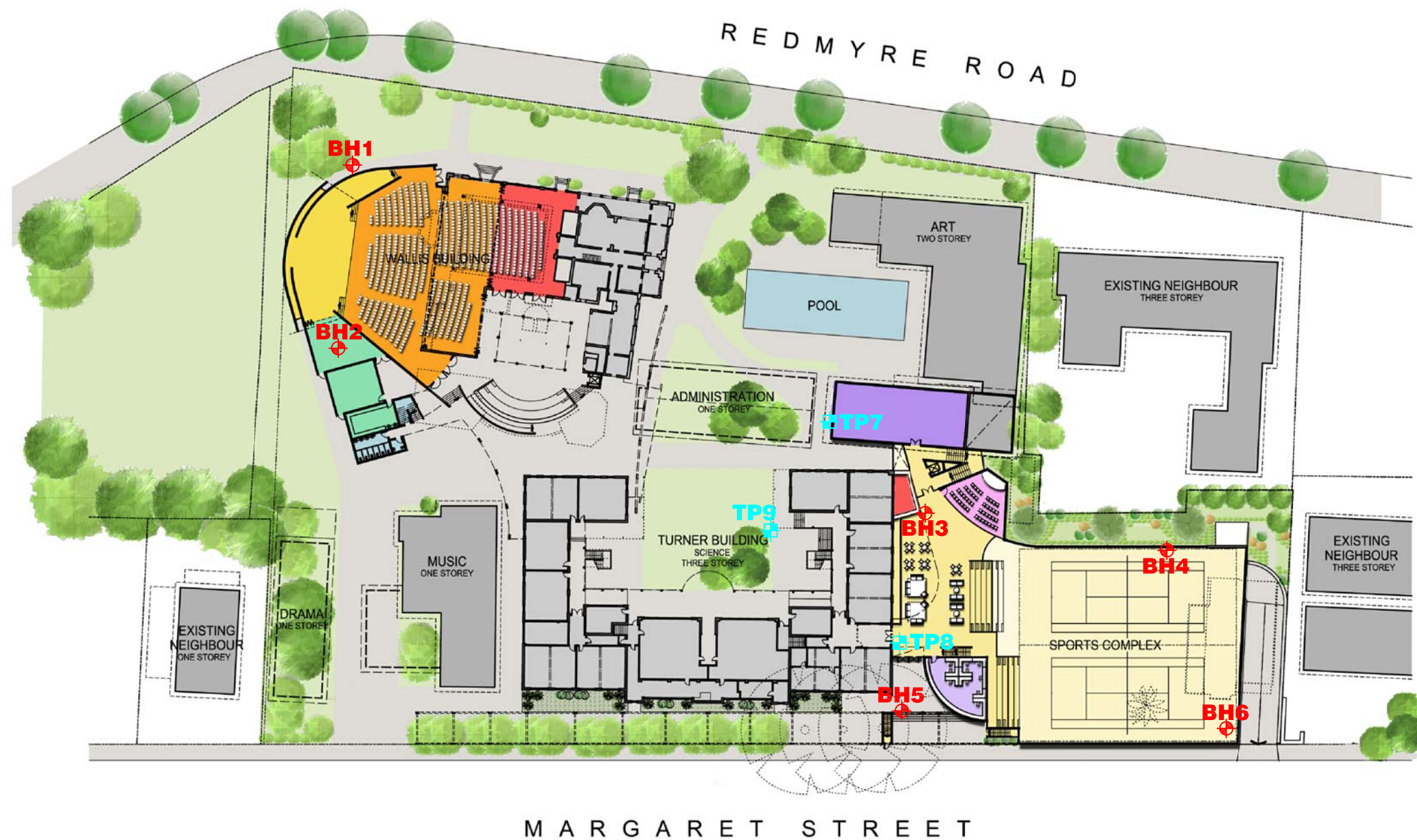
Legend

-  Environmental Borehole
-  Geotechnical and Environmental Borehole
-  Proposed Development Areas (the site)
-  Senior School Boundary







Locality Plan



LEGEND

- + Test Pit Location
- ◆ Borehole Location

NOTE: Base drawing from NBRIS & Partners Pty Ltd (Drawing 12404-CdC000-p1, dated 30.7.2013)

 <p>Douglas Partners Geotechnics Environment Groundwater</p>	CLIENT: Meriden School		TITLE: Locations of Tests Proposed Development Margaret Street, STRATHFIELD		PROJECT No: 73654
	OFFICE: Sydney	DRAWN BY: PSCH			DRAWING No: 1
	SCALE: As shown	DATE: 11.10.2013			REVISION: 0



● Current borehole (73654.01) ● Previous borehole (73654.00)

	CLIENT: Meriden Anglican School	Locations of Boreholes Meriden Anglican School for Girls 10 - 28 Redmyre Road, Strathfield	PROJECT No: 73654.01
	OFFICE: Sydney		DWG No: 1
	DATE: 30 May 2014		REVISION: 0

