MURRAY RIX LIMITED

REMEDIATION METHOD STATEMENT FOR EDITH NEVILLE PRIMARY SCHOOL, CENTRAL SOMERS TOWN, LONDON

Report No: 17-2642r

August 2017

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1. INTRODUCTION

1.1 The purpose of this report is to provide a remediation strategy and to set down the sequential operations proposed to address the remediation of contamination during the redevelopment of Edith Neville Primary School, Central Somers Town, London. This report was prepared on instructions given by the Client, Neilcott Construction Ltd (Excel House, Cray Avenue, Orpington, Kent, BR5 3ST).

1.2 The site has been the subject of a Phase 1 Desk Study and two intrusive investigations as referenced below.

- Pell Frischmann Phase 1 Geo-environmental Desk Study Edith Neville Primary School and Children's Centre – A CIP Project, Camden. May 2013 R12794/G001A.
- ESG Central Somers Town, London. Factual and Interpretative Report on Ground Investigation. Volume 1 Factual Report. Report No: D5061-15/1 September 2016.
- ESG Central Somers Town, London. Factual and Interpretative Report on Ground Investigation. Volume 2 Interpretative Report. Report No: D5061-15/2 September 2016.
- WSP Report No 700342223. Edith Neville Primary School Addendum Ground Investigation – June 2017.

1.3 The remedial proposals presented in this report are to leave the site fit for its proposed end use for a new primary school with artificial sports pitches, play areas and some soft landscaping. The layout of the proposed development is included as Figure 2, Appendix (i).

2. SITE LOCATION AND SETTING

2.1 The area under consideration comprises the existing Edith Neville Primary School, including school buildings and playgrounds, which is located to the north west of Kings Cross St Pancras Station and north east of Euston Station, London as shown on Figure 1, Appendix (i). It should be noted that the desk study and investigation reports cover a larger area than the school redevelopment including land to the south west and south east.

2.2 Historically the site has been part of a school complex since the late 1800s prior to which it comprised residential properties. Full details are given in the Phase 1 Desk Study Report by Pell Frischmann.

3. FINDINGS OF THE INVESTIGATIONS AND ASSESSMENTS

3.1 The investigations undertaken by ESG Limited and WSP Limited included analysis of made ground for a range of contaminants including heavy metals, Polyaromatic Hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPH), Volatile Organic Compounds (VOCs), Semi Volatile Organic Compounds (SVOCs), phenol, cyanide, BTEX, polychlorinated biphenyls (PCBs) and asbestos. Reference should be made to the reports of section 1.2 for full details of the site, the investigations carried out and the available test results.

3.2 The investigations have indicated elevated levels of PAHs, beryllium, lead and TPH in some of the exploratory holes at the site. In addition, loose asbestos fibres were identified in two locations by WSP Ltd and potential asbestos containing materials were noted in several locations by ESG during the initial investigation although no laboratory testing was undertaken to confirm the presence of asbestos in these locations.

3.3 Gas monitoring has also been carried out which does not appear to indicate the need for gas protection measures within the proposed development.

4. REMEDIATION REQUIREMENTS

4.1 The risk assessments included in the reports of Section 1.2 have indicated potential risks to end users as detailed below:

- Elevated concentrations of lead, beryllium and PAHs in SS2, SS3, BH5 and WS16.
- Hydrocarbons of concern in WS16 0.3m depth.
- Loose asbestos fibres in SS1 and SS3 and possible asbestos containing materials in WS10, WS11A, WS12, WS13, WS15, WS17 and WS17A.

In achieving effective remediation of the development area it will be necessary to break the source-pathway-receptor pollution linkages. The pathways which have been identified as of concern to end users are most relevant in any areas of soft landscaping. Where the contamination is present beneath buildings, paving, other hard cover, and artificial surfaces then risks to end users are reduced or negated and remedial action may not be necessary.

Risks to construction works and future maintenance personnel may exist where asbestos fibres or asbestos containing materials are present. An asbestos management plan should be put in place for the construction phase as a minimum precaution. Further assessment of asbestos containing materials and asbestos quantities is likely to be required in order to establish appropriate methods of

management/mitigation during the construction phase. An asbestos in soils management plan may be required to detail how groundworks should be carried out. Particular consideration should be given to the design of drainage measures beneath permeable surfaces to limit the spread of any contamination including asbestos fibres.

4.2 In order to remediate the site the following measures are currently proposed:

- In areas of soft landscaping a suitable thickness of clean inert soils is to be placed to provide a cover between end users and the underlying soils. A cover thickness of 300mm would be considered appropriate in conjunction with a geotextile membrane.
- Additional sampling and testing to determine the extent of possible asbestos containing materials and allow formulation of an asbestos strategy. Depending on the outcome of the additional sampling and testing, remedial measures could include removal of impacted made ground, screening of made ground to remove bulk asbestos product and ensure residual asbestos concentrations within soil are within a suitable limit, and encapsulation of residual asbestos below a suitable capping layer including a geotextile membrane.

The results of the additional sampling and testing and any associated assessments should be submitted to the Local Authority for their comment and approval. Any revisions and clarifications to this Remediation Method Statement based on the findings of such investigations and assessments should also be submitted to and approved by the Local Authority prior to their implementation.

4.3 Following demolition and clearance of the site an inspection should be undertaken by a suitably experienced Engineer to identify any further potential sources of contamination and to confirm that the foregoing remedial approach is still appropriate.

4.4 Following the remedial works proposed in section 4.2 above and any additional testing and assessments it may be appropriate to adopt normal water supply pipes rather than barrier pipe. However, advice should be sought from the water supply company regarding the specification of appropriate water supply pipes. Details of the water supply pipe should be forwarded to the Local Authority for their records.

4.5 Any materials excavated and removed from the site should be disposed of at a suitably licensed disposal facility. Copies of all conveyance and disposal notes should be retained for inclusion in the validation report.

4.6 Any topsoil or additional materials imported to site for use in soft landscaping areas will need to be independently sampled and tested to confirm they are

uncontaminated and fit for purpose. Details of the recommended testing suite and acceptance criteria are included in Appendix (iii).

4.7 The remedial works will need to be checked and validated by an Independent Engineer and as in section 6.2 below, a validation report will need to be drawn up on completion of the work.

4.8 If any unexpected contamination is encountered during the works these will be reported to the Engineer and the Local Authority so that any additional works necessary can be agreed. An asbestos discovery plan should be drawn up to ensure any such materials are dealt with in a safe and appropriate manner.

4.9 All remediation works will be carried out to the satisfaction of the Local Authority.

5. ENVIRONMENTAL PROTECTION

5.1 There are requirements for site works to comply with all relevant guidance and legislation. In particular, attention is drawn to the HSE Document 'Protection of workers and the general public during development of contaminated land'.

5.2 Reasonable steps should be taken to reduce the risk of raising dust caused by the excavation and movement of site materials during the works. This is to reduce the risk to site operatives and to reduce the risk of nuisance to neighbouring properties.

5.3 There is a standing requirement to ensure that all reasonable precautions are taken to prevent pollution arising from remedial and associated works. No potentially polluting materials or liquids are permitted to enter any controlled water. This includes groundwater and surface water. Works should be undertaken in such a manner as to prevent this occurring or to prevent any other pollution event. Excavated materials must be stockpiled on an impermeable surface to prevent contamination of underlying soils. Water draining from stockpiles must be prevented from entering excavations or contaminating surface soils.

6. CERTIFICATION OF WORKS

6.1 The remediation works will be inspected and overseen by a suitably qualified and experienced independent Engineer.

6.2 On completion of the works a validation report should be complied for submission to the local authority. The validation report should include the following information:

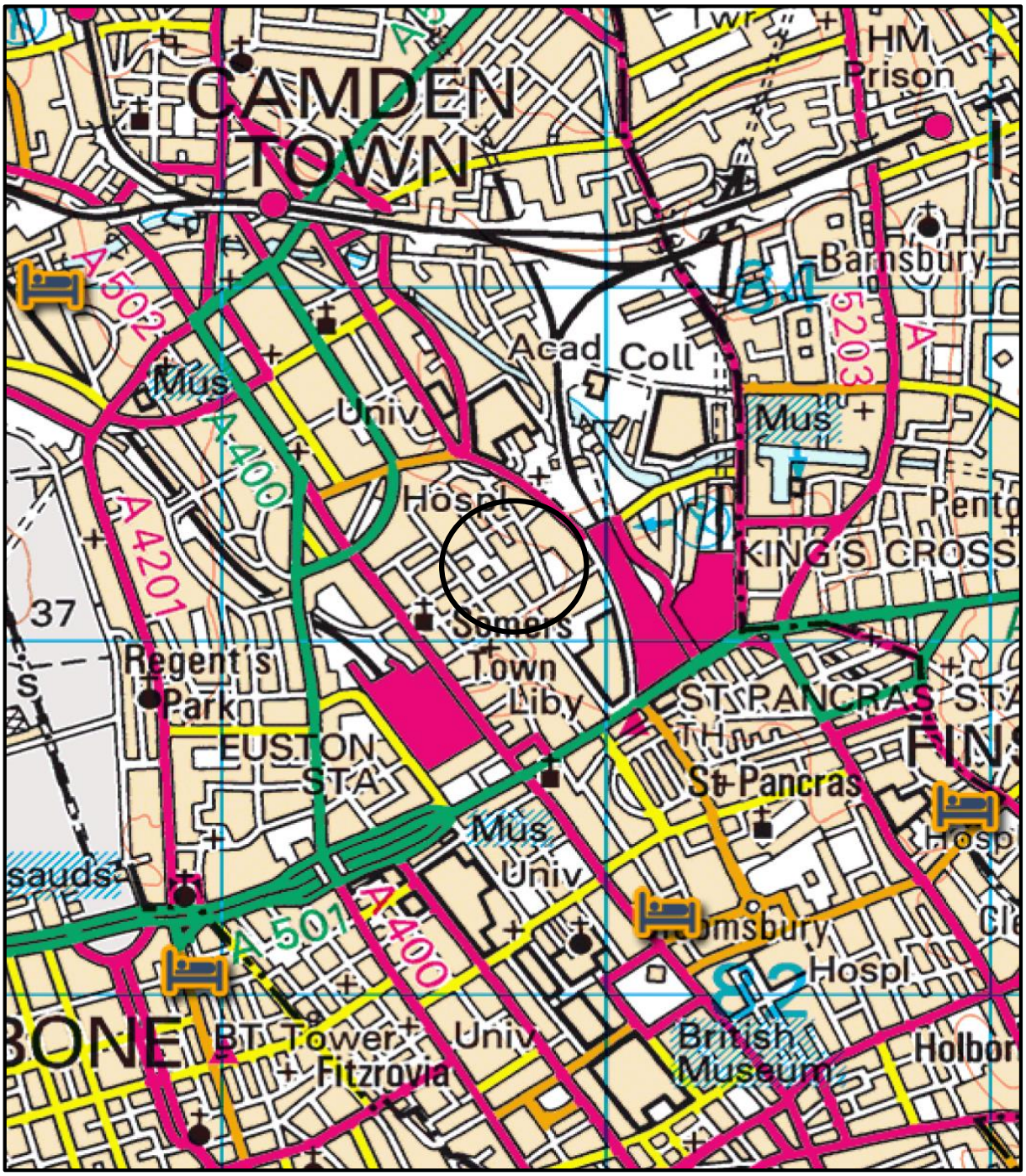
- The sequence of operations undertaken in remediation of the site.
- Records of inspections undertaken.

- Records of materials excavated, the location of the excavation(s) and any testing carried out.
- The destination and volumes of materials removed from site, together with details of the consignment and disposal notes.
- The volume, source and independent chemical analysis of any materials imported to site.
- Photographic record.
- Details of all other matters that come to light during the works.
- A statement on the suitability of the site for end use and that the remediation has been carried out to the desired standard.
- The report should be compiled in general accordance with the requirements of CLR11 and the EA Verification of Remediation of Land Contamination SC030114/R1.

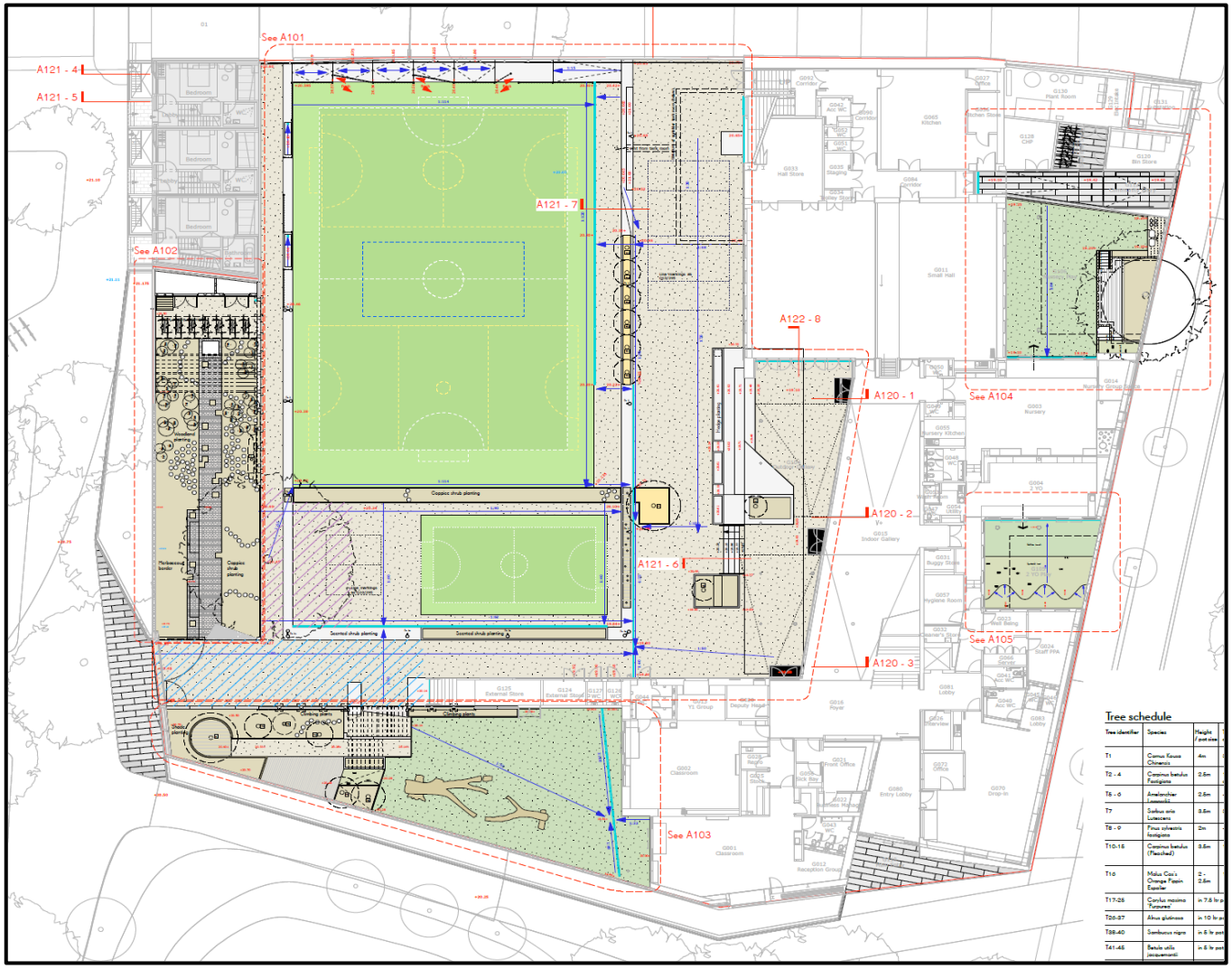
R. Jones BSc, MSc, C Geol, FGS

Appendix (i)
Figures

Not to Scale



Location:	Edith Neville Primary School Central Somers Town London	**Murray Rix:**	
		Job No:	17-2642r
		Date:	August 2017
		Figure 1	Site Location Plan



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Extract from Howard Miller Design Ltd Drawing No 033 A100 R3 dated 01.07.16 - General Arrangement Ground

Location:	Edith Neville Primary School Central Somers Town London	**Murray Rix**	
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		Figure 2	Proposed Layout Plan

Appendix (ii)
Sampling Suite and Acceptance Criteria for Imported Materials

Details of Recommended Testing Suite for Imported Materials and Acceptance Criteria

Heavy Metals

Contaminant	Acceptance Criteria (mg/kg)
Arsenic	37
Cadmium	11
Chromium VI	6
Elemental Mercury	1.2
Lead	200
Selenium	250
Copper	2400
Nickel	180
Zinc	3700

Speciated PAH

Contaminant	Acceptance Criteria (mg/kg)
Acenaphthene	510
Acenaphthylene	420
Anthracene	5400
Benzo(a)Anthracene	11
Benzo(a)Pyrene	2.7
Benzo(b)Fluoranthene	3.3
Benzo(k)Fluoranthene	93
Benzo(ghi)Perylene	340
Chrysene	22
Dibenz(ah)Anthracene	0.28
Fluoranthene	560
Fluorene	400
Indeno(123cd)Pyrene	36
Naphthalene	5.6
Phenanthrene	220
Pyrene	1200

Asbestos

Contaminant	Acceptance Criteria
Asbestos	None Detected

TPH CWG Analysis

Contaminant	Acceptance Criteria (mg/kg)
TPH C5-6 aliphatic	78
TPH C6-8 aliphatic	230
TPH C8-10 aliphatic	65
TPH C10-12 aliphatic	330
TPH C12-16 aliphatic	2400
TPH C16-21 aliphatic	92000
TPH C21-35 aliphatic	92000
TPH C6-7 aromatic	140
TPH C7-8 aromatic	290
TPH C8-10 aromatic	83
TPH C10-12 aromatic	180
TPH C12-16 aromatic	330
TPH C16-21 aromatic	540
TPH C21-35 aromatic	1500

The acceptance criteria assume a soil organic matter content of 2.5% and are based on the most stringent criteria for a residential end use with uptake of homegrown vegetables. If a higher organic matter content is measured the acceptance criteria may be varied in line with the LQM/CIEH 2014 guidelines.

In the absence of TPH CWG Analysis the following criteria may be considered acceptable.

Banded TPH Analysis

Determinand	Acceptance Criteria (mg/kg)
TPH EC 10-12	180
TPH EC 12-16	330
TPH EC 16-21	540
TPH EC 21-35	1500
TPH EC 35-40	1500

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