

**Heyford Park
Dorchester Living: Phase 9
Remediation Earthworks Completion Report
For Urban Regen Ltd.
August 2021**

Report Ref: R1742-R23-v2

DOCUMENT CONTROL SHEET

Report Title: Heyford Park, Dorchester Phase 9
Remediation Earthworks Completion Report

Client: Urban Regen Ltd

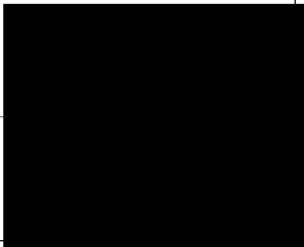
Report Reference Number: R1742b-R23

Report Status: Final

Version: v2

Report Date: 20 August 2021

Signed for Smith Grant LLP:

	Name	Position	Signature	Date
Author	D Wayland BSc MSc AssocCIWM MCIWEM C.WEM	Partner		20.08.21
Reviewer	S Miller BSc MCIWEM	Senior Consultant		20.08.21

Document Revision Record:

Version	Report Status	Date	Details of Revision
v1	Draft	13.08.21	Draft issued to client for comment
v2	Final	20.08.21	Final for issue.

This report has been prepared by Smith Grant LLP for the sole and exclusive use of Urban Regen Ltd and Dorchester Living. All reasonable skill, care and diligence has been exercised within the terms of the contract with the client. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report may be relied upon or transferred to any other parties only with the express written authorisation of Smith Grant LLP, such consent not to be unreasonably withheld or delayed. If any Third Party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty or care of skill.

Smith Grant LLP reserves the right to alter any of the foregoing information in the event of new information being disclosed or provided and in the light of changes to legislation, guidelines, and responses by the statutory and regulatory authorities.

Contents

- 1 Introduction
- 2 Remediation Strategy
- 3 Description of Works
- 4 Inspections and Testing
- 5 Conclusions and Recommendations

Drawings

- 01 Phase Boundary
- 02 Hotspot Investigation
- 03 Formation Sampling Locations
- 04 Outstanding Remedial Requirements

351-20-001-01 As built topographic survey and constraints
351-20-001-02A As built topographic survey and constraints
351-20-001-03 As built topographic survey and constraints
351-20-001-04 As built topographic survey and constraints
351-20-001-05 As built topographic survey and constraints
351-20-001-07 As built topographic survey and constraints
351-20-001-08 As built topographic survey and constraints
351-20-001-09 As built topographic survey and constraints

0521-PH9-102 Proposed Layout

Appendices

- A Walkover Photographic Record
- B Hotspot Photographic Record
- C Formation Validation Photographic Record
- D Laboratory Test Certificates
- E Ph9 Baseball Pitch Topsoil & Formation Report
- F PAH Ratio Cross Plot

1. Introduction

- 1.1. Planning Consent for the redevelopment of the area referred to as Phase 9 within the former RAF/USAF Upper Heyford Airbase New Settlement Area (NSA) was granted by Cherwell District Council (CDC) on 7th December 2016 (ref. 16/02446/F). Dorchester Living (DL) intend to redevelop the site with the construction of 296 residential dwellings with associated infrastructure and areas of landscaping and public open space.
- 1.2. Urban Regen Ltd. (URL) was instructed by DL to carry out demolition, remediation and preparatory earthworks within Phase 9 to allow construction works to commence. URL duly instructed Smith Grant LLP (SGP) to carry out the verification works and produce the earthworks completion reporting.
- 1.3. The above planning consent contains the following conditions relating to contamination remediation:

	<u><i>Pre-Commencement Conditions (phased)</i></u>
10	<p><i>No development shall take place within a phase or sub-phase hereby approved until a Remediation Strategy that includes the following components to deal with the risks associated with contamination of that phase or sub-phase has been submitted to and approved, in writing, by the Local Planning Authority:</i></p> <ol style="list-style-type: none"> <i>a). A preliminary risk assessment which has identified:</i> <ul style="list-style-type: none"> <i>• All previous uses.</i> <i>• Potential contaminants associated with those uses.</i> <i>• A conceptual model of the site indicating sources, pathways and receptors.</i> <i>• Potentially unacceptable risks arising from contamination affecting that phase or sub-phase.</i> <i>b). A site investigation scheme, based on (a) to provide information for a detailed assessment of the risks to all receptors that may be affected, including those off-site.</i> <i>c). The results of the site investigation and the detailed risk assessment referred to in (b) and, based on these, an options appraisal and remediation strategy giving full details of the remediation measures required and how they are to be undertaken.</i> <i>d). A verification plan providing details of the data that will be collected in order to demonstrate that the works set out in the remediation strategy in (c) are complete and identifying and requirements for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action.</i> <p><i>Any changes to these components require the express written consent from the Local Planning Authority. The scheme shall be implemented as approved.</i></p>
	<u><i>Conditions Requiring Approval or Compliance Before Specific Construction Stages</i></u>
19	<p><i>If, during development, contamination not previously identified is found to be present, no further development shall take place until full details of a remediation strategy detailing how the unsuspected contamination shall be dealt with has been submitted to and approved in writing by the Local Planning Authority. Thereafter the remediation strategy shall be carried out in accordance with the approved details.</i></p>

22	<p><u>Conditions Requiring Approval or Compliance Before Occupation</u></p> <p><i>Prior to the first use or occupation of any phase or sub-phase of the development hereby approved, a verification report for that phase or sub-phase, demonstrating completion of works set out in the remediation strategy approved under Condition 10 and the effectiveness of the remediation shall be submitted to and approved, in writing, by the Local Planning Authority. The report shall include results of sampling and monitoring carried out in accordance with the approved verification plan to demonstrate that the site remediation criteria have been met. It shall also include any plan (a "long-term monitoring and maintenance plan") for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action, as identified in the verification plan. The long-term monitoring and maintenance plan shall be implemented as approved.</i></p>
----	--

- 1.4. It is understood that Condition 10a has been approved following consultation between Planning and the Local Authority Environmental Protection Officer (EPO) on 16.06.18 where it was acknowledged that an intrusive investigation and Remediation Strategy is required.
- 1.5. A site investigation report was produced by Hydrock (ref. HPW-HYD-MS-ZZ-RP-G-0001) in February 2017 which has been submitted to satisfy Condition 10b. LA EPO approval of this report was received on 04.11.20 under application of discharge condition 20/02729/DISC. Commentary was provided by the Environment Agency (EA) on 26.03.21 with general agreement of the findings of the site investigation but with requirements of further groundwater investigation within Phase 9 following building demolition and tank removal. The request for additional groundwater investigation was limited to the area of BH01 and BH02, and this element of works is being undertaken separately following the completion of demolition and preparatory works.
- 1.6. A Remediation Statement (10c) which covered Phase 9 and other development phases was prepared by Hydrock (ref. HPW-HYD-PX-REM-RP-GE-P1-S2, April 2017); however, it was decided that a revised Strategy should be produced to align remedial and verification works to the SGP Remediation Strategy which was produced to cover the neighbouring NSA areas (R1742-R01-v1; May 2014) under Planning Consent 10/1642/OUT for consistency. Approval of the Strategy was received from the LA on 26.03.21, however formal approval by the EA is currently outstanding pending the further groundwater investigation works. It is understood this element of work is being completed by others and will be submitted in due course.
- 1.7. This verification report is intended to assist in the discharge of Condition 10d (although some aspects can only be completed by the developers).
- 1.8. This report deals with the completion of preparatory remedial works by URL for DL across the main Phase 9 area which was occupied by former buildings. A separate completion report has been produced by SGP which relates to the Phase 9 baseball pitch (ref. R1742-R22). The Phase 9 site and area covered by this report is provided in Drawing D01.

- 1.9. Remedial works were not completed in the verge areas in the west of the site, the south due to coverage by a number of developer stockpiles, or the southeast corner. These areas are shown within D04 and will be subject to further verification works and reporting at a later date.
- 1.10. A development layout has been provided by DL (ref. 0521-Ph9-102) which shows that the site is to comprise a variety of detached, semi-detached and terraced housing with private gardens, areas of public open space and associated infrastructure. A large area of public open space with a pond, children's play area and football pitch are proposed in the southeast of the site.

Figure 1.1 Approximate boundary of Phase 9



Red – Phase 9 area

Blue – Phase 9 Baseball Pitch (report ref. R1742b-R22)

Green – Area covered by this report (ref. R1742-R23)

- 1.11. SGP has regularly inspected the URL preparatory earthworks carried out to date and has collected samples of recovered topsoil, formation soils, site generated aggregate and remediated hotspot areas. This report describes the works carried out, drawing conclusions, and making recommendations concerning the further works required by Dorchester in order to fully discharge Planning Conditions 10.

2. Remediation Strategy

2.1. Expected Contamination

- 2.1.1. The Phase 9 area formed part of the wider Upper Heyford Airbase which was developed and used by the United States Airforce. It is understood that the site originally formed housing for families living on the airbase, but once expansion of the base took place, the buildings were converted into the 'Upper Heyford American High School' with playing fields and a boiler house. The area of the site covered by this report is the main developed area of the site with the former dormitory buildings / classrooms and boiler house.
- 2.1.2. Identified known or potential contamination sources determined from the historical uses of the site and site investigations were generally found to be minor, consisting of low-level but pervasive contamination by metals / PAHs with localised areas of made ground and the potential for localised hydrocarbons associated with bulk fuel storage tanks within the area of the former boiler house.
- 2.1.3. Two localised hotspots (TP102 and TP104) were identified by Hydrock where black staining / tar odours were reported, however no source could be attributed to these observations so further investigation within both areas was recommended.
- 2.1.4. More recent supplementary works undertaken by SGP identified that the former POL (Petroleum Oil Lubricant) pipeline extended beneath the eastern portion of the Phase 9 area. The POL system was a supply pipe present on the Upper Heyford Flying Field which connected to the National Fuel Pipeline (NFP) located to the south of Phase 9 and transported fuel around the airbase. Decommissioning of the POL pipeline was undertaken and reported by Vertase (ref. 1246DOR) in 2012, but it was recognised that there was potential for fuel contamination around the pipeline. SGP undertook a supplementary investigation along the POL pipeline in January 2021 (ref. R1742b-R21) and identified a hydrocarbon hotspot attributed to the fuel pipeline in the north of the baseball pitch area.
- 2.1.5. The fuel hotspot area within the baseball pitch has been remediated and reported within the Phase 9 Baseball Pitch Completion Report (ref: R1742b-R22). As part of the supplementary investigation works, trial-pitting along the route of the pipeline was undertaken and no further impacted soils along the pipeline route were identified. It was, however, acknowledged that localised areas of impacted soils could be present along the pipeline and that the remediation contractor during removal of the pipeline should remain vigilant and notify SGP of any contamination indicators if encountered. The pipework has been removed from the accessible parts of Phase 9 (excluding areas where existing stockpiles prevent removal) and URL have confirmed that no contamination indicators were encountered. It is however recognised that there are areas within Phase 9 where remediation and preparatory earthworks are still outstanding (see Drawing D04).

2.1.6. Natural background contamination may be present in the bedrock and soils. The site lies within, or adjacent to, the "ironstone domain" as described in DEFRA Technical Guidance Sheet TGS01 "Arsenic", July 2012, and within 1km of mapped outcrops of ironstones within the Jurassic sedimentary rocks. Within the ironstone domain, the normal background concentration (NBC) of arsenic is reported to be 220 mg/kg; the NBC is defined as the upper 95% confidence limit of the 95th percentile of topsoil concentrations. This value substantially exceeds the criteria for garden soils (Remediation Strategy, Table 3.3).

2.2. Remediation Objectives and Approach

2.2.1. The key contamination remediation objectives are to:

- create a significant betterment of the groundwater environment thereby protecting groundwater quality at and beyond the site boundary;
- remove / remediate significant pollution sources such as hydrocarbon hotspots, if present, that pose a risk to man and the environment, to the extent feasible;
- break significant or potentially significant future pollutant linkages resulting from the change of land use, in particular related to shallow garden soils and human exposure;
- carry out further soil investigations / inspections to complete gaps in the existing investigation coverage;
- respond appropriately to contingencies, in particular the discovery of previously undisclosed contamination;
- remove development constraints and prepare the site physically to enable residential development;
- manage all emissions to air and water to protect surface waters, groundwater and the atmosphere during the remediation works;
- provide appropriate additional protection measures, where necessary, to be implemented during construction - including building gas barriers, water mains protection, and garden / open space soil quality and thickness.

2.2.2. The general requirements for garden and landscaped soils taken from the Remediation Strategy are as follows:

- provision of 600mm of clean soil cover within garden areas / 300mm in soft landscaping where the underlying soils contain one or more concentrations of substances in excess of contamination targets set out in Table 3.3 of the Strategy;
- materials to be used as garden/landscape soils must be suitable for use, validated, and comply with contamination targets set out in the Remediation Strategy at a rate of 1 sample per 500m³;
- imported soils used for cover purposes to comply with contamination targets set out in the approved Remediation Strategy at a rate of 1 sample per 250m³ with a minimum of 3 samples per source;

- in areas where natural uncontaminated soils are present following the site re-grade, clean topsoil may be required as a growing medium but there will be no requirement for a full 600mm of placed soil cover.

2.2.3. It is confirmed that Phase 9 may be generally classed as “Green” under the NHBC classification scheme with no special measures required to address risks posed by ground gas. In localised areas of hydrocarbon contamination such as around USTs / the fuel pipeline where it is not feasible to remove impacted soils (such as adsorption into bedrock etc) then post-remediation vapour monitoring may be necessary to assess whether vapour protection measures are required. In the absence of further monitoring or assessment then precautionary VOC protection measures may be required.

2.3. Site Characterisation

2.3.1. The site was formerly agricultural land with a surface watercourse (Gallos Brook) in the east until 1966 when the site was developed to form part of RAF Upper Heyford. It is understood that the site was originally used for the housing of families on the airbase before later being used as a school (Upper Heyford American High School) with playing fields, classrooms, a boiler house, gymnasium and playing fields / baseball pitches.

2.3.2. Gallos Brook, which was originally a surface watercourse, has since been culverted beneath the site. It is understood that surface water drainage from the wider airfield to the north discharges into the brook.

2.3.3. An oil-fired boiler house was located in the approximate centre of the site which is assumed to have provided heating to the former buildings on site with three associated underground storage tanks present. No significant contamination was reported by Hydrock who carried out the intrusive investigation on the site, however entries were limited around the tanks due to the presence of live services at the time of investigation. Hydrock borehole BH2 is located to the south of the boiler house (although not directly downgradient with groundwater flow reported in a south to southeast direction) within which elevated hydrocarbons were reported. Further groundwater monitoring works are currently being undertaken as requested by the EA and will be reportedly separately.

2.3.4. A Petroleum Oil Lubricant (POL) pipeline is present in the east of the site which extends from the southern boundary adjacent to Gallos Brook where it was formerly connected to the National Fuel Pipeline (NFP). The POL pipeline crosses the site via two routes: the first extends from the southern boundary in a northerly direction parallel to Gallos Brook up to Camp Road, whilst a second spur runs northwest along the site’s eastern boundary before later joining to the other pipeline within the Phase 9 baseball pitch area. The pipeline was decommissioned by Vertase in 2012 which included the clearing, foam filling and breaking of the pipeline.

- 2.3.5. SGP carried out supplementary investigation works along the POL pipeline in December 2020 and excavated 4 entries (TP8-TP11) within the main phase 9 site to confirm the presence / depth of the pipeline and assess the presence of any fuel impacted soils. The pipeline was encountered within all entries excluding TP11 and no fuel impacted soils around the pipeline was encountered. Impacted soils were limited to an area within the Phase 9 baseball pitch which has subsequently been remediated and validated (see report: R1742-R22).
- 2.3.6. Hydrock also identified two further potential contamination hotspots attributed to visual / olfactory contamination indicators and elevated hydrocarbon concentrations above GACs within entries TP102 and TP104. The descriptions suggest the presence of tar or bitumen which appear to be localised in nature; in any case, further investigation and remediation was recommended.
- 2.3.7. The site was found to have a generally thin veneer of made ground, largely consisting of reworked natural soils with inert inclusions such as glass and brick, however localised incidences of ash and asphalt were recorded.

2.4. Phase-specific Strategy

- 2.4.1. It was concluded that Phase 9 posed a localised risk of contamination associated with the former underground fuel tanks within the area of the former boiler house, localised areas of made ground containing anthropogenic inclusions of ash and asphalt, and two areas of elevated hydrocarbons associated with tar / bitumen indicators. It was also recognised that there was potential around the area of the decommissioned pipeline for any localised impacted soils associated with historical leaks, although no evidence has been reported to date to confirm this.
- 2.4.2. The site-wide strategy of ensuring clean cover soils to 600mm depth (subject to formation testing) is considered to be an appropriate approach. No requirement for the remediation of hydrocarbon impacted soils or groundwater was identified pending additional inspection / investigation of the former UST locations after emptying and removal of the tanks, removal of the decommissioned POL pipeline, and further investigation of two localised hotspot areas. It is, however, acknowledged that further groundwater monitoring is due to take place following these preparatory works as required by the EA and that the findings will be reported separately.

3. Description of Works

3.1. General Approach

3.1.1. Preparatory works within the main Phase 9 site included:

- soft strip and vegetation clearance;
- asbestos survey and strip in accessible buildings and structures;
- segregation of waste materials including wood, metal and plastic for recovery / disposal;
- demolition of all above ground structures;
- recovery of topsoil.

3.1.2. Remediation earthworks within the main Phase 9 site included:

- Grubbing out of relict ground floor slabs, foundations and roadways;
- Removal / treatment of underground storage tanks in accordance with the Remediation Strategy;
- Removal of decommissioned POL pipeline;
- Further investigation / remediation of Hydrock hotspots TP102 & TP104;
- Crushing on-site of suitable hard materials (masonry, concrete and brick) to recover aggregate for reuse.

3.1.3. The works within Phase 9, including site preparatory works, were carried out over a period from January 2021 to May 2021. It is understood that remediation of the peripheral areas to the west, south and southeast are yet to take place and that these will be completed at a later date and subject to additional reporting. The areas where outstanding works are required are detailed on the accompanying URL as-built drawings appended to this report and within drawing D04.

3.1.4. The existing buildings were demolished following an asbestos survey and removal was carried out by a specialist sub-contractor (Elite). Removal of any asbestos containing material (ACM) from the buildings was carried out prior to demolition; copies of the asbestos survey reports and removal of ACM certificates are retained by URL and are available on request.

3.1.5. Relict structures including basal slabs, foundations and redundant infrastructure were removed. Recoverable materials such as concrete, brick and masonry were segregated before crushing to produce aggregate to be used by the developer as bulk fill or for construction platforms / sub-base under building footprints and roads. Scrap metal and any timbers were sent off-site for recycling. An estimated 12,756m³ of site-generated aggregate has been placed within 3 temporary stockpiles (referred to as Ph9-Agg-SP1, Ph9-Agg-SP2 and Ph9-Agg-SP3) which are intended to be handed over to the developer for use within the site.

- 3.1.6. Approximately 2,700m³ of topsoil was recovered from the site (mainly from verges around the former buildings) which has been stockpiled within the east of Phase 9. Shallow natural deposits of sandy clay or reworked natural deposits with occasional inclusions of inert materials (brick etc.) were present at surface level following removal of buildings, slabs and topsoil. Formation testing has been undertaken across the site as per the Remediation Strategy to establish the suitability of the shallow soils for retention within garden areas.

3.2 Contamination Hot-Spots

- 3.2.1 Three areas within Phase 9 (excluding the baseball pitch) were determined as potential contamination hotspots which required further investigation and, if necessary, remediation. These included:

- USTs associated with the former boiler house
- Hydrock TP102 (black staining and tar odour – hydrocarbon exceedances)
- Hydrock TP104 (black staining and tar odour) – hydrocarbon exceedances)

- 3.2.2 The redundant fuel pipeline which crosses the eastern part of Phase 9 was also identified as a potential contamination hotspot, however supplementary investigation works along the pipeline prior to the commencement of remedial works did not identify any contamination beyond that which was present within the Phase 9 baseball pitch, as remediated and reported within SGP report R1742b-R22. A recommendation was therefore made for a watching brief to be maintained during the removal of the pipeline for any impacted soils.

- 3.2.3 Investigation, remediation and verification testing have been undertaken at the 3 potential hotspot areas as described in Section 4 and 5 of this report. Prior to the removal of the USTs and sampling of the resultant void, emptying and purging was completed by specialist contractor CSG.

- 3.2.4 All validation testing on the base and sidewalls of remedial excavations were carried out by SGP in accordance with the Remediation Strategy.

3.3 Validation of Formation Level Strata

- 3.3.1 It is a requirement under the Remediation Strategy that a 600mm cover of clean soils is to be placed over made ground in garden areas; however, due to the requirement to trim development areas by -200mm below existing ground levels, made ground was largely absent due to the shallowness of the natural strata or comprised inert materials (brick fragments etc.) within reworked natural soils. This meant that a 400mm depth of natural soil / reworked natural soils with occasional inert inclusion (brick etc.) could form part of the full 600mm of garden soil cover after placement of garden topsoil.

3.3.2 In-situ sampling of the formation level strata was carried out by sampling of the upper 400mm at a test frequency of 1 sample per 500m³, the residual 400mm depth equating to 1 sample per 1,250m² plan area of development. Fifty-one in-situ samples were collected from the exposed formation level with depth validation photos showing the 0-400mm soil profile. Samples were analysed for a suite of contaminants as specified with the Remediation Strategy.

3.3.3 Where exceedances were reported further assessment has been made and/or recommendations for an appropriate soil cover system to be adopted as per the Strategy requirements.

3.4 Site Waste Management

3.4.1 As described, waste materials removed from the Phase 9 area included timber, scrap metal and ACM. Wood and metal were carefully segregated and sent off-site to be recycled and ACMs were stripped from the buildings prior to demolition by an appropriately qualified sub-contractor and disposed at an appropriate waste accepting facility. URL maintain copies of all waste transfer documentation which can be provided on request.

3.5 Constraints and Limitations

3.5.1 Remedial works were limited to the contractual extent of URL which encompasses the area of the former buildings on site as per the accompanying as-built drawings. Remedial works are still required within the peripheral areas of the site to the north, east, south and west, although these are largely limited to verges but also includes removal of the decommissioned fuel pipeline in the east. Further verification reporting within these outstanding areas including formation testing, as necessary, will still be required as per drawing D04.

3.6 Unforeseen Contamination

3.6.1 During the removal of surface harstanding in the northwest fragments of ACM were observed within the top 0.5m of soils within a localised area. An excavator was used to expose the soils whilst a specialist sub-contractor carried out hand-picking to remove visible ACM. Removed ACM was double-bagged and disposed of to a suitable accepting waste facility. Following the completion of hand-picking, SGP attended site and collected 8 samples from the remediated area (1 sample per 5m²) for asbestos identification to confirm the absence / presence of residual fibres within the shallow soils.

4. Inspections and Testing

4.1. SGP attended the site on 1 occasion in 2018 to carry out a pre-remediation walkover, 11 visits during the remediation earthworks, and a completion visit on 08.06.21 which included final stockpile sampling. The dates and activities carried out in the Phase 9 area during SGP attendance cross-referenced to the site inspection photographic record (Appendix A), hotspot photographic record (Appendix B), formation soil photographic record (Appendix C) and laboratory analysis (Appendix D) are summarised in the table below.

Table 4.1 SGP Inspection Summary

Date	Description of Site Works	SGP Activities	Record
22.05.18	None	Pre-commencement walkover	Appendix A – Photo 1-7
20.01.21	Vegetation strip (north) / ACM strip	Site walkover	Appendix A - Photos: 8-10
02.02.21	Building demolition / recovery of waste materials / breaking out hardstanding / ACM strip	Site walkover	Appendix A - Photos: 11-13
08.02.21	Recovery of building demolition wastes / regrade in area of eastern most buildings following ACM strip / demolition	Site walkover	Appendix A – Photos 14-16
16.02.21	Substation demolition, ACM strip	Site walkover	Appendix A – Photos 17-22
17.02.21	Substation demolition, ACM strip	Site walkover / HS-TP104 investigation	Appendix B – HS-TP104 Appendix D - Lab Ref: 21-2316
02.03.21	Building demolition / ACM strip / material recovery	Site walkover / Formation sampling (S1-S11)	Appendix A – Photos 23-28 Appendix C – Photos 1-11 Appendix D - Lab Ref: 21-06789
09.03.21	Building demolition / ACM strip / material recovery / removal of hardstanding	Site walkover / Formation sampling (S12-S23) / exposure of UST tanks	Appendix A – Photos 29-36 Appendix C – Photos 12-23 Appendix D - Lab Ref: 21-07749
06.04.21	Crushing hardstanding / waste recovery	Site walkover / Formation sampling (S24-S37) / aggregate sampling / topsoil sampling	Appendix A – Photos 37-42 Appendix C – Photos 24-37 Appendix D - Lab Ref: 21-11321, 21-11315
20.04.21	Crushing hardstanding / waste recovery / ACM handpick within HS-ACM	Site walkover / aggregate sampling	Appendix A – Photos 43-49 Appendix D - Lab Ref: 21-13303
28.04.21	Crushing hardstanding	Site walkover / Formation sampling (S38-S51) / HS-TP102 investigation / HS-ACM sampling / UST validation sampling / aggregate sampling	Appendix A – Photos 50-53 Appendix B – HS-TP104; HS-ACM, HS-UST Appendix C – Photos 38-51 Appendix D – 21-14510, 21-14505, 21-14506, 210506-141

Date	Description of Site Works	SGP Activities	Record
13.05.21	None – works completed	Completion visit / aggregate sampling	Appendix A – Photos 54-58 Appendix D – 21-16265
08.06.21	None – works completed	Aggregate sampling	Appendix D – 21-19648

4.2. Hydrock TP104 Hotspot

- 4.2.1. Following the completion of building demolition and the breaking out of surface hardstanding, SGP attended site on 17.02.21 to carry out the excavation of trenches to inspect the ground within the area of Hydrock TP104. Two trenches (TP1 and TP2) were excavated parallel to one another, encompassing an area of 7m x 5m.
- 4.2.2. The ground was recorded as a natural dark brown clay with angular gravel underlain by a coarse gravel of limestone in a light brown clayey soil. TP1 was excavated to 0.8m bgl and TP2 to 1.1m bgl. A photographic record is provided in Appendix B.
- 4.2.3. No black staining or odours were observed and screening of arisings with a photoionisation detector (PID) failed to exceed detection limits (<0.1ppm).
- 4.2.4. Three samples (HS-TP104-S1 to -S3) were collected at depths ranging from 0.0-0.4m and 0.4-1.1m which were submitted for fractioned hydrocarbon analysis (lab ref. 21-2316). Concentrations are compared to the assessment criteria for hydrocarbon remediation as set out in Table 3.4 of the Remediation Strategy (adopted from Table B2 of the Watermans Controlled Waters DQRA, ref. EED10658-14.1.7_FA) and the garden soils criteria in Table 3.3 of the Strategy.

Table 4.2 TP104-HS validation data

Contaminant	Samples	Range of Concentrations (mg/kg unless stated)	Hotspot Criteria (Table 3.4)	Garden Soils Criteria (Table 3.3)	Exceedance Concentration & location
			Screening criteria (mg/kg unless stated)	Screening criteria (mg/kg unless stated)	
Aliphatic C5-C6	3	<0.1	-	42	None
Aliphatic C6-C8	3	<0.1	-	100	None
Aliphatic C8-C10	3	<0.1	80	27	None
Aliphatic C10-C12	3	<0.2	1000	130	None
Aliphatic C12-C16	3	<4	1000	1100	None
Aliphatic C16-C21	3	<7-14	1000	65,000	None
Aliphatic C21-C35	3	<7-63	1000	65,000	None
Aromatic C5-C7	3	<0.1	-	42	None
Aromatic C7-C8	3	<0.1	-	130	None
Aromatic C8-C10	3	<0.1	-	34	None
Aromatic C10-C12	3	<0.2	7	74	None
Aromatic C12-C16	3	<4	120	140	None
Aromatic C16-C21	3	<7-33	440	260	None
Aromatic C21-C35	3	<7-231	1000	1100	None

Contaminant	Samples	Range of Concentrations (mg/kg unless stated)	Hotspot Criteria (Table 3.4)	Garden Soils Criteria (Table 3.3)	Exceedance Concentration & location
			Screening criteria (mg/kg unless stated)	Screening criteria (mg/kg unless stated)	
Benzene	3	<0.005	0.08 (Table 3.3)		None
Toluene	3	<0.005	120 (Table 3.3)		None
Ethylbenzene	3	<0.005	65 (Table 3.3)		None
m/p-Xylene	3	<0.005	42 (Table 3.3)		None
o-xylene	3	<0.005	44 (Table 3.3)		None

4.2.5. No exceedances were reported which is consistent with the observed ground conditions. It was noted that within the immediate surrounding area a tarmac surface layer was present which could have possibly been associated with Hydrock's observations of black staining and a tar odour.

4.3 Hydrock TP102 Hotspot

4.3.1 Following the clearance of surface materials and breaking out of surface hardstanding, SGP attended site on 28.04.21 to carry out an investigation within the area of Hydrock TP102. Two trenches were excavated (TP1 and TP2) to lengths extending 12m to allow inspection of the ground.

4.3.2 Both TP1 and TP2 recorded a light brown clay soil (0-0.2m) underlain by a thin layer of coarse black gravel (0.2-0.3m) then natural limestone gravel. Following identification of the black gravel (which was suspected to be the material reported by Hydrock), the extent of this material was uncovered and removed by an excavator and placed within the stockpile of stripped tarmac for disposal. The extent of the remediated area was approximately 10m x 15m and coincided with the area of a former radio mast on the site, the black gravel presumably relating to its base. Soils were screened with a PID during removal with readings consistently below detection limits (<0.1ppm), although this is typical of a bitumen bound aggregate. A photographic record is presented in Appendix B.

4.3.3 Six validation samples were collected on a 1 per 5m² spacing (TP102-HS-SS1 to SS6) of the stripped surface following removal of the black aggregate and a single sample of the removed material (TP102-HS-S1). Samples were submitted for fractionated hydrocarbon analysis (lab ref. 21-14505) and are compared to the assessment criteria for hydrocarbon remediation as set out in Table 3.4 of the Remediation Strategy (adopted from Table B2 of the Watermans Controlled Waters DQRA, ref. EED10658-14.1.7_FA) and the garden soils criteria in Table 3.3 of the Strategy.

Table 4.3 TP102-HS Remediation Validation Data

Contaminant	Samples	Range of Concentrations (mg/kg unless stated)	Hotspot Criteria (Table 3.4)	Garden Soils Criteria (Table 3.3)	Exceedance Concentration & location
			Screening criteria (mg/kg unless stated)	Screening criteria (mg/kg unless stated)	
Aliphatic C5-C6	7	<1	-	42	None
Aliphatic C6-C8	7	<1	-	100	None
Aliphatic C8-C10	7	<1-4.2	80	27	None
Aliphatic C10-C12	7	<1-42	1000	130	None
Aliphatic C12-C16	7	<1-99	1000	1100	None
Aliphatic C16-C21	7	<1-78	1000	65,000	None
Aliphatic C21-C35	7	<1-320	1000	65,000	None
Aromatic C5-C7	7	<1	-	42	None
Aromatic C7-C8	7	<1	-	130	None
Aromatic C8-C10	7	<1-2	-	34	None
Aromatic C10-C12	7	<1-11	7	74	TP102-HS-S1
Aromatic C12-C16	7	<1-660	120	140	TP102-HS-S1
Aromatic C16-C21	7	<1-2,400	440	260	TP102-HS-S1
Aromatic C21-C35	7	<1-6,700	1000	1100	TP102-HS-S1
Benzene	7	<0.005	0.08 (Table 3.3)		None
Toluene	7	<0.005	120 (Table 3.3)		None
Ethylbenzene	7	<0.005	65 (Table 3.3)		None
m/p-Xylene	7	<0.005	42 (Table 3.3)		None
o-xylene	7	<0.005	44 (Table 3.3)		None

4.3.4 No exceedances were reported within the validation samples collected from the retained soils following removal of the black aggregate confirming the effectiveness of the remedial works. Exceedances were limited to sample TP102-HS-S1 which was collected from the removed black aggregate.

4.4 ACM Hotspot

4.4.1 Following building demolition and removal of hardstanding, a localised area of ACM was observed within the surface soils by URL in the northwest of the site. Handpicking was undertaken by specialist sub-contractor Elite with all ACM double-bagged and placed in secure skips along with the ACM removed as part of the pre-demolition building strip. Following removal of surface deposits an excavator was used to carry out a shallow (0.5m turnover of soils) to allow the sub-contractor to inspect and undertake further picking, if necessary. The remediated area extended approximately 10m x 20m.

4.4.2 Following handpicking of visible ACM, SGP attended site and collected samples of the retained soils on a 1 per 5m² frequency for asbestos identification to assess whether any loose fibres remained within the soils.

4.4.3 During sampling the soils were inspected for any potential ACM, no such materials were observed with the soils consisting of re-worked sandy clay with coarse limestone gravel and

inclusions of brick. A photographic record is presented in Appendix B and a copy of the laboratory test results (lab ref. 21-14505) in Appendix D.

- 4.4.4 Composite samples were collected from a depth of 0-0.5m across the remediated area and submitted for asbestos identification analysis. Any samples where a positive identification was reported were scheduled for further quantification analysis to establish the volume of fibres present. The results are summarised in the table below and are compared to the garden soils criteria of <0.001%.

Table 4.4 ACM Hotspot Remediation Validation Data

Sample	Asbestos Identification	Mass (%)	Garden Soils Criteria (Table 3.3)	Exceedance
PH9-ACMHS-S1	NAD	-	<0.001%	No
PH9-ACMHS-S2	Amosite – Fibre Clump	<0.001		No
PH9-ACMHS-S3	NAD	-		No
PH9-ACMHS-S4	NAD	-		No
PH9-ACMHS-S5	NAD	-		No
PH9-ACMHS-S6	NAD	-		No
PH9-ACMHS-S7	NAD	-		No
PH9-ACMHS-S8	NAD	-		No

- 4.4.5 A single incidence of asbestos was reported within sample PH9-ACMHS-S2 with fibre clumps of amosite; however, quantification confirmed a mass of <0.001% which did not result in an exceedance. No incidences were reported within the remainder of the samples.

4.5 USTs

- 4.5.1 SGP attended site on 09.03.21 to both uncover / establish how many tanks remained adjacent to the former boiler house in the centre of the site. Following confirmation that 3 tanks were present that were filled with water and a surface layer of floating oil, URL commissioned CSG to empty and purge the tanks prior to removal.
- 4.5.2 SGP re-attended site on 28.04.21 following the immediate removal of the tanks to inspect the remediation excavation and collect validation samples from the base and sidewalls. A photographic record is presented in Appendix B.
- 4.5.3 Visual inspection and screening of the removed concrete cradle with a PID was also undertaken which confirmed the absence of any visible staining or presence of volatile organic compounds (VOCs). The material was therefore deemed to be uncontaminated and suitable for processing.
- 4.5.4 Observed ground conditions consisted of a sandy clay soil with coarse limestone gravel to approximately 2.3m bgl where weathered bedrock was encountered. The depth of the excavation extended to a depth of approximately 2.8m.

4.5.5 Visual inspection of the base and sidewalls was undertaken with no staining or areas of free product observed. No odours were recorded from the excavation and screening of soils from the base and sidewall with a PID failed to exceed detection limits (<0.1ppm). A photographic record is provided in Appendix B.

4.5.6 Eight composite samples were collected from the sidewalls (PH9-UST-SS1 to SS8) and 4 from the base (PH9-UST-SS9 to SS12). The spacing of samples was completed in accordance with the approved Remediation Strategy with 1 sample collected per 15m² of the excavated surface. All validation samples were submitted for TPHCWG and BTEX analysis (lab ref. 21-14510) and the results have been compared to the assessment criteria for hydrocarbon remediation as summarised in the table below:

Table 4.5 Ph9 UST Hotspot Remediation Validation Data

Contaminant	Samples	Range of Concentrations (mg/kg unless stated)	Table B2	
			Screening criteria* (mg/kg unless stated)	Exceedances Concentration & location
Aliphatic C5-C6	12	<1	-	-
Aliphatic C6-C8	12	<1	-	-
Aliphatic C8-C10	12	<1	80	None
Aliphatic C10-C12	12	<1-51	1000	None
Aliphatic C12-C16	12	<1-280	1000	None
Aliphatic C16-C21	12	<1-300	1000	None
Aliphatic C21-C35	12	<1-250	1000	None
Aromatic C6-C7	12	<1	-	-
Aromatic C7-C8	12	<1	-	-
Aromatic C8-C10	12	<1	-	-
Aromatic C10-C12	12	<1-70	7	(4): SS1, SS2, SS9 & SS10
Aromatic C12-C16	12	<1-330	120	(4): SS1, SS2, SS9 & SS10
Aromatic C16-C21	12	<1-32,000	440	(2): SS1 & SS2
Aromatic C21-C35	12	<1-1,100	1000	(1): SS2
Benzene	12		0.08 (Table B1)	None
Toluene	12		120 (Table B1)	None
Ethyl benzene	12		65 (Table B1)	None
m/p-Xylene	12		42 (Table B1)	None
o-xylene	12		44 (Table B1)	None

4.5.7 Exceedances were reported within the aromatic hydrocarbon >C10 fractions within samples SS1 and SS2 (eastern sidewall) and SS9 and SS10 (base), as summarised below:

- C10-C12 (criteria 7 mg/kg): SS1 - 47 mg/kg, SS2 - 40 mg/kg, SS9 - 70 mg/kg and SS10 - 35 mg/kg
- C12-C16 (criteria 120 mg/kg): SS1 - 190 mg/kg, SS2 - 250 mg/kg, SS9 - 330 mg/kg and SS10 - 250 mg/kg
- C16-C21 (criteria 440 mg/kg): SS1 - 32,000 mg/kg and - SS2 610 mg/kg
- C21-C35 (criteria 1000 mg/kg): SS2 - 1,100 mg/kg

- 4.5.8 Exceedances were generally considered to be minor in respect of the assessment criteria. Given the low mobility due to a high viscosity and low volatility of the fractions for which there were exceedances, the risks to groundwater, human health and the proposed development is considered to be low. Two of the exceedance locations were from the base where further removal could not take place due to the presence of intact bedrock.
- 4.5.9 A significantly elevated concentration of the aromatic C16-C21 fraction was reported within sample SS1 with a concentration of 32,000 mg/kg compared to the criteria of 440 mg/kg. It is noted that sample SS2 located on the same sidewall also reported an exceedance of this fraction, albeit much lower. At the concentration reported free product would be anticipated, however no product or staining was observed. Similarly, no odours were noted during sampling which may readily be anticipated at the reported concentrations if heating oil impacted soil was present.
- 4.5.10 It was noted during the site works that a former road ran immediately parallel to the eastern site boundary and it is considered most likely that some cross-contamination of the tarmac has occurred during sampling. Due to the high sidewalls an excavator was utilised to collect sidewall and basal samples and this was completed by a toothed bucket being dragged up the sidewall from base to the surface. This could have inadvertently resulted in the collection of any tarmac at the surface.

4.6 Phase 9 Baseball Pitch Topsoil

- 4.6.1 Two sources of topsoil have been recovered as part of the Phase 9 remedial works, the first was associated with the former baseball pitch which has been duly reported within the Phase 9 Baseball Pitch Completion Report (ref. R1742-R22), however for completeness the results have been reproduced in the section below.
- 4.6.2 Prior to the commencement of preparatory earthworks, including the recovery of topsoil, SGP carried out both in-situ topsoil and formation soil testing in 2018. The findings were reported in a letter report (R1742b-L07; August 2018), a copy of which is provided in Appendix E.
- 4.6.3 SGP collected 9 in-situ samples on the working assumption that circa 4,400m³ of topsoil was present across the baseball pitch area ((14,650m²) x assumed thickness of topsoil (0.3m)) to achieve a sampling frequency of 1 per 500m³. URL having since confirmed following recovery that 3,700m³ of topsoil was recovered from the baseball pitch. A testing frequency of 1 sample per 410m³ has therefore been achieved, satisfying the prescribed rate of 1 sample per 500m³. The stockpile is currently located within the main Phase 9 area covered by this report.
- 4.6.4 The results of the baseball pitch topsoil sampling (lab ref. 18-7823 and 18-14613) are reproduced in the table below and are compared to the garden cover criteria outlined in Table 3.3 of the Remediation Strategy.

Table 4.6 Ph9 Baseball Pitch Site-Won Topsoil

Contaminant	Samples	Range of Concentrations (mg/kg unless stated)	Residential Use	
			Screening criteria (mg/kg unless stated)	Exceedances
SOM	9	1.5-3.8	-	None
pH	9	7.74-8.25	-	None
asbestos fibre	9	NAD	<0.001%	None
arsenic	9	15.2-52.1	37 (S4UL)	(1): Ph9-S9A
cadmium	9	0.1-0.2	11 (S4UL)	None
chromium	9	36.9-82.2	910 (S4UL)	None
chromium IV	9	<0.3	6 (S4UL)	None
copper	9	10-29	2400 (S4UL)	None
lead	9	17-88	200 (C4SL)	None
mercury	9	<0.1	1.2 (S4UL)	None
nickel	9	18.3-51.50	180 (S4UL)	None
selenium	9	<1-2	250 (S4UL)	None
vanadium	9	52-119	410 (S4UL)	None
zinc	9	64-174	3700 (S4UL)	None
naphthalene	9	<0.04	2.3 (S4UL)	None
acenaphthylene	9	<0.03	170 (S4UL)	None
acenaphthene	9	<0.05	210 (S4UL)	None
fluorene	9	<0.04	170 (S4UL)	None
phenanthrene	9	<0.03-0.26	95(S4UL)	None
anthracene	9	<0.04-0.09	280 (S4UL)	None
fluoranthene	9	0.09-0.95	2400 (S4UL)	None
pyrene	9	0.09-0.87	620 (S4UL)	None
benzo(a)anthracene	9	0.06-0.59	7.2 (S4UL)	None
chrysene	9	0.06-0.46	15 (S4UL)	None
benzo(bk)fluoranthene	9	0.11-1.09	-	-
benzo(a)pyrene	9	0.06-0.59	2.2 (S4UL)	None
indeno(123cd)pyrene	9	0.04-0.44	27 (S4UL)	None
dibenzo(ah)anthracene	9	0.04-0.09	0.24(S4UL)	None
benzo(ghi)perylene	9	0.04-0.4	320 (S4UL)	None
aliphatic C5-C6	9	<0.1	42 (S4UL)	None
aliphatic C6-C8	9	<0.1	100 (S4UL)	None
aliphatic C8-C10	9	<0.1	27 (S4UL)	None
aliphatic C10-C12	9	<0.2	130 (S4UL)	None
aliphatic C12-C16	9	<4	1100 (S4UL)	None
aliphatic C16-C21	9	<7	5000 (S4UL)	None
aliphatic C21-C35	9	<7	5000 (S4UL)	None
aromatic C5-C7	9	<0.1	70 (S4UL)	None
aromatic C7-C8	9	<0.1	130 (S4UL)	None
aromatic C8-C10	9	<0.1	34 (S4UL)	None
aromatic C10-C12	9	<0.2	74 (S4UL)	None
aromatic C12-C16	9	<4	140 (S4UL)	None
aromatic C16-C21	9	<7	260 (S4UL)	None
aromatic C21-C35	9	<7	1100 (S4UL)	None
benzene	9	<0.005	0.08 (S4UL)	None

Contaminant	Samples	Range of Concentrations (mg/kg unless stated)	Residential Use	
			Screening criteria (mg/kg unless stated)	Exceedances
toluene	9	<0.005	130 (S4UL)	None
ethylbenzene	9	<0.005	47 (S4UL)	None
o-xylene	9	<0.005	60 (S4UL)	None
m-xylene	9	<0.005	56 (S4UL)	None
p-xylene	9	<0.005	56 (S4UL)	None
methyl tert butyl ether	9	<0.005	-	None

Notes to table:

S4UL: Suitable For Use Levels published by Chartered Institute of Environmental Health and Land Quality Management Ltd, residential with plant uptake scenario (1% SOM); copyright Land Quality Management Ltd reproduced with permission publication number S4UL3102. All rights reserved.

C4SL: Category 4 Screening Levels published by CL:AIRE (C4SLs); 'residential without home grown produce land use' (at 1% SOM)

4.6.5 A single minor exceedance was reported for arsenic within sample Ph9-S9A with a concentration of 52.1 mg/kg compared to the criterion of 37 mg/kg.

4.6.6 Statistical analysis was undertaken that confirms the exceedance is an outlier of the dataset and is not representative of the soil concentrations and can therefore be excluded from the dataset. When this value is removed, the upper confidence limit (0.95) for arsenic is reduced to 23.26, well below the criteria of 37 mg/kg.

Table 4.7 Statistical Analysis of Arsenic

statistic	arsenic (mg/kg)
criterion	37
no. of samples	9
Grubbs outlier test for highest value (P0.05)	Ph9-S9A (max value 52.1 mg/kg) is an outlier
arithmetic mean, including outlier	22.42
upper confidence limit (UCL 0.95) including outlier	39.09 (fail)
arithmetic mean, excluding Ph9-S9A outlier	18.71
upper confidence limit (UCL 0.95) excluding Ph9-S9A outlier	23.26 (pass)

4.6.7 No made ground or ashy deposits were observed within the topsoil and it is anticipated that some vertical mixing of the underlying ironstone within which naturally elevated arsenic at similar concentrations have been reported within the wider Heyford Park development area. Typically the bio-accessibility of naturally occurring arsenic associated with ironstones (normally present in the form of arsenopyrite) will be low, and the risk to future residential use is therefore considered to be low.

4.7 Phase 9 Topsoil

4.7.1 In addition to the topsoil recovered from the Phase 9 baseball pitch, approximately 2,700m³ of topsoil was recovered from the remainder of the Phase 9 area (as covered within this report) from areas of soft landscaping and verges around the former buildings.

4.7.2 SGP attended site on 06.01.21 and collected 6 samples from the stockpiled material, satisfying the prescribed sampling frequency of 1 per 500m³ for site-won topsoil. A copy of the lab results (ref. 21-11321) is provided in Appendix D with results compared to the garden cover criteria outlined in Table 3.3 of the Remediation Strategy. Due to several exceedances, comparison to the S4UL for public open space within a residential setting (POS_{resi}) have also been utilised to assess the potential for reuse in less sensitive areas of the development.

Table 4.8 Summary of Ph9 Topsoil

Contaminant	Samples	Range of Concentrations (mg/kg unless stated)	Garden Cover System Screening criteria (mg/kg unless stated)	Exceedances	POS _{resi} Screening criteria (mg/kg unless stated)	Exceedances
SOM	6	3.1-5.3	-	-	-	-
pH	6	8.2-8.4	-	-	-	-
asbestos fibre	6	NAD	<0.001%	None	<0.001%	None
arsenic	6	21-54	37 (S4UL)	(1): S4	79	None
cadmium	6	0.29-0.38	11 (S4UL)	None	120	None
chromium	6	25-63	910 (S4UL)	None	1,500	None
chromium IV	6	<0.5	6 (S4UL)	None	7.7	None
copper	6	15-23	2400 (S4UL)	None	2,400	None
lead	6	33-77	200 (C4SL)	None	630	None
mercury	6	<0.1-0.13	1.2 (S4UL)	None	16	None
nickel	6	20-38	180 (S4UL)	None	230	None
vanadium	6	45-100	410 (S4UL)	None	2,000	None
zinc	6	62-130	3700 (S4UL)	None	81,000	None
naphthalene	6	<0.1	2.3 (S4UL)	None	4,900	None
acenaphthylene	6	<0.1	170 (S4UL)	None	15,000	None
acenaphthene	6	<0.1	210 (S4UL)	None	15,000	None
fluorene	6	<0.1	170 (S4UL)	None	9,900	None
phenanthrene	6	0.57-3.90	95(S4UL)	None	3,100	None
anthracene	6	0.19-1.10	280 (S4UL)	None	74,000	None
fluoranthene	6	1.90-9.70	2400 (S4UL)	None	3,100	None
pyrene	6	1.90-9.60	620 (S4UL)	None	7,400	None
benzo(a)anthracene	6	0.37-4.30	7.2 (S4UL)	None	29	None
chrysene	6	0.87-5.10	15 (S4UL)	None	57	None
benzo(bk)fluoranthene	6	2.09-10.60	-	-	-	-
benzo(b)fluoranthene	6	1.6-7.8	2.6 (S4UL)	(3): S2, S4, S5	7.1	None
benzo(k)fluoranthene	6	0.49-2.80	77 (S4UL)	None	190	None
benzo(a)pyrene	6	1.10-5.60	2.2 (S4UL)	(1): S2	5.7	None
indeno(123cd)pyrene	6	0.19-4.80	27 (S4UL)	None	82	None

Contaminant	Samples	Range of Concentrations (mg/kg unless stated)	Garden Cover System Screening criteria (mg/kg unless stated)	Exceedances	POS _{resi} Screening criteria (mg/kg unless stated)	Exceedances
dibenzo(ah)anthracene	6	0.10-0.77	0.24(S4UL)	(4): S1. S2. S3. S5	29	None
benzo(ghi)perylene	6	0.65-4.10	320 (S4UL)	None	640	None
aliphatic C5-C6	6	<1	42 (S4UL)	None	570,000	None
aliphatic C6-C8	6	<1	100 (S4UL)	None	600,000	None
aliphatic C8-C10	6	<1	27 (S4UL)	None	13,000	None
aliphatic C10-C12	6	<1	130 (S4UL)	None	13,000	None
aliphatic C12-C16	6	<1	1100 (S4UL)	None	13,000	None
aliphatic C16-C21	6	<1	5000 (S4UL)	None	250,000	None
aliphatic C21-C35	6	<1-7.9	5000 (S4UL)	None	250,000	None
aromatic C5-C7	6	<1-34	70 (S4UL)	None	56,000	None
aromatic C7-C8	6	<1	130 (S4UL)	None	56,000	None
aromatic C8-C10	6	<1	34 (S4UL)	None	5,000	None
aromatic C10-C12	6	<1	74 (S4UL)	None	5,000	None
aromatic C12-C16	6	<1	140 (S4UL)	None	5,100	None
aromatic C16-C21	6	<1	260 (S4UL)	None	3,800	None
aromatic C21-C35	6	<1	1100 (S4UL)	None	3,800	None
benzene	6	<0.001	0.08 (S4UL)	None	72	None
toluene	6	<0.001	130 (S4UL)	None	56,000	None
ethylbenzene	6	<0.001	47 (S4UL)	None	5,700	None
o-xylene	6	<0.001	60 (S4UL)	None	6,600	None
m-xylene	6	<0.001	56 (S4UL)	None	5,900	None
p-xylene	6	<0.001	56 (S4UL)	None	5,900	None

4.7.3 A single minor elevated arsenic concentration was reported within sample S4 with a concentration of 54 mg/kg compared to the garden criteria of 37 mg/kg, although this was below the POS_{resi} value of 79mg/kg.

4.7.4 Multiple PAH exceedances were also reported for dibenzo(ah)anthracene (4), benzo(b)fluoranthene (3) and benzo(a)pyrene (1) when compared to the garden cover criteria.

4.7.5 Due to the frequency of the reported exceedances, it is considered that this topsoil is unsuitable for reuse as garden soils, however no exceedances were reported when concentrations were compared to the S4UL criteria for public open spaces within a residential setting (POS_{resi}). It is therefore considered that this material is suitable for reuse in areas of soft-landscaping and areas of public open space but must be excluded for private gardens.

4.8 Validation of Formation Soils

4.8.1 Sampling and analysis was carried out to determine the suitability of formation level soils to form part of the 600mm soil cover system. Development levels for the site are yet to be

confirmed by the developer; however, in-situ sampling of the formation level will determine whether a reduced 200mm topsoil cover can be placed within garden areas providing the 400mm of natural strata is chemically suitable for retention.

- 4.8.2 In-situ sampling of subsoils was carried out through the excavation and sampling of the top 400mm of natural subsoil with a total of 51 samples collected. Assuming an approximate area of 56,600m², the volume of validated soils is effectively 22,640m³ and the test rate is equivalent to 1 sample per 443m², achieving the specified rate of 1 sample per 500m³.
- 4.8.3 Sampled soils generally consisted of a natural or re-worked natural sandy soil with coarse limestone gravel; occasional sandy clay to clay soil was also encountered. Inclusions of brick were occasionally noted but was generally limited to surface deposits. No inclusions of ash, clinker or slag were observed either during sampling or the following walkover.
- 4.8.4 A photographic record confirming the depth and soil profile at each test location is provided within Appendix C and laboratory test certificates (lab ref. 21-0779, 21-11315, 21-14506 and 210506-141) are provided in Appendix D. All sample locations are shown within Drawing D03.
- 4.8.5 Results are summarised in the table below and are compared to assessment criteria for garden cover soils.

Table 4.9 Analysis of Formation Soils

Contaminant	Samples	Range of Concentrations (mg/kg unless stated)	Residential Use	
			Screening criteria (mg/kg unless stated)	Exceedances
SOM	51	0.4-2.2	-	None
pH	51	8-9.10	-	None
asbestos fibre	51	NAD	<0.001%	None
arsenic	51	10-43	37 (S4UL)	(1): SS43
cadmium	51	0.1-0.23	11 (S4UL)	None
chromium	51	3.2-45	910 (S4UL)	None
chromium IV	51	<0.5	6 (S4UL)	None
copper	51	1.4-18	2400 (S4UL)	None
lead	51	1.5-25	200 (C4SL)	None
mercury	51	<0.1	1.2 (S4UL)	None
nickel	51	2.8-39	180 (S4UL)	None
vanadium	51	7.8-76	410 (S4UL)	None
zinc	51	3.9-61	3700 (S4UL)	None
naphthalene	51	<0.1-0.18	2.3 (S4UL)	None
acenaphthylene	51	<0.1	170 (S4UL)	None
acenaphthene	51	<0.1-0.39	210 (S4UL)	None
fluorene	51	<0.1-0.31	170 (S4UL)	None
phenanthrene	51	<0.1-3.60	95(S4UL)	None
anthracene	51	<0.1-1.2	280 (S4UL)	None
fluoranthene	51	<0.1-11	2400 (S4UL)	None

Contaminant	Samples	Range of Concentrations (mg/kg unless stated)	Residential Use	
			Screening criteria (mg/kg unless stated)	Exceedances
pyrene	51	<0.1-11	620 (S4UL)	None
benzo(a)anthracene	51	<0.1-4.3	7.2 (S4UL)	None
chrysene	51	<0.1-4	15 (S4UL)	None
benzo(b)fluoranthene	51	<0.1-5.10	2.6 (S4UL)	(3): SS26, SS28, SS37
benzo(k)fluoranthene	51	<0.1-2.3	77 (S4UL)	
benzo(a)pyrene	51	<0.1-4	2.2 (S4UL)	(3): SS26, SS28, SS37
indeno(123cd)pyrene	51	<0.1-2.9	27 (S4UL)	
dibenzo(ah)anthracene	51	<0.1-1.3	0.24(S4UL)	(3): SS26, SS28, SS37
benzo(ghi)perylene	51	<0.1-2.5	320 (S4UL)	None
aliphatic C5-C6	51	<0.1	42 (S4UL)	None
aliphatic C6-C8	51	<0.1	100 (S4UL)	None
aliphatic C8-C10	51	<0.1	27 (S4UL)	None
aliphatic C10-C12	51	<0.1	130 (S4UL)	None
aliphatic C12-C16	51	<0.1	1100 (S4UL)	None
aliphatic C16-C21	51	<0.1	5000 (S4UL)	None
aliphatic C21-C35	51	<0.1-12	5000 (S4UL)	None
aromatic C5-C7	51	<0.1	70 (S4UL)	None
aromatic C7-C8	51	<0.1	130 (S4UL)	None
aromatic C8-C10	51	<0.1	34 (S4UL)	None
aromatic C10-C12	51	<0.1	74 (S4UL)	None
aromatic C12-C16	51	<0.1	140 (S4UL)	None
aromatic C16-C21	51	<0.1-27	260 (S4UL)	None
aromatic C21-C35	51	<0.1-170	1100 (S4UL)	None
benzene	51	<0.001	0.08 (S4UL)	None
toluene	51	<0.001	130 (S4UL)	None
ethylbenzene	51	<0.001	47 (S4UL)	None
o-xylene	51	<0.001	60 (S4UL)	None
m-xylene	51	<0.001	56 (S4UL)	None
p-xylene	51	<0.001	56 (S4UL)	None

4.8.6 Exceedances were limited to a single incidence of elevated arsenic in sample PH9-SS43 and multiple minor elevated PAHs (benzo(a)pyrene, dibenzo(ah)anthracene and benzo(b)fluoranthene) within three samples (PH9-SS26, -SS28 and -SS37). These are discussed further in the sections below. No asbestos fibres were detected.

Arsenic

4.8.7 A single minor arsenic exceedance was reported within the 51 samples collected with a concentration of 43 mg/kg in sample PH9-SS43 compared to the criteria of 37mg/kg. Given the consistency in the formation soils and the absence of any identified anthropogenic material (excluding brick), it was determined that a statistical estimate should be carried out on the sample mean within Phase 9 as a single averaging area.

Table 4.10 Analysis of Formation Soils

statistic	arsenic (mg/kg)
criterion	37.0
no. of samples	51
arithmetic mean, including outlier	22.12 (pass)
upper confidence limit (UCL 0.95) including outlier	23.95 (pass)

4.8.8 The statistical analysis shows that the same dataset has a UCL (0.95) of 23.95 mg/kg and an arithmetic mean arsenic concentration 22.12 mg/kg, significantly below the criterion of 37 mg/kg.

4.8.9 Soil sampled was of natural appearance from an area of the site remote from identified historical contaminative activities, identical in appearance to other soils around the phase, and mineralisation is therefore likely to be of natural origin. Typically, the bio-accessibility of naturally occurring arsenic associated with ironstones (normally present in the form of arsenopyrite) will be low, and the risk to future residential use is therefore considered also likely to be low. The S4UL for arsenic in residential garden soil where plants may be grown for consumption is 37 mg/kg. The maximum soil concentration recorded was only slightly above this value.

PAHs

4.8.10 Minor elevated PAHs were reported within samples PH9-SS26, -SS28 and -SS37, all of which related to exceedances of benzo(a)pyrene (2.8-4.0 mg/kg), dibenzo(ah)anthracene (0.64-1.3 mg/kg) and benzo(b)fluoranthene (3.9-5.1 mg/kg).

4.8.11 PAH ratio analysis has been undertaken to determine the probable source of the minor elevated PAHs. Source identification suggests a coal / coal tar source, a copy of the plot is included within Appendix F. It is most likely that this signature relates to very fine inclusions of broken out and removed tarmac. Small residues may remain in surface soils within these locations although no visible remains were observed during sampling. Source identification confirms a probable low bio-availability due to the sequestration of PAHs within a carbon or vitrified matrix with benzo(a)pyrene concentrations significantly below the DEFRA C4SL criteria of 5 mg/kg for garden soils.

4.8.12 The overall risks to future residents from these minor isolated exceedances is considered low, however it is recommended due to the slight coal tar signature that a surface scrape is undertaken from future garden areas across these locations to allow removal of any remaining surface inclusions and supplemented by additional PAH testing following removal.

4.9 Validation of Phase 9 Generated Aggregate

4.9.1 Three stockpiles of aggregate have been generated from recovered hardstanding in the Phase 9 area including 195m³ recovered from Phase 8. The approximate volume of processed material in each stockpile following completion of the works is as follows:

Table 4.10 Summary of Phase 9 generated aggregate

Stockpile Ref	Approximate Volume (m ³)	No. Asbestos Tests	Sampling Frequency	No. Geotech Tests	Sampling Frequency [#]
Ph9-AGG-1	1,725	4	1 per 430m ³	1	1 per 1,725m ³
Ph9-AGG-2	8,440	16	1 per 527m ³	3	1 per 2,813m ³
Ph9-AGG-3	2,590	6	1 per 430m ³	4	1 per 648m ³

#No frequency for geotechnical testing under approved Strategy. Sampling as instructed by client.

4.9.2 Sampling frequencies for asbestos identification (lab ref. 21-11321, 21-13303, 21-14505 & 21-16265, 21-19648) were undertaken in accordance with the approved Remediation Strategy at a frequency of 1 sample per 500m³. A sampling frequency of 1 per 527m³ was achieved for aggregate stockpile Ph9-AGG-2, however this is only considered marginal and not likely to impact the assessment or conclusions made. The requirement or frequency of geotechnical sampling of aggregates was not specified within the Strategy and so testing was completed as per the client's request.

Table 4.11 Asbestos Screening Summary for Phase Generated Aggregate

Stockpile Ref	Lab Ref	Sample	Asbestos Identification	Asbestos Concentration (%)	ACM Identification
Ph9-AGG-1	21-11321	Agg-060421-S1	NAD		
		Agg-060421-S2	NAD		
	21-19648	AGG-SP1-S3	NAD		
		AGG-SP1-S4	NAD		
Ph9-AGG-2	21-13303 & 21-14505	Ph9-Agg2-S1	Yes	0.009	Chrysotile – fibre / clumps
		Ph9-Agg2-S2	Yes	<0.001	Chrysotile – fibre / clumps
		Ph9-Agg2-S3	NAD		
		Ph9-Agg2-S4	Yes	<0.001	Chrysotile – fibre / clumps
		Ph9-Agg2-S5	NAD		
		Ph9-Agg2-S6	NAD		
		Ph9-Agg2-S7	NAD		
		Ph9-Agg2-S8	NAD		
		Ph9-Agg2-S9	Yes	<0.001	Chrysotile – fibre / clumps
		Ph9-Agg2-S10	NAD		
	21-19648	Ph9-Agg2-S11	NAD		
		Ph9-Agg2-S12	NAD		
		Ph9-Agg2-S13	NAD		
		Ph9-Agg2-S14	NAD		
		Ph9-Agg2-S15	NAD		
		Ph9-Agg2-S16	NAD		

Stockpile Ref	Lab Ref	Sample	Asbestos Identification	Asbestos Concentration (%)	ACM Identification
Ph9-AGG-3	21-1405 & 21-16265	Ph9-Agg3-S1	NAD		
		Ph9-Agg3-S2	NAD		
		Ph9-Agg3-S3	NAD		
		Ph9-Agg3-S4	NAD		
		Ph9-Agg3-S5	Yes	0.008	Chrysotile – fibre / clumps
		Ph9-Agg3-S6	Yes	<0.001	Chrysotile – fibre / clumps

4.9.3 No asbestos was detected in Ph9-Agg-1 whilst positive incidences of chrysotile fibre/clumps were reported in 4 out of 10 samples from Ph9-Agg-2 and 2 out of 6 samples from Ph9-Agg-3. Following the positive identifications, quantification analysis was scheduled to determine the mass of asbestos present. Concentrations were generally below detection limits (<0.001%), however two samples, one sample from each stockpile recorded a mass at 0.008% (Ph9-Agg-3) and 0.009% (Ph9-Agg-2). This signified the requirement for further assessment to assess the suitability for use of the aggregate within the development. Even though feedstock materials were inspected by URL for ACM prior to crushing, it is envisaged that the most likely source of the contamination were discrete deposits of ACM within recovered structures.

4.9.4 The ACM present within the aggregate has been confirmed by the laboratory analysis as chrysotile fibres (fibres / clumps). As the asbestos was detected in a loose form and has therefore already degraded from its former matrix, it is considered to be in the state with the highest amount of respirable fibres (CIRIA C733¹). The influence on soil type can also affect fibre release with granular soils (sands and gravels) resulting in a higher airborne fibre count following disturbance compared to clay soils¹. As the material in question is aggregate (i.e., gravel), a high proportion for airborne release of fibres can therefore be assumed.

4.9.5 The main receptors considered are adult workers during the movement and placement of aggregate as either general fills or placement as piling mats below permanent structures (plots) and within road boxes. The aggregate within stockpiles Ph9-Agg-2 and Ph9-Agg-3 is not suitable for placement within service corridors where disturbance during maintenance works could occur. The isolation of aggregate under permanent structures, outside service corridors and the top 600mm of garden soils is unlikely to result in exposure to future site occupants or maintenance workers. During the construction phase works, exposure is likely to occur during the disturbance and movement of the impacted aggregate.

4.9.6 Even though the sensitivity of the site is considered to be high (residential), due to the isolation of the material beneath future permanent structures, hardstanding, or at depth as general fill, where required, this will greatly limit the pathway for future exposure. For this assessment to remain valid, and in accordance with the requirement to maintain exposure to

asbestos to levels which are as low as reasonably practicable, aggregate from stockpiles Ph9-Agg-2 and Ph9-Agg-3 must be excluded from the upper 600mm of private garden areas or upper 300mm within areas of public open space / landscaping.

- 4.9.7 It is therefore considered that the site generated aggregate is suitable for its understood, intended purpose, although appropriate control measures in accordance with CAR2012 should be employed during the initial placement of the material within the development to minimise the level of exposure to site workers. Such measures are anticipated to include dust suppression during disturbance / placement works.

¹ CIRIA (C733). Asbestos in soil and made ground.

5. Conclusions & Recommendations

5.1. Conclusions

- 5.1.1. Remedial works in accordance with the Remediation Strategy have been completed within the main Phase 9 area as detailed within the URL as-built drawings. It is acknowledged that a number of areas, generally relating to the periphery of the main site and the area to the south-east (proposed POS), are yet to undergo preparatory works which have largely been constrained due to the presence of stockpiles. It is understood that these areas will be subject to remedial works, verification testing and reporting at a later date.
- 5.1.2. Further investigation, remediation and assessment has been undertaken within identified potential contamination hotspots (TP102, TP104 and USTs), whilst a previously unexpected asbestos hotspot was also remediated and validated.
- 5.1.3. Investigation within the area of TP102 confirmed the presence of a black bitumen bound gravel immediately below surface soils possibly associated with the base of a former radio mast. Removal of the black gravel was completed and verification testing of the stripped surface soils reported to no exceedances to be present.
- 5.1.4. Investigation of TP104 where Hydrock had previously reported black stained gravel with tar odour was completed through excavation of trenches, however no such material was encountered with only natural soils present. Chemical testing of the soils was carried out with no exceedances reported. The area of TP104 was located adjacent to a road covered in tarmac and it is considered likely that Hydrock's observations may have related to this area.
- 5.1.5. Three underground storage tanks associated with the former boiler house were uncovered, emptied and removed. Twelve validation samples were collected from the base and sidewalls of the excavations with 2 minor exceedances reported within the base and 1 minor exceedance in the eastern sidewall. A fourth, more significant exceedance was also reported within the eastern sidewall with an aromatic C16-C21 concentration of 32,000 mg/kg. Such a concentration would be indicative of free product; however, no staining or product was observed on the soils during sampling. If any residual heating oil was present, either associated with historical leaks or spills, then due to the low mobility and high viscosity some staining would be present. It was concluded that the elevated concentration is most likely to be associated with residual fragments of tarmac which may have been inadvertently sampled by the machine bucket during collection. A broken-out road which was surfaced with tarmac was located to the immediate east which coincides with the sampling location.
- 5.1.6. Following removal of surface hardstanding in the northwest, a localised area of ACM was identified on formation soils. Handpicking was undertaken by a specialist sub-contractor, following which samples of surface soils were collected and submitted for asbestos identification to ascertain whether any residual fibres were present. A single incidence of

amosite fibre clumps was reported in sample PH9-ACMHS-S2 and was subject to quantification. A fibre mass of <0.001% v/v was reported which is compliant with the adopted screening level for garden soils.

- 5.1.7. Two stockpiles of topsoil are present within Phase 9 with approximately 3,700m³ recovered from the former baseball pitch (which has been reported under separate cover) and 2,700m³ from verges around the former building on the main Phase 9 site. Topsoil from the baseball pitch reported 1 minor exceedance of arsenic, however statistical analysis confirms this is an outlier, is not representative of the wider soils and that the material is suitable for reuse as garden soils, although this is subject to regulatory approval. Topsoil from the wider Phase 9 area contained multiple PAH exceedances when compared to residential soils criteria, however no exceedances were reported when compared to criteria for a public open space within a residential setting (POS_{resi}). It is concluded that the topsoil from the baseball pitch is suitable for use in residential gardens (subject to regulator approval) and that the topsoil from the remainder of the Phase 9 area should only be used for placement within areas of public open space and soft landscaping.
- 5.1.8. Formation testing of the top 400mm of site soils has been completed within the remediated area with 51 samples collected. Exceedances were limited to a single minor arsenic exceedance of 43 mg/kg, however when the total averaging area is taken into account this is substantially below the assessment criteria of 37 mg/kg. Multiple PAH exceedances were reported within 3 locations (SS26, SS28 and SS37) with PAH ratio analysis suggesting a coal / coal tar signature. It was concluded on the basis of the source identification that the most probable source was very minor inclusions of residual tarmac following the breaking out and removal of hardstanding although such visual deposits were absent. The exceedances were minor and are likely to be of a low bioavailability given the sequestration within a vitrified matrix, however a recommendation for a final strip of surface soils from the future garden areas within these locations and additional testing for PAHs is made as a precautionary measure.
- 5.1.9. Three stockpiles (SP1, SP2 and SP3) of site generated aggregate have been produced with a total volume of 12,756m³, testing was undertaken for asbestos identification at a frequency of approximately 1 per 500m³. No asbestos was detected in SP1, however low-level fibres were reported within SP2 (non-detect to 0.009%) and SP3 (non-detect to 0.008%). Aggregate from SP2 and SP3 should not be used as backfill within service corridors but is considered suitable for use below permanent structures (plots, drives, roads etc.) where future disturbance is highly unlikely. Appropriate mitigation measures should be deployed during the movement of the aggregate to reduce the likelihood of residual fibre mobilisation and to maintain exposure to asbestos to levels which are as low as reasonably practicable.

5.1.10. A risk assessment with regards to water pipelines may be required by the utility provider. This should be undertaken utilising the information provided within this report and supplemented as appropriate by other reporting pertaining to the site.

5.1.11. No specific testing has been undertaken for potentially aggressive conditions to concrete. Reference should be made to the preceding site investigation reports.

5.2. Recommendations

5.2.1. To secure completion of remediation in Phase 9 in accordance with the Remediation Strategy and the recommendations made within this report (subject to Local Authority Approval), the developer is required to complete the following actions:

- Surface strip of formation soils from the garden areas of Plots 681-684, 701 & 691-693 (according to current plans) due to PAH exceedances and further testing for PAHs to assess whether any exceedances remain;
- Placement of clean topsoil to a nominal depth of 150-200mm within all gardens / POS / landscaped areas;
- Site-won materials to be used as clean soil cover within gardens / POS / landscaped areas must be suitable for use and validated to comply with contamination targets set out in Table 3.3 of the Remediation Strategy with sampling to be carried out at a rate of 1 sample per 500m³;
- Imported soils used for cover purposes are to comply with contamination targets set out in Table 3.3 of the Remediation Strategy with sampling to be carried out at a rate of 1 sample per 250m³ (minimum 3 samples per single source);
- Reuse of site-won (Phase 9 - main area) topsoil within POS / landscaped areas only. Topsoil recovered from baseball pitch suitable for use in gardens;
- Completion of preparatory works including formation testing and POL pipeline removal within outstanding areas as per Drawing D04.

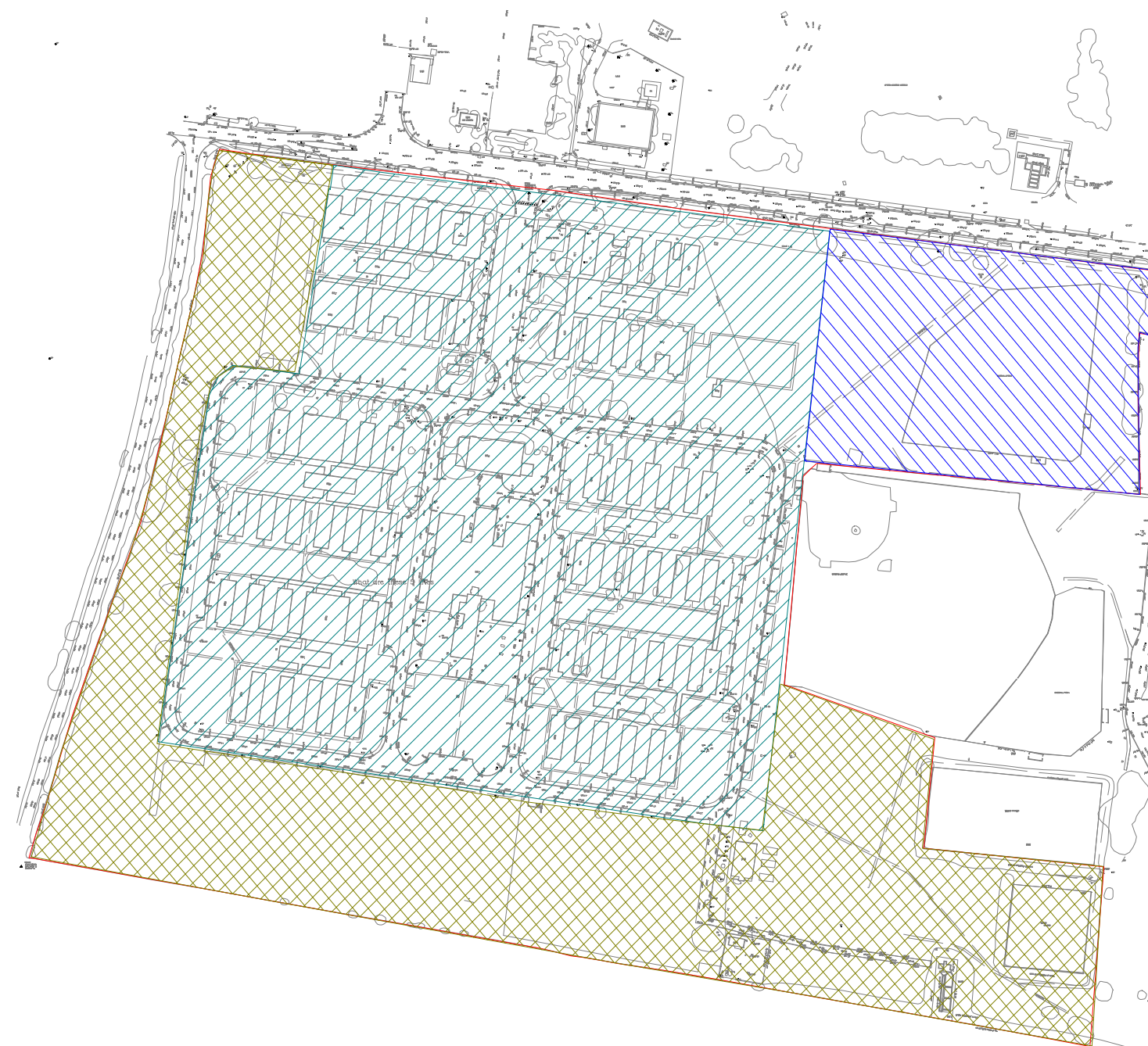
5.2.2. With the adoption of the above normal practices for Brownfield development, and on the information available to it, SGP concludes that the preparatory remedial works have been completed in accordance with the agreed strategy. In the event that any previously undisclosed contamination or suspect materials are identified then this should be assessed by an appropriately qualified and experienced person.

5.3. Limitations

5.3.1. SGP reserves the right to alter any of the foregoing information in the event of new information being disclosed or provided and in the light of changes to legislation, guidelines and responses by the statutory and regulatory authorities.

- 5.3.2. This report has been prepared by Smith Grant LLP, for the sole and exclusive use of Urban Regen Ltd. and Dorchester Living, and the benefit of this report may not be assigned to any third party without the prior agreement in writing of Smith Grant LLP.
- 5.3.3. Reasonable skill, care and diligence have been exercised within the timescale and budget available, and in accordance with the technical requirements of the brief. Notwithstanding the efforts made by the professional team in undertaking the assessment and preparing this report, it is possible that other ground conditions and contamination as yet undetected may exist. Reliance on the findings of this report must therefore be limited accordingly. Such reliance must be based on the whole report and not on extracts which may lead to incomplete or incorrect conclusions when taken out of context. This report reviews and relies upon site investigations largely conducted by others. If errors or omissions in previous work have been noted then these have been duly noted, however SGP accepts no responsibility for advice given on the basis of incorrect factual information provided to it.

DRAWINGS



Phase 9 Boundary
Extent of URL PH9 Remedial Works Reported within R1742-R23
PH9 Baseball Pitch Completed - Reported in R1742b-R22
Remedial Works Outstanding - To be completed at a later date

Reproduced with the permission of
the Ordnance Survey © Crown Copyright
Licence No. 100005799



Smith Grant LLP
Station House, Station Road
Ruabon, Wrexham LL14 6DL

Tel: 01978 822367
Fax: 01978 8247182

www.smithgrant.co.uk
email: consult@smithgrant.co.uk

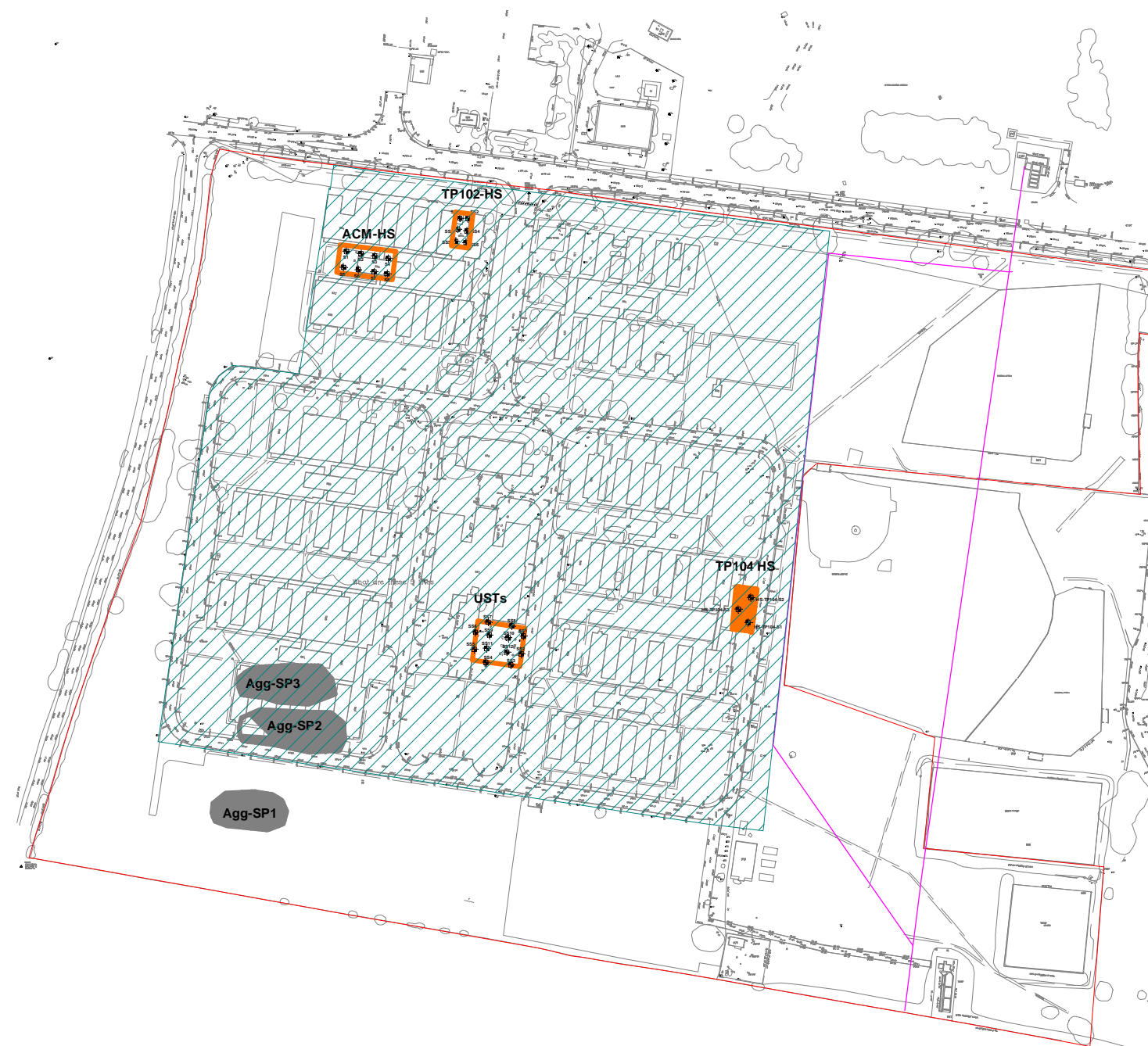
Project:
Heyford Park: Phase 9

Drawing:
Phase 9 Boundary Plan

Drawn: SM Checked: DW

Date: 12.08.21 Scale: 1:2,500 @ A3

Job No: R1742b Drg No: R23-D01



Approx Line of POL pipeline
Phase 9 Boundary
Extent of URL P119 Remedial Works Reported within R1742-R23

Validation Sample

Reproduced with the permission of
the Ordnance Survey © Crown Copyright
Licence No. 100005799



Smith Grant LLP
Station House, Station Road
Ruabon, Wrexham LL14 6DL

Tel: 01978 822367
Fax: 01978 8247182

www.smithgrant.co.uk
email: consult@smithgrant.co.uk

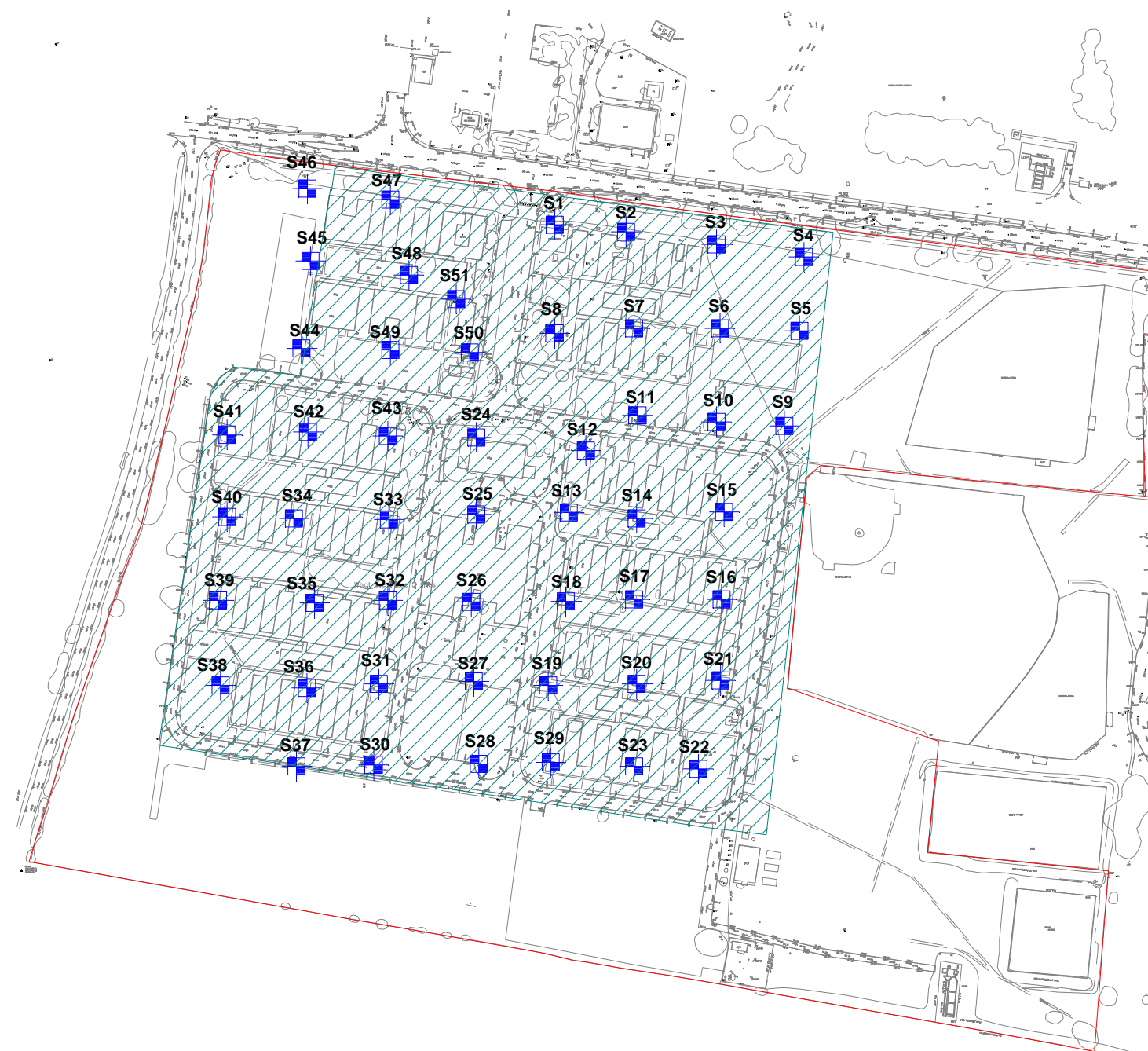
Project:
Heyford Park: Phase 9

Drawing:
Phase 9 Hotspot Investigation

Drawn: SM
Checked: DW

Date: 12.08.21
Scale: 1:2,500 @ A3

Job No: R1742b
Drg No: R23-D02



Phase 9 Boundary
Extent of URL P119 Remedial Works Reported within R1742-R23



Formation Sample

Reproduced with the permission of
the Ordnance Survey © Crown Copyright
Licence No. 100005799



Smith Grant LLP
Station House, Station Road
Ruabon, Wrexham LL14 6DL

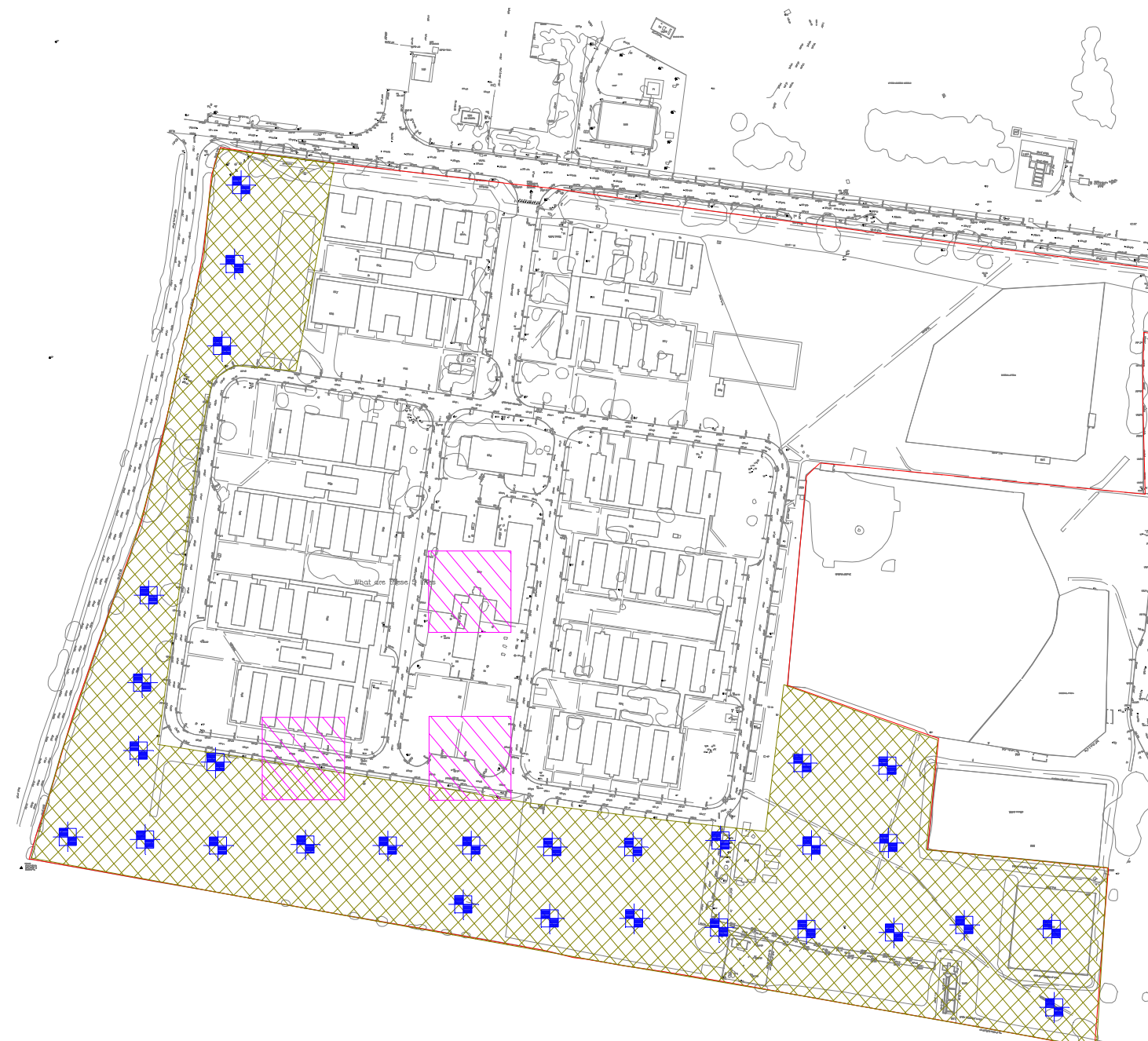
Tel: 01978 822367
Fax: 01978 8247182

www.smithgrant.co.uk
email: consult@smithgrant.co.uk

Project:
Heyford Park: Phase 9

Drawing: Phase 9 - Formation
Validation Locations

Drawn: SM	Checked: DW
Date: 12.08.21	Scale: 1:2,500 @ A3
Job No: R1742b	Drg No: R23-D03



- Phase 9 Boundary
- Remedial Works Outstanding - To be completed at a later date
- Outstanding Formation Validation - To be completed at a later date
- Precautionary surface strip from future gardens & additional PAH testing required

Reproduced with the permission of
the Ordnance Survey © Crown Copyright
Licence No. 100005799



Smith Grant LLP
Station House, Station Road
Ruabon, Wrexham LL14 6DL

Tel: 01978 822367
Fax: 01978 8247182

www.smithgrant.co.uk
email: consult@smithgrant.co.uk

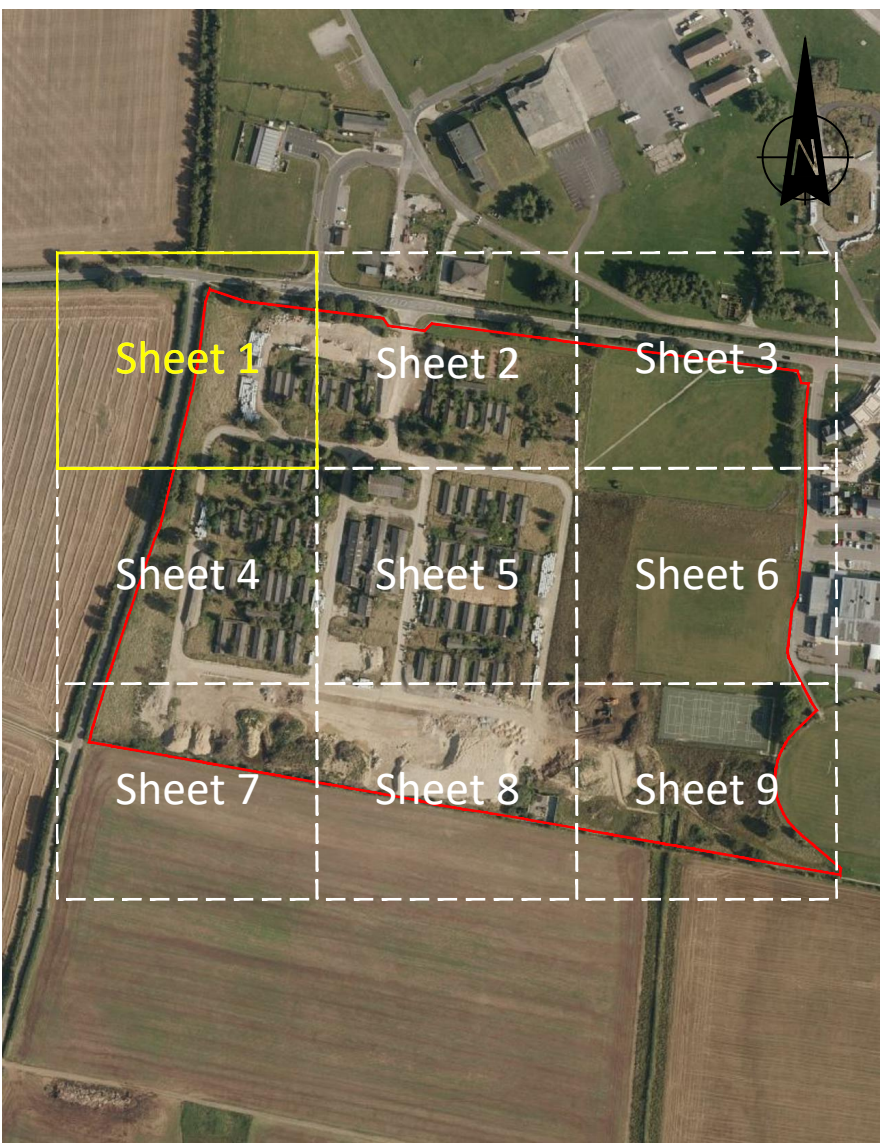
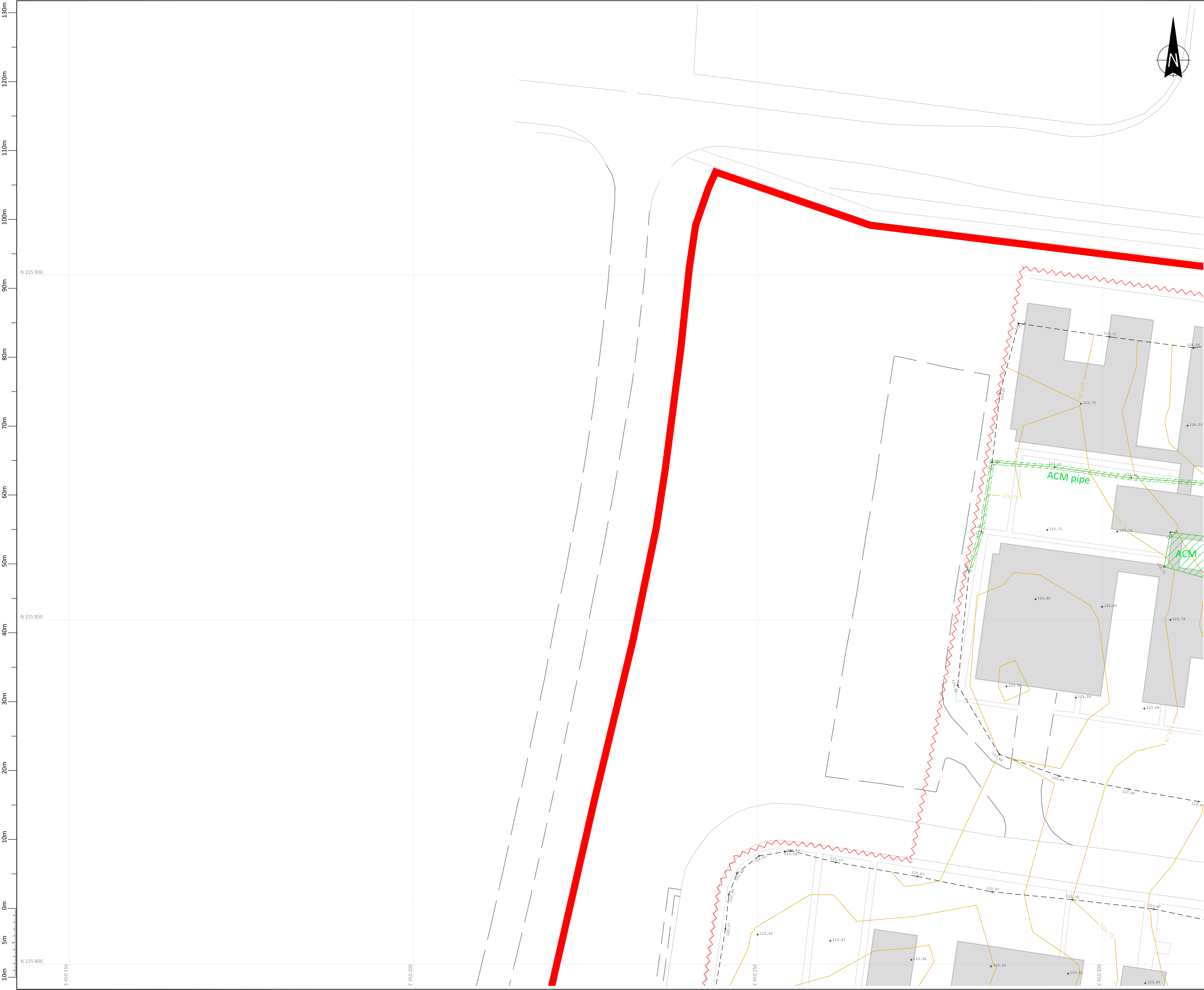
Project:
Heyford Park: Phase 9

Drawing: Phase 9 - Outstanding Remedial Works

Drawn: SM Checked: DW

Date: 12.08.21 Scale: 1:2,500 @ A3

Job No: R1742b Drg No: R23-D04



Sheet Plan Scale 1:5000

Notes:	
Site boundary	
Approximate extent of remediation works	
Contour (0.25m interval)	
Spot level	
Bottom / top of bank	
Building footprints (see note 2)	
In ground excavations (see note 3)	
Tank excavation (see note 4)	
Contamination excavation (see notes 6, 7, and 8)	
Contamination unremediated (see note 9)	
POL pipeline as surveyed by Vertase (approximate position only)	
Developer compound area (see note 10)	

- Notes**
1. This plan is to be read in conjunction with the associated SGP validation report.
 2. Made ground associated with the removal of the historic building foundations extends to approximately 0.5-1.5m below remediated ground levels.
 3. Made ground associated with the removal of building service trenches, deep foundations and EWS's extends to approximately 1.5-2.5m below remediated ground levels.
 4. Made ground associated with the removal of in-ground tanks extends to approximately 4m below remediated ground levels.
 5. Localised areas of made ground associated with the remediation works may be present but which are not detailed on this plan.
 6. The extent of the contamination excavation is approximate only.
 7. In-ground contamination excavations extend to 2-3m below remediated ground levels.
 8. Fill materials used to make up any bulk deficit due to contamination excavation was provided by the Client
 9. Contamination unremediated due to restrictions (and extending beyond the site boundary).
 10. A layer of crush approximately 300mm thick was established on top of remediated levels to establish the developer compound.

Survey Information:			
Co-ord System:	Co-ord Type:	Primary Survey Control:	Secondary Survey Control:
OSGB36(15)	Grid	Leica SmartNet	Site

Rev	Date	Amendment	Drawn	Checked



Client:
Dorchester Homes

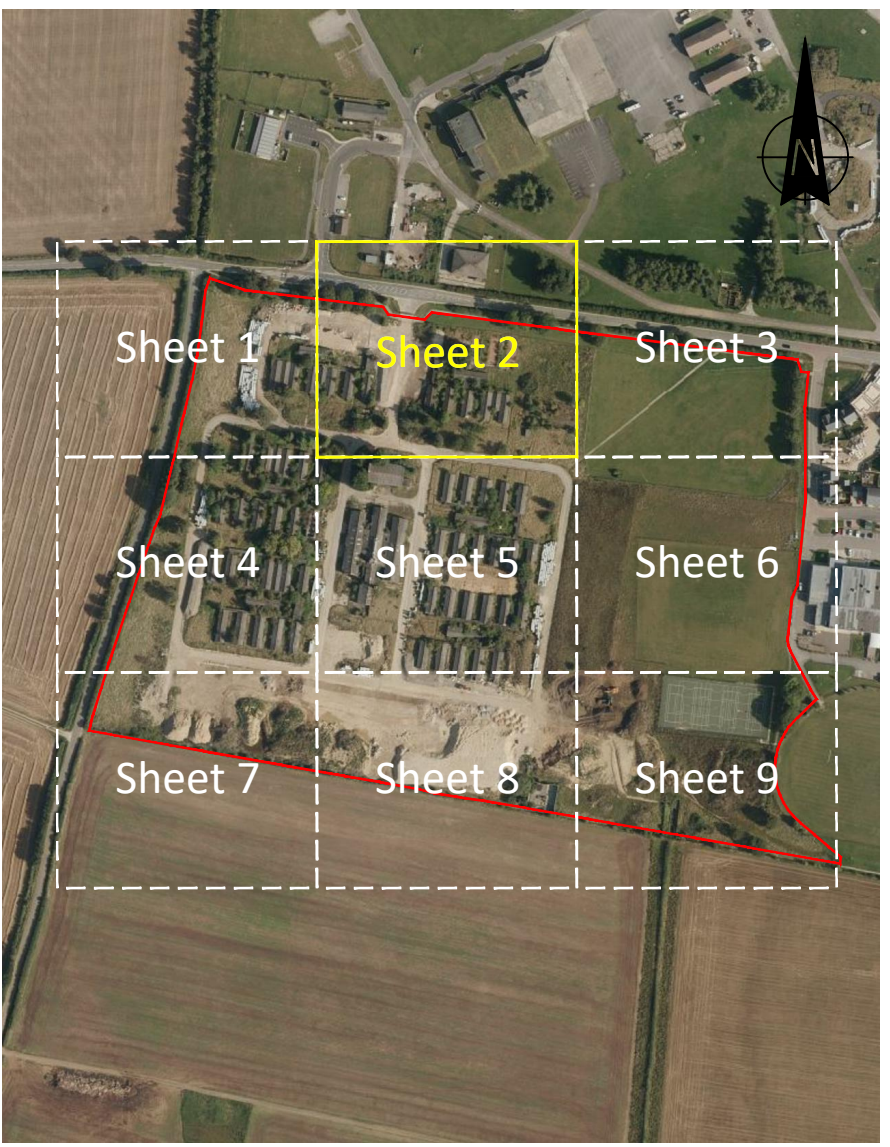
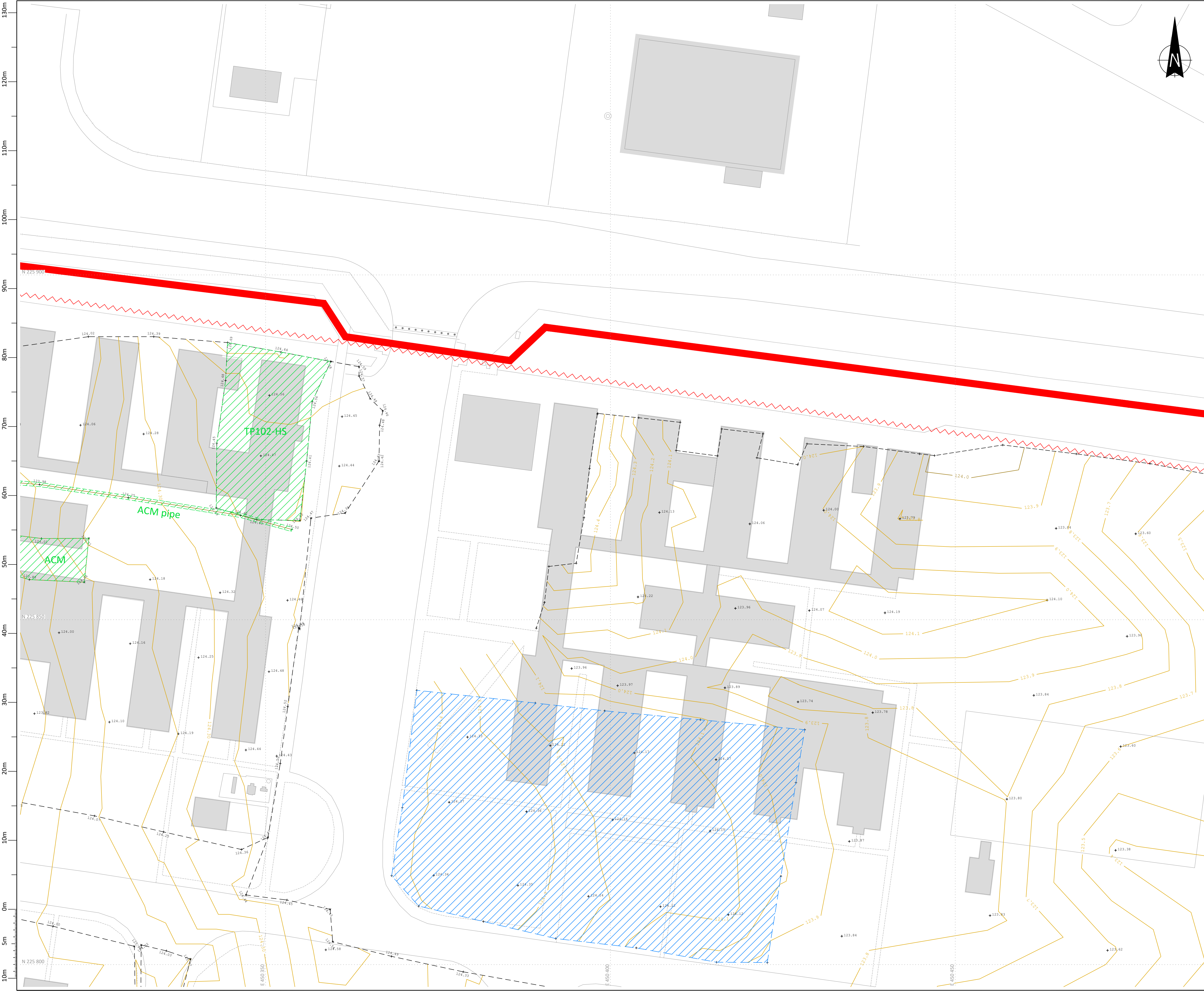
Project:
Upper Heyford (Phase 9)

Title:
As built topographic survey and constraints (Sheet 1 of 9)

Scale:	First Issue:	Drawn:	Checked:
1:250 @A1	23rd Jul 2021	D.J.Woodrow	B.Carter

Drawing No:
351-20-001-01

Revision:



Sheet Plan Scale 1:5000

Notes:

- Site boundary
- Approximate extent of remediation works
- Contour (0.25m interval)
- Spot level
- Bottom / top of bank
- Building footprints (see note 2)
- In ground excavations (see note 3)
- Tank excavation (see note 4)
- Contamination excavation (see notes 6, 7, and 8)
- Contamination unremediated (see note 9)
- POL pipeline as surveyed by Vertase (approximate position only)
- Developer compound area (see note 10)

Notes

- This plan is to be read in conjunction with the associated SGP validation report.
- Made ground associated with the removal of the historic building foundations extends to approximately 0.5-1.5m below remediated ground levels.
- Made ground associated with the removal of building service trenches, deep foundations and EWS's extends to approximately 1.5-2.5m below remediated ground levels.
- Made ground associated with the removal of in-ground tanks extends to approximately 4m below remediated ground levels.
- Localised areas of made ground associated with the remediation works may be present but which are not detailed on this plan.
- The extent of the contamination excavation is approximate only.
- In-ground contamination excavations extend to 2-3m below remediated ground levels.
- Fill materials used to make up any bulk deficit due to contamination excavation was provided by the Client
- Contamination unremediated due to restrictions (and extending beyond the site boundary).
- A layer of crush approximately 300mm thick was established on top of remediated levels to establish the developer compound.

Survey Information:

Co-ord System:	Co-ord Type:	Primary Survey Control:	Secondary Survey Control:
OSGB36(15)	Grid	Leica SmartNet	Site

A	23/07/21	As built and constraints information updated.	D.J.W	B.C
Rev	Date	Amendment	Drawn	Checked



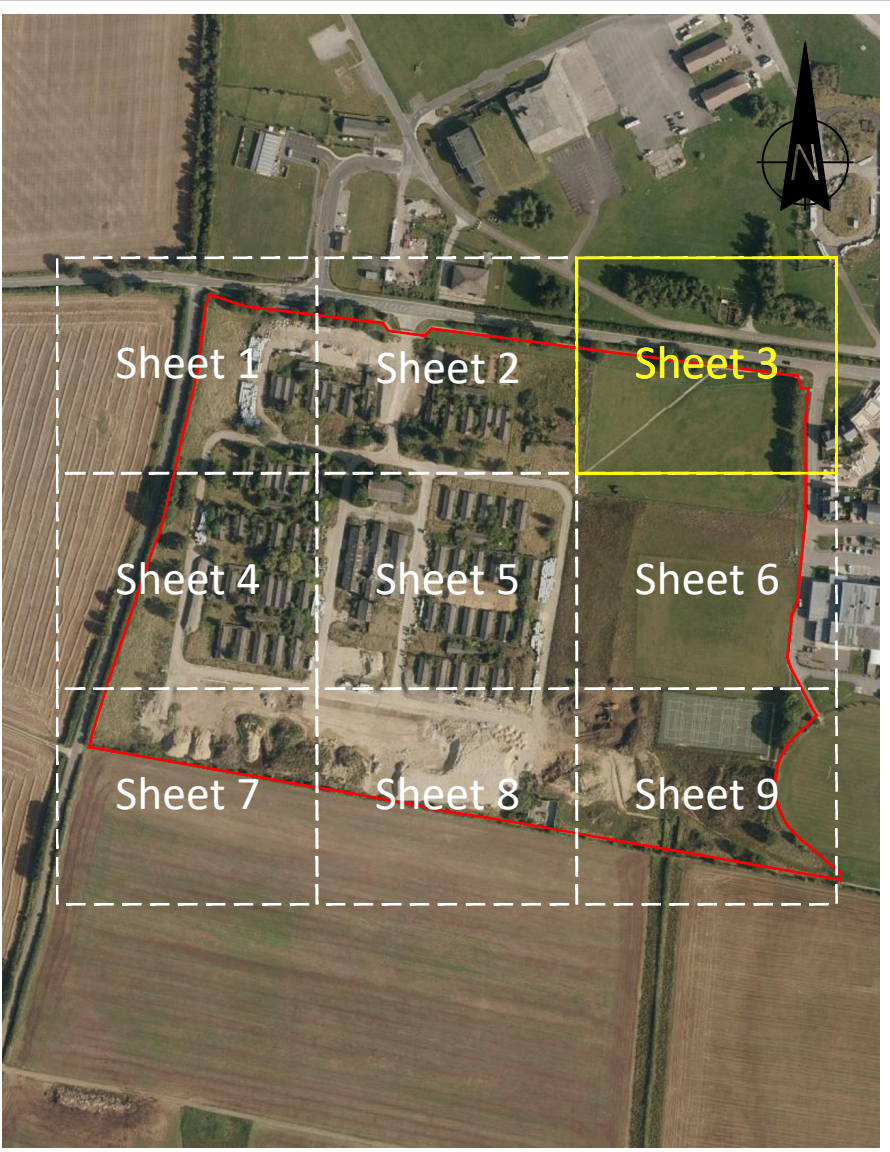
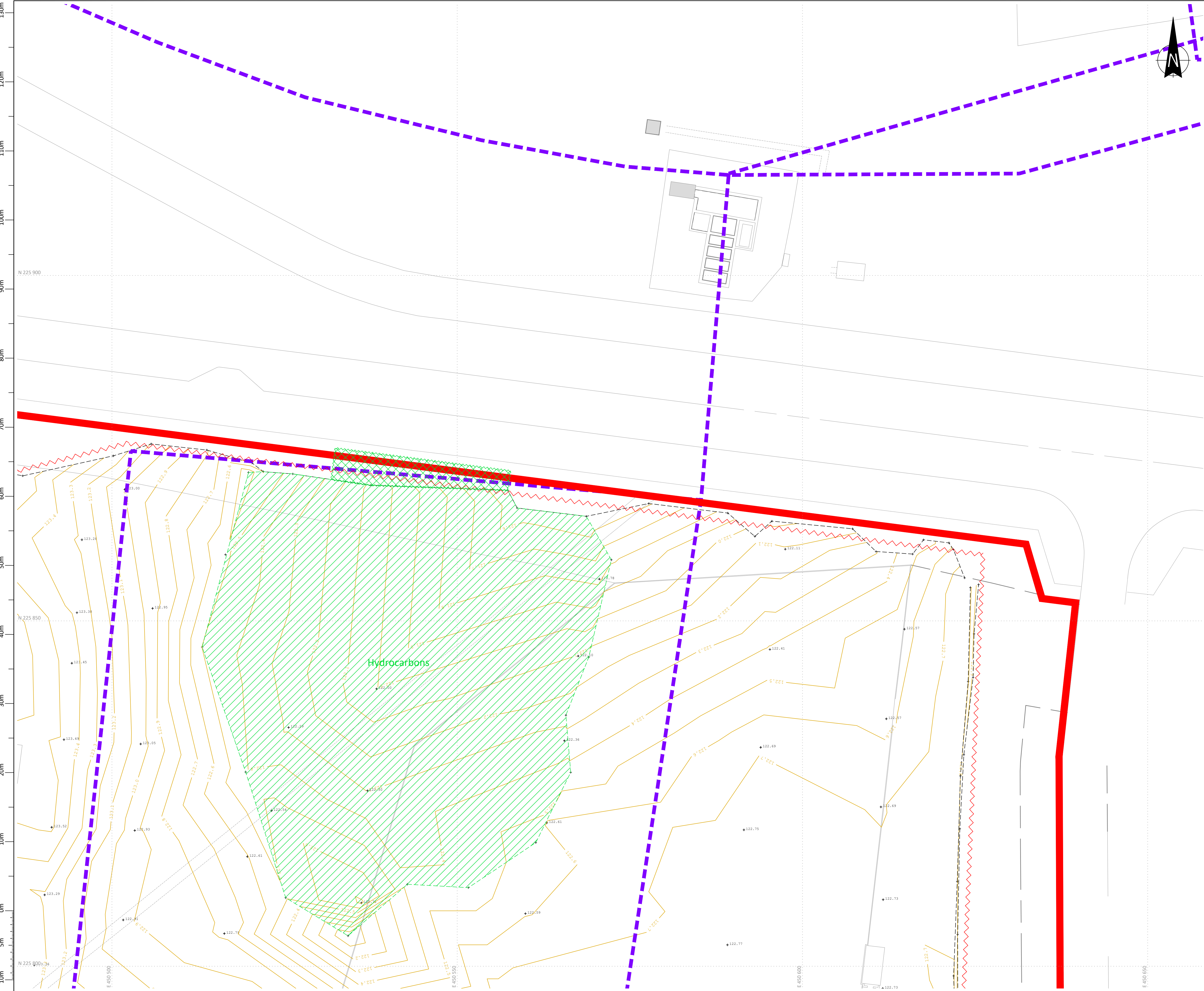
Client: Dorchester Homes

Project: Upper Heyford (Phase 9)

Title: As built topographic survey and constraints (Sheet 2 of 9)

Scale:	First Issue:	Drawn:	Checked:
1:250 @A1	1st Mar 2021	D.J.Woodrow	B.Carter

Drawing No: 351-20-001-02 Revision: A



Sheet Plan Scale 1:5000

Notes:	
Site boundary	
Approximate extent of remediation works	
Contour (0.25m interval)	
Spot level	
Bottom / top of bank	
Building footprints (see note 2)	
In ground excavations (see note 3)	
Tank excavation (see note 4)	
Contamination excavation (see notes 6, 7, and 8)	
Contamination unremediated (see note 9)	
POL pipeline as surveyed by Vertase (approximate position only)	
Developer compound area (see note 10)	

- Notes**
- This plan is to be read in conjunction with the associated SGP validation report.
 - Made ground associated with the removal of the historic building foundations extends to approximately 0.5-1.5m below remediated ground levels.
 - Made ground associated with the removal of building service trenches, deep foundations and EWS's extends to approximately 1.5-2.5m below remediated ground levels.
 - Made ground associated with the removal of in-ground tanks extends to approximately 4m below remediated ground levels.
 - Localised areas of made ground associated with the remediation works may be present but which are not detailed on this plan.
 - The extent of the contamination excavation is approximate only.
 - In-ground contamination excavations extend to 2-3m below remediated ground levels.
 - Fill materials used to make up any bulk deficit due to contamination excavation was provided by the Client
 - Contamination unremediated due to restrictions (and extending beyond the site boundary).
 - A layer of crush approximately 300mm thick was established on top of remediated levels to establish the developer compound.

Survey Information:	
Co-ord System:	Co-ord Type:
OSGB36(15)	Grid
Primary Survey Control:	Secondary Survey Control:
Leica SmartNet	Site

A	23/07/21	As built and constraints information updated.	D.J.W	B.C.
Rev	Date	Amendment	Drawn	Checked



Client:

Dorchester Homes

Project:

Upper Heyford (Phase 9)

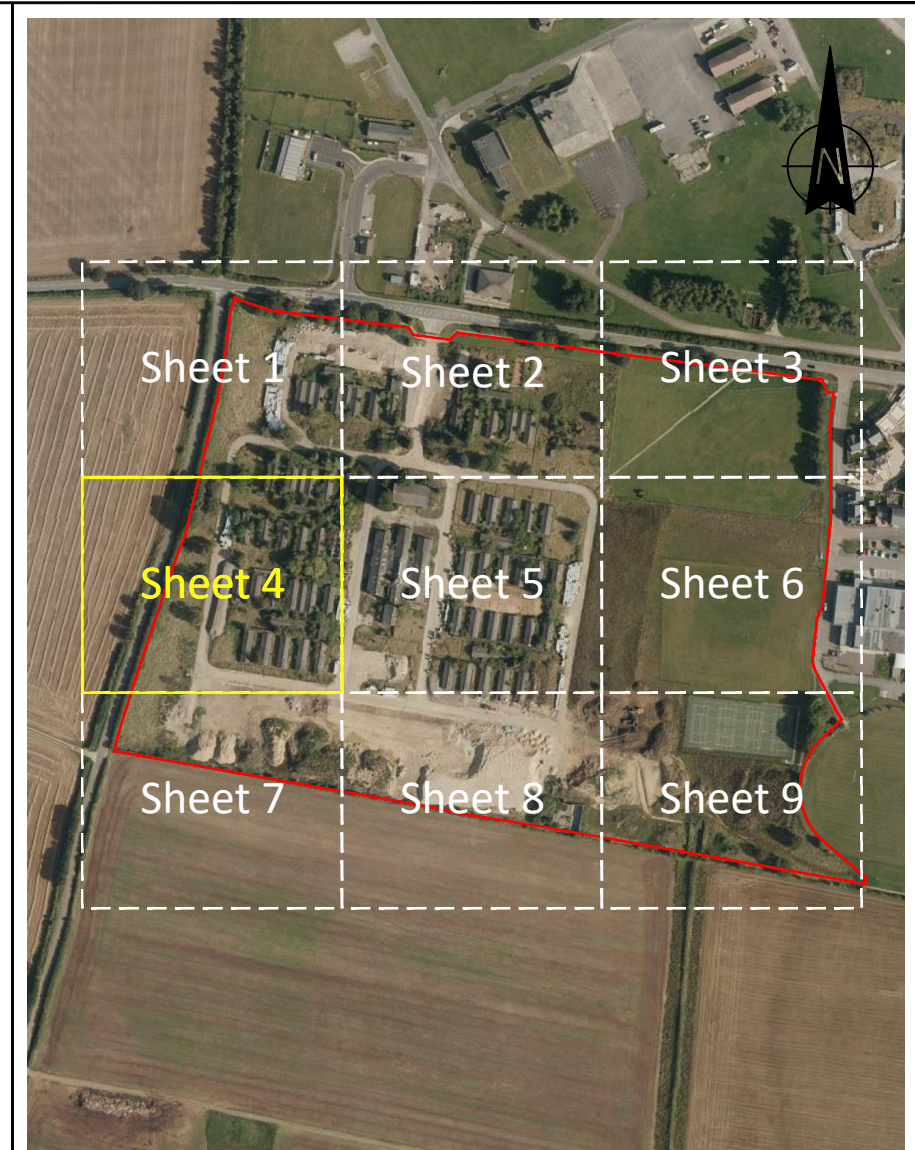
Title:

As built topographic survey and constraints (Sheet 3 of 9)

Scale:	First Issue:	Drawn:	Checked:
1:250 @A1	1st Mar 2021	D.J.Woodrow	B.Carter
Drawing No:	Revision:		













351-20-001-03

A



Sheet Plan Scale 1:5000

Notes:

- | | |
|---|---|
| Site boundary |  |
| Approximate extent of remediation works |  |
| Contour (0.25m interval) |  |
| Spot level |  ×120.12 |
| Bottom / top of bank |  |
| Building footprints (see note 2) |  |
| In ground excavations (see note 3) |  |
| Tank excavation (see note 4) |  |
| Contamination excavation (see notes 6, 7, and 8) |  |
| Contamination unremediated (see note 9) |  |
| POL pipeline as surveyed by Vertace (approximate position only) |  |
| Developer compound area (see note 10) |  |

Notes

1. This plan is to be read in conjunction with the associated SGP validation report.
2. Made ground associated with the removal of the historic building foundations extends to approximately 0.5-1.5m below remediated ground levels.
3. Made ground associated with the removal of building service trenches, deep foundations and EWS's extends to approximately 1.5-2.5m below remediated ground levels.
4. Made ground associated with the removal of in-ground tanks extends to approximately 4m below remediated ground levels.
5. Localised areas of made ground associated with the remediation works may be present but which are not detailed on this plan.
6. The extent of contamination excavation is approximate only.
7. In-ground contamination excavations extend to 2-3m below remediated ground levels.
8. Fill materials used to make up any bulk deficit due to contamination excavation was provided by the Client
9. Contamination unremediated due to restrictions (and extending beyond the site boundary).
10. A layer of crush approximately 300mm thick was established on top of remediated levels to establish the developer compound.

Survey Information:

Co-ord System: OSGB36(15)	Co-ord Type: Grid	Primary Survey Control: Leica SmartNet	Secondary Survey Control: Site
------------------------------	----------------------	---	-----------------------------------

Rev	Date	Amendment	Drawn	Checked



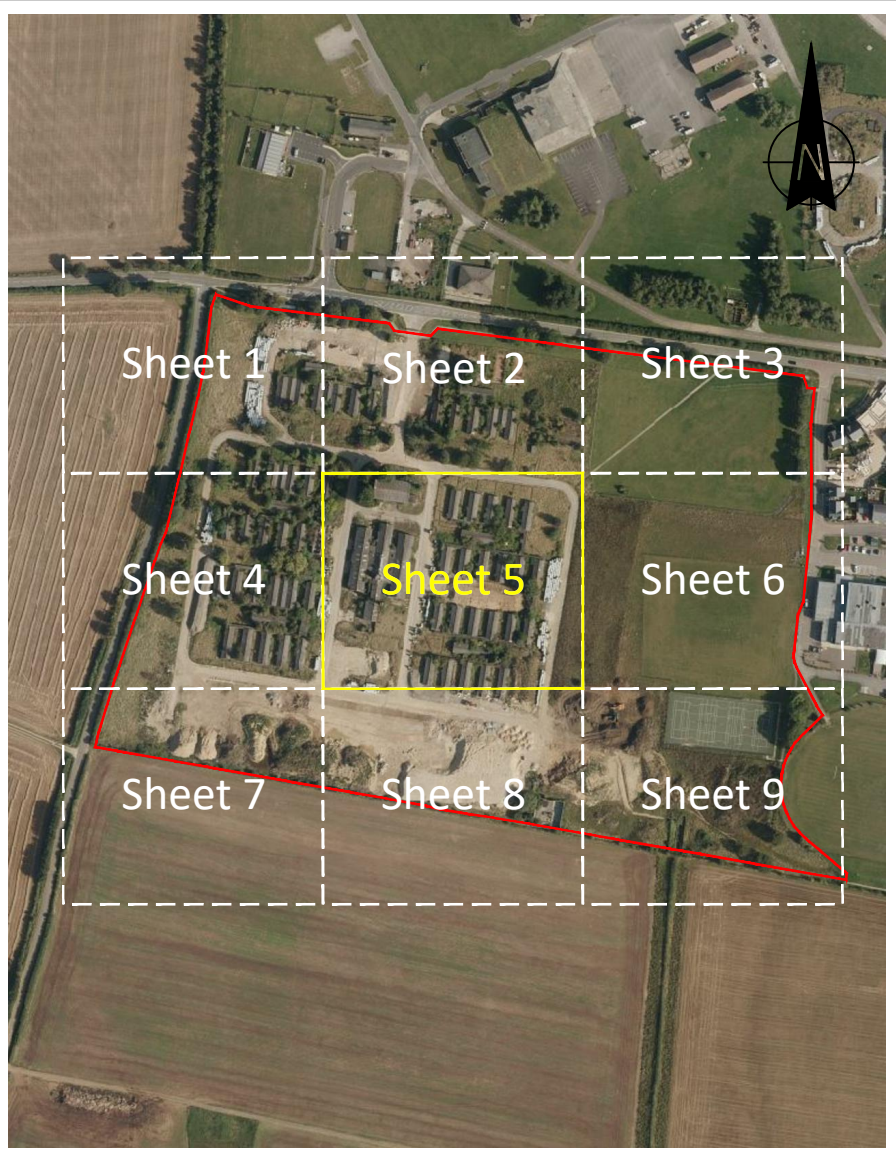
Client: **Dorchester Homes**

Project: Upper Heyford (Phase 9)

Title: As built topographic survey and constraints (Sheet 4 of 9)

Scale: 1:250 @A1	First Issue: 23rd Jul 2021	Drawn: D J Woodrow	Checked: B Carter
---------------------	-------------------------------	-----------------------	----------------------

DATE: 07/12/2021	DATE: 07/12/2021	DATE: 07/12/2021	DATE: 07/12/2021
Drawing No: 351-20-001-04			Revision:



Sheet Plan Scale 1:5000

- Notes:
- Site boundary
 - Approximate extent of remediation works
 - Contour (0.25m interval)
 - Spot level
 - Bottom / top of bank
 - Building footprints (see note 2)
 - In ground excavations (see note 3)
 - Tank excavation (see note 4)
 - Contamination excavation (see notes 6, 7, and 8)
 - Contamination unremediated (see note 9)
 - POL pipeline as surveyed by Vertase (approximate position only)
 - Developer compound area (see note 10)

- Notes
- This plan is to be read in conjunction with the associated SGP validation report.
 - Made ground associated with the removal of the historic building foundations extends to approximately 0.5-1.5m below remediated ground levels.
 - Made ground associated with the removal of building service trenches, deep foundations and EWS's extends to approximately 1.5-2.5m below remediated ground levels.
 - Made ground associated with the removal of in-ground tanks extends to approximately 4m below remediated ground levels.
 - Localised areas of made ground associated with the remediation works may be present but which are not detailed on this plan.
 - The extent of the contamination excavation is approximate only.
 - In-ground contamination excavations extend to 2-3m below remediated ground levels.
 - Fill materials used to make up any bulk deficit due to contamination excavation was provided by the Client
 - Contamination unremediated due to restrictions (and extending beyond the site boundary).
 - A layer of crush approximately 300mm thick was established on top of remediated levels to establish the developer compound.

Survey Information:			
Co-ord System:	Co-ord Type:	Primary Survey Control:	Secondary Survey Control:
OSGB36(15)	Grid	Leica SmartNet	Site

Rev	Date	Amendment	Drawn	Checked



Client:
Dorchester Homes

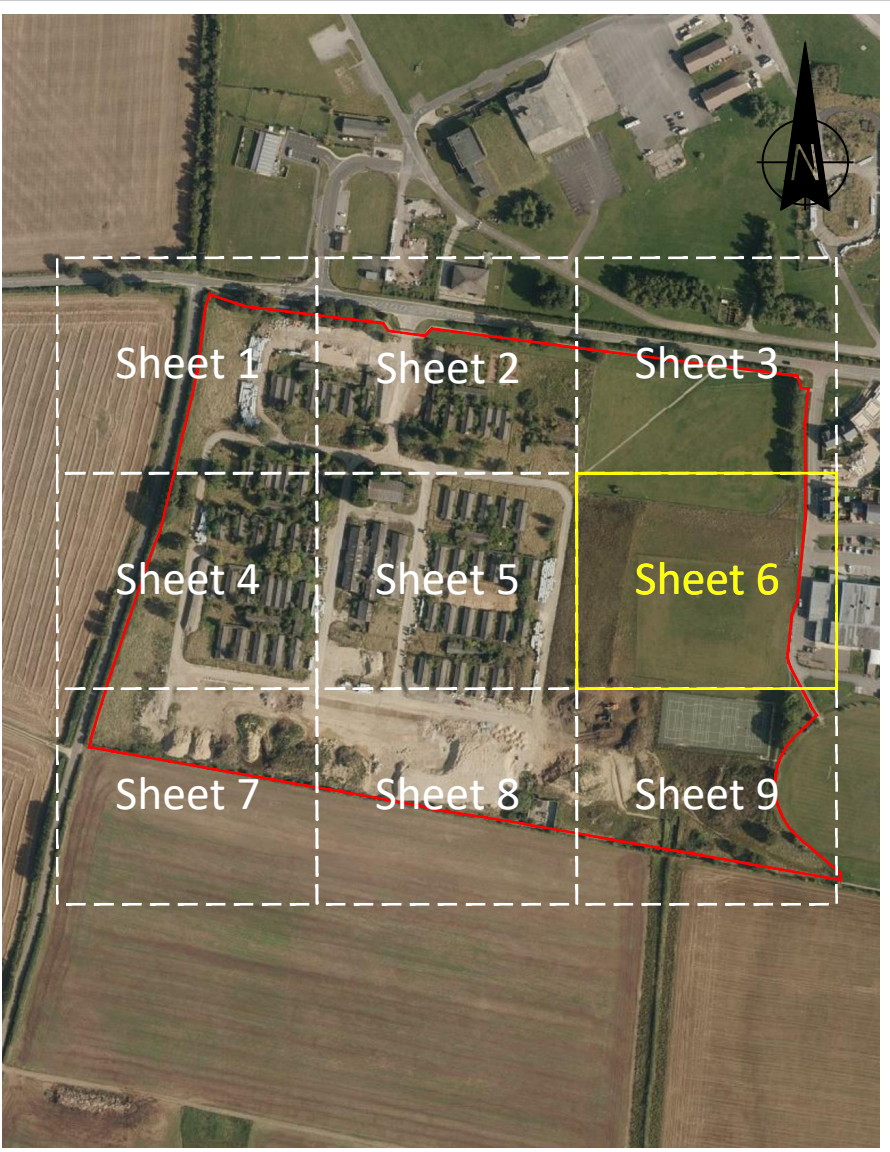
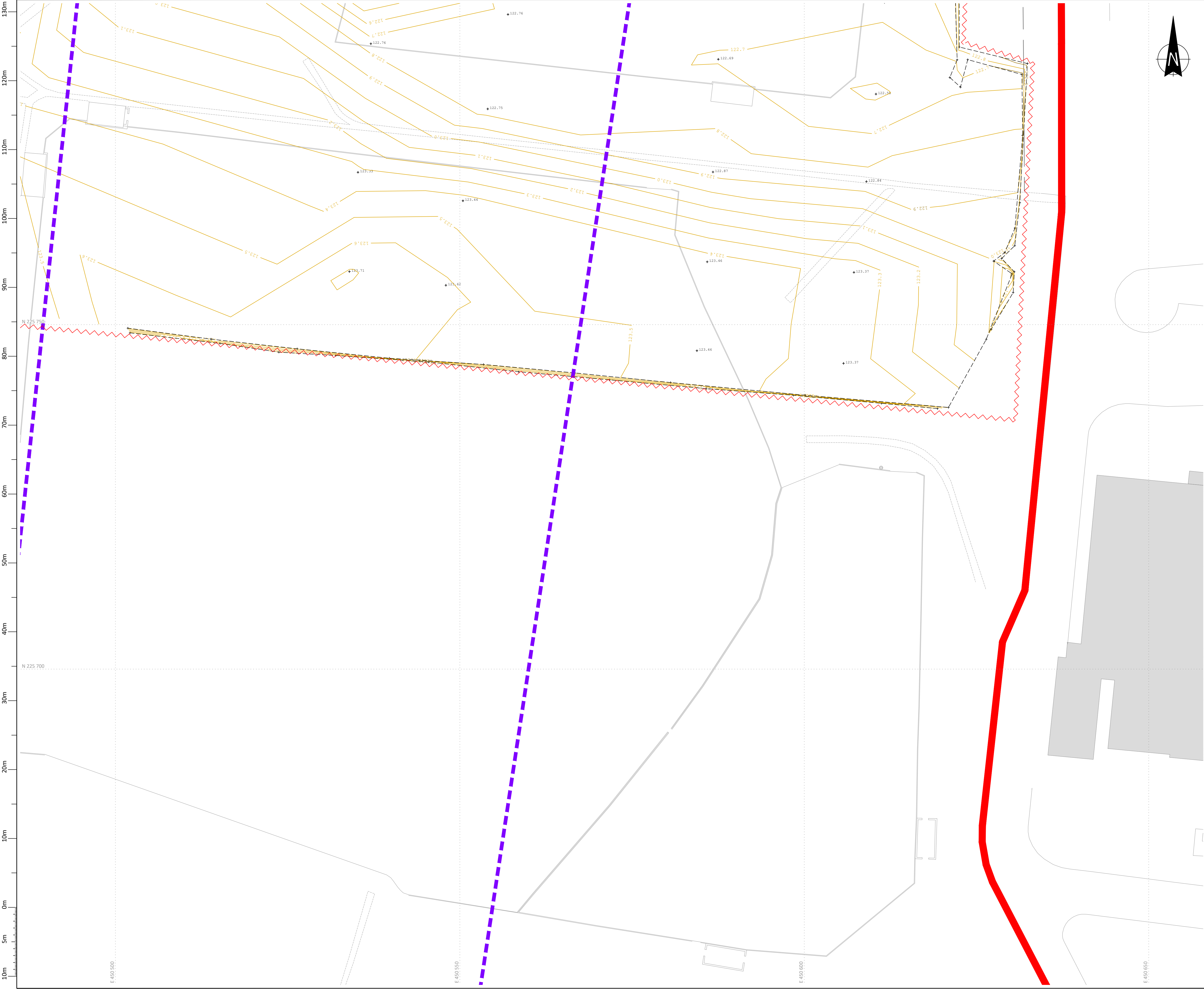
Project:
Upper Heyford (Phase 9)

Title:
As built topographic survey and constraints (Sheet 5 of 9)

Scale:	First Issue:	Drawn:	Checked:
1:250 @A1	23d Jul 2021	D.J.Woodrow	B.Carter

Drawing No:	Revision:
-------------	-----------

351-20-001-05



Sheet Plan

Scale 1:5000

Notes:

Site boundary

Approximate extent of remediation works

Contour (0.25m interval)

Spot level

Bottom / top of bank

Building footprints (see note 2)

In ground excavations (see note 3)

Tank excavation (see note 4)

Contamination excavation (see notes 6, 7, and 8)

Contamination unremediated (see note 9)

POL pipeline as surveyed by Vertase (approximate position only)

Developer compound area (see note 10)

Notes

1. This plan is to be read in conjunction with the associated SGP validation report.

2. Made ground associated with the removal of the historic building foundations extends to approximately 0.5-1.5m below remediated ground levels.

3. Made ground associated with the removal of building service trenches, deep foundations and EWS's extends to approximately 1.5-2.5m below remediated ground levels.

4. Made ground associated with the removal of in-ground tanks extends to approximately 4m below remediated ground levels.

5. Localised areas of made ground associated with the remediation works may be present but which are not detailed on this plan.

6. The extent of the contamination excavation is approximate only.

7. In-ground contamination excavations extend to 2-3m below remediated ground levels.

8. Fill materials used to make up any bulk deficit due to contamination excavation was provided by the Client

9. Contamination unremediated due to restrictions (and extending beyond the site boundary).

10. A layer of crush approximately 300mm thick was established on top of remediated levels to establish the developer compound.

Survey Information:

Co-ord System:

OSGB36(15)

Co-ord Type:

Grid

Primary Survey Control:

Leica SmartNet

Secondary Survey Control:

Site

A

23/07/21

As built and constraints information updated.

D.J.W

B.C.


Rev

Date

Amendment

Drawn

Checked

Urban Regen

ESTABLISHED 2001

Client:

Dorchester Homes

Project:

Upper Heyford (Phase 9)

Title:

As built topographic survey and constraints (Sheet 6 of 9)

Scale:

1:250 @A1

First Issue:

1st Mar 2021

Drawn:

D.J.Woodrow

Checked:

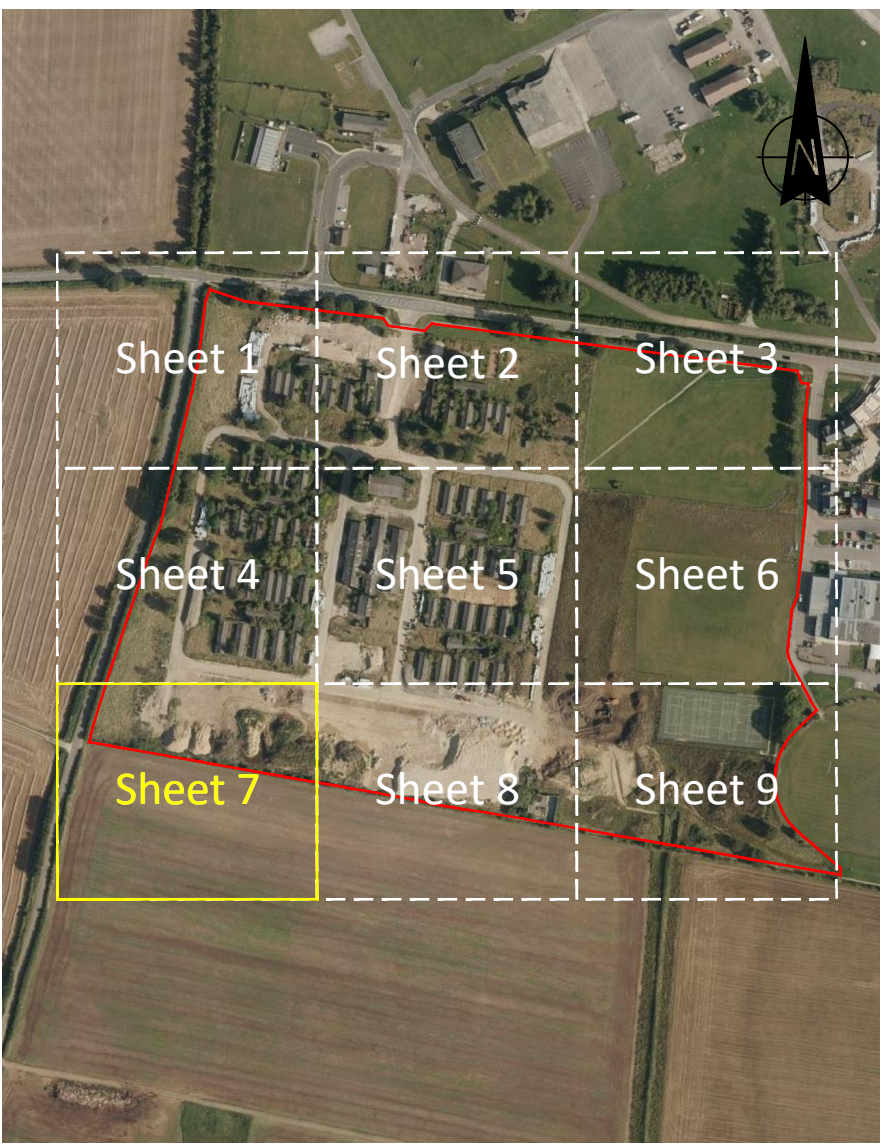
B.Carter

Drawing No:

351-20-001-06

Revision:

A



Sheet Plan Scale 1:5000

Notes:	
Site boundary	
Approximate extent of remediation works	
Contour (0.25m interval)	
Spot level	x120.12
Bottom / top of bank	
Building footprints (see note 2)	
In ground excavations (see note 3)	
Tank excavation (see note 4)	
Contamination excavation (see notes 6, 7, and 8)	
Contamination unremediated (see note 9)	
POL pipeline as surveyed by Vertase (approximate position only)	
Developer compound area (see note 10)	

- Notes**
1. This plan is to be read in conjunction with the associated SGP validation report.
 2. Made ground associated with the removal of the historic building foundations extends to approximately 0.5-1.5m below remediated ground levels.
 3. Made ground associated with the removal of building service trenches, deep foundations and EWS's extends to approximately 1.5-2.5m below remediated ground levels.
 4. Made ground associated with the removal of in-ground tanks extends to approximately 4m below remediated ground levels.
 5. Localised areas of made ground associated with the remediation works may be present but which are not detailed on this plan.
 6. The extent of the contamination excavation is approximate only.
 7. In-ground contamination excavations extend to 2-3m below remediated ground levels.
 8. Fill materials used to make up any bulk deficit due to contamination excavation was provided by the Client
 9. Contamination unremediated due to restrictions (and extending beyond the site boundary).
 10. A layer of crush approximately 300mm thick was established on top of remediated levels to establish the developer compound.

Survey Information:			
Co-ord System:	Co-ord Type:	Primary Survey Control:	Secondary Survey Control:
OSGB36(15)	Grid	Leica SmartNet	Site

Rev	Date	Amendment	Drawn	Checked



Client:

Dorchester Homes

Project:

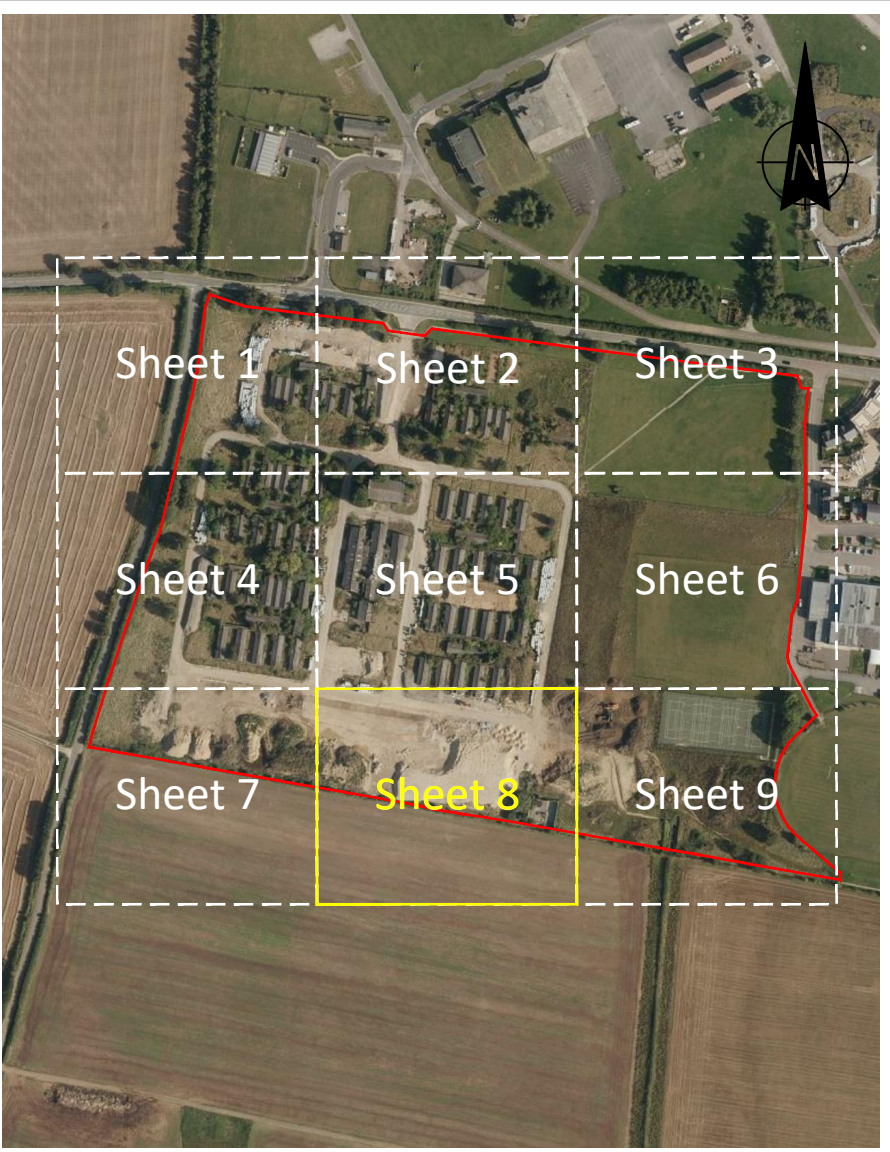
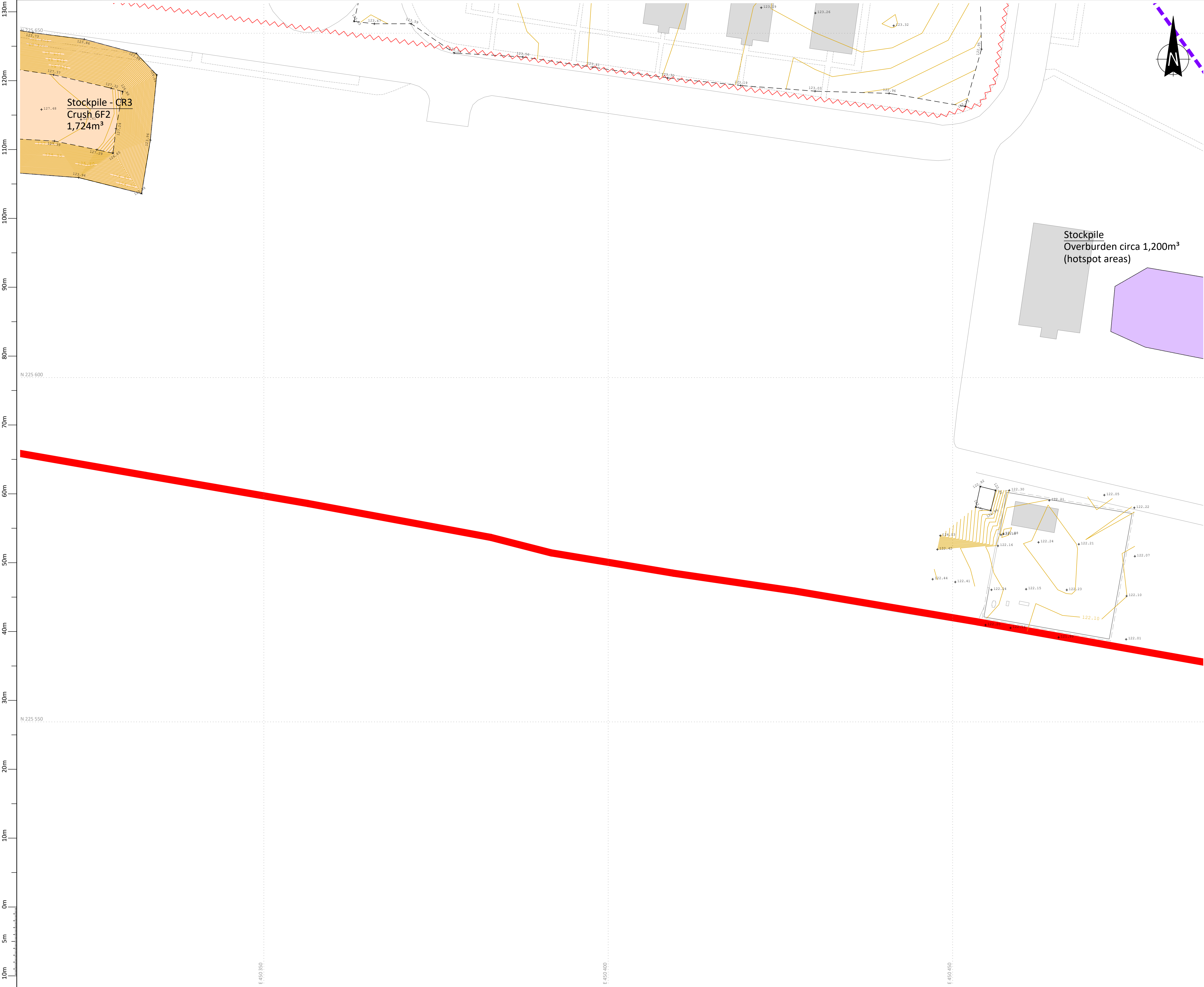
Upper Heyford (Phase 9)

Title:

As built topographic survey and constraints (Sheet 7 of 9)

Scale:	First Issue:	Drawn:	Checked:
1:250 @A1	23rd Jul 2021	D.J.Woodrow	B.Carter

Drawing No:	Revision:
351-20-001-07	



Sheet Plan

Scale 1:5000

Notes:

Site boundary

Approximate extent of remediation works

Contour (0.25m interval)

Spot level

Bottom / top of bank

Building footprints (see note 2)

In ground excavations (see note 3)

Tank excavation (see note 4)

Contamination excavation (see notes 6, 7, and 8)

Contamination unremediated (see note 9)

POL pipeline as surveyed by Vertase (approximate position only)

Developer compound area (see note 10)

× 120.12

Notes

1. This plan is to be read in conjunction with the associated SGP validation report.

2. Made ground associated with the removal of the historic building foundations extends to approximately 0.5-1.5m below remediated ground levels.

3. Made ground associated with the removal of building service trenches, deep foundations and EWS's extends to approximately 1.5-2.5m below remediated ground levels.

4. Made ground associated with the removal of in-ground tanks extends to approximately 4m below remediated ground levels.

5. Localised areas of made ground associated with the remediation works may be present but which are not detailed on this plan.

6. The extent of the contamination excavation is approximate only.

7. In-ground contamination excavations extend to 2-3m below remediated ground levels.

8. Fill materials used to make up any bulk deficit due to contamination excavation was provided by the Client

9. Contamination unremediated due to restrictions (and extending beyond the site boundary).

10. A layer of crush approximately 300mm thick was established on top of remediated levels to establish the developer compound.

Survey Information:

Co-ord System:

OSGB36(15)

Co-ord Type:

Grid

Primary Survey Control:

Leica SmartNet

Secondary Survey Control:

Site

Rev

Date

Amendment

Drawn

Checked

Urban Regen

ESTABLISHED 2001

Client:

Dorchester Homes

Project:

Upper Heyford (Phase 9)

Title:

As built topographic survey and constraints (Sheet 8 of 9)

Scale:

1:250 @A1

First Issue:

23rd Jul 2021

Drawn:

D.J.Woodrow

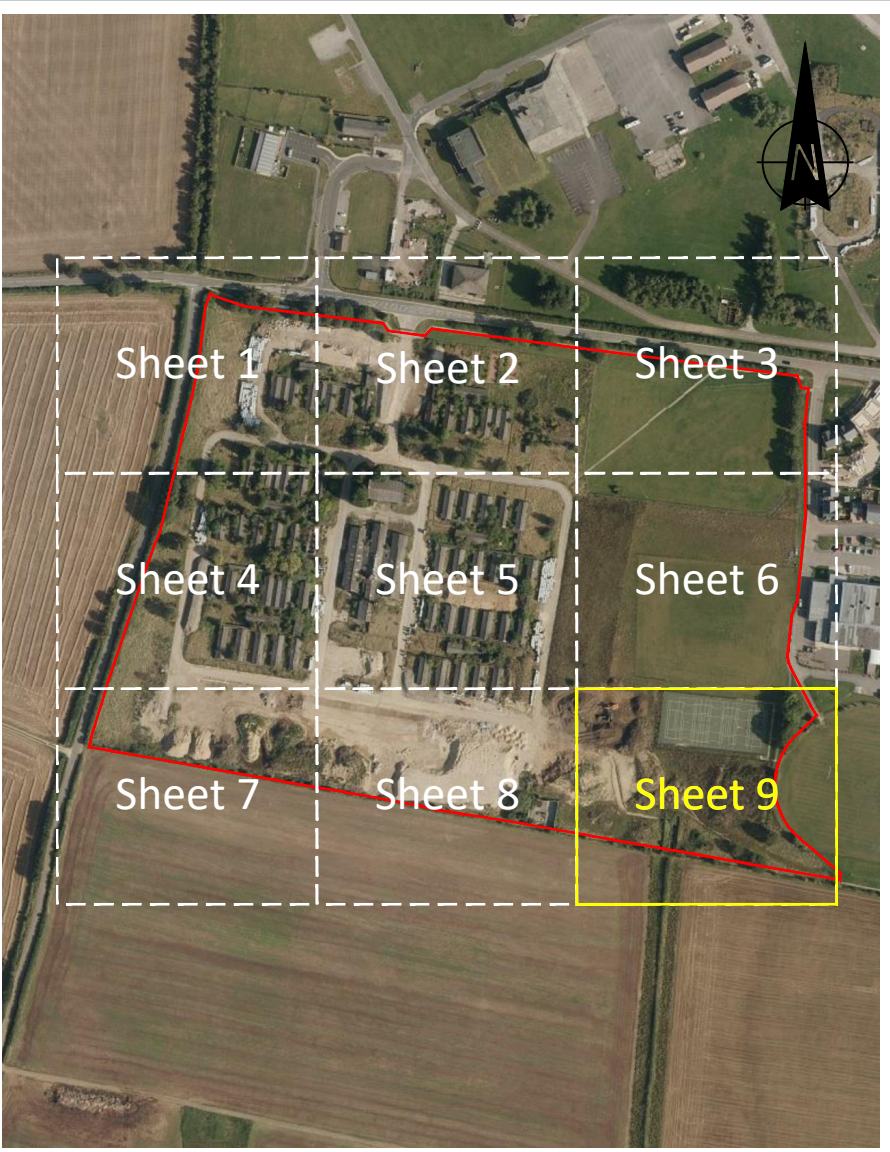
Checked:

B.Carter

Drawing No:

351-20-001-08

Revision:



Sheet Plan Scale 1:5000

Notes:	
Site boundary	
Approximate extent of remediation works	
Contour (0.25m interval)	
Spot level	x 120.12
Bottom / top of bank	
Building footprints (see note 2)	
In ground excavations (see note 3)	
Tank excavation (see note 4)	
Contamination excavation (see notes 6, 7, and 8)	
Contamination unremediated (see note 9)	
POL pipeline as surveyed by Vertase (approximate position only)	
Developer compound area (see note 10)	

- Notes**
1. This plan is to be read in conjunction with the associated SGP validation report.
 2. Made ground associated with the removal of the historic building foundations extends to approximately 0.5-1.5m below remediated ground levels.
 3. Made ground associated with the removal of building service trenches, deep foundations and EWS's extends to approximately 1.5-2.5m below remediated ground levels.
 4. Made ground associated with the removal of in-ground tanks extends to approximately 4m below remediated ground levels.
 5. Localised areas of made ground associated with the remediation works may be present but which are not detailed on this plan.
 6. The extent of the contamination excavation is approximate only.
 7. In-ground contamination excavations extend to 2-3m below remediated ground levels.
 8. Fill materials used to make up any bulk deficit due to contamination excavation was provided by the Client
 9. Contamination unremediated due to restrictions (and extending beyond the site boundary).
 10. A layer of crush approximately 300mm thick was established on top of remediated levels to establish the developer compound.

Survey Information:			
Co-ord System:	Co-ord Type:	Primary Survey Control:	Secondary Survey Control:
OSGB36(15)	Grid	Leica SmartNet	Site

Rev	Date	Amendment			Drawn	Checked



Client:

Dorchester Homes

Project:

Upper Heyford (Phase 9)

Title:

As built topographic survey and constraints (Sheet 9 of 9)

Scale:	First Issue:	Drawn:	Checked:
1:250 @A1	23rd Jul 2021	D.J.Woodrow	B.Carter

Drawing No:	Revision:
351-20-001-09	

APPENDIX A

Site Photographs

1.



22.05.18 – Eastern view across north of site. Derelict buildings lined across site associated with former school classrooms.

2.



22.05.18 – Building's present across centre of the site

3.



22.05.18 – Former boiler house in the centre of the site (chimney) with USTs

4.



22.05.18 – boilers within boiler house

5.



22.05.18 – Northwestern view across site

6.



22.05.18 – Eastern view across the southern half of the site

7.



22.05.18 – Temporary stockpile storage area in the south.
Development arisings generated from wider Heyford development

8.



20.01.21 - Recovery of vegetation from northeast

9.



20.01.21 - Recovery and recycling of demolition materials

10.



20.01.21 - Asbestos strip in northern buildings

11.



02.02.21 – Building demolition in north

12.



02.02.21 – Recovery of metal and wood wastes following building
demolition for recycling

13.



02.02.21 – Building demolition and hardstanding removal

14.



08.02.21 – Easternmost line of building demolished and hardstanding removal prior to surface level regrade

15.



08.02.21 – Western view across site from eastern boundary

16.



08.02.21 – Regrading to east of boiler house

17.



16.02.21 – Building demolition in south

18.



16.02.21 – Turf recovery of verge area around boiler house

19.



16.02.21 – Breaking out of walls around former substation

20.



16.02.21 – ACM strip from boiler house

21.



16.02.21 – Eastern view across site within area of recent building demolition

22.



16.02.21 – Stockpile of recovered hardstanding prior to processing

23.



02.03.21 – Formation soils ready for sampling in northeast of site

24.



02.03.21 – ACM strip of boiler house complete, internal strip of boilers on-going

25.



02.03.21 – Boiler house

26.



02.03.21 – Demolition of buildings in north/centre of site following ACM strip

27.



02.03.21 – Northern view of site from southern end. Buildings awaiting ACM strip

28.



02.03.21 – Recovery of metal waste in to recycling skip in the southeast

29.



09.03.21 – Eastern view following regrade completion

30.



09.03.21 – Breaking out of hardstanding (slab) below demolished building footprint

31.



09.03.21 – Western view across the southern half of the site

32.



09.03.21 – Building demolition complete in the northern part of the site, recovery of hardstanding for processing

33.



09.03.21 – Eastern part of the site trimmed awaiting formation testing

34.



09.03.21 – Stockpile of recovered hardstanding awaiting processing to generate aggregate

35.



09.03.21 – Building demolition

36.



09.03.21 – Exposure of USTs following demolition of boiler house

37.



06.04.21 – Western part of site demolition complete, hardstanding removed, and site regraded ahead of formation sampling

38.



06.04.21 – Crushing site-won hardstanding commencing

39.



06.04.21 – Formation of site-generated aggregate stockpile (Agg-SP1) in the south

40.



06.04.21 – North-western view across the site following building demolition and regrade

41.



06.04.21 – Recovery of demolition waste materials in the north

42.



06.04.21 – Temporary stockpiles of wastes (metal, wood and masonry) prior to recovery

43.



20.04.21 – Stockpile of site-generated aggregate (Agg-SP2)

44.



20.04.21 – Northern view across site

45.



20.04.21 – Aggregate processing on-going

46.



20.04.21 – Dust suppression taking place during dry conditions

47.



20.04.21 – Eastern view across the north of the site following building demolition and hardstanding removal but prior to regrade

48.



20.04.21 – Eastern view across the north of the site

49.



20.04.21 – Handpicking of ACM fragments within localised area in the north (HS-ACM) by specialist sub-contractor

50.



28.04.21 – Northern view along the western end of the site

51.



28.04.21 - Northern view across centre of site

52.



28.04.21 – Eastern view of southern end of site with site-generated aggregate stockpiles present

53.



28.04.21 – Stockpiles of arisings generated from wider Heyford development temporarily stored in the south

54.



13.05.21 – Northern view following completion of works

55.



13.05.21 – North-eastern view following completion of works

56.



13.05.21 – Eastern view

57.



13.05.21 -South-eastern view. Temporary stockpile of contaminated soils from Phase 9 baseball pitch remains within quarantine area





58.









13.05.21 – Stockpiles of site-generated aggregate present in the south

APPENDIX B

Hotspot Photographic Record

Job Number: R1742b (Heyford Park – Phase 9)	Date: 28.04.21	Hotspot Location: ACM-HS	Compiled By: DW
Lab Ref: 21-14505		Samples: Ph9-ACMHS-S1 to S8	
			
28.04.21 – Excavation to 0.6m bgl and collection of sample (S1) following completion of hand-picking. No visible ACM observed	28.04.21 - Excavation to 0.6m bgl and collection of sample (S2) following completion of hand-picking. No visible ACM observed	28.04.21 - Excavation to 0.6m bgl and collection of sample (S3) following completion of hand-picking. No visible ACM observed	
			
28.04.21 - Excavation to 0.6m bgl and collection of sample (S4) following completion of hand-picking. No visible ACM observed	28.04.21 - Excavation to 0.6m bgl and collection of sample (S5) following completion of hand-picking. No visible ACM observed	28.04.21 - Excavation to 0.6m bgl and collection of sample (S6) following completion of hand-picking. No visible ACM observed	

Job Number: R1742b (Heyford Park – Phase 9)	Date: 28.04.21	Hotspot Location: HS-TP102	Compiled By: DW
Lab Ref: 21-14505		Samples: HS-TP102-HS1 (contam); HS-TP102-SS1 to SS6 (stripped surface)	
			
28.04.21 – Excavation of trench 1 within Hydrock hotspot area TP102.	28.04.21 – Black gravel present below surface cover of reworked natural (0-0.2m) and underlain by natural limestone gravel	28.04.21 – Black gravel within approximate area of former aerial mast, possible former base	
			
28.04.21 – Trench 2 excavated adjacent to access road into site, no black gravel encountered	28.04.21 – Natural strata of limestone gravel in clays soil (weathered bedrock) within trench confirming limited extend of area impacted by black gravel	28.04.21 – URL removal of black stained gravel	

Job Number: R1742b (Heyford Park – Phase 9)	Date: 17.02.21	Hotspot Location: HS-TP104	Compiled By: DW
Lab Ref: 21-2316		Samples: HS-TP104-S1 to -S3	
			
17.02.21 – Location of Hydrock hotspot located by GPS	17.02.21 – Excavation of trench to 0.8m due to presence of possible drain and water pipe	17.02.21 – Arisings side cast and consisted of coarse limestone gravel in brown clay (weathered bedrock). No visual or olfactory evidence of contamination, PID <0.1ppm.	
			
17.02.21 – Excavation of second trench to 1.1m bgl	17.02.21 – Natural soils encountered from the surface to the base, consisting of limestone gravel in clay soil	17.02.21 – Inspection of arisings and collection of validation samples. No visual or olfactory evidence of contamination, PID <0.1ppm.	

Job Number: R1742b (Heyford Park – Phase 9)	Date: 28.04.21	Hotspot Location: USTs	Compiled By: DW
Lab Ref: 21-14505		Samples: Ph9-UST-SS1 to SS12	
			
09.03.21 – Exposure of tank locations following demolition of boiler house	09.03.21 – Tank surface exposed confirming 3 tanks present. Removal of cover confirms water filled with some floating oil product	28.04.21 – Excavation void following removal of tanks. Natural soils present on all sides. No evidence of staining on sidewalls or base	
			
28.04.21 – Base of excavation at approximately 2.8m bgl. Limestone gravel present to 2.3m bgl with limestone bedrock to base	28.04.21 – No visual or olfactory evidence of contamination with PID <0.1ppm in all instances	28.04.21 – Sidewalls and base absent from staining or indicators of fuel contamination	

APPENDIX C

Formation Validation Photographic Record

1.



02.03.21 – Formation Validation: S1

2.



02.03.21 – Formation Validation: S2

3.



02.03.21 – Formation Validation: S3

4.



02.03.21 – Formation Validation: S4

5.



02.03.21 – Formation Validation: S5

6.



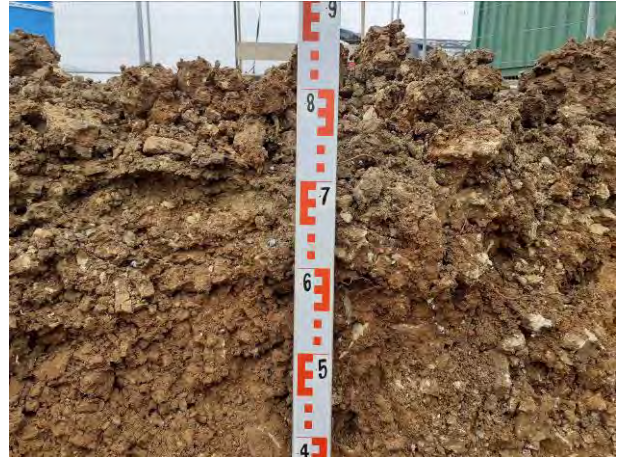
02.03.21 – Formation Validation: S6

7.



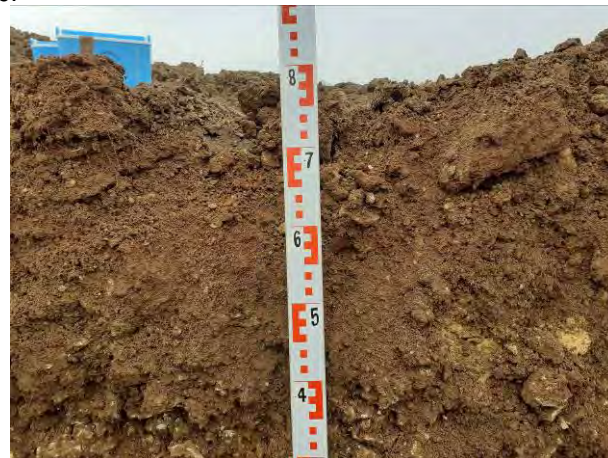
02.03.21 – Formation Validation: S7

8.



02.03.21 – Formation Validation: S8

9.



02.03.21 – Formation Validation: S9

10.



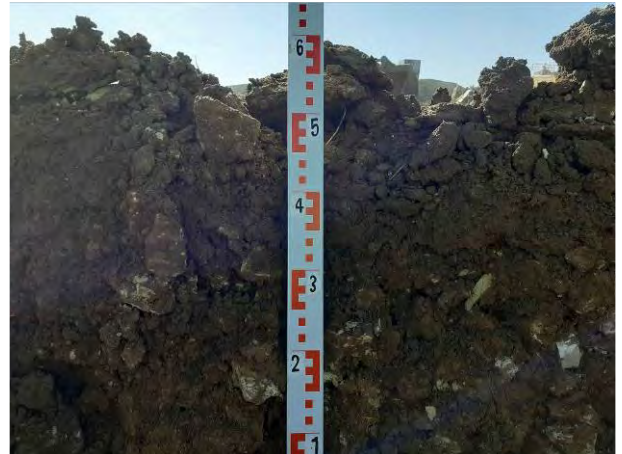
02.03.21 – Formation Validation: S10

11.



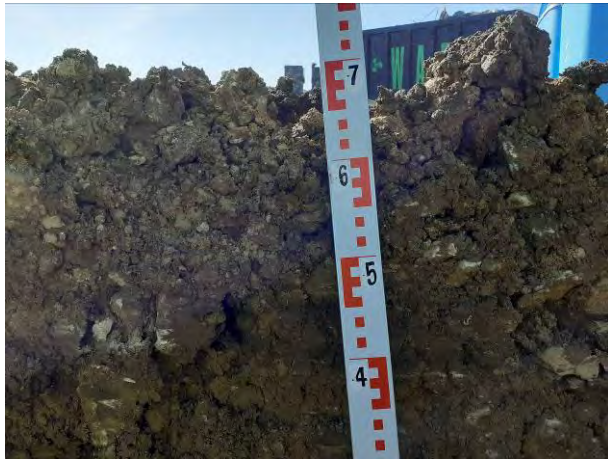
02.03.21 – Formation Validation: S11

12.



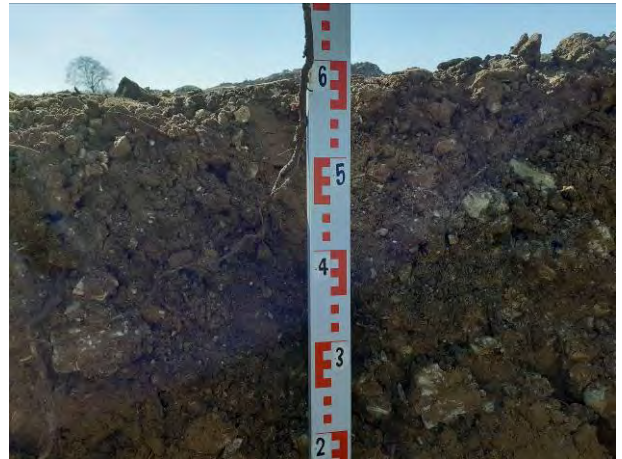
09.03.21 – Formation Validation: S12

13.



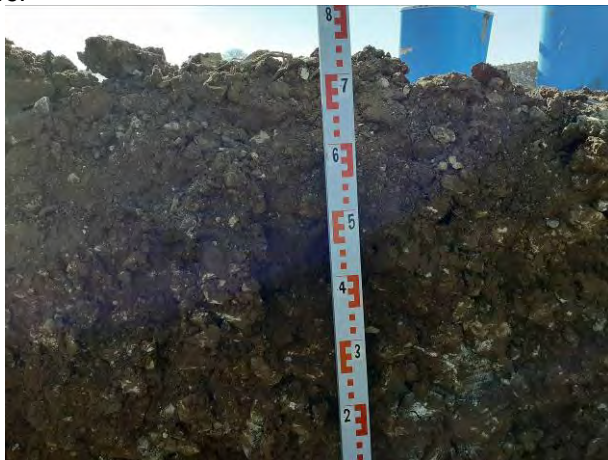
09.03.21 – Formation Validation: S13

14.



09.03.21 – Formation Validation: S14

15.



09.03.21 – Formation Validation: S15

16.



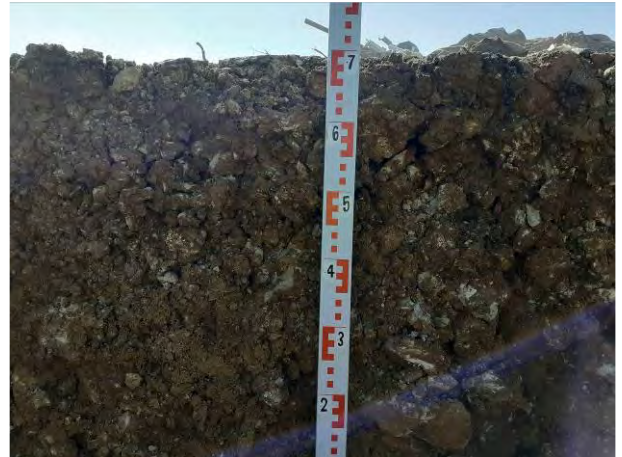
09.03.21 – Formation Validation: S16

17.



09.03.21 – Formation Validation: S17

18.



09.03.21 – Formation Validation: S18

19.



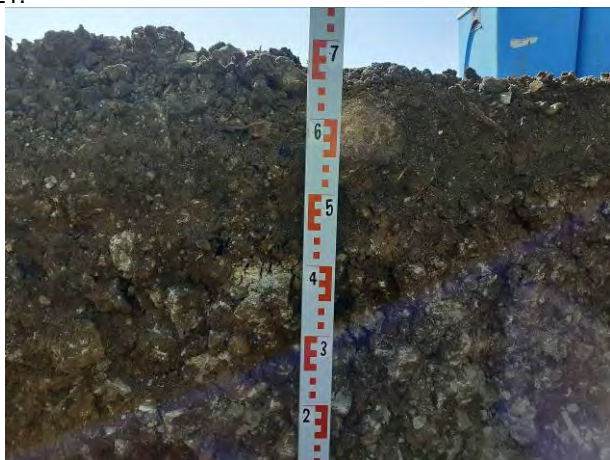
09.03.21 – Formation Validation: S19

20.



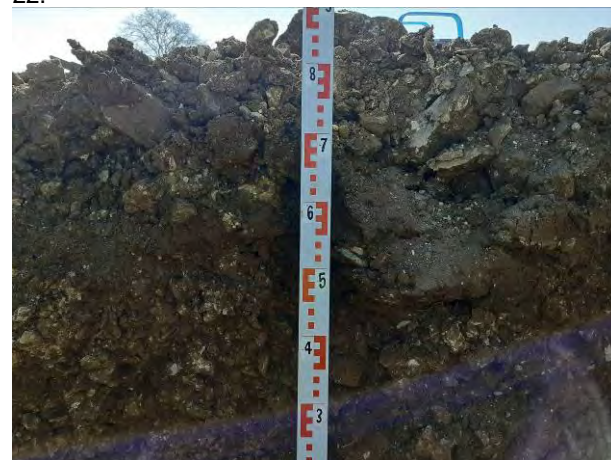
09.03.21 – Formation Validation: S20

21.



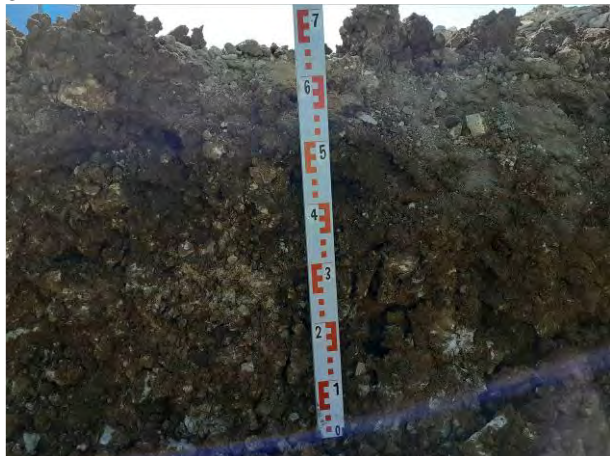
09.03.21 – Formation Validation: S21

22.



09.03.21 – Formation Validation: S22

23.



09.03.21 – Formation Validation: S23

24.



06.04.21 – Formation Validation: S24