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PHASE 2 SITE INVESTIGATION AND SITE SPECIFIC RISK ASSESSMENT REPORT

Allotments Site,
Spittles Lane
Lyme Regis, Weymouth

WPA ENVIRONMENTAL

For
Dorset Council

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Final V1

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PREFACE FROM DORSET COUNCIL

A disused landfill site is located at the end of Spittles Lane in Lyme Regis. Ongoing erosion of cliffs by the sea in the vicinity has caused slippage of land, including part of the landfilled ground, down towards the beach.

Dorset Council has an ongoing management programme in relation to this issue. This includes the use of professional consultants to undertake periodical sampling of slipped material, and associated analysis and interpretation. Additionally, periodical observations are made of any physical detritus on the beach, with removal of such material by a contractor as appropriate.

This approach is derived from the Council's general interest in relation to public safety and health, combined with its role as an owner of land in the area.

In pursuit of the above stated interests, Dorset Council's work also includes consideration of any other potential effects of the disused Spittles Lane landfill, for example on nearby land. Lyme Regis Town Council owns an area of allotments on land adjacent to the land containing the former landfill.

This report concerns itself with the Phase 2 exploratory intrusive site investigation works and risk assessment on this allotment site and evaluation of potential contaminated land risks from the adjacent Spittles Lane (SL) Landfill Site to the allotments. As such, this is a key step in Dorset Councils actions as a responsible landowner.

In the course of the production of this report, consultants will have utilised relevant regulatory concepts as a matter of good professional practice. However, this report is not in pursuit of any Council regulatory function.

Bearing in mind the above considerations, it must be understood that no conclusions can be drawn from this document as to whether any land might be 'contaminated' or whether any regulatory action might be appropriate.

EXECUTIVE SUMMARY

As authorised by Dorset Council, WPA Consultants Ltd, trading as WPA Environmental (WPA), has conducted a Phase 2 Exploratory Site Investigation and a Site Specific Risk Assessment for an allotments site in close proximity to the former Spittles Lane (SL) Landfill Site in Lyme Regis, West Dorset.

SL Landfill Site is a Dorset Council's (DC) asset, and it is Dorset Council's responsibility to investigate and assess whether this asset could pose a Significant Risk of Significant Harm (SPOSH) to off-site sensitive receptors, including the allotments site and its users.

Considering the above, the Phase 2 exploratory intrusive site investigation works aimed to investigate ground conditions, contaminant linkages identified by the preliminary Conceptual Site Model (CSM) included in the Phase 1 Desk Study Report and assess potential contaminant migration pathways from SL Landfill Site to the allotments. The intrusive site investigation works also aimed to investigate and assess the extent and proximity of SL Landfill to the allotments site.

The works undertaken are based on instructions provided and agreed with Dorset Council. The framework of the assessment included in this report is provided by a variety of statutory, non-statutory and technical guidance which have all been subject to various debate and interpretation since publication. The approach followed by WPA in the risk assessment reflects existing Environment Agency (EA) guidance and industry good practice. Guidance most pertinent to the risk evaluation stage is provided by DEFRA.

The outcome of the exploratory site investigation indicates that infilled ground associated with the former SL Landfill Site is present 50-54m from the eastern boundary of the allotments, extending to the east. It was not possible to determine whether there are infilled soils between 21 and 50m from the allotment's eastern boundary. However, field observations suggest that infilled soils related to SL Landfill activities may commence 30m from this boundary, where an earth bank is present. The absence of infilled soils associated with the landfill activities is confirmed by boreholes at 18-21m from the eastern boundary of the allotments.

In terms of the human health risk assessment, site data and Site Specific Risk Assessment (SSRA) have determined that a contaminant linkage does not exist between Contaminants of Concern (CoC), mainly lead, revealed within made ground and infilled soils of Spittles Lane Landfill Site and CoC identified within allotments Land. The ground gas risk assessment further indicates that a ground gas risk from SL landfill Site is not present at the allotment site.

The SSRA further determines that concentrations of CoC do not represent a Significant Risk of Significant Harm (SPOSH) to human health receptors identified as site visitors (general public). It is noted that access to eastern areas off-site of the allotment is limited, due to significantly overgrown vegetation. This is considered to further reduce any potential risk to human health receptors. No further action is therefore considered necessary in this regard at this time.

However, the refined CSM and SSRA has identified potential contaminant linkages within the allotments land area, which should be further investigated. This includes the presence of lead within surface soils along the northern and eastern boundaries of the allotments.

Traces of asbestos fibres were also reported from a single surface soil sample, but such traces levels (below detection limit) are not considered to be significant.

Allotments can typically contain contaminant species for a variety of reasons closely associated with the use of the allotments themselves, as opposed to contamination migrated from neighbouring land. Examples include the informal import of a wide variety of soils and materials for fertilising/soil improvement. Additionally, ash and clinker were often used in the past to create pathways between allotments and as fertilizers.

Over the years, such materials will usually have included manure, other soils, ash, compost, industrial fertilizers/ pesticides etc, which could result in the contamination of soils at an allotment site. For lead, other sources of contamination may include atmospheric urban deposition (leaded petrol and other combustion processes) and particles of lead from painted wood, sheds, etc.

This report is in pursuit of the Council's role as an owner of land containing a former landfill site near to the allotments. As previously addressed, the objective of this exploratory site investigation was to determine whether a contaminant linkage exists within the allotments site and the former SL Landfill Site. Site investigation data and risk assessment indicate that such contaminant linkage is not present.

It is however recommended that the findings of this investigation are made available to the allotment's users. Although the surface soils reported to be contaminated with lead are along the boundaries of the allotments and this area is not used for the production of fruit and vegetables, there is a possibility that the lead exceedances may extend to areas where fruit and vegetables are produced for human consumption.

Further investigation is therefore recommended to assess lead levels within the soils used for production of fruit and vegetables. The further investigation should also consider the assessment of soils within areas where imported soils were incorporated as part of the ground stabilization works. Contamination testing should include lead bioavailability testing to determine the portion of lead which is available to for uptake to the human body.

At the time of the preparation of this report there is no evidence to suggest the allotments site could be determined as contaminated under Part 2A of the Environmental Protection Act 1990. However, contaminant linkages have been identified within allotments land, which should be further investigated.

1.0 INTRODUCTION

1.1 Background and Scope of Works

1.1.1 At the instruction of Dorset Council, a Phase 2 Exploratory Site Investigation and Risk Assessment has been undertaken for an allotments site behind Charmouth Car Park, Lyme Regis, DT7 3DR.

1.1.2 The purpose of the Phase 2 investigation is to assess ground conditions and provide environmental risk assessment in terms of land quality issues. The allotments are in close proximity to the historic Spittles Lane (SL) Landfill Site and there are concerns of potential environmental impacts from this off-site historical land use to the existing allotments.

As part of the intrusive site works, this Phase 2 investigation has investigated land between the former SL Landfill Site and the allotments to determine the proximity of infilled land to the allotments and subsequently stablish any potential liabilities or risks from the former Spittles Landfill Site to the allotments in the context of Part 2A of the Environmental Protection Act (EPA) 1990.

1.1.3 Based on the outcome of the site investigation and risk assessment for human health and controlled waters, the Conceptual Site Model (CSM) has been revised and updated to reflect the encountered site conditions.

A Site Specific Risk Assessment have subsequently been undertaken to establish firstly whether unacceptable risk as defined in Part 2A is present and secondly whether a possibility of harm to human health or property has been posed by the Spittles Lane (SL) Landfill Site to the allotments site.

Considering the outcome of such assessment, recommendations have been made as included in Section 10 of this report.

This report has been completed in accordance with CLR11, BS10175 and the Statutory Guidance to Part 2A of the Environmental Protection Act 1990.

1.2 Methodology

1.2.1 The approach followed in this assessment by WPA Consultants Ltd, trading as WPA Environmental (WPA), reflects existing Environment Agency guidance and industry good practice, and is structured as follows:

I. Identify the problem – Preliminary Risk Assessment. This relates to the Phase 1 Desk Study Report, Final V1, by WPA Environmental, December 2019.

II. Complete site investigation works, to gather information on the ground conditions revealed at the site and/or its surroundings and assess potential contaminant linkages identified by the Phase 1 Assessment.

III. Assess contamination linkages to establish whether risks are negligible, low, medium or high, in the context of Part 2A of the EPA 1990, via comparison of reported soil contaminant concentrations with the appropriate Tier 1 Generic Acceptance Criteria for Allotments Land Use.

IV. Provide conclusions and recommendations for the site based on a contaminated land risk assessment.

1.3 Limitations

1.3.1 It should be understood this Phase 2 Exploratory Site Investigation and Risk Assessment is a land quality assessment and does not purport to consider geotechnical engineering, ecological, flood risk or archaeological aspects of the allotments site which fall outside of the scope of this assessment and may require specific surveys.

1.3.2 The information contained in this report is intended for the use of Dorset Council. WPA takes no responsibility for the use of this information by any other party or for uses other than that described in this report.

1.3.3 It should be appreciated that whilst detailed references have been obtained and reviewed, there may be conditions at the site which could invalidate the conclusions and recommendations made in this report.

2.0 Site Description and Surrounding Areas

2.1 Site Description

2.1.1 The allotments site (Grid Reference 334405.81, 92505.62) is located to the east of Charmouth Road Car Park, east of Lyme Regis, at the border between Dorset and Devon in South West England. The postcode for the area is DT7 3DR. A site location plan is included as Drawing 1.

2.1.2 WPA understands that the allotments are owned by Lyme Regis Town Council but maintained and managed by Charmouth Road Allotment Association.

The allotments are accessed from a lane from Charmouth Car Park. The allotments generally slope down from north to south towards the cliffs and Lyme Bay to the south. The allotments have 36 plots and are used to grow fruit and vegetables suitable for the UK climate including onions, leeks, tomatoes, courgettes, carrots, potatoes, cabbages, fruit trees, etc. Some small animals such as chickens can be found at the site. Drawing 2 shows the allotments layout and plots distribution.

2.1.3 The edge of the cliffs is approx. 100m south of the allotment's southern boundary. The cliffs and foreshore between Lyme Regis (west) and Charmouth (east) are actively eroding and are prone to coastal erosion and large-scale landslides. These processes are mainly due to the geology and soft rocks of the cliff that are prone to weathering, and to surface and toe erosion.

2.1.4 WPA understands that following a major landslip in 2008, approx. 60-70m east of the eastern site boundary and 120m east of the end of the new seawall, where more than 400m of the cliff along the coastal stretch collapsed after a period of rainfall, major improvements to Lyme Regis Coastal Defence have been carried out. Some of the cliff improvements included a continuous pile wall from the southern part of Charmouth Car Park towards the east and into the southern part of the allotments. As part of the works a new drain was also put through the allotments to collect rainwater and prevent further erosion of the cliffs.

The piling and drainage work included the excavation and replacement of soils. WPA understands that the works were carried out by West Dorset District Council. Unfortunately, no further information and/or records have been provided regarding soils imported and currently present in the southern part of the allotments. WPA understands the works were completed in 2016. Drawing 3 shows the improvement ground works and approximate areas of the allotments where soils were excavated and replaced with imported materials.

2.2 Surrounding Areas

2.2.1 Generally, off-site surrounding areas include:

- North: Spittles Lane and agricultural ground further north.
- North-west: Football ground and Lyme Regis Football Club
- West: Charmouth Car Park and Skate park. Charmouth Road further west and residential areas.

- South: Coastal Cliffs, Lyme Bay.
- East: Spittles Lane Landfill Site and The Spittles Coastal Cliffs.

2.2.2 The allotments are in close proximity to the historic Spittles Lane (SL) Closed Landfill Site. SL landfill is accessed from Spittles Lane which runs to the north of Lyme Regis Football Ground and the allotments site. Beyond the allotments, Spittles Lane becomes a track and then an overgrown footpath. The gate house of the former landfill (end of the track) is now derelict and covered by vegetation.

2.2.3 Dense vegetation is currently present from the eastern boundary of the allotments towards the former SL Landfill Site, to the east. The morphology of the land near the allotments may suggest that made ground is present in eastern areas close to the allotment's boundary. However, the presence of mature trees along and close to the allotments may also suggest that land in close proximity to its boundary has not been infilled. There are signs of recent fly tipping within these off-site open land areas.

2.2.4 As per section 2.0 of the Phase 1 Report, Bennett (2007) indicated that the western boundary of the landfill lies approx. 50m from the eastern boundary of the allotments. Comparison of field observations with google earth aerial photographs, which show the areas of landslides with waste materials approx. 50-60m east of the allotments site and 120m from the end of the new seawall, may corroborate records from Bennett (2007). However, it is not possible to identify the exact position or extent of the original landfill site from site inspections. Intrusive ground investigation works have been proposed for this purpose as included in this report.

Drawings 4 and 5 show the extent of the landfill suggested by Bennett 2007, in relation to waste deposition further recorded by WPA in April 2018 and March 2019.

3.0 INITIAL CONCEPTUAL MODEL & PRELIMINARY RISK ASSESSMENT

3.1 Preamble to the risk assessment

3.1.1 Within the Phase 1 Preliminary Risk Assessment (Phase 1 Desk Study Report), the Source-Pathway-Receptor methodology was utilised to identify known or potential contaminants on-site and/or off-site, the routes or means via which they may migrate and the potential humans, properties and/or controlled waters receptors, that may be affected by a contaminant if a suitable pathway were to exist.

3.1.2 The normal procedure for assessing land dictates that identified Potential Contaminant Linkages (the Source-Pathway-Receptor methodology) should be assessed and that an evaluation of the risks associated with each linkage should drive decisions regarding the status of the land as contaminated, unaffected by contamination or requiring further investigation.

Under Part 2A, the starting point should be that land is not contaminated land unless there is reason to consider otherwise. Only land where unacceptable risks are clearly identified, after a risk assessment has been undertaken in accordance with the Statutory Guidance, should be considered as meeting the Part 2A definition of contaminated land.

3.1.3 Under Part 2A, risks should be considered only in relation to the current use of the land. “Current use” means:

A. The use which is being made of the land currently.

B. Reasonably likely future uses of the land that would not require a new or amended grant of planning permission.

C. Any temporary use to which the land is put, or is likely to be put, from time to time within the bounds of current planning permission.

D. Likely informal use of the land, for example children playing on the land, whether authorised by the owners or occupiers, or not

3.1.4 Sites subject to Detailed Inspection under Part 2A by Local Authorities should be classified as Categories 1 to 4.

Category 1: Human Health Cases. A significant possibility of significant harm exists in any case where a Local Authority considers there is an unacceptably high probability, supported by robust science-based evidence that significant harm would occur if no action is taken to stop it.

Category 2/3: Human Health Cases. For land that cannot be placed into Categories 1 or 4, the local authority should decide whether the land should be placed into either: (a) Category 2: Human Health, in which case the land would be capable of being determined as contaminated land on grounds of significant possibility of significant harm to human health. This includes land where there is little or no direct evidence that similar land, situations or levels of exposure have caused harm

before, but nonetheless the authority considers on the basis of the available evidence, including expert opinion, that there is a strong case for taking action under Part 2A on a precautionary basis; or (b) Category 3: Human Health, in which case the land would not be capable of being determined on such grounds. This can include land where the risks are not low, but nonetheless the authority considers that regulatory intervention under Part 2A is not warranted.

Category 4: Human Health Case. Occur where there is no risk or that the level of risk posed is low. The authority may decide that the land is a Category 4: Human Health case as soon as it considers it has evidence to this effect, and this may happen at any stage during risk assessment including the early stages.

3.1.5 To build the initial conceptual model, the Phase 1 Desk Study Report used desk study data to identify all the Sources, Pathways and Receptors present on site. The elements of the conceptual model contained in Table 3/3 consider Potential Contaminant Linkages, their significance and the acceptability of risk for allotments land use.

3.1.6 When considering the Contaminants, Receptors and Pathways relevant to the Site, WPA has been mindful that the current and future land use are allotment gardens.

The risk assessment examines the consequence of a hazard to a receptor against the likelihood of its occurrence. The likelihood is rated accordingly:

- **Certain:** > 90% of hazard receptor linkage
- **Likely:** 60-90% of hazard receptor linkage
- **Possible:** 40-60% of hazard receptor linkage
- **Unlikely**: 10-40% of hazard receptor linkage
- **Negligible:** <10% of hazard receptor linkage

3.1.7 Using this information, a risk classification is then attached to each of the potential hazard sources in accordance with Table 3/1. The risk classifications are:

- **Severe**: it is likely that the hazard source could cause harm to a designated receptor and harm would be significant.
- **Moderate**: it is possible that the hazard source could cause harm to a designated receptor, but it is unlikely that the harm would be significant.
- **Mild**: it is possible that the hazard source could cause significant harm to a designated receptor, however it is likely to be mild.
- **Negligible**: the potential hazard source cannot cause significant harm to the receptor.

Tables 3/1 and 3/2 set out the potential consequences of that correspond to each classification of risk and the risk classification

Table 3/1
Potential Consequence of Hazard Linkage

Classification	Human Health	Controlled water	Built Environment	Ecosystems
Severe	Irreversible damage to human health	Significant pollution to a sensitive or important controlled water	Damage to a building or structure that would require repair or remedial measures in excess of £20,000.	Irreversible change to an existing ecological species, habitat or ecosystem. Prohibit proposed growth of species, ecosystem or habitat
Moderate	Reversible long-term damage to human health	Pollution to a non-sensitive controlled water	Damage to a building or structure that would require repair or remedial measures below £20,000.	Will impair the development of an existing species, ecosystem or habitat. Permit limited growth of a proposed species, ecosystem or habitat
Mild	Reversible but short-term damage to human health	Minor pollution to a non-sensitive controlled water	Repairable damage to building or structures which would not require excessive cost	Minor change or effects of development on species or habitat but does create long term effects on ecosystem.
Negligible	No discernible damage to human health	No discernible pollution likely to a non-sensitive controlled water	Insubstantial damage not requiring repair	No significant effects on existing or proposed species, habitats or ecosystems.

Table 3/2
Risk Classification

		Potential consequence of hazard linkage			
		Severe	Moderate	Mild	Negligible
Likelihood of hazard receptor linkage	Certain	High	High	Medium	Low
	Likely	High	High	Low	Low
	Possible	High	Medium	Low	Negligible
	Unlikely	Medium	Low	Negligible	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

3.2 Contaminant Sources

The statutory guidance for Part 2A, defines a Contaminant as:

"a substance which is in, on or under the land and which has the potential to cause significant harm to a relevant receptor, or to cause significant pollution of controlled waters."

- Potential historical/current contaminative land uses on-site: Active allotments.

- Historical/current contaminative land uses (potential off-site sources): Former Spittles Lane Landfill Site.

3.3 Pathways

The statutory guidance for Part 2A, defines a pathway as:

" a route by which a receptor is or might be affected by a contaminant."

Following an assessment of the environmental, geological and hydrogeological setting of the site, considering the existing and proposed land use and historic/current land uses within the site and its vicinity, pathways have been identified for contaminants/ground gas and hydrocarbon vapours, which could be on-site or potentially migrate from off-site areas to the allotments site. Further detail is provided in the CSM produced in Table 3/3 below

3.4 Receptors

The statutory guidance for Part 2A, defines a receptor as:

"something that could be adversely affected by a contaminant, for example a person, an organism, an ecosystem, property, or controlled waters"

Those that are not considered present are excluded from further assessment, although decisions taken at this time should be reviewed as and when the conceptual model is revisited.

Identified receptors associated with commercial land use are:

- Allotment Tenants/Site Users
- Allotment Site workers
- Property
- Controlled waters

Table 3/3 below summarises where potentially unacceptable risks that require further consideration have been identified.

Table 3/3 – Preliminary CSM Risk Summary

Use	Potential Sources	Likely Contaminants	Pathways	Receptors	Hazard Receptor Significance	Likelihood of Contaminant Linkage		Consequence	Risk Prior to Mitigation
Allotments gardens since before 1928 to present time.	Atmospheric urban deposition Paint from painted wood, sheds Bonfires and ashes Wood preservatives, e, g creosote (mainly PAHs) Pesticides Tar oils Compost and associated organic and/or pathogenic contaminants Asbestos in construction materials in sheds. Insulation of structures	Metals, hydrocarbons (TPH & PAH), phenols, solvents (SVOC), pesticides, dioxins, furans	Direct contact with soils (dermal contact and soil ingestion)	Allotment tenants/ site users	Toxic, carcinogenic or hazardous to human health.	Possible	Contaminants associated with the allotment land use varies significantly and depends on practices carried out during various periods of time by the allotment tenants. Depending on individual practices, contaminants can vary from plot to plot within an allotments site. Methodology to determine whether contamination has originated at the site as a result of allotment practices, comprise the investigation and testing of surface soils from different plots. Depending on contaminant concentrations reported from the soils, further testing may be carried out including produce testing of individual plots.	Moderate to Mild	**Medium to Low**
			Inhalation of dust and hydrocarbons /organic vapours (outdoor air)	Allotment tenants/site users	Asphyxiation risk and risk of explosion.	Possible		Moderate to Mild	**Medium to Low**
			Consumption of contaminated fruit and vegetables.	Allotment tenants and families/site users	Toxic, carcinogenic or hazardous to human health.	Possible		Moderate to Mild	**Medium to Low**
			Consumption of contaminated soil attached to fruit and vegetables	Allotment tenants and families/site users	Toxic, carcinogenic or hazardous to human health.	Possible		Moderate to Mild	**Medium to Low**
			Ingress of organic contaminants in plastic water supply pipes	Allotment tenants /site users	Toxic, carcinogenic or hazardous to human health.	Possible		Moderate to Mild	**Medium to Low**
			Inhalation of hydrocarbons/ and/or organic vapours (indoor air)	Allotment tenants/ site users	Asphyxiation risk and risk of explosion.	Unlikely	There is the potential of storage sheds associated with the allotment land use to be present, which could store fuels/organic chemicals used within the allotments and/or allotments machinery. It is noted that due to the possible shed's structure (leaky structures) and position of the allotments (top of the cliffs), the potential risk from significant accumulation and inhalation of organic vapours in enclosed structures/sheds is considered to be low.	Moderate	**Low**
			Migration through permeable strata off-site	Controlled waters Surface drain and Lyme Bay	Toxic, carcinogenic or hazardous to human health and environment	Possible	The surface drain along the western site boundary flows from north to south towards Lyme Bay. Environmental impacts on Lyme Bay are considered to be reduced by significant dilution and dispersion processes at the Bay. Groundwater is not considered to be a sensitive receptor.	Mild	**Low**

Use	Potential Sources	Likely Contaminants	Pathways	Receptors	Hazard Receptor Significance	Likelihood of Contaminant Linkage		Consequence	Risk Prior to Mitigation
Offsite: Former Spittles Lane (LS) Landfill Site From 1900s to approx. 1974	Made ground/infilled material	Metals, hydrocarbons, TPH, PAHs, phenols, Asbestos in made ground/infilled land.	Transport of contaminants through permeable soils and/or perched groundwater to beneath the site. Subsequent direct contact, ingestion of contaminated soils, ingestion of potentially contaminated allotment products	Allotment tenants and families/site users	Toxic, carcinogenic or hazardous to human health.	Possible	The SL Landfill Site is situated in close proximity to the allotments site and potential contaminant migration from the landfill site to the allotments is possible. **It is however noted that contaminated land risks are likely to be reduced due to the topography of the area and expected perched groundwater/surface water movement, flowing from north to south towards Lyme Bay, rather than to the west towards the allotment gardens.** An intrusive site investigation is recommended to investigate potential contaminant migration pathways. Also, to determine the proximity of the former LS Landfill Site to the allotments site.	Moderate	**Medium**
			Transport of contaminants through permeable soils and perched groundwater to beneath the site. Subsequent inhalation of fugitive emissions (outdoors)	Allotment tenants/site users	Toxic, carcinogenic or hazardous to human health.	Unlikely	Due to the extensive vegetative cover of the site and the allotments being upwind of the landfill, with predominantly westerly wind direction, this risk is not considered to be significant.	Moderate	**Low**
			Historical atmospheric deposition of contaminants from possible past burning activities at SL Landfill Site. Subsequent direct contact, ingestion of contaminated soils, ingestion of potentially contaminated allotment products	Allotment tenants and families/site users	Toxic, carcinogenic or hazardous to human health.	Unlikely	The allotments location (upwind) and airflow wind direction (as above) suggest this risk unlikely to be significant. An intrusive site investigation is however recommended to investigate this potential contaminant migration pathway.	Moderate	**Low**
		Ground gases (methane, carbon dioxide)	Transport of ground gas through permeable soils and groundwater to beneath the site. Accumulation and inhalation of landfill gas from off-site infilled areas to the allotments. Accumulation in enclosed spaces/buildings (indoors)	Allotment tenants/site users	Asphyxiation risk and risk of explosion.	Unlikely	There are limited enclosed structures /buildings present at the allotments site. Due to the likely shed's structure (leaky structures), position of the allotments (top of the cliffs), topography of the area and expected hydrogeological movement of groundwater/surface water towards Lyme Bay, the risk from significant migration, accumulation and inhalation of ground gas in enclosed structures/sheds at the allotments is considered to be low. This should however be considered by intrusive site investigation works, ground gas monitoring and ground gas risk assessment.	Moderate	**Low**

4.0 INTRUSIVE SITE INVESTIGATION

4.1 Site Investigation Strategy

4.1.1 Spittles Lane (SL) Landfill Site is a Dorset Council's (DC) asset, and it is Dorset Council's responsibility to investigate and assess whether this asset could pose a significant risk of significant harm (SPOSH) to off-site sensitive receptors, including the allotments site and its users.

Considering that allotments can typically contain contaminant species for a variety of reasons closely associated with the use of the allotments themselves (as opposed to contamination migrated from neighbouring), Dorset Council wishes to acquire empirical information which might help in refining the assessment of probability that any contaminants found on the allotments (if present) have (or have not) been derived from the Spittles Former Landfill, as opposed to being more intrinsic to the allotment land.

4.1.2 Dorset Council has asked WPA to consider the notion of designing appropriate intrusive sampling for this purpose. For an initial exploratory site investigation, WPA considers that this is a reasonable approach to establishing whether the allotment/landfill boundary presents any characteristics that indicate continuity and contaminant migration. The findings of the exploratory site investigation will subsequently determine whether further site investigation would be required including the intrusive investigation of soils at the allotments site.

4.1.3 Considering the above, the preliminary intrusive ground investigation works here reported are aimed to investigate ground conditions, contaminant linkages identified by the preliminary Conceptual Site Model (CSM) and assess potential contaminant migration pathways from SL Landfill Site to the allotments. The intrusive site investigation works are also aimed to investigate and assess the extent and proximity of Spittles Lane Landfill to the allotments site.

4.1.4 Prior to commencement of the intrusive ground works, geological conditions at the allotments site and its vicinity were assessed. Windowless sampling boreholes were previously used for the allotments and vicinity to investigate ground conditions for the ground stabilization works completed in 2016. From this experience, it was considered that this technique was likely to be appropriate for the intrusive site investigation works proposed along and in close proximity to the eastern boundary of the allotments.

The windowless sampling boreholes will enable the investigation of deep soils and facilitate ground gas and groundwater monitoring, (if required), as part of the site investigation works. For the intrusive site investigation works along the northern and eastern boundaries of the allotments, within allotments land, hand auger pits were excavated to avoid major disturbance of soils within the allotments site.

Sampling of soils off-site and within the allotments was targeted to determine contaminant levels within made ground, topsoil, infilled soils and indigenous soils and assess potential contaminant migration pathways from SL Landfill Site.

4.2 Intrusive Site Works

4.2.1 The exploratory intrusive site investigation works were undertaken on 08th and 10th July 2020. Windowless sampling boreholes were sunk along the northern and eastern boundaries of the allotments (land to the east and north of the allotments) to assess the nature of soils, investigate potential contaminant migration pathways from SL Landfill Site, and enable ground gas and groundwater monitoring to be undertaken for the site.

The boreholes facilitated the delineation of the western boundary of the landfill and enabled to assess its proximity to the allotments site by confirming or dismissing the presence of refuse/infilled soils. The boreholes extended to encountered indigenous soils below made ground and/or infilled soils and extended up to 8.0m bgl.

4.2.2 Due to access limitations, significant presence of overgrown vegetation and potential ground stability issues, the windowless sampling boreholes did not extend further than 40m from Spittles Lane track towards the south. However, the location of boreholes is considered sufficient to assess the proximity of the SL Landfill Site to the allotments and obtain appropriate data to assess potential contaminant migration pathways from SL Landfill Site to the allotments.

4.2.3 For land within the allotments site, hand dug auger pits were excavated along the northern and eastern site boundaries. The approximate location of the windowless sampling boreholes and hand auger pits is shown on Drawing 6 of this report. Table 4.2.1 below shows the rationale for the exploratory hole locations and collection of soil samples for contamination testing. Photographic records of the site works are included as Appendix A.

Table 4.2.1 Site Investigation Works

Borehole/Pit reference	Depth (m)	Location of Borehole/Hand Dug Pit	Samples Collected for Testing
WS01	Terminated at 4.0m bgl	Next to northern boundary of the allotments	0.20 – Made ground 2.70 – Indigenous Soils (Clay)
WS02	Terminated at 3.0m bgl	18m from the eastern boundary of the allotments	0.2-0.3 – Made ground 0.9-1.0 – Indigenous Soils (Clay)
WS03	Terminated at 3.0m bgl	21m from the eastern boundary of the allotments	0.2-0.3 – Made ground 0.8-1.2 – Indigenous Soils (Clay)
WS04	Terminated at 8.0m bgl	54m from the eastern boundary of the allotments	0.30 – Made ground 1.5-1.7 – Made ground/infilled soils 3.0-3.5 – Made ground/infilled soils
WS05	Terminated at 4.0m bgl	50m the eastern boundary of the allotments	0.3-0.4 – Made ground 1.4-1.7 – Made ground/infilled soils 2.3-2.5 – Made ground/infilled soils
WS06	Terminated at 4.0m bgl	50m from the eastern boundary of the allotments	0.30 – Made Ground 1.0 – Made ground/infilled soils 2.1-2.3 – Made ground/infilled soils
HA01-HA06	Terminated at 0.85 - 1.20m bgl	Hand dug auger pits along the northern and eastern site boundaries within allotments land	Samples collected from surface soils (0.10-0.30m bgl) and indigenous soils below (0.70-0.80m bgl)

4.2.4 Analysis of soils was undertaken based on the Conceptual Site Model (CSM) within the Phase 1 Report and ground conditions revealed by the site investigation. In total 24 of the 27 soil samples, taken from the boreholes and hand dug auger pits, were scheduled for contamination testing. Testing included: metals, pH, SOM, speciated PAH's, BTEX, MTBE, phenols, TPH CWG aliphatic/aromatic banding and asbestos ID.

Analysis was undertaken by i2 Analytical Environmental Science, an UKAS/MCERT's accredited laboratory. The soil samples were collected and placed in appropriate sampling containers, stored in refrigerated cool boxes, when on site or in transit. Samples were transferred under chain of custody to the laboratory via their courier.

4.2.5 For ground gas, three rounds of ground gas monitoring were undertaken from WS01, WS02 and WS03 during low and/or falling atmospheric pressure within a two months period.

4.2.6 For groundwater, groundwater inflow was not recorded during the site investigation works and collection and analysis of groundwater samples was therefore not undertaken as part of the site works.

4.2.7 The intrusive site investigation complied with current guidance included in BS5930, BS10175, BS 8576:2013 and other approved guidance for the investigation of contaminated land.

5.0 GROUND AND GROUNDWATER CONDITIONS

5.1. Ground Conditions

5.1.1 Windowless Sampling Boreholes

Soils encountered by the windowless sampling boreholes is shown on Table 5.1.1 below. For clarity, made ground soils in this report refer to soils which have been reworked and may contain man made components such as brick, glass etc, but are not necessarily linked with landfill activities.

Infilled soils are soils which have been infilled and contain waste materials linked with landfill activities, in this case, Spittles Lane Landfill Site.

Table 5.1.1 Ground Conditions - Windowless Sampling Boreholes

Borehole ID	Location	Depth (m)	Ground Conditions
WS01	Borehole to the north of the allotments. Excavated in close proximity to a new cut off drain. Borehole is approx. 2m higher than land at the allotments site.	0.0-0.50 0.5-2.20m 2.20-4.0m	MADE GROUND: sandy very gravelly & cobbly CLAY with chert brick carbonaceous fragments FILL: (loose) single sized coarse GRAVEL. Gravel associated with the new drain INDIGENOUS SOILS: Firm to stiff CLAY
WS02-WS03	18-21m east	0.0 to 0.25-0.35 0.25-0.35 to 0.90-1.20 0.90-1.20 to 3.00	MADE GROUND: stiff friable sandy gravelly silt/clay with brick carbonaceous fragments limestone chert INDIGENOUS SOILS: Very stiff cobbly and gravelly CLAY. INDIGENOUS SOILS: Stiff to Very Stiff to Stiff CLAY.
WS04	54m east of allotments and 30-40m south of Spittles Lane	0.0-0.20 0.20 to 6.5 6.5 to 8.0	MADE GROUND: stiff friable sandy silt/clay with brick carbonaceous fragments limestone chert MADE GROUND: INFILLED SOILS INDIGENOUS SOILS: Stiff thinly laminated dark grey CLAY.
WS05 – WS06	50m east 20 and 2m south of Spittles Lane respectively	0.0-0.20 0.20 to 2.8-3.5 2.8-3.5 to 4.0	TOPSOIL: stiff friable sandy and gravelly clay/silt with flint chert and limestone MADE GROUND: INFILLED SOILS INDIGENOUS SOILS: Stiff thinly laminated dark grey CLAY.

Note that the windowless sampling boreholes logs do not differentiate made ground from infilled soils. Differentiation included in the Table above is based on description of the made ground materials and field data. The windowless sampling borehole logs are included in Appendix B.

5.1.2 Hand Auger Pits

Soils encountered by the Hand Auger Pits are shown on Table 5.1.2 below. The hand auger logs are included in Appendix B.

Table 5.1.2 Ground Conditions – Hand Auger Pits

Hand Auger Pit ID	Location	Depth (m)	Ground Conditions
HA01 to HA04 And HA06	Hang auger pits excavated along the northern and eastern site boundaries within allotments land.	0.0 to 0.25-0.45 0.45 to 0.85-1.1	TOPSOIL: Stiff friable dark grey slightly sandy & gravelly organic clay/silt with flint chert brick limestone. INDIGENOUS SOILS: Stiff to Very Stiff CLAY. Cobble and gravelly CLAY was reported from HA03 and HA04 from 0.20- 0.30m to -0.70-0.80m bgl.
HA05	Hang auger pit excavated to the east of a new cut off drain (ground stabilisation works)	0.0-0.50 0.50-1.00 1.0-1.20m	MADE GROUND: Stiff slightly sandy vey gravelly cobbly & bouldery clay with predominantly angular chert brick carbonaceous fragments limestone. INDIGENOUS SOILS: Stiff to very stiff slightly gravelly cobbly CLAY. Gravel is angular chert. INDIGENOUS SOILS: Stiff to very stiff CLAY

5.2 Groundwater Conditions

Groundwater was not encountered in any of the boreholes and/or hang auger excavations during the site investigation works. The boreholes extended up to 8.0m bgl.

Ground gas monitoring undertaken in August – September 2020 reported groundwater levels from boreholes in close proximity to the allotments as shown on Table 5.2 below.

Table 5.2 Groundwater Levels

Borehole ID	Depth (m)	Remarks
WS01	2.62m, 2.48m and 2.36m bgl	Water levels recorded during ground gas monitoring on 14 August, 10 and 25 September 2020. Borehole recorded made ground and fill gravel from a new drain up to 2.70m. Firm to stiff clay was reported below. Groundwater is likely to be perched surface water sitting on top of the CLAY soils.
WS02	2.97m	Water recorded only on one occasion (14 August 2020). Borehole terminated at 3.0m bgl. Groundwater likely to be perched/surface water sitting on top of CLAY soils and within the slotted standpipe.
WS03	2.68m, 2.79m and 2.59m bgl	Water levels recorded during ground gas monitoring on 14 August, 10 and 25 September 2020. Borehole terminated at 3.0m bgl. Groundwater likely to be perched/surface water sitting on top of CLAY soils and within the slotted standpipe.

Based on the above and considering the general geological conditions revealed by the intrusive site works, it is most likely that groundwater recorded during the ground gas monitoring relate to perched surface water sitting on top of CLAY soils.

5.3 Extent and Proximity of the SL Landfill Site to the allotments

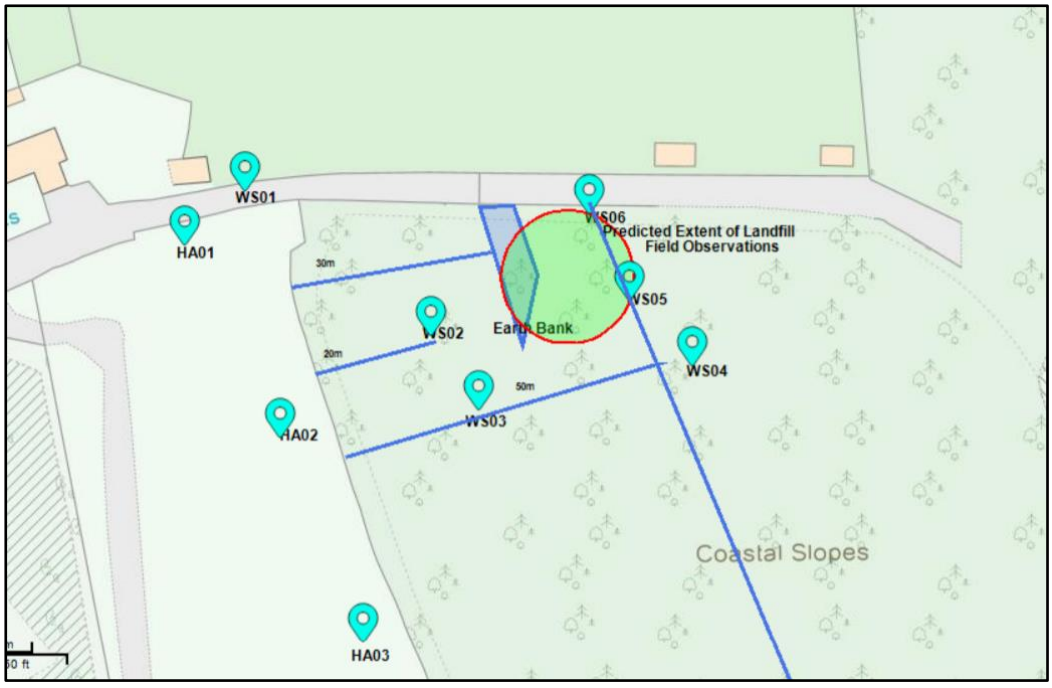
Records included in the Phase 1 Desk Study Report prepared for the allotments suggested that the western boundary of the SL Landfill Site lies approx. 50m from the eastern boundary of the allotments site (Bennett 2007).

However, it was not possible to precisely identify the extent of the original landfill site from the site inspection and desk study investigation and intrusive ground works were recommended to confirm the landfill boundary predictions (western boundary of the landfill site) and determine its proximity from the allotments site.

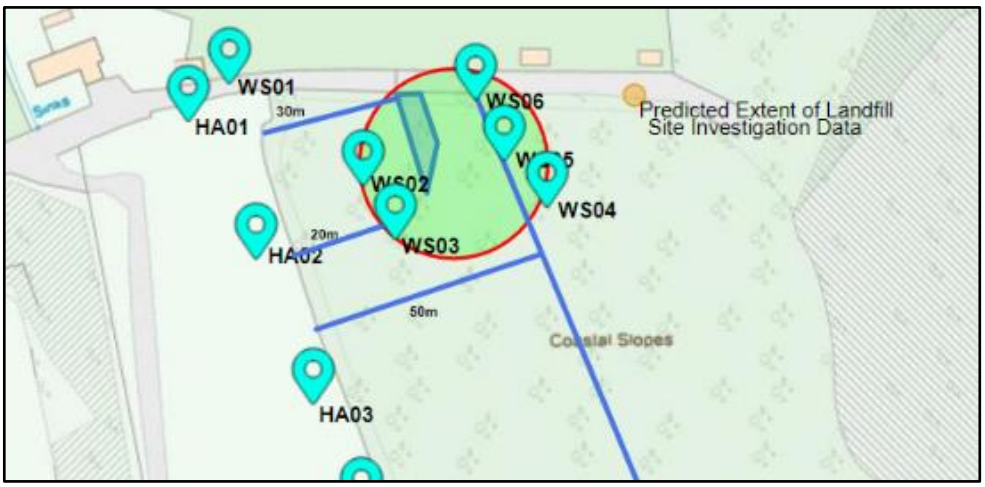
The site investigation data has confirmed the presence of made ground/infilled soils 50-54m from the eastern boundary of the allotments site (WS04, WS05, WS06). The site investigation has further confirmed the absence of infilled soils 18-21m east of the eastern boundary of the allotments.

Field observations further suggest that infilled ground associated with SL landfill activities may commence 30m east of the eastern boundary of the allotments, where an earth bank of approximate 2.0m height is clearly identified. The earth bank extends to the east towards the former landfill site.

Extracts from Drawings 7 and 8 shows the predicted extent of infilled ground based on field observations and borehole data.

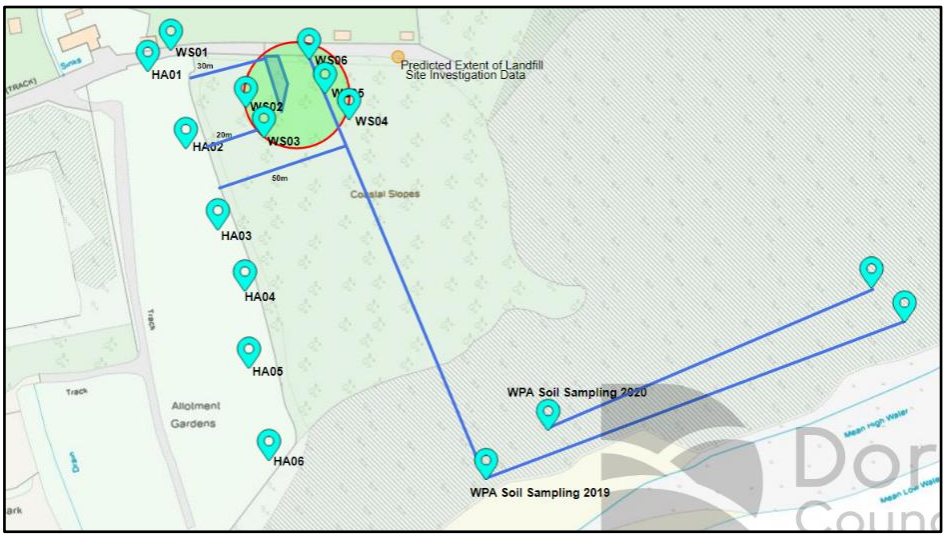


Extract from Drawing 7. Predicted extent of SL Landfill Site to the west based on field observations and borehole data.



Extract from Drawing 8. Predicted extent of SL Landfill Site to the west based on site data.

Drawing 8 compares the location of recorded infilled soils (borehole data) with records of the landslide with waste across the foreshore. As can be seen from the drawing, SL Landfill landslide is recorded approximate 50-60m east from the allotments site. Records of the most recent landslides from 2019 and 2020, show the landslide with waste material to originate below areas where infilled soils have been recorded by this borehole investigation.



Extract from Drawing 8

Considering the above, infilled ground associated with former landfill activities at Spittles Lane Landfill Site is confirmed 50-54m east of the allotment's boundary extending to the east. This corroborates records of the landslide with waste materials along the foreshore and predictions from Bennett 2007.

It is not possible to determine whether there are infilled soils between 21-50m from the allotment's eastern boundary. However, field observations suggest that infilled soils may commence 30m from the allotment's eastern boundary, where an earth bank is present. Site data further suggest that infilled soils found 50-54m east of the allotment are most likely to related to reworked soils present within the western boundary of the former landfill site. The absence of made ground/infilled soils associated with the landfill activities is confirmed by boreholes at 18-21m from the eastern boundary of the allotments.

6.0 SOIL RISK ASSESSMENT

6.1 Soil Contamination Testing and Human Health Risk Assessment

The Generic Acceptance Criteria (GACs) used to threshold contaminant levels at the site include: DEFRA Category 4 Screening Levels (C4SL's) and LQM/CIEH Suitable for Use Levels (S4ULs) for Allotments Land Use.

Table 6.1 below summarises the findings of the soil analysis results and reproduces the Tier 1 Generic Acceptance Criteria (GAC) used to threshold contaminant levels at the site. Exceedances of the Tier 1 GAC are highlighted in red.

The GACs used for the human health risk assessment is included as Appendix C. The soil analysis results certificate No 20-19823 is contained as Appendix D.

Table 6.1- Summary of Soils Analysis Results and GACs for Allotments Land Use

Determinant	LOD	Units	Assessment Criteria	No. Exceedances	Minimum	Maximum	Samples exceeding GAC
Arsenic	1	mg/kg	49	1	10	36	
Boron (water-soluble)	0.2	mg/kg	45	0	0.9	5.2	
Cadmium	0.2	mg/kg	4.9	0	<0.2	1.8	
Chromium III	1	mg/kg	18000	0	30	60	
Chromium VI	1.2	mg/kg	170	0	<1.2	<1.2	
Copper	1	mg/kg	520	0	13	130	
Lead	**1**	**mg/kg**	**80**	**13**	**19**	**170** **650** **320** **250** **110** **130** **240** **270** **120** **100** **200** **460** **180**	**WS01 0.30** **WS02 0.20-0.30** **WS03 0.20-0.30** **WS04 0.20-0.40** **WS04 0.20-0.30** **WS04 1.40-1.70m** **WS06 1.0m** **HA01 0.10-0.20m** **HA02 0.30m** **HA03 0.20m** **HA04 0.20m** **HA05 0.20-0.30m** **HA0.20m**
Mercury	0.3	mg/kg	6	0	<0.3	1.7	
Nickel	1	mg/kg	230	0	19	100	
Selenium	1	mg/kg	88	0	<1.0	3.7	
Zinc	1	mg/kg	620	0	42	520	
Naphthalene	0.05	mg/kg	24	0	<0.05	<0.05	
Acenaphthylene	0.05	mg/kg	160	0	<0.05	<0.05	
Acenaphthene	0.05	mg/kg	200	0	<0.05	<0.05	
Fluorene	0.05	mg/kg	160	0	<0.05	<0.05	
Phenanthrene	0.05	mg/kg	90	0	<0.05	3.20	
Anthracene	0.05	mg/kg	2200	0	<0.05	0.59	
Fluoranthene	0.05	mg/kg	290	0	<0.05	5.5	

Determinant	LOD	Units	Assessment Criteria	No. Exceedances	Minimum	Maximum	Samples exceeding GAC
Pyrene	0.05	mg/kg	620	0	<0.05	5.2	
Benzo(a)Anthracene	0.05	mg/kg	13	0	<0.05	3.3	
Chrysene	0.05	mg/kg	19	0	<0.05	2.6	
Benzo(b)fluoranthene	**0.05**	**mg/kg**	**3.9**	**0**	**<0.05**	**5.3**	**WS01 0.30m**
Benzo(k)fluoranthene	0.05	mg/kg	130	0	<0.05	1.7	
Benzo(a)Pyrene	0.05	mg/kg	5.7	0	<0.05	4.1	
Indeno(123-cd)Pyrene	0.05	mg/kg	39	0	<0.05	2.1	
Dibenzo(ah)Anthracene	**0.05**	**mg/kg**	**0.43**	**0**	**<0.05**	**0.57**	**WS01 0.30m**
Benzo(ghi)Perylene	0.05	mg/kg	640	0	<0.05	2.6	
Benzene	0.001	mg/kg	0.18	0	<0.001	<0.001	
Ethylbenzene	0.001	mg/kg	91	0	<0.001	<0.001	
M/P Xylene	0.001	mg/kg	170	0	<0.001	<0.001	
O Xylene	0.001	mg/kg	160	0	<0.001	<0.001	
Toluene	0.001	mg/kg	120	0	<0.001	<0.001	
Methyl tert-Butyl Ether	0.001	mg/kg		0	<0.001	<0.001	
TPH (C5-C6 aliphatic)	0.001	mg/kg	3900	0	< 0.001	< 0.001	
TPH (C6-C8 aliphatic)	0.001	mg/kg	13000	0	< 0.001	< 0.001	
TPH (C8-C10 aliphatic)	0.001	mg/kg	1700	0	< 0.001	< 0.001	
TPH (C10-C12 aliphatic)	1	mg/kg	7300	0	<1.0	1.9	
TPH (C12-C16 aliphatic)	2	mg/kg	13000	0	<2.0	20	
TPH (C16-C21 aliphatic)	8	mg/kg	270000	0	<8.0	22	
TPH (C21-C35 aliphatic)	8	mg/kg	270000	0	<8.0	<8.0	
TPH (C5-C7 aromatic)	0.001	mg/kg	57	0	< 0.001	< 0.001	
TPH (C7-C8 aromatic)	0.001	mg/kg	120	0	< 0.001	< 0.001	
TPH (C8-C10 aromatic)	0.001	mg/kg	51	0	< 0.001	< 0.001	
TPH (C10-C12 aromatic)	1	mg/kg	74	0	<1.0	<1.0	
TPH(C12-C16 aromatic)	2	mg/kg	130	0	<2.0	5.3	
TPH(C16-C21 aromatic)	10	mg/kg	260	0	<10	38	
TPH(C21-C35 aromatic)	10	mg/kg	1600	0	<10	90	
	DEFRA C4SLs, SOM 6%						
	LQM/CIEH 2014 S4ULs						

ND = No Asbestos Detected: **Traces of Asbestos Fibres detected in HA01 at 0.10-0.20m**

6.2 Generic Quantitative Risk Assessment Results

6.2.1 Methodology: Substances present at above the assessment criteria thresholds are identified as potential contaminants of concern (COC) and should either be subject to further site-specific risk assessment or risk mitigation action.

With respect to the allotments site and land to the east identified as the former SL Landfill Site, the Generic Risk Assessment have been separately undertaken for soil samples outside the allotments area and soil within the allotments site.

In addition, soil samples have been separately analysed to consider the soil profile and/or origin of soils, e.g. topsoil, made ground, infilled soils (landfill materials) and indigenous soils below made ground and/or topsoil.

6.2.2 Quantitative Risk Assessment – Soils Outside Allotments Land

Made Ground and/or Infilled Soils

For inorganic contaminants, lead concentrations reported from boreholes at depths of between 0.20m-0.30m and up to 1.70m bgl were above the GAC for allotments land use of 80mg/kg. The lead concentrations which exceeded its GAC are shown below:

Determinant	Units	Assessment Criteria	No. Exceedances	Maximum	Samples exceeding GAC
Lead	**mg/kg**	**80**	**7**	**170** **650** **320** **250** **110** **130** **240**	**WS01 0.30** **WS02 0.20-0.30** **WS03 0.20-0.30** **WS04 0.20-0.40** **WS05 0.20-0.30** **WS05 1.40-1.70m** **WS06 1.0m**

All the lead exceedances were reported from soil samples described as made ground and/or infilled soils. Concentrations of lead from indigenous soils below made ground were low and below the GAC for allotments land use.

For organic contaminants, concentrations of benzo(b)fluoranthene of 5.3mg/kg and dibenzo(ah)anthracene of 0.57mg/kg, were above their respective GAC of 3.9mg/kg and 0.43mg/kg respectively. The exceedances were reported from WS01 at 0.30 from made ground soils. Concentrations of these contaminants from indigenous soils were low and below their respective GAC.

Due to the lead and PAHs concentrations above the GAC for allotments land use, further risk assessment has been undertaken for these contaminants as included in section 6.3 and 6.4 of this report.

All other organic and inorganic contaminant concentrations reported from the made ground/infilled soil samples were below their respective GAC for allotments land use.

Indigenous soils

All inorganic and organic contaminant concentrations were below their respective Generic Acceptance Criteria (GAC) for allotments land use. No further action is therefore considered necessary with relation to contaminant concentrations reported from natural soils in close proximity to the allotments site.

6.2.3 Quantitative Risk Assessment – Allotments Site

Topsoil and Made Ground

For inorganic contaminants, lead concentrations ranging between 100mg/kg and 270mg/kg were reported from surface topsoil samples to depths up to 0.30m bgl. These concentrations were reported from hand auger pits excavated along the northern and eastern boundary of the allotments (within allotments land) and are above the GAC for lead of 80mg/kg.

Made ground was only encountered within the allotments at HA05 location. The made ground soil sample reported lead levels of 460mg/kg, above the GAC of 80mg/kg. This soil sample reported the highest lead levels within the allotments site as shown in the table below.

Determinant	Units	Assessment Criteria	No. Exceedances	Maximum	Samples exceeding GAC
Lead	**mg/kg**	**80**	**6**	**270** **120** **100** **200** **460** **180**	**HA01 0.10-0.20m** **HA02 0.30m** **HA03 0.20m** **HA04 0.20m** **HA05 0.20-0.30m** **HA0.20m**

It is noted that indigenous soils below the topsoil and single made ground sample (HA05) were low with levels ranging between 16mg/kg and 27mg/kg.

All other inorganic and organic contaminant concentrations from topsoil/made ground samples were low and below their respective GAC for allotments land use

Asbestos: Asbestos fibres described as Chrysotile- Loose Fibres below <0.001, were reported from a topsoil sample from HA01 at 0.10-0.20m. It is noted that only traces of asbestos fibres were reported at one location. Asbestos were not reported from any other samples from topsoil, made ground and/or indigenous soils.

Due to the lead exceedances and single asbestos occurrence reported from surface soils within allotments land, further risk assessment has been undertaken for these contaminants, as included in Section 6.3 and 6.5 of this report.

Indigenous soils
All inorganic and organic contaminant concentrations were below their respective Generic Acceptance Criteria (GAC) for allotments land use. No further action is therefore considered necessary with relation to contaminant concentrations reported from natural soils along the northern and eastern boundary of the allotments site.

6.3 Further Soil Risk Assessment – Lead

Further risk assessment has been undertaken for lead concentrations which exceeded the acceptance criteria for allotments land use. The further risk assessment includes the analysis of contaminant levels, location and depths of sampling points, likely source generation and plausible pathways between the potentially impacted soils and human receptors.

Contaminant Source: Based on site data and field observations, various sources of lead have been identified for the allotments site and its vicinity as described below:

Made Ground and Infilled Soils Associated with SL Landfill Site: Lead levels ranging between 130mg/kg and 650mg/kg were reported from made ground and infilled soils from surface levels up to 1.70m bgl.

The highest levels of lead of 650mg/kg and 320mg/kg were reported from WS02 and WS03 at 0.20-0.30m. These boreholes are located 18-21m east of the allotment's eastern boundary. Fly tipping has been identified within this area. Sources of lead at these locations are therefore suspected to be leaching of lead from metal containers and other metal items/waste identified within this area.

Infilled soils associated with former landfill activities were not encountered within these locations with indigenous soils (Clay) recorded from 0.30-0.35m to 3.0m bgl.

It is noted that although the above lead concentrations exceed the GAC for allotments land use (80mg/kg), the concentrations are below GAC for public open space (2) of 1300mg/kg. This GAC is considered more appropriate to threshold contaminant levels within areas not included within the allotments, as the consumption of allotment produce is not applicable for off-site areas.

It is further noted that lead concentrations reported from indigenous soils below made ground were very low, with concentrations reported as 19mg/kg (0.90m-1.0m) and 15mg/kg (0.80-1.20m) for WS02 and WS03 respectively. This suggests that the surface lead impaction is mainly contained within the made ground and the clay soils below are acting as a natural barrier, reducing the potential migration of lead into deeper substrate.

For WS04, WS05 and WS06, where soils were described as infilled soils associated with the SL Landfill Site, lead concentrations ranged between 110mg/kg and 250mg/kg. Although these concentrations are above the GAC for allotments land use (80mg/kg), the concentrations are not significantly elevated and are below GAC for residential land use without homegrown produce of 310mg/kg and GAC for public open space (2) of 1300mg/kg.

Sources of lead in infilled soils are likely to be associated with leaching of lead from potential metal fragments and other waste components potentially present in landfill and possibly within near surface fly tipped materials. It is further recognised that atmospheric deposition of lead from combustion of leaded petrol and other combustion processes may also have contributed to the lead levels at surface levels, which are reported to be greater than within deeper infilled soils.

Potential pathways: Pathways between contaminants of concern (lead) and human receptors include the direct contact pathway (direct soil ingestion, dermal contact and inhalation of dust). Inhalation of vapours is not applicable to lead as it is not a volatile contaminant. Consumption of contaminated fruit and vegetables is not applicable to areas off-site the allotments.

As previously discussed, the lead concentrations reported outside the allotments are below GAC for public open space (2) and the lead concentrations are therefore unlikely to represent a significant risk of significant harm (SPOSH) for potential human receptors (public) accessing these parts of the land off-site the allotments. It is further noted that areas off-site the allotments are not easily accessible due to overgrown vegetation and it is unlikely that the general public will be visiting these areas.

In terms of potential migration of lead through permeable soils and groundwater towards the allotments, this pathway has been dismissed by the findings of the site investigation. Indigenous soils encountered 18-21m from the eastern boundary of the allotments comprise firm to stiff CLAY, with no groundwater reported within the boreholes during the site investigation works.

Furthermore, the perched groundwater levels recorded during subsequent ground gas monitoring in boreholes suggest that any water movement flows from north to south towards Lyme Bay, in accordance with the topography of the area.

Lead is further considered to be contained within the made ground and infilled soils off-site the allotments site, with the indigenous clay below acting as a natural barrier, which prevents the vertical and/or horizontal migration of lead to other areas, including the allotments.

Considering the above, a pathway between lead impacted soils off-site of the allotments, in the vicinity of the closed landfill, and soils at the allotment site is not confirmed and a contaminant linkage between off-site lead impacted soils and the allotments is unlikely to exist.

In terms of potential risk to the public, lead concentrations within areas off-site the allotments are below GAC for public open space (2) and are considered not to represent a significant risk of significant harm (SPOSH) to identified human health receptors. No further action is therefore considered necessary in this regard.

Lead levels reported at surface level at the allotments site are further considered to originate from a different source and are unlikely to be linked to lead levels reported outside of the allotments site as discussed below.

Topsoil and Made Ground - Allotments Land

Lead concentrations ranging between 100mg/kg and 270mg/kg were reported from topsoil samples from surface levels up to 0.30m bgl, from soils along the northern and eastern boundaries of the allotments site.

A single lead concentration of 460mg/kg was also reported from soils described as made ground. Made ground was only encountered at one location (HA05), within an area reported as likely to have imported soils related to a new cut off drain installed as part of the ground stabilization works completed in 2016. For further information, refer to Drawing 3 of this report.

Testing results indicate that the lead impaction is only present within surface soils up to 0.30m. Indigenous soils described as stiff to very stiff CLAY were encountered from 0.20-0.30m bgl up to 1.2m bgl. Lead concentrations within these soils were very low with concentrations ranging from 16mg/kg to 27mg/kg.

Sources of lead in the surface soils can be expected to vary and may include atmospheric urban deposition of lead (leaded petrol and other combustion processes), particles of lead from painted wood, sheds, etc, and other practices carried out within the allotments.

For the single higher lead concentration of 460mg/kg, a metal tank was identified next to the sampling location. Leaching of lead from this metal container may be the source of the lead levels within the soils. Other sources may include atmospheric urban deposition of lead and/or lead present within the made ground soils.

It is noted that the GAC for allotments land use of 80mg/kg uses very conservative parameters as significant ingestion of fruit and vegetables is considered within the modelling. For comparison, GAC for residential land use with homegrown produce is 200mg/kg, and for residential land use without homegrown produce is 310mg/kg.

Although the surface topsoil samples exceeded the GAC for allotments land use of 80mg/kg, apart from the lead concentrations from made ground soils, concentrations of 100mg/kg and 270mg/kg were not significantly elevated and below GAC for residential land use without homegrown produce.

Potential pathways: Pathways between contaminants of concern (lead) and human receptors (users of the allotments) include the direct contact pathway (direct soil ingestion, dermal contact and inhalation of dust), and consumption of allotments products.

It is stressed that testing of soils was undertaken along the northern and eastern boundaries of the allotments and not from soils used within the allotments to grow fruit and vegetables.

Site data further suggest that the lead is confined within the surface soils and that indigenous clay below topsoil and made ground act as a natural barrier preventing the horizontal and vertical migration of lead to other areas.

The objective of this exploratory site investigation was to determine whether a contaminant linkage exists within the allotments site and the former SL Landfill Site. The site investigation data indicates that contaminant linkages are not present and the lead contaminated soils at the allotments do not originate from potential contaminant migration from the former SL Landfill site.

It is noted that although the investigated soils are along the boundaries of the allotments and these areas are not use for the production of fruit and vegetables, there is a possibility that the lead exceedances may extent to areas where fruit and vegetables are grown for human consumption. It is further noted that the highest lead concentration was reported from made ground soils, within an area where WPA understands that imported soils may have been placed as part of the ground stabilization works.

It is therefore recommended that the findings of this investigation are made available to the allotment's users and that further investigation is undertaken to assess lead levels within the soils used for production of fruit and vegetables. The further investigation should include lead bioavailability testing to determine the portion of lead which is available for uptake to human receptors.

The further investigation should also consider the investigation and assessment of soils within areas where imported soils were incorporated as part of the ground stabilization works.

6.4 Further Soil Risk Assessment - Benzo(b)fluoranthene and Dibenzo(ah)anthracene

Benzo(b)fluoranthene of 5.3mg/kg and dibenzo(ah)anthracene of 0.57mg/kg, were above their respective GAC for allotments land use of 3.9mg/kg and 0.43mg/kg respectively. The exceedances were reported from WS01 from made ground soils at 0.30m bgl.

Contaminant Source: WS01 is located outside allotments land, next to a track, to the north of the allotments. Potential sources of the PAHs within surface soils can vary significantly and may include atmospheric deposition of ash from bonfires, fires and other combustion processes, wash off of wood preservatives and tar oils containing PAHs, etc.

Although the above PAHs exceed the GAC for allotments, the PAH concentrations are below GACs of open space (2) of 16mg/kg and 1.4mg/kg respectively. The reported PAHs concentrations are therefore considered not to represent a risk to the public, potentially accessing this area.

Potential Pathways: Site data indicates that the PAHs have been confined within the made ground and are not migrating down the soil profile to impact indigenous soils. The indigenous clay below made ground is further considered to act as a natural barrier for vertical/horizontal contaminant migration.

This is confirmed by chemical testing, which report very low concentrations of the above PAH in indigenous soils below the made ground. Furthermore, the above contaminants have only been recorded at one location, outside allotments land, suggesting that the PAHs are not migrating to other areas.

Based on the above, a contaminant linkage between off-site PAH impacted soils and the allotments is not confirmed by this risk assessment. In terms of the general public, the benzo(b)fluoranthene and dibenzo(ah)anthracene are below GACs of open space (2) and considered not to represent a Significant Risk of Significant Harm (SPOSH) to potential human receptors.

No further action is therefore considered necessary with regard to the PAH concentrations reported outside the allotments site.

6.5 Further Soil Risk Assessment - Asbestos

There is no safe level to utilise as an assessment criterion for asbestos. It is however noted that the asbestos testing results reported Chrysolite fibres below the detection limit of <0.001%. This indicates that although traces of asbestos fibres are present within this single location (HA01 at 0.10m- 0.20m), the concentrations are not significant to represent a significant risk of significant harm (SPOSH) to human health receptors.

Asbestos fibres/Asbestos Containing Materials (ACMs) were not reported from any other soil sample and/or visually identified during the site works. It is further considered unlikely that the reported asbestos fibres at HA01 originate from historical landfill activities at the former SL landfill site and its single occurrence can be an anomaly or a result of the various activities potentially undertaken by the allotments users.

It is not part of the scope of this report to assess contaminant concentrations within allotments soils, which could be intrinsic of the allotments land use. It is further noted that the traces of asbestos reported by the chemical testing are not significant and unlikely to represent a human health risk to the allotment users.

However, there may be the opportunity in the future to investigate suitability of soils within the allotments land and determine whether there is the potential for ACMs/asbestos fibres and/or other common contaminants within allotments land use such as lead and PAHs to be present within active parts of the allotments soils.

7.0 GROUNDWATER RISK ASSESSMENT

7.1 Groundwater risk assessment has been undertaken for contaminants which exceeded the GAC for allotments land, to determine whether they could represent a potential risk to controlled water receptors.

Sensitive controlled water receptors are identified as Lyme Bay, to the south of the allotments and Spittles Lane Landfill Site.

7.2 Exceedances of the GAC for lead and traces of asbestos fibres were reported from made ground and topsoil up to 0.30m bgl within the allotments. Exceedances of the GAC for lead, benzo(b)fluoranthene and dibenzo(ah)anthracene, were also reported from areas off-site the allotments, from made ground and infilled soils up to 1.7m bgl.

7.3 As discussed in section 6.3, the GACs for allotments land use uses very conservative parameters in the modelling calculations and their exceedance does not necessarily indicate a significant risk of significant harm (SPOSH) to controlled water receptors.

In terms of contaminant migration and potential impact on controlled waters, indigenous soils below topsoil/made ground/infilled soils were reported as not contaminated, with CoC concentrations reported as very low and below their respective GAC for allotments land use.

It is therefore considered that CoC are contained within topsoil, made ground and infilled soils and have not leached and impacted natural clay soils below. The natural clay soils are further considered to act as a barrier and reduce potential vertical and/or horizontal contaminant migration.

The risk to Lyme Bay is further reduced by the absence of significant groundwater inflow within the studied area, which reduces the potential risk of significant contaminant leaching and migration and impact on Lyme Bay.

7.4 Considering the above, a significant risk of significant harm (SPOSH) is not perceived from CoC to controlled water receptors.

All other organic and inorganic soil contaminant concentrations were low and considered not to represent a risk to controlled water receptors. No further action is therefore considered necessary in this regard.

8.0 GROUNDGAS MONITORING AND RISK ASSESSMENT

Ground gas monitoring was undertaken from boreholes in close proximity to the allotments boundary to assess whether there was a potential risk to the allotments from potential ground gas production and migration from Spittles Lane (SL) Landfill Site.

8.1 Ground Gas Monitoring Results

Three rounds of ground gas monitoring were undertaken on 14 August, 10 September and 25 September 2020, during low and/or falling atmospheric pressure.

The ground gas monitoring certificates are contained in Appendix E. Table 8.1 summaries hydrocarbon vapours and ground gas concentrations reported from the boreholes.

Table 8.1 Ground gas and VOCs monitoring results

Date	Parameter	WS01	WS02	WS03
14.08.20	Methane (%)	0.0	0.0	0.0
	Carbon Dioxide (%)	0.2	2.4	2.3
	Flow Rate (l/hr)	0.0	0.0	0.0
	VOCs	0.2	0.1	0.0
	Barometric Pressure	1007 mbar, Falling		
10.09.20	Methane (%)	0.0	0.0	0.0
	Carbon Dioxide (%)	0.2	2.2	2.5
	Flow Rate (l/hr)	0.0	0.0	0.0
	VOCs	0.0	0.0	0.0
	Barometric Pressure	1016mbar, Falling		
25.09.20	Methane (%)	0.0	0.0	0.0
	Carbon Dioxide (%)	0.1	3.0	3.4
	Flow Rate (l/hr)	0.0	0.0	0.0
	VOCs	0.0	0.0	0.0
	Barometric Pressure	999 mbar, level		

8.2 Ground Gas Risk Assessment

8.2.1 From the ground gas monitoring, maximum ground gas levels during the three rounds of monitoring were reported as follow:

Gas flow: 0.0 /h
Methane: 0.0%
Carbon dioxide: 3.4% - WS03 (25.09.2020) - Low atmospheric pressure
VOC: No significant concentrations were reported from the boreholes, with maximum levels of 0.2ppm from WS01.

8.2.2 A gas screening value can be calculated by using the following equation:

Gas Concentration (%) x Flow Rate (l/hr) = Gas Screening Value (l/hr)

Gas Screening Values, based on worst case conditions or location, for methane and carbon dioxide concentrations and flow rates are:

Methane GSV	=	0.0 x 0.0 l/hr =0.0 l/hr = CS1
Carbon Dioxide GSV	=	0.034 x 0.0 l/hr =0.0 l/hr = CS1

The GSVs for methane and carbon dioxide equates to Characteristic Situation 1 (CS1). Under this classification, negligible gas regime is identified, and gas protection measures are not considered necessary for any enclosed structures.

8.2.3 For Volatile Hydrocarbons (VOCs), maximum VOC concentrations of 0.2ppm are not significant and considered not to indicate a hydrocarbon vapour risk. Chemical laboratory testing further reports all TPH concentrations below their respective GAC for allotments land use, with all volatile fractions reported below their respective detection limit.

8.2.4 It is therefore considered that a risk from ground gas (methane and carbon dioxide) and/or hydrocarbon vapours to the allotments site is not perceived by this investigation.

It is further noted that firm/ stiff to very stiff CLAY was reported as indigenous soils beneath the made ground. The clay is considered to acts as a natural vertical/ horizontal barrier and further reduces any potential risk from ground gas migration to the allotments site.

No further action is therefore considered necessary with regard to ground gas migration and its potential impact on the allotments site.

9.0 REFINED CONCEPTUAL SITE MODEL

9.1. Methodology

9.1.1 Following completion of the different stages of site investigation works, the Conceptual Site Model (CSM) has been revised. The Source-Pathway-Receptor methodology has been utilised to identify contaminants on-site and/or off-site, the routes or means via which they may migrate and the risks to humans, property or controlled waters, that may be affected by the contaminant, if a suitable pathway were to exist.

9.1.2 It is stressed that the refined CSMs detailed below are based on the outcome of the exploratory site investigation undertaken for land in close proximity to the allotments and within the boundaries of the allotment site.

The scope of the exploratory site investigation was to determine whether a contaminant linkage existed within the allotments site and the former SL Landfill Site. Therefore, soil samples analysed for contamination relate to soils within 50-54m from the eastern boundary of the allotments and from along the northern and eastern boundaries within allotments land.

There is therefore the possibility that concentrations of contaminants analysed by this investigation may vary significantly within the core of Spittles Lane (SL) Landfill Site and/or within soils used for production of fruit and vegetables within the allotments.

9.2 Refined CSM - Land off-site of the Allotments

Source	Pathway	Receptor	Likelihood	Risk
lead, benzo(b)fluoranthene and dibenzo(ah) anthracene	Direct contact with soils (dermal contact and soil ingestion	General Public	Although CoC exceed GAC for allotments land use, further risk assessment determines that levels of CoC are below GAC for Public Open Space (2). This land use is more appropriate to threshold contaminant for land off-site the allotments. Since all CoC are below their respective GACs for Public Open Space, a human health risk is not perceived for the public/users of the area. No further action is necessary	**Negligible**
	Migration and Impaction of Controlled waters	Controlled Waters (Lyme Bay)	Risk assessment to controlled waters indicate a negligible risk from the reported contaminant concentrations to Lyme Bay. No further action is necessary	**Negligible**
	Migration from off-site to the allotments site	Allotments Soils, allotments produce, allotments users	Assessment of the topography and hydrogeological conditions of the area indicate that the potential contaminant migration from land off-site to the allotments is highly unlikely. This has been further confirmed by contamination testing results. A contaminant linkage between land off-site including SL Landfill Site and the allotments is not considered to be present. No further action is necessary.	**Negligible**
Ground Gas generated by infilled soils at SL Landfill Site	Migration through the made ground and any preferential pathways	Shed structures	Ground gas and VOCs levels considered not to represent a risk. Gas regime identified as CS1 where a negligible risk is perceived from ground gas/VOC vapours. No further action is necessary.	**Negligible**

9.3 Refined CSM - Allotments Land

Source	Pathway	Receptor	Likelihood	Risk
Asbestos fibres	Inhalation of Airborne fibres	Allotments users	Asbestos fibres/ACMs were not reported from any other soil sample within the allotments and/or off-site. The single reported occurrence could be an anomaly, or a result of activities intrinsic of the allotments site. The reported levels of Chrysolite fibres below detection limit of <0.001%, indicates that although traces of asbestos fibres are present within this single location (HA01 at 0.10m- 0.20m), the concentrations are not significant to represent a significant risk of significant harm (SPOSH) to human health receptors. No further action is required.	**Low to Negligible**
	Asbestos fibres attached to fruit and vegetables			
Lead	Direct contact with soils (dermal contact and soil ingestion)	Allotments users	Lead concentrations above the GAC for allotments land use of 80mg/kg were reported from surface soil samples along the northern and eastern boundaries of the allotments Although the investigated soils are not use for production of fruit and vegetable, there is a possibility that the lead exceedances may extent to areas where fruit and vegetables is undertaken for human consumption. Should soils contaminated with lead be present within areas of the allotments used for production of fruit and vegetables, a Medium Risk to human health will be perceived. Further investigation is recommended to assess lead levels within the soils used for production of fruit and vegetables.	**Medium**
	Consumption of contaminated fruit and vegetables.			
	Migration and Impaction of Controlled waters	Controlled Waters (Lyme Bay)	Risk assessment to controlled waters indicate a negligible risk from the reported contaminant concentrations to Lyme Bay. No further action is necessary	**Negligible**

9.3.1 As above, contaminants of concern (CoC) are considered most likely to originate from activities undertaken at the allotments site, rather than been derived from the former Spittles Lane Landfill Site.

9.3.2 It is not part of the scope of this report to further assess concentrations of contaminant which are intrinsic within the allotments land. It is however recommended that the findings of this investigation are made available to the allotments users and that further investigation is undertaken to assess lead levels within the soils used for production of fruit and vegetables. The further investigation should include lead bioavailability testing to determine the portion of lead which is available to the human body.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 Exploratory Site Investigation and Ground Conditions

10.1.1 The Phase 2 intrusive site investigation works aimed to investigate ground conditions, contaminant linkages identified by the preliminary Conceptual Site Model (CSM) included in the Phase 1 Desk Study Report and assess potential contaminant migration pathways from SL Landfill Site to the allotments. The intrusive site investigation works also aimed to investigate and assess the extent and proximity of SL Landfill to the allotments site.

10.1.2 Ground conditions revealed by the investigation for land outside the allotments (18-21m east) include made ground up to 0.35m, underlain by indigenous soils described as Firm, Stiff and Very Stiff Clay. For soils 50-54m from the eastern boundaries of the allotments, made ground and infilled soils associated with former landfill activities at SL Landfill Site were revealed up to 6.5m bgl, underlain by Stiff Clay.

10.1.3 For the allotments, ground conditions are generally described as topsoil up to 0.45m bgl, underlain by Stiff to Very Stiff Clay. Made ground up to 0.50m bgl was recorded at a single location, (HA05), likely to relate to imported soils used at the allotments as part of the ground stabilization works. The made ground was underlain by indigenous Stiff to Very Stiff Clay.

10.1.4 Groundwater was not encountered within the site investigation works. Groundwater recorded during ground gas monitoring in boreholes is considered to relate to perched surface water sitting on top of CLAY soils.

10.2 SL Landfill Western Boundary and Proximity to the Allotments Site

10.2.1 Infilled ground associated with former landfill activities at Spittles Lane Landfill Site is confirmed 50-54m east of the allotment's boundary extending to the east. This corroborates records of the landslide with waste materials along the foreshore and predictions from Bennett 2007.

Site data further suggest that infilled soils found 50-54m east of the allotment are most likely to related to reworked soils present within the western boundary of the former landfill site.

Although it was not possible to determine whether there are infilled soils between 21-50m from the allotment's eastern boundary, field observations suggest that infilled soils related to SL Landfill activities may commence 30m from the allotment's eastern boundary, where an earth bank is present.

The absence of made ground/infilled soils associated with the landfill activities is confirmed by boreholes at 21-18m from the eastern boundary of the allotments.

10.3 Contaminants Linkages

10.3.1 Land Off-site the Allotments

Contaminants of Concern: The refined CSM and Site Specific Risk Assessment (SSRA) undertaken for Contaminants of Concern (CoC) identified as lead, benzo(b)fluoranthene and dibenzo(ah)anthracene, have determined that concentrations of CoC do not represent a Significant Risk of Significant Harm (SPOSH) to human health receptors, identified as the general public.

The level of risk for potential human health receptors is therefore considered to be **Negligible**. It is addressed that access to eastern areas off-site of the allotment is limited, due to significantly overgrown vegetation. This is considered to further reduce any potential risk to potential users of the area.

A **Negligibl**e risk is further perceived to controlled water receptors for the above CoC. No further action is considered necessary in this regard.

Migration Pathways: For the potential contaminant migration pathway from off-site the allotments to the allotments site, the refined CSM and SSRA indicates that a contaminant linkage does not exist between Contaminants of Concern (CoC) within made ground/infilled soils off-site and CoC identified within allotments Land.

The firm/stiff/very stiff CLAY encountered by the site investigation works is considered to act as a natural barrier to prevent any potential lateral/vertical contaminant migration. The risk is further reduced by the absence of significant groundwater and topography of the area. This has been further confirmed by contamination testing results.

Ground Gas: The ground gas risk assessment further indicates that a ground gas risk from SL landfill Site is not present for the allotments.

A **Negligible Risk** is therefore determined for the above contaminant linkages by the refined CSM. No further action is considered necessary in this regard.

10.3.2 Allotments Land

The refined CSM and SSRA has identified potential contaminant linkages within allotments land, which should be further investigated. This includes the presence of lead within surface soils along the northern and eastern boundaries of the allotments. Traces of asbestos fibres were also reported from a single surface soil sample, but at trace levels (below detection limit), considered not to be significant.

Allotments can typically contain contaminant species for a variety of reasons closely associated with the use of the allotments themselves, as opposed to contamination migrated from neighbouring land. For lead, sources of contamination may include atmospheric urban deposition (leaded petrol and other combustion processes) and particles of lead from painted wood, sheds, etc, and other activities intrinsic of allotments land.

It is noted that the surface soils reported to be contaminated with lead are along the boundaries of the allotments and are not used for production of fruit and vegetable, However, there is a possibility that the lead exceedances may extend to areas where fruit and vegetables are grown for human consumption.

Should soils contaminated with lead be present within other areas of the allotments (used for food production), a **Medium Risk** to human health will be perceived by the refined CSM. On this basis, further investigation and assessment is recommended to determine the level of risk and assess potential impacts on human receptors.

10.4 Statutory Guidance

10.4.1 At the time of the preparation of this report there is no evidence to suggest the allotments site could be determined as contaminated under Part 2A of the Environmental Protection Act 1990. However, contaminant linkages have been identified within allotments land, which should be further investigated.

It is therefore recommended that the findings of this investigation are made available to the allotment's users. Further investigation is recommended to assess lead levels within the soils used for production of fruit and vegetables. The further investigation should also consider the assessment of soils within areas where imported soils were incorporated as part of the ground stabilization works. Contamination testing should include lead bioavailability testing to determine the portion of lead which is bioavailable to the human body.

WPA stresses that this Phase 2 Investigation is a factual land quality assessment and does not purport to consider geotechnical/structural engineering, ecological, flood risk or archaeological aspects, which fall outside of the scope of this assessment and may require specific surveys.

The evaluation and conclusions included in this report do not preclude the existence of soil or groundwater contamination or ground gas hazards, which could not reasonably have been revealed by this Phase 2 exploratory investigation. Hence, this report should be used for information purposes only and should not be construed as a comprehensive characterisation of the allotments and its surroundings,

It is stressed that this report is in pursuit of the Council's role as an owner of land containing a former landfill site near to the allotments. It is widely acknowledged that allotment land can contain significant and measurable levels of a wide variety of contaminants, due to the range of materials brought to the land, for example by allotment owners or holders themselves. Therefore, great care should be exercised in interpreting the results of this investigation, particularly if considering any putative contaminant linkages between the disused Spittles Lane Landfill Site and the allotments site.

This report is for the exclusive use of the named client and their exclusive agents; no warranties or guarantees are expressed or should be inferred by any third parties. WPA Consultants Ltd disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

WPA October 2020

REFERENCES

Reference has been made to the following publications and government guidance in the execution of this investigation and in writing this report.

BS 5930, BS 10175 and BS 8576.

CIRIA Reports 665 and C659.

CLEA documentation.

CLR Publications 1-6

Contaminated Land Research Document 7 – Assessment of Risks to Human Health from Land Contamination: An overview of the development of the soil guideline values and related research.

Contaminated Land Research Document 8 – Potential Contaminants for the Assessment of Contaminated Land.

Contaminated Land Research Document 9 – Contaminants in Soil: Collation of toxicological data and intake values for humans.

Contaminated Land Research Document 10 – The Contaminated Land Exposure Assessment (CLEA) Model: Technical basis and algorithms.

Contaminated Land Research Report CLR 11, Environment Agency (2004). Model Procedures for the Management of Contaminated Land: Risk Assessment Procedure.

DEFRA and the EA Documentation and Toxicological Reports

Research and Development Technical Reports P5-066/TR and P5/065/TR relating to Technical Aspects of site investigation and Procedures for soil sampling strategies.

Environment Agency technical advice to third parties on pollution of controlled waters for Part IIA of the EPA1990 (also relevant to planning).

R&D Publication 66 – Guidance for the Safe Development of Housing on Land Affected by Contamination.

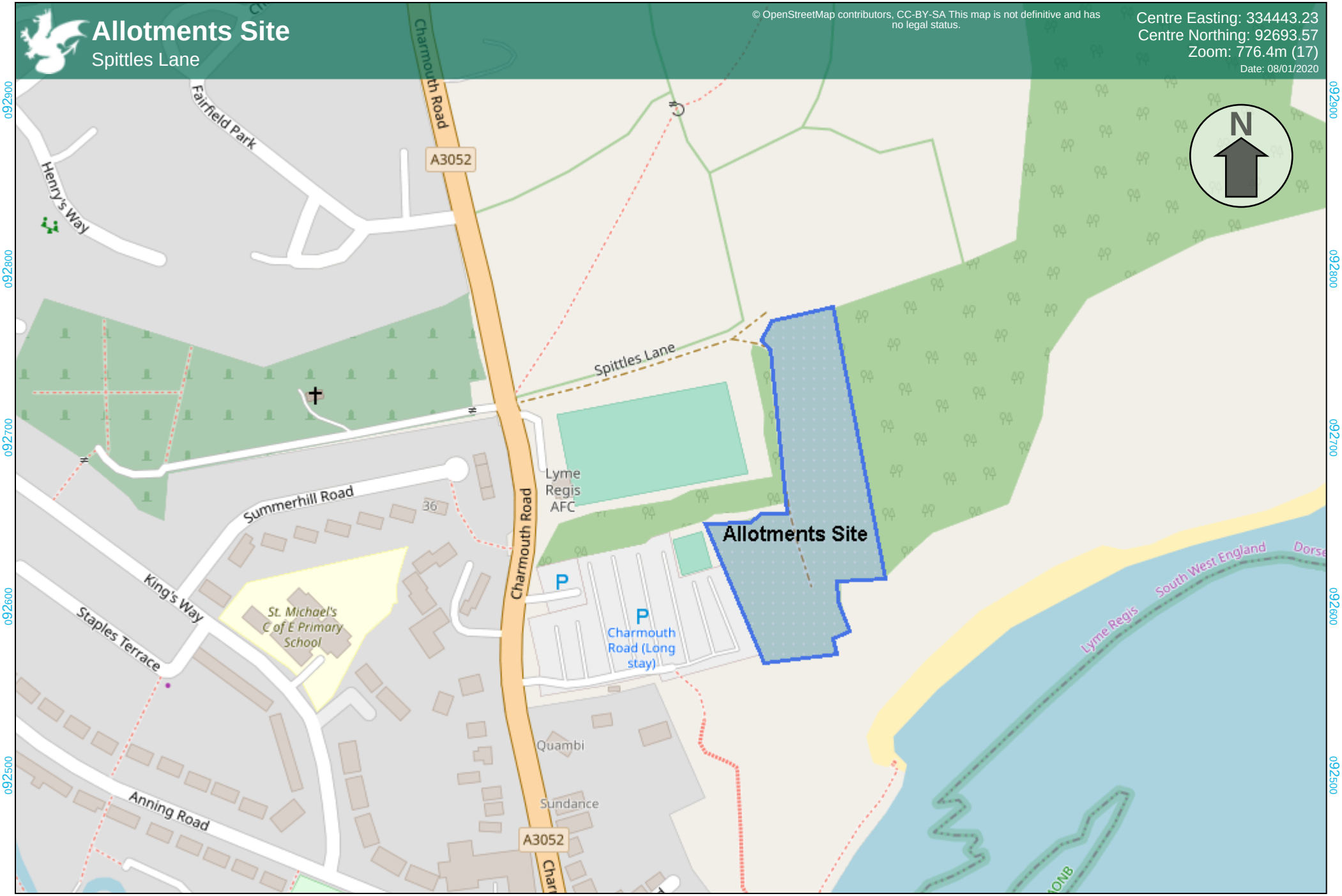
Waste Management Papers
Department of the Environment (1993). Waste Management Paper No 26A, Landfill Completion, A technical memorandum providing guidance on assessing the completion of licensed landfill sites. HMSO, 47pp, ISBN 0-11-752807-2

Department of the Environment (1991). Waste Management Paper No 27, Landfill Gas, A technical memorandum providing guidance on the monitoring and control of landfill gas. HMSO, 82pp, ISBN 0-11-752488-3

The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in soils

DRAWINGS AND APPENDICES

Drawing 1 Site Location Plan

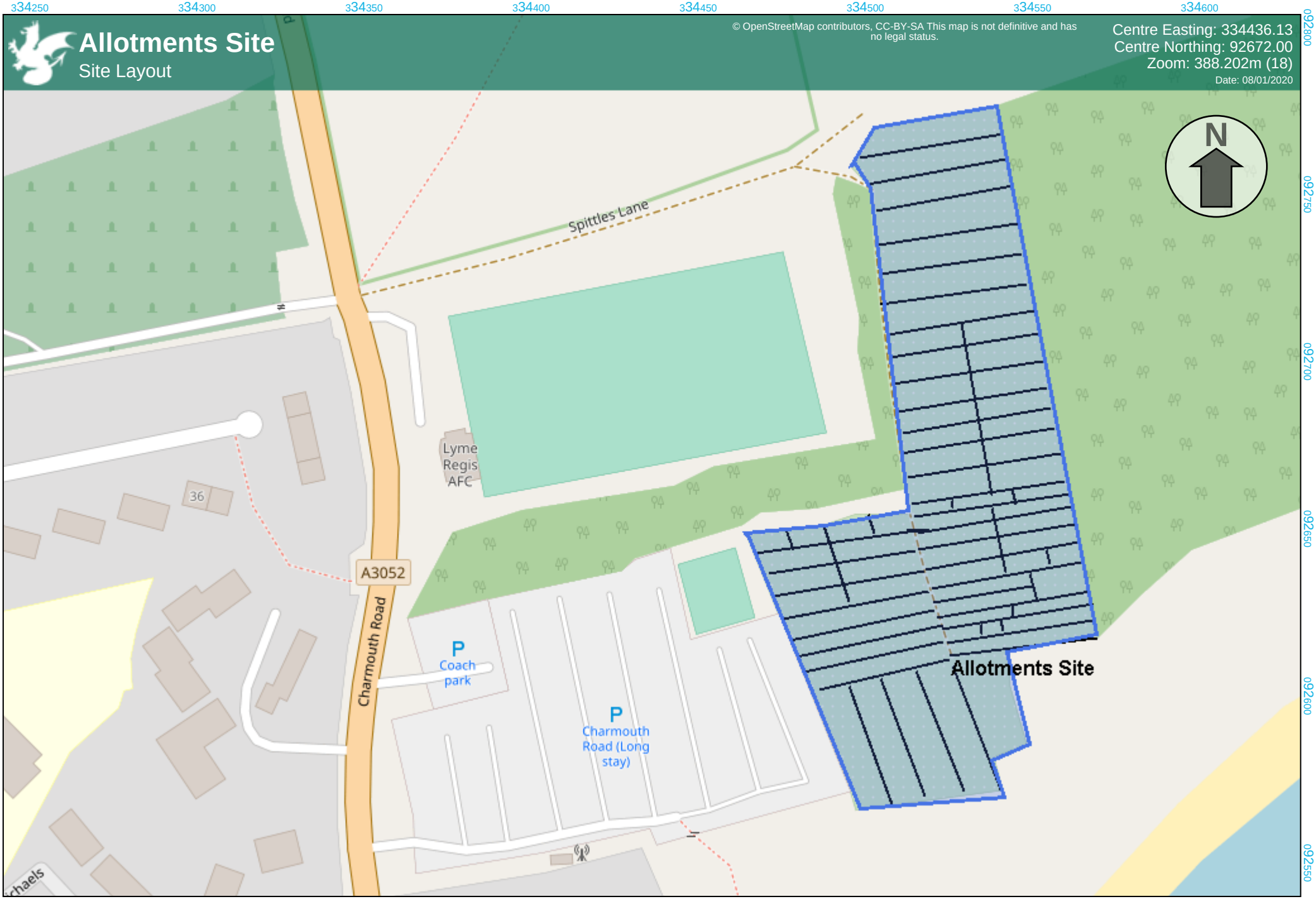

Allotments Site
Spittles Lane
© OpenStreetMap contributors, CC-BY-SA This map is not definitive and has no legal status.
Centre Easting: 334443.23
Centre Northing: 92693.57
Zoom: 776.4m (17)
Date: 08/01/2020
N
334100
334200
334300
334400
334500
334600
334700
334800
092900
092800
092700
092600
092500
Fairfield Park
Henry's Way
Charmouth Road
A3052
Spittles Lane
Lyme Regis AFC
Allotments Site
Summerhill Road
36
King's Way
Staples Terrace
St. Michael's C of E Primary School
P
Charmouth Road (Long stay)
Quambi
Sundance
Anning Road
South West England
Lyme Regis

Drawing 2 Allotments Layout Plan

Allotments Site

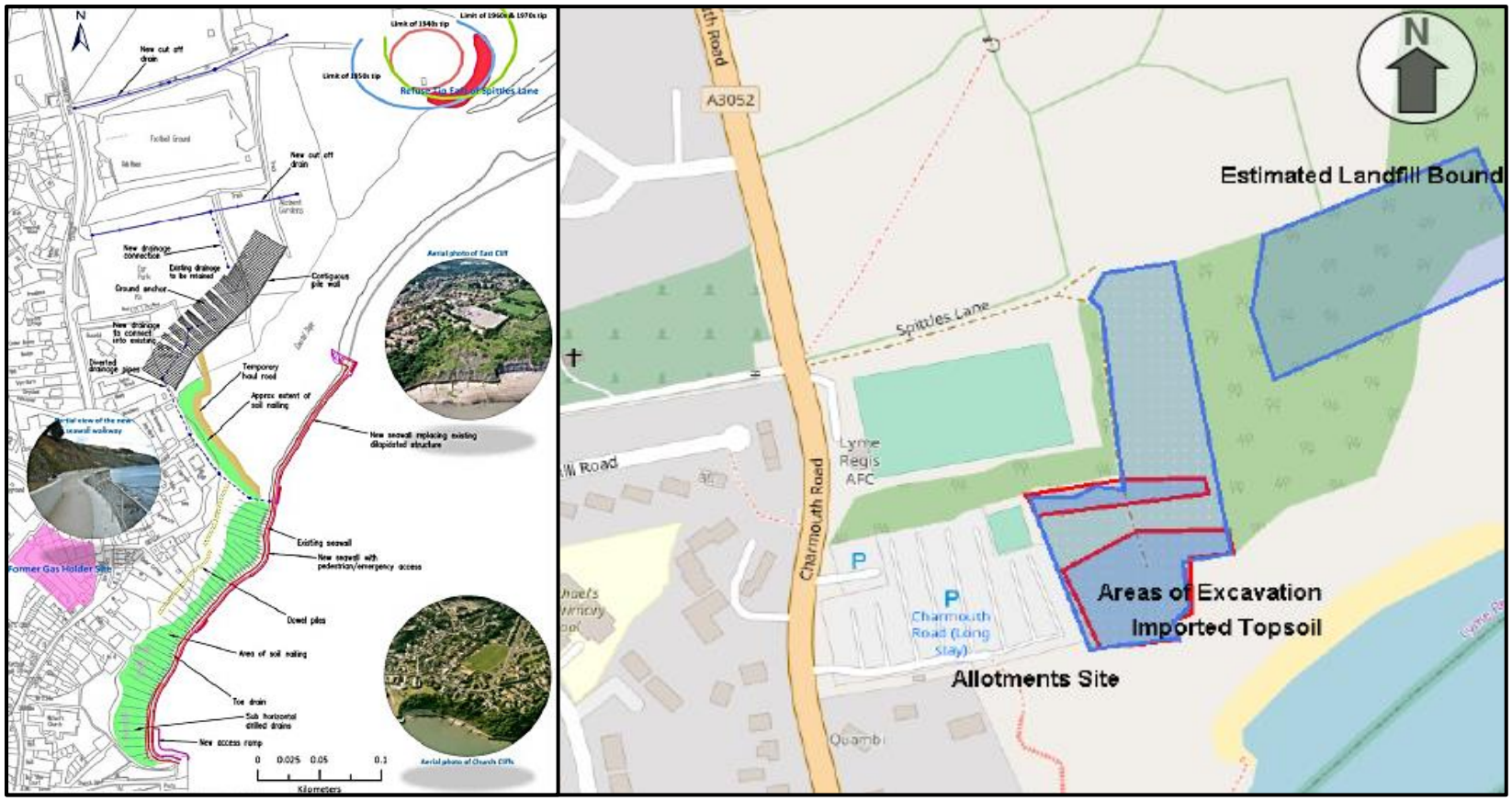
Site Layout

Centre Easting: 334436.13
Centre Northing: 92672.00
Zoom: 388.202m (18)
Date: 08/01/2020



Drawing 3 Lyme Regis Coastal Defence Works – Charmouth Car Park and Allotments

DRAWING 3. Lyme Regis Coastal Defence Works – Charmouth Car Park and Allotments



Not to Scale

Drawing 4 Spittles Lane Landfilled Areas – Walkover Survey and Aerial Photography

DRAWING 4. Estimated Spittles Lane Landfilled Areas – Walkover Survey and Aerial Photography

Estimated Spittles Lane Landfilled Areas - Bennett 2007

Estimated Western Landfill Boundary based on Walkover Survey March 2019. Waste observed on the landslide toe and foreshore during walkover survey.

Not to Scale

Drawing 5 Spittles Lane Landfill Site -Estimated Boundaries (Bennett 2007, WPA 2018, WPA 2019)

Allotments Site

Spittles Lane

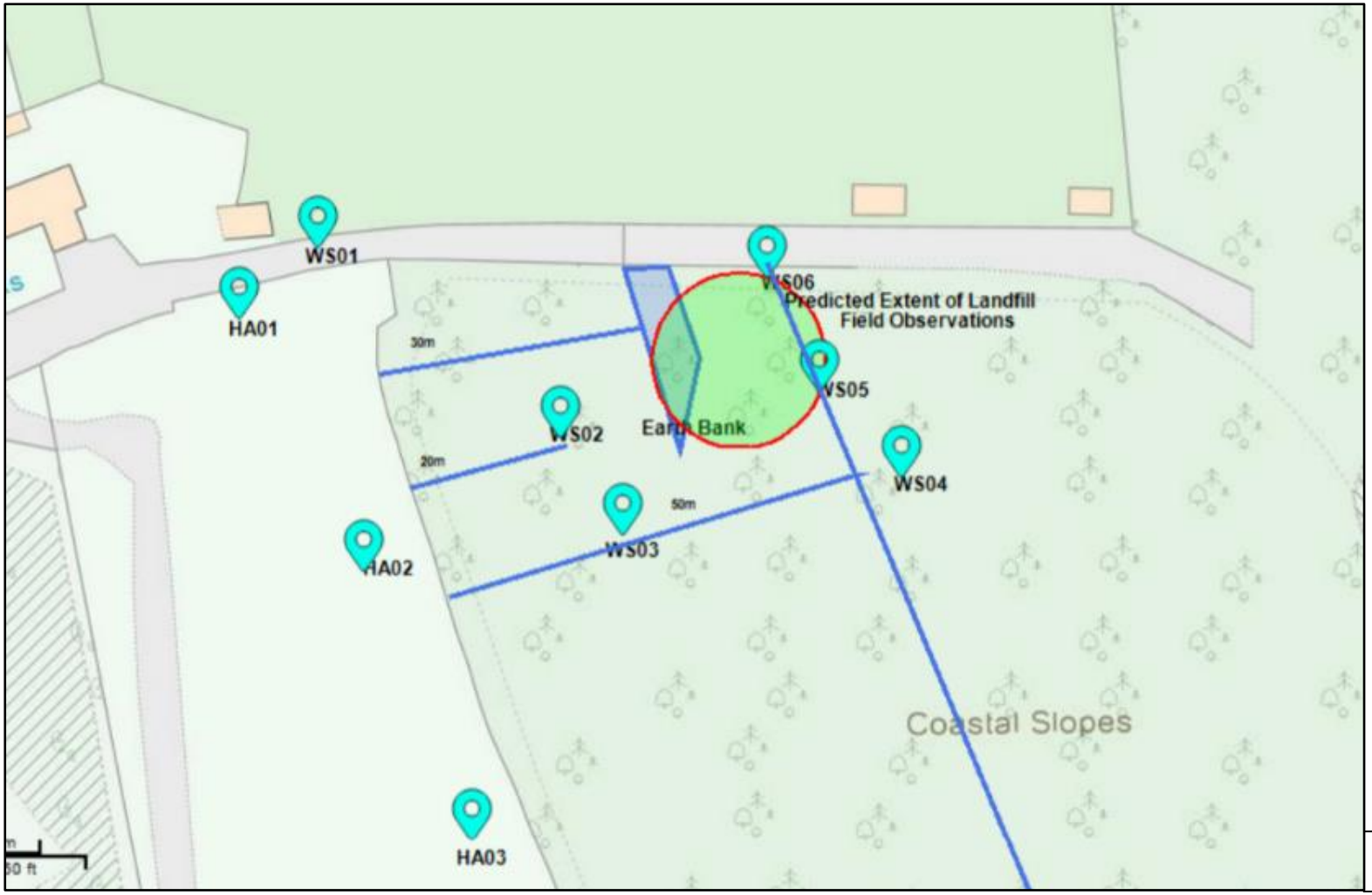
Centre Easting: 334612.70
Centre Northing: 92709.95
Zoom: 776.398m (17)
Date: 09/01/2020

Drawing 6 Site Investigation Plan

DRAWING 6. SITE INVESTIGATION PLAN

Drawing 7 Predicted Extent of SL Landfill Site to the West – Field Observations and Site Data

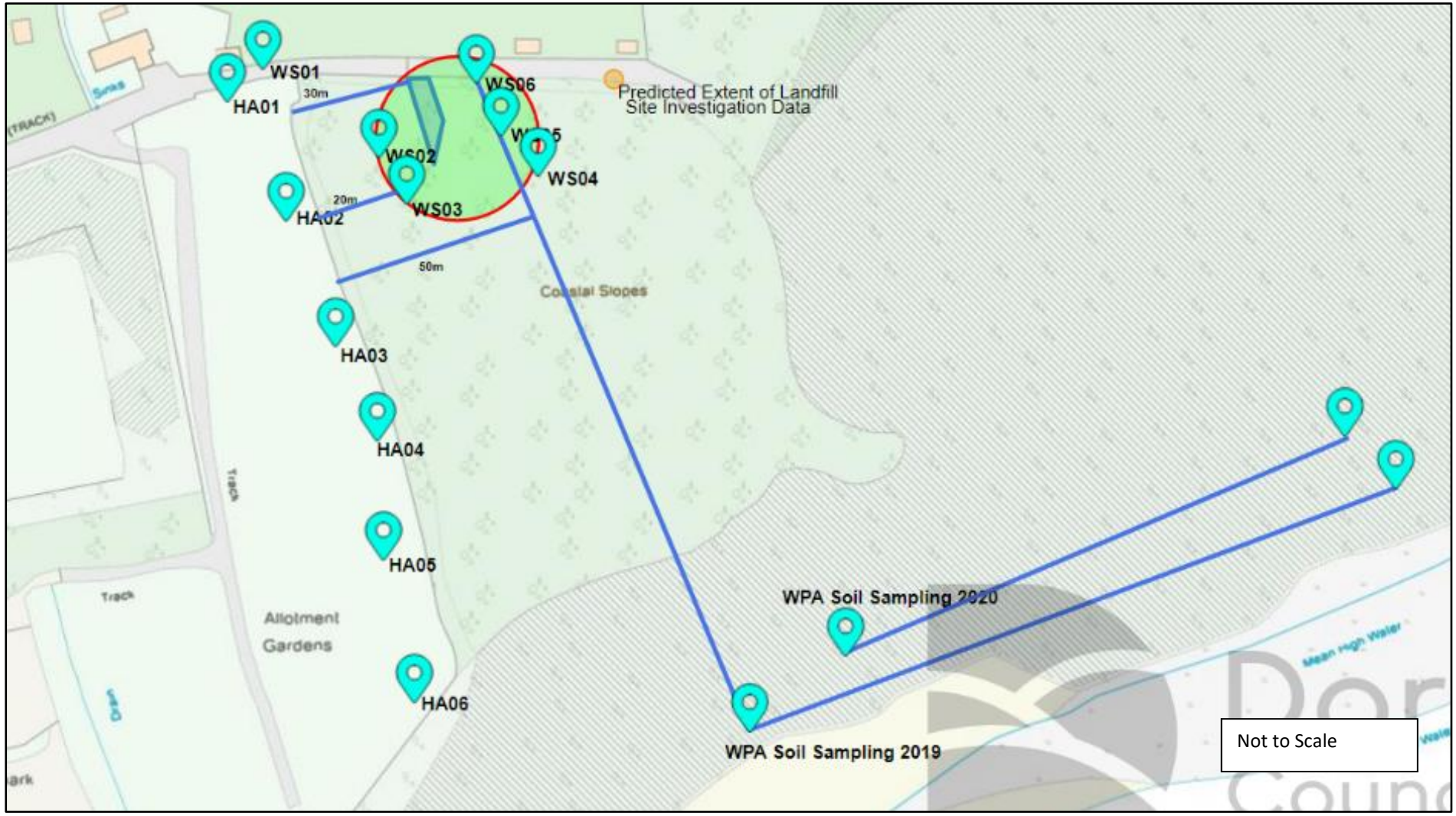
DRAWING 7. Predicted Extent of Landfill to the West – Field Observations and Site Data



Not to Scale

Drawing 8 Predicted Extent of SL Landfill Site to the West – Site Data

DRAWING 8. Predicted Extent of Landfill to the West – Site Data



Appendix A Photographic Records

APPENDIX A. Photographic Records

Plate 1. Allotments Site, Spittles Lane, Lyme Regis

Plate 2. Plate shows location of WS02

Plate 3. Plate shows soils from WS02

Plate 4. Plate shows location of WS03

Plate 5. Plate shows soils from WS03

Plate 6. Plate shows soils from WS01

Plate 7. Plate shows soils from WS04 Landfill Area

Plate 8. Plate shows soils from WS05 Landfill Area

Plate 9. Plate shows soils from WS06 Landfill Area

Plate 10. Plate shows Hand Auger Pit within Allotments

Plate 11. Plate shows Hand Auger Pit within Allotments

Plate 12. Plate shows soils from Hand Auger Pits

Plate 13. Plate shows soils from Hand Auger Pits

Appendix B Borehole Logs
Hand Auger Pit Logs

ADVANCED INVESTIGATION SYSTEMS LTD
Tel: 07970 460 427
Email: enquiries@windowsampling.com
Web: www.windowsampling.com

BOREHOLE RECORD
(Window Sampling)

Borehole Number
WS01

Site:	Engineer:	Drilling Equipment:
The Spittles, Lyme Regis	WPA Consulting Ltd	Competitor 130

Client:	Elevation mAOD:	Easting:	Northing:	Start:	Finish:	Scale:
Dorset County		334524.00	92776.00	08/07/2020	08/07/2020	1:50

Sheet 1 of 1

GROUND WATER			SAMPLING & IN SITU TESTING			STRATA RECORD			
Strike	Well	Depth (m)	Depth/Type (m)	Standard Penetration Testing	Sampler / Recovery	Depth mBGL	Depth mAOD	Key	Description
					101mm WLS: 70%	1	-1.0		MADE GROUND: stiff dark grey & dark yellow brown slightly sandy very gravelly & cobbly CLAY with chert brick carbonaceous fragments.
					101mm WLS: 70%	2	-2.0		FILL: (loose) light red brown / grey single sized coarse angular limestone GRAVEL.
					92mm WLS: 80%	3	-3.0		FILL: (loose) yellow brown slightly sandy medium coarse flint chert angular GRAVEL.
					70mm WLS: 80%	4	-4.0		Firm to stiff yellow brown occasionally mottled light grey CLAY.
						5	-5.0		Firm to stiff becoming stiff dark grey locally dark yellow brown variegated CLAY displaying thinly laminated fabric towards base.
						6	-6.0		
						7	-7.0		
						8	-8.0		
						9	-9.0		
						10	-10.0		

Remarks / Well Installation / Casing Details

Dry hole. 50mm ID slotted well screen installed to 3.0m BGL.

AGS

ES ES Sample
● □ Disturbed Sample
W Water Sample
Φ Bulk Sample
U Undisturbed Sample

WLS Windowless Sampler
WS Window Sampler
▽ Depth to water strike
▼ Standing water depth

Job No. Z0608

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Email: enquiries@windowsampling.com
Web: www.windowsampling.com

BOREHOLE RECORD
(Window Sampling)

Borehole Number
WS02

Site:	Engineer:	Drilling Equipment:
The Spittles, Lyme Regis	WPA Consulting Ltd	Competitor 130

Client:	Elevation mAOD:	Easting:	Northing:	Start:	Finish:	Scale:
Dorset County		334539.00	92768.00	08/07/2020	08/07/2020	1:50

GROUND WATER | **SAMPLING & IN SITU TESTING** | **STRATA RECORD** | Sheet 1 of 1

Strike	Well	Depth (m)	Depth/Type (m)	Standard Penetration Testing	Sampler / Recovery	Depth mBGL	Depth mAOD	Key	Description
						0			MADE GROUND: stiff friable dark brown grey humic sandy gravelly SILT CLAY with brick carbonaceous fragments limestone chert.
									Very stiff dark light yellow brown grey variegated cobbly & gravelly CLAY. Gravel & cobbles are angular chert.
					101mm WLS: 80%	1	-1.0		Stiff to very stiff becoming firm to stiff at base yellow brown / grey variegated becoming increasingly dark grey with depth CLAY.
					92mm WLS: 90%	2	-2.0		
									Stiff dark grey CLAY with abundant ordered lithorelic development.
					79mm WLS: 100%	3	-3.0		
						4	-4.0		
						5	-5.0		
						6	-6.0		
						7	-7.0		
						8	-8.0		
						9	-9.0		
						10	-10.0		

Remarks / Well Installation / Casing Details

Dry hole. 50mm ID slotted well screen installed to 3.00m BGL.

AGS

ES ES Sample
● □ Disturbed Sample
W Water Sample
Φ Bulk Sample
U Undisturbed Sample

WLS Windowless Sampler
WS Window Sampler
▽ Depth to water strike
▼ Standing water depth

Job No. Z0608

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BOREHOLE RECORD
(Window Sampling)

Borehole Number
WS03

Site:	Engineer:	Drilling Equipment:
The Spittles, Lyme Regis	WPA Consulting Ltd	Competitor 130

Client:	Elevation mAOD:	Easting:	Northing:	Start:	Finish:	Scale:
Dorset County		334541.00	92751.00	08/07/2020	08/07/2020	1:50

GROUND WATER | SAMPLING & IN SITU TESTING | STRATA RECORD

Strike	Well	Depth (m)	Depth/Type (m)	Standard Penetration Testing	Sampler / Recovery	Depth mBGL	Depth mAOD	Key	Description
						0	0.0		MADE GROUND: stiff friable dark brown grey humic sandy gravelly SILT CLAY with brick carbonaceous fragments limestone chert.
					101mm WLS: 90%	1	-1.0		Very stiff light yellow brown grey variegated cobbly & gravelly CLAY. Gravel & cobbles are angular chert.
					92mm WLS: 90%	2	-2.0		Stiff to very stiff becoming firm to stiff at base yellow brown / grey variegated becoming increasingly dark grey with depth CLAY.
					79mm WLS: 100%	3	-3.0		Stiff dark grey CLAY with abundant ordered lithorelic development.
						4	-4.0		
						5	-5.0		
						6	-6.0		
						7	-7.0		
						8	-8.0		
						9	-9.0		
						10	-10.0		

Remarks / Well Installation / Casing Details

Dry hole. 50mm ID slotted well screen installed to 3.00m BGL.

AGS

ES ES Sample
● □ Disturbed Sample
W Water Sample
Φ Bulk Sample
U Undisturbed Sample

WLS Windowless Sampler
WS Window Sampler
▽ Depth to water strike
▼ Standing water depth

Job No. Z0608

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BOREHOLE RECORD
(Window Sampling)

Borehole Number
WS04

Site:	Engineer:	Drilling Equipment:
The Spittles, Lyme Regis	WPA Consulting Ltd	Competitor 130

Client:	Elevation mAOD:	Easting:	Northing:	Start:	Finish:	Scale:
Dorset County		334591.00	92749.00	10/07/2020	10/07/2020	1:50

GROUND WATER | **SAMPLING & IN SITU TESTING** | **STRATA RECORD** | Sheet 1 of 1

Strike	Well	Depth (m)	Depth/Type (m)	Standard Penetration Testing	Sampler / Recovery	Depth mBGL	Depth mAOD	Key	Description
									MADE GROUND: stiff friable dark brown grey humic sandy SILT CLAY with brick carbonaceous fragments limestone chert.
									MADE GROUND: stiff grey yellow brown locally brown & orange brown gravelly cobbly CLAY with chert limestone battery carbonaceous fragments.
					101mm WLS: 70%	1	-1.0		
					101mm WLS: 60%	2	-2.0		
					92mm WLS: 30%	3	-3.0		
					92mm WLS: 80%	4	-4.0		MADE GROUND: firm to stiff green grey / grey / yellow brown variegated gravelly locally sandy CLAY with chert slate brick limestone.
					79mm WLS: 100%	5	-5.0		
					79mm WLS: 70%	6	-6.0		
						7	-7.0		Stiff thinly laminated dark grey CLAY. Recovered as shavings within sampler (end blocked with cobble).
					54mm WS: 30%	8	-8.0		
						9	-9.0		
						10	-10.0		

Remarks / Well Installation / Casing Details

Dry hole. Backfilled with arisings.

AGS

ES ES Sample
● □ Disturbed Sample
W Water Sample
Φ Bulk Sample
U Undisturbed Sample

WLS Windowless Sampler
WS Window Sampler
▽ Depth to water strike
▼ Standing water depth

Job No. Z0608

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BOREHOLE RECORD
(Window Sampling)

Borehole Number
WS05

Site:	Engineer:	Drilling Equipment:
The Spittles, Lyme Regis	WPA Consulting Ltd	Competitor 130

Client:	Elevation mAOD:	Easting:	Northing:	Start:	Finish:	Scale:
Dorset County		334582.00	92759.00	10/07/2020	10/07/2020	1:50

GROUND WATER | **SAMPLING & IN SITU TESTING** | **STRATA RECORD** | Sheet 1 of 1

Strike	Well	Depth (m)	Depth/Type (m)	Standard Penetration Testing	Sampler / Recovery	Depth mBGL	Depth mAOD	Key	Description
					101mm WLS: 90%	1	-1.0		TOPSOIL: stiff friable dark grey slightly sandy & gravelly organic CLAY/SILT with flint chert brick limestone. MADE GROUND: stiff grey yellow brown locally brown & orange brown gravelly cobbly CLAY with chert limestone fragments.
					92mm WLS: 90%	2	-2.0		Fine dark grey / grey brown variegated slightly gravelly organic CLAY with chert brick organic material carbonaceous fragments.
					79mm WLS: 70%	3	-3.0		
					79mm WLS: 60%	4	-4.0		Stiff thinly laminated yellow brown grey variegated CLAY.
						5	-5.0		Moderately weak light grey calcareous MUDSTONE.
						6	-6.0		
						7	-7.0		
						8	-8.0		
						9	-9.0		
						10	-10.0		

Remarks / Well Installation / Casing Details

Dry hole. Backfilled with arisings.

AGS

ES ES Sample
● □ Disturbed Sample
W Water Sample
Φ Bulk Sample
U Undisturbed Sample

WLS Windowless Sampler
WS Window Sampler
▽ Depth to water strike
▼ Standing water depth

Job No. Z0608

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Web: www.windowsampling.com

BOREHOLE RECORD
(Window Sampling)

Borehole Number
WS06

Site:	Engineer:	Drilling Equipment:
The Spittles, Lyme Regis	WPA Consulting Ltd	Competitor 130

Client:	Elevation mAOD:	Easting:	Northing:	Start:	Finish:	Scale:
Dorset County		334576.00	92772.00	10/07/2020	10/07/2020	1:50

GROUND WATER | **SAMPLING & IN SITU TESTING** | **STRATA RECORD** | Sheet 1 of 1

Strike	Well	Depth (m)	Depth/Type (m)	Standard Penetration Testing	Sampler / Recovery	Depth mBGL	Depth mAOD	Key	Description
					101mm WLS: 100%	1	-1.0		TOPSOIL: stiff friable dark grey slightly sandy & gravelly organic CLAY/SILT with flint chert brick limestone. MADE GROUND: stiff grey yellow brown locally brown & orange brown gravelly cobbly CLAY with chert concrete bituminous macadam. Brown wood & organic material at 2.1m BGL.
					101mm WLS: 90%	2	-2.0		
					92mm WLS: 90%	3	-3.0		Stiff dark grey slightly gravelly silty CLAY with carbonaceous fragments chert rare brick (Relic Topsoil). Stiff yellow brown locally brown grey gravelly CLAY. Gravel is angular chert.
					79mm WLS: 100%	4	-4.0		Stiff dark grey locally yellow brown variegated CLAY with ordered lithorelic development. Stiff thinly laminated yellow brown grey variegated CLAY.
						5	-5.0		
						6	-6.0		
						7	-7.0		
						8	-8.0		
						9	-9.0		
						10	-10.0		

Remarks / Well Installation / Casing Details

Dry hole. Backfilled with arisings.

AGS

ES ES Sample
● □ Disturbed Sample
W Water Sample
Φ Bulk Sample
U Undisturbed Sample

WLS Windowless Sampler
WS Window Sampler
▽ Depth to water strike
▼ Standing water depth

Job No. Z0608

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TRIAL PIT RECORD

Trial Pit Number

HA01

Site:	Engineer:	Plant Equipment:
The Spittles, Lyme Regis	WPA Consulting Ltd	Hand auger

Client:	Elevation mAOD:	Easting:	Northing:	Start:	Finish:	Scale:
Dorset County		334515.00	92768.00	08/07/2020	08/07/2020	1:20

GROUND WATER | **SAMPLING & IN SITU TESTING** | **STRATA RECORD**

Sheet 1 of 1

Strike	Well	Depth (m)	Depth/Type (m)		Sampler / Recovery	Depth mBGL	Depth mAOD	Key	Description
					200mm hand auger				TOPSOIL: stiff friable dark grey slightly sandy & gravelly organic CLAY/SILT with flint chert brick limestone.
									Stiff yellow brown occasionally mottled light grey CLAY with occasional disseminated calcareous nodules to 5mm.
									Stiff to very stiff yellow brown / grey variegated CLAY. Angular limestone boulder at base.
						1	-1.0		
						2	-2.0		
						3	-3.0		
						4	-4.0		

Remarks / Orientation / Dimensions / Stability

Dry hole. Backfilled with arisings.

AGS

ES ES Sample
● □ Disturbed Sample
W Water Sample
Φ Bulk Sample

WLS Windowless Sampler
WS Window Sampler
▽ Depth to water strike
▼ Standing water depth

Job No. Z0608

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TRIAL PIT RECORD

Trial Pit Number

HA02

Site:	Engineer:	Plant Equipment:
The Spittles, Lyme Regis	WPA Consulting Ltd	Hand auger

Client:	Elevation mAOD:	Easting:	Northing:	Start:	Finish:	Scale:
Dorset County		334529.00	92739.00	08/07/2020	08/07/2020	1:20

GROUND WATER | **SAMPLING & IN SITU TESTING** | **STRATA RECORD**

Sheet 1 of 1

Strike	Well	Depth (m)	Depth/Type (m)		Sampler / Recovery	Depth mBGL	Depth mAOD	Key	Description
					200mm hand auger	1	-1.0		TOPSOIL: stiff friable dark grey slightly sandy & gravelly organic CLAY/SILT with flint chert brick limestone.
						2	-2.0		Stiff to very stiff yellow brown / grey variegated becoming increasingly dark grey with depth CLAY. Angular limestone boulder at base.
						3	-3.0		
						4	-4.0		

Remarks / Orientation / Dimensions / Stability

Dry hole. Backfilled with arisings.

AGS

ES ES Sample
● □ Disturbed Sample
W Water Sample
Φ Bulk Sample

WLS Windowless Sampler
WS Window Sampler
▽ Depth to water strike
▼ Standing water depth

Job No. Z0608

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TRIAL PIT RECORD

Trial Pit Number

HA03

Site:	Engineer:	Plant Equipment:
The Spittles, Lyme Regis	WPA Consulting Ltd	Hand auger

Client:	Elevation mAOD:	Easting:	Northing:	Start:	Finish:	Scale:
Dorset County		334541.00	92708.00	08/07/2020	08/07/2020	1:20

GROUND WATER | **SAMPLING & IN SITU TESTING** | **STRATA RECORD**

Sheet 1 of 1

Strike	Well	Depth (m)	Depth/Type (m)		Sampler / Recovery	Depth mBGL	Depth mAOD	Key	Description
									TOPSOIL: stiff friable dark grey slightly sandy & gravelly organic CLAY/SILT with flint chert brick limestone.
									Stiff to very stiff dark yellow brown grey variegated cobbly & gravelly CLAY. Gravel & cobbles are angular chert.
						1	-1.0		Very stiff yellow brown / grey variegated becoming increasingly dark grey with depth CLAY.
					200mm hand auger				
						2	-2.0		
						3	-3.0		
						4	-4.0		

Remarks / Orientation / Dimensions / Stability

Dry hole. Backfilled with arisings.

AGS

ES ES Sample
● □ Disturbed Sample
W Water Sample
Φ Bulk Sample

WLS Windowless Sampler
WS Window Sampler
▽ Depth to water strike
▼ Standing water depth

Job No. Z0608

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Email: enquiries@windowsampling.com
Web: www.windowsampling.com

TRIAL PIT RECORD

Trial Pit Number

HA04

Site:	Engineer:	Plant Equipment:
The Spittles, Lyme Regis	WPA Consulting Ltd	Hand auger

Client:	Elevation mAOD:	Easting:	Northing:	Start:	Finish:	Scale:
Dorset County		334551.00	92685.00	10/07/2020	10/07/2020	1:20

GROUND WATER | **SAMPLING & IN SITU TESTING** | **STRATA RECORD** | Sheet 1 of 1

Strike	Well	Depth (m)	Depth/Type (m)		Sampler / Recovery	Depth mBGL	Depth mAOD	Key	Description
									TOPSOIL: stiff friable dark grey slightly sandy & gravelly organic CLAY/SILT with flint chert brick limestone.
									Stiff yellow brown cobbly very bouldery & gravelly CLAY. Gravel cobbles & boulders are angular chert.
					Hand dug				
									Stiff to very stiff dark yellow brown grey variegated slightly gravelly CLAY. Gravel is angular chert.
						1	-1.0		
					200mm hand auger				
						2	-2.0		
						3	-3.0		
						4	-4.0		

Remarks / Orientation / Dimensions / Stability

Dry hole. Backfilled with arisings.

AGS

ES ES Sample
● □ Disturbed Sample
W Water Sample
Φ Bulk Sample

WLS Windowless Sampler
WS Window Sampler
▽ Depth to water strike
▼ Standing water depth

Job No. Z0608

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Email: enquiries@windowsampling.com
Web: www.windowsampling.com

TRIAL PIT RECORD

Trial Pit Number

HA05

Site:	Engineer:	Plant Equipment:
The Spittles, Lyme Regis	WPA Consulting Ltd	Hand auger

Client:	Elevation mAOD:	Easting:	Northing:	Start:	Finish:	Scale:
Dorset County		334552.00	92656.00	10/07/2020	10/07/2020	1:20

GROUND WATER | **SAMPLING & IN SITU TESTING** | **STRATA RECORD** | Sheet 1 of 1

Strike	Well	Depth (m)	Depth/Type (m)		Sampler / Recovery	Depth mBGL	Depth mAOD	Key	Description
									MADE GROUND: stiff dark grey & dark yellow brown slightly sandy vey gravelly cobbly & bouldery CLAY with predominantly angular chert brick carbonaceous fragments limestone.
					Hand dug				Stiff to very stiff yellow brown & yellow grey variegated slightly gravelly cobbly CLAY. Gravel is angular chert.
						1	-1.0		Stiff to very stiff yellow brown / grey variegated CLAY. Angular limestone boulder at base.
					200mm hand auger				
						2	-2.0		
						3	-3.0		
						4	-4.0		

Remarks / Orientation / Dimensions / Stability

AGS

ES ES Sample
● □ Disturbed Sample
W Water Sample
Φ Bulk Sample

WLS Windowless Sampler
WS Window Sampler
▽ Depth to water strike
▼ Standing water depth

Job No. Z0608

ADVANCED INVESTIGATION SYSTEMS LTD
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Web: www.windowsampling.com

TRIAL PIT RECORD

Trial Pit Number

HA06

Site:	Engineer:	Plant Equipment:
The Spittles, Lyme Regis	WPA Consulting Ltd	Hand auger

Client:	Elevation mAOD:	Easting:	Northing:	Start:	Finish:	Scale:
Dorset County		334559.00	92621.00	10/07/2020	10/07/2020	1:20

GROUND WATER | **SAMPLING & IN SITU TESTING** | **STRATA RECORD**

Sheet 1 of 1

Strike	Well	Depth (m)	Depth/Type (m)		Sampler / Recovery	Depth mBGL	Depth mAOD	Key	Description
									TOPSOIL: stiff friable dark grey slightly sandy & gravelly organic CLAY/SILT with flint chert brick limestone.
									Very stiff yellow brown occasionally mottled light grey CLAY with occasional disseminated calcareous nodules to 5mm.
					Hand dug				
									Stiff to very stiff yellow brown / grey variegated CLAY.
						1	-1.0		
					200mm hand auger				
						2	-2.0		
						3	-3.0		
						4	-4.0		

Remarks / Orientation / Dimensions / Stability

Dry hole. Backfilled with arisings.

AGS

ES ES Sample
● □ Disturbed Sample
W Water Sample
Φ Bulk Sample

WLS Windowless Sampler
WS Window Sampler
▽ Depth to water strike
▼ Standing water depth

Job No. Z0608

Appendix C GAC for Allotments Land Use and Public Open Space (2)

APPENDIX C. GACs for Allotments Land Use

Determinant	LOD	Units	Assessment Criteria
Arsenic	1	mg/kg	49
Boron (water-soluble)	0.2	mg/kg	45
Cadmium	0.2	mg/kg	4.9
Chromium III	1	mg/kg	18000
Chromium VI	1.2	mg/kg	170
Copper	1	mg/kg	520
Lead	1	mg/kg	80
Mercury	0.3	mg/kg	6
Nickel	1	mg/kg	230
Selenium	1	mg/kg	88
Zinc	1	mg/kg	620
Naphthalene	0.05	mg/kg	24
Acenaphthylene	0.05	mg/kg	160
Acenaphthene	0.05	mg/kg	200
Fluorene	0.05	mg/kg	160
Phenanthrene	0.05	mg/kg	90
Anthracene	0.05	mg/kg	2200
Fluoranthene	0.05	mg/kg	290
Pyrene	0.05	mg/kg	620
Benzo(a)Anthracene	0.05	mg/kg	13
Chrysene	0.05	mg/kg	19
Benzo(b)fluoranthene	0.05	mg/kg	3.9
Benzo(k)fluoranthene	0.05	mg/kg	130
Benzo(a)Pyrene	0.05	mg/kg	5.7
Indeno(123-cd)Pyrene	0.05	mg/kg	39
Dibenzo(ah)Anthracene	0.05	mg/kg	0.43
Benzo(ghi)Perylene	0.05	mg/kg	640
Benzene	0.001	mg/kg	0.18
Ethylbenzene	0.001	mg/kg	91
M/P Xylene	0.001	mg/kg	170
O Xylene	0.001	mg/kg	160
Toluene	0.001	mg/kg	120
Methyl tert-Butyl Ether	0.001	mg/kg	
TPH (C5-C6 aliphatic)	0.001	mg/kg	3900
TPH (C6-C8 aliphatic)	0.001	mg/kg	13000
TPH (C8-C10 aliphatic)	0.001	mg/kg	1700

Determinant	LOD	Units	Assessment Criteria
TPH (C10-C12 aliphatic)	1	mg/kg	7300
TPH (C12-C16 aliphatic)	2	mg/kg	13000
TPH (C16-C21 aliphatic)	8	mg/kg	270000
TPH (C21-C35 aliphatic)	8	mg/kg	270000
TPH (C5-C7 aromatic)	0.001	mg/kg	57
TPH (C7-C8 aromatic)	0.001	mg/kg	120
TPH (C8-C10 aromatic)	0.001	mg/kg	51
TPH (C10-C12 aromatic)	1	mg/kg	74
TPH(C12-C16 aromatic)	2	mg/kg	130
TPH(C16-C21 aromatic)	10	mg/kg	260
TPH(C21-C35 aromatic)	10	mg/kg	1600

DEFRA C4SLs, SOM 6%
LQM/CIEH 2014 S4ULs

DEFRA C4SLs, SOM 6%

Substance	Allotments		Public Open Space 2	
Arsenic	49	mg/kg	168	mg/kg
Benzene	0.18	mg/kg	230	mg/kg
Benzo(a)pyrene	5.7	mg/kg	21	mg/kg
Cadmium	4.9	mg/kg	880	mg/kg
Chromium (VI)	170	mg/kg	250	mg/kg
Lead	80	mg/kg	1300	mg/kg

Appendix D Testing Results

Claudia Norman
WPA Environmental
Shears Building
Stone Lane Industrial Estate
Wimborne
Dorset
BH21 1HD

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Analytical Report Number : 20-19823

Replaces Analytical Report Number: 20-19823, issue no. 2

Additional analysis undertaken.

Project / Site name:	Allotments Site, Land next to Pittles Lane, Lyme Regis	**Samples received on:**	16/07/2020
Your job number:		**Samples instructed on/ Analysis started on:**	16/07/2020
Your order number:		**Analysis completed by:**	17/08/2020
Report Issue Number:	2	**Report issued on:**	18/08/2020
Samples Analysed:	24 soil samples		

Signed:

Rachel Bradley
Deputy Quality Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-19823
Project / Site name: Allotments Site, Land next to Pittles Lane, Lyme Regis

Lab Sample Number				1564841	1564842	1564843	1564844	1564845
Sample Reference				WS01	WS01	WS02	WS02	WS03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	2.70	0.20-0.30	0.90-1.00	0.20-0.30
Date Sampled				08/07/2020	08/07/2020	08/07/2020	08/07/2020	08/07/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	13	22	14	18	18
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.2	1.2	1.2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.7	8	7.7	7.9	7.4
Organic Matter	%	0.1	MCERTS	2.6	1	6.4	1.2	5
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	2.4	< 0.05	1.8	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.47	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	5.1	< 0.05	1.4	< 0.05	0.9
Pyrene	mg/kg	0.05	MCERTS	5.1	< 0.05	1.2	< 0.05	0.9
Benzo(a)anthracene	mg/kg	0.05	MCERTS	4	< 0.05	1.1	< 0.05	1.3
Chrysene	mg/kg	0.05	MCERTS	2.5	< 0.05	0.8	< 0.05	0.77
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	5.3	< 0.05	1.2	< 0.05	1.7
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.7	< 0.05	0.65	< 0.05	0.71
Benzo(a)pyrene	mg/kg	0.05	MCERTS	4.1	< 0.05	1.1	< 0.05	1.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.1	< 0.05	0.57	< 0.05	0.57
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.57	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2.6	< 0.05	0.63	< 0.05	0.7
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	35.9	< 0.80	10.4	< 0.80	8.61
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	16	36	12	18
Boron (water soluble)	mg/kg	0.2	MCERTS	1.5	2.6	2	5.2	3.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.8	0.3	1.2	1.2	0.8
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	37	44	44	51	42
Copper (aqua regia extractable)	mg/kg	1	MCERTS	55	52	130	88	64
Lead (aqua regia extractable)	mg/kg	1	MCERTS	170	27	650	19	320
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	1.7	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	41	57	53	61	37
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	3.1	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	160	91	450	160	190
Speciated Mercury (Dry Weight)								
Inorganic Mercury	mg/kg	0.005	NONE	-	-	1.324	-	-

Analytical Report Number: 20-19823
Project / Site name: Allotments Site, Land next to Pittles Lane, Lyme Regis

Lab Sample Number				1564841	1564842	1564843	1564844	1564845
Sample Reference				WS01	WS01	WS02	WS02	WS03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	2.70	0.20-0.30	0.90-1.00	0.20-0.30
Date Sampled				08/07/2020	08/07/2020	08/07/2020	08/07/2020	08/07/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Organo-Mercury Species (including Methyl Hg)	mg/kg	0.005	NONE	-	-	0.008	-	-
Elemental Mercury	mg/kg	0.005	NONE	-	-	0.458	-	-
Speciated Mercury (Dry Weight)								
F1 - Water soluble	mg/kg	0.005	NONE	-	-	0.024	-	-
F2 - Weak acid	mg/kg	0.005	NONE	-	-	< 0.005	-	-
F3 - Organo- complexed	mg/kg	0.005	NONE	-	-	0.008	-	-
F4 - Strongly complexed	mg/kg	0.005	NONE	-	-	0.458	-	-
F5 - Mineral bound	mg/kg	0.005	NONE	-	-	1.297	-	-
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	5.3	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	38	< 10	17	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	90	< 10	34	< 10	27
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	130	< 10	51	< 10	37

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 20-19823
Project / Site name: Allotments Site, Land next to Pittles Lane, Lyme Regis

Lab Sample Number				1564846	1564847	1564848	1564849	1564850
Sample Reference				WS03	WS04	WS04	WS05	WS05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.80-1.20	0.20-0.40	1.50-1.70	0.20-0.30	1.40-1.70
Date Sampled				08/07/2020	10/07/2020	10/07/2020	10/07/2020	10/07/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	9.5	14	16	11	15
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.2	1.2	1.2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.9	7.6	7.9	7.5	7.7
Organic Matter	%	0.1	MCERTS	0.2	3.7	1.8	3.1	3.3
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	3.2	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.59	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	5.5	< 0.05	< 0.05	0.37
Pyrene	mg/kg	0.05	MCERTS	< 0.05	5.2	< 0.05	< 0.05	0.35
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	3.3	< 0.05	< 0.05	0.25
Chrysene	mg/kg	0.05	MCERTS	< 0.05	2.6	< 0.05	< 0.05	0.25
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	3.1	< 0.05	< 0.05	0.25
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.6	< 0.05	< 0.05	0.17
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	2.9	< 0.05	< 0.05	0.22
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	1.3	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.38	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	1.5	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	31.2	< 0.80	< 0.80	1.86
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	10	14	14	21	16
Boron (water soluble)	mg/kg	0.2	MCERTS	1.3	1	1.1	2	0.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.8	0.7	0.9	0.9
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	34	30	39	37	34
Copper (aqua regia extractable)	mg/kg	1	MCERTS	13	37	42	39	53
Lead (aqua regia extractable)	mg/kg	1	MCERTS	15	250	72	110	130
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.5	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19	25	35	40	38
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	2.8	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	42	310	110	130	210
Speciated Mercury (Dry Weight)								
Inorganic Mercury	mg/kg	0.005	NONE	-	-	-	-	-

Analytical Report Number: 20-19823
Project / Site name: Allotments Site, Land next to Pittles Lane, Lyme Regis

Lab Sample Number				1564846	1564847	1564848	1564849	1564850
Sample Reference				WS03	WS04	WS04	WS05	WS05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.80-1.20	0.20-0.40	1.50-1.70	0.20-0.30	1.40-1.70
Date Sampled				08/07/2020	10/07/2020	10/07/2020	10/07/2020	10/07/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Organo-Mercury Species (including Methyl Hg)	mg/kg	0.005	NONE	-	-	-	-	-
Elemental Mercury	mg/kg	0.005	NONE	-	-	-	-	-
Speciated Mercury (Dry Weight)								
F1 - Water soluble	mg/kg	0.005	NONE	-	-	-	-	-
F2 - Weak acid	mg/kg	0.005	NONE	-	-	-	-	-
F3 - Organo- complexed	mg/kg	0.005	NONE	-	-	-	-	-
F4 - Strongly complexed	mg/kg	0.005	NONE	-	-	-	-	-
F5 - Mineral bound	mg/kg	0.005	NONE	-	-	-	-	-
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	20	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	29	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	49	< 10	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 20-19823
Project / Site name: Allotments Site, Land next to Pittles Lane, Lyme Regis

Lab Sample Number				1564851	1564852	1564853	1564854	1564855
Sample Reference				WS06	WS06	HA01	HA01	HA02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	1.00	0.10-0.20	0.70-0.80	0.30
Date Sampled				10/07/2020	10/07/2020	08/07/2020	08/07/2020	08/07/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	13	16	19	17	14
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.2	1.2	1.2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	Chrysotile	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	< 0.001	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	< 0.001	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.7	7.7	7.5	8	7.3
Organic Matter	%	0.1	MCERTS	2	3.3	4.3	1	3.8
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.62	0.94	0.83	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	0.63	0.79	0.75	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.46	0.62	0.55	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.34	0.48	0.74	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.53	0.57	0.81	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.35	0.37	0.5	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.51	0.48	0.64	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.3	0.25	0.4	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.37	0.32	0.49	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	4.11	4.82	5.71	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	19	22	9.8	10
Boron (water soluble)	mg/kg	0.2	MCERTS	1	2.5	0.9	2.4	2.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.1	1.3	1.3	0.5	0.6
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	33	49	48	43	33
Copper (aqua regia extractable)	mg/kg	1	MCERTS	32	73	85	42	38
Lead (aqua regia extractable)	mg/kg	1	MCERTS	89	240	270	16	120
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	0.4
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	41	60	55	42	23
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	3.5	3.2	3.7	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	170	320	360	64	160
Speciated Mercury (Dry Weight)								
Inorganic Mercury	mg/kg	0.005	NONE	-	-	-	-	-

Analytical Report Number: 20-19823
Project / Site name: Allotments Site, Land next to Pittles Lane, Lyme Regis

Lab Sample Number				1564851	1564852	1564853	1564854	1564855
Sample Reference				WS06	WS06	HA01	HA01	HA02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	1.00	0.10-0.20	0.70-0.80	0.30
Date Sampled				10/07/2020	10/07/2020	08/07/2020	08/07/2020	08/07/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Organo-Mercury Species (including Methyl Hg)	mg/kg	0.005	NONE	-	-	-	-	-
Elemental Mercury	mg/kg	0.005	NONE	-	-	-	-	-
Speciated Mercury (Dry Weight)								
F1 - Water soluble	mg/kg	0.005	NONE	-	-	-	-	-
F2 - Weak acid	mg/kg	0.005	NONE	-	-	-	-	-
F3 - Organo- complexed	mg/kg	0.005	NONE	-	-	-	-	-
F4 - Strongly complexed	mg/kg	0.005	NONE	-	-	-	-	-
F5 - Mineral bound	mg/kg	0.005	NONE	-	-	-	-	-
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	12	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	28	30	19	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	35	37	32	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 20-19823
Project / Site name: Allotments Site, Land next to Pittles Lane, Lyme Regis

Lab Sample Number				1564856	1564857	1564858	1564859	1564860
Sample Reference				HA02	HA03	HA03	HA04	HA04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.80	0.20	0.70	0.20	0.80
Date Sampled				08/07/2020	08/07/2020	08/07/2020	10/07/2020	10/07/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	19	16	16	14	15
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.2	1.2	1.2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8	7.7	8	7.2	7.8
Organic Matter	%	0.1	MCERTS	2.4	3.6	1	6.1	0.5
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.1	13	8.7	17	12
Boron (water soluble)	mg/kg	0.2	MCERTS	2.4	0.9	2.6	5.7	2.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.8	0.6	0.3	0.9	0.5
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	46	46	41	43	56
Copper (aqua regia extractable)	mg/kg	1	MCERTS	44	41	34	78	36
Lead (aqua regia extractable)	mg/kg	1	MCERTS	16	100	19	200	26
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	0.7	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	42	41	43	33	62
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	76	130	78	270	100
Speciated Mercury (Dry Weight)								
Inorganic Mercury	mg/kg	0.005	NONE	-	-	-	-	-

Analytical Report Number: 20-19823
Project / Site name: Allotments Site, Land next to Pittles Lane, Lyme Regis

Lab Sample Number				1564856	1564857	1564858	1564859	1564860
Sample Reference				HA02	HA03	HA03	HA04	HA04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.80	0.20	0.70	0.20	0.80
Date Sampled				08/07/2020	08/07/2020	08/07/2020	10/07/2020	10/07/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Organo-Mercury Species (including Methyl Hg)	mg/kg	0.005	NONE	-	-	-	-	-
Elemental Mercury	mg/kg	0.005	NONE	-	-	-	-	-
Speciated Mercury (Dry Weight)								
F1 - Water soluble	mg/kg	0.005	NONE	-	-	-	-	-
F2 - Weak acid	mg/kg	0.005	NONE	-	-	-	-	-
F3 - Organo- complexed	mg/kg	0.005	NONE	-	-	-	-	-
F4 - Strongly complexed	mg/kg	0.005	NONE	-	-	-	-	-
F5 - Mineral bound	mg/kg	0.005	NONE	-	-	-	-	-
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	1.3	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	11	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	21	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 20-19823
Project / Site name: Allotments Site, Land next to Pittles Lane, Lyme Regis

Lab Sample Number				1564861	1564862	1564863	1564864
Sample Reference				HA05	HA05	HA06	HA06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-0.30	0.80	0.20	0.80
Date Sampled				10/07/2020	10/07/2020	10/07/2020	10/07/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	14	15	11	15
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.1	1.2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-
General Inorganics							
pH - Automated	pH Units	N/A	MCERTS	7.6	7.9	7	7.9
Organic Matter	%	0.1	MCERTS	5	0.5	5.9	1
Total Phenols							
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	2.9	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.41	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	1	< 0.05	1.8	< 0.05
Pyrene	mg/kg	0.05	MCERTS	0.99	< 0.05	1.5	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.55	< 0.05	0.75	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.55	< 0.05	0.96	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.68	< 0.05	1.1	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.42	< 0.05	0.36	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.6	< 0.05	0.63	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.24	< 0.05	0.29	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.33	< 0.05	0.41	< 0.05
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	5.39	< 0.80	10.9	< 0.80
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	17	12	16	12
Boron (water soluble)	mg/kg	0.2	MCERTS	2.7	1.7	3.6	2.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.1	0.2	1.5	1.8
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	42	60	47	53
Copper (aqua regia extractable)	mg/kg	1	MCERTS	53	31	69	74
Lead (aqua regia extractable)	mg/kg	1	MCERTS	460	27	180	22
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	33	43	46	100
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	520	83	430	120
Speciated Mercury (Dry Weight)							
Inorganic Mercury	mg/kg	0.005	NONE	-	-	-	-

Analytical Report Number: 20-19823
Project / Site name: Allotments Site, Land next to Pittles Lane, Lyme Regis

Lab Sample Number				1564861	1564862	1564863	1564864
Sample Reference				HA05	HA05	HA06	HA06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-0.30	0.80	0.20	0.80
Date Sampled				10/07/2020	10/07/2020	10/07/2020	10/07/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Organo-Mercury Species (including Methyl Hg)	mg/kg	0.005	NONE	-	-	-	-
Elemental Mercury	mg/kg	0.005	NONE	-	-	-	-
Speciated Mercury (Dry Weight)							
F1 - Water soluble	mg/kg	0.005	NONE	-	-	-	-
F2 - Weak acid	mg/kg	0.005	NONE	-	-	-	-
F3 - Organo- complexed	mg/kg	0.005	NONE	-	-	-	-
F4 - Strongly complexed	mg/kg	0.005	NONE	-	-	-	-
F5 - Mineral bound	mg/kg	0.005	NONE	-	-	-	-
Monoaromatics & Oxygenates							
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons							
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	1.9
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	20
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	22
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	52
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	13	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	22	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: **20-19823**
Project / Site name: **Allotments Site, Land next to Pittles Lane, Lyme Regis**
Your Order No:

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1564853	HA01	0.10-0.20	118	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Analytical Report Number : 20-19823
Project / Site name: Allotments Site, Land next to Pittles Lane, Lyme Regis

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1564841	WS01	None Supplied	0.3	Brown loam and clay with gravel.
1564842	WS01	None Supplied	2.7	Brown loam and clay with gravel.
1564843	WS02	None Supplied	0.20-0.30	Brown loam and clay with gravel and vegetation.
1564844	WS02	None Supplied	0.90-1.00	Brown loam and clay with gravel and vegetation.
1564845	WS03	None Supplied	0.20-0.30	Brown loam and clay with gravel and vegetation.
1564846	WS03	None Supplied	0.80-1.20	Brown loam and clay with gravel and vegetation.
1564847	WS04	None Supplied	0.20-0.40	Brown loam and clay with gravel and vegetation.
1564848	WS04	None Supplied	1.50-1.70	Brown loam and clay with gravel and vegetation.
1564849	WS05	None Supplied	0.20-0.30	Brown loam and clay with gravel and vegetation.
1564850	WS05	None Supplied	1.40-1.70	Brown loam and clay with gravel.
1564851	WS06	None Supplied	0.3	Brown loam and clay with gravel and vegetation.
1564852	WS06	None Supplied	1	Brown loam and clay with gravel.
1564853	HA01	None Supplied	0.10-0.20	Brown loam and clay with gravel and vegetation.
1564854	HA01	None Supplied	0.70-0.80	Brown loam and clay with gravel and vegetation.
1564855	HA02	None Supplied	0.3	Brown loam and clay with gravel and vegetation.
1564856	HA02	None Supplied	0.8	Brown loam and clay with gravel and vegetation.
1564857	HA03	None Supplied	0.2	Brown loam and clay with gravel and vegetation.
1564858	HA03	None Supplied	0.7	Brown loam and clay with gravel and vegetation.
1564859	HA04	None Supplied	0.2	Brown loam and clay with gravel and vegetation.
1564860	HA04	None Supplied	0.8	Brown loam and clay with gravel.
1564861	HA05	None Supplied	0.20-0.30	Brown loam and clay with gravel and vegetation.
1564862	HA05	None Supplied	0.8	Brown loam and clay with gravel.
1564863	HA06	None Supplied	0.2	Brown loam and clay with gravel and vegetation.
1564864	HA06	None Supplied	0.8	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 20-19823
Project / Site name: Allotments Site, Land next to Pittles Lane, Lyme Regis

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Speciated Mercury in soil by Millennium Merlin Ana	Determination of Speciated Mercury in soil by Millennium Merlin Analyzer	In-house method	L085-PL	Dry	NONE
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Appendix E Ground Gas Monitoring Results

ADVANCED INVESTIGATION SYSTEMS LIMITED

Web: www.windowsampling.com

Borehole Gas Monitoring Results

Procedure Ref: CIRIA C665 (2007); NHBC Guidance on Methane & Carbon Dioxide, Report No. 04, (March 2007); Ground Gas Handbook, Wilson, Card & Haines (2009)

Project:	The Spittles, Lyme Regis
Client:	Dorset Council
Engineer:	WPA Consulting Ltd

Job Number:	Z0608
Date	14 August 2020
Pressure (Rising / Falling / Level)	Falling

Gas Monitor:	GA2000+ Infrared Gas Analyser & Flow Pod
Calibrated:	04 September 2019

Serial Number:	GA10030
Certificate Number:	10030-440912

Photoionisation Detector:	Phocheck 1000+
Calibrated:	16 December 2019

Serial Number:	07-01478
Certificate Number:	105639

Borehole		Background	BH01	BH02	BH03				
Flow Rate (l/hr)		-	0.0	0.0	0.0				
Barometric Pressure (mbar)		1007	1007	1007	1007				
Methane- CH4 (%)	Peak	0.0	0.0	0.0	0.0				
	Steady State	0.0	0.0	0.0	0.0				
Carbon Dioxide - CO2 (%)	Peak	0.0	0.2	2.4	2.3				
	Steady State	0.0	0.2	2.4	2.3				
Oxygen - O2 (%)	Peak (low)	19.9	19.3	17.9	17.8				
	Steady State	19.9	19.3	17.9	17.8				
Balance Gases (%)		80.1	80.5	79.7	79.9				
Carbon Monoxide - CO (ppm)		0	0	0	0				
Hyd. Sulphide - H2S (ppm)		0	0	0	0				
PID VOC (ppm)		0.0	0.2	0.1	0.0				
Water Level (mBGL)		-	2.62	2.97	2.68				

Weather / Temperature °C / Comments:	Cloudy with scattered showers / 22

ADVANCED INVESTIGATION SYSTEMS LIMITED

Web: www.windowsampling.com

Borehole Gas Monitoring Results

Procedure Ref: CIRIA C665 (2007); NHBC Guidance on Methane & Carbon Dioxide, Report No. 04, (March 2007); Ground Gas Handbook, Wilson, Card & Haines (2009)

Project:	The Spittles, Lyme Regis
Client:	Dorset Council
Engineer:	WPA Consulting Ltd

Job Number:	Z0608
Date	10 September 2020
Pressure (Rising / Falling / Level)	Falling

Gas Monitor:	GA2000+ Infrared Gas Analyser & Flow Pod
Calibrated:	04 September 2019

Serial Number:	GA10030
Certificate Number:	10030-440912

Photoionisation Detector:	Phocheck 1000+
Calibrated:	16 December 2019

Serial Number:	07-01478
Certificate Number:	105639

Borehole		Background	BH01	BH02	BH03				
Flow Rate (l/hr)		-	0.0	0.0	0.0				
Barometric Pressure (mbar)		1016	1016	1016	1016				
Methane- CH4 (%)	Peak	0.0	0.0	0.0	0.0				
	Steady State	0.0	0.0	0.0	0.0				
Carbon Dioxide - CO2 (%)	Peak	0.0	0.2	2.2	2.5				
	Steady State	0.0	0.2	2.2	2.5				
Oxygen - O2 (%)	Peak (low)	20.0	19.8	18.3	18.1				
	Steady State	20.0	19.8	18.3	18.1				
Balance Gases (%)		80.0	80.0	79.5	79.4				
Carbon Monoxide - CO (ppm)		0	0	0	0				
Hyd. Sulphide - H2S (ppm)		0	0	0	0				
PID VOC (ppm)		0.0	0.0	0.0	0.0				
Water Level (mBGL)		-	2.48	Dry	2.79				

Weather / Temperature °C / Comments:	Cloudy / 18

ADVANCED INVESTIGATION SYSTEMS LIMITED

Web: www.windowsampling.com

Borehole Gas Monitoring Results

Procedure Ref: CIRIA C665 (2007); NHBC Guidance on Methane & Carbon Dioxide, Report No. 04, (March 2007); Ground Gas Handbook, Wilson, Card & Haines (2009)

Project:	The Spittles, Lyme Regis
Client:	Dorset Council
Engineer:	WPA Consulting Ltd

Job Number:	Z0608
Date	25 September 2020
Pressure (Rising / Falling / Level)	Level

Gas Monitor:	GA2000+ Infrared Gas Analyser & Flow Pod
Calibrated:	04 September 2019

Serial Number:	GA10030
Certificate Number:	10030-440912

Photoionisation Detector:	Phocheck 1000+
Calibrated:	16 December 2019

Serial Number:	07-01478
Certificate Number:	105639

Borehole		Background	BH01	BH02	BH03				
Flow Rate (l/hr)		-	0.0	0.0	0.0				
Barometric Pressure (mbar)		999	999	999	999				
Methane- CH4 (%)	Peak	0.0	0.0	0.0	0.0				
	Steady State	0.0	0.0	0.0	0.0				
Carbon Dioxide - CO2 (%)	Peak	0.0	0.1	3.0	3.4				
	Steady State	0.0	0.1	3.0	3.4				
Oxygen - O2 (%)	Peak (low)	20.2	20.1	17.8	17.7				
	Steady State	20.2	20.1	17.8	17.7				
Balance Gases (%)		79.8	79.8	79.2	78.9				
Carbon Monoxide - CO (ppm)		0	0	0	0				
Hyd. Sulphide - H2S (ppm)		0	0	0	0				
PID VOC (ppm)		0.0	0.0	0.0	0.0				
Water Level (mBGL)		-	2.36	Dry	2.59				

Weather / Temperature °C / Comments:	Overcast / 14