



INVESTIGATE



REMEDiate



REGENERATE



REMEDIATION STRATEGY REPORT

FOR
FORMER CALLBOY PUBLIC HOUSE,
HARMER STREET,
GRAVESEND,
KENT,
DA12 2AX

PREPARED FOR
SONY DEVELOPMENTS LIMITED

REPORT NO. SE1540C
JUNE 2024

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**REMEDIAL STRATEGY REPORT FOR FORMER CALLBOY PUBLIC HOUSE,
HARMER STREET, GREAVESEND, KENT, DA12 2AX**

CLIENT: SONY DEVELOPMENTS LIMITED

ARCHITECTS: BBD ARCHITECTURE

1. INTRODUCTION

This report has been prepared in accordance with an email dated 30th April 2020, from the Client.

The brief was set out in our estimate, ref. ESE2374A and dated 26th February 2020, with amendments as the investigation proceeded and includes:

We have previously issued reports for the site, as follows:

- Phase I: Walkover Survey and Desk Study Report, ref. SE1540 and dated February 2020
- Phase II: Ground Investigation Report, ref. SE1540A and dated July 2020
- Phase II: Ground Gas Update Report, ref. SE1540B and dated May 2024

The above reports should be read in conjunction with this report and summaries are given in Section 2.2 below.

This Phase III Remediation Strategy Report has been prepared in general accordance with the Environment Agency's Land Contamination Risk Management (LCRM) guidance (October 2020, updated July 2023) and also meets the criteria for a Remediation Statement, as defined in Section 78H of Part 2A of the Environmental Protection Act 1990.

1.1 Site Location and Description

The site is located at the Former Callboy Public House, Harmer Street, as indicated on Figure 1. The approximate National Grid Reference of the centre of the site is E565097, N174258.

As shown on Figures 1 & 2, the rectangular shaped about 0.06 hectare site is bounded to the north by the rear garden areas of dwellings situated on Harmer Street and The Terrace, to east is rear gardens situated on East Terrace, to the south is East Crescent Road, to the west is Harmer Street.

1.2 Proposed Development

We understand that it is proposed to convert the existing Former Public House into a residential dwelling comprising flats and construct a two storey detached mews block comprising three houses to the rear with associated garden areas, as shown on Figure 2. It should be noted that the proposed landscaping arrangement has been amended since the time of our original Phase II report (Ref. SE1540A), an updated plan is given on Figure 3.

SE1540C Former Callboy Public House

1.3 Contact Details of Involved Parties

The contact details for the developer are as follows:

Sony Developments Limited
9 Norville Terrace
Headingley Lane
Leeds
LS6 1BS

2. SITE ASSESSMENT

2.1 Current Status

The proposed buildings have been constructed and the site is in the final stages of development.

2.2 Summary of Previous Reports

2.2.1 Phase I

A Phase I Walkover Survey and Desk Study Report, ref. SE1540 was undertaken by Sub Surface South East Limited in February 2020.

At the time of the Phase I investigation the site comprised of a two storey building and basement with a garden area to the rear. The site was surfaced with a combination of concrete hardstanding and grass areas to the rear of the building. The boundary of the site was fenced with high stone and brick walls to the rear.

The interior of the building had been completely stripped leaving just wood flooring and occasional wiring. The basement contained a rectangular basin sunk into the concrete hardstanding with some old cabling along the walls.

The rear garden was partly surfaced with concrete hardstanding, however the surface was not entirely visible as overgrown grass and shrubs were present. A lot of general waste piles were observed comprising of plastics, wood, a couple of old mattress's and other old furniture with some segregated old general appliances.

No visual or olfactory contamination was noted during the walkover survey.

The historical appraisal found that prior to 1866 the site was developed with a Literary Institute building. In 1897 the site was shown as the Grand Theatre. The Grand Theatre burnt down prior to 1953 and was replaced with The Grand Public House. In 1964 the Grand Public House was renamed The Callboy Public House.

In the wider area prior to 1866 the River Thames, Royal Terrace Pier and a garden area were shown to the north, New Tavern Fort was shown to the east and the surrounding area was mostly developed with residential dwellings. In 1909 the gardens to the north were replaced with dwellings. A Lead Oxide Works was shown to the north in 1953. The Lead Oxide Works prior to 1980 was no longer shown and a car park was then shown to the south east.

The Phase I report also included an appraisal of the geological and environmental setting of the site, the findings of which have been incorporated into Section 2.3 below.

The conceptual ground model indicated that an intrusive ground investigation was required to assess the ground conditions and to obtain soil samples for contamination analysis and asbestos detection and, where possible, groundwater and surface water samples for contamination analysis.

The Phase I report also recommended that if a significant depth of made ground was encountered, gas monitoring should be undertaken as part of the ground investigation.

2.2.2 Phase II

The Phase II ground investigation was undertaken in May 2020 and comprised:

- 3 No. cable percussive boreholes
- Insitu testing
- Geotechnical laboratory testing
- Contamination analyses
- Installation of standpipes followed by groundwater and ground gas monitoring

The boreholes found granular made ground in all three boreholes to depths of between 1.90m and 2.20m, directly underlain by structureless chalk composed of mainly off white and occasional brownish yellow slightly gravelly slightly sandy silt with localised flint gravel., or slightly sandy gravel and cobbles (interbedded grades Dm and Dc). The chalk clasts were predominantly extremely weak or weak, low density and off white.

No groundwater was encountered in the exploratory holes although it should be noted that they were only left open for a short period of time and groundwater levels and rates of inflow and may be subject to seasonal and/ or climatic variations.

Monitoring of standpipes installed in the boreholes were found to be dry during all of the monitoring visits.

Three soil samples were analysed for a suite of determinands. The contamination analyses determined an elevated concentration of benzo(a)pyrene in the sample taken from BH2 (12mg/kg) and elevated levels of lead in all three boreholes (1500mg/kg in BH1, 1200mg/kg in BH2, 920mg/kg in BH3) when compared with the C4SLs for a residential with homegrown produce end use (5mg/kg and 200mg/kg respectively).

The report recommended that where the contaminated materials are covered by buildings or a hard surface cover of concrete or bituminous macadam no clean cover will be required. However, in gardens and other open space areas it was recommended that the end users should be protected from the contaminated materials and plants should be provided with a medium in which they can safely grow.

It was proposed that a 600mm blanket of clean topsoil/ subsoil (equivalent to two spade depths) should be provided in back gardens and a 450mm blanket of imported clean topsoil/ subsoil should be provided in front and side gardens and other open spaces. In addition, it was recommended that deeper rooted bushes and trees should be pit planted on and in clean topsoil.

To assess the potential risk to controlled waters, three samples of made ground were subjected to leachate analyses. The analyses found elevated concentrations of metals when compared to the EQS, UK DWS and/ or WHO.

However, given the exceedances were relatively low, and given the depth to the groundwater table, the cohesive nature of the near surface weathered chalk, the distance to the nearest surface water (River Thames 160m to the north) and the distance to the nearest potable water abstraction (976m to the south), the report concluded that the risks are very low and no precautions or remedial measures were required in respect of groundwater contamination.

Ground gas monitoring was undertaken on six occasions. No elevated levels of methane or carbon dioxide, and no gas flows were recorded. However, a single depleted level of associated oxygen was recorded in BH3a (0.5m to 2.0m response zone) during the third monitoring visit.

The levels of gas were assessed in accordance with British Standard 8485, "Code of practice for the design of protective measures for methane and carbon dioxide gasses for new buildings", published in June 2015 (BS.8485:2015).

The characteristic hazardous gas flow rate (Q_{hgs}) was determined to be 0.0011 l/hr, indicating that the site falls into Characteristic Situation CS1 (very low).

The report advised that for the type of development proposed no remedial measures in relation to ground gas are required.

2.3 Environmental Setting

2.3.1 Topography

The area of investigation and the immediate surroundings are relatively flat. The topography of the wider area slopes gently down to the River Thames to the north.

2.3.2 Potentially Contaminative Land Use

Within 250m of the site there are no significant potential contaminative industrial land uses.

Historically the site was occupied by a public house and prior that was occupied by a theatre. No other historical potentially contaminative industrial or commercial activity was recorded within the immediate vicinity of the site.

2.3.3 Geology & Aquifer Designation

No superficial deposits are recorded by the BGS in the area of the site.

The bedrock beneath the site is anticipated to comprise Seaford Chalk Formation, and has been designated as a Principal Aquifer.

2.3.4 Abstractions

According to data provided by the Environment Agency and included in the Phase I report there are no surface water abstraction licences, six groundwater abstraction licences and one potable water abstraction licences within 2000 metres of the site boundary, the nearest being 976 metres south.

There are no Source Protection Zones, set up to protect a water source within 500 metres of the site of boundary, present according to the environmental data report.

2.3.5 Surface Water

The nearest sensitive surface watercourse to the site is the River Thames some 160m to the north.

2.4 **Source Pathway Receptor Linkages**

Potential sources of contamination identified in the desk study and confirmed by the Phase II investigation are:

2.4.1 Sources

Potential sources of contamination identified in the desk study and confirmed by the Phase II investigation are:

- General contaminants including asbestos from any made ground on site due to past on site and surrounding developments and general waste piles. The contaminants of concern are lead and localised benzo(a)pyrene.

2.4.2 Pathways

Potential pathways between sources and receptors for the proposed development are:

- Direct contact with and ingestion of contaminated soil
- Inhalation of dust
- Environmental deposition of airborne pollutants
- Consumption of contaminated fruit and vegetables

2.4.3 Receptors

Potential receptors for the proposed development are:

Construction Phase

- Site workers during any demolition and construction phases
- Adjacent properties and local residents

Post Development Phase

- The residents who will be the end users of the site
- Adjacent properties and local residents

2.4.4 Potential Pollutant Linkages

Construction Phase

- Direct contact with and ingestion of contaminated soil and inhalation of dust by site workers during construction
- Inhalation by local residents of dust generated during construction.

Post Development Phase

- Inhalation by local residents of airborne dust arising from exposed soil in any soft landscaping
- Direct contact with and ingestion of contaminated soil and inhalation of dust arising from exposed soil in any soft landscaping by the residents who will be the end users of the site.
- Consumption of homegrown produce grown in any soft landscaping by the residents who will be the end users of the site.

2.5 Updated Conceptual Ground Model

The conceptual ground model of a site has been updated with regards to contamination sources, pathways and receptors, following the ground investigation, as follows:

TABLE 1 CONCEPTUAL GROUND MODEL

Potential Source	Contaminants Associated with the Source	Pathway	Receptor	Mitigation Action
Contaminants in Made Ground derived from past building and demolition.	Lead Benzo(a)pyrene	Ingestion of soil Ingestion of dust Ingestion of contaminated vegetable produce Dermal contact Inhalation of dust	Site Operatives	Limit contact with soil by wearing adequate clothing and PPE.
			Nearby Residents	Stockpiles to be sheeted over in dry weather to reduce airborne dust.
			End Users	Topsoil cover system.

3. OPTIONS APPRAISAL

After careful consideration of the risks and benefits, timeframes, costs and sustainability of the available remedial options the Client has decided to adopt the following remedial measures:

- Topsoil Cover System

4. SOIL CONTAMINATION REMEDIATION & VERIFICATION STRATEGY

4.1 Remediation Objectives

Elevated concentrations of lead and localised benzo(a)pyrene have been determined in the made ground and remedial measures are therefore required to break the source-receptor pathways where the impacted soil is not covered by buildings or permanent hard surfacing.

The aims of the remediation strategy are:

- To provide a remediated site that is safe and suitable for the proposed end use (residential housing).
- To ensure the remediation is undertaken in a sustainable manner in compliance with current guidelines and with a suitably robust verification plan.
- To satisfy the requirements of the Local Planning Authority (Gravesham Borough Council)

4.2 Preparatory Works

Preparations for remedial works need to address issues of health and safety, pollution and nuisance in relation to site operatives, visitors to the site and associated plant, surrounding residents and the general public who may be affected by on-site works.

The site area should be made secure to prevent unauthorised access during site remediation works when contaminated materials are to be exposed. Access to site should be regulated by the site manager with records kept of on-site personnel and visitors, lorry movements, materials imported and exported from the site etc. This information should be made available for the Phase IV Validation Report.

4.3 Soil Contamination Remediation: Topsoil Cover System

4.3.1 Cover System Methodology

In order to break the pathway from the contaminated soils (source) to the end users of the development (receptors) the following measures are to be adopted:

- A 600mm capping layer of clean topsoil or topsoil and subsoil will be placed in all soft landscaping.
- Deeper rooted bushes and trees should be pit planted on and in clean topsoil/subsoil.

The above depths have been determined on the basis that in the landscaped areas the soil is unlikely to be dug to a depth greater than two spade depths (approximately 600mm). The proposed depth also allow for some degree of bioturbation, which normally occurs in the upper 300mm (according to BRE Report BR465 'Cover Systems for Land Regeneration').

It should be noted that the only soft landscaping is to the rear of the property. The front is hard paved with the only vegetation being in raised planters.

4.3.2 Verification Plan

An appropriately qualified and experienced person should have a "watching brief" during the remediation and the observations of this person should be made available for the Phase IV Validation Report.

In order to demonstrate that the imported material used in the cover system is suitable for the intended use chemical analyses should be undertaken. The analyses should be carried out after materials have been imported to site, though it would be advisable to undertake some screening prior to import in order to reduce the risk of the imported material being rejected.

A number of soil samples should be tested for a range of common contaminants and include hydrocarbons and asbestos and the testing should be carried out at an MCERTS and UKAS accredited laboratory. The testing results should be assessed against up to date generic assessment criteria for a residential development without plant uptake.

The sampling frequency should be set as a minimum of three samples or one per 100m³ (whichever is greater).

The testing suite should include the following contaminants as a minimum:

Arsenic	Nickel
Asbestos	pH
Boron	Phenols
Cadmium	Polynuclear Aromatic Hydrocarbons (16 EPA PAH)
Chromium	Selenium
Copper	Sulphide
Cyanide	Sulphate
Lead	Total Petroleum Hydrocarbons (3-BAND SPECIATION)
Mercury	Zinc

An appropriately qualified and experienced person should assess the results of the contamination analysis which should be compared with up to date UK based generic assessment criteria (GACs) for a residential with homegrown produce end use, to determine whether it is suitable for use in the cover system.

We recommended that the imported clean material is stockpiled and protected/covered until the analyses is received and assessed.

Transfer documentation for each load of imported clean topsoil/ subsoil should be made available for the Phase IV Validation Report.

The site will be visited by a suitably qualified person to inspect the cover system. The thickness of clean cover system will be checked either by comparison of before and after topographical surveys or by taking out an appropriate number of hand dug trial pits. A photographic record will be made during placement of the cover system or during the trial pitting. The above information will form part of the Phase IV Verification Report.

5. RISKS TO SITE OPERATIVES

Measures need to be put in place to prevent site operatives coming into direct contact with contaminated materials either by skin contact or by breathing in dust due to the elevated concentrations of lead and localised benzo(a)pyrene.

Site personnel involved in earthworks and excavations should be made aware of the hazards of working with contaminated materials found on site. Strict personal hygiene should be observed and appropriate personal protective equipment (PPE) should be worn. Washing and messing facilities should be made available on site and smoking should be prohibited.

6. ENVIRONMENTAL MITIGATION MEASURES & WASTE MANAGEMENT

6.1 Earthworks

Earthworks undertaken during dry weather might generate dust and in this instance dust should be damped down and dust masks made available to site operatives. In addition stockpiled materials should be sheeted over to prevent excessive airborne dust being formed which could potentially migrate off site.

If groundwater is to be pumped out of excavations, then contamination analyses should be undertaken for groundwater to be disposed of, and the results submitted to the appropriate authority or a waste disposal operator to determine the most cost effective method of disposal. Groundwater should not be discharged to a sewer without firstly obtaining a discharge consent from the appropriate authority.

6.2 Controlled Waters

Our Phase II ground investigation report concluded that given the relatively low concentrations of leachable potential contaminants, the presence of relatively low permeability strata beneath the site, and the distance to the nearest sensitive watercourse (River Thames 160m to the north), the risks to controlled waters including groundwater were determined to be very low.

The proposed remedial measures will not significantly alter the groundwater regime on site and in our opinion the risks to controlled waters do not warrant any further consideration.

6.3 Waste Soil Management

If it is necessary to reduce levels to accommodate the proposed remediation scheme, then classification of the waste soil arisings should be undertaken prior to removing it to a licensed waste disposal or treatment facility.

All vehicles carrying contaminated material should be securely sheeted and the wheels and undercarriages cleaned before leaving site to ensure that hazardous materials are not dropped onto public roads.

Transfer documentation for each load of contaminated material exported from the site will be obtained and made available for the Phase IV Validation Report.

7. CAVEATS, ASSUMPTIONS AND CONTINGENCY PLAN

It should be appreciated that only a small proportion of the area to be developed has been sampled and consequently the recommendations made and opinions expressed in our reports can only be applied to such conditions as were encountered in the exploratory holes.

The exploratory holes taken out during the Phase II investigation indicate a nature and degree of similarity to the extent that we consider them likely to be representative of the natural ground conditions. However, no guarantee can be given. For the purposes of this remediation strategy it is assumed that the findings of the Phase I and Phase II investigations are representative of the site conditions, however with any site it is possible that unrecorded potentially contaminative activities may have taken place, or that zones of contamination exist which have not been encountered by the intrusive investigation.

We recommend that a contingency plan is put in place to deal with unforeseen contaminated ground being found. In this regard a “watching brief” should be employed during earthworks and the following procedure followed if unforeseen ground conditions are encountered:

- Cease earthworks.
- Liaise with the Client and/ or Regulator.
- Agree revised course of action with the Client and/ or Regulator.
- Revise Remediation Statement, if necessary.

8. VERIFICATION REPORT

On completion of the remedial works a Phase IV Verification Report should be produced by the independent suitably qualified person. The report should include records of on-site observations together with contamination analysis certificates, transfer notes, discharge consents, specifications etc.

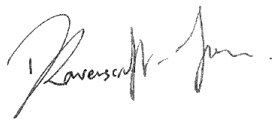
9. GENERAL

This Remediation Statement should be submitted to the Regulator, for approval in writing, prior to commencement. On completion of the actions set out in the Phase III Remediation Statement and receipt of an instruction, we would be happy to validate the remedial works and prepare a Phase IV Validation Report.

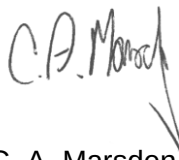
Should the proposed development of the site be undertaken in stages, we would be happy to provide a Phase IV Validation Report at each stage of the development.

We trust that this report fulfils your present requirements but if you have any queries or we can be of further assistance please contact the undersigned or Mr Gurbinder Singh Mann at our Tipton office.

SUB SURFACE CONSULTANTS LIMITED
REPORT No. SE1540C
JUNE 2024

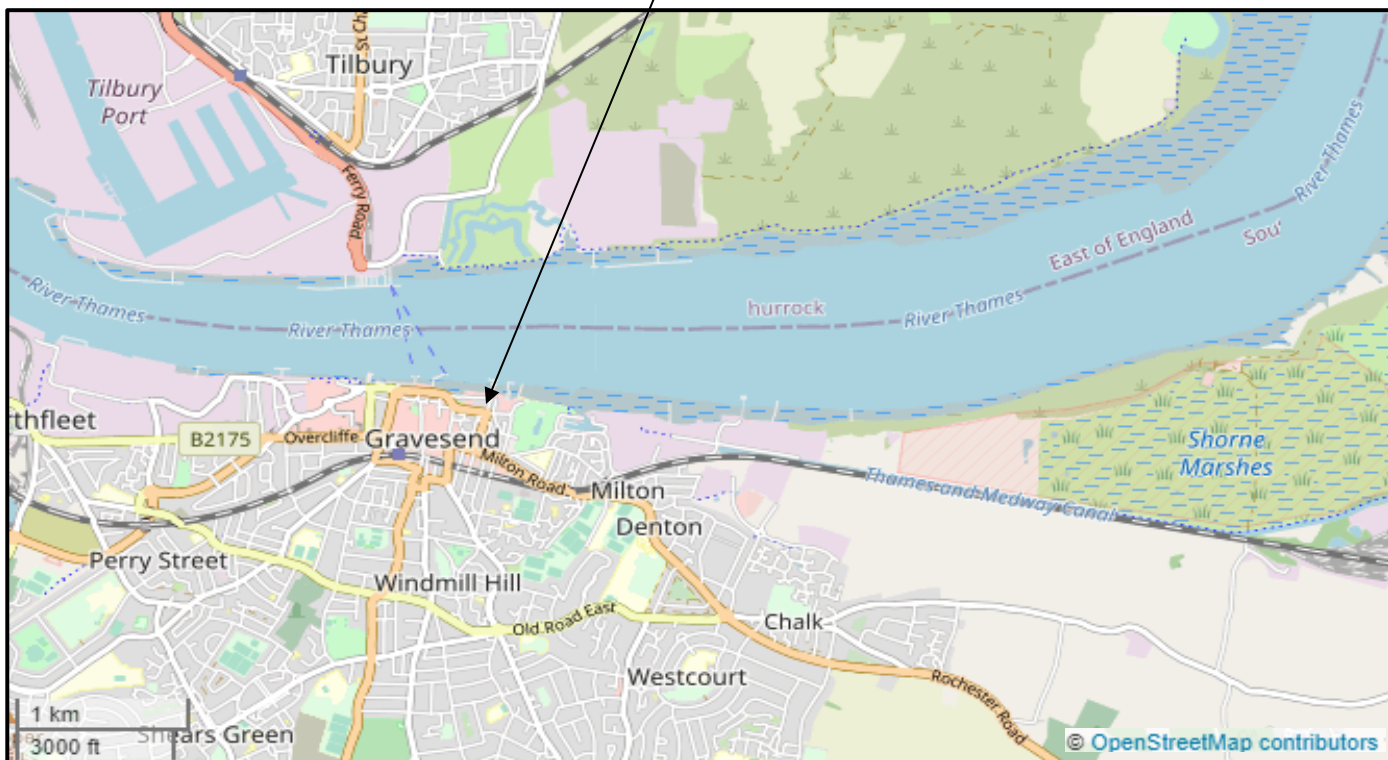
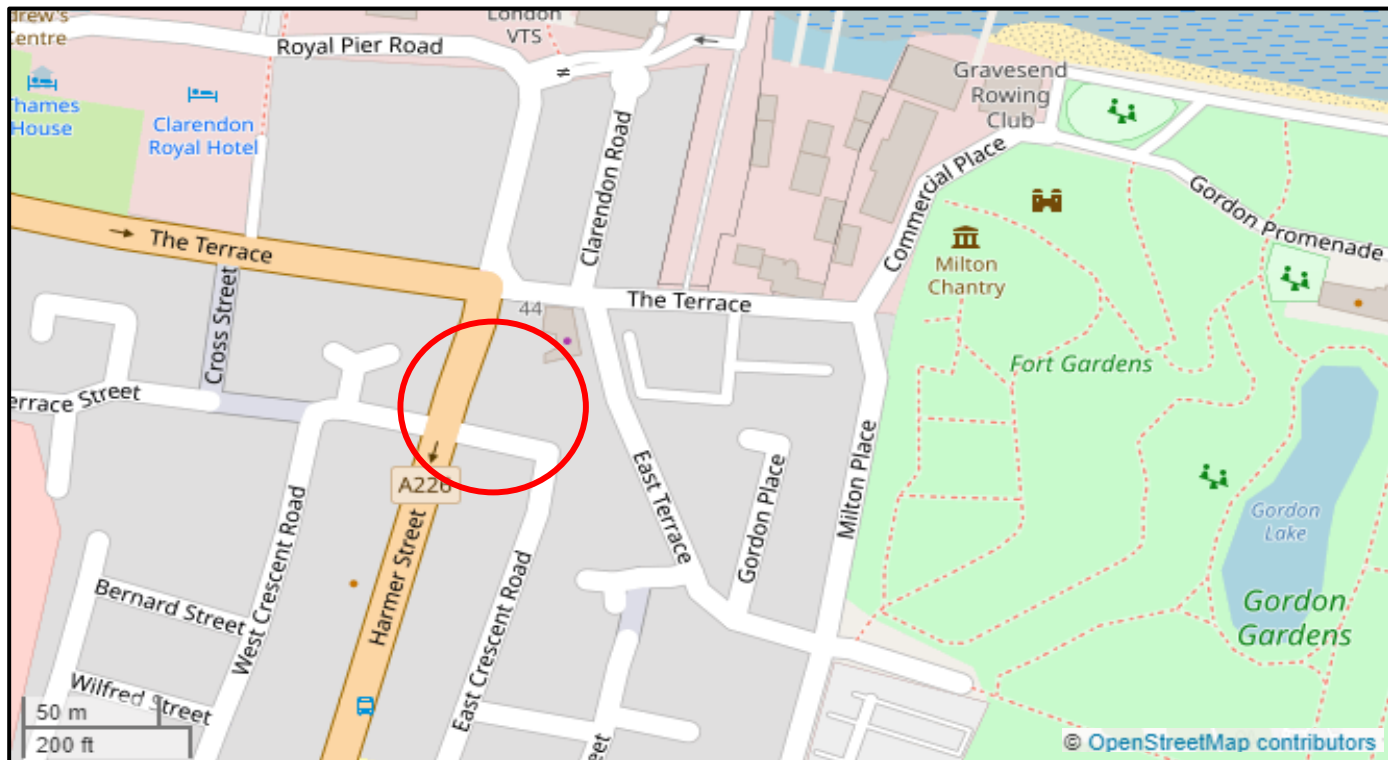


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Principal Geoenvironmental Engineer
For and on behalf of
Sub Surface Consultants Limited



C. A. Marsden B.Sc.(Hons.), C.Eng., M.I.C.E.
Director
For and on behalf of
Sub Surface Consultants Limited.

FIGURES



SUB SURFACE

SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Site

FORMER CALLBOY PUBLIC HOUSE, HARMER STREET,
GRAVESEND, KENT

Client:

SONY DEVELOPMENTS LIMITED

Site Location

Date Drawn

03/07/2020

Date Checked

Orientation



Job No.

S1540D

Drawn By

DJ

Checked By

Scale

As Shown

Figure No.

1

NOTES:

- Do not scale from this drawing.
- All dimensions to be verified on site.
- Builder to verify all dimensions, heights and levels prior to commencement of work.
- All documents shall be checked to ensure that they are compatible by the contractor before construction commences. In the event of apparent ambiguity or contradiction the engineer and/or architect shall be notified immediately.
- The contractor in preparing his estimate shall visit the site and acquaint himself with the problems involved.
- The contractor shall issue all statutory notices to the local Authority during progress and completion of works.

Scale
1:100



Scale
1:500



Project Title
CALL BOY
Harmer street,
Gravesend.
DA12 2AP

Drawing Title

- Site Location Plan
- Existing and Proposed:
- Block Plans
- Basement Plans

DWG No.
CB01

Date
17/08/17

Rev.
12

Drawn by
EA



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Existing Block Plan 1:500



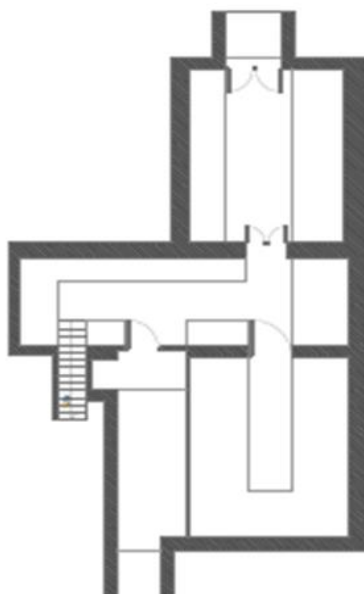
Proposed Block Plan 1:500



Existing View from street



Site Location Plan 1:100



Existing Basement Plan 1:100



Proposed Basement Plan 1:100



SUB SURFACE

SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Site

FORMER CALLBOY PUBLIC HOUSE, HARMER STREET,
GRAVESEND, KENT

Client

SONY DEVELOPMENTS LIMITED

Proposed Development

Date Drawn

03-Jul-20

Date Checked

Orientation



Job No.

S1540D

Drawn By

DJ

Checked By

Scale

—

Figure No.

2

