



C263 ARCHAEOLOGY LATE EAST Method Statement General Watching Brief Trial Pit Surveys, Marmadon Sewer Document Number: C263-MLA-X-GMS-CRG03-50001

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Note for Readers

Various readers of this method statement and risk assessment are likely to be directly interested in different parts of the document. The following table is intended to help readers identify which sections cover their main interests.

Reader's main interest	Most relevant sections
Principal Contractor	2.1, 2.3 3.1 4 5 15 16 17 21
Health, Safety, & Environment	15 17 21
Contractual	1.1 2 4 7 8 10 14 18 19 20
Archaeological methodology	1 3 5 6 9 10 11 12 13

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1 Introduction

This document sets out the methodology for the archaeological investigations to be undertaken at Plumstead Portal by the Museum of London Archaeology (MOLA). The investigations involve carrying out a General Watching Brief (GWB) and Non Listed Building Recording (NLBR) on a trial pit being excavated adjacent to the Southern Manhole of the Marmadon Sewer. The works are scheduled to begin August 2011, and run for approximately 6 weeks.

This Method Statement has been developed in conjunction with the Principal Contractors (HMJV) currently appointed who will be responsible for ensuring that the archaeological works may be carried out as specified. The work follows methodologies outlined in the Site Specific Written Scheme of Investigation (doc. Ref: C156-Csy-T-RGN-CR148_PT005-00028).

A previous geoarchaeological deposit model (document no. C263-MLA-X-RGN-CRG07-5001) identified a 6m thick sequence of deposits of archaeological and palaeoenvironmental interest within the vicinity of the trial pit works. An evaluation trench has been proposed for this part of the site. Given the depths of the sequence, the General Watching Brief works will provide an initial assessment of the archaeological and palaeoenvironmental potential of the deposits, which can be utilised to inform the design details of any evaluation trench required at a later stage.

The trial pits works also give an opportunity to make an assessment on the necessary building recording required for the Marmadon sewer itself.

If the project design or scope/method of working is subject to changes during the works, the Method Statement will be updated and re-issued to the Project Archaeologist and CDM Advisor for approval, in accordance with the specified document control procedures (see 9).

1.1 Site Description

The Plumstead site lies within the London Borough (LB) of Greenwich. The area of the works is comprised of two construction compounds to the north of the existing North Kent Line (NKL). To the west of White Hart Road lies the 'West Worksite', also known as the Plumstead/Old Goods Yard worksite, and to the east lies the 'East Worksite'. The portal site falls within the 'East Worksite', situated between White Hart Road and Church Manor Way. It is within this part of the site that the archaeological evaluation trenches are to be undertaken. The portal site centres approximately on National Grid Reference (NGR) 545546 178885.

1.2 Geological and Topographical setting

The site is situated on the southern fringes of the Holocene alluvial floodplain of the Thames. Just to the south of the site, outcrops of the Tertiary Woolwich and Reading beds form an area of higher ground. The site therefore lies in what could be considered an ecotonal position between the high and dry ground towards the south, and the wetland landscape towards the north.

The alluvial deposit sequence across the site was characterised in a previous geoarchaeological deposit model (document no. C263-MLA-X-RGN-CRG07-5001), utilising geotechnical data gathered from ground investigate works. Within the study

area three Landscape Zones (LZ's) were identified, two of which (LZ2 and 3) fall within footprint of the portal. The characteristics of these zones are summarised below.

LZ2

An area of prehistoric peats and wetland deposits that cover the western and far eastern end of the portal footprint. Across this zone the surface of the basal floodplain gravels lies at c 98–99m ATD. These gravels belong to the Shepperton Gravel formation and were deposited within a cold climate braided river regime between 18 000 to 15 000 years ago. These gravels mark the base line for deposits of archaeological interest.

The gravels are overlain by thin beds of fine sand and silts, that represent fluvial deposition within a multiple threaded freshwater channel system during the Late Glacial/Early Holocene period, approximately 15 000 to 10 000 years ago. Following climate amelioration, channel stabilisation and down cutting, terrestrial soils may have formed across the surface of these sand and gravels. By the Neolithic period, c 6000 years ago, the effects of relative sea level rise resulted in a rise in river levels and the ground waterlogging of these terrestrial landsurfaces. This gave rise to peat formation that continued in to the Bronze Age period c 4000 years ago. Previous palaeoenvironmental work carried out in the area on these peat deposits demonstrates that the peat formed within semi terrestrial alder carr wet woodland.

By the Iron Age the up stream migration of the tidal head, and the onset of fully estuarine conditions, resulted in a switch from biogenic peat formation, to minerogenic sedimentation. The peats are therefore found to be sealed by clays and silts deposited within intertidal salt marsh and mudflat conditions. This tidal inundation continued into the medieval period, gradually raising and levelling off the undulating topography of the floodplain surface. The upper part of the alluvial sequence displays evidence of soil formation indicative of seasonally inundated accretionary floodplain soils. The entire Holocene sequence measures up to 3m in thickness.

LZ3

This zone falls across the central section and the majority of the eastern end of the portal footprint. The proposed trail pit adjacent to the Southern Manhole also falls within this zone. It characterises a major palaeoenvironmental feature orientated on a north south alignment. Across the zone the surface of the floodplain gravels occurs at c 96.5m ATD, and indicates a phase of possible channel incision into the relict gravel surface.

The gravels are overlain by a complex and variable set of channel fills that consist of sands, silts, organic deposits and thin peat lenses. The sand and silts represent fluvial deposition within active parts of the channel belt, while the organics and peats formed during episodes of channel cut off and abandonment, or in channel marginal areas colonised by aquatic vegetation. Overall the full depth of the channel fills measure up to c 3m in thickness.

Just to the south of the site a tributary channel known as the Great Breach Dyke flows northwards off the high ground before turning to a north easterly direction. It is possible that the palaeochannel feature may represent a former course of this

channel. Interestingly, recent excavations to the north of the site on Belmarsh prison also identified a similar channel in terms of depth, level and complexity, also running on a north to south alignment. Despite the uncertainty of the association of these two features with the palaeochannel within LZ3, the palaeochannel probably formed a dominant feature of the landscape from the Early Holocene through to the later prehistoric periods.

The channel sediments are sealed by thick peat deposits overlain by minerogenic clays and silts. These peats and minerogenic deposits are probably associated with the alder carr peats and intertidal muds and salt marsh deposits that accumulated within LZ2. The channel fills and overlying floodplain deposits form a sequence that measures up to 5m in thickness.

1.3 Archaeological and Historic Background

1.3.1 Prehistoric Period (c 500 000 BP to 50AD)

During the Mesolithic period dryland surfaces suitable for occupation may have developed across the surface of the Late Pleistocene sands and gravels within LZ2. Previous excavations in the Woolwich area have found evidence of Mesolithic activity in the form of a few flint tools but the evidence is generally sparse. Evidence of Mesolithic activity is likely to take the form of ephemeral scatters of lithics and animal bone representing a range of subsistence activities associated with make shift hunter gatherer campsites.

From the Neolithic to Bronze Age periods the increase in river levels resulting in the formation of a thick peat unit indicative of alder carr floodplain woodland. This landscape would have been unsuitable for any form of permanent settlement, although these wetland landscapes would have provided an important subsistence resource. Activity from the Neolithic to Bronze Age periods is therefore likely to consist of timber structures constructed to traverse access and exploit this wetland landscape. Evidence of jetties wharfs and platforms may also occur on the margins of channel features within LZ3. Recent excavations a few hundred metres to the north of the site on Belmarsh prison did uncover the remains of a Neolithic timber trackman. This structure is the earliest timber track way to be found within the Thames floodplain.

1.3.2 Roman (AAD 50 to 450)

Throughout the majority of the Roman period the area was dominated by estuarine environments leading to the deposition of fine muds and silts within saltmarsh and intertidal mudflats. The landscape would have been unsuitable for any form of occupation. However, limited evidence may exist of attempts to reclaim and manage parts of this estuarine landscape.

1.3.3 Medieval Period (AD 450 to 1540)

Medieval features associated with land reclamation and agricultural activity may occur within the upper alluvium. This evidence may take the form of drainage ditches, embankments and field systems, The Saxon and medieval village of Plumstead is known to have existed approximately 400m to the south of the site.

1.3.4 Post–Medieval (AD1540 to 1900)

Until the 19th century the area remained as open rural land. In 1849 the construction of the NKL significantly changed the characteristics of the landscape. Features associated with this rail line may occur within the made ground deposits.

2 Interfaces and Communication Plan

2.1 Interface with Project Archaeologist

The Method Statement has been developed jointly with the Principal Contractor and then submitted to the Project Archaeologist and Crossrail Safety/CDM Advisor for approval. Any comments have been incorporated. Regular progress reports will be submitted to the Project Archaeologist and will be augmented by progress meetings and site visits when required, in order to optimise communications and feedback.

2.2 Interface with C263 Contract Administrator

MOLA shall submit documentation in accordance with the C263 Contract to the Contract Administrator.

2.3 Interface with the Principal Contractor

MOLA has received the draft documents for the Method Statement and the Construction Phase Health and Safety Plan from the appointed sub-contractor (Meeres Civil Engineering Ltd, CARL No: 3905). The relevant details within these documents have been used to prepare this Method Statement. The archaeological investigations will take place under the auspices and supervision of the Principal Contractors (HMJV). This interface extends to joint Health and Safety planning under CDM requirements. MOLA will provide the Principal Contractors (HMJV) with all necessary information to support site start-up (e.g. names of staff for inductions), health and safety planning; and (if required) to support the Principal Contractors' Permits to Dig. The majority of this information will be contained in this Method Statement. MOLA will liaise with the Principal Contractors regarding access, order of works, programme and commencement date.

2.4 Interface with Design Team

MOLA shall liaise with the design archaeologist, to implement the correct archaeological design specification, described in the SS-WSI (Section 1 above).

2.5 Interface with External consultees

Design archaeologist shall liaise with the GLAAS (Greater London Archaeology Advisory Service) Archaeological Advisor for the LB of Greenwich to inform them of the archaeological works.

3 Scope of Works

3.1 Planned Fieldwork Events

This Method Statement sets out the methodology and health and safety requirements for the General Watching Brief on the Marmadon Sewer trial pit being undertaken on the site of the Plumstead Portal. The mitigation strategy for the site will be preservation by record.

3.2 Confirmation of Methods and Standards

The archaeological fieldwork and reporting will be conducted in accordance with the following guidance and standards:

- Crossrail Environmental Minimum Requirements (Crossrail 2008)
- Crossrail Archaeology Generic Written Scheme of Investigation (draft July 2009)
- SS-WSI – *C156 Plumstead Portal*, Crossrail, December 2010, Document No C156-CSY-T-RGN-CR148_PT005-00028
- Crossrail Archaeology Specification for Evaluation & Mitigation (including Watching Brief) (CR-PN-LWS-EN-SP-00001)
- Crossrail Code of Construction Practice
- English Heritage Centre for Archaeology Guidelines, Environmental archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation (2002)
- English Heritage, 2004, Geoarchaeology: using earth sciences to understand the archaeological record
- Institute for Archaeologists (IFA) Standards and guidance for watching briefs and field evaluation (IFA 2001a and 2001b)
- Museum of London Archaeological Site Manual (1994)
- Museum of London General Standards for the preparation of archaeological archives deposited with the Museum of London (1998)
- United Kingdom Institute for Conservation's Conservation Guidelines No. 2

3.3 Aims and Objectives

The overall objectives of the General Watching Brief is to establish the nature, extent and state of preservation of any surviving archaeological and/or palaeoenvironmental remains that will be impacted upon by the development. The results of this work will inform the design details and requirements for the proposed evaluation trenches.

Specifically, the archaeological investigations have the potential to recover:

- Evidence of medieval to post –medieval cut features (i.e. drainage ditches, field systems) within the upper minerogenic alluvium
- Possible evidence of railway archaeology within the upper made ground deposits

- Prehistoric timber structures associated with the exploitation of the palaeochannel feature within LZ3. This may consist of jetties, wharfs and platforms. Structural remains of this type are most likely to occur at the interface of LZ2 and 3 (i.e. on the margins of the channel)
- Palaeoenvironmental evidence relating to climate and landscape change, hydrology, geomorphology and palaeoecology within the alluvial floodplain sequence. Particularly within the deep channel sediments of LZ3 where long sequences with high chronological resolution are likely to exist.

3.4 Event Codes

The works will be carried out under the site code **XSW11**.

4 Site Management Plan

4.1 Tools and Equipment

Tools and equipment appropriate for the archaeological works will be ordered by the Supervising Archaeologist and delivered to site by the MOLA Equipment Officer from the MOLA central store. See Section Appendix 1, section 9.2 for details.

4.2 Training and Certification

MOLA provides Safety Training for its staff as follows:

- Induction Training for all staff (undertaken on joining MOLA, and as appropriate on individual projects).
- General H&S Training for supervisory staff (an H&S awareness course targeted at Field and Support Staff).
- Specialist H&S Training (designed to cover specialist areas and to update professional knowledge; as appropriate to deployment)

All MOLA staff on site will be competent to carry out their archaeological work. On site all staff will be supervised by a competent person. All MOLA staff will attend a site induction undertaken by Principal Contractor (HMJV). This will be booked with the Principal Contractor prior to the start of the works. The induction is likely to take 1.5 hours.

The General and Targeted Watching Briefs will be undertaken by a MOLA Supervisor (Grade 5)/Senior Archaeologist (Grade 4) and supervised by a MOLA Field Director (Grade 3) or Contracts Manager/Assistant Contracts Manager via regular site visits, advice and mentoring.

For certain specific aspects of MOLA work only those members of staff with the relevant training and certification will be allowed to undertake them. These include Cable and Pipe/Underground Service Location, Chainsaw use, Confined Spaces and Power Auger use. It is anticipated that only Confined Spaces will be required on this site.

At present the profession of Archaeologist is largely covered by the CSCS, Construction Related Organisation CRO White Card for Archaeological Technician (Code 5363); other cards are available for site visitors etc. All MOLA staff have passed a CITB Health and Safety Test to operative level and carry the card on site at all times.

All staff will have their MOLA ID cards with them (see Appendix 1, section 7.1).

4.3 Site Monitoring

The site will be monitored by the MOLA Field Director (Craig Halsey, BSc), Assistant Contracts Manager (Louise Davies, BA, MSc) and Contracts Manager (David Divers, MSc, MA) via site visits, as and when required, in order to provide advice and support to the MOLA Supervisor. MOLA H & S Advisor (Hascom) will also regularly monitor the site, see 16.4.

The results of the H & S advisor's monitoring, and the monthly HS&E incident summary form, along with monthly environmental audits will be submitted to Crossrail.

4.4 Progress Reporting

MOLA has agreed a programme of weekly written progress reports, and progress meetings (if appropriate) with the Project Archaeologist. MOLA shall provide information describing progress on-site to date, the processing of samples and artefacts and feedback from initial assessment.

4.5 Resource Plan

General Watching Briefs:

- The general watching briefs will be supervised by a MOLA Supervisor (Grade 4 or 5) assisted by members of the MOLA field team (Grade 6) with support from MOLA Geomatics and Photographic team members when required. Other archaeological specialists (Grade 8, e.g. geoarchaeologists or osteologists), may be called in if necessary.
- The Supervisor will be Matt Ginnever (Tel: 07894 280 557). Other staff to be assigned when required.

Staff will be drawn from the pool of CVs submitted to Crossrail for approval.

All archaeological staff are direct MOLA employees, ordinarily full time. The working hours are set out in 4.7 below.

4.6 Programme

The programme details for the trial pit survey on the Southern Manhole Cover have not been confirmed. MOLA will liaise with the Principal Contactor to ascertain when a watching brief attendance is required. It is envisaged that a watching brief attendance will only be required for the excavation of the trial pit itself.

4.7 Working Hours

Work on site shall only take place within the core Crossrail working hours, which are between 0800 to 1800 on weekdays and 0800 to 1300 on Saturdays as specified in the Environment Requirements (Section 4 of Works Information Vol 2). Operations anticipated to cause disturbance are limited to these hours (or as specified within a Section 61 consent obtained by the Principal Contractor), in order to minimise disruption to local residents and the general environment.

MOLA will provide a site attendance when required during these specified periods, so that all the relevant Principal Contractor's ground works defined in this MS are monitored and recorded.

4.8 Timesheets

During General Watching Briefs and Targeted Watching Briefs, MOLA will supply timesheets included in the weekly progress reports to Crossrail.

4.9 Access

Access to work areas to be determined as they become available. See Appendix 1, section 7.1. MOLA staff will comply with the Principal Contractor's site rules on security, access, safe walking routes, etc.

4.10 Requirements from Principal Contractor

These are listed in Appendix 1, section 9.1. They include welfare facilities, currently predicted to be for up 1–3 MOLA staff for the watching brief.

5 Fieldwork Methodology

5.1 General Watching Brief Methodology

A General Watching Brief consists of a basic monitoring presence to observe the works carried out either by the Principal Contractor or their sub-contractor without constraint on their working methods (Crossrail 2009 Archaeology Specification for Evaluation & Mitigation (including Watching Brief) CR-PN-LWS-EN-SP-0001, version 3). This includes making a basic record of notes, measurements, drawings and photographs consistent with an observation role; eg depth, character, date and survival/truncation of deposit sequence, height of natural geology. Monitoring and recording during a general watching brief will generally be made by observation from ground level.

During a general watching brief MOLA staff will only enter the trench or area of excavation by agreement with the Principal Contractor or their sub-contractor. Staff will only enter an excavation via an appropriate means, such as a secured ladder with walkway access along the edge of the excavation. If access into the excavation is required the means of access will be supplied and designed by the attendant sub-contractor. Ladders will be used for excavation access only. No works will be undertaken from the ladder itself.

It is likely that the watching brief will require recording of natural floodplain deposits. Therefore, if possible, profiles through the alluvium will be examined in section. If access into the trenches is not feasible, the alluvial deposits will be recorded by examining spoil brought up from the excavation by machine bucket. Depths of the sequences will be recorded by measuring down from the side of the excavation if safe to do so.

Generally monitoring will only be undertaken when the trench has been dug down to the level of potential archaeological interest. For this reason, a flexible approach will be taken and kept under review. The monitoring presence may alternate between full and part-time depending upon the Principal Contractor's programme (eg the nature and intensity of ground works) and the archaeological results. For example, any areas where the Principal Contractor's works prove to be of insufficient depth to affect significant archaeological deposits will be scoped out of the Watching Brief. The MOLA Senior Archaeologist undertaking the monitoring will make an appraisal inspection during the Principal Contractor's initial breaking out, removal of overburden etc. in order to determine at what depth the relevant deposits (if present) occur.

The MOLA monitoring archaeologist will maintain regular contact with a nominated member of the Principal Contractor's team on site regarding the overall work programme and progress, including any changes to the proposed depths of excavation. The frequency of visits will be adjusted as necessary as work progresses to take into account areas where it can be shown that existing disturbance has already removed archaeological deposits, or where there are areas of unexpected archaeological survival.

If potentially significant (but localised) remains are exposed, such that they cannot be recorded adequately under basic monitoring, then the status of the fieldwork event

will be reviewed by Project Archaeologist and it may be redefined as a Targeted Watching Brief (see 5.2). This redefinition, if authorised by the Project Archaeologist, would permit additional resources in terms of staff and attendance to allow for more intensive recording.

5.2 Targeted Watching Brief Methodology

A targeted watching brief comprises the observation and recording of the Principal Contractor's or their sub-contractor's works with specific operations carried out under the supervision of a MOLA Senior Archaeologist. Targeted watching briefs are carried either out in areas where the density of archaeological features or deposits are not considered of sufficient significance to warrant investigation in advance of construction, or they may be carried out in areas where access prior to construction has been impossible and where, as a result, there is a possibility of unexpected discoveries (Crossrail 2009 Archaeology Specification for Evaluation & Mitigation (including Watching Brief) CR-PN-LWS-EN-SP-0001, version 3).

It should be noted that during a targeted watching brief, the Archaeological Contractor may impose constraints on, or require changes to, the Principal Contractor's or his sub-contractor's method of working to enable the archaeological investigation to take place alongside construction works. These constraints may include restrictions on the type of equipment used, the methodology employed, stopping excavation works to allow time for recording and the installation of temporary works or other attendances such as pumping out, in order that the archaeologists may enter the works excavations safely.

In addition to anthropogenic deposits, some assessment and basic recording of any naturally deposited levels will be necessary, e.g. alluvial deposits. This may require the attendance of a MOLA Geoarchaeological specialist to record and sample the deposits (section 6). Normally if the remains are localised the Principal Contractor's works may continue in other areas (subject to a safe method of working and monitoring). It is expected that the Principal Contractor will make allowance in their work programme to take account of the delays that a targeted watching brief may cause.

During a targeted watching brief MOLA staff will compile a basic record consisting of notes, measurements, drawings and photographs consistent with an observation role; e.g. depth, character, date and survival/truncation of deposit sequence, height of natural geology.

If potentially very significant (but localised) remains are exposed, such that they cannot be recorded adequately under the scope of the targeted watching brief, then subject to the Project Archaeologist's approval, additional archaeological resources and time may be required at that location (to allow for more detailed follow-up recording and perhaps limited excavation).

In the event that significant archaeological remains are uncovered and a targeted watching brief is required, the works are likely to require controlled machine excavation under MOLA supervision. This will need to be undertaken by a large 360 degree excavator fitted with a wide bladed bucket (ditching or similar) with no teeth. Once levels of archaeological significance are exposed hand cleaning will be undertaken in order to carry out recording as outlined in section 5.3.

5.3 General/Targeted Watching Brief Recording Methods

The archaeological remains will be recorded to best practice standards, recognising the special circumstances of a watching brief which demand flexibility in order to achieve archaeological objectives and requirements within the construction environment.

The recording will include as a minimum:

- The Event Code and chainage/location of the area observed
- The date(s) of the observations
- Personnel employed on site
- A description of the works observed
- The works (sub) contractor and personnel undertaking and supervising the construction activity
- Depths and extents of excavation works observed
- Measure of confidence that any archaeological remains would have been observed and reasons
- Reasons why any particular area of works was not observed, noting those areas not subject to disturbance from construction
- Location and description of any archaeological remains
- Location and description of any modern remains
- The written record of individual context descriptions on appropriate pro-forma.
- The drawn record: including, plans and section drawings of appropriate features, structures and individual contexts (1:50 1:20 or 1:10). Isolated archaeological remains (artefacts) may be spot located in plan and a height provided where possible. Deposits which are regular in plan (pits and ditches) may be located through co-ordinates, annotated with dimensions, and may be recorded digitally.
- Other appropriate drawn and written records will be produced (for environmental/geoarchaeological sampling etc.).
- The photographic record: photographs taken with a digital camera of resolution of 12 megapixels or greater, providing similar resolution to a conventional 35mm SLR. The photographic record will include photographs of archaeological features, appropriate groups of features, structures, and quaternary deposits. Each photograph will be recorded on site using a proforma photographic record sheet, showing image number, area/test pit, context number(s), subject/description, direction of view, and date. In addition, appropriate record photographs will be undertaken to illustrate work in progress.

5.4 Survey

The watching brief observations will be located manually by MOLA staff on a suitable hardcopy site plan. Observations can be related to features included on the OS mapping (e.g. adjacent structures or property boundaries), or chainage events located on the contractors CAD drawings. In event of significant features being uncovered, MOLA Geomatics staff will be called upon to carry out the survey using GPS/GNSS.

5.5 Non Listed Building Recording

The General Watching Brief will also include an element of Building recording of the existing sewer. This initial recording will be at level 1 as defined in Understanding Historic Buildings (EH 2006). The aim of the NLBR work at this stage is to make a rapid initial record of the sewer, assess the significance of the structure and establish the scope of any further recording that may be required during the main sewer diversions.

6 Geoarchaeological methodology

Geoarchaeology is the study of soils and sediments in either a natural or anthropogenic context, that either contain human cultural material or are contemporary with human habitation within the region being studied (i.e. the Pleistocene/Lower Palaeolithic and later). It can include techniques of landscape reconstruction such as palaeobotany, palynology and soil micromorphology.

Given the likely impact on the floodplain deposits, a geoarchaeological approach shall be adopted in recording any floodplain soils and/or sediments uncovered during the watching brief works. Deposits will be recorded according to standard sedimentological criteria in order to ascertain the depositional environment and site formation processes. This will involve characterising the visible properties of each deposit, in particular relating to its colour, compaction, texture, structure, bedding, inclusions, clast-size and dip. Geoarchaeological recording will be undertaken by and/or under advice of a MOLA Senior geoarchaeologist.

Significant features and/or layers of alluvial stratigraphy revealed during the investigations may require sampling if deemed necessary by the Project Archaeologist and/or the GLAAS Regional Scientific advisor. The sampling methodology is set out in section 7 below. This work will be conducted under the geoarchaeological and palaeoenvironmental sampling strategy (archaeological science strategy) as set out in WSI's for the Plumstead Portal sites.

7 Sampling strategy

It is unlikely that sampling will be required during the watching brief work, unless archaeological features or floodplain deposits of significance are encountered. In the event of required sampling, it will be targeted to establishing the palaeoenvironmental potential and significance of the deposits. The aim of this sampling is to evaluate the degree of preservation and range of environmental remains preserved within the archaeological/palaeoenvironmental deposits, assess their potential to address the overall site objectives and identify any additional research aims that might also be addressed by the archaeological deposits surviving on the site.

In general, sampling will be undertaken by the archaeologists. However, a geoarchaeologist will be on call to visit the site, advise and where necessary record and take samples from selected deposits.

General Methodology

Where significant features and/or alluvial layers are encountered the Contract Manager and MOLA Supervisor will ensure the following with the support of a MOLA Environmental Archaeologist / Geoarchaeologist:

- That a range of suitable samples are collected from the site for the recovery of an appropriate range of environmental evidence that will contribute to the research strategy that underpins the requirement for the watching brief and recording.
- That the environmental procedures outlined in the *Archaeological Site Manual* (MoL 1994) and *Environmental archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation* (English Heritage 2002) are followed.
- That general bulk samples, 40 litres in size (20L if waterlogged) will be the standard samples taken and that the processing methods are designed to recover a wide a range of materials from the same deposit in a single sample. In addition, as a number of post-excavation analytical techniques will be employed on the material recovered, a number of different sampling approaches will be required. These might include: gridded/spatial bulk samples, to sample horizontal stratigraphy where it survives (i.e. prehistoric soils and activity horizons), the sample size will depend on feature; column bulk samples (c 2-20L) to sample ditches, deep cut features and natural deposit profiles; spot samples for dating; monolith and micro morphology samples to recover *in-situ* blocks of sediments or complex strata.

Sample	Sampled by	Material	Processing
Hand Collected	archaeologist	Human Bone	Hand washing
	archaeologist	Large/small mammal, bird, fish	Power hosed
Bulk (general 40 litre sample), for cut features	archaeologist	Large/small mammal, bird, fish, reptile, amphibian, marine molluscs, eggshell, plant macrofossils	Flotation or wet sieving
		Insects	Paraffin flotation
		Artefacts	Hand Washed

Sample	Sampled by	Material	Processing
Column bulk (20 litre), at 0.1m intervals down deposit profiles	Archaeologist on advice of geoarchaeologist	Freshwater and terrestrial molluscs, ostracods,	Disaggregated and wet sieved
		Plant macrofossils	Flotation or wet sieving
		Insects	Paraffin flotation
Monolith	geoarchaeologist	Sediments	Laboratory cleaning
		Pollen and Diatoms	Sub-sampled for external Specialist
Kubiena	geoarchaeologist	Soils/complex strata	External Specialist
Spot/Grab	archaeologist	Coprolites, unidentified organic materials	Specialist
	geoarchaeologist	Pollen, diatoms, ostracods, forams, radiocarbon	Sub-sampled from for external specialists

- The sampling strategy will be monitored throughout the works and adapted in light of the preservation and the type of features encountered. A MOLA Environmental Archaeologist/Geoarchaeologist will undertake site visits to provide advice and additional advice will be sought from the EH Regional Archaeological Science Advisor when necessary. A MOLA Environmental Archaeologist/Geoarchaeologist will be on site during any visit made by the EH Regional Archaeological Science Advisor.
- As a general policy, uncontaminated negative features will be bulk sampled and bone collected by hand. Horizontal stratigraphy if it survives will be sampled on a spatial basis where appropriate. Unstratified contexts, make-up layers and contexts thought to have a high degree of residual or intrusive material will not be sampled. Bulk samples may also be taken to recover artefacts such as evidence for metalworking and/or other industrial activity.
- If encountered, human burials will be recovered individually, with separate parts of the body (i.e. right arm, torso, left leg etc.) bagged separately on site. Samples will be taken for analysis of the abdominal area if the soil conditions are wet or moist. Control samples will also be taken by consultation with the appropriate Specialist. Cremations will be excavated in consultation with specialists.

8 Deliverables and Submission Programme

MOLA shall provide the following reports to the Project Archaeologist in accordance with the Crossrail, 2009 Archaeology Specification for Evaluation & Mitigation including Watching Brief CR-PN-LWS-EN-SP-0001, version 3 and the WSI (see section 1) or as otherwise instructed by the Project Archaeologist:

- Organisation of site monitoring visits, as and when requested by the Project Archaeologist.
- A weekly illustrated progress report to the Project Archaeologist containing the information required at part 5.10 of the C263 Contract.
- A short illustrated interim statement within 1 week of the completion of fieldwork if required.
- A survey report within 2 weeks of the completion of fieldwork.
- A Fieldwork Report will be prepared within 6 weeks if required. This will include the results of any Geoarchaeological investigation, building recording, and an assessment of the deposits sampled. All levels cited in these reports should be Above Tunnel Datum (ATD = OD +100m). All Co-ordinates cited in these reports should be based on the London Survey Grid, apart from archive copies which will use OS National Grid.
- MOLA will produce monthly progress photographs of archaeological work on the sites in this method statement to contribute to the 30 per month required across the whole of the C263 contract (see 15.3).
- MOLA will complete an SMR (OASIS) Summary Sheet for the works (ie one per fieldwork event). This Summary Sheet will be included in the Fieldwork Report if required.
- A Summary report of no more than 500 words for the works shall be prepared by MOLA for submission to the Project Archaeologist for subsequent publication within the London Archaeologist Annual Fieldwork Round-up.

9 Document Control and Record Keeping

MOLA will access the Crossrail eB control system for transmitting reports and other deliverables. The primary report deliverables (as per 8) will be submitted to the Project Archaeologist (and Crossrail CDM Advisor in the case of Method Statements) in draft form (Version 1.0). Any tracked changes or comments added by the Project Archaeologist and/or Crossrail CDM Advisor will then be incorporated and future dated versions (2.0 etc) will be returned via eB accompanied with the appropriate Checklist with Contractor's responses.

10 Artefact Recovery and Conservation

All finds recovered during the watching brief work will be dealt with under the following professional standards:

- MOL Archaeological Finds Procedure Manual (2006)

- Relevant English Heritage Centre for Archaeology Guidelines eg on Environmental Archaeology (English Heritage 2002)
- Guidelines of the Society of Museum Archaeologists for the Selection, Retention and Dispersal of Archaeological Collections (SMA 1993).
- IFA Guidelines to the standards for recording human remains (2004)
- Minimum Standards for the Processing, Recording, Analysis and Publication of Post-Roman Ceramics produced by the Medieval Pottery Research Group Occasional Paper 2, (Slowikowski, A, Nenck, B. and Pearce, J 2001)

In general all material from stratified archaeological deposits is retained unless it is clearly residual or part of a large but routine assemblage, in which case samples of both typical and diagnostic items are retained.

Due allowance will be made for occasional specialist attendances which may be needed on and off-site to complete the investigation to the appropriate specified standard. These would only be called upon on a case-by-case basis, if significant structures or strata are revealed. Such attendances may include artefact conservation, photography, surveying, environmental sampling, finds assessment, Geoarchaeology and scientific dating. MOLA has a full range of in-house specialists and can therefore deploy such resources at short notice, if needed, eg to advise on sampling strategies.

All finds and samples will be treated in a proper manner and to Museum of London standards. They will be exposed, lifted, cleaned, conserved, marked, bagged and boxed in accordance with the guidelines set out in the United Kingdom Institute for Conservation's Conservation Guidelines No. 2 and the Museum of London's Standards for the Preparation of Finds to be permanently retained by the Museum of London. Metal objects will be x-rayed and appropriate objects then selected for conservation.

10.1 Retention and Disposal

The finds retrieval policies of the Museum of London will be adopted. An adequate and representative sample of finds and deposits as advised by appropriate MOLA specialists who will be available to attend site as required (see 12.1).

11 Treasure

All finds falling within the definitions of treasure (Treasure Act 1996) shall be reported immediately to the Project Archaeologist and all subsequent works must be undertaken in accordance with the relevant legislative requirements as set out in the Environmental Requirements (archaeology) section of the relevant package Works Information.

To protect the finds from theft, MOLA shall record the finds and remove them to a safe place. Where recording and removal is not feasible or appropriate on the day of discovery, MOLA shall ensure, on liaison with the Project Archaeologist that adequate site security is provided by the Principal Contractor.

12 Archaeological Science Strategy

Where necessary, the strategy for sampling archaeological and environmental deposits and structures (which can include soils, timbers, animal bone and human burials) will be developed by MOLA in accordance with English Heritage and IFA guidelines. Advice will be sought from appropriate MOLA specialists and if additionally required from English Heritage. Subsequent on-site work and assessment of the processed samples and remains will be undertaken by MOLA Specialists.

If necessary, samples for absolute dating such as C14 or timber samples for dendrochronology will be submitted to nominated MOLA external laboratories. This will only be done with the prior approval of the Project Archaeologist where there are particular research objectives to be addressed by such dating. See section 7 for the site-specific sampling strategies.

12.1 Specialist Strategy

An appropriate programme of ceramic dating and study of other excavated artefactual and environmental materials (including deposits of Geoarchaeological significance) will be undertaken by MOLA Specialists as their contribution to the Fieldwork Report.

12.2 Excavation and Recording of Human Remains

Human remains are unlikely to be present on the Plumstead Portal site. If human remains were to be found, they will be treated in accordance with the procedures in section 7.A.6 to 7.A.15 of Archaeology, Specification for Evaluation & Mitigation (including the WSI's for *C156 Plumstead Portal*, Crossrail, December 2010, Document No C156-CSY-T-RGN-CR148_PT005-00028, Version 8)

Crossrail procedures for dealing with discoveries of human remains shall identify any specific individual roles or actions that are relevant to the works. If removal of human remains were to be required, an Exhumation Licence would be required from the Coroner's Office of the Ministry of Justice, under the terms of the 1857 Burial Act. This would be obtained by the archaeological contractor, unless otherwise required by the Project Archaeologist.

13 Archiving and Dissemination Method

The required methodology for off-site work including specialist method statements, assessment, analysis, publication and archive is set out in the SS-WSI's and is not repeated here.

The site-specific publication and archive requirements will be agreed in conjunction with the Project Archaeologist in the light of the overall approach being developed for the Crossrail project (eg publication format and the extent to which individual sites may be grouped spatially or thematically; and degree to which the archive will be systematised and deposited as a single whole).

14 IT Capability – Digital Survey Recording, Data Capture and Curation

The required methodology for IT (including site survey) will be carried out in accordance with the C263 Contract and project standard survey requirements.

14.1 Survey

- For dispersed Watching Briefs occurring on large sites the Principal Contractor's survey controls may not yet have been installed (e.g. for service diversions etc. at the early enabling works stage). Here the primary aim will be to use digital techniques (such as direct survey capture of works locations and archaeological features) to speed recording and data handling and so minimise any risk of delay to the Principal Contractor.
- For Targeted Watching Briefs it is proposed that Principal Contractor's surveys assist with the location of temporary base lines and the plotting of significant archaeological features where appropriate.
- Upon completion of the fieldwork a Site Survey Report will be compiled.

15 Additional Details

15.1 Standards and Guidance

See Section 3.2.

15.2 Unexpected and Nationally-important remains

In cases where unexpected discoveries cannot be preserved *in situ*, the response plan would revert to the normal Crossrail mitigation strategy of further archaeological investigation (*preservation by record*). The aim would be a rapid and commensurate response, targeted to just those remains unavoidably affected by the works.

Recording and sampling methods would also be proportionate to the significance of the remains. Additional archaeological resources would be deployed to achieve this, in order to minimise any delay to the Principal Contractor's works. With flexibility and good communication it is often possible for the development works to continue in other areas while localised discoveries are recorded.

15.3 Progress Photographs

In addition to the archaeological photography specified in the SS-WSI and this Method Statement MOLA will submit a monthly professional photographic record of the progress of the archaeological scope of works. The photographs from the sites in this method statement will form part of the 30 required each month across the whole of the C263 contract.

15.4 Management of Consents

In the event of the unexpected discovery of human remains on site, MOLA will obtain a Burial Licence from the Ministry of Justice.

16 Health and Safety

16.1 CDM Responsibilities and Reporting

- MOLA will be supporting and reporting to the Principal Contractor (HMJV) and to the Crossrail Project Archaeologist and CDM Co-ordinator.
- MOLA will be implementing archaeological designs in the SS-WSI prepared by the appropriate FDC consultant, therefore not acting as CDM Designer under the Construction (Design and Management) Regulations 2007.

MOLA will provide:

- A current health and safety policy, including defined operational procedures and managerial responsibilities, risk assessment/control, and measures to ensure that a safe method of working is implemented by the archaeological team on site, including appropriate advice and support from office-based managers.
- Adequate safety information in the MOLA site accommodation including the WSI, current Health and Safety Policy, Data Protection Compliant Accident Book, and copies of Public and Employers Liability Insurance. The Supervisory Archaeologist is responsible for ensuring that this information is made available.
- Compliance with current legislation and HSE guidance; including the Construction Design and Management Regulations (CDM) 2007 (not as a Designer); and the Principal Contractor's Health and Safety Policy, safety inductions and fire and emergency procedures.
- Field staff qualified to operative level (or higher) of the CITB Health and Safety test and therefore eligible to carry a Construction Related Organisation (CRO) White Card for Archaeological Technician (Code 5363).
- Services of a Contract Manager, Project Officer and Supervisory Archaeologist to manage site investigations, including liaison with the Principal Contractor's Health and Safety Co-ordinator and Principal Contractor, attendance at site meetings etc. The Supervisory Archaeologist will act as principal liaison with the Principal Contractor.
- Services of a professional health and safety consultant to attend site when required; reporting to the Supervisory Archaeologist and Project Officer, with any concerns or recommendations copied to the Principal Contractor's site manager
- A safety monitoring/reporting procedure. This should include accident reporting by the Supervisory Archaeologist to non RIDDOR and RIDDOR standard and any necessary liaison and follow-up of agreed safety actions with the Principal Contractor's site manager
- All necessary staff supervision, training and personal protective equipment (PPE) including tool box talks and safety inductions for new staff.
- Review and compliance with the Principal Contractor's Construction Phase Plan under the CDM Regulations 2007.
- Trained First Aiders, 'Where to get First Aid' poster and a First Aid kit (to be located in the MOLA site accommodation). The Principal Contractor will also have first aid facilities on site.

The Principal Contractor will provide:

- Overall control and supervision of the site and a safe working environment. The archaeological organisation will be unable to complete the specified works in any area where this is not provided.
- Technical services and attendances to the archaeologists as required. These services may include providing, site accommodation, plant for the excavation of trenches and other equipment such as lighting, handrails, shoring and ladders. These requirements are listed in detail in Appendix 1 section 9.1.

The CDM Co-ordinator will provide:

- Overall co-ordination of health and safety planning and management.
- A communications structure; including contact details for key personnel, meetings, reporting, etc.
- Supply of material information: e.g. services and contamination reports; any relevant requirements regarding rights of way, noise, hours of operation, etc.

16.2 Rail Sites

The works are not taking place near to active railway lines.

16.3 Highway Sites

The works will take place in a sealed off compound away from active highways.

16.4 Health and Safety Reporting

Adherence to health and safety procedures will be monitored by the MOLA Health and Safety Consultant, Contract Manager, Project Officer and Site Supervisor. The consultant will attend site for regular monitoring visits and, on each occasion, will supply a report on the archaeological work, containing any necessary health and safety recommendations. This will be forwarded to the Principal Contractor's site manager. Where appropriate to the scale of work, regular on-site progress meetings will be held between MOLA, the Project Archaeologist and the Principal Contractor at which any safety issues may be discussed, agreed and actioned.

16.5 Liaison with Principal Contractor

The MOLA supervisory archaeologist will act as the principal point of contact with the Principal Contractor's site manager throughout the periods of site investigation. Contact details will be exchanged. The supervisory archaeologist will be supported and advised by the MOLA Fieldwork Director and project management team as needed.

16.5.1 C263 MOLA Project Management team contact details

- David Divers, Contracts Manager
ddivers@museumoflondon.org.uk
Direct Line: 020 7410 2253
Mobile: 07867 783310
- Louise Davies, Assistant Contracts Manager
ldavies@museumoflondon.org.uk
Direct Line: 020 7410 2221
Mobile: 07872 127299
- Craig Halsey, Fieldwork Director Contracts Manager
chalsey@museumoflondon.org.uk
Direct Line: 020 7410 2232
- Matt Ginniver, Site Supervisor (Senior Archaeologist)
mginnever@museumoflondon.org.uk
Mobile: 07894 280 557

16.6 Behavioural Safety BMOS

Mobile phones, personal CD players, iPods, and similar will not be used by MOLA staff in archaeological trenches or areas of work. Smoking and naked flames are/is not permitted in the trenches or areas of work. Alcohol is not permitted on site. This aspect will be monitored by the MOLA Supervisor and H and S Advisor (see 4.3).

17 Emergency Response

17.1 Emergency Preparedness & Response Plan

A General Emergency Preparedness Plan (EPP) is currently being prepared within the MOLA Health and Safety Plan for C263. This should be referred to for generic emergency and accident issues.

Site-specific issues are as follows:

- For the Watching Brief MOLA staff will comply with the Principal Contractor's (HMJV) emergency procedures as set out in the Construction Phase Health and Safety Plan for Trial Pit Surveys (ref: CARL Reference No:3905)

Employers Incident Response Contact	Crossrail helpdesk 0345 602 3813
Principal Contractor (HMJV) Incident Response Contact	Eamonn Burns Mobile: 07966 015 819
MOLA Incident Response Contact	David Divers, Contracts Manager ddivers@museumoflondon.org.uk Direct Line: 020 7410 2253 Mobile: 07867 783310
Local A&E location	<i>Full A & E at:</i> Queen Elizabeth Hospital Stadium Road Greenwich SE18 4QH Tel: 020 8836 6000

17.2 Training

MOLA provides Safety Training for its staff as in Section 4.2.

The MOLA Experienced Archaeologist will attend all emergency training/inductions on Preparedness/Response Plan provided by the Principal Contractor.

17.3 Emergency & Accident Equipment

- MOLA Archaeologists when working singly on the watching brief tasks will carry a single person First Aid Kit and mobile phone.
- It is expected that the Principal Contractor will also provide basic first aid facilities on site.

17.4 Monitoring & Testing

MOLA staff will comply with Crossrail requirements.

17.5 Emergency & Accident Incident Reporting

All accidents and emergencies must be reported to the Principal Contractor's project manager (Riku Tauriainen, mobile: tbc) who will call the emergency services, if required. They will also be reported to the Crossrail Helpdesk (24 hour helpline) Call: 0345 602 3813 or helpdesk@crossrail.co.uk

All accidents and emergencies must be reported to the following personnel at Crossrail and MOLA:

- Jay Carver, Project Archaeologist, Crossrail Central, Crossrail Ltd, 25 Canada Square, London E14 5LQ
DD 0203 229 9258 Int 2258
Mobile 07870 191 705
- Nick Dyball, CDM Advisor, Crossrail Central, Crossrail Ltd, 25 Canada Square, London E14 5LQ
Mobile 07718861942
- George Dennis, Senior Contracts Manager, Museum of London Archaeology, Mortimer Wheeler House, 46 Eagle Wharf Road, London N1 7ED
DD 0207 410 2200 Int 2256
- Ian Grainger, Field Manager, Museum of London Archaeology, Mortimer Wheeler House, 46 Eagle Wharf Road, London N1 7ED
DD 0207 410 2200 Int 2271

18 Environmental Management

The archaeological works will be carried out whilst the Principal Contractor is in possession of the site. MOLA has received a draft copy of the sub-contractors (Meeres Engineering Ltd) Construction Phase Health and Safety Plan for Trial Pit Surveys (ref: CARL Reference No:3905) that outline the procedures for environmental hazards. MOLA will comply with the Principal Contractor's procedures outlined in this document.

If any remedial action is needed, eg controls for dust, water, noise or controlled waste, this will be agreed with and undertaken by the Principal Contractor as part of the required attendances (see 16 and Appendix section 9.1). In addition an updated MOLA corporate Environmental Management Plan is currently being prepared for submission to Crossrail.

The nominated environmental person is: Alison Telfer, atelfer@museumoflondon.org.uk, 020 7410 2276.

18.1 Contamination

MOLA staff will not disturb or damage asbestos, or undertake asbestos removal from a building, structure, or buried material. If asbestos is found the Principal Contractor will be responsible for having it dealt with by a licensed contractor.

18.2 Water Disposal

The Principal Contractor is responsible for disposal of any ground water pumped from the trenches or other excavations, in accordance with their environmental management plan, with which MOLA will comply.

18.3 Site Waste Management Plan

MOLA staff will adhere to the Principal Contractor's site waste management plan.

18.4 Vehicles/Motorised Equipment

MOLA staff will liaise with the Principal Contractor to provide safe access and parking for MOLA vehicles if required to attend site:

- Ford Silver Transit (Medium Wheelbase) – EA55 NBJ – Harry Matthews, Equipment Officer, 07730 646063.
- 1.7 Turbo Diesel Astra Estate – KC54 XTZ – Sarah Jones, Geomatics Manager, 0207 410 2200 Int 2287.

18.5 Other Requirements

MOLA staff will always be courteous with any members of the public they have dealings with.

19 Quality Assurance Plan

An updated Quality Assurance Plan has been submitted to Crossrail in accordance with the format specified at part 5.4 of the C263 contract. Records will be kept and supplied to Crossrail in accordance with procedures set out in Crossrail Specification CR-PN-LWS-EN-SP-00001, as amplified by the SS-WSI's.

20 Community Relations

MOLA will co-operate with the Principal Archaeologist and Principal Contractor regarding any notified community relations issues in relation to the Construction Community Relations Strategy Framework as defined in the Works Information.

MOLA will in the first instance refer any media enquires or community relation issues to the Crossrail Helpdesk and the Project Archaeologist.

21 Responsible Procurement

A draft Responsible Procurement Plan document was submitted to Kelly Hussey, Crossrail on 28th April 2011. The MOLA responsible procurement representative is Dawn Jackson, who is a member of the Senior Management Group.

22 Appendix 1: Health and Safety Method Statement

1. Introduction and Purpose

1.1. Project Background

Archaeological investigations are to be carried out on this site by Museum of London Archaeology (MOLA). The works involve carrying out a General watching Brief on the trial pit survey being undertaken on the Southern Manhole of the Marmadon Sewer.

2. Scope of Document

This Method Statement sets out the specific MOLA safe methods of working to be applied to:

- **GWB (general watching brief) for the Marmadon sewer Southern Manhole trial pit survey**

This method statement has been developed with information supplied by the Principal Contractor, who will be responsible for ensuring that the archaeological works may be carried out as specified.

3. Responsible Persons and Site Management

3.1. Site Management

The MOLA Senior Archaeologist/Site Supervisor will ensure that a copy of the MOLA Welfare, Health & Safety Method Statement is made available to the appropriate Principal Contractor at the site. Where further changes or additions to the WH&S Method Statement are required and agreed these should be appended to the site master copy by the MOLA Senior Archaeologist/Site Supervisor.

All changes to the WH&S Method Statement will be signed off by the Project Archaeologist, Crossrail H & S Advisor, MOLA Senior Contract Manager and MOLA Field Manager.

4. Scope of Works

The scope of archaeological works is set out in section 2 of the appendix and in section 1 of the method statement, above.

5. Methodology, Programme and Sequence

The provisional programme is set out in section 4.6 of the method statement, above.

The timetable, length of programme and sequence of tasks are to be confirmed by the Principal Contractors.

6. Risk Assessments

Overall and site specific risk assessments for the General Watching Brief on the Marmadon sewer Southern Manhole are included in the following section.

6.1. MOLA Risk Assessment – General Watching Brief

Site – Marmadon Sewer Southern Manhole trial pit survey		Type of Work		General Watching Brief
	Persons Affected	No	Classification	No
	Employees	1-3	Experienced	Up to 3
	Other workers		Inexperienced	
	Public		Disabled	

Known and Suspected Hazards on site (tick as appropriate)					
Mobile Plant	x	Power Auger		Ionising radiation	
Moving Machine Parts		Access equipment		Lasers	
Moving objects		Hazardous Substances		Ultraviolet	
Falls from height	x	Contamination	x	Temperature	
Falls on level	x	Micro organisms		Noise	x
Manual Handling	x	Vermin/Weil's Disease	x	Vibration	
Buried services	x	Fumes/Gas		Weather	x
Electrical		Lone working		Hot/cold objects	
LPG etc		Welfare		Physical attack etc	
Fire/Explosion		Confined spaces	x	Vehicles	
Chainsaw		Hand Tools	x	Human Remains	
UXO	x			On/Near Water	

Control Measures Required

Compliance with H&S at Work Act 1974, Construction(Design and Management) Regulations 2007 and MOLA H&S Policy
 Compliance with MOLA Generic or Site Specific Risk Assessment(s) for the Hazards marked above
 Compliance with Principal Contractor's safety policy, site specific method statement, permits to work, instructions.
 Attendance of Principal Contractor's induction on first day at work
 Implementation and attendance of tool box talks by Principal Contractor and MOLA
 MOLA supervisors to be trained and competent.
 Certified First Aider on site.

Assessment of Remaining risk (Low, Medium, High) (see notes on reverse)

	L	M	H		L	M	H		L	M	H
Mobile Plant		x		Power Auger				Ionising radiation			
Machine Parts				Access equipment				Lasers			
Moving objects				Hazardous Substances				Ultraviolet			
Falls from height	x			Contamination		x		Temperature			
Falls on level	x			Micro organisms				Noise	x		
Manual Handling				Vermin/Weil's Disease	x			Vibration			
Buried services		x		Fumes/Gas				Weather	x		
Electrical				Lone working				Hot/cold objects			
LPG etc				Welfare				Physical attack etc			
Fire/Explosion				Confined spaces		x		Vehicles			
Chainsaw				Hand Tools	x			Human Remains			
UXO	x							On/Near Water			

Emergency action/additional assessment required for remaining medium/high risk

See Site Specific Risk Assessments for Mobile Plant, Buried Services, Confined Spaces

Competent Person(s) appointed to take action:	Report seen by (initials)	
	PM GD	Archaeologists

MOLA Supervisor	SA(s) TBC	
	Client JC/RD	
	Contractor	
	Other	

6.2. MOLA Site Specific Risk Assessment – Mechanical Excavators

MOLA RISK ASSESSMENT		MECHANICAL EXCAVATORS			
Significant Hazards		Assessment of Risk			
		Insignif	Low	Medium	High
1	Shovel or load dropping inadvertently			•	
2	Overturning of machine		•		
3	Materials dropping from shovel or bucket			•	
4	Persons struck by machine			•	
5	Restriction of driver’s vision.			•	
6	Hydraulic fluid spray		•		
ACTIONS ALREADY TAKEN TO REDUCE RISKS					
<p>Compliance with: MOLA Health and Safety Policy Operational Procedures (September 2010) Construction(Design and Management) Regulations 2007 Control of noise at Work regulations 2005 Control of Vibrations at Work Regulations 2005 British or European Standards including: 5228: Noise on construction sites. 6912: Safety in earthmoving machinery 6913: Operation & maintenance of earthmoving machinery</p>					
<p>Planning: MOLA Staff will not operate Mechanical excavators. Choice of hire equipment and requirements assessed with regards to ground conditions and local operational requirements. Choice of Excavators and driver/operator to be from sub-contractors competent to provide the machinery and service required.</p>					
<p>Physical: <u>180 degree machines</u> - When using the backhoe the front bucket must be lowered to the ground <u>360 degree machines</u> - At least 600mm clearance to be allowed for tail swing. No persons are allowed to stand or work within operating radius without the operator’s permission. Loads must not be slewed over personnel, vehicle cabins or huts. Overhangs are not to be created on high workfaces. Wheels/tracks are to be at 90 degrees to the workface. Travel and operations on a gradient must be controlled to ensure machine stability. A banksman is to be used where driver’s vision is impaired or operating in congested areas.</p>					
<p>Management: Certification of drivers must be checked. Drivers must be over 18 years old. MOLA Staff must not operate mechanical excavators All trenching and deep excavation work must be supervised to ensure the stability of machine and excavation, and that persons do not work within the swinging radius of a backhoe. Vehicles must be checked by drivers before use and secured afterwards. Management must ensure speed restrictions are enforced, and monitor use on sloping ground. Noise levels are to be monitored and assessed as may be necessary.</p>					
<p>Training: Driver training to CITB/CSCS (or equivalent) standard is required; also to comply with BS 6264: Operator training for earthmoving machinery. Excavator driving by uncertificated operatives is not permitted; this also applies to our subcontractors and the self-employed.</p>					
MOLA SITE/TASK SPECIFIC RISK ASSESSMENT					

For each site, location, and task the appropriate generic assessment should be reviewed to ensure that all significant hazards and their risks are identified and controlled. Completion of this Risk Assessment will ensure that your assessment is both appropriate and complete

Site/Location/Task:	Site - Marmadon Sewer Southern Manhole trial pit survey GWB
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Frequency and Duration of Task:	Daily, up to 6 weeks	Number of Staff Involved:	Up to 3
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Specific Hazards Identified?

Persons struck by machine
Fall of material from bucket

Control Measures Required?

All mini excavators and similar plant to be operated and controlled by trained and CPCS certified Principal Contractors' operatives under the overall supervision of the HMJV Site Manager or designated deputy
No MOLA staff to operate any plant
No MOLA staff to supervise or direct machine operations except for archaeological work as specified in the MS
Compliance with Principal Contractor's permit to work
Archaeological supervision to be by MOLA Supervisor only
No staff to stand/move within operating circle of active plant
All staff to attend induction and toolbox talks
All staff to wear required PPE
First Aider and First Aid Box present
Machine to operate within Principal Contractor's Method Statement and Risk Assessments

Assessment of Remaining Risks:	High	Medium	Low
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Serious and Imminent Danger Identified:	Yes	No
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What Emergency Action Required?

MOLA Supervisor to report all accidents/incidents to Principal Contractor's Site Manager or specified deputy in his absence

Ensure all serious non-emergency casualties not treatable by first aid are accompanied to the nearest A&E at:

Full Accident and Emergency

Queen Elizabeth Hospital

Stadium Road
Greenwich
SE18 4QH

Tel: 020 8836 6000

Emergencies: MOLA supervisor to 999 in absence of PC Site Manager or specified deputy.

Circumstances Requiring Additional Assessment?

Competent Persons Appointed to Take Action			
Principal Contractor Site Manager: John Cannon			
MOLA Site Supervisor: TBC			
Circulation of Risk Assessment			
Employees and Volunteers	x		
Principal Contractor	x		
Client	x		
Sub Contractor			
Public/Visitors			
Other Occupier			
Risk Assessment Prepared by	Signed: CJH	Name: Craig Halsey	Date: 3/6/11

6.3. MOLA Site Specific Risk Assessment - Underground Services

MOLA RISK ASSESSMENT		UNDERGROUND SERVICES			
Significant Hazards		Assessment of Risk			
		Insignif	Low	Medium	High
1	Contact with electricity or gas supplies			●	
2	Contact with sewage			●	
3	Flooding from water services			●	
4	Explosion or asphyxia from gas leaks			●	
5					
<p>Compliance with: MOLA Health and Safety Policy Operational Procedures (September 2010) Electricity at Work Regs.1989 Construction(Design and Management) Regulations 2007 DSEAR 2002 Regulatory Reform (Fire Safety) Order 2005 HSE Guidance Booklet HS(G)47 - Avoiding danger from underground services. Highways Act 1980, New Roads and Streetworks Act 1991 DoT ACOP - Safety at Street Works & Roadworks Traffic Signs Manual, Chapter 8 National Joint Utilities Group publications : No.3 - Cable locating devices No.42 - Identification of small buried mains and services.</p>					
<p>Planning: All work to be planned in advance, taking account of the above. Full details of underground services must be obtained in advance from the relevant authority, including Television Cable Companies, BT and other telephone companies, and private property owners.</p>					
<p>Physical: Plans and cable location equipment to be available before work starts. Plans must not be assumed to be accurate, and location devices to be used in addition. Trial holes to be dug, using hand digging to confirm locations, taking account of physical indications such as junction boxes and manholes. The lines of services to be marked, using paint, wooden pegs, etc. All services to be assumed to be live until proven otherwise. Services crossing excavations to be supported. Services in concrete to be isolated before breaking operations begin.</p>					
<p>Management: Site supervisors or the person in charge to ensure that services are located and marked before further work begins. Full consultation to be held with relevant authorities to agree precautions to be carried out before work begins. All personnel, machine operators and subcontractors to be fully briefed before they begin work. All temporary services to be properly marked.</p>					
<p>Training: The person in charge must be trained in operation of cable locating equipment, and the requirements of HS(G)47. Personnel locating services must be similarly trained</p>					

MOLA SITE/TASK SPECIFIC RISK ASSESSMENT			
<p>For each site, location, and task the appropriate generic assessment should be reviewed to ensure that all significant hazards and their risks are identified and controlled. Completion of this Risk Assessment will ensure that your assessment is both appropriate and complete</p>			
Site/Location/Task:	General/Targeted Watching Brief (Marmadon Sewer Southern Manhole)		
Frequency and Duration of Task:	Daily – up to 6 weeks	Number of Staff Involved:	Up to 3
<p>Specific Hazards Identified? Contact with existing services –during initial breaking out and/or machine clearance of trenches during archaeological monitoring, but also risk of encounter during any subsequent hand digging. Electrocution Explosion, fire Sewage and Flooding Asphyxiation</p>			
<p>Control Measures Required? Compliance with Principal Contractor’s permits to work system. Principal Contractor operative to check trench location with CAT scanner for live electrical services before commencement of breaking out operations and again before each new level of machining thereafter. Discovery of buried service (live or otherwise) will be reported to the Principal Contractor’s Manager immediately and work shall cease on the trench until the Principal Contractor Manager or designated deputy declares it safe to resume. All staff to attend induction and toolbox talks All staff to wear required PPE (including flame retardant overalls) First Aider and First Aid box present</p>			
Assessment of Remaining Risks:	High	Medium	Low
Serious and Imminent Danger Identified:	Yes	No	
<p>What Emergency Action Required? MOLA supervisor to report all accidents/incidents to Principal Contractor’s Manager of specified deputy in his absence Ensure all serious none emergency casualties not treatable by first aid are accompanied to the nearest A&E: <i>Full Accident and Emergency:</i> Queen Elizabeth Hospital Stadium Road Greenwich SE18 4QH Tel: 020 8836 6000</p> <p>Emergencies: MOLA supervisor to call 999 in absence of PC Site Manager or specified deputy.</p>			

Circumstances Requiring Additional Assessment?			
Competent Persons Appointed to Take Action			
Principal Contractor Manager			
MOLA Site Supervisor			
Circulation of Risk Assessment			
Employees and Volunteers	x		
Principal Contractor	x		
Client	x		
Sub Contractor			
Public/Visitors			
Other Occupier			
Risk Assessment Prepared by	Signed: CJH	Name: Craig Halsey	Date: 3/6/11

6.4. MOLA Site Specific Risk Assessment - Confined Spaces

MOLA RISK ASSESSMENT Significant Hazards		CONFINED SPACES			
		Assessment of Risk			
		Insignif	Low	Medium	High
1	Toxic gases				•
2	Asphyxiation - lack of oxygen				•
3	Explosion				•
4	Fire				•
5	Excessive heat			•	
6	Drowning				•
7					
ACTIONS ALREADY TAKEN TO REDUCE RISKS					
<p>Compliance with: MOLA Safety Policy, Confined Spaces Regulations 1997 Construction (Design and Management) Regulations 2007 HSE Guidance Note GS5 - Entry into confined spaces. Local Authority/ client safety standards, e.g. on sewer entry.</p>					
<p>Planning: The confined space should be formally identified as such by a competent person. Note: what constitutes a confined space is open to interpretation and may vary from project to project. Eliminate need for entry where possible. Eliminate use of hazardous materials by selection of alternative methods of work or materials. Assessment of: ventilation available and possible local exhaust ventilation requirements, potential presence of hazardous gases/atmosphere, process by-products, need for improved hygiene/welfare facility.</p>					
<p>Physical: Documented entry system must apply, preferably Permit to Work. Adequate ventilation must be present or arranged. Detection equipment must be present before entry to check on levels of oxygen and presence of toxic or explosive substances. The area must be tested before entry and continually during the presence of persons in the confined space. Breathing apparatus or airlines must be provided if local ventilation is not possible. Where no breathing apparatus is assessed as being required, emergency BA and rescue harnesses must be provided. Rescue equipment including lifting equipment, resuscitation facilities, safety lines and harnesses must be provided. A communication system with those in the confined space must be established. Air must not be sweetened with pure oxygen. Precautions for safe use of any plant or heavier-than-air gases in the confined space must be established before entry. Necessary PPE and hygiene facilities must be provided for those entering sewers</p>					
<p>Management: The management role is to decide on the nature of the confined space and to put a safe system into operation, including checking the above. Flood potential and isolations must be checked.</p>					
<p>Training: Full training is required for all entering and managing confined spaces. Rescue surface party must be trained, including in first-aid and operation of testing and rescue equipment. All personnel must be certificated as trained, and supervisory staff trained to the same standard</p>					

MOLA SITE/TASK SPECIFIC RISK ASSESSMENT			
<p>For each site, location, and task the appropriate generic assessment should be reviewed to ensure that all significant hazards and their risks are identified and controlled. Completion of this Risk Assessment will ensure that your assessment is both appropriate and complete</p>			
Site/Location/Task:		General Watching Brief (Marmadon Sewer Southern Manhole)	
Frequency and Duration of Task:		Daily, Up to 6 mths	Number of Staff Involved: 1-3
<p>Specific Hazards Identified? Deeper areas of excavation may be designated a confined space, if sufficient depth is reached. Access/egress Evacuation of injured operative</p>			
<p>Control Measures Required?</p> <p>The Principal Contractor or appointed specialist sub-contractor is responsible for the formal identification, monitoring and control of Confined Spaces, and for provision of gas monitoring, rescue equipment, and other equipment or procedures required. The appointed Principal Contractor (or specialist sub-contractor) 'top man' will carry out an initial assessment of the confined space atmosphere and continually monitor at regular intervals, recording this as excavation progresses.</p> <p>Access/egress point to be identified and kept clear at all times.</p> <p>Only trained, certificated MOLA operatives to work in areas designated as confined spaces. During the General Watching Brief, shaft and heading excavations should not be entered by MOLA operatives without prior agreement with the Principal Contractor or their sub-contractor.</p> <p>All personnel entering the excavation will be required to wear a harness and be trained in the use of escape sets. The number of personnel entering the excavation at any one time is to be kept to an absolute minimum, sufficient only to carry out the task in hand.</p> <p>Permit to enter/permit to work system to be used.</p>			
Assessment of Remaining Risks:		High	Medium
Serious and Imminent Danger Identified:		Yes	No

What Emergency Action Required?

MOLA Supervisor to report all accidents/incidents to HMJV's Site Manager or specified deputy in his absence

Ensure all serious non- emergency casualties not treatable by first aid are accompanied to the nearest A&E at:

Full Accident and Emergency:

Queen Elizabeth Hospital
Stadium Road
Greenwich
SE18 4QH

Tel: 020 8836 6000

Emergencies: MOLA supervisor to call 999 in absence of PC Site Manager or specified deputy.

Circumstances Requiring Additional Assessment?

Air monitor indicates poor air quality/presence of gas
Accident within the confined space

Competent Persons Appointed to Take Action

Principal Contractor Site Manager: TBC

MOLA Supervisor: TBC

Circulation of Risk Assessment

Employees and Volunteers	X		
Principal Contractor	X		
Client	X		
Sub Contractor			
Public/Visitors			
Other Occupier			
Risk Assessment Prepared by	Signed: CJH	Name: Craig Halsey	Date: 3/6/11

6.5. MOLA Site Specific Risk Assessment - Deep Excavations

MOLA RISK ASSESSMENT		DEEP EXCAVATIONS			
Significant Hazards		Assessment of Risk			
		Insignif	Low	Medium	High
1	Collapse of sides			•	
2	Striking existing services				•
3	Persons falling in			•	
4	Plant, bucket, and materials falling in				•
5	Flooding			•	
6	hazardous atmosphere				•
7	contaminated soil				•
ACTIONS ALREADY TAKEN TO REDUCE RISKS					
<p>Compliance with: MOLA Safety Policy, COSHH Regs 2002. Management of Health & Safety at Work Regulations 1999 Construction (Design and Management) Regulations 2007, Confined Spaces Regulations 1997 Standards including: 6031: Earthworks</p>					
<p>Planning: See Confined Spaces Risk Assessment. Project Managers to negotiate wherever possible that excavation shafts are wider than four metres. Where this is not possible ensure that spoil removal is by a beam hoist rather than a crane - smaller buckets should be used as these are more controllable. Electric hoists are preferred as they would reduce fume hazard. Sufficient numbers of trained operatives and competent supervision must be available before work starts. Sufficient and suitable plant must be available for trench support before work starts. Suitable monitoring equipment and personnel trained in its use will be required where known exposure to toxic substances or lack of oxygen may occur. Location of existing services must be complete before work starts, also information obtained on ground conditions.</p>					
<p>Physical: Substantial barriers must be erected around excavation shafts greater than 2m deep. Where poor ventilation is identified, the atmosphere must be continually monitored. Stop barriers must be used to prevent vehicle entry. Spoil and materials must be stacked at least 1.5m from the edge of excavation shafts. Ladders must be provided for safe access/egress and secured at all times. Suitable signs and barriers must be provided to warn of the work</p>					
<p>Management: Ensure safe system of work provided, taking account of prevailing conditions including weather, traffic and ensure all parts of structures placed over shafts for weather protection is secure. Personnel working in deep shafts to stand well clear of the hoisting in a protected area when the bucket is hoisted and lowered into shaft. If this is not possible then personnel must leave the shaft before hoisting and NOT re-enter UNTIL after the bucket has been lowered into place. Provide suitable PPE as required and ensure its correct use. Inspect excavations daily, and record thorough examination weekly in F91</p>					
<p>Training: Supervisors must have received training in general site safety, theory and practice of excavation work. Where necessary operatives must be instructed to leave excavation shaft before the bucket is hoisted and not to re-enter until bucket is lowered back into shaft (This applies to contractors as well as Company employees.)</p>					

MOLA SITE/TASK SPECIFIC RISK ASSESSMENT			
<p>For each site, location, and task the appropriate generic assessment should be reviewed to ensure that all significant hazards and their risks are identified and controlled. Completion of this Risk Assessment will ensure that your assessment is both appropriate and complete</p>			
Site/Location/Task:	Marmadon Sewer Southern Manhole trial pit survey GWB		
Frequency and Duration of Task:	Daily, up to 6 weeks	Number of Staff Involved:	Up to 3
<p>Specific Hazards Identified? Monitoring of deep excavations: -Mechanical hoist bucket or contents striking person in trench -Persons falling in -Flooding -Hazardous atmosphere</p>			
<p>Control Measures Required? Principal Contractor/appointed specialist sub-contractor to: -provide shoring and safe trench access -scan for services -provide barriers around deep excavations -measures from separate Confined Spaces risk assessment</p> <p>During the General Watching Brief, MOLA staff only to enter excavations with prior agreement with the Principal Contractor or their sub-contractor</p> <p>If work is being undertaken within the areas of deep excavation, MOLA staff to leave the shaft before hoisting of bucket takes place and not under normal operations re-enter until bucket is lowered back into position unless:</p> <ul style="list-style-type: none"> - suitable space or protection is afforded within the shaft so that staff will not be at risk should the bucket fall; - a banksman or topman is constantly present to ensure that the bucket is not re-lowered or suspended over the trench while staff are working in the trench; - there is clear agreement that the hoist or machine operating as a hoist will not be in operation for a specified time period at that location and will not in any case recommence operations without the agreement of the MOLA supervisor or suitable deputy. 			
Assessment of Remaining Risks:	High	Medium	Low
Serious and Imminent Danger Identified:	Yes	No	

<p>What Emergency Action Required? MOLA Supervisor to report all accidents/incidents to Principal Contractor's Site Manager or specified deputy in his absence Ensure all serious non- emergency casualties not treatable by first aid are accompanied to the nearest A&E at:</p> <p><i>Full Accident and Emergency:</i> Queen Elizabeth Hospital Stadium Road Greenwich SE18 4QH</p> <p>Tel: 020 8836 6000</p> <p>Emergencies: MOLA supervisor to call 999 in absence of PC Site Manager or specified deputy.</p>			
<p>Circumstances Requiring Additional Assessment?</p>			
<p>Competent Persons Appointed to Take Action Principal Contractor Site Manager: TBC MOLA Supervisor: TBC</p>			
<p>Circulation of Risk Assessment</p>			
Employees and Volunteers	X		
Principal Contractor	X		
Client	X		
Sub Contractor			
Public/Visitors			
Other Occupier			
Risk Assessment Prepared by	Signed: CJH	Name: Craig Halsey	Date: 3/6/11

7. Health and Safety Control Measures

7.1. Site Access/Vehicle Movements

On arrival at the site, MOLA staff will sign in, establish contact with the nominated Site Manager (or equivalent) attend any inductions etc. in accordance with the required access procedure for the site (to be notified to MOLA in advance by the Principal Contractor). All MOLA staff working on site will carry identification and CSCS cards.

Safe access routes from the site gate to work Areas and any offices and/or facilities will be erected and maintained at all times throughout the course of the archaeological monitoring of the works by the Principal Contractor.

7.2. Services and Ground Hazards

The location and making safe of live services before or during archaeological works is the responsibility of the relevant Principal Contractor in control of the site. MOLA staff will exercise care and due diligence and report any discovery of unexpected services or other ground hazards promptly to the Principal Contractor, Project Archaeologist and MOLA H & S Officer.

8. Safety of Excavations

8.1. Entering the Trench during General Watching Briefs

- MOLA Staff will not enter the trench if it is declared unsafe by the Principal Contractor.

8.2. Confined Spaces

- The trial pits may be designated confined spaces if sufficient depth is reached. All MOLA staff working in such designated areas will be trained to work in Confined Spaces. See Appendix, section 6.7.
- The Principal Contractor or appointed specialist sub-contractor is responsible for monitoring and control of Confined Spaces, and for provision of gas monitoring, rescue equipment, and other equipment or procedures required. The appointed PC/sub-contractor 'top man' will carry out an initial assessment of the confined space atmosphere and continually monitor at regular intervals, recording this as excavation progresses. All personnel will be trained in confined space working and deemed to be competent.
- All personnel entering the excavation will be required to wear a harness and be trained in the use of escape sets. The number of personnel entering the excavation at any one time is to be kept to an absolute minimum, sufficient only to carry out the task in hand.

- Given the proposed dimensions of the combined utilities trench, designation may change as excavation progresses. This will be kept under constant review.

8.3. Machine Excavation

- Machine excavation will be monitored by MOLA Senior Archaeologist/ Site Supervisor, but will at all times be under the control of the Principal Contractor.

8.4. Lone Working (watching briefs)

- The monitoring MOLA Supervisor will complete the necessary signing in procedures for each site visit and will also notify the Principal Contractor's Site Manager of their presence, and which works are to be monitored. The MOLA Supervisor will only be providing an attendance to observe, monitor and record the defined Principal Contractor's works and therefore will not be working alone. In particular the MOLA Supervisor will not attend works or enter excavations when the Principal Contractor is not present.

8.5. Contamination

- Contaminated land may be encountered on the site. The results of ground investigations are currently being assessed by independent consultants. The results will determine working methods and PPE requirements. All MOLA staff shall comply with the site regulations regarding contaminated land.

8.6. Ordnance

- In the event of MOLA not having been issued with an Ordnance Report from the Principal Contractor all MOLA Staff shall comply with the PC's rules. If Ordnance is unexpectedly found the MOLA Supervisor shall inform the PC immediately and withdraw to a safe place outside the area designated by the PC.

8.7. Site Rules

- All MOLA Staff will comply with the Principal Contractor's site rules and with the MOLA single person watching brief rules (when applicable).

9. Planning and Resources

9.1. Principal Contractor's Supply of Attendances

The site specific requirements for services, facilities and attendances to be provided by the Principal Contractor, to enable MOLA to undertake the defined archaeological works are set out below. Those items in **bold will be required** for this site – others may be required, depending on site conditions, which will be reviewed on site by the MOLA Supervisor in conjunction with the Principal Contractor's nominated Site Manager:

- **general site security** including hoardings, gateway, warning notices, etc; to create a secure site perimeter, sufficient to prevent unauthorised access. If the Principal Contractor has retained security guards, it is recommended that the archaeological investigation areas be added to their schedule for regular patrols, particularly out of hours.
- **specific site security**: it may be necessary to separately secure individual archaeological trenches via a physical barrier (such as Heras fencing) eg if there are public areas nearby or human remains are encountered.
- **providing safe access** to the site and the specified archaeological investigation areas via separately identified pedestrian routes, signing, safety guard-rails, secure ladders etc. This includes segregating these areas from any vehicles and plant operating nearby eg via a robust physical barrier.
- **adequate ventilation** and protection from noise, fumes and dust where plant is in use, especially within standing buildings
- **managerial services** – nominated points of contact for Principal Contractor and other key members of development team.
- **technical advice** to be available if required (eg via client or Principal Contractor's consulting engineer) ré protection of adjacent streets and buildings, removal of obstructions, depth of excavation, live services etc.
- **site accommodation and welfare facilities with electricity and water**. To include, at the North Woolwich Portal worksite furnished main base cabin as work space; separate male/female changing areas, toilets and washing facilities; plus additional steel cabin for secure storage of MOLA PPE, equipment, camera and paperwork and finds. For the basic monitoring component of a small watching brief, these facilities would normally be shared with the Principal Contractor's site establishment and separate work space is not normally required. For the general watching brief on utilities, shared desk space and lockable storage (eg small cabinet) for site paperwork will be required.
- **site preparation and clearance**. Removal of structures, vegetation, rubbish, spoil heaps, demolition materials, slab, modern obstructions, infill, made ground, etc. as required, prior to and during the archaeological investigation. The majority will be mechanical excavator, under archaeological

- supervision, but occasional hand work by labourers may be needed (eg clearing individual obstructions or removing spoil from investigation areas if the machine cannot re-enter).
- transport/mounding/storage of spoil from archaeological investigation areas. This includes removal from site, if necessary.
 - filling back and reinstatement upon completion (trenches are normally backfilled, for safety reasons, unless there are client instructions to the contrary).
 - supply of plant and equipment; principally a mechanical excavator of appropriate size; supplied with driver, breaker, toothed digging bucket and toothless ditching blade. Other plant such as dumpers, compressor/breakers, hoist and pumps may also be needed.
 - accreditation and supervision of operatives, plant and equipment, including supply of sufficient qualified banksmen/supervisors to control plant movements and adequate certification for plant and operatives.
 - *temporary support*: design, installation and maintenance of appropriate temporary support to excavations, where deeper than c 1.2 m (or as required in unstable ground). This will be via benching/battering back and/or shoring, depending on depth and ground conditions.
 - other safety measures in deep excavations: monitoring of air quality and provision of rescue facilities and equipment in any areas defined by the Principal Contractor as a confined space. Where hoists are used in shored shafts less than 4metres x 4metres area, MOLA staff shall leave the shaft before hoisting of bucket takes place and not under normal operations re-enter until bucket is lowered back into position:
Unless:
 - a banksman or topman is constantly present to ensure that the bucket is not re-lowered or suspended over the trench while staff are working in the trench;
 - there is clear agreement that the hoist or machine operating as a hoist will not be in operation for a specified time period at that location and will not in any case recommence operations without the agreement of the MOLA supervisor or suitable deputy.
 - Where mechanical or electrical hoists are in use in larger excavation trenches, the area in which the hoist is in use must be clearly demarcated and no staff will enter this area while the hoist is being raised or lowered or in the interval between these operations except under the circumstance specified above.
 - pumping-out: a suitable method to keep the trenches dry, eg pumping into a previously investigated trench, to create a sump.
 - temporary roofing (not required) to archaeological excavations (eg clear plastic sheets on scaffolding frame).

Needs to have adequate water drainage and ventilation. Local, portable frames would only be required if significant remains are present. There is no need for routine roofing of all excavation areas.

- **110v. site lighting and power supply** for access routes to excavations, plus individual task lighting within trenches (eg tripod-mounted spotlights) if required. The need for lighting depends on the depth, season and weather conditions or on ambient light level if working inside a standing building
- **locating and making safe any live services or hazardous substances (above or below ground):** preliminary services searches should be carried out by the Principal Contractor via the statutory undertakers etc, plus on-site inspection and testing where required. Where there is reason to believe from previous uses that the ground or adjacent buildings may be contaminated the Principal Contractor should make arrangements for advance inspection, sampling, testing and where necessary specialist remediation. The results of such surveys should be forwarded to MOLA *prior to commencement on site*. Any identified hazards will be addressed in the health and safety planning. Any unexpected hazards encountered during the investigations will also need to be made safe by the Principal Contractor before archaeological fieldwork may continue. In the event of the accidental disruption of a live service by archaeologists or sub-contractors under archaeological supervision the MOLA supervisor will inform both their project manager and the Principal Contractor and, when appropriate, call the relevant emergency number.
- **development of a safe method of working:** archaeologists will not be able to work within excavations whilst attendances (such as installing temporary support or removing spoil) are taking place, and when demolition, construction or heavy plant activity occurs adjacent or overhead.
- **First Aid:** provision of First Aid facilities, and an emergency plan. On evaluations or watching briefs with small numbers of staff, MOLA may not be able to supply a first aider. In that case, the services of the Principal Contractor's qualified first aider(s) may be required.

9.2. Equipment

Equipment will be supplied by the MOLA equipment central store:

- First Aid Kit
- Hand tools, dumpy levels, stationary, grid pegs, digital camera, etc.

9.3. PPE

All MOLA staff are supplied with and will wear or use the following PPE where required and as appropriate:

Safety Helmets (EN397)

Ear Defenders (EN 352-3)

Safety spectacles (EN166)

Dust masks plain and valved (EN149 2001)

Hi-visibility vests (EN471)

Gloves Nitrile and latex disposable, PVC, EN374

Safety footwear - steel toecap and mid-sole boots and Wellingtons EN345-47 (No riggers are allowed)

Flame retardant overalls

9.4. Staff

The timing and overall duration of the evaluation and the various watching brief/evaluation tasks listed earlier will be determined by the contractor's programme and the nature and extent of any surviving remains. It is envisaged that General Watching Briefs will be initially carried out by one MOLA Supervisor, with a second archaeologist coming in to assist with any recording work if required. Other archaeological specialists may be called in if necessary.

10. Briefing Arrangements

10.1. MOLA Staff Induction – New Starters

- All MOLA staff shall receive a full induction including Health and Safety on commencement of their first day of work with the organisation. A record of the induction is kept.
- The MOLA Supervisor will be briefed by MOLA Contracts Manager/Assistant Contracts Manager on all relevant aspects of work before work commences. This briefing will include all SS-WSI, Method Statements (PC's and including this document.
- The MOLA Supervisor will be responsible for briefing any other MOLA staff on site before they commence work on all aspects of the work and documents.

10.2. Site Specific Inductions, Weekly Briefings and Tool Box Talks

- Where a site is under the control of a Principal Contractor (as in this case), MOLA staff will attend all initial site inductions and subsequent toolbox talks as required and managed by the Principal Contractor.
- Irrespective of whether the site is controlled by MOLA or a Principal Contractor, on larger projects, e.g. those with more than 2-3 staff and of a week or longer duration, regular toolbox talks will be given by the MOLA Senior Archaeologist or other suitable member of staff using the CITB: construction site safety tool box talks manual. As a minimum requirement these talks will occur 1-2 times per week and be of 10-15 minutes duration.

11. First Aid

11.1. Trained First-Aid Personnel

During the evaluation there will be at least one MOLA staff, who is a qualified First Aider (i.e. 3 day F.A. at work course) present on site.

11.2. First Aid Documents

The MOLA site safety documents will be located with the first aid kit in the site office/mess hut/canteen. The safety documents will include a minimum of:

- Accident Book compliant with the Data Protection Regulations.
- MOLA Public Liability Insurance & Employers Liability Insurance for display
- Current MOLA Health and Safety Policy

- A copy of the site Welfare, Health and Safety Method Statement, extracted from the Site WSI, and modified as agreed during the course of the site.

11.3. First Aid Equipment

A MOLA First Aid kit, of an appropriate size for the site, will be located in the site office/mess hut/canteen or in the case of a small watching brief a 'bum bag' will be carried by the MOLA Supervisor at all times.

12. Accident, Incident, Near Miss and Environmental Incident Reporting

12.1. Reporting of Accidents/Incidents and Dangerous Occurrences

The Reporting of Injuries, Diseases and Dangerous Occurrences (RIDDOR) Regulations, 1995 sets out requirements for the reporting of certain types of accidents. RIDDOR notifiable accidents will be reported immediately by the MOLA site supervisor as specified in Section 17.5 (main document).

12.2. Documentation

In order to identify quickly problem areas and allow corrective action to be taken all accidents, dangerous occurrences and near misses, including those that do not cause injury, will be reported immediately to Section 9 (main document):

- Principal Contractor's Site Manager
- MOLA supervisor
- MOLA H & S officer
- MOLA Senior/Contracts Manager
- Crossrail Project Archaeologist
- Crossrail Helpdesk.
- Crossrail HS Manager

The site accident book for both the Principal Contractor and MOLA should be filled in giving details of the incident.

12.3. Investigation of Accidents and Dangerous Occurrences

MOLA will comply with the Principal Contractor's and Crossrail procedures.

MOLA will also initiate internal procedures as follows:

- Initial accident/incident report to MOLA Senior Contract Manager and Field Manager and action taken as appropriate.
- Non Riddors investigated by Senior Contract Manager/Field Manager.
- Riddors investigated and reported on to Senior Management Consultant by MOLA H & S Consultants.

12.4. Key MOLA Project Personnel

- George Dennis, Senior Contracts Manager, MOLA
- David Divers, Contracts Manager, MOLA
- Louise Davies, Assistant Contracts Manager, MOLA
- Craig Halsey, Fieldwork Director, MOLA

13. Emergency Procedures – Site General

All MOLA staff will comply with the Principal Contractor's procedures as outlined at the Site Specific Induction.

14. Emergency Services Contact Details

The Principal Contractor will confirm the hospital location:

Full Accident and Emergency:

Queen Elizabeth Hospital
Stadium Road
Greenwich
SE18 4QH

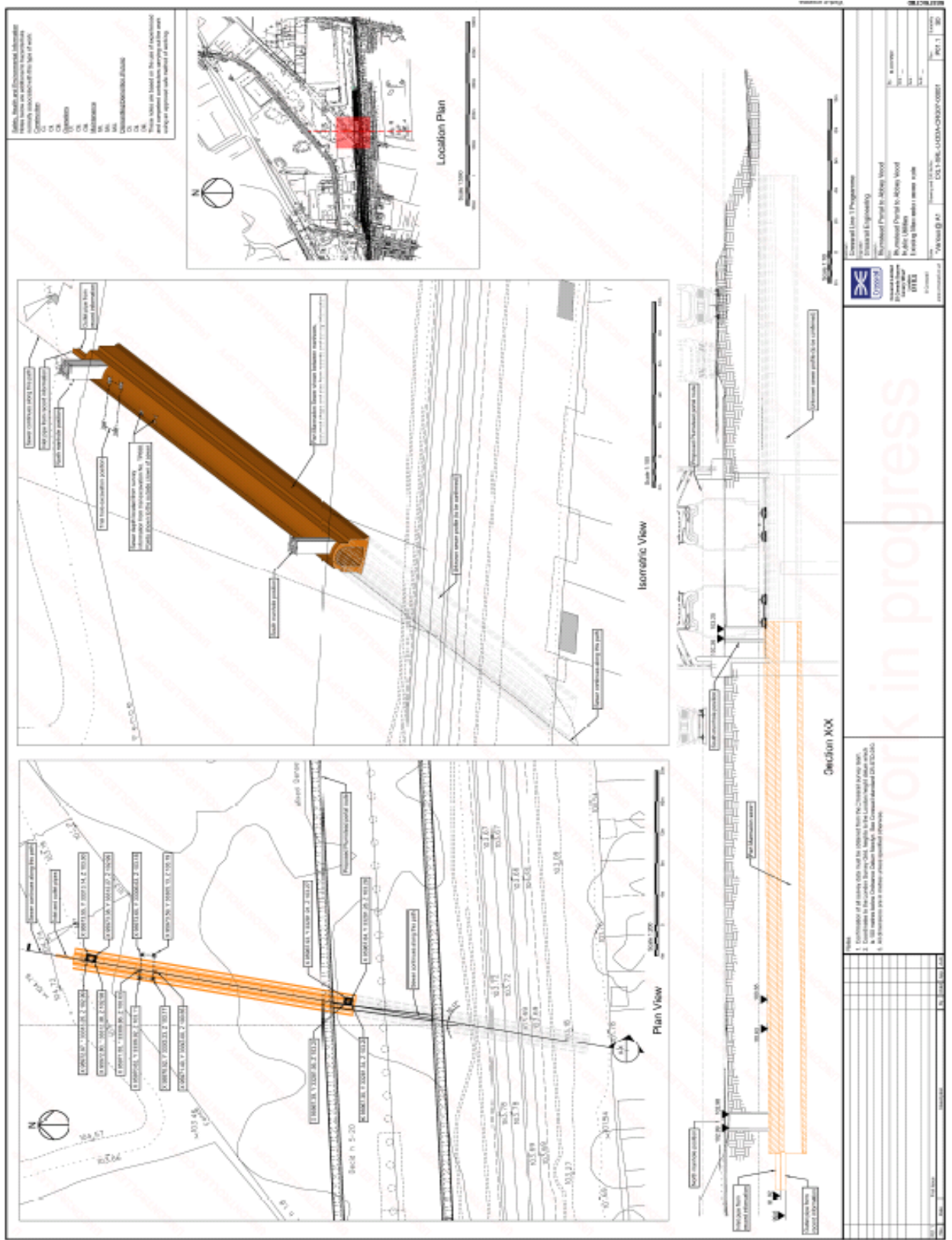
Tel: 020 8836 6000.

The MOLA supervisor will dial 999 for fire, ambulance and police in the case of an emergency if the Principal Contractor's Site Manager or his deputy is not present on site.

15. Route to Hospital

The Principal Contractor will advise on route to hospital at their site specific induction. The location and directions will also be displayed in the site offices and canteen.

Fig 1: Site Location



From: Moor, Ryan [ryanmoor@murphygroup.co.uk]
Sent: 05 September 2011 11:52
To: Halsey, Craig
Cc: Burns, Eamonn
Subject: Marmadon sewer watching brief

Attachments: C263_Marmadon_Sewer_WB_v2.0.doc
Craig

The revised Method Statement (v2.0) is acceptable to HMJV.

Regards

Ryan Moor



C310 – Thames Tunnel

Site Address: HMJV Site Compound, White Hart Avenue, Plumstead, London SE28 0AB
M: 07736 799953
Head Office: J Murphy and Sons Limited, Hiview House, Highgate Rd, London NW5 1TN

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