



# C257 ARCHAEOLOGY CENTRAL

## Method Statement

### Archaeological Watching Briefs

### Farringdon Eastern Ticket Hall

**Document Number: C257-MLA-T1-GMS-CRG02-00001**

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2a. Stakeholder (Principal Contractor: C430 Laing O'Rourke / Strabag Jv) review required? YES   
 NO

(If NO, strike out sections 2a & 2b and go to section 3)

This document has been reviewed by R. Farrell in the capacity of garbage manager (Laing O'Rourke / Strabag) for coordination, compliance, integration, and acceptance as a safe system of work, output, control, sequence. This document is acceptable for transmittal to Earl Mechanics for no objection to the works being executed as described.

Sign: [Signature] Name: Russell Farrell Date: 11/6/12

2b. Review by Stakeholder (if required):

Stakeholder Organisation	Job Title	Name	Signature	Date	Acceptance
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3. Acceptance by Crossrail

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Reviewed/Accepted by: (signature) <u>[Signature]</u>	Print Name: <u>J. CARVER</u>	Position: <u>8105 ALTH</u>	Date: <u>11/6/12</u>
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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
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<b>Contractual</b>	1.1 2 4 7 8 10 14 18 19 20
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*Fig 1 Moorgate Sidings Trial Pit Location, dwg no. C122-OVE-C2-DDH-CR001\_Z-00034 Rev. P01.1 (from Survey Request Scope)*

## 1 Introduction

Archaeological investigations are to be carried out on this site by the Museum of London Archaeology (MOLA). The requirements are set out in:

- A Crossrail **Site-specific Written Scheme of Investigation (SS-WSI)**: *Farringdon Station, Site-specific Written Scheme of Investigation, Doc. No. CR-SD-FAR-EN-SY-0001 Version 6, 20.11.09*
- An **Addendum to the WSI**: Package C136 – *Farringdon Station, Addendum to Written Scheme of Investigation: Trial Trench Evaluation, Watching Brief & Detailed Excavation – Eastern Ticket Hall (XSF10), Doc. No. C136-SWN-T1-XAP-M123\_WS098-00001 Revision 1.0, 12.10.10*
- ARUP-Atkins jv, 2010, Smithfield Intrusive Survey Scope - word.pdf [FAR-0248; doc. no. C122-OVE-S-QSV-M123-50001]

Task	FDC Notification	Principal Contractor	Provisional Programme
<ul style="list-style-type: none"> <li>• <b>General Watching Brief</b> on 9 trial pits and 3 shallow trial trenches in basement of <b>Smithfield Market</b> (Moorgate Spur) (Fig 1)</li> </ul>	FDCN C136-0008	C430 Laing O'Rourke / Strabag jv (LORS)	June 2012
<b>For Information:</b>			
<ul style="list-style-type: none"> <li>• COMPLETED <b>General Watching Brief</b> on TP/C2 at <b>10 Hayne Street</b></li> </ul>	FDCN C136-0005		<b>CANCELLED</b>
<ul style="list-style-type: none"> <li>• COMPLETED <b>General Watching Brief</b> on TP/H1 to TP/H4 at <b>33–37 Charterhouse Square</b></li> </ul>	FDCN C136-0006	Keltbray	<b>COMPLETED</b>
<ul style="list-style-type: none"> <li>• COMPLETED <b>General Watching Brief</b> on TP/G2, TP/G4, &amp; TP/F4 at 8–10 Hayne Street</li> </ul>	FDCN C136-0007	Keltbray	<b>COMPLETED</b>
<ul style="list-style-type: none"> <li>• COMPLETED <b>Trial Trench Evaluation</b> at 20–23 Long Lane, 2 Lindsey Street and 8–10 Hayne Street. Seven trenches (T1 to T7)</li> </ul>	FDCN C136-0003	C430 Laing O'Rourke / Strabag jv	<b>Completed July–Sept 2011,</b>
<ul style="list-style-type: none"> <li>• COMPLETED <b>Targeted Watching Brief</b> on structural trial trench adjacent to RBS building, 23–28 Charterhouse Square, Farringdon, c 1.5m x 1.5m x 6m deep</li> </ul>	<i>no FDCN</i>	C430 Laing O'Rourke / Strabag jv	<b>Completed Sept–Oct 2011</b>
<ul style="list-style-type: none"> <li>• COMPLETED <b>General and Targeted Watching Brief</b> on a <b>new utilities corridor</b> in Hayne Street and Charterhouse Square</li> </ul>	FDCN C136-0004	C240 McNicholas	<b>Completed Aug 11–Jan 2012</b>

This Method Statement has been developed in conjunction with the Principal Contractor (C430 LORS), who will be responsible for ensuring that the archaeological works may be carried out as specified. The purpose of the Watching Briefs is to



mitigate the impact of the specified development works upon archaeological remains, by making an adequate record of them in during the construction ground works (a mitigation strategy of *preservation by record* in line with Crossrail requirements). The purpose of the evaluations is to provide information on the presence or absence, character, extent, date, preservation, and importance of the potential archaeological remains currently predicted on the site, in order to inform future mitigation of potential impacts of the Crossrail works.

If the project design or scope/method of working are subject to changes during the works, the method statement will be updated and re-issued to the Project Archaeologist and Projectwide Construction Safety Manager for approval, in accordance with the specified document control procedures (see 7).

## **1.1 Site Description**

The Crossrail Eastern Ticket Hall worksite consists of properties between Lindsey Street and Hayne Street (south of the cutting for the Metropolitan and Circle Line and former Network Rail; immediately west of the LUL Barbican Station), and properties on the western and southern sides of Charterhouse Square (north of the cutting). Addresses are in the list of tasks above.

## **1.2 Geological and Topographical setting**

The drift geology consists of Pleistocene river terrace gravels (Hackney Sands and Gravels) overlying London Clay. The topography of the West Smithfield area is dominated by the former river Fleet, the main channel approximating the line of Farringdon Street and Farringdon Road. The Fleet is the largest of London's lost rivers, now confined to a sewer beneath Farringdon Street and New Bridge Street. The steep east bank of the Fleet is still in evidence today, falling from 116.5m ATD in West Smithfield to 107.9m ATD in Farringdon Street. The Fleet was the largest of London's former rivers and is now confined to a sewer beneath Farringdon Street and New Bridge Street. Tributaries flowing from east–west were also present in the area, but archaeological monitoring in the Farringdon area suggests that no stream features are likely to survive within the railway cutting.

## **1.3 Archaeological and Historic Background**

The site is situated to the north of the line of the Roman and medieval city wall and its associated defensive ditches. During the Roman period this area was used as a burial ground.

A market for horses and other livestock is first mentioned at this location in 1173. The field was also the site of the annual Bartholomew Fair from 1123–1855 and was used for tournaments.

It is possible that part of the outer cemetery of Charterhouse, (a Carthusian monastery founded in 1370, and closed in 1537) extended as far south as Charterhouse Square. It is understood that victims of the Black Death were buried in mass graves in the Charterhouse Square area, but the exact extent of these mass graves is uncertain. The Black Death is traditionally considered to a combination of bubonic, pneumonic and septicaemic plague. During 1349–50 it believed that

between a third and a half of the population of London and its suburbs (estimated at between 45,000 and 80,000) were killed during this pandemic.

John Stow in c 1600 stated that more 150,000 victims of the Black Death were buried here. According to Stow, initially there was a burial ground here known as 'No Man's Land' which the Bishop of London Ralph Stratford had established in 1348, which was subsequently used to bury over 50,000 victims of the Black Death. This mass burial ground was served by a mortuary chapel, which by Stow's time had been converted into a house. Stow states that in 1349 on the adjoining plot of land former known as 'Spittle Croft', Sir Walter Manny had established a second burial ground, where apparently another 100,000 plague victims were interned. Manny also established a chapel and later Carthusian monastery on the site of this second mass burial ground.

On the Agas map of c 1570, the general vicinity is shown as an area of suburban housing and gardens flanked by Smithfield livestock market to the south and the remains of Charterhouse to the north. Charterhouse by this time had been converted into an aristocratic residence. In 1611 Charterhouse was acquired by Thomas Sutton and converted in to a boys school and a hospital for 'poor gentleman'. Historic mapping generally shows that the majority of the site was probably undeveloped until the 17th century. In 1638, the cattle market was formally recognised with a Royal Charter. In 1851–66, Sir Horace Jones built the existing central market building, and in 1868 it opened as the London Central Meat Market.

Construction of the Metropolitan Line railway by 1873 dramatically altered the street layout and buildings between Long Lane and Charterhouse Lane with Lindsey Street and Hayne Street both being created at that time. It is likely that all of the 19th-century buildings on the site were demolished at that time.

#### **1.4 Deposit survival**

The Site-Specific WSI for Farringdon Station (Document Number: CR-SD-FAR-EN-SY-00001 Version 6, 20/11/09) recorded that archaeological sites and geotechnical boreholes in the area show that made ground deposits can generally be expected at c 113 to 116m ATD overlying c 1m of River Terrace deposits (Hackney Sands and Gravels).

In the basements of Smithfield Market and the Moorgate Spur, the only archaeological remains likely to survive are foundations of the Market, itself a listed building. All earlier remains are expected to have been removed by excavation of the basement and railway cutting.

## **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/Projectwide Construction Safety Manager 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 Crossrail Contract Administrator**

MOLA shall submit costings and timesheet reports in accordance with the C257 Contract to the Contract Administrator.

### **2.3 Interface with Principal Contractor**

MOLA shall liaise with the Principal Contractors (C430 Laing O'Rourke) to prepare the Method Statement. The archaeological investigations take place during enabling works and will therefore be undertaken under the auspices and supervision of the Principal Contractor. This interface extends to joint Health and Safety planning under CDM requirements. MOLA will provide the Principal Contractors 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. The Principal Contractors shall give MOLA 4 weeks notice of start date(s) for each work area or phase.

The Principal Contractor(s) for Farringdon Station are listed in section 1.

### **2.4 Interface with Crossrail Design Team**

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

### **2.5 Interface with External Consultees**

The Crossrail design archaeologist shall liaise with the City of London and English Heritage 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 archaeological evaluation and watching brief work to be carried out in advance of construction of the Eastern Ticket Hall for the future Crossrail Farringdon Station. These currently comprise the single watching brief listed in section 1.

The mitigation strategy for the site is *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:

- Brickley M and McKinley JI 2004. (eds.) Guidelines to the Standards for Recording Human Remains, BABAO/IFA paper no. 7
- Corporation of London Department of Planning and Transportation, 2004 Planning Advice Note 3: Archaeology in the City of London, Archaeology Guidance
- Crossrail Environmental Minimum Requirements (Crossrail 2008)
- Crossrail Archaeology Generic Written Scheme of Investigation (draft July 2009)
- Crossrail Archaeology Specification for Evaluation & Mitigation (including Watching Brief) (CR-PN-LWS-EN-SP-00001)
- Crossrail Code of Construction Practice
- Crossrail SS-WSI - Farringdon Station, Site-specific Written Scheme of Investigation, Crossrail November 2009, Doc. No. CR-SD-FAR-EN-SY-0001 Version 6.0 and addendum to the SS-WSI: Package C136 – Farringdon Station, Addendum to Written Scheme of Investigation, Crossrail October 2010, Trial Trench Evaluation, Watching Brief & Detailed Excavation – Eastern Ticket Hall (XSF10), Doc. No. C136-SWN-T1-XAP-M123\_WS098-00001 Revision 1.0
- English Heritage, July 2009, Standards for Archaeological Work, London Region, External Consultation Draft
- 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)
- Mays S, Brickley M, and Dodwell N, 2002, Centre for Archaeology Guidelines. Human Bones from Archaeological Sites: guidelines for producing assessment documents and analytical reports. English Heritage

- McKinley, J and Roberts, C, 1993, Excavation and Post-Excavation treatment of cremated and inhumed human remains. IFA technical paper 13
- 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)
- Museum of London (Powers N (ed.)), 2008, Human osteology method statement, <http://www.museumoflondon.org.uk/NR/rdonlyres/2D513AFA-EB45-43C2-AEAC-30B256245FD6/0/MicrosoftWordOsteologyMethodStatementMarch2008.pdf>
- Museum of London Archaeology Service (Powers N), undated, Guidelines for the assessment of inhumations and disarticulated bone, unpublished
- United Kingdom Institute for Conservation's Conservation Guidelines No. 2

### 3.3 Aims and Objectives

#### 3.3.1 Research Aims

The original aims and objectives were listed in the SS-WSI Farringdon Station (Doc. No. CR-SD-FAR-EN-SY-0001, see section 1) and stated that 'Archaeological investigation and mitigation within the Crossrail worksites for Farringdon Station have the potential to contribute to the research themes set out below':

*Evidence for burials and/or features associated with the Charterhouse burial ground may contribute to the following research aims:*

- Understanding life expectancy, origins and belief, seen through studying health, diet and disease, and preparing models for future research;
- Considering the relationship between cemeteries and major or minor roads, in terms of symbolism, status, privacy and convenience; and
- Understanding the differences, if any, between burial practices in the city and outlying cemeteries.

*Archaeological remains associated with post-medieval extra-mural development may contribute to the following aim:*

- Contributing to our understanding of the creation of the London suburbs with direct contribution to today's aspirations for an urban regeneration.

#### 3.3.2 Fieldwork Objectives

The overall objectives of the investigation are to establish the nature, extent and state of preservation of any surviving archaeological remains that will be impacted upon by the development. Those of the various watching briefs are to preserve by record any surviving archaeological remains that will be impacted upon by the relevant works.

The task-specific aims and objectives from the Addendum to the WSI (Doc. No. C136-SWN-T1-XAP-M123\_WS098-00001, see section 1) are:

1. Mitigation in the form of archaeological watching brief to excavate and record archaeological deposits for analysis and dissemination [excavation as mitigation does not form part of this method statement] .

Specifically, the archaeological investigations have the potential to recover:

- Remains of Roman extra-mural activity, potentially including field systems
- Burials from the Outer Cemetery of mediaeval charterhouse, and other associated features
- Medieval occupation features, and possibly buildings, from the expansion of extra-mural settlement in the West Smithfield area following the establishment of the livestock market
- Post-medieval buildings and occupation features representing the creation and expansion of the extra-mural suburbs

In addition, **the GWB in Smithfield Market** (Moorgate Spur) **has the additional objective to prevent any impact to the listed structure.**

### **3.4 Event Codes**

The sitecode is **XSF10**.

## **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.

In the case of the General Watching Briefs and Targeted Watching Briefs a MOLA Supervisor (Grade 5)/Senior Archaeologist (Grade 4) will be supervised by a MOLA Senior Archaeologist (Grade 3) or Contracts Manager/Assistant Contracts Manager

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. However, it is not anticipated that this 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 Contracts Manager (Elaine Eastbury, BSc) or Assistant Contracts Manager (Nicholas Elsdon, BSc) via site visits, as and when required, in order to provide advice and support to the MOLA Supervisor. The MOLA H & S Compliance Manager, Ian Grainger, and if required their Advisor (Hascom) will also regularly monitor the site, see 15.3.

#### 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, and a BMOS report (see 15.5).

#### 4.5 Resource Plan

The general watching brief will be supervised by a MOLA Experienced Archaeologist or Senior Archaeologist, assisted by members of the MOLA field team with support from MOLA Geomatics and Photographic team members when required.

Other archaeological specialists (Grade 8) may be called in if necessary.

##### **General/Targeted 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, eg geoarchaeologists or osteologists), may be called in if necessary.

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

The named Supervisor will be confirmed to Crossrail and the Principal Contractor in advance, and added to subsequent versions of this method statement, once the firm start date has been notified to MOLA. Other staff to be assigned when required.

For the evaluation:

Person	Role	Responsibility	Qualifications
Sam Pfizenmaier	Supervisor	Overall site supervision	BA (Hons) Archaeology

Other staff and specialists are to be determined when required.

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

#### 4.6 Programme

The start dates and durations for the tasks are contained in the table in section 1.

#### 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.

## 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 (providing that there is proper access and that it is safe to do).

Generally monitoring will only be undertaken when areas or trenches have been dug down 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 Experienced or 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.

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 0). This redefinition if authorised by the Project Archaeologist would permit additional resources in terms of staff and attendance to allow for more intensive recording.

In the event (**exceedingly unlikely in the basement of Smithfield Market/Moorgate Spur**) of *in-situ* human remains being uncovered during the excavation any structural test pits or service diversion trenches being monitored, the excavation will cease. Then the remains will be cleaned and recorded by MOLA staff. At this point in terms of Crossrail archaeological procedure the site would be upgraded to a targeted watching brief (see 0). The decision to either excavate or remove any *in-situ* remains encountered in any structural test pits or service trenches at this stage will be made on an individual basis in conjunction with the Project Archaeologist. Any ex-situ human bones discovered will be collected, bagged up, examined by the Osteologist and reburied in the test pit in which they were found before it is backfilled. It is assumed that any excavated spoil that may possibly contain disarticulated human remains will be used to backfill the test pit or trench from which it was derived and will not be removed from site.

#### 5.1.1 General watching brief tasks

The general watching brief tasks to be conducted are:

- Monitoring the excavation of 9 trial pits and 3 shallow trial trenches in basement of Smithfield Market (Moorgate Spur) (Fig 1)

## **6 Environmental archaeology investigation methodology**

### **These methods are exceedingly unlikely to be required in the basement of Smithfield Market/Moorgate Spur.**

Environmental archaeology examines the plant, animal and human remains associated with past human activity and the past landscape context of this activity, in order to obtain a better understanding of the economic, social and environmental setting of archaeological evidence. It involves input from a wide range of specialisms to cover the varied spectrum of environmental remains (from microscopic pollen and diatoms, to snails, seeds, insects, bird and fish bone, large mammal bone and human remains) that might be preserved in the soils and sediments excavated on an archaeological site. In addition, in order to understand how the archaeological deposits built up and to reconstruct their depositional environment geoarchaeologists examine the archaeological deposit sequence *in situ*.

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 (ie the Pleistocene/Lower Palaeolithic and later).

Within the Crossrail Farringdon Eastern Ticket Hall site the focus of the environmental archaeology work will be on the likely burials and evidence for the medieval and later Smithfields Market and post-medieval urban expansion. Although the site lies at the margins of the Fleet Valley it is anticipated that there may only be a limited geoarchaeological component to the work. No geoarchaeological deposits requiring intensive specialist sampling (e.g. alluvium) are currently predicted on this site. Potentially the work may include the following types of deposit, if present and suitable:

- Cut features such as rubbish pits or ditches
- Burials
- Dumps / deposits of animal bone

This work will be conducted under the environmental archaeology sampling strategy (archaeological science strategy) for the Farringdon site, see below.

### **6.1 Sampling strategy for Farringdon Eastern Ticket Hall**

This sampling strategy addresses the whole archaeological project for Farringdon Eastern Ticket Hall. At the initial field evaluation stage, sampling would be targeted to establishing the environmental archaeology potential of deposits, eg by taking selected bulk samples. This allows the more detailed sampling described below to be undertaken in a more informed manner generally as part of the following mitigation phase of the archaeological project (where this is warranted).

#### **Overview**

Selected Roman, medieval and post-medieval negative features will be targeted for environmental sampling, where suitable. The aim of this sampling is to evaluate the degree of preservation and range of environmental remains preserved within the

archaeological 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 excavating each trench. If required, an environmental archaeologist or osteologist will be on call to visit the site, advise and where necessary record and take samples from selected deposits.

### General Methodology

For each trench the Contracts Manager and MOLA Supervisor will ensure the following with the support of a MOLA Environmental Archaeologist / and/or Osteologist:

- 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 excavation and recording.
- That the environmental procedures outlined in section 3.2, and in particular the following documents are followed if required and requested by the Project Archaeologist:
  - Archaeological Site Manual (MoL 1994)
  - Environmental archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation (English Heritage 2002)
  - Centre for Archaeology Guidelines. Human Bones from Archaeological Sites: guidelines for producing assessment documents and analytical reports (English Heritage (Mays S, Brickley M, and Dodwell N) 2002b)
  - Human osteology method statement (Museum of London (ed. Powers N) 2008)
- That general bulk samples, 40 litres in size (20L if waterlogged) will be the standard samples taken (depending on the volume of the feature) 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 (ie floor layers), the sample size will depend on feature; column bulk samples (c 2–20L) to sample ditches, deep refuse deposits and natural deposits; spot samples for dating; monolith and micromorphology 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)	archaeologist	Large/small mammal, bird, fish, reptile, amphibian, marine molluscs, eggshell, plant	Flotation or wet sieving

sample)		macrofossils	
		Insects	Paraffin flotation
		Artefacts	Hand Washed
Column bulk (20 litre)	Archaeologist on advice of geoarchaeologist	Freshwater and terrestrial molluscs, ostracods	Disaggregated and wet sieved
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 augerhole cores for external specialists

- The sampling strategy will be monitored throughout the excavation and adapted in light of the preservation and the type of features encountered. A MOLA Environmental Archaeologist and/or Osteologist 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 and/or osteologist, as appropriate, 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.

### Sampling approach to main features anticipated

- *Human remains*: articulated burials (inhumations) will be recovered individually, with separate parts of the body (right arm, torso, left leg etc.) bagged separately on site. Where redeposited and/or disarticulated human remains are encountered, they will be lifted and labelled by context and retained for examination by the Osteologist. It is not anticipated that cremations will be present on this site, however if present, they will be subject to 100% sampling.

- *Cess/rubbish pit fills*: in general a 40 litre sample will be taken from each fill within the pit. If the fill is deep and homogeneous samples should be taken from the top, middle and base of the fill. The sample size may be reduced to 20 litres if waterlogged.
- *Discrete rubbish dumps/middens*: a single 40 litre sample will be taken, if they are extensive these will be sampled spatially with smaller bulk samples (for example: 10-20 litres at 1m intervals), and if deep, at different depths, as there may be variations within the deposit. If large dumps of animal bone are present, an animal bone specialist will visit the site to assess and advise on retention and sampling policies, as required.
- *Occupation deposits (sunken floors, cellars etc)*: as for midden deposits, but paying particular attention to corners and other areas where greater accumulation occurred. Where appropriate soil blocks for micromorphology will also be taken from these deposits.
- *Ditches/Linear cuts*: will be sampled at several locations along the length (40 litre bulk samples at intervals for macro-remains (plants, insects, molluscs) and 20 litres for waterlogged deposits). Any natural accumulations encountered within such features will have monolith samples taken (for study of sediments and micro-organisms, e.g. pollen), with an adjacent column of continuous bulk sample slabs, respecting context interfaces, for macro-remains.

## **7 Deliverables and Submission Programme**

MOLA shall provide the following reports in accordance with the C257 Contract and the Site Specific Written Scheme of Investigation (C136-SWN-C2-JLT-M123-00001) and Addendum (C136-SWN-T1-XAP-M123\_WS098-00001) to the Project Archaeologist *or as confirmed or otherwise instructed by the Project Archaeologist at the end of the fieldwork*:

- Organisation of site monitoring visits, as and when requested by the Principal Archaeologist.
- A weekly illustrated progress report to the Project Archaeologist containing the information required at part 5.10 of the C257 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. All levels cited in these reports should be Above Tunnel Datum (TD = OD +100m). All Co-ordinates cited in these reports should be based on the Crossrail 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 C257 contract (see 14.3).
- 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.

## **8 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 7) will be submitted to the Project Archaeologist in draft form (Version 1.0). Any tracked changes or comments added by the Project Archaeologist 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.



## 9 Artefact Recovery and Conservation

**These methods are exceedingly unlikely to be required in the basement of Smithfield Market/Moorgate Spur.**

Sampling strategies are developed on a site specific basis to meet the evaluation objectives stated in the Crossrail Site-specific WSI; and the following professional standards, in consultation with appropriate specialists:

- 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, e.g. 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.

### 9.1 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 11.1).

## 10 Treasure

**These methods are exceedingly unlikely to be required in the basement of Smithfield Market/Moorgate Spur.**

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.

## 11 Archaeological Science Strategy

**These methods are exceedingly unlikely to be required in the basement of Smithfield Market/Moorgate Spur.**

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 6.1 for the site-specific sampling strategy.

### 11.1 Specialist Strategy

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

### 11.2 Excavation and Recording of Human Remains

The required methodology for human remains is set out in detail in the SS-WSI and the MOLA Framework Method Statement (Technical Submission 2.4, section 4.6) and is not repeated here. It is anticipated that human remains may present on this site and exhumation licences have been applied for and received from the Ministry of Justice (see 14.4).

If human remains are present, any complete or semi-complete, articulated burials will be left *in situ*, suitably covered and protected, at the exploratory or enabling works

stage of Crossrail works. Protective measures may include covering with Terram and sand before the trench is backfilled (to be provided by the Principal Contractor). Any *in situ* human remains will be recorded to watching brief standard (cleaned, location recorded and photographed). Any re-deposited, disarticulated human bones will be collected, examined briefly by the Osteologist, bagged, labelled and returned to the trench in which they were found, before it is backfilled. The advice of a MOLA Osteologist will be sought where the nature of a deposit containing human remains is ambiguous. Similarly, if any of the contractor's excavated spoil may also contain further disarticulated human bone it must not be removed from site but should be re-filled by the Principal Contractor into the trenches on completion.

If this proposed method for retaining human remains is not feasible, eg where the Principal Contractor may be under instruction to reach a certain depth and that can only be achieved by removing *in situ* remains, then further resources would be needed for a more detailed prior investigation and record, as per *additional follow up recording* (see 5.1) and the Crossrail, 2009 Archaeology Specification for Evaluation & Mitigation including Watching Brief CR-PN-LWS-EN-SP-0001, version 3. A Ministry of Justice licence would be obtained by MOLA if required.

## **12 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 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).

### **13 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 C257 Contract and project standard survey requirements.

- For evaluations the trenches may be manually marked out on site in relation to existing real world features by MOLA staff in the locations specified by the Project Archaeologist on a suitable hardcopy site plan. If trench locations are required to be set out on Crossrail London Survey Grid co-ordinates, then Crossrail surveyors will need to supply MOLA Geomatics with the relevant survey control and mapping sufficiently in advance of the site visit to allow for survey preparation. In the event of MOLA Geomatics staff setting out trenches without Crossrail survey control, then they will reference locations to OSGB36 co-ordinates, through using GPS/GNSS. It is expected that the survey methodology employed will vary depending on the individual circumstances of each site, and the availability or suitability of using London Survey Grid control and co-ordinates.
- For dispersed Watching Briefs occurring on large sites the Principal Contractor's survey controls may not yet have been installed (eg 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.
- 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 if MOLA have conducted the surveying.

## 14 Additional Details

### 14.1 Standards and Guidance

See Section 3.2.

### 14.2 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.

### 14.3 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 C257 contract.

### 14.4 Management of Consents

MOLA will liaise with the Employer and Principal Contractor regarding supply of any necessary information in support of required consents, eg road closures, Permit to Dig.

In general separate consents for archaeological works are unlikely to be required, the exception being human remains. **A burial licence is not required in advance for the Smithfield Market basement/Moorgate Spur, as any burials once present are exceedingly likely to have been removed by excavation of the basement/cutting.**

## **15 Health and Safety**

### **15.1 CDM Responsibilities and Reporting**

- MOLA will be supporting and reporting to the Principal Contractor and to the Crossrail Project Archaeologist and Projectwide Construction Safety Manager:
- 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, Health and Safety at Law Poster, 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 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 handrails, shoring and ladders. These requirements are listed in detail in separate documents.
- Construction Phase Plan (CPP: not yet received from Principal Contractor).

The Projectwide Construction Safety Manager 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: eg services and contamination reports; any relevant requirements regarding rights of way, noise, hours of operation, etc.

## **15.2 Rail Sites**

This is not a designated rail site (the railway is disused).

## **15.3 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.

## **15.4 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.

### **15.5 Behavioural Safety BMOS**

Mobile phones, personal CD players, i-pods and similar will not be used by MOLA staff in archaeological trenches or areas of work. Smoking and naked flames are 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 and reported on in the progress report (see 4.3).



## **16 Emergency Response**

### **16.1 Emergency Preparedness & Response Plan**

An Emergency Preparedness/Continuity Plan is currently being prepared by MOLA and will be submitted to Crossrail for approval.

MOLA staff will comply with the Principal Contractor's Emergency Plan.

### **16.2 Training**

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

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

### **16.3 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.

### **16.4 Monitoring & Testing**

MOLA staff will comply with Crossrail requirements.

### **16.5 Emergency & Accident Incident Reporting**

All accidents and emergencies must be reported to the Principal Contractor (Gwyn Edwards (m 07776 457508) for the Smithfield Market trial pits/trenches who will call the emergency services, if required. They will also be reported to the Crossrail Incident Report Desk: 020 3197 5000.

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
- Projectwide Construction Safety Manager, Crossrail Central, Crossrail Ltd, 25 Canada Square, London E14 5LQ  
Mobile 07718 861941

- 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, Health and Safety Compliance Manager, Museum of London Archaeology, Mortimer Wheeler House, 46 Eagle Wharf Road, London N1 7ED  
DD 0207 410 2200, Int 2271

## 17 Environmental Management

The archaeological works will be carried out whilst the Principal Contractor is in possession of the site. MOLA will therefore request a copy of the Principal Contractor's Environmental Management Plan prior to commencement and will supply any necessary inputs with regard to MOLA works. MOLA will comply with the Principal Contractor's Environmental Management System as documented in their Environmental Management Plan, and contribute to their EMS reporting if required.

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 15 and Appendix: 9.5). 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](mailto:atelfer@museumoflondon.org.uk), 020 7410 2276.

### 17.1 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 a licenced contractor.

### 17.2 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.

### 17.3 Site Waste Management Plan

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

It is anticipated that very little waste will be removed from the site from the archaeological works, but any produced will be disposed of by the Principal Contractor in accordance with their Waste Management Plan.

### 17.4 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:

NAME	VEHICLE REG NO
M Cox	KC54 XTZ & DY59 YWB

A Chopping	KC54 XTZ & DY59 YWB
G Spurr	KC54 XTZ & DY59 YWB
H Matthews	EA55 NBJ
S Jones	KC54 XTZ & DY59 YWB
C Drew	KC54 XTZ & DY59 YWB
M Burch	KC54 XTZ & DY59 YWB
V Yendell	KC54 XTZ & DY59 YWB
<b>CONTACT (All)</b>	<b>020 7410 2200</b>

### 17.5 Other Requirements

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

## 18 Quality Assurance Plan

An updated Quality Assurance Plan has been prepared for submission to Crossrail in accordance with the format specified at part 5.4 of the C257 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. The MOLA responsible procurement representative is Dawn Jackson, who is a member of the Senior Management Group.

## 19 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.

## **20 Responsible Procurement**

An updated Responsible Procurement document was submitted to Alison Jackson, Crossrail on 6th August 2010.

## **21 Health and Safety Method Statement**

### **21.1 Introduction and Purpose**

#### **21.1.1 Project Background**

Archaeological investigations are to be carried out on this site by Museum of London Archaeology (MOLA). The requirements are set out in a Crossrail Site-specific Written Scheme of Investigation (SS-WSI – Farringdon Station, Site-specific Written Scheme of Investigation, Doc. No. CR-SD-FAR-EN-SY-0001 Version 6.0 and the addendum to the Written Scheme of Investigation: Trial Trench Evaluation, Watching Brief & Detailed Excavation – Eastern Ticket Hall (XSF10), Doc. No. C136-SWN-T1-XAP-M123\_WS098-00001 Revision 1.01).

### **21.2 Scope of Document**

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

- **General Watching Brief** on 9 trial pits and 3 shallow trial trenches in basement of **Smithfield Market** (Moorgate Spur).

This method statement has been developed in conjunction with the Principal Contractors, who will be responsible for ensuring that the archaeological works may be carried out as specified.

### **21.3 Responsible Persons and Site Management**

#### **21.3.1 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 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.

### **21.4 Scope of Works**

#### **21.4.1 Proposed archaeological works**

The scope of archaeological works is set out in No. 2 above, and in section 1 of the method statement, above.

## **21.5 Methodology, Programme and Sequence**

The programme is set out in section in the table in section 1 of the method statement, above.

The next task to start is currently expected to be the Smithfield Market works in June 2012.

## **21.6 Health and Safety Control Measures**

### **21.6.1 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.

### **21.6.2 Services**

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.

## **21.7 Safety of Excavations**

### **21.7.1 Entering the Trench during General or Targeted Watching Briefs**

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

### **21.7.2 Shoring**

- Where required during a Targeted Watching Brief or Evaluation the trench will be shored in a suitable manner by the Principal Contractor and safe access arranged.

### **21.7.3 Confined Spaces**

- At the time of writing no areas have been defined by MOLA or the Principal Contractor as Confined Spaces. This will be kept under constant review.

#### 21.7.4 Machine Excavation

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

#### 21.7.5 Hand Excavation during Evaluation or Targeted Watching Brief

- Hand excavation will be limited to selected times/areas defined by the MOLA Senior Archaeologist/ Site Supervisor, with the agreement of the Principal Contractor, and will be properly fenced, demarcated and signed.

#### 21.7.6 Lone Working

- 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, which works are to be monitored. The MOLA Supervisor will only be providing an attendance to observe, monitor and record the defined Principal Contractors 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.

#### 21.7.7 Contamination

- MOLA shall be issued with all relevant contamination test results for above and below ground hazards by the Principal Contractor prior to commencement. Any necessary remedial action will then be agreed with the Principal Contractor as part of the H & S Plan and supplied as an attendance item (9.1 below). Wherever possible such action must be undertaken by the Principal Contractor prior to MOLA commencement on site. If this is not done there may be operational constraints on the MOLA safe method of working that could restrict achievement of the archaeological scope of works set out in the SS-WSI.

#### 21.7.8 Ordnance

- In the event of MOLA not having been issued with an Ordnance Report from the Principal Contractor, the MOLA Supervisor 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.

#### 21.7.9 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).



## 21.8 Planning and Resources

### 21.8.1 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) re 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 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. It is provisionally estimated that accommodation etc for 1 person will be required for the watching brief.
- **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 360 degree tracked mechanical excavator of minimum 12 ton 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 a 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 4m x 4m size MOLA staff will leave the shaft before hoisting of buckets takes place. Beyond a depth of 3m within such shafts gas monitoring equipment will be required to ensure appropriate air quality for those working there. 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.
- **pumping-out**: a suitable method to keep the trenches dry, eg pumping into a previously investigated trench, to create a sump.
- **temporary roofing (only required if human remains are present)** 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** 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.

#### 21.8.2 Equipment

Equipment will be supplied by the MOLA equipment central store:

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

Any specialised equipment such as power augers will have certification of maintenance kept at MOLA headquarters.

#### 21.8.3 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)

#### 21.8.4 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 and Targeted 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. The evaluation will be supervised by one MOLA Supervisor assisted by an adequate number of field staff. Other archaeological specialists may be called in if necessary.

It is *provisionally* estimated that 1 archaeologist might be required on site for the watching brief. MOLA will notify the Principal Contractor if more staff are required.

### 21.9 Briefing Arrangements

#### 21.9.1 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.

#### 21.9.2 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 Supervisor 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.

### **21.10 First Aid**

#### 21.10.1 Trained First-Aid Personnel

During the evaluation there will be at least one MOLA Archaeologist who is a qualified First Aider (ie 3 day FA at work course) on site.

#### 21.10.2 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:

- Current Health and Safety at Law Poster for display where legislation requires
- Accident Book compliant with the Data Protection Regulations.
- MOLA Public Liability Insurance & Employers Liability Insurance for display
- Where To Get First Aid poster – to be displayed if required.
- 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.

#### 21.10.3 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 this site a 'bum bag' will be carried by the MOLA Senior Archaeologist at all times.

## **21.11 Accident, Incident, Near Miss and Environmental Incident Reporting**

### 21.11.1 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 16.5 of the method statement, above.

### 21.11.2 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:

- Principal Contractor's Site Manager
- MOLA supervisor
- MOLA H & S officer
- MOLA Senior/Contracts Manager
- Crossrail Project Archaeologist
- Crossrail Incident Report Desk: 020 3197 5000

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

### 21.11.3 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.

### 21.11.4 Key Project Personnel

- George Dennis, Senior Contracts Manager, MOLA
- Elaine Eastbury, Contracts Manager, MOLA
- Nicholas Elsdon, Assistant Contracts Manager, MOLA

### **21.12 Emergency Procedures – Site General**

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

### **21.13 Emergency Services Contact Details**

The Principal Contractor will confirm the hospital location:

*Minor A & E at:*

St Bartholomew's

West Smithfield Street, EC1

020 7377 7000

Tube: Barbican, Farringdon, St Paul's

*Full A & E at:*

University College Hospital (UCH)

Ground Floor

235 Euston Road

London NW1 2BU

Telephone 0845 155 5000 ext 70001 or 70011

Fax 0207 380 9708

Tube: Warren Street (Northern / Victoria Lines) or Euston Square (Circle / Hammersmith & City / Metropolitan Lines)

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 (see ) is not present on site.

### **21.14 Route to Hospital**

The Principal Contractor will advise on route to hospital at their site specific induction.

## 22 Risk Assessments

### MOLA Risk Assessment – General & Targeted Watching Brief

Site- Farringdon ETH: Smithfield Market			Type of Work		General Watching Brief
	<b>Persons Affected</b>	<b>No</b>	<b>Classification</b>	<b>No</b>	
	Employees	1	Experienced	1	
	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	x
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.

<b>Assessment of Remaining risk (Low, Medium, High) (see notes on reverse)</b>												
	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	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	x			
UXO	x							On/Near Water				
<b>Emergency action/additional assessment required for remaining medium/high risk</b>												
See Site Specific Risk Assessment for Buried Services												
<b>Competent Person(s) appointed to take action:</b>				<b>Report seen by (initials)</b>								
MOLA Supervisor				<b>PM GD</b>				<b>Archaeologists</b>				
				<b>SA(s) TBC</b>								
				<b>Client JC/RD</b>								
				<b>Contractor</b>								
				<b>Other</b>								



## 22.2 MOLA Site Specific Risk Assessment – Confined Spaces

MOLA RISK ASSESSMENT		CONFINED SPACES			
Significant Hazards		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><b>Compliance with:</b>                      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><b>Planning:</b>                      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>					

**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 (both start of work and after breaks) 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

Rescue equipment (in particular hoists) should be **operated, and inspected on a daily basis, by a trained, competent, operative/supervisor from the Principal Contractor (C430 LORS)** or their subcontractor, and receive a **thorough examination at the intervals specified in the Principal Contractor’s method statement/risk assessment for the use of the equipment**. The MOLA Site Supervisor will not start work until it is confirmed that C430 LORS(or their sub-contractor) have checked the rescue equipment (in particular hoists) on set up and conducted their daily visual inspection, as specified in the Principal Contractor’s method statement/risk assessment for the use of the equipment. The MOLA Site Supervisor will sign the daily record to show that they have seen that C430 LORS(or their sub-contractor) have conducted their inspection (MOLA is **not** inspecting the equipment themselves).

**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.

**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.

<b>MOLA SITE/TASK SPECIFIC RISK ASSESSMENT</b>			
<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>			
<b>Site/Location/Task:</b>	<b>Farringdon ETH: Smithfield Market, Watching Brief</b>		
<b>Frequency and Duration of Task:</b>	Daily c 1 month	<b>Number of Staff Involved:</b>	<b>1</b>

<b>Specific Hazards Identified?</b>			
Restricted access points to the market may potentially result in some or all of the trenches being defined as confined spaces.			
<b>Control Measures Required?</b>			
<p><b>The Principal 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 C430 Laing O'Rourke / Strabag jv (LORS) (or their 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.</b></p> <p><b>Only trained, certificated MOLA operatives to work in areas designated as confined spaces.</b></p> <p><b>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.</b></p> <p><b>No power augering to be undertaken in designated confined spaces.</b></p> <p><b>Permit to enter/permit to work system to be used.</b></p>			
<b>Assessment of Remaining Risks:</b>	High	<b>Medium</b>	Low
<b>Serious and Imminent Danger Identified:</b>	Yes	<b>No</b>	

**What Emergency Action Required?**

**MOLA Supervisor to report all accidents/incidents to C430 Laing O'Rourke / Strabag jv (LORS) 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:

*Minor A& E at:*

St Bartholomew's, West Smithfield Street, EC1  
020 7377 7000  
Tube: St Paul's

*Full A & E at:*

University College Hospital (UCH)  
Ground Floor  
235 Euston Road  
London NW1 2BU  
Telephone 0845 155 5000 ext 70001 or 70011  
Fax 0207 380 9708

Tube: Warren Street (Northern / Victoria Lines) or Euston Square (Circle / Hammersmith & City / Metropolitan Lines)

**Emergencies: MOLA supervisor to call 999 in absence of C430 LORSSite 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**  
**MOLA Supervisor: Sam Pfizenmaier**

**Circulation of Risk Assessment**

<b>Employees and Volunteers</b>	<b>X</b>
<b>Principal Contractor</b>	<b>X</b>
<b>Client</b>	<b>X</b>
<b>Sub Contractor</b>	

<b>Public/Visitors</b>			
<b>Other Occupier</b>			
<b>Risk Assessment Prepared by</b>	<b>Signed:</b> NJE	<b>Name:</b> Nick Elsden	<b>Date:</b> 11.06.12

### 22.3 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					
6					
7					
ACTIONS ALREADY TAKEN TO REDUCE RISKS					
<p><b>Compliance with:</b>                      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 &amp; 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><b>Planning:</b>                      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>					

**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.

**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.

**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

**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:**

**Farringdon ETH: Smithfield Market, Watching Brief**

**Frequency and Duration of Task:**

**Daily –  
c 1  
month  
TBC**

**Number of Staff Involved:**

**1**

**Specific Hazards Identified?**

Contact with existing services –during initial breaking out and machine clearance of trenches under archaeological supervision, but also risk of encounter during subsequent hand digging.

Electrocution

Explosion, fire

Sewage and Flooding

Asphyxiation

**Control Measures Required?**

Compliance with Principal Contractor’s permits to work system.

<p>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.</p> <p>Discovery of a buried services (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.</p> <p>All staff to attend induction and toolbox talks</p> <p>All staff to wear required PPE</p> <p>First Aider and First Aid box present</p>				
<b>Assessment of Remaining Risks:</b>		High	Medium	Low
<b>Serious and Imminent Danger Identified:</b>		Yes	No	
<b>What Emergency Action Required?</b>				
<p>MOLA supervisor to report all accidents/incidents to Principal Contractor 's Site Manager or specified deputy in his absence.</p> <p>Ensure all serious none emergency casualties not treatable by first aid are accompanied to the nearest A&amp;E:</p> <p>Minor A&amp; E at:</p> <p>St Bartholomew's West Smithfield Street, EC1 <u>020 7377 7000</u> Tube: St Paul's</p> <p>Full A &amp; E at:</p> <p>University College Hospital (UCH) Ground Floor, 235 Euston Road, NW1 2BU Telephone 0845 155 5000 ext 70001 or 70011 Tube: Warren Street or Euston Square</p> <p>Emergencies: MOLA supervisor to 999 in absence of PC Site Manager or specified deputy.</p>				
<b>Circumstances Requiring Additional Assessment?</b>				
<b>Competent Persons Appointed to Take Action</b>				
Principal Contractor Manager: TBC				
MOLA Site Supervisor: TBC				
<b>Circulation of Risk Assessment</b>				
<b>Employees and Volunteers</b>	x			
<b>Principal Contractor</b>	x			
<b>Client</b>	x			
<b>Sub Contractor</b>				



<b>Public/Visitors</b>			
<b>Other Occupier</b>			
<b>Risk Assessment Prepared by</b>	<b>Signed:</b> NJE	<b>Name:</b> Nick Elsden	<b>Date:</b> 11.06.12

## 22.4 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><b>Compliance with:</b></p> <p>MOLA Health and Safety Policy Operational Procedures (September 2010)</p> <p>Construction(Design and Management) Regulations 2007</p> <p>Control of noise at Work regulations 2005</p> <p>Control of Vibrations at Work Regulations 2005</p> <p>British or European Standards including:</p> <p>5228: Noise on construction sites.</p> <p>6912: Safety in earthmoving machinery</p> <p>6913: Operation &amp; maintenance of earthmoving machinery</p>					
<p><b>Planning:</b></p> <p>MOLA Staff will not operate Mechanical excavators.</p> <p>Choice of hire equipment and requirements assessed with regards to ground conditions and local operational requirements.</p> <p>Choice of Excavators and driver/operator to be from sub-contractors competent to provide the machinery and service required.</p>					
<p><b>Physical:</b></p> <p><u>180 degree machines</u> - When using the backhoe the front bucket must be lowered to the ground</p> <p><u>360 degree machines</u> - At least 600mm clearance to be allowed for tail swing.</p> <p>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.</p> <p>Overhangs are not to be created on high workfaces. Wheels/tracks are to be at 90 degrees to the workface.</p> <p>Travel and operations on a gradient must be controlled to ensure machine stability.</p> <p>A banksman is to be used where driver's vision is impaired or operating in congested areas.</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.

**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.

**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

<b>Site/Location/Task:</b>	<b>Farringdon ETH: Smithfield Market, Watching Brief</b>		
<b>Frequency and Duration of Task:</b>	<b>Daily</b> c 1 month	<b>Number of Staff Involved:</b>	<b>1</b>

**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 CPSP certified operatives under the overall supervision of the Principal Contractor’s 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 the Principal Contractor's Method Statement			
<b>Assessment of Remaining Risks:</b>		High	<b>Medium</b>
			Low
<b>Serious and Imminent Danger Identified:</b>		Yes	<b>No</b>
<b>What Emergency Action Required?</b>			
MOLA Supervisor to report all accidents/incidents to Principal Contractor's Site Manager or specified deputy in his absence			
Ensure all serious none emergency casualties not treatable by first aid are accompanied to the nearest A&E:			
Minor A & E at:			
St Bartholomew's West Smithfield Street, EC1 <u>020 7377 7000</u> Tube: St Paul's			
Full A & E at:			
University College Hospital (UCH) Ground Floor, 235 Euston Road, NW1 2BU Telephone 0845 155 5000 ext 70001 or 70011 Tube: Warren Street or Euston Square			
Emergencies: MOLA supervisor to 999 in absence of PC Site Manager or specified deputy.			
<b>Circumstances Requiring Additional Assessment?</b>			
<b>Competent Persons Appointed to Take Action</b>			
Principal Contractor Manager: TBC			
MOLA Supervisor: TBC			
<b>Circulation of Risk Assessment</b>			
<b>Employees and Volunteers</b>	<b>X</b>		
<b>Principal Contractor</b>	<b>X</b>		
<b>Client</b>	<b>X</b>		
<b>Sub Contractor</b>			
<b>Public/Visitors</b>			
<b>Other Occupier</b>			
<b>Risk Assessment Prepared by</b>	<b>Signed:</b> NJE	<b>Name:</b> Nick Elsden	<b>Date:</b> 11.06.12

**Fig 01 Moorgate Sidings Trial Pit Locations**

Crossrail Ltd

Survey Request Scope – Unique Survey Ref.; Document No:

