

City Airport Development Programme (CADP1)

Condition 62: Archaeology Scheme of Investigation and List of Historic Buildings



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SUMMARY

This document sets out an over-arching Written Scheme of Investigation (WSI) as required by Planning Condition 62 of Planning Permission 13/01228/Ful for the City Airport Development Programme (CADP) 1 works.

The WSI has been prepared by RPS Group, on behalf of London City Airport (the Airport) and responds to the requirements of Condition 62 (Archaeology) of the CADP 1 permission. It reflects discussion, meetings and e-mail correspondence with the Archaeological Adviser to the London Borough of Newham (LBN) at the Greater London Archaeology Advisory Service (GLAAS), in Historic England in relation to the Interim Works and the revised Single Phase Construction Plan.

In accordance with Condition 62 a WSI for the Interim Works of CADP1 was submitted to the London Borough of Newham (LBN) in February 2017 (17/00508/AOD) and was subsequently approved in March 2017. The approved WSI was prepared after discussions and consultation with the LBN and their Archaeological Advisers at the Greater London Archaeology Advisory Service (GLAAS) at Historic England.

RPS Group and GLAAS agreed a framework – set out in the approved WSI - for discharging planning Condition 62. This framework consisted of:

- A Level 2 photographic record of King George V (KGV) Dock to supplement existing reports. [This has been undertaken and the report is being prepared.](#)
- Watching brief on the Dock wall removal. [Watching Brief on Dolphin 7 has now been completed with the report being prepared;](#)
- Liaison with the LBN regarding any requirements for the use of removed Dock wall stonework; and
- Geo-archaeological boreholes within the area of the Western Energy Centre (WEC) and the Western Terminal Extension (WTE).

In accordance with Condition 4 of the CADP1 permission the Airport is now seeking to build out CADP1 in a single uninterrupted phase. This updated WSI therefore been prepared to consider the whole CADP1 works.

This WSI sets out the agreed approach to discharging Condition 62 (also set out in the WSI) and also describes revised impacts in relation to the CADP 1 Works.

Geo-archaeological evaluation consisting of three boreholes has been undertaken within the location of the proposed WEC. The report on that evaluation is included as Appendix 8.

As set out in the WSI for the Interim Works of CADP1, Watching Brief on Dolphin 7 demolition is required along with Historic Building Recording. This has been completed following discussions with the LPA's Archaeological Adviser with the report currently being prepared. Watching brief on the dock wall removal is forthcoming and will be reported on separately.

The finalised drainage strategy, submitted under Condition 69 of the CADP 1 permission, has been reviewed by RPS and, due to the depths and scale of impacts in relation to the depths of disturbed made ground it was concluded that it was not necessary to undertake archaeological works in these impact areas. This same approach was proposed and confirmed in relation to the Construction Compound Area. [Details](#)



submitted in relation to Condition 96 have been altered to reflect the accelerated programme (see below) but the proposed archaeological response is not altered.

As this WSI relates to archaeological evaluation only, any mitigation that may be required as a result of the findings of the evaluation works will be the subject of separate WSI's to be submitted to and approved by GLAAS and LBN.

1 INTRODUCTION

1.1 The City Airport Development Programme (CADP) 1 planning application (13/01228/FUL) was granted planning permission by the Secretaries of State for Communities and Local Government and Transport in July 2016 following an appeal and public inquiry which was held in March/April 2016.

1.2 Condition 62 requires that:

“No Phase of the Development shall Commence other than demolition to existing ground level unless and until there has been secured the implementation of a programme of archaeological evaluation in relation to that Phase in accordance with a Written Scheme of Investigation which has been submitted to and approved by the Local Planning Authority.

Such a submitted Scheme shall include:

- *details of a programme for investigating and recording archaeological assets, works and historic structures that might be found during Development of that Phase; and*
- *lists all historic buildings at the Airport,*

The Phase shall be implemented in accordance with the relevant approved Scheme.

Reason: The site has archaeological potential in terms of heritage assets of archaeological interest. The Local Planning Authority wishes to secure the provision of archaeological investigation and the subsequent recording of the remains prior to Development, in accordance with recommendations given by the Local Planning Authority, English Heritage and in the NPPF”.

1.3 The Airport submitted a Construction Phasing Plan to LBN pursuant to Condition 4 of the CADP1 permission in February 2017. It was proposed to build out CADP1 as a single uninterrupted period of construction over 5 years split into two distinct phases. Consistent with terminology used in the UES, the two phases were referred to as the ‘Interim Works’ and the ‘Completed Works’ – each delivering different parts of the CADP infrastructure. The Interim Works would be delivered first and would be immediately followed by the Completed Works. This Construction Phasing Plan was approved by LBN in March 2017 (ref. 17/00500/AOD) and the details pursuant to Condition 62 for the ‘Interim Works’ were also approved at the same time (ref. 17/00508/AOD). The approved WSI was prepared after discussions and consultation with the LBN and their Archaeological Advisers at the Greater London Archaeology Advisory Service (GLAAS) at Historic England.

1.4 Ahead of the commencement of construction of CADP1, the Airport’s Delivery Partner have identified a number of programme efficiencies and improvements to the 5 year build which would reduce the duration of the construction programme by 14 months to 3 years 10 months and deliver the full CADP1 infrastructure in an accelerated single phase (*2017 Accelerated Construction Phasing Plan*). The new *2017 Accelerated Construction Phasing Plan* has been submitted to LBN pursuant to Condition 4 under separate cover.

1.5 This submission seeks approval of details pursuant to Condition 62 for the entire approved CADP1 infrastructure to be delivered by the new *2017 Accelerated Construction Phasing Plan*.

- 1.6 At the request of LBN Officers, new text added to the previously approved details (17/00508/AOD) has been distinguished in blue text in this document.
- 1.7 This WSI has been prepared by RPS Group, on behalf of the Airport.
- 1.8 The site (approximate NGR 542351, 180376) is broadly located on land between KGV Dock and the Royal Albert Dock (the Docks) and to the south and south-west of the KGV. This is land that has undergone dramatic change since the last maritime operations in 1983, altering from a maritime, industrial based landscape (with associated warehouse, jetties, cranes and associated infrastructure) to a modern transport landscape consisting of airport buildings, airplane taxi stands and an east-west aligned runway with associated modern transport infrastructure (e.g. the Docklands Light Railway to the north and south of the airport).
- 1.9 Evidence from site visits during the course of preparing the CADP Updated Environmental Statement (UES 2015) and the historic photographs of KGV Dock indicate that the airport has been able to maximise the opportunity provided by the form of the construction of the Docks. Large Docks, with the facility to handle large amounts of cargo and shipping required a linear development that is not dissimilar to the requirements of airport runways. In using this location, City Airport has enabled this form to be adapted to a modern form of transportation.
- 1.10 The minor structural remains of some of the former maritime industrial landscape are visible – e.g. dock walls, dolphins, mooring posts.

Consultation

- 1.11 RPS Group and GLAAS agreed a framework, set out in the approved WSI for discharging planning Condition 62. This framework - set out below consists of:
- A Level 2 photographic record of KGV Dock to supplement existing reports. This can be achieved from land and will not require access to the Dock water;
 - A watching brief on Dock wall and Dolphin 7 removal so that any significant structural information can be recorded. This watching brief will not be a “full time” watching brief but will be undertaken at significant parts of the Dock wall and Dolphin 7 removal programme (e.g. initial breaking / at times and locations that the archaeologist believes may reveal any new structural information regarding these items); and
 - Geo-archaeological boreholes within the area of the WEC and the WTE.
- 1.12 The discussion between RPS Group and GLAAS (Appendix 1A and 1B) included a recognition that this WSI will relate to historic building recording and archaeological/geo-archaeological evaluation. If significant archaeology/heritage requires watching brief and/ or excavation mitigation there will be supplementary WSI's that set out these proposals.
- 1.13 The WSI for the Interim Works of CADP1 was submitted to the London Borough of Newham (LBN) in February 2017 (17/00508/AOD) and approved in March 2017 following advice provided to the London Borough of Newham by GLAAS.
- 1.14 This WSI mirrors the approved WSI for the Interim Works of CADP1 2017 but reflects the Accelerated Construction Phasing Plan that has been submitted to LBN pursuant to Condition 4 under separate cover and results in an overall construction programme of approximately 3 years

and 10 months (46 months), compared to 5 years (60 months) under the previously approved Construction Phasing Plan (March 2017). This accelerated approach has been discussed with GLAAS.

- 1.15 This WSI accordingly sets out the protocols that [have been](#) followed for historic building recording and archaeological/geo-archaeological watching brief evaluation and is submitted to discharge planning Condition 62. [Further archaeological watching brief on the coping stones removal is forthcoming.](#)
- 1.16 The S106 requirement for the proposals for heritage interpretation at the finished site are not triggered until the Eastern Terminal Extension (ETE) is built out so details will follow at the appropriate time.
- 1.17 The drainage designs (submitted to discharge Condition 69 of the CADP1 permission) including the position and dimensions of attenuation tanks have been reviewed as part of the preparation of this WSI, along with the Construction Compound Area (details submitted to discharge Condition 96). Due to the depths and scale of impacts in relation to the depths of disturbed Made Ground that is shown in these locations, it is not necessary to undertake archaeological works in these impact areas.
- 1.18 Consultation with GLAAS (November 2017) indicates that they would expect to see the results of the completed on-site geo-archaeological works submitted in tandem with this WSI so that the need for mitigation (on-site or off-site) can be discussed. The report providing the results of the completed on-site geo-archaeological works is provided at Appendix 8.

2 BASELINE ASSESSMENT

Historic Environment Background

- 2.1 The site is located within an LBN designated Archaeological Priority Area. Newham 2015 (Public Consultation Version 2) identifies the site as being located in a Tier 3 Archaeological Priority Area (Newham APA 3.3: Royal Docks). The Summary provided in this document includes;

“The Royal Docks are classified as Tier 3 because of their landscape scale and relatively sparse distribution of known heritage assets combined with topographical potential for preservation and historic industry.”

- 2.2 The Significance of APA 3.3 is described as

“The presence of an extensive deeply buried well preserved prehistoric landscape indicates significant archaeological interest including the possibility of discovering sites of schedulable quality, although the Royal Docks themselves will have removed earlier remains within their extensive footprints. Elsewhere remains of the pre-modern estuarine/marshland landscape can be expected to survive beneath modern made ground. The Fort Street Neolithic timber platform illustrates the exceptional preservation that can be expected within anoxic conditions and the potential for discovering heritage assets of schedulable quality. Other potential discoveries could include boats, fishtraps, flood defences and trackways as well as artefacts and environmental evidence.

The Royal Docks have considerable historical interest as the final and largest phase of the internationally significant sequence of wharves and docks built downstream from the City of London as it developed into an Imperial Capital. As well as possessing historical interest they are dramatic landscape features and were part of the social fabric of the East End linked to the industry and working class housing of Silvertown and North Woolwich.”

- 2.3 There are no Scheduled Ancient Monuments within the 1km search area although there are eight listed buildings, namely;

- St Mark's Church, 4/31 Woolwich Road;
- North Woolwich Station (Pier Road) including turntable and platform lamp standards;
- Central Buffet at Custom House;
- Entrance to Woolwich Pedestrian Tunnel (Pier Road);
- Gallions Hotel;
- The Connaught Tavern;
- Central Offices at Custom House; and
- War Memorial at former St Marks Church.

- 2.4 The Docks are not listed and are not within a designated Conservation Area.

- 2.5 There are a number of statutorily and locally listed buildings within the vicinity of the site. These were considered in the UES.

- 2.6 A significant amount of baseline data was prepared and submitted within the UES. It is not intended to repeat that detail in this WSI and a summary is provided instead.
- 2.7 The baseline assessment in the UES highlighted the prehistoric and later archaeological potential that the Thames Valley and the vicinity of KGV Dock contained, whilst also showing that the construction of the Docks, being approximately 11m deep, caused a massive impact on that potential; either through the excavation of the Docks themselves or through the construction of dockside structures and infrastructure. This is reflected in the fact that the designated Archaeological Priority Area does not cover the water body of the Docks.
- 2.8 The early development of the Royal Docks in Newham were a mid-nineteenth century response to changing transport forms and communication infrastructure and were the first docks built expressly for steam ships and the first to be planned with direct rail links onto the quay.
- 2.9 The design, excavation and construction of KGV Dock was a response to changing demands, requiring the construction of a new dock able to take ships of up to 30,000 tons. Binns (1923) provides a detailed statement on the construction of KGV Dock and indicates that it was the largest and most important of the works undertaken by the Port Authority.
- 2.10 Baseline information (construction records and photographs) also shows that, when in use, the Docks had capacity to berth 14 large vessels (Binns 1923, 398) and were a centre of international trade (import and export). Site visits undertaken during the preparation of the UES show that there is little of that industrial heritage remaining.

Topographical and Geological Background

- 2.11 The topographical and geological background to the site is taken from a number of sources (e.g. Powell, 1973, Tyler 1989, Scott-Wilson 2004 and archaeological report listed in the Bibliography).
- 2.12 The alluvial landscape that lies along the northern foreshore of the River Thames consists of peat and clay horizons which overlie river terrace gravels. The alluvial sediments were laid down during fluctuations in the level of the river. Periods of high water levels, with marine or brackish water conditions caused the deposition of clays and silts. Low water levels allowed the growth of plant communities and have resulted in the formation of layers of peat.
- 2.13 The site lies in the Plaistow Levels, which was an area of marsh next to the River Thames. Historically, the site lies in Kent, in the parish of Woolwich, a part of which was north of the River Thames, adjacent to the manor of East Ham. This land was divided into two parts, a smaller area of 68 acres east of Ham Creek and a larger area of 334 acres extending to Barking Creek.
- 2.14 The Plaistow Levels have historically suffered extensive recurrent flooding; periods of higher sea levels caused the River Thames and other freshwater courses to inundate the low ground. Occupational evidence from the levels and other areas of marsh and fen suggests the sea level was lower during the Roman period than today, and the marshes were drier and extensively used. Sea level rise in the 4th century led to flooding higher up the Thames Valley. The sea level dropped in the later Anglo-Saxon period, but rose again from about 1250, leading to severe floods in the 14th and 15th centuries and damaging valuable pasture which had been reclaimed from the marsh by Stratford and Barking Abbeys.

- 2.15 Ditches dug to drain the water levels developed into major drainage dikes, becoming open sewers feeding into the tributaries of the Thames and the river itself as the Plaistow marshes joined the industrial expansion of the 19th century.
- 2.16 Silvertown developed in what were formerly the Plaistow levels; a large area of marsh forming part of the extensive wetlands which extended along both sides of the River Thames and its tributaries throughout what is now Greater London. Evidence that these marshes have been frequently exploited by man since at least the Neolithic period has been found in the alluvial deposits of this area, including the Royal Albert Dock itself, since the last century (Scott Wilson, 2004).

- 2.17 Binns (1923, 373) reported;

“Neither London Clay nor the Woolwich beds are present. The alluvium consists of clay, lignite or peat, and ballast. In the peat and clay detrital wood and water-logged trunks of trees were common. Fresh-water shells, hazelnuts, reeds, etc, were also found. Several silted up creeks cutting into the peat were encountered in the course of the excavations, the largest of these being the old Ham creek which in the seventeenth century was navigable.”

Site Investigation Data

- 2.18 The full inventory of site investigation works that have been undertaken at London City Airport is provided in Appendix 2.
- 2.19 These reports have been reviewed as part of the geo-archaeological works proposed within this WSI.
- 2.20 The results of the Soil Mechanics 2001, Keltbray 2011 site investigation (SI) works, RPS 2013 and 2014 and [Concept 2016](#) SI's are provided in Appendices 3 to 7.
- 2.21 Of particular note are the depth of disturbed ground airside (Soil Mechanics 2001 – Appendix 3), the depths of disturbed made ground south of KGV Dock (RPS 2013 – Appendix 5) and the thick deposits of peat (in several phases) in RPS 2014 (Appendix 6).
- 2.22 The Soil Mechanics report largely shows recently disturbed Made Ground overlying disturbed sand and gravel which would suggest that dock and airport development activities have truncated/removed any below ground archaeological potential within the location of the existing runways and where the new deck and drainage impacts are in the “airside” part of the airport. As a result of this no trial trenching or “below ground” archaeological works (other than watching brief on Dock wall removal) are proposed in this location.
- 2.23 The RPS 2013 report shows recently disturbed Made Ground of up to 5.0m thickness, to the south of KGV Dock in the area of the New Deck and New Dockside Attenuation tanks and the proposed Construction Compound.
- 2.24 The RPS 2014 report shows significantly large deposits of peat (2.30m thick on top of the gravel in BH1; 2.80m thick on top of a thin band of alluvium just above the gravel in BH2; 2.0m thick on top of the gravel in BH 3; 2.30m thick on top of the gravel in BH 4; and 1.50m thick on top of the gravel in BH 5) which will require geo-archaeological evaluation possibly leading to geo-archaeological assessment and analysis and archaeological evaluation.

3 CADP1 WORKS DESCRIPTION

3.1 The CADP1 Works will consist of the following (Figure 1);

- Completion of all of the marine piling and deck over KGV Dock; including constructing the apron platform for all new stands, the full length parallel taxiway the deck for the ETE;
- Reconfiguration of four existing stands (No.'s 21-24) to make Code-C compliant; Stand 21 will be taken out of operation to facilitate the construction and operation of the Temporary Coaching Facility until the Completed Works are delivered;
- Operating 4 new stands;
- Operating the Parallel Taxilane up to Taxiway Link Foxtrot;
- Temporary Noise Barrier;
- Western Energy Centre (WEC);
- All of the Western Terminal Extension (WTE);
- Installation of surface water drainage attenuation tanks, both airside and landside, to service the Interim Works;
- Removal of the Temporary Coaching Facility and re-instating operation of Stand 21;
- Operation of the remaining new aircraft stands (providing 25 operational stands in total);
- Operation of the remainder of the Parallel Taxilane (to the existing hold point);
- Eastern Terminal Extension (ETE);
- East Pier;
- Eastern Energy Centre (EEC);
- Floating RVP Pontoon;
- New Forecourt (inc. demolition of City Aviation House);
- New surface and decked Car Parking;
- Upgrade to Hartmann Road;
- Opening up of Eastern Access to Airport; and
- Other Dockside works.

3.2 The details of these are set out below.

Stands and Deck

- 3.3 The CADP1 Works comprise new aircraft stands and construction of a Parallel Taxiway.
- 3.4 The apron slab will be supported by large piles that will be designed to support the proposed infrastructure.
- 3.5 The new apron will connect to the existing Eastern Apron supporting stands 21-24. To enable a tie-into the existing airfield pavements, the levels of the new deck are constrained. These key tie-in points are: the existing Eastern Apron to the west; the existing runway to the north; and the existing runway Hold 27 to the east. The level of the apron also dictates the extent and position of the stands as the tails of the aircraft on the stand need to be beneath the runway transitional surface. With these constraints it is necessary to cut down the existing Dock wall. However, the minimum Dock wall height of +5.6m AOD will be maintained to all edges of the new development in order to maintain the same flood defence characteristics. This will be achieved through an upstand around the new deck.
- 3.6 Additional cutting of the Dock wall is required to enable services infrastructure to connect through the Dock wall to the suspended deck.

Western Terminal Extension

- 3.7 The WTE (Figure 2) is a 3 storey above ground extension of the existing Terminal building.
- 3.8 The WTE comprises:
- WTE: A permanent structure allowing the existing security area to be displaced from the restricted existing terminal footprint, thus freeing its previous location to serve as much needed passenger amenity space within a reconfigured terminal plan;
 - Western Service Yard: A permanently reconfigured 'Triangle' Service Yard area will accommodate the WTE building and serve the new terminal in both Interim and Completed phases of the development; and
 - WEC: A consolidated housing for energy supply and general plant to meet the demands of the interim development facilities.
- 3.9 Foundations will be piled with auger piles, concrete filled with ground beams and concrete lift pits.
- 3.10 The levels of the Western Service Yard will be predominately as existing, with minor re-grading to minimise the amount of cut and fill on the site.
- 3.11 There will be amendments to the services infrastructure to support the proposed design. One significant element of this will be the surface water drainage which includes an attenuation tank to reduce the runoff from the site.

Western Energy Centre

- 3.12 The WEC is a single storey concrete and steel framed building above a single storey basement.
- 3.13 The WEC will have a single storey part-plan basement which will house mechanical plant, a sprinkler tank and a potable water tank. The ground floor slab above the basement is supported

on reinforced concrete (RC) beams spanning between the capping beams and RC columns. The excavation to form the basement and basement floor slab will be down to approximately 5.5m below ground level. The basement will be formed using a secant piled retaining wall with in situ RC liner wall and RC capping beam. The piled basement raft slab supports a large water tank approximately 15m x 5m x 3m deep and 3 internal RC columns (Figures 3A, 3B & 3C).

- 3.14 Geo-archaeological evaluation has taken place within the location of the WEC and is reported in Appendix 8.

Surface Water Drainage/Attenuation

- 3.15 The Proposed Surface Water Drainage Strategy (Atkins, 2013) that accompanied the UES sets out the following:

“A meeting was held with English Heritage on 6th March 2013, who advised that it had no objections to pipework penetrating through the existing KGV Dock wall, provided that a record is provided of the wall prior to any construction works. The modifications to the Dock wall to accommodate the airside deck drainage infrastructure were also explained. English Heritage advised that it would advise the London Borough of Newham (LBN) (as the Local Planning Authority) to secure it's requirements, in relation to the recording of the Dock wall, through the placing of planning condition(s) on any planning permission.”

- 3.16 The Airport submitted a Sustainable Drainage Systems Report pursuant to Condition 69 of the CADP1 permission, which was approved in May 2017 (17/00778/AOD). The report sets out the proposed landside and airside drainage strategy. This is represented in Figures 4A to 4I including details of typical attenuation tanks depths.

- 3.17 Details of the Airside attenuation is set out below;

“The attenuation structure for the airfield is proposed to be a reinforced concrete box culvert structure. A box culvert structure is proposed as this is a durable structure that can withstand the loading that may be imposed on it within the runway strip. It also allows for maintenance access to the structure without significant excavation works which would be difficult within the runway strip. The proposed tank size is in accordance with the CADP1 drainage strategy and it is proposed to be an internal 3m wide by 2.1m deep structure. The length is proposed to be in the order of 177m to provide a storage volume of 1,115m³. Final details of the structure may vary slightly to suit the product choices of a contractor although the storage volume will be maintained to ensure no flooding in a 1:30 year storm.

It is proposed that the proposed East Pier, Out Bound Baggage and East Terminal Extension roofs discharge into the dock via downpipes, due to the low risk of contamination.”

- 3.18 Details of the network to serve the Landside area in the Western Service Yard, WTE and WEC include a cellular attenuation tank in the pedestrian footway.

- 3.19 The Forecourt and Dockside areas include pipe systems and attenuation tanks as illustrated in Figures 4A to 4I.

- 3.20 Details for the full CADP build pursuant to condition 69 have been submitted under separate cover.

- 3.21 Due to the depths of Made Ground in the Construction Compound and the Attenuation Tank locations, no archaeological work is proposed in relation to these impacts.

Eastern Terminal Extension

- 3.22 The ETE Elevations are illustrated in Figure 5. Ground impacts associated with construction of the ETE consist of piling within the existing body of the dock, so there will be no archaeological impact. Historic Building recording will provide a record of this location.

East Pier

- 3.23 Ground impacts associated with the construction of the East Pier consist of piling within the existing body of the dock, so there will be no archaeological impact. Historic Building recording will provide a record of this location.

Eastern Energy Centre

- 3.24 The EEC will be on piled foundations, the layout of which is illustrated in Figure 6. The closest site investigation information to the EEC (Window Sample 13 & 14, Appendix 5) show between 1.30m and 4.70m of disturbed Made Ground overlying peaty clay. Due to the depths of Made Ground no archaeological work is proposed in relation to these impacts.

Floating RVP Pontoon

- 3.25 Ground impacts associated with construction of the Floating RVP Pontoon (illustrated in Figure 7) consist of piling within the existing body of the dock, so there will be no archaeological impact. Historic Building recording will provide a record of this location.

New Forecourt (inc. demolition of City Aviation House)

- 3.26 The already completed Historic Building recording will provide a record of this location.

New surface and decked Car Parking

- 3.27 The new surface and decked Car Parking, illustrated in Figure 8, will be on piled foundations. The closest site investigation information to the car parking (Window Sample 11, 12 & 13 - Appendix 5) show between 1.30 and 4.50m of disturbed Made Ground overlying peaty clay. Due to the depths of Made Ground no archaeological work is proposed in relation to these impacts.

Upgrade to Hartmann Road

- 3.28 No response suggested in this WSI.

Opening up of Eastern Access to Airport

- 3.29 The already completed Historic Building recording will provide a record of this location.

Other Dockside works

- 3.30 The already completed Historic Building recording will provide a record of this location.

Construction Compounds

- 3.31 No response suggested in this WSI (see Figures 10A & 10B).

4 AIMS & OBJECTIVES

Introduction

- 4.1 The overriding aim of this WSI is to provide documentation to address the requirements of Condition 62 of the planning consent and to set out a methodology and scope for the required CADP1 works.
- 4.2 The following scope of works has been agreed with GLAAS in relation to the Interim Works;
- A Level 2 photographic record of the KGV to supplement existing reports. This can be achieved from land and will not require access to the Dock water;
 - Watching brief on the Dock wall and Dolphin 7 removal so that any significant structural information can be recorded;
 - Geo-archaeological borehole proposals for the WEC & WTE;
 - Recognition that the WSI relates to evaluation and that if significant archaeology/ heritage is identified there will be subsequent WSI's that set out any mitigation proposals – particularly in relation to potential peat deposits in area of the WEC and WTE.
- 4.3 This Full WSI has been discussed with GLAAS in outline and will be discussed in detail once finalised.
- 4.4 Any archaeological / geo-archaeological and historic building recording contractor, in accepting a commission to undertake these works will produce their own Risk Assessment / Method Statement in adherence with the terms of this WSI as part of their contractual obligations.

Aims of the Investigation

- 4.5 The aims of the proposed works are as follows;
- To undertake a Level 2 (see Methodology below) photographic record of the KGV Dock in its present condition and supplement existing survey information ([this has commenced as of 17th November 2017](#)).
 - To review the removal of the capping of the Dock wall and supplement existing survey information;
 - To review the removal of the dolphin and supplement existing survey information ([this has commenced as of December 2017](#));
 - To evaluate the geo-archaeological potential of the sub-surface topography in the location of the WEC and WTE and review its potential for holding evidence of human settlement / activity ([see Appendix 8](#));
 - To evaluate the impact that deep excavations (e.g. basements - subject to design) may have and make recommendations for mitigation (on or off site) if necessary;

- To assess the ecofactual and environmental potential of any archaeological features and deposits; and
- To make the results of the investigation available to interested parties.

5 SCHEME OF INVESTIGATION

Introduction

- 5.1 All work will be undertaken in line with the Standards and Guidance issued by Chartered Institute for Archaeologist (CIfA, 2014) and Historic England (2016, Understanding Historic Buildings: A Guide to Good Recording Practice & 2015, Guidelines for Archaeological Projects in Greater London. Greater London Archaeological Advisory Service).
- 5.2 In accepting a contract to undertake the works, the appointed archaeological sub-contractor will take responsibility for the standards and levels of recording and reporting plus the preparation of Health and Safety documentation.
- 5.3 An Archaeological Site Code will be obtained by the Contractor from the Museum of London which is the relevant Archaeological Archive Repository.

Competent persons

- 5.4 RPS Group will be the principal point of contact in relation to archaeological matters.
- 5.5 All archaeological works will be monitored on behalf of the Airport by Simon Blatherwick BA, MA, MCIfA, Robert Masefield, BSc, MA, FSA, MCIfA, or other members of the Historic Environment Team at RPS.
- 5.6 Fieldwork and reporting will be undertaken by a CIfA Registered Organisation who are also an RPS Approved Supplier of Archaeological Services.

Building Recording Methodology

- 5.7 Building recording of the Dock and its walls will make use of the photographs in Volume 2 of Soil Mechanics Survey (2001) and the hydrographic survey information provided in PLA Hydrographic Services report (2015, Report of Survey. London City Airport Dock Wall Survey).
- 5.8 PLA (2015) recorded 79 “features” on the dock walls. The features identified are either protrusions or recesses from the surrounding wall. Most of the features identified protrude or recess by 0.1m (PLA, 2015, 5-1).
- 5.9 A total of 65 targets were identified on the Dock bed that either lie against the wall or are of a significant height as to obscure the wall (PLA. 2015, Summary). These are not described in the PLA report but Soil Mechanics (2001, Vol 2) describes rubble, scaffold tubes, shopping trolleys, steel pipes, wheel axles, possible vehicle and railway bogey being observed by divers on the Dock floor.
- 5.10 Building recording of the Dolphin to be removed (Dolphin 7) will make use of Binns (1923) and Constructex (2016). The Constructex report describes an inspection of Dolphin 7 by means of an underwater diving survey and a surface inspection.
- 5.11 Level 2 Building recording (Historic England 2016a, 26) is described as;

“a descriptive record, made in similar circumstances to Level 1 but when more information is needed. It may be made of a building which is judged not to require a more detailed record, or it may serve to gather data for a wider project. Both the exterior and interior of the building will be seen, described and photographed. The examination of the building will produce an analysis of its development and use and the record will include the conclusions reached, but it will not discuss in detail the evidence on which this analysis is based. A plan and sometimes other drawings may be made but the drawn record will normally not be comprehensive and may be tailored to the scope of a wider project.

A Level 2 record will typically consist of:

- *drawn record*
- *photography;*
- *written record”.*

- 5.12 The drawn record will consist of annotations of existing plans (where available) and sketched plan, section, elevation or where appropriate. Sketches may be roughly dimensioned.
- 5.13 The photographic record will consist general view or views of the Dock (in its wider setting or landscape) giving an overall impression of its size and shape. Detail shots of “industrial structures” (dolphins, mooring posts, railway lines and other industrial remains) will be undertaken as well as shot setting these remain in their context. Further views may be desirable to reflect the original design intentions of the builder or architect, where these are known from documentary sources or can be inferred from the building or its setting.
- 5.14 The Written Record will be provided in an illustrated report and provide the precise location of the Dock, the date when the record was made the location of any archive material and a summary statement summarising the building’s form, function, date and sequence of development. The names of architects, builders, patrons and owners should be given if known. Its purpose is to describe the Dock and its setting when no fuller record is necessary.
- 5.15 If prior to the commencement of development, LBN request that LCY make available a [specified] number of stones removed from the Dock edge for re-use in local projects (under its direction), the Airport would seek to make these available, subject to being practicable, as part of the removal and recording process as set out in this WSI.

Archaeological Watching Brief Methodology

- 5.16 Occasional watching brief will be undertaken on the Dock wall and Dolphin 7 removal so that any significant structural information can be recorded.
- 5.17 The definition of an Archaeological Watching Brief (ClfA 2014,4) is as follows:

"The definition of an archaeological watching brief is a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.

This definition and Standard do not cover chance observations, which should lead to an appropriate archaeological project being designed and implemented, nor do they apply to monitoring for preservation of remains in situ."

5.18 The purpose of a watching brief is defined (ClfA, 2014, 4) as

"a) to allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works

b) to provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard

A watching brief is not intended to reduce the requirement for excavation or preservation of known or inferred deposits, and it is intended to guide, not replace, any requirement for contingent excavation or preservation of possible deposits.

The objective of a watching brief is to establish and make available information about the archaeological resource existing on a site."

5.19 Plant and welfare facilities will be provided by the Client / Main Contractor. The archaeologist will be present to observe ground-works that may have an impact on archaeological deposits/ historic structures and be positioned outside the working area of the mechanical excavator (if used), in the normal working arrangement. If access to the working area is needed the machine will cease operations and, if necessary, relocated to ensure safe access. Subject to safe access, the archaeologist will enter the trench/ excavation area to carry out close inspection or record limited sections.

Geo-archaeological Evaluation Methodology

5.20 Geo-archaeological boreholes (maximum of three) [have been undertaken](#) in the area of the WEC and the WTE (Figure 9) due to the thickness of peat deposit recorded in the RPS 2014 Site Investigation. This peat is of geo-archaeological interest.

5.21 The boreholes will enhance the understanding of the sub-surface stratigraphy of the site (particularly in relation to the peat deposits in RPS 2014 and enable decisions to be made on any further assessment / analysis of the deposits (or watching brief/evaluation) in these areas. [The QUEST report on these works is enclosed.](#)

5.22 Five significant research aims relevant to the geo-archaeological investigations at the site are outlined here:

1. To clarify the nature of the sub-surface stratigraphy across the site;
2. To clarify the nature, depth, extent and date of any alluvium and peat deposits;
3. To investigate whether the sequences contain any artefact or ecofact evidence for prehistoric or historic human activity;
4. To investigate whether the sequences contain any evidence for natural and/ or anthropogenic changes to the landscape (wetland and dryland); and

5. To integrate the new geo-archaeological record with other recent work in the local area for publication in an academic journal.

5.23 In order to address the first two of these aims, the following objectives are proposed:

- To retrieve a maximum of three geo-archaeological borehole sequences on a west to east transect across the locations; and
- To use the stratigraphic data from the new locations, and existing records to produce a deposit model of the major depositional units across the site.

5.24 Aims 3 to 5 will be addressed through laboratory-based assessment/ analysis, the scope for which will be confirmed after achieving Aims 1 and 2.

Field Investigations, Deposit Modelling and Reporting

5.25 In order to address the objectives set out above, the following methods will be employed:

- Continuous, undisturbed borehole core samples will be put down at the agreed and accessible locations;
- The boreholes will be recovered using an Eijkelpkamp windowless sampler and gouge set using an Atlas Copco TT 2-stroke percussion engine. This coring technique provides a reliable method for the recovery of continuous, undisturbed core samples and provides sub-samples suitable for not only sedimentary and microfossil assessment and analysis, but also macrofossil analysis. The recovered core samples will be wrapped in clear plastic to prevent moisture loss, labelled with the depth (metres from ground surface) and orientation (top and base) and retained for storage in a purpose built facility. This temperature prevents fungal growth on the core surface, which may lead to anomalous radiocarbon dates, and moisture loss. The geo-archaeological borehole locations will be recorded using a Leica GS09 Differential Global Positioning System with an accuracy of ± 1 cm;
- Detailed laboratory-based description of the borehole sequences using the Tröels-Smith (1955) procedure for the description of sediments, noting composition, colour boundary types (sharp or diffuse) and degree of humification. The results will be used to contribute to the existing deposit models for the location (where available) and understanding of the site formation processes and depositional environment. Description of the sedimentary sequence recovered in the borehole core samples will provide important, primary information on the nature of the depositional environment through time. Sand and gravel indicates deposition with a high energy fluvial environment, such as braided river system, during cold climatic conditions. Fine-grained mineral sediment, such as silt or clay indicates deposition within or on the margins of a lake, pond or river. Soil and peat formation indicates the formation of semi-terrestrial or fully terrestrial conditions resulting in the colonisation of vegetation adapted to the specific local conditions; and
- Integration of the new geo-archaeological borehole records and any relevant existing geotechnical records to produce a site-wide model of the stratigraphic architecture. This deposit model will be created using Rockworks 16 and Adobe Illustrator and will assist in the reconstruction of site formation and transformation processes, such as alluvial sedimentation and peat formation.

- 5.26 Following the results of the deposit modelling, a report will be produced which makes recommendations for any further environmental archaeological assessment.

Laboratory-based Assessment and Reporting

- 5.27 Laboratory-based environmental archaeological assessment of a minimum of two selected sequences will be carried out (if necessary). The assessment of samples from the site will consist of the following analytical techniques:

Organic Matter Determinations

- 5.28 Quantification of the organic matter content is a quick and easy technique to undertake that provides highly useful information. In particular, it: (1) aids in the interpretation of the sedimentary sequence, indicating more terrestrial conditions (e.g. peat/soil); (2) enables the recognition of flood events during peat accumulation, that may not solely be recognised by sedimentary description, and (3) identifies the most 'organic-rich points' within an organic-rich sequence (e.g. peat) for radiocarbon dating. Each of the main sedimentary units recovered in the borehole core samples will be assessed for their organic matter content, and the results tabulated and presented diagrammatically.

Pollen Assessment

- 5.29 The analysis of pollen grains and spores (palynology) is widely used in environmental archaeology since they frequently provide valuable information on vegetation composition, structure and succession (palaeo-ecology), plant migration (biogeography), climate change, human modification of the natural vegetation cover and land-use (anthropogenic activity), and diet. They enable us to record vegetation succession due to natural processes, such as competition and climate change, and human activities, such as woodland clearance and cultivation. The assessment procedure will consist of recording the preservation and concentration of pollen grains and spores from each borehole sequence to provide a preliminary reconstruction of the vegetation history, detect evidence for human activities (e.g. woodland clearance and cultivation). The pollen assessment will focus on identifying sedimentary sequences that provide a record of both natural and human-induced vegetation succession, which will permit improved understanding of the processes and events that determined the nature of vegetation change at the site. To achieve this objective, the assessment will identify key indicator taxa or groups of taxa that will permit a provisional reconstruction of changing vegetation communities e.g. alder carr, reed swamp, cultivated ground, dryland woodland, and provide a provisional explanation for the changes recorded. Sub-samples will be extracted from the selected borehole sequences by standard laboratory procedures and subject to an assessment of potential for analysis (see Branch et al., 2005). The assessment will involve identification and tabulation of the main pollen taxa (no pollen counts), and an evaluation of the overall quality of the preservation and concentration, for each sub-sample. The information provided by the preservation and concentration data is especially important because they will permit an evaluation of the stratigraphic integrity of the pollen assemblage. Recommendations for further analysis will be based upon: (1) adequate preservation and concentration of pollen to ensure a full stratigraphic analysis; (2) the samples having the potential to achieve the objectives outlined above.

Diatom Assessment

- 5.30 Diatoms are unicellular algae and comprise a silicified (opaline silica) cell wall (frustule) with two overlapping valves (epivalve and hypovalve). Their taxonomy and ecology are well known, with different species occupying the bottom of (benthic), or floating within (planktonic), water bodies (e.g. oceans, lakes, ponds, rivers, salt marshes, ditches), and living in soil and on trees (epiphytic). They will be a valuable part of the assessment because species are indicative of a wide variety of environmental conditions (e.g. marine, brackish or freshwater) that reflect temperature, salinity (level of common salt in solution), pH (potential hydrogen), oxygen and mineral content (e.g. silica, phosphate, nitrate and iron). For example, deep alluvial sequences in other parts of the Lower Thames Valley have recorded changes in diatom assemblages because of fluctuations in the height of relative sea level during the Holocene. Marine transgressive phases are indicated by the dominance of marine diatoms, whereas the transition to marine regressive phases (reduction or stabilisation in relative sea level) shows a progressive increase in freshwater and brackish water taxa. Sub-samples will be extracted from the borehole sequences by standard laboratory procedures and subject to an assessment of potential for analysis (see Branch et al., 2005). The assessment will involve identification and tabulation of the main diatom taxa (no diatom counts), and an evaluation of the overall quality of the preservation and concentration, for each sub-sample. The information provided by the preservation and concentration data is especially important because they will permit an evaluation of the stratigraphic integrity of the diatom assemblage. Recommendations for further analysis will be based upon: (1) adequate preservation and concentration of diatoms to ensure a full stratigraphic analysis; (2) the samples having the potential to achieve the objectives outlined above.

Waterlogged Plant Macrofossil Assessment

- 5.31 Waterlogged seeds are one of the most common plant remains found within organic-rich palaeo-environmental sequences. Preservation by waterlogging occurs in anoxic conditions, which retards the decay process and results in the loss of internal anatomical structures. In peat and alluvium, seeds are almost exclusively preserved in a waterlogged state. The seeds and their components (e.g. stems, leaves, buds) in peat and alluvium will represent either plants growing locally (autochthonous) or plants growing at an uncertain distance from the point of deposition (allochthonous). Analysed in conjunction with other proxies (e.g. pollen, insects), they may provide valuable information on climate change or vegetation history. Small bulk samples will be processed by standard laboratory procedures involving wet sieving, and subject to an assessment of potential for analysis (see Branch et al., 2005). The assessment will involve identification and tabulation of the main waterlogged taxa (no macrofossil counts), and an evaluation of the overall quality of the preservation and concentration, for each bulk sample. Recommendations for further analysis will be based upon: (1) adequate preservation and concentration of waterlogged, charred and mineralised remains to ensure a full analysis; (2) the samples having the potential to achieve the objectives outlined above.

Waterlogged Wood Assessment

- 5.32 Wood preserved by anaerobic, waterlogged conditions is often found in both geological deposits, such as peat, and archaeological archives (e.g. trackways, platforms, hurdles, ditches, pits). It provides primary data on woodland composition, and hence vegetation history, woodland management, agricultural practices (e.g. fodder and bedding for animals), woodland exploitation for domestic fires (fuel), human impact on the natural environment, catastrophic, natural wild fires, material culture (wooden artefacts), time of woodland exploitation, local environmental conditions, preservation and bias in wood assemblages and technological sophistication. Small bulk samples

will be processed by standard laboratory procedures involving wet sieving, and subject to an assessment of potential for analysis (see Branch et al., 2005). The assessment will involve identification and tabulation of the main taxa based upon random sub-sampling of ten specimens from each bulk sample for waterlogged wood (no macrofossil counts), and an evaluation of the overall quality of the preservation and concentration, for each bulk sample. Recommendations for further analysis will be based upon: (1) adequate preservation and concentration of wood and charcoal to ensure a full analysis; (2) the samples having the potential to achieve the objectives outlined above.

Insect Assessment

- 5.33 Insect remains are found in a range of wet and dry environments. Their robust chitinous exoskeletons are often found as well-preserved fragments. Insects provide valuable information on regional and local environmental conditions, the local human environment, human and animal diet, and the function of archaeological features, condition of human and animal mummified remains, and the contents of offerings. These applications require detailed records of modern groups of insect species and their ecological preferences, and the ability to differentiate between those species indicative of the general environment (allochthonous species) and local area (autochthonous species). Small bulk samples will be processed by standard laboratory procedures involving paraffin flotation, and subject to an assessment of potential for analysis (see Branch et al., 2005). The assessment will involve identification and tabulation of the main taxa (no insect counts), and an evaluation of the overall quality of the preservation and concentration, for each bulk sample. Recommendations for further analysis will be based upon: (1) adequate preservation and concentration of insects to ensure a full stratigraphic analysis; (2) the samples having the potential to achieve the objectives outlined above.

Radiocarbon Dating

- 5.34 Radiocarbon dating of the top and base of the peat in a minimum of one borehole sequence will be carried out in order to ascertain the age of peat accumulation and cessation. Radiocarbon dating has almost single-handedly transformed our understanding of the timing of events and rates of change in archaeological records (Branch et al., 2005). Careful consideration will be given to the selection of materials for radiocarbon dating to avoid recent or geological contamination e.g. percolating humic acids, rootlets and bacterial deposits. In all instances, we will attempt to select terrestrial plant macrofossils (e.g. seeds and wood) for plants formerly growing in-situ, rather than bulk organic samples or organic detritus. To test for potential contamination, the stable isotopic ratio of ^{13}C to ^{12}C will be measured in all samples submitted. Ages will be reported as an age from year zero, which is taken as A.D. 1950, when the ^{14}C content of the atmosphere was approximately in equilibrium, prior to nuclear bomb testing. This age will be given as Before Present (or B.P.) and can be then converted to A.D. or B.C. To avoid any confusion between calibrated and un-calibrated dates, we will use '14C' prior to the nomenclature used (i.e. 14C B.P., 14C A.D. and 14C B.C.) if the ages are un-calibrated, and use 'cal' prior to the term if calibrated (i.e. cal. B.P., cal. A.D. and cal. B.C.). Ages will be quoted with the measurement error only, and is typically given at 2 standard deviation (i.e. 95%) confidence limits. Calibration of radiocarbon dates, due to cosmic ray flux, solar intensity and changes in the carbon cycle will be conducted on radiocarbon ages to 11,857 dendro (tree ring) years B.P. (see Stuiver et al., quoted in Branch et al., 2005).

Reporting

- 5.35 Following completion of the laboratory-based assessment, an assessment report will be generated detailing the results of the investigations and making detailed recommendations for further work at the analysis stage (if necessary).

Archiving

- 5.36 The archiving of the environmental archaeological processed samples (ecofacts) and text will follow Museum of London guidelines for London Archaeological Archive and Research Centre (LAARC).

Laboratory-based Analysis, Reporting and Publication

- 5.37 The need for further laboratory-based analysis will be reviewed after this geo-archaeological evaluation/assessment stage.

General Archaeological Recording Protocols

- 5.38 Evaluation trenching is not considered to be necessary. However, if required, this will be undertaken in locations yet to be determined, with a flat-bladed ditching bucket.
- 5.39 Archaeological recording, where not precluded by Health & Safety considerations, will consist of:
- Hand cleaning of any archaeological sections and surfaces sufficient to establish the stratigraphic sequence exposed;
 - The collection of dating evidence from in-situ deposits and spoil scans;
 - Archaeological recording (context sheets/plans/sections) in accordance with Museum of London (1994);
 - A scaled photographic recording of representative exposed sections and surfaces, along with sufficient photographs to establish the setting and scale of the groundworks; and
 - A record of the datum levels of archaeological deposits.
- 5.40 The exposed surface of the natural deposits (if reached) will be hand cleaned sufficiently to define any archaeological features present.
- 5.41 Records will be produced using either pro-forma context or trench record sheets and by the single context planning method and will be compatible with those published by the Museum of London (MoL 1994).
- 5.42 A record of the full sequence of all archaeological deposits as revealed in the watching brief will be made. Plans and sections of features will be drawn at an appropriate scale of 1:10 or 1:20.
- 5.43 If Services are encountered during the digging of any trenches they will be treated as “live” and subject to hand digging. The Contractor will ensure that any service runs are properly supported as required.
- 5.44 The site grid and all archaeological features will be accurately surveyed using a Total Station or GPS and will be related to the National Grid. Surveyed locations will be accurately placed on the site plan.

- 5.45 All site plans will show Ordnance Survey (OS) grid points and spot levels and will be fully indexed and related to adjacent plans. It is not anticipated that single context recording will be universally but should stratified and /or complex sequences of deposits or features be encountered, then single context recording will be undertaken.
- 5.46 The Ordnance Datum (OD) height of all principal strata and features will be calculated and indicated on the appropriate plans and sections.
- 5.47 The overall site record will include photographs made using, as appropriate, high end digital, 35mm, medium and large format cameras. The photographic record will illustrate all significant phases, structures, important stratigraphic and structural relationships, and individual items of interest, including artefacts. All site photographs, except 'working shots', will include a photographic scale of appropriate size. When film is used, originals will be archivally processed and stored; contact prints will be produced and mounted on contact cards. Colour transparencies will be mounted and stored in archival conditions. A computerised index will be compiled, relating image number, site photograph number, context numbers, excavation area, and other relevant information. At the request of the client a file of site photographs may be produced and copied digitally.
- 5.48 A 'site location plan' based on the current Ordnance Survey 1:1250 map will be prepared. This will be supplemented by a trench plan at 1:200 (or 1:100), which will show the location of the areas investigated in relation to the investigation area and National Grid Reference.
- 5.49 All recorded sections should be located on plan with OS co-ordinates. The location of the OS bench marks used and the site TBM will also be indicated.
- 5.50 A 'Harris Matrix' stratification diagram will be used to record stratigraphic relationships. This record will be compiled and fully checked during the course of the evaluation. Spot dating should be incorporated where applicable during the course of the works.

Treatment of Finds & Samples

- 5.51 Appropriate specialist staff will be used on this project depending on the type of artefacts and soil samples recovered during the course of the fieldwork.
- 5.52 The strategy for sampling archaeological and environmental deposits and structures (which can include soils, timbers, pollen, diatoms, animal bone and human burials) will – if required - be developed in consultation with GLAAS. Certain classes of material, i.e. post-medieval pottery and building material may be discarded after recording if a representative sample is kept.
- 5.53 Different sampling strategies may be employed according to the perceived importance of the deposit or feature under investigation and future mitigation strategies. Close attention will be given to sampling for date, structure and environment. Sample size should take into account the frequency with which material is likely to occur. All finds will be treated in a proper manner and to standards agreed in advance with the recipient museum. They will be exposed, lifted, cleaned, conserved, marked, bagged and boxed in accordance with best professional practice.
- 5.54 Finds will be scanned to assess the date range of the assemblage with particular reference to pottery. In addition the artefacts will be used to characterise the site, and to establish the potential for all categories of finds should further archaeological work be necessary.

- 5.55 All finds and samples will be treated in a proper manner and to standards agreed in advance with the recipient museum. Finds will be exposed, lifted, cleaned, conserved, marked, bagged and boxed in accordance with the professional guidelines set out in United Kingdom Institute for Conservation's Conservation Guidelines No. 2.

Environmental Sampling

- 5.56 In consultation with RPS and GLAAS, the archaeological sub-contractor will recover environmental data, if available during the archaeological works that might help to characterise local environmental changes or inform on the characterisation of land-use for the site.
- 5.57 Organic ditch or pit fills will be sampled for environmental information. All alluvium, peat and/or underlying gravels/raised beach deposit exposed will be assessed and recorded in the field, with samples taken for detailed lab analysis, if required as mitigation. Preparation, taking, processing and assessment of environmental samples will be in accordance with guidance provided by English Heritage – now Historic England (2011).
- 5.58 Bulk samples, 20L for wet and 40L-60L for dry contexts will be taken from appropriate contexts for the recovery and assessment of environmental data. Provision will be made for column and other appropriate samples to be taken, if appropriate. Sampling methods will follow English Heritage (now Historic England) guidelines (2011).
- 5.59 The sampling strategy and methodology will be based on the following (subject to H&S considerations):
- All collected samples will be labelled with context and sequential sample numbers;
 - Appropriate contexts will be bulk sampled for the recovery of carbonised plant remains and insects. Assemblages of charred crop remains are of particular importance and will be used to provide data in addition to the associated weed flora on agricultural activities, the economy of the site and its relationship to the river valley;
 - If occupation surfaces are encountered, spatially controlled collection of environmental bulk samples may be taken to aid evaluation procedures. Spatial co-ordinates will be recorded for all samples, and the sampling grid related to the site grid and Ordnance Survey grid. Assessment of spatial information should be undertaken to enable the degree of resolution to be defined following appropriate consultation;
 - Environmental samples will be taken where organic remains survive in well-stratified, datable deposits. Bulk samples will be taken for wet sieving and flotation where there is clear indication of good analytical potential and dating evidence for such material (subject to evaluation requirements). Where there is potential for spatial variation in the distribution of such remains, the sampling strategy will include a percentage sample of each feature/deposit type, distributed throughout the excavation area, sufficient to ensure that such variation is detected;
 - Bulk samples may be taken, if appropriate, from significant datable waterlogged deposits for insects and macroscopic plant remains;
 - Sub-samples or monolith samples of waterlogged deposits and sealed buried soils with potential for pollen preservation will be taken for assessment if appropriate and columns of

such samples will be taken through deposits where there is clear potential for recovering a datable sequence of environmental information;

- Recovery of small animal bones, bird bone and large molluscs will normally be achieved through processing other bulk samples;
- Undisturbed kubiena tin or column samples of sediments will be taken for micro-morphology of buried soils/peat deposits where these are likely to shed light on the environmental development of the area;
- If samples are taken, a pilot study will be undertaken as an initial stage of environmental processing. This will enable an assessment of which groups of samples are likely to be most productive for complete processing and further study.

Human Remains

- 5.60 Any human remains identified, including cremations, will be left in-situ, covered and protected, unless otherwise directed. Human remains will only be excavated after obtaining the relevant Ministry of Justice Licence, as required by the Burials Act of 1857 (amended 1981).

Treasure Act or Potential Treasure

- 5.61 Any finds covered by the provisions of the Treasure Act (1996, amended 2003) and Treasure (Designation) Order 2002, including gold and silver, will be moved to a safe place and reported to the coroner's office according to the procedures determined by the Act. They will also be reported to the local finds liaison officer from the Portable Antiquities Scheme. Where removal cannot be effected on the same working day as the discovery, suitable security measures will be taken to protect the artefacts from theft or damage.
- 5.62 Under The Treasure Act 1996, all treasure finds must be reported to the Coroner in the relevant district within 14 days of the day of discovery, or within 14 days of the day on which it is realised it might be treasure, for example after having it identified.

Health and Safety

- 5.63 Health and Safety will take priority over all other requirements. A conditional aspect of all archaeological work is both safe access to the area of work and a safe working environment.
- 5.64 In undertaking a contract to perform these works the Archaeological Contractor will take on the responsibility for the Health and Safety, on this project, in relation to their works.
- 5.65 Under The Construction (Design and Management) Regulations 2015;

"Pre-construction archaeological investigations are not included within the scope of the definition of construction work (regulation 2(1));

In these Regulations construction work" means the carrying out of any building, civil engineering or engineering and includes;

(b) the preparation for an intended structure, including site clearance, exploration, investigation (but not site survey) and excavation (but not pre-construction archaeological investigations), and the clearance or preparation of the site or structure for use or occupation at its conclusion;”

- 5.66 Regardless of the exclusion of pre-construction archaeological investigations from the 2015 Construction (Design & Management) Regulations, (CDM) all relevant Health and Safety legislation will be adhered to. A Health & Safety Risk Assessment and Method Statement (RAMS) including the staffing, programme and methodology will be prepared by the Archaeological Contractor and submitted to the Project CDM Co-ordinator.
- 5.67 The Archaeological Contractor will attend the Main Contractor’s Site Induction and abide by the Site Rules at all times.
- 5.68 No personnel will work in deep or unsupported excavations. The sides of all excavations or excavations deeper than 1.2 metres (or less if the ground is considered by a competent person or the Project CDM Co-ordinator to be unstable) will be stepped and/or battered.
- 5.69 The archaeologist(s) will not enter an area under machine excavation without alerting the machine driver /banks man to his/her intention.
- 5.70 The archaeologist(s) shall remain alert and take due care not to impede the progress of moving machinery. He/ she shall stand well back from the turning circle of an excavator’ buckets and cabs.
- 5.71 Suitable accommodation and welfare facilities will be provided for staff to shelter from inclement weather and during breaks (by the Main Contractor). Hand washing facilities and welfare will be provided by the Contractor.
- 5.72 As a minimum, the Archaeological Contractor will provide any necessary protective footwear, high-visibility jackets, and safety helmets. Gloves, protective clothing and /or glasses will be worn unless Risk Assessments indicate they are not needed. All staff and visitors to the site will be expected to wear full PPE at all times, unless advised to the contrary.

6 PROGRAMME AND MONITORING

- 6.1 The geo-archaeological evaluation works in the area of the WEC has been undertaken by Quest (Appendix 8).
- 6.2 Building recording of Dolphin 7 and the industrial landscape of the KGV has now been completed and the report is currently being prepared. GLAAS were informed of the start of works (telephone conversation between RPS and GLAAS on 16th November 2017) and will be provided with the report for review when it is available. .
- 6.3 The archaeological work will be monitored by RPS on behalf of the Airport. This monitoring will involve liaison with GLAAS over the proposed works (programme/location etc), the results of that work, the arrangement of monitoring and review meetings (on and off site as achievable), the review of information provided by the works and the submission of reports as provided by sub-contractors. The Airport will also be kept informed of the results of this monitoring.
- 6.4 GLAAS, or their representative, will be responsible for monitoring progress and standards throughout the project on behalf of LBN.
- 6.5 Access to the airport (landside and airside) will be subject to London City Airport Security protocols and requirements.

7 REPORTING

- 7.1 Reporting will follow on from the completion of each stage of works.
- 7.2 Reports on the differing aspects of evaluation works / historic building recording will be prepared and submitted to RPS for distribution.
- 7.3 Reporting requirements will be in accordance with the ClfA guidelines. Expert advice and reporting (in relation to cultural artefacts and ecofacts) will be provided by individual specialists appointed as appropriate.
- 7.4 After watching brief and / or evaluation is completed a Phase 2 Review will be undertaken. Phase 2 Review can result in either a formal assessment stage or publication, as set out in Map II, Appendix 7 (English Heritage 1991, 39-41).
- 7.5 Reporting is expected to be completed within six weeks of the completion of each stage of fieldwork, subject to the availability of specialist reports. An interim statement of results can be prepared earlier, if required.
- 7.6 Reporting will include as a minimum the following:
- A location plan of the site;
 - A location plan of the construction impacts and / or the fieldwork strategy employed;
 - Plans and sections of features and / or extent of archaeology located. These will be at an appropriate scale;
 - A summary statement of the results;
 - A table summarising per trench the deposits, features, classes and numbers of artefacts encountered and spot dating of significant finds; and
 - An assessment of the significance of the recorded archaeological deposits / remains.
- 7.7 Copies of the watching brief report will be issued to the LPA, the Greater London Historic Environment Records Manager, and the LBN Archives and Local Studies Library on the understanding that it will become a public document after an appropriate period of time.
- 7.8 Publication in local or national journals appropriate to the results will be considered. Minimum publication will consist of a note in a local archaeological journal (London Archaeologist Excavation Round-up).
- 7.9 An OASIS form (Online Access to the Index of archaeological investigationS) will be completed and an electronic copy of the watching brief report deposited with the Archaeological Data Service (ADS).

8 ARCHIVE DEPOSITION

- 8.1 The site archive will be organised to be deposited with London Archaeological Archive and Research Centre (LAARC) according to current guidance <http://www.museumoflondon.org.uk/collections-research/laarc/standards-deposition>.
- 8.2 Tariffs for the deposition of the archives are available on the LAARC web-site. It is the appointed Archaeological Contractors' responsibility to ensure that conform to their standards.
- 8.3 The Archaeology Contractor will ensure that every element of the archive is kept clean and secure, and that it is stored in a suitable environment.
- 8.4 The archive comprising written, drawn, photographic and electronic media, will be fully catalogued, indexed, cross referenced and checked for archival consistency.
- 8.5 A copy of the archive (on microfiche) should be deposited with the NMR and HER, as appropriate.
- 8.6 RPS will monitor progress and standards throughout the project, and will be kept regularly informed during fieldwork, post-excavation and publication stages by the appointed Archaeological Contractor.
- 8.7 An OASIS form will be prepared and submitted by the Archaeological Contractor.
- 8.8 Landowner(s) are required to complete a Deed of Transfer http://www.museumoflondon.org.uk/files/6713/7234/1664/legal_supplement.pdf for the Archive to be transferred to the Museum of London.

9 GEO-ARCHAEOLOGICAL EVALUATION & MITIGATION

- 9.1 Geo-archaeological evaluation consisting of three boreholes has been undertaken by QUEST. The report on that evaluation is provided at Appendix 8.
- 9.2 In summary, the QUEST report identifies a relatively thick sequence of overlying a Shepperton Gravel surface of variable height, indicative of a potential Late Devensian/Early Holocene palaeochannel towards the west. The surface of the peat was recorded between (minus) -1.5 (LCY-BH3) and (minus) -3.5m OD (LCY-BHAC02).
- 9.3 The report concludes that the lower Gravel surfaces are considered to be of negligible archaeological potential but recommends that a programme of environmental archaeological assessment is undertaken on one selected borehole (LCY-BHAC03).
- 9.4 Information regarding the WEC indicates that the basement slab will not impact the surface of the peat. The surface of the peat is recorded at between (minus) -1.5 and (minus) -3.5m OD and the top of the proposed basement slab is at circa (minus) – 0.22m OD (see Figure 3C). Piling associated with the WEC, load bearing piles and a secant pile wall, is therefore considered likely to penetrate the peat.
- 9.5 However, in light of the depth of made ground (see borehole logs in Appendix 6 indicating 3.40m to 3.80m of made ground, and geo-archaeological borehole logs in Appendix 8 indicating 4.60m to 8.0m of made ground and concrete) no further on-site mitigation is proposed within the location of the WEC.

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FIGURE 1

Extent of the Works

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- Internal layouts are for illustrative purposes only.

- Base building survey information by LCY and MSA

SCALE BAR



LEGEND

- EXISTING RETAINED PRINCIPAL BUILDINGS
- PROPOSED BUILDINGS
- EXTENT OF PROPOSED WORKS
- EXTENT OF PARKING ZONES FOR FULL PLANNING PERMISSION
- PROPOSED DEVELOPMENT BOUNDARY LINE
- PROPOSED NOISE BARRIER
- APPLICATION DRAWING SET BOUNDARY

| | | | |
|-----|----|----------|----------------------------|
| A | SW | 16.06.15 | Issued for Planning Appeal |
| - | MN | 01.07.13 | Issued for Planning |
| Rev | Dm | Date | Description |

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London City Airport Limited City Aviation House Royal Docks London E16 2PB

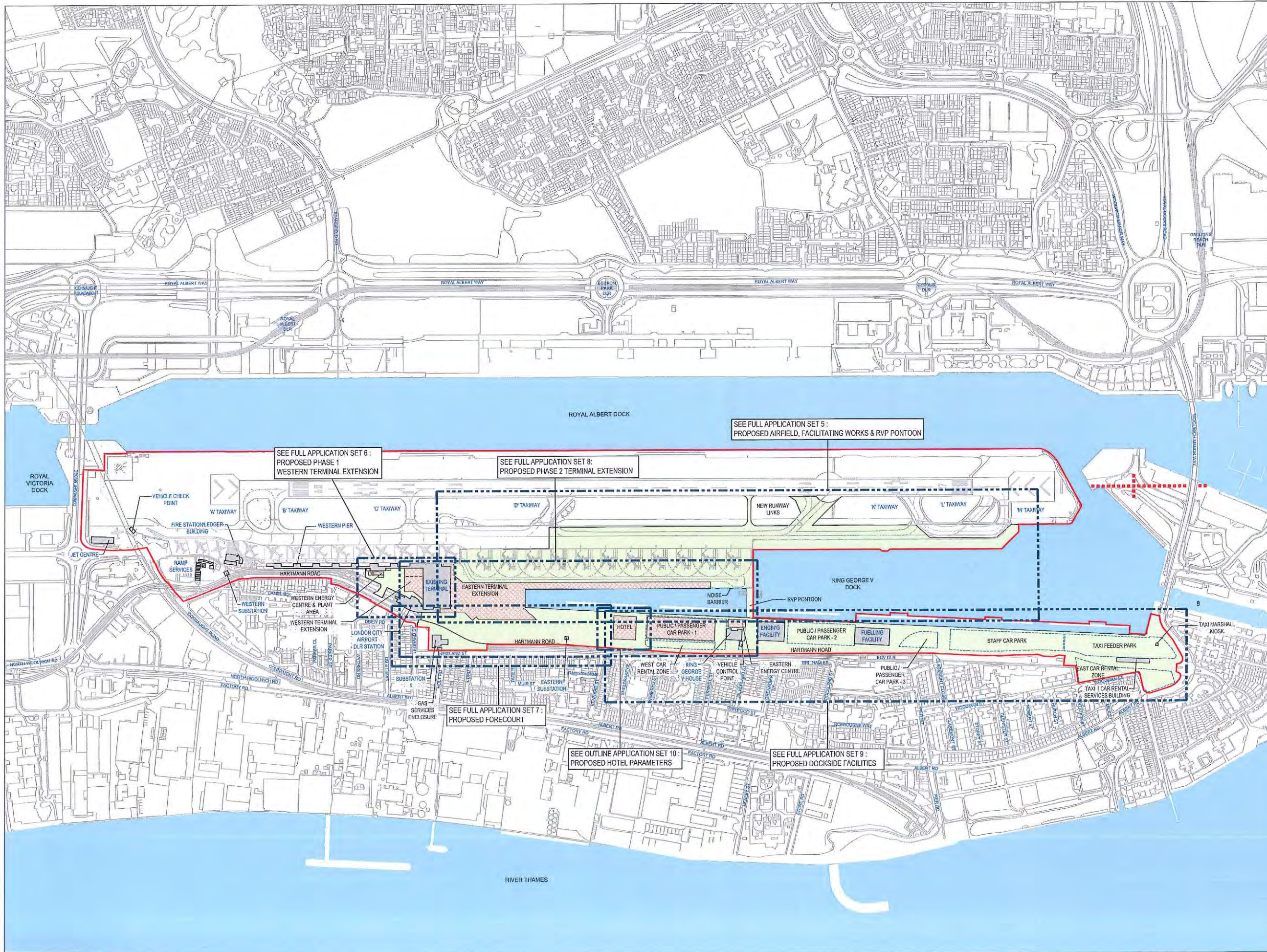
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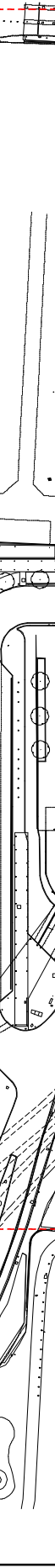
Client
LONDON CITY AIRPORT
Project Name
CITY AIRPORT DEVELOPMENT PROGRAMME

Title
3 - KEY PLAN

| | | | |
|-------------------------|---------------------------|----------------------|------------|
| Discipline | Architecture | Project Phase | PLANNING |
| Drawing Originator | Pascall+Watson architects | Originator's job No. | 4486 |
| Checked By | SW | Checked Date | 16.06.2015 |
| Drawn By | GC | Drawn Date | 11.03.2013 |
| Approved By | MN | Approval Date | 16.06.2015 |
| Scale | 1:3500 | | A1 |
| Building Grid Reference | SITE | | |
| Client | LCY | Originator | P+W |
| Project Ref. | 4486 | Discipline | B |
| Drawing No. | SI20004 | Revision | A |



1 PROPOSED SITE KEY PLAN
1:3500



This architectural drawing shows a section of a building. On the left, a staircase with a curved wall is visible. To the right, a large room with a curved wall and a small square opening is shown. The drawing includes various lines indicating structural elements and a small square symbol in the upper right corner.

This architectural section drawing illustrates a building's internal structure and roof profile. The roof is shown with a significant slope, supported by a series of vertical structural elements. The interior space is divided into multiple levels and rooms, with various wall and floor thicknesses indicated. A dashed line suggests a hidden or structural boundary. The drawing is a technical representation of a building's cross-section.



FIGURE 2

Western Terminal Extension

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The Licensee warrants that this drawing is a true and accurate representation of the information provided to it by the Licensee.
All information shown outside the Proposal Boundary is for illustrative purposes only.
Internal layouts are for illustrative purposes only.
Base building survey information by LCT and MSA.

None. Model files attached.

Scale Bar
0 5m 10m

North Arrow
N

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LONDON CITY AIRPORT
CITY AIRPORT DEVELOPMENT PROGRAMME

6.6 PROPOSED PHASE 1 WESTERN
TERMINAL ELEVATION
GROUND LEVEL 00

Project Name
6.6 Proposed Phase 1 Western Terminal Elevation

Project Manager
Pascall + Watson Architects

Project Number
5077

Client
London City Airport Limited

Contract Date
08.09.2016

Issue Date
23.09.2016

Issue By
SW

Issue For
23.09.2016

Issue No
1/230 - A1

Issue Description
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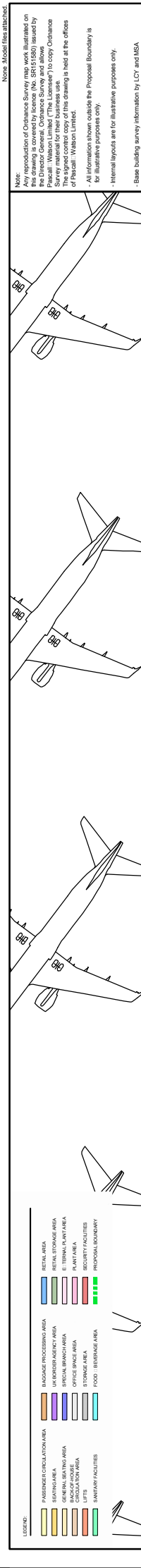
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FIGURE 3

Western Energy Centre