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PADDINGTON STATION
SITE SPECIFIC ARCHAEOLOGICAL
DETAILED DESK-BASED ASSESSMENT

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Executive Summary

A Detailed Desk-Based Assessment (DDBA) has been undertaken on the construction sites at Paddington Station as part of the construction of Crossrail. The construction sites which have been assessed include:

- Work sites at Bishops Bridge Road (also a service Deck location), Paddington Central;
- Red Star Deck;
- Paddington Box structure at Eastbourne Terrace and Departures Road;
- District & Circle Line Connection;
- Main Line Connection;
- Bakerloo Line Connection.

The report has found that there is a low likelihood of significant prehistoric features being located in the Paddington area given an understanding of the geology and truncation impacts. There is a high likelihood of locating moderately significant post-medieval archaeology associated with construction of Brunel's Great Eastern Railway and ancillary features such as the Osbourne tunnel. Non-listed buildings which have been identified as being demolished will require further assessment.

The Bakerloo Line connection is to be constructed within London Clay and will not have an impact on archaeological deposits. The Red Star Deck vertical core construction is also unlikely to have an impact on archaeological deposits given previous works in the area. However where these works impact upon the vaults which run underneath the Red Star Deck, these will require mitigation through a programme of building to English Heritage's Building Recording Guidance 2006, level 2.

The work sites are predicted to have a low impact on significant archaeology, given the limited nature of ground impact. If the works are to impact upon the tunnel a programme of building recording may be required to mitigate this impact.

The proposed connections for the District and Circle Line and Main Line station are located in areas which are likely to have been truncated due to construction of MacMillan House basement and previous access works. A Targeted Watching Brief (TWB) is considered sufficient to record the anticipated archaeological resource.

The Paddington box structure is likely to occur in an area which has been truncated to about 3m depth by construction works associated with the construction of Paddington Station. This area lies to the west of the Westbourne River location. However, the extent of truncation below 3 metres is unknown. This area is recommended to be assessed under a Trial Trench Evaluation (TTE).

1 Introduction

The Cross London Rail Line (Crossrail) is a major new transport link that has been developed to serve London and the south-east of England. The Scheme Design for Paddington Station has been developed by MDC2. The details of the Scheme Design for Paddington Station are presented in the following documents:

- Paddington Station Scheme Design Report - Volume 3 – Civil, Structural & Tunnel Engineering Report. Document Number: CR-SD-PAD-CE-RT-00002
- Paddington Construction Planning Report – Volume 2. Document Number: CR-DV-PAD-X-RT-00016

This detailed desk-based assessment (DDBA) addresses the area surrounding Paddington Station at the western end of MDC2. The construction package includes the Station box which will be constructed along Westbourne Avenue and Departures Road, the District and Circle Line connection and the Main Line connection from the box, relocation of taxi facilities to the Red Star Deck and associated work sites (see Figure 1 below).

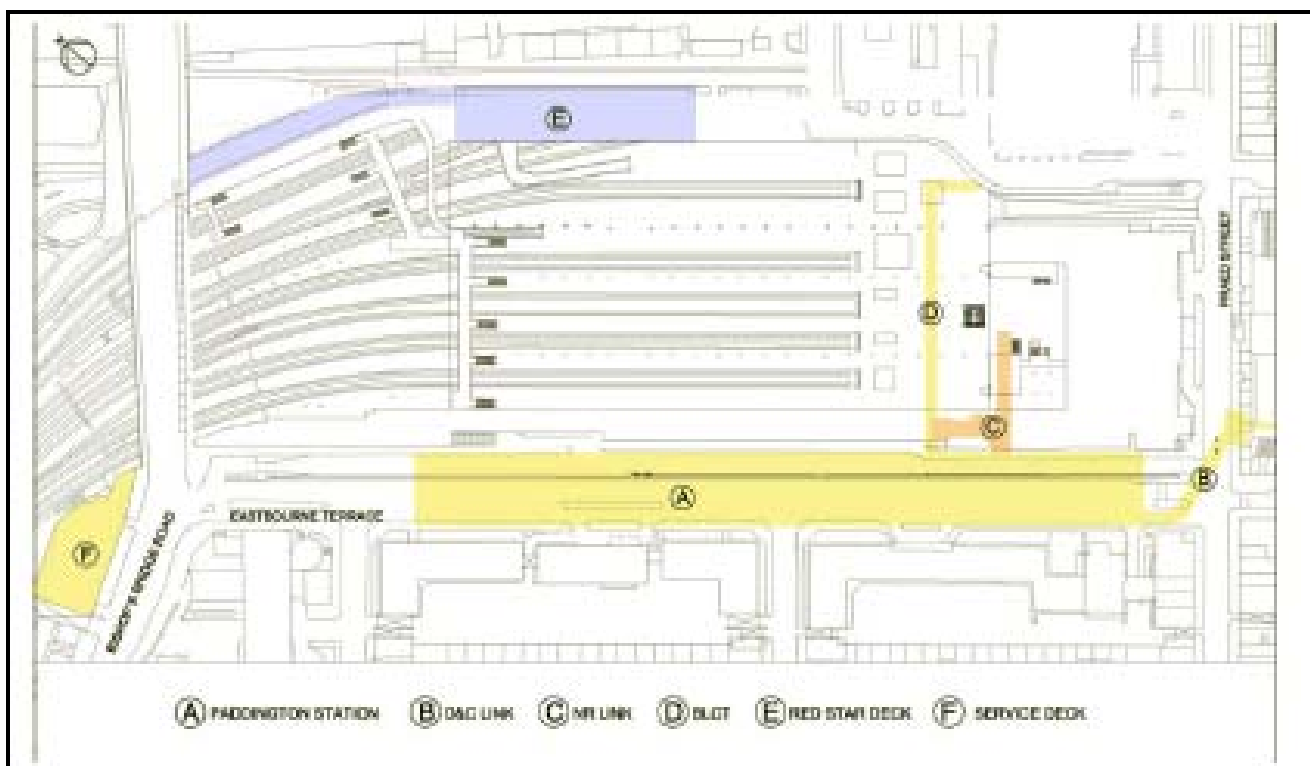


Figure 1. Figure 10.1 from Scheme Design Report (Document Reference SD-PAD-CE-RT-00002) illustrating plan of Crossrail works at Paddington

The report comprises the second stage of a process in identifying the presence/absence, location, extent, character, quality and date of any archaeological remains or built heritage features which may be affected by the construction of Crossrail. The first stage comprised a general desk-based assessment of high level data gathering and largely predictive analysis of archaeological potential. That work was presented in the Specialist Technical

Reports: (STR) Assessment of Archaeology Impacts (Parts 1-6) which were produced in support of the Crossrail Environmental Statement (ES) (2005) and subsequent addenda.

This DDBA represents an additional programme of targeted research and review of documentation. This assessment was required to further define the archaeological potential and site conditions. This DDBA describes the construction impact of Crossrail and its associated works on the archaeological and built heritage (non-listed) resource in support of the production of a site specific site location, proposes mitigation of potential impacts, and provides the scope for a WSI. The assessment has been undertaken for the latest scheme design for the site.

In compiling the DDBA the following assumptions have been made and limitations noted:

- The assessment is based on details as described in Scheme Design Report available at the time of compilation of this report;
- The assessment is based on site conditions as current at the time of compilation of the report;
- The results of the geotechnical investigation, including test pits, undertaken as part of Package 16 have yet to be completed. Only preliminary information has been incorporated into this DDBA.
- No archaeological field survey has been carried out within the site as part of the assessment. An initial site visit was made to understand the general layout and landform of the locality.

A series of documents are being prepared by CLRL in relation to the archaeological works. Where available these have been taken into consideration for the preparation of this DDBA. These are:

- Archaeology Generic Written Scheme of Investigation (14022008-44ES-P2Z1)
- Archaeology Project Design: Information management Plan (in progress)
- Archaeology Procedure for Detailed Desk-based Assessment (in draft)
- Archaeology Procedure for non-Listed built heritage recording (in progress)
- Archaeology Consultation Strategy (in progress)

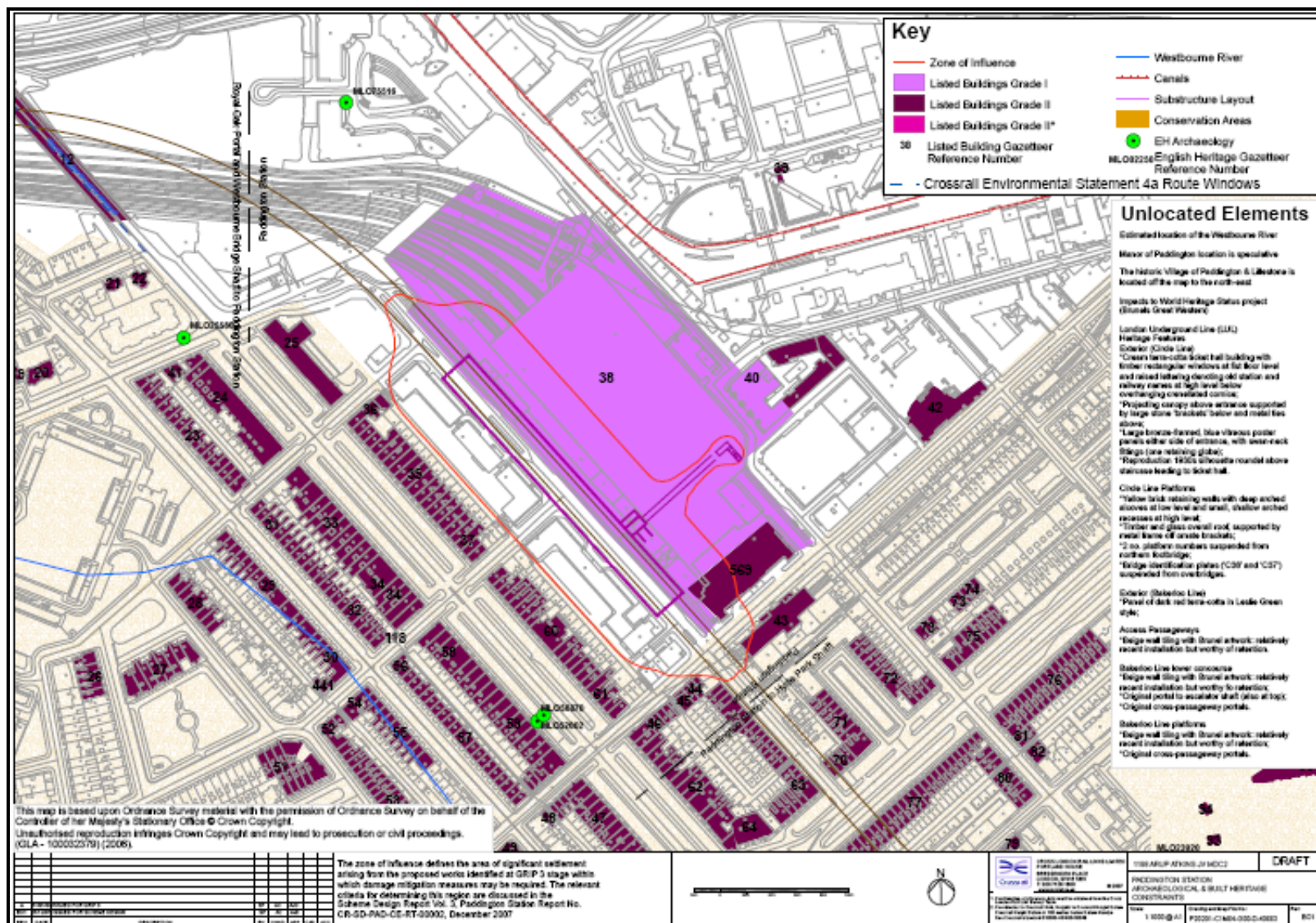


Figure 2. Drawing no. P20201-C1M04-G00-D-40003 from Scheme Design Report (Document Reference SD-PAD-CE-RT-00002) showing key areas of heritage and archaeological value.

2 Topography and Geology

London is situated within the Thames Basin, a large glacially scoured area cut into the Cretaceous chalk which outcrops at the Chilterns to the north and the North Downs to the south. The basin subsequently infilled with Tertiary age (65 million to 1.5 million years ago) marine and estuarine sands and clays, such as the Reading / Woolwich Beds and the London Clay. The Thames Valley also contained a number of substantial gravel terraces deposited by the river during successive glaciations between approximately 450,000 to 50,000 years ago. One such substantial terrace plateau crosses the study area in an east/west direction at around 125m ATD¹ called the Lynch Hill phase.

The main terrace sequences in Paddington are however more complex where crossed by tributaries such as the Westbourne, which flowed south towards the Thames. This river is of considerable antiquity and together with its associated alluvial fills may have originally developed in conjunction with the glacial phases of the Thames. The course of the former river Westbourne lies some 20m west of the site.

Lynch Hill terrace gravels overly much of the Paddington area. These have been recorded at a height of c.123m ATD to 123.5m ATD in Eastbourne Terrace and Praed Street, respectively. However, at the northern end of the Paddington Station Box, the London Clay is exposed at 122.7m ATD (Archaeology Programming Assessment, November 2006 1E0318-G0E00-00006 rev. B MoLAS).

There is an overall slope south towards the River Thames, but there is a local south-west trend towards the shallow valley of the Westbourne. The north-south Thames slope is reflected in the drop along Eastbourne Terrace from 128m ATD in the north-west, to c.125.4m ATD in the south-east.

Within the area of the Lawn Concourse in Paddington Station, construction appears to have caused truncation below those of natural geology. The basements of MacMillan house in this area have been predicted to be located on top of the London Clay between 118 and 120m ATD (Paddington Scheme Design Report Document CR-SD-PAD-CE-RT-00002).

A series of test pits (TP6, TP7, TP9 and TP10) and one self boring pressuremeter (SBP1) ground investigation works were undertaken around the Paddington site. CLRL have provided additional information from CPTs (CPTu3-CPTu8), trial pits (TP78-TP84, TP76A, TP77A and TP82A) carried out by Soil Mechanics in 1993 and boreholes for the Telstar House Development (BH1).

Alluvium was not encountered in any of the exploratory holes. The superficial River Terrace Deposits vary in thickness across the site. The River Terrace Deposits appear to

¹ Heights are provided in metres Above Tunnel Datum (ATD), unless otherwise stated; where the reports referenced originally gave heights in Ordnance Datum, one hundred metres has been added to them for consistency.

be thickest in the east of the main Paddington Box site becoming progressively thinner towards the west.

Further geotechnical ground investigation, Package 16, are being undertaken on behalf of CLRL including the route covered by MDC2 and includes the area relevant to Paddington station. The ground investigation for Paddington has not been finished at the time of preparation of the DDBA, however, archaeological monitoring of these works is occurring concurrently. A review of one of the Package 16 boreholes, P14 in the location of the proposed station box, evidenced tarmac, concrete and 19th to 20th century dumping to c.3.3m overlying a dirty gravel (N. Elsdon, pers. comm. Jan 2008).

3 Aims and Objectives of Assessment

The aims and objectives of this DDBA are to:

- Determine the potential for, and survival of, archaeological resources within the area of Paddington Station and associated construction sites, building on information provided during the Crossrail ES stage;
- Provide additional information relating to the archaeological impact of the scheme, based on the engineering design and interpretive site deposit modelling, and to;
- Inform the subsequent phases and scope of archaeological mitigation planning, under a Written Scheme of Investigation (WSI).

3.1 Methodology

The methodology employed for this DDBA was set out in the draft CLRL Procedure for Detailed Desk Based Assessment. The DDBA seeks to define what engineering design information exists for a specific construction site and to target research on those areas within the construction site which require it. This process identifies changes to the design since publication of the ES. Other associated work activities which have been considered in relation to this DDBA are enabling and utility works and systems and rolling stock works.

Updated baseline information was supplied to MDC2 by the Museum of London Archaeology Service (MoLAS), acting as specialist archaeological advisors to CLRL during the Bill process. MoLAS supplied:

- Updated Greater London Sites and Monuments Record (GLSMR) information;
- Updated information in relation to designations, e.g. World Heritage Sites, Scheduled Ancient Monuments, Local Authority Archaeological Priority Areas, Listed Buildings and Conservation Areas;
- Historic maps of the locality, thus enabling MDC2 to undertake a map regression exercise facilitating a better understanding of the phasing and use of the site;
- A review to archaeological excavations records held at the London Archaeological Archive & Research Centre (LAARC) to provide data on anticipated deposit heights to assist in ground modelling.

This new information was then compared to the Scheme Design engineering and construction information.

A visual site appraisal was made of publicly accessible areas to gain an understanding of the local topography and the construction impact.

Additional documentary sources consulted included where available:

- Historic building records
- Updated technical reports (such as the latest Scheme Design Reports).

A review was undertaken of available geotechnical and geological data procured through recent site investigations such as Package 16 on behalf of CLRL to confirm depths of superficial deposits and subsurface depths and thickness of potential archaeological deposits. This data was proposed to:

- Further understand the potential of the archaeological resource;
- Aid in understanding the degree of preservation/truncation of archaeological deposits;
- Determine the potential of the archaeological resource which had been detailed in previous reports (Archaeology Programming Assessment, November 2006 1E0318-G0E00-00006 rev. B MoLAS)

4 Results

A separate gazetteer for the recorded archaeological features is presented in Appendix 1. A gazetteer outlining the Archaeological evaluation sites used in the deposit model is located in Appendix 2. For archaeological records, the number, for example **MOL1313**, in the following text refers to the number allocated on the Greater London Sites and Monuments Record (GLSMR), in the Gazetteer. The sites are located in a map in Figure 2.

For the purposes of the baseline the following periods are used:

Table 1: Time Periods

Prehistoric	
Palaeolithic	450,000 - 12,000BC
Mesolithic	12,000 - 4,000BC
Neolithic	4,000 - 2,000BC
Bronze Age	2,000 - 700BC
Iron Age	700BC - AD43
Historic	
Romano-British	AD43 - 410
Early/Mid Saxon	AD410 - 850
Late Saxon/Early Medieval	AD850 - 1066
Medieval	AD1066 - 1485
Post-Medieval	AD1485 - 1750
Industrial	AD1750 - 1900
Modern	AD1900 - to Date

Prehistoric

The landscape of the study area during the prehistoric period would have been dominated by the valley of the River Westbourne which ran to the west of the study area. This would have provided a background for hunter gatherer activity and occupation during this time period. Evidence for such activity would have been masked by later alluvial build up. However, prehistoric occupation and land use soil evidence is fragile and vulnerable, particularly in urban environments. Isolated finds of Palaeolithic axes (c 450,000-12,000 BC) have been recovered from these gravel deposits. Little evidence remains of early farming and land use dating to the prehistoric period, and what has been recovered is piecemeal in nature. Research has not located any evidence of prehistoric deposits recovered to date within the location of Paddington Station. This is due mainly to the loss of Lynch Hill deposits within which archaeology of this date has been located.

Roman

The Roman city of *Londinium* lay approximately 6km to the east of the site. The city was served by a series of Roman roads, two of which are in the vicinity of the site. Bayswater Road is aligned on Roman Stane Street, approaching London from Chichester in the south-west (MLO14883; MLO11208). The area is located to the north west of the Roman road *Via Trinobantia* (Oxford Street) which ran to the Roman town of Silchester.

Previous archaeological field work and research has determined that there are no Roman known remains in the area and no known deposits in the immediate locality of the Station. The study area would have been an open agricultural landscape. Occupation sites would be expected to be located at the intersection of roads (i.e. Marble Arch).

Anglo-Saxon & Medieval

Following the exodus of the Romans from Britain, rural settlement continued and villages such as Paddington and Lillestone to the north east are identified. The busy trading port of Saxon Lundenwic was located around the Strand and Aldwych to the east. The land of Hyde Park and surrounding regions, including the Westbourne River formed the Saxon agricultural lands of Eia, which was bequeathed by Geoffrey de Mandeville to Westminster Abbey in 1086.

To the north of the former Estate of Eia the countryside was owned by the Bishops of London. Paddington was a small settlement around a central green, and Hyde Park had been acquired by Henry VIII; he turned it into an enclosed Deer Park in 1540.

Post-Medieval

Land use changed dramatically in the post medieval period with economic factors during the Tudor period leading to a population explosion in London. Urbanisation extended out from the City, particularly after the Great Fire of 1666. The suburb of Paddington evolved from a medieval village into a suburb within Central London, situated on the junction of Roman Watling Street and the road to Harrow. During the 16th and 17th century's it was still a small settlement centred around a village green. In 1756 Marylebone Road was constructed to connect Islington to Paddington and this gave rise to increased housing, commercialism and industrialisation of the area, particularly with the construction of the Grand Union Canal in 1801.

A footpath ran east from Westbourne Green to Paddington Green in 1746, but this was cut short by the construction of the Canal. This had the effect of angering the vestry as reported in the Victorian County History Volume 9. (VCH 1989:175). The path became known as Bishops Walk in 1828. This path connected to land acquired for the '...depot and lines of the G.W.R Co., which in 1837 undertook to construct a road, including a viaduct over the railway and a bridge over the canal.' (VCH 1989:176). This became known as the Bishop's Road, and then as Bishop's Bridge Road in 1938.

A water conduit is located in Westbourne Terrace and is associated with the diversion of the Westbourne River (MLO 56870, 52002). This begins near Cannon Hill in West Hampstead and flowed south in the area of Bishops Bridge Road between the area of Craven Terrace and Gloucester Terrace. It is interesting to note the relationship

postulated by Bromehead in his discussion on watercourses and human settlement in London. He comments that '...the areas of bare London clay remained unoccupied till the advent of steam pumping and iron water mains. The outlying hamlets around London all originated on water-bearing strata, as pointed out by Sir Joseph Prestwich: Putney, Roehampton, Clapham, and Brixton on the south; Ealing, Acton, Paddington, Kensington, and Islington on the north, with many others, were on the river gravels, Hampstead and Highgate on the Bagshot Sand...But in such a densely populated area the supply from the gravel soon became inadequate in quantity and foul in quality -" decayed" is Stow's word. The terrible ravages of disease must have been largely due to the use of contaminated water. Several means were adopted for remedying this trouble, of which the earliest, the conduit system, dates back to the thirteenth century. Spring water from outlying districts was piped to the city (Bromehead 1992:132-133). The Westbourne supplied the Bayswater area until 1844, until it too became too polluted and a conduit established (1992:134).

The completion of Brunel's Great Western Railway in around 1840 completed the industrialisation of the area (MLO 97446). This work was authorised by the Great Western Railway Companies Act of Incorporation in 1835. 'By agreement with the Bishop and his lessees, work began on the easternmost stretch from Acton to Paddington, running through clay cuttings south of the canal, in 1836, although the eastern end and terminus were delayed until an Act of 1837 permitted the alteration of public roads.' (VCA 1989:176). The Station was inspired by a forerunner at Munich and by the Crystal Palace. '...it had one of England's first large station roofs in metal, spanning an area 700 ft. by 238 ft. and at the height of its curves reaching 55 ft. above the platforms.' (VCA 1989:176). The area underneath the Red Star deck is underpinned by brick buttresses or vaults.

The World's first underground railway opened in 1863, running from Bishop's Road to the north of Paddington Station and then extended to Praed Street Station in the following year (see photograph 1). This was the Metropolitan Line.



'The stretch from Praed Street junction through Bayswater to Gloucester Road was opened in 1868. On the completion of the 'circle' line in 1884, trains at first were run alternately by its two owners, the Metropolitan and the Metropolitan District or District railway companies. Later District trains ran on the inner rail and Metropolitan trains, clockwise, on the outer rail. Electric trains were introduced in 1905 by the Metropolitan, which soon afterwards took over the sole working of the 'Inner Circle'. A subway between Praed Street and the terminus was built only in 1887. Praed Street station was renamed Paddington in 1948 and Bayswater was called Bayswater (Queen's Road) for Westbourne Grove from 1922 until 1933.' (VCA 1989:177).

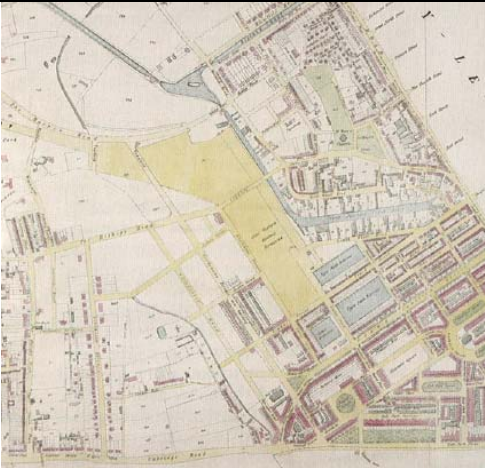
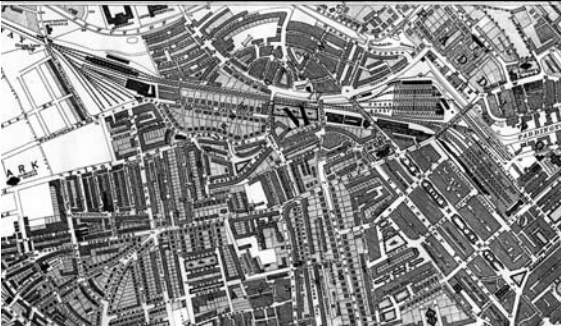
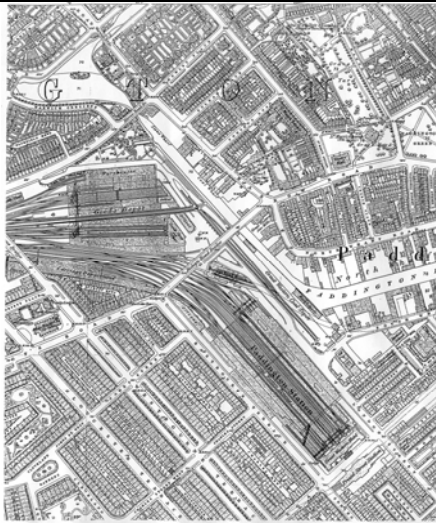
The subway was constructed using a cut and cover method resulting in the removal of considerable areas of deposits. Further sub-surface construction work had included the construction of basements and connections to the Underground tube platforms. Post-medieval dumping evidence has been located during various excavations in this area (MLO 25550).

The 2006 MoLAS Programming Assessment Report states that there is uncertainty over the absence or archaeology or of the sufficient depth or complexity which any archaeological investigation would require. An analysis of boreholes or test pits is recommended to help understand the sub-surface possibilities. The result of this work is still outstanding but would help to make a more informed assessment of the truncation to archaeological deposits. The reports comments on the moderate potential for features associated with a medieval water conduit, and post-medieval garden features with low potential for Saxon and Medieval Paddington village and Brunel's GWR Station of 1838. Any evidence of Brunel's station would be of moderate significance. The report also comments on the basemending across the 'Red Star' Deck which will have removed all archaeological remains in its footprint. This basement is in itself viewed to be of low to moderate heritage significance.

4.1 Map Regression

A map regression exercise was carried out to understand the development of the study area, and to identify any earthworks which would have had a detrimental impact to any earlier archaeology.

MAP NAME	MAP DATE	MAP IMAGE	COMMENTS
Rocque	1746		<p>This map is one of the earliest for the locality. It shows the site as lying in open fields. The valley associated with the line of the Westbourne valley is defined as a shaded to the east of what is now Paddington Station. A lane named the Green Lane runs to the north of the study area</p> <p>No structures are mapped within the area of Crossrail construction activity; only field boundaries.</p>
Greenwood	1824		<p>Nearly 100 years later this map shows considerable development with the construction of the Grand Junction Canal to the north of Paddington Station. The Westbourne River is still evident although a culvert has been constructed to divert it under the Canal. The site lies across Bishops Walk, a small lane. The water works exists to the immediate south.</p> <p>Other than Bishops Lane and field boundaries, no structures are illustrated within the Crossrail works area.</p>

<p>Plan of the Parish of Paddington, George Oakley Lucas</p>	<p>1842</p>		<p>The parish of Paddington was developed in the 1820s. The map shows the large area set aside for the rail line and all the major road links. The Grand Junction Canal has been completed through to Paddington by 1805. The buildings shown here is the original Great Western Station built in 1834. Brunel's building was not built until 1854.</p>
<p>Stanford</p>	<p>1862</p>		<p>Less than 40 years later, there has been extensive development across the entire Paddington station area, with road construction and housing surrounding the site.</p> <p>The railway station, its tracks and goods yard have been constructed between Eastbourne Terrace and the Grand Junction Canal. The layout which remains today has been established. Westbourne Street has been renamed to become Westbourne Terrace and Departures Road runs parallel to it.</p> <p>It is apparent that extensive 19th century construction activity will have affected and most likely truncated earlier deposits which may have existed.</p>
<p>Ordnance Survey Map</p>	<p>1872</p>		<p>The Ordnance Survey map shows dense housing surrounding Paddington Station. Across the Station area the 'greyed out' expanses indicate perhaps an overhead structure or canopy.</p> <p>Spot height markers on the plan indicate a gradual slope to the south along Eastbourne Terrace.</p>

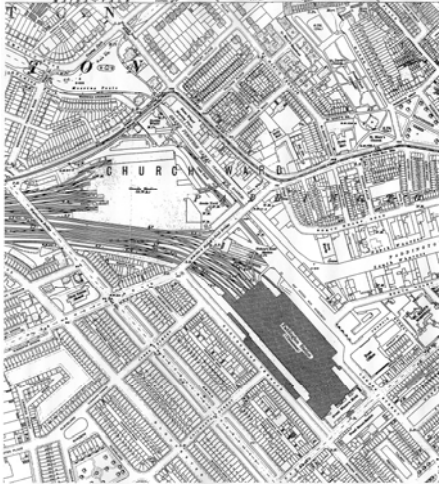
Ordnance Survey Map	1914		<p>There is no great difference between the 1872 and 1914 Ordnance Survey maps in terms of changes to street layouts and the physical structure of Paddington Station.</p> <p>Eastbourne Terrace and Praed Street remain unchanged.</p>
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Table 2. Map Regression Summary

The map regression exercise demonstrates that until the mid 19th century the area remained in fields and was not extensively developed. The increase of population within London required an upgrade to the existing transport system. The construction of the Great Western Railway through to Paddington, along with the Canal and road upgrades has had the most impact on the study area. The diversion of the Westbourne River into culverts and conduits has also extensively modified the landscape.

4.2 Truncation Evidence/Disturbance

The construction of the Paddington Railway Station resulted in the deposition of several metres of overburden onto the area of the new Crossrail station box. Research to establish a deposit model for the site, located previous archaeological excavations at approximately 290m to the north and 550m to the east. The soil sequence for the excavations to the north consists of London Clay at the existing ground level, just beneath modern road/pavement (archaeological site codes PGY90, PYD00). Whereas the archaeological investigations to the east were established in the Lynch Hill Gravels (site code PRA98) indicating a higher potential for archaeology. These Lynch Hill gravels have historically been rich sources of Palaeolithic finds, although research within the immediate vicinity of Paddington Station has not located any evidence of Palaeolithic or prehistoric activity. The Lynch Hill gravels are not thought to be located in the Paddington site.

Further disturbance is associated with the construction of the Post Office Tunnel (Osbourne Tunnel), the tube lines and Paddington Station rail access under Praed Street as well as the construction of the Red Star Deck. The Red Star Deck is so called as the Red Star was a division of a British Rail operated parcel service, the office of which was located on the Deck. This delivery service is now operated by Lynx but the name has stayed.



Picture Reference: 10325362, Science Museum Archive entitled 'Constructing Paddington (Praed St) Station, London, 1866-1868'.

Photograph 1. Constructing Paddington (Praed St) Station

Truncation evidence from these excavations and observations noted above (Section 2) indicates that much of the soil layer in which archaeology is located (Lynch Hill Gravels and any surviving archaeological made ground) has been removed. In the Red Star Deck VCC area the construction will impact to a depth of 122m ATD. This area is not predicted to have an impact on archaeology.

It is anticipated that there is a low likelihood that archaeology will be located within the either Station Box area, or the Circle and District Lines and Main Line connections. However it is likely that this will be confirmed once the results of the Package 16 ground investigation in these areas are completed and analysed.

In order to determine with accuracy that this is the case it will be necessary to assess the results of Package 16 ground investigations and utility trial trench surveys which are on-going. Initial observation of P14 in the location of the Station Box (see Figure 1 for location of Box) evidenced tarmac, concrete, and 19-20th century dumping to c.3.3m thick, overlying a dirty gravel. However, the assessment was not able to determine whether any archaeology horizons existed at the base of the dumping. Further evaluation is required in the area of the Station Box, particularly in the south area of the proposed box.

4.3 Discussion

The results of the archaeological and historical research undertaken for the Paddington Station, in relation to the construction of Crossrail and its associated activity, shows that

the land remained in open fields up until the 19th century when rapid housing growth and transport construction occurred. It is this transport construction which has contributed to the truncation of archaeological deposits, through road construction, the construction of Paddington Station and its rail infrastructure. In particular, during the excavation for Paddington station rail-line and foundation infrastructure, large amounts of excavated soil was deposited in the proposed Crossrail station box area along Eastbourne Terrace and Departures Road.

Initial assessment of Package 16 boreholes shows that this 'made ground' sequence occurs to a depth of 3 metres below ground. The depth of the proposed Station Box cutting is 121.4m ATD. This demonstrates that it is unlikely that archaeological deposits of significance prior to the 19th century exist.

The archaeological watching brief of the Package 16 ground investigations has been targeted at Paddington so as to assist in determining the appropriate mitigation in the area of the Station Box, Main Line, and District and Circle Line connections. The research to date indicates that much of this area has been truncated as stated above, however final results of the watching brief have not been made available. The results of this watching brief will act to further identify and scope the mitigation strategy.

The December 2007 Scheme Design report provides the latest detailed engineering designs (CR-SD-PAD-CE-RT-00002; 21 Dec 07). The earlier Initial Reference Design Report has also been referred to (Paddington Construction Volume 2 CD-DV-PAD-X-RT-00016; Jan 07). Based on the information provided in these reports, works will begin with service diversions and obstruction removals, followed by enabling works, such as site set-up. Actual construction sequence will to begin with the excavation of the central box area (258m long, 27m wide and 23m deep) which will connect to the Circle and District lines through shallow cut and cover tunnels, and through a connection to the main-line 'lawn concourse'.

The Scheme Design has removed the need for the west and east shafts and reduced the length of the central box. The construction sequence begins with the northern half of the station before proceeding to the southern section. Further work to establish the stratigraphy and likely nature of surviving soil horizons in the area of the box would determine whether or not mitigation of construction impact is required.

The shallow cut and cover works required for the District and Circle line connection in Praed Street occurs in an area of previous road construction and utility works. There is also truncation due to the construction of Paddington Station.

It should be noted however that Paddington Station itself is a significant feature and that features and associated archaeology may be located within the construction works for Crossrail. As an example, in 2004, during work on the replacement of Bishops Bridge Road, a cast iron bridge constructed as part of Brunel's design to carry the road over the railway, was exposed. In addition, the post-medieval construction techniques used in the construction of Paddington Station are also of interest and should be recorded where they are evidenced.

The Bakerloo Line construction works will remain in London Clay.

Connection to Main Line 'Lawn Concourse' Network Rail and LUL ticket hall now involves the demolition of the Bomb Gap area and affected area of Macmillan House.

4.3.1 Work sites

Platform 1a Bishops Bridge Road

To the west of Bishop's Bridge Road lies the site of Platform 1A, previously railway sidings and currently a public car park. This site is considered the most practicable area for the site compound, which will include site offices, welfare facilities, stores, workshops and materials storage. The existing access arrangements (entrance off Bishop's Bridge Road and exit onto Orsett Terrace) will be maintained.

The construction on this worksite will not impact upon archaeological material as ground disturbance will be minimal, however any impact on the Osbourne Tunnel as part of enabling works will require mitigation. This Tunnel is considered to have moderate heritage significance due to its use as early engineering and function. At present the scheme does not impact upon the tunnel rather, piling impacts will occur to the 'sandwich making rooms' on either side.

Paddington Central

Paddington Central is located north of the Great Western Mainline, heading into Paddington Mainline Station and to the northeast of Westbourne Bridge. The area is currently being developed and part of the site remains potentially available for use. The area available is underneath a recently constructed deck, the future use of which is not yet known. The area beneath would provide a dry and relatively secure area, with headroom clearance of around 5m. The construction on this worksite will not impact upon archaeological material as ground disturbance will be minimal.

Red Star Deck

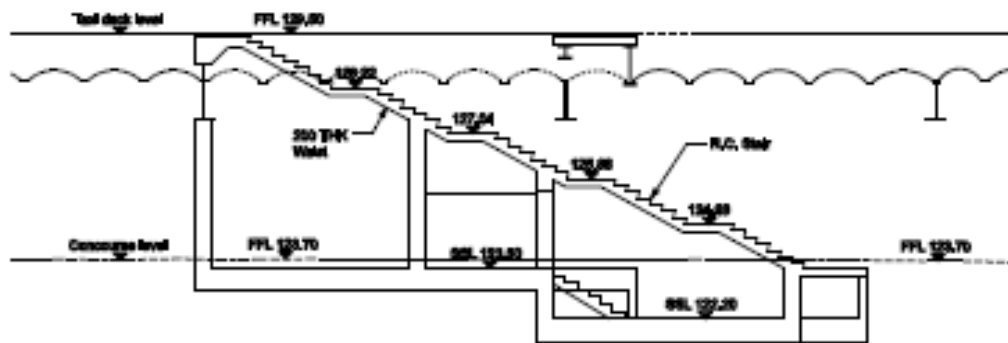
This package of works to be carried out at Paddington Station comprises the relocation of the taxi rank from Eastbourne Terrace to the Red Star deck area. This area is covered under the heritage buildings assessment however the archaeology element is assessed as part of this DDBA. The existing Red Star building shed will be dismantled and removed. A vertical circulation area will then be created in the existing deck structure. This structure will require strengthening to support the taxi facilities.

The ground disturbing works will arise from the construction of a Vertical Circulation Core (VCC) from the Mainline Station Concourse level to the Red Star Deck Level to facilitate the movement of passengers between the station and the taxi area. This VCC will consist of two escalators, a staircase, and a 16 person lift. The proposed location of the VCC is in the store area at the back of Platform 12.

Stratum	Elevation at top (mATD)	Thickness (m)	Design elevation top of stratum (mATD)
Made Ground	121.60 – 121.72	0.90 – 2.10	130.00
Terrace Gravel	121.60 – 121.65	0.00- 2.60	121.50
London Clay	120.82 ²	56.60 ²	121.00
Lambeth Group	64.20 ³	> 2.50 ³	64.50

Table 10.3E – Design Stratigraphy Summary – Taxi Relocation Area

- Notes:
- 1 - Only boreholes P8, P11 and BH432 considered.
 - 2 - Terrace Gravel not encountered in BH432
 - 3 - Only BH432 proved the base of London Clay (and top of Lambeth Group)



Section A-A

Figure 3. From Drawing P2020201-C1M04-R00-D-60001 in Scheme Design Report (Document Reference SD-PAD-CE-RT-00002)

The table above demonstrates the stratigraphy likely to be located at the Red Star Deck. This will be cut through to concourse level at 122. ATD. Brick vaults or buttresses dating to the Victoria era are located beneath the Red Star Deck. These will require mitigation, likely through English Heritage’s Building Recording Guidance 2006, to level 2.

Non-Listed Buildings

Non-listed built heritage requirements are set out in CLRL *Information Paper D22 Archaeology* and encompasses above ground historic features and structural elements of historical interest.

Two main groups are:

- Non-listed buildings proposed for demolition in conservation areas; and
- Historic street furniture and materials falling within a worksite and being temporarily or permanently impacted upon by the works.

Table 2 below has been provided by CLRL in their draft *Non-listed built heritage recording procedure*. The red arrow indicates where the contribution of a structure is assessed as different from the ES.


Property ID (Book Of Reference)	Route Window	Property Address/ Description of Features	Contribution to Conservation Area		
			Negative	Neutral	Positive
83 & 84	C2	4-18 (even) Bishop's Bridge Road	*		
131-135	C2	19-23 Spring Street		*	
127	C2	191-195 Praed Street	*		

Table 3. Non-listed built heritage: Building location & assessment value

During the Enabling Works additional archaeological (non-listed built heritage) assessment is required to determine the need for, and/or level of, mitigation works in advance of demolition. These structures are already the subject of requests for survey.

Elements of historic street furniture for recording and/or retention have yet to be identified. It is understood that CLRL will commission a survey and subsequent inventory of those assets to be retained as part of the scheme, or salvaged and stored. It is understood that this survey will be undertaken as part of the enabling works by a contractor to be appointed by CLRL. The identification of historic elements will occur at that time.

5 Recommendations

These recommendations are based on review of previous assessments (Documents 1E0318-G0E00-00006 rev. B; CR-SD-PAD-CE-RT-00002), engineering scheme design and an understanding of archaeological potential and truncation. The requirements for further evaluation have been assessed as regards the programming requirements. Critical Phase archaeological works are required to be undertaken prior to construction works, while Phase 1 works are to be undertaken during the enabling works process, while Phase 2 works are to be undertaken during the main construction works. Phase 3 works comprise post excavation/construction works such as analysis and publication.

Due to the limited nature of archaeological deposits predicted to survive on site, a general watching brief is recommended for all site works across the Paddington site with the exception of the Station Box area. Archaeological evaluation in this area is defined as being Phase 2 works. A General Watching brief is defined in the Specification for Site Specific Archaeology WSI as:

A programme of observation, investigation and recording during construction activities where remains have not been identified by assessment and evaluation studies but where there remains a risk of archaeological discoveries. In this case the Contractor's preferred method of working would not be controlled for archaeological purposes, unless important archaeological discoveries are found and the site in question is redefined as a TWB or detailed excavation area.

The Station Box area is recommended to be assessed through trench evaluation prior to construction activities. This is due to the fact that construction techniques will not assist a watching brief assessment and the assessment so far has failed to determine conclusively the depth of truncation that has occurred in this area. Archaeological evaluation in this area is defined as being Phase 1 works.

It is recommended that the trench evaluation occur at the time the Eastbourne Terrace road is closed and this should be programmed into the construction sequence. Further mitigation requirements will be determined once the evaluation has been completed. A Trial Trench Evaluation (in advance of construction) is defined as:

A targeted or sample-based mechanical or hand excavated trench (or test pit) based investigation to record the character and extent of archaeological remains identified through other non-intrusive or intrusive survey and to inform decision making on further mitigation works that may be appropriate.
(Specification for Site Specific WSI –in draft)

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Appendix 1

GREATER LONDON SITES AND MONUMENTS RECORD

GAZETTEER OF KNOWN ARCHAEOLOGICAL SITES

GLSMR	Easting	Northing	Type	Date	Name/ Description/ Location
MLO949 09	526248	181921	Building	18th Century to 19th Century	Junctions House, Regents Canal, Canal workers cottage
MLO956 87	526250	181703	Building	Modern	Paddington British Rail Maintenance Depot, West Block. Contains workshop, office, boiler house, concrete framed building,
MLO958 65	526095	181559	Building	Modern to Unknown	Westbourne Bridge, road bridge
MLO961 86	526075	181823	Building	19th Century	British waterway Board office, office and toll house
MLO974 46	526563	181370	Building	19th Century to Modern	Paddington Station including lawn and offices along Eastbourne Terrace
MLO976 53	526305	181730	Building	Modern	Paddington British Rail Maintenance depot, east block: Garage, concrete framed building
MLO110 24	526705	181754	Monument	Medieval to Post Medieval	Paddington Green, Chapel and Church
MLO142 21	526977	180980	Monument	Post Medieval	26 Sussex Place, Terraced House
MLO153 26	526005	181805	Monument	Medieval	Westbourne Green, house
MLO255 50	526205	181405	Monument	Post Medieval	Paddington Goods yard evaluation, dump and findspot
MLO316 2	526005	181605	Monument	Palaeolithic	Paddington railway cutting, findspot of axe
MLO568 70	526505	181104	Monument	Medieval to Post Medieval	Westbourne Terrace, Conduit head
MLO573 82	526805	181405	Monument	Post Medieval	Praed Street Hospital
MLO589 34	525645	181885	Monument	Post Medieval	Garden at Senior St
MLO703 28	526705	181705	Monument	Post Medieval	Westway Cemetery
MLO703 42	526705	181705	Monument	Post Medieval	St Mary's Square churchyard
MLO730 85	526854	181554	Monument	Post Medieval	Regents Canal, Canal Basin
MLO730 86	526305	181785	Monument	Post Medieval	Bridge over Grand Union Canal, Paddington Basin
MLO755 16	526331	181599	Monument	Unknown	Paddington Goods Yard, City of Westminster No archaeological evidence located during Eval
MLO755 54	526865	181415	Monument	Post Medieval	St Mary's Hospital, Paddington (Paddington Basin Health Campus) Praed Street and South Wharf Road, London W2
MLO779 79	526705	180755	Monument	Unknown	Lancaster gate, Kensington gardens. No archaeological evidence located during Eval
MLO600 34	526924	180804	Monument	Unknown	Victoria Gate. No archaeological evidence located during Eval

GLSMR	Easting	Northing	Type	Date	Name/ Description/ Location
MLO600 99	526454	181754	Monument	Unknown	1-14 Porteus Road. No archaeological evidence located during Eval
MLO710 37	526595	181515	Monument	Unknown	12-20 Praed Street, Unclassified deposit located during Eval
MLO732 53	525704	181605	Monument	15th Century to 17th Century	Settlement formerly located at Westbourne Park Rd.
MLO239 20	527000	181000	Monument	Post Medieval	Hyde Park, a Royal Park
MLO520 02	526500	181100	Monument	Medieval to Post Medieval	Conduit located at Paddington

Appendix 2

GROUND DEPOSIT MODEL

Data ID	Easting	Northing	Data Location	Natural surface m OD	Description	Ground Level	Notes
PYD 00	526331	181600	London Street, Paddington Goods Yard	22.0	London Clay	27.0-29.0	London Clay truncated by railway cutting. No archaeology survived; localised truncation of natural geology by concrete slab to c 20.0m OD
PGY 90	526336	181613	London Street, Paddington Goods Yard	22.0	London Clay	29.0	London Clay truncated by railway cutting. Wooden pile (probably from Brunel's 1838 GWR terminus), and mid-late 19th-century brick foundation, cut into the London Clay.
PAG 97	526800	181800	Paddington Green, Children's Hospital	31.6	Brickearth	33.1	17th to 19th-century deposits and features truncated the natural brickearth (which overlay Lynch Hill Terrace gravels)
PRT 93	526450	181750	1-14 Porteus Road	30.0	London Clay	30.2-30.8	19th-century garden deposits at 29.7-30.6m OD; Localised truncation of London Clay by late Victorian cellars and modern drains down to 29.5m OD
PRA 98	527000	181550	12-20 Praed Street, Paddington Basin	29.0-29.1	Lynch Hill Terrace gravels	30.0	