C254 – Archaeology West

Archaeological Works at Old Oak Common Depot, London NW10
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Summary

This report details a programme of archaeological works undertaken by Oxford Archaeology/Ramboll at Old Oak Common Depot, Old Oak Common Lane in the London Borough of Hammersmith and Fulham, London NW10.

The archaeological works were carried out intermittently from March 2011 until April 2015 and comprised Trial Trenching, Targeted and General Watching Briefs. These took place during the demolition and remodelling of a former Motive Power Depot to create a maintenance depot and stabling facilities for Bombardier Rail who will be responsible for the maintenance and servicing of Crossrail traction and rolling stock.

The depot opened in 1906, which was designed by the Great Western Railway's chief locomotive superintendent J. C. Churchward was an important component of, what was at the time, one of the country's most innovative railways. As the first of a number of new locomotive depots built by the Great Western Railway during the Churchward era, the layout of Old Oak Common served as the template for those that followed. The majority of which were closed and demolished in the late 1960s.

Until its closure in 2009 the Old Oak Common Depot represented the last remaining 'factory' repair facility on the former GWR network.

The below ground remains of a number of structures were uncovered and recorded during the project. These included parts of a large brick built turntable pit, sections of a brick built engine shed as well as a number of below ground brick built inspection pits and the remains of a Second World War Air raid shelter.

1 Introduction

1.1 Scope of Work

1.1.1 Oxford Archaeology/Ramboll UK (OAR) who were previously known as Oxford Archaeology/Gifford (OAG), were commissioned by Crossrail Ltd (CRL) to undertake a programme of archaeological works at Old Oak Common Depot, Old Oak Common Lane in the London Borough of Hammersmith and Fulham, NW10 (henceforth the Site).

1.1.2 This report details the results of this fieldwork, which took place intermittently between March 2011 and April 2015, and is a full Fieldwork Report in line with Section 8.6 of the Specification for Evaluation and Mitigation (CRL1-XRL-T1-RSP-CRG03-50001).

1.1.3 The archaeological fieldwork comprised; Trial Trench Evaluations and a General Watching Brief (GWB) on enabling works. The works were part of the remodelling of the site as a new maintenance depot and stabling sidings to be used by Bombardier Ltd for the care and maintenance of Crossrail's fleet of trains.

1.1.4 The onsite construction works will include; stabling sidings, a train care facility, a maintenance storage building, accommodation for maintenance staff and train crews as well as new access roads and parking spaces for 150 cars. Other new facilities will include a paint shed, a biohazard pit, a wheel lathe facility and associated siding, train washers, lighting gantries and a new traction substation. As part of the scheme the sidings will be fitted with Overhead Line Equipment (OHLE).

1.1.5 During the main construction phase of the Crossrail project the Old Oak Common depot was used to support the main tunnelling works. The pre-cast concrete sections of the twin-bore tunnels were manufactured and stored at the depot. To support this a number of temporary facilities were constructed on Site, including concrete batching facility, silos, concrete segment storage facilities as well as new track and drainage works.

1.2 Planning Background

1.2.1 The overall framework within which the archaeological work took place is set out in the Environmental Minimum Requirements (EMR) for Crossrail (3rd Draft November 2007). http://www.crossrail.co.uk/about-us/crossrail-act-2008/environmental-minimum-requirements-including-crossrail-construction-code

1.2.2 The requirements being progressed follow the principles of Planning Policy Guidance Note 16 on archaeology and planning (1990), superseded by PPS5 as of 23 March 2010, Accordingly: "*The nominated undertaker or any contractors were required to implement certain control measures in relation to archaeology before construction work begins*". This was subsequently replaced by National Planning Policy Framework (NPPF) Section 12 in 2014.

1.2.3 The strategy for archaeological works is set out in the Crossrail Generic Written Scheme of Investigation (WSI) (Document No. CR-XRL-T1-GST-CR001-00003). The Generic WSI presents the strategy for archaeology design, evaluation, mitigation, analysis, dissemination and archive deposition that were adopted for the design and construction of Crossrail and provides a general statement of objectives, standards, and structure for the planning and implementation of archaeological works.

1.2.4 OAR on behalf of Crossrail produced a specification for the archaeological works. This was set out in a Site Specific Written Scheme of Investigation (SSWSI - C254-OXF-T1-GMS-CRG03-50002 Rev.6.0), which sought to identify where the construction activities described above would affect areas of potential archaeological significance. It then specified a series of mitigation measures designed to address the impacts.

1.2.5 Subsequent to this OAR produced an Archaeology Method Statement (AMS C254-OXF-T1-GMS-CRG03-50004). Both documents were approved in advance of the works by Crossrail's Project Archaeologist.

1.3 Location

1.3.1 The Old Oak Common Depot worksite lies within route window W3 (Old Oak Common Depot (Western Ave to Hythe Road)), as defined in the Crossrail Environmental Statement (2005).

1.3.2 The Site, which lies 4 km to the west of the Crossrail Tunnel Portal at Royal Oak. It consists of a broad corridor of land covering a roughly triangular shaped area of 14.16 ha.

1.3.3 To the east it is bounded by Old Oak Common Lane, to the north, and by the Grand Union Canal to the west. To the south, the Site is bounded by the upline of the Paddington Mainline and Old Oak Common railway sidings, which services trains operated by First Great Western, Heathrow Express and Heathrow Connect.

1.3.4 The central Ordnance Survey National Grid Reference for the site is TQ 21870 82390 (Figure 1).

1.3.5 The Site was until recently occupied by a complex of railway facilities; these included extensive sidings, the Coronation Carriage sidings, carriage sheds, workshops and other elements. The Site continued to stable and maintain single diesels locomotives, special trains and local traction and rolling stock, including those operated by the English Welsh and Scottish Railway/Axiom Rail until it was purchased by Crossrail in 2009.

1.3.6 Non-listed built heritage assets surviving on the Site in 2009 included elements of the locomotive depot built by the Great Western Railway (GWR) in 1904-6, a carriage repair depot built in the late 1930s. A locomotive oil fuelling plant built in the late 1940s and various servicing facilities added in the mid-1960s, when the steam locomotive depot was converted into a Motive Power Depot (MPD) for diesel locomotives (historical assets are marked 1-36 on Figure 2).

2 Geology and Topography

2.1.1 The drift geology of the Site is, as is common over most of this part of the capital, London Clay a marine geological deposit dating to the Eocene c. 56-49Ma. This deposit, which is approximately 90m-110m thick, in turn overlies the mottled clays with sand and pebble beds of the Upnor, Woolwich and Reading Formations which in turn overlays the fine grained sand of the Thanet Sand Formations (The Geological Survey of Great Britain Sheet 256, 'North London').

2.1.2 The Site is generally flat at c. 126m ATD (above Tunnel Datum where the Tunnel Datum is calculated as being 100m above Ordnance Datum e.g. 1m aOD = 101m ATD). The northern and western Site boundaries are formed by relatively steep slopes, which slope up some 4m to c. 130m ATD.

2.1.3 The earliest map (Rocques 1746 "An exact survey of London and the borough of Southwark and the county ten miles around") which feature the Site appears to show a general east-west slope with a substantial ridge running north–south across the Site. However overall, the Site appears to be the same level as the surrounding area (Figure: 5 in Crossrail 2008).

2.1.4 The original topography of the Site has therefore clearly been radically altered by the removal of deposits in advance of the construction of the depot during the first decade of the 20th century. With further reduction, embankment and earth moving taking place in association with subsequent enlargement of the railway depot in the 1930s.

2.1.5 When the development of a carriage and locomotive depot at Old Oak Common was first proposed by the GWR in 1899, it was estimated that it was necessary to excavate 240,000 cubic yards of material to facilitate the works (TNA 250/270: 132). Before this an unknown quantity of material was also excavated from Old Oak Common in association with the construction of the Acton to Northolt line *c*.1900 (TNA RAIL 252/1235).

2.1.6 The topography of the Site was further changed during the construction of the British Railways Staff Hostel adjacent to the northwest boundary of the Site in 1947/8. This necessitated further extensive groundwork, including unanticipated excavations owing to the; "excessive amount of sulphate crystals in the soil". While the collapse of the earthwork bank between the two buildings necessitated a mitigation strategy that included the construction of reinforced concrete retaining walls in the vicinity of the rebuilt embankment (TNA AN 13/168, 26/06/1953).

3 Archaeological and Historical Background

3.1 Reports and Documentation

3.1.1 The impact of the Crossrail Bill scheme on archaeological remains and deposits has been assessed in Specialist Technical Reports (STR): Assessment of Archaeology Impacts (Parts 1-6). Prepared in support of the Environmental Statement (2005), and the Old Oak Common Worksites: Archaeological Detailed Desk-Based Assessment: Non-listed Built Heritage (C150-CSY-T1-RGN-CR076_PT001-00011 Rev 4.0.). The summary of the archaeological and historical development of the Site is mainly drawn from the latter document.

3.1.2 There are no Scheduled Ancient Monuments (SAMs), Listed Buildings or Registered Parks and Gardens within the 1 km radius of the Site. The Site does not fall within an Archaeological Priority Area (APA), although Brent council's APA, centred on the medieval core of Harlesden, lies a little to the north of Willesden Junction. To the south Ealing council's Acton APA, centred on the 13th century village core, is situated to the south of Western Avenue in East Acton. Both of these are more than 1 km from the Site

3.1.3 There is a limited archaeological record for the area on the Greater London Historic Environment Record (GLHER) which has 11 sites listed, mostly standing building, within 1 km of the Site. These are reviewed in detail in document (C150-CSY-T1-RGN-CR076_PT001-00011 Figure 4), but only one, a post medieval footbridge over the Grand Union Canal (MLO73024 SMR 054589/00/00), lies within 500m of the Site.

3.1.4 To date, research has not located any evidence of prehistoric deposits within the Old Oak Common worksite. However, the landscape of the area during the prehistoric period would have been greatly influenced by the Stamford Brooke. Which before being diverted into an underground culvert, ran north to south across the eastern edge of the Site. It is likely that the rich resources associated with this perennial watercourse would have encouraged prehistoric peoples to settle and forage along its banks. It should be noted that the proximity of the former Stamford Brooke also means that some of the evidence for such activity could be masked by later fluvial deposition.

3.1.5 No archaeological evidence of the early farming communities of the Neolithic period has been found in the immediate vicinity of the Site. It is likely that the London Clay that covers much of the area would have been a major barrier to Neolithic cultivation and settlement (MoLAS 2000: 65). Again the Stamford Brooke would have provided a background for activity and occupation during this period.

3.1.6 Archaeological evidence of Bronze Age activity is relatively poor in this part of Hammersmith and Fulham, and in the adjoining areas of the London Boroughs of Brent and Ealing. A founder's hoard (GLSMR 0950206) was discovered at Disraeli Road, Park Royal, approximately 1.5 km northwest of the site, suggesting that settlers had begun to encroach upon the London Clay by this period. However no evidence of Bronze Age settlement, cultivation or industrial activity has been identified within the area (*Ibid* 94).

3.1.7 The Iron Age is poorly represented in the archaeological record of Greater London, and Old Oak Common is no exception. No evidence of Iron Age activity has been identified near the Site and it is likely that it remained wooded during the period.

3.1.8 Archaeological evidence of Roman activity in northwest London has been largely restricted to the river terrace gravels beside the River Brent (*ibid*: 162). In contrast it is likely that that the London Clay soils of the Old Oak Common area remained heavily wooded during the period (*ibid*: 152), though this vital resource may well have been managed and exploited for fuel, timber and foraging. No archaeological evidence has yet emerged of Romano-British settlement or cultivation on or close to the site.

3.1.9 Despite the Saxon derivation of the place name Acton (meaning 'oak town'), no credible references to the settlement predate the Norman Conquest, and the name was first recorded in 1181 (Baker & Elrington, 1982: 7). At the eve of the Conquest, Acton was a division of the Bishop of London's manor of Fulham (*ibid*: 16). The estate was not mentioned in Domesday Book and the extent of cultivation is unknown.

3.1.10 No archaeological evidence of settlement or cultivation dating to the period has been discovered within the vicinity of the Site. Given the medieval and post-medieval history of Old Oak Common, it is likely that the Site was marginal, and almost certainly remained wooded throughout the Saxon period.

3.1.11 The earliest evidence of permanent settlement in Acton dates to the early 13th century, when records show that the hamlet of Church Acton had become established in the western part of the parish. A second hamlet had emerged on the edge of an area of common land on the east side of the parish by the 1290s; originally called *Estacton* this hamlet subsequently became known as East Acton.

3.1.12 Manors with holdings in the area included Sutton Court, a manor in Chiswick held by the dean and chapter of St. Paul's Cathedral, but leased out to lay tenants since at least the 13th century. In the 1520s Sir Thomas More leased both Sutton Court Manor and Old Holt Wood, nearly 200 acres of woodland stretching between Acton and Willesden. By the 1590s Old Holt Wood had been so denuded of trees by the tenants of Sutton Court that it was described as comprising little more than oak scrub full of thorns, bushes and furze. Still used by the householders of Sutton Court as common grazing land, the former wood was known as Old Oak Common by the second decade of the 17th century.

3.1.13 The earliest significant post-medieval encroachment upon the Common was a result of the commercial development of the Acton Wells, three springs located on the southwest edge of the Common, approximately 200m southwest of the Site. The wells, which were also called the "Old Oak Wells", were first recorded in 1613 (Baker & Elrington, 1982, 7-14).

3.1.14 The wells became an attraction in their own right in the mid-18th century, when an Assembly Room was built at, what by then had become a popular health spa, to host fashionable entertainments.

3.1.15 On John Rocque's 1746 map (Figure: 5 in Crossrail 2008) the Site is shown as partly enclosed, with two fenced fields and a fenced off wooded area in the east. The western half of the Site is separated from the enclosed fields by a significant north to south bank or ridge and appears to be open. This unfenced area looks rougher and it was presumably still part of the Common. A north–south track crosses the western corner of the Site.

3.1.16 The Acton Wells are also depicted, complete with ornamental gardens. At this time the Wells were at the height of their fame. The notable antiquarian and topographer Daniel Lysons wrote that; "water from the Acton Wells was held in great repute for its medical virtues" (Lysons 1795, 625). However by the end of the century they had fallen out of favour and the Assembly Rooms were "nearly in ruins" (*ibid:* 1-20). The Assembly Rooms were subsequently converted into tenements, before becoming a part of Wails Farm.

3.1.17 By the time that the Greenwood map was published in the 1820s, approximately 3 acres of the former common land surrounding the farm had been enclosed (Baker & Elrington, 1982: 23-30).

3.1.18 During the 1790s the Grand Junction Canal Company began to acquire land for the proposed Paddington branch of the canal. The company purchased land and grazing rights on Old Oak Common at the end of the decade. The canal was built in the following three years and opened to traffic in 1801 (*ibid*: 2-7; 23-30). Within four years the Grand Junction had expanded eastwards beyond the Paddington area via the Regents Canal, turning it into a navigable waterway that eventually ran across the northern suburbs of London as far east as the River Lea. This canal, which is sometimes marked on maps as the "Paddington Canal", was renamed the Grand Union Canal in 1929.

3.1.19 On Greenwood's 1819-1820 map (Figure: 6 Crossrail 2008) the Site is shown as open being part of "Old Oak Common" and "Wormholt Scrubs". The "Paddington Canal" is shown as is the Stamford Brook, which can be clearly seen running north-south along the eastern edge of the Site. A path or track crosses the western corner of the Site and is almost certainly the same track as the one shown in Rocque's plan. The Acton Wells are shown to the southwest, as is "Wail's Farm". A public house the "Mitre Tavern" and another farm "White House Farm" are drawn to the northeast of the site close to Scrubs Lane.

3.1.20 The Grand Junction Canal brought some industry to the area. A 'Naphtalia Works' (presumably converting refined Naphtalene into products such as solvents and tanning agents) was established on its north bank to the west of Old Oak Lane by 1866 and is depicted on maps of the era. Whilst in the 1870's the Willesden Paper and Canvas Works set up a factory making waterproof paper south of the canal at Old Oak Common Lane (ibid, 20-30). However on the whole the canal appears to have had only a limited effect on the immediate area of the site, which appears to have remained essentially rural in character.

3.1.21 The construction of the GWR's Bristol to Paddington line to the south of the site in the late 1830's also appears to have had only limited effect on the immediate area. The site was still used for common grazing, mostly for pigs until it was acquired by the GWR in the 1890s. Local residents had pasture rights for their animals and received compensation in 1805 from the Paddington Canal Company and from the GWR in 1837 when the Paddington–Bristol Mainline was built along the southern boundary of the Common (Ibid 20-30).

3.1.22 The construction of the GWR's mainline into Paddington was followed in 1853 by the construction of a short, 4½ mile-long branch of the North and South Western Junction Railway (NSWJR) which connected the London and North Western railway (LNWR) at Willesden with the London and South Western Railway (LSWR) at Brentford (Kew Junction). This railway ran north-south to the west of Old Oak Common Lane some 50m to the west of the site, and is now used by Transport for London's Stratford to Richmond Overground line. This was followed in 1860 by the North London Railway's Hampstead Junction Railway, which joined the NSWJR line at Old Oak Junction (Baker et al 1982: 2). Eight years later the Midland and South Western Junction Railway's (MSWJR) "Dudding Hill Railway" was connected to the NSWJR and the LNWR at Acton Wells Junction (North Acton).

3.1.23 The construction of the various railway lines and stations in this part of London began to have an effect on the surrounding area, which became increasingly dominated by the railways. By 1889 rows of cottages, known as “Railway Cottages”, had been built by the LNWR for its employees in Old Oak Lane south of Willesden Junction. This was followed by further building, including a railway institute, mission church and school at Stephenson and Goodhall Streets to the northwest of the site (ibid 7-14). The Victorian County history states that in 1901 “transport” was the leading employer of men in the area (ibid 23-30).

3.1.24 However, the immediate area of the site was still mixed farmland until the turn of the century with most of the remnants of the Old Oak Common being enclosed in the early 1860s. In the 1870s part of the present Site became a short-lived “*biergarden*”, the ‘Willesden People’s Garden’ run by the German Club of Foley Street which used parts of the Site until the 1880’s. The “Willesden Biergarden” is not depicted on the 1865 -1871 Ordnance Survey (OS) map of the area (Figure: 7 in Crossrail 2008), although the canal, the Stamford Brook and the various railway lines are. Whilst on the 1896 OS map, although a number of wharves, the White Lead Works and engineering works are shown to the north of the canal, the site itself remains open aside from the buildings of “Old Oak Farm” in its southwest corner.

3.1.25 By the end of the 1880s GWR services using Paddington Station and adjacent goods yards were experiencing considerable disruption caused by congestion in the west London area. This was partly caused by an unforeseen expansion of traffic, but was also the result of the cramped conditions at the Paddington area’s Locomotive Department’s Depot at Westbourne Park. This was the GWR’s sole stabling and maintenance facility for their engines running out of Paddington Station and the Bishop’s Bridge Goods Yard. At both Westbourne Park and the at Carriage Works, situated next to the down line between Bishops Bridge and Westbourne Bridge, there was insufficient space to accommodate and repair the GWR’s expanding locomotive and rolling stock. Both of these depots were by the 1880s situated in a densely built-up area that offered little room for enlargement.

3.1.26 In 1859 a 12 acres strip of land, which had originally been part of Little Wormwood Scrubs, was acquired by the GWR for use as sidings for goods wagons and maintenance buildings. The West London Junction Sidings, which was situated to the southeast of the Site, was further enlarged in the early 1890s. By which date consideration had also been given to accommodating passenger carriages at the same location (TNA RAIL 250/334: 17, 148). Approval was granted for the construction of additional carriage sidings at the West London Junction in 1892 to relieve the increased overcrowding at Paddington (TNA RAIL 250/335: 150). Within five years of the opening of the new carriage sidings it had become apparent that further carriage accommodation was required in the vicinity of the West London Junction. Owing to the insufficient space, marshalling operations had begun to obstruct traffic on the running lines. It was therefore proposed to build additional sidings at a total cost of nearly £12,000 (TNA RAIL 250/339: 66). The new carriage sidings would offer a temporary solution to the problem of overcrowding. However the proposed reconstruction of the GWR’s Westbourne Park/Paddington New Yard Locomotive Depot in 1898, presented the company with an opportunity to radically reorganise engine and carriage lines and facilities. As well as reducing congestion in the bottlenecks, which had developed over time between Paddington and Old Oak Common (ibid: 255).

3.1.27 In November of that year the GWR's General Manager proposed an ambitious scheme of works to relieve the chronic shortage of storage capacity bedevilling the company's Paddington operations. The idea was to erect new carriage sheds beside the up line at a green field site between the Paddington Canal and the GWR Paddington-Bristol Mainline at Old Oak Common. In order to replace those on the down line at West London Junction. The site of which was required for a new line and engine sheds to replace those at Westbourne Park. There was also to be an additional general goods and coal depot as well as extra sidings for standing and marshalling wagons (TNA RAIL 250/339: 255-257). In October 1899 the company revised this plan and decided to build the locomotive engine sheds at Old Oak Common instead and to dispense with the proposed goods and coal depot (TNA RAIL 250/340: 145-6). Little came of this scheme, and by the end of 1902 the company had done little more than build a number of carriage sidings and an oil gas main at the Old Oak Common site.

3.1.28 Parts of the site, along its southern edge, were partially excavated in c.1903 during the construction of the joint GWR Great Central Railway's (GCR) New North Main Line. Running between Old Oak Common (GWR's Old Oak Common Halt station was opened in October 1906) and Northolt Junction (since 1942 known as South Ruislip Station). This was built to link Paddington Station via Northolt Junction to GWR's Birmingham Snow Hill Station and its Midlands operations.

3.1.29 In June 1903 George Jackson Churchward (GWR nearly appointed Locomotive Superintendent) revived the earlier scheme to build a new engine shed and locomotive depot at Old Oak Common (TNA RAIL 250/271: 124). The GWR Old Oak Common site was divided into three large areas; the southwest was given over to carriage sidings with 26 tracks with a vast carriage shed housing 15 tracks beneath a triple span roof to the north. The middle of the site was initially covered by a large marshalling yard with 35 lines of tracks and the northern edge of the site was given over to the new locomotive depot.

3.1.30 The contract for the construction of the locomotive depot was awarded to Messrs William Walkerdine of Derby, who tendered to undertake the works for £40,313 (TNA RAIL 250/47: 52, 86). Construction started in January 1904 when the site was graded to a level of c. 126m ATD. By October the works were sufficiently advanced for the GWR to order the fixtures, fittings and machinery for the new buildings, these included four 65ft turntables.

3.1.31 The Old Oak Common Locomotive Depot was one of the most up-to-date locomotive repair facilities in the country when it opened in March 1906. A combination of tried-and-tested construction techniques and modern materials was used to create a depot capable of accommodating and servicing the company's latest and largest locomotives. One of the largest depots on the whole GWR system, Old Oak Common set the pattern for locomotive depots throughout the GWR network.

3.1.32 A vast new engine shed, which accommodated four 65ft (19.8m) 'undergirder' turntables and nearly 100 locomotives, was the centrepiece of the new depot. Build of red brick with six east-west aligned double-pitched roofs with raised longitudinal raised lanterns. The roofs were covered with Welsh slate and were supported on 18.3m (60ft) long steel rafters all of which were held up by metal columns. The engine shed measured 135.3m (444ft) by 19.8m (65ft)

3.1.33 The four turntables, bought from Ransomes & Rapier of Ipswich at a cost of £3,900 (TNA RAIL 250/271: 224), were placed in a four square pattern in the corners of the shed. Each electrically operated turntable had 28 tracks spanning out from it and were able to accommodate locomotives up to 75ft (22.9m) in length. Turntables were favoured because it made moving locomotives around the depot easier when compared with traditional 'dead-end' type sheds.

3.1.34 A large locomotive repair shop was built in the northeast corner of the depot (Building 15a-b in Figure 2). With 11 roads which approached the repair shop over an electric powered traverser and an additional road from the depot. The works was undertaken by Messrs William Walkerdine of Bridge Street, Derby under the supervision of the Great Western's New Works Engineer, Walter Young Armstrong (TNA RAIL 252/1340, 04/01/1904). Walkerdine undertook to build the offices, lifting shop, stores, carpenters', smiths', coppersmiths' shops and sand furnaces (collectively known in GWR parlance as the 'Factory'). They also built the engine shed, WCs, messrooms, internal and external inspection pits, turntable foundations and a coal stage and associated elevated road (*ibid*, Bill No. 2: 5; Bill No. 3: 48-55). The GWR supplied and installed the timber baulks and rails, chairs, hydrants and standpipes. As well as the sand furnace ironwork and bunkers, the coal stage tank and ladder, steel platforms, water pipes, valves, turntables, traversers and traverser foundations and to lay tracks outside the shed (*ibid*, General Conditions & Specification of Works: 2).

3.1.35 The specification described all aspects of the new buildings in considerable detail. With regard to the foundations and flooring. Walkerdine was instructed to ensure that all paved areas were "t*o have a bed of dry ashes 6'' thick, well rammed on a layer of dry filling or ashes about 15'' (381mm) thick*". While the floors of the offices of the Shed Foreman and Clerk, the Stores Clerk and the Messengers were to have a bed of cement concrete 6'' (152mm) thick, "*in which will be bedded dovetail joists to receive felt and boarding*". The floors of the lifting shop and carpenters shop were to be similarly constructed, though they were to be laid with 5'' (127mm) creosoted wooden blocks (*ibid*, General Conditions & Specification of Works: 18, 26). In contrast the engine shed, sand furnace houses, messrooms, enginemen's room, stores, coppersmiths' shop, WC and pits were to be paved with Staffordshire blue bricks laid flat. While the floor of the smith's shop was to consist of 3'' (76mm) of fine ashes on top of 6'' (152mm) of dry ash (*ibid*: 22). Brickwork was, unless instructed otherwise, to be laid in lime mortar in Old English bond to be faced externally with red-pressed facing bricks (*ibid*: 21-22). Exceptions included, the foundation walls of the turntables in the engine shed and the walls of the catch pits, both of which were to be of brindled brickwork in cement (*ibid*: 9-10). The windows of the sheds were to have '*special-made'* blue brick sills, while the external walls were to be surmounted by a blue brick plinth (*ibid: 21-22*).

3.1.36 The works included a number of brick built engine pits beneath certain (rail) roads leading to the engine shed. The pits were between 88ft and 226ft 6" in length (WSHC 2525/410/0062, 10/10/1906; WSHC 2515/409/1172, December 1906; WSHC 2515/409/1180, May 1907). In 1907 two further pits, of 400ft and 500ft in length respectively were constructed beside the coal stage (WSHC 2515/409/0866, December 1907).

3.1.37 Electrical power for the GWR's facilities in Old Oak Common was supplied by the company's new generating station at Park Royal, which necessitated the construction of a sub-station (Building 26 in Figure 2) to the east of the 1904-1906 stores (Building 16a and b in Figure 2).

3.1.38 Churchward retired as GWR's chief mechanical engineer in 1922, and was replaced by C.B Collett who building on Churchward's achievements, designing the Castle and King classes of locomotive which pulled GWR's expresses in the 1920s and 1930s.

3.1.39 The majority of works undertaken at Old Oak Common during the inter war years were mostly essential repairs to and maintenance of existing plant and machinery. Expenditure authorised during this period, included £3,900 for the repair of the engine shed turntables in early 1919 (TNA RAIL 250/275: 75, 114, 122). Although GWR committee minutes revealed little about the nature and extent of the turntable repairs. A plan of the turntables produced shortly after the Second World War suggests that the turntable in the northeast corner of the shed may have been replaced relatively early in the history of the depot.

3.1.40 During the second half of the 1920s, plans were put forward to double the size of the engine shed and add four more turntables (Hawkes and Reeve, 1987.57). A scheme that was never released.

3.1.41 In the 1930s the GWR's acceptance of the Government's Development Loan Guarantees and Grants Act of 1929, which was designed to alleviate unemployment, lead to a number of changes at the depot including extensive ground reduction works. These excavations were undertaken prior to the building of a new carriage serving facilities on the southern edge of the Site. Works included the setting out of new sidings and the extension of the 1905 carriage shed (TNA RAIL 250/58: 348). As well as a new carriage paint shop (Figure 2: Building 22) and a new carriage lifting shop (Figure 2: Building 23) (WSHC 2515/404/1654, August 1938). A new electricity substation was also built adjacent to the southwest corner of the lifting shop in order to supply power to the shop's machinery (Figure 2: Building 36).

3.1.42 A number of other major works were also carried out during the second half of the 1930s in both the carriage and locomotive depots. Proposals to substitute a new 70ft articulated engine turntable for an existing 50ft turntable in the carriage yard had been raised in the middle of the decade. Presumably in association with plans to increase the capacity of the carriage sidings (WSHC 2515/403/0356, May 1935). It was installed at some point between May 1935 and March 1937, when the Swindon Drawing Office took possession of the drawings (WSHC 2515/403/0357, dated 17/04/1935, received 11/03/1937; WSHC 2515/403/0358, received 11/03/1937; WSHC 2515/403/0359, received 24/03/1937).

3.1.43 Despite the proximity of substantial Anti-Aircraft defences on Wormwood Scrubs, GWR's Old Oak Common Depot was attacked by enemy aircraft on a number of occasions. During the early stages of the Blitz of 1940 the carriage depot was bombed the carriage sheds were damaged several times and a number of carriages destroyed (TNA RAIL 253/309, 1940). As the War progressed the GWR undertook a number of 'special measures' at the Old Oak Common Depot, the cost of which was borne by the Government.

3.1.44 The Air Raid Protection measures included additional protection of the glazed roofing of the carriage and locomotive workshops (TNA RAIL 250/58.TNA RAIL 250/59: 14). Two steel-framed shelters (Figure 2: Building 33) were also placed over the ash roads on either side of the coal stage, in order to conceal the glow of firebox ash waste from enemy aircraft (TNA RAIL 250/58: 418; Lyons, 1978: 7). In December 1941 the GWR Board approved a recommendation that the locomotive yard offices be converted into a canteen (Building 17A in Figure 2). So that the clerical staff could be transferred to new office accommodation at Paddington (TNA RAIL 250/59: 90). The ground floor office in the carriage paint shop was also converted into a reinforced dormitory/shelter for company staff (WSC 2515/403/0361(A), received 21/11/1940). In 1942 four sub surface air raid shelters were built along the north and west perimeter of the depot (Marked as Buildings 60 in Figure 2). A surface shelter, the shutter's cabin (Marked as Building 1 in Figure 2), this was located at the eastern tip of the Site on the north side of the sidings and against the northern boundary of the Site. This single storey rectangular building was largely constructed of red brick, its north wall was built of concrete blocks and the flat roof constructed of reinforced concrete. This shelter was built to provide protection for staff working in the locomotive yard, signal box and in the open yard. After the cessation of hostilities it was converted into a mess room for the shunting staff.

3.1.45 During the War the demands upon the locomotive facilities at Old Oak Common was high, and repairs accounted for a substantial proportion of subsequent expenditure (TNA RAIL 250: 58: 120, 225; RAIL 250/60). Naturally much of the spending was the consequence of increased wear and tear, examples of which included the renewal of some of the engine pits and coal stage pits, authorisation for which was granted in July 1943 (RAIL 250/60: 13). Existing facilities, plant and machinery were also upgraded as the War progressed. Examples included the installation of an additional boiler at the economical boiler washing plant and the installation of new electrically-driven coaling lifts at the coal stage, which together cost almost £4,200 (TNA RAIL 250/60: 45, 89-90).

3.1.46 A number of the expenditures incurred at Old Oak Common during the War were associated with schemes intended to improve the operational efficiency of the depot during wartime and beyond. In 1943 elements of the abortive 1927 scheme for the enlargement of the engine shed were revived (WSHC 2525/410/0720, Scheme no. 1, 08/12/1943). The scheme proposed building a new 65ft turntable to the northeast of the lifting shop and the removal of the coal stacks in that location in order to allow the lifting shop to be extended the east. On completion the latter building was to be converted into a new engine shed. Consequently the existing traverser would be lifted and moved to a new location at the west end of the existing engine shed, the west wall of which would be knocked through to permit the westward extension of the tracks. This scheme never came to fruition. It was instead supplanted by less ambitious proposals for the removal of the coal stack in front of (east of) the traverser, the enlargement of the existing 30ft engine pits under the two roads to 40ft. As well as the addition of a new stationary boiler for boiler washing at southwest corner of the engine shed (WSHC 2515/403/2192, 08/05/1944).

3.1.47 During the winter and spring of 1944 allied forces assembled at camps and bases across southeast England in anticipation of the forthcoming invasion of continental Europe. Towards the end of March of 1944 the Ministry of War Transport instructed the GWR to build accommodation at the Old Oak Common Depot for troops of the US Army (TNA RAIL 250/60: 154).

3.1.48 Although we have evidence of Italian prisoners-of-war being used as labourers at the Old Oak Common Depot (TNA RAIL 1172/2343, 1941-1944). It has not been possible to confirm a reference to Italian prisoners-of-war having been billeted in the carriage paint shop.

3.1.49 The months that followed the end of the Second World War were largely taken up at Old Oak Common by the ongoing process of repairing war damage (TNA RAIL 250/60: 417). A number of improvements were made to signalling arrangements and track circuitry during the autumn of 1945 and a system for the electrical detection of points was installed at the east signal box that winter (*ibid*: 483).

3.1.50 During the War, supplies of fuel for domestic, industrial and transport uses had become greatly depleted. In order to reduce the impact of any shortages on the transport infrastructure, each of the “Big Four” railway companies launched initiatives to convert coal-fired steam locomotives to run on oil. In 1946 the GWR built a heavy oil fuel depot in order to refuel coal-fired locomotives converted to run on oil (WSHC 2515/403/2185, 26/09/1946; 2525/410/1187). This stood on the site of the former coal stacking ground at the northern end of the Old Oak Common Locomotive Depot, and originally comprised two vertical heavy fuel oil tanks (Building 53 in Figure 2). Each with a capacity of 176,000 gallons, 34ft 6’’ in diameter and 30ft 2” tall (though the foundations were capable of supporting larger tanks should they have been required). A boiler house, surmounted by a 400-gallon water tank, drove the steam pumps accommodated in the pump house (Building 6 in Figure 2). Ten unloading stations for fuel oil were also built as part of the scheme. The heavy oil fuel depot was used by a small number (34) of coal-fired locomotives that had been converted to run on oil. The GWR planned to establish similar depots at; Llanelli, Severn Tunnel Junction, Laira (Plymouth), Bath Road (Bristol), Newton Abbot, Canton (Cardiff) and Swindon (TNA RAIL 250/62: 46). While the Laira Depot remains in use as a TMD (Traction Maintenance Depot), all of the other depots have since been closed and it is highly unlikely that their oil fuelling facilities from this period have survived.

3.1.51 This was not a successful move, principally because Britain lacked the cash reserves to pay for the oil, all of which had to be imported. The oil depot was quickly adapted into a fuelling plant for GWR's experimental gas-turbine electric locomotives built by the Swiss manufacturer Brown Boveri (TNA RAIL 250/62: 72, 94). The new locomotives (no. 18000 and 18100), which were not delivered until after the "Big Four" railway companies were nationalised at the beginning of 1948, were designed to run on heavy fuel oil. Which was readily available at the Old Oak Common Oil Storage Depot. Only two locomotives of this type ever operated on British Railways.

3.1.52 The plant continued to be used as a diesel fuel depot for the refuelling of standard diesel locomotives following the withdrawal of the gas-turbine locomotives at the end of the 1950s. Although the horizontal heavy fuel oil storage tank used by the gas-turbine locomotives was later removed.

3.1.53 In October 1946 the Great Northern Board authorised the expenditure of £6,000 to replace "No. 4 engine turntable" with a model to be supplied by Cowans Sheldon Ltd of Carlisle (TNA RAIL 250/62: 106). This was a reflection of the fact that, despite the frequent repair and refurbishment of all of the turntables over the proceeding decades, the four Ransomes 65ft engine turntables were approaching the end of their useful lives. A drawing issued by the British Railways (BR) Western Region's Swindon drawing office in September 1949 indicates that the remaining turntables were also considered to be in need of replacement by that date. It was proposed to replace the northwest and northeast turntables with turntables of identical diameter, while the southwest turntable was to be replaced by a turntable 70ft in diameter (WSHC Drawing No. 128308, 23/09/1949). In 1952-3 the northeast and northwest turntables were replaced with 65ft diameter models supplied by Cowans, Sheldon & Co Ltd of Carlisle, who also replaced the turntable in the southwest corner with a new 70ft model the same year.

3.1.54 This turntable remained a central element of the diesel MPD until the latter closed in 2009. This turntable was the subject of a Non-Listed Heritage Report in 2010 (Crossrail 2010b). It has since been dismantled and relocated to Norden, Dorset in anticipation of being re-installed as part of the Swanage Heritage Railway.

3.1.55 Plans drawn in 1943 and 1949 shows that twenty-eight tracks radiated outward from the original 65ft turntables. Most of the roads appear to have been equipped with below ground inspection pits directly adjacent to the turntables themselves. The two western turntables were connected to each other by a single track to the south/north and to the two eastern turntables by east-west roads on their eastern side. A track is shown radiating out from the south western turntable's southeast corner, connecting the turntable to the depot's rail network to the south of the shed, through a door in the engine shed's southern wall. The north western turntable had a road radiating out from its north east corner linking up to the depot's eastern rail network through a door in the shed's northern wall. To the east the two eastern turntables were linked to the outside rail network by single east-west roads radiating out from their eastern sides (Figures 25 and 27 Crossrail 2010a). The track layout for the three 65ft turntables also remained unchanged from 1949 until their removal in the mid 1960s (Figures 6, 7 and 9 Crossrail 2010b).

3.1.56 By the mid-1950s the era of post-war austerity had ended, and in 1955 the British Transport Commission (BTC) unveiled a 15-year plan to modernise and re-equip British Railways (TNA AN 8/4; TNA 8/9). The primary goal of the programme was to eliminate steam traction. By the introduction of diesel and electric multiple units (DMUs and EMUs) for local and suburban passenger traffic and diesel-electric and diesel hydraulic locomotives for freight and mainline passenger services.

3.1.57 The BTC anticipated that steam traction would have been largely eliminated from all local and suburban passenger services and on some mainline routes in BR's Western Region by 1961/2 (TNA AN 199/184 BTC WAB Memorandum, 24/05/1957). The scheme envisaged that Pullman deluxe DMUs (known as 'Blue Pullmans' thanks to their distinctive liveries) would be operating between Paddington and Bristol and between Paddington and Birmingham and Wolverhampton by that date. This would require the conversion of facilities at Old Oak Common to maintain the new diesel stock.

3.1.58 BTC guidelines regarding the design and specification of DMU depots specified that DMUs were to be serviced in a separate section of the motive power depot (MPD) from steam locomotives (TNA AN 8/18: 1). With the locomotive depot still in use, the pre-war carriage repair depot was selected for conversion. Although the carriage lifting shop contained dedicated workshop facilities, the larger carriage paint shop was considered better suited to the overhaul, repair and servicing of diesel power units, and plans for the conversion were issued in the autumn of 1959 (WSHC 2525/410/0690, 01/10/1959;Figure 31). The shed was converted during the course of the following year, and the new Blue Pullman DMUs entered service in September 1960 (Leigh, 1993: 64). And were in operation in mainline service until 1973 (Walters, 1993: 142).

3.1.59 The British Railways modernisation programme also established a timetable for the conversion of selected steam locomotive depots into diesel MPDs. While many of the systems steam depots were surplus to future requirements and were therefore earmarked for closure. The association between Paddington Station and Old Oak Common guaranteed the survival of the latter into the new diesel era. When it was used as a depot for the new diesel-hydraulic locomotives of the 'Warship' 'Western' and 'Hymek' classes that entered BR's Western Region mainline service at the end of the 1950s (TNA AN 90/87, February 1958; Leigh, 1993: 70-74).

3.1.60 The introduction of the diesels would render whole areas of the existing Old Oak Common Depot, such as the coal stage, redundant. While the new diesel servicing regime meant that extensive covered accommodation at the engine shed was also surplus to requirements (TNA AN 8/17, 1957: 1; TNA AN 91/13, 1965: 2). Preliminary plans for the conversion of the depot were issued at the beginning of the 1960s (Figure 32). Because it was necessary to retain a reduced number of steam locomotives at Old Oak Common during the conversion process, during the two years from 1963 the depot accommodated both diesel and steam locomotives. Demolition of the 1906 engine shed began in March 1964, although it was not until the following March that the last steam locomotive left the depot (Lyons, 1978: 55; TNA AN 91/13, 1967: 2).

3.1.61 In March 1964 the discussion was taken to move the remaining steam locomotives operating out of Paddington to Southall MPD and Oak Common Depot was converted to a Motive Power Depot (MPD) for diesel locomotives. Within a year the majority of the GWR 1906 depot was demolished, with only "The Factory" repair shop, the 70ft engine shed turntable (now in the open air) and parts of the stores remaining. To the south of the residual GWR buildings BR built a storage depot, later known as the Coronation Carriage Sidings, for the Blue Pullman trains.

3.1.62 Following the demolition of the 1906 engine shed and the removal of the three 65ft turntables, the 70ft turntable stood alone and a new arrangement of track was laid to it (Figure 32 Crossrail 2010a). Additions included a second direct access to the rail network from the north side, while three tracks connected the turntable with the new diesel maintenance shed (Figure 2: Building 19) just to the east.

3.1.63 The depot now offered facilities for the full maintenance of 70 mainline and 25 shunting locomotives, with daily servicing to 65 locomotives (TNA AN 91/12, 1965). Servicing took place at the new servicing shed (Figure 2: Building 19), a single storey structure with three through roads, which could accommodate two mainline locomotives simultaneously (TNA AN 91/13, 1967: 2). The new shed had a 6½" thick concrete floor slab and was built on top of the turntable ring of the former engine shed's south east turntable. With three servicing pits cut into the turntable foundations (WSHC 2515/409/0488, 20/05/1964), (Crossrail 2010a Figure 33).

3.1.64 The lifting shop (Figure 2: Building 15a) and coppersmiths' shop (Figure 2: Building 15b) were re-designated as a diesel maintenance shop and were equipped with inspection pits to access the undersides of the diesel locomotives. Electrically operated synchronised lifting jacks and a new load cell for locomotive weighing also formed part of the maintenance shop's equipment (TNA AN 91/13, 1967: 2). The remaining space was used as a workshop and for the storage of major components. The former carpenters' shop (Figure 2: Building 15c) was subdivided and converted into a boiler house compressor room and bulk lubricating oil store. Whilst the stores building was subdivided between offices, storage space and a new filter cleaning plant (WSHC 2525/410/2172, 20/12/1966).

3.1.65 A number of new buildings were added during the course of the conversion, including an underframe cleaning plant (Figure 2: Building 4), which was equipped with its own steam generating plant (Figure 2: Building 5). All of which are shown on the OS 1966 Map (Crossrail 2010a Figure 34). Despite the numerous repairs and refurbishments that took place over the next forty years, the majority of these buildings continued to be used until the depot was eventually closed at the end of the first decade of the 21st century.

3.1.66 On the area to the south of the Coronation Carriage sidings and almost adjacent to the Paddington mainline an InterCity 125 depot was constructed in the late 1970s. Today the area is used to stable and maintain the trains which operate the First Great Western Services and lies beyond the area affected by the Crossrail scheme.

3.1.67 In 1997 a new depot was constructed at the southern end of the Old Oak Common site, between the former GWR depot and the Paddington main line. This was funded by the British Airports Authority (BAA) to service and maintain the Heathrow Express (HEX) and Heathrow Connect trains. The inauguration of the HEX services saw the electrification of the main line from Paddington to Hayes and onto Heathrow Airport using 25kV overhead gantries. The BAA depot was the first privately funded train depot in the UK since the British Railways nationalisation in 1948. These two depots are still in use and lie beyond the limits of the Crossrail worksite.

3.1.68 The residual GWR buildings were used from the 1970s to house and maintain diesel locomotives, special trains, carriages and freight stock. On the privatisation of BR in 1997, the buildings were allocated to English Welsh and Scottish Railway, and were latterly operated by their commercial subsidiary Axiom Rail. During the last few years of the Old Pak Common Depot it was partially used as a dumping ground for stored locomotives and carriages. In 2009 this area of the Site, together with the adjacent Coronation Carriage Sidings, was taken over by Crossrail project.

3.1.69 As the first of a number of new locomotive depots built by the GWR during the Churchward era, the layout of Old Oak Common served as the template for those that followed. The majority of which were closed and demolished in the late 1960s. In contrast, despite some significant changes, i.e. the demolition of the depot's vast engine shed and removal of three of its turntables in 1960s, a substantial amount of Churchward's Old Oak Common Depot remained largely intact. The depot continued to flourish well into the diesel era and essentially retained its original layout, much of which remained extant until the clearing of the Site as part of the Crossrail scheme in 2011.

3.1.70 Old Oak Common Depot represented the last remaining 'factory' repair facility on the former GWR network. For this reason the standing elements of Churchward's depot were, by the time the depot closed, of regional significance. These included the 'Factory', the stores, the office building, a 1906 electricity sub-station and a sand furnace.

3.2 Previous Work

3.2.1 A number of previous studies and documents of specific relevance to the Site have been undertaken. These include work by the Museum of London Archaeology (MOLA, formerly MoLAS). Undertaken during the early stages of the Crossrail Bill process (such as Specialist Technical Reports: Assessment of Archaeology Impacts (Parts 1, 2, and 6) prepared in support of the Environmental Statement 2005 (Crossrail 2005). A Detailed Desk-Based Assessment (DDBA) of the Site (C150-CSY-T1-RGN-CR076- PT001-00011 Rev 4.0). As well as previous SSWSIs for Old Oak Common (document CR-RG-OOC-EN-SP-00001 Rev 3.0 and previous revisions).

3.2.2 A series of trial trenches were monitored by Pre-Construct Archaeology (PCA) in 2010 (Test Pits 604-6) the results of these are recorded in Appendix 4 of the DDBA (Crossrail 2010a) but in summary:

Trial Pit 604. Excavated down to 1.10m from present ground level. The earliest deposit recorded was a deposit of London Clay, which was recorded at 126.1m ATD. This Natural Geology was sealed by a, 0.4m thick, layer of "made ground", thought to be of early 20th century date. This was in turn covered by a 0.4m thick layer of modern "made ground".

Trial Pit 605. Located between the water softening plant (Building 12 in Figure 2) and the safety store (Building 10). Excavated down to 1.20m from present ground level. London Clay was recorded at the base of the trench at 126.75m ATD. This Natural deposit was truncated by two 19th/20th century walls built of red brick on a concrete footings.

Trial Pit 606. Located in the northern part of the Site, on the assumed location of the northwest turntable, and was excavated down to 1.10m from ground level. The earliest deposit recorded was a concrete structure, which was interpreted as a base of an early 20th century turntable. It was recorded at a maximum height of 124.98m ATD and a minimum height of 124.78m ATD. "Made ground" comprised of three "modern" layers overlay the concrete structure.

Trial Pit 607. Excavated down to 1.60m from ground level. London Clay was seen at the base of trench at 128.20m ATD. A 0.90m thick layer of "early 20th century" "made ground" was recorded at 127.90m ATD. This underlay a 0.3m thick layer of modern "made ground".

Trial Pit 608. Excavated down to 2.30m from the ground level. London Clay, which was uncovered at 125.25m ATD, This was sealed by a 1.4m thick layer of early 20th century "made ground. Which underlay a 0.4m thick layer of modern "made ground".

Trial Pit 609. Excavated down to 1.40m from the ground level. The earliest deposit recorded was London Clay. Which was recorded at 126.11m ATD. A 0.3m thick layer of early 20th century "made ground" was recorded at 126.41m ATD. This underlay a layer of "modern" material.

Trial Pit 610. Excavated down to 1.50m from the ground level. The earliest deposit recorded was Natural London Clay recorded at 125.96m ATD. "Made ground" possibly early 20th century in date, was recorded at 126.50m ATD. A layer of modern "made ground" beneath a layer of modern concrete, formed the latest deposits in this trench.

Trial Pit 633. Located in the central part of the Site, on the predicted location of the northeast turntable, and was excavated down to 1.35m from the ground level. The earliest deposit recorded was Natural London Clay at 126.07m ATD. A layer of early 20th century "made ground" overlay the clay. This layer was 0.3m thick and was recorded at 126.37m ATD. A layer of modern "made ground" sealed this. No trace of the turntable pit was found in this trench

Trial Pit 634. Excavated down to 1.10m from ground level. The only deposit encountered in was modern "made ground".

Trial Pit 637. Located in the eastern part of the Site. Excavated down to 2.30m from ground level. The earliest deposit recorded was Natural London Clay at 125.10m ATD. This was sealed by a layer of early 20th century "made ground". This layer was 1.55m thick and was recorded at 126.65m ATD. Modern "made ground" formed the latest deposit observed in this trench. It was suggested by the excavator that remains of two parallel 19th/20th century walls uncovered in Trial Pit 605 represented a "masonry arch", which supported raised railways tracks associated with the early 20th century Old Oak Common Depot. Whilst the concrete structure uncovered in TP 606 was interpreted as part of the base of the northwest of the four engine turntables which we know from records were located within the depot's former engine shed.

3.2.3 Natural Geology was uncovered in Trial Pits 604, 605, 607, 608, 609, 610, 633 and 637 and was represented by London Clay. The highest point of the London Clay was recorded in Trial Pit 607, which was located in the western part of the Site. The lowest point was recorded in Trial Pit 637, which was located in the eastern part of the Site. These levels suggest that, as is suggested by early cartographic evidence, the Natural Geology sloped down from west to east.

4 Research Aims and Objectives

4.1.1 The overall objective of the investigations was to establish the character, nature, date, extent and state of preservation of any surviving archaeological remains that would be impacted upon by the development.

4.1.2 Selected research themes derived from the Regional Research Aims outlined in; *A Research Framework for London Archaeology 2002* (Nixon *et al*, 2003) were included in the Assessment of Archaeology Impacts Technical Report, Part 2 (Crossrail 2005), and the SSWSI (Crossrail 2011). The below-ground archaeological remains predicted to survive on the Site were seen to have the potential to contribute to the following research themes:

- *Examining the concept of core/periphery for different periods in London's past, as a means of understanding how evolving settlement patterns reflect the need for sustainable, beneficial relationships between a settlement and its environs, a city and its hinterland.*
- *Understanding the reasons for evolution of the road systems, street layouts, river crossings and ferries, and their importance as engines of development and change.*
- *Establishing how daily work and life in London reflected and contributed to the rise of London as the commercial centre of the British Empire, and to its continued eminence as a world city thereafter.*

4.1.3 For landscape development (e.g. land construction) through assessment of the soil stratigraphy. This would have the potential to contribute to the following research themes:

- *Contributing to our understanding of the creation of the London suburbs;* and

4.1.4 Defining levels of landscape change due either to environment and climate or human interaction.

4.1.5 In addition, archaeological fieldwork relating to the use of the Site during the Second World War would meet the need, noted in Modern Military Matters (Schofield 2004), to understand what;

- '*Measures were put in place during World War II to ensure the functioning of the railway system. Structures included hardened signal boxes, railway control centres and related air raid shelters. Little is known of this subject*.' Schofield notes that '*Research through archives and in particular local and national records may provide information about this. Information may also appear in the local defence schemes. Some official histories and archives held by GPO (General Post Office) or BT (British Telecom), or the National Archives may assist with a wireless communications study. There is some urgency, particularly for recording railway buildings which are disappearing very rapidly due to rail.'*

4.1.6 Specifically, the mitigation proposed was seen to have;

- *'the potential to recover evidence relating to the original 65' turntables which were housed in the Engine Shed, the construction method and materials used to found the walls and columns of the Engine Shed and Stores, the use of the Site during WWII, the nature and extent of survival of the traverser pit, the nature of the stone marked on early OS maps, the survival of the four-ton crane which was sited outside the Stores and the construction method and materials used to found the raised track of the coaling stage and former boiler house.'*

4.1.7 Additionally, evidence may be;

- *'Recovered for the development and use of the watercourse which formerly crossed the Site.'*

4.1.8 Finally, it was an objective to assess and analyse the data collected from documentary work and the archaeological investigations undertaken in connection with this project in order to prepare a publication in accordance with the generic SSWSI (CR-XRL-T1-GST-CR001-00003).

5 Methodology

5.1 Methodological Standards

5.1.1 All works were undertaken, and the preparation of this report was carried out in accordance a Site Specific Written Scheme of Investigation (SSWSI - C254-OXF-T1-GMS-CRG03-50002 Rev.6.0) and the subsequent Archaeology Method Statement (AMS - C254-OXF-T1-GMS-CRG03-50004). Which was submitted to and approved by Crossrail's Project Archaeologist before commencement of the works.

5.1.2 It was also carried out in accordance with OA best practice and accepted professional standards and as outlined in:

5.1.3 Crossrail Archaeological Generic Written Scheme of Investigation (CR-XRL-T1-GST-CR001-00003 2012 (AWSI);

5.1.4 Crossrail Archaeology Specification for Evaluation and Mitigation (including Watching Brief), Document No: CRL1-XRL-T1-RSP-CRG03-50001, Nov 2012, (ASEM);

- Chartered Institute for Archaeologists – Standard and Guidance for archaeological excavation, 2014;
- Chartered Institute for Archaeologists – Standard and Guidance for an archaeological watching brief, 2014;
- Museum of London collections and archive policies and guidance;
- English Heritage – Geoarchaeology, 2007 (revised as Historic England 2015);

- GLAAS Archaeological Guidance Papers 1999 (revised as Historic England, Guidelines for Archaeological Projects in Greater London 2015);
- Corporation of London archaeology guidance – Planning Advice Note 3, 2004;
- Museum of London Archaeology Service site recording manual (MOLA 1994) and
- OA Fieldwork Manual 1992.

5.2 Fieldwork Techniques

5.2.1 This section sets out the methods to be applied during the archaeological works. The archaeological field work conducted by OAR consisted of two elements;

- A general watching brief during groundworks associated with ground investigation works; and
- An archaeological trial pit evaluation centred on areas of the Site where construction impacts coincide with the predicted historic structures;

Watching Brief

5.2.2 A Watching Brief, as defined in the Generic WSI, is a programme of archaeological monitoring (*i.e.* observation, investigation and recording) which is carried out by a suitably qualified archaeologist during site investigations and construction works.

5.2.3 The purpose of a watching brief is to identify the potential of any archaeological remains that are uncovered in the course of the works and record them appropriately (as far as is reasonably practicable). The watching brief shall result in the preparation of an ordered archive which will be incorporated into the post-excavation works and into publication of the project results.

5.2.4 The following observations were recorded on a daily basis:

- The Event Code and location of the area observed
- The date of the observation
- Personnel employed on site
- A description of the construction works observed
- Any relevant works sub-contractor and personnel undertaking and supervising the construction activity
- Depths and extents of excavation works observed of any archaeological remains that are uncovered during the course of the works and record them appropriately (as far as is reasonably practicable
- A measure of confidence that any archaeological remains would have been observed and reasons
- The areas and horizons (both those containing archaeological or remains of quaternary geological importance and those which do not) unaffected by construction activity (with special reference to archaeological sites identified for preservation in situ)
- The reasons why any particular area of the works was not observed, and noting those areas not subject to disturbance from construction
- Location and description of any archaeological remains
- Location and description of any modern remains

Targeted Trial Trench Excavations

5.2.5 Archaeological mitigation in the form of trial trench evaluation by C254, with enablement by the Principal Contractor, was required at the following locations (see Figure: 3).

Trench No.	Dimensions (in m)	Rationale
11 (Trench G in the AMS OAR 2014, 8 and 13)	1.8 wide by 15 length	Trench was intended to characterise the construction methods and materials used to build the Traverser (Structure 42) and to test for the survival of the equipment required to operate it
12 (Trench H in the AMS OAR 2014, 8 and 13)	1.8 wide by 25 length.	Trench was intended to characterise the construction methods and materials used to build the Engine Shed's northwest turntable (Structure 41) and to test for the survival of the equipment required to operate it

Table 1: Archaeological Trial Trenches H /11 and G/12

5.2.6 These locations coincided with areas where construction impacts on known historical assets had been identified. The trenches were required to identify the level of survival (if any) of significant heritage assets.

5.2.7 The trenches were archaeologically excavated before any construction works (e.g. piling) took place at each location.

5.2.8 None of the structures identified by the SSWSI as being historic assets were heritage-listed buildings or structures.

5.2.9 The recording strategy consisting of three main elements: a drawn record, a descriptive, written record and a photographic record. As the historic assets were industrial and housed many different functions particular attention was paid to evidence of the former use of the buildings and their operations.

5.2.10 Any evidence relating to the primary or historic use of the structures were recorded and interpreted in order to inform the overall understanding of the buildings and workings of the depot. This included evidence of power transmission, transport within building (rail tracks) or other mechanical installations and fittings, and residual artefacts, relating to the use of the structures.

5.2.11 Health and Safety considerations were of paramount importance in conducting all fieldwork. Safe working practices overrode archaeological considerations at all times.

5.2.12 The trial trenches were excavated to the base of archaeological remains/deposits or to the lowest construction levels as agreed by the Project Archaeologist.

5.2.13 The trenches were excavated under continuous archaeological supervision using a 7.5 or 12 ton 360° excavator equipped with a toothless machine bucket. The machine and its operation including; breaking out, banking, all temporary works and any hand investigation required to address below ground hazards were the responsibility of the Principal Contractor.

5.2.14 The machine reduced the ground level progressively, in spits of up to 500mm depth (dependent on specific site conditions).

5.2.15 OAR personnel used their professional judgement to determine the appropriate depth of each spit and advised the Principal Contractor accordingly. Any variations to the excavation methodology were at the discretion of the supervising archaeologist and recorded in writing for inclusion in the final report to the Project Archaeologist. Machine excavation ceased at the level where archaeological levels are reached, at which point hand excavation commenced.

5.2.16 Each spit was examined carefully to assist the recovery of any archaeologically significant artefacts and thus to determine when to cease machining.

5.2.17 All spoil and arisings from the excavations were scanned visually for artefacts and ecofacts.

5.2.18 All revealed deposits and features were investigated by hand.

5.2.19 Dependent upon the results of each trial trench and subject to the Site constraints current at the time of work. The trial trenches were, with the agreement of the Project Archaeologist, enlarged so as to either partially or fully reveal the extent of significant structures (e.g., the turntables). This work aimed to expose such machinery, fittings and artefactual, construction or engineering evidence not apparent or only partially resolved in the trial trench excavation.

5.2.20 This was followed by the full historic building recording of the revealed structures. The excavations ceased when these details are resolved unless the Project Archaeologist instructed otherwise.

5.2.21 Recording

5.2.22 All observations were undertaken against a unique Event Site Code (XSU10). A continuous unique numbering system was used.

5.2.23 All archaeological deposits and features were recorded by means of Oxford Archaeology (OA) pro-forma recording sheets.

5.2.24 OAR supervised the excavation of each trial trench in such a manner as to allow a cumulative or continuous section to be recorded. Planning and section drawing of appropriate structures, single contexts and features were undertaken at a variety of scales. Usually at 1:20 scale for plans and 1:10 scale for sections.

5.2.25 Section drawings were located on the relevant plan and both London Grid and OS co-ordinates recorded.

5.2.26 A record of the full extent in plan of all archaeological structures and deposits as revealed in the investigation was made; these plans were on polyester based drawing film. Single context recording was as used as appropriate.

5.2.27 A ‘Harris matrix’ stratification diagram was employed to record stratigraphic relationships. This record was compiled and fully checked during the course of the excavations.

5.2.28 The photographic record consisting of monochrome prints/negatives and digital imagery and included photographs of archaeological features and structures, as well as record photographs taken to illustrate “work in progress”.

5.2.29 Upon the completion of the archaeological work the trenches were backfilled and levelled with the excavated material in the approximate order in which it was excavated. This was carried out with the agreement of the Crossrail Principle Archaeologist

5.3 Site Survey and Spatial Recording

5.3.1 All trial trench setting out was undertaken by the Principle Contractors' Site engineers. In accordance with the setting out co-ordinates supplied by the Project Archaeologist. The set outs were conducted using an approved and calibrated Total Station Theodolite or other suitable automated equipment referenced from approved Crossrail Permanent Ground Marker (PGM) data and in accordance with the London Survey Grid Standard (formerly Crossrail Survey Grid, see Crossrail standard CR-SATD-010).

5.3.2 Survey work was conducted using a combination of Total Station Theodolite (TST) survey utilising Reflectorless Electronic Distance Measurement (REDM) GPS (Global Positioning System) and where appropriate, hand-measured elements.

5.3.3 Excavated archaeological interventions and areas of complex stratigraphy were hand-drawn. At least two Drawing Points (DPs) were set in as a baseline and measurements taken off this by tape and offset. The hand drawn plans were referenced to the digitally captured pre-site plan by measuring in the DPs with a TST or GPS. These hand-drawn elements were then be scanned in, geo-referenced using the DPs as reference points and digitised following OA's digitising protocols. For further details on hand planning procedure please refer to the fieldwork guidelines.

5.3.4 Surface heights were recorded and related to PGMs (Permanent Ground Marker) or approved Ordnance Survey Bench Marks (OSBM) where reasonably accessible. Levelling accuracy between OSBMs/PGMs and site Temporary Bench Marks (TBMs) were within 10 mm/k: where 'k' is the total distance levelled in kilometres. All drawings have been composed of closed polygons, polylines or points in accordance with the requirements of GIS construction and OA Geomatics protocols.

5.3.5 In all instances, CAD work has, and will, follow the guidelines set out in Crossrail's CAD Standards (CR-STD-005 CAD Standards v2) and Crossrail's *Archaeology Specification for Evaluation & Mitigation (including Watching Brief)* (Document CRL1-XRL-T1-RSP-CRG03-50001). Two main drawings are maintained; one consists of the compiled survey data, digitised features and raster images in the Crossrail co-ordinates system. The other has the same information but has been inserted to a certified Ordnance Survey mapping system and uses the OS co-ordinates. This second drawing will be a requirement for archiving in London.

5.3.6 All plan scans have been numbered according to their plan Site number. Digital plans will be given a standard new plan number from the Site plan index at the time of archiving.

5.3.7 All digital data were backed up incrementally on CD or DVD. Each Friday the entire data directory were backed up and returned to Oxford, where it were copied onto the OA projects server.

5.3.8 Each CAD drawing contained an information layout, which included all the relevant details appertaining to that drawing. Information (metadata) on all other digital files were created and stored as appropriate.

5.3.9 At the end of the survey all raw measurements were made available as hard copy for archiving purposes.

5.4 Artefact Recovery, Conservation, Retention and Disposal

5.4.1 Any artefacts recovered during the archaeological work are the properties of Crossrail Ltd. Arrangements were made via the Crossrail Principle Archaeologist to organise legal deposition with the receiving museum or appropriate heritage body.

5.4.2 All artefacts recovered from hand-excavated contexts were retained unless they are of recent origin. In these cases, sufficient quantities of the material did usually be retained to validate the date and establish the function of the deposit from which the finds have been recovered.

5.4.3 Finds retrieval policies of the Museum of London were adopted. Some categories of finds of limited intrinsic interest may be sampled and recorded on Site where their retention was not considered to contribute to the archaeological aims and objectives (e.g. burnt stone or undifferentiated post-medieval tile fragments). Exact retention and disposal policies, as specified by the Museum of London, was set out in subsequent revisions of this method statement.

5.4.4 Unstratified objects from modern made ground or other modern deposits were not normally retained except where they were collected for a specific purpose or were of intrinsic interest either in their own right or in contributing to an understanding of the Site.

5.4.5 Recovery was normally by hand, except where bulk samples were taken for other purposes or for special recovery of small items. Where possible all upcast/spoil was scanned by hand and any finds retrieved.

5.4.6 All finds and samples were treated in an appropriate manner and to standards agreed in advance with the Museum of London.

5.4.7 Artefacts collected during the excavation were identified by context. The artefacts were exposed, lifted, cleaned, stabilised, marked, bagged and boxed in appropriate materials and conditions to ensure that no deterioration occurs.

5.4.8 All artefact/ecofact processing/storage was carried out in accordance with UKIC (United Kingdom Institute for Conservation), now ICON (Institute of Conservation) - Archaeology Section Guidelines for the Preparation and Storage of Excavation Archives for long-term Storage (1990). As well as the Standards and Guidelines for the collection, documentation, conservation and research of archaeological materials (Institute for Archaeologists 2001), and any specific guidelines provided by the recipient organisation identified as the repository for the above.

5.4.9 A number of historic items relating to the use of the Site were revealed during the mitigation works. Such items might prove suitable candidates for salvage and re-use, and these were identified and fully recorded, issued with a catalogue number and brought to the attention of the Project Archaeologist. An appraisal of their significance was also made.

5.4.10 Historic items of significance. Which are defined in this instance as; "*objects such as machinery, machine components, architectural fittings, fragments or components, signage, tools, permanent way fixtures and fittings, and general railway paraphernalia which could be salvaged and for which it may be reasonably supposed would be accepted by a heritage body*".

5.4.11 OAR were not responsible for storing any of the items identified for salvage, nor for sourcing appropriate storage space for them or managing the process of transferring salvage items to potential recipients for the salvaged items.

5.5 Archaeological Science

5.5.1 The archaeological science methods followed the specifications set out in the SSWSI, Crossrail document CR-PN-LWS-EN-SP-00001 and guidelines from Historic England and the Chartered Institute for Archaeologists.

6 Results

6.1 Introduction

6.1.1 This section summarises the results of the archaeological investigation integrated with selected specialist material. The work is primarily summarised by investigation for clarity (Trenches 1-12).

6.1.2 Within each individual trench the results are presented as a single chronological narrative describing its chronological development with the earliest first and the most recent last.

6.1.3 Although a number of features and deposits did not contain dating material they have been phased on the basis of their stratigraphic and spatial associations.

6.1.4 Detailed summaries of the archaeological features and deposits are presented in Appendix 1 and full details are available in the fully cross-checked project archive.

6.2 Trench 1

6.2.1 Trench 1 was 9m long 1.4m wide and 1.2m deep. This trench was excavated by the main contractor to test for buried services and ran north-south directly to the south of Structure 12 (water softening plant) (Figure: 3. Plate: 1).

6.2.2 The upper surface of the earliest deposit in this trench was uncovered 0.8m below the present ground level. This deposit was an archaeologically sterile brownish orange clay (104) and has been tentatively interpreted as Natural Geology.

6.2.3 This layer was sealed by a 0.2m thick dark blue grey gravel rich ashy clay sand (103) which was one of a number of “makeup” layers in this part of the Site. This in turn was sealed by a 0.28m thick, loose rubble rich layer (102). This acted as a “makeup” layer or sub-base for a 0.26m thick concrete slab (101), which formed the present surface in this part of the Site (Plate: 2).

6.2.4 No archaeological features or structures were seen in this trench.

6.3 Trench 2

6.3.1 Trench 2 was 34.5m long 2m wide and 0.8m deep. This trench was excavated by the main contractor to test for buried services and ran east-west from the eastern side of Structure 17b (new amenity building) to just south of Structure 8 (temporary metal store) (see Figure: 3).

6.3.2 The upper surface of the earliest deposit in this trench was uncovered 0.8m below the present ground level. This deposit was an archaeologically sterile brownish yellow clay (206) (Plate: 3). This Natural Geology was sealed by a, 0.42m thick, layer of blue black, firm ashy sandy clinker (205). At the surface of this makeup deposit two parallel wooden “beams” (204) running 0.3m apart and set in a soft concrete mortar (Plate: 5). This structure had been badly damaged and its function was unclear.

6.3.3 This layer was overlain by a 0.26m thick deposit of dark blue black, firm ashy clinker and gravel (202). This lay directly beneath the 0.1m thick concrete remains of a former road (203) (Plate: 4). Which itself lay below a 0.26m thick concrete slab (201) which formed the present surface in this part of the Site.

6.3.4 At the western end of the trench the remains of the basement wall of Structure 17b was observed. The construction trench of wall 203 was seen to cut into layer (202).

6.4 Trench 3

6.4.1 Trench 3 was 5.6m long 1.7m wide and 0.82m deep. This trench was excavated by the main contractor to test for buried services and ran north-south directly to the south of Structure 17b (new amenity building) (Figure: 3. Plate: 6).

6.4.2 The upper surface of the earliest deposit in this trench was uncovered 0.8m below the present ground level. This deposit was an archaeologically sterile, brownish orange clay (303). This Natural Geological layer was sealed by a 0.6m thick layer of track ballast (302). Which in turn was covered by a 0.18m thick concrete slab the present surface in this part of the Site.

6.4.3 No archaeological features or structures were seen in this trench.

6.5 Trench 4

6.5.1 Trench 4 was 21.6m long 0.6m wide and 1.2m deep and was aligned east-west across the railway sidings to the south of the Site (Figure: 3 Plate: 7).

6.5.2 The earliest deposit uncovered was a dark greenish grey sterile clay (405). This was sealed by a firm dark grey sandy ashy gravel (404) containing occasional fragments of slag and fragments of pottery including some storage jars but mostly comprising tablewares ("canteen-style" tea cups, saucers, plates and parts of a teapot). The majority of the tablewares appear to date from the late 1930s early 1940s and many are marked with the GWR's logo and with writing. Which showed that they initially came from the GWR's Great Western Hotel at Paddington Station (now the Paddington Hilton). Although a number bore the marks of other railway companies; Southern Railways and the London Midland and Scottish (LMS) (see below section 7 for details). This "makeup" deposit was cut by a east-west aligned water pipe trench (cut 403). The upper most deposit in this trench was a dark brown sandy loam topsoil (401) (Plate: 8).

6.6 Trench 5

6.6.1 This trench was 15m long, 1.23m wide and 1.5m deep. It was aligned northwest-southeast to the west of the 1906 Depot's canteen (Structure 17a) and to the south of the covered walkway (Structure 56) that connected 17a to the southeast corner of the diesel refuelling maintenance shed (Structure 19) (Figure: 3).

6.6.2 The earliest deposit uncovered in this trench was an orange yellow sterile clay (505) uncovered c.1.5m below present ground level. Although this deposit was sterile it has been provisionally interpreted as a re-deposited layer of natural clay used, like in Trench 2, as a "makeup" layer. This deposit was cut by the construction trench of an east-west aligned brick wall (506/503) (Plates: 9 and 10). Built of pinkish red unfrogged machine made bricks. Set in a compact dark grey sand based mortar and lain on bed in an English bond. Wall (506/503) was 0.7m wide and was set upon concrete footings. This wall has been interpreted as the remains of the southeast corner of the 1906 engine shed.

6.6.3 Subsequent to the construction of wall 506/503 a 0.4m layer of dark blue black sandy gravel (504) was laid down. This was the probable surface when the structure was in use. Layer (504) was in turn covered by a 0.18m thick layer of brownish black ashy gravel (502), which was almost certainly lain down when the walls were demolished in the 1960s. This layer was sealed by a thin layer of Tarmac (501) which formed the modern surface in this part of the Site.

6.7 Trench 6

6.7.1 This trench was 21m long, 1.4m wide and 0.84m deep. It was aligned north–south to the east of mess room (Structure 20) (Figure: 3. Plate: 12).

6.7.2 The earliest deposit in this trench was a firm mid brownish-yellow sterile sandy-clay (606) interpreted as part of the London clay Complex which represents the drift geology in this part of the Site. Layer (606) was 0.84m below the present ground level and was overlain by a buried topsoil (605). This was cut by the construction trench for a concrete encased water pipe (Plate: 11). This was in turn sealed by a dark bluish grey firm ashy gravel. "Track ballast" containing rare fragments of slag and brick (602). This 0.68m thick deposit interpreted as a modern "makeup" layer. A 0.18m thick concrete slab (601) and Tarmac pathway (604) of present roadway covered the "makeup" deposit (Plate: 13).

6.8 Trench 7

6.8.1 This trench was 12m long and 1.4m wide. It was aligned north- south directly to the south of the southwest corner of the boiler house of the Pullman Shed (Structure 21) (Figure: 3).

6.8.2 The earliest deposit in this trench was a yellow orange clay (714), this was overlain by a layer of firm sandy ashy clay (706). A similar deposit was found in all of the other trenches. This "makeup" deposit was beneath a tarmac footpath (701) and roadway (703). With associated bedding layers (702, 709 and 705). At the northern end of the trench the "makeup" layer was truncated by a brick built square man hole (704) which sat on a concrete base (713) and a series of later services (Plates: 14-15).

6.9 Trench 8

6.9.1 Aligned north-south to the north of the Pullman Shed (Structure 22) (Figure: 3. Plate: 16).

6.9.2 The earliest deposit in this trench was a firm mid brownish yellow sterile sandy clay (804) interpreted as part of the London clay complex which represents the drift geology in this part of the Site. Layer (804) was 0.52m below the present ground level and was overlain by a dark bluish grey firm ashy clay gravel (803). This "track ballast" containing rare fragments of slag and brick. A 0.13m thick heavily compacted mix of stone and concrete fragments served as the sub base for a thin concrete slab (801) the present roadway covered the "makeup" deposit 803 (Plate: 17).

6.10 Trench 9

6.10.1 This trench was c.10m long, 1.6m wide and 1.04m deep, and was aligned north-south across the road to the northwest of the Pullman Shed (Figure: 3. Plate: 18).

6.10.2 The earliest deposit in this trench was a firm light to mid brownish yellow sterile sandy clay (907) interpreted as part of the London clay complex which represents the drift geology in this part of the Site. Layer (907) was 1m below the present ground level and was overlain by a soft sandy yellow clay which appeared to be re-deposited natural clay. This was sealed by a firm dark greyish brown sandy clay gravel (905) this "makeup" deposit, which was 0.21m thick, contained fragments of ceramic cylindrical jars. These jars, which are marked with "Keiller's Dundee Marmalade" have a dating range from ca. 1873-1940 (see below section 7 for details). This deposit was covered by a dark bluish grey firm ashy clay gravel (904). This "track ballast", which was uncovered in all of the trenches, contained rare fragments of slag. This was itself overlain by a later layer of pale red clay gravel (903) which was interpreted as a levelling / "makeup" deposit. A 50mm thick compacted sandy gravel (902) served as the sub base for a thin layer of Tarmac (901) the present roadway covered the "makeup" deposit (Plate: 19).

6.11 Trench 10

6.11.1 This trench ran northwest-southeast, between the 1960s built diesel refuelling and maintenance shed (Structure 19) and the 1906 engine shed's southwest turntable and was situated entirely within the footprint of the original 1906 engine shed (Figure: 3).

6.11.2 This trench revealed the remains of a back filled brick built inspection pit (1001) which was covered with a 0.25m thick "lip" of concrete (Plates: 20-23).

6.11.3 This structure appeared to be the southeast end of one of the long rectangular inspection pits which we known radiated out from the engine shed's southwest turntable. The main super structure of which was only removed in 2010.

6.11.4 A 1.9m x 1.5m concrete column base (1002) was also uncovered at the northern end of this trench (Plate: 24-25). This rectangular block was 1.2m thick and was rendered on its upper surface with a sandy finish. A series of four 50mm diameter circular holes pieced into the block's four corners represent the shorn off supports for a column which supported the gabled roof of the engine shed. A larger hole set into the block's centre contained the remains of a wrought iron vertical drainpipe which feed rain water from the shed's roof to a brick built access hole to the east.

6.12 Trench 11 / Trench H

6.12.1 This trench was 15m long and 3.8m wide and 1.5m deep and was aligned east-west at the northern edge of the Site, on the site of the lifting shed's traverser (Structure 42) (Figure: 3).

6.12.2 At the base of the trench, a deposit of London Clay (1102) was uncovered at 1.5m below ground level. This layer of mid pinkish brown stiff clay had a series of machine bucket teeth marks scratched into its surface. This natural deposit was covered by 1.3m thick deposit of very soft pale pinkish brown clay mixed with a dark greyish black loose stony silt both of which contained very frequent fragments of brick and concrete (1100). This deposit appeared to represent a "modern" backfill probably lain down when the Traverser (Structure 42), which documents indicate stood in this part of the Site, was removed. This deposit was itself covered by a layer of very recent overburden (1100) (Plates: 26-28).

6.12.3 No archaeological deposits structures associated with the former traverser or other features were found in this trench.

6.13 Trench 12/ Trench G

6.13.1 Excavated in the northwest corner of the Site, this trench was 25m long and 4m wide and was situated on the site of the engine shed's north west turntable (Structure 41) (Figures 3 and 4).

6.13.2 The remains of a circular brick built turntable pit was uncovered just below the modern surface of the present yard at 125.8m ATD (Top of modern slab =127m ATD).

6.13.3 This turntable pit, which was 19.81m (65ft) in diameter and 0.6m deep (125.43m ATD) at the edge and 0.8m deep (125m ATD) in the centre, appeared to have two building phases. The initial brick build circular pit with two inspection pits (1243 and 1244) running almost up to the edges of the pit (Plates:34-39). During the second phase a cap of concrete (1203) was added. This ran up to the edge of the pit's sidewalls and the two inspection pits and covered the area between the pits. In this phase, part of the pit's eastern sidewall was removed and a small brick built inspection pit (1245) was added on to the pits eastern quadrant. This was the same width as the earlier pits, which still appear to have been in use, but was separated from the earlier pit by a crude brick wall.

6.13.4 The turntable pit consisted of a single 0.32m (1ft) wide brick-built side wall (1204/1235) and a sloping concrete floor (1223) (Plates: 31-33).

6.13.5 The pit's sidewall was constructed out of dark red unfrogged machine made bricks (240mm x 111mm x 80mm). These were lain on bed in alternate rows of headers and stretchers. Many of the bricks were dark grey on the outside and all were set in hard pale grey cement mortar (Plate: 31-33, 42).

6.13.6 The floor of the turntable pit was of brown concrete. The floor gently sloped down to the centre. The outermost metre of the pit base was close to horizontal with just enough of a slope to shed rainwater and it is here that the circular turntable track/guide rail would have been located. A series of cut off metal bolts set vertically into the floor represented the remains of the guide rail.

6.13.7 A 0.8m thick square concrete block (1231) was seen at the centre of the pit's floor. The top of this block was 125.83m ATD. This block represented the remains of the base for the turntable's central pivot. A round hollow in the middle of its upper surface and a circle of shorn off metal bolts at its centre, represented the remains of the central pivot that was fixed to the square concrete base with eight bolts (Plates: 41 and 43).

6.13.8 Two rectangular troughs were uncovered at the eastern end of the trench. These served as inspection pits for two of the 26 roads, which we know radiated out from the turntable. The more northerly of the two, 1244/1245, was 1.22m (4ft) wide and 0.61m (2ft) deep. This pit had originally run right up to the sidewall of the turntable pit but had been divided into two by the addition of a rude brick wall [1206]. The sidewalls of the pit (1214/1213/1208/1209) were 0.43m wide and were built of dark red machine made, unfrogged bricks (230mm x 110mm x 80mm). These were all lain on bed in alternate courses of headers and stretchers set in a hard pale grey cement mortar. The inspection pit's floor was a single course of dark grey machine made unfrogged bricks these were laid in a stretcher pattern running north to south. The floor was slightly cambered down towards a gully made up of two rows of bricks set at right angles to the other bricks and which ran down the middle of the floor (Plate:). At the western end of the pit a single north-south brick step (1221), with a 0.38m rise and 0.20m wide tread, was set onto the brick floor, this appears to be a later addition (Plate: 39). During this phase the western floor of the northern inspection pit to the west of wall 1246 one was covered with a skin of concrete (1217).

6.13.9 To the south, inspection pit (1243) was 1.06m wide and 0.61m (2ft) deep. The pit's sidewalls (1222/1212/1211) were 0.43m wide and were built of dark red machine made, unfrogged bricks (230mm x 110mm x 80mm). These were all lain on bed in alternate courses of headers and stretchers set in a hard pale grey cement mortar. The inspection pit's floor (1216) was a single course of dark grey machine made unfrogged bricks these were lain in a stretcher pattern running north south. The floor was slightly cambered down towards a gully made up of two rows of bricks set at right angles to the other bricks and which ran down the middle of the floor (Plate: 36). At the western end of the pit a single north-south brick step, with a 0.38m rise and 0.20m wide tread, was set onto the brick floor. Unlike pit (1244/1245) to the north pit (1243) did not run right up to the turntable pit ending 2.5m to the east. However it appears that it may have originally run right up to the turntable's sidewall having been robbed out and backfilled with re-deposited brown clay (1218).

6.13.10 A 7" metal pipe (1207) was seen set into in its own cut, running north-south to the west of inspection pit 1243 (Plate: 37-38).

6.13.11 To the west Trench 12 did not reveal any inspection pits. However the robbed out remains of an inspection pit which was later backfilled with re-deposited clay (1249) was seen on the turntable pit's western side.

6.13.12 The areas to the west and east of the turntable pit were covered by a 0.26m thick concrete cap (1203/1233). The remains of rows of rail fastening chairs (1230/1234) were uncovered set into the upper surface of the concrete capping. These ran along either side of the inspection pits. These remains comprised the traces of the chairs square bases and screws and occasionally the metal chairs themselves (Plates: 40-44).

6.13.13 To the west a series of shallow tapering narrow east-west slots (1232) of unknown use were uncovered set into the concrete capping (1234).

6.13.14 The excavation also revealed the final phase of the turntable. In this phase the driving mechanism, the turntable's supper structure and its wooden deck was removed, although most of the turntable's pit remained intact, with the exception of some voids to the wall caused by later service trenches. None of the turntable platform/deck, structural ironwork or working mechanism survived insitu. Although a number of metal bolts set into the floor and central concrete block as well as the traces of the base of the central metal pivot set into the central concrete block (1231) survived (Plate: 41). The turntable deck and any movable parts of its running mechanism had presumably been removed when the turntable was dismantled and its pit backfilled. The lines of rails, which formerly ran along the top of the inspection pits to form the roads had also been removed, leaving the chairs and the bolts in place.

6.13.15 The turntable pit and the associated inspection pits were filled with demolition rubble (1205/1219/1220 and 1229). These were broadly loose dark grey rubble rich gravelly ashy silts. Containing frequent fragments of red and blue bricks, quantities of mortar and large sections of broken concrete fragments. Numerous whole and broken bricks, both red and blue grey engineering bricks were also seen within the backfill, including a number of red bricks marked with "Whitwick Colliery" and blue engineering bricks marked with "Cakemore BBC". The fill also contained an extensive lens of broken asbestos roofing at the trenches northwest end. This deliberate back fill appeared to be mostly derived from the demolition of the engine shed which we know took place in the 1960s.

6.13.16 The backfill was sealed by a 0.50m thick levelling layer of compact black limestone track ballast (1227), which in the southeast corner of the trench was covered by a series of bedding layers. Consisting of Type 1 aggregate (1226) and the gravel/loose tarmac sub base (1201) (Plate: 30) for a northeast-south west aligned tarmac road complete with markings and a line of granite kerbstones. The former roadway was covered by a layer of Type 1 aggregate the sub-base for the concrete slab of Crossrail's tunnel segment storage yard.

6.14 Air Raid Shelter

6.14.1 During ground reduction works along the northern edge of the Site, the remains of a well-built brick and concrete structure (1307) were uncovered by the Principle Contractor and recorded by OAR. This rectangular structure, which was almost certainly the remains of one of the five sub surface air raid shelters, which documentary evidence shows were built in 1942, was partly sunk into the embankment which runs along the northern edge of the Site. It was constructed on its west and eastern sides of 0.5m thick brick walls built from frogged red bricks set in a light grey cement. The northern wall of the shelter, which was set into the embankment, was constructed of rectangular concrete panels 71mm thick, which were held up by six square 0.26m wide concrete columns. The outer facing was rendered with a thin layer of poured mastic. The floor of the structure was built of two overlapping concrete and was up to 0.36m thick. Partly demolished the southern wall and roof of the structure was not intact (Plates: 48-49).

7 Finds

7.1 Introduction and Methodology

7.1.1 The Site produced a total of 421 sherds pottery weighing 5.461kg from two contexts. The Estimated Number of Vessels (ENV) was 87. The real ENV total however is probably closer to 66 vessels due a degree of double-counting (explained below). The assemblage mainly comprises mid-20th-century pottery including an interesting group of tablewares bearing the insignia of the GWR and one or two other railway companies. It is unusual to recover such a late and distinctive group of marked tablewares from an archaeological context and to consider them from an archaeological viewpoint. For these reasons they have been recorded in some detail.

7.1.2 All the pottery was examined, spot-dated and fully catalogued during the present assessment stage (see Excel spreadsheet in archive). This was catalogued in accordance with the standards of the Museum of London Archaeology Service (MoLAS) and using the system of post-Roman pottery fabric codes developed in London over several decades (MoLA 2015). For each context and fabric the total pottery sherd count and weight were recorded. Vessel form, if identifiable, was also recorded along with ENV (minimum vessel count). Vessel part, decorative details, makers' marks and any other points of interest were recorded in the comments field. A representative selection of vessels has also been illustrated by photography.

7.2 Date and Nature of the Assemblage

7.2.1 The railway depot at Old Oak Common was constructed in 1905 but saw almost continual alterations throughout its lifetime. The small amount of pottery from Context (906) comprises a few marmalade jars with marks allowing them to be dated to the period ca. 1873-1940 (see below). The larger assemblage of tablewares from Context (404) contains several pieces marked on the underside with makers' marks and in a small number of cases with factory batch marks which appear contain the date of manufacture. On the basis of these the latest pieces in the assemblage were probably made during the period ca. 1937-1943 (see below) and deposited soon after this and perhaps during the Second World War? The tablewares from 404, mainly cups and saucers, are robust canteen-style vessels made for frequent use and designed to last. Although many survive as large fresh sherds, including a few complete vessel profiles, it is notable that a large proportion of the assemblage appears to be heavily smashed or crushed; the fact that nearly all the teacup handles are present as detached sherds underlines this and suggests perhaps that the vessels were deliberately or accidentally crushed - perhaps during the collapse of surrounding buildings? Many vessels are also stained with an oily black deposit which is very difficult to remove and may be oil (engine oil?) or tar. Destruction during wartime bombing remains a possible explanation. The vessels were recovered from a makeup layer for a concrete slab.

7.3 Pottery Fabrics

7.3.1 A detailed breakdown of pottery fabric quantities is presented below.

Fabric	Common name	E Date	L Date	Sherds	Weight	ENV
BLUE	Blue stoneware	1800	1900	1	8	1
ENGS BRST	English stoneware with Bristol glaze	1830	1900+	6	268	4
REFW	Plain refined white earthenware	1805	1900+	1	16	1
TPW	Transfer-printed refined whiteware	1830	1900+	413	5169	80
Total				**421**	**5461**	**87**

Table 2. Breakdown of Post-medieval pottery fabrics

7.3.2 By far the most common fabric here is transfer-printed refined whiteware (TPW), probably the commonest type of mass-produced pottery found in 19th- and early 20th-century Britain, and synonymous with Victorian 'Willow Pattern' blue-and-white tablewares. Most of this was produced at the highly industrialised potteries of Staffordshire and the Midlands and at Stoke-on-Trent in particular. The version of this found at Old Oak Common however is a late development of this fabric and comprises functional and durable crockery made for use in canteens and hotels. This has a very hard white and sometimes almost porcelain-like body with a clear or slightly greyish glaze. In character it often resembles very closely the vitreous white near-porcelain used for sanitary wares in the late 19th and 20th century. The undecorated version of this is coded REFW. Although the fashion for blue-and-white printed 'Willow Pattern' pottery faded-out around 1900 transfer-printed designs and the white-bodied fabric of REFW and TPW remain in production to this day. English stoneware with a Bristol-type clear glassy glaze (ENGS BRST) was developed in the 1830s and remains in production to this day but its common use for domestic storage vessels declined sharply by the 1940s due to the increased use of glassware and plastics. 'English' stoneware during this period was made in many towns and cities across Britain but London and the Midlands were the main suppliers in England. Although Staffordshire remained the major supplier of pottery to most of the country, the later 19th and 20th centuries marked a period of mass-production and distribution when similar-looking tablewares or stonewares could be produced almost anywhere in Britain and end up almost anywhere in the world - particularly in the British colonies. Tableware services, such as the railway crockery seen at Old Oak Common, were often commissioned directly from Staffordshire suppliers by large organisations or companies for use anywhere where the company had offices or premises.

7.4 Summary of the Pottery by Context and Vessel Form

7.4.1 Full descriptions of the pottery assemblage are given in the detailed catalogue (Table 3) and only summarised here. All significant vessels were assigned an individual catalogue entry or record while groups of identical sherds were often assigned to a single record. As the pottery forms two distinct groups from two distinct contexts these will be treated in turn - beginning with the earliest.

Context (906) ca. 1873-1940

7.4.2 This comprised just 6 sherds (391g) from two vessels in transfer-printed whiteware (TPW), one of them nearly complete. These are cylindrical marmalade jars with a commonplace inscription or label for Keiller's Dundee marmalade in black lettering and with fairly elaborate ornamentation contained within an oakleaf wreath, all in black. The inscriptions on both list the medals for excellence won at exhibitions in London in 1862 and at Vienna in 1873. The jars themselves were made by the Maling company of Newcastle whose mark is on the base. The '1873' label remained in use into the first few decades of the 20th century; its end-date is unclear but pottery and stoneware preserve jars seem to have been gradually replaced by glassware versions during the 1930s and '40s. These would normally be associated with the pantry or the kitchen area of households.

Context (404) ca. 1937-1943

7.4.3 This comprised 415 sherds (5070g) with an estimated vessel number (ENV) of 85 vessels. The true minimum number of vessels however is probably closer to 64 because counts of teacups handles give a minimum of 21 vessels whereas counts of distinctively decorated teacup rims suggests at least 25 vessels and the problem of the variations between teacups, saucers, dishes and/or plates. Only 6 vessels are not in transfer-printed whiteware (TPW); these comprise the following:

7.4.4 A stray saucer rim in blue-grey or 'celadon' coloured near-stoneware (BLUE), probably early 20th century.

7.4.5 Four vessels in English stoneware (ENGS BRST). These include 3 cylindrical storage jars in cream and pale grey stoneware - probably for preserves. One has a complete recessed flat base with an impressed trade mark or factory mark showing a ligatured symbol with a central 'M' with an 'F' on either side (mirror image) and a small 'C' above the M. The significance of the mark has yet to traced but it is fairly common on stoneware jars of this period. The fourth vessel is represented by a body sherd from the front of a cylindrical-bodied bottle with part of an underglaze transfer-printed inscription in black mentioning 'Stone's Ginger Beer'.

7.4.6 A teacup rim in plain refined white earthenware (REFW). This is quite unlike the TPW 'service' below as it is thin-walled with spiral fluted (moulded) decoration. It is probably a stray from a late 19th or early 20th century service.

7.4.7 The remainder of the assemblage (at least 60 vessels) comprises tablewares - mainly cup and saucers - in transfer-printed whiteware (TPW). These all have a very similar, very hard and sometimes porcelain-like fabric, but closer to an earthenware than a true porcelain. Many pieces bear transfer-printed designs, mostly in black, including the names and insignia of railway companies and it is clear that the majority of these are tablewares items made for the Great Western Railway ('GWR') hotel at Paddington Station. They represent serviceable everyday crockery for use in hotels and cafes but united in style by their simplicity and company 'branding'. Several items bear the printed or impressed marks of Staffordshire pottery factories on the underside, all of them operating in and around Stoke-on-Trent. These include big companies like Mintons but also smaller ones like the Soho Pottery, Bridgwood's Anchor Pottery and the Crescent Pottery of George Jones and Sons. The latter mark dates after 1921 but most of the other company marks were in use from the late 19th century onwards and cannot be dated very closely.

7.4.8 In addition to makers' mark a few vessels also have small transfer-printed numbers on the underside and these are probably batch-marks giving the month and year of production. The printed marks include '6.35' '3.37' and '5.37' suggesting production dates between1935-1937. A few Minton's dishes are marked underside both with a printed company logo and a separate impressed mark with the company name and a group of three or four numbers below this which may also represent a dated batch mark. Unfortunately these are not very clear (and do not always start with a '19--') but three marks have digits ending in '33' or '35' and one clearly reads '5-36' while another mark ends in a '43'. If the impressed marks are date marks then the latest datable pieces in the collection were made in 1943. Although some vessels may have been a decade or two old at deposition it seems likely that the bulk of the assemblage was broken and deposited sometime during the period c 1937-1943. It is tempting to link the deposition of the assemblage with the War and this may well be the case - if not directly (e.g. by bombing) then at least indirectly. Documentary research into the history of the Old Oak Common railway depot shows it to have been a hive of activity during the war with almost constant renovations and repairs taking place including the installation of air raid shelters, anti-aircraft guns and extra-thick walls to protect men and engines from bombing. Despite this the depot was attacked by enemy aircraft on a number of occasions during the early stages of the Blitz of 1940 and the carriage depot was badly damaged in September of that year. Thereafter renovations continued until the end of the war and beyond. It is within this wartime context that the present pottery assemblage was probably deposited. It is impossible to say with certainty whether it was destroyed by bombing or not but the very fragmentary condition of many pieces makes this a strong probability. It is fairly certain however that it ended up as hardcore in building operations during or very soon after the war.

Teacups

7.4.9 These are all of similar form with a cylindrical body rounding into a footring base and a handle made in a mould and then applied to the vessel wall. The handles have a distinctive robust appearance with a solid bracket-like support below the finger loop (resembling an ear-lobe), typical of Art Deco-style pottery made between the 1920s and the 1940s. About half the teacup sherds have overglaze transfer-printed designs while the remaining plain sherds are almost certainly from the undecorated areas of the same vessels. Counts of teacups handles give a minimum of 21 vessels whereas counts of distinctively decorated teacup rims suggests at least 25 vessels (total 46 ENV). Obviously some of these are from the same vessels so a minimum of around 25 transfer-printed whiteware (TPW) teacups appears likely. The fact that most of the handles have become detached from the cups - despite their very strong design - has already been noted and is the strongest piece of evidence that the assemblage was smashed or crushed to some extent. Nearly all teacups (and others forms) are decorated on the outside - just below the rim - either with inscriptions and insignia (logos), or both, linking them to the Great Western Railway company.

7.4.10 The inscriptions are fairly standard throughout but there are at least two main designs or styles of decoration seen on the teacups and lesser variants seen in the size of the lettering and the company logo. These may represent different batches of tablewares commissioned at different times, and/or possibly from different pottery manufactories? These include a set of Art Deco-style cups and a set of 'plain-style' cups. The first and more decorative style maybe the earliest. This has the company 'GWR' logo in black Art Deco-style letters within a circle and below this inscription '[GWR] HOTELS RETURN TO PADDINGTON STATION'. The same or very similar inscriptions appear on all the other GWR vessels but sometimes in slightly different arrangements. Some Art Deco-style cups and saucers have a black border line at the rim with a border of stylised laurel (?) leaves below this, but some are border-less. The plainer-style cups are more numerous. These are border-less and have a design consisting of an inscription only. The letters 'G.W.R' in larger font are enclosed by the other lines of inscription in smaller font arching over and underlining it : 'PROPERTY OF G.W.R. RETURN TO PADDINGTON STATION' . The plainer less fussy style evident here suggests a slightly later date perhaps in the later 1930s and '40s when Art Deco was falling out of fashion but it is likely that older and newer cups were in use alongside each other in the last few years of service. As the cups etc clearly weren't returned to Paddington Station but ended up 3 miles down the line at Old Oak Common one might ask how they strayed this far? Were they casual acquisitions by railway workers, or were they part of a legitimate supply of company crockery to GWR employees further up the line?

7.4.11 At least three teacups bear the marks of railway companies other than the GWR. One cup bears the printed mark 'LMS' in light purplish-red letters near the rim representing the London Midland and Scottish railway company. Another bears a heraldic-style circular garter device in dark green containing the words 'SOUTHERN RAILWAY' on the strap area. A third cup bears a slightly different-shaped garter (damaged) in brown but the upper part with the company name is missing. These clearly represent stray vessels from stations others than Paddington. In addition to the teacup form there is a single sherd from a larger cylindrical mug possibly with traces of a poorly printed (or painted?) black design.

Saucers

7.4.12 There are around 25 of these - the same number as for teacups. Most show the same two main GWR designs as the teacups above. At least four saucers however are decorated on the inner wall (or flange) with the elaborate coat of arms of the GWR - a vertically bisected shield with the arms of Bristol on the right and those of London on the left with helmeted finials over both halves and the words 'GREAT WESTERN RAILWAY HOTELS' on a ribbon below. The rims have the same stylised leaf border as the Art Deco cups and saucers and are probably contemporary. A fragmentary plainer-style saucer bears a variant inscription including the words '[?COAC]HES & [?---]/ [?RETURN TO PADDINGTON] STATION'. The GWR saucers have rim diameters in the 160-170mm range. Two non-GWR saucers were identified including one with the same green 'SOUTHERN RAILWAY' inscription and garter as the cup above and another with the same 'LMS' inscription in purplish-red as a cup above.

Dishes or plates

7.4.13 At least five examples (all c 220-230mm diam). One has the same GWR coat of arms and leaf border as the saucers above. Four others are probably of the same design but no coat of arms survives. Three bear the Minton's trademark on the underside.

Teapot

7.4.14 A single example identified - a complete lid-seated rim in near-porcelain. It has the same stylised leaf border as the GWR-marked Art Deco vessels above. The body has not survived.

Lid

7.4.15 A single example represented only by a small discoid knob probably from a teapot similar to that above. The top is decorated with a 'bull's eye' in black - a large dot within a thin circle.

8 Environmental Evidence

8.1.1 Due to the absence of any suitable deposits, no samples were taken for environmental analysis.

9 Phasing

9.1 Introduction

9.1.1 Four broad phases of archaeological activity could be defined across the Site.

- Phase 0: Natural Drift Geology
- Phase 1: GWR depot 1903-1948
- Phase 2: 1948 until the end of steam-1967
- Phase 3: 1967-present

9.2 Phase 0-Natural Drift Geology

9.2.1 The natural geology on the site was characterised by a layer of archaeologically sterile, brown or grey stiff clay (London Clay - 104, 206, 303, 405, 505, 606, 714, 804, 907 and 1102). This deposit was revealed in most of the trenches at a depth of c. 0.8m –1.2m below ground level.

9.3 Phase 1- GWR depot 1903-1948

9.3.1 This phase the of activity on the Site dates from the initial phase of the railway depot from G.J Churchward's laying out of the depot in 1903-1906 up to the nationalisation of the railways and end of the GWR in 1948. This phase is represented by a number of structures and deposits uncovered during OAR's work on the Site.

9.3.2 Just above the natural geology a broadly similar deposit was seen across most of the Site. This was compact layer of dark greyish black ashy gravel with clinker inclusions (103, 205, 302, 404, 504, 602, 710, 803 and 905) this "makeup" deposit was seen in most of the trenches excavated. This track ballast was up to 0.6m thick but was often much thinner. This layer represents the land surface contemporary with the use of many of the structures found on Site i.e. turntable pit, inspection pits and was almost certainly the surface put down when the Old Oak Common was lain out in 1903-1906. Although it appears that later layers of identical ballast were added to the initial surface i.e. context 404 which contained pottery dating to the Second World War (see section 7.2 Table).

9.3.3 In Trench 10 the works exposed the remains of a square concrete base, complete with vertical drain pipe and shorn off metal bolts, for one of the metal columns that supported the roof of the 1906 engine shed.

9.3.4 The remains of two of the 28 inspection pits radiating out from the engine shed's northwest turntable and one of the pits for the engine shed's southwest turntable were uncovered in Trenches 12 and 10 (Figure: 4 and Plates: 20, 21, 34-39). A series of long narrow inspection pits are shown beneath the roads radiating out from each of the turntables on GWR drawings dating from 1943 and 1946 (Figures 25 and 27 of Crossrail 2010a). On these plans the inspection pits are shown running right up to the turntable's sidewalls. They appear to have a small separate pit adjacent to the turntable's sidewalls. One of these (1245) and the robbed out remains of two others (1247 and 1248) were uncovered in Trench 12.

9.3.5 The works also revealed the remains of 1307 one of the five sub surface air raid shelters, which documentary evidence shows were built In 1942, along the north and west perimeter of the depot. This rectangular structure was partly sunk into the embankment which runs along the northern edge of the Site and was constructed of brick side walls with a thick concrete floor. The northern wall of the shelter, which was set into the embankment, was constructed of rectangular concrete panels held up by six concrete columns. On a plan of the depot surveyed in 1943 four of the shelters were shown as being protected by the embankments to the north and west of the engine shed. Suggesting that all were sunken or semi-sunken in order to afford blast protection to the occupants (WSHC 2525/410/0672, September 1943; Figure 25).

9.4 Phase 3- 1948-1964

9.4.1 The last phase of the steam locomotive depot and the change over from GWR to BR. The robbing out of the small end chambers at the ends of the inspection pits adjacent to the turntable's side wall and the insertion of an un-mortared brick wall across one of the pits probably date to this period.

9.4.2 This phase is represented by a 10" capping of concrete (1203/1233) which was lain over the original surface of the turntable, and covered the un-mortared brick wall and parts of the robbed out pits.

9.4.3 That some of the concrete surfaces seen across the Site date to the immediate post war period is shown by context 906. A layer of redeposited clay used as a makeup layer. This deposit contained finds from the late 1930s or early 1940s, these finds, which mostly consisted of canteen style cups, saucers and tea pots were marked with the GWR logo and were probably broken during the Second World War. The remains of the broken tableware were then incorporated into hardcore in building operations during or very soon after the war.

9.5 Phase 4- 1964-Present

9.5.1 This phase represents the end of the depot as a steam locomotive depot and change over to a diesel locomotive depot that occurred from 1964-1965. Few remains from this period have been found at Old Oak Common. However, the project did uncover evidence of the demolition of the former Locomotive Depot's engine shed and turntables, which took place from March 1964 onwards.

9.5.2 Most of the floors of the engine shed had been removed and its walls cut down to the ground (c.121.8m ATD). Although their below ground foundations and the associated inspection pits were mostly left in.

9.5.3 The robbing out of the guide rails and shearing off of various metal bolts in the base of the turntable pit is evidence of the dismantling of the turntable's deck and superstructure. The turntable pit and the inspection/ash pits were all back filled with a broadly similar deposit a mix of ashy track ballast and brick and concrete rich rubble. These rubble rich fills were almost certainly derived from the demolition of the standing buildings on Site.

9.5.4 The fills of the inspection pits were relatively devoid of finds and it seems that the GWR's reputation for parsimony was well deserved. However, the backfill of the turntable pit contained a number of metal fixtures and fittings either from the demolished engine shed or from the turntable superstructure itself. Including several "Monkey Metal" light shades from the engine shed ceiling, metal struts, piping and a section of the central metal plate of the turntable's wooden deck with a short section of rail attached.

9.5.5 Of some interest was a section of the backfill of the turntable pit. Which contained copious fragments of roofing slate and asbestos cement sheeting (see below Section 9. Constraints). These are tentatively interpreted as the remains of the "soft strip" demolition phase. The original the engine shed roof of Welsh roofing slate had been replaced with corrugated asbestos roofing sheets. When this was taken down and it was disposed of in a handy hole in 1964. The backfills of the turntable's inspection pits were similar in nature, but without the roofing slate or corrugated asbestos sheeting and were laid down during the same episode. The backfills /demolition deposits were all overlain with a 0.1m-0.6m thick makeup deposit which appears to have formed the post 1960s surface across most of the Site. This deposit, was a compact layer of dark greyish black ashy gravel with clinker inclusions (103, 205, 302, 404, 504, 602, 710, 803, 905 and 1201).

9.5.6 A series of post 1960s roadways and concrete and/or tarmac pathways were also seen in a number of trenches (Trench 12).

9.5.7 The concrete slab of the temporary Crossrail yard covered much of the Site and represents the most recent phase of occupation of the depot.

10 Assessment of Results

10.1 Results

10.1.1 The results of the evaluation and excavation have produced a body of data that can be gauged using the criteria for assessing national importance outlined in documents. Such as MoRPHE (Management of Research Projects in the Historic Environment) and DCMS Scheduling (Department for Culture, Media and Sport), PPS5 (and its predecessor, PPG16), and in accordance with the generic SSWSI (CR-XRL-T1-GST-CR001-00003).

10.1.2 Assessing the results of the watching brief and excavations against the original expectations may be done by comparing the results against the previous baseline.

10.1.3 Historic Environment Record data (HER) from the GLSMR (Greater London Sites and Monuments Record), as derived from the DDBA (Crossrail 2010a), shows 11 known sites in the vicinity. These entries range from a medieval moated site, close to Willesden Junction Station. Through to Second World War Anti-Aircraft batteries on Wormwood Scrubs. No below ground investigations are shown on the GLSMR.

10.2 Period

10.2.1 The site produced remains dating exclusively to the 20th century.

10.3 Relative Completeness

10.3.1 None of the elements of the site at the time of evaluation survived fully intact. All the structures had suffered truncation both vertically and horizontally. Most of the structures found on Site had been backfilled and /or partly demolished down to ground level. Although the below ground foundations, pits etc had survived.

10.4 Condition

10.4.1 The surviving features deposits and artefacts encountered were all in a reasonable state of preservation. All remains were incomplete (see above) but were not so fragmentary as to obscure their form and function. Brickwork was generally in good order although damaged in parts by service trenches. Deposits were uncontaminated and were either site wide, i.e. track ballast or were fills of discreet structures i.e. turntable pits or inspection pits, which had been laid down over a very short period.

10.5 Rarity

10.5.1 The uncovered remains cannot be regarded as rare in themselves, there are other examples of similar remains both visible as extant structures and as below ground features. However, the structural remains uncovered were integral parts of a pioneering locomotive depot, which was partly designed by G. J Churchward, one of Edwardian Britain's most influential railway engineers, and which played an essential role in the running of the GWR in this part of London for much of the 20th century. As such, they are much rarer- see below.

10.6 Group Value

10.6.1 The Old Oak Common Locomotive Depot was designed and built under the supervision of Churchward, and was used as the template of Locomotive Depots elsewhere in the GWR network. The depot therefore played a crucial part in the development and workings of the early railway in London and of the development of the GWR in particular. The GWR is acknowledged as one of the most innovative railways both in Britain and the world, Churchward's fully enclosed locomotive workshop was the first in the world. The rarity of this railway complex has led to the provision for an above and below ground record of the site to be made.

10.7 In Relation to Investigation Aims

10.7.1 At each stage of this project, aims were established as part of the framework of investigation. After the completion of each stage the aims were re-examined and the results checked to see whether the general and site specific objectives had been achieved.

10.7.2 Although it is not intended to re-iterate the detailed findings of this exercise they are briefly outlined below:

10.7.3 Selected research themes derived from A Research Framework for London Archaeology 2002 (Nixon *et al*, 2003) are included in the Assessment of Archaeology Impacts Technical Report (Crossrail 2005). Specifically here, archaeological investigation and mitigation within the Site should provide evidence relating to early railway construction. This evidence would have the potential to contribute to the following research themes:

- *Understanding the reasons for evolution of the road systems, street layouts, river crossings and ferries, and their importance as engines of development and change.*

10.7.4 At Old Oak Common there was relatively little evidence from the investigations to address these aspects. The GWR rail corridor and the Site itself are both in substantial cuttings which would to an extent have influenced the surrounding road system. However, historical mapping shows that the Paddington Mainline to the south has influenced the road network but the Site itself does not appear to have had such an effect. The closest road to the Site, Old Oak Common Lane, appears to predate the arrival of the railways and is shown on Roques 1645 map.

10.7.5 The Site sitting in triangle with substantial railway tracks and yards to the south and east and the Grand Union Canal to the north is to this day mostly cut off from the surrounding area and it appears that it was not initially connected to the surrounding road system. The considerable workforce would obviously require to get on and off site and the 1914-1915 OS map shows a footbridge situated at northern edge of the Site. A path or steps is shown leading down from the southern end of the footbridge and the canal towpath on to the Site. This appears to have been the main way on to the Site on foot. The footbridge is shown crossing the canal to a north-south aligned path which runs towards Willesden Junction. This path still exists running north-south through the Apex Industrial Estate from the canal to Hythe Road. A different path or track is also shown leading up from the northwest corner of the Site up to Old Oak Common Lane.

10.7.6 How vehicles entered the Site at this time is not clear although they could possibly have used the track up to Old Oak Common Lane. Since then the Site has become connected to the surrounding road network, via a metalled road leading up to Old Oak Common Lane in the northwest corner of the Site. Work in Trench G uncovered part of a metalled road which ran across the southeast corner of the infilled turntable pit.

- *Examining the concept of core/periphery for different periods in London's past, as a means of understanding how evolving settlement patterns reflect the need for sustainable, beneficial relationships between a settlement and its environs, a city and its hinterland.*

10.7.7 Documentary evidence shows that the Old Oak Common area was essentially rural until the middle of the 19th century with only small settlements at Church Acton, East Acton to the south and Holsdon Green to the north. The Victorian county history notes that "there were 241 inhabited houses in 1801 and 426 by 1841" (Baker & Elrington, 1982, 7-9). At that stage they were certainly at the periphery of London. It was the construction of the Grand Junction Canal (Grand Union Canal) followed by the GWR and other railways serving the capital in the area that stimulated the gradual establishment of residential and industry in the area and was instrumental in extending the core of London into this part of Middlesex. Even so it was not until the construction of the GWR Old Oak Common Depot at the turn of the 20th century that the surrounding area started to become dominated by the unique mix of transport infrastructure, housing and industry that is seen today.

10.7.8 The recent work carried by OAR on Site revealed some of the remains of this depot, providing a limited insight into the development, layout and workings of the depot. The building of which was a major stimulus to the growth and urbanisation of this part of London.

- *Establishing how daily work and life in London reflected and contributed to the rise of London as the commercial centre of the British Empire and to its continued eminence as a world city thereafter*.

10.7.9 The Old Oak Common depot played an important part in the running of a railway that linked London to the port city of Bristol and rich agricultural hinterland in the West Country as well as the South Wales coalfield. Allowing coal and agricultural produce to be shipped into the capital. The importance of this trade is illustrated by the construction of large goods yards to the west of the Bishops Bridge as well as specific milk platforms to the west of Platform 1 and on northern side of Paddington Station. Yards for storage and shipment of coal, which remained the capital's main source of heating until the 1960s, were also built to the north of Paddington Station.

10.7.10 The development of the county's railway system, of which the GWR was an important part, meant that goods and raw materials could be moved further, cheaper and quicker than previously. With all its obvious benefits to London both as the capital of Britain but as the capital of the British Empire. The railway's ability to bring in and take out vast amounts of materials and goods from the capital was, when coupled with the expansion of London's docks, an essential factor in London's rapid expansion as the world's largest mercantile city and put it on the road to becoming a "world city".

10.7.11 Crucially the railways also enabled a growing population, essential for an ever-expanding metropolis both as a workforce and as consumers, to travel quickly and relatively cheaply to and from centre of London into the suburbs and further afield.

10.7.12 The development of the railways as a means of mass transport also enabled the movement of building materials in bulk which made these items much cheaper. They could now be manufactured elsewhere, at low cost and to standard sizes and methods, and brought to the capital. The railway was crucial in the rapid expansion of the built up area of London.

10.7.13 The different materials used in the building of the depot itself reflect this with Bangor roofing slate from North Wales being used in the sheds roofs and bricks used in their walls. The remains of which were uncovered during the works. A case in point is the blue engineering bricks with chamfered edges discovered in the backfill of the turntable. These were stamped with the markers marks showing that they had been manufactured at the Cakemore blue brick company of Rowley Regis, Worcestershire which stood on a branch of the GWR into Birmingham's Snow Hill Station.

- *Defining levels of landscape change due either to environment and climate or human interaction.*

10.7.14 The archaeological works carried out by OAR at Old Oak Common Depot demonstrated the survival of modern remains throughout the Site. These remains were exclusively associated with GWR and BR's occupation of the Site from 1906. Remains included a series of brick built inspection pits parts of engine shed and a turntable pit.

10.7.15 Much of the underlying archaeological deposits, mostly ashy clinker rich, track ballast, beneath the modern roadway appeared to be levelling/surfacing deposits for the depot or were used to level out the local topography, during the development of the area at the beginning the 20th century. A process which involved the terracing of most of the Site and removed any traces of the original landscape and any remaining pre 20th century structures.

10.7.16 In most of the trenches the lowest deposits encountered, generally at a depth of between 0.8m and 1.5m bgl, were confidently identified as *in situ* London Clay. Which forms part of the Natural Geology in this part of London. No artefacts or ecofacts were visible in these any of these geological deposits.

- *The potential to recover evidence relating to the original 65' turntables which were housed in the Engine Shed, the construction method and materials used to found the walls and columns of the Engine Shed and Stores, the use of the Site during WWII, the nature and extent of survival of the traverser pit, the nature of the stone marked on early OS maps, the survival of the four-ton crane which was Sited outside the Stores and the construction method and materials used to found the raised track of the coaling stage and former boiler house.*

10.7.17 The well-preserved remains of the northwest 65ft engine shed turntable pit were uncovered in Trench 12. This was seen to be built of red brick walls with a concrete floor. The remains of a section of the Engine Shed's wall (Trench 5) and the base of one of the Sheds columns was uncovered in Trench 10.

10.7.18 The remains of one of a brick and concrete air raid shelter were uncovered during works on the northern edge of the Site. This appears to be one of five semi subterranean shelters built in 1942. A range of ceramics illustrates the nature and extent of the railway supply chain and mobility of these durable products in use.

10.7.19 The remains of the Traverser pit (Trench 11) were not uncovered during the works. Nor were any trace of the four-ton crane, coaling stage, boiler house recovered.

- *Recover evidence for the development and use of the watercourse which formerly crossed the Site.*

10.7.20 No evidence of the watercourse (Stamford Brooke) was uncovered during the archaeological works. Aside from Natural Geology (London Clay), all the deposits uncovered on Site appear to have been laid down post 1906.

10.7.21 All of these deposits and structures related to the use of the Site by the GWR with no alluvial deposits present. This was not surprising as documentary sources show that all of the pre 20th century Holocene deposits, Including any riverine deposits, were removed when the Site was levelled out during the construction of GWR/GCR's New North Mainline Railway in 1903 and the GWR depot from 1904-1906.

11 Statement of Potential of Archaeology

11.1 Stratigraphic Data

11.1.1 The potential for analysis of the stratigraphic data is limited given the nature of the remains recorded. The investigations revealed the absence or presence of remains associated with the known OOC complex. The construction of the railway complex had removed any earlier strata with archaeological potential.

11.2 Finds Data

11.2.1 The modest assemblage and variety of finds recovered from the works has a reasonable potential; their presence is important in terms of the archaeological record and as a record of the Site for the future. The material culture has some limited potential to examine spatial and temporal distributions of produced goods, personal items, wholesale and retail/consumer issues and regional and global trade. It can reveal and confirm the hypothesised nature of the occupation on Site and the range of activities that occurred there and can shed light on activities that relate to a wider sphere of influence.

11.3 Documentary Study

11.3.1 The supporting primary documentary evidence available increases the significance of the fieldwork results. A limited appraisal of these sources have been undertaken as part of earlier desk-based work, although this has by no means been exhaustive. Further detailed examination of the primary documentary evidence, particularly records relating to property ownership and use, probates, leases, bibliographic records and photographic material could provide significant additional information. Antiquarian and contemporary reports of life in London during the periods of occupation would provide an intriguing comparison to the results of the fieldwork and their interpretation.

11.3.2 An important primary documentary resource for future research would be the collection of minute books, contracts, plans and leases generated by the GWR and its successor organisations. Including the British Railways Board (BRB), the British Railways Western Region (BR-WR) and the British Transport Commission (BTC). Currently held by the National Archives at Kew (TNA), the National Railway Museum in York, the British Library, the Borough of Hammersmith and Fulham Archives Centre and the Wiltshire and Swindon History Centre (WSHC).

12 Conclusions

12.1.1 The uncovered remains at Old Oak Common can be reasonably well dated by documentary and cartographic sources. Starting from the beginning of the 20th century with the site of the GWR's Locomotive Departments Depot, through to its development as state of the art engine maintenance and stabling facility. Subsequently its evolution from a steam locomotive depot into a diesel depot in the 1960s and its later role as railway sidings.

12.1.2 The Old Oak Common Depot played a crucial role in the running and maintenance of the GWR's engine stock at the London end of the company's important Paddington to Bristol line and was essential in the running of the GWR's operations in the London area. It could be said that without the depot at Old Oak Common neither Paddington Station nor the rest of the rail network in GWR's "London District" would have been able to operate.

12.1.3 Although the maps and plans already examined provide a relatively detailed external plan for the structures found at Old Oak Common. The archaeological works undertaken by OAR have provided new information on the materials used for the development of the depot, the construction techniques employed and the condition of below ground remains currently existing at the Site. It adds to the existing body of documentary sources, which outline a relatively detailed external plan for the structures found at Old Oak Common.

13 Publication and Dissemination

13.1.1 The remains uncovered during the project are not of sufficient significance to warrant further publication on their own. The results will instead be incorporated in one of the series of theme specific publications describing the archaeological results uncovered during the Crossrail scheme.

13.1.2 Information from the Crossrail investigations and recordings at Old Oak Common also contributes to a chapter on Old Oak Common in Brindle 2013.

14 Archive

14.1.1 The complete project archive includes paper context records and indices, permatrace drawings, both black and white and colour photographs, digital plans and photographs.

14.1.2 These were prepared following the guidelines set out in: *Guidelines for the preparation of excavation archive for long-term storage* (Walker, 1990).

14.1.3 The digital data will be temporarily stored on the server at OA South, which is backed up on a daily basis. For long term storage of the digital data CDs/DVDs will be used and will include the reports, plans, scanned images and digital photographs. Each disk will be fully indexed and accompanied by the relevant metadata as provenance.

14.1.4 The project archive and finds are currently held at the offices of Oxford Archaeology (south) in Osney Mead, Oxford, under the Site code XSU 10.

14.1.5 It is anticipated that in due course, subject to agreement with Crossrail Ltd, the archive will be deposited with LAARC (London Archaeological Archive and Research Centre).

14.1.6 Copies of the report will be lodged with Historic England Greater London Archaeological Advisory Service, GLHER (Greater London Historic Environment Record), the City of Westminster and Westminster City Archives.

14.1.7 All dry and stable finds will be packaged according to the Museum of London's specifications, either in acid-free cardboard boxes, or in airtight plastic boxes for unstable material. Each box will have a compiled list of its contents and the boxes will in general contain only one type of material e.g.: bone or ceramic etc. It is anticipated that the finds will be deposited with LAARC.

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Appendix 1 Archaeological Context Inventory

Context	Type	Comments
101	Deposit	Concrete-Modern surface
102	Deposit	Rubble rich makeup layer- Reddish black sandy gravel red bricks
103	Deposit	Makeup layer, track ballast- Firm dark blue grey ashy clay sandy gravel
104	Deposit	Natural Geology -Firm brownish orange clay
201	Deposit	Concrete-Modern surface
202	Deposit	Makeup layer- Firm dark bluish black ashy sand and clinker
203	Deposit	Concrete-Road
204	Structure	Wooden beams set in concrete
205	Deposit	Makeup layer- Track ballast; firm dark blue grey ashy clay sand and clinker
206	Deposit	Natural Geology-Firm brownish yellow clay
207	Cut	Construction trench
208	Deposit	Backfill- Mid blue black, sand clinker, brick fragments
209	Structure	Wall
301	Deposit	Concrete-Road
302	Deposit	Makeup layer- Track ballast; firm dark blue grey ash clay gravel rare fragments of slag
303	Deposit	Natural Geology-Firm brownish yellow clay
401	Deposit	Topsoil- Loose, dark brownish black sandy loam occasional stones
402	Deposit	Backfill- Mid blue black, sand ash gravel
403	Cut	Pipe trench
404	Deposit	Makeup layer- Track ballast; firm dark greyish black sandy ash gravel rare fragments of slag, and 1930s-1940s pottery
405	Deposit	Natural Geology-Firm dark greenish grey clay
501	Deposit	Tarmac-road
502	Deposit	Makeup layer- Track ballast firm brownish black ashy gravel
503	Structure	Wall- Pinkish red bricks in greyish black compact sandy mortar
504	Deposit	Makeup layer- Firm dark blue black, ashy sandy gravel
505	Deposit	Firm orange yellow clay
506	Structure	Concrete- Base
507	Cut	Construction trench
601	Deposit	Concrete-Road
602	Deposit	Makeup layer- Dark blue grey ashy gravel clay rare slag bricks
603	Service	Concrete enclosed pipe

Context	Type	Comments
604	Deposit	Tarmac-Footpath
605	Deposit	Topsoil
606	Deposit	Natural Geology-Firm mid brown yellow sandy clay
701	Deposit	Tarmac-Footpath
702	Deposit	Makeup layer- Sub base; gravel sand
703	Deposit	Tarmac-Road
704	Service	Drain
705	Deposit	Makeup-Sub base; gravel
706	Deposit	Makeup layer- Firm dark blue black, ashy sandy gravel
707	Voided	Voided
708	Deposit	Tarmac-Road
709	Deposit	Makeup layer; sub base
710	Deposit	Makeup layer- Firm dark blue black, ashy sandy gravel
711	Deposit	Concrete-Pipe
712	Deposit	Fill
713	Structure	Concrete-Drain
714	Deposit	Natural Geology-Yellowish orange clay
801	Deposit	Concrete-Road
802	Deposit	Makeup layer- Sub base
803	Deposit	Makeup layer- Firm dark blue grey, ashy clay gravel, rare slag
804	Deposit	Natural Geology- Firm mid brownish yellow clay
901	Deposit	Tarmac-Road
902	Deposit	Makeup layer- Sub base
903	Deposit	Makeup layer- Loose pale red clay gravel
904	Deposit	Makeup layer- Track ballast; firm dark blue grey, sand ash gravel rare slag and pottery fragments
905	Deposit	Makeup layer- Firm dark greyish brown clay gravel sand
906	Deposit	Layer- Soft yellow grey brown sandy clay
907	Deposit	Natural Geology- Firm light brown yellow, sandy clay
1001	Structure	Concrete- Rectangular block; column base
1002	Structure	Inspection pit-Red brick with concrete lip
1100	Deposit	Topsoil/overburden- Dark grey brown soft clay silt
1101	Deposit	"Recent" Backfill- Pale pinkish brown clay and dark grey black stony silt frequent fragments brick concrete
1102	Deposit	London Clay-Natural Geology; mid pinkish brown stiff clay

Context	Type	Comments
1200	Deposit	Concrete Hardstanding
1201	Deposit	Makeup/levelling- Track ballast; very firm dark grey silty angular gravel
1202	Deposit	Road surface- Tarmac and concrete
1203	Structure	Concrete capping
1204	Structure	Turntable pit sidewall- Dark red brick, in pale grey cement
1205	Deposit	Rubble backfill- Loose dark grey rubble rich gravel silt, large fragments of concrete
1206	Structure	Wall- Red brick no mortar
1207	Service	Iron Pipe
1208	Structure	Inspection pit wall- Dark red brick pale grey cement
1209	Structure	Inspection pit wall- Dark red brick pale grey cement
1210	Structure	Concrete- Square block,
1211	Structure	Inspection pit wall- Dark red brick pale grey cement
1212	Structure	Inspection pit wall- Dark red brick pale grey cement
1213	Structure	Inspection pit wall- Dark red brick pale grey cement
1214	Structure	Inspection pit wall- Dark red brick pale grey cement
1215	Deposit	Floor of Inspection pit- Dark red brick pale grey cement
1216	Deposit	Floor of Inspection pit- Dark red brick pale grey cement
1217	Deposit	Floor of Inspection pit- Dark red brick pale grey cement
1218	Deposit	Redeposited London Clay- Stiff pale pinkish brown clay
1219	Deposit	Fill- Loose dark grey sandy ashy silt, frequent rubble, bricks and concrete
1220	Deposit	Fill- Firm dark grey silty sand gravel, frequent brick
1221	Structure	Inspection pit wall- Red brick hard pale grey cement
1222	Structure	Inspection pit wall- Dark red brick pale grey cement
1223	Deposit	Concrete floor of turntable pit; light grey
1224	Cut	Pipe trench
1225	Deposit	Fill of pipe trench-Loose dark grey ashy gravel rich silt
1226	Deposit	Type 1 sub-base
1227	Deposit	Makeup layer- Track ballast; compact dark grey back ashy silty angular gravel
1228	Deposit	Orange gravel sub-base
1229	Deposit	Fill; loose dark grey ashy silt, very frequent sub angular stones, occasional coal
1230	Structure	Track Chairs
1231	Structure	Pivot base-concrete
1232	Cut	Linear

Context	Type	Comments
1233	Deposit	Concrete capping
1234	Structure	Track Chairs
1235	Structure	Turntable pit sidewall; red bricks
1236	Deposit	Fill; compact dark grey ashy gravel rich clay silt
1237	Fitting	"Valve" circular
1238	Fitting	"Valve" circular
1239	Fitting	Section of turntable decking, metal plate with length of bullhead rail
1240	Fitting	Fitting
1241	Fitting	Beam
1242	Fitting	Beam
1243	Group	E-W Inspection Pit
1244	Group	E-W Inspection Pit
1245	Group	E-W Inspection Pit
1246	Fitting	Light shade
1247	Cut	Robbed out inspection pit
1248	Cut	Robbed out inspection pit
1249	Deposit	Re-deposited clay backfill of robbed out inspection pit
1300	Structure	Concrete slab floor
1301	Structure	Brick wall
1302	Structure	Brick wall
1303	Structure	Concrete panelled wall
1304	Structure	Concrete slab floor
1305	Structure	Concrete columns
1306	Cut	Construction cut
1307	Group	Air Raid Shelter

Appendix 2 Summary of Site Details

Client name: Crossrail Ltd

Site name: Old Oak Common Depot, Acton, London NW10

Site code: XSU10

Grid reference: TQ 21870 82390

Type of investigation: Trenching, Targeted and General Watching Brief

Date and duration of project: March 2011- July 2015,

Location of archive: The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES, and were deposited with the Museum of London in due course.

Appendix 3 – SMR / HER / OASIS Record forms

OASIS DATA COLLECTION FORM: England

Printable version

OASIS ID: oxfordar1-234839

Project details

Project name	Crossrail Old Oak Common Watching Brief and Evaluation
Short description of the project	The archaeological works were carried out intermittently from March 2011 until April 2015 and comprised Trial Trenching, Targeted and General Watching Briefs. These took place during the demolition and remodelling of a former Motive Power Depot to create a maintenance depot and stabling facilities for Bombardier Rail who will be responsible for the maintenance and servicing of Crossrail traction and rolling stock. The depot, which was designed by the Great Western Railway's chief locomotive superintendent J. C. Churchward was an important component of, what was at the time, one of the country's most innovative railways. As the first of a number of new locomotive depots built by the Great Western Railway during the Churchward era, the layout of Old Oak Common served as the template for those that followed. The majority of which were closed and demolished in the late 1960s. Until its closure in 2009 the Old Oak Common Depot represented the last remaining 'factory' repair facility on the former GWR network. The below ground remains of a number of structures were uncovered and recorded during the project. These included parts of a large brick built turntable pit, sections of a brick built engine shed as well as a number of below ground brick built inspection pits and the remains of a Second World War Air raid shelter.
Project dates	Start: 01-03-2011 End: 01-05-2015
Previous/future work	Yes / No
Any associated project reference codes	XSU10 - Sitecode
Any associated project reference codes	XSU10 - Museum accession ID
Type of project	Field evaluation
Site status	None
Current Land use	Other 3 - Built over
Monument type	RAILWAY INFRASTRUCTURE Modern
Significant Finds	CERAMIC Modern
Methods & techniques	''Sample Trenches'',''Targeted Trenches''
Development type	Rail links/railway-related infrastructure (including Channel Tunnel)
Prompt	Planning condition
Position in the planning process	After full determination (eg. As a condition)

Project location

Country	England
Site location	GREATER LONDON HAMMERSMITH AND FULHAM HAMMERSMITH AND FULHAM Crossrail Old Oak Common Watching Brief and evaluation
Study area	14.6 Hectares
Site coordinates	TQ 21870 82390 51.52676257398 -0.243009843326 51 31 36 N 000 14 34 W Point

Project creators

Name of Organisation	Oxford Archaeology/Ramboll (OAR)
Project brief originator	Crossrail Ltd
Project design originator	Crossrail
Project director/manager	R. Brown
Project supervisor	G Evans

Project archives

Physical Archive recipient	Museum of London
Physical Archive ID	XSU10
Physical Contents	''Ceramics''
Digital Archive recipient	Museum of London
Digital Archive ID	XSU10
Digital Contents	''other''
Digital Media available	''Images raster / digital photography'',''Text''
Paper Archive recipient	Museum of London
Paper Archive ID	XSU10
Paper Contents	''other''
Paper Media available	''Notebook - Excavation',' Research',' General Notes'',''Plan'',''Report''

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	Crossrail Old Oak Common Watching Brief and Evaluation Fieldwork Report
Author(s)/Editor(s)	OA/Ramboll
Date	2015
Issuer or publisher	OA/Ramboll
Place of issue or publication	Oxford
Description	Client report

Entered by	Susan Rawlings (susan.rawlings@oxfordarch.co.uk)
Entered on	16 December 2015

OASIS:

Please e-mail Historic England for OASIS help and advice

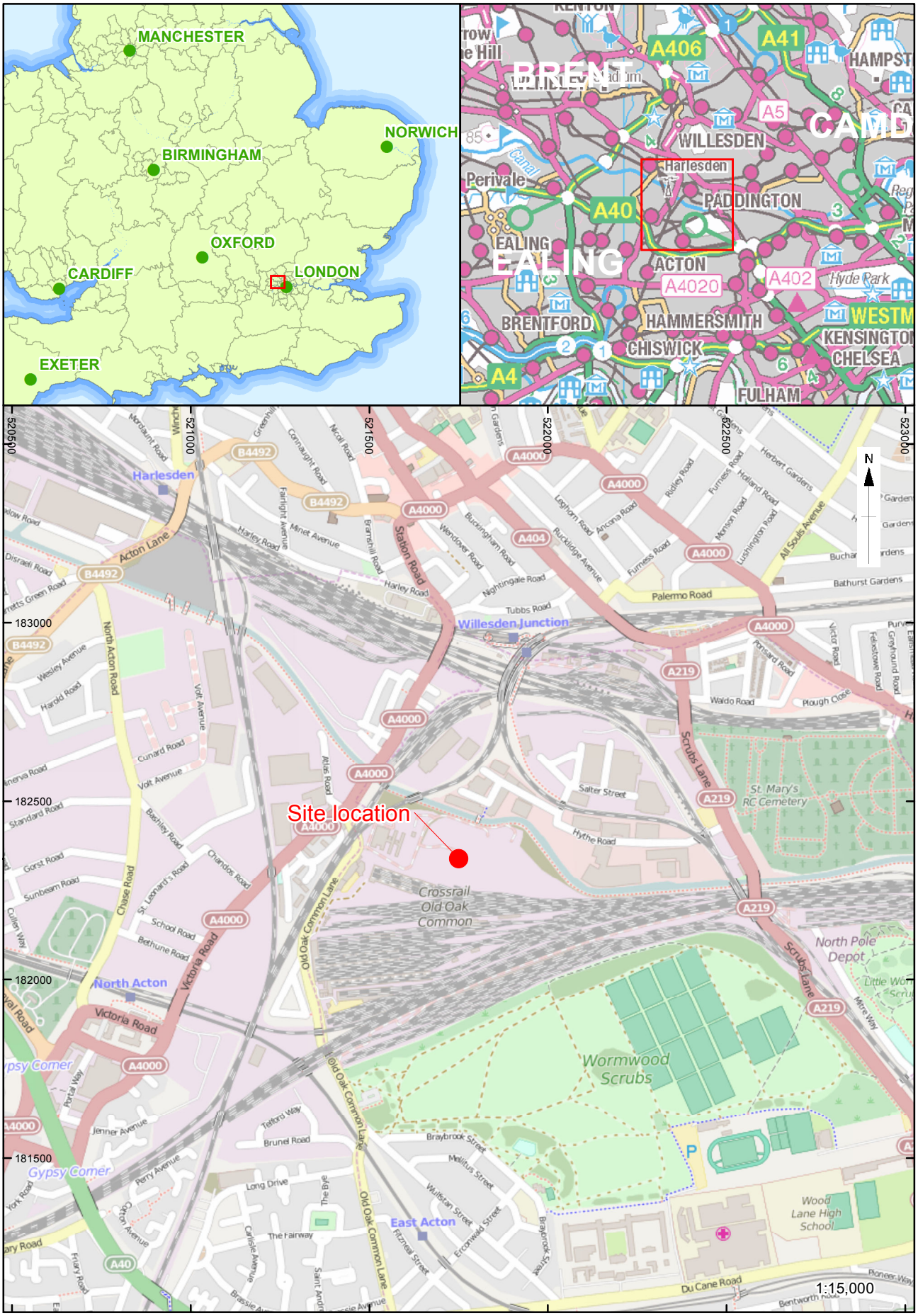

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Figure 1: Site location

1. SHUNTERS CABIN
2. NETWORK RAIL CABIN MAINTENANCE
3. CARRIAGE WASHING PLANT (BOMBARDIER)
4. UNDERFRAME CLEANING SHED
5. STEAM RAISING PLANT
6. DIESEL/OIL PUMPHOUSE
7. CARRIAGE WASHER TREATMENT PLANT
8. WATER TOWER
9. TEMPORARY METAL STORE
10. SAFETY STORE
11. OFFICES/PORTA CABINS
12. WATER SOFTENING PLANT
13. WATER TOWER (SOFT WATER)
14. SUMP/OIL INTERCEPTOR
15a. THE FACTORY AKA LIFTING SHOP OR MAINTENANCE SHED
15b. LIFTING BAY AKA THE FACTORY OR COPPERSMITHS SHOP
15c. BOILER HOUSE - FACTORY INC. TANKS

16b. STORES/OFFICES
17a. AMENITY BUILDING PREVIOUSLY CANTEEN, DATES 1906
17b. NEW AMENITY BUILDING
18. OFFICES/PORTA CABINS
19. DIESEL REFUELING MAINTENANCE SHED
20. MESS ROOM PREVIOUSLY SAND FURNACE
21. BOILER HOUSE - PULLMAN SHED
22. PULLMAN SHED AKA CARRIAGE SHED, CARRIAGE PAINTSHOP, ELECTRICAL SHOP
23. LIFTING SHOP AKA CARRIAGE LIFTING SHED
24. SUMP/OIL INTERCEPTOR
25. ACCESS ROAD
26. SUB STATION B2
27. OUTLINE OF DEMOLISHED STEAM SHED
28. TURNTABLE
29. BUNDED OIL TANK
30. TOILET BLOCK
31. DIESEL/OIL OVERHEAD DELIVERY LINE
32. DIESEL/OIL DELIVERY AREA
33. ASH SHELTER
34. FUEL OIL TANKS
35. SITE OF DEMOLISHED MASONRY ARCH TO SUPPORT RAISED TRACKS
36. SUB STATION B3
37. SITE OF DEMOLISHED BOILER HOUSE
38. SUBSTATION B5
39. MESS ROOM
40. CORONATION SIDINGS
41. BURIED TURNTABLE PITS
42. BURIED/SITE OF TRANSVERSER PIT
43. SITE OF DEMOLISHED WATER SOFTENER
44. SITE OF DEMOLISHED REFUSE DESTRUCTER
45. SITE OF DEMOLISHED SAND FURNACE
46. SITE OF DEMOLISHED MESS ROOMS
47. SITE OF DEMOLISHED COALING BUILDING AND WATER TOWER
48. SITE OF DEMOLISHED EMBANKMENT LEADING TO COALING BUILDING
49. CONSERVATION AREA FORMERLY COAL STOCK PILE
50. TANK BASES TO PREVIOUSLY REMOVED OIL TANKS
51. SITE OF EMBANKMENT LEADING TO FORMER BOILER HOUSE
52. BUNDED OIL TANK
53. SITE OF DIESEL/OIL TANK
54. DIESEL/OIL TANK PUMP HOUSE
55. COVERED WALKWAY TO REAR OF STORES
56. COVERED WALKWAY
57. GAS METER HOUSE
58. PIPE BRIDGE
59. SITE OF DEMOLISHED AIR RAID SHELTERS
60. STORAGE SHELTER
61. BOUNDARY RETAINING WALL
62. BOILER WASHING PLANT HOUSE
63. BOILER/PUMP HOUSE
64. BOILER/PUMP HOUSE

16a. STORES

N

N

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0 100 m

Scale at A3 1:2500

Figure 2: Site with former structures from historic sources

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1. SHUNTERS CABIN
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5. STEAM RAISING PLANT
6. DIESEL/OIL PUMPHOUSE
7. CARRIAGE WASHER TREATMENT PLANT
8. WATER TOWER
9. TEMPORARY METAL STORE
10. SAFETY STORE
11. OFFICES/PORTA CABINS
12. WATER SOFTENING PLANT
13. WATER TOWER (SOFT WATER)
14. SUMP/OIL INTERCEPTOR
15a. THE FACTORY AKA LIFTING SHOP OR MAINTENANCE SHED
15b. LIFTING BAY AKA THE FACTORY OR COPPERSMITHS SHOP
15c. BOILER HOUSE - FACTORY INC. TANKS

16b. STORES/OFFICES
17a. AMENITY BUILDING PREVIOUSLY CANTEEN, DATES 1906
17b. NEW AMENITY BUILDING
18. OFFICES/PORTA CABINS
19. DIESEL REFUELING MAINTENANCE SHED
20. MESS ROOM PREVIOUSLY SAND FURNACE
21. BOILER HOUSE - PULLMAN SHED
22. PULLMAN SHED AKA CARRIAGE SHED, CARRIAGE PAINTSHOP, ELECTRICAL SHOP
23. LIFTING SHOP AKA CARRIAGE LIFTING SHED
24. SUMP/OIL INTERCEPTOR
25. ACCESS ROAD
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27. OUTLINE OF DEMOLISHED STEAM SHED
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30. TOILET BLOCK
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44. SITE OF DEMOLISHED REFUSE DESTRUCTER
45. SITE OF DEMOLISHED SAND FURNACE
46. SITE OF DEMOLISHED MESS ROOMS
47. SITE OF DEMOLISHED COALING BUILDING AND WATER TOWER
48. SITE OF DEMOLISHED EMBANKMENT LEADING TO COALING BUILDING
49. CONSERVATION AREA FORMERLY COAL STOCK PILE
50. TANK BASES TO PREVIOUSLY REMOVED OIL TANKS
51. SITE OF EMBANKMENT LEADING TO FORMER BOILER HOUSE
52. BUNDED OIL TANK
53. SITE OF DIESEL/OIL TANK
54. DIESEL/OIL TANK PUMP HOUSE
55. COVERED WALKWAY TO REAR OF STORES
56. COVERED WALKWAY
57. GAS METER HOUSE
58. PIPE BRIDGE
60. SITE OF DEMOLISHED AIR RAID SHELTERS
61. STORAGE SHELTER
62. BOUNDARY RETAINING WALL
63. BOILER WASHING PLANT HOUSE
64. BOILER/PUMP HOUSE

16a. STORES

Key to mitigation areas:
Red = GWB
Green = TWB
Blue = Trench excavation

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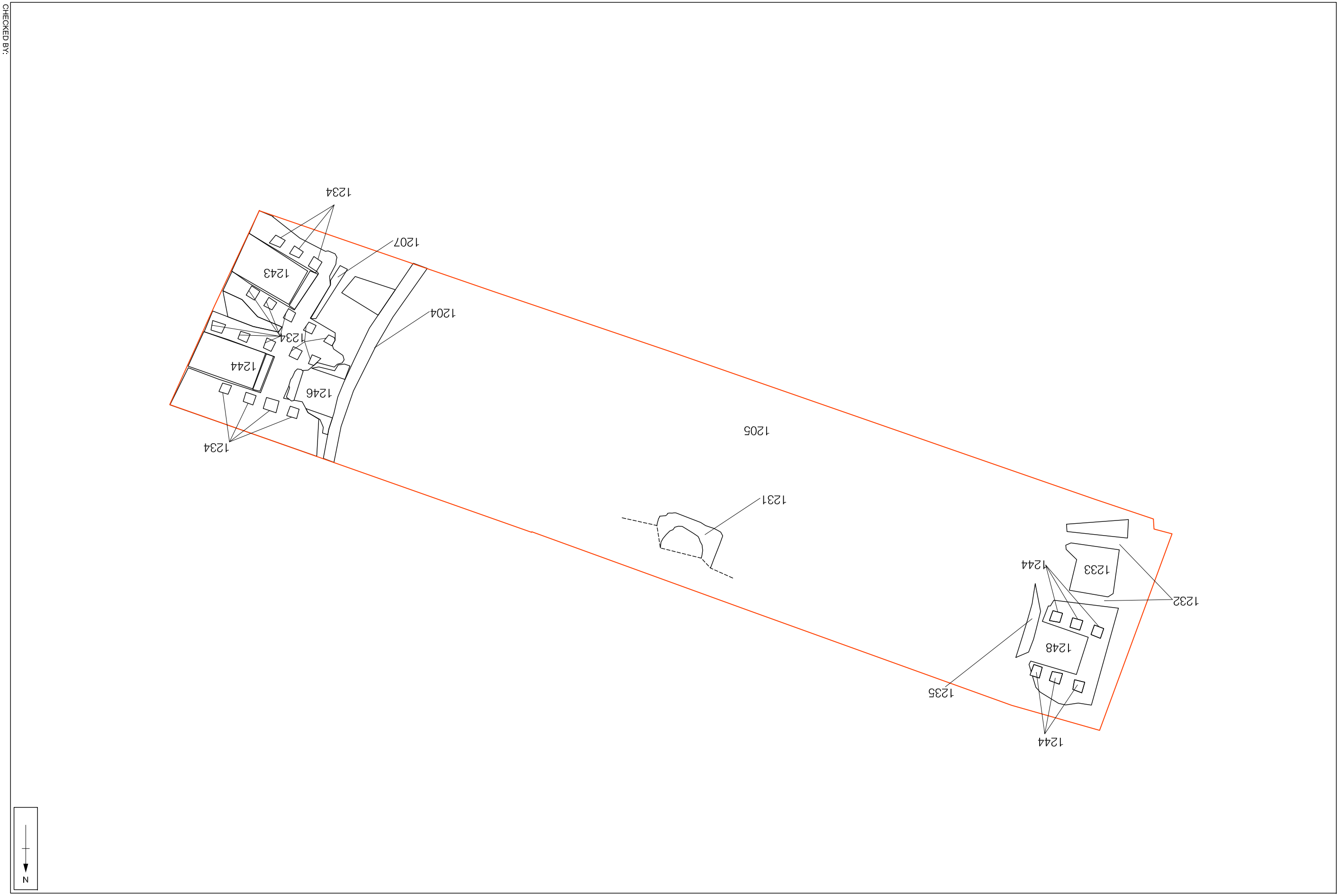
0 100 m

Scale at A3 1:2500

Figure 3: Location of investigation trenches. Trenches 1-12



Scale at A3 1:100

0 5 m

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Figure 4: Plan of turntable uncovered in trench 12 (H)

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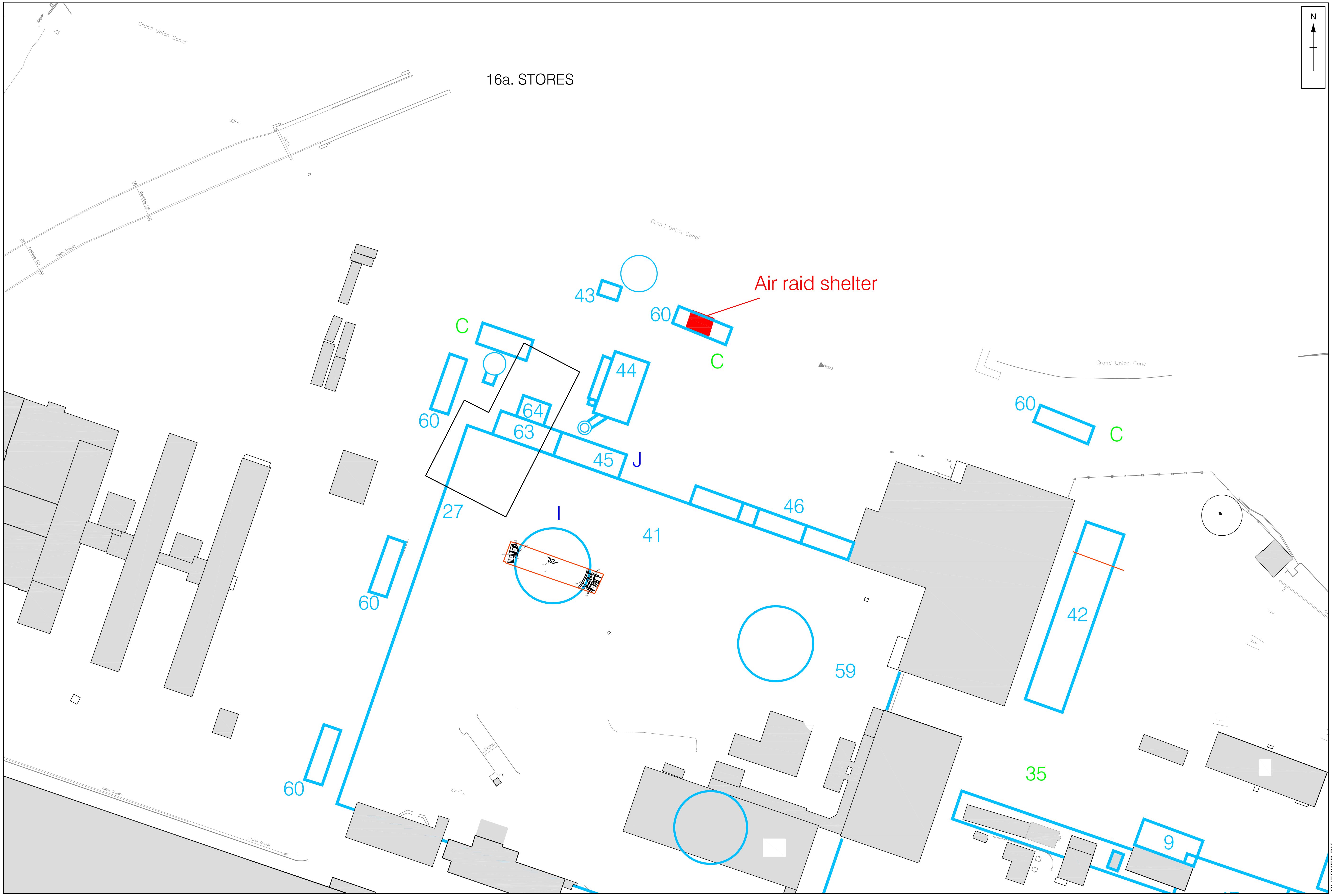

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0 10 m
Scale at A3 1:200

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Figure 5: Air raid shelter

Plate 1: Trench 1.Overall view Looking north

Plate 2: Trench 1. Section through “makeup” and dump deposits (102 and 103) below concrete slab (101). The underlying firm Natural Clay (104) at base

Plate 3: Trench 2. Section looking north. Ashy clinker levelling and “makeup” layers (202) and (205) beneath the present concrete slab (201) and former concrete roadway (203). Sterile Natural clay (206) at base

Plate 4: Trench 2. Looking north. Former concrete roadway (203)

Plate 5: Trench 2. Looking north. Concrete and wood structure [204] with Building 17b in background

Plate 6: Trench 3. Looking south

Plate 7: Trench 4. Looking east

Plate 8: Trench 4. Section looking south showing “makeup “ layer (404) over Natural clay (405)

Plate 9: Trench 5. Brick foundations of SE corner of 1906 Engine Shed [503] from east

Plate 10: Trench 5. Brick foundations of SE corner of 1906 Engine Shed [503] from east

Plate 11: Trench 6. Southern end of trench looking north. Concrete encased water main [604] in foreground

Plate 12: Trench 6. Northern end of trench

Plate 13: Trench 6. Section showing the sequence of deposits beneath concrete slab on to firm Natural clay (606)

Plate 14: Trench 7. Looking south. Building 22 in background

Plate 15: Trench 7. West facing section. Showing the sequence of deposits beneath concrete slab on to firm Natural clay (714)

Plate 16: Trench 8. Looking south

Plate 17: Trench 8. East facing section. Showing the sequence of “makeup” deposits (802-803) beneath concrete slab (801) on to firm Natural clay (804)

Plate 18: Trench 9 looking south

Plate 19: Trench 9. East facing section. Showing the sequence of “makeup” deposits (902-906) beneath Tarmac roadway 901 on to firm Natural clay (907)

Plate 20: Trench 10. Inspection pit [1001]. Looking SE

Plate 21: Trench 10. SE end of Inspection pit [1001] with brick step

Plate 22: Trench 10. Detail of brick floor and S sidewall of inspection pit [1001]

Plate 23: Trench 10. Section through inspection pit [1001]. Showing brick floor and floor's concrete sub base and concrete footings of pit's sidewalls

Plate 24: Trench 10. Concrete plinth [1002] for roof column of 1906 Engine Shed. Showing bolts for column and central hole for vertical down drain pipe

Plate 25: Trench 10. Concrete plinth [1002] for roof column of 1906 Engine Shed with brick manhole behind

Plate 26: Trench 11. View of excavated trench looking S. Showing recent “madeground” deposit (1101) over Natural clay (1102)

Plate 27: Trench 11. View of excavated trench looking W. Showing recent “madeground” deposit (1101) over Natural clay (1102)

Plate 28: Trench 11. Base of trench looking N. Showing recent “madeground” deposit (1101) over Natural clay (1102)

Plate 29: Trench 12. Overall view of trench from NW

Plate 30: Trench 12. Roadway (1202) beneath concrete slab (1200)

Plate 31: Trench 12. Floor (1223) and E wall of turntable pit. Looking NE

Plate 32: Trench 12. Floor (1223) and E wall [1204] of turntable pit. Looking N

Plate 33: Trench 12. Floor (1223) and E wall [1204] of turntable pit. Looking S

Plate 34: Trench 12. Inspection pit [1243] detail of floor [1215] and brick step [1221]

Plate 35: Trench 12. Inspection pits [1243 1244] Looking W

Plate 36: Trench 12. W end of Inspection pit [1244/1245]. Showing floor (1217) and walls [1209] and [1208] from N

Plate 37: Trench 12. Inspection pit [1243]. Looking S. Showing W end of pit, and metal pipe [1207]

Plate 38: Trench 12. Inspection pit [1243]. Looking N. Showing W end of pit, and metal pipe [1207]

Plate 39: Trench 12. Inspection pit [1243]. Looking W. Showing W end of pit, floor [1216] and step [1222]

Plate 40: Trench 12. Concrete layer [1203]. Looking NW showing rail chairs [1230]

Plate 41: Trench 12. Concrete base of turntable's central pivot. Looking N

Plate 42: Trench 12. W sidewall [1235] and floor [1223] of turntable

Plate 43: Trench 12. Overview of trench from E. Showing pivot base [1203] turntable floor (1223) and W turntable sidewall [1235]

Plate 44: Trench 12. Concrete cap (1233) with rail chairs [1234] from W

Plate 45: Trench 12. Concrete cap (1233) with radiating cuts [1232]

Plate 46: Bricks from backfill (1205) of turntable pit. Showing maker's mark

Plate 47: Section of turntable deck with rail from backfill (1205) of turntable pit

Plate 48: Air Raid Shelter from northeast

Plate 49: Detail of northern wall of Air Raid Shelter

Plate 50: Group photo of detached handles from 'GWR' teacups. Date ca. 1937-1943

Plate 51: Group photo of Great Western Railway (GWR) teacups with Art Deco-style decoration. Date ca. 1937-1943

Plate 52: Group photo of Great Western Railway (GWR) teacups with plainer-style inscription. Date ca. 1937-1943

Plate 53: Two saucers with plainer-style 'GWR' inscription. Date ca. 1937-1943

Plate 54: Dish rim with 'Great Western Railway Hotels' coat of arms and Art Deco-style leaf border. Date ca. 1937-1943.

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