

London 2012 Olympic Park

Enabling Works (Stage 1) Consolidated Validation Report

Planning Delivery Zone 1

January 2012

Notice

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Shape files shall be presented in the Stage II CVR

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PART I

1. Introduction

1.1 Scope

The aim of this Enabling Works Consolidated Validation Report (CVR) is to provide a high level commentary on the approved remediation related documentation pertaining to Planning Delivery Zone 1 (PDZ1). These remediation works were completed as part of the Olympic Delivery Authority (ODA) redevelopment of the London 2012 Olympic Park in Stratford, London. On the basis that the individual remediation reports have previously been approved by the Local Planning Authority (Olympic Delivery Authority Planning Decisions Team (PDT)) this Enabling Works CVR will not reproduce or re-evaluate any of the detailed testing, results, or assessments that have been previously reported and are contained therein.

This Enabling Works CVR has been prepared to fully discharge the ODA's obligation under Condition 35 of the Olympic, Paralympic and Legacy Transformation Planning Applications: Site Preparation Planning Application ⁽¹⁾.

1.2 Report Objectives

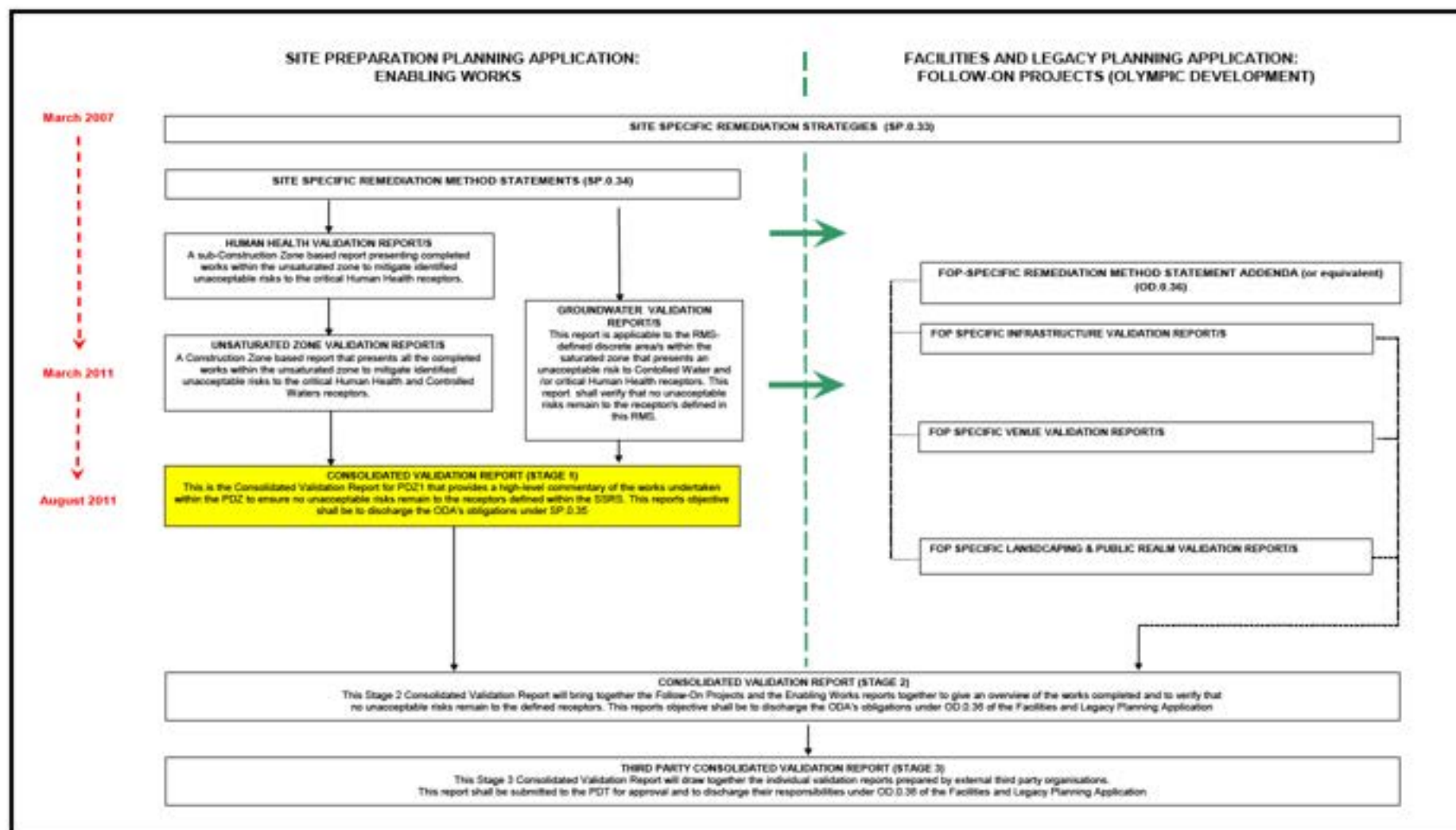
The focus of this report is to discharge the ODA's responsibilities under the relevant Planning Conditions in the following principal Planning Applications. The CVRs prepared by the ODA shall be issued to the PDT for approval in two stages to provide clarity and ensure progressive regulatory approval is achieved. This two stage process is set out as follows:

- **Stage 1** will comprise Part I (Background) and Part II (Implementation of Design – Site Preparation (Enabling Works)). Part I sets out the remediation works within the context of the preceding remedial design. Part II shall concisely discuss the implementation and validation works completed by the Enabling Works Team. The objective of this CVR (Stage 1) is to fully discharge the ODA's obligations under Condition 35 of the Olympic, Paralympic and Legacy Transformation Planning Applications: Site Preparation Planning Application ⁽¹⁾.
- **Stage 2** shall comprise only Part III (Implementation of Design – Olympic Development (Follow-on Projects)). Part III presents the completed construction and remediation works as required to facilitate the development aspects of the works i.e. infrastructure, venues and landscaping. The same CVR issued with completed Part III will be submitted to discharge the ODA's obligation under Condition 36 of the Olympic, Paralympic and Legacy Transformation Planning Applications: Facilities and Their Legacy Transformation Planning Application ⁽²⁾ and subsequent applicable Slot-In Planning Conditions relating to construction variations.

In certain instances the completion of the Human Health Separation Layer and other overlay / completion works will be carried out by external third party organisations, most notably the London Organising Committee of the Olympic and Paralympic Games (LOCOG). In such circumstances, it will be the responsibility of these third parties to prepare, submit and obtain PDT approval of their works by way of separate Validation Reports. As a consequence of these separate validation reports, it is currently envisaged that another CVR (**Stage 3**) will require submittal under Condition 36 of the Olympic, Paralympic and Legacy Transformation Planning Applications: Facilities and Legacy Transformation Planning Application. If such a Stage 3 CVR is required this will be prepared and submitted by one of these third party organisations.

The PDZ1 validation reporting sequence, presenting these three stages of Consolidated Validation Reporting, is illustrated in Table 1.1 below.

Table 1.1: PDZ1 Validation Reporting Structure



* Please refer to Appendix B for a summary of each report and the development of the remedial design, implementation and validation

1.3 Relevant Planning Conditions

The reporting boundary for this CVR is presented on Figure 1. The document is submitted to the PDT for approval to facilitate discharge of the Planning Conditions listed in Table 1.2 below.

Table 1.2 - Validation Related Planning Conditions to be discharged by this Report

Site Preparation Planning Application (No. 07/90011/FUMODA)		
SP.0.35	Remediation Validation	Stage 1 submitted for Discharge

1.4 Outstanding Works

There are no outstanding physical works remaining or reports awaiting approval in PDZ1 within the Enabling Works scope. However, the site wide Retained Areas Risk Assessment report is currently "in consultation" with the PDT and is still subject to approval. The latest version of the report has been used in this report.

1.5 Limitations/Exclusions

This CVR is based on third party information made available to the ODA from the sources listed as key supporting data and references and the information is assumed to be accurate and complete.

This CVR does not present new information or re-evaluate any of the data previously assessed within the approved documents summarised herein.

This CVR should be read in light of the legislation, statutory requirements and/or industry good practice applicable at the time of the works being undertaken. Any subsequent changes in this legislation, guidance or design may necessitate the findings to be reassessed in the light of these circumstances.

2. Basis of Remedial Design

The Enabling Works Project primarily comprised site clearance, demolition, earthworks and remediation works so as to deliver a platform upon which the infrastructure and venues for the London 2012 Olympic Park could be constructed. These works were implemented by the Enabling Works Tier 1 Contractor (BAM Nuttall Ltd (BNL)). The objective of the Enabling Works was also to ensure the site was remediated to a standard protective of both human health and controlled waters receptors as defined by the Olympic and Legacy Masterplans (see Section 2.2).

The Global Remediation Strategy (GRS) was prepared by Capita Symonds for the project as a high level roadmap that was further developed by the construction zone specific Site Specific Remediation Strategies (SSRS). In addition, the SSRS were informed by the investigation works completed in accordance with the Intrusive Investigation Method Statement (IIMS) that presents a framework and provides a generic specification for undertaking contamination intrusive investigations across the London 2012 Olympic Park. For the purposes of risk assessment and remediation, the PDZ1 Site Specific Remediation Strategies⁽³⁾ were divided into Construction Zone 1a (CZ1a) and Construction Zone 1b (CZ1b). This internal boundary between CZ1a and CZ1b was sub-divided as a result of vacant possession and construction programme. CZ1a and CZ1b was further sub-divided according to Legacy land use, Designer defined remediation areas and phasing of the works due to handover (to others) dates.

2.1 Site Location

PDZ1 comprises an elongate parcel of land, widening to the south with the River Lea adjacent to the northern tip, the Waterworks River forming the western boundary and railway lines forming the northern, eastern and southern boundaries. The Stratford City Development is present to the north and east, residential and commercial buildings are present to the south east and the Olympic Park Development is present to the south and west. The total area of the site is approximately 11 hectares and is presented in Figure 1.

2.2 Olympic and Legacy End Use

The Olympic and Legacy end use as defined by the Designers⁽³⁾ is:

Olympic Mode (Figure 2): Approximately two-thirds of the site will be used for the Aquatics Centre and Waterpolo with surrounding areas of hard and soft landscaping. Sections of the site have also been identified for use as roads or transport areas along with a head-house located in the southern section of the site.

Legacy Mode (Figure 3): The Aquatics Centre will remain in use as a legacy facility with the surrounding areas having been earmarked for a mix of land uses including: service corridor, residential mixed use (with no private gardens), soft landscaping and hard landscaping (including a road). The head-houses located in the southern section of the site are retained.

There have been no significant land use changes within PDZ1, for example, venue movements or changes in topography. In addition, the figures should be read in conjunction with Drawing SKE-ATK-XX-ZZZ-OLP-XXX-O-0003 (Sub Zone Remediation Areas (including areas anticipated as no remediation)).

2.3 Site History

The London 2012 Olympic Park has had an extensive industrial legacy of potentially contaminative land uses ranging from, but not limited to, petrol stations, glue factories, match works, uncontrolled landfills, garages and fish processing.

PDZ1 was identified to have experienced rapid industrialisation during the late 1800s / early 1900s with further expansion up to the mid 1900s. Heavy industrial activity continued until the mid to late 1900s, after which parts of the site were either demolished and remained undeveloped, or were occupied by light industrial / storage activities. Specific industrial processes and activities historically present on PDZ1 included: paint, fragrance and enamel works, potted meat works, soap works, sack and bag works, engineering works and chemical works, goods depot with associated rail infrastructure and vehicle salvage and maintenance⁽³⁾. Primary contaminants of concern identified are recorded in the respective SSRS.

2.4 Site Investigation

As part of the site investigation scoping exercise a review of the historical (and current) site usage via walkover surveys, review of trade directories, aerial photographs and pertinent environmental data sources were used to design a technically robust and pragmatic site investigation. This was resulted in several stages of site investigation and associated ground gas and groundwater monitoring/sampling being undertaken both prior to and as part of ODA redevelopment of the site. The exploratory holes carried out during the Site Investigation phase are presented on Figure 4 and summarised below in Table 2.1 (in terms of the stratum the exploratory hole was terminated), noting this excludes exploratory holes carried out during the remediation phase.

Table 2.1: Summary of exploratory holes in PDZ1 (during the Site Investigation Phase only)

Number & Stratum	Made Ground	Alluvium	River Terrace Deposits	Lambeth Group	Thanet Sands	Chalk
Exploratory Holes	125	2	47	38	17	11

2.5 Geology

In summary, the ground conditions encountered during site investigations carried out prior to and during the Enabling Works comprised Made Ground overlying Alluvium, which in turn overlay the River Terrace Deposits (RTD). The solid strata comprised the Lambeth Group overlying the Thanet Sand Formation, with the White Chalk present at depth. A more detailed description of each geological stratum is given in Table 2.2 below.

Table 2.2: Summary of PDZ1 Geology

Stratum	Generalised Description	Approximate Thickness Range (m)	Aquifer Classification
Made Ground	Dark brown, slightly clayey, sandy with gravel sized fragments of concrete, brick and flint, with chalk, clinker, slag and wood.	0.7 to 5.0	Not Classified
Alluvium	Soft to firm, grey mottled black clay/silt with occasional organic plant remains, occurring as discontinuous layers and lenses in some areas.	0.2 to 3.5	Non-Productive (Non)
River Terrace Deposits (RTD)	Variable composition consisting of sandy silt/clay, clayey sand and silty/clayey sandy gravel as a thin layer at the top, generally becoming granular and coarser with depth	0.5 to 6.0	Secondary (Minor)
	A peat layer was encountered in one location	0.5	
Lambeth Group	Various interbedded lithologies comprising laminated clays, silts and sands as well as loosely cemented gravel sized fractions.	9.5 to 17.5	Non-Productive (Non)
Thanet Sand	Dense to very dense, silty sand with occasional basal gravel	15.5	Secondary (Minor)
Upper Chalk	Micritic limestone with flint nodules and interbedded calcareous mudstone in the lower part of the Upper Chalk	(base not proven)	Principal (Major)

2.6 Hydrogeology

The SSRS⁽³⁾ classifies the ground directly underlying the site (understood to relate to the RTD) as a Secondary (Minor) Aquifer. The Thanet Sands are generally in continuity with the Chalk and are classed as a Secondary (Minor) aquifer, with the Upper Chalk classified as a Principal (Major) aquifer (see Table 2.2 above). Discontinuous water (referred to herein as perched water) within the Made Ground was encountered in discrete areas within PDZ1.

The Lambeth Group is generally considered to behave as an aquitard across the Olympic Park, limiting downward migration to the Thanet Sands and Upper Chalk, due to the presence of clays and silts of relatively low permeability interbedded with sand lenses of greater permeability.

Eight historic groundwater abstraction wells constructed into the Chalk, and therefore representing potential direct pathways for contamination into the Major Aquifer system, were suspected to be present in PDZ1^(3a).

2.7 Hydrology

The River Lea flows southwards along the north western tip of PDZ1 and the Waterworks River flows southwards along the western boundary of PDZ1.

2.7.1 Impoundment

The Impoundment Scheme is a British Waterways, London, led project involving the construction of additional locks to improve the navigation of the River Lea and its tributaries. The details and potential effects of the impoundment works on the River Lea, its tributaries and groundwater levels⁽⁵⁾. Principally, the study addressed two main areas:

- potential changes in contaminant migration pathways in the aquifers; and
- the increased risk of groundwater related flooding.

Given the impoundment scheme was completed in 2008, the Enabling Works in this zone was completed according to post-impoundment conditions. It was therefore required that further assessment of the interaction between the river and the shallow groundwater be undertaken to determine any changing conditions. This study concluded that there would be a theoretical „change point“ in surface water levels approximately 2.4km upstream of the Prescott Channel impoundment structure (adjacent to CZ5a and CZ6d). Downstream (south) of this change point, surface water levels would be increased to above the previous mid-tide river levels.

The study also concluded that river water levels adjacent to CZ1a will increase to mid-tide/high-tide levels by approximately 0.3m⁽⁵⁾. The Designers expected this to result in some recharge of river water into the superficial deposits on-site. It was also identified that any recharge into the superficial aquifer will result in a change in the groundwater flow regime with shallow groundwater tending toward an easterly direction. As a result of impoundment and the subsequent river level rises, this changed the shallow aquifer flow direction making the eastern, rather than the southern, compliance point the predominant receptor. This eastern receptor point was developed to protect off-site groundwater migration to the Chalk Aquifer, which was considered to be the most sensitive receptor.

3. Development of Remediation Design

In March 2007 White Young Green Environmental (WYGE) produced Site Specific Remediation Strategies (SSRSs) for CZ1a, CZ1a River Wall and CZ1b. The aim of these documents was to design a remediation strategy to practicably minimise the risks to the identified human health and controlled waters receptors⁽³⁾.

Given the risk assessment and remediation for PDZ1 was divided into CZ1a and CZ1b for vacant possession and construction programme purposes, the Conceptual Site Model (CSM) (see 2DD-WYG-CM-C1A-AQA-XXX-E-1016) had been derived based on these individual Construction Zones. The CSM outlined within the SSRS's presents the potential sources of contamination, sensitive human health and controlled waters receptors, and pathways representing pollutant linkages between the sources and receptors.

These SSRS documents used a two-tiered approach to risk assessment, incorporating Generic Quantitative Risk Assessment (GQRA) and Detailed Quantitative Risk Assessment (DQRA). GQRA was undertaken using screening values outlined in the Global Remediation Strategy (GRS), unless otherwise indicated. If ground conditions were found to exceed GQRA screening values, further assessment and DQRA was undertaken and Site Specific Assessment Criteria (SSAC) and Site Specific Remediation Targets (SSRTs) were derived. SSAC illustrate the individual contaminant concentrations protective of either controlled waters or human health and SSRTs are the chemical criteria above which remedial corrective action is likely to be required. Representative concentrations for soil and groundwater data were derived through statistical analysis and where this representative concentration exceeds the respective SSAC remedial action or further delineation was required^(3a, b & c).

The risk assessment process outlined in both the CZ1a and CZ1b SSRS's identified significant risks to both human health legacy and controlled waters receptors across PDZ1 that required excavation, treatment and/or further investigation/delineation^(3a & b).

The remedial design was developed in tandem with remedial works in PDZ1 as more data from further site investigation became available. In accordance with good practice and to ensure a robust CSM was maintained, the design documentation was further refined to ensure the remedial works were reflective of the encountered ground conditions. A summary of the eight principal changes to the conceptual site model design are presented within Appendix B. These changes primarily relate to changes to the controlled waters compliance point as a result of the collection of additional data.

Following on from the design, the Enabling Works Tier 1 Contractor – BAM Nuttall issued a series of Remediation Method Statements (RMS)⁽⁴⁾ to the PDT for their approval. These RMSs detail how the design will be implemented with the intention of;

- Supporting ground contamination management, including the basis upon which validation would be achieved;
- Summarising additional ground investigation data completed after approval of the SSRS (and subsequent SSRS Addenda) and assessing whether the additional information supported the existing CSM;
- Defining the extent of the remediation required by the current design;
- Providing an outline of the remedial measures proposed;
- Outlining the environmental monitoring procedures in place to protect against potential impacts from the works; and
- Discharge of the relevant planning conditions relating to ground contamination.

For validation reporting purposes the project developed a structured receptor-based approach to demonstrating compliance with the SSRS via the Human Health, Unsaturated Zone and Groundwater Validation Reports. This is schematically presented as a flow chart in Table 1.1.

3.1 Human Health Design

The remediation design allows for placement of a Human Health Separation Layer (HHSL) or hard standing in the proposed Olympic and Legacy end uses within PDZ1. These measures reduced the Human Health pathways such as dermal contact, ingestion and dust inhalation to acceptable levels^(3 & 4). The general remedial profile adopted across the Park is presented in Appendix A.

The placement of a minimum of 600mm HHSL (or less should hard standing be used) is designed to result in the underlying General Fill materials having to comply with less stringent remedial targets. The HHSL (the base of which is demarcated by a brightly coloured Marker Layer) and General Fill are required to be validated to demonstrate compliance with the Human Health and Controlled Waters Site Specific Assessment Criteria (SSACs).

The remedial strategy is based on a number of assumptions and/or limitations, which are further identified in Table 5.1 with the primary two assumptions being highlighted below:

- no private gardens or vegetable growing areas are proposed for Legacy end use thus reducing risks associated with the ingestion pathway; and
- incorporation of ground gas / vapour protection measures within the fabric of building structures reduces risks associated with the ingress of ground gas and / or vapour.

Given the remedial works have been completed based on the information contained within the remedial design, should the assumptions set out in these documents change then a re-assessment may be considered necessary.

3.2 Controlled Waters Design

The Lower Lea Valley Groundwater Model by Capita Symonds⁽⁵⁾ was used as the basis of controlled waters modelling within the CZ1a and CZ1b remediation strategies.

The Waterworks River and the Chalk Primary (Major) Aquifer were considered as the main controlled waters receptors since perched waters within the Made Ground are not considered to be „Controlled Waters“ under current legislation. The shallow aquifer was considered by the Environment Agency to represent a source and/or pathway for contaminants but not a receptor⁽³⁾.

Remediation of the RTD groundwater in CZ1a was proposed as a response to the identified relevant pollutant linkage whereby dissolved phase contamination and Light Non-Aqueous Phase Liquid (LNAPL) in the shallow groundwater within the RTD could migrate under natural hydraulic gradient into the Waterworks River and the notional eastern compliance point^(3a).

Unsaturated zone soils in CZ1a and CZ1b were impacted by varying levels of both inorganic and organic contaminants, which were considered to be the primary source of contamination. Vertical migration from these primary source contaminants of concern had impacted the underlying shallow groundwater within the RTD of CZ1a with LNAPL and dissolved phase organic contamination, thereby creating a secondary source of contaminated shallow groundwater. The secondary source presented a potential risk to the Waterworks River and also resulted in an expanding plume of contamination extending horizontally within the RTD⁽⁶⁾.

The primary objectives of the remediation design specified in the SSRS and RMSs in CZ1a and CZ1b were as follows^(3 & 4):

- excavation of unsaturated soils (including hotspots) and its replacement with chemically acceptable backfill materials (as defined by the Designers SSAC⁽³⁾);
- construction of a sheet pile river wall with sealed clutches to prevent migration of contamination from the RTD directly into the adjacent Waterworks River; and
- Groundwater treatment of dissolved phase hydrocarbons and LNAPL in CZ1a RTD to achieve the following remedial goals:
 - reduction in the contaminant mass and concentrations of the contaminants of concern within the RTD groundwater by active removal of LNAPL, gross hydrocarbon contamination sources and reducing contaminant mass in groundwater; and

- betterment of groundwater quality within the RTD through the direct application of an in-situ oxygen releasing substrate to assist natural attenuation in the medium to long term.

PART II

4. Implementation of Design – Site Preparation (Enabling Works)

4.1 Summary of Works Undertaken

Remediation works within PDZ1 began in May 2007 on the basis of the WYGE SSRSs and the remedial design developed as the remediation works progressed (as discussed above). The scope of Enabling Works was completed in early 2010. A detailed summary of all changes to the remedial design is available within the approved PDZ1 RMS and Validation Reports, which are summarised in Appendix B.

4.1.1 Significant Land Use Changes

There have been no significant land use changes within PDZ1 that has varied the legacy end use from that defined within the respective SSRS.

4.1.2 Hotspots

Table 4.1: Number of Unsaturated Zone Defined Hotspots (presented in the SSRS & RMS) in PDZ1

Document	No. of hotspots	Comments
Site Specific Remediation Strategies (including subsequent addenda)	CZ1a: 11	As the SSRS design developed, a total of 11 defined areas (unsaturated zone) were identified requiring remediation
	CZ1b: 6	-
Remediation Method Statement (including subsequent addenda)	CZ1a: 12	During remedial works an additional hotspot (an extension area bridging 'Rem Zones' 2, 3 and 4) was identified and agreed to require remedial excavation
	CZ1b: 6	-
Validation Reports	CZ1a: 12	-
	CZ1b: 6	-

NB: Hotspot numbers are not cumulative

In total, there were 12 controlled waters hotspots identified in the unsaturated zone within CZ1a and 6 within CZ1b. There were no hotspots identified that were considered to pose an unacceptable risk to Human Health. Further details regarding the hotspot development are provided in the Unsaturated Zone Validation Report⁽⁷ⁿ⁾.

4.2 Unsaturated Zone (Combined Health Health and Controlled Waters)

A total of 12 SSRS/RMS defined remediation zones were excavated and validated within PDZ1. In addition to these SSRS/RMS defined hotspots; there were a number of outliers recorded as part of the chemical validation testing of backfill materials to demonstrate compliance. These outliers were then subsequently delineated, removed, validated and backfilled with complaint materials. In the limited number of cases where this was not the case, due to agreements with the Follow On Projects, these are recorded in Table 5.1 and Figure 10.

In total approximately 146,000m³ of unsaturated soil was removed during Enabling Works, of which approximately 80,000m³ was from hotspots / remediation zones and the remainder was as part of the general earthworks⁽⁷ⁿ⁾. The Enabling Works sub grade level is presented on Figure 5.

A total of approximately 130,000m³⁽⁷ⁿ⁾ of chemically acceptable general fill (below the marker layer materials) was placed The Enabling Works sub-formation level is presented on Figure 6.

A total of approximately 45,000m³ chemically complaint HHSL was placed over a brightly coloured Marker Layer comprising orange Terram geotextile⁽⁷ⁿ⁾. The Marker Layer serves as a visual indication of the boundary between underlying general fill and / or in situ soils and „cleaner“ overlying HHSL materials. The Enabling Works Formation Level is illustrated on Figure 7 and the extent of Marker Layer and thickness of HHSL is illustrated on Figure 8.

It was agreed in certain circumstances that the thickness of/or presence of the HHSL/marker layer can be varied to suit the incoming Follow-on Projects scope of works. These agreements were made to facilitate earlier workings and for the benefit of the Programme. Such circumstances were discussed and formally agreed with the incoming Project Team, which are detailed in the specified Validation Reports and presented in Figure 8.

4.2.1 Victorian Wells

Additional ground investigations were undertaken at the site to confirm the location of suspected Victorian abstraction wells which had been identified from historical maps and thought to extend into the Chalk. Seven locations in CZ1a and one location in CZ1b were identified as being potential locations. Each location was investigated by reference to the survey drawings and excavation into the Alluvium. Only one well was positively identified and decommissioned in accordance with the Environment Agency guidance and project protocols. This decommissioning protocol was also applied for the boreholes installed to derive the CSM and for validation purposes⁽⁷ⁿ⁾.

4.3 Saturated Zone

4.3.1 Installed Sheet Piled Walls

The historic river wall along the Waterworks River was replaced with a new sheet pile wall founded into the underlying relatively impermeable Lambeth Group. This wall separated the Waterworks River from the landward River Wall Zone. This was not sealed or clutched and ran along the majority of the CZ1a river frontage. The second clutched-sealed sheet pile wall between the River Wall Zone and the CZ1a site was installed to intercept the pathway between the RTD groundwater and the most critical controlled water receptor, the Waterworks River^(4b & 7n). The installation of this wall had the effect of increasing the RTD flow path within the shallow groundwater into the Waterworks River receptor and changing the groundwater flow direction to the south. This then allowed the controlled waters SSAC to be re-calculated to be protective of the revised Waterworks River compliance point located beyond the southern site boundary and the notional eastern compliance point representing the Principal Chalk Aquifer⁽⁶⁾. Pump tests were completed at several locations along the length of the wall which proved its hydraulic integrity.

In addition, existing drains/culverts discharging into Waterworks River were appropriately decommissioned, sealed and/or removed and new outfalls installed⁽⁷ⁿ⁾.

4.3.2 Area 1

In Area 1 (see Figure 11), LNAPL and dissolved phase petroleum hydrocarbon (toluene, ethylbenzene and xylenes) concentrations above the SSAC were identified in the RTD⁽⁶⁾. Groundwater exceedances relative to the SSAC were also identified for polycyclic aromatic hydrocarbons (PAHs) and hydrocarbons, however these contaminants were not considered to be a contaminant of concern following agreement with the Environment Agency to screen against environmental quality standards (EQS) rather than the more conservative groundwater assessment criteria (GWAC) used by WYGE in the SSRS^(3 & 4h).

Excavation of hot spots in Made Ground and saturated RTD (approximately 6,750m³) materials impacted by LNAPL was undertaken in Area 1 to remove the primary source, whilst RTD groundwater impacted with LNAPL and dissolved phase contamination was pumped from sump collection points within the excavation^(4g & 7m).

Dissolved phase hydrocarbon contamination was also abstracted from selected boreholes during excavation. Ex-situ treatment of abstracted groundwater comprised separation of the DNAPL followed by off-site disposal to a suitably licensed facility and filtration through granular activated carbon followed by disposal to foul sewer. Oxygen Releasing Compound (ORC) were also injected into the RTD to enhance biodegradation of dissolved phase hydrocarbon contamination⁽⁷⁾.

4.3.3 Areas 2, 3 and 4

In Areas 2, 3 and 4 (see Figure 11) concentrations of dissolved phase aliphatic and aromatic petroleum hydrocarbons and chlorinated solvents (1,2-dichloroethane and vinyl chloride) were identified above the SSAC within the RTD groundwater and LNAPL was identified within the RTD groundwater in Area 2.

In Areas 2, 3 and 4 the Made Ground outlier locations were removed, but the RTD was left in place and in-situ measures were taken to reduce risks from LNAPL and dissolved phase contamination. In Area 2 a Dual Phase Vapour Extraction (DPVE) system was installed to recover LNAPL from the saturated RTD with ex-situ treatment (using an oil water separator and granular activated carbon filter) prior to disposal and a qualitative risk assessment was produced for the residual non-mobile LNAPL^(4d & 7k). ORC injection into the RTD to enhance biodegradation of dissolved phase hydrocarbon contamination was also undertaken in Areas 2, 3 and 4^(6 & 7).

4.4 SSRS Groundwater Monitoring

Groundwater monitoring has been undertaken for a number of purposes with different monitoring and sampling requirements. One of these groundwater monitoring strands („Validation“) aims to validate the remediation works by monitoring/sampling the underlying aquifers within this PDZ before, during and after the bulk remediation works. This requirement originated from the SSRS, where the Designers required the groundwater data gathered as part of the Enabling Works to be assessed to determine the presence or absence of any adverse effects. As such, this data has been utilised as a line of evidence to demonstrate the aquifers conditions within the PDZ has not significantly deteriorated from the conditions at pre-commencement (of earthworks) phase⁽⁷ⁿ⁾.

Exploratory locations were installed as monitoring wells into the underlying geology, with specific reference to the RTD and Chalk, to record the hydrogeological conditions. The hydrogeochemical data collected prior to, during and following completion of the remedial works has shown there to be no consistent upward trend. It is on this basis that these monitoring wells were appropriately decommissioned in line with Project Documentation⁽¹¹⁾ (which is based on Environment Agency guidance) prevailing at the time as reported in the applicable unsaturated zone validation reports⁽⁷ⁿ⁾.

4.5 Other Matters

4.5.1 Non Remediated Areas

A number of discrete areas within PDZ1 have been retained across the Olympic Park in accordance with approved Planning Application conditions and/or due to operational constraints. Within these areas full site investigation coverage has not been possible due to the presence of a particular features that must be retained. Typical retained features include retained buildings and services, third party boundaries, retained roads and other areas of hardstanding, batter exclusion zones and areas of retained vegetation (either confirmed or aspirational). These discrete areas in PDZ1 are discussed further in the Validation Reports⁽⁷⁾ and are presented on Figure 9

To further support these non-remediated areas, the Designers have submitted a site wide retained areas risk assessment report⁽⁸⁾ to the PDT for the approval. This report qualitatively assesses potential risks to human health and controlled waters arising from potentially contaminated land beneath those areas. The assessment considers the nature of the retained features, possible contamination present in the nearby area, and the final land use and receptors. Relevant extracts from the latest Retained Areas Risk Assessment Report are presented in Appendix D.

4.5.2 Unexploded Ordnance

An Olympic Park wide risk assessment for German air-dropped unexploded ordnance (UXO) was conducted by BAE Systems in advance of the project⁽⁹⁾, together with a CZ1a site specific study⁽¹⁰⁾. The objectives of these documents were to assess the potential to encounter UXO during the project, to evaluate implications of such an occurrence and to determine whether risk mitigation measures would be necessary.

Eight UXO were dealt with during the PDZ1 remediation works, which are further discussed in the Unsaturated Zone Validation Report. Whilst the majority of items encountered were deemed to be Explosive Ordnance (EO) Scrap, given the site location (East London) and history it would be considered appropriate that subsequent incumbents are cognisant of the potential to encounter further items of UXO.

It should also be noted that several ordnance related items were removed from the Waterworks River prior to Enabling Works and there was considered to a high risk of encountering further items in the watercourse should specific activities such as dredging or site investigation be required. However as this area is outside the CZ1a and CZ1b boundary, it is included for information purposes only and not considered further in this report⁽⁷ⁿ⁾.

4.5.3 Pathogens

Pathogens were analysed in specific locations where the site history, presented in the SSRS, indicated the use, production or burial of animal based products. Whilst there was no visual identification of animal remains during the earthworks in these discrete areas, a precautionary approach was adopted and soil samples were collected from the subgrade and excavated arisings were scheduled for pathogen analysis. All analytes were recorded as below the identified SSAC⁽⁷ⁿ⁾.

4.5.4 Radiological Material

The SSRS did not identify any risk of radiological contamination and field observations did not present any evidence to suggest the potential presence of radiological material⁽⁷ⁿ⁾.

4.5.5 Unexpected Contamination

No unexpected contamination was identified within PDZ1, unless otherwise stated in Section 4.5.4.

4.5.6 Methodology for Assessing Asbestos

The assessment for asbestos and criterion in the HHSL and the below marker layer materials was further developed as the works progressed. This development gave rise to a Site Wide SSRS that revised the SSACs and its assessment methodology^(3g).

4.6 Sampling and Analytical Testing

TES Bretby, or ESGL as they are currently known, was selected to undertake the chemical analysis of the soils and groundwaters at their off-site laboratory. Bretby's Method Detection Levels were generally able to detect the determinands listed in the SSRS and are suitably accredited through MCerts and UKAS (where appropriate). Further details pertaining to the sampling strategy and frequency are presented in the respective Unsaturated Zone Validation Reports⁽⁷ⁿ⁾.

The Planning Application required all validation samples to be collected in-situ. However, in order to reduce the potential for placing non-compliant soils (general fill and separation layer) whilst maintaining programme, Enabling Works commissioned an on-site chemical laboratory and used field analytics to aid real-time decision making on soil reuse through further characterisation. The on-site chemical laboratory was UKAS accredited (where appropriate) for the main chemical tests on soils. However, these results were not typically utilised in the validation reporting, although they were occasionally used as a secondary lines of evidence.

The frequency of sampling and testing for hotspots, subgrade and backfill materials (general fill and separation layer quality materials) were undertaken to acceptable standards in accordance with the Site Preparation Planning Application.

4.7 Waste Management

The Enabling Works in PDZ1 was completed under Olympic Development Authority (ODA) Environmental Permit (issued as a Waste Management Licence) for the south Olympic Park [Reference: EAWML80790 and subsequent Notice of Variation, Modification Number: M0597]. This Environmental Permit enables the ODA to use site-won materials, suitable for use after treatment, but classified as either hazardous or non-hazardous waste, to be used as fill to create the landform required for the redevelopment. This Environmental Permit enables the placed materials to be "recovered", and as such they cease to be a waste, which minimises disposal to landfill and serves a useful purpose in replacing materials that would otherwise have had to be imported to construct the scheme.

The permit also covers the import and use of waste materials from an alternative source whose works are directly associated with the potential Olympic Park redevelopment. These fill materials can be utilised where they are deemed suitable for use and a need for these materials has been demonstrated. „Suitable for use" will be proved in accordance with the Memorandum of Understanding (MoU) which is an agreement between the ODA and the Environment Agency covering Waste Licensing Issues. The ODA will seek to discharge this upon approval of the Stage II CVR.

4.8 Health, Safety and Environment

Remediation works were completed in accordance with Construction (Design and Management) (CDM) Regulations. As CDM Co-ordinator, Arup were responsible for producing the Health and Safety file for PDZ1, in conjunction with the Contractor, Project Manager and Client. A Permit to Work system was in operation for the duration of remediation works. Staff wore suitable Personal Protective Equipment (PPE), with gloves, helmets, boots, eye protection and hi-vis clothing required at all times as a minimum. Environmental monitoring comprising fugitive emissions, air quality, noise, dust (including PM10), nitrogen dioxide and odours was carried out at the site throughout the works, which were progressively presented on a monthly basis in the Tier 1 Environmental Monitoring Monthly Reports⁽⁷ⁿ⁾.

5. Conclusions

The PDZ1 Validation Reports⁽⁷⁾ conclude that neither the soils nor groundwater pose an unacceptable risk to the SSRS defined critical controlled waters and human health receptors. It is on this basis that this PDZ1 Consolidated Validation Report seeks to discharge the ODA's obligations under Condition 35 of the Site Preparation Planning Application.

It is the responsibility of the Follow On Project that, as a minimum, they complete the separation layer to a thickness of no less than 600mm, unless otherwise agreed with the PDT. The incoming Project Teams shall be cognisant of the SSRS underlying assumptions of the SSRS and the items noted in Section 5.1 and Table 5.1 below.

5.1 Further Work

Table 5.1 records the outstanding physical works that were within Enabling Works scope that has been transferred to the Follow On Projects to complete and validate (see Figure 10) and restrictions on future works. This table seeks to update similar tables presented in the individual Validation Reports referenced herein⁽⁷⁾.

In addition, Table 5.1 records some key aspects for the Follow On Projects to consider as part of their works. This table does not in anyway alleviate the incumbent Project Teams from complying with the full requirements of the remediation documentation, their legal, regulatory and contractual obligations.

Table 5.1: Outstanding Works transferred to the Follow On Project, Restrictions on Future Works and some key aspects for the Follow On Projects to consider as part of their works

No.	Title	Description	Action By
1	<i>Potential removal of sub-grade with asbestos concentrations >0.1% w/w (wet weight)</i>	<i>Asbestos concentrations in the sub-grade have been identified at >0.1% w/w. Confirmation has now been received from the OPLC that no further works are required in this respect. on the basis the pathway to human health has been intercepted by the overlying general fill and/or separation layer.</i>	- <i>(this action has now been closed)</i>
2	Removal of temporary fill placed in the River Wall Zone	Temporary material was placed in the river wall zone to protect the integrity of the erosion protection layer beneath it and to support the river edge sheet piles in their temporary condition. This will require removal and (if required) replacement with suitably compliant materials. Alternatively it should be sampled and verified should it be considered necessary to leave it in-situ.	Follow on Project
3	Placement of marker layer	The area where marker layer has been placed during Enabling Works is presented on Figure 8. Future contractors are to complete the marker layer where not present over remediated areas or obtain agreement from the PDT to its omission.	Follow on Project
4	Placement of additional separation layer over remainder of site and provision of survey plans of final separation layer	The Follow-On Project are required to provide survey plans within two months of completion of the entire (minimum 600mm thickness) separation layer to demonstrate to the PDT an acceptable thickness of separation layer. These survey plans should also identify any areas where the marker layer is not laid. Where Enabling Works has placed separation layer in excess of 300mm thickness, only the upper 300mm below EWFL is to be included within the minimum 600mm final thickness. Reference will be required to Figure 6, 7, 8 & 9 for the survey of the separation layer, the EWFL the extent of marker layer placed during Enabling Works and the non-remediated area drawing.	Follow on Project
5	Suitable infrastructure design	Structures should be designed recognising the chemical and other characteristics of the stratum in which they are founded. Sections in contact with potentially contaminated materials may need to be resistant to chemical attack, particularly by sulphates.	Follow on Project

Table 5.1: Outstanding Works transferred to the Follow On Project, Restrictions on Future Works and some key aspects for the Follow On Projects to consider as part of their works

No.	Title	Description	Action By
6	Incorporation of vapour protection to building structures	The SSRS specified that the incorporation of land gas / vapour protection measures within fabric of building structures was one of the key remediation / mitigation measures for the site. Specific measures are subject to detailed design.	Follow on Project
7	Maintenance of Riverwall cut off	Cut off provided by sheet piles, sealant, geo-membrane, anchorage and associated works to be maintained to ensure integrity. Any openings or breaches are to be sealed to Designers approval ⁽³⁾ for river wall installation as built	Follow on Project
8	Protection of monitoring installations and facilities	Undertake any required measures to protect monitoring and groundwater remediation installations and facilities at the Site. Any damage to such installations or facilities is to be reported to the Permit to Proceed Team as soon as practicable so that remedial works / decommissioning (as appropriate) can be undertaken.	Follow on Project
9	Final validation report	<p>The Follow-On Projects are required to issue and gain approval of final validation report on completion of their works to PDT within 2 months. Liaison shall be with the CLM SiteWide Validation Team. The Follow On Project shall specifically confirm the following:</p> <ul style="list-style-type: none"> Evidence that the separation layer placed by Enabling Works has been removed in the areas shown on the hand annotated drawings 7060-SBH-H08-C-SKE/7000/X01 and 6001-AQC-BSM-W-SKE-0465-Rev P01 included within the CZ1a Aquatics (Main Site 1a) Area Human Health Validation Report Addendum (REP-ENL-CK-01a-OLP-SP1-E-0225). Evidence that the separation layer placed by Enabling Works has been removed in the areas shown on the hand annotated drawings 6001-AQC-BSM-W-SKE-0465-Rev P01 included within the Human Health Report for CZ1b (Excluding Late Access Areas) (REP-ENL-CK-01b-OLP-SP1-E-0146). Evidence shall be provided that confirms construction of the H08 approach embankment in line with the design. This shall also confirm removal of the separation layer associated with sample N01b-FVP001-083101 as part of the works. This is further discussed in the Addendum to the Human Health Validation Report for Riverwall Zone and North of Marshgate Lane (REP-ENL-CK-01Z-OLP-SP1-E-0305). 	Follow on Project

Table 5.1: Outstanding Works transferred to the Follow On Project, Restrictions on Future Works and some key aspects for the Follow On Projects to consider as part of their works

No.	Title	Description	Action By
10	Excavation of soils at the Site	<p>The Permit To Proceed Protocol (Appendix E) must be implemented for all below ground works. Arisings from excavations shall be treated as contaminated unless proven otherwise.</p> <p>A review of available data relating to the condition of the soils at the Site should be undertaken prior to any excavation and appropriate precautions must be undertaken.</p> <p>The Validation Reports prepared by Enabling Works base their assessments on long-term risks to the end-user assuming the Legacy end use stated in the SSRS and does not consider risks to construction or maintenance workers when validating the site. It is considered that following an appropriate risk assessment, any risks to construction workers can safely mitigated through PPE and suitable engineering precautions. Reference should also be made to the Health & Safety File.</p>	Follow on Project(s) / Future land owners
11	Risk assessments	<p>In addition to risk assessments outlined above regarding excavation of soils at the Site, appropriate risk assessments would need to be undertaken with respect to UXO, pathogens, asbestos and ground gas/vapours when undertaking construction activities at the Site.</p>	Follow on Project(s) / Future land owners
12	Restrictions to remediation	<p>Restrictions exist in discrete areas of PDZ1 as presented on Figure 9 and referred to in Item 9 of Table 5.1.</p> <p>If these areas are developed in the future an assessment may be required to determine if further remediation is required. In the meantime, any construction adjacent to these areas should consider available evidence from samples at the limits of the remediation works. It should be noted that during the Enabling Works, additional control measures, including an increased level of PPE (and RPE), were employed during any excavation in this area.</p>	Follow on Project(s) / Future land owners

Table 5.1: Outstanding Works transferred to the Follow On Project, Restrictions on Future Works and some key aspects for the Follow On Projects to consider as part of their works

No.	Title	Description	Action By
13	Future land use	<p>Any future uses of the Site must comply with the SSRS definition and therefore must not involve construction of private gardens. The areas designated for different land uses shall not be amended without reassessment of the soil conditions.</p> <p>The Site shall not be used for growing edible crops or private gardens.</p> <p>Any future uses of the Site will require a detailed vapour / gas design which may include the installation of land gas protection measures if any future buildings / enclosed spaces are to be constructed on the site. The requirement for gas / vapour protection measures shall not be amended without reassessment of the site conditions and acceptance by PDT.</p>	Follow on Project(s) / Future land owners
14	Future Services	Appropriately resistant / sealed utility corridors shall be constructed as per the SSRS ⁽³⁾	Follow on Project(s) / Future land owners
15	Maintenance of river wall cut off	<p>The river wall cut off must be maintained. In particular, attention is drawn to the requirements identified on Figure 2DD-ATK-CW-01Z-WAT-RWA-E-0001⁽³⁾ such as:</p> <ul style="list-style-type: none"> • Lightweight fill only to be used above river wall. • Seal any pipes or openings made in the river wall. <p>Strengthen any such pipe entry or other opening with a suitable collar.</p>	Follow on Project(s) / Future land owners
16	Changes in final level	Any changes to final levels may require a reassessment of the underlying soil and potentially additional investigation or remediation. Levels used for the Enabling Works remediation were designed on the basis that a minimum 600mm thickness of human health separation layer will be installed.	Follow on Project(s) / Future land owners
17	Rate of infiltration/recharge	The Follow-On Projects/Future incumbents are required to comply with the infiltration / recharge requirements specified in the SSRSs ⁽³⁾	Follow on Project(s) / Future land owners

6. References

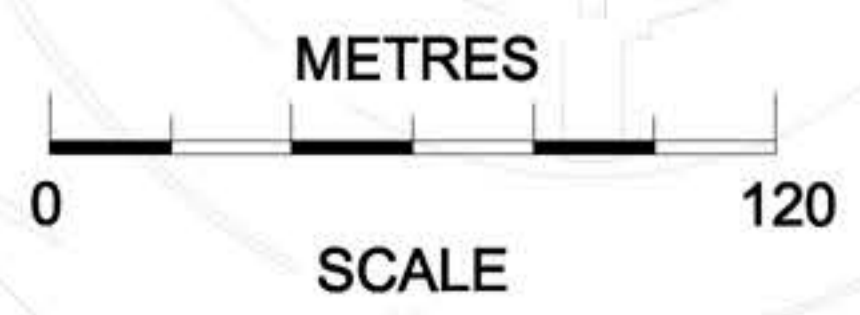
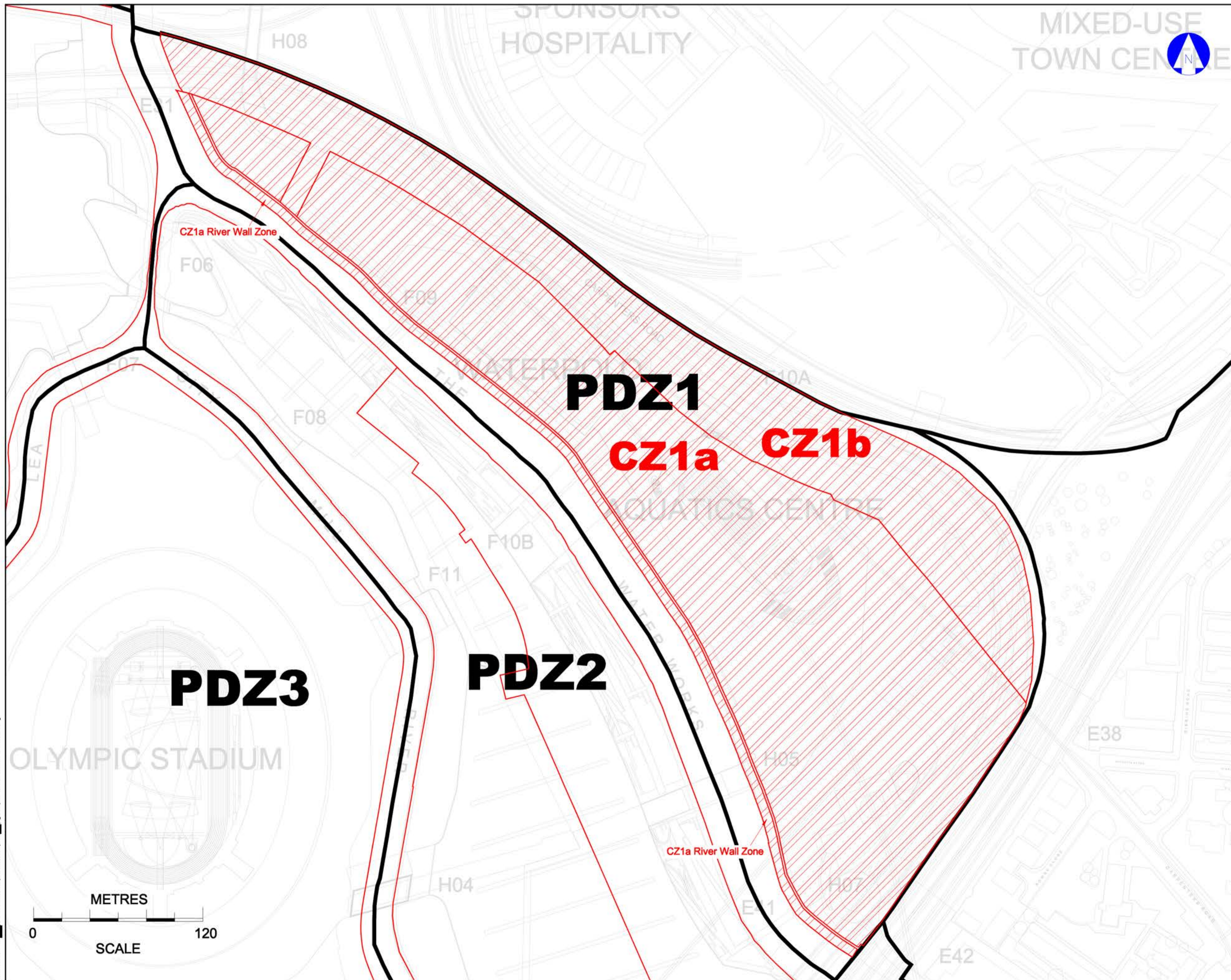
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3. Site Specific Remediation Strategies (SSRS):
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FIGURES

- Figure 1: Location of Planning Delivery Zone 1
- Figure 2: Olympic End Use for Planning Delivery Zone 1
- Figure 3: Legacy End Use Planning for Delivery Zone 1
- Figure 4: Site Investigation Locations for Planning Delivery Zone 1 (A0)
- Figure 5: Sub Grade Level for Planning Delivery Zone 1 (A0)
- Figure 6: Sub Formation Level for Planning Delivery Zone 1 (A0)
- Figure 7: Enabling Works Formation Level for Planning Delivery Zone 1 (A0)
- Figure 8: Extent of Marker Layer and Human Health Separation Layer for Planning Delivery Zone 1
- Figure 9: Non Remediated Areas within Planning Delivery Zone 1
- Figure 10: Summary of Exceedances requiring Action by Follow On Projects
- Figure 11: Sheet 1: Enabling Works Validation Reporting Areas for PDZ1 (Unsaturated Zone)
Sheet 2: Enabling Works Validation Reporting Areas for PDZ1 (Groundwater)



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DO NOT SCALE THIS DRAWING.



- LEGEND
- PLANNING DELIVERY ZONE BOUNDARIES
 - CONSTRUCTION ZONE BOUNDARIES
 - AREA OF SITE WITHIN PDZ1

NOTES

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH SKE-ATK-XX-ZZZ-OLP-XXX-O-0003 AND FIGURE 9 NON-REMIEDIATED AREAS WITHIN PDZ1



02	Additional note as per A03e comments	25-10-11		
01	Assembled based on A03e comments	28-09-11		
00	First Issue	24-01-11		
Rev	Description	Drawn	Chk'd	Date

Client
OLYMPIC DELIVERY AUTHORITY
23rd Floor, 1 Churchill Place, Canary Wharf, E14 5LH

Organisation
bam nuttall

Project Title
OLYMPIC PARK ENABLING WORKS

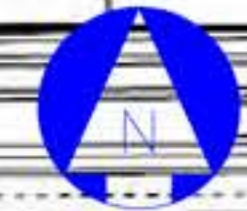
Drawing Title
Figure 1: Location of Planning Delivery Zone 1 (PDZ1)

OLYMPIC GRID

Drawn	Checked	Approved
Scale (A1)	Date	Status
1:1250	24/01/11	Information

Work Instruction No: W/ZZZ/068
Drawing No: 2DD-ENL-CK-ZZZ-OLP-SP1-E-0346
Rev: 02

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Stratford International

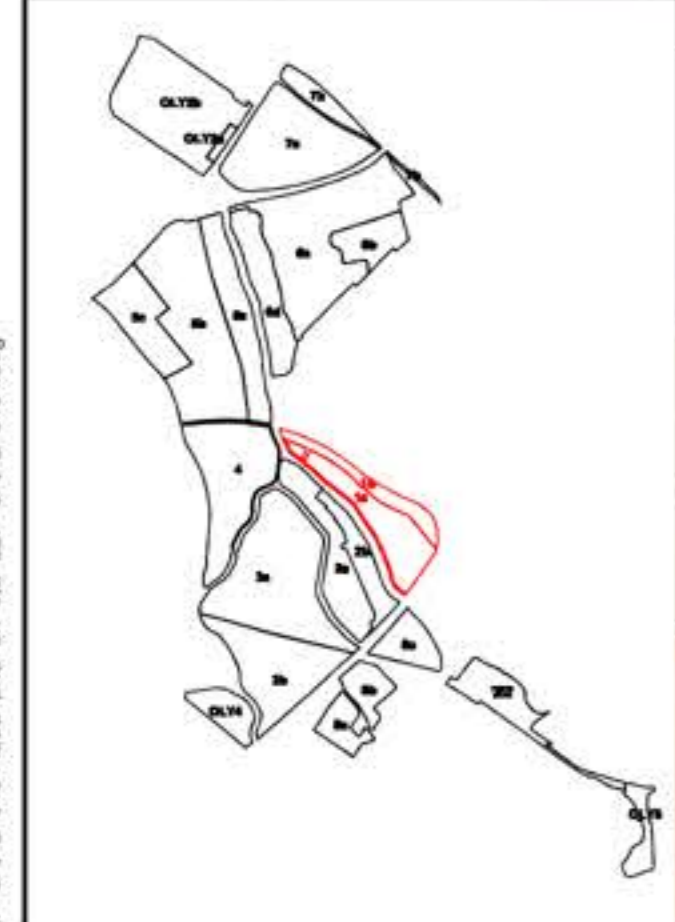
STRATFORD MIXED-USE TOWN CENTRE

SPONSORS HOSPITALITY

H08

ACCREDITATION CHECKING

- LEGEND**
- PLANNING APPLICATION SITE BOUNDARY —
 - SECURITY FENCES - - -
 - PLANNING PARAMETERS - - - - -
 - CTRL - - - - -
 - UTILITY SERVICE CORRIDORS - - - - -
 - HED MAIN STADIUM PODIUM - - - - -
 - RIVER + CANAL (WATERWAYS) —
 - PROPOSED INTEGRATION ZONE A —
 - FIELD OF PLAY —
 - ATHLETES AREAS —
 - BROADCAST AREA —
 - SPECTATORS AREAS —
 - FRONT OF HOUSE —
 - BACK OF HOUSE —
 - POTENTIAL BACK OF HOUSE - - -
 - ACCREDITATION CHECKING —
 - UTILITIES —
 - TRANSPORT AREAS —
 - UNALLOCATED AREA —
 - WETLANDS —
 - PPR —
 - NATURE RESERVE —



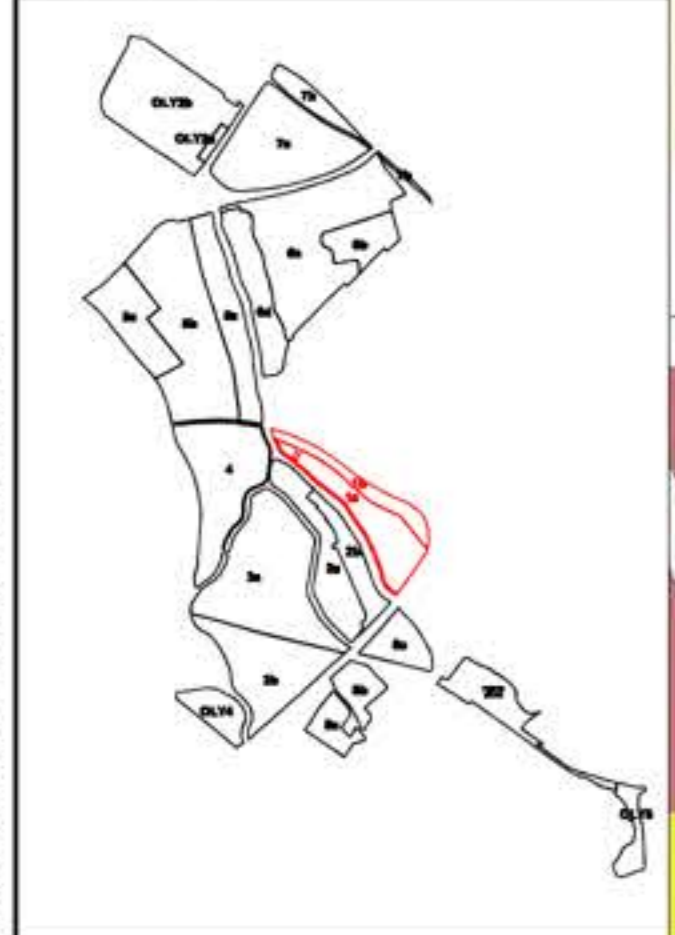
<p>00 First Issue</p> <p>Rev Description Drawn CH/1 Date 02/06/09</p>	<p>© Olympic Delivery Authority (ODA), 2008. All rights reserved. Except as permitted by the Copyright, Designs and Patents Act 1988, no part of this document may be reproduced, stored, transmitted or distributed in any form or by any means, whether electronic, mechanical, by photocopy, recording or otherwise, without the prior written permission of a director. Except where otherwise expressly agreed in writing, the ODA shall have no responsibility or liability for any loss (direct, consequential or otherwise) which may arise from reliance on or use of this document or the information contained in it.</p> <p>DO NOT SCALE THIS DRAWING.</p> <p>NOTES</p> <ul style="list-style-type: none"> — PDZ1 Boundary - - - Internal CZ1a / CZ1b Boundaries 	<p>OLYMPIC GRID</p> <p>Client: OLYMPIC DELIVERY AUTHORITY 23rd Floor, 1 Churchill Place, Canary Wharf, E14 5LN</p> <p>Organisation: bam nuttall</p> <p>Project Title: OLYMPIC PARK REMEDIATION</p>	<p>Drawing Title: PDZ1 - OLYMPIC LAND USE (2012)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Design</td> <td>Checked</td> <td>Approved</td> </tr> <tr> <td>Scale (A1): 1:1250</td> <td>Date: 06/08/09</td> <td>Status: AS BUILT</td> </tr> <tr> <td colspan="3">Work Instruction No: W1ZZZ/033</td> </tr> <tr> <td>Drawing No: 2DD-ENL-CK-01Z-OLP-SP1-E-0484</td> <td colspan="2">Rev: 00</td> </tr> </table>	Design	Checked	Approved	Scale (A1): 1:1250	Date: 06/08/09	Status: AS BUILT	Work Instruction No: W1ZZZ/033			Drawing No: 2DD-ENL-CK-01Z-OLP-SP1-E-0484	Rev: 00	
Design	Checked	Approved													
Scale (A1): 1:1250	Date: 06/08/09	Status: AS BUILT													
Work Instruction No: W1ZZZ/033															
Drawing No: 2DD-ENL-CK-01Z-OLP-SP1-E-0484	Rev: 00														

CAD FILE: REF: W1ZZZ



LEGEND

PLANNING DELIVERY ZONE BOUNDARY	[Red line]
HARD LANDSCAPE	[Light green]
GREEN	[Light green]
ALLOTMENTS	[Light green]
RIVER/CANAL	[Blue]
EDUCATION	[Yellow]
EMPLOYMENT	[Purple]
PREDOMINANTLY EMPLOYMENT MIXED USE	[Red]
PREDOMINANTLY RESIDENTIAL MIXED USE	[Red]
PARKING	[Dark grey]
UTILITIES	[Green]
VENUES	[Green]
STRATFORD CITY	[Light green]
WETLANDS	[Light green]



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NOTES

- [Red line] PDZ1 Boundary
- [Red line] Internal CZ1a / CZ1b Boundaries

Client
OLYMPIC DELIVERY AUTHORITY
23rd Floor, 1 Churchill Place, Canary Wharf, E14 5LN

Organisation
bam
nuttall

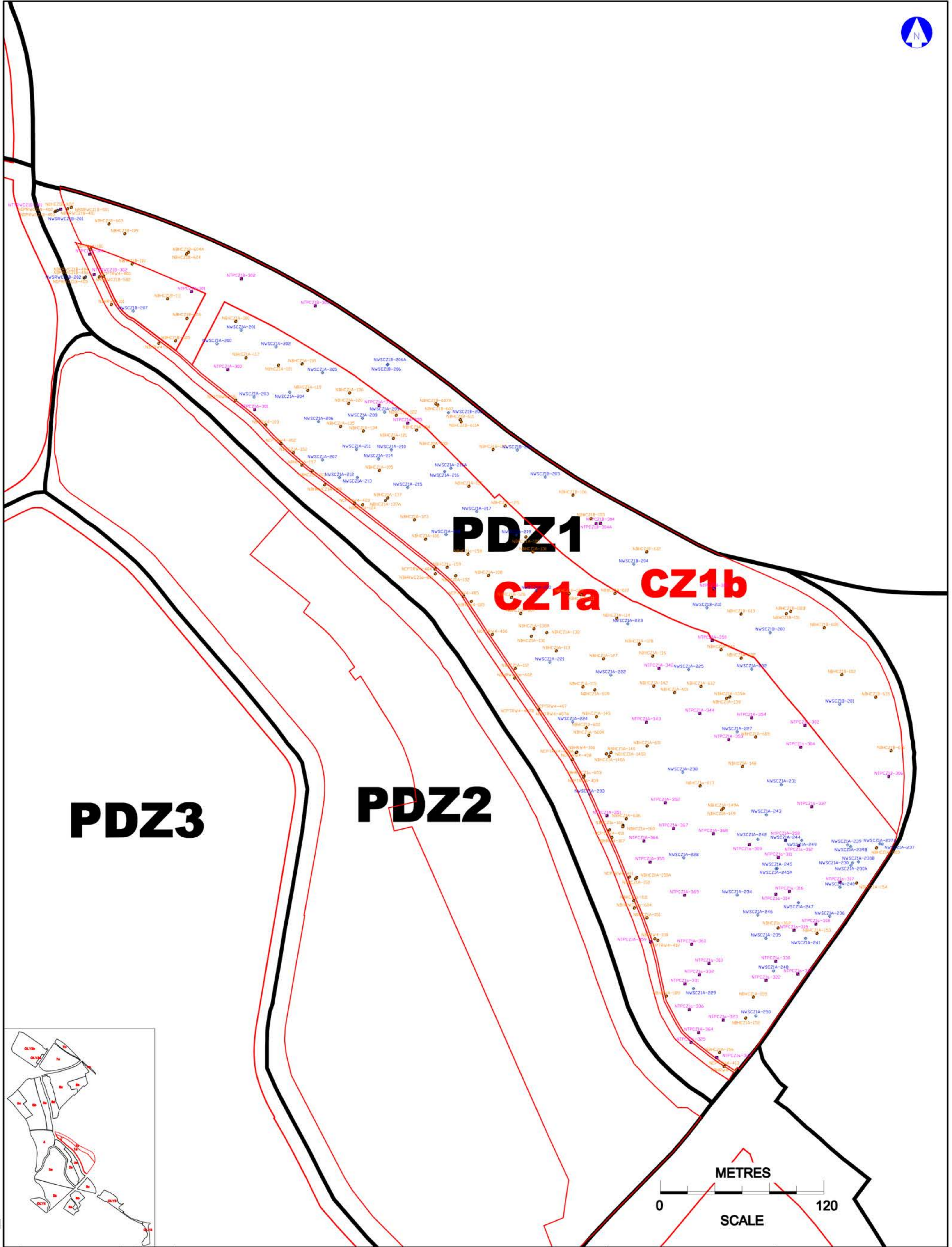
Project Title
OLYMPIC PARK REMEDIATION

Drawing Title		
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[Signature]	[Signature]	[Signature]
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1:1250	06/08/09	AS BUILT
Work Instruction No: W1ZZZ/033		
Drawing No.	Rev.	
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CAD FILE REF: W1ZZZ-033-2DD-ENL-CK-01Z-OLP-SP1-E-0483.dwg

00	First Issue	Drawn	CHK'd	Date
				02/08/09

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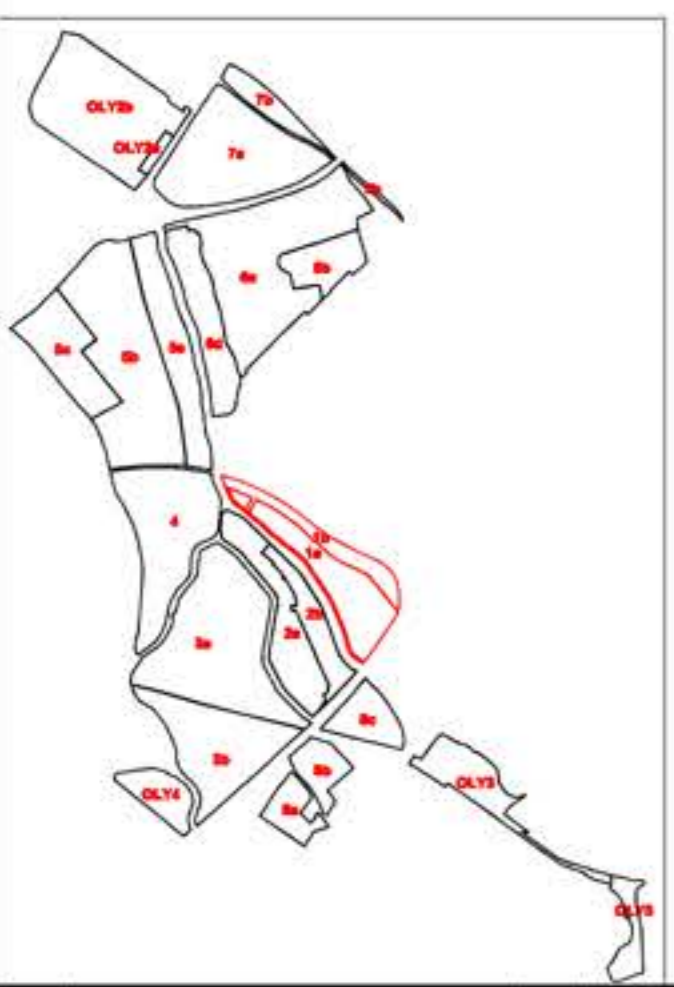
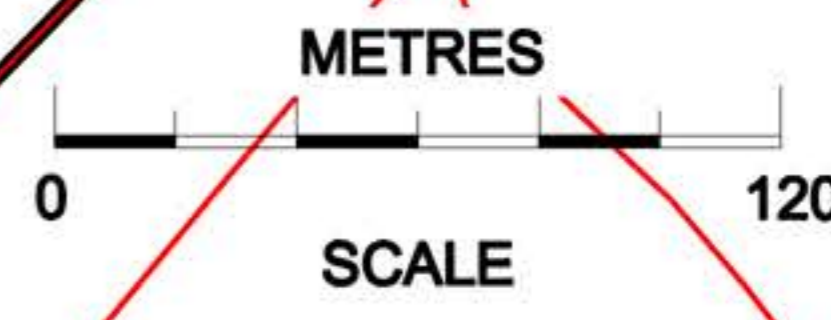
PDZ3

PDZ1

PDZ2

CZ1a

CZ1b



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- DO NOT SCALE THIS DRAWING.
- NOTES
- PLANNING DELIVERY ZONE BOUNDARIES
 - CONSTRUCTION ZONE BOUNDARIES
 - NBHCZ1a-110 BOREHOLE LOCATION AND ID
 - ⊕ NWSCZ1a-110 WINDOW SAMPLE LOCATION AND ID
 - NTPCZ1a-110 TRIAL PIT LOCATION AND ID

Rev	Description	Drawn	Chk'd	Date
01	Amended based on ABB's comments			28-10-11
02	Final Issue			24-01-11

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OLYMPIC GRID

Client: **OLYMPIC DELIVERY AUTHORITY**
23rd Floor, 1 Churchill Place, Canary Wharf, E14 5LN

Organisation: **bam nuttall**

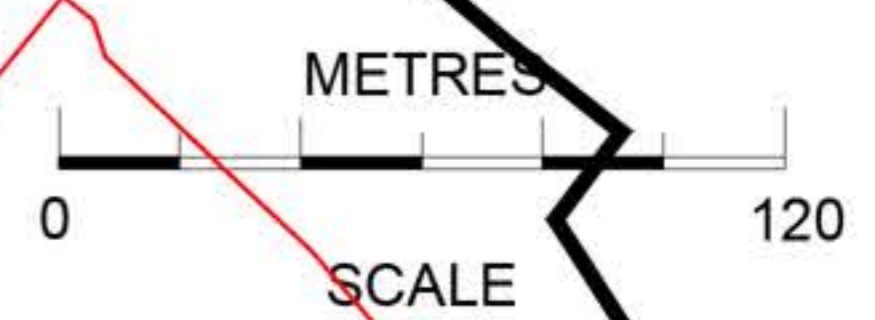
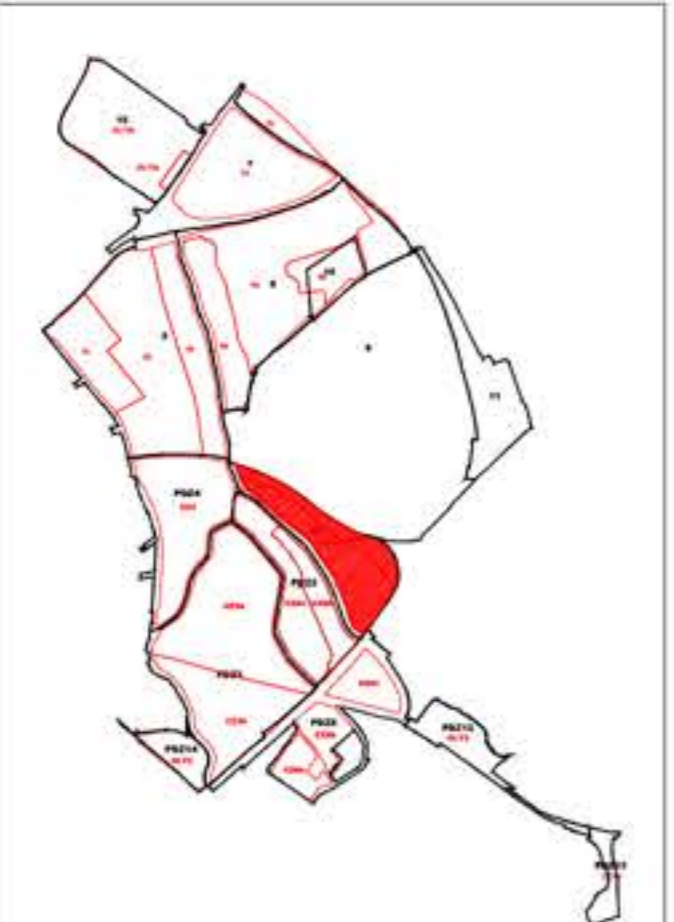
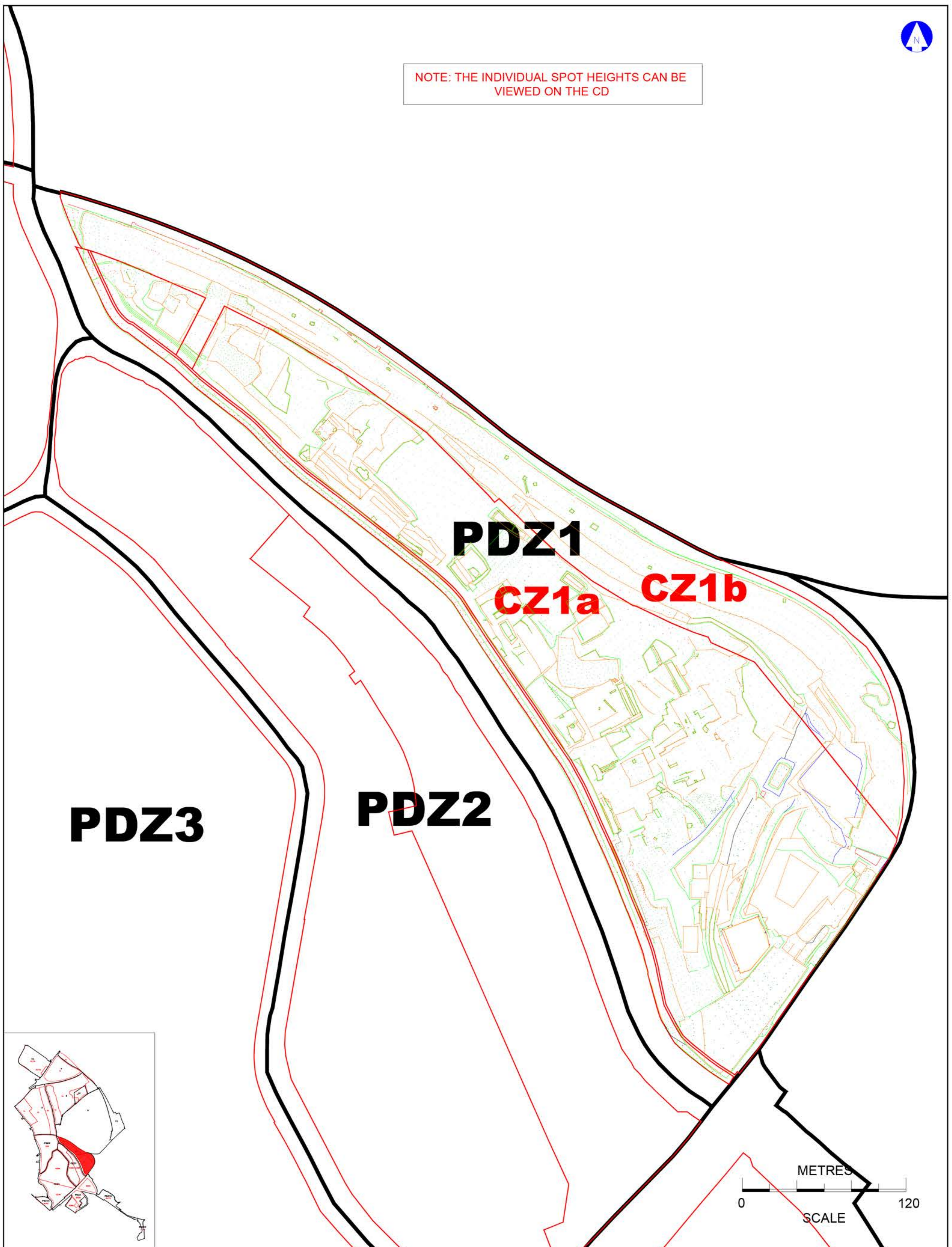
Project Title: **OLYMPIC PARK ENABLING WORKS**

Drawing Title		
Figure 4: Site Investigation Locations of Planning Delivery Zone 1 (PDZ1)		
Drawn	Checked	Approved
Scale (A1)	Date	Status
1:1250	24-01-11	Information
Work Instruction No:	WVZZZ068	
Drawing No.	2DD-ENL-CK-ZZZ-OLP-SP1-E-0352	
Rev.	01	

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NOTES

- PLANNING DELIVERY ZONE BOUNDARIES
- CONSTRUCTION ZONE BOUNDARIES
- TOP OF BANK (LEVEL SHOWN IN mAOD)
- BOTTOM OF BANK (LEVEL SHOWN IN mAOD)
- 1.34 SURVEYED SPOT LEVEL (mAOD)

THIS FIGURE SHOULD BE READ IN CONJUNCTION WITH FIGURES 6, 7 & 8.

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Client
OLYMPIC DELIVERY AUTHORITY
23rd Floor, 1 Churchill Place, Canary Wharf, E14 5LN

Organisation
bam nuttall www.bam-nuttall.co.uk

Project Title
OLYMPIC PARK ENABLING WORKS

Drawing Title
Figure 5: Sub Grade Level for Planning Delivery Zone 1 (PDZ1)

Drawn	Checked	Approved
Scale (A1)	Date	Status
1:1250	24-01-11	Information

Work Instruction No: W1/ZZZ/068

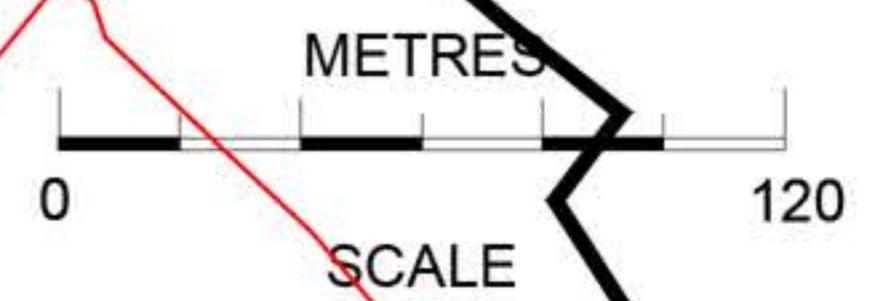
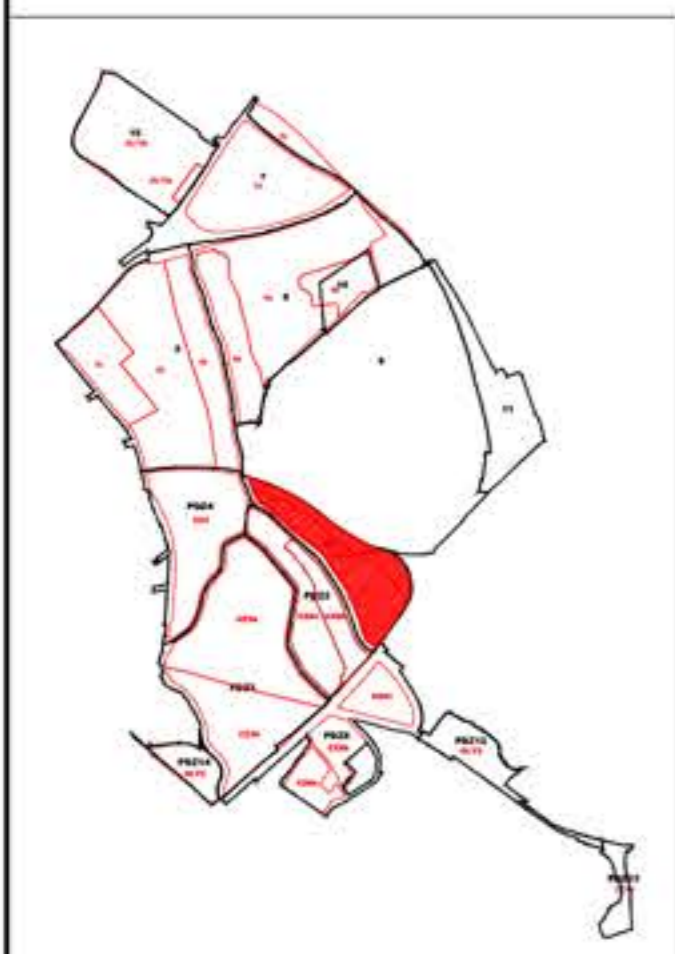
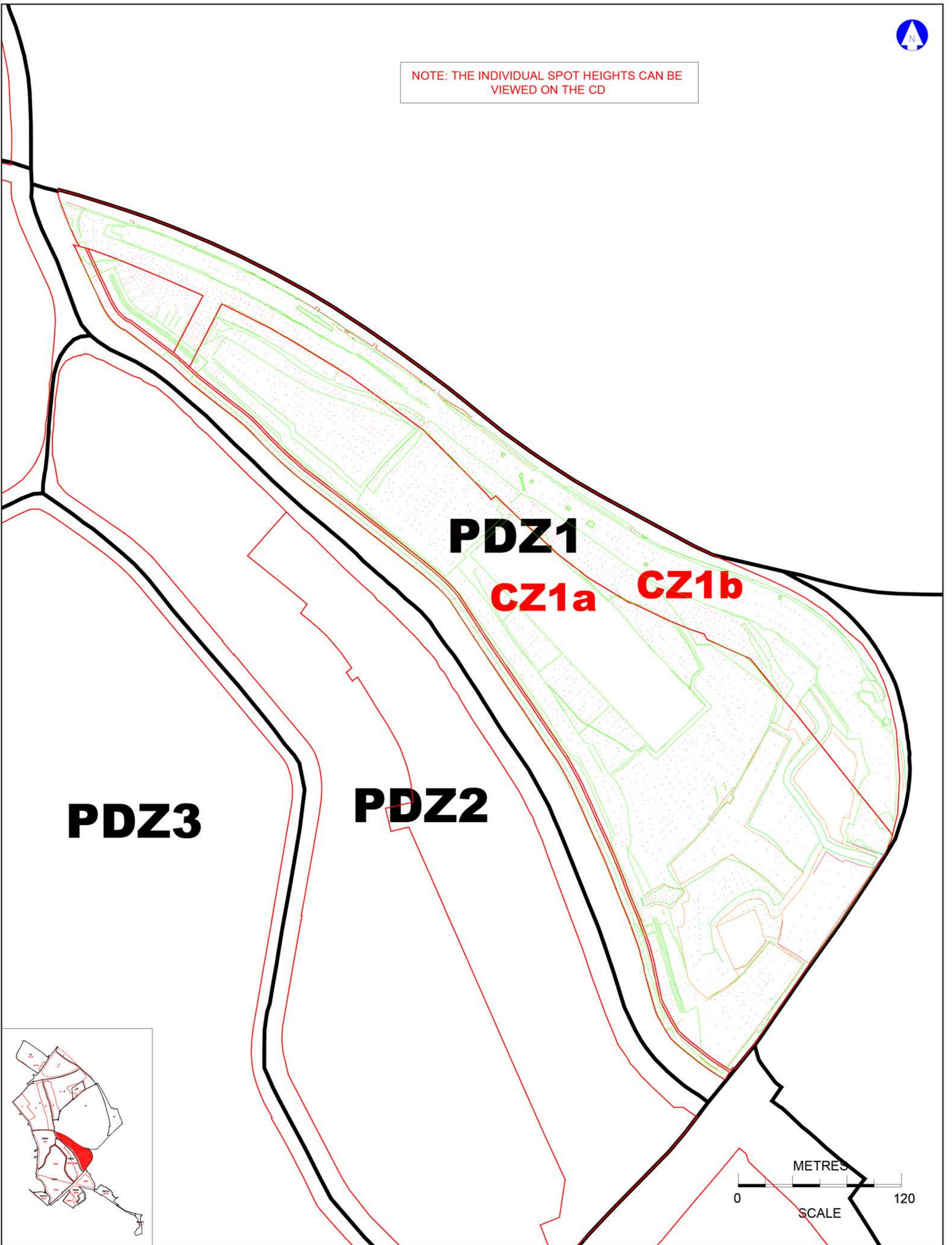
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Rev: 03

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NOTES

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- CONSTRUCTION ZONE BOUNDARIES
- TOP OF BANK (LEVEL SHOWN IN mAOD)
- BOTTOM OF BANK (LEVEL SHOWN IN mAOD)
- 5.34 SURVEYED SPOT LEVEL (mAOD)

THIS FIGURE SHOULD BE READ IN CONJUNCTION WITH FIGURES 5, 7 & 8.

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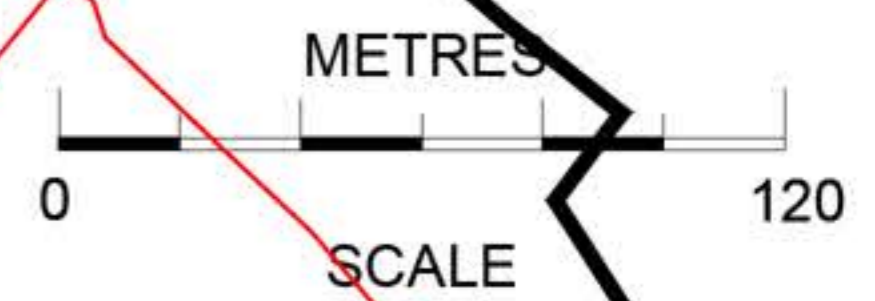
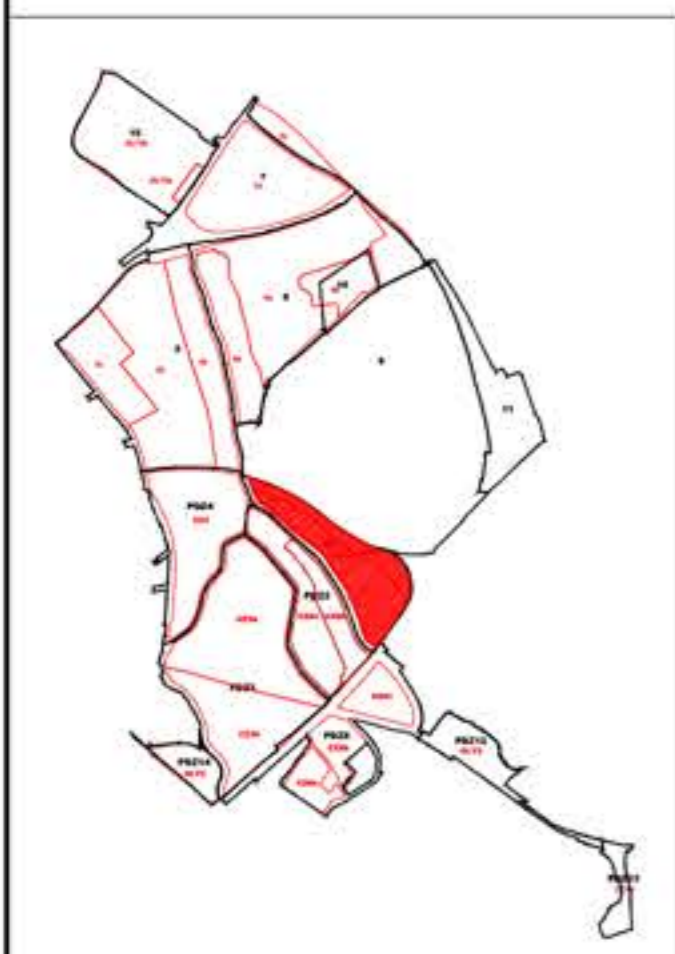
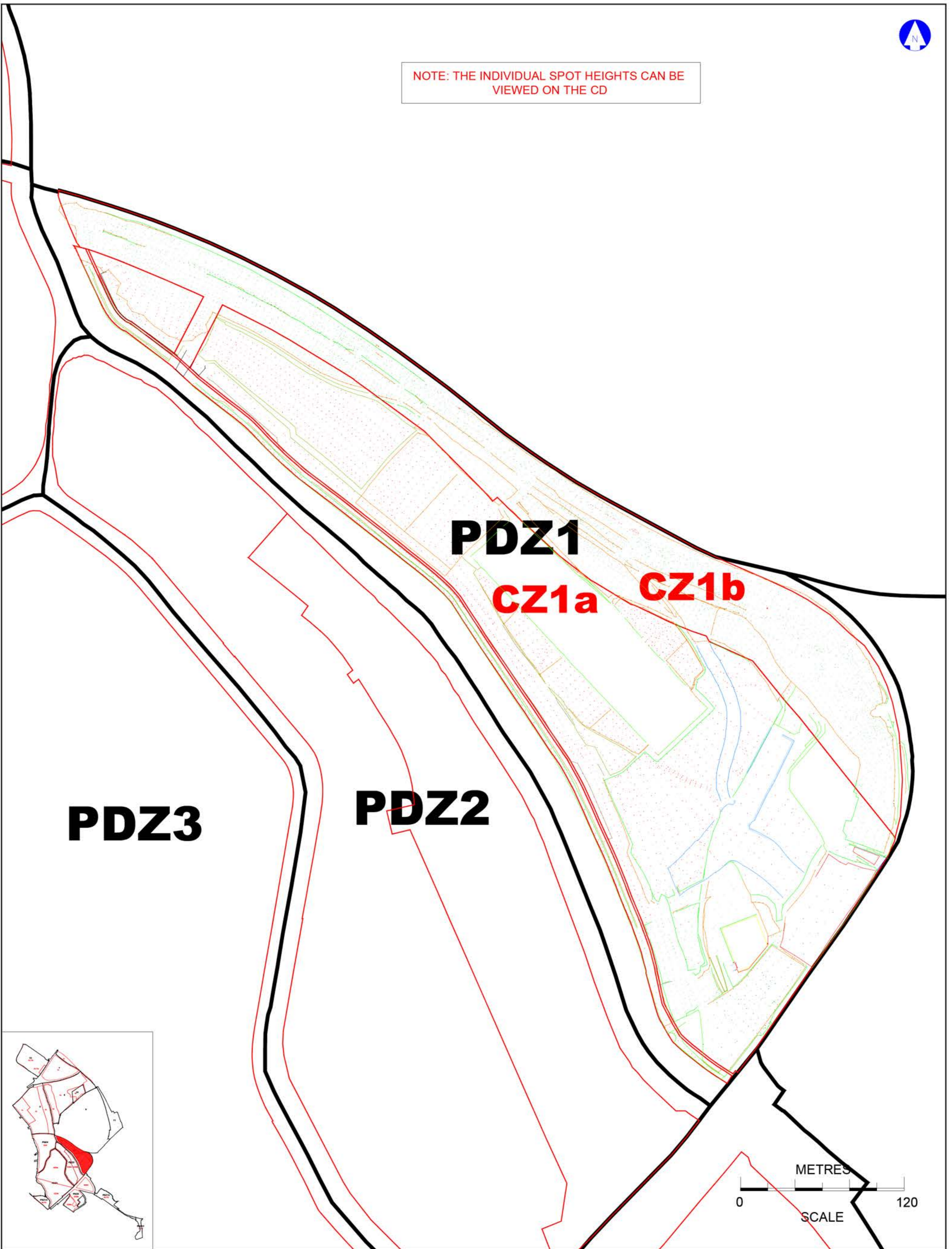
Rev	Description	Drawn	CW/CJ	Date
03	Note amended as per PDT comments			27-01-12
02	Additional note on per Abbie comments			24-10-11
01	Additional note on Abbie comments			05-05-11
00	Final issue			24-01-11

OLYMPIC GRID Client OLYMPIC DELIVERY AUTHORITY 23rd Floor, 1 Churchill Place, Canary Wharf, E14 5LN Organisation Project Title OLYMPIC PARK ENABLING WORKS	Drawing Title Figure 6: Sub Formation Level for Planning Delivery Zone 1 (PDZ1)	
	Drawn: [Redacted] Scale (A1): 1:1250	Checked: [Redacted] Date: 24-01-11
Work Instruction No: W1/ZZZ/068		Drawing No: 2DD-ENL-CK-ZZZ-OLP-SP1-E-0364
		Rev: 03

CAD FILE REF.: C:\PIREVIEW\figure 62DD-ENL-CK-ZZZ-OLP-SP1-E-0364.dwg



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NOTES

- PLANNING DELIVERY ZONE BOUNDARIES
- CONSTRUCTION ZONE BOUNDARIES
- TOP OF BANK (LEVEL SHOWN IN mAOD)
- BOTTOM OF BANK (LEVEL SHOWN IN mAOD)
- 1.34 SURVEYED SPOT LEVEL (mAOD)

THIS FIGURE SHOULD BE READ IN CONJUNCTION WITH FIGURES 5, 6 & 8.

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Rev	Description	Drawn	Chkd	Date
03	Note amended as per PDT comments			27-01-12
02	Additional note on per Abnke comments			24-11-11
01	Additional note on Abnke comments			05-05-11
00	Final issue			24-01-11

OLYMPIC GRID

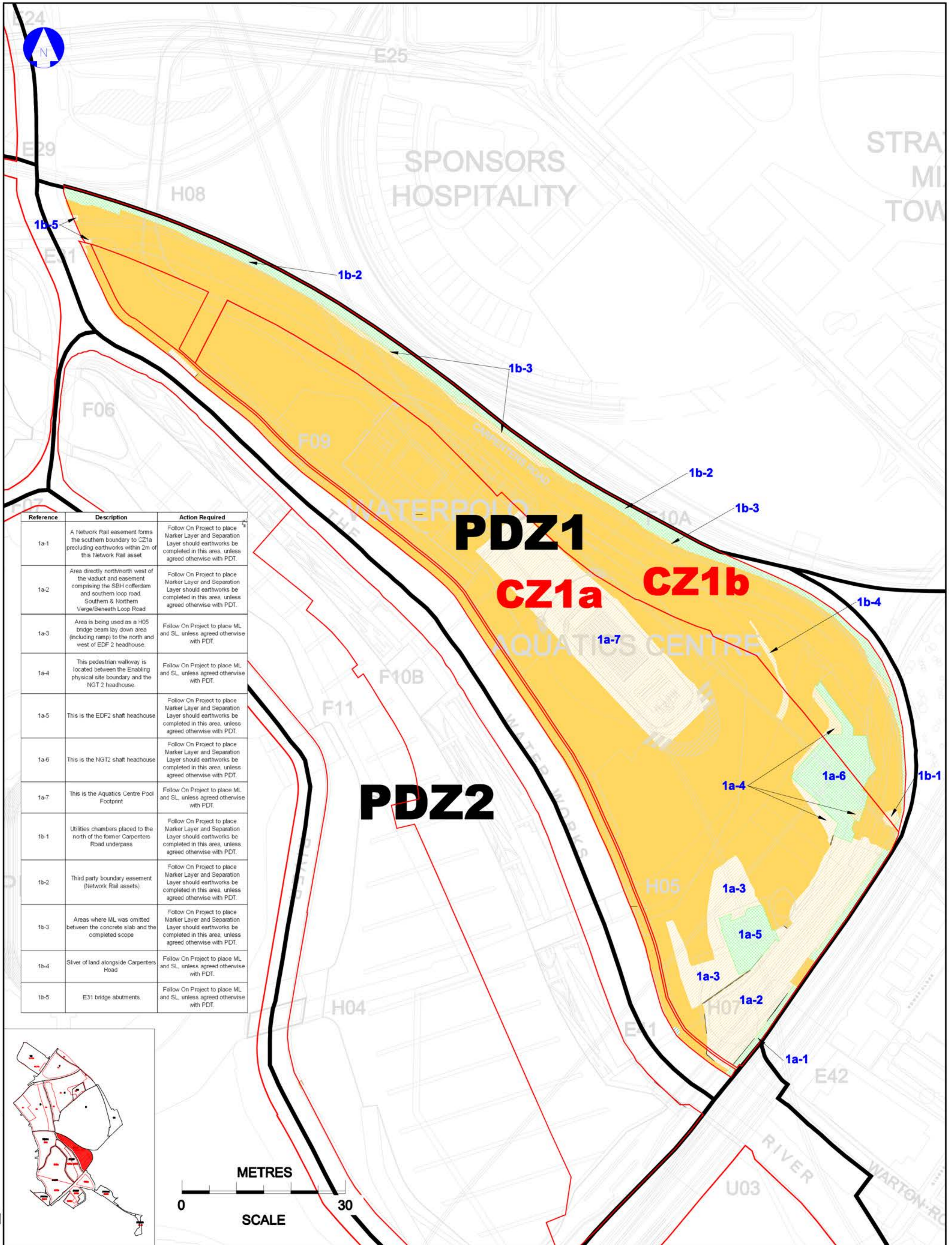
Client: **OLYMPIC DELIVERY AUTHORITY**
23rd Floor, 1 Churchill Place, Canary Wharf, E14 5LN

Organisation: **bam nuttall**

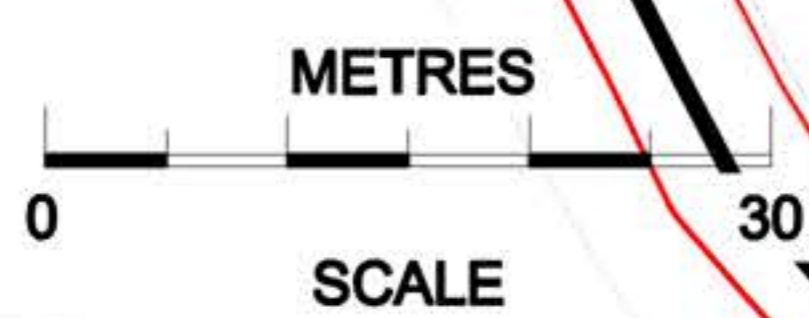
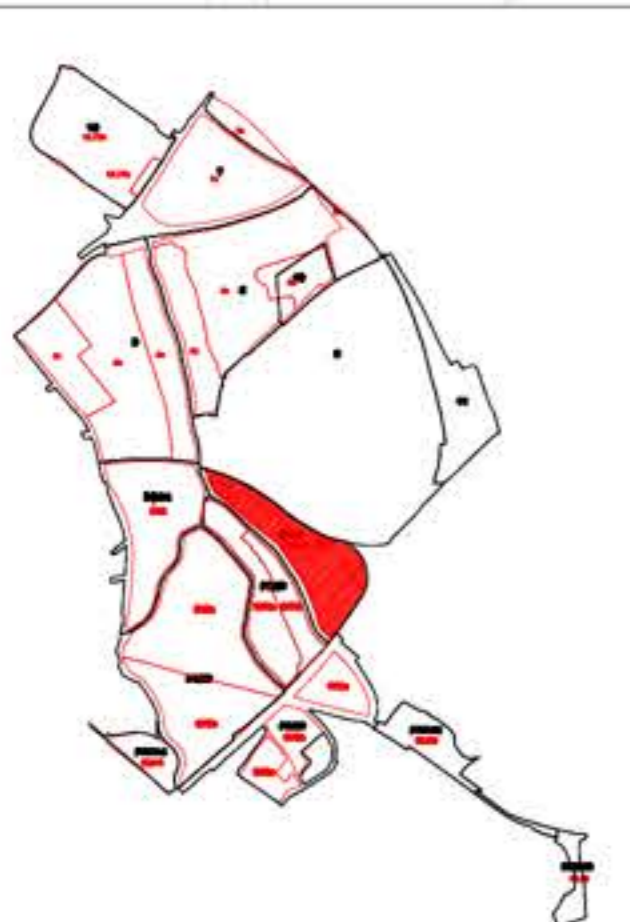
Project Title: **OLYMPIC PARK ENABLING WORKS**

Drawing Title: Figure 7: Enabling Works Formation Level for Planning Delivery Zone 1 (PDZ1)			
Drawn: [Redacted]	Checked: [Redacted]	Approved: [Redacted]	
Scale (A1): 1:1250	Date: 24-01-11	Status: Information	
Work Instruction No: W1/ZZZ/068	Drawing No: 2DD-ENL-CK-ZZZ-OLP-SP1-E-0370		Rev: 03

CAD FILE REF.: C:\PIREVIEW\figure 7\2DD-ENL-CK-ZZZ-OLP-SP1-E-0370.dwg



Reference	Description	Action Required
1a-1	A Network Rail easement forms the southern boundary to CZ1a precluding earthworks within 2m of this Network Rail asset	Follow On Project to place Marker Layer and Separation Layer should earthworks be completed in this area, unless agreed otherwise with PDT.
1a-2	Area directly north/north west of the viaduct and easement comprising the SBH cofferdam and southern loop road. Southern & Northern Verge/Beneath Loop Road	Follow On Project to place Marker Layer and Separation Layer should earthworks be completed in this area, unless agreed otherwise with PDT.
1a-3	Area is being used as a H05 bridge beam lay down area (including ramp) to the north and west of EDF 2 headhouse.	Follow On Project to place ML and SL, unless agreed otherwise with PDT.
1a-4	This pedestrian walkway is located between the Enabling physical site boundary and the NGT 2 headhouse.	Follow On Project to place ML and SL, unless agreed otherwise with PDT.
1a-5	This is the EDF2 shaft headhouse	Follow On Project to place Marker Layer and Separation Layer should earthworks be completed in this area, unless agreed otherwise with PDT.
1a-6	This is the NGT2 shaft headhouse	Follow On Project to place Marker Layer and Separation Layer should earthworks be completed in this area, unless agreed otherwise with PDT.
1a-7	This is the Aquatics Centre Pool Footprint	Follow On Project to place ML and SL, unless agreed otherwise with PDT.
1b-1	Utilities chambers placed to the north of the former Carpenters Road underpass	Follow On Project to place Marker Layer and Separation Layer should earthworks be completed in this area, unless agreed otherwise with PDT.
1b-2	Third party boundary easement (Network Rail assets)	Follow On Project to place Marker Layer and Separation Layer should earthworks be completed in this area, unless agreed otherwise with PDT.
1b-3	Areas where ML was omitted between the concrete slab and the completed scope	Follow On Project to place Marker Layer and Separation Layer should earthworks be completed in this area, unless agreed otherwise with PDT.
1b-4	Sliver of land alongside Carpenters Road	Follow On Project to place ML and SL, unless agreed otherwise with PDT.
1b-5	E31 bridge abutments	Follow On Project to place ML and SL, unless agreed otherwise with PDT.



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LEGEND:

- Construction Zone boundary.
- Marker Layer & Separation Layer complete.
- Marker Layer and Separation Layer to be placed by Follow on Contractors.
- Marker Layer omitted.
- No Marker Layer or Separation Layer. Retained Vegetation.
- No Marker Layer or Separation Layer. Third Party easements.

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH SKE-ATK-XX-ZZZ-OLP-XXX-O-0003 AND THE RETAINED AREAS RISK ASSESSMENT REPORT (REP-ATK-CM-ZZZ-OLP-XXX-E-0007).

THIS FIGURE SHOULD BE READ IN CONJUNCTION WITH FIGURES 5, 6, 7 & 11.

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Client: OLYMPIC DELIVERY AUTHORITY
23rd Floor, 1 Churchill Place, Canary Wharf, E14 5UH

Organisation: bam nuttall

Project Title: OLYMPIC PARK REMEDIATION

Drawing Title: Figure 8: Extent of Marker Layer and Human Health Separation Layer for Planning Delivery Zone 1 (PDZ1)

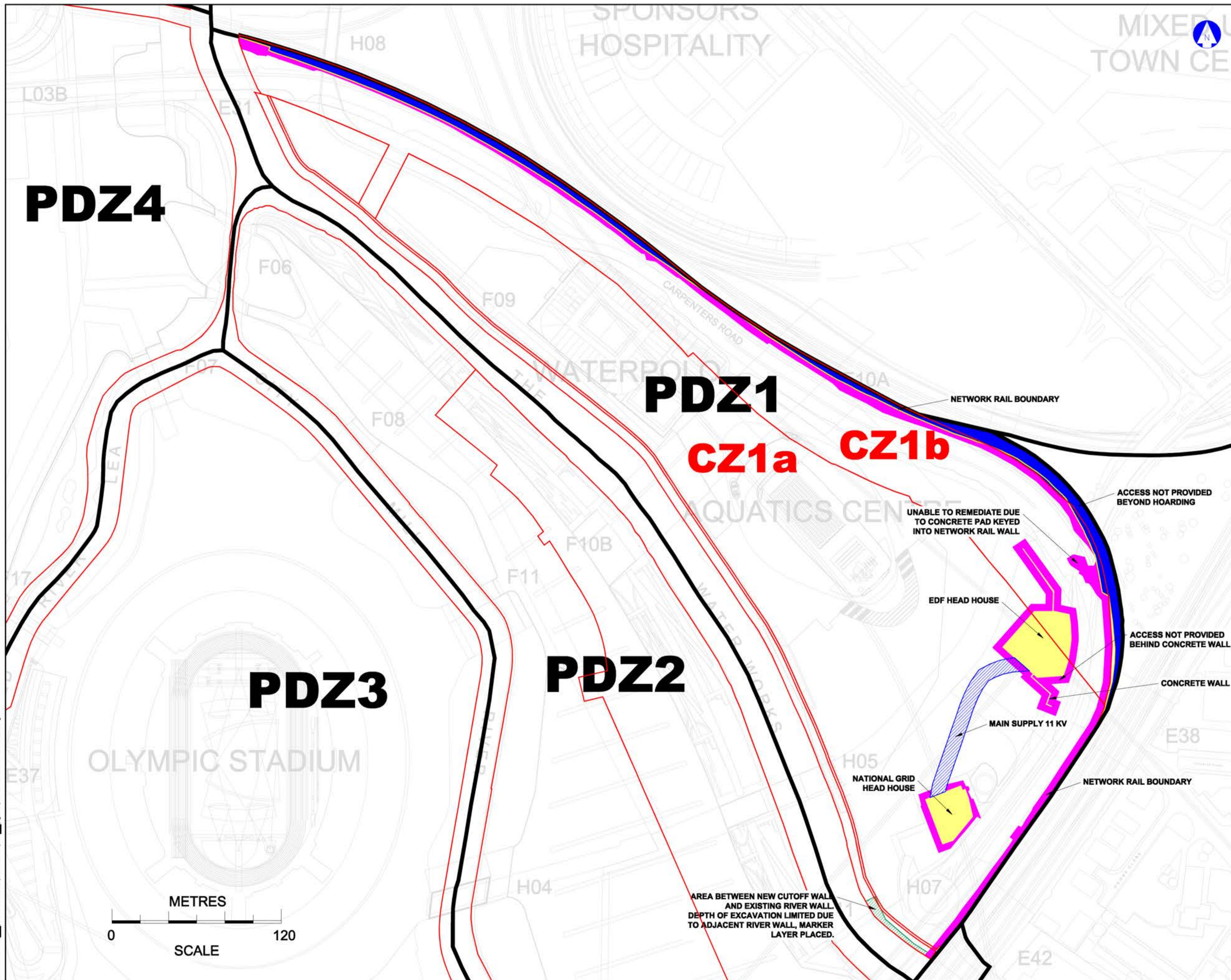
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Scale (A1): 1:800 **Date:** 24-01-11 **Status:** Information

Work Instruction No: WI/ZZZ/068

Drawing No.: 2DD-ENL-CK-ZZZ-OLP-SP1-E-0376 **Rev.:** 02

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LEGEND

Boundaries

- Planning Delivery Zone Boundaries
- Construction Zone Boundaries
- Network Rail Boundary

Unremediated due to

- Retained Building
- Third Party Boundary
- Service Restriction
- Partially Remediated Area
- Beyond Physical Site Boundary

NOTES

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH SKE-ATK-XX-ZZZ-OLP-XXX-O-0003 AND THE RETAINED AREAS RISK ASSESSMENT REPORT (REP-ATK-CM-ZZZ-OLP-XXX-E-0007)

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02	Additional note as per A3line comments	25-10-11
01	Amended based on A3line comments	24-09-11
00	Final Issue	24-01-11

Rev	Description	Drawn	Chkd	Date

Client: **OLYMPIC DELIVERY AUTHORITY**
23rd Floor, 1 Churchill Place, Canary Wharf, E14 5LH

Organisation: **bam nuttall**

Project Title: **OLYMPIC PARK ENABLING WORKS**

Drawing Title: **Figure 9: Non Remediated Areas within Planning Delivery Zone 1 (PDZ1)**

OLYMPIC GRID

Drawn	Checked	Approved

Scale (A1) 1:1250 Date 24-01-11 Status Information

Work Instruction No: W1/ZZZ/068

Drawing No. 2DD-ENL-CK-ZZZ-OLP-SP1-E-0382 Rev. 02

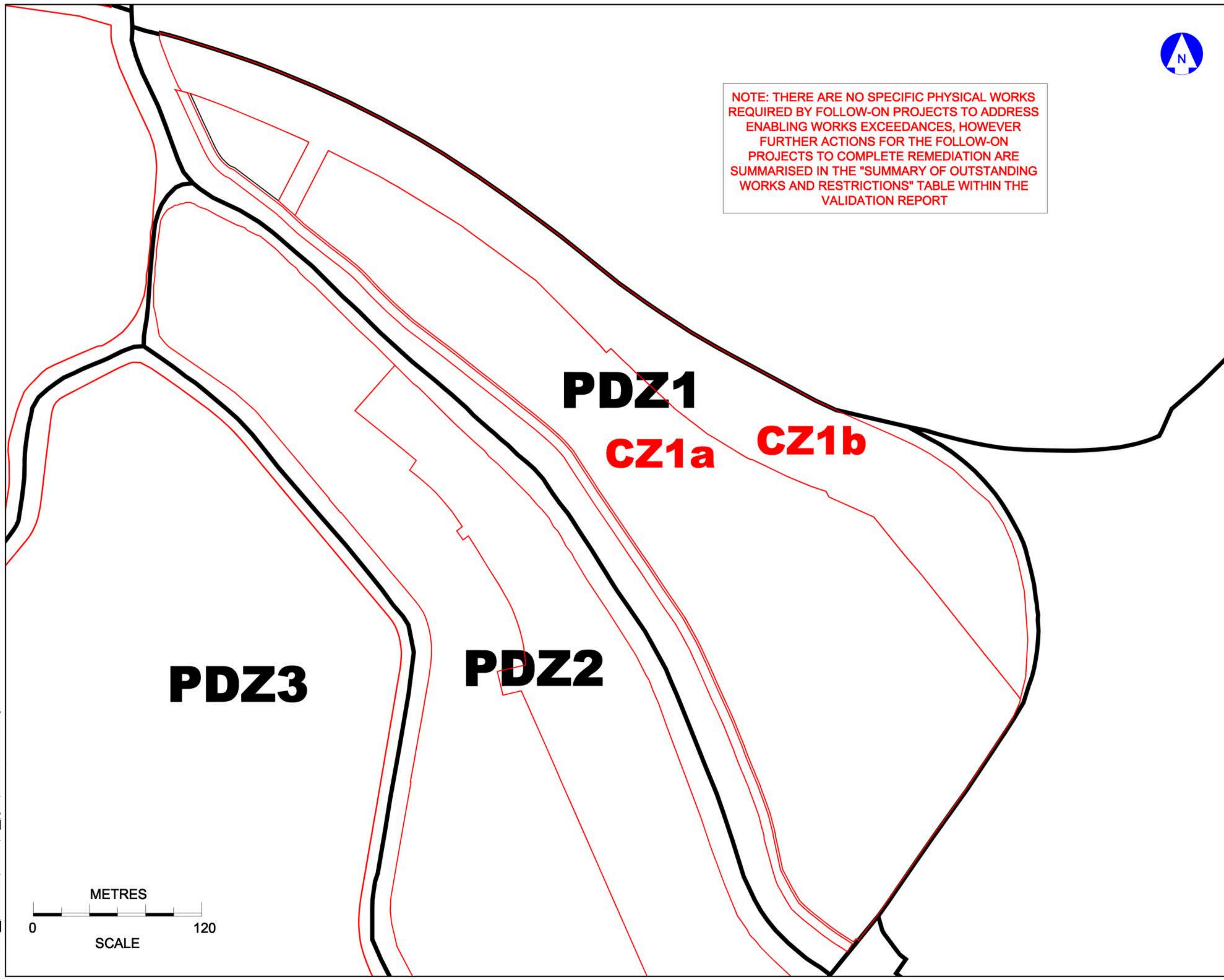
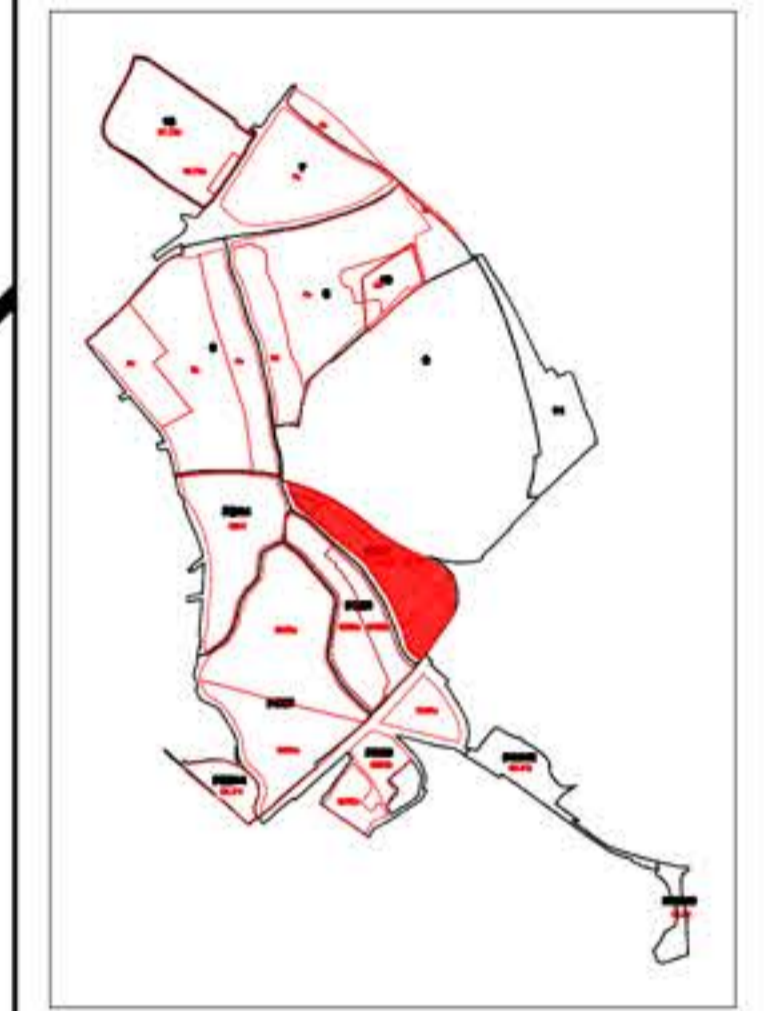
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NOTE: THERE ARE NO SPECIFIC PHYSICAL WORKS REQUIRED BY FOLLOW-ON PROJECTS TO ADDRESS ENABLING WORKS EXCEEDANCES, HOWEVER FURTHER ACTIONS FOR THE FOLLOW-ON PROJECTS TO COMPLETE REMEDIATION ARE SUMMARISED IN THE "SUMMARY OF OUTSTANDING WORKS AND RESTRICTIONS" TABLE WITHIN THE VALIDATION REPORT

DO NOT SCALE THIS DRAWING.
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 — CONSTRUCTION ZONE BOUNDARIES



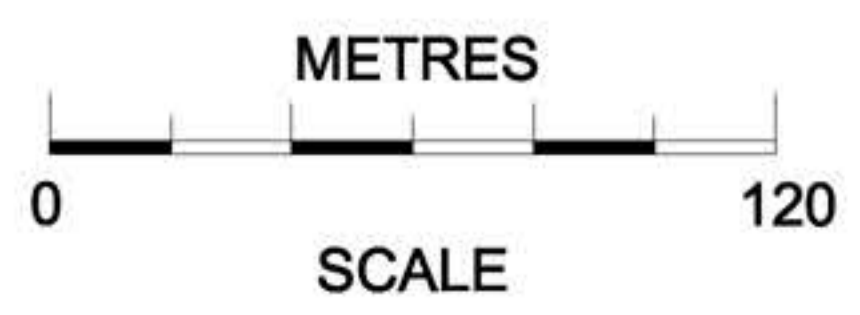
PDZ3

PDZ2

PDZ1

CZ1a

CZ1b



01	Amended based on Atkins comments	26-10-11
00	First Issue	24-01-11
Rev	Description	Date

Client
OLYMPIC DELIVERY AUTHORITY
 23rd Floor, 1 Churchill Place, Canary Wharf, E14 5LH

Organisation
bam nuttall

Project Title
 OLYMPIC PARK ENABLING WORKS

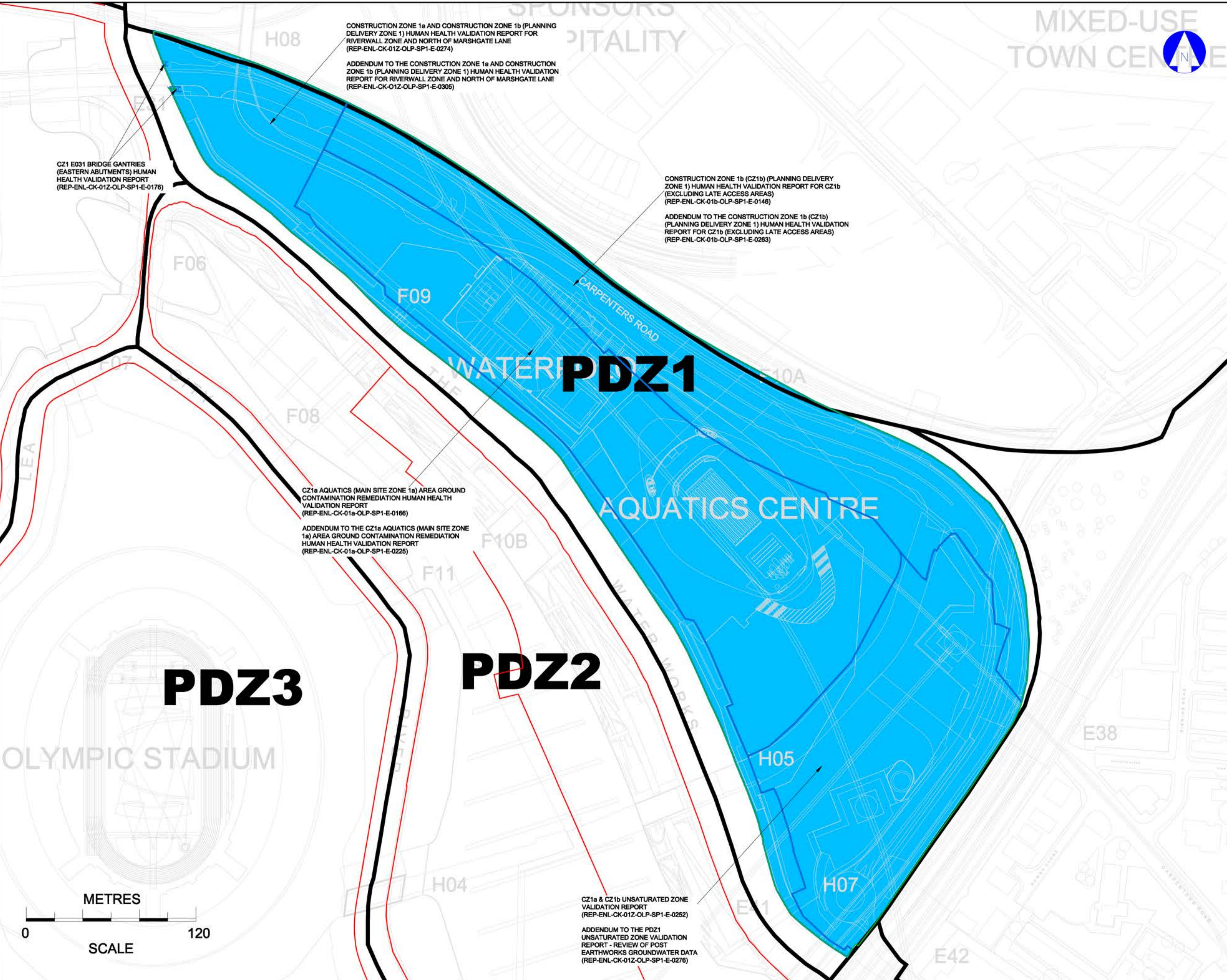
Drawing Title
 Figure 10: Summary of Exceedances requiring Action by Follow On Projects within Planning Delivery Zone 1 (PDZ1)

OLYMPIC GRID

Drawn	Checked	Approved
Scale (A1)	Date	Status
1:1250	24/01/11	Information

Work Instruction No: W1ZZZ068
 Drawing No: 2DD-ENL-CK-ZZZ-OLP-SP1-E-0388
 Rev: 01

CAD FILE REF: C:\CAD Files Resources\CAO\2DD-ENL-CK-ZZZ-OLP-SP1-E-0388.dwg



CONSTRUCTION ZONE 1a AND CONSTRUCTION ZONE 1b (PLANNING DELIVERY ZONE 1) HUMAN HEALTH VALIDATION REPORT FOR RIVERWALL ZONE AND NORTH OF MARSHGATE LANE (REP-ENL-CK-01Z-OLP-SP1-E-0274)

ADDENDUM TO THE CONSTRUCTION ZONE 1a AND CONSTRUCTION ZONE 1b (PLANNING DELIVERY ZONE 1) HUMAN HEALTH VALIDATION REPORT FOR RIVERWALL ZONE AND NORTH OF MARSHGATE LANE (REP-ENL-CK-01Z-OLP-SP1-E-0305)

CZ1 E031 BRIDGE GANTRIES (EASTERN ABUTMENTS) HUMAN HEALTH VALIDATION REPORT (REP-ENL-CK-01Z-OLP-SP1-E-0176)

CONSTRUCTION ZONE 1b (CZ1b) (PLANNING DELIVERY ZONE 1) HUMAN HEALTH VALIDATION REPORT FOR CZ1b (EXCLUDING LATE ACCESS AREAS) (REP-ENL-CK-01b-OLP-SP1-E-0148)

ADDENDUM TO THE CONSTRUCTION ZONE 1b (CZ1b) (PLANNING DELIVERY ZONE 1) HUMAN HEALTH VALIDATION REPORT FOR CZ1b (EXCLUDING LATE ACCESS AREAS) (REP-ENL-CK-01b-OLP-SP1-E-0263)

CZ1a AQUATICS (MAIN SITE ZONE 1a) AREA GROUND CONTAMINATION REMEDIATION HUMAN HEALTH VALIDATION REPORT (REP-ENL-CK-01a-OLP-SP1-E-0166)

ADDENDUM TO THE CZ1a AQUATICS (MAIN SITE ZONE 1a) AREA GROUND CONTAMINATION REMEDIATION HUMAN HEALTH VALIDATION REPORT (REP-ENL-CK-01a-OLP-SP1-E-0225)

CZ1a & CZ1b UNSATURATED ZONE VALIDATION REPORT (REP-ENL-CK-01Z-OLP-SP1-E-0252)

ADDENDUM TO THE PDZ1 UNSATURATED ZONE VALIDATION REPORT - REVIEW OF POST EARTHWORKS GROUNDWATER DATA (REP-ENL-CK-01Z-OLP-SP1-E-0278)

MIXED-USE TOWN CENTRE

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- LEGEND
- PLANNING DELIVERY ZONE BOUNDARIES
 - CONSTRUCTION ZONE BOUNDARIES
 - PDZ1 UNSATURATED ZONE VALIDATION REPORT BOUNDARY
 - REPORTING BOUNDARY
 - HUMAN HEALTH ASSESSMENT REPORTING AREAS

NOTES

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH SKE-ATK-XX-ZZZ-OLP-XXX-0-0003 AND THE RETAINED AREAS RISK ASSESSMENT REPORT (REP-ATK-CM-ZZZ-OLP-XXX-E-0007)



02	Groundwater sheet added	07-10-11
01	Assembled based on Alice comments	28-09-11
00	First Issue	18-05-11

Client
OLYMPIC DELIVERY AUTHORITY
23rd Floor, 1 Churchill Place, Canary Wharf, E14 5LN

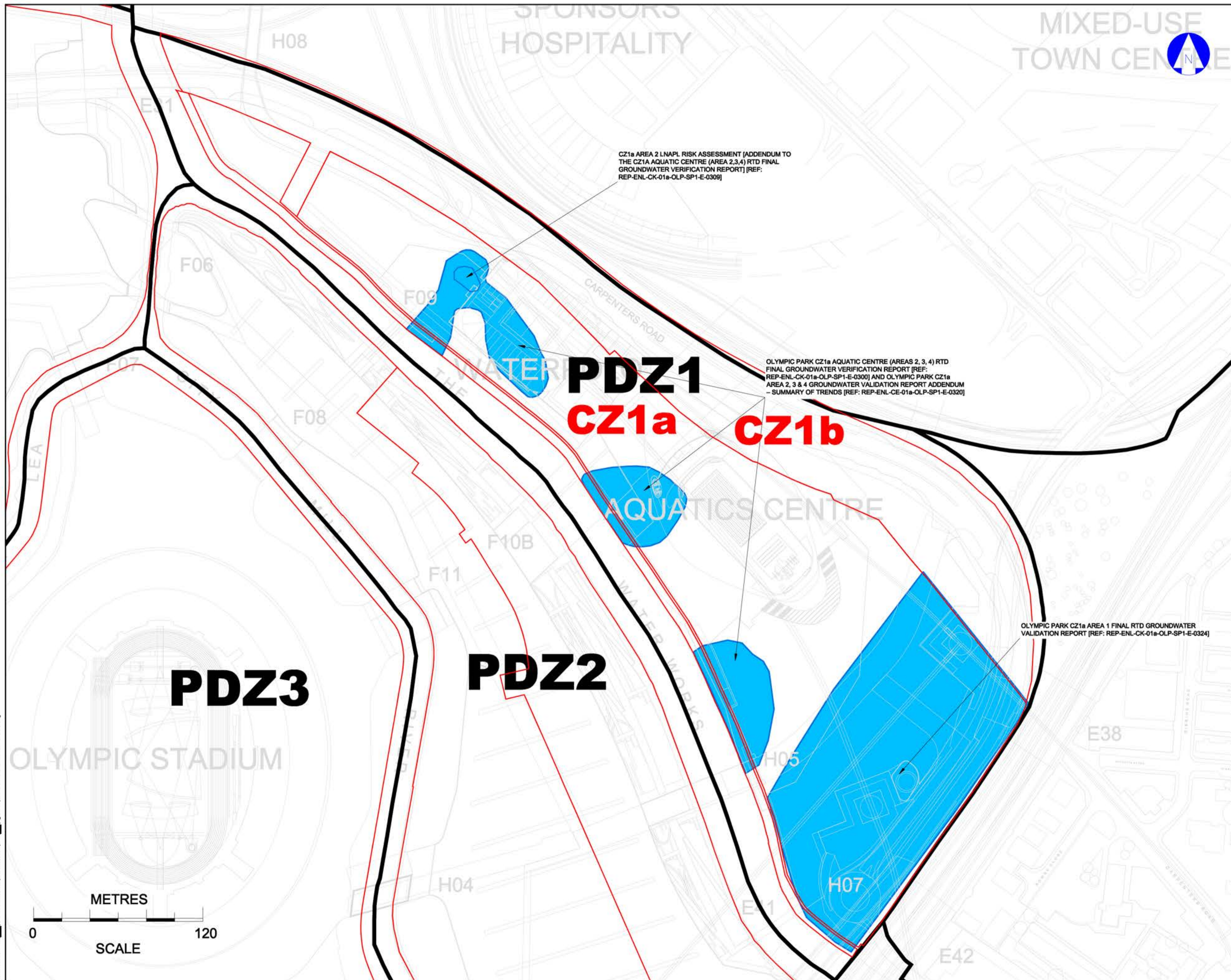
Organisation
bam nuttall

Project Title
OLYMPIC PARK ENABLING WORKS

Drawing Title
Figure 11: Enabling Works Validation Reporting Areas for Planning Delivery Zone 1 (PDZ1) [Unsaturated Zone]

OLYMPIC GRID		
Drawn	Checked	Approved
Scale (A1)	Date	Status
1:1250	19/08/11	Information
Work Instruction No:	W/ZZZ/068	
Drawing No.	2DD-ENL-CK-ZZZ-OLP-SP1-E-0418	
Rev.	02	

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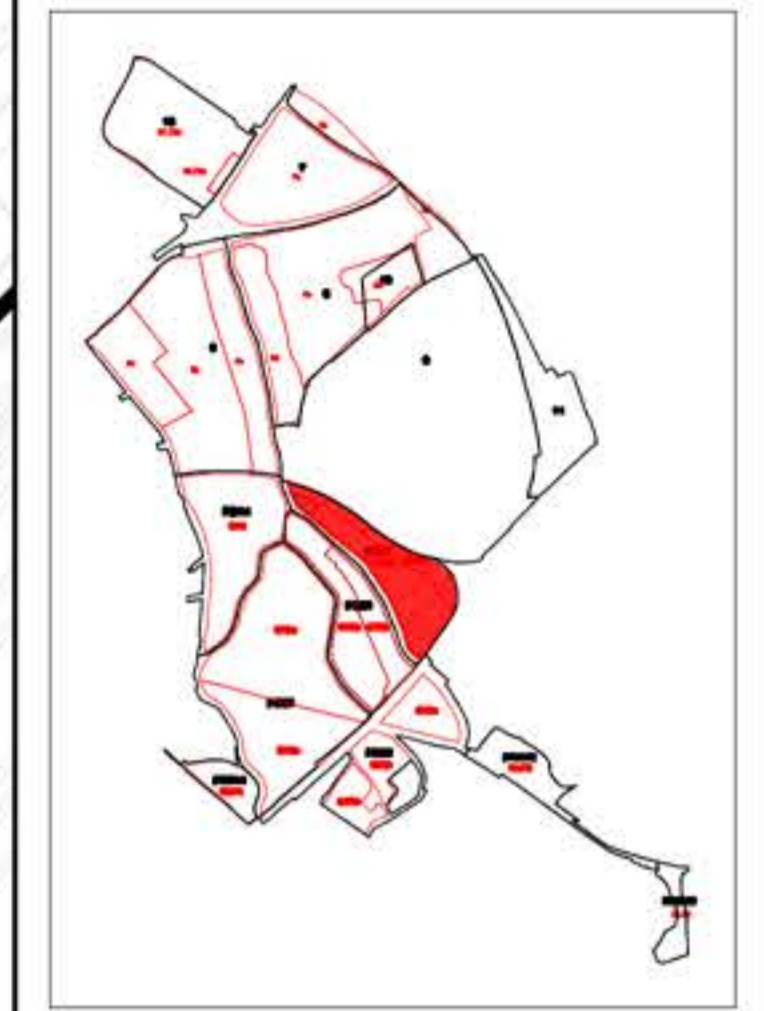
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- LEGEND
- PLANNING DELIVERY ZONE BOUNDARIES
 - CONSTRUCTION ZONE BOUNDARIES
 - REPORTING BOUNDARY
 - GROUNDWATER ASSESSMENT REPORTING AREAS

NOTES:

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH SKE-ATK-XX-ZZZ-OLP-XXX-O-0003 AND THE RETAINED AREAS RISK ASSESSMENT REPORT (REP-ATK-CM-ZZZ-OLP-XXX-E-0007)



CZ1a AREA 2 LNAPL RISK ASSESSMENT (ADDENDUM TO THE CZ1a AQUATIC CENTRE (AREA 2,3,4) RTD FINAL GROUNDWATER VERIFICATION REPORT) [REF: REP-ENL-CK-01a-OLP-SP1-E-0309]

OLYMPIC PARK CZ1a AQUATIC CENTRE (AREAS 2, 3, 4) RTD FINAL GROUNDWATER VERIFICATION REPORT [REF: REP-ENL-CK-01a-OLP-SP1-E-0300] AND OLYMPIC PARK CZ1a AREA 2, 3 & 4 GROUNDWATER VALIDATION REPORT ADDENDUM - SUMMARY OF TRENDS [REF: REP-ENL-CE-01a-OLP-SP1-E-0320]

OLYMPIC PARK CZ1a AREA 1 FINAL RTD GROUNDWATER VALIDATION REPORT [REF: REP-ENL-CK-01a-OLP-SP1-E-0324]

02	Groundwater sheet added	07-10-11		
01	Assembled based on A300 comments	28-09-11		
00	First Issue	18-08-11		
Rev	Description	Drawn	Chk'd	Date

Client
OLYMPIC DELIVERY AUTHORITY
23rd Floor, 1 Churchill Place, Canary Wharf, E14 5LH

Organisation
bam nuttall

Project Title
OLYMPIC PARK ENABLING WORKS

Drawing Title
Figure 11: Enabling Works Validation Reporting Areas for Planning Delivery Zone 1 (PDZ1) [Groundwater]

OLYMPIC GRID

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Scale (A1)	Date	Status
1:1250	19/08/11	Information

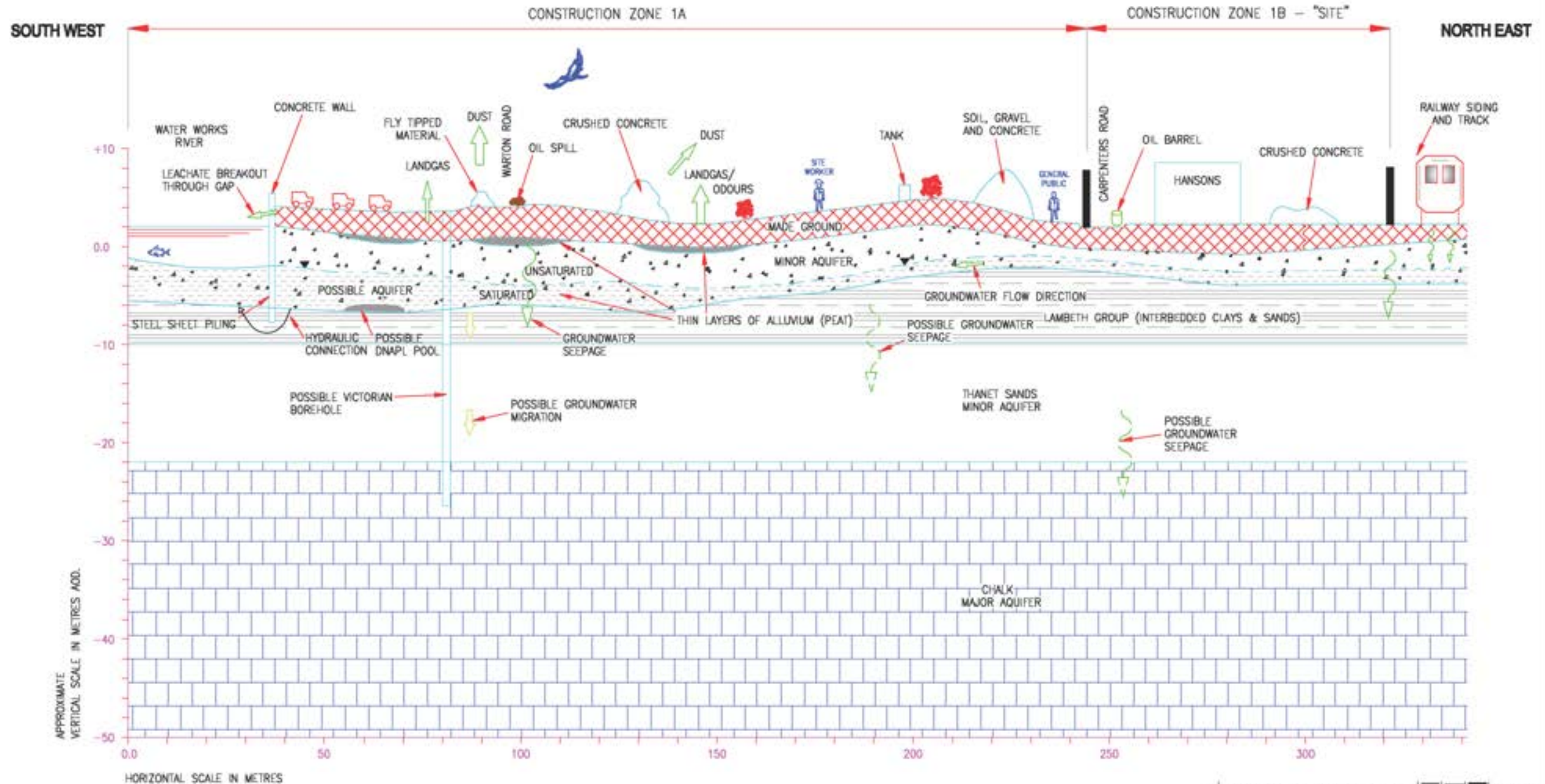
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Drawing No: 2DD-ENL-CK-ZZZ-OLP-SP1-E-0418
Rev: 02

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DRAWINGS

- 2DD-WYG-CM-C1A-AQA-XXX-E-1016: Conceptual Site Model for CZ1a and CZ1b (including river wall zone)
- 2DD-ENL-CK-01a-OLP-SP1-E-0141: CZ1a As-built Location of All Remediation Zones
- SKE-ATK-XX-ZZZ-OLP-XXX-O-0003: Sub Zone Remediation Areas (including areas anticipated as no remediation)

NOTE: THIS SKETCH IS VERY CONCEPTUAL. IT AIMS TO SCHEMATICALLY REPRESENT KEY ENVIRONMENTAL ASPECTS ONLY. IT SHOULD NOT BE USED FOR SCALING OR ENGINEERING PURPOSES.



Rev	Description	By	Chk	App	Date
A	MODIFICATION TO CONSTRUCTION ZONES				22/12/06

White Young Green Environmental Ltd.
 Yeoman House
 63 Croydon Road
 London SE20 7TS
 Tel: 020 8669 9009
 Fax: 020 8678 9008
 e-mail: env.enr@wYG.com

Environmental Consultancy
 Civil Structural Mechanical Electrical Process Rail Traffic Environmental Project Management

Project:
CARPENTERS ROAD REMEDIATION AND EARTHWORKS (CONSTRUCTION ZONE 1A AND 1B)

Client:
LONDON DEVELOPMENT AGENCY

Scale of A3	Drawn By	Date	Checked By	Date	Approved By	Date
N.T.S.		NOV. 2006		NOV. 2006		NOV. 2006
Office	Type	Project No.	Drawing No.	Revision		
40	ENV	E03778	200-WYG-CR-CIA-JQA-XXX-E-10/6	A		



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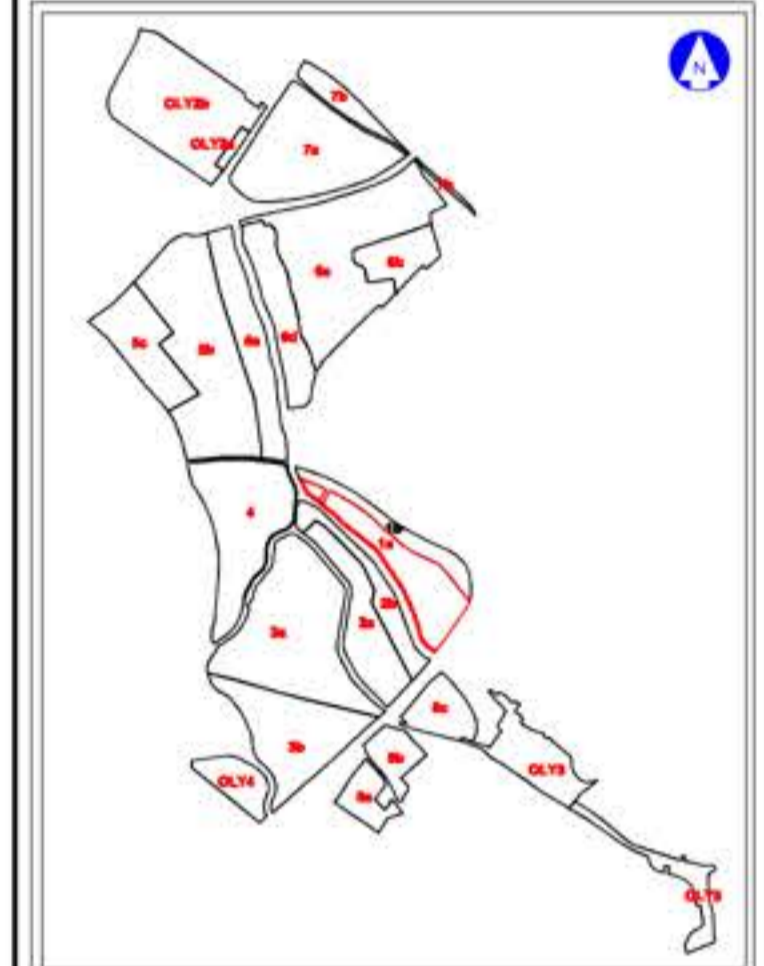
DO NOT SCALE THIS DRAWING.

Key :

- Plot Boundary
- Construction Zone Boundary
- Bottom of Bank
- Top of Bank

NOTES

Rem Zone 12 and hotspots 243 and 244 incorporated into as built extent of Rem Zone 6.1



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 Olympic Delivery Authority, 10/08/08 (2008)

Rev	Description	Drawn	Chk'd	Date
04	Rem zone 8 amended	RR	NW	01.08.08
03	Added zones 1 & 6.1 / Amended zones 6 & 11			02.07.08
02	Added aerial bar			15.10.08
01	Freeze remediation boundary			20.03.08
00	Final Issue			09.03.08

Client
OLYMPIC DELIVERY AUTHORITY
 23rd Floor, 1 Churchill Place, Canary Wharf, E14 5LH

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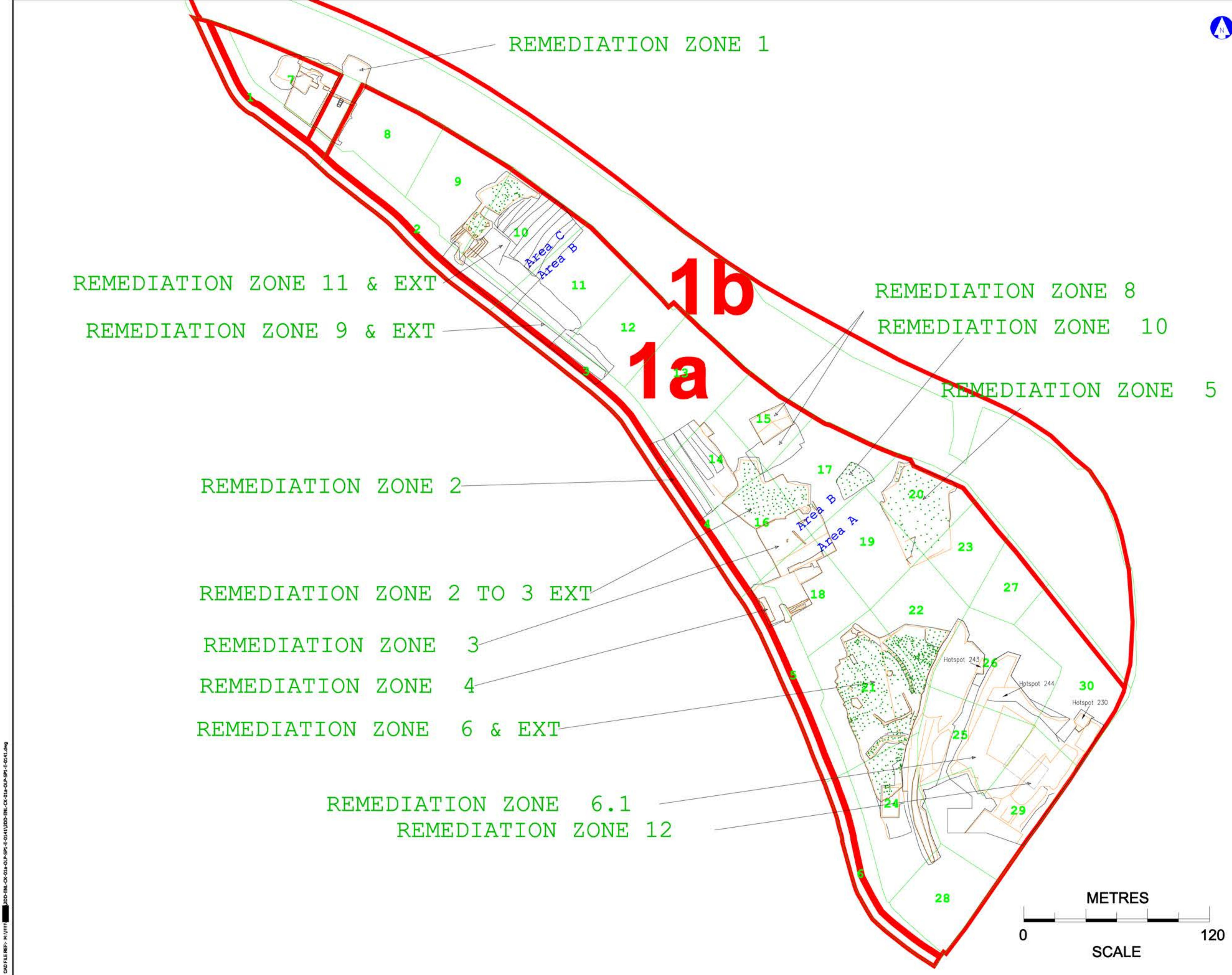
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 OLYMPIC PARK REMEDIATION

Drawing Title
 CZ1a AS-BUILT LOCATION OF ALL REMEDIATION ZONES

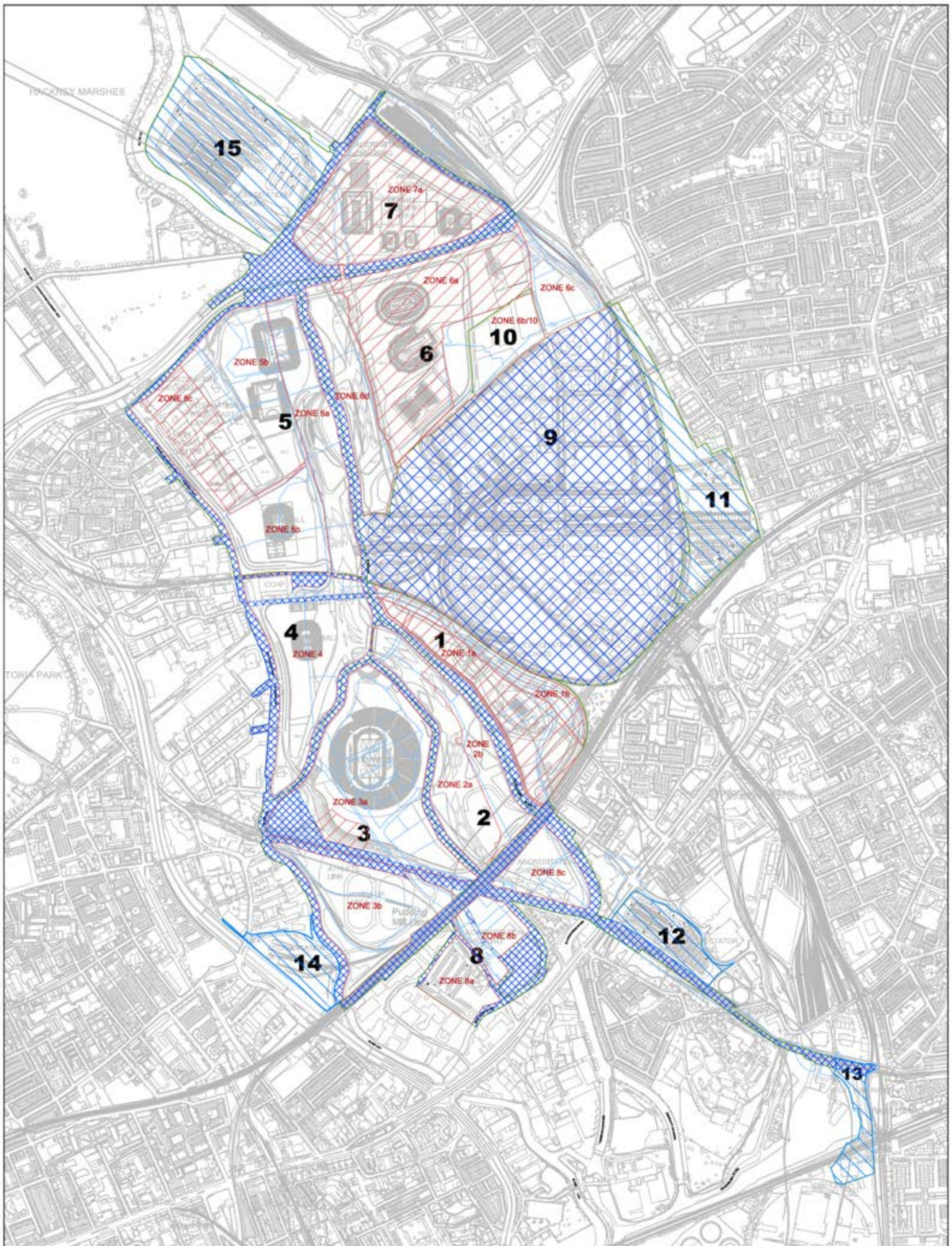
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Drawn	Checked	Approved

Scale (A1) 1:1250 Date 08/05/08 Status INFO
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 Drawing No. 2DD-ENL-CK-01a-OLP-SP1-E-0141 Rev. 04



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Rev	Description	Drawn	Checked	Date
03	ZONE 2 AMENDED			24/03/08
02	EXTEND NO REMEDIATION AREA			27/11/07
01	MINOR AMENDMENTS			20/09/07
00	ISSUED FOR COMMENT			24/09/07

NOTES

—	SI SITE REFERENCE	▨	AREAS OF ADVANCED REMEDIATION
—	PDZ BOUNDARY	▩	AREAS ANTICIPATED AS NO REMEDIATION
—	SUB ZONE BOUNDARY	▧	AREAS EXCLUDED FROM SITE PREPARATION APPLICATION
—	HANDOVER BOUNDARY		

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OLYMPIC DELIVERY AUTHORITY
 1st Floor, 1 Churchill Way, Canary Wharf, E14 5UB
 Olyn/Del/001
ATKINS
 Project Title
OLYMPIC PARK DESIGN

Drawing Title
PLANNING APPLICATION SUB ZONE REMEDIATION AREAS
 Scale: 1:2500
 Date: 03/09/07
 Drawing No: **SKE-ATK-XX-ZZZ-OLP-XXX-O-0003**
 Rev: **03**

APPENDICES

- Appendix A: Glossary of Terms and Definitions
- Appendix B: Schedule of Key Documentation
- Appendix C: Key Parties
- Appendix D: Assessment of Retained Areas in PDZ1
- Appendix E: Permit to Proceed Protocol (CD only)

APPENDIX A:

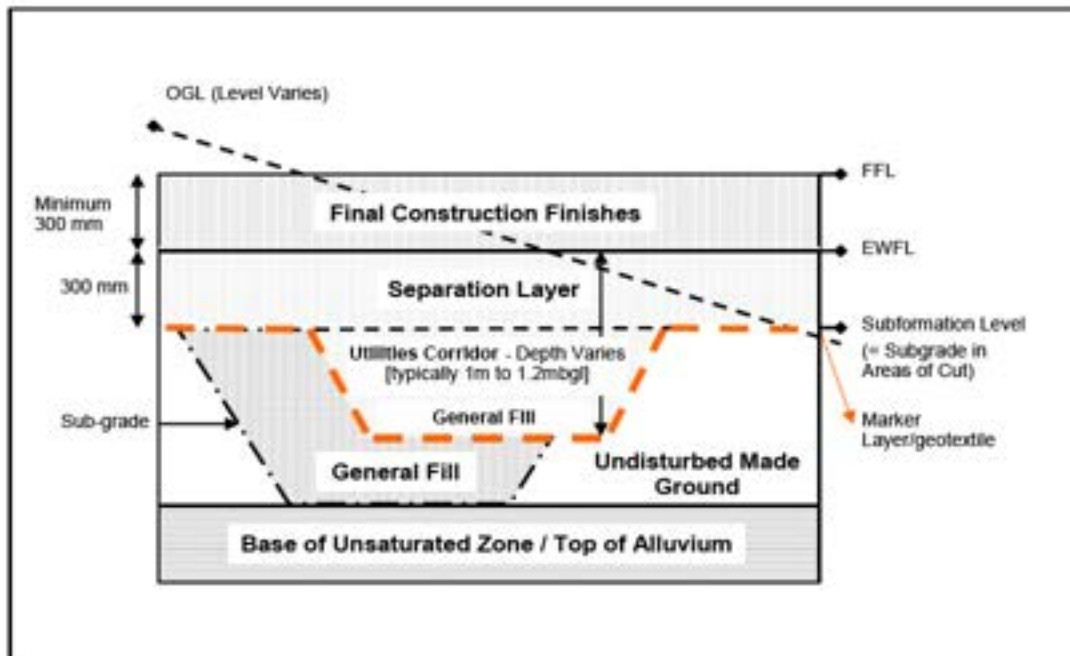
Glossary of Terms and Definitions

Glossary of Terms and Definitions

Term	Meaning / Definition
BNL	BAM Nuttall Limited (Enabling Works)
CoC	Contaminant(s) of Concern
CSM	Conceptual Site Model
CVR	Consolidated Validation Report
CZ	Construction Zone
DPVE	Dual Phase Vapour Extraction
DQRA	Detailed Quantitative Risk Assessment
EA	Environment Agency
EQS	Environmental Quality Standard
ESGL	Environmental Scientifics Group Limited
EWFL	Enabling Works Formation Level
FFL	Final Finished Level
GRS	Global Remediation Strategy
GQRA	Generic Quantitative Risk Assessment
GWAC	groundwater assessment criteria
HHSL	Human Health Separation Layer
LDA	London Development Agency (see OPLC)
LNAPL	light non-aqueous phase liquid
ODA	Olympic Delivery Authority
ORC	Oxygen Release Compound
PAH	Polycyclic Aromatic Hydrocarbons
ODA PDT	Olympic Delivery Authority Planning Decisions Team
OPLC	Olympic Park Legacy Company (formerly known as LDA)
PDZ	Planning Delivery Zone
RMS	Remediation Method Statement
RTD	River Terrace Deposits
SSAC	Site Specific Assessment Criteria

SSRS	Site Specific Remediation Strategy
SSRSpec	Site Specific Remediation Specification
SSRT	Site Specific Remediation Target
UXO	Unexploded Ordnance
WSP	WSP Group Plc
WYGE	White Young Green Environmental

Generalised Earthworks Summary and Terminology



APPENDIX B:
Schedule of Key Documentation
(including summary of contents)

SUMMARY OF CONTENTS

This section provides a summary of the development of remedial design, implementation and validation relevant to this Planning Delivery Zone. In addition, we have summarised two site wide documents that form the basis for design and five that have resulted in changes to the SSACs for clarity. In the case of the latter five documents, whilst these are referred to the applicable Validation Reports, and in some cases the RMS's, it is felt that given the impact these reports have had, that these should be specifically discussed in this section. This section should be read in conjunction with the text of this CVR and the reference list presented in Section 6.

Site Wide Documents

Capita Symonds. MST-CSP-CM-ZZZ-OLP-XXX-E-0040. Intrusive Investigation Method Statement (IIMS). November 2006. (ODA Ref: 07/90216/AODODA)

The IIMS presents a framework and provides a generic specification for undertaking contamination intrusive investigations across the Olympic Park to gather sufficient information to support planning applications and scheme design. It has been prepared with reference to the Environment Agency Model Procedures for the Management of Land Contamination CLR 11.

The intrusive investigation works outlined in this document gathered sufficient information to inform production of Site Specific Remediation Strategies (SSRS) to support planning application requirements and detailed design.

In particular the intrusive investigation works provided sufficient information to:

- (i) assess the nature, extent and source of soil and groundwater contamination;
- (ii) assess the soil gas generation potential;
- (iii) prepare site conceptual model;
- (iv) undertake generic and detailed quantitative risk assessment; and
- (v) identify of areas requiring remediation.

Capita Symonds. REP-CSP-VZ-ZZZ-OLP-XXX-E-0076. Global Remediation Strategy, (Version 2.0, Rev B), January 2007. (ODA Ref.: 07/90011/FUMODA)

Given the scale and the strict delivery requirements of the Olympics, the GRS has been prepared to provide a common resource for remediation strategy related work, thus minimising duplication of design, regulatory requirements and programme risk.

To this end the GRS sets out site wide principles and procedures for taking forward the SSRSs, which are, and have been, prepared for individual Construction Zones/Sub Zones. Specifically the following principles and technical resources have been established:

- (i) a „Global Conceptual Site Model“ (GCSM) for the Olympic Park identifying the major potential contamination related risks; and
- (ii) a wide range of soil and groundwater „Generic Assessment Criteria“ (GAC) for screening of chemical testing results to identify potential contamination risks.

With regard to (ii) above computer based generic quantitative risk assessment (QRA) has been undertaken to derive generic screening values for areas potentially requiring remediation.

The DEFRA and Environment Agency document 'Model Procedures for the Management of Land Contamination' (CLR11) has been consulted in production of this document. In this respect this document broadly represents the Generic Quantitative Risk Assessment process outlined within CLR 11.

Atkins. REP-ATK-CM-ZZZ-OLP-ZZZ-E-0004. Proposed changes to the Human Health SSAC values for Lead, General Metals, and PAHs in the Separation Layer and General Fill. August 2008. (ODA Ref.: 08/90265/AODODA)

Revised SSAC were calculated for lead using the Provisional Tolerable Weekly Intake method for the Soft Landscaping Legacy end use, for general metals using a single Soil Ingestion Rate, and for PAHs assessing the potential contribution from each of the vapour inhalation pathways based on the Henry's Law Constant.

Atkins. REP-ATK-CM-ZZZ-OLP-ZZZ-E-0004 Errata to Document entitled 'Proposed changes to the Human Health SSAC values for Lead, General Metals, and PAHs in the Separation Layer and General Fill'. September 2008. (ODA Ref.: 08/90265/AODODA)

The recalculated inhalation Tolerable Daily Intake for lead, however the inhalation pathway was still not considered to be significant. The dermal pathway for lead was also calculated, resulting in a new SSAC for areas of soft landscaping not associated with commercial buildings.

Atkins. ENW-ATK-LET-00269. Site Wide RMS Addendum (Use of Hardcover as a Substitute to the Separation Layer). February 2009. (ODA Ref.: 08/90292/AODODA)

Under this site wide RMS addendum the remedial designers developed a framework for reducing the thickness of the HHSL under suitably robust hard standing. The basic premise behind this design change was that hard standing would act as a suitable barrier to certain pollution pathways (namely ingestion, dermal contact and dust inhalation) and reduce the requirement for a full-thickness HHSL.

Nuttall. MST-ENL-CE-ZZZ-OLP-SP1-E-0159 Rev 05. Site Wide RMS Addendum (Asbestos in the Sub-grade & General Fill), March 2009. (ODA Refs: 08/90083/AODODA, 08/90181/AODODA, 08/90216/AODODA, 08/90217/AODODA, 08/90218/AODODA, 08/90219/AODODA, 08/90220/AODODA, 08/90221/AODODA, 08/90222/AODODA 08/90223/AODODA, 08/90281/AODODA and 08/90326/AODODA)

The SSACs and methodology for assessing asbestos in the HHSL and below marker layer materials was further developed as the works progressed as set out in the Site Wide SSRS Addendum - Criteria for Asbestos in Fill Material (0241-ENW-ATK-LET-00276) detailed below. In addition, this RMS details the sampling strategy to be utilised when an asbestos value of >0.1% w/w is encountered within emplaced materials.

Atkins. MEM-ATK-CM-ZZZ-OLP-ZZZ-0004 Rev 2. Site Wide SSRS Addendum (Justification of Deviation from the GRS in the Derivation of SSAC). September 2009. (ODA Ref.: 09/90233/AODODA)

This document details the changes applied in the derivation of SSAC from the methodology or data sources presented in the GRS along with justification for the changes.

This memo has been produced to support any deviations from the GRS specifically in relation to TPH and PAH. It documents the changes Atkins has applied in the derivation of the SSAC from the methodology or data sources presented in the GRS. Where changes have been made from the GRS, these have been justified. Updated versions of the TPH and PAH criteria summary tables are appended to this document and in the case of TPH is based on differing FOC.

Site-Specific Documents

White, Young and Green Environmental (WYGE). REP-WYG-CM-C1A-AQA-XXX-E-1011, v8.0. SSRS for CZ1a. March 2007. (ODA Ref: 07/90217/AODODA)

Outline Design of the remediation requirements for CZ1a main site primarily comprises the remediation of seven Remediation Areas in the unsaturated zone. This is augmented by groundwater remediation in 2 areas via further monitoring and investigation, treatment and/or installation of in ground barriers to mitigate off-site contaminant migration near part of southern site boundary. In addition, the SSRS derived of Site Specific Assessment Criteria (SSAC) and specified placement of chemically and geotechnically compliant materials to the EWFL. It also detailed the Victorian wells to be decommissioned, remediation/treatment of existing soil mounds, gap analysis ground investigation, and the oversight of the works by an UXO specialist.

WYGE also record their requirement for surface water management measures to be incorporated into the development to manage and practically reduce infiltration and future mobilisation of leachable soil bound contamination. All structures shall include the provision for land gas and vapour membranes.

White, Young and Green Environmental (WYGE). REP-WYG-CM-C1B-AQA-XXX-E-1301, v5.0. The SSRS for CZ1b. March 2007. (ODA Ref: 07/90234/AODODA)

Outline Design of the remediation requirements for CZ1b primarily comprises the remediation of one area in the unsaturated zone. Groundwater remediation was not considered necessary at the time. In addition, the SSRS derived the SSACs and specified placement of chemically and geotechnically compliant materials to the EWFL. In addition any Victorian wells encountered were to be decommissioned, gap analysis ground investigation undertaken, along with remediation of existing soil/demolition rubble mounds.

WYGE also record their requirement for the incorporation of landgas / vapour protection measures within the fabric of any future building structures. Surface water management measures are also required to be incorporated into the development to manage and practically reduce infiltration and future mobilisation of leachable soil bound contamination.

WYGE. REP-WYG-CM-C1A-AQA-XXX-E-1110. SSRS for CZ1a River Wall. March 2007. (ODA Ref: 07/90217/AODODA)

This SSRS produced an Outline Design for the new Waterworks River Wall to the landward side of the existing river wall, which is designed to intercept the pathway between CZ1a Main Site and the Waterworks River. This reports also specifies the removal of impacted unsaturated soils and their replacement with chemically and geotechnically compliant materials. The SSRS all details the removal of the identified free phase in the saturated zone; additional gap analysis ground investigation; and develops an approach for the introduction of oxygen release compound (or other suitable alternative approach to groundwater remediation) along with the decommissioning of Victorian wells.

Surface water management measures are also required to be incorporated into the development to manage and practically reduce infiltration and future mobilisation of leachable soil bound contamination.

Nuttall. MST-ENL-CE-01b-OLP-SP1-E-0070. RMS for CZ1b. September 2007. (ODA Ref: 07/90245/AODODA).

This report specifies how the remedial design will be implemented, with particular reference to the excavation of one unsaturated zone hotspot, methods for decommissioning the Victorian Wells, installation of compliant backfill, and remediation of soil mounds. In addition it details the remediation of services, drains etc to prevent contaminant migration and delivery of earthworks to the EWFL.

WSP Remediation. MST-ENL-CE-01a-OLP-SP1-E-0092. CZ1a Groundwater RMS. November 2007. (ODA Ref: 07/90245/AODODA)

This report details the methodology for the remediation of groundwater Remediation Areas 1 to 4. Prior to detailed design, further investigation is proposed to fully investigate and delineate the extent of NAPL and dissolved phase hydrocarbon contamination. It proposes treatability trials prior to the removal of NAPL via dual phase vacuum extraction and the treatment of dissolved phase hydrocarbon contamination by the injection of ORC to enhance natural attenuation of hydrocarbon based contaminants. In the case of Area 2 the (concurrent) injection of in-situ chemical oxidation (ISCO) followed by ORC injection was proosed to target chlorinated solvent contamination in one discreet location. This will be followed by a period of monitored natural attenuation (MNA).

Nuttall. MST-ENL-CE-01a-OLP-SP1-E-0021 v06. RMS for CZ1a. November 2007. (ODA Ref: 07/90245/AODODA)

This report specifies the implementation of the remedial design with particular reference to the excavation of the unsaturated zone hotspots, methods for decommissioning the Victorian Wells, placement of compliant backfill, and remediation of soil mounds. In addition it details the installation of a vertical barrier along the west and south west sides of the site, the remediation of services, drains etc. to prevent direct discharge into the river earthworks delivery to the EWFL.

WYGE. REP-WYG-CM-C1A-AQA-XXX-E-1060 v8.0. Supplementary Technical Note to the CZ1a SSRS. April 2008. (ODA Ref: 08/90167/AODODA)

This report supplements the initial CZ1a SSRS CSM following the new information gathered from the 2007 site investigations and remediation works. This collected data predominantly centred on the groundwater conditions with a flatter hydraulic gradient being identified. In addition the relatively impermeable unit within the Lambeth Group, revised compliance point (being to the east of the site rather than the south of the site) and as a result of impoundment a Freshwater EQS was applied. These changes along with amendments to the RBCA and P20 modelling tools to provide greater compliance with the EA and GRS methodologies in order to better reflect the site conditions. The aforementioned changes in turn altered the unsaturated zone remediation areas and the prevailing SSAC.

WYGE. REP-WYG-CM-C1A-AQA-XXX-E-1061 v5.0. CZ1b Supplementary Technical Note to the SSRS. April 2008. (ODA Ref.: 08/90046/AODODA)

This report supplements the initial CZ1b SSRS CSM following the gathering of new information in the 2007 site investigations and remediation works. This collected data predominantly centred on the groundwater conditions with a flatter hydraulic gradient being identified. In addition the relatively impermeable unit within the Lambeth Group, a revised compliance point (being to the east rather than the south of the construction zone), and as a result of impoundment a Freshwater EQS was applied. These changes along with modification to the RBCA and P20 modelling tools to provide greater compliance with the EA and GRS methodologies, confirmed that active groundwater remediation was not required. This report better reflected the site conditions, which in turn altered the unsaturated zone remediation areas (from one to six) and prevailing SSAC.

WSP Remediation. REP-ENL-CE-01a-OLP-SP1-E-0111. Groundwater Verification Report: (Areas 2, 3, 4). May 2008. (this interim report acted as a progress report and was submitted to the EA for information. The findings of this report have been superseded by the Final Verification Report for this area –please see 09/90281/AODODA)

This report validates the remediation of Areas 2,3 & 4 within PDZ1 in line with the two objectives set out in the RMS. The first objective required the LNAPL thickness during active recovery to be less than 5mm. Monitoring undertaken throughout March 2008 showed the observed LNAPL thickness in boreholes to be consistently <2mm during active recovery. In accordance with the programme of works and the ongoing earthwork and construction programme, the LNAPL recovery system was decommissioned.

The second objective with ORC works was to enhance natural attenuation processes, which was measured by an increase in dissolved oxygen and ORP (Redox) conditions. The oxygen-rich environment encouraged the degradation action of naturally occurring aerobic microbes which in effect installed an oxygen-rich 'curtain' between the LNAPL impacted source area and the sensitive (Waterworks) receptor.

Nuttall. MST-ENL-CE-01a-OLP-SP1-E-0119. Addendum to the RMS for CZ1a (Aquatics Centre and River Wall 4 Zone). June 2008. (ODA Ref: 08/90206/AODODA)

This addendum has been prepared following the release of the Designers WYGE SSRS CZ1a SSRS Addendum. This report has been updated to reflect the Designers changes to the remediation areas drawing (2DD-WYG-CM-C1a-AQA-XXX-E-1023, Rev F) and the changes made to the SSAC and SSRT for all of CZ1a.

WSP Remediation. MST-ENL-CE-01a-OLP-SP1-E-0133. Olympic Park CZ1a Groundwater (Area 2) DPVE RMS Addendum. July 2008. (ODA Ref: 08/90242/AODODA)

This document relates to the groundwater remediation activities that will be required in 'Area 2' requiring removal of LNAPL and the reduction of dissolved phase concentrations of TPH and (where present) VOCs. The selected remedial approach included the removal of as much phase separated hydrocarbon mass (LNAPL) as possible through active treatment followed by enhancement of the natural attenuation processes by the application of ORC to provide treatment during and after construction.

Nuttall. MST-ENL-CE-01b-OLP-SP1-E-0118. Addendum to CZ1b RMS. July 2008. (ODA Ref: 08/90209/AODODA)

This addendum has been prepared following the release of the Designers WYGE CZ1b SSRS Addendum. This report has been updated to reflect the Designers changes to the extent of the remediation required by the current design and outline the monitoring procedures in place to protect against environmental impacts from the works. The report derives the SSAC for materials to be used within the Service Corridor area and outside the Service Corridor Area following the release of the Supplementary Technical Note to the SSRS V5.0.

Nuttall. MST-ENL-CE-01a-OLP-SP1-E-0140. Addendum to RMS for CZ1a (Murphy's Yard). November 2008. (ODA Ref: 08/90344/AODODA)

This report specifies how the remedial design will be implemented following the issuance of the Supplementary Technical Note and its associated alterations to the remedial design with particular reference to Rem Area 12 and extension to Rem Area 6.1 following validation failures to the base and sides.

WYGE. REP-WYG-CM-XZ1-RWA-XXX-E-1101. CZ1 – River Wall Zone SSRS Ground Contamination Addendum. January 2009. (ODA Ref: 10/90347/AODODA)

This report supplements the initial SSRS CSM following the new information gathered from the 2007 site investigations, remediation works and also takes into account the revised scheme proposals. The key amendments in this report are: confirmation of impoundment will effectively remove tidal influence in the river which in turn will reduce the hydraulic gradient between river and site. In addition the removal of several metres of Made Ground in the River Wall Zone (RWZ) resulted in the improvement in ground conditions and therefore no further active soil remediation was required. Further the SSRS confirms the construction of two new river walls; and notes no active groundwater remediation is considered necessary.

The new 'main' river wall that has been constructed as part of the CZ1A scheme runs along the majority of the eastern part of the RWZ, effectively forming the boundary between the RWZ and CZ1A Main Site. A further sheet piled wall has also been constructed along most of the western side of the RWZ, adjacent to the river, termed here the 'riverside' wall. The main wall was constructed with extra sealing of the sheet pile clutches, to enhance hydraulic sealing/separation.

Nuttall. REP-ENL-CK-01a-OLP-SP1-E-0166. CZ1a Aquatics (Main Site 1a) Area Human Health Validation Report. January 2009. (ODA Ref: 08/90150/AODODA)

This report validates the remedial works carried out within a sub-section of CZ1a in relation to Human Health only. The defined hotspots were excavated, validated and backfilled with complaint fill materials. An additional ten outliers were identified during the implementation of these works, which were again remediated. However, residual works remain to deal with outliers such as the TPH in 'Rem Zone' 11, lead, arsenic and benzo(a)pyrene which we are reported separately.

Nuttall. REP-ENL-CK-01Z-OLP-SP1-E-0176. CZ1 E031 Bridge Gantries (Eastern Abutments) Human Health Validation Report. January 2009. (ODA Ref: 08/90064/AODODA)

This report validates the remedial works carried out within the E031 south eastern and north eastern bridge abutment in CZ1a in relation to Human Health only. All validation samples collected passed the prevailing SSAC.

Nuttall. REP-ENL-CK-01a-OLP-SP1-E-0225. CZ1a Aquatics (Main Site 1a) Area Human Health Validation Report Addendum. February 2009. (ODA Ref: 08/90150/AODODA)

The residual actions recorded in the CZ1a Aquatics report pertaining to TPH in 'Rem Zone' 11 subgrade were excavated, validated and replaced with compliant fill materials. The nine outliers of lead, arsenic and benzo(a)pyrene identified in the separation layer had been removed by the Follow On Project as part of their works.

Nuttall. REP-ENL-CK-01b-OLP-SP1-E-0146. Human Health Report for CZ1b (Excluding Late Access Areas). February 2009. (ODA Ref: 09/90044/AODODA)

This report validates the remedial works carried out within a sub-section of CZ1a in relation to Human Health only. Six hotspots were specifically excavated, validated and backfilled with complaint fill materials. One asbestos exceedance was identified during the earthworks in the separation layer. This will be further investigated, remediated and reported separately. A lead outlier was identified in the separation layer, which will be excavated as part of Follow-on Project works. Records of the material removal and verification that all replacement fill materials comply with the SSAC will be included by the Follow-on Projects validation report

Atkins. 0241-ENW-ATK-LET-00268. Site Wide SSRS Addendum - Criteria for Asbestos in Fill Material. February 2009. (ODA Refs: 08/90083/AODODA, 08/90181/AODODA, 08/90216/AODODA, 08/90217/AODODA, 08/90218/AODODA, 08/90219/AODODA, 08/90220/AODODA, 08/90221/AODODA, 08/90222/AODODA 08/90223/AODODA, 08/90281/AODODA and 08/90326/AODODA)

The SSACs and methodology for assessing asbestos in the HHSL and below marker layer materials was further developed as the works progressed. This resulted in the following changes:

Separation Layer:

- The material for the upper section of the separation layer has a maximum concentration of potentially asbestos fibres of 0.001% w/w [dry weight].
- The lower section will have an arithmetical average (mean) concentration of asbestos fibres of 0.005% w/w [dry weight].

Below Marker Layer:

The asbestos acceptance criteria for materials below the marker layer are not based on potential risk to Legacy end user human health as the presence of a minimum 600mm thick separation layer eliminates the inhalation and other pathways between source and receptor for the exposure of end users of the site. The below marker layer SSAC for placed material (general fill) is based on the EA Hazardous Waste guidance, which is set at 0.1%w/w [wet weight]. This criterion is based on pre-classification of material rather than in-situ testing.

The sub-grade criterion is solely based on potential landowner liabilities. Therefore, as this material is not considered a „waste“, it is not bound by the Hazardous Waste Regulations. However, the landowner is conscious of the classification of these materials in the future, should they be excavated for disposal, and so uses the waste criterion as a screening measure to inform them on the need for further action.

The risks to construction and future maintenance workers are not addressed by remediation, as they are expected to be dealt with by risk assessment and subsequent mitigating actions.

Nuttall. MST-ENL-CE-01a-OLP-SP1-E-0164. Addendum to the RMS for CZ1a (Additional Works at Murphy's Yard). April 2009. (ODA Ref: 09/90114/AODODA)

During the implementation of the works; further localised hydrocarbon contamination was identified as an immiscible product within the RTDs, particularly in the lower (coarser) section of the RTD, which required treatment. This report delineates an area within the gravels where contamination is considered to exist at concentrations that could not be addressed by the injection of ORC. As such, the excavation and removal of approximately 7,700m³ of impacted gravels will be undertaken in order for the ORC treatment to be effective.

Nuttall. REP-ENL-CK-01b-OLP-SP1-E-0263 Addendum to the CZ1b (CZ1b) Human Health Validation Report (Excluding Late Access Areas), April 2009. (ODA Ref: 09/90044/AODODA)

This report concludes that the identified asbestos exceedance in the separation layer was less than the prevailing criterion based on the Legacy land use being hardcover. Given the risk to human health associated with asbestos is driven by inhalation of fibres, the presence of hard standing will mitigate the risk to human health by eliminating the pathway between source and receptor.

WSP Remediation MST-ENL-CE-01Z-OLP-SP1-E-0168. Groundwater RMS for Area 1 (Murphys Yard). May 2009. (ODA Ref: 09/90155/AODODA)

This document provides confirmation of the additional groundwater remedial works to be undertaken within Area 1 only in Murphys Yard in the southern portion of Cz1a to address the identified hydrocarbon contamination within the RTD groundwater.

WSP Remediation. REP-ENL-CE-01a-OLP-SP1-E-0167. Interim Verification Report: Groundwater (Areas 2, 3, 4). May 2009. (this interim report acted as a progress report and was submitted to the EA for information. The findings of this report have been superseded by the Final Verification Report for this area – please see 09/90281/AODODA)

This report details the post remediation groundwater monitoring for validation purposes undertaken in December 2008 within the RTD only. The majority of Groundwater Remediation Area 2 (South) and some of Area 3 is located within the Balfour Beatty cofferdam, and as a consequence, full verification of this area using groundwater samples is not possible due to the loss of monitoring wells. However two down hydraulic gradient boreholes have been installed south of the cofferdam to allow further monitoring. Recharge of LNAPL has been identified in one discrete location of Area 2 (North), which has resulted in the DPVE system being re-commissioned for the recovery of LNAPL in line with the RMS Addendum. The hydrogeochemical field data gathered to date confirms the aquifer within the areas of concern remains aerobic which will facilitate hydrocarbon degradation and therefore no additional ORC application measures are considered necessary at this stage.

Nuttall. REP-ENL-CK-01Z-OLP-SP1-E-0274. Human Health Validation Report for CZ1 River Wall and North of Marshgate Lane, June 2009. (ODA Ref: 09/90167/AODODA)

This report validates the remedial works completed in the five sub-sections of the River Wall Areas: northern hard wall, north soft wall, south soft wall, central hard wall and the strip of land between cofferdam and the existing river wall at the southern end of the site. Three remediation zones (Rem Zone 1, 2 and 3) located within CZ1b (North of Marshgate Lane) and a single remediation zone (hotspot area) (also Rem Zone 1) located within CZ1a (North of Marshgate Lane) were excavated, validated and replaced with compliant fill materials. One asbestos exceedance was identified within the separation layer that will be excavated and reported in a separate report.

WSP Remediation. REP-ENL-CK-01a-OLP-SP1-E-0300. Olympic Park CZ1A Aquatic Centre (Area 2, 3, 4) RTD Final Groundwater Verification Report, Revision 2. September 2009. (ODA Ref: 09/90281/AODODA)

This report validates the RTD groundwater treatment areas 2, 3 & 4 within CZ1a. Assessment and verification of the controlled waters SSAC has been undertaken on a well by well basis for each contaminant for the three treatment areas. The LNAPL and gross contamination abstraction works have been successful in reducing the contaminant mass in area 2 north with recovery of localised recharged LNAPL in Area 2 (north) continuing.

The DPVE system continues in Areas 1 and 3 and shall be operated until no practical LNAPL recovery continues or observed LNAPL monitoring remains <5mm thickness over a period of two months. An addendum to this report will be submitted to validate and verify the outstanding LNAPL recovery works.

Nuttall. REP-ENL-CK-01Z-OLP-SP1-E-0305. Addendum to the Human Health Validation Report for Riverwall Zone and North of Marshgate Lane. December 2009. (ODA Ref: 09/90415/AODODA)

The main report identified the residual exceedance of asbestos in the separation layer that required corrective action. This report confirms this asbestos exceedance will be removed by the Follow-on Project as part of the works associated with construction of the temporary H08 bridge approach embankment. Confirmation of its removal will be recorded in the Follow-on Projects validation report.

WSP Remediation. REP-ENL-CK-01a-OLP-SP1-E-0309. CZ1a Area 2 LNAPL Risk Assessment (Addendum to the CZ1a Aquatic Centre [Areas 2, 3, 4] Final Groundwater Verification Report). March 2010. (ODA Ref: 09/90384/AODODA)

This report presents an assessment of the residual risks to controlled water receptors presented by LNAPL that remains in the north of CZ1a Area 2. The LNAPL has been confirmed to be heavy end distillate lubrication oil (C₂₀-C₃₅), which has inhibited its recovery via various techniques including DPVE and passive recovery. Due to this the long term verification requirements that have been specified could not be achieved. However, further assessment following the remedial works (installation of the river wall) and construction of the Aquatic Centre cofferdam, has identified that groundwater flow is now towards the south and southeast in the northern and central section of the site, becoming south-westerly in the south of CZ1a. Therefore, the pathway for contamination from the LNAPL source to the compliance point is approximately 660m, rather than the 40m assumed in the SSRS, which has resulted in a distance of 100m being used as the revised compliance point. Risk based remedial targets have been derived for comparison to the maximum source concentration, which demonstrate that the residual LNAPL and associated dissolved phase contamination presents a negligible risk to controlled waters at the agreed compliance point. Based on the limited extent of the residual LNAPL, limited solubility and mobility of the lubrication oils, observed degradation patterns and hydrogeological regime, it is concluded that the residual LNAPL on the CZ1a site does not represent an ongoing risk to controlled water receptors. On this basis the DPVE system ceased operation and was decommissioned in Area 2. In order to confirm the stability of the LNAPL following the cessation of extraction, a number of down-gradient boreholes will be monitored quarterly for a period of six months.

WSP Remediation. REP-ENL-CE-01a-OLP-SP1-E-0320. Validation Report Addendum: Summary of Groundwater Trends (Areas 2, 3, 4). April 2010. (ODA Ref: 10/90131/AODODA)

This letter report confirms the findings of the main verification report, and the additional monitoring confirms that groundwater concentrations and trends have remained consistent through the additional six months monitoring period. Field monitoring of aquifer conditions and contaminant concentration trends provide lines of evidence of the ongoing degradation of contaminants. As such, it is proposed that no further monitoring of the RTD groundwater remediation works is required and the RTD groundwater in Areas 2, 3, 4 is validated with respect to controlled waters.

Nuttall. MST-ENL-CK-01Z-OLP-SP1-E-0180. Addendum to the RMS for CZ1a and 1b (Review of Controlled Waters PAH Assessment Methodology). April 2010. (ODA Ref: 10/90201/AODODA)

This report presents a review of the CSM and provides revised PAH SSAC for CZ1a and CZ1b, based on adopting an assessment approach consistent with the other nearby construction zones. This CSM review enabled the SSACs to be revised with respect to the controlled waters in CZ1a and CZ1b only.

WSP Remediation. REP-ENL-CK-01a-OLP-SP1-E-0324. CZ1a Area Final RTD Groundwater Validation Report. May 2010. (ODA Ref: 10/90241/AODODA)

This document validates the treatment of the RTD groundwater completed within Murphys Yard. The gross contamination abstraction work has been successful in reducing the contaminant mass and the ORC injections were successful in reducing the dissolved phase contamination in Area 1. All contaminants of concern within the CZ1a Area 1 are below the prevailing SSAC. The designers do not specify the risks to human health from groundwater as alternative mitigation measures have been proposed via incorporation of gas and vapour protection into any future buildings.

Nuttall. REP-ENL-CK-01Z-OLP-SP1-E-0252. PDZ1 Unsaturated Zone Validation Report. September 2010. (ODA Ref: 10/90347/AODODA)

This reports validates the remedial works in the three sub-sections within PDZ1: CZ1a, CZ1b and the CZ1a River Wall area comprising delivery of the EWFL, remediation of the hotspots and "Rem Zones" (12No. in CZ1a & 6 in CZ1b) via excavation, validation and backfilling with compliant fill, installation of a new river wall and cofferdam, investigation of 9 former Victorian Wells and the decommissioning of one former Victorian Well.

Nuttall. REP-ENL-CK-01Z-OLP-SP1-E-0276. Addendum to the PDZ1 Unsaturated Zone Validation Report - Review of Post Earthworks Groundwater Data. September 2010. (ODA Ref: 10/90457/AODODA)

This report concludes the RTD groundwater within the saturated zone does not present an unacceptable risk to the human health of end-users of the site or to controlled waters based on the design SSRS and the current understanding of the Legacy Masterplan.

APPENDIX C:

Key Parties

Key Parties for PDZ1

Responsibility	Organisation
Client:	Olympic Delivery Authority (ODA)
Land owner:	Olympic Park Legacy Company (OPLC) (this was transferred from London Development Agency)
Local Planning Authority:	ODA Planning Decisions Team - PDT
Key Stakeholders:	British Waterways Environment Agency London Borough of Newham
Client's Project Manager:	Atkins
Designer:	White Young Green Environment (WYGE)
CDM Coordinator:	Arup
Enabling Works Tier 1 Contractor:	BAM Nuttall Limited (Nuttall)
Enabling Works Tier 1 Contractor Technical Adviser – Remediation:	Halcrow
Main soil treatment contractors (Tier 2 Contractor):	DEME Environmental Contractors (DEC)
Groundwater Monitoring – Enabling Works:	Nuttall
Groundwater Monitoring – Post Enabling Works:	WSP Environmental
Chemical Testing Laboratory:	TES Bretby (ESGL)
Geotechnical Testing Laboratory:	Environmental Services Group Limited (ESGL)
Groundwater remediation in CZ1a (Tier 2 Contractor)	Erith/WSP
UXO Study:	BAE Systems
UXO Site Specialists:	MACC International

APPENDIX D:

Assessment of Retained Areas Risk in PDZ1

Selected extracts, using the same heading numbers, have been provided below from the Retained Areas Risk Assessment Report (Version 4) REP-ATK-CM-ZZZ-OLP-XXX-E-0007 for information purposes only. We recommend the final Retained Areas Risk Assessment Report is read in its entirety and that no reliance shall be placed upon this extract.

4. Findings

4.1 Human Health Risk Assessment

The retained areas described for each PDZ or CZ below include all the originally identified retained areas, including those which have since been removed from the assessment on the basis of further works carried out by Enabling Works or FoP since the earlier drafts of this report. Those areas removed / remediated have been included for continuity and completeness. Some areas were only partially removed / remediated; this may be either a proportion of the area being fully remediated thereby reducing the size of the retained area, or by the further works addressing specific pathways whilst others may still remain (e.g. placement of separation layer or hard cover which prevents ingestion, dermal contact and inhalation of dust from potentially contaminated soils but does not prevent inhalation pathways). This may have led to a change in the risk rating from that provided in earlier drafts of this report.

4.1.1 Initial Risk Assessment

The tables in this section present the results of the qualitative risk assessment undertaken for the retained areas. The tables show the risk assessment risk rating and note where this has been revised from earlier drafts of this report due to further remedial works being undertaken.

A number of these retained areas are within areas of land which are privately owned and outside the control of the ODA. These features have been identified in the tables below and have been included in the tables in Appendix C for completeness. As these areas are within the RLB there is a requirement for the potential risk to these areas to be assessed. Areas which have never been under the control of the ODA have been considered separately in this report. Areas which were under the control of the ODA and have subsequently been permanently handed over to a third party have been included within the risk assessment and where required further assessed in this report.

4.1.1.1 PDZ1

Retained areas in PDZ1 are shown on Figure 1 and summarised in Table C1.1 (Appendix C). The information in these tables is derived from the SSRS reports for CZ1a and CZ1b and as well as supplementary drawings and documentation presented in Appendices A and B.

Retained areas consist of the third party boundary present along the eastern and south-eastern edges of PDZ1, two head houses (RB1 and RB2), a concrete sump (RB3), associated service areas and a batter exclusion zone. A section of the E31 bridge access road has also been retained in the north-western part of the site.

The proposed Legacy end uses for the retained areas in PDZ 1 comprise Legacy Soft and Hard Landscaping, Stadia and Legacy Athletes Village (residential). The most sensitive end user in PDZ1 is assumed to be a 0-6 year old female child and the remaining human health exposure pathways that apply to this receptor for the Legacy end uses relevant to the retained areas in this PDZ are soil ingestion, dermal contact, inhalation of outdoor vapours from soil, inhalation of outdoor particulates and inhalation of indoor vapours from soil. It should be noted that if there is a change in land use on this PDZ the number and type of pathways may require adjustment.

Table 4.1 summarises the risk categories of retained features in PDZ1 detailed on Figure 1 and reported in Table C1.1 in Appendix C.

Table 4.1 – PDZ1 Retained features human health risk assessment summary.

Retained Feature	Description	Initial Risk Assessment
RR1	E31 Bridge Abutment	No unacceptable risk*
TPB1	Boundary with Network Rail	Low Risk
TPB1a	Buried drums adjacent to boundary with Network Rail	Low Risk
TPB2	Boundary with National Grid Head House	Low Risk
TPB3	Boundary with EDF Head House area	Low Risk
RB1	EDF Head House	No unacceptable risk
RB2	National Grid Head House	No unacceptable risk
RB3	Concrete Sump	Low Risk
S1**	Mains Supply 1kv	High Risk
BEZ1**	Associated with River Wall	Medium Risk

*Risk rating has been down graded from 'Low Risk' in earlier drafts of this report due to feature removal and remediation of associated area. Details of the remediation undertaken are presented in Table C1.1 provided in Appendix C.

**Feature has been partially removed or remediated. Details of the remediation undertaken are presented in Table C1.1 provided in Appendix C and where the risk is low/medium or higher, the risk considered further in this report.

Retained area RR1 was assessed in earlier drafts of this report as having a low risk rating. This area has since been remediated (excavated and backfilled with compliant material, with a 150 – 200 mm concrete blinding layer placed at the base of the excavation) and validated as part of the works for the construction of the E31 bridge abutment. Therefore, the risk rating has been downgraded to 'no unacceptable risk' and RR1 is not considered further.

Retained areas S1 and BEZ1 have been identified as high risk and medium risk respectively and have been taken forward for further assessment as presented in this report.

4.1.2 Further Assessment and Mitigation Measures

For those retained areas which have been identified as remaining and which are presenting a low/medium risk or higher, further assessment or risk reduction measures will need to be considered. It will be the responsibility of the FoP to implement risk reduction measures or undertake any further detailed assessments which may be required to assess potential risk to human health.

Table 4.2 lists the retained areas assessed in the previous section as low/medium to high risk, the responsible FoP and details of further assessment or risk reduction measures that will be taken on site to protect receptors from the potential risk. A revised risk based on these measures being implemented has also been provided. It has not been possible to identify all responsible FoPs or potential risk reduction measures. Any remedial works undertaken by the FoP will be included in their validation reports and any remaining areas will be included in the Validation Residual List, which will be handed over to any following contractors or developers for consideration in their detailed design.

The majority of areas have been reduced to low risk, either due to the proposed incorporation of marker layer and separation layer, presence of hardcover or due to the fact that they constitute a relatively small area and therefore the receptor is only likely to spend a very brief period of time within the retained feature. The classification of small retained areas as low risk was agreed in discussions with PDT in a meeting held on 7th July 2010. Small areas are considered to only present a low risk to human health as the duration and frequency of exposure to the area is likely to be lower than would be assumed for a larger area. For the purposes of risk assessment it is generally assumed the contamination is uniformly spread over an area. However, the retained features generally constitute part of a much larger area, the majority of which has been remediated. The retained areas which are considered to be small are those areas where the receptor will not be continually exposed to contamination either because the area is very narrow and therefore the potential receptor will pass over it quickly or is small in areal extent. It is therefore considered the frequency and duration of exposure to these areas is likely to be lower than if the contamination was uniformly spread over a much wider area.

It should be noted that if the mitigation measures are not implemented in these areas then the risk assessment for the area would revert back to the initial assessment.

Table 4.2 – Retained areas initially considered to be low/medium to high.

Retained Feature	Description	Result of Initial Risk Assessment	Responsible Follow on Project	Management / Risk Reduction Measures <i>Additional Proposed Management / Risk Reduction Measures</i>	Revised Risk (Risk driving item(s))
PDZ1					
S1	Mains Supply 1kv	High Risk	Legacy Developer	<p>Partially remediated. Enabling works have removed material abutting the utilities ducts and 1.5 to 3 m of fill including marker layer and separation layer have been placed. The remaining source is only a thin strip (~10 m wide) of material beneath the cable ducts at depth.</p> <p><i>The SSRS specifies that vapour protection will be incorporated within the fabric of built structures.</i></p>	<p>Medium Risk</p> <p>(Only the outdoor inhalation of vapours pathway remains. If the area is developed as a road and is not incorporated into residential gardens then the risk rating could be revised further to Low Risk)</p>
BEZ1	Associated with River Wall	Medium Risk	Structures Bridges and Highways (SBH) / LPR	<p>Partially remediated. Some material within this area has been excavated and material at base of excavations verified. Levels in this area have been reduced by approximately 1 m and marker layer placed over half of the area.</p> <p><i>150 mm of topsoil will be placed and seeded for meadow grass. It is considered likely this will be retained at Legacy.</i></p>	<p>Low Risk</p> <p>(Ingestion and dermal contact pathways have been removed by the placement of marker layer and the 150 mm of topsoil and only the outdoor air pathway will remain)</p>

4.2 Controlled Waters Risk Assessment

4.2.1 PDZ1

A site wide source of COC was identified within CZ1a, however no source was identified in CZ1b. No outliers have been observed within, or within 5 m of, retained areas on PDZ1.

Remedial technologies applied within PDZ1 include soil source removal, removal of non-aqueous phase liquid NAPL and injection of ORC into groundwater. Additionally a river wall has been constructed along the western boundary of PDZ1 and has been proven to greatly reduce the hydraulic connection between the River Terrace Deposits aquifer and the river itself. These remedial measures are expected to have considerably reduced the leaching of contaminants into groundwater across the PDZ and thus reduce the related risk to controlled waters receptors.

4.3 Privately Owned Areas

A number of the retained areas fall within parts of the site which are privately owned.

These privately owned areas can be split into two categories;

- Areas which have never been under the control of the ODA; and
- Areas which were under the control of the ODA and have subsequently been permanently handed over to a third party

4.3.1 Areas never under the control of the ODA

Although these areas have never been under the control of the ODA since they fall within the RLB there is a requirement for the potential risk to these areas to be assessed.

4.3.1.1 PDZ1

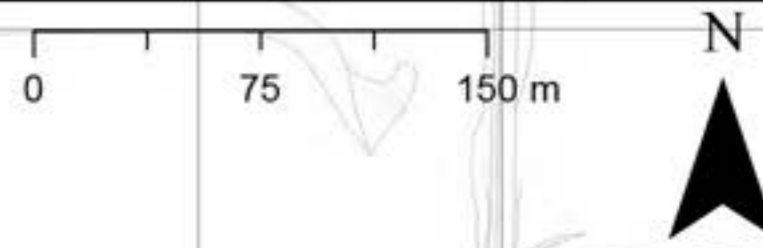
The EDF and NGPH headhouses are privately owned land.

4.3.2 Areas subsequently handed over to third party

Areas which have been permanently handed over to a third party have been included within the preliminary assessment. The third party will have been made aware of the retained areas through the handover information. The responsibility for these areas is no longer with the ODA.

Only those areas which were identified as greater than Low Risk during the initial assessment have been considered further. This was only identified to be the case in CZ8a for RV3 and part of RV2.

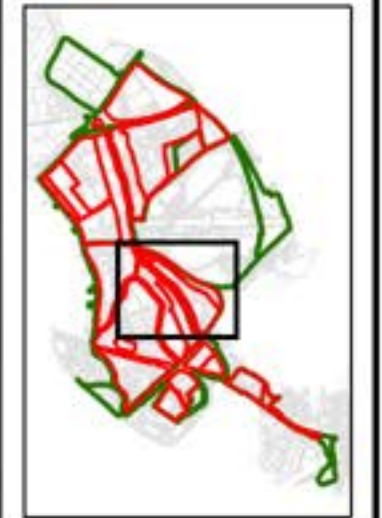
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Do not scale this drawing.
 Notes:
 (*) This drawing is based upon the Tier 1 retained area drawing 2DD-ENL-CK-01Z-OLP-SP1-E-0335

- Legend**
- Planning Delivery Sub-zone Boundary
 - Services (S)
 - Batter Exclusion Zone (BEZ)
 - Retained Building (RB)
 - Third Party Boundary (TPB)
 - Retained Road (RR)
 - Other (O)
 - Feature Removed



Rev	Description	Drawn Date	Date

Safety Health and Environment Information
 In addition to the hazards/risks normally associated with the type of work specified on this drawing, note the following text and instructions:

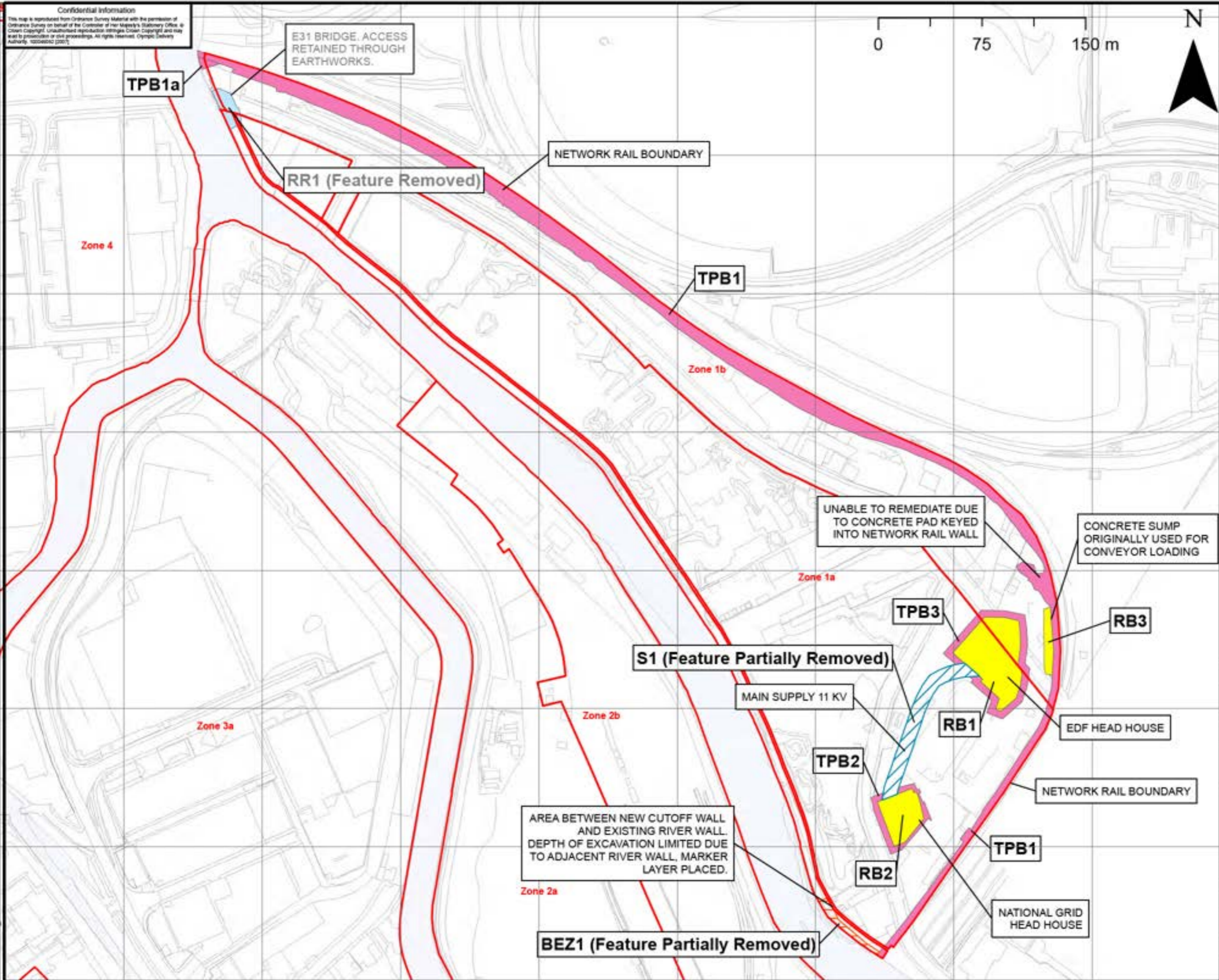
Construction	
Commissioning	
Decommission/Future	

For information regarding to use, clearing and maintenance see the health and safety file. It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement.

Prepared by
 ATK NS
 On behalf of the ODA

RETAINED AREAS IN PLANNING DELIVERY ZONE 1

Project Title RETAINED AREAS RISK ASSESSMENT		
Drawn	Checked	Approved
Date 15/01/11	Scale 1:2,500	Size A3
Purpose of Drawing FOR INFORMATION		Drawn by
Drawing No. FIGURE 1	Drawn	Rev.



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Table CL1
 POZ1 retained features summary table
 of risks to human health

FEATURE DESCRIPTION, REFERENCES AND AREA						HUMAN HEALTH POLLUTANT EMERGE SUMMARY							
Sub-area Reference (where applicable)	Type of non-retained feature	Feature identifier <small>(refer to figure 1 in report REP-WYD-CM-C22-CLP-XXX-E-000)</small>	Feature description and surface profile	SOPD Report reference	If available, what is the Validation Report reference?	Size of feature			Source Assessment: Summary of Information from SORP Reports				
						Length of feature <small>(m)</small>	Average width of feature <small>(m)</small>	Area of feature <small>(m²)</small>	Summary of site history	Findings of archive assessment	DORA Results: Zone Wide Contamination	DORA Results: Outliers falling within feature	Is a source present or likely to be present?
C21a and C21b	Retained Road	R01	E01 Edge Abutment			25	12.8	320.7	Paint, Ingress and stored works; Paved road works; Soap works; Gas and bag works; Chemical works; Engineering works; Goods depot; Fuel infrastructure; vehicle salvage and maintenance; and concrete manufacture / distribution.	No archive assessments available	Heavy Metals/Asbestos + VOC + Hydrocarbons	Information not available from WYD Lab SORPs	Yes
C21b	Third Party Boundary	TP01	Network Flat Boundary (north of E to 4-m) - partially soft landscaping partly concrete			900	8.8	801.4					
C21b	Third Party Boundary	TP01a	Buried drains adjacent to boundary with Network Flat			15.00	4.2	67.0					
C21a	Third Party Boundary	TP02	Associated with National Grid Head House			120	3.5	421					
C21a and C21b	Third Party Boundary	TP03	Associated with EDF Head House			200	5.0	993.7					
C21a and C21b	Retained Building	R01	EDF Head House - recently built and complete deep shafts beneath			30	87.6	2627.5					
C21a	Retained Building	R02	National Grid Head House - recently built and complete deep shafts beneath			15	56.6	852.1					No
C21b	Retained Building	R03	Concrete sump	REP-WYD-CM-C1A-AQA-XXX-E-1011 REP-WYD-CM-C1A-AQA-XXX-E-1110 REP-WYD-CM-C1A-AQA-XXX-E-1090 REP-WYD-CM-C1A-RWA-XXX-E-1101 REP-WYD-CM-C1B-AQA-XXX-E-1301 REP-WYD-CM-C1B-AQA-XXX-E-1081	REP-ENL-CX-01a-DLP-SP1-E-0184 REP-ENL-CX-01a-DLP-SP1-E-0205 REP-ENL-CX-017-DLP-SP1-E-0206 REP-ENL-CX-017-DLP-SP1-E-0214 REP-ENL-CX-019-DLP-SP1-E-0148 REP-ENL-CX-019-DLP-SP1-E-0263 REP-ENL-CX-012-DLP-SP1-E-0252 REP-ENL-CX-019-DLP-SP1-E-0098	45	6.4	288.8					
C21a	Services	S1	Main supply 11kV			112	10.7	1195.6					Yes
C21b	Water Exclusion Zone	BEZ1	Area between new cut-off wall and existing river wall. Depth of extension was limited due to river wall. Marker layer has been placed and material beneath verified.			50	4.8	237.9					
						Sum of Retained Feature Areas (m ²) Total site area of POZ1 (m ²) Percentage of Site Covered by Retained Areas (%)			1993 128114 15				

Cells in grey - Area is already owned

NO VOCs are listed please ensure this is an accurate assessment - see report
 NO PCBs are listed please ensure this is an accurate assessment - see report

Table C1.1
PSZ1 retained features summary table
of risks to human health.

		HUMAN HEALTH POLLUTANT LINKAGE SUMMARY							HUMAN HEALTH RISK SUMMARY												
Sub-area Reference (where applicable)	Type of non-remediated feature	Feature Identifier <small>(Refer to Figure 5 in report ESP-ATN-OR-22-014-100-0-000)</small>	Pathway Assessment					Receptor Assessment		Risk Magnitude Assessment				Initial Risk Assessment		Management / Risk Reduction Measures Additional Proposed Management / Risk Reduction Measures		Feature Removed	Responsible Follow on Project	Justification for revised risk assessment	Revised Risk Assessment
			Is ingestion pathway present?	Is dermal contact pathway present?	Is dust inhalation pathway present?	Is indoor inhalation pathway present?	Is outdoor inhalation pathway present?	What is the most sensitive and use category?	Critical Receptor	Is a receptor present?	Complete Potential Pollutant Linkage	Frequency of critical receptor visiting the site?	Likely duration of visit?	Comments	Risk Rating / Is No Unacceptable Risk, Low, Low-Medium, Medium, Medium-High or High?	Comments	Yes / No	Y/N?	Comments	Risk Rating / Is No Unacceptable Risk, Low, Low-Medium, Medium, Medium-High or High?	
C21a and C21b	Retained Road	RR1	No	No	No	No	Yes	Hard Landscaping Legacy Use	0 to 6 year old female child	Yes	Yes	Daily	Short periods	Bridge structure - beneath road and bridge over waterway. Prolonged periods likely. Assume used daily by a commuter.	Low Risk	Area remediated (excavated and backfilled with composite material, with a 150-200mm concrete binding layer placed at base of excavations) and refilled.	Yes	N/A	Feature removed	No Unacceptable Risk	
C21b	Third Party Boundary	TPB1	Yes	Yes	Yes	No	Yes	Soft Landscaping Olympic Use	0 to 6 year old female child		Yes	Rarely	Short periods	Pathway embankment - Prolonged access unlikely.	Low Risk	No further assessment required.					
C21c	Third Party Boundary	TPB1a	Yes	Yes	Yes	No	Yes	Soft Landscaping Legacy Use	0 to 6 year old female child		Yes	Rarely	Short periods	Pathway embankment. Prolonged access unlikely. Drains probably empty (one was removed but disconnected to be filled with soil).	Low Risk	No further assessment required.					
C21d	Third Party Boundary	TPB2	No	No	No	No	Yes	Hard Landscaping Legacy Use	0 to 6 year old female child		Yes	Rarely	Short periods	Associated with National Grid and EDF head house - both are areas of hard landscaping.	Low Risk	No further assessment required.					
C21e and C21f	Third Party Boundary	TPB3	No	No	No	No	Yes	Hard Landscaping Legacy Use	0 to 6 year old female child		Yes	Rarely	Short periods	Associated with National Grid and EDF head house - both are areas of hard landscaping.	Low Risk	No further assessment required.					
C21a and C21b	Retained Building	RB1	No	No	No	Yes	No	Stable/Vermat Legacy Use	Female adult (age 18 to 59 years)		No			Potential source material has been excavated during building of shafts. Privately Owned Land - restricted access; area not covered by Olympic Planning Permission.	No Unacceptable Risk	No further assessment required - Privately Owned Land					
C21e	Retained Building	RB2	No	No	No	Yes	No	Stable/Vermat Legacy Use	Female adult (age 18 to 59 years)		No			Assumed that this is not accessed as it was originally used for conveyor loading.	Low Risk	No further assessment required.					
C21f	Retained Building	RB3	No	No	No	No	Yes	Hard Landscaping Legacy Use	0 to 6 year old female child		Yes	Rarely	Short periods	Assumed that this is not accessed as it was originally used for conveyor loading.	Low Risk	No further assessment required.					
C21g	Services	S1	Yes	Yes	Yes	Yes	Yes	Athletes Village Legacy Use	0 to 6 year old female child		Yes	Daily	Long periods	Legacy plan indicates potential use for residential property.	High Risk	Material showing the cable ducts has been excavated. 1.5-2 m of fill and marker layer have been placed over the top of the features. SS105 specifies that vapour protection will be incorporated within the fabric of built structures.	Partially	N/A	Games track is likely to be asphalt. Legacy plan indicates potential development partially as a road and partially as part of development site. For vapour pathways, the SS105 specifies incorporation of hard gas / vapour protection measures within fabric of building structures. Outdoor vapour pathway is the only remaining source as the remaining source is only a thin strip of material beneath the cable ducts. This is considered to pose a low risk to human health.	Medium Risk (Low Risk if no residential gardens placed over top of features)	
C21h	Water Exclusion Zone	BEZ1	Yes	Yes	No	No	Yes	Soft Landscaping Legacy Use	0 to 6 year old female child		Yes	Daily	Short periods	Information from site indicates that it is not fully excavated hence marker layer. Residential property nearby, assume daily visit but for brief periods.	Medium Risk	Validation report indicates that although depth of excavation was limited due to adjacent river wall, the material at base of excavation has been verified. The overcast was not altered, but the levels of the area have been reduced by approximately 1m. 100mm of topsoil to be spread for re-vegetation grass for games and probably to be retained in legacy.	Partially	DB11LPR	Small area remaining. Ingestion and dermal contact pathways have been removed.	Low Risk	

Cells in grey - Area is Privately Owned

BSF - 2/1/2024
Sheet 1 of 10
Long - 4 hours

Table C2.1
PDZ1 retained features summary table of risks to controlled waters.

FEATURE DESCRIPTION, REFERENCES AND AREA														
Sub-zone Reference (where applicable)	Type of non-remediated feature	Feature identifier (Date is Type 1 in report REF-476-CK-07-CKP-001-E-0001)	Feature description and salient points	SORS Report reference	If available, what is the Validation Report reference?	Size of feature			Summary of site history	Findings of site history assessment	CW Zone (if applicable). Please refer to drawing			
						Length of feature (m)	Average Width of feature (m)	Area of feature (m ²)						
C21a and C21b	Retained Road	R01*	F.0: Bridge Abutment			25	12.8	320.7						
C21b	Third Party Boundary	TP01	Netherak Hall boundary (land off 2 to 4 m) - partially soft landscaping, partly concrete			905	8.8	8031.4						
C21b	Third Party Boundary	TP01a	Buried drains adjacent to boundary with Netherak Hall			15.96	4.2	67.6						
C21a	Third Party Boundary	TP02	Associated with National Grid Head House			123	3.5	431						
C21a and C21b	Third Party Boundary	TP03	Associated with EDF Head House			200	5.8	1162						
C21a and C21b	Retained Building	R01	EDF Head House - mostly built and comprise deep shafts beneath	REF-WYG-CK-C1A-AGA-000-E-1011 REF-WYG-CK-C1A-AGA-000-E-1119	REF-036-CK-012-CKP-0P1-E-0252 REF-036-CK-012-CKP-0P1-E-0260	30	67.8	2037.2	Tank, lagging and stored works; Potted plant works; Soap works; Sack and bag works; Chemical works; Engineering works; Deeds depot; Rail infrastructure; vehicle storage and maintenance and concrete manufacture / distribution.	No change assessment available	No controlled waters zone			
C21b	Retained Building	R02	National Grid Head House - mostly built and comprise deep shafts beneath	REF-WYG-CK-C1A-AGA-000-E-1021 REF-WYG-CK-C1B-AGA-000-E-1001	REF-036-CK-012-CKP-0P1-E-0320 REF-036-CK-012-CKP-0P1-E-0324	15	36.8	552.1						
C21b	Retained Building	R03	Concrete pump	REF-WYG-CK-C1B-AGA-000-E-1001	REF-036-CK-012-CKP-0P1-E-0275	45	8.1	364.5						
C21a	Service	S1**	Main supply 11kV			112	10.7	1195.6						
C21b	Water Exclusion Zone	REZ1**	Area between new cut-off wall and existing river wall. Depth of excavation was limited due to river wall. Marker layer has been placed and material beneath verified.			50	4.8	237.9						
						Area of all retained features (m ²)						14915		
						Total site area of PDZ1 (m ²)						120114		
						Retained area as % of total						12.4		
						Area of remediated site						105171		

Cells in grey - Area is privately owned and has therefore been excluded from this assessment.
* Feature removed, ** Feature partially removed.
Validation details are pending, to be provided by the responsible project.
Unknown if Controlled Waters remediation has been undertaken upon feature total or partial removal.

Table C2.1
PDZ1 retained features summary table of risks to controlled waters.

FEATURE DESCRIPTION, REFERENCES AND AREA			CONTROLLED WATERS RISK ASSESSMENT					
Sub-zone Reference (where applicable)	Type of non-remediated feature	Feature Identifier (Refer to Figure 1.11 report WPA/AN/CM/22/03/PA004/005)	Controlled Waters for Controlled Waters	DQSA Results: Contaminants of Concern in soils and groundwater	DQSA Results: Soil outliers falling within Site of Interest	What remediation methods were employed?	Is risk based only upon Ammoniacal Nitrogen or Sulphate?	Risk summary
CZ1a and CZ1b	Retained Road	R01*	Soils and Groundwater	None	No	None Required	No	The majority of the soil source within the unexcavated zone has been removed. Groundwater beneath retained areas is considered to be in continuity with groundwater beneath adjacent areas of land. The risk arising from this are considered to be greatly mitigated by remediation undertaken to address the contamination in the River Terrace Deposits groundwater. The remedial actions applied in the River Terrace Deposits groundwater are considered to mitigate all potential risks arising from groundwater beneath retained areas and any potential source within the unexcavated zone.
CZ1b	Third Party Boundary	TPB1		None				
CZ1b	Third Party Boundary	TPB1a		Heavy Metal/Metalloid - Hydrocarbons		Soil source removal, removal of NAPL and gross contamination, OHC and reconstruction of river wall incorporating pitched water and River Terrace Deposits groundwater cut-off		
CZ1a	Third Party Boundary	TPB2		None		None Required		
CZ1a and CZ1b	Third Party Boundary	TPB3		None		None Required		
CZ1a and CZ1b	Retained Building	R01		None		None Required		
CZ1b	Retained Building	R02		None		None Required		
CZ1b	Retained Building	R03		None		None Required		
CZ1a	Sinkhole	SH1**		Heavy Metal/Metalloid - Hydrocarbons		Soil source removal, removal of NAPL and gross contamination, OHC and reconstruction of river wall incorporating pitched water and River Terrace Deposits groundwater cut-off		
CZ1b	Water Exclusion Zone	BEZ1**		None		None Required		

Column grey - Area is privately owned and has therefore been excluded from the assessment.
 * Feature removed, ** Feature partially removed.
 Validation details are pending, to be provided by the responsible project.
 Unknown if Controlled Waters remediation has been undertaken upon feature total or partial removal.

APPENDIX E:
Permit to Proceed Protocol (CD only)



The Permit to Proceed Protocol: Protection of Remediation Works on the Olympic Park

Notice

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Document History

ATKINS JOB NUMBER: 5051803.400 ATKINS DOCUMENT REF: WIZZZ/000/02/03/0293			DOCUMENT REF: PRO-ATK-CM-ZZZ-ZZZ-ZZZ-E-0003 (Formerly PRO-ATK-CM-03a-STA-SP1-Z-0001)			
Revision	Purpose Description	Originated	Checked	Reviewed	Authorised	Date
10	Division of Permit to Proceed & Soil Hospital Documents	■	■	■	■	01/07/09
09	For Implementation	■	■	■	■	30/01/09
08	For Implementation	■	■	■	■	15/08/08
07	For Implementation	■	■	■	■	11/08/08
06	For Implementation	■		■	■	11/07/08
05	For Implementation	■		■	■	06/06/08
04	For Implementation	■		■	■	14/02/08
03	For Issue			■	■	07/01/08
02	For Information	■				
01	For Information	■				



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Appendices

APPENDIX A: Summary of Follow on Project Obligations Covered Under the Permit to Proceed Protocol

APPENDIX B: Permit to Proceed Process Diagram



Definitions

CLM – The Employers Delivery Partner

Employer – The Olympic Delivery Authority (ODA) located at 23rd Floor, 1, Churchill Place, Canary Wharf, London, E14 5LN, and includes transferees, successors and assignees.

Enabling Works – The site clearance, demolition, bulk earthworks and Remediation Works carried out by the Enabling Works Tier 1 Contractors to prepare the Olympic Park platform for construction by Follow on Projects.

Enabling Works Formation Level (EWFL) – The site surface level that is handed over to the Follow on Projects by the Enabling Works Tier 1 Contractors.

Enabling Works Sub-Formation Level (EWSFL) – The level beneath the EWFL upon which the Marker Layer is placed.

Enabling Works Tier 1 Contractors – The contractors appointed to a Framework Contract to undertake Demolition, Remediation and Enabling Works. They are BAM Nuttall Ltd (BNL) who have responsibility under the Enabling Works contract to provide the works to the southern area of the site (Construction Zones (CZ) 1, 2, 3, 4 and 8; Planning Delivery Zones (PDZ) 12, 13 and 14) and Morrison Construction Ltd (MCL) who have responsibility to provide the works to the northern area of the site (CZ 5, 6 and 7; PDZ 15).

Exported Material – Materials excavated and removed from Follow on Project sites.

Final Finished Level (FFL) – Final ground levels or constructed floor levels under a building, upon completion of works by Follow on Projects.

Final Build Layer – Term referenced in Planning Conditions for the Olympic Park, meaning soil or other material placed to complete the remediation and, with the exception of topsoil, to be at the finished ground levels.

Follow on Projects (FOP) – Any project involving contractors employed by the Employer to construct infrastructure and venue works on the Olympic Park following completion of Enabling Works by the Tier 1 Contractors.

Human Health Separation Layer (HHSL) (or Separation Layer) – Chemically and geotechnically acceptable fill material which satisfies Human Health and Controlled Waters Site Acceptance Criteria (SSAC/SSRT), which lies above the Marker Layer but beneath the final ground cover.

Imported Material – Infill materials brought into FOP from within or from outside the Olympic Park. All permanent fill materials placed within the Park must be compliant with the site specific remediation criteria as established in the Baseline Remediation Strategy and associated Site Specific Remedial Strategies and Specifications.

Marker Layer – An orange non woven geo-textile membrane (or similar) placed directly beneath the Separation Layer to clearly delineate the separation layer from potentially contaminated materials below.

Permit to Proceed (PTP) Team – The Team responsible for implementation and administration of the protection of remediation works by Follow on Projects. The PTP Team are provided by Atkins and from June 2009 will operate under CLM Project Assurance. The management of the supply and receipt of earthworks materials to and from Follow on Projects will be handled by the separate Soil Hospital Team.

Remediation Technical (RemTech) Team – The Team responsible for residual Enabling Works and established to offer technical advice to Follow on Projects on remediation issues.

Sharepoint – A web-based shared workspace (<https://sharepoint.demrem.com>) which hosts data regarding chemical and geotechnical laboratory test results of materials supplied by Tier 1 Contractors. Its aim is to provide direct access for the FOP to data needed in the validation process of the infill material sourced from Tier 1 contractors.

SMARTStart – A computer system available from BRE, which provides a Site Waste Management Plan (SWMP) tool to aid the construction industry in meeting legislation and as an aid to improving waste management (www.smartwaste.co.uk). This is designed to monitor and track all materials used and / or



generated within a construction site, supporting the requirements of clients and contractors under duty of care.

Soil Hospital Team – Part of the former PTP Team responsible for the administration and management of ‘Request from Contractor’ applications from Follow on Project Teams for the import and export of earthworks materials to and from those projects. The Soil Hospital Team will also retain the responsibility to coordinate the resolution borehole conflicts where construction works conflict with borehole installations across the Olympic Park.



1. Introduction

1.1 Permit to Proceed: The Protection of Remediation Works

The Employer has established this Permit to Proceed (PTP) Protocol, which shall be adopted by all Follow on Project (FOP) Teams, to regulate any disruption, modification or penetration of ground surfaces and to protect the overall integrity of site remediation works across the Olympic Park.

From June 2009 the PTP Team will form part of CLM Assurance. Implementation of this PTP Protocol is designed to protect existing remediation works and maintain environmental protection measures.

The PTP Team will administer this Protocol via 'Protection of Remediation Works (ATK-084)' applications that will be submitted by FOP Teams for all elements of their works that penetrate previously remediated ground surfaces. ATK-084 applications shall be submitted to permit.to.proceed@london2012.com.

1.2 Soil Hospital: Management of Olympic Park Earthworks Material

To facilitate the supply and receipt of earthworks materials between FOP and soil treatment facilities within the Olympic Park, FOP Teams will submit 'Request from Contractor (ATK-088)' applications to the Soil Hospital Team. ATK-088 applications shall be submitted to soil.hospital@demrem.com.

The function of the Soil Hospital Team is described in the separate document:

The Soil Hospital Protocol: Management of Olympic Park Earthworks Materials. (Document Ref: PRO-ATK-CM-ZZZ-ZZZ-ZZZ-E-0005)

1.3 Soil Hospital: Resolution of Borehole Installation Conflicts

Monitoring wells and other borehole installations are located across the Olympic Park. Many of the installations must remain intact and accessible in order to verify that remediation objectives have been met or to allow ongoing groundwater remediation works.

Matters relating to the management of boreholes that conflict with construction works are detailed in the Soil Hospital Protocol (referenced above).

1.4 Compliance Auditing

The PTP Team will audit FOP works to ensure they conform to authorised site remediation strategies and Planning Conditions. Members of the PTP and Soil Hospital Teams shall be allowed access to FOP sites to inspect and audit construction works for compliance against this PTP Protocol; the Soil Hospital Protocol and any relevant permits issued under either protocol.

An audit report will be issued to the FOP Team, their CLM Project Manager and CLM Assurance detailing performance and any key issues identified in the audit.

1.5 Non-Conformance Reports

Where the FOP Team fails to conduct works in accordance with this PTP Protocol, or if in the view of the PTP Team any works or actions pose a potential risk to the integrity of previous (or ongoing groundwater) remediation works, a Non-Conformance Report will be raised by the PTP Team and issued through CLM Assurance.

Non-conformance reports will be issued to the FOP Team and their CLM Project Manager and will be reported to the CLM Executive in monthly Performance Assurance Reports.



2. Olympic Park Remediation Information

2.1 Site Remediation Background

It is the responsibility of the FOP Team to ensure they are familiar with all relevant aspects of completed or ongoing site remediation works and construction activities; such that they may ensure their works do not damage or otherwise negate any preceding site remediation works.

A general summary of remediation works completed at the Olympic Park to date is provided below. These descriptions are not exhaustive and are provided for introductory purposes only. Exact details of completed or ongoing remediation works for specific parts of the site are detailed in site handover documentation and will be referenced on the CLM Sharepoint website (<https://sp.h0twise.com>) within the 'Programme Delivery Management System' (PDMS).

Completed site remediation works have involved or included:

- Removal and treatment of soils below the Enabling Works Formation Level (EWFL) that contained concentrations of contaminants above acceptance criteria defined within Site Specific Remediation Specifications (SSRSpec) and which presented a risk to controlled waters and/or human health receptors in either Olympic or Legacy land use phases of the Olympic Park.
- Provision of a remediated ground cover system incorporating:
 - a Marker Layer (ML), in most cases placed 600-800mm below the Final Finished Level (FFL) and typically consisting of orange geotextile 'Terram 1000' on horizontal surfaces and 'Signal' geogrid type marker layer on slopes steeper than 1(V):3(H).
 - Human Health Separation Layer (HHSL) of soil or aggregate placed in a thickness of (typically) 300mm over the Marker Layer.
- Treatment of excavated soils to render them suitable for reuse, predominantly as General and Structural Fill beneath the Marker Layer.
- Treatment of contaminated groundwater via both pump & treat systems and/or in-situ remediation
- Groundwater interception and pathway control via construction of below ground barriers and/or installation of pumping systems.
- In geotechnical terms, materials have been placed using Method Compaction or End Product Compaction (95% of maximum dry density) as appropriate. California Bearing Ratio (CBR) tests (one test per 1,000m²) have been carried out on the Enabling Works Sub-Formation level (EWSFL) and EWFL to ensure a minimum CBR of 5% on Class 1 and Class 6a (granular fills) and a minimum CBR of 2% on Class 2 materials (cohesive fills).
- Remediation works to address post-construction risks to controlled waters and human health. These works do not, and will not, address potential risks to any FOP Team workforce arising from exposure to soils, groundwater, ground gases or vapours below the site. **The Olympic Park remains a "brownfield site"**. In accordance with legislation, the FOP Team must appropriately assess, control and mitigate potential risks to worker health and safety.

2.2 Reference Documents and Information Sources

It is the responsibility of FOP Teams to be familiar with all applicable planning conditions and relevant site remediation specifications prior to commencing any ground works. These documents will be included or referenced within site handover documentation and on the CLM Sharepoint website (<https://sp.h0twise.com>) within the PDMS.

The following list of generic specification and planning documents is not exhaustive and it remains the responsibility of FOP Teams to be aware of all documents applicable to their works. The PTP Team may audit any aspect of FOP works against any applicable site remediation specifications or planning conditions (which relate to the protection and maintenance of site remediation works).



2.2.1 Remediation Design Documents

1. (Typical) Site Specific Remediation Documents

Site specific remediation and earthworks design documents remain applicable to FOP construction works and present (chemical) soil acceptance criteria and details of how remediated ground cover systems (ML and HHSL) must be constructed within site formation levels:

- Site Specific Remediation Strategy (SSRS)
- Site Specific Remediation Specification (SSRSpec)
- Remediation Method Statement
- Site Validation Reports (where available)

2. Park-wide Remediation Documents

Where site specific remediation design documents do not apply, global site remediation documents and specifications will normally be adopted:

- Global Remediation Strategy
- Global Groundwater Monitoring Strategy

3. Amendments to Remediation Specifications

Agreed alterations or updates to site specific remediation specifications may be introduced via submissions approved by the Planning Decisions Team. Any such amendments made by prior contractors / occupiers of the site will be provided in supplementary handover documentation and will be referenced on the PDMS.

2.2.2 Olympic Park Planning Permissions

Approved planning permissions for the development of the Olympic Park can be viewed at the ODA website (<http://www.london2012.com/planning/>). The park-wide permissions include:

- Olympic, Paralympic and Legacy Transformation Planning Applications: Site Preparation Planning Application
- Olympic, Paralympic and Legacy Transformation Planning Applications: Facilities and their Legacy Transformation Planning Application

2.2.3 Further Standards and Guidance Documents

The following documents include additional design requirements and obligations that FOP Teams must implement with respect to various site construction works:

- The Soil Hospital Protocol: Management of Olympic Park Earthworks Materials
- The Code of Construction Practice
- Intrusive Investigation Method Statement
- EA Guide to Contractors on the Olympic Park
- Environmental Protection Requirements for Piling (REP-ATK-CG-ZZZ-ZZZ-ZZZ-Z-0001)
- Soil Gas and Vapour Risks: A Briefing Note to Designers (REP-ATK-CM-ZZZ-OLP-ZZZ-Z-0001)
- Environmental Permit No. EAWML80790 (South Park Waste Management License)
- Environmental Permit No. EAWML80791 (North Park Waste Management License)
- Construction Waste Management Plan (CLM-D0701-Rep-CWMP-v1.6.doc)
- Memorandum of Understanding for Waste Management Licensing Applied to the Olympic Park (Appended to CWMP)
- A Guide to Material Movements: London 2012 Enabling Works (GUI-MOR-CE-ZZZ-ZZZ-XXX-E-0015)

3. The Protection of Remediation Works

3.1 Introduction

As a minimum, FOP Teams are responsible for the following matters, against which they will be audited:

- Works must comply with site remediation design specifications.
- Works shall not invalidate any previously completed site remediation works.
- Protection, reinstatement or installation (completion) of remediated ground cover systems as necessary (Marker Layer and Human Health Separation Layer).
- Protection of ongoing groundwater remediation works and the maintenance of adequate access to them to allow completion.
- Additional remediation of any unexpected contamination or contaminant hotspots (if necessary).
- 'Duty of Care' obligations under Waste Regulations to satisfy the conditions of Waste Recovery Licenses for the Olympic Park.
- Protection of boreholes and groundwater monitoring installations.

These obligations and responsibilities are further detailed in Table 1 of Appendix A, which includes a cross-reference to generic remediation design, specification and guidance documents and relevant planning conditions.

3.2 Implementation: Application Form ATK-084

Follow on Projects shall submit a PTP application for the 'Protection of Remediation Works' (ATK-084) for any excavation works and under any circumstances where FOP construction works will result in the disturbance or penetration of the EWFL, irrespective of whether or not the works are of a sufficient depth to penetrate the Marker Layer.

Protection of Remediation works applications shall be submitted to the PTP Team (permit.to.proceed@london2012.com) a minimum of 5 working days prior to the commencement of such works. Applications shall be made on an ATK-084 form, shown in the following pages. An electronic version of this form shall be issued to all FOP Teams.

The ATK-084 application should indicate the maximum plan size of any excavation. This will not generally be greater than one section of trench up to 100 metres long, or an area of ground works with plan dimensions up to 25 metres in any one direction (exceptions to these dimensions of works should be agreed with the PTP Team directly and in advance). The FOP may prepare standard method statements that may be referenced in the ATK-084 application to assist in the assessment and granting of the ATK-084 Protection of Remediation Works Permit by the PTP Team.

The ATK-084 application procedure shall be as follows:

1. FOP Team completes Section A of the ATK-084 proforma and submits it electronically to permit.to.proceed@london2012.com, with all necessary supporting documentation (as indicated in the ATK-084 proforma and this PTP Protocol);
2. The PTP Team will review the application and if the planned works comply with this Protocol, will sign off Section B of the ATK-084 proforma and return it to the applicant;
3. On completion of works, the FOP Team completes Section C of the ATK-084 proforma and returns it to the PTP Team (permit.to.proceed@london2012.com) together with necessary earthworks volume information, SMARTStart verification and supporting as-built information;
4. If works have been conducted in accordance with the requirements of the PTP Protocol, the PTP Team will sign off Section D and return it to the FOP Team, closing the ATK-084 application;
5. If the works have **not** been carried out in accordance with the requirements of the PTP Protocol, the FOP shall undertake additional works or provide additional information, which the PTP Team may reasonably require.

London 2012 Olympic Park		PERMIT TO PROCEED	
PROTECTION OF REMEDIATION WORKS: FORM ATK-084			
PTP Reference: <i>(To be completed by PTP team)</i>			
Dear Sirs, With respect to the protection and maintenance of previously completed ground remediation works and site specific remediation strategies we hereby submit this Permit to Proceed application for our intrusive works and for your acceptance. We understand we initially require your completed section B <u>prior to commencement</u> of our works and that we are responsible for the integrity of the remediation works.			
SECTION A <i>(Please complete & submit to permit.to.proceed@london2012.com 5 days prior to works)</i>			
Prepared by		Authorised by	
of Company		of Company	
Date		Date	
Follow on Project	<i>(eg SBH Lot X)</i>	Principal Contractor	<i>(i.e. the PC in control of the LA site)</i>
Title of Works	<i>(eg H12 north abutment)</i>	FOP Reference	<i>(if different from PTP reference)</i>
Construction Zone		Works Start Date	
LA Site Reference		Works Finish Date	
Co-ordinates of works	<i>(Olympic Grid or Ordinance Survey)</i>		
Drawing Reference	<i>(Attach drawing or sketch indicating the location of works)</i>		
Description of works			
Dimension of works (incl. depth)			
Method Statement Reference(s)	<i>(Attach applicable method statements, including specific MS for unexpected contamination or invasive species removal works where necessary)</i>		
Piling Risk Assessment Ref.	<i>(Required by the EA for piling works)</i>		
Existing Marker layer depth			
Earthworks above marker layer (m ³)			
Earthworks below marker layer (m ³)			
Historic boreholes at vicinity of works			
Planned backfill material types			
Additional Comments:			
SECTION B <i>(Completed by and returned from Permit to Proceed Team prior to works)</i>			
Prepared by		Authorised by	
of Company		of Company	
Date		Date	
Accepted	Yes / No		
Conditions of acceptance / reason for non-acceptance:			
Distribution: Originating Team, Principal Contractor, CLM Project Manager, RemTech Team.			

SECTION C (Please complete and return to permit.to.proceed@london2012.com on completion of the works)

Dear Sirs,

We confirm completion of works in accordance with the methods described in Section A and conditions described in Section B. On the basis of the following information and the attached supporting documents, we request that this application be formally closed.

Prepared by		Authorised by	
of Company		of Company (PC)	
Date		Date	

C1: COVER LAYER	Reinstated	Altered	Omitted
Marker Layer	Yes / No	Yes / No	Yes / No
Human Health Separation Layer	Yes / No	Yes / No	Yes / No

Comments or description of cover system reinstatement *(Detail Marker Layer and Human Health Separation Layer materials and any reasons for specific omission)*

Photo record of excavation and Marker Layer reinstatement *(Attach photograph record document)*

As-Built drawings provided *(Attach as-built drawing or sketch indicating cover system reinstatement)*

C2: EXCAVATED VOLUMES	Above Marker Layer (m³)	Below Marker Layer (m³)
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Total cut

Cut volume retained (on site)

Cut volume to Soil Hospital

Cut volume sent off Olympic Park

Related ATK-088 Export Application(s):

SMARTWaste References *(Attach spreadsheet from SMARTStart detailing relevant entries)*

C3: FILL VOLUMES	Above Marker (m³)	Chemical Tests (no.)	Below Marker (m³)	Chemical Tests (no.)
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Total fill

Site won fill (reused)

Fill from Soil Hospital

Fill from outside Olympic Park

Related ATK-088 Import Application(s):

Additional Comments:

SECTION D (Application is closed by the Permit to Proceed Team following review of Section C and returned to FOP Team)

Prepared by		Authorised by	
of Company		of Company	
Date		Date	

Accepted & Closed Yes / No

Comments or conditions on closure / reason for non-closure of application:

Distribution: Originating Team, Principal Contractor, CLM Project Manager, RemTech Team, EW Project Manager.

APPENDIX A:

**SUMMARY OF FOLLOW ON PROJECT OBLIGATIONS
COVERED UNDER THE PERMIT TO PROCEED PROTOCOL**

Table 1: Summary of Follow on Project Obligations Covered Under the Permit to Proceed Protocol

FOP Obligation / Responsibility	Description	Applicable Remediation Design Documents, Guidance Documents and Planning Conditions	PTP Implementation and Auditing
<p>Ensure works comply with site remediation design specifications</p>	<p>Earthworks materials used within the Olympic Park must comply with remediation design specifications applicable to the Planning Delivery Zone (PDZ) in which the works are being undertaken.</p> <p>All earthworks materials placed by FOP Teams (above or below the ML) shall meet the Site Specific Assessment Criteria (SSAC) outlined in applicable remediation design documents.</p>	<p>The Soil Hospital Protocol: Management of Olympic Park Earthworks Materials. Site Specific Remediation Strategy (SSRS) Site Specific Remediation Specification (SSRSpec) Remediation Method Statement Site Validation Reports (where available) Global Remediation Strategy</p> <p><i>OD.0.36 Validation of the Remediation Works for the purposes of human health protection must be provided within two months of completion of the Final Build Layer within any Construction Zone. When all works for the protection of human health are completed within each Planning Delivery Zone, a consolidated validation report, drawing together the Construction Zone validations, shall be submitted to the Local Planning Authority. This shall include topographic mapping of the final finished ground levels.</i> Reason: To ensure the protection of human health and avoidance of pollution of controlled waters.</p> <p><i>OD.0.37 Approved post-remediation monitoring and maintenance of the remediated land shall continue, as set out in the validation reports, until such dates or events as are approved by the Local Planning Authority.</i> Reason: To ensure the protection of human health and avoidance of pollution of controlled waters.</p> <p><i>OD.0.39 No soils or infill materials (including silt dredged from watercourses), shall be imported onto the Site until it has been satisfactorily demonstrated that they present no risk to human health, planting and the environment. Documentary evidence to confirm the origin of all imported soils and infill materials, supported by appropriate chemical analysis test results, shall be submitted to and approved by the Local Planning Authority prior to that import. The import onto Site of material classified as 'waste' is only acceptable with the prior approval of the Local Planning Authority.</i> Reason: To ensure that no contaminated material is brought onto Site.</p>	<p>FOP Teams submit an ATK-088 Application (Request from Contractor) to the Soil Hospital Team at soil.hospital@demrem.com (Refer to separate Soil Hospital Protocol document for further details.)</p> <p>FOP Teams submit an ATK-084 Application (Protection of Remediation Works) to the PTP Team at permit.to.proceed@london2012.com detailing the scope of works and arrangements for completing works in accordance with the site remediation design.</p> <p>Section C of Form ATK-084 requires that information on the number of chemical tests performed on backfill materials is reported.</p> <p>In auditing the works the PTP Team may request evidence and details of sampling and chemical testing of backfill materials.</p>
<p>Ensure works do not invalidate any previously completed site remediation works</p>	<p>Completed remediation works that must be maintained may include (but are not limited to):</p> <ul style="list-style-type: none"> • Placed fill materials that comply with applicable remediation design documents (as above) • Cut off walls and sheet piling • Low permeability layers • Gas membranes • Groundwater or ground gas monitoring boreholes • Groundwater remediation systems <p>In addition FOP Teams must ensure that pathways are not created in the ground that could:</p> <ul style="list-style-type: none"> • invalidate any completed Remediation Works • present any pollution risks to controlled waters • cause any ingress of ground borne gases or vapours to any buried structures <p>This shall be achieved by selecting, designing and constructing piling, deep foundation works and ground treatment methods that do not create such pathways (in this regard, the guidance and requirements of the Environment Agency shall apply).</p>	<p>Site Specific Remediation Strategy (SSRS) Site Specific Remediation Specification (SSRSpec) Remediation Method Statement Site Validation Reports (where available) Global Remediation Strategy EA Guide to Contractors on the Olympic Park Environmental Protection Requirements for Piling (REP-ATK-CG-ZZZ-ZZZ-ZZZ-Z-0001) Soil Gas and Vapour Risks: A Briefing Note to Designers (REP-ATK-CM-ZZZ-OLP-ZZZ-Z-0001)</p> <p><i>OD.0.26 Before the construction of each building is commenced, details of the foundations and piling, the means by which previously installed remediation measures are to be safeguarded and any measures to prevent ingress of gaseous contaminants into that building or the contamination of controlled waters, shall be submitted to and approved by the Local Planning Authority.</i> Reason: To avoid risk to human health or contamination of controlled waters.</p> <p><i>OD.0.59 Before construction of any bridge or other structure requiring foundations is commenced, details of foundation design, including details of any piling and a method statement for any piling, shall be submitted to and approved by the Local Planning Authority.</i> Reason: To avoid risk to human health or contamination of controlled waters.</p>	<p>FOP Teams submit an ATK-084 (Protection of Remediation Works) Application to the PTP Team at permit.to.proceed@london2012.com detailing the scope of works and any proposed measures to protect completed remediation works and prevent any adverse environmental effects.</p> <p>Section C of Form ATK-084 requires information on the number of chemical tests on backfill materials and as-built details to prove integration. Any details of vapour protection measures should also be reported in Section C.</p> <p>In auditing the works the PTP Team will inspect methods of piling and other intrusive works. Where necessary, the PTP Team will check that piling risk assessments have been approved by the Environment Agency.</p>

FOP Obligation / Responsibility	Description	Applicable Remediation Design Documents, Guidance Documents and Planning Conditions	PTP Implementation and Auditing
Reinstate or install remediated ground cover systems (Marker Layer and Human Health Separation Layer)	<p>Project works must maintain the integrity of existing site remediation and remediated ground cover systems.</p> <p>The majority of FOP Teams will need to penetrate installed ML and HHSL elements and excavate materials beneath those layers to construct foundations or install utilities. Where the ML is penetrated or altered it must be reinstated and integrated within final constructed levels to ensure that applicable remediation designs are met.</p> <p>FOP Teams shall ensure that the ML is reinstated immediately beneath materials that satisfy SSAC for HHSL and that any altered location and level of the ML is accurately recorded.</p> <p>ML and HHSL requirements may differ between or within Planning Delivery Zones.</p> <p>In some instances it will be more practical to locally deepen or raise the ML. Significant changes to ML depth will require approval from the Planning Decisions Team (PDT) and FOP Teams should seek approval from the PDT where any such changes or omissions are proposed.</p>	<p>Site Specific Remediation Strategy (SSRS) Site Specific Remediation Specification (SSRSpec) Remediation Method Statement Site Validation Reports (where available) Global Remediation Strategy Any approved supplementary design for ML and HHSL (which may allow omission of ML and/or HHSL), as submitted to and approved by the Planning Decisions Team</p> <hr/> <p><i>OD.0.37 Approved post-remediation monitoring and maintenance of the remediated land shall continue, as set out in the validation reports, until such dates or events as are approved by the Local Planning Authority.</i> Reason: To ensure the protection of human health and avoidance of pollution of controlled waters.</p>	<p>FOP Teams submit an ATK-084 Application (Protection of Remediation Works) to the PTP Team at permit.to.proceed@london2012.com detailing the scope of works and arrangements for the protection of remediation works.</p> <p>Section C of Form ATK-084 requires that photographic evidence and as-built drawings are supplied to detail reinstatement of ML and HHSL elements.</p> <p>In auditing the works the PTP Team may request evidence of adequate ML reinstatement and integration into FOP works.</p>
Protect groundwater remediation works and maintain adequate access to them	<p>Several sites across the Olympic Park contain active groundwater remediation systems. Some of these are intended to remain operational throughout the Olympic Park construction period and into Legacy phases.</p> <p>FOP Teams must protect all elements of such groundwater remediation systems, including any extraction or injection wells and connecting pipe work and cable routes. Other elements of the installed remediation systems may include compound areas containing operational plant and storage areas for ancillary equipment.</p> <p>Groundwater monitoring wells used to assess the progress of groundwater remediation works must also be maintained.</p>	<p>Site Specific Remediation Strategy (SSRS) Site Specific Remediation Specification (SSRSpec) Remediation Method Statement Site Validation Reports (where available) Global Remediation Strategy Global Groundwater Monitoring Strategy Site Specific Groundwater Treatment Method Statement</p> <hr/> <p><i>OD.0.37 Approved post-remediation monitoring and maintenance of the remediated land shall continue, as set out in the validation reports, until such dates or events as are approved by the Local Planning Authority.</i> Reason: To ensure the protection of human health and avoidance of pollution of controlled waters.</p>	<p>FOP Teams submit an ATK-084 Application (Protection of Remediation Works) to the PTP Team at permit.to.proceed@london2012.com detailing the scope of works and arrangements for the protection of any known groundwater remediation equipment and works (within appended Method Statements).</p> <p>In auditing the works the PTP Team may request evidence of adequate project integration between FOP works and incumbent groundwater remediation contractors.</p>
Unexpected contamination	<p>If unexpected contamination is encountered during earthworks, the PTP Team and the Planning Decisions Team should be notified and a methodology for the assessment, remediation and validation of the affected area shall be prepared to support a Remediation Change Note as required by Planning Condition OD.0.38.</p>	<p>Site Investigation Reports Site Specific Remediation Strategy (SSRS) Site Specific Remediation Specification (SSRSpec) Remediation Method Statement Site Validation Reports (where available) Global Remediation Strategy</p> <hr/> <p><i>OD.0.38 If at any time during the construction of the Olympic Development, contamination is encountered which was not previously identified or treated or has been brought to the surface by construction activity, construction work in that Construction Zone shall not proceed (except to the extent that it would not further disturb that contamination) until a Remediation Change Note, containing an assessment of that contamination and a scheme and timetable to contain, treat or remove it has been submitted to and approved by the Local Planning Authority and any necessary remediation has been carried out.</i> Reason: To ensure the protection of human health and avoidance of pollution of controlled waters.</p>	<p>FOP Teams shall submit an ATK-084 Application (Protection of Remediation Works) to the PTP Team at permit.to.proceed@london2012.com (as well as an ATK-088 Application to cover the transfer of excavated materials).</p> <p>The application shall detail excavations and earthworks associated with any remediation works, supported by method statements, as required by OD.0.38.</p>

<p>Uphold 'Duty of Care' obligations under Waste Regulations and satisfy conditions of Waste Recovery Licenses for the Olympic Park</p>	<p>The recovery and re-use of materials within the Olympic Park is authorised by two Waste Recovery Licenses held by the Olympic Delivery Authority.</p> <p>By legislation, excavation within a contaminated or 'Brownfield' site requires that materials must be characterised before being excavated or re-used. The Principal Contractor of any site is the responsible party under Waste Regulation 'Duty of Care' obligations, the Environment Act (including associated legislation) and the Waste Recovery Licenses for the Olympic Park.</p> <p>Any Principal Contractor conducting earthworks within the Olympic Park is therefore deemed a Waste Operator and must meet obligations associated with the handling of waste and recycled earthworks materials. Those obligations include the requirement to maintain accurate information relating to earthworks materials excavated from or placed within the site and to ensure traceability of material movement within and between different sites across the Olympic Park.</p> <p>The ODA has determined that BRE's SMARTStart system shall be used within all projects to allow electronic records of all material movements and final deposition locations of to be referenced and traceable.</p>	<p>Environmental Permit No. EAWML80790 (South Park Waste Management License) Environmental Permit No. EAWML80791 (North Park Waste Management License) Construction Waste Management Plan (CLM-D0701-Rep-CWMP-v1.6.doc) Memorandum of Understanding for Waste Management Licensing Applied to the Olympic Park (Appended to CWMP) A Guide to Material Movements: London 2012 Enabling Works (GUI-MOR-CE-ZZZ-ZZZ-XXX-E-0015)</p> <p><i>OD.0.39 No soils or infill materials (including silt dredged from watercourses), shall be imported onto the Site until it has been satisfactorily demonstrated that they present no risk to human health, planting and the environment. Documentary evidence to confirm the origin of all imported soils and infill materials, supported by appropriate chemical analysis test results, shall be submitted to and approved by the Local Planning Authority prior to that import. The import onto Site of material classified as 'waste' is only acceptable with the prior approval of the Local Planning Authority.</i> <i>Reason: To ensure that no contaminated material is brought onto Site.</i></p>	<p>References of SMARTStart entries relating to specific works must be provided to the PTP in Section C of ATK-084 applications and if necessary be backed up with a printed spreadsheet of information generated from SMARTStart.</p> <p>This information is required to ensure materials are being adequately tracked in SMARTstart and to ensure that obligations under Waste Recovery Licenses are being fulfilled.</p>
<p>Protection of Boreholes and Groundwater Monitoring Installations</p>	<p>FOP Teams must protect, preserve and ensure access to all existing boreholes and monitoring locations, unless or until the Soil Hospital Team formally confirm alternative arrangements and/or arrange for borehole decommissioning.</p> <p>Identification and resolution of conflicts between borehole locations and FOP construction works are detailed in the Soil Hospital Protocol.</p> <p>Any damage to an operational borehole will be reported as an Environmental Incident and should be raised by the FOP responsible for the damage and be reported to the Soil Hospital Team and CLM Assurance.</p>	<p>Site Specific Remediation Strategy (SSRS) Site Specific Remediation Specification (SSRSpec) Remediation Method Statement Site Validation Reports (where available) Global Remediation Strategy Global Groundwater Monitoring Strategy Site Specific Groundwater Treatment Method Statement</p> <p><i>OD.0.37 Approved post-remediation monitoring and maintenance of the remediated land shall continue, as set out in the validation reports, until such dates or events as are approved by the Local Planning Authority.</i> <i>Reason: To ensure the protection of human health and avoidance of pollution of controlled waters.</i></p>	<p>FOP Teams submit an ATK-095 Application (Borehole Conflict) to the Soil Hospital Team at soil.hospital@demrem.com a minimum of six-weeks prior to occurrence of conflict with FOP works. (Refer to separate Soil Hospital Protocol document for further details.)</p> <p>During audits the PTP Team will review borehole protection measures installed at any site and request that any potential risks to borehole installations are rectified and that any damage is reported.</p>

APPENDIX B:

PERMIT TO PROCEED PROCESS DIAGRAM

Protection of Remediation Works Process - Form ATK-084

