

# Olympic Enabling Works Earthworks and Remediation Validation Report – Human Health

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International Broadcasting Centre (CZ5b Portion)

Author: Jeanne Reno

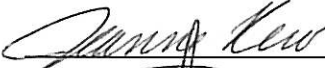


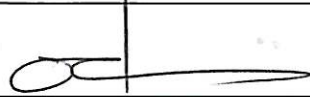
Checker: Susannah Green

Chris O'Grady

Approver: On behalf of Hyder Consulting

David Mutter

On behalf of Morrison Construction

ODA Ref REP-MOR-CE-05b-XXX-  
XXX-E-0287

Revision: 01

Date:

March 2009

Hyder Consulting (UK) Limited

2212959

29 Bressenden Place, London SW1E 5DZ, UK

Tel: +44 (0)870 000 3006 Fax: +44 (0)870 000 3906 [www.hyderconsulting.com](http://www.hyderconsulting.com)



Consulting

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**Drawings**

**SSRS:**

2DD-ATK-CM-05b-OLP-XXX-E-0001	Location of CZ5b Main Site within Olympic Park
2DD-ATK-CM-05b-OLP-XXX-E-0003	Olympic End Use (2012)
2DD-ATK-CM-05b-OLP-XXX-E-0004	Legacy End Use (2021)
2DD-ATK-CM-05b-OLP-XXX-E-0005	Zonation of Site for Human Health Assessment

**For Construction:**

2DD-MOR-CM-05b-OLP-XXX-E-0105	Remedial Action Plan – CZ5b Incorporating Latest Specification and Addendum No. 3 Requirements
2DD-MOR-CM-05X-ZZZ-XXX-E-5024	CZ5b/CZ5c IBC Boundaries
SK-LOG-LA5240	PCR Boundary LA5240 IBC/MPC MSCP Construction
SK-LOG-LA5240-3	PCR Boundary LA5240-3 IBC/MPC (IBC Studios North of Corridor 5-4)
SK-LOG-LA5240-4	PCR Boundary LA5240-4 IBC/MPC (IBC Studios North of Corridor 5-4 to South)
SK-LOG-LA5240-6	PCR Boundary LA5240-6 IBC/MPC (IBC Studios Corridor 5-4 to South)
SK-LOG-LA4970-2	PCR Boundary LA4970-2 NLR CH: 1950-2140 – SBH to Utilities
SK-LOG-LA5850	PCR Boundary LA5850 Access to Utilities Corridor 5-4 (IBC2 CH90-229)

**As Constructed:**

2DD-MOR-CM-05b-ZZZ-XXX-E-5112 CZ5b Portion of IBC: Chemical Validation Samples

LA4970-2

2DD-MOR-CE-05b-OLP-SP1-E-0020 Human Health Validation CZ5b Utility Corridor Completed by 30.06.08

LA5850

2DD-MOR-CE-05Z-OLP-XXX-E-0014 Handover LA5850 Earthworks Sub-Formation Level Drawing

2DD-MOR-CE-05Z-OLP-XXX-E-0015 Handover LA5850 Earthworks Formation Level Drawing

LA5240

2DD-MOR-CE-05B-OLP-XXX-E-0079 Handover LA5240-0 Earthworks Sub-Formation Level Drawing

2DD-MOR-CE-05B-OLP-XXX-E-0080 Handover LA5240-0 Earthworks Formation Level Drawing

LA5240-3

2DD-MOR-CE-05b-OLP-SP1-E-0092 Handover LA5240-3 Earthworks Sub-Formation Level Drawing

2DD-MOR-CE-05b-OLP-SP1-E-0093 Handover LA5240-3 Earthworks Formation Level Drawing

LA5240-4

2DD-MOR-CE-05b-OLP-SP1-E-0113 Handover Area LA5240-4 Sub-formation Levels

2DD-MOR-CE-05b-OLP-SP1-E-0114 Handover Area LA5240-4 Formation Levels

LA5240-6

2DD-MOR-CK-05z-OLP-SP1-E-0095

Handover Area LA5240-6 and LA5240-7 Sub-formation Levels

2DD-MOR-CK-05z-OLP-SP1-E-0096

Handover Area LA5240-6 and LA5240-7 Formation Levels

**APPENDICES**

- Appendix A Site Specific Assessment Criteria (SSAC) – Human Health Only**
- Appendix B Chemical Certificates of Analysis – Electronic Copy of Results Only**
- Appendix C Summary Chemical Assessments**
- Appendix D Laboratory QA/QC Information – Electronic Copy Only**
- Appendix E Project Team Correspondence**

## EXECUTIVE SUMMARY

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Morrison Construction (MCL) were required to undertake ground preparation and remedial works at the proposed International Broadcasting Centre (IBC) positioned in Olympic Park Enabling Works Construction Zones 5b and 5c prior to handover of this area to follow-on venue contractors. This report solely addresses 'human health' validation matters (in terms of the Atkins CZ5b SSRS and SSRS Addendum No. 3) for the CZ5b portion of the proposed IBC site, with contamination matters concerning controlled waters presented in the forthcoming CZ5b Unsaturated Zone Validation Report. The reader is referred to the CZ5c Human Health and Unsaturated Zone Validation Reports (Refs. 2 and 3) for further details regarding validation of the CZ5c portion of the IBC site.

The subject site has been designated by others for the following Olympic and Legacy end uses (Refer to SSRS [Refs. 4, 5 and 7]):

- Olympic end use: Accreditation checking and International Broadcast Centre (Drawing Ref. 2DD-ATK-CM-05b-OLP-XXX-E-003).
- Legacy End Use: Commercial area comprising multi-story car park, industrial units and office space (Drawing Ref. 2DD-ATK-CM-05b-OLP-XXX-E-0004).

The works carried out by MCL within the subject IBC site (CZ5b portion) comprised:

- Earthworks cut and fill. In accordance with PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2584 no marker layer / separation layer is required within the footprint of the IBC studios footprint area;
- Construction of 2No. utility corridors;
- Remediation of 2No. SSRS Addendum No. 3 (Ref. 5) defined contamination hotspots;
- Remediation of 1No. underground concrete structure; and
- Validation of works by way of chemical analysis of collected soil samples and comparison of results with SSAC's as instructed the CZ5b SSRS Addendum No. 3 (Ref. 5) and relevant Project Manager's Instructions (see Section 3).

On the basis of the above, MCL consider that the site is compliant with the requirements of the SSAC's protective of human health for the validation data collected, namely:

- SSRS Addendum No. 3 defined controlled waters contamination hotspot (BH11): The validation samples for this hotspot were analysed for the contaminant of concern, mercury, only and as such these validation results are included in Appendix B for reference purposes only and are not included in the Appendix C assessments. Information pertaining to this location will be discussed in the CZ5b Unsaturated Zone Validation Report;
- SSRS Addendum No. 3 defined human health and controlled waters contamination hotspot (TP113): No human health non-compliances were identified in the assessment of the TP113 (REM9 and REM29) validation samples. Asbestos quantification testing was not scheduled for these

samples, however, no bulk asbestos fibres were observed by ESGL operatives within these samples.

- Underground Concrete Structure Removal Validation Samples (REM4): One human health non-compliance was recorded within the underground concrete structure removal validation samples:
  - 5b/REM4/007 (sidewall sample): Total Cyanide – Result 20.3mg/kg, SSAC 17mg/kg. Free Cyanide Result <0.7mg/kg and therefore, no corrective action is proposed in line with the approach to cyanide within the SSRS/SSRS Addendum No. 3 (Refs. 4 and 5) and GRS (Ref. 24).

Asbestos quantification testing was not scheduled for these samples, however, no bulk asbestos fibres were observed by ESGL operatives within these samples.

- General Fill (Below Marker Layer): One human health non-compliance was recorded within the general fill (below marker layer) validation samples:
  - 5b/V/3/006: Total Cyanide – Result 24.6mg/kg, SSAC 17mg/kg. Free Cyanide Result <0.5mg/kg and therefore, no corrective action is proposed in line with the approach to cyanide documented within the SSRS/SSRS Addendum No. 3 (Refs. 4 and 5) and GRS (Ref. 24).

Asbestos quantification results for all general fill samples where asbestos quantification was scheduled were below the criteria of 0.1% instructed in PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2605 (Ref. 15) as shown in Appendix C. No bulk asbestos fibres were observed by ESGL operatives in those samples where asbestos quantification was not scheduled (see Appendix C).

- Sub-formation level (where separation layer material is present) and formation level (where separation layer material is absent) Validation Samples (including site investigation data at 8-9mAOD): No human health non-compliances were identified in the assessment of the sub-formation and formation level validation samples. Asbestos quantification results for all sub-formation and formation samples where asbestos quantification was scheduled were below the criteria of 0.1% instructed in PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2605 (Ref. 15) as shown in Appendix C. No bulk asbestos fibres were observed by ESGL operatives in those samples where asbestos quantification was not scheduled (see Appendix C).
- Separation Layer (within utility corridors): No human health non-compliances requiring corrective action were recorded within the separation layer (above marker layer, within utility corridors) validation samples. Asbestos quantification testing was not scheduled for these samples, however, no bulk asbestos fibres were observed by ESGL operatives within these samples.
- Separation Layer (outside of utility corridors): No human health non-compliances requiring corrective action were recorded within the separation layer (above marker layer, outside of utility corridors) validation samples. All individual asbestos quantification results were below the criteria of 0.1%.

MCL consider that the site is compliant with the human health (in terms of the proposed Legacy use) requirements of SSRS Addendum No. 3 and subsequent Project Manager's Instructions.

# 1 INTRODUCTION

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## 1.1 Report Objectives

This document has been prepared by Hyder Consulting (HCL) on behalf of and with the assistance of Morrison Construction (MCL) and presents the Legacy human health validation aspects of the earthworks and remediation activities completed by MCL within the Construction Zone 5b portion of the proposed International Broadcasting Centre (IBC) site (Drawing Ref. 2DD-MOR-CM-05X-ZZZ-XXX-E-5024). This report addresses only the validation of the CZ5b portion of the IBC site which covers some of the following land plots: LA4970-2, LA5850, LA5240, LA5240-3 to 4, and LA5240-6 (Drawing Ref. 2DD-MOR-CM-05X-ZZZ-XXX-E-5024). The reader is referred to the CZ5c Human Health and Unsaturated Zone Validation Reports (Refs. 2 and 3) for further details regarding validation of the CZ5c portion of the IBC site.

This report has been prepared in light of the Planning Decisions Team (PDT) requirement for a report solely presenting the human health validation aspects of the defined works. This report is presented in order to discharge the following planning application conditions:

- Condition SP.0.35 of Site Preparation Planning Application No. 07/90011/FUMODA; and
- Condition OD.0.4 of Facilities and their Legacy Transformation Planning Application No. 07/90010/OUMODA.

This report does not present a full record of all earthworks and remediation activities undertaken by MCL within the site in question. The summary table below details forthcoming reports and intended programme for submission to the PDT (where necessary), in accordance with the requirements of PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-1213 (Ref. 1).

Table 1.1 Proposed Validation Reports for the CZ5b portion of the IBC:

	Report Ref.	Document Information	Planning Condition No.	Programme For Submission
ENABLING WORKS	Human Health Validation Report – International Broadcasting Centre (CZ5b portion), Revision 01	Human health validation of completed works within the CZ5b portion of the IBC	Site Preparation Planning application No. 07/90011/FUMODA Condition SP.0.35 and Facilities and their Legacy Transformation Planning Application No. 0790010/OUMODA Condition OD0.4	Enabling works (this document)
	Unsaturated Zone (For Human Health and Controlled Waters) Validation Report – CZ5b (whole of CZ5b including CZ5b portion of the IBC site)	Human Health and controlled waters validation data of the completed works, hazardous waste classification and environmental monitoring, including groundwater quality monitoring.	Site Preparation Planning Application No. 07/90011/FUMODA Condition SP.0.35 and Facilities and their Legacy Transformation Planning Application No. 0790010/OUMODA Condition OD0.4	Enabling works (late 2009)
	CZ5b Groundwater Validation Report	Groundwater remediation validation within CZ5b – to be confirmed pending confirmation of requirements	Site Preparation Planning Application No. 07/90011/FUMODA Conditions SP.0.35.	TBC
	Earthworks (Geotechnical) Validation Report		Not required by PDT, Local Authority or Environment Agency.	
FOLLOW ON VENUE CONTRACTORS	Final Validation Report	Post Enabling Works remediation aspects.	To be advised	Follow on venue contractors

It should be noted that all the above reports will be included in the site’s Health and Safety File and handover documentation.

MCL are not proposing to submit an Unsaturated Zone Report specific to the CZ5b portion of the proposed IBC site; rather this information will be included in the forthcoming CZ5b wide Unsaturated Zone Validation Report.

This report has been prepared to support the handover from MCL to parties involved in future Olympic construction of the site area (via the client). Data presented herein has been provided by the referenced sources and has been used in good faith. MCL have not designed aspects of the works relating to land contamination. The Enabling Works Project Manager (Atkins) is managing consultation with the PDT. This report, or later revisions, may be submitted to the PDT for their formal consideration. The handover information transfer is being coordinated by the Project Manager.

This report does not offer occupational hygiene advice related to contaminant risks to site workers; nor does the report address radiological issues. The term human health relates solely to the SSRS defined future uses of the subject site. This report solely relates to the proposed Legacy land uses as defined in the SSRS, SSRS Addendum and Specification (Refs. 4, 5, and 6).

For conciseness, this document uses or references pertinent extracts of key design documents, rather than duplicates them in full herein.

## 1.1.1 Glossary

The following terms are used in Olympic Park documents and may also be included within this report.

- Final Finished Level (FFL): The design ground level of the completed development used in the Designer's Site Specific Remediation Strategies. Typically, this does not directly apply to the Enabling Works as the final finishes will be undertaken by the Contractors involved in the 'follow-on' construction works.
- Enabling Works Formation (or Sub-Formation) Level (EWFL): Typically this is the design level presented in the Designer's earthworks drawings to which MCL are required to construct to.
- Separation Layer or Cover Layer: A chemically suitable (as defined by the designers) top layer appropriate for the intended temporary or permanent land use.
- Sub-formation: Highest level of the Enabling Works earthworks, beneath the separation layer, which is typically highlighted by the presence of a brightly coloured marker layer.
- Sub-grade: Lowest level of excavation in cut areas (including hot - spots) or an existing level if fill only areas. This is always underlain by undisturbed materials (in terms of the Enabling Works). This may, be coincident with sub-formation.
- Site Specific Remediation Target (SSRT): The contamination / chemical criteria established by the designers above which remedial corrective action is likely to be required.

- Site Specific Assessment Criteria (SSAC): The contamination / chemical criteria established by the Designers, which illustrate the individual contaminant concentrations protective of either controlled waters or human health. Chemical concentrations above the SSAC are likely to necessitate further consideration. Typically the Designers have stated the SSAC and SSRT are equal.
- Site Specific Remediation Strategy (SSRS) – Document presented by the Designers, which identifies the principal pollutant linkages following the findings of the generic and detailed quantitative risk assessments and produces the SSAC and SSRT.
- Global Remediation Strategy (GRS) – Document which presents the site wide remediation principals and procedures to be taken forward to the Site Specific Remediation Strategies (SSRS)
- Generic Assessment Criteria (GAC) – The contamination / chemical criteria established by the Designers above which remedial corrective action is likely to be required. The GAC's are associated with generic land uses as outlined in the GRS.
- Contaminated Land Report (CLR) – series of DEFRA and Environment Agency reports providing researches and authoritative advice and information to assist in the identification, assessment and management of contaminated land.
- Upper 95<sup>th</sup> percentile of the mean measured concentrations (UCL95) – the statistically representative mean concentration.
- Statistical Outlier Test – see SSRS (Refs. 4 and 5).

## 1.2 Site Location

For the purposes of this report, the "site" refers to the CZ5b portion of the IBC area as shown on Drawing Ref. 2DD-MOR-CM-05X-ZZZ-XXX-E-5024, SK-LOG-LA5240, SK-LOG-LA5240-3, SK-LOG-LA5240-4, SK-LOG-LA5240-6, SK-LOG-LA5850, SK-LOG-LA4970-2, and SK-LOG-LA4970-2 where Works have been completed by MCL. The IBC is situated within Olympic Park Construction Zones 5b and 5c (Drawing Ref. 2DD-ATK-CM-05b-OLP-XXX-E-003).

## 1.3 Key Parties & Responsibilities

In relation to this Validation Report and the site in question:

- Client: Olympic Delivery Authority (ODA). CLM is the Client's Delivery Partner.
- Land owner: London Development Agency (LDA).
- Client's Project Manager: Atkins.
- Principal Contractor (Tier 1 Contractor): Morrison Construction (MCL), advised by Hyder Consulting (HCL). The responsibility for implementing the works as required by the Designers (Atkins) lies with MCL and their advisors HCL, acting as a single co-ordinated project team. For the purposes of this report, the combined MCL / HCL project team is termed MCL. In terms of the site works, HCL's agreed brief with MCL was to coordinate the chemical verification testing, assess these results and recommend corrective action if this was required. Such corrective action would typically require Project Manager acceptance. HCL are not required to monitor or supervise the works, although HCL did manage the contamination validation process.
- CZ5b Designers: Atkins (Remediation & Earthworks).
- Chemical Testing Laboratory: Environmental Services Group (ESGL).

This document has been considered by the Project Manager prior to submission to external 3<sup>rd</sup> parties.

## 1.4 Document Structure

The outline structure of this document had been agreed between the Project Manager and MCL, in an endeavour to achieve consistent reporting throughout all Olympic Park Construction Zones.

## 1.5 Future Use

The site has been designated for the following Olympic and Legacy end uses [Refer to SSRS and SSRS Addendum No. 3 (Refs. 4 and 5)]:

- Olympic end use: Accreditation checking and International Broadcast Centre (Drawing Ref. 2DD-ATK-CM-05b-OLP-XXX-E-003).
- Legacy End Use: Commercial area comprising multi-story car park, industrial units and office space (Drawing Ref. 2DD-ATK-CM-05b-OLP-XXX-E-0004).
- Earthworks: Significant re-profiling of ground levels to achieve Olympic Park Enabling Works 'Formation Level' (generally via cut/excavation), to achieve a level of 9mAOD and limited earthworks fill.

## 1.6 Other Site Information

The reader is referred to the forthcoming 'Unsaturated Zone Validation Report' which will discuss the following details in the context of the wider CZ5b site:

- Site setting;
- Site history;
- Summary of site investigations undertaken within the site;
- Waste classification;
- Site specific geological and hydrogeological information;
- Archaeology, unexploded ordnance and ecological issues;
- Conceptual site model and identified pollutant linkages; and
- Third Party approvals (including permits, licenses and consents).

## 1.7 Outstanding Information

In respect of the human health validation works carried out by MCL within the subject site, as part of the Enabling Works, no additional information is awaited.

## 1.8 Site Specific Remediation Targets (SSRT) / Site Specific Assessment Criteria (SSAC) – Human Health Only

MCL has not designed any aspects in relation to land contamination within the subject site. For the purposes of this Human Health Validation Report the SSAC's utilised herein are discussed below. The SSAC's referenced below are presented in various Designer documents which have been formally issued to MCL and are included for reference within Appendix A.

All CZ5b SSAC's Protective of Human Health are based upon spatially defined human health zones as per Drawing 2DD-ATK-CM-05b-OLP-XXX-E-0005. The CZ5b portion of the IBC site is wholly located within human health zone CZ5b.2. As such, Zone CZ5b.2 SSAC's Protective of Human Health only have been utilised in this report.

The reader is referred to the CZ5c Human Health Validation Report (Ref. 2) for further details regarding human health validation of the CZ5c portion of the IBC site.

### 1.8.1 Hotspot Validation, Sub-Formation Level Validation, Formation Level Validation and General Fill Validation (Below Marker Layer)

The SSAC's Protective of Human Health applied to the validation of hotspot, sub-formation level (where separation layer material is present), formation level (where separation layer material is absent) and general fill samples within CZ5b are presented within Appendix A (Appendix J6 - Import Criteria and Backfill Criteria (0.6m) for CZ5b Addendum 3 - Zone 2) (Ref. 5). The SSAC's for PAH's have been updated as presented in PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2669 (Appendix A – Updated SSAC for Hard Landscaping Legacy 0.6m – Table 4.12). This criteria is applied in accordance with PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2551 (Ref. 16 and Appendix A).

In addition to these criteria detailed above, PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2445 (Ref. 18) instructs the use of the Hard Landscaping GAC presented within the GRS (Ref. 21) where hard landscaping is confirmed to represent the most sensitive receptor in either Olympic or Legacy end use (see Drawing Refs. 2DD-ATK-CM-05b-OLP-XXX-E-0004 and 0005). Hard Landscaping GAC were utilised herein as shown in Appendix C.

### 1.8.2 Separation Layer Validation (Above Marker Layer)

#### Utility Corridor Separation Layer Material

The SSAC's Protective of Human Health applied to utility corridor separation layer validation samples (5b/CV/4/002 to 004 and 5b/CV/7/001 to 010) are presented within PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-1661 (Ref. 22 and Appendix A). In addition to these criteria detailed above, updates to the separation layer SSAC's Protective of Human Health were instructed under PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2669 (Ref. 23). This Project Manager's Instruction presented revised PAH and metals SSAC's Protective of Human Health for 'Soft Landscaping Legacy' end uses (Appendix A – Updated SSAC for Soft Landscaping Legacy 0.3m – Table 2.8, 3.2 and 4.2) which is utilised herein in accordance with PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2712 (Ref. 8) as shown in Appendix C.3. It should be noted however that the IBC area end use is designated as hard landscaping as per Drawing Refs. 2DD-ATK-CM-05b-OLP-XXX-E-0004 and 0005 and the RMS Addendum Letter submitted to the PDT on 19 March 2009 (Ref.7).

#### Separation Layer Material (Outside of Utility Corridors)

The SSAC's Protective of Human Health applied to the validation of separation layer validation samples outside of utility corridors (5b/CV9/007; 5b/CV16/001 to 8; 5b/CV25/001 to 004; and 5b/CV27/001 to 008) within CZ5b are presented within Appendix A (Appendix J2 - Separation Layer (0.3m) Criteria for CZ5b Addendum 3 - Zone 2) (Ref. 5). These criteria are

applied in accordance with PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2551 (Ref. 16). In addition to these criteria detailed above, updates to the separation layer metals and PAH SSAC's Protective of Human Health were instructed under PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2669 (Ref. 23). This Project Manager's Instruction presented revised PAH SSAC's Protective of Human Health for 'Hard Landscaping Legacy' end uses (Appendix A – Updated SSAC for Hard Landscaping Legacy 0.3m – Table 4.4) which is utilised herein as shown in Appendix C.4.

### 1.8.3 General Fill , Subgrade and Separation Layer – Asbestos Validation

The asbestos criteria applied to the validation of CZ5b (Separation Layer, General Fill and Subgrade) are presented in PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2605 (Refs. 15 and Appendix A).

## 1.9 Limitations of Validation Report

This document is based on the information that has been made available to MCL and their advisors HCL from the sources listed. The conclusions drawn in the report are considered correct although any subsequent additional information may allow refinement of the conclusions. It should be noted that:

- The document has been prepared under the express instructions and solely for the use of MCL and the site Health and Safety File.
- This document expresses professional opinion of experienced engineers and contaminated land specialists. MCL does not provide legal advice and the advice of lawyers may also be required.
- This document has been prepared using factual information contained in maps and documents prepared by others. No responsibility can be accepted by MCL nor HCL for the accuracy of such information.
- Sampling of soil by its very nature provides only a general indication of contaminants present on site. Different concentrations of contaminants and ground conditions relative to the samples taken may be present at site. The possibility exists for other concentrations of contaminants to be present at site in parts not investigated.

## 2 THE WORKS – HUMAN HEALTH ASPECTS

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### 2.1 Introduction

In the context of this Human Health Validation Report for the CZ5b portion of the proposed IBC site, the works can be summarised as:

- Excavation of soils to formation level (termed EWFL) or sub-formation level (where separation layer is absent) of 9mAOD. Some fill (approximately 2,500m<sup>3</sup> in the northeast portion of the IBC site and approximately 1,988m<sup>3</sup> within LA5240-3) was required to achieve this EWFL;
- Remediation and validation of 1No. SSRS Addendum No. 3 defined contamination hotspot for controlled waters (mercury) located at BH11 (Drawing Ref. 2DD-MOR-CM-05b-OLP-XXX-E-0105). Validation to be presented in the Unsaturated Zone Validation Report;
- Remediation and validation of 1No. SSRS Addendum No. 3 defined contamination hotspots for human health (naphthalene) and controlled waters (benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene and pyrene) located at TP113 (Drawing Ref. 2DD-MOR-CM-05b-OLP-XXX-E-0105);
- Excavation, removal and validation of one concrete structure containing 'bluish white' material believed to contain lime encountered during earthworks activities (REM4) (Ref. 19 – Appendix E);
- Deposition and validation sampling of approximately 7,771m<sup>3</sup> of general fill (below marker layer) material comprising blended washed sands and gravels and processed general fill within the northeast portion of the IBC site and within LA5240-3 and LA5240-4 (this volume includes hotspot backfill);
- Placement of marker layer geotextile and deposition of approximately 4717m<sup>3</sup> of lime stabilised PLUG (Power Lines Underground works) material (comprising silty Thanet Sands) separation layer material to formation level (typically 300mm thickness) in areas outside of the IBC studios footprint area. This volume includes 1,720m<sup>3</sup> of separation layer material utilised within utility corridors on the subject site as described below. The IBC studios footprint area does not require marker or separation layer as per PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2584 (Ref. 17 and Appendix E). Details of this approach were submitted to the PDT in the form of an RMS Addendum letter on 19 March 2009 (Ref. 7 and Appendix E).
- Construction of 2No. Utility Corridors (LA5850 and LA4970-2) within the CZ5b portion of the IBC site. Details of construction are as follows:

- Excavation of existing ground as detailed in drawing 2DD-MOR-CE-05b-OLP-SP1-E-0020 (LA4970-2) and 2DD-MOR-CE-05Z-OLP-XXX-E-0014 and 0015 (LA5850);
- Placement of suitable marker layer geotextile at the base and sides of the utility corridor excavation (see cross section in drawing 2DD-MOR-CE-05b-OLP-SP1-E-0020); and
- Deposition of the following volumes of lime stabilised PLUG (Power Lines Underground works) material (comprising silty Thanet Sands) separation layer material to formation level:
  - LA5850 Volume: Approximately 920m<sup>3</sup>.
  - LA4970-1 Volume: Approximately 800m<sup>3</sup>.

## 2.2 Programme and Other Works Details

The reader is referred to Table 1.1, which presents a summary of the proposed validation reports for submission. The future Validation Reports will include information relating to:

- Works programme of completed activities;
- For construction earthworks drawings;
- Contamination treatment processes;
- Waste management and Landfill Tax issues; and
- Recorded quantities.

## 2.3 Variations from Original Design

### 2.3.1 Earthworks

In accordance with PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2584 (Ref. 17 and Appendix E), no marker layer / separation layer is required within the IBC studios footprint area. Details of this approach were submitted to the PDT on 19 March 2009 in the form of an RMS Addendum letter (Ref. 7 and Appendix E).

### 2.3.2 Remediation

The findings of the validation works are presented in Section 3.

Two hotspots (BH11 and TP113) presented in the CZ5b SSRS Addendum No. 3 (Ref. 5) were located within the boundary of the IBC and were required to be remediated and appropriately validated.

In addition, 1No. underground concrete structure was encountered during the works containing 'bluish white' solid material (Ref. 17 and Appendix E). The structure was intact and the soil surrounding the structure was not visually impacted. This structure and contents were removed offsite via the

Soil Treatment Centre and the sides and base of the excavation were validated (REM4 in Drawing Ref. 2DD-MOR-CM-05X-ZZZ-XXX-E-5021).

## 3 VALIDATION OF THE HUMAN HEALTH ASPECTS ONLY

### 3.1 Validation Sampling and Monitoring

Validation sampling and monitoring undertaken as part of the works was completed in accordance with the general methodology for validation specified within the Construction Zone Specific RMS (Ref. 9) and the Northern Construction Zones Baseline RMS (Ref. 10). In summary, sampling frequencies were planned on the following basis:

- General Fill – 1No. sample per 1,000m<sup>3</sup>.
- Separation Layer - 1No. sample per 200m<sup>3</sup>.
- Hotspot Validation – 1No. sample per 25m<sup>2</sup> of base/sides of excavation.

Table 3.1 Approximate Fill Volumes and Number of Associated In-situ Validation Samples

Fill Type	Approximate Volume (m <sup>3</sup> )	No. of In Situ Samples Collected	Sampling Frequency
General Fill (Below Marker Layer)	7,771m <sup>3</sup>	13*	Approximately 1No. sample per 598m <sup>3</sup>
Separation Layer (Above Marker Layer)	4,717m <sup>3</sup>	34	Approximately 1No. sample per 139m <sup>3</sup>

\*The general fill volume and number of samples includes hotspot backfill materials.

### 3.2 Description of Fill Materials

#### 3.2.1 General Fill (Below Marker Layer) Description

Blended washed sands and gravels and processed made ground was utilised as general fill material. Descriptions of the general fill (below marker layer) materials are also presented in the analytical laboratory within Appendix B.

#### 3.2.2 Separation Layer (Above Marker Layer) Description

Lime stabilised PLUG (Power Lines Underground works) material (comprising silty Thanet Sands) was utilised in the separation layer material placed within the IBC site outside of the IBC Studios footprint as per the RMS Addendum Letter (Ref. 7).

## 3.3 Validation Results

### 3.3.1 Introduction and Assessment Methodology

For the purposes of this report, only those SSAC's that are protective of human health, as defined by the SSRS Designers, have been utilised herein for this validation assessment (refer to Section 1.8). All validation assessments in this report have utilised SSAC's for human health zone CZ5b.2 (Drawing Ref. 2DD-ATK-CM-05b-OLP-XXX-E-0005), where the IBC is located.

The locations of the hotspot / other encountered contamination remediation, general fill, and separation layer validation samples utilised in the assessment presented herein are shown on Drawing Ref. 2DD-MOR-CM-05X-ZZZ-XXX-E-5112.

Copies of the validation results are presented within Appendix B. Summaries of the assessments are presented within Appendix C.

#### **SSRS Addendum No. 3 Defined Hotspot Validation Samples**

Two SSRS Addendum No. 3 (Ref. 5) defined contamination hotspots were located within the site (TP113 and BH11).

TP113 was identified as a human health (naphthalene) and controlled waters (benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene and pyrene) hotspot. Validation sample results for TP113 (REM9 and REM29) have been directly compared against the criteria presented in Section 1.8.1 and Appendix A herein.

BH11 (REM30) was identified as a controlled waters hotspots for mercury (Drawing Ref. 2DD-MOR-CM-05b-OLP-XXX-E-0105), and as such has only been tested for this contaminant of concern. No SSAC Protective of Human Health for mercury is presented for CZ5b.2 Import and Backfill Verification Criteria (below the marker layer) (Refer to Appendix A). As such, these validation results are presented in this report for reference purposes only and are not included in the Appendix C assessments. The reader is referred to the forthcoming CZ5b Unsaturated Zone Validation Report for further details regarding controlled waters specific validation of the above noted hotspots.

#### **Underground Concrete Structure Removal Validation Samples**

The validation samples (REM4) from the removal of the underground concrete structure described in Section 2 and the Field Record in Appendix E (Ref. 19) were tested for the site wide chemical verification suite and directly compared to the human health SSAC's for import material below the marker layer as shown in Appendix C in the absence of specific excavation criteria within the SSRS Addendum No. 3.

### **General Fill (Below Marker Layer)**

The general fill validation sample results were directly compared to the SSRS Addendum No. 3 human health SSAC's for import material below the marker layer as shown in Appendix C due to the limited number of general fill samples and their presence in non-continuous areas.

### **Sub-formation and Formation Level Validation Samples**

The Upper 95<sup>th</sup> percentile (UCL95) of the mean measured contaminant concentration (representative mean concentration) has been calculated using the statistical package, ProUCL. (Version 4.0) for the sub-formation and formation level validation data set. ProUCL determines the representative mean concentration appropriate to the distribution of the contaminant dataset (e.g., normal, log-normal, gamma, and non-parametric) by selecting the most appropriate statistical method. This calculated representative mean concentration (95% UCL) has then been assessed against the appropriate Human Health SSAC for the site as detailed in the following sections. This approach to the statistical assessment of contamination data is considered more appropriate than the direct application of the Mean (Student-t test) and is consistent with the approach adopted by the Designers within the SSRS and SSRS Addendum No.3 (Refs. 4 and 5).

In the use of ProUCL (Version 4.0) a number of assumptions have been made within the data assessments. Data assessment has included non-detect values (concentrations recorded below the laboratory level of detection (LOD)) within calculation of the 95%UCL. Where values are recorded as non-detections, the laboratory level of detection has been used, e.g. LOD equals <5, assessment uses value of 5, as this was considered a more conservative approach.

Concentrations of contaminants across a site will vary as a result of natural variation. It may be the case that on consideration of a sample population, certain elevated contaminant concentration values, may not fall within the high end of a typical population distribution (i.e. falling outside it). As such, these elevated values may be considered more representative of a separate area of contamination, which should be considered separately from the main sample population. Statistically such areas are referred to as 'outliers'.

The SSRS and SSRS Addendum No. 3 use the Grubbs' Test to define statistical outliers in combination with review of sample distribution as defined within a histogram. As such, the Grubbs' Test has been used to assess for the presence of outliers within the subformation/formation level dataset. Additional review has been undertaken of the plotted histogram data distribution and consideration of any available field descriptions, where appropriate. Where potential outliers have been identified during this assessment, defined outliers have been removed from the dataset. A new UCL95 value has then been calculated for the datasets (following removal of the outliers) against the relevant SSAC to determine potential site wide issues requiring further consideration / corrective action. This is presented

within the summary tables within Appendix C and in subsequent sections below. Where outliers are identified consideration is given as to whether corrective action is required.

The SSAC's Protective of Human Health (Import Material Verification Criteria) for CZ5b.2 (refer to section 1.8.1) were utilised in the assessment in the absence of specific excavation criteria within the SSRS Addendum No. 3. Where SSAC exceedances are noted, the Hard Landscaping GAC's have been applied per PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2445 where appropriate (Ref. 18 and Appendix A).

### **Separation Layer (Above Marker Layer)**

The separation layer validation sample results were directly compared to the human health SSAC's for separation layer material as shown in Appendix C.3 (Utility Corridor Validation Samples) and Appendix C.4 (Validation Samples Outside of Utility Corridors). The UCL95 was not calculated for the separation layer validation samples due to the limited number of samples within the separate corridor and non-corridor data sets. Also, the separation layer deposition areas are not continuous (i.e., separate, distinct areas), it was considered more appropriate to review the data directly against the SSAC's.

### **Asbestos Quantification - General Fill and Subgrade**

General Fill and subgrade asbestos quantification results (where asbestos quantification was scheduled) were directly compared to the criteria of 0.1% instructed in PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2605 (Ref. 15) as shown in Appendix C.

### **Asbestos Quantification - Separation Layer Samples Outside of Utility Corridors**

The individual asbestos quantification results were directly compared to the criteria of 0.1% instructed in PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2605 (Ref. 15) as shown in Appendix C.

### **Asbestos Quantification - Separation Layer Samples Within Utility Corridors**

Asbestos quantification testing was not scheduled for these samples, however, no bulk fibres were observed by ESGI operatives within these samples (see Appendix C).

## 3.3.2 Validation of SSRS Addendum No. 3 Defined Hotspots

No human health chemical non-compliances (against the SSAC's protective of human health) were identified in the assessment of the TP113 hotspot contamination validation samples (REM9 and REM29) (see Section 1.8 and Appendix C). The contaminants of concern are as follows: human health - naphthalene and controlled waters - benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene and pyrene.

As noted above, BH11 (REM30) is a controlled waters hotspot for mercury contamination and therefore the validation results for BH11 are presented in Appendix B herein for reference purposes only and are not included in the Appendix C assessments. The reader is referred to the forthcoming CZ5b Unsaturated Zone Validation Report for further details regarding controlled waters specific validation for the above noted hotspots.

Asbestos quantification testing was not scheduled for these samples, however, no bulk fibres were observed by ESGL operatives within these samples (see Appendix C).

### 3.3.3 Validation of Underground Concrete Structure Removal Validation Samples

The assessment undertaken of the validation samples associated with the void following removal of the underground concrete structure (when directly compared to the SSAC's Protective of Human Health – Section 1.8 and Appendix A) has determined the following non-compliance (see Appendix C):

Validation Sample Ref.	Depth (mAOD)	Determinant	SSAC	Result	Pass/Fail – Further Consideration Required
5b/REM4/007	8.345	Total Cyanide	17mg/kg	20.3mg/kg	Free cyanide passes (result <0.7mg/kg)

As the above free cyanide result is below the SSAC, no corrective action is proposed. This is in line with the approach to cyanide documented within the SSRS/SSRS Addendum No. 3 (Refs. 4 and 5). This states that hydrogen cyanide is unlikely to persist in the vapour phase over the exposure period and that unacceptable risks from total cyanide at depths below 0.6mbFFL via the vapour inhalation pathways are not considered to be present during the Olympic and Legacy end use.

Asbestos quantification testing was not scheduled for these samples, however, no bulk asbestos fibres were observed by ESGL operatives within these samples(see Appendix C).

### 3.3.4 Validation of Sub-formation and Formation Level

No human health non-compliance were identified in the assessment of the sub-formation (where separation layer material is present) and formation level (where separation layer material is absent) validation samples (see Appendix C and Drawing Ref. 2DD-MOR-CM-05X-ZZZ-XXX-E-5112).

Asbestos quantification results for all sub-formation and formation samples where asbestos quantification was scheduled were below the criteria of 0.1% instructed in PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2605 (Ref. 15) as shown in Appendix C. No bulk fibres were observed by ESGL operatives in those

samples where asbestos quantification was not scheduled (see Appendix C).

### 3.3.5 Validation of General Fill (Below Marker Layer)

The assessment undertaken of the general fill in-situ (below marker layer) validation samples (when directly compared to the SSAC's Protective of Human Health – Section 1.8 and Appendix A) has determined the following non-compliance (see Appendix C):

Validation Sample Ref.	Depth (mAOD)	Determinant	SSAC	Result	Pass/Fail – Further Consideration Required
5b/V/3/006	8.352	Total Cyanide	17mg/kg	24.6mg/kg	Free cyanide passes (result <0.5mg/kg)

As the above free cyanide result is below the SSAC, no corrective action is proposed. This is in line with the approach to cyanide documented within the SSRS/SSRS Addendum No. 3 (Refs. 4 and 5). This states that hydrogen cyanide is unlikely to persist in the vapour phase over the exposure period and that unacceptable risks from total cyanide at depths below 0.6mbFFL via the vapour inhalation pathways are not considered to be present during the Olympic and Legacy end use.

Asbestos quantification results for all general fill samples where asbestos quantification was scheduled were below the criteria of 0.1% instructed in PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2605 (Ref. 15) as shown in Appendix C. No bulk fibres were observed by ESGL in those samples where asbestos quantification was not scheduled (see Appendix C).

### 3.3.6 Validation of Separation Layer (Above Marker Layer)

#### Utility Corridor Separation Layer Samples

No human health chemical non-compliances (when directly compared to the SSAC's Protective of Human Health and Project Manager revised PAH – Section 1.8 and Appendix A) were recorded for the utility corridor separation layer (above marker layer) validation samples (Appendix C).

Asbestos quantification testing was not scheduled for these samples, however, no bulk asbestos fibres were observed by ESGL within these samples (see Appendix C).

#### Separation Layer Samples (Outside Utility Corridors)

No human health chemical non-compliances (when directly compared to the SSAC's Protective of Human Health and Project Manager revised PAH – Section 1.8 and Appendix A) were recorded for the separation layer (above marker layer) validation samples (Appendix C).

The IBC area Legacy end use is designated as hard landscaping as per Drawing Refs. 2DD-ATK-CM-05b-OLP-XXX-E-0004 and 0005 and therefore, the separation layer asbestos quantification samples were compared to the criteria of 0.1% instructed in PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2605 (Ref. 15). All individual asbestos quantification results were below the criteria of 0.1% (see Appendix C)..

### 3.3.7 Validation of Separation Layer Material Thickness

Refer to the following drawings which establish the separation layer thickness:

- LA4970-2: 2DD-MOR-CE-05b-OLP-SP1-E-0020;
- LA5850: 2DD-MOR-CE-05Z-OLP-XXX-E-0014 and 0015;
- LA5240: 2DD-MOR-CE-05B-OLP-XXX-E-0079 and 0080;
- LA5240-3: 2DD-MOR-CE-05b-OLP-SP1-E-0092 and 0093;
- LA5240-4: 2DD-MOR-CE-05b-OLP-SP1-E-0113 and 0114; and
- LA5240-6: 2DD-MOR-CE-05b-OLP-SP1-E-0095 and 0096.

## 3.4 Laboratory QA/QC Methodology

The reader is referred to the Laboratory Specification (Ref. 14) which confirmed QA/QC methods. Whilst ESGL provide on site analytical laboratory as well as a field screening tool, it was agreed that validation samples would be solely tested using the off site MCERTS laboratory, thus not requiring site based analysis.

ESGL's Laboratory Quality Report is presented in Appendix D for reference (Ref. 11). This demonstrates ESGL's Olympic Park testing activities from July 2007 to December 2008 in line with their QMS procedures.

## 3.5 Concluding Statement

MCL consider that the site is compliant with the human health (in terms of the proposed Legacy use) requirements of the SSRS Addendum No. 3 and subsequent Project Manager's Instructions.

## 4 OTHER ASPECTS

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The reader is referred to Table 1.1 which details forthcoming reports relating to the earthworks and remediation undertaken on CZ5b and the intended programme for their submission to the PDT (where necessary). Details relating to limitations on the final site uses, maintenance requirements, decommissioning of site investigation boreholes and essential wayleaves (remnant structures/foundations, known below ground utilities) will be included in these subsequent reports.

BAE Systems were procured by MCL to undertake an Olympic Park site wide assessment of possible UXO items (Ref. 12). Site staff were briefed on the possibility of UXO in a tool box talk. No obvious UXO were encountered during the ground investigation works.

Future works should be cognisant that the risk of ground obstructions remains; the locations of identified in-ground obstructions will be provided in the handover documentation.

The works have been designed and implemented on the basis of the anticipated and acknowledged future CZ5b landuses. If future landuses differ from that presented in the SSRS / GRS, further specialist assessment is required. With reference to future private gardens, the reader is referred to the SSRS/SSRS Addendum No. 3.

No uncontrolled excavation or penetration of ground should be allowed. As detailed in the referenced ground investigation reports, potential ground contamination remains on site below the EWFL and should therefore be expected by follow on parties / contractors. Sampling by its very nature typically represents a fraction of a site and therefore future works should consider the anticipated variability between sample locations. Contaminants are likely to be present in many forms, for example, solid, gaseous, liquid as well as deleterious forms (asbestos) and therefore future works should take into account this possibility. Remnant ground conditions may be hazardous in nature or categorisation (see Waste Management Licensing regulations), the latter in terms of re-excavate, process and deposit. Any work that involves excavation will need to follow the Permit to Proceed (PtP) protocol (Ref. 13).

Piling design and methods should be considered and risk assessments undertaken to prevent the creation of groundwater pathways to significant receptors. Nor should such piling cause the mobilisation of significant contamination. Environment Agency and Olympic Park guidance on such matters should be followed.

Future parties involved with later construction elements which have the potential for workers to come into contact with material referenced herein should wear appropriate personal protective equipment (PPE) and make their own assessment of the contaminant results given herein.

Some aspects of the SSRS / SSRS Addendum require implementation by the follow-on venue contractors, for example:

- Land gas protection measures within the fabric of building structures.
- Appropriate final development surface cover and sustainable urban developments (SUDs) in line with SSRS requirements.
- Appropriate chemically resistant infrastructure.

## 5 REFERENCES

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- 1 Project Managers Instruction – Validation Report Process, Atkins, May 2008, ODA Ref. PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-1213.
- 2 Olympic Enabling Works Earthworks and Remediation Validation Report – Human Health, Construction Zone 5c, Morrison Construction/Hyder Consulting, August 2008, Rev 03, ODA Ref. REP-MOR-CE-05c-XXX-XXX-E-0010.
- 3 Olympic Enabling Works Earthworks and Remediation Unsaturated Zone Validation Report, Construction Zone 5c, Morrison Construction/Hyder Consulting, November 2008, Rev 00, ODA Ref. REP-MOR-CE-05c-OLP-SP1-E-0012.
- 4 Site Specific Remediation Strategy (SSRS) – Construction Zone 5b (Delivery Zone 5), Atkins, December 2007, ODA Ref. REP-ATK-CM-05b-OLP-XXX-E-0001.
- 5 Site Specific Remediation Strategy Addendum No. 3 – Construction Zone 5b (Delivery Zone 5), Atkins, January 2009 ODA Ref. REP-ATK-CM-05b-OLP-XXX-E-0007.
- 6 Site Specific Remediation Specification for Construction Zone 5b, Atkins, August 2008, Rev 03, ODA Ref. SPE-ATK-CM-05b-XXX-XXX-E-0001.
- 7 Letter from John Pearson of Atkins to Vivienne Ramsey of the Olympic Delivery Authority, Planning Decisions Team, Regarding PDZ 5 (IBC) RMS Addendum (Use of Hard Cover as a substitute to the Separation Layer), Dated 19 March 2009.
- 8 Project Managers Instruction – Use PAH/Lead SSACs Paper with Regard to Service Corridor, Atkins, 26 February 2009, ODA Ref. PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2712.
- 9 Remediation Method Statement, CZ5b, Morrison Construction/ Hyder Consulting, April 2008, Rev 00, ODA Ref MST-MOR-CE-05b-XXX-XXX-E-5000.
- 10 Baseline Remediation Method Statement – Northern Construction Zones (CZ 5a, 5b, 5c, 6a, 6d, 7a), Morrison Construction/ Hyder Consulting, December 2007, Rev 02, ODA Ref. MST-MOR-CM-ZZZ-ZZZ-ZZZ-E-5004.
- 11 Laboratory Quality Report, Environmental Services Group Ltd, December 2008, Rev 07, ODA Ref. REP-ENL-CE-04Z-OLP-SP1-E-0150.
- 12 Environmental Risk Assessment for German Air Dropped UXOs – Olympic Park North, BAE Systems, February 2007, REP-MOR-CE-ZZZ-OLP-SP1-E-0001 Rev 00.
- 13 Protection of Parkwide Remediation Works and Maintenance of Environmental Protection Measures During Follow on Excavation Works – Permit to Proceed Protocol, Atkins, ODA Ref. PRO-ATK-CM-ZZZ-ZZZ-ZZZ-E-0003.

- 14 Specification for the Provision of On- and Off-site Laboratory testing Services, ESG Ltd, September 2008, Rev 02, ODA Ref. REP-ENL-CK-ZZZ-OLP-SP1-E-0084.
- 15 Project Manager's Instruction – Updated Asbestos Criteria for General Backfill and Separation Layer, Atkins, February 2009, ODA Ref. PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2605.
- 16 Project Manager's Instruction – PMI Clarification Regarding Changes to Design, Atkins, January 2009, ODA Ref. PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2551.
- 17 Project Manager's Instruction – IBC/MPC – Studios Footprint Separation Layer, Atkins, February 2009, ODA Ref. PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2584.
- 18 Project Manager's Instruction – Hard Landscaping GAC, Atkins, January 2009, ODA Ref. PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2445.
- 19 Field Record – Underground Concrete Structure – CZ5b/5240-3, Hyder Consulting, March 2008.
- 20 Olympic Park Enabling Works Earthworks Handover Report, CZ5b Subzone LA5850, Morrison Construction, January 2009, Rev 00, ODA Ref. REP-MOR-CK-05b-OLP-SP1-E-0258.
- 21 Lower Lea Valley Olympic and Retained Legacy Olympic Park, Global Remediation Strategy (GRS), Capita Symonds, January 2007, Version 2.0 Rev B, ODA Ref. REP-CSP-VZ-ZZZ-OLP-XXX-E-0076.
- 22 Project Manager's Instruction – Human Health Criteria for Utilities Corridor, Atkins, August 2008, ODA Ref. PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-1661.
- 23 Project Managers Instruction – Changes to Human Health Layer SSAC's, Atkins, 10 February 2009, ODA Ref. PMI-ATK-PM-ZZZ-ZZZ-ZZZ-E-2669.
- 24 Global Remediation Strategy (GRS), Version 2.0 Revision B, Capita Symonds, January 2007, ODA Ref. REP-CSP-VZ-ZZZ-OLP-XXX-E-0076.