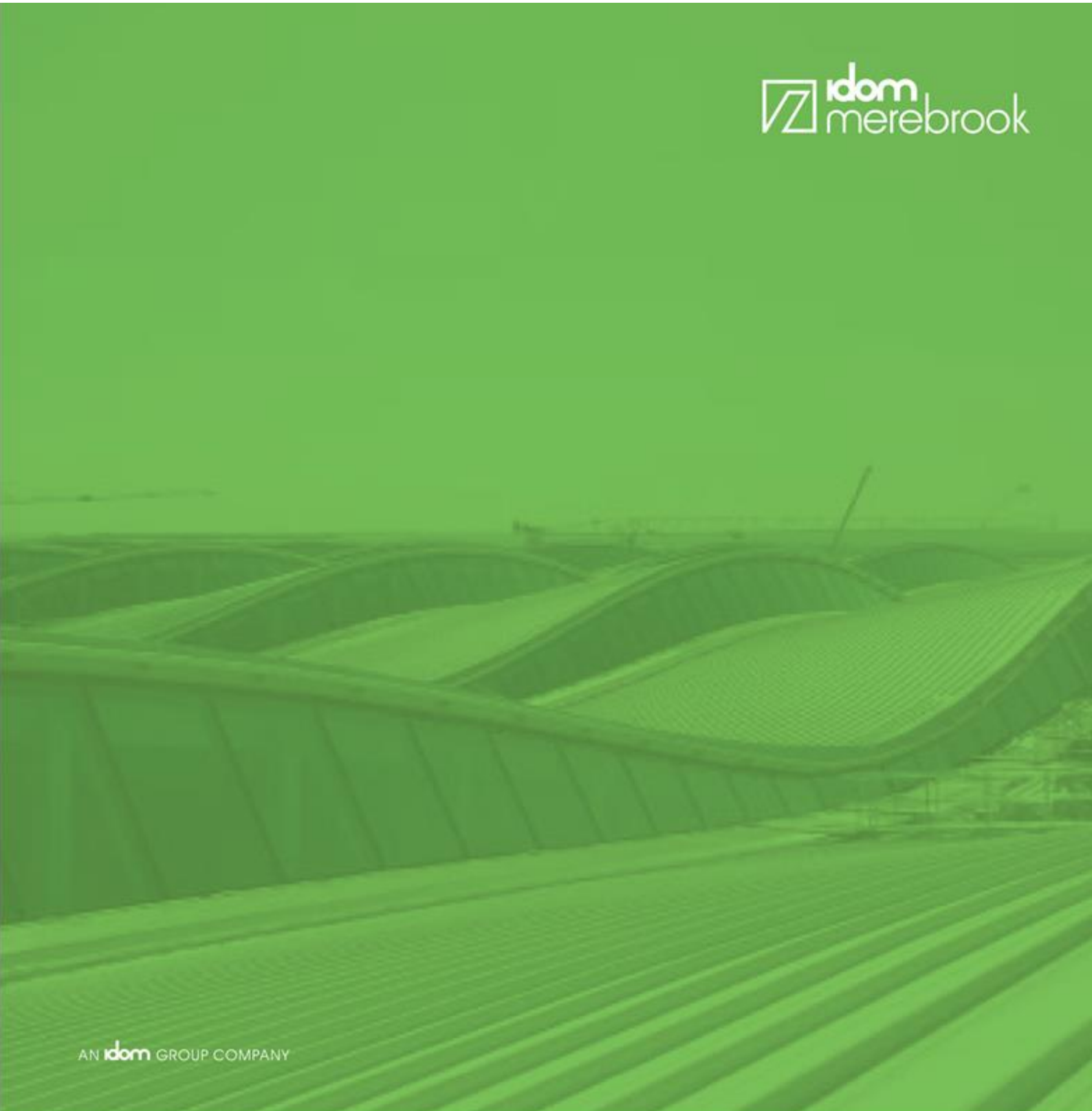
SITE INFORMATION AND PARTICULAR SPECIFICATION
SOUTH QUAY PARKSIDE
BARRY
THE BARRY WATERFRONT CONSORTIUM
PS-179633G-14-88 REV B
AUGUST 2015



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SECTION 1 DESCRIPTION OF WORKS

1.1 PURPOSE OF THIS DOCUMENT

This document details requirements applicable to the remediation of the former Barry Quays, South Quay Parkside, at Barry, Vale of Glamorgan, on behalf of the Employer, The Barry Waterfront Consortium.

1.2 SITE LOCATION

South Quay Parkside covers an area of approximately 5.96 hectares and is located to the south of Barry town centre along the north shore of Barry Island, centred on national grid reference 311281,166990. The site is bounded to the southwest by Barry Harbour Car Park, to the northwest by an adjacent parcel known as West Pond, to the northeast by an adjacent parcel known as South Quay, and to the southeast by a cliff and Clive Road which runs along the top of the cliff beyond which lies residential properties on Barry Island. A site location plan is provided in Appendix 1.

1.3 BACKGROUND

The Barry Waterfront Consortium is a joint venture between Barratt Homes, Persimmon Homes and Taylor Wimpey. The Vale of Glamorgan Council granted full planning approval for the development in March 2012. South Quay Parkside Parkside forms part of the regeneration of Barry's waterfront area.

1.4 OBJECTIVES

In summary the Works shall comprise:

i. The remediation of South Quay Parkside and removal of all redundant pipework. In order to mitigate against a 1 in 200 year tidal event, the site will be levelled to a minimum of 8.9 m AOD.

The Works shall be carried out in order to achieve the following objectives:

i. Removal of all sources of potential contamination by reducing the concentrations of hydrocarbons within the soil to meet the Remediation Criteria;

ii. Provide a site suitable for redevelopment for a residential end use

1.5 SITE HISTORY

1.5.1 Historical Summary

South Quay Parkside was formerly part of the adjacent parcels known as West Pond and South Quay, and was reported as such in previous investigations. The area formerly part of West Pond was occupied by a Tank Wash building which has since been demolished with the slab left in-situ. The remaining part of the site was

formerly part of a wider tank farm which extended onto South Quay. The site history summary has been largely taken from the following report which was submitted as part of an Environmental Statement:

i. Geo-Environmental Site Investigation Report – South Quay, Ove Arup & Partners Ltd, October 2008

"*Before construction of the dock…..the site was mainly used as coal loading area with railway sidings (low level).*

In the 1960s the site was redeveloped to facilitate storage of fuel and other hydrocarbons (e.g. diesel oil, jet fuel, kerosene, lube oil, mineral oils, carbon tetrachloride, phenol, benzene, solvents) and other chemical substances (e.g. sodium hydroxide solution, methanol, silicone)." Tank locations and a directory of their contents is provided in Appendix 2.

By the early 2000s, all of the tanks had been demolished or removed. At the current time, the site is predominantly hardstanding with overgrown ruderal vegetation. The current site layout is provided in Appendix 1 and a full set of historical maps is provided in Appendix 3.

1.6 DEFINITIONS AND DUTIES

In the context of this document the following definitions shall apply:

Employer – means the person or persons, firm, company, subsidiaries, or other body who have responsibility for the site. The Employer will enter into a Contract with the Contractor for the execution of the Works specified in this Particular Specification document and the other Contract documents. The Employer may be represented on site by personal representatives or other parties, e.g. the Project Manager. For the purposes of this document the Employer is The Barry Waterfront Consortium.

Contractor – means the person or persons, firm, company or other body to whom the Contract is awarded by the Employer and includes the Contractor's personal representatives or other parties, e.g. Domestic Sub-Contractors, Manufacturers and suppliers. The Contractor will undertake the execution of the Works under the terms of the Contract. This includes the remediation of the site, associated earthworks, plus duties as the Principal Contractor under the CDM regulations.

Project Manager (PM) – means the person who is appointed by the Employer to manage the Contract on behalf of the Employer for the proper execution of the Works. For the purpose of this document, the Project Manager is The Barry Waterfront Consortium.

Supervisor – means the person, firm or company appointed by the Employer to act on his behalf to monitor and check that the Works are undertaken in

accordance with the Contract. For the purpose of this document the Supervisor is Merebrook Consulting Limited.

SECTION 2 AVAILABLE DOCUMENTS AND SITE INVESTIGATION INFORMATION

A package of site investigations has been conducted by Ove Arup & Partners Limited and is presented within Appendices 4 to 8. The following works have been undertaken:

i. Barry No. 1 Dock Redevelopment Geotechnical and Contamination Report, Ove Arup & Partners Limited, November 1992. (Appendix 4)

ii. Site Investigation Report No.3b, Phase II Reclamation, Ove Arup & Partners Limited, July 1994. (Appendix 5)

iii. Reclamation of Tank Farm and Mole at Barry No. 1 Dock. Factual Report on Ground Investigation, Exploration Associates, August 1994. (Appendix 6)

iv. West Pond Supplementary Controlled Water Risk Assessment, Earth Science Partnership, October 2010 (Appendix 7)

v. South Quay and West Pond Desk Study, Ove Arup & Partners Limited, February 2008. (Appendix 8)

vi. Geo-Environmental Site Investigation Report – West Pond, Ove Arup & Partners Limited, September 2008. (Appendix 9)

vii. Geo-Environmental Site Investigation Report – South Quay, Ove Arup & Partners Limited, October 2008. (Appendix 10

viii. Supplementary Site Investigation, South Quay Parkside. Merebrook Consulting, March 2014. Report Reference SSI-17633g-14-77. (Appendix 11).

2.1 1992 INVESTIGATION

A total of 11 trial pits and 1 borehole were advanced in South Quay Parkside as part of a wider investigation. The investigation was carried out by Integral Geotechnique Ltd on behalf of Arup. Borehole and trail pit logs are not available in the report.

The cliff geology of South Quay Parkside was described as being a member of the Penarth Group comprising mainly dark grey and medium grey shales with subordinate bands of sandstones, siltstones and limestones.

Groundwater levels were described as fluctuating and controlled by the water level in the dock, suggesting continuity between the two water bodies.

The report indicated South Quay Parkside Tank Farm was contaminated by spillages and would require the most extensive and expensive decontamination.

The report also makes reference to, and includes within an Appendix, a 1992 report on asbestos contamination within West Pond carried out by Berridges. One trial pit location, ATP1, was located along the current site boundary between West Pond and South Quay Parkside. Asbestos analysis of soils in ATP1 showed asbestos was present at the surface and at 0.5m bgl depth. The report concluded that the site was "*badly contaminated with asbestos containing materials*."

2.2 JULY 1994 INVESTIGATION

One trial pit (W25) was advanced on South Quay Parkside as part of a wider investigation. The investigation was carried out by Integral Geotechnique Ltd on behalf of Arup. Trial pit logs were provided. Trial pit W25 was shown to have 0.4m of fill over weathered bedrock. Analysis of the fill material was restricted to a metals suite which showed an elevated concentration of arsenic when compared to current published residential SGVs.

2.3 AUGUST 1994 INVESTIGATION

Four trial pits (M10, M12, M13 and M14) were advanced on South Quay Parkside as part of a wider investigation. The investigation was carried out by Exploration Associates Ltd on behalf of Arup. Trial pit logs were provided.

The trial pits were located along the current boundary between West Pond and South Quay Parkside. The depth of made ground (fill) in the trial pits was not proven but was at least to a depth of 2.6 m bgl. Trial hole M10 was noted to have black stained sand from oil contamination at a depth of 2.5-2.6m bgl.

Analysis comprised a metals suite, phenols and TEM (toluene extractable matter). Analysis for xylene and styrene was carried out on a sample taken from trial hole M10 (0.3m). The TEM results indicated an elevated amount of hydrocarbon contamination in trial hole M10.

2.4 2008 DESK STUDY AND INVESTIGATION

2.4.1 Overview

A total of 32 trial pits and one borehole were advanced in in the parcel now known as South Quay Parkside (formerly parts of South Quay and West Pond) as part of wider investigations. Chemical testing was carried out on soil samples obtained from the trial pits. Groundwater samples were taken from the borehole.

Within the former tank farm (formerly part of South Quay), the presence of hydrocarbon sheens and odours was observed.

No hydrocarbon contamination was noted outside of the former tank farm with the exception of WPTP110 adjacent to the former tank wash building where black staining and a 'moderate' hydrocarbon odour were noted.

2.4.2 Analytical Results

A Tier 1 risk assessment was carried out which identified a number of contaminants of concern which were present both within the natural and made ground.

A detailed human health risk assessment showed that provision of a minimum of 600mm of clean capping across the site would be adequate to mitigate the risks to future site users in a residential setting, including the risks from vapour inhalation.

A detailed groundwater risk assessment conducted on South Quay (which included the tank farm now within South Quay Parkside) showed that there was a significant risk to the quality of the dock water. However it was noted that there was no evidence that the contamination had mobilised to the dock wall. It was recommended that free product be removed from the groundwater prior to further treatment in order to achieve remedial targets.

A detailed groundwater risk assessment conducted on the water body beneath West Pond showed that there was not a significant risk to water quality in the Severn Estuary from groundwater leaving the site via Barry Harbour.

For the tank farm area formerly part of South Quay, it was recommended that soil remediation be undertaken in order to remove potential sources of contamination. Remedial targets for treated soils and soils left in-situ were derived.

It was recommended that the ground level of the site should be raised to 8.9 m AOD for flood prevention purposes.

2.5 2014 INVESTIGATION

A total of 11 trial pits and trenches were excavated in order to determine the present hydrocarbon contaminative status of the site and to delineate the extent of hydrocarbon contamination. Previously uninvestigated areas were also examined.

Seven soil samples were taken from the trial pits/trenches and analysed for a broad suite of hydrocarbons including Volatile Organic Compounds (VOCs) and semi-Volatile Organic Compounds (sVOCs). An asbestos screen was also carried out on selected samples.

The investigation confirmed that provision of a minimum of 600mm of clean capping across the site would be adequate to mitigate the risks to future site users in a residential setting, including the risks from vapour inhalation.

2.6 ACCURACY OF INFORMATION

The Contractor shall be deemed to have read the relevant site investigation logs and test results, relevant drawings, have visited the site, and have consulted all available information concerning the site conditions and extent of the sub-structures to be broken out, prior to submitting his tender, signing the Contract and commencing the work.

Any discrepancies will be reported to the Project Manager who will issue the necessary clarifications. Such discrepancies shall be reported within seven days of receipt of drawings and documents and shall be clarified in writing.

SECTION 3 GENERAL REQUIREMENTS

3.1 COMPLIANCE WITH PARTICULAR SPECIFICATION

All workmanship and materials shall be strictly in accordance with the Clauses of the Particular Specification. Should the Contractor wish to deviate from this Particular Specification in any way, he shall agree such variations with the Project Manager and the Supervisor by writing, in advance. The Contractor should raise any queries regarding this Particular Specification during the tendering period. Any claims resulting from a failure to comply with this Particular Specification or to seek clarification during the tender period will be deemed to be invalid. Should there be any conflict between this Particular Specification and any other Contract document, the Project Manager's decision will be final with respect to determining precedence.

3.2 COMPLIANCE WITH THE BYLAWS, REGULATIONS, BUILDINGS ACTS, HEALTH AND SAFETY LEGISLATION

The Contractor is deemed to have included in his prices for all plant, labour, materials and scheduling required to comply with bylaws, regulations, Building Acts etc, as well as compliance with pertinent Health and Safety Legislation. Any requisite liaison or cooperation with the Employer, Project Manager or Supervisor is also deemed to be included.

The Contractor shall serve all Notices, paying for all fees legally demandable, and arrange for inspection permissions, notification procedures and licences (not indicated as provided by the Project Manager or Supervisor) of work as required by the relevant Statutory or Local Authorities. The Contractor shall notify the Project Manager and the Supervisor of any decisions made by the Authority representatives if they in any way affect the Project Manager or the Supervisor's details before the work is carried out. The Contractor shall provide a copy of his Environmental Permit with his tender for any remediation treatment methods which he proposes to undertake as a part of the Works.

The Contractor shall ensure that the method of working or other on site activities, or associated off site operations, comply with the requirements of the Statutory Authorities. Provisions for these requirements are deemed included within the Contract Tender Sum.

Approval of the work by the Authority representatives shall not necessarily mean acceptance by the Project Manager or the Supervisor.

3.3 COMPLIANCE WITH BRITISH STANDARDS AND GUIDANCE DOCUMENTS

All documents referred to or implied in this Particular Specification shall be those current at the time of Tender, including all the latest amendments.

All work at, below or above ground level shall be in accordance with all relevant British Standards and other relevant guidance documents, particularly with the following and any other documents noted therein, except the requirements of this Specification, which shall be applied wherever they are at variance with the British Standards.

i. BS 6031: Code of Practice for Earthworks

ii. Manual of Contract Documents for Highway Works Volume 1: Specification for Highway Works Consolidated Edition 1994, Highways Agency (hereafter referred to as SHW)

iii. EPA 1990: Environmental Protection Act including the Contaminated Land Regulations 2000 enacted under Part IIA and Section 34 Duty of Care requirements

iv. EA 1995: Environment Act

v. Relevant Health and Safety Executive Guidance Notes in particular HS(G)66

vi. HS(G)66: Protection of Workers and the General Public during the Development of Contaminated Land

vii. Water Resources Act 1991

Should there be any discrepancy with this Specification or any of the above documents the Project Manager's decision shall be sought in writing. Such a decision shall be final and absolute.

The industry has no definitive documents relating to the site remediation, but good industry practice as detailed in CIRIA documentation, combined with Environment Agency / Natural Resources Wales documentation is required as a baseline.

3.4 WORKMANSHIP

The workmanship throughout the Works is to be to the standard required by relevant British Standard Specification and Codes of Practice and is to be done to the complete satisfaction of the Project Manager and the Supervisor in regard to method, order and quality.

Operatives must be appropriately skilled and experienced for the type of work being carried out and hold or be training to obtain relevant CITB Certificates of Competence. Site staff responsible for supervision and control of the work are to be experienced in the assessment of the risks involved and in the methods of demolition to be used.

3.5 SUPERVISION

No Works shall commence on site until the Contractor has an experienced and competent person, as agreed with the Project Manager and the Supervisor, in full

time attendance. Curriculum Vitae of all key personnel shall be provided with the Contractor's tender along with an organisation chart clearly indicating the position and role of each key person. Remediation Works are to be supervised and instructed by staff that holds relevant Waste Management Industry Training Board (WAMITAB) accreditation in accordance with any site specific environmental permit applicable to the remedial technique utilised. Such supervision must be present on site at all times during the remediation phases. The Contractor is to provide a competent Agent, General Foreman and Gangers as necessary and to provide all necessary supervision to produce workmanship to the complete satisfaction of the Project Manager and the Supervisor. The Contractor must also provide adequate engineering staff to ensure accurate setting out, construction and quality control. Supervisors must have had the experience of the construction of similar Works, i.e. earthworks, remediation etc.

3.6 **SUB-CONTRACTORS**

The Contractor will be responsible under this Contract for any work carried out by Sub-Contractors. This responsibility includes for all aspects of the Works, including Safety. The Project Manager's approval in writing is to be obtained in advance for all Sub-Contractors the Contractor intends to employ. Approval for Sub-Contractors will be given at Award of Contract stage, and this may not be varied under any circumstances without the prior approval of the Project Manager in writing.

The following information is required at Tender stage before Award of Contract:

i. Company history/background

ii. Listing of recent similar remediation and/or earthworks projects, stating date, location, client and size

iii. Accreditation to professional bodies

iv. Detailed CV's of all proposed key subcontract personnel for the Works, including relevant training certificates

3.7 **RESPONSIBILITY**

No approval, nor acceptance, shall relieve the Contractor of his responsibilities under the Contract for the design of any excavations; support thereof; the quality of materials or standard of workmanship in the Works.

The presence of the Supervisor, shall not absolve the Contractor of his responsibilities under the Contract.

3.8 **COMMUNICATION**

Lines of communication shall be as follows subject to agreement with the Contractor:

i. The Project Manager shall be the first point of contact for all contractual or financial matters relating to the Contract.

ii. The Supervisor shall be the first point of contact for all technical matters relating to the Works.

iii. The Contractor shall act as the point of contact in the arrangement of Statutory Authority licenses, consents and approvals required for operating the system.

3.9 **PROGRAMME**

The Contractor shall provide an outline programme for the Works with his tender. He shall provide a detailed programme for approval by the Project Manager following award of the Contract and at least two weeks prior to the start of the Works.

3.10 **STATUTORY, REGULATORY AND ADMINISTRATIVE BODIES: POINTS OF CONTACT AND RESPONSIBILITIES**

Preliminary consultations have been undertaken with both the Natural Resources Wales (NRW) and the Contaminated Land Officer (CLO) at Vale of Glamorgan Council as the key consultees. The Supervisor will continue to consult with the CLO and the NRW throughout the Contract.

Depending on the Contractor's chosen methodology of treatment it shall be the responsibility of the Contractor to obtain all necessary licences (and these may include pumping or abstraction licences or disposal licences etc.), permissions and approvals necessary to undertake the Works and he shall make allowance for obtaining these in his programme.

The Contractor is required to consult each Authority to make full enquiries with respect to their imposed restrictions and stipulations. He shall also give notice of commencement of the Works and provide specific information, including a full method statement on the nature and programming of the Works one week following tender acceptance.

Supporting correspondence from these Authorities shall be required indicating that a clear, concise but complete method statement has been accepted prior to commencing work and satisfaction on completion of the Works.

3.11 **LANDFILL TAX**

Landfill Tax will be applicable to any waste disposed of from the site at the rate applicable at the time the Works are carried out.

3.12 **PUBLIC RELATIONS**

All public relations issues shall be passed to the Project Manager. There are to be no press releases, statements, comments or communication with the press or third parties without the written agreement of the Project Manager.

3.13 HEALTH AND SAFETY – GENERAL

The Contractor shall fulfil the role of Principal Contractor in accordance with CDM Regulations (2007) within the Works areas and other areas of site set up and accessed, such as treatment areas. Outside of those areas where the Contractor is the Principal Contractor, he shall comply with the site rules of the Employer which shall be confirmed prior to the start of mobilisation to site for the Works.

The Contractor shall be responsible for ensuring that all his operations and activities whether on or off the Works areas site, are carried out in full compliance with the appropriate health and safety legislation, at current amendments, and with the appropriate guidance documents and approved Codes of Practice published by the HSE. Relevant guidance includes, but is by no means limited to the following:

i. The Health and Safety at Work Act 1974

ii. Management of Health and Safety at Work Regulations 1999

iii. The Manual Handling Operations 1992

iv. The Provision and Use of Work Equipment Regulations 1998

v. The Personal Protective Equipment at Work Regulations 1992

vi. The Workplace (Health, Safety and Welfare) Regulations 1992

vii. The Construction (Design and Management) Regulations 2007

viii. The Health and Safety (Consultation with Employees) Regulations 1996

ix. RIDDOR 2013

x. COSHH Regulations

The principles of the Health and Safety Executive Guidance Note HS (G) 66: 'The Protection of Workers and the General Public during the Redevelopment of Contaminated Land' HMSO, 1991 shall apply to this site in full where appropriate. All allowances are deemed included in the Contractor's Tender.

Copies of the Contractor's Health and Safety risk assessment shall be summarised and issued to all site personnel, any visiting personnel and displayed in prominent accessible locations, one of which shall be in the Contractor's Offices and another in the mess unit.

All plant utilised on site is to be fitted with a reversing audible alarm and all plant with poor rear visibility, e.g. dumper trucks, shall be fitted with reversing cameras.

Plant not fitted with such safety devices will not be permitted to work on site until such equipment is fitted. Walk by checks and maintenance records of vehicles shall be made weekly in line with the Employer's Requirements.

3.14 SITE SPECIFIC HEALTH AND SAFETY

The Contractor shall formulate a Construction Phase Health and Safety Plan for the proposed Works outlining the risks associated with these Works and detailing the health and safety measures and procedures that are to be adopted on site to protect both workers and the general public.

Copies of the Contractor's Safety Policy and other relevant safety documentation must be forwarded with the Contractor's Tender.

The Contractor shall include a detailed method statement for the Works with his tender (see Section 4 for further details). On submission of the Contract programme the Contractor shall supply any further method statements as required by the Project Manager, the Supervisor or the Regulatory Authorities.

Copies of the Contractor's Health and Safety risk assessment shall be summarised and issued to all site personnel, any visiting personnel and displayed in prominent accessible locations, one of which shall be in the Contractor's Offices.

3.15 PERSONAL SAFETY EQUIPMENT

The Contractor shall ensure that all workers are provided with and use the appropriate equipment in the work zone as detailed in the risk assessment.

A minimum level of equipment required for workers on site includes disposable overalls, safety boots with toe caps and mid-sole protection, safety glasses/goggles, gloves or gauntlets, to conform with HSE approved lists, and shall have available face masks and filters for use as required. Where access to confined spaces is required, breathing apparatus, safety harness and ropes, portable gas detectors and audible alarms shall be provided. First aid and safety equipment must be available within any restricted zones for use in an emergency. In addition, hard hats and high visibility/reflective jackets shall be provided and worn in all areas of the site at all times.

Site visitors for inspection shall wear, as a minimum: hardhat, safety boots, a high visibility/reflective jacket and have disposable overalls and dust masks available.

3.16 TRAINING

All site personnel and site visitors shall be informed and fully trained through a signed induction procedure in relation to the potential hazards of the site regarding contamination and on site safety procedures. This should also be in line with the Employer's Health and Safety policy.

Plant operators and specialist subcontractors shall be suitably trained and qualified to a recognised training and competence scheme such as CITB, WAMITAB or COTC etc.

3.17 SAFETY OFFICER / FIRST AID PERSONNEL

A nominated and appropriately qualified Safety and First Aid Officer shall be on site at all times, shall have experience of working on sites of a similar nature and be fully conversant with reaction procedures.

3.18 ENTRY TO EXCAVATIONS

In addition to the standard Health and Safety Regulations for above and below ground Works, the Contractor is required to follow procedures as outlined in HS(G) 66 for entry into confined spaces.

A number of potentially toxic/flammable gases may conceivably be encountered in trenches or enclosed underground spaces such as tanks, manholes or wells or even adjacent to recently disturbed ground:

i. Methane (CH_4)

ii. Carbon dioxide (CO_2)

iii. Carbon monoxide (CO)

iv. Hydrogen sulphide (H_2S)

v. Volatile and Semi-Volatile Organic Compounds (VOC's and sVOC's)

Hazards are most likely to occur when ventilation is restricted, such as inside confined spaces or tanks. Instantaneous gas testing for the above agents is required prior to workers entering confined spaces or trenches where these have been enclosed or unventilated for a period overnight or longer. This list is not exhaustive and the Contractor shall make his own assessment of potentially toxic/flammable gases that may be present.

3.19 PROTECTION TO EXCAVATIONS

Before excavation commences to proposed depths in excess of 1.0m in any particular area, a safety fence shall be erected around the proposed excavation, or the excavation battered to an appropriate safe angle. Such fencing shall be of Heras type, adequately signed with appropriate 'deep excavation' warning signs. During working within any demarked safety fence areas, temporary safety fences shall be used which shall stand at least 800mm above ground level and shall consist of steel spikes driven into the ground at regular intervals and with brightly coloured plastic netting or similar approved materials between the posts. Fences shall be reinstated at the end of each working day, and shall remain in place and be maintained by the Contractor, to the satisfaction of the Project Manager and the

Supervisor until the completion of the Works. Signs shall be placed as necessary to warn of deep excavations.

3.20 **OBSTRUCTIONS**

The Contractor shall remove and process all obstructions to the base of the remediation excavation, as a minimum. He shall also remove any other obstructions which he considers it necessary to remove in order to meet the Remediation Criteria. All underground pipework, existing foul sewers, drains and buried tanks, etc. shall be evacuated, once confirmed as dead, in an approved manner of all residues and these shall be disposed of in a controlled manner to a suitably licensed facility.

The Project Manager and Supervisor shall be informed of any contaminated obstructions prior to their removal from the excavation.

All obstructions removed from the ground shall be crushed to Class 6A (for filling under water) or Class 6F2 (for all other filling) in accordance with the Specification for Highway Works (2005) and shall be re-used to backfill the excavation. Particle Size Distribution classification tests shall be undertaken on the crushed material at a minimum frequency of 1 test per 500m^3. Sampling for these tests shall be undertaken by the Contractor in the presence of the Supervisor. Any concrete for re-use (from the demolition works or the remediation Works) which is shown to be contaminated (visibly stained) shall be tested at a frequency of 1 test per 250 m^3 and shall be re-used only if it meets the Remediation Criteria given in Appendix 10. If deemed to be unsuitable, the material shall not be used and shall be disposed of off-site to a suitably licensed facility.

Full details of the former locations of obstructions removed by the Contractor and of any obstructions remaining in the ground shall be provided on the survey drawings listed in Section 3.29 of this document.

3.21 **SERVICES**

Known live and redundant services are shown on the Existing Services Drawing provided in Appendix 11 and include the following (the indicated BT overground cable has since been decommissioned):

i. Drainage outfall

ii. 11kV High Voltage Cable

These drawings are included for information only. The accuracy of the drawings cannot be verified and they should be considered indicative only. Other services may exist, and it shall be the Contractor's responsibility to locate and protect or safely remove as appropriate any services which will be affected by the Works.

All redundant pipework and drainage is to be removed from the site. Product must be drained from pipelines into suitable containers and disposed of in a manner agreed with the Supervisor.

The Contractor is to provide and maintain his own temporary services to his plant and facilities at the site. All costs associated thereof shall be borne by the Contractor and his rates shall be deemed to be fully inclusive of such provision.

3.22 **SITE SET UP**

3.22.1 **Sewer**

If the Contractor requires to dispose of water to sewer he shall be responsible for obtaining and complying with a discharge consent from the local water authority. The proposed sewage discharge point is to be confirmed. If the Contractor requires, as a part of his Works, to dispose to sewer, he shall make provision for all connections and plant required to discharge to the sewer. The Contractor shall also include in his price for the cost of disposal of water to sewer.

3.22.2 **Site Welfare**

The Contractor shall make all arrangements for all necessary welfare requirements including first aid, mess rooms and cleaning/changing facilities, that he deems necessary for his or his subcontractors' operatives.

Any welfare facilities are nevertheless to comply with the requirements of the Local Authority and Health and Safety at Work Act, where applicable.

The Contractor shall not use the site for any purpose other than that of executing the remediation. Arrangements for the establishment of the Contractor's temporary site accommodation, materials and equipment storage facilities shall be agreed with the Project Manager.

The Contractor shall agree suitable bunding arrangements for the storage of fuel and the refuelling of any plant not returning to central refuelling facilities.

3.22.3 **Site Access**

Site access is via Clive Road Way through a set of secure gates.

3.22.4 **Facilities for the Project Manager and Supervisor**

The Contractor shall provide and maintain within the Contractor's area, space within the Contractor's accommodation for separate desk and telephone for use by the Project Manager and the Supervisor.

The majority of the other welfare facilities and services may be shared with the Contractor. The Contractor will maintain all facilities provided for the Supervisor for the duration of the Works. The facilities for the Supervisor shall be ready for

occupation and use by them from the date of commencement of the Works and shall be regularly cleaned and maintained throughout by the Contractor.

3.22.5 **Security and Fencing**

The Contractor shall be wholly responsible for ensuring the security of their work areas, accesses and any other areas which are agreed with the Employer as areas for use by the Contractor. The Contractor shall not be permitted to enter other areas of Barry Quays, outside of those areas agreed for access, without prior approval from the Project Manager.

The Contractor is to provide and maintain any lights, guards and watching when and where necessary, as required by himself, the Project Manager or the Supervisor or by any other competent statutory or other Authority, for the protection of personnel, the Works and construction plant associated with the Works, and for the safety and convenience of other parties on site, both during and outside normal working hours.

The Contractor must monitor all entries and exits into the work area. No unauthorised person shall be allowed on site. The Contractor must employ a suitable signing in and out procedure at all times, to the agreement of the Project Manager who shall be informed of staff movements daily. It is also essential that no person enters the site without a full knowledge of the potential dangers of the materials contained therein.

The Contractor shall provide all hoardings/temporary fences required to secure the areas of his possession. The Contractor shall maintain any hoardings or the like to the site, decorate, maintain and adapt them as necessary throughout the duration of the Contract.

The Contractor should adequately safeguard the site, products, materials, plant and the Works from damage and theft.

The remediation works areas shall be bounded by a secure Herras type fence, with adequate signage warning of deep excavation. Upon completion of filling operations, fencing may be removed only upon confirmation from the Project Manager.

3.22.6 **Clean and Dirty Areas**

The site shall be designated into clean and dirty areas. These areas shall have restricted interaction, the 'clean' areas being defined as a zones not directly involved with the remediation Works. Generally these zones will be confined to the site compounds and adjacent prepared areas.

The remediation working areas shall be designated as ‘dirty’ and shall be suitably defined with fencing along their perimeters. Hygiene facilities of appropriate size for the Works are to be located in such a way as to form the main access point into

the areas of operations on the site. A boot wash shall be located immediately outside of the units, on the operations area side.

The main site offices are not to be located in the dirty areas.

The Contractor shall provide a drawing showing his proposed site set up upon award of the Contract and not less than two weeks prior to the start of the Works.

3.22.7 **Wheel Washing Facility**

The wheel washing facility will be used by all vehicles immediately on exiting the 'dirty' area. If mud or slurry spreads onto roads outside the work area and/or into the associated highways drainage system, then the Contractor shall undertake the cleaning of such to the Project Manager's, Supervisor's and if applicable the Highway Department's satisfaction, at his own expense.

The wheel washing facility will be required as a minimum to consist of:

i. Automatic activation/de-activation of wheel wash.

ii. Directional jet sprays within shielded area to be so positioned, and of an adequate number, to ensure complete wheel, mud flap and under-body coverage, including the removal of dirt lodged between double wheels and from wheel treads.

iii. Angled trays positioned to carry sprayed water and waste into a collection tank equipped with a slurry pump. Slurry will be collected and removed to an appropriate licensed facility after testing. The water will be re-used if appropriate after a period in a settlement lagoon or tank but disposed of when unsuitable for use.

iv. Splash screens and controls.

The disposal of waste water produced by this process is deemed included within the Tender Sum and shall be disposed of in an appropriate manner. Disposal and control shall be undertaken only after consultation with, and approved from, the relevant parties, which shall include as a minimum: the Regional Water Authority, NRW and the Project Manager.

3.22.8 **Stockpiling of Contaminated Soils**

Contaminated soils shall be stockpiled only on bunded areas of hardstanding or areas specifically prepared by the laying of heavy duty plastic sheeting. Run off from these areas shall be collected and disposed of to the Contractor's water treatment plant or by other appropriate means as agreed with the Project Manager e.g. removal off site by tanker. The bunds surrounding the stockpiles shall be of sufficient height and the stockpiling shall allow for sufficient space to remain such that contaminated run off does not escape the bunded areas even during periods of heavy or prolonged rainfall.

3.22.9 **Treatment Area**

Any on site soil remediation treatment shall be carried out in the treatment areas agreed with the Supervisor. The Contractor is to provide and set up all necessary bunds and run-off collection to ensure contaminants within the soils stockpiled in the treatment area do not escape and impact the underlying or surrounding area.

3.22.10 **Fuel Storage and Vehicle Refuelling**

Any fuel required for plant shall be stored in double bunded tanks which are placed within bunded impermeable surfacing. Refuelling shall be undertaken such that any spillage is collected on a spill tray and disposed of from site. Toolbox talks shall be held by the Contractor in order to ensure that his operatives are fully aware of correct refuelling procedures. Any spillages shall be reported immediately to the Supervisor, immediately cleared and cleaned in an approved manner and any contaminated sub-soil immediately removed.

3.22.11 **Tidiness**

The Contractor shall clear away from the site all temporary buildings, old materials, dirt, rubbish and superfluous materials as they accumulate and at completion of the Works. All storage and working areas are to be kept clean and tidy at all times.

Material stockpiled for reuse shall be formed in such a manner that detrimental damage due to ingress of water or excessive drying out is minimised. Any material that becomes unsuitable shall be removed and processed until in a suitable condition, at the Contractor's own cost.

The Contractor shall, where applicable, supply COSHH statements for all chemicals/materials used on site.

Any remedial action necessary to be taken as a result of spillages will be at the Contractor's cost.

The Contractor shall be responsible for the removal and disposal of all arisings from their activities (in particular the establishment Works).

3.23 **ENVIRONMENTAL CONTROLS**

3.23.1 **Construction Environmental Management Plan (CEMP)**

The Contractor is required to produce a Construction Environmental Management Plan (CEMP) setting the management framework for the implementation of construction activities in accordance with the requirements of any planning conditions or Section 106 legal agreements. Its purpose is to reduce the risk of adverse impacts upon environmental receptors within the vicinity of the site.

The Contractor must ensure that the CEMP is agreed in writing with the Regulators prior to the works commencing on site.

As a minimum, the CEMP shall address the following issues, but not limited to:

i. Ecology;

ii. Air Quality (including odour);

iii. Noise and Vibration;

iv. Archaeology and Heritage; and,

v. Water Environment.

3.23.2 **Ecology**

South Quay Parkside has been indicated to be suitable reptile habitat.

Reptiles are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) in respect of Section 9 (1) and 9 (5) only. All native reptile species are UK Biodiversity Action Plan Priority species and Species of Principal Importance under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

The Contractor or their approved Specialist Sub-Contractors shall implement the reptile translocation works from the site prior to works commencing.

The Contractor shall comply with all relevant legislation and guidance relating to reptiles.

The Contractor shall ensure that the translocation of the reptile population adheres to Natural England's Reptile Mitigation Guidelines, 2011.

The Contractor shall ensure that a Method Statement, detailing the reptile trapping and translocation methodologies is included within the CEMP and will be agreed with the Regulators and Employer's Representative prior to works commencing on site.

There is potential for the site to support breeding birds and suitable nesting habitat in areas containing trees and scrub are present.

Breeding birds are protected under the Wildlife and Countryside Act 1981, (as amended). Schedule 1 of the Wildlife and Countryside Act 1981 provides further species protection from disturbance at or near an active nest site.

The Contractor shall ensure that wherever possible, vegetation will be removed outside of the breeding bird and nesting season (March – August). Should vegetation be required to be removed during the bird nesting season, it will be inspected by a suitably qualified ecologist, employed by the Contractor, prior to any works commencing, and appropriate mitigation measures will be adopted.

The scree at the base of the cliffs has also been identified as a key habitat for invertebrates. Current mitigation proposals agreed with the local ecology officer specify that a strip, at least 2 m wide, along the cliff base should be re-established following site works in order to provide a continued habitat resource.

The Contractor shall ensure that an Ecology Method Statement and Mitigation Strategy is included within the CEMP and agreed with the Regulators.

3.23.3 **Air Quality**

A programme of air monitoring (dust, vapour and asbestos) shall be carried out for the duration of the project by the Contractor. The final arrangement of this shall be determined by the Contractor to the satisfaction of the Regulators and the Supervisor.

The monitoring data shall constitute the basis for enhancement of hazard control, upgrading of safety measures and amendments to methods of working as and where deemed necessary.

Material shall be removed from site in covered vehicles to minimise dust liberation.

The Contractor shall be aware of the sensitive neighbours to the south of the site along Clive Road. The Contractor shall take all reasonable steps to protect these neighbours from dust during the Works.

Dust control measures shall be undertaken to the satisfaction of the Project Manager and Supervisor at all times and Works will be stopped if acceptable measures are not in place or being utilised. The CEMP will detail the Contractor's dust control system method. Dust control measures shall include as a minimum the damping down of the site with water during periods of dry weather. The use of water from the remediation excavation for this purpose will not be permitted.

The release of hydrocarbons to the atmosphere as a result of the remediation Works shall be strictly controlled. As a minimum, the Contractor shall walk the site and treatment area boundaries and note odours on a daily basis. In the event of nuisance levels of odour being encountered at these boundaries, remedial measures shall be taken including the immediate removal or covering or control of odour sources.

If the preferred remediation treatment method has the potential to generate odours, methods of odour control shall be detailed in the CEMP and implemented when required either by the Project Manager or Supervisor.

Monitoring of airborne asbestos fibres shall be undertaken at remedial excavations and locations on the site boundary to be agreed with the Supervisor and the Regulators throughout the duration of the works.

3.23.4 **Noise**

The Contractor's attention is drawn to the presence of nearby residential properties on Clive Road.

The Contractor shall ensure that noise and vibration produced as a result of the site works do not exceed the following trigger and action levels:

i. The noise level at 1 metre from the facade of the nearest occupied building shall not exceed a level of LAeq 10-hour: 75 dB, over the period 08.00 - 18.00 hours on weekdays or where more stringent levels are stipulated by the Planning Conditions.

The Contractor shall agree a suitable noise monitoring protocol with the Local Authority prior to the commencement of site works to ensure compliance with the above criteria.

3.23.5 **Archaeology**

There is potential for unrecorded archaeology of unknown value to lie within the site. The Contractor shall ensure that the site shall be subject to an archaeological watching brief to ensure that any unidentified archaeology will be identified and recorded.

The Contractor shall ensure that the archaeological watching brief and a protocol for dealing with hitherto unidentified remains is agreed with the County Archaeologist prior to the commencement of site works.

3.23.6 **Monitoring**

Procedures for environmental protection are specified below and are generally encompassed within the rules for safe working. Additional monitoring may be required by the Project Manager, Supervisor, Employer and/or the Local Authority Contaminated Land Officer (CLO) to ensure that limits are not breached at the site boundary, control measures are in place and that additional protection measures can be brought in where necessary.

Prior to commencing the Works, the Contractor shall ensure that any existing borehole standpipes to be used for groundwater monitoring outside the areas of excavation and filling are appropriately protected for the duration of the Works. Such protection shall include as a minimum temporary high visibility fencing, and/or the use of concrete manhole rings. Any monitoring wells, either existing or installed by the Contractor and which are damaged by the Contractor shall be replaced at his own costs.

The locations of groundwater monitoring boreholes will be advised prior to the start on site but will be locations outside of the remediation areas. Further details regarding groundwater monitoring are provided in Section 4.11 of this specification.

3.23.7 **Contaminated Waters**

3.23.7.1 The Contractor shall ensure that hydrocarbon free product, contaminated water or leachate deriving from the Works is not allowed to migrate and contaminate otherwise suitable materials or watercourses. Any breakout shall be immediately brought to the attention of the Supervisor and Employer and suitable temporary control measures put in place immediately to protect the workers, Works and the environs. The collected waters etc. shall be disposed of in accordance with the Supervisor's instructions. Prior to the start of Works, the Contractor shall provide a method statement detailing the emergency measures which he will employ if any breakout does occur.

3.24 SITE HAZARDS

3.24.1 General

The Contractor shall take measures to ensure gaseous emissions from all plant, fuel etc are minimised and at levels approved by the Project Manager.

Because of the occurrence of hydrocarbon contamination or other combustible materials and gases within the sites, the Contractor shall ensure the lighting of fires is prohibited at all times. Notices to this effect shall be erected and maintained at appropriate locations.

Prior notice shall be given to the Supervisor of any intention to use welding equipment.

Smoking on site will not be permitted.

Precautions shall be put in place to prevent fire or explosion caused by gas or vapour.

Adequate precautions shall also be in place to protect site operatives and the general public from dangerous fumes and dust arising during the course of the demolition works.

Dangerous openings shall be illuminated and protected as necessary.

Suspected asbestos containing materials shall be reported immediately to the Supervisor and Project Manager. The Contractor shall avoid disturbing such materials and agree methods for safe removal.

3.24.2 Unexploded Ordnance (UXO)

Anecdotal history indicates that there is a low risk of UXO being present on site.

The Contractor shall include within his risk assessments and method statements awareness of the risks of UXO. If suspicious items are encountered during the works then the Contractor is to stop works and contact the Supervisor and Project Manager immediately and await further instructions.

Any suspected item of UXO is to be identified, made safe and removed from site by appropriately qualified and competent Explosive Ordnance Disposal (EOD) personnel.

3.25 **SITE CLEARANCE**

Before beginning general excavation the site is to be cleared of all rubbish and debris. Vegetation will be chipped and shredded and recycled as appropriate, either for later incorporation into the development or for off-site recycling.

3.26 **GENERAL EXCAVATION**

Surfaces of excavations with a gradient greater than 1 in 5 which are to receive filling must have horizontal benches cut to match the depths of compacted layers of filling.

Where an excavation encroaches below a line drawn at an angle of 45 degrees from the horizontal from the nearest formation level of another higher excavation, the lower excavation, all work within it and backfilling there to must be completed before the higher excavation is made.

Where old foundations, beds, voids, basements, filling, tanks, pipes, cables, drains, manholes, watercourses, ditches, etc. not shown on the drawings are encountered, these shall not be disturbed or entered and instructions shall be obtained from the Supervisor before proceeding.

Excavations shall be backfilled if taken wider or deeper than required with the material specified for backfilling.

3.27 **ADVERSE GROUND CONDITIONS**

If, during the course of excavation, the Contractor exposes any wells, voids, mine workings or shafts, or natural faults, he shall inform the Supervisor immediately who will issue an instruction accordingly.

3.28 **PROVISION OF MATERIALS**

The Contractor shall provide all materials and services to enable him to undertake the remediation Works. Costs shall include provision for all power consumption during the Works.

3.29 **LEVEL SURVEYS**

A survey of existing ground levels shall be carried out by the Contractor prior to the commencement of any excavation on site. This will comprise a coordinated level survey of the entire site to an extent such that all the Works are covered. Surveys are to be to an accuracy of +/-10mm and referenced to Ordnance Datum and be in 3D format. The Contractor shall be responsible for setting up and maintaining a site datum and for setting out the Works.

The Project Manager shall within two working days or receipt of any commencement survey, write to accept or reject the survey as being representative of commencing levels. Should the survey be rejected, the Contractor shall within a further period of not more than three working days, rectify the errors and resubmit to the Project Manager. No Works shall proceed until an agreement has been reached. The Contractor shall have full responsibility for any delays as a result.

Further coordinated level surveys to the same specification shall be required throughout the Works to be used for validation purposes. Surveys shall be submitted to both the Project Manager and the Supervisor in both paper and digital format within two working days of undertaking each survey. The Supervisor shall verify and approve the surveys (for measurement purposes only) within two working days of receipt of the surveys. The approved surveys will be used for measurement of volumes if required. Each survey shall include as a minimum, grid reference, temporary or permanent bench marks used, spot levels and contours shown at 0.25m intervals, together with reference to materials used and locations of verification samples taken.

As a minimum surveys will be required for but not limited to:

i. Commencement of Works including existing borehole locations

ii. Locations of obstructions removed from the remediation excavation

iii. Locations of obstructions identified and remaining in the ground

iv. Remediation excavation dimensions weekly during periods of excavation

v. Locations of remediation validation samples

vi. Locations of material conformance test results in the backfilled area

vii. Completion of final surfaces – levels

Survey drawings shall be provided to the Project Manager within one week of the completion of each of the activities to which they relate.

3.30 REPORTING

3.30.1 Site Reporting

The Contractor shall keep an up to date copy of all relevant Contract records on site for inspection by the Project Manager or the Supervisor upon demand.

3.30.2 Monthly Reporting

The Contractor shall provide the Project Manager and the Supervisor with a fortnightly update report prior to fortnightly progress meetings with the Employer and Merebrook, incorporating details of the progress of the Works including

validation test results, groundwater and environmental monitoring results and any changes to the methods or scope of the remediation Works.

3.30.3 **Photographic Record**

The Contractor shall keep a photographic record of the Works as a minimum 20 No. photographs shall be taken by the Contractor per week showing the progress of the Works for the duration of the Works. These photographs shall be presented, and labelled in a chronological order, in the validation report a maximum of two weeks after the substantial completion of the Works. The photographs shall also be available to view by the Employer, Project Manager or Supervisor at any time during the Works.

3.30.4 **Completion Reporting**

The Contractor shall provide a Completion Report for the site in draft a maximum of four weeks after substantial completion of the Works. The report shall be provided electronically (in a format to be agreed with the Project Manager) and as a hard copy. As a minimum the report shall include the following:

i. Condition survey information

ii. Remediation methodology and any modifications to remediation design during Works

iii. Excavation volumes

iv. Volumes of material remedially treated for re-use

v. Volumes and tonnages of material disposed of from site

vi. Volume of concrete crushed

vii. Soil remediation validation test results

viii. Chemical test results for off-site disposal classification

ix. Geotechnical test results (Excel format)

x. Groundwater monitoring results (Excel format), including groundwater levels, visual / olfactory evidence records and chemical laboratory test results

xi. Waste transfer notes

xii. Tip receipts

xiii. Licence and regulatory details

xiv. Correspondence with the Statutory Authorities

xv. Survey drawings (see Section 3.29)

xvi. Source details for all imported materials

3.31 CONTROL AND TREATMENT OF GROUNDWATER AND FREE PRODUCT

All groundwater or leachate arising on site shall be considered to be contaminated and therefore potentially hazardous. The Contractor shall ensure that potentially contaminated waters and leachate from the excavations or stockpiles do not reach watercourses, drains, rivers, etc. The Contractor shall ensure such contaminated waters do not discharge onto ground external to the site and only on the site with the prior agreement of the Supervisor. Water from excavations will be sampled and tested and will be disposed of appropriately. Disposal may be by one of the following methods:

i. Discharge to sewer under a Discharge Consent from the local Water Authority, where test results indicate that the limits of the consent have been met

ii. Groundwater treatment prior to discharge to sewer as above

iii. Off-site disposal in tankers to a licensed treatment plant

If free phase hydrocarbons become present on the surface of the water in excavations they will be immediately controlled by the use of floating booms and recovered using skimming scavenger pumps, mopping devices, or oeliphillic blankets.

Groundwater or free product removed from the excavation should be placed in a holding tank and subject to audit testing before disposal. It must be accurately recorded in terms of date, time, quantity and quality of discharge and such records must be maintained at all times and copies made available to the Supervisor upon request.

It shall be noted that direct discharge of groundwater is not permitted into the Local Authority foul or surface water sewers or any other standing body of water without specific consent or approval. It shall remain the Contractor's responsibility to ensure that all necessary consents are in place. Details of the proposed control and treatment of groundwater and free product shall be provided by the Contractor with his tender.

SECTION 4 REMEDIATION WORKS SOUTH QUAY PARKSIDE

4.1 BRIEF SCOPE OF WORKS

The Works shall comprise the remediation of hydrocarbon contamination within South Quay Parkside in order to achieve the following objectives:

i. Remediation of contaminated soils and perched water contained within Remediation Area A presented in Appendix 14, to meet the Remediation Criteria contained in Appendix 12.

ii. Removal and processing of all obstructions to the base of the excavations, as a minimum.

iii. Removal of any underground pipework encountered and chasing out to the site boundary.

iv. Backfilling of the excavation with material meeting the chemical and geotechnical criteria contained within this document.

v. Groundwater monitoring prior to and during the remediation Works.

4.2 METHOD STATEMENTS FOR THE WORKS

The Contractor shall provide with his tender, a detailed method statement for the Works including the following as a minimum:

i. Dewatering and temporary excavation support.

ii. Remediation excavation in order to meet the objectives.

iii. Treatment of contaminated soils.

iv. Emergency measures if contamination from the site is released into uncontaminated areas or off-site.

v. Removal of pipework.

vi. Removal of any hazardous materials.

vii. Identification and location of services.

viii. Procedure if UXO are encountered.

ix. Groundwater sampling.

4.3 REMEDIATION EXCAVATION

4.3.1 General

The Contractor shall undertake excavation of contaminated soil in order to meet the Remediation Criteria. Based on the site investigations carried out to date, the

identified remediation areas (drawing xxx) have been estimated and the approximate volumes of soil requiring remediation have been calculated.

Whilst approximate volumes and areas of contaminant impact are given in Table 1 below, the Contractor shall allow in his price for the removal and processing of any obstructions within the excavation and for extending excavations laterally and vertically such that all validation samples are below the Remediation Criteria and no visual or olfactory evidence of hydrocarbon contamination remains at the excavation boundaries.

Table 1: Estimated Remediation Volumes

Area	Surface Area (m^2)	Thickness of 'clean' overburden (m)	Volume of 'clean' overburden (m^3)	Depth to which contamination is anticipated to extend (m)	Estimated volume of contaminated soils (m^3)
A	16,384	0.5 up to 0.4 concrete approx. 50% total area	8,192 3,276	average depth 2.0	24,576

When the excavation has been undertaken to meet the objectives to the satisfaction of the Supervisor, the excavation shall be cleared for validation sampling and final surveying. Any backfilling by the Contractor prior to the receipt of the validation test results shall be at the Contractor's risk. Any additional dig required to extend the excavation either laterally or vertically due to validation failures shall be included within the Contractor's lump sum price.

4.3.2 Services

The Contractor shall locate and mark the positions of services affected by the remediation works and arrange with the appropriate authorities for the location and marking of the positions of mains services.

Before starting the remediation works the Contractor shall arrange with the appropriate authorities for the disconnection of services and removal of fittings and equipment if required.

The Contractor shall protect drains and fittings still in use, keep them free of debris at all times and make good any damage arising from demolition work and leave clean and in working order at completion.

Bypass connections shall be provided as necessary to maintain continuity of services to occupied areas of the same and adjoining properties. The Contractor shall give adequate notice to occupiers if shutdown is necessary.

The Contractor shall notify the Project Manager and service authority or owner of any damage to services which are to remain and make all arrangements for repair to the satisfaction of the Project Manager and service authority or owner bearing any costs arising.

4.4 REMEDIATION TREATMENT OF SOILS

Excavated soils contaminated by free product or exceeding the Remediation Criteria shall be transported to a designated treatment area within the site boundary and treated ex-situ until the Remediation Criteria are met. Starting concentrations of the contamination for which treatment techniques and costs should allow are provided in Appendix 11. All on site treatment shall be carried out under the appointed Contractor's Environmental Permit. The Contractor shall liaise directly with NRW in this respect and shall allow an appropriate period of time for such in his programme.

The Contractor shall make provision for the time of year and potential for cold weather during the Works within his Method Statements and Programme and shall allow for items such as blankets to cover the soils or any other methods which he considers necessary in order for the Works to meet his Programme.

It is proposed that remediation will be carried out ex-situ and the Contractor's works area is anticipated to be large enough to allow for this. The Contractor shall provide a method statement for his proposed remediation technique in order to meet the Remediation Criteria in his tender return.

4.5 VALIDATION OF SOILS

Hydrocarbon contamination removal to meet the Remediation Criteria shall be undertaken initially on a visual basis. All hydrocarbon impacted soils shall be treated in the designated treatment area and re-used where possible, however the Contractor shall remove from site all contaminated soils (following treatment where appropriate) which do not meet the Remediation Criteria or geotechnical re-use criteria at his own risk.

Following removal of impacted soils and prior to backfilling, validation sampling shall be carried out based on a 20m x 20m grid within excavations. The 20m grid is a guide for the defined remediation areas and reflects the minimum sampling density of one sample per 20m grid cell within the base of a remediation excavation. Additionally soil samples shall be obtained by the Contractor from the intact faces of the excavation in the presence of the Supervisor at a frequency of not less than one per 20m width and at every 2m depth, or as directed by the Engineer, and submitted for laboratory chemical analysis at a UKAS and MCertS accredited laboratory to enable validation of the remedial Works. The validation tests of the remediation excavation base and sides are required to meet the Remediation Criteria and further excavation will be required if these are not met.

The Contractor is to make due allowance for the time necessary to undertake validation testing and shall give the Supervisor at least 24 hours notice of validation sampling to be undertaken.

Should the Contractor wish to backfill areas on the basis of initial on-site testing, in advance of receipt of laboratory results, then he does so at his own risk.

4.6 SOILS FOR RE-USE

Soils which meet the Remediation Criteria either before or following treatment and are geotechnically suitable for reuse shall be re-used to backfill the remediation excavations. Soils for re-use shall be chemically tested to demonstrate that contaminant levels are below the Remediation Criteria at a frequency of 1 sample per 500m^3. All samples shall be taken by the Contractor in the presence of the Supervisor. The Supervisor shall be given a minimum of 24 hours notice of any sampling being undertaken. Geotechnical testing of soils for re-use shall be undertaken as indicated in Section 4.9. Chemically suitable materials for re-use shall be subject to geotechnical acceptance testing as given in Section 4.9 and shall be placed in accordance with the Specification for Highways Works as summarised in Section 4.9 and tested following placement as detailed in Section 4.9.

4.7 STOCKPILES

All excavation arisings shall be either loaded directly into lorries/dumpers for transport to the treatment area, re-use or off-site disposal and stockpiled in a methodical order. Each stockpile shall be identified according to assumed or confirmed categorisation, source, type and deposition date, and details of any analyses. Stockpiles shall be physically separated to avoid cross contamination and temporary road access provided for placement and loading.

All contaminated stockpiles shall be placed on impervious surfaces to collect drainage and prevent loss of entrained water and leachate to ground. All temporary stockpiles shall be located on impervious surfaces to prevent rainwater leaching of contaminants to ground.

The Contractor shall ensure that the stockpiles will not contaminate or increase the contamination in the areas where they are located. If the Contractor proposes to provide a barrier below the stockpiles to prevent downward migration of contamination he shall supply the Supervisor with details of the barrier for approval 5 working days before excavation commences.

4.8 IMPORTED MATERIAL

Where necessary in order to meet the requirements outlined in Section 4.1, material shall be imported onto site to backfill the remediation excavations. The Contractor shall make within his tender allowance for any import required in order to complete the works and to level the site to a minimum of 8.9 m AOD. Imported

material shall be chemically and geotechnically suitable for use in the area required. Imported materials shall be chemically tested at a frequency of 1 sample per 500m^3 or a minimum of 3 samples per source, shall meet the Import Criteria given in Appendix 15, and shall meet the geotechnical requirements for backfill material outlined below. Information on the source of imported material is to be provided to the Supervisor for incorporation into the Validation Report.

4.9 EXCAVATION BACKFILLING

4.9.1 General

The Contractor shall backfill the excavations on completion of the contamination excavation. If insufficient material is present within the Works, the Contractor shall import material as necessary and shall include for this in his price. Imported material shall meet the requirements outlined in Section 4.8.

All backfilling shall be undertaken in accordance with the Specification of Highways Works (2005) and shall generally comprise filling with clean soil compacted in 200mm layers. On completion of the works the whole site shall be capped under a minimum of 100 mm clean material which shall meet the Remediation Criteria for capping material (Appendix 13).

There will be provision of an engineered clean capping solution in all soft landscaped areas (gardens and POS) during subsequent development of the site following remediation which is not part of this contract. The details of this clean capping (depths and acceptance criteria) will be agreed with the regulatory authorities.

Prior to backfilling any excavation the Contractor shall ensure that excavations and areas to be filled are free from loose soil, rubbish and standing water. No frozen materials or materials containing ice shall be used for backfilling and backfill shall not be placed on frozen surfaces.

The plant employed for transporting, laying and compacting must be suited to the type of material.

Differing materials must be laid separately so that only one type of material occurs in each layer.

Where, during the progress of the Works, the difference in level between adjacent areas of filling exceeds 600mm, it will be necessary to cut into the edge of the higher filling to form benches having a minimum width of 600mm and a height equivalent to the depth of a layer of compacted filling. New filling shall be spread and compacted to ensure maximum continuity with the previous filling.

The first layer of compacted filling is to be of thoroughly compacted suitable hard granular material.

In order to protect compacted fill material construction traffic shall not be allowed on compacted cohesive soil filling until the level has been raised not less than 150mm above formation level by properly compacted temporary protective filling.

Any temporary protective filling shall be removed from site before beginning permanent construction.

To prevent ponding of water after the works, the completed surface levels shall be finished at a level that allows a slight fall towards the north to encourage surface run-off.

4.9.2 **Acceptable Material for Backfilling Below Water**

Material for any backfilling underwater shall comprise material meeting Class 6A of the Specification for Highways Works. The Contractor shall be responsible for processing or importing sufficient volumes of such material from the material excavation as a part of the Works.

Any backfilling under water shall be agreed in advance with the Supervisor. Excavations shall require dewatering for remediation and validation.

4.9.3 **Acceptable Material for Backfilling Dry Excavations**

Acceptable material is defined as material that complies with each of the following:

i. 100% passing BS 125mm sieve

ii. Have contaminant levels which falls below the agreed Remediation Criteria presented in Appendix 12 or meet the Import Criteria (for imported soils) in Appendix 15

iii. Shall not comprise vegetation arising from initial site strip operations

Material when placed shall conform to the following performance criteria:

i. dry density greater than 95% of maximum dry density determined in accordance with BS1377: Part 4 (2.5 kg rammer or vibrating hammer method as appropriate)

ii. less than 5% air voids

iii. greater than 50 kN/m2 shear strength, applicable only to soils where percentage by mass passing 63mm exceeds 20%.

iv. less than 1% organic material

The Contractor shall allow in his tender price for any treatment e.g. screening or liming required for material to meet the geotechnical acceptance criteria.

4.9.4 **General Filling**

Materials for general filling shall be either material arising from the excavations or geotechnically suitable imported material complying with the Import Criteria.

If both suitable and unsuitable material is excavated, the Contractor shall select and keep separate sufficient suitable material. If there is insufficient suitable excavated material the Contractor shall provide the Project Manager with details and quantities of proposed imported material.

General fill shall be spread and levelled in layers and as soon as possible and thereafter compacted in layers using plant and methods suitable to the type of material.

Well in advance of starting work, the Contractor shall submit details of the following and shall obtain confirmation of acceptance from the Project Manager before proceeding:

i. Materials to be used

ii. Type of plant

iii. Maximum depth of each compacted layer

iv. Minimum number of passes per layer

4.9.5 **Geotechnical Classification Testing for Non-Cohesive Material for Re-use on Site**

The geotechnical classification tests given in Table 2 shall be carried out on all non-cohesive material for re-use and for each type of non-cohesive material. The frequency of testing should be increased if the material variance if greater than the testing frequency such that each material type is tested.

Table 2: Geotechnical Classification Tests for Non-Cohesive Material

Test Description	Test Specification	Frequency
Particle Size Distribution	BS1377, Part 2, Clause 9	1 per 400m^3 or a minimum of 2 samples per stockpile
Moisture Content	BS1377, Part 2, Clause 3	
Determination of Dry Density / Moisture Content relationship using a 2.5kg rammer or vibratory rammer, as appropriate (for material passing 37.5mm sieve where no more than 30% is retained on 20mm sieve)	BS1377, Part 4, Clause 3	
Organic Content (loss on ignition)	BS1377, Part 3, Clause 4	

4.9.6 **Geotechnical Classification Testing for Cohesive Material for Re-use on Site**

The geotechnical classification tests given in Table 3 shall be carried out on all cohesive material for reuse and for each type of cohesive material. The frequency of testing should be increased if the material variance is greater than the testing frequency such that each material type is tested.

Table 3: Geotechnical Classification Tests for Cohesive Material

Test Description	Test Specification	Frequency
Particle Size Distribution	BS1377, Part 2, Clause 9	1 per 400m^3 or a minimum of 2 samples per stockpile
Moisture Content	BS1377, Part 2, Clause 3	
Atterberg Limits	BS1377, Part 2, Clauses 4 and 5	
Remoulded CBR Test	BS1377, Part 4, Clause 7	
Organic Content (loss on ignition)	BS1377, Part 3, Clause 4	

4.9.7 **Geotechnical Conformance Testing for Placed Non-Cohesive Material**

The conformance testing in Table 4 shall be undertaken by the Contractor in order to confirm the acceptability of the laid material.

Table 4: Geotechnical Conformance Testing for Placed Non-Cohesive Material

Test Description	Test Specification	Frequency
Moisture Content	BS1377, Part 2, Clause 3	1 per 250m^2 every fourth layer
Determination of in situ density(for material passing 37.5mm sieve where no more than 30% is retained on 20mm sieve)	BS1377, Part 9, Clause 2	
Determination of 5 point dry density / moisture content calibration using 2.5kg rammer or vibratory hammer as appropriate (for material passing 37.5mm sieve where no more than 30% is retained on 20mm sieve)	BS1377, Part 4, Clause 3	

4.9.8 **Geotechnical Conformance Testing for Placed Cohesive Material**

The conformance testing in Table 5 shall be undertaken by the Contractor in order to confirm the acceptability of the laid material.

Table 5: Geotechnical Conformance Testing for Placed Cohesive Material

Test Description	Test Specification	Frequency
Moisture Content	BS1377, Part 2, Clause 3	1 per 250m^2 every fourth layer

In situ CBR test	BS1377, Part 9, Clause 4.3	

4.10 **OFF SITE DISPOSAL**

4.10.1 **General**

Material which fails the Remediation Criteria, which is unsuitable for on-site treatment and subsequent reuse on site or fails the Remediation Criteria following treatment shall be removed from site and disposed of at an appropriately licensed facility by the Contractor at his cost. The Contractor shall ensure that any disposal is carried in accordance with relevant statutory requirements and, if requested by the Supervisor or the Project Manager, shall submit written confirmation to this effect.

The results of chemical testing undertaken in order to classify material for off-site disposal shall be provided to the Supervisor in the Completion Report. The Contractor shall include any testing within his tender prices.

The Contractor shall sub-let carting away only to suitably competent carriers and shall obtain from such carriers written confirmation concerning the location of their tipping areas.

The Contractor may undertake remediation treatment of these soils prior to disposal if he considers it to be cost effective to do so e.g. in order to reduce the waste classification of the material from Hazardous to Non-hazardous or if it is required in order to meet the requirements of the chosen landfill.

Prior to the commencement of Works, the Contractor is required to consult with all relevant authorities; in particular NRW and Vale of Glamorgan Council with respect to contamination prevention measures and waste disposal operations at the site. The Contractor shall, prior to, during and on completion of relevant stages of work also provide copies of the required waste disposal documentation/certification to the Supervisor. In addition, the Contractor shall provide specific information, including full method statements of the nature, logistics and programming of the Works (as required by current legislation) prior to commencement.

It is the responsibility of the Contractor in consultation with NRW to locate suitably licensed disposal facilities. Any waste classification tests required by NRW or tip operator are deemed included within the Tender figure.

4.10.2 **Documentation**

All material excavated on site not suitable for re-use shall be disposed of off-site at suitably licensed facilities. The Contractor shall supply the Supervisor with the following details of appropriately licensed disposal site(s) to which wastes are to be transferred at least two weeks in advance of disposal:

i. Name, address and telephone number of disposal site and contact name

ii. Extract of disposal site waste management licence confirming that the waste may be accepted

iii. Name, address and telephone number of the appropriate NRW office

In addition the Contractor shall supply the Supervisor within four weeks of completion of the Works the following:

i. Copy of consignment note for each load of material carried off site including proof of receipt of material at an appropriate landfill site

No wastes shall be disposed of until the Supervisor has given written prior approval, and is satisfied that the site is properly licensed to receive the waste.

All vehicles used to transport waste material off the site shall be registered waste carriers under the Control of Pollution (Amendment) Act 1989 and subsequent industry guidance. The Contractor shall supply to the Supervisor copies of waste carrier registration certification of all vehicles removing waste material on the site prior to the removal of such. The Contractor shall keep records/transfer notes of all waste materials removed from this site and shall include the volume of waste material, the description of the waste material, date of removal, the destination of the waste material and the carrier. The Contractor shall supply the Supervisor with a summary record of disposal at the end of each day. A cumulative ongoing total shall also be reported weekly and summarised at team meetings.

4.11 GROUNDWATER MONITORING

Groundwater monitoring points shall be established around the site in order to monitor if any adverse impacts on groundwater are occurring due to the works, such that rapid measures to prevent any further contamination can be implemented. It will be possible to utilise the monitoring points already installed during previous site investigations for this purpose which shall be protected during remediation works.

Groundwater sampling and testing shall be carried out by the Contractor every two weeks throughout the Works, following an initial baseline monitoring round prior to the start of any excavation.

Groundwater samples collected by the Contractor shall be tested for the range of contaminants and to the detection limits listed in Appendix 16. The results of the groundwater monitoring shall be provided to the Supervisor within one week of each monitoring round.

APPENDIX 1

- Drawings
- 001-002 Site Location Plan
- 300-001 Existing Site Layout

APPENDIX 2 ▪ Tank Location Plan and Contents Directory

APPENDIX 3 ▪ Historical Maps

APPENDIX 4

- Barry No. 1 Dock Redevelopment Geotechnical and Contamination Report, Ove Arup & Partners Limited, November 1992

APPENDIX 5

- Site Investigation Report No.3b, Phase II reclamation, Ove Arup & Partners Limited, July 1994.

APPENDIX 6

- Reclamation of Tank farm and Mole at Barry No.1 Dock. Factual Report on Ground Investigation, Exploration Associates, August 1994.

APPENDIX 7

- West Pond Supplementary Controlled Waters Risk Assessment, Earth Science Partnership, October 2010

APPENDIX 8

- South Quay and West Pond Desk Study, Ove Arup & Partners Limited, February 2008

APPENDIX 9

- Geo-Environmental Site Investigation Report – West Pond, Ove Arup & Partners Limited, September 2008

APPENDIX 10

- Geo-Environmental Site Investigation Report – South Quay, Ove Arup & Partners Limited, October 2008

APPENDIX 11

- Supplementary Site Investigation Report, South Quay Parkside. Merebrook Consulting, October 2014. Report Reference GEA-17633-14-250

APPENDIX 12 ▪ Remediation Criteria

APPENDIX 13 ▪ Services Drawing

APPENDIX 14 ▪ Indicative Remediation Areas

APPENDIX 15 ▪ Import Criteria

APPENDIX 16 ▪ Groundwater Testing Suite and Detection Limits

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