Wates Group Limited

Channel View, Phase 1

Surface water and silt management plan

315486 R01 (03)

JULY 2024

RSK GEOSCIENCES

RSK GENERAL NOTES

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Client: Wates Group Limited

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Author	Kieran Bancroft / Tim Crowe / Michael Knott	**Technical reviewer**	Andrew Przewieslik
Signature		Signature	
Date:	July 2024	Date:	July 2024
Project manager	Tim Crowe	**Quality reviewer**	Stacey Brown
Signature		Signature	
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Revision control sheet

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Rev 03	July 2024	Revision following client comments	Michael Knott	Andrew Przewieslik

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1 INTRODUCTION

1.1 Scope and objectives

RSK Environment Limited (RSK) was commissioned by Wates Group Limited (Wates), to produce a surface water and silt management plan (SWMP) for the land known as Channel View, Phase 1 located to the west of Cardiff city centre, Wales. This project has been carried out to the agreed brief as set out in RSK e-mail dated 1 December 2023.

This site-specific SWMP has been developed to outline the mitigation measures and water/silt management strategies for the site known as Phase 1, Channel View, as shown on **Figure 1**.

The objectives of this SWMP are as follows:

- Employ appropriate mitigation, including monitoring and implementation of contingencies to control and minimise surface water pollution associated with site activities.

The following aspects have been considered during the development of this SWMP:

- The development activities that produce potential sources of surface water pollution and their point(s) of release to surface water receptors; and
- The mitigation measures that are to be implemented to prevent, as far as is practicably feasible, the potential effect of any surface water pollution release, and details of the persons responsible for the actions at the site.

This document must be considered as a '**living**' document and must be regularly reviewed and amended to reflect site-specific changes or conditions as the development/build progresses.

It is recommended that a digital and/or hardcopy of this report is retained within the site compound for reference by site staff.

This report is subject to the RSK service constraints given in **Appendix A.**

2 SITE SETTING

2.1 Development proposals

The proposed development scheme comprises Phase 1 of the wider development comprising:

"Outline permission for: The redevelopment and extension of part of the Channel View estate for up to 319 residential apartments and houses, up to 285 sq.m of retail floorspace (use class A1), communal gardens incorporating allotments and picnic areas, formal and informal children's play space landscaping, cycle paths/footpaths, drainage infrastructure, roads and parking; The regeneration of the Marl public open space to include new/improved sports pitches, children's play space, a new 'beach', water features, landscaping, and cycle paths/footpaths; The provision of a new bus/cycle/pedestrian link between Channel View Road and South Clive Street and a new cycle/pedestrian link between South Clive Street and Ferry Road; The provision of a new parking area; together with associated works (All matters reserved for future consideration).

Full permission is sought for a first phase of development comprising of new tower blocks (6-15 storeys) providing 126 older-persons accommodation units, a 99 sq.m community café, communal gardens incorporating allotments and picnic areas, landscaping, drainage infrastructure, footpaths, roads, parking and associated works".

2.2 Site location

The site is located adjacent to Channel View Road, forming part of the wider Channel View development and covers approximately 1.1 hectares (Ha) in area. The site was formerly occupied by residential apartment blocks with associated hard landscaping, access road and associated below ground infrastructure. The site is noted to be predominantly flat with a slight slope down from north-west to south-east.

The site as a whole is bounded to the north by an area of public open space (POS); to the west by Phase 2 of the Channel View development with residential properties beyond; to the south by residential properties; and to the east by a pedestrian footpath with the River Taff beyond. Phase 1 is located in the south-eastern area of the wider Channel View site.

Access to the site is granted via the south from Channel View Road, located in the south-western corner of the site.

The approximate centre of the site is at National Grid Reference (NGR) ST 18078 73919.

A site location plan is presented as **Figure 1**.

2.2.1 Environmental designations

The site does not lie in a 'designated environmentally sensitive area' considered appropriate to the scope of this SWMP.

The River Taff is located adjacent to the eastern boundary of the site and is designated a statutory main river. Whilst the River Taff adjacent to the site isn't designated as an environmentally sensitive area, the Severn Estuary, to which the River Taff drains, located

1.5 km south, is designated a Ramsar site, site of special scientific interest (SSSI), special areas of conservation (SPC) and special protection area (SPA).

2.3 Site geology & hydrogeology

RSK have been provided with copies of an intrusive ground investigation report and draft remedial strategy for the wider Channel View development. Details of the reports are set out below with pertinent details included in the following sections:

- Terrafirma, Geotechnical and Geo-environmental Report: Proposed residential development at Channel View Cardiff, prepared for Cardiff County Council, July 2020, Job No: 16017
- Terrafirma Wales (TFW), Draft Preliminary Remediation Strategy Report, Phase 1, Channel View, Cardiff, January 2024, Job No: 16017/RS

2.3.1 Geology

Published geological maps indicate that the bedrock geology beneath the site is expected to comprise the Mercia Mudstone Group, comprising mudstone. Superficial deposits beneath the site are expected to comprise Tidal Flat Deposits containing clay, silt and sand. Due to the development history of the site, Made Ground is expected to be present beneath the Phase 1 site.

The area of POS, bounding the Phase 1 site to the north, is recorded as being a historic landfill (The Marls), operational between 1936 and 1945. The landfill is recorded as accepting inert, industrial, commercial, household and special waste categories.

A geotechnical and geo-environmental ground investigation was undertaken by Terrafirma in April 2020 across the wider Channel View site. The investigation comprised three cable percussive boreholes with rotary-core follow on. In addition, four shallow windowless sample boreholes were advanced. However, none of the investigation locations were undertaken within the Phase 1 boundary. Locations BH03 and WS02 were located adjacent to the northern and southern Phase 1 boundaries, respectively. Ground conditions in these boreholes identified a thickness of Made Ground ranging between 3.20 m to 5.30 m comprising gravelly sand with significant amounts of anthropogenic material (metal, slag, brick, glass and coal), overlying superficial Tidal Flat Deposits comprising silty clay over sandy silty gravel and cobbles of mixed lithologies. The Mercia Mudstone was encountered in BH03 at 19.60 m below ground level (bgl).

No geological faults or other lines of geological weakness are shown to cross the site.

The ground investigation report identified a number of contaminants above the generic acceptance criteria (GAC) deemed appropriate for the site and its setting. Leachate testing from samples obtained in BH03, located adjacent to the northern site boundary, identified elevated concentrations of copper, zinc and chromium above the guideline criteria. Analysis of potential contaminants of concern from within the groundwater found elevated concentrations of copper and chromium, when compared against Water Framework Directive (WFD) thresholds for inland freshwater environments (freshwater EQS).

The ground investigation report concluded that the elevated concentrations of copper and chromium are likely to be as a result of leaching from the landfill to the north (The Marl).

In addition, the report summarised that the concentrations identified are varied across the wider development site and are highly unlikely to adversely impact the adjacent River Taff.

The greatest risk to the adjacent surface water body is considered to be during the construction period, as a result of de-watering, excavation of contaminated soils and surface water runoff. With good-practice management measures in place, the ground investigation assessment considered that the risk would be negligible. The assessment report set out the following control measures that should be considered during the construction phase:

- Prepare a drainage plan and mark the manholes to prevent pollutants accidently reaching the surface water sewers;
- Carry out any activities that could cause pollution in a designated, bunded area, away from rivers or foundation excavations. Where possible it should drain to the foul sewer;
- Use settlement ponds to remove silty water;
- Store all oils and chemicals in a fully bunded area to prevent leaks or spills;
- Get advice on whether you need an environmental permit and apply in good time.

2.3.2 Hydrology and Hydrogeology

The underlying bedrock geology at the site is classified as a secondary undifferentiated aquifer.

The site is not located within a groundwater source protection zone (SPZ).

Groundwater was recorded at multiple locations during intrusive ground investigation work completed between December 2023 and February 2024.

Groundwater was recorded at 3 No. locations during the intrusive ground investigation works. Groundwater levels were initial recorded at depths ranging from 12.7 m to 13.5 m bgl before rising to levels ranging between 7.9 m and 10.4 m bgl. No resting water levels were recorded as part of the investigation's return ground gas monitoring rounds.

The nearest surface water feature to the site is the River Taff. which flows from north to south directly adjacent to the eastern boundary. This river feeds Cardiff Bay, which is managed by a series of lock gates.

An existing below-ground storm sewer is present beneath the site and is fed by the wider residential setting to the west, existing surface water drains and highway gullies, both on site and off site to the west. The surface water storm sewer discharges from the eastern site boundary into the River Taff (OF1) at approximate National Grid Reference ST 18126 73956. A second below-ground surface water drainage network is known to be present off site to the north. A series of below-ground pipes have been traced, which discharge surface water from across The Marls POS area into the River Taff, via a second headwall outfall (OF2), located to the north of the Phase 1 boundary. This is thought to be located at approximate National Grid Reference ST 18126 73997.

2.4 Site drainage arrangements

The site is to be redeveloped for residential land use with associated infrastructure, hardstanding, and areas of soft landscaping. The development of Channel View will be brought forward in seven phases, with Phase 1 occupying the south-eastern area of the site. Access to the Phase 1 development will be via Channel View Road in the south-western corner of the site.

Demolition of the existing structures within Phase 1 has been completed with the slab removal and grubbing out of below-ground infrastructure yet to be completed. It is understood that this will be undertaken in phases, prior to construction commencing, to enable the storm water sewer to be diverted.

The development proposals will incorporate the existing surface water sewer, which will be diverted towards the centre of the site, to flow north-east towards the eastern site boundary before flowing north under the existing footpath, where it will discharge via the existing headwall.

Surface water at the site is expected to discharge via a number of swales and bio retention basins located around the periphery of the proposed structures. A number of the swales, along the eastern boundary of the site will be supported by below-ground cellular attenuation crates beneath the swales. Additional cellular attenuation tanks are proposed in the north-eastern corner of the development area and adjacent to the southern and western façades of the northern structure. Surface water discharge from the swales and attenuation crates will be controlled by a number of flow control chambers / orifice plates before discharging via the existing outfall headwall into the River Taff. Flow control chambers will have set discharge rates ranging between 0.7 l/s to 10.6 l/s into the stormwater sewer.

The proposed development will also incorporate area of sustainable urban drainage systems (SuDS), tree planning and permeable paving.

The proposed development plan for Channel View Phase 1 is presented as **Figure 2**.

Engineering drawings showing the site surface water drainage arrangements are presented in **Appendix B**.

Surface water discharges from the site will be rainfall dependent and consist of run-off from the active development area, including haul roads, building footings and areas of disturbed/exposed ground following the installation of below-ground infrastructure.

Given the sensitivity of the adjacent watercourse, collected surface water during the construction phase will need to be managed on site and discharged under controlled measures to the adjacent soft landscaping.

2.5 Site discharge locations and discharge rates

Site surface water run-off, from the permanent drainage system, will be discharged from the site boundary via the existing outfall headwall (OF1). A temporary discharge point (OF3), from excavations during the construction phase, will likely be required while the storm sewer is diverted. A second, existing outfall headwall from surface water drainage from The Marl is located offsite to the north. Temporary discharge from the construction

works to the pump cell, located on soft ground to the north, may impact the outfall from this location (OF2). The approximate discharge points for the temporary discharge and permanent discharge points are set out in **Table 1**.

Table 1: Discharge points

		Easting	Northing
OF1	Existing outfall headwall	318126	173956
OF2	The Marl - existing outfall headwall	318126	173997
OF3	Temporary Discharge Point via pump cell	318074	173992

The discharge rates from the temporary discharge point, will be controlled by a pump on site. The maximum flow rate will be limited to that agreed through planning for the permanent discharge point, set at the greenfield runoff rate. Discharge from OF1 will be limited by the flow control chamber on the final hydrobreak. This is expected to be limited to 14.7 l/s.

3 SENSITIVE RECEPTORS

3.1 Identified sensitive receptors to surface water pollution

A review of published Ordnance Survey (OS) mapping data and a walkover of the site and its surroundings, indicates that the River Taff, a statutory main river, runs along the eastern boundary of the site, flowing from north to south. The river discharges into the Severn Estuary via Cardiff Bay. The Severn Estuary, located approximately 1.5 km south, is designated a Ramsar site, SSSI, SPA and SPC. The River Taff and Severn Estuary are considered to be the primary receptors associated with site discharge activities.

Secondary receptors associated with site discharge activities include:

- Residents in completed phases (upon completion and occupation).
- On site highways, highway gullies and associated below-ground infrastructure (once constructed)
- Wider public highway realm off site beyond the construction site entrances and site boundaries.
- Residents beyond the site boundaries within existing properties and POS.

Shallow groundwater has been recorded within the site's surroundings during previous phases of ground investigation. Site-specific groundwater depths were recorded as between 7.9 and 10.4 m bgl and therefore below the depths of anticipated shallow footings and infrastructure emplacement.

4 SURFACE WATER POLLUTION SOURCE INVENTORY

4.1 Potential pre-existing contamination considerations

The site investigation work completed for The Marl located to the north of the development area, indicated that leachate testing measured elevated concentrations of selected heavy metals above the guideline criteria. Analysis of potential contaminants of concern from within the groundwater found elevated concentrations of copper and chromium, when compared against WFD thresholds for freshwater EQS. Given the location of the borehole and samples obtained, the elevated concentrations of copper and chromium are likely to be as a result of leaching from the landfill. In addition, the report summarised that the concentrations identified are varied across the wider development site and are highly unlikely to adversely impact the adjacent River Taff.

The Phase 1 site has been subject to intrusive ground investigation works by TerraFirma Wales in March 2024 (ref: Proposed Phase 1 Residential Development, Channel View, Cardiff, Geotechnical and Geoenvironmental Report, provided for Cardiff City Council, ref: 250324-16017-01 Draft, dated March 2024).

The ground investigation report included a contamination risk assessment supported by laboratory analysis of samples collected from the site. This assessment indicated a number of contaminants of concern, associated with the Made Ground beneath the site, above the GAC level. **Table 2** provides a summary of the identified contaminants of concern.

Table 2: Contaminants of concern

Contaminant	Associated Threshold (µg/l) (WFD)	Result	Associated Strata	Identified Depth (m)
Lead (Soils)	-	25 – 410 mg/kg	Made Ground	0.3 – 2.7
Lead (Groundwater)	1.2	<0.5 µg/l		Groundwater
Nickel	4	1.8 – 4.8 µg/l		Groundwater
Zinc	10.9	17 – 140 µg/l		Groundwater
Dibenzo(ah)anthracene (Soils)		<0.1 – 2.2 mg/kg		0.3 – 2.7
Dibenzo(ah)anthracene (Groundwater)	-	<0.01 µg/l		Groundwater
Asbestos (Chrysotile)		0.019 % w/w		0.5

* WFD = Water Framework Directive

Elevated concentrations of Nickel and Zinc have been identified within the groundwater beneath the subject site.

The geoenvironmental assessment has identified that the elevated concentrations of Zinc and Nickel are associated with the made ground present beneath the subject site and the landfill beneath the Marl, immediately to the north of the site boundary. The assessment concluded that the risk to the aquatic environment from waters and soils beneath the site is low.

Given the geological succession beneath the subject site, the site does not lie within 500 m of a groundwater SPZ or a surface water abstraction point and there are no sensitive land uses within the vicinity of the site, the site is not considered to pose a significant risk to sensitive controlled waters receptors.

Stands of Japanese Knotweed have been identified along the bank of the River Taff. Four stands and present and have associated exclusion zones as presented on Figure 3. Works to construct the surface water sewer within the existing public footpath, to the east of the eastern site boundary, are expected to be undertaken within the exclusion zone for one of these stands.

A Japanese Knotweed specialist has been commissioned by Wates to undertake a programme of remediation which would involve the completion of a watching brief and the removal of impacted soils should any roots or rhizomes be discovered during excavation.

Excavation and removal of the impacted soils within the service trench would be undertaken under a watching brief by a suitably qualified ecologist. However, given the proximity to the watercourse, the expected depth of the trench and the potential continuity between the surface watercourse and groundwater within the trench, there is likely to be a requirement to dewater the excavation during the works. There is therefore a risk that Rhizomes (if present) from the Japanese Knotweed, without control measures could be over-pumped and impact an area of the site or its surroundings. It is therefore essential that mitigation measures, as set out in **Section 5.2.4** are implemented for the duration of the works.

Consequently, the principal contaminant to surface waters is considered to be from mobilised silt (suspended solids), during surface water runoff, associated with exposed soils during the enabling and construction phases of the development.

4.2 Sources of surface water pollution

Due to the nature of site activities, there is the potential for suspended solids to be generated and mobilised in surface water run-off.

Table 3 provides a summary of the surface water pollution source inventory as well as associated hazards, receptors, and consequences.

Table 3: Surface water pollution sources identified for Channel View, Phase 1

Hazard	Receptor	Pathway	Consequence at Receptor
Leak/spillage of hazardous material on site (e.g., oils and fuels).	River Taff	Via infiltration, overland flow or via the surface water drainage system (storm system).	Contamination of River Taff with hazardous substances.
Leak of oil/fuel from pumps used as part of a water treatment system or other temporary pumping activity.			
Discharge of water containing suspended solids (silt).		Overland flow from site boundary, or discharged from the outfalls.	Contamination of River Taff with suspended solids (silt).
Discharge of water containing chemicals from active treatment process.		Overland flow from site boundary, or discharged from the outfalls.	Contamination of River Taff with dosing chemicals.
Discharge of water containing chemicals from passive treatment process.		Overland flow from site boundary, or discharged from the outfalls.	
Spillage of collected solids from settlement system.		Overland flow from site boundary, or discharged from the outfalls.	Contamination of River Taff water with suspended solids (silt).
Failure of pumping equipment – overflow of water from drainage etc.		Via surface flow or surface water drainage system.	
Vandalism – resulting in release of contaminants from containers.		Via surface flow.	Contamination of River Taff
Discharge of water containing Japanese Knotweed Rhizomes	River Taff and surroundings	Over-pumping to an area of soft landscaping or the River Taff	Inadvertent spreading of invasive species to the River Taff or surrounding environment.

5 SURFACE WATER DISCHARGE CONTROL MEASURES

5.1 Introduction

The potential sources, pathways and receptors to surface water pollution associated with discharges from the site have been considered and assessed for Phase 1 of the Channel View development.

In order to prevent unacceptable surface water pollution and reduce the risk of surface water pollution incidents or accidents, the following control measures will be employed at the site, as required and reviewed on a regular basis.

Wates Group Limited and/or their appointed groundwork contractor shall be responsible for the implementation of appropriate control measures.

5.2 Procedural & management control measures

The following procedural and management control measures shall be implemented as appropriate:

5.2.1 Soil stockpiling

- Utilise soil stockpiling procedures to ensure that the number and condition of stockpiles maintained on site are closely maintained and monitored in accordance with DEFRA guidance on best practice for topsoil storage during the construction phase.
- Locating stockpiles in designated areas as far as practicably feasible, away from sensitive water receptors, the southern and eastern site boundary and surface water drains.
- Seal stockpiles to prevent water ingress/runoff.
- Sediment collected via passive and active treatment measures will be stockpiled in designated locations for appropriate disposal or (if appropriate approval received) subsequent re-use on site under a U1 exemption.
- If required, silt fencing shall be installed around stockpile(s) to control run-off.
- If required or applicable, stockpiles can be seeded or covered with an appropriate covering to provide additional stability, prevent water ingress, and reduce the potential for sediment run-off and dust generation. However, this is only likely to be necessary if significant run off occurs and if stockpiles are to remain for significant periods of time.

5.2.2 Surface water management infrastructure

- Any pre-existing land drainage pipework, identified during the slab removal, grubbing out of below-ground infrastructure and construction activities, will be noted and sealed to prevent preferential flow pathways that bypass surface water protection measures.
- During the diversion of the underground sewer system and the connection to the existing outfall, measures will need to be put in place to seal the outfall before removal of drainage, to prevent any mobilised sediment being discharged. It is also critical that the installed diversion and existing (to remain) headwall should be inspected with any residual sediment cleaned out prior to the outfall becoming live. Temporary inflatable bungs can be used on a short term basis. Water will need to be over pumped during the diversion of the assets, ideally with water transferred to the other storm water outfalls via temporary pipework.
- Installation of surface water management infrastructure, including temporary surface water attenuation basins, discharge points and road drainage infrastructure will be undertaken, as far as is practicable, as a priority when commencing activities in active construction areas.
- Installation and maintenance of physical mitigation and management control measures, as set out in Section 5.3.
- Installed surface water drainage infrastructure will be regularly inspected and appropriately cleaned, when required, to remove excess sediment and maintain surface water drainage rates/capacity.

5.2.3 Dewatering of excavations

- Where dewatering of excavations is required, water will either be pumped to a dewatering cell arrangement, comprising measures to remove any suspended sediments from the water, or directly to the active treatment system (where a suitable permitted system is established). Pump cell measures may include passing uplifted water through a silt sock or dewatering bag, situated on a bed of gravel and wooden pallet within an area of soft landscaping away and down-gradient of active construction areas. An area of POS is best suited for this. The proposed indicative location for a pump cell is situated within The Marl, to the north of the development site, as indicated on **Figure 3**.
- The dewatering cell will be surrounded by appropriate media; such as silt fence wrapped gabion baskets or coir rolls, with an outer layer of silt fencing to capture any residual sediment as shown on **Figure 3**. This dewatering arrangement may need to be fenced with heras fencing if locate within a POS.
- Should dewatering of excavations be required, where practicable, dewatering cells will be located in fully vegetated areas or areas where suitable erosions control measures have been deployed across the ground surface to prevent filtered water from remobilising any sediment.
- Dewatering activities will only be undertaken when appropriate supervision is available to confirm that, either water passing through the dewatering cell is clear and free of contaminants, or that the active treatment system is dosed appropriately for the waters

being pumped. Therefore, an assessment can be made that no risk is posed to identified receptors.

- Dewatering activities will immediately cease in the event of significant sediment levels, which pose a risk to identified receptors are observed leaving the chemical treatment system or dewatering cell arrangements.

5.2.4 Dewatering of service trench in possible Japanese Knotweed impacted area

- Dewatering of the service trench, to enable the removal of potentially impacted soils for off-site disposal (if needed), should be done via a dedicated pipe to a dedicated silt bag within either the dewatering cell or placed directly on the bank of the river Taff, away from the knotweed stands and their exclusion zones.
- If the silt bag is to be placed on the bank, a means to secure it and remove the bag without damaging it should be setup prior to dewatering commencing.
- Dewatering of the trench should be undertaken by pumping through a pre-filter (gauze) to minimise the risk of extracting any rhizomes (if present) within the potentially impacted area.
- The dedicated silt bag and waste sediment should be disposed of off-site assuming that it contains soils impacted by Japanese Knotweed, via the correct waste stream.

5.2.5 Site access roads, surfacing and vehicle movements

- Early installation of suitably surfaced access roads to provide a clean running surface and reduce vehicle movements over bare/exposed ground (i.e. gravel cover).
- Install a suitable running surface along the site access haul road and any internal temporary access roads to reduce the likelihood of soft ground disturbance generating sediment run-off (i.e. gravel cover).
- Establish, maintain, and review vehicle movement routes across the development site.
- Minimise, as far as practicable, the movement of machinery on and off-site access roads to prevent tracking excess soil onto roads and highways.
- Prevent, as far as practicable, the movement of machinery on undisturbed ground, such as retained areas of vegetation.
- Utilisation of a road sweeper, or other suitable road cleaning equipment, on site roads, as they become completed, and surrounding public highways where necessary. Frequency of road cleaning to be continually assessed and updated as appropriate to address site conditions.
- Install a suitable surfacing in construction material storage areas, site offices and contractor car parking areas and key access points to each development phase (i.e. gravel cover).
- Utilisation of wheel washing is to be used, in line with the site Construction Environmental Management Plan (CEMP), ahead of the junction between the site access and the public highway, to remove mud from vehicle wheels before leaving the development site. In line with the CEMP, the location of the wheel wash will be reviewed throughout the site development, as works progress. However, waste water

must not be allowed to enter the wider development or site surface water drains. The water must be diverted to areas where infiltration to ground is possible, such as exposed service trenches, soft ground or other temporary catchment/infiltration pit. The use of rumble strips to clear bulk sediment from vehicle wheels may need to be considered depending on the effectiveness of the wheel washing.

5.2.6 Vegetation retention & growth

- Landscaping of completed POS and tree pits shall be undertaken as soon as practicable following their installation.

5.2.7 Site personnel and documentation

The following measures are recommended for implementation to increase awareness and bring existing site documentation up to date:

- Include a detailed section relating to surface water and silt protection within the site induction folder for all phases of the work.
- Continued documented review by the site management team of the existing site conditions in relation to this SWMP and update the requirements on a routine basis.
- The technical team to undertake documented monthly or fortnightly site inspections and obtain support from the appointed Environmental Consultant if/when required. This will be supported by daily site inspections by the site management team, of key areas such as dewatering activities, silt mitigation measures and discharge point.
- Conduct a site pre-start meeting with all relevant parties to agree methods of working to control surface water and silt management.
- Undertake additional detailed site-based awareness training (Site Briefing / Toolbox Talk) on surface water and silt management and protection for all pertinent site staff including groundworkers. Clear guidance should be given to groundworkers on the mitigation measures discussed.
- Where utilised on site, ensure all relevant training is provided by the supplier/manufacturer of the chemical treatment system, prior to commissioning. Retain contact information on site for the provider should any issues or questions arise during its operation.

Actions reported for project personnel include:

Technical Team:

- Ensure this SWMP is communicated to the site management team and updated as necessary.
- Ensure that the appropriate permits and watercourse consents are in place for each phase of works.
- As further phases of the wider development are commenced, ensure that the surface water management measures for adjoining development parcels meet the requirements of this surface water management plan, to protect the storm sewers, outfalls and River Taff, as detailed in this report.

- Regular progress meetings should be undertaken to ensure that appropriate measures are in place on adjoining development parcels. This should include parcel specific inspections on a frequent basis, to ensure that silt contaminated waters are not being allowed to leave the development parcel.
- Prior to connecting newly installed surface water drainage network, an inspection of water quality and site conditions should be undertaken by a suitably qualified Environmental Consultant.
- Undertake periodic (monthly or fortnightly depending on weather conditions) site inspections and regular reviews of daily site inspection documents, undertaken by the site manager, to identify potential areas where additional protection is required as the site develops. This should be communicated to both the site management team and to their appointed environmental advisor.

Site Team:

- Undertake environmental monitoring of the offsite surface water features.
- Ensure that a hard copy of any permits obtained for the site are held in the site office and made available, when requested, by the regulatory authority.
- Where utilised on site, ensure the output from the chemical treatment system is monitored on a daily basis, ensuring that the output readings, either by manual measurement, automated telemetry or a combination of the two, are within acceptable limits and that the water is visibly clear of sediment.
- Ensure the measures presented within this SWMP are implemented by the site construction contractors. Site team to hold regular meetings to ensure that measures are in place.
- Brief sub-contractors and site operatives on effective water management and their responsibilities. Site team will review all contractor method statements.
- Review contractor method statement for works in and around surface water features and obtain advice from the appointed Environmental Consultant.
- Undertake regular documented inspections and checks to ensure the effectiveness of the pollution prevention measures, especially before, during and after heavy rainfall events, adverse weather and during the wetter seasons (winter and spring).
- Keep clear records of all inspections, including photographs and laboratory test results (if applicable).
- Undertake regular monitoring inspections of the condition of the adjacent watercourse, downstream from the development, ensuring pollution events are not occurring and reporting any degradation in condition.
- Key monitoring points have been identified as:
    i. Site entrances where the site access roads meet the existing highway.
    ii. Final discharge points where surface waters are discharged to the watercourse.
    iii. On site temporary surface water basins.

iv. Fuel and chemical storage areas including mobile plant locations, temporary mixing stations and mortar silos.

v. Site boundaries with existing sensitive receptors.

- Report any environmental incident (such as silt ingress to the stream/drain) to an appointed environmental advisor.

Contractors:

- Ensure that this SWMP is communicated to all relevant site teams and groundworkers.
- Ensure appropriate water management controls are included in relevant risk assessments and method statements as well as detailed arrangements regarding increased supervision and management during adverse weather or large scale earthworks.
- Report any damage, faults or breakdowns to silt mitigation features (e.g. silt fencing or treatment plant) as a result of plant movement or work and arrange for repairs to be made as soon as practicable.
- Follow and implement water management and pollution prevention controls as instructed by the site manager and identified in the risk assessment/method statements (RAMS).
- Immediately report to the site manager if pollution prevention measures are not in place, are damaged or ineffective, or if works results in a silt release to surface water or the storm water sewer system.

Report any environmental incident or near miss to the site manager immediately.

5.2.8 Maintenance activities

- Replacement / repair of storage equipment and site equipment/plant containing hazardous materials (e.g., fuel and oils) if damage or evidence of leaking is observed.
- Maintenance and repair, where required, of chemical treatment system. Daily checks of the de-sludge unit to ensure the treatment unit and clarifier are operating at optimum performance.
- Site plant will be inspected routinely for damage and wear by plant users.
- Any defects noted by site personnel will be reported to the site management team so repairs can be scheduled.
- All plant items and equipment will be serviced and maintained with due regard to the manufacturer's recommendations in order to minimise the risk of breakdown or leaks.

5.2.9 Hazardous material storage

- All hazardous materials, including fuel and oils will be stored in suitable containers within an appropriately bunded area and on impermeable ground.
- Mortar silos will be located in designated areas and securely bunded to prevent surface water run-off.

5.2.10 Spill control

- A supply of surface water protection and silt management equipment; including spill kits, silt mats, coir rolls and silt fence, will be maintained within the site compound / material storage for rapid deployment in the event of an emergency. If necessary, a supply of materials will also be maintained next to any temporary works being undertaken in sensitive areas, such as the pipeline diversion within close proximity to a surface water course or a location where surface water run-off has the potential to circumvent installed protection measures.

5.3 Physical control measures

To supplement the procedural and management controls listed in Section 5.2, the following physical control measures listed below shall be implemented by the site management team. The implementation of these measures will be made with due consideration to site activities, build programme and commensurate to the associated risk posed by site activities.

Figures 3 visually depicts the indicative locations of large-scale long-term physical silt pollution controls on a site wide level.

Shorter duration temporary physical controls should be implemented as required during the construction process and their locations recorded on a site plan held within the site office for reference by the site management team and visitors.

5.3.1 Passive control measures

5.3.1.1 Silt fencing

- To be installed as per the site wide mitigation plan contained within **Figure 3**. Silt fencing should be installed along the northern, southern and eastern site boundaries.
- Silt fencing is to comprise a semi-permeable membrane staked at regular intervals with typical installation details presented on **Figure 3**. Importantly, the base of the membrane on silt fencing should be buried to prevent surface water from passing beneath it. In areas with excavation into the underlying ground is prohibited, such as no-dig zones within areas of suspected Japanese Knotweed, then the base of the silt fence shall be lapped onto the ground and covered over with clean soil to prevent surface water from passing underneath the silt fence.
- For longer term protection and to reduce maintenance requirements, the silt fence installation would benefit from stockproof wire mesh fencing to reduce wind damage to the membrane. Examples of the silt fence materials and installation are also presented within **Appendix C**

5.3.1.2 Cut-off trenches

- Trenches will be installed along the southern and south-eastern boundaries, as set out on **Figure 3**. Cut-off trenches are designed to direct the water away from the boundary and towards the temporary detention basin for collection, settlement and subsequent infiltration or discharge.

- Aggregate check dams or silt/flocculant matting will be placed at regular intervals, within the base of the cut-off trenches to provide additional sediment capture capacity prior to run-off entering surface water detention basin. Silt mats are to be located up-gradient of the gravel check dams.
- Cut-off trenches will be required for the duration of the earthworks phase of the project, until much of the below-ground and ground level infrastructure is complete. Therefore consideration will be given to seeding or turfing the trench to encourage vegetation growth.

5.3.1.3 Gully protection

- Gully protection must be installed within all road gullies at the earliest possible opportunity following construction. The condition of the gully protection should be reviewed at regular intervals by the site management team to ensure they remain in good condition and replaced / cleaned when necessary. A layer of geotextile (terram) should also be placed over the top of the gully guard and secured immediately beneath the metal grate cover to prevent bulk ingress of sediment to the gully. This will also prolong the effectiveness of the gully guard itself.

5.3.1.4 Road ramps

- Upon completion of the new site access road, temporary road ramps, or other suitable barrier feature, should be installed to direct surface water run-off from site road into site road gullies at key locations. This will help prevent run-off onto the existing adjacent highway.

5.3.2 Active treatment systems

Due to the proximity to the River Taff and the shallow groundwater level, active treatment measures will likely be deployed (as required and under appropriate approval from Natural Resources Wales (NRW)) to supplement passive treatment systems. The use of active chemical treatment systems will assist with removing suspended sediment prior to discharge.

Where required, the active treatment measures will include either:

- In-line pipe reactors containing gel flocculant; or
- Liquid flocculant, coagulant and pH balancer pump and treat system.

Locations of active treatment measures will vary depending on the phase of works on site, during which the measures are wanting to be implemented. Given the space considerations at the site, it is likely that these will be positioned towards the north of the site, within The Marl.

5.3.2.1 In-line pipe reactor system

An in-line pipe reactor system may be utilised to either encourage sediment settlement within surface water detention basin by being utilised as a water recirculation system or as a part of a suitable pump and discharge treatment system discharging water via the designated outfall locations.

Gel flocculant will be placed within the in-line pipe reactor in volumes specified by the manufacturer and water passed through the in-line pipe reactor via a pump and either recirculated into the surface water detention basin for settlement and discharge or into a settlement tank; or series of settlement tanks, supported by additional passive treatment measures (if required) for discharge.

Gel Flocculant ranges to be used within an in-line pipe reactor system will be determined prior to use with suitable settlement tests and dosing trials undertaken. Further details on the use of flocculants are provided in Section 5.3.3 of this report.

Depending on site conditions, the pumps supporting the in-line pipe reactor system will operate on a float switch or manually.

5.3.2.2 Liquid flocculant, coagulant and pH balancer pump and treat system

An active pump and treat system utilising liquid flocculant, coagulant and pH balancer shall comprise a pump passing water through a chemical pre-treatment system, which will dose incoming water with a flocculant, coagulant, and a pH balancer (if required). The dosing rate will be determined by the supplier prior to the commencement of treatment activities.

The dosed water will then pass into a settlement tank; or multiple tanks depending on discharge volumes, which will remove the particles from suspension by gravity and capture them within the individual settlement tank units.

The treated water will then be discharged from the treatment system and transferred via dedicated pipework or installed site drainage infrastructure to the designated discharge point.

The active pump and treat system will likely utilise poly-aluminium chloride (PAC) as a coagulant and the anionic polymer AQ2084 (otherwise known as Aquatreat 2084) as the flocculant. If required, a pH balancer (sodium hydroxide) will be included into the treatment process to ensure that pH levels of water discharged from the treatment system do not fall below 6. The chemicals required for the treatment system will be determined prior to use with suitable settlement tests and dosing trials undertaken.

Depending on site conditions, the pumps supporting the liquid flocculant, coagulant and pH balancer pump and treat system will operate on a float switch or manually.

5.3.2.3 Maintenance of active treatment systems

Where utilised on site, active treatment systems (including supporting pumps and pipework) will be monitored and maintained in accordance with the manufacturer's recommendations.

When operational, the active treatment systems will be visually inspected on a regular basis by the site management team or other appointed person.

Additional monitoring will be undertaken as required during periods of higher use, such as during periods of heavy rainfall.

Should any evidence of faults be identified the treatment and discharge will be suspended and suitable expertise from the supplier sought to address any issues or concerns prior to restarting the treatment process.

5.3.3 Use of flocculants, coagulants, and pH balancer

The deployment and use of flocculants, coagulants, and pH balancers will be undertaken under appropriate approval from NRW.

Where employed, all flocculants, coagulants, and pH balancers present on the site will be deployed and utilised in accordance with the manufacturer's instructions.

Prior to their usage at the site, a settlement test / dosing trial will be conducted to confirm the appropriate dosing rates.

A settlement and gel flocculant test trial was completed for the site, with the results presented within Appendix E. The test indicated that synthetic anionic polyacrylamides in the form of WaterLynx (WL) 398 and 494 utilising acrylamide, polyacrylamide polyelectrolyte (PP) and aluminium contained in gel flocculant, resulted in favourable settlement of solids and would be suitable for use on site.

In the case of the liquid flocculant pump and treat system, the dosing trial will also confirm whether the additional of a pH balancer to the treatment system is required.

Given the constantly evolving nature of site activities, should any alteration in the effectiveness of the active treatment systems be identified, during monitoring, then the suppliers will be notified, and a new settlement test / dosing trial will be completed to confirm whether any amendments are required to the dosing rates.

5.3.3.1 Use of flocculants in passive physical treatment measures

To supplement the removal of sediment by passive treatment measures, gel flocculants may be deployed as necessary in passive treatment measures across the development site.

Positioning of flocculant containing passive treatment measures will be informed by manufacturer's recommendations and prevailing site conditions. Deployment locations will include:

- Surface water drainage chambers immediately up-gradient of headwalls into surface water detention basins.
- Cut-off trenches

Deployment locations for measures containing flocculants, coagulants and pH balancers shall be recorded on a site plan held within the site office for reference by the site management team and visitors.

5.3.4 Installation of physical control measures

The physical control measures discussed in Section 5.3 will be installed in a phased approached determined by activities being undertaken across the site and the associated levels of risk posed to identified sensitive receptors.

In areas of little to no construction activity, a baseline level commensurate with the associated risk will be installed, as set out on **Figure 3**. Remaining physical control measures will be installed as required prior to commencement of higher risk activities.

5.3.5 Maintenance of physical control measures

The physical control measures discussed in Section 5.3 shall be maintained in their position throughout the construction period and for the duration that a risk to the identified receptors remains.

Condition and efficacy of physical control measures will be monitored and those measures, such as silt fencing and curtains, shall be replaced as required to ensure continued efficiency.

5.3.6 Removal of physical control measures

The site management team will undertake regular reviews of protection measures installed at the site and whether the level of protection remains commensurate to risks posed by site activities. If required, advice shall also be sought from a specialist Environmental Consultant.

Physical control measures will be removed in a phased approach determined by the residual risk posed to sensitive receptors.

Complete removal of physical control measures will only be undertaken when the risks posed to sensitive receptors from construction related activities is negligible.

6 SURFACE WATER DISCHARGE MONITORING AND RECORDING

6.1 Surface water monitoring

The following monitoring procedures shall be carried out on a regular basis by the site management team to enable continuous review of site management practices.

A comprehensive record of the effectiveness of surface water management measures should then be maintained to enable further review by any parties attending site.

Any emissions to surface water identified will result in the implementation of the protocols detailed herein. Any complaints in relation to surface water emissions will be fully investigated as detailed in the following sections. The resultant actions will be recorded in site records.

6.1.1 Meteorological conditions

Meteorological forecasts and weather conditions (including precipitation) will be monitored to identify high rainfall events, which could result in elevated site water levels to be predicated and appropriate additional management measure implemented.

6.1.2 Regular inspection and monitoring

Due to the nature of the development, visual monitoring techniques will principally be used within the boundary of the site. These may be supplemented by the collection of water samples from each outfall location.

Regular visual inspections of surface water discharge quality as well as the overall condition of the wider site will be undertaken as part of general site walkovers completed by the site management team and site operatives during their daily tasks.

When operational, the chemical treatment system will be visually inspected on a daily basis by the site management team or other appointed person. Should any evidence of faults with the active treatment system be identified the treatment and discharge will be suspended and suitable expertise from the supplier sought, to address any issues or concerns prior to restarting the treatment process.

Additional monitoring beyond the site boundary, above the monitoring at the discharge points, will be completed in response to the identification of potential emissions to surface water from the site or upon receipt of complaints. All monitoring will be carried out in cognisance of the prevailing weather conditions and site activities.

In addition to this, weekly routine inspections of the site to monitor and record surface water run-off quality and other environmental issues will be undertaken by the site management team or other appointed person. Records of these inspections will be kept for the duration of the project.

Wates Group safety, health, and environment team will also undertake monthly inspections which will include the condition of internal roads, adjacent public highways and any immediate surface water receptors.

Regular inspection of implemented surface water management measures, including passive and active treatment measures, will also be undertaken, either by Wates Group or a nominated third party.

Inspection frequencies will be increased as required in response to prevailing meteorological conditions.

6.2 Water sample collection and testing

To supplement the regular visual inspections and monitoring of surface water discharges from the site, instantaneous (spot) samples of discharged water may be collected by the site management team (or nominated deputy) for analysis to confirm it adhere to emission limits presented in **Table** .

It is recommended that water samples will be inspected periodically and after storm events, particularly when chemical treatment systems are in use, from each of the discharge points. A test frequency will be agreed with NRW prior to using chemical treatment methodologies and the commencing of works.

Samples collected for laboratory analysis will be tested for the determinands and limits presented in **Table** .

Table 4: Channel View Phase 1, - Discharge Point Monitoring Parameters and Limits

Parameter	Limit (Including Unit)	Compliance Statistic
Total suspended solids	25 mg/l	Maximum
Total aluminium as Al	1,000 µg/l	Maximum
pH	6 to 9	Minimum and maximum

In addition to the above, visual inspection for oil and/or grease will be completed.

All monitoring points are indicated on Figure 3 (315486-BL-276-SS-D-C-27601-C02), which should form part of the monitoring programme however, water sampling will likely only be required from the designated discharge points i.e. OF1, OF2 and OF3.

NRW may alter / instruct additional monitoring points as part of the permit application / determination.

In addition to the live telemetry readings from the active treatment system, it is strongly recommended that field readings are undertaken at each watercourse discharge point or at the final storm water chamber, prior to discharge. This will comprise of measuring Total Suspended Solids (TSS) directly or recording turbidity (NTU) of discharged water using a suitable monitoring device, such as a portable turbidity meter. NTU reading will subsequently be converted to an approximate corresponding TSS value using a site-specific NTU/TSS calibration curve. A site specific NTU/TSS calibration curve will be provided once a settlement test has been completed for the site.

Additionally, a portable pH meter can be used to provide an on-site indication of the pH level of water being discharged from the site.

6.3 Site records

In addition to regular site monitoring, the following significant events at the site will be recorded:

- Maintenance.
- Breakdowns.
- Emergencies.
- Site inspections.
- Despatch of records to Natural Resources Wales (NRW).
- Severe weather conditions.
- Complaints received.
- Visitors to the site.

The site management team or nominated person(s) will maintain a record of all the above information in the site log, on inspection forms, or as part of wider environmental management records, as appropriate. They are also responsible for ensuring that management measures are maintained and repaired, as required.

All records and copies of inspection forms will be maintained and will be made available for inspection at all reasonable times by any authorised officer of NRW.

7 EMERGENCY PROCEDURE AND COMPLAINTS HANDLING

7.1 Emergency Procedure

Supplementary surface water protection measures, treatment capacity or off-site removal of surface water shall be deployed as necessary to provide additional surface water treatment/containment/management capacity.

Prior to commencing works at the site, it is recommended that the local foul drainage provider be contacted, to determine if an agreement to pump to foul can be agreed during peak rainfall conditions.

If required, advice should also be sought from specialist environmental advisors.

7.1.1 Spillage emergency procedure

In the event of a major liquid spillage/leak the following actions will be taken, where appropriate:

- Report the occurrence to the site management team immediately;
- Trained facility operatives to take immediate action to try and contain the spillage/leak where it is safe to do so using appropriate materials (such as spill kits);
- If it is safe to do so, the cause of the spill or leak will be isolated and/or moved to a bunded area;
- Inert material such as clay or sandbags are to be used to make a temporary containment bund to prevent pollution of any water or land;
- Drainage covers will be installed over any road gullies to prevent ingress into the site's drainage system.
- Access to the immediate area will be restricted until a disposal/clean up solution is implemented;
- If the spillage cannot be contained using approved methods, senior management will be contacted immediately, and specialist advice and help will be sought; and

Once the spillage has been contained the site management team will make necessary arrangements for the appropriate removal of the spillage from the site.

Any incidents or near misses should be reported as soon as possible so that the appropriate environmental advisor is notified as soon as possible. Where damaged or missing protection measures have been identified, the site manager should implement repairs or replacements as soon as possible.

Site staff should immediately report to the site manager if pollution prevention measures are not in place, are damaged or ineffective, or if works results in a silt release to surface water or the storm water sewer system.

7.2 Complaints process

Any complaints received at the site or via the regulatory bodies (including the Natural Resources Wales and Local Authority), will be recorded and investigated via a combination of visual inspection at the location of the complaint and collection of water samples for analysis to determine the source of the pollution to be identified.

Where possible, as much information and detail about the complaint will be recorded, whether this be from the relevant authority or complainant. This information will assist the investigation in determining the source of the surface water pollution.

Should a complaint be received, the following information will be gathered and recorded:

- Complaint details (including the address of the complainant where possible) and the location where surface water pollution is perceived;
- Weather conditions including rainfall levels;
- Results of the latest round of monitoring carried out by site personnel;
- Operational status of the site (noting any abnormal conditions that may have caused the complaint);
- Inspection of site conditions upon the receipt of a complaint (where feasible); and
- Details of the proposed corrective action, if required.

A subsequent follow up to the complainant shall be provided, detailing whether the corrective action, if required, was successful. If not, details shall be set out of any new strategy implemented, until the issue is resolved.

Records of complaints received will be kept for inspection and review by both internal and external personnel.

In the event that surface water discharges from the site are found to be causing a pollution incident – as determined by investigation into off site complaints or during routine monitoring, the following measures will be taken to confirm the source:

- Supplementary monitoring will be undertaken to identify the extent and potential cause of the event i.e., damage to perimeter protection measures or fault in treatment system;
- Examination of the operational activities at the site at the time of the complaint or event identification;
- Examination of the meteorological conditions at the time of the complaint or event identification;
- Examination of the process conditions via the plant operational records / telemetry (where recorded);
- A review of the operational procedure, process controls and the instigation of any control measures immediately following identification of the pollution; and
- Further visual monitoring will be carried out to ensure the issue has been addressed and to monitor the effectiveness of any control measures undertaken.

All complaints will be investigated however, direct calls to site from complainants will allow for an immediate response and investigation. However, it is the site management team's experience that complaints submitted to regulatory authorities can sometimes be made long after the occurrence of a surface water pollution event. This can result in a delayed notification to the site management team and commencement of investigation works. Due to the transient nature of surface water pollution and meteorological conditions, this may result in the pollution pathway being unidentifiable.

FIGURES

APPENDIX A
SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for Wates Group Limited (the "Client") in accordance with the RSK terms of a contract [RSK Environment Standard Terms and Conditions] between RSK and the Client, dated 01 December 2023. The Services were performed by RSK with the reasonable skill and care ordinarily exercised by an environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the Client.
2. Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the Client. RSK is not aware of any interest of or reliance by any party other than the Client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.**
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK 's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates, or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the Client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate, or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the Client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off site of asbestos, invasive plants, electromagnetic fields, lead paint, heavy metals, radon gas, persistent, bioaccumulative or toxic chemicals (including PFAS/ PFOS) or other radioactive or hazardous materials, unless specifically identified in the Services.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a visual inspection of the site together with RSK's interpretation of information, including documentation, obtained from third parties and from the Client on the history and usage of the site,

unless specifically identified in the Services or accreditation system (such as UKAS ISO 17020:2012 clause 7.1.6):

a. The Services were based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely.

b. The Services were limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the visual inspection.

c. The Services did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services.

RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the Client and RSK.

8. The intrusive environmental site investigation aspects of the Services are a limited sampling of the site at pre-determined locations based on the known historic / operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the properties of the materials adjacent and local conditions, together with the position of any current structures and underground utilities and facilities, and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters (as stipulated in the scope between the client and RSK, based on an understanding of the available operational and historical information) and it should not be inferred that other chemical species are not present.

9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.

10. The comments given in this report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows, may vary from those reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.

11. Asbestos is often observed to be present in soils in discrete areas. Whilst asbestos-containing materials may have been locally encountered during the fieldworks or supporting laboratory analysis, the history of brownfield and demolition sites indicates that asbestos fibres may be present more widely in soils and aggregates, which could be encountered during more extensive ground works.

12. Unless stated otherwise, only preliminary geotechnical recommendations are presented in this report and these should be verified in a Geotechnical Design Report, once proposed construction and structural design proposals are confirmed.

APPENDIX B
DRAINAGE LAYOUT

APPENDIX C
INSTALLATION EXAMPLES AND EXAMPLE MANUFACTURER PRODUCT SHEETS

APPENDIX D
INSPECTION CHECKLIST EXAMPLES