

Hedyn

JACK'S PILL LAND, USK WAY, NEWPORT

Remediation Strategy Report

14627/LP/26/RS

CLIENT: Hedyn

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1.0 INTRODUCTION

1.1 GENERAL

Intégral Géotechnique (Wales) Limited have been appointed as Geotechnical and Geoenvironmental Consultants by Hedyn to prepare a remediation strategy for the redevelopment of the site to a standard suitable for a proposed residential end use. The location of the site is shown in Figure 1.

The development will comprise the construction of a number of residential apartment blocks and a number of low-rise terraced residential properties. The development will include associated infrastructure such as access roads, car parking areas, private driveways, areas of landscaping, and private gardens.

The following Site Investigation Report has been reviewed as part of the preparation of the remediation strategy and should be read in conjunction:

- Jack's Pill Land, Usk Way, Newport, Site Investigation Report, Report No. 14627/JJ/26/SI, dated August 2026.

The purpose of this report is to provide a remediation strategy for the delivery of the site to a standard suitable for the proposed residential end use and details how the remediation works will be supervised and validated.

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1.2 PROPOSED DEVELOPMENT

The proposed development will comprise the construction of a number of residential apartment blocks and a number of low-rise terraced residential properties. The development will include associated infrastructure such as access roads, car parking areas, private driveways, areas of landscaping, and private gardens.

It is understood that ground levels are to be raised by up to 0.85m (above existing) across areas of the site.

1.2 PROPOSED DEVELOPMENT (CONTINUED)

The development layout is shown in PHG Drawing Ref: Engineering Layout (drawing no. 2177-100, rev E, dated July 2021). An extract of the proposed layout is shown in Figure 2.

2.0 BACKGROUND

2.1 SITE LOCATION AND DESCRIPTION

The site is located off Usk Way, approximately 1.0km southeast of Newport city centre, at a National Grid Reference of 331850, 187530, see Figure 1.

The site is roughly rectangular in shape and occupies an area of approximately 1.1 hectares. The boundaries of the site are defined by a pedestrian walkway along the River Usk to the east and south, Usk Way to the west, and 'Newport Student Village' to the north.

The majority of the site comprises a disused former pay-and-display car park (formerly known as 'Usk Way Car Park'). The ground surface generally comprises gravel and areas of scrub vegetation.

A remnant concrete floor slab (associated with a former building) and tarmac hardstanding is present in the southern and south-western area of the site.

It should be noted that the majority of the site was subjected to site reclamation earthworks in 2005 (as discussed below in Section 2.2). However, the southern and south-western area was not.

A site plan is presented in Figure 3.

The site is generally flat and situated on relatively low-lying ground at an approximate elevation of 9m AOD.

2.2 CURRENT SITE INVESTIGATION DATA

The following report has been reviewed as part of these works.

- Jack's Pill Land, Usk Way, Newport, Site Investigation Report, Report No. 14627/JJ/26/SI, dated August 2026.

The above report should be reviewed in conjunction with this report to gain a detailed appraisal of the site and the works completed to date.

2.3 HISTORICAL SITE INVESTIGATION AND SITE RECLAMATION DATA

The above site investigation report included a review of the following reports:

- Geotechnical Report by Intégral Géotechnique (Wales) Limited, Ref. 8418/RB/04, dated September 2004. On behalf of Newport City Council.
- Validation Report for Site Remediation by Intégral Géotechnique (Wales) Limited, Ref. 9059/TD/06, dated August 2006. On behalf of Newport City Council.

Intégral Géotechnique (Wales) Limited previously undertook a site investigation within the site and the land parcel directly to the north in 2004. The site investigation works consisted of the drilling of cable percussion and windowless sample boreholes and the excavation of trial pits.

During the previous/historical intrusive works, the encountered ground conditions typically consisted of a variable thickness of made ground, overlying superficial deposits consisting of alluvial clays, over gravels, over bedrock of the Mercia Mudstone Formation.

The made ground was proven to depths of between approximately 1.8m and 7.3m below existing ground level, with an average thickness of 3.0m. The made ground consisted of loose, loose to medium dense and medium dense clayey ashy sand, gravels and cobbles or locally clay.

The made ground was underlain by alluvial deposits consisting of soft, soft to firm occasional sandy silty clay and sandy silt. The deposits were encountered to depths of between 12.7m and 16.8m below existing ground level. The cohesive deposits were further underlain by granular deposits consisting of medium dense sand, gravel and cobbles. The granular deposits were encountered to a maximum depth of 20m below existing ground level.

The superficial deposits were further underlain by mudstone bedrock strata of the Mercia Mudstone Formation.

Perched groundwater was encountered within the made ground deposits at a depth of typically 1.5m to 1.8m below existing ground level. The perched groundwater was often oily with a hydrocarbon odour.

Deeper groundwater was encountered within the granular superficial deposits at depths of between 12.8m and 16.5m below existing ground level. Due to the proximity of the site to the River Usk, the deeper groundwater is tidally influenced.

2.3 HISTORICAL SITE INVESTIGATION AND SITE RECLAMATION DATA (CONTINUED)

During the site investigation works, samples of the made ground were sent for laboratory chemical testing, and the results were screened against appropriate residential thresholds. The results indicated exceedance of arsenic, cadmium, lead, copper and zinc and locally PAHs, petroleum hydrocarbons, SVOCs and VOCs. The results of the laboratory leachate testing indicated exceedances of copper, zinc and cyanide.

Monitoring wells were installed within cable percussion boreholes to monitor and sample the deeper groundwater. The results of the laboratory groundwater testing indicated exceedances of magnesium, copper, zinc, petroleum hydrocarbons and naphthalene.

Shallow ground gas monitoring wells were also installed within the boreholes. The results of the ground gas monitoring programme indicated a mean maximum methane concentration of 10.3% and a mean maximum carbon dioxide concentration of 7.1%. Depleted oxygen concentrations were encountered within the boreholes.

Based on the findings of the previous/historical site investigation works, it was recommended that any proposed buildings be founded utilising piled foundations set at an appropriate depth within the granular deposits or the underlying Mercia Mudstone Formation.

Following the previous/historical site investigation works, a reclamation and remediation strategy was produced by Intégral Géotechnique (Wales) Limited. The main features of the works consisted of removal of hardstanding, structures and buried obstructions to a depth of 1.5m, removal of any areas of loose/soft made ground, reprocessing the made ground for re-use with the removal and treatment of any encountered contamination hotspots within the made ground and perched groundwater, and engineered placement of structural clean fill to create a development plateau. A minimum 600mm thick clean capping layer was advised in areas of soft landscaping and gardens following development.

The reclamation works were undertaken in 2005 by Alun Griffiths (Contractors) Limited, and monitored by Intégral Géotechnique, who prepared a validation report for the works. The validation report states that an acceptable reclaimed plateau was achieved by removing the existing made ground to a depth of 1.5m, including the removal to 1.5m depth of any hardstanding and buried obstructions and placing of acceptable reprocessed materials in an engineered manner to form a development surface.

2.3 HISTORICAL SITE INVESTIGATION AND SITE RECLAMATION DATA (CONTINUED)

It should be noted that during the reclamation works a 7m easement was established along the River Usk to the east and Jack's Pill to the south. A further 3m easement was established around a commercial building located in the south-western corner of the site, as the premises remained occupied for the duration of the works. No reclamation or remediation works were undertaken within the easement zones.

During the reclamation earthworks monitoring works, samples were taken at regular intervals for chemical and physical testing. Suspected hotspots were removed and subject to additional chemical testing. Materials found to be acceptable were re-used on site. Perched groundwater, locally encountered to contain free phase hydrocarbon products was pumped into an oil/water separator before being returned to the site via a second discharge sump.

Following completion of the works, 40 validation samples were taken from across the reclaimed site surface at approximate 20m centres. The results of the laboratory chemical testing indicated that the contaminant concentrations were below the appropriate threshold with exception to lead. No asbestos fibres were identified within the made ground samples.

To determine the presence of potential buried obstructions below the 1.5m reduced dig a geophysical survey was undertaken. No significant anomalies were identified.

Additional groundwater monitoring wells were installed on site to obtain groundwater samples from both the perched groundwater and the deeper groundwater. The results of the laboratory groundwater testing indicated that the contaminant concentrations within the deeper groundwater were below the appropriate EQS thresholds for estuarine waters. Elevated concentrations of mercury were detected within the perched groundwater. However, it was concluded that the past site usage and the made ground present does not impact adversely on groundwater.

2.4 SITE HISTORY

The history of the site was assessed with the aid of historical maps.

The earliest edition of the map, dated 1883-1884, indicated that the site was known as Victoria Wharf and a number of buildings were located in the northern and western area of the site. A tank was located in the northern to central area of the site. Railway lines/tram lines were located across the remaining site area extending from the north-western corner towards the River Usk immediately east of the site and Jack's Pill located immediately south of the site. The high-water mark of the River Usk was located along the eastern and southern site boundary.

River Wharf was located immediately north of the site, which was occupied by a number of buildings and tram lines. Further railway lines/tram lines were located directly west of the site. Numerous wharfs continued along the River Usk to the north and south of the site. A goods depot was located approximately 145m west of the site. Residential areas were located some 60m northwest of the site and some 155m southwest of the site. A cattle market was located approximately 230m southwest of the site.

By 1901-1902, no significant changes had occurred on site, with the exception to reconfiguration and/or addition of buildings and railway lines/tram lines. The wharf to the north was now known as Gloucester Wharf and Mary Dry Dock was located approximately 65m south of the site. A number of buildings were located some 20m south of the site. Further railway lines/tram lines were located immediately east of the site.

A map dated 1937, indicated that the tank was no longer located on site. The number of railway lines/tram lines crossing the site had decreased, along with a slight reduction in the number of buildings in the northern area of the site. Within Gloucester Wharf, the buildings had been removed. Along the banks of the River Usk, the number of wharfs had decreased, and a number of docks had been infilled.

A map dated 1956, indicated that the buildings located on site had been reconfigured and were labelled as Ebbw Vale House and a warehouse. The number of railway lines/tram lines had further decreased; however, a number of cranes associated with the lines were located on site. On Gloucester Wharf located directly north of the site, new buildings had been constructed. Mary Dry Dock located 65m south of the site had been infilled and the buildings located some 20m south of the site were noted as ruins.

2.4 SITE HISTORY (CONTINUED)

A map dated 1965-1978, showed significant changes had occurred on site, with Victoria Wharf noted as disused. Ebbw Vale House and the Warehouse remained in the north of the site; however, the buildings had been reconfigured with the addition of some further buildings. In the central area of the site a Wagon Works was located, and a Welding and Engineering Works was located in the south-western area of the site. Gloucester Wharf to the north was also noted as disused. Additional buildings were located on the site and noted as a Scrap Yard. The former area of Mary Dry Dock was now noted as Jack's Wharf with the construction of a large building on the former dock. The number of railway lines directly west of the site had significantly decreased. A number of breweries and some residential properties were located some 150m east and southeast of the site. A new road network had been constructed in the immediate area, with the construction of George Street Bridge crossing the River Usk approximately 75m north of the site and Dock Street and East Dock Road located approximately 106m west and 115m south of the site.

By 1973-1987, the Wagon Works were no longer shown, and the Welding and Engineering Works were extended across the site. Additional buildings were located in the Scrap Yard located directly north of the site. The goods depot had been removed and replaced with a Coal Distribution Centre which contained hoppers, conveyors, cranes etc.

By 1993, no significant changes had occurred on site with the exception to the reconfiguration of the buildings. Jacks Pill Industrial Estate was located south of Jack's Pill. All railway lines had now been removed to the west of the site and replaced by the A4042. The Coal Distribution Centre had been removed. The brewery buildings located some 150m to the west of the site were no longer present.

An aerial image dated 2000, indicated that the industrial works remained on site and consisted of a number of buildings and storage areas. The scrap yard remained to the north and the former Coal Distribution Depot remained cleared and vacant.

Subsequent Google Earth Images indicated that the Jacks Pill Industrial Estate and remaining brewery buildings were demolished and cleared circa early 2000s. By 2004, demolition works were ongoing in the northern area of the site, and the storage areas had been cleared. The Scrap Yard to the north had been cleared and the buildings partially demolished.

2.4 SITE HISTORY (CONTINUED)

A Google Earth Image dated 2006, indicated that the majority of the buildings located on site had been demolished with one building remaining in the southern corner. The site, along with the former Scrap Yard to the north was used as a site compound with stockpiles, storage areas, site cabins etc located on site. The former Jacks Pill Industrial Estate remained vacant, and construction of buildings had commenced on the site of the former Coal Distribution Centre.

A Google Earth Image dated 2009 indicated that the site was vacant with the exception of a building remaining in the southern area. Newport Student Village was located directly north of the site and construction of buildings was ongoing on the former Jacks Pill Industrial Estate. Further construction had taken place on the former Coal Distribution Centre including commercial/office buildings, HM Passport Office and Newport Magistrates' Court. An Asda Supermarket had been constructed on the site of the former Cattle Market and brewery buildings. By 2013, the remaining building on site had been removed and the site consisted of a car park.

No significant changes had occurred on site in the subsequent map editions and Google Earth Images with the site remaining a car park until present day.

2.5 SUMMARY GROUND CONDITIONS

A summary of the typical ground conditions encountered across the site is presented below in Table 1.

Table 1: Summary of Ground Conditions		
Depth (m)		Stratum
From	To	
0.00	0.05/0.20	HARDSTANDING: Bituminous or Concrete Hardstanding (southwestern area of the site only)
0.00	0.10/0.20	MADE GROUND: (Loose) grey and red brown sandy fine to coarse GRAVEL of angular limestone [Aggregate].
0.10/0.20	0.30/0.40	MADE GROUND: (Very Dense) grey sandy fine to coarse GRAVEL with high cobble content. Gravel and cobbles are angular of slag and clinker.
0.10/0.40	0.70/1.90	MADE GROUND: (Dense) grey and brown sandy fine to coarse GRAVEL of angular brick, concrete, slag and clinker [Compacted fill].
0.05/1.90	1.60/5.80	MADE GROUND: Variable granular and cohesive deposits. Typically, dark grey, reddish brown mottled grey or black. Containing anthropogenic constituents such as ash, brick, concrete, lime, timber and plastic and slag.
1.60/5.80	16.0/17.0	Soft, locally very soft, grey CLAY with occasional organic matter [Tidal Flat Deposits – Alluvial Clay]. ...inferred peat band recorded in CPT5A between approximately 9.40m and 10.60m
16.0/17.0	20.0/20.8	Medium dense brown sandy fine to coarse GRAVEL with medium cobble content. Gravel and cobbles are rounded of sandstone [Tidal Flat Deposits – Basal Gravels].
20.0/20.8	21.5/21.9	Stiff becoming very stiff red brown gravelly CLAY. Gravel is fine to coarse angular of mudstone [Completely Weathered Bedrock].
21.5/21.9	>30.0	Extremely weak to very weak red brown mottled green grey highly weathered MUDSTONE and/or SILTSTONE with bans of moderately weak to medium strong red brown locally mottled green grey SANDSTONE and/or CONGLOMERATE.

2.5 SUMMARY GROUND CONDITIONS (CONTINUED)

2.5.1 Surface Aggregate and Hardstanding

The site surface predominantly comprises a layer of limestone aggregate, between approximately 0.1m and 0.2m thick.

Within the southwestern area of the site that was previously inaccessible during the 2021 site investigation, the site surface comprised a layer of either bituminous hardstanding (approximately 0.05m and 0.10m thick) or concrete hardstanding (approximately 0.10m and 0.20m thick).

2.5.2 Compacted / Re-engineered Fill

As discussed in Section 2.2, the site was reclaimed by Alun Griffiths in 2005 on behalf of Newport City Council. The reclamation works comprised the excavation, processing and re-compaction of made ground to a depth of 1.5m below original ground level.

A variable thickness of engineered fill was encountered within all trial pits and boreholes.

The encountered engineered fill is predominantly granular, comprising a thin layer of very dense grey sandy fine to coarse gravel and cobbles of angular slag and clinker (approximate 0.2m thick), over dense grey and brown sandy fine to coarse gravel of angular brick, concrete, slag and clinker.

A number of bulk samples of the re-engineered fill were taken and sent for Particle Size Distribution (PSD) testing. The results indicate the material comprises a silty sandy gravel.

The base of the encountered engineered fill was recorded at depths ranging between approximately 0.7m (at TP1) to 1.9m (at TP10).

2.5.3 Made Ground

A variable thickness of uncompacted made ground (i.e., not re-engineered) underlies the re-engineered fill. These deposits comprise variable dark grey and black granular and cohesive soils containing anthropogenic constituents such as ash, brick, concrete, lime, timber and plastic. The base of the made ground was proven at depths ranging between approximately 1.6m (at TP9) and 5.8m (at BH5).

2.5 SUMMARY GROUND CONDITIONS (CONTINUED)

The southern / south-western area of the site was not remediated during 2005 reclamation works due the presence of an operational building. The area was also not accessible during the 2021 site investigation. Accordingly, during the 2024 intrusive investigation six trial pits (referenced TP01 to TP06) were recently excavated within the area.

Within the trial pits, a variable thickness of uncompacted made ground (i.e., not re-engineered) directly underlies the hardstanding. The made ground was similar to that encountered within the remaining site area, as described above. Where encountered, the base of the made ground was proven at a depth of between 2.7m (TP02) and 2.9m (TP03).

Local to borehole BH5, which was sunk in the southern area of the site in July 2026, the made ground observed from approximately 3.2m to 5.8m depth comprised firm to stiff reddish brown mottled grey silty initially slightly sand gravelly cobbly clay, where gravel and cobble consisted of fine to coarse angular to sub-angular slag. Rare fragments of organic matter were also observed towards the base of the soil horizon.

2.5.4 Tidal Flat Deposits – Alluvial Clay

The made ground deposits were recorded to be underlain by natural strata comprising firm or soft to firm, rapidly becoming soft and very soft, grey organic clay. These soils are considered to represent superficial Tidal Flat Deposits / Alluvial Clay.

Typically, at depths shallower than approximately 3.0m/4.0m bgl, these cohesive deposits were observed to have a consistency of firm or soft to firm. At depths greater than approximately 3.0m/4.0m bgl, these cohesive deposits were observed to become notably softer.

The base of the Tidal Flat Deposits / Alluvial Clay was recorded at depths of between approximately 16.0m and 17.0m within the boreholes drilled across the site.

An inferred layer of 'peat rarely grading to silty clay' was recorded at CPT5A between approximately 9.40m and 10.40m bgl. It should be noted that peat was not recorded within any of the other exploratory holes positioned across the site. This includes shell and auger borehole BH5 drilled at the position of CPT5A in July 2026.

2.5 SUMMARY GROUND CONDITIONS (CONTINUED)

Laboratory plasticity testing undertaken on samples of the clay soils recorded plasticity indices in the range of 29% to 37%. The calculated modified plasticity indices range between 26% to 36%, indicating the soils to have a medium volume change potential.

2.5.5 Tidal Flat Deposits – Basal Gravels

The Tidal Flat Deposits / Alluvial Clays were recorded to be underlain by a layer of typically medium dense brown sandy fine to coarse gravel with medium cobble content. The gravel and cobbles were recorded to comprise rounded and sub-rounded sandstone.

The base of the gravel deposits was recorded at depths of between approximately 20.0m and 20.8m bgl.

2.5.6 Weathered Bedrock

Stiff becoming very stiff red brown gravelly clay, considered to represent completely weathered bedrock of the St Maughans Formation, was encountered below the basal gravels at depths ranging between approximately 20.0m and 20.8m bgl.

The completely weathered bedrock was recorded to be underlain by solid mudstone bedrock strata, typically comprising extremely weak to very weak red brown mottled green grey highly weathered mudstone or locally siltstone, encountered from depths of between approximately 21.5m and 22.5m bgl.

These materials have been classified as partially weathered (Grade III to II) in accordance with CIRIA Report C570. The partially weathered Grade III to II materials are typically fractured, with randomly orientated extremely closely and very closely to closely spaced fractures and typically 0 to 15 degree bedding planes that are typically undulating, planar, round and locally infilled with clay, sand and/or gravel.

The strata contained bands of moderately weak to medium strong sandstone and conglomerate varying in thickness of between 1.00m and 2.55m.

The Mercia Mudstone was also found to be interbedded with some clay bands. The Mercia Mudstone was also often encountered, particularly within the mudstone as non-intact mudstone with bands of intact core. Poor recovery was noted within the rotary cored borehole and often due to excessive water.

SPT 'N' values ranging between 50 (for 75mm) and 80 (for 150mm) were recorded within the solid mudstone bedrock strata.

2.5 SUMMARY GROUND CONDITIONS (CONTINUED)

2.5.7 Buried Obstructions

A buried masonry structure, considered to represent a cut down former dock/wharf wall was encountered at Trench 1, at a depth of approximately 2.1m bgl. This structure was recorded to be between approximately 0.8m and 2.0m wide.

A buried timber obstruction, possibly associated with an old dock/wharf wall was encountered at Trench 2, at a depth of approximately 3.0m bgl. This structure was recorded to be approximately 0.5 wide.

2.5.8 Groundwater

A summary of the groundwater conditions encountered during the excavation of the trial pits is as follows:

- TP1 – Fast inflow of perched groundwater at 2.3m depth.
- TP2 – Fast inflow of perched groundwater at 2.0m depth.
- TP3 – Fast inflow of perched groundwater at 2.0m depth.
- TP4 – Seepage of perched groundwater at 1.6m depth.
- TP5 – No groundwater encountered.
- TP6 – No groundwater encountered.
- TP7 – Fast inflow of perched groundwater at 1.9m depth.
- TP8 – Fast inflow of perched groundwater at 2.4m depth.
- TP9 – Seepage of perched groundwater at 1.6m depth.
- TP10 – Fast inflow of perched groundwater at 1.9m depth.
- TP11 – Seepage of perched groundwater at 2.0m depth.
- TP12 – Seepage of perched groundwater at 3.5m depth.
- TP01 – Fast inflow of perched groundwater at 1.8m depth.
- TP02 – Low to moderate inflow of perched groundwater at 1.6m depth.
- TP03 – Moderate inflow of perched groundwater at 2.2m depth.
- TP04 - Low to moderate inflow of perched groundwater at 1.6m depth.
- TP05 – No groundwater encountered.
- TP06 – No groundwater encountered.

A summary of the groundwater conditions encountered during the drilling of the boreholes is as follows. Note that the boreholes typically encountered two separate water bodies (i.e., a shallow perched groundwater table in the made ground, and a deep natural groundwater table within the basal gravels underlying the alluvial clays):

2.5 SUMMARY GROUND CONDITIONS (CONTINUED)

- BH1 – Perched at 3.0m depth / Deep at 16.0m depth.
- BH2 – Perched at 2.8m depth / Deep at 16.6m depth.
- BH3 – Perched at 3.6m depth / Deep at 17.0m depth.
- BH4 – Perched at 3.0m depth / Deep at 16.2m depth.
- BH5 – Perched at 6.0m depth / Deep at 15.0m depth.

During the drilling of the rotary boreholes, excessive water was noted by the driller within the Mercia Mudstone at BH2 below a depth of 21m bgl.

The groundwater conditions are based on observations made at the time of the fieldwork. It should be noted that groundwater levels may vary due to seasonal, tidal and other effects.

A summary of the groundwater levels measured within the boreholes during return visits to site is provided below in Table 2.

Table 2: Summary of Groundwater Depths						
Borehole Ref:	Depth (m bgl)					
	Round 1 8/11/21	Round 2 16/11/21	Round 3 26/11/21	Round 4 01/12/21	Round 5 15/12/21	Round 6 23/12/21
BH1 (shallow)	1.42	1.52	1.46	1.91	1.90	1.95
BH1 (deep)	8.18	9.48	9.15	6.78	6.89	6.98
BH2 (shallow)	1.48	2.13	1.45	2.14	2.11	2.14
BH2 (deep)	7.79	8.52	8.84	6.83	6.87	7.20
BH3 (shallow)	2.33	2.24	2.17	2.47	2.42	2.48
BH3 (deep)	8.62	9.81	9.47	9.73	9.23	9.55
BH4 (shallow)	2.68	2.62	2.57	2.68	2.63	2.65
BH4 (deep)	8.84	8.28	8.19	9.18	8.97	9.21

2.6 IDENTIFIED CONTAMINATION - SOILS

A summary of the soil contamination identified as part of the site investigation works (as outlined in Site Investigation Report, Report No. 14627/JJ/26/SI dated August 2026) is provided below.

2.6.1 Re-engineered Fill

Seven samples of the re-engineered fill were tested for contamination. The contamination testing results are discussed below:

- Exceedances of lead were recorded in all tested samples of the re-engineered fill.
- A single exceedance of cadmium was recorded in a tested sample of the re-engineered fill from TP4 (0.4m).
- A single exceedance of zinc was recorded in a tested sample of the re-engineered fill from TP8 (0.5m).
- Exceedances of the polycyclic aromatic hydrocarbons (PAHs) were recorded in tested samples of the re-engineered fill from TP4 (0.4m) and TP5 (0.5m).
- Loose fibres of chrysotile asbestos in soil were recorded in tested samples of the re-engineered fill from TP4 (0.4m) and Trench 1 (0.5m).
- No elevated petroleum hydrocarbon concentrations were recorded within the tested soil samples.
- No elevated volatile organic compound (VOC) concentrations were recorded. All VOC concentrations were recorded below detectable limits.

A summary of the contaminants recorded at concentrations which exceed the applied residential screening criteria is provided below in Table 3.

Table 3: Re-engineered Fill Exceedances					
Contaminant	Screening criteria (mg/kg)	No. of samples tested	No. samples exceeding screening criteria	Min concentration (mg/kg)	Max concentration (mg/kg)
Lead	200	5	5	220	670
Cadmium	11	5	1	1.4	45
Zinc	3700	5	1	280	4000
Dibenzo(ah)anthracene	0.28	5	2	<0.05	0.94
Benzo(a)pyrene	2.7	5	1	0.64	3.9
Benzo(b)fluoranthene	3.3	5	1	0.69	5.2
Asbestos (chrysotile – loose fibres)	N/A	7	2	Non-detect	0.001%

2.6 IDENTIFIED CONTAMINATION – SOILS (CONTINUED)

2.6.2 *Made Ground*

Twelve samples of the made ground were tested for contamination. Note that the made ground deposits underlie the layer of compacted / re-engineered fill across the majority of the site area. However, in the southern/south-western part of the site (i.e., the area that was not subjected to historical site reclamation earthworks), the made ground deposits are present directly below the surface hardstanding (comprising concrete slab and tarmac hardstanding).

The contamination testing results are discussed below:

- Exceedances of lead were recorded in all tested samples of the made ground.
- Exceedances of arsenic were recorded in tested samples of the made ground from TP1 (0.8m), TP7 (1.0m), TP9 (1.0m) and TP01-2024 (0.5m).
- Exceedances of beryllium were recorded in tested samples of the made ground from TP01-2024 (0.5m) and TP05-2024 (0.4m).
- Exceedances of mercury were recorded in tested samples of the made ground from TP3 (1.3m) and TP7 (1.0m).
- An exceedance of nickel was recorded in a tested sample of the made ground from TP01-2024 (0.5m).
- Exceedances of the polycyclic aromatic hydrocarbons (PAHs) were recorded in tested samples of the made ground from TP7 (1.0m), TP8 (2.0m), TP9 (1.0m), Trench 1 (2.0m), Trench 2 (1.1m), TP01-2024 (0.5), TP05-2024 (0.4m) and TP06-2024 (0.3m).
- Loose fibres of chrysotile asbestos in soil were recorded in a tested sample of the made ground from TP8 (2.0m) and TP01-2024 (0.5m).
- Loose fibrous debris of chrysotile asbestos in soil was recorded in a tested sample of the made ground from Trench 1 (2.0m).
- Loose fibres of crocidolite asbestos in soil were recorded in a tested sample of the made ground from Trench 2 (1.1m).
- Chrysotile asbestos cement type material was recorded in a tested sample of the made ground from TP3 (1.3m).
- Loose fibres of amosite asbestos in soil were recorded in a tested sample of the made ground from TP05-2024 (0.4m).
- Loose fibres of amosite and chrysotile asbestos in soil were recorded in a tested sample of the made ground from TP06-2024 (0.3m).
- No elevated petroleum hydrocarbon concentrations were recorded within the tested soil samples.
- No elevated VOC concentrations were recorded within the tested soil samples.

2.6 IDENTIFIED CONTAMINATION – SOILS (CONTINUED)

- No elevated PCB concentrations were recorded within the tested soil samples.

A summary of the contaminants recorded at concentrations which exceed the applied residential screening criteria is provided below in Table 4.

Table 4: Made Ground Exceedances					
Contaminant	Screening criteria (mg/kg)	No. of samples tested	No. samples exceeding screening criteria	Min concentration (mg/kg)	Max concentration (mg/kg)
Lead	200	12	12	230	1100
Arsenic	37	12	4	29	100
Mercury	1.2	12	2	<0.3	2.7
Beryllium	1.7	12	2	0.81	2.2
Nickel	130	12	1	28	390
Dibenzo(ah)anthracene	0.28	12	8	<0.05	6.7
Benzo(a)pyrene	2.7	12	3	0.67	33
Benzo(b)fluoranthene	3.3	12	3	1.1	42
Benzo(a)anthracene	11	12	1	0.64	76
Chrysene	22	12	1	0.74	49
Naphthalene	5.6	12	2	<0.05	9.4
Asbestos (chrysotile – loose fibres or loose fibrous debris)	N/A	12	3	Non-detect	0.008%*
Asbestos (crocidolite – loose fibres)	N/A	12	1	Non-detect	<0.001%*
Asbestos (chrysotile – hard/cement type material)	N/A	12	1	Non-detect	0.336%*
Asbestos fibres (amosite – loose fibres)	N/A	12	1	Non-detect	<0.001%*
Asbestos fibres (amosite and chrysotile – loose fibres)	N/A	12	1	Non-detect	0.001%*

* denotes %

2.6 IDENTIFIED CONTAMINATION – SOILS (CONTINUED)

2.6.3 Natural Ground

Two samples of natural ground were tested for petroleum hydrocarbon contamination.

All petroleum hydrocarbon concentrations were recorded below detectable limits.

2.7 IDENTIFIED CONTAMINATION – LEACHATE

A summary of the soil leachate contamination identified as part of the site investigation works (as outlined in Site Investigation Report, Report No. 14627/JJ/26/SI dated August 2026) is provided below.

Samples of the made ground from TP1 (0.8m), TP8 (2.0m), TP01-2024 (0.5m) and TP05-2024 (0.4m) were tested for their leachable concentrations for the same suite of contaminants as the soils (with the exception of asbestos).

As part of a 'Tier 1' screening exercise, the results of the leachate analyses have been compared against the Annual Average Environmental Quality Standards (AA-EQS) for estuaries and coastal waters in the first instance. Where no AA-EQS values are available, the results have been compared against the available Maximum Allowable Concentration Environmental Quality Standards (MAC-EQS) for estuaries and coastal waters. Where no EQS values are available, the results have been compared against UK and WHO drinking water standards, in hierarchical order.

Most of the results were below the laboratory detection limits, or the relevant published guidelines. However, exceedances of copper, lead and zinc have been recorded.

A summary of the exceedances recorded within the soil leachate samples is provided below.

- Copper was recorded above the adopted AA-EQS (13.8ug/l) in one sample from TP01-2024 (0.5m bgl) at an exceeding concentration of 27ug/l. It should be noted that the concentration is significantly below the UKDWS of 2000ug/l.
- Lead was recorded above the adopted AA-EQS (1.3ug/l) in three samples from TP1 (0.8m), TP8 (2.0m) and TP01-2024 at (0.5 bgl). The exceeding concentrations were 3.7ug/l, 4.6ug/l and 11ug/l respectively. It should be noted that the concentrations are significantly below the published MAC EQS of 14ug/l, and the UKDWS of 10ug/l (with the exception of TP01 at 0.5m).

2.7 IDENTIFIED CONTAMINATION – LEACHATE (CONTINUED)

- Zinc was recorded above the adopted AA-EQS (6.8ug/l) in samples from TP1 (0.8m), TP8 (2.0m), TP01-2024 (0.5m) and TP05-2024 at (0.4m bgl). The exceeding concentrations were 15ug/l, 19ug/l, 35ug/l and 10ug/l respectively. It should be noted that all concentrations are significantly below the published UKDWS of 5000ug/l.

No further exceedances were recorded within the analysed soil leachate samples.

With regards to copper and zinc in the soil samples, 'Predicted No-Effect Concentrations' PNECs have been calculated utilising the Water Framework Directive M-BAT Tool and measured value of pH, DOC and calcium.

Based on the leachate analysis undertaken in samples from TP1 (0.8m), TP8 (2.0m), TP01-2024 (0.5m) and TP05-2024 (0.4m), PNEC values of between 19.44ug/l and 32.57ug/l have been calculated for copper. The recorded concentrations of copper are below their respective PNECs.

PNEC values of between 29.3ug/l and 56.83ug/l have been calculated for zinc. Only the zinc concentration from sample TP01 at 0.5m bgl remains elevated above their respective PNECs.

With regard to lead in the soil samples, a PNEC have been calculated utilising the Water Framework Directive M-BAT Tool and measured value of pH and DOC.

Based on the leachate analysis undertaken in samples from TP1 (0.8m), TP8 (2.0m), TP01 (0.5m) and TP05 (0.4m), PNEC values of between 6.59ug/l and 13.92ug/l have been calculated for lead. Only the lead concentration from sample TP01 at 0.5m bgl remains elevated above their respective PNECs.

2.8 IDENTIFIED CONTAMINATION - GROUNDWATER

A summary of the groundwater contamination identified as part of the site investigation works (as outlined in Site Investigation Report, Report No. 14627/JJ/26/SI dated August 2026) is provided below.

Groundwater samples were taken from BH2 (deep), BH3 (deep), BH4 (deep), and BH3 (shallow) and analysed at the UKAS and MCERTS accredited laboratories of i2 Analytical for the same suite of elements and compounds as the soils (with the exception of asbestos).

2.8 IDENTIFIED CONTAMINATION – GROUNDWATER (CONTINUED)

As part of a 'Tier 1' screening exercise, the results of the groundwater analyses have been compared against the Annual Average Environmental Quality Standards (AA-EQS) for estuaries and coastal waters in the first instance. Where no AA-EQS values are available, the results have been compared against the available Maximum Allowable Concentration Environmental Quality Standards (MAC-EQS) for estuaries and coastal waters. Where no EQS values are available, the results have been compared against UK and WHO drinking water standards, in hierarchal order.

Most of the results were below the laboratory detection limits, or the relevant published guidelines. However, localised exceedances of arsenic, copper, mercury and zinc have been recorded.

In Round 1 of testing the following exceedances were detected:

- Arsenic was recorded above the adopted AA-EQS (25ug/l) in samples of groundwater from BH3 (deep), and BH4 (deep). The exceeding concentrations at these locations were 44.9ug/l at BH3, and 22.7ug/l at BH4.
- Copper was recorded above the adopted AA-EQS (17.25ug/l) in samples of groundwater from BH3 (shallow), and BH4 (deep). The exceeding concentrations at these locations were 22ug/l at BH3, and 23ug/l at BH4. It should be noted that both concentrations are significantly below the UKDWS of 2000ug/l.
- Mercury was recorded above the adopted MAC-EQS (0.07ug/l) in samples of groundwater from BH2 (deep), and BH3 (shallow). The exceeding concentrations at these locations were 0.52ug/l at BH2, and 0.60ug/l at BH3. It should be noted that both concentrations are below the UKDWS of 1ug/l.
- Zinc was recorded above the adopted AA-EQS (6.8ug/l) in samples of groundwater from BH2 (deep), BH3 (deep), and BH4 (deep). The exceeding concentrations at these locations were 7.7ug/l at BH2, 17ug/l at BH3, and 8.3ug/l at BH4. It should be noted that both concentrations are significantly below the UKDWS of 5000ug/l.

In Round 2 of testing the following exceedances were detected:

- Arsenic was recorded above the adopted AA-EQS (25ug/l) in samples of groundwater from BH3 (deep), and BH4 (deep). The exceeding concentrations at these locations were 37.2ug/l at BH3, and 36.4ug/l at BH4.

2.8 IDENTIFIED CONTAMINATION – GROUNDWATER (CONTINUED)

- Mercury was recorded above the adopted MAC-EQS (0.07ug/l) in a sample of groundwater from BH3 (shallow). The exceeding concentrations at this location was 0.21ug/l. It should be noted that both concentrations are below the UKDWS of 1ug/l.
- Zinc was recorded above the adopted AA-EQS (6.8ug/l) in samples of groundwater from BH2 (deep), BH3 (deep), BH4 (deep) and BH3 (shallow). The exceeding concentrations at these locations were 12ug/l at BH2, 8.77ug/l at BH3, and 7.2ug/l at BH4. The exceeding concentration at BH3 (shallow) was 9.1ug/l. It should be noted that both concentrations are significantly below the UKDWS of 5000ug/l.

In Round 3 of the testing the following exceedances were detected:

- Arsenic was recorded above the adopted AA-EQS (25ug/l) in samples of groundwater from BH2 (deep), BH3 (deep), and BH4 (deep). The exceeding concentrations at these locations were 30.8ug/l at BH2, 30.9ug/l at BH3, and 38.9ug/l at BH4.
- Mercury was recorded above the adopted MAC-EQS (0.07ug/l) in a sample of groundwater from BH3 (shallow). The exceeding concentrations at this location was 0.13ug/l. It should be noted that both concentrations are below the UKDWS of 1ug/l.
- Zinc was recorded above the adopted AA-EQS (6.8ug/l) in samples of groundwater from BH2 (deep), BH4 (deep) and BH3 (shallow). The exceeding concentrations at these locations were 7.9ug/l at BH2, 7.7ug/l at BH4, and 6.9ug/l at BH3 (shallow). It should be noted that both concentrations are significantly below the UKDWS of 5000ug/l.

No further exceedances were recorded within the analysed groundwater samples.

With regards to copper and zinc in the groundwater, 'Predicted No-Effect Concentrations' PNECs have been calculated utilising the Water Framework Directive M-BAT Tool and measured values of pH, DOC and calcium.

2.8 IDENTIFIED CONTAMINATION – GROUNDWATER (CONTINUED)

Based on the three rounds of groundwater testing undertaken, PNEC values of between 12.56ug/l and 56.46ug/l have been calculated for copper. Only copper concentrations detected within the first round of testing within the perched / shallow groundwater body sampled in BH3 remains elevated above their respective PNECS.

Based on the three rounds of groundwater monitoring undertaken, PNECs values of between 31.99ug/l and 61.21ug/l have been calculated for zinc. The zinc concentrations recorded within each round of testing are below their respective PNECs.

2.9 IDENTIFIED CONTAMINATION – GROUND GAS

A summary of the ground gas monitoring results is presented in Table 5.

Table 5: Summary of Ground Gas Results				
Borehole	Maximum Methane Concentration (%)	Maximum Carbon Dioxide Concentration (%)	Minimum Oxygen Concentration (%)	Gas Flow Rate (l/hr)
BH1 (shallow)	0.20	1.60	16.20	0.80
BH2 (shallow)	19.30	1.10	10.60	<0.30
BH3 (shallow)	0.10	0.40	17.80	<0.30
BH4 (shallow)	2.40	1.90	4.50	<0.30

The results show a maximum methane concentration of 19.3% and a maximum carbon dioxide concentration of 1.90%. A minimum oxygen concentration of 4.50% was recorded. A maximum gas flow rate of 0.80l/hr was measured during the gas monitoring programme.

2.10 DETAILED SITE-SPECIFIC RISK ASSESSMENT – HUMAN HEALTH

The general approach for assessing the potential risk to a receptor is by a combination of qualitative and quantitative risk assessment.

A quantitative risk assessment would involve selecting and deriving generic assessment criterion to compare low risk substances, based on the fate, transport and toxicological properties and the exposure scenario being considered.

2.10 DETAILED SITE-SPECIFIC RISK ASSESSMENT – HUMAN HEALTH (CONTINUED)

With regards to assessing risk to human health, a generic quantitative risk assessment have been undertaken using published screening criteria values for a proposed residential with home grown produce end use.

There are no published screening criteria values for asbestos, and neither are there any in preparation. As discussed in CIRIA Report C733 Asbestos in Soil and Made Ground: a Guide to Understanding and Managing Risks, agreement has yet to be reached in the UK on an appropriate toxicological criterion on which a screening value for asbestos could be based. It also states that 'based on current knowledge, it is believed that that a scientifically defensible UK GAC (generic acceptance criteria) for asbestos in soil cannot be developed or imported.'

It is therefore considered that a more qualitative assessment of the potential risk is appropriate, as asbestos is determined to be a non-threshold substance.

CIRIA Report C733 states that asbestos (asbestos containing materials and asbestos containing soils) only present a risk to health if airborne fibres are released into the atmosphere. The report goes on to state that the number of fibres released into the air from asbestos containing soils is likely to be influenced by a number of site-specific factors, as listed below.

- Characteristics of the asbestos (concentration, degree of heterogeneity, depth in relation to final ground level, volume/area, type, condition, extent of bonding, weathering, fraction of free fibres, shape of fibres)
- Characteristics of the soil (type, moisture content, surface vegetation, presence of hard standing)
- Weather (humidity, precipitation, temperature, ground freezing, wind speed and direction)
- Land use/soil disturbing activities (behaviour of receptors, distance between receptor and source, types of activity, duration/frequency of activity, dust mitigation measures).

The depth below ground level of the asbestos containing soils is imperative to the potential risk posed.

CIRIA Report C733 states that in the absence of significant physical disturbance, exposure to airborne asbestos fibres from soil will be from friable materials or asbestos fibres present at, or very close to, the soil surface (the soil – air interface).

2.10 DETAILED SITE-SPECIFIC RISK ASSESSMENT – HUMAN HEALTH (CONTINUED)

Materials that have been buried, or are below the soil surface, will pose a lower, or less immediate, risk as these materials are unable to release airborne fibres unless brought to the soil surface by physical activity/disturbance.

The contamination test results, and investigation observations show locally elevated concentrations levels in the re-engineered fill of lead, cadmium, zinc and several PAH compounds. Asbestos fibres were detected within the screened samples of the re-engineered fill. Quantification testing undertaken on the detected samples indicated that the asbestos fibres within two detected samples were at 0.001% asbestos by weight.

Within the made ground encountered beneath the re-engineered fill or from the surface in the southern / southwestern area of the site, elevated concentrations of lead, arsenic, mercury, beryllium, nickel and PAH compounds. Asbestos fibres were detected within several samples of the made ground. Quantification testing undertaken on the detected samples indicated that the asbestos fibres were at between <0.001% and 0.008% asbestos by weight. Within a sample of made ground where chrysotile hard/cement type material was detected, the results of the quantification testing indicated 0.336% asbestos by weight.

Given the elevated contaminant concentrations within the re-engineered fill and made ground, it is considered that a potential risk to human health may exist via the following relevant pollutant linkages:

- Dermal contact
- Ingestion of soil or soil derived dust
- Ingestion of soil attached to homegrown produce
- Ingestion of homegrown produce
- Inhalation of soil bourn dust.

The inhalation of vapours pathways (indoor and outdoor air) are not considered to be active since the contaminants of concern identified are not sufficiently volatile.

It is considered necessary to protect future site end users and construction site operatives from exposure to the contamination recorded within the re-engineered fill and made ground.

The remediation measures to be carried out at the site have been designed to address the identified potentially active contaminant pathways listed above.

2.11 DETAILED SITE-SPECIFIC RISK ASSESSMENT – CONTROLLED WATERS

The groundwater regime beneath the site comprises two separate groundwater bodies as follows: (1) a shallow/perched inconsistent groundwater body in the made ground, separated from (2) a deep groundwater body, present in the basal gravel layer below the low permeability alluvial clays.

The results of the 'Tier 1' screening exercise (as detailed in Section 2.7) indicate minimal groundwater contamination at the site. Most of the results were below the laboratory detection limits, or the relevant published guideline values. However, localised exceedances of arsenic, copper and mercury have been recorded.

2.11.1 Perched Groundwater

The site was reclaimed in 2005 by Alun Griffiths (Contractors) Limited. The works undertaken included a shallow turn-and-recompact earthworks exercise. As noted in Validation Report of Site Remediation (ref: 9059/TD/06, dated August 2006), during the reclamation earthworks, perched groundwater was encountered and was locally observed to contain free phase hydrocarbon product. When encountered, the contaminated perched groundwater was remediated by being pumped through oil/water separators before being returned to the site via a second discharge sump.

Pockets of perched groundwater were encountered at varying depths below existing ground level within the made ground during the recent 2021 site investigation works. However, it should be noted that no free phase hydrocarbon product was observed. The perched groundwater body sits within the made ground, on top of the underlying low permeability alluvial clay deposits. The perched water was found to be inconsistent and is considered to 'pond' in natural depressions on top of the natural clay soils.

The results of the groundwater testing have recorded very minimal contamination within the perched groundwater body. In a sample obtained from BH3 (shallow) the only contaminants to exceed the adopted EQS screening values were copper and mercury. All organic contaminants (PAHs and petroleum hydrocarbons), VOCs and PCBs were recorded at concentrations below laboratory detectable limits.

It is considered that any migration of contaminants from the shallow/perched groundwater body into the deep groundwater body is significantly hindered by the presence of the underlying low permeability alluvial clay deposits. This is demonstrated by the results of the groundwater testing completed to date, which do not indicate any correlation between contaminants in the shallow and deep groundwater bodies at BH3.

2.11 DETAILED SITE-SPECIFIC RISK ASSESSMENT – CONTROLLED WATERS (CONTINUED)

Based on the minimal contamination recorded and the previous remediation undertaken during 2005, it is considered that the shallow/perched groundwater body does not present a risk to environmental receptors such as the River Usk.

2.11.2 Deep Groundwater

Minimal contamination has been recorded within the deep groundwater body beneath the site. The only contaminants to exceed the adopted screening values are arsenic and mercury.

All organic contaminants (PAHs and petroleum hydrocarbons), VOCs and PCBs were recorded at concentrations below laboratory detectable limits.

The recorded metal concentrations are not considered significant and are likely to be representative of normal background levels for this formerly industrialised area of Newport.

Based on the contamination data obtained to date, the risks to environmental receptors such as the Secondary 'A' Aquifer in the bedrock strata, and the River Usk, from site sourced contamination is considered to be low.

2.12 DETAILED SITE-SPECIFIC RISK ASSESSMENT – GROUND GAS

In order to assess the potential ground gas risk at the site, a programme of ground gas monitoring has been completed.

The results show a maximum methane concentration of 19.3% and a maximum carbon dioxide concentration of 1.90%. A minimum oxygen concentration of 4.50% was recorded. A maximum gas flow rate of 0.80l/hr was measured during the gas monitoring programme completed to date. In accordance with CIRIA Report C665 a worst-case Gas Screening Value (GSV) of 0.1544l/hr has been calculated.

Due to elevated concentrations of methane and carbon dioxide, the site has been classified as 'CS2' in accordance with BS8485:2015+A1:2019.

The proposed buildings will need to incorporate CS2 ground gas protection measures designed in accordance with the scoring system outlined in BS8485:2015+A1:2019.

Note that independent CS2 membrane integrity testing and validation is a mandatory requirement under BS8485.

2.12 DETAILED SITE-SPECIFIC RISK ASSESSMENT – GROUND GAS (CONTINUED)

All excavations should be regularly checked for safe atmospheres, including oxygen levels, and guidance sought should low oxygen levels be identified in excavations/confined spaces.

No radon protective measures are required for the site.

3.0 REMEDIATION STRATEGY

A remediation strategy is proposed such that the site is prepared to a standard suitable for the proposed residential end use.

The remediation process will ensure that delivery of a suitably remediated site for development is of critical importance to the robustness of the remediation strategy.

The following remediation strategy is proposed:

- Within the southern / southwestern area of the site (i.e., area previously not remediated – see Figure 3) all remnant structures, redundant drainage / services ducts / infrastructure / basements etc. should be broken out to a depth of 2.0m below underside of proposed foundation ground beams below proposed buildings or 2.0m below finished ground level in external areas. Great care should be taken in tracing all residual structures to this depth.
- All encountered buried obstructions/structures (such as old foundations, basements, chambers, ducts etc.), along with all exposed formations and any excavated made ground or re-engineered fill should be inspected and handpicked of any identified asbestos containing material (ACM). These works should be carried out by a suitably licensed contractor in accordance with an appropriate risk assessment and managed in accordance with the requirements of the Control of Asbestos Regulations (2012).
- Any handpicked ACM should be disposed off-site at a suitable licensed facility as hazardous waste. Daily records and waste transfer notes should be kept in order to document the identification and subsequent removal of any ACM. These records and waste transfer notes should be made available for review as they will be required for remediation verification.
- A system should be established by which any 'unusual' materials (such as any unforeseen contamination, such as petroleum hydrocarbons or asbestos containing material) that may be encountered are reported rapidly to the site management, so that the appropriate action may be taken, following specialist advice if necessary. An unusual material may be identified on site by colour, odour or physical nature.

3.0 REMEDIATION STRATEGY (CONTINUED)

- During site clearance and construction works should any petroleum hydrocarbon product be encountered within the perched / shallow groundwater, the petroleum hydrocarbon impacted groundwater should be appropriately pumped and treated within any petroleum hydrocarbon product skimmed off/removed and disposed off-site at a suitable facility.
- A capping layer, of a minimum 600mm thickness, of clean inert imported subsoil and topsoil will be required in all gardens and areas of soft landscaping. A hi-visibility geotextile separation membrane (such as Terram T1000 orange) should be placed at the base of the capping soils to maintain the integrity of the capping layer and to prevent the upwards migration of contamination.
- As per NHBC guidance, a Detailed Design Report for the required ground gas protection system should be prepared by a suitably qualified and competent person in accordance with BS8485. The Detailed Design Report should include a verification plan based on the site-specific design in accordance with CIRIA C735.
- Installation and verification of CS2 compliant ground gas protective measures by a specialist contractor, in accordance with CIRIA C735.
- Drinking water supply pipe specification to be agreed between Vistry Group and DCWW.

4.0 REMEDIATION IMPLEMENTATION

4.1 OBJECTIVES

The main objective of the proposed remediation works is to render the site suitable for residential end use. The remediation activities required in order to achieve this objective are as follows:

4.2 METHODOLOGY

The remediation works required in order to meet the objectives defined above will be undertaken as follows:

- The removal of areas of hardstanding (southern / southwestern area – as shown in Figure 3), along with residual obstructions such as foundations, pits, walls, buried obstructions etc. associated with the former site use.
- Following removal of the surface hardstanding and slabs, it is recommended that the ground (southern / southwestern area – as shown in Figure 3) is excavated out to 2.0m below underside of proposed foundation ground beams below proposed buildings or 2.0m below finished ground level in external areas to ensure that residual structures are removed to these depths. All remnant structures, redundant drainage / services ducts / infrastructure / basements etc. should be broken out to a depth of 2.0m below underside of proposed foundation ground beams below proposed buildings or 2.0m below finished ground level in external areas. Great care should be taken in tracing all residual structures to this depth.
- The excavated material should be sorted and processed, in accordance with an agreed Earthworks Specification. Any oversized materials should be crushed to a suitable grade and stockpiled on site for future re-use as granular fill material. Detailed material re-use strategies should be produced prior to the commencement of works to maximise the re-use of materials. The remaining bulk excavation materials should be processed and any unacceptable materials, such as timber, metal, rag, plastic etc removed. The acceptable materials should be stockpiled on site for compliance testing and future re-use.

4.2 METHODOLOGY (CONTINUED)

- Following site clearance works and during construction, all residual and buried obstructions, all exposed formations and any excavated made ground or re-engineered fill should be visually inspected by an asbestos awareness trained ground worker. Any identified asbestos containing materials (ACM) should be reported to the site management and picked/disposed of by a licensed asbestos contractor.
- Any excavated material (e.g. arisings from foundation and drainage run excavations, site strip etc.) from within the site should be visually inspected by an asbestos awareness trained ground worker. Any identified ACM should be reported to the site management and picked/disposed of by a licensed asbestos contractor.
- All of the above works should be carried out under an appropriate risk assessment and managed in accordance with the Control of Asbestos Regulations 2012. Any handpicked ACM should be disposed off-site at a suitable licensed facility as hazardous waste.
- Daily records and waste transfer notes should be kept in order to document the identification and subsequent removal of any ACM. These records and waste transfer notes should be made available for review as they will be required for potential remediation verification.
- A system should be established by which any 'unusual' materials and potential hotspots of contamination that may be encountered are reported rapidly to the site management, so that the appropriate action may be taken, following specialist advice if necessary. An unusual material may be identified on site by colour, odour or physical nature.
- Should any petroleum hydrocarbon product be encountered within the perched / shallow groundwater, the petroleum hydrocarbon impacted groundwater should be appropriately pumped and treated within any petroleum hydrocarbon product skimmed off/removed and disposed off-site at a suitable facility.
- Installation of capping layer, of a minimum 600mm thickness, of clean inert imported subsoil and topsoil in all gardens and areas of soft landscaping. A hi-visibility geotextile separation membrane (such as Terram T1000 orange) should be placed at the base of the capping soils to maintain the integrity of the capping layer and to prevent the upwards migration of contamination.

4.2 METHODOLOGY (CONTINUED)

- The undertaking of a Detailed Design Report for the required ground gas protection system by a suitably qualified and competent person in accordance with BS8485. The Detailed Design Report should include a verification plan based on the site-specific design in accordance with CIRIA C735.
- Installation and verification of CS2 compliant ground gas protective measures by a specialist contractor, in accordance with CIRIA C735.
- Installation of appropriate drinking water supply pipes.

The site will be deemed remediated by the following active remedial measures:

- Breaking out of hardstanding and removal of any redundant foundation, floor slabs, buried obstructions etc. if encountered in the area of the proposed buildings.
- Incorporation of a robust clean 600mm thick capping layer within proposed garden and soft landscaped areas, a hi-visibility geotextile separation membrane (such as Terram T1000 orange) at the base of the capping soils.
- Installation and verification of CS2 ground gas protective measures by a specialist contractor, in accordance with CIRIA C735.
- Provision of DCWW agreed drinking water supply pipe.

Review of the methodologies will be a continuing process and subject to findings of the proposed validation works, and if necessary, further quantitative and qualitative risk assessments.

4.3 OPERATIONS

The works are to be undertaken by a specialist contractor experienced in brownfield reclamation/remediation. The remediation works will be monitored by Intégral Géotechnique (Wales) Limited.

Site preparation and operational constraints will be covered in the contractor's method statements. These should include the contractor's proposals for controls and monitoring of dust, noise, vibrations and odour.

4.3 OPERATIONS (CONTINUED)

Site procedures for managing the remedial works in a manner that will not cause pollution to controlled waters will be covered in the contractor's method statements which will be submitted in discharge of the Conditions of Planning.

The proposed remediation works will be controlled by the appropriate mobile treatment license to be held by the remediation contractor, if such works become necessary. The conditions imposed under the planning process will be considered adequate to control the works.

Additionally, a system should be established by which any 'unusual' materials that may be encountered are reported rapidly to the site management, so that the appropriate action may be taken, following specialist advice if necessary. An unusual material may be identified on site by colour, odour or physical nature.

5.0 REMEDIATION VERIFICATION

5.1 OBJECTIVES

A remediation verification report is required in order to record the data gathering necessary to demonstrate that the works have been carried out in accordance with the agreed strategy, confirm that the works satisfy the site remediation criteria and that the site is suitable for the proposed development.

5.2 REMEDIATION VERIFICATION METHODOLOGY AND DATA GATHERING REQUIREMENTS

The site reclamation/remediation will be verified by the following measures:

- Evidence to be provided of the site records and waste transfer notes relating to identification and subsequent removal of any asbestos containing materials (ACM).
- Validation of the hi-visibility geotextile separation/alert membrane (such as Terram T1000 orange) at the base of the capping soils.
- Validation of the chemistry and thickness of the proposed 600mm capping layer to be placed within any gardens and areas of soft landscaping.
- Certification of installation and verification of CS2 compliant ground gas protective measures by a specialist contractor, in accordance with CIRIA C735.
- Notification in the CDM file of residual risks associated with the remediated site.
- Certification of installation of DCWW agreed drinking water supply pipe.

6.0 FINAL REMEDIATION VALIDATION

The development will not be complete, in accordance with the remediation strategy for the site, until placement of the final 600mm (minimum thickness) of clean imported capping soils over a geotextile separation/alert membrane in all gardens and soft finished areas.

In order to validate these works a series of hand dug pits will be excavated to confirm an adequate thickness of inert soils are in place. A photographic record will be kept. The capping system is to comprise imported clean inert materials conforming to the Requirements for the Chemical Testing of Imported Materials for Various End Uses and Validation of Cover Systems prepared by Welsh Land Contamination Working Group and satisfy appropriate soil guideline values for residential development with gardens. Samples of topsoil and subsoil will be taken for laboratory analysis, at a rate of 4 per 250m³.

Placement of the required final 600mm capping layer will be the responsibility of the developer and is usually undertaken on a plot-by-plot basis, late in the development programme, as plots are completed.

Reporting of the clean capping to garden areas will be submitted independently of the remediation works.

In order to aid drainage of the garden areas, it is recommended that the surface of the engineered formation is raked and loosened prior to the placement of the required hi-visibility geotextile separation membrane beneath the 600mm thick capping layer.

FIGURES

SITE LOCATION

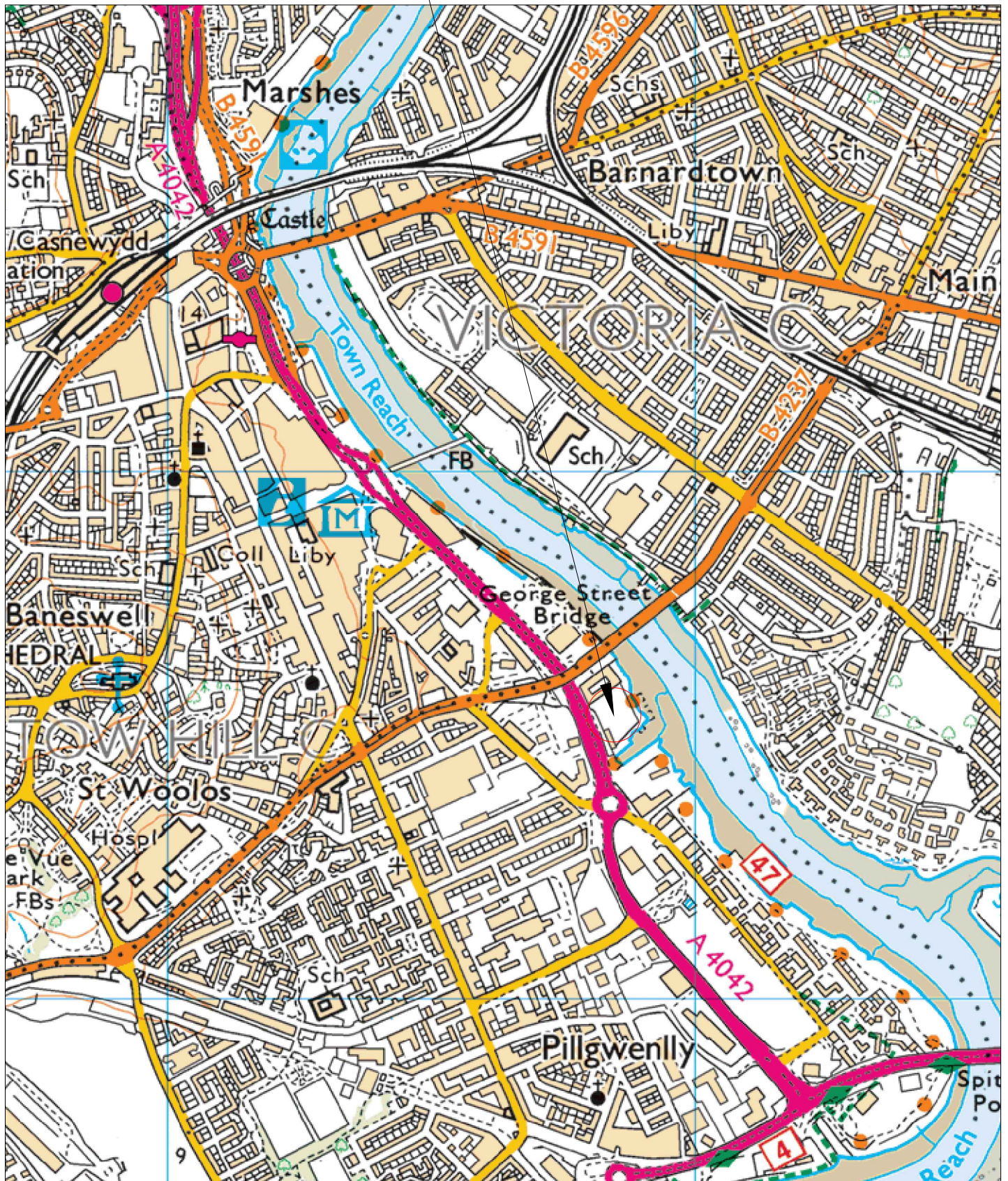


Figure 1: Site Location

Project: Jacks Pill Land, Usk Way, Newport

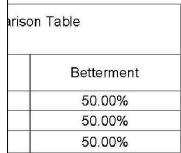
Job no.: 14627

Client: Hedyn

Scale: 1:10,000 at A4

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Figure 3: Exploratory Hole Location Plan