

Willmott Dixon Construction Limited

**BISHOP HEDLEY SCHOOL CAMPUS,
MERTHYR TYDFIL**

Outline Remediation Strategy Report

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1.0 INTRODUCTION

1.1 GENERAL

Intégral Géotechnique (Wales) Limited (IG) have been appointed as Geotechnical and Geoenvironmental Consultants by Willmott Dixon in conjunction with Merthyr Tydfil County Borough Council to prepare a remediation strategy for the redevelopment of a site located off Galon Uchaf Road, Merthyr Tydfil, for educational end-use.

The site comprises the existing Bishop Hedley School Campus (to the east of Galon Uchaf Road) and part of Galon Uchaf Park (to the west of Galon Uchaf Road). The location of the site is shown on Figure 1. A site plan is presented in Figure 2.

Cambria Consulting are the appointed Consulting Civil and Structural Engineer for the scheme.

The redevelopment proposals include the demolition of the existing buildings (excluding the existing sports hall) on the Bishop Hedley School Campus site area, followed by the constructions of a new school building with associated access roads, areas of car parking and sport pitches. A new external plant room is also proposed.

It is understood that an existing sports hall building is to be retained and extended.

In addition to the above, a new sports pitch is also proposed on part of the existing Galon Uchaf Park, situated to the west of Galon Uchaf Road.

A copy of the indicative proposed development layout is shown In Figure 3.

The following reports that are relevant to this remediation strategy report have been produced by Intégral Géotechnique (Wales) Limited:

- Bishop Hedley School Campus, Merthyr Tydfil, Site Investigation Report, Report No. BCA-IGW-XX-XX-RP-G-0001-S2-P04 dated January 2024.
- Proposed Sports Pitch and Access Track Embankment, Bishop Hedley School, Merthyr Tydfil, Controlled Waters Risk Assessment Report, Report No. BCA-IGW-XX-XX-RP-G-0005-S2-P01 dated January 2024.

These previous reports have been used as information as part of the remediation strategy and should be read in conjunction.

1.1 GENERAL (CONTINUED)

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

This report (including all appendices to it and any subsequent addendums or correspondence) has been prepared for the sole benefit, use and information Willmott Dixon and no third party is entitled or permitted to rely on it. This report may not be used, reproduced or circulated (in whole or part) for any purpose without the written consent of Intégral Géotechnique (Wales) Limited. Intégral Géotechnique (Wales) Limited shall not be liable to any third party who does not have such express written permission to rely on the report for any losses they may suffer.

1.2 PROPOSED DEVELOPMENT

The redevelopment proposals include the demolition of the existing buildings (excluding the existing sports hall) on the Bishop Hedley School Campus site area, followed by the construction of a new school building with associated access roads, areas of car parking and sport pitches. A new external plant room is also proposed.

It is understood that an existing sports hall building is to be retained and extended.

In addition to the above, a new sports pitch is also proposed on part of the existing Galon Uchaf Park, situated to the west of Galon Uchaf Road.

The current site layout is illustrated in drawings by SNC-Lavalin and Cambria Consulting. The drawings are referenced below:

- BCA-ATK-VX-ZZ-DR-A-021001/ Rev.P.05
- Sheet 1/3 - BCA/CAM/ZZ/ZZ/GA/S/0051/ Rev.P04
- Sheet 2/3 - BCA/CAM/ZZ/ZZ/GA/S/0052/ Rev.P04
- Sheet 3/3 - BCA/CAM/ZZ/ZZ/GA/S/0053/ Rev.P04

A copy of the indicative proposed development layout is shown in Figure 3.

2.0 BACKGROUND

2.1 SITE LOCATION AND DESCRIPTION

The site is located to the east and west of Galon Uchaf Road approximately 1km northeast of Merthyr Tydfil town centre, at a National Grid Reference of 305350, 207380, see Figure 1. A site plan is presented in Figure 2.

Existing Bishop Hedley School Campus (east of Galon Uchaf Road)

The existing school site is irregular in shape and split into two parts (i.e., a northern site area and a southern site area), separated by Gwaunfarren Road. Collectively, the existing school site (i.e., the northern and southern sites together) occupies an area of approximately 6.8 hectares. The boundaries are defined by Galon Uchaf Road to the northwest, allotments gardens and residential development to the east, residential development to the south and a primary school and residential development to the west.

The existing school site is situated on sloping ground that generally falls to the south. The elevation varies from an approximate maximum of 275m AOD in the north, to an approximate minimum of 234m AOD in the south.

The site has been subjected to historical cut/fill earthworks in order to create a number of existing development plateaux separated by embankments.

The northern area (i.e., the area to the north of Gwaunfarren Road) is occupied by existing school buildings with associated access roads, car parking areas, and areas of hardstanding. The areas surrounding the developed parts of the site are grass covered. The eastern boundary of the site is heavily vegetated.

The southern area (i.e., the area to the south of Gwaunfarren Road) is occupied by existing school buildings, including a sports hall, with associated access roads, car parking areas, and areas of hardstanding. The areas surrounding the developed parts of the site are grass covered. An existing sports field is situated within the southwest area.

The northern and southern site areas are linked via an existing pedestrian tunnel/subway trending north to south beneath Gwaunfarren Road.

Land West of Galon Uchaf Road

The part of the site located to the west of Galon Uchaf Road occupies an area of approximately 5.02 hectares.

2.1 SITE LOCATION AND DESCRIPTION (CONTINUED)

The boundaries are defined by Galon Uchaf Road and existing residential properties to the east, undeveloped land with residential development beyond to the south, undeveloped woodland to the west and existing sport pitches to the north.

The area is situated on sloping ground that generally falls to the south. The elevation varies from an approximate maximum of 278m AOD in the north, to a minimum elevation of 270m AOD in the south.

This part of the site comprises undeveloped public open space (part of Galon Uchaf Park).

The area has been subjected to historical cut/fill earthworks in order to create two separate plateaux (referred to as Plateau 1 and Plateau 2) separated by an embankment. At the time of the site investigation, the bank was covered by extensive Japanese Knotweed.

The site boundaries are lined by a combination of vegetation, hedges, fences and mature and immature trees. Mature trees are also located on site, particularly within the eastern and southern area.

2.2 AVAILABLE SITE INVESTIGATION DATA

The following reports, relevant to the remediation strategy, have been produced by Intégral Géotechnique (Wales) Limited:

- Bishop Hedley School Campus, Merthyr Tydfil, Site Investigation Report, Report No. BCA-IGW-XX-XX-RP-G-0001-S2-P04 dated January 2024.
- Proposed Sports Pitch and Access Track Embankment, Bishop Hedley School, Merthyr Tydfil, Controlled Waters Risk Assessment Report, Report No. BCA-IGW-XX-XX-RP-G-0005-S2-P01 dated January 2024.

These previous reports have been used as information as part of the remediation strategy and should be read in conjunction.

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

The above reports produced by Intégral Géotechnique provides the information on which this Outline Remediation Strategy report is based.

2.3 SITE HISTORY

The recent history of the site has been traced with the aid of available historical OS maps.

The earliest edition of the map dated 1875 indicated the site to be undeveloped fields with the eastern area separated by an east-west orientated road and another road which separated the eastern area from the northwestern part of the site. A wooded field boundary crossed the southwest area of the site, possibly lined with a surface water feature. Trees were also noted within the southern area. An area of disturbed ground and small spoil heap was noted on the boundary within the southwestern area of the site. An existing surface water feature flowed along the eastern boundary and then continued in a southerly direction. The area to the northwest of the road was generally undeveloped apart from areas of disturbed ground, potentially indicative of patch workings. An embankment ran along the northern and northwestern boundary of the site with a rail track running along the top, likely to be associated with the coal/ironstone works.

The nearest development was a small building adjacent to the road which separated the eastern area from the northwest area and Gwain-faren which was a large, detached property with associated landscaped gardens located adjacent to the western boundary. A shaft (coal) was located approximately 50m to the east. Another air shaft was located approximately 20m to the east of the northern area and an old level was located approximately 80m to the southeast of the site. Pen-y-bryn Water Works was located approximately 80m to the northeast of the site with works including an Engine House and Filtering Beds. Pen-y-daren was well established approximately 100m to the southeast including a school and terraces of residential properties. Pen-y-daren Iron Works was operational approximately 250m to the south. A large expanse of patch workings were noted beyond the iron works approximately 400m to the southeast of the site.

The 1900 edition of the map indicated the site to have remained undeveloped and with excavations and deposited material evident within the northwest area beyond the road. The southwest area of the site was no longer indicated to be wooded. A pond feature was now located within the former area of disturbed ground on the boundary within the southern area of the site. Gwaun-farren to the west had been extended slightly. The surface water feature located along the eastern boundary of the site was indicated to be flowing in a southerly direction. The Water Works remained operational to the northeast, but the Iron Works was no longer operational to the south, with the associated buildings now removed. There was no longer any evidence of shafts, air shafts or coal levels in the vicinity of the site. There was also no longer any evidence of the track which ran along the top of the embankment which formed the northwestern and northern boundary of the site. Pen-Y-Darren continued to develop to the southwest.

2.3 SITE HISTORY (CONTINUED)

The 1904 edition of the map indicated no significant changes to the site or the surrounding areas.

The 1919 edition of the map indicated the site to have remained undeveloped and with disturbed ground and excavations still evident within the northwest area. Significant residential development had taken place within Pen-Y-Darren up to the southeastern boundary of the site. Residential development also continued further away to the south and southwest. An additional small property had been constructed next to the original building which was located adjacent to the road in between the eastern and northwestern site areas.

The 1945 aerial photo indicated the northern part of the eastern area of the site to have remained undeveloped, apart from a small building on the southern edge adjacent to the road which crossed the area. The southern area had been divided into small parcels of land. These parcels of land were likely to have been allotment gardens. Excavations and spoil were still evident within the northwest area beyond the road.

The 1957 edition of the map indicated a spoil heap within the southwest area of the site which was accessed via two tracks which crossed the southern area from the north and east. The road which separated the eastern area was now known as Gwaunfarren Road. The former building indicated to the north of Gwaunfarren Road within the northern part of the eastern area was now a ruin. The majority of the eastern area remained undeveloped. The surface water feature which flowed along the field boundary which crossed the southwestern area of the site, was indicated to sink as it reached the spoil heap and issue to the south of the spoil heap within the southwest corner of the site. The road which separated the eastern area from the northwestern area was now more established and known as Galon Uchaf Road. Disturbed ground, excavations and spoil heaps were indicated within the northwest area and two small pond features were now located within the area just to the northwest of Galon Uchaf Road. This disturbed ground was indicated to be refuse tips by the edition of the map dated 1963-1964. Gwaunfarren to the west was now a maternity hospital and additional residential development continued to the west and beyond the water works to the northeast.

2.3 SITE HISTORY (CONTINUED)

The edition of the map dated 1957-1989 indicated buildings associated with Bishop Hedley Roman Catholic High School to have been constructed within the eastern area of the site to the north and south of Gwaunfarren Road. It is understood that the school was constructed in the northern area in 1967 and within the southern area by 1973, based on historical aerial photos. Earthworks were indicated within the northern area to create a level development plateau for the buildings and possible playground areas. The spoil heap within the southwest area had been reprofiled and levelled with a graded embankment indicated along the southern edge, with the area utilised as playing fields. The northwestern area had also been regraded and with evidence of earthworks to form a number of level plateaux. The plateaux off site to the north were indicated to be playing fields. Development continued along Galon Uchaf Road in between the eastern and northwestern areas of the site. Gwaunfarren Primary School had been constructed by this time to the west of the southern area of the site. Residential development also continued in the vicinity of the site, particularly to the west and southwest and further to the east.

By the edition of the map dated 1985-1988 the eastern school site had remained relatively unchanged. A new residential estate had been constructed within the grounds of Gwaunfarren Hospital to the west of the site.

The existing school site and the regraded plateaux within the northwest area have remained relatively unchanged in between the 1990's and the present day. The two school areas remained separated by Gwaunfarren Road and occupied by school buildings. The southwest former tip areas remained in use as playing fields. The former tips and regraded northwestern area has remained undeveloped.

2.4 SUMMARY GROUND CONDITIONS

The ground conditions encountered at the existing Bishop Hedley School Campus and the Land West of Galon Uchaf Road are summarised separately below.

The exploratory hole locations are presented in Figures 4a, 4b and 4c.

2.4.1 Existing Bishop Hedley School Campus

Beneath the existing school campus site area, the encountered ground conditions typically comprised a variable thickness of made ground/reworked ground, as a result of historical terracing/reprofiling earthworks for the existing school development, over natural in-situ glacial till deposits.

Bedrock was not encountered during the site investigation works.

2.4 SUMMARY GROUND CONDITIONS (CONTINUED)

In areas of soft landscaping, topsoil was encountered to typically 0.1/0.4m depth. In areas of hardstanding, a surface layer of tarmac/bituminous material was present to typically 0.1m over a layer of granular sub-base.

The topsoil and hardstanding were typically underlain by made ground/reworked ground to depths of between approximately 0.5m and 4.0m below existing ground level. Locally, the base of the made ground/reworked ground could not be proven due to encountering buried obstructions. The variable thickness of made ground/reworked ground is considered to represent the previous cut and fill earthworks undertaken to create development plateaux for the existing school buildings, car parking areas and playing fields.

The reworked made ground materials comprised natural materials that had been cut and placed as fill. Locally, made ground containing anthropogenic materials such as slag, concrete, plastic, glass and wood were present overlying the reworked made ground materials.

Natural in-situ glacial till soils were encountered from typically between 0.5/4.0m and proven to >2.0/>4.8m depth. Locally, the made ground/reworked ground were absent and the topsoil was observed to be directly underlain by natural in-situ glacial soils.

All trial pits remained generally stable throughout the duration of excavation. However, local instability was observed to be associated with cobble and boulder removal. Some instability was noted within the windowless sample holes specifically within the granular made ground deposits.

Topsoil

A veneer of topsoil was encountered within areas of soft landscaping located around the school buildings. The topsoil was encountered from ground level and proven to depths ranging between 0.1m and 0.4m below existing ground level.

The topsoil varied in composition across the site but generally comprised soft light brown slightly sandy silt or soft black / brown gravelly clayey silt. Frequent roots and rootlets were recorded throughout. The gravel constituents were reflective of the underlying natural stratum and typically comprised fine to coarse angular to sub-rounded sandstone, siltstone, and mudstone.

2.4 SUMMARY GROUND CONDITIONS (CONTINUED)

Surface Hardstanding and Sub-Base

Thin surface coverings of hardstanding material were encountered within the vicinity of the school buildings, areas of car parking and access roads. The hardstanding areas generally comprised a thin layering of tarmac / asphalt. The hardstanding areas were proven to depths of typically 0.1m, but up to 0.16m depth across the site.

Windowless sample WS277 was located within a courtyard area between the school buildings and was laid to a surface covering of concrete patio slabs underlain by a lean sand mix concrete. The hardstanding material local to WS277 was proven to a depth of approximately 0.09m below existing ground level.

The sub-base materials encountered comprised loose grey angular gravel of limestone, loose grey, brown and green sandy gravelly clayey sand/ gravel with a low cobble content of sub-angular concrete and compact greyish brown, red, grey, and black silty sandy clayey gravel. The gravel constituents of the sub-base typically comprised angular to sub-rounded bituminous material, brick, concrete, vesicular and vitreous slag, limestone, sandstone, and mudstone/ siltstone.

The majority of the sub-base material encountered underlying areas of hardstanding existed as a fill material reminiscent of typical made ground material. Similarly, some areas of hardstanding were underlain by deeper made ground fill deposits and no specific sub-base layer was recorded (see WS173). However, a typical sub-base material was recorded underlying the areas of hardstanding local to WS273 where the coarse angular gravel of limestone was recorded.

Made Ground and Reworked Ground

Made ground/reworked ground was encountered across the majority of the site and existed as variable compositions of reworked fill materials and/or anthropogenic made ground. The made ground/reworked ground was encountered at depths ranging from typically 0.3/0.7m to 0.5/4.0m depth.

Locally, where topsoil or hardstanding was absent, made ground/reworked ground was encountered from ground level. Locally, the base of the made ground/reworked ground could not be proven due to obstructions in some areas of the site made ground was absent.

2.4 SUMMARY GROUND CONDITIONS (CONTINUED)

The reworked made ground materials comprised natural materials that had been cut and placed as fill. Locally, made ground containing anthropogenic materials such as slag, concrete, plastic, glass and wood were present overlying the reworked made ground materials.

The reworked ground varied locally in composition but generally comprised firm, stiff and firm to stiff, locally soft and locally stiff grey, brown and greyish brown mottled orange and yellow silty sometimes sandy, gravelly friable / fissured clay. Low to high cobble and boulder content of angular to sub-rounded sandstone and mudstone was encountered. The gravel constituents comprised fine to coarse angular to sub-rounded sandstone, siltstone and mudstone with fine and medium gravel sized lithorelicts of mudstone.

Windowless sample holes WS174 and WS176 encountered localised peaty clays within the made ground at approximate depths of 0.8m and 1.8m respectively. Lower SPT N values were recorded at these depths, likely to be reflective of these materials.

Locally, the reworked materials were overlain by a layer of made ground containing anthropogenic materials such as slag concrete, plastic, wood, etc. Where present, the anthropogenic made ground was encountered to typically 0.5/1.5m depth overlying reworked made ground. Locally, the base of the anthropogenic made ground could not be proved due to obstructions. The anthropogenic made ground / fill comprised varying compositions of soft to firm, firm to stiff locally firm and stiff to very stiff / loose, medium dense and loose to medium dense greyish brown and brownish grey mottled yellow and orange sandy gravelly clayey silty silt / clay or gravel. Low to high cobble and boulder contents were recorded which typically comprised angular to sub-rounded sandstone, siltstone, mudstone, concrete, brick, and vesicular slag. The gravel constituents were recorded as fine to coarse angular to sub-rounded of sandstone, siltstone, mudstone, brick, concrete, shale, coal, vesicular and vitreous slag, and bituminous material. Miscellaneous inclusions of material were encountered including plastic, metal, wood, glass, ceramics, and rebar.

Within windowless sample hole WS179, the reworked made ground materials were underlain at 1.8m depth by made ground comprising colliery spoil. The windowless sample hole refused in this material at 2.0m depth.

Uncorrected SPT N values within the made ground ranged between 3 and 50. The higher range of SPT N values were typically derived within the reworked materials.

2.4 SUMMARY GROUND CONDITIONS (CONTINUED)

Laboratory plasticity testing undertaken on samples of reworked materials recorded a plasticity index in the range of 17% and 21%. The calculated modified plasticity indices of 12.2% and 16.8%, indicates this stratum has a low volume change potential.

Natural Soils

Natural glacial till soils were encountered from typically between 0.5/4.0m and proven to >2.0/>4.8m depth. Locally, the made ground/reworked ground were absent and the topsoil was underlain directly by in-situ natural glacial soils.

The natural soils underlying the site generally comprised firm to stiff and stiff, locally soft, brownish grey / reddish brown / greyish brown, mottled orange and yellow sandy gravelly sometimes friable clay. Low to high cobble and boulder contents were recorded throughout the natural soils observed as angular to sub-rounded mudstone, siltstone and sandstone. The gravel constituents of the natural soils comprised fine to coarse angular to sub-rounded sandstone, siltstone and mudstone with fine and medium gravel sized lithorelicts of mudstone.

Local to TP245 medium dense brownish grey silty gravel was encountered at 1.10m below ground level and proven to a depth of >2.40m.

Uncorrected SPT N values within the natural soils ranged between 6 and 50.

Laboratory plasticity testing undertaken on samples of natural soils recorded a plasticity index in the range of 17% and 23%. The calculated modified plasticity indices of 12.4% and 19.3%, indicates this stratum has a low volume change potential.

2.4.2 Land West of Galon Uchaf Road

Beneath the land west of Galon Uchaf Road, the ground conditions are typically characterised by a veneer of topsoil underlain by variable made ground deposits typically comprising domestic refuse/landfill waste.

Natural in-situ glacial soils were locally encountered below the made ground.

During the excavation of the trial pits, trial trenches and drilling of the windowless sample boreholes, instability was encountered resulting in collapse of trial pits and borehole sides.

2.4 SUMMARY GROUND CONDITIONS (CONTINUED)

Topsoil

Within the land west of Galon Uchaf Road, a veneer of topsoil was encountered at each exploratory location. The topsoil comprised of slightly gravelly sandy organic clayey silt to silty clay with rootlets. Locally the topsoil contained gravel and fragments of coal, ash and brick.

The topsoil was encountered at a thickness of between 0.10m and 0.20m.

Made Ground – Landfill Waste

Variable thicknesses of made ground underlie the vast majority of the site area.

Beneath the majority of the site, the made ground consists of historical domestic landfill waste, which is understood to have been deposited during the 1960s and 1970s.

Where encountered, the historical landfill waste was generally recorded to be present directly beneath the surface topsoil layer, at depths ranging from approximately 0.10m and 0.20m bgl. No evidence of a landfill capping layer was recorded.

Where proven, the base of the historical landfill waste was recorded to be highly variable, ranging between approximately 1.50m (at TP109) and 8.00m bgl (at BH05). No evidence of a landfill liner was recorded at the base of the waste deposits.

The encountered historical landfill waste was observed to be variable in nature, but predominantly comprised granular materials with secondary cohesive inclusions.

The historical landfill waste can be generally described as very loose or loose dark grey to black slightly silty very sandy gravel of ash, clinker, burnt shale, slag and mudstone with frequent glass, metal, timber, brick, plastic, rubber etc. Fragments of suspected asbestos containing materials (ACM) were noted within trial pit TP15 at a depth of 2.00m below existing ground level and within TP17 at a depth of 1.00m below existing ground level.

The uncorrected SPT N values recorded within the historical landfill waste were highly variable, ranging between 2 and 37.

2.4 SUMMARY GROUND CONDITIONS (CONTINUED)

Made Ground – Non-Landfill Waste

Historical landfill waste was not encountered within several exploratory holes positioned across the far northern and eastern extents of Plateau 2, and the north-eastern extents of Plateau 1 (see TP101, TP102, TP103, TP105, TP106, TP107, TP13, TT10, BH01, BH02, and BH07 as shown in Figure 2).

At these locations (with the exception of at TP105 and TP106), made ground deposits were encountered but did not resemble domestic landfill waste. These deposits are herein referred to as made ground (non-landfill) deposits.

No made ground or landfill waste was encountered within TP105 and TP106, with the topsoil being directly underlain by natural soils.

The made ground (non-landfill) deposits were encountered immediately below the topsoil at depths of between approximately 0.10m and 0.20m bgl.

Where proven, the base of the made ground (non-landfill) deposits was recorded to be variable, ranging between approximately 0.30m (at TP107) and 4.90m bgl (at BH02).

The made ground (non-landfill) deposits were variable, either comprising loose / loose to medium dense granular soils, or firm / firm to stiff cohesive soils with rare anthropogenic constituents including ash and brick.

The uncorrected SPT N values recorded within the made ground (non-landfill) deposits ranged between 24 and 60.

Natural Superficial Soils

Natural superficial soils were encountered at TP101, TP102, TP103, TP105, TP106, TP107, TP109, TP111, BH1, BH3, BH4, BH5, BH6, BH7, BH8, BH10, TP11, TP12, TP13, TP17, TT2 and TT10 (as shown in Figure 2).

With the exception of at TP105 and TP106, the natural superficial soils were encountered immediately below overlying made ground (either comprising landfill or non-landfill waste) at highly variable depths ranging between approximately 0.30m (at TP107) and 8.00m bgl (at BH05).

At TP105 and TP106 the natural soils were encountered directly below the surface topsoil layer at depths of approximately 0.10m and 0.20m bgl respectively.

2.4 SUMMARY GROUND CONDITIONS (CONTINUED)

Where encountered, the natural superficial soils typically consisted of firm or firm to stiff, grey locally mottled brown and orange slightly gravelly slightly sandy silty clay (typical of heavily over-consolidated Glacial Till deposits).

The uncorrected SPT N values recorded within the natural soils varied between 16 and 47.

Previous soil infiltration testing undertaken within the natural soils yielded insufficient infiltration in order to calculate permeability values. This indicates that the in situ natural soils underlying the site are relatively impermeable.

Weathered Bedrock

Weathered mudstone bedrock was proven within boreholes BH03 and BH05 only, at depths of 7.02m and 10.50m bgl respectively.

The encountered weathered bedrock at BH3 and BH5 was recorded to comprise extremely weak grey, brown highly weathered mudstone, recovered as a clayey fine to coarse angular gravel.

The uncorrected SPT N values recorded within the weathered bedrock were greater than 50.

2.4.3 Groundwater

During the intrusive site investigations with the existing Bishop Hedley School Campus area groundwater was typically encountered at depths of between 1.3m and 4.5m below existing ground level and often noted as seepages.

During the subsequent monitoring visits to measure ground gas concentrations and groundwater levels, groundwater, where present, was noted to be at depths of between 0.08m and 3.75m below existing ground level.

During the intrusive site investigations within the Plateau 1 & 2 within the Land to the West of Galon Uchaf localised groundwater seepages were encountered at depths of between 1.6m and 5.8m below existing ground level.

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 and other effects.

2.4 SUMMARY GROUND CONDITIONS (CONTINUED)

During the subsequent monitoring visits to measure ground gas concentrations and groundwater level, the majority of the monitoring wells were dry with groundwater encountered within BH07 and BH10 only at depths of between 3.21m and 5.62m below existing ground level.

2.5 IDENTIFIED CONTAMINATION - SOILS

2.5.1 Made Ground- General

A total of 16 samples of the general made ground from the existing Bishop Hedley School Campus were tested for contamination, including asbestos in accordance with the findings of the desk study.

The results of the laboratory testing indicate that the majority of the analysed chemical elements or compounds are present at concentrations below the appropriate thresholds.

However, the initial screening indicates exceedances of beryllium and the PAH compounds, benzo(a)pyrene, benzo(b)fluoranthene and dibenzo(ah)anthracene.

Asbestos was not detected with the screened samples.

2.5.2 Made Ground- – Domestic Refuse/Landfill Waste

A total of 14 samples of the made ground consisting of the domestic refuse/landfill waste were tested for contamination, including asbestos in accordance with the findings of the desk study.

The results of the laboratory testing indicates that the majority of the analysed chemical elements or compounds are present at concentrations below the appropriate thresholds.

Within the made ground samples, elevated concentrations of beryllium, arsenic and the PAH compounds naphthalene, dibenzo(ah)anthracene and benzo(b)fluoranthene were detected above the relevant thresholds.

Selected samples were also analysed for petroleum hydrocarbons. The results of the laboratory testing indicate that the analysed petroleum hydrocarbon bands are detected at concentrations below the appropriate thresholds.

2.5 IDENTIFIED CONTAMINATION – SOILS (CONTINUED)

Asbestos fibres identified as loose chrysotile fibres were detected within a made ground sample from WS11 at 0.6m depth. Quantification testing undertaken on the sample indicated that the asbestos fibres were at <0.001% asbestos by weight.

During the excavation of the trial pits and drilling of the windowless sample boreholes, suspected asbestos containing material (ACM) was noted within trial pit TP15 at a depth of 2.0m below existing ground level and within TP17 at a depth of 1.0m below existing ground level. The results of the laboratory asbestos identification testing indicated that the ACM obtained from TP15 consisted of chrysotile hard/cement type material. The results indicated that no asbestos was detected within the suspected ACM obtained from TP17.

2.5.3 Topsoil

The results of the laboratory testing of topsoil samples from the existing Bishop Hedley School Area indicates that the analysed chemical elements or compounds are present at concentrations below the appropriate thresholds.

Asbestos was not detected within the screened topsoil samples.

It should be noted that no topsoil samples were obtained from the land west of Galon Uchaf Road.

2.5.4 In-situ Natural Ground

No visual or olfactory evidence of contamination of the in-situ natural ground was identified during the drilling of the windowless sample boreholes and excavation of the trial pits. At the time of writing this report one sample of natural ground had been tested and all analysed chemical elements and compounds were below the relevant thresholds. Asbestos was not detected within the sample. It is considered likely that concentrations of determinants within the natural ground are likely to be naturally occurring and as such, the natural ground poses no significant threat to human health or the environment.

2.5.5 Coal Tar Testing

Four samples (WS171, WS173, WS274 and WS281) of bituminous hardstanding from the existing school site were tested for coal tar content, including PAH compounds.

The results indicate a maximum benzo(a)pyrene concentration of 6.5mg/kg (0.00065%).

The samples were also tested for coal tar and total residue.

The results indicate that coal tar was not identified and the maximum total residue was 740mg/kg (0.074%).

2.5 IDENTIFIED CONTAMINATION – SOILS (CONTINUED)

Based on these results, the materials are not classified as hazardous waste since the coal tar content is <0.1% and the benzo(a)pyrene concentration is <0.005%.

2.6 IDENTIFIED CONTAMINATION - LEACHATE

The results of the soil leachate testing on samples of the domestic refuse/landfill waste indicated that several contaminants are present at concentrations above the respective published threshold levels. The results indicate elevated concentrations of copper, lead, nickel and zinc. Ammoniacal nitrogen was also recorded at varying concentrations within the leachate samples. A single elevated concentration of sulphate as SO₄ was also detected.

All PAH and petroleum hydrocarbon results were below the limit of laboratory detection. Most exceedances recorded throughout the leachate testing exceeded the respective AA-EQS threshold values only, with the exception of sulphate as SO₄ which exceeded the UK Drinking Water standard only.

2.7 IDENTIFIED CONTAMINATION – GROUNDWATER

Due to the lack of groundwater present within the monitoring installations located within the domestic refuse/landfill waste, no samples of groundwater were able to be collected from the dry boreholes. As such samples of groundwater were only collected from BH07 and BH10.

The results of the groundwater monitoring programme indicated elevated concentrations of copper, nickel, zinc and ammoniacal nitrogen within the groundwater at concentrations above the respective published threshold levels.

Based on the results of the groundwater testing, site specific PNECs (Predicted No-Effect Concentrations) have been calculated for copper, nickel and zinc with the Water Framework Directive M-BAT (Metal Bioavailability) Tool (using a function of dissolved organic carbon (DOC), calcium and pH).

Site specific PNECs (Predicted No-Effect Concentrations) have also been calculated for lead with the Water Framework Directive M-BAT (Metal Bioavailability) Tool (using a function of dissolved organic carbon (DOC)).

2.7 IDENTIFIED CONTAMINATION – GROUNDWATER (CONTINUED)

The results of the M-BAT assessment indicate concentrations of copper and zinc are present the exceed the respective PNEC (Predicted No Effect Concentrations).

The M-BAT assessment for zinc indicates the concentrations in the second round of monitoring exceeds the PNEC.

2.8 IDENTIFIED CONTAMINATION – GROUND GAS

2.8.1 Existing Bishop Hedley School Campus

The results of the ground gas monitoring programme show a maximum methane concentration of 0.6% and a maximum carbon dioxide concentration of 2.3%. A maximum gas flow rate of 0.4l/hr was measured during the gas monitoring programme.

Results indicate the general absence of hydrogen sulphide, with concentrations below the limit of detection. During the six monitoring rounds a maximum carbon monoxide concentration of 14ppm was recorded.

In accordance with CIRIA Report C665 a Gas Screening Value (GSV) of 0.0092l/hour has been calculated. This GSV corresponds to gas Characteristic Situation 1 (CS1), which does not require any special gas protective measures.

Reference should also be made to BS8485+A1:2019.

In accordance with BS8485+A1:2019 and based on the results of the ground gas monitoring programme with the site being classified as CS1, for Development Type B and C (commercial/public), the minimum gas protection score is zero, and therefore no specific gas protection measures are required in regards to carbon dioxide and methane.

However, as stated in Section 8.3, maximum carbon monoxide concentrations of 14ppm were detected during the gas monitoring programme.

The HSE Workplace Exposure Limit for carbon monoxide is 20ppm for long term exposure (8-hour timeweighted average period), which is not exceeded by the maximum recorded concentration. It is therefore considered that the potential risk from carbon monoxide within the proposed school buildings is considered to be low.

No radon protective measures are required.

2.8 IDENTIFIED CONTAMINATION – GROUND GAS (CONTINUED)

2.8.2 Land West of Galon Uchaf Road

The results of the gas monitoring programme indicate a maximum methane concentration of 9.4% and a maximum carbon dioxide concentration of 5.8%. A maximum gas flow rate of 0.1l/hr has measured during the gas monitoring programme.

Depleted oxygen concentrations were detected within WS10, WS14 and WS15, where minimum oxygen concentrations of between 1.2% and 9.4% were recorded.

In accordance with CIRIA Report C665 a Gas Screening Value (GSV) of 0.0282l/hour has been calculated. This GSV corresponds to gas Characteristic Situation 1 (CS1). However, as the maximum methane concentrations exceeds 1% and the maximum carbon dioxide concentration exceeds 5% and considering the nature of the made ground encountered on site, considerations should be given to upgrading the classification to Characteristic Situation 2 (CS2).

It is therefore considered that gas protection measures would be required if any enclosed spaces/buildings are proposed within the land west of Galon Uchaf Road.

2.9 RESIDUAL STRUCTURES

At the time of the intrusive investigations works, the existing Bishop Hedley School buildings and structures were still present.

Therefore, significant structures, foundations, possible basements etc., associated with the existing buildings remain beneath the site.

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.

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 without home grown produce end use.

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

It should be noted that published thresholds for a school end use are unavailable and it has been considered that a residential without the consumption of home grown produce end use has been deemed appropriate for the site, as a conservative assessment in the first instance.

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 concentration levels in the general made ground encountered beneath the existing school area of beryllium and three PAH compounds, benzo(a)pyrene, benzo(b)fluoranthene and dibenzo(ah)anthracene. Asbestos was not detected in the screened samples.

Within the made ground consisting of general domestic waste/landfill waste encountered beneath the land west of Galon Uchaf Road elevated concentrations of beryllium, arsenic and PAH compounds were identified. Asbestos fibres identified as loose chrysotile fibres were detected within a made ground sample from WS11 at 0.6m depth. Quantification testing undertaken on the sample indicated that the asbestos fibres were at <0.001% asbestos by weight.

Suspected ACM was noted within trial pits TP15 and TP17. The results of the laboratory asbestos identification testing indicated that the ACM obtained from TP15 consisted of chrysotile hard/cement type material. The results indicated that no asbestos was detected within the suspected ACM obtained from TP17.

Given the elevated beryllium and PAH concentrations within the general made ground encountered and elevated beryllium, arsenic, PAH compounds, asbestos fibres and ACM in the landfill material, 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,
- Inhalation of soil bourn dust.

It is considered necessary to protect future site end users and construction site operatives from exposure to the contamination recorded within the 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

2.11.1 Existing Bishop Hedley School Campus

The results of the soils testing did not indicate widespread contamination across the area with only localised elevated concentrations of beryllium and three PAH compounds (benzo(a)pyrene, benzo(b)fluoranthene and dibenzo(ah)anthracene) were encountered within the general made ground located beneath the existing school campus area.

The underlying natural ground comprised of generally cohesive glacial deposits.

Shallow groundwater was not generally encountered during the intrusive works, with only localised groundwater inflows encountered at depths of between 1.3m and 4.5m below existing ground level and often noted as seepages.

In the developed state, the site will be covered by either the building footprint or areas of hardstanding and the areas of soft landscaping and any sport pitches underlain by made ground will be covered by a minimum 600mm thick capping layer of clean imported soils, placed above a high visibility anti-dig membrane.

It is therefore considered that the potential for rainfall infiltration into the made ground, subsequent leachate generation from the made ground and the potential for vertical migration of unacceptable leachate concentration to impact the underlying groundwater is considered to be low.

2.11.2 Land West of Galon Uchaf Road

With regards to assessing the risk to controlled waters from potential leachable contaminants within the general domestic waste/landfill waste encountered beneath the Land West of Galon Uchaf Road, a generic quantitative risk assessment has been undertaken using published screening criteria values for risk to controlled waters.

The results of the soil leachate testing on samples of the domestic refuse/landfill waste indicated exceedances of copper, nickel, ammoniacal nitrogen and localised sulphate.

The results of the groundwater sampling (where groundwater was present) within the domestic refuse/landfill material encountered elevated concentrations of copper, nickel, zinc and ammoniacal nitrogen.

The results of the soil leachate and groundwater testing are not considered to indicate gross levels of contamination that presents a significant risk to controlled waters.

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

In addition to this, the investigations have not encountered a consistent perched water body within the made ground, or a shallow groundwater table within the underlying in situ natural soils. The in situ natural soils have also been found to be of a low permeability/impermeable.

There is no evidence for a sufficiently thick capping layer above the existing made ground/landfill material. Site levels are to be raised in this part of the site and a sports pitch constructed. Therefore, in the developed state, the site will comprise an approximate 0.5m to 3.5m layer of fill placed over the existing made ground/landfill waste.

Additionally, the placed fill will include a network of appropriately designed drainage to remove surface water from the sports pitch. It is considered that the proposed fill in conjunction with the proposed drainage feature will greatly reduce the amount of the rainfall and percolation into the landfill waste and subsequently reduce leachate generation.

Considering the above geoenvironmental factors, it is considered that the potential risk of leachate generation from the proposed development impacting on controlled waters is considered to be low.

3.0 REMEDIATION STRATEGY

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

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

The following remediation strategy is proposed:

- All buildings/structures to be demolished should be subject to a 'Demolition Asbestos Survey', soft strip and disposal of asbestos containing materials to a licensed tip.
- Following demolition of the existing above ground structures and removal of floor slabs, it is recommended that further contamination compliance checks are undertaken across the former building footprints. These works should include visual inspection of exposed formations for evidence of potential contamination (including inspection and handpicking for any suspected asbestos containing materials by asbestos awareness trained personnel), additional soil sampling and laboratory chemical testing for a range of contamination including asbestos and locally petroleum hydrocarbons and PCB's in the area of any above or below ground storage tanks and electrical substations (if removed) respectively. A supplementary contamination risk assessment should be undertaken.
- Following site strip and clearance all exposed formations should be visually inspected and handpicked for any identified ACM. Additionally, any excavated made ground materials, any encountered buried foundations, service runs/ducts, pipework etc. should also be visually inspected and handpicked of any identified 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.
- Following completion of any asbestos clearance works appropriate validation sampling will be required.

3.0 REMEDIATION STRATEGY (CONTINUED)

- In order to reliably prepare a cleared formation, clear of foundations, buried obstructions etc associated with the past site usage would be to excavate within the previously developed zones and areas of made ground to a depth of 2.0m below the proposed underside of foundation levels or to expose the natural strata (whichever is shallowest). The excavated materials should be sorted and processed with any oversized materials crushed to a suitable grade and stockpiled on site for reuse as granular fill. Any unacceptable materials (such as timber, metal, plastic etc) should be removed. Any localised soft spots should also be excavated and replaced with structural fill.
- During site clearance within the existing school site area, made ground containing anthropogenic material should be segregated and stockpiled separately on-site. This made ground should be re-used on site either below the proposed sport pitch or below buildings and areas of hardstanding.
- Following site clearance works, completion of formation checks, all supplementary sampling and testing and completion of the reclamation and remedial works, within any areas of soft landscaping and any sport pitches where the made ground containing anthropogenic material remains exposed at, or within 600mm of, the site surface, a capping layer of a minimum thickness of 600mm, of clean imported subsoil and topsoil, placed above a robust high visibility anti-dig membrane would be required. The ground level within the area of the proposed sport pitches within the former landfill area to the west of Galon Uchaf Road, are proposed to be raised by 0.5m to 3.5m with clean acceptable fill and therefore the construction of sport pitches and the raising of the ground levels provide a suitable capping layer between the underlying landfill material and future site users.
- Drinking water supply pipe specification to be agreed between Willmott Dixon Construction Limited and DCWW.

4.0 REMEDIATION IMPLEMENTATION

4.1 OBJECTIVES

The main objective of the proposed remediation works is to render the site suitable for educational end use. In order to achieve this objective, it is necessary to break any potential pathways between proposed site end users and contaminated made ground.

4.2 METHODOLOGY

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

- The removal of existing buildings, structures and areas of hardstanding, along with all residual obstructions such as foundations, pits, walls etc associated with the former site use.
- Following site clearance works and when access is available, further samples should be taken from below the former buildings and structures and tested for a range of contaminants including asbestos and additional contaminants such as PCB's and petroleum hydrocarbons in areas of electrical substations (if removed) and any storage tanks, as required. A supplementary contamination risk assessment should be undertaken.
- During site clearance within the existing school site area, made ground containing anthropogenic material should be segregated and stockpiled separately on-site. This made ground should be re-used on site either below the proposed sport pitch or below buildings and areas of hardstanding.
- Following site clearance works and during construction, all exposed formations within the site 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.

4.2 METHODOLOGY (CONTINUED)

- 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.
- During excavation, in order to prevent cross contamination of materials, the arisings should be segregated from any underlying natural soils.
- All arisings should be screened to remove any deleterious material such as brick, concrete, metal, timber etc. Following screening, the materials should be stockpiled separately (i.e. placed in stockpiles separate from any crushed concrete, tarmac, natural ground etc.) before being crushed to a grade suitable for reuse on site as general fill beneath building floor slabs or areas of hard standing.
- Within areas of soft landscaping and any sport pitches where made ground containing anthropogenic material remains exposed at, or within 600mm of, the site surface, a capping layer of a minimum thickness of 600mm, of clean imported subsoil and topsoil, placed above a robust high visibility anti-dig membrane will be required. The ground level within the area of the proposed sport pitches within the former landfill area to the west of Galon Uchaf Road, are proposed to be raised by 0.5m to 3.5m with clean acceptable fill and therefore the construction of sport pitches and the raising of the ground levels provide a suitable capping layer between the underlying landfill material and future site users.
- Adoption of DCWW agreed drinking water supply pipe.

4.2 METHODOLOGY (CONTINUED)

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

- Breaking out and removal of redundant foundations, floor slabs, walls and any buried obstructions etc.
- Post site clearance sampling with specific sampling below existing buildings and above and below storage tanks, if present and any electrical substation, if removed.
- Incorporation of a robust clean 600mm thick capping layer within proposed soft landscaped areas and sport pitches, with a robust high visibility anti-dig membrane at the base where made ground containing anthropogenic material remains exposed at, or within 600mm of, the site surface.
- Raising of ground level with clean acceptable fill within the area of the proposed sports pitch above the former landfill to provide a suitable capping layer between the underlying landfill material and future site users.
- 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.

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.

4.3 OPERATIONS (CONTINUED)

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.

An appropriately licensed asbestos contractor will be required to deal with and dispose of any identified asbestos containing materials (ACM).

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 educational development.

5.2 REMEDIATION VERIFICATION METHODOLOGY AND DATA GATHERING REQUIREMENTS

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

- Testing and assessment of the exposed formations across the site following site clearance with specific sampling below the existing buildings and any storage tanks and electrical substation, as appropriate.
- 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 robust high visibility anti-dig membrane placed at the base of the capping soils within any areas of soft landscaping and sport pitches where made ground containing anthropogenic material remains exposed at, or within 600mm of, the site surface.
- Validation of the chemistry and thickness of the proposed 600mm capping layer to be placed within any areas of soft landscaping and sport pitches that are underlain by made ground containing anthropogenic material remains exposed at the surface.
- Notification in the CDM file of residual risks with the remediated site.
- Certification by Willmott Dixon of installation of appropriate 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 all buried obstructions have been removed, post site clearance validation checks and testing have been carried out, all visible ACM has been handpicked and placement of the final 600mm (minimum thickness) of clean imported capping soils over a robust high visibility anti-dig membrane to soft finished areas and sport pitches where made ground containing anthropogenic material remains exposed at, or within 600mm of, the site surface.

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 an educational development. 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, as appropriate will be the responsibility of the developer and is usually undertaken, late in the development programme, as areas/sections are completed.

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

In order to aid drainage of the landscaped areas, it is recommended that the surface of the engineered formation is raked and loosened prior to the placement of the required geotextile separation/alert membrane below the 600mm thick capping layer.

FIGURES

Site Location

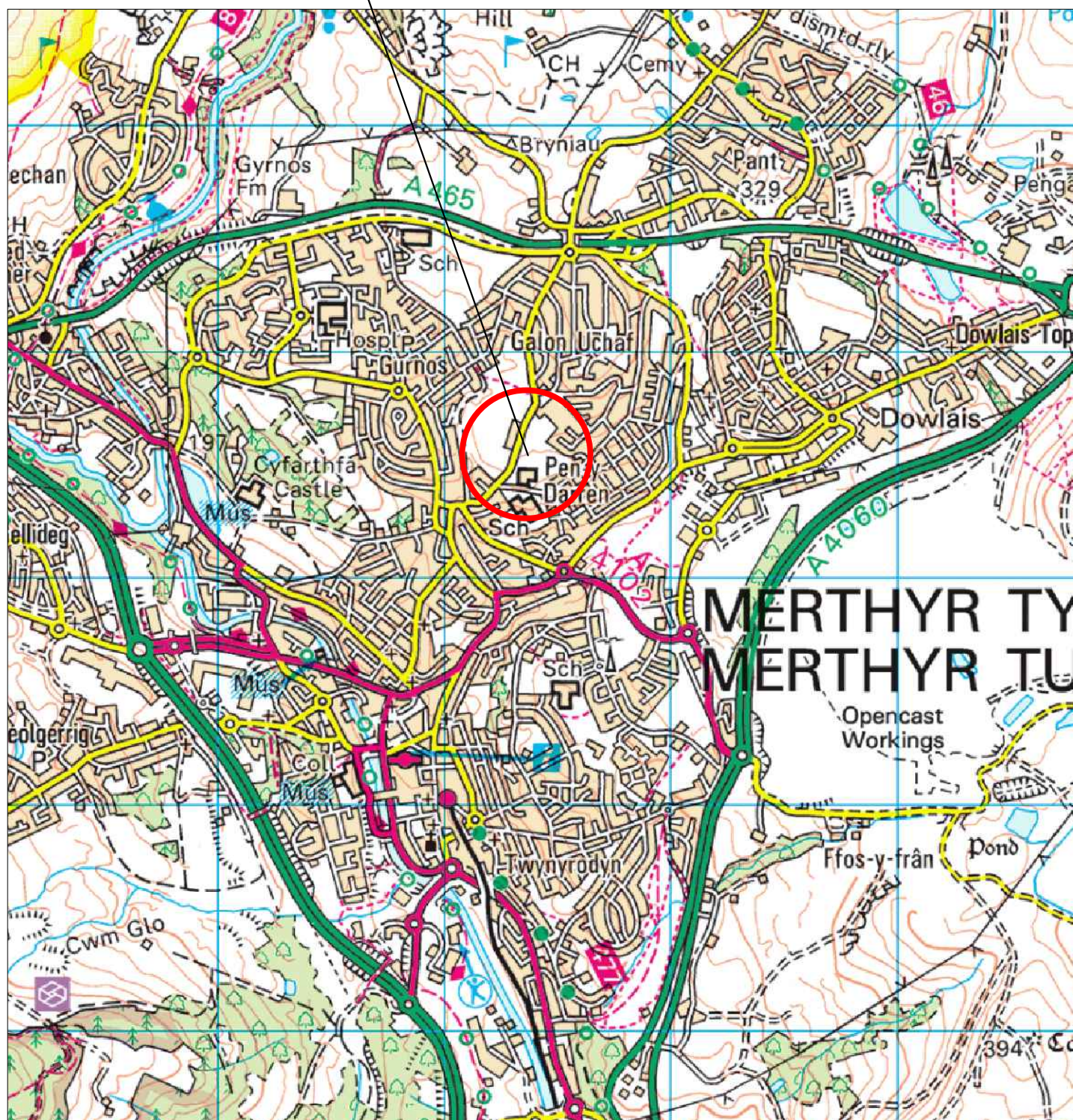


Figure 1: Site Location

Project: Bishop Hedley School, Merthyr Tydfil Job no.: 14075

Client: Willmott Dixon Construction Ltd

Scale: 1:25,000 at A4

Intégral
Géotechnique

Integral House,
7 Beddau Way,
Castlegate Business Park,
Caerphilly,
CF83 2AX.
Tel: 029 2080 7991

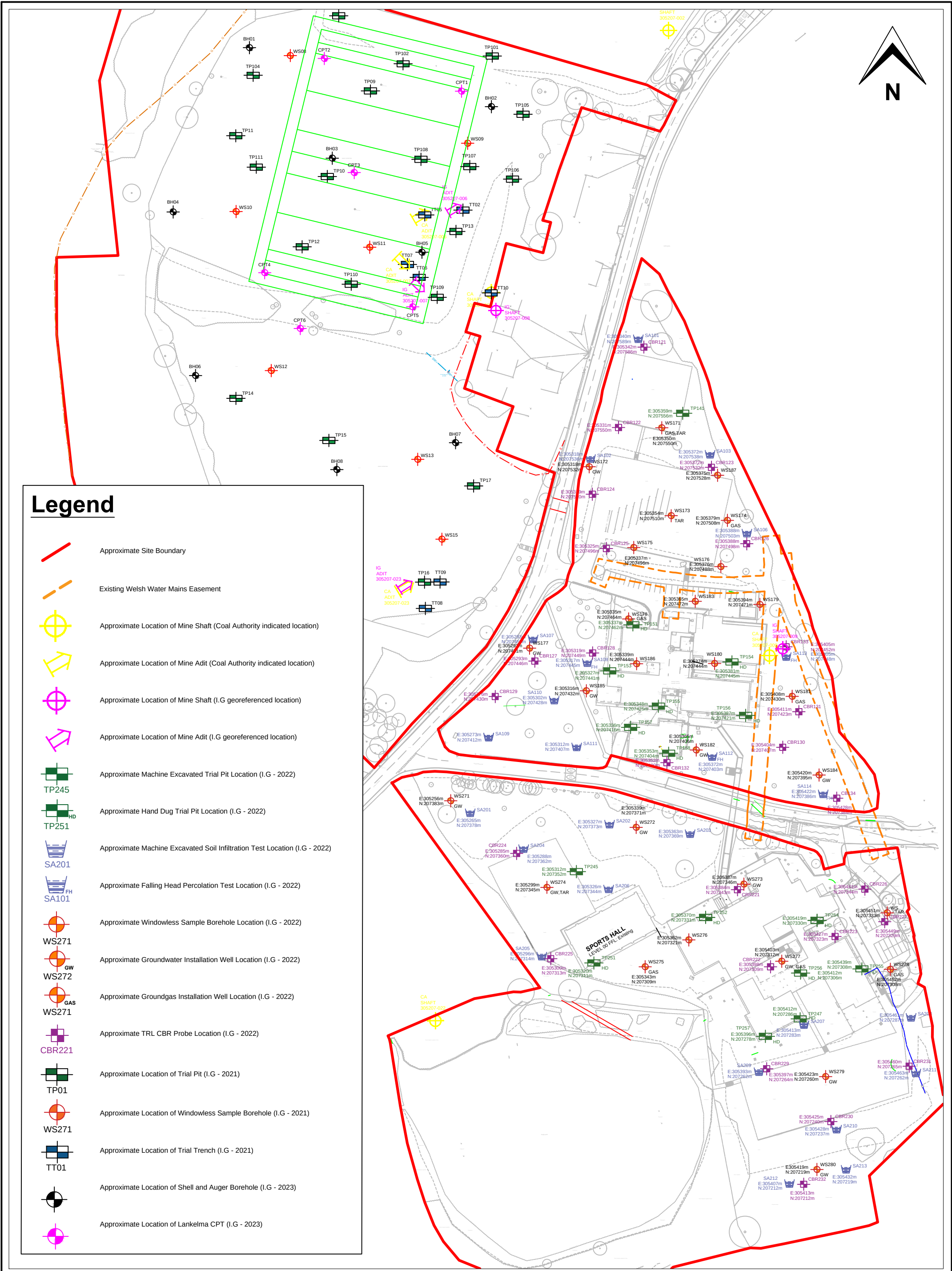


Figure 2: Site Plan

Project: Bishop Hedley School, Merthyr Tydfil	Job No.: 14075	Integral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Willmott Dixon Construction Ltd	Scale: 1:1,500 at A3		

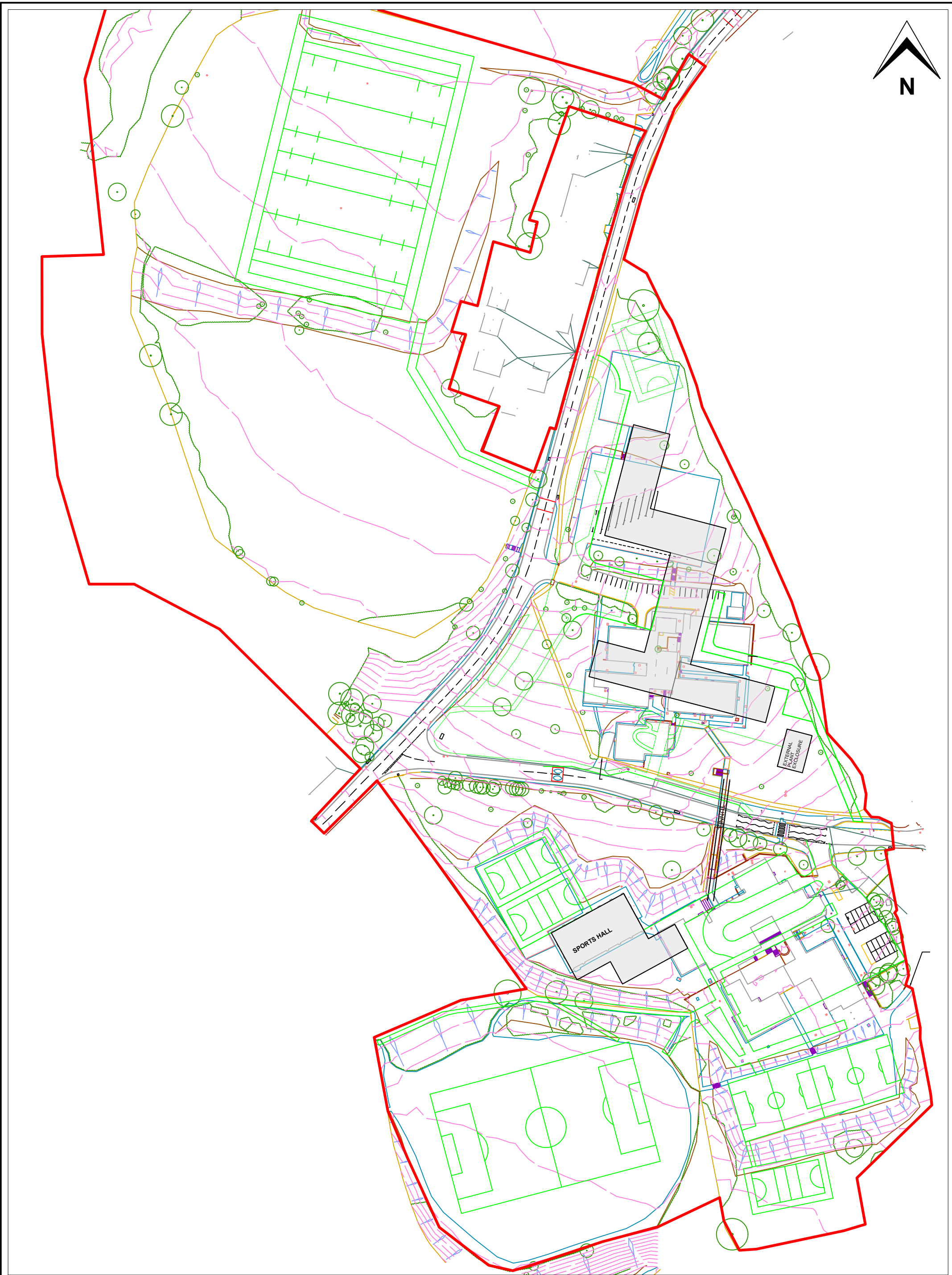


Figure 3: Indicative Proposed Development Layout

Project: Bishop Hedley School, Merthyr Tydfil

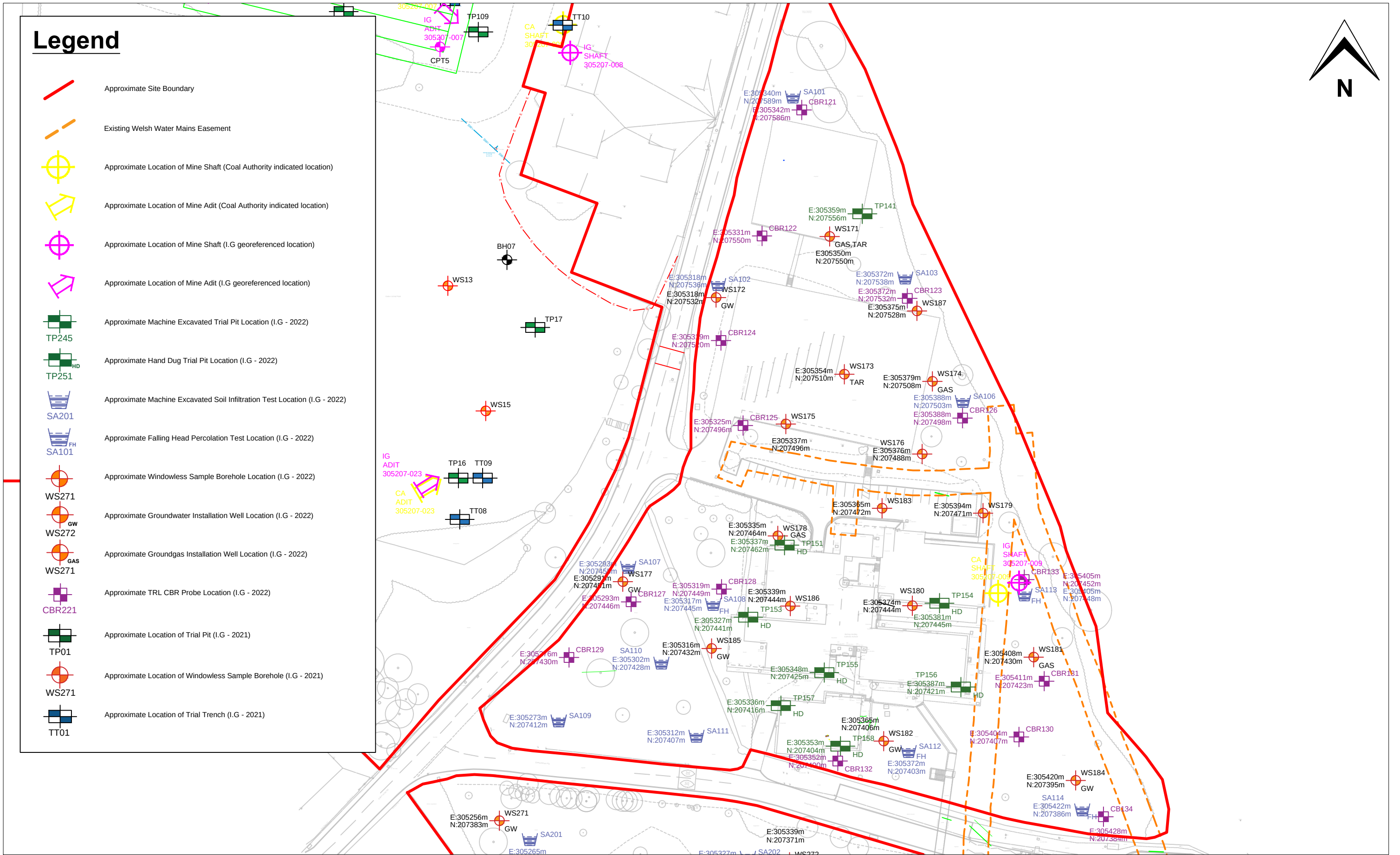
Client: Willmott Dixon Construction Ltd

Job No.: 14075

Scale: 1:1,500 at A3

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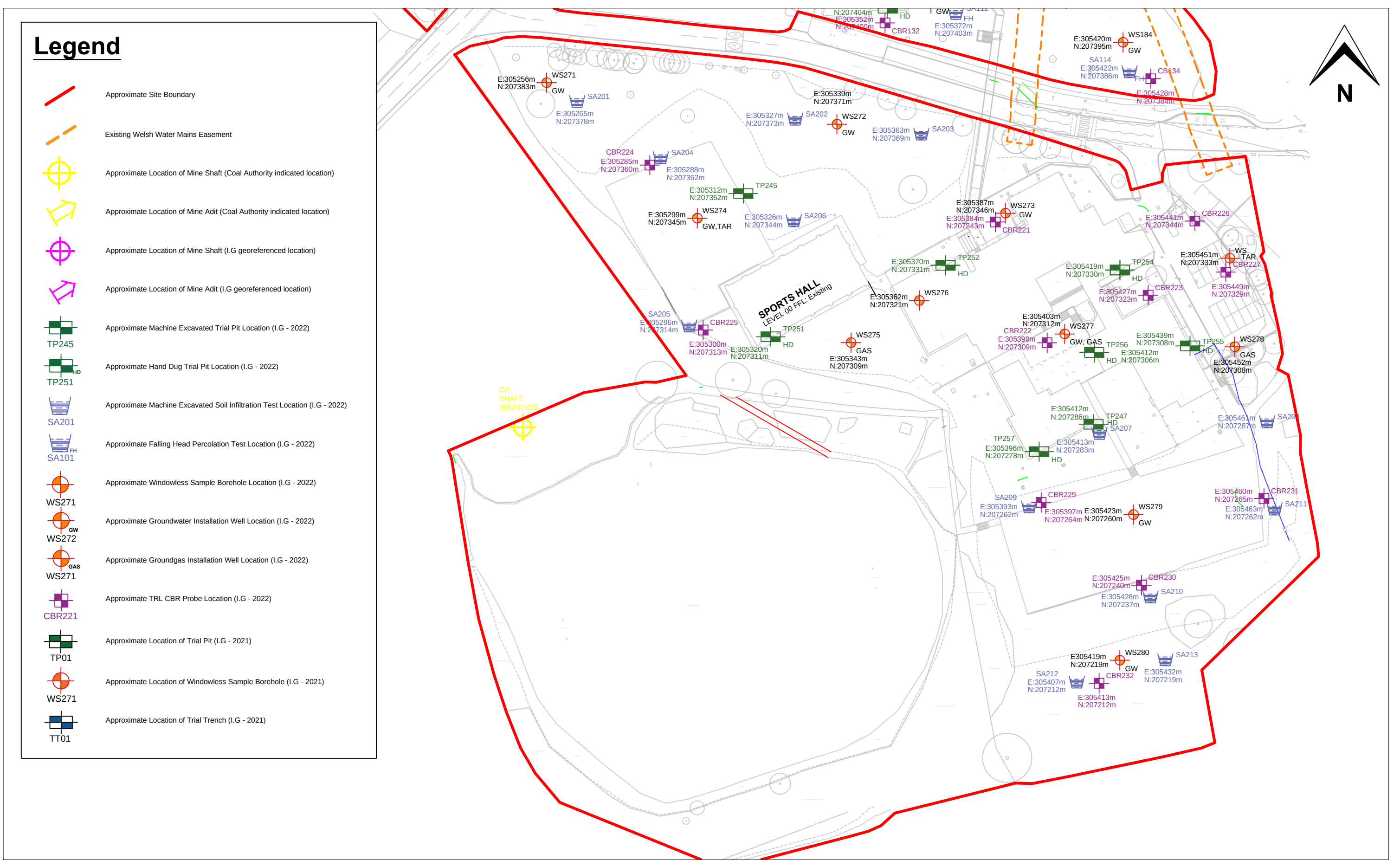


Figure 4b: Exploratory Hole Locations - Existing School Campus (South)

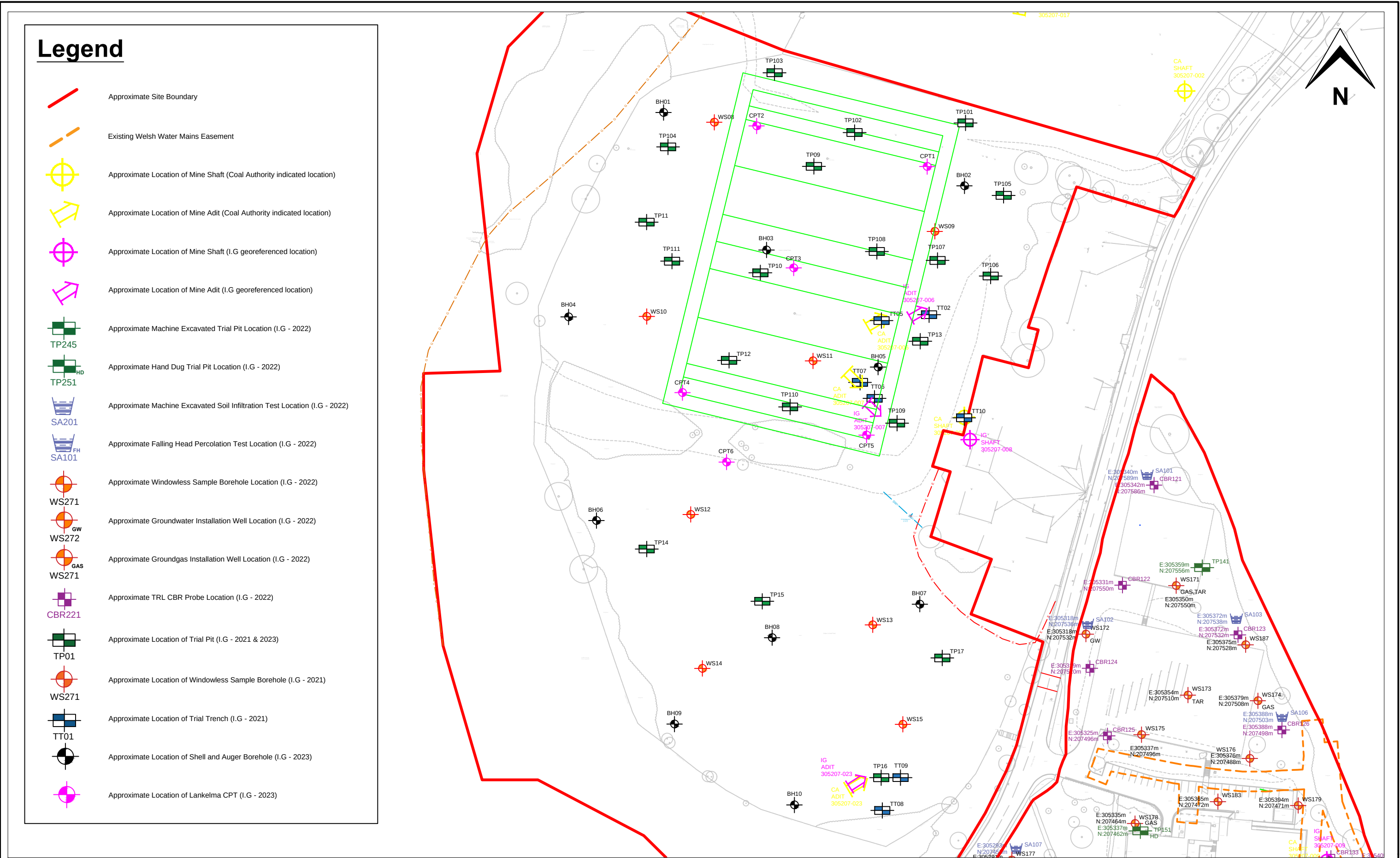


Figure 4c: Exploratory Hole Locations - Land West of Galon Uchaf Road

Project: Bishop Hedley School, Merthyr Tydfil

Client: Willmott Dixon Construction Ltd

Job No.: 14075

Scale: 1:1,250 at A3

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