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THE IRON LINE, MILLOM (VISITORS CENTRE)

PILING RISK ASSESSMENT

Curtins Ref: **080874-CUR-XX-XX-T-GE-00010**
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Client Name: Cumberland Council

Client Address: Parkhouse Building, Baron Way, Carlisle, CA6 4SJ

Site Address: The Iron Line, Millom, Cumbria, LA18 4LB

Rev	Description	Issued by	Checked	Date
P01	First Issue	RT	NF	09 October 2025

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1 INTRODUCTION

Curtins were instructed by Cumberland Council to undertake a Piling Risk Assessment for the proposed Welcome Centre which forms part of the wider The Iron Line development project located in Millom, LA18 4LB. Part of the site is designated as a Site of Special Scientific Interest (SSSI), a Ramsar Site, a Special Protection Area and a Special Area of Conservation which comprises RSPB Hodbarrow and the southern side of the Redhills Quarry (owned by Cumbria Council).

The proposed development on site comprises the construction of a visitors centre with a café/shop, group room, staff/volunteer room, toilet facilities and carpark. The proposed development plans (General Arrangement) are included within *Appendix A* of this report.

The site has been characterised through a desk-based Phase 1 Preliminary Risk Assessment (Ref 1.) and Phase 2 Ground Investigation Report (Ref 2.) undertaken by Curtins in December 2023 and March 2024 respectively. These reports were updated in 2025 to reflect updates to the proposed development and additional ground investigation works.

The bedrock geology underlying the site (Red Hill Limestone, Martin Limestone Formation, Low Furness Basal Formation and the Dalton Formation) corresponds with a Secondary A aquifer classification, and as such, a piling risk assessment (PRA) has been produced to identify the risk associated with a piled foundation solution, should piles be installed in/on the bedrock to support discharge of an anticipated pre-commencement planning condition.

It is understood that the preferred piling methodology is Continuous Flight Auger (CFA) piles. At tender stage the piling contractor indicated that it is likely a socket will be required into the Limestone beneath the site. 450mm diameter piles are an appropriate assumption at this stage.

Pile lengths of between around 10m to 20m are anticipated based on depths bedrock was encountered and accounting for a socket into bedrock.

Where there are changes to the proposed pile design this assessment should be updated accordingly.

1.1 Scope

This piling risk assessment provides an overview of the site's ground and groundwater conditions and considers the potential risks associated with the installation of CFA piles to groundwater.

The report identifies appropriate risk management and monitoring protocols that can be adopted to ensure any residual risk is brought within adequate and practicable limits.

1.2 References

In preparation of this report reference has been made to the following key guidance document:

- Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention National Groundwater & Contaminated Land Centre report NC/99/73 (EA Report 2001) (Ref. 3)

Reference is also made to the following geo-environmental reports undertaken for the site:

- Curtins (2025) The Iron Line, Millom Phase 1 Preliminary Phase 1 Risk Assessment Ref. 080874-CUR-00-XX-RP-GE-001 Rev. P03 (Ref. 1).
- Curtins (2025) The Iron Line, Millom (Visitors Centre) Phase 2 Ground Investigation Ref. 080874-CUR-XX-XX-RP-GE-00006 Rev P04 (Ref. 2).
- Curtins (2025) The Iron Line, Millom Remediation Strategy Ref. 080974-CUR-XX-XX-T-GE-00008 Rev P02 (Ref. 4).

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- Curtins (2025) The Iron Line, Millom Mining Risk Assessment Ref. 080874-CUR-XX-XX-T-GE-00005 Rev P02 (Ref. 5)
- Curtins (2025) The Iron Line, Millom Mining Risk Mitigation Strategy Ref. 080874-CUR-XX-XX-T-GE-00009 Rev. P02 (Ref. 6)

It is assumed that the client is in receipt of these reports and that they will also be submitted to and accepted by Cumberland Council to discharge relevant planning conditions.

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2 SITE SETTING

This section of the report summarises the site setting, history, geology, hydrogeology, hydrology and environmental conditions at the site with reference to the geo-environmental reports referenced previously. It is not the intention of this report to duplicate these reports, with the information below providing background information to support the piling risk assessment and recommendations. For further background information the full reports should be consulted.

2.1 The Site Setting

The site herby known as the Visitor Centre, is located within Zone 1 of the wider which forms part of the wider The Iron Line development project located in Millom, LA18 4LB. Part of the site is designated as a Site of Special Scientific Interest (SSSI), a Ramsar Site, a Special Protection Area and a Special Area of Conservation which comprises RSPB Hodbarrow and the southern side of the Redhills Quarry (owned by Cumbria Council). A site location plan is presented below in *Figure 1*, with the site boundary outlined in red.



Figure 1 Site Location Plan with Development Zones, Site Boundary Shown in Red

2.2 Hydrogeology and Hydrology

The British Geological Society (BGS) does not record superficial deposits underlying the site. The BGS record multiple bedrock lithologies across the site, recorded as the Red Hill Limestone, Martin Limestone Formation, Low Furness Basal Formation, and the Dalton Formation. The bedrock deposits are classified as a Secondary A Aquifer.

The site is not situated within a Source Protection Zone (SPZ). Groundwater vulnerability has been assessed as high risk; the site is situated on a Productive Bedrock and Superficial Aquifer which has well connected fractures, contributing to a high pollutant speed and a dilution of >550mm/year. There is low soluble rock risk in relation to groundwater vulnerability.

There are no groundwater abstraction points located within 1km of the site.

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The nearest surface water feature is an unidentified river feature in the southwest of site, the RSPB Hodbarrow nature reserve lakes on site and off site, and the tidal Duddon river approximately 16m south from site. There are 23 OS Water Network Lines within 500m of the site.

There are no surface water abstractions within 1km of the site.

There are seven active discharge consents issued by United Utilities within 500m of the site boundary. These are approximately 326 to 363m northwest.

2.3 Ground Conditions

The following sections present a summary of the ground conditions identified during Curtins' phases intrusive ground investigation completed in March and April 2024, December 2024 and June 2025. The exploratory hole logs are presented within *Appendix B*.

2.3.1 Surface Cover

During the initial ground investigation Made Ground soils comprising of vegetation cover overlying topsoil, with a maximum depth of 0.50m bgl (13.06m AOD), was encountered in all locations, excepting ST 1-02, TP 1-04, CP 1-01, CP 1-01B, CP 1-01C, CP 1-02, CP 1-03 and RH2-01, which recorded surface cover comprised of vegetation overlaying granular Made Ground deposits.

2.3.2 Made Ground

Granular Made Ground was encountered in all exploratory across the site. The thickness and composition varied across the site.

Within the footprint of the historic reservoir, Made Ground comprises:

- Dark greyish brown very gravelly sand with cobbles. Gravel comprised glass, ceramic, plastic, metal, rope, mudstone, sandstone, brick, coal and slag. Cobbles include metal, mudstone and bricks.
- Brown sandy gravelly clay with cobbles. The gravel fraction includes mudstone, limestone sandstone and concrete. Cobbles include metal, mudstone and bricks.
- Grey sandy clay.

This general sequence is indicative of backfilled materials and soils within the former historic reservoir (TT 1-01, TT 1-02, TT 1-03, TT 1-04 and DSBH 1-05.

Elsewhere across the site the Made Ground comprises:

- Brown sandy gravelly clay. The gravel fraction includes mudstone, sandstone and brick;
- Greyish brown slightly clayey very gravelly sand. The gravel fraction includes brick, slag, coal, metal, mudstone, sandstone and glass.
- Reddish brown sandy gravel. The gravel fraction includes, limestone, mudstone and brick.
- Brown very clayey, gravelly, cobble fine to coarse sand. Gravels comprise of slag, clinker, limestone, glass and coal. Cobbles comprise of limestone.
- Black and grey mottled very gravelly, silty fine to coarse sand. Gravels comprise of slag, clinker, glass coal and steel.

The site is a recorded BGS and historic landfill site, part of Red Hills Quarry landfill. Deposited waste is indicated to include inert, industrial, commercial, household, special waste and liquid sludge. Varied Made Ground encountered during the ground investigation may be indicative of 'landfill' material, including glass bottles, tyres, scrap metal, cups, ceramics, polystyrene and plastic. Relatively limited putrescible materials were identified during the investigation.

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Made Ground soils within the vicinity of CP1-01 and CP1-01B were confirmed to contain asbestos cement sheet pieces from ground level to a proven depth of 0.90m bgl.

Made Ground soils containing ash were identified in CP1-03 from 0.20m to 1.50m bgl. Fine to medium white ash was recorded to make up 20% of the total soil volume.

2.3.3 Cohesive Superficial Deposits

Cohesive deposits indicative of Glacial Till was encountered in DSBH 1-01, RH 1-01, RH 1-02, RH 1-03, TP 1-01, TT 1-01, TT 1-03 CP1-01C, CP1-02, CP1-03 and RH2-01. The base of the deposit was encountered within the rotary boreholes, however due to the open hole drilling technique, only visual confirmation from chipping returns was possible. The base of the cohesive Glacial Till was confirmed in the cable percussive boreholes with the deposit proven to depths ranging between 9.00m and 15.00m bgl (5.46m to -1.60m AOD).

The Cohesive deposits comprised reddish-brown to brown, mottled grey, slightly sandy slightly gravelly clay, underlain by light brown sandy lightly gravelly clay.

2.3.4 Granular Superficial Deposits

Granular deposits were encountered in RH 1-01, RH 1-02, RH 1-03 and CP1-03. The base of the deposit was encountered within the rotary boreholes, however due to the open hole drilling technique, only visual confirmation from chipping returns was possible. The base of this deposit was confirmed in cable percussive borehole CP1-03 and was proven to a depth of 14.50m bgl (-0.50m AOD).

The Granular deposits comprised reddish brown to brown, slightly gravelly sand, underlain by brown sandy gravel, or Brown gravelly sand. The granular deposits were encountered underlying cohesive deposits and overlying the bedrock deposits.

2.3.5 Low Furness Basal Formation

Bedrock deposits indicative of the Low Furness Basal Formation were encountered at 18.0m bgl (-4.60m AOD) in RH 1-02. The formation comprised reddish brown conglomerate with lithoclasts of mudstone and sandstone and a reddish-brown sand matrix. The base of the deposit was not encountered during the investigation.

The bedrock deposit was logged based on the chipping returns from open hole drilling.

No evidence of broken ground or voids were identified.

2.3.6 Redhill Limestone Formation

Bedrock underlying the development site is consistent with the Red Hill Limestone Formation encountered as grey limestone.

Bedrocks deposits consistent with the Red Hill Limestone Formation were encountered from depths ranging between 9.00m to 18.70m bgl (5.46m to -5.80m AOD) for the top of these deposits. This deposit was encountered as a grey limestone. The extent of this deposit was not proven during the ground investigation.

2.3.7 Groundwater

Groundwater was encountered within the initial ground investigation within DSBH 1-01 at 2.50m bgl, TP 1-02 at 0.65m bgl, TP 1-04 at 1.90m bgl, TT 1-02 at 2.50m bgl, TT 1-2A at 2.50m bgl, TT 1-03 at 2.50m bgl, SA 1-02 at 0.23m bgl, SA1-03 at 0.40m bgl and RH 1-03 at 1.10m bgl. Deep groundwater infiltration within rotary open boreholes could not be noted or monitored due to the use of the air mist flush.

During the additional ground investigation water strikes were recorded within the cohesive Glacial Till at 13.50m bgl (CP1-01C), 6.00m bgl (CP1-02) and 9.40m bgl (CP1-03). An additional groundwater strike was recorded in the granular superficial deposits at 14.10m bgl, directly overlying the bedrock (CP1-03).

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2.4 Observed Potential Contamination

Several instances of observed contamination were identified during the ground investigations details of which are included in Table 1 below.

Table 1 – Summary of Visual or Olfactory Contamination.

Exploratory Hole	Installation Strata	Depth of observed contamination m bgl	Description
TT 1-02	Made Ground	2.50	Perched water strike with fast infiltration rate and a greenish brown colour. No odour noted.
TT 1-02A	Made Ground	2.50	Perched water strike with fast infiltration rate and a greenish brown colour. No odour noted.
TT 1-03	Made Ground	2.50	Perched water strike with fast infiltration rate and a greenish brown colour. No odour noted.
SA 1-02	Made Ground	0.24 – 1.50	Slight sulphur smell
TP 1-04	Made Ground	0.20 – 1.90	Slight sulphur smell
CP1-01	Made Ground	0.30 – 0.40	ACMs observed in Made Ground
CP1-01B	Made Ground	0.70 – 0.80	ACMs observed in Made Ground

As part of Curtins ground investigations (Ref. 2) nineteen soils samples were obtained. An additional groundwater sample was obtained from the groundwater within the cohesive superficial soils. Environmental chemical analysis was undertaken on all samples.

2.4.1 Soils

The soil environmental chemistry results were compared with Generic Assessment Criteria for soils with respect to human health for a 'Commercial end-use'. With respect to the proposed end-use of the site no exceedances were recorded within all samples tested.

However, asbestos was positively identified within five samples of Made Ground soils and two samples of bulk cement. Subsequently, asbestos quantification was carried out on these samples, with the results summarized below in Table 2.

Table 2 – Positively Identified Asbestos.

Location	Depth (m bgl)	Type	Matrix	Asbestos in soil Quantification (%)	Asbestos Bulk Fibre Quantification (%)
TP 1-03	0.40 – 0.50	Chrysotile	Loose Insulation	<0.001	-
TP 1-04	0.10 – 0.20	Chrysotile	Loose Fibres	<0.001	-
DSBH 1-01	0.20 – 0.30	Amosite	Loose Insulation	0.038	-
DSBH 1-03	0.30 – 0.40	Chrysotile	Cement	0.513	-
CP1-01	0.30 – 0.40	Chrysotile	Cement	0.087	-
CP1-01	0.30 – 0.40	Chrysotile	Cement	-	15
CP1-01B	0.70 – 0.80	Chrysotile	Cement	-	15

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2.4.2 Controlled Waters

Groundwater environmental chemistry results of a water sample taken from CP1-03 was compared against UK/EU Drinking Water Standards (DWS) due to the presence of the underlying Secondary A aquifer within the bedrock deposits.

With respect for UK/EU Drinking Water Standards no exceedances were recorded within the samples obtained. A **Low** risk rating was identified to controlled waters was consequently concluded in relation to groundwater and surface water receptors accounting for the presence of the cohesive Glacial Till preventing the lateral and downwards migration of contaminants to controlled waters. Notwithstanding it was recommended pile types should be considered which present minimal risk to driving contaminants down into the aquifer, a piling risk assessment is recommended.

2.4.3 Ground Gas

Curtins completed an initial ground gas monitoring program of four visits undertaken between the 29th of April and the 30th of May 2024. A further two monitoring visits were undertaken between the 09th January and 22nd of January 2025. The Curtins Phase 2 Report (Ref 2) concluded that it was appropriate to characterise the site as a Characteristic Situation 2 (CS-2) in accordance with BS8485, indicating gas protection measures are required.

2.4.4 Aggressive Ground Conditions

Chemical analysis for pH and soluble sulphate content showed that soils meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1 in accordance with BRE Special Digest 1 (2005).

2.5 Remediation

An outline Remediation Strategy has been produced (Ref. 4) to inform remedial action to be undertaken at the site. The methodologies to be implemented by the remediation contractor are to be confirmed.

Broadly, remedial works will comprise of removal of visible asbestos, capping in areas of soft landscaping as well as an asbestos management plan to be implemented throughout the duration of the construction works. Additionally, remedial works will include CS2 gas protection and full Radon protection measures to be installed within the Visitor Centre.

This risk assessment has been undertaken in anticipation of future ground conditions.

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3 PILING RISK ASSESSMENT

It is understood at the current design stage, the adoption of Continuous Flight Auger (CFA) piles at a depth of between c.10.00m to 20.00mm bgl and socketed into the bedrock is considered to be the preferred piling solution. This method has been selected with consideration of minimal ground vibration, as well as groundwater protection aspects.

CFA piles essentially involve driving a large auger into the ground, with soils with the radius of the auger brought to the surface and replaced with concrete on withdrawal of the auger. The displacement of the surrounding ground is governed by the speed of rotation of the auger relative to the speed of vertical penetration. Theoretically, it is possible to adjust the speeds so that the volume of soils displaced laterally and removed arisings is equal to the volume of concrete placed.

Within the EA Report (2001), the six Source-Pathway-Receptor scenarios are identified as:

1. *Creation of preferential pathways, through a low permeability layer (an aquitard), to allow potential contamination of an underlying aquifer;*
2. *Creation of preferential pathways, through a low permeability surface layer, to allow upward migration of landfill gas, soil gas or contaminant vapors to the surface;*
3. *Direct contact of site workers and others with contaminated soil arising which have been brought to the surface;*
4. *Direct contact of the piles or engineered structures with contaminated soil or leachate causing degradation of pile material (where the secondary effects are to increase the potential for contaminant migration);*
5. *The driving of solid contaminants down into an aquifer during pile driving; and*
6. *Contamination of groundwater and subsequently, surface waters by concrete cement paste or grout.*

This piling risk assessment tabulated overleaf addresses aspects 1, 4, 5 and 6 above only, in keeping with the objectives of this report (assessing the risk to groundwater).

Other aspects should be appropriately dealt with through engineering design and suitable on-site management. The risk assessment methodology follows that presented in *Appendix C*.

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Table 3 - Tabulated Risk Assessment: CFA Piles

Aspect	Potential Consequence	Potential Probability	Potential Risk	Risk Management Options Available	Resultant Risk
1. Creation of preferential pathways, through a low permeability layer (an aquitard), to allow potential contamination of an underlying aquifer.	**Medium** Pollution of groundwater resources. Site overlies generally deep made ground and extensive cohesive superficial soils. Secondary A Aquifer (bedrock deposits) in which piles are to be socketed. The site is not located within a Source Protection Zone and there are no potable groundwater abstractions within 1km of the site boundary.	**Unlikely** • Limited visual or olfactory evidence of contamination observed during site investigation considered to pose minimal risk to the underlying Secondary A Aquifer. • No exceedances in relation to EU/UK Drinking Water Standards recorded within samples recovered from cohesive superficial soils. • It is possible unidentified contamination is present on site given the extensive Made Ground deposits but a contamination discovery strategy is in place to mitigate this risk. • CFA piling method is essentially self-sealing with concrete and therefore no resultant pathway.	**Low**	Not required	**Low**
4. Direct contact of the piles or engineered structures with contaminated soil or leachate causing degradation of pile materials (where the secondary effects are to increase the potential for contaminant migration).	**Medium** Damage to sensitive buildings/structures/services or the environment.	**Unlikely** • Soluble sulphate concentrations in soils meet a Design Sulphate Class of DS-1 AC-1 for Made Ground soils, natural soils and bedrock.	**Low**	Not required	**Low**
5. The driving of solid contaminants down into an aquifer during pile driving.	**Medium** Pollution of groundwater resources. Site overlies generally deep made ground and extensive cohesive superficial deposits. Secondary A Aquifer (bedrock deposits) in which piles are to be socketed. The site is not located within a Source Protection Zone and there are no potable groundwater abstractions within 1km of the site boundary.	**Low** • Considerations mentioned above. • Arising brought to the surface using CFA methodology. The speed of auger rotation to be matched with downward force to avoid the driving soils down.	**Moderate/ Low**	Speed of auger rotation to be matched with downward force to avoid driving soils down.	**Low**
6. Contamination of groundwater and subsequently, surface waters by concrete, cement paste or grout.	**Medium** Pollution of groundwater resources. Site overlies generally deep made ground and extensive cohesive superficial deposits. Secondary A Aquifer (bedrock deposits) in which piles are to be socketed. The site is not located within a Source Protection Zone and there are no potable groundwater abstractions within 1km of the site boundary.	**Low Likelihood** • Considerations mentioned above but accounting for potential bleeding of concrete.	**Moderate/ Low**	Cement content of the concrete will need to be closely monitored so that this in itself does not ‘bleed’ into groundwater.	**Low**

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4 SUMMARY AND RECOMMENDATIONS

The risk assessment herein is based on the information attained during the Curtins ground investigation and relates to the construction of a Vistors Centre with a café/shop, group room, staff/volunteer room, toilet facilities and carpark.

It is concluded that there is a low risk associated with the contamination of groundwater underlying the site including Secondary A aquifer (bedrock) from the use of CFA piling, providing that the following risk management measures are put in place:

- *Speed of auger rotation needs to be matched with the downward force to avoid driving soils down; and*
- *Cement content of the concrete will need to be closely monitored so that this in itself does not 'bleed' into groundwater.*
- *Suitable sulphate concrete should be used for all substructures to remain in contact with Made Ground soils meeting DS-1 DS class and AC1 ACEC class in accordance with BRE Special Digest 1:2005 Concrete in Aggressive Ground guidance.*

The following considerations should also be taken into account:

- *The piling contractor should prepare and submit relevant method statements for approval prior to piling works commencing.*
- *Where arisings are generated, they should be classified, handled and disposed of in compliance with relevant best practice and regulatory requirements;*
- *The piling contractor should make allowance for the provision of appropriate PPE, sanitary facilities and working practices based on the soil chemical analysis testing results, including the identification of asbestos, and groundwater chemical analysis results in the Curtins Phase 2 Report;*
- *The piling contractor should undertake their own risk assessments with regard to UXO risk at the site; and*
- *In the event of uncovering any areas of unexpected contamination during the piling works, including odorous or stained soils, or contaminated perched water, works should be ceased with the advice of the appointed environmental consultant sought immediately.*

This document should be forwarded to the Planning Authority for discharge of a relevant planning condition where applicable, before piling works commence to disclose that there is a low risk to groundwater from the proposed use of CFA piling on site where the above risk management measures are adhered to.

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5 REFERENCES

1. **Curtins (2025)** The Iron Line, Millom Phase 1 Preliminary Phase 1 Risk Assessment Ref. 080874-CUR-00-XX-RP-GE-001 Rev. P03
2. **Curtins (2025)** The Iron Line, Millom (Visitors Centre) Phase 2 Ground Investigation Ref. 080874-CUR-XX-XX-RP-GE-00006 Rev P03
3. **Environmental Agency (2001)** Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention National Groundwater & Contaminated Land Centre report NC/99/73
4. **Curtins (2025)** The Iron Line, Millom Remediation Strategy Ref. 080974-CUR-XX-XX-T-GE-00008 Rev P02
5. **Curtins (2025)** The Iron Line, Millom Mining Risk Assessment Ref. 080874-CUR-XX-XX-T-GE-00005 Rev P02
6. **Curtins (2025)** The Iron Line, Millom Mining Risk Mitigation Strategy Ref. 080874-CUR-XX-XX-T-GE-00009 Rev. P02

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APPENDICES

Appendix A – Drawings

Appendix B – Exploratory Hole Logs

Appendix C – Risk Assessment Rationale

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Appendix A - Drawings

- Development Plans
- Curtins Exploratory Hole Location Plan

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Legend

Exploratory Hole Locations

- CBR
- HP
- ROBH
- SA
- TP
- WS
- TT
- CP

Development Plans (April 2025)

289-LYR-XX-ZZ-DWG-L-1000

Site Boundary

Google Satellite

Curtins

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Status	INFORMATION
Project:	**Iron Line, Millom**
Drg Title:	**Zone 1 - Visitors Centre** **Exploratory Hole Location Plan with Development Plan Overlay**

Scale:	Size:	Issue Date:	Drawn:	Checked:
See scale bar above	A3	08/04/2025	LW	NF

Drg No:	Rev:
080874-CUR-XX-XX-DR-GE-80010	P02

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Legend

Exploratory Hole Locations

- CBR
- HP
- ROBH
- SA
- TP
- WS
- TT
- CP

Development Plans (April 2025)

289-LYR-XX-ZZ-DWG-L-1000

Site Boundary

Google Satellite

0 7.5 15 m

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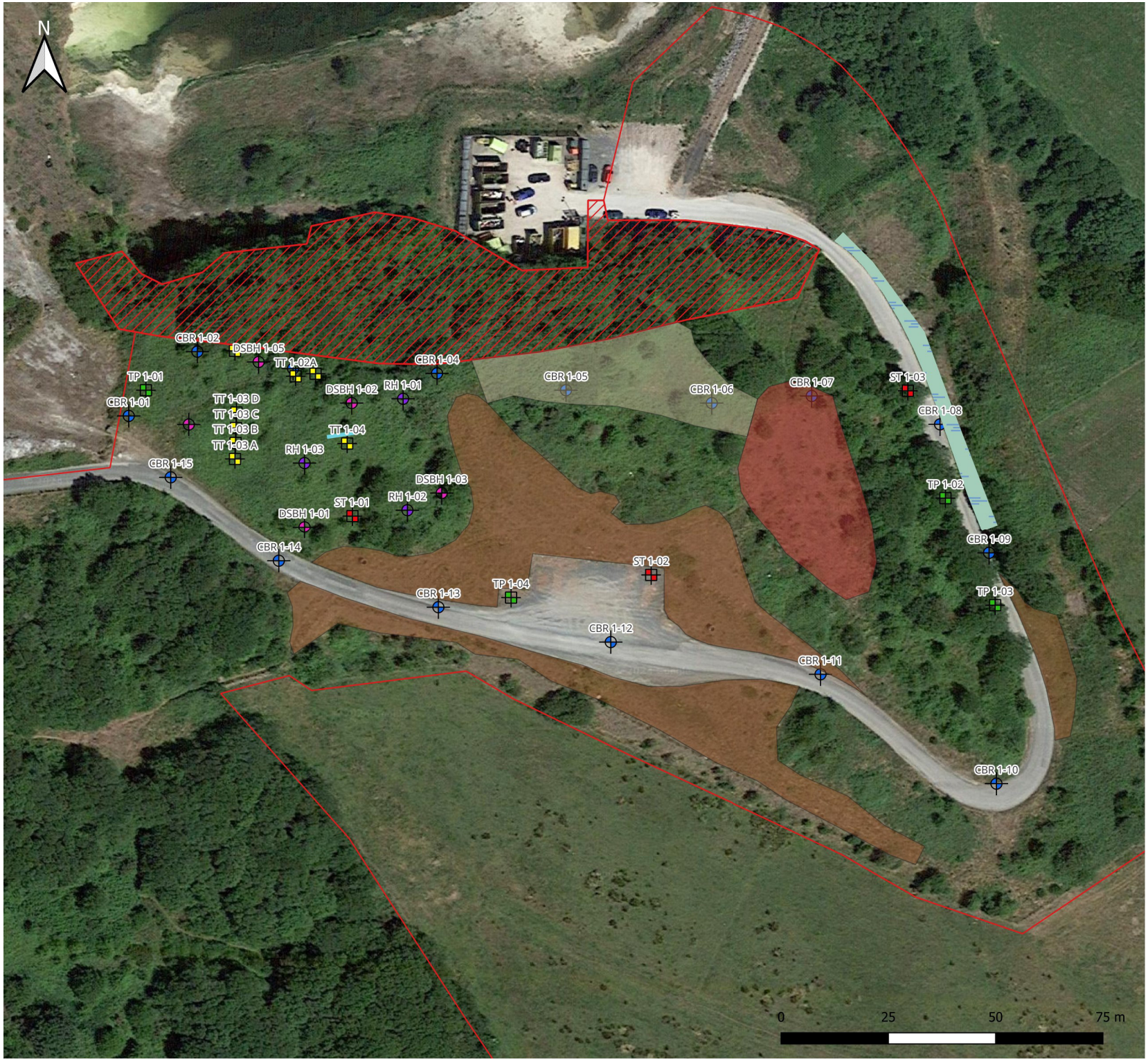
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Status	INFORMATION
Project:	**Iron Line, Millom**
Drg Title:	**Zone 1 - Visitors Centre (Wider Area) Exploratory Hole Location Plan with Development Plan Overlay**

Scale:	Size:	Issue Date:	Drawn:	Checked:
See scale bar above	A3	08/04/2025	LW	NF

Drg No:	Rev:
080874-CUR-XX-XX-DR-GE-80021	P01

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Legend

Services
- Water Pipe

Constraints
- Inaccessible
- Swamp
- Grassland
- Accessible by Foot
- Invasive Species

Proposed BH Locations
- CBR
- HP
- ROBH
- SA
- TP
- WS
- TT
- Site Boundary

Notes

- A water pipe encountered within the made ground of TT 1-04 aligned ENE-WSW.
- Approximate allignment of Water pipe running towards the recycling centre.
- Grassland and swamp areas are not able to be traversed.
- Invasive species require a 3m exclusion zone.
- Additional vegetation clearence needed.

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Status	INFORMATION
Project:	**Iron Line, Millom**
Drg Title:	**Zone 1 - Welcome Building Exploratory Hole Constraints During GI Plan**

Scale:	Size:	Issue Date:	Drawn:	Checked:
See scale bar above	**A3**	**26/03/2024**	**JP**	**NF**

Drg No:	Rev:
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Proposed BH Locations

CP

0 5 10 15 20 m



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Status	INFORMATION
Project:	**Iron Line, Millom**
Drg Title:	**Zone 1 - Iron Line Exploratory Hole Location Plan**

Scale:	Size:	Issue Date:	Drawn:	Checked:
See scale bar above	**A3**	**20/11/2024**	**RT**	**NF**

Drg No:	Rev:
080874-CUR-XX-XX-D-GE-80013	**P01**

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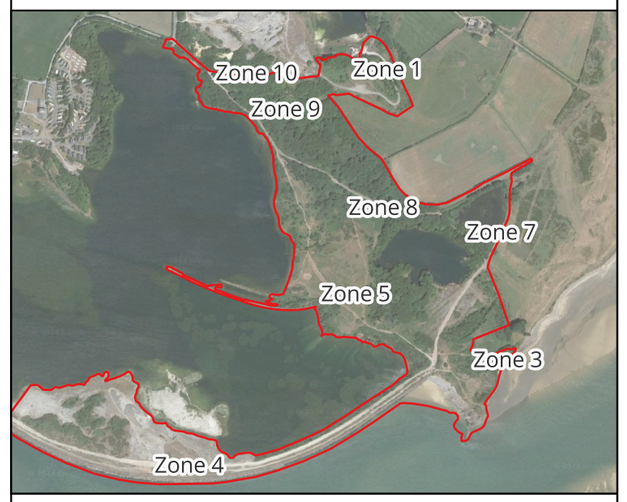


Legend

Proposed BH Locations

- TP
- WS
- CP

0 7.5 15 m



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Status: INFORMATION

Project: **Iron Line, Millom**

Drg Title: **Exploratory Hole Locations Where Asbestos has been Identified**

Scale:	Size:	Issue Date:	Drawn:	Checked:
See scale bar above	A3	21/01/2024	RT	NF

Drg No: **080874-CUR-XX-XX-DR-GE-80019** Rev: **P01**

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Legend

Exploratory Hole Locations

ROBH

Development Plans (April 2025)

289-LYR-XX-ZZ-DWG-L-1000

Site Boundary

Google Satellite

Underground Working

Underground Road

0 7.5 15 m

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Status	INFORMATION
Project:	**Iron Line, Millom**
Drg Title:	**Zone 1 - Visitors Centre (Wider Area) Exploratory Hole Location Plan with Development Plan and Underground Road Overlay**

Scale:	Size:	Issue Date:	Drawn:	Checked:
See scale bar above	**A3**	**07/05/2025**	**JP**	**NF**

Drg No:	Rev:
080874-CUR-XX-XX-DR-GE-80022	**P01**

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07/04/2025

REVISION HISTORY

DATE	REV	ZONE	DESCRIPTION	CHK
26/03/25	P01		Stage 03 draft issue - for coordination	MDM
07/04/25	P02		Issued for planning	MDM

KEY

GENERAL INFORMATION

APPLICATION BOUNDARY

HARDWORKS

S1.0 **S1.0 – SELF BINDING GRAVEL WITHOUT EDGINGS EXCEPT ON STEEP GRADIENTS (P)**
Location: To primary pedestrian routes
Dims: 1.5m wide

S2.0 **S2.0 – STONE TO DUST SURFACE (V)**
Assumed: Existing surface planed - pot holes filled - Type 1 dressing with Grano Dust surface finish
Location: To Byway
Dims: As existing

S3.0 **S3.0 – TIMBER BOARDWALK (P)**
Location: To sand dune raised walkway
Dims: 1.8m wide w/ low upstand

S4.0 **S4.0 – VEHICULAR MACADAM (V)**
Location: Visitor Centre car park / Access Road Trench
Dims: 1.5m wide trench cover w/ passing places

S5.0 **S5.0 – VEHICULAR ROUTE (MACADAM) (V)**
Assumed: Some resurfacing as per S4.0 specification
Location: To access road from Mainsgate Road to visitor centre - existing surface made good
Dims: 4.8m wide

S6.0 **S6.0 – NATURAL STONE PAVING (P)**
Location: To Towsey Hole Windmill

S7.0 **S7.0 – INSITU CONCRETE w/ SMOOTH FINISH (P)**
Location: To in ground railway details / Visitor Centre / Hodbarrow Lighthouse

S7.1 **S7.1 – INSITU CONCRETE w/ EXPOSED AGGREGATE FINISH (P / V)**
Location: To Visitor Centre / Whiterock Junction

S8.0 **S8.0 – REINFORCED GRAVEL (P)**
Location: To Visitor Centre car park / Annie Lowther Hide

S9.0 **S9.0 – RAISED STEEL WALKWAY w TIMBER EDGE (P)**
Location: To Visitor Centre

SE **SE – SURFACE EXISTING**
Location: As noted

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Cumberland Council

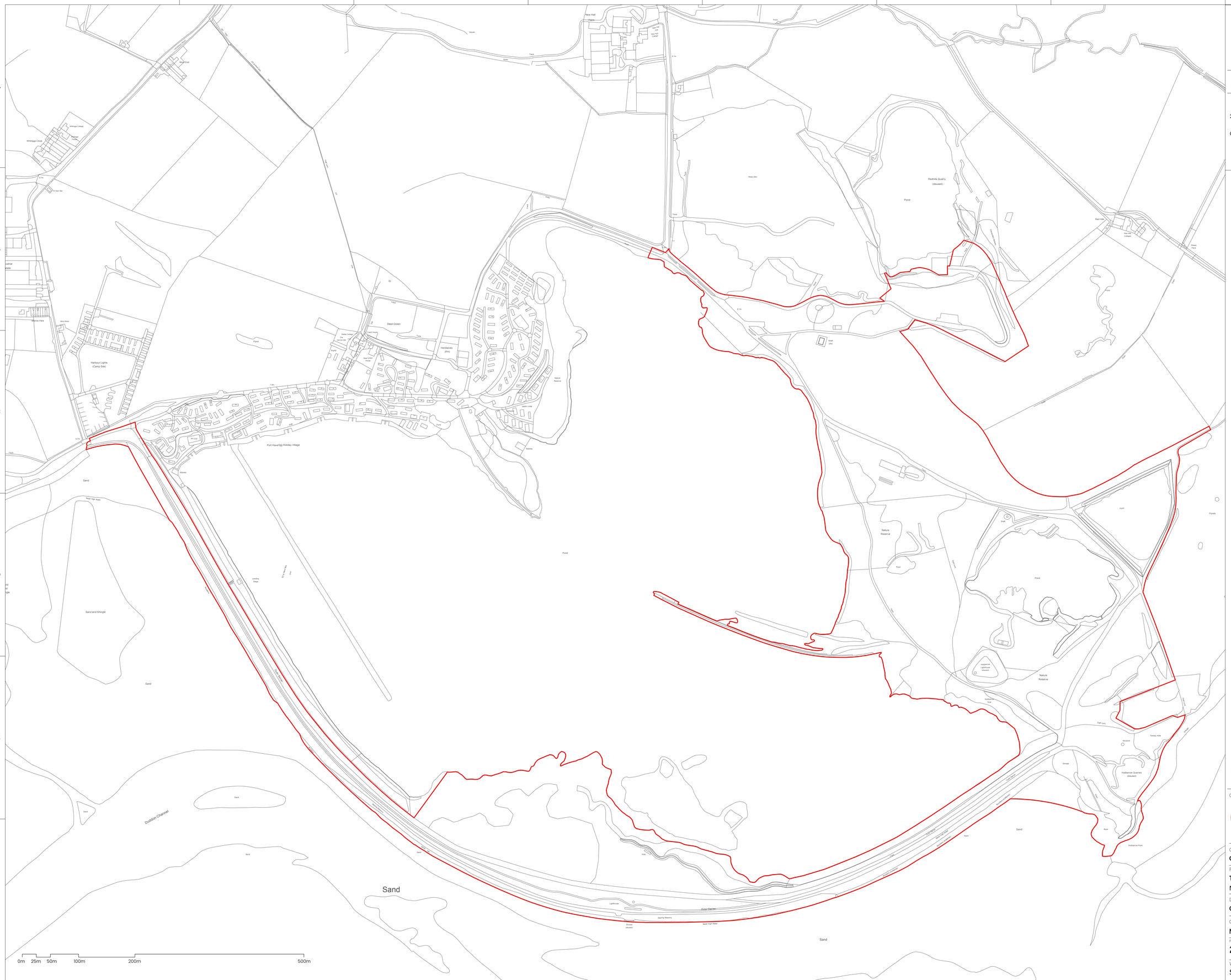
Project
The Iron Line
Millom, Cumbria

Drawing Title
GA | Site Masterplan

Created By	Checked By	Scale	Sheet Size
MDM	CL	1:3000	A1

Project Number	Originator	Volume	Level	File Type	Discipline	Number
289	LYR	XX	ZZ	DWG	L	1000

Work Stage	Status	Revision
Stage 3	Planning	P02


New Hall
Pond
Track
Wood End
Whitrigga Close
Whitrigga Cottage
Telegraph Hill
Mast
Steel Green
Harbour Lights
(Camp Site)
Pond
Hardwicks
(Pits)
Port Haverigg Holiday Village
Nature
Reserve
Sand
Mean High Water
Sand and Shingle
Leading
Stage
Outer Barrier
Lighthouse
Spring Masonry
Stones
(Above)
Mean High Water
Redhills Quarry
(closed)
Heap (disc)
Shaft
(dis)
Hodbarrow
Lighthouse
(disused)
Hodbarrow
Mine
Hodbarrow Quarries
(Disused)
Hodbarrow Point
Ponds
Shingle
Rock
Path (uncl)
Drowsty Hole
Drowsty Hole Level
Hodbarrow Level
Hodbarrow Mine
Adit
Shaft
Ore Bin
Path
Track
Ditch
Fence
Wall
Building
Slope
Pylon
Sluice
Weir
Ford
Quay
Jetty
Groyne
Hide
Viewpoint
Sewage Works
Caravan
Site
Steel Green
Cottages
Steel Green
House
Nature Reserve
Harbour View
Moor Road
Whitrigga Cottage
Whitrigga Close
Wood End
New Hall
New Hall Cottage
Redhills Quarry
(closed)
Red Hills
Hall Gate
Cottages
Shaw Park
Path (uncl)
Drowsty Hole
Hodbarrow Quarries
(Disused)
Hodbarrow Point
Ponds
Sand
Sand
Sand



FURNITURE / BOUNDARIES

F1.0 – PICNIC TABLE
Location: Site wide
Material: Corten Steel / Timber / Concrete

F2.0 – BENCH
Location: Site wide
Material: Corten Steel / Timber / Concrete

F2.1 – BENCH (EXISTING)
Location: Site wide
Material: Timber

F3.0 – WAYFINDING - SITE NAVIGATION
Location: Site wide
Material: Corten Steel w/ laser cuttings

F4.0 – WAYFINDING - ARRIVAL
Location: Site wide
Material: Corten Steel w/ laser cuttings

F5.0 – INFO BOARD: ECOLOGY
Location: Site wide
Material: Corten Steel w/ laser cuttings

F5.1 – INFO BOARD: MAP LOCATION
Location: Site wide
Material: Corten Steel w/ laser cuttings

F5.2 – INFO BOARD: HERITAGE
Location: Site wide
Material: Corten Steel w/ laser cuttings

F6.0 – VIEWING SCREEN
Location: To Hidden Lagoon
Material: Timber

F7.0 – DOUBLE LEAF GATE
Location: Road to Welcome Building / HWRC
Material: Subject to future detail

F7.1 – SINGLE LEAF GATE
Location: To RSPB BOAT boundary
Material: Subject to future detail

F8.0 – FEATURE FENCE
Location: Site wide
Material: Timber

F8.1 – EXISTING FENCE
Location: Site wide
Material: Timber

F9.0 – FEATURE ARTWORK
Location: Site wide
Refer to Design & Access Statement Chapter 7

F10.0 – CAR PARK PAY MACHINE
Location: To Visitor Centre car park
Material: -

F11.0 – FEATURE CONC BENCH w/ TIMBER TOP
Location: Site wide
Material: Concrete / Timber

F12.0 – CYCLE PARKING
Location: Site wide
Material: Steel

F13.0 – TIMBER LOGS
Location: To car parking spaces
Material: Timber

F14.0 – EV CHARGING LOCATIONS
Location: To welcome building car park
Material: -

F15.0 – THRESHOLD DETAIL
Location: To key thresholds
Material: Corten

F16.0 – BIRD HIDE
Location: To Hidden Lagoon / Lagoon
Material: Timber

F17.0 – PV CANOPY
Location: To welcome building car park
Material: Subject to future detail

F18.0 – WASTE BIN
Location: Site wide
Material: Subject to future detail

F19.0 – HAND RAIL
Location: To entrance steps
Material: Subject to future detail

F20.0 – BOLLARD
Location: To Byway Entrances
Material: Timber

NOTES:

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07/04/2025

REVISION HISTORY

DATE	REV	ZONE	DESCRIPTION	CHK
26/03/25	P01		Stage 03 draft issue - for coordination	MDM
07/04/25	P02		Issued for planning	MDM

KEY

GENERAL INFORMATION

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HARDWORKS

S1.0 **S1.0 – SELF BINDING GRAVEL WITHOUT EDGINGS EXCEPT ON STEEP GRADIENTS (P)**
Location: To primary pedestrian routes
Dims: 1.5m wide

S2.0 **S2.0 – STONE TO DUST SURFACE (V)**
Assumed: Existing surface planed - pot holes filled - Type 1 dressing with Grano Dust surface finish
Location: To Byway
Dims: As existing

S3.0 **S3.0 – TIMBER BOARDWALK (P)**
Location: To sand dune raised walkway
Dims: 1.8m wide w/ low upstand

S4.0 **S4.0 – VEHICULAR MACADAM (V)**
Location: Visitor Centre car park / Access Road Trench
Dims: 1.5m wide trench cover w/ passing places

S5.0 **S5.0 – VEHICULAR ROUTE (MACADAM) (V)**
Assumed: Some resurfacing as per S4.0 specification
Location: To access road from Mainsgate Road to visitor centre - existing surface made good
Dims: 4.8m wide

S6.0 **S6.0 – NATURAL STONE PAVING (P)**
Location: To Towsey Hole Windmill

S7.0 **S7.0 – INSITU CONCRETE w/ SMOOTH FINISH (P)**
Location: To in ground railway details / Visitor Centre / Hodbarrow Lighthouse

S7.1 **S7.1 – INSITU CONCRETE w/ EXPOSED AGGREGATE FINISH (P / V)**
Location: To Visitor Centre / Whitehouse Junction

S8.0 **S8.0 – REINFORCED GRAVEL (P)**
Location: To Visitor Centre car park / Annie Lowther Hide

S9.0 **S9.0 – RAISED STEEL WALKWAY w TIMBER EDGE (P)**
Location: To Visitor Centre

SE **SE – SURFACE EXISTING**
Location: As noted

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Cumberland Council

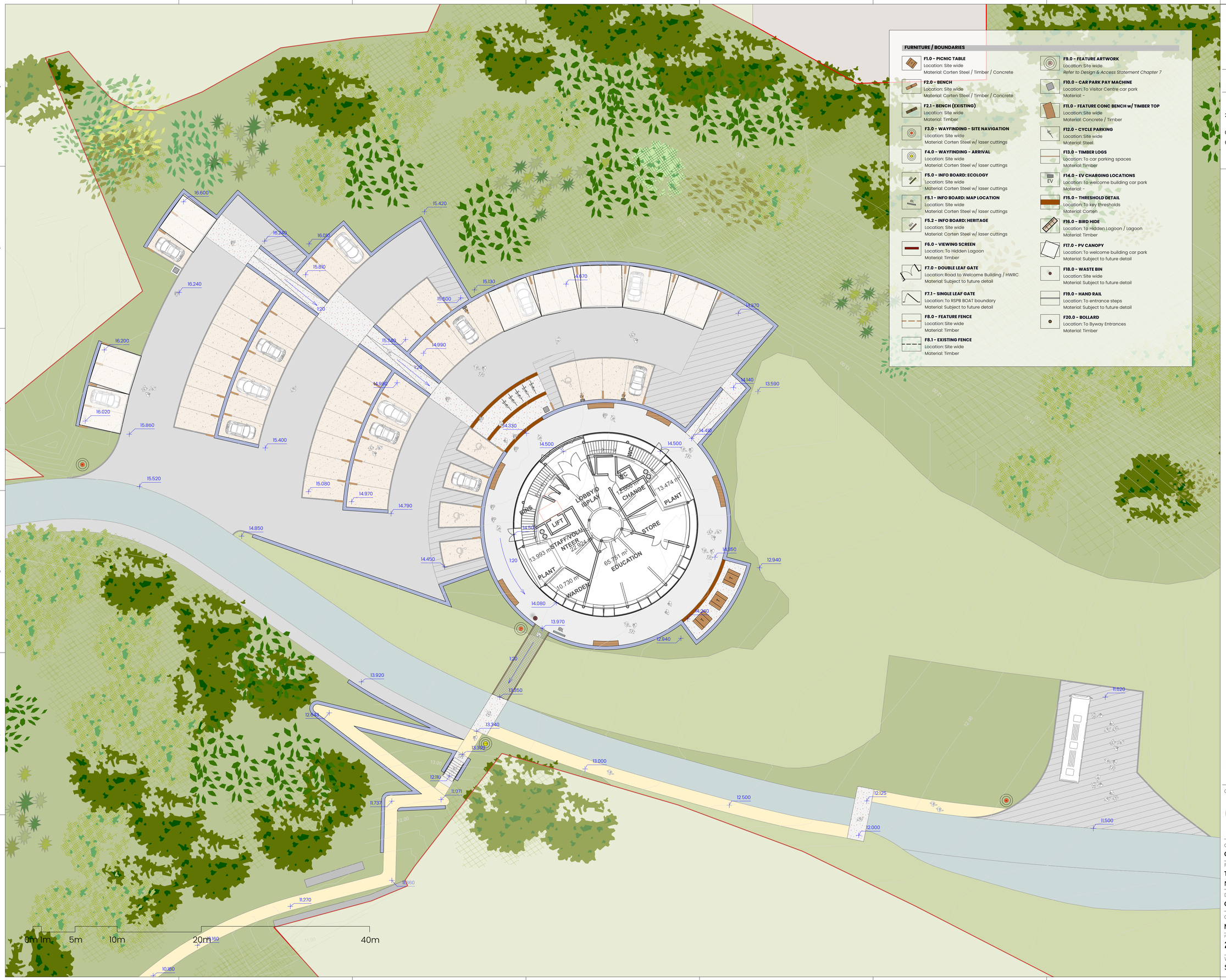
Project
The Iron Line
Millom, Cumbria

Drawing Title
GA | Visitor Centre 1:500

Created By	Checked By	Scale	Sheet Size
MDM	CL	1:500	A1

Project Number	Originator	Volume	Level	File Type	Discipline	Number
289	LYR	XX	ZZ	DWG	L	1202

Work Stage	Status	Revision
Stage 3	Planning	P02



FURNITURE / BOUNDARIES

F1.0 – PICNIC TABLE
Location: Site wide
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F2.0 – BENCH
Location: Site wide
Material: Corten Steel / Timber / Concrete

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Material: Corten Steel w/ laser cuttings

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Location: Site wide
Material: Corten Steel w/ laser cuttings

F5.1 – INFO BOARD: MAP LOCATION
Location: Site wide
Material: Corten Steel w/ laser cuttings

F5.2 – INFO BOARD: HERITAGE
Location: Site wide
Material: Corten Steel w/ laser cuttings

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Location: To Hidden Lagoon
Material: Timber

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Material: Subject to future detail

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Material: Timber

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Location: Site wide
Material: Timber

F9.0 – FEATURE ARTWORK
Location: Site Wide
Refer to Design & Access Statement Chapter 7

F10.0 – CAR PARK PAY MACHINE
Location: To Visitor Centre car park
Material: -

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Material: Concrete / Timber

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Location: Site wide
Material: Steel

F13.0 – TIMBER LOGS
Location: To car parking spaces
Material: Timber

F14.0 – EV CHARGING LOCATIONS
Location: To welcome building car park
Material: -

F15.0 – THRESHOLD DETAIL
Location: To key thresholds
Material: Corten

F16.0 – BIRD HIDE
Location: To Hidden Lagoon / Lagoon
Material: Timber

F17.0 – PV CANOPY
Location: To welcome building car park
Material: Subject to future detail

F18.0 – WASTE BIN
Location: Site wide
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F19.0 – HAND RAIL
Location: To entrance steps
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REVISION HISTORY

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26/03/25	P01		Stage 03 draft issue - for coordination	MDM
03/04/25	P02		Updates	MDM
07/04/25	P02		Issued for planning	MDM

KEY

GENERAL INFORMATION

APPLICATION BOUNDARY

HARDWORKS

S1.0 **S1.0 – SELF BINDING GRAVEL WITHOUT EDGINGS EXCEPT ON STEEP GRADIENTS (P)**
Location: To primary pedestrian routes
Dims: 1.5m wide

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Assumed: Existing surface planed - pot holes filled - Type 1 dressing with Grano Dust surface finish
Location: To Byway
Dims: As existing

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Location: To sand dune raised walkway
Dims: 1.8m wide w/ low upstand

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Dims: 1.5m wide trench cover w/ passing places

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Dims: 4.8m wide

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S7.1 **S7.1 – INSITU CONCRETE w/ EXPOSED AGGREGATE FINISH (P / V)**
Location: To Visitor Centre / Whitehorse Junction

S8.0 **S8.0 – REINFORCED GRAVEL (P)**
Location: To Visitor Centre car park / Annie Lowther Hide

S9.0 **S9.0 – RAISED STEEL WALKWAY w TIMBER EDGE (P)**
Location: To Visitor Centre

SE **SE – SURFACE EXISTING**
Location: As noted

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Client
Cumberland Council

Project
The Iron Line
Millom, Cumbria

Drawing Title
GA | Visitor Centre 1:200

Created By	Checked By	Scale	Sheet Size
MDM	CL	1:200	A1

Project Number	Originator	Volume	Level	File Type	Discipline	Number
289	LYR	XX	ZZ	DWG	L	1203

Work Stage	Status	Revision
Stage 3	Planning	P02

Appendix B – Exploratory Hole Logs

- Exploratory Hole Logs

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Trial Pit Log

Trialpit No
CBR 1-01
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317844.00 - 478998.00 Level: 15.93	Date 21/03/2024
Location: Millom		Dimensions (m): 2 × 1.5 Depth 0.30	Scale 1:10
Client: Cumberland Council			Logged JP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets and occasional roots.
				0.25	15.68		
				0.30	15.63		MADE GROUND: Brown sandy gravelly clay with frequent cobbles. Gravel is angular to subrounded fine to coarse of brick, slate, concrete, sandstone, mudstone, coal, ceramic and slag. Cobbles are subangular of brick, slate, and sandstone.
							End of pit at 0.30 m

1

2

Remarks: Machine Excavated Trial Pit for CBR in-situ testing to 0.3m bgl. Position was CAT scanned before breaking ground. No groundwater was encountered during excavation. CBR test results located within Structural Soils report 785592_plt_2024.03.21, test PLTCBR01.

Stability: Stable

AGS

Trial Pit Log

Trialpit No
CBR 1-02
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317860.00 - 479013.00 Level: 16.35	Date 21/03/2024
Location: Millom		Dimensions (m): 2 × 1.5 Depth 0.35	Scale 1:10
Client: Cumberland Council			Logged JP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets and occasional roots.
				0.30	16.05		
				0.35	16.00		MADE GROUND: Brown sandy gravelly clay with frequent cobbles. Gravel is angular to subrounded fine to coarse of brick, slate, concrete, sandstone, mudstone, coal, ceramic and slag. Cobbles are subangular of brick, slate, and sandstone.
							End of pit at 0.35 m

1

2

Remarks: Machine Excavated Trial Pit for CBR in-situ testing to 0.35m bgl. Position was CAT scanned before breaking ground. No groundwater was encountered during excavation. CBR test results located within Structural Soils report 785592_plt_2024.03.21, test PLTCBR01.

Stability: Stable

Trial Pit Log

Trialpit No
CBR 1-03
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317878.00 - 479022.00 Level: 15.40	Date 21/03/2024
Location: Millom		Dimensions (m): 2 × 1.5 Depth 0.25	Scale 1:10
Client: Cumberland Council			Logged JP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets and occasional roots.
				0.20	15.20		
				0.25	15.15		MADE GROUND: Brown sandy gravelly clay with frequent cobbles. Gravel is angular to subrounded fine to coarse of brick, slate, concrete, sandstone, mudstone, coal, ceramic and slag. Cobbles are subangular of brick, slate, and sandstone. End of pit at 0.25 m

1

2

Remarks: Machine Excavated Trial Pit for CBR in-situ testing to 0.25m bgl. Position was CAT scanned before breaking ground. No groundwater was encountered during excavation. CBR test results located within Structural Soils report 785592_plt_2024.03.21, test PLTCBR01.

Stability: Stable

Trial Pit Log

Trialpit No
CBR 1-04
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317903.00 - 479014.00 Level: 13.49	Date 21/03/2024
Location: Millom		Dimensions (m): 2 × 1.5 Depth 0.30	Scale 1:10
Client: Cumberland Council			Logged JP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets and occasional roots.
				0.25	13.24		
				0.30	13.19		MADE GROUND: Brown sandy gravelly clay with frequent cobbles. Gravel is angular to subrounded fine to coarse of brick, slate, concrete, sandstone, mudstone, coal, ceramic and slag. Cobbles are subangular of brick, slate, and sandstone.
							End of pit at 0.30 m

1

2

Remarks: Machine Excavated Trial Pit for CBR in-situ testing to 0.3m bgl. Position was CAT scanned before breaking ground. No groundwater was encountered during excavation. CBR test results located within Structural Soils report 785592_plt_2024.03.21, test PLTCBR01.

Stability: Stable

Borehole Log

Borehole No. **RH 1-02**

Sheet 1 of 4

Project Name: The Iron Line	Project No. 080874	Co-ords: 317909.00 - 478976.00	Hole Type BH
Location: Millom		Level: 13.40	Scale 1:50
Client: Cumberland Council		Dates: 12/03/2024 - 13/03/2024	Logged By JP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20	13.20		Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets and occasional roots.
					1.20	12.20		MADE GROUND: Dark brown slightly clayey gravelly sand with occational cobbles. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of brick, glass, metal, ceramic, slag, coal, mudstone, limestone and sandstone. Cobbles are angular to subangular of brick. Assumed MADE GROUND of dark brown gravelly sand.
					4.00	9.40		Brown gravelly CLAY. Gravel fragments of mudstone and sandstone observed.
					8.50	4.90		Brown gravelly sand. Gravel fragments of mudstone observed.
								Continued on next sheet

Remarks

Rotary Open Hole Borehole to 40.0m bgl. Position was CAT scanned before breaking ground and at 0.4m bgl. No groundwater encountered during drilling. No evidence of voids, broken ground or loss of flush was recorded during drilling. No evidence of mine gas emissions were recorded during drilling.

Borehole Log

Borehole No.
RH 1-02
Sheet 2 of 4

Project Name:	The Iron Line	Project No. 080874	Co-ords:	317909.00 - 478976.00	Hole Type BH
Location:	Millom		Level:	13.40	Scale 1:50
Client:	Cumberland Council		Dates:	12/03/2024 - 13/03/2024	Logged By JP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					13.50	-0.10		Brown sandy gravelly CLAY. Gravel fragments of mudstone and sandstone observed.
					17.00	-3.60		Brown sandy GRAVEL. Gravel fragments of mudstone and sandstone observed.
					18.00	-4.60		Reddish brown CONGLOMERATE with inclusions of mudstone and sandstone and a reddish brown sand matrix. Conglomerate recovered as a fragments of conglomerate, mudstone and sandstone. *From 18.00m to 28.40m bgl: Rotary drilling took approximately 30 minutes per run.*

Continued on next sheet

Remarks
Rotary Open Hole Borehole to 40.0m bgl. Position was CAT scanned before breaking ground and at 0.4m bgl. No groundwater encountered during drilling. No evidence of voids, broken ground or loss of flush was recorded during drilling. No evidence of mine gas emissions were recorded during drilling.

Borehole Log

Borehole No.
RH 1-02
Sheet 3 of 4

Project Name:	The Iron Line	Project No. 080874	Co-ords:	317909.00 - 478976.00	Hole Type BH
Location:	Millom		Level:	13.40	Scale 1:50
Client:	Cumberland Council		Dates:	12/03/2024 - 13/03/2024	Logged By JP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								From 28.40m to 33.80m bgl: Rotary drilling took approximately 15 minutes per run.
								Continued on next sheet

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Remarks
Rotary Open Hole Borehole to 40.0m bgl. Position was CAT scanned before breaking ground and at 0.4m bgl. No groundwater encountered during drilling. No evidence of voids, broken ground or loss of flush was recorded during drilling. No evidence of mine gas emissions were recorded during drilling.

Borehole Log

Borehole No.
RH 1-02
Sheet 4 of 4

Project Name:	The Iron Line	Project No. 080874	Co-ords:	317909.00 - 478976.00	Hole Type BH
Location:	Millom		Level:	13.40	Scale 1:50
Client:	Cumberland Council		Dates:	12/03/2024 - 13/03/2024	Logged By JP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								From 33.80m to 40.00m bgl: Rotary drilling took approximately 40 minutes per run.
					40.00	-26.60		End of borehole at 40.00 m

Remarks
Rotary Open Hole Borehole to 40.0m bgl. Position was CAT scanned before breaking ground and at 0.4m bgl. No groundwater encountered during drilling. No evidence of voids, broken ground or loss of flush was recorded during drilling. No evidence of mine gas emissions were recorded during drilling.

Borehole Log

Borehole No.
DSBH 1-01
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317885.00 - 478972.00	Hole Type WS
Location: Millom		Level: 13.75	Scale 1:25
Client: Cumberland Council		Dates: 20/03/2024 - 20/03/2024	Logged By JP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10	13.65		Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets and occasional roots.
					0.40	13.35		MADE GROUND: Brown sandy gravelly clay. Gravel is angular to subrounded fine to coarse of brick, slate, concrete, sandstone, mudstone, coal and slag.
		0.90 - 1.00	ES					MADE GROUND: Greyish brown slightly clayey very gravelly sand. Gravel is subangular to subrounded fine to coarse of brick, slate, concrete, sandstone, mudstone, coal, slag and glass.
		1.20		N=7 (1,1/2,2,1,2)				
		2.00		N=17 (4,8/8,5,2,2)	2.00	11.75		MADE GROUND: Reddish brown sandy gravel. Gravel is subangular to subrounded fine to coarse of sandstone, mudstone and brick.
		3.00		N=21 (11,6/4,5,6,6)	3.00	10.75		Stiff brown mottled grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mudstone and sandstone.
		3.50 - 3.60	D					
		4.00		N=27 (4,4/4,7,7,9)				
					4.45	9.30		End of borehole at 4.45 m

Remarks
Window Sample Borehole to 4.45m bgl. Position was CAT scanned before breaking ground and at 0.4m bgl.
Groundwater encountered at 2.5m bgl.

Borehole Log

Borehole No.
DSBH 1-02
Sheet 1 of 1

Project Name:	The Iron Line	Project No. 080874	Co-ords:	317896.00 - 479001.00	Hole Type WS
Location:	Millom		Level:	14.47	Scale 1:25
Client:	Cumberland Council		Dates:	20/03/2024 - 20/03/2024	Logged By JP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.20	ES		0.20	14.27		Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets and occasional roots.
		1.20		50 (1,1/50 for 200mm)	1.40	13.07		MADE GROUND: Brown sandy gravelly clay. Gravel is angular to subrounded fine to coarse of brick, slate, concrete, sandstone, mudstone, coal and slag.
								End of borehole at 1.40 m

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Remarks
Window Sample Borehole to 1.4m bgl. Position was CAT scanned before breaking ground and at 0.4m bgl. No groundwater encountered during drilling.

Borehole Log

Borehole No.
DSBH 1-03
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317917.00 - 478980.00	Hole Type WS
Location: Millom		Level: 13.27	Scale 1:25
Client: Cumberland Council		Dates: 20/03/2024 - 20/03/2024	Logged By JP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.60 - 0.70	ES		0.15	13.12		Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets and occasional roots.
		1.20		N=3 (1,0/1,1,1,1,0)				MADE GROUND: Brown sandy gravelly clay with frequent cobbles. Gravel is angular to subrounded fine to coarse of brick, slate, concrete, sandstone, mudstone, coal, plastic, wood, glass, rubber and slag. Cobbles are subangular of brick, wood, concrete and slate.
					1.80	11.47		End of borehole at 1.80 m

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Remarks
Window Sample Borehole to 1.8m bgl. Position was CAT scanned before breaking ground and at 0.4m bgl. No groundwater encountered during drilling.

Borehole Log

Borehole No.
DSBH 1-05
Sheet 1 of 1

Project Name:	The Iron Line	Project No. 080874	Co-ords:	317878.00 - 479009.00	Hole Type WS
Location:	Millom		Level:	15.75	Scale 1:25
Client:	Cumberland Council		Dates:	20/03/2024 - 20/03/2024	Logged By JP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20	15.55		Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets and occasional roots.
					0.70	15.05		MADE GROUND: Brown sandy gravelly clay with frequent cobbles. Gravel is angular to subrounded fine to coarse of brick, slate, concrete, sandstone, mudstone, coal, ceramic and slag. Cobbles are subangular of brick, wood, concrete and slate.
		1.20		N=8 (5,3/2,3,1,2)				MADE GROUND: Brown and dark brown very gravelly sand. Gravel is angular to subrounded fine to coarse of glass, ceramic, slate, mudstone, limestone, brick, coal and slag.
		2.00		N=7 (1,0/0,1,0,6)				
		3.00		N=34 (25 for 85mm/27,4,2,1)				
					4.00	11.75		End of borehole at 4.00 m

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Remarks
Window Sample Borehole to 4.0m bgl. Position was CAT scanned before breaking ground and at 0.4m bgl. No groundwater encountered during drilling.

Trial Pit Log

Trialpit No
SA1-01
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317886.60 - 478953.10 Level: 13.56	Date 21/03/2024
Location: Millom	Dimensions (m): Depth 1.65	2 / 0.8	Scale 1:20
Client: Cumberland Council			Logged LW

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Grass and brambles over dark greyish brown, sandy, gravelly clay with frequent roots/rootlets and occasional cobbles. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of limestone, brick and metal. Cobbles of subangular limestone and whole brick. (Topsoil)
				0.50	13.06		MADE GROUND: Brown, sandy, gravelly clay with frequent roots/rootlets and cobbles. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of metal, brick and limestone. Cobbles of subangular limestone.
				1.20	12.36		MADE GROUND: Red/reddish brown, sandy, slightly clayey gravel with cobbles and occasional boulders. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of limestone. Cobbles of subangular limestone. Boulders of subangular limestone.
				1.65	11.91		End of pit at 1.65 m

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Remarks: Machine excavated trial pit to 1.65m bgl for soakaway testing. No groundwater encountered. Trial pit unstable, collapsing in on itself at depth, undermining the ground surface. Soak away test results located within Structural Soils report 785592_soaks_2024.03.21, test SA101.

Stability: Unstable

AGS

Trial Pit Log

Trialpit No
SA1-02
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317951.46 - 478966.88 Level: 11.65	Date 20/03/2024
Location: Millom		Dimensions (m): 2.1 x 0.7 Depth 2.70	Scale 1:20
Client: Cumberland Council			Logged LW

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.09	11.56		MADE GROUND: Dark grey, slightly clayey gravel. Gravel is fine to coarse, subangular to angular of slate, wood, plastic, metal and limestone.
▼				0.24	11.41		MADE GROUND: Reddish brown, slightly sandy, slightly clayey gravel with occasional cobbles. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of limestone. Cobbles of subangular limestone.
							MADE GROUND: Dark brown/black, slightly clayey, very gravelly sand with cobbles and occasional boulders. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of slate, limestone, wood and brick. Cobbles of subangular limestone. Boulders of subangular limestone.
							Slight sulphur smell noted between 0.24m - 1.50m bgl.
	1.00	ES					
							Larger cobble and boulder content from 2.40m bgl.
				2.70	8.95		End of pit at 2.70 m

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Remarks: Machine excavated trial pit to 2.70m bgl for soakaway testing. Groundwater encountered at 0.23m bgl, described as a slow seepage from Made Ground. Soak away test results located within Structural Soils report 785592_soaks_2024.03.21, test SA102.

Stability: Stable

AGS

Trial Pit Log

Trialpit No
SA1-03
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 318039.00 - 478980.00 Level: 3.32	Date 20/03/2024
Location: Millom		Dimensions (m): 2.1 x 0.65 Depth 1.00	Scale 1:20
Client: Cumberland Council			Logged LW

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	ES		0.13	3.19		Grass and brambles over dark brown, slightly sandy, slightly gravelly clay with frequent rootlets. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of limestone, brick, glass, metal and plastic. (Topsoil)
▼	0.25	ES		0.30	3.02		MADE GROUND: Reddish brown, slightly sandy, slightly gravelly clay. Sand is fine to coarse. Gravel is fine to coarse, subangular to angylar oof limestone, brick, metal and glass.
							MADE GROUND: Dark grey, sandy, clayey gravel with cobbles. Sand is fine to coarse. Gravel is fine to coarse, subangular to anglar of brick, limestone and metal. Cobbles of subangular to angular whole brick and limestone.
				1.00	2.32		End of pit at 1.00 m

Remarks: Machine excavated trial pit to 1.00m bgl for soakaway testing. Position was terminated due to obstruction at 1.00m bgl. Groundwater encountered at 0.40m bgl described as a fast inflow, rising to 0.30m bgl within 1 minute and stabilising at this level. Soak away test results located within Structural Soils report 785592_soaks_2024.03.21, test SA103.

Stability: Stable

Trial Pit Log

Trialpit No
TP 1-01
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317848.00 - 479004.00 Level: 16.20	Date 21/03/2024
Location: Millom		Dimensions (m): 3.2 × 0.6, Depth 2.50	Scale 1:20
Client: Cumberland Council			Logged JP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.15	16.05		Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets and occasional roots.
				0.25	15.95		MADE GROUND: Dark gravelly clay. Gravel is angular to subangular fine to coarse of brick, slag, coal, mudstone, sandstone and glass.
				0.55	15.65		MADE GROUND: Greyish brown gravelly slighty sandy clay. Gravel is angular to subangular fine to coarse of brick, slag, coal, mudstone, sandstone and glass.
				1.50	14.70		MADE GROUND: Soft reddish brown slightly sandy clay.
	2.00 - 2.10	ES					MADE GROUND: Dark grey very gravelly sand. Gravel is angular to subangular fine to coarse of coal and slag.
	2.40 - 2.50	D		2.40	13.80		
				2.50	13.70		Firm brown slightly sandy slightly gravelly CLAY. Gravel is subrounded fine to coarse of mudstone.
							End of pit at 2.50 m

Remarks: Machine Excavated Trial Pit to 2.5m bgl. Position was CAT scanned before breaking ground. No groundwater was encountered during excavation.

Stability: Stable

Trial Pit Log

Trialpit No
TP 1-03
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 318048.00 - 478954.00 Level: 3.28	Date 22/03/2024
Location: Millom		Dimensions (m): 3.3 x 1.4, Depth 2.00	Scale 1:20
Client: Cumberland Council			Logged JP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20	3.08		Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets and occasional roots.
	0.40 - 0.50	ES					MADE GROUND: Brown slightly clayey gravelly sand with frequent cobbles. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone, brick, rope, glass and slag.
				1.80	1.48		MADE GROUND: Greyish brown slightly clayey very gravelly sand with abundant cobbles. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone, brick, glass and slag. Cobbles are subangular of brick and sandstone.
				2.00	1.28		End of pit at 2.00 m

Remarks: Machine Excavated Trial Pit to 2.0m bgl. Position was terminated due to obstruction at 2.00m bgl. Position was CAT scanned before breaking ground. No groundwater was encountered during excavation.

Stability: Stable

Trial Pit Log

Trialpit No
TP1-02
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 318028.00 - 479004.00 Level: 3.66	Date 20/03/2024
Location: Millom		Dimensions (m): 2.1 × 0.65, Depth 1.20	Scale 1:20
Client: Cumberland Council			Logged LW

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.30	3.36		Grass and brambles over reddish brown, slightly sandy, gravelly, cobbly clay with frequent roots/rootlets and occasional cobbles. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of brick, limestone, glass bottles. Cobbles of subangular limestone. (Topsoil)
▼	0.75	ES					MADE GROUND: Dark grey, slightly sandy, clayey gravel with cobbles. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of brick, metal, glass, wood and limestone. Cobbles of angular whole brick, limestone and a metal pole with a concrete base.
				1.20	2.46		End of pit at 1.20 m

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Remarks: Machine excavated trial pit to 1.20m bgl. Position was terminated due to obstruction at 1.20m bgl. Groundwater encountered at 0.65m bgl described as a very fast inflow, rising to 0.30m bgl within 1 minute and stabilising at this level.

Stability: Stable

AGS

Trial Pit Log

Trialpit No
TP1-04
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317917.00 - 478970.00 Level: 12.32	Date 20/03/2024
Location: Millom		Dimensions (m): 3 × 0.7, Depth 2.90	Scale 1:20
Client: Cumberland Council			Logged LW

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.07	12.25		MADE GROUND: Light grey and grey, slghtly clayey, slightly sandy gravel. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of slate, limestone, wood and plastic.
				0.20	12.12		MADE GROUND: Reddish brown, slightly sandy, slightly clayey gravel with cobbles. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of limestone. Cobbles of subangular limestone.
							MADE GROUND: Dark greyish brown/black, slightly clayey, very gravelly sand with cobbles and occasional boulders. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of limestone, wood and brick. Cobbles of subangular limestone, whole brick and wood. Boulders of subangular limestone.
							Slight sulphur smell noted from 0.20m - 1.90m bgl.
							Wooden railway sleeper at 1.40m bgl.
▼				1.90	10.42		MADE GROUND: Reddish brown, slightly sandy, slightly clayey, gravelly cobble with boulders. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of limestone. Cobbles of subangular limestone. Boulders of subangular limestone.
				2.90	9.42		End of pit at 2.90 m

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Remarks: Machine excavated trial pit to 2.90m bgl. Groundwater encountered at 1.90m described as a slow seepage. Trial pit unstable, collapsing in on itself at depth, undermining the ground surface.

Stability: Unstable

AGS

Trial Pit Log

Trialpit No
TT 1-01
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317868.00 - 479013.00 Level: 15.86	Date 22/03/2024
Location: Millom		Dimensions (m): 3.4 x 5.1 Depth 3.50	Scale 1:20
Client: Cumberland Council			Logged JP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10	15.76		Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets.
				0.40	15.46		MADE GROUND: Brown sandy gravelly clay with frequent cobbles. Gravel is subangualr to subrounded fine to coarse of mudstone, sandstone and concrete. Cobbles are subangular to subrounded fine to coarse of mudstone and sandstone.
	0.50 - 0.60	ES					MADE GROUND: Dark greyish brown very gravelly sand. Gravel is angular to subangular fine to coarse of glass, ceramic, plastic, metal, rope, mudstone, sandstone, brick, coal, slag, railway grider, fabric and polystyrene.
			HVP=130 HVP=135	2.50	13.36		Stiff brown mottled grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone and coal.
			HVP=136 HVP=140				
	3.40 - 3.50	D					
			HVP=140 HVP=140	3.50	12.36		End of pit at 3.50 m

Remarks: Machine Excavated Trial Trench to 3.5m bgl. Position was CAT scanned before breaking ground. No groundwater was encountered during excavation.

Stability: Not Stable

Trial Pit Log

Trialpit No
TT 1-02
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317887.00 - 479007.00 Level: 15.16	Date 22/03/2024
Location: Millom		Dimensions (m): 3.6 × 1.2 Depth 2.50	Scale 1:20
Client: Cumberland Council			Logged JP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20	14.96		Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets.
							MADE GROUND: Dark greyish brown very gravelly sand. Gravel is angular to subangular fine to coarse of glass, ceramic, plastic, metal, rope, mudstone, sandstone, brick, coal and slag.
	1.30 - 1.40	ES					
▼				2.50	12.66		End of pit at 2.50 m

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Remarks: Machine Excavated Trial Trench to 2.5m bgl. Position was CAT scanned before breaking ground. Groundwater with a very fast infiltration rate was encountered at 2.5m bgl. Position was moved to new location due to water ingress.

Stability: Not Stable

AGS

Trial Pit Log

Trialpit No
TT 1-02A
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317882.00 - 479007.00 Level: 15.16	Date 22/03/2024
Location: Millom		Dimensions (m): 3.5 × 1.2 Depth 2.70	Scale 1:20
Client: Cumberland Council			Logged JP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10	15.06		Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets.
				0.30	14.86		MADE GROUND: Brown sandy gravelly clay with frequent cobbles. Gravel is subangualr to subrounded fine to coarse of mudstone, sandstone and concrete. Cobbles are subangular to subrounded fine to coarse of mudstone and sandstone.
							MADE GROUND: Dark greyish brown very gravelly sand. Gravel is angular to subangular fine to coarse of glass, ceramic, plastic, metal, rope, mudstone, sandstone, brick, coal and slag.
▼				2.70	12.46		End of pit at 2.70 m

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Remarks: Machine Excavated Trial Trench to 2.7m bgl. Position was CAT scanned before breaking ground. Groundwater with a fast infiltration rate was encountered at 2.5m bgl.

Stability: Not Stable

AGS

Trial Pit Log

Trialpit No
TT 1-03 A
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317868.00 - 478987.00 Level: 15.40	Date 22/03/2024
Location: Millom		Dimensions (m): 11 × 1.2 Depth 1.70	Scale 1:20
Client: Cumberland Council			Logged JP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10	15.30		Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets.
				0.20	15.20		MADE GROUND: Dark greyish brown very gravelly sand. Gravel is angular to subangular fine to coarse of glass, ceramic, plastic, metal, rope, mudstone, sandstone, brick, coal and slag.
				0.40	15.00		MADE GROUND: Grey sandy clay.
			HVP=140 HVP=140 HVP=140				Stiff brown mottled grey sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of coal and mudstone.
				1.70	13.70		End of pit at 1.70 m

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Remarks: Machine Excavated Trial Trench to 3.9m bgl. Position was CAT scanned before breaking ground. Trial trench log split into 4 sections to show the change in ground conditions, log split into TT103A-TT103D.

Stability: Not Stable

AGS

Trial Pit Log

Trialpit No
TT 1-03 B
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317868.00 - 478991.00 Level: 15.40	Date 22/03/2024
Location: Millom		Dimensions (m): 11 × 1.2 Depth 2.20	Scale 1:20
Client: Cumberland Council			Logged JP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20	15.20		Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets.
							MADE GROUND: Dark greyish brown very gravelly sand. Gravel is angular to subangular fine to coarse of glass, ceramic, plastic, metal, rope, mudstone, sandstone, brick, coal and slag.
				1.20	14.20		MADE GROUND: Grey sandy clay.
				1.40	14.00		Stiff brown mottled grey sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of coal and mudstone.
			HVP=137 HVP=140 HVP=140				
				2.20	13.20		End of pit at 2.20 m

Remarks: Machine Excavated Trial Trench to 2.2m bgl. Position was CAT scanned before breaking ground. Groundwater with slow ingress was encountered at 2.5m bgl.

Stability: Not Stable

Trial Pit Log

Trialpit No
TT 1-03 C
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317868.00 - 478994.00 Level: 15.40	Date 22/03/2024
Location: Millom		Dimensions (m): 11 × 1.2 Depth 3.20	Scale 1:20
Client: Cumberland Council			Logged JP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets.
				0.20	15.20		MADE GROUND: Dark greyish brown very gravelly sand. Gravel is angular to subangular fine to coarse of glass, ceramic, plastic, metal, rope, mudstone, sandstone, brick, coal and slag.
				2.60	12.80		MADE GROUND: Grey sandy clay.
				2.80	12.60		Stiff brown mottled grey sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of coal and mudstone.
			HVP=140 HVP=140 HVP=140				
				3.20	12.20		End of pit at 3.20 m

1
2
3
4

Remarks: Machine Excavated Trial Trench to 3.2m bgl. Position was CAT scanned before breaking ground. Groundwater with slow ingress was encountered at 2.5m bgl.

Stability: Not Stable

AGS

Trial Pit Log

Trialpit No: **TT 1-03 D**

Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317868.00 - 478998.00 Level: 15.40	Date 22/03/2024
Location: Millom		Dimensions (m): 11 × 1.2 Depth 3.90	Scale 1:20
Client: Cumberland Council			Logged JP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets.
				0.20	15.20		MADE GROUND: Dark greyish brown very gravelly sand. Gravel is angular to subangular fine to coarse of glass, ceramic, plastic, metal, rope, mudstone, sandstone, brick, coal and slag.
				3.00	12.40		MADE GROUND: Grey sandy clay.
				3.20	12.20		Stiff brown mottled grey sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of coal and mudstone.
			HVP=126 HVP=140 HVP=140				
				3.90	11.50		End of pit at 3.90 m

Remarks: Machine Excavated Trial Trench to 3.9m bgl. Position was CAT scanned before breaking ground. Groundwater with slow ingress was encountered at 2.5m bgl. HSV tests were undertaken in natural clay

Stability: Not Stable

Trial Pit Log

Trialpit No
TT 1-04
Sheet 1 of 1

Project Name: The Iron Line	Project No. 080874	Co-ords: 317894.00 - 478991.00 Level: 14.56	Date 22/03/2024
Location: Millom		Dimensions (m): 3.8 x 2.7 Depth 1.60	Scale 1:20
Client: Cumberland Council			Logged JP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20	14.36		Brush and moss cover over brown sandy clayey TOPSOIL with abundant rootlets.
▼				1.60	12.96		MADE GROUND: Dark greyish brown very gravelly sand. Gravel is angular to subangular fine to coarse of glass, ceramic, plastic, metal, rope, mudstone, sandstone, brick, coal and slag. End of pit at 1.60 m

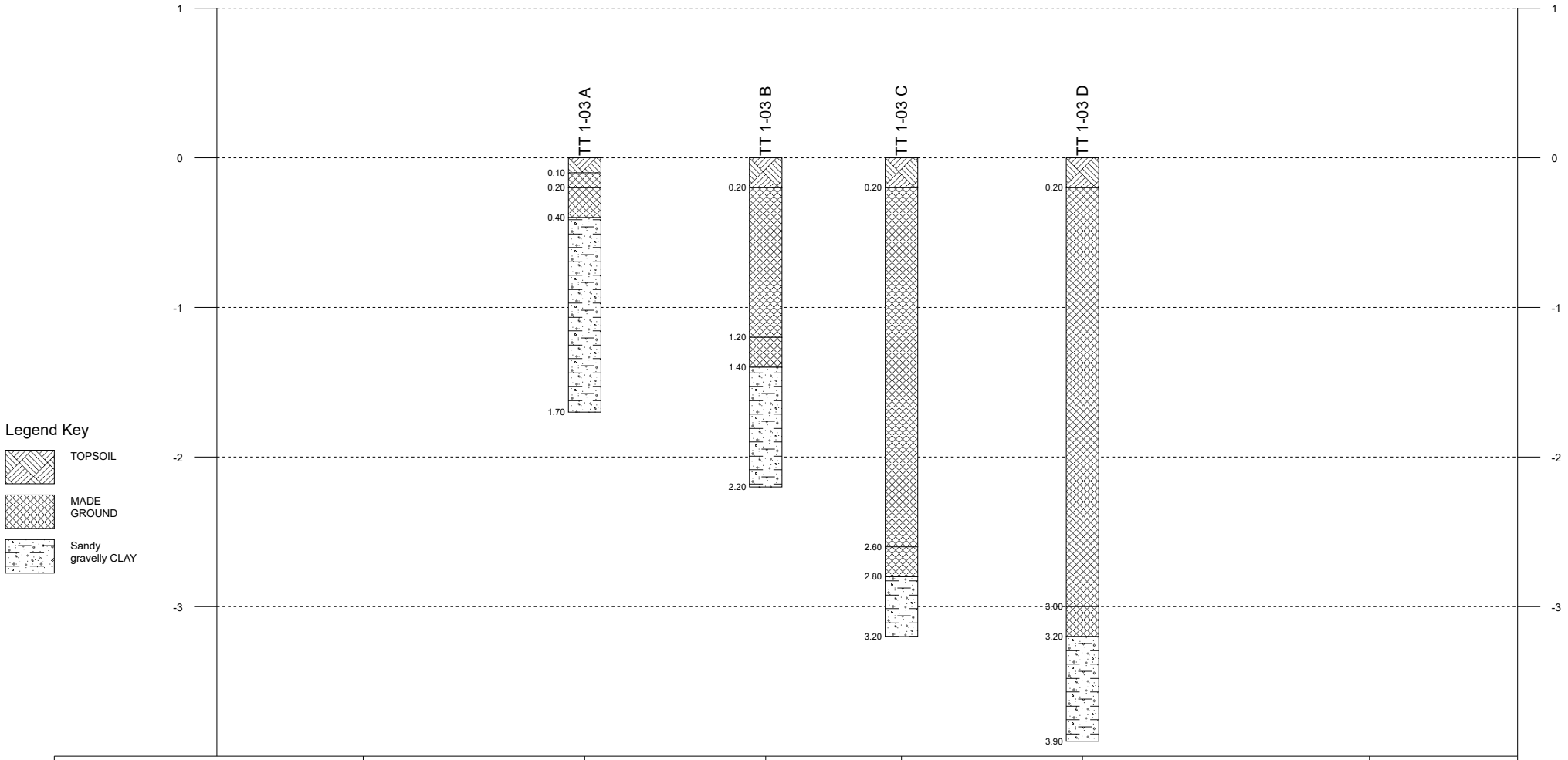
1
2
3
4

Remarks: Machine Excavated Trial Trench to 1.6m bgl. Position was CAT scanned before breaking ground. An unrecorded water pipe was encountered at 0.7m bgl. Position was moved 1m to the south where groundwater with a fast infiltration rate was encountered at 1.5m bgl.

Stability: Not Stable

AGS

Project Id: 080874	Title: Section line 1
Project Title: The Iron Line	Vertical Scale: 1:39
Location: Millom	Horizontal Scale: 1:129
Client: Cumberland Council	Engineer:



Chainage (m)	0.00	4.89	8.89	11.89	15.89	22.23
Offset (m)	0.26	0.23	0.21	0.18		
Elevation (mAOD)						

Curtins

Borehole Log

Borehole No. **CP1-01**

Sheet 1 of 1

Project Name: Millom Iron Line	Project No. 080874.302	Co-ords: 317909.32 - 478972.97	Hole Type CP
Location: Millom		Level: 13.40	Scale 1:50
Client: Cumberland Council		Dates: 11/12/2024 - 11/12/2024	Logged By RT

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30 - 0.40 0.30 - 0.40	ES ES		0.40	13.00		MADE GROUND: Brown very clayey, very gravelly, cobbly fine to coarse sand. Gravel is fine to coarse slag, coal, limestone, brick and suspected asbestos cement. Cobbles are subangular brick and suspected asbestos cement sheet. End of borehole at 0.40 m

Remarks

Service inspection pit hand excavated from GL to 0.40m. No groundwater encountered. Terminated due to the presence of possible asbestos.

AGS

Curtins

Borehole Log

Borehole No.
CP1-01B
Sheet 1 of 1

Project Name:	Millom Iron Line	Project No. 080874.302	Co-ords: 317909.30 - 478986.96	Hole Type CP
Location:	Millom		Level: 13.40	Scale 1:50
Client:	Cumberland Council		Dates: 11/12/2024 - 11/12/2024	Logged By RT

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.50	B					MADE GROUND: Brown very clayey, gravelly, cobbly fine to coarse sand. Gravel is fine to coarse subangular to angular limestone, brick and slag. Cobbles are subangular limestone.
		0.30 - 0.40	ES					
					0.57	12.83		MADE GROUND: Brown very clayey, very gravelly, cobbly fine to coarse sand. Gravel is fine to coarse slag, coal, limestone, brick and suspected asbestos cement. Cobbles are subangular brick and suspected asbestos cement sheet.
		0.70 - 0.80	ES					
					0.90	12.50		End of borehole at 0.90 m

Remarks
Service inspection pit hand excavated from GL to 0.90m. No groundwater encountered. Terminated due to the presence of possible asbestos.

AGS

Curtins

Borehole Log

Borehole No. **CP1-01C** Sheet 1 of 2

Project Name: Millom Iron Line	Project No. 080874.302	Co-ords: 317907.22 - 478985.09	Hole Type CP
Location: Millom		Level: 13.40	Scale 1:50
Client: Cumberland Council		Dates: 12/12/2024 - 12/12/2024	Logged By RT

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		1.50		N=2 (1,0/1,0,1,0)	1.50	11.90		MADE GROUND: Brown very clayey, gravelly fine to coarse sand. Gravel is fine to coarse subangular to subrounded limestone, plastic, steel, slate and brick. Cobbles are subangular slag and brick.
		3.00		N=11 (12,5/3,3,2,3)				MADE GROUND: Black very gravelly, slightly bouldery fine to coarse sand. Gravel is fine to coarse subangular to angular glass, slag and tarmac. Boulders are subangular concrete.
		3.20 - 3.45	D		3.20	10.20		Firm to stiff reddish brown very sandy, gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subrounded to rounded mudstone, siltstone, sandstone and quartzite.
		4.50		N=21 (2,3/5,5,5,6)				
		4.50 - 4.95	D					
		7.50		N=30 (2,3/5,5,8,12)				
		7.50 - 7.95	D					
		9.00 - 9.45	U	Ublow=38				

Continued on next sheet

Remarks
Service inspection pit hand excavated from GL to 1.20m. Groundwater encountered at 13.50m bgl rising to 9.50m bgl after 20 minutes.

AGS

Curtins

Borehole Log

Borehole No.
CP1-01C
Sheet 2 of 2

Project Name: Millom Iron Line	Project No. 080874.302	Co-ords: 317907.22 - 478985.09	Hole Type CP
Location: Millom		Level: 13.40	Scale 1:50
Client: Cumberland Council		Dates: 12/12/2024 - 12/12/2024	Logged By RT

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.50 10.50 - 10.95	D	N=26 (1,2/3,5,6,12)				
		12.00 - 12.45	U	Ublow=37				
		13.50		N=44 (4,8/8,12,12,12)				
		15.00		50 (4,12/50 for 180mm)	15.00 15.10	-1.60 -1.70		Grey LIMESTONE. End of borehole at 15.10 m

11 12 13 14 15 16 17 18 19 20

Remarks
Service inspection pit hand excavated from GL to 1.20m. Groundwater encountered at 13.50m bgl rising to 9.50m bgl after 20 minutes.

AGS

Curtins

Borehole Log

Borehole No. **CP1-02** Sheet 1 of 1

Project Name: Millom Iron Line	Project No. 080874.302	Co-ords: 317888.45 - 478986.96	Hole Type CP
Location: Millom		Level: 14.40	Scale 1:50
Client: Cumberland Council		Dates: 09/12/2024 - 10/12/2024	Logged By RT

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.30 - 0.40 0.30 - 1.20 0.60 - 0.70	ES B ES		0.30	14.10		MADE GROUND: Brown very clayey, gravelly, cobbly fine to coarse sand. Gravel is fine to coarse subrounded to angular brick, limestone and clinker. Cobbles are angular brick.
		1.20		N=24 (2,3/3,3,8,10)				MADE GROUND: Black and brown mottled very gravelly, silty fine to coarse sand. Gravel is fine to coarse subangular to angular slag, clinker, glass, coal and steel.
		3.00 3.00 - 3.45	D	N=20 (1,4/5,5,5,5)	3.00	11.40		Firm to stiff reddish brown very sandy, gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subrounded to rounded mudstone, siltstone, sandstone and quartzite.
		4.00 - 4.45	U	Ublow=28				
		5.00 5.00 - 5.45	D	N=21 (3,3/4,5,5,7)				
		6.00 6.00 - 6.45	D	N=10 (1,1/2,3,3,2)				
		7.50 - 7.95	U	Ublow=31				
		9.00		50 (25 for 70mm/50 for 10mm)	9.00	5.40		Grey LIMESTONE.
		9.00 - 9.20	D					
		9.50		50 (25 for 0mm/50 for 0mm)	9.50	4.90		End of borehole at 9.50 m

Remarks

Service inspection pit hand excavated from GL to 1.20m. Groundwater encountered at 6.00m bgl rising to 2.70m bgl after 20 minutes.

AGS

Curtins

Borehole Log

Borehole No. **CP1-03**

Sheet 1 of 2

Project Name: Millom Iron Line	Project No. 080874.302	Co-ords: 317902.86 - 479000.82	Hole Type CP
Location: Millom		Level: 14.00	Scale 1:50
Client: Cumberland Council		Dates: 10/12/2024 - 11/12/2024	Logged By RT

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20 - 1.50	B		0.20	13.80		MADE GROUND: Brown very clayey, gravelly fine to coarse sand. Gravel is fine to coarse subangular brick and concrete.
		0.40 - 0.50	ES					MADE GROUND: Brown very clayey, gravelly, cobbly fine to coarse sand. Gravel is fine to coarse subrounded to subangular slag, clinker, limestone, glass and coal. Cobbles are subangular limestone. (Made Ground content contains approx 20% ash).
		1.00 - 1.10	ES					
		1.20		N=20 (2,2/3,5,6,6)				
					1.50	12.50		MADE GROUND: Brown very sandy, very gravelly clay. Sand is fine to coarse. Gravel is fine to coarse brick, mudstone, sandstone and siltstone.
		2.00		N=8 (2,2/2,2,2,2)	2.00	12.00		Firm to stiff reddish brown very sandy, gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subrounded to rounded mudstone, siltstone, sandstone and quartzite.
		2.00 - 2.45	D					
		3.00 - 3.45	U	Ublow=30				
		4.00		N=17 (1,2/3,4,5,5)				
		4.00 - 4.45	D					
		5.00		N=18 (1,2/3,3,6,6)				
		5.00 - 5.45	D					
		6.00 - 6.45	U	Ublow=50				
		7.50		N=21 (2,4/4,5,5,7)				
		7.50 - 7.95	D					
		9.00		N=25 (2,3/5,6,7,7)				

Continued on next sheet

Remarks

Service inspection pit hand excavated from GL to 1.20m. Groundwater encountered at 9.40m bgl rising to 8.20m bgl and 14.10m bgl rising to 13.50m bgl after 20 minutes.

AGS

Curtins

Borehole Log

Borehole No. **CP1-03** Sheet 2 of 2

Project Name: Millom Iron Line	Project No. 080874.302	Co-ords: 317902.86 - 479000.82	Hole Type CP
Location: Millom		Level: 14.00	Scale 1:50
Client: Cumberland Council		Dates: 10/12/2024 - 11/12/2024	Logged By RT

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.50 10.50 - 10.95	D	N=20 (2,3/5,5,5,5)				
		12.00		N=15 (1,1/2,2,5,6)				
		12.80		N=41 (25 for 40mm/21,6,6,8)				
					14.10	-0.10		Very dense reddish brown very sandy GRAVEL of fine to coarse subangular to angular limestone. Sand is fine to coarse.
		14.50		50 (25 for 40mm/50 for 25mm)	14.50	-0.50		Grey LIMESTONE.
		14.50 - 14.95	D					
		15.00		50 (25 for 30mm/50 for 30mm)	15.10	-1.10		End of borehole at 15.10 m

Remarks
Service inspection pit hand excavated from GL to 1.20m. Groundwater encountered at 9.40m bgl rising to 8.20m bgl and 14.10m bgl rising to 13.50m bgl after 20 minutes.

AGS

Curtins

Borehole Log

Borehole No.
RH2-01
Sheet 1 of 5

Project Name: Millom	Project No. 080874.304	Co-ords: 317914.10 - 478965.98	Hole Type CP
Location: Millom, Cumbria		Level: 12.90	Scale 1:50
Client: Storey		Dates: 10/06/2025 - 11/06/2025	Logged By RT

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND: Dark brown very gravelly fine to coarse sand with high cobble content. Gravel is fine to coarse subangular to subrounded brick, concrete, clinker, slag, coal and limestone. Cobbles are subangular brick.
					3.00	9.90		Greyish brown sandy CLAY. Sand is fine to coarse.
					4.10	8.80		Brown sandy CLAY. Sand is fine to coarse.
								Continued on next sheet

1 2 3 4 5 6 7 8 9 10

Remarks
Service inspection pit hand excavated to 1.20m bgl. No relic mining features identified.

AGS

Curtins

Borehole Log

Borehole No.
RH2-01
Sheet 2 of 5

Project Name:	Millom	Project No. 080874.304	Co-ords:	317914.10 - 478965.98	Hole Type CP
Location:	Millom, Cumbria		Level:	12.90	Scale 1:50
Client:	Storey		Dates:	10/06/2025 - 11/06/2025	Logged By RT

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					14.10	-1.20		Brown sandy, very gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular of mixed lithologies.
					18.70	-5.80		Reddish brown IRONSTONE
					19.30	-6.40		Grey, dark grey and reddish brown LIMESTONE and IRONSTONE.
								Continued on next sheet

11 12 13 14 15 16 17 18 19 20

Remarks
Service inspection pit hand excavated to 1.20m bgl. No relic mining features identified.

AGS

Curtins

Borehole Log

Borehole No.
RH2-01
Sheet 3 of 5

Project Name:	Millom	Project No. 080874.304	Co-ords:	317914.10 - 478965.98	Hole Type CP
Location:	Millom, Cumbria		Level:	12.90	Scale 1:50
Client:	Storey		Dates:	10/06/2025 - 11/06/2025	Logged By RT

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				

21
22
23
24
25
26
27
28
29
30

Continued on next sheet

Remarks
Service inspection pit hand excavated to 1.20m bgl. No relic mining features identified.

AGS

Curtins

Borehole Log

Borehole No.
RH2-01
Sheet 4 of 5

Project Name:	Millom	Project No. 080874.304	Co-ords:	317914.10 - 478965.98	Hole Type CP
Location:	Millom, Cumbria		Level:	12.90	Scale 1:50
Client:	Storey		Dates:	10/06/2025 - 11/06/2025	Logged By RT

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				

31
32
33
34
35
36
37
38
39
40

Continued on next sheet

Remarks
Service inspection pit hand excavated to 1.20m bgl. No relic mining features identified.

AGS

Curtins

Borehole Log

Borehole No.
RH2-01
Sheet 5 of 5

Project Name:	Millom	Project No. 080874.304	Co-ords: 317914.10 - 478965.98	Hole Type CP
Location:	Millom, Cumbria		Level: 12.90	Scale 1:50
Client:	Storey		Dates: 10/06/2025 - 11/06/2025	Logged By RT

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					42.00	-29.10		Grey LIMESTONE.
					45.00	-32.10		End of borehole at 45.00 m

41
42
43
44
45
46
47
48
49
50

Remarks
Service inspection pit hand excavated to 1.20m bgl. No relic mining features identified.

AGS

Appendix C – Risk Assessment Rationale

The qualitative risk assessment of environmental harm is designed to establish connecting links between a hazardous source to a potential receptor via an exposure pathway.

The qualitative risk assessment corresponds with the proposed piling operations on site.

Risk assessment is the process of collating known information on a hazard or set of hazards in order to estimate actual or potential risk to receptors. The receptor may be humans, a water resource, a sensitive local ecosystem or future construction materials. Receptors can be connected to the hazardous source by one or several exposure pathways such as direct contact for example. Risks are generally managed by isolating the receptor or intercepting the exposure pathway or by isolating or removing the hazard.

Without the three essential components of a source, pathway and receptor there can be no risk. Therefore, the presence of hazard on a site does not necessarily mean there is a risk.

By considering where a viable pathway exists which connects a source with a receptor the risk assessment in Section 3.0 and Table A4.1 identifies where pollutant linkage exists. If there is no pollutant linkage there is no risk and only where a pollutant linkage is established does the risk assessment, consider the level of risk.

The risk assessment considers the likelihood of a particular event taking place (accounting for the presence of the hazard and receptor and the integrity of the exposure pathway) in conjunction with the severity of the potential consequence (accounting for the potential severity of the hazard and the sensitivity of the receptor).

In the risk assessment the consequence of the hazard has been classified as severe or medium or mild or minor and the probability (likelihood) of the circumstances actually occurring classified as high likelihood or likely or low likelihood or unlikely.

The consequences and probabilities are subsequently cross-correlated to give a qualitative estimation of the risk using Department of the Environment risk classifications as detailed in the table below and as referenced in CIRIA C552.

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability (Likelihood)	**High Likelihood**	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

In accordance with DoE guidance, the following categorisation of **consequence** has been developed.

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Classification	Definition	Examples
Severe	Short-term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem or organisation forming part of such ecosystem.	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health. Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of such ecosystem.	Concentration of a contaminant from site exceeds the generic or site-specific assessment criteria. Leaching of contaminants from a site to a Principal or Secondary A aquifer. Death of a species within a designated nature reserve. Lesser toxic and asphyxiate effects.
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services. Damage to sensitive buildings/structures/services or the environment.	Pollution of non-classified groundwater (inc. Secondary B aquifers). Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing, etc). Easily repairable effects of damage to buildings, structures and services.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discoloration of concrete.

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In accordance with DoE guidance, the following categorisation of **probability** has been developed.

Classification	Definition
High Likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

In accordance with DoE guidance, the following categorisation of **risk** has been developed.

Classification	Definition
Very High Risk	There is a *high probability* that *severe harm* could arise to a designated receptor from an identified hazard at the site without appropriate further action.
High Risk	*Harm* is *likely to arise* to a designated receptor from an identified hazard at the site without appropriate further action.
Moderate Risk	*It is possible* that without appropriate further action *harm could arise* to a designated receptor. It is relatively *unlikely* that any such harm would be *severe,* and if any harm were to occur it is *more likely* that such harm would be *relatively mild.*
Low Risk	*It is possible* that *harm could arise* to a designated receptor from an identified hazard. It is *likely* that, at worst, if any harm was realised any effects would be *mild.*
Very Low Risk	The presence of an identified hazard does not give rise to the potential to cause harm to a designated receptor.

The term ‘risk’ in this instance refers to the risk that the source, pathway, receptor linkage for a given source of contamination is complete. It does not refer to immediate risk to individuals or features present on the site from potential contaminants and is intended to be used as a tool to assess the necessity of further investigation or risk management operations.

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