

Northumberland Line

Preliminary Sources Study Report - Ashington Station
Appendix 06

Northumberland County Council

Project number: 60601435
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1. Introduction

1.1 Background Information

The reintroduction of passenger services on the Northumberland Line (NL) (formerly known as the Ashington, Blyth and Tyne (ABT) line) has been an aspiration of Northumberland County Council (NCC) for many years and accords with key local and regional policy, principally in terms of promoting economic growth across South East Northumberland.

Improving the links between towns such as Ashington and Blyth with Newcastle upon Tyne is of fundamental importance to encouraging more sustainable access to the key regional economic centres in Tyne and Wear.

The project involves the conversion of the Northumberland Line from its current use as a freight railway back to a passenger and freight railway. The scheme will provide six new stations at Northumberland Park, Seaton Delaval, Newsham, Blyth Bebside, Bedlington and Ashington. The works will require some upgrading to existing track infrastructure, including signalling, earthworks, etc. Also, as part of these works new car parking and associated infrastructure will be required at certain stations.

The NL route is approximately 23.4km in length (Ch 0.0 to 23.4km); Drawing 60601435-ACM-XX-ZZ-DRG-EGE-101 P01 included in Report 60601435-ACM-XX-ZZ-REP-EGE-001 shows the NL route and the provisional location of proposed stations. This is the Preliminary Sources Study Report (PSSR) for the proposed Ashington Station at approximate Ch. 22970 to 23190m; the proposed platform is 100m in length. Station design is being finalised and minor changes to the platform location are expected.

1.2 Report Scheme Extents

This report forms Appendix 06 of the Preliminary Sources Study Report (PSSR) for the entire scheme and includes desk study information for the proposed Ashington Station, at approximate chainage Ch. 22970 to 23190m. The National Grid Reference (NGR) at the approximate centre of the site is NZ273 876.

The station development at Ashington will include provision of a platform adjacent to the Down rail line, a 275 space car park for rail passengers located to the west of Northumberland Line (NL), and access for vehicles to and from Kenilworth Road to the west, cycle storage area and taxi and drop off bays. Areas of landscaping will be provided around the proposed car park. Details of the proposed development are shown on highways car park general arrangement, Drawing 60601435-ACM-07-ZZ-DRG-EHW-070001 P02. This also shows the location of a lift access to provide access for Persons of Reduced Mobility (PRM TSI) between the platform and Wansbeck Square to the north adjacent to Station Road. A retaining wall is also proposed to support a change in ground level between landscaping next to the south east corner of the station car park and the adjacent railway earthworks. This will enable provision of a platform emergency exit from the south of the platform. The form of the lift access is shown on Drawings 60601435-ACM-07-ZZ-DRG-EST-001301 P01.1, 60601435-ACM-07-ZZ-DRG-EST-001302 P01.1 and 60601435-ACM-07-ZZ-DRG-EST-001303 P01.1.

The PSSR will focus on the proposed station site including the platform, the car park connecting access to Kenilworth Road, the access lift and rail line, and discuss features of interest in the surrounding area; a Site Location Plan is included as Drawing 60601435-ACM-07-ZZ-DRG-EGE-001 P03.

The site is located in the urban area of Ashington, west of Ashington town centre. The north end of the proposed Ashington Station footprint is located approximately 25m south of Station Road, which passes over the Northumberland Line (NL) via a bridge to the north. Ashington Cricket Club lies to the west of the site and the St John Street Car Park to the east, Wilko Retail Store is located to the north of the proposed station car park, and the residential gardens of Ashbourne Crescent lie to the south.

For the purposes of this report features identified below or within a 25m buffer of the proposed station are considered to be 'On the Site'. Features identified within a 250m buffer of the proposed station are considered to be 'Within the Vicinity of the Site'

1.3 Objectives of the Report

The purpose of this report is to collate geotechnical and geo-environmental information for the proposed site of Ashington Station, present a summary of that information and identify possible geotechnical and geo-environmental development constraints. Identified constraints are presented as a series of plans and overlays.

The objectives of the PSSR are to consider the geotechnical and geo-environmental risks associated with the scheme, their implications and assess the feasibility of proposed options as scheme development assessments progress. As part of this assessment, the following tasks have been undertaken:

- Review of the site geology, hydrogeology, topography;
- Review of the site historical setting;
- Identify and review previous intrusive investigations and factual reports;
- Identify and review previous interpretative reports;
- Review relevant geo-environmental records and data;
- Review historical coal mining reports, records and plans;
- Provide an overview of ground and groundwater conditions;
- Undertake a site walkover to review site setting in light of available desk study information;
- Identify potential geotechnical risks; and
- Identify potential geo-environmental risks (contaminated land).

The review activities detailed above have been undertaken to:

- aid specification of ground investigation to support feasibility assessment;
- help determine potential constraints for design and construction; and
- identify areas of information deficiency and any on-going or anticipated future geotechnical and geo-environmental problems which may affect the proposed scheme.

Recommendations for ground investigation are included in Annex A of the overall PSSR, reference 60601435-ACM-XX-ZZ-REP-EGE-001 and an extract of the Schedule 2 Exploratory Holes for this site is summarised in Annex A of this report.

1.4 Limitations and Exceptions to the Report

Report Limitations and Exceptions are included in the overall Preliminary Sources Study Report (PSSR) for the scheme, reference 60601435-ACM-XX-ZZ-REP-EGE-001.

2. Sources of Information and Desk Study

Sources of information have been obtained as part of this study are summarised in Table 1.

Table 1. Sources of Information

Information	Consultee		
Geotechnical	BGS	1:50,000, Sheet 9, Rothbury, Bedrock and Superficial Edition, 2009. (http://www.largeimages.bgs.ac.uk/iip/mapsportal.html?id=1001844)	
	BGS	1:10,000, NZ28NE (1990).	
	BGS	Geological Memoir, The Geology of the Country around Rothbury, Amble and Ashington (Sheet 9 & 10), 1936. (http://pubs.bgs.ac.uk/publications.html?pubID=B01492) Technical Report WA/90/14, Geology and land-use planning: Morpeth – Bedlington – Ashington, Part 1, LAND-USE AND PLANNING, 1990. (http://nora.nerc.ac.uk/id/eprint/510111/1/WA90014.pdf) Technical Report WA/90/19, Geology and land-use planning: Morpeth – Bedlington – Ashington, Part 2, GEOLOGY, 1990. (http://nora.nerc.ac.uk/id/eprint/510112/1/WA90019.pdf) Geological memoir, The Geology of the country around Sunderland, Memoir for 1:50 000 geological sheet 21 (England and Wales), 1994. (http://pubs.bgs.ac.uk/publications.html?pubID=B01500)	
	BGS	BGS Boreholes (http://mapapps2.bgs.ac.uk/geoindex/home.html)	
	Landmark	Envirocheck Report Reference 269898566_1_1, 01 December 2020.	
	Mining	Coal Authority	Coal Mining Report, Reference 51002332189001, dated 02 December 2020. Consultants Coal Mining Report, Reference 51002332189002, dated 02 December 2020. Coal Authority Interactive Viewer (http://mapapps2.bgs.ac.uk/coalauthority/home.html) Coal Seams with a History of Spontaneous Combustion , (viewed 11/01/2021).
		Durham Mining Museum	http://www.dmm.org.uk/mindex.htm
Historical		English Heritage	Aerial photographs dated 1945 to 1988.
	Landmark	Envirocheck Report Reference 269898566_1_1, 01 December 2020 including Ordnance Survey Maps dated between 1865 and 2020.	
Environmental	Landmark	Envirocheck Report Reference 269898566_1_1, 02 December 2020	
Previous Reports	Jacobs	Ashington Blyth & Tyne GRIP 2 Study, Reference: 139586-JAC-ABT-0-RP-EM-0000011 P02, dated 15 June 2016.	

3. Field Studies

3.1 Walkover

A site walkover of the station site was undertaken by AECOM on 15 July 2019. The purpose of the site walkover was to review the general condition of the site, observe features identified in the desk study, confirm the earthworks assessments included on the Network Rail LNE & EM Earthworks Database and Earthworks Observations made by others (as summarised in Section 6) and assess access constraints for possible future ground investigation works. The site walkover was primarily undertaken within the rail corridor and selected photographs are included in Appendix A.

The Northumberland Line (NL) at the former Ashington Station lies in a shallow cutting, with the car parks east and west of the line at a slightly higher elevation than the track, Plate 1. The former platforms are in a poor condition with a broken surface overgrown with vegetation, Plate 2. The existing Wilko Retail Store car park together with the southern mainly grassed area of Library Garden with ornamental trees located to the west of this, Plate 3, and the area of scrubland on the former Essendene Care Home site (now demolished) to the south, Plate 4, are proposed as the location of the new station car park.

Land to the east of the proposed station comprises the existing John Street Car Park, Plate 5. No access for the walkover was made to Ashington Cricket Club west of the site or the residential gardens to the south.

A footbridge is present north of the proposed station, Plates 6 and 7, connecting Wansbeck Square, to the north of Wilko's, to John Street Car Park on the east of the NL.

3.2 Geomorphological / Geological Mapping

No scheme specific mapping undertaken. Section 4.2 reviews publicly available BGS maps.

3.3 Probing, pitting and testing

None reviewed or undertaken.

3.4 Drainage / Hydrogeological Studies

None reviewed or undertaken.

3.5 Geophysical Surveys

None reviewed or undertaken.

3.6 Previous Ground Investigation

No site-specific ground investigation is available for the scheme. Publicly available BGS records are discussed in Section 4.3.

3.7 Photographic Surveys

Historical aerial photographs dated 1945 to 1988 were obtained from English Heritage (EH) as part of the assessment. Features identified from the aerial photographs compliment the historical development and where relevant are specifically described in Section 4.8. Due to EH copyright restrictions the aerial photographs cannot be copied / reproduced.

Photographs taken as part of the walkover survey of the site are discussed in Section 3.1 above.

4. Site Description

4.1 Topography

The topography at the proposed Ashington Station is relatively level at around 35m OD, with regional levels falling to the south towards the River Wansbeck, approximately 1.8km to the south.

OS mapping shows the 35m OD contour line in an approximate east-west alignment through the site, although the contour line is not shown on some OS mapping in the car park to the west of the railway. The PWay OS map shows a spot level of 39.3m OD on the road surface on Station Road bridge where it crosses over the railway ~165m to the north and a level of 32.3m OD on a footpath to the west of the railway approximately 180m south south east of the site, just south of Hospital Crossing (~Ch. 22780).

4.2 Geology

British Geological Survey (BGS) 1:50,000 scale mapping reproduced in the Envirocheck Report is included in Appendix B and shown on scheme wide geological mapping included as Drawing 60610435-ACM-XX-ZZ-DRG-EGE-102 P01. The mapping comprises of separate sheets for Artificial Ground and Landslip, Superficial Geology and Bedrocks and Faults. Superficial soils are shown to comprise "Till, Devensian – Diamicton" on the BGS GeoIndex Onshore database <https://mapapps2.bgs.ac.uk/geoindex/home.html> (accessed on 08 January 2021), whereas formerly they were denoted "TILLD" as indicated in the Envirocheck Report. There is no lithological description for TILLD, but the BGS Lexicon of Named Rock Units provides a generic description of TILL (Till) as "unsorted and unstratified drift, generally overconsolidated, deposited directly by and underneath a glacier without subsequent reworking by water from the glacier. It consists of a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape (diamicton)". It should be noted that in addition to Diamicton (e.g. "Boulder Clay" or "Stony Clay"), the soils can contain gravel-rich, or include laminated and / or sand layers; of varied colour and consistency.

Solid strata at the site comprise the Pennine Middle Coal Measures Formation (PMCM). The BGS Lexicon describes the deposits as an interbedded sequence of grey mudstone, siltstone, pale grey sandstone and commonly, coal seams, with a bed of mudstone containing marine fossils at the base, and several such marine fossil-bearing mudstones in the upper half of the unit.

The Geological Memoir for the Geology of the Country around Rothbury, Amble and Ashington (Explanation of Sheets 9 and 10) describes boulder clay (glacial till) as being divided into two divisions, parted by sand and gravel. The lower clay has a very stiff bluish clay matrix with many rock fragments and contains stones up to boulder size which are predominately formed from sandstones, dolerites and limestone. The upper clay is occasionally reddish but often brownish and prismatic, especially along the coast. It only contains a few small stones. This is interpreted to be equivalent to the Pelaw Clay and Prismatic Clay present at the top of the glacial drift succession across parts of Tyneside and Wearside. In the Geological Memoir for the Geology of the country around Sunderland the BGS report that the prismatic nature of the Pelaw Clay "causes considerable problems in excavations, which require special support. The weakness stems from a low natural shear strength applied to the columnar jointing and to moisture retentivity in the lower part of the profile; this creates an inverted strength profile and leads rapidly to failure of the walls of unsupported excavations". Over the Coal Measures the memoir states that the covering of glacial deposits is very variable in thickness. Sub-ordinate sand and gravel is reported to be present, either interbedded or superimposed. The memoir describes Laminated Clay as relatively unimportant in the district.

The BGS Technical Report Part 2: GEOLOGY Map 4 Drift Thickness identifies the site being underlain by less than 5m of Glacial Till deposits which supports historical boreholes adjacent to the site, which have recorded superficial drift thicknesses ranging between 3.5 and 5m before encountering rock. The Report describes the till as an over-consolidated lodgement till, grey and grey-brown that was deposited by a single phase of glaciation during the late-Devensian.

An extract from BGS 1:10,000 scale BGS Map Sheet NZ28NE is reproduced on Drawing 60601435-ACM-07-ZZ-DRG-EGE-002 P03. The 1:10,000 scale mapping confirms the anticipated geology shown on the smaller scale 1:50,000 mapping. Superficial soils are mapped as Till (Boulder Clay) and Glacial Drift, undifferentiated.

The maps show a series of coal seams striking north east - south west, subcropping in close succession, dipping south east below the site area. These seams are recorded as the Rowlington (youngest), Top Ryhope Five Quarter, Bottom Ryhope Five Quarter, Ryhope Little and Moorland (oldest). The shallowest named seam below the site is the Rowlington which is shown to sub-crop approximately 180m to the north west. There are two other unnamed thin coal seams shown on the geological vertical section included on the map between the Kirkby's Marine Band, which sub-crops below the site, and the underlying Rowlington. These two thin unnamed seams are unlikely to have been economical to mine.

The BGS Technical Report WA/90/19 records approximately 17m separation between the Kirkby's Marine Band and the Rowlington Coal. The NZ28NE 1:10,000 scale map identifies the Rowlington Coal to be up to 1.27m thick with a separation of 15m between this seam and the overlying marine band. The Technical Report records that north of the Stakeford Fault, located approximately 1.25km south of Ashington Station, the seam thickness typically ranges between 0.33m and 0.76m, but a seam thickness of 0.91m was recorded at the former Woodhorn Colliery which was tentatively correlated to the Rowlington seam. Based upon a greater than 10:1 ratio of rockhead to seam thickness not including drift, there is a low risk for migration to the surface of crown hole collapse features developing from unrecorded mine working in the Rowlington, should they exist.

In the Ashington area it is reported that the strata separating the Rowlington and the Top Ryhope Five Quarter typically ranges between 3.5m and 6.1m, comprising fossiliferous mudstone overlain by sandstones. The Technical Report states that north of the Stakeford Fault (in the vicinity of the site), the Ryhope Five Quarter has been observed split into the Top and Bottom Ryhope Five Quarter with a separation between the leaves of 1.9 to 7.4m.

The Report indicates that north of the Stakeford Fault the Top Ryhope Five Quarter seam thickness averages 0.25m compared to 0.05 to 0.61m shown on the 1:10,000 scale map section, and the Bottom has an average thickness 0.21m with up to 0.45m thickness shown on the map section. The 1:10,000 map's generalised vertical section shows the Top and Bottom Ryhope Five Quarter seams are separated by ~5.5m.

The separation between the Bottom Ryhope Five Quarter and the underlying Ryhope Little north of the Stakeford Fault is approximately 5.5m and is chiefly of mudstone. The Technical Report states that the Ryhope Little is recorded with an average thickness of 0.36m, although up to 1.29m at West Sleekburn Colliery Shaft. The BGS generalised vertical section on map NZ28NE, indicates that the Ryhope Little reaches thicknesses up to 0.53m.

The Technical Report indicates the separation between the Ryhope Little and the Moorland seams is variable, however, borehole NZ28NE60, located 1.25km south west in a similar geological setting, suggests there is an approximately 15m separation between the seams.

The Technical Report states that the full recorded thickness of the Moorland seam is between 0.23 and 1.80m, however the generalised vertical section of BGS map NZ28NE records the thickness ranging between 0.23m and 2.42m. The Report states the Moorland is generally encountered with thicknesses between 0.75 and 1.25m and is commonly split by dirt bands into at least two seams, which becomes more pronounced to the north. Only three mine plans in the district have recorded probable Moorland workings – Ashington, Bebside and Horton Grange. Its shallow depth and also the need to stabilise old workings, has resulted in opencast workings at a number of locations. Non recorded mine workings are likely to be more extensive with old workings noted at Blackclose, Bebside, Blyth and Bedlington.

There are no geological faults shown below the study area, although inferred faults are present to the east and north of the station site, Drawing 60601435-ACM-07-ZZ-DRG-EGE-002 P03. The closest fault is located ~10m east of the northern end of the platform approximately parallel to the Northumberland Line (NL) with a throw (unspecified) to the west potentially bringing the fault plane beneath the boundary of the site (assuming the fault is a Normal type fault).

4.3 BGS Boreholes

A scheme-specific ground investigation (GI) has not been completed. Site works for an initial Approval In Principle (AiP) phase of GI, Phase 1, have been completed but laboratory testing is ongoing and the survey findings are not yet available. A number of publicly available BGS borehole logs have been reviewed from the BGS borehole viewer website <http://www.bgs.ac.uk/data/boreholescans/home.html>.

Boreholes NZ28NE357 to 361, which lie within the site, have been reviewed to determine the depth of bedrock in the area. Locations of boreholes in relation to the proposed Northumberland Line are presented on Drawing 60601435-ACM-07-ZZ-DRG-EGE-003 P03. A copy of the BGS logs is included in Appendix C.

The logs all show a cover of superficial deposits with interbedded Middle Coal Measures recorded below. Five holes, NZ28NE357 to 361, summarised in Table 2, located immediately to the west and north of the site show the likely ground conditions to be encountered at the Ashington Station site.

Table 2. BGS Boreholes

Depth from (m)	Depth to (m)	Thickness (m)	Strata Description / Coal Seam	Interpreted Geological Unit
NZ28NE357 to 359, 361 - Car Park and Office Block - Ashington - NDC (1975), immediately west of site – Surface Level ~35m OD				
0.0	0.5 – 0.8	0.5 – 0.8	Tarmac, hardcore	Made Ground
0.5 - 0.8	3.7 – 4.5	3.0 – 4.0	Firm to stiff/ firm mottled, grey brown sandy Clay with stones / very shaly Clay	Glacial Till
3.7 - 4.4	4.0 – 5.0	0.3 – 0.5+*	Hard grey Shale	Pennine Middle Coal Measures
NZ28NE360 - Car Park and Office Block - Ashington - NDC (1975), immediately west of site – Surface Level ~35m OD				
0.0	0.8	0.8	Tarmac, hardcore.	Made Ground
0.8	2.2	1.4	Firm to stiff mottled, grey brown sandy Clay with stones, coal and sandstone fragments.	Glacial Till
2.2	2.8	0.6	Stiff grey sandy Clay with stones, coal and sandstone fragments.	Glacial Till
2.8	4.9	2.1	Loose brown sand and fine gravel with occasional large boulders at base.	Glacial Till / Pennine Middle Coal Measures [possible weathered sandstone]
4.9	5.1	0.2+*	Hard grey Shale	Pennine Middle Coal Measures

Notes:

*: thickness unproven

4.4 Mining

Scheme wide mining constraints mapping is included as Drawing 60610435-ACM-XX-ZZ-DRG-EGE-103 P01.

4.4.1 Coal Authority Coal Mining Report

The site is in an area of known coal mine workings and is identified on the Coal Authority online interactive map as within a Mining Reporting Area; therefore, a mining report was obtained for the site. A Coal Authority CON29M Coal Mining Report, Reference 51002332189001, was obtained on 02 December 2020 for the station. The Report is included in Appendix D and the main details are summarised in Table 3.

The proposed station site lies outside the Coal Authority's Development High Risk Area.

Table 3. Coal Authority Potential Mining Risk

Item	Evidence or Potential of	Yes/No	Details
1	Past underground coal mining	Yes	The property is in a surface area that could be affected by underground mining in 6 seams of coal at 80m to 240m depth, and last worked in 1951. Any movement in the ground due to coal mining activity associated with these workings should have stopped by now.
2	Present underground coal mining	No	The property is not within a surface area that could be affected by present underground mining.
3	Future underground coal mining	Yes	The property is not in an area where the Coal Authority has received an application for, and, is currently considering whether to grant a licence to remove or work coal by underground methods. The property is not in an area where a licence has been granted to remove

Item	Evidence or Potential of	Yes/No	Details
			or otherwise work coal using underground methods. The property is not in an area likely to be affected from any planned future underground coal mining. However, reserves of coal exist in the local area which could be worked at some time in the future. No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.
4	Mine entries	No	There are no recorded coal mine entries known to the Coal Authority within, or within 20 metres of, the boundary of the property. This information is based on the information that the Coal Authority has at the time of this enquiry. Based on the Coal Authority's knowledge of the mining circumstances at the time of this enquiry, there may be unrecorded mine entries in the local area that do not appear on Coal Authority records.
5	Coal mining geology	No	The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.
6	Past opencast coal mining	No	The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.
7	Present opencast coal mining	No	The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.
8	Future opencast coal mining	No	There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary. The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.
9	Coal mining subsidence	Yes	There is a claim within 50 metres of the property boundary that does not match the property address. This is shown on the enquiry boundary plot. [Inspection of the Coal Authority plan shows this relates to Ashington Cricket Club.] There is no current Stop Notice delaying the start of remedial works or repairs to the property. The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.
10	Mine gas	No	The Coal Authority has no record of a mine gas emission requiring action.
11	Hazards related to coal mining	No	The property has not been subject to remedial works, by or on behalf of the Coal Authority, under its Emergency Surface Hazard Call Out procedures.
12	Withdrawal of support	No	The property is not in an area where a notice to withdraw support has been given. The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.
13	Working facilities order	No	The property is not in an area where an order has been made, under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.
14	Payments to owners of former copyhold land	No	The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

The Professional Opinion of the Coal Authority is as follows:

According to the official mining information records held by the Coal Authority at the time of this search, evidence of, or the potential for, coal mining related features have been identified. It is unlikely that these features will impact on the stability of the enquiry boundary.

The Coal Authority has provided the following advice regarding the risk of mining subsidence:

The site is within an area of previous interest. It is close to where the Coal Authority or licensed mine operator has investigated and where necessary remediated issues relating to coal mining subsidence. The site requires further investigation and may influence your risk assessment.

As advised by the Coal Authority, a Subsidence Claims Report has been ordered for the site.

The Coal Authority uploads a list of coal seams in the United Kingdom (UK) with a history of spontaneous combustion; Coal Authority “Coal Seams with a History of Spontaneous Combustion” https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/415771/Coal_Seams_With_a_History_of_Spontaneous_Combustion_.pdf (viewed 11/01/2021). The list identified two seams in the Northumberland Coalfield with a history of spontaneous combustion: the High Main and Main. The Coal Authority also state that coal seams which are not listed *should not be regarded as free from risk of spontaneous combustion as the majority of coal seams could suffer from spontaneous combustion depending upon the method of them being entered, worked or disturbed.*

The Coal Authority Consultants Coal Mining Report summarised in Section 4.4.3 below confirms that the High Main seam was worked beneath the site.

4.4.2 Coal Authority Mine Plans

Coal Authority records show the shallowest recorded workings beneath the site are around 80m depth, likely to correlate to the Ashington (High Main) seam. Given the depth to the workings Mining Record Plans have not been obtained for the site.

4.4.3 Coal Authority Consultants Coal Mining Report

A Coal Authority Consultants Coal Mining Report has been obtained, referenced 51002332189002 dated 02 December 2020, and is included in Appendix D.

The Report identifies past recorded underground mining. Details of the workings in the Seventy Fathom Ashington High Main and High Main which are present at depths of less than 100m beneath the property are summarised in Table 4. The Seventy Fathom Ashington High Main was extracted from the Ashington Colliery and an unnamed colliery.

Table 4. Coal Authority Consultants Report - – Section 1 – Mining activity and geology

Colliery	Seam	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
Ashington	Seventy Fathom Ashington High Main	80	Beneath Property	4.9	South-East	120	1942
Unnamed	Seventy Fathom Ashington High Main	81	Beneath Property	3.9	South-East	137	1942
Unnamed	High Main	95 - 104	Beneath Property	4.2 – 5.7	South-East	122	1929

The Consultants Coal Mining Report indicates that the Seventy Fathom Ashington High Main seam at 80m depth has the shallowest recorded workings below the site. Records of the Seventy Fathom Ashington High Main were obtained from two different sources: Ashington Colliery and an unnamed colliery. There is only 1m difference in the level of the seam between the two sets of records.

Two records for workings in the High Main are also available from unnamed collieries, but there is a discrepancy in the worked levels which vary between 95 and 104m depth.

Further workings in the Bottom Yard, Low Main and Brass Thill coal seams are reported at depths of 129 to 131m, 184m, 202 to 206m respectively beneath the property. These coals were extracted from the following Collieries respectively: unnamed (Bottom Yard) and Ashington (Low Main and Brass Thill).

The Consultants Coal Mining Report indicates there are no Coal Authority database entries for “probable unrecorded shallow workings” in the dataset for the site. This denotes an absence of evidence of mining from other sources as distinct from official records such as mine abandonment plans.

The Coal Authority also reports that no spine roadways are recorded at shallow depth and that no coal outcrops, and faults, fissures or breaklines are recorded. It also reports that no mine entries are recorded within 100m of the enquiry boundary.

4.4.4 Durham Mining Museum

The Durham Mining Museum (<http://www.dmm.org.uk/colliery/a007.htm>) has records of the coal seams worked from Ashington Colliery, located approximately 300m north of the site. The Colliery was opened in 1867 and closed in 1986; the worked seams worked from 1914 to 1988 are summarised in Table 5. There is a slight inconsistency on the Durham Mining Museum stating Ashington Colliery was closed 1986, however also recording the Three Quarter seam being worked up until 1988.

Table 5. Durham Mining Museum – Collieries and Recorded Mine Workings

Colliery	Worked Seams
Ashington	Five Quarter, High Main, Low Main, Main, Plessey, Yard, Diamond, Bentinck, Bensham, Lower Plessey, Middle Main, Bottom Main, Three Quarter, Tilley, Victoria

The geological memoir which discusses the Geology of the district around Newcastle upon Tyne, Gateshead and Consett, reported that individual collieries applied their own set of seam names. This led to much confusion and a proliferation of local seam names that are often confused or mixed with other coals between collieries. Seam names and typical thicknesses obtained from the geological vertical section on BGS map sheet NZ28NE and Part 2 of the BGS Technical Report are given in Table 6.

Table 6. Coal Seam Names and Thickness

Seam Name	Alternative Seam Names	Seam Thickness (m)	
		NZ28NE	BGS Technical Report
Rowlington	N/A	Up to 1.27	0.33 to 0.76
Top Ryhope Five Quarter	N/A	0.05 to 0.61	0.25
Bottom Ryhope Five Quarter	N/A	Up to 0.45	0.21
Ryhope Little	N/A	Up to 0.53	0.36
Moorland	Blackclose*	0.23 to 2.42	0.75 to 1.25
Ashington	High Main*, Upper High Main**	Up to 1.76	Up to 1.4
High Main	Diamond**, Top Main*, New Main**	0.21 to 1.70	0.8 to 1.2
Metal	Middle Main*, Top Main**	0.27 to 1.47	<1.0 to >1.5
Five Quarter	Bottom Main*, Bottom Grey**	0.40 to 1.60	1.0
Bentinck	Top Yard**	0.05 to 0.92	<0.7
Yard	N/A	0.03 to 1.86	0.74 to 0.96

Notes:

*: Seam name for Ashington Colliery reported in Table 3A of BGS Technical Report WA/90/19 Part 2 Geology (1990);

** : Other seam names given on the vertical section given on geological map sheet NZ28NE;

***: Thickness recorded at Hawks Cliff, approximately 4km to the south east of the site.

4.4.5 Non-Coal Mining

The Envirocheck Report, apart from the extraction of coal, does not report the extraction of other materials within 250m of the proposed station.

4.4.6 Mining Summary

The Coal Authority CON29M Coal Mining Report has confirmed the presence of mine workings in at least 6 seams of coal at 80 to 240m depth, and last worked in 1951. The Coal Authority states that any movement associated with historical coal workings should have stopped by now.

In the CON29M Coal Mining Report (see Section 4.4.1), the Coal Authority reported that a subsidence claim has been made within 50 metres of the property boundary that does not match the property address. The property relating to the claim is shown on the enquiry boundary plot, see Appendix D. Inspection of the Coal Authority plan shows this relates to *Ashington Cricket Club*. As advised by the Coal Authority, a Subsidence Claims Report has been ordered for the site.

A Consultants Coal Mining Report obtained from the Coal Authority states that the shallowest recorded workings are within the Ashington Seam at 80m beneath the site with an extraction thickness of 1.20m within the Ashington Colliery. Other records from an unnamed colliery indicate an extraction thickness of 1.37m at a depth of 81m. The depth for the Ashington coal seam given in the Consultants report corroborates the level estimated from BGS map Sheet NZ28NE for the north of the site.

The BGS Technical Report WA90/19 records that the Ashington (High Main) Seam was worked at Longhirst Colliery, to the north west, and Woodhorn Colliery, to the north east, reaching thicknesses up to 1.4m thick but locally with a dirt band of over 0.2m. The Consultants Report indicates there are records from two unnamed collieries of an extraction thickness for the High Main of 1.22m at a minimum depth ranging between 95 and 104m beneath the site.

The Consultants Report states the site does not fall within the dataset for “probable unrecorded shallow workings”, therefore it can be inferred the Coal Authority has no evidence to suggest there are any unrecorded shallow workings beneath the site. It should be noted that there are several named coal seams at shallow depth below the site that may be capable of being mined therefore it would be prudent to confirm that unrecorded mine workings will not pose a risk to the development.

Unrecorded workings may be present in the Rowlington (15 to 25m), Top Ryhope Five Quarter (20 to 30m), Bottom Ryhope Five Quarter (30 to 40m), the Ryhope Little (35 to 45m) and Moorland Seams (40 to 55m).

4.4.7 Quarrying and Landfill

The Envirocheck Report and Site Sensitivity maps are included in Appendix B. Details of quarries and landfills within 250m of the proposed Ashington Station are summarised in Table 7.

Table 7. Quarrying and Landfill

Envirocheck Map ID	Relevant Feature	On site	Off-site (within 250m)	Distance (m)
N/A	BGS Recorded Mineral Site	None	None	
N/A	BGS Recorded Landfill Site	None	None	
N/A	Historical Landfill Site	None	None	
N/A	Local Authority Recorded Landfill	None	None	
A 22	Potentially Infilled Land (Non-Water)	None	A: One	
			Unknown Filled Ground (Pit, quarry etc) - Suspected colliery tip 1897, developed as housing from 1923 (OS 1:2,500 mapping)	46
N/A	Potentially Infilled Land (Water)	None	None	

The Potentially Infilled Land (Non-Water) (A22) is related to land previously used for disposal of colliery spoil north of the site, see Drawing 60601435-ACM-07-ZZ-DRG-EGE-004 P03. The area, which is located immediately north of Station Road, is shown as agricultural land (undeveloped) in 1895, but by 1926 there is a wagonway on the north side of Station Road leading to an adjacent spoil tip. During the same period the N.E.R. Newbiggin branch railway had been constructed through the site together with a branch line to Ashington Colliery, which skirted around the north of the tip area. By 1923, most of the spoil tip had been redeveloped as housing and a Fire Station, leaving a small area of spoil tip sandwiched between the Ashington Colliery branch line and a new wagonway running east to west approximately 200m north of the site. Since the tip area was redeveloped

for the most part (and closest part) prior to 1923 as housing (and fire station) it is not anticipated there will be any significant pollutant linkage to the site for contamination associated with colliery spoil via dust, ground gas or leachate.

It is not anticipated that identified quarries and landfilling included in the Envirocheck Report represent a geotechnical constraint for the station development.

4.5 BGS Hazards

The Envirocheck Report and Site Sensitivity maps are included in Appendix B. Details of BGS hazards within 250m of the proposed Ashington Station are summarised in Table 8.

Table 8. BGS Hazards

Envirocheck Map ID	BGS Hazard	On site	Off-site (within 250m)	Distance (m)
N/A	Potential for Collapsible Ground Stability Hazards	Very low		
N/A	Potential for Compressible Ground Stability Hazards	No hazard	Very Low	215 (NW)
N/A	Potential for Ground Dissolution Stability Hazards	No hazard		
N/A	Potential for Landslide Ground Stability Hazards	Very Low		
N/A	Potential for Running Sand Ground Stability Hazards	Very Low	No Hazard	126 (E)
			No Hazard	243 (N)
N/A	Potential for Shrinking or Swelling Clay Ground Stability Hazards	Low	Very Low	126 (E)
			No Hazard	142 (E)
			Very Low	243 (N)
N/A	Radon Potential - Radon Affected Areas	The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level).		
N/A	Radon Potential - Radon Protection Measures	No radon protective measures are necessary in the construction of new dwellings or extensions		

BGS hazards at the site do not constitute unusual or onerous development constraint.

4.6 Hydrology

The Envirocheck Report and Site Sensitivity maps are included in Appendix B. Details of hydrological features within 250m of the proposed Ashington Station are summarised in Table 9.

Table 9. Hydrology

Envirocheck Map ID	Relevant Feature	On site	Off-site (within 250m)
N/A	River Catchment Area	Wansbeck	Wansbeck
N/A	Ponds	None	None
N/A	Drainage	Unknown	Unknown
N/A	Extreme Flooding from Rivers or Sea without Defences	None	None
N/A	Flooding from Rivers or Sea without Defences	None	None

Envirocheck Map ID	Relevant Feature	On site	Off-site (within 250m)
N/A	Areas Benefiting from Flood Defences	None	None
N/A	Flood Water Storage Areas	None	None
N/A	Flood Defences	None	None
N/A	OS Water Network Lines	None	None
N/A	Risk of Flooding from Surface Water	Low Risk	High to low risk.

The Agency and Hydrological (Flood) map included in the Envirocheck Report confirms that the site is not at risk from flooding or extreme flooding from rivers or sea. The nearest OS Water Network Data entry lies 530m to the north of the station site. The EA/NRW Suitability map – Slice A shows an area with a Low to High risk of flooding (defined as >1 in 1000 to >1 in 30 year return period) from surface water on the western boundary of the site along Kenilworth Road, crossing into the south west corner of the site with a Low flooding risk. A Low surface flooding risk is also attributed to the boundary with Oakland Terrace at the southeast corner of the site, at the north tip of the platform, and also outside the boundary along most of St John Street. The vast majority of the site is classified as no significant risk (<1 in 1000 year return period).

Overall it is considered that hydrological conditions at the site do not constitute unusual or onerous development constraint. The risk of surface water flooding is not considered a constraint and should be incorporated into the design.

4.7 Hydrogeology

The Envirocheck Report and Site Sensitivity maps are included in Appendix B. Details of hydrogeological features within 250m of the proposed Ashington Station are summarised in Table 10.

Table 10. Hydrogeology

Relevant Feature	On site	Off-site (within 250m)
Superficial Aquifer Designation	Secondary Aquifer – Undifferentiated (Devensian Till)	Secondary Aquifer – Undifferentiated (Devensian Till) Superficial deposits are absent east of the site
Bedrock Aquifer Designation	Secondary Aquifer – A (Coal Measures)	Secondary Aquifer – A (Coal Measures)
Groundwater Vulnerability	Medium	Medium but dropping to low to the north and west
Source Protection Zones	None	None

The identified aquifer designations and inferred groundwater vulnerability risk do not constitute an unusual or onerous constraint for development.

NE Mining & Groundwater Constraint mapping on the Coal Authority Interactive Website shows the site to be within the Bates Colliery mine water block. Information for the Bates Colliery Mine Water Block is published at <https://www.gov.uk/government/publications/mine-water-block-factsheets/north-east-england-mine-water-block-factsheets#bates-mine-water-block-factsheet>. The Bates mine water block extends from the River Wansbeck in the north, Whitley Bay in the south and to the west of Cramlington. Mine water levels are controlled by pumping at Bates Colliery shaft in Blyth. In addition to this there is a gravity discharge at Seaton Burn. Water levels are being lowered to reduce / stop the flows to Seaton Burn.

Typically, pumping of mine water is terminated when mining is ceased, or at some time thereafter. This may in the future lead to recovery of groundwater levels to the pre-mining position. Hazard mapping has been undertaken on behalf of the Coal Authority and the Environment Agency to identify areas where groundwater rebound due to cessation of mine water pumping needs to be taken into account within the Planning process (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770544/Minin_g_and_groundwater_constraints_guidance_and_further_information.pdf).

A risk Category B has been assigned to the site in the NE Mining & Groundwater Constraint mapping. UK government guidance at <https://www.gov.uk/guidance/mining-and-groundwater-constraints-for-development>

(viewed 11 January 2021) indicates that Category B refers to areas on the coalfield. In Category B areas, there may be specific requirements for major development and deep ground works or deep drainage boreholes. There is no specific consultation required regarding impact of rising mine water on sustainable drainage (SuDS) unless deep drainage boreholes over 30 metres deep are proposed.

Rising mine water in itself is unlikely to lead to significant expulsion of mine gases because it is a slow process, however if the range of natural variation for the seasonal water table is brought up to the level of unsaturated mine workings, then heavy precipitation could lead to enhanced gas migration. Complete saturation of mine workings by rising mine water is likely to reduce the long-term risk from generation of hazardous mine gases.

BGS Flood Groundwater Flood Susceptibility (GFS) data is also provided in the Envirocheck Report. Details of the potential for groundwater flooding within 250m of the site are shown in Table 11.

Table 11. Groundwater Flooding Potential

Relevant Feature	On site	Off-site (within 250m)
Limited Potential for Groundwater Flooding to Occur	None	Yes, eastern and northern edge only
Potential for Groundwater Flooding of Property Situated Below Ground Level	None	Yes, northern edge only
Potential for Groundwater Flooding at Surface	None	None

The inferred groundwater flooding potential does not constitute an unusual or onerous constraint for development.

4.8 Historical Development

An Envirocheck Report, Reference 269898566_1_1, dated 01 December 2020 was obtained for the scheme, included in Appendix B. The Report includes Ordnance Survey (OS) maps dated from 1865 and 2020. A summary of the historical development on and within the vicinity of the site is provided in Table 12.

Table 12. Historical Development

OS Map Edition(s)	Significant features on site	Significant features off site
1865-1866 (1:10,560) Northumberland	The site comprises agricultural fields, field boundaries and uncultivated / rough ground to the south.	The surrounding area comprises agricultural fields, field boundaries and uncultivated ground. A north – south trending road is present approximately 230m to the east of the site. High Hirst Farm is located ~300m east of the site on the northern side of a second south west – north east aligned road with High Blackclose Farm located ~240m to the south east. The village/ hamlet of Ashington is located ~1.2km south west of the site.
1874-1895 (1:1,250) Northumberland	No significant changes are noted.	No significant changes are noted. A <i>benchmark</i> of 123.6ft (37.67m OD) is shown 100m north of the site boundary.
1897 (1: 1,250) Northumberland	The north northwest – south southeast aligned dual-track <i>railway</i> , along with the <i>Ashington Station</i> have been constructed. Included in the site boundary are <i>Signal Points</i> and <i>Boxes, Goods Shed, and Sidings</i> .	The main <i>Ashington Station</i> buildings are located immediately east of the northern elongate section of the site. The railway turns north at the end of the station under an <i>overbridge</i> on the newly constructed <i>Station Road</i> , which is orientated east to west ~25m north of the site. A <i>crane</i> is located between sidings north of the <i>Goods Shed</i> . Approximately 25m north of <i>Station Road</i> , the railway branches on a single-track north westward towards <i>Ashington Colliery</i> . The main line bears north northeast on dual tracks. <i>Residential development</i> and <i>road infrastructure</i> are shown north east, east and south east of the site. A <i>wagonway</i> and <i>spoil tip</i> associated with <i>Ashington Colliery</i> are shown north of <i>Station Road</i> ~255m north west of the site. A <i>well</i> is located ~35m east of the southern site boundary. A new <i>benchmark</i> of 128.1ft (39.04mOD) is shown approximately 75m east of the northern site boundary (the previous <i>benchmark</i> is below the railway line).
1898 (1:10,560) Northumberland	The railway line is labelled as the <i>N.E.R. Newbiggin Branch</i> and continues along the north east branch to the north of the site. <i>Sidings and Goods Shed</i> are still shown on the site.	The main <i>Ashington Station</i> buildings are still shown to the east of the site, but the <i>Crane</i> north of the <i>Goods Sheds</i> is no longer named. The <i>Well</i> is still shown. <i>Ashington Colliery, associated railway tracks, earthworks, Gasometer</i> and <i>ancillary buildings</i> are noted ~700m north west of the site. <i>Residential development</i> (terrace housing) is present to the south of <i>Ashington Colliery</i> to the north of <i>Station Road</i> . A <i>Miners Hall, School</i> and <i>Methodist Chapel</i> are located to the south of <i>Station Road</i> , west of the site. <i>New Hirst Brick Works</i> is ~850m south southeast of the site to the east of the railway.

OS Map Edition(s)

Significant features on site

Significant features off site

<p>1923 (1:2,500) Northumberland</p>	<p><i>The site is labelled Station. A Goods Shed, Crane and Sidings are still shown. Two locations of Oil Tanks are recorded: in the centre of the site and towards the southeast corner.</i></p>	<p>The main <i>Ashington Station</i> buildings are no longer labelled east of the site, although the structures are still present. Further residential development has occurred to the north west, north east, east and south east, including a <i>Hospital</i> ~75m to the east. <i>Allotments</i> are shown north and south of the hospital. A <i>Cricket Ground</i> and <i>Tennis Court</i> are present ~35m to the west of the site. A <i>Football Ground</i> is present 130m north east of the site. The <i>Wagonway</i> and <i>spoil tip</i> to the north west of the site have been largely redeveloped as <i>terraced housing</i> and a <i>Fire Station</i> leaving a narrow area of <i>spoil</i> and <i>wagonways</i> within a 250m buffer from the north boundary of the site.</p>
<p>1924 (1:10,560) Northumberland</p>	<p>The <i>Crane</i> and south east area of <i>Oil Tanks</i> are not labelled.</p>	<p>The main station structures east of the site are highlighted as public buildings. The <i>buildings, rail tracks</i> and <i>earthworks (spoil)</i> associated with <i>Ashington Colliery</i> have expanded. Residential developments in <i>Ashington</i> (labelled <i>Hirst</i>) to the east of the site have also expanded. <i>New Hirst Brick Works</i> to the south is no longer shown.</p>
<p>1932 (1:2,500) Northumberland</p>	<p>No <i>Oil Tanks</i> are labelled within the site, but one small rectangular building is still present at the south east <i>tanks</i> site. The <i>Station, sidings, Crane</i> and <i>Goods Shed</i> are still present. The west boundary of the site has been fenced.</p>	<p>A <i>Footpath</i> is shown alongside the western site boundary. The <i>Crane</i> is labelled north of the <i>Goods Shed</i>. Residential development has occurred north west, west and south west of the site; the <i>Cricket Ground</i> to the west is no longer shown however a <i>Tennis Court</i> is still shown north of the undeveloped field. The <i>Football Ground</i> to the north east is no longer shown. The <i>Allotment Gardens</i> to the north of the <i>Hospital</i> to the east of the railway are shown as building plots (which are developed for housing on future maps).</p>
<p>1938 (1:10,560) Northumberland</p>	<p>No significant changes are noted.</p>	<p>The field west of the site is re-labelled <i>Cricket Ground</i>. The building plots in the former <i>Allotment Gardens</i> to the north of the <i>Hospital</i> have different outlines to that shown on the previous mapping. A <i>School</i> has been constructed 240m south west of the site (later identified as <i>Ashington County Mining School</i>). Roads are constructed on <i>Ashbourne Crescent</i> south of the site for future housing.</p>
<p>1951 (1:10,000) Ordnance Survey Plan</p>	<p>No significant changes are noted.</p>	<p>The <i>buildings, tracks, earthworks (spoil)</i> associated with <i>Ashington Colliery</i> have changed and developed further to the north. A number of <i>ponds</i> are present to the north west of the colliery, possibly indicative of mining related ground subsidence. <i>Housing</i> is shown adjacent to the south boundary of the site.</p>

OS Map Edition(s)

Significant features on site

Significant features off site

<p>1959 (1:2,500) Ordnance Survey Plan</p>	<p><i>Ashington Station</i> has been substantially redeveloped. Three <i>Platforms</i> are marked in the north of the site. The <i>Goods Shed</i> building is still present but not identified. The main station buildings to the east of the site have been extended over the west boundary of the site with a glass-roofed canopy.</p> <p><i>Library Gardens</i> are present within the site boundary. A small <i>enclosed structure</i> is shown within the north west corner of the site. There is a small structure and enclosure within the south east corner of the site ~10m from the southern boundary (later labelled <i>Electrical Substation</i>).</p> <p>Earthwork hatchings are shown along the eastern side of the <i>railway</i> and to the south of the site, inferred to indicate a shallow <i>earthwork</i> cutting.</p>	<p>A <i>Pavilion</i> has been constructed in the <i>Cricket Ground</i>, which appears to have been extended over the <i>Tennis Court</i>.</p> <p>A <i>Library</i> is shown to the north of the <i>Library Gardens</i>. A <i>shelter</i> is shown in the <i>Library Gardens</i> (presumed not an air raid shelter since there is no "Keys to the Past" record as per Richardson Road http://www.keystothepast.info/article/10339/Site-Details?PRN=N27888).</p> <p>The <i>Tennis Court</i> to the west is no longer shown and the former area is now part of a <i>Cricket Ground</i>.</p> <p>The majority of the <i>Allotment Gardens</i> south of the hospital (now named <i>Ashington Hospital (General)</i>), are no longer shown, with the exception of a small area in the east of the former site. Well is no longer present. North of the hospital the land has been mainly developed for residential housing, but a <i>Masonic Hall</i> is present in the north of this area. A <i>Dairy</i> is present, 30m east of the <i>station</i>. Further residential development has occurred to the south of the site and west of the railway, including the <i>Ashington County Mining School</i>, ~240m south west of the site.</p>
<p>1967 (1:10,000) Ordnance Survey Plan</p>	<p>No significant changes are noted.</p>	<p><i>Ashington Colliery</i> has altered in layout with changes to <i>rail sidings</i>, <i>buildings</i>, <i>earthworks (spoil areas)</i>, etc. An <i>Aerial Ropeway</i> is aligned north east from the <i>mine</i> to a large <i>earthwork</i>. A small elongate <i>pond</i> is present to the south west of the spoil area with a <i>drain</i> emerging to its west which flows to the north. The <i>ponds</i> to the north west shown on the previous 1:2,500 map is no longer marked.</p>
<p>1968 (1:2,500) Ordnance Survey Plan</p>	<p>A <i>Coal Depot</i> incorporating the former <i>Goods Shed</i> is shown straddling the site over the area of former <i>sidings</i> and <i>Platforms</i> (now removed) on the eastern side of the site. The <i>glass canopy</i> structure has been removed.</p> <p>An <i>Electricity Substation (EI Sub Sta)</i> and <i>Essendene (care home)</i> are shown within the southern boundary of the site, having been constructed across the <i>Library Gardens</i>, which is present in a reduced size to the north. A small isolated rectangular structure is shown in the north east corner of <i>Essendene</i>.</p> <p>The <i>enclosed structure</i> is no longer shown in the north west corner of the site.</p> <p>There are no structures remaining at the location of the <i>Oil Tanks</i>.</p>	<p>The <i>Crane</i> appears now to have been removed and there is a <i>Weigh Bridge</i> north of the former <i>Goods Shed</i> (now <i>Coal Depot</i>).</p> <p><i>Ashington Station</i>, which appears now to be restricted to two platforms, is labelled to the east of the site.</p> <p>A small area of <i>Allotment Gardens</i> is noted on the east boundary of the site sandwiched between new <i>parking</i> along <i>St John Street</i> and the <i>railway</i> (Northumberland Line).</p> <p><i>Ashington Hospital (General)</i> has developed to the south.</p> <p>The pavilion within the <i>Cricket Ground</i> is labelled as <i>Terraces</i>.</p>
<p>1974 (1:10,000) Ordnance Survey Plan</p>	<p>No significant changes.</p>	<p>No significant changes.</p> <p><i>Ashington Colliery / Mine</i> no longer named. Some changes have occurred to the railway siding and building layout with a further increase in the footprint of earthworks (presumed colliery spoil) present to the northwest of the Mine. Aerial ropeway is no longer</p>

OS Map Edition(s)	Significant features on site	Significant features off site
1981 (1:1,250) Ordnance Survey Plan	The railway is identified as a <i>Mineral Railway</i> . <i>Ashington Station</i> is no longer named. A <i>car park</i> is shown in the north east of the site on the former <i>Coal Depot</i> (previously <i>Station</i>). <i>Library Gardens</i> and <i>Essendene</i> are still shown, however the east side of the gardens has been included in the <i>car park</i> .	identified. A <i>Car Park</i> is shown at the former <i>Ashington Station</i> east of the site, the previous <i>Car Park</i> to the south of this along <i>St Johns Street</i> has been removed. A <i>Depot</i> is located to the east of the <i>Car Park</i> occupying a building marked as <i>Dairy</i> on previous mapping. <i>Ashington County Mining School</i> is now named as <i>Ashington County High School</i> . The area of <i>Coal Depot</i> and <i>Weigh Bridge</i> to the north of the site is part of the <i>Car Park</i> constructed on the site. Two new structures have been constructed north of the <i>Car Park</i> , the smaller structure to the west is labelled <i>Council Office</i> . The larger structure corresponds with the current <i>Wilko Retail Store</i> with a slightly smaller footprint.
1985 (1:10,000) Ordnance Survey Plan	No significant changes are noted.	The <i>Mine</i> to the north is now named <i>Ashington Colliery</i> , with changes in <i>railways</i> , <i>buildings</i> and <i>earthworks (spoil)</i> noted. The eastern <i>spoil</i> area has been landscaped with strips of mixed woodland present on the eastern, northern and western boundaries of the former <i>earthwork</i> . The <i>drain</i> shown in 1974 is no longer identified and the <i>earthwork (spoil)</i> to the north west is identified as <i>Tip (dis)</i> , presumably a <i>disused tip</i> .
1989 (1:1,250) Additional SIMs	No significant changes are noted.	The large rectangular building (now <i>Wilko Retail Store</i>) to the west of the <i>railway</i> has been extended to the current size.
1992 (1:10,000) Ordnance Survey Plan	No significant changes are noted.	Ashington Colliery is still marked but <i>Disused Workings</i> is recorded across the north west spoil area. Only a few buildings, railway sidings are present on site. Most of the site has been cleared and the area of earthworks to the northwest has reduced in size with an irregular pond to the north of the spoil and a drain to the northwest.
1993 and 1995 (1:1,250) Large-Scale National Grid Data	No significant changes are noted.	No significant changes are noted.
1999 Aerial Photograph	The <i>railway line</i> , <i>Essendene</i> and <i>Car Park</i> are shown.	No significant changes are noted.
2000, 2006, 2020 (1:10,000) 10k Raster Mapping	2020 - <i>Essendene (Care Home)</i> in the south of the site has been demolished and shown as open ground (undeveloped). The south end of the <i>Car Park</i> is labelled to the south west as <i>Depot</i> . It is thought this area refers to a recycling facility located in the car park, and not to the former <i>Essendene</i> site.	2000 - <i>Ashington Colliery</i> is no longer shown, with the former <i>Mine</i> landscaped and <i>Wansbeck Business Centre</i> now present in the south of the former <i>colliery</i> site. 2006 - <i>Ashington Hospital</i> building is no longer shown, with the former site shown clear of buildings.

4.9 Man-Made Features

A review of the historical geological maps and environmental information and Ordnance Survey (OS) maps included in the Envirocheck Report provided by Landmark has identified the following man-made features that may potentially impact the site and the surrounding area:

- Mining (beneath and sub adjacent to the site);
- Railway (on site);
- Former railway sidings (on site / north);
- Former goods shed (on site)
- Former oil tanks (on site)
- Former coal depot (on site / north);
- Former electricity sub-station (on site);
- Former weighbridge (north);
- Potential buried foundations - Essendene (on site), and
- Made Ground beneath the car park (on site).

The features are presented on three drawings. Mining Constraints are shown on Drawing 60601435-ACM-07-ZZ-DRG-EGE-003 P03 and Geotechnical and Geoenvironmental Constraints identified from past land uses are presented on Drawings 60601435-ACM-07-ZZ-DRG-EGE-004 P03 and 60601435-ACM-07-ZZ-DRG-EGE-005 P01 based on Envirocheck data and historical OS maps, respectively.

In the CON29M Coal Mining Report (see Section 4.4.1), the Coal Authority reported that a subsidence claim has been made within 50 metres of the property boundary that does not match the property address. The property relating to the claim is shown on the enquiry boundary plot, see Appendix D. Inspection of the Coal Authority plan shows this relates to *Ashington Cricket Club*. As advised by the Coal Authority, a Subsidence Claims Report has been ordered for the site.

Drawing 60601435-ACM-07-ZZ-DRG-EGE-005 P01 shows two historical *Electrical Sub Station* Facilities in the south east corner of the site, although only one is evident from historical mapping, see Drawing 60601435-ACM-07-ZZ-DRG-EGE-004 P03. The point labelled *Oil, petroleum & gas refining & storage (1924)* is taken from the 1924 1:10,560 scale OS map edition for a point labelled *Oil Tanks*. Two *Oil Tanks* identified on the 1923 1:2,500 scale OS map edition are also shown, along with the *Coal Depot* and *WB* (weighbridge) from the 1968 1:2,500 scale OS map edition.

4.10 Regulatory Information

The Envirocheck Report and Site Sensitivity maps are included in Appendix B. Details of regulatory information within 250m of the proposed Ashington Station are summarised in Table 13.

Table 13. Regulatory Information

Envirocheck Map ID	Relevant Feature	On site	Off-site (within 250m)	Distance (m)
N/A	Water Abstractions	None	None	
N/A	Discharge Consents	None	None	
N/A	Pollution Incidents to Controlled Waters	None	None	
N/A	Integrated Pollution Prevention and Control	None	None	
N/A	Local Authority Pollution Prevention Controls	None	None	

Envirocheck Map ID	Relevant Feature	On site	Off-site (within 250m)	Distance (m)
	Contemporary Trade Directory Entries	None	Twenty-Four (Eighteen Inactive)	45-247
A 31-41			Bailey's Blinds Ltd (A31) located 88m north east of the site. Asda Petrol (A35) located 180m north of the site. (299m according to fuel station entry). National Tyres and Autocare (A37) located 200m north east of the site. J Hodgetts Motor Repairs (A39) located 207m north west of the site. M C Auto Repairs (A40) located 214m north west of the site. Ashington Direct Auto Care located 241m north east of the site.	88-236
N/A	Fuel Station Entries	None	Ashington Service Station located 187m north west of the site. Status - Obsolete	187
N/A	Control of Major accident Hazards Site (COMAH) and Explosive Sites Information	None	None	

Features identified from the Regulatory Information included in the Envirocheck Report do not constitute an unusual or onerous development constraint.

4.11 Sensitive Land Use

Sensitive land uses identified in the Envirocheck Report are summarised in Table 14.

Table 14. Sensitive Land Use

Envirocheck Map ID	Relevant Feature	On site	Off-site (within 500m)	Distance (m)
N/A	Ancient Woodland	None	None	
N/A	Areas of Adopted Green Belt	None	None	
N/A	Areas of Unadopted Green Belt	None	None	
N/A	Area of Outstanding Natural Beauty	None	None	
N/A	Environmentally Sensitive Areas	None	None	
N/A	Forest Parks	None	None	
N/A	Local Nature Reserve	None	None	
N/A	National Nature Reserve	None	None	
N/A	National Parks	None	None	
N/A	Nitrate Sensitive Areas	None	None	
N/A	Nitrate Vulnerable Zone	None	None	
N/A	Ramsar Sites	None	None	
N/A	Site of Special Scientific Interest (SSSI)	None	None	

Envirocheck Map ID	Relevant Feature	On site	Off-site (within 500m)	Distance (m)
N/A	Special Area of Conservation	None	None	
N/A	Special Protection Areas	None	None	
N/A	World Heritage Sites	None	None	

No Sensitive Land Uses have been identified within 500m of the site.

4.12 UXO

An Unexploded Ordnance (UXO) survey for the site has not been undertaken. However, an Unexploded Bomb Risk Map was obtained from Zetica UXO (<https://zeticauxo.com/downloads-and-resources/risk-maps/>) dated 23 April 2019 which is included in Appendix E. The map shows the site falls within a low risk area; low risk areas are defined as having ≤15 bombs per 1000 acres. Therefore, it is considered that the site is not at significant risk from Unexploded Bombs (UXB) and further specialised searches or precautionary measures are not required.

4.13 Geo-environmental and possible contamination issues

Contaminative land that may be associated with the man-made features and historical land uses described under Sections 4.8 and 4.9 above are assessed under Section 6.6 which describes the site conceptual model and includes a preliminary environmental risk assessment in accordance with guidance provided in CIRIA C552 – 'Contamination Land Risk Assessment, A Guide to Good Practice'.

5. Ground Conditions

5.1 Soils Anticipated

Based on a review of the geological mapping and available British Geological Survey (BGS) borehole logs the following ground conditions are anticipated to be present at the site, summarised in Table 15.

Table 15. Ground Conditions

Strata	Strata Description
Made Ground	Made Ground anticipated from previous and existing land uses, i.e. car park, former railway sidings and existing railway line. Based on BGS holes, the anticipated depth is ~1.0m.
Glacial Till	Glacial Till. Based on BGS holes the anticipated depth is from ~0.5m to ~4.4 to 5.0m
Bedrock	Pennine Middle Coal Measures Formation. Based on BGS holes the anticipated rock depth is from ~4.4m to 5.0m. The Coal Authority Consultants Coal Mining Report states that the shallowest recorded worked seam beneath the site is at ~80m depth (this is inferred to the Ashington (High Main) seam). Unrecorded workings may be present in the Rowlington (15 to 25m), Top Ryhope Five Quarter (20 to 30m), Bottom Ryhope Five Quarter (30 to 40m), the Ryhope Little (35 to 45m) and Moorland Seams (40 to 55m).

A scheme specific ground investigation (GI) is being undertaken across the site. The works are being carried out in two phases, an initial Approval In Principle (AiP) phase for feasibility design and a subsequent phase to inform detailed design. At the time of writing, site works for the initial AiP phase GI have been completed, laboratory testing is ongoing but the results are not available. The second detailed design phase of the GI has not yet been finalised.

5.2 Engineering Properties

Location specific engineering properties are not available.

5.3 Significance of Geological Formations

An extract from British Geological Survey (BGS) 1:10,000 scale BGS Map Sheet NZ28NE is reproduced on Drawing 60601435-ACM-07-ZZ-DRG-EGE-002 P03. Superficial soils are mapped as Till (Boulder Clay) and Glacial Drift, undifferentiated. The underlying solid geology comprises the Middle Coal Measures now renamed as the Pennine Middle Coal Measures Formation. The map shows a series of coal seams striking north east - south west, subcropping in close succession, dipping south east below the site area. These seams are recorded as the Rowlington (youngest), Top Ryhope Five Quarter, Bottom Ryhope Five Quarter, Ryhope Little and Moorland (oldest). The shallowest named seam below the site is the Rowlington which is shown to sub-crop approximately 180m to the north west. There are two other unnamed thin coal seams shown on the geological vertical section included on the map between the Kirkby's Marine Band, which sub-crops below the site, and the underlying Rowlington. These two thin unnamed seams are unlikely to have been economical to mine. However, as outlined in Section 4.4.6, there is a potential risk of subsidence migration caused by the collapse of shallow unrecorded coal workings (<30m bgl) within the five seams named above (Table 15 gives details of the depth ranges that they are estimated to be present below the site).

According to official mining information records held by the Coal Authority (02 December 2020) at the time of mine records searches, they were of the opinion that the recorded workings reported to be present at depths of 80 to 240m are unlikely to impact the stability of the property (as reported in the mining reports summarised in Sections 4.4.2 and 4.4.3 and presented in Appendix D).

The shallowest coal seam below the site known to have been worked in the District is the Rowlington, identified to be up to 1.27m thick. The Coal Authority Consultants Coal Mining Report (summarised in Section 4.4.3 and presented in Appendix D) states that the site does not fall within the dataset for "probable unrecorded shallow

workings", therefore it can be inferred the Coal Authority has no evidence to suggest there are any unrecorded shallow workings beneath the site. It should be noted that there are several named coal seams at shallow depth below the site that may be capable of being mined therefore it would be prudent to confirm that unrecorded mine workings will not pose a risk to the development.

5.4 Groundwater Conditions

At this stage groundwater conditions are not known but they may be subject to seasonal fluctuations.

6. Preliminary Engineering Assessment

6.1 General

The proposed platform for Ashington Station is to be located to the west of the track. The proposal at this location is for the construction of only one platform as the station forms the northern end of the line, meaning boarding and disembarking can be undertaken at the same platform. A siding will be required in the area of the new station to allow for passing of freight trains; the exact location of the siding is still to be confirmed.

The proposed station layout includes a 275 space car park to the west and an access lift to the north to provide access for Persons of Reduced Mobility (PRM TSI) between the platform and Wansbeck Square. No changes to the rail earthworks are currently proposed. However, a retaining wall is proposed south of the platform to accommodate a difference in level between an area of landscaping (next to the car park) and the adjacent rail earthworks. This is required to enable construction of a platform emergency exit. The earthworks at the site are <2m deep / high and so are not assessed as part of Network Rail's regular programme of earthworks inspections.

6.2 Cuttings

Not required.

6.3 Embankments

Not required.

6.4 Road Pavement Foundation / Subgrade

The station car park is proposed as an extension to the existing Wilko's Retail Store car park to the west of the railway extending southwards across an area of uneven ground formed following the demolition of Essendene (a former Care Home). In addition, the development is proposed to include access for vehicles between the station car park and Kenilworth Road to the west, a cycle storage area and taxi and drop off bays. Detailed proposals are shown on Drawing 60601435-ACM-07-ZZ-DRG-EHW-070001 P02.

Pavement subgrade (ground) conditions below areas of new road pavement should be assessed in accordance with CD 225 Revision 0 Design for new pavement foundation (which replaces IAN 73/06 revision 1 (2009) and HD25/94). Design considerations include the minimum layer thickness required during construction, protection of the subgrade whilst works take place and the ability of the ground to provide long term support to the overlying bound road pavement. Other issues which need to be addressed during design include drainage and durability.

Preliminary California Bearing Ratio (CBR) values for use in road pavement design are provided in Table 16. Adequate pavement drainage will be required to maintain such values in the long term.

Table 16. Preliminary Design CBR Values

Material Type	Preliminary CBR Values (%)
Made Ground (Fine grained)	2 to 4
Made Ground (Coarse grained)	5 to 15
Glacial Till (Fine grained)	2 to 4

CD225 Revision 0 (2020) allows the use of CBR values to determine subgrade surface modulus (E) values for short term (construction) and long term (in service) conditions. The design E value assigned to the pavement foundation is the lowest E value calculated. If $E < 30\text{MPa}$, improvement of the subgrade shall be undertaken. Ground investigation (GI) is being undertaken to assess ground conditions at the site and provide engineering data to determine CBR values across the footprint of the proposed road pavements.

For road pavement foundation design, the scheme-specific GI is intended to confirm the spatial distribution and depth of any Made Ground present across the site, investigate the composition and engineering characteristics of this material and the natural Glacial Till soils and determine groundwater levels.

For subgrades with CBR values of <2.3%, the formation will require treatment (by provision of a thickened subgrade, dig out of the formation and replacement with engineered fill, improvement or strengthening) prior to construction of the bound pavement layers. Where the soil is fine (cohesive and clay rich), the soil can be improved by treatment. It is likely that highly plastic clay soils like laminated clays which are locally present within the glacial soils beneath the site will be amendable to modification and or stabilisation by the addition of lime and cement binders to provide capping and subbase quality materials. However, this technique may be less suitable for modifying less plastic well graded and coarser Made Ground (if present) and Glacial Till soils, which are expected to form the most of the natural subgrade soils exposed at the site.

Stabilisation of natural soils in-situ reduces the amount of excavation, minimises imported capping material requirements and reduces subsequent replacement of excavated materials. However, lime cement stabilisation treatment may prove prohibitive on grounds of cost, due to mobilisation of equipment required. In-situ stabilisation tends to be adopted for large development sites remote from existing residential housing. It is noted that the new Design CBR should be assumed to be equivalent to 2.3%, unless agreed otherwise under Departure from Standard approval. Typically, field trials and testing are required to demonstrate the improved CBR provided by modified subgrade soils. This process can lead to delay and additional cost. Binder treatments also require careful control to avoid adverse environmental impact from noise and dust, where works are to be undertaken close to residential housing, sensitive wildlife habitats, highways and railways. Given the constrained nature of the site, the relatively small development area and the sensitive surrounding land uses (e.g. residential housing), this technique is unlikely to be feasible at this location.

If Made Ground is expected to form the pavement subgrade, a preliminary E value of <30MPa should be assumed. Subgrade conditions are likely to need to be improved by provision of a thickened subgrade or dig out of formation and replacement with engineered fill. Site works for an initial phase (Approval In Principle) phase of GI have been undertaken at the site which included carrying out in-situ CBR tests in selected machine dug trial pit but the results are not available at the time of writing.

The design should include drainage measures to protect and maintain the integrity of the pavement subgrade from either ponded surface water or shallow groundwater.

6.5 Structures

Structures currently proposed for Ashington Station includes a station platform, a lift shaft on the west side of the line to provide access to provide access for Persons of Reduced Mobility (PRM TSI) between the platform and Wansbeck Square to the north and a retaining wall at the south east corner of the site between car park landscaping and the railway earthworks. The lift will require excavation of an access pit and the structure is currently envisaged to be supported on piled foundations. It is anticipated that the station platform will be formed on a crosswall arrangement supported on spread foundations bearing onto natural soils or underlying bedrock.

Details of the proposed structures are presented in Table 17.

Table 17. Structures – Preliminary Geotechnical Assessment

Structure	Chainage (m) from	Chainage (m) to	Foundation Soils (from geological mapping)	Foundation / Special Measures
Platform, lift shaft and retaining wall adjacent to the south east corner of the adjacent car park.	22970	23190	Till (Boulder Clay) and Glacial Drift, undifferentiated (Glacial Till).	Spread or piled foundations. Possible ground treatment (e.g. consolidation grouting) of any shallow unrecorded coal workings found below the site during ground investigation survey.

Ground investigation (GI) is required to assess the potential impact of the geotechnical and geo-environmental constraints identified at the site of the proposed structures. The GI will be undertaken to confirm the foundation soils beneath the proposed station platform, lift access and retaining wall to investigate the underlying stratigraphy. The GI will also determine if shallow unrecorded mine workings are present in the Rowlington, Top Ryhope Five Quarter, Bottom Ryhope Five Quarter, the Ryhope Little and Moorland seams beneath the site.

6.6 Contaminated Land

In order to make an assessment of the construction, environmental and human health risk a conceptual model needs to be developed for the site. This requires an examination of the 'Source-Pathway-Receptor' linkages to define construction, human health and environmental risk associated with existing and future conditions. The first step of model development is to identify the contaminants of concern from possible sources and potential receptors on and around the site.

The risk assessment is based on guidance provided in CIRIA C552 - Contamination Land Risk Assessment, A Guide to Good Practice. At this stage, the risk assessment is of a preliminary nature as site specific ground investigation and laboratory test results are not available. The risk assessment is based on information obtained in this geotechnical and geo-environmental study and should be updated as further information becomes available.

The risk assessment is performed in accordance with the precautionary principle, in which a pathway is assumed to exist unless there is reasonable contrary evidence. The risk associated with each source-receptor linkage is a product of the probability that a significant pathway exists and the severity of the potential impact. For preliminary risk assessment the adopted method for risk evaluation is a qualitative method and involves classification of:

- magnitude of the potential consequence (severity) of risk (Table 6.3 - CIRIA 552), classified as: Severe, Medium, Mild, Minor.
- magnitude of the probability (likelihood) of risk occurring (Table 6.4 - CIRIA 552), classified as High Likelihood, Likely, Low Likelihood, Unlikely.

Assuming that a pathway is present, the consequence of exposure depends on the concentrations of the contaminants as well as the exposure route and the sensitivity of the receptor. This principle drives the DEFRA Contaminated Land Exposure Assessment model (CLEA). It is necessary therefore, to consider the potential hazard a chemical may pose as well as the normal range of concentrations likely for the land use, the efficiency of delivery by the anticipated pathway of direct contact, ingestion, dust or vapour inhalation, and the sensitivity of the receptor, be that adult or child etc. As an example, the concentration of arsenic in colliery spoil may possibly exceed a screening level for ingestion by a child in a residential setting, however it would be unlikely to exceed a chronic health screening threshold for an adult worker by direct contact, and even less likely to be a problem from an off-site source via wind-blown dust. For preliminary risk assessment, the adopted consequence of exposure has taken into account a reduction in consequence from exposure due to the reasonable limitation of source concentration, the directness of the exposure route and the sensitivity of the receptor. For the typical range of contaminant concentrations expected in colliery spoil for example, this might reduce the consequence of exposure for an adult worker from Medium, which reflects a chronic risk, conservatively to Mild. This is intermediate between Medium and Minor, the latter according to CIRIA guidance reflecting a non-permanent health impact.

A comparison of consequence against probability is undertaken to indicate the risk presented by each potential pollutant linkage. The probability indicates the likelihood that an exposure route may exist. This depends on whether the impacted soils are likely to be present, or indeed exposed, and also the probability that the potential receptor will come in contact with enough of the contamination to be impacted. The principal factors governing probability of exposure are the likely distribution of contaminants and the possible activities that may lead to exposure.

Overall risk is calculated in accordance with Table 6.5 – CIRIA 552, reproduced below:

		CONSEQUENCE			
		Severe	Medium	Mild	Minor
PROBABILITY	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
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Existing Railway Infrastructure / abandoned railways

From recent site history based upon Ordnance Survey mapping the principal source of contamination is the current use of the site as a railway.

The Department of Environment Industry Profile for Railway Land indicates imported fill was often utilised during construction of the railways where there was a shortfall of natural excavated material. Imported fill often included waste material containing clinker and ash. Boiler ash generated by steam locomotives was also often used to form ballast along many railway lines. Other potential sources of contaminants that may be encountered on railway land include herbicides, polychlorinated biphenyls (PCB's) utilised in electrical transformers, and general spills of materials used or transported, which may include fuels, oils, paraffin, solvents, antifreeze liquids such as ethylene glycol, creosotes, paints etc. Metal fines, ash and asbestos are also frequently present on railway land. Concentrations of contaminants (if present) are likely to be relatively low and acute or chronic health risks are not anticipated for railway workers or passengers between stations.

Contamination of rail track bedding within stations is only expected to be slightly greater than adjacent track; due to increased average residence time of trains, the possibility of leaking or damaged locomotives stopping at the station, and the potential increased use of pesticides and herbicides. It is also probable that spills within stations are more likely to be cleaned up (to a higher standard) due to greater surveillance. More significantly, the presence of foot passengers on station platforms and associated landscaping introduces a more sensitive receptor. However, chronic health risks from exposure to contamination on the rail tracks are not considered a viable pathway for foot passengers, since the exposure duration for direct contact should be vanishingly small.

Former Collieries

Ashington Colliery was located about 0.5km north-northwest of the site. The distance to the colliery is probably too great for it to have a direct significant impact on the site, however it is likely that adjacent land will be affected by deposition of colliery spoil from mining activity, in addition to colliery spoil being used for railway embankment / fill placed below building ground slabs for example.

Historically, the main industry in the district has been coal mining. Collieries generate vast amount of spoil in the form of excavated soil and rock as well as coal washings (tailings) with variable coal content. Other wastes such as flue dust, boiler ash and clinker are generated by mine engines, and associated coking and gas works, which are also responsible according to DOE Industry profiles for production of ammoniacal liquor, coal tar, spent oxide (Blue Billy / cyanide complexes) and foul lime, asbestos. The colliery is shown to include a gasometer therefore production of town gas (from coal) is likely, although theoretically gas could have been imported (piped in). Colliery wastes would have been a ready source of embankment material therefore colliery spoil, ash and clinker have probably been used for embankment construction, however contamination by other wastes may also be present although it is less likely. Colliery spoil especially from older collieries may have a relatively high coal content giving rise to possible combustion risk. These issues are included in the geotechnical risk register, Section 7.

Colliery spoil containing pyrite and low concentrations of carbonate (acid neutralisation capacity) may produce acid mine drainage by oxidation of sulphide to produce hydrogen sulphate (sulphuric acid). Acid may increase the solubility of certain metals leading to contamination in downstream watercourses. Potentially this process can accelerate however it is most likely that conditions have stabilised over time, unless there has been a significant change in spoil thickness, depth of water table, compaction or cover permeability to oxygen. Excess heat from the exothermic reaction may be responsible for slow combustion and generation of carbon dioxide or carbon monoxide gases. Acid mine water may be corrosive to construction materials and pose a problem for water disposal from cuttings.

The known shafts at Ashington are considered to be at too great a distance to be a direct hazard for mine gas; however, there may be unknown mine entries closer to the site.

Spoil heaps contain large volumes of material, however due to the age of the structures and general characteristics of the waste it is not anticipated there will be significantly high rates of gas emission.

Infilled land

The only land identified by Landmark in the Envirocheck Report (presented in Appendix B) as being infilled (non-water) is an area of earthworks, railway and access tracks 46m from the site associated with Ashington Colliery.

This area has been housing since around 1923 and once included a fire station. Landmark has not identified any infilled water features close to the site. The site is not regarded as being at risk from landfilling in terms of impact by contaminated wastes or landfill gases, however low concentrations of gas may be present in made ground associated with land spreading of colliery spoil or imported fills for the car park or railway infrastructure. The risk from imported fill on and off the site can be dealt with adequately by assessing the risk from railway land and spoil (on and off-site).

Other Land uses

The surrounding residential and commercial land use and associated road infrastructure are not considered to be a contamination risk to the site. Historically oil tanks were shown in 1923 mapping (no longer labelled as such by 1932) within the site. The inferred tank structures were removed over time, with the last visible evidence disappearing by 1968. Based on the age of the tanks and the description as “oil” there is not expected to be a significant problem from hydrocarbon leakage and migration below the site. Concentrations of critical volatiles are likely to have been low and over time these become depleted. Residual oil, if present, is not expected to be mobile or volatile. Localised contamination may have occurred on-site from leaks and spillages from vehicles, the *Goods Shed*, electricity substations, or off-site from the crane, weighing machine, construction etc. however the impact on the development is not likely to be significant due to the small-scale nature of these events.

The profile for contamination associated with railways and collieries includes metals / metalloids and hydrocarbons therefore the types of off-site contamination anticipated for electricity substations and general urban environments can be addressed by railway and colliery land uses.

Abandoned mine workings

Given the presence of the known mine workings below the site at depth and possible workings in the shallow Rowlington coal seam, there is a risk of potential harmful mine gases including Carbon Dioxide, Methane, Carbon Monoxide and more rarely Hydrogen Sulphide from underground mine workings. Ground / mine gases can be toxic, explosive and asphyxiant, and also be Oxygen deficient. However, as the proposed development comprises a railway and a car park there is limited scope for a source-path-receptor linkage to exist and therefore this risk is considered **Low** for the proposed development with the possible exception of enclosed spaces such as the lift shaft, toilets, ticket offices, poorly ventilated equipment cabinets etc. Monitoring of potentially harmful mine gas will be undertaken during ground investigation as rotary coring progresses into the underlying bedrock. Should significantly elevated concentrations of potentially harmful mine gases be recorded during ground investigation then this risk will need to be reassessed.

Environmental risks have been assessed for the generic land use types of “Railway” for on-site risks, and “Colliery” for off-site risks. The Railway land use includes contamination associated with operation of a railway and also presence of colliery spoil or other contaminated fill materials on the site. The Colliery land use includes risk from imported colliery spoil contaminated by mine operations arising from ash, clinker, coal, hydrocarbons and asbestos, as well as metal / metalloid contamination of colliery spoil, and risk from mine gases to buildings. Risk from mine gas from shallow workings, mine shafts and adits on or adjacent to the site, and risk from the old oil tanks have been assessed under separate headings. Results of this analysis are presented in Table 18.

Table 18. Environmental Risk

A. Railway (on-site)					
Source	Pathway	Receptor Linkage	Consequence	Likelihood	Risk
Metals / metalloids	1. Ingestion / skin contact	Railway Workers (1,2,10)	Mild	Likely	Moderate / Low
	2. Dust Inhalation	Passengers (on-site) (1,2)	Mild	Likely	Moderate / Low
	3. Vapour Inhalation				
	4. Explosion / Asphyxiation	General Public (off-site) (1,2)	Mild	n/a	n/a
	5. Plant Uptake / Phytotoxicity	Fauna & Flora (5)	Minor	Low	Very low
	6. Leaching to surface water	Surface Water (6)	Minor	Low	Very low
	7. Leaching to groundwater	Groundwater (7)	Mild	Low	Low
pH / sulphate / chloride	8. Corrosion / chemical attack	Fauna & Flora (5)	Minor	Low	Very low
	9. Permeation of pipes	Surface Water (6)	Minor	Low	Very low
		Groundwater (7)	Mild	Low	Low
	10. Exposure to contaminated water	Buildings (8,9)	Mild	Likely	Moderate /

A. Railway (on-site)					
<i>Source</i>	<i>Pathway</i>	<i>Receptor Linkage</i>	<i>Consequence</i>	<i>Likelihood</i>	<i>Risk</i>
					Low
		Railway Workers (10)	Minor	Low	Very low
Hydrocarbons PAH / TPH		Railway Workers (1,2,3,4,10)	Mild	Likely	Moderate / Low
		Passengers (on-site) (1,2,3)	Mild	Likely	Moderate / Low
		General Public (off-site) (1,2,3)	Mild	n/a	n/a
		Buildings (4,8,9)	Minor	Likely	Low
		Fauna & Flora (5)	Minor	Low	Very low
		Surface Water (6)	Minor	Low	Very low
		Groundwater (7)	Mild	Low	Low
	PCB		Railway Workers (1)	Minor	Likely
		Passengers (on-site) (1)	Minor	Likely	Low
		General Public (off-site) (1)	Minor	n/a	n/a
		Surface Water (6)	None	n/a	n/a
		Groundwater (7)	None	n/a	n/a
VOC / SVOC		Railway Workers (1,2,3,4,10)	Minor	Likely	Low
		Passengers (on-site) (1,2,3)	Minor	Likely	Low
		General Public (off-site) (1,2,3)	Minor	n/a	n/a
		Buildings (4,9)	None	n/a	n/a
		Fauna & Flora (5)	None	n/a	n/a
		Surface Water (6)	None	n/a	n/a
		Groundwater (7)	Minor	Low	Very low
Asbestos		Railway Workers (2)	Mild	Likely	Moderate / Low
		Passengers (on-site) (2)	Mild	Low	Low
		General Public (off-site) (2)	Mild	Unlikely	Very low

B. Colliery (off-site)					
<i>Source</i>	<i>Pathway</i>	<i>Receptor Linkage</i>	<i>Consequence</i>	<i>Likelihood</i>	<i>Risk</i>
Metals / metalloids	1. Ingestion / skin contact 2. Dust Inhalation 3. Vapour Inhalation 4. Explosion / Asphyxiation 5. Plant Uptake / Phytotoxicity 6. Leaching to surface water 7. Leaching to groundwater 8. Corrosion / chemical attack 9. Permeation of pipes 10. Exposure to contaminated water	Railway Workers (1,2,10)	Minor	Likely	Low
		Passengers (on-site) (1,2)	Minor	Likely	Low
		General Public (off-site) (1,2)	Minor	n/a	n/a
		Fauna & Flora (5)	None	n/a	n/a
		Surface Water (6)	None	n/a	n/a
		Groundwater (7)	Minor	Low	Very low
		pH / sulphate / chloride	Fauna & Flora (5)	Minor	Low
Surface Water (6)	Minor		Low	Very low	
Groundwater (7)	Mild		Low	Low	
Buildings (8,9)	Mild		Likely	Moderate / Low	
Railway Workers (10)	Minor		Low	Very low	
Hydrocarbons PAH / TPH		Railway Workers (1,2,3,4,10)	Minor	Likely	Low

A. Railway (on-site)					
<i>Source</i>	<i>Pathway</i>	<i>Receptor Linkage</i>	<i>Consequence</i>	<i>Likelihood</i>	<i>Risk</i>
		Passengers (on-site) (1,2,3)	Minor	Likely	Low
		General Public (off-site) (1,2,3)	Minor	n/a	n/a
		Buildings (4,8,9)	None	n/a	n/a
		Fauna & Flora (5)	None	n/a	n/a
		Surface Water (6)	None	n/a	n/a
		Groundwater (7)	Minor	Low	Very low
Asbestos		Railway Workers (2)	Minor	Likely	Low
		Passengers (on-site) (2)	Minor	Low	Very low
		General Public (off-site) (2)	Minor	Unlikely	Very low
Hazardous Gas		Railway Workers (4)	Minor	Likely	Low
		Buildings (4)	Minor	Likely	Low

C. Shallow Workings / shafts / adits					
<i>Source</i>	<i>Pathway</i>	<i>Receptor Linkage</i>	<i>Consequence</i>	<i>Likelihood</i>	<i>Risk</i>
pH / sulphate / chloride	1. Ingestion / skin contact 2. Dust Inhalation 3. Vapour Inhalation 4. Explosion / Asphyxiation 5. Plant Uptake / Phytotoxicity	Fauna & Flora (5)	None	n/a	n/a
		Surface Water (6)	None	n/a	n/a
		Groundwater (7)	Minor	Low	Very low
		Buildings (8,9)	Minor	Likely	Low
		Railway Workers (10)	None	n/a	n/a
Hazardous Gas	6. Leaching to surface water 7. Leaching to groundwater 8. Corrosion / chemical attack 9. Permeation of pipes 10. Exposure to contaminated water	Railway Workers (4)	Medium	Likely	Moderate
		Buildings (4)	Medium	Likely	Moderate

D. Oil Tanks (off-site)					
<i>Source</i>	<i>Pathway</i>	<i>Receptor Linkage</i>	<i>Consequence</i>	<i>Likelihood</i>	<i>Risk</i>
Hydrocarbons PAH/TPH	1. Ingestion/ skin contact 2. Dust Inhalation 3. Vapour Inhalation 4. Explosion / Asphyxiation 5. Plant Uptake / Phytotoxicity 6. Leaching to surface water 7. Leaching to groundwater 8. Corrosion / chemical attack 9. Permeation of pipes 10. Exposure to contaminated water	Railway Workers (1,2,3,4,10)	Minor	Low	Very low
		Passengers (on-site) (1,2,3)	Minor	n/a	n/a
		General Public (off-site) (1,2,3)	Minor	n/a	n/a
		Buildings (4,8,9)	None	n/a	n/a
		Fauna & Flora (5)	None	n/a	n/a
		Surface Water (6)	None	n/a	n/a
		Groundwater (7)	Minor	Low	Very low

Magnitude of the potential **Consequence** (severity) of risk, Table 6.3, CIRIA C552.

Magnitude of the **Probability** (likelihood) of risk occurring, Table 6.4 - CIRIA C552.

Risk presented by each pollutant linkage, Table 6.5 – CIRIA C552.

Actions corresponding with the risk classification are calculated based on the requirements of Table 6.6 – CIRIA 552. The table indicates that any risk classified as moderate or higher will require further investigation or mitigation measures.

The main receptors at (**Moderate**) risk from harm due to migration of hazardous mine gases are railway workers in confined spaces such as excavations and drain culverts, and poorly ventilated structures (ticket offices, toilets, equipment cabinets, ticket machines etc). Mine gas is not anticipated to be a risk for open platforms or the railway line itself; however enclosed structures might be designed so they are intrinsically safe, e.g. raised off the ground with a gap between the structure and the ground. It would also be possible to provide structures with a physical barrier such as a gas protection membrane, however this would require a higher level of design and verification. The access lift shaft is likely to require both water protection and gas protection therefore a combined system should be designed and verified. Where a physical barrier option is selected, then requirements for installation of instruments and monitoring of gas concentrations, pressures and flow rates need to be considered to establish the parameters for adequate design and verification of the protection measures. This might be difficult in the case of the lift shaft given the physical constraints for long term monitoring, and it might be preferable to consider installation of a precautionary design and integrity testing once constructed by agreement with the regulator. Working in excavations or other environments susceptible to intrusion by mine gases should be controlled using safe working practices for confined spaces.

During site investigation activities, hazardous mine gases are also a risk to drilling crews and to neighbouring structures that are sensitive to displacement of mine gas. Safe drilling practices must be agreed with the Coal Authority as part of licensing to obtain permission to disturb old mine workings. Gas monitoring will be necessary for safe drilling of Coal Measures and potentially results from the investigation could be used to develop a scope for long term monitoring.

Railway workers including ground workers are likely to come into contact with soils containing metals/metalloids, hydrocarbons and potentially asbestos from use of the site as railway land and possible import of contaminated fills for construction. The most dangerous friable forms of asbestos such as insulation materials are likely if present to be sporadic in nature from localised use, whereas asbestos cement, which is less harmful, may be more widespread. Low concentrations of fibres could also be present from the abrasion of brake pads and linings; however, this is not considered to be a significant risk due to the low potential for high numbers of asbestos fibres to become airborne. It is assumed that excavations in made ground may encounter contamination; and to manage the conditions it will be necessary to undertake site investigation prior to earthworks commencing, balanced with measures taken during construction to manage unacceptable risk. The extent of ground investigation proposed could be optimised for the construction proposals and the amount of excavation required.

Passengers are only likely to come into direct contact with soils in areas of landscaping. The risk to passengers such as young children playing in muddy areas is considered to be **Moderate to Low** for metals/metalloids and hydrocarbons. Risk from asbestos in soils is lower for passengers than railway workers since the likelihood for generation of significant numbers of respirable fibres is higher for construction. Mitigation for contamination in public areas if needed could be provided by using hard-standing or construction of a clean cover system. If the use of site-won topsoil or subsoil is under consideration for public areas it would be advisable to carry out a contamination assessment to determine whether the selected soils are suitable.

Construction materials such as concrete and steel may be at **Moderate to Low** risk from corrosive conditions associated with leachate from colliery spoil or pollution from mine water. Geochemical Risks to construction materials from made ground and natural deposits are considered in the geotechnical risk register, Section 7.

Surface water tributaries and groundwater are not considered to be at significant risk from the existing land use as a railway since the associated construction comprises a thin strip of material above the water table and has been present for many decades. The boreholes on the site indicate about 4m of low permeability drift (Glacial Till) although in one borehole NZ28NE360 this is replaced by 2.1m of sand and gravel with boulders above mudstone bedrock. Given the distance to local watercourses it is unlikely that contamination from the site will have a significant impact on surface water quality.

Preliminary assessment indicates the environmental risks to controlled waters to be **Low, Very Low** or negligible. However, routine screening tests of the Made Ground will be undertaken to quantify hazardous properties and waste acceptance criteria for assessment of pre-treatment options and disposal, for example from spoil arising from the construction process. This will provide data for potential leachability of Made Ground. Outside of the

routine chemical testing proposed, environmental and human health risk will therefore not be considered further as part of future phases of work unless excavation is planned or areas of public land will be landscaped.

Temporary works could have adverse impacts on surface water courses through generation and / or mobilisation of fines and spills or leaks from construction plant. These risks should be controlled as a normal part of site operations and planning for construction works and are not considered part of the land quality assessment.

Acid mine drainage from rising mine water or leachate generated in spoil heaps could theoretically be a problem for the site if it enters site drainage and requires disposal. Typically, iron and other metals are deposited as the mine water reaches equilibrium with the environment. These deposits can block up drains as well as being unsightly. Concentrations of toxic metals such as copper, lead and zinc in the effluent may also exceed environmental standards. This potentially creates a problem for disposal of effluent to watercourses even though the source is likely to be off-site. If there is evidence of acid mine drainage such as ochreous deposits noted during earthworks or drainage intervention works then further assessment will be necessary.

Due to the age of the tanks and the anticipated properties of the oil, no risks are anticipated from the presence of former oil tanks on the site. However, if any unexpected visual or olfactory evidence for contamination of soil or water by oil or other noxious substance is encountered during site investigation or earthworks, then additional risk assessment will be necessary, as usually dictated by Planning Conditions. Chemical testing will also be required under Duty of Care regulation for disposal of any waste soils to assess Hazardous Properties, and if necessary to assess Waste Acceptance Criteria for landfill selection.

Soils on site may be coal-rich due to use of the site a coal depot. From the history of the site it is not anticipated that the impacted soils will be significantly deep, however due to their combustibility impacted soils may not be suitable as backfill unless they are well compacted and sealed to prevent ignition at the surface.

6.7 Effects of Man Made Obstacles / Site History

Man-made features are listed in Section 4.9 and the risks are discussed in Section 6.6 and the Geotechnical Risk Register, Table 20.

7. Comparison of Project Options and Risks

7.1 General

Comparison of options specific to the scheme have not been undertaken as part of this report and will be undertaken as design options are further developed. The project options are most likely to be related to structures (platforms etc.) and car park locations are likely to be finalised once ground investigation data becomes available.

7.2 Risk Register

A geotechnical risk register for the scheme is presented as Table 20. The register lists the primary risks currently identified and assesses the impact of these risks on the project. For the purposes of this report, risk has been assessed with reference to 'probability', 'impact' and 'risk rating'. Risk rating (R) = Probability (P) x Impact (I), see Table 19.

Table 19. Risk Assessment Table

Likelihood (L)		Severity (S)		Risk (R = L X S)			
Very probable	5	Very High	5	Potential to halt project	OR	Potential for major claim or similar	17 to 25
Probable	4	High	4	Significant delay to overall project		Major impact on cost	13 to 16
Possible	3	Medium	3	Major delay on this task, but significant impact on overall project unlikely		Minor impact on cost	9 to 12
Unlikely	2	Low	2	Minor delay on this task, but significant impact on overall project unlikely		Minor impact on cost	5 to 8
Negligible	1	Very Low	1	No significant impact on task or project.		Negligible impact on cost	1 to 4

Table 20. Geotechnical Risk Register

Item	Identified Geotechnical Hazard / Risk	Works Affected	Cause	Risk before Control			Consequence	Mitigation Measures
				L	S	R (L*S)		
1	Unexpected ground conditions	Station platform, lift access shaft building, retaining wall Car park extensions / modifications & access roads Below ground ancillary works (chambers, lighting and signage column footings, rail signalling & buried utilities)	Unknown soil strength Bearing capacity / stiffness (subgrade surface modulus / CBR) is lower than anticipated or variable. Depth of Made Ground or soft soils variable.	3	3	9	Construction or Operation – collapse – structural failure. Construction or Operation – injury to site workers, users, rail workers and / or public. Construction or Operation – excessive ground movements which could cause serviceability problems and lead to a long-term maintenance liability such as damage to existing rail drainage and signalling. Construction – increase in road or cycle / footway pavement foundation construction thickness. Construction – programme delay and increase in works cost. Design – increase in complexity, duration and cost.	Survey – undertake ground investigation. Design – adequate assessment of design parameters. Design – adequate design in light of ground conditions proved on site. Construction – removal of spot spots and / or areas and replacement with imported engineered fill. Construction assurance – inspection of the works during construction to ensure the ground conditions are as assumed.
2	Historical coal workings	Station platform, lift access shaft building, retaining wall Car park extensions / modifications & access roads Below ground ancillary works (chambers, lighting and signage column footings, rail signalling & buried utilities)	Possible unrecorded shallow mine workings.	3	5	15	Construction or Operation – collapse – structural failure. Construction or Operation – injury to site workers, users, rail workers and / or public. Construction or Operation – excessive ground movements – risk of deformation above old voids or degradation of remaining pillars leading to collapse / settlement which could cause serviceability problems and lead to a potential maintenance liability from damage to the existing railway, drainage and signalling as well as the new infrastructure to be constructed as part of the station development. Construction or Operation – ground movements – requirement	Survey – undertake ground investigation to include rotary coring to investigate the presence / absence of unrecorded mine workings in the Rowlington, Top Ryhope Five Quarter, Bottom Ryhope Five Quarter, Ryhope Little and Moorland seams. Design – adequate design measures such as ground treatment by consolidation grouting (of worked seams below the station platform, lift shaft, footbridge supports and retaining wall). Design – road or cycle / footway pavement construction design changes – incorporation of geogrid reinforcement into the unbound granular pavement sub base / capping foundation or within a thickened granular sub base construction to provide a reinforced flexible pavement (subject to the agreement of The Coal

Item	Identified Geotechnical Hazard / Risk	Works Affected	Cause	Risk before Control			Consequence	Mitigation Measures
				L	S	R (L*S)		
							for ground treatment of worked seams below station platform (and possibly the car parks and access road to Kenilworth Road). Construction – programme delay and increase in works cost. Design – increase in complexity, duration and cost.	Authority). Construction - such as detailed assurance monitoring of ground movements to confirm against design predictions and / or preparation of a grouting closure report.
3	Difficult construction conditions	Station platform, lift access shaft building, retaining wall Car park extensions / modifications & access roads Below ground ancillary works (chambers, lighting and signage column footings, rail signalling & buried utilities)	Unstable soft ground. Shallow groundwater levels. Poor trafficking conditions. Natural / man-made in-ground obstructions (hard spots, relict buried building walls, slabs and foundations, other demolition rubble, old rails, sleepers, redundant utilities etc).	3	3	9	Construction – possible over-excavation. Construction – unstable excavation sides. Construction – possible groundwater inflows. Construction – difficult construction, programme delay and increase in works cost.	Survey – undertake ground investigation to identify obstructions. Survey – installation and monitoring of groundwater level instruments. Design – carry out adequate design. Construction – include a cost / risk allowance for possible delays in the construction programme and risk register. Construction – include provision of advanced drainage works if appropriate. Construction – include adequate allowance for removal of soft spots and natural / man-made in-ground obstructions as a risk item in the construction risk register. Construction – make adequate provision for groundwater control (pumping or cut-off) within excavations during construction as a risk item in the construction risk register.
4	Difficult construction conditions	Station platform, lift access shaft building, retaining wall support pile foundations (if proposed)	Obstructions / cobbles / boulders in the Made Ground and underlying natural glacial soils inhibit advancement of piles to their intended depth.	3	3	9	Construction – structural damage (cracking / spalling) to driven concrete or steel piles, loss of plan position and / or verticality tolerances. Construction – slow progress, damage to piling equipment (e.g. augers). Design – possible redesign, increase in duration and cost. Construction – difficult construction conditions lead to	Survey – undertake ground investigation to identify obstructions. Design – carry out adequate design taking account of the ground conditions proved on site. Selection of appropriate pile type and size. Construction – select adequate section size, installation plant and construction methodology. Construction – carry out advanced probing / clearance works at proposed

Item	Identified Geotechnical Hazard / Risk	Works Affected	Cause	Risk before Control			Consequence	Mitigation Measures
				L	S	R (L*S)		
							replacement installation or a change in foundation type, programme delay and increase in works cost.	pile positions.
5	Difficult construction conditions	Station platform, lift access shaft building, retaining wall support pile foundations (if proposed)	Strength of Coal Measures rocks inhibit advancement of piles to their intended depth.	3	3	9	<p>Construction – structural damage (cracking / spalling) to driven concrete or steel piles, loss of plan position and / or verticality tolerances.</p> <p>Construction – slow progress, damage to piling equipment (e.g. augers).</p> <p>Design – possible redesign, increase in duration and cost.</p> <p>Construction – difficult construction conditions lead to replacement installation or a change in foundation type, programme delay and increase in works cost.</p>	<p>Survey – undertake ground investigation to determine the type and strength of the solid succession close to rockhead.</p> <p>Design – carry out adequate design taking account of the ground conditions proved on site. Selection of appropriate pile type and size.</p> <p>Construction – select appropriate pile section size, installation technique, plant and construction methodology. Assess unconfined compressive strength and rig torque capacity.</p> <p>Construction – consider use of rotary bored or ODEX piling techniques as alternative to continuous flight auger (cfa) or driven precast concrete segmental piles. Assess whether rock shoes should be added to the toe of driven segmental piles to aid penetration.</p>
6	Aggressive ground conditions.	Station platform, lift access shaft building, retaining wall foundations Car park, station access road and cycle / footway access connections Below ground ancillary works (chambers, lighting and signage column footings, rail signalling & buried utilities)	Aggressive elevated concentrations of soluble sulphate and chloride and acidic or alkaline pH in soil or groundwater.	3	2	6	<p>Operation - corrosion of buried steel leading to a loss of section (a reduction in yield strength) and / or excessive structural deflection.</p> <p>Operation – sulphate attack on buried concrete resulting in concrete strength and / or structural damage.</p> <p>Operation - serviceability problems leading to long term maintenance liability.</p> <p>Operation – corrosion of polyethylene (PE) and polyvinyl chloride (PVC) plastic pipes.</p>	<p>Survey – undertake ground investigation including sampling and testing to determine ground aggressivity in accordance with BRE SD1 Third Edition.</p> <p>Design – carry out adequate design.</p> <p>Construction – utilities to be installed within clean inert pipe bedding material.</p> <p>Construction – consider the use of wrapped steel, wrapped ductile iron, copper and PE barrier pipe with an aluminium barrier layer (PE-Al-PE) for services and water supplies in contaminated soils.</p>
7	Ground gas	Station platform, lift access shaft building,	Carbon dioxide, methane and volatile	3	3	9	Construction or Operation – asphyxiation and / or explosion.	Survey – undertake ground investigation to identify potential ground gas.

Item	Identified Geotechnical Hazard / Risk	Works Affected	Cause	Risk before Control			Consequence	Mitigation Measures
				L	S	R (L*S)		
		retaining wall Foundation excavations Rail signalling Rail drainage Below ground ancillary works (chambers, lighting and signage column footings, rail signalling & buried utilities)	vapours may potentially migrate from Made Ground or from underlying shallow mine workings.					Design – carry out adequate design including provision of gas protection measures for all structures. Design – provide a verification plan prior to construction, Construction – provide integrity testing of gas protection measures if applicable, provide verification for design and construction of gas control measures.
8	Contamination of watercourses and groundwater.	Site wide	Flow of surface water / groundwater into local drainage. Leachate, runoff contamination of local drainage and / or waterbodies (underlying aquifer) from fines and construction operations.	3	3	9	Construction – pollution incident causing the release of contaminants into watercourses, drains and underlying Secondary A' aquifer corresponding to the Pennine Middle Coal Measures Formation rocks. Construction – increased cost for disposal of groundwater. Construction – programme delay, increase in works cost. Reputational damage.	Survey – undertake ground investigation (to determine groundwater regime and the extent of any existing groundwater contamination across the site). Design – carry out adequate design. Construction – adopt best practices during construction, including implementation of Construction Environmental Management Plan (CEMP).
9	Buried utilities	Site wide	Unknown location of existing utility services. Disused redundant and live buried services associated with past land use. New construction causes damage to existing buried infrastructure / services.	4	3	12	Construction – severing / damaging utility. Construction or Operation – settlement of utility / services. Construction or Operation – restricted maintenance access to utility provider. Construction – difficult construction, programme delay and increase in works cost.	Survey – to obtain adequate service survey / drawings to confirm status of utility. Survey – undertake service / utility surveys of existing services. Hand dug inspection pits to be excavated to confirm position, depth and status of known utilities which will be impacted by construction. Design – reposition proposed works to avoid existing services or negotiate and agree diversions with service owners. Construction – include a cost / risk allowance for service diversions. Construction – undertake utility diversions as advanced works prior to main construction works.

Item	Identified Geotechnical Hazard / Risk	Works Affected	Cause	Risk before Control			Consequence	Mitigation Measures
				L	S	R (L*S)		
10	Material reuse / disposal	Site wide	<p>Earthworks cut / fill balance.</p> <p>Soft soils excavated from bulk and foundation excavations unacceptable for reuse as fill in areas of soft landscaping.</p> <p>Possible contaminated soils.</p>	3	3	9	Construction – disposal offsite.	<p>Survey – undertake ground Investigation including geo-environmental sampling and testing.</p> <p>Design – assess earthworks required to minimise surplus and create earthwork balance.</p> <p>Design – carry out contamination assessment of all chemical data.</p> <p>Construction – include a cost / risk allowance for possible off-site waste disposal of contaminated soils including non-hazardous and hazardous waste to be allowed for in the construction risk register.</p> <p>Waste may be contaminated with Hazardous materials.</p>
11	Contaminated land	Site wide	<p>Historical land use indicates there is a potential for contaminated land to be present within the rail corridor.</p> <p>Elevated concentrations of substances that can be harmful to health of the environment, flora and fauna and controlled waters.</p> <p>Contamination may be present from leaks and spills of oil, fuel, lubricants, hydraulics fluids, dielectric fluid (electrical substation).</p>	3	3	9	<p>Construction - contaminated materials may require on-site processing or removal from site.</p> <p>Construction – programme delay and increase in works cost.</p>	<p>Survey – undertake ground investigation including sampling and testing of soils for Environment Agency (EA) Waste Acceptance Criteria (WAC).</p> <p>Construction – adopt best practices during construction, including implementation of Construction Environmental Mitigation Plan (CEMP), Materials Management Plan and Waste Management Plan and Asbestos Management Plan.</p>
12	Colliery Spoil, Coal / Spontaneous Combustion	Site wide	<p>Un-compacted colliery spoil with high coal content may be at risk from spontaneous combustion. Coal may also be concentrated in soils from past activity</p>	3	3	9	<p>Construction – damage to earthworks and rail infrastructure.</p> <p>Construction – programme delay and increase in works cost.</p>	<p>Survey – request further information from Network Rail.</p> <p>Survey – undertake ground investigation to confirm the presence of coal rich colliery spoil.</p> <p>Construction – re use excavated coal rich</p>

Item	Identified Geotechnical Hazard / Risk	Works Affected	Cause	Risk before Control			Consequence	Mitigation Measures
				L	S	R (L*S)		
			at the coal depot.					colliery spoil by compacting material to a recognised earthworks specification such as MCHW SHW Appendix 6/1. Ideally compaction should be undertaken to a method. Alternatively, if a performance approach (end product) is adopted, site testing should be undertaken to confirm air voids percentage (compaction effectiveness).
13	Pollution of environment	Site and surrounding area	Dust. Spillages. Noise.	3	3	9	Construction – pollution of local environment, disturbance to adjacent site users / residents. Reputational damage. Construction – programme delay and increase in works cost.	Construction - implement good construction / site management practices including adoption of a Construction Environmental Mitigation Plan (CEMP) and Materials Management Plan.
14	Archaeological, environmental and ecological risk	Site and surrounding area	Damage or disturbance to protected environmental sites or species.	3	3	9	Construction – pollution, damage or destruction of archaeology, environment and ecology. Reputational damage. Construction – programme delay and increase in works cost.	Survey – undertake archaeological, ecological surveys (by others) to determine the extent of risk and mitigation measures to be adopted. Construction – implement environmental impact mitigation measures during the works, undertake environmental monitoring and adopt an Archaeological Watching Brief if appropriate. Outside of the scope of this report.



KEY

- CARRIAGEWAY
- FOOTWAY
- VERGE
- EARTHWORKS
- LANDSCAPING
- TACTILE PAVING
- FENCING
- NETWORK RAIL SECURE FENCING
- BOLLARD

- SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX**
- IT IS ASSUMED THAT WORKS ON THIS DRAWING WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROPRIATE METHOD STATEMENT
- THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT
- Notes**
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DOCUMENTATION.
 2. ALL DIMENSIONS IN MILLIMETERS, UNLESS STATED OTHERWISE. ALL CHAINAGES, LEVELS AND COORDINATES ARE IN METERS, UNLESS STATED OTHERWISE.
 3. ALL ROAD WORKS TO BE IN ACCORDANCE WITH MCHW VOLUME 1 SPECIFICATION FOR HIGHWAY WORKS
 4. REFER TO CIVILS DRAWINGS REFER TO 60601435-ACM-07-ZZ-DRG-ECV-000002 FOR DETAILS OF STATION PLATFORM
 5. FOR TYPICAL CROSS SECTIONS REFER TO DRAWINGS 6060145-ACM-07-ZZ-DRG-EHW-070002 & 070003.
 6. FOR PROPOSED DRAINAGE LAYOUT REFER TO DRAWING 6060145-ACM-07-ZZ-DRG-EHW-070006
 7. FOR TRAFFIC SIGNS AND ROAD MARKINGS REFER TO DRAWING 6060145-ACM-07-ZZ-DRG-EHW-070004.
 8. FOR STREET LIGHTING LAYOUT REFER TO DRAWING 6060145-ACM-07-ZZ-DRG-EPT-000067.
 9. FOR LANDSCAPING LAYOUT REFER TO DRAWINGS 6060145-ACM-XX-ZZ-DRG-EEN-000013.
 10. NO. OF CAR PARKING SPACES PROVIDED:
- 244 No. STANDARD
- 17 No. DISABLED (6%)
- 18 No. ELECTRIC VEHICLE (6%)
 11. ASSETS EAST OF (AND INCLUDING) THE NETWORK RAIL FENCING ARE TO BE OWNED AND MAINTAINED BY NETWORK RAIL.

Not Used	CH	DB	JOB	07/08/20	P01
Issued for Planning	CH	DB	NW	07/08/20	P02
Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue: **SUITABLE FOR INFORMATION**

GRIP Stage: **GRIP 4**

Client: **Northumberland County Council**

Project Title: **NORTHUMBERLAND LINE**

Drawing Title: **ASHINGTON CAR PARK HIGHWAYS GENERAL ARRANGEMENT**

Designed C. Hodson	Drawn C. Hodson	Checked D. Barker	Approved N. Webster	Date 14/01/21
Signed	Signed	Signed	Signed	

Subsidiary S2	AECOM Internal Project No. 60601435	Engineering Manager Alexander Bathie alexander.bathie@aecom.com
Scale @ 594 x 841	Zone / ELR / Mileage --- 10	0141 354 5868

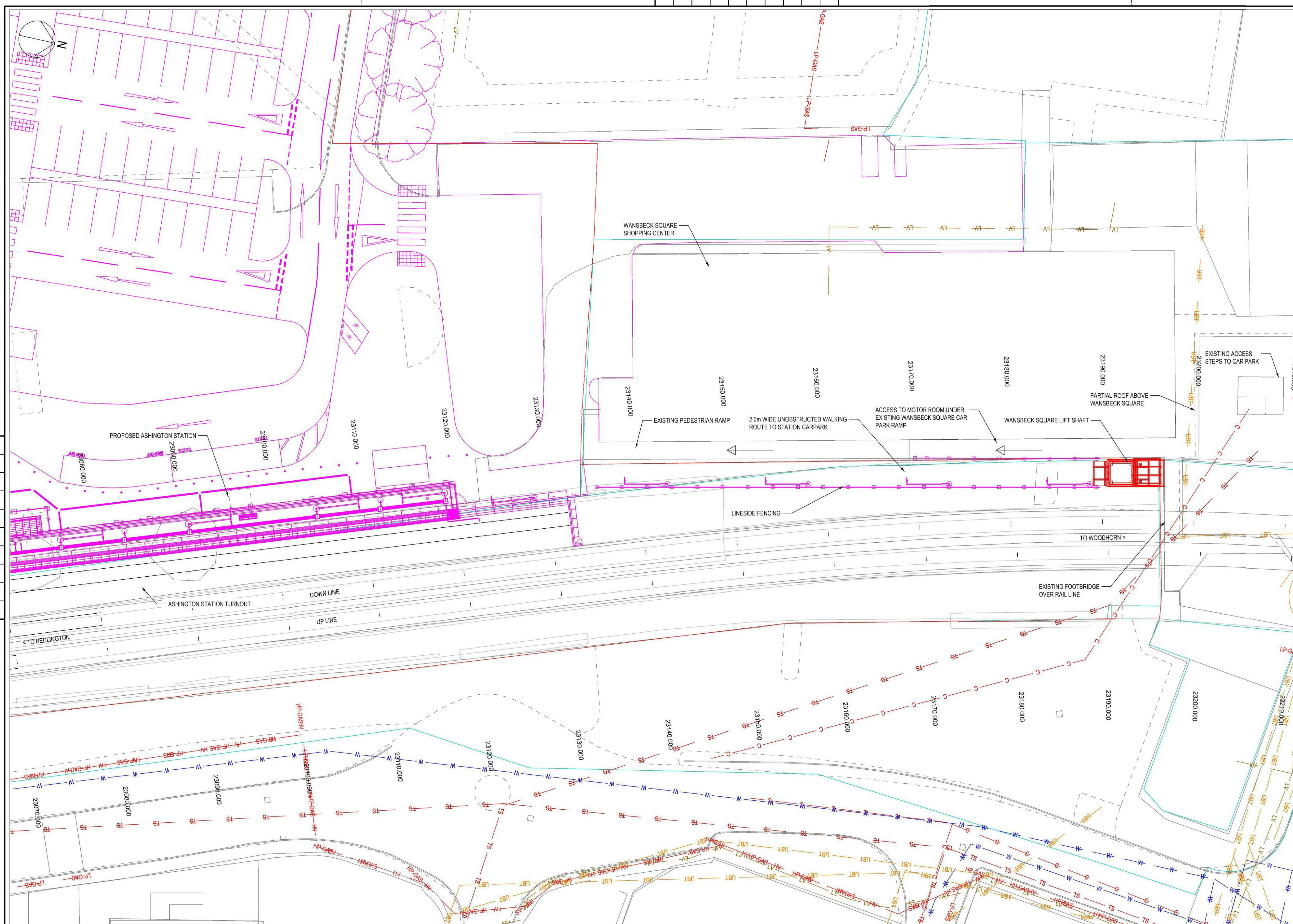
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Drawing Number 60601435-ACM-07-ZZ-DRG-EHW-070001	P02

PLAN
SCALE 1:500



PLAN
SCALE 1:200

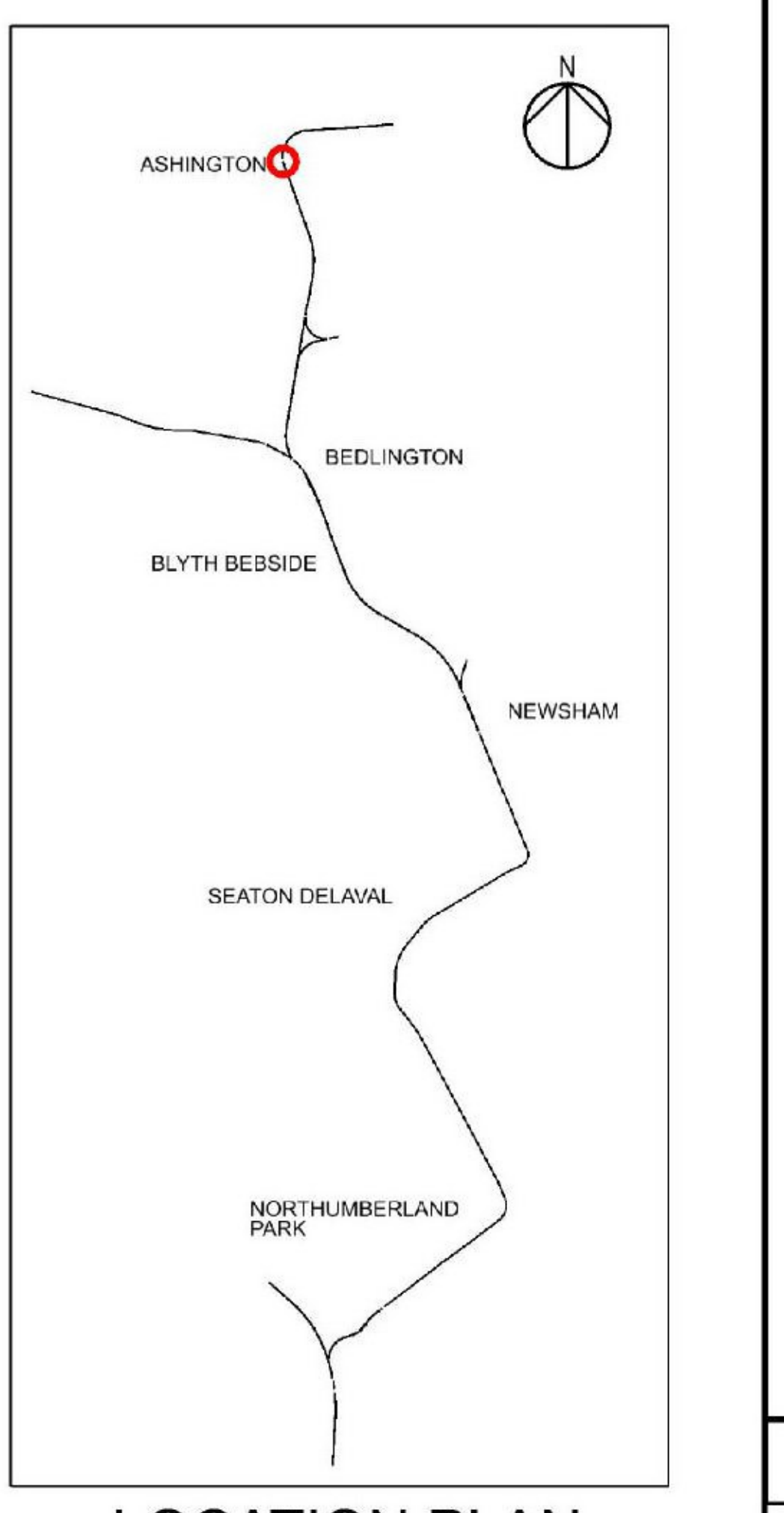
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4. FOUNDATION TYPE, DIMENSIONS AND DEPTHS TO BE CONFIRMED FOLLOWING GROUND INVESTIGATION
5. THE NEED FOR CONSOLIDATION GROUTING OF MINE WORKINGS TO BE ADVISED AFTER COMPLETION OF SCHEME SPECIFIC GROUND INVESTIGATION



UTILITY SERVICES KEY

- HV — ELECTRICITY - 11kv HV CABLES
- W — WATER - SUPPLY
- C — WATER - COMBINED SEWER
- TS — WATER - TREATED SEWER
- UBT — UNDERGROUND B.T. TELEPHONE
- HP-GAS — GAS NETWORK - IP MAINS

Revision Details	By	Chk	Appd	Checked Date	Suffix
First Issue				28/12/1	P01.1

Purpose of Issue: **WIP-S0 SUITABILITY**

GRIP Stage: **N/A**

Client: **Northumberland County Council**

Project Title: **NORTHUMBERLAND LINE**

ASHINGTON STATION PROPOSED WANSBECK SQ LIFT ACCESS GENERAL ARRANGEMENT

Designed	Drawn	Checked	Approved	Date
Signed	Signed	Signed	Signed	

Subsidiary: **S0**

Scale @ 594 x 841: **AS SHOWN**

AECOM Internal Project No.: **60601435**

Engineering Manager: **Alexander Bathie**
alexander.bathie@aecom.com
+44 7610 771397

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AECOM

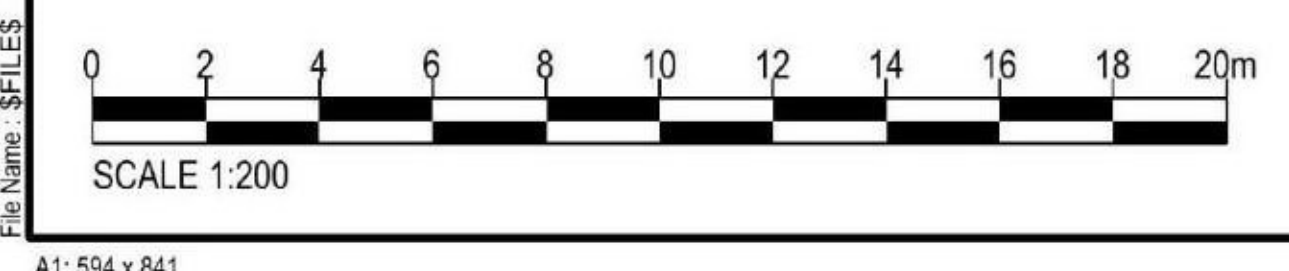
www.aecom.com

Drawing Number: **60601435-ACM-07-ZZ-DRG-EST-001301**

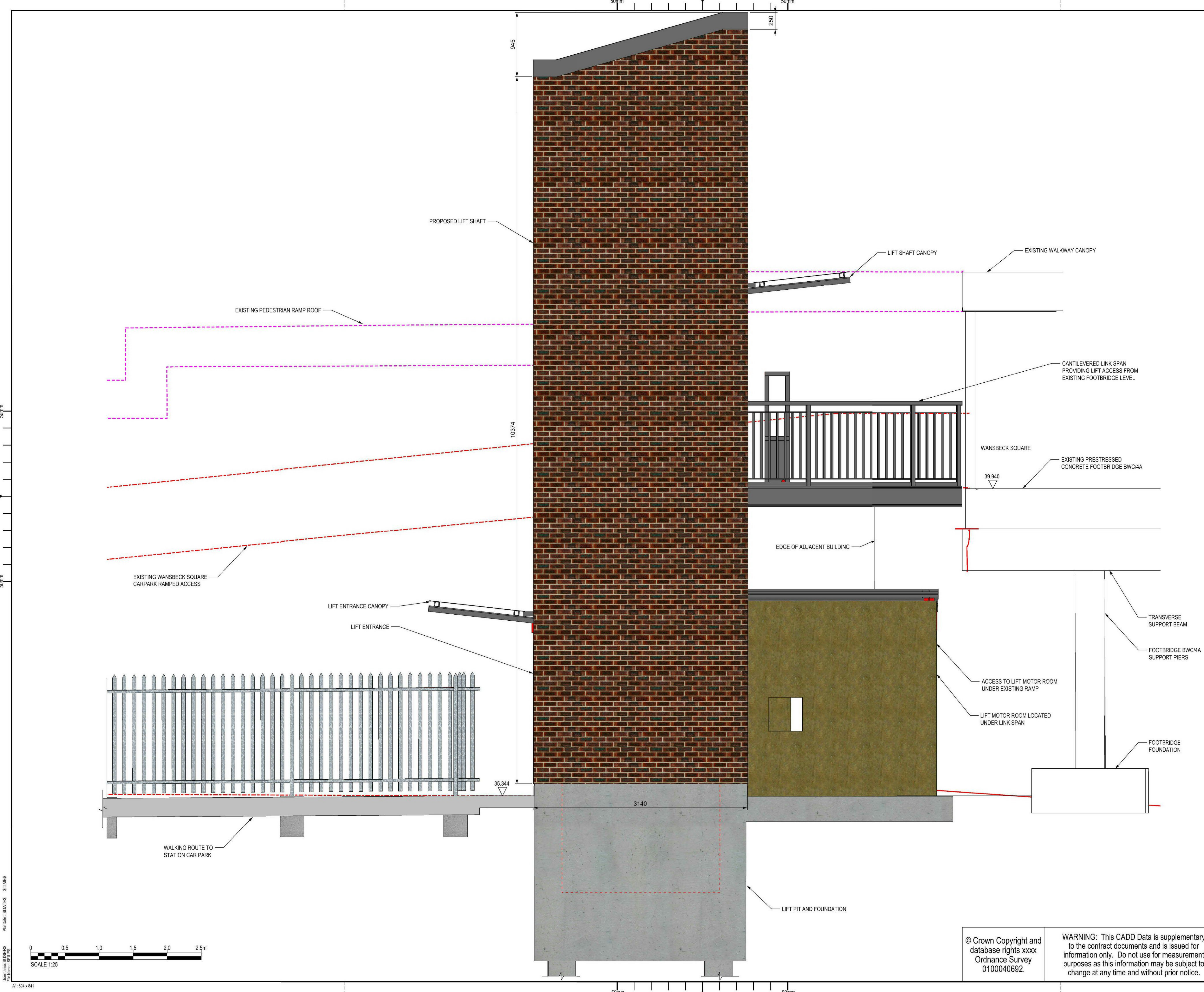
Rev: **P01.1**

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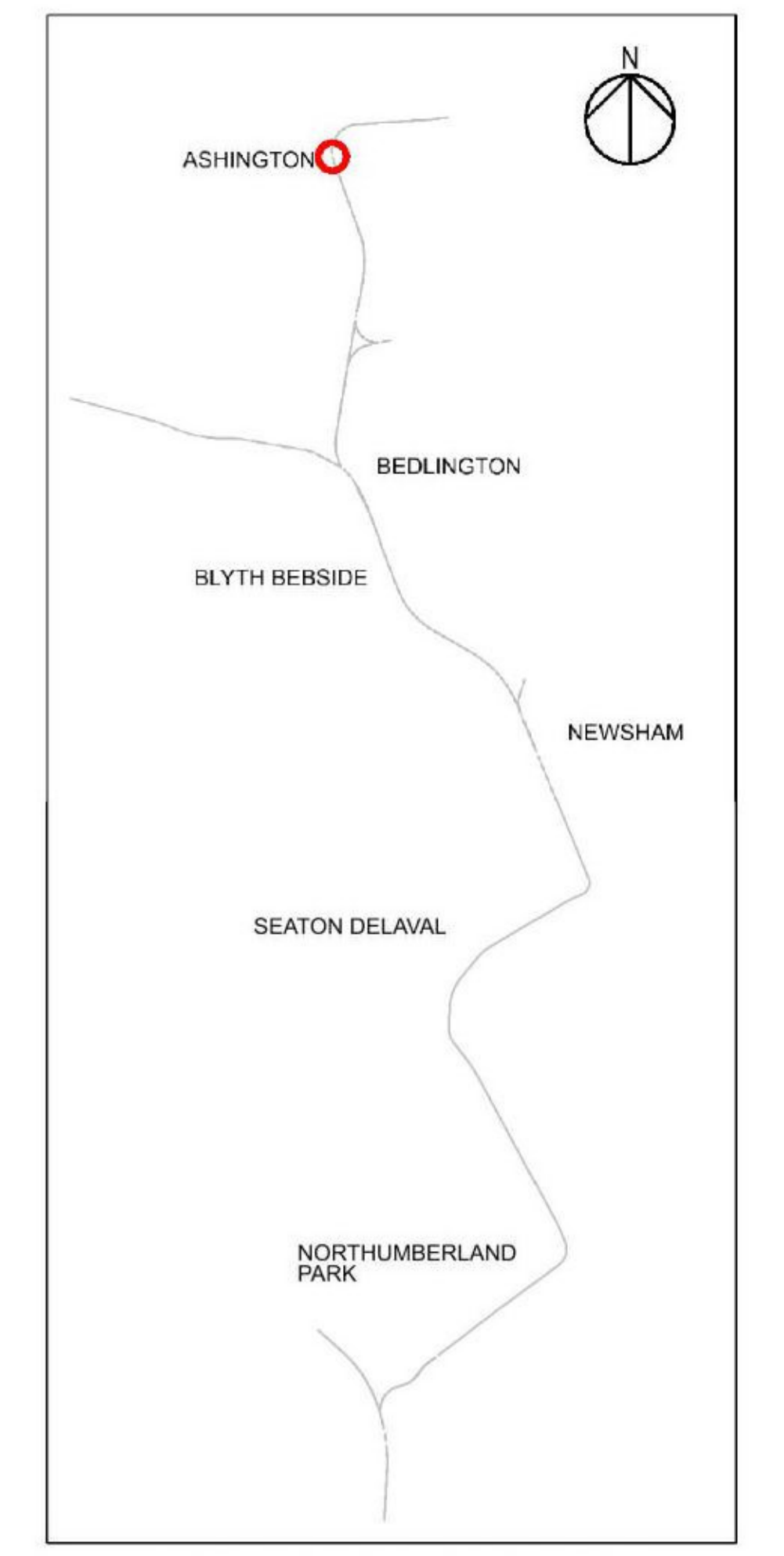


Vertical text on the left margin: Pol Date: SDATES STIMES



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 5. FOUNDATION TYPE, DIMENSIONS AND DEPTHS TO BE CONFIRMED FOLLOWING GROUND INVESTIGATION.
 6. THE NEED FOR CONSOLIDATION GROUTING OF MINE WORKINGS TO BE ADVISED AFTER COMPLETION OF SCHEME SPECIFIC GROUND INVESTIGATION.



LOCATION PLAN

Revision Details	By	Chkd	Appd	Checked Date	Suffix
First Issue				17/11/20	P01.1

Purpose of Issue: WIP-S0 SUITABILITY
 GRIP Stage: N/A

Client: **Northumberland County Council**

Project Title: **NORTHUMBERLAND LINE**

Drawing Title: **ASHINGTON STATION PROPOSED WANSBECK SQ LIFT ACCESS SIDE ELEVATION**

Designed	Drawn	Checked	Approved	Date
Signed	Signed	Signed	Signed	

Subsidiary: SO
 Scale @ 504 x 841
 AS SHOWN

AECOM Internal Project No: 60601435
 Zone / ELR / Mileage
 --- SWC 28 1000yds to BWC 2V 02/5/20

Engineering Manager: Alexander Bathie
 alexander.bathie@aecom.com
 +44 7810 771307

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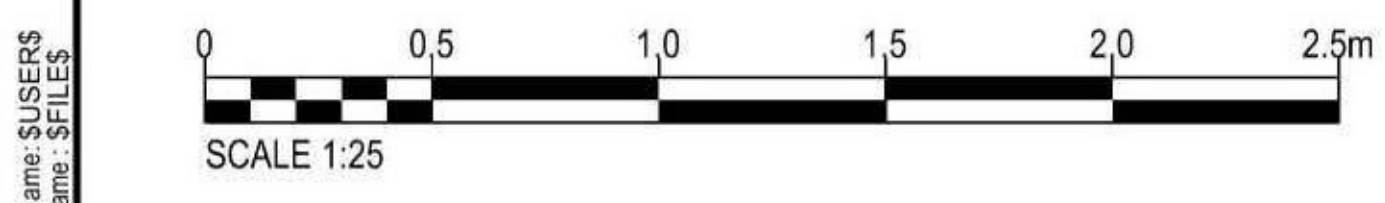
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 Rev: P01.1

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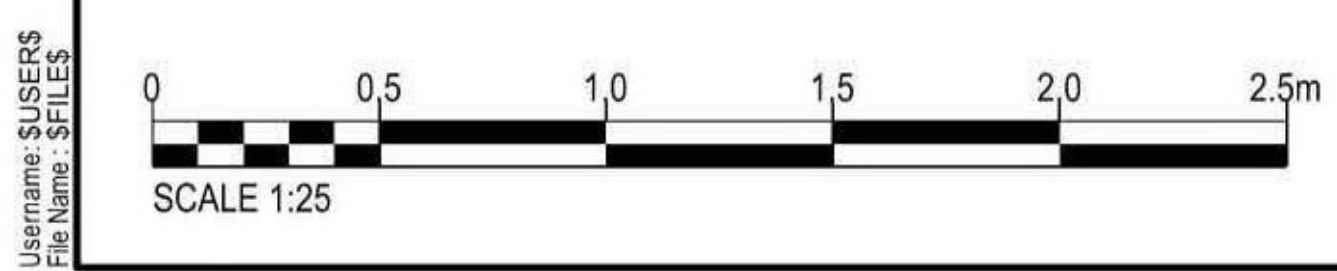


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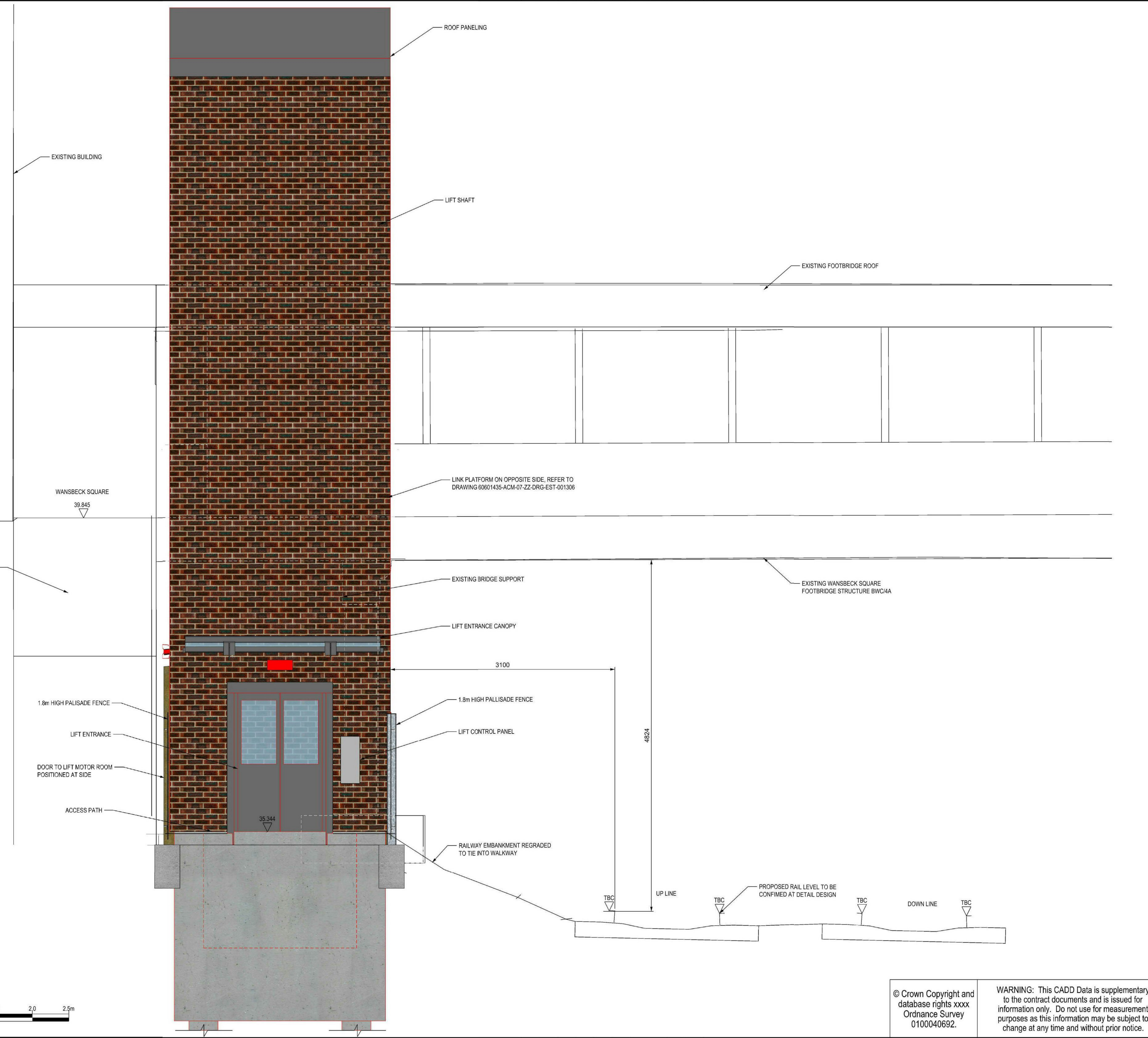
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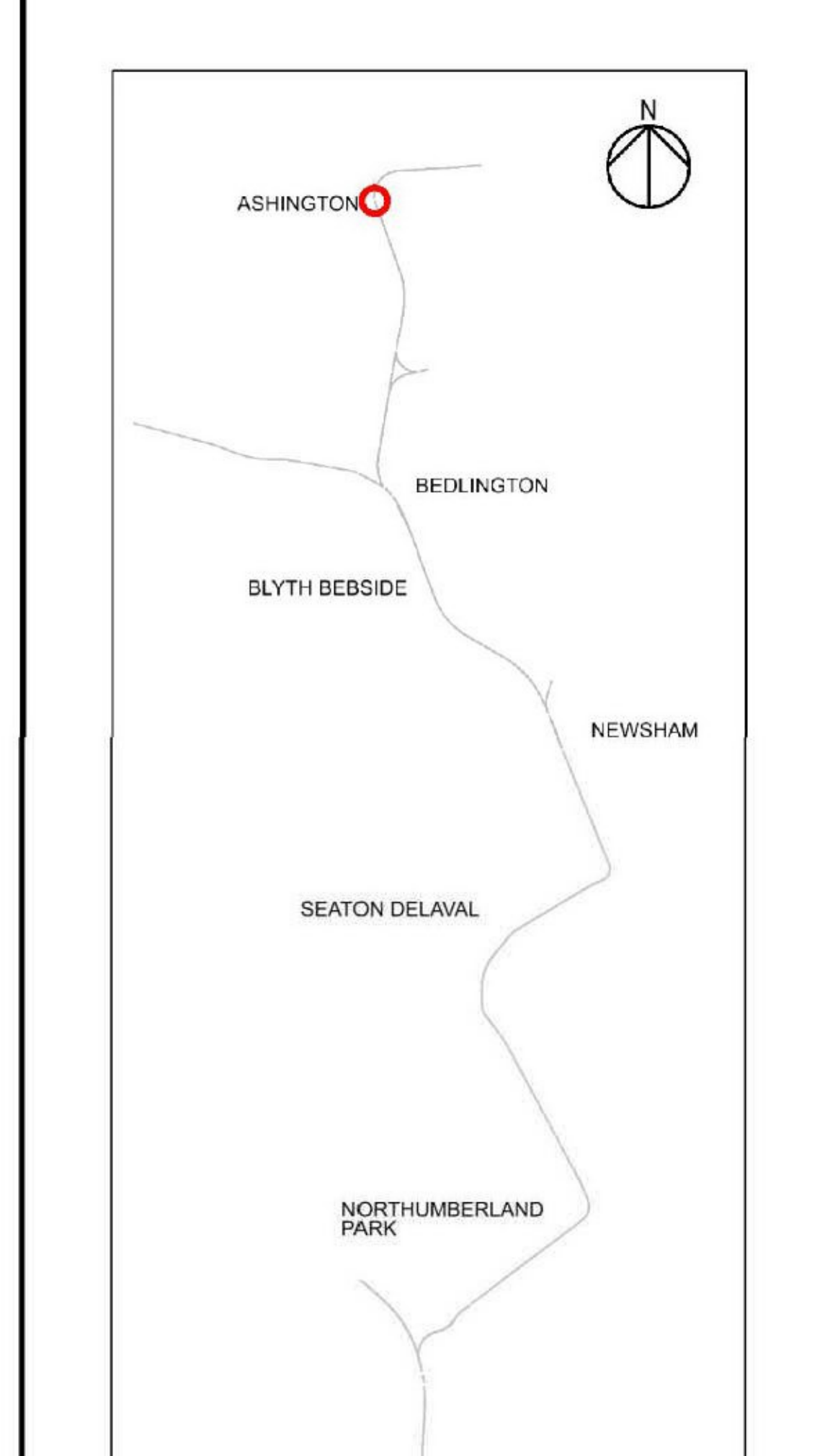
Upstream SURVEYS
Downstream SURVEYS
P01 Date: 04/05/2016 ST/MBE



A1: 594 x 841



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Revision Details	By	Chkd	Appd	Checked Date	Suffix
First Issue				17/11/20	P01.1

Purpose of Issue: WIP-S0 SUITABILITY
GRIP Stage: [Blank]
Client: Northumberland County Council
Project Title: NORTHUMBERLAND LINE

Drawing Title: ASHINGTON STATION PROPOSED WANSBECK SQ LIFT ACCESS FRONT ELEVATION

Designed	Drawn	Checked	Approved	Date

Subsidiary: AECOM Internal Project No: 60601435
Scale: @ 594 x 841
Zone / ELR / Mileage: AS SHCOWN
Engineering Manager: Alexander Bathie
alexander.bathie@aecom.com
+44 7810 771387

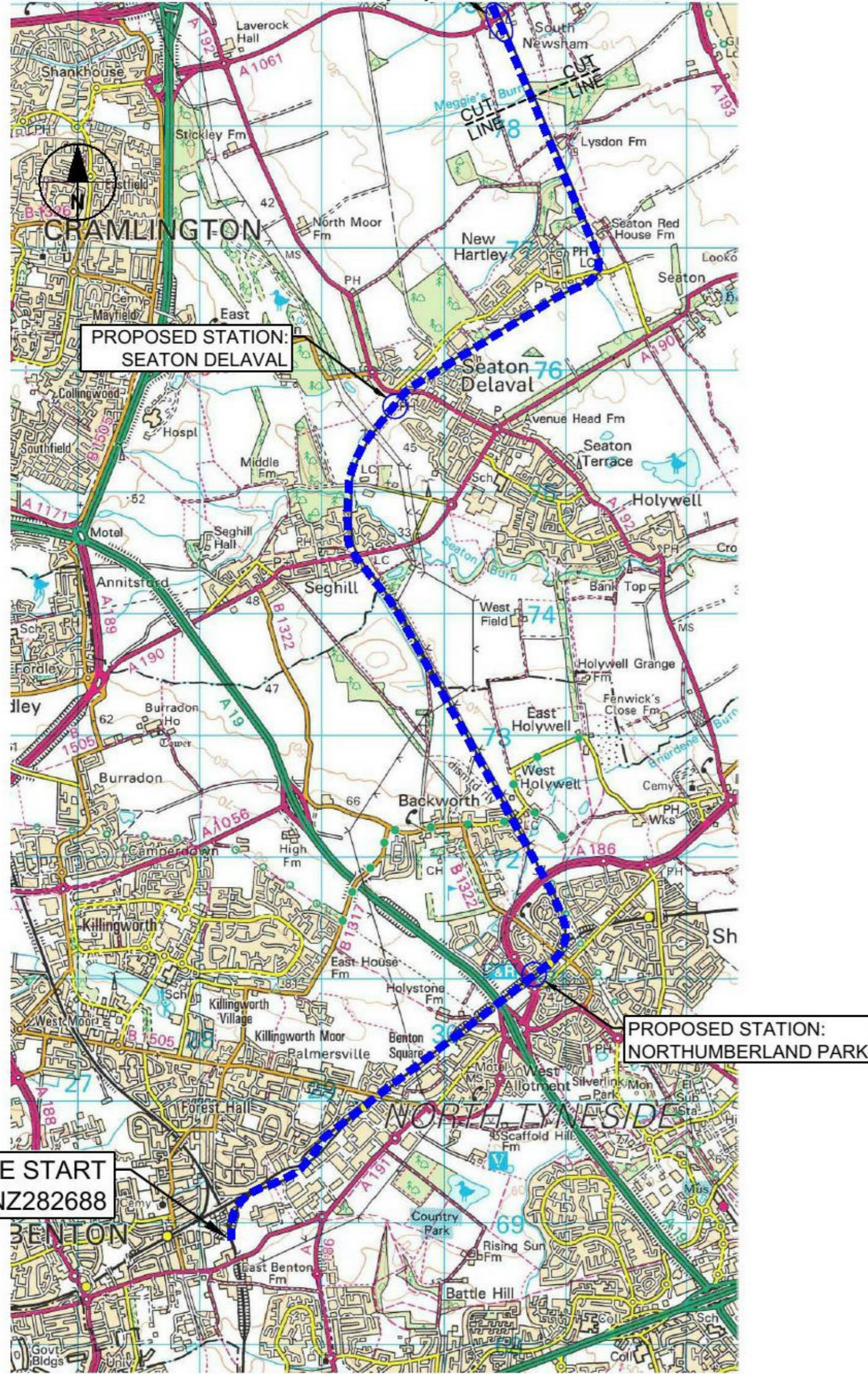
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Drawing Number: 60601435-ACM-07-ZZ-DRG-EST-001303
Rev: P01.1

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ROUTE PLAN - VIEW 1 OF 2
SCALE 1:50,000



ROUTE PLAN - VIEW 2 OF 2
SCALE 1:50,000

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REGIONAL PLAN
SCALE 1:200,000

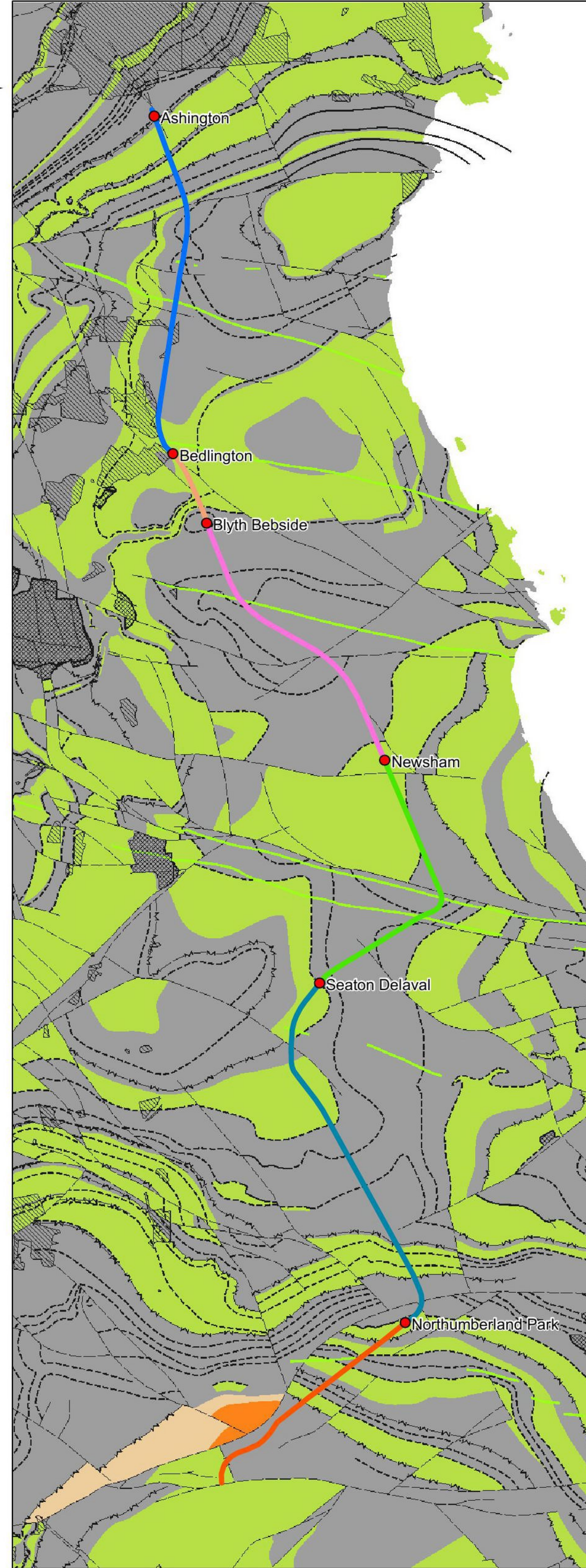
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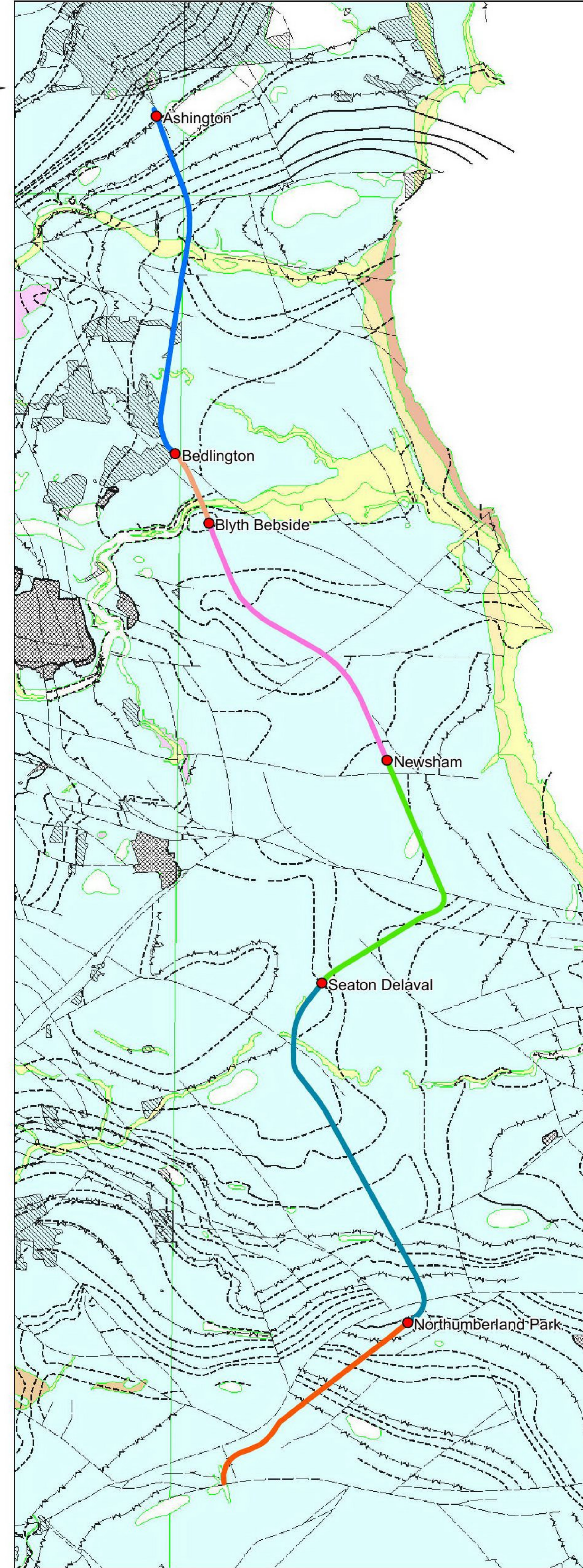
ROUTE PLAN
SCALE: 1:50,000
0 0.5 1 1.5 2 2.5 Kilometers

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BGS SOLID GEOLOGY
(1:50,000 SCALE MAPPING)

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BGS SUPERFICIAL GEOLOGY
(1:50,000 SCALE MAPPING)

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Notes/Legend

1. BRITISH GEOLOGICAL SURVEY (BGS) 1:50,000 DIGITAL GEOLOGICAL MAPPING PRESENTED.

Legend

Route Sections

Earthwork Splits

- EW1 ECLM to Northumberland Park
- EW2 Northumberland Park to Seaton Delaval
- EW3 Seaton Delaval to Newsham
- EW4 Newsham to Blyth Bebside
- EW5 Blyth Bebside to Bedlington
- EW6 Bedlington to Ashington

Proposed Station

BGS Legend (1:50,000)

Linear Feature

- Coal Inferred
- Coal Observed
- Dyke linear Inferred
- Fault Inferred
- Fault Observed
- M— Marine band

Artificial Ground

- Infilled Ground
- Made Ground (Undivided)

Superficial Deposits

- Alluvium
- Lacustrine Deposits
- Glaciofluvial Deposits
- Marine Beach Deposits
- Blown Sand
- Glacial Till

Bedrock

- Igneous - Microgabbro
- Yellow Sands Formation (Permian)
- Mudstone, Siltstone & Sandstone (PUCM)
- Mudstone, Siltstone & Sandstone (PMCM)
- Sandstone (PMCM)

First issue	RPA	DCG	SDM	07/08/19	P01
Revision Details	By	Chkd	Appd	Checked Date	Suffix
Purpose of Issue	SUITABLE FOR INFORMATION				
GRIP Stage	N/A				
Client					
Project Title	NORTHUMBERLAND LINE				
Drawing Title	SCHEME WIDE - GEOLOGY 1:50,000 SOLID AND DRIFT				
Designed	Drawn	Checked	Approved	Date	
R.Addison	R.Addison	D.Green	S.Mason	07/08/2019	
Suitability	AECOM Internal Project No.				
S2	60601435				
Scale @ A1	Zone / ELR / Mileage				
1:50,000					

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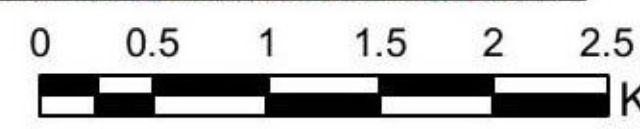
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Drawing Number
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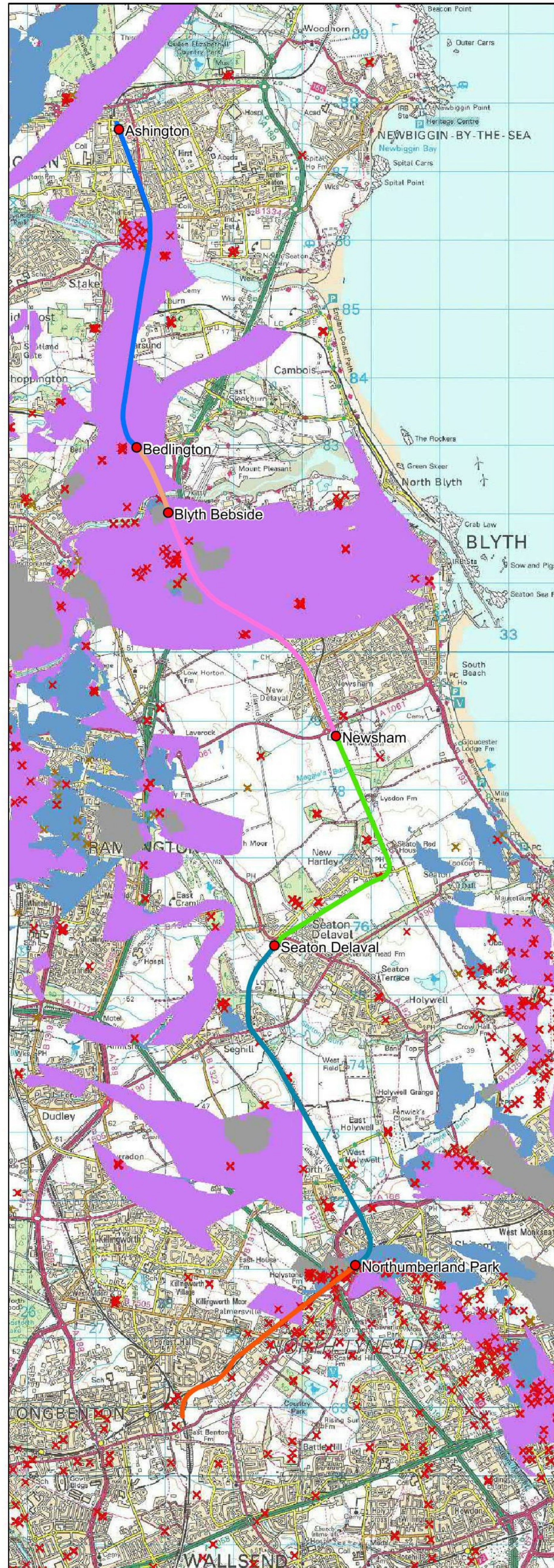
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ROUTE PLAN
SCALE 1:50,000

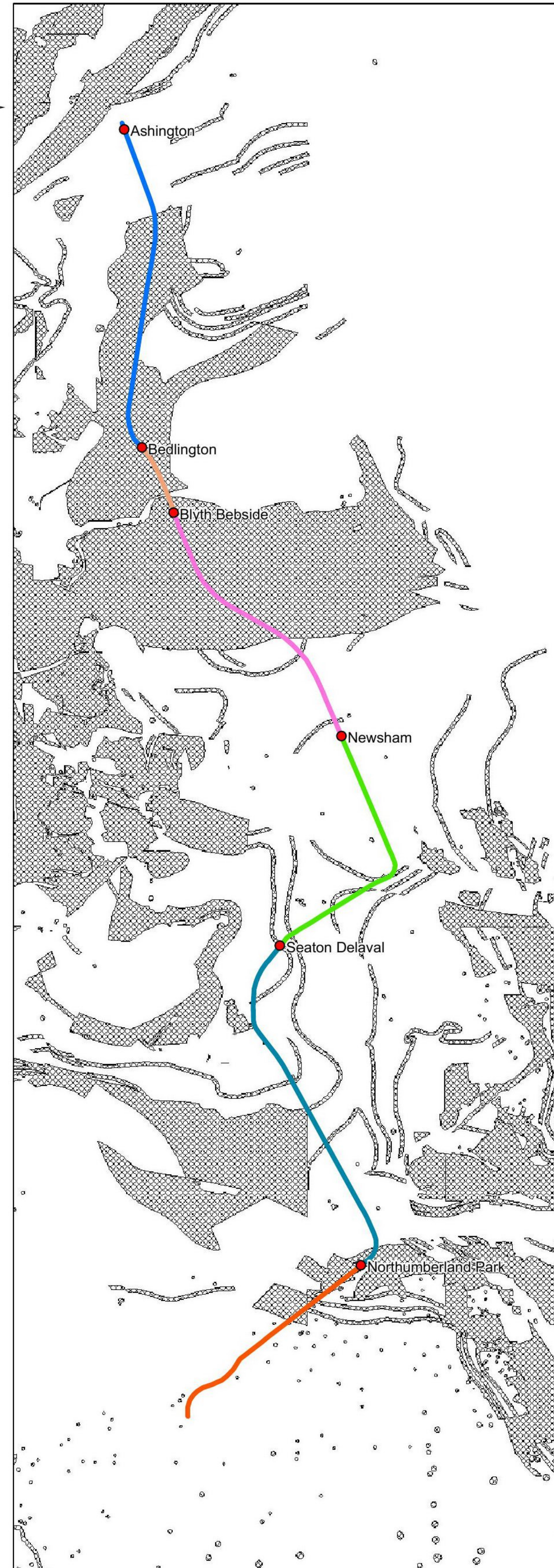


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COAL AUTHORITY MINING DATA
SCALE 1:50,000

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COAL AUTHORITY DEVELOPMENT
HIGH RISK AREAS
SCALE 1:50,000

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Notes/Legend

- Coal Authority Legend**
- Surface Mining (Past and Current)
 - Past Shallow Coal Mine Workings
 - Probable Shallow Coal Mine Workings
 - ▨ Development High Risk Area
 - × Mine Entrance (Shaft)
 - × Mine Entrance (Adit)

- Route Sections**
- Earthwork Spits**
- EW1 ECML to Northumberland Park
 - EW2 Northumberland Park to Seaton Delaval
 - EW3 Seaton Delaval to Newsham
 - EW4 Newsham to Blyth Bebside
 - EW5 Blyth Bebside to Bedlington
 - EW6 Bedlington to Ashington
 - Proposed Station

First issue	RPA	DCG	SDM	07/08/19	P01
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Revision Details	By	Chkd	Appd	Checked Date	Suffix
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Purpose of Issue: SUITABLE FOR INFORMATION
GRIP Stage: N/A

Client: **Northumberland County Council**

Project Title: **NORTHUMBERLAND LINE**

Drawing Title: **ROUTE MINING CONSTRAINTS**

Designed	Drawn	Checked	Approved	Date
R.Addison	R.Addison	D.Green	S.Mason	07/08/2019

Suitability	AECOM Internal Project No.
S2	60601435
Scale @ A1	Zone / ELR / Mileage
1:50,000	

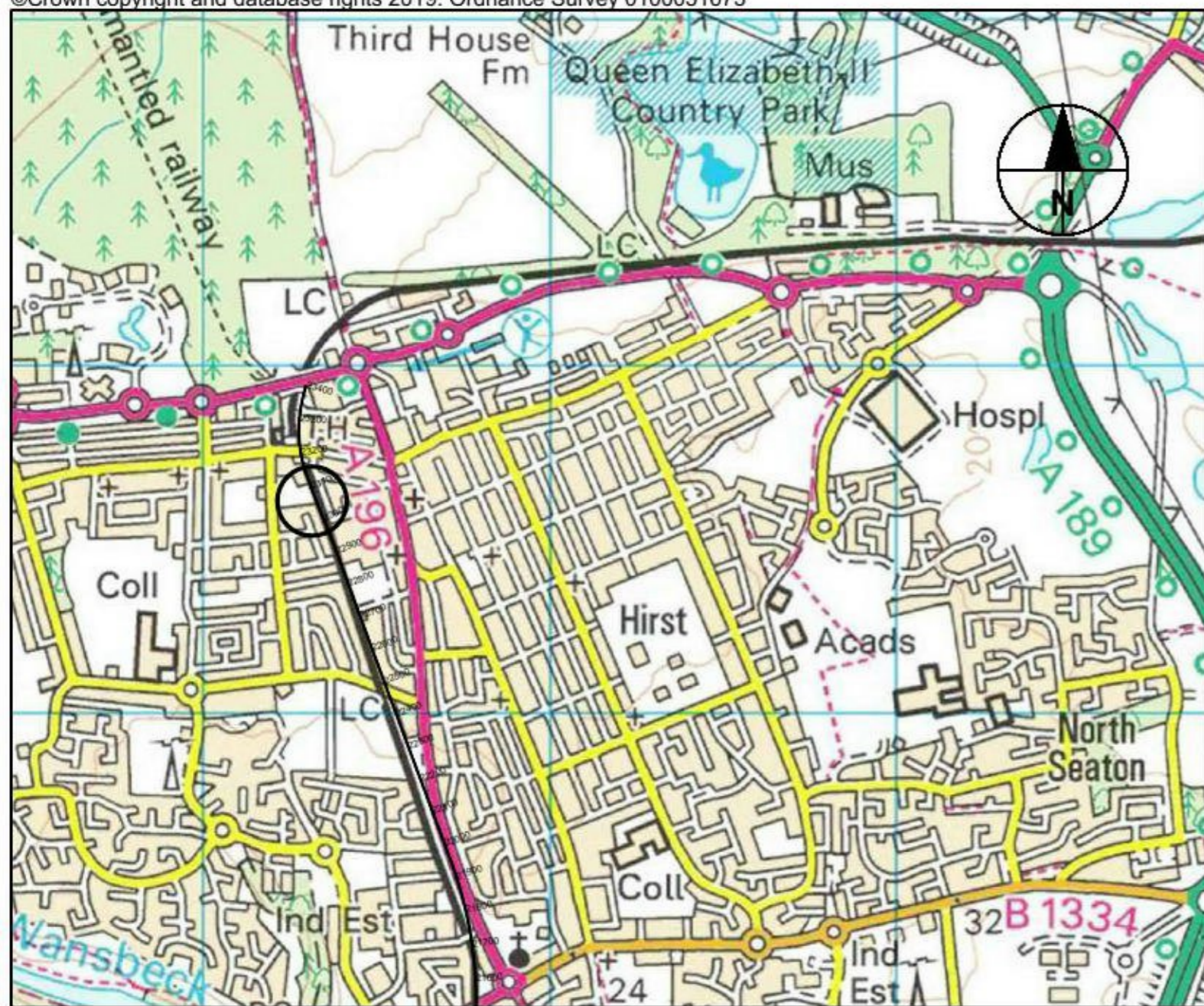
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Rev: P01

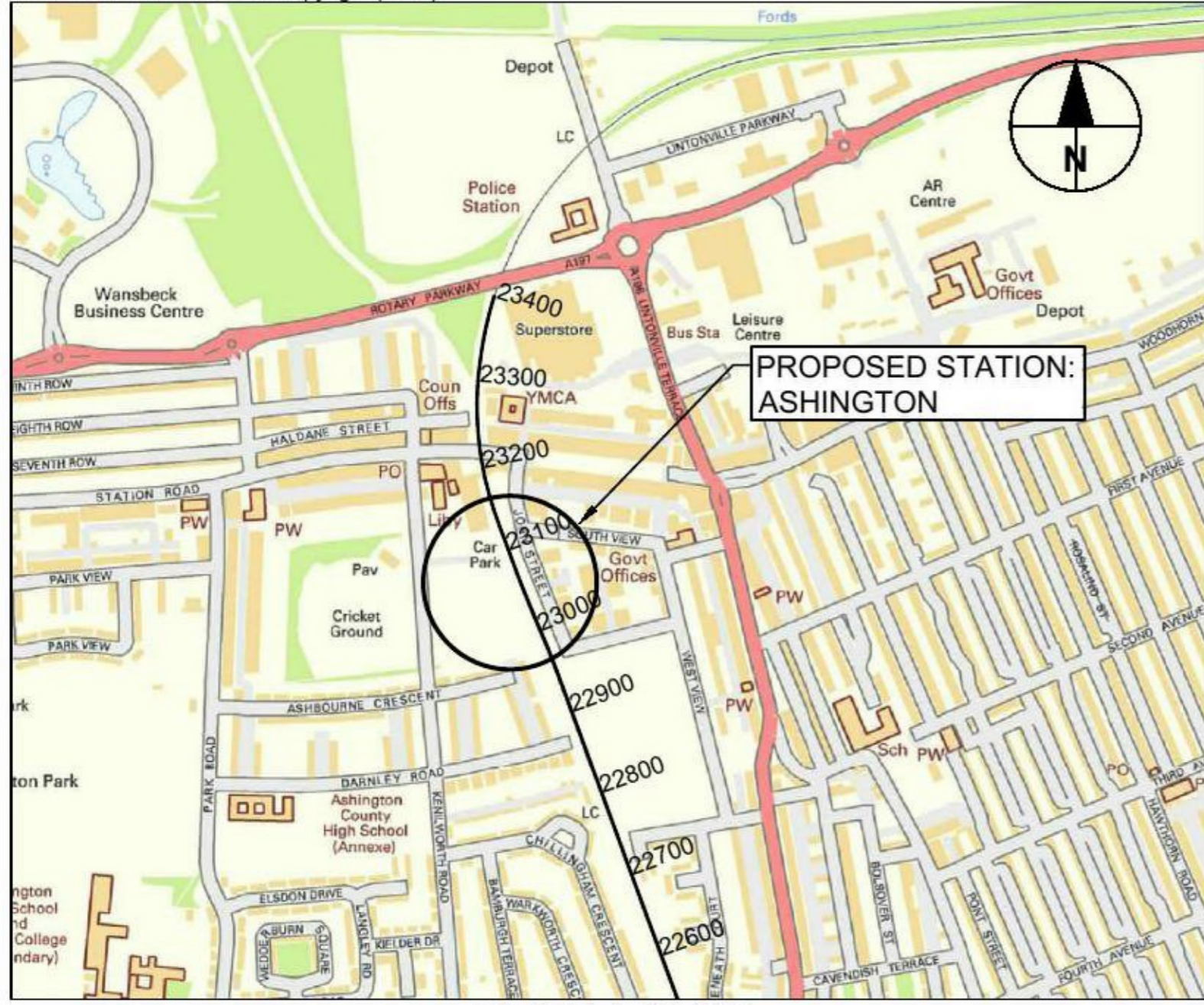


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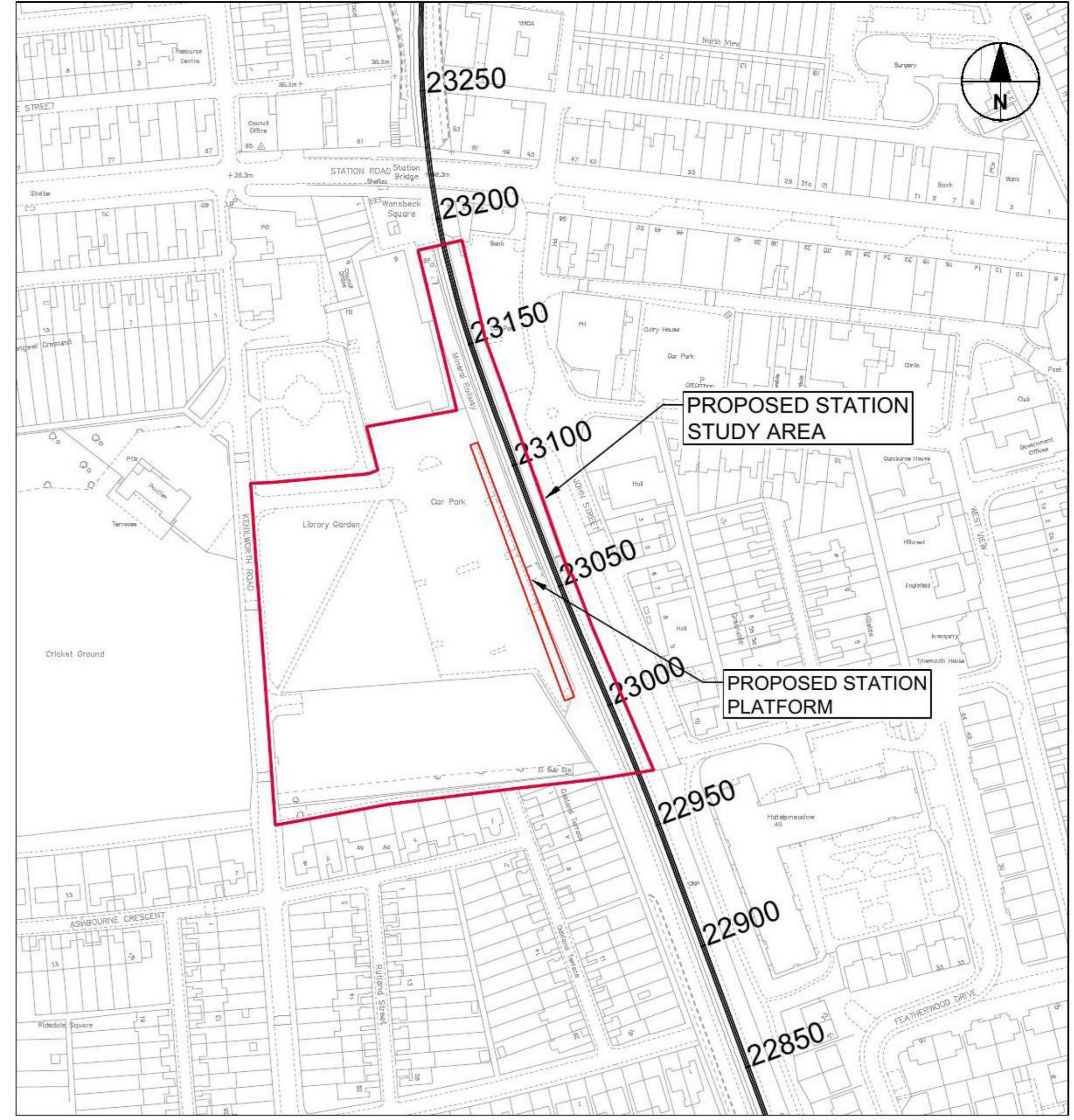


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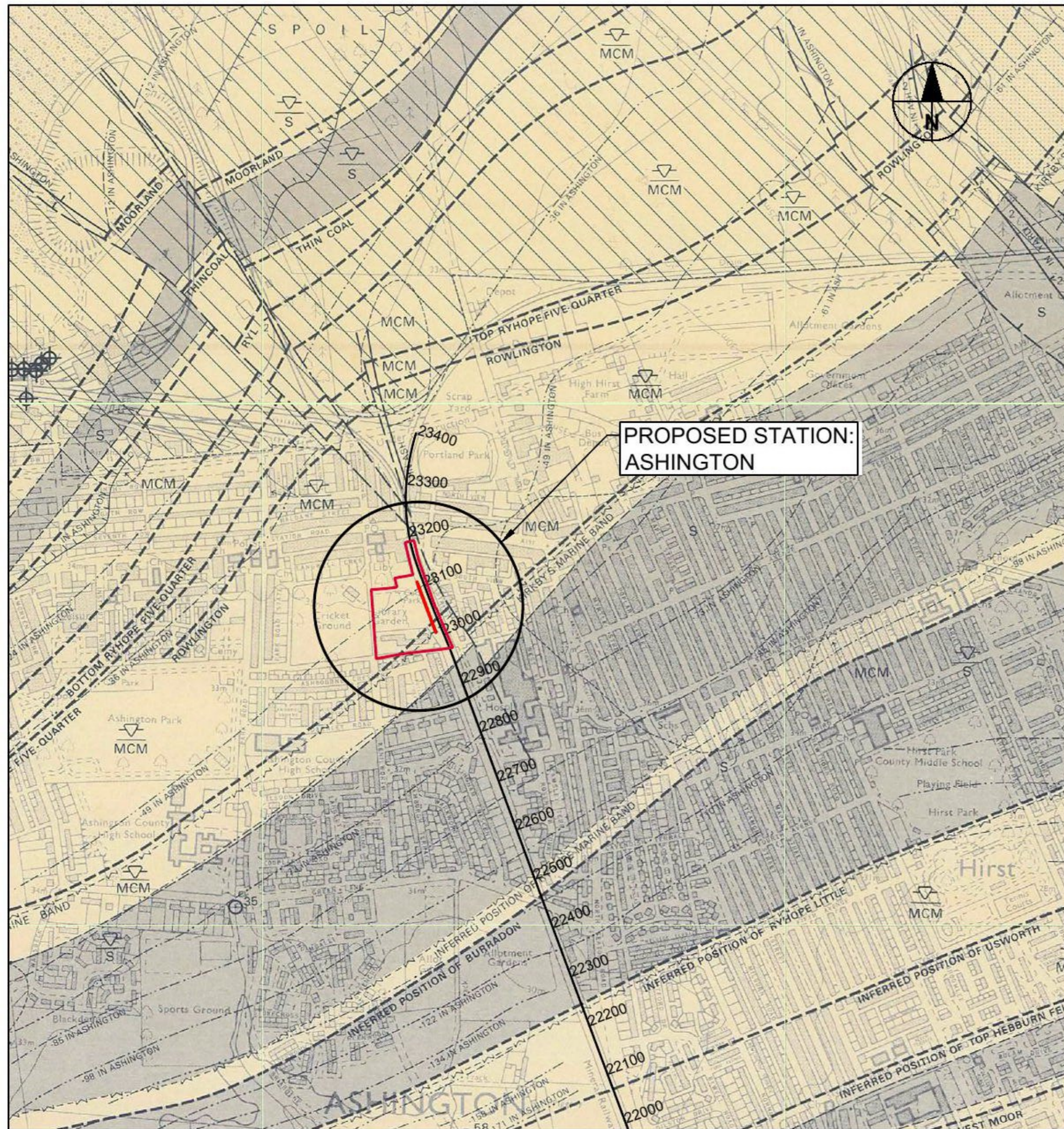
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SCALE 1:2,000

ISSUE/REVISION		
P03	DEC 2020	STATION BOUNDARY REVISED
P02	JUN 2020	STATION BOUNDARY REVISED
P01	AUG 2019	FIRST ISSUE
I/R	DATE	DESCRIPTION

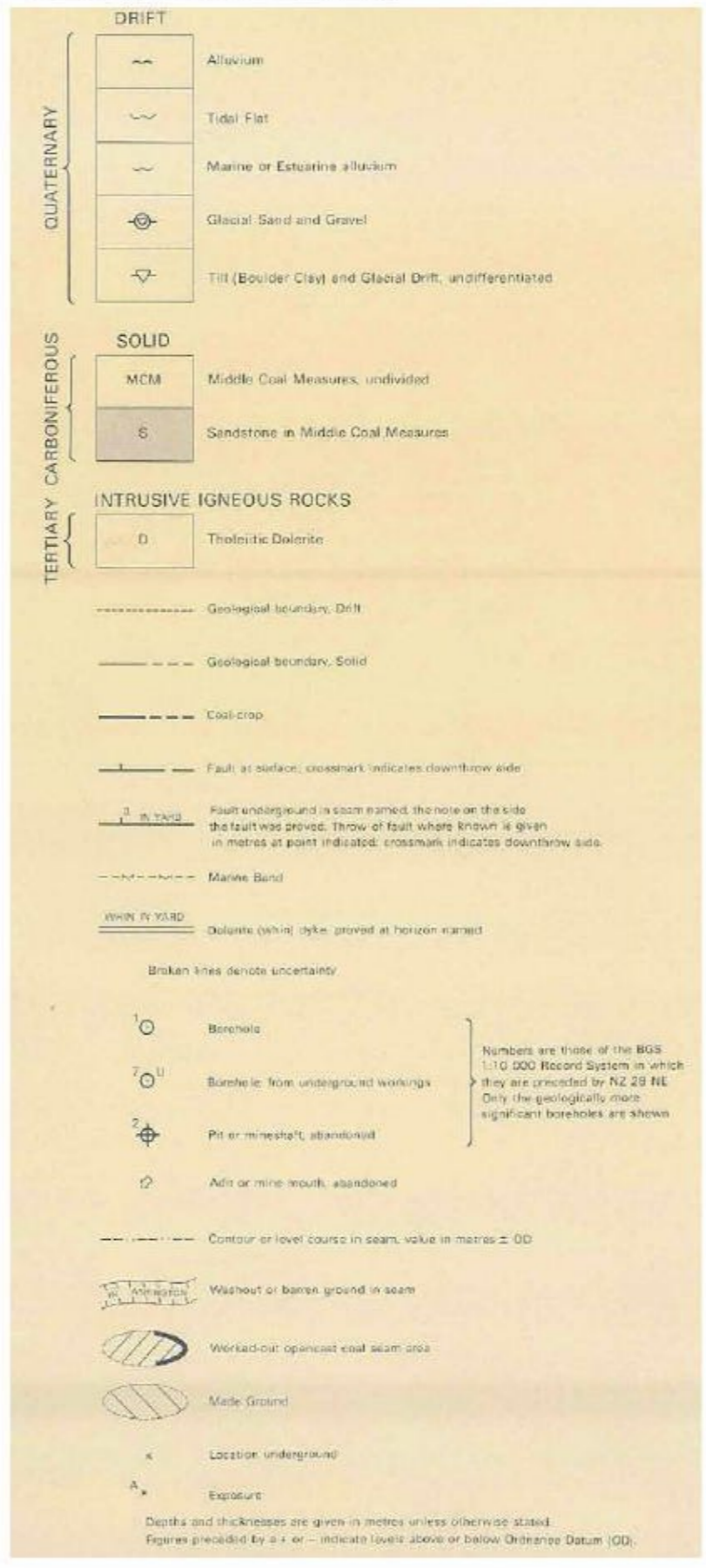
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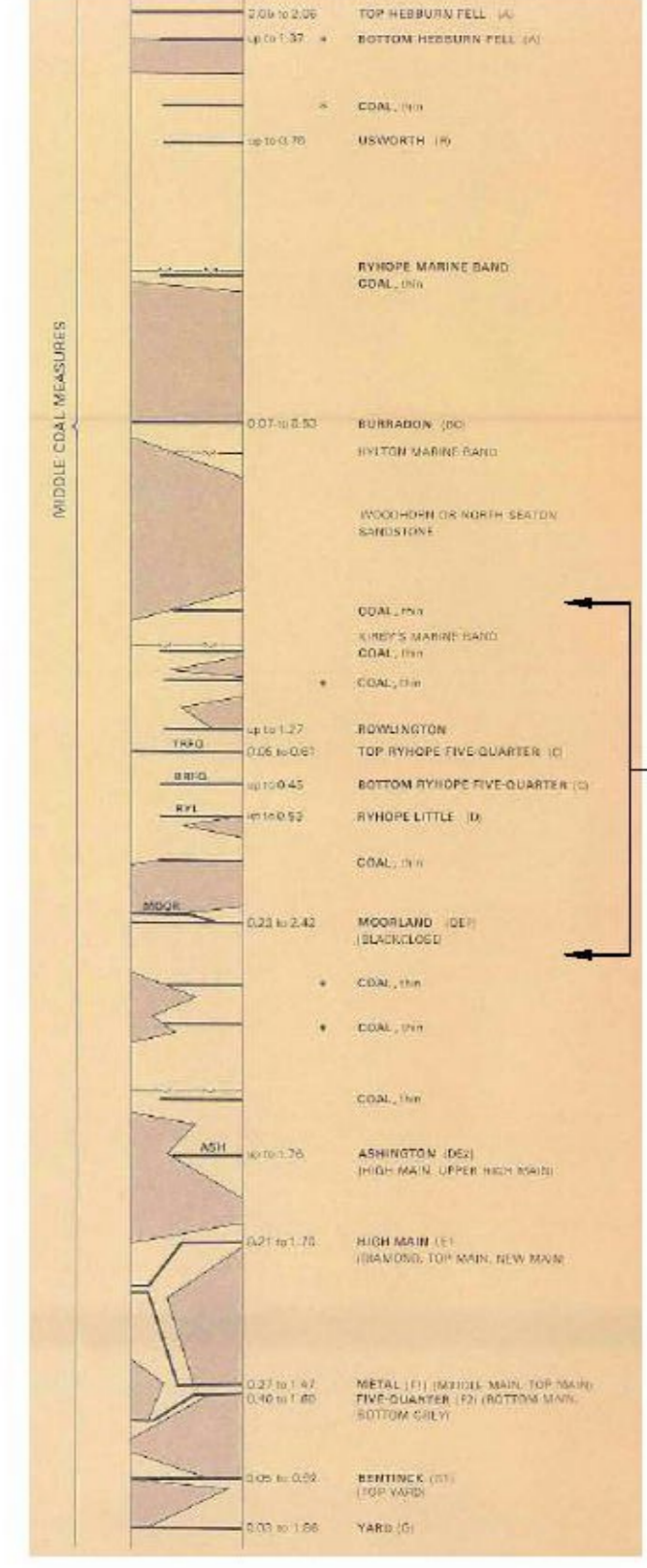
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GEOLOGICAL KEY

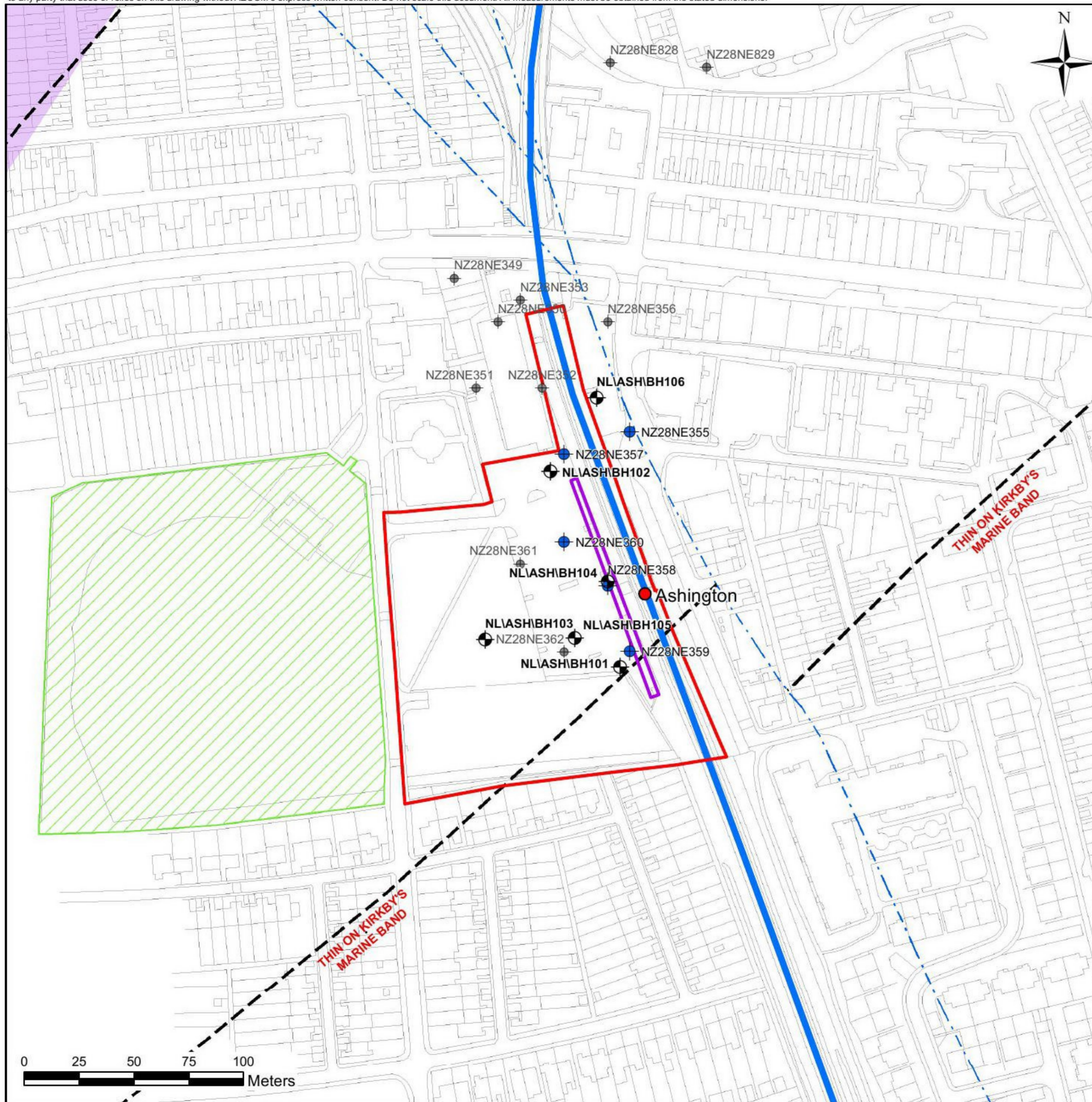


VERTICAL SECTION
 SCALE 1:2,000 (1cm to 20m)



INFERRED SOLID GEOLOGY

ISSUE/REVISION		
P03	DEC 2020	STATION BOUNDARY REVISED
P02	JUL 2020	STATION LOCATION REVISED
P01	AUG 2019	FIRST ISSUE
I/R	DATE	DESCRIPTION



Legend

AECOM Ground Investigation

2020 Off-Track Investigation (Proposed Locations Presented)

- Borehole
- Trial Pit
- BGS Borehole**
- 0.01 - 10.00
- 10.01 - 30.00
- 30.01 - 371.00
- Confidential
- BGS Boreholes not referenced

Route Sections

Earthwork Splits

- EW1 ECML to Northumberland Park
- EW2 Northumberland Park to Seaton Delaval
- EW3 Seaton Delaval to Newsham
- EW4 Newsham to Blyth Bebside
- EW5 Blyth Bebside to Bedlington
- EW6 Bedlington to Ashington

- Proposed Station
- Red Line Boundary Study Area
- Proposed Platform

BGS Data Legend

- Coal (Inferred)
- Coal (Observed)
- Fault

Coal Authority Mining Data

- Mine Entrance - Adit
- Mine Entrance - Shaft
- Opencast
- Recorded Shallow Workings
- Probable Shallow Workings
- Coal Mining Subsidence Claim

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ISSUE \ REVISION

I/R	DATE	DESCRIPTION
P03	DEC 2020	UPDATED SITE OUTLINE
P02	JULY 2020	UPDATED SITE OUTLINE
P01	AUG 2019	FIRST ISSUE

NORTHUMBERLAND LINE



Ashington Station Mining Constraints & Borehole Plan

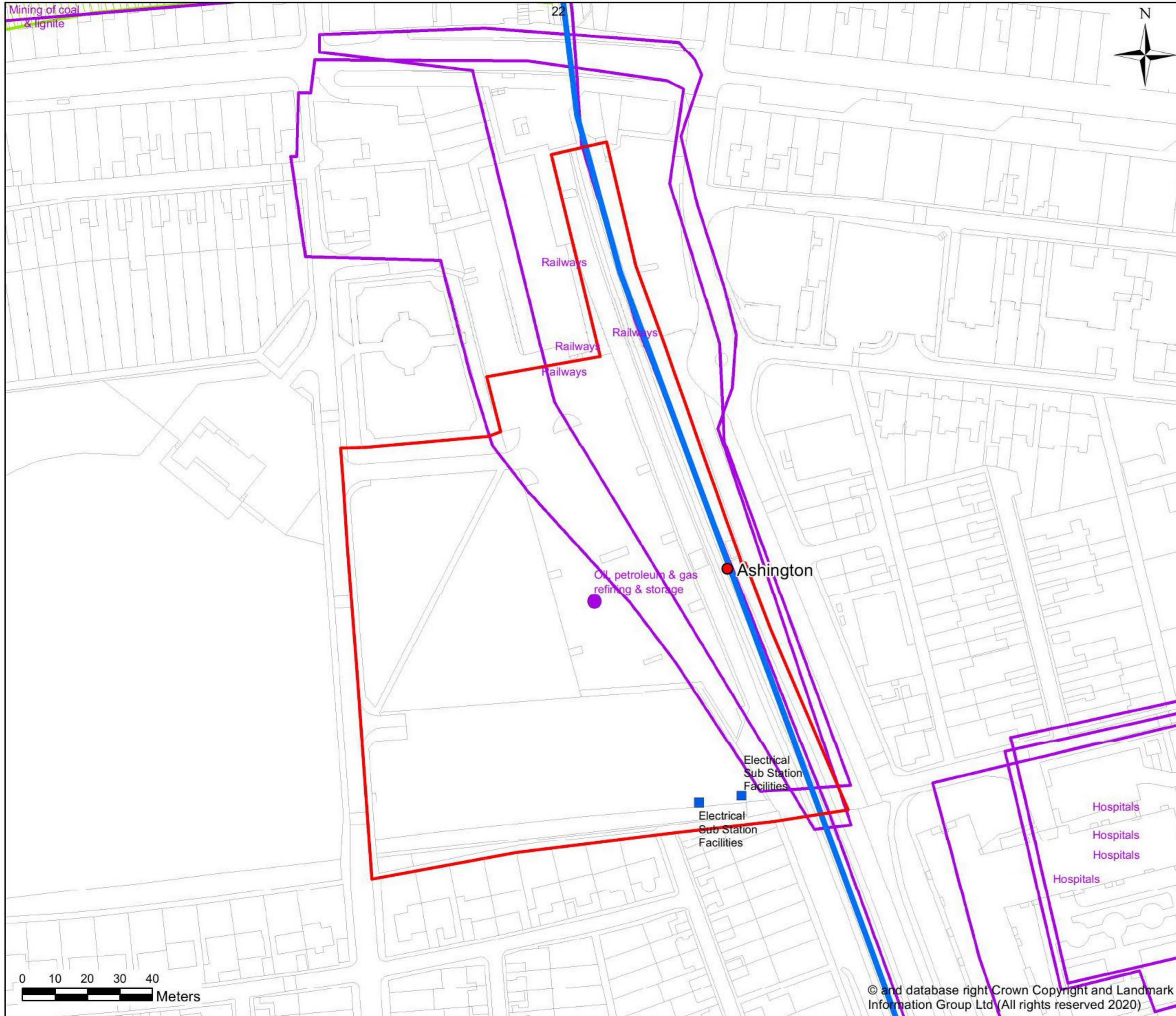
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Drawing Number: 60601435-ACM-07-ZZ-DRG-EGE-003 P03



Project No: 60601435

Date: August 2019



Legend

Route Sections

Earthwork Splits

- EW1 ECML to Northumberland Park
- EW2 Northumberland Park to Seaton Delaval
- EW3 Seaton Delaval to Newsham
- EW4 Newsham to Blyth Bebside
- EW5 Blyth Bebside to Bedlington
- EW6 Bedlington to Ashington
- Red Line Boundary Study Area
- Proposed Station

Envirocheck Waste Data

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historical Landfill
- Licensed Waste Management Facility (Boundary)
- Local Authority Recorded Landfill Site (Location)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site
- Registered Landfill Site (Location)
- Historical Map Features (Locations)
- BGS Recorded Mineral Sites
- Discharge Consents
- Fuel Station Entries
- Pollution Incidents to Controlled Waters

Envirocheck Infilled Land Data

- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Contaminated Land Use
- Potentially Contaminated Land Use
- Potentially Contaminated Land Use

NOTES:

1. DIGITAL DATA SUPPLIED BY LANDMARK FOR THE FOLLOWING ENVIROCHECK REPORTS PURCHASED FOR THE NORTHUMBERLAND LINE:

EW1 199782170
 EW2 199784004
 EW3 199790663
 EW4 199792138
 EW5 199794470
 EW6 199796483

ISSUE \ REVISION

I/R	DATE	DESCRIPTION
P03	DEC 2020	UPDATED SITE OUTLINE
P02	JULY 2020	UPDATED SITE OUTLINE
P01	AUG 2019	FIRST ISSUE

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NORTHUMBERLAND LINE



Ashington Station Geotechnical & Geoenvironmental Constraints Plan (Envirocheck Data)

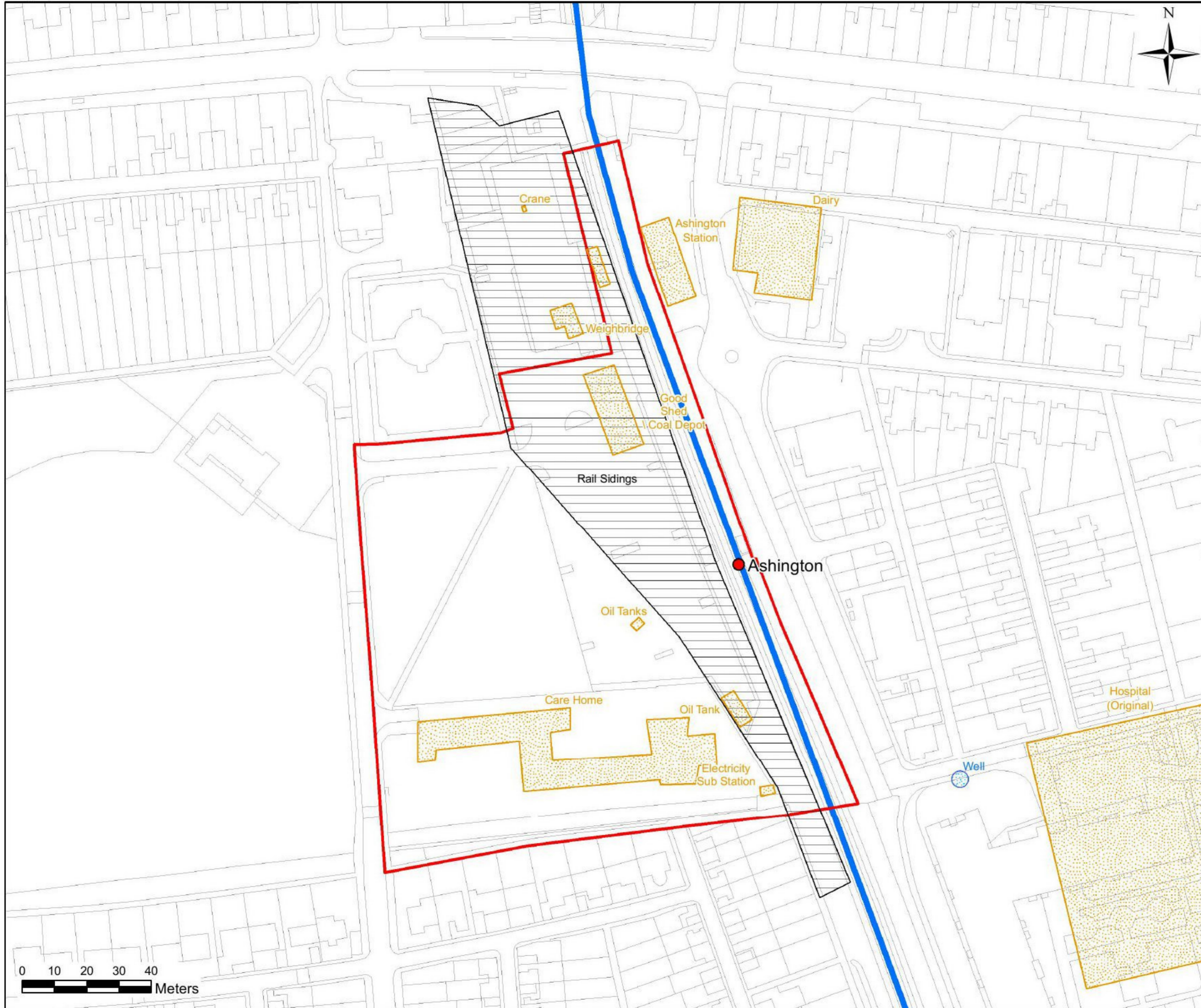
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Drawing Number: 60601435-ACM-07-ZZ-DRG-EGE-004 P03



Project No: 60601435

Date: August 2019



Legend

Feature from Historical OS Map

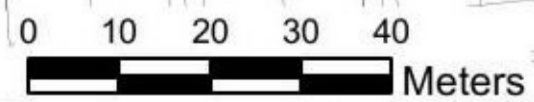
Type

- Building
- Earthwork
- Excavation
- Industry
- Rail
- Water

Route Sections

Earthwork Splits

- EW1 ECML to Northumberland Park
- EW2 Northumberland Park to Seaton Delaval
- EW3 Seaton Delaval to Newsham
- EW4 Newsham to Blyth Bebside
- EW5 Blyth Bebside to Bedlington
- EW6 Bedlington to Ashington
- Red Line Boundary Study Area
- Proposed Station



NOTES:

1. HISTORICAL ORDNANCE SURVEY MAPPING PROVIDED IN SITE SPECIFIC STATION ENVIROCHECK REPORTS PURCHASED FROM LANDMARK. REFER TO STATION PSSR REPORT FOR FURTHER DETAILS.

ISSUE \ REVISION

ISSUE	DATE	DESCRIPTION
P01	JAN 2021	FIRST ISSUE
I/R	DATE	DESCRIPTION

NORTHUMBERLAND LINE



Ashington Station Geotechnical & Geoenvironmental Constraints Plan (From Historical OS Maps)

Scale: 1:1,250

Drawing Number: 60601435-ACM-07-ZZ-DRG-EGE-005 P01



Project No: 60601435

Date: January 2021

8. Drawings

Drawing Number	Title
60601435-ACM-07-DRG-EHW-070001 P02	Ashington Car Park Highways General Arrangement
60601435-ACM-07-ZZ-DRG-EST-001301 P01.1	Ashington Station Proposed Wansbeck Sq Lift Access General Arrangement
60601435-ACM-07-ZZ-DRG-EST-001302 P01.1	Ashington Station Proposed Wansbeck Sq Lift Access Side Elevation
60601435-ACM-07-ZZ-DRG-EST-001303 P01.1	Ashington Station Proposed Wansbeck Sq Lift Access Front Elevation
60610435-ACM-XX-ZZ-DRG-EGE-101 P01	Scheme Wide – Route Plan
60601435-ACM-XX-ZZ-DRG-EGE-102 P01	Scheme Wide – Geology 1:50, 000 Solid and Drift
60601435-ACM-XX-ZZ-DRG-EGE-103 P01	Scheme Wide – Route Mining Constraints
60610435-ACM-07-ZZ-DRG-EGE-001 P03	Ashington Station Location Plan
60610435-ACM-07-ZZ-DRG-EGE-002 P03	Ashington Station - Geological Map
60610435-ACM-07-ZZ-DRG-EGE-003 P03	Ashington Station Mining Constraints & Borehole Plan
60610435-ACM-07-ZZ-DRG-EGE-004 P03	Ashington Station Geotechnical & Geoenvironmental Constraints Plan (Envirocheck Data)
60610435-ACM-07-ZZ-DRG-EGE-005 P01	Ashington Station Geotechnical & Geoenvironmental Constraints Plan (From Historical OS Maps)