Balfour Beatty

SSEN ASTI FRAMEWORK CAMBUSHINNIE 400KV BRACO HAUL TRACK

Preliminary Design Report

CMBS-LT520-BB-TRAC-ZZ-RPT-H-0003
MAY 2025

CONFIDENTIAL

Balfour Beatty

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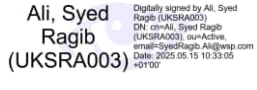
Signature				
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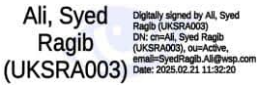
Signature				
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APPENDICES

1. INTRODUCTION

1.1. APPOINTMENT AND BRIEF

1.1.1. WSP has been commissioned by Balfour Beatty to undertake the design development of a haul track to facilitate the construction of the Cambushinnie Braco Substation.

1.1.2. The proposed haul track is located at Braco, Scotland and is designed to facilitate access for transformer deliveries and construction traffic, connecting from the existing A822 road to the planned substation, whilst bypassing Braco Village.

1.1.3. This document has been prepared to inform on the preliminary design deliverables and highlight any key risks and decisions.

1.1.4. This document relates solely to the above proposed development and site.

1.1.5. This document is intended for the sole benefit of the parties named above and shall not be capable of assignment without prior agreement. WSP shall not be liable for any use of the document for any reasons other than that for which it was originally prepared and provided.

1.1.6. Although this document was prepared using the degree of skill and care ordinarily exercised by engineers practicing under similar circumstances, please note that WSP cannot take responsibility for errors in the information provided by third parties.

1.1.7. This document is to be read in conjunction with all preliminaries, general conditions and all project drawings.

1.2. SITE LOCATION

1.2.1. The proposed site for the haul track is located to the south of Braco Village, Dunblane, FK15 9QZ (National Grid Reference NN832091; X: 283288, Y: 709119). The site location is shown in Figure 1 below.

Figure 1 - Site Location Plan

1.2.2. The proposed development is located to the south of Braco village. The haul track will leave the A822 to the west, cross the Keir Burn, intersect with the B8033, and continue westwards until joining with the existing access track north of the Gamekeeper's Cottage.

1.2.3. The location of the site is shown against OS background on 'Braco Haul Track Supplementary Location Plan CMBS-LT520-BB-TRAC-ZZ-PLN-T-0002' included within *Appendix A* of this document.

1.3. DOCUMENT STRUCTURE

1.3.1. This report has been prepared based on the design carried out during the ECE design phase (referred to as preliminary design in this document). The design has been developed in close collaboration with the *Contractor (Balfour Beatty)* and the *Client (SSEN).*

1.3.2. This report summaries the design philosophy considered for this design stage and has been presented in accordance with the relevant Manual of Contract Documents for Highway Works (MCHW) series for clarity.

1.3.3. The report also includes departures from standards where applicable and variations from the parameters mentioned in the 'Design Parameters Report CMBS-LT520-BB-TRAC-ZZ-RPT-H-0001'.

1.3.4. The design standards and guidance considered for the preparation of the preliminary design and this report are as follows:

- Design Manual for Roads and Bridges (DMRB) CD 109
- Design Manual for Roads and Bridges (DMRB) CD 123
- Forestry Commission Road Specifications
- Manual of Contract Documents for Highway Works (MCHW)
- Traffic Sign Manual (TSM) Chapter 4
- Traffic Sign Manual (TSM) Chapter 8 Part 1

2. PRELIMINARIES

2.1. SITE INFORMATION

2.1.1. A topographical survey was conducted to determine the site layout. The survey data was used to create a 3D model, which informed the vertical and horizontal alignment of the track.

2.1.2. The existing topography of the proposed development area generally falls from north-west to south-east, with ground elevations along the haul track ranging from approximately 106m to 130m above Ordnance Datum.

2.1.3. At its eastern end, where it connects to the A822, the proposed track level is approximately 107.1m. The track then ascends to cross the Keir Burn at approximately 110.9m before tying in with the B8033 at 109.1m. Beyond the B8033, the track generally follows the existing topography, rising to meet the existing access track at the northwestern end at an approximate level of 129.7m. Over its 1.2km length, the proposed haul track spans a significant elevation range from 107m to 130m.

2.1.4. For further details, refer to the plan and profile drawings CMBS-LT520-BB-TRAC-ZZ-D-H-0001 and CMBS-LT520-BB-TRAC-ZZ-D-H-0002.

2.1.5. NRSWA C2 requests were submitted to all relevant utility companies, except BT, as approval for this request is still pending from Balfour Beatty.

2.1.6. Responses have been received from Scottish Water, SGN, SPEN, National Gas Transmission, and SSEN. City Fibre has not responded. However, the topographical survey identified existing telegraph lines within the site that are not recorded in any current C2 responses.

2.2. HAUL TRACK GEOMETRY

2.2.1. The geometric design parameters were agreed with the *Client* at the commencement of the preliminary design stage and are mentioned in the 'Design Parameters Report CMBS-LT520-BB-TRAC-ZZ-RPT-H-0001'. The haul track geometry has been divided into two sections: the eastern section from Ch. 0 to 400 (intersection with the B8033) and the western section from Ch. 410 onwards.

2.2.2. The primary design parameter influencing the horizontal and vertical geometry of the proposed haul track is the design vehicle. The substation delivery vehicle is a 24-axle F5.5 Trailer Transport Arrangement, approximately 65m in length. As this vehicle is not included in the standard Vehicle Tracking library, a custom design vehicle was used.

2.2.3. In addition to the custom design vehicle, the haul track has been designed to accommodate a two-way flow of typical construction vehicles, assumed to be 10m-long rigid HGVs.

2.2.4. The stopping sight distance along the haul track has been measured in accordance with the envelope of visibility specified in clause 3.1 of *DMRB CD 109.*

2.2.5. The design compliance check of the preliminary design with respect to the agreed design parameters is shown in Table 1 below.

Table 1 – Haul Track Compliance Check

Parameter	Design Value	Compliance
Stopping Sight Distance	Min. 65m	Yes
Horizontal Radius	Min. 127m	Yes
Max. Longitudinal Gradient	1.78% (Eastern Section) 6.5% (Western Section)	Yes
Min. Longitudinal Gradient	0.5% (Eastern Section) 0.8% (Western Section)	No
Min. K value	9	Yes
Carriageway Width	6.5m	Yes
Crossfall	2.5% (Eastern Section) 3.5% (Western Section)	No

2.3. JUNCTION DESIGN

2.3.1. A822 Junction: Designed as a major-minor simple priority junction in accordance with *DMRB CD 123*, this junction accommodates the swept path of the custom design vehicle.

2.3.2. B8033 Junction: Designed as a crossroads junction in accordance with *DMRB CD 123*, with minimised kerb returns to discourage unauthorized vehicle access to the haul track.

2.3.3. The junction visibility splays are shown on drawing numbers CMBS-LT520-BB-TRAC-ZZ-D-H-0031 and -0032.

2.3.4. The visibility check results for both the junctions are shown in Table 2 below:

Table 2 – Junction Visibility Checks

Parameter	Design Value	Compliance
Haul track approach SSD visibility to A822 junction	300m	Yes
Haul track approach visibility to A822 junction	Min. 15m	Yes
A822 junction visibility towards North	X: 4.5m Y: 135m	No*
A822 junction visibility towards South	X: 4.5m Y: 215m	Yes
Haul track approach SSD visibility to B8033 junction	Min. 135m	Yes

Haul track approach visibility to B8033 junction	Min. 15m	Yes
B8033 junction (West) visibility towards North	X: 2.4m Y: 39.5m	No
B8033 junction (West) visibility towards South	X: 2.4m Y: 35m	No
B8033 junction (East) visibility towards North	X: 2.4m Y: 160m	Yes
B8033 junction (East) visibility towards South	X: 2.4m Y: 67.5m	No

*A set-back of 4.5m has been considered on the A822 junction considering the existing A822 road having a straight alignment and a posted speed limit of 60mph. This set-back can be reduced to 2.4m which can help achieve a compliant visibility of 215m and help reduce tree clearance. It should be noted that a reduced value of 2.4m does not result in a departure from standard.

2.4. DEPARTURES AND VARIATIONS

2.4.1. Departure: The junction visibility at the B8033 does not meet the requirements of CD 123 and is therefore classified as a departure from standard.

2.4.2. Relaxation: At the A822 junction, the required visibility towards the north can only be achieved with a reduced 'X' value of 2.4m. As a result, this has been identified as a relaxation within this document.

2.4.3. Variation: The minimum longitudinal gradient incorporated in the haul track western section design is 0.8%, which does not comply with the *Forestry Commission Road Specification* and has therefore been raised as a variation.

2.4.4. Variation: The crossfall for the unbound section of the haul track is 3.5%, which does not meet the *Forestry Commission Road Specification* and has been identified as a variation.

2.5. RISKS

2.5.1. The horizontal and vertical geometry is currently based on a swept path analysis using a custom design vehicle. The horizontal and vertical geometry must be finalised by *SSEN* based on further consultation with *Allelys* and formal provision of an AutoTRACK vehicle swept path template by Allelys to allow WSP to check the horizontal and vertical geometry.

2.5.2. The junction visibility at the B8033 junction is significantly less compared to the requirements of *DMRB CD 123* and hence poses a risk to the road users.

2.5.3. The junction kerb radii at the B8033 west junction is currently only 1 metre. In the future, when the Keir Burn bridge is removed, this radius may be insufficient for vehicles making a right turn onto the haul track.

3. SITE CLEARANCE

3.1. GENERAL

3.1.1. The haul track spans from the A822 to the existing access track north of Gamekeeper's cottage. Along this length of the proposed track there are several existing utilities, vegetation (trees and bushes), and minor structures that will require removal or diversions.

3.1.2. It has been noted that where the proposed haul track junction with the A822 will be located, there is an overhead electricity line that will either need to be protected or diverted.

3.1.3. There are also several trees that have been identified for removal due to the width of the bell mouth of the A822 junction. Most of these trees have been identified as Category 'A' trees to BS 5837 in the survey carried out by others (AECOM). Additionally, there is also an existing stone dyke which will require removal along with some hedges.

3.1.4. Between the A822 and the B8033, the proposed haul track crosses two fields. These are both surrounded with post and wire fencing that will need to be taken down and removed to a tip off site. At the proposed bridge over the Keir Burn, the existing informal bund arrangement will be retained. The removal of existing trees and vegetation shall be confirmed at Part 'A' design stage.

3.1.5. At the intersection with the B8033, the alignment of the proposed haul track has been designed to minimise the removal of mature trees.

3.1.6. There are also overhead telegraph lines that will require to either be protected or diverted. Post and wire fencing will need to be taken down and removed on both sides of the B8033, as will a stone dyke on the western side of the existing road.

3.1.7. Between the B8033 and Gamekeeper's Cottage, there are a couple sections of fencing that will require removal, including deer fencing surrounding a Christmas tree plantation. There are also overhead electricity lines that require protection or diversion and a drainage pipe that will require replacement, as well as numerous of hedges and trees.

3.1.8. Please refer to site clearance drawing numbers CMBS-LT520-BB-TRAC-ZZ-D-H-0009 and 0010 for more details.

3.2. RISKS

3.2.1. The proposed tree removal at the location of B8033 junction has been kept to a minimum, resulting in a sub-standard junction visibility. Providing a compliant junction visibility will result in significant removal of mature tress which are mostly Category 'A' trees.

3.2.2. The overhead electrical lines and telegraph lines have not been identified on the received C2 responses (response received from *SSEN*). These overhead lines will need to be either protected or diverted and ownership will need to be ascertained prior to commencement of detailed design.

4. FENCING AND ROAD RESTRAINT SYSTEMS

4.1. FENCING

4.1.1. As the proposed haul track cuts through several fields and a Christmas tree plantation, it has been proposed that the track will have post and wire fencing that will tie in with the existing fencing.

4.1.2. It should be noted that there is an existing deer fence surrounding the Christmas tree plantation. It has been proposed that where the haul track enters the Christmas plantation area, a deer cattle grid with accompanying deer fencing shall be installed.

4.1.3. Cattle grids and/or deer grids have been proposed at the locations shown on drawings CMBS-LT520-BB-TRAC-ZZ-D-H-0011 and 0012 in consultation with the landowner.

4.1.4. Whilst the final specification of the deer grid will depend on the supplier, the length of the deer grid proposed is 8 metres.

4.2. RRS

4.2.1. For the proposed haul track, two critical locations were identified where road restraint systems may be required. Subsequently, a road restraint system assessment was carried out and three potential risk scenarios were identified. The risk assessment carried out for these scenarios are discussed in 'Road Restraint Assessment Report included within *Appendix B'.*

4.2.2. As a result of the risk assessment, high containment kerbs have been proposed on the approach to the Keir Burn bridge.

4.3. GATES

4.3.1. Field access and haul track access gates have been proposed as shown on drawings CMBS-LT520-BB-TRAC-ZZ-D-H-0011 and 0012 in consultation with the landowner.

4.3.2. The type and specification of gates shall be determined at Part 'A' detailed design stage.

5. DRAINAGE AND SERVICE DUCTS

5.1. TRACK DRAINS

5.1.1. The haul track drainage design strategy is specified in the Drainage Impact Assessment report CMBS-LT520-BB-TRAC-ZZ-RPT-C-0006.

5.1.2. Some key parameters considered for haul track drainage design are mentioned below:

- Rainfall data: Flood Studies Report (FSR)
- Climate Change: 39%
- Attenuation Criteria:
  - Blacktop (Asphalt) Pavement Sections: Attenuation to 1-in-1, 1-in-5, 1-in-30 years greenfield run-off rates
  - Water bound (Type 1) Pavement Sections: Proposed discharge rates have been minimised via orifices

5.1.3. Refer to drainage design drawing numbers CMBS-LT520-BB-TRAC-ZZ-D-H-0015 to 0019 for more details.

5.2. FLOOD RISK ASSESSMENT

5.2.1. Flood risk assessment for Keir Burn fluvial flooding was carried out by others (Jacobs) and has been briefly described in the Drainage Impact Assessment report CMBS-LT520-BB-TRAC-ZZ-RPT-C-0006.

5.3. RISKS

5.3.1. The drainage design is subject to change based on consultations with *Perth and Kinross Council* and *SEPA.*

5.3.2. There is a risk of a clash between an existing Scottish Water main at the B8033 and the proposed drainage. The clash shall be further assessed at detailed design stage and may also result in amendment of the drainage design.

5.3.3. There are design clashes identified between the flood relief culverts specified by Jacobs and the haul track and associated drainage systems designed by WSP. These clashes, and the design boundaries between the two items, will need to be resolved at detailed design stage.

6. EARTHWORKS

6.1. GENERAL

6.1.1. An earthwork slope of 1 in 3 has been considered at the preliminary design stage in accordance with ‘Design Parameters Report CMBS-LT520-BB-TRAC-ZZ-RPT-H-0001’.

6.1.2. During the preliminary design stage, a GI factual report was prepared by IGNE (Reference No. 26762).

6.2. RISKS

6.2.1. The draft factual report for the haul track was compiled and issued at the end of the preliminary design stage for the scheme. Therefore, findings from the draft factual report have not been incorporated into the preliminary design. The final factual report will be used to inform the detailed design stage and may introduce changes to earthworks slopes, bridge arrangements etc. as the detailed design evolves.

7. TRACK PAVEMENT

7.1. GENERAL

7.1.1. In consultation with the *Client* the eastern section of the haul track, from chainage 0 to 450m, will be bound asphalt pavement construction whereas from chainage 450m onwards the haul track has been specified as being unbound, compacted Type 1 material. Refer to pavement layout drawings CMBS-LT520-BB-TRAC-ZZ-D-H-0019 and 0020 and pavement construction detail drawing CMBS-LT520-BB-TRAC-ZZ-D-H-0021 for more details.

7.1.2. The CBR value considered for determining the Type 1 unbound pavement construction is 5%. Depending on the outcome of the GI works, a capping layer and a membrane may also be required.

7.1.3. The pavement construction over the Keir Burn shall be in accordance with the Bridge Supplier's specifications/requirements.

7.2. TRAFFIC VOLUMES

7.2.1. Balfour Beatty has provided indicative traffic volumes showcasing the estimated weekly flows for HGVs, LGVs, cars, and vans estimated over a five-year period. A snapshot of the indicative volumes is shown in Figure below.

2025								Jul-25	Aug-25	Sep-25	Oct-25	Nov-25	Dec-25
	Vehicle Description												
	HGV							408	744	744	718	1116	1116
	Up to 3.5t cars, LGV							510	680	960	990	770	770

2026		Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26
	Vehicle Description												
	HGV	1588	1288	1610	1288	1288	1288	1610	986	152	424	1144	1144
	Up to 3.5t cars, LGV	1140	1160	1450	1160	1160	1160	1450	1160	1450	1230	1440	1440

2027		Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27
	Vehicle Description												
	HGV	768	1024	1024	1280	1472	1304	1630	1504	1816	1424	1424	1328
	Up to 3.5t cars, LGV	1030	1400	1400	1640	1680	2000	2600	2310	2760	2760	2730	1970

2028		Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28	Aug-28	Sep-28	Oct-28	Nov-28	Dec-28
	Vehicle Description												
	HGV	990	1310	1600	1250	1240	1540	1200	1490	140	112	104	80
	Up to 3.5t cars, LGV	1500	2000	2450	1960	1840	2250	1800	2250	2050	1370	1360	1050

2029		Jan-29	Feb-29	Mar-29	Apr-29	May-29	Jun-29	Jul-29	Aug-29	Sep-29	Oct-29	Nov-29	Dec-29
	Vehicle Description												
	HGV	80	104	130	114	180	130	88	170	88	88	170	86
	Up to 3.5t cars, LGV	1010	1360	1700	1270	1250	950	760	170	1020	1350	1000	600

2030		Jan-30	Feb-30	Mar-30	Apr-30	May-30	Jun-30	Jul-30	Aug-30	Sep-30	Oct-30	Nov-30	Dec-30
	Vehicle Description												
	HGV	42	0	0									
	Up to 3.5t cars, LGV	160	0	0									

Figure 2 - Site Location Plan

7.2.2. The traffic modelling results shall be used for further consultation with WSP's Pavement Team at detailed design stage (Part A works).

8. TRAFFIC SIGNS AND ROAD MARKINGS

8.1. TRAFFIC SIGNS

8.1.1. Warning signs are proposed on the A822, B8033, existing access track and the haul track itself. The proposed traffic signs are in accordance with TSM Chapter 4 and TSM Chapter 8 Part 1 (section D3.23). For details of the proposed traffic sign layout, refer to drawing numbers CMBS-LT520-BB-TRAC-ZZ-D-H-0024 and 0026.

8.1.2. Since the haul track was designed to bypass the village of Braco, it is assumed that all construction and substation delivery traffic will travel northbound on the A822. Consequently, the 'Works Access' sign will be positioned south of the junction, while the 'Works Exit' sign will be placed to the north.

8.1.3. As the haul track intersects the B8033, 'Crossroads' warning and 'Heavy Plant Crossing' signs are proposed to be installed north and south of the intersection. The new 'Crossroads' warning sign will replace the existing warning signage for the sharp bend.

8.1.4. On the junction with the A822 and the existing access tracks, 'give way' signs have been proposed 50 yards prior to the junctions. On the junction with the B8033, 'STOP' signs have been proposed because of the reduced visibility at the junction.

8.1.5. The spacing and size of the proposed signs were determined based on Table A-1 of TSM Chapter 4. For the signs located south of the A822 junction, the 85th percentile speed bracket was assumed to be between 51 and 60 mph. For the signs located north of the A822 and on the B8033, the assumed 85th percentile speed bracket was assumed to be between 41 and 50 mph. Additionally, a bendiness assessment was conducted on the existing B8033 road, with the calculations provided in *Appendix C* of this document.

8.1.6. The smaller bracketed sizes were deemed adequate considering the physical constraints on site (narrow verges with very limited room for signage) and the nature of the haul track (a semi-permanent route).

Table 3 – Signage Sizing and Spacing

Location of Sign	Assumed 85th Percentile Speed of private cars (mph)	Height of Triangular Warning Signs (mm)	Minimum Clear Visibility Distance (m)	Regulation Distance from Junction (m)	Design Distance from Junction (m)
A822 South of Junction	51 to 60	Min. 900	75	110 — 180	135
A822 North of Junction	41 to 50	Min. 750	75	45 — 110	80
B8033 North of Junction	41 to 50	Min. 750	75	45 — 110	110
B8033 South of Junction	41 to 50	Min. 750	75	45 — 110	110

8.2. ROAD MARKINGS

8.2.1. Standard junction road markings are proposed at the A822 and B8033 junctions. Additionally, 'SLOW' road markings are proposed on the existing B8033 road to warn the road users of the proposed B8033 crossroads junctions.

8.2.2. No road markings have been proposed beyond Ch. 450 on the haul track due to the unbound Type 1 pavement construction proposed.

8.2.3. For road marking layouts, refer to drawing numbers CMBS-LT520-BB-TRAC-ZZ-D-H-0022 and 0023.

8.3. RISKS

8.3.1. The proposed traffic signs and road markings are subject to change based on traffic management and construction- and delivery-phase signal arrangements at the B8033 crossroads junction.

8.3.2. The proposed traffic signs and road markings are subject to change once consultation has taken place with Perth & Kinross Council regarding available visibility and the proposed (albeit limited) mature tree clearance at the crossroads location.

8.3.3. Some of the proposed signs, especially at the B8033 and the existing access tracks, may need to be installed in adjacent private land to ensure they have sufficient set-back from the existing public road and track channel edges.

9. STRUCTURAL DESIGN

9.1. TEMPORARY BRIDGE

9.1.1. Initial consultation with two bridge suppliers, Beaver Bridges and Mabey Bridge, was undertaken by WSP the results of which were shared with Balfour Beatty.

9.1.2. At a later stage, Balfour Beatty confirmed the use of Acrow compact temporary bridge at the Keir Burn. An indicative general arrangement drawing number '26838-26818-AGL-COM-001-DR-CD-101' provided by Acrow has been included within *Appendix D* of this document.

9.1.3. It is to be noted that the design of the Keir Burn bridge is not within WSP's scope of works.

9.2. BRIDGE ABUTMENTS

9.2.1. The bridge sub-structure shall be designed by WSP at detailed design stage (Part A works). At the current stage, only an indicative General Arrangement drawing (drawing number CMBS -LT520-BB-TRAC-ZZ-D-H-0029) showing the abutments and bridge has been prepared.

9.3. RISKS

9.3.1. The length of bridge span as shown on the Acrow general arrangement drawing is approximately 36.5m. This span poses a potential risk of the bridge substructure encroaching on the existing Keir Burn bunds. It is likely that the span will need to be increased if the existing bunds are to remain untouched by any temporary or permanent works.

9.3.2. The deck level of the bridge is subject to change based on structural calculations that shall be carried out at detailed design stage.

10. PRELIMINARY DESIGN DELIVERABLES

10.1.1. Design drawings prepared as part of the preliminary design are mentioned below:

Title	Drawing Number
Braco Haul Track Plan and Profile Sheet 1	CMBS-LT520-BB-TRAC-ZZ-D-H-0001
Braco Haul Track Plan and Profile Sheet 2	CMBS-LT520-BB-TRAC-ZZ-D-H-0002
Braco Haul Track Typical Cross Sections Sheet 1	CMBS-LT520-BB-TRAC-ZZ-D-H-0003
Braco Haul Track Typical Cross Sections Sheet 2	CMBS-LT520-BB- TRAC -ZZ-D-H-0004
Braco Haul Track Red Line Boundary Sheet 1	CMBS-LT520-BB-TRAC-ZZ-D-H-0005
Braco Haul Track Red Line Boundary Sheet 2	CMBS-LT520-BB-TRAC-ZZ-D-H-0006
Braco Haul Track Vehicle Swept Path Analysis Sheet 1	CMBS-LT520-BB-TRAC-ZZ-D-H-0007
Braco Haul Track Vehicle Swept Path Analysis Sheet 2	CMBS-LT520-BB-TRAC-ZZ-D-H-0008
Braco Haul Track Site Clearance Sheet 1	CMBS-LT520-BB-TRAC-ZZ-D-H-0009
Braco Haul Track Site Clearance Sheet 2	CMBS-LT520-BB-TRAC-ZZ-D-H-0010
Braco Haul Track Fencing Layout Sheet 1	CMBS-LT520-BB-TRAC-ZZ-D-H-0011
Braco Haul Track Fencing Layout Sheet 2	CMBS-LT520-BB-TRAC-ZZ-D-H-0012
Braco Haul Track Fencing Details Sheet 1	CMBS-LT520-BB-TRAC-ZZ-D-H-0013
Braco Haul Track Fencing Details Sheet 2	CMBS-LT520-BB-TRAC-ZZ-D-H-0014
Braco Haul Track Drainage Layout Sheet 1	CMBS-LT520-BB-TRAC-ZZ-D-H-0015
Braco Haul Track Drainage Layout Sheet 2	CMBS-LT520-BB-TRAC-ZZ-D-H-0016
Braco Haul Track Drainage Standard Details Sheet 1	CMBS-LT520-BB-TRAC-ZZ-D-H-0017
Braco Haul Track Pavement Layout Sheet 1	CMBS-LT520-BB-TRAC-ZZ-D-H-0019
Braco Haul Track Pavement Layout Sheet 2	CMBS-LT520-BB-TRAC-ZZ-D-H-0020
Braco Haul Track Pavement Standard Details	CMBS-LT520-BB-TRAC-ZZ-D-H-0021
Braco Haul Track - Road Marking Layout Sheet 1	CMBS-LT520-BB-TRAC-ZZ-D-H-0022
Braco Haul Track - Road Marking Layout Sheet 2	CMBS-LT520-BB-TRAC-ZZ-D-H-0023
Braco Haul Track Traffic Sign Layout Sheet 1	CMBS-LT520-BB-TRAC-ZZ-D-H-0024

Braco Haul Track Traffic Sign Layout Sheet 2	CMBS-LT520-BB-TRAC-ZZ-D-H-0025
Braco Haul Track Traffic Sign Details Sheet 1	CMBS-LT520-BB-TRAC-ZZ-D-H-0026
Braco Haul Track Traffic Sign Details Sheet 2	CMBS-LT520-BB-TRAC-ZZ-D-H-0027
Braco Haul Track A822 Junction Visibility Splays	CMBS-LT520-BB-TRAC-ZZ-D-H-0031
Braco Haul Track B8033 Junction Visibility Splays	CMBS-LT520-BB-TRAC-ZZ-D-H-0032

10.1.2. Design documents prepared as part of the preliminary design are mentioned below:

Title	Document Number
Design Parameters Technical Note	CMBS-LT520-BB-TRAC-ZZ-RPT-H-0001
RRS Assessment Technical Note	CMBS-LT520-BB-TRAC-ZZ-RPT-H-0002
Preliminary Design Report (This document)	CMBS-LT520-BB-TRAC-ZZ-RPT-H-0003
B8033 Bendiness Assessment Technical Note	CMBS-LT520-BB-TRAC-ZZ-RPT-H-0006
Drainage Impact Assessment Report	CMBS-LT520-BB-TRAC-ZZ-RPT-C-0006

11. NOTES FOR PART ‘A’ (DETAILED DESIGN) WORKS

11.1.1. Consultation with *Perth and Kinross Council* and *SEPA* has not been undertaken during preliminary design stage and hence shall be carried out during Part ‘A’ detailed design stage.

11.1.2. The design of the sub-structure for the Keir Burn temporary bridge shall be carried out at Part ‘A’ detailed design stage.

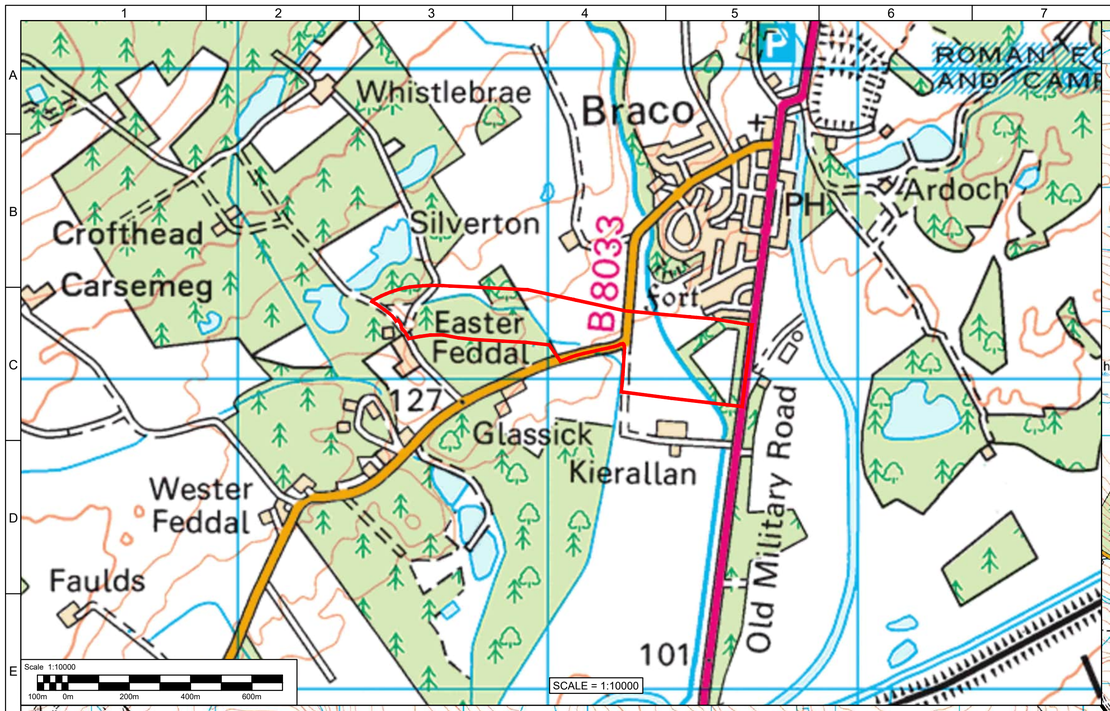
11.1.3. Considering the junction visibility risks at the B8033 crossroads junctions it is recommended that the option of providing traffic signals is investigated at Part ‘A’ detailed design stage.

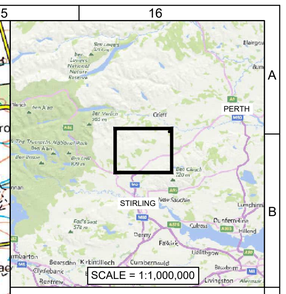
11.1.4. The tree removal at the proposed A822 junction can be further minimised by considering a reduced set-back (X value) of 2.4m for junction visibility.

11.1.5. The design of field accesses and crane pads for the Keir Burn bridge installation have not been undertaken during preliminary design stage and hence shall be carried out during Part ‘A’ detailed design stage.

Appendix A

SUPPLEMENTARY LOCATION PLAN





NOTES:

1. DO NOT SCALE FROM THIS DRAWING.
2. ALL DIMENSIONS ARE SHOWN IN METRES UNLESS OTHERWISE STATED.
3. THE DRAWING IS TO BE PRINTED IN COLOUR.
4. THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION PURPOSE.
5. FOR MORE DETAILS ON THE PROPOSED HAUL TRACK DEVELOPMENT REFER TO PLAN AND PROFILE DRAWING NUMBERS CMBS-LT520-BB-TRAC-ZZ-D-H-0001 AND CMBS-LT520-BB-TRAC-ZZ-D-H-0002.

KEY:

BRACO HAUL TRACK RED LINE BOUNDARY

DRAWN	SRA	REMARKS:				
CHKD	FY	SECOND ISSUE – MINOR AMENDMENTS				
DESIGN	SRA	STATUS	S5	DATE	14/05/2025	
APPD	FY	FOR ACCEPTANCE		REV	P02	
DRAWN	SRA	REMARKS:				
CHKD	FY	FIRST ISSUE				
DESIGN	SRA	STATUS	S5	DATE	13/01/2025	
APPD	FY	FOR ACCEPTANCE		REV	P01	

Scottish & Southern Electricity Networks

Balfour Beatty

PROJECT NAME: ASTI-ECE

LOCATION: CAMBUSHINNIE 400kV S/S | SITE: CMBS

TITLE:

BRACO HAUL TRACK SUPPLEMENTARY LOCATION PLAN

SIZE	SCALE	FORMAT	SHEET No.
A1	As Shown	ACAD	01 OF 01

DRAWING No. CMBS-LT520-BB-TRAC-ZZ-PLN-T-0002

Appendix B

HAUL TRACK RISK ASSESSMENT

CMBS-LT520-BB-TRAC-ZZ-RPT-H-0002
BRACO HAUL TRACK RRS ASSESSMENT

DATE:	06 May 2025	**CONFIDENTIALITY:**	Confidential
SUBJECT:	Road Restraint System Assessment		
PROJECT:	Cambushinnie Braco Haul Track	**AUTHOR:**	GU
CHECKED:	SRA	**APPROVED:**	AC

INTRODUCTION

WSP has been appointed by Scottish and Southern Electric (SSE) to carry out design work at Braco, for a haul track for the proposed Cambushinnie substation. The purpose of the proposed haul track is to allow access for the substation delivery vehicles to the site of the substation. The track is proposed to leave the A822 to the west, cross the Keir Burn, intersect with the B8033, and continue westwards until joining with the existing access track north of Gamekeeper's Cottage. When crossing the Keir Burn, the haul track rises to approximately a level of 110.9m resulting in an embankment height of approximately 3m.

Two critical locations have been identified for further evaluation as part of the Road Risk Assessment. These locations are highlighted in Figure 1 below.

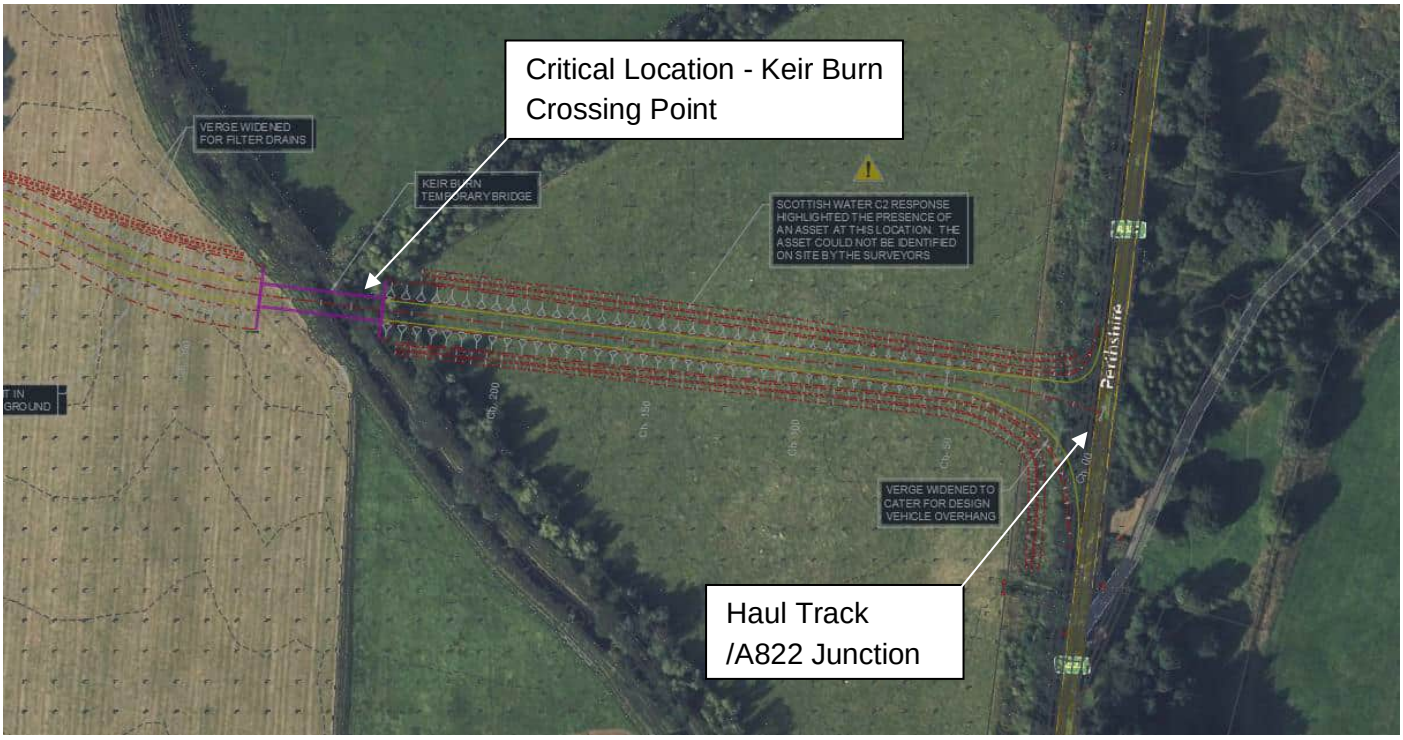


Figure 1 Existing Location (Satellite Source: Google Maps)

CMBS-LT520-BB-TRAC-ZZ-RPT-H-0002
BRACO HAUL TRACK RRS ASSESSMENT

DATE:	06 May 2025	**CONFIDENTIALITY:**	Confidential
SUBJECT:	Road Restraint System Assessment		
PROJECT:	Cambushinnie Braco Haul Track	**AUTHOR:**	GU
CHECKED:	SRA	**APPROVED:**	AC

Purpose

The purpose of this Technical Note is to carry out a Road Restraint System (RRS) requirement appraisal for the two locations mentioned above whilst considering an errant vehicle to fall down the embankment as the primary risk.

In order to carry out the RRS assessment, guidance has been taken from “Provision of Road Restraint Systems on Local Authority Roads” document published by Department for Transport (DfT) instead of Design Manual for Roads and Bridges (DMRB) Standard CD 377. This is because the DMRB Standard CD 377 – “Requirements for Road Restraint Systems” has been developed using accident data for routes with traffic flows over 5,000 Average Annual Daily Traffic (AADT) and a speed limit of 50mph or greater, whereas the design speed on the proposed haul track is 25mph/40kph. Application of the approach in CD 377 to low speed and low flow roads is likely to result in overuse of road restraint systems.

CMBS-LT520-BB-TRAC-ZZ-RPT-H-0002
BRACO HAUL TRACK RRS ASSESSMENT

DATE:	06 May 2025	**CONFIDENTIALITY:**	Confidential
SUBJECT:	Road Restraint System Assessment		
PROJECT:	Cambushinnie Braco Haul Track	**AUTHOR:**	GU
CHECKED:	SRA	**APPROVED:**	AC

RISK ASSESSMENT

Risk assessments for both locations have been carried out using Method C – Risk Scoring as specified in "Provision of Road Restraint Systems on Local Highway Authority Roads". The risk assessment covers the following scenarios:

- Risk Scenario 1: vehicles entering the haul track from the A822 and falling down the embankment
- Risk Scenario 2A: westbound vehicles approaching the bridge over the Keir Burn and falling down the embankment
- Risk Scenario 2B: eastbound vehicles approaching the bridge over the Keir Burn and falling down the embankment

The risk scoring for these scenarios is shown in Tables 1, 2, and 3. The total priority score shall be carried out in accordance with section 6.5 of the risk assessment guidance, a snapshot of which is shown below.

$F_{LOCATION}$(Range 0-6) +
F_{LAYOUT} (Largest of two scores, Range 0-5 or 0-3) +
$F_{COLLISION}$ (Sum of two separate scores, Range 0-4) +
$F_{CONSEQUENTIAL}$ (Sum of three separate scores, Range 0-3).

Table 1 - Risk Assessment for Scenario 1

Factor	Priority Rank	Risk Factor Score	Comment
Location	2 – Rural A road	3	The A822 is a rural A class road.
Layout (Maximum value to be considered)	0 – Complies with CD 109	0	The approach to the junction from A822 complies with the design requirements of CD 109. The junction complies with the requirements of CD 123
	1 – Some potential for lane changing, overtaking, positioning	2	Value chosen due to good visibility on A822 road. The existing road markings on A822 is to TSRGD number 1005 which allows overtaking.

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SUBJECT:	Road Restraint System Assessment		
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	manoeuvres or avoiding action.		
Collision	1 – Series of individual hazards less than 50m apart or a longitudinal hazard that might be reached.	1	An average value has been considered for this risk factor
	0 – Percentage of KSI for primary hazard < 20%	0	This element of score is based on KSI% of 19.9%. Determined “Other permanent objects” in the “non-built up roads” section of Table 3 of “Provision of Road Restraint Systems on Local Highway Authority Roads”.
Consequential	0 – No secondary events likely	0	In case of an incident, no secondary events are expected.
	0 – No impact on network availability	0	Very unlikely that impact would prevent access to the haul track for greater than one day.
	0 – No significant cost implications	0	No significant cost implications have been considered
Total Priority Score		6	6 – Lower Priority Score

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SUBJECT:	Road Restraint System Assessment		
PROJECT:	Cambushinnie Braco Haul Track	**AUTHOR:**	GU
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Table 2 - Risk Assessment for Scenario 2A

Factor	Priority Rank	Risk Factor Score	Comment
Location	0 – All other roads	0	The haul track is a private access track.
Layout (Maximum value to be considered)	0 - Straight alignment and/or complies with CD 109	0	The haul track has a straight alignment at the bridge crossing the Keir Burn. The longitudinal gradient is compliant with CD 109.
	0 – No reason for lane changing/manoeuvres	0	There is no reason for lane changing on the approach to the bridge
Collision	2 – Longitudinal Hazard that is highly likely to be reached resulting in harm	2	Highest risk considered for vehicles falling down the embankment and encroaching the Keir Burn (or damaging the Keir Burn bunds).
	2 – Percentage of KSI for primary hazard >30%	2	This element of score is based on KSI% of 31.6%. Determined “Submerged” in the “Non-built up roads” section of Table 3 of “Provision of Road Restraint Systems on Local Highway Authority Roads”.
Consequential	1 – When damaged or collapsed the feature could give rise to the risk of secondary accidents	1	The incident could result in damage to the bridge resulting in secondary vehicular accidents
	1 – If hazardous feature was damaged or collapsed this could give rise to network	1	Damage to the bridge would result in a full closure of the haul track.

DATE:	06 May 2025	**CONFIDENTIALITY:**	Confidential
SUBJECT:	Road Restraint System Assessment		
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	disruption for more than one day		
	1 – Significant cost of repair or replacement following collisions	1	Damage to the bridge would result in significant cost implications.
Total Priority Score		7	7 - Lower Priority Score

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Table 2 - Risk Assessment for Scenario 2B

Factor	Priority Rank	Risk Factor Score	Comment
Location	0 – All other roads	0	The haul track is a private access track.
Layout (Maximum value to be considered)	1 - One step below desirable minimum R with superelevation of 5%	1	The eastbound approach to the Keir Burn bridge is curved with a radius of 180m and is bi-camber with a 2.5% crossfall. This results in a V^2/R ratio of 8.88 and because of no superelevation the design of the approach is considered as One Step below desirable minimum R with superelevation of 5%.
	0 – No reason for lane changing/manoeuvres	0	There is no reason for lane changing on the approach to the bridge.
Collision	2 – Longitudinal Hazard that is highly likely to be reached resulting in harm	2	Highest risk considered for vehicles falling down the embankment and encroaching the Keir Burn (or damaging the Keir burn bunds).
	2 – Percentage of KSI for primary hazard >30%	2	This element of score is based on KSI% of 31.6%. Determined “Submerged” in the “Non-built up roads” section of Table 3 of “Provision of Road Restraint Systems on Local Highway Authority Roads”.
Consequential	1 – When damaged or collapsed the feature could give rise to the risk of secondary accidents	1	The incident could result in damage to the bridge resulting in secondary vehicular accidents

DATE:	06 May 2025	**CONFIDENTIALITY:**	Confidential
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PROJECT:	Cambushinnie Braco Haul Track	**AUTHOR:**	GU
CHECKED:	SRA	**APPROVED:**	AC

	1 – If hazardous feature was damaged or collapsed this could give rise to network disruption for more than one day	1	Damage to the bridge would result in a full closure of the haul track.
	1 – Significant cost of repair or replacement following collisions	1	Damage to the bridge would result in significant cost implications.
Total Priority Score		8	8 - Lower Priority Score

CMBS-LT520-BB-TRAC-ZZ-RPT-H-0002
BRACO HAUL TRACK RRS ASSESSMENT

DATE:	06 May 2025	**CONFIDENTIALITY:**	Confidential
SUBJECT:	Road Restraint System Assessment		
PROJECT:	Cambushinnie Braco Haul Track	**AUTHOR:**	GU
CHECKED:	SRA	**APPROVED:**	AC

CONCLUSION

The risk ranking bands as specified in Table 6.9 of "Provision of Road Restraint Systems on Local Highway Authority Roads" are as follows:

TOTAL RISK RANKING SCORE	CATEGORY	OUTCOME
14 or more	Higher Priority	(see Table 5.2)
9-13	Medium Priority	
0-8	Lower Priority	

Scenario 1

The following has been concluded on the provision of VRS for Scenario 1:

- The result from the RRS assessment indicates that the risk ranking score for an errant vehicle falling down the embankment is less than 8. According to the rating system, this classifies the site as a Lower Priority Site.
- Vehicles are expected to be traveling at low speeds due to the approach to the junction and the presence of warning signs.
- Although the junction is formed on an embankment the average height of the embankment in the region of vehicle turning movement is less than 1m.

Given this categorisation and considering other factors, it is recommended that VRS is not provided at this location.

Scenarios 2A and 2B

The following has been concluded on the provision of VRS for Scenarios 2A and 2B:

- The result from RRS assessment indicates that the risk ranking score for an errant vehicle falling down the embankment is 7 for westbound approach and 8 for eastbound approach. According to the rating system, this classifies the site as a Lower Priority Site.
- Vehicles are expected to be traveling at low speeds due to the approach to the bridge.

Given this categorisation and considering other factors, it is recommended that a permanent VRS is not provided. Due to the risk assessment for the Keir Burn Bridge having a score of 100% (4/4 and 3/3) on the Collision and Consequential segments and the risk score being on the higher side of the risk scoring band, it

DATE:	06 May 2025	**CONFIDENTIALITY:**	Confidential
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is recommended other mitigation measures are investigated at this location. The mitigation measures that can be considered to reduce the risk are as follows:

- A temporary barrier system should be installed on both the approaches to the bridge.
- The verge should be widened to accommodate the temporary barrier system.
- A speed limit should be imposed for both the approaches to the bridge and appropriate warning signage should be installed.
- Kerbs could be provided for a length of approximately 30m on either side of the bridge.

Risk to other users

- Risk to Non-Motorised Users: Since there are no walking, cycling, or horse-riding routes in the vicinity of the infiltration basin, there is no risk to Non-Motorized Users.
- Risk to construction workers: Workers operating near the bridge may be at risk of falling into the burn. Therefore, temporary fencing and other protective measures such as warning signs, assigned walkways, and appropriate lighting for night working should be considered to safeguard the workers. Additionally, appropriate Emergency Response Plan should be put in place for the worst-case scenarios.

Appendix C

B8033 BENDINESS ASSESSMENT

Project / Contract Name:	Cambushinnie 400kV Substation		
Document Title:	Braco Haul Track B8033 Bendiness Assessment		
Contract / PO Number:	PTS5644		
SSEN Document No:	CMBS-LT520-BB-TRAC-ZZ-RPT-H-0006		
SSEN Project No:	LT000520		
SSEN Reason for Issue	For Acceptance	No. of Pages	7

BIM Code	CMBS-LT520-BB-TRAC-ZZ-RPT-H-0006	BB Rev	P01	Suitability	S5

Sign Off	Name	Signature	Date
Prepared	Syed Ragib Ali	Ali, Syed Ragib (UKSRA003) Digitally signed by Ali, Syed Ragib (UKSRA003) DN: cn=Ali, Syed Ragib (UKSRA003), ou=Active, email=SyedRagib.Ali@wsp.com Date: 2025.05.14 17:21:26 +01'00'	06/05/2025
Reviewed	Fred Young	Young, Fred (UKACY600) Digitally signed by Young, Fred (UKACY600) DN: cn=Young, Fred (UKACY600), ou=Active, email=Fred.Young@wsp.com Reason: I have reviewed this document Date: 2025.05.15 10:22:37 +01'00'	06/05/2025
Authorised	Fred Young	Young, Fred (UKACY600) Digitally signed by Young, Fred (UKACY600) DN: cn=Young, Fred (UKACY600), ou=Active, email=Fred.Young@wsp.com Reason: I am approving this document Date: 2025.05.15 10:23:23 +01'00'	06/05/2025

Rev	SSEN Revision History	Author	Date
P01	First Issue	Michael Easdon	29/01/2025
P02	Revision 1	Syed Ragib Ali	06/05/2025
-	-	-	-
-	-	-	-

CMBS-LT520-BB-TRAC-ZZ-RPT-H-0006
B8033 Bendiness Assessment

DATE:	06 May 2025	**CONFIDENTIALITY:**	Confidential
SUBJECT:	B8033 Bendiness Assessment Technical Note		
PROJECT:	Cambushinnie Braco Haul Track	**AUTHOR:**	ME
CHECKED:	SRA	**APPROVED:**	FY

INTRODUCTION

WSP has been appointed by Scottish and Southern Electricity Networks (SSEN) via Balfour Beatty to carry out design work at Braco, for a haul track serving the proposed Cambushinnie Braco Substation. The purpose of the proposed haul track is to provide access for construction traffic and delivery vehicles to the site of the substation. The haul track is proposed to leave the A822 south of the village of Braco, cross the Keir Burn, intersect with the B8033, and continue westwards until joining with the existing access track north of Gamekeeper's Cottage.

Where the proposed Braco haul track meets the B8033 it creates a crossroads junction. Visibility is significantly reduced at this location due to a combination of numerous mature trees lining the verges of the B8033 and a sharp bend (approximately 70 degrees) on the B8033. This scenario creates a significant hazard for vehicles, introducing the risk of collisions when haul track traffic crosses the B8033. The location of the proposed B8033 junction is shown in Figure 1 below and on sketch CMBS-WSP-HGN-ZZ-SK-009 included within *Appendix A*.

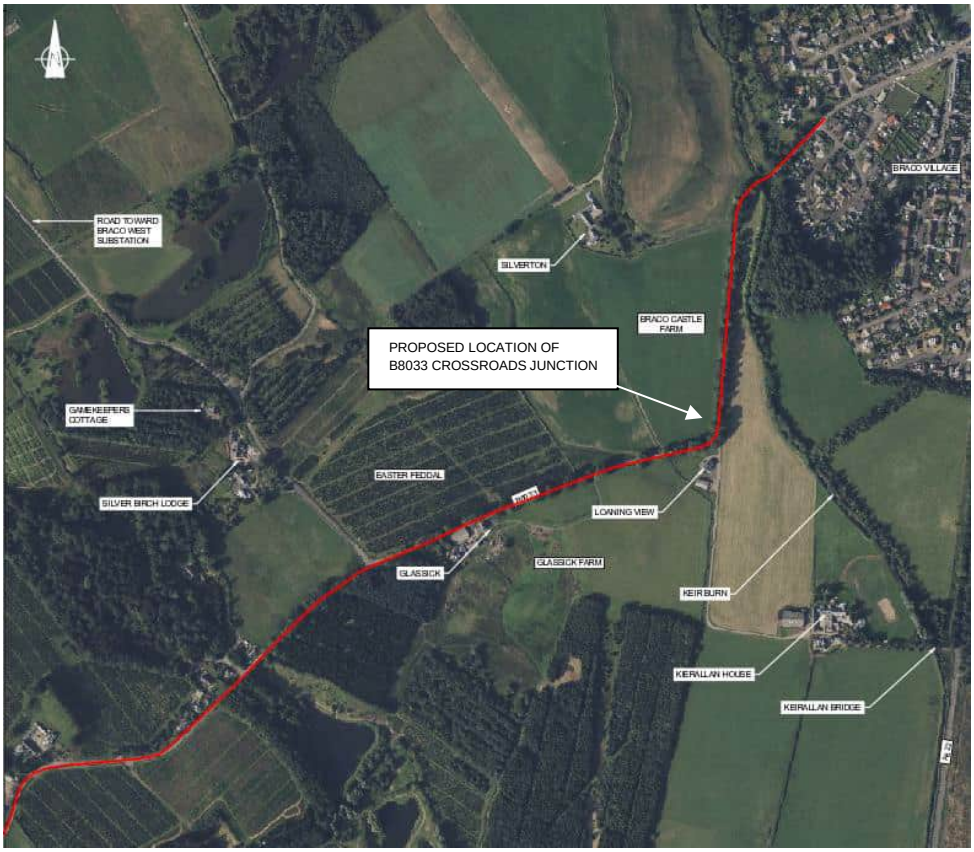

Figure 1: Location of B8033 junction and B8033 centreline (Satellite Source: Bing Maps)

CMBS-LT520-BB-TRAC-ZZ-RPT-H-0006
B8033 Bendiness Assessment

DATE:	06 May 2025	**CONFIDENTIALITY:**	Confidential
SUBJECT:	B8033 Bendiness Assessment Technical Note		
PROJECT:	Cambushinnie Braco Haul Track	**AUTHOR:**	ME
CHECKED:	SRA	**APPROVED:**	FY

PURPOSE OF TECHNICAL NOTE

This technical note has been prepared to present the bendiness assessment that has been carried out along the B8033. This assessment will determine the appropriate design speed for the section of B8033 road where the crossroads junction is proposed. The assessment has been carried out for a minimum distance of 2km in accordance with DMRB CD 109 Chapter 2. Currently the posted speed limit along this stretch of the B8033 is 60mph (national speed limit) which results in a required Stopping Sight Distance (SSD) value of 215m in accordance with CD 109 Table 2.10.

The existing section of B8033 at the location of the proposed junction is rural in nature. There is significantly reduced junction visibility at the crossroads junction because of the existing bend on the B8033 and because of significant vegetation of the inside of the curve. A snapshot of the bend is shown in Figure 2 below.

Figure 2: B8033 Southbound at bend where proposed haul track crosses (Satellite Source: Google Maps)

CMBS-LT520-BB-TRAC-ZZ-RPT-H-0006
B8033 Bendiness Assessment

DATE:	06 May 2025	**CONFIDENTIALITY:**	Confidential
SUBJECT:	B8033 Bendiness Assessment Technical Note		
PROJECT:	Cambushinnie Braco Haul Track	**AUTHOR:**	ME
CHECKED:	SRA	**APPROVED:**	FY

ASSESSMENT

In order to carry out the bendiness assessment, guidance has been taken from Chapter 2 of DMRB standard CD 109 – "Highway Link Design". The sketch showing the location of the B8033 junction and the approximate geometry of the existing B8033 road is included within ***Appendix A*** of this document.

The design speed calculations are summarised below:

Alignment Constraint

- VW (verge width) = **0.5**
- B = Bendiness degrees/km: **154.1** (308.2/2)
- $Log_{10}VISI = 2.46 + VW/25 – B/400$ …Equation 2.8.2 of CD 109
  $2.46 + 0.5/25 – 154.1/400$
  $2.46 + 0.02 – 0.385$
  $Log_{10}VISI = 2.095$
  $VISI = 10^{2.095}$ = **124.45**
- $Ac= 12 - VISI/60 + 2B/45$ …Equation 2.2b of CD 109
  $12 – 124.45/60 + 2(154.1)/45$
  $12 – 2.074 + 6.85$
  Ac = **16.78**

Layout Constraint

- Lc = **30** (taken from Table 2.3 of CD 109)

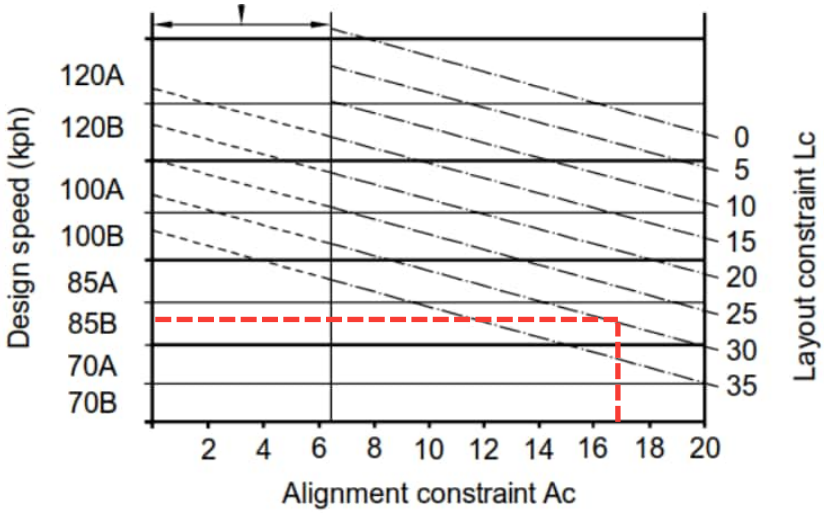

Figure 3: Fig:2.1 from DMRB CD109 Highway Link Design

CMBS-LT520-BB-TRAC-ZZ-RPT-H-0006
B8033 Bendiness Assessment

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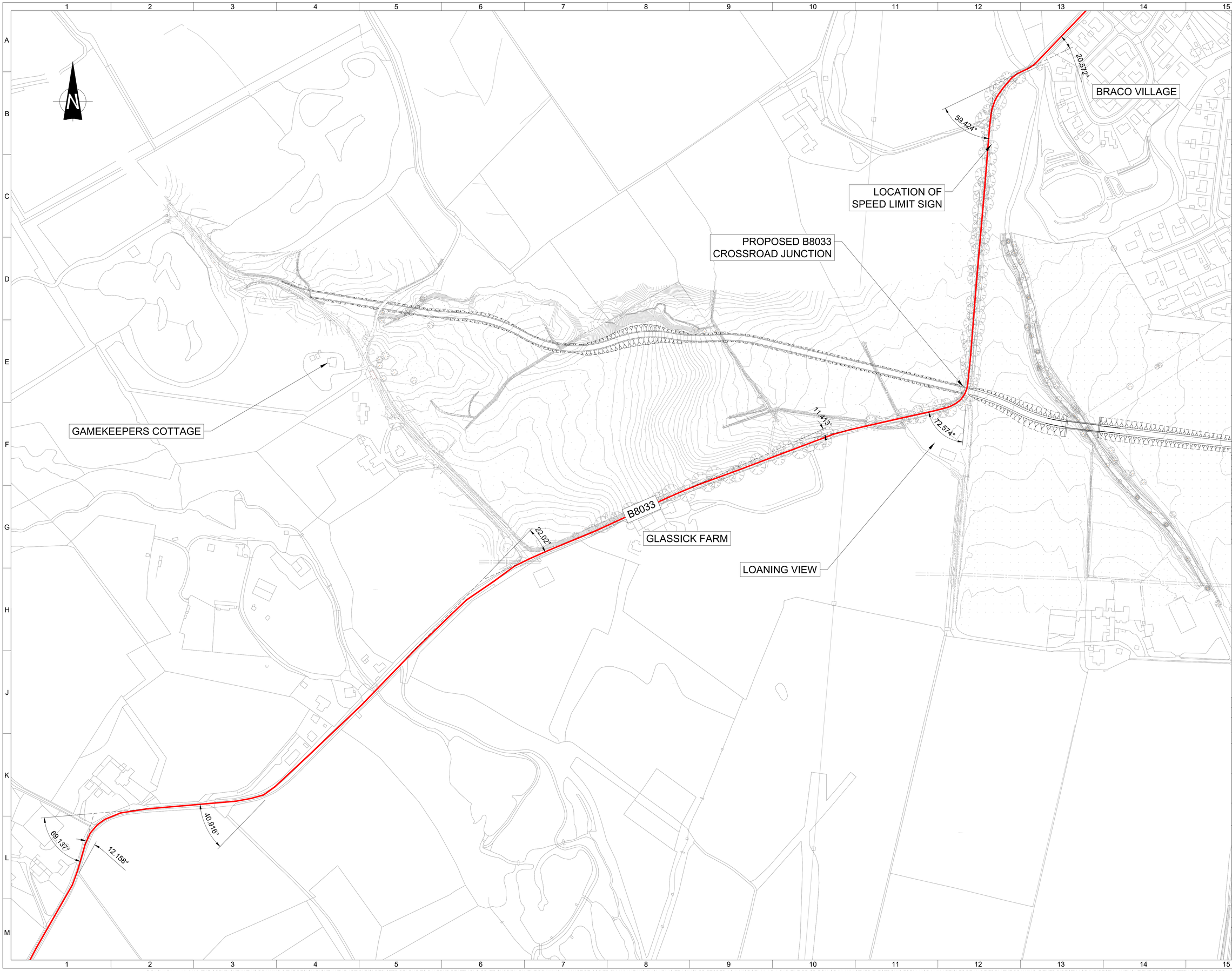
SUBJECT:	B8033 Bendiness Assessment Technical Note		
PROJECT:	Cambushinnie Braco Haul Track	**AUTHOR:**	ME
CHECKED:	SRA	**APPROVED:**	FY

CONCLUSION

- **Design Speed**: Based on Figure 2.1 of CD 109, the design speed for the B8033 road at this specific location is determined to be 85B kph (50 mph).
- **Visibility Requirements**: At this design speed, the desirable minimum visibility (stopping sight distance) at/around the junction shall be 160m, as specified in Table 2.10 of CD 109.
- **Site Clearance Considerations**: Even the reduced visibility requirement of 160m on a 60mph carriageway will necessitate significant site clearance, including the removal of numerous mature Category ‘A’ trees on both verges of the proposed crossroads location. Given the environmental and practical implications of this clearance, it is recommended that traffic management measures, such as the implementation of temporary traffic signals be introduced at the B8033 junction to minimise loss of mature trees and associated habitat. These temporary traffic signals would be installed to allow slow-moving abnormal loads carrying sub-station equipment along the haul track to negotiate the crossroads safely with no risk of conflicts with vehicles using the B8033.

APPENDIX A

CMBS-WSP-HGN-ZZ-SK-009: B8033 BENDINESS ASSESSMENT SKETCH



Designer's Site Specific Risk Assessment

This assessment is for non-standard or unusual Hazards and it is expected that Hazards associated with standard installations and designs are well understood by a competent Contractor.

By: | Date:

- No works associated with this drawing

HAZARDS/ ACTIVITY - Assessed as Low (L) / Medium (M) / High (H)

- Falls From Height
- Hazardous Material
- Excavation/Service Strike
- HAVS
- Confined Workplace
- Access/Egress
- Weight Limit
- Residual Electricity
- Drowning/Fall onto Rebar
- Contaminated Land
- Poor Ground conditions
- Site Fabrication/drilling
- Manual Handling
- Stored Energy
- Congested site
- Existing equipment in close proximity

Interfaces: - Public - Operatives - Vehicle/Plant

WHO COULD BE HARMED?

- Construction operatives
- Dismantling crew
- Future maintenance crew

CONTROL MEASURES

- Existing work instruction
- Method detailed on drawing
- Method detailed on separate document

TEMPORARY WORKS

- No temporary works required
- Temporary works required and documented separately
- Drawing contains temporary works:

DC0 -
DC1
DC2 - More complex design
DC3 - Complex/Innovative
DC4 - Abnormal Highly innovative

} Complete temporary works design check certificate: ENG-SF-0101C

Level 1 Control

OK to proceed, no significant design hazards and risks, standard control measures apply.

Level 2 Control

OK to proceed as detailed in existing work instruction or procedure detailed on drawing or separate document.

Level 3 Control

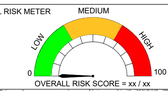
OK to proceed providing specific design hazards and risks have been recognised, acknowledged and understood by the operation team. Site operatives may require additional instruction/training

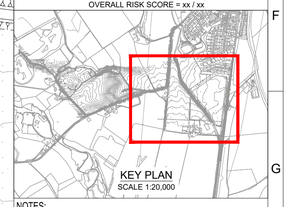
CDM REGULATIONS RESIDUAL RISKS

Design based hazards are actively eliminated where possible. Where hazards cannot be eliminated, this symbol along with an attached note will identify the hazard and indicate that an action is required by the person supervising the works to manage the design hazard during construction.

Other than those noted, we are not aware of any further residual design risks apart from those that a competent contractor would ordinarily consider.

RESIDUAL RISK METER





NOTES:

1. DO NOT SCALE FROM THIS DRAWING.
2. ALL DIMENSIONS ARE SHOWN IN METRES UNLESS OTHERWISE STATED.
3. THE DRAWING IS TO BE PRINTED IN COLOUR.
4. THE LENGTH OF ROAD CONSIDERED FOR BENDINESS ASSESSMENT IS APPROXIMATELY 2km IN ACCORDANCE WITH DMRB CD 109 CL. 2.4.

KEY:

APPROX. ROAD CENTRELINE (REFER TO NOTE 4)

BEND IN GEOMETRY CONSIDERED FOR ASSESSMENT (11.433°)

DRAWN	ME	REMARKS:			
CHKD	SRA	ISSUED FOR INFORMATION			
DESIGN	ME	STATUS	S5	DATE	27/01/2025
APPD	FY	FOR ACCEPTANCE		REV	P01

Scottish & Southern Electricity Networks

Balfour Beatty

PROJECT NAME: ASTI-ECE

LOCATION: CAMBUSHINNIE 400kV S/S | SITE: CMBS

TITLE:

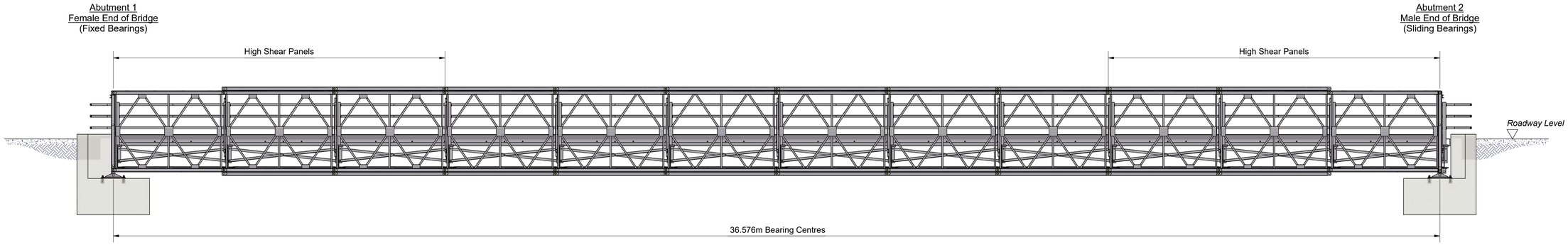
B8033
BENDINESS ASSESSMENT
SKETCH

SIZE	SCALE	FORMAT	SHEET No.
A1	1:2000	ACAD	01 OF 01

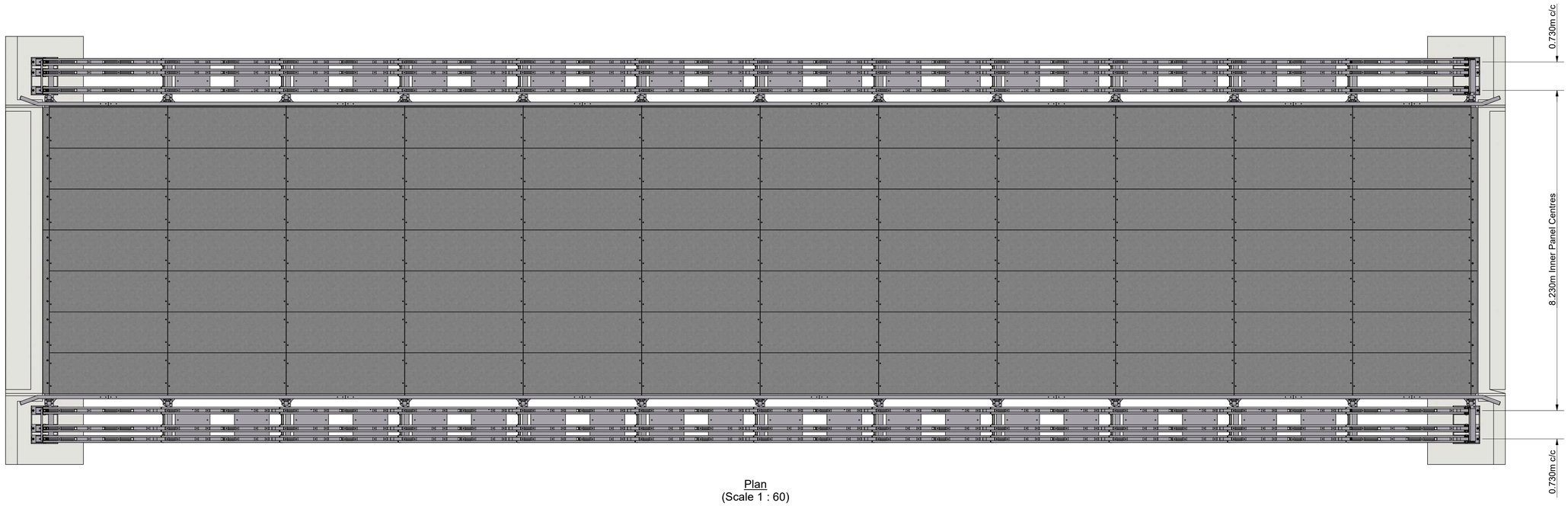
DRAWING No. CMBS- WSP-HGN-ZZ-SK-009

Appendix D

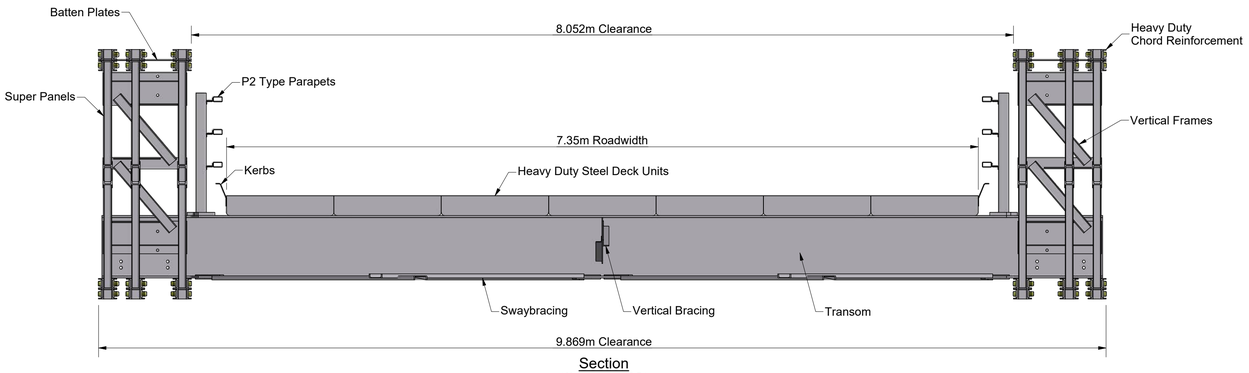
ACROW BRIDGE DRAWING



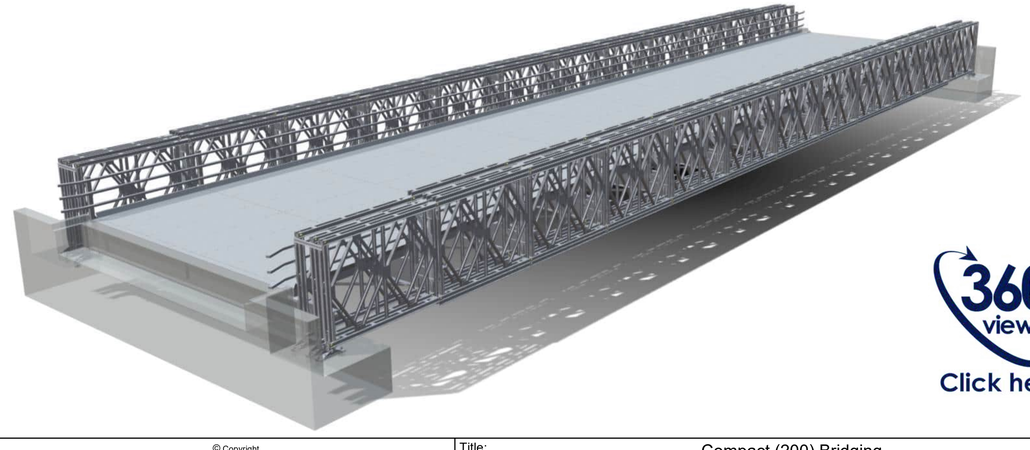
Elevation
(Scale 1 : 60)



Plan
(Scale 1 : 60)



Section
(Scale 1 : 30)



360° view
Click here

Revision	Details	Drawn By	Checked By	Auth By	Date
P01	Original	CW	RTK	-	09/07/2024

PRELIMINARY

This drawing is indicative only.
All details may be subject to change at final design stage.

Scale: As shown do NOT scale from this drawing
Original sheet size = A1 (841x594mm)

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Title:

Compact (200) Bridging

General Arrangement for a 36.576m Single Span (12 Bay) Bridge
7.35m Roadwidth - TSHR3H+++ Construction - Heavy Duty Steel Deck Units with Anti-Skid
Complete with P2 Type Parapets

Cambushinnie Substation Temporary Bridge — United Kingdom

ACROW

Drawing No:

26838-26818-AGL-COM-001-DR-CD-101-P01

Project | Sale | Originator | Volume | Location | Type | Role | Number | Revision

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