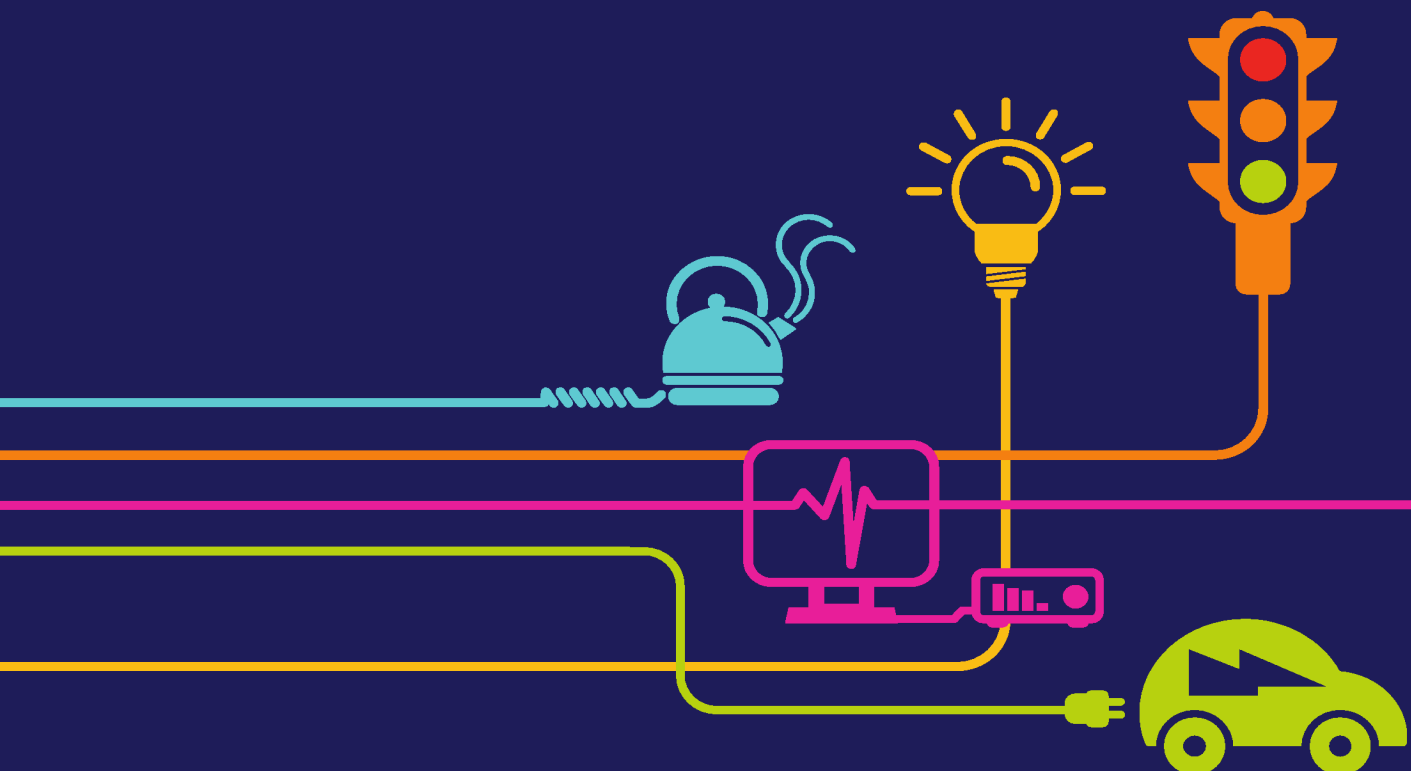


DOCUMENT 7.5

Outline Construction Traffic Management Plan

National Grid (North Wales Connection Project)

*Regulation 5(2)(c) of the Infrastructure Planning
(Applications: Prescribed Forms and Procedure) Regulations 2009*



national**grid**

North Wales Connection Project

Volume 7.0

Document 7.5 Outline Construction Traffic Management Plan

National Grid
National Grid House
Warwick Technology Park
Gallows Hill
Warwick
CV34 6DA

Final September 2018

Page intentionally blank

Document Control			
Document Properties			
Organisation	AECOM		
Author	Phil Gibbon, AECOM		
Approved by	Adam Leary, AECOM		
Title	Outline Construction Traffic Management Plan		
Document Reference	Document 7.5		
Version History			
Date	Version	Status	Description/Changes
September 2018	Rev A	Final	Final for submission

Page intentionally blank

Contents

1	Introduction	1
1.1	Background and Scope	1
1.2	Construction Traffic Management Plan Objectives	2
1.3	Scoping and Consultation	2
2	The Proposed Development	4
2.1	Overview	4
2.2	Proposed Development Phases	4
2.3	Construction Vehicle Classification	5
2.4	Abnormal Indivisible Load Movements	7
2.5	Project Timescales	8
3	Construction Traffic Access	9
3.1	Introduction	9
3.2	Strategic and Local Road Networks	9
3.3	Local Highway Constraints and Considerations	12
3.4	Temporary Access Points	14
3.5	Temporary Access Tracks	16
3.6	Local Road Network Structures	16
3.7	Network Rail Structures	17
4	Construction Traffic Route Strategy	18
4.1	Introduction	18
4.2	Construction traffic routes	18
4.3	Enabling Works Routes	34
4.4	Contingency Routes	34
4.5	Construction Traffic Routes Risk Register	36
5	Bulk Materials	37
5.1	Introduction	37
5.2	Temporary Access Tracks and Hard Standing aggregate	37
5.3	Tunnel and tunnel Shaft Arisings	37
5.4	Precast Concrete Segments	37
5.5	Concrete and Grout Mix	38
5.6	Pylons	38
5.7	Cables and COnductor	38
5.8	Earthworks	38
6	Traffic Management	40
6.1	Introduction	40
6.2	Construction traffic routes and Temporary Access Signage	41

6.3	Temporary Access Road Signage	41
6.4	Temporary Access Traffic Management	41
6.5	Temporary Road Closures and Diversions	42
6.6	Working Hours	43
6.7	Local Special Events	43
7	Overhead Line Stringing and Scaffolding	44
7.1	Overhead Line Stringing	44
7.2	Scaffolding	44
7.3	Strategic Road Network (SRN)	44
7.4	Local Road Network (LRN)	45
7.5	Railway Crossing	45
8	Public Rights of Way (PRoW)	46
8.1	Public Rights of Way Management Plan	46
9	Mitigation Measures	47
9.1	Proposed Mitigation Measures	47
10	Traffic Incident Management	52
11	Monitoring, Review and Improvement	53
11.1	Communication	53
11.2	Compliance, Enforcement and Corrective Measures	53

TABLES	
Table 1.1	Objectives of the OCTMP
Table 2.1	Proposed Project Sections and Construction Element
Table 2.2	Typical Construction Vehicles Classification
Table 2.3	Typical Construction Vehicle Activities
Table 3.1	SRN and LRN Construction Traffic Routes by Project Section
Table 3.2	Common Local Road Network Constraints
Table 4.1	Proposed Construction Traffic Route - Group 1 - IACC
Table 4.2	Proposed Construction Traffic Route - Group 2 - IACC
Table 4.3	Proposed Construction Traffic Route - Group 3 - IACC
Table 4.4	Proposed Construction Traffic Route - Group 4 - IACC
Table 4.5	Proposed Construction Traffic Route - Group 5 - IACC
Table 4.6	Proposed Construction Traffic Route - Group 6 - IACC

Table 4.7	Proposed Construction Traffic Route - Group 7 - IACC
Table 4.8	Proposed Construction Traffic Route - Group 8 - IACC
Table 4.9	Proposed Construction Traffic Route - Group 9 - IACC
Table 4.10	Proposed Construction Traffic Route - Group 10 - IACC
Table 4.11	Proposed Construction Traffic Route - Group 11 - IACC
Table 4.12	Proposed Construction Traffic Route - Group 12 - Gwynedd Council
Table 4.13	Contingency Route Options - Braint
Table 9.1	Proposed Traffic and Transport Mitigation Measures

ANNEXES	
ANNEX A	Proposed Construction Traffic Routes Proposed Contingency Routes - Braint
ANNEX B	Proposed Abnormal Indivisible Load Routes and Report
ANNEX C	Existing Local Road Network Structures Plan
ANNEX D	Indicative Traffic Management Schedules and Plans
ANNEX E	Indicative Road and Rail Crossing Schedule and Plan
ANNEX F	Construction Traffic Routes Risk Register and Hazard Map

Page intentionally blank

1 Introduction

1.1 BACKGROUND AND SCOPE

1.1.1 This Outline Construction Traffic Management Plan (OCTMP) accompany an application by National Grid Electricity Transmission (plc) (National Grid) for a Development Consent Order (DCO) under Section 37 of the Planning Act 2008 (the Act), for a new 400,000 kilovolt (400 kV) electricity transmission connection between the existing 400 kV substation at Wylfa on Anglesey and the existing electricity transmission network at Pentir Substation in Gwynedd to facilitate the export of power from the proposed Wylfa Newydd Power Station. This connection is known as the North Wales Connection Project (the Proposed Development).

1.1.2 The Proposed Development is known as the North Wales Connection Project and consists of the following components:

- extension to the existing substation at Wylfa;
- section of new 400 kV OHL between Wylfa Substation and Braint Tunnel Head House (THH) and Cable Sealing End Compound (CSEC) on Anglesey including modifications to parts of the existing 400 kV OHL between Wylfa and Pentir;
- Braint THH and CSEC, including a permanent access track;
- a tunnel between Braint and Tŷ Fodol THHs;
- Tŷ Fodol THH and CSEC including a permanent access track;
- a new section of OHL connection between Tŷ Fodol THH and CSEC and Pentir Substation;
- an extension to the existing substation at Pentir; and
- temporary construction compounds, access tracks, construction working areas, localised widening of the public highway and third party works required to construct the infrastructure listed above.

1.2 CONSTRUCTION TRAFFIC MANAGEMENT PLAN OBJECTIVES

1.2.1 The final CTMP (and compliance with it) would be secured by Requirement 7 of the draft Development Consent Order (DCO) (**Document 2.1**) and would be included within the construction Contractor's documentation to form a comprehensive construction traffic management package which would be adhered to by the appointed contractor.

1.2.2 The key objectives for the OCTMP are shown in **Table 1.1**:

Table 1.1 Objectives of the OCTMP	
Objective	Description
A	Ensure that movements of people, plant and materials are achieved in a safe, efficient, timely and sustainable manner.
B	Ensure that any impact to the local communities and tourism industry is reduced so far as reasonably practicable.
C	Ensure construction traffic levels do not exceed an acceptable level during network peak periods.
D	Reduce and control construction vehicle trips where practical.
E	Ensure strategies and mitigation measures are implemented and adhered to through continued monitoring, review and improvement of the OCTMP.
F	Limit the effects of construction traffic on the Local Road Network (LRN).

1.2.3 This OCTMP details the mitigation measures which have been included within the design of the Proposed Development and would be implemented to mitigate, so far as reasonably practicable, the potential effects of traffic during the construction phase of the Proposed Development.

1.2.4 This OCTMP should be read alongside the ES (**Volume 5.0**, with **Document 5.13** Traffic and Transport particularly relevant) and the Transport Assessment (TA) (**Document 5.13.2.1**) which support the application for a DCO.

1.3 SCOPING AND CONSULTATION

1.3.1 The Proposed Development is located within North Wales in the administrative boundaries of the following local authorities:

- Cyngor Sir Ynys Môn / Isle of Anglesey County Council (IACC); and
 - Cyngor Gwynedd / Gwynedd Council.
- 1.3.2 Construction traffic associated with the Proposed Development would also use the Strategic Road Network (SRN) and would cross rail infrastructure (in the form of overbridges) therefore engagement has also taken place with the following stakeholders:
- North and Mid Wales Trunk Road Agency (via Welsh Government);
 - UK Highways A55 Ltd (via Welsh Government); and
 - Network Rail.
- 1.3.3 Engagement has also taken place with North Wales Police (NWP), North Wales Fire and Rescue Service (NWFRS) and Welsh Ambulance Services NHS Trust (WAST).
- 1.3.4 An initial draft OCTMP was included within the Preliminary Environmental Impact Report (PEIR) and was available during Stage 3 statutory consultation. Communities and stakeholders have been consulted throughout the Proposed Development design process, with any proposed changes to construction traffic routes consulted upon. The feedback received through consultation has been welcomed and has helped to inform the OCTMP.
- 1.3.5 A further draft version of the OCTMP was issued in April 2018, and comments raised by stakeholders including IACC, Welsh Government, NWP and NWFRS in relation to that version on the OCTMP have been incorporated, wherever possible and appropriate, in this version of the document.

2 The Proposed Development

2.1 OVERVIEW

- 2.1.1 The Proposed Development is located in north-west Wales and crosses the administrative boundaries of the IACC and Gwynedd Council. The location of the Proposed Development is illustrated on Figure 1.1 (**Document 5.1.1.1**).
- 2.1.2 The route of the Proposed Development has been split into six sections. The Sections are illustrated on Figure 1.1 (**Document 5.1.1.1**) and are outlined in **Table 2.1**.

Table 2.1: Proposed Development Sections and Construction Element		
Section	Location	Construction Element
Section A	Wylfa to Rhosgoch	Wylfa Substation upgrade OHL
Section B	Rhosgoch to Llandyfrydog	OHL
Section C	Llandyfrydog to B5110 north of Talwrn	
Section D	B5110 north of Talwrn to Afon Ceint	
Section E	Afon Ceint to Afon Braint	
Section F	Afon Braint to Pentir	Braint CSEC, Tunnel Shaft, Tunnel and THH, Tŷ Fodol CSEC, Tunnel Shaft, Tunnel, THH, OHL, Pentir Substation extension

- 2.1.3 Chapter 4 (**Document 5.4**) describes how the Proposed Development would be constructed, operated, maintained and decommissioned.

2.2 PROPOSED DEVELOPMENT PHASES

- 2.2.1 In line with ES Chapter 13 Traffic and Transport (**Document 5.13**), this OCTMP considers the construction phase of the Proposed Development only.

- 2.2.2 During the operational phase there would be infrequent trips related to routine maintenance which are considered to be negligible. Very infrequently (approximately 40+ years) there may be a need for more substantial refurbishment work; although trip numbers would be higher for such work, the geographical scale and duration would be much more limited than during construction. The transport implications of maintenance and refurbishment are described in greater detail in the Transport Assessment (**Document 5.13.2.1**).
- 2.2.3 The decommissioning phase of the Proposed Development is difficult to predict given the design life of certain elements, however it is anticipated that the effects would be significantly less than the construction phase.

2.3 CONSTRUCTION VEHICLE CLASSIFICATION

General Construction Traffic

- 2.3.1 A wide variety of vehicle types would be used for the construction of the Proposed Development. Vehicles would be required to transport people, equipment and materials.
- 2.3.2 Volumes of Light Goods Vehicles (LGVs) and Heavy Goods Vehicles (HGVs) associated with the construction phase of the Proposed Development are detailed and assessed in ES Chapter 13 Traffic and Transport (**Document 5.13**) and the TA (**Document 5.13.2.1**).
- 2.3.3 For the purposes of the TA and EIA assessment work, construction vehicles have been classified as follows, in accordance with the Driver and Vehicle Standards Agency Lorry types and weights guide¹:
- LGV = Vehicles 3.5 tonnes (t) or below in gross weight; and
 - HGV = Vehicles above 3.5 t in gross weight.
- 2.3.4 The proposed construction traffic routes are illustrated in Figures 13.2 and 13.3 (**Documents 5.13.1.2 to 15.13.1.7**) and for ease of reference are included in Annex A of this document.
- 2.3.5 Table 2.2 outlines the vehicle classification and typical vehicle types that would be required for the construction of the Proposed Development. These have been identified based on experience of those used for similar National Grid projects.

¹ <https://www.gov.uk/government/publications/guide-to-lorry-types-and-weights>

Table 2.2: Typical Construction Vehicles Classification	
Light Goods Vehicles	Medium and Heavy Goods Vehicles
3.5 t or below	Over 3.5 t
Car, van, 4x4 pick up, welfare van	Excavator, HIAB/winch tractor, tractor and trailer, 10 m and 12 m rigid vehicles, 20 t tippers, concrete mixers, 14m and 16.5 m articulated vehicles, low loaders, small and large cranes (250 t and 300 t)

2.3.6 The typical vehicles would be used for a range of activities during the construction of the Proposed Development as outlined in Table 2.3.

Table 2.3: Typical Construction Vehicles and Activities	
Vehicles	Activity
Car, van, 4x4 pick up	Surveying/setting out
Car, van, 4x4 pick up, tractor and trailer	Vegetation clearance
Car, van, 4x4 pick up, tractor and trailer, HIAB winch/tractor, 20 t tipper, dumper, excavator, compactor roller	Access construction, work area preparation, construction compounds
Car, van, 4x4 pick up, tractor and trailer, HIAB winch/tractor, 20t tipper, small crane, large crane (250t and 350t) typically one off movements, concrete mixer, 10m and 12m rigid vehicles, 14m and 16.5m articulated vehicles and low loaders.	Foundations, pylon erection, scaffold construction, line stringing Tunnel shaft, tunnelling, head house construction Bulk material delivery / removal
Car, Van, 4x4 pick up, tractor and trailer, excavator, dumper	Reinstatement of accesses and compounds

2.3.7 Further details of typical construction vehicles required for the Proposed Development are contained within the Construction Vehicles Illustrative Guide (**Document 5.13.2.1 Annex B**). It should be noted that the list of vehicles is not exhaustive and that the precise type and composition of the fleet of construction vehicles used will be determined by the appointed contractor(s).

- 2.3.8 In order to facilitate construction and achieve the programme commitments of the Proposed Development some sections of primary LGV routes have been identified for use by tractor and trailer type vehicles, these routes are shown in Figures 13.2 and 13.3 (**Documents 5.13.1.2 to 15.13.1.7**) and for ease of reference are included in Annex A of this document.
- 2.3.9 It is anticipated that the types of vehicles using these routes would be of a similar size and configuration to agricultural vehicles observed to be present throughout the existing LRN.

Site Investigation/Exceptional Circumstances

- 2.3.10 Vehicular access for site investigation (SI) works would be required to facilitate the construction of the Proposed Development. Prior to establishment of the construction access track network some SI vehicles may require access to the more remote locations. Where a prescribed HGV route or alternative reasonably practicable solution to access cannot be provided then the SI vehicles would follow the proposed LGV routes.
- 2.3.11 It is anticipated that the SI vehicles would also be similar to existing agricultural type vehicles, such as tractors and trailers, which already use the LRN
- 2.3.12 Additionally, there may be a requirement to use some of the primary LGV routes for delivery of equipment (such as an excavator) or one-off crane movements required for pylon construction. This requirement would be influenced by the OHL construction programme and the pylon construction sequencing. The number of movements would be reduced so far as reasonably practicable and restricted to locations where the use of the temporary access track network would not provide a viable alternative.
- 2.3.13 The contractor would liaise with local highway officers to ensure appropriate traffic management and mitigation measures are implemented during these relatively infrequent movements so as to ensure safety on the LRN was not compromised and reduce, so far as reasonably practicable, any disturbance and inconvenience to residents and road users.

2.4 ABNORMAL INDIVISIBLE LOAD MOVEMENTS

- 2.4.1 The Proposed Development would require the movement of Abnormal Indivisible Loads (AILs). AILs are defined as vehicles which fall outside the provisions contained within The Road Vehicles (Construction and Use)

Regulations 1986² and The Road Vehicles (Authorised Weight) Regulations 1998³.

- 2.4.2 AIL movements are detailed in the Abnormal Indivisible Load Report included in Annex B of this document.

2.5 PROJECT TIMESCALES

- 2.5.1 A high-level construction programme is included in ES Chapter 4 Construction, Operation, Maintenance and Decommissioning of the Proposed Development report (**Document 5.4**) which provides information on the anticipated construction programme for the Proposed Development. In summary, the works are anticipated to commence in Q3 2020 and finish in Q3 2026.

² The Road Vehicles (Construction and Use) Regulations 1986. SI 1986:1078 (as amended).

³ The Road Vehicles (Authorised Weight) Regulations 1998. Si 1998:3111 (as amended)

3 Construction Traffic Access

3.1 INTRODUCTION

3.1.1 In order to provide vehicular access and facilitate construction of the various elements of the Proposed Development there are three types of road network to be utilised. These are outlined in **Figure 3.1**:

Image 3.1: Construction traffic route hierarchy

Type 1 – Strategic Road Network (SRN)

Comprises principally of the A55 North Wales Expressway, also incorporates the A487 and a short section of the A5 providing access to Type 2 – Local Road Network

Type 2 – Local Road Network (LRN)

Comprises the IACC and Gwynedd Council maintained LRN and provides access to Type 3 – Temporary Access Tracks

Type 3 – Temporary Access Tracks

A network of temporary access tracks which link the Proposed Development to the LRN

3.2 STRATEGIC AND LOCAL ROAD NETWORKS

3.2.1 The SRN routes that are proposed for construction vehicle use are as follows:

- A55 and Junctions 3, 5, 6, 7, 7A, 8, 8A, 9, 10 and 11;
- A487; and
- A short section of the A5 between A55 Junction 11 (J11) and the A4244.

3.2.2 Construction vehicle access to and from the SRN would be achieved via the LRN. The LRN which has been identified for use by various types and volumes of construction traffic is detailed further within Transport

Assessment (**Document 5.13.2.1**), Figure 15.13.1.2 Sheets 1 to 6 and is also listed in **Table 3.1**.

Table 3.1: SRN and LRN Construction Traffic Routes by Section				
Section	SRN HGV/LGV	LRN HGV/LGV	LRN Access Tractor Trailer/LGV	LRN Access LGV
A	A55 J3	A5 A5025 UNR 23 UNR 23A UNR 23B	UNR 3 Brynddu Road central Brynddu Road south	A5025 Ffordd y felin Brynddu Road north
B	A55 J5 A55 J6	UNR 1 UNR 4 north UNR 4 central UNR 4 south B5111	UNR 8	
C	A55 J6	B5111 B5110	UNR 9 east UNR 10 north UNR 10 central UNR 10 south	UNR 9 west
D	A55 J6	B5111 B5110 B5109 B5420 west Ffrodd Cae Sel Llangefni Link Road (LLR) A5114	LLR B5109 B5420	

Table 3.1: SRN and LRN Construction Traffic Routes by Section				
Section	SRN HGV/LGV	LRN HGV/LGV	LRN Access Tractor Trailer/LGV	LRN Access LGV
E	A55 J7	A5152 A5 west A5 central UNR21 Llandaniel Road between accesses E6 and E7 Contingency Llandaniel Road between access E7 and the A5 B5420 central	UNR16 UNR17 UNR20 Llandaniel Road between the A5 and access E7	
F (IACC)	A55 J7A Enabling works A55 J8A Contingency A55 J8 A55 J8A	A5 central UNR 22 north Enabling works A5 east A4080 UNR22 south Contingency B5420 east A5 east A4080		
F (Gwynedd Council)	A55 J9 A55 J10 A55 J11 A487 A5	A4244 B4547 A4087 Enabling Works Fodolydd Lane west Fodolydd Lane east		Fodolydd Lane west

Table 3.1: SRN and LRN Construction Traffic Routes by Section

Section	SRN HGV/LGV	LRN HGV/LGV	LRN Access Tractor Trailer/LGV	LRN Access LGV
		UNR 24 UNR 25		

3.2.3 Stage 3 statutory consultation feedback and meetings with the LHAs, Welsh Government, NWP, NWFRS and WAST have been used to inform construction traffic route selection and level of use.

3.3 LOCAL HIGHWAY CONSTRAINTS AND CONSIDERATIONS

3.3.1 Site visits and audits have taken place along the proposed construction traffic routes and at temporary access points. Matters which have been identified and have informed the construction traffic route proposals are as follows:

- existing height and weight restrictions;
- existing highway classification;
- existing highway structures;
- existing highway layout (width and horizontal/vertical alignments);
- existing traffic calming measures;
- built environment indicators (BEIs) adjacent to the highway such as schools;
- existing visibility constraints;
- existing speed limits and surveyed traffic speeds;
- existing Public Rights of Way (PRoW); and
- other road users (pedestrians, cyclists and equestrians).

3.3.2 Table 3.2 details the existing LRN constraints and considerations, how they have been mitigated at the route planning stage and further opportunities for mitigation during the construction stage.

Table 3.2: Local Road Network Constraints and Considerations		
Constraint/Consideration	Stage of Mitigation	Potential Mitigation
Urban areas and BEIs (villages, towns, schools)	Route planning stage	Proposed construction traffic routes avoid sensitive areas so far as reasonably practicable.
Eastern section of A5025 which is a popular tourist route		Construction traffic routes to avoid the eastern side of Anglesey.
Narrow local roads and junction constraints		<p>Avoid unsuitable LRN where practical by providing temporary access points and temporary access track links.</p> <p>Physical improvement works to LRN where practical for duration of construction works.</p> <p>Suitable traffic management to be implemented at locations where physical works are impractical.</p> <p>Suitable vehicle movement restrictions imposed and designation of routes for contingency use only.</p>
Existing highway conditions	Route planning and construction stage	Appropriate inspections and condition surveys to be agreed with LHAs.
Existing highway structures		<p>Structure locations identified and avoided where practical.</p> <p>Appropriate surveys to be undertaken (to be agreed with LHAs).</p>
Visibility at temporary access points		Visibility based on Technical Advice Note (TAN) 18. Appropriate vegetation clearance, traffic management and speed reduction measures to be implemented to achieve safe access. See

Table 3.2: Local Road Network Constraints and Considerations		
Constraint/Consideration	Stage of Mitigation	Potential Mitigation
		Temporary Access Principles Note (Document 5.4.2.1).
Impacts on pedestrians and cyclists	Route planning and construction stage	Construction traffic routeing strategy. Appropriate traffic management, signage and communications. See also: Public Right of Way Management Plan (Document 7.6).
Road Safety		Construction traffic routes and temporary access design. See Temporary Access Principles Note (Document 5.4.2.1). Suitable traffic management, signage and communications. Hazard risk register, road safety awareness and continued liaison with LHAs and emergency services.
Impact on SRN/LRN junctions and link capacity, delay, impact on emergency services response times.	Route planning and construction stage (informed by TA capacity analysis)	Construction traffic routeing strategy. Scoping exercise and consultation with Welsh Government, LHAs and emergency services to identify constrained junctions and seek to exclude them, where practical from proposed construction traffic routes. Capacity assessments on SRN and LRN and results included in the TA (Document 5.13.2.1) mitigation measures, such as timing restrictions.

3.4 TEMPORARY ACCESS POINTS

- 3.4.1 Proposed temporary access points (bellmouths) are located directly off the LRN with many of the locations making use of existing accesses.

Temporary access points would provide direct construction vehicular access to and from the LRN.

- 3.4.2 Consultation with the LHAs has been undertaken as part of an iterative process of designing the proposed construction traffic routes and temporary access provision and a Temporary Access Principles Note (**Document 5.4.2.1**) has been produced.
- 3.4.3 The preliminary design of each temporary access point has been based on site specific requirements in accordance with appropriate guidance such as TAN 18 and Design Manual for Roads and Bridges (DMRB) TD41/95. The detailed design of each access point would be approved by the local authority prior to construction.
- 3.4.4 There are a total of 57 access points proposed on the LRN. The access locations are shown on the Access and Rights of Way Plans (**Document 4.5**) and within the Temporary Access Principles Note (**Document 5.4.2.1**).
- 3.4.5 Typical construction details for temporary accesses are shown on Design Plan DCO_DE/PS/11 01 sheet 1 of 6 (**Document 4.13**). Typical stone and interlocking panel access tracks are shown on Design Plans DCO_DE/PS/11 02 sheet 2 of 6 and sheet 3 of 6 (**Document 4.13**) respectively.
- 3.4.6 Table 3.3 shows the number of proposed temporary access points within each section of the Proposed Development and lists the typical construction activities that they would serve.

Table 3.3: Temporary Access Locations		
Section	Total No.	Construction Activities
A (IACC)	11	Wylfa Substation works OHL
B (IACC)	11	OHL
C (IACC)	10	
D (IACC)	4	OHL Penmynydd Road Construction Compound

Table 3.3: Temporary Access Locations		
Section	Total No.	Construction Activities
E (IACC)	8	OHL
F (IACC)	3	OHL Braint CSEC Braint tunnelling and THH
F (Gwynedd Council)	10	OHL Tŷ Fodol CSEC Tŷ Fodol tunnelling and THH Pentir Substation works

3.5 TEMPORARY ACCESS TRACKS

- 3.5.1 Off road temporary access tracks have been provided so far as reasonably practicable in order to provide a connection between proposed HGV construction traffic routes, to reduce construction traffic effects on the LRN and to address the OCTMP Objectives in Table 1.1.
- 3.5.2 In particular they have been proposed where a construction element of the Proposed Development cannot be accessed directly from the LRN or where the LRN is deemed unsuitable for certain types of construction vehicles.
- 3.5.3 The proposed temporary access tracks are shown in Figure 4.1 (**Document 5.4.1.1**). Construction details of typical stone and interlocking panel access tracks are shown on Design Plans DCO_DE/PS/11 02 sheet 2 of 6 and sheet 3 of 6 (**Document 4.13**) respectively.

3.6 LOCAL ROAD NETWORK STRUCTURES

- 3.6.1 Consultation with the LHAs has been undertaken to identify existing structures along the proposed construction traffic routes on the LRN. Information has also been obtained from the Electronic Service Delivery for Abnormal Loads (ESDAL) to locate highway structures on the SRN.
- 3.6.2 A plan detailing existing highway structures is included in Annex C to this document.
- 3.6.3 Condition surveys would be undertaken during pre-construction, construction and post-construction stages in association with the structure

asset owner and in accordance National Grid requirements so far as reasonably practicable and necessary.

3.7 NETWORK RAIL STRUCTURES

3.7.1 The proposed HGV and AIL vehicle routes to the Braint Construction Compound on Anglesey require the crossing of the following Network Rail assets:

- Britannia Bridge (Network Rail Reference 165);
- A4080 Tollgate Bridge (Network Rail Reference 168);
- Pont Ronwy/Pensarn Bridge (Network Rail Reference 169); and,
- Star Bridge (Network Rail Reference 172).

3.7.2 Meetings and site visits with Network Rail have been undertaken through the design process as detailed in the Consultation Report (**Document 6.1**). It is intended that the agreed terms for the use of Network Rail assets during the construction of the Proposed Development will be included in a Statement of Common Ground (SoCG) and Basic Asset Protection Agreement (BAPA) between National Grid and Network Rail, as necessary.

3.7.3 The anticipated AILs, route options and structures are detailed in the Abnormal Load Report included in Annex B of this document.

4 Construction Traffic Route Strategy

4.1 INTRODUCTION

4.1.1 The proposed construction traffic routeing strategy has evolved through an iterative process of working with project engineers and consultation with the LHAs and other relevant stakeholders.

4.1.2 The routeing strategy is based on the following principles:

- provide safe and efficient construction access for the Proposed Development;
- reduce as far as reasonably practicable and mitigate to acceptable levels disruption to the public;
- where practical use the shortest route between the access point and the SRN;
- avoid the eastern section of the A5025;
- as far as reasonably practicable avoid sensitive receptors; and
- use of temporary off-road access tracks and access points in order to reduce impacts on the LRN and to provide the opportunity for construction traffic to avoid unsuitable sections of the LRN.

4.2 CONSTRUCTION TRAFFIC ROUTES

4.2.1 The Proposed Development is subject to a degree of flexibility as set out in Chapter 6, EIA Methodology and Basis of Assessment of the Environmental Statement (ES) (**Document 5.6**). This flexibility has been taken into account in the identification of the construction traffic routes identified in this document and consequently these routes work/are applicable to all possible iterations the proposed development.

4.2.2 Should external factors influence the appropriateness of these routes then it may be prudent to review and amend the construction traffic routes in consultation with stakeholders. In order to facilitate this, a Transport Review Group has been proposed and is detailed in Section 11 of this document.

- 4.2.3 In order to enable construction vehicle trip assignment to inform the TA (**Document 5.13.2.1**) work, the proposed temporary access points have been grouped by LRN or 'link' access and egress routes. Groups have been determined by the availability of suitable LRN routes and the off road temporary access track provision.
- 4.2.4 Tables 4.1 to 4.12 on the following pages set out the route options and types to each temporary access location. The tables should be cross referenced with the proposed construction traffic routes (Annex A).
- 4.2.5 For key locations, where more than one route choice is available, a preferred route for the Proposed Development construction traffic is indicated. This is a provisional preference and is subject to change, if appropriate, through further investigation or discussion with the LHAs.

Table 4.1: Proposed Construction Traffic Route - Group 1 - IACC

Access	SRN A55	LRN Route from SRN to/from Group 1
A1	J3	<u>HGV/LGV</u> - A5, A5025, Unnamed Road (UNR) 23
A2		
A3		
A4		

Table 4.2: Proposed Construction Traffic Route - Group 2 - IACC

Access	SRN A55	LRN Route from SRN to/from Group 2
A5	J3	<u>HGV/LGV Contingency Access</u> - A5 and A5025

A5A		<u>HGV/LGV</u> - A5, A5025, UNR23A and crossover UNR23B
A6		<u>HGV/LGV</u> - as route to access A5A then access track <u>LGV</u> - A5, A5025 and Ffordd y Felin
A7		<u>HGV/LGV</u> - as route to access A6 then crossover Ffordd y Felin <u>LGV</u> - as route to access A6
A8	J3	<u>HGV/LGV</u> - as route to access A7 then access track <u>LGV</u> - A5, A5025, Ffordd y Felin, Brynddu Road and UNR3
	-	<u>Tractor Trailer (TT)/LGV from/to Penmynydd Road (OHL) Construction Compound</u> B5420, B5109, Ffordd Cae Sel, B5111, UNR4, UNR1, Brynddu Road, UNR3 and access A8
A9	J3	<u>HGV/LGV</u> - as route to access A8 then crossover UNR3 <u>LGV</u> - as route to access A8
	-	<u>TT/LGV from/to OHL Construction Compound</u> - as route to access A8
A10	J3	<u>HGV/LGV</u> - as route to access A8 then crossover UNR3 <u>LGV</u> - as route to access A8
	J6	<u>TT/LGV from/to OHL Construction Compound</u> Access D3, B5420, B5109, Ffordd Cae Sel, B5111, UNR4, UNR1 and Brynddu Road
B1	J3	<u>HGV/LGV</u> - as route to access A9 then access track <u>LGV</u> - A5, A5025, Ffordd y Felin, Brynddu Road and UNR1
	J6	<u>HGV/LGV</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel, B5111, UNR4 and UNR1 (route via access B8 and B7 to avoid left turn from B5111 to UNR4) (route via access B5 and B4 to bypass bridge on UNR4)
	-	<u>HGV/LGV from/to OHL Construction Compound</u> - access D3, B5420, B5109, Ffordd Cae Sel, B5111, UNR4 and UNR1 (route via access B8 and B7 to avoid left turn from B5111 to UNR4) (route via access B5 and B4 to bypass bridge on UNR4)

B2	J3	<u>HGV/LGV</u> - as route to access B1 then crossover UNR1 <u>LGV</u> - as route to access B1
	J6	<u>HGV/LGV</u> - as access B1
	-	<u>HGV/LGV from/to OHL Construction Compound</u> as route to access B1

Table 4.3: Proposed Construction Traffic Route - Group 3 - IACC

Access	SRN A55	LRN Route from SRN to/from Group 3
B4	J3	<u>HGV/ LGV</u> - as route to access B1 then UNR1 and UNR4 <u>LGV</u> - A5, A5025, Ffordd y Felin, Brynddu Road, UNR1 and UNR4
	J5	<u>LGV</u> - B5112, B5111 and UNR4.
	J6	<u>HGV/LGV</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel, B5111 and UNR4 (route via access B8 and B7 to avoid left turn from B5111 to UNR4) (route via access B5 and B4 to bypass bridge on UNR4)
	-	<u>HGV/LGV from/to OHL Construction Compound</u> Access D3, B5420, B5109, Ffordd Cae Sel, B5111 and UNR4 (route via access B8 and B7 to avoid left turn from B5111 to UNR4) (route via access B5 and B4 to bypass bridge on UNR4)
B5	J3	<u>HGV/LGV</u> - as route to access B1 then UNR1 and UNR4 (route via access B4 and access track to bypass bridge) <u>LGV</u> - A5, A5025, Ffordd y Felin, Brynddu Road, UNR1 and UNR4
	J5	<u>LGV</u> - B5112, B5111 and UNR4
	J6	<u>HGV/LGV</u> – as route to access B4 (route via access B8 and B7 to avoid left turn from B5111 to

		UNR4)
	-	<u>HGV/LGV from/to OHL Construction Compound</u> as route to access B4

Table 4.4: Proposed Construction Traffic Route - Group 4 - IACC

Access	SRN A55	LRN Route from SRN to/from Group 4
B7	J3	<u>HGV/LGV</u> - A5, A5025, UNR23A, UNR23B, access A5A, access track, access A6, crossover Ffordd y Felin, access A7, access track, access A8, crossover UNR3, access A9, access track, access B1, UNR1 and UNR4 (route via access B4, access track and access B5 to bypass bridge) <u>LGV</u> - A5, A5025, Ffordd y Felin, Brynddu Road, UNR1 and UNR4
	J5	<u>LGV</u> - B5112, B5111 and UNR4
	J6	<u>HGV/LGV</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel, B5111 and UNR4
	-	<u>HGV/LGV from/to OHL Construction Compound</u> Access D3, B5420, B5109, Ffordd Cae Sel, B5111, UNR4 and access B7 (route via access B8 to avoid left turn from B5111 to UNR4)
B8	J3	<u>HGV/LGV</u> - as route to access B7 then access track
	J5	<u>LGV</u> - B5112 and B5111
	J6	<u>HGV/LGV</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel and B5111
	-	<u>HGV/LGV from OHL Construction Compound</u> Access D3, B5420, B5109, Ffordd Cae Sel and B5111

Table 4.5: Proposed Construction Traffic Route - Group 5 - IACC

Access	SRN A55	LRN Route from SRN to/from Group 5
B9	J3	<u>HGV/LGV</u> - A5, A5025, UNR23A, UNR23B, access A5A, access track, access A6, crossover Ffordd y Felin, access A7, access track, access A8, crossover UNR3, access A9, access track, access B1, UNR1, UNR4 and B5111 (route via access B4, access track and access B5 to bypass bridge) <u>LGV</u> - A5, A5025, Ffordd y Felin, Brynddu Road, UNR1, UNR4 and B5111
	J5	<u>LGV</u> B5112 and B5111
	J6	<u>HGV/LGV</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel and B5111
	-	<u>HGV/TT/LGV from/to OHL Construction Compound</u> Access D3, B5420, B5109, Ffordd Cae Sel and B5111
B10	J3	<u>HGV/LGV</u> - as route to access B9 then access track <u>LGV</u> - A5, A5025, Ffordd y Felin, Brynddu Road, UNR1, UNR4, B5111 and UNR8
	J5	<u>LGV</u> - B5112, B5111 and UNR8
	J6	<u>HGV/LGV</u> - as route to access B9 then access track <u>LGV</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel, B5111 and UNR8
	-	<u>TT/LGV from/to OHL Construction Compound</u> B5420, B5109, Ffordd Cae Sel, B5111 and UNR 8
B11	J3	<u>HGV/LGV</u> - as route to access B10 then crossover UNR8 <u>LGV</u> - as route to access B10
	J5	<u>LGV</u> - as route to access B10
	J6	<u>HGV/LGV</u> - as route to access B10 then crossover UNR8 <u>LGV</u> - as route to access B10
	-	<u>TT/LGV from/to OHL Construction Compound</u> - as route to access B10

B12	J3	<u>HGV/LGV</u> - as route to access B11 then access track <u>LGV</u> - as route to access B11 then access track
	J5	<u>LGV</u> - as route to access B11 then access track
	J6	<u>HGV/LGV</u> - as route to access B11 then access track <u>LGV</u> - as route to access B11 then access track
	-	<u>TT/LGV from/to OHL Construction Compound</u> - as route to access B11 then access track
B13	J3	<u>HGV/LGV</u> as route to access B12 then crossover UNR18 <u>LGV</u> - B5112, B5111, UNR9, access C1 and access track
	J5	<u>LGV</u> - as route to access B12 then crossover UNR18
	J6	<u>HGV/LGV</u> - as route to access B12 then crossover UNR18 <u>LGV</u> - As route to access B12 then crossover UNR18
	-	<u>TT/LGV from/to OHL Construction Compound Option 1</u> - as route to access B11 then access track <u>TT/LGV from/to OHL Construction Compound Option 2</u> - B5420, B5109, Ffrodd Cae Sel, B5111, UNR10, UNR 9, access C1 and access track
C1	J3	<u>HGV/LGV</u> - as route to access B13 then access track. <u>LGV</u> - A5, A5025, Ffordd y Felin, Brynddu Road, UNR1, UNR4, B5111 and UNR9
	J5	<u>LGV</u> - B5112, B5111 and UNR9
	J6	<u>HGV/LGV</u> - as route to access B13 then access track <u>LGV</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel, B5111 and UNR10
	-	<u>TT/LGV from / to OHL Construction Compound</u> B5420, B5109, FFRODD CAE SEL, B5111, UNR10 and UNR9 east (route via access C3, access track and access C2 to avoid priority junction UNR9 and UNR10)
C2	J3	<u>HGV/LGV</u> - as route to access C1 then crossover UNR9 east. <u>LGV</u> - as route to access C1
	J5	<u>LGV</u> - as route to access C1

	J6	<u>HGV/LGV Option 1</u> - as route to access C1 then crossover UNR9 east <u>HGV/LGV Option 2</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel, B5111, B5110, access C8, access track, access C7, crossover UNR19, access C6, access track, access C4, crossover UNR10 and access track
	-	<u>TT/LGV from to OHL Construction Compound</u> as route to access C1
C3	J3	<u>HGV/LGV</u> - as route to access C2 then access track <u>LGV</u> - As route to access C2 then access track
	J5	<u>LGV</u> - as route to access C2 then access track
	J6	<u>HGV/LGV Option 1</u> - as route to access C2 then access track <u>HGV/LGV Option 2</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel, B5111, B5110, access C8, access track, access C7, crossover UNR19, access C6, access track, access C4 and crossover UNR10 <u>LGV</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel, B5111 and UNR10
	-	<u>TT/LGV from/to OHL Construction Compound</u> B5420, B5109, Ffordd Cae Sel, B5111 and UNR10

Table 4.6: Proposed Construction Traffic Route - Group 6 - IACC

Access	SRN A55	LRN Route from SRN to/from Group 6
C4	J3	<u>HGV/LGV</u> - as route to access C3 then crossover UNR10
	J5	<u>LGV</u> - as route to access C3 then crossover UNR10
	J6	<u>HGV/LGV Option 1</u> - as route to access C3 then crossover UNR10 <u>HGV/LGV Option 2</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel, B5111, B5110, access C8, access track, access C7, crossover UNR19, access C6 and access track. <u>LGV</u> - as access to C3

	-	<u>TT/LGV from/to OHL compound</u> B5420, B5109, Ffordd Cae Sel, B5111 and UNR10
C5	J6	<u>HGV/LGV</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel, B5111, B5110 access C8, access track, access C7, crossover UNR19 and access track <u>LGV</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel, B5111 and UNR10
	-	<u>TT/LGV from/to OHL Construction Compound</u> B5420, B5109, Ffordd Cae Sel, B5111 and UNR10
C6	J6	<u>HGV/LGV</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel, B5111, B5110 access C8, access track, access C7 and crossover UNR19
	-	<u>TT/LGV from/to OHL Construction Compound</u> B5420, B5109, Ffordd Cae Sel, B5110, UNR19 and access C6
C7	J6	<u>HGV/LGV</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel, B5111, B5110 access C8 and access track
	-	<u>TT/LGV from/to OHL Construction Compound</u> B5420, B5109, Ffordd Cae Sel, B5110, UNR19 and access C6
C8	J6	<u>HGV/LGV Option 1</u> - A5114, LLR B5420, B5109, Ffordd Cae Sel, B5111 and B5110. <u>HGV/LGV Option 2</u> - A5114, LLR, B5420, access D3, access track, access D2, crossover B5109, access D1, access C10 and B5110

Table 4.7: Proposed Construction Traffic Route - Group 7- IACC

Access	SRN A55	LRN Route from SRN to/from Group 7
C9	J6	<u>HGV/LGV Option 1</u> - A5114, LLR B5420, B5109, Ffordd Cae Sel, B5111 and B5110 <u>HGV/LGV Option 2</u> - A5114, LLR, B5420, access D3, access track, access D2, crossover B5109, access D1, access C10 and B5110

Table 4.8: Proposed Construction Traffic Route - Group 8 - IACC

Access	SRN A55	LRN Route from SRN to/from Group 8
C10	J6	<u>HGV/LGV Option 1</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel, B5111 and B5110
		<u>HGV/LGV Option 2</u> - A5114, LLR, B5420, access D3, access track, access D1, crossover B5109, access D1 and access track
D1	J6	<u>HGV/LGV Option 1</u> - A5114, LLR, B5420, B5109, Ffordd Cae Sel, B5111, B5110, access C10 and access track <u>HGV/LGV Option 2</u> - A5114, LLR, B5420, access D3, access track, access D2 and crossover B5109
	-	<u>TT/LGV from/to OHL Construction Compound</u> - B5420, LLR and B5109
D2	J6	<u>HGV/LGV Option 1</u> - as route to access D1 then crossover B5109 <u>HGV/LGV Option 2</u> - A5114, LLR, B5420, access D3 and access track
	-	<u>TT/LGV from/to OHL Construction Compound</u> - B5420, LLR and B5109
D3	J6	<u>HGV/LGV to/from OHL Construction Compound</u> - A5114, LLR and B5420 <u>Preferred</u>
	J7	<u>HGV/LGV to/from OHL Construction Compound</u> - access E5A, access track, access E1, crossover UNR16, access E2, access track, access D4 and B5420
	J8	<u>HGV/LGV to/from OHL Construction Compound - Contingency Route</u> A5025 and B5420

Table 4.9: Proposed Construction Traffic Route - Group 9 - IACC

Access	SRN A55	LRN Route from SRN to/from Group 9
--------	------------	------------------------------------

D4	J6	<u>HGV/LGV</u> - A5114, LLR and B5420 <u>Preferred</u>
	J7	<u>HGV/LGV</u> - Access E5A, access track, access E4, crossover UNR17, access E3, access track access E1, crossover UNR16, access E2 and access track
	J8	<u>HGV/LGV Contingency Route</u> A5025 and B5420
E2	J6	<u>HGV/LGV</u> - as route to access D4 then access track <u>TT/LGV</u> - A5114, LLR, B5420 and UNR16
	J7	<u>HGV/LGV</u> - UNR20, access E5A, access track, access E4, crossover UNR17, access E3, access track access E1 and crossover UNR16
	J8	<u>HGV/LGV Contingency Route</u> - A5025, B5420, access D4 and access track <u>TT/LGV Contingency Route</u> - A5025, B5420 and UNR16
	-	<u>TT/LGV from/to OHL Construction Compound</u> - B5420 and UNR16
E1	J6	<u>HGV/LGV</u> - as route to access E2 then crossover UNR16 <u>TT/LGV</u> – as route to access E2
	J7	<u>HGV/LGV</u> - UNR20, access E5A, access track, access E4, crossover UNR17, access E3 then access track
	J8	<u>HGV/LGV Contingency Route</u> - as route to access E2 <u>TT/LGV Contingency Route</u> – as route to access E2
E3	J6	<u>HGV/LGV</u> - As route to access E1 then access track <u>TT/LGV</u> – as route to access E1 then access track
	J7	<u>HGV/LGV</u> - UNR20, access E5A, access track, access E4 and crossover UNR17 <u>TT/LGV</u> - UNR20 and UNR17
	J8	<u>HGV/LGV Contingency Route</u> as route to access E1 then access track <u>TT/LGV Contingency Route</u> as route to access E1 then access track
E4	J6	<u>HGV/LGV</u> - as route to access E3 then crossover UNR17. <u>TT/LGV</u> - as route to access E3 then crossover UNR17

	J7	<u>HGV/LGV</u> - UNR20, access E5A then access track. <u>TT/LGV</u> - UNR20 and UNR17
	J8	<u>HGV/LGV Contingency Route</u> –as route to access E3 then crossover UNR17 <u>TT/LGV Contingency Route</u> - as route to access E3 then crossover UNR17
E5A	J6	<u>HGV/LGV</u> - as route to access E4 then access track <u>TT/LGV</u> - as route to access E4 then access track
	J7	<u>HGV/LGV</u> - UNR20.
	J8	<u>HGV/LGV Contingency Route</u> – as route to E4 then access track <u>TT/LGV Contingency Route</u> - as route to access E4 then access track
E5	J6	<u>HGV/LGV</u> - as route to E4 then access track <u>TT/LGV</u> – as route to E4 then access track
	J7	<u>HGV/LGV Option 1</u> - UNR20, access E5A and access track <u>HGV/LGV Option 2</u> – A5152, A5, NCN8 and UNR21
	Jct. 8	<u>HGV/LGV Contingency Route</u> – as route to E4 then access track <u>TT/LGV Contingency Route</u> - as route to access E4 then access track

Table 4.10: Proposed Construction Traffic Route - Group 10 - IACC

Access	SRN A55	LRN Route from SRN to/from Group 10
E6 OHL	J7	<u>HGV/LGV</u> - A5152, A5, UNR22, access F1C or F1, access track, access E7 and Llanddaniel Road/NCN8 <u>TT/LGV</u> - A5152, A5 and Llanddaniel Road/NCN8 <u>HGV/LGV Contingency Route</u> - A5125, A5 and Llanddaniel Road/NCN8
	J7A Inbound Only	<u>HGV/LGV</u> - A5, UNR22, access F1C or F1, access track, access E7 and Llanddaniel Road/NCN8 <u>TT/LGV</u> - A5 and Llanddaniel Road/NCN8 <u>HGV/LGV Contingency Route</u> - A5 and Llanddaniel

		Road/NCN8
--	--	-----------

Table 4.11: Proposed Construction Traffic Route – Group 11 - IACC

Access	SRN A55	LRN Route from SRN to/from Group 11
E7	J7	<u>HGV/LGV</u> - A5152, A5, UNR22, access F1C or F1 and access track. <u>TT/LGV</u> - A5152, A5 and Llanddaniel Road/NCN8 <u>HGV/LGV Contingency Route</u> Llanddaniel Road/NCN8, A5 and A5152
	J7A Inbound Only	<u>HGV/LGV</u> - A5, UNR22, access F1C and access track <u>TT/LGV</u> - A5 and Llanddaniel Road/NCN8 <u>HGV/LGV Contingency</u> - A5 and Llanddaniel Road/NCN8
F1	J7	<u>HGV/LGV</u> - A5152, A5 and UNR22
	J7A Inbound Only	<u>HGV/LGV</u> - A5 and UNR22
	J8A	<u>HGV/LGV Enabling Works</u> - A5, A4080 and UNR22 <u>HGV/LGV Contingency</u> - A5, A4080 and UNR22
F1C	J7	<u>HGV/LGV</u> - A5152, A5 and UNR22
	J7A Inbound Only	<u>HGV/LGV</u> - A5 and UNR22
F2	J8A	<u>HGV/LGV Enabling Works</u> - A5, A4080 and UNR22 <u>HGV/LGV Contingency</u> - A5, A4080 and UNR22

Table 4.12: Proposed Construction Traffic Route - Group 12 - Gwynedd Council

Access	SRN	LRN Route from SRN to/from Group 12
F3	A55 9 A487	<u>LGV</u> - B4547 and Fodolydd Lane west <u>HGV Enabling Works</u> - B4547 and Fodolydd Lane west
	A55 J10 Inbound Only Contingency	<u>LGV</u> - A4087, B4547 and Fodolydd Lane west <u>HGV Enabling Works</u> - A4087, B4547 and Fodolydd Lane west
	A55 J11 A5	<u>LGV</u> - A4144, B4547 and Fodolydd Lane west <u>HGV Enabling Works</u> - A4144, B4547 and Fodolydd Lane west
F4	A55 J9 A487	<u>HGV/LGV</u> - B4547, access F14, access track, access F9, crossover UNR24, access F8, access track, access F7, crossover UNR25, access F6, access track, access F5 and crossover Fodolydd Lane east. <u>HGV/LGV Enabling Works</u> - B4547 and Fodolydd Lane east
	A55 J10 Inbound Only Contingency	<u>HGV/LGV</u> - A4087, B4547, access F14, access track, access F9, crossover UNR24, access F8, access track, access F7, crossover UNR25, access F6, access track, access F5 and crossover Fodolydd Lane east <u>HGV/LGV Enabling Works</u> - A4087, B4547 and Fodolydd Lane east
	A55 J11 A5	<u>HGV/LGV</u> - A4144, B4547, access F14, access track, access F9, crossover UNR24, access F8, access track, access F7, crossover UNR25, access F6, access track, access F5 and crossover Fodolydd Lane east <u>HGV/LGV Enabling Works</u> - A4144, B4547 and Fodolydd Lane east
F5	A55 J9 A487	<u>HGV/LGV</u> - B4547, access F14, access track, access F9, crossover UNR24, access F8, access track, access F7, crossover UNR25, access F6 and access track. <u>HGV/LGV Enabling Works</u> - as route to access F4
	A55 J10 Inbound Only Contingency	<u>HGV/LGV</u> - A4087, B4547, access F14, access track, access F9, crossover UNR24, access F8, access track, access F7, crossover UNR25, access F6 and access track. <u>HGV/LGV Enabling Works</u> as route to access F4

	A55 J11 A5	<u>HGV/LGV</u> - A4144, B4547, access F14, access track, access F9, crossover UNR24, access F8, access track, access F7, crossover UNR25, access F6 and access track. <u>HGV/LGV Enabling Works</u> - as route to access F4
F6	A55 J9 A487	<u>HGV/LGV</u> - B4547, access F14, access track, access F9, crossover UNR24, access F8, access track, access F7 and crossover UNR25. <u>HGV/LGV Enabling Works</u> - B4547, Fodolydd Lane east and UNR25
	A55 J10 Inbound Only Contingency	<u>HGV/LGV</u> - A4087, B4547, access F14, access track, access F9, crossover UNR24, access F8, access track, access F7 and crossover UNR25. <u>HGV/LGV Enabling Works</u> - A4087, B4547, Fodolydd Lane east and UNR25
	A55 J11 A5	<u>HGV/ LGV</u> - A4144, B4547, access F14, access track, access F9, crossover UNR24, access F8, access track, access F7 and crossover UNR25. <u>HGV/LGV Enabling Works</u> - A4144, B4547, Fodolydd Lane east and UNR25
F7	A55 J9 A487	<u>HGV/LGV</u> - B4547, access F14, access track, access F9, crossover UNR24, access F8 and access track. <u>HGV/LGV Enabling Works</u> - as route to access F6
	A55 J10 Inbound Only Contingency	<u>HGV/LGV</u> - A4087, B4547, access F14, access track, access F9, crossover UNR24, access F8 and access track. <u>HGV/LGV Enabling Works</u> – as route to access F6
	A55 J11 A5	<u>HGV/LGV</u> - A4144, B4547, access F14, access track, access F9, crossover UNR24, access F8 and access track, <u>HGV/LGV Enabling Works</u> - as route access F6
F8	A55 J9 A487	<u>HGV/LGV</u> - B4547, access F14, access track, access F9 and crossover UNR24. <u>HGV/LGV Enabling Works</u> B4547, Fodolydd Lane east and UNR24
	A55 J10	<u>HGV/LGV</u> - A4087, B4547, access F14, access track, access F9 and crossover UNR24

	Inbound Only Contingency	<u>HGV/LGV Enabling Works</u> A4087, B4547, Fodolydd Lane east and UNR24
	A55 J11 A5	<u>HGV/LGV</u> - A4144, B4547, access F14, access track, access F9 and crossover UNR24 <u>HGV/LGV Enabling Works</u> - A4144, B4547, Fodolydd Lane east and UNR24
F9	A55 J9 A487	<u>HGV/LGV</u> - B4547, access F14 and access track. <u>HGV/LGV Enabling Works</u> - as route to access F8
	A55 J10 Inbound Only Contingency	<u>HGV/LGV</u> - A4087, B4547, access F14 and access track <u>HGV/LGV Enabling Works</u> - as route to access F8
	A55 J11 A5	<u>HGV/LGV</u> - A4144, B4547, access F14 and access track. <u>HGV/LGV Enabling Works</u> - as route to access F8
F10	A55 J9 A487	<u>HGV/LGV</u> - B4547, access F14, access track, access F11 and crossover Fodolydd Lane east
	A55 J10 Inbound Only Contingency	<u>HGV/LGV</u> - A4087, B4547, access F14 access track, access F11 and crossover Fodolydd Lane east
	A55 J11 A5	<u>HGV/LGV</u> - A4144, B4547, access F14 access track, access F11 and crossover Fodolydd Lane east
F11	A55 J9 A487	<u>HGV/LGV</u> - B4547, access F14 and access track
	A55 J10 Inbound Only Contingency	<u>HGV/LGV</u> A4087, B4547, access F14 and access track
	A55 J11 A5	<u>HGV/LGV</u> A4144, B4547, access F14 and access track
F14	A55 J9 A487	<u>HGV/LGV</u> B4547
	A55 J10 Inbound Only Contingency	<u>HGV/LGV</u> A4087 and B4547
	A55 J11 A5	<u>HGV/LGV</u> A4144 and B4547

4.3 ENABLING WORKS ROUTES

4.3.1 Enabling works are required to facilitate the construction of the Proposed Development. The appointed contractor would liaise with local highway officers to ensure appropriate traffic management and mitigation measures are implemented to ensure safety on the LRN is not compromised, and reduce, so far as reasonably practicable, disturbance and inconvenience to residents and road users.

4.3.2 At this stage, the enabling works routes have been identified for the Braint and Tŷ Fodol Construction Compounds and are shown in Annex A and detailed as follows.

Braint Construction Compound

4.3.3 Vehicles would require the use of A55 Junction 8A, A5/Holyhead Road, A4080 and Pont Ronwy/UNR22 between A5 Holyhead Road and A4080. Use of these routes is required for plant delivery, construction of temporary access points and access tracks.

Tŷ Fodol Construction Compound

4.3.4 Vehicles would require the use of Fodolydd Lane (east), Fodolydd Lane (west), UNR24 and UNR25. Use of these routes is required for plant delivery, construction of water crossings, temporary access points and access tracks.

4.4 CONTINGENCY ROUTES

4.4.1 Contingency routes would only be used if one of the preferred construction traffic routes became unavailable. A route is considered to be 'unavailable' if it is either closed (by the highway authority or the police), or becomes subject to a restriction making it unsuitable for construction traffic (for example a weight or height restriction).

4.4.2 The proposed contingency routes are shown in Annex A and are described as follows.

Braint Construction Compound

4.4.3 The primary inbound and outbound construction traffic route for the Braint Construction Compound would be via Pont Ronwy/UNR22 and access F1C or F1. If the primary construction traffic route was to become unavailable

and construction activity needed to continue, a contingency route utilising accesses E7 and F2 is proposed.

- 4.4.4 There is anticipated to be approximately four weeks' storage capacity for excavated material and tunnel concrete liner segments at the Braint Construction Compound. Therefore, at this stage, the contingency route use during a period of anything up to four weeks is anticipated to be predominantly for LGVs and HGVs comprising of concrete and grout delivery vehicles.
- 4.4.5 The identified contingency route options for the Braint Construction Compound are detailed in Table 4.13.

Table 4.13: Braint Construction Compound Contingency Route Options		
Access	Westbound on A55	Eastbound on A55
E7 Inbound	<u>Option 1</u> A55 J7A, A5 and NCN8/Llanddaniel Road	<u>Option 1</u> A55 J7, A5152, A5 and NCN8/Llanddaniel Road
	<u>Option 2</u> A55 J7, A5152, A5 and NCN8/Llanddaniel Road	<u>Option 2</u> A55 J9, A55, J7A, A5 and NCN8/Llanddaniel Road
E7 Outbound	NCN8/Llanddaniel Road, A5, A5152 and A55 J7 <u>Preferred</u>	
F2 Inbound	A55 J8A, A5, Tollgate Junction. and A4080 <u>Preferred</u>	A55 J9, A55, A55 J8A, A5, Tollgate Junction. and A4080 <u>Preferred</u>
F2 Outbound	A4080, Tollgate Junction, A5, A55 J8A and A55 J9	A4080, Tollgate Junction, A5 and A55 J8A

- 4.4.6 The contingency routes (if Pont Ronwy/UNR22 became unavailable) are influenced by the origin and destination of construction traffic and the timescales involved.

Penmynydd Road Construction Compound

4.4.7 The OHL construction compound is located off the B5420 and would be accessed via temporary access D3. The primary routes to/from access D3 are proposed to be as follows:

- A55 J6 – A5114 – LLR – B5420; and

4.4.8 If either of these routes became unavailable then, depending on the urgency of access or egress, it is proposed that a contingency route via A55 J8, A5025, Four Crosses Roundabout and B5420 be used.

Tŷ Fodol and Pentir Construction Compounds

4.4.9 The primary inbound and outbound construction traffic route options to the Tŷ Fodol and Pentir Construction Compounds are proposed to be as follows;

- From/to mainland A55 J11 – A5 – A4244 – B4547 and access F14; and
- From/to Anglesey A55 J9 – A487 – B4547 and access F14.

4.4.10 A westbound and inbound only movement via A55 J10 has been identified as a contingency route for construction traffic to the Tŷ Fodol and Pentir Construction Compounds.

4.5 CONSTRUCTION TRAFFIC ROUTES RISK REGISTER

4.5.1 A construction traffic route risk register and hazard map have been produced as part of the process of selecting construction traffic routes and identifying appropriate potential control measures. The identified hazards are detailed in Annex F of this document along with the potential control measures to be considered further during detailed design and final CTMP implementation.

4.5.2 The construction traffic route risk register is intended to be dynamic and would be passed to the contractor upon contract award as required by the Construction Design Management (CDM) regulations.

5 Bulk Materials

5.1 INTRODUCTION

5.1.1 The majority of the HGV vehicle trips required to construct the Proposed Development would be associated with the delivery and removal of bulk materials. The types of bulk material are summarised as follows, however, the Outline Waste Management Plan (OWMP) (**Document 7.11**) provides more detail on volumes and types of bulk materials.

5.2 TEMPORARY ACCESS TRACKS AND HARD STANDING AGGREGATE

5.2.1 Aggregate would be required for temporary access track construction, pylon working areas and construction compounds. Typically, suitable aggregate would be delivered during the enabling works phase of the Proposed Development and removed during the re-instatement phase of the Proposed Development.

5.3 TUNNEL AND TUNNEL SHAFT ARISINGS

5.3.1 The proposed alignment of the tunnel is illustrated on Design Plan DCO_DE/PS/07 01 Sheet 1 of 2 (**Document 4.13**) and an illustrative cross section on Design Plan DCO_DE/PS/07 02 Sheet 2 of 2 (**Document 4.13**).

5.3.2 Both shafts would have an internal diameter of 15 m. An illustrative shaft cross section is shown on Design Plan DCO_DE/PS/07 Sheet 2 of 2 (**Document 4.13**).

5.3.3 The excavated material would be continuously removed during the construction of the tunnel and tunnel shafts. Typically, this material would be removed from site at a consistent rate by 20 tonne tippers. The TA (**Document 5.13.2.1**) provides further detail on this.

5.4 PRECAST CONCRETE SEGMENTS

5.4.1 If a tunnel boring machine is used to construct the tunnel then concrete rings, formed by individual precast concrete segments, are likely to be required for the tunnel lining. The delivery of concrete segments would be required throughout the duration of the tunnel construction. The arrangement of the concrete rings are subject to change, but for the purposes of traffic assessment it is assumed that one ring would consist of

eight individual segments and three rings (24 segments) could be delivered per HGV and that approximately five deliveries per day would be required.

5.5 CONCRETE AND GROUT MIX

- 5.5.1 Ready mix concrete and grout mix would be required for a number of construction elements of the Proposed Development. These include, but are not limited to, pylon and building foundations, shaft and tunnel lining, high pressure grouting (to deal with strength and permeability conditions of the insitu ground) and tunnel construction.
- 5.5.2 If the tunnel is constructed by a drill and blast technique then a sprayed concrete tunnel lining is likely to be used.
- 5.5.3 Ready mix concrete would typically be delivered to site in concrete mixer vehicles and dry grout mix would typically be delivered in 20 tonne capacity HGVs.
- 5.5.4 There is also the potential for concrete to be batched on site at the tunnel compounds; however the need for ready mix deliveries is included as a worst case for vehicle movements.

5.6 PYLONS

- 5.6.1 The OHL element of the Proposed Development would require delivery of steel works for the construction of electricity pylons. Steel for pylons would typically be delivered to site on articulated HGVs, low loaders or hiab wagons and unloaded via small cranes or telehandlers.

5.7 CABLES AND CONDUCTOR

- 5.7.1 The OHL element of the Proposed Development would require the removal of existing conductor wires and the delivery of new conductor wires. OHL conductor would typically be delivered to a secure compound on articulated vehicles, low loaders or hiab wagons depending on the size of the conductor drum and then delivered to site as required.
- 5.7.2 It is anticipated that the cable for the tunnel would be delivered as AILs to either the Tŷ Fodol or Braint Construction Compound.

5.8 EARTHWORKS

- 5.8.1 Earthworks required for items such as temporary access tracks, working areas and compounds would not typically require material export as it is anticipated that excavated material would remain on site until

reinstatement. This method would reduce construction traffic on the road network.

- 5.8.2 Earthworks would be required for the extension of the Pentir Substation. Export of existing material such as soil would be required as a consequence of site preparation and levelling. Import of aggregate would be required in order to provide a suitable base layer for the substation extension. Materials would typically be imported and exported via 20 tonne tippers and would comprise the majority of the Pentir Substation works traffic.

6 Traffic Management

6.1 INTRODUCTION

6.1.1 Traffic management methods would be used on the LRN and where physical mitigation measures prove to be not reasonably practicable or cannot be accommodated during the construction period of the Proposed Development. Traffic Signs Manual Chapter 8 states:

'The complexity of traffic management arrangements varies from scheme to scheme but the primary objective is;

- *to maximise the safety of the workforce and the travelling public.*

The secondary objective is;

- *to keep traffic flowing as freely as possible'.⁴*

6.1.2 Traffic management on all highways and roads would comply with the UK Government's Code of Practice 'Safety at Streetworks and Roadworks' (DfT, 2013)⁵ or other relevant legislation and guidance as appropriate at the time of implementation. Traffic management would be agreed with the relevant LHA prior to the commencement of works.

6.1.3 Traffic management signage would be in accordance with the Traffic Signs Regulations and General Directions (TSRGD) 2016 and Traffic Signs Manual Chapter 8.

6.1.4 Whilst typical traffic management layouts are provided in Annex D, detailed traffic management layouts, site specific risk assessments and method statements would be produced and agreed with the relevant LHA for all traffic management and highways related construction activities.

⁴ Traffic Signs Manual Chapter 8

⁵ Department for Transport (2013) 'Safety at Street Works and Road Works; Code of Practice'. Available from: <https://www.gov.uk/government/publications/safety-at-street-works-and-road-works>

6.2 CONSTRUCTION TRAFFIC ROUTES AND TEMPORARY ACCESS SIGNAGE

- 6.2.1 Temporary signs providing route information for contractors would be erected at key locations along the proposed construction traffic routes on the LRN and potentially the SRN. Project information boards would be erected and would include key project information for the public and relevant contact details.
- 6.2.2 The design and location of route information signs and project information boards would be agreed with the LHA prior to installation. Signs would be bi-lingual, with messages written in Welsh above English on the sign face.
- 6.2.3 Consistent signage at temporary access locations would be installed during use in order to provide relevant warnings and information to other road users of the presence of construction traffic. If required by the LHA, and given the nature of the OHL construction programme, in particular, these signs can be removed or covered when the temporary access is not in use.

6.3 TEMPORARY ACCESS ROAD SIGNAGE

- 6.3.1 The off road temporary access tracks would have signage in order to assist the construction contractor to operate safely and efficiently. Signage on the temporary access tracks would include information such as: safety messages; speed limits; typical and site-specific hazards; distance to the LRN; area of potential vehicle conflicts; and PRow crossings.
- 6.3.2 Where a temporary access track intersected with a PRow, the form and content of the signs would be agreed with the PRow officers at IACC and Gwynedd Council.

6.4 TEMPORARY ACCESS TRAFFIC MANAGEMENT

- 6.4.1 In order to limit potential disruption to the LRN, traffic management would only be deployed as required. This applies in particular to the OHL element of the Proposed Development given the 'rolling' nature of the construction programme, with construction activity more temporary and mobile compared to that at the THH/CSEC Compounds at Braint and Ty Fodol.
- 6.4.2 The type of traffic management required at each temporary access location is dependent on a number of factors including traffic speeds, road widths, visibility and site characteristics. A flow chart for the design and monitoring of the effectiveness of the traffic management at each location is provided in the Temporary Access Principles Note (**Document 5.4.2.1**).

- 6.4.3 Traffic management at temporary access points could be traffic control by priority signs, stop/go boards or portable traffic signals along with additional approach signage to reduce speeds where required. Typical Traffic management layouts are provided in Annex D.
- 6.4.4 Temporary Traffic Regulation Orders (TTROs) would be implemented as part of the traffic management approach for the Proposed Development where necessary. TTROs would include speed, access and waiting prohibition and restrictions. The proposed TTRO locations and extents are shown on the Traffic Regulation Orders Plans (**Document 4.12**) and they are detailed further within the draft DCO (**Document 2.1**) and would be agreed and implemented in liaison with the relevant LHA.

6.5 TEMPORARY ROAD CLOSURES AND DIVERSIONS

- 6.5.1 There would be three types of road closure required for the Proposed Development:
- 1) Where a temporary access is constructed on the LRN and the existing road width cannot accommodate the required traffic management, sideways safety zones and running lane widths; then a road closure and diversion(s) may be required.
 - 2) Where a section of road is required to be closed to allow enabling works or the construction of an element of the Proposed Development to take place.
 - 3) During installation of an overhead line conductor over a road.
- 6.5.2 The locations of the closures and diversion routes are shown on the Access and Rights of Way Plans (**Document 4.5**).

Pont Ronwy/UNR22 Closure

- 6.5.3 The road closure for Pont Ronwy/UNR22 would be required for the duration of the construction of the Proposed Development, in order to reduce the potential for certain traffic effects on this part of the highway network, to keep construction traffic and general traffic separate and to help reduce the risk of accidents.
- 6.5.4 Exceptions to the closure would include emergency services, and may include residents and refuse collections. The closure would be continuously reviewed with the LHA officers to determine whether it could be re-opened for specific periods of time or certain additional movements permitted during construction activities with low traffic movements

- 6.5.5 The contractor would develop appropriate traffic management arrangements for the Pont Ronwy/UNR22 closure and these would be agreed with LHA officers. An indicative traffic management arrangement for the closure is included in Annex D of this document.

6.6 WORKING HOURS

Core Working Hours

- 6.6.1 The core working hours are detailed within the Construction Environmental Management Plan (CEMP) (**Document 7.4**) and would be between the hours of 0700 to 1900 Monday to Saturday and between 0900 and 1700 on Sundays.

Alternative Working Hours

- 6.6.2 Some construction activities would require work to be undertaken outside of the core hours, for example, activities that require continuous 24-hour operations such as tunnelling, and associated operations..
- 6.6.3 In order to reduce impact on the LRN, and for logistical and safety reasons, some deliveries such as AILs or large plant, and activities such as scaffolding, netting, stringing over roads and rail lines may be required to be undertaken outside of core working hours. The timings of such activities would be discussed and a sensible, practical approach agreed with the relevant LHA as necessary.
- 6.6.4 Equally, whilst working hours are specified in the CEMP, it is recognised that in certain circumstances, for example where HGV routes run in close proximity to schools, it may be a necessary, as a form of mitigation, to further define the hours of vehicle movement within the working day, for example to avoid school drop-off and pick-up times. This will be the subject of further discussion with the relevant LHA.

6.7 LOCAL SPECIAL EVENTS

- 6.7.1 Construction traffic movements and traffic management would be restricted or removed as required for the duration of local special events such as the 'Tour De Môn' (annual cycle event) which requires use of the LRN. This event typically uses, Pont Ronwy/UNR22, which would be re-opened to cyclists for the duration of the event.
- 6.7.2 National Grid will seek to agree the events that would be considered in this manner with the relevant LHA.

7 Overhead Line Stringing and Scaffolding

7.1 OVERHEAD LINE STRINGING

- 7.1.1 Construction of the OHL would involve the 'stringing' of conductors between pylons. This process crosses over existing roads, railway lines, PRow and hedgerows. Various levels of protection would be required at all crossing locations.
- 7.1.2 A Road, Rail and PRow Crossing Schedule (**Document 5.3.2.3**) shows these crossing locations. For ease of reference an indicative road and rail crossing schedule and plan is contained in Annex E of this document.

7.2 SCAFFOLDING

- 7.2.1 Where scaffolding adjacent to the carriageway is required for OHL construction then a site-specific risk assessment and method statement would be undertaken to determine appropriate traffic management, signage, safety clearance and level of protection.

7.3 STRATEGIC ROAD NETWORK (SRN)

- 7.3.1 There is one OHL crossing of the SRN over the A55 between J7 and J7A. Welsh Government has been notified of the possibility of using the existing layby at this location to facilitate the construction of scaffolding and OHL stringing.
- 7.3.2 A Road Restraints Risk Assessment Process (RRRAP) in accordance with TD19/06 would be undertaken if required and would be submitted for approval prior to commencement of works. A TTRO for restriction of waiting would be submitted at least 12 weeks in advance of the works.
- 7.3.3 It is proposed that a rolling road block would be implemented during the installation of the netting over the A55. Discussions with Welsh Government will continue on the temporary possession required and the most suitable traffic management to be implemented to facilitate this element of the Proposed Development.

7.4 LOCAL ROAD NETWORK (LRN)

- 7.4.1 Traffic management requirements on the LRN for scaffolding and netting will be determined by a site-specific risk assessment and agreed with the relevant LHAs prior to commencement of works. Traffic management such as traffic signals, stop/go boards or traffic marshals could be used.
- 7.4.2 Vehicular access for scaffold delivery would be via the use of temporary access track 'spurs' connected to proposed temporary access points and temporary access tracks or via the use of existing gated field accesses.
- 7.4.3 This arrangement would allow delivery vehicles to unload and load equipment whilst located off the LRN. This would be the typical arrangement with the exception of one location as described as follows.
- 7.4.4 At the proposed pylons near access E6 and in a scenario where vehicular access to the northern pylon could not be taken through the existing business access, the scaffold equipment would be lifted over from a delivery vehicle parked on the LRN. Appropriate traffic management would be agreed and provided during this scenario.

7.5 RAILWAY CROSSING

- 7.5.1 The Proposed Development would require one crossing of the North Wales Coast Line and one crossing of the disused Anglesey Central Railway. Appropriate applications, risk assessments and method statements would be undertaken in accordance with Network Rail's requirements prior to commencement of works.

8 Public Rights of Way (PRoW)

8.1 PUBLIC RIGHTS OF WAY MANAGEMENT PLAN

- 8.1.1 In order to construct the various elements of the Proposed Development a number of existing PRoW would be affected. The type of PRoW crossing, whether by a temporary access track or the OHL, would dictate the required management and mitigation level.
- 8.1.2 Further details and management/mitigation measures are included in Public Right of Way Management Plan (**Document 7.6**).

9 Mitigation Measures

9.1 PROPOSED MITIGATION MEASURES

9.1.1 In line with the objectives set out in Table 1.1, a number of mitigation measures would be implemented as summarised in Table 9.1.

Table 9.1: Proposed Traffic and Transport Mitigation Measures		
Mitigation Measure	Ref.	Objective
<p>Prescribed HGV and LGV Construction traffic routes</p> <p>Only proposed construction traffic routes are to be used for the construction of the Proposed Development.</p> <p>Appropriate self-enforcement and monitoring measures to reduce the need for LHAs and NWP to enforce and monitor would be included within the conditions of contract and penalties would apply for non-compliance.</p>	1	A/B
<p>Temporary Access Principles Note</p> <p>A Temporary Access Principles Note (Document 5.4.2.1) has been produced and discussed with the LHAs which details temporary access design, traffic management requirements and monitoring.</p> <p>A road safety assessment and road safety audits have been undertaken by independent road safety auditors and have been used to inform access provision.</p>	2	A
<p>Physical LRN Improvements</p> <p>Physical highway improvements have been proposed where reasonably practicable as detailed within the TA (Document 5.13.2.1 Annex M).</p>	3	F
<p>Road Safety Information</p> <p>National Grid, in consultation with the LHAs and emergency services, would promote and publicise appropriate road safety information during the construction of the Proposed Development.</p>	4	A/B
<p>Framework Travel Plan</p>	5	A

Table 9.1: Proposed Traffic and Transport Mitigation Measures		
Mitigation Measure	Ref.	Objective
A Framework Travel Plan is included within the TA. Opportunities for park and ride, mini bus use and other sustainable travel measures are included in the Travel Plan.		
<p>Community Engagement and Public Information</p> <p>Information regarding construction traffic activities and movements would be provided to the public. The means of communication could include online updates, letter drops, information boards and details of key contacts.</p> <p>National Grid would provide a community relations team which would manage a 24-hour free telephone hotline and a project website.</p>	6	B/D
<p>Traffic Management and Diversion Routes</p> <p>Where required, suitable traffic management would be implemented to ensure safe operation and to reduce as far as reasonably practicable the impact of construction vehicles on the LRN. Where road closures were required, diversions would be put in place with suitable signage and monitoring.</p>	7	A/B/F
<p>Temporary Traffic Regulation Orders</p> <p>Temporary Traffic Regulation Orders have been proposed to allow enforcement of reduced speed limits, road closures and parking restrictions.</p>	8	A/B/F
<p>Vegetation Management</p> <p>Where deemed hazardous, overgrown vegetation and grass verge encroachment onto the edge of carriageway along key construction traffic routes would be managed during construction traffic route use. This would benefit all motorists and other road users.</p>	9	A/B/F
<p>Wheel Cleaning Facilities</p> <p>Appropriate facilities would be installed at temporary access locations to allow removal of debris from construction vehicles prior to use of the LRN.</p>	10	F

Table 9.1: Proposed Traffic and Transport Mitigation Measures		
Mitigation Measure	Ref.	Objective
<p>Street Cleaning Schedule</p> <p>The use of road sweepers throughout the construction of the Proposed Development would be agreed with the relevant LHAs.</p>	11	F
<p>Delivery Management System</p> <p>Delivery records would be kept at the Penmynydd Road Construction Compound, the Braint and Tŷ Fodol Construction Compounds and at the Pentir Substation Construction Compounds. Delivery records would allow vehicular activities to be recorded, monitored and managed throughout the construction of the Proposed Development to ensure compliance with the OCTMP.</p>	12	ALL
<p>HGV Traffic Movement and Timing Restrictions</p> <p>These may be determined as necessary to mitigate potential traffic effects and could include:</p> <ul style="list-style-type: none"> • Timing restrictions on routes with schools during school drop off and pick up times; • Restrictions within the AM or PM peak hour for certain movements at certain junctions linked to junction capacity assessment; and • Restriction of certain movements at certain locations to accommodate local special events. <p>Details in terms of when and where restrictions may be required would be determined as necessary and monitored during the construction of the Proposed Development.</p>	13	C/D/F
<p>HGV Emissions and Safety Features</p> <p>Typical HGVs used for the construction of the Proposed Development would be to the required Euro Class and could have additional cycle friendly measures such as cameras, full length door windows, blind spot warning system and additional mirrors.</p>	15	A/B

Table 9.1: Proposed Traffic and Transport Mitigation Measures		
Mitigation Measure	Ref.	Objective
<p>Abnormal Indivisible Loads (AILs)</p> <p>Temporary traffic management would be provided during AIL delivery where required, along with appropriate communications with the local community.</p> <p>Department for Transport ESDAL system would be used for notifications.</p> <p>Night deliveries would be undertaken where required, to reduce disruption and maintain safety on the LRN.</p>	16	A/B/E/F
<p>Traffic Marshals</p> <p>Suitably qualified personnel would be present at key locations and times during construction to guide traffic and to enhance safety.</p>	17	A
<p>Contractor Information Packs</p> <p>Contractors would be provided with:</p> <ul style="list-style-type: none"> • Details of prescribed Construction traffic routes • Code of Good Practice • Traffic Incident Management Plan • Project/Local Authority/Emergency Contact Details • Delivery Management Systems and Vehicle Monitoring • HGV Timing Restrictions. 	18	ALL
<p>Highway Condition Surveys, Maintenance and Repair</p> <p>A highway inspection, monitoring and repair strategy, to be deployed during the construction of the Proposed Development, would be agreed in advance with the LHAs and included in the final CTMP.</p>	19	F
<p>Highway Structure Condition Surveys, Maintenance and Repair</p> <p>A highway structure inspection, monitoring and repair strategy, to be deployed during the construction of the Proposed Development, would be agreed in advance with the LHAs and Network Rail and included in the final CTMP.</p>	20	F

Table 9.1: Proposed Traffic and Transport Mitigation Measures

Mitigation Measure	Ref.	Objective
<p>Traffic Safety and Control Officer (TSCO)</p> <p>The contractor(s) would appoint a TSCO for the duration of the construction of the Proposed Development to act as the main point of contact with the LHAs and emergency services and undertake the following duties :</p> <ul style="list-style-type: none"> • Check and approve all traffic management drawings prior to issue. • Ensure sufficient resource available to maintain traffic management on site. • Monitor traffic management to ensure effectiveness and safety to workers and public. • Communicate with LHA officers and emergency services. • Provide a visible presence at site. 	21	A/B/F

10 Traffic Incident Management

- 10.1.1 National Grid has consulted with Welsh Government, the LHAs, NWP and NWFRS regarding traffic incident management.
- 10.1.2 The contractor appointed Traffic Safety and Control Officer (TSCO) would act as the main point of contact between the emergency services, traffic control units and contractors to ensure that incidents were recorded and communicated effectively to contractors and to ensure construction traffic on the road network followed traffic procedures as set out by statutory bodies.
- 10.1.3 In the event of an incident on the road network, if required, then the TSCO would instruct construction traffic to be held at site within compounds, working areas or on access tracks.
- 10.1.4 Similarly, if required, the TSCO would communicate procedures with supply chains whether they be en-route to the Proposed Development or have a scheduled delivery during an incident. Contractors would be required to hold deliveries at origin or, if en-route, could be diverted to an alternative working area or compound or appropriate waiting area, or be instructed to return to their origin.
- 10.1.5 As part of the construction traffic route monitoring process, the TCSO would record and report any near misses or incidents on the proposed construction traffic routes in order to inform the construction traffic routes risk register and communicate, react and control any hazards arising during the construction of the Proposed Development.
- 10.1.6 The following chapter provides details of a proposed Transport Review Group, which would provide a forum within which the incident management plan would be reviewed.

11 Monitoring, Review and Improvement

11.1 COMMUNICATION

11.1.1 National Grid will continue to consult with the LHAs, Welsh Government, NWP, NWFRS and WAST. The final CTMP and compliance with is secured through Requirement 7 of the DCO.

11.1.2 In order to ensure that the objectives and mitigation measures which are set out in this OCTMP are met, implemented as appropriate and managed effectively, National Grid proposes to ensure that a Transport Review Group is in place prior to and during the construction of the Proposed Development.

11.1.3 The Transport Review Group would have the following responsibilities:

- communicate and monitor the OCTMP and its mitigation measures;
- ensure records of HGV movements were maintained and reported;
- be the first point of contact for the public, stakeholders and contractors;
- hold regular update meetings with LHAs and relevant stakeholders;
- record near misses, incidents and hazards and resolve issues as informed by contractors, stakeholders and the public; and
- monitor, review and improve, where necessary, the OCTMP and associated mitigation measures.

11.2 COMPLIANCE, ENFORCEMENT AND CORRECTIVE MEASURES

11.2.1 National Grid would be committed to ensuring compliance with the final CTMP and recognises that self-enforcement would reduce resource requirements on the LHAs and emergency services.

11.2.2 As a consequence, the following compliance methods are proposed to be adopted, as far as reasonably practicable;

- Traffic Safety and Control Officer to be appointed;

- Delivery Management System; and,
- HGV identification and tracking technology.

11.2.3 Compliance with the OCTMP would be part of the conditions of contract and penalties for non-compliance would be imposed by National Grid.

11.2.4 The Transport Review Group would provide a platform to ensure that any issues are recorded, addressed and appropriate corrective measures are implemented.

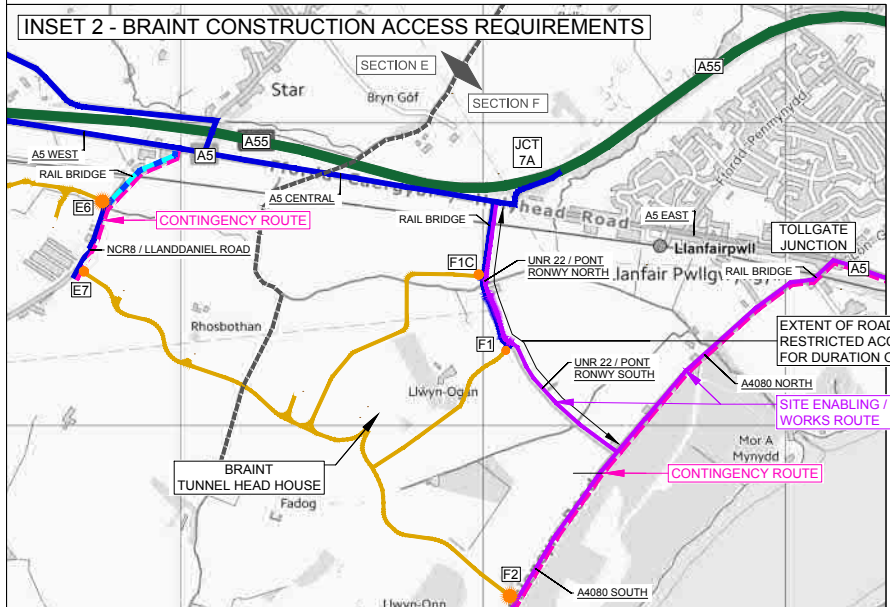
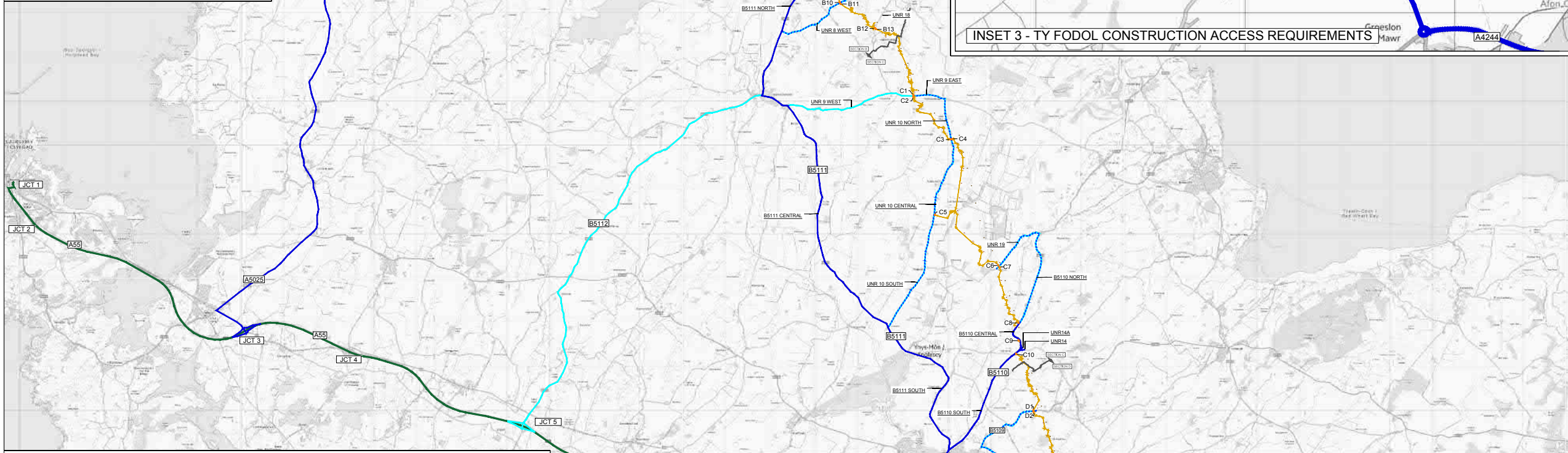
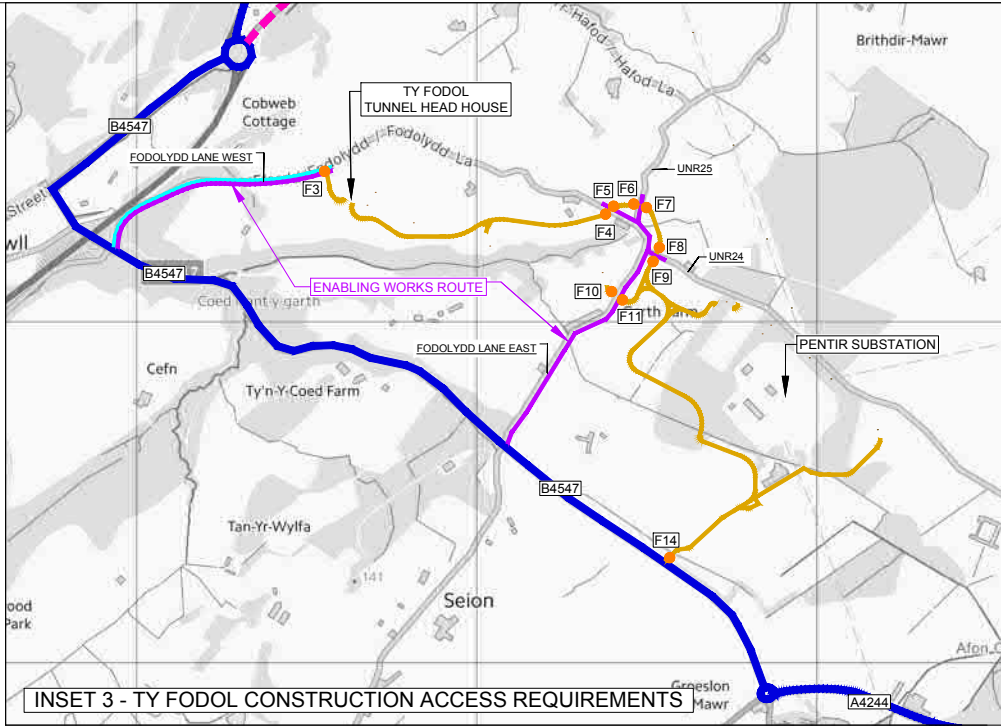
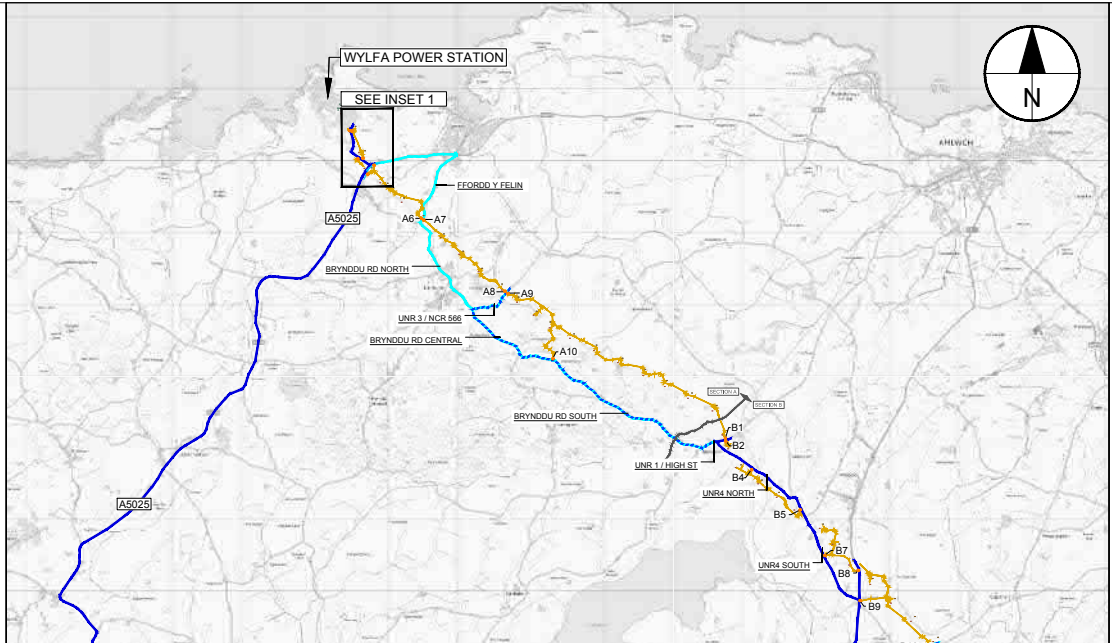
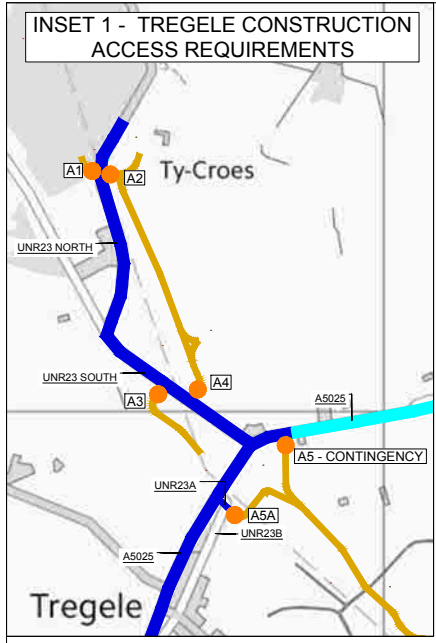
Page intentionally blank

Annexes

Annex A

Proposed Construction Traffic Routes

Proposed Contingency Routes – Braint



KEY

- TRUNK ROAD NETWORK
- PRIMARY LGV / HGV ROUTE
- PRIMARY LGV ROUTE
- PRIMARY LGV / TRACTOR TRAILER ROUTE
- LGV / HGV ENABLING WORKS ROUTE
- LGV / HGV CONTINGENCY ROUTE
- INDICATIVE SITE ACCESS TRACKS
- INDICATIVE SITE ACCESS POINT

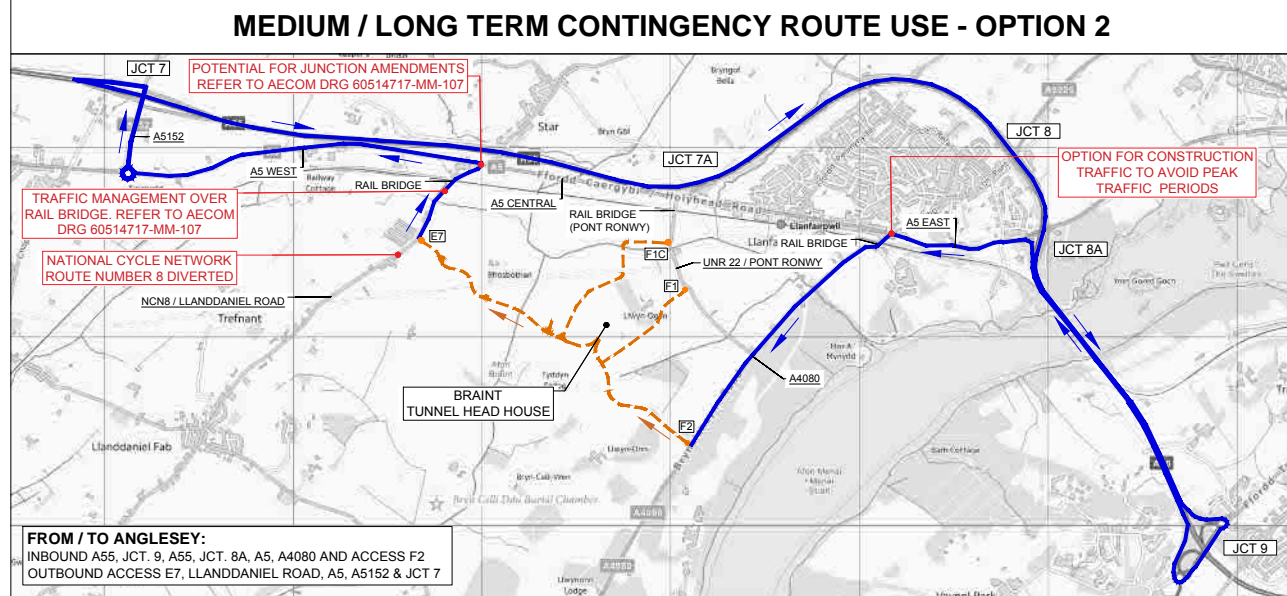
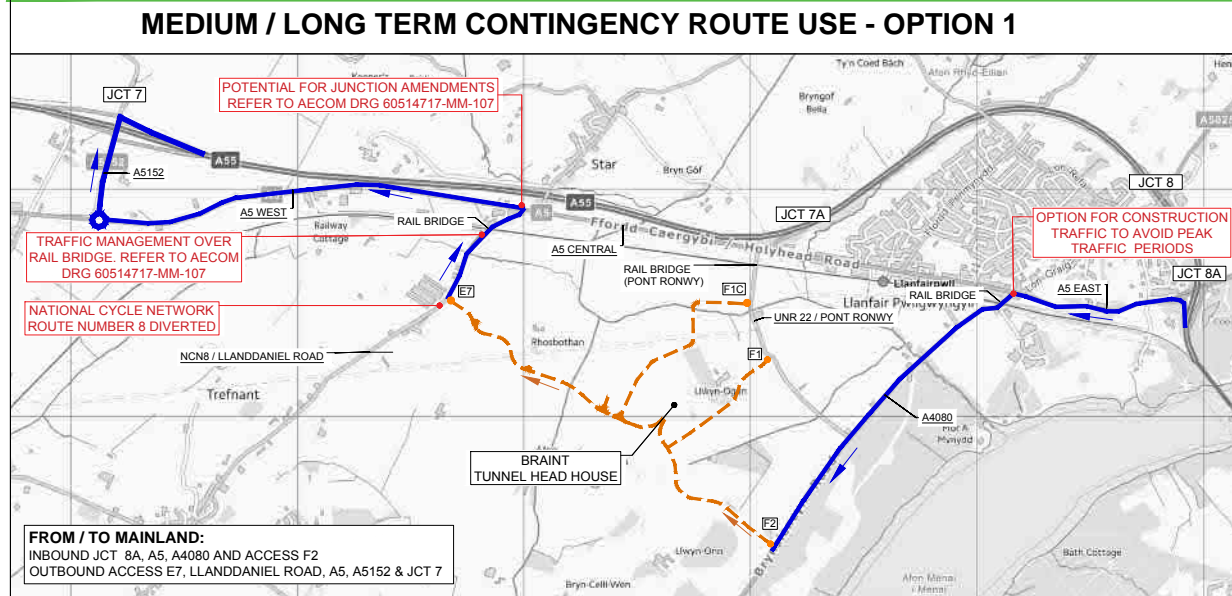
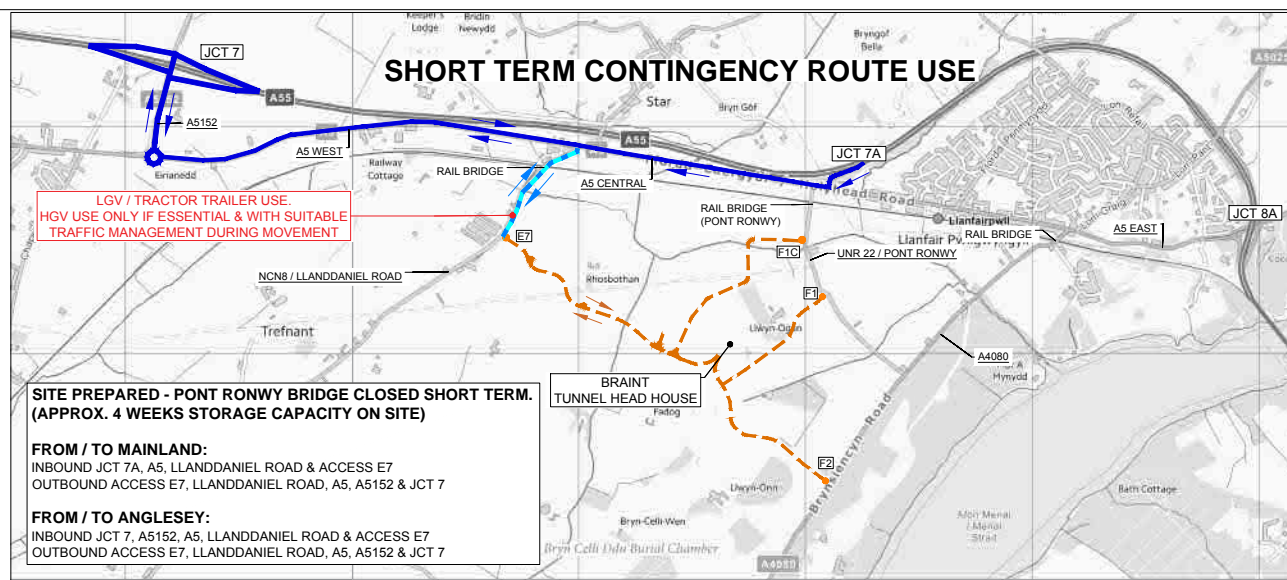
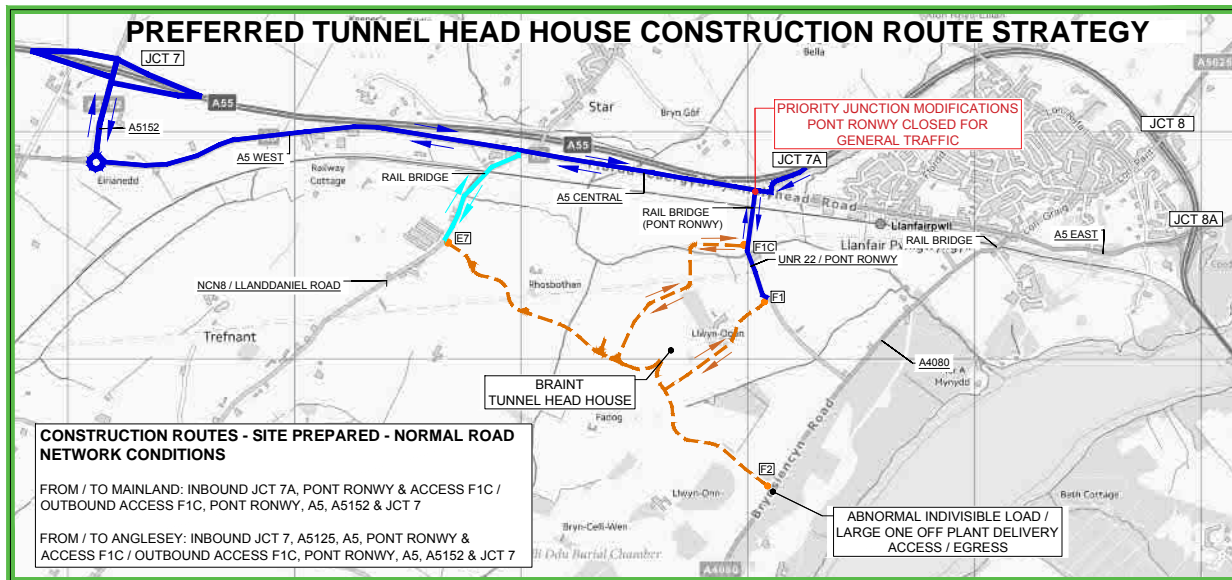
NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF OVERSEEING ORGANISATION.

Rev	Date	Description	CAD	Chk	App
20.07.2018		DCO Submission	-	-	-

nationalgrid	
Site:	NWC
Scheme Name:	NORTH WALES CONNECTION
Document Title:	PROPOSED CONSTRUCTION TRAFFIC ROUTES VIA TRUNK ROAD NETWORK
Creator:	PG
Checker:	RT
Approver:	AL
Sheet Number:	60514717-TM-013
Document Type:	FIGURE
Scale:	NTS
Format:	A1 / A3
Sheets:	1 of 1
Rev:	-

Contains OS data © Crown copyright and database right 2018. Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown Copyright Ordnance Survey. National Grid Electricity - 100024241. National Grid Gas - 100024886. Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown copyright and database rights 2018. Ordnance Survey 0100031673.

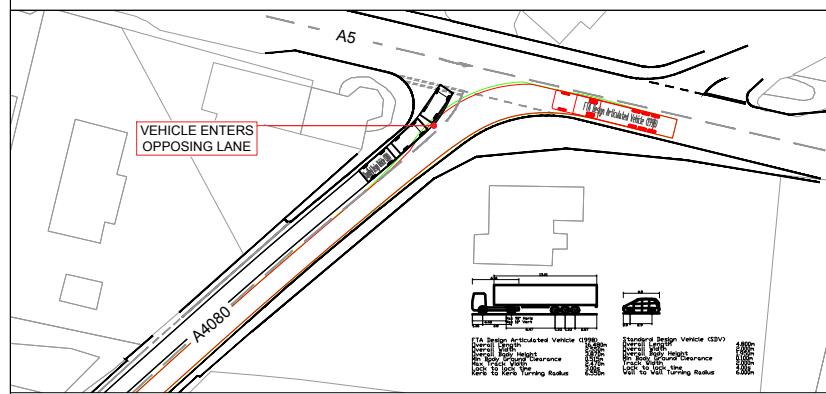


KEY

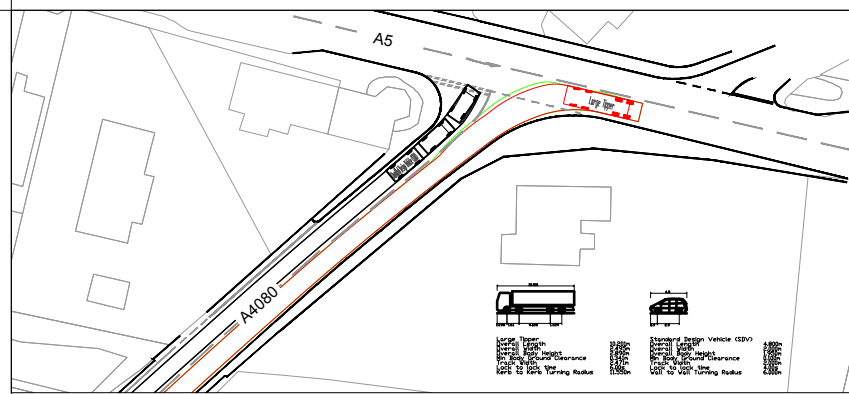
- PRIMARY LGV / HGV ROUTE
- PRIMARY LGV ROUTE
- LGV / TRACTOR TRAILER ROUTE
- SITE ACCESS TRACKS (INDICATIVE)
- SITE ACCESS POINT (INDICATIVE)
- POTENTIAL MITIGATION MEASURE

A5 / A4080 TOLLGATE JUNCTION SWEEP PATH ANALYSIS

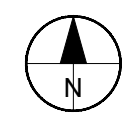
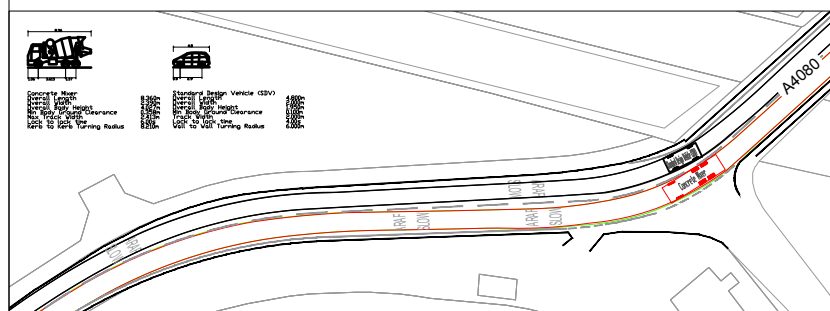
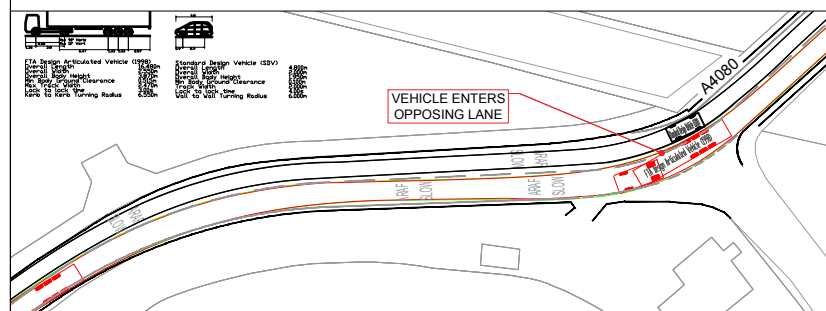
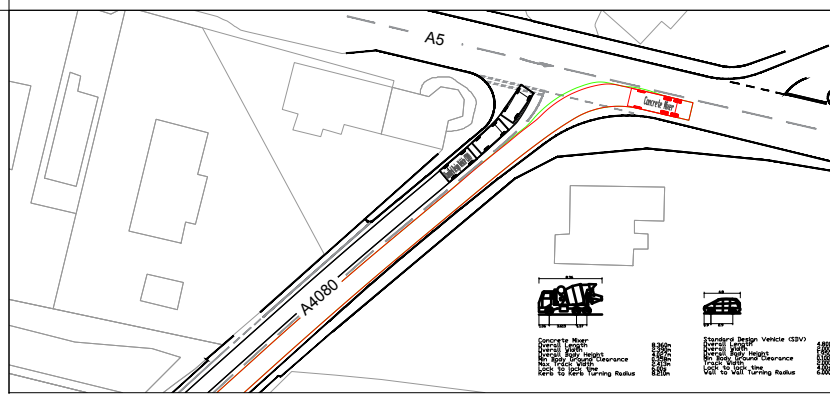
LEFT TURN MOVEMENT FROM A5 TO A4080 - 16.5m ARTICULATED VEHICLE.



LEFT TURN MOVEMENT FROM A5 TO A4080 - LARGE TIPPER



LEFT TURN MOVEMENT FROM A5 TO A4080 - CONCRETE MIXER



NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF OVERSEEING ORGANISATION.
- KERBLINES AND ROAD MARKINGS FOR SWEEP PATH ANALYSIS TAKEN FROM LEICA SURVEY 15.06.18

Rev	Date	Description	CAD	Chk	App
	20.07.2018	DCO Submission	-	-	-



Site: NWC
 Scheme Name: NORTH WALES CONNECTION
 Document Title: PROPOSED CONTINGENCY ROUTE PRINCIPLES BRAINT TUNNEL HEAD HOUSE

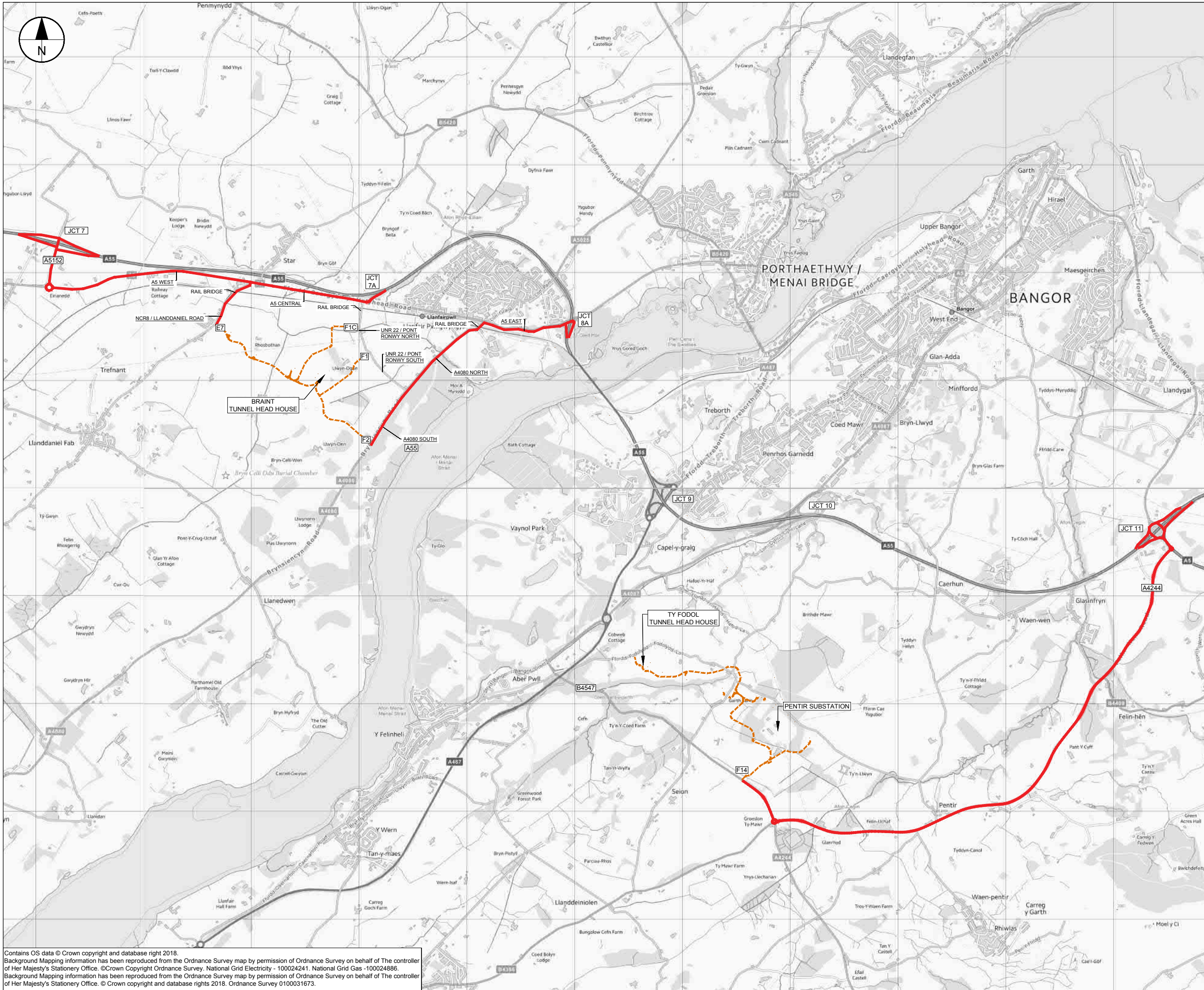
Creator:	Checker:	Approver:	Sheet Number:
PG	JF	AL	60514717-TM-036
Document Type:	Scale:	Format:	Sheets:
FIGURE	NTS	A1 / A3	1 of 1

Contains OS data © Crown copyright and database right 2018. Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown Copyright Ordnance Survey, National Grid Electricity - 100024241, National Grid Gas - 100024886. Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown copyright and database rights 2018. Ordnance Survey 0100031673.

COPYRIGHT: NOT TO BE REPRODUCED WITHOUT THE WRITTEN PERMISSION OF NATIONAL GRID ELECTRICITY TRANSMISSION PLC

Annex B

Proposed Abnormal Indivisible Loads Report and Routes



KEY

- ABNORMAL INDIVISIBLE LOAD ROUTE OPTIONS
- - - SITE ACCESS TRACKS

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF OVERSEEING ORGANISATION.

20.07.2018	DCO Submission	-	-	-	
Rev	Date	Description	CAD	Chk	App

Site: NWC				
Scheme Name: NORTH WALES CONNECTION				
Document Title: PROPOSED ABNORMAL INDIVISIBLE LOAD ROUTE OPTIONS				
Creator: PG	Checker: JF	Approver: AL	Sheet Number: 60514717-TM-012	
Document Type: FIGURE	Scale: NTS	Format: A1 / A3	Sheets: 1 of 1	Rev: -

Contains OS data © Crown copyright and database right 2018. Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown Copyright Ordnance Survey. National Grid Electricity - 100024241. National Grid Gas - 100024886. Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown copyright and database rights 2018. Ordnance Survey 0100031673.



Abnormal Indivisible Load Access Study - Transportation of Tunnel Boring Machines, Cable Drums, Mobile Cranes and Reactors to proposed locations at Braint (Anglesey) & Ty Fodol (Gwynedd)

Prepared for National Grid





National Grid I 16-889 North Wales Connection I TBM AIL Access I 10.05.17

NAME		SIGNATURE	DATE
Prepared by:	Andy Pearce	[REDACTED]	18.04.17
Checked by:	Peter Wynn	[REDACTED]	19.04.17
Approved by:	Andy Pearce	[REDACTED]	10.05.17

DISCLAIMER

Any conclusions, calculations or findings presented here should not be changed or altered.

COPYRIGHT AND NON-DISCLOSURE NOTICE

The contents and layout of this report are subject to copyright owned by Wynns Ltd save to the extent that copyright has been legally assigned by us to another party or is used by Wynns Ltd under licence. To the extent that we own the copyright in this report, it may not be copied or used without our prior written agreement for any purpose other than the purpose indicated in this report.

The methodology (if any) contained in this report is provided to you in confidence and must not be disclosed or copied to third parties without the prior written agreement of Wynns Ltd. Disclosure of that information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests. Any third party who obtains access to this report by any means will, in any event, be subject to the Third Party Disclaimer set out below.

THIRD PARTY DISCLAIMER

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by Wynns Ltd at the instruction of, and for use by, our client named on the front of the report. It does not in any way constitute advice to any third party who is able to access it by any means. Wynns Ltd excludes to the fullest extent lawfully permitted all liability whatsoever for any loss or damage howsoever arising from reliance on the contents of this report. We do not however exclude our liability (if any) for personal injury or death resulting from our negligence, for fraud or any other matter in relation to which we cannot legally exclude liability.

DOCUMENT REVISIONS

Issue	Date	Details
0	21.04.17	Final Report
1	10.05.17	Revised after client comment & additional information
2		



Contents

Executive Summary	iii
1. Introduction	5
2. Historical Information	6
2.1. Pentir Substation	6
2.2. Movement Along Welsh Routes (MAWR)	6
3. Highways England Agreement in Principle and Legislative Requirements	7
3.1. Definition of Abnormal Indivisible Load (AIL)	7
3.2. Legislation	7
4. Abnormal Indivisible Load Movements - Highways Act 1980	8
4.1. Recovery of Excessive Maintenance Costs - Section 59 Agreements	8
4.2. The Removal and Replacement of Street Furniture	8
5. Plant Dimensions Included within Study Work	9
6. Transport Configurations	10
6.1. Reactor	10
6.2. Tunnel Boring Machine Components	10
6.3. Cable Drums	10
6.4. Mobile Crane	12
6.5. Gantry Crane Beam for lift shaft	12
7. Physical Restrictions Affecting a Road Movement	13
7.1. General	13
7.2. Headroom	13
7.3. Negotiability	14
7.4. Structural Capability and Highway Capacity	15
7.5. Speed	16
8. The Width of Highways, Fences and Verges, Overrun and Over-Sail	17
8.1. Width of Highway	17
8.2. Fences and Verges	17
8.3. Over-sail	18
9. Structural Route Information	18
9.1. Pentir Substation Reactor Access	18
9.2. Pentir Substation – Ty Fodol Access for TBM, Cable Drums & Mobile Cranes	20
9.3. Braint (Anglesey) - Access for TBM, Cable Drums & Mobile Cranes	20
10. Route Negotiability	23
10.1. Pentir Substation Reactor Access & Ty Fodol Access for TBM, Cable Drums & Mobile Cranes	23
10.2. Braint (Anglesey) - Access for TBM, Cable Drums & Mobile Cranes	28
11. Summary and Conclusions	33



Appendix 1	35
Maps	35
Appendix 2	36
Drawings & Transport Configurations	36
Appendix 3	37
Highways England have issued an aide memoir	37
Appendix 4	38
Selected Correspondence	38



Executive Summary

The contents of this report include land transport feasibility investigations into achieving access to Pentir Substation and sites named as Braint (Anglesey) and Ty Fodol (Gwynedd) where National Grid are planning to deliver various Abnormal Indivisible Loads (AIL) as part of a future development scheme for new connection projects in North Wales.

The final transport dimensions of the components for delivery to the sites remain unconfirmed at this early stage in the project but a selection of indicative worst case transport dimensions have been included for investigative purposes. The final dimensions of components will be significant to achieving access in terms of both structural suitability of highway infrastructure and also the physical negotiability of proposed loads in view of length, width and height. Consideration has been given to access for Tunnel Boring Machines (TBM), Cable Drums, Reactors, mobile cranes and gantry crane beams.

Written confirmation remains outstanding from Gwynedd County Council (GCC) on the route to Pentir and Ty Fodol for reactor transport, but it has been structurally approved for cable drum and TBM components and no structural issues are expected from GCC.

The North & Mid Wales Trunk Road Agency (NMWTRA) initially advised that the A55 was not able to accommodate the proposed reactor loads due to a structural limitation at Abergele (Dundonald Avenue Bridge) although they have approved the proposed TBM, cable drum and mobile crane loads. Further discussions have resulted in clearance for the reactor now being given. However, there are some inconsistencies in information available to NMWTRA on this structure and they are undertaking a more detailed review of the structure on behalf of the Welsh Government to clarify matters. It is expected that this will be completed within 6 months. Although no major problems are anticipated, this cannot be guaranteed and it is possible that the results could further restrict access for larger AILs. NMWTRA consider the A55 to be of strategic importance to North Wales generally and therefore any issues with the long term capacity of this bridge are expected to be prioritised. Notwithstanding the possible issue with the A55, an alternative option for AIL delivery would be to ship the reactor to Port Penrhyn for onward road transport to Pentir.

The route to Pentir is considered negotiable for all loads. Therefore all loads are expected to be able to access Pentir and Ty Fodol although the final delivery method remains to be confirmed.

The preferred route for TBMs, cable drums and mobile cranes to Braint (Anglesey) is via route 1 (or 2 and 3) and the A4080 to approach from the south east of the new compound location (Access point reference F2) from which point new haul roads are to be constructed. This route has been cleared by Network Rail in terms of the A4080 Tollgate Bridge and Britannia Bridge. The alternative route to Braint is to approach via Llanddaniel Road and the Network Rail bridge known as Star Bridge. Network Rail have advised that some of the proposed loads are able to cross this bridge but the heavier TMB and cable drums would not be permitted to cross the bridge. This is detailed further within Section 9. Although access is physically feasible, this route is not considered as appropriate for AIL access as the route via the A4080.

Isle of Anglesey County Council (IoACC) has advised that although there are no significant concerns with their structures they will require that a third party consulting engineer is appointed to undertake a specific AIL assessment for loads in excess of 40te. 4 structures have all passed their most recent assessments as required by IoACC for Construction and Use 40te loadings but have never been considered for AILs. The council do not have the resources to carry out the assessments in house and have advised that before they can agree to the structures being utilised



by the proposed AILs, detailed assessments are necessary. In terms of access to Access point reference F2 the most significant structure of IoACC is Aber Braint on the A4080.

No specific consideration of onsite access within the sites themselves with all route investigations ceasing at the point at which the public road access to the site is proposed to be constructed.

The report is intended to be a summary of the Abnormal Indivisible Load (AIL) route access at the current time and is not a guarantee that the route will be cleared in the future. Specific movements will need to be assessed at the time on an individual basis. If any further information is required, it is available on request.



1. Introduction

- 1.1. The contents of this report include land transport feasibility investigations into achieving access to Pentir Substation and sites named as Braint (Anglesey) and Ty Fodol (Gwynedd) where National Grid are planning to deliver Abnormal Indivisible Loads (AIL) as part of a future development scheme for new connection projects in North Wales.
- 1.2. This will see reactors delivered to Pentir Substation and Tunnel Boring Machines (TBM) components and Cable Drums to Braint and Ty Fodol. At this stage it is understood that TBM and Cable Drums could be delivered or removed from Braint and Ty Fodol as no decision has yet been made on which way the cable tunnels are to be drilled. Mobile cranes and gantry crane beams will also need to access Braint and Ty Fodol.
- 1.3. This report is a summary of the status of the current AIL access investigations and seeks to present the situation as it currently stands. The issues highlighted in this report as risks to achieving AIL access in the future, will need to be revisited and progressed as the scheme develops.
- 1.4. This investigation considers the potential land transport routes from the England/Wales Border via the A55 trunk road based on the assumption that movements will take place under Special Types General Order (STGO) Regulations.
- 1.5. No specific allowance is made for marine delivery locations at Holyhead, Porthmadog and Port Penrhyn, which have traditionally been used for Special Order transport to the region, as none of the loads considered in this report are expected to require delivery under Special Order permission from Highways England. A separate report is provided in respect to transformer delivery requirements to the proposed Bryncir Substation which does explore Special Order access in more detail (issued 29.03.17).
- 1.6. Formal movement applications will be necessary upon appointment of a haulage contractor by the component manufacturer(s).
- 1.7. No consideration of site access within the existing Pentir substation or the Braint and Ty Fodol cable head houses is included and the route surveys end at the point at which site access is proposed to exit the public highway. A detailed appraisal of the technical requirements for handling components on-site will be required as the scheme progresses in the future.
- 1.8. The report is intended to be a summary of the AIL route access at the current time and is not a guarantee that the route will be cleared in the future. Specific movements will need to be assessed at the time on an individual basis. If any further information is required, it is available on request.
- 1.9. The report considers access in terms of AIL transportation only. No allowance is made for Construction and Use and general traffic requirements including traffic management plans that may be associated with the wider development plan.



2. Historical Information

2.1. *Pentir Substation*

- 2.1.1. Recent deliveries (March 2014) have been undertaken to Pentir Substation by road from Liverpool for reactors of 112te nett weight and below and have not required Special Order permissions requiring them to be transported via the closes port of access, traditionally Port Penrhyn.
- 2.1.2. Pentir Substation does however have Super Grid Transformers (SGTs) that would be expected to be moved at Special Order category and as such requires that access is maintained from Port Penrhyn which is the established heavy load delivery port for the substation. There are no specific requirements for SGTs as part of this project as far as Wynns are aware and therefore SGT transport to Pentir is outside of the scope of this report.
- 2.1.3. Braint (Anglesey) and Ty Fodol (Gwynedd) are new locations with no specific history of AIL access although Ty Fodol is adjacent to Pentir Substation and it is understood that the development proposals allow for potential construction of a new haul road from the existing Pentir Substation access road to the site.

2.2. *Movement Along Welsh Routes (MAWR)*

- 2.2.1. The Movement Along Welsh Routes (MAWR) Group is a group consisting of companies with a requirement to move AILs in the North Wales area. Member companies include First Hydro Company, National Grid and Magnox. Each of these companies has a requirement for heavy load access to their associated power stations and substations in North Wales. MAWR meets every year, with representatives of the Welsh Government and local authority highway departments also in attendance, with a remit to discuss issues impacting on heavy load access to power stations and substations. This applies to routes that require AIL access and as such are regarded as being strategically important by MAWR. AIL movement requirements are infrequent but access needs to be maintained at all times to enable expedient movement in the event of a system failure at a power station or substation resulting in the need for an emergency AIL movement.
- 2.2.2. MAWR has spent considerable time and resources over the years in ensuring that access for heavy loads is maintained to member companies sites. Typically heavy load requirements are necessary from the ports of Holyhead, Port Penrhyn and Porthmadog to power station and substations sites at Dinorwig, Pentir, Wylfa, Trawsfynydd and Ffestiniog.
- 2.2.3. It has been discussed at MAWR meetings historically that if and when there is any specific requirement for AILs to cross Britannia Bridge from the mainland to Anglesey that a detailed plan for agreeing a Bridge Management Strategy with all interested parties, including Welsh Government, Network Rail, UK Highways A55, Gwynedd County Council, Isle of Anglesey County Council and North Wales Police is put into place to minimise the impact of AILs.
- 2.2.4. It is recommended that as the North Wales Connection Project proceeds that representatives from National Grid continue to attend MAWR meetings to update relevant interested parties of future AIL requirements.



3. Highways England Agreement in Principle and Legislative Requirements

3.1. Definition of Abnormal Indivisible Load (AIL)

3.1.1. The Department for Transport, of which Highways England (HE), formally the Highways Agency (HA), is a government-owned company with responsibility for managing the core road network in England, state that the strict definition of an AIL refers to a load which cannot, without undue expense or risk of damage, be divided into two or more loads for the purpose of carriage on roads and which, owing to its dimensions or weight, cannot be carried on a vehicle which complies in all respects with the 'standard vehicle regulations' these are:

- The Road Vehicles (Construction and Use) Regulations 1986 (as amended)
- The Road Vehicles (Authorised Weight) Regulations 1998 (as amended)
- The Road Vehicles Lighting Regulations 1989 (as amended).

3.1.2. All equipment should be stripped of their ancillaries before they are transported. HE will only accept that further dismantling is not required where it cannot be economically achieved due to the requirement for its construction within specific factory environments or where extremely high tolerances have to be maintained.

3.2. Legislation

3.2.1. Conventional heavy goods vehicles have an operating weight limit of 44 tonnes. The category known as abnormal indivisible loads (AIL) covers those vehicles where the gross weight exceeds 44 tonnes. An Abnormal Load is defined as that which cannot be carried under Construction and Use (C&U) Regulations. Items which, when loaded on the load carrying vehicle exceed the weights encompassed by the C&U Regulations, but do not exceed Special Order Permission Limits, are governed by Special Types General Order (STGO) categories 1 to 3 depending on size. Where dimensions exceed 6.1m in width, 30m in rigid length or 150 tonnes gross weight, Special Order from HE is required. Highways England have issued an aide memoir that explains notification requirements in more detail. This document has been attached as Appendix 3.

3.2.2. Special Order category AIL movements are authorised by the HE Abnormal Loads team, based in Birmingham.

3.2.3. STGO loads orders grant consent for loads that satisfy the following criteria:

<u>Category 1 weight</u>	44 – 50 tonnes and 11.5te axle weights
<u>Category 2 weight</u>	50 – 80 tonnes and 12.5te axle weights
<u>Category 3 weight</u>	80 – 150 tonnes and 16.5te axle weights
<u>Width Restriction</u>	3.0m (C&U) – 5m (VR1 Required) – 6.1m (SO Required)
<u>Length Restriction</u>	18.65m (C&U) – 30.0m (SO Required)

3.2.4. The 112te reactor and various cable drum and TBM components considered within these investigations are expected to be transported at STGO Category 2 or 3. Such loads are required to provide two clear working weekdays notice to be given to the Police forces on the proposed route and are required to provide 5 clear working weekdays notice together with an indemnity to the highway and bridge authorities on the route.



- 3.2.5. The most appropriate way forward is to avoid the abnormal load Special Order (SO) process (8 to 12 weeks submission and consent period). To achieve this it will be necessary to ensure that the overall transport width would be less than 5.0 metres and the gross weight of the vehicle carrying the fully laden drum does not exceed 150te.
- 3.2.6. As the loads considered in these investigations are within STGO and therefore no specific consideration of Special Order requirements, including the Department for Transport's (DfT) Water Preferred Policy for AILs is considered necessary and no specific marine access investigations are included. Wynns do have significant data on the ports of Holyhead, Port Penrhyn and Porthmadog should future loads enter into Special Order category.
- 3.3. As the loads are not restricted to Special Order requirements they will not necessarily be delivered to a North Wales Port and could arrive via any UK port and travel to the motorway and trunk road network to enter Wales on the A55 trunk road. It was assumed at the commencement of investigations that this will be feasible without difficulty for the proposed loads as has been the case for STGO loads to Pentir Substation and Ffestiniog power Station in recent years. The final approach to the sites from the A55 England/Wales border are discussed in terms of structural clearance in Section 9.

4. **Abnormal Indivisible Load Movements - Highways Act 1980**

4.1. *Recovery of Excessive Maintenance Costs - Section 59 Agreements*

4.1.1. Section 59 of the Highways Act 1980 allows the highways authority to raise a charge against a user of the highway to cover repair works necessitated by excessively heavy or unusual loads being carried on the road by that user. This provision is typically used where the passage of heavy lorries to and from industrial premises or building sites causes excessive damage to the road, requiring expensive remedial works by the Council. Under Section 59, the Council may charge on such costs to the organisation responsible for the damage, the amount payable being calculated as the excess cost of repair compared to normal maintenance costs for the road. Rather than wait to be charged such excessive repair costs, the Council and the third party may enter into an agreement under Section 59 whereby the third party accepts liability and makes payment of an agreed sum to the Council to cover the excessive repair costs.

4.2. *The Removal and Replacement of Street Furniture*

4.2.1. Where the removal and replacement of street furniture is required for the mobilisation of out of gauge vehicles into existing sites then these are generally managed under Temporary Traffic Regulation Order (TTRO) and Street Works Legislation. These are normally, but not necessarily, organised by the haulage contractor. These requirements are generally to ensure that the supervisors and operatives are competent and that the works will be carried out to a prescribed standard with the appropriate traffic management in place. In some circumstances the Highway Authority or LA will insist that their preferred contractors will carry out such work.



5. Plant Dimensions Included within Study Work

- 5.1. The information included within this report is based around a selection of different manufacturing contractor's potential equipment which has been made available to Wynns. All details of possible transport dimensions should be treated with caution and be understood to be in need of clarification as the scheme progresses.
- 5.2. Table 1 shows a selection of potential worst case equipment that has been included within the study for initial feasibility assessment work.
- 5.3. These dimensions have been used to derive indicative transport arrangement drawings for presentation to highway and structural authorities as detailed in Section 6. These should be treated with caution and are only based on currently available information.

Table 1. Selected Items to be considered.

Item	Length (m)	Width/ Diameter (m)	Height (m)	Weight (kgs)	Notes
200MVA 400kv reactor for Pentir	7.176	3.253	3.960	110,500	Drawing number 925990-104-01-A refers
TBM Cutting Head for Braint and Ty Fodol	4.72	4.72	1.929	40,000	No specific TBM components detailed so file information considered.
TBM Stationary Shell Thrust Pipe for Braint and Ty Fodol	7.415	4.705	4.705	105,000	No specific TBM components detailed so file information considered.
TBM Tail Can for Braint and Ty Fodol	4.45	4.70	4.70	23,000	No specific TBM components detailed so file information considered.
TBM Forward Shell Shield for Braint and Ty Fodol	3.98	4.71	4.71	103,000	No specific TBM components detailed so file information considered.
Cable Drum	3.44	4.46	4.46	43,450	Advised by Aecom email 03.02.17.
Cable Drum	2.50	4.85	4.85	100,000	Wynns file information from London Power Tunnels concept work only
500te Mobile Crane					Indicative information on crane shown on transport drawing No. NG-NCW-C01
Gantry Crane Beam for lift shaft	20	TBC	TBC	TBC	Email 8.3.17 advises span of 18-20m required.



6. Transport Configurations

6.1. *Reactor*

- 6.1.1. Based on the information available to date the 400kv reactor considered within this report is advised as being 112te nett weight. The transport height is shown within Drawing Reference No. 925990-104-01-A refers to be 3960mm.
- 6.1.2. Based on information available at this moment in time it is assumed that the road transport configuration would consist of a ballast tractor pulling a 10 axle flat top modular trailer for which the trailer element would weigh in the region of 146te gross with axle loads less than the 16.5te restriction for STGO configurations.
- 6.1.3. There are numerous haulage contractors with equipment able to carry the reactor within STGO Category 3. An indicative transport configuration is attached as Drawing Reference No. NG-NCW-TC01 which shows the minimum turning radii and axle, wheel and overall ground loadings for a 10 axle flat top modular trailer during transportation of the Shunt Reactor.

6.2. *Tunnel Boring Machine Components*

- 6.2.1. The exact dimensions of TBM components for this project are not confirmed at this stage. Therefore information has had to be derived from available file data.
- 6.2.2. There are numerous haulage contractors with equipment able to carry the TBM components within STGO and these have been used to inform and produce the conceptual transport drawings considered within this report. As various haulage contractors are available, competitive tendering is viable.
- 6.2.3. In the absence of more detailed confirmation of conceptual arrangements at the commencement of the investigations these were used as an assumed worst case bases based on weights of up to 105te nett transport weight.
- 6.2.4. The following transport drawing has been submitted to structural authorities for comment.
- Drawing No NG-NCW-SSTP01 105te Stationary Shell Trust Pipe
- 6.2.5. The following transport drawing have also been produced for information relevant to the project at lesser weights.
- Drawing No NG-NCW-CH01 Cutting Head
 - Drawing No NG-NCW-FSS01 Shell Shield
 - Drawing No NG-NCW-TC01 Tail Can

6.3. *Cable Drums*

- 6.3.1. Wynns has file information available from concept data prior to the London Power Tunnels project work that saw cable drums delivered to multiple locations in London in recent years. In the absence of more detailed confirmation of conceptual arrangements at the commencement of the investigations these were used as an assumed worst case bases based on cable drum weights of up to 100te nett transport weight.



6.3.2. Subsequently Wynns were advised that a typical cable drum component to be considered for the project was based on actual movements to London projects should be used and this involved a drum at 4.46m diameter and 3.44m wide. The following transport drawings have been submitted to structural authorities for comment.

- Drawing No NG-NCW-TC01 4.46m cable drum at 43.35te
- Drawing No NG-NCW-TC01 4.85m cable drum at 100te

6.3.3. The transport arrangements highlighted are indicative only and used for current project planning only. As the scheme progresses more detailed transport dimensions will become available once confirmed by potential manufacturing contractors it will be necessary to revisit possible road transport arrangements.

6.3.4. There are numerous haulage contractors with equipment able to carry the cable drums within STGO and these have been used to inform and produce the conceptual transport drawings considered within this report. As various haulage contractors are available, competitive tendering for the transport of cable drums is viable. Based on information available at this moment in time and the issues detailed it is assumed that road transport configuration for cable drums would utilise a bed trailer.

6.3.5. The investigations have considered the maximum size of cable reel that can be transported at below the UK Special Order category cut off of 150te gross. For the general purposes of this investigative work we have produced transport arrangements considerate of 100te nett cable drums.

6.3.6. We have also considered a smaller transport configuration based on a 43te cable reel as requested by National Grid. Varying incremental size of reels between 50te and 100te can be determined too if necessary for specific sites but loads particular to these variations have not been produced at this moment in time. The 43te cable reel is representative of the cable reels advised as being associated with other cable laying activities on the network.

6.3.7. A selection of haulage contractors are shown below (other contractors do exist that have the equipment and experience) based on that obtained by Wynns through ongoing work in the heavy haulage industry. The contractors identified also have the expertise to jack and skid the cable reels. Some of the contractors identified also operate Mega Lift (overhead) lift systems and those with this type of equipment have been identified.

- Allelys Heavy Haulage
- Cadzow
- Collett Heavy Haulage
- GCS Johnsons
- MarTrain
- JB Rawcliffe and Sons

6.3.8. The transport configurations that provide the optimum capacity to carry Cable reels at below Special Order category is shown in Plate 1 below. On this configuration it is possible to carry loads of approximately 104 tonne whilst maintaining the gross load of less than 150te.



Source: Heanor Transport

Plate 1. Transport configuration for a cable reel off approximate 100te

- 6.3.9. To ensure that the diameter of the Cable Reel can be maximised the majority of configurations considered are based on a Vessel Deck as shown in Plate 2 below. This allows the cable Reel to be carried either longitudinally or laterally whilst allowing the reel to be between the beams minimising the overall height of the loaded transport configuration.



Source: Mar-Train

Plate 2. General arrangements of Vessel Deck.

- 6.3.10. An appraisal of the route requirements to Pentir and Braint and Ty Fodol has been undertaken and is discussed in Sections 9 and 10.
- 6.3.11. Further information on potential transport arrangements can be provided if required and those used thus far are indicative only.
- 6.4. *Mobile Crane*
- 6.4.1. A 500te mobile crane has also been included for consideration of delivery to and from for Braint and Ty Fodol. Drawing Reference No. NG-NCW-C01.
- 6.5. *Gantry Crane Beam for lift shaft*
- 6.5.1. No specific transport drawing of a Gantry Crane beam has been produced as it was not advised until 08.03.17. The route investigations detailed within Section 10 in terms of negotiability refer where necessary.

7. Physical Restrictions Affecting a Road Movement

7.1. General

7.1.1. An abnormal load is one that is incapable of division into two or more loads by reason of expense or risk of damage, and which cannot be carried by a trailer complying in all respects with the Road Traffic; Road Vehicles (Construction and Use) Regulations 1986 (SI No. 1078) (C12) (S38) as amended (“the Construction and Use Regulations”) or where the trailer does so comply, the total laden weight exceeds 44 tonnes.

7.1.2. This section of the report examines the general factors that have to be considered when assessing the suitability of road routes for the movement of abnormal loads with a more specific appraisal of the current status of the possible land transport routes detailed in Sections 9 and 10.

7.2. Headroom

7.2.1. Movement is impossible unless sufficient headroom is available along the proposed route to accommodate the travelling height of the load. Generally maximum headroom of 5.03 metres (16’6”) is maintained within the UK on major motorway and trunk road routes, but this is not guaranteed and the actual height is posted on structures, such as bridges and gantries, which are below this figure. The UK electricity supply industry and plant manufacturers generally work to a travelling height of 4.95 metres (16’3”) to allow for a safe margin.



Source: Collett Heavy Haulage

Library Photograph 1

Unmarked bridges provide a minimum height clearance $\geq 5.03\text{m}$. Below this height bridges are clearly marked and transport arrangements necessitating due diligence during the planning phase of a project need to account for low bridge heights.

7.2.2. The height of the load will be increased by the height of the trailer and any packing that may be utilised to give a gross travelling height.

7.2.3. Where restrictions are caused by overhead services such as telephone lines and local power distribution lines, it is feasible to raise or underground these along relatively short routes. Arrangements are made with the responsible undertakers. This is, however, not usually feasible over longer routes or where there are a large number of lines involved. It is usually impossible to do anything to raise low bridges, but steel gantries with bolted connections can sometimes be temporarily lifted.

- 7.2.4. Although there is no legal limit on the travelling height of load, the Department for Transport does advise hauliers to inform the Regional Electricity Company's (REC), British Telecom and any other company with overhead service lines, of the route of proposed movements with a travelling height in excess of 5.0 metres. This enables arrangements to be made for temporary or permanent re-arrangement of facilities.
- 7.2.5. It should be noted, that the Electricity Supply Regulations 1988 refer to the minimum height for overhead lines. Part IV, Section 13 of these regulations states that the height above ground of any overhead line or wire shall not be less than a specific height at any point where the line is over a road depending on the voltages outlined below:
- Not Exceeding 33000 Volts - 5.8m
 - Exceeding 33000 Volts but Not Exceeding 66000 - 6.0m
 - Exceeding 66000 Volts but Not Exceeding 132000 - 6.7m
 - Exceeding 132000Volts but Not Exceeding 275000 - 7.0m
 - Exceeding 275000 Volts but Not Exceeding 400000 - 7.3m
- 7.2.6. It is recommended that overhead line authorities are approached to confirm recorded and safe height clearances for all wires above the often-referred to high load cut of point of 16'6" (5.03m). Just because a line is of a given height it does not mean that high loads will automatically be permitted to pass underneath due to flashover and safe height clearance requirements of the line owner. Further information can be obtained from the Health & Safety Executive Guidance note GS6 'AVOIDANCE OF DANGER FROM OVERHEAD ELECTRIC POWER LINES' (HSE Books 1997 ISBN 0717613488).



Source: Abnormal Load Engineering
Library Photograph 2

Overhead services being lifted to accommodate the transit of a vehicle height in excess of 6.0m en-route between London Thamesport and Grain Power Station.

- 7.2.7. No liaison with national or regional electricity companies or with British Telecom has been carried out at this stage.
- 7.3. *Negotiability*
- 7.3.1. Assuming that sufficient headroom is available, or can be achieved, it is necessary to establish that the route can be negotiated in terms of the overall width and length of the transporter arrangement. Selection of transporter is often influenced by the load carrying capability of the route. If a large number of axles are needed in order to obtain the required

load distribution on the road and bridge decks, this may result in a configuration that is unable to negotiate the particular route.

7.3.2. Where negotiability is restricted by the width or the curvature of the route, it can be increased by the temporary removal of 'street furniture' such as lamp posts, traffic signs etc., but normally little can be done if passage is restricted by more permanent objects such as buildings. These works are done with the agreement of the relevant local and highway authorities.

7.3.3. The negotiability of the proposed routes are detailed within Section 10.

7.4. *Structural Capability and Highway Capacity*

7.4.1. The load carrying capability of roads depends to a great extent on axle loading rather than total weight of the load being transported. The load carrying capability of the route has to be assessed in relation to the loadings that would be imposed by the total gross weight of the load plus transporter for each item to be transported. The factors to be considered are the axle and wheel pair loadings; the road crust; the effect of such loadings on bridges; underground services and speed. The tractor unit is normally considered as a separate unit in terms of imposed axle and wheel loadings. Indemnities are given to highway and bridge authorities for any damage caused, usually by the appointed haulage contractor.

A. Road Crust

1. Road crust strength is important, but with the spread of load obtained with modern multi-wheeled transporters, it is not normally a problem, providing the road is maintained to a reasonable standard.
2. Damage of the road crust especially at the fringes of un-kerbed roads can become prevalent during the construction phase of projects within remote areas. This effect can have a damaging effect on the available track width for abnormal loads due to the risk of wheels becoming sunken into damaged road edges or soft verges. Prior to the delivery phase it would be advisable to inspect the road surface especially at pinch points to ensure its compatibility to the abnormal load transport configurations.

B. Bridges

1. Bridges in Great Britain are designed and constructed in accordance with the loading standard set down in British Standard BS 5400-2:2006 Steel, concrete and composite bridges. Specification for loads, which in 2006 replaced the British Standard BS 5400: Part 2: 1978. This Part of BS 5400 specifies nominal loads and their application, together with the partial factors, to be used in deriving design loads. The loads and load combinations specified are for highway, railway and foot/cycle track bridges in the United Kingdom.
2. This standard provides for two types of loading: Type HA and Type HB. Older bridges may not have necessarily been designed to these standards but that does not prevent them from being assessed for abnormal load carrying capability.
3. Type HA is the normal design loading in Great Britain suitable for normal vehicles permitted under the Construction and Use Regulations rather than for those used for the carriage of abnormal loads.
4. Type HB loading is suitable for exceptional industrial loads likely to use the roads in the area. It takes account of the loading that would be imposed on to the highway by a "standard" 4 axle, 16 wheeled HB vehicle, conforming to the dimensions set down in the Standard.

5. The HB Vehicle is a theoretical vehicle that represents an abnormal vehicle and consists of a group of sixteen identical wheel loads. A unit of HB loading corresponds to four axles and should be taken as equal to 10kN per axle; each axle has four equally loaded wheels. The overall length of the HB vehicle is taken as 10, 15, 20, 25 and 30 metres corresponding to inner axle spacing of 6, 11, 16, 21 and 26 metres respectively. The effects of the most severe of these cases must be adopted. The overall vehicle width is taken as 3.5 metres. In all cases, the longitudinal axis of the HB vehicle is taken as parallel to the lane markings.
6. Unless the axle configuration of the transporter matches that of the “standard” exactly, it is not possible to say directly whether passage of a particular abnormal load would be permissible. Notwithstanding that it is known that a road meets a particular HB loading standard, it is necessary to access routes with respect to individual loads. However, if bridges have been designed to meet a known standard this greatly assists the assessment process.
7. In general terms the UK motorway and trunk road network is nominally designed to be able to accommodate 45HB units. Depending on the class of roads, and the age of a structure, county roads are often lower rated at 37.5HB/30HB etc.
8. For example 45 units of HB therefore correspond to a 180 tonne vehicle on four axles at the worst case spacing of those given above and with the vehicle fully aligned with the structure. None of this is precisely duplicated within any of the transport configurations or in the track geometry during transit of structures hence the variations indicated.

C. Underground Services

1. When assessing the effect of weight on underground services, such as water pipes, sewers and service ducts, the loading imposed by individual wheels is normally considered.
2. The weight that can be safely borne by underground services varies depending on their age and condition; the depth to which they are buried; and the strength of the road crust covering. All these factors have to be considered when assessing the suitability of a road for the passage of abnormal loads and assessment is usually carried out by the relevant authority or undertaker concerned.
3. Risk to services can be considered in relation to the weight to which they could be exposed by the passage of normal vehicles permitted by the Construction and Use Regulations. This can then be compared with that which would be imposed by the passage of the proposed abnormal load movements, and with the pressure to which they may have been subjected by previous movements of abnormal loads.
4. Experience gained by the heavy haulage industry generally is that underground services are not damaged providing that road crust strength is to a reasonable standard and that the depth of cover and condition of services are normal. In any event, the haulage contractor would be required to provide indemnities against possible damage as a result of the movements by the terms of the Special Orders.

7.4.2. The structural status of the proposed routes are detailed within Section 9.

7.5. *Speed*

7.5.1. A slow moving abnormal load imposes less impact loading than a relatively fast moving vehicle permitted under the Construction and Use Regulations. This helps to mitigate the effect of the additional wheel loading imposed by the abnormal load.

8. The Width of Highways, Fences and Verges, Overrun and Over-Sail

8.1. *Width of Highway*

8.1.1. Orlick (1993) states that in general there will not be documentary evidence of the width of a highway and, if there is, it may well not be conclusive. “*What matters more is what exists on the ground.*” If the Highway Authority has maintained land at the side of the road, as well as the metalled road itself, that is strong evidence that the land is part of the highway.

8.1.2. The rights of public passage and the consequential restrictions on the powers of owners to deal with their land as they see fit have meant that there have been plenty of disputes as to the width of particular highways. As well maintenance by Highway Authorities, the existence of statutory undertakers’ apparatus such as telephone cables, electric cables and gas mains can indicate extent of highway.



Library Photograph 3

The services markers are a clear indicator that the wall forms the edge of the highway. Similarly manhole covers in the verge probably shows that the verge forms part of the highway.

8.1.3. If the undertakers have obtained wayleave consents from adjoining owners to place their apparatus in, say, a verge at the side of the road, that suggests that the verge is not part of the highway. If, on the other hand, they have not obtained any wayleaves, then this suggests that they are using their statutory powers and the Public Utilities Streetworks Code to lay services in the highway without the need to obtain consents of any private party.

8.2. *Fences and Verges*

8.2.1. The existence of a metalled road may be a good indication of the extent of the highway when such a road crosses unenclosed land such as a heath or common. It is no indication of the extent of the highway in other cases for example where there are fences or ditches on both sides of the highway the public right of passage will be taken to be the extent of the whole space between the fences or ditches even through the width of the highway may be varying and unequal and even though there may be a substantial amount of land lying between the metalled road and the fence. However it should be noted that the presumption that the fences mark the highway boundary can often be rebutted and confirmation of the highway boundary, where there exists ambiguity should be confirmed with the relevant highway authority.

8.3. *Over-sail*

- 8.3.1. Over-sail is a common occurrence when moving large components and therefore it is important to understand the law. The law that needs to be considered is the law of trespass which is defined as the unauthorised interference with the possession of someone's home, garden or other land interests. It is useful to note that trespass is not a criminal offence and trespassers cannot usually be prosecuted. They can, however, be sued as trespass is a civil offence.
- 8.3.2. The boundary of a property may be indicated by a physical marker such as a river, a wall, or a fence. The actual boundary may fall on either side of the boundary feature or fall along the median line through the boundary feature itself or bear no resemblance to the physical boundary feature. The starting point for establishing a boundary is the title deeds. Theoretically speaking, it is an established legal principle that a vertical boundary also extends from the subsoil beneath the boundary to the centre of the earth and also extends to the sky above. This means that ownership of property includes the airspace above it and also the ground beneath it.
- 8.3.3. There is established protocol for over-sail in the construction sector where an over-sail licence is issued as this is often an issue if, for example, a large crane is being used. An over-sail licence is an agreement which provides a land owner (and its developer) with the legal right to pass through another's air space. If a crane is used in a construction project the jib of the crane may well swing in and out of neighbouring airspace. Without an over-sail licence this could constitute a trespass and the land owner could be faced with an injunction.
- 8.3.4. Guidance states that the licence should cover issues such as time of day (and night) that the item of plant may over-sail neighbouring land, the heights of the over-sail and the duration of the licence. An indemnity for any damage caused by the crane may also be included.
- 8.3.5. It is essential to try and negotiate an agreement for any financial compensation payable for the use of land which is either owned by another party or subject to rights in favour of a third party. As with any dispute, a reasonable approach can produce savings in terms of costs awards should the matter reach court even if the other party to the dispute refuses to negotiate with you.

9. **Structural Route Information**

9.1. *Pentir Substation Reactor Access*

- 9.1.1. The route from the English Border at the A55 Chester bypass, a recognised heavy load route, and which has been used for reactor delivery to Pentir in recent years is shown below as it has been presented to structural and highway authorities for comment.

Proposed Route 1:

From English Border continue A55 westbound to junction 11
Turn left A5
Turn right A4244
Turn right B4547 at Pentir roundabout
Turn right Pentir Substation



9.1.2. The route has been cleared by the structural authorities detailed below.

- Canal & Rivers Trust
- Highways England Historic Railways Estate
- Network Rail

9.1.3. To date no written response has been received from Gwynedd County Council (GCC) although no problems are expected but we will continue to seek formal clarification.

9.1.4. The North & Mid Wales Trunk Road Agency (NMWTRA) initially advised (email 08.04.17) that the 10 axle flattop trailer proposed would require a more detailed analysis to assess the suitability of the bridge which carries the A55 across Dundonald Avenue at Abergele (OS Reference SH 9465 7845). This is due to the bridge having an assessed capacity of 32 units of HB loading. The simple evaluation initially undertaken indicated an over-loading of 10% and NMWTRA.

9.1.5. However, on 06.05.17 NMWTRA advised that a more detailed review of the structure has been commissioned by Welsh Government and as part of this review they have applied the detailed analysis method of Clause D3 from Annex D in BD86/11 (The Design Manual for Roads and Bridges – The Assessment of Highway Bridges and Structures for the effect of Special Types General Order and Special Order Vehicles). This has resulted in the proposed vehicle currently being advised as just satisfactory for passage over Dundonald Avenue Bridge. Welsh Government have agreed to review the assessment of this structure in the current financial year and caution is required as this may result in a re-assessment of the bridge deck which may change the assessed capacity of the structure (up or down). It is expected that once they have investigated further the structure would become prioritised as it is critical to access to North Wales via the A55. The situation in respect to this bridge should be monitored.

9.1.6. Wynns approached to Conwy County Council (CCC) to ascertain whether there is any chance to divert via Abergele to avoid the bridge and CCC have advised that they have two small span structures that would require assessment. CCC have advised (email 24.04.17) that for each bridge an estimated assessment costs of £3,000 should be budgeted for. This route would require a diversion through the town prior to re-joining the A55 at Llanddulas via the A547.

9.1.7. Whilst alternative 5 bed 5 bed trailers may be able to secure structural clearance on the bridge, subject to further review by NMWTRA, these trailers, with a heavier deadweight, would put the overall gross weight into Special Order category as it would be above 150te. As such they would need to meet with the Water Preferred Policy requirements previously highlighted in Section 3 and be expected to be shipped to Port Penrhyn.

9.1.8. Although any restriction on the use of the A55 is unwelcome for STGO loads in terms of future transport logistics and costs, it is not a showstopper to the project overall as in the worst case, even if the load remains within STGO, it could still be shipped to Port Penrhyn for onward road transport to Pentir if the A55 was not available.

9.1.9. NMWTRA have also advised that the A55 bridge crossing of the River Elwy (OS Ref SJ 0346 7487) has recently been assessed. It has a local weakness in the deck slab which will require any vehicle of this weight to travel across the structure with strict control of lateral position and at less than 10 mph. This is a standard caution and is not a specific concern.



9.1.10. North Wales Police have been approached for comment on the proposed route submitted for consultation and have no major objections to the proposed route. They have not indicated that a police escort would be required and it is expected that the load could be delivered with a private escort although this would be confirmed at the time of formal movement notification by the appointed haulage contractor when further discussions are undertaken with respect to confirming escort requirements.

9.2. *Pentir Substation - Ty Fodol Access for TBM, Cable Drums & Mobile Cranes*

9.2.1. In terms of the road movement on the public highway the route is as detailed in 9.1 for the TBM, Cable Drums and Mobile Cranes. The route has been cleared by the structural authorities detailed below.

- Gwynedd County Council
- North & Mid Wales Trunk Road Agency
- Canal & Rivers Trust
- Highways England Historic Railways Estate
- Network Rail

9.2.2. The route has therefore been structurally cleared by all authorities on route in North Wales.

9.2.3. North Wales Police comments are as 9.1.4.

9.3. *Braint (Anglesey) - Access for TBM, Cable Drums & Mobile Cranes*

9.3.1. There are various possible routes to this location which is presently undeveloped. These routes are shown below as they have been presented to structural and highway authorities for comment.

Proposed Route 1:

From English Border continue A55 westbound to junction 8a
Turn left A5 Holyhead Road
Turn left A4080 Brynsiencyn Road
Turn right at approximate OS Grid Ref SH 5201 7028 at access point AC6-2

Proposed Route 2:

From English Border continue A55 westbound to junction 7a
Turn left A5 Holyhead Road
Turn right A4080 Brynsiencyn Road
Continue as route 1

Proposed Route 3:

From English Border continue A55 westbound to junction 7
Turn left A5152 Cefn Du Interchange
Turn left A5 Ffordd Caergybi
Turn right A4080 Brynsiencyn Road
Continue as route 1

Proposed Route 4:

As route 3 to A5 Ffordd Caergybi
Turn right at on National Cycle Route 8, at approximate OS Grid Ref SH 5099 7190
Turn left at approximate OS Grid Ref SH 5064 7149 at access point AC6-1

9.3.2. The routes have been structurally cleared by the structural authorities detailed below.

- North & Mid Wales Trunk Road Agency
- Canal & Rivers Trust
- Highways England Historic Railways Estate
- UK Highways A55

9.3.3. Network Rail have advised (email 13.04.17) that there are no specific structural problems for the proposed loads on Britannia Bridge.

9.3.4. Tollgate Bridge (CNH3/B/168, A4080 From Junction With Station Road To Junction With Holyhead Road A4080, OS Reference SH 5311 7150) which is on proposed Routes 1, 2 and 3 has been advised by Network Rail as acceptable for the proposed loads although there is a need for a caution when crossing. This is standard procedure for heavy loads and the requirements are shown below for reference:

FULL CAUTION - A full caution must be observed over the following bridge(s): i.e. Vehicles to proceed

- at a crawl speed,
- in the centre of the carriageway,
- with no other vehicles on the structure at the same time
- with no changing of gears or stopping

9.3.5. The status of the Network Rail bridge known as Star Bridge (CNH3/B/172, Road From Junction Near Gwernllwyn To A5 At Star Crossroads, OS Reference SH 5086 7184) on Route 4 is less certain. The bridge has been deemed as able to accommodate the mobile crane and smaller cable drums (43.35te nett) with a Full Caution as detailed above, but has been rejected for the heavier 100te nett cable drums (Drawing NG-NWC-CD03) and the 105te nett Shell Thrust Pipe (Drawing NG-NWC-SSTP01). Therefore some loads will be able to utilise this access route but others will not. A full review of all loads has not been completed by Network Rail and this would need further consideration if Route 4 was to be utilised as the AIL access route. As the alternative routes via the A4080 are available this has not been progressed any further at this stage.

9.3.6. Network Rail Lon Pont Ronwy Bridge (CNH3/B/169) is not considered to be on a suitable route (See Section 10.2 Route Negotiability) and as such has not been specifically considered.

9.3.7. The Isle of Anglesey County Council (IoACC) are the highway authority responsible for the final approach to site once the loads exit the A55. IoACC have advised (emails 21.03.17 and 24.03.17) that there are 4 of their structures impacted by the four proposed routes above. These bridges are as highlighted below in Table 2.



Table 2. Isle of Anglesey County Council Structures in Need of Assessment.

Bridge	Approx OS Location	On proposed Route Number?	Additional Information
1 - Pont Aber Braint	SH 5275 7125	1, 2, 3	MEXE assessment from 2003 provided by IoACC
2 - Pont Tal Y Bont / Kwik Save	SH 5224 7171	2, 3 (If route 1 was amended to approach Ffordd Caergybi and access point AC-2 from the east to access the site then this bridge would be crossed.	MEXE assessment from 2005 provided by IoACC
3 - Pont Bryn Gof	SH 5148 7183	3 (If route 1 was amended to approach Ffordd Caergybi and access point AC-2 from the east to access the site then this bridge would be crossed.	No further information provided by IoACC.
4 - Culvert	SH 5074 7171	4	2 no. 0.6m slate slab culverts with 1.0m cover. No further information provided by IoACC.

- 9.3.8. IoACC has advised that although there are no significant concerns with the 4 structures they will require that a third party consulting engineer is appointed to undertake a specific AIL assessment for loads in excess of 40te. The structures have all passed their most recent assessments as required by IoACC for Construction and Use 40te loadings but have never been considered for AILs in excess of the standard Construction and Use requirements. Unfortunately the council no longer have the resources to carry out the assessments in house and therefore have advised that before they can agree to the structures being utilised by the proposed AILs, detailed assessments are necessary.
- 9.3.9. Wynns have not made any approaches to third party consulting engineers for assessment costs and time scales but further work on this can be carried out if required by National Grid. This would involve agreement with IoACC and suitably qualified engineers in terms of the agreed methodology to carry out assessment as part of the formal Agreement in Principle (AIP) process for bridge assessment. None of the structures is especially large in span or complicated in design and it is anticipated that assessments would be likely to have a positive outcome but this needs to be confirmed. Although formal quotations for assessments have not been sought to date, recent experience of similar works in other areas of the UK would suggest that a budget cost of approximately £10,000 would be expected to be allowed for to carry out the assessment of these 4 structures.
- 9.3.10. No specific concerns on these routes have been raised by North Wales Police.

10. Route Negotiability

10.1. *Pentir Substation Reactor Access & Ty Fodol Access for TBM, Cable Drums & Mobile Cranes*

10.1.1. The A55 to the A5/A55 junction is negotiable without difficulty for the proposed loads, including the tunnels and roundabouts at Llanfairfechan (J15) and Penmaenmawr (J16). However, it is understood that there are plans for the removal of the roundabouts at Jct 15 and Jct 16 being progressed by Welsh Government who are planning to replace the roundabouts with height separated junctions. This means that side roads will go either under or over the main A55, with traffic joining the trunk road via a slip road instead of a roundabout. This will improve AIL negotiability although caution with associated roadworks during construction is required. It is understood these works are due to commence in late 2017 and the status of them should be monitored by National Grid, not only for the specific AILs discussed in this report but the wider traffic management implications for the North Wales Connection development. Further information is available here: <http://gov.wales/topics/transport/roads/schemes/a55/junction-15-junction-16/?lang=en>

10.1.2. Welsh Government are also working on a scheme to improve a 2.2km length of the A55 between the Tai'r Meibion and the Abergwyngregyn interchange. No significant impact on AIL access is expected but the roadworks associated the scheme could impact on access in the future. Further information is available here: <http://gov.wales/topics/transport/roads/schemes/a55/abergwyngregyn/?lang=en>

10.1.3. The STGO AIL load route the exits the A55 at Junction 11 onto the A5 for a short distance to the service area roundabout with the B4244 and is discussed below in terms of all reactor, cable drum, TBM and mobile crane loads.



Photograph 1

A5/A4244 Roundabout at Bangor Services. Load moves away from camera and turns right.

10.1.4. The roundabout is considered negotiable in conventional fashion for STGO Loads. However, the roundabout has been designed to be accessed for large girder frame trailers in contraflow considerate of Dinorwig Power Station loads. The street furniture is also demountable and the roundabout could be contraflowed if necessary depending on the final size of loads selected to deliver components to the site.



Photograph 2

A5/A4244 Roundabout at Bangor Services. Reverse angle. Street furniture is demountable.



Photograph 3

A5/A4244 Roundabout at Bangor Services. Removable street furniture.



Photograph 4

A4244 pedestrian footbridge. File notes indicate bridge height clearance was agreed with MAWR/First Hydro prior to completion to be 5.5m. Negotiable for all STGO loads considered to date.



Photograph 5

A4244 example of street furniture removal required for wide loads although not restrictive for current STGO requirements. Overhead lines which would be issue for loads in excess of 5m.



Photograph 6

A4244. Example of overhead lines which would be issue for loads in excess of 5m.

- 10.1.5. As discussed in Section 7.2, it is generally accepted that headroom clearance of 4.95m will be available. However, in the event that loads may approach this standard height at which loads are considered as “high” then it would be prudent to confirm the available headroom clearances of the overhead lines on route with the appropriate authority and utility provider. For single large AIL movements it is often the case that utilities are temporarily lifted to enable movement. In the event that the amount of AILs requiring lifting of wires becomes significant, for a major development for example, then it may be prudent to consider permanent increases to available headroom. This would only be confirmed as being necessary upon the final confirmation of the transport dimensions of the components to be delivered to the site.



Photograph 7

A4244 roundabout at Pentir. Load moves away from camera and turns right. Negotiable.

10.1.6. It is understood that National Grid are considering two options for site access for the head house compound. The first option is to use the existing Pentir Substation access road and to construct a new haul road to the compound. The second option is to create a new access just north of the substation access road. This would be at approximate OS Ref SH 5516 6756. Both options are shown in Figure 1 below.

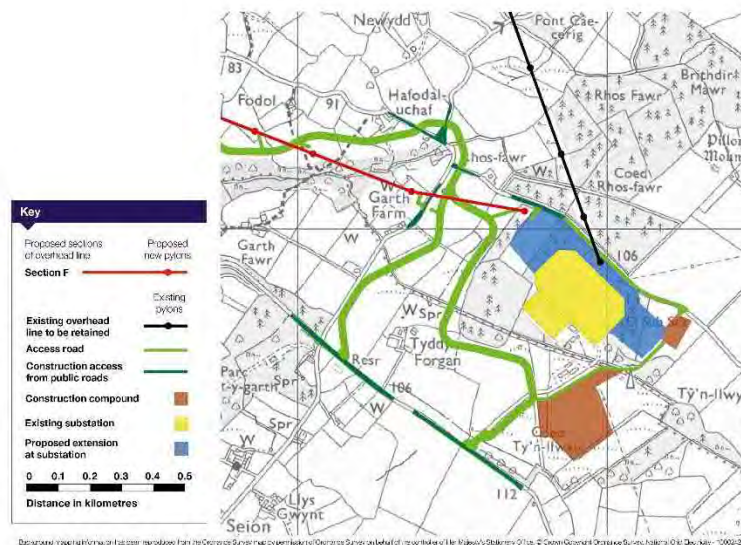
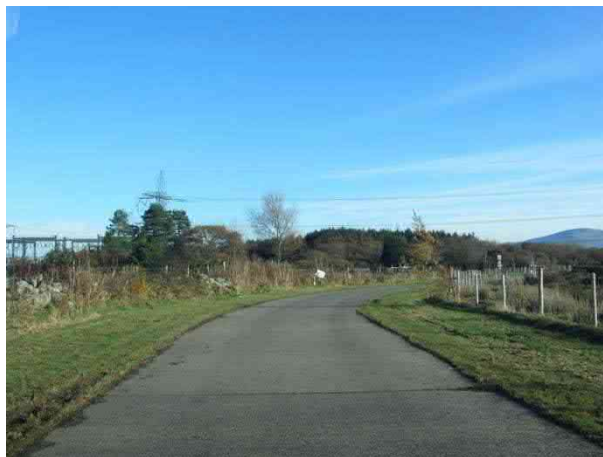


Figure 1. Location of two possible access roads to Ty Fodol adjacent to Pentir Substation (As provided by National Grid).



Photograph 8

B4547/Pentir Substation access road. Load moves away from camera and turns right. Negotiable for STGO trailers considered for all loads within this report. Larger girder frame trailers for SGT access will require removal of signage on the inside of the turn.



Photograph 9

Load moves away from camera into substation and access to proposed new access would exit to the left of camera.



Photograph 10

Load approaches camera and then turns right to proposed alternative site access at OS Ref SH 5516 6756. Negotiable to this point.

- 10.1.7. The construction of a new access road just north of the substation access road is feasible for AIL access as long as the new access road is designed to be considered of AIL requirements as detailed in the transport drawings attached to this report to provide

adequate opportunity to leave the principal highway with expediency. The turning circles identified within the transport configuration drawings should be applied within the design phase.

- 10.1.8. Much of the access design criteria on which the planning authorities relies upon is contained in “*Places Streets and Movement*”, a national document published in 1998. In particular this sets out the visibility standards at access onto the road network. The sight line information, shown in Table 2, should be considered in conjunction with the turning radii information detailed within the transport configuration drawings.
- 10.1.9. To enable drivers emerging from the access to see and be seen by drivers proceeding along the carriageway unobstructed visibility is needed within the proximity of the junction. The distance along the centreline of the new access from the carriageway edge to the point where the emerging driver should be able to see a specified distance in each direction of the principal carriageway can be derived from the aforementioned documentation.

Table 2. Junction Visibility Splays

Measured Major Road Speed - Mph/kph	70/ 120	60/ 100	50/ 85	40/ 70	35/ 60	30/ 50
Major Road Distances (m)	295	215	160	120	90	70

10.2. *Braint (Anglesey) - Access for TBM, Cable Drums & Mobile Cranes*

- 10.2.1. The A55 onto Anglesey beyond the A5/A55 junction required for Pentir (See 10.1) is also negotiable for the proposed loads, including the Britannia Bridge which is not of restricted headroom clearance.
- 10.2.2. It is understood that National Grid are considering two possible site access points for this location. These are to the south east on the A4080 and to the north on Llanddaniel Road and access via both of these options is discussed in the following notes and photographs.
- 10.2.3. Of the 4 routes proposed route 1 is the preferred route to site and this is described below under photographs 11-16.



Photograph 11

A55 junction with A5. Vehicle enters from behind the camera and turns left, exiting to the left of the photograph. Negotiable.



Photograph 12

A5 Approaching the junction with the A4080 Brynsiencyn Road. Load moves away from camera and turns left. Negotiable.



Photograph 13

Junction of A5/A4080. Vehicle enters from top right of picture and turns left towards the camera, exiting behind the camera. Negotiable for cable drum transport.



Photograph 14

Tollgate Bridge (Network Rail Ref CNH3/B/168) Rail bridge on A4080 Brynsiencyn Road. Load moves away from camera. Negotiable with caution on hump in carriageway. Structural status discussed in 9.3.



Photograph 15

The route continues along the A4080 with no issues other than traffic management as the loads will take up the entire width of the carriageway.



Photograph 16

Site entrance close to this location at approx. OS Ref SH 5212 7047. Load moves away from camera and turns right. New site entrance planned. We recommend a swept path assessment is undertaken as part of any future access entrance design.

- 10.2.4. Of the 4 routes proposed routes 2 and 3 from the A55 junction 7a and 7 respectively are negotiable to the point at which they rejoin route 1 at the A4080 as described above.



Photograph 17

A5/Llanddaniel Road junction onto National Cycle Route 8. Turn is negotiable for cable drum transport using the full width of the A5 on Route 4 from the west. It is however most suitable to access from the east by way of extending access from the A55 Junction 7 or 7a in a westerly direction and route 1 could be amended to travel west on the A5 to this point from the A55.



Photograph 18

National cycle route 8 towards Llanddaniel. Load moves away from camera. Negotiable.



Photograph 19

Star Bridge (Network Rail Ref CNH3/B/172). Load moves away from camera. Structural status discussed in 9.3



Photograph 20

Llanddaniel Road. Full width of road required for the complete length with appropriate traffic management as the loads will be utilising the entire carriageway.



Photograph 21

Llanddaniel Road. Full width of road required for the complete length with appropriate traffic management as the loads will be utilising the entire carriageway.



Photograph 22

The site entrance is located in this area with a new entrance required.

- 10.2.5. Of the two final approach routes to the proposed development site, route 1 via the A4080 is preferred, the road being wider and more appropriate for cable drum and TBM delivery. The alternative route via NCR8 would be achievable subject to confirmatory swept path assessments when the site entrance is determined.



11. Summary and Conclusions

- 11.1. Written confirmation remains outstanding from Gwynedd County Council (GCC) on the route to Pentir and Ty Fodol for reactor transport, but it has been structurally approved for cable drum and TBM components and no structural issues are expected from GCC.
- 11.2. The North & Mid Wales Trunk Road Agency (NMWTRA) initially advised that the A55 was not able to accommodate the proposed reactor loads due to a structural limitation at Abergele (Dundonald Avenue Bridge) although they have approved the proposed TBM, cable drum and mobile crane loads. Further discussions have resulted in clearance for the reactor now being given. However, there are some inconsistencies in information available to NMWTRA on this structure and they are undertaking a more detailed review of the structure on behalf of the Welsh Government to clarify matters. It is expected that this will be completed within 6 months. Although no major problems are anticipated, this cannot be guaranteed and it is possible that the results could further restrict access for larger AILs. NMWTRA consider the A55 to be of strategic importance to North Wales generally and therefore any issues with the long term capacity of this bridge are expected to be prioritised. Notwithstanding the possible issue with the A55, an alternative option for AIL delivery would be to ship the reactor to Port Penrhyn for onward road transport to Pentir.
- 11.3. The route to Pentir from the A55 is negotiable for all proposed loads to the point at which the new access road is to be constructed. The access road will need to be considerate of the proposed AILs detailed within this report.
- 11.4. Various routes have been considered from the A55 trunk road to Braint (Anglesey) for TBM and Cable Drum components. Route 1 is the preferred route via the A4080 (Access point reference F2). IoACC has advised that although there are no significant concerns with their structures they will require that a third party consulting engineer is appointed to undertake a specific AIL assessment for loads in excess of 40te.
- 11.5. In terms of access to Access point reference F2 the most significant structure of IoACC is Aber Braint on the A4080. The council do not have the resources to carry out the assessments in house and have advised that before they can agree to the structures being utilised by the proposed AILs, detailed assessments are necessary.
- 11.6. The preferred route 1 (or 2 and 3) via the A4080 has been cleared by Network Rail in terms of the A4080 Tollgate Bridge and Britannia Bridge.
- 11.7. The alternative route to Braint is to approach via Llanddaniel Road and the Network Rail bridge known as Star Bridge. Network Rail have advised that some of the proposed loads are able to cross this bridge but the heavier TMB (105te nett) and cable drums (100te concept load) would not be permitted to cross the bridge.
- 11.8. In addition to Aber Braint there are a further 3 structures which would also require assessment by IoACC depending on which route to site was utilised from the A55 to the Braint access locations.
- 11.9. Although access is physically feasible, the alternative route to Braint via Llanddaniel Road and Star Bridge is not considered as appropriate for AIL access as the route via the A4080.
- 11.10. All routes to Braint are considered negotiable for the proposed loads although the final approaches from the A5 to site will require the entire road width to be used for



negotiability and careful consideration of traffic management requirements will be necessary.

- 11.11. The route investigations detailed are a view of the current status of the proposed heavy load route options.
- 11.12. The final transport dimensions of the components for delivery to the site remain unconfirmed at this early stage in the project and the final dimensions selected will be critical for remedial measures that are expected to be required to enable road transport to be facilitated.



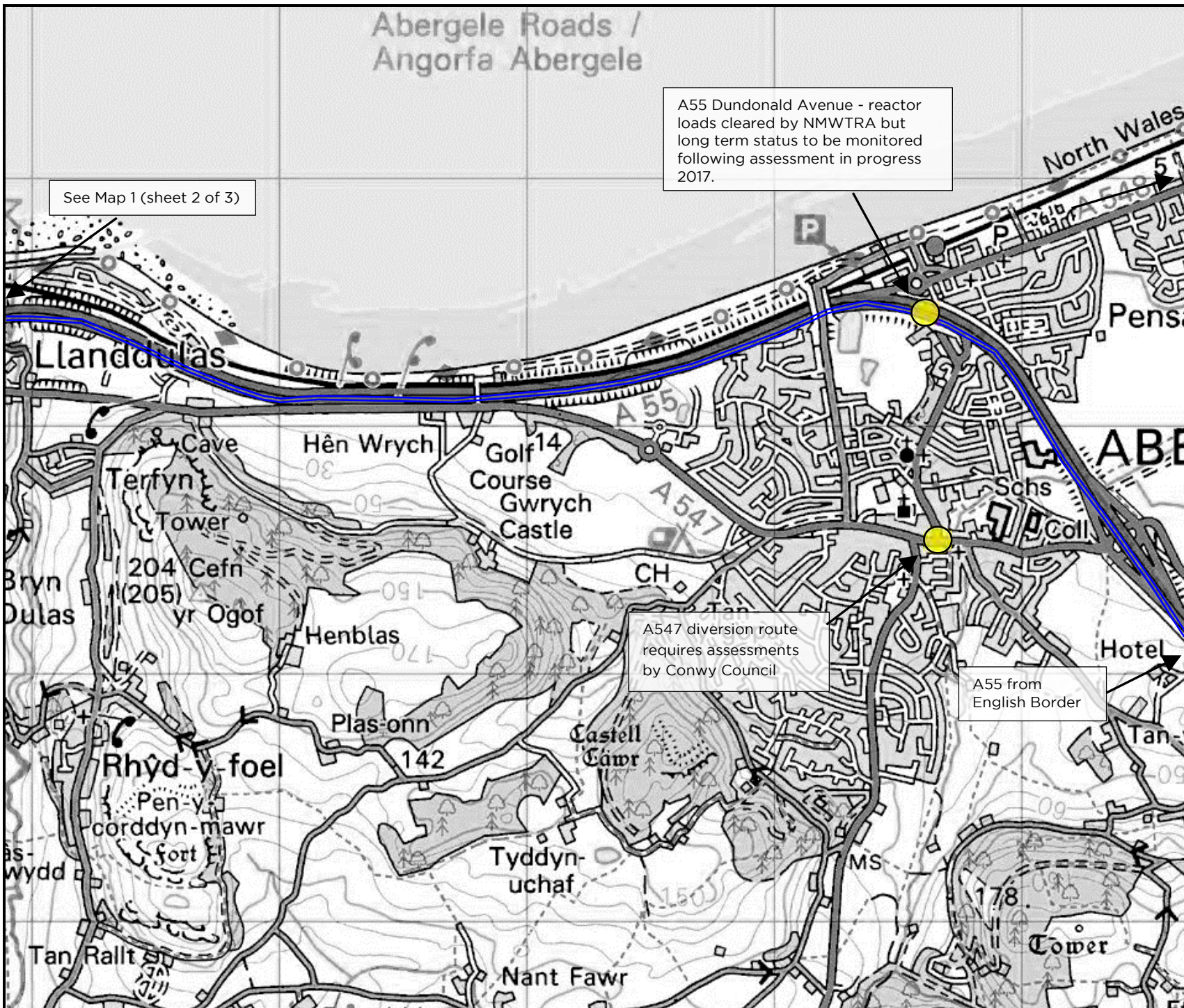
Appendix 1

Maps

Abergele Roads / Angorfa Abergele

A55 Dundonald Avenue - reactor loads cleared by NMWTRA but long term status to be monitored following assessment in progress 2017.

See Map 1 (sheet 2 of 3)



A547 diversion route requires assessments by Conwy Council

A55 from English Border

Key

- Route 1 to Pentir & Ty Fodol
- Route 1 to Braint
- Route 2 to Braint
- Route 3 to Braint
- Route 4 to Braint
- Point of Interest
- Pentir Substation
- Proposed TBM Headhouse Ty Fodol
- Proposed TBM Headhouse Braint

Rev	Date	Amendments:
B		
A	10.05.17	Second Issue
O	21.04.17	First Issue

Revisions



Wynns Ltd.
Independent
Transportation
Engineers

Shaftesbury House, 2 High Street, Eccleshall,
Stafford, ST21 6BZ. Tel: (01785) 850411

Client:	National Grid Hams Offices Hams Lane Coleshill B46 1AW
---------	--

Project:	North Wales Connection Project
----------	--------------------------------

Title:	Map 1 - Routes to Pentir, Ty Fodol & Braint Substations
--------	---

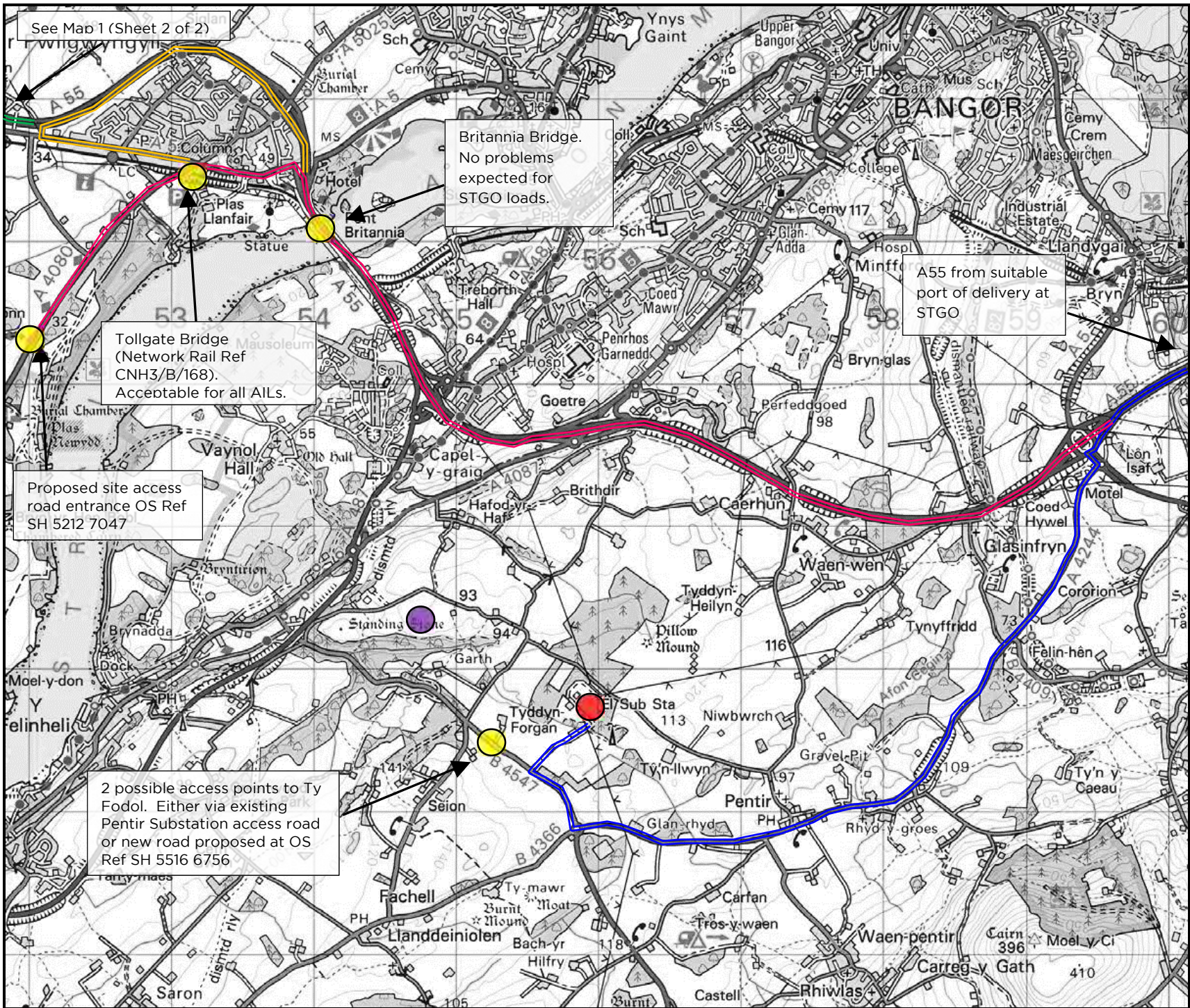
Drawing Status:	Final Report
-----------------	--------------

Scale (A4):	Drawn by:	Checked by:
NTS	DMW	ARP

Ref No.:	Sheet:	Rev.:
NG-NWS-Map1	1 of 3	0

© Wynns Ltd. This drawing is not to be reproduced in whole or in part, in any form or by any means, without prior written consent.

© Crown Copyright.
All rights reserved. Licence No AL100035894



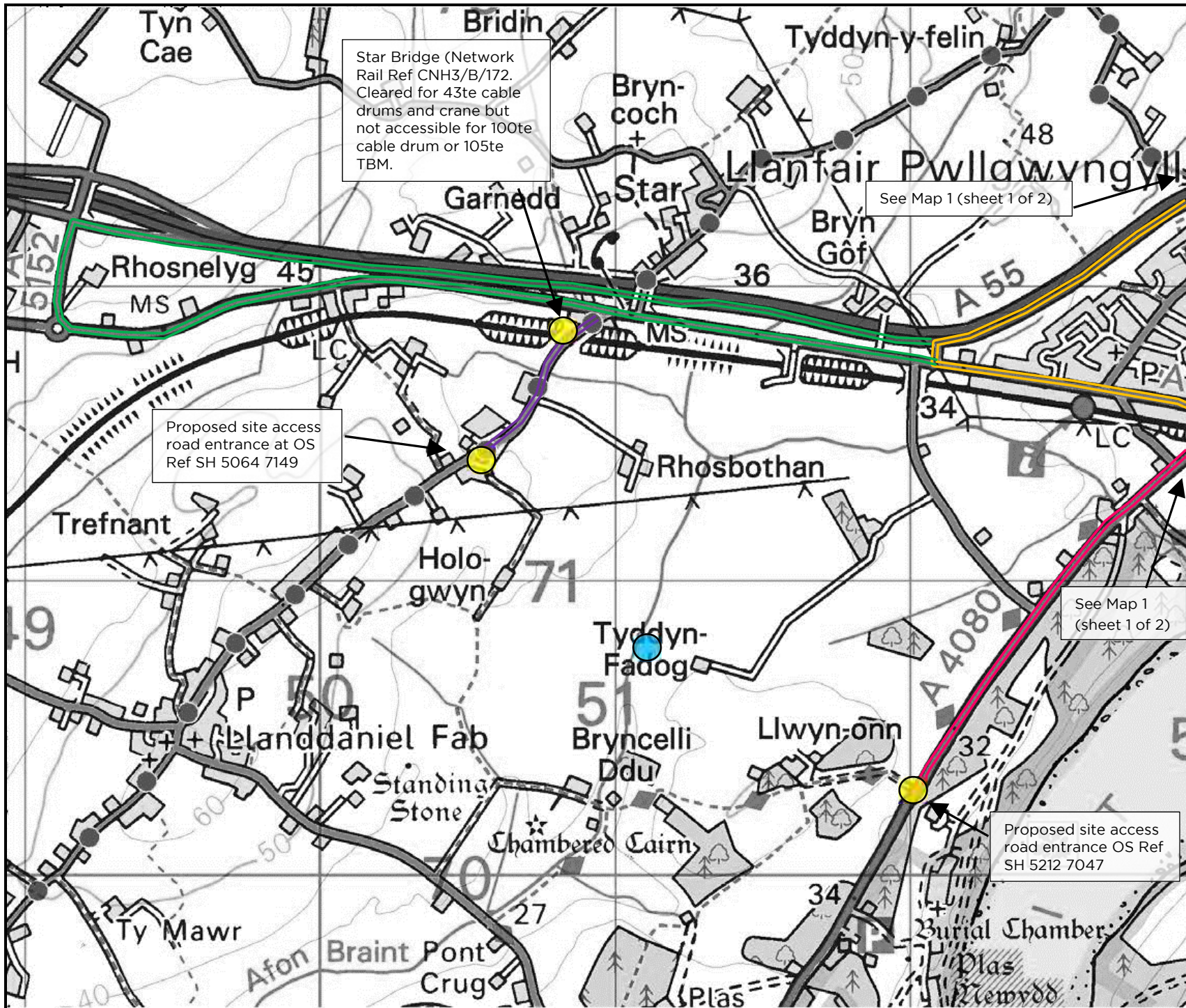
Key		
	Route 1 to Pentir & Ty Fodol	
	Route 1 to Braint	
	Route 2 to Braint	
	Route 3 to Braint	
	Route 4 to Braint	
	Point of Interest	
	Pentir Substation	
	Proposed TBM Headhouse Ty Fodol	
	Proposed TBM Headhouse Braint	

B		
A		
O	19.04.17	First Issue
Rev	Date	Amendments:

Revisions		
Wynns Ltd. Independent Transportation Engineers		
Shaftesbury House, 2 High Street, Eccleshall, Stafford, ST21 6BZ. Tel: (01785) 850411		
Client:	National Grid Hams Offices Hams Lane Coleshill B46 1AW	
Project:	North Wales Connection Project	
Title:	Map 1 - Routes to Pentir, Ty Fodol & Braint Substations	
Drawing Status:	Final Report	
Scale (A4):	Drawn by:	Checked by:
NTS	DMW	ARP
Ref No.:	Sheet:	Rev.:
NG-NWS-Map1	1 of 2	0

© Wynns Ltd. This drawing is not to be reproduced in whole or in part, in any form or by any means, without prior written consent.

© Crown Copyright. All rights reserved. Licence No AL100035894



Star Bridge (Network Rail Ref CNH3/B/172). Cleared for 43te cable drums and crane but not accessible for 100te cable drum or 105te TBM.

Proposed site access road entrance at OS Ref SH 5064 7149

Proposed site access road entrance OS Ref SH 5212 7047

See Map 1 (sheet 1 of 2)

See Map 1 (sheet 1 of 2)

Key

- Route 1 to Pentir & Ty Fodol
- Route 1 to Braint
- Route 2 to Braint
- Route 3 to Braint
- Route 4 to Braint
- Point of Interest
- Pentir Substation
- Proposed TBM Headhouse Ty Fodol
- Proposed TBM Headhouse Braint

B		
A		
O	19.03.17	First Issue
Rev	Date	Amendments:

Revisions



Wynns Ltd.
Independent
Transportation
Engineers

Shaftesbury House, 2 High Street, Eccleshall, Stafford, ST21 6BZ. Tel: (01785) 850411

Client: National Grid
Hams Offices
Hams Lane
Coleshill
B46 1AW

Project: North Wales Connection Project

Title: Map 1 – Routes to Pentir, Ty Fodol & Braint Substations

Drawing Status: Final Report

Scale (A4): NTS	Drawn by: DMW	Checked by: ARP
-----------------	---------------	-----------------

Ref No.: NG-NWS-Map1	Sheet: 2 of 2	Rev.: 0
----------------------	---------------	---------

© Wynns Ltd. This drawing is not to be reproduced in whole or in part, in any form or by any means, without prior written consent.

© Crown Copyright. All rights reserved. Licence No AL100035894

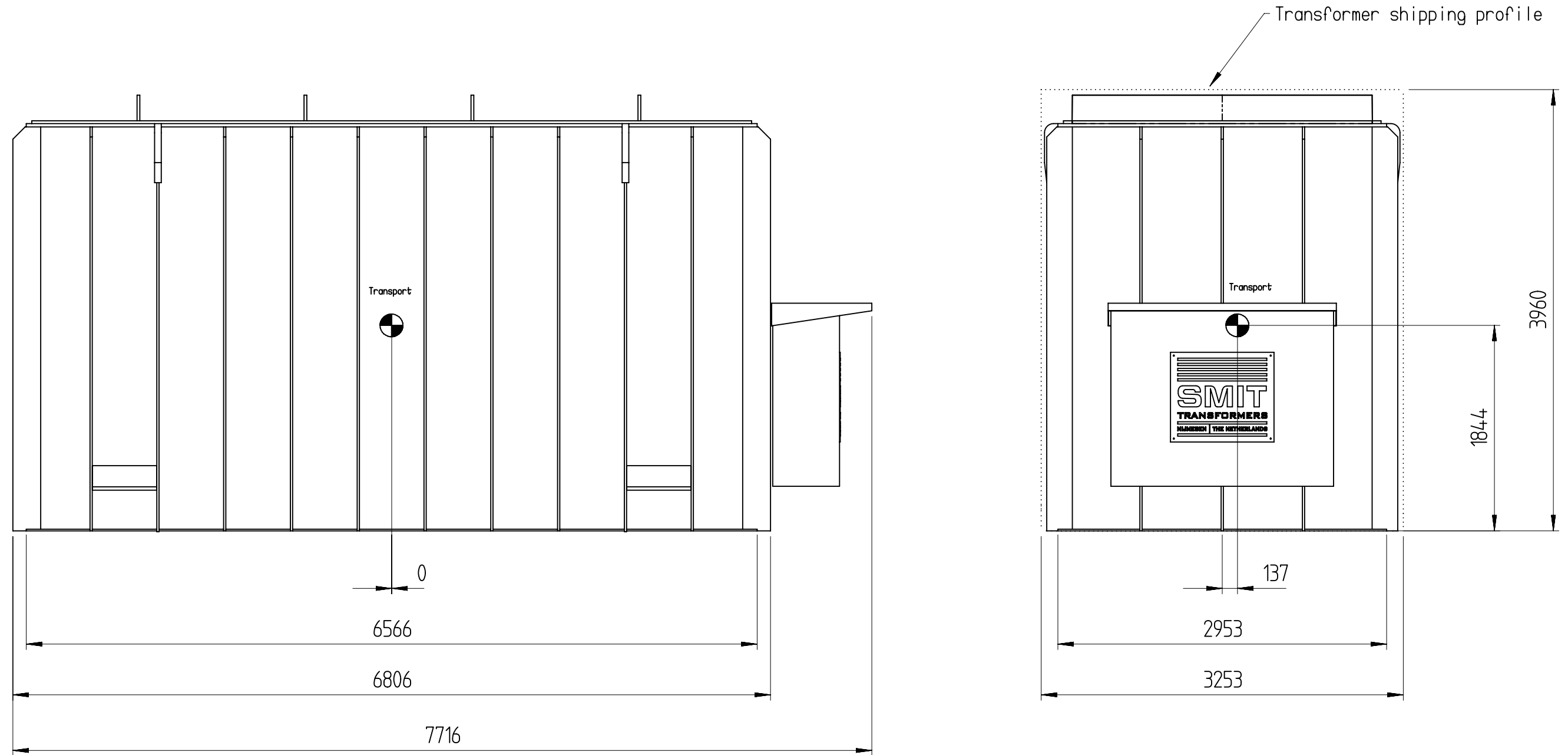


Appendix 2


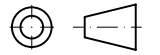
Drawings & Transport Configurations

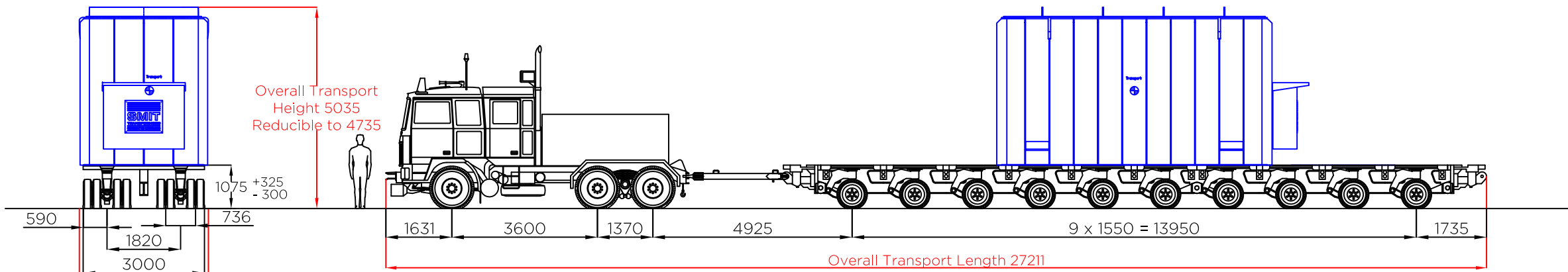
Transport weight : 110.500 kg

310001709-p60

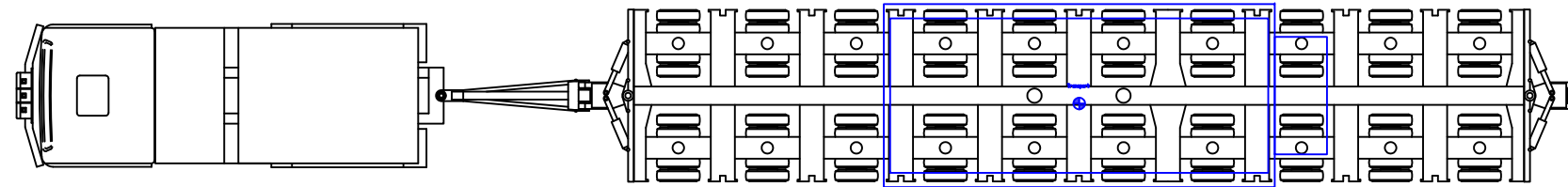


Proposal drawing / Subject to changes

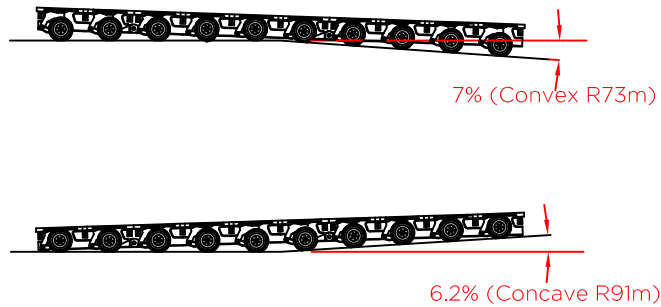
Smit K-00-0-0011e	Description of modification			Modified by	Date
DO NOT MEASURE FROM DRAWING	-			-	-
	Material:	Project number	Article number	Drawn	17-Mar-2015
	n.a.		LT_TRAFO_COMPL	Checked	27-Mar-2015
	Name			Projection	Form
	Shunt Reactor				A3
	200 MVAR - 400 kV			Drawing number	Rev
				925990-104	A



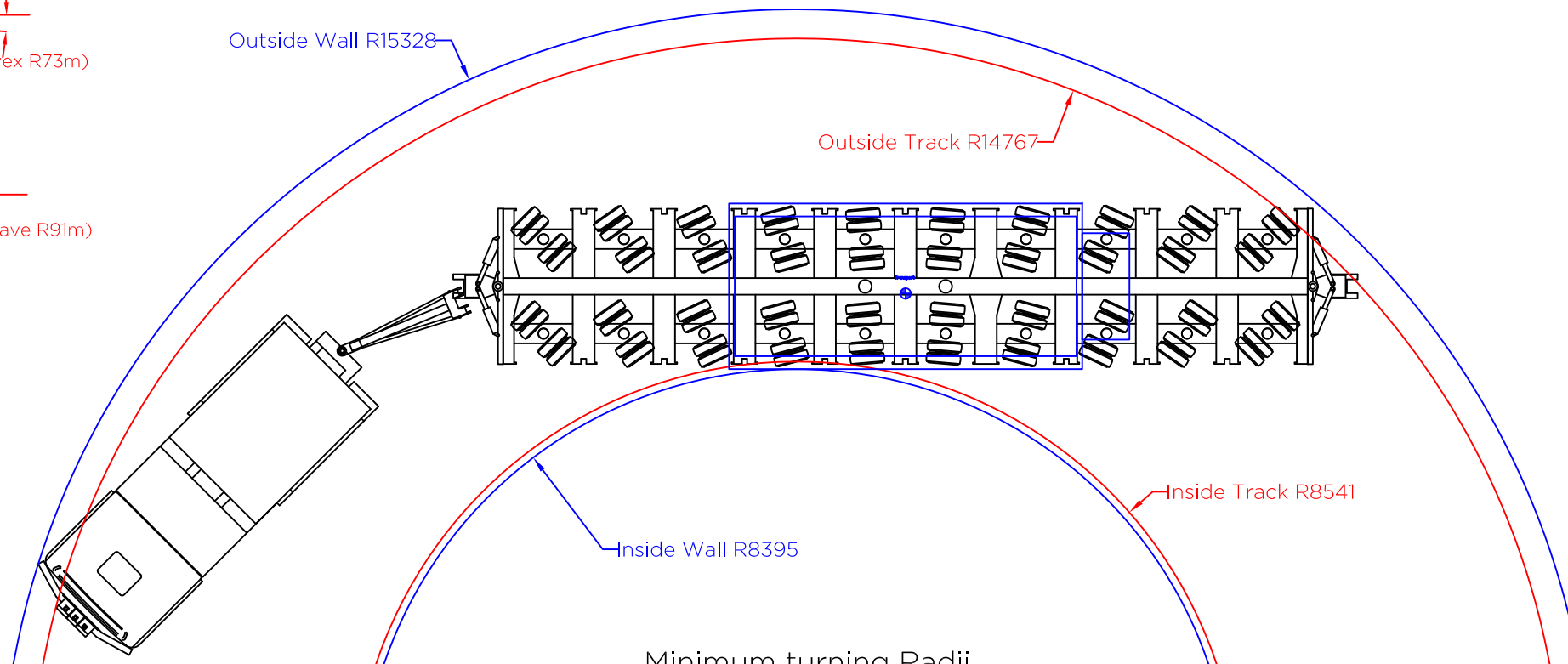
Side Elevation - 10 Axle Flat Top Trailer - Concept Model Only
Indicative 110.5Te Shunt Reactor



Plan View - 10 Axle Flat Top Trailer - Concept Model Only
Indicative 110.5Te Shunt Reactor



Vertical Curve Negotiability Information
based on manufacturers literature
(Scale: 1:250)



Minimum turning Radii
10 Axle Flat Top Trailer Concept Model Only
Indicative 110.5Te Shunt Reactor

Load Table	
10 Axle Flat Top Trailer	
Self Weight of Load	110.5 Te
Self Weight of Trailer	Say 35.0 Te
Self Weight of Aux. Steelwork (for L&S)	Say 1.0 Te
Total Combined Weight	146.5 Te
Load Per Axle Line	14.65 Te
Load Per Wheel (8 per axle)	1.83 Te
Load Per Wheel (4 per axle)	3.66 Te
Overall Ground Bearing Pressure	3.50 Te/m ²
Tyre Contact Patch (est. min)	300mm x 180mm
Tyre Pressure	140psi / 9bar

Tractor (40Te)	
Front Axle	7.0 Te
Rear Axle	16.5 Te
Rear Axle	16.5 Te

The figures shown above are representative of the transport configuration portrayed. However as tractor and trailer arrangements vary then the loads and dimensions indicated should be treated as probable values.

Actual dimensions, including axle spacing and mean running height, may vary slightly depending on manufacturer of trailer deployed.

All linear measures in millimeters unless stated otherwise.

Reactor drawing reproduced from SMIT drawing No: 925990-104.

Rev.	Date	Amendments
A		
0	02.12.16	Issued for comment
		Revisions

Prepared By:



Shaftesbury House, 2 High Street,
Eccleshall, Stafford, ST21 6BZ
Tel: (01785) 850411

Independent Transportation Engineers

Client:



National Grid
Hams Lane
Coleshill
West Midlands
B46 1AW

Project:

North Wales Connection

Title:

**Indicative Transport Configuration
Pentir Substation
110.5Te Shunt Reactor carried upon typical
10 Axle Flat Top Trailer
Showing Minimum Turning Radii**

Drawing Status:

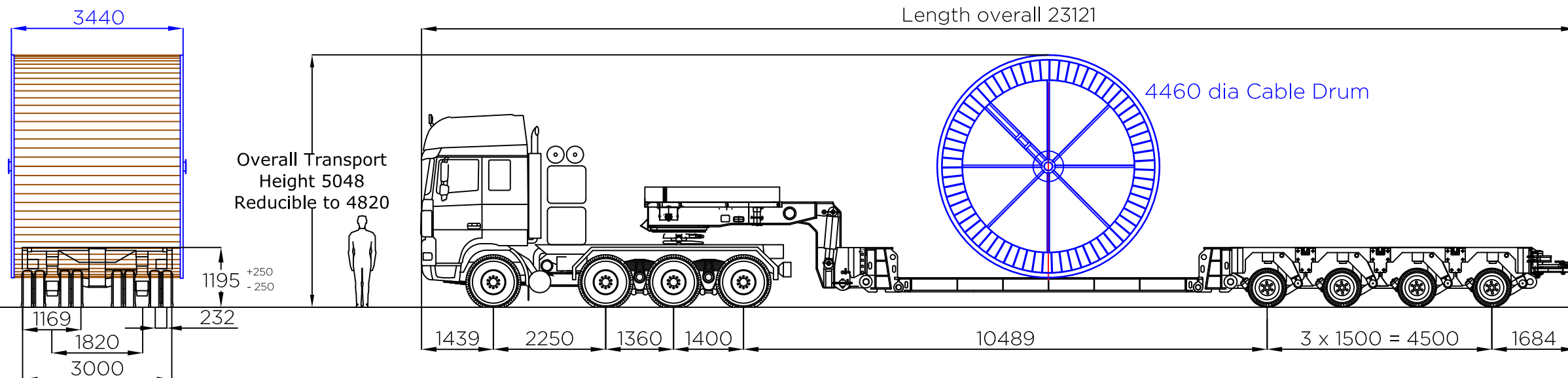
Final Report

Scale (A3): 1:125	Drawn By: DJT	Checked By: AP
----------------------	------------------	-------------------

DWG. No: NG-NWC-TC01	Sheet: 1 of 1	Rev: 0
-------------------------	------------------	-----------

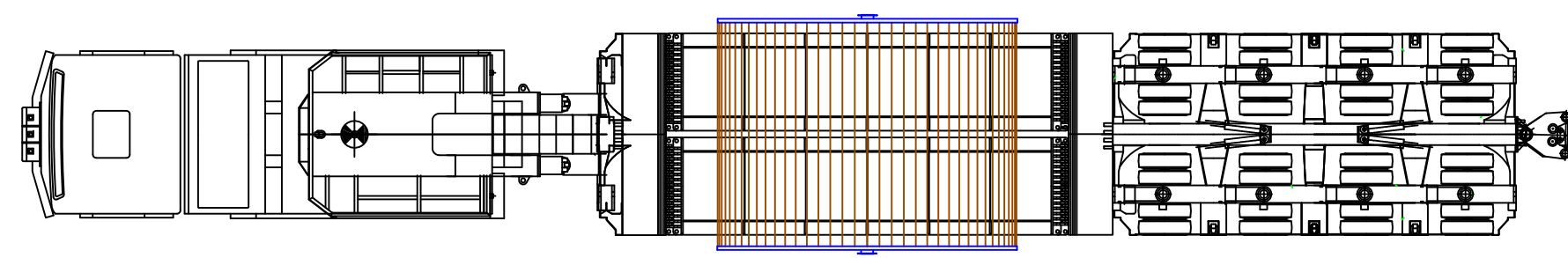
Wynns Limited. This drawing is not to be reproduced in whole or in part, in any form or by any means, without prior written consent.

P:\Clients\Existing Clients\National Grid Company\16-889 North Wales TBM Movement\TC01.dwg

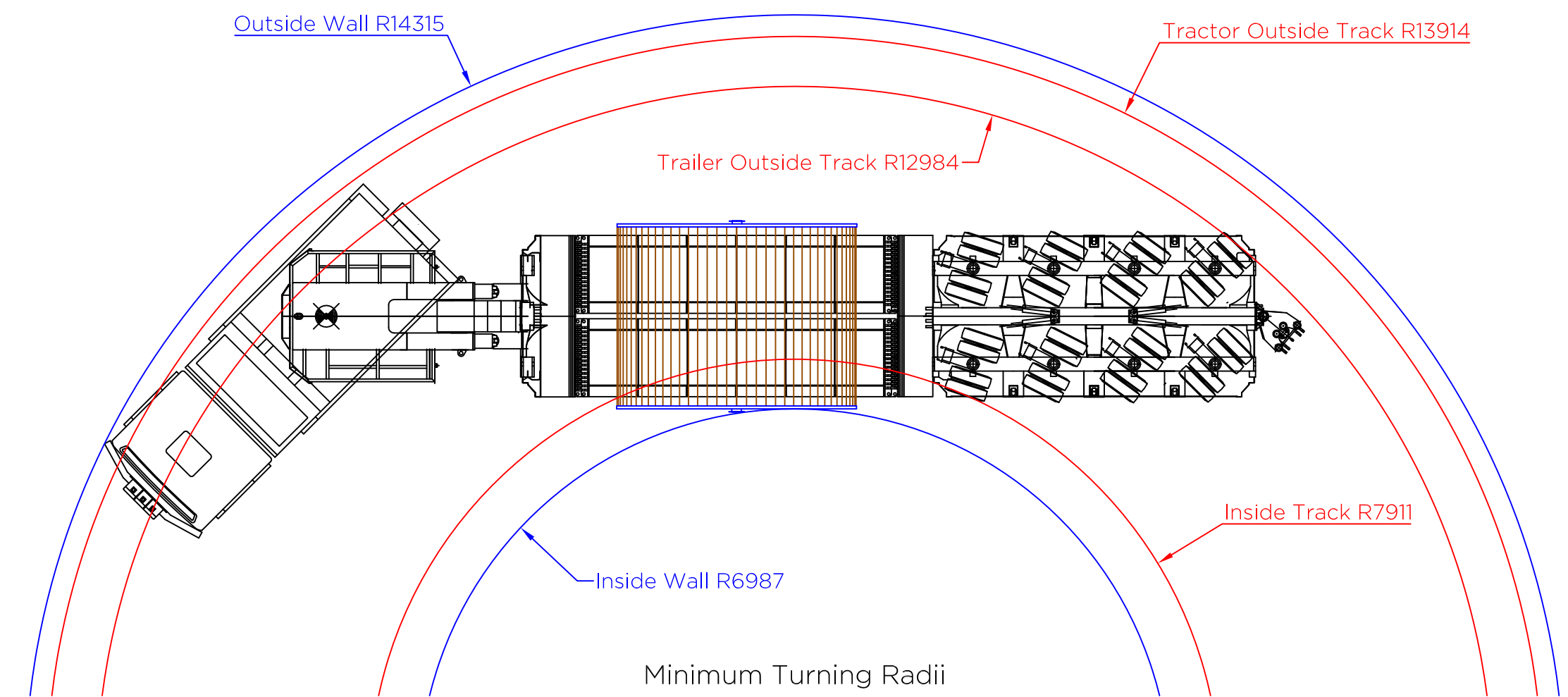


End Elevation

Side Elevation 4460mm Drum diameter



Plan View 4460mm Drum diameter



Minimum Turning Radii

Load Table	
Goose Neck Low Bed 4 Axle Trailer	
Self Weight of Cable Drum	43.35 Te
Self Weight of Trailer	24.0 Te
Self Weight of Tractor	14.0 Te
Total Combined Load	81.35 Te
Load Per Axle Line	11.23 Te
Load Per Axle	5.61 Te
Load Per Wheel (4 per axle)	1.40 Te
Tyre Pressure	140psi/9bar
Block Ground Loading	3.33 Te/m ²
Tractor (14Te)	
Front Axle	8.0 Te
Second Steer	6.0 Te
Rear Axle	11.23 Te
Rear Axle	11.23 Te

The figures shown above are representative of the transport configuration portrayed. However as tractor and trailer arrangements can vary then the loads and dimensions indicated should be treated as probable values.

Actual dimensions, including axle spacing and mean running height, may vary slightly depending on manufacturer of trailer deployed.

All linear measures in millimetres unless stated otherwise.

Drawing of Cable Drum Indicative only.

Assume Goose Neck raising cylinders are fitted.

Rev.	Date	Amendments
A		
O	07.02.17	Issued for comment

Prepared By:



Shaftesbury House, 2 High Street,
Eccleshall, Stafford, ST21 6BZ
Tel: (01785) 850411

Independent Transportation Engineers

Client:



National Grid
Hams Lane
Coleshill
West Midlands
B46 1AW

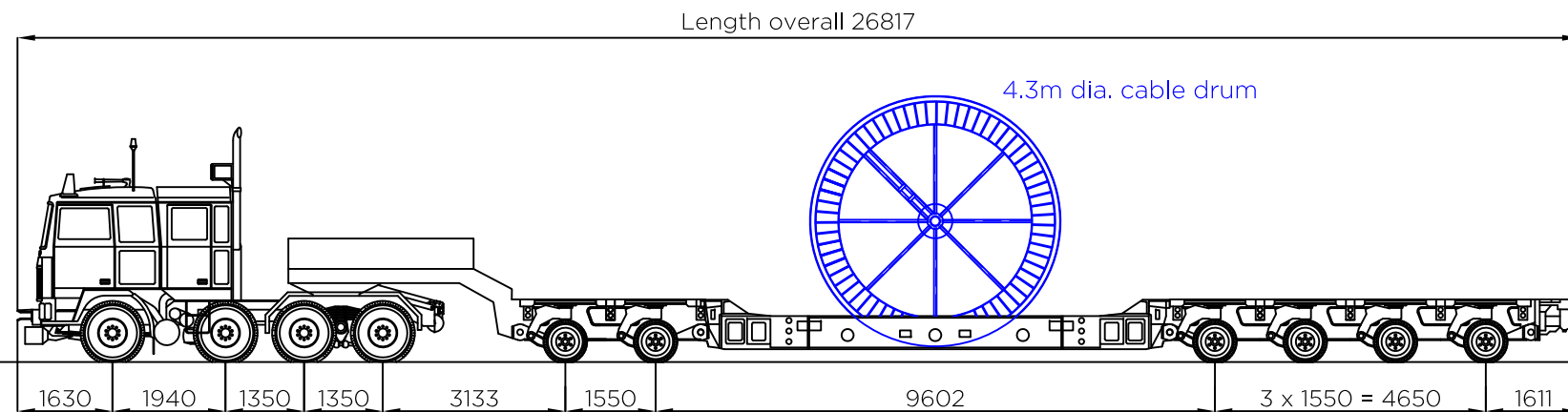
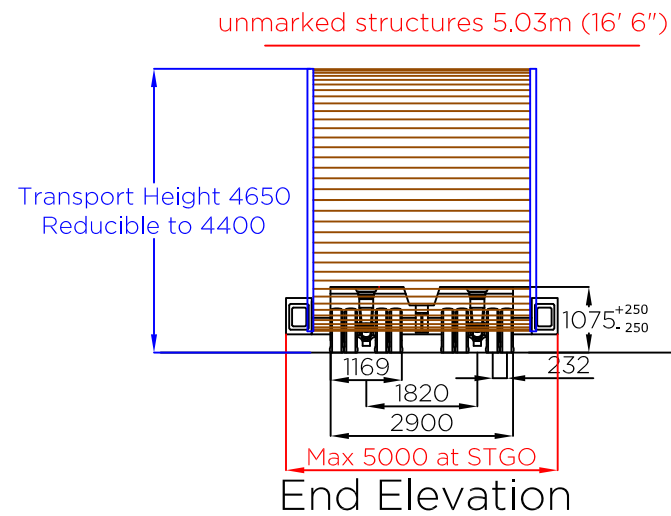
Project: **North Wales Connection**

Title: **Indicative Transport Configuration for Delivery of 4.46m Dia 43.35Te Cable Drums Shown on Goose Neck Low Bed 4 Axle Trailer and Articulated Tractor**

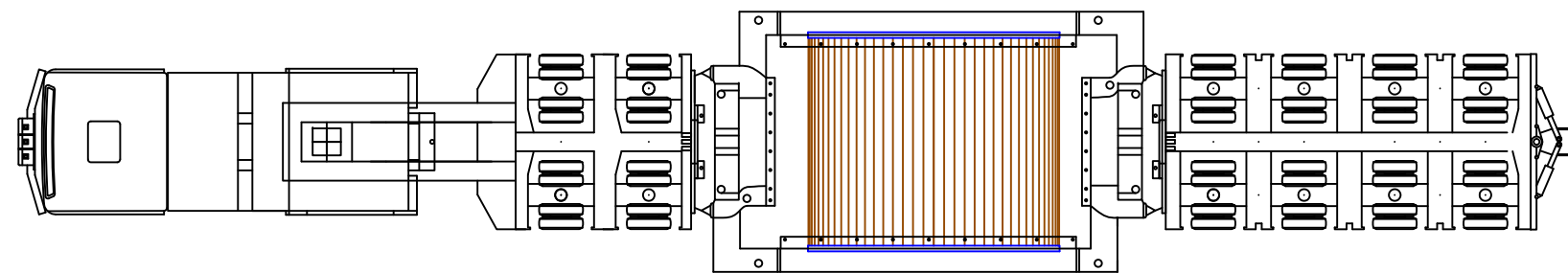
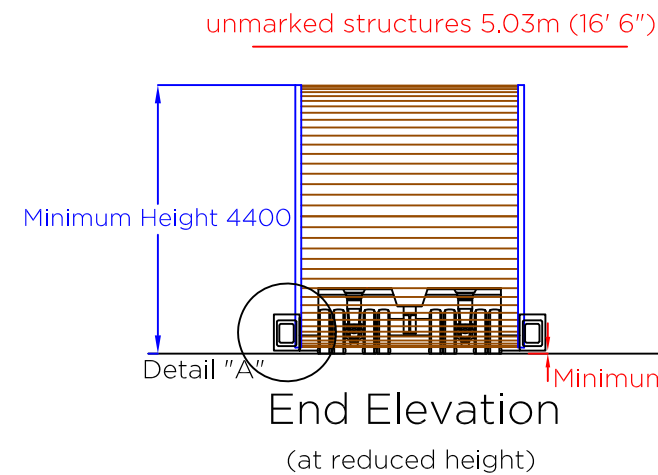
Drawing Status: **Final Report**

Scale (A3): 1:100	Drawn By: DJT	Checked By: ARP
DWG. No: NG-NWC-CD01	Sheet: 1 of 1	Rev: 0

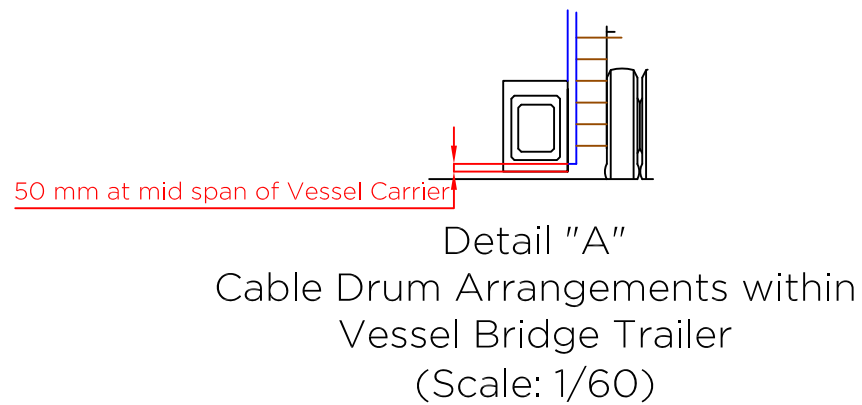
Wynns Limited. This drawing is not to be reproduced in whole or in part, in any form or by any means, without prior written consent.



Side Elevation 4300mm Drum diameter



Plan View 4300mm Drum diameter



Outside Wall Tractor R 15.958m

Outside Track Tractor R 15.628m

Outside Track Trailer R 15.035m

Inside Wall Cable Reel R 7.633m

Minimum Turning Radii

Inside Track Trailer R 9.429m

Load Table	
2 Axle Bed 4 Axle Goose Neck Trailer	
Self Weight of Cable Drum	50.0 Te
Self Weight of Trailer	43.0 Te
Self Weight of Tractor	14.0 Te
Total Combined Load	107.0 Te
Load Per Axle Line	11.63 Te
Load Per Axle	5.81 Te
Load Per Wheel (4 per axle)	1.45 Te
Tyre Pressure	140psi/9bar
Block Ground Loading	3.45 Te/m ²
Tractor (14Te)	
Front Axle	8.0 Te
Second Steer	6.0 Te
Rear Axle	11.63 Te
Rear Axle	11.63 Te

The figures shown above are representative of the transport configuration portrayed. However as tractor and trailer arrangements can vary then the loads and dimensions indicated should be treated as probable values.

Actual dimensions, including axle spacing and mean running height, may vary slightly depending on manufacturer of trailer deployed.

All linear measures in millimetres unless stated otherwise.

Drawing of Cable Drum Indicative only.

Assume Goose Neck raising cylinders are fitted.

Rev.	Date	Revisions
A		
0	07.02.17	Issued for comment

Prepared By:

Shaftesbury House, 2 High Street,
Eccleshall, Stafford, ST21 6BZ
Tel: (01785) 850411

Independent Transportation Engineers

Client:

National Grid
Hams Lane
Coleshill
West Midlands
B46 1AW

Project:

North Wales Connection

Title:

Indicative Transport Configuration
for Delivery of 4.3m Dia Cable Drums Circa 50Te
Shown on 2 Axle Bed 4 Axle Goose Neck Trailer
and Articulated Tractor

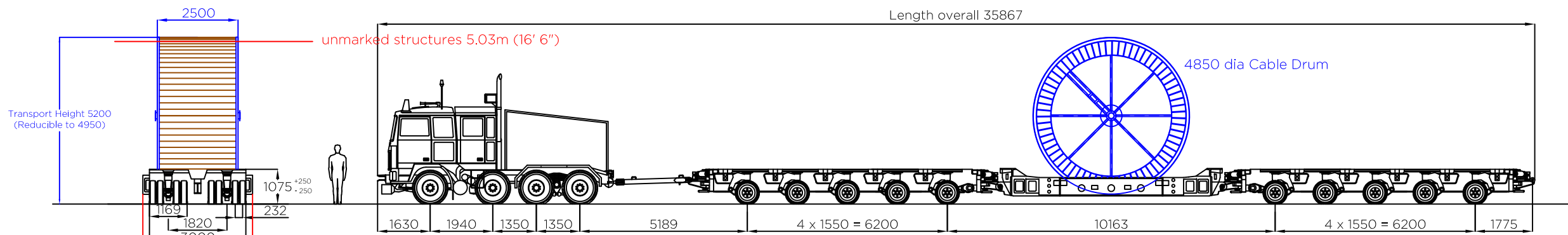
Drawing Status:

Final Report

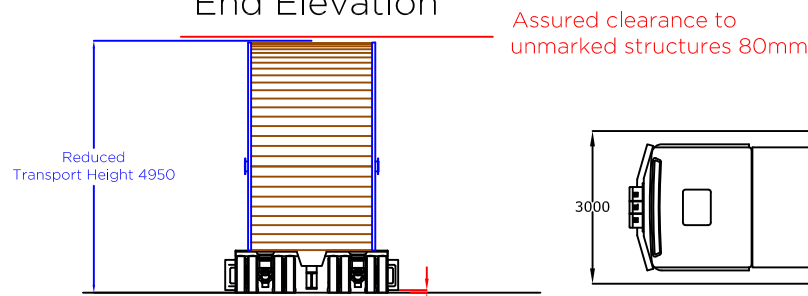
Scale (A3): 1:125	Drawn By: DJT	Checked By: ARP
----------------------	------------------	--------------------

DWG. No: NG-NWC-CD02	Sheet: 1 of 1	Rev: 0
-------------------------	------------------	-----------

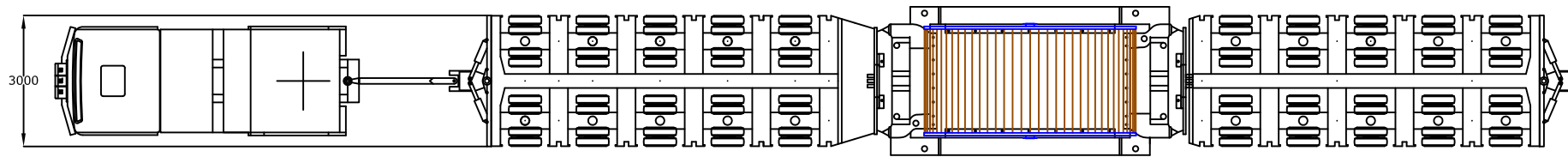
Wynns Limited. This drawing is not to be reproduced in whole or in part, in any form or by any means, without prior written consent.



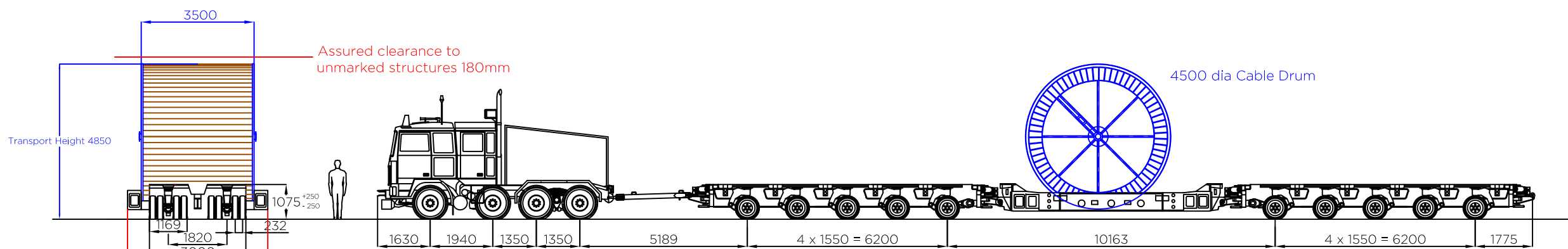
Side Elevation 4850mm Drum diameter



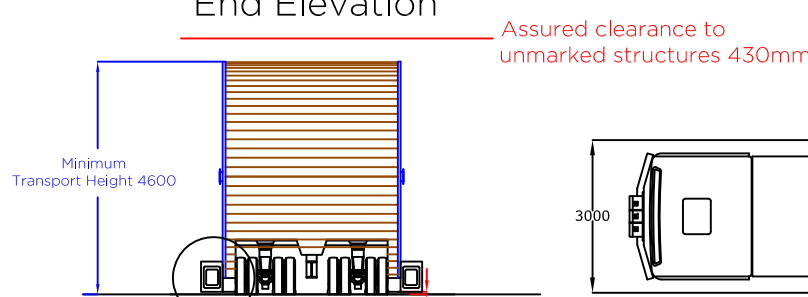
End Elevation
(at reduced height)



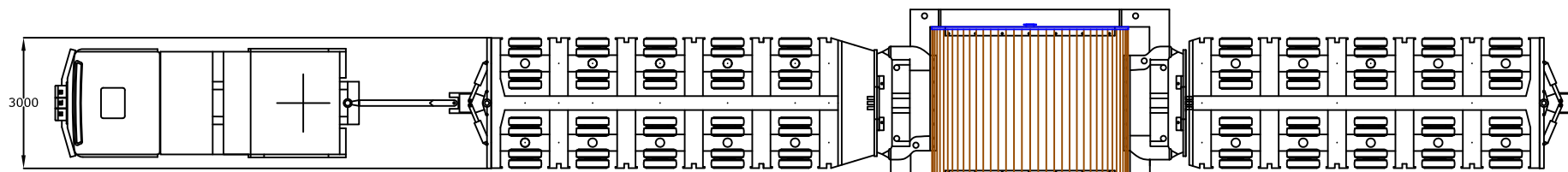
Plan View 4850mm Drum diameter



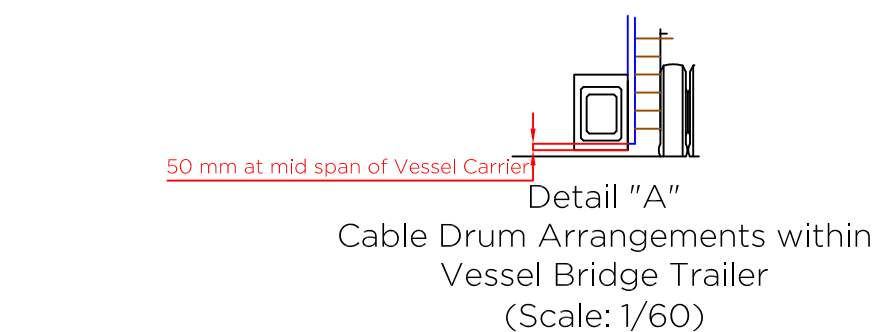
Side Elevation 4500mm Drum diameter



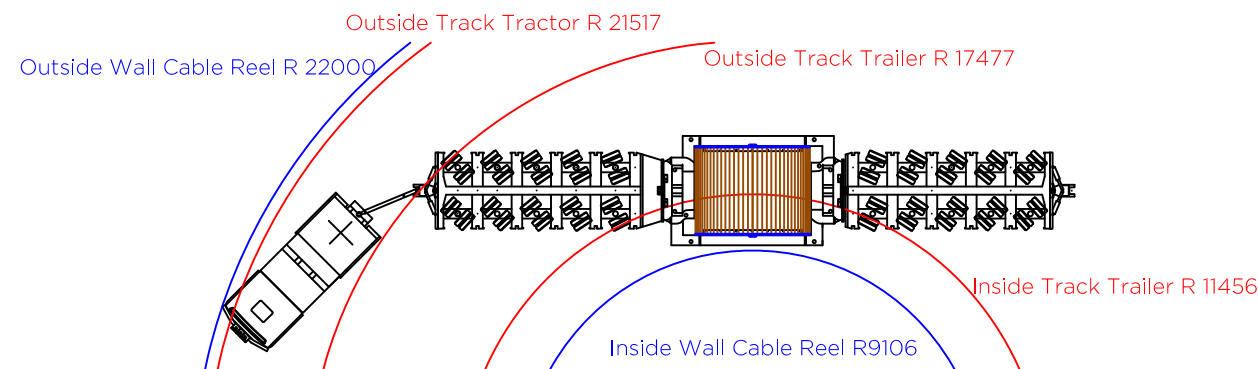
End Elevation
(at reduced height)



Plan View 4500mm Drum diameter



Detail "A"
Cable Drum Arrangements within
Vessel Bridge Trailer
(Scale: 1/60)



Minimum Turning Radii (Scale 1:300)

Load Table	
5 Axle Bed 5 Axle Draw Bar Trailer	
Self Weight of Cable Drum	100.0 Te
Self Weight of Trailer	45.9 Te
Self Weight of Tractor	14.0 Te
Total Combined Load	145.9 Te
Load Per Axle Line	14.6 Te
Load Per Axle	7.3 Te
Load Per Wheel (4 per axle)	3.65 Te
Tyre Pressure	140psi/9bar
Block Ground Loading	3.92 Te

Tractor (45Te)	
Front Axle	7.5 Te
Second Steer	7.5 Te
Rear Axle	15.0 Te
Rear Axle	15.0 Te

The figures shown above are representative of the transport configuration portrayed. However as tractor and trailer arrangements can vary then the loads and dimensions indicated should be treated as probable values.

Actual dimensions, including axle spacing and mean running height, may vary slightly depending on manufacturer of trailer deployed.

All linear measures in millimetres unless stated otherwise.

Drawing of Cable Drum Indicative only.

A		
O	07.02.17	Issued for comment
Rev.	Date	Amendments
		Revisions

Prepared By:



Shaftesbury House, 2 High Street,
Eccleshall, Stafford, ST21 6BZ
Tel: (01785) 850411

Independent Transportation Engineers

Client:



National Grid
Hams Lane
Coleshill
West Midlands
B46 1AW

Project:

North Wales Connection

Title:

Indicative Transport Configuration
for Delivery of both 4.85m & 4.5m Dia Cable
Drums Circa 100Te
Shown on 5 Axle Bed 5 Axle Draw Bar Trailer and
Articulated Tractor

Drawing Status:

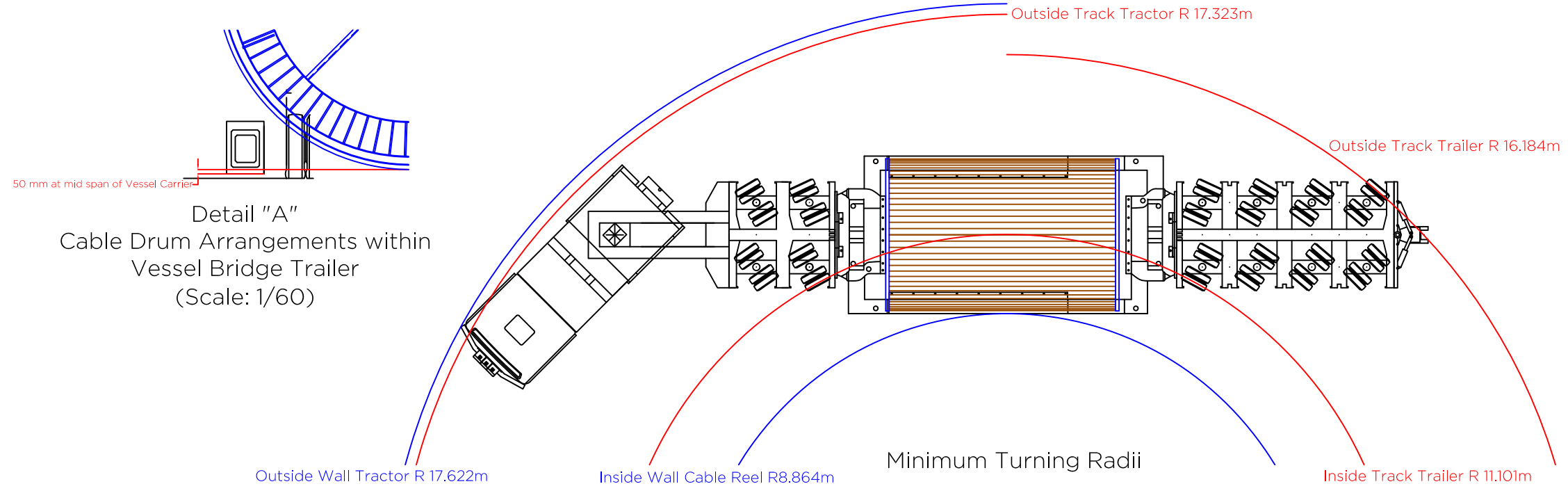
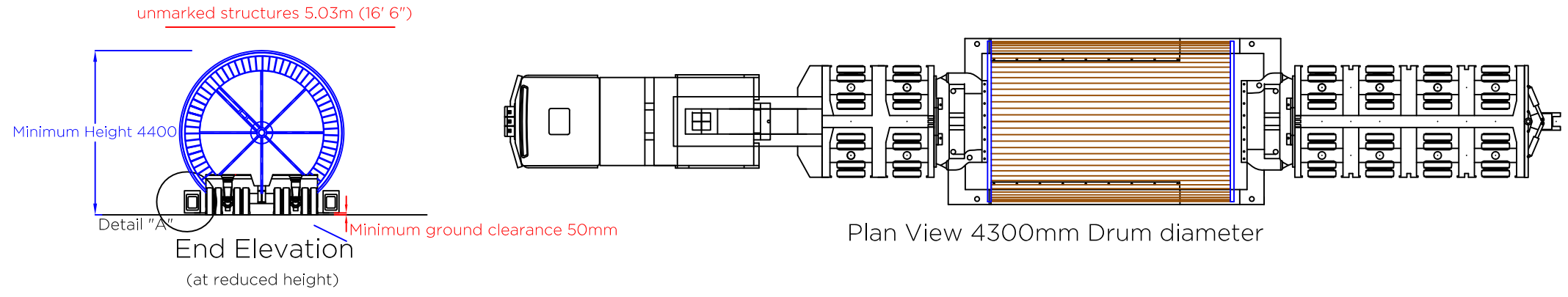
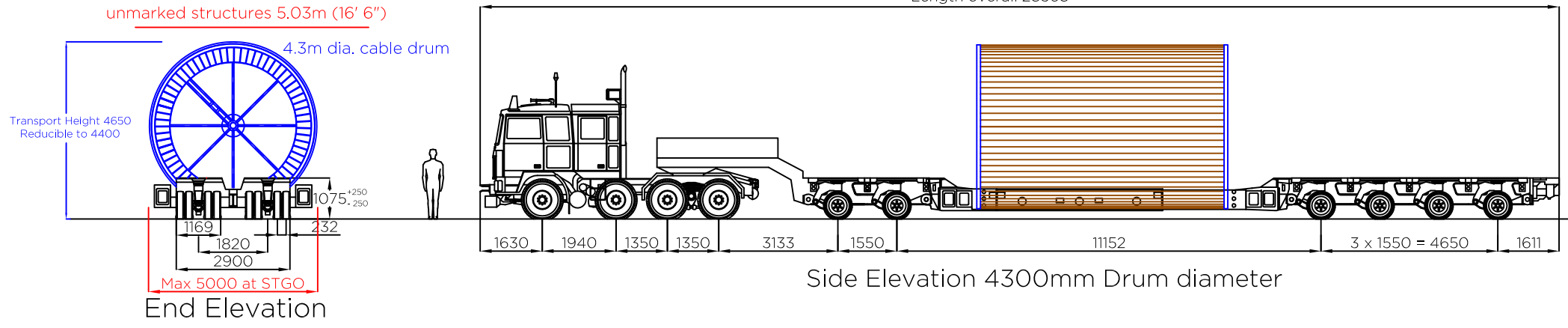
Final Report

Scale (A3):	Drawn By:	Checked By:
1:150	DJT	ARP
DWG. No:	Sheet:	Rev:
NG-NWC-CD03	1 of 1	0

Wynns Limited. This drawing is not to be reproduced in whole or in part, in any form or by any means, without prior written consent.

P:\Clients\Existing Clients\National Grid Company\16-889 North Wales TBM Movement\Drawings\CD03.dwg

Length overall 28368



Load Table	
2 Axle Bed 4 Axle Goose Neck Trailer	
Self Weight of Cable Drum	50.0 Te
Self Weight of Trailer	43.0 Te
Self Weight of Tractor	14.0 Te
Total Combined Load	107.0 Te
Load Per Axle Line	11.63Te
Load Per Axle	5.81 Te
Load Per Wheel (4 per axle)	1.45 Te
Tyre Pressure	140psi/9bar
Block Ground Loading	3.45 Te/m ²

Tractor (14Te)	
Front Axle	8.0 Te
Second Steer	6.0 Te
Rear Axle	11.63 Te
Rear Axle	11.63 Te

The figures shown above are representative of the transport configuration portrayed. However as tractor and trailer arrangements can vary then the loads and dimensions indicated should be treated as probable values.

Actual dimensions, including axle spacing and mean running height, may vary slightly depending on manufacturer of trailer deployed.

All linear measures in millimetres unless stated otherwise.

Drawing of Cable Drum Indicative only.

Assume Goose Neck raising cylinders are fitted.

Rev.	Date	Revisions
A		
O	07.02.17	Issued for comment

Prepared By:



Shaftesbury House, 2 High Street,
Eccleshall, Stafford, ST21 6BZ
Tel: (01785) 850411

Independent Transportation Engineers

Client:



National Grid
Hams Lane
Coleshill
West Midlands
B46 1AW

Project: **North Wales Connection**

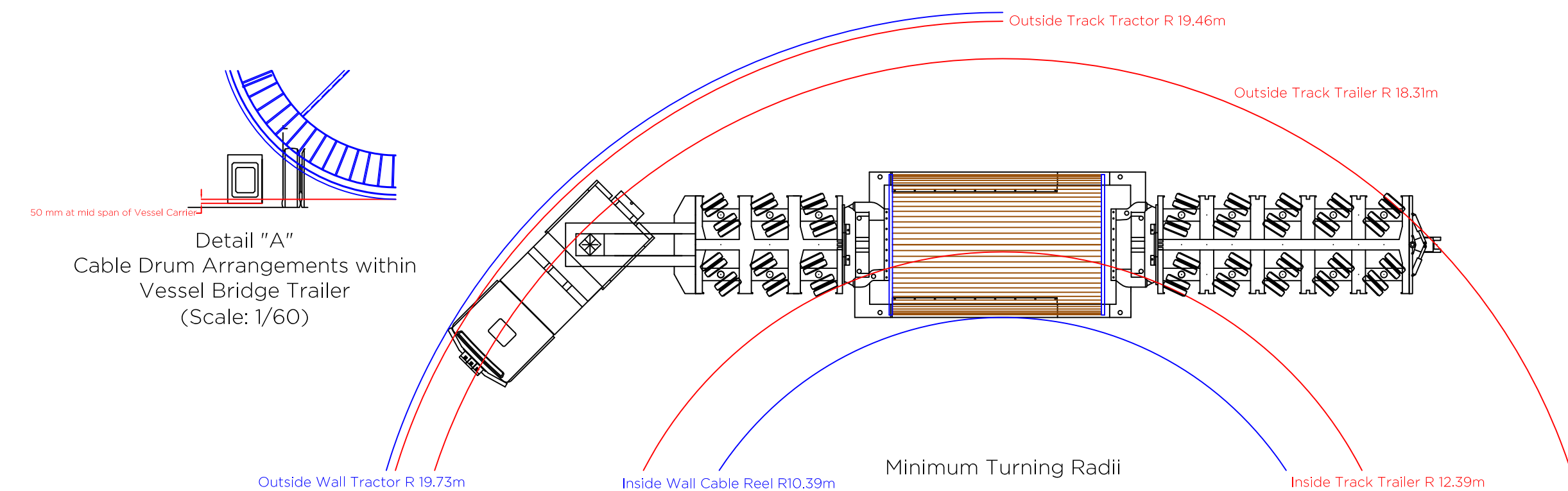
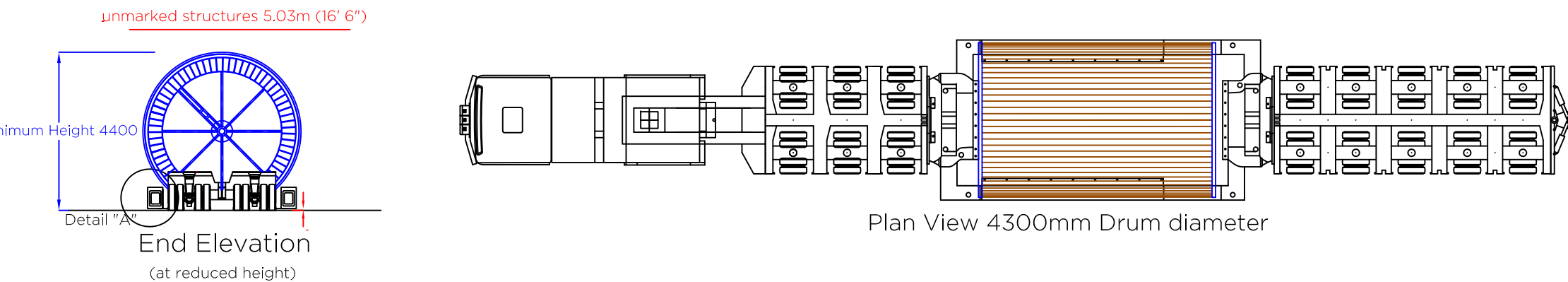
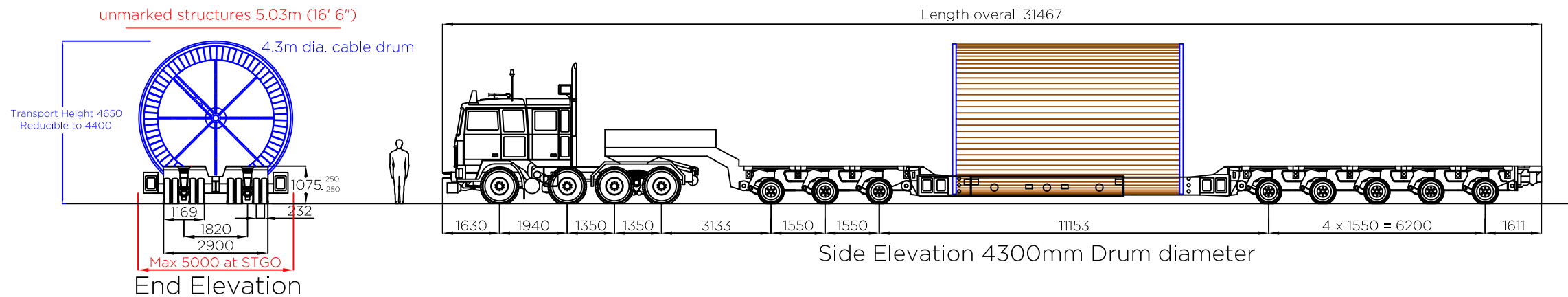
Title:
Indicative Transport Configuration
for Delivery of 4.3m Dia Cable Drums Circa 50Te
Shown on 2 Axle Bed 4 Axle Goose Neck Trailer
and Articulated Tractor

Drawing Status: **Final Report**

Scale (A3): 1:150	Drawn By: DJT	Checked By: ARP
DWG. No: NG-NWC-CDO4	Sheet: 1 of 1	Rev: 0

Wynns Limited. This drawing is not to be reproduced in whole or in part, in any form or by any means, without prior written consent.

P:\Clients\Existing Clients\National Grid Company\16-889 North Wales TBM Movement\Drawings\CDO4.dwg



Load Table	
3 Axle Bed 5 Axle Goose Neck Trailer	
Self Weight of Cable Drum	80.0 Te
Self Weight of Trailer	50.0 Te
Self Weight of Tractor	14.0 Te
Total Combined Load	144.0 Te
Load Per Axle Line	13.0 Te
Load Per Axle	6.50 Te
Load Per Wheel (4 per axle)	1.63 Te
Tyre Pressure	140psi/9bar
Block Ground Loading	3.62 Te/m ²
Tractor (14Te)	
Front Axle	8.0 Te
Second Steer	6.0 Te
Rear Axle	13.0 Te
Rear Axle	13.0 Te

The figures shown above are representative of the transport configuration portrayed. However as tractor and trailer arrangements can vary then the loads and dimensions indicated should be treated as probable values.

Actual dimensions, including axle spacing and mean running height, may vary slightly depending on manufacturer of trailer deployed.

All linear measures in millimetres unless stated otherwise.

Drawing of Cable Drum Indicative only.

Assume Goose Neck raising cylinders are fitted.

Rev.	Date	Amendments
A		
O	07.02.17	Issued for comment
Revisions		

Prepared By:



Shaftesbury House, 2 High Street,
Eccleshall, Stafford, ST21 6BZ
Tel: (01785) 850411

Independent Transportation Engineers

Client:



National Grid
Hams Lane
Coleshill
West Midlands
B46 1AW

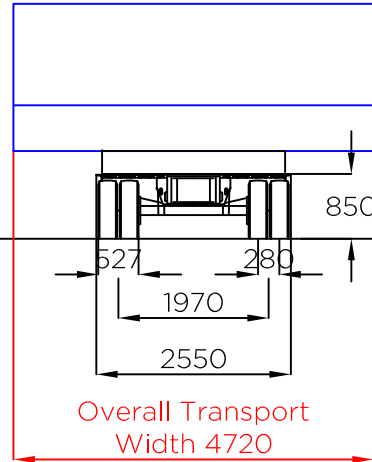
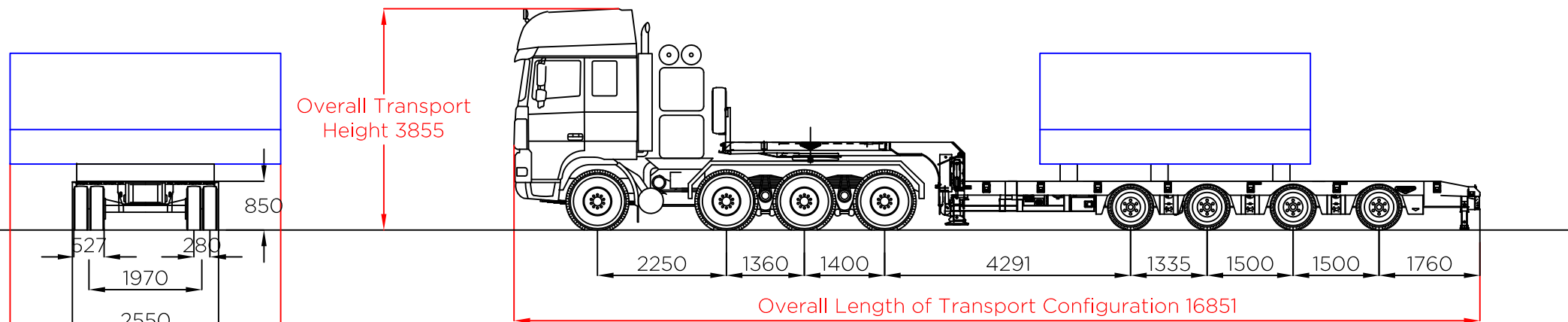
Project: **North Wales Connection**

Title: **Indicative Transport Configuration for Delivery of 4.3m Dia Cable Drums Circa 80Te Shown on 3 Axle Bed 5 Axle Goose Neck Trailer and Articulated Tractor**

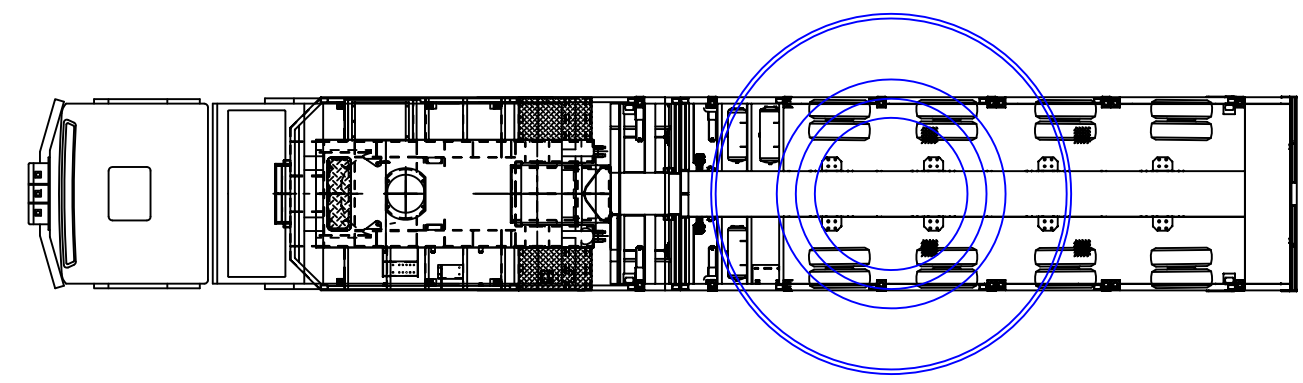
Drawing Status: **Final Report**

Scale (A3): 1:150	Drawn By: DJT	Checked By: ARP
DWG. No: NG-NWC-CD05	Sheet: 1 of 1	Rev: 0

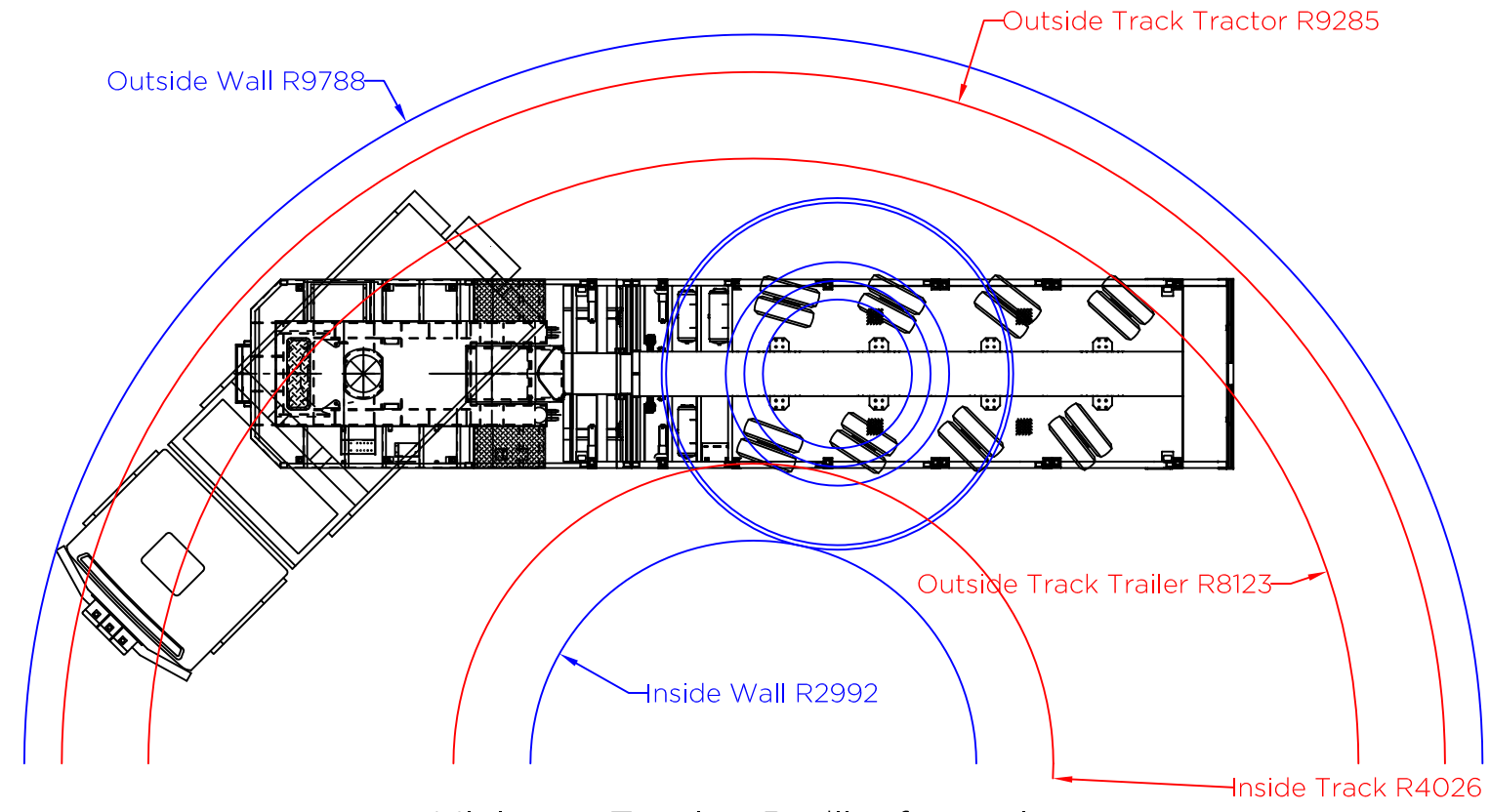
Wynns Limited. This drawing is not to be reproduced in whole or in part, in any form or by any means, without prior written consent.



Side Elevation - 4 Axle Steerable Stepframe
Indicative 4.72m dia Cutting Head.



Plan View - 4 Axle Steerable Stepframe
Indicative 4.72m dia Cutting Head.



Minimum Turning Radii Information

Load Table	
4 Axle Steerable Stepframe	
Self Weight of Load	40.0 Te
Self Weight of Trailer	15.0 Te
Self Weight of Tractor(s)	14.0 Te
Total Combined Weight	69.0 Te
Load Per Axle Line	9.17 Te
Load Per Wheel (4 per axle)	2.29 Te
Overall Ground Bearing Pressure	3.32 Te/m ²
Tyre Contact Patch (est. min)	300mm x 180mm
Tyre Pressure	140psi / 9bar

Tractor (14Te)	
Front Axle	6.0 Te
Second Steer	8.0 Te
Rear Axle	9.17 Te
Rear Axle	9.17 Te

The figures shown above are representative of the transport configuration portrayed. However as tractor and trailer arrangements can vary then the loads and dimensions indicated should be treated as probable values.

Actual dimensions, including axle spacing and mean running height, may vary slightly depending on manufacturer of trailer deployed.

All linear measures in millimetres unless stated otherwise.

Drawing of Cutting Head Indicative only.

Rev.	Date	Amendments
A		
0	08.02.17	Issued for comment
		Revisions

Prepared By:



Shaftesbury House, 2 High Street,
Eccleshall, Stafford, ST21 6BZ
Tel: (01785) 850411

Independent Transportation Engineers

Client:



National Grid
Hams Lane
Coleshill
West Midlands
B46 1AW

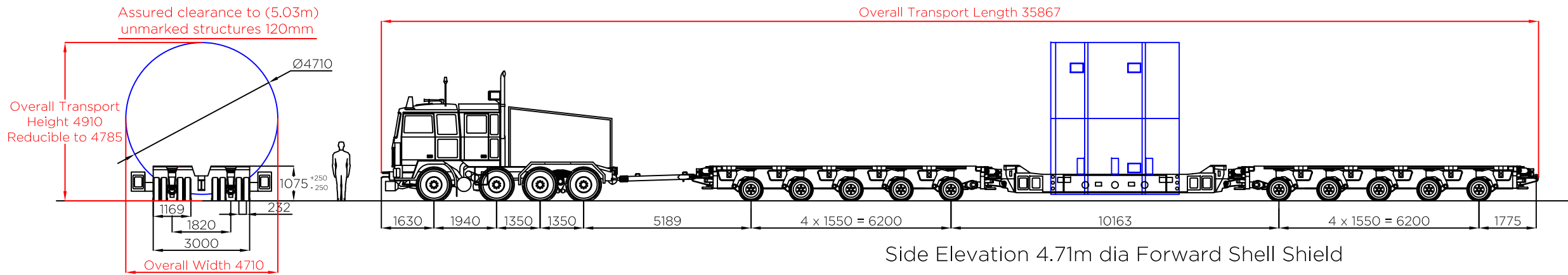
Project: **North Wales Connection**

Title: **Indicative Transport Configuration for Delivery of 4.72m Dia 40Te Cutting Head Shown on 4 Axle Steerable Stepframe Trailer and Articulated Tractor**

Drawing Status: **Final Report**

Scale (A3): 1:100	Drawn By: DJT	Checked By: ARP
DWG. No: NG-NWC-CH01	Sheet: 1 of 1	Rev: 0

Wynns Limited. This drawing is not to be reproduced in whole or in part, in any form or by any means, without prior written consent.



Assured clearance to (5.03m) unmarked structures 120mm

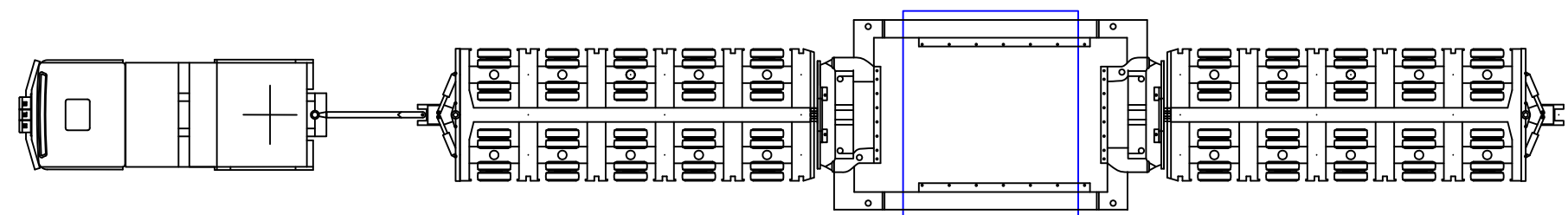
Overall Transport Height 4910 Reducible to 4785

Overall Transport Length 35867

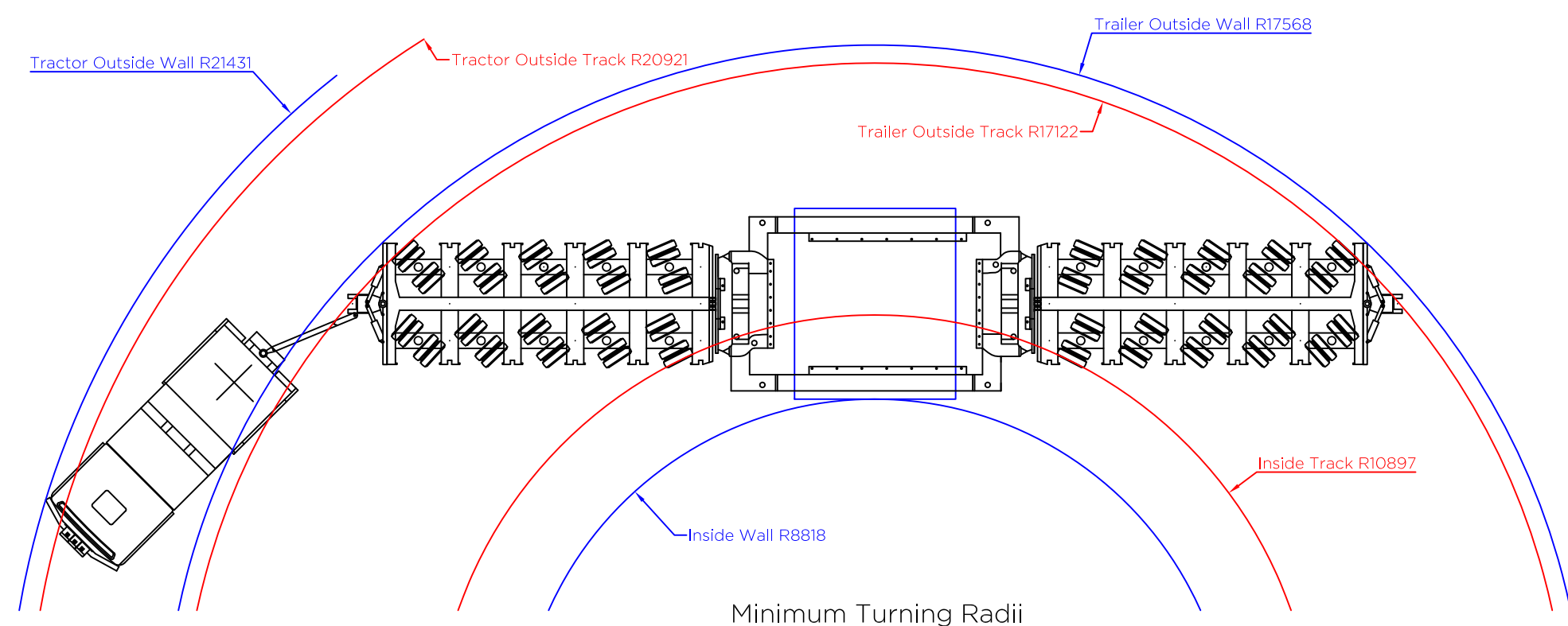
Overall Width 4710

End Elevation

Side Elevation 4.71m dia Forward Shell Shield



Plan View 4.71m dia Forward Shell Shield



Minimum Turning Radii

Load Table	
5 Axle Bed 5 Axle Draw Bar Trailer	
Self Weight of Load	103.0 Te
Self Weight of Trailer	45.9 Te
Self Weight of Tractor	40.0 Te
Total Combined Load	188.9 Te
Load Per Axle Line	14.89 Te
Load Per Axle	7.45 Te
Load Per Wheel (4 per axle)	1.86 Te
Tyre Pressure	140psi/9bar
Block Ground Loading	4.0 Te/m ²

Tractor (40Te)	
Front Axle	7.5 Te
Second Steer	7.5 Te
Rear Axle	12.5 Te
Rear Axle	12.5 Te

The figures shown above are representative of the transport configuration portrayed. However as tractor and trailer arrangements can vary then the loads and dimensions indicated should be treated as probable values.

Actual dimensions, including axle spacing and mean running height, may vary slightly depending on manufacturer of trailer deployed.

All linear measures in millimetres unless stated otherwise.

Drawing of TBM Component Indicative only.

Rev.	Date	Amendments
A		
O	08.02.17	Issued for comment
		Revisions

Prepared By:



Shaftesbury House, 2 High Street, Eccleshall, Stafford, ST21 6BZ
Tel: (01785) 850411

Independent Transportation Engineers

Client:



National Grid
Hams Lane
Coleshill
West Midlands
B46 1AW

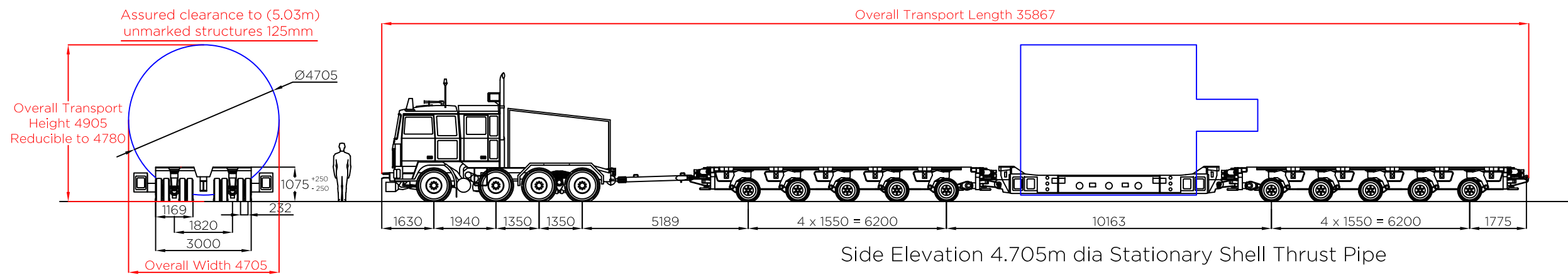
Project: **North Wales Connection**

Title: Indicative Transport Configuration for Delivery of 4.71m Dia 103Te Forward Shell Shield Shown on 5 Axle Bed 5 Axle Draw Bar Trailer and Articulated Tractor

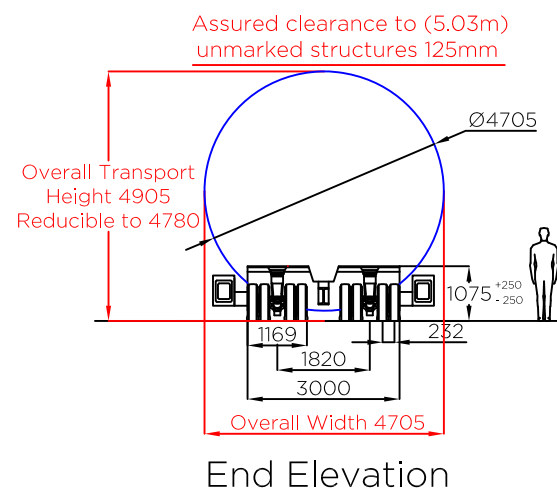
Drawing Status: Final Report

Scale (A3): 1:150	Drawn By: DJT	Checked By: ARP
DWG. No: NG-NWC-FSS01	Sheet: 1 of 1	Rev: 0

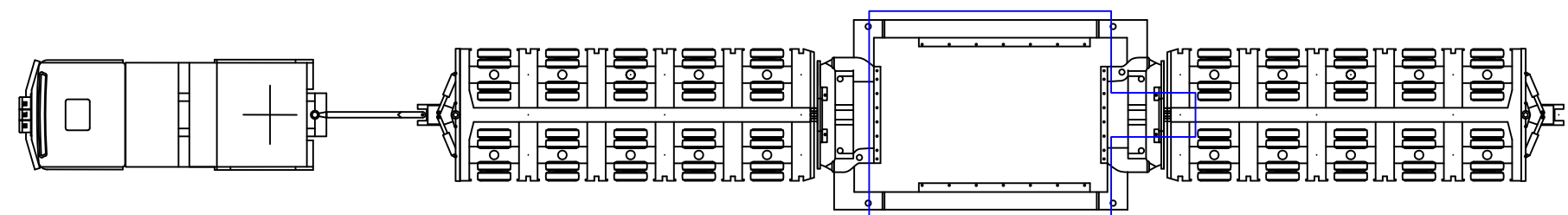
Wynns Limited. This drawing is not to be reproduced in whole or in part, in any form or by any means, without prior written consent.



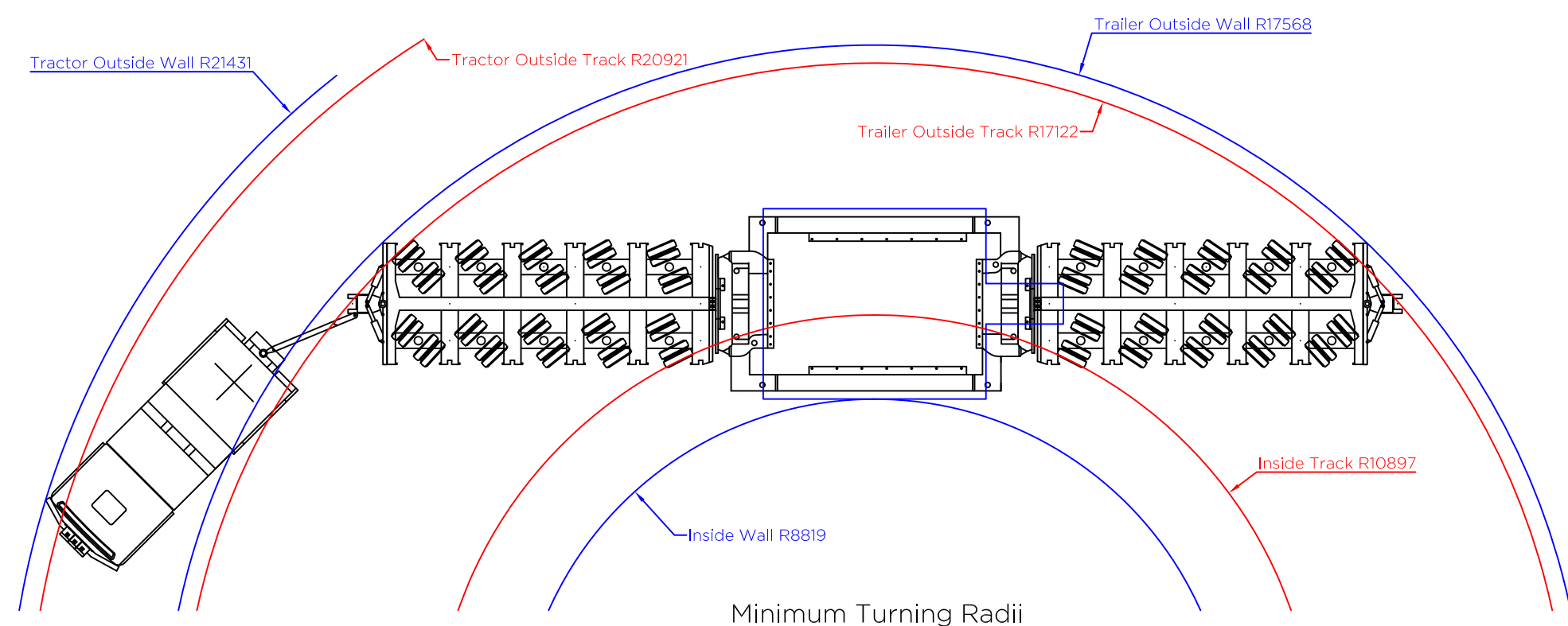
Side Elevation 4.705m dia Stationary Shell Thrust Pipe



End Elevation



Plan View 4.705m dia Stationary Shell Thrust Pipe



Minimum Turning Radii

Load Table	
5 Axle Bed 5 Axle Draw Bar Trailer	
Self Weight of Load	105.0 Te
Self Weight of Trailer	45.9 Te
Self Weight of Tractor	40.0 Te
Total Combined Load	190.9 Te
Load Per Axle Line	15.09 Te
Load Per Axle	7.55 Te
Load Per Wheel (4 per axle)	1.89 Te
Tyre Pressure	140psi/9bar
Block Ground Loading	4.06 Te/m ²

Tractor (40Te)	
Front Axle	7.5 Te
Second Steer	7.5 Te
Rear Axle	12.5 Te
Rear Axle	12.5 Te

The figures shown above are representative of the transport configuration portrayed. However as tractor and trailer arrangements can vary then the loads and dimensions indicated should be treated as probable values.

Actual dimensions, including axle spacing and mean running height, may vary slightly depending on manufacturer of trailer deployed.

All linear measures in millimetres unless stated otherwise.

Drawing of TBM Component Indicative only.

Rev.	Date	Amendments
A		
O	08.02.17	Issued for comment
		Revisions

Prepared By:



Shaftesbury House, 2 High Street,
Eccleshall, Stafford, ST21 6BZ
Tel: (01785) 850411

Independent Transportation Engineers

Client:



National Grid
Hams Lane
Coleshill
West Midlands
B46 1AW

Project: **North Wales Connection**

Title: Indicative Transport Configuration for Delivery of 4.705m Dia 105Te Stationary Shell Thrust Pipe Shown on 5 Axle Bed 5 Axle Draw Bar Trailer and Articulated Tractor

Drawing Status: Final Report

Scale (A3):	Drawn By:	Checked By:
1:150	DJT	ARP

DWG. No:	Sheet:	Rev:
NG-NWC-SSTP01	1 of 1	0

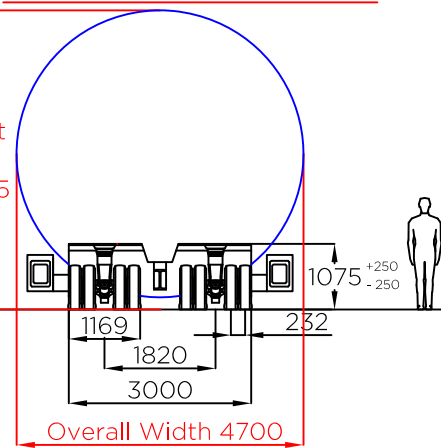
Wynns Limited. This drawing is not to be reproduced in whole or in part, in any form or by any means, without prior written consent.

Assured clearance to (5.03m) unmarked structures 130mm

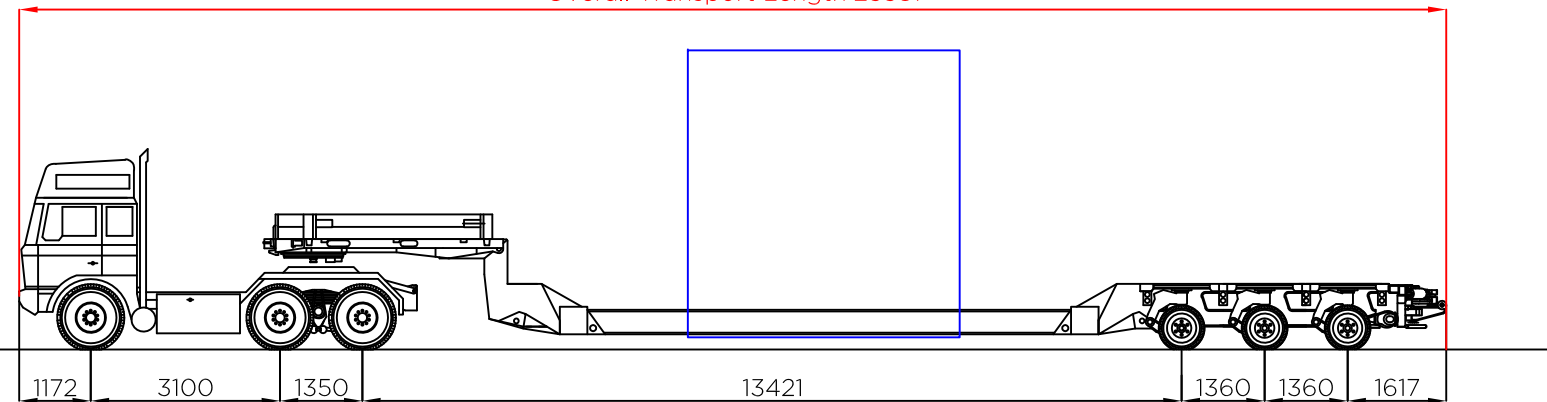
Overall Transport Height 4900
Reducible to 4775

Overall Width 4700

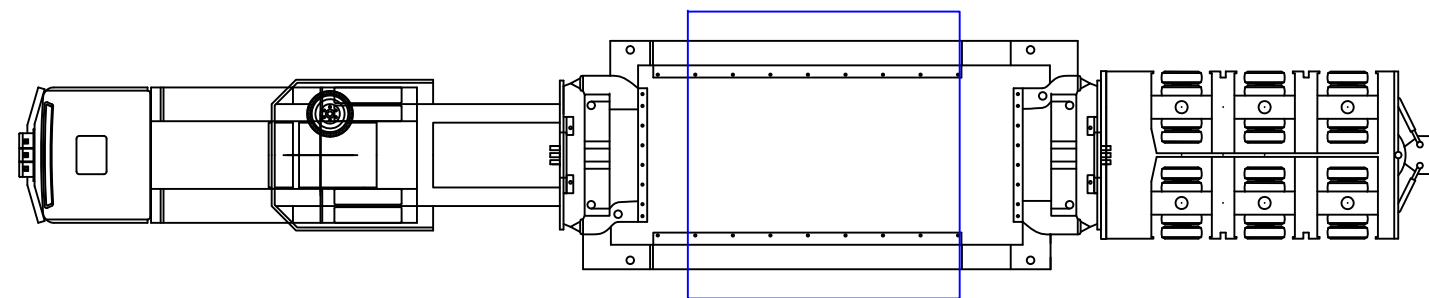
End Elevation



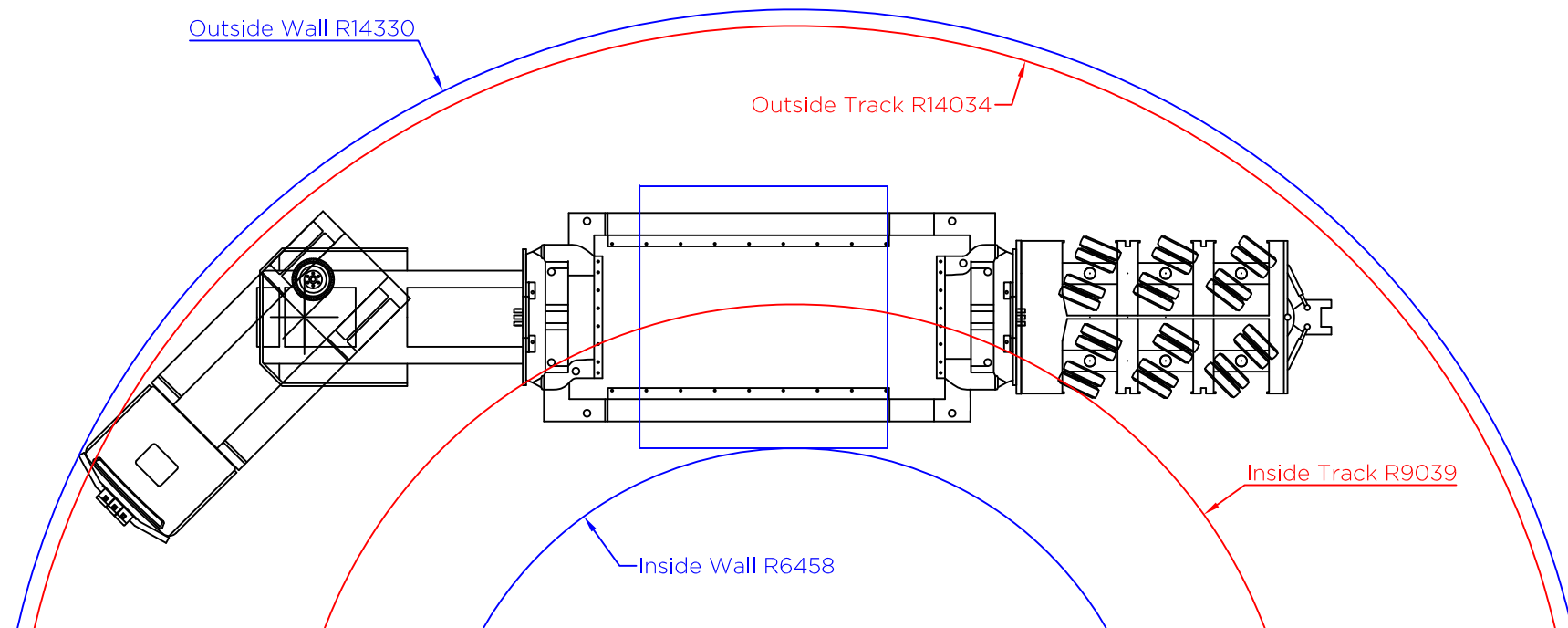
Overall Transport Length 23381



Side Elevation 4.7m dia Tail Can



Plan View 4.7m dia Tail Can



Plan View 4.7m dia Tail Can

Load Table	
Goose Neck Low Bed 3 Axle Trailer	
Self Weight of Tail Can	23.0 Te
Self Weight of Trailer	24.44 Te
Self Weight of Tractor	12.0 Te
Total Combined Load	59.44 Te
Load Per Axle Line (Trailer)	10.1Te
Load Per Axle	5.05 Te
Load Per Wheel (4 per axle)	1.26 Te
Tyre Pressure	140psi/9bar
Block Ground Loading	3.71 Te/m ²

Tractor (12Te)	
Front Axle	7.2 Te
Rear Axle	10.97 Te
Rear Axle	10.97 Te

The figures shown above are representative of the transport configuration portrayed. However as tractor and trailer arrangements can vary then the loads and dimensions indicated should be treated as probable values.

Actual dimensions, including axle spacing and mean running height, may vary slightly depending on manufacturer of trailer deployed.

All linear measures in millimetres unless stated otherwise.

Drawing of Cable Drum Indicative only.

Assume Goose Neck raising cylinders are fitted.

Rev.	Date	Ammendments
A		
O	08.02.17	Issued for comment
		Revisions

Prepared By:



Shaftesbury House, 2 High Street,
Eccleshall, Stafford, ST21 6BZ
Tel: (01785) 850411

Independent Transportation Engineers

Client:



National Grid
Hams Lane
Coleshill
West Midlands
B46 1AW

Project: **North Wales Connection**

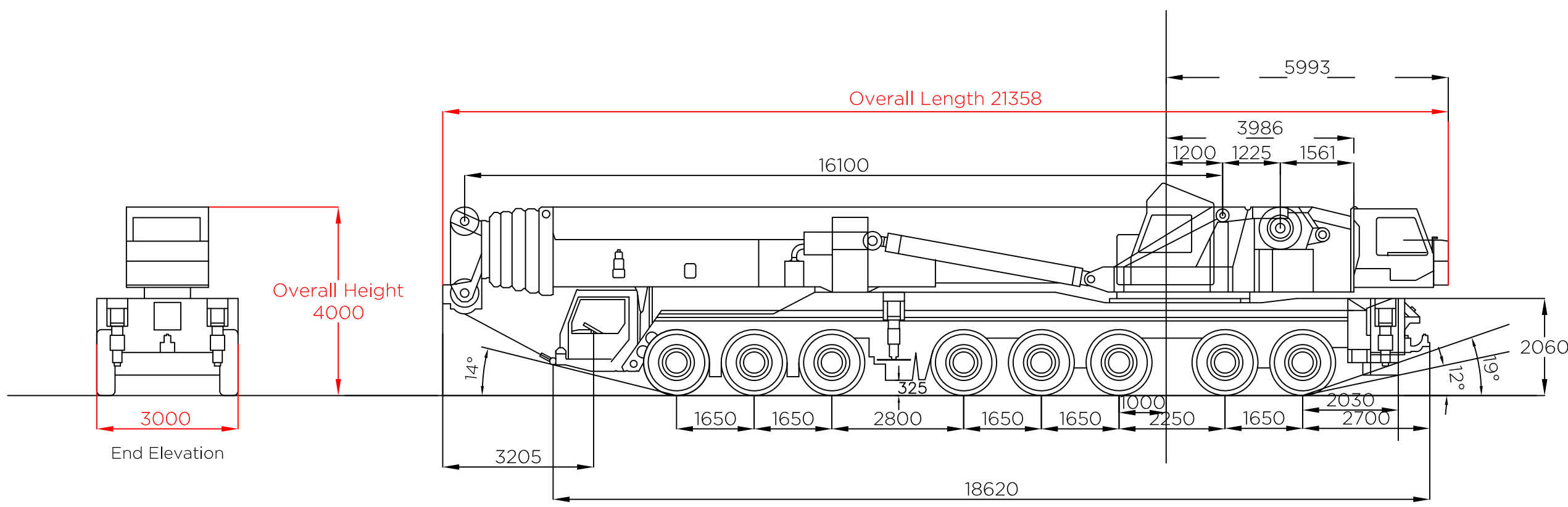
Title: **Indicative Transport Configuration for Delivery of 4.7m Dia 23Te Tail Can Shown on Goose Neck Low Bed 3 Axle Trailer and Articulated Tractor**

Drawing Status: **Final Report**

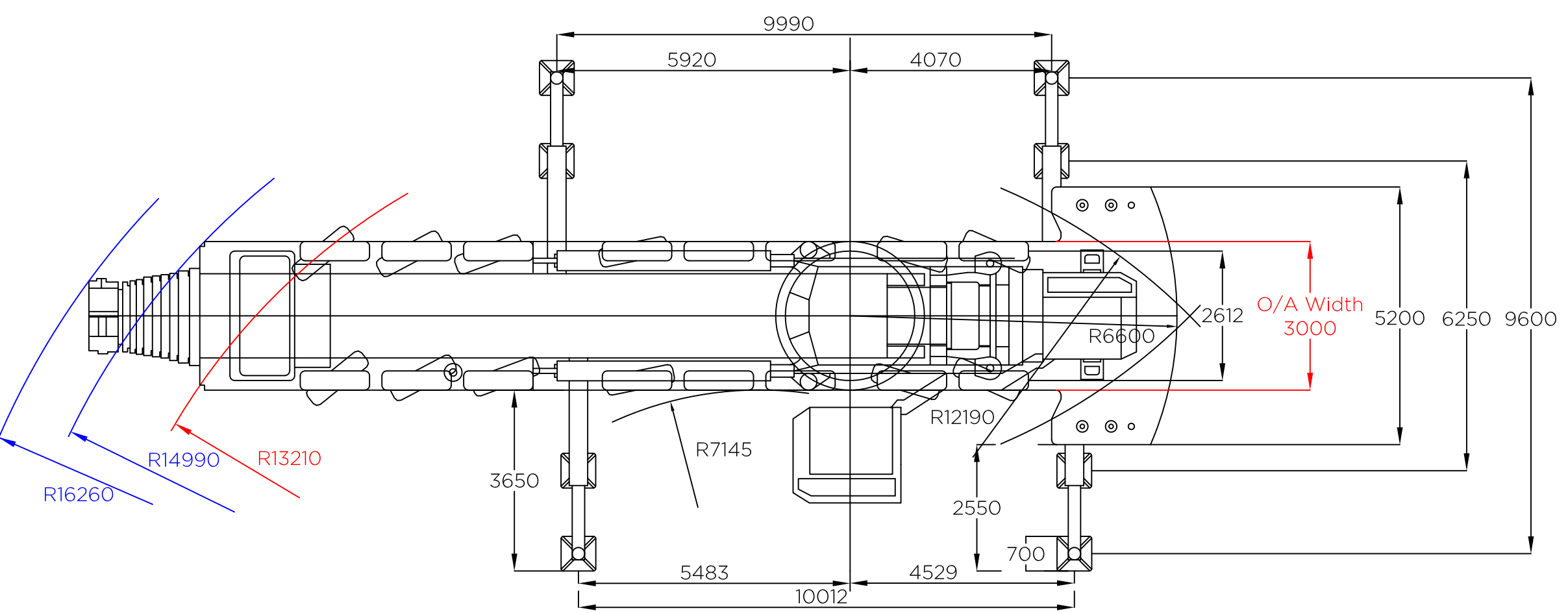
Scale (A3): 1:125	Drawn By: DJT	Checked By: ARP
----------------------	------------------	--------------------

DWG. No: NG-NWC-TC01	Sheet: 1 of 1	Rev: 0
-------------------------	------------------	-----------

Wynns Limited. This drawing is not to be reproduced in whole or in part, in any form or by any means, without prior written consent.



500te Mobile Crane - Side Elevation.
Scale: 1/100



500te Mobile Crane - Set Up and Minimum
Turning Radii - Plan.
Scale: 1/100

HOOKBLOCK

CAPACITY:	171	84	37	12.5
WEIGHT:	2.75	1.8	1.23	0.6

Load Table	
Indicative of 500Te Mobile Crane	
Self Weight of Crane (stripped of ballast)	96.0 Te
Load Per Axle Line (Manufacturers minimum assuming no ballast)	12.0 Te
Load Per Wheel	6.0 Te
Tyre Pressure	140psi/9bar

The figures shown above are representative of the transport configuration portrayed. However as tractor and trailer arrangements can vary then the loads and dimensions indicated should be treated as probable values.

Actual dimensions, including axle spacing and mean running height, may vary slightly depending on manufacturer of trailer deployed.

All linear measures in millimetres unless stated otherwise.

Rev.	Date	Amendments
A		
0	08.02.17	Issued for comment
		Revisions

Prepared By:



Shaftesbury House, 2 High Street,
Eccleshall, Stafford, ST21 6BZ
Tel: (01785) 850411

Independent Transportation Engineers

Client:



National Grid
Hams Lane
Coleshill
West Midlands
B46 1AW

Project: **North Wales Connection**

Title: **Indicative Transport Configuration
500Te Mobile Crane
Showing Outrigger arrangements
and minimum turning radii information**

Drawing Status: **Final Report**

Scale (A3): 1:100	Drawn By: DJT	Checked By: ARP
DWG. No: NG-NWC-C01	Sheet: 1 of 1	Rev: 0

Wynns Limited. This drawing is not to be reproduced in whole or in part, in any form or by any means, without prior written consent.



Appendix 3

Highways England have issued an aide memoir

HIGHWAYS AGENCY

Aide Memoire for notification requirements for the movement of Abnormal Indivisible Loads or vehicles by road when not complying with The Road Vehicles (Construction and Use) Regulations 1986 (commonly known as C & U)

Weight

Gross weight of vehicle carrying the load exceeding C & U limits up to 80,000kgs (78.74 tons)	2 clear days notice with indemnity to Road and Bridge Authorities.
Gross weight of vehicle carrying the load exceeding 80,000kgs up to 150,000kgs (147.63 tons)	2 clear days notice to Police and 5 clear days with indemnity to Road and Bridge Authorities.
Gross weight of vehicle carrying the load exceeding 150,000kgs (147.63 tons)	HA Special Order* plus 5 clear days notice to Police and 5 clear days notice with indemnity to Road and Bridge Authorities

Width

C & U loads:- width exceeding 2.9m (9ft 6ins) up to 4.3m (14ft 1 ins) STGO loads:- width exceeding 3.0m (9ft 10ins) up to 5.0m (16ft 5ins)	2 clear days notice to Police
Width exceeding 5.0m (16ft 5ins) up to 6.1m (20ft)	HA form VR1** plus 2 clear days notice to Police
Width exceeding 6.1m (20ft)	HA Special Order* plus 5 clear days notice to Police and 5 clear days notice with indemnity to Road and Bridge Authorities

Length

C&U loads:- length exceeding 18.65m (61ft 2in) up to 27.4m (90ft) - See C&U Regulations 1986 for definition of length STGO loads:- length exceeding 18.75m (61ft 6 ins) - See part 2, article 12 of the Road Vehicles (Authorisation of Special Types) (General) Order 2003 (Commonly known as STGO) for definition of length	2 clear days notice to Police
Overall length of a part 2 vehicle-combination exceeding 25.9m (85ft)	2 clear days notice to Police
Maximum length exceeding 30.0m (98ft 5ins) – see STGO Schedule 1, part 4, paragraph 25 for definition of maximum length NB For some very light loads, such as yacht masts, that are moved on conventional motor vehicles not exceeding 12 tonnes gross weight or trailers not exceeding 10 tonnes gross weight, an HA Special Order* will be required if the rigid length exceeds 27.4m (89ft 11ins)	HA Special Order* plus 5 clear days notice to Police and 5 clear days notice with indemnity to Road and Bridge Authorities.

NOTE 1 “Clear days Notice” excludes Saturdays, Sundays or a public holiday in any part of Great Britain in relation to movements authorised by the Special Types General Order only, there being no such exclusion in Special Orders unless specifically stated.

NOTE 2 There is no statutory limit governing the overall height of a load, however, when applying for a Special Order or VR1 it should, wherever possible, not exceed 4.95m (16ft 3ins) in order that the maximum use can be made of the motorway and trunk road network.

NOTE 3 The notification requirements for mobile cranes can be found in the Road Vehicles (Authorisation of Special Types) (General) Order 2003, statutory instrument number 1998 (Part 2 Articles 10 to 18), which is available on the OPSI website:
<http://www.opsi.gov.uk/si/si2003/20031998.htm#sch10>.

*A Special Order application can be completed and submitted online at <https://www.gov.uk/esdal-abnormal-load-notification>. The Special Order [Application form BE16](#) can also be downloaded from the Highways Agency website and e-mailed to the address below. Approval is not automatic and is at the discretion of the Highways Agency Abnormal Loads Team acting on behalf of the Secretary of State for Transport. To ensure that the necessary clearances can be obtained in good time from the Police, Highway and Bridge Authorities, you should request permission for the move by returning the completed form 10 weeks prior to the scheduled date of the move. In fact you cannot apply too early and we invite manufacturers or hauliers to contact us at pre tender stage, before making a financial commitment to supply the load, to check whether permission would be granted.

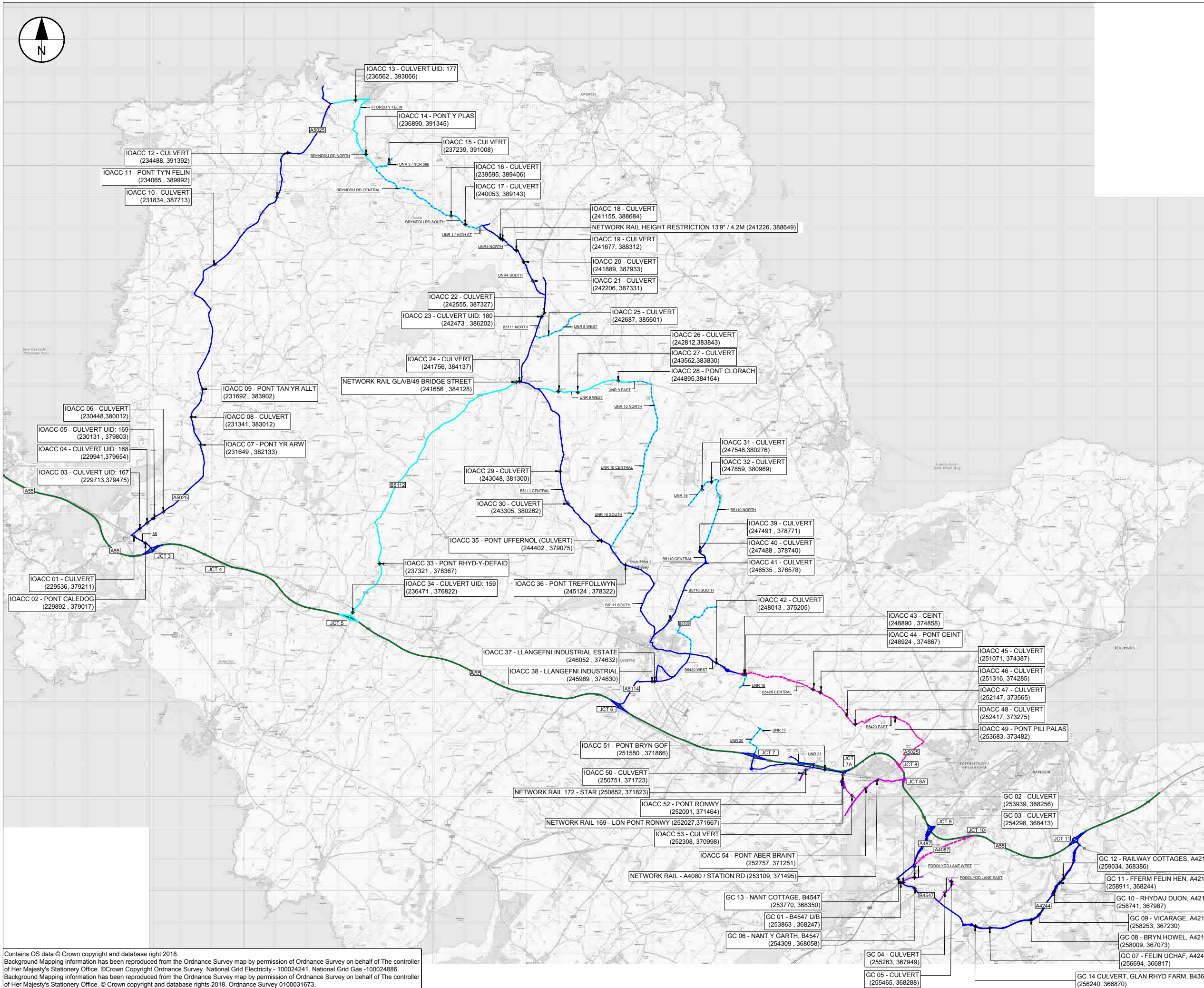
** A VR1 application can be completed and submitted online at <https://www.gov.uk/esdal-abnormal-load-notification>. [Application form VR1](#) can also be downloaded from this site but must not be e-mailed or faxed because the VR1 form is a legal document and so we must receive the original signed form. Approval is not automatic and is at the discretion of The Highways Agency Abnormal Loads Team acting on behalf of The Secretary of State for Transport. To ensure that the necessary formalities can be completed in good time, you should request permission for the move by posting the completed form 2 weeks prior to the date of the scheduled move. Again, you cannot apply too early and we invite manufacturers or hauliers to contact us at pre tender stage, before making a financial commitment to supply the load, to check whether permission would be granted.

**Forms and enquiries to:
Highways Agency
Abnormal Loads Team
9th Floor, The Cube
199 Wharfside Street
Birmingham B1 1RN**

**E-mail abnormal.loads@highways.gsi.gov.uk
Tel: 0121 678 8068
Fax: 0121 678 8569**

Annex C

Existing Structures Plan



KEY

- █ TRUNK ROAD NETWORK
- █ PRIMARY LIGHT GOODS VEHICLE (LGV) / HEAVY GOODS VEHICLE (HGV)
- █ PRIMARY LGV ROUTE
- █ PRIMARY LGV / TRACTOR TRAILER ROUTE
- █ LGV / HGV ENABLING WORKS ROUTE
- █ LGV / HGV CONTINGENCY ROUTE
- - - INDICATIVE SITE ACCESS TRACKS
- INDICATIVE SITE ACCESS POINT

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF OVERSEEING ORGANISATION.

20.07.2018	DCO Submission	-	-	-	
Rev	Date	Description	CAD	Chk	App

Site:	NWC
Scheme Name:	NORTH WALES CONNECTION
Document Title:	LOCATION OF EXISTING LOCAL ROAD NETWORK STRUCTURES ON PROPOSED CONSTRUCTION ROUTES
Creator:	PG
Checker:	RT
Approver:	AL
Sheet Number:	60514717-TM-010
Document Type:	FIGURE
Scale:	NTS
Format:	A1 / A3
Sheets:	1 of 1
Rev:	-

Contains OS data © Crown copyright and database right 2018. Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown Copyright Ordnance Survey. National Grid Electricity - 100024241. National Grid Gas - 100024886. Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown copyright and database rights 2018. Ordnance Survey 0100031673.

Annex D

Indicative Traffic Management Schedules and Layouts

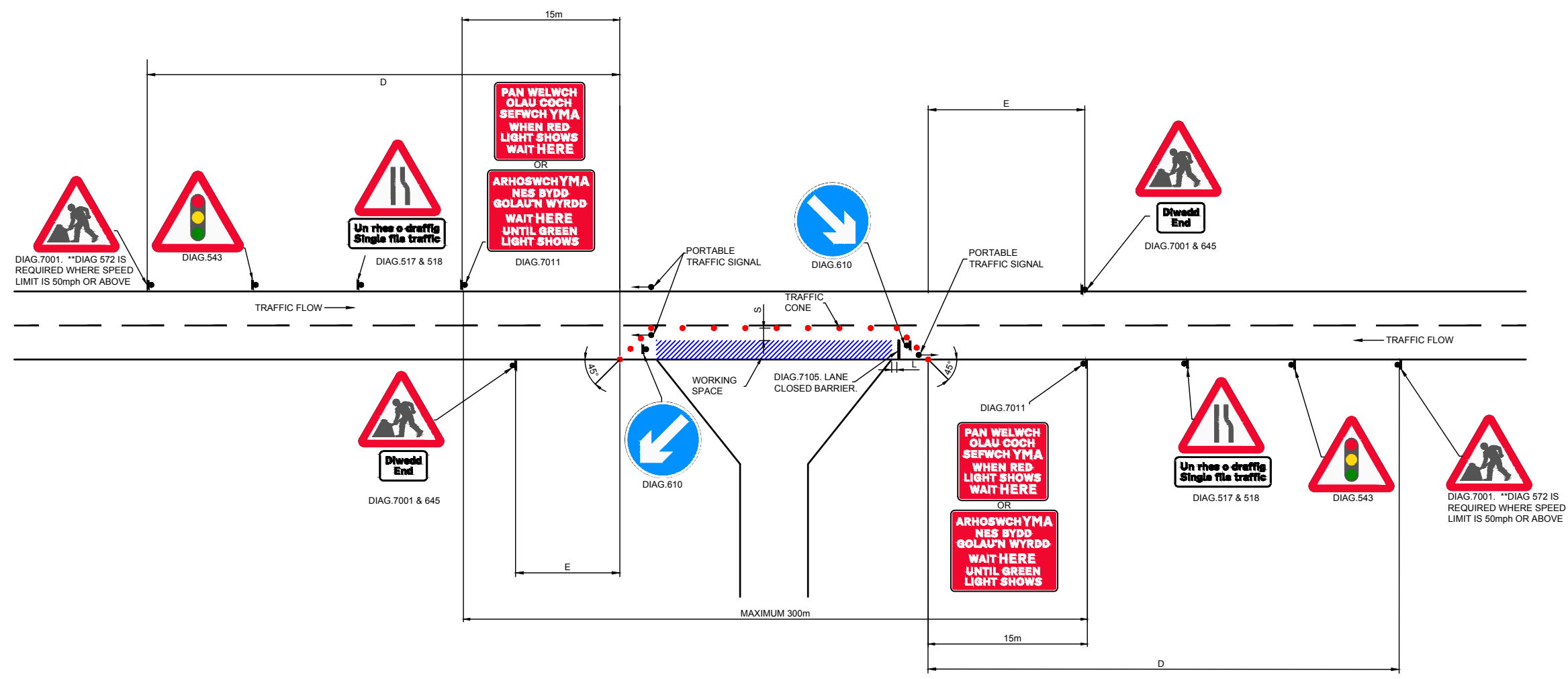
- NOTES**
1) The contractor will be responsible for designing all temporary works including the traffic control / management to suit appropriate working method
2) All traffic management to be in accordance with Safety at Street Works and Road Works a Code of Practice and agreed with Local Highway Authority
3) Access for emergency vehicles, cyclists and pedestrians is to be facilitated as required
4) To be read in conjunction with temporary access drawings and proformas included in the Temporary Access Principles Note

above 3.5m
between 2.5 and 3.5m
below 2.5m

<35mph
>35mph -<40mph
>40mph or key access

LHA	Section	Ref.	Road Ref.	Road Width (m)	Signed Speed Limit (mph)	Min. width of sideways safety zone (m)	Remaining road width (m)	Neutral weekday vehicle count	Recorded Mean Speeds	Potential traffic control during access CONSTRUCTION	Recorded Speed 85th%ile		Potential hazards associated with access OPERATION	Potential Mitigation Measures and Traffic Management During Access OPERATION										
											LEFT	RIGHT												
A		A1	UNR23	4.9	NSL	1.2	3.7	12	NB 21.7 SB 25.3	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	28	31	Construction traffic turning movements	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph										
		A2									31	28												
		A3									43	43												
		A4		A5025	6	NSL	0.5	4.8	1147	NB 36.5 SB 36.5	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	43	43	Key access HGV waiting to turn right blocking ahead traffic Right turning HGVs crossing opposing lane Left turning HGVs entering opposing lane	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph									
		A5	43									43												
		A5A		UNR23A UNR23B	7	40	0.5	3.7	361B	WB 30.8 EB 39.8	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	47	36	Key access HGV waiting to turn right blocking ahead traffic Right turning HGVs crossing opposing lane Left turning HGVs entering opposing lane	Use as contingency or emergency only Advanced warning signs on LRN and temporary access track Junction modifications as detailed on drawing 60514717-MM-101 Additional traffic calming measures such as coloured road surfacing, high friction surfacing or VMS TTRO - Speed limit reduction to 30mph									
		A6										Ffordd Y Felin	6			NSL	1.2	4.8	1169	26.8	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	29	32	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph
		A7																				32	29	
		A8		UNR3	3	NSL	1.2	1.8	91	NB 24.9 SB 25.5	(1) Road Closure NCN566 to remain open	30	29	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph										
		A9										29	30											
A10		Brynddu Rd	4.2	NSL	1.2	3	642	32.2	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	41	42	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph												
B		B1	UNR1	6.7	30	0.5	6.2	418	34.9	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	43	42	B1 - Key access Crossover point and turning movements Existing traffic speeds	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph										
		B2									42	43												
		B4		UNR4	5.4	NSL	1.2	4.2	910	38.2	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	46	44	Construction traffic turning movements existing traffic speeds	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph									
		B5										52	54											
		B7										54	52											
		B8		B5111	6.6	NSL	1.2	5.4	2546	47.9	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	55	54	Construction traffic turning movements Reduced visibility to left existing traffic speeds	Advanced warning signs on LRN and temporary access track Access to be in only Traffic Marshal / additional traffic management if outbound required TTRO - Speed limit reduction to 30mph									
		B9										58	56											
		B10		UNR8	4.6	NSL	1.2	3.4	339	35.4	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	42	42	Key access Construction traffic turning movements, right turn potentially blocking ahead existing traffic speeds	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph									
		B12		UNR18	3.2	NSL	1.2	2	58	NB 27.4 SB 30.2	(2) Road Closure	37	33	Construction traffic crossover and turning movements	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph									
		B13		Lon Leidar	3.2	NSL	1.2	2	58	NB 27.4 SB 30.2	(2) Road Closure	33	37	Construction traffic crossover and turning movements	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph									
C		C1	UNR9	5	NSL	1.2	3.8	647	31.6	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	37	39	Construction traffic crossover and turning movements	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph										
		C2									39	37												
		C3		UNR10	5.5	40	0.5	5	479	38.9	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	48	48	Construction traffic crossover and turning movements existing traffic speeds	Advanced warning signs on LRN and temporary access track Additional traffic calming measures such as coloured road surfacing, high friction surfacing or VMS TTRO - Speed limit reduction to 30mph									
		C4										48	48											
		C5										47	49											
		C6		UNR19	2.5	NSL	1.2	1.3	63	27.6	(3) Road Closure	36	36	Construction traffic crossover and turning movements	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph									
		C7										36	36											
		C8		B5110	6.3	NSL	1.2	4.6	2975	43.8	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	51	48	Construction traffic turning movements existing traffic speeds	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph									
		C9										47	49											
		C10										54	53											
D		D1	B5109	5.5	NSL	1.2	4.3	1836	43.4	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	50	51	Crossover point and turning movements existing speeds	Advanced warning signs on LRN and temporary access track TTRO - Speed limit reduction to 30mph										
		D2									51	50												
		D3		B5420	8.9	NSL	1.2	7.7	2299	43.8	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	53	54	Key access serving OHL Compound construction traffic turning movements existing speeds	Advanced warning signs on LRN and temporary access track Additional mitigation measures as detailed on drawing 60514717-MM-105 TTRO - Speed limit reduction to 30mph TTRO - No over taking									
		D4										49	47											
E		E1	UNR16	4.5	NSL	1.2	3.3	503	35	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	43	41	Crossover point and turning movements	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph										
		E2									41	43												
		E3		UNR17	3.6	NSL	1.2	2.4	75	WB 23.8 EB 28	(4) Road Closure	33	28	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph										
		E4										28	33											
		E5		UNR21	5.9	NSL	1.2	4.7				-	-	Very low traffic flows here, speed likely to be less than 30mph Contingency Access										
		E5A		UNR20 / Junction 7 A55	TBC	NSL	1.2	TBC				TBC	TBC	Key Access construction traffic waiting to turn right blocking ahead traffic	Existing bellmouth deemed suitable for HGVs Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph - TBC									
		E6		NCN8	5.1	NSL	1.2	3.9	1190	39.9	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	47	50	HGV / LV turning movements	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays / Traffic Marshal during HGV use TTRO - Speed limit reduction to 30mph									
E7		50	47																					
F		F1C	UNR22 Pont-Ronwy	4.5	NSL	1.2	3.3	490	28	(5) Road Closure	32	36	Key access HGV / LV turning movements	10 mph speed limit for construction vehicles one way working over rail bridge TTRO - Speed limit reduction to 30mph TTRO - Road Closure										
		F1										32			36									
		F2		A4080	5.6	50	1.2	4.4	3839	NB 50.2 SB 49.4	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	56	57	Key access AIL / HGV / LV turning movements	Advanced warning signs on LRN and temporary access track Contingency and AIL use. One way traffic option if used as contingency route Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph									
G		F3	Foddydd Lane	3	NSL	1.2	1.8	43	NB 21.9 SB 26.0	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	26	43	CSEC / THH - LV Access / Enabling works access Traffic marshal during enabling works use	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays TTRO - Speed limit reduction to 30mph										
		F4										TBC			TBC									
		F5										TBC			TBC									
		F6		UNR25	2.6	NSL	1.2	1.4	27	19.6	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	24	24	CSEC / THH / OHL HGV / LV crossover point / Enabling works	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays / traffic marshals TTRO - Speed limit reduction to 30mph									
		F7										24	24											
		F8		UNR24	2.5	NSL	1.2	1.3	39	21.8	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	31	31	Key access HGV / LV turning movements	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays / traffic marshals TTRO - Speed limit reduction to 30mph									
		F9										31	31											
		F10		Foddydd Lane	2.5	NSL	1.2	1.3	87	NB 18.7 SB 17.9	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	22	23	OHL - HGV / LV crossover point	Advanced warning signs on LRN and temporary access track Provision of adequate visibility plays / traffic marshals TTRO - Speed limit reduction to 30mph									
		F11										23	22											
		F14		B4547	7.2	NSL	1.2	6	6010	49.1	1) Traffic Signals 2) Stop Go Boards 3) Priority Signs	58	57	Key Access - OHL / CSEC / THH / Substation HGV / LV slowing and right turning movements, right turn blocking ahead existing speeds	Advanced warning signs on LRN and temporary access track Additional mitigation measures as detailed on drawing 60514717-MM-111 TTRO - Speed limit reduction to 40mph TTRO - No over taking									

1. ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
2. ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
3. ALL SIGNAGE TEXT IS REQUIRED TO BE IN ENGLISH AND WELSH.
4. THIS DRAWING REFLECTS THE TRAFFIC SIGNS AND SAFETY MEASURES REQUIRED FOR A 30MPH ROAD WITH PORTABLE TRAFFIC SIGNALS. REFER TO TABLE 1 FOR DIMENSIONS REGARDING 40MPH, 50MPH AND 60MPH.
5. REFER TO 'SAFETY AT STREET WORKS AND ROAD WORKS - A CODE OF PRACTICE' AND 'TRAFFIC SIGNS MANUAL - CHAPTER 8' FOR FURTHER.



NOTES:

THE USE OF PORTABLE TRAFFIC SIGNALS IS A POSITIVE METHOD OF TRAFFIC CONTROL THAT CAN BE APPROPRIATE IN MANY ENVIRONMENTS, 24 HOURS A DAY, WHERE WORKS ARE NO MORE THAN 300 METRES LONG.

ALL SIGNAL HEADS SHOULD BE PLACED IN A POSITION WHERE THEY ARE CLEARLY VISIBLE TO APPROACHING TRAFFIC. ADDITIONAL GUIDANCE ON THE USE OF PORTABLE TRAFFIC SIGNALS CAN BE FOUND IN AN INTRODUCTION TO THE USE OF PORTABLE VEHICULAR SIGNALS, COMMONLY KNOWN AS THE 'PINK BOOK', AND IN TRAFFIC ADVISORY LEAFLET 2/11: PORTABLE TRAFFIC SIGNALS FOR THE CONTROL OF VEHICULAR TRAFFIC. GUIDANCE ON PORTABLE PEDESTRIAN FACILITIES CAN BE FOUND IN TRAFFIC ADVISORY LEAFLET 3/11: SIGNAL-CONTROLLED PEDESTRIAN FACILITIES AT PORTABLE TRAFFIC SIGNALS.

TWO WAY PORTABLE TRAFFIC SIGNALS MAY ONLY BE USED UNDER THE FOLLOWING CIRCUMSTANCES:

- THE SITE LENGTH (FIRST CONE TO LAST CONE) DOES NOT EXCEED 300 METRES;
- THEY ARE VEHICLE-ACTUATED (UNLESS OTHERWISE INSTRUCTED BY THE HIGHWAY AUTHORITY);
- THE EQUIPMENT IS TYPE APPROVED FOR USE ON THE HIGHWAY;
- STOP / GO BOARDS ARE AVAILABLE ON SITE IN CASE OF SIGNAL FAILURE; AND
- THE HIGHWAY AUTHORITY HAS GIVEN WRITTEN PERMISSION FOR THEIR USE (FOR EMERGENCY WORKS, IT IS PERMITTED TO USE THE PORTABLE TRAFFIC SIGNALS AND SEEK PERMISSION RETROSPECTIVELY AS SOON AS POSSIBLE).

WHEN USING TWO WAY PORTABLE SIGNALS TO CONTROL TRAFFIC, YOU MUST CONSIDER THE FOLLOWING:

- THE SPEED OF THE TRAFFIC. IF THESE SIGNALS ARE TO BE USED ON ROADS WHERE THE 85TH PERCENTILE SPEED IS 35MPH OR MORE, SPEED REDUCING MEASURES SHOULD BE CONSIDERED ON THE APPROACH;
- THE POSITION OF BUS STOPS AND PARKING BAYS;
- THE POSITION OF PEDESTRIAN CROSSINGS, EITHER SIGNAL-CONTROLLED OR ZEBRA;
- THE LOCATION OF EXISTING TRAFFIC CONTROLS, JUNCTIONS AND ROUNDABOUTS THAT COULD AFFECT OR BE AFFECTED BY TRAFFIC FLOW BEYOND THE WORKS;
- THE NEEDS OF CYCLISTS AND OTHER VULNERABLE ROAD USERS;
- ANY JUNCTIONS THAT ARE SO CLOSE TO THE SHUTTLE SECTION THAT MULTI-PHASE CONTROL MAY BE REQUIRED;
- THE POTENTIAL FOR THE SHUTTLE SECTION TO BECOME BLOCKED BY STATIONARY TRAFFIC; AND
- THE POTENTIAL FOR WAITING TRAFFIC TO BLOCK ANY LEVEL CROSSING.

WARNING: UNDER NO CIRCUMSTANCES SHOULD PORTABLE TRAFFIC SIGNALS BE USED AT WORKS THAT STRADDLE A RAILWAY LEVEL CROSSING, NOR TO CONTROL ROAD TRAFFIC WITHIN 50 METRES OF A LEVEL CROSSING EQUIPPED WITH WIG-WAG TRAFFIC SIGNALS. YOUR SUPERVISOR, MANAGER OR OTHER COMPETENT PERSON MUST CONTACT THE RAILWAY OWNER OR TRAMWAY OPERATOR WHEN WORKS REQUIRING PORTABLE SIGNALS ARE TO TAKE PLACE AT OR NEAR A LEVEL CROSSING, OR WHERE TRAFFIC QUEUES COULD AFFECT A LEVEL CROSSING.

TABLE 1: TRAFFIC SAFETY MEASURES AND SIGNAGE

SPEED LIMIT	30MPH	40MPH	50MPH OR MORE
MINIMUM VISIBILITY DISTANCE TO FIRST SIGN	60m	60m	75m (50mph) 90m (60mph)
DISTANCE FROM FIRST SIGN TO START OF LEAD IN TAPER (D)	20m to 45m	45m to 110m	275m to 450m
END OF WORKS SIGN (E)	10m to 30m	30m to 45m	30m to 45m
MINIMUM WIDTH OF SIDEWAYS SAFETY ZONE (S)	0.5m	0.5m	1.2m
LONGWAYS CLEARANCE (L)	0.5m	15m	30m (50 mph) 60m (60mph)
TAPER CONE SIZE	450mm	450mm	750mm
TAPER CONE SPACING	3m	3m	1.5m (relaxation 3m)
LONGITUDINAL CONE SIZE	450mm	450mm	750mm
MINIMUM NUMBER OF CONES	18	28	68 (relaxation 38)

Contains OS data © Crown copyright and database right 2018.
Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office. © Crown Copyright Ordnance Survey, National Grid Electricity - 100024241, National Grid Gas - 100024886.
Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office. © Crown copyright and database rights 2018, Ordnance Survey 0100031673.

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF OVERSEEING ORGANISATION.

20.07.2018	DCO Submission	-	-	-	
Rev	Date	Description	CAD	Chk	App

nationalgrid

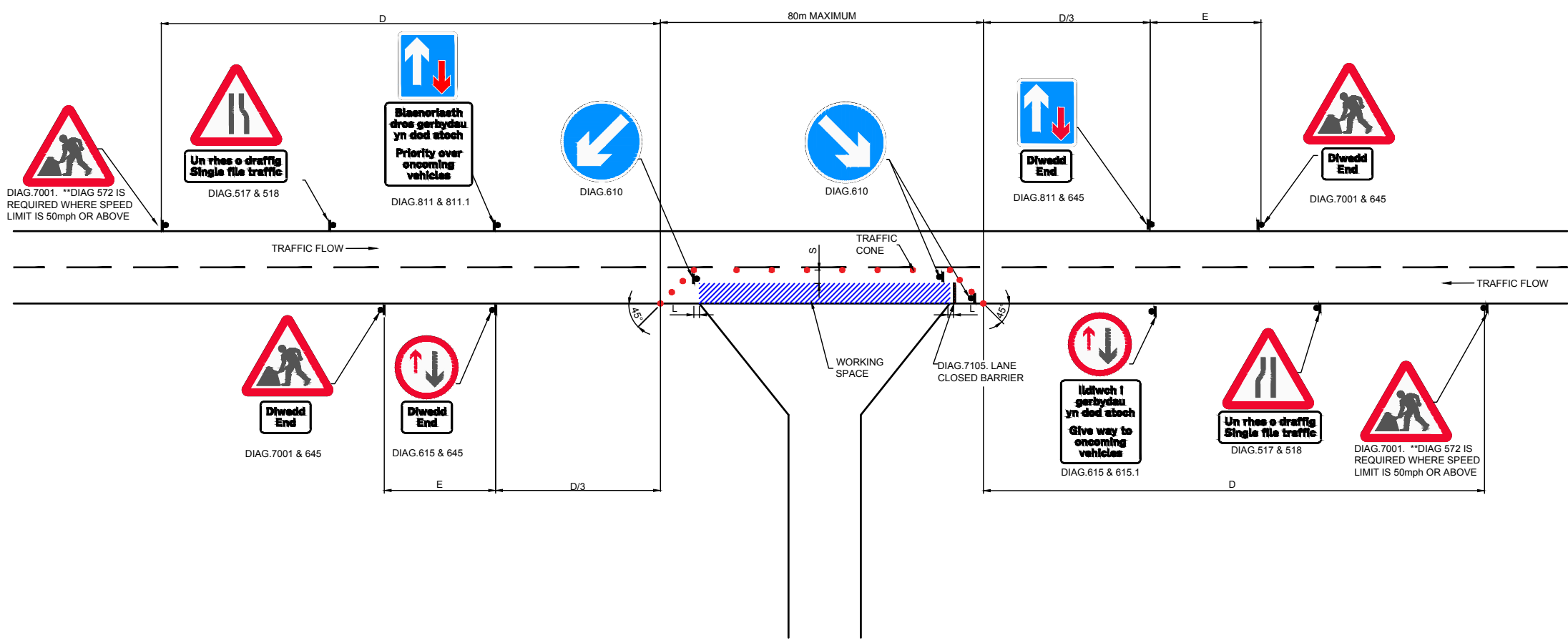
Site: NWC

Scheme Name: NORTH WALES CONNECTION

Document Title: TRAFFIC CONTROL BY PORTABLE SIGNALS

Creator: JF	Checker: PG	Approver: RT	Sheet Number: 60514717-TM-001
Document Type: FIGURE	Scale: NTS	Format: A1 / A3	Sheets: 1 of 1

1. ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
2. ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
3. ALL SIGNAGE TEXT IS REQUIRED TO BE IN ENGLISH AND WELSH.
4. THIS DRAWING REFLECTS THE TRAFFIC SIGNS AND SAFETY MEASURES REQUIRED FOR A 30MPH ROAD WITH PORTABLE TRAFFIC SIGNALS. REFER TO TABLE 1 FOR DIMENSIONS REGARDING 40MPH, 50MPH AND 60MPH.
5. REFER TO 'SAFETY AT STREET WORKS AND ROAD WORKS - A CODE OF PRACTICE' AND 'TRAFFIC SIGNS MANUAL - CHAPTER 8' FOR FURTHER.



- NOTES:
- PRIORITY SIGNS CAN ONLY BE USED WHEN ALL OF THE FOLLOWING APPLY:
- THE SPEED LIMIT IS 60MPH OR LESS;
 - THE LENGTH OF THE WORKS FROM FIRST CONE TO LAST CONE IS 80 METRES OR LESS;
 - TWO-WAY TRAFFIC FLOW IS NO MORE THAN 42 VEHICLES COUNTED OVER 3 MINUTES (840 VEH/H); AND
 - DRIVERS APPROACHING FROM EITHER DIRECTION HAVE VISIBILITY BEFORE AND BEYOND THE WORKS AS SHOWN IN TABLE 1.

A 'GIVE WAY TO ONCOMING VEHICLES' ROUNDLET IN CONJUNCTION WITH A SUPPLEMENTARY 'END' PLATE SHOULD BE CONSIDERED WHERE THE WORKS ARE MORE THAN 50 METRES LONG AND THE NATURE OF THE WORKS OBSCURES THE VIEW OF THE ROAD DOWNSTREAM OF THE SINGLE FILE LANE. USE OF THIS SIGN COMBINATION CAN ALSO BE CONSIDERED WHERE THE SITE EXTENDS WELL PAST THE PRIORITY SECTION SUCH THAT THE 'END OF ROAD WORKS' SIGN IS OVER 100 METRES FROM THE END OF PRIORITY WORKING.

IF THE 'GIVE WAY TO ONCOMING VEHICLES' SIGN IS USED, THEN THE 'PRIORITY OVER ONCOMING VEHICLES' SIGN MUST BE PLACED FOR TRAFFIC FLOWING IN THE OPPOSITE DIRECTION.

WARNING: THE SIGN AND SUPPLEMENTARY PLATE 'GIVE WAY TO ONCOMING VEHICLES' MUST BE POSITIONED ON THE SAME SIDE OF THE ROAD AS THE WORKS.

SPEED LIMIT	30MPH	40MPH	50MPH OR MORE
MINIMUM VISIBILITY BEFORE AND BEYOND WORKS	60m	70m	80m (50mph) 100m (60mph)
DISTANCE FROM FIRST SIGN TO START OF LEAD IN TAPER (D)	20m to 45m	45m to 110m	275m to 450m
END OF WORKS SIGN (E)	10m to 30m	30m to 45m	30m to 45m
MINIMUM WIDTH OF SIDEWAYS SAFETY ZONE (S)	0.5m	0.5m	1.2m
LONGWAYS CLEARANCE (L)	0.5m	15m	30m (50 mph) 60m (60mph)
TAPER CONE SIZE	450mm	450mm	750mm
TAPER CONE SPACING	3m	3m	1.5m (relaxation 3m)
LONGITUDINAL CONE SIZE	450mm	450mm	750mm
MINIMUM NUMBER OF CONES	18	28	68 (relaxation 38)

- NOTES
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF OVERSEEING ORGANISATION.

nationalgrid

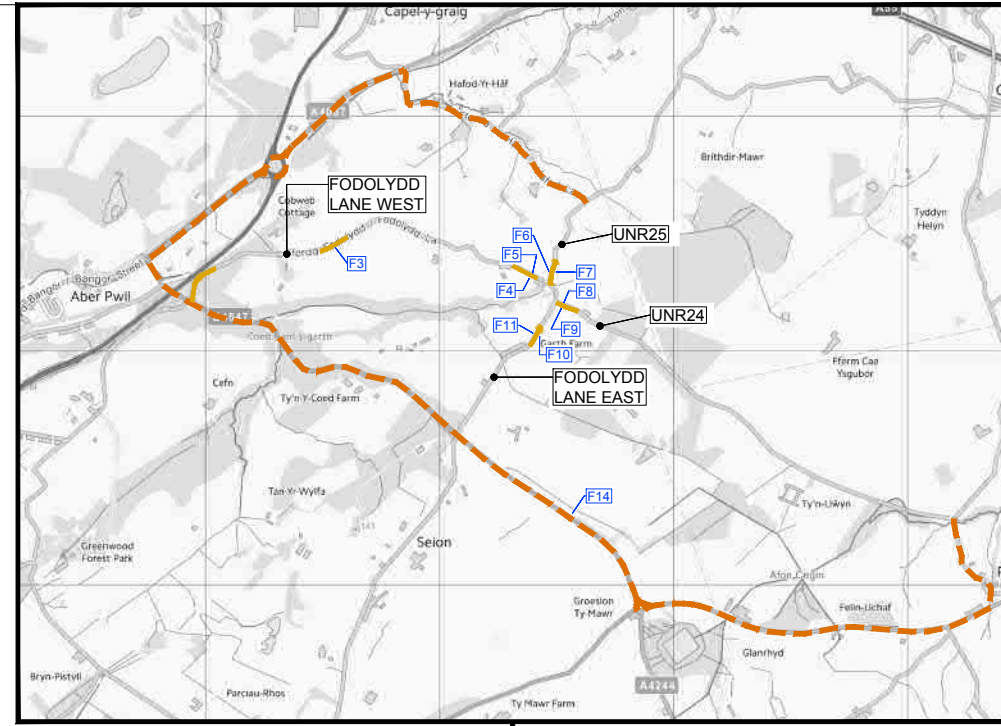
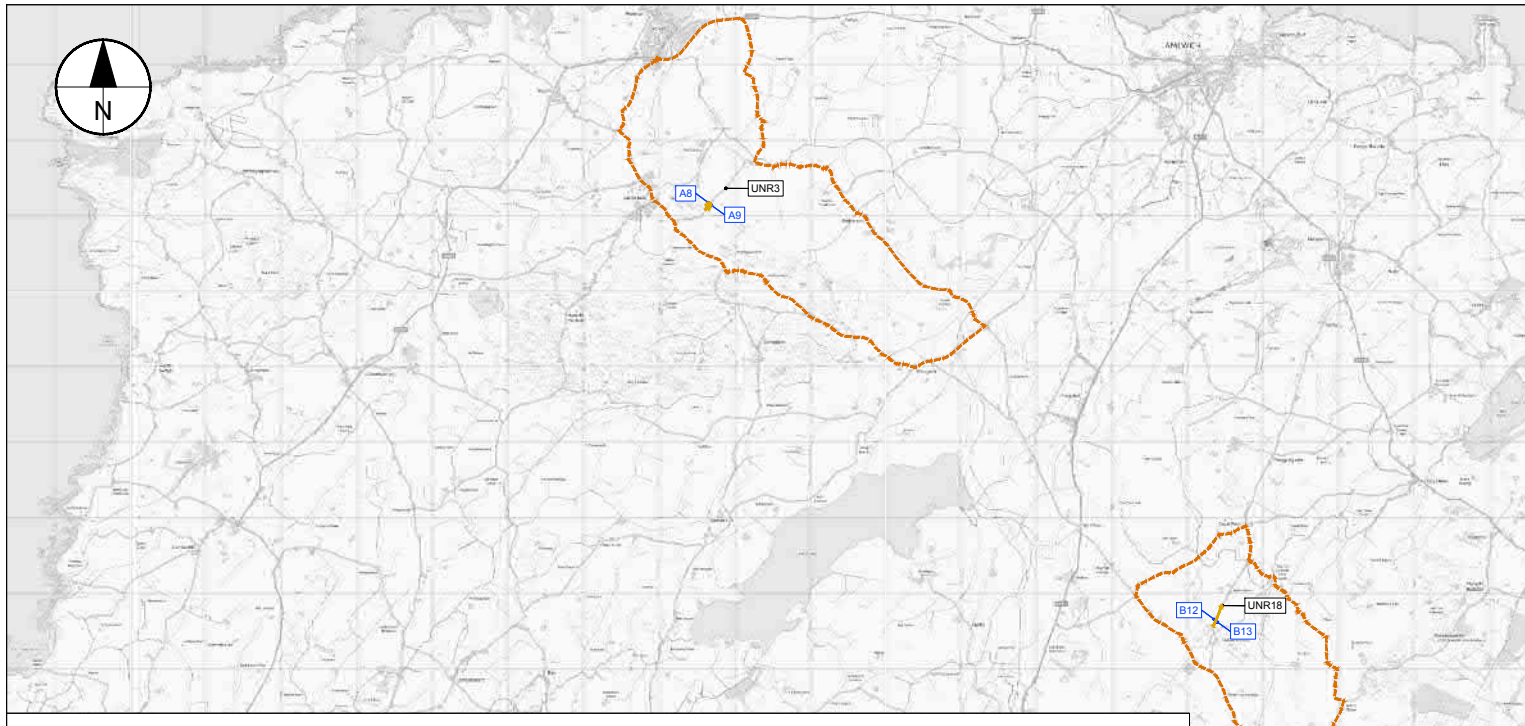
Site: NWC

Scheme Name: NORTH WALES CONNECTION

Document Title: TRAFFIC CONTROL BY PRIORITY SIGNS

Creator:	Checker:	Approver:	Sheet Number:
JF	PG	RT	60514717-TM-002
Document Type:	Scale:	Format:	Sheets:
FIGURE	NTS	A1 / A3	1 of 1
Rev:			

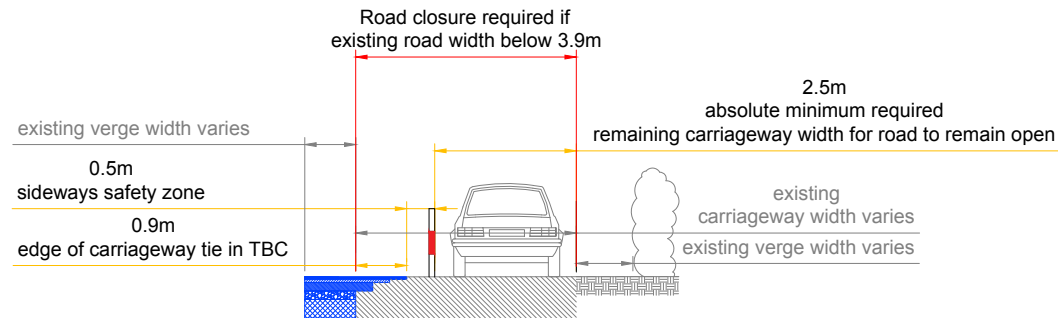
Contains OS data © Crown copyright and database right 2018.
 Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown Copyright Ordnance Survey. National Grid Electricity - 100024241. National Grid Gas - 100024886.
 Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown copyright and database rights 2018. Ordnance Survey 0100031673.



KEY

- PROPOSED TEMPORARY ROAD CLOSURE
- PROPOSED DIVERSION ROUTE
- TEMPORARY ACCESS REFERENCE
- ROAD REFERENCE

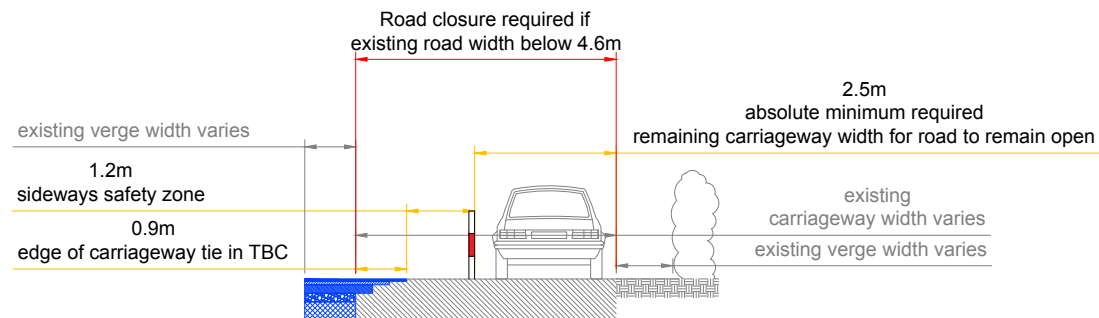
Principles for Road Diversions - Bellmouth Construction - 0.5m Sideways Safety Zone



0.5m sideways safety zone
 Single Carriageway - speed limit 30mph or less
 Single Carriageway - speed limit 40mph or less
 All-purpose dual carriageway - speed limit 40mph or less

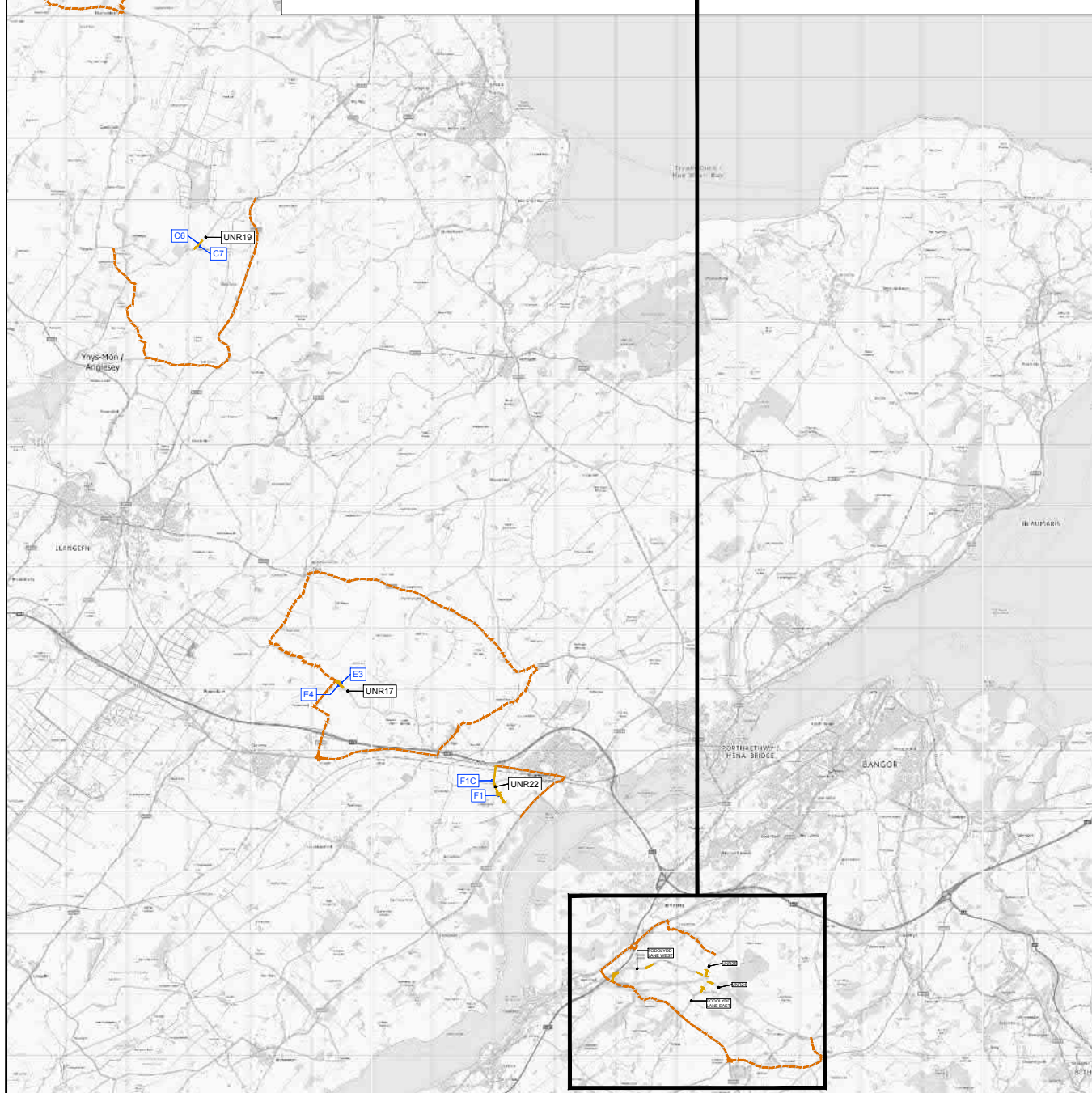
Remaining Road width
 Standard: Normal traffic including buses and HGVs
 Two way working = 6.75m min
 Shuttle working = 3.25-3.5m desirable, 3.0m absolute min
 Restricted: Cars and light vehicles only
 Two way working = 5.5m min
 Shuttle working = 2.5m min

Principles for Road Diversions - Bellmouth Construction - 1.2m Sideways Safety Zone



1.2m sideways safety zone
 Single Carriageway - speed limit 50mph or more

Remaining Road width
 Standard: Normal traffic including buses and HGVs
 Two way working = 6.75m min
 Shuttle working = 3.25-3.5m desirable, 3.0m absolute min
 Restricted: Cars and light vehicles only
 Two way working = 5.5m min
 Shuttle working = 2.5m min



NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF OVERSEEING ORGANISATION.

Rev	Date	Description	CAD	Chk	App
20.07.2018		DCO Submission	-	-	-



Site: NWC
 Scheme Name: NORTH WALES CONNECTION
 Document Title: PROPOSED ROAD CLOSURES FOR ACCESS CONSTRUCTION

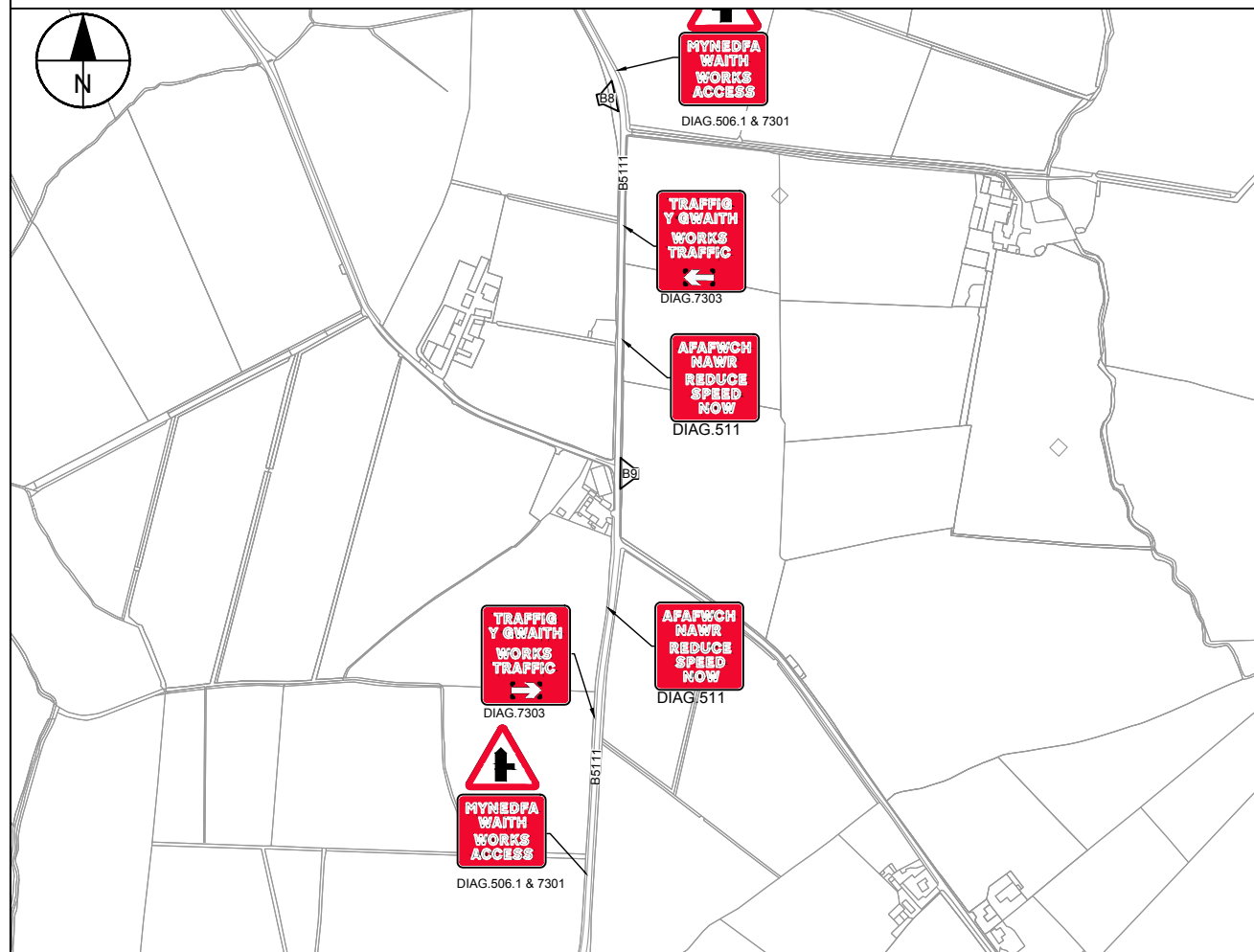
Creator	Checker	Approver	Sheet Number	
PG	RT	AL	60514717-TM-024	
Document Type	Scale	Format	Sheets	Rev
FIGURE	NTS	A1 / A3	1 of 1	-

Contains OS data © Crown copyright and database right 2018.
 Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. ©Crown Copyright Ordnance Survey, National Grid Electricity - 100024241, National Grid Gas -100024886.
 Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown copyright and database rights 2018. Ordnance Survey 0100031673.

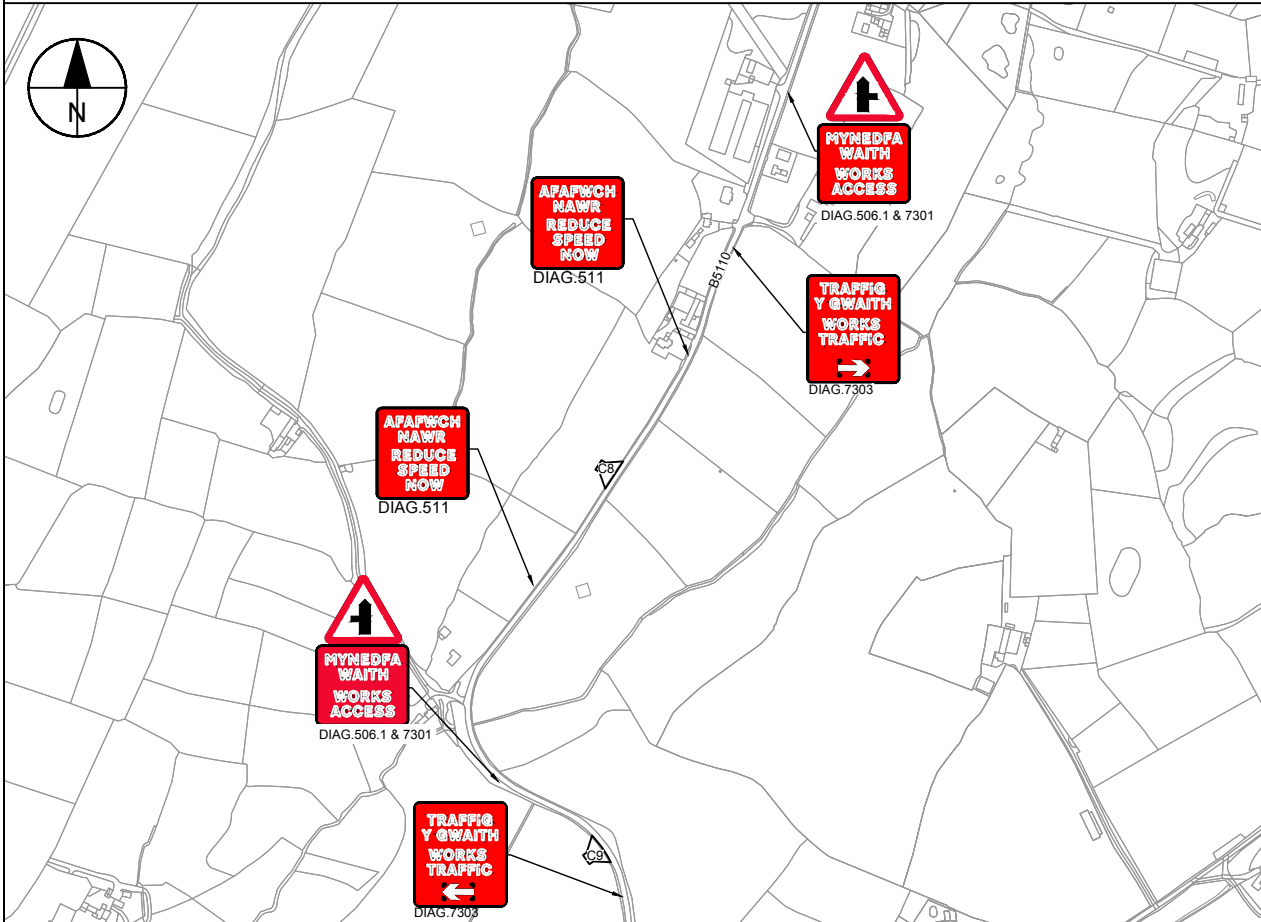
TEMPORARY CONSTRUCTION ACCESS 'A5A' INDICATIVE HAZARD WARNING SIGNAGE LAYOUT



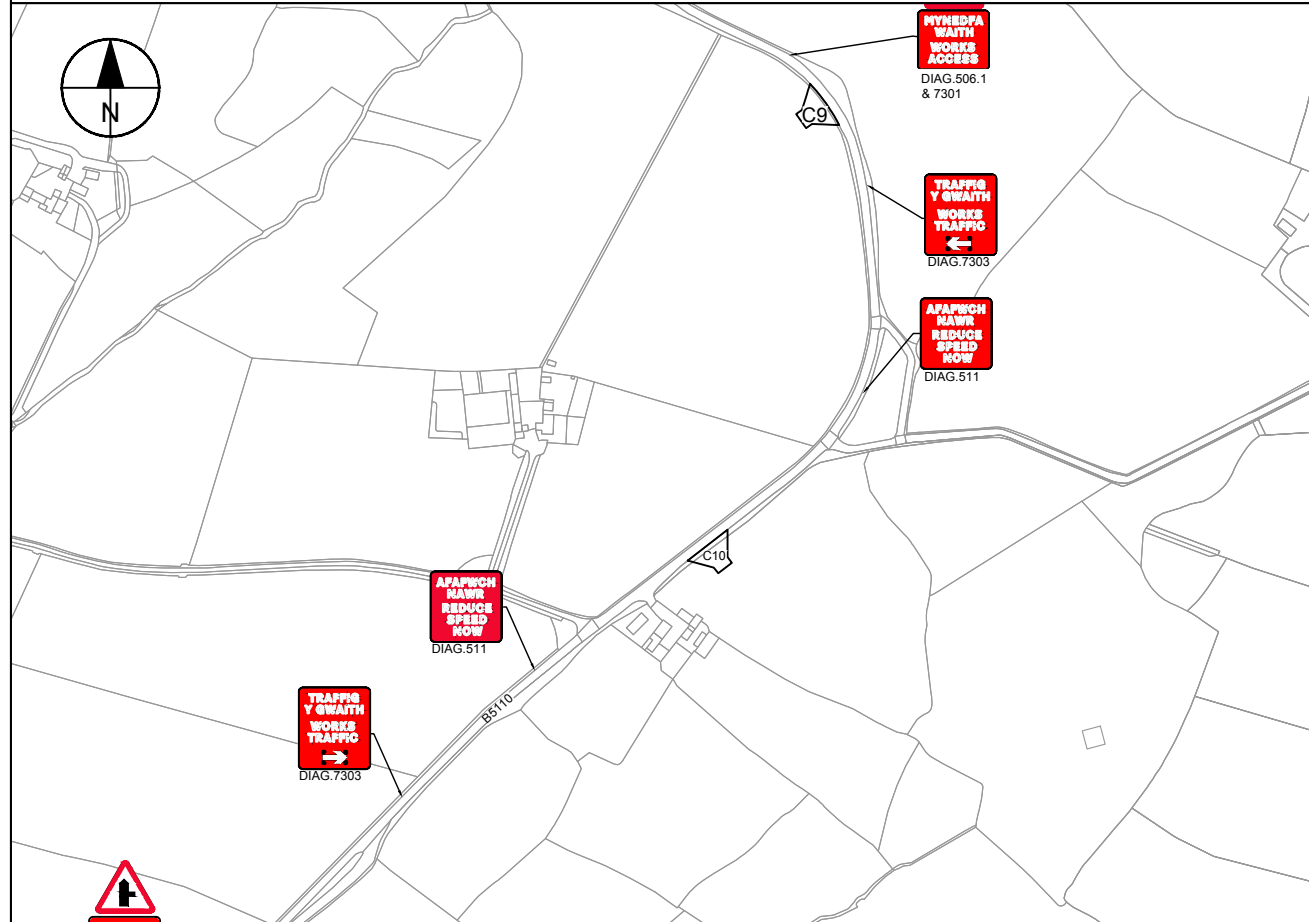
TEMPORARY CONSTRUCTION ACCESS 'B9' INDICATIVE HAZARD WARNING SIGNAGE LAYOUT



TEMPORARY CONSTRUCTION ACCESS 'C8' INDICATIVE HAZARD WARNING SIGNAGE LAYOUT



TEMPORARY CONSTRUCTION ACCESS 'C10' INDICATIVE HAZARD WARNING SIGNAGE LAYOUT



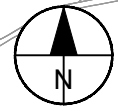
Contains OS data © Crown copyright and database right 2018.
 Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown Copyright Ordnance Survey, National Grid Electricity - 100024241, National Grid Gas - 100024886.
 Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown copyright and database rights 2018, Ordnance Survey 0100031673.

COPYRIGHT: NOT TO BE REPRODUCED WITHOUT THE WRITTEN PERMISSION OF NATIONAL GRID ELECTRICITY TRANSMISSION PLC

NOTES
 1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF OVERSEEING ORGANISATION.

20.07.2018	DCO Submission	-	-	-	
Rev	Date	Description	CAD	Chk	App

Site: NWC					
Scheme Name: NORTH WALES CONNECTION					
Document Title: TYPICAL HAZARD WARNING SIGNAGE LAYOUT AT TEMPORARY ACCESS POINTS					
Creator: JF	Checker: PG	Approver: RT	Sheet Number: 60514717-TM-024		
Document Type: FIGURE	Scale: NTS	Format: A1 / A3	Sheets: 1 of 1	Rev: -	



FFORDD O'CH BLAEN AR GAU ROAD AHEAD CLOSED

min. 45-110m in advance for 40mph

FFORDD AR GAU ROAD CLOSED

Gwyrriad Diverston
←

Gwyrriad Diverston
↑

DIWEDD y gwyrriad Diverston ENDS

Gwyrriad Diverston
↑

Gwyrriad Diverston
→

Gwyrriad Diverston
←

Gwyrriad Diverston
←

Gwyrriad Diverston
↑

FFORDD AR GAU ROAD CLOSED

FFORDD AR GAU ROAD CLOSED

Gwyrriad Diverston
→

Gwyrriad Diverston
↑

DIWEDD y gwyrriad Diverston ENDS

FFORDD O'CH BLAEN AR GAU ROAD AHEAD CLOSED

min. 275-450m in advance for 50mph

Construction access 'F1C'
Farm access to be maintained FA1 / FA2 / FA3
Residential access to be maintained RA1

Farm access to be maintained FA4

Residential access to be maintained RA2
Construction access 'F1'

Suitable vehicle turning area to be provided here

Farm access to be maintained FA5

Residential access to be maintained RA3
Farm access to be maintained FA6

Residential access to be maintained RA4

Existing 40mph/50mph Speed Limit

KEY
EXTENT OF TEMPORARY ROAD CLOSURE / NO THROUGH ROUTE

NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF OVERSEEING ORGANISATION.
- CONCEPT DESIGN ONLY. SUBJECT TO DETAILED DESIGN

20.07.2018	DCO Submission	-	-	-	
Rev	Date	Description	CAD	Chk	App



Site: NWC				
Scheme Name: NORTH WALES CONNECTION				
Document Title: INDICATIVE DIVERSION SIGNAGE IN RELATION TO CLOSURE OF UNNAMED ROAD 22 / PONT RONWY				
Creator: PG	Checker: RT	Approver: AL	Sheet Number: 60514717-TM-030	
Document Type: FIGURE	Scale: NTS	Format: A1 / A3	Sheets: 1 of 1	Rev: -

Contains OS data © Crown copyright and database right 2018.
 Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office. © Crown Copyright Ordnance Survey. National Grid Electricity - 100024241. National Grid Gas - 100024886.
 Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office. © Crown copyright and database rights 2018. Ordnance Survey 0100031673.

COPYRIGHT: NOT TO BE REPRODUCED WITHOUT THE WRITTEN PERMISSION OF NATIONAL GRID ELECTRICITY TRANSMISSION PLC

Annex E

Road and Rail Crossing Schedule and Plan

NOTES

- 1) The contractor will be responsible for designing all temporary works including the traffic control / management to suit appropriate method statement and risk assessment
- 2) All traffic management to be in accordance with Safety at Street Works and Road Works a Code of Practice or relevant guidance and agreed with Local Highway Authority
- 3) Access for emergency vehicles, cyclists and pedestrians is to be provided as required

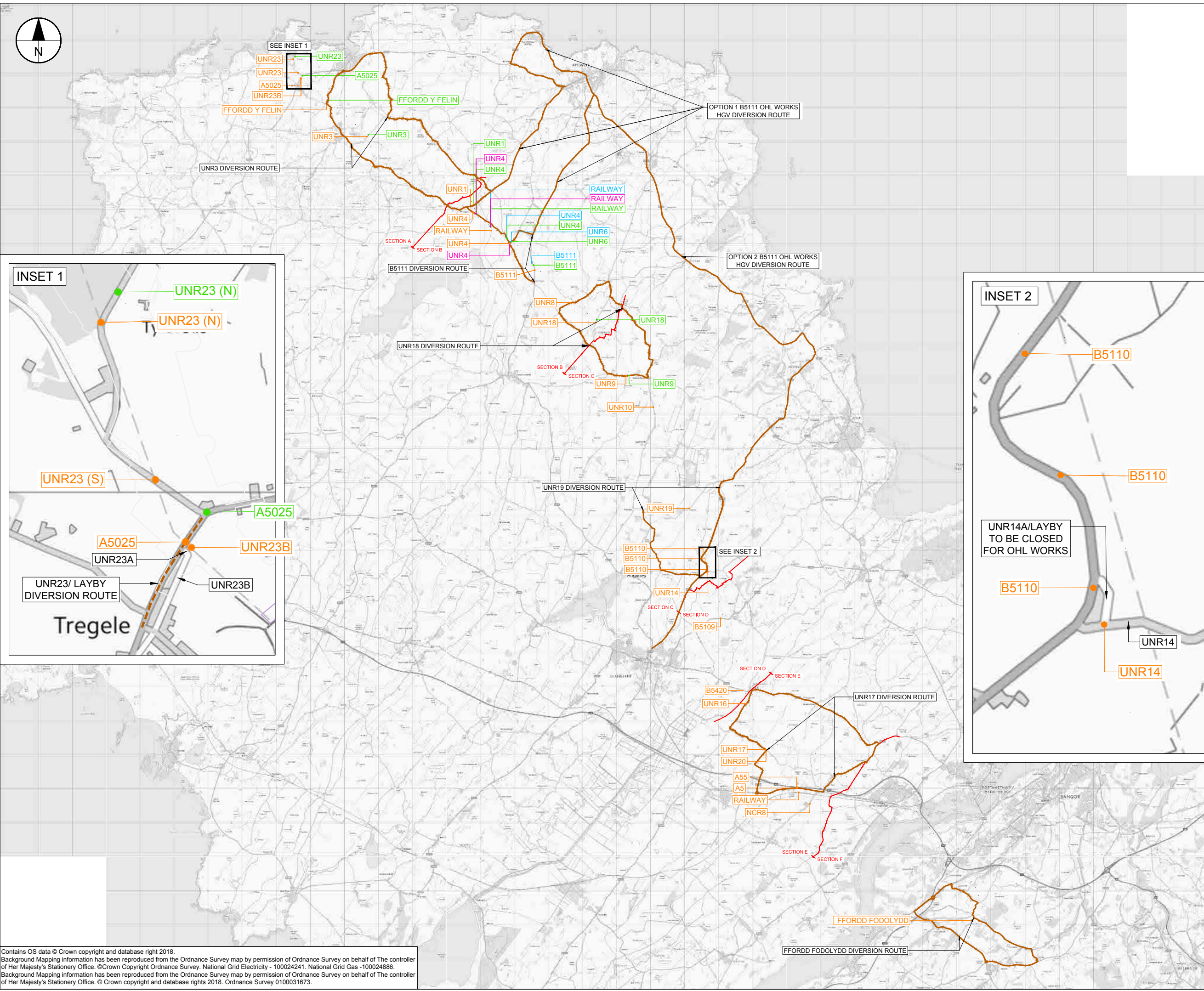
[Drawing Hyperlink](#)
[Traffic Profiles Hyperlink](#)

10	A or B Road
11	Major Unnamed Road
8	Minor Unnamed Road
2	Railway
31	Total

Normal size scaffold requires traffic stop for netting anticipated to be -
Large size scaffold requires traffic stop for netting anticipated to be -

INDICATIVE TIMESCALES			NB: Timescales are indicative and can vary depending on matters such as size of scaffold, width of road crossing, stringing works and overhead line programme.
3 hours	5 hours	TBC	

LHA	Section	Ref.	Signed Speed Limit	85th%ile Recorded Speeds (mph)	Mean Recorded Speeds (mph)	No. Recorded Vehicles 2 way (7 day, 24hr ATC)	Road Width (m)	4AP Alignment	4ZA Alignment	Temporary Works	Dismantling Works	TRAFFIC STOP NETTING OPTION	ROAD CLOSURE OPTION	DIVERSION ROUTE	Provision for scaffold access off road	Comments / Potential Mitigation & Traffic Control	
IACC	A	UNR 23 (N)	NSL	31	24	233	4.9	✓	✓			3hrs	YES	NO	YES	Traffic control such as signals or stop / go boards at off peak period could be used. Also, consider night time works and or traffic stop for each pull.	
		UNR 23 (S)		43	37	5901	6	✓			3hrs	NO	NO	YES	Scaffold and Netting Traffic control such as signals or stop / go boards at off peak periods. Consider traffic stop for each catenary pull (30mins) and night time working		
		A5025	40	47	40	44247	7	✓	✓			2 x 3hrs	NO	NO	YES		
		UNR 23B	-	-	-	-	-	-	✓			3 hrs	YES	YES	YES	Road Closure UNR23B is an existing layby and is proposed to be temporarily stopped up	
		FFORDD Y FELIN	NSL	32	27	13307	6	✓	✓			2 x 3hrs	NO	NO	YES	Scaffold and Netting Traffic control such as signals or stop / go boards at off peak periods. Consider traffic stop for each catenary pull (30mins) and night time working	
		UNR 3		30	26	566	3	✓	✓			2 x 3hrs	YES	YES	YES	Road Closure. Consider shorter durations more of them or scaffold and netting.	
	B	UNR 1 HIGH STREET	30	43	35	6034	6.7	✓	✓			2 x 3hrs	NO	NO	YES	Scaffold and Netting Traffic control such as signals or stop / go boards at off peak periods. Consider traffic stop for each catenary pull (30mins) and night time working	
		UNR 4 (north of rail bridge)	NSL	54	44	12337	5.5	✓	✓		✓	2 x 3hrs	NO	NO	YES		
		RAILWAY (DISUSED)	-	-	-	-	-	-	✓	✓	✓	✓	4 x 3hrs	-	-	-	Track possession required
		UNR 6	NSL	-	-	-	-	-		✓	✓		3 hrs	NO	NO	YES	Scaffold and Netting Traffic control such as signals or stop / go boards at off peak periods. Consider traffic stop for each catenary pull (30mins) and night time working
		UNR 4 (south of rail bridge)		54	44	12337	5.5	✓	✓	✓	✓	2 x 5hrs	NO	NO	YES		
		B5111		58	48	26961	6.6	✓	✓	✓		TBC	YES	YES	YES	Road Closure or Scaffold and Netting Traffic control such as signals or stop / go boards at off peak periods for each catenary pull (30mins). Consider night time working	
		UNR 8		42	35	3928	4.6	✓				3hrs	NO	NO	YES	Scaffold and Netting Traffic control such as signals or stop / go boards at off peak periods. Consider traffic stop for each catenary pull (30mins) and night time working	
	UNR 18 / LON LEIDER	37		30	383	3.2	✓	✓			2 x 3hrs	YES	YES	YES	Road Closure. Consider shorter durations more of them or scaffold and netting.		
	C	UNR 9	NSL	39	32	5501	5	✓	✓			2 x 3hrs	NO	NO	YES	Scaffold and Netting Traffic control such as signals or stop / go boards at off peak periods. Consider traffic stop for each catenary pull (30mins) and night time working	
		UNR 10	40	48	39	3881	5.5	✓				5hrs	NO	NO	YES		
		UNR 19	NSL	36	28	338	2.5	✓				3hrs	YES	YES	YES	Road Closure. Consider shorter durations more of them or scaffold and netting.	
		B5110		51	44	31403	6	✓				3hrs	NO	NO	YES		
				51	44	31403	6	✓				3hrs	NO	NO	YES	Scaffold and Netting Traffic control such as signals or stop / go boards at off peak periods for each catenary pull (30mins). Consider night time working	
				51	44	31403	6	✓				5hrs	NO	NO	YES		
	UNR 14				1317		✓				3hrs	NO	NO	YES	Scaffold and Netting Traffic control such as signals or stop / go boards at off peak periods. Consider traffic stop for each catenary pull (30mins) and night time working		
	D	B5109	NSL	51	43	19535	5.5	✓				3hrs	NO	NO	YES	Scaffold and Netting Traffic control such as signals or stop / go boards at off peak periods for each catenary pull (30mins). Consider night time working	
		B5420		54	42	21314	5.5	✓				3hrs	NO	NO	YES		
	E	UNR 16	NSL	43	35	2913		✓				3hrs	NO	NO	YES		
UNR 17		33		28	563		✓				5hrs	YES	YES	YES	Scaffold and Netting Traffic control such as signals or stop / go boards at off peak periods. Consider traffic stop for each catenary pull (30mins) and night time working		
UNR 20		37		30	798		✓				3hrs	NO	NO	YES			
A55						✓				TBC	TBC	TBC	YES	TBC			
A5						✓				TBC	TBC	TBC	YES				
RAILWAY		-	-	-	-	-	-	✓			3hrs	-	-	YES	Track possession required		
LLANDANIEL RD NCR8		NSL	50	40	13056		✓				3hrs	NO	NO	YES	Traffic control such as signals or stop / go boards at off peak periods for each catenary pull (30mins). Consider night time working		
GC	F	FFORDD FODOLYDD (EAST)	NSL	22.8	18	509	2.5	✓				3hrs	YES	YES	YES	Scaffold and Netting Traffic control such as signals or stop / go boards at off peak periods. Consider traffic stop for each catenary pull (30mins) and night time working	



KEY

- UNR4 4AP CROSSING
- UNR6 4ZA CROSSING
- UNR6 TEMPORARY CROSSING
- UNR4 DISMANTLING CROSSING
- - - DIVERSION ROUTE OPTION FOR OHL WORKS
- SECTION CUT LINES

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF OVERSEEING ORGANISATION.

20.07.2018	DCO Submission	-	-	-	
Rev	Date	Description	CAD	Chk	App

nationalgrid

Site: NWC

Scheme Name: NORTH WALES CONNECTION

Document Title: PROPOSED ROAD AND RAIL OVERHEAD LINE CROSSING AND DIVERSION ROUTES

Creator:	Checker:	Approver:	Sheet Number:	
PG	RT	AL	60514717-TM-011	
Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	NTS	A1 / A3	1 of 1	-

Contains OS data © Crown copyright and database right 2018. Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown Copyright Ordnance Survey, National Grid Electricity - 100024241, National Grid Gas - 100024886. Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown copyright and database rights 2018, Ordnance Survey 0100031673.

Annex F

Construction Route Hazard Risk Register and Plan

NOTES

This document is dynamic and is to be updated to reflect risks on the network
To be read in conjunction with drawing 60514717-TM-25 and Traffic Management Schedule

HGV Use Construction Routes										
Link Reference	Location	Description of hazards	Before Controls			Control Opportunities	After Controls			Comments
			Probability	Severity	Risk Rating (PxS)		Probability	Severity	Risk Rating (PxS)	
All	All	Red List	1 to 5	1 to 5	10 to 25	1 - Early consultation with stakeholders and notification to public 2 - Advanced hazard warning signs at construction access points 3 - Construction activity information signs / communications 4 - Traffic Marshals / Traffic Management 5 - Temporary Speed Restrictions 6 - Physical measures 7 - Traffic Safety and Control Officer 8 - Code of Practice; - Safe Driving Talks / Tests - Obey Speed Limits / Courteous Driving - Notified and made aware of Route Hazard Risk Register - Remain on prescribed routes - Adhere to final agreed CTMP	1 to 5	1 to 5	10 to 25	
		Amber List	1 to 5	1 to 5	5 to 9		1 to 5	1 to 5	5 to 9	
		Green List	1 to 5	1 to 5	1 to 4		1 to 5	1 to 5	1 to 4	
ISLE OF ANGLESEY COUNCIL										
A55 Jct. 3	Jct. 3	Increase in construction traffic movements (1 slight RTC between 2012-2016)	1	4	4	Driver Code of Practice	1	4	4	
A5 (VALLEY)	between A55 Jct. 3 & A5025	Increase in construction traffic movements (1 slight RTCs between 2012-2016)	1	4	4		1	4	4	
A5 (VALLEY) / A5025	signal controlled junction	Increase in construction traffic movements (1 slight RTC between 2012-2016)	2	4	8		1	4	4	
A5025	between signal control junction and Llanyngghendl	Increase in construction traffic movements (1 slight and 1 serious RTC between 2012-2016) Accidents from most recent 16month period are higher than national average for links of similar characteristics - Transport Assessment	1	4	4	Driver Code of Practice On line highway improvements by Horizon	1	4	4	
	between Llanyngghenedl and north of Llanfachraeth	Section of Wales Coastal Path on A5025 School in Llanfachraeth / Pedestrians and crossing points vulnerable roads users Shops / Businesses / Bus Stops / Residential properties adjacent to A5025 (5 slight RTC between 2012-2016) Accidents from most recent 16month period are higher than national average for links of similar characteristics - Transport Assessment	3	4	12	Driver Code of Practice On line highway improvements by Horizon Opportunity to restrict movements during peak traffic periods Opportunity to restrict movements during school times	1	4	4	
	between north of Llanfachraeth and south of Llanfaethlu	Increase in construction traffic movements (1 slight and 1 serious RTC between 2012-2016) Accidents from most recent 16month period are higher than national average for links of similar characteristics - Transport Assessment	2	4	8	Driver Code of Practice On line highway improvements by Horizon	1	4	4	
	between south of Llanfaethlu and Pen Y Cae	Increase in construction traffic movements Shops / Businesses / Residential properties adjacent to A5025 2 x sharp bends (4 slight and 1 serious RTC between 2012-2016) Accidents from most recent 16month period are higher than national average for links of similar characteristics - Transport Assessment	3	4	12	Driver Code of Practice On line highway improvements by Horizon Opportunity to restrict movements during peak traffic periods Hazard warning signs	1	4	4	
	between Pen Y Cae and NCR566 crossing point	Increase in construction traffic movements (1 slight and 1 serious RTC between 2012-2016) Accidents from most recent 16month period are higher than national average for links of similar characteristics - Transport Assessment	1	4	4	Driver Code of Practice On line highway improvements by Horizon	1	4	4	
	NCR566 crossing point	Cyclists (vulnerable road user) Increase in construction traffic	2	4	8	Driver Code of Practice Hazard warning signs for motorists and cyclists On line highway improvements by Horizon	1	4	4	
	between NCR566 crossing point and Llanddygfael- Groes	Increase in construction traffic movements Sharp bends (2 slight RTC between 2012-2016) Accidents from most recent 16month period are higher than national average for links of similar characteristics - Transport Assessment	2	4	8	Driver Code of Practice On line highway improvements by Horizon	1	4	4	
A5025	between Llanddygfael and south of Tregale	Increase in construction traffic movements (1 slight RTC between 2012-2016) Accidents from most recent 16month period are higher than national average for links of similar characteristics - Transport Assessment	1	4	4	Driver Code of Practice On line highway improvements by Horizon	1	4	4	
	between south of Tregale and access A5A	Increase in construction traffic movements Shops / Businesses / Bus Stops / Residential properties adjacent to A5025 Side roads (1 slight RTC between 2012-2016) Accidents from most recent 16month period are higher than national average for links of similar characteristics - Transport Assessment	3	4	12	Driver Code of Practice On line highway improvements by Horizon Hazard warning signs Opportunity to restrict movements during peak periods of Horizon construction traffic	1	4	4	
	access A5A	Increase in construction traffic movements HGV waiting to turn right blocking ahead traffic Right turning HGVs crossing opposing lane Left turning HGVs entering opposing lane Accidents from most recent 16month period are higher than national average for links of similar characteristics - Transport Assessment	3	4	12	Driver Code of Practice Hazard warning signs notifying of presence of slow turning construction traffic. Junction widening to accommodate HGV left turn onto A5025 Potential for carriageway widening on A5025 to accommodate nearside passing bay / left hand diverging lane loop for right turn / right turn pocket Speed restrictions - TRO. Install layby near access A5A for police vehicle	1	4	4	Monitor operation of access A5A prior to installing any physical mitigation measures

HGV Use Construction Routes										
Link Reference	Location	Description of hazards	Before Controls			Control Opportunities	After Controls			Comments
			Probability	Severity	Risk Rating (PxS)		Probability	Severity	Risk Rating (PxS)	
A5025	access A5	HGV waiting to turn right blocking ahead traffic Right turning HGVs crossing opposing lane Left turning HGVs entering opposing lane A5025 between Valley and Wyifa - accidents from most recent 16month period are higher than national average for links of similar characteristics - see Transport Assessment	4	4	16	Access to be used as contingency or emergency only	1	4	4	
UNR23	A5025 / UNR23 Priority junction	Increase in turning traffic - Horizon and North Wales Connection construction traffic	4	4	16	Driver Code of Practice Opportunity to restrict movements during peak periods of Horizon traffic Additional hazard warning signs	1	4	4	
	between access A3 and access A4 between access A3 and access A1 / A2	Increase in Horizon and North Wales Connection construction traffic	2	4	8	Driver Code of Practice Opportunity to restrict movements during peak periods of Horizon traffic Additional hazard warning signs	1	4	4	
UNR1 / High St	Section of road between UNR4 and access B1/B2	Increase in HGV turning movements Narrow single carriageway could lead to verge damage Turning movements leading to carriageway deterioration Existing speeds above speed limit	3	4	12	Driver Code of Practice Communications with local residents Avoid peak traffic periods Hazard warning signs	1	4	4	
UNR1 AND UNR4	Priority Junction	Increase in HGV construction traffic HGV right turn and left turn swept path enters opposing lane Deterioration of carriageway surface course	3	4	12	Use of 3 way traffic signal control or traffic marshals as required during construction traffic movements Speed restriction measures. Provision within access B1 / B2 to accommodate police vehicle / speed detection equipment. Conditions surveys - repair c'way surfacing as required	1	4	4	
UNR4	between priority junction and low height bridge	Increase in HGV construction traffic Narrow single carriageway - risk of damage to verge 2 way HGV traffic route HGV turning traffic at access B4 Bus route	3	4	12	Driver Code of Practice Hazard warning signs Communications with bus operators Vegetation / verge maintenance	1	4	4	
	Low height bridge.	Increase in HGV construction traffic Risk of high sided vehicles colliding with bridge Increased risk of RTAs with additional HGV traffic Two way HGV traffic	4	4	16	Driver Code of Practice Avoid low bridge by using temporary access track between access B4 & B5. Hazard warning signs at all access point B4 / B5 / B7 and along UNR4. Opportunity for HGV traffic to avoid peak times.	1	4	4	
	between low height bridge and sharp bend	Narrow single carriageway - risk of damage to verge Two way HGV traffic HGV turning traffic into / out of access B4 Bus route	3	4	12	Driver Code of Practice Hazard warning signs Vegetation / verge maintenance Opportunity to have HGV one way system with A5025 and B5111 Introduce temporary speed reduction	1	4	4	
UNR4	Sharp bend	Increase in HGV construction traffic Sharp bend Two way HGV traffic (1 slight RTC between 2012 and 2016)	4	4	16	Driver Code of Practice Opportunity to restrict movements during peak periods Additional hazard warning signs Edge of carriageway maintenance if required Opportunity to impose HGV one way system with A5025 and B5111 Opportunity for HGV traffic to avoid section of carriageway by using temporary access track between access B4 and B5.	1	4	4	
	Access B7	Right turning HGVs. Child minding business to north of access B7 - AM/PM departures High existing speeds	3	4	12	Driver Code of Practice Opportunity to restrict movements during peak periods	1	4	4	
	between sharp bend and B5111	Narrow single carriageway - risk of damage to verge Two way HGV traffic HGV turning traffic into / out of access B5 and B7 Bus route (1 slight RTC between 2012 and 2016)	3	4	12	Additional hazard warning signs particularly at access points Edge of carriageway maintenance if required Opportunity to impose HGV one way system with A5025 and B5111 Opportunity to introduce temporary speed reduction between B5111 and bridge	1	4	4	
UNR4 / B5111	Priority Junction	Increase HGV left in right out turning traffic swept path enters opposing lane could lead to RTA introduction of crossroads with the creation of access B9	4	4	16	Driver Code of Practice Additional hazard warning signs on approach to junction Avoid peak times Potential to use 3 way traffic signal control or traffic marshals as required during construction traffic movements Use of access tracks at B8 or B9 to left turn into junction Provision of advanced hazard warning signs.	1	4	4	
B5111	Access B8	Reduced visibility due to horizontal and vertical alignment of road High existing speeds (1 slight and 1 serious RTC between 2012 and 2016)	3	4	12	Driver Code of Practice Access B8 to be in only. Construction traffic to exit via access B7. If vehicles are to exit B8 in one off occurrence then traffic management / traffic marshals to be in place.	1	4	4	
	Access B9	Increase in HGV construction traffic HGV waiting to turn right blocking ahead traffic Right turning HGVs crossing opposing lane Left turning HGVs entering opposing lane Ahead traffic from B9 to UNR4 Deterioration of c'way surfacing High existing speeds (1 slight RTC between 2012 and 2016)	3	4	12	Advanced warning signs on B5111 notifying of presence of slow turning construction traffic. Access to be designed to accommodate HGV exit left turn without entering opposing lane. Conditions surveys - repair c'way surfacing as required Speed restrictions Temporary Traffic Regulation Order. Use of existing layby to south for speed enforcement	1	4	4	
B5111	Between access B9 and north of Llanerchymedd	Increase in construction traffic Key route between Amlwch and Llangefnï. Bus Route / Emergency Services Route Approx. 6m wide single carriageway rural road 2 way HGV traffic Damage to verge Cyclists - NCR566 joins B5111 at UNR8 (2 slight RTC between 2012 and 2016)	2	4	8	Driver Code of Practice Hazard warning signage along route Communications with emergency services and bus operators Verge at carriageway edge and vegetation along route to be maintained if required Road markings to be re-newed at key locations if damaged by works Option to use temporary access track between B9 and C8	1	4	4	
	Llanerchymedd	Increase in construction traffic Built up area / Parked cars / Residential / Businesses School located off B5111 Pedestrians / Cyclists / NCR566 and NCR5 Bus Route Vegetation overhanging c'way (2 serious RTC between 2012 and 2016)	3	4	12	Driver Code of Practice Communications with emergency services and bus operators Avoid peak times (school / work) Option to use temporary access track between B9 and C8 during peak hours	1	4	4	

HGV Use Construction Routes										
Link Reference	Location	Description of hazards	Before Controls			Control Opportunities	After Controls			Comments
			Probability	Severity	Risk Rating (PxS)		Probability	Severity	Risk Rating (PxS)	
	Between Llanerchymedd and Cefn-Gwyn	Increase in construction traffic Key route between Amlwch and Llangefni. 6m single carriageway rural road Bus Route (6 slight RTC between 2012 and 2016)	2	4	8		1	4	4	
B5111	Between Cefn-Gwyn and UNR10	Increase in construction traffic Key route between Amlwch and Llangefni. 6m single carriageway rural road Damage to verge Bus Route (2 slight and 1 serious RTC between 2012 and 2016)	2	4	8	Driver Code of Practice Communications with emergency services and bus operators Hazard warning signage along route Avoid peak times (school / work) Verge at carriageway edge and vegetation along route to be maintained if required Road markings at key locations to be renewed if damaged by works	1	4	4	
	Between UNR10 and Rosmeirch	Increase in construction traffic Key route between Amlwch and Llangefni. 6m single carriageway rural road Damage to verge Bus Route (0 RTC between 2012 and 2016)	2	4	8		1	4	4	
	Rosmeirch to B5110	Increase in construction traffic Built up area / Parked cars / Residential / Businesses Pedestrians Bus Route / bus stops Gradient between Oriol Ynys Mon and B5110 (1 Slight RTC between 2012 and 2016)	2	4	8		1	4	4	
	B5111 / B5110 Priority Junction	Increase in HGV movements at junction Right turn from B5111 onto B5110, restricted visibility to the left due to vegetation (1 slight RTC between 2012 and 2016)	3	4	12		1	4	4	
B5110	between B5111 and Lon Cae Cwta	Increase in construction traffic Built up area / residential properties footways / bus route (1 fatal and 1 slight RTC between 2012 and 2016)	3	4	12	Driver Code of Practice Avoid peak times (school / work) Option to route construction traffic on temporary access tracks	1	4	4	
	B5110 to access C10	Increase in construction traffic Overhanging vegetation Potential for increase in over taking movements	2	4	8	Driver Code of Practice Hazard warning signs Avoid peak times (school / work) Option to transfer OHL traffic to temporary access tracks from OHL compound access D3 Option to transfer proportion of OHL traffic to B5111 Option to use route as one way system along with B5111 Vegetation management if required Consideration of TRO - no overtaking and associated white markings / signage	1	4	4	
	access C10	Increase in construction traffic HGV waiting to turn right blocking ahead traffic Right turning HGVs crossing opposing lane Left turning HGVs entering opposing lane Restricted forward visibility for southbound traffic due to vegetation and horizontal alignment High existing speeds	3	4	12	Driver Code of Practice Hazard warning signs Vegetation clearance / management if required Option to restrict C10 access to egress only Option for OHL traffic for this section to access OHL works via D3 (OHL compound access) Consider Reduced Speed limit - TTRO - Police layby opposite access C9 or north of access C10	2	4	8	
	between access C10 and access C8	Increase in construction traffic Horizontal alignment of the road, reduced forward visibility. Risk of RTC, 2 HGVs passing high speeds (1 serious RTC between 2012 and 2016)	3	4	12	Driver Code of Practice Advanced warning signs General vegetation management Opportunity to clear vegetation from and maintain existing chain link fencing if required Reduced speed limit and associated signage Consideration of TTRO - no overtaking and associated white markings	1	4	4	
	access C9	Increase in construction traffic Access located on bend, reduced visibility could increase risk of RTC High existing speeds	3	4	12	Driver Code of Practice General vegetation management if required Opportunity to clear vegetation from and maintain existing chain link fencing if required Traffic management deployed such as signals during access C9 construction and use. (access required for construction of 1 pylon)	1	4	4	
	access C8	Increase in construction traffic New access for left in right out construction traffic movements.	3	4	12	Driver Code of Practice Advanced warning signs Vegetation clearance / management if required Reduced Speed limit - Temporary Traffic Regulation Order - Police vehicle layby incorporated into access	1	4	4	
B5109 AND B5420	between Llangefni Link Road and Ffrodd Cae Sel (supermarket link road)	Increase in construction traffic Built up area / parked cars / pedestrians (multiple crossing points) / shops / businesses / residential properties / bus route (6 slight RTC between 2012 and 2016)	3	4	12		1	4	4	
FFRODD CAE SEL (SUPERMARKET LINK ROAD)	between B5109 and B5111	Increase in construction traffic Built up area / parked cars / pedestrians (multiple crossing points) / shops / businesses / residential properties / bus route (1 slight RTC between 2016 and 2012)	3	4	12	Driver Code of Practice Option to avoid peak times (school / work) Option to transfer traffic from B5110 to temporary access track between D3 (OHL Compound) and access C8 during peaks Option to transfer construction traffic from B5111 onto A5025 during peaks	1	4	4	
B5111	between Ffrodd Cae Sel (supermarket link road) and B5110	Increase in construction traffic Built up area / parked cars / pedestrians (multiple crossing points) / shops / businesses / residential properties / bus route (1 slight RTC between 2012 and 2016)	3	4	12		2	4	8	
LLANGEFNI LINK ROAD	between A5114 and B5420	Increase in construction traffic movements could increase RTAs (3 slight and 1 serious RTC between 2012-2016)	2	4	8		1	4	4	
A5114	section between A55 Junction 6 and Llangefni Link Road	Increase in construction traffic increase risk of RTA (1 slight RTC between 2012 and 2016)	2	4	8	Driver Code of Practice Avoid peak times (school and work) Opportunity to restrict movements during peak traffic periods Opportunity to route construction traffic via temporary access tracks between access E5a and access D4	1	4	4	
A55	Junction 6	Increase in construction traffic increase risk of RTA (1 slight RTC between 2012 and 2016)	1	4	4	Option to form one way system with use access E5A	1	4	4	

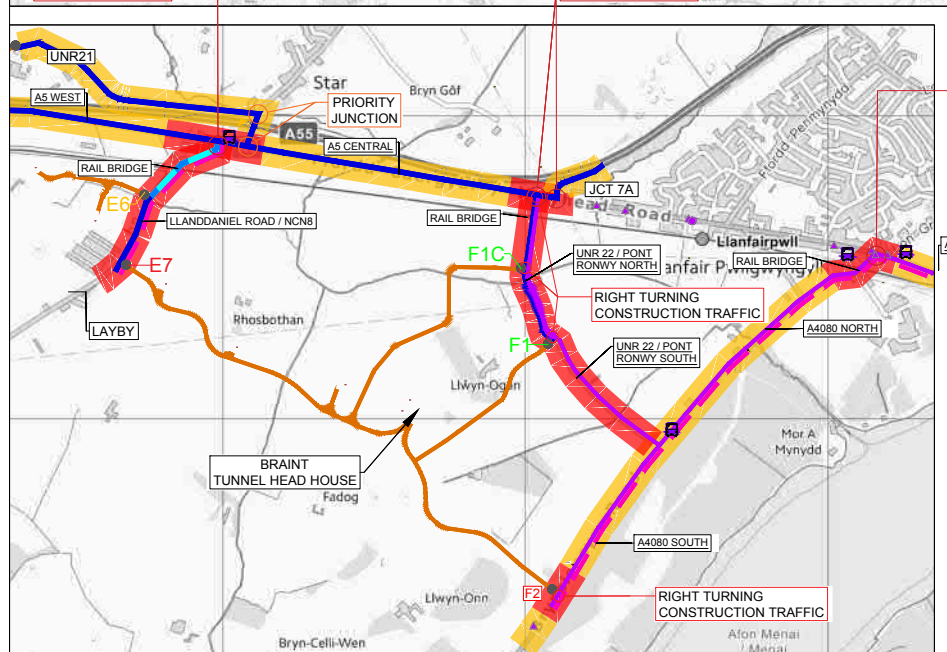
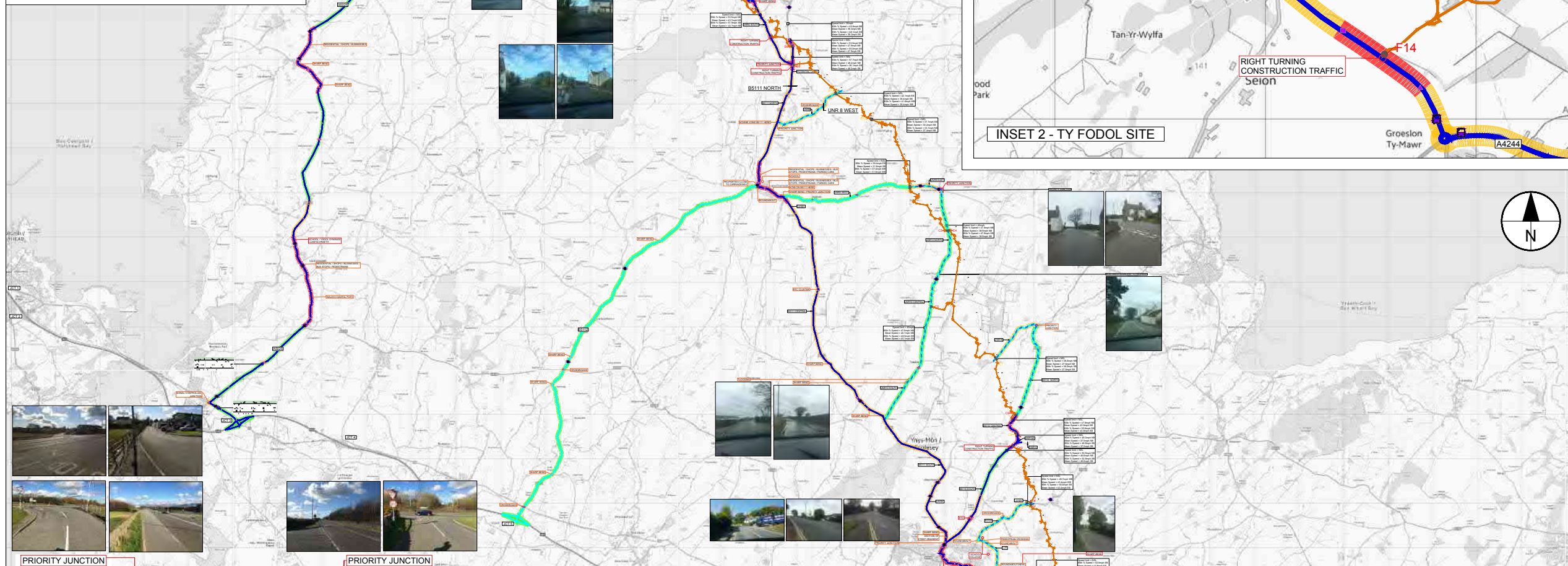
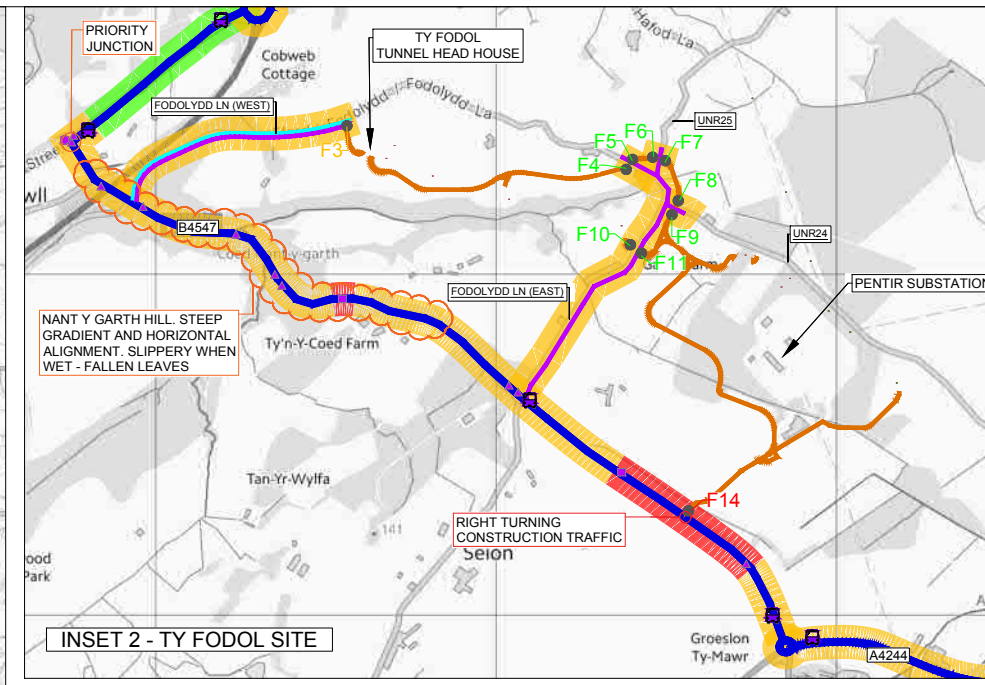
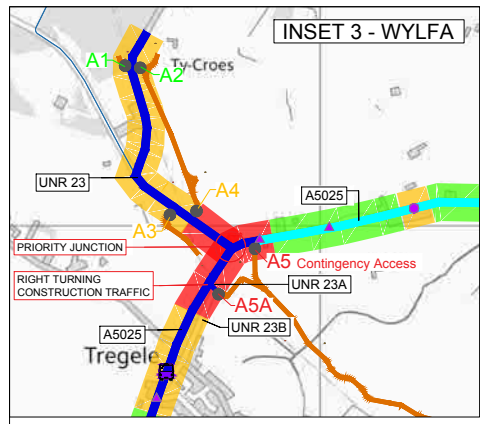
HGV Use Construction Routes										
Link Reference	Location	Description of hazards	Before Controls			Control Opportunities	After Controls			Comments
			Probability	Severity	Risk Rating (PxS)		Probability	Severity	Risk Rating (PxS)	
B5420	between Llangefni Link Road and access D3	Increase in construction traffic Narrow single carriageway Overgrown vegetation - leading to edge shyness 2 way HGV movements high existing speeds (1 serious RTC between 2012 and 2016)	3	4	12	Driver Code of Practice Option to route construction traffic from A55 Junction 7 and access E5A using temporary access tracks to access D4 to avoid this section of B5420 Option to form one way system with use of access E5A Verge at carriageway edge and vegetation maintenance if required Hazard warning signage	1	4	4	
	Dafarn Newydd Bend	Increase in Construction Traffic Sharp bend with reduced visibility Overgrown vegetation 2 Way HGV movements	3	4	12		1	4	4	
	Access D3	Increase in construction traffic Increase in HGV left in / right out turning movements at OHL site compound Visibility to left from access restricted by horizontal and vertical carriageway alignment 85th percentile speeds circa 50mph	3	4	12	Driver Code of Practice Vegetation clearance to increase visibility splay if required Traffic calming measures - coloured surfacing /rumble strips Hazard warning and variable message signs Speed restriction TTRO - start at Cient crossroads space for police car parking to be created within access D3	2	4	8	
	Access D4	Increase in right HGV turning movements Visibility restricted by vertical alignment of carriageway 85th percentile speeds circa 50mph	3	4	12	Driver Code of Practice Construction traffic could route via E5A Vegetation clearance to increase visibility splay if required Traffic calming measures - coloured surfacing /rumble strips Hazard warning and variable message signs Speed restriction TTRO - start at Ceint crossroads	1	4	4	
	between access D3 and Penhesgyn Newydd	Increase in construction traffic Single carriageway Carriageway pinch points and restrictive horizontal alignment along route 2 way HGV traffic could lead to increase RTC Sharp bends (6 slight and 1 serious RTC between 2012 and 2016)	2	4	8		1	4	4	
	between Penhesgyn Newydd and Four Crosses Roundabout	Increase in construction traffic increase risk of RTC (1 slight RTC between 2012 and 2016)	2	4	8	Driver Code of Practice Potential to restrict timings and types of vehicle Route to be a contingency route / emergency route	1	4	4	
B5420 / A5025	Four Crosses Roundabout	Increase in construction traffic Potential capacity constraints in peaks	3	4	12		1	4	4	
A5025	Between A55 Junction 8 and B5420	Increase in construction traffic (1 slight RTC between 2012 and 2016)	1	4	4		1	4	4	
A55	Junction 8	Increase in construction traffic (7 slight and 1 fatal RTC between 2012 and 2016)	2	4	8		1	4	4	
A55	Junction 7	Increase in construction traffic	2	3	6	Driver Code of Practice	1	4	4	
UNR20	between A55 Junction 7 and access E5a	Increase in construction traffic movements Right turn into site could block ahead traffic Left turn out of site could enter opposing lane	2	4	8	Advanced warning signs. Access to be designed to accommodate most onerous swept path without entering opposing lane	1	4	4	
							1	4	4	
A5152	between A55 Junction 7 and A5 / Holyhead Road	Increase in construction traffic movements could increase RTAs Menai Science Park	2	4	8	Driver Code of Practice	1	4	4	
A5 / HOLYHEAD ROAD	between A5152 and Llanddaniel Road / NCR8	Increase in construction traffic movements could increase RTAs Key HGV route to/from Braint Tunnel Head House Increase in overtaking manoeuvres (2 slight and 1 serious RTC between 2012 and 2016)	2	4	8	Driver Code of Practice Consideration of extending no overtaking TRO and road markings Additional hazard warning signs	1	4	4	
A5 / HOLYHEAD ROAD AND LLANDDANIEL ROAD / NCR8	Priority junction	Increase in construction traffic Junction alignment horizontal and vertical alignment reduces visibility splays HGV left turn out of junction onto A5 could enter opposing lane HGV right turn in to junction from A5 could cut across waiting traffic HGV turning traffic could block ahead traffic	3	4	12	Route to be a HGV outbound contingency for Tunnel Head House traffic if main UNR22 / Unnamed Road 22 route unavailable additional hazard warning signs if used as contingency HGV OHL traffic for access E6 to route through Braint THH site via access F1C Option for land acquisition and widen junction to accommodate HGV swept path left to onto A5. Option to restrict traffic movements / traffic management hours of operation if contingency is required Speed reduction TRO on the A5 - Police vehicle could be accommodated in bus layby. route to be tractor trailer / LGV only	1	4	4	
LLANDDANIEL ROAD / NCR8	between A5/Holyhead Road and E6	Increase in construction traffic Bus Route Cyclists NCR8 Horizontal and vertical alignment over railway create pinch points for 2 way HGVs/buses Road bridge over railway line Increase risk of RTC	3	4	12	Route to be HGV outbound contingency route for tunnel head house traffic if main UNR22 / Unnamed Road 22 route unavailable Hazard warning signs Traffic marshals to be used at access E6 if required Route OHL traffic via access E7 signal control / shuttle working over at bridge if contingency route is required option to restrict traffic movements / traffic management hours of operation if contingency is required route to be tractor trailer / LGV only	1	4	4	
	between access E6 and E7	Increase in construction traffic Bus Route / NCR8 Horizontal and vertical alignment creates pinch points for 2 way HGVs / buses passing risk of edge of carriageway damage	3	4	12	Driver Code of Practice HGV route between access E6 and E7 only. HGV OHL traffic to route through Braint site via access F1C route required for construction of 2 pylons use of traffic marshals if required option to restrict traffic movements / traffic management hours of operation option to extend construction programme for enabling works and working areas option to provide 6.8m wide carriageway by widening into verge on eastern side	1	4	4	
	access E7	increase in construction traffic reduced forward visibility to access E7 increase in HGV turning traffic	3	4	12	Driver Code of Practice advanced warning signs to be provided traffic marshals or signals to be provided during HGV movements if required vegetation around bend to be removed / managed if required Speed restriction TRO - police vehicle layby south of E7 or incorporated into access design	1	4	4	

HGV Use Construction Routes										
Link Reference	Location	Description of hazards	Before Controls			Control Opportunities	After Controls			Comments
			Probability	Severity	Risk Rating (PxS)		Probability	Severity	Risk Rating (PxS)	
A5 / HOLYHEAD ROAD	between Llanddaniel / NCR8 and A55 Junction 7A	Increase in construction traffic movements Potential increase in right turn HGV turning traffic	3	4	12	Driver Code of Practice potential to add no overtaking signage additional hazard warning signs communications with local residents / road users option to extend 30mph zone in a westerly direction up to Llanddaniel / NCR8 junction Police vehicle could park in existing layby to east	1	4	4	
A5 / HOLYHEAD ROAD & PONT RONWY / UNR 22	Priority Junction	Increase in HGV / LV construction traffic making left turn from A5 into Pont Ronwy and right turn out of Pont Ronwy onto A5 Junction geometry unsuitable for HGV manoeuvres Traffic blocking ahead movements and entering opposing lane Carriageway damage from turning movements Vehicle over hang at site entrance	3	4	12	Driver Code of Practice Junction re-alignment and widening proposed to allow safe HGV movements off and onto the A5 / Holyhead Road. Advanced warning signs to be provided on approach to junction Condition surveys and repair of c'way as required Site access control to be located as far as practical south of the A5, priority given to arriving traffic	1	4	4	
A55	Junction 7A	Increase in HGV turning traffic making right turn onto A5 / Holyhead Road. Increase risk of RTC	2	4	8	Driver Code of Practice Advanced warning signs to be provided on approach to junction - presence of slow turning vehicles Road markings to maintained / renewed if required	1	4	4	
PONT RONWY / UNR22	between A5 and access F1	Increase in construction traffic Narrow single carriageway. Road Bridge over railway line Increase in HGV movements 2 HGVs cannot pass, damage to verge, bridge, carriageway Carriageway on embankments up to rail bridge - no VRS	3	4	12	Driver Code of Practice Proposal to close road off during construction phase of project. Proposal to restrict effective carriageway width over the bridge to enforce one way working. Opportunity to review road closure during lower volumes of construction traffic, traffic management such as priority signs or traffic lights could be implemented. Traffic marshal to be provided at northern end of Pont Ronwy to allow access for construction vehicles, refuse vehicles and emergency services if required Reduce speed to 10mph between A5 / Holyhead Road and access F1 Access for residents to be via the A4080 Diversion route for all through traffic provided via Toll Gate junction Opportunity to provide vehicle turning area at access F1	1	4	4	
	between access F1 and A4080	Increase in construction traffic Narrow single carriageway. Increase in HGV movements Impact on pedestrians	3	4	12	Driver Code of Practice To be used for Braint site enabling works only where vehicles can not enter/exit via A5/Holyhead Road. Likely to be low level of use by construction vehicles Traffic marshals / management to be used during use. Communications with residents	1	4	4	
A55	Junction 8A	Increase in HGV movements Abnormal indivisible load movements will impact general traffic (2 slight and 2 serious RTC between 2012 and 2016)	1	4	4	Driver Code of Practice Route to be HGV inbound contingency and enabling works route for tunnel head house traffic Option to avoid peak hours AIL movements to be traffic managed and delivered outside of peak traffic hours to minimise disruption Clearway Traffic regulation order to be introduced as required along AIL route	1	4	4	
A5	between A55 junction 8A and Toll Gate junction	Increase in HGV movements Abnormal indivisible load movements will impact general traffic (2 serious RTC between 2012 and 2016)*	2	4	8	Driver Code of Practice Route to be HGV inbound contingency route and enabling works route for Braint tunnel head house traffic	1	4	4	
A5 / A4080	Toll Gate junction and rail bridge	Junction alignment and buildings restrict visibility of traffic turning onto A5. Junction and approach geometry creates difficulties for large HGV swept paths Increase in HGV movements - 2 way Increase risk of RTC Abnormal indivisible load movements will impact general traffic (3 slight RTC between 2012 and 2016)	3	4	12	See swept path analysis drawing in CTMP Annex A - hazardous vehicle movements to occur in off peak periods with adequate TM AIL movements to be traffic managed and delivered outside of peak traffic hours to minimise disruption Clearway Traffic regulation order to be introduced as required along AIL route	1	4	4	
A4080	between rail bridge and access F2	Increase in HGV movements AIL deliveries - impact on public Increase in risk of RTAs Impact on pedestrians along coastal path	2	4	8	Driver Code of Practice Route to be HGV inbound enabling works / contingency /emergency route for tunnel head house traffic AIL movements to be traffic managed and delivered outside of peak traffic hours to minimise disruption Clearway Traffic regulation order to be introduced as required along AIL route	1	4	4	
	access F2	HGV or AIL waiting to turn right blocking ahead traffic Right turning HGV or AIL crossing opposing lane Coastal path users impacted by traffic movements and provision of visibility splay at access F2 (1 slight RTC between 2012 and 2016)	3	4	12	Driver Code of Practice Route to be HGV inbound enabling works / contingency route for tunnel head house traffic Traffic marshals to be in place during AIL movements if required F2 access to be inbound only to reduce impact on coastal path and dry stone wall as consequence of visibility splay Pedestrian crossing point to be provided at access F2 - see PRoW management plan.	1	4	4	
UNR 21	between access E5 and priority junction	Increase in construction traffic movements narrow single carriageway damage to verge	2	4	8	Route to be used as contingency only (HGVs to route via access E5A or D4) opportunity to install passing place vegetation clearance around bend if required	1	4	4	

HGV Use Construction Routes										
Link Reference	Location	Description of hazards	Before Controls			Control Opportunities	After Controls			Comments
			Probability	Severity	Risk Rating (PxS)		Probability	Severity	Risk Rating (PxS)	
GWYNEDD COUNCIL										
A55	Junction 9	Increase in construction traffic movements could increase RTCs (4 slight RTC between 2012 and 2016)	1	4	4		1	4	4	
A487	between junction 9 and B4547	Increase in construction traffic movements could increase RTCs NCR 8 (6 slight RTC between 2012 and 2016)	1	4	4		1	4	4	
A487 / A4087 / B4547	Roundabout	Increase in construction traffic movements could increase RTCs NCR 8 (6 slight RTC between 2012 and 2016) Accidents from most recent 16month period are higher than national average for junction of similar characteristics - see Transport Assessment	2	4	8		1	4	4	
B4547	between roundabout and priority junction	Increase in construction traffic movements could increase RTCs NCR 8	1	4	4	option to only use route if A55 Junction 11 is unavailable i.e contingency route option for outbound traffic only if A55 Junction 10 used for inbound traffic and A55 Junction 9 for outbound traffic option to avoid peak times (work / school)	1	4	4	
	Priority Junction	Increase in construction traffic movements could increase RTCs NCR 8 (2 slight and 1 serious RTC between 2012 and 2016)	2	4	8		1	4	4	
	between priority junction and Ty'n-y-coed farm	Increase in construction traffic movements could increase RTCs Carriageway gradient, and horizontal alignment, overhanging vegetation, wet leaves in winter increase risk of RTC from vehicle skidding (5 slight and 1 fatal RTC between 2012 and 2016)	2	4	8		1	4	4	
	between Ty'n-y-coed farm and access F14 (existing substation access)	Increase in construction traffic movements could increase RTCs Risk of increase in over taking manoeuvres (2 slight and 1 fatal RTC between 2012 and 2016)	2	4	8		1	4	4	
	between access F14 (substation access) and A4244 roundabout	HGV or AIL waiting to turn right blocking ahead traffic Right turning HGV or AIL crossing opposing lane Potential increase in vehicle overtaking manoeuvres Increase risk of RTC (1 slight RTC between 2012 and 2016)	3	4	12		advanced warning signs on B4547 notifying of presence of slow turning construction traffic. traffic calming and speed reduction measures Pentir substation access widening to accommodate HGV left turn onto B4547 potential for carriageway widening on B4547 to accommodate nearside passing bay or right turn pocket level of provision dependant on direction of drilling and subsequent traffic volumes option for speed restrictions - TTRO. Police vehicle layby could be incorporated into access design	1	4	4
FODOLYDD LANE (WEST)	between B4547 and bellmouth F3	Increase in construction traffic narrow single carriageway verge damage Increase risk of RTC	2	4	8	route to be used for enabling works at Ty Fodol tunnel head house. Suitable TM and hazard warning signs. Local engagement	1	4	4	
FODOLYDD LANE (EAST)	between B4547 and access F4 / F5	Increase in construction traffic narrow single carriageway verge damage Increase risk of RTC	2	4	8	route to be used for enabling works only to facilitate bridge construction between access F7 and F8 vegetation management if required consideration of carriageway widening or passing place - install F10 and F11 as a passing place prior to enabling works	1	4	4	
UNR 25	between Fodolydd lane (east) and access F6 and F7	Increase in construction traffic narrow single carriageway verge damage Increase risk of RTC	2	4	8	route to be used for enabling works to facilitate bridge construction between access F7 and F8 vegetation management if required consideration of carriageway widening or passing place - install F10 and F11 as a passing place prior to enabling works	1	4	4	
UNR 24	between Fodolydd lane (east) and access F8 and F9	Increase in construction traffic narrow single carriageway verge damage Increase risk of RTC	2	4	8		1	4	4	
A4244	between B4547 and petrol station	Increase in construction traffic AIL route - disruption to general traffic - cable drum deliveries Potential for increase in over taking manoeuvres NCR82 crossing (8 slight and 2 serious RTC between 2012 and 2016)	2	4	8	option for additional advance warning and information signs along route option to traffic manage AILs along route option to restrict AIL movements to outside peak hours	1	4	4	
	between petrol station and A5	Increase in construction traffic right turning traffic into the petrol station blocking ahead traffic AIL route Increase risk of RTA	2	4	8		1	4	4	
A5	between A4244 and A55 Junction 11	Increase in construction traffic AIL route Increase risk of RTA	2	4	8		1	4	4	
A55	Junction 11	Increase in construction traffic AIL route Increase risk of RTC accident cluster at westbound off slip at roundabout (8 slight RTC between 2012 and 2016)	2	4	8	opportunity to avoid peak traffic periods option to traffic manage AILs along route option to restrict AIL movements to outside peak hours	1	4	4	

Tractor and Trailer and LGV Use Construction Routes										
Link Reference	Location	Description of hazards	Before Controls			Control Opportunities	After Controls			Comments
			Probability	Severity	Risk Rating (PxS)		Probability	Severity	Risk Rating (PxS)	
All	All	Red List	1 to 5	1 to 5	10 to 25	1 - Early consultation with stakeholders and notification to public 2 - Advanced hazard warning signs at construction access points 3 - Construction activity information signs / communications 4 - Traffic Marshals / Traffic Management 5 - Temporary Speed Restrictions 6 - Physical measures 7 - Traffic Safety and Control Officer 8 - Code of Practice; - Safe Driving Talks / Tests - Obey Speed Limits / Courteous Driving - Notified and made aware of Route Hazard Risk Register - Remain on prescribed routes - Adhere to final agreed CTMP	1 to 5	1 to 5	10 to 25	
		Amber List	1 to 5	1 to 5	5 to 9		1 to 5	1 to 5	5 to 9	
		Green List	1 to 5	1 to 5	1 to 4		1 to 5	1 to 5	1 to 4	
ISLE OF ANGLESEY COUNCIL										
BRYNDDU ROAD	Between UNR 3 and UNR 1	Increase in construction traffic movements Key link between A5025 and B5111 Narrow single carriageway Bus Route / Bus Stops (1 slight and 1 serious RTC between 2012 and 2016)	2	3	6	Driver Code of Practice Hazard warning signs Use of temporary access tracks Vegetation management Improvements to existing passing places - take forward for discussion with LHA	1	3	3	
UNR3	Between Brynddu Road and access A8 / A9	Increase in construction traffic movements Narrow single carriageway could lead to increase in RTC Cyclists - NCR556	2	4	8		1	3	3	
UNR 1	between Brynddu Road and UNR4	Increase in construction traffic movements Narrow single carriageway Bus Stops Increase in turning movements at junctions	2	3	6	Driver Code of Practice Hazard warning signs Use of temporary access tracks Vegetation management	1	3	3	
UNR 8	between B5111 and access B10 and B11	Increase in construction traffic movements Narrow single carriageway Cyclists on NCR556 Caravan Park	2	4	8		1	3	3	
UNR 9	between C1 / C2 and UNR10	Increase in construction traffic movements Narrow single carriageway Cyclists on NCR5 Bus route (2 slight RTC between 2012 and 2016)	2	4	8		1	3	3	
UNR 9 and UNR 10	Priority Junction	Increase in construction traffic movements reduced visibility at junction Increase in turning traffic, swept path could enter opposing lane	3	3	9	Driver Code of Practice Additional hazard warning signs on approach to junction Avoid peak times Potential to use 3 way traffic signal control or traffic marshals as required during construction traffic movements Use of access tracks at C3/C2 to avoid junction	1	3	3	
UNR10	between UNR9 and C3/C4	Increase in construction traffic movements Cyclist on NCR5	1	4	4	Driver Code of Practice	1	3	3	
	between B5111 and access C3 / C4	Sections of flooding and surfacing in poor condition at UNR10 South (1 slight and 1 serious RTC between 2012 and 2016)	1	4	4		1	3	3	
B5110	between access C10 and UNR19	Increase in construction traffic movements (1 slight and 1 serious RTC between 2012 and 2016)	1	3	3	Driver Code of Practice	1	3	3	
UNR 19	between B5110 and access C6/C7	Increase in construction traffic movements narrow single carriageway surfacing in poor condition	2	3	6	Driver Code of Practice Hazard warning signs Use of temporary access tracks Vegetation management	1	3	3	
LLANGEFNI LINK ROAD	between B5420 and B5109	Increase in construction traffic movements School located on route	2	4	8	Driver Code of Practice Hazard warning signs Use of temporary access tracks during school opening / closing hours	1	3	3	
B5109	between LLR and access D1 / D2	Increase in construction traffic movements Narrow single carriageway sharp bends	2	3	6	Driver Code of Practice Hazard warning signs Use of temporary access tracks during peak traffic hours	1	3	3	
UNR 16	between B5420 and access E1 / E2	Increase in construction traffic movements narrow single carriageway	2	3	6		1	3	3	
UNR 20	between access E5A and UNR17	Increase in construction traffic movements narrow single carriageway sharp bends	2	3	6	Driver Code of Practice Hazard warning signs Use of temporary access tracks during peak traffic periods Vegetation management	1	3	3	
UNR 17	between access E3/E4 and UNR20	Increase in construction traffic movements narrow single carriageway	2	3	6		1	3	3	
LLANDDANIEL ROAD / NCR8	between A5/Holyhead Road and E6	Bus Route NCR8 Horizontal and vertical alignment over railway create pinch points for 2 way HGVs/buses Road bridge over railway line Increase risk of RTC	2	4	8	Driver Code of Practice Traffic marshals to be used at access E6 if required signal control / shuttle working over at bridge if required option to restrict traffic movements / traffic management hours of operation	1	3	3	

LGV Use Construction Routes										
Link Reference	Location	Description of hazards	Before Controls			Control Opportunities	After Controls			Comments
			Probability	Severity	Risk Rating (PxS)		Probability	Severity	Risk Rating (PxS)	
All	All	Red List	1 to 5	1 to 5	10 to 25	1 - Early consultation with stakeholders and notification to public 2 - Advanced hazard warning signs at construction access points 3 - Construction activity information signs / communications 4 - Traffic Marshals / Traffic Management 5 - Temporary Speed Restrictions 6 - Physical measures 7 - Traffic Safety and Control Officer 8 - Code of Practice; - Safe Driving Talks / Tests - Obey Speed Limits / Courteous Driving - Notified and made aware of Route Hazard Risk Register - Remain on prescribed routes - Adhere to final agreed CTMP	1 to 5	1 to 5	10 to 25	
		Amber List	1 to 5	1 to 5	5 to 9		1 to 5	1 to 5	5 to 9	
		Green List	1 to 5	1 to 5	1 to 4		1 to 5	1 to 5	1 to 4	
ISLE OF ANGLESEY COUNCIL										
A5052	between access A5 and Ffordd Y Felin	(4 slight and 1 serious RTC between 2012 and 2016)	1	3	3	Driver Code of Practice avoid peak time and use temporary access tracks improvements to existing passing places provision of hazard warning signs on route / vegetation management if required	1	3	3	
FFORDD Y FELIN	between A5025 and Brynddu Road	Cemaes Primary School located on route vulnerable road users (children) at school start / finish times	2	4	8		1	3	3	
BRYNDDU ROAD	between Ffordd Y Felin and Llanfechell	key link between A5025 and B5111 Cyclists on NCR556 (1 slight RTC between 2012 and 2016)	1	4	4		1	3	3	
	Llanfechell	Built up area. Shops / Residential properties adjacent to c'way - vulnerable road users narrow carriageway with pinch points at bend through the town Bus Route / Bus Stops Key link between A5025 and B5111 Pedestrians / cyclists on NCR556 Narrow single carriageway could lead to increase in RTC (1 slight RTC between 2012 and 2016)	2	4	8		1	3	3	
A55	Junction 5	None identified	1	3	3		Driver Code of Practice	1	3	3
B5112	between A55 Junction 5 and Llanerchymedd	some sections of narrow single carriageway with sharp bends bus route and bus stops	1	3	3	Driver Code of Practice route LGV traffic onto A5025 or B5111	1	3	3	
UNR9	between B5111 and access C1 / C2	Narrow single carriageway Cyclists on NCR5 Bus route (1 slight and 1 serious RTC between 2012 and 2016)	1	4	4	Driver Code of Practice route via UNR10	1	3	3	
GWYNEDD COUNCIL										
FODOLYDD LANE (WEST)	between B4547 and access F3	narrow single carriageway with overhanging vegetation risk of verge damage reduced visibility due to horizontal and vertical alignment	3	3	9	Driver Code of Practice option to avoid local peak traffic times by routing traffic via F14 vegetation management if required community engagement throughout construction period traffic marshalls and traffic management	1	3	3	



KEY

- HIGH RISK
- MEDIUM RISK
- LOW RISK
- RECORDED 85TH PERCENTILE SPEEDS AT ACCESS POINT
 - Ref. <35MPH
 - Ref. >35MPH <40MPH
 - Ref. >40MPH
- SITE ACCESS TRACKS
- SITE ACCESS POINT
- ▲ SLIGHT ACCIDENT (2012-2016)
- SERIOUS ACCIDENT (2012-2016)
- FATAL ACCIDENT ((2012-2016)
- EXISTING BUS STOP
- WAST ROUTES (TBC)
- PRIMARY LGV / HGV ROUTE
- PRIMARY LGV ROUTE
- PRIMARY LGV / TRACTOR TRAILER ROUTE
- LGV / HGV ENABLING WORKS ROUTE
- LGV / HGV CONTINGENCY ROUTE



NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF OVERSEEING ORGANISATION.

Rev	Date	Description	CAD	Chk	App
20.07.2018		DCO Submission	-	-	-

nationalgrid					
Site:	NWC				
Scheme Name:	NORTH WALES CONNECTION				
Document Title:	CONSTRUCTION ROUTES HAZARD MAP PRE CONTROLS				
Creator:	Checker:	Approver:	Sheet Number:		
PG	RT	AL	60514717-TM-025		
Document Type:	Scale:	Format:	Sheets:	Rev:	
FIGURE	NTS	A1 / A3	1 of 1	-	

Contains OS data © Crown copyright and database right 2018. Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. ©Crown Copyright Ordnance Survey. National Grid Electricity - 100024241. National Grid Gas - 100024886. Background Mapping information has been reproduced from the Ordnance Survey map by permission of Ordnance Survey on behalf of The controller of Her Majesty's Stationery Office. © Crown copyright and database rights 2018. Ordnance Survey 0100031673.

COPYRIGHT: NOT TO BE REPRODUCED WITHOUT THE WRITTEN PERMISSION OF NATIONAL GRID ELECTRICITY TRANSMISSION PLC