

Annex Q - Routing Report

August 2022



**Route Report for the delivery
of a
109.65 Tonne Transformer
from
Grangemouth Docks
to
SSE Substation Crarae**



Issue	Reason for Issue	Date	Prepared By	Approved By
00	Issued for comment	09/03/22	AC	DA
01	Alternative Option	13/04/22	AC	DA

A Complete Road Transport, Multimodal Logistics and Specialist Project Service

Route Report

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ALLELYS GROUP - ROUTE REPORT

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1. REPORT OUTLINE

1.1 Introduction

This route feasibility study reviews and assesses the road transportation of a 109.65 Tonne Transformer from Grangemouth Docks to SSE Substation Crarae.

The transport options considered are:

- 12 Axle Modular (flat top) Drawbar Trailer

This report will examine the above options and determines the transport route and what works will be required to deliver the load.

1.2 Definition of Abnormal Indivisible Load (AIL)

Transport Scotland 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 which, owing to its dimensions or weight, cannot be carried on a vehicle which complies in all respect 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)

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

1.3 Legislation

Conventional heavy goods vehicles have an operating weight limit of 44 tonnes. The category known as (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 6100mm in width, 30000mm in rigid length or 150 tonnes gross weight, Special Order from Highways England is required.

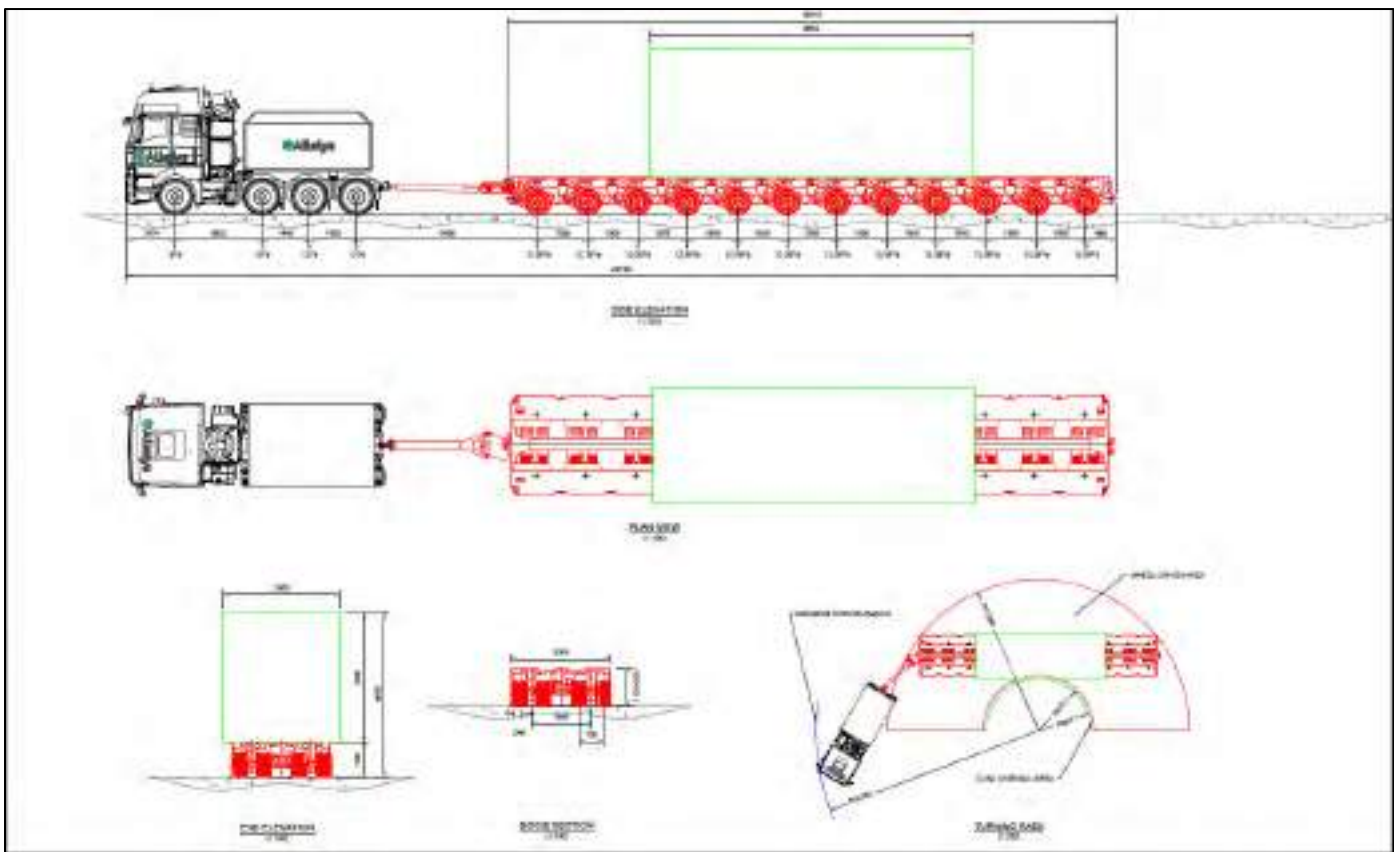
Special Order category AIL movements are authorised by the Transport Scotland Abnormal Loads Team on behalf of the Secretary of State for Transport.

2. TRANSPORTATION REQUIREMENTS

2.2 Transport Dimensions

Load	Length (m)	Width (m)	Height (m)	Weight (Te)
Transformer	9.7	3.5	3.9	109.65

2.3 Transportation Arrangements Considered



12 Axle Drawbar Trailer

2.3 Goldhofer Modular Trailer

For the road transportation of the transformer, Allelys propose to use Goldhofer Modular Trailers.

These specialist trailers can support a payload of 30Te / axle line when the route permits. Bed width of Allelys modular trailer is 3000mm, creating a larger block ground loading area ultimately reducing the ground bearing pressure. Standard running height is nominally 1120 mm \pm 300 mm, allowing the travelling height for the trailer and load to be lowered or raised when required. Axles are spaced at 1500 mm between centres and each axle load is divided over a total of 8 wheels, reducing the point loads further. Any number of axles can be connected together to reduce axle weights when the route or site requires. A maximum steering angle of 60° is achievable on the front and rear inside axles of the trailer allowing greater manoeuvrability.



Goldhofer Steering Geometry



Goldhofer Self-Levelling Suspension

3.0. ROUTE DETAILS

3.1 Route Summary



1. Exit Grangemouth Docks, negotiate local roads to M9 junction 6
2. Negotiate M9 Northbound between junctions 6 & 10
3. Negotiate A84 to Doune
4. Negotiate A84 / A85 from Doune to Crianlarich
5. Negotiate A85 / A82 from Crianlarich to The Green Welly Stop
6. Negotiate A82 / A85 from The Green Welly Stop to A819, Dalmally
7. Negotiate A819 Southbound to Inverary
8. Negotiate A83 Inverary to Minard
9. Crarae Delivery Option A
10. Crarae Delivery Option B
11. Crarae Delivery Option C
12. Crarae Delivery Option D

4.0. ROUTE SURVEY



1a. Exit Grangemouth Docks via the West gate.

1 x post to be removed by Forth Ports, Grangemouth



1b. At the roundabout, take 3rd exit onto A904.



1c. Continue on A904.



1d. At the roundabout, take the 4th exit and join the M9 North bound.



2a. Continue on M9 for 13 miles, exit at junction 10.

Various structures to be checked by BEAR Scotland, including the River Carron Bridge (above).



2b. Exit M9 at junction 10. At the roundabout, take the 2nd exit onto the A84.



3a. Continue on A84 for 0.3 mile. Cross River Forth Bridge – to be checked by BEAR Scotland.



3b. At the roundabout, take the 2nd exit and continue on A84.

No street furniture removal requirements.



3d. Cross River Teith Bridge – Bridge will need to be cleared by BEAR Scotland.



3e. SWA required on exit of River Teith Bridge. PRI may be required.



4a. Continue on A84/A85 for 37.7 miles.

Various small span structures will need to be cleared by BEAR Scotland



5a. Negotiate Crianlarich Rail Bridge.

Full land survey and SWA recommended.



5b. At the roundabout, use the wrong carriageway to turn right and join A82.

1 x bollard to be removed.



5c. Continue on A82 for 4.5 miles.

Various small span structures to be cleared by BEAR Scotland.



5d. Cross bridge at the Green Welly Stop. Structure to be cleared by BEAR Scotland.



6a. Continue on A82 for 200 meters, then bear right onto A85.



6b. Continue on A85 for 12.8 miles.

Various small span structures and culverts to be cleared by BEAR Scotland.

No issues with trailer position or manoeuvrability.



6c. Turn left onto A819.



7a. Continue on A819 for 14.3 miles.

Various small span structures and culverts to be cleared by Argyll & Bute Council.



7b. Turn left into Inveraray Castle. End of day 1.

2x bollards to be removed.

Transport to lay-up in Inveraray Castle car park over night.

Inveraray Castle to be contacted regarding project deliveries.



7c. Use Inveraray Castle roads to avoid Inverary Arch.

1 – culvert in road may require further checks and/or protecting.



7d. Turn right onto A83.



8a. Negotiate A83 through Inverary.

SWA required at Church.



8b. Continue on A83 for 11.4 miles.

Single carriageway throughout.

Multiple structures to be cleared by BEAR Scotland.



8c. Negotiate traffic calming at Minard.

Trailer may need to use pavement.



8d. Continue on A83 for 1.4 miles.

Multiple small span structures to be cleared by BEAR Scotland.

5.0. Crarae Delivery Option A



9a. Turn right onto site access road.

SWA required.



9b. Road to be widened to 4 meters (minimum) and effect on trailer backfill/retaining walls checked. Current track width – 3.3 meters.

1x culvert to be checked.



9c. Bear left at Loch Bealach Gherran.



9d. Continue on site access road for 1.7 miles.

Small span structures and culverts to be cleared.



9e. Cross structure. 12m span, 3.2m width. Overbridge will be required.

Significant fall on North side of bridge. Road surface will need to be raised level.

Full land survey and overbridging design required.



9f. Continue on site access road for 200 meters, then cross second bridge.

12m span, 3.2m width. Overbridge will be required.

Full land survey and overbridging design required.



9g. Continue on site access road for 500 meters, then bear right.



9h. Continue on site access road for 1.9 miles.

Good road. Minor local repairs (pot holes etc) may be required.



9i. Continue on site access road.

Good road built to date. Finished road to be checked prior to delivery.

5.0. Crarae Delivery Option B



10a. Turn right onto site access road.

SWA required.



10b. Road to be widened to 4 meters (minimum) and effect on trailer backfill/retaining walls checked. Current track width – 3.3 meters.

1x culvert to be checked.



10c. Bear right at Loch Bealach Gherran.



10d. Continue on site access road for 3 miles.



10e. Turn left onto access road.

1. Major road improvements required: road widened throughout.

Full land survey and SWA required to confirm requirements.

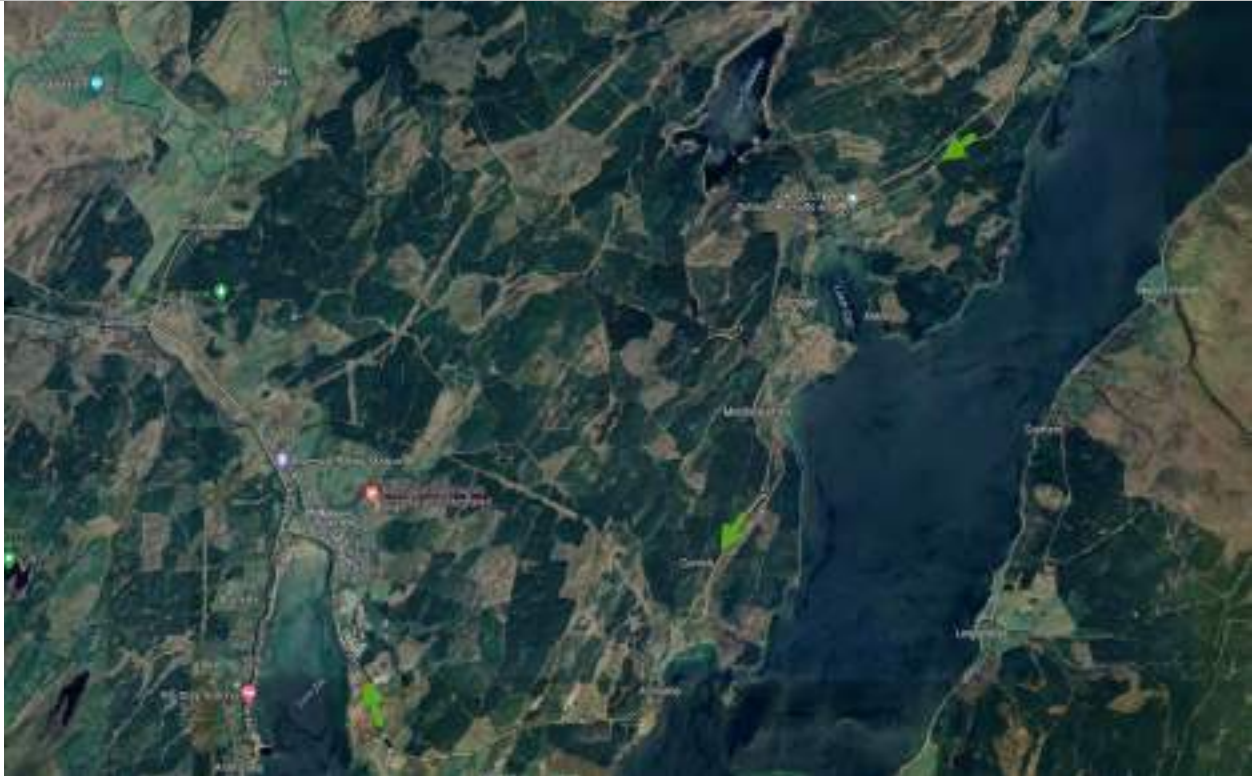


10f. Negotiate site access road/farmers road to site.

2. Major road improvements required: significant fill and regrading at barn.

Full land survey and SWA required to confirm requirements.

6.0. Crarae Delivery Option C



11a. Continue on A83 (past the junction for option A&B), for 10.3 miles.

Various small span structures and culverts to be cleared by BEAR Scotland.



11b. At the roundabout take the 1st and continue on A83.



11c. Continue on A83 for 0.7 miles. At the roundabout, take the 1st exit and continue on A83.

SWA required to confirm if any street furniture requires removal.



11d. Continue on A83 for 300 meters. At the roundabout, take the 1st exit and continue on A83.



11e. Continue on A83 for 500 meters. At the roundabout, take the 2nd exit onto the A816.

1x structure to be cleared by BEAR.



11f. Continue on A816 for 2.2 miles.



11g. Turn right onto site access road.



11h. Continue on site access road for 1.7 miles.

Good road/tracks. Gates on route – 4.3m wide.



11i. Overbridging operation required of structure.

11m span, 3.7m width restriction at curbs.

Bridge survey required to confirm overbridging requirements.



11j. Continue on site access road for 1.7 miles.

Road to be widened where possible.



11k. Overbridging operation required of structure.

5m span, 4.1m width restriction at curbs.

Bridge survey required to confirm overbridging requirements.



11I. Continue on site access road for 4 miles.

Road to be widened where possible, to a minimum of 13.5 meters.

- 1. Road widening at corner**
- 2. Road to be widened. Current road width – 3m.**
- 3. Road to be widened. Current road width – 3.2m.**
- 4. Road repairs at culvert (above) and widened to 3.5m minimum.**
- 5. Road to be widened. Current road width – 3.2m.**



11m. Overbridging operation required of structure.

9m span, 3.2m width restriction at curbs.

Bridge survey required to confirm overbridging requirements.



11n. Continue on site access road for 0.7 mile.

Road to be widened to 3.5m minimum.



11o. Continue on site access road for 500 meters, then bear right.



11p. Continue on site access road for 1.9 miles.

Good road. Minor local repairs (pot holes etc) may be required.



11q. Continue on site access road.

Good road built to date. Finished road to be checked prior to delivery.

7.0. Crarae Delivery Option D



12a. Turn right onto site access road.

SWA required.

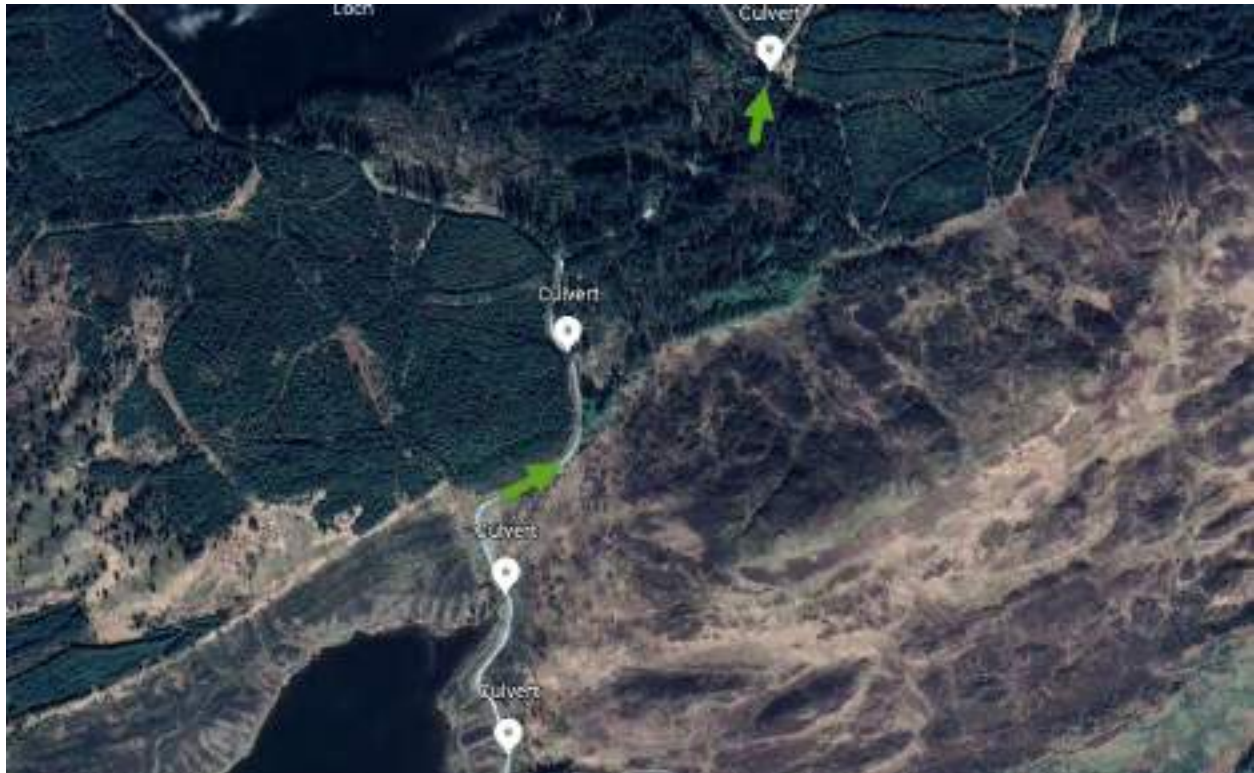


12b. Road to be widened to 4 meters (minimum) and effect on trailer backfill/retaining walls checked. Current track width – 3.3 meters.

1x culvert to be checked.



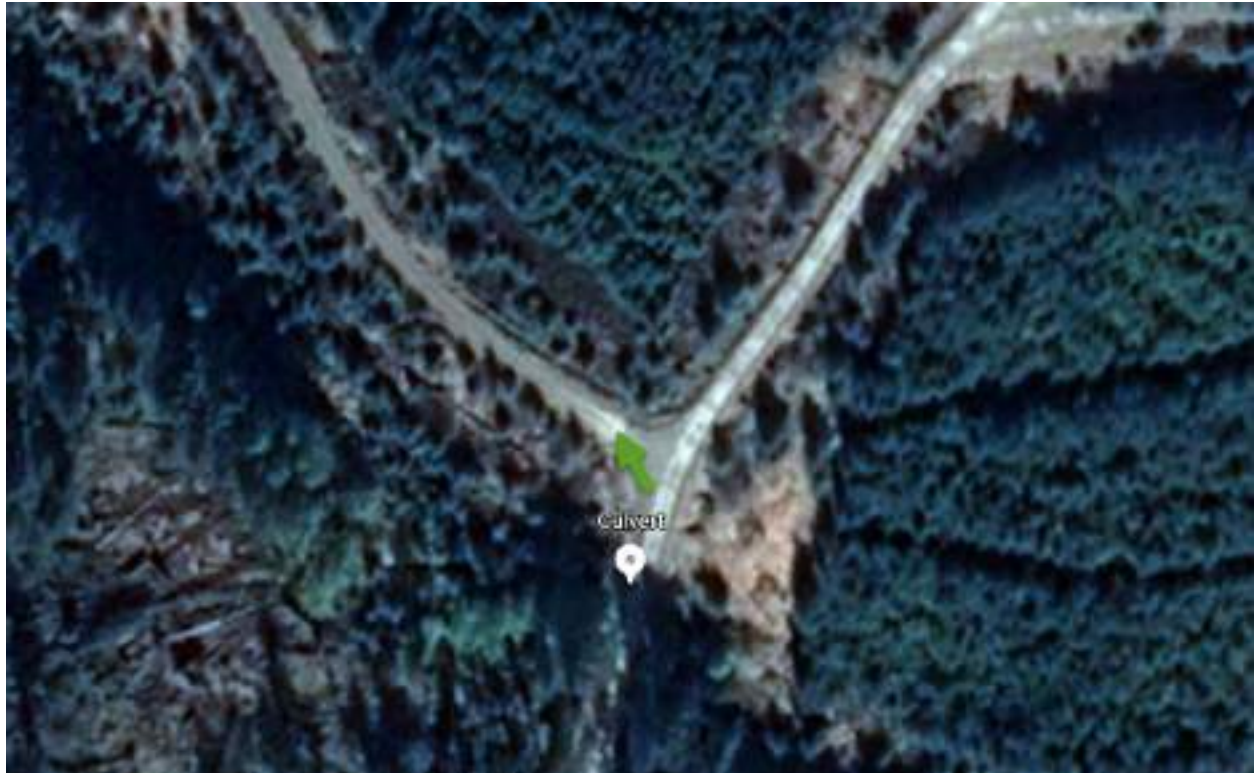
12c. Bear right at Loch Bealach Gherran.



12d. Continue on site access road for 0.6 miles.

Road to be widened and repaired in areas

4 x culverts to be checked

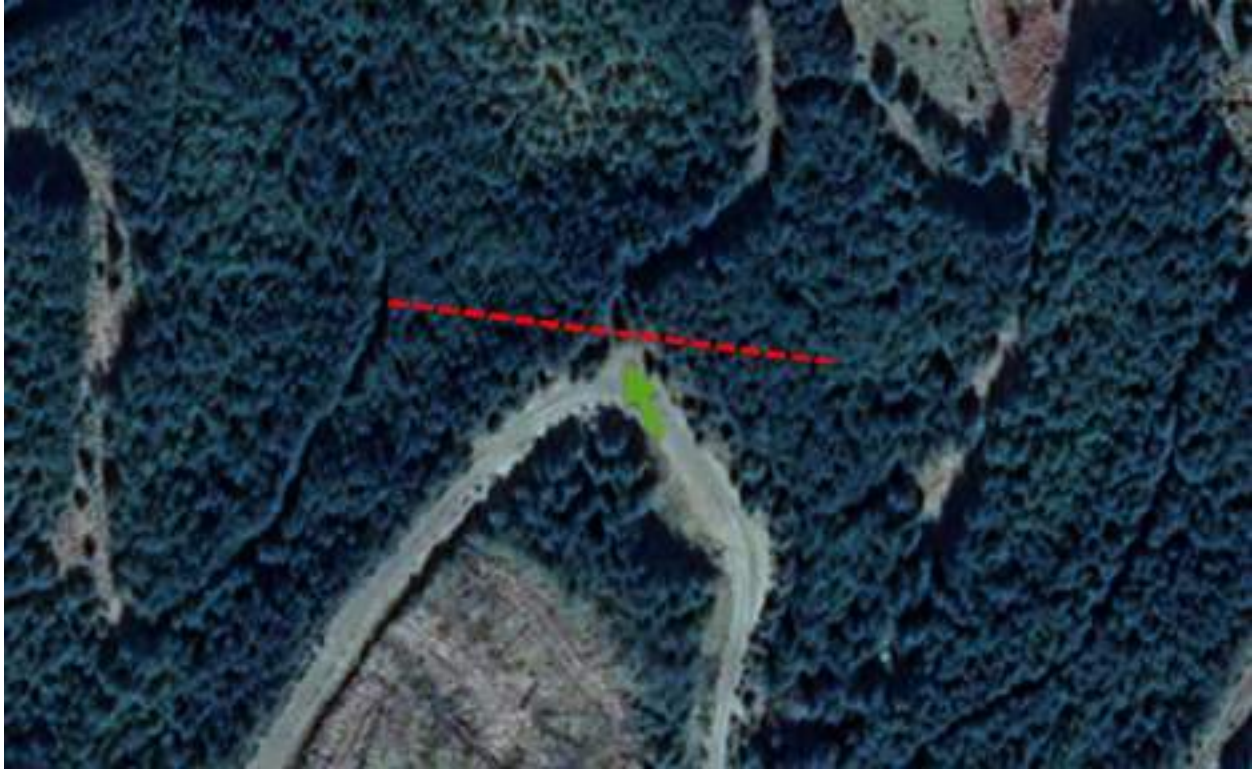


12e. Bear right onto logging track



12f. Continue on logging track for 1 mile.

Road to be widened in areas and influence on retaining walls/banks checked.



12g. Extent of survey.

Further checks required on site access road.

Notes

- Large number of structures on routes, which will need to be cleared by the relevant consultants.
- Police escort will be required.
- Delivery to site will take two days. Lay-up point at Inverary Castle to be investigated.
- A905, A84, A85, A82 & A819 and A83 are single carriageway roads. Possible road closures and Police Escort requirements to be discussed with Police Scotland.
- Additional tractor unit(s) required to negotiate steep incline on site road.
- Overbridging operations will be required for options A & C.
- Traditional land surveys at Crianlarich Rail Bridge, River Teith Bridge and logging track (Option D), should be considered.

Crarae Delivery Options

Crarae delivery option A – Although feasible, there is a large amount of PRI works to complete prior to delivery:

- Road widening throughout.
- The North side of the road at the first overbridge (page 39) will require substantial fill and regrading.
- Two overbridging operations required.

Crarae delivery option B – Is not considered feasible, as there is a significant amount of PRI works to complete prior to delivery:

- Road widening throughout.
- The left turn prior to negotiating the site access road/farm track (page 48) is currently not possible, and a wide area will be required.
- The site road after negotiating this turn (page 48) will require widening, due to steep embankment to the East, the works required are substantial.
- The steep incline by the barn (page 49) will require regrading and the road widening. Due to the floor level of the barn, the works required are substantial.

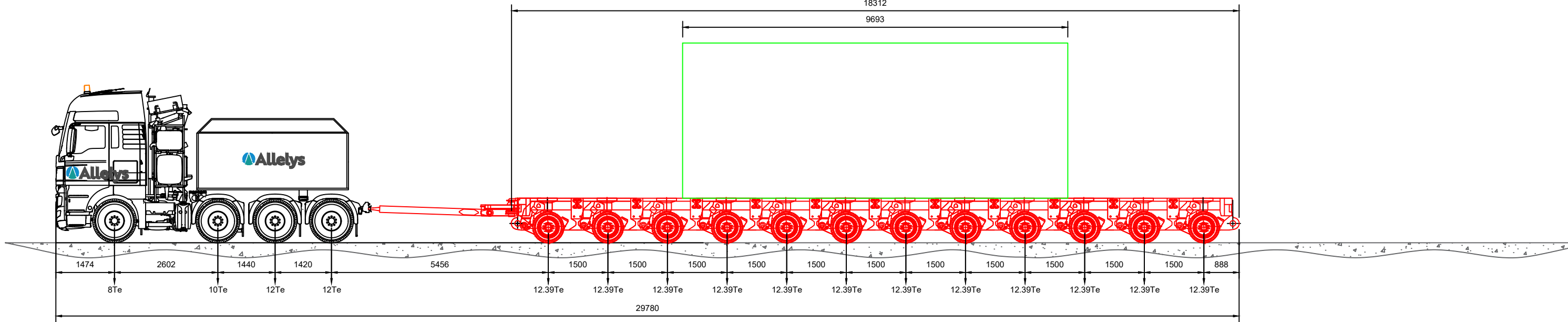
Crarae delivery option C – Is considered feasible, and is deemed the most suitable of the three options. There are however some PRI works to complete prior to delivery:

- Road widening in areas.
- Three overbridging operations required.
- Road repairs required.

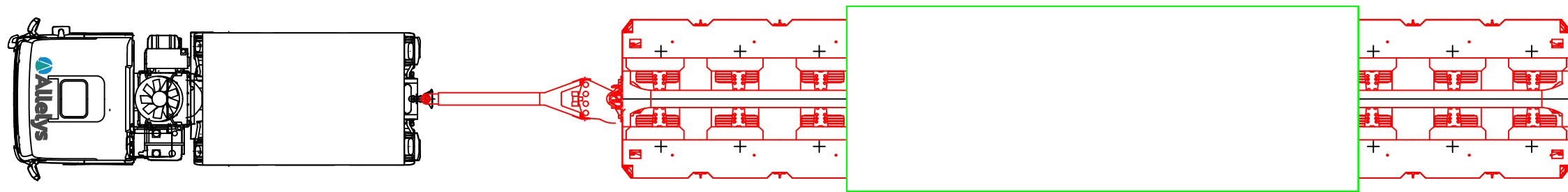
Crarae delivery option D – Although feasible, there is still a large amount of PRI works to complete prior to delivery

- Road widening in areas, mainly at existing culverts.
- Tree / foliage trimming required.
- Traditional land survey of logging track is recommended.

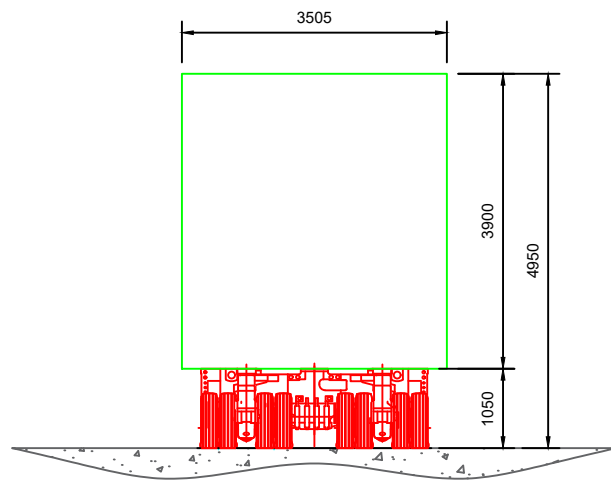
Appendix A – Drawings



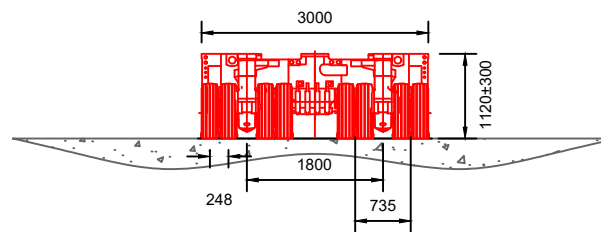
SIDE ELEVATION
(1:100)



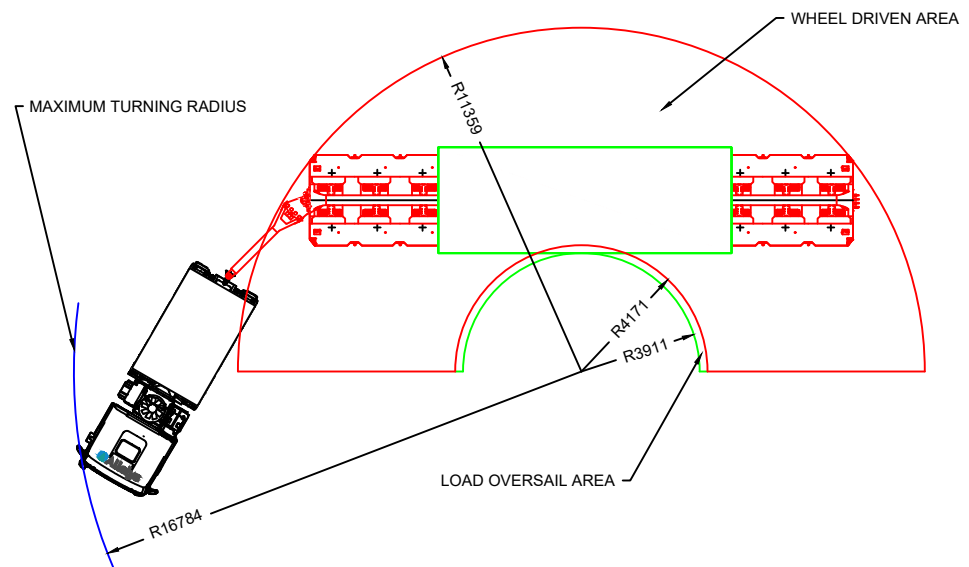
PLAN VIEW
(1:100)



END ELEVATION
(1:100)



BOGIE SECTION
(1:100)



TURNING RADII
(1:250)

DRAWING NOTES:

1. All dimensions are in mm unless otherwise stated.
2. All weights are in metric tonnes unless otherwise stated.
3. All details are provisional and are subject to confirmation.
4. Tractor unit(s) dimensions and axle spacing's may vary depending on the type of tractor unit(s) used.

TECHNICAL NOTES:

1. Suitable trailer lashings to be applied, not drawn.

Load Table

Applied Load Weight (Te)	109.65
Trailer Tare Weight (Te)	38.98
Auxiliary Steel Work (Te)	0.00
Trailer Gross Weight (Te)	148.63
Load per Axle (Te)	12.39
Block Ground Loading (Te/m ²)	2.75

Rev.	Date	Drawn	Checked	Amendments
0	09/02/22	TWP	AC	Issued for Comment

Revisions				



Client: SSE

Project: Argyle

Title: 109.65 Te Unit
12 Axle Modular Drawbar Trailer Transport Arrangement

Scale (A3): 1:100, 1:250
Drawn: TWP
Checked: AC

Dwg. No: A210107-00
Sheet: 1 of 1
Revision: 0

Appendix B – Obstacle List

ROUTE SURVEY / OBSTACLE LIST
PROJECT: Crarae
ROUTE: Grangemouth Docks to Crarea Substation

Seq. No.	Type of Obstacle	Location (e.g. road-no.)	Identification of structure (e.g. bridge name, no., year of constr.)	Relevant Photo(s) (page No.)	Responsible Authority / Ownership	Technical Information on Obstacle (e.g. bridge span, type of construction)	Expected required measure(s)	Permit applied for on: DD/MM/YY	At Licencing Authority	Permit granted on (with requirements): DD/MM/YY	Required Measure(s) (by Authority, e.g. static calc., geological survey)	Executing Contractor	Starting Date of Works: DD/MM/YY	Finishing Date of Works: DD/MM/YY	Re-submission f. approval of measure (Y/N)	Remarks
1	Bridge	M9	River Carron	Page 12	BEAR	98m span	TBC	TBC	Higheays England							
2	Bridge	M9	A9 (plean)	Page 12	BEAR	20m span	TBC	TBC	Higheays England							
3	Bridge	A84	River Forth	Page 14	BEAR	80m+ span	TBC	TBC	Higheays England							
4	Bridge	A84	River Teith	Page 17	BEAR	40m+ span	Survey and PRI	TBC	Higheays England							
5	Bridge	A84	Alt a' Choire Bhric	Page 19	BEAR	40m+ span	TBC	TBC	Higheays England							
6	Bridge	A84	River Dochart	Page 19	BEAR	8m+ span	TBC	TBC	Higheays England							
7	Rail Bridge	A85	OBN1/003	Page 20	Network Rail	4.5m high 6m wide	Survey and PRI	TBC	Higheays England							
8	Bridge	A82	River Fillian	Page 22	BEAR	15m+ span	TBC	TBC	Higheays England							
9	Bridge	A82	River Fillian	Page 22	BEAR	6m+ span	TBC	TBC	Higheays England							
10	Bridge	A819	Teatle Water	Page 27	Argyll & Bute Council	12m+ span	TBC	TBC	Higheays England							
11	Bridge	A819	River Aray	Page 27	Argyll & Bute Council	12m+ span	TBC	TBC	Higheays England							
12	Bridge	A819	Erallich Water	Page 27	Argyll & Bute Council	12m+ span	TBC	TBC	Higheays England							
13	Bridge	A819	River Aray	Page 27	Argyll & Bute Council	15m+ span	TBC	TBC	Higheays England							
14	Bridge	A819	River Aray	Page 27	Argyll & Bute Council	14m+ span	TBC	TBC	Higheays England							
15	Culvert	Inverary Castle Rd	TBC	Page 29	Argyll & Bute Council	14m+ span	TBC	TBC	Higheays England							
16	Bridge	A83	Roman Bridge	Page 32	BEAR	14m+ span	TBC	TBC	Higheays England							
17	Bridge	A83	TBC	Page 32	BEAR	14m+ span	TBC	TBC	Higheays England							
18	Bridge	A83	TBC	Page 32	BEAR	13m+ span	TBC	TBC	Higheays England							
19	Bridge	A83	Loch Clip	Page 54	BEAR	13m+ span	TBC	TBC	Higheays England							
20	Bridge	Site road	Auchoish Burn	Page 58	TBC	11m span	Overbridge	TBC	Higheays England							
21	Bridge	Site road	Duppinn Burn	Page 60	TBC	5m span	Overbridge	TBC	Higheays England							
22	Bridge	Site road	Abhainn Bheag an Tunns	Page 62	TBC	9m span	Overbridge	TBC	Higheays England							
23																
24																
25																
26																
27																
28																
29																

ROUTE SURVEY / OBSTACLE LIST
PROJECT: Crarae
ROUTE: Grangemouth Docks to Crarea Substation

30																	
31																	
32																	
33																	
34																	
35																	
36																	
37																	