

# **Coire Glas**

# AIL Route Survey Report



# March 2018

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# **1** INTRODUCTION

# **Report Purpose**

- 1.1 WYG has been commissioned by SSE to undertake a route review for the delivery of abnormal loads associated with construction of the proposed Coire Glas Hydro Scheme, located above the north-west shore of Loch Lochy in Lochaber, Scottish Highlands.
- 1.2 This report has been prepared in accordance with instructions from SSE on the above project details. No liability is accepted for the use of all or part of this report by third parties.
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# **Report Structure**

- 1.4 Following this introduction, the proceeding chapters of the report are structured as follows:
  - **Chapter Two** describes the location of the proposed development;
  - **Chapter Three** describes the route options reviewed on the site visit along with areas of potential significant constraints;
  - **Chapter Four** provides a summary of the report and an outline of suggested further works, actions and recommendations for consideration by the SSE.



# 2 PROPOSED SITE AND ACCESS STRATEGY

# Site Description and Location

2.1 The proposed Corie Glas Hydro Sheme is located above the north-west shore of Loch Lochy in Lochaber, Highlands. The site location is illustrated below in Figure 2.1.



### Figure 2.1: Site Location

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# **Proposed Loads**

2.2 There are two distinct groups of abnormal loads proposed for the project, namely:

- Loads associated with equipment to be installed in the power station to enable the generation of electricity; and
- Loads associated with construction plant such as large scale loaders, cranes, etc.
- 2.3 The number of loads associated with the generation equipment required for the site are summarised below in Table 2.1.



	Dimensions				
Item	Number	Length	Width	Height	Weight
Turbine Head Cover	5	4m	4m	2m	50 tonnes
Generator Shaft	5	11m	-	-	80 tonnes
Stator Frame	5	7m	5m	5m	50 tonnes
Generator Hub	5	4m	4m	5m	150 tonnes
Penstock Lining	40 - 80, dependant upon length of sections	10m to 20m	2.4m to 10m	2.4m to 10m	Dependant on length
Transformer	5	11.6m	6.7m	6.0m	280 tonnes
Powerhouse Crane	1	22m	3m	3m	55 tonnes

### Table 2.1: Numbers of Abnormal Loads

- 2.4 It is assumed that components detailed in Table 2.1 will be landed at the Corpach Harbour and then transported by barge via the Caledonian Canal. The canal locks have sufficient capacity to accommodate the proposed loads and as such, the equipment loads would have no impact on the road network.
- 2.5 It is proposed that barges will be used to transport rock from the site to Corpach and these barges could be used for the movement of the required equipment back to site when returning.

# **AIL Construction Plant**

- 2.6 Large scale construction plant will be required at the site. This will include large dumper trucks, dozers, loaders and cranes.
- 2.7 The exact requirements for construction equipment will be set by the contractor appointed by SSE to deliver the civil engineering aspects of the project. A review of the likely plant required at site has been undertaken to ascertain the likely transport issues. Typical plant dimensions are provided in Table 2.2.



	Dimensions			
Vehicle	Length	Width	Height	Weight
CAT 777F Dump Truck	10.5m	6.5m	5.2m	74 tonnes
CAT 992K Loader	15.8m	5.5m	5.7m	97.5 tonnes
CAT D10 Dozer	7.6m	3.2m	4.1m	77.9 tonnes
Liebherr LG 1750 Crane	19.2m	3m	4m	96 tonnes

### **Table 2.2: Indicative Plant Dimensions**

- 2.8 These loads would be broken down as far as is practical to facilitate access to the site. Given the geographical location of the site, it is considered likely that all plant would approach the site by barge for wider loads or for narrower loads, by road from Inverness using the A82.
- Loads would travel on the public road in demobilised form on low loaders to facilitate easy and safe access. Photos 2.1 2.3 illustrate similar loads being transported.
- 2.10 Narrow loads such as the dozers and cranes would travel by road from Inverness. These loads would travel to site via the A82. Loads required at the dam site, would then turn onto the A87 and proceed to the north site access junction at White Bridge (Invergarry). Loads travelling to the lower reservoir works would continue on the A82 to the Kilfinnan Road junction.
- 2.11 Certain loads may need to travel between the two sites. If the temporary haul road is built between the lower reservoir works and the upper reservoir works, then this could be utilised for these loads. If this is not possible, then loads would travel via the A82 and A87.
- 2.12 Marine access for hydro projects has been used on the Caledonian Canal in the past, an example being the movement of transformers for the Foyers project.





Photo 2.1: Demobilised CAT 777F Dumper Truck in transit

Photo 2.2: CAT 777F Dumper Truck in transit







### Photo 2.3: Demobilised CAT 992K Loader in Transit

# **Marine Access**

- 2.13 The site is located on the shore of Loch Lochy and a jetty is to be provided to enable marine access to and from the site. The Loch is accessible via the Caledonian Canal, which can accommodate barges up to 45m in length, 10m wide with a draft of 4.1m. The maximum height limit is 27m.
- 2.14 Marine access for the electrical generation equipment and the widest construction plant loads is considered to be the most feasible access option as it will remove heavy loads from the road network and reduce disruption caused by abnormal load traffic.
- 2.15 To enable marine access, the quayside (jetty) will need to be constructed to allow a heavy lift area to enable crane access. Cranes would then lift components from the barge onto Self Propelled Modular Transports (SPMT) or other low loader transporters.
- 2.16 Loads would then be mobilised at the construction site or moved directly into the turbine chamber via the access tunnels.



# **3 ROUTE REVIEW**

- 3.1 A route review was undertaken by video survey from the Inverness docks to both site access roads. This method allows a full record of the route to be undertaken, with notes recorded following completion of the survey. Not only is this process efficient, it also provides a much safer working environment for staff. The video survey allows a full record of the route to be kept for future reference. To accompany the video survey, various Points of Interest (POI) were recorded using a Global Positioning System (GPS) tracker that logs the locations of points on the routes to Ordnance Survey (OS) coordinates.
- 3.2 The site visit did not include any geotechnical, utility or environmental reviews and as such the information provided in this report is based solely on the observations noted on the site visit and subsequent swept path assessments.
- 3.3 All roads are considered suitable for the movement of loads, subject to improvements at selected points and a detailed review of the structural capacity of bridges and culverts along the route. An initial consultation using the ESDAL system to review structures and axle loads has been undertaken and is presented in later sections of this report.
- 3.4 Plans illustrating the location of the constraints and a detailed list of POI's are provided in Appendix A.



# **Route Description**

- 3.5 Loads from Inverness will depart the A9 at the Longman Roundabout and would proceed to site via the A82. These loads will include smaller scale construction plant and the cranes.
- 3.6 Loads arriving from the canal (wide construction plant) will be loaded onto the quayside at the lochside construction area. Using low loaders they will proceed to the dam site either by internal road network or via Kilfinnan Road, the A82 and A87.
- 3.7 Figure 3.1 illustrates the proposed road routes.

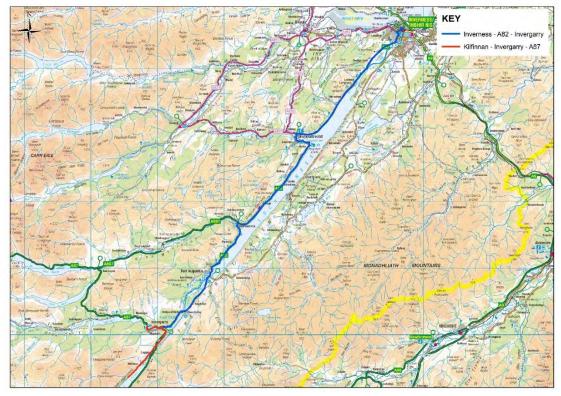


Figure 3-1: Abnormal Load Route – Inverness – Site Access Junctions

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# Network Constraints: Inverness – A87 & A82 Access

3.8 Table 3.1 details the potential constraint point locations along the route from the A9 at Inverness through to the proposed site access. A Liebherr crane has been used at the basis for the assessment.

POI	Key Constraint	Details
1	Longman Road Roundabout	Loads will approach the junction from the south and will take the first exit onto the A82.
		A swept path assessment has been undertaken and indicates that no physical improvement measures are required.
		Loads however will require full access to the exit and entry lanes.
2	Harbour Road Roundabout	Loads will continue on the A82 westbound and will take the second exit.
		A swept path assessment has been undertaken and indicates that no physical improvement measures are required.
		Loads however will require full access to the exit and entry lanes.
3	Rose Street Roundabout	Loads will continue on the A82 westbound and will take the second exit at the roundabout.
		A swept path assessment has been undertaken. This indicates that no remedial works are considered necessary, although loads will need both circulation lanes and full access to the A82 west arm of the junction.

### Table 3-1: Route Constraint Point



POI	Key Constraint	Details
4	Shore Street Roundabout	Loads will continue on the A82 southwest bound and will take the second exit at the roundabout. A swept path assessment has been undertaken. This indicates that no remedial works are considered necessary, although loads will need both circulation lanes and full access to the A82 south arm of the junction.
5	Telford Roundabout         Image: Constraint of the second secon	Loads will continue on the A82 westbound and will take the second exit at the roundabout. A swept path assessment has been undertaken. This indicates that no remedial works are considered necessary.
6	A82/Tomnahurich Junction	Loads will turn right at the junction and will proceed westbound on the A82. Care will be required when turning at the junction to avoid the load over-sailing the footway.



POI	Key Constraint	Details
7	A82/A831 Junction	Loads will proceed on the A82 at the junction. The advance escort vehicles should hold oncoming A82 traffic back from the corner in the interests of safety. Careful negotiation of the junction is required to avoid over-sailing the inside footway.
8	A82/A887 Junction	Loads will proceed on the A82 at the junction. The advance escort vehicles should hold oncoming A82 traffic back from the corner in the interests of safety and should ensure that the right turn lane is clear of traffic prior to the loads approaching. Careful negotiation of the junction is required to avoid over-sailing the inside footway.
9	A82/B862 Junction, Fort Augustus	Loads will proceed ahead on the A82 and will continue westbound. The advance escorts should hold oncoming traffic prior to the bend in the interests of road safety.
10	A82/A87 Junction, Invegrarry	At this junction, loads will either turn right heading to the dam works site or will continue southbound for the lochside works site. No physical accommodation works are required at this location, however a traffic management plan will be necessary to assist with abnormal load movements.



POI	Key Constraint	Details
11	A87/Site Entrance Junction	Loads will turn left onto the upgraded site access track at this location.
12	Kilfinnan Road / A82 Junction	Loads will turn right into Kilfinnan Road at this junction. Kilfinnan Road will be widened to accommodate two way traffic. To accommodate the crane loads, the road would need to be widened near the access junction and one road sign and one electricity pole relocated.

# **Network Constraints: Kilfinnan Road - A87 Access**

3.9 Table 3.2 details the potential constraint point locations along the route from theKilfinnan Road junction through to the A87 access junction. A CAT 777F on a transporterhas been assumed for the assessment load.



POI	Key Constraint	Details
12	Kilfinnan Road / A82 Junctions	Loads will turn left from Kilfinnan Road onto the A82. Kilfinnan Road is to be widened to two lanes, however to accommodate the proposed wide loads, the junction will need to be widened as per the swept path assessment. Several road signs and one electricity pole should be relocated. The pedestrian guard rail on the nearby bridge should be lowered. A traffic management plan will be necessary to ensure that oncoming traffic is held when these loads are operating on the network.
13	A82 Narrowing	The road narrows at this location. Oncoming traffic should be held back prior to this section to allow loads full access to both lanes.

### Table 3-2: Route Constraint Points



POI	Key Constraint	Details
10	A82/A87 Junction	Loads will turn right onto the A87 at this location.
		A swept path assessment has been undertaken and indicates that two areas of load bearing plating will be necessary to accommodate loads. The drawing is located in Appendix B.
		One road sign and one lighting column should be relocated during movements.
		Oncoming traffic on the A87 should be held prior to the site access junction to allow loads full access to both lanes.
14	A87 Invergarry Primary School	Loads will not be permitted to move
		during school hours to prevent any potential conflicts with drop off and pick up traffic.
12	A87/Site Entrance Junction	Loads will turn off the A87 onto the site access road. One road sign in the
		verge should be relocated.

# Swept Path Assessment Results

3.10 The detailed swept path drawings for the locations analysed in Tables 3.1 and 3.2 are provided in Appendix B for review.



- 3.11 The drawings in Appendix B illustrate tracking undertaken for the worst case loads at each location. The colours provided on the swept paths are:
  - Green vehicle/trailer outline (body swept path);
  - Red wheel tracked pathway (wheel swept path); and
  - Purple load over-sail tracked path (load swept path).
- The points in Table 3.1 (Inverness to site) have been assessed for a Liebherr LG 1750 crane, whilst the section from Kilfinnan Road to the A87 site junction presented in Table
   3.3, have been assessed for a CAT 777F on a transporter.
- 3.13 Where mitigation works are required, the locations are illustrated on the swept path drawings. Please note that any alterations to the specified load or vehicle details will invalidate the assessment results.
- 3.14 It is important to note that a number of the swept path assessments undertaken have been based on OS data. There can be measurement errors associated with the use of this data.
- 3.15 Kilfinnan Road will be rebuilt as a two lane road and the design of the road will incorporate the requirements to move wide loads such as those described in this report. As such, no assessment of Kilfinnan Road has been undertaken.

# **Route Summary**

3.16 Assuming that the outlined mitigation and reconstruction of Kilfinnan Road are in place, the proposed route is considered feasible for the delivery of proposed components.

# Land Ownership and Utilities

- 3.17 The limits of road adoption can vary depending upon the location of the site and the history of the adopting agency. In general, the adopted area is that contained within a defined boundary where the local authority or Transport Scotland holds the maintenance rights for the land from the original land owner. In urban areas, this is usually defined as the area from the edge of the footway across the road to the opposing footway back edge.
- 3.18 In rural areas the area of adoption can be open to greater interpretation as defined boundaries may not be readily visible. In these locations, the general rule is that the



area of adoption is between established fence / hedges lines or a maximum 2m from the road edge. This can vary between areas and every location can be different.

# ESDAL Weight and Structural Review

- 3.19 WYG has undertaken an ESDAL (Electronic Service Delivery for Abnormal Loads) review for the proposed loads using the Highways Agency website www.esdal.com.
- 3.20 The review identified the following key contacts for the route option amongst the various transport agencies and road authorities along the proposed route. Table 3.2 summarises the various consultees, with comments received to date attached in Appendix C.

Organisation	Email Address
Police Scotland	OSDAbnormalLoadsScotland@scotland.pnn.poli
Folice Scotland	<u>ce.uk</u>
Transport Scotland	paul.winn@transport.gov.scot
Network Rail LC & Rail over Road	abnormalloadscontact@networkrail.co.uk
Highland Council	abnormal.loads@highland.gov.uk
Abnormal Loads Jacobs	RSGBRB@jacobs.com
National Grid - Gas Distribution -	plantprotection@nationalgrid.com
Utility Company	
Scotland Has Networks (Scotia) –	customer@sgn.co.uk
Utility Company	

### Table 3-2: ESDAL Consultee List

3.21 Responses received to date can be found in Appendix C.

# **General Comments**

- 3.22 WYG has undertaken a review of the potential access route from KGV Docks through to the proposed site access. WYG would strongly suggest that a review of the following is undertaken prior to the delivery of the abnormal loads, to ensure load and road user safety:
  - Detailed discussions with Transport Scotland, The Highland Council and overhead utility suppliers should be held regarding the movements;
  - A review of maximum axle loading on structures along the entire access route with the various road agencies is undertaken immediately prior to the loads being transported in case of last minute changes to structures;



- A review of clear heights with utility providers and the transport agencies along the route (maximum height of the loads transported on land is expected to be no greater than 5m). The haulier is recommended to ensure with utility providers that there is sufficient clearance with an appropriate safety factor (especially with respect to power lines);
- That any vegetation which may foul the loads is trimmed back to allow passage (this is of concern once the load is on the local road network and should be assessed for summer conditions);
- That there are no roadworks or closures that could affect the passage of the loads.
   A check with the Transport Scotland should be made before the transit of the first abnormal load;
- That a test run is completed to further assess the routes for all components and confirm findings of the swept path assessments;
- Vertical assessments are carried out to confirm ground clearance;
- That there are no new or diverted underground services on the access route that are at risk from the abnormal loads; and
- That a condition survey is undertaken to ascertain the extents of any highway defects and that this is agreed in advance of any load movements with the roads agencies to protect the client group from unrelated damage claims. This is to be undertaken in conjunction with The Highland Council.



# 4 SUMMARY AND FURTHER WORKS

# **Summary**

- 4.1.1 WYG has been commissioned by SSE to undertake a route review for the delivery of abnormal loads associated with the proposed Coire Glas Hydro Scheme, located above the north-west shore of Loch Lochy in Lochaber, Scottish Highlands.
- 4.1.2 Minor road works at the junction of the A82 / Kilfinnan Road and at the junction of the A82 / A87 area required and discussion with Transport Scotland should be held to agree the technical works following planning approval.

# **Initial Considerations and Further Work**

- 4.1.3 From this review, WYG would suggest any mitigation works are designed to be permanent to ensure that future maintenance can be undertaken without the need to reopen land and access rights on site.
- 4.1.4 The following work is recommended to SSE for consideration in relation to the proposed access route:
  - Detailed design review of the proposed mitigation works;
  - Consider the needs of abnormal load access when designing the widening of Kilfinnan Road;
  - Provide a suitable lochside quay area at the southern access compound to enable load transfer from barge to land;
  - Confirm the exact dimensions of the generation equipment and dimensions of plant required to construct when the contractors are appointed and reconfirm the need for mitigation works; and
  - Traffic Management Plan a detailed Traffic Management Plan (TMP) will be essential for this project given the level of constraint in a number of areas.



Appendix A

**POI PLANS** 

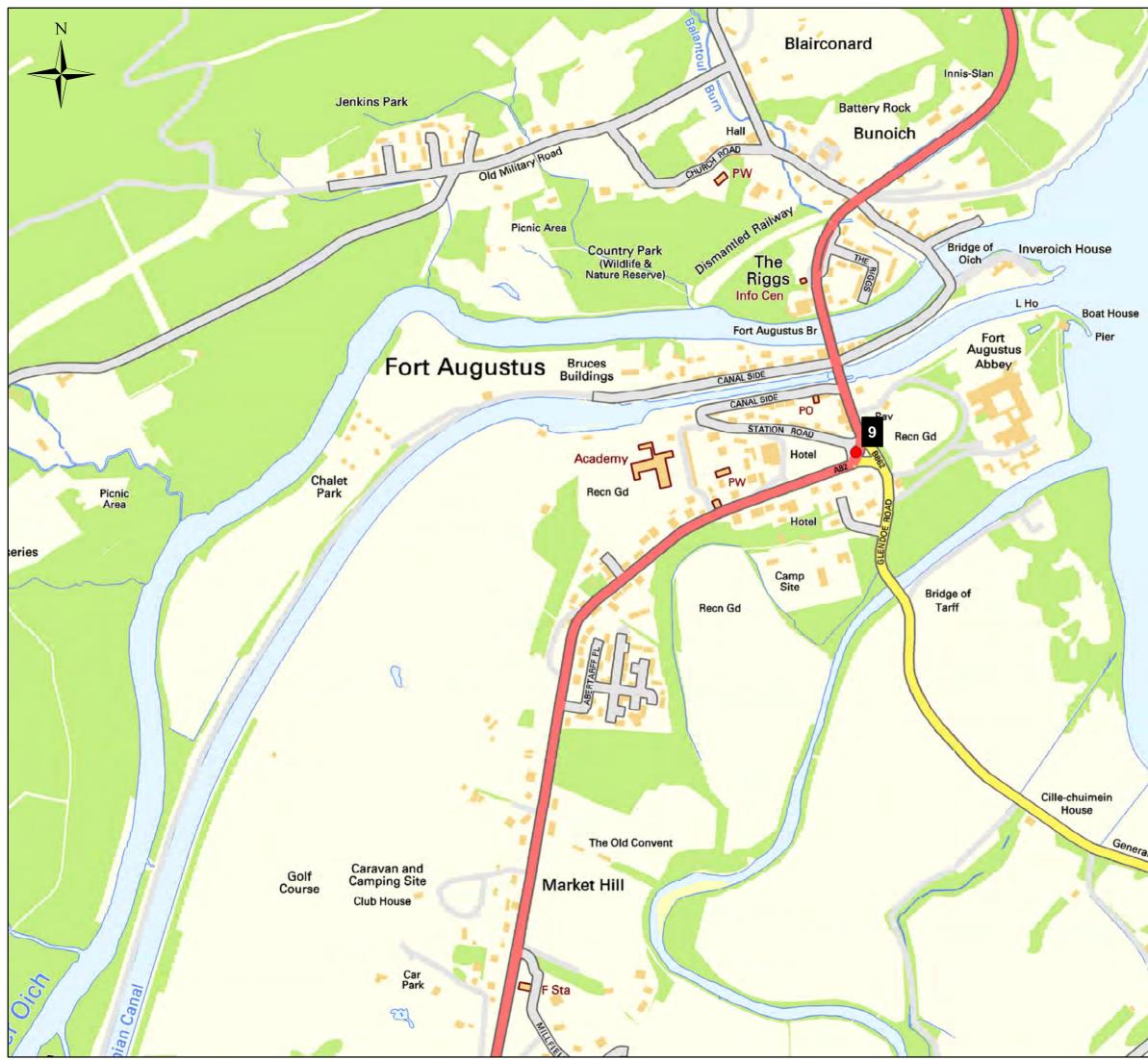
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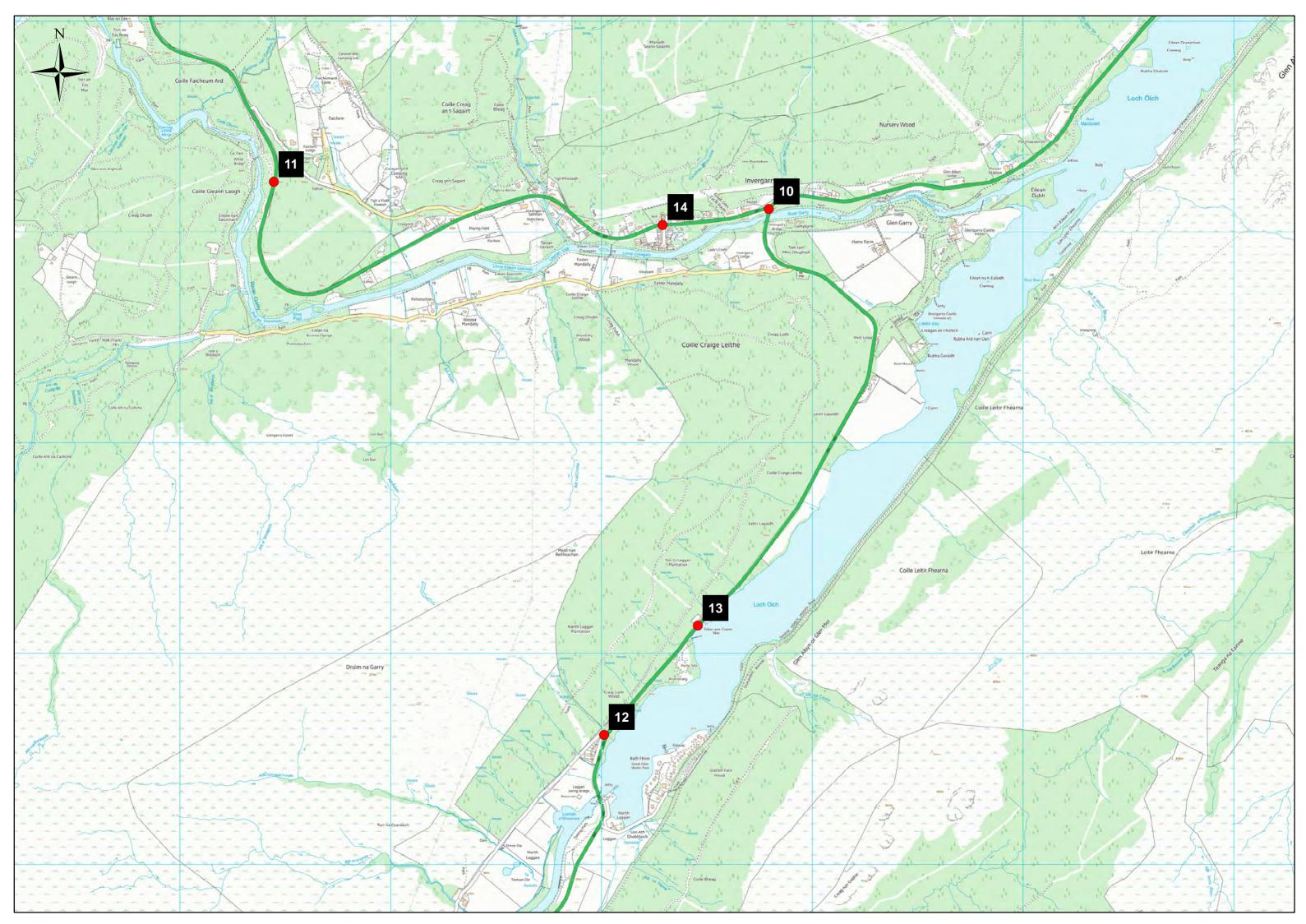








# Loch Ness General Wade's Military Road Borlum Cottage Borlum Farm W





Appendix B

**Swept Path Assessments** 

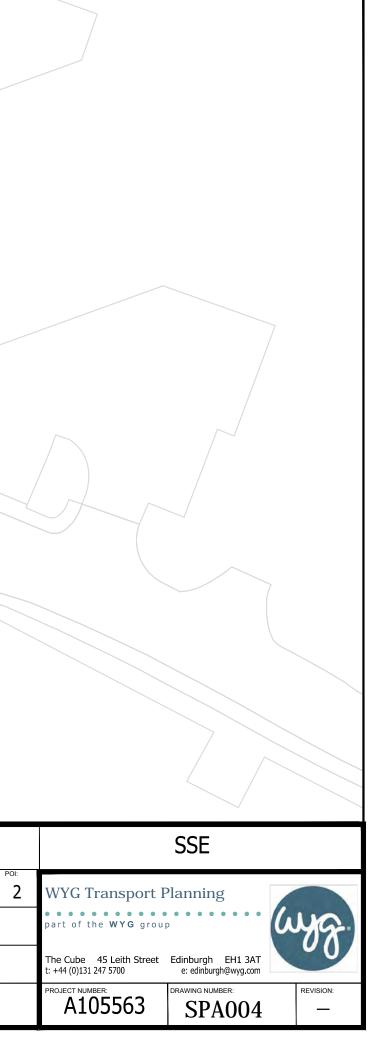
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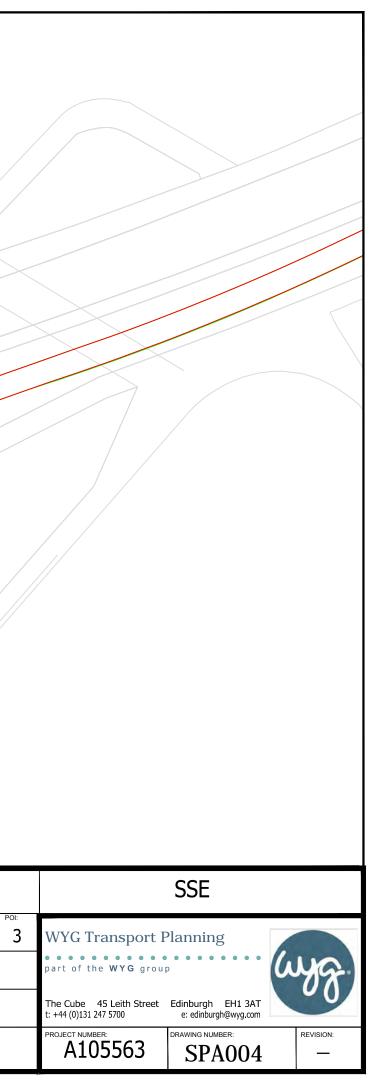
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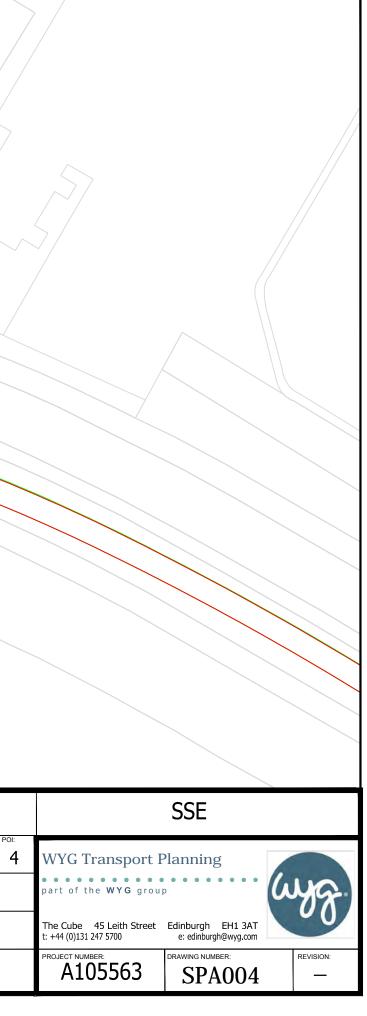
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	Wheel Swept Path		A82 Rose	Street Roun	dabout	
	Ordnance Survey Mapping		61750 Crane			
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	PROJECT NUMBER: A105563	DRAWING NUMBER: SPA004		REVISION:

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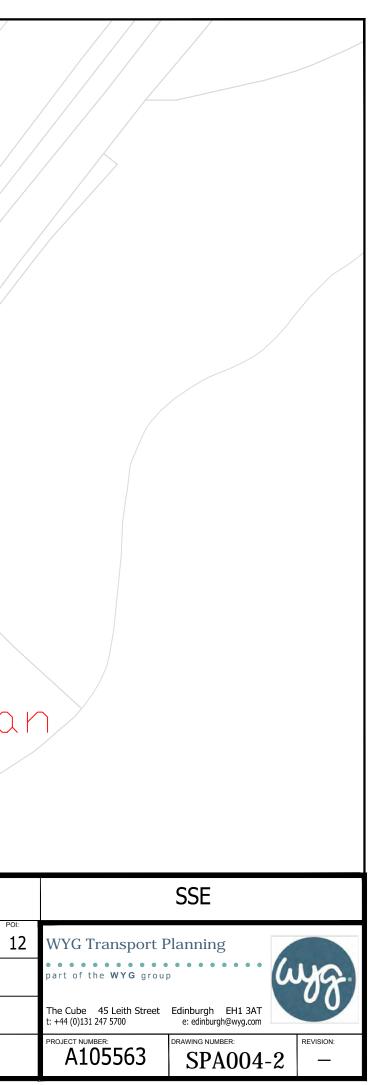
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	NO MITIGATION REQUIRED	Swept Path Assessment
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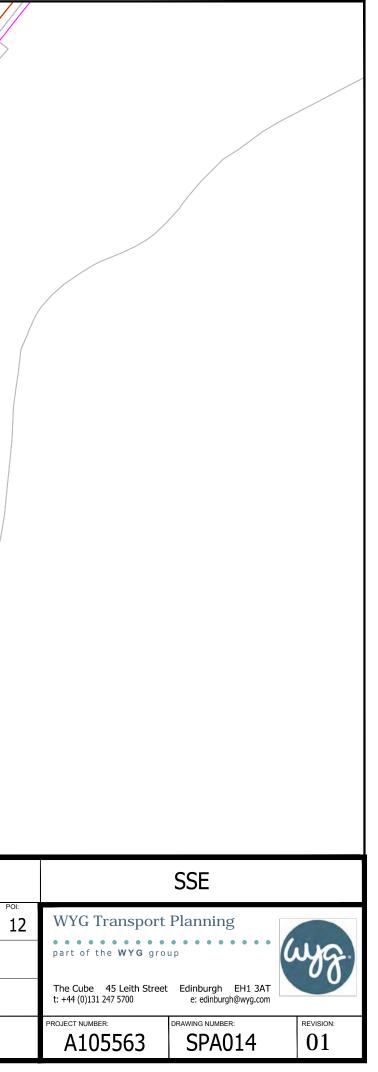
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	Ordnance Survey Mapping		G1750 Crane		
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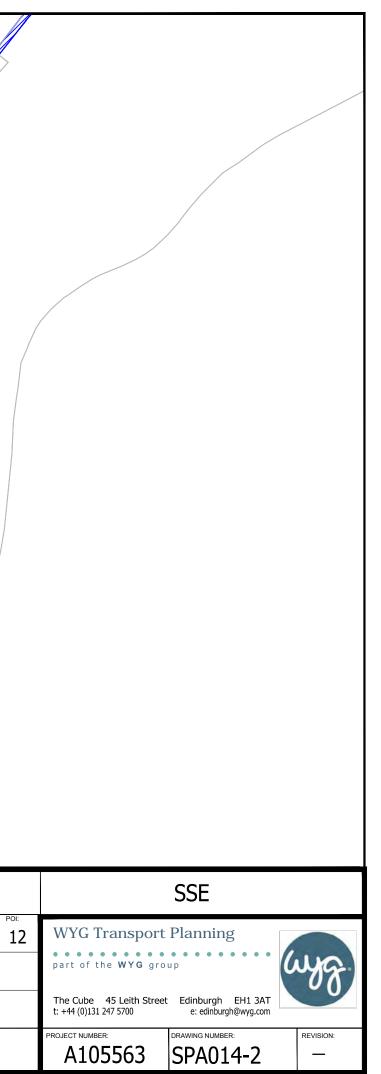
Relocate	one cycle sign and one electricity pole	
Kilfinan Road to be widened to two lar		
Notes: 1. This is not a construction drawing and is intended for illustrative purposes only.	Key: Ver-run Required	Coire Glas Pumped Storage Hydro Scheme
	Over-sail Required	Kilfinnan Road / A82 Junction         COMPONENTS:         Liebherr LG1750 Crane         Required Remedial Works         DRAWN:       CHECKED:         DATE:       SCALES:
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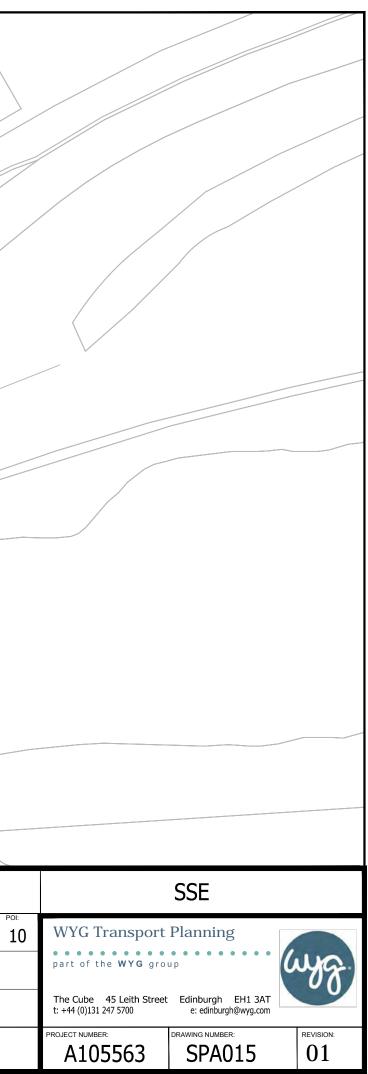
		Laggan
Notes: <ol> <li>This is not a construction drawing and is intended for illustrative purposes only.</li> <li>(c) Crown copyright and database rights 2018 Ordnance Survey 0100031673</li> </ol>	Key: Load Swept Path Vehicle Swept Path Wheel Swept Path Ordnance Survey Mapping This drawing copyright (c) WYG 2018	Coire Glas Pumped Storage Hydro Scheme         LOCATION:         Kilfinnan Road / A82         COMPONENTS:         CAT 777F Transporter         Swept Path Assessment         DRAWN:       CHECKED:         CN       GB         JAN 2018       1:500 @ A3



Low	er pedestrian guard rail and fence— Relocate three road signs and two bollards.				
Relocat	Relocate road sign				
				La	ggan
		7 80 7 80			
Notes: 1. This is not a construction drawing and is intended for illustrative	Key: Over-run Required	٨		umped Stora	age Hydro Scheme
purposes only.	<ul><li>Over-sail Required</li><li>Ordnance Survey Mapping</li></ul>		LOCATION: Kilfinnan Road /	A82 Junction	
			CAT 777F Transp	sporter	
			Required Remed		
(c) Crown copyright and database rights 2018 Ordnance Survey 0100031673	This drawing copyright (c) WYG 2018		DRAWN: CHECKED:	di date: GB JAN 201	8 1:500 @ A3



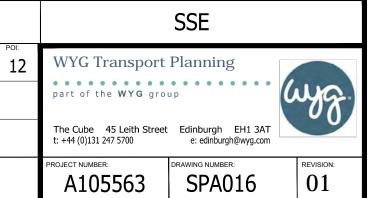
		/			
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	7				
			1917 - 1917 Marga		
Notes: 1. This is not a construction drawing and is intended for illustrative	Key: Load Swept Path		Coire Glas Pumpe	d Storage	Hydro Scheme
purposes only.	Vehicle Swept Path     Wheel Swept Path		LOCATION: A87 / A82 COMPONENTS:		
	Ordnance Survey Mapping		CAT 777F Transporter		
			Swept Path Assessment		SCALES:
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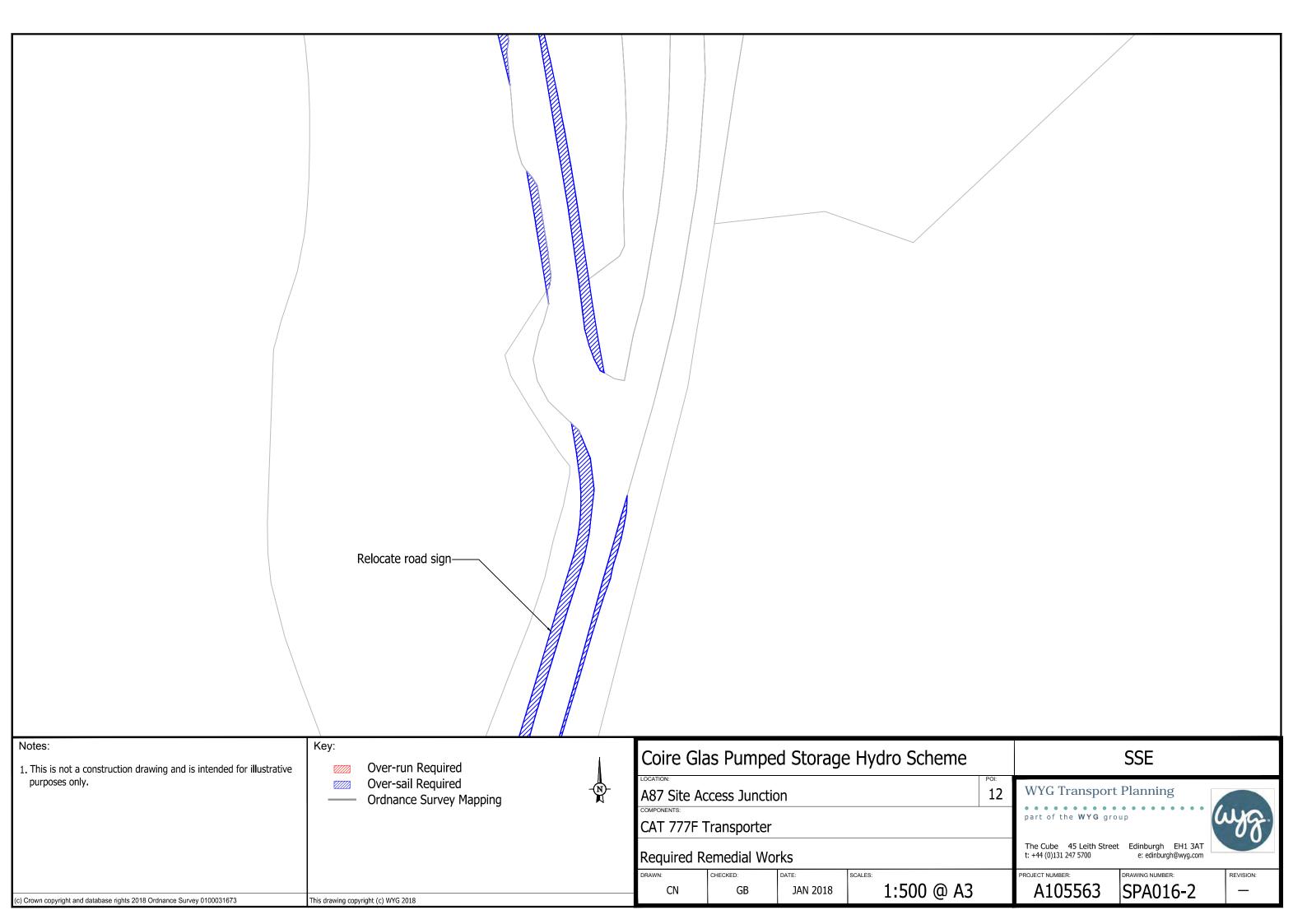


	,					
one t	Relocate one lit road sign and ghting column. Provide plating o protect footway and services.					
			8			
				Pro	vide plating to	o protect footway
Notes:	Key:		Coire Gla	s Pumne	d Storage	e Hydro Scheme
1. This is not a construction drawing and is intended for illustrative purposes only.	Over-run Required	(N)-	LOCATION:			
	Ordnance Survey Mapping	-(N) M	A87 / A82 J			
			CAT 777F T Required Re		rkc	
					date: JAN 2018	
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Notes:         1. This is not a construction drawing and is intended for illustrative purposes only.         (c) Crown copyright and database rights 2018 Ordnance Survey 0100031673	Key:       Load Swept Path         Vehicle Swept Path       Wheel Swept Path         Ordnance Survey Mapping         This drawing copyright (c) WYG 2018	Coire Glas Pumped Storage Hydro Scheme         LOCATION:         A87 Site Access Junction         COMPONENTS:         CAT 777F Transporter         Swept Path Assessment         DRAWN:         CN       GB         JAN 2018       1:500 @ A3





**Coire Glas AIL Study** 



Appendix C

**ESDAL Responses** 

WYG Group

creative minds safe hands

## ESDAL RESPONSES IN REGARDS TO THE LOADS DELIVERED FROM LOCH LOCHY

### Hi

We would be OK with this in principle if none of the other consultees have any objections. You might want to check this with Bear North West as they are responsible for the A82 and A87. Scottish Canals also have structures in this area but I've checked on Esdal and as far as I can tell none of these are affected

Regards, Paul \_\_\_\_\_\_ Paul Winn Network Administrator Administration Team TRBO T: 0141 272 7339 <u>transport.gov.scot</u> Transport Scotland, Buchanan House, 58 Port Dundas Road, Glasgow, G4 0HF

Dear Cezary,

This route is fine with me, as it will not impact on any HRE structures.

Regards

Tania

Tania Howell Abnormal Loads Officer Jacobs DDI: 0118 946 8911

#### Dear Cezary

Your proposed movement does not affect any Network Rail owned road over rail bridges or tunnels therefore we have no objection to your proposed route.

Please note we only check the load carrying capacity of Network Rail owned road over rail bridges affected we do not check anything else including:

- Load carrying capacity of level crossings
- Clearance to bridge parapets
- Clearance under a rail bridge
- · Clearance to overhead wires at level crossings

Many Thanks Sunil Maniraj Abnormal Loads Clerk Abnormal Loads Help Desk: 01908 783 140 Network Rail

Thank you for your recent e-mail received on

We have carried out detailed checks is respect to our operational transmission networks. Based on the information you have provided and the proximity and sensitivity of these networks we have concluded that the risk is negligible.

It is recommended that when passing beneath an overhead transmission line that the vehicle does not stop for a distance of six metres either side of the outermost conductors. In the event of a breakdown beneath an overhead transmission line under no circumstances allow anyone to climb on top of the vehicle or load.

Yours faithfully

Plant Protection

0800 688 588

# ESDAL RESPONSES IN REGARDS TO THE LOADS DELIVERED FROM INVERNESS

### Hi

We would be OK with this in principle if the other consultees have no objections. You might want to check this with Bear North West and Scottish Canals.

Regards, **Paul Winn** Network Administrator Administration Team TRBO T: 0141 272 7339 transport.gov.scot

#### Dear Cezary

Network Rail

Your proposed movement does not affect any Network Rail owned road over rail bridges or tunnels therefore we have no objection to your proposed route.

Please note we only check the load carrying capacity of Network Rail owned road over rail bridges affected we do not check anything else including:

- Load carrying capacity of level crossings
- Clearance to bridge parapets
- Clearance under a rail bridge
- Clearance to overhead wires at level crossings

Many Thanks Sunil Maniraj Abnormal Loads Clerk Abnormal Loads Help Desk: 01908 783 140

Thank you for your recent e-mail received on

We have carried out detailed checks is respect to our operational transmission networks. Based on the information you have provided and the proximity and sensitivity of these networks we have concluded that the risk is negligible.

It is recommended that when passing beneath an overhead transmission line that the vehicle does not stop for a distance of six metres either side of the outermost conductors. In the event of a breakdown beneath an overhead transmission line under no circumstances allow anyone to climb on top of the vehicle or load.

Yours faithfully Plant Protection 0800 688 588