

MORAY WEST OFFSHORE WINDFARM

Onshore Transmission Infrastructure Environmental Impact Assessment (EIA)

Moray Offshore Windfarm (West) Limited

Technical Appendix 9.3

Abnormal Load Traffic Route Assessment Report



P-7951-18

WHITEHILLOCK SUBSTATION

ABNORMAL LOAD TRAFFIC ROUTE ASSESSMENT REPORT

May 2018
Issue No 1

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Client Contact Name: James Grant
Client Company Name: EDPR
Issued By: Allelys Heavy Haulage Ltd
The Slough
Studley
Warwickshire
B80 7EN

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Issue No: 1	Name	Signature	Date	Position
Prepared by	David Allely			Director
Checked by	David Allely			Director
Approved by	David Allely			Director

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1. INTRODUCTION

1.1. Background

Allelys Heavy Haulage Ltd was commissioned by EDPR Ltd to prepare an Abnormal Indivisible Load (AIL) Traffic Route Assessment report, and review all constraints and mitigation required on the road network associated with transporting a series of transformer AIL's to the Moray West On-shore substation Whitehillock, near Keith, in the Moray Council area.

This route has previously been utilised by Allelys Heavy Haulage to transport similar transformers into the SSE substation at Blackhillock. This report confirmed the suitability of the route subject to detailed assessments of various structures and implementation of constraints mitigation.

It is anticipated that there will be abnormal load deliveries to the site spread over the duration of the overall construction project ranging 230Te.

The loads proposed do not have a more significant impact on the route than previously used trailer configurations or proposed mitigation to accommodate abnormal loads.

As part of this study AHH has carried out visual inspections of all identified constraints along AIL routes outlined in the report.

This report outlines the final mitigation required for agreement with The Moray Council and Transport Scotland /BEAR

1.2. Site location

The substation site is located off the A96 to the south of Keith, in Moray, and is shown on the site location plan below.

2. PROPOSED ABNORMAL INDIVISIBLE LOADS AND ROUTING.

2.1. Abnormal Loads

Details of the proposed abnormal loads have been based on information provided by EDPR.

Adopting this information, appropriate trailer configurations for each transport have been designed by Allelys Heavy Haulage Ltd for use in routing assessments and structure loadings.

Load and trailer details are contained in the appendix and form the basis of the mitigation and conclusions of this report.

Any significant changes to supplier information will require to be checked and suitability confirmed.

2.2. Port of entry

AHH have considering the alternatives for port of entry and routes to the site.

The selected location from Buckie Harbour was confirmed to be suitable and closest to the site in previous reports and movements. The remains the case as there have been no changes to impact this selection.

2.3. Route Description

The proposed route from Buckie to Blackhillock substation adopted in the previous movements have been reviewed and found suitable for Whitehillock. Following detailed bridge assessments by AHH/Aecom along the proposed route, Tynet Bridge (A98) was identified as a significant constraint.

As a result of consultations between AHH/Aecom and The Moray Council, agreement was reached to adopt a revised route using the B9016, subject to confirmation of the suitability of structures and mitigation of constraints.

The agreed route is shown on drawing Figure 1 contained in the Appendix. The amended route has been reviewed on site by Aecom and Allelys Heavy Haulage Ltd and is deemed suitable for proposed transports using the proposed trailer arrangements for each load type contained in the Appendix.

The proposed route is outlined below:

Exiting Buckie Harbour, the route heads east along Commercial Road, then south via Freuchny Road and March Road to the A98.

Heading west along the A98, the route turns south along the B9016, and joins the A96(T) north of Keith.

The route continues south along the A96(T), through Keith, before turning onto the ??, where it heads to the site.

The following paragraphs provide more detailed information on the route.

2.3.1. Buckie

Commercial Road, Freuchny Road and March Road are local roads within the town of Buckie serving the harbour area, together with access to residential and industrial areas.

2.3.2. A98

The A98 is a major road that runs between Fochabers and Fraserburgh. The section covering the proposed AIL route is a single carriageway road, which varies in width over its length between 6.0m – 7.3m.

2.3.3. B9016

The B9016 is a B-Class road that runs between the junction with the A98 3km west of Buckie, and the junction with A96(T) 2km north of Keith. It is a single carriageway road which has a general width of around 6.0m.

2.3.4. A96(T)

The A96(T) is a trunk road that runs between Inverness and Aberdeen. The section covering the proposed AIL route is a single carriageway road, which varies in width over its length between 6.0m – 7.3m.

2.3.5. Site Access

3.0 CONSULTATIONS

3.1 Consultation with Roads Authorities

As noted in previous movements, consultations with The Moray Council and Transport Scotland / BEAR have been ongoing since November 2010 to continually update them on development of the SHE-T infrastructure works at Blackhillock and now for Whitehillock.

Based on the route plans submitted to The Moray Council and Transport Scotland / BEAR, agreement was obtained on all structures to be reviewed and the form of assessment to be carried out for each.

All available information on the structures was also obtained from The Moray Council and Transport Scotland/ BEAR for use in assessments.

The locations of structures are shown on drawings contained in Appendix, and are scheduled on a spreadsheet within the appendix.

Visual inspections of the identified structures and other constraints along the route have been carried out by AHH/Aecom for previous movements but would need to be re-inspected prior to new movements.

Assessments were carried out on each agreed structure and Approval in Principle (AIP) and Formal Certification in accordance with the TA1 procedure were obtained with each owner for all previous movements. These may need to be re-visited for future movements but no reduction of capacity is expected.

3.2 Consultation with Harbour Authorities

Buckie Harbour (known locally as Cluny Harbour) is controlled by The Moray Council

The Harbour Master was consulted for previous movements and has confirmed no change to the previous advice.

In June 2014 the Harbour Master confirmed a similar load of 500Te was shipped from this harbour.

The fabricated vessel was lifted from the shore to ship by crane (Saracen's) from the west dock area using suitable load spread beneath the jack leg locations.

4.0 ROUTE CONSTRAINTS AND MITIGATION

Section 4.1 below considers route constraints and the mitigation options at various locations in The Moray Council and Transport Scotland (A96T) areas which are required for abnormal load traffic.

Individual mitigations are to be agreed in detail with the respective authorities.

4.1 Abnormal Load Traffic Route Constraints and Proposed Mitigation

4.1.1 Location 1 – Buckie Harbour exit on Commercial Road (A942)



Existing Constraints

- 3 No. existing fence posts
- 2 No. gate posts
- 1 No. vehicle gate
- 2 No. small sections of fence
- 1 No. Pedestrian gate
- 1 No Vehicle gate

Proposed Mitigation

- Remove 3 No. fence posts and replace with demountable type
- Remove 2 No. small sections of fence and replace with demountable type
- Remove 1 No. pedestrian gate and replace with demountable type
- Remove and reinstate 2 No. gate posts following each transport
- Remove and reinstate 1 No. vehicle gate following each transport

Note

For loads carried on large Girder trailers the transporter will leave the port facility in reverse using the junction opposite to increase turning area. It is noted that there are several large boulders placed on the verge opposite the harbour entrance. There may be a requirement to temporarily move some of these prior to vehicle movements.

4.1.2 Location 2 – Quayside, adjacent to junction of Commercial Road and Freuchny Road



Existing Constraints

- 10 No. Galvanised steel bollards and link chains in removable sockets
- Community sign board with removable sockets on two posts.
- Wooden bench
- 6 No. Steel bollards and chains (surrounding sign)

Proposed Mitigation

Mitigation required to provide over-run space for right turn onto Freuchny Road:

- 10 No. galvanized bollards (with socket foundations) to be temporarily removed, and reinstated following AIL delivery.
- 6 No. white bollards & chains to be permanently removed, and sockets infilled.
- Bench and community signboard to be relocated to new location to be agreed by The Moray Council.

Note

Existing directional traffic signage and lighting column opposite junction do not require to be relocated. It should be noted that the girder trailer configuration will oversail the footways.

The land where this oversail will occur is within The Moray Council's control and there are currently no other constraints to those noted above in this area.



4.1.3 Location 3 – Junction of Freuchny Road and March Road

Existing Constraint

- Existing lighting column with lit 'Give Way' sign on east side of junction.

Proposed Mitigation

Mitigation required to allow oversail of trailer body over the footway and corner area:

- Relocate lighting column to west side of carriageway.
- Install overlit "Give Way" column and sign with socket or fold down base.

It should be noted that the girder trailer will oversail the footway and verge at this junction. The land where this oversail will occur is within The Moray Council's control and there are currently no other constraints to those noted above in this area.

4.1.4 Location 4 – Junction of March Road and Marchmont Crescent



Existing Constraint

- Street lighting column on north-west corner of junction.

Proposed Mitigation

Mitigation required to allow oversail of trailer body over footway and verge on west side of carriageway:

- Relocate existing street lighting column to south side of junction.

Note

No parking should be permitted in layby space opposite junction during transports.

The existing BT pole adjacent to junction to remain. It should also be noted that the girder trailer will oversail the footway and verge at this junction. The land where this oversail will occur is within The Moray Council's control and there are currently no other constraints to those noted above in this area.

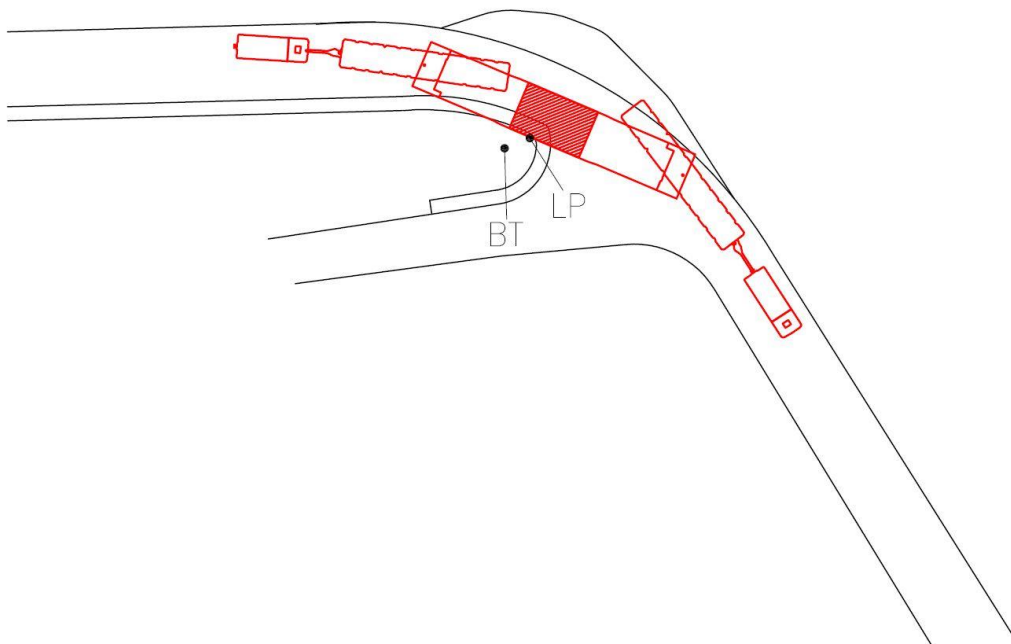


Diagram of Proposed 253Te Transporter at Location 4

N.T.S.

4.1.5 Location 5 – March Road roundabout (north leg)



Existing Constraint

- Street lighting column north-east of roundabout.

Proposed Mitigation

Mitigation required to allow oversail of trailer body over grass verge on east side:

- Relocate existing lighting column to west side of carriageway.

Note

It should be noted that the girder trailer will oversail the footways and verges at this junction. The land where this oversail will occur is within The Moray Council's control and there are currently no other constraints to those noted above in this area.

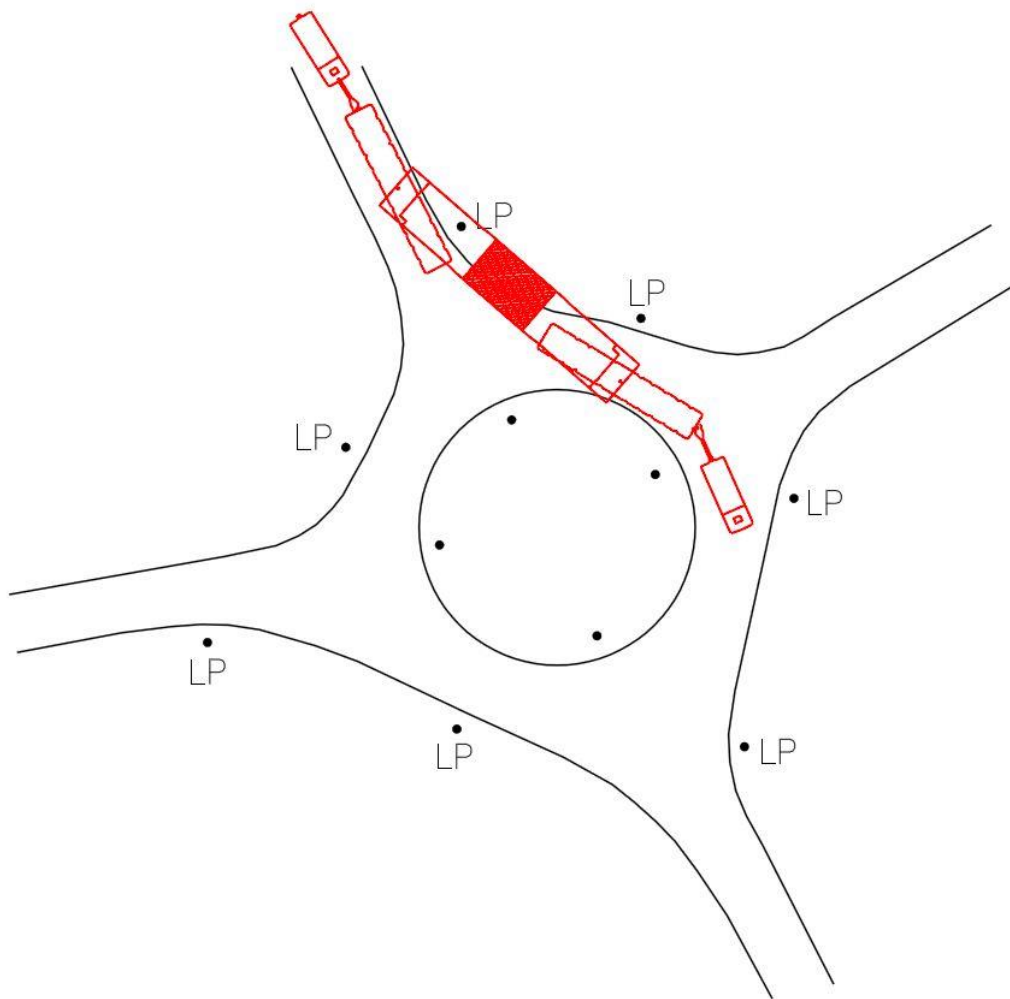


Diagram of Proposed 253Te Transporter at Location 5

N.T.S

An option to use the west carriageway of the roundabout has been considered.

This option would not require the removal of any lighting columns, but would require cutting-back of trees/bushes on the north-west corner, and may also require the use of land outwith Moray Council ownership.

The option to use the east carriageway has been taken forward.

4.1.6 Location 6 – March Road roundabout (central island)



Existing Constraint

- Existing base lit 'Keep Left' symbol bollard.

Proposed Mitigation

Mitigation required to allow oversail of trailer body over Central Island:

- Remove and reinstate bollard cap during each transport if bollard is replaced prior to transports.

Note

It was noted during May 2015 site visit that bollard cap had been removed. If bollard cap is replaced prior to transports, removal of cap will be required during each transport. No construction works required.

It should also be noted that the girder trailer will oversail the roundabout at this location. The land where this oversail will occur is within The Moray Council's control and there are currently no other constraints to those noted above in this area.

As noted above in 4.1.15, an option has been considered to use the west carriageway of the roundabout. If this option was taken forward, the corresponding bollard cap of the west side of the central island would require to be temporarily removed.

4.1.7 Location 7 – March Road roundabout (south leg)



Existing Constraint

Street lighting column on east side of carriageway.

Proposed Mitigation

Mitigation required to allow oversail of trailer body over grass verge:

- Relocate existing lighting column to west side of carriageway.

Note

It should be noted that the girder trailer will oversail the verge at this junction. The land where this oversail will occur is within The Moray Council's control and there are currently no other constraints to those noted above in this area.

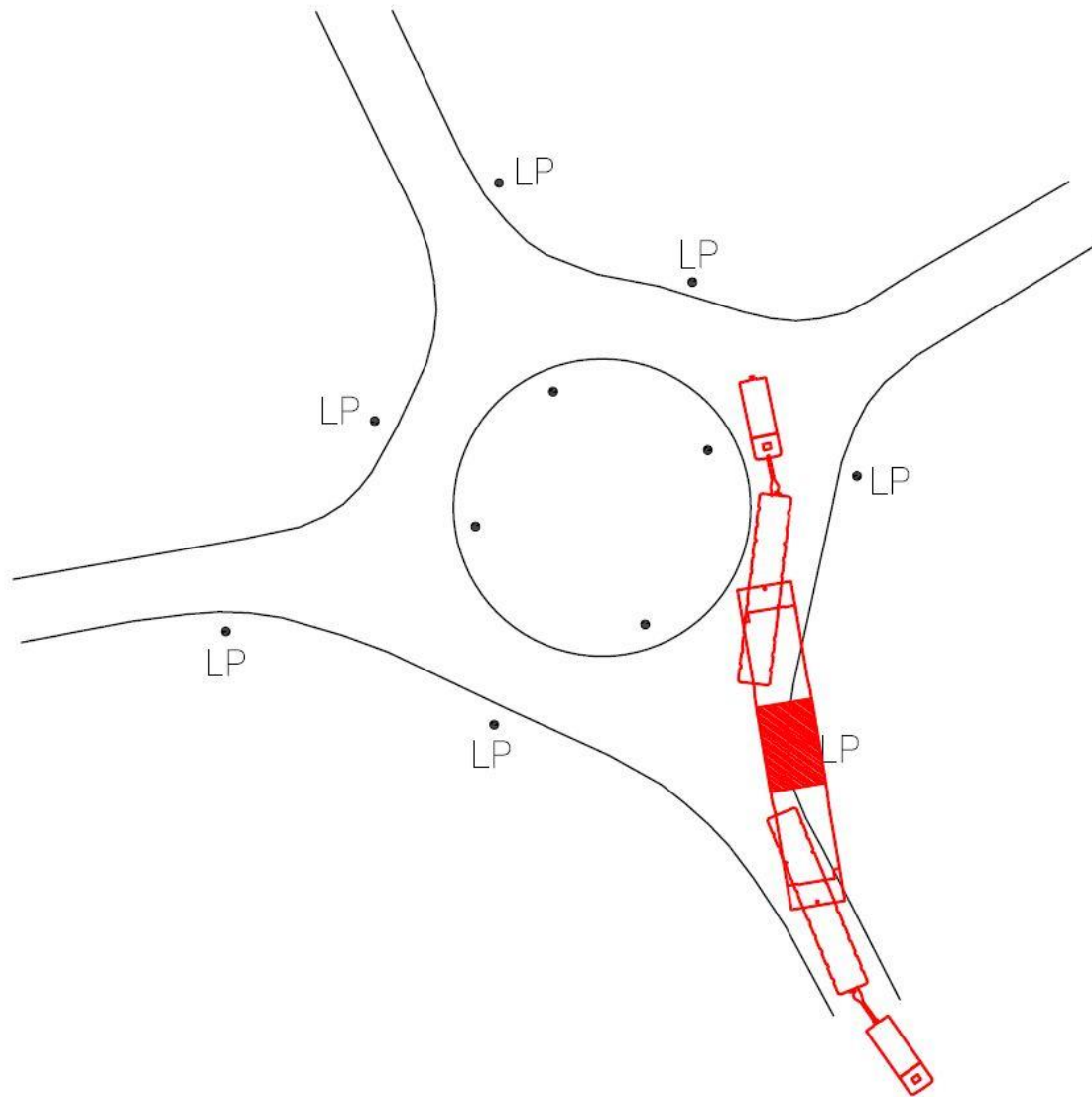


Diagram of Proposed 253Te Transporter at Location 7

N.T.S

As noted above in 4.1.15, an option to use the west carriageway of the roundabout has been considered.

This option would not require the removal of any lighting columns, but would require cutting-back of trees/bushes on the north-west corner, and may also require the use of land outwith Moray Council ownership.

The option to use the east carriageway has been taken forward.

4.1.8 Location 8 – Junction of March Road and A98



Existing Constraints

- 2No. existing unlit reflective bollards on west side of junction

Proposed Mitigation

Mitigation required to allow oversail of trailer body over grass verge:

- Replace bollards with socket foundations, and temporarily remove for AIL delivery.

Note

It should be noted that the girder trailer will oversail the verge at this junction. The land where this oversail will occur is within The Moray Council control. There are currently no other constraints to those noted above in this area.

A98, to junction with B9016

There are no above-ground route constraints noted on the A98 from March road to the junction with the B9016.

A number of structures, culverts and pipes below the road have been identified and are shown on the drawings and schedules in this report, and for which a structural evaluation has been carried out and approval received from The Moray Council. Refer to spreadsheet in Appendix 8.5, and signed AIPs in Appendix 8.7 for details.

4.1.9 Location 9 – Junction of A98 and B9016Existing Constraints

- 2No. unlit reflective bollards on east side of junction

Proposed Mitigation

Mitigation required to allow oversail of trailer body over grass verge:

- Replace bollards with socket foundations, and temporarily remove for AIL delivery.

Note

It should be noted that the girder trailer will oversail the verge at this junction. The land where this oversail will occur is within The Moray Council's control. There are currently no other constraints to those noted above in this area.

4.1.10 B9016

There are no above-ground route constraints noted along the B9016.

A number of structures, culverts and pipes below the road have been identified and are shown on the drawings and schedules in this report, and for which a structural evaluation has been carried out, and approval received from The Moray Council. Refer to spreadsheet in Appendix 8.5 and signed AIPs in Appendix 8.7 for details.

4.1.11 Location 10 – Junction of B9016 and A96(T)



Existing Constraints

- 1No. Unlit pole mounted Give Way sign on south side of junction.
- 1No. Reflective bollard on south side of junction.

Proposed Mitigation

Mitigation required to allow oversail of trailer body over grass verge:

- Remove and replace existing “Give Way” sign pole with socket base.
- Remove and replace existing reflective bollard with socket base.

Note

It should be noted that the girder trailer will oversail the verge at this junction. The land where this oversail will occur is within the Moray Council and Transport Scotland’s control. There are currently no other constraints to those noted above in this area.

4.1.12 A96 (T)

Item 4.1.13 identifies above-ground route constraints on the A96(T).

A number of structures, culverts and pipes below the road have been identified and are shown on the drawings and schedules in this report, and for which a structural evaluation has been carried out, and approval received from Transport Scotland. Refer to spreadsheet in Appendix 8.5 for details.

It is understood that some bridge parapet repair works on the Keith-Dufftown railway bridge are proposed to be carried out by BEAR. Timescales and extent of works are to be confirmed, and it is noted that this could potentially impact on proposed abnormal load vehicle movements due to possible temporary lane closures, etc.

4.1.13 Locations 11, 12, 13 and 14 – Traffic islands in Keith

There are five traffic islands through the town on Keith, which exist as potential constraints for the AIL transports, depending on load size.



Location 11 – Church Road



Location 12 – Church Road





Location 13 – Church Road

Location 14 – Moss Street

Location 15 – Moss Street

Existing Constraints (at each traffic island)

- 1No. Lighting column
- 2 No. Lit “Keep left” bollards

Proposed Mitigation (at each traffic island)

Mitigation required to allow oversail of trailer body over islands;

- Remove bollards during transits
- Replace existing lighting columns on splitter islands with removable type

Note

At two of the above traffic islands (locations 12 & 13) it may be possible for the transport vehicle to pass through without the requirement to remove bollards and lighting columns. Details to be confirmed by Allelys Heavy Haulage Ltd.

4.2**4.3 Site Access****4.4 Overhead Power Cables.**

The location and height of overhead bare wire power circuits may constrain the maximum height of abnormal loads without mitigation. A check on existing heights has been carried out by SHE-T, and all were found to be above the 5.0m standard transport height..

This check measured the clearances above road level at most (but not all) of the overhead line crossings along the route. Those lines not measured were as follows:

- Two line crossings on the A96(T) north of Keith.
- Three line crossings on the A96(T) south of Keith.

Whilst these unmeasured line clearances are anticipated to be adequate, a detailed check requires to be carried out to confirm this.

Overhead line clearances should comply with SSE Power Distribution “*Application of clearances to Overhead Lines at LV to 400kV*” (PR-PS-340). Current AIL proposals are within normal HGV heights for this route.

4.5 Overhead Cables (BT)

Current AIL proposals are within normal HGV heights for this route.
For future loads where the height exceeds 5.0m a check may be needed or allowance made for lifting cables during the transport.

5.0 PROPOSED TRAFFIC MANAGEMENT

In order to address potential impacts from AIL traffic, the following will require to be implemented.

- The contractor will liaise with The Moray Council and Transport Scotland to determine appropriate traffic management arrangements for all AIL vehicle movements;
- The Contractor will agree appropriate dates and times for all AIL loads to the site with The Moray Council, Transport Scotland, Police and other stakeholders and will be required to use approved access routes;
- Movement of loads will be restricted to take place outside peak flow hours to minimise disruption to general traffic flows;
- Police escort or other escort approved by the relevant Police Authority will accompany abnormal load vehicle movements for the delivery of transformer components or any other loads deemed necessary by the roads authorities.
- Where required, traffic will be stopped in the opposite direction to enable abnormal loads to negotiate pinch points along the route
- The contractor will monitor and ensure that agreed mitigation measures are being implemented.
- Overhead lines for BT and other SSE Low voltage and High voltage infrastructure cross the route in several locations.
A check of existing line clearances has been carried out by SHE-T, though this has not been fully completed. This requires to be finalised prior to any vehicle movements.

6.0 STRUCTURES, CULVERTS AND BURIED PIPES

Through consultation with The Moray Council and Transport Scotland / BEAR all structures listed on their records along each part of the route have been identified

The schedules contained in Appendix contain details from visual inspections of the structures identified by The Moray Council and Transport Scotland / BEAR. Detailed assessments for the AIL loading have been carried out adopting a TA1 assessment process and design certification agreement prior to use for previous movements and these should be sufficient for the movements to Whitehillock site.

Culverts and pipes identified by The Moray Council, Transport Scotland and Aecom which do not fall into the TA1 assessment and approval category have been scheduled and reviewed by on site visual inspections, and the findings are outlined in the schedules in the Appendix of this report.

Inspections carried out reviewed the visual condition of accessible parts, together with the size and depth below the road surface, and the risk of damage as a result of abnormal loading compared to normal HGV traffic loadings. Where any potential problems are identified they are noted in the schedules contained in the Appendix together with the recommended mitigation

7.0 SUMMARY AND CONCLUSIONS

Roads to be used by abnormal load traffic have been identified and an assessment of the constraints undertaken.

The constraints and mitigation have been identified on the network for AIL traffic and are noted in this report.

Consultation with The Moray Council and Transport Scotland / BEAR has been completed for the Blackhillock deliveries and the above parties have identified structures where they required detailed assessments for AIL loading to be carried out adopting a TA1 assessment and design certification process prior to use, which have all been completed.

Visual on-site inspections have been carried out in 2017 at the end of the deliveries undertaken to Blackhillock substation.

Small culverts and pipes have been identified and do not require a TA1 assessment and design certification process. Inspections and confirmation were requested to confirm AIL loading will not impact their condition or performance.

On-site inspections were carried out and it was confirmed that the proposed AIL loading below wheels was generally less than normal HGV traffic and was unlikely to affect the existing condition and performance of the majority of pipes and culverts.

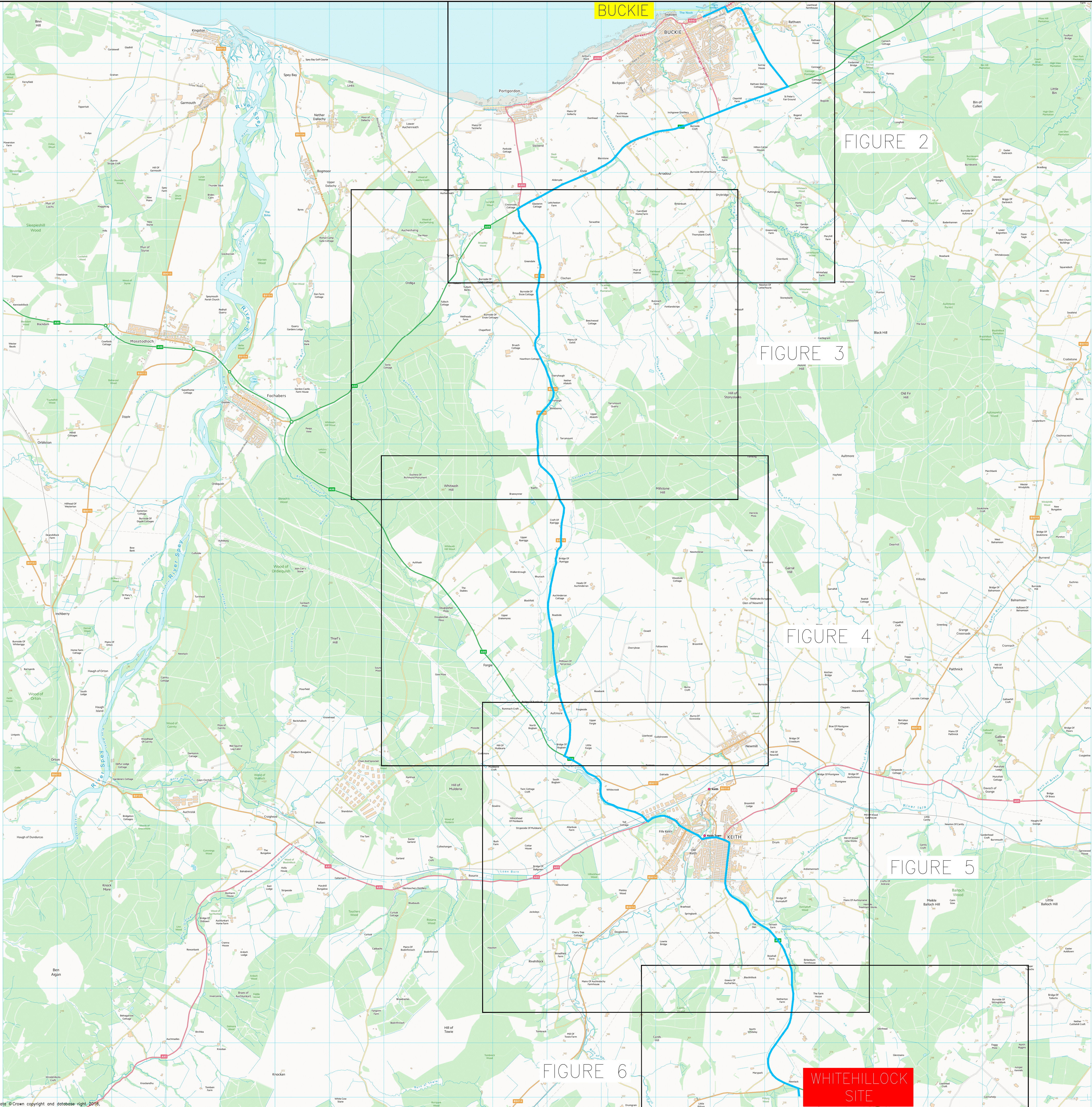
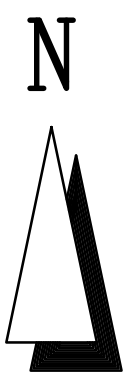
Where inspections identified small pipes and culverts in poorer condition or shallow depth, monitoring or mitigation may be required at a small number of locations. Details of inspections carried out and recommended mitigation can be found in figure 8 of this report.





This route study confirms the proposed Abnormal Indivisible Load Route to be suitable subject to agreement with The Moray Council and Transport Scotland / BEAR on the implementation of mitigation measures at the locations highlighted Section 4 and Appendix 8.5 of this report.

As noted above in Chapter 4, all proposed mitigation (removal / relocation of lighting columns, bollards, signage, etc.) are only required for the larger 253Te girder trailer arrangements transformers.

8.0 APPENDICES

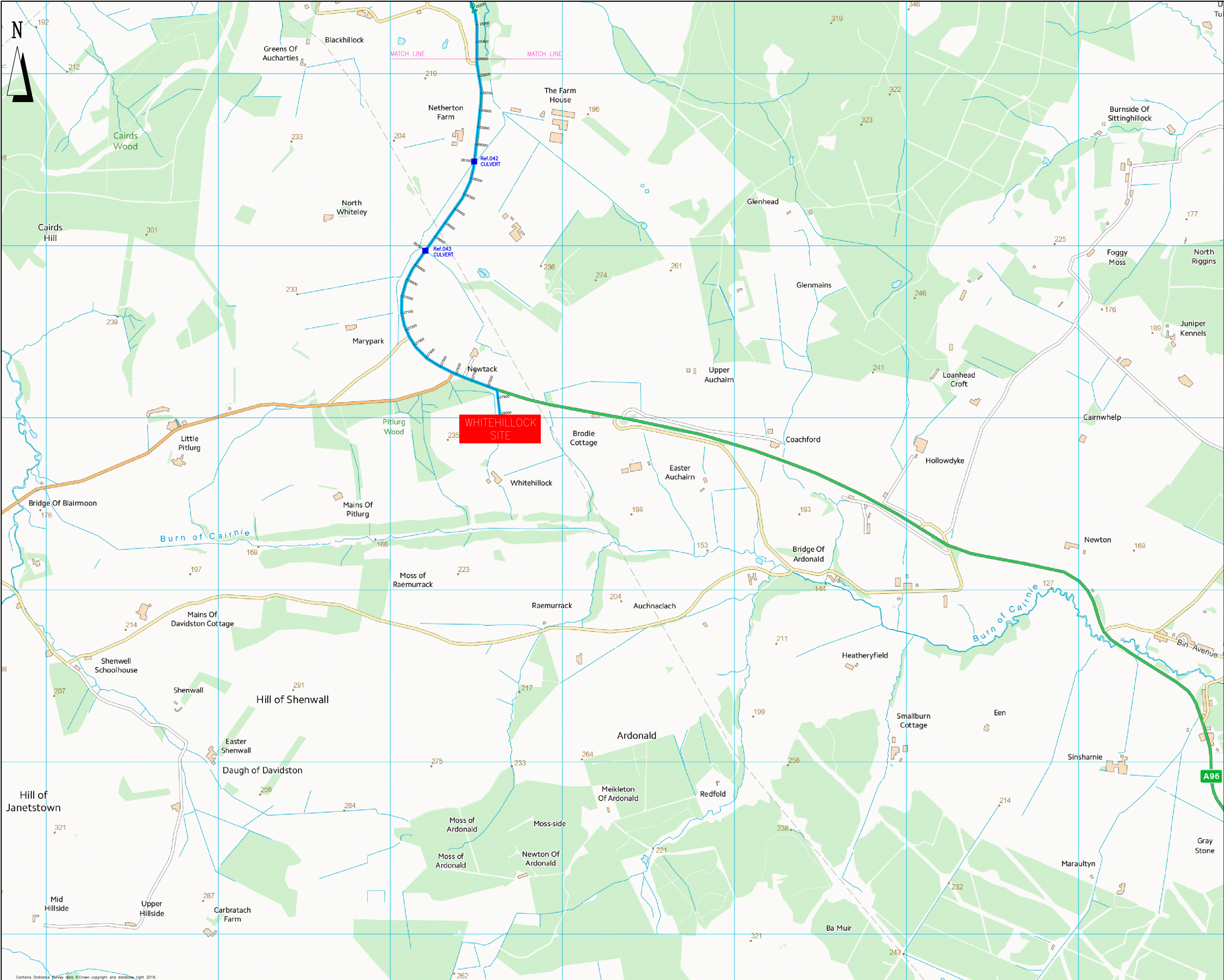
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|-----|--|--|
| 8.1 | Route Plan | Figure 1 |
| 8.2 | Route Constraints Plans | Figure 2 – Route section 1 |
| | | Figure 3 – Route section 2 |
| | | Figure 4 – Route Section 3 |
| | | Figure 5 – Route Section 4 |
| | | Figure 6 – Route Section 5 |
| | | Figure 7 – Culvert protection measures |
| | | Figure 8 – Cable heights |
| 8.5 | Access route assessment spreadsheet:
Schedule of structures, culverts and pipes from consultations. | |
| 8.6 | Proposed Trailer configurations: | |
| | 253Te Load | 24 Axle Girder Trailer |



CONSTRUCTION RISKS		MAINTENANCE / CLEANING RISK		DEMOLITION RISKS	
In addition to the hazard/risks normally associated with the types of work detailed on this drawing take note of above. It is assumed that all works on this drawing will be carried out by a competent contractor working, where appropriate, to an appropriate method statement.					
SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX					
NOTES					
		- SUBSTATION / BOWL SITE LOCATION			
		- PORT OF ENTRY			
		- PROPOSED AIL ROUTE			
Revision Details					
FOR INFORMATION					
Client					
EDPR					
Project Title					
MORAY WEST BUCKIE TO WHITEHILLOCK AIL STUDY					
Drawing Title					
AIL ROUTE					
Designed	Drawn	Checked	Approved	Date	
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URS Internal Project No.			Subsidiary		
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Drawing Number				Rev	
FIGURE 1					

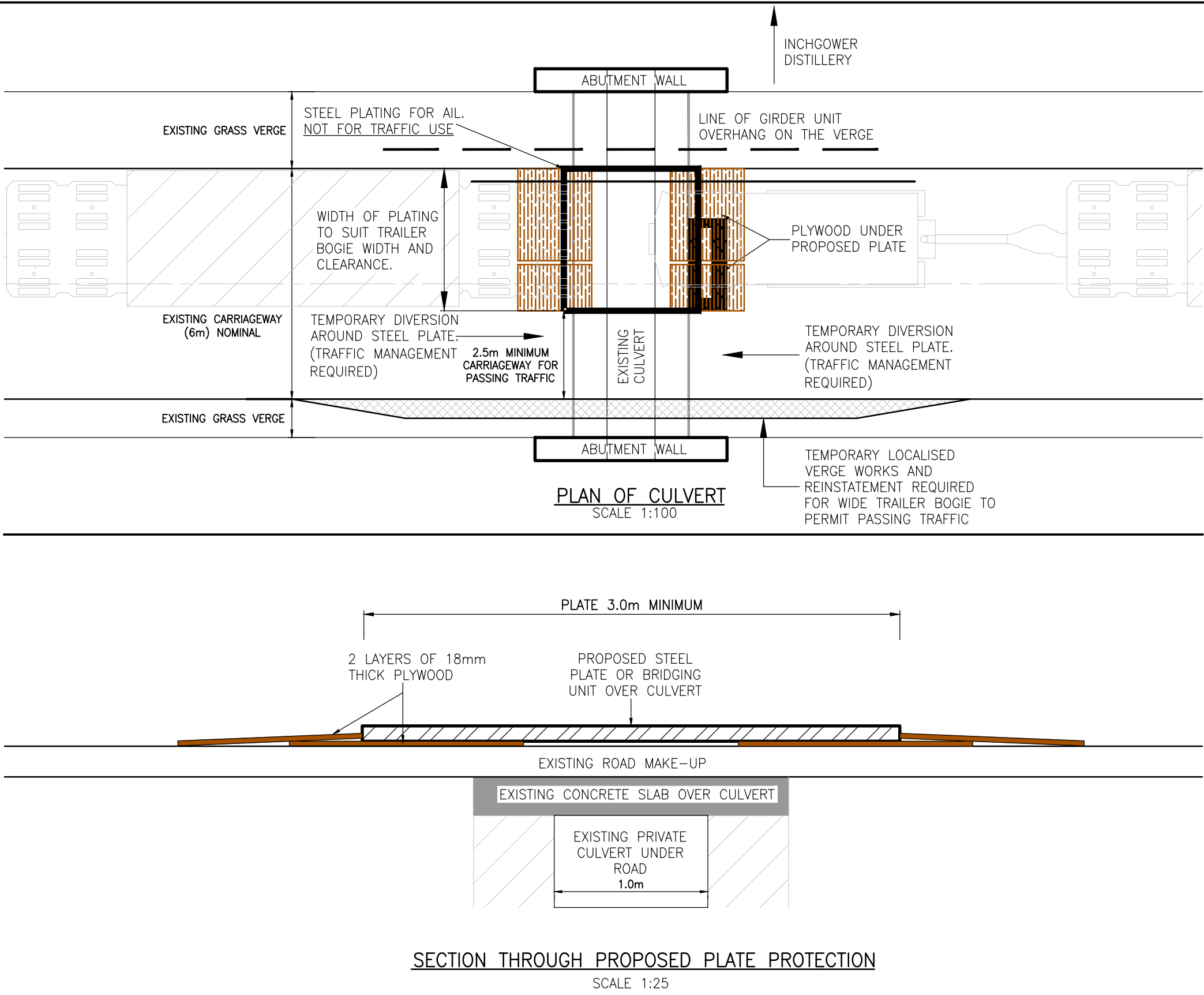


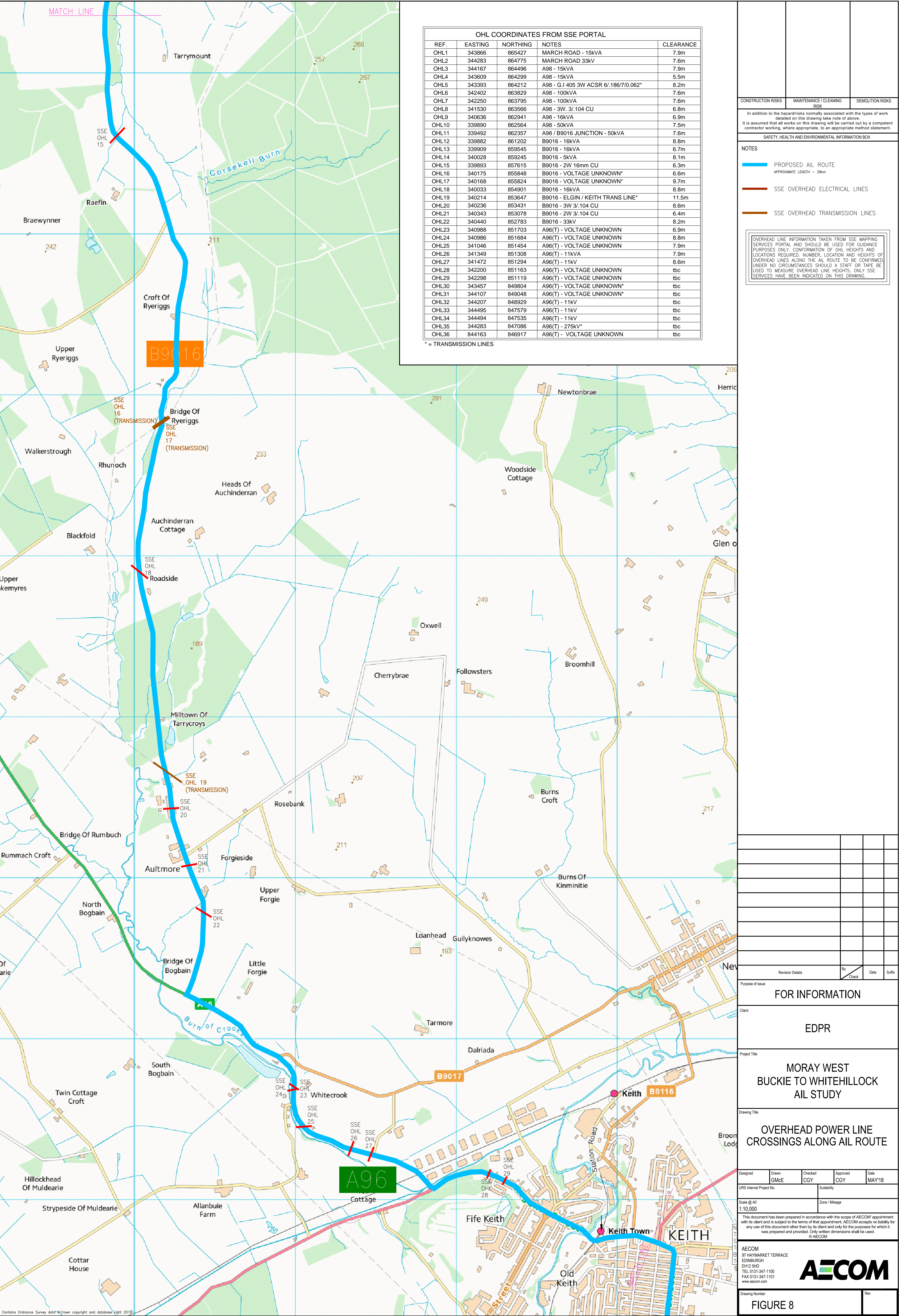
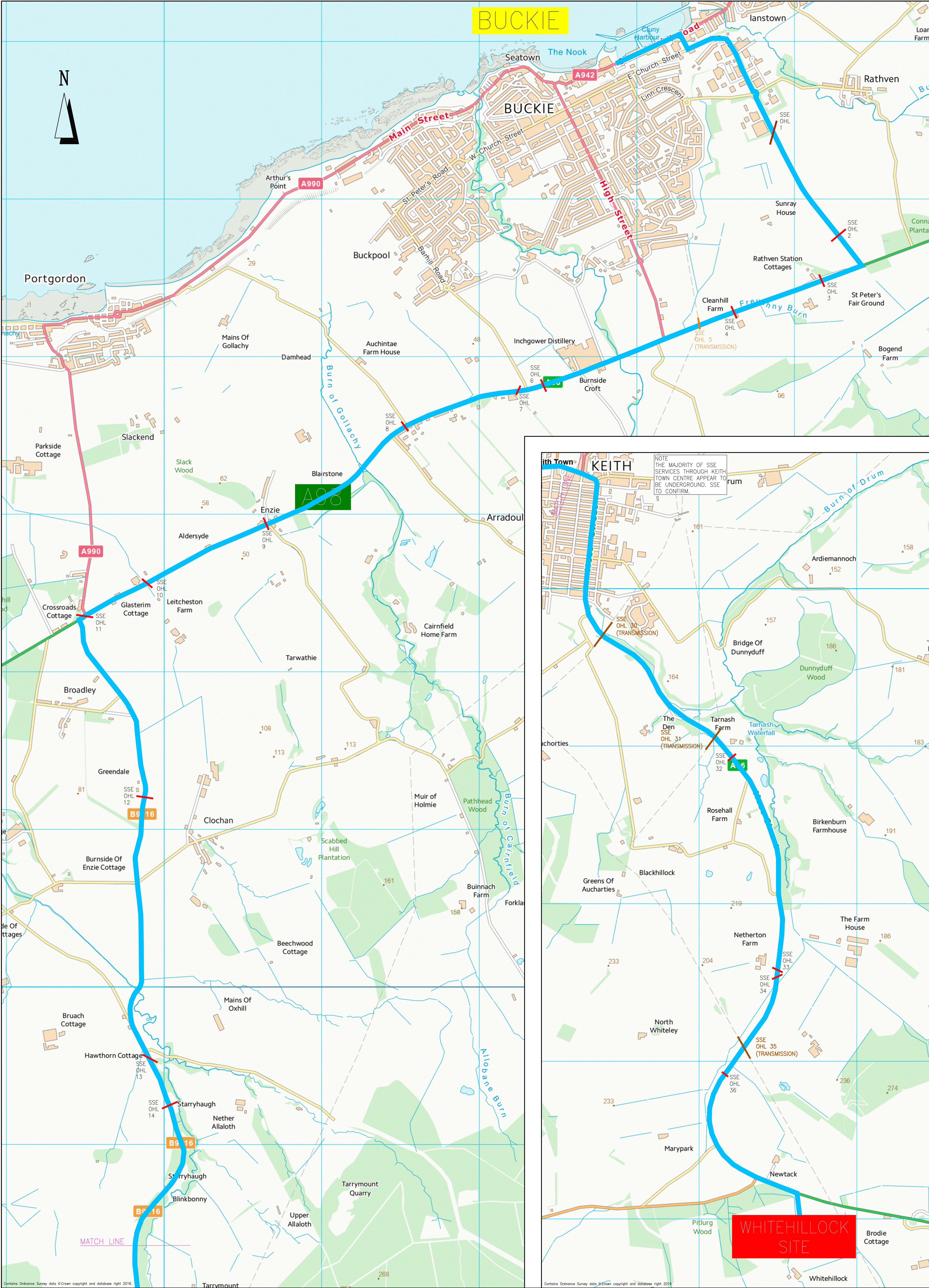
CONSTRUCTION RISKS			MAINTENANCE / CLEANING RISK			DEMOLITION RISKS		
In addition to the hazard/risks normally associated with the types of work detailed on this drawing take note of above. It is assumed that all works on this drawing will be carried out by a competent contractor working, where appropriate, to an appropriate method statement.								
SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX								
NOTES								
BUCKIE			- PORT OF ENTRY					
[Blue Line]			- PROPOSED AIL ROUTE					
[Pink Square]			- BRIDGE					
[Blue Square]			- CULVERT					
[Red Circle]			- RETAINING WALL					
LOCATION OF BRIDGES, CULVERTS, AND RETAINING WALLS ESTABLISHED FROM ORDNANCE SURVEY MAPS, AND INFORMATION SUPPLIED BY TRANSPORT SCOTLAND AND MORAY COUNCIL.								
FURTHER STRUCTURES (eg SMALLER CULVERTS, MINOR RETAINING WALLS, etc.) MAY EXIST IN ADDITION TO THOSE SHOWN ON THIS DRAWING.								
APPROXIMATE DISTANCE FROM BUCKIE HARBOUR TO PROPOSED SUBSTATION SITE = 28km.								
Revision Details								
By: [] Date: [] Suffix: []								
Purpose of Issue								
FOR INFORMATION								
Client								
EDPR								
Project Title								
MORAY WEST BUCKIE TO WHITEHILLOCK AIL STUDY								
Drawing Title								
BRIDGES, CULVERTS AND RETAINING STRUCTURES ALONG AIL ROUTE - SHEET 1 OF 5.								
Designed		Drawn		Checked		Approved		Date
URS Internal Project No.		GMC/E		CGY		CGY		MAY'18
Scale @ A1 1:10,000				Subsidiary Zone / Mileage				
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FIGURE 2								



CONSTRUCTION RISKS		MAINTENANCE / CLEANING RISK		DEMOLITION RISKS	
In addition to the hazard/risks normally associated with the types of work detailed on this drawing take note of above. It is assumed that all works on this drawing will be carried out by a competent contractor working, where appropriate, to an appropriate method statement.					
SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX					
NOTES					
WHITEHILLOCK SITE — SUBSTATION / BOWL SITE LOCATION					
— PROPOSED AIL ROUTE					
— BRIDGE					
— CULVERT					
— RETAINING WALL					
LOCATION OF BRIDGES, CULVERTS, AND RETAINING WALLS ESTABLISHED FROM ORDNANCE SURVEY MAPS, AND INFORMATION SUPPLIED BY TRANSPORT SCOTLAND AND MORAY COUNCIL.					
FURTHER STRUCTURES (eg SMALLER CULVERTS, MINOR RETAINING WALLS, etc.) MAY EXIST IN ADDITION TO THOSE SHOWN ON THIS DRAWING.					
APPROXIMATE DISTANCE FROM BUCKIE HARBOUR TO PROPOSED SUBSTATION SITE = 28km					
Revision Details					
FOR INFORMATION					
Client					
EDPR					
Project Title					
MORAY WEST BUCKIE TO WHITEHILLOCK AIL STUDY					
Drawing Title					
BRIDGES, CULVERTS AND RETAINING STRUCTURES ALONG AIL ROUTE - SHEET 5 OF 5.					
Designed		Drawn		Checked	
URS Internal Project No.		GMC		CGY	
Scale @ A1		Date		Subsity	
1:10,000		MAY'18			
Zone / Mileage					
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Drawing Number					Rev
FIGURE 6					

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Aecom ref.	Type	Moray Council / BEAR	Location / description	Chainage	Co-ordinates	Culvert		Bridge		Retaining wall		Notes
						Approximate diameter / span	Approx. cover below road level	Approximate span	Approx. cover below road level	Approximate overall length	Approx. highest retained height	
001	Culvert	Moray Council	Junct. of Freuchny Rd and Commercial Rd	430m	343272E, 866047N	900mm Ø	1.5m	n/a	n/a	n/a	n/a	Outfall into Buckie Harbour. Unclear where pipe passes under road.
002	Culvert	Moray Council	On A98, east of junction with A942	3,700m	343311E, 864166N	550mm Ø	1m	n/a	n/a	n/a	n/a	Culvert from open ditch on upstream side. Manhole on downstream side.
003	Bridge	Moray Council	On A98. Inchgower Bridge	4,170m	342884E, 863995N	n/a	n/a	6.7m	0.75m	n/a	n/a	Bridge over Burn of Buckie.
004	Retaining wall	Moray Council	On A98 at Burnside Croft	4,290m	342767E, 863949N	n/a	n/a	n/a	n/a	30m	0.5m	Low retaining wall at cottage. 1m back from edge of carriageway.
005	Culvert	Moray Council	On A98 at Inchgower Distillery	4,350m	342704E, 863925N	1m span	<0.5m	n/a	n/a	n/a	n/a	Shallow box culvert. Noted as old mill lead. Small dip in road surface.
006	Retaining wall	Moray Council	On A98 at Inchgower	4,420m	342636E, 863898N	n/a	n/a	n/a	n/a	10m	1m	Short retaining wall alongside ditch. 1m back from edge of carriageway.
007	Culvert	Moray Council	On A98 at Westholme, Arradoul	4,950m	342142E, 863770N	225mm Ø	0.5m - 1m	n/a	n/a	n/a	n/a	Manholes on both sides of road. Noted as 225mm pipe, but no inlet / outlet.
008	Culvert	Moray Council	On A98 at Arradoul House	5,120m	341967E, 863732N	1m span	1m	n/a	n/a	n/a	n/a	Concrete box culvert
009	Culvert	Moray Council	On A98, west of Arradoul House	5,160m	341930E, 863718N	300mm Ø	0.6m	n/a	n/a	n/a	n/a	Small diameter pipe. No visible inlet on south side of road.
010	Culvert	Moray Council	On A98 at Milton Cottage, Arradoul	5,500m	341606E, 863594N	225mm Ø	0.6m	n/a	n/a	n/a	n/a	No inlet visible. Appears to be no longer in use.
011	Culvert	Moray Council	On A98 east of Blairstone	5,970m	341262E, 863299N	2.4m span	2m-3m	n/a	n/a	n/a	n/a	Concrete box culvert on Burn of Gallochy Known as Stonie's Culvert. 3m below road.
012	Culvert	Moray Council	On A98 east of Blairstone	5,990m	341249E, 863283N	1500mm Ø	3m	n/a	n/a	n/a	n/a	Large diameter concrete pipe. 3m below road.
012A	Culvert	Moray Council	On A98, west of Smirak	6,220m	341060E, 863137N	Ø unknown	unknown	n/a	n/a	n/a	n/a	Appears to be no longer in use. Inlet / outlet could not be located
013	Culvert	Moray Council	On A98 at Enzie	6,680m	340659E, 862939N	225mm Ø	1m-1.5m	n/a	n/a	n/a	n/a	Possibly no longer in use. Small diameter pipe at inlet. Stone chamber at outlet.
014	Culvert	Moray Council	On A98 at Leitcheston Farm	7,540m	339886E, 862560N	1m-1.5m span	1m-2m	n/a	n/a	n/a	n/a	1m masonry arch, and 1.5m wide slab over Core Burn
015	Culvert	Moray Council	On A98 at junction with B9016	8,010m	339473E, 862339N	300mm Ø	0.5m	n/a	n/a	n/a	n/a	Small diameter pipe. Outlet could not be located.
016	Culvert	Moray Council	On B9016, 100m south of Cremarorium	8,870m	339829E, 861608N	500mm span	0.7m	n/a	n/a	n/a	n/a	Stone slab with shallow cover.
017	Culvert	Moray Council	On B9016, at Clochan Crossroads	9,820m	339829E, 860654N	1m span	0.7m	n/a	n/a	n/a	n/a	Shallow 1m wide box culvert.
018	Culvert	Moray Council	On B9016, 500m north of Burn of Tynet	9,980m	339845E, 860499N	300mm Ø	0.5m	n/a	n/a	n/a	n/a	Small diameter pipe. Stone slab covering inlet.
019	Bridge	Moray Council	Enzie Bridge (Burn of Tynet)	10,500m	339831E, 859981N	n/a	n/a	tbc	tbc	n/a	n/a	Stone arch bridge over Burn of Tynet
020	Culvert	Moray Council	On B9016 at Hawthorn Cottage	10,900m	339867E, 859613N	300mm Ø	1.5m	n/a	n/a	n/a	n/a	Small diameter pipe. 1.5m below road.
020A	Culvert	Moray Council	On B9016, south of Starryhaugh	11,430m	340068E, 859122N	Ø unknown	unknown	n/a	n/a	n/a	n/a	Could not be located. On steep section of road. Assumed to be well below road.
021	Culvert	Moray Council	On B9016, 700m north of Raefin	12,750m	339825E, 857915N	900mm Ø	2m	n/a	n/a	n/a	n/a	900mm wide stone arch on upstream side. Small diameter pipe on downstream side.
022	Culvert	Moray Council	On B9016, 400m north of Raefin	13,080m	339891E, 857600N	500mm Ø	3m	n/a	n/a	n/a	n/a	Stone slab and arch on upstream side. Pipe at downstream outlet. 3m below road.
022A	Culvert	Moray Council	On B9016, north of U13E, Foggie Moss Road	13,600m	340173E, 857178N	400mm Ø	1m	n/a	n/a	n/a	n/a	400mm diameter concrete pipe.
023	Culvert	Moray Council	On B9016, at Croft of Ryriggs	14,290m	340267E, 856519N	500mm Ø	1m	n/a	n/a	n/a	n/a	Brick chamber on upstream side. Small diameter pipe on downstream side.
024	Culvert	Moray Council	On B9016, at Ryriggs	14,680m	340260E, 856141N	500mm Ø	>1m	n/a	n/a	n/a	n/a	500mm concrete pipe. Steep gradient under road. Very deep on downstream side.

Aecom ref.	Type	Moray Council / BEAR	Location / description	Chainage	Co-ordinates	Culvert		Bridge		Retaining wall		Notes
						Approximate diameter / span	Approx. cover below road level	Approximate span	Approx. cover below road level	Approximate overall length	Approx. highest retained height	
025	Culvert	Moray Council	On B9016, 200m south of Ryeriggs	14,960m	340164E, 855872N	1750mm Ø	2m	n/a	n/a	n/a	n/a	Concrete culvert of Burn of Ryeriggs
026	Culvert	Moray Council	On B9016, at Auchinderran	15,930m	340026E, 854917N	unknown	unknown	n/a	n/a	n/a	n/a	Culvert could not be located
026A	Culvert	Moray Council	On B9016, south of access to Auchinderran	16,000m	340036E, 854875N	250mm Ø	>1m	n/a	n/a	n/a	n/a	Small diameter plastic pipe crosses the road diagonally. Outlet could not be located.
027	Bridge	Moray Council	On B9016. Tarrycroys Bridge	16,650m	340117E, 854201N	n/a	n/a	3.1m	2.2m	n/a	n/a	Stone arch over Burn of Auchinderran
028	Culvert	Moray Council	On B9016, at north end of Aultmore.	17,250m	340197E, 853625N	1000mm Ø	0.7m-1.5m	n/a	n/a	n/a	n/a	Large diameter concrete pipe
029	Culvert	Moray Council	On B9016, at Aultmore Distillery	17,340m	340219E, 853525N	400mm Ø	1m	n/a	n/a	n/a	n/a	Noted as catchpit / stone culvert. Possibly no longer in use.
030	Culvert	Moray Council	On B9016, at south end of Aultmore.	17,650m	340281E, 85328N	300mm Ø	0.5m	n/a	n/a	n/a	n/a	Stone cover over inlet. Manhole on outlet side.
030A	Culvert	Moray Council	South of Aultmore	17,800m	340337E, 853078N	150mm Ø	>1m	n/a	n/a	n/a	n/a	Small diameter pipe. Inlet could not be located.
031	Culvert	Moray Council	On B9016, 200m south of Aultmore.	18,050m	340422E, 852859N	1500mm Ø	0.5m	n/a	n/a	n/a	n/a	Large diamter culvert on Kitchen Burn, Bridge of Forgieside
032	Culvert	BEAR	On A96 at Little Forgie	18,820m	340480E, 852190N	225mm Ø	1m-2.5m	n/a	n/a	n/a	n/a	Small diamter pipe. Well below road.
033	Bridge	BEAR	On A96 in Keith. Network Rail bridge	20,620m	341770E, 851158N	n/a	n/a	8.4m	0.6m	n/a	n/a	Network Rail bridge. Skewed stone arch. Refer BEAR report <i>A96 380 Keith Haughs Rail PI</i> .
034	Bridge	BEAR	On A96 in Keith. Bridge of Haughs	20,720m	341834E, 851085N	n/a	n/a	9.5m	2m	n/a	n/a	Bridge over Burn of Haughs. Refer BEAR report <i>A96 370 Haughs PI</i> .
035	Bridge	BEAR	On A96 in Keith. River Isla bridge	21,850m	342807E, 850786N	n/a	n/a	12.5m	2.3m	n/a	n/a	Bridge over River Isla. Reinforced stone arch. Refer BEAR report <i>A96 360 Isla PI</i> .
036	Bridge	BEAR	On A96 in Keith. Dufftown Rail bridge	21,910m	342863E, 850746N	n/a	n/a	4.5m	0.8m	n/a	n/a	Bridge over Keith-Dufftown heritage railway. Refer BEAR report <i>A96 350 Keith Dufftown Rail PI</i> .
037	Retaining wall	BEAR	On A96, 250m south of Keith	23,250m	343290E, 849867N	n/a	n/a	n/a	n/a	23m	2m	Retaining wall over 3m away from edge of road. Refer BEAR report <i>A96 345 W84 Rowans Wall RB</i>
038	Culvert	BEAR	On A96, 250m south of Keith	23,460m	343404E, 849688N	800mm Ø	1.5m - 2m	n/a	n/a	n/a	n/a	Large diamter concrete pipe. 1.5m-2m below road.
039	Culvert	BEAR	On A96, 700m south of Keith	23,870m	343701E, 849430N	500mm Ø	1.5m	n/a	n/a	n/a	n/a	Concrete pipe. 1.5m below road.
040	Culvert	BEAR	On A96, 900m south of Keith	24,040m	343796E, 849277N	1200mm Ø	1.7m	n/a	n/a	n/a	n/a	Large diamter concrete pipe. Refer Transport Scotland Report <i>A96 345 C80 Denhead</i>
041	Culvert	BEAR	On A96, 1.1km south of Keith	24,230m	343946E, 849157N	2m span	6m	n/a	n/a	n/a	n/a	Upstream side 2m wide masonry arch. Downstream side stone slab extension. Refer BEAR report <i>A96 345 C75 Tarnash</i> .
042	Culvert	Moray Council	On U-class road between A96 and site.	26,420m	343857E, 848378N	450mm Ø	1.5m	n/a	n/a	n/a	n/a	Constructed as part of substation PRI works

Key:

	Culvert	(Approximate diameter / span, and cover to road level measured on site where possible.)
	Bridge	(Refer separate URS Detailed Structural Assessments.)
	Retaining wall	(Approximate length and highest retained heights measured on site where possible)
	Structure where steel plating is proposed - Refer individual notes.	
	Location where vehicle is required to be positioned on specific side of road - Refer individua; notes.	

Proposed mitigation
None
None
None. Refer to Approval In Principle
Vehicle to keep to centre of carriageway
Steel plating over road
Vehicle to keep to centre of carriageway
None
None
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None
None. Refer to Approval In Principle
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Proposed mitigation
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MORAY WEST

OFFSHORE WINDFARM

Contact

Moray Offshore Windfarm (West) Limited

4th Floor, 40 Princes Street

Edinburgh EH2 2BY

Tel: +44 (0)131 556 7602

