APPENDIX 8: TRANSPORT STATEMENT

BAILLIE GREENER GRID PARK
LAND WITHIN BAILLIE WIND FARM, WEST OF THURSO

FOR STATKRAFT UK LTD

NOVEMBER 2021

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1 INTRODUCTION

1.1 Background

This Transport Statement has been prepared by Arcus Consultancy Services Ltd ('Arcus') on behalf of Statkraft LTD ('the Applicant') to accompany the planning application submitted to The Highland Council ('the Council') for the installation of a Greener Grid Park ('the Development') at land within the existing Baillie Wind Farm site, West of Thurso, Highlands, centred approximately at National Grid Reference ('NGR') 302430, 965060 ('the Site').

This Transport Statement provides an overview of the Development in relation to traffic and will assess the anticipated impact of the Development on traffic and transportation resources within the local area.

1.2 Overview of the Development

The layout and technical details of the Development are provided in the associated Planning Statement, Design and Access Statement and accompanying Figures. The Site Layout is shown as Planning ***Drawing No 4246-DR-P-0001-P6*** of the planning application.

Construction and operational access to the Site will be via the existing access junction into the Baillie Wind Farm site, approximately 1.5 km south east of the Site. There are adequate visibility splays in either direction from the proposed access point and no upgrade of the access junction is required. The Route to Site is included in Figure **1** within Appendix **A**.

2 LEGISLATION, POLICY AND GUIDANCE

A summary of the legislation, policy and guidance considered during preparation of this Transport Statement is provided in Table 2.1.

Table 2.1 - Legislation, Policy and Guidance

Policy or Author	Title	Policy Description	Notes
The Scottish Government	Scottish Planning Policy (2020)	This provides a statement of the Scottish Government's policy on nationally important land use planning matters. The section which deals with transportation matters, A Connected Place – Promoting Sustainable Transport, advises that: *"Where a new development or a change of use is likely to generate a significant increase in the number of trips, a transport assessment should be carried out. This should identify any cumulative effects which need to be addressed."* SPP – paragraph 286 Paragraph 169 sets out a number of factors to be taken into account when considering energy infrastructure development, including: • *Impacts on roads traffic;* • *Impacts on adjacent trunk roads*	N/A
Department for Transport ('DfT')	Design Manual for Roads and Bridges ('DMRB') – CD 123	Details the geometric design standard for at-grade priority and signal-controlled junctions.	This has been used within this report to appraise the standard of existing infrastructure, in particular the Site entrance junction.
Transport Scotland	Transport Assessment Guidance (2012)	Sets out the methodology for preparation of a Transport Assessment.	Transport Assessments are normally associated with developments which are expected to cause a long term, or permanent, change in traffic flow or composition. It is therefore of limited relevance for this Development, where the principal traffic effects will be short term and associated with construction.

Policy or Author	Title	Policy Description	Notes
Institute of Environmental Management and Assessment ('IEMA', 1993)	Guidelines for the Environmental Assessment of Road Traffic	Sets out guidelines for determining the appropriate and significance of traffic effects as a result of a proposed development. The following criteria should be applied for determining where further assessment is required: • Routes where traffic is predicted to increase by 30% or more; and • On highly sensitive routes where traffic is predicted to increase by 10% or more.	This guidance is primarily intended to apply to Environmental Impact Assessments; however, the quoted thresholds are useful for determining where traffic increase may be significant.

3 EXISTING CONDITIONS

3.1 Highway Infrastructure

Construction traffic is expected to arrive via the A9. This assessment will consider effects on routes between the Site entrance and the nearest major road, which in this case is the A9.

3.1.1 A9

The A9 is a major road in Scotland which runs in a north–south direction running from Falkirk Council area in central Scotland to Scrabster Harbour, Thurso in the Highlands region. The A9 is a single carriageway road and generally subject to the national speed limit except in built-up areas where the speed limit is reduced.

Construction traffic will exit the A9 onto the A836. As this road is a major transport link, it is expected that any increase in traffic numbers due to construction of the Development will be negligible.

3.1.2 A836 Road

The A836 is a major single carriageway road within the Highlands which runs from Ross and Cromarty to Caithness. The A836 is generally subject to the national speed limit except in built-up areas where the speed limit is reduced. The junction connecting the A836 to the C1001 Shebster to Westfield Road, which will be used by construction traffic, is a crossroads junction. It is expected that any increase in traffic numbers on the A836 due to construction of the Site will be negligible.

3.1.3 C1001 Shebster to Westfield Road

The C1001 Road is a rural, single carriageway road, which provides a connection between the A836 and Thurso via Shebster, Westfied and the B874. It serves a number a of residential properties and farms dotted along the route and access to the existing Baillie Wind Farm is via this road. The road was used by HGVs during the construction of the Baillie Wind Farm and other neighbouring wind farms.

3.1.4 Site Access Junction

Access to the Site will be via an existing access junction into the Baillie Wind Farm. This priority junction is well formed with good visibility and was used during construction and maintenance of the Ballie Wind Farm and therefore would not require improvement works to allow access to the proposed Development.

3.2 Baseline Traffic Flow Data

Baseline traffic flow conditions were established from publicly available information published by the Department for Transport (DfT). **Error! Reference source not found.** s ummarises the data collected from these sources[1]. Traffic count locations are shown on Figure **1** located in Appendix **A**.

The latest available DfT data is for the year 2020 however due to significant uncertainty of travel patterns as a result of the Coronavirus Pandemic, we have used 2019 traffic flows.

[1] https://roadtraffic.dft.gov.uk/#13/58.5953/-3.6261/basemap-countpoints

Table 3.1 – Existing Annual Average Daily Flow (AADF) 2019

Ref	Road	Location	Year	Count Type	Total AADF	HGV AADF	HGV% of Total AADF
1	A836, Forss	DfT Point ID: 10934	2019	Estimate	2,460	67	2.7%
2	A9, Thurso	DfT Point ID: 40800	2019	Automatic	3,277	148	4.5%

3.3 Road Traffic Collision Assessment

A study of all 'serious', 'fatal' and 'slight' reported road traffic collisions ('RTCs') within the last five years between the Site and the A9 was undertaken[2]. Figure **1** included in Appendix **A** indicates the location of each identified RTC.

Collisions are categorised according to the severity of injuries sustained by those involved:

- 'Slight' are those which are reported but do not meet any of the above criteria;
- 'Serious' injuries are those which result in hospitalisation or death more than 30 days after the incident; and
- 'Fatal' results in the death of one or more persons at the scene of the collision or within 30 days of the incident.

10 'slight', 1 'serious' and 2 'Fatal' RTCs in total were recorded within or near to this study area.

A review of the RTC reports suggests driver decision errors being the reason for the collisions. No RTCs were identified within the immediate vicinity of the proposed Site access junction.

[2] Study was undertaken using data compiled from crashmap.co.uk [Accessed 01/09/2021]

4 THE PROPOSED DEVELOPMENT

4.1 Construction Traffic Composition

The Development would comprise synchronous condenser units, transformers, cooling system, control module and ancillary infrastructure.

Development construction traffic will primarily be associated with the importation of construction materials including synchronous compensator components, battery containers, electrical equipment, aggregate and other construction materials.

It is expected that the majority of these materials will be transported to the Site by HGVs except for the large items of electrical plant, which will be classified as Abnormal Indivisible Loads (AILs). All AIL's will be delivered to the Site under escort in accordance with permits issued by the Local Roads Authority.

Other vehicles associated with construction of the Development can be expected from construction workers and other site personnel commuting to and accessing the Site.

4.2 Construction Vehicle Routing

It is assumed that the majority of vehicles will approach the Site from the east via the A836, however the origin of general construction traffic is currently unknown and likely to be distributed throughout the region and a proportion may approach from the east by the B874. It is anticipated that AILs will originate from Scrabster Harbour due to its close proximity to the Site and they will be transported to the Site via the A836. This port is frequently used for renewables deliveries because it has a sufficient quay and is well located for sites within the region. The proposed route is indicated on **Figure 1** included in Appendix **A** and is listed below:

- Exit A9 onto the A836 westbound;
- Continue along the A836 westbound for approximately 15 km until its junction with the C1001 Shebster to Westfield Road;
- Turn left onto the C1001 Road eastbound and continue for approximately 6 km towards the Baillie Wind Farm access junction;
- Turn left into the existing wind farm and continue northbound until the on-site junction;
- Turn left and continue for approximately 0.5 km and turn left onto the internal access road towards the Site.

All construction vehicles departing the Site are expected to use the same route as on approach in reverse. It is acknowledged that further investigations are required for the delivery of the AILs, though it is noted this route was used by construction traffic (including the delivery of turbine components) during the construction of the Baillie Wind Farm.

4.3 Construction Traffic Volume

An indicative programme of anticipated construction traffic associated with the Development is provided in Table 4.2 and is expected to run for approximately 12 months. The following sub-sections provide detail for each element of work. Detailed assumptions have been made in estimating material quantities.

4.3.1 Site Mobilisation and Demobilisation

HGV and other vehicle movements will be required during Site mobilisation. This will comprise the erection of welfare facilities, delivery of construction site vehicles and importation of plant and equipment. The majority of these movements will be as HGVs and low loaders which will deliver and then depart the Site empty.

During site demobilisation, the majority of this equipment will be removed from Site. Vehicle movements for demobilisation will result from empty HGVs and low loaders travelling to Site and then departing loaded.

This is expected to require up to 15 HGV deliveries or 30 two-way HGV movements at the commencement of construction of the Development.

4.3.2 Access Track and Hardstanding

As far as possible the existing access tracks will be used to support construction of the Development The new internal access track will take up an approximate area of 3,087 m² and will be formed at a depth of 0.45 m using Type 1 aggregate. This results in roughly 1,389 m³ of aggregate being required for this element of works.

Proposed hardstanding areas make up an area of approximately 15,757 m² and will be formed at a depth of 0.45 m using Type 1 aggregate. This results in roughly 7,090 m³ of aggregate being required for this element of works.

In total, approximately 8,480 m³ of aggregate will be imported to the Site via a 20T tipper lorry with an assumed volumetric capacity of 9 m^3 which will result in 943 HGV loads for this element of works over the course of several months.

4.3.3 Control Building, Energy Management Building and Electrical Cabling

Construction of the synchronous compensator building will commence once the access tracks are complete. Two synchronous compensator buildings will be imported, likely in pre-fabricated parts. However, materials, namely concrete, to be imported to form the foundations of the building structure will be required. This is expected to result in 39 HGV loads or 78 two-way movements.

Cabling for the Development will also be delivered and this is estimated to require 6 HGV deliveries or 12 two-way vehicle movements.

4.3.4 Battery Container, Inverter and Switchgear Delivery

Battery containers will be delivered following the completion of the access tracks. The containers will be transported to site via a standard HGV resulting in 60 deliveries or 120 two-way vehicle movements.

In addition to the battery containers, the associated inverters and switchgear containers are expected to be delivered, resulting in a further 9 HGV loads or 18 two-way vehicle deliveries.

Concrete will be required for the foundations of these containers and is expected to amount to approximately 2,155 m³. Assuming a volumetric capacity of 9 m³ for the concrete delivery vehicles, this results in roughly 240 loads or 480 two-way vehicle movements.

4.3.5 Additional Supporting Infrastructure

As indicated on the Site layout, additional items will be required to be delivered to Site. These items are highlighted in Table 4.1 below.

Table 4.1 - Miscellaneous Delivery Items

Item	No Units	No. of Loads
Air Blast Coolers 9.6 m x 2.4 m x 2.5 m	6	6
2500kVA 690V Additional Transformers (4 m x 4 m x 2.9 m)	2	1
1000kVA 400V Transformers (3 m x 3 m x 2.14 m)	6	3
BESS Communications House (12.19 m x 2.44 m x 2.59 m)	1	1

Water Cooler Pump Skids (6.35 m x 2.05 m x 2.6 m)	2	1
Synchronous compensator HV control and protection (12.19 m x 3.45 m x 2.59 m)	2	2
LV Electrical House (12.19 m x 3.45 m x 2.59 m)	2	2
Lube Oil Pump Skids (2.15 m x 1.1 m x 1.1 m)	2	1
Welfare (12.19 m x 3.45 m x 2.59 m)	1	1
Statkraft Distribution Containers (12.19 m x 3.45 m x 2.59 m)	1	1
Synchronous Compensator Communications House (12.19 m x 3.45 m x 2.59 m)	1	1
275kV AIS & Transformer	1	2
Total		**22**

A total of 22 HGV loads have been assumed to deliver these items to Site, resulting in 44 two-way movements.

Concrete will be required for the foundations of these containers and is expected to amount to approximately 1,019 m³. Assuming a volumetric capacity of 9 m³ for the concrete delivery vehicles, this results in approximately 118 loads or 236 two-way vehicle movements.

4.3.6 Staff

Staff levels are likely to vary through construction depending on the operations being undertaken.

It is anticipated that an average of 40 vehicles movements per day (for approximately 20 staff) will be made to the Site during the peak construction months. For the purposes of this assessment, the most recent available Scottish private vehicle occupancy rate of 1.57 people per vehicle was used, equating to approximately 25 vehicles movements per day. Assuming a 26-day working month, this will result in 650 car/light van movements per month.

The above figures are conservative, as staff will be encouraged to car share (including the use of Minibuses), so it is anticipated that the figure for car or van movements is likely to be considerably lower than the above estimates in practice.

4.3.7 Fuel

Fuel for plant will be required on the Site regularly through construction, this is estimated to result in one HGV fuel tanker delivery per month or two vehicle movements per month.

4.3.8 Overall Delivery Programme

Table 4.2 shows an indicative construction programme and schedule of deliveries.

Table 4.2 - Anticipated Construction Programme

Activity	Month												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Total****
	HGVs												
Site Mobilisation/Demobilisation	30											30	60
Access Track and Hardstanding Construction	100	472	472	472	370								1,886
Inverters, Cabling Delivery & Switchgear Containers					10	10	10						30
Battery Container Delivery							30	30	30	30			120
Concrete Requirements					160	158	158	158	160				794
Misc. Component Deliveries		4	4	5	5	5	5	4	4	4	4		44
Fuel Delivery	2	2	2	2	2	2	2	2	2	2	2	2	24
Sub-Total	132	478	478	479	647	175	205	194	196	36	6	32	**2,934**
	Abnormal Loads												
Synchronous Compensators										4			
Sub-Total										**4**			**4**
	Staff Cars and Vans												
Staff	130	195	455	650	650	650	650	650	455	325	65	65	
Sub-Total	130	195	455	650	650	650	650	650	455	325	65	65	**4,940**
Total (All Vehicles)	262	673	933	1,129	1,197	825	855	844	651	365	71	97	7,902
Total (HGV Only)	132	478	478	479	547	175	205	194	196	40	6	32	
Average Total Traffic per Day*	10	26	36	43	46	32	33	32	25	14	3	4	
Average HGV Traffic per Day*	5	18	18	18	21	7	8	7	8	2	0	1	

**ASSUMES 26-DAY WORKING MONTH; **TOTALS MAY NOT ADD UP DUE TO ROUNDING*

The Development is expected to be constructed over a 12-month period. Approximately 7,902 two-way vehicle movements are expected to occur during this period for staff, and to deliver construction materials and components.

4.4 Assessment of Traffic Effects

4.4.1 Peak Increase in Traffic

As indicated in Table 4.2, the peak month for construction is expected to occur in Month 5. During this month there are approximately 1,197 two-way movements, made up of 650 car/van movements and 547 HGV movements. Assuming a 26-day working month, this would equate to a maximum of 46 two-way vehicle movements per day which would consist of 25 car/van movements and 21 HGV movements on average.

4.4.2 Effect of Traffic Increase during Construction

The percentage change in traffic volume expected during the peak month of construction was calculated for each of the traffic count locations identified in the baseline study. To present a worst-case scenario it has been assumed that all construction traffic will be transported along the construction traffic route specified in Section 4.2. Table 4.3 indicates the predicted change in average daily flow ('ADF') in Month 5.

Table 4.3 - Predicted Peak Month Average Daily Traffic (Month 5)

Ref	All Vehicles			HGV Only*		
	Baseline	Baseline + Development	% Increase	Baseline	Baseline + Development	% Increase
1	2,460	2,503	1.8%	67	85	28%
2	3,277	3,277	1.4%	148	148	12%

The lowest threshold of impact for traffic generation at sensitive receptors is typically 10%. As indicated in Table 4.3 above, the increase in Average Daily Traffic Flow ('ADTF') due to total construction traffic is less 10%, however, the impact of HGV traffic on the A836 and the A9 exceeds the 10% threshold.

Traffic count information for the C1001 Shebster to Westfield Road between the A836 and Site entrance was not available, however it is expected that the percentage increase in traffic will be higher on this road due to a lower baseline flow level.

When considering increases in traffic on roads with a low baseline traffic flow, it is important to consider the overall and residual capacity of the road in question. The baseline HGV flows level are low (92 HGVs per day on the A836 & 148 HGVs on the A9) and the magnitude of the predicted increase is low in absolute terms (21 vehicles per day), and therefore the impact of this on the roads in the study area would not be significant.

Construction and operational staff will be encouraged to car share, so it is anticipated that the figure for car or van movements is likely to be considerably reduced. Furthermore, it should be noted that deliveries associated with HGV movements will be distributed throughout the working day and also with the A9 and A836 being the major road routes in the area, we assume that temporary increases in HGV traffic are not uncommon.

Therefore, this temporary change in traffic volume on routes approaching the Site is likely to be minor in terms of the existing traffic flow. The Applicant is committed to avoiding peak school traffic during construction. The effect of the temporary increase in traffic during construction of the Development on routes within the vicinity of the site is therefore expected to be negligible.

4.4.3 Effect on Highway Safety

Access to the Site will be via the existing priority junction into the Baillie Wind Farm site which is well formed with good visibility.

On other routes considered within this study the predicted temporary increase in traffic during construction of the Development is minor, and below recognised thresholds of significance. No trends or hotspots could be identified in the RTCs within the study area. In the absence of any identifiable RTC trends or hotspots, a minor increase in traffic is not sufficient to have a detrimental effect on the safe operation of the highway network. Therefore, no effect on highway safety is anticipated.

4.4.4 Operational Traffic

Vehicle movements to the Site during the operation of the Development will comprise activities associated with inspection, monitoring and general site up-keep. It is anticipated that such visits will occur up to once per week on average and be via van or other similar sized vehicles. The Site will not be manned.

Due to the very low numbers of vehicle movements anticipated it is unlikely that the operation of the Development will have any significant impact on the road network. The Site is not intended to attract visitors for any reason, and therefore it is not anticipated to generate other types of trips.

The effect of operational traffic is therefore expected to be negligible.

4.5 Cumulative Traffic

Following a review of proposed developments which have the potential to result in cumulative traffic and transport effects and for which construction traffic will utilise a section of the road network (A9 & A836) as the Development, the following developments were identified:

- Proposed Limekiln Wind Farm (Planning Ref: 2021/03750/S36). In planning awaiting a decision but would likely have similar construction timescales.

In order to assess the cumulative effect of the possible simultaneous construction on the local road network, the peak traffic period for each development has been combined to give an overall peak traffic estimate. It should be noted that the below estimate is a worst-case scenario assumption in which the peak periods of each development coincide, though in reality, this is unlikely to occur.

It is anticipated that during construction, the maximum number of vehicles accessing the proposed Limekiln Wind Farm Site during the peak construction phase would be 26 HGVs and approximately 84 light vehicles per day. Therefore, in line with the conclusion of Section 4.5.2 of this report, it is considered that there is sufficient residual capacity on each of the roads to accommodate the predicted increase in traffic which may occur in the cumulative scenario.

A Construction Traffic Management Plan ('CTMP') will be prepared for submission prior to the commencement of construction, the requirement for which could be secured by an appropriately worded planning condition. The CTMP will provide specific timings of construction phases, including in relation to proposed Limekiln Wind Farm scheme, and will detail any measures required to avoid conflict between peak construction periods.

5 TRAFFIC MANAGEMENT

5.1 Overview

A number of traffic management procedures will be implemented to ensure safe operation of routes within the vicinity of the Site associated with construction of the Development.

Given that a Principal Contractor has not been appointed, at this stage only the general principles of the traffic management measures to be employed during construction of the Development have been provided.

The following sub-sections outline the general management procedures which will be implemented.

5.2 Route to Site

Drivers of all delivery vehicles will be made aware of the approved route to the Site, and any restrictions. Drivers of HGVs and other vehicles will be made aware that only the approved route is to be used and that access from non-approved routes is prohibited.

5.3 Temporary Warning Signage

Prior to the commencement of construction, the Contractor will install temporary construction phase signage on the approved route to the Site. The required signage will fall into two broad categories; directional signage on the approved route to the Site and warning signage.

Directional signage should be located at key points on the approved route to the Site with the purpose of reinforcing the route and preventing delivery vehicles from using the wrong route.

Warning signage will principally be located within the vicinity of the Site entrance to warn members of the public of the possibility of HGVs. Pedestrian and road user safety will be enhanced via the installation of signage and the maintenance of sight lines. This will minimise any adverse impacts caused by construction traffic on the local road network associated with the Development.

5.4 Construction Management Plan ('CTMP')

Prior to the commencement of construction works on Site, a CTMP will be prepared and submitted to the Council for approval. It is assumed the requirement for the CTMP would be secured by an appropriately worded planning condition. This CTMP will provide specific timings of construction phases and will consider the specific details of how construction will be managed alongside the potential construction of the nearby proposed Limekiln Wind Farm if it is consented and if the constriction timescales of the two projects overlap.

6 CONCLUSION

This Transport Statement has considered the likely impact of traffic generated by the Development on the local transport network. A detailed review of the type and quantity of vehicles associated with each element of the construction project has been provided along with an approximate programme of construction. The route to Site for all construction traffic has also been provided.

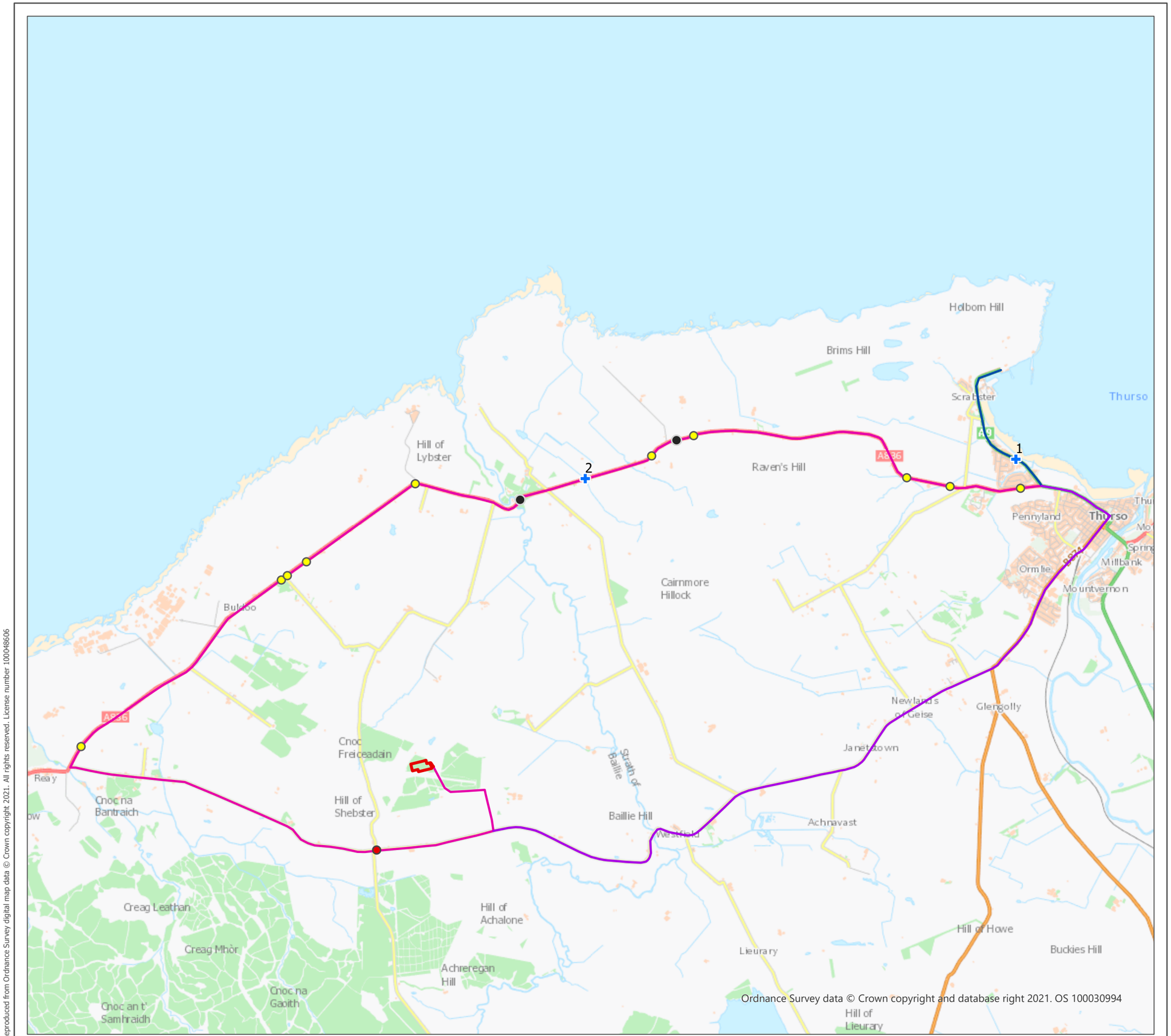
Access to the Site will be via the existing Baillie Wind Farm. Construction of the Development will generate approximately 7,902 vehicle movements during the 12-month construction period. It is expected that during the peak month of construction (Month 5), 46 - vehicle movement per day will occur per day, which would consist of 25 car/van movements and 21 HGV movements on average.

The increase in traffic generation due to construction traffic was calculated using baseline traffic data from manual and estimated counts on the A9 and the A836 and was found to be significant. However, further assessment of the road showed significant residual capacity when including construction traffic numbers. Due to this and the temporary nature of the works, the impact on traffic generation due to construction is therefore not significant.

Traffic management procedures have been proposed within this report which would ensure the safe operation of the approach route to the Site during construction. Determination of the final details of these traffic management measures will occur once the Principal Contractor has been appointed and can be secured via an appropriately worded condition of consent.

As the Site will not be manned, operational traffic is expected to be minimal and would be conducted by smaller vehicles. The impact of this on the wider road network is therefore expected to be negligible.

APPENDIX A – FIGURES



Statkraft

ARCUS

- Site Boundary
- Traffic Count Location
- ALV Route
- General Construction Traffic Route
- ALV + General Construction Traffic Route

RTC Severity

- Fatal
- Serious
- Slight
- World_Regions

1:50,000 Scale @ A3

0 1 2 km

NORTH

Produced By: BM	Ref: 4246-REP-014
Checked By: FO	Date: 29/09/2021

Transport Figure
Figure 1

Baillie Greener Grid Park
Transport Statment

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