
FENWICK SOLAR FARM

Preliminary Environmental Information Report

Volume III Appendix 13-7: High Level Route Assessment

March 2024

Prepared for:
Fenwick Solar Project Limited

Prepared by:
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1. Introduction

1.1 Overview

- 1.1.1 This document has been prepared by AECOM on behalf of Fenwick Solar Project Limited (the 'Applicant') and provides a technical review and assessment demonstrating the routing possibilities for Heavy Goods Vehicle (HGV) and abnormal indivisible loads (AIL) vehicles to the Fenwick Solar Farm Site and associated Grid Connection Corridor.
- 1.1.2 The Scheme would comprise the installation of Solar Photovoltaic (PV) Panels, On-Site Cables, Interconnecting Cables, Battery Energy Storage System(s) (BESS) Area, On-Site Substation, a cable or line drop connecting the new On-Site Substation(s) to the Existing National Grid Thorpe Marsh Substation, and other supporting infrastructure including fencing, access tracks, drainage, and landscaping at a proposed site in Doncaster (hereafter collectively referred to as the 'Scheme'). The Scheme would allow for the generation, storage and export of more than 50 megawatts (MW) electrical generation capacity.
- 1.1.3 Due to its proposed generating capacity, the Scheme is classified as a Nationally Significant Infrastructure Project (NSIP) and would therefore require a Development Consent Order (DCO) under the Planning Act 2008 (Ref. 1) for its construction, operation and maintenance, and decommissioning phase.

1.2 The Applicant

- 1.2.1 The Applicant is Fenwick Solar Project Limited which is a wholly owned subsidiary of BOOM Developments Limited who specialise in non-subsidised solar and battery storage projects. BOOM Developments Limited was founded in 2020, and the name BOOM is an acronym for Build Own Operate Maintain. This reflects the organisation's intentions to be involved in sustainable energy projects from day one right the way through to the operation. The BOOM Managing Director and team have been responsible in previous roles for constructing more than 700 MW of solar developments in the UK between 2015 and 2017 and developing more than 850 MW of solar projects including the UK's first nationally significant infrastructure solar photovoltaic project, Cleeve Hill, which was granted a Development Consent Order in 2020. In 2021, the UK based BOOM partnered with the Pelion Green Future group of companies based across Australia, America, and the European mainland.

1.3 The Site

- 1.3.1 The Site is located approximately 5 kilometres (km) north of Doncaster and is comprised of three main areas:
- a. The land located east of Fenwick and immediately south of the River Went, hereafter referred to as the 'Solar PV Site';
 - b. The land between the Solar PV Site and the existing compound for Thorpe Marsh Substation, hereafter referred to as the 'Grid Connection Corridor'; and

- c. The land located within the existing compound for Thorpe Marsh Substation, hereafter referred to as the 'Existing National Grid Thorpe Marsh Substation'.
- 1.3.2 The Scheme would lie within the administrative area of City of Doncaster Council, who are also the Local Highway Authority.

1.4 Purpose and Structure of this Report

- 1.4.1 The purpose of this report is to assess potential routes to be used to deliver construction materials, including solar PV equipment and batteries, via an HGV and/or an AIL vehicle. This report will also assess what works may be required to facilitate the usage of each route. The assessment and works considered are typically carriageway widening to allow for vehicle tracking and swept path analysis, whilst identifying any height or weight restriction which provide significant constraints to the type and weight of vehicle used.
- 1.4.2 The maximum gross weight for goods vehicles is set out in the Road Vehicles (Construction and Use) Regulations 1986 and the Road Vehicles (Authorised Weight) Regulations 1998. Depending on the vehicle type, HGVs are permitted to operate at weights up to 44,000 kg.
- 1.4.3 Vehicles operating above 44,000 kg are referred to as an AIL, which as a load that cannot be broken down into smaller loads, without undue expense or risk of damage. These vehicles are permitted to operate in exceptional circumstances, however special provisions and authorisation are in required as set out in the Road Vehicles (Authorisation of Special Types) (General) Order 2003.

2. Large Vehicle Movement Tracking

- 2.1.1 The main vehicle impacts during the construction phase are expected to be associated with the movement of materials for site construction, including solar PV and battery equipment. In order to identify potential pinch point locations on access routes to the Site locations, a desktop review using Google Maps was carried out.
- 2.1.2 National Highways Electronic Service Delivery for Abnormal Loads (ESDAL) system enables hauliers to plan routes and check the suitability for any loads and get full details of all organisations and authorities that would need to be notified prior to travel being undertaken. As part the ESDAL system it categorises various parts of the road network under heavy and high load designations. For further ESDAL, please refer to the following website: <https://nationalhighways.co.uk/road-safety/abnormal-loads-and-the-esdal-system/>.
- 2.1.3 Within the vicinity of the Solar PV Site, the strategic road network operated and maintained by National Highways designates the following routes as heavy load routes:
- a. A1(M) Junctions 35 to 38;
 - b. M62 Junctions 33 to 36; and
 - c. M18 Junctions 2 to 7.
- 2.1.4 The surrounding strategic road network does not designate any of the above routes as a high load route, therefore delivery of equipment to the Site will need to consider normal carriageway restrictions.
- 2.1.5 As stated in Paragraph 2.1.1 this is a desk study review and detailed and specific assessments would be required for AIL authorisation.
- 2.1.6 Using AutoTrack software within AutoCAD, vehicle movements at pinch point locations have been tracked. This tracking is known as Swept Path Analysis (SPA).
- 2.1.7 The SPAs have been carried out based on a Max Legal Length (UK) Articulated Vehicle (16.5 m overall length). Images of the vehicle used are provided in Plate 2-1.

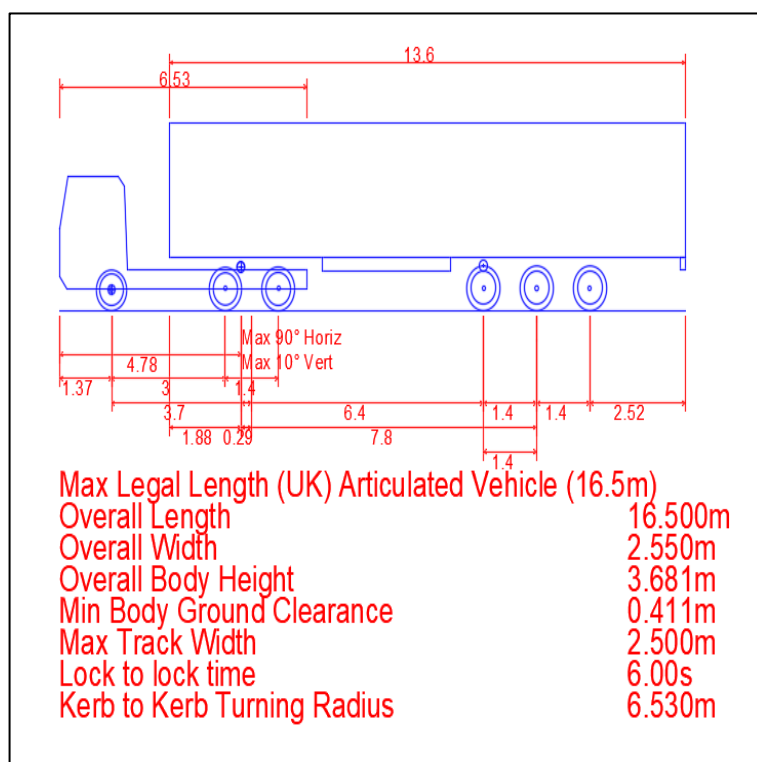


Plate 2-1: Max Articulated Vehicle

- 2.1.8 Routing of the Max Legal Articulated HGV has been undertaken for movements to and from the Scheme access points.
- 2.1.9 Each of the route sections reviewed have been given a temporary name to assist in identifying the vehicle tracked paths. Where vehicles are predicted to overrun onto verges, suitable mitigation will need to be provided to ensure damage to verges is kept to a minimum. This could include temporary road widening through track mats for routes that are to be used sparingly or more permanent solutions such as carriageway widening where regular overrun is anticipated. Passing bays and temporary parking restrictions along narrow routes may also need to be considered.
- 2.1.10 The SPA has been undertaken using OS and aerial imagery data to determine the carriageway edge. There may be opportunity to refine the manoeuvres with topographical survey data during detailed design, to reduce potential areas of mitigation.
- 2.1.11 This report focuses primarily upon the routing to the Solar PV Site and Grid Connection Corridor. For any improvement works to facilitate access such as new or upgraded junctions and access points, please refer to the following appendices:
 - a. **PEIR Volume III Appendix 13-5: Indicative Access and Appraisal for the Solar PV Site;** and
 - b. **PEIR Volume III Appendix 13-6: Indicative Access Appraisal for the Grid Connection Corridor.**

2.2 Routing To and From Access Points

- 2.2.1 The starting locations from which the access assessment was conducted are shown in Plate 2-2 and consists of:

- a. Origin 1 – M62 Junction 34;
- b. Origin 2 – M62 Junction 36;
- c. Origin 3 – M18 Junction 6;
- d. Origin 4 – M18 Junction 5;
- e. Origin 5 – M18 Junction 4;
- f. Origin 6 – A19 junction with Arksey Lane; and
- g. Origin 7 – A19 junction with Station Road.

2.2.2 The proposed routes to the Solar PV Site and Grid Connection Corridor access locations are as shown in Plate 2-2.

- a. Access A1 – Access to be from Moss Road;
- b. Access A2 – Access to be from Moss Road;
- c. Access B – Junction of Moss Road and Fenwick Common Lane;
- d. Access C – Junction of Fenwick Common Lane and Hags Lane;
- e. Access D – Access to be from West Lane;
- f. Access E – Grid connection access from Thorpe Bank; and
- g. Access F – Grid connection access from Fordstead Lane.



Plate 2-2: Origin and Access Point Map

- 2.2.3 A Red Amber Green (RAG) rating has been applied for each route as described below. See Annex A for a sketch of the route maps with a RAG rating.
- a. Green – Route navigable for HGVs with minimal improvement or intervention, with street furniture removal only temporary.
 - b. Amber – Route navigable by HGVs. However, traffic management and passing bays considerations are required to resolve issues with lane discipline in the corners and/or difficulty passing vehicles coming in the opposite direction on narrow road sections.
 - c. Red – Route not navigable by HGVs without significant highways interventions or structural limitations due to width or weight restriction associated with existing bridges.
- 2.2.4 Through the completion of this SPA assessment, the project team have determined that the most optimal route for HGVs to navigate to the Solar PV Site is via the M62 Junction 34 (Origin 1) travelling south on the A19 towards the junction of Station Road (Origin 7), before travelling East on Station Road and Moss Road to access the Solar PV Site.
- 2.2.5 In the event that HGV access is required to the Existing National Grid Thorpe Marsh Substation via Fordstead Lane (Access F), it is recommended that HGVs navigate to Access F via the A19 junction with Arksey Lane (Origin 6). This route follows designated heavy load route HR16 outlined by ESDAL with a heavy load route classification of D, which accounts for a 12 axle gross trailer weight of 264.16 T and 14 axle gross trailer weight of 299.72 T. This route has been considered so as to ensure that vehicles do not have to navigate carriageways near the perimeter of the On-Site Substation that are subject to a 7.5 ton weight restriction.
- 2.2.6 The following narrative contained in Section 2 will provide the justification for the above conclusions being the preferred route, alongside additional narrative to demonstrate why M62 Junction 36 (Origin 2), M18 Junctions 5 and 6 (Origin 4 and 3 respectively) were discounted as viable options for HGV traffic.

2.3 Origin 1 M62 Junction 34 to Origin 7 A19 Junction with Station Road

- 2.3.1 The most direct route from the M62 Junction 34 to both the Solar PV Site and the associated Grid Connection Corridor is the A19 South, which leads to the A19 junction with Station Road, Origin 7. See Section 2.4 for details of Origin 7 to Access B.
- 2.3.2 This section of the A19 between Origin 1 and 7 is characterised as a single carriageway road, the SPA has identified no constraints or pinch points along this route for an HGV.
- 2.3.3 Based upon the findings of the SPA, this route has been designated Green on drawing number 60698207-ACM-XX-00-SK-CE-0001 in .

2.4 Origin 7 - A19 Junction with Station Road to Access B

- 2.4.1 HGV access to and from the Solar PV Site has been tracked via Station Road and Moss Road. This section of road is characterised as a single carriageway with no identified constraints or pinch points.
- 2.4.2 However, it should be noted that, whilst a HGV is able to complete the access/egress movements at the junction of Moss Road and Fenwick Common Lane junction (Access B), SPA has identified that this manoeuvre does not maintain lane discipline and could give rise to the risk of vehicle conflicts.



Plate 2-3: Junction of Moss Road and Fenwick Common Lane

- 2.4.3 Plate 2-3 demonstrates that a HGV travelling eastbound along Moss Road turning into Fenwick Common Lane would have to leave the carriageway to avoid encroaching on the oncoming lane where opposing traffic might be present. Plate 2-3 also shows that Fenwick Common Lane is too narrow for two HGVs to pass within the carriageway limits, highlighting the potential requirement for local widening on this route.
- 2.4.4 As a consequence, this access route is recommended as an operational access route only, in order to minimise the magnitude of highways interventions. For further details in respect to the access improvements that would be required to make this junction suitable for construction please refer to the Fenwick Solar Park Access Locations Technical Note.
- 2.4.5 Based upon the findings of the SPA, Station Road and Moss Lane have been designated as Green on drawing number 60698207-ACM-XX-00-SK-CE-0001 in Annex A. However, the junction of Moss Road and Fenwick Common Lane would require improvements to enable vehicle traffic to head north on Fenwick Common Lane.

2.5 Origin 7 to Access A1 and A2 Access Off of Moss Road

- 2.5.1 Due to the issues arising at the junction of Moss Road and Fenwick Common Lane, the Scheme has considered Access Point A1 and A2, which would constitute a direct access to the Solar PV Site off Moss Road.
- 2.5.2 As noted in Section 2.4, HGV access to and from the Access A1 and A2 has been tracked via Station Road and Moss Road. This section of road continues to be characterised as a single carriageway with no identified constraints or pinch points.
- 2.5.3 Based upon the findings of the SPA, this route has been designated Green on drawing number 60698207-ACM-XX-00-SK-CE-0001 in Annex A.

2.6 Access B to Access C via Fenwick Common Lane

- 2.6.1 This is a straight section of narrow road that an HGV would be able to traverse while remaining within the carriageway. However, the SPA of the HGV in each direction overlaps, indicating that they would be unable to pass within the carriageway limits. For this access route to be made suitable for construction traffic, it is anticipated that passing bays or temporary traffic management would need to be installed between the junction of Moss Road (Access B) leading to Hags Lane (Access C), which would require the approval of the Local Highway Authority and may give rise to additional hedgerow or tree removal subject to a formal preliminary design being prepared. For further details please on this section of carriageway and the associated access points please refer to the Fenwick Solar Park Access Locations Technical Note.
- 2.6.2 Based upon the findings of the SPA, this route has been designated Amber on drawing number 60698207-ACM-XX-00-SK-CE-0001 in Annex A.

2.7 Origin 2 M62 Junction 36 to Access D off West Lane

- 2.7.1 Access D is currently proposed as an alternate or secondary access during the, which could act as a secondary access during the operation and maintenance phase.
- 2.7.2 This is a potential route that could be utilised by HGVs to access the easternmost part of the Solar PV Site. However, the results of the SPA identify a number of locations where the carriageway would require either localised widening to accommodate turning movements or the implementation of passing bays due to stretches where the carriageway narrows which may limit two way vehicle movements. This route also contains one blind corner, which without widening, would result in HGVs encroaching into the opposite lane as they travelled around the bend.



Plate 2-4: Oak Lane - Blind Corner



Plate 2-5: Oak Lane - Blind Corner

- 2.7.3 Based upon the findings of the SPA, this route has been designated Amber on drawing number 60698207-ACM-XX-00-SK-CE-0001 in Annex A.
- 2.7.4 The SPA of Access D covered in this Section concludes an Amber rating for HGV movements. Therefore, it is considered that this route is not preferred for HGV movements, and that primary access to the Solar PV Site off Moss Road is considered. This access could, however, be used during the construction, and, operation and maintenance phases for LGV vehicles to provide greater flexibility to construction and operation and maintenance requirements for the Solar PV Site.

2.8 Origin 6 A19 Junction with Arksey Lane to Access E Grid Connection Corridor Access from Fordstead Lane

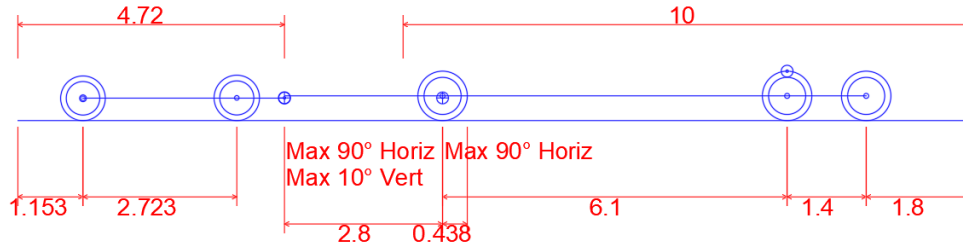
- 2.8.1 Following the SPA assessment, it is anticipated that there are no issues along this route, consisting of Arksey Lane, Station Road, Almholme Lane and Fordstead Lane, for an HGV to navigate, which reflects the classification of this route as a Heavy Load Route (HR16) on ESDAL.
- 2.8.2 Based upon the findings of the SPA, this route has been designated Green on drawing number 60698207-ACM-XX-00-SK-CE-0001 in Annex A. However, this route will need to be reviewed in conjunction with the Local Highway Authority and the operator of the Existing National Grid Thorpe Marsh Substation to confirm the constraints put in place by the existing 7.5-ton weight restriction which is in place at the junction of Fordstead Lane and Marsh Lane to the junction of Fordstead Lane and Thorpe Bank. This is due to the fact that the existing weight restriction is in place just to the west of the junction of Fordstead Lane and Marsh Lane and therefore confirmation as to whether this restriction is in place for Fordstead Lane to the east of the junction or Marsh Lane to the north needs to be clarified. Subject to this information being confirmed this may alter the RAG status of this option.

2.9 Origin 7 to Access D

- 2.9.1 As noted in Section 2.4, HGV access to and from Origin 7 to Access A1 and A2 has been tracked via Station Road and Moss Road. This section of road continues to be characterised as a single carriageway with no identified constraints or pinch points. This section of Moss Road has therefore been designated as Green on drawing number 60698207-ACM-XX-00-SK-CE-0001 in Annex A.
- 2.9.2 The route between Access A2 and Access D consists of Moss Road, Flashley Carr Lane and West Lane. The SPA indicates that there will be conflicts between HGVs travelling in opposite directions along this route, on both the straights and the bends. These conflicts are due to the road narrowing to the east of the junction of Moss Road and Flashley Carr Lane.
- 2.9.3 Based upon the findings of the SPA, this route has been designated Amber on drawing number 60698207-ACM-XX-00-SK-CE-0001 in Annex A.

2.10 Grid Connection Corridor Access (Between Access A1/A2 and E)

- 2.10.1 The route between Access A and Access E consists of Moss Road, Trumfleet Lane, Marsh Road and Thorpe Bank. This route is important as it will act as the main route for construction and operational vehicles in order to access the Grid Connection Corridor. As a consequence, an SPA assessment has been undertaken in order to determine the types of construction vehicles which will be appropriate for use to transport materials and equipment to the Grid Connection Corridor and any constraints where additional interventions may be required.
- 2.10.2 As part of the SPA, the junction of Moss Road and Trumfleet Lane will act as the primary access to the Grid Connection Corridor from the Solar PV Site. The SPA of the junction for the HGV as shown in Plate 2-8 and Plate 2-10 has demonstrated that lane discipline is not possible without junction widening being required. As a consequence, the Scheme has sought to identify alternative construction vehicles that could be used to deliver construction material to the Grid Connection Corridor. For this additional assessment the Scheme has considered the following vehicle type:



Farm tractor & hay wagon 10.0m	
Overall Length	16.820m
Overall Width	2.500m
Overall Body Height	0.438m
Min Body Ground Clearance	0.398m
Max Track Width	2.500m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	4.620m

Plate 2-6: Tractor and Trailer Detail

2.10.3 Based upon an assessment using the tractor and 10 m trailer, it is evident that this vehicle offers an improvement when compared to the HGV vehicle at this junction. However, when reviewing the output of the SPA shown in Plate 2-7 and Plate 2-9 it is evident that construction vehicle movements accessing to/from the west off Moss Road will maintain far more appropriate lane discipline when compared to the east. However, subject to the selection of the preferred Solar PV Site access, the extents of any highways improvements or temporary traffic management will need to be agreed with the Local Highways Authority.



Plate 2-7: Tractor and 10 m Trailer



Plate 2-8: HGV



Plate 2-9: Tractor and 10 m Trailer



Plate 2-10: HGV

- 2.10.4 The SPA for the rest of the Grid Connection Corridor has continued to assess the carriageway utilising the Tractor and 10 m trailer as a consequence of the above identified constraints.
- 2.10.5 Plate 2-11 shows the junction between Trumfleet Lane and Hawkhouse Lane. A tractor and trailer can complete this manoeuvre within the carriageway extents. However, in order to complete this manoeuvre, the vehicle has to stray into the opposing lane and loses some lane discipline. Further consultation with the Local Highway Authority will be required in this location to determine if any localised interventions may be required to ensure this section of the carriageway is suitable for construction vehicles.



Plate 2-11: Junction of Trumfleet Lane and Hawkhouse Lane

2.10.6 There is a 90 degree bend on Trumfleet Lane approximately 200 m north of Wrancarr Lane, the SPA for this can be seen in Plate 2-12. This bend also has very poor visibility due to a building blocking sightlines. Further consultation with the Local Highway Authority will be required in this location to determine if any localised interventions may be required to ensure this section of the carriageway is suitable for construction vehicles.

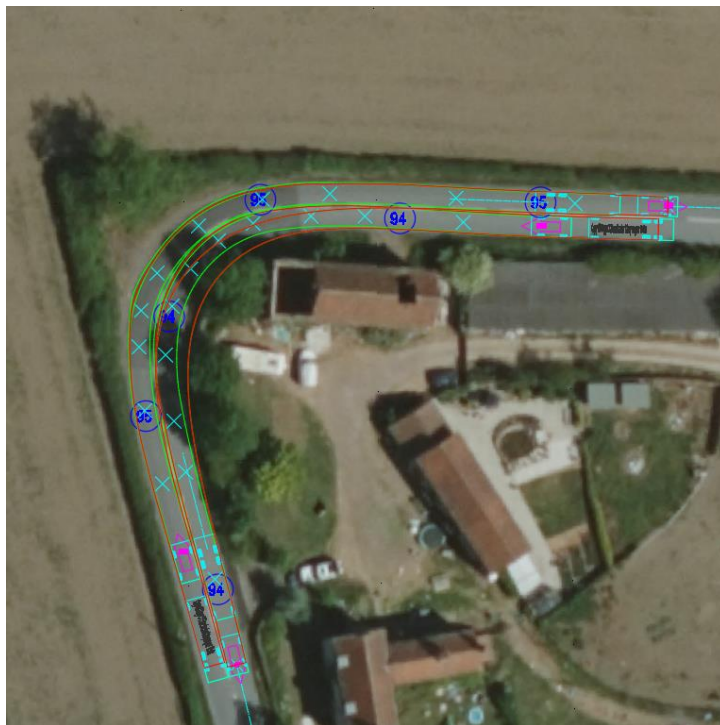


Plate 2-12: Trumfleet Lane

- 2.10.7 There is a noticeable pinch point along Marsh Road that construction vehicles will need to navigate due to the proximity to Wilsick Ferry House to Marsh Road resulting in the carriageway narrowing to single file as shown in Plate 2-13. However, it is noted that forward visibility is available to road users in this region which offers road users the ability to give way to oncoming traffic, although this is an informal arrangement rather than having an established priority right of way.



Plate 2-13: Marsh Road

- 2.10.8 Along Thorpe Bank there is a narrow structure that crosses Thorpe Marsh Drain, over this structure the road narrows to a single lane, only allowing traffic to flow from one direction at a time. As existing traffic flow is single file at this location, it is anticipated that this section of the carriageway would operate in the same manner as the pinchpoint at Marsh Road above.
- 2.10.9 Based upon the findings of the SPA for a HGV, this route has been designated Amber on drawing number 60698207-ACM-XX-00-SK-CE-0001 in Annex A. However, the findings for a tractor and 10 m trailer, which would currently be the preferred type of vehicle to deliver construction material to the Grid Connection Corridor, has been assessed in greater granularity on 60698207-ACM-XX-00-SK-CE-0003.
- 2.10.10 Due to the issues regarding the Moss Road and Trumfleet Lane junction, the project team is seeking to minimise the impact on the Local Road Network by investigating the feasibility of using an internal haul route within the Site Boundary between the south off Moss Road access proposal and the East off Trumfleet Lane access proposal. This optioneering will continue to be evaluated and refined during preliminary design.

If the internal haul route is deemed feasible this could allow for the use of a larger transport vehicle for the Grid Connection Corridor. If that is the case the tractor and 12 m trailer will be revisited and analysed during preliminary design.

2.11 Discounted Option - Origin 3 M18 Junction 6 to Access D

- 2.11.1 This origin point was considered and discounted as it leads to a narrow bridge, approximately 2 m wide, on Ferry Road which features a 3-ton

weight restriction which can be seen in Plate 2-14 and Plate 2-15. Therefore, this origin point was deemed unsuitable and has been discounted from any future assessments.



Plate 2-14: Weak Bridge on Ferry Road



Plate 2-15: Ferry Road

- 2.11.2 Based upon the findings of the SPA, this route has been designated a RAG status of red and identified as purple on drawing number 60698207-ACM-XX-00-SK-CE-0001 in Annex A.

2.12 Discounted Option - Origin 4 M18 Junction 5 Access A1/2 or Access D

- 2.12.1 This origin point was considered and discounted as it leads to two narrow bridges sited on Water Lane. Whilst a desktop study has not identified any weight restriction in place for this structure, the SPA demonstrates that HGVs crossing the bridge would effectively restrict two way traffic movements. This, in combination with the vertical alignment of the bridge restricting visibility for oncoming traffic, has resulted in the route being discounted due to the risks to road user safety.



Plate 2-16: Steep Vertical Gradient on Approach to Bridge Structure



Plate 2-17: Narrow Bridge Crossing



Plate 2-18: Bridge Hill

- 2.12.2 Based upon the findings of the SPA, this route has been designated a RAG status of red and identified as purple on drawing number 60698207-ACM-XX-00-SK-CE-0001 in Annex A.

2.13 Discounted Option - Origin 5 M18 Junction 4 to Grid Connection Access from Access E Thorpe Bank

- 2.13.1 The SPA assessment was completed for this potential route consisting of A63, Armthorpe Lane and Station Road. It found that there are no SPA issues for a HGV navigating this route until the bridge over the River Don on Fordstead Lane, where the road narrows sufficiently to prevent two HGVs travelling in opposite directions passing.



Plate 2-19: Fordstead Lane

- 2.13.2 Based upon the findings of the SPA, this route has been designated Green before transitioning to Amber on drawing number 60698207-ACM-XX-00-SK-CE-0001 in Annex A.

2.14 Discounted Option - Origin 6 Grid Connection Access from Fordstead Lane to Access E via Thorpe Bank

- 2.14.1 This route would consist of travelling along Fordstead Lane, then turning left at the junction with Thorpe Bank and travelling north to the Site. This route is not feasible due to a 7.5-ton weight restriction along a segment of Fordstead Lane that forms part of this route.
- 2.14.2 Based upon the findings of the SPA, this route has been designated a RAG status of red and identified as purple on drawing number 60698207-ACM-XX-00-SK-CE-0001 in Annex A.

3. AIL Vehicle Movement Tracking

- 3.1.1 To connect the Solar PV Site to the national electricity grid, new transformers will need to be transported to the Site. The transformers will be located within the Solar PV Site and, due to their size and weight, would need to be transported via AIL.
- 3.1.2 It is anticipated that this vehicle will only be required to transport components to the Solar PV Site, and will not be required to transport components to assets being installed on the Grid Connection Corridor. Therefore, this assessment does not consider access to Accesses E and F, but considers their adjacent carriageways as routes to Access A1, A2, B, C and D.
- 3.1.3 The transformer size, weight and dimension details are yet to be confirmed. However, a modular flat deck trailer with 12 axles has been assumed for the vehicle tracking based upon the Client’s experience on other solar projects, as shown in Plate 3-1.

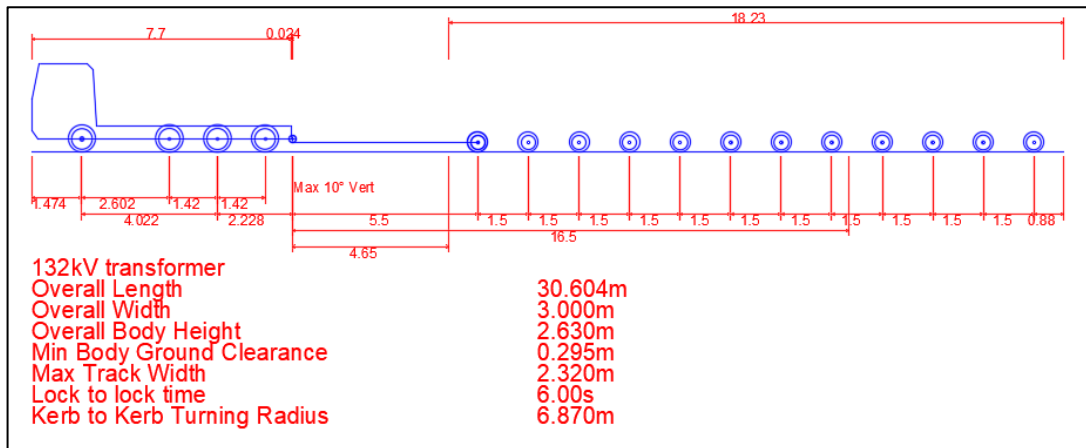


Plate 3-1: AIL Transformer Vehicle

3.2 AIL Routes

- 3.2.1 Similar to the HGV assessment, initially there were 7 potential origin points, however origin points 3 and 4 have been discounted for the same reasons stated in Sections 2.11 and 2.12.
- 3.2.2 It has been assumed that the AIL will be escorted by to the Site due to the size of the vehicle. Along the route, road closures and other traffic regulation measures may be required.
- 3.2.3 Any components that are to be delivered utilising the AIL will need to consider headroom clearance of overhead infrastructure, such as rail electrification or telephone cables.
- 3.2.4 A RAG rating has been assigned for each route described below. See Annex A for a sketch of the route maps with a RAG rating.
 - a. Green – Route navigable for AILs with minimal improvement or intervention, with street furniture removal only temporary.
 - b. Amber – Route navigable by AILs. However, traffic management and passing bays considerations are required to resolve issues with lane

discipline in the corners and/or difficulty passing vehicles coming in the opposite direction on narrow road sections.

- c. Red – Route not navigable by AILs without significant highways interventions or structural limitations due to weak/small bridges.

3.2.5 Following the SPA it was decided that the preferred routes to the Site would be from the A19 to Access A1 and A2, the following Section of this report provides a more detailed narrative of the preferred solution, any additional works required during preliminary design to validate the route and any options that were discounted for access to the Solar PV Site.

3.3 Origin 1 to Access A1/A2

3.3.1 The preferred route for the AIL manoeuvre reflects the conclusions drawn from the HGV assessment, whereby AIL vehicles would access the Solar PV Site from the M62 Junction 34 (Origin 1). However, for the AIL vehicle to access the Solar PV Site via the A19, Station Road and Moss Road, the AIL vehicle will need to navigate the signalised junction within Askern. For the AIL to complete this manoeuvre, the SPA identified the need for street furniture be removed on two traffic islands sited within the carriageway, which would require any associated traffic signals and bollards on these islands to be temporarily removed. As a consequence, the Scheme will need to liaise with the Local Highway Authority to agree temporary traffic signal arrangements whilst these AIL manoeuvres are completed. These temporary signals will only need to be in place to allow the transportation of the On-Site Substation components and, following completion of the deliveries, the permanent street furniture can be reinstalled to the satisfaction of the Local Highway Authority.



Plate 3-2: A19 junction with Station Road at Askern

- 3.3.2 Travelling eastbound on Moss Road, there is a risk of a long and/or low vehicle grounding over the crest of the rail level crossing 220 m to the east of the A19 and Station Road junction. The project team will complete vertical clearance assessments during preliminary design to confirm if this could act as a constraint to the AIL manoeuvre.
- 3.3.3 To the east of the level crossing, the AIL will be required to navigate its way through Askern along Moss Road. The SPA indicates that there are no issues for the AIL along this route. However, given the width of the vehicle and the need for the vehicle to be escorted to the Site, this manoeuvre will be discussed with the Local Highway Authority to determine if any additional interventions such as temporary parking suspensions are required to minimise the risk of the vehicle manoeuvre being impeded.
- 3.3.4 Approximately 100 m to the west of Access B there is another level crossing presenting the risk of the vehicle grounding and therefore a vertical clearance assessment will be undertaken during preliminary design to confirm if this could act as a constraint to the AIL manoeuvre. The existing 5.0 m height restriction for the overhead electrification of the railway line will need to be considered as a constraint for any material deliveries to the Solar PV Site or Grid Connection Corridor.
- 3.3.5 Based upon the findings of the SPA, this route has been designated Green on drawing number 60698207-ACM-XX-00-SK-CE-0002 in Annex B, with the recognition that temporary works will be required at the junction of the A19 and Station Road and additional vertical clearance assessments are required to validate any localised vertical constraints during preliminary design.

3.4 Discounted Option - Origin 2 to Access A1, A2, B and D

- 3.4.1 This was a potential route that was considered and, despite a portion of the route up to the Existing National Grid Thorpe Marsh Substation being part of a designated heavy load route (HR16), was ultimately dismissed for an AIL as the route has a narrow bridge that crosses the Aire and Calder Navigation Knottingley and Goole Canal with a noticeable crest in the middle making it a impassable constraint for the vehicle.
- 3.4.2 The SPA indicated that the route between Access D and A would require localised widening along multiple bends along the existing carriageway to accommodate the AIL vehicle.
- 3.4.3 Based upon the findings of the SPA, this route has been designated a RAG status of red and identified as purple on drawing number 60698207-ACM-XX-00-SK-CE-0002 in Annex B.

3.5 Discounted Option - Origin 5 to Access A, B C and D

- 3.5.1 Originating from Origin 5 the SPA completed for this potential route consisted of the A63, Armthorpe Lane and Station Road. There is an existing bridge over the railway on the approach to Barnby Dun, immediately south of the Armthorpe Lane - Doncaster Road junction. This bridge has a noticeable crest presenting the risk for the AIL vehicle grounding as it attempts to go over the bridge. This risk will need to be verified by topographical survey or other means.
- 3.5.2 Originating from Origin 5 the SPA indicates that there are no issues for the AIL moving through Bentley if using the full width of the carriageway. However, given the width of the vehicle and the need for the vehicle to be escorted to the Site, this manoeuvre will be discussed with the Local Highway Authority to determine if any additional interventions such as temporary parking suspensions are required to minimise the risk of the vehicle manoeuvre being impeded. There is a level crossing in between Bentley and Arksey which presents the risk of the vehicle grounding. There is also the risk of the vehicle colliding with the overhead cables associated with the level crossing. These risks need to be verified via topographical survey or other means. There is a 7.5-ton weight restriction along the segment of Fordstead Lane commencing immediately prior to the junction of Marsh Lane and Fordstead Lane until the junction of Fordstead Lane and Thorpe Bank that would need to be lifted, or temporarily suspended, for this route to be used.
- 3.5.3 There is a level crossing along Thorpe Bank which presents the risk of the vehicle grounding. There is also the risk of the vehicle colliding with the overhead cables associated with the level crossing. These risks need to be verified via topographical survey or other means.
- 3.5.4 There is a narrow single lane bridge crossing Thorpe Marsh Drain see Plate 3-3, where the SPA indicates that the bridge is not suitable for the AIL vehicle.



Plate 3-3: Structure on Thorpe Bank

- 3.5.5 The route north would then require localised widening in multiple areas. Section 2.10 gives examples.
- 3.5.6 Based upon the findings of the SPA, this route has been designated a RAG status of red and identified as purple on drawing number 60698207-ACM-XX-00-SK-CE-0002 in Annex B.

4. Summary

4.1 Large Vehicle Movements

- 4.1.1 The evidence presented in this report for the SPA of the HGV type of vehicle demonstrates that, of the five potential routes considered, there is only one suitable option for access to the main Solar PV Site, which is the M62 Junction 34 (Origin 1) leading to Access A1 and A2, which would be a direct access off Moss Road. Access B and C offers an alternative access to the Solar PV Site for construction, however this route would require additional junction improvements or passing places being required to offer the same level of safe access.
- 4.1.2 The SPA of Access D covered in both Section 2.7 and 2.9 concludes an Amber rating for HGV movements. Therefore, it is considered that this route is not preferred for HGV movements, and the main access off Moss Road is utilised. Access D could however, be used during the construction and operation and maintenance for LGV vehicles to provide greater flexibility to construction and operation and maintenance requirements for the Solar PV Site.
- 4.1.3 For access to the Existing National Grid Thorpe Marsh Substation, access for HGVs could also be provided from the A19 Junction with Arksey Lane (Origin 6). However, this route could only be used to access the Existing National Grid Thorpe Marsh Substation subject to the confirmation of the existing purpose of the 7.5 ton weight restriction in the vicinity of the junction of Marsh Lane and Fordstead Lane.
- 4.1.4 Following the outputs of the SPA, the Grid Connection Corridor will need to be accessed by construction vehicles that are no larger than the Tractor and 10 m Trailer in order to minimise any permanent works required at the junction Moss Road and Trumfleet Lane. An alternative option using internal haul roads covered in Section 2.10 is to be analysed during preliminary design.

4.2 AIL Vehicle Movements

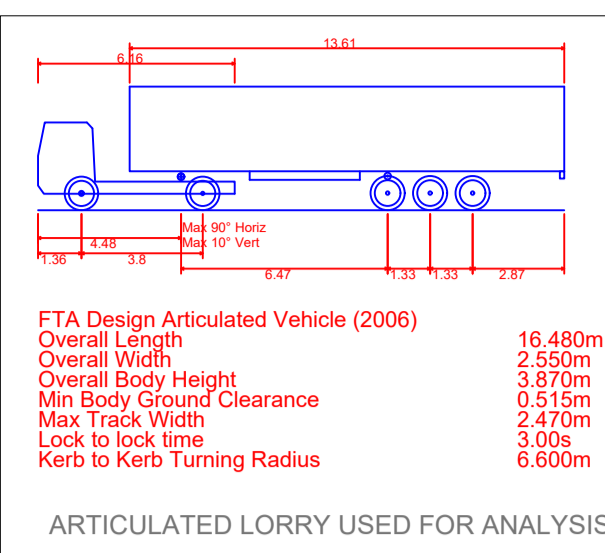
- 4.2.1 The evidence presented in this report for the SPA of the AIL type of vehicle demonstrates that of the options considered, there is only one feasible option for getting to the Solar PV Site, which is the M62 Junction 34 (Origin 1) leading to Access A1 and A2. This route will originate on the M62, which is a designated Heavy Load Route in accordance with ESDAL records and would and utilise sections of the Local Road Network where minimal constraints have been identified. All other options would require work to structures to make them viable or would require the suspension of existing weight restrictions and therefore were deemed unsuitable.
- 4.2.2 For this option however, temporary works would be required at the junction of the A19 and Station Road in Askern. As a minimum, these works would consist of the removal of a set of traffic signals and other street furniture associated with the traffic islands on the junction. This would require temporary traffic lights to be installed in the interim prior to reinstatement to the satisfaction of the Local Highway Authority. It is also advised that consultation with the Local Highway Authority in regard to temporary parking

suspensions are considered during the escort of this vehicle on Station Road and Moss Road. The vertical clearance at the level crossing in Askern also needs to be assessed to ensure the AIL would not become grounded over the crest.

5. References

- Ref. 1 His Majesty's Government (2008). Planning Act 2008. Available at: <https://www.legislation.gov.uk/ukpga/2008/29/contents>. [Accessed 15 February 2024].

Annex A– Routeing Assessment - HGVs



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1. ALL DIMENSIONS IN MILLIMETERS UNLESS STATED OTHERWISE.
 2. DO NOT SCALE FROM THIS DRAWING USE ONLY FIGURED DIMENSIONS.
 3. THE SWEEP PATH ANALYSIS HAS BEEN UNDERTAKEN WITH SATELLITE IMAGERY.
 4. ITS RECOMMEND THAT A REVIEW AGAINST TOPOGRAPHICAL SURVEY DATA IS CARRIED OUT AT A LATER DATE TO VALIDATE THIS ASSESSMENT.
 5. THIS ASSESSMENT HAS NOT CONSIDERED THE VERTICAL GEOMETRY OF THE ROAD.
 6. THE CARRIAGEWAY WIDTHS FOR ALL ROUTES MAY LIMIT PASSING MANOEUVRES, ESPECIALLY AROUND BENDS.
 7. ALL LEVEL CROSSINGS HAVE A 5M HEIGHT RESTRICTION DUE TO OVERHEAD ELECTRIFICATION, UNLESS STATED OTHERWISE. TRANSPORTATION OF MATERIALS OR TRANSFORMER COMPONENTS WILL NEED TO CONSIDER THIS CONSTRAINT.
 8. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE HIGH LEVEL ROUTING ASSESSMENT REPORT.

Key

Red line	ORDER LIMITS
Green line	ROUTE SUITABLE FOR HGVS (REQUIRING EITHER NO OR MINIMAL ADDITIONAL WORK)
Yellow line	ROUTE SUITABLE FOR HGVS (REQUIRING A MODERATE AMOUNT OF WORKS POTENTIALLY IN 3RD PARTY LAND PLUS ROAD TOO NARROW FOR HGVS TO PASS)
Purple line	ROUTE NOT SUITABLE FOR HGVS

ISSUE/REVISION

NO	DATE	DESCRIPTION
P02	09/02/2024	Issued for Client Review
P01	30/11/2023	For Information
I/R		

Purpose Of Issue
FOR INFORMATION

Project Number
 60698207

Sheet Title
 ROUTING ASSESSMENT - HGVS

Sheet Number
 60698207-ACM-XX-00-SK-CE-0001

Scale: NTS **Rev:** P02

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Annex B - Routeing Assessment – All Vehicle



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 - THIS ASSESSMENT HAS NOT CONSIDERED THE VERTICAL GEOMETRY OF THE ROAD.
 - THE CARRIAGEWAY WIDTHS FOR ALL ROUTES MAY LIMIT PASSING MANOEUVRES, ESPECIALLY AROUND BENDS.
 - ALL LEVEL CROSSINGS HAVE A 5M HEIGHT RESTRICTION DUE TO OVERHEAD ELECTRIFICATION, UNLESS STATED OTHERWISE. TRANSPORTATION OF MATERIALS OR TRANSFORMER COMPONENTS WILL NEED TO CONSIDER THIS CONSTRAINT.
 - THIS VEHICLE WOULD BE CLASSED AS ABNORMAL INDIVISIBLE LOADS (AIL)
 - THE ABNORMAL LOAD VEHICLE WILL NEED TO TRAVEL TO SITE UNDER ESCORT.
 - THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE HIGH LEVEL ROUTEING ASSESSMENT REPORT

Key

- ORDER LIMITS
- ROUTE SUITABLE FOR AIL (REQUIRING EITHER NO OR MINIMAL ADDITIONAL WORK)
- ROUTE SUITABLE FOR AIL (REQUIRING A MODERATE AMOUNT OF WORKS POTENTIALLY IN 3RD PARTY LAND)
- ROUTE NOT SUITABLE FOR AIL

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P02	12/02/2024	Issued for Client Review
P01	30/11/2023	For information
I/R	DATE	DESCRIPTION

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Project Number
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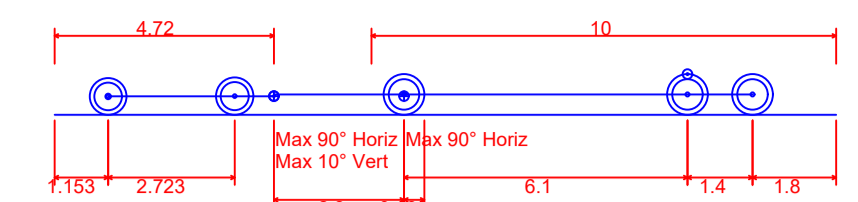
Sheet Title
ROUTEING ASSESSMENT - ABNORMAL LOAD VEHICLE

Sheet Number
60698207-ACM-XX-00-SK-CE-0002

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Annex C – Routeing Assessment – Tractor and 10 m Trailer along the Grid Connection Corridor



Farm tractor & hay wagon 10.0m
 Overall Length 10.0m
 Overall Width 2.500m
 Overall Body Height 0.438m
 Min Body Ground Clearance 0.398m
 Max Track Width 2.500m
 Lock to lock time 4.00s
 Kerb to Kerb Turning Radius 4.620m



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 4. ITS RECOMMEND THAT A REVIEW AGAINST TOPOGRAPHICAL SURVEY DATA IS CARRIED OUT AT A LATER DATE TO VALIDATE THIS ASSESSMENT.
 5. THIS ASSESSMENT HAS NOT CONSIDERED THE VERTICAL GEOMETRY OF THE ROAD.
 6. THE CARRIAGEWAY WIDTHS FOR ALL ROUTES MAY LIMIT PASSING MANOEUVRES, ESPECIALLY AROUND BENDS.

- Key**
- ORDER LIMITS
 - ROUTE SUITABLE FOR TRACTOR WITH 10m TRAILER (REQUIRING EITHER NO OR MINIMAL ADDITIONAL WORK)
 - INDICATIVE INTERNAL HAUL ROUTE
 - ROUTE SUITABLE FOR TRACTOR WITH 10m TRAILER (REQUIRING A MODERATE AMOUNT OF WORKS POTENTIALLY IN 3RD PARTY LAND OR TEMPORARY TRAFFIC MANAGEMENT)

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P01	09/02/2024	Issued for Client Review
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Project Number
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Sheet Title
 ROUTEING ASSESSMENT - CABLE CORRIDOR

Sheet Number
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An aerial photograph of a vast solar farm at sunset. The rows of solar panels stretch across the landscape, creating a strong sense of perspective. The sky is a deep orange and red, with the sun low on the horizon, casting long, dark shadows across the panels.

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