DESIGN & ACCESS STATEMENT

In support of a planning application for the installation of Standalone Solar PV modules and Associated Infrastructure on land at Sweeting Thorns, Scunthorpe

January 2015

Prepared by

aardvark
environment matters

On Behalf of

Elgar Middleton
Infrastructure & Energy

Project Quality Control Sheet

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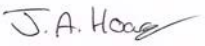
Signature			
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1 Introduction

1.1 Site Location

The site is located on land adjacent to Sweeting Thorns, south east of Scunthorpe and within the boundary of North Lincolnshire District Council.

The site is located approximately 1km west of Ashby, 2.85km east of Broughton and 4.9km north east of Messingham. It is accessed directly via Holme Lane from the south of the site.

The immediate surroundings comprise agricultural land, woodland and industrial land.

The site is shown in the context of its surroundings by the red line area on Figure 1 below.

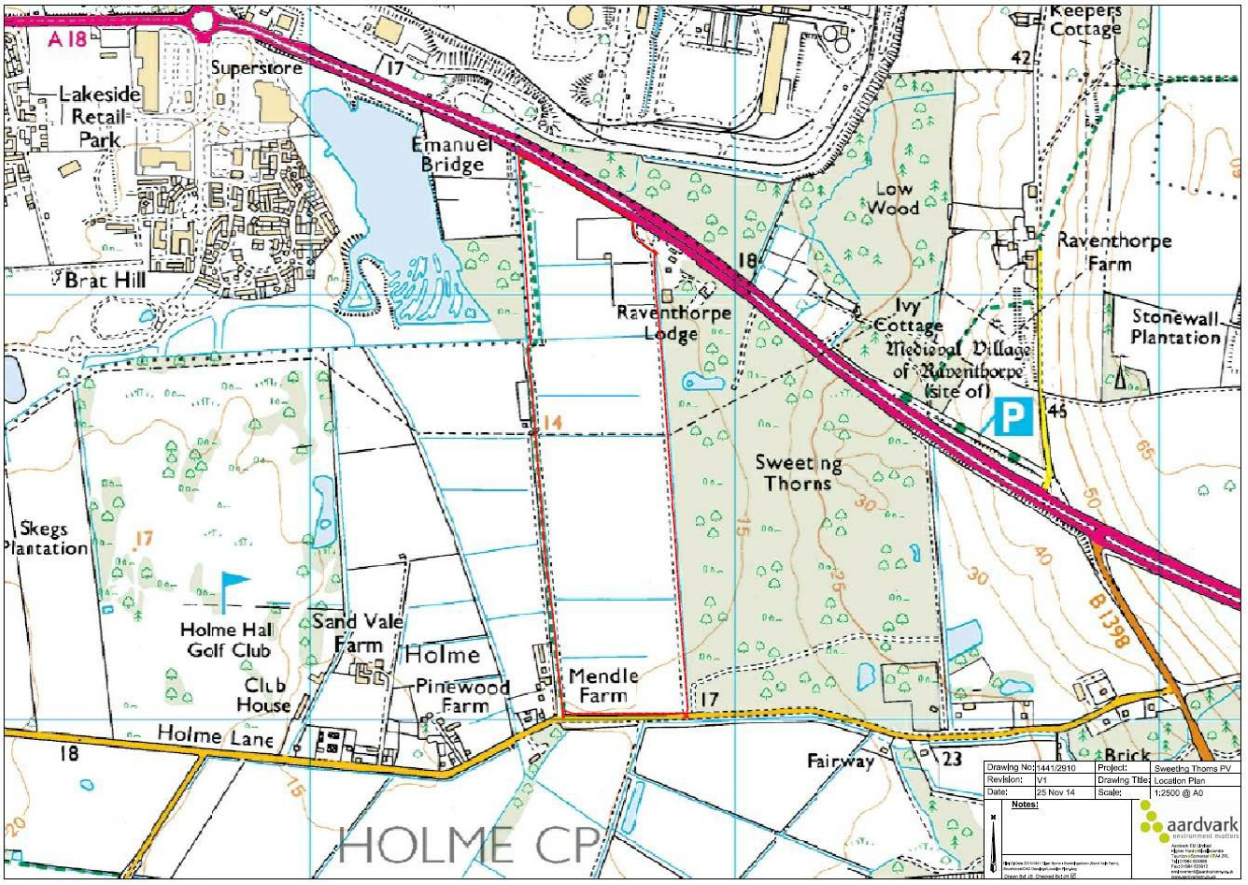

Figure 1 – Location Plan

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1.2 Site Description

The site comprises five agricultural fields totalling approx. 37.38 hectares, a general view looking north east across the site is shown in Plate 1 below. The field boundaries, which will be retained by the proposed development in order to provide natural screening, comprise mature hedgerows and trees.

The red line area as shown on the proposed site plan is 37.38 hectares.

The topography of the site is relatively flat with levels between 13 and 15m AOD.

Plate 1 General View across the site

The large majority of the land is currently in agricultural use, although the proposal also incorporates a semi-industrial area of hard standing, which adjoins a layby off of the A18 to the north. This area is shown in plate 2 below.

Plate 2 Hard standing area in the north of the site

An Agricultural Land Classification assessment has been undertaken which is submitted with the application. The assessment found that 100% of the agricultural land within the proposed development area is Grade 3b.

The proposal will therefore not result in the loss of high grade agricultural land, as per the direction of the National Planning Policy Framework (NPPF).

There is a footpath running along the western boundary. The nearest unconnected residential dwelling is immediately west of the site at Mendle Farm.

2 Use & Sustainability

2.1 Existing and Proposed Use

The proposed use of the site is for the generation of renewable energy from solar PV panels, to be exported to the National Grid.

The site design does not prohibit the grazing of livestock throughout the operation of the modules.

Following decommissioning of the modules, the land will be returned to agricultural use. There will be no constraints on returning the site to its current condition.

2.1 Site Selection

As an experienced renewable energy development company, Elgar Middleton always seek to follow best practice guidance when selecting sites for solar arrays, ensuring that all sites brought forward for development are deemed suitable against a number of criteria, particularly those set out by BRE and the Solar Trade Association. Key considerations provided by both these organisations, in the siting of field scale solar developments include:

- The use of the non-agricultural or low grade agricultural land
- Opportunities to continue agricultural practices alongside solar development
- Opportunities to utilise existing natural screening and provide enhancements to existing onsite biodiversity features.

The site was selected initially as it is relatively flat and well screened from views within the wider landscape by mature hedges.

The site is currently used for arable crops and in accordance with the latest planning guidance issued by BRE, a full agricultural land assessment was carried out to establish the agricultural land classification grade. This assessment was completed by Fisher German during July 2014, who concluded that the land is grade 3, subgrade b; land deemed to be of moderate quality. The full report is submitted as part of this application.

The site is also close to and easily accessible from the A18 and the M180, causing minimum disruption during the construction phase as no delivery vehicles would need to enter the main town. Furthermore, the site was chosen as it is located within the semi agricultural urban fringe of Scunthorpe and not within a designated landscape.

2.2 Electricity Generating Capacity

The concept layout, based on an installation with 27.65MW export capacity has been calculated as producing a yearly total of 910kWh per kW installed, therefore yielding approximately 25,261MWh per year in total.

These figures are based on the anticipated generational output of the solar array based on the site's solar irradiation and the candidate solar PV modules power curve. However, the benefits would vary depending on the actual solar irradiation harnessed by the array over a year and therefore it is more appropriate to consider the benefits as a range rather than an exact figure.

The proposed development will supply low carbon renewable energy into the local electricity distribution network which will be utilised locally when demand exists.

Based upon the UK average household consumption of 4,229kWh/year (DECC) the proposal would produce renewable energy equivalent to the usage of approx. 5,950 homes. Using more specific data, North Lincolnshire has an average energy use of 3,850kWh per annum so the number of typical homes in North Lincolnshire would increase to 6,535 homes.

The carbon offset over the lifetime of the installation using the DECC emission factor for the 'Valuation of energy use and greenhouse gas (GHG) emissions' of 0.3184 is estimated to be 8,011tCO2 per annum when compared with electricity generated from fossil fuel sources.

Business rates will be payable on the completed and operational scheme, securing additional revenue for North Lincolnshire Council throughout the lifetime of this development.

3 Design

The proposed development is for the erection of 106,364 solar photovoltaic (PV) modules, with associated infrastructure for export of renewable energy to the National Grid. There will be twenty three transformer houses, as well as one private high voltage switchgear building, one DNO Substation building and one storage container, located in the north east corner of the northern field, adjacent to the main site entrance.

The total installed capacity based on 260w panels of the array is 27.65MWp. Based on the site's solar irradiation level of 3.01kWh/m², the array is anticipated to generate approximately 25,261MWh per year.

The scheme has been specifically designed to maximise the amount of electrical hours of production per hectare. The design layout takes into account topography, orientation, appropriate hedgerow buffer zones and mitigation planting.

The industry standard allows for 1MW PV modules per 2.8 hectares, the design for Sweeting Thorns has achieved a design criteria of 27.65MWp into 37.38 hectares, the equivalent of approximately 1MWp/1.35 hectares.

Figure 2 below, and the corresponding scaled drawing submitted with the application, sets out the proposed Development Plan (Drawing ref 1441-2913).

Figure 2 – Proposed Development Layout

4 Layout & Landscaping

4.1 Access Tracks and Paths

Access to the site will be via the layby to the north of the site, off the A18, an existing access serving the transport Café and farmyard storage area. This entrance will not require alteration for the ingress and egress of site vehicles. A single access track will be created running down the eastern side of the site to provide access for construction and maintenance during operation. The necessity for temporary access tracks to extend the existing access any further into the site during construction will be decided based on the ground conditions at the time of installation.

The long term access track will be surfaced using crushed hard core, maintaining a useable surface throughout the year.

The local public highways will remain unchanged in terms of traffic volume during the operational phase of the proposed development. During construction additional vehicles will be accessing and exiting the site via the A18, which as a main trunk road, is considered appropriate to handle the anticipated vehicles during construction.

Further detail is provided in the Construction Traffic Management Plan (1441-4231), submitted with the application.

4.2 Public Rights of Way

There are two public rights of way (PROW) within the vicinity of the proposed development site, as shown in figure 3 below. Path number 211 runs along the western boundary of the site; however this will remain outside of the perimeter fence of the development with uninterrupted public access retained throughout construction and operation. Proposals for planting to enhance the route of path 211 will be outlined within a landscape and ecological mitigation plan.

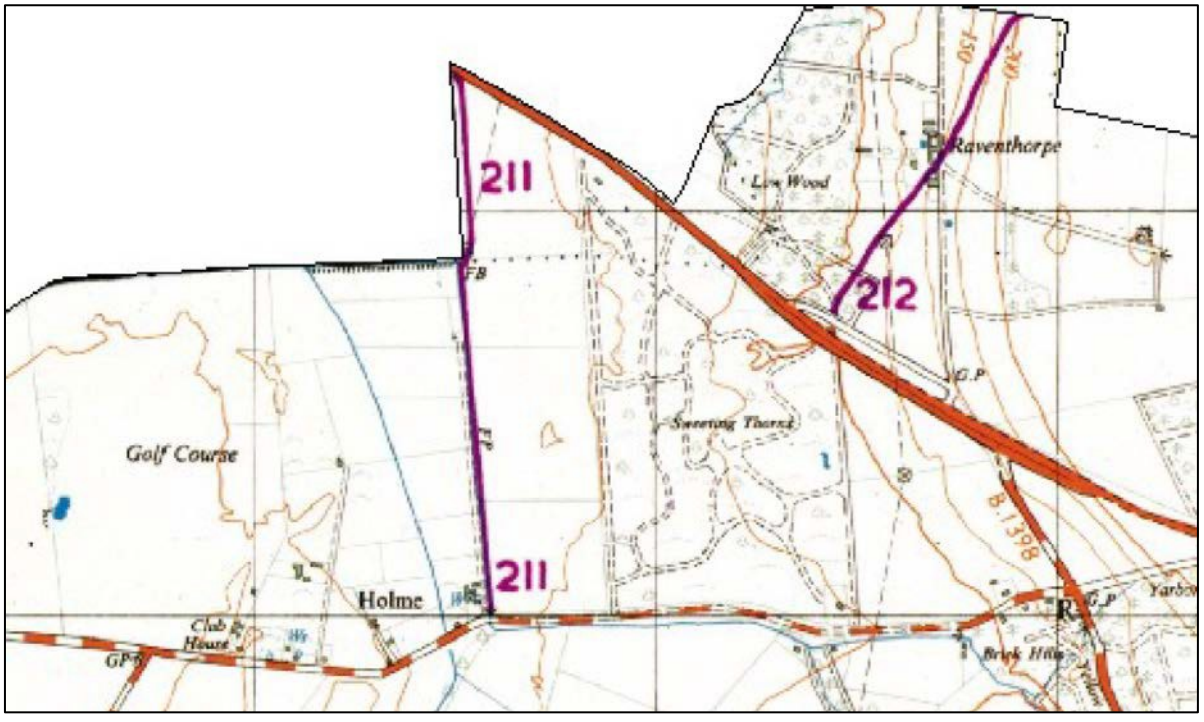

Figure 3 – Public rights of way within the vicinity of the proposed site

4.3 Site Levelling and Landscaping Works

The site is considered to be the most appropriate in the locality as it is visually discrete from sensitive receptors, as described in the Landscape and Visual Impact Assessment (LVIA) and illustrated by the topographic survey.

Due to the relatively flat topography, it will not be necessary to conduct levelling works for the construction of the panels, which will be erected on driven posts.

Minor re-levelling may be required for the construction of the transformer housing, high voltage switchgear housing, substation housing and on-site storage container otherwise the panel mounting systems will account for any minor undulations across the field.

It will also be necessary to install a series of shallow swales at the lowest parts of the site in the east of the site, in order to minimise any potential flood risk by channelling concentrated runoff from the modules, as proposed in the Flood Risk Assessment (1441-4230) submitted with this planning application.

All existing hedgerows and field margins on the site are to be retained and enhanced where appropriate, in accordance with the landscape mitigation plan to be submitted, and will be maintained as approved for the duration of the approved development.

4.4 The PV Modules

It is proposed to use the concept layout drawing reference: 1441-2913 as a basis for the application, however, it is proposed that the final layout is confirmed by way of a pre-commencement condition.

The proposed concept layout will occupy 37.38 hectares.

The panels will be approximately 1670 x 1015 x 35mm with the rows spaced approximately 2029mm apart as shown in the cross section diagram in Figure 4 below.

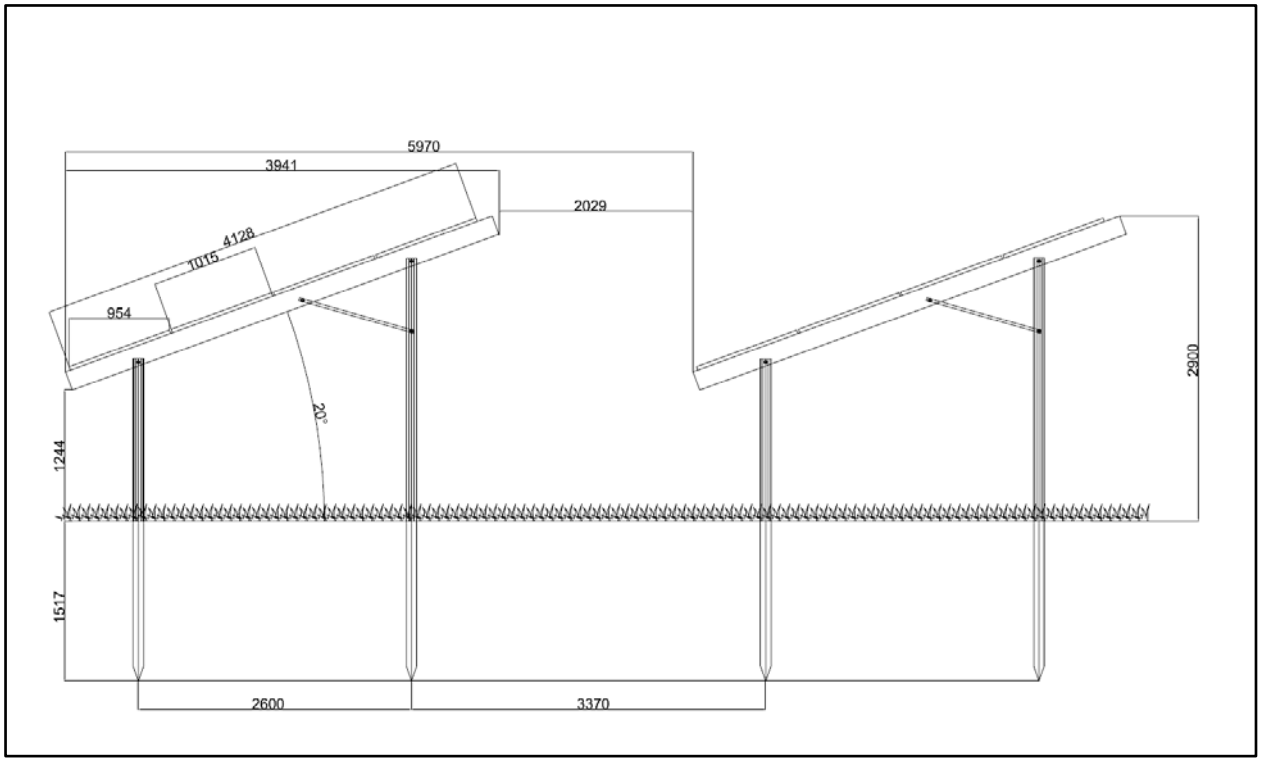

Figure 4 – Cross section of panel and mounting system

The lifetime of the panels, degradation and power generation depend on the environmental impact of an individual site; the effect of longevity on their performance is limited. Research by Hanwha SolarOne, a leading manufacturer, suggests that a PV installation should produce electricity for 35 years and longer, indeed they state that 'it is not at all unreasonable to believe that PV modules would still be producing economically viable kW of free electricity 50 years after they have been installed'. This illustrates the high quality of the proposed panels. Full planning permission is therefore sought from North Lincolnshire District Council rather than a time limited consent.

The aluminium frame mounting system as shown in the cross section drawing will stand approximately 1244mm off the ground at the front of the panel and 2900mm at the rear with an approximate gradient of 20^{o}.

It is proposed that the installation will be mounted on driven posts measuring 1.5m approximately in depth. This is dependent on ground conditions on site.

The longevity of the proposed component parts means that there is anticipated to be minimal maintenance (other than routine performance checks and for general wear and tear) during the operational period of the scheme. Similarly, replacements will be due only to failure or third party interference as opposed to a planned maintenance programme.

4.5 Transformers/Inverter Units

The transformer/inverter units will connect the solar arrays to the sub-stations. These will comprise metal clad units on a concrete plinth with approximate dimensions of 6040mm (l) x 2591mm (h) x 2438mm (w). The maximum height including the plinth will be 3000mm as shown on the LTi Reenergy Container drawing.

The transformers, substation and arrays will be connected by cables laid underground following the eastern perimeter, alongside the track way. The trench will be excavated to standard dimensions approximately 450mm wide, 1200mm deep in accordance with best practice.

4.6 Grid Connection and Substations

The DNO has confirmed a grid connection capacity for the export of energy generated from the proposed scheme.

The DNO substation and private high voltage switchgear will be constructed in the north east corner of the site as shown in drawing 1441-2913. The DNO substation will be located outside of the security fence to allow 24/7 access and include an area of hard standing for a car parking space.

Cables connecting the substation to the Point of Connection will be laid underground in trenches excavated to standard dimensions approximately 450mm wide and 1200mm deep, in accordance with best practice the Distributive Network Operators standard specifications. The trenches will then be backfilled with suitable material and the ground level reinstated allowing for a period of settlement.

4.7 Security, Fencing and Lighting

In addition to the existing protection afforded by the hedges and trees a security fence and CCTV cameras will be constructed around the perimeter of the site.

The security fence is designed in terms of colour and height to assimilate into the visual landscape. The fence will be green mesh with a maximum height of 2065mm. Gates will be installed at the

entrance to the site in the north east corner of the northern field and between the two fields aligned with the existing field gates and gap in the perimeter hedgerow. An example is shown below.

Plate 3 Example of Security Fencing

As a requirement for insurance by the financial investors in the scheme, CCTV cameras will be erected at 50–60m intervals around the perimeter of the site. The passive cameras will be infrared and at a maximum height of 3000mm. It is proposed that the colour of the poles will be Moss Green (RAL6005) to match the electrical buildings.

4.8 Miscellaneous

A container will be sited next to the substation in the north east corner of the site to provide on-site storage for during construction and operation. This will comprise a standard steel shipping container with approximate dimensions of 6058mm x 2438mm x 2591mm as per the submitted Storage Container Drawing.

4.9 Landscaping

The majority of the proposed development components are 3000mm or less in height; therefore in general terms it is capable of being screened by the mature hedgerows surrounding the site which are typical of the area.

Mitigation measures incorporated into the scheme design include measures to reduce the visual prominence of the solar arrays. It is proposed that additional tree planting is added to the northern and southern perimeters.

Mitigation varies in scale depending on location and nature of development. In this case, the scale of development requires a small level of mitigation to assist with assimilation into the natural setting. In general the aspirations of the proposed mitigation can be summarised as follows:

- No change to the existing levels of the site

- During construction, protect existing vegetation in accordance with BS: 5837 '*Trees in relation to design, demolition and construction*'
- Provision of a minimum 10m buffer on either side of the existing ditches
- Additional hedgerow planting along drainage ditches to minimise visual impact and provide new habitats
- Ensure construction operations do not conflict with conservation interests such as the seasonal requirements of flora and fauna
- Reinforce gaps in existing hedgerows with native species. This will enhance screening of the development, including low level activity on site, and create a visual foil for higher elements in the long term
- Consider the colour and texture of materials to be recessive against the backdrop of existing vegetation
- Fences and other ancillary items to be commensurate with the setting.

5 Appearance

5.1 PV Modules

The concept layout submitted with the application is based on 106,364 260W panel solar PV modules with dimensions of 1670 x 1015 x 35mm. The total number and dimensions of the solar PV modules may change from those used in the site layout provided, subject to the make and model of the solar PV modules chosen. The modules are typically no more than 35mm in depth. The module frame is aluminium, with the mounting system being galvanised steel (with matt finish), fixed to the ground by 1500mm (approximate) driven post ground fixings (geology and ground condition dependent).

Each module is dark blue-grey in colour. Modules will be chosen that have an anti-reflective coating and have a matt grey metallic trim, to ensure that glint and glare are minimised. The impact of both glint and glare is considered in further detail in the LVIA submitted with this report. Care has been taken to determine the best angle of pitch (20^{o}) that will both optimise efficiency of absorption, whilst minimising visual impact.

5.2 Additional Structures

The transformer/inverter houses and private switchgear will comprise powder coated steel containers. The storage container will also be clad in powder coated steel. All these structures will be coloured Moss green (RAL 6005). The DNO substation measuring 4790mm (l) x 3548mm (h) x 5350mm (w) will be as shown on the DNO substation and elevation plan drawing.

5.3 Site/Construction Buildings

It is anticipated that the construction team will put in place a temporary work compound including site office and welfare facilities. This will be located outside of the main site, within the layby area adjacent to the site entrance. All temporary works and protective fencing will be removed post construction during the operational phase.

The following temporary buildings and provisions will be in place in the northern section of compound during the construction period:

- Site Office - 4 containers 6/2.4/2.4m
- Toilets - 1 container 6/2.4/2.4m
- Parking area for workers - Using existing concreted area
- Storage containers - 4 containers 6/2.4/2.4m.

The southern end of the construction compound will incorporate the following;

- Delivery and unloading area
- Open Storage area for plant and equipment
- Utilising existing yard area outside of the former transport yard
- Turning Circle - there is adequate turning room available and the trees in the centre would act as an internal roundabout.

Additional Information:

- Security Fence - Heras Fence at the entrance, in front of office and welfare containers as well as around car park
- Trees & Hedgerows - existing mature trees and hedgerow boundaries will be suitably protected in line with best practice and British Standard BS5837 'Trees in relation to design, demolition and construction (2005)'.

All the above will be removed on completion of the construction works.

5.4 Lighting, CCTV and Security

External lighting will be used during the construction period only between the hours of 07.00 and 19.00. There is no requirement for external lighting during the operational period except for an emergency light on the outside of the DNO sub-station and the private switchgear containers.

The CCTV poles and security fence will be Green in colour.

6 Access

6.1 Access to Site

Access to the site will be via the layby to the north of the site, off the A18, an existing access serving the transport Café and farmyard storage area as shown in figure 5 below. These accesses will not require any alterations, benefitting from adequate existing visibility for the sizes of vehicles required.

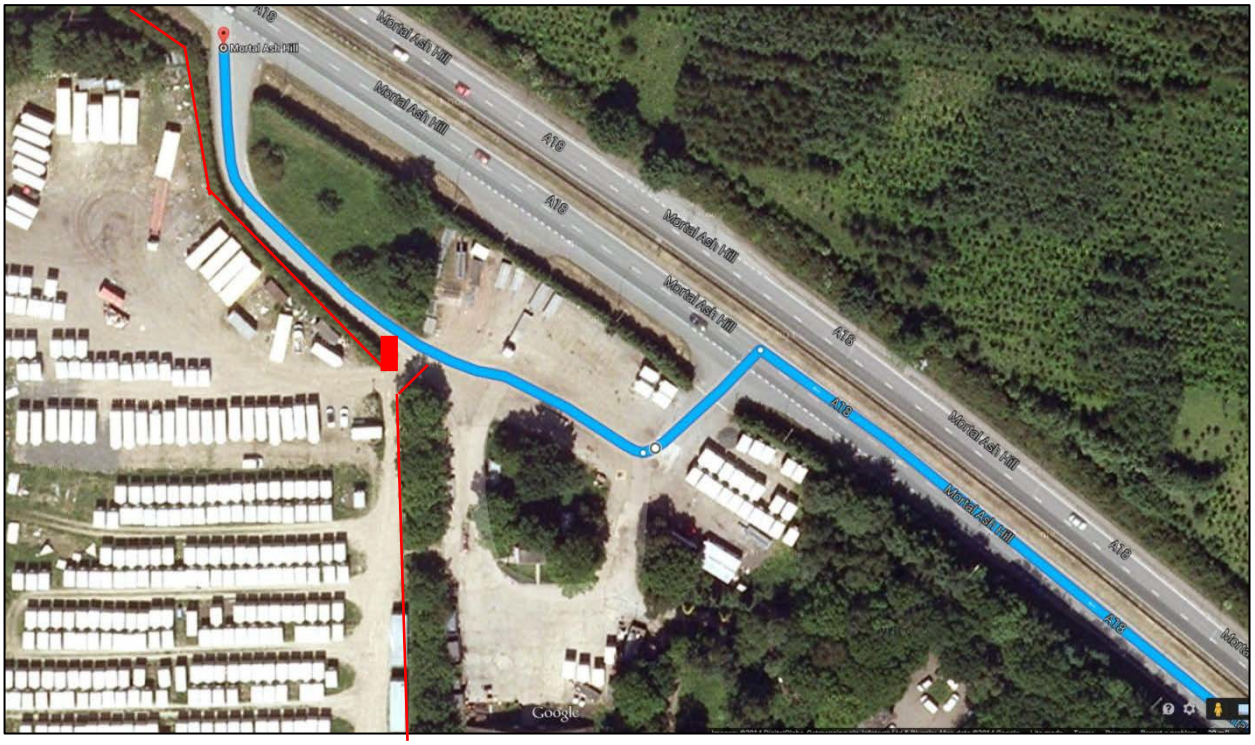

Figure 4 – Existing Access from the A18

A detailed swept path analysis and access arrangements are shown in the accompanying drawings 14759- AT01, T01 and T02, submitted with this application.

The local public highways will remain unchanged in terms of traffic volume during the operational phase of the proposed development. During construction additional vehicles will be accessing and exiting the site via the A18, which as a main trunk road, is considered appropriate to handle the anticipated vehicles during construction.

A proposed construction phase route to the site for delivery of the component parts for the development has been provided within the Construction Traffic Management Plan and described in 6.2 below.

6.2 Construction Traffic

A Construction Traffic Management Plan has been submitted with the application.

There will be minimal impact on the local traffic network resulting from the proposal during the construction phase, and no impact during the operational phase of the proposed development.

Delivery of the components would be by standard HGVs as the panels are palletised and the switchgears/transformers do not require abnormal loads. Construction traffic would not require

additional escorting to site and the delivery schedule will be coordinated to minimise impact on the local highway network and impact on the local residents' amenity. The delivery schedule can be agreed in advance with the Local Authority's Highways Team.

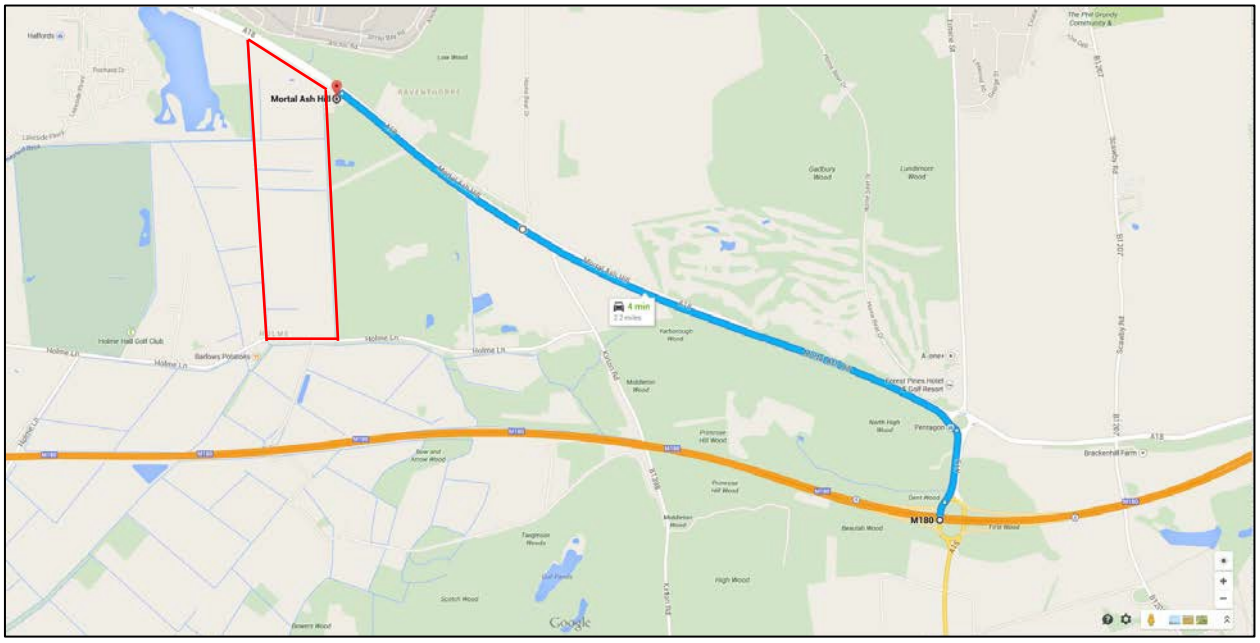

Figure 6 – Proposed Construction Delivery Route

It is not anticipated that delivery, construction, maintenance or decommissioning vehicles would contribute to significant increases in local traffic. The final route taken by vehicles during construction will be dependent on the contractor chosen to undertake the installation.

If there are any periods of wet weather during the construction period a temporary wheel wash will be located on site for all vehicles exiting on to the public highway to avoid depositing mud onto the road. Similarly, in excessively dry periods the public highways immediately adjacent to the site entrance will be swept if there is excessive dust.

6.3 Operational Traffic

Post construction, site traffic will be minimal comprising cars and small commercial vehicles accessing the site for maintenance or operational purposes.

6.4 Traffic Summary

Based on the concept layout and design criteria the peak construction rate of the project would be 25-30 traffic movements a week for the delivery of modules, mounting systems and electrical equipment. These deliveries would take place over a period of around 12 weeks of the installation and construction phase of the project (see construction programme below).

Given the scale of construction activity proposed it is considered that the local road network will be readily able to accommodate the small number of additional vehicles during the construction of the solar array.

6.5 Construction Programme

It is anticipated that the construction of the proposed development will take approximately 18 weeks with work being undertaken 7 days a week. The Parish Council and local highways department will be notified prior to commencement on site and provided with a copy of the Construction Programme. During construction contact details for an on-site representative will be made available.

The poles for mounting the PV modules and substructure will be assembled first. This involves the ramming of galvanised steel poles into the ground and subsequent assembly of the substructure.

The PV modules are mounted on a steel substructure and screwed through their aluminium frame and the steel rails. Modules are designed as shatterproof and will be lifted into position to be mounted in landscape orientation with four modules arranged above each other in rows.

During construction a number of ground work installation teams will work on the site to install the posts into the ground using tracked ramming vehicles, each team expecting to erect 300 poles in a day. Other teams will then assemble the structural mountings and fix the PV panels onto the structure.

The substructure will be attached to the poles using battery operated power tools and hand operated tools for fixing. The pile driving will not exceed 80db. Vibration is only very local and will not exceed an area of 5m².

No activities audible from the boundary of the nearest noise sensitive receptor shall take place on Sundays during the construction period or at times outside 07.00 and 19.00.

No vehicular deliveries shall arrive, be received or despatched from the site outside the hours of 07.00 to 19.30 Monday to Friday and 07.00 to 17.30 on Saturdays.

6.6 Decommissioning

The design life of the modules is in excess of 40 years and a full planning consent is sought.

However, if prior to the end of planning consent, the applicant decides to decommission, replace or refit the modules, or if required to by condition following a period of 12 months of non-continuous generation, an appropriate method statement based on the preferred option for decommissioning will be prepared and submitted to the Council for their consideration and agreement.

Should the modules be decommissioned, this will be undertaken within 6 months of notice given to the Council and is anticipated to take approximately eighteen weeks and follow the construction stages in reverse. Reinstatement will occur at each stage of the decommissioning and all waste removed from site to a suitably licensed facility.

The proposed scheme including the penetrative ground fixings are fully reversible and all structures can be removed from the site and the land reinstated to agricultural use. The majority of the component parts, including the aluminium framework and silicon in the module panels, can be recycled for other uses. Any waste will be removed from site to a suitably licensed facility.

Vehicle movements are anticipated to be the same as per the construction period.