CHAPTER 6 - DEVELOPMENT PROPOSAL

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ELEMENTS OF THE EAST STOUR SOLAR FARM

6.1 The elements of the East Stour Solar Farm are described in this chapter. Where these elements may have potential impacts on the environment, reference is made to the Environmental Statement chapter where the impacts are discussed and assessed.

6.2 The proposed development comprises a solar array with the necessary electrical and supporting infrastructure to export the generated electricity to the grid. In addition to the technical equipment, a range of environmental enhancements and social benefits are included with the application. These measures are discussed further from **Paragraph 6.45 on page 105**, while first the technical infrastructure is detailed.

Solar Array

6.3 An array of ground-mounted solar photovoltaic panels is set out within a fenced area of approximately 65.5 hectares. The export capacity of the array is up to 49.9MW (3 S.F.). A typical solar panel specification is provided at **Plate 6.1**.

6.4 The panels are grouped in blocks (or 'racks') of 64 panels that are arranged in two rows of 32 panels in portrait format. Half 'racks' of 2 rows by 16 columns of panels are used to infill smaller areas.

6.5 Candidate model solar panels have been used for the purpose of the EIA. The final solar panel model choice will be selected prior to construction and will match or better the environmental performance predicted in this ES.

Panel Frames and Anchors

6.6 The solar panels will be mounted on frames at an angle of approximately 20 degrees, with a maximum height of 3.0m. Frames that support the panels are typically made of aluminium and fixed to the ground with ground anchors. Where less disturbance is required to the subsurface, concrete 'feet' can be used to stabilise the panel frames on the surface. Typical frame and footing details are provided at **Figure 6.1 (ES Volume 3)** and shown at **Plate 6.1** and **Plate 6.2 on page 100**.

Plate 6.1 - *Typical Ground-Mounted Solar Array on Frame with Anchors*

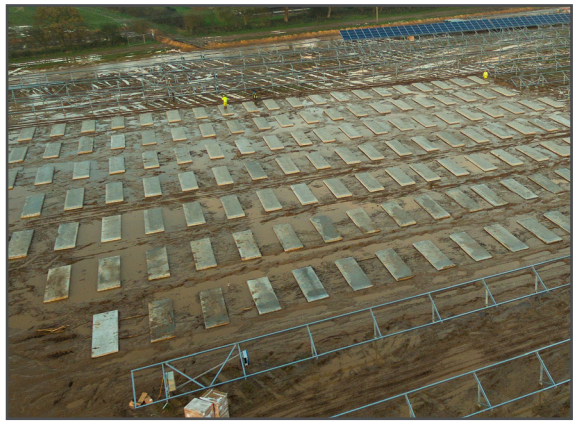

Plate 6.2 - *Typical Ground-Mounted Solar Array Concrete 'Feet' Foundations*

6.7 The lower edge of the panels will be a minimum of 0.8m above the ground to allow for safe sheep grazing.

6.8 Space between frames is provided for maintenance access and to minimise shading from neighbouring panels (**Figure 6.1, ES Volume 3)**.

Site Access Tracks

6.9 Access within the site is required during construction, through operation, and finally during the decommissioning of the site at the end of the project's operational life.

6.10 It is proposed that existing field entrances will be utilised and upgraded, where necessary, to allow access to individual segments of the solar array with a single new access point to cross Church Lane.

6.11 Three points of access for construction are proposed from the public highway, located off Church Lane (**Figure 6.2, ES Volume 3**). The access points for the northern area and Bested Hill central area will use existing field entrances off Church Lane. A new access point will be required to reach the eastern area with a new crossing of Church Lane.

6.12 An appropriate visibility splay is available in accordance with the Design Manual for Roads and Bridges (Highways Agency, 2020) and Manual for Streets (DfT, 2007) from the entrance off the highway. This is further discussed in **Chapter 8 - Traffic and Access**.

6.13 Where possible, the layout of the proposed access tracks (**Figure 1.2** and **Figure 1.3** in **ES Volume 3)** has followed the route of the existing farm tracks to minimise land loss and impacts on ecological habitat. Where new access tracks are required these have been designed to follow field boundaries and use existing field entrances or hedge gaps, where possible, to minimise the impacts on farming practices.

6.14 Watercourse crossings will be upgraded to accommodate anticipated construction traffic.

6.15 Where sections of new, upgraded or widened access track are required, these will have the appearance of typical vernacular farm tracks with a crushed stone running surface (**Plate 6.3**) that will grass over in time. As illustrated in further detail in **Figure 6.3 (ES Volume 3)**, the running surface (4.0m wide) is laid over a permeable stone sub-surface on a surface-mounted geogrid base (e.g. Cellweb). At some locations, internal access tracks may need temporary widening to accommodate delivery vehicles. The tracks will be reinstated and panels may be placed over these areas as construction concludes.

6.16 Water drainage off the track has also been considered in the track design and layout, and is assessed in **Chapter 9 - Hydrology and Hydrogeology**.

6.17 The on-site access tracks within the solar farm need to remain in place through the lifetime of the project to facilitate access for routine maintenance.

Plate 6.3 - *Typical New Site Access Track*

Inverter/Transformers

6.18 The solar panels generate Direct Current (DC) electricity, which must be converted to Alternating Current (AC) and the voltage raised to the grid connection voltage before it is exported at the grid connection point within the Sellindge Converter Station, to the north and east of the proposed development areas. The DC to AC and voltage conversion would be undertaken by 20 containerised inverter/transformer units, each up to 6.0m long by 3.0m wide and 3.0m high (**Plate 6.4** and **Figure 6.4, ES Volume 3**). The external finish will be agreed with the Local Planning Authority prior to construction commencing.

6.19 Electrical cables pass along the rear of the panels then underground across site to the inverter/transformer units.

6.20 From the inverter/transformers, export cables pass through the on site substation cabinets then onwards to the Sellindge Converter Station as discussed further from **Paragraph 6.25 on page 102**.

Plate 6.4 - *Typical Inverter/Transformer (image courtesy of SMA Solar Technology AG)*

6.21 Communications cables link the inverter/transformers to the substation from where the site can be monitored remotely.

Site Cabinets

6.22 Three cabinets located at the northern and one in the central areas of the site (**Figure 1.2** and **Figure 1.3, ES Volume 3**) will contain welfare facilities and the security and solar farm control systems, equipment for general maintenance and spare parts, should they be needed during the operational phase. These are glass reinforced plastic (GRP) or steel container-based cabinets at maximum 6.0m long, 3.0m wide and 3.0m high.

6.23 **Plate 6.5** shows a typical container-based cabinet and **Plate 6.6** a typical GRP cabinet. Drawings of typical cabinets are provided as **Figure 6.4**, (**ES Volume 3**). The external finish will be agreed with the Local Planning Authority prior to construction commencing.

Plate 6.5 - *Typical Steel Storage Unit*

Plate 6.6 - *Typical GRP Cabinet*

Substations and Grid Connection

6.24 Four substations are proposed for the site: three internal substations within each parcel of land, and a central substation (**Figure 1.2** and **Figure 1.3, ES Volume 3**).

6.25 Underground cables will connect from the inverter/transformer units to the respective on-site substations providing protection equipment (e.g. fuses) and isolation switches.

6.26 The substations will be a maximum of 6.0m long, 3.0m wide and up to 3.0m tall and constructed of Glass Reinforced Plastic (GRP) or steel container-based cabinets, finished in a colour to be agreed with the Local Planning Authority. **Figure 6.4 (ES Volume 3)** provides typical details of the on site cabinets.

6.27 From the central on-site substation (located immediately west of the Sellindge Converter Station/ substation) the cables will travel underground adjacent to the hedges, tracks and Church Lane verge to the Sellindge Converter Station/ substation, where the electricity is connected to the National Grid. Where Church Lane passes under the railway bridges, the cable will be buried in the road. The anticipated route of connection between the on-site substations and point of connection is shown at **Plate 6.7**.

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Plate 6.7 - *Indicative Grid Connection Route (in blue)*

Cables and Conduits

6.28 The solar panels are electrically connected to each other, with connections made for:

- electronic communication and control;
- low voltage power supply for the monitoring and operating systems;
- high voltage power export cables; and
- broadband telecommunication for remote site monitoring and management.

6.29 Cables between solar panels in the same row are hung in ducts fixed along the back of panels to the end of the row.

6.30 All connection cables will be run across the site in underground cable trenches. The typical detail of the cable trenches are shown on **Figure 6.5 (ES Volume 3)** and are designed to ensure safety and avoid disturbance from agricultural equipment and activities.

Security

6.31 A perimeter fence would be installed to protect the panels from theft. The fence will be stock style fencing with wooden posts and open wire mesh up to 2.15m tall (as shown at **Plate 6.8**). A typical fence and accompanying wire mesh gate detail is shown in **Figure 6.6 (ES Volume 3)**. To secure the site and existing farm entrances, there will be up to twelve gates in the site fencing and one new field gate west off Church Lane south of the East Stour bridge. Two existing field gates will be retained.

6.32 Access points for wildlife will be included in the fence line to ensure permeability across habitat.

6.33 Public rights of way will remain open although some management may be required during construction for health and safety reasons.

Plate 6.8 - *Typical Site Perimeter Fence*

6.34 Inward facing CCTV cameras will be located around the perimeter of the site. Cameras will be positioned on posts that are up to 2m tall, as shown at **Figure 6.7** (**ES Volume 3**).

Lighting

6.35 No visible lighting is proposed as part of the East Stour Solar Farm for the operational period. Lighting associated with CCTV Cameras will be infrared and not visible to the naked eye.

6.36 During the construction phase, temporary lighting may be required should deliveries be scheduled for

after dusk, and security lighting on a sensor is typically utilised for the construction phase whilst machinery and materials are stored on site. Any lighting on site during the construction phase will be kept to a minimum to avoid disturbance to local residents and ecological species as far as practically possible whilst operating a safe site.

Temporary Construction Compounds

6.37 For the duration of the construction (and decommissioning) periods, temporary compound areas will be required to provide secure storage of equipment and construction materials, welfare facilities and office accommodation for site staff.

6.38 For the proposed development, three separate temporary construction compound areas of varying sizes are required to service the different areas of the site during the construction programme. There will be a main compound at the centre of the site near to the railway line on Bested Hill, and two additional welfare areas serving the northern and eastern land parcels. Temporary welfare facilities will likely move around as the construction team move across the site. The locations of the temporary construction compound areas are shown at **Plate 6.9**.

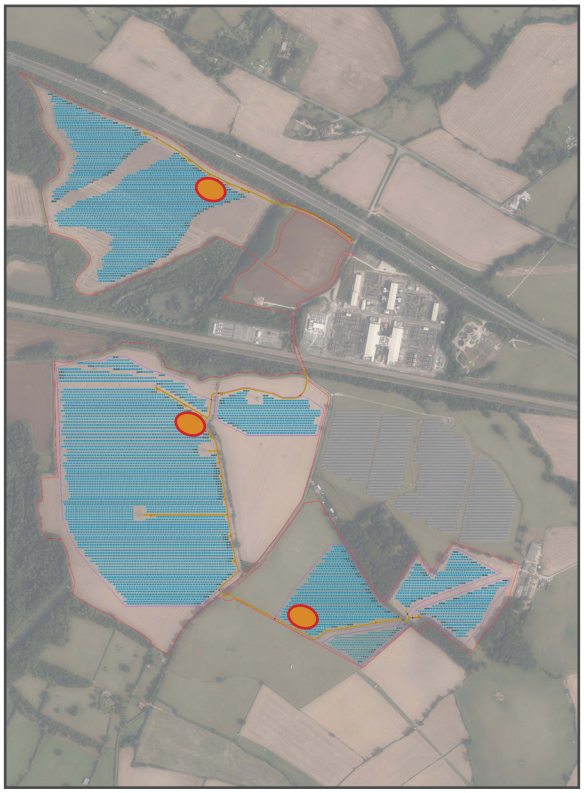

Plate 6.9 - *Approximate locations of the Temporary Construction Compound Areas (orange dots)*

6.39 Elements contained in the temporary construction compounds include the following:

- site office;
- welfare facilities;
- equipment storage area;
- materials storage area;
- waste separation and holding area;
- wheel washing facilities;
- HGV turning area; and
- vehicle parking spaces.

6.40 The layout of elements within the construction compounds may vary but the overall dimensions will be no more than 5 000m^2.

Operational Period

6.41 As noted at **Chapter 3 - Site Selection and Design**, solar farms are normally temporary structures and planning conditions are applied to ensure that the installations are removed at the end of their operational life and that the land is restored to its previous use. The proposed operational period for the East Stour Solar Farm is 40 years.

PROPOSED DEVELOPMENT SUMMARY

6.42 In summary, the elements forming the East Stour Solar Farm are:

- solar photovoltaic panels with a total export capacity of up to 49.9MW;
- panel frames with a combination of ground anchors or concrete feet;
- new access track, up to 4.0m wide;
- 20 inverter/transformer units;
- 3 spare parts stores;
- a welfare unit;
- 4 on-site substations;
- a perimeter fence, up to 2.15m tall with gates as required;
- cables and conduits;
- CCTV cameras on 2m posts; and
- three temporary construction compound areas with welfare, storage and office facilities.

6.43 The arrangement of these elements is shown on **Figure 1.2** and **Figure 1.3 (ES Volume 3**) with the temporary construction compound locations shown on **Plate 6.9** on **page 104**.

6.44 In addition to the technical infrastructure required, a series of ecological and landscape enhancements are proposed. These are discussed further from **Paragraph 6.45 on page 105** and detailed within **Chapter 10 - Ecology** and **Chapter 11 - LVIA**, and shown on **Figure 11.9 (ES Volume 3)**.

SUMMARY OF ENHANCEMENTS

6.45 Alongside the technical infrastructure required to construct and operate the proposed solar farm, additional measures are proposed as part of the development.

6.46 **Chapter 8** - **Chapter 14** inclusive describe the environmental assessments of the proposed solar farm and, where relevant, identify whether mitigation is required or enhancements are suitable. These measures are summarised at **Chapter 16 - Avoidance and Mitigation**.

6.47 Alongside the elements required to operate the solar farm, the proposal includes a series of environmental additions designed specifically for this site. The measures have been determined through consultation of the BRE National Solar Centre Biodiversity Guidance for Solar Developments (BRE, 2014).

6.48 The biodiversity enhancements will be incorporated with the development of the solar farm and managed over the project life in accordance with a Landscape and Environment Management Plan (LEMP). As shown in **Figure 11.9**, **ES Volume 3**, the measures include:

- local species rich grassland and wild flower meadow between and under the rows of solar panels, providing habitat for birds and invertebrates;
- wide meadow belts between the public footpaths and proposed solar panels in the area east of Park Wood and to the south of Bested Hill;
- establishing a large meadow between Church Lane and Bested Hill;

- hedge and tree planting around the site to:
  - reinstate hedgerows and create new hedgerow lines;
  - strengthen existing hedgerows;
  - continue roadside hedgerows; and
  - plant new low density woodland on the west side of Church Lane at the south of Bested Hill to provide visual screening.
- bat boxes will be positioned on trees around the development site to provide additional bat roosting opportunities;
- birds boxes will be positioned around the site; and
- habitat piles for invertebrates to be introduced in appropriate areas around the site to encourage native bees, amongst other species, to maximise benefits of the wildflower and grassland areas.

6.49 A mix of local native species will be used and will be agreed with Ashford Borough Council through the Landscape and Environment Management Plan (to be agreed under Condition). To avoid creating a uniform habitat, a mixture of specimen sizes will be used and ongoing maintenance through grazing, mowing and rotational trimming will allow variation in height to result in a natural appearance whilst maximising screening benefits. The planting has been specifically designed to reflect the wider pattern and scale of woodland and hedging in the area.

6.50 A grass margin will separate woodland from the edge of the solar array, ensuring that the trees do not create shadows over the panels as well as creating habitat for a range of species.

6.51 The environmental management of the site for the life of the project will be detailed within a LEMP. This ensures that:

- specimens that do not survive are replaced to maintain screening;
- hedges and trees are maintained to appropriate heights;
- plans are in place to effectively and sensitively manage mowing/ grazing in conjunction with wild flower growth; and
- environmental best practice is adhered to during the construction, operation and decommissioning phases of the project.

REFERENCES

Building Research Establishment National Solar Centre, 2014, Biodiversity Guidance for Solar Developments, BRE, UK.

Department for Transport (DfT), 2007, Manual for Streets, HMSO, UK.

Highways England, Transport Scotland, Welsh Government and Department for Infrastructure, 2020, The Design Manual for Roads and Bridges, Volume 6, Section 2, Part 6, CD 123 - Geometric design of at-grade priority and signal-controlled junctions revision 1, Highways England, UK.