SUNNICA ENERGY FARM

EN010106

8.87 Design Principles

Planning Act 2008

Infrastructure Planning (Examination Procedure) Rules 2010

30 January 2023
Version number: 00

Planning Act 2008

Infrastructure Planning
(Examination Procedure) Rules 2010

Sunnica Energy Farm

Design and Principles

Planning Inspectorate Scheme Reference	EN010106
Application Document Reference	EN010106/APP/8.87
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Version	Date	Status of Version
Rev 00	30 January 2023	Submitted at Deadline 6

Introduction

This Design Principles document has been prepared to accompany the Development Consent Order (DCO) application for the Scheme. It is expected to be the subject of a Requirement of the DCO in order to prescribe the guiding principles to inform the detailed design of the Scheme. Assuming the DCO is granted and applications are made to the relevant local planning authority (LPA) for approval of detailed design, the LPA will assess those details having regard to the principles set out in Tables 1 to Table 10 of this document and the ES for the Scheme as certified by the Secretary of State.

It is necessary to achieve flexibility in the DCO because solar PV and battery energy storage technology is rapidly evolving. The Applicant needs to make provision in the DCO for technological innovation and improvement realised at the time of procurement and construction to ensure that it can construct the Scheme in the most appropriate manner. That flexibility has been facilitated by the adoption of the 'Rochdale Envelope' approach in the ES as outlined in **Chapter 3: Scheme Description** of the Environmental Statement **[REP3-022].** This document defines the key design principles which reflect the worst-case scenario adopted in the Environmental Impact Assessment that has been undertaken for the Scheme. Provided that the detailed design of the Scheme is in accordance with the key principles set out in this document, the conclusions of the ES will be upheld, whilst also providing for flexibility.

The Design Principles have been set out in Table 1 to Table 10 below organised in accordance with the descriptions of the numbered works contained Schedule 1 of the Draft DCO **[EN010106/APP/3.1]** the limits of deviation for which are shown on the Works Plans **[EN010106/APP/2.2].** Where required, the tables make reference to other documents, such as the OLEMP, which take priority over the Design Principles document in relation to the discharge of a Requirement.

For each Scheme component outlined in Tables 1 to 10, the parameter has been defined by its:

a. Location – the location of the Scheme component within the Scheme as assessed within the ES,

b. Scale – either a minimum or maximum parameter which has been assessed in the ES; and

c. Design – relevant design parameter which has been assessed in the ES.

All heights defined in Tables 1 to 10 are Above Ground Level (AGL), unless otherwise specified.

Table 1 Work No. 1 Design Principles

Scheme component	Parameter Type	Design Principle
Work No. 1— a ground mounted solar photovoltaic generating station with a gross electrical output capacity of over 50 megawatts including— (a) **Work No. 1A**— works on the East A Site comprising— (i) solar modules; (ii) solar stations; (iii) electrical cables including electrical cables connecting to Work No. 3A; (iv) monitoring and control systems housed within a control room building or container; and (v) weather stations and direct current (DC) electrical boxes, (b) **Work No. 1B**— works on the East B Site comprising— (i) solar modules; (ii) solar stations; (iii) electrical cables including electrical cables connecting to Work No. 3B; (iv) monitoring and control systems housed within a control room building or container; and (v) weather stations and DC electrical boxes, (c) **Work No. 1C**— works on the West A Site comprising— (i) solar modules; (ii) solar stations; (iii) electrical cables including electrical cables connecting to Work No. 3C; (iv) monitoring and control systems housed within a control room building or container; and (v) weather stations and DC electrical boxes; and		
Solar PV infrastructure	Location	The solar PV infrastructure will be located within the limits of deviation of Work Nos. 1A, 1B and 1C as shown on the **Works Plans [EN010106/APP/2.2].**
	Scale	The maximum area of solar PV infrastructure, including the solar PV modules and mounting structures, solar PV control room or container, solar stations, inverters, transformers and switchgears, but excluding the full extent of the onsite cabling is: • Sunnica East Site A – 115ha • Sunnica East B – 227ha • Sunnica West Site A – 256ha
	Design	Solar PV infrastructure will be offset from watercourses by a minimum of 10m.
Solar PV Modules and Mounting Structures	Location	The solar PV modules will be located within limits of deviation of Work Nos. 1A, 1B and 1C as shown on the **Works Plans [EN010106/APP/2.2].**
	Scale	The maximum height of the highest part of the solar PV modules will be 2.5m AGL.

Scheme component	Parameter Type	Design Principle
	Scale	The minimum height of the lowest part of the solar PV modules will be 0.6m AGL. In Flood Zone 3 areas, the minimum height of the lowest part of the solar PV modules will be 0.85m AGL. In swales and infiltration basins the minimum height of the lowest part of the solar PV modules will be 0.85m AGL.
	Scale	Separation distance will be 2m at the closest point and 11m at the furthest point.
	Scale	Maximum depth of mounting structure will be 3.5m below ground level.
	Design	The solar PV modules will slope towards the south, at a fixed slope of 15 to 35 degrees from horizontal.
	Design	The solar PV modules are likely to be either black or dark blue. This will be fixed during detailed design.
	Design	The frame type will be anodized aluminium alloy
	Design	The panel technology will be monofacial and/or bifacial panels.
	Design	Modules will be mounted on a rack made with galvanised steel or other suitable design material.
	Design	Foundation are most likely to be galvanised steel poles driven into the ground. These will either be piles rammed into a pre-drilled hole, a pillar attaching to a steel ground screw, pillars fixed to a concrete foundation, or a pillar set in concrete in a pre-made hole in the ground.
Solar PV control room or container	Location	The solar PV control room or container will be located within limits of deviation of Work Nos. 1A, 1B and 1C as shown on the Works Plans **[EN010106/APP/2.2]**.
	Scale	The monitoring and control system will be housed within a control room or container with dimensions of up to 7.5m by 3.5m and up to 3.5m in height.
	Scale	Maximum of 17 solar PV control rooms or containers located across the Sites.
	Design	Concrete base or monolith plinth to a maximum depth of 1m.
	Design	Externally finished to be in keeping with the prevailing surrounding environment, most likely with a green, light grey or white painted finish.
Solar Station (a station comprising an inverter, a transformer and the switchgears)	Location	The Solar Stations will be located within the limits of deviation of Work Nos. 1A, 1B and 1C as shown on the **Works Plans [EN010106/APP/2.2].**
	Scale	The maximum parameter of each solar station in an outdoor configuration will be up to a 17m by 6.5m footprint, and 3.5m in height. If in an indoor

Scheme component	Parameter Type	Design Principle
		configuration the indoor solar station dimensions would be 15m by 5m footprint and 3.5m in height.
	Scale	A maximum of 136 solar stations across Works No. 1.
	Design	Externally finished to be in keeping with the prevailing surrounding environment, most likely with a green, light grey or white painted finish.
	Design	Outdoor solar stations: a concrete foundation slab for each of the inverters and transformers and a levelling layer of thick sand with a maximum depth of 1m, with a concrete perimeter pavement for the switchgear. Indoor solar stations: a concrete foundation slab.
	Design	No Solar Stations will be located within Flood Zone 3.
Inverters	Location	The inverters will be located within the limits of deviation of Work Nos. 1A, 1B and 1C as shown on the **Works Plans [EN010106/APP/2.2]** and within a solar station.
	Scale	The maximum parameters of inverter will be 9m by 6.5m in plan and 3.5m in height, sited within the dimensions of the solar station. There will be one inverter per solar station.
	Design	The inverters will be centralised.
Transformers	Location	The transformers will be located within the limits of deviation of Work Nos. 1A, 1B and 1C as shown on the **Works Plans [EN010106/APP/2.2]** and within a solar station.
	Scale	The maximum parameters of the transformer will be 5.5m by 6.5m in plan and 3.5m in height, sited within the dimensions of the solar station. There will be one transformer per solar station.
	Design	Externally finished to be in keeping with the prevailing surrounding environment, most likely with a green, light grey or white painted finish.
Switchgear	Location	The switchgear will be located within the limits of deviation of Work Nos. 1A, 1B and 1C as shown on the **Works Plans [EN010106/APP/2.2** and within a solar station.
	Scale	The maximum footprint will be 2.5m by 6.5m in plan and a maximum height of 3.5m, sited within the dimensions of the solar station. There will be one switchgear per solar station.
	Design	Externally finished to be in keeping with the prevailing surrounding environment, most likely with a green, light grey or white painted finish.
Onsite cabling	Location	The onsite cabling will be located within the limits of deviation of Work Nos. 1A, 1B and 1C as shown on the **Works Plans [EN010106/APP/2.2].**

Scheme component	Parameter Type	Design Principle
	Scale	Low voltage - between PV modules and inverters and from inverters to transformers: The maximum dimensions of the onsite trench will be 1.1m deep and 1m wide.
	Scale	33kV – between transformers and the switchgear and from switchgear to the onsite substation: where underground, maximum cable trench dimension will be a depth of 1.5m and 1.0m wide.
	Scale	Maximum depth of cables laid within using non-intrusive techniques is 20m BGL.
	Design	Cabling will be above ground level between the PV modules. These will be fixed to the mounting structure along the row of racks. Cabling between the PV modules, inverters, and transformers will be buried within underground trenches. Cables between transformers and the switchgear and from switchgear to the onsite substation will be buried within underground trenches.
Weather Stations	Location	The weather stations will be located within the limits of deviation of Work Nos. 1A, 1B and 1C as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	Weather Stations will be up to 6m in height
	Scale	There will be up to a maximum of 136 weather stations across Work No. 1.
DC electrical boxes	Location	The DC boxes will be located within the limits of deviation of Work Nos. 1A, 1B and 1C as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	1.5m by 0.5m by 1m in height
	Scale	Up to 20 DC boxes per inverter within Works No. 1.
	Design	DC box would sit on the back of a solar PV Module.

Table 2 Work No. 2 Design Principles

Work No. 2— an energy storage facility including—

(a) **Work No. 2A**— a battery energy storage compound on the East A Site comprising—

(i) battery energy storage cells;

(ii) a structure protecting the battery energy storage cells comprised in Work No. 2A(i) and ancillary equipment, being either one container or multiple containers joined to each other, mounted on a reinforced concrete foundation slab or concrete piling;

(iii) heating, ventilation and air conditioning (HVAC) or liquid cooling systems either housed within the containers comprised in Work No. 2A(ii), attached to the side or top of each of the containers, or located separate from but near to each of the containers;

(iv) battery stations;

(v) monitoring and control systems housed within a container with the HVAC or liquid cooling systems in Work No. 2A(iii) or located separately in its own container or control room;

(vi) electrical cables including electrical cables connecting to Work No. 3A;

(vii) fire safety infrastructure comprising fire suppression system; and

(viii) a water storage structure for the purposes of firefighting comprising fire water tanks and fire water containment.

(b) **Work No. 2B**— works on the East B Site comprising—

(i) battery energy storage cells;

(ii) a structure protecting the battery energy storage cells comprised in Work No. 2B(i) and ancillary equipment, being either one container or multiple containers joined to each other, mounted on a reinforced concrete foundation slab or concrete piling;

(iii) heating, ventilation and air conditioning (HVAC) or liquid cooling systems either housed within the containers comprised in Work No. 2B(ii), attached to the side or top of each of the containers, or located separate from but near to each of the containers;

(iv) battery stations;

(v) monitoring and control systems housed within a container with the HVAC or liquid cooling systems in Work No. 2B(iii) or located separately in its own container or control room;

(vi) electrical cables including electrical cables connecting to Work No. 3B;

(vii) fire safety infrastructure comprising fire suppression system; and

(viii) a water storage structure for the purposes of firefighting comprising fire water tanks and fire water containment.

(c) **Work No. 2C**— works on the West A Site comprising—

(i) battery energy storage cells;

(ii) a structure protecting the battery energy storage cells comprised in Work No. 2C(i) and ancillary equipment, being either one container or multiple containers joined to each other, mounted on a reinforced concrete foundation slab or concrete piling;

(iii) heating, ventilation and air conditioning (HVAC) or liquid cooling systems either housed within the containers comprised in Work No. 2C(ii), attached to the side or top of each of the containers, or located separate from but near to each of the containers;

(iv) battery stations;

(v) monitoring and control systems housed within a container with the HVAC or liquid cooling systems in Work No. 2C(iii) or located separately in its own container or control room;

(vi) electrical cables including electrical cables connecting to Work No. 3C;

(vii) fire safety infrastructure comprising fire suppression system; and

(viii) a water storage structure for the purposes of firefighting comprising fire water tanks and fire water containment.

Battery Energy Storage (BESS) Compound	Location	The BESS compounds will be located within the limits of deviation of Work Nos. 2A, 2B and 2C as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	There are three BESS Compounds, with maximum footprints of the compounds being up to: • Work No. 2A (Sunnica East Site A): 66,000m^2. • Work No. 2B (Sunnica East Site B): 162,000m^2. • Work No. 2C (Sunnica West Site A): 83,000m^2.
	Design	The BESS compounds will include battery storage containers and Battery Stations (containing battery inverters, transformers, and switchgear). Batteries will be grouped in racks, protected by structures / containers which will be located inside the BESS compounds.
	Design	The detailed design will ensure that the parameters assessed in the study presented in **Appendix 16D: Unplanned Atmospheric Emissions from Battery Storage Systems (BESS)** of the Environmental Statement **[REP2-033]** are met (i.e. 1 kg to 3 kg of hydrogen fluoride from a 5 rack fire).
	Design	The design of BESS includes a number of design elements to both prevent, detect and control a fire should one occur. These include: • The use of batteries that are sealed by design so do not vent when in normal use and have no free electrolyte. • The battery modules will contain cells separated by a thermal barrier or an air gap to prevent one cell affecting the temperature of the adjacent one, with the modules themselves also separated from one another by another thermal barrier or an air gap. The thermal barrier or an air gap is intended to ensure that should one cell/module heat up it will not impact on the adjacent cell/module so as to prevent a thermal cascade. • The batteries will be controlled by charging management systems that will detect if a cell or battery is not operating correctly and the whole BESS will be fitted with a fire monitoring system so if one cell or module were to catch fire the fire suppression system will automatically be triggered to reduce the temperate and ensure that the burning cell/module does not affect the other cells/modules in the BESS. • The expected hydrogen fluoride emissions will be checked against the assumptions in **Appendix 16D: Unplanned Atmospheric Emissions from Battery Storage Systems (BESS)** of the Environmental Statement **[REP2-033]** at detailed design stage (post-consent) once the make, model and layout of the BESS is known.

		• If necessary, consequence modelling will be undertaken to demonstrate the impacts associated with an unplanned fire would not exceed the effects outlined in **Appendix 16D: Unplanned Atmospheric Emissions from Battery Storage Systems (BESS)** of the Environmental Statement **[REP2-033]** or cause any significance adverse health effects to the local community.
BESS battery container housing the battery energy storage cells	Location	The BESS battery containers will be located within the limits of deviation of Work Nos. 2A, 2B and 2C as shown on the **Works Plans [EN010106/APP/2.2],** within the footprint of the BESS compound.
	Scale	The maximum dimensions of each BESS container within a BESS compound is 17m by 5m footprint and up to 6m in height.
	Design	Externally finished to be in keeping with the prevailing surrounding environment, most likely with a green, light grey or white painted finish.
	Design	HVAC or liquid cooling systems will be housed either within each of the containers, attached to the side or top of each of the containers, or located separate from but near to each of the containers.
	Design	The foundations within the BESS containers will either be a reinforced concrete base to a maximum depth of 1m, or a piling solution may be required, depending on the results of geotechnical surveys. If this is the case, piles to a maximum depth of 12m would be used.
Battery Stations	Location	The Battery Stations will be located within the limits of deviation of Work Nos. 2A, 2B and 2C as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	The components of the Battery Stations will be up to a maximum of 6m.
	Design	A station comprising transformers, switchgear, power conversion system (PCS) or inverter, and other ancillary equipment. These will either be located outside or housed together in a container.
	Design	The foundations for the Battery Stations will either be with a concrete foundation slab for each of the inverters and transformers and a levelling layer of thick sand with a concrete perimeter pavement for the switch gear when located outside, or on a concrete foundation slab when housed in a container. A piling solution may also be required, for both the indoor and outdoor options ,depending on the results of geotechnical surveys. If this is the case, piles to a maximum depth of 12m would be used.
Onsite cabling	Location	The onsite cabling will be located within the limits of deviation of Work Nos. 2A, 2B and 2C as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	33kV – between transformers and the switchgear and from switchgear to the onsite substation: where underground, maximum cable trench dimension will be a depth of 1.5m and 1.0m wide.

	Design	Cabling between batteries and inverters, and from inverters to transformers will be above ground in cable trays or laid in an underground trench.
Monitoring and control system	Location	The monitoring and control system will be located within the limits of deviation of Work Nos. 2A, 2B and 2C as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	The monitoring and control system will be housed in a building or container within the BESS compound and, will be up to a maximum of 6m in height..
	Design	The monitoring and control system will be housed either in an adapted container or built from glass reinforced plastic (GRP). The system will be within the same container or room as the HVAC or in its own container or control room.
Internal BESS Fire Suppression System	Location	The internal BESS fire suppression system will be located within the limits of deviation of Work Nos. 2A, 2B and 2C as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	The water supply container will be up to a maximum of 6m in height, if located externally to the BESS Battery Containers.
	Design	Water supply will be integrated into the design of each BESS container and will be located either within or outside the BESS container. If located outside, the water supply will either be decentralised and located at each container or centralised and located together with pumping equipment and pipework at a central location(s).
External Fire Fighting Water Tanks	Location	The external fire fighting water tanks will be located within the limits of deviation Work Nos. 2A, 2B and 2C as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	Option 1: Water supply for the firefighting operations only: • Two half capacity sectional steel panel tanks with dimensions of 6m by 6m and 3m in height; or • Two half capacity cylindrical steel tanks with dimensions of 4.58m diameter and 6m in height and with a 0.3m thick concrete base. Option 2: Water supply for simultaneous operation of the water drenching system and firefighting operations: • Two half capacity sectional steel panel tanks with dimensions of 8m by 6m and 3m in height; or • Two half capacity cylindrical steel tanks with dimensions of 5.35m diameter and 6m in height and with a 0.3m thick concrete base.
	Scale	Maximum of 242.5m^3 of fire fighting water will be provided per BESS compound
	Design	Storage will either be in one or two rectangular sectional steel panel tanks or cylindrical steel tanks within each BESS compound.
Fire Fighting Water Containment	Location	The Fire Fighting Water Containment will be located within the limits of deviation of Work Nos. 2A, 2B and 2C as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	A minimum of 410m^3 of bunded storage area will be provided per BESS Compound

	Design	A sump will be integrated into each BESS container for internal fire suppression.
	Design	A bunded BESS area linked to a bunded lagoon will be provided to capture fire water run-off from external fire water.

Table 3 Work No. 3 Design Principles

Work No. 3— onsite substations including—

(a) **Work No. 3A**— works on the East A Site comprising—

(i) substation;
(ii) control building or container;
(iii) welfare facilities;
(iv) hardstanding areas; and
(v) electrical cables including electrical cables connecting to Work Nos. 1A, 2A and 4;

(b) **Work No. 3B**— works on the East B Site comprising—

(i) substation;
(ii) shunt reactor
(iii) control building or container;
(iv) welfare facilities;
(v) hardstanding areas; and
(vi) electrical cables including electrical cables connecting to Work Nos. 1B, 2B and 4; and

(c) **Work No. 3C**— works on the West A Site comprising—

(i) substation;
(ii) control building or container;
(iii) welfare facilities;
(iv) hardstanding and parking areas; and
(v) electrical cables including electrical cables connecting to Work Nos. 1C, 2C and 4.

Onsite substations	Location	The onsite substations will be located within the limits of deviation of Work Nos. 3A, 3B and 3C as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	Maximum parameters for the onsite substations, control building or container, welfare facilities, hardstanding areas and hardstanding parking areas, but excluding the full extent of the cabling are outlined below: • Sunnica East Site A: 85m by 55m footprint, 10m in height. • Sunnica East Site B: 85m by 130m footprint, 10m in height. • Sunnica West Site A: 85m by 130m footprint, 10m in height.
	Design	Concrete base or monolith plinth to a maximum depth of 1m. A piling solution may be required depending on the results of geotechnical surveys. If this is the case, piles to a maximum depth of 12m would be used.
Onsite substation control building or container	Location	The substation control buildings or container will be located within the limits of deviation of Work Nos. 3A, 3B and 3C as shown on the **Works Plans [EN010106/APP/2.2]** within the maximum footprint of the substation areas.
	Scale	Maximum parameters for the substation control building are 25m by 12m footprint and 7m in height.
	Design	Foundation will either be concrete base or monolith plinth to a maximum depth of 1m.

	Design	The control buildings will be a painted block building with external colours and finishes to be confirmed prior to construction.
Welfare facilities	Location	The onsite cabling will be located within the limits of deviation of Work Nos. 3A, 3B and 3C as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	The onsite facilities will be either be located within the onsite substation control building, or in a separate building within the onsite substation area with maximum parameters of 6m by 3m and up to 3.5m in height.
Hardstanding parking areas	Location	Hardstanding parking areas will be located within the limits of deviation of Work Nos 3C as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	Up to a maximum of 20 car parking places will be provided within Work No 3C.
Onsite cabling	Location	The onsite cabling will be located within the limits of deviation of Work Nos. 3A, 3B and 3C as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	Where underground, maximum cable trench dimension will be a depth of 1.5m and 1.0m wide.
	Scale	Maximum depth of cables laid within using non-intrusive techniques is 20m BGL.
	Design	33kV cables.

Table 4 Work No. 4 Design Principles

Work No. 4— works to lay electrical cables and temporary construction laydown areas for the electrical cables including—

(a) electrical cables connecting Work No. 3A to Work No. 3B;
(b) electrical cables connecting Work No. 3B to Work No. 3C;
(c) electrical cables connecting Work No. 3C to Existing Burwell Substation; and
(d) up to 15 temporary construction laydown areas comprising—
  (i) areas of hardstanding, compacted ground or track matting;
  (ii) car parking;
  (iii) area to store materials and equipment;
  (iv) site and welfare offices and workshops;
  (v) security infrastructure, including cameras, perimeter fencing and lighting;
  (vi) safety infrastructure to warn and manage traffic when crossing roads or other obstacles;
  (vii) site drainage and waste management infrastructure (including sewerage); and
  (viii) electricity, water, waste water and telecommunications connections.

Grid Connection Routes A and B connecting Sites to Burwell Substation	Location	The electrical cabling will be located within the limits of deviation of Work No. 4 as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	The maximum width of the cable corridor per trench is 3.5m, except from where it meets the jointing bay. In which case the dimensions described for jointing bays apply.
	Scale	The maximum depth of cable corridor per trench is 2m BGL.
	Scale	Maximum depth of cables laid within the cable corridor using non-intrusive techniques is 20m BGL.
	Design	The cabling will consist of 400kV cables, earthing cables and optical fibre cables. Trenches will house one circuit. Each circuit will consist of up to three sets of cables.
Jointing bays within Grid Connection Routes A and B	Location	The jointing bays will be located within the limits of deviation of Work No. 4 as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	One set of cables (one circuit) will sit within one bay 18.5m in length, by 3m in width and 2.5m in depth.
	Scale	Jointing bays will be up to 2000m apart.
Fibre bays within Grid Connection Routes A and B	Location	The fibre bays will be located within the limits of deviation of Work No. 4 as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	Maximum dimensions of 1.75m by 1.75 and 2m in depth.
	Scale	Fibre bays will be up to 2000m apart.

Construction laydown areas within Work No. 4 (d).	No design principles applicable as temporary infrastructure. The maximum extent of the construction laydown areas is defined by **Works Plans [EN010106/APP/2.2].**

Table 5 Work No. 5 Design Principles

Work No. 5— Not Used

Table 6 Work No. 6 Design Principles

Work No. 6— works to create, enhance and maintain green infrastructure, including—

(a) **Work No. 6A**— works on the East A Site comprising—

(i) soft landscaping including planting;
(ii) landscape and biodiversity enhancement measures;
(iii) earth works;
(iv) permissive paths;
(v) hard standing and hard landscaping;
(vi) drainage and irrigation infrastructure and improvements or extensions to existing irrigation systems;
(vii) fencing, gates, boundary treatment and other means of enclosure; and
(viii) improvement, maintenance and use of existing private tracks;

(b) **Work No. 6B**—works on the East B Site comprising—

(i) soft landscaping including planting;
(ii) landscape and biodiversity enhancement measures;
(iii) earth works;
(iv) permissive paths;
(v) hard standing and hard landscaping;
(vi) drainage and irrigation infrastructure and improvements or extensions to existing irrigation systems;
(vii) fencing, gates, boundary treatment and other means of enclosure; and
(viii) improvement, maintenance and use of existing private tracks;

(c) **Work No. 6C**— works on the West A Site comprising—

(i) soft landscaping including planting;
(ii) landscape and biodiversity enhancement measures;
(iii) earth works;
(iv) hard standing and hard landscaping;
(v) drainage and irrigation infrastructure and improvements or extensions to existing irrigation systems;
(vi) fencing, gates, boundary treatment and other means of enclosure; and
(vii) improvement, maintenance and use of existing private tracks; and

Green Infrastructure	Location	The green infrastructure will be located within the limits of deviation of Work Nos. 6A, 6B and 6C as shown on the **Works Plans [EN010106/APP/2.2]**.
	Design	The green infrastructure will be designed as per the OLEMP contained within Appendix 10I of the ES **[EN010106/APP/6.2]**), in accordance with the requirements of the DCO.

Table 7 Work No. 7 Design Principles

Work No. 7— temporary construction laydown areas including— (a) **Work No. 7A**— a temporary construction laydown area on the East Site A comprising— (i) areas of hardstanding; (ii) car parking; (iii) site and welfare offices and workshops; (iv) security infrastructure, including cameras, perimeter fencing and lighting; (v) site drainage and waste management infrastructure (including sewerage); and (vi) electricity, water, waste water and telecommunications connections; (b) **Work No. 7B**— up to five temporary construction laydown areas on the East Site B comprising— (i) areas of hardstanding; (ii) car parking; (iii) site and welfare offices and workshops; (iv) security infrastructure, including cameras, perimeter fencing and lighting; (v) site drainage and waste management infrastructure (including sewerage); and (vi) electricity, water, waste water and telecommunications connections; (c) **Work No. 7C**— up to three temporary construction laydown areas on the West Site A comprising— (i) areas of hardstanding; (ii) car parking; (iii) security infrastructure, including cameras, perimeter fencing and lighting; (iv) site drainage and waste management infrastructure (including sewerage); and (v) electricity, water, waste water and telecommunications connections; and	
Construction laydown areas	No design principles applicable as temporary infrastructure. The maximum extent of the construction laydown areas is defined by **Works Plans [EN010106/APP/2.2].**

Table 8 Work No. 8 Design Principles

Work No. 8— warehouse buildings and permanent compounds comprising—

(a) **Work No. 8A**— warehouse building and a permanent compound on the East Site A comprising—

(i) a warehouse building for the storage for spare parts and office and welfare facilities;

(ii) a canteen either located within the warehouse building within Work No. 8A(i) or in a separate container or building;

(iii) waste skips;

(iv) parking areas; and

(v) a permanent compound area; and

(b) **Work No. 8B**— warehouse building and a permanent compound area on the East Site B comprising—

(i) a warehouse building for the storage of spare parts and office and welfare facilities;

(ii) a canteen either located within the warehouse building within Work No. 8B(i) or in a separate container or building;

(iii) waste skips;

(iv) parking areas; and

(v) a permanent compound area.

Permanent Compound	Location	The permanent compounds will be located within the limits of deviation of Work Nos. 8A and 8B as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	The maximum parameters for the permanent compound in Sunnica East Site A is 12,000m^2
	Scale	The maximum parameters for the permanent compound in Sunnica East Site B is 8,000m^2
	Scale	All of the works associated with Works No. 8, including the office and warehouse building, canteen, waste skips and parking areas, will be within the footprint of the permanent compounds and the maximum parameters described.
Office and warehouse building	Location	The office and warehouse buildings will be located within the permanent compound and within limits of deviation of Work Nos. 8A and 8B as shown on the **Works Plans [EN010106/APP/2.2]**.
	Scale	The maximum parameters for the office and warehouse building in Sunnica East Site A is 13 x 31m and 5m height
	Scale	The maximum parameters for the office and warehouse building in Sunnica East Site B is 25 x 35.5m and 8m height
	Design	Externally finished to be in keeping with the prevailing surrounding environment, most likely with a green, light grey or white painted finish.
	Design	The foundations will either be concrete base or monolith plinth to a maximum depth of 1m.
Parking areas	Location	The parking areas will be located within the limits of deviation of Work Nos. 8A and 8B as shown on the **Works Plans [EN010106/APP/2.2],** within the footprint of the permanent compound area.

	Scale	Up to a maximum of 20 car parking places will be provided within each onsite substation area

Table 9 Work No. 9 Design Principles

Work No. 9— works to existing streets to facilitate access to Work Nos. 1 to 8.						
Works to Streets	Location	The works to streets will be located within the limits of deviation of Work No. 9 as shown on the **Works Plans [EN010106/APP/2.2]** as more particularly described in the relevant **Schedule** of the **draft DCO [EN010106/APP/3.1]** and shown on the **ARoW Plans [EN010106/APP/2.3]** .				
		ARoW Access Reference	**Scheme Phase**			
			Construction	**Operation**	**Decommissioning**	**Comment**
		Sunnica East Sites A and B				
		SE-A	√	√	√	Access SE-A will only be used during construction and decommissioning by cranes / Abnormal Indivisible Loads. The access will be retained during operation for use by emergency vehicles only to provide two accesses for the BESS area, in the event of a fire.
		SE-B	√	√	√	Access will be used during all phases.
		SE-C	√	√	√	Access SE-C is the primary access for Sunnica East Sites A and B and will be used during all phases.
		SE-D	√	√	√	Access will be used during all phases.
		SE-E	√	√	√	Access will be used during all phases.
		SE-F	√	√	√	Access will be used during all phases.
		SE-G	√	√	√	Access will be used during all phases.
		SE-H	√	X	√	Access SE-H will only be used during construction and

						decommissioning and will not be used during operation.
		SE-I	√	X	√	Access SE-I will only be used during construction and decommissioning and will not be used during operation.
		SE-J	X	√	X	Access SE-J will only be used during operation and will not be used during construction or decommissioning.
		SE-K	√	√	√	Access SE-K will only be used during construction and decommissioning by cranes / Abnormal Indivisible Loads. The access will be retained during operation for use by emergency vehicles only to provide two accesses for the BESS area, in the event of a fire.
		Sunnica West Sites A				
		SW-A	√	√	√	Access SW-A is the primary access for Sunnica West Sites A and B and will be used during all phases.
		SW-B	√	√	√	Access will be used during all phases.
		SW-C	√	√	√	Access will be used during all phases.
		Burwell National Grid Substation				

		CR-A	√	√	√	Access CR-A will provide access to Burwell National Grid Substation to facilitate connection to the National Electricity Transmission Network and will be used during all phases.
		Grid Connections Routes A and B				
		CR-B	√	√	X	The access locations across Grid Connection Routes A and B will be re-instated to their condition prior to the construction phase; however, the rights to utilise these access points will be retained during operation and secured through the DCO to allow access for maintenance, if required. Access to the Grid Connection Routes A and B is not required during decommissioning as the cable and infrastructure will remain *in-situ.*
		CR-C	√	√	X	
		CR -D	√	√	X	
		CR -E	√	√	X	
		CR -F	√	√	X	
		CR -G	√	√	X	
		CR -H	√	√	X	
		CR -I	√	√	X	
		CR -J	√	√	X	
		CR -K	√	√	X	
		CR -L – Not Used				
		CR -M	√	√	X	
		CR -N	√	√	X	
		CR -O	√	√	X	
		CR -P	√	√	X	
		CR -Q	√	√	X	
		CR -R	√	√	X	
		CR -S	√	√	X	
		CR -T	√	√	X	
	Scale	Primary and crane / Abnormal Indivisible Loads access points will be a minimum of 6m in width.				

	Scale	Secondary accesses will be a minimum of 3.5m in width.

Table 10 Work No. 10 Design Principles

Work No. 10— works to create and maintain stone curlew reserve.		
Stone Curlew Reserve	Location	The stone curlew works will be located within the limits of deviation of Work No. 10 as shown on the **Works Plans [EN010106/APP/2.2]**.
	Design	The design of the Stone Curlew reserve will be designed as per the OLEMP contained within Appendix 10I of the ES **[EN010106/APP/6.2]**) in accordance with requirement 8 of the DCO.