Appendix H4

Embodied Carbon Assumptions

Appendix H4: Embodied Carbon Assumptions

Product/Element	Unit	Quantity	Assumptions / Note		
1 General Site					
Topsoil - Site Area	m3	8,800.0	Remove of 50% Soil - 20cm depth		
Imported stone - Soil stabilisation	m3	45,650.0	Included for a temp access track 750mx5mx0.4m		
Temporary Access Road	m3	2,096.5	750m x 5m x 0.4m - Area measured on drawing - Stone Import		
1.1 Foundations					
Acoustic Fence foundation (Concrete)	m3	44.3	0.25 m3/unit (0.5mx0.5mx1m) - 161 units (1 each 4.5 metres) - C32/40 25% GGB		
Acoustic Fence foundation steel reinforcement	kg	4,430.6	UK CARES Average Steel - 100 kg/m3		
Livestock Fence foundation (Concrete)	m3	45.1	0.045 m3/unit (0.3mx0.3mx0.5m) - 912 unit (1 each 2.2 metres) - C32/40 25% GGB		
Livestock Fence foundation steel reinforcement	kg	4,513.0	UK CARES Average Steel - 100 kg/m3		
Palisade Fence foundation (Concrete)	m3	75.5	0.16 m3/unit (0.4mx0.4mx1m) - 361 unit (1 each 2.7 metres) - C32/40 25% GGB		
Total foundations excavation	m3	164.9			
1.2 Access Road					
Access Road Area	m2	4,554.7	Area measured on drawing - 40 cm depth - Asphalt Paving Assumed		
Excavation for Access Road	m3	2,004.1			
1.3 Fencing for Battery Storage					
Acoustic fence	lm	797.5	Area measured on drawing - magenta line - 4m High		
Livestock fence (General Site)	m2	2,041.3	Area measured on drawing - brown line - 1.1 High		
Palisade fence (Battery Storage)	lm	1,071.4	Area measured on drawing - green line - 3.4 High		
1.4 Drainage Ditch					
Excavation for Drainage Ditch	m3	2,042.7	2m width - Assumed 1.5m depth		
1.5 Cable Route to POC					
Proposed Underground Cable Route to POC	lm	1,453.8	Length measured on drawing - Armoured cable assumed		
HDPE Duct for Underground Cable	lm	1,453.8	Assumed 500mm		
Underground Cable Route Trench (Excavation and Backfilling)	m3	1,744.5	Assumed - 1m width and 1.20m depth		
Crushed gravel bed	m3	290.8	Assumed - 1m width and 0.2m depth		

1.6 Security Systems & Lighting						
Lighting Pole	#	14.0	20m high			
CCTV Poles	#	25.0	6m high			
Concrete Footing (CCTV and Lighting)	m3	15.1	2.2 m deep - Concrete C32/40 25% GGB			
Foundation steel reinforcement	kg	1,510.1	UK CARES Average Steel - 100 kg/m3			
Luminaries	#	28.0	2 External luminaires per post - 150W LED Luminaries Assumed(Assumption for climate change assessment only)			
CCTV Cameras	#	75.0	3 CCTV Camera per post			
Communication Cables	#	25.0	CCTV cable 4 optical fibbers - 480 kg/km			
2 Battery Modules						
2.1 Substructure						
Foundation concrete	m3	6,177.6	Includes Foundation for Battery Blocks and Skids - Concrete C32/40 25% GGB			
Foundation steel reinforcement	kg	617,760.0	Steel reinforcement 100 kg/m3 - Includes Foundation for Battery Blocks and Skids - UK CARES			
2.2 Supporting Services						
Aluminium Cable	kg	39,593.3	14.07 kg/metre - 2558.2 metres in total			
Cable Trays	kg	551,232.0	Steel - Assumed 145 kg of cable trays per battery			
R134a - Batteries Refrigerant	kg	8,743.7	Based on 2.3 kg per unit (Base on Cat EnerONe+BESS Cabinet) - 4 Annual leakage - 95 recovery rate			
2.1 Batteries & Supporting services						
Battery Module	kWh	500,000.0	EPD Average			
MV Skids	kWh	500,000.0	EPD Average			
Power Module	kWh	500,000.0	EPD Average			
3 Ancillary Buildings & Main Trat	ffo					
3.1 Ancillary Buildings						
Foundation concrete	m3	2,161.5	Includes Foundation for Traffic/Drainage - Concrete C32/40 25% GGBS			
Foundation steel reinforcement	kg	216,150.0	Steel reinforcement 100 kg/m3 - Includes Foundation for Battery Blocks and Skids - UK CARES Average Steel - 100 kg/m3			
Foundation concrete - Ancillary Areas	m3	41.4	Concrete C32/40 25% GGBS			
Foundation steel reinforcement - Ancillary Areas	kg	4,143.9	UK CARES Average Steel - 100 kg/m3			
Structural Steel (Beams & Columns)	kg	23,271.4	UK Average - Structure			
Walls - Ancillary Buildings	m2	942.3	Assumed insulated metallic cladding system			

Roof - Ancillary Buildings	m2	525.5	Assumed insulated metallic cladding system + RAF			
Floor - Ancillary Buildings	m2	525.5	Assumed insulated metallic cladding system			
Solid Doors (Fire Rated)	#	24.0	eTool Benchmark			
Balustrade	m2	157.3	eTool Benchmark			
External Floor (Mesh grating)	m2	148.0	Stainless Steel Grate Flooring Assumed			
Louvres	m2	1.7	eTool Benchmark			
Windows	m2	4.7	eTool Benchmark			
2 2 - Ancillary Building Services						
Water Tank	m3	457.6	Total site water tanks (4 Units x 104 m3)			
Copper Power cabling and distribution system	m2	480.2	eTool Benchmark			
Power distribution board	#	13.0	eTool Benchmark			
Electricity Meter	#	15.0	eTool Benchmark			
Switch Boards	#	80.0	eTool Benchmark			
Lighting	m2	480.2	eTool Benchmark			
IT Equipment & Communications	m2	480.2	eTool Benchmark			
Fire detection and suppression systems	#	480.2	eTool Benchmark			
ACU (Cooling)	#	8.8	Refrigerant Type: R134a - EER 3.65			
3.3 Traffo & Electric Supporting Services						
HV Yard	kVA	40,000.0	Assumed as three phase transformer (because only available carbon data) 40MVA/unit			
Main Traffo	#	2.0	Assumed transformer (because only available carbon data)			
LV Traffo	#	2.0	Assumed transformer (because only available carbon data)			
Aux Traffo	#	4.0	Assumed transformer (because only available carbon data)			
Genset	#	4.0	Gensets - 9.5 x 3.5 x 3.5 m			
Synchronous compensations	#	4.0	Four synchronous compensators, 2 within for each building (fall within quantity contingency).			