

Designer Embodied Carbon (EC) Calculation - Civil & Electrical			
Build Table Most Contributing Materials 1%+ Embodied Carbon A1-3			
Project Name:	Avalon Pt Reinforcement		
Project Code:	1547 Tynes Cable Single Circuit XPE Rise Length 47km		
Project Embodied Carbon Breakdown and Totals (tCO2e)	Calculation Date:	18/03/2024	
Total A1-3:	216.35	Note: Total A1-3 (tCO2e) Type 1&2 + Type 3&4 + Weight / Soil landscape + Air	Project Code: 1547
A1-3:	4.20		Project Completion in Financial Year: FY24
Total A1-3 (tCO2e)	220.55	Note: Total A1-3 (tCO2e) Total A1-3 + A1-3 + Air	Estimated Cost of Carbon (by Material A1-3)
			£208,244.70

Category	From	To	Existing Cable (m)	Total Sub-structure (t)	Material Proposed (t)	Road Type 1&2 (t)	Road Type 3&4 (t)	Total
Sub-structure	0	0	0	0	0	0	0	0
Material Proposed	0	0	0	0	0	0	0	0
Road Type 1&2	0	0	0	0	0	0	0	0
Road Type 3&4	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0

Road & Cable Calculations Table															
Type 1&2 - Region	Cable Type & Excavation	Cable/Duct Number	Units values to input in conversion to tonnes	Conversion to tonnes	Quantity (t)	ECF kg(tCO2e/kg)			Embodied Carbon (tCO2e)			Total EC (tCO2e)	Notes / Comments		
						A1-3	A1-3	A1-3	A1-3	A1-3	A1-3				
Type 1&2 - Region	Asphalt 0% (Bitumen) binder content (by mass) weight @ 232kg/m ³		Input value in m ³ (in conversion to tonnes call)	41.2	35.8594	0.008	0.009	0.009	0.227194	0.37623	0.320	0.22021743	Brick/Surface Course Layer (Formed)	9.25507103	
	Ready mix concrete 230kg/m ³		Input value in m ³ (in conversion to tonnes call)	74.2	174.37	0.132	0.009	0.009	20.0384	0.01161	0.009	20.0511005	Base Layer (Concrete)	25.23712005	
	Ready Mix Expanding Foam Concrete weight @ 4.5kg/m ³		Input value in m ³ (in conversion to tonnes call)	0	0	0.188	0.009	0.011	0	0	0	0	Sub - base layer (Aggregate / MOT / DPF Sand)	3.2643086	
	Engineering MOT		Input value in m ³ (in conversion to tonnes call)	66.5	128.76	0.008	0.009	0.009	0.54676	0.00901	0.166	1.00004			
	Aggregate 1000kg/m ³ (Note: aggregate density will change per m ³ based on type and mix to suit of material)		Input value in m ³ (in conversion to tonnes call)	0	0	0.008	0.009	0.009	0	0	0	0			
	Sand 1600kg/m ³		Input value in m ³ (in conversion to tonnes call)	16.4	131.64	0.008	0.009	0.009	0.1346	0.009	0.166	0.1346006		Depth of soil to be calculated @ 50% improved and 50% benefit	
	Waste material content: 1m ³ = 1.43 tonnes		Input value in m ³ (in conversion to tonnes call)	2056	471.28	0.008	0.009	0	2.28864	0.016	0.009	2.3046362	Excavations & Backfill Layer	3.30531462	
	Self assumed 0% cement content: 1m ³ x 1.8 tonnes of dry soil		Input value in m ³ (in conversion to tonnes call)	86.5	154.25	0.008	0.009	0	0.69176	0.009	0.009	0.7007556			
	Cable Ducts PVC weight @ 200mm dia x 4.4kg/m		Input value in meters (in conversion to tonnes call)	0	0	0.323	0.009	0.172	0	0	0	0		Cable Ducts	15.65313819
	Cable Ducts PVC weight @ 150mm dia x 3.2kg/m		Input value in meters (in conversion to tonnes call)	839	2.787	3.23	0.009	0.172	0.00901	0.010455	0.011	0.00901058			
	Cable Ducts PVC weight @ 100mm dia x 2.1kg/m		Input value in meters (in conversion to tonnes call)	839	1.754	3.23	0.009	0.172	0.00901	0.008605	0.011	0.00901058			
	Cable 230V (Steel) weight @ 3.85kg/m		Input value in meters (in conversion to tonnes call)	0	0	0.381	0.009	0.172	0	0	0	0		Cables	18.27110107
Cable 6.6 / 11kV (Steel) weight @ 1.7kg/m		Input value in meters (in conversion to tonnes call)	839	4.42028	12.79	0.16	0.172	0.166	0.172046	0.009	0.172046009				
A1-3 tCO2e											116.417100				

Road & Cable Calculations Table															
Type 3&4 - Region	Cable Type & Excavation	Cable/Duct Number	Units values to input in conversion to tonnes	Conversion to tonnes	Quantity (t)	ECF kg(tCO2e/kg)			Embodied Carbon (tCO2e)			Total EC (tCO2e)	Notes / Comments		
						A1-3	A1-3	A1-3	A1-3	A1-3	A1-3				
Type 3&4 - Region	Asphalt 0% (Bitumen) binder content (by mass) weight @ 232kg/m ³		Input value in m ³ (in conversion to tonnes call)	31.36	19.4702	0.008	0.009	0.009	0.253194	0.42864	0.320	0.2459804	Brick/Surface Course Layer (Formed)	7.2459804	
	Ready mix concrete 230kg/m ³		Input value in m ³ (in conversion to tonnes call)	56.46	122.855	0.132	0.009	0.009	7.91076	0.01161	0.009	7.9223706	Base Layer (Concrete)	18.2683506	
	Ready Mix Expanding Foam Concrete weight @ 4.5kg/m ³		Input value in m ³ (in conversion to tonnes call)	0	0	0.188	0.009	0.011	0	0	0	0	Sub - base layer (Aggregate / MOT / DPF Sand)	2.28946728	
	Engineering MOT		Input value in m ³ (in conversion to tonnes call)	69.86	131.76	0.008	0.009	0.009	0.58268	0.00901	0.166	1.00004			
	Aggregate 1000kg/m ³ (Note: aggregate density will change per m ³ based on type and mix to suit of material)		Input value in m ³ (in conversion to tonnes call)	0	0	0.008	0.009	0.009	0	0	0	0			
	Sand 1600kg/m ³		Input value in m ³ (in conversion to tonnes call)	62.72	100.32	0.008	0.009	0.009	0.50176	0.00901	0.166	0.6607706		Depth of soil to be calculated @ 50% improved and 50% benefit	
	Waste material content: 1m ³ = 1.43 tonnes		Input value in m ³ (in conversion to tonnes call)	207.26	453.703	0.008	0.009	0	2.30932	0.016	0.009	2.3264104	Excavations & Backfill Layer	3.33288028	
	Self assumed 0% cement content: 1m ³ x 1.8 tonnes of dry soil		Input value in m ³ (in conversion to tonnes call)	69.86	125.14	0.008	0.009	0	0.62944	0.009	0.009	0.6385304			
	Cable Ducts PVC weight @ 200mm dia x 4.4kg/m		Input value in meters (in conversion to tonnes call)	0	0	0.323	0.009	0.172	0	0	0	0		Cable Ducts	14.93880128
	Cable Ducts PVC weight @ 150mm dia x 3.2kg/m		Input value in meters (in conversion to tonnes call)	764	2.3812	3.23	0.009	0.172	0.00901	0.010455	0.011	0.00901058			
	Cable Ducts PVC weight @ 100mm dia x 2.1kg/m		Input value in meters (in conversion to tonnes call)	764	1.62444	3.23	0.009	0.172	0.00901	0.008605	0.011	0.00901058			
	Cable 230V (Steel) weight @ 3.85kg/m		Input value in meters (in conversion to tonnes call)	0	0	0.381	0.009	0.172	0	0	0	0		Cables	14.4022012
Cable 6.6 / 11kV (Steel) weight @ 1.7kg/m		Input value in meters (in conversion to tonnes call)	764	4.10028	12.79	0.16	0.172	0.166	0.172046	0.009	0.172046009				
A1-3 tCO2e											100.907888				

Road & Cable Calculations Table															
Type 3&4 - Region	Cable Type & Excavation	Cable/Duct Number	Units values to input in conversion to tonnes	Conversion to tonnes	Quantity (t)	ECF kg(tCO2e/kg)			Embodied Carbon (tCO2e)			Total EC (tCO2e)	Notes / Comments		
						A1-3	A1-3	A1-3	A1-3	A1-3	A1-3				
Type 3&4 - Region	Asphalt 0% (Bitumen) binder content (by mass) weight @ 232kg/m ³		Input value in m ³ (in conversion to tonnes call)	0	0	0.008	0.009	0.009	0	0	0	0	Brick/Surface Course Layer (Formed)	0	
	Ready mix concrete 230kg/m ³		Input value in m ³ (in conversion to tonnes call)	0	0	0.132	0.009	0.009	0	0	0	0	Base Layer (Concrete)	0	
	Ready Mix Expanding Foam Concrete weight @ 4.5kg/m ³		Input value in m ³ (in conversion to tonnes call)	0	0	0.188	0.009	0.011	0	0	0	0	Sub - base layer (Aggregate / MOT / DPF Sand)	4.82647328	
	Engineering MOT		Input value in m ³ (in conversion to tonnes call)	0	0	0.008	0.009	0.009	0	0	0	0			
	Aggregate 1000kg/m ³ (Note: aggregate density will change per m ³ based on type and mix to suit of material)		Input value in m ³ (in conversion to tonnes call)	0	0	0.008	0.009	0.009	0	0	0	0			
	Sand 1600kg/m ³		Input value in m ³ (in conversion to tonnes call)	221.12	353.702	0.008	0.009	0.009	1.76864	0.00901	0.166	1.9346506		Depth of soil to be calculated @ 50% improved and 50% benefit	
	Waste material content: 1m ³ = 1.43 tonnes		Input value in m ³ (in conversion to tonnes call)	0	0	0.008	0.009	0	0	0	0	0			
	Self assumed 0% cement content: 1m ³ x 1.8 tonnes of dry soil		Input value in m ³ (in conversion to tonnes call)	221.12	400.128	0.008	0.009	0	1.76864	0.011	0.009	1.7807362	Excavations & Backfill Layer	2.81277622	
	Cable Ducts PVC weight @ 200mm dia x 4.4kg/m		Input value in meters (in conversion to tonnes call)	0	0	0.323	0.009	0.172	0	0	0	0		Cable Ducts	11.428704
	Cable Ducts PVC weight @ 150mm dia x 3.2kg/m		Input value in meters (in conversion to tonnes call)	2764	8.1212	3.23	0.009	0.172	0.00901	0.010455	0.011	0.00901058			
	Cable Ducts PVC weight @ 100mm dia x 2.1kg/m		Input value in meters (in conversion to tonnes call)	2764	5.9704	3.23	0.009	0.172	0.00901	0.008605	0.011	0.00901058			
	Cable 230V (Steel) weight @ 3.85kg/m		Input value in meters (in conversion to tonnes call)	0	0	0.381	0.009	0.172	0	0	0	0		Cables	19.888376
Cable 6.6 / 11kV (Steel) weight @ 1.7kg/m		Input value in meters (in conversion to tonnes call)	2764	14.6788	12.79	0.16	0.172	0.166	0.172046	0.009	0.172046009				
A1-3 tCO2e											250.999828				

Key	Material	Calculation Method	Notes
A1-3	Asphalt	Calculation based on Embodied Carbon Factors (ECF) to Extract & Manufacture the material Calculated as Tonnes x ECF kg(tCO2e/kg) + Embodied Carbon (tCO2e). Sourced from ICE.	
A1-3	Ready mix concrete	Calculation based on kg of CO2e produced by Decarbon based on ICE. ECF based on Tonnes x ECF kg(tCO2e/kg) + Embodied Carbon (tCO2e). Sourced from ICE.	
A1-3	Ready Mix Expanding Foam Concrete	Calculation based on kg of CO2e produced by Decarbon based on ICE. ECF based on Tonnes x ECF kg(tCO2e/kg) + Embodied Carbon (tCO2e). Sourced from ICE.	
A1-3	Engineering MOT	Calculation based on kg of CO2e produced by Decarbon based on ICE. ECF based on Tonnes x ECF kg(tCO2e/kg) + Embodied Carbon (tCO2e). Sourced from ICE.	
A1-3	Aggregate	Calculation based on kg of CO2e produced by Decarbon based on ICE. ECF based on Tonnes x ECF kg(tCO2e/kg) + Embodied Carbon (tCO2e). Sourced from ICE.	
A1-3	Sand	Calculation based on kg of CO2e produced by Decarbon based on ICE. ECF based on Tonnes x ECF kg(tCO2e/kg) + Embodied Carbon (tCO2e). Sourced from ICE.	
A1-3	Waste material	Calculation based on kg of CO2e produced by Decarbon based on ICE. ECF based on Tonnes x ECF kg(tCO2e/kg) + Embodied Carbon (tCO2e). Sourced from ICE.	
A1-3	Self assumed 0% cement content	Calculation based on kg of CO2e produced by Decarbon based on ICE. ECF based on Tonnes x ECF kg(tCO2e/kg) + Embodied Carbon (tCO2e). Sourced from ICE.	
A1-3	Cable Ducts PVC	Calculation based on kg of CO2e produced by Decarbon based on ICE. ECF based on Tonnes x ECF kg(tCO2e/kg) + Embodied Carbon (tCO2e). Sourced from ICE.	
A1-3	Cables	Calculation based on kg of CO2e produced by Decarbon based on ICE. ECF based on Tonnes x ECF kg(tCO2e/kg) + Embodied Carbon (tCO2e). Sourced from ICE.	

