	Designer Embodied Carbon (EC) Calculation - Civil & Electrical												
	Build Table Most Contributing Materials 1% Embodied Carbon A1-5												
Project Name:	xct Name: Burnley BSP - Athletic Street Cable Replacement Fluid Filled Cable Replacement												
Project Scope:	33KV Cable 400mm2 Cu XLPE. Route Length 3465m.												
Project Er	mbodied Carbon Breakdown and Totals t(Co2e):		Calculation Date:	17/09/2024									
Total A1-5w	384.06	Note: Total A1-5w t(CO2e): Type 1&2 + Type 3&4 = Ans	Project Code:	50022051									
A5a	7.40		Project Completed in Financial Year:	2024									
Total A1-5 t(CO2e)	391.47	Note: Total A1-5t(CO2e): Total A1-5w + A5a = Ans	Estimated Cost of Cable Works(£): (To Estimate A5a)	£1,057,742.00									

Roadway	From	То			Verge / Soft Landscape Inported MAT. (m)	Road Type 1&2 Imported Material (m)	Road Type 3&4 Imported Material (m)	Total
Grounds to Burnley BSP	Joint Position 1A	Widow Hill Road			75			75
Widow Hill Road	Grounds of Burnley BSP	Eastern Avenue					110	110
Eastern Avenue	Widow Hill Road	Queen Victoria Road				800		800
Queen Victoria Road	Eastern Avenue	Queen Park Road				233		233
Queens Park Road	Queen Victoria Road	Ridge Avenue					510	510
Ridge Avenue Brunshaw Road	Queen Park Road	Brunshaw Road					830	830
Brunshaw Road	Ridge Avenue Brunshaw Road	Brunshaw Avenue				466		466
Brunshaw Avenue		Lyndhurst Road					121	121
Lyndhurst Road	Brunshaw Avenue	Morse Street					30	30
Morse Street	Lyndhurst Road	Athletic Street					160	160
Athletic Street	Morse Street	Grounds of Athletic Street Substation					90	90
Grounds of Athletic Street Substation	Athletic Street	Joint Position 9A					40	40
			Tota		75	1499	1891	3,465
	Desktop Contigen	ev.	0%	2	0	0	0	0

	Road & Cable Calculations Table															
		Cable Type & Excavation	Cable/Duct Number	Units values to input in	Conversion to		ECF	kg(CO2e/	kg)		Embodied	Carbon t(CC	02e)		Total EC t(CO2e)	Notes / Comments
				conversion to tonnes cell	tonnes	(t)	A1-3	A4	A5w	A1-3	A4	A5w	A1-5w		A1-5w	
		Asphalt, 8% (Bitumen) binder content (by mass) weight @ 2322kg / m3		input value in m3 (in 'conversion to tonnes' cell)	59.96	139.22712	0.086	0.005	0.006	11.9735323	0.6961356	0.80432	13.47398299	Binder/ Suface Course layer (Tarmac)		
		Ready mix concrete 32/40. 2350kg / m3		input value in m3 (in 'conversion to tonnes' cell)	107.93	253.6355	0.132	0.005	0.008	33.479886	1.2681775	2.08362	36.83167913	Base layer (Concrete)	00 0010 7010	
		Ready Mix Expanding Foam Concrete weight @ 4.5kg / m3		input value in m3 (in 'conversion to tonnes' cell)	0	0	0.188	0.005	0.011	0	o	0	O	Base layer (Concrete)	36.83167913	
		Engineering MOT		input value in m3 (in 'conversion to tonnes' cell)	125.9	188.85	0.005	0.005	0.001	0.94425	0.94425	0.28025	2.1687534		4.372211448	Depth of soil to be calculated @ 50% imported and 50% backfill
		Aggregate, 1500kg/m3 Note: aggregate density will change per m3 based on type and mm to dust of material.		input value in m3 (in 'conversion to tonnes' cell)	0	0	0.005	0.005	0.001	0	0	0	O	Sub - base layer (Aggregate / MOT / DTP)		
e182	h Voltage	Sand, 1600kg/m3		input value in m3 (in 'conversion to tonnes' cell)	119.92	191.872	0.005	0.005	0.001	0.95936	0.95936	0.28474	2.203458048			
Type	ow & Hig	Waste material content. 1m3 = 1.43 tonnes.		input value in m3 (in 'conversion to tonnes' cell)	479.7	685.971		0.005	0.001	0	3.429855	0.8362	4.266053649	Excavations & Backfill layer	5.753700639	
	2	Soil assumed 5% cement content. 1m3 = 1.9 tonnes of clay soil.		input value in m3 (in 'conversion to tonnes' cell)	125.9	239.21		0.005	0.001	0	1.19605	0.2916	1.48764699			
		Cable Ducts PVC weight @ 200mm dia 4.44kg / m	0	input value in meters (in 'conversion to tonnes' cell)	o	0	3.23	0.005	0.172	0	o	0	٥			
		Cable Ducts PVC weight @ 150mm dia 3.3kg / m	1	input value in meters (in 'conversion to tonnes' cell)	1499	4.9467	3.23	0.005	0.172	15.977841	0.0247335	0.85286	16.8554301	Cable Ducts	16.8554301	
		Cable Ducts PVC weight @ 100mm dia 2.16kg / m	0	input value in meters (in 'conversion to tonnes' cell)	0	0	3.23	0.005	0.172	0	0	0	Ó			Until manufacturers ECF values are
		Cable 33kV (New) : weight @ 5.2kg/m	3	input value in meters (in 'conversion to tonnes' cell)	1499	23.3844	3.81	0.16	0.04	89.094564	3.741504	0.93257	93.76863787	Cables	1	
		Cable 6.6 / 11kV (New) : weight @ 1.7kg/m	0	input value in meters (in 'conversion to tonnes' cell)	0	0	3.81	0.032	0.039	0	0	0	O	Cables	33.70803/8/	
								. —						A1-5w t(CO2e)	171.0556422	1

	Road & Cable Calculations Table																
	Cable Type & Excavation		Cable/Duct Number	Units values to input in conversion to tonnes cell	Conversion to tonnes		ECF	kg(CO2e/kg	g)	Embodied Carbon t(CO2e)					Notes / Comments		
				conversion to tonnes cell	tonnes	(t)	A1-3	A4 J	A5w	A1-3	A4	A5w	A1-5w		A1-5w		
		Asphalt, 8% (Bitumen) binder content (by mass) weight @ 2322kg / m3		input value in m3 (in 'conversion to tonnes' cell)	75.64	175.63608	0.086	0.005 0	0.006	15.1047029	0.8781804	1.01465	16.99753291	Binder/ Suface Course layer (Tarmac)	16.99753291		
		Ready mix concrete 32/40. 2350kg / m3		input value in m3 (in 'conversion to tonnes' cell)	136.15	319.9525	0.132	0.005 0	0.008	42.23373	1.5997625	2.62841	46.46190229	Base laver (Concrete)	46.46190229		
		Ready Mix Expanding Foam Concrete weight @ 4.5kg / m3		input value in m3 (in 'conversion to tonnes' cell)	0	0	0.188	0.005 0	0.011	0	0	0	0				
		Engineering MOT		input value in m3 (in 'conversion to tonnes' cell)	158.8	238.2	0.005	0.005 0	0.001	1.191	1.191	0.35349	2.7354888	Sub - base layer (Aggregate / MOT /	2 7354888		
		Aggregate, 1500kg/m3 Note: aggregate density will change per m3 based on type and mm to dust of material.		input value in m3 (in 'conversion to tonnes' cell)	0	0	0.005	0.005 0	0.001	0	0	0	٥	DTP)	2.7354888		
	oltage	Sand, 1600kg/m3		input value in m3 (in 'conversion to tonnes' cell)	151.3	242.08	0.005	0.005 0	0.001	1.2104	1.2104	0.35925	2.78004672			Depth of soil to be calculated @ 50% imported and 50% backfill.	
Type 3 &	V Hgh V	Waste material content. 1m3 = 1.43 tonnes.		input value in m3 (in 'conversion to tonnes' cell)	605.12	865.3216		0.005 0	0.001	0	4.326608	1.05483	5.38143503	Excavations & Backfill laver	7.25783171		
	Low 8	Soil assumed 5% cement content. 1m3 = 1.9 tonnes of clay soil.		input value in m3 (in 'conversion to tonnes' cell)	158.8	301.72		0.005 0	0.001	0	1.5086	0.3678	1.87639668	Excertations & Becaminayer	120/00/11		
		Cable Ducts PVC weight @ 200mm dia 4.44kg / m	0	input value in meters (in 'conversion to tonnes' cell)	0	0	3.23	0.005 0	0.172	0	0	0	٥				
		Cable Ducts PVC weight @ 150mm dia 3.3kg / m	1	input value in meters (in 'conversion to tonnes' cell)	1891	6.2403	3.23	0.005 0	1.172	20.156169	0.0312015	1.07588	21.26325438	Cable Ducts	21.26325438		
		Cable Ducts PVC weight @ 100mm dia 2.16kg / m	0	input value in meters (in 'conversion to tonnes' cell)	0	0	3.23	0.005 0	1.172	0	0	0	0				
		Cable 33kV (New) : weight @ 5.2kg/m	3	input value in meters (in 'conversion to tonnes' cell)	1891	29.4996	3.81	0.16	0.04	112.393476	4.719936	1.17644	118.289856	Cables		Until manufacturers ECF values are available the ECF value for New Copper is used for Power Cables	
		Cable 6.6 / 11kV (New) : weight @ 1.7kg/m	0	input value in meters (in 'conversion to tonnes' cell)	0	0	3.81	0.032 0	0.039	0	0	0	0	Caules	1010000		
														A1-5w t(CO2e)	213.0058661		

## Important note: All materials calculated in above sheet, includes only imported materials

	A1-3	Caculation are based on Embodied Carbon Factors (I kg(CO2e/kg) = Embodied Carbon t(CO2e). Sourced											
Key:		Calculation based on kg of CO2e produced by Distanc Carbon t(CO2e). Distances referenced from IStructE: 320km = 0.32kg(COe) / European sourced within 15t	Locally sourced within 50km	0.005kg(CO2e) / Nationally Sc		Calculating	for Cable & Duc						
	A5w	Calculation based on the Waste Factor (WF) of Materi ECF x Distance Travelled x Distance travelled forwar A5w / Example, assumed waste of concrete is : 0.053 :	ste material taken to lanfill (C:	2) x C02 used for processing di			ig in cable length embodied carbo		lation <b>must</b> include o	able nun	nbers for the table to		
	5a	Typical assumed costat stage A1-5 of build is 50% se = Ans t(CO2e): Soruced IstructE	p: 700kg(CO2e) per £100,000 so	2: 0.7 x (cost of build + 100,000)	Key:		Designer to fill in all cells highlighted in light grey				Reference note:	Calculations & Embodied Carbon factors for materials used in the	
Note:		Please fill in all relavent cells highlighted in GREY - Profile Depths for Type 1&2: layer = 100mm	Tarmac top Concrete layer =			The 'Embodied Carbon t(CO2e)' cells are using a traffic light system to indicate, low-high contributing materials. Below this cell in an example of how the colour format works for each material and what they indicate.						tableare sourced from the Brisa (ICE) & IstructE	
		180mm Backfill = 210mm Sand layer = 200mm (+/-300mm) Waste = Estimate 80% of total Excavated material	MOT = 210mm Material			Low		Medium		High	Ref for material Emobdied Carbon Factors:	A BSRIA guide: Hammond.G etal., 'Embodied Carbon'., The inventory of Cabon and Energy., (ICE).	
		Profile Depths for Type 3&4: 100mm	Tarmac top layer = Concrete layer = 50mm			0	12.5	25	37.5	50		Embodied Carbon - The Inventory of Carbon and Energy (ICE)	
		MOT = 275mm Backfill = 275mm Sand layer = 200mm (+/- 300mm) Material Waste = Estimate 80% of total Excavated m	aterial								Ref for calculating Embodied Carbon A1-5& Cell colour formatting:	The Institution of Structural Engineers 'How to calculate embodied carbon'.	
												<u>A brief guide to calculating embodied</u> carbon (istructe.org)	

