

	Project	Job no. 180447				
Conisbee	Calcs for	Start page no./Revision				
1-5 Offord Street		2				
London	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved da
N1 1DH	НН	29/01/2019				
Maximum moment span 1 at 1	650 mm	Ms1_max = 1	1 kNm	Ms1_red	= 11 kNm	
Maximum moment support B		$M_{B_{max}} = 0$	kNm	M_{B_red}	= 0 kNm	
Maximum shear support A		V _{A_max} = 14	k kN	VA_red =	= 14 kN	
Maximum shear support A spa	n 1 at 100 mm	$V_{A_s1_max} =$	13 kN	V _{A_s1_r}	_{ed} = 13 kN	
Maximum shear support B		$V_{B_{max}} = -1$	4 kN	V _{B_red} :	= -14 kN	
Maximum shear support B spa		V _{B_s1_max} =		V _{B_s1_r}	_{ed} = -13 kN	
Maximum reaction at support A		R _A = 14 kN				
Unfactored dead load reaction		$R_{A_Dead} = 7$				
Unfactored imposed load react		RA_Imposed =				
Maximum reaction at support E		R _B = 14 kN				
Unfactored dead load reaction		$R_{B_{Dead}} = 7$				
Unfactored imposed load react	tion at support B	$R_{B_{Imposed}} =$	2 KN			
Rectangular section details		h 1000 m				
Section width		b = 1000 m				
Section depth		h = 150 mr				
-150-						
⊥						
<u> </u>						
_ _		1	000			
4		1	000			
Concrete details		1 C40/50	000		•	
Concrete details	be strength					
Concrete details Concrete strength class	-	C40/50 f _{cu} = 50 N/r	nm²	_{cu} = 30000 N/mm	2	
Concrete details Concrete strength class Characteristic compressive cul	-	C40/50 f _{cu} = 50 N/r	nm ² mm ² + 200 × f	cu = 30000 N/mm	2	
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concrete	-	C40/50 f _{cu} = 50 N/r E _c = 20kN/	nm ² mm ² + 200 × f	_{cu} = 30000 N/mm	2	
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concret Maximum aggregate size	te	C40/50 f _{cu} = 50 N/r E _c = 20kN/	nm² mm² + 200 × f ım	_{cu} = 30000 N/mm	2	
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concret Maximum aggregate size Reinforcement details	reinforcement	C40/50 f _{cu} = 50 N/r E _c = 20kN/ h _{agg} = 20 m f _y = 500 N/r	mm² mm² + 200 × f 1m mm²	_{cu} = 30000 N/mm	2	
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concret Maximum aggregate size Reinforcement details Characteristic yield strength of	te reinforcement shear reinforcen	C40/50 f _{cu} = 50 N/r E _c = 20kN/ h _{agg} = 20 m f _y = 500 N/r	mm² mm² + 200 × f 1m mm²	_{cu} = 30000 N/mm	2	
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concret Maximum aggregate size Reinforcement details Characteristic yield strength of Characteristic yield strength of	te reinforcement shear reinforcen ent	C40/50 f _{cu} = 50 N/r E _c = 20kN/ h _{agg} = 20 m f _y = 500 N/r	ກm² mm² + 200 × f າm mm² /mm²	cu = 30000 N/mm	2	
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concret Maximum aggregate size Reinforcement details Characteristic yield strength of Characteristic yield strength of Nominal cover to reinforcem	te reinforcement shear reinforcen ent ment	C40/50 $f_{cu} = 50 \text{ N/r}$ $E_c = 20 \text{kN/r}$ $h_{agg} = 20 \text{ m}$ $f_y = 500 \text{ N/r}$ hent $f_{yv} = 500 \text{ N}$	mm² mm² + 200 × f 1m mm² /mm² mm	_{cu} = 30000 N/mm	2	
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concret Maximum aggregate size Reinforcement details Characteristic yield strength of Characteristic yield strength of Nominal cover to reinforcem Nominal cover to top reinforce	reinforcement shear reinforcen ent ment prcement	C40/50 $f_{cu} = 50 \text{ N/r}$ $E_c = 20 \text{ kN/r}$ $h_{agg} = 20 \text{ m}$ $f_y = 500 \text{ N/r}$ thent $f_{yv} = 500 \text{ N}$ $C_{nom_t} = 35$	mm² mm² + 200 × f nm mm² /mm² mm mm	_{cu} = 30000 N/mm	2	
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concret Maximum aggregate size Reinforcement details Characteristic yield strength of Characteristic yield strength of Nominal cover to reinforcem Nominal cover to top reinforced	reinforcement shear reinforcen ent ment prcement	C40/50 $f_{cu} = 50 \text{ N/r}$ $E_c = 20 \text{kN/}$ $h_{agg} = 20 \text{ m}$ $f_y = 500 \text{ N/r}$ $f_{yv} = 500 \text{ N}$ Cnom_t = 35 Cnom_b = 35	mm² mm² + 200 × f nm mm² /mm² mm mm	_{cu} = 30000 N/mm	2	
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concret Maximum aggregate size Reinforcement details Characteristic yield strength of Characteristic yield strength of Nominal cover to reinforcem Nominal cover to top reinforced Nominal cover to bottom reinforced Nominal cover to side reinforced	reinforcement shear reinforcen ent ment prcement	C40/50 $f_{cu} = 50 \text{ N/r}$ $E_c = 20 \text{kN/}$ $h_{agg} = 20 \text{ m}$ $f_y = 500 \text{ N/r}$ $f_{yv} = 500 \text{ N}$ Cnom_t = 35 Cnom_b = 35	mm² mm² + 200 × f nm mm² /mm² mm mm			
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concret Maximum aggregate size Reinforcement details Characteristic yield strength of Characteristic yield strength of Nominal cover to reinforcem Nominal cover to top reinforced Nominal cover to bottom reinforced Nominal cover to side reinforced	reinforcement shear reinforcen ent ment prcement	C40/50 $f_{cu} = 50 \text{ N/r}$ $E_c = 20 \text{kN/}$ $h_{agg} = 20 \text{ m}$ $f_y = 500 \text{ N/r}$ $f_{yv} = 500 \text{ N}$ Cnom_t = 35 Cnom_b = 35	mm² mm² + 200 × f nm mm² /mm² mm mm			
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concret Maximum aggregate size Reinforcement details Characteristic yield strength of Characteristic yield strength of Nominal cover to reinforcem Nominal cover to top reinforced Nominal cover to bottom reinforced	reinforcement shear reinforcen ent ment prcement	C40/50 $f_{cu} = 50 \text{ N/r}$ $E_c = 20 \text{kN/}$ $h_{agg} = 20 \text{ m}$ $f_y = 500 \text{ N/r}$ $f_{yv} = 500 \text{ N}$ Cnom_t = 35 Cnom_b = 35	mm² mm² + 200 × f nm mm² /mm² mm mm		2 legs at 50 c/c	
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concret Maximum aggregate size Reinforcement details Characteristic yield strength of Characteristic yield strength of Nominal cover to reinforcem Nominal cover to top reinforced Nominal cover to bottom reinforced Nominal cover to side reinforced	te reinforcement shear reinforcen ent ment prcement ement	C40/50 $f_{cu} = 50 \text{ N/r}$ $E_c = 20 \text{kN/}$ $h_{agg} = 20 \text{ m}$ $f_y = 500 \text{ N/r}$ $f_{yv} = 500 \text{ N}$ Cnom_t = 35 Cnom_b = 35	mm² mm² + 200 × f nm mm² /mm² mm mm			
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concret Maximum aggregate size Reinforcement details Characteristic yield strength of Characteristic yield strength of Nominal cover to reinforcem Nominal cover to top reinforce Nominal cover to bottom reinfo Nominal cover to side reinforce	te reinforcement shear reinforcen ent ment procement ement	C40/50 $f_{cu} = 50 \text{ N/r}$ $E_c = 20 \text{ kN/}$ $h_{agg} = 20 \text{ m}$ $f_y = 500 \text{ N/r}$ $f_y = 500 \text{ N/r}$ $f_{yv} = 500 \text{ N}$ $c_{nom_t} = 35$ $c_{nom_b} = 35$ $c_{nom_s} = 35$	nm ² mm ² + 200 × f im mm ² /mm ² mm mm mm	6 x 8∳ bars 2 x 6∳ shear 6 x 12∳ bars		
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concret Maximum aggregate size Reinforcement details Characteristic yield strength of Characteristic yield strength of Nominal cover to reinforcem Nominal cover to top reinforced Nominal cover to bottom reinfor Nominal cover to side reinforced Mid span 1	te reinforcement shear reinforcen ent ment procement ement	C40/50 f _{cu} = 50 N/r E _c = 20kN/ h _{agg} = 20 m f _y = 500 N/r nent f _{yv} = 500 N Cnom_t = 35 Cnom_b = 35 Cnom_s = 35	mm ² mm ² + 200 × f mm ² /mm ² mm mm mm	6 x 8φ bars 2 x 6φ shear 6 x 12φ bars oment		
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concret Maximum aggregate size Reinforcement details Characteristic yield strength of Characteristic yield strength of Nominal cover to reinforcem Nominal cover to top reinforced Nominal cover to bottom reinfor Nominal cover to side reinforced Mid span 1	te reinforcement shear reinforcen ent ment orcement ement ••••••••••••••••••••••••••••••••••••	C40/50 $f_{cu} = 50 \text{ N/r}$ $E_c = 20 \text{ kN/r}$ $h_{agg} = 20 \text{ m}$ $f_y = 500 \text{ N/r}$ $f_y = 500 \text{ N/r}$ $f_{yv} = 500 \text{ N}$ $C_{nom_t} = 35$ $C_{nom_b} = 35$ $C_{nom_s} = 35$	nm ² mm ² + 200 × f im mm ² /mm ² mm mm mm mm	$6 \times 8_{\phi}$ bars 2 × 6_{ϕ} shear 6 × 12 $_{\phi}$ bars 5ment		
Concrete details Concrete strength class Characteristic compressive cul Modulus of elasticity of concret Maximum aggregate size Reinforcement details Characteristic yield strength of Characteristic yield strength of Nominal cover to reinforcem Nominal cover to top reinforced Nominal cover to bottom reinfor Nominal cover to side reinforced Mid span 1	te reinforcement shear reinforcen ent ment orcement ement ••••••••••••••••••••••••••••••••••••	C40/50 $f_{cu} = 50 \text{ N/r}$ $E_c = 20 \text{ kN/}$ $h_{agg} = 20 \text{ m}$ $f_y = 500 \text{ N/}$ $f_y = 500 \text{ N/}$ $f_{yv} = 500 \text{ N}$ $c_{nom_t} = 35$ $c_{nom_b} = 35$ $c_{nom_s} = 35$ $c_{nom_s} = 35$ $c_{nom_s} = 35$ $c_{nom_s} = 35$ $c_{nom_s} = 35$	mm ² mm ² + 200 × f mm ² /mm ² mm mm mm	6 x 8φ bars 2 x 6φ shear 6 x 12φ bars oment n = 103 mm		

	Project		Job no. 180447					
Conisbee	Calcs for	Start page no./Revision						
1-5 Offord Street London		Ground floo	Ground floor slab. Check			3		
N1 1DH	Calcs by HH	Calcs date 29/01/2019	Checked by	Checked date	Approved by	Approved		
			$(d^2 \times f_{cu}) = 0.0$	021				
		K' = 0.156						
				No compression		nt is requ		
Lever arm	-		K / 0.9) ^{0.5}), 0.95	× a) = 98 mm				
Depth of neutral axis			0.45 = 11 mm					
Area of tension reinforcement required			$(0.87 \times f_y \times z) =$	= 205 mm²				
Tension reinforcement provided		6 × 12¢ bar						
Area of tension reinforcement provided Minimum area of reinforcement		$A_{s,prov} = 679$	$0.13 \times b \times h = 1$	105 mm^2				
		,	$4 \times b \times h = 60$					
Maximum area of reinforceme		-,			a of roinforce	mont roqu		
	PASS - Area of	reimorcement	provided is g	greater than area	a or reiniorcer	nem requ		
Rectangular section in shea								
Shear reinforcement provided		$2 \times 6\phi$ legs						
Area of shear reinforcement p		$A_{sv,prov} = 11$			27			
Minimum area of shear reinfor		-	-	• •				
				ement provided	exceeas minii	num requ		
Maximum longitudinal spacing		,	5 × d = 77 mm		ided is less th			
Design constate chaor stress	-			forcement prov				
Design concrete shear stress			$v_c = 0.79 \text{N/mm}^2 \times \min(3,[100 \times A_{s,prov} / (b \times d)]^{1/3}) \times \max(1, (400 \text{mm})^{1/3})$					
		$(d)^{1/4}$ × (min(f _{cu} , 40N/mm ²) / 25N/mm ²) ^{1/3} / $\gamma_m = 0.903$ N/mm ²						
Design shear resistance provided		$v_{s,prov} = A_{sv,prov} \times 0.87 \times f_{yv} / b = 0.492 \text{ N/mm}^2$						
Design shear stress provided		$v_{prov} = v_{s,prov} + v_c = 1.395 \text{ N/mm}^2$ $V_{prov} = v_{prov} \times (b \times d) = 143.7 \text{ kN}$						
Design shear resistance	inks provided val		. ,		n rainfaraama	nt of 670 i		
		u between on	ini anu 5500 i		Trennorceme	111 01 07 9 1		
Spacing of reinforcement (c	-	"						
Actual distance between bars	in tension	$s = (b - 2 \times$	$(C_{nom_s} + \phi_v + \phi_v)$	\$bot/2)) /(Nbot - 1) -	- φ _{bot} = 169 mm	1		
Minimum distance between		-						
Minimum distance between bars in tension		$S_{min} = h_{agg} +$	$s_{min} = h_{agg} + 5 mm = 25 mm$					
		00						
				SS - Satisfies the	e minimum sp	oacing crit		
Maximum distance between	bars in tension (cl 3.12.11.2)	PAS	SS - Satisfies the		bacing crit		
Design service stress		cl 3.12.11.2) $f_s = (2 \times f_y)$	PA: $<$ A _{s,req}) / (3 × A	SS - Satisfies the $A_{s,prov} imes eta_b) = 130.$	2 N/mm ²	oacing crit		
		cl 3.12.11.2) $f_s = (2 \times f_y)$	PA: < A _{s,req}) / (3 × A 47000 N/mm /	SS - Satisfies the $A_{s,prov} \times \beta_b$ = 130. f _s , 300 mm) = 30	2 N/mm² 00 mm	-		
Design service stress		cl 3.12.11.2) $f_s = (2 \times f_y)$	PA: < A _{s,req}) / (3 × A 47000 N/mm /	SS - Satisfies the $A_{s,prov} imes eta_b) = 130.$	2 N/mm² 00 mm	-		
Design service stress	pars in tension	cl 3.12.11.2) $f_s = (2 \times f_y)$	PA: < A _{s,req}) / (3 × A 47000 N/mm /	SS - Satisfies the $A_{s,prov} \times \beta_b$ = 130. f _s , 300 mm) = 30	2 N/mm² 00 mm	-		
Design service stress Maximum distance between b Span to depth ratio (cl. 3.4.6 Basic span to depth ratio (Tab	bars in tension 5) ble 3.9)	cl 3.12.11.2) f _s = (2 × f _y > s _{max} = min(- span_to_de	PA: (3 × A 47000 N/mm / PAS epthbasic = 20.0	SS - Satisfies the $A_{s,prov} \times \beta_b$ = 130. f_s , 300 mm) = 30 SS - Satisfies the	2 N/mm² 00 mm e maximum sp	-		
Design service stress Maximum distance between b Span to depth ratio (cl. 3.4.6 Basic span to depth ratio (Tab Design service stress in tensio	bars in tension 5) ble 3.9) on reinforcement	cl 3.12.11.2) f _s = (2 × f _y > s _{max} = min(- span_to_de	PA: (3 × A 47000 N/mm / PAS epthbasic = 20.0	SS - Satisfies the $A_{s,prov} \times \beta_b) = 130.$ $f_s, 300 mm) = 30$ SS - Satisfies the	2 N/mm² 00 mm e maximum sp	-		
Design service stress Maximum distance between b Span to depth ratio (cl. 3.4.6 Basic span to depth ratio (Tab	bars in tension 5) ble 3.9) on reinforcement rcement	cl 3.12.11.2) $f_s = (2 \times f_y) \times S_{max} = min(x)$ $span_to_determines f_s = (2 \times f_y) \times f_s$	PA: (3 × A 47000 N/mm / PAS epthbasic = 20.0 (3 × As	SS - Satisfies the $A_{s,prov} \times \beta_b$ = 130. f_s , 300 mm) = 30 SS - Satisfies the $a_{s,prov} \times \beta_b$ = 130.2	2 N/mm² 00 mm e <i>maximum sp</i> 2 N/mm²	pacing crit		
Design service stress Maximum distance between b Span to depth ratio (cl. 3.4.6 Basic span to depth ratio (Tak Design service stress in tensio Modification for tension reinfo	bars in tension 5) ble 3.9) on reinforcement rcement f _{tens} = m	cl 3.12.11.2) $f_s = (2 \times f_y) \times S_{max} = min(x)$ $span_to_determines f_s = (2 \times f_y) \times f_s$	PA: (3 × A 47000 N/mm / PAS epthbasic = 20.0 (3 × As	SS - Satisfies the $A_{s,prov} \times \beta_b$ = 130. f_s , 300 mm) = 30 SS - Satisfies the	2 N/mm² 00 mm e <i>maximum sp</i> 2 N/mm²	pacing crit		
Design service stress Maximum distance between b Span to depth ratio (cl. 3.4.6 Basic span to depth ratio (Tab Design service stress in tensio	pars in tension ble 3.9) on reinforcement rcement f _{tens} = m reinforcement	cl 3.12.11.2) $f_s = (2 \times f_y) \times g_{max} = min(x)$ $span_to_def_s = (2 \times f_y) \times f_s = (2 \times f_y)$ in(2.0, 0.55 + (x))	PA: (A _{s,req}) / (3 × A 47000 N/mm / PAS epthbasic = 20.0 (A _{s,req})/ (3 × A 477N/mm ² - f _s)	SS - Satisfies the $A_{s,prov} \times \beta_b$ = 130. f_s , 300 mm) = 30 SS - Satisfies the $a_{s,prov} \times \beta_b$ = 130.2) / (120 × (0.9N/m	2 N/mm ² 00 mm e <i>maximum sp</i> 2 N/mm ² nm ² + (M / (b ×	d ²))))) = 2		
Design service stress Maximum distance between b Span to depth ratio (cl. 3.4.6 Basic span to depth ratio (Tab Design service stress in tensio Modification for tension reinfo Modification for compression	pars in tension ble 3.9) on reinforcement rcement f _{tens} = m reinforcement	cl 3.12.11.2) $f_s = (2 \times f_y) \times s_{max} = min(4)$ $span_to_determines f_s = (2 \times f_y) \times s_s = (2 \times f_y)$ in(2.0, 0.55 + (4)) in(1.5, 1 + (5))	PA: (As,req) / (3 × A (47000 N/mm / PAS (200 × As,req)/ (3 × As (477N/mm ² - fs) (00 × As2,prov / 10)	SS - Satisfies the $A_{s,prov} \times \beta_b$ = 130. f_s , 300 mm) = 30 SS - Satisfies the $a_{s,prov} \times \beta_b$ = 130.2	2 N/mm ² 00 mm e <i>maximum sp</i> 2 N/mm ² nm ² + (M / (b ×	d ²))))) = 2		
Design service stress Maximum distance between b Span to depth ratio (cl. 3.4.6 Basic span to depth ratio (Tak Design service stress in tensio Modification for tension reinfo Modification for compression to Modification for span length	pars in tension ble 3.9) on reinforcement rcement f _{tens} = m reinforcement	cl 3.12.11.2) $f_s = (2 \times f_y) \times s_{max} = min(x)$ $span_to_determines f_s = (2 \times f_y) \times s_s = (2 \times f_y) \times s_s = (2 \times f_y) \times s_s = min(2.0, 0.55 + (x))$ $sin(2.0, 0.55 + (x)) \times s_s = min(1.5, 1 + (x)) \times s_s = 1.000$	PA: $(A_{s,req}) / (3 \times A_{47000} N/mm / PAS)$ $(A_{7000} N/mm / PAS)$ $(A_{s,req}) / (3 \times A_{477} N/mm^2 - f_s)$ $(00 \times A_{s2,prov} / m)$	SS - Satisfies the As,prov × βb) = 130. fs, 300 mm) = 30 SS - Satisfies the s,prov × βb) = 130.2) / (120 × (0.9N/m (b × d)) / (3 + (10	2 N/mm ² 00 mm e <i>maximum sp</i> 2 N/mm ² nm ² + (M / (b × 0 × A _{s2,prov} / (b	d ²))))) = 2 × d)))) = 1		
Design service stress Maximum distance between b Span to depth ratio (cl. 3.4.6 Basic span to depth ratio (Tab Design service stress in tensio Modification for tension reinfo Modification for compression	pars in tension ble 3.9) on reinforcement rcement f _{tens} = m reinforcement	cl 3.12.11.2) $f_s = (2 \times f_y) \times S_{max} = min(-1) \times S_{max} = min(-1) \times S_{max} = min(-1) \times S_{max} = (2 \times f_y) \times S_{max} = (2 \times $	PA: $(A_{s,req}) / (3 \times A_{47000} N/mm / PAS)$ $(A_{7000} N/mm / PAS)$ $(A_{s,req}) / (3 \times A_{477} N/mm^2 - f_s)$ $(00 \times A_{s2,prov} / m)$	SS - Satisfies the $A_{s,prov} × β_b) = 130.$ $f_s, 300 mm) = 30.$ SS - Satisfies the $a_{s,prov} × β_b) = 130.2$ $A_{s,prov} × β_b = 130.2$	2 N/mm ² 00 mm e <i>maximum sp</i> 2 N/mm ² nm ² + (M / (b × 0 × A _{s2,prov} / (b	d ²))))) = 2 × d)))) = 1		