		Job No.	Sheet No.	Rev.
CONSULTING Engineering C			Sheet No.	
ENGINEERS Consulting Eng	gineers	jXXX		1
		Member/Location		
Job Title Member Design - Steel N	on Composite Beam BS5950	V. Drg.	I	
Member Design - Steel Non Composi	te Beam	Made by XX	Date 21	L/11/2021 <sup>Chd.</sup>
Input Parameters				
Primary beam spacing (= secondary	beam span) =		6.500	m
Primary beam span =			4.000	m
Secondary beam spacing =			3.000	m
Support condition for primary beam				·
Support condition for secondary bea	m = Simply Supported			·
Redistribution of hogging moment (v	vhere applicable) =		0 🗸	%
Internal or edge beam (primary) (af	fects loading tributary) =	Edge Bea	am 🔻	, 
Internal or edge beam (secondary) (	affects loading tributary) =	Edge Bea	am 🔻	,
Steel grade =			75 (43) 🔻	' <b> </b>
Primary beam =		JB 610x305x149	•	'
Secondary beam =		JB 533x210x101		
Mass per area of primary beam, $m_p$			23.0	kg/m <sup>2</sup>
Mass per area of secondary beam, m		ng =	33.7	kg/m <sup>2</sup>
Mass per area of structural steelwork	$k = m_p + m_s =$		56.6	kg/m <sup>2</sup>
Thickness of precast slab, $t_p =$			250	mm
Density of precast slab, $\rho_p =$			24	kN/m <sup>3</sup>
Live load (including partitions), LL =			6.00	kPa
Super dead load, SDL =			1.78	kPa
Dead load, DL = $\rho_p t_p + \text{ for pri}(m_p + t_p)$		$\sec m_s.g =$	6.33	kPa
ULS pressure load (primary beam) =			21.27	kPa
Internal or external facade primary l		-	4.0	kN/m
Internal or external facade secondar	· · · · ·		4.0	kN/m
Concentrated dead point load (desig		_	0.0	kN
Concentrated live point load (design			0.0	kN
Shorter distance of primary beam po			0.000	m OK
Construction loading (for constructio	n stage checks, >=0.5 kPa)	=	0.50	kPa <b>OK</b>
Method of construction (affects all co	-	Inpropped Constr		
LTB prop restraint for construction c			100.0	%
Percentage of dead and superimpose	ed dead load deflection preca	amber, %pcar	80.0	%
Steel Beam Parameters				
Modulus of alasticity.				
Modulus of elasticity, E =			205.0	GPa
Primary beam second moment of are			125876	cm <sup>4</sup>
Secondary beam second moment of	aiea, 1 =		61519	cm⁴
Primary hear ITP length for decise			0.271	m
Primary beam LTB length for design Primary beam LTB length for constru		c snacing) i Ji		m
Primary beam LTB length for design				m
Primary beam LTB length for constru		-	3.775 3.775	m
		residen spacin	5.775	m
Secondary beam LTB length for design	an sag = $1 - \frac{1}{2}$		0.179	m
Secondary beam LTB length for cons		Sec suan/Tol		m
Secondary beam LTB length for design			6.598	m
Secondary beam LTB length for cons				m
		Dres. Sec Spa	0.090	
Primary beam depth, $D_p =$			612.4	mm
Secondary beam depth, $D_p =$			536.7	mm
			550.7	
			l	

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CON	NSULTING	Engineerin	g Calculatio	on Sheet		Job No.	Sheet No.		Rev.
		Consulting				jXXX		2	
			1	1		Member/Location			
Job Title		esign - Stee			n BS5950 v	Drg.			4
Member D	esign - Ste	el Non Com	posite Bean	n	1	Made by XX	Date <b>2</b> 1	L/11/2021 <sup>0</sup>	na.
Utilisatio	n Summar	<u>.</u>							
Perform de	esign prima	ary and seco	ndary beam	<b>1</b>	<u>_</u>	Floor Desig	gn j		
					Durin				
	sign primar				Prir	nary Beam I	Design		
Peform de	sign second	dary beam			Seco	ndary Beam	n Design		
		-							
	E	Design Sag				11%	ОК		
	Sea	Design Hog				10%	ΟΚ		
S	۳ ح	Live Load I				2%	ОК		
eck	Primary Beam	SLS Load [				2%	OK		
Ch	rin L	-	on Sagging			5%	ОК		
r.			on Hogging			4%	ОК	28%	
Utilisation Checks		Design Sag				25%	ОК		
lisa	Secondary Beam	Design Hog				10%	ОК		
Uti	conda Beam	Live Load I				9%	ОК		
	Be	SLS Load [				7%	ОК		
	Se	-	on Sagging			28%	ОК		
		Constructio	on Hogging			4%	ОК		
Dead and	superimpos	sed dead loa	d deflection	n precambe	r primary b	eam, %pca	0.3	mm	
Dead and	superimpos	sed dead loa	d deflectior	n precambe	r secondary	∕ beam, %p	2.4	mm	
LTB Restr	raint								
	<b>-</b> -								
	Design sa	ag	No	LTB	Note that	nominal stud	ds are still	required	
	Construc	-		LTB B,SAG		nominal stud el beams in d			
		tion sag	L <sub>LTE</sub>		in the stee		order to pi	rovide	
	Construc	tion sag og	L <sub>LTE</sub>	3,SAG	in the stee	el beams in o int and mair	order to pi	rovide	
	Construc Design h Construc	tion sag og	L <sub>LTE</sub>	3,SAG 3,HOG	<i>in the stee LTB restra</i>	el beams in o int and mair	order to pi	rovide	
Façade Lo	Construc Design h Construc	tion sag og	L <sub>LTE</sub>	3,SAG 3,HOG	<i>in the stee LTB restra</i>	el beams in o int and mair	order to pi	rovide	
Façade Lo	Construc Design h Construc	tion sag og	L <sub>LTE</sub>	3,SAG 3,HOG	<i>in the stee LTB restra</i>	el beams in o int and mair	order to pi	rovide	
	Construc Design h Construc oading	tion sag og tion hog	L <sub>LTE</sub> L <sub>LTE</sub>	3,SAG 3,HOG 3,HOG	<i>in the stee LTB restra action of t</i>	el beams in c int and main he slab.	order to pi ntain diapl	rovide	
<i>Vote that</i>	Construc Design h Construc oading the façade	tion sag og tion hog	L <sub>LTE</sub> L <sub>LTE</sub> L <sub>LTE</sub>	3,SAG 3,HOG 3,HOG ,HOG , , , , , , , , , , , , , , , , , , ,	<i>in the stee LTB restra action of t</i> <i>bes not auto</i>	el beams in c int and main he slab. omatically fe	order to pr ntain diapl eature as a	rovide hragm hradm hrad on the	
Note that a primary be	Construc Design h Construc oading the façade eam; Emplo	tion sag og tion hog loading on t by instead th	L <sub>LTE</sub> L <sub>LTE</sub> L <sub>LTE</sub> the seconda	3,SAG 3,HOG 3,HOG 1,HOG	<i>in the stee LTB restra action of t</i> <i>bes not auto</i>	el beams in c int and main he slab. omatically fe	order to pr ntain diapl eature as a	rovide hragm hradm hrad on the	
Note that a primary be	Construc Design h Construc oading the façade eam; Emplo	tion sag og tion hog loading on t	L <sub>LTE</sub> L <sub>LTE</sub> L <sub>LTE</sub> the seconda	3,SAG 3,HOG 3,HOG 1,HOG	<i>in the stee LTB restra action of t</i> <i>bes not auto</i>	el beams in c int and main he slab. omatically fe	order to pr ntain diapl eature as a	rovide hragm hradm hrad on the	
Note that a primary be Limiting S	Construc Design h Construc oading the façade eam; Emplo Slenderne	tion sag og tion hog loading on t by instead th ss for No L	L <sub>LTE</sub> L <sub>LTE</sub> L <sub>LTE</sub> the seconda the point loa TB Effects	3,SAG 3,HOG 3,HOG <i>ory beam dc</i> <i>d option for</i>	<i>in the stee LTB restra action of t</i> <i>bes not auto</i>	el beams in c int and main he slab. omatically fe	order to pr ntain diapl eature as a	rovide hragm hradm hrad on the	
Note that a primary be Limiting s	Construc Design h Construc oading the façade eam; Emplo Slenderne quivalent sl	tion sag og tion hog loading on t by instead th ss for No L enderness, 2	$L_{LTE}$ $L_{LTE}$ $L_{LTE}$ $L_{LTE}$ $L_{LTE}$ $L_{TE}$ $L_{TE}$ $L_{TE}$ $L_{TE}$ $L_{TE}$ $L_{L0} = 0.4(\pi^{2}$	<sup>3,SAG</sup> <sup>3,HOG</sup> <sup>3,HOG</sup> <i>ry beam dc</i> <i>d option for</i> <sup>2</sup> E/p <sub>y</sub> ) <sup>0.5</sup>	<i>in the stee LTB restra action of t</i> <i>action of t</i> <i>action of t</i>	el beams in c int and main he slab. omatically fe	order to pr ntain diapl eature as a	rovide hragm a load on the able;	
Note that a primary be Limiting s	Construc Design h Construc oading the façade eam; Emplo Slenderne quivalent sl	tion sag og tion hog loading on t by instead th ss for No L	$L_{LTE}$ $L_{LTE}$ $L_{LTE}$ $L_{LTE}$ $L_{LTE}$ $L_{TE}$ $L_{TE}$ $L_{TE}$ $L_{TE}$ $L_{TE}$ $L_{L0} = 0.4(\pi^{2}$	<sup>3,SAG</sup> <sup>3,HOG</sup> <sup>3,HOG</sup> <i>ry beam dc</i> <i>d option for</i> <sup>2</sup> E/p <sub>y</sub> ) <sup>0.5</sup>	<i>in the stee LTB restra action of t</i> <i>action of t</i> <i>action of t</i>	el beams in c int and main he slab. omatically fe	order to pr ntain diaph eature as a ere applica	rovide hragm hradm hrad on the	
Note that a primary be Limiting s	Construc Design h Construc oading the façade eam; Emplo Slenderne quivalent sl	tion sag og tion hog loading on t by instead th ss for No L enderness, 2	$L_{LTE}$ $L_{LTE}$ $L_{LTE}$ $L_{LTE}$ $L_{LTE}$ $L_{TE}$ $L_{TE}$ $L_{TE}$ $L_{TE}$ $L_{TE}$ $L_{L0} = 0.4(\pi^{2}$	<sup>3,SAG</sup> <sup>3,HOG</sup> <sup>3,HOG</sup> <i>ry beam dc</i> <i>d option for</i> <sup>2</sup> E/p <sub>y</sub> ) <sup>0.5</sup>	<i>in the stee LTB restra action of t</i> <i>action of t</i> <i>action of t</i>	el beams in c int and main he slab. omatically fe	order to pr ntain diaph eature as a ere applica 34.3	rovide hragm a load on the able;	
Note that a primary be Limiting s	Construc Design h Construc oading the façade eam; Emplo Slenderne quivalent sl e of L <sub>E</sub> for l Primary l	tion sag og tion hog loading on t by instead th ss for No L enderness, i imiting slend Beam	$L_{LTE}$ $L_{LTE}$ $L_{LTE}$ $L_{LTE}$ $L_{CTE}$ $L_{C$	<sup>3,SAG</sup> <sup>3,HOG</sup> <sup>3,HOG</sup> <i>ry beam dc</i> <i>d option for</i> <sup>2</sup> E/p <sub>y</sub> ) <sup>0.5</sup> no LTB effe	in the stee LTB restra action of the pes not auto the primal ects =	el beams in c int and main he slab. omatically fe	order to pr ntain diaph eature as a ere applica 34.3	rovide hragm a load on the able;	
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Note that a primary be Limiting s	Construc Design h Construc oading the façade eam; Emplo Slenderne quivalent sl e of L <sub>E</sub> for l Primary l	tion sag og tion hog loading on t by instead th ss for No L enderness, i imiting slend Beam alent slender	$L_{LTE}$ $L_{LTE}$ $L_{LTE}$ $L_{LTE}$ $L_{CTE}$ $L_{C$	<sup>3,SAG</sup> <sup>3,HOG</sup> <sup>3,HOG</sup> <sup>3,HOG</sup> <sup>1</sup> <sup>1</sup> <sup>2</sup> <sup>2</sup> E/p <sub>y</sub> ) <sup>0.5</sup> no LTB effe	in the stee LTB restra action of the pes not auto the primal ects =	el beams in c int and main he slab. Domatically fe	eature as a ere applica 34.3 10	rovide hragm a load on the able;	
Note that a primary be Limiting s	Construc Design h Construc oading the façade eam; Emplo Slenderne quivalent sl e of L <sub>E</sub> for l Primary l	tion sag og tion hog loading on t by instead th ss for No L ss for No L enderness, 2 imiting slend Beam alent slender	LLTE LLTE LLTE LLTE LLTE LLTE LLTE LLTE	<sup>3,SAG</sup> <sup>3,HOG</sup> <sup>3,HOG</sup> <sup>3,HOG</sup> <sup>1</sup> <sup>1</sup> <sup>2</sup> <sup>2</sup> E/p <sub>y</sub> ) <sup>0.5</sup> no LTB effe <sup>2</sup> <sup>2</sup> E/p <sub>y</sub> ) <sup>1.5</sup> <sup>2</sup> <sup>1</sup> <sup>2</sup> <sup>2</sup> <sup>2</sup> <sup>2</sup> <sup>2</sup> <sup>2</sup> <sup>2</sup> <sup>2</sup>	in the stee LTB restra action of the pes not auto the primal ects =	el beams in c int and main he slab. Domatically fe	eature as a ere applica 34.3 10 38.7	rovide hragm a load on the able;	
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Note that a primary be Limiting s	Construc Design h Construc oading the façade eam; Emplo Slenderne quivalent sl e of L <sub>E</sub> for l Primary l Set equiva Radius of	tion sag og tion hog loading on t by instead th ss for No L enderness, f imiting slend Beam alent slender Buckling pa Say slender	L <sub>LTE</sub> L <sub>LTE</sub> L <sub>LTE</sub> L <sub>LTE</sub> L <sub>LTE</sub> the seconda the point loa <b>TB Effects</b> $\lambda_{L0} = 0.4(\pi^2)$ derness for rness, $\lambda_{LT} =$ arameter, u erness facto y axis, ry =	3,SAG 3,HOG 3,HOG a	in the stee LTB restra action of the pees not autor the primation ects = for λ =	el beams in c int and main he slab. Domatically fe	2017 2017 2017 2017 2017 2017 2017 2017	rovide hragm a load on the able; %	
Note that a primary be <b>_imiting s</b> _imiting eq	Construc Design h Construc oading the façade eam; Emplo Slenderne quivalent sl e of L <sub>E</sub> for l Primary l Set equiva Radius of Minor axis	tion sag og tion hog loading on t oy instead th ss for No L enderness, i imiting slend Beam alent slender Buckling pi Say slende gyration y-y	LLTE LLTE	<sup>3,SAG</sup> <sup>3,HOG</sup> <sup>3,HOG</sup> <sup>3,HOG</sup> <sup>1</sup> <sup>2</sup> <sup>2</sup> <sup>2</sup> <sup>2</sup> <sup>2</sup> <sup>2</sup> <sup>2</sup> <sup>2</sup>	in the stee LTB restra action of the period shows a start period shows a start action of the period shows a start for $\lambda =$ for $\lambda =$ $\lambda = \lambda \cdot r_y =$	el beams in d int and main he slab. Domatically fe ry beam whe	2017 2017 2017 2017 2017 2017 2017 2017	rovide hragm a load on the able; %	
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Note that a primary be Limiting s	Construc Design h Construc oading the façade eam; Emplo Slenderne quivalent sl e of L <sub>E</sub> for l Primary l Set equiva Radius of Minor axis Effective u Secondar Set equiva	tion sag og tion hog loading on t oy instead th ss for No L ss for No L enderness, imiting slende buckling pa Say slende gyration y-y seffective le unrestrained ry Beam alent slenden gyration y-y seffective le unrestrained say slende gyration y-y	LLTE LLTE	B,SAG B,HOG B,HOG B,HOG B,HOG C, V E A C, V = 1 C, V = 1	in the stee LTB restra action of the pess not autor the primation ects = for $\lambda$ = $= \lambda \cdot r_y$ = cts, L <sub>E,no LTE</sub> for $\lambda$ =	el beams in d int and main he slab. Domatically fe ry beam whe	2.711 0.271 39.3 0.874 1.00 4.57	rovide hragm a load on the able; % % % cm m m m m cm cm	
<b>Limiting S</b>	Construc Design h Construc oading the façade eam; Emplo Slenderne quivalent sl e of L <sub>E</sub> for l Set equiva Radius of Minor axis Effective u Set equiva Set equiva	tion sag og tion hog tion hog loading on t oy instead th ss for No L ss for Ss f	L <sub>LTE</sub> L <sub>LTE</sub> L <sub>LTE</sub> L <sub>LTE</sub> L <sub>LTE</sub> L <sub>LTE</sub> <i>μ</i> <i>μ</i> <i>μ</i> <i>μ</i> <i>μ</i> <i>μ</i> <i>μ</i> <i>μ</i>	B <sub>3</sub> ,SAG B <sub>3</sub> ,HOG B <sub>3</sub> ,HOG B <sub>3</sub> ,HOG B <sub>1</sub> ,HOG B <sub>1</sub> ,HOG Constant of the second option for Constant of the second option for Constant of the second option for Constant o	in the stee LTB restra action of the pes not autor r the priman ects = for $\lambda$ = $= \lambda \cdot r_y =$ for $\lambda$ = $= \lambda \cdot r_y =$ $= \lambda \cdot r_y =$	el beams in d int and main he slab. pmatically fe ry beam whe a =	2.711 0.271 39.3 0.874 1.00 4.57 1.794	rovide hragm a load on the able; % cm m m m cm m m cm m m m	
Note that a primary be Limiting s	Construc Design h Construc oading the façade eam; Emplo Slenderne quivalent sl e of L <sub>E</sub> for l Set equiva Radius of Minor axis Effective u Set equiva Set equiva	tion sag og tion hog loading on t oy instead th ss for No L ss for No L enderness, imiting slende buckling pa Say slende gyration y-y seffective le unrestrained ry Beam alent slenden gyration y-y seffective le unrestrained say slende gyration y-y	L <sub>LTE</sub> L <sub>LTE</sub> L <sub>LTE</sub> L <sub>LTE</sub> L <sub>LTE</sub> L <sub>LTE</sub> <i>μ</i> <i>μ</i> <i>μ</i> <i>μ</i> <i>μ</i> <i>μ</i> <i>μ</i> <i>μ</i>	B <sub>3</sub> ,SAG B <sub>3</sub> ,HOG B <sub>3</sub> ,HOG B <sub>3</sub> ,HOG B <sub>1</sub> ,HOG B <sub>1</sub> ,HOG Constant of the second option for Constant of the second option for Constant of the second option for Constant o	in the stee LTB restra action of the pes not autor r the priman ects = for $\lambda$ = $= \lambda \cdot r_y =$ for $\lambda$ = $= \lambda \cdot r_y =$ $= \lambda \cdot r_y =$	el beams in d int and main he slab. pmatically fe ry beam whe a =	2.711 0.271 39.3 0.874 1.00 4.57	rovide hragm a load on the able; % % % cm m m m m cm cm	

	Job No.	Sheet No.	Rev.
CONSULTING Engineering Calculation Sheet			
ENGINEERS	jXXX		3
	Member/Location		
lob Title Member Design - Steel Non Composite Beam BS5950	V. Drg.		
Member Design - Steel Non Composite Beam	Made by XX	Date 21	/11/2021 <sup>Chd.</sup>
Primary Beam Design			
Гуре of support condition =		Supported	
Tributary width i.e. beam spacing (divided by 2 if edge beam), $t_v$	v =	3.250	m
Live load (including partitions), LL =		6.00	kPa
Super dead load, SDL =		1.78	kPa
Super dead load (from elevation loading), $SDL_{elev} =$ Jnfactored live load, $\omega_{LL} = LL \cdot t_w =$		4.0	kN/m
Jnfactored load, $\omega_{\text{DL}} = (\text{SDL} + \text{DL}) \cdot t_w + \text{SDL}_{elev} =$		19.5 31.1	kN/m kN/m
Jnfactored SLS load, $\omega_{SLS} = (LL + SDL + DL) \cdot t_w + SDL_{elev} =$		50.6	kN/m
Factored ULS load, $\omega_{\text{ULS}} = (1.6\text{LL} + 1.4\text{SDL} + 1.4\text{DL}) \cdot t_w + 1.4\text{SDL}$	DI =	74.7	kN/m
Concentrated dead point load on primary beam, $P_{DL+SDL} =$		0.0	kN
Concentrated live point load on primary beam, $P_{LL} =$		0.0	kN
Shorter distance of primary beam point load from beam end, $a =$	:	0.000	m
Simply Supported			
M <sub>HOG</sub> =0.0=	Pab	0	kNm
$M_{SAG} = [0.125(1.4\omega_{DL+SDL}+1.6\omega_{LL})]L^2 + M_{max}(P=1.4P_{DL+SDL}+1.6\omega_{LL})]L^2 + M_{max}(P=1.4P_{DL+SDL}+1.6\omega_{LL}+1.6\omega_{LL})]L^2 + M_{max}(P=1.4P_{DL+SDL}+1.6\omega_{LL}+1.6\omega_{LL})]L^2 + M_{max}(P=1.4P_{DL+SDL}+1.6\omega_{LL}+1.6\omega_{LL})]L^2 + M_{max}(P=1.4P_{DL+SDL}+1.6\omega_{LL}+1$	DL Mmax. = <u>L</u>	149	kNm
$V = [0.500(1.4\omega_{DL+SDL}+1.6\omega_{LL})]L + R_A(P = 1.4P_{DL+SDL}+1.6\omega_{LL})]L + R_A(P $	/	149	kN
$\delta_{LL} = 5\omega_{LL} L^4 / (384 EI) + d_{centre} (P = P_{LL}) =$	<u>P[3]3a_4/9.137</u>	0.3	mm
$\frac{\delta_{LL} = 5\omega_{LL}L^4/(384\text{EI}) + d_{centre}(P = P_{LL}) = \delta_{SLS} = 5\omega_{SLS}L^4/(384\text{EI}) + d_{centre}(P = P_{DL+SDL} + P_{LL}) = \delta_{SLS} = 5\omega_{SLS}L^4/(384\text{EI}) + d_{centre}(P = P_{DL+SDL} + P_{LL}) = \delta_{SLS} = 5\omega_{SLS}L^4/(384\text{EI}) + d_{centre}(P = P_{DL+SDL} + P_{LL}) = \delta_{SLS} = 5\omega_{SLS}L^4/(384\text{EI}) + d_{centre}(P = P_{DL+SDL} + P_{LL}) = \delta_{SLS} = 5\omega_{SLS}L^4/(384\text{EI}) + d_{centre}(P = P_{DL+SDL} + P_{LL}) = \delta_{SLS} = 5\omega_{SLS}L^4/(384\text{EI}) + d_{centre}(P = P_{DL+SDL} + P_{LL}) = \delta_{SLS} = 5\omega_{SLS}L^4/(384\text{EI}) + d_{centre}(P = P_{DL+SDL} + P_{LL}) = \delta_{SLS} = 5\omega_{SLS}L^4/(384\text{EI}) + d_{centre}(P = P_{DL+SDL} + P_{LL}) = \delta_{SLS} = \delta_{SLS}L^4/(384\text{EI}) + \delta_{SL}L^4/(384\text{EI}) + \delta_{$	8 <i>E1</i> [L 1L/]	0.7	mm
continuous z Span			
$M_{HOG} = [0.125(1.4\omega_{DL+SDL}) + 0.125(1.6\omega_{LL})]L^2 + M_A(P = 1.4\omega_{DL+SDL}) + 0.125(1.6\omega_{LL})]L^2 + 0.125(1.6\omega_{LL})$		149	kNm
$M_{SAG} = [0.070(1.4\omega_{DL+SDL}) + 0.096(1.6\omega_{LL})]L^2 + M_C(P = 1)$		97	kNm
$V = [0.625(1.4\omega_{DL+SDL}) + 0.625(1.6\omega_{LL})]L + R_{B} = \frac{2}{2} \frac{1}{2} 1$	$L = P - R_B$	187	kN
$\delta_{LL} = \omega_{LL} L^4 / (185EI) + d_c (P = P_{LL}) = $	<u>Pa<sup>3</sup>b<sup>2</sup></u> (4L-a)	0.1	mm
	12616	0.3	mm
Continuous 3 Span (End Span) $M_{HOG} = [0.100(1.4\omega_{DL+SDL}) + 0.117(1.6\omega_{LL})]L^2 + M_A(P=1.4)$	M POLZ-02)	128	kNm
$M_{SAG} = [0.080(1.4\omega_{DL+SDL}) + 0.101(1.6\omega_{LL})]L^{2} + M_{C}(P = 100)M_{C}(P = 1$	- <u>P\$/2-30+ 63</u>	126	kNm
$V = [0.600(1.4\omega_{DL+SDL}) + 0.101(1.6\omega_{LL})]L + R_{B} = \frac{2}{2}/6 + 2$		182	kN
$\frac{1}{\delta_{LL} = \omega_{LL} L^4 / (185EI) + d_c (P = P_{LL}) = 0}$	L) Ma = P - MB	0.1	mm
$\delta_{SLS} = \omega_{SLS} L^4 / (185EI) + d_c (P = P_{DL+SDL} + P_{LL}) = 4c^4$	<u>Pab</u> (4L-a)	0.3	mm
Continuous 3 Span (Interior Span)			
$M_{HOG} = [0.100(1.4\omega_{DL+SDL}) + 0.117(1.6\omega_{LL})]L^2 + M_A(P=1.4\omega_{DL+SDL}) + 0.117(1.6\omega_{LL})]L^2 + 0.117(1.6$	1P MA=-Peb	128	kNm
$M_{SAG} = [0.025(1.4\omega_{DL+SDL}) + 0.075(1.6\omega_{LL})]L^2 + M_C(P=1.4)$		55	kNm
	P(?) (1+2 ?)	160	kN
$\delta_{LL} = \omega_{LL} L^4 / (384 \text{EI}) + d_{\text{max}} (P = P_{LL}) =$	2Pg 2 b3	0.1	mm
$\delta_{SLS} = \omega_{SLS} L^4 / (384 EI) + d_{max} (P = P_{DL+SDL} + P_{LL}) =$	3EI(3L-2a)2	0.1	mm
Continuous 4 or More Span (End Span)	a. 63 - 31		
$M_{HOG} = [0.107(1.4\omega_{DL+SDL}) + 0.121(1.6\omega_{LL})]L^2 + M_A(P = 1.4\omega_{DL+SDL}) + 0.121(1.6\omega_{LL})]L^2 + 0.120(1.6\omega_{LL})]L^2 + 0.120(1.6\omega_{LL})$		135	kNm
$M_{SAG} = [0.077(1.4\omega_{DL+SDL}) + 0.100(1.6\omega_{LL})]L^2 + M_C(P = 1)$	c= <u>'2(2-2+2)</u>	104	kNm
$V = [0.607(1.4\omega_{DL+SDL}) + 0.620(1.6\omega_{LL})]L + R R = \frac{2}{2} (b+2)$	$L = P - R_B$	183	kN
$\delta_{LL} = \omega_{LL} / (185EI) + d_c (P = P_{LL}) =$	Pa 32 (41-a)	0.1	mm
$\delta_{SLS} = \omega_{SLS} L^4 / (185EI) + d_c (P = P_{DL+SDL} + P_{LL}) =$	IZEILS	0.3	mm
Continuous 4 or More Span (Interior Span)	MAR-Pab	105	L(N)m
$M_{HOG} = [0.107(1.4\omega_{DL+SDL}) + 0.121(1.6\omega_{LL})]L^2 + M_A(P=1.4\omega_{DL+SDL}) + 0.081(1.6\omega_{LL})]L^2 + 0.081(1.6$		135	kNm
$ M_{SAG} = [0.036(1.4\omega_{DL+SDL}) + 0.081(1.6\omega_{LL})]L^2 + M_C(P=1.4\omega_{DL+SDL}) + 0.603(1.6\omega_{LL})]L + R_A(P=1.4\omega_{DL+SDL}) + 0.603(1.6\omega_{LL})]L + 0.603(1.6\omega_$	ης <u>=</u> <u>ι</u>	66 169	kNm kN
$\frac{ V  = [0.536(1.4\omega_{DL+SDL}) + 0.603(1.6\omega_{LL})]L + R_A(P=1.)}{\delta_{11} = \omega_{11}L^4/(384EI) + d_{max}(P=P_{11}) =  I }$	P(+2 +2)	0.1	mm
$\frac{ o_{LL} = \omega_{LL} / (384EI) + d_{max}(P = P_{LL}) =  }{\delta_{SLS} = \omega_{SLS} L^4 / (384EI) + d_{max}(P = P_{DL+SDL} + P_{LL}) =  }$	$\max = \frac{2Pq^2 b^3}{3EI(3L-2q)^2}$	0.1	mm
$\frac{\sigma_{SLS} = \omega_{SLS} \perp / (364 \pm 1) + u_{max}(P = P_{DL+SDL} + P_{LL}) = 1}{Note for udl loads (DL and SDL) uniform loading cons}$	idered ·	0.1	
For udl loads (LL) patch loading considered;			
For points loads (LL) patch loading considered, For points loads (DL, SDL and LL) patch loading consi	dered:		

0.017						Jak Nia			David
CON	SULTING	Engineerin	g Calculatio	on Sheet		Job No.	Sheet No.		Rev.
		Consulting				jXXX		4	
						Member/Location			
1.1. The	Manahan Di	Char		a a sita Da a m		Drg.			
				posite Beam	1 BS5950 V	-	Date	(11 (202)	Chd
Member De	esign - Stee	el Non Com	posite Bean	1		Made by XX		/11/202	Louid
		<b>.</b>							_
Primary B	eam Desig	gn Hogging	g						
		moment, M					0	kNm	
				uous beams			0	%	
ULS noggir	ng benaing	moment, M	$I_{ULS,HOG} = (1$	-RD)M <sub>ULS,HC</sub>	G,Elastic =		0	kNm	
ULS shear	force, $V_{ULS}$	=					149	kN	
Primary B	eam Desig	gn Sagging	]						
	a la sur P							1.01	_
		moment, M					149	kNm	_
ULS saggin	g bending i	moment, M	ULS,SAG = MU	JLS,SAG,Elastic	- κυ.Μ <sub>ULS,Η</sub>	OG,Elastic =	149	kNm	
_ · _									
Primary B	eam Live	Load Defle	ection						-
Live In 19	aflactic a						0.0		
	eflection, $\delta_{l}$						0.3	mm	
Live load d	eflection ut	ilisation = δ	5 <sub>LL</sub> / (L/360	) =			2%		ОК
Primary B	eam SLS L	Load Defle	ction						
<u></u>	<i>a</i>						-		_
	eflection, $\delta_{g}$						0.7	mm	_
				$\delta_{\text{DL}} = \delta_{\text{SLS}}$			0.4	mm	_
				load deflect	-			%	
				n with preca	/1	= (1-%pca	0.1	mm	
				$\delta_{LL} + \delta_{DL,p} =$	=		0.3	mm	
		ilisation = $\delta$					2%		ОК
Dead and s	superimpos	ed dead loa	d deflectior	n precambe	r, %pcam .	$\delta_{DL} =$	0.3	mm	
Primary B	eam ULS (	Connectior	1 Force						
		end of bean					149	kN	
		end of bean of beam =					149 0	kN kNm	

					Job No	).	Sheet No.		Rev.
	SULTING Engineer	-	on Sheet					-	
ENGI	[ <b>N E E R S</b> Consultin	ig Engineers			jXXX	×		5	
					Member/Lo	cation			
Job Title	Member Design - St	eel Non Com	posite Bearr	n BS5950 v	, Drg.				
Member D	esign - Steel Non Co	mposite Bean	n		Made by	XX	Date <b>21</b>	/11/202	1 <sup>Chd.</sup>
Secondar	y Beam Design								
	pport condition =		2.10			nply	Supported		
	width i.e. beam space		y 2 if eage	beam), t <sub>w</sub> =	=		1.500	m	
	including partitions), d load, SDL =	LL =					6.00 1.78	kPa kPa	_
	d load (from elevatio	n loading) Si					4.0	kPa kN/m	
	$d$ live load, $\omega_{LL} = LL$ .						9.0	kN/m	
	d dead load, $\omega_{DL+SDL}$ =		t + SDI	. =			16.2	kN/m	
	$1 \text{ SLS load, } \omega_{\text{SLS}} = (L)$						25.2	kN/m	
	JLS load, $\omega_{\text{ULS}} = (1.6)$						37.1	kN/m	
					CIEV	$\rightarrow$	5711		
	Simply Supported					-+			
·	$M_{HOG} = 0.0 =$				1	$\square$	0	kNm	
	M <sub>SAG</sub> =[0.125(1.4ω <sub>DI</sub>	+ <sub>SDL</sub> +1.6ωιι)]	]L <sup>2</sup> =				196	kNm	
	$V = [0.500(1.4\omega_{DL+SD})]$				1		120	kN	
	$\delta_{LL} = 5\omega_{LL}L^4/(384EI) =$						1.7	mm	
	$\delta_{SLS} = 5\omega_{SLS}L^4/(384EI)$						4.6	mm	
	Continuous 2 Spa	n							
	$M_{HOG} = [0.125(1.4\omega_D)]$	L+SDL)+0.125(	$(1.6\omega_{LL})]L^2 =$				196	kNm	
	$M_{SAG} = [0.070(1.4\omega_{DI})]$	_+SDL)+0.096(	$[1.6\omega_{LL})]L^2 =$				125	kNm	
	$V = [0.625(1.4\omega_{DL+SD})]$	L)+0.625(1.6	ω <sub>LL</sub> )]L=				151	kN	
	$δ_{LL}=5ω_{LL}L^4/(384EI)=$						1.7	mm	
	$\delta_{SLS} = \omega_{SLS} L^4 / (185EI)$	=					1.9	mm	
	Continuous 3 Spa								
	M <sub>HOG</sub> =[0.100(1.4ω <sub>D</sub>	<sub>L+SDL</sub> )+0.117(	$(1.6\omega_{LL})]L^2 =$				167	kNm	
	M <sub>SAG</sub> =[0.080(1.4ω <sub>DI</sub>						138	kNm	
	$V = [0.600(1.4\omega_{DL+SD})]$		ω <sub>LL</sub> )]L=				146	kN	
	$\delta_{LL} = 5\omega_{LL}L^4/(384EI) =$						1.7	mm	
	$\delta_{SLS} = \omega_{SLS} L^4 / (185EI)$		 }				1.9	mm	
	Continuous 3 Spa						167	L(N)ma	
	$M_{HOG} = [0.100(1.4\omega_D)]$ $M_{SAG} = [0.025(1.4\omega_D)]$						167 70	kNm kNm	
	$M_{SAG} = [0.025(1.4\omega_{DI})]$ V=[0.500(1.4 $\omega_{DL+SD}$						128	kN	
	$\delta_{LL} = 5\omega_{LL}L^4/(384EI) =$		/@[[/] <b>L</b> —				1.7	mm	
	$\delta_{\text{SLS}} = \omega_{\text{SLS}} L^4 / (384\text{EI})$						0.9	mm	
	Continuous 4 or M		nd Snan)			-+	0.2		1
	$M_{HOG} = [0.107(1.4\omega_D)]$						176	kNm	
	$M_{SAG} = [0.077(1.4\omega_{DI})]$				1		135	kNm	
	$V = [0.607(1.4\omega_{DL+SD})]$						147	kN	
	$\delta_{LL} = 5\omega_{LL}L^4/(384EI) =$				1		1.7	mm	
	$\delta_{SLS} = \omega_{SLS} L^4 / (185EI)$						1.9	mm	
	Continuous 4 or M		nterior Spa	an)					
	M <sub>HOG</sub> =[0.107(1.4ω <sub>D</sub>						176	kNm	
	M <sub>SAG</sub> =[0.036(1.4ω <sub>DI</sub>						84	kNm	
	V=[0.536(1.4 <sub>0DL+SD</sub>		ω <sub>LL</sub> )]L=				135	kN	
	$\delta_{LL}=5\omega_{LL}L^4/(384EI)=$						1.7	mm	
	$\delta_{SLS} = \omega_{SLS} L^4 / (384 EI)$						0.9	mm	
	Note for udl loads (	,		ding consid	lered;				
	For udl loads (LL) p	atch loading o	considered;						
									<b>_</b>
					-				

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E N G I	N E E R S	Consulting	Engineers			jXXX		6	
						Member/Location			
Job Title	Mombor D	l esign - Stee	Non Com	nocito Boar	BC5050 V	Drg.			
		_	-		1033330 4	Made by XX	Date <b>ว</b> 1	1/11/2021	ıChd.
Member De	esign - Stee	el Non Com	posite bean			XX	Z	/11/2021	
		l	-						
Secondary	y Beam De	esign Hogg	ling						
	a la caralta a							1.51	
		moment, M					0	kNm	
		ing momen					0	%	
ULS hoggir	ig bending	moment, M	$I_{ULS,HOG} = (1$	RD)M <sub>ULS,HC</sub>	)G,Elastic =		0	kNm	
ULS shear	force, $V_{ULS}$	-					120	kN	
Secondary	y Beam De	esign Sagg	ing						
		moment, M					196	kNm	
ULS saggin	g bending i	moment, M	ULS,SAG = ML	JLS,SAG,Elastic	⊦ кD.M <sub>ULS,Н</sub>	OG,Elastic =	196	kNm	
		L							
Secondary	y Beam Liv	ve Load De	flection						
	<b>a</b>								
	eflection, $\delta_{L}$			ļ			1.7	mm	
Live load d	eflection ut	$tilisation = \delta$	δ <sub>LL</sub> / (L/360)	) =			9%		ОК
Secondary	y Beam SL	S Load De	flection						
	eflection, $\delta_S$						4.6	mm	
-		ed dead loa					3.0	mm	
_		nd superimp						%	
		ed dead loa			/1	= (1-%pca	0.6	mm	
SLS load d	eflection wi	ith precamb	er, $\delta_{SLS,p} =$	$\delta_{LL} + \delta_{DL,p} =$	=		2.3	mm	
SLS load de	eflection uti	ilisation = $\delta$	S <sub>SLS,p</sub> / (L/20	) =			7%		ОК
Dead and s	superimpos	ed dead loa	d deflectior	n precambe	r, %pcam .	$\delta_{DL} =$	2.4	mm	
Secondary	y Beam UL	S Connect	ion Force						
Momont at		end of bean					120	kN	
moment dt		end of bean of beam =					120 0	kN kNm	
moment dl							-		
							-		
							-		
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							-		
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	ISULTING	-	-	n Sheet				7	_
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						Member/Location			
Job Title	Member De	-			า BS5950 v	Drg.			
Member D	esign - Stee	l Non Com	posite Bean	1		Made by XX	Date <b>21</b>	/11/2021	Chd.
Primary E	Beam Cons	truction							
Turne of our						Circondu			
	pport condit		l (dividad b	v 2 if odgo	hoam) t		Supported 3.250		
Constructi		ani spacing		y z ii euge	beam), t <sub>w</sub> :	=	0.50	m kPa	
	d live load, a	. – constr	uction load	+ -			1.6	kN/m	
	d dead load, d			<sub>w</sub> –			21.3	kN/m	
	JLS load, ω <sub>UI</sub>			oad + 1.4D	  ).t., =		32.4	kN/m	
	oped constru					ts. and vice			
(11020 2102									
	Simply Su	pported							
	M <sub>HOG</sub> =0.0=						0	kNm	
			1.6ω <sub>LL</sub> )]L <sup>2</sup> =				65	kNm	
		$1.4\omega_{DL}+1.6$					65	kN	
	Continuou								1
			+0.125(1.6	ω <sub>LL</sub> )]L <sup>2</sup> =			65	kNm	
			-0.096(1.6				37	kNm	
			525(1.6ω <sub>LL</sub> )				81	kN	
	Continuou	ıs 3 Span	(End Span	)					
	M <sub>HOG</sub> =[0.10	00(1.4ω <sub>DL</sub> )-	+0.117(1.6	ນ <sub>LL</sub> )]L <sup>2</sup> =			53	kNm	
	M <sub>SAG</sub> =[0.08	30(1.4ω <sub>DL</sub> )+	-0.101(1.6	ຍ <sub>LL</sub> )]L <sup>2</sup> =			42	kNm	
	V=[0.600(	1.4ω <sub>DL</sub> )+0.0	517(1.6ω <sub>LL</sub> )	]L=			78	kN	
			(Interior S						
			+0.117(1.6				53	kNm	
			-0.075(1.6a				15	kNm	
			583(1.6ω <sub>LL</sub> )				66	kN	
			re Span (E						
			+0.121(1.6				56	kNm	
			-0.100(1.6				41	kNm	
			520(1.6ω <sub>LL</sub> )	-			79	kN	
			re Span (I	-	an)		FC	LaNtara	
			+0.121(1.6)				56	kNm	
			+0.081(1.6α 503(1.6ω <sub>LL</sub> )				21 70	kNm kN	
					only whilet	II includor	patch load		
	NOLE DL an			in ioauniy		LL IIICIUUES	βρατεπισαυ	ing as well.	
Primary G	Beam Cons	truction H	ogging						
			ציייצפי						
ULS const	ruction hogg	ing momer	nt, Mulis constr				0	kNm	
	tion of hogg				s, RD =		0	%	1
	ruction hogg					nstruct,HOG =	0	kNm	
	ruction shea					,	65	kN	
Primary E	Beam Cons	truction Sa	agging						
	ruction sagg						65	kNm	
ULS const	ruction sag r	moment, M	ULS,construct,SA	$_{\rm G}$ = M <sub>ULS,con</sub>	struct,SAG + F	RD.M <sub>ULS,const</sub>	r 65	kNm	
									<b>_</b>
									<u> </u>
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CON						Job No.	Sheet No.		Rev.
	SULTING N E E R S	-	-	n Sheet		jXXX		8	
ENGI	NEERS	consulting	Engineers	I		_		0	
						Member/Location			
	Member De	-			n BS5950 v	, Drg.	Dete		deal
Member De	esign - Stee	I Non Com	oosite Bearr	<b>ו</b>		Made by	Date 21	/11/2021	una.
Secondar	y Beam Co	nstruction							
Secondary	y Beam Co								
Type of su	oport condit	ion =				Simply	/ Supported		
	vidth i.e. be		(divided b	y 2 if edge	beam), t <sub>w</sub> :		1.500	m	
Constructio							0.50	kPa	
Unfactored	live load, a	o <sub>LL</sub> = constr	uction load	. t <sub>w</sub> =			0.8	kN/m	
	dead load,						9.5	kN/m	
	LS load, $\omega_{UI}$						14.5	kN/m	
(Note prop	ped constru	ction will n	ot produce	any constru	uction effec	ts, and vic	e versa)		
	Simply Su						-	1.51	
	$M_{HOG} = 0.0 =$		1 6 0 11 2				0	kNm kNm	
	M <sub>SAG</sub> =[0.12 V=[0.500(1						77 47	kNm kN	
	Continuou		₩LL <b>/]└─</b>				4/		
		-	-0.125(1.6	$(p_{11})^{11^2} =$			77	kNm	
			-0.096(1.60				44	kNm	
			525(1.6ω <sub>LL</sub> )				59	kN	
			End Span						
	M <sub>HOG</sub> =[0.10	00(1.4ω <sub>DL</sub> )+	-0.117(1.60	ω <sub>LL</sub> )]L <sup>2</sup> =			62	kNm	
	M <sub>SAG</sub> =[0.08	30(1.4ω <sub>DL</sub> )+	0.101(1.60	$\omega_{LL})]L^2 =$			50	kNm	
	V=[0.600(	1.4ω <sub>DL</sub> )+0.6	517(1.6ω <sub>LL</sub> )	]L=			57	kN	
			Interior S						
			-0.117(1.6				62	kNm	
	$M_{SAG} = [0.02]$						18	kNm	
			583(1.6ω <sub>LL</sub> )				48	kN	
	Continuou		<u> </u>					L.N.I.	
	$M_{HOG} = [0.10]$		-0.121(1.60 -0.100(1.60				66	kNm	
			520(1.6ω <sub>LL</sub> )	== =			48	kNm kN	
		-		ı∟– nterior Spa	an)		57	KIN	
			-0.121(1.6d		,		66	kNm	
			0.081(1.60				24	kNm	
			503(1.6ω <sub>LL</sub> )				51	kN	
				-	only whilst	LL includes	patch load	ing as well.	, ,
									1
Secondary	y Beam Co	nstruction	Hogging						
	uction hogg						0	kNm	
	ion of hogg						0	%	
	uction hogg			$_{\rm ruct,HOG} = (1)$	-RD)M <sub>ULS,col</sub>	$_{\rm nstruct,HOG} =$	0	kNm	
ULS constr	uction shea	r torce, V <sub>UL</sub>	S,construct =				47	kN	
Sacarda	Boom Co	nctru et	Sagira						
Secondary	y Beam Co	IISTRUCTION	sayying						
ULS constr	uction sagg	ina momen	t. Mure				77	kNm	
	uction sagg				struct SAG + F	L RD.Mulis const		kNm	
		/ • •	ses, construct, SA		Struct, SAG · ·	013,0015			
							1		

CON						Job No.	Sheet No.		Rev.
	SULTING N E E R S			on Sheet		jXXX		9	
ENGI	NEEKS	consulting	Lingineers			_		9	
						Member/Location			
ob Title		-		posite Bean	n BS5950 v	Drg.	-		I
1ember D	esign - Stee	el Non Comp	oosite Bean	1 		Made by XX	Date 21	/11/2021	ihd.
-	<b>Primary Be</b> s not entere	-		Encuro m	pogligible	and intern	al boam col	lactad: Ena	cina ic
	butary; Lock								
-	sign for firs		48	beams		iple Primary			
chonn ac			10	beams	Mult		Deam Des		
Beam	-		Spacing	Cladding	P <sub>DL+SDL</sub>	P <sub>LL</sub>	а	Span	
Ref	Sec	tion	(m)	(kN/m)	(kN)	(kN)	(m)	(m)	
B1-3RD	UC 203x203x4	6 💌	1.150	0.0	0.0	0.0	0.000	5.500	
B3-3RD	UC 203x203x4	6 🔻	1.200	0.0	0.0	0.0	0.000	4.750	
B4-3RD	UC 203x203x4	6 🔻	2.600	0.0	0.0	0.0	0.000	5.500	
B5-3RD	UC 152x152x2	3 🔻	2.500	0.0	0.0	0.0	0.000	2.700	
B6-3RD	UC 152x152x3	7 🗸	2.600	0.0	0.0	0.0	0.000	4.500	
B7-3RD	UC 203x203x4	6 🗸	2.950	0.0	0.0	0.0	0.000	5.300	
B9-3RD	UC 203x203x5		2.750	7.5	0.0	0.0	0.000	5.500	
	UC 203x203x5		4.100	0.0	0.0	0.0	0.000	5.300	
	UC 203x203x5		3.600	4.0	0.0	0.0	0.000	5.400	
	UC 203x203x4		2.250	0.0	0.0	0.0	0.000	5.300	
	UC 203x203x4		2.750	0.0	0.0	0.0	0.000	5.500	
	UC 203x203x5		2.100	0.0	0.0	0.0	0.000	6.500	
	UC 203x203x4		4.000 2.600	0.0 20.0	32.0 0.0	0.0	0.200	4.900 5.500	
B5-4TH	UC 203x203x7		2.500	20.0	0.0	0.0	0.000	2.750	
B7-4TH	UC 152x152x2 UC 203x203x5		3.700	0.0	0.0	0.0	0.000	5.500	
	UC 203x203x5		2.750	7.5	129.0	0.0	0.900	5.400	
	UC 254x254x8		4.200	0.0	169.0	0.0	1.000	5.300	
	UC 254x254x8		3.600	4.0	156.0	0.0	1.000	5.300	
	UC 203x203x4		4.500	0.0	42.0	0.0	0.200	4.900	
	UC 203x203x4		3.250	7.5	0.0	0.0	0.000	4.500	
	UC 203x203x5		2.250	0.0	104.0	0.0	0.700	5.300	
	UC 203x203x4		2.600	20.0	0.0	0.0	0.000	4.500	
B2-5TH	UC 203x203x4	6 🔻	0.625	0.0	0.0	0.0	0.000	2.700	
B4-5TH	UC 203x203x4	6 🗸	2.200	4.2	0.0	0.0	0.000	4.500	
B5-5TH	UC 203x203x4	6 🗸	2.275	4.2	13.6	0.0	0.600	5.500	
B6-5TH	UC 203x203x5	2 🔻	2.800	7.5	25.2	0.0	1.300	4.650	
B7-5TH	UC 203x203x6	0 🗸	4.100	0.0	38.6	0.0	1.300	4.500	
B8-5TH	UC 203x203x7		3.600	4.0	34.6	0.0	1.300	4.500	
B9-5TH	UC 203x203x5		2.250	0.0	22.2	0.0	1.300	4.500	
	UC 203x203x4		0.625	0.0	0.0	0.0	0.000	5.100	
	UC 203x203x4		3.050	0.0	0.0	0.0	0.000	5.500	
	UC 152x152x2		1.875	0.0	0.0	0.0	0.000	3.200	
B17-5TH B20-5TH	UC 203x203x6		3.000	0.0 7.5	0.0	0.0	0.000	5.600 4.400	
	UC 152x152x3		1.400	0.0	0.0	0.0	0.000	4.400	
	UC 152x152x2 UC 203x203x4		3.700	0.0	53.5	0.0	0.300	4.130	
	UC 203x203x4 UC 203x203x7		2.250	0.0	0.0	0.0	0.000	6.500	
	UC 203x203x7		1.500	7.5	57.0	0.0	0.200	4.700	
B2-6TH	UC 152x152x2		1.303	0.0	0.0	0.0	0.000	4.900	
B4-6TH	UC 152x152x2		1.303	0.0	0.0	0.0	0.000	4.500	
B5-6TH	UC 203x203x4		3.172	0.0	11.4	0.0	0.600	5.200	
B7-6TH	UC 152x152x2		2.180	0.0	0.0	0.0	0.000	4.100	
B9-6TH	UC 203x203x4		5.550	0.0	0.0	0.0	0.000	4.700	
B12-6TH	UC 203x203x7	1 🔻	4.440	0.0	0.0	0.0	0.000	5.500	
B18-6TH	UC 203x203x4	6 🔻	5.155	0.0	0.0	0.0	0.000	4.500	
B21-6TH	UC 203x203x4	6 🗸	1.300	0.0	89.0	0.0	0.200	4.500	
	UC 254x254x7		3.050	0.0	0.0	0.0	0.000	6.400	

CON	SULTING	Engineering	a Calculatio	on Sheet		Job No.	Sheet No.	Rev.
	NEERS					jXXX	:	10
						Member/Location		
ob Title	Member De	sign - Stee	I Non Com	posite Beam	1 BS5950 v	Drg.		
	esign - Stee	_	-			Made by XX	Date 21	/11/2021 <sup>Chd.</sup>
	Maximum ι	utilisation =					100%	
Beam	Design	Design	LL	Utilisation SLS		Construct		
Ref	Sag	Hog	Defin	Defin	Sag	Hog	Overall	
B1-3RD	36%	36%	14%	34%	36%	36%	36%	
B1 SRD B3-3RD	36%	36%	10%	23%	36%	36%	36%	
B4-3RD	54%	36%	32%	73%	69%	36%	73%	
B5-3RD	36%	36%	14%	31%	36%	36%	36%	
B6-3RD	60%	25%	37%	83%	67%	25%	83%	
B7-3RD	57%	36%	33%	74%	71%	36%	74%	1
B9-3RD	73%	33%	30%	98%	59%	33%	98%	1
B11-3RD	70%	33%	40%	89%	78%	33%	89%	
B12-3RD	75%	33%	37%	98%	72%	33%	98%	
B13-3RD	44%	36%	25%	57%	55%	36%	57%	
B17-3RD	58%	36%	34%	78%	73%	36%	78%	
B28-3RD	55%	33%	38%	86%	70%	33%	86%	
B29-3RD	71%	41%	35%	83%	78%	36%	83%	
B4-4TH	80%	32%	19%	100%	36%	26%	100%	
B5-4TH	81%	37%	14%	75%	38%	36%	81%	
B7-4TH	68%	33%	40%	90%	78%	33%	90%	
B12-4TH	90%	42%	16%	91%	29%	20%	91%	
B13-4TH	85%	52%	15%	71%	33%	31%	85%	
B14-4TH	82%	50%	13%	68%	31%	31%	82%	
B25-4TH	81%	49%	40%	94%	87%	36%	94%	
B29-4TH	62%	36%	22%	69%	51%	36%	69%	
B34-4TH	88%	52%	22%	94%	44%	33%	94%	
B40-4TH	81%	37%	18%	91%	41%	36%	91%	
B2-5TH	36%	36%	1%	2%	36%	36%	36%	
B4-5TH	40%	36%	15%	45%	36%	36%	45%	
B5-5TH	68%	36%	28%	90%	61%	36%	90%	
B6-5TH	71%	33%	18%	76%	39%	33%	76%	
B7-5TH	68%	29%	21%	67%	43%	28%	68%	
B8-5TH	57%	27%	15%	54%	30%	26%	57%	
B9-5TH	44%	33%	13%	44%	33%	33%	44%	
B10-5TH	36%	36%	6%	15%	36%	36%	36%	
B11-5TH	64%	36%	38%	86%	81%	36%	86%	
B16-5TH	37%	36%	17%	38%	42%	36%	42%	
B17-5TH	50%	28%	30%	67%	55%	28%	67%	
B20-5TH	60%	31%	17%	85%	34%	31%	85%	
B23-5TH	46%	36%	27%	62%	63%	36%	63%	
B24-5TH	74%	48%	33%	84%	72%	36%	84%	
B30-5TH	44%	26%	28%	64%	48%	26%	64%	
B35-5TH	51%	43%	12%	56%	36%	36%	56%	
B2-6TH	60%	36%	42%	95%	93%	36%	95%	
B4-6TH	50%	36%	33%	74%	74%	36%	74%	
B5-6TH	64%	36%	33%	80%	72%	36%	80%	
B7-6TH	69%	36%	41%	93%	94%	36%	94%	
B9-6TH	84%	37%	43%	97%	96%	36%	97%	
B12-6TH	61%	26%	33%	75%	61%	26%	75%	
B18-6TH	71%	36%	35%	79%	80%	36%	80%	
B21-6TH	36%	47%	9%	31%	36%	36%	47%	
	44%	38%	24%	55%	53%	38%	55%	1

