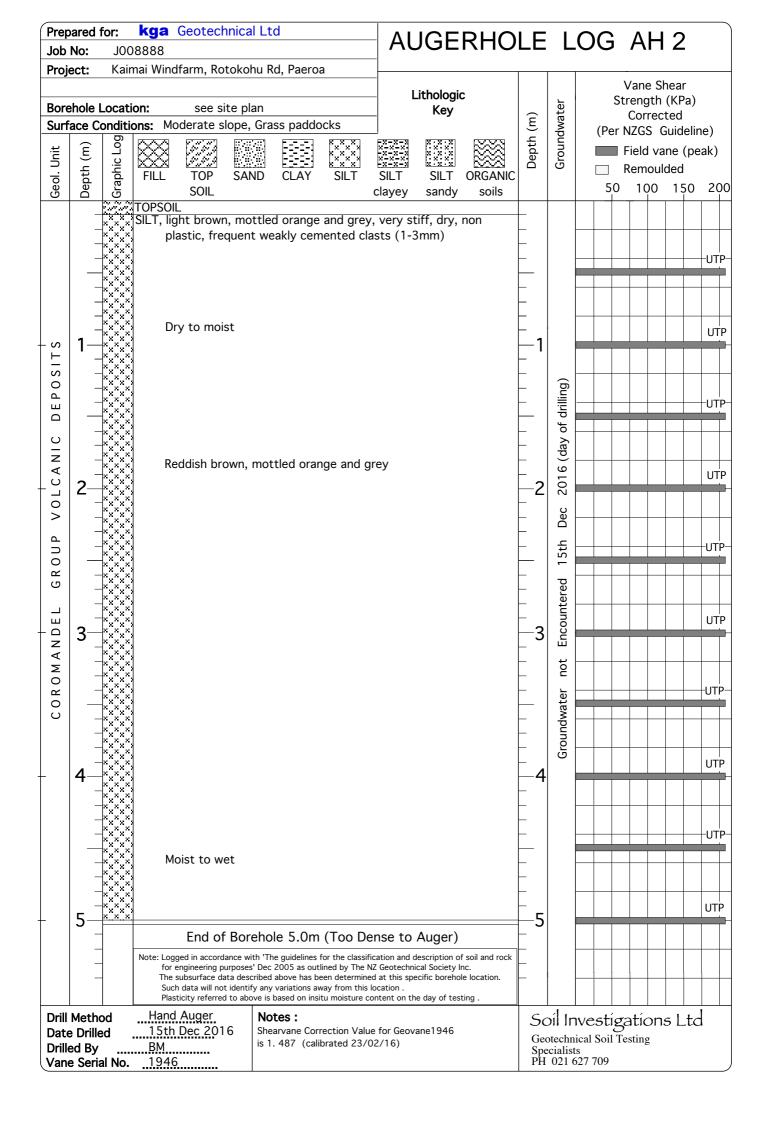
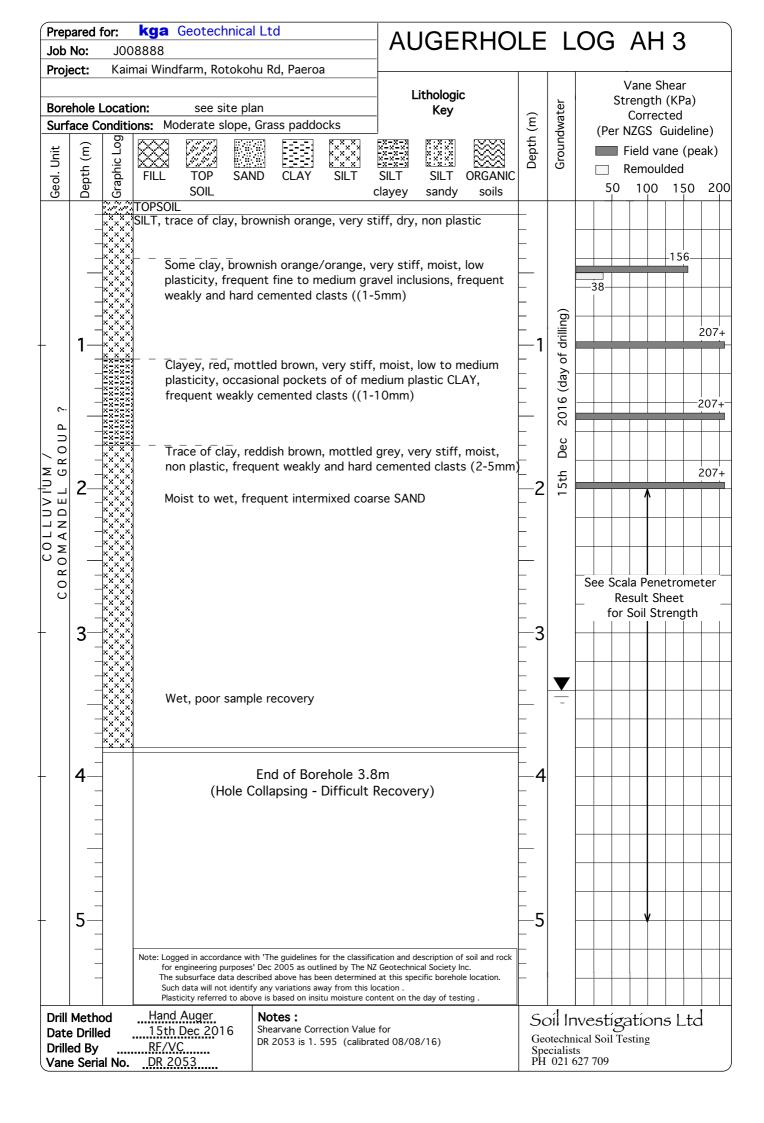


# **APPENDIX 1**

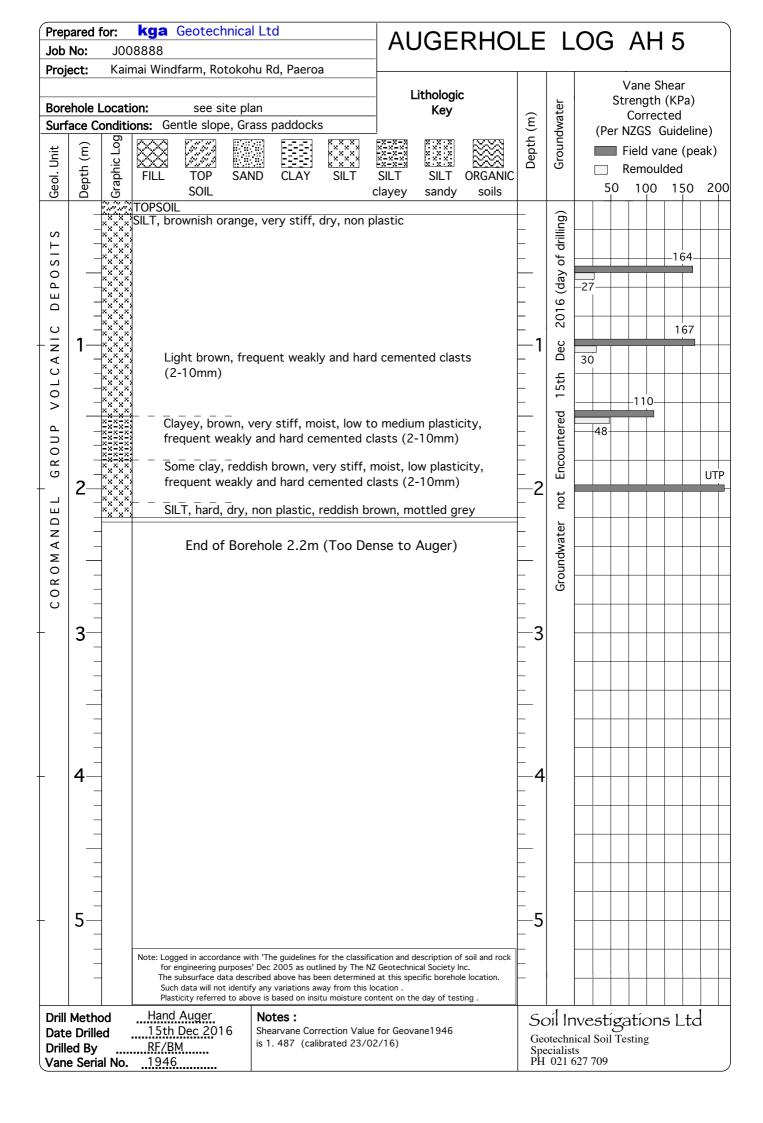
Boreholes Logs

	ared f		kga Geotechnica	l Ltd		- Al	JGE	RHO	LE	L	00	A 6	H 1		
Job N Proje			8888 nai Windfarm, Rotokol	u Pd Paero	2	-								1	
Bore	hole L	.ocati	on: see site pl	an		_	_ithologic Key	2	(	ater		Stren	ie Shea gth (Kl rrecteo	Pa)	
Surfa	ice Co		ons: Gentle slope, Gra	ass paddocks					(m)	Mp	(P		S Guid		)
Geol. Unit	Depth (m)	Graphic Log	FILL TOP SAN SOIL		***** ***** SILT	SILT clayey	SILT sandy	ORGANIC soils	Depth (m)	Groundwater		Ren	d vane nouldec 00 1	ł	k) 200
UVI <sup>I</sup> UM / <sup>I</sup> COLLUVIUM / VDEL GROUP ? ALLUVIUM	- - - - - - - - - - - - - - - - - - -		TOPSOIL SILT, brownish orange Some clay, brow Clayey, light bro gravel inclusions SILT, some clay, oran sensitive, moist Frequent weakly	vnish orange own, stiff, mo s, occasional ge, mottled low plasticit v cemented o	, very stil bist, low p minor or brown an ty clasts (1-	ff, moist plasticity ganic ind d grey, 5mm)	v, frequer clusions very stiff	nt fine	1	15th Dec 2016 (day of drilling)	24		116		
COROMAN			Trace of clay, re stiff, sensitive, cemented clasts inclusions (1-2n SILT, orange, hard, m	moist, non to s (1-5mm), c nm)	o low plas occasiona	sticity, f	requent v				·12	1`	10		JTP
DEPOSITS	3	<u>x''x''x'</u>		prehole 3.0r		Dense t	o Auger	·)	-3	_					
VOLCANIC									  						
GROUP	<b>4</b>  								4  						
COROMANDEL									- - - - - - 5						
			Note: Logged in accordance wi for engineering purposes The subsurface data dess Such data will not identif Plasticity referred to abo	' Dec 2005 as out ribed above has be y any variations av	lined by The N een determine way from this	IZ Geotechn ed at this sp location .	ical Society Ir ecific borehol	nc. le location.							
Date Drille	Metho Drille d By Seria	d	Hand Auger 15th Dec 2016 VC/BM 1946	e for Geov )2/16)	ane1946		Soil Investigations Ltd Geotechnical Soil Testing Specialists PH 021 627 709								

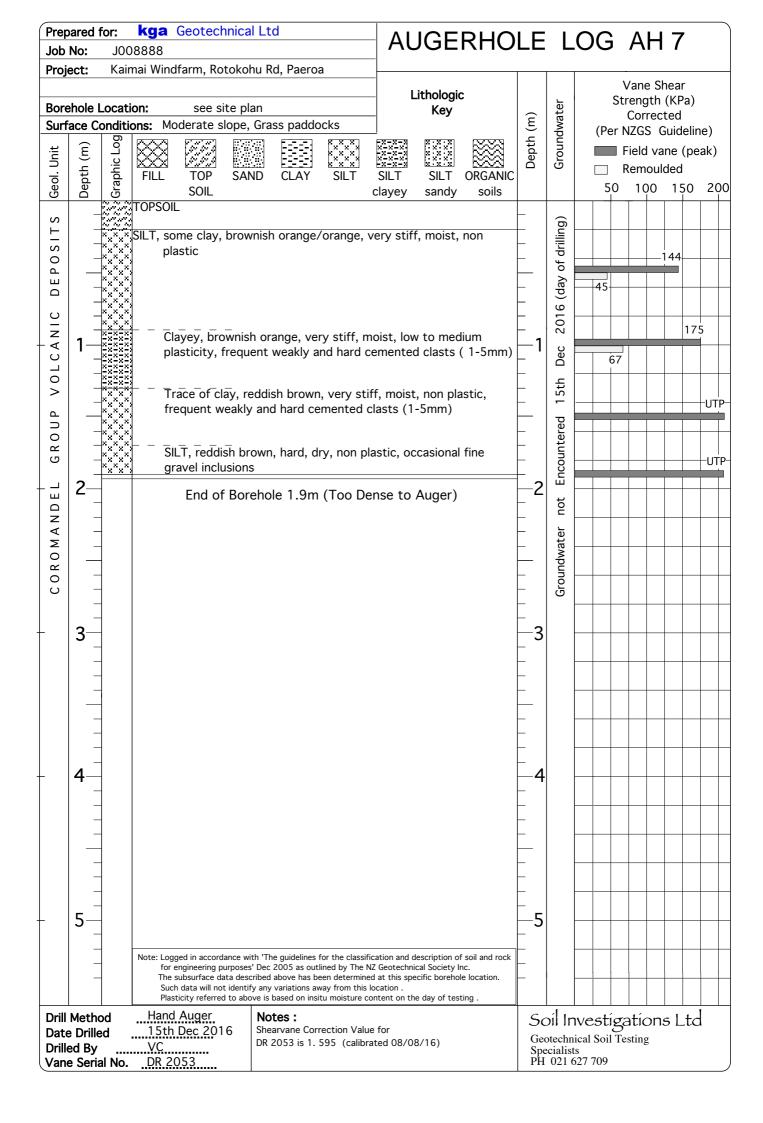




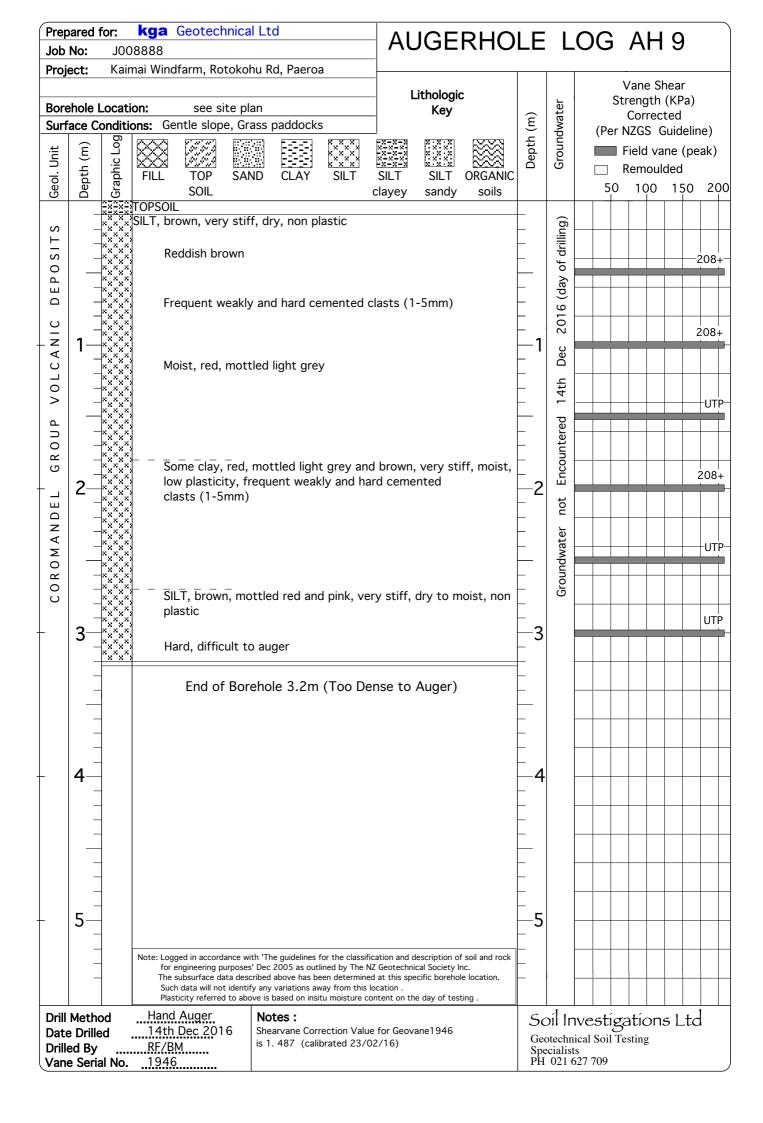
Prep Job	ared f		kga Geotechnica 8888	l Ltd	AUGERHO	LE	L	OG	Aŀ	14	
			nai Windfarm, Rotoko	hu Pd. Paeroa							
Proje		r\dlf	וומו איוויטומוווו, אטנטאט	nu nu, raeiva					Vane	Shear	
Pore	ehole I	oosti	on: see site pl	<u></u>	Lithologic		5	5		h (KPa)	)
			ons: Gentle slope, Gr		Кеу	Ê	Groundwater		Corre		
Jun		1			j Farara atata notona -	Depth (m)	hdv			Guidel	
Geol. Unit	Depth (m)	Graphic Log				ept	Lou			vane (p	eak)
). 	oth	phi	FILL TOP SA	ND CLAY SILT	SILT SILT ORGANIC		0		Remo	ulded	
Geo			SOIL	(	clayey sandy soils			50	) 100	) 150	200
	_		TOPSOIL		1	_					
ΤS	_	× × × × × × × × × × × ×	SIL1, brownish orang	e, very stiff, dry, non p	lastic	_	of drilling)				
S I	_	× × × × ×				_	drill			.	
0		××××× ×č×č×		vnish orange, very stiff		-	of		107		
Ш	_	×^×^× × × × ×	plasticity, occas	sional fine gravel inclusi	ons	_	(day	-15			
	_	×××× ×××××				_	o ا				
<u> </u>	-	îxîxî; Xxxxx,	SILT, reddish br	own, very stiff, moist,	non plastic, frequent	-	201				+++
z V	1	× × × ×	weakly and hare	d cemented clasts (1-5	mm)	_1					UTP
U	' _	xxxx xxxx				- '	Dec				
0 L	_		Becomes dry, h	ard, difficult to auger		-	ب				UTP-
>		<u>~ ~ ~</u>					15th				
4			End of Bor	ehole 1.3m (Too Dei	nse to Auger)		σ				
n o	_					_	ere		_		
<u>~</u>							nut				
G	_					_	Encountered				
	2—					-2					
							not				
Z V	_					_	er				
Σ	_					_	Groundwater				
R O							pur				
0 0	_						Gro				
	_					_					
	3					3					
	່ _										
	_					_					
						_					
	-					-					
						-					
†	4					4					+
	_							-   -	$\parallel$	$\parallel$	$\parallel$
	_					$\vdash$					
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	_					_		-   -	$\parallel$	$\parallel$	$\parallel \parallel$
	_					$\vdash$					
						$\vdash$			++		+
↓	5—					5		-   -	$\square$		
	<b>-</b>										
	-				ation and description of soil and rock				++		+
			for engineering purpose	s' Dec 2005 as outlined by The NZ					$\square$		
			Such data will not identi	fy any variations away from this lo ove is based on insitu moisture co	cation .						
Drill	Metho	d d	Hand Auger	Notes :		5,	ما ا	vestíg	ratio	nel +	
1	e Drille		15th Dec 2016	Shearvane Correction Value				ical Soil			<b>ч</b>
	ed By		BM	is 1. 487 (calibrated 23/02	2/16)	Spe	cialis	ts	resung		
Vane	e Seria	al No.	1946			PH	021 0	527 709			

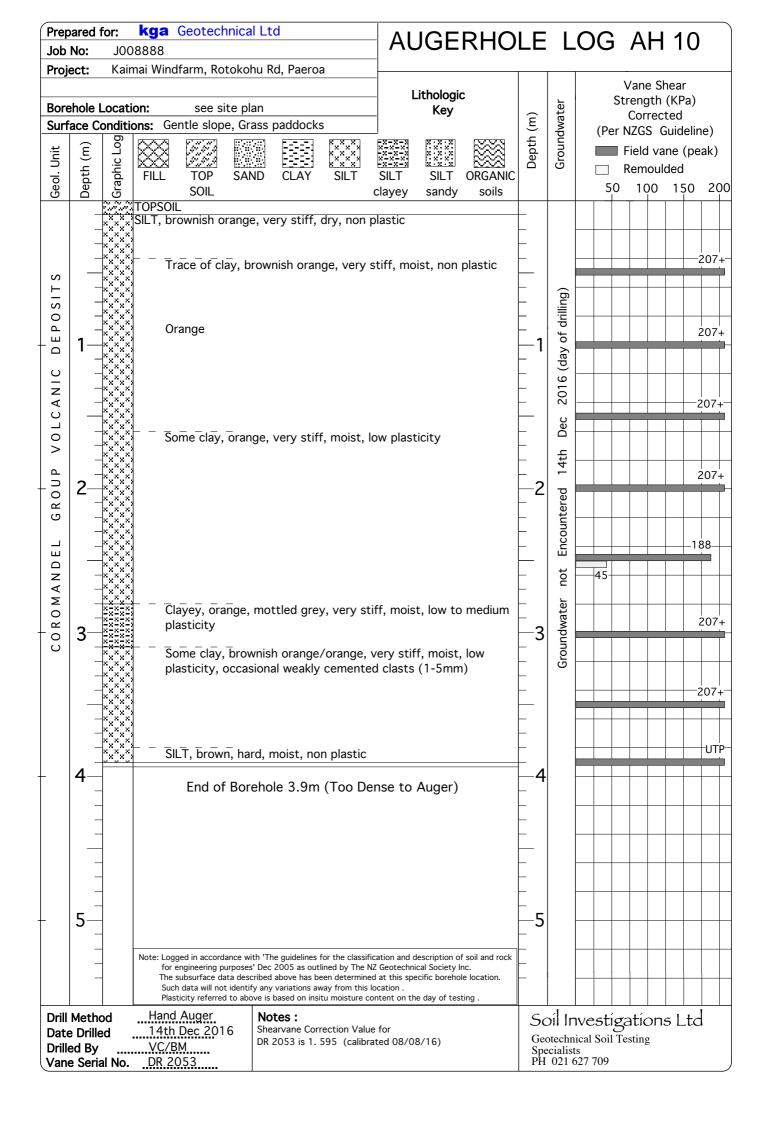


Prep Job	oared f No:		<b>kga</b> 8888	Geotech	nical Lt	d		AL	JGE	RHO	LE		OG	А	Η	6	
Proj	ect:	Kain	nai Wind	lfarm, Ro	tokohu R	d, Paero	а	_									
	ehole L ace Co			see si oderate sl	te plan	ss paddo	ocke	L	ithologic. Key	C	Э Э	vater		Stren Cor	rect	KPa) ed	
Geol. Unit	Depth (m)	Graphic Log	FILL	TOP SOIL	SAND	CLAY		SILT clayey	SILT sandy	ORGANIC soils	Depth (m)	Groundwater	(Pe	Field Rem	d var nould	uidelin ne (pe led 150	-
DEPOSITS			gr	ownish o avel inclu	sions			plastic, f	requent	fine		(day of drilling)					207+
CANIC	 1		B6	End of				ense to	Auger)		_ 1	Dec 2016					UTP
P VOL											  	15th					
GROU	_ _ _										-	Encountered					
MANDEL	2							2 	ater not								
CORON												Groundwater					
-	3										3 3						
_	 4										_ 4						
+	5— – –			ged in accorda						f soil and rock nc.	5 						
	_		Such	subsurface da n data will not ticity referred	identify any	variations av	vay from this	location .									
Date Drille	Metho Drille ed By e Seria	ed	Hand 15th VC/B	Auger Dec 201	ue for Geova 02/16)		-	Soil Investigations Ltd Geotechnical Soil Testing Specialists PH 021 627 709									

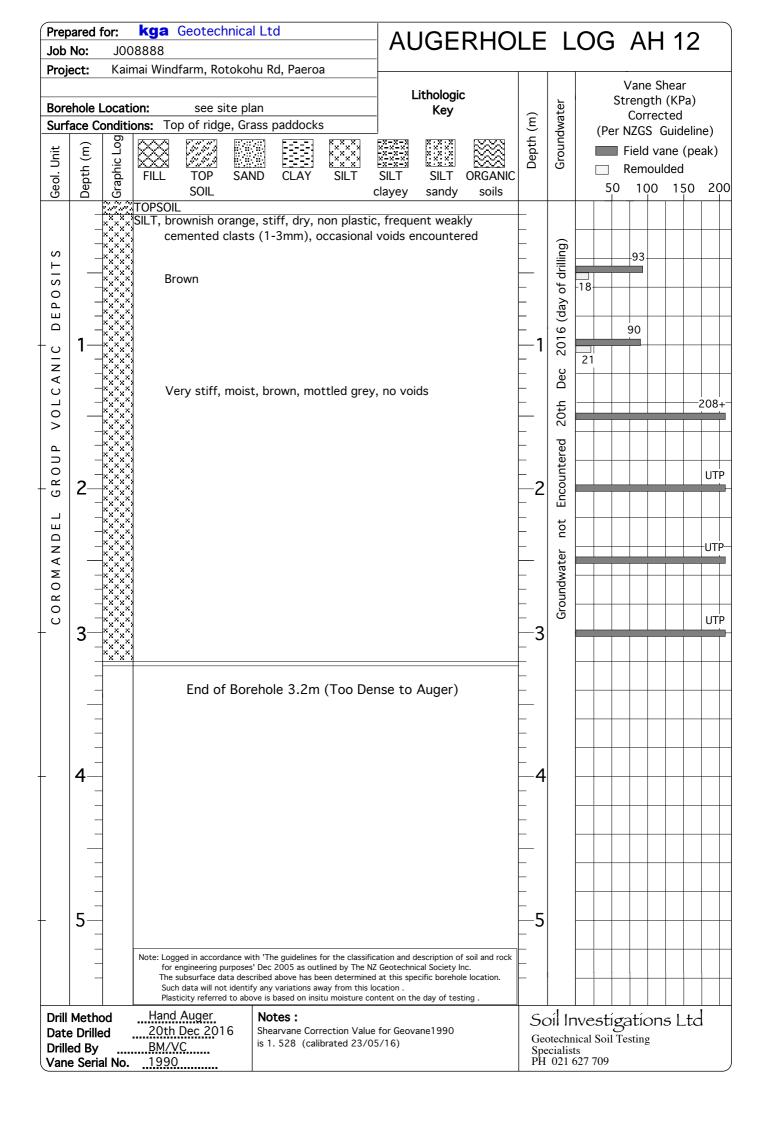


Prep Job	ared f		<b>kga</b> 8888	Geotech	nical Lt	d		AL	JGE	RHO	LE		0	G	Α	Η 8	3	
Proje				lfarm, Ro	tokohu R	d, Paeroa	а								_			
Bore	ehole L	_ocati	on:	see si	te plan			L	ithologic. Key	2	(L	ater			reng	e Shea Ith (K recteo	Pa)	
Geol. Unit Jung	Depth (m) ac	Graphic Log	ons: Ge	entle slope TOP SOIL	e, Grass SAND	paddocks CLAY	s ***** **** SILT	 SILT clayey	SILT sandy	ORGANIC soils	Depth (m)	Groundwater			NZGS Field	5 Gui vane oulde	delin (pea	
TS 0		$\tilde{a}$	TOPSOI SILT, br		range, ve	ery stiff,	dry, non				_	g)						
CANIC DEPOSI			pl Co <u>-</u>	ome clay, asticity ommon w LT, browr emented o	eakly cer n, hard, r	mented c noist, no	clasts (1-	5mm)			- - - - -	2016 (day of drilling)				15	2	UTP
P VOL(	-			End of	Boreho	le 1.0m	(Too De	ense to	Auger)		_  	15th Dec						
GROUF											 	Encountered						
NDEL	2							_ 2	not Enco									
ROMA												Groundwater n						
C 0												Ground						
_	3— 										3 							
											_ 							
	  4										_ _ 							
											_							
											_ _ 5							
			for The	engineering pu subsurface da	urposes' Dec ta described	2005 as out above has be	lined by The I een determin	NZ Geotechni ed at this spe	cal Society Ir									
Date Drille	Metho Drille ed By e Seria	. d	Plas Hand 15th BM	h data will not ticity referred Auger Dec 201	to above is <b>No</b> 6 She	based on insi <b>tes :</b> arvane Corr		ontent on th		ting .	Geo Spe	otechr	ical S	oil Te		ons l	_td	

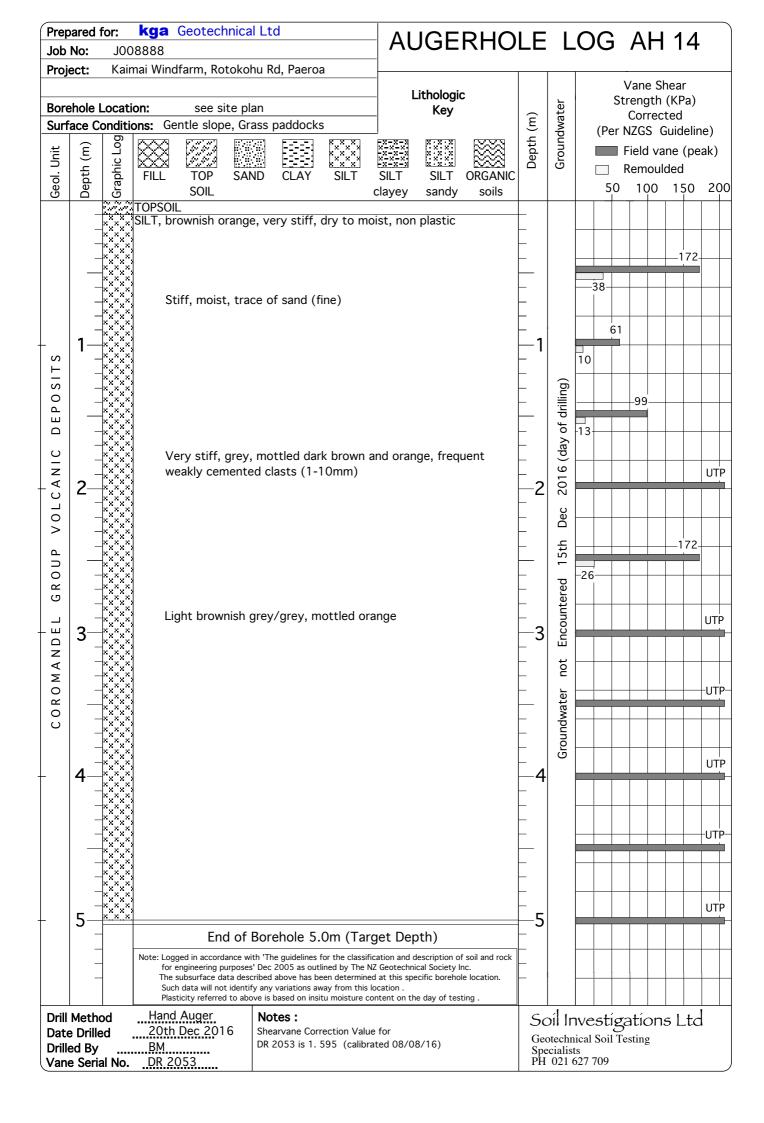


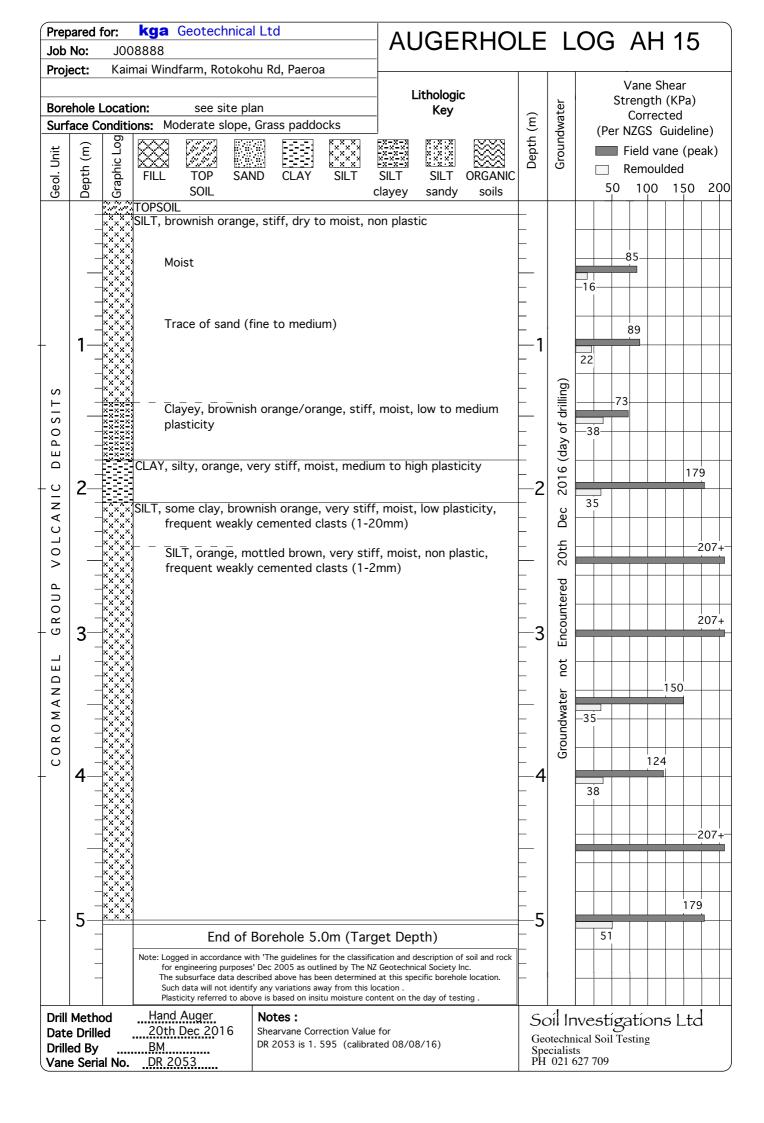


	bared		kga Geotechnica	l Ltd	AUGERHO		1	OG	Δ	H 1	11	
Job			8888					.00	/ \		•••	
Proje	ect:	Kain	nai Windfarm, Rotokol	nu Rd, Paeroa					Vana	Char		
					Lithologic				vane Streng	e Shea ith (Kl		
		Locati			Кеу	2	ate			rected		
Surf			ons: Gentle slope, Gr			Jepth (m)	Groundwater	(Pei	NZGS	S Guio	deline	)
nit	(E	Graphic Log		48) E-E-E-: **** A9) E-E-E-: ****		eptl	our		Field	vane	(peal	k)
Geol. Unit	ţ	ohic	FILL TOP SAM	ID CLAY SIL	SILT SILT ORGANIC		Ū		Rem	oulded	k	
Geo	Depth	Gral	SOIL		clayey sandy soils			50	) 10	0 1	50	200
		2.2.2	TOPSOIL						T			
	-		SILT, brownish orange	e, very stiff, dry, n	on plastic							
	-		Trace of clay, b	ownish orange. ve	ry stiff, dry to moist, non to	-						
	_	_×,×,×,×, _×,×,×,×,	low plasticity		. j =, = j ==	L					172—	
	-	× × × ×				-		-33				
	-					$\vdash$						
			CLAY, silty, brownish	orange, very stiff,	moist, medium plasticity	t					172	
_ v	1_					<b>—</b> 1						
	· ·	× × × ×	SILT. some clav. brow	nish orange, verv	stiff, moist, low plasticity	+ .		62				
0 S	-		,,,,,			E	(j					
Б	-					F	drilling)			144-		
	-	-×××××××××××××××××××××××××××××××××××××				-	f dr					
ပ	-		CLAY, silty, orange, v	ery stiff, moist, m	edium plasticity	Ł	ıy of	48-				
z	-	- E E E					(day					
C A	-					F	16			131		
- L +	2-		Becomes stiff	ighly plastic, brow	nish orange	-2	201	49				
>			becomes sun, i	lightly plastic, brow	nish orange		Dec	49				
4	-					-						
	-					-	4th		89_			
<b>≃</b>	_						_	-27				
G	-					-	red					
	-		Very stiff, medi frequent silver f		brown, mottled orange,	-	Encountered			140		
	3–			IECKS		-3				140		
A N	<b>.</b>					⊢Ŭ	ш	48				
Σ		×-×-×-×-×-×-×-×-×-×-×-×-×-×-×-×-×-×-×-	SILT, clayey, light bro	wn, very stiff, mo	st, low to medium plasticity	t	not					
RO	-	-×-×-× ×-×-×-×									<u></u> 20	  -+8(
0 0	-					$\vdash$	vate					
		×=×=× =×=×=× ×=×=×					hdv					
	-	_×^×^×^* _×`×`×`*			tiff, moist, non plastic,	-	Groundwater					
	<b>_</b>	-xxxxxx	пеqueпt weakiy	cemented clasts	(1-511111)				11	3		
1	4-					-4		30				
	-	××××× ×××××	Some clay, light plasticity	brownish orange,	very stiff, moist, low	-						
	-	XXX XXXXXXXX	plasticity			$\vdash$			71			
			Stiff, moist to v	vet, orange								
	-	X^_X^_X^_X X_X^_X_X^X				-		-30				
	-	-××××× ×、×、×				-						
		XXXX XXXX							77			
+	5–	××××				-5						-
	-		End of	Borehole 5.0m (	Farget Depth)	L		27				
					assification and description of soil and rock The NZ Geotechnical Society Inc.	F						
	-	-	The subsurface data desc	ribed above has been dete	mined at this specific borehole location.	F						+
				y any variations away from ve is based on insitu moist	this location . ire content on the day of testing .							
1	Meth		Hand Auger	Notes :		Sc	oíl Ir	nvestig	zatíc	onsl	_td	
	e Drill		14th Dec 2016	Shearvane Correction is 1. 487 (calibrated	Value for Geovane1946 23/02/16)	Geo	otechr	nical Soil	Testing	5		
	ed By e Seri	′ ial No.	<u>RF/BM</u> 1946				cialis 021	ts 627 709				
- and	5 561					1						



Prep Job	ared f		kga Geotechnica	l Ltd	AUGERHO	LE	L	.OG	AH	13
Proj			8888 nai Windfarm, Rotokol	nu Rd. Paeroa	-					_
		Tan							Vane Sł	
Bore	ehole L	ocati	on: see site pl	an	Lithologic Key	•	ter	S	trength Correc	
Surf	ace Co		ons: Gentle slope, Gr	ass paddocks		(Ľ	dwa	(Per		Guideline)
it	Ê	Graphic Log				Depth (m)	Groundwater			ne (peak)
Geol. Unit	Depth (m)	hic	FILL TOP SAM	ND CLAY SILT	SILT SILT ORGANIC	De	G		Remoul	
Geol	Jep	Grap	SOIL		clayey sandy soils			50	100	150 200
			TOPSOIL							
	_	× × × × × × × × × × × × × × × × × × ×	SILT, trace of clay, br	ownish orange, very st	tiff, moist, non plastic	_	of drilling)			
ΤS		××××××				—	dril		119_	
. I S		ŶXŶXŶ					y of			
P O	_	× × × × × × × × ×				_	(day	-21		
DE		×`×`×` ×`×`×`×	No clay content	:		_	2016			
	_	×°×°×° ×°×°×				_	20			180
N IC	1—	× × × × × × × × ×				—1	Dec			
⋖		×××××			brown, very stiff, moist,	_		40		
L C	-	×××××	low plasticity, o	ccasional weakly ceme	nted clasts (5-10mm)	_	20th			
0 >		ŶŶŶŶŶ								196
4	_	× × × × × × × × ×				_	cere	46		
ПО	_	× × × × × × × ×					punt			
2		× × × × × ×		nedium), grey, loose, r	noist, non plastia	_	Encountered			156
0	2—	× × × × × ×		gravel inclusions	noist, non plastic,	-2	not	10		
		× × × × × ×		-		_	ğ	18		
D Z	_	× × × × × ×	Solid obstructio	n - Gravel/Rocks		_	ater	NA		
ΜA							Groundwater			
R O	_		End of B	orehole 2.4m (Unabl	e to Auger)	_	Groi			
C O	_					_				
+	3—					—3				
	_					_				
	_					_				
	_					_				
	_					_				
	-					_				
						_				
+	4					4				
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						_				
	-					_		$\vdash$		
+	5-					5				
	_		Note: Logged in accordance wi	th 'The auidelines for the elecsific	ation and description of coll and real	_				
			for engineering purposes	' Dec 2005 as outlined by The NZ	ation and description of soil and rock Z Geotechnical Society Inc. I at this specific borehole location.					
			Such data will not identi	Ty any variations away from this loove is based on insitu moisture co	ocation .					
Drill	Metho	bd	Hand Auger	Notes :	· · · · · · · · · · · · · · · · · · ·	Sr	níl Ir	westic	gation	sita
Date	e Drille	d	20th Dec 2016	Shearvane Correction Value				ical Soil		
	ed By e Seria		RF/VC 1990	is 1. 528 (calibrated 23/0	07 i 0 <i>j</i>	Spe	cialis		0	
vaile							5210			





### Scala Penetrometer Results - Blows Per 50mm Penetration

Job Name: Kaimai Windfarm, Rotokohu Rd, Paeroa - Turbine North Job No: J008888 Date: 14, 15th & 20th December, 2016 Tested By: BM/RF/VC

Augerhole No	AH1	AH2	AH3	AH3	AH4	AH5	AH6	AH7
Start Depth (m)	3.00m	5.00m	2.10m	cont'd	1.30m	2.20m	0.80m	1.90m
50	5	4	8	2	5	6	9	7
100	5	5	8	1	7	7	13	9
150	6	6	14	2	6	6	10	10
200	6	6	10	2	8	6	15	12
250	6	7	8	2	8	10	18	13
300	8	8	4	2	6	10	18	12
350	7	10	3	3	4	12		12
400	7	10	3	4	4	13		14
450	6	10	6	7	6	12		13
500	6	11	4	4	5	12		
550	6	13	3	3	6			
600	5	13	3	3	7			
650	5		3	3	11			
700	6		3	3	13			
750	6		3	3	12			
800	6		3	3	12			
850	6		3	4	14			
900	6		3	3	18			
950	7		3	4				
1000	6		4	5				
1050	7		7	4				
1100	7		8	6				
1150	8		7	7				
1200	10		4	7				
1250	11		4	7				
1300	13		3	8				
1350	14		3	6				
1400	13		3	6				
1450	13		3	7				
1500			3	8				
1550			2	9				
1600			4	9				
1650			3	8				
1700			2	10				
1750			3	12				
1800			2	13				
1850			2	12				
1900			2	1				
1950			1					
2000			2					
End Depth (m)	4.45m	5.60m		5.95m	2.20m	2.70m	1.10m	2.35m

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### Scala Penetrometer Results - Blows Per 50mm Penetration

Job Name: Kaimai Windfarm, Rotokohu Rd, Paeroa - Turbine North Job No: J008888 Date: 14, 15th & 20th December, 2016 Tested By: BM/RF/VC

Augerhole No	AH8	AH9	AH10	AH11			
Start Depth (m)	1.00m	3.20m	3.90m	5.00m		 	
50	4	6	8	0.5		 	
100	4	7	6	0.5			
150	2	8	5	1			
200	2	4	2	1			
250	4	5	1	2			
300	4	5	2	3			
350	10	4	4	3			
400	10	4	2	3			
450	6	5	2	3			
500	5	5	2	3			
550	5	7	2	3			
600	6	9	3	3			
650	8	9	4	3			
700	9	8	4	4			
750	12	8	6	4			
800	10	7	3	4		 	
850	10	7	2	4			
900	10	7	3	5		 	
950	11	6	2	7			
1000	12	7	3	6		 	
1050		5	3	7			
1100		6	2	7		 	
1150		5	3	7		 	
1200		5	3	7		 	
1250		6	4	10		 	
1300		6	3	8		 	
1350		6	4	7		 	
1400		5	5	7		 	
1450		5	4	6		 	
1500		6	5	7		 	ļ
1550		7	8	7		 	
1600		7	7	6		 	
1650		7	6	7	ļ	 	
1700			6	8	ļ	 	
1750			10	7	ļ	 	
1800			7	8		 	
1850			4	7		 	
1900			6	8		 	
1950			7	ļ		 	
2000				<u></u>		 	
End Depth (m)	2.00m	4.85m	5.85m	6.90m	<u> </u>	 <u> </u>	<u> </u>

### Scala Penetrometer Results - Blows Per 50mm Penetration

Job Name: Kaimai Windfarm, Rotokohu Rd, Paeroa - Turbine South Job No: J008888 Date: 14, 15th & 20th December, 2016 Tested By: BM/RF/VC

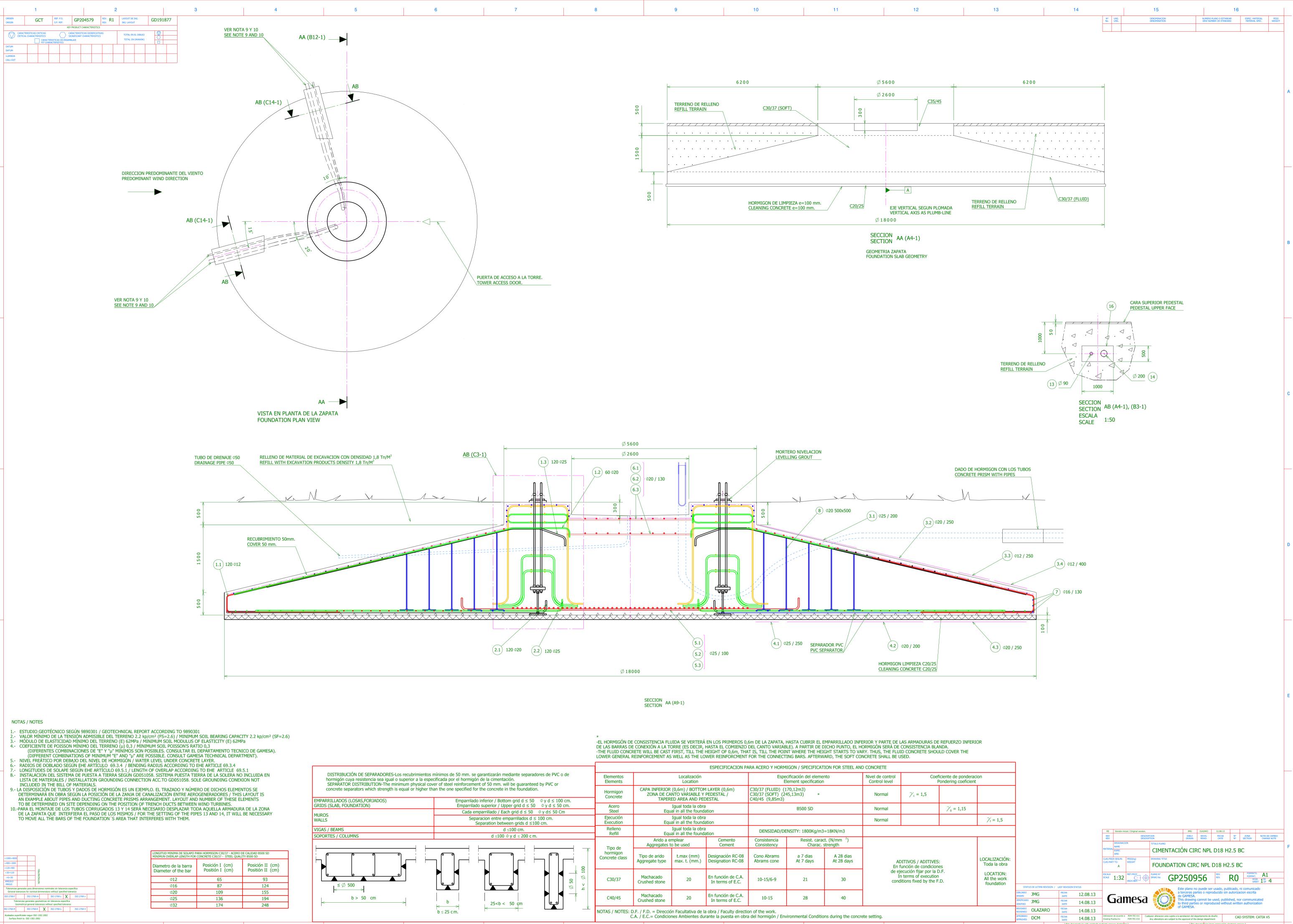
Augerhole No	AH12	AH13	AH13	AH14	AH15		
Start Depth (m)	3.20m	2.40m	cont'd	5.00m	5.00m		
50	9	8	3	8	3		
100	5	4	3	8	2		
150	6	1	2	7	2		
200	8	1	2	10	2		
250	8	3	3	8	2		
300	7	2	2	6	3		
350	9	1	2	5	2		
400	8	2	3	5	4		
450	9	1	4	4	3		
500	9	2	3	5	3		
550	8	1	3	8	3		
600	9	2	4	5	4		
650	12	2	7	2	3		
700	10	2	7	3	4		
750	10	1	8	2	4		
800	7	2	9	1	2		
850	7	2	11	1	2		
900	6	2	13	2	5	 	
950	6	2	13	6	6		
1000	12	3	12	8	6		
1050	10	3	8	9	6		
1100	10	2	7	8	6		
1150	10	3	13	11	5		
1200	11	2	14	13	4		
1250	12	2	19	14	5		
1300	13	2		13	5		
1350		5		14	7		
1400		4		16	8		
1450		5			6		
1500		3			8		
1550		4			8		
1600		3			7		
1650		3			5		
1700		4			6	 	
1750		3			7	 	
1800		4		1	7	 	1
1850		4			8	 	1
1900		3			8	 	
1950		2				 	
2000		3				 	
End Depth (m)	4.50m		4.65m	6.40m	6.90m	 	

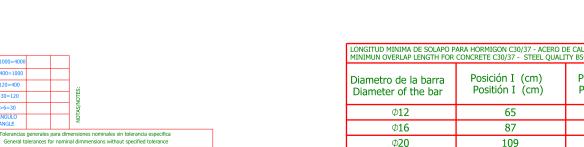
Soil Investigations Ltd PO Box 47-559 Ponsonby Ph 021 627 709

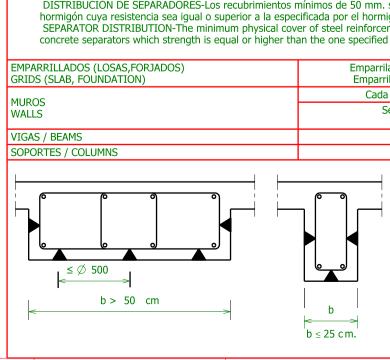


## **APPENDIX 2**

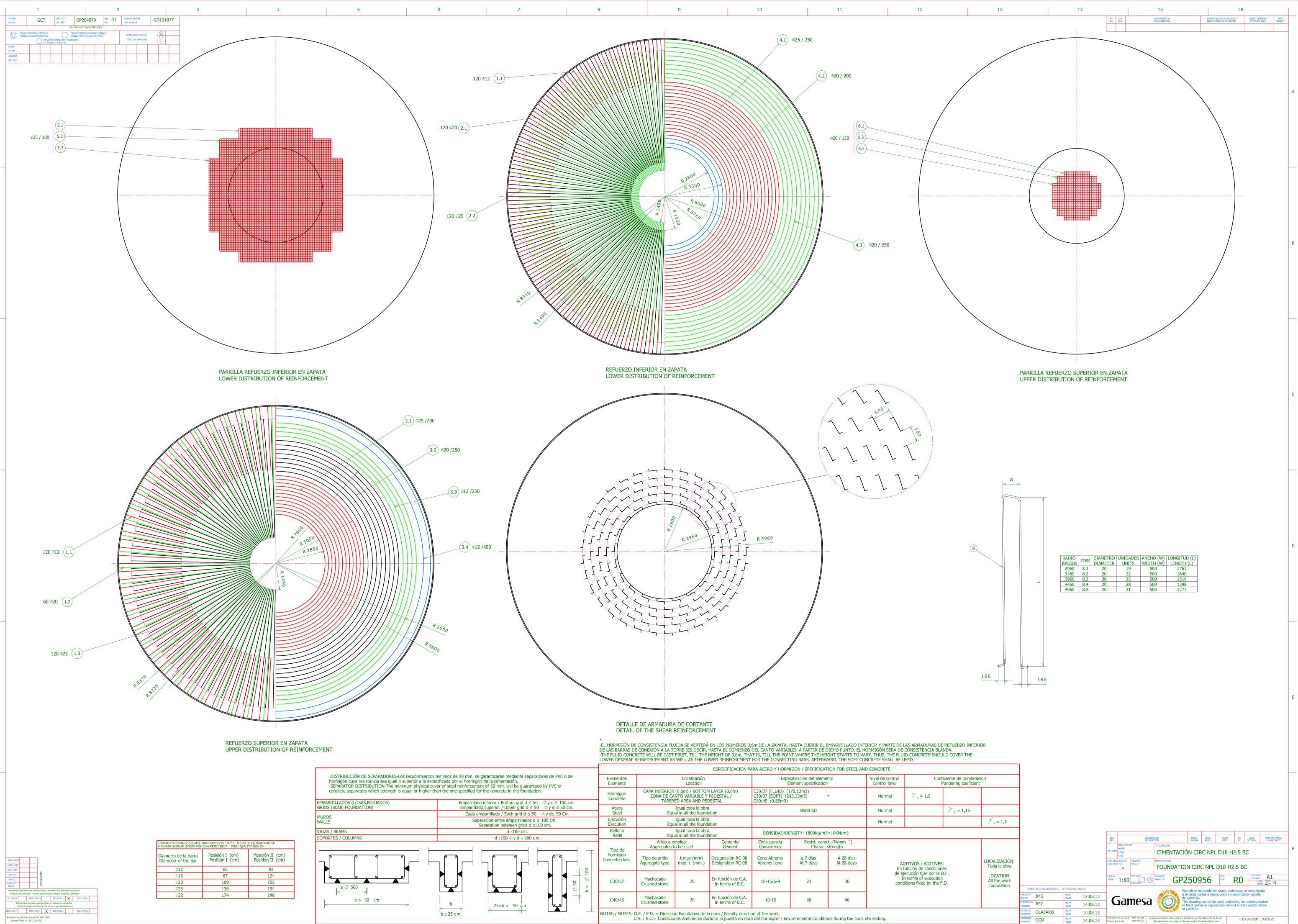
Gamesa Standard Turbine Details







				ESPECIFICACION P	ARA ACERO Y HORMJ	IGON / SPECIFICAT	TION FOR STEEL AN	D CONCRETE			
. se garantizarán mediante separadores de PVC o de nigón de la cimentación. ement of 50 mm. will be guaranteed by PVC or	Elementos Elements		Localización Location			cificación del eleme ement specificatior		Nivel de control Control level		ficiente de ponderac Pondering coeficient	
d for the concrete in the foundation.	Hormigon Concrete	ZONA DE CA	(0,6m) / BOTTOM NTO VARIABLE Y ED AREA AND PEI	PEDESTAL /	C30/37 (FLUID) (1 C30/37 (SOFT) (24 C40/45 (9,85m3)	70,12m3) I5,13m3) *		Normal	$\gamma_{\rm c}$ = 1,5		Γ
ilado inferior / Bottom grid d $\leq$ 50 $\phi$ y d $\leq$ 100 cm. rilado superior / Upper grid d $\leq$ 50 $\phi$ y d $\leq$ 50 cm. a emparrillado / Each grid d $\leq$ 50 $\phi$ y d $\leq$ 50 Cm	Acero Steel		Igual toda la obra al in all the founda		(3,03113)	B500 SD		Normal		$\gamma_{g}$ = 1,15	t
Separacion entre emparrillados d ≤ 100 cm. Separation between grids d ≤100 cm.	Ejecución Execution	Equ	Igual toda la obra al in all the founda					Normal			Γ
d ≤100 cm. d ≤100 Φ y d ≤ 200 cm.	Relleno Refill	Equ	Igual toda la obra al in all the founda		DENSIDAD/DENSITY: 1800Kg/m3=18KN/m3						
	Tipo de	Arido a e Aggregates t		Cemento Cement	Consistencia Consistency		ct. (N/mm <sup>2</sup> ) strength				
	hormigon Concrete class	Tipo de arido Aggregate type	t.max (mm) max. t. (mm.)	Designación RC-08 Designation RC-08	Cono Abrams Abrams cone	a 7 dias At 7 days	A 28 dias At 28 days		DITIVOS / ADITIVES unción de condicion		
	C30/37	Machacado Crushed stone	20	En función de C.A. In terms of E.C.	10-15/6-9	21	30	Ír	ecución fijar por la I n terms of execution itions fixed by the F	1	
25 <b 50="" <="" cm<="" td=""><td>C40/45</td><td>Machacado Crushed stone</td><td>20</td><td>En función de C.A. In terms of E.C.</td><td>10-15</td><td>28</td><td>40</td><td></td><td></td><td></td><td></td></b>	C40/45	Machacado Crushed stone	20	En función de C.A. In terms of E.C.	10-15	28	40				
	NOTAS / NOTES: D	D.F. / F.D. = Direccić .A. / E.C.= Condicio	n Facultativa de la nes Ambientes du	a obra / Faculty direction rante la puesta en obra	on of the work. a del hormigón / Env	ironmental Conditio	ons during the concr	ete setting.			



		1	REF. P.S.         CD204E70         REV.         D.1         LAYOUT DE ING.         CD101							
	RIGEN RIGIN	GCT	REF. P.S. S.P. REF.	GP2	04579	REV. R1	LAYOUT DE ING. LAYOU		GD1918	877
F										
	CARACTERISTICAS CRITICAS CARACTERISTICAS SIGNIFICATIVAS SIGNIFICATIVAS SIGNIFICATIVAS SIGNIFICAT CHARACTERISTICS		5	TOTAL EN TOTAL ON		Ŏ	5			
	ATUM ATUM									
	LAMADA ALL-OUT									

CARACTERÍSTICAS DE LAS BARRAS	(12.2) <i>\phi</i> 20/140	260	
120 (60x2) barras con extremos roscados.		>	//////
M39 según ISO-898-1 (área nominal = 976mm2). Material 10.9 según ISO 898-1 (fu=1000N/mm2, fy=900N/mm2).			////
Longitud total: 2500mm.			////
Longitud roscada mínima extremo superior: 510mm.			
Longitud roscada mínima extremo inferior: 250mm.	50		
Protección contra corrosión: galvanizado en caliente según ISO1461. Espesor mínimo: 55µm.			
Módulo elástico mínimo: 200000 N/mm2.	CA (D9-3)		
Precarga inicial necesaria: 355kN.			//
CARACTERÍSTICAS DE LA PLANTILLA SUPERIOR			
Geometría y características según: GP249218.			
Horizontalidad durante el hormigonado: la desviación vertical máxima entre dos puntos cualesquiera de la			
plantilla no debe exceder 3mm.			
Horizontalidad después hormigonado: la desviación vertical máxima entre dos puntos cualesquiera de la plantilla	) m		
no debe exceder 5mm.			
CARACTERÍSTICAS DE LA PLANTILLA INFERIOR			
Geometría y características según: GP249219.			
Horizontalidad durante el hormigonado: la desviación vertical máxima entre dos puntos cualesquiera de la			
plantilla no debe exceder 2mm.			
		300	
SISTEMA DE NIVELACIÓN		<u>&lt;                                      </u>	
Geometría y características según: GP150950.			
	$\phi$ 20 (11.2)		
CARACTERÍSTICAS DEL MORTERO			
Tipo mortero: Masterflow 9300 (BASF), Conbextra BB92-O (Fosroc Euco) o algún mortero con características		300	
similares (validación por parte de Gamesa necesaria). Mínima resistencia característica del mortero: 70MPa.	CB (D12-3)		
minima resistencia característica del mortero. 70mra.			
THREADED BARS CHARACTERISTICS			
120 (60x2) bars with threaded ends.			
M39 according to ISO-898-1 (nominal stress area = 976mm2).			
Nominal diameter of shank: $36$ mm (shank area = $1017.9$ mm2).			
Material 10.9 according to ISO 898-1 (fu=1000N/mm2, fy=900N/mm2). Total length: 2500mm.			
Minimum threaded length top end: 510mm.	Φ20		
Minimum threaded length bottom end: 250mm.			~
Corrosion protection: Hot Dip Galvanized according to ISO1461. Min thickness 55µm.	(11.2)		
Minimum elastic modulus: 200000 N/mm2.			
Necessary initial preload on each bar: 355 kN.		┨┓┨	
UPPER TEMPLATE CHARACTERISTICS			
Geometry and characteristics of this template are defined in GP249218.			

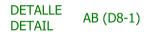
The horizontality of the upper template must be ensured: a maximum vertical deviation of 3 mm between any two points is allowed during the concreting of the foundation. A maximum vertical deviation of 5 mm between any two points of the upper template is allowed for the final configuration of the foundation.

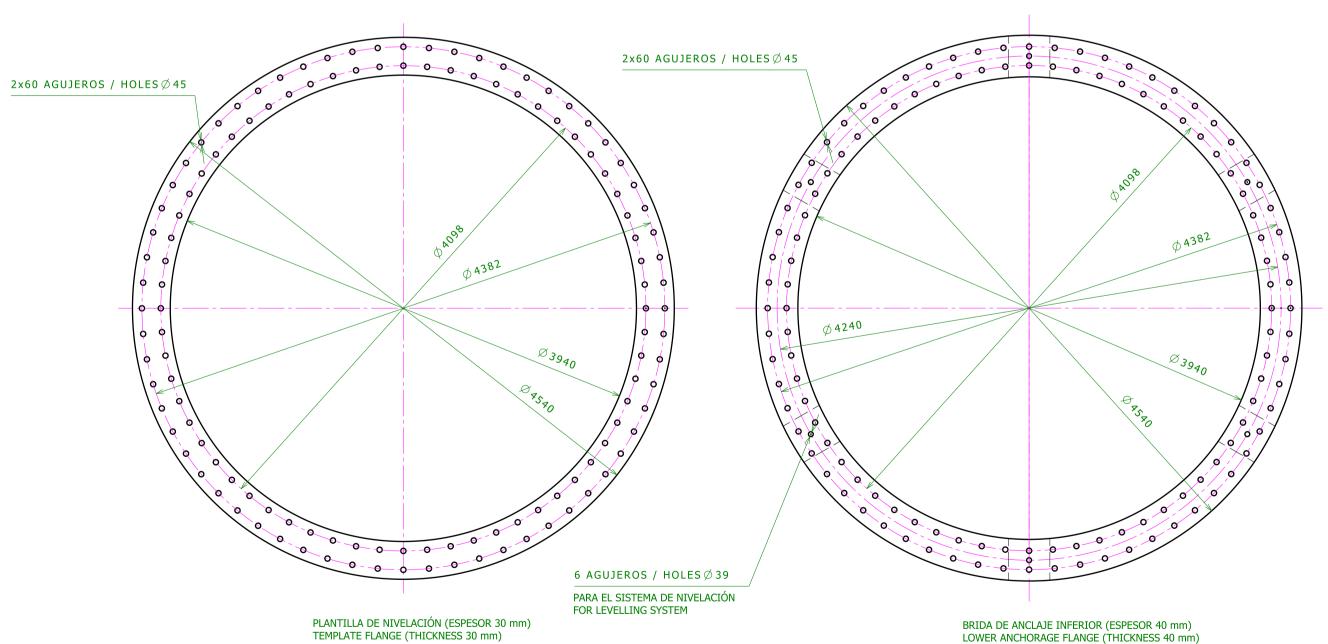
LOWER TEMPLATE CHARACTERISTICS Geometry and characteristics of this template are defined in GP249219.

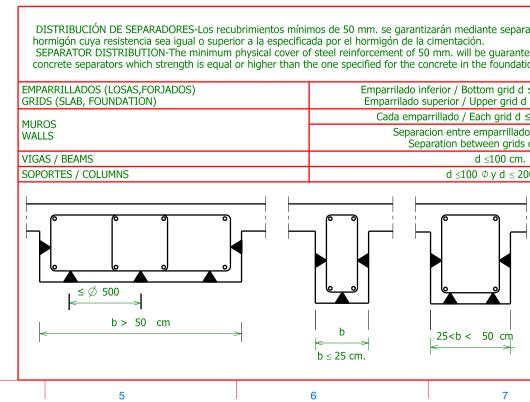
The horizontality of the lower template must be ensured: a maximum vertical deviation of 2 mm between any two points is allowed during the concreting of the foundation.

LEVELLING SYSTEM Geometry and characteristics according to: GP150950.

GROUT CHARACTERISTICS Grout type: Masterflow 9300 (BASF), Conbextra BB92-O (Fosroc Euco) or another grout with similar characteristics (validation from Gamesa is necessary). Minimum charactesitic strength: 70MPa.







LONGITUD MINIMA DE SOLAPO PARA HORMIGON C30/37 - ACERO DE CALIDAD B500 SD MINIMUN OVERLAP LENGTH FOR CONCRETE C30/37 - STEEL QUALITY B500 SD										
Diametro de la barra Diameter of the bar	Posición I (cm) Positión I (cm)	Posición II (cm) Positión II (cm)								
Φ12	65	93								
<b>Φ16</b>	87	124								
<b>Φ20</b>	109	155								
Ø <b>25</b>	136	194								
Ø <b>32</b>	174	248								

4

3

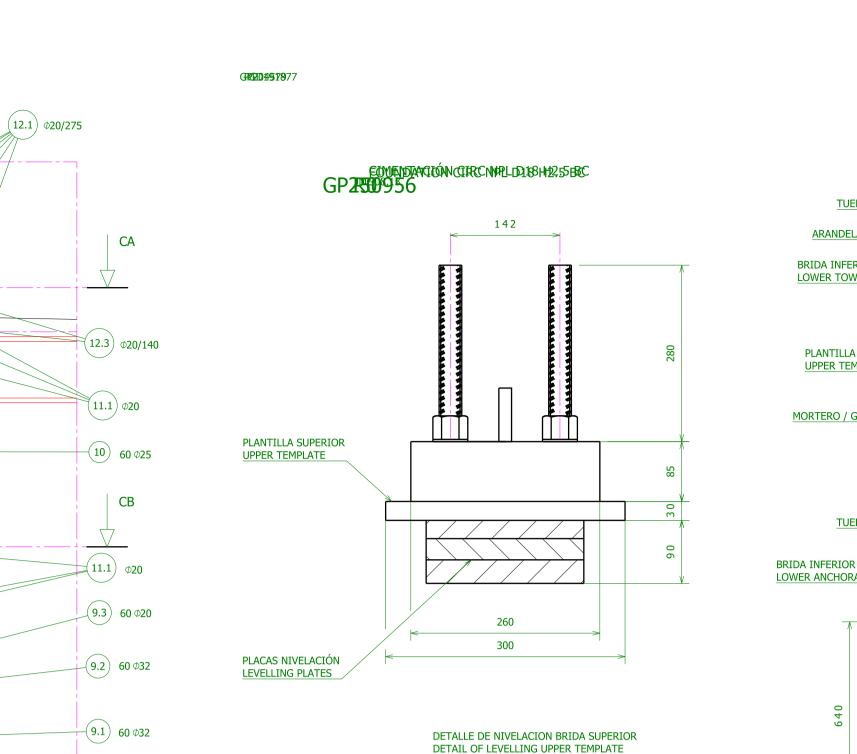
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ISO 2768-m ISO 2768-c X ISO 2768-v

ISO 2768-К X ISO 2768-L

dos superficiales segun ISO 1302 2002 urface finish to ISO 1302 2002

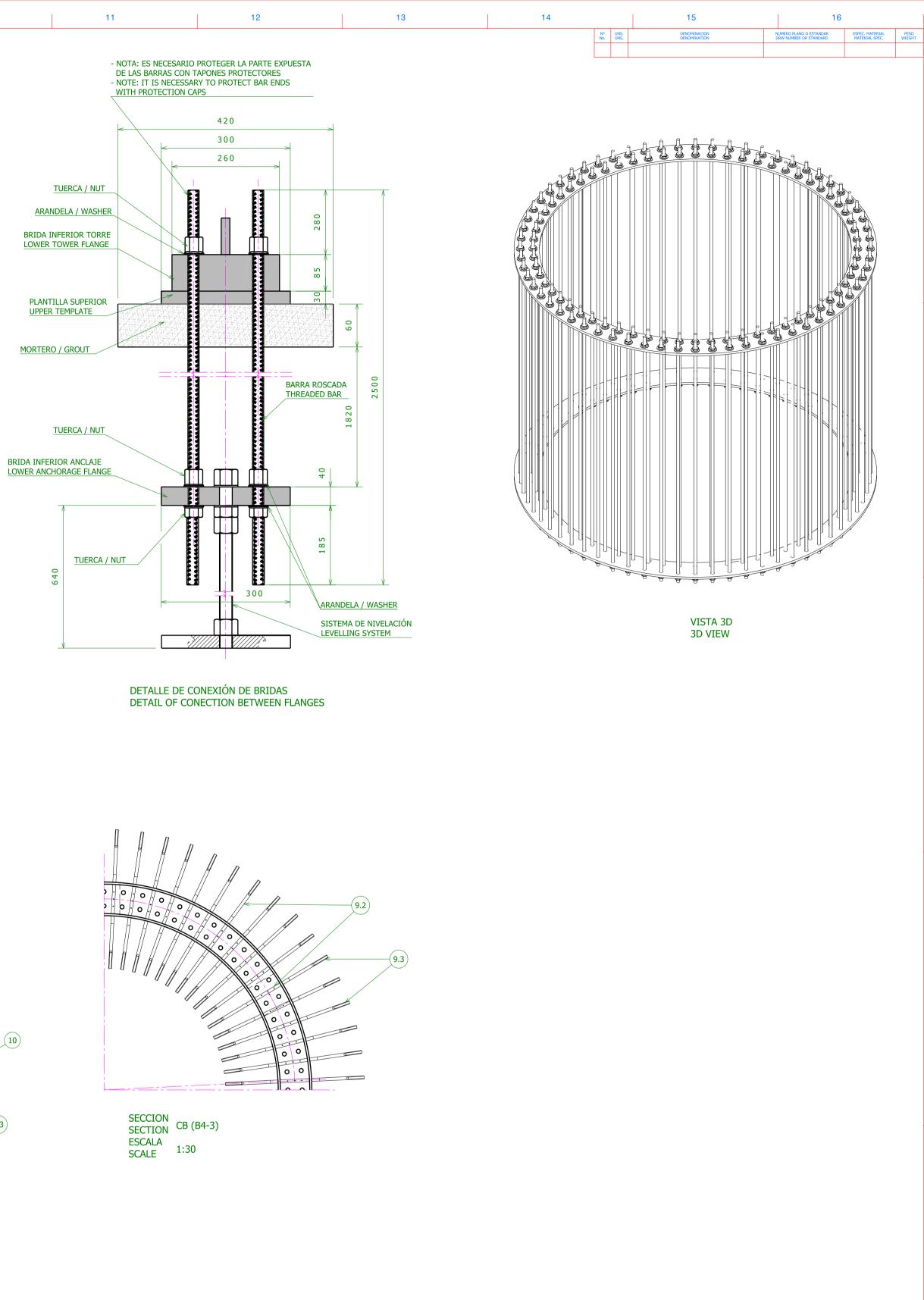
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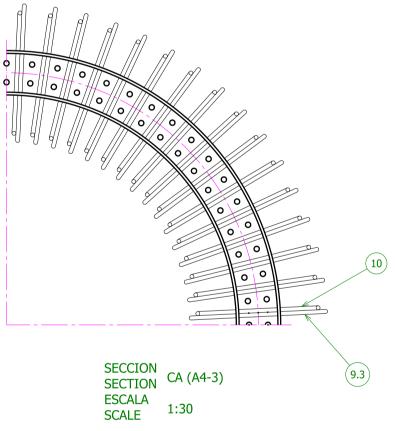


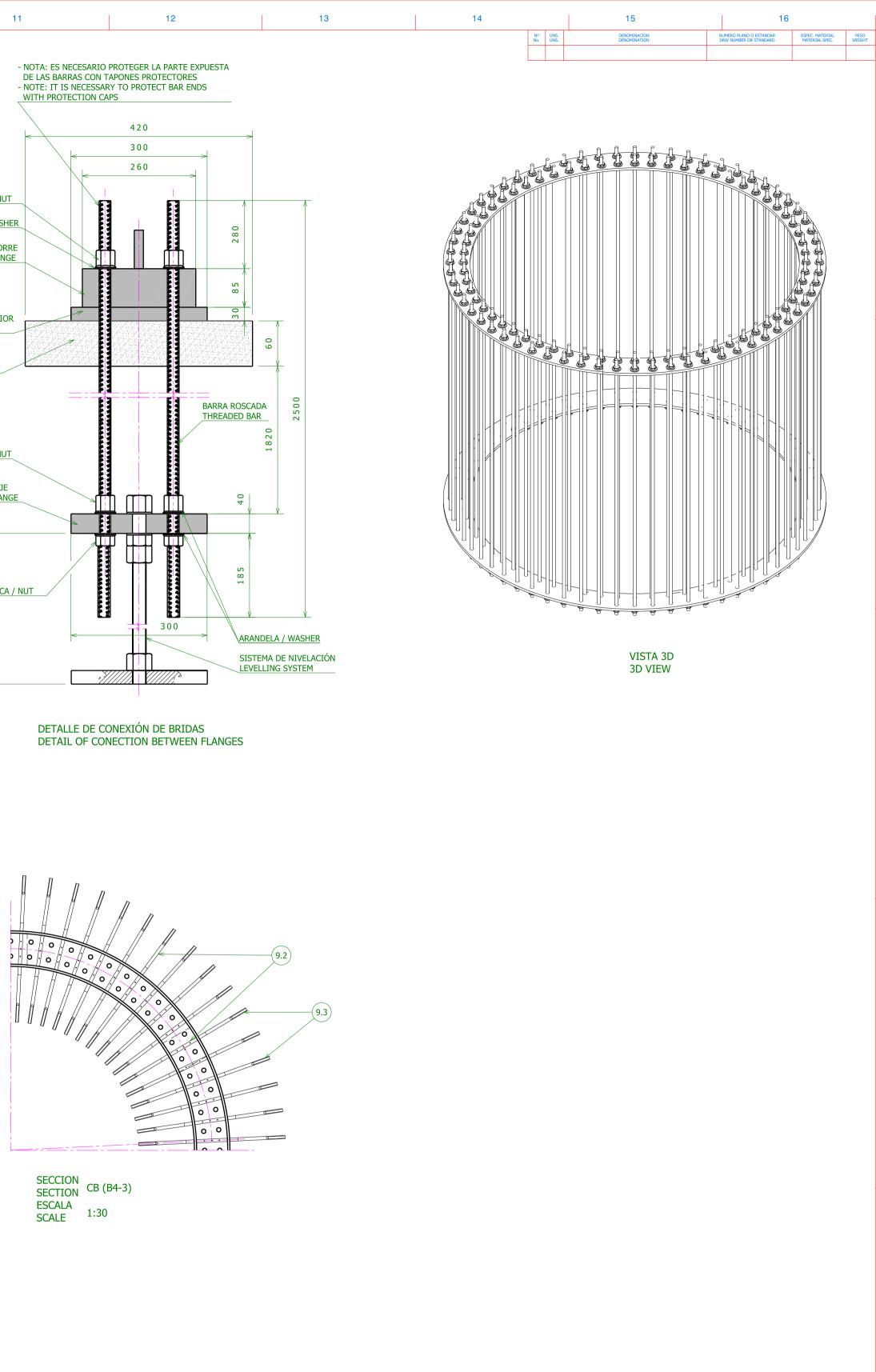
9

8

10







SPESOR 40 mm) HICKNESS 40 mm)	DE LAS BARRAS DE -THE FLUID CONCE	E CONEXIÓN A LA TO RETE WILL BE CAST	ORRE (ES DECIR, FIRST, TILL THE	EN LOS PRIMEROS 0 HASTA EL COMIENZO HEIGHT OF 0,6m, TH WER REINFORCMENT	DEL CANTO VARIA	BLE). A PARTIR DE I	DICHO PUNTO, EL H IGHT STARTS TO V	HORMIGÓN SERÁ DE ARY. THUS, THE FLU	CONSISTENCIA BL ID CONCRETE SHC	ANDA.	RIOR	
				ESPECIFICACION P	ARA ACERO Y HORM	IGON / SPECIFICAT	TION FOR STEEL AN	ID CONCRETE				
garantizarán mediante separadores de PVC o de de la cimentación.	Elementos Elements	Localización Location				cificación del eleme lement specificatior				eficiente de pondera Pondering coeficien		
t of 50 mm. will be guaranteed by PVC or the concrete in the foundation.	Hormigon Concrete	CAPA INFERIOR (0,6m) / BOTTOM LAYER (0,6m) ZONA DE CANTO VARIABLE Y PEDESTAL / TAPERED AREA AND PEDESTAL			C30/37 (FLUID) (170,12m3) C30/37 (SOFT) (245,13m3) * C40/45 (9,85m3)			Normal	γ <sub>c</sub> = 1,5			
lado inferior / Bottom grid d $\leq$ 50 $\phi$ y d $\leq$ 100 cm.ilado superior / Upper grid d $\leq$ 50 $\phi$ y d $\leq$ 50 cm.a emparrillado / Each grid d $\leq$ 50 $\phi$ y d $\leq$ 50 Cm	Acero Steel	Igual toda la obra Equal in all the foundation			B500 SD			Normal		∕′ <sub>g</sub> = 1,15		
Separation entre emparrillados d $\leq$ 100 cm. Separation between grids d $\leq$ 100 cm.	Ejecución Execution	Igual toda la obra Equal in all the foundation				Normal			$\gamma_{\rm f}$			
d ≤100 cm. d ≤100 ∅ y d ≤ 200 cm.	Relleno Refill	Igual toda la obra Equal in all the foundation			DENSIDAD/DENSITY: 1800Kg/m3=18KN/m3							
	Tipo de	Arido a emplear Aggregates to be used		Cemento Cement	Consistencia Consistency	Resist. caract. (N/mm <sup>2</sup> ) Charac. strength						
	hormigon Concrete class	Tipo de arido Aggregate type	t.max (mm) max. t. (mm.)	Designación RC-08 Designation RC-08	Cono Abrams Abrams cone	a 7 dias At 7 days	A 28 dias At 28 days	A[ En 1		LOCAL Toda		
$ \begin{vmatrix} \alpha \\ \beta \\ \beta \\ \gamma \\ \gamma$	$\begin{array}{c cccc} & & & & & & \\ \hline & & & & & \\ \hline & & & & &$		10-15/6-9	21	30	de ejecución fijar por la D.F. In terms of execution conditions fixed by the F.D.		n	LOC All ti four			
25 <b 50="" <="" cm<="" td=""><td>C40/45</td><td>Machacado Crushed stone</td><td>20</td><td>En función de C.A. In terms of E.C.</td><td>10-15</td><td>28</td><td>40</td><td></td><td></td><td></td><td></td></b>	C40/45	Machacado Crushed stone	20	En función de C.A. In terms of E.C.	10-15	28	40					
				a obra / Faculty directi rante la puesta en obr		vironmental Conditio	ons during the conc	rete setting.				

 $\gamma_{\rm f}$  = 1,5 DIBUJ REVIS, FECHA Nº ZONA NOTA DE CAMBIO DRAWN REWD. DATE Nº SECTION CHANGE NOTE DESCRIPCION CIMENTACIÓN CIRC NPL D18 H2.5 BC LOCALIZACIÓN: Toda la obra FOUNDATION CIRC NPL D18 H2.5 BC LOCATION: GP250956 All the work foundation JMG 12.08.13 Gamesa JMG 14.08.13 OLAZARO 14.08.13 
 14.08.13
 Delineacion de acuerdo a:
 PDM-TEC-011
 Cualquier alteracion esta sujeta a la aprobacion del departamento de diseño Any alteracions are subject to the approval of the design department
 DCM CAD SYSTEM: CATIA V5 8 12 11 9 10 13 15 14 16



RIGIN         CREF.         CIT 20 157 57         REV.         TING, LAYOUT           KEY PRODUCT CHARACTERISTICS           CARACTERISTICAS CRITICAS CRITICAL CHARACTERISTICS         CARACTERISTICAS SIGNIFICATIVAS SIGNIFICANT CHARACTERISTICS         TOTAL EN EL I										
TOTAL ON DR		JNIDADES UNITS	DESCRIPCION DESCRIPTION	FORMA O CÓDIGO SHAPE OR CODE	DIAMETRO DIAMETER	LONGITUD LENGTH	LONGITUD TOTAL TOTAL LENGTH	MATERIAL MATERIAL	PESO WEIGHT	
	1.1	120	HORQUILLA / FORK	R 100 2510	12	6590	790800	B 500 S	702	
	1.2	60	ARMADURA RADIAL SUPERIOR / UPPER RADIAL REINFORCEMENT	1310 210 R 110 6330	20	7850	471000	B 500 S	1161.55	
	1.3	120	ARMADURA RADIAL SUPERIOR / UPPER RADIAL REINFORCEMENT	635 675 210 R 110 5586	25	7106	852720	B 500 S	3285.8	
	2.1	120	ARMADURA RADIAL INFERIOR / LOWER RADIAL REINFORCEMENT	7080 R 110 210	20	7290	874800	B 500 S	2157.4	
	2.2	120	ARMADURA RADIAL INFERIOR / LOWER RADIAL REINFORCEMENT	6820 R 110 210	25	7030	843600	B 500 S	3250.7	
	3.1	38	ARMADURA CIRCUNFERENCIAL SUPERIOR UPPER CIRCUMFERENTIAL REINFORCEMENT	R2800 - R5000	25	10020	380760	B 500 S	1467.2	
	3.2	37	ARMADURA CIRCUNFERENCIAL SUPERIOR UPPER CIRCUMFERENTIAL REINFORCEMENT	R5250-R7000	20	10697	395789	B 500 S	976	
	3.3	24	ARMADURA CIRCUNFERENCIAL SUPERIOR UPPER CIRCUMFERENTIAL REINFORCEMENT	R7250 - R8000	12	10728	257472	B 500 S	228.5	
	3.4	10	ARMADURA CIRCUNFERENCIAL SUPERIOR UPPER CIRCUMFERENTIAL REINFORCEMENT	R8400 - R8800	12	11670	116700	B 500 S	103.6	
	4.1	9	ARMADURA CIRCUNFERENCIAL INFERIOR LOWER CIRCUMFERENTIAL REINFORCEMENT	R2800-R3300	25	8667	78003	B 500 S	300.5	
	4.2	56	ARMADURA CIRCUNFERENCIAL INFERIOR LOWER CIRCUMFERENTIAL REINFORCEMENT	R3500 - R6500	20	10414	583184	B 500 S	1438.2	
	4.3	47	ARMADURA CIRCUNFERENCIAL INFERIOR LOWER CIRCUMFERENTIAL REINFORCEMENT	R6750 - R8750	20	10798	507506	B 500 S	1251.6	
	5.1	86	PARRILLA INFERIOR EN ZAPATA LOWER DISTRIBUTION OF REINFORCEMENT	7600 R 110 270	25	8140	700040	B 500 S	2697.5	
	5.2	44	PARRILLA INFERIOR EN ZAPATA LOWER DISTRIBUTION OF REINFORCEMENT	6330 R 110 270 4100	25	6870	302280	B 500 S	1164.8	
	5.3	24	PARRILLA INFERIOR EN ZAPATA LOWER DISTRIBUTION OF REINFORCEMENT	R 110 270 270	25	4640	111360	B 500 S	429.1	
	6.1	48	PARRILLA SUPERIOR EN ZAPATA UPPER DISTRIBUTION OF REINFORCEMENT	2800	20	2800	134400	B 500 S	331.5	
	6.2	24	PARRILLA SUPERIOR EN ZAPATA UPPER DISTRIBUTION OF REINFORCEMENT	2300	20	2300	55200	B 500 S	136.1	
	6.3	16	PARRILLA SUPERIOR EN ZAPATA UPPER DISTRIBUTION OF REINFORCEMENT	1440	20	1440	23040	B 500 S	56.8	
	7	18	ARMADURA DE PIEL LOSA / SLAB FACE REINFORCEMENT	R 8942	16	10510	189180	B 500 S	298.5	
	8.1	19	ARMADURA DE CORTANTE / SHEAR REINFORCEMENT	R 50 R 50	20	4342.5	80764	B 500 S	199.1	
	8.2	22	ARMADURA DE CORTANTE / SHEAR REINFORCEMENT	1640 9 1 8 50 R 50 R 50	20	4100.6	89148	B 500 S	219.8	
	8.3	25	ARMADURA DE CORTANTE / SHEAR REINFORCEMENT	1519 9 1519 9 1 9 1 9 1 9 1 9 1 9 1 9 1	20	3858.7	96011	B 500 S	236.8	
	8.4	28	ARMADURA DE CORTANTE / SHEAR REINFORCEMENT	$\begin{array}{c c} & 1399 \\ \hline \\ & & \\ \hline \\ & \\ & \\ & \\ & \\ & \\ & \\$	20	3616.8	101354	B 500 S	250	

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ITEM	UNIDADES UNITS	DESCRIPCION DESCRIPTION	FORMA O CÓDIGO SHAPE OR CODE	DIAMETRO DIAMETER	LONGITUD LENGTH	LONGITUD TOTAL TOTAL LENGTH	MATERIAL MATERIAL	PESO WEIGHT
1.1	120	HORQUILLA / FORK	3680 R 100 2510	12	6590	790800	B 500 S	702
1.2	60	ARMADURA RADIAL SUPERIOR / UPPER RADIAL REINFORCEMENT	1310 210 R 110 6330	20	7850	471000	B 500 S	1161.55
1.3	120	ARMADURA RADIAL SUPERIOR / UPPER RADIAL REINFORCEMENT	635 675 210 R 110 5586	25	7106	852720	B 500 S	3285.8
2.1	120	ARMADURA RADIAL INFERIOR / LOWER RADIAL REINFORCEMENT	7080 R 110 210	20	7290	874800	B 500 S	2157.4
2.2	120	ARMADURA RADIAL INFERIOR / LOWER RADIAL REINFORCEMENT	6820 R 110 210	25	7030	843600	B 500 S	3250.7
3.1	38	ARMADURA CIRCUNFERENCIAL SUPERIOR UPPER CIRCUMFERENTIAL REINFORCEMENT	R2800 - R5000	25	10020	380760	B 500 S	1467.2
3.2	37	ARMADURA CIRCUNFERENCIAL SUPERIOR UPPER CIRCUMFERENTIAL REINFORCEMENT	R5250-R7000	20	10697	395789	B 500 S	976
3.3	24	ARMADURA CIRCUNFERENCIAL SUPERIOR UPPER CIRCUMFERENTIAL REINFORCEMENT	R7250 - R8000	12	10728	257472	B 500 S	228.5
3.4	10	ARMADURA CIRCUNFERENCIAL SUPERIOR UPPER CIRCUMFERENTIAL REINFORCEMENT	R8400 - R8800	12	11670	116700	B 500 S	103.6
4.1	9	ARMADURA CIRCUNFERENCIAL INFERIOR LOWER CIRCUMFERENTIAL REINFORCEMENT	R2800-R3300	25	8667	78003	B 500 S	300.5
4.2	56	ARMADURA CIRCUNFERENCIAL INFERIOR LOWER CIRCUMFERENTIAL REINFORCEMENT	R3500 - R6500	20	10414	583184	B 500 S	1438.2
4.3	47	ARMADURA CIRCUNFERENCIAL INFERIOR LOWER CIRCUMFERENTIAL REINFORCEMENT	R6750 - R8750	20	10798	507506	B 500 S	1251.6
5.1	86	PARRILLA INFERIOR EN ZAPATA LOWER DISTRIBUTION OF REINFORCEMENT	7600 R 110 270 270 270	25	8140	700040	B 500 S	2697.5
5.2	44	PARRILLA INFERIOR EN ZAPATA LOWER DISTRIBUTION OF REINFORCEMENT	6330 R 110 270 4100	25	6870	302280	B 500 S	1164.8
5.3	24	PARRILLA INFERIOR EN ZAPATA LOWER DISTRIBUTION OF REINFORCEMENT	R 110 270 270 270	25	4640	111360	B 500 S	429.1
6.1	48	PARRILLA SUPERIOR EN ZAPATA UPPER DISTRIBUTION OF REINFORCEMENT	2800	20	2800	134400	B 500 S	331.5
6.2	24	PARRILLA SUPERIOR EN ZAPATA UPPER DISTRIBUTION OF REINFORCEMENT	2300	20	2300	55200	B 500 S	136.1
6.3	16	PARRILLA SUPERIOR EN ZAPATA UPPER DISTRIBUTION OF REINFORCEMENT	1440	20	1440	23040	B 500 S	56.8
7	18	ARMADURA DE PIEL LOSA / SLAB FACE REINFORCEMENT	R 8942	16	10510	189180	B 500 S	298.5
8.1	19	ARMADURA DE CORTANTE / SHEAR REINFORCEMENT	R 50 R 50	20	4342.5	80764	B 500 S	199.1
8.2	22	ARMADURA DE CORTANTE / SHEAR REINFORCEMENT	1640 9 1640 9 1 0 9 1 0 9 1 0 9 1 0 9 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	20	4100.6	89148	B 500 S	219.8
8.3	25	ARMADURA DE CORTANTE / SHEAR REINFORCEMENT	1519 9 7 8 5 8 50 8 50 8 50	20	3858.7	96011	B 500 S	236.8
8.4	28	ARMADURA DE CORTANTE / SHEAR REINFORCEMENT	1399 9 1399 9 1 9 1 9 1 9 1 9 1 1 9 1 1 9 1 1 1 1 1 1 1 1 1 1 1 1 1	20	3616.8	101354	B 500 S	250
8.5	31	ARMADURA DE CORTANTE / SHEAR REINFORCEMENT	R 50 R 50 R 50	20	3374.9	105177	B 500 S	259.4

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		10	11	12	13		14			15	16		ſ	
				·		<u> </u>		Nº UNS. No. UNS.	DEN DEP	ENOMINACION ENOMINATION	NUMERO PLANO O ESTANDAR DRW NUMBER OR STANDARD	ESPEC. MATERIAL MATERIAL SPEC.	PESO WEIGHT	
												]	L]	
TEM	UNIDADES UNITS	D	DESCRIPCION DESCRIPTION	FORMA O CÓDI SHAPE OR COI	DE	DIAMETRO DIAMETER	LONGITUD LENGTH	LONGITUD TOTAL TOTAL LENGTH	MATERIAL MATERIAL	PESO WEIGHT				
9.1	60	ARMADURA OMEGA / OMEGA F	REINFORCEMENT	R 120 78	R 270	32	3560	213600	B 500 S	1348.5				A
9.2	60	ARMADURA OMEGA / OMEGA F	REINFORCEMENT	R 120 83	R 270	32	4140	248400	в 500 S	1568.2				
9.3	60	Armadura omega / omega f	REINFORCEMENT	R 150 135	50 R 190 350	20	6560	393600	B 500 S	970.7				
10	60	CERCO SUPERIOR PEDESTAL STIRRUP PEDESTAL REINFORC	CEMENT	1350 R 100		25	3100	186000	B 500 S	716.7				
1.1	12	ARMADURA CIRCUNFERENCIAL CIRCUNFERENTIAL PEDESTAL	IL PEDESTAL . REINFORCEMENT	R 1970		20	7650	91800	B 500 S	226.4				в
1.2	12	ARMADURA CIRCUNFERENCIAL CIRCUNFERENTIAL PEDESTAL	IL PEDESTAL . REINFORCEMENT	R 2270		20	8590	103080	B 500 S	254.2				
12.1		ARMADURA DE PIEL PEDESTAL PEDESTAL FACE REINFORCEME		R2740 - R1365		20	7910	94920	B 500 S	234				
12.2	6	ARMADURA DE PIEL PEDESTAL PEDESTAL FACE REINFORCEME	L IENT	R2740		20	10070	60420	B 500 S	149				<u> </u>
12.3		ARMADURA DE PIEL PEDESTAL PEDESTAL FACE REINFORCEME		R1360		20	5730	34380	B 500 S	84.8				
13		TUBOS PARA CABLES DE POTE PIPES FOR TOWER CABLE	ENCIA	P610164		90			TPC					
14	2	TUBOS PARA CABLES DE POTE PIPES FOR TOWER CABLE		P610163		200			TPC					
15	З	VARILLAS ELÉCTRICAS TOMA T ELECTRICAL EARTHING RODS	5			20	750	2250	B 500 S	5.5				с
16		DADO HORMIGON / DUCTING	CONCRETE PRISM						C20/25					
17		TUBO DE DRENAJE DRAINAGE PIPE				50								
18		HORMIGÓN DE LIMPIEZA CLEANING CONCRETE							C20/25					
19		HORMIGÓN ESTRUCTURAL STRUCTURAL CONCRETE							C30/37	307.95				
20		HORMIGÓN PEDESTAL PEDESTAL CONCRETE							C40/45	10.72				
							ACERO (kg) STEEL (kg)	- 3.		28161.1			ļ	
							STEEL (kg) HORMIGÓN (i CONCRETE (n CUANTIA (kg, QUANTITY (i	$(m^3)$		318.7			ļ	
							QUANTITY (I	kg/m <sup>3</sup> )		88.4			ļ	

							REV DESC DESIGNACION NAME MATERIAL FSPEC	RIPCION DIBUJ DRAWN DIBUJ REVIS. FECHA RIPTION DRAWN CIMENTACIÓN CIRC NPL D18	
							CLAS.PIEZA SEGUN: PESO(kg) CLAS.PART TO: WEIGHT A	DRAWING TITLE FOUNDATION CIRC NPL D18	
							SCALA 1:20 MET.PROY.	PLANO N° GP250956 REV. REV.	R0 FORMATO. A1 HOJA JE SHEET 4 OF 4
					STATUS DE ULTIMA REVISION / DIBUJADO DRAWN JMG VERIFICADO JMG	DATE 12.08.13	Gamesa	Este plano no puede ser usado, a terceras partes o reproducido : de GAMESA. This drawing cannot be used, pu to third parties or reproduced wi	sin autorizacion escrita
					REVISADO REVIEWED OLAZARO	DATE         14.08.13           FECHA DATE         14.08.13	Delineacion de acuerdo a: PDM-TEC-011 (	to third parties or reproduced wi of GAMESA.	
9	10	11	12	13	APPROVED DCM	FECHA DATE 14.08.13 " Este documento ha sido aprobado 14	Drawing Practice to: PDM-TEC-018	Any alterations are subject to the approval of the design department This document has been approved 15	CAD SYSTEM: CATIA V5 by electronic process * 16