Section 2 - Pa			273	Z _x (cm³)		kNm	Moment	t Uniform	Equivaler
Section 2 - 11			309	S _x (cm³)		33.77	MA	noment	Maximum n
		Calc By:	ct No:	Project I		1.00	m	tor	Uniform fact
D.C		2930	c .		cl. 4.3.7.2	33.77	M _{bar}	oment	Buckling me
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_	λ_{Lo}	limiting slenderness		Project:			derness R		
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13.3	Х	torsional index		Date:	λ	r _y (cm)	m		m
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79.15	λ_{LT}	equivalent slenderness	L IV cl. B.2.5	' l				•	
0.314	η_{LT}	Perry coefficient	of 161 ^{ci} Ær lin	bishment of	osed Refur	ons for Pror	al Calculatio	Structura	Title:
84.98	M _D	Plastic moment capacity			Actual	Allowable	nits	ection Lim	
99.79	M _E	Elastic critical moment	cl. B.2.2		mm	mm	atios	deflection r	span/
108.04	ϕ_{B}	Buckling index			5.8	9.0	500	ads	Imposed Lo
					10.4	12.5	360		Total Loads
51.53	M _b	Buckling capacity	cl. B.2.1						
					52×37	152x1	UC	used:	Section

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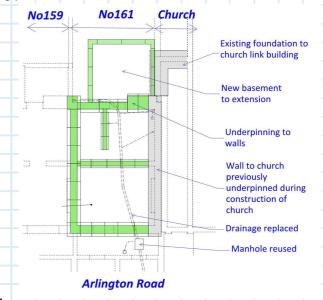
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Section 3 Ground Conditions and Design Parameters

Basement

The proposed basement works has two distinct parts, the construction of the new basement to the rear extension and the underpinning of the main walls in the main house, The wall to the church does not require underpinning as it was previously underpinned for the construction of the church c1927as shown in the following plan:



Rear Basement

The existing basement appears to have been constructed within the original rear lightwell, with the original wall retained (a wall in this position was observed during the trial pit investigation but could not be investigated further.

The basement has two distinct parts.

At the rear, adjacent the house, there are existing walls present on all sides:

- The rear wall of No161
- The retaining wall between the lightwell to the rear of No159 and No161. This wall founds at a similar level to existing formation level and has been confirmed by trial pit.
- The flank wall to the church link building. This wall founds at a similar level to existing Formation level and has been confirmed by trial pit.

In this zone the lateral loading is minimal due to the existing walls. There may be a requirement for underpinning.

At the front, further from the house, the basement retains the soil to the gardens (L Clay). This is the worst design case.

To enhance safety during construction it has been assumed that the garden walls adjacent the front basement section will be demolished for the duration of construction and rebuilt to match the existing once the basement has been constructed. This also deals with the matter of the No159 garden wall showing lateral movement beyond the limits normally taken for stability.



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Section 3 Ground Conditions and Design Parameters

Ground Conditions and Geotechnical Parameters

Fastrak Report 27798 included a borehole carried out at garden level which confirmed the soil strata on the site to be topsoil/made ground over brown London Clay. The borehole is included below:

Water Strikes			n Situ Testing	Depth (m)	Legend	Stratum Description
Strikes	Depth (m)	Type	Results	(m)		TOPSOIL
		1 1		0.12		
		1 1		0.12		MADE GROUND
		1 1		1		
		1 1		0.45		
	0.50	D	V (kPa) = 38	0.10		Mid brown CLAY
		1 1	V (kPa) = 38	1		
		1 1		1		
		1 1		1		
	1.00	ь		1		
	1.00	"	V (kPa) = 60	1		
		1 1	V (kPa) = 62	1		
		1 1		1		
		1 1		1		1
	1.50	D		1		
		1 1	V (kPa) = 76 V (kPa) = 80	1		
		1 1	V (ki a) = 00	1		
		1 1		1		
				1		
	2.00	D	V (kPa) = 100	1		1
		1 1	V (kPa) = 104	2.20		
		1 1		2.20		Mid brown sandy CLAY
		1 1		1		
	2.50	ь		1		2.40m - Mid brown CLAY begins to show grey mottling.
		-	V (kPa) = 124	1		
		1 1	V (kPa) = 130	1		
		1 1		1		
		1 1		1		
	3.00	D	V (kPa) = 138	1		
		1 1	V (kPa) = 138 V (kPa) = 140	1		
		1 1		1		
		1 1		1		
	3.50	ь		1		
	5.50	"	V (kPa) = 140	1		
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		1 1		1		
		1 1		1		
	4.00	D	M (I-D-) - 440	1		
		1 1	V (kPa) = 140	1		
		1 1		1		
	l			I		
	4.50	ь		1		
	4.50	"	V (kPa) = 140	1		
	l	1 1		1		
_				1		
lacksquare				1		4.90m - Standing water
	5.00	D		5.00	and the same	End of Borehole at 5.000
			V (kPa) = 140	I		2.10 31 2-3 31 000 84 3.000
		1		1		
				1		
		1 1		I.	1	I

Geotechnical Design Parameters

For the design of the new retaining walls long term (>6m) / effectice stress parameters will be used:

Cohesion	c'	0	kN/m2	
Angle of shearing resistance	φ'	23	degree	
Density - London Clay	γ	20	kN/m3	
Density - water	Υ _w	10	kN/m3	
Other Design parameters				
Surcharge	q	5	kN/m2	(Garden areas with no limited access)
Density concrete	Υ _c	24	kN/m3	



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Section 4 New Extension - Assumed Basement Construction Sequence

Assumed Sequence of Construction for Rear Basement

The sequence below has been assumed in the design of the new basement.

- 1 Isolate all services and ensure they are not live. Demolish existing conservatory structure.
- 2. Locally demolish existing garden walls and ground floor slab to basement
- 3. Reduce dig across area of new basement
- 4. Install local propping to side faces
- 5. Demolish existing basement walls, demolishing original rear lightwell wall
- 6. Adjust propping to side walls as required
- 7. Batter back rear soil face to an slope of approx 60deg.
- 8. Demolish existing basement walls and floor slab
- 9. Install drainage and below ground services
- 10. Site blind area of new basement
- 11. Cast new basement slab with starter bars for walls
- 12. Cast new basement walls with starter bars to ground floor slab
- 13. Prop new basement walls off basement slab using push-pull props as required
- 14. Cast new ground floor slab (RC on metal decking
- 15. Install waterproofing lining to basement
- 16. Complete fit out of new extension

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Density water

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Rev 01 Title: Structural Calculations for Proposed Refurbishment of 161 Arlington Road New Extension - Basement 5Section 5 Rear Wall - Sections 3b (+3a) Wall design: Treat as propped cantilever Use effective stress parameters Design for full height water - cracked zone 2.35m from surface Surcharge = 5kPa Ring beam cast on top of wall Support to top of wall from RC ring beam / slab Support to bottom of wall from basement slab` SURCHARGE SOIL PRESSURE www PRESSURE PRESSURE **Wall Parameters** Height to formation Floor to floor 2210 mm 350 FFL dropped Finsihes, allow 250 300 Slab 50 Blinding 3160 Allow Ht = 3200 mm Wall stem thickness 250 mm Base to wall 300 mm Base to wall width 1.7 24 kN/m3 **Soil Parametrs** 0 kPa $Ka = 1-\sin \varphi' / 1+\sin \varphi'$ Cohesion Angle of shearing resistance φ' 23 degree = 0.4381 **Density London Clay** 20 kN/m3

10 kN/m3



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