Wadham Gardens

Monitoring proposal

Issued 04th October 2015

Knowles Basements

Revision B

1. INTRODUCTION

The purpose of this proposal is to put forward a monitoring system that will measure the effects that the excavation and basement construction activity may have on the neighbouring structures. Maintenance

The monitoring will consist of the following items:

- 3D Reflective Targets;
- HILTI Nails where required

2. INSTALLATION

2.1 Control

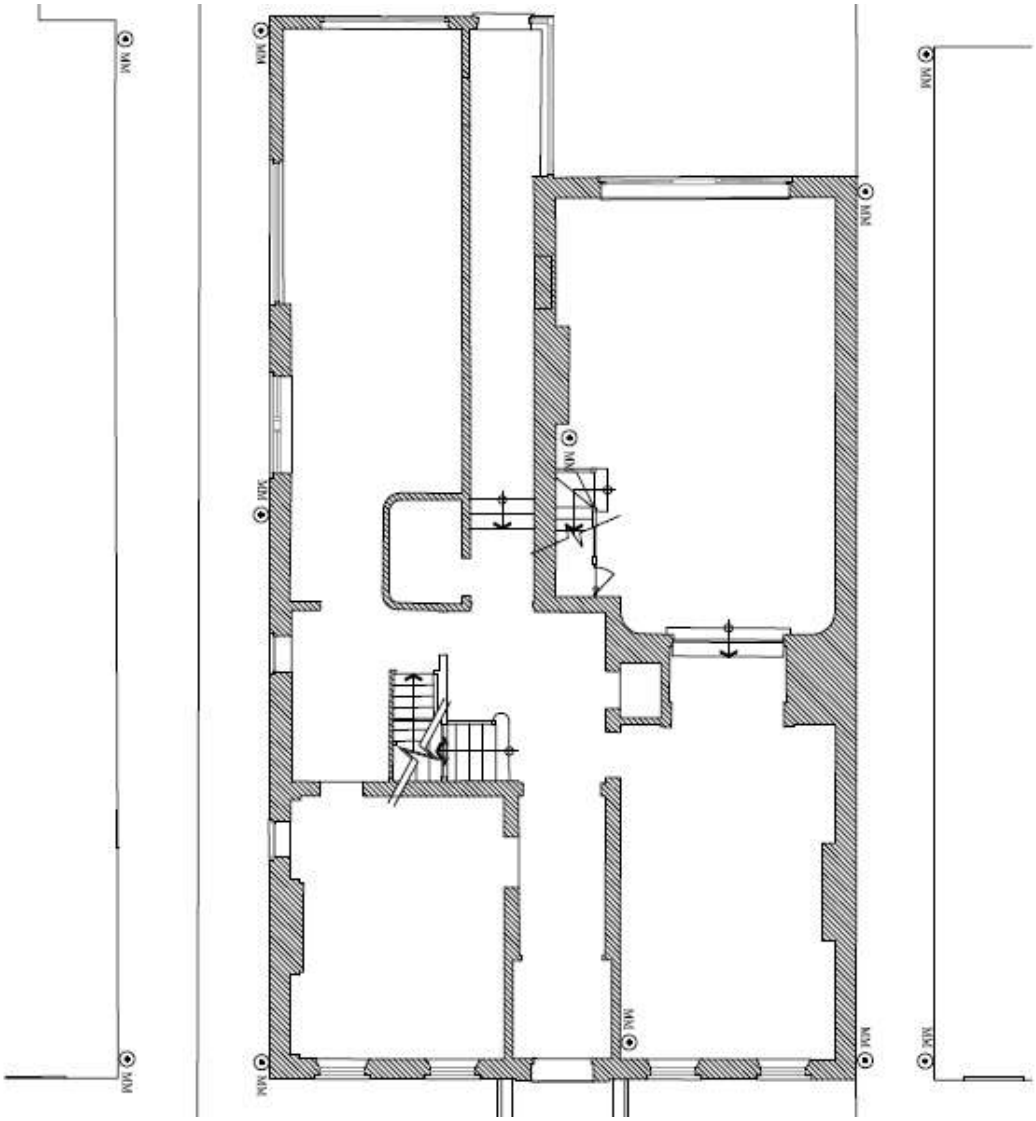
Monitoring control station will be established around site perimeter, from which the monitoring targets will be surveyed. The coordinate system will be specific to the monitoring, unless instructed otherwise.

Additional survey targets for control will be placed on surrounding structures outside of the site's zone of influence and these points will be accurately fixed in the 3-dimensional plane. Their positions will be determined during the establishment of the primary control. Access and permission to install these points will have to be provided by others.

These targets will be used to establish station coordinates prior the commencement of each survey. Their coordinates will be calculated using the resection method calculated within the instrument. This method of control establishment allows for accurate control to be determined without having to rely on a fixed station position in close proximity to site

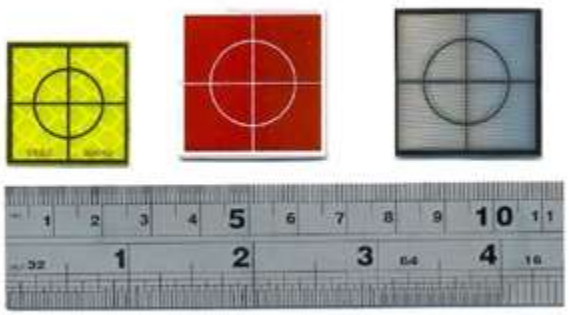
2.2 Reflective Targets

Reflective survey targets will also be installed as per drawings Below



2.3 Levels

The reflective targets will be giving levels as well as easting and northing values to record the vertical movement in the front and rear facades of the building
Examples of targets to be used



3. MONITORING

3.1 Targets

A resection which shoots a minimum of two points records the angles by a module built into the instrument. The instrument then will display any error on the screen, the targets placed on the building will then be shot using the EDM and the results recorded both on the system and manually
The 3d target monitoring provides a ±2mm accuracy

4. FREQUENCY AND DURATION OF READINGS

The monitoring frequency is set to:

- Weekly – during excavation and basement works (up to and including casting of the ground floor slab)*
- Monthly – after completion of the ground works and basement construction

* During the critical excavation and basement works monitoring readings shall be taken daily if Amber trigger alarm reached

5. TRIGGER VALUES

Trigger values for Vertical movement have been set as follow:

Underpinning

Amber 7mm
Red 9mm

Underpinning to Party Walls:

Amber 7mm
Red 9mm

Temporary Works to superstructure:

Amber 7mm
Red 9mm

Ground Movements during construction:

Amber 7mm
Red 9mm

Trigger values for Lateral movement have been set as follows:

Underpinning

Amber 7mm
Red 9mm

Underpinning to Party Walls:

Amber 7mm
Red 9mm

Temporary Works to superstructure:

Amber 7mm
Red 9mm

Ground Movements during construction:

Amber 7mm
Red 9mm

6. REPORTS

The measurements are to be taken as per the proposed frequency at regular intervals and the results will be issued to the main contractor every Friday.

The readings are to be put into a table format with graphical data; the report will have the following information:

- Date of survey
- Eastings, northings and level
- Movement in the eastings northing and levels in mm
- Movement from the baseline
- Movement from the last reading

If a trigger value is reached in the report the following is to happen

Amber
The temporary works engineer and party wall surveyor to be informed immediately
Monitoring to be increased to twice weekly and reporting within 2 calender days

Red

If/when the Red Alarm is reached HALT all works to the affected Party Wall boundary and make safe the site.
Inform Party Wall Surveyors/Engineers immediately.
Contractor/BO's PWS to convene a site meeting to agree 'next steps' with AO's PWS/Engineer et al.

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7. INSTRUMENTATION

Lecia 1200+series

Leica TPS1200+ Series

Leica TPS1200+
Technical specifications and system features

Models and options

	TC	TCR	TCRM	TCA	TCP	TCRA	TCRP
Angle measurement	•	•	•	•	•	•	•
Distance measurement (IR-Mode)	•	•	•	•	•	•	•
PinPoint reflectorless dist. measurem. (RL-Mode)		•	•			•	•
Motorized			•	•	•	•	•
Automatic Target Recognition (ATR)				•	•	•	•
PowerSearch (PS)					•		•
Guide Light (EGL)	◦	◦	◦	◦	◦	◦	◦
Remote Control Unit / RadioHandle	◦	◦	◦	◦	◦	◦	◦
GIS'74 Laser Guide				◦		◦	
SmartStation (AX1230+ GNSS)	◦	◦	◦	◦	◦	◦	◦

• = Standard ◦ = Optional

Angle measurement

		Type 1201+	Type 1202+	Type 1203+	Type 1205+
Accuracy (std.dev., ISO 17123-3)	Hz, V	1" (0.3 mgon)	2" (0.6 mgon)	3" (1 mgon)	5" (1.5 mgon)
	Display resolution	0.1" (0.1 mgon)	0.1" (0.1 mgon)	0.1" (0.1 mgon)	0.1" (0.1 mgon)
Method	absolute, continuous, diametrical				
Compensator	Working range	4' (0.07 gon)	4' (0.07 gon)	4' (0.07 gon)	4' (0.07 gon)
	Setting accuracy	0.5" (0.2 mgon)	0.5" (0.2 mgon)	1.0" (0.3 mgon)	1.5" (0.5 mgon)
	Method	centralized dual axis compensator			

Distance measurement (IR-Mode)

Range (average atmospheric conditions)	Round prism (GPR1)	3000 m
	360° reflector (GRZ6)	1500 m
	Mini prism (GMP101)	1200 m
	Reflective tape (60 mm x 60mm)	250 m
	Shortest measurable distance	1.5 m
Accuracy / Measurement time (standard deviation, ISO 17123-4)	Standard mode	1 mm + 1.5 ppm / typ. 2.4 s
	Fast mode	3 mm + 1.5 ppm / typ. 0.8 s
	Tracking mode	3 mm + 1.5 ppm / typ. < 0.15 s
	Display resolution	0.1 mm
Method	Special phase shift analyzer (coaxial, visible red laser)	

PinPoint R400/R1000 reflectorless distance measurement (RL-Mode)

Range (average atmospheric conditions)	PinPoint R400:	400 m / 200 m (Kodak Gray Card: 90 % reflective / 18 % reflective)
	PinPoint R1000:	1000 m / 500 m (Kodak Gray Card: 90 % reflective / 18 % reflective)
	Shortest measurable distance	1.5 m
	Long Range to round prism (GPR1)	1000 m – 7500 m
Accuracy / Measurement time (standard deviation, ISO 17123-4) (object in shade, sky overcast)	Reflectorless ≤ 500 m	2 mm + 2 ppm / typ. 3 – 6 s, max. 12 s
	Reflectorless > 500 m	4 mm + 2 ppm / typ. 3 – 6 s, max. 12 s
	Long Range	5 mm + 2 ppm / typ. 2.5 s, max. 12 s
Laser dot size	At 30 m	approx. 7 mm x 10 mm

Automatic Target Recognition (ATR)

Range ATR mode / LOCK mode (average atmospheric conditions)	Round prism (GPR1):	1000 m / 800 m
	360° reflector (GRZ4, GRZ122):	600 m / 500 m
	Mini prism (GMP101):	500 m / 400 m
	Reflective tape (60 mm x 60 mm):	55 m (175 ft)
	Shortest measurable distance:	1.5 m / 5 m
Accuracy / Measure time (std. dev. ISO 17123-3)	ATR angle accuracy Hz, V:	1 " (0.3 mgon)
	Base positioning accuracy:	± 1mm
	Measure time for GPR1:	3 – 4 s
Maximum speed (LOCK mode)	Tangential (standard mode):	5 m / s at 30 m, 25 m / s at 100 m
	Radial (tracking mode):	4 m / s
Method	Digital image processing (laser beam)	

PowerSearch (PS)

Range (average atmospheric conditions)	Round prism (GPR1):	300 m
	360° reflector (GRZ4, GRZ122):	300 m (perfectly aligned to instrument)
	Mini prism (GMP101):	100 m
	Shortest distance:	5 m
Search time	Typical search time:	< 10 s
Maximum speed	Rotating speed:	45° / s
Method	Digital signal processing (rotating laser fan)	

Guide Light (EGL)

Range (average atmospheric conditions)	Working range:	5 m – 150 m
Accuracy	Positioning accuracy:	5 cm at 100 m

General data

Telescope	
Magnification:	30 x
Free objective aperture:	40 mm
Field of view:	1°30' (1.66 gon) / 2.7 m at 100 m
Focusing range:	1.7 m to infinity
Keyboard and Display	
Display:	1/4 VGA (320*240 pixels), graphic LCD, colour, illumination, touch screen
Keyboard:	36 keys (12 function keys, 12 alphanumeric keys), illumination
Angle display:	360° ' ", 360° decimal, 400 gon, 6400 mil, V%
Distance display:	meter, int. ft, int. ft/inch, US ft, US ft/inch
Position:	face I standard / face II optional
Data storage	
Internal memory:	256 MB (optional)
Memory card:	CompactFlash cards (256MB)
Number of data records:	1750 / MB
Interfaces:	RS232, Bluetooth® Wireless-Technology (optional)
Circular Level	
Sensitivity:	6' / 2 mm

Laser plummet	
Centering accuracy:	1.5 mm at 1.5 m
Laser dot diameter:	2.5 mm at 1.5 m
Endless drives	
Number of drives:	1 horizontal / 1 vertical
Battery (GEB221)	
Type:	Lithium-Ion
Voltage:	7.4 V
Capacity:	4.4 Ah
Operating time:	typ. 5 – 8 h
Weights	
Total station:	4.8 – 5.5 kg
Battery (GEB221):	0.2 kg
Tribrach (GDF121):	0.9 kg
Environmental specifications	
Working temperature range:	–20° C to +50° C
Storage temperature range:	–40° C to +70° C
Dust / water (IEC 60529):	IP54
Humidity:	95 %, non-condensing

Remote Control Unit (RX1250T/Tc)

Communication	via integrated radio modem	
Control unit	Display:	1/4 VGA (320*240 pixels), graphic LCD, touch screen, illumination
	Keyboard:	62 keys (12 function keys, 50 alphanumeric keys), illumination
	Interface:	RS232
Battery (GEB211)	Type:	Lithium-Ion
	Voltage:	7.4 V
	Capacity:	2.2 Ah
	Operating time:	RX1250T: typ. 9 h, RX1250Tc: typ. 8 h