Work Area: SMM	
Work Type: I&M	
Originator Company: GEOCISA	

C435
Farringdon Main Station

CRL Lead reviewer: [redacted]	
CRL Reviewer: Eve Herrington	

Monitoring Close-Out Report:
Section G

CRL Document Number: C435-BFK-C2-RGN-M123-51657

Supplier Document Number: N/A

Contract MDL reference C14.022

1. Contractor Document Submittal History:

Revision:	Date:	Prepared by:	Checked by:	Approved by:	Reason for Issue:
1.0	25-04-2016	[redacted]			For acceptance
2.0	13-06-2016				For acceptance

2a. Stakeholder Review Required? YES ☐ NO ☒

Stakeholder submission required: LU ☐ RfL ☐ NR ☐ LO ☐ DLR ☐ Other: _____

Purpose of submission: For no objection ☐ For information ☐

This document has been reviewed by the following individual for coordination, compliance, integration and acceptance and is acceptable for transmission to the above stakeholder for the above stated purpose.

Sign: _____ Role: _____ Name: _____ Date: _____

Sign: _____ Role: _____ Name: _____ Date: _____

2b. Review by Stakeholder (If required):

Stakeholder Organisation	Job Title	Name	Signature	Date	Acceptance
					☐
					☐
[redacted]					☐

compliance with their contractual obligations and does not constitute
ds or materials developed or selected by the designer/supplier.

3. Acceptance by *Crossrail*:

[redacted]

11/11/2016

[redacted]

Contents

A. INTRODUCTION

In line with the C122 – M&W Specification KX10 – Instrumentation & Monitoring C122-OVE-Z4-RSP-CR001-00007, this Close-Out Report aims to address the following points in relation to the instrumentation defined in Section 2.

- Identify movements observed by the relevant instruments;
- Relate these movements to construction activities, where applicable;
- Identify trigger breaches that may have occurred;
- Demonstrate that the rate of change of the data is either in line with the required rate or such that residual risks are minimal;
- Identify any such residual risks should there be considered to be any.

Based on the above points, this close out reports will provide justification for the decommissioning of the instruments.

B. INSTRUMENTS

B.1 Description of the Instruments

This Close-Out Report relates the monitoring devices installed on Section G, refer to Table 1 bellow with the details for the devices on Section G

Sensor	Location	Easting (m)	Northing (m)	Elevation (mATD)
C435-XR20000	Charterhouse St	82215.3284	36546.5398	115.8991

Table 1: Details of the devices installed on Section G

Installation and as-built-details are available in the following documents:

Drawings:

- C122-OVE-C2-DDA-CR001_Z-31531. Asset protection I&M ground surface and In-ground.
- C435-BFK-C2-DWG-M123-50042. In ground devices installed for Farringdon Station.

Installation Reports:

- C435-BFK-C2-RGN-M123-50051. Installation Report- In ground monitoring Extensometer XR2000.

B.2 Location of the Instruments

Devices associated with Section G are located on the plan below highlighted in yellow.

Figure 1 – Map showing the Location for the device on Section G

C. MOVEMENTS

C.1 Movements Resulting from Construction Activities

C.1.1 Relevant Crossrail (BFK) Works

The construction activities affecting these instruments are outlined in the table below:

Activity	Start Date	End Date
WB TBM	04-10-2013	05-10-2013
EB TBM	19-01-2014	20-01-2014
PTW	22-10-2014	08-11-2014
PTE	16-09-2014	06-10-2014
CP6	12-11-2014	22-11-2014
CH2	27-01-2015	28-05-2015

Table 2 – Construction Activities associated with Section G.

C.1.2 Resulting Movements

- **Extensometer XR20000.**

The monitoring data for the extensometer at street level is shown in Appendix B.

- WB TBM caused maximum 2-3mm of settlement from 04-10-2013 to 05-10-2013
- Residual movement caused 2mm of settlement.
- Compensation grouting from Moorgate Shaft 2 caused maximum 3-4mm of heave from 25-12-2013 to 10-01-2014
- EB TBM caused 2mm maximum of settlement from 19-01-2014 to 20-01-2014.
- Residual settlement caused 4mm maximum.
- PTW works caused maximum 4mm of settlement from 16-09-2014 to 06-10-2014.
- PTE construction caused 4-5mm of settlement form 22-10-2014 to 08-11-2014.
- CP6 construction caused 10mm maximum of settlement from 12-11-2014 to 22-11-2014.
- CH2 construction caused maximum 3mm of settlement from 27-01-2015 to 28-05-2015.

C.2 Trigger Breaches

The Instrumentation and Monitoring Plan: Farringdon Station Ground Movement and Asset Protection C122-OVE-C2-RGN-M123-50013 in section 6.1, no triggers are applicable for in-ground monitoring.

C.3 Significant Issues with the Instrumentation

No issues with these devices.

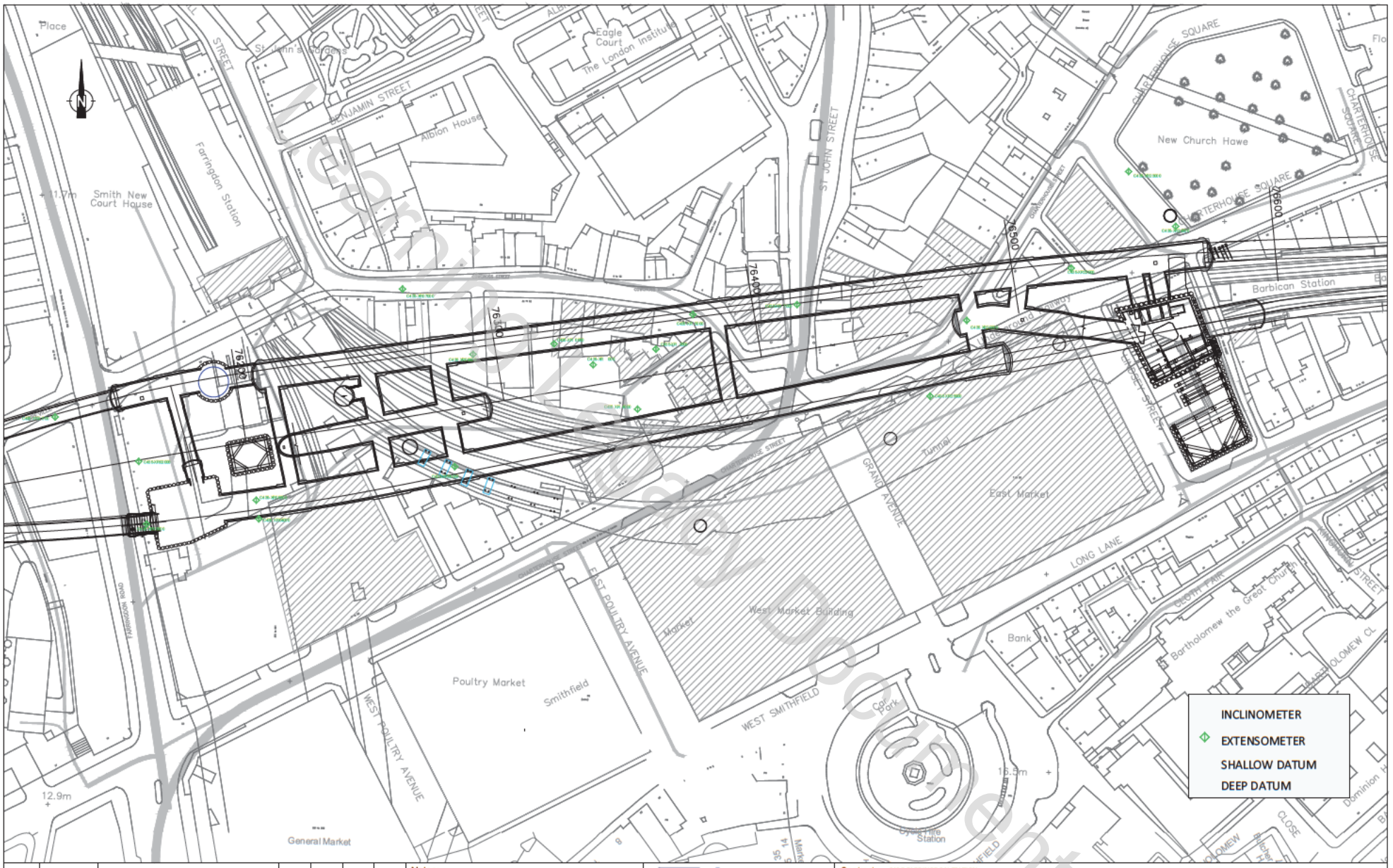
C.4 Residual Risks

The rate of settlement for all instrumentation within this report has been analysed and in all cases the rate is less than 2mm/year

D. CONCLUSIONS

No triggers breached, monitoring stable. No residual risks remain. Long term monitoring to be completed by Crossrail.

APPENDIX A: DRAWINGS



Rev.	Date	Description	By	Chkd	App	Auth
1	15-11-2013					

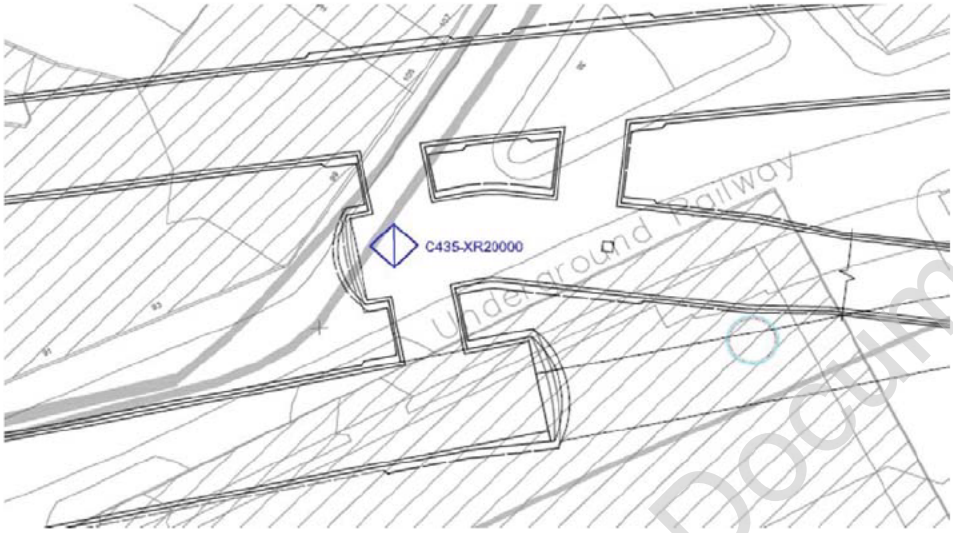
Notes:

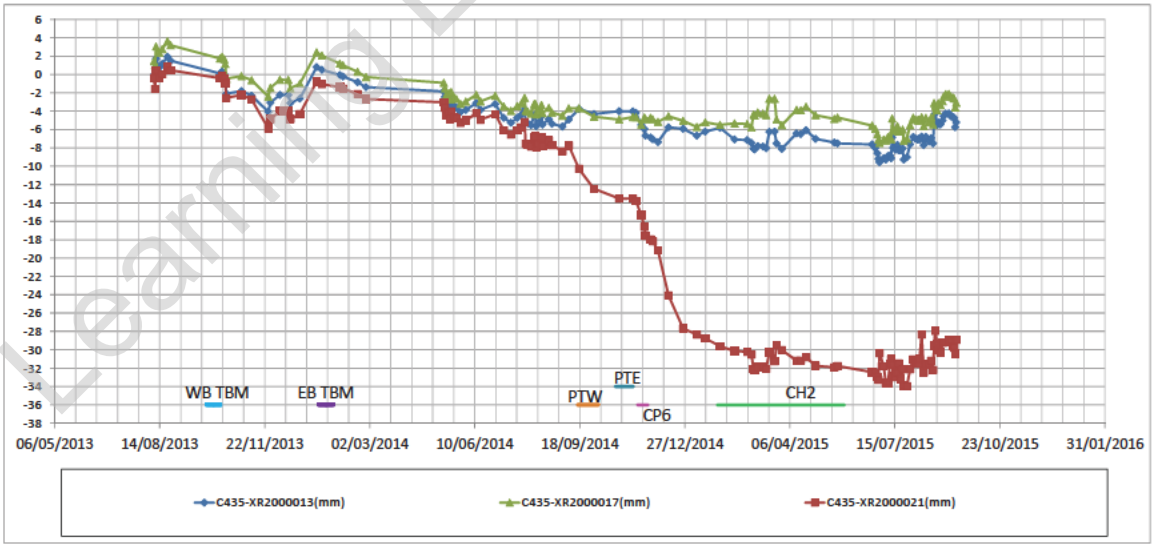
GEOCISA UK
C/ Los Llanos de Jerez 10 12
28823 MADRID
www.geocisa.com

Scale : @ A3

Contract : C435 FARRINGDON STATION
Originator : GEOCISA
Location : CROSSRAIL GENERAL
Title : IN-GROUND DEVICES INSTALLED FOR FARRINGDON STATION.
By : -
Chk : -
App : -
Drg No : - C435-BFK-C2-DWG-M123-50042
Rev :
Suit :
Auth : GEOCISA

APPENDIX B: GRAPHS





REMARKS:

APPENDIX C: GLOSSARY

➢ ATS	Automatic Total Station.
➢ ETH	Eastern Ticket Hall.
➢ WB	Westbound.
➢ TBM	Tunnel Boring Machine.
➢ EB	Eastbound.
➢ PTW	Platform Tunnel West
➢ PTE	Platform Tunnel East
➢ CP	Cross passages.
➢ CH	Concourse Hall.
➢ VA	Ventilation Adit
➢ STE	Stub Tunnel East
➢ RTE	Running Tunnel East.
➢ ES	Escalator Shaft