C510 – Whitechapel and Liverpool Street Station Tunnels

Instrumentation and Monitoring Close Out Report
NESRS

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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
					☐
					☐

3. Acceptance by *Crossrail*:

	Crossrail Review and Acceptance Decal	
	This decal is to be used for submitted documents requiring acceptance by *Crossrail*.	
☑	Code 1.	Accepted. Work May Proceed
☐	Code 2.	Not Accepted. Revise and resubmit. Work may proceed subject to incorporation of changes indicated
☐	Code 3.	Not Accepted. Revise and resubmit. Work may not proceed

[redacted] Date: 01/06/17

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Document Revision History		
Revision	Date	Purpose
1.0	02/12/2016	For approval
2.0	03/03/2017	For approval
3.0	21/03/2017	For approval

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Tables and Figures

1 Purpose of Close out Report

Materials and Workmanship Specification - Instrumentation and Monitoring (C122-OVE-Z4-RSP-CR001-00007), section KX10.2114 specifies the requirement for a close out report prior to the decommissioning of monitoring sensors and instruments. It is therefore, the purpose of this close out report to gain acceptance to decommission identified monitoring sensors at NESRS of Crossrails's C510 Whitechapel station. Acceptance to decommission sensors will result in ceasing measurements; stopping the reporting and removal of the sensors.

CRL are currently on-going discussion with Thames Water to determine whether they will undertake the in-sewer I&M decommissioning. Then surface cable, power and logger boxes will need to be decommissioning by BBMV, and a subsequent H&S file handed over to Thames Water if they agree to decommission the in-sewer instruments.

N.B. Monitoring sensors refer to all monitoring points; which include extensometers, crack meters, and prisms. Please note this is not an exhaustive list and does not include monitoring systems/equipment, such as communication boxes.

2 Scope of Monitoring Assessment for Close Out

Specification KX10.2114 of document C122-OVE-Z4-RSP-CR001-00007 states that to establish approval for decommissioning, the contractor is to produce a close out report which summarises the observations in correlation with the construction activities. The report is to demonstrate monitoring has reached acceptable settlement rates; whether to the specified rate, or where no rate is specified trigger values are evaluated against potential residual risks. I&M schedule C122-OVE-C2-DDA-CR001-Z-31521 specifies the acceptable settlement rates with the requirements to monitor at different construction phases, and duration for completion. To summarise the I&M schedule states that the automated monitoring within the sewer is to continue during post construction for a period of 3 months at a frequency of 3 hourly measurement. The long term monitoring for the sewer is to be assessed every 3 months until the adjacent ground settlement has met a criteria of settlement trend equal to or less then 2mm per annum.

3 Close Out Report NESRS Description and Location Plan

3.1 NESRS Location

Figure 1 shows the Whitechapel Station general location plan, the C510 tunnels and location of the NESRS, coloured in green. Detailed location plans can be found within the installation reports as listed in Section 3.5.

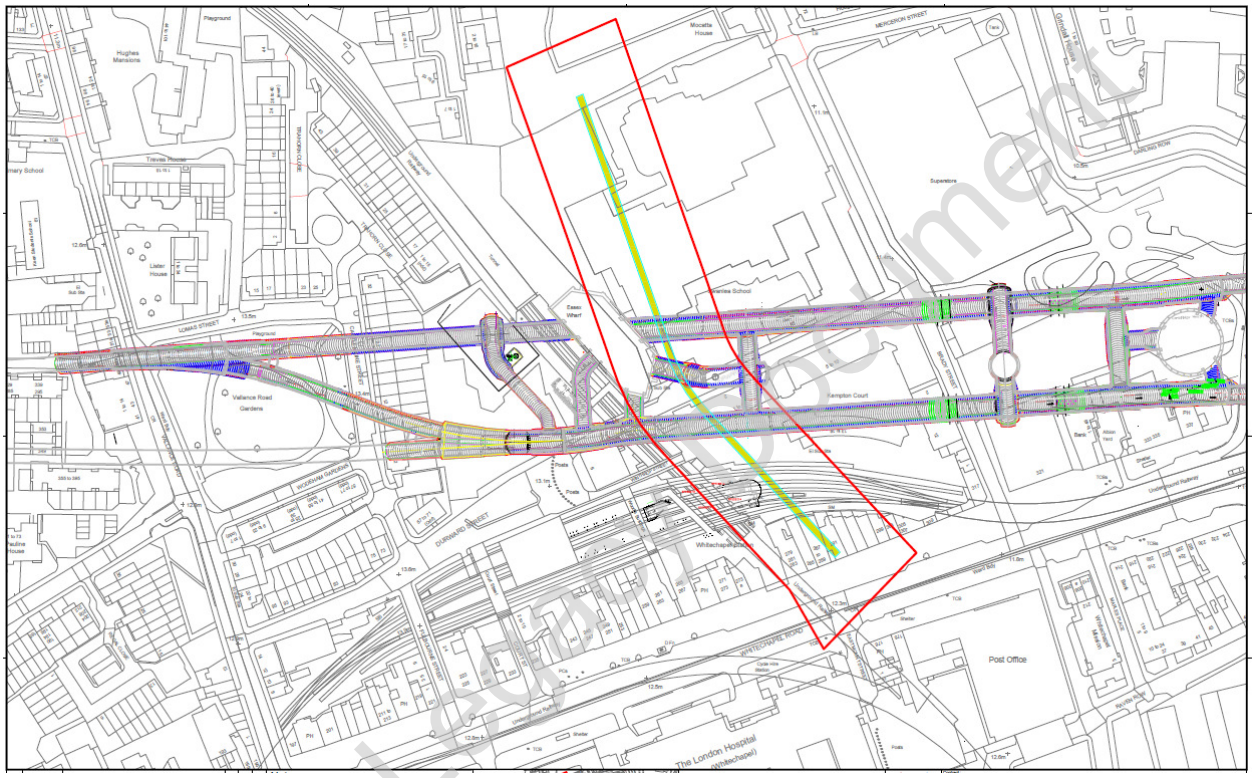
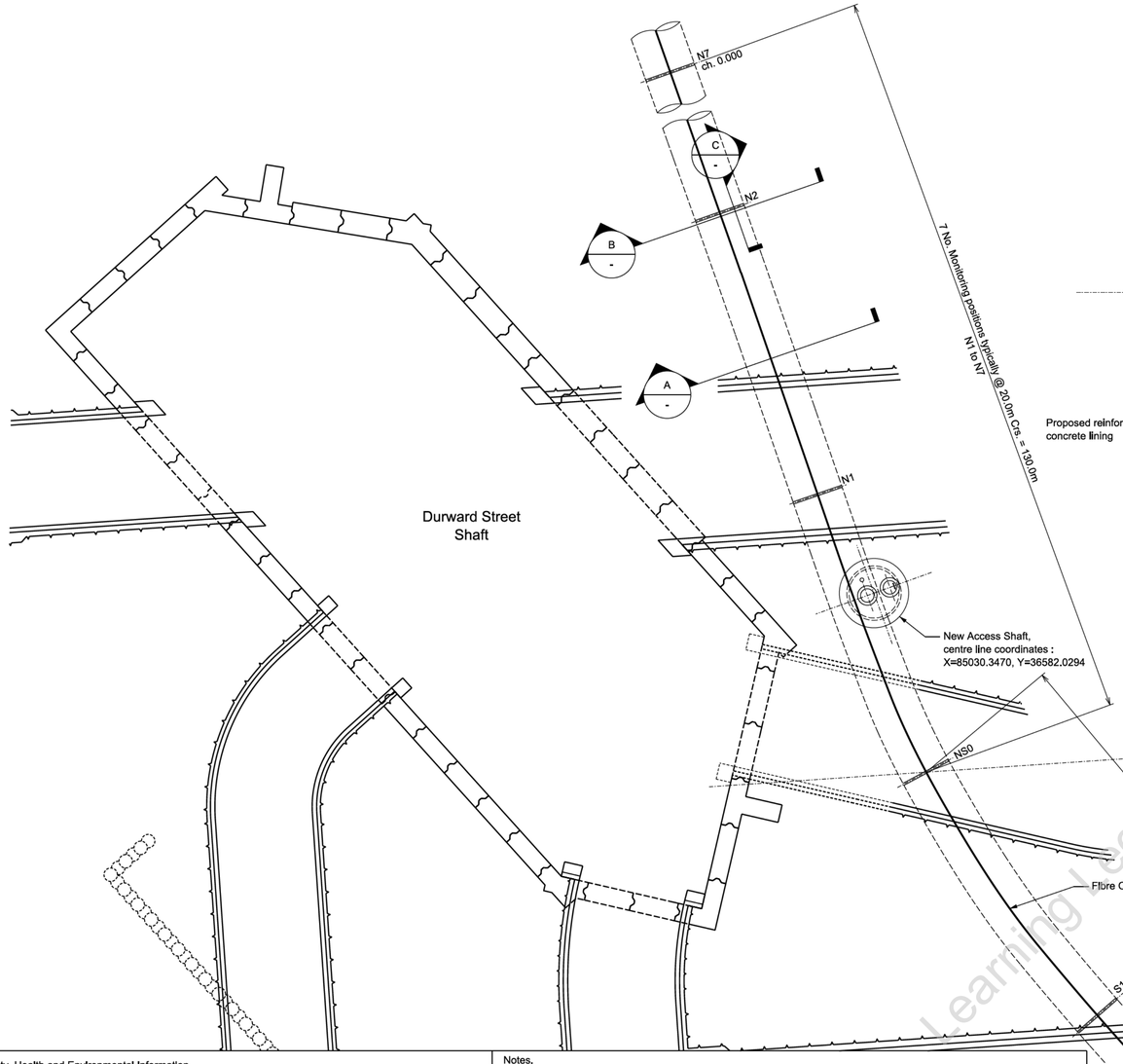
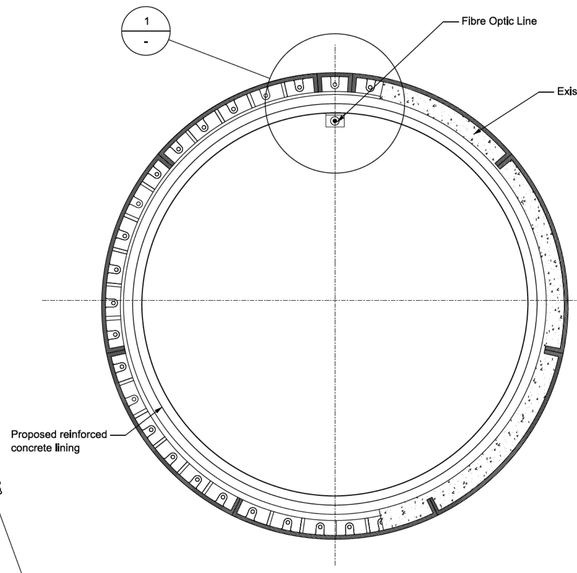


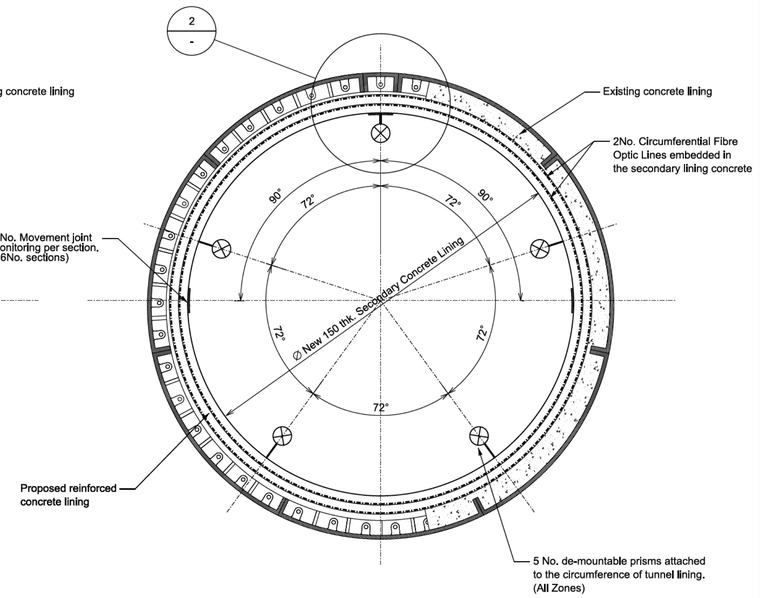
Figure 1- *shows the Whitechapel Station general location plan*

3.2 Plan view of the section of the NESRS





Section A - A
1:25



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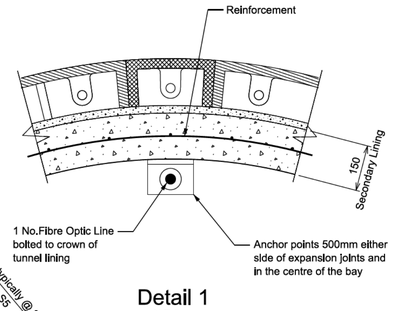
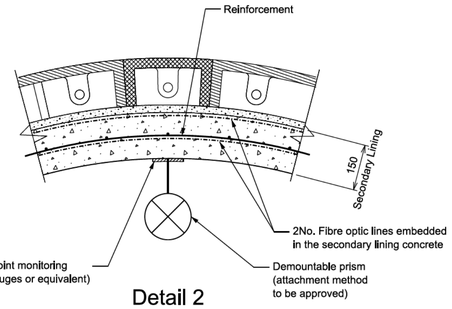


Detail 1
N.T.S.



Detail 2
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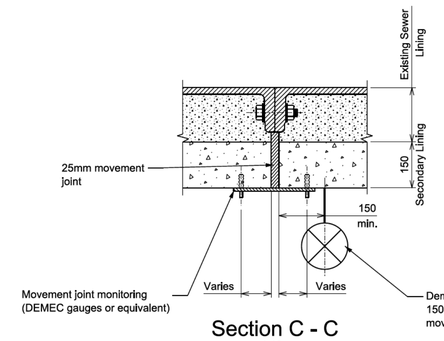

Section C - C
1:10

Safety, Health and Environmental Information
Notes below are additional to hazards/risks normally associated with this type of work:
Construction
CI. Monitoring Surveyor entry/egress into/from NESR Sewer via temporary access shaft/manholes is situated in at least one location within the Crossrail Whitechapel Station construction site, with associated potential safety hazards presented by those works, plus intrinsic confined space entry hazards (Ref: Items SEW-NES-030 & 032/033)
CII. Significant rainfall events liable to cause rapid flooding of sewer and construction shaft and risks to any Monitoring Surveyor personnel present therein. (Ref: Item SEW-NES-020)
Maintenance
MI. Potential for NESR sewer and access shaft to be forced apart due to excessive ground movement occuring during Whitechapel Station construction period, causing groundwater ingress or possible ground 'wash-in' resulting in the loss of sewer capacity, consequential flooding and possible consequential associated health and safety hazards (Ref: Item SEW-NES-036)
MII. Potential for NESR sewer lining excessive distortion and rupture either transversely or horizontally due to excessive ground movement occuring during Whitechapel Station construction period This leading to a collapse within the sewer resulting the loss of sewer capacity, consequential associated health and safety hazards (Ref: Item SEW-NES-038)
MIII. Potential for unplanned Whitechapel Station construction event occuring at a level below the protected sewer causing damage to its lining resulting in sewer failure causing flooding or deluging to Whitechapel Station escalator or platform tunnels underneath (Ref: Item SEW-NES-040)

Dismantling/Demolition (Future)
None identified.

See Designers CDM Risk Register Ref: Doc. No: C122-OVE-N3-LRG-CRG01-00011 for full hazard, risk and mitigation details.

These notes are based on the use of experienced and competent contractors carrying out the work using an approved safe method of working.

Notes.
Monitoring will be used to ensure the response of the sewer to the construction works is within predicted limits and to verify the design assumptions.

The monitoring will comprise:
a) Optical fibres installed along the crown of the tunnel and at critical transects. These directly measure the strain between anchor points and will be used to measure longitudinal (axial) strain and transect distortion (bending strain). They will also be used to calculate movement along the line of the tunnel. Anchor points (clamps used to tension the optical fibres) positioned at 500mm either side of movement joints and in the middle of the bay, 1 No. in the middle of a 4m bay and 2 No. in the middle of an 8m bay. The 2 No. optical fibre rings at the critical transects are embedded in the concrete of the new secondary lining, one on the boundary between the existing and new lining and one on the reinforcement of the new lining.
b) A separate back-up manual monitoring system including arrays of de-mountable targets positioned around the tunnel lining which will be monitored in three dimensions using a total station. 5 targets will be positioned in each array. This system will measure line/level at the survey points and any distortion of the tunnel lining at the critical transects. The system will have an accuracy of ±1mm.
c) Monitoring of the movement joints by an array of DEMEC studs (gauges) or equivalent situated at points in the tunnel where the curvature is expected to be greatest. These studs will validate assumptions about rotation of the segments at the movement joints when combined with the known deformation profile of the sewer.
d) Visual survey of the tunnel to confirm the tunnels structural response to the ground movement.

The optical fibres will be read remotely, and have the capacity to be read in real time. They will be used to monitor the sewer response during the construction works and to trigger control / contingency measures. The manual monitoring will take place during possessions of the sewer prior to and immediately after the construction works and as a result of a trigger level being breached. It will also be used if there is any malfunction of the real-time system. Visual surveys will be carried out as a minimum immediately before and after the CRL excavation works.

The optical fibres exit the sewer through a duct in the side of the new access shaft. They are to be connected to a data logger securely positioned within the worksite.

The longitudinal optical fibre and 2 No. rings at critical transects comprises Fujikura reinforced ribbon cable (JBT- 03813) or equivalent for strain measuring. The optical fibre used for temperature strain and transmission from the critical transects to the data logger comprises 8-Core single mode fibre (205-301 EXCEL OS1 8C 9/125 LOOSE TUBE LSOH BLACK) or equivalent.

Rev.	Date	Descrfptlon	By	Chkd	App	Auth
P01	15/02/2010	Draft for comments		AG	AS	PC
P02	04/03/2010	Draft for comments		AG	AN	RM
P03	27/05/2010	Issued for IDR		GP	AS	RM
P04	28/05/2010	Issued for IDR		JC	AN	RM
P05	23/06/2010	Relssued for tender purposes		JN	AS	RM

Notes

4m 0 4m 8m 12m 16m 20m
1:200
0.5m 0 0.5m 1m 1.5m 2m 2.5m
1:25
200mm 0 200mm 400mm 600mm 800mm 1000mm
1:10

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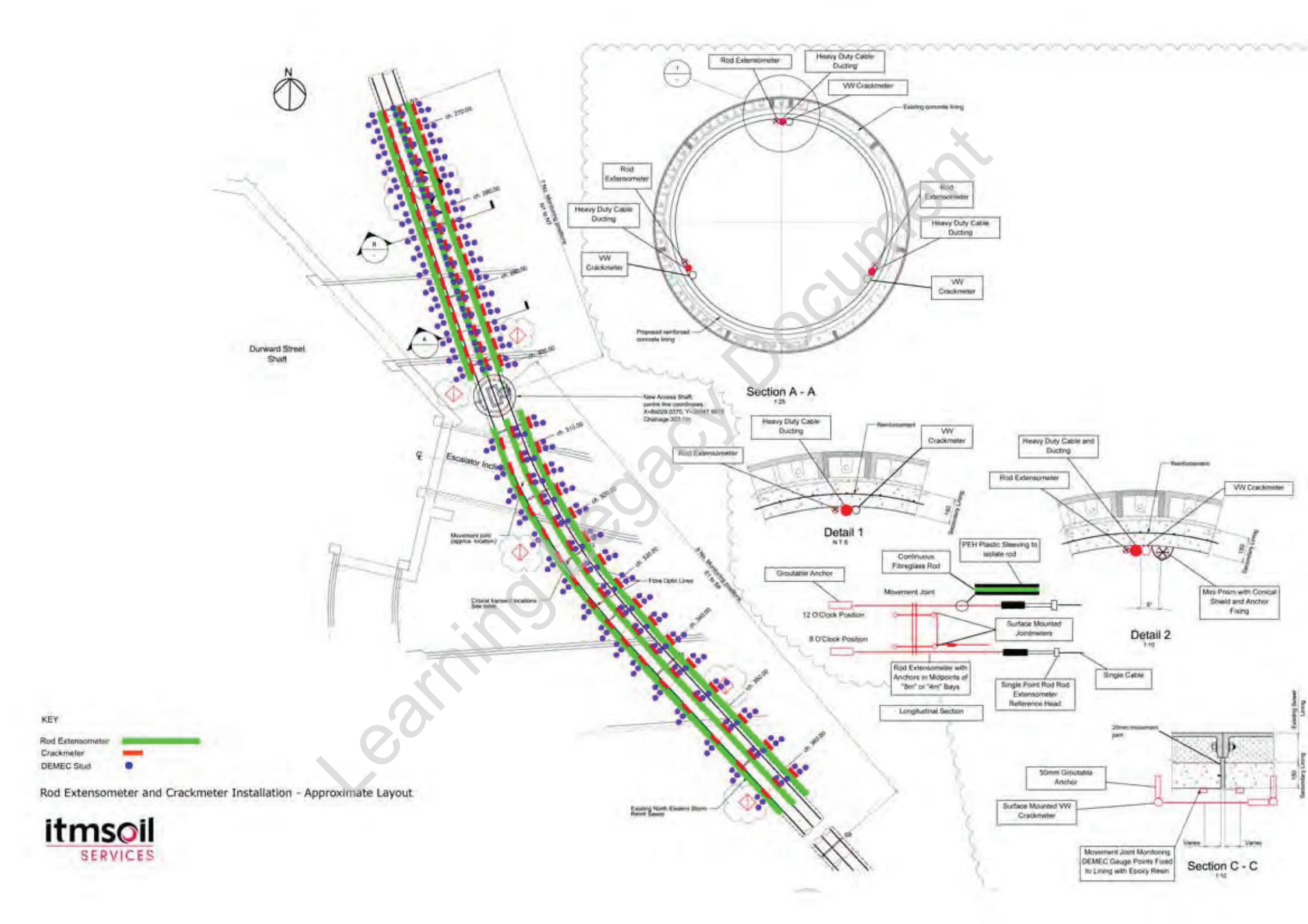
Contract : Bored Tunnels (Alignment and Track)
Originator : Ove Arup & Partners Limited
Location : Crossrail General
Title : Bored Tunnels
North Eastern Storm Relief Sewer
Strengthened Sewer Monitoring Details
C217
By : [redacted]
Chk : [redacted]
App : [redacted]
Auth : [redacted]
Scale : 1:200@ A1
Drawing and CAD file No : C122-OVE-D-DDD-CR001_Z-53361
Rev : P05
Suitability : S4

Fit for authorisation
RESTRICTED
Copy Approved for Design - Created: 25-JUN-2010

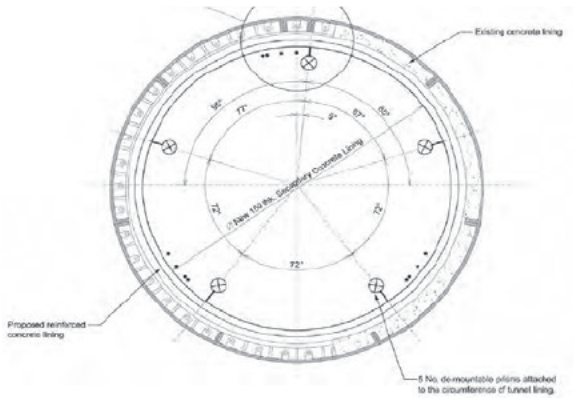


Section through NESRS Instrument Locations NOT TO SCALE REV 01 Issued 20/06/12

Array of prism have been installed at the critical transection as detailed in drawing ITM Sketch SK5133 rev X01. The table below is the approx chainage given for the locations. But these are to be locally moved to the centre of the bay

N1	298.8
N2	290.3
N3	281.8
N4	266.9
N5	249.8
N6	215.8
N7	181.7

S1	307.4
S2	315.9
S3	324.4
S4	330
S5	341.5
S6	356.4
S7	390.5
S8	424.6



3.3 NESRS Description

An access shaft for the NESRS was constructed adjacent to Swanlea School. The installation of instrumentation started at chainage 198.632, north of Swanlea School; to chainage 403.304 towards Whitechapel Road (see Figures 3 and 4). Detailed location plans can be found within the installation reports as listed in Section 3.5.

In addition to specified monitoring sections there were further 2no. of monitoring reference sections installed in the tunnel. These two sections were installed outside the zone of influence, one extending the North tunnel site boundary and the second the South tunnel end boundary. Each of these reference sections are formed of 5no. of prisms using the same type of prisms and positioning. These two reference sections at either tunnel ends are considered to have fixed coordinates. Any future manual monitoring will be adjusted based on these reference prisms.

3.4 NESRS Instrumentation:

- 99 No. Rod Extensometer (XR) – Automated monitoring
- 99 No Vibrating Wire Crackmeters (CK) – Automated monitoring
- Data Management System
- Junction Boxes
- Protective Covers
- Cabling
- 75 No. Clam Prism+ 6 No. Reference Target - Automated system
- 99 No. DEMEC studs - Verification of Automated system.

3.5 Monitoring Installation Report:

The monitoring sensors details for any further relevant information can be found from the installation report as follow:

- Monitoring Installation Report NESRS O & M Manual
  CRL Document Number: C217-CAR-C-GML-D061-WS107-50012
- Monitoring Installation Report WHI-LB-5 Kempton Court – Whitechapel
  CRL Document Number: C510-BBM-C2-RGN-D061-50012
- Monitoring Installation Report WHI-LP-5 Kempton Court – Whitechapel
  CRL Document Number: C510-BBM-C2-RGN-D061-50008
- Monitoring Installation Report WHI-LP-8 Sports Hall – Whitechapel
  CRL Document Number: C510-BBM-C2-RGN-D06150007
- Monitoring Installation Report WHI-LP-25 Durward Street – Whitechapel
  CRL Document Number: C510-BBM-C2-RGN-D061-50043
- Monitoring Installation Report Rod Extensometer C510-XR50501 – Whitechapel
  CRL Document Number: C510-BBM-C2-RGN-D061-50062

- Monitoring Installation Report Rod Extensometer C510-XR50502 – Whitechapel
  CRL Document Number: C510-BBM-C2-RGN-D061-50075

4 Construction Programme Influencing NESRS

Extent of Influence (EOI) monitoring areas were established to record ground movements in relation to C510 construction. The EOI purpose is to ensure all assets and areas are adequately monitored for movement during construction, this is achieved by controlling when and how often monitoring occurs. The Asset Protection Instrument and Monitoring (I&M) Schedules (C122 –OVE-C2-DDJ-CR001_Z-31521, states the extent of influence (EOI) of an active tunnel is 2 x depth from the active tunnel face. The EOI is used to determine when monitoring sensors are no longer influenced by construction and can be considered for decommissioning. Also, Inclinometer/ Extensometer/ Studs, which are installed to monitor the effect on North East Storm Relief Sewer on the surface, were in the Schedules (C122 –OVE-C2-DDA-CR001_Z-31521) and all information regarding these specific instruments were included in the monitoring section 5.

In order to identify the tunnels that had the potential to significantly affect NESRS, an area Zone of Influence (ZOI) was established by giving each monitoring sensor a radius of 2 x tunnel diameter from the exposed face. This area was then used to determine all the mining advances that occurred within its boundary, Figure 5 shows the area and the tunnels. The tunnel's advances start and finish date was used in assessment of the monitoring data and Active ZOI of construction has been identified in (Table 1)

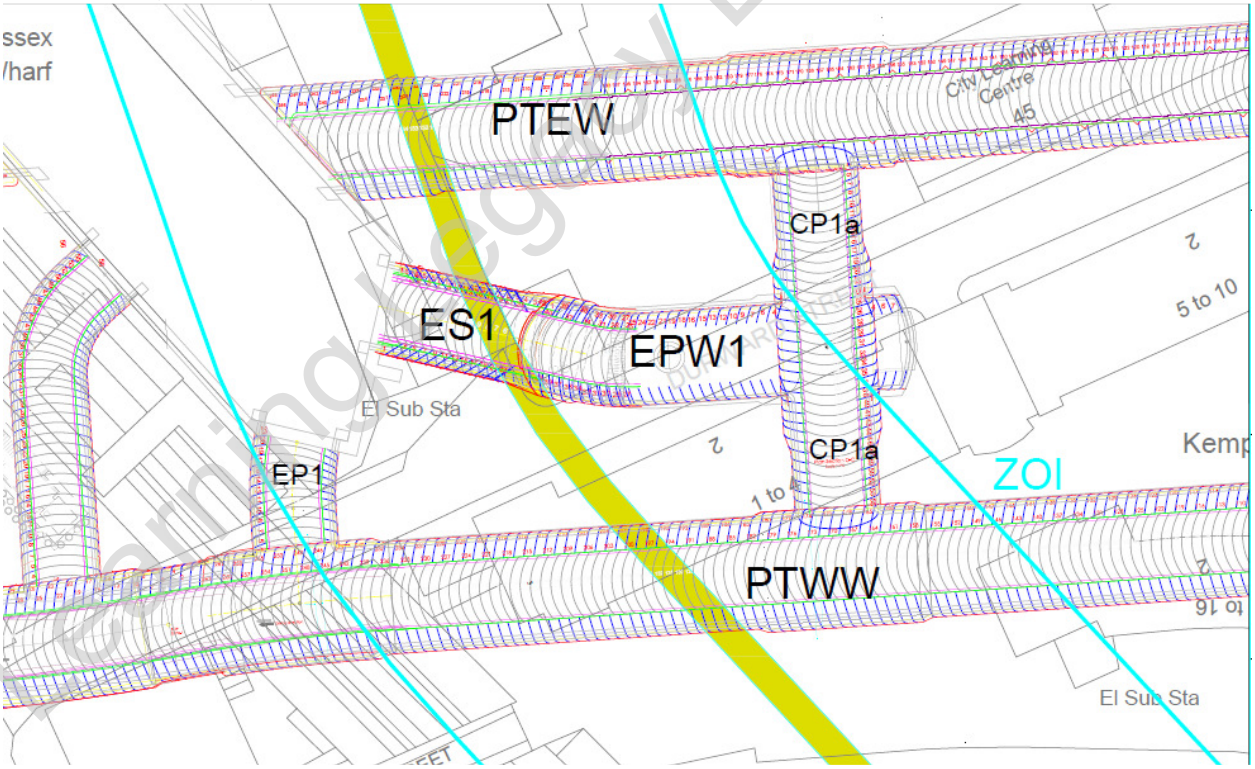


Figure 5 NESRS Active ZOI Construction.

All Active ZOI advances potentially affecting NESRS are listed and summarised in table 1 below.

4.1 Tunnel Advances Affecting NESRS

The information presented in Table 1, were used in monitoring graphs for Extensometers (XR) and Crackmeters (CK) in (Section 5.1), to show the movements in relation to construction. An active ZOI is established to identify the construction activities affecting NESRS.

TUNNEL ADVANCES STARTS & ENDS DATES FOR GRAPHS							
Tunnel Code	Tunnel Reference	Primary Layer Type	Start Date	End Date	Start Advance	End Advance	Zone
PTWW Pilot	PTWW (CS1)	Pilot	16/02/2013	06/03/2013	150	247	ZOI
PTEW Pilot	PTEW (CS1)	Pilot	06/02/2013	17/03/2014	93	166	ZOI
PTWW Enlargement	PTWW (CS1)	Enlagement	08/05/2013	14/07/2013	147	263	ZOI
PTEW Enlargement	PTEW (CS1)	Enlagement	08/07/2013	04/04/2014	135	248	ZOI
CP1a Pilot	CP1a	Pilot	16/08/2013	24/08/2013	2	37	ZOI
CP1a Enlargement	CP1a	Enlagement	07/09/2013	09/10/2013	2	59	ZOI
EP1 Pilot	EP1	Pilot	11/10/2013	16/04/2014	3	14	ZOI
EP1 Enlargement	EP1	Enlagement	14/10/2013	25/04/2014	5	23	ZOI
EPW1 Pilot	EPW1	Pilot	23/01/2014	29/01/2014	3	14	ZOI
EPW1 Enlargemnet	EPW1	Enlagement	08/04/2014	15/04/2014	4	42	ZOI
ES1 Pilot	ES1	Pilot	06/08/2014	22/10/2014	1	19	ZOI
ES1 Enlargement	ES1	Enlagement	17/09/2015	15/10/2015	1	27	ZOI

Table 1- Tunnel Advances Affecting NESRS

Heading Index:

CP - Cross Passage

ES – Escalator

PTEW – Platform Tunnel East (west of CS1)

PTWW – Platform Tunnel West (west of CS1)

EPW – Escalator Passageway

5 Monitoring Assessment NESRS

The monitoring sensors within the sewer were extensometers, Crackmeters (automated), prisms and manual DEMEC studs to verify the automated system. Extensometers and Crackmeters (automated) have been assessed through the graphs and tables stated in section 5.1. Table 2 and 3 highlights monitoring sensors that are within the sewer showing their stability within the green trigger level of 5mm over two years.

Note that, the in-sewer instruments stopped providing data as of May 2016 due vibrating wire interface (in the logger enclosure) has failed.

In the case of prisms and DEMEC studs, due to safety reason, it was agreed with Crossrail and Thames water not to undertake the manual monitoring.

Some other surface monitoring sensors were also installed for asset protection of the North East Storm Relief Sewer were Inclinometer, Extensometer and Studs, with their targets name listed below and their graphs listed in section 5.1

XR00003, XR00004, IM00011, LP00008 and LP00011, these (I&M) are included in Appendix 7 are for asset protection of the NESRS also LP50526 LP50551, LP50552, LP50553, LP50554, LP50555, LP50556, LP50557, LP50805, LP50806, LP50834, LP52521, XR50501 and XR50502. All these sensors listed would provide additional information, to the in-sewer instruments, for asset protection of the NESRS.

Evidence for decommissioning each monitored sensor is shown through graphs and tables. Each element of assessment compliments the other and is used together to determine acceptance of decommissioning of in-sewer sensors.

Table 4 highlights the surface monitoring sensors settlement. If the adjacent ground settlement is <2mm/year then decommissioning can be proposed. In some cases supplementary evidence is required to prove stability or provide reasoning for decommissioning.

If it has not, then there will be a need to make the case to TW to allow decommissioning of the in-sewer I&M on the condition that the adjacent surface monitoring sensors will continue to be monitored until the 2mm/year criteria has been achieved.

5.1 Time Graphs Monitoring Full History and Construction Durations

To assess the movement of NESRS monitoring sensors; the full history of extensometers and crackmeters (automated) were used. Each monitoring sensor data type is displayed in a line graph, with a Gantt chart (bar) representing the construction activities identified in section 4 for monitoring sensors within the sewer only.

- *Graph 1 - All Extensometers (XR) monitoring sensors within the NESRS in Relation to Construction*
- *Graph 2 - All Crackmeters (CK) monitoring sensors within the NESRS in Relation to Construction*

Also to assess the movement of the surface monitoring sensors within the boundary of NESRS, the sensors name is shown in the plan below (Figure 6) and each monitoring sensors data type is displayed in a line graph, as listed below.

In the plan below: those sensors highlighted in red monitored by C512, while those highlighted in blue monitored by C510.

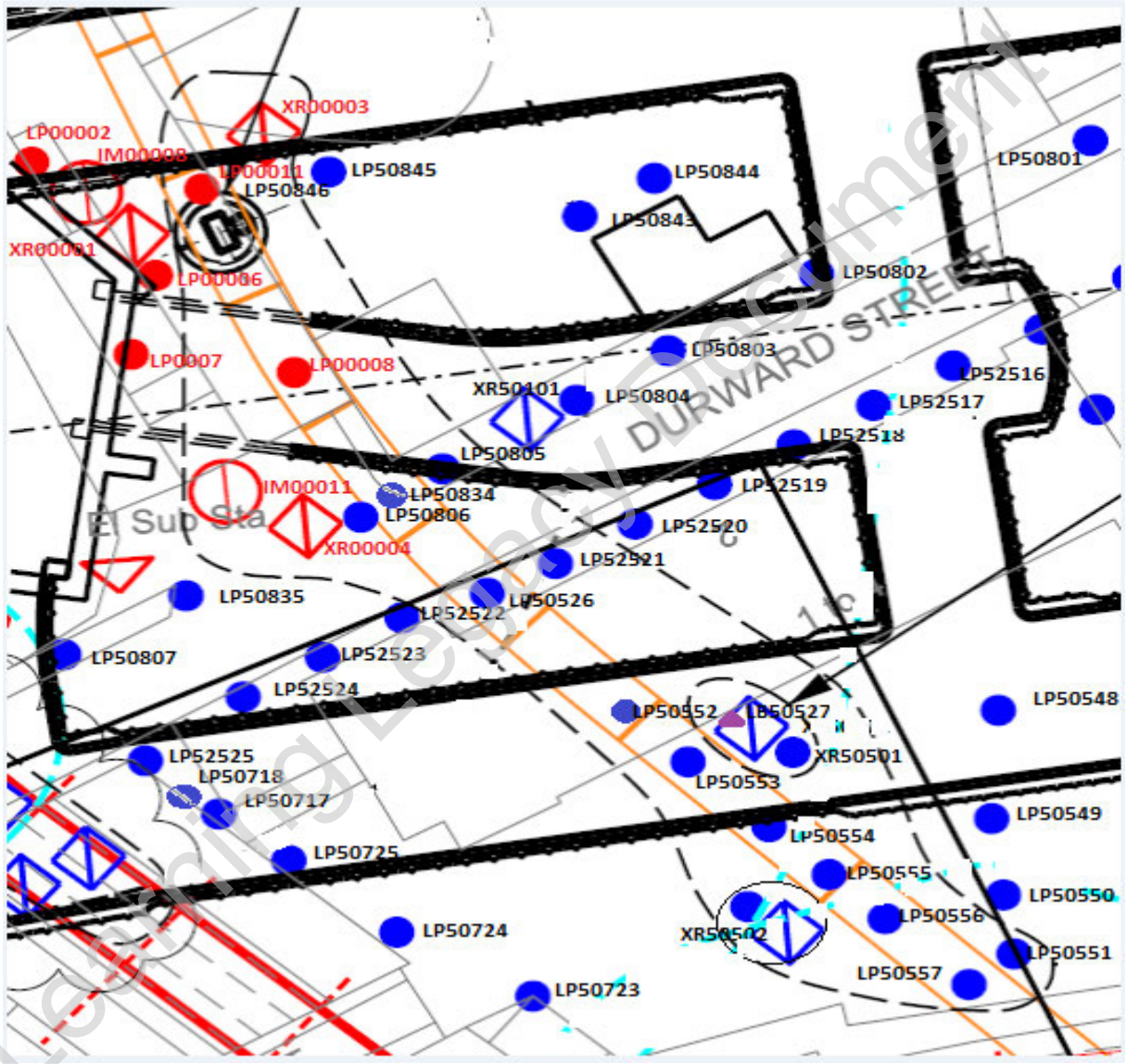
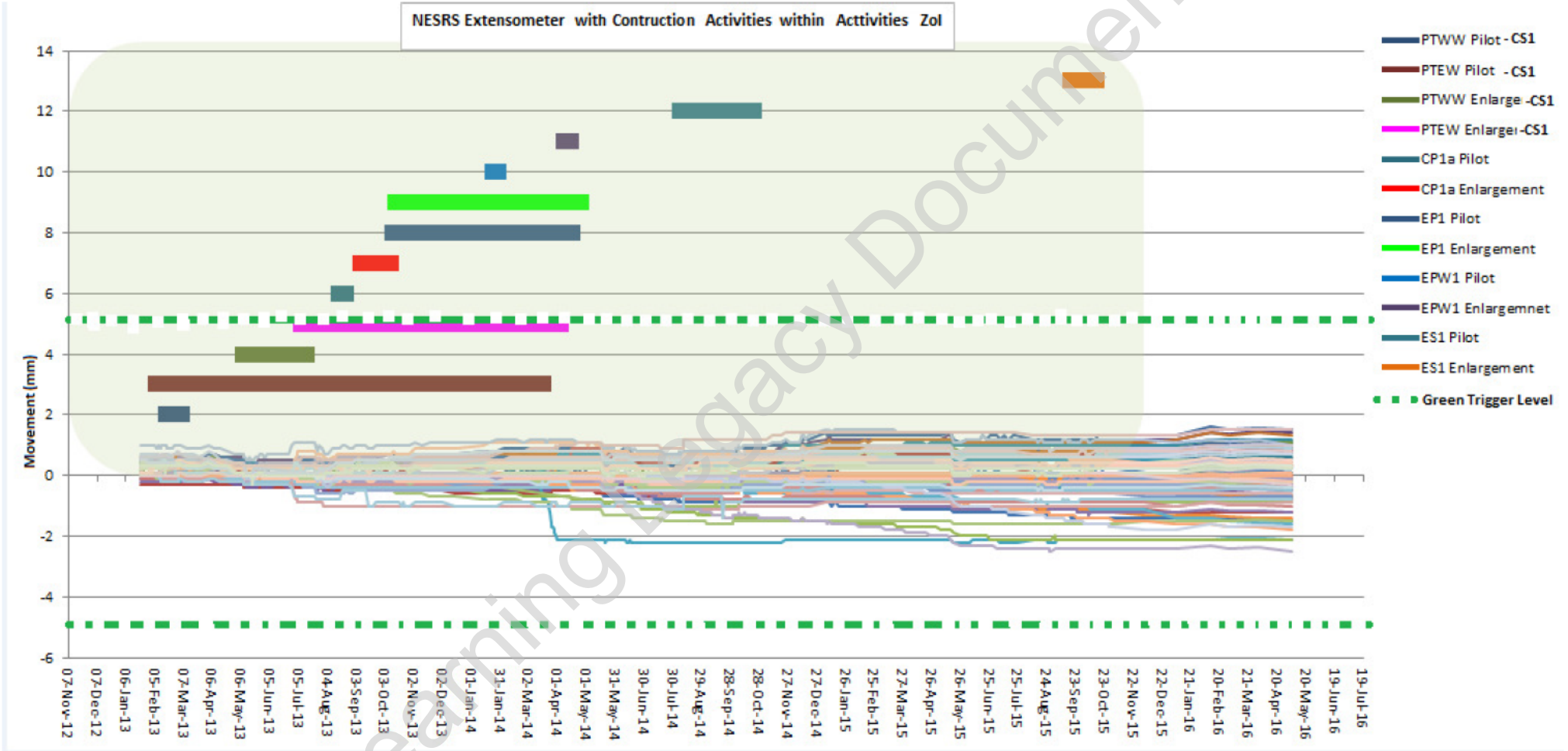


Figure 6 show the Inclinometer/ Extensometer/ Studs, which are also for asset protection Instrument and Monitoring (I&M) of the North East Storm Relief Sewer on the surface area.

- *Graph 3 - BRE (LB) in block 5 Manual Monitoring sensor adjacent to the NESRS.*
- *Graph 4 - Road studs (LP) in block 5 Manual Monitoring sensors adjacent to the NESRS.*
- *Graph 5- Road studs in block 8 Manual Monitoring sensors adjacent to the NESRS.*
- *Graph 6 - Road studs in block 25 Manual Monitoring sensors adjacent to the NESRS.*
- *Graph 7- C510-XR50501 XR Manual Monitoring sensors adjacent to the NESRS.*

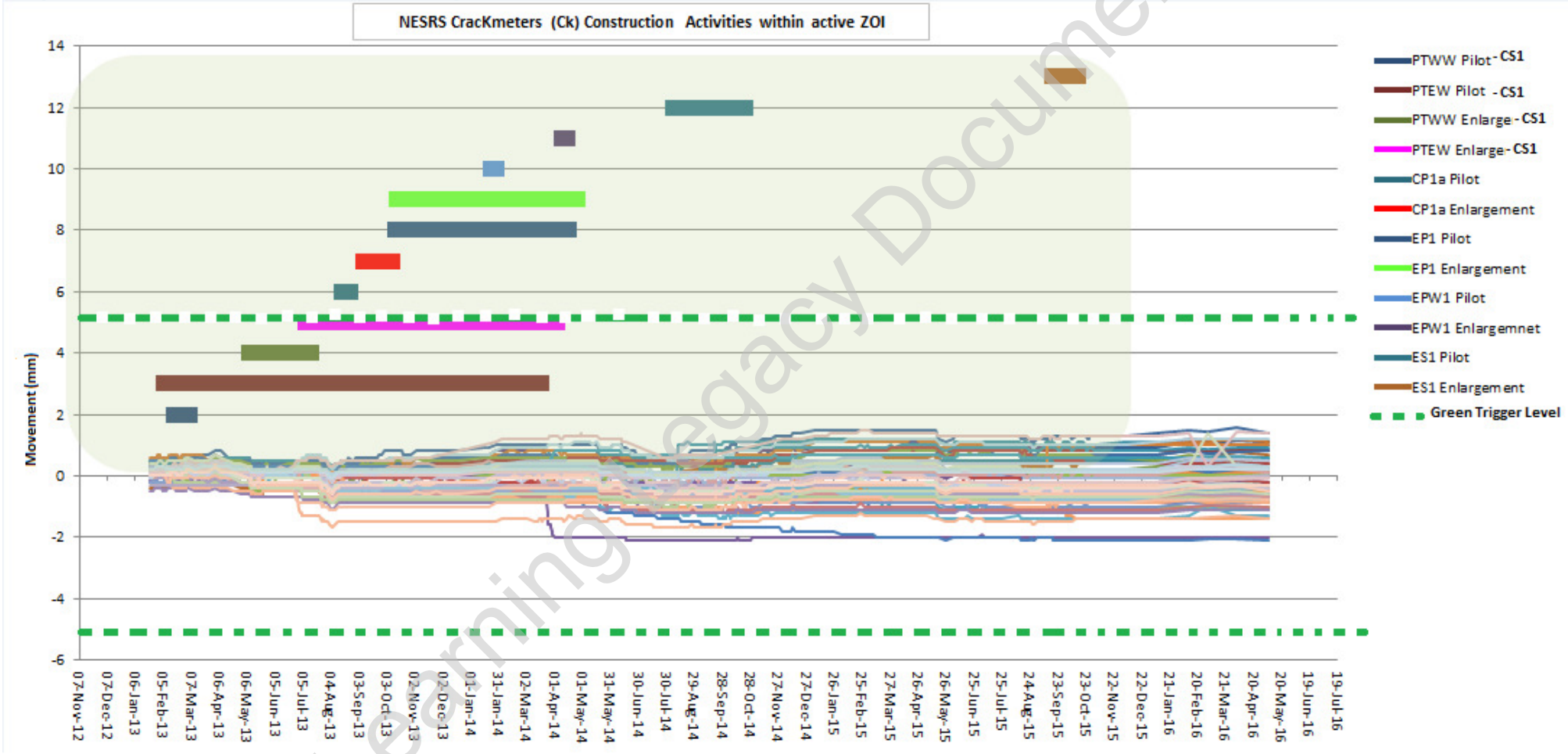
- *Graph 8- C510-XR50502 XR Manual Monitoring sensors adjacent to the NESRS.*

Graph 1 - All Extensometers (XR) monitoring sensors within the NESRS in Relation to Construction

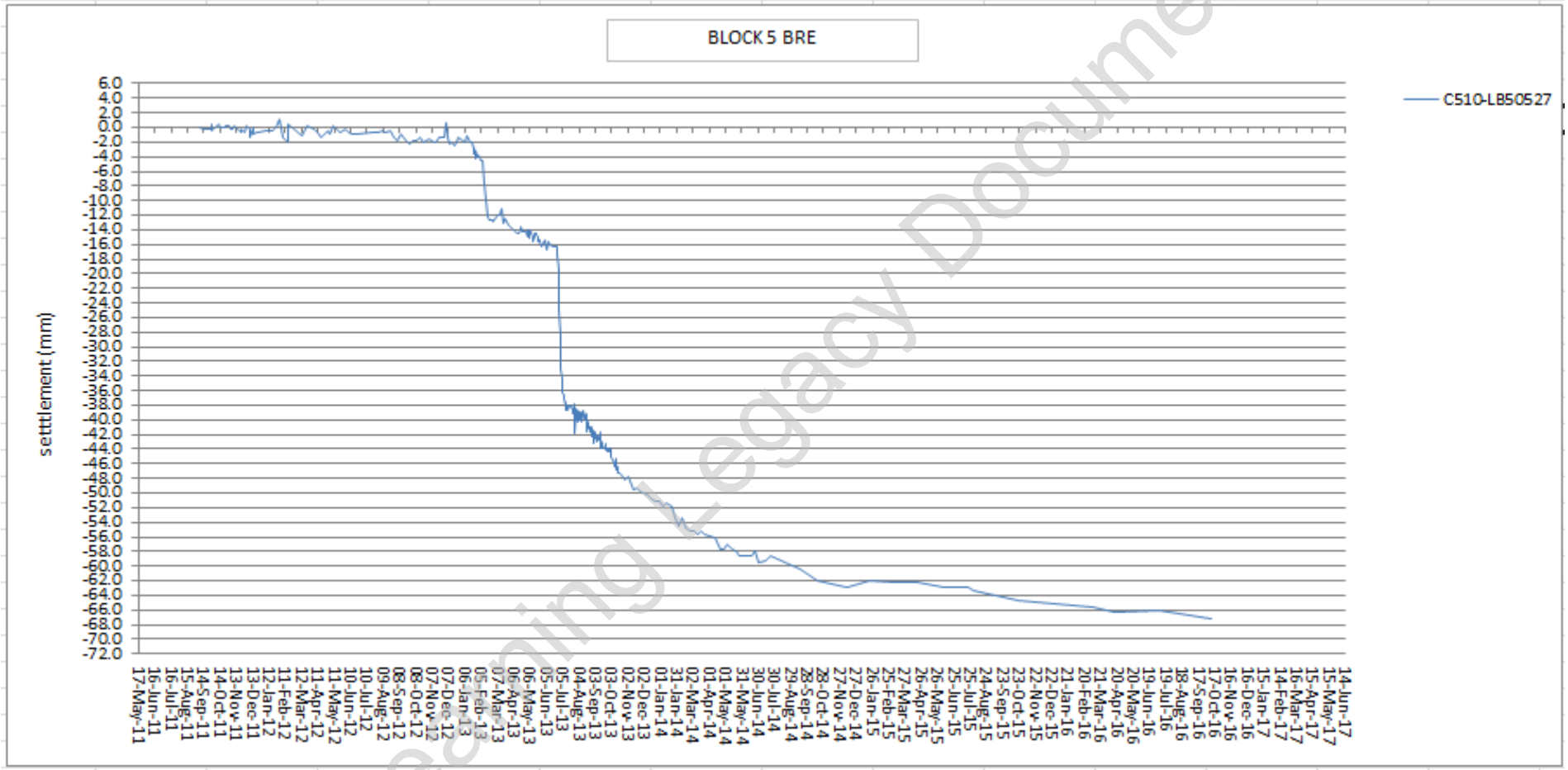


(From General Document Template ref: BBMV-Form-S9-04 rev 5.0)

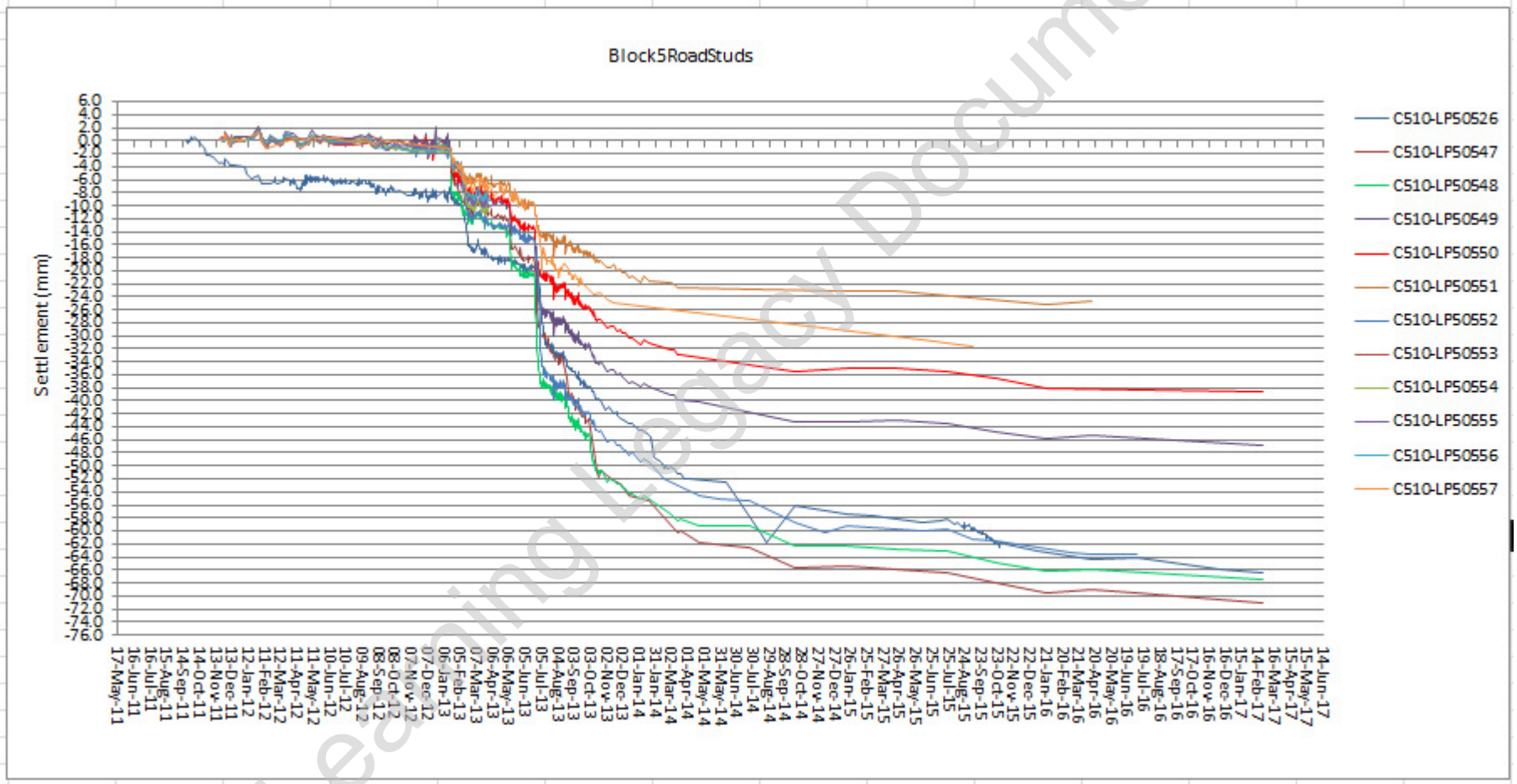
Graph 2 - All Crackmeters (CK) monitoring sensors within the NESRS in Relation to Construction



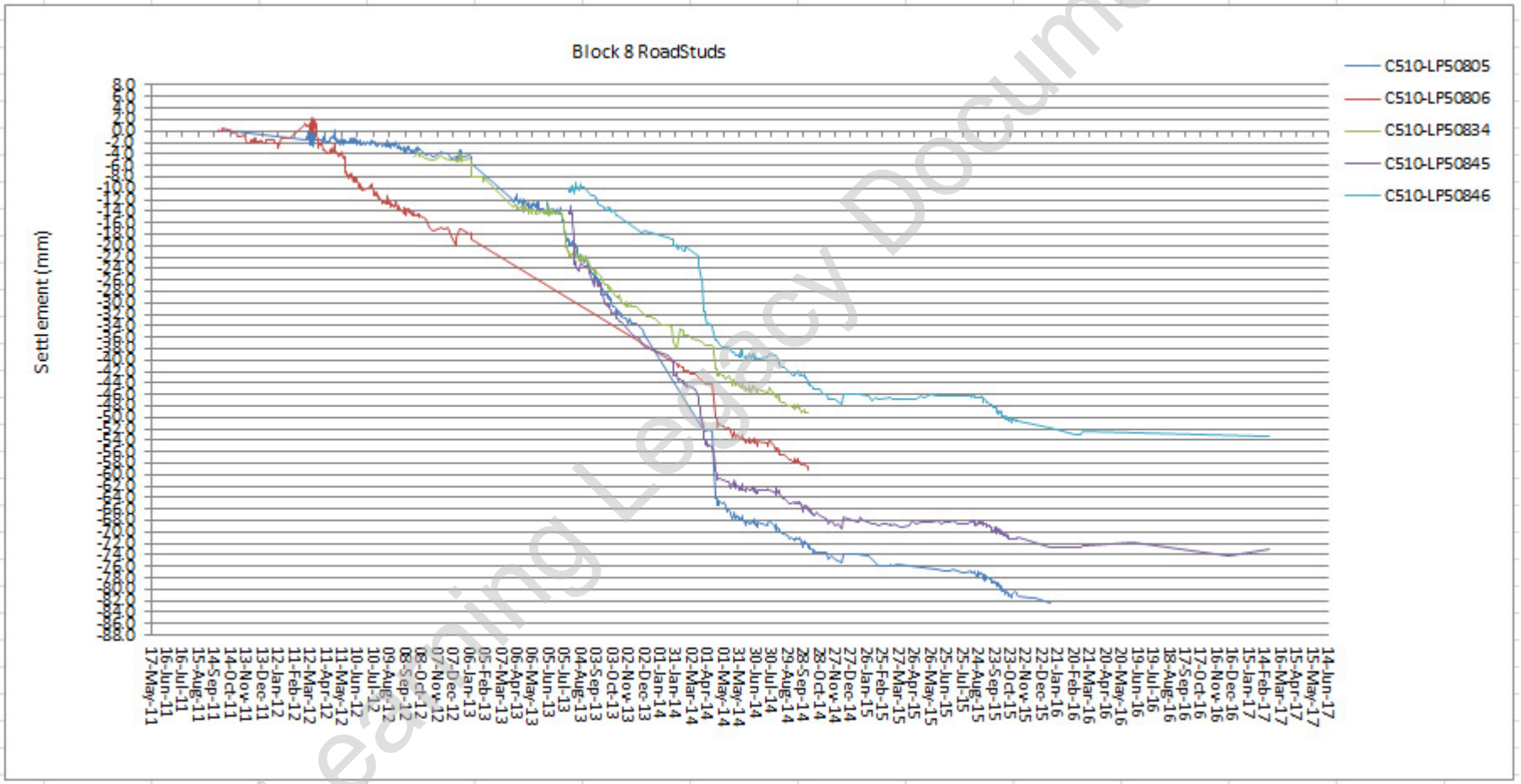
Graph 3 - BRE (LB) in block 5 Manual Monitoring sensor adjacent to the NESRS



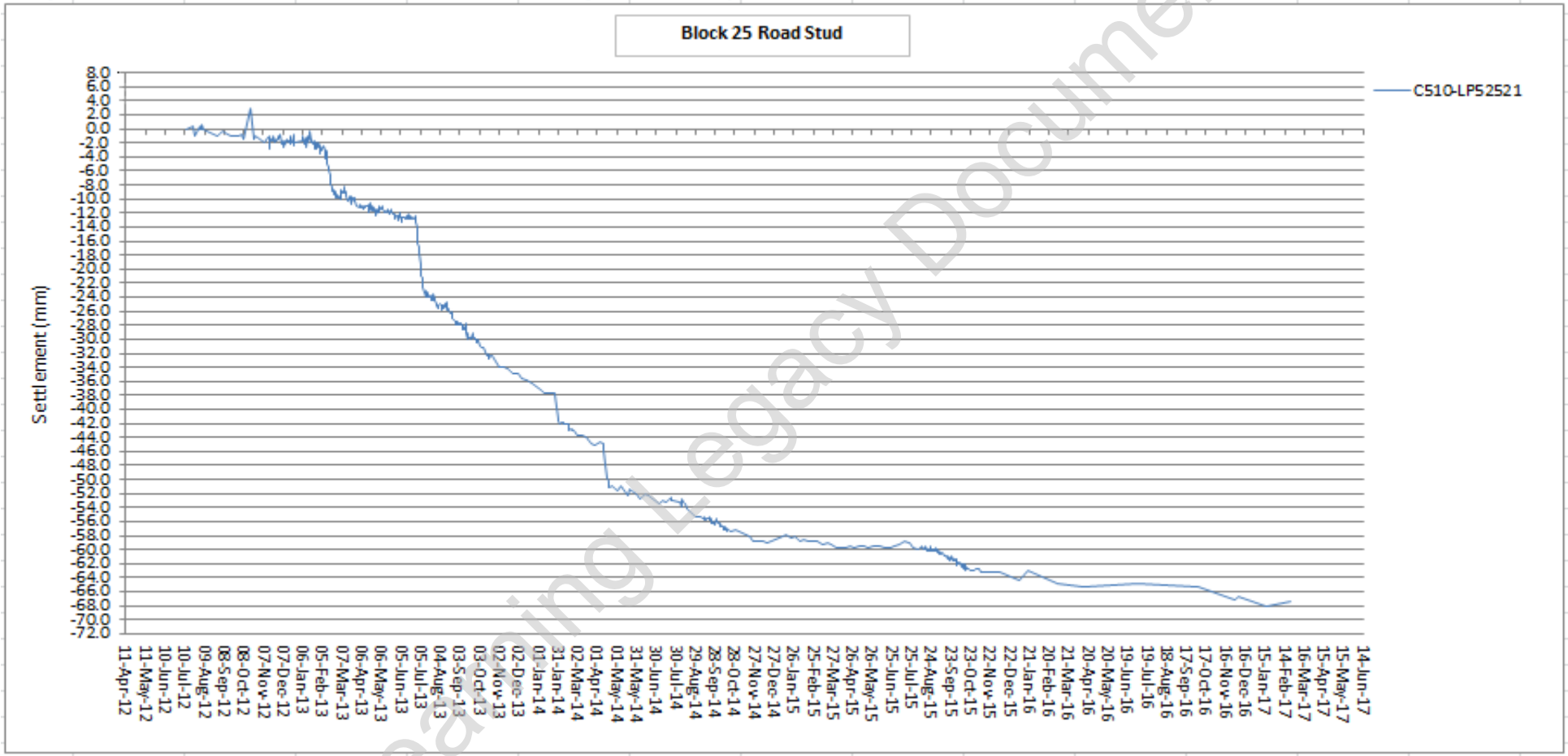
Graph 4 - Road studs (LP) in block 5 Manual Monitoring sensors adjacent to the NESRS



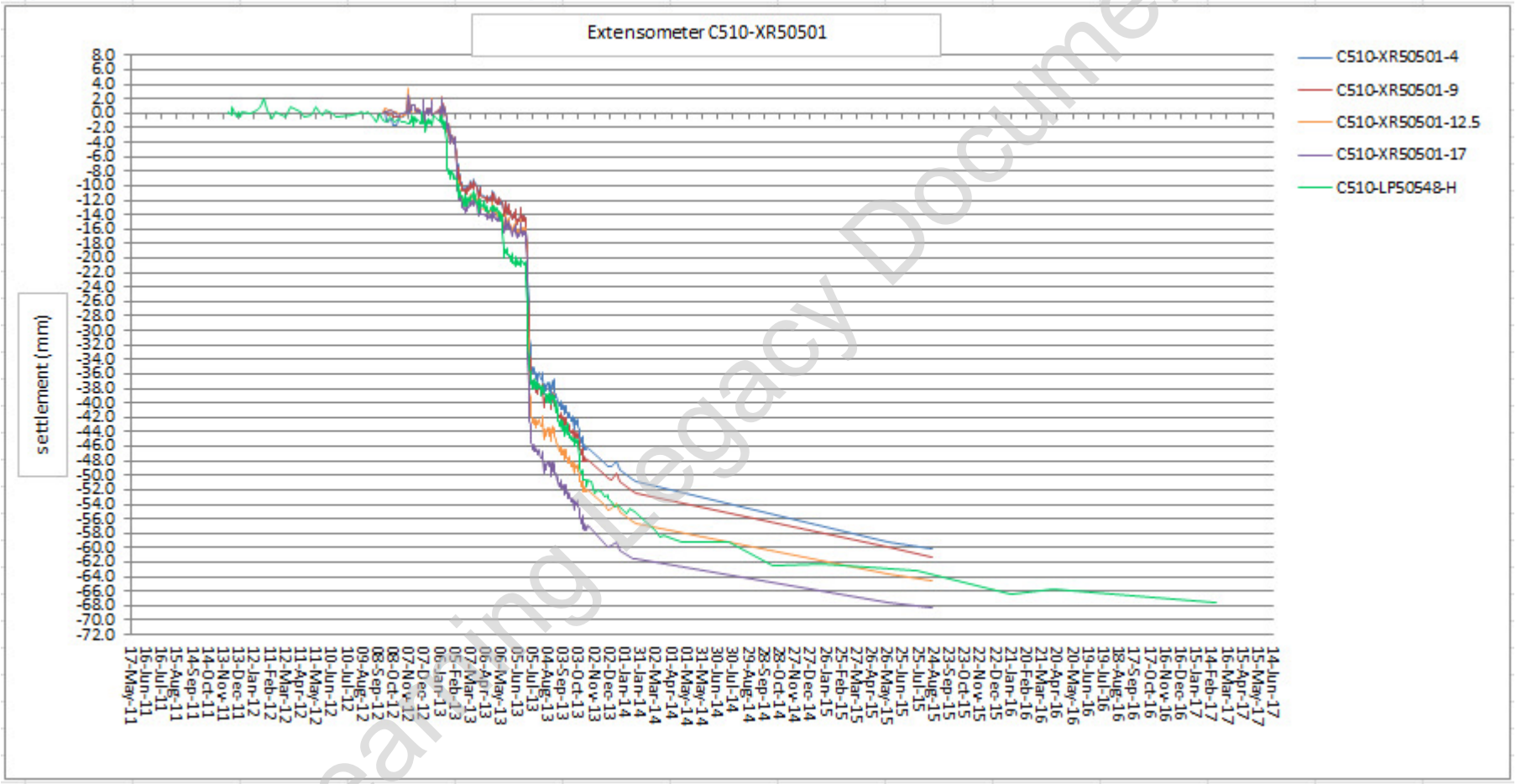
Graph 5- Road studs in block 8 Manual Monitoring sensors adjacent to the NESRS



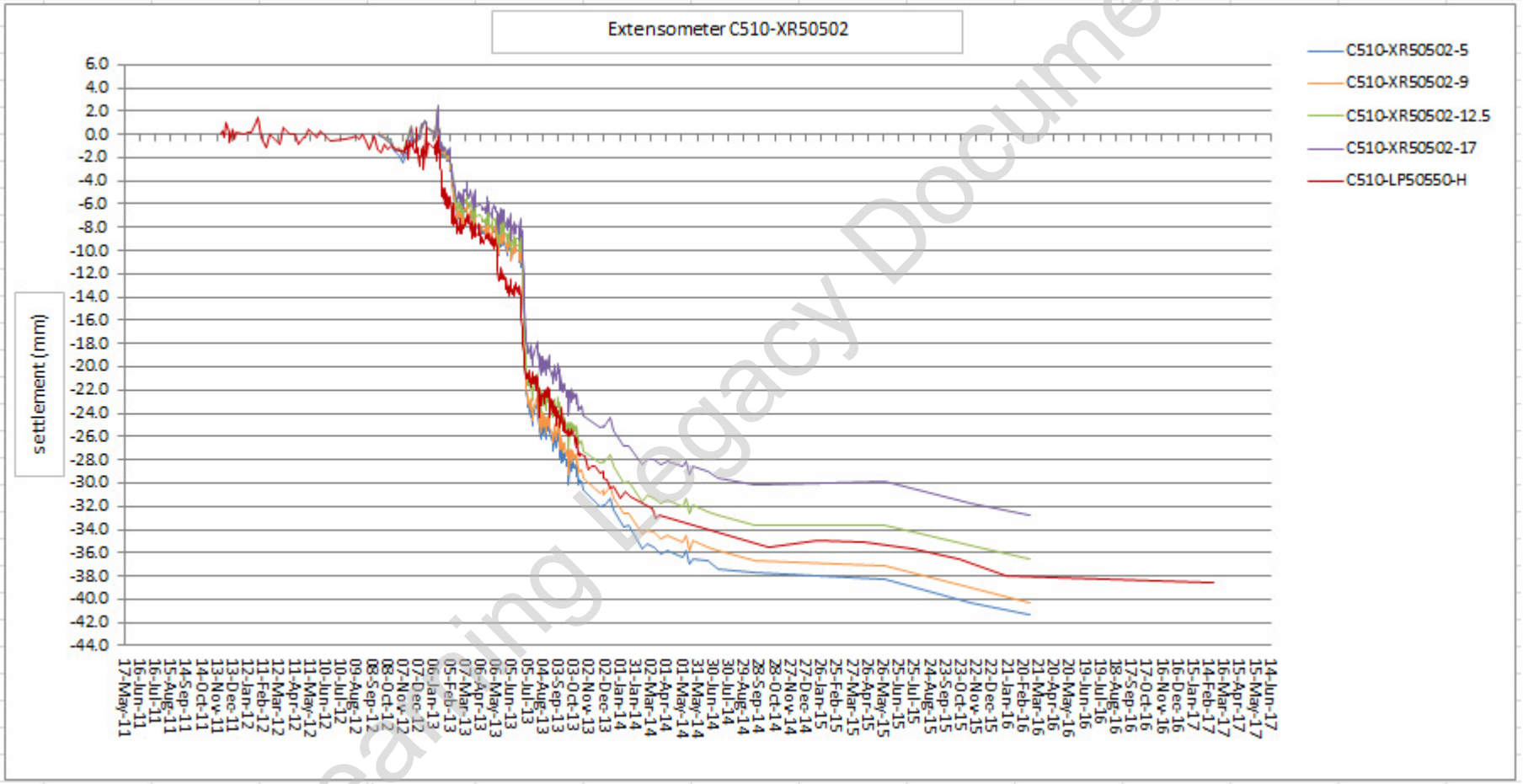
Graph 6- Road studs in block 25 Manual Monitoring sensors adjacent to the NESRS



Graph 7- C510-XR50501 XR Manual Monitoring sensors adjacent to the NESRS



Graph 8- C510-XR50502 XR Manual Monitoring sensors adjacent to the NESRS



5.2 Decommissioning Status Tracker

The decommissioning tracker identifies *(Table 2, 3 & 4)* each monitoring sensor and provides the critical information to enable decommissioning assessment for each sensor. The initial fields shown in the tracker are descriptors of the monitoring sensor, whilst the remaining fields are the assessment for decommissioning. The purpose of the tracker is to provide Crossrail reviewers with sufficient information in conjunction with construction movement graphs and plots, to accept BBMV's proposal to decommission sensors on an individual basis.

Detailed explanation of the tracker column headers:

Tracker Column Header – 120, 180 & 365 Days Average Settlement Trend

There are three average settlement trends, which tie into the defined monitoring time frames; 120, 180 and 365 days. The calculation used to determine the trend is the same for all three periods. It is a slope calculation (explained below) of the defined period, multiplied over one year. The trend is calculated from the latest reading and includes all readings within the defined period, which is averaged and then multiplied over 1 year. If there is no initial reading for the time frame date, the calculation will continue back to include the next available date. This is an important consideration when assessing the trend and to assist the reviewers, the time frame used within the calculation is included within the decommissioning tracker status table. Defined monitoring time frames:

- The 120 day average rate is used to show the completion of manual monitoring step down period, this is the minimum period of monitoring prior to InSAR taking monitoring responsibility.
- The 180 day average rate is the minimum monitoring period after construction for automated sensors.
- The 365 day average trend is a calculation to determine annual settlement rates using measurements taken across a full year. This measurement period is therefore the desired duration to be used to assess whether long term settlement meets the 2mm per annum specification.

Slope calculation Settlement Trend:

Description – The settlement trend calculates the slope of the linear regression line through data points in known_y's and known_x's. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.

Calculation

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$

Example - If the calculated trend for a 6 month period is 1.5mm, it is multiplied into 365 days, to equal a projected settlement trend of 3mm over 1 year.

Tracker Column Header – Decommissioning Status

The status is the decommissioning situation for each sensor.

The different statuses are as follows:

- Outstanding - Monitoring sensor has not met the close out requirements and approval to decommission will be sought in subsequent revisions of this close out report.
- Proposed - the sensor is proposed to be decommissioned. Crossrail to accept the sensor can be decommissioned.
- Agreed – Agreed to decommission through previous revision of the close out report. No further reporting or monitoring has taken place.
- Complete - Monitoring sensor has been removed and evidence gathered during decommissioning.

N.B. When monitoring sensors have not met the requirements, it may still be appropriate to decommission. In this scenario supplementary evidence will be provided to explain the reasoning for decommissioning.

Table 2- Decommissioning Tracker CK

Table 2- Decommissioning Status Tracker CK

21/04/2017

< 2.0 mm	< 3.5 mm	> 3.5 mm

Stability of joint width

C510 Sensor Name	Block	Section	Int / Ext	Measurement Type	Sensor Type	Sensor Description	Asset/Location	Last Construction Date	Latest Surveyed Date	120 Days	180 Days	365 Days	General Comment	Decommissioning Status
CK201601	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.03	0.08	0.02	stability within the green trigger level of 5mm over two years.	Proposed
CK201603	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.00	0.00	-0.04	stability within the green trigger level of 5mm over two years.	Proposed
CK201605	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.07	0.20	0.09	stability within the green trigger level of 5mm over two years.	Proposed
CK201501	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.26	0.25	0.04	stability within the green trigger level of 5mm over two years.	Proposed
CK201503	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.00	0.00	0.00	stability within the green trigger level of 5mm over two years.	Proposed
CK201505	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.70	0.65	0.12	stability within the green trigger level of 5mm over two years.	Proposed
CK201401	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.59	0.53	0.10	stability within the green trigger level of 5mm over two years.	Proposed
CK201403	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.02	-0.03	-0.01	stability within the green trigger level of 5mm over two years.	Proposed
CK201405	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.19	0.29	0.12	stability within the green trigger level of 5mm over two years.	Proposed
CK201301	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.27	0.37	0.10	stability within the green trigger level of 5mm over two years.	Proposed
CK201303	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.03	0.03	0.01	stability within the green trigger level of 5mm over two years.	Proposed
CK201305	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.48	0.52	0.15	stability within the green trigger level of 5mm over two years.	Proposed
CK201201	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.09	0.37	0.11	stability within the green trigger level of 5mm over two years.	Proposed
CK201203	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.00	0.00	0.00	stability within the green trigger level of 5mm over two years.	Proposed
CK201205	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.24	0.51	0.13	stability within the green trigger level of 5mm over two years.	Proposed
CK201101	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.00	0.00	0.00	stability within the green trigger level of 5mm over two years.	Proposed
CK201103	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.21	-0.10	-0.14	stability within the green trigger level of 5mm over two years.	Proposed
CK201105	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.35	0.32	0.07	stability within the green trigger level of 5mm over two years.	Proposed
CK201001	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.25	0.23	-0.08	stability within the green trigger level of 5mm over two years.	Proposed
CK201003	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.04	0.25	-0.04	stability within the green trigger level of 5mm over two years.	Proposed
CK201005	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.14	0.03	-0.19	stability within the green trigger level of 5mm over two years.	Proposed
CK200901	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.03	0.08	-0.09	stability within the green trigger level of 5mm over two years.	Proposed
CK200903	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.26	0.25	-0.07	stability within the green trigger level of 5mm over two years.	Proposed
CK200905	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.00	0.00	2.22	stability within the green trigger level of 5mm over two years.	Proposed
CK200801	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.30	-0.10	-0.19	stability within the green trigger level of 5mm over two years.	Proposed
CK200803	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.05	0.04	-0.70	stability within the green trigger level of 5mm over two years.	Proposed
CK200805	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.20	0.09	-0.09	stability within the green trigger level of 5mm over two years.	Proposed
CK200701	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.02	-0.01	-0.03	stability within the green trigger level of 5mm over two years.	Proposed
CK200703	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.04	0.04	-0.14	stability within the green trigger level of 5mm over two years.	Proposed
CK200705	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.07	0.02	-0.02	stability within the green trigger level of 5mm over two years.	Proposed
CK200601	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.06	-0.08	0.00	stability within the green trigger level of 5mm over two years.	Proposed
CK200603	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.04	-0.05	-0.02	stability within the green trigger level of 5mm over two years.	Proposed
CK200605	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.03	0.02	-0.03	stability within the green trigger level of 5mm over two years.	Proposed
CK200501	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.02	0.02	0.02	stability within the green trigger level of 5mm over two years.	Proposed
CK200503	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.03	-0.05	0.03	stability within the green trigger level of 5mm over two years.	Proposed
CK200505	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.10	0.01	-0.01	stability within the green trigger level of 5mm over two years.	Proposed
CK200401	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.00	0.00	0.00	stability within the green trigger level of 5mm over two years.	Proposed
CK200405	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.06	0.06	-0.10	stability within the green trigger level of 5mm over two years.	Proposed
CK200301	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.25	0.23	-0.16	stability within the green trigger level of 5mm over two years.	Proposed
CK200303	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.00	0.00	-0.01	stability within the green trigger level of 5mm over two years.	Proposed
CK200305	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.01	0.00	-0.22	stability within the green trigger level of 5mm over two years.	Proposed
CK200201	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.01	-0.03	-0.05	stability within the green trigger level of 5mm over two years.	Proposed
CK200205	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.04	0.04	-0.16	stability within the green trigger level of 5mm over two years.	Proposed
CK200101	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.04	0.03	-0.15	stability within the green trigger level of 5mm over two years.	Proposed
CK200103	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.00	0.00	-0.18	stability within the green trigger level of 5mm over two years.	Proposed
CK200105	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.24	0.23	0.03	stability within the green trigger level of 5mm over two years.	Proposed
CK202101	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.00	0.01	-0.12	stability within the green trigger level of 5mm over two years.	Proposed

CK202103	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.01	0.01	-0.55	stability within the green trigger level of 5mm over two years.	Proposed
CK202105	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.01	0.01	0.00	stability within the green trigger level of 5mm over two years.	Proposed
CK202201	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.01	0.10	-0.10	stability within the green trigger level of 5mm over two years.	Proposed
CK202203	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.02	-0.02	-0.41	stability within the green trigger level of 5mm over two years.	Proposed
CK202205	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.04	0.05	0.01	stability within the green trigger level of 5mm over two years.	Proposed
CK202301	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.20	0.38	0.04	stability within the green trigger level of 5mm over two years.	Proposed
CK202303	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.00	0.00	-0.55	stability within the green trigger level of 5mm over two years.	Proposed
CK202305	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.29	0.27	-0.02	stability within the green trigger level of 5mm over two years.	Proposed
CK202401	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.28	0.28	0.05	stability within the green trigger level of 5mm over two years.	Proposed
CK202403	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	08/05/2014	-1.83	-1.22	-0.64	stability within the green trigger level of 5mm over two years.	Proposed
CK202405	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.28	0.28	0.01	stability within the green trigger level of 5mm over two years.	Proposed
CK202501	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.30	0.18	-0.15	stability within the green trigger level of 5mm over two years.	Proposed
CK202503	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.06	0.06	-0.14	stability within the green trigger level of 5mm over two years.	Proposed
CK202505	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.02	-0.03	0.02	stability within the green trigger level of 5mm over two years.	Proposed
CK202601	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.20	0.20	-0.06	stability within the green trigger level of 5mm over two years.	Proposed
CK202603	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.00	0.00	0.00	stability within the green trigger level of 5mm over two years.	Proposed
CK202605	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.20	0.30	-0.09	stability within the green trigger level of 5mm over two years.	Proposed
CK202701	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.51	0.61	0.59	stability within the green trigger level of 5mm over two years.	Proposed
CK202703	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.02	0.11	0.03	stability within the green trigger level of 5mm over two years.	Proposed
CK202705	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.01	0.01	-0.03	stability within the green trigger level of 5mm over two years.	Proposed
CK202801	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.05	0.04	-0.02	stability within the green trigger level of 5mm over two years.	Proposed
CK202803	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.05	0.08	0.00	stability within the green trigger level of 5mm over two years.	Proposed
CK202805	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.00	-0.01	-0.04	stability within the green trigger level of 5mm over two years.	Proposed
CK202901	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.06	0.06	-0.16	stability within the green trigger level of 5mm over two years.	Proposed
CK202903	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.08	0.08	0.07	stability within the green trigger level of 5mm over two years.	Proposed
CK202905	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.02	0.01	-0.18	stability within the green trigger level of 5mm over two years.	Proposed
CK203001	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.26	0.40	0.13	stability within the green trigger level of 5mm over two years.	Proposed
CK203003	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.02	0.02	0.01	stability within the green trigger level of 5mm over two years.	Proposed
CK203005	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.00	0.00	0.00	stability within the green trigger level of 5mm over two years.	Proposed
CK203101	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.34	0.46	-0.02	stability within the green trigger level of 5mm over two years.	Proposed
CK203103	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.05	0.27	0.03	stability within the green trigger level of 5mm over two years.	Proposed
CK203105	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.81	0.82	0.10	stability within the green trigger level of 5mm over two years.	Proposed
CK203201	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.50	0.61	-0.03	stability within the green trigger level of 5mm over two years.	Proposed
CK203205	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.25	0.37	0.05	stability within the green trigger level of 5mm over two years.	Proposed
CK203301	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.84	0.72	0.09	stability within the green trigger level of 5mm over two years.	Proposed
CK203303	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.27	0.48	0.02	stability within the green trigger level of 5mm over two years.	Proposed
CK203305	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.55	0.56	-0.07	stability within the green trigger level of 5mm over two years.	Proposed
CK203401	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.20	0.32	0.07	stability within the green trigger level of 5mm over two years.	Proposed
CK203403	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.50	-0.13	-0.14	stability within the green trigger level of 5mm over two years.	Proposed
CK203405	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.07	0.69	0.07	stability within the green trigger level of 5mm over two years.	Proposed
CK203501	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.26	0.37	-0.16	stability within the green trigger level of 5mm over two years.	Proposed
CK203503	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.29	0.28	0.05	stability within the green trigger level of 5mm over two years.	Proposed
CK203505	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	-0.55	-0.30	-0.20	stability within the green trigger level of 5mm over two years.	Proposed
CK203601	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.31	0.31	-0.10	stability within the green trigger level of 5mm over two years.	Proposed
CK203603	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.24	0.24	-0.05	stability within the green trigger level of 5mm over two years.	Proposed
CK203605	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.27	0.27	-0.05	stability within the green trigger level of 5mm over two years.	Proposed
CK203701	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.21	0.32	0.04	stability within the green trigger level of 5mm over two years.	Proposed
CK203703	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.26	0.26	0.01	stability within the green trigger level of 5mm over two years.	Proposed
CK203705	in-sewer	N/A	internal	Automated	CK	Crackmeter	NESRS	15/10/2015	06/05/2016	0.15	0.25	0.06	stability within the green trigger level of 5mm over two years.	Proposed

Table 3- Decommissioning Status Tracker XR

21/04/2017

< 2.0 mm	< 3.5 mm	> 3.5 mm

Stability of Measurement

C510 Sensor Name	Block	Section	Int / Ext	Measurement Type	Sensor Type	Sensor Description	Asset/Location	Last Construction Date	Latest Surveyed Date	120 Days	180 Days	365 Days	General Comment	Decommissioning Status
XR201601	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.24	0.23	0.03	stability within the green trigger level of 5mm over two years.	Proposed
XR201603	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.22	0.21	0.03	stability within the green trigger level of 5mm over two years.	Proposed
XR201605	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.04	0.04	0.05	stability within the green trigger level of 5mm over two years.	Proposed
XR201501	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.24	0.33	0.22	stability within the green trigger level of 5mm over two years.	Proposed
XR201503	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.00	0.00	0.20	stability within the green trigger level of 5mm over two years.	Proposed
XR201505	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.22	-0.11	-0.02	stability within the green trigger level of 5mm over two years.	Proposed
XR201401	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.52	0.50	0.20	stability within the green trigger level of 5mm over two years.	Proposed
XR201402	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.01	0.01	-0.23	stability within the green trigger level of 5mm over two years.	Proposed
XR201403	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.26	0.37	-0.04	stability within the green trigger level of 5mm over two years.	Proposed
XR201301	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.57	0.55	0.21	stability within the green trigger level of 5mm over two years.	Proposed
XR201302	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.25	0.25	0.10	stability within the green trigger level of 5mm over two years.	Proposed
XR201303	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.25	0.58	0.19	stability within the green trigger level of 5mm over two years.	Proposed
XR201201	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.49	0.59	0.24	stability within the green trigger level of 5mm over two years.	Proposed
XR201202	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.70	0.84	0.14	stability within the green trigger level of 5mm over two years.	Proposed
XR201203	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.26	0.36	0.18	stability within the green trigger level of 5mm over two years.	Proposed
XR201101	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.00	0.00	0.00	stability within the green trigger level of 5mm over two years.	Proposed
XR201102	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.48	0.48	0.10	stability within the green trigger level of 5mm over two years.	Proposed
XR201103	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.52	0.50	0.12	stability within the green trigger level of 5mm over two years.	Proposed
XR201001	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.29	0.28	0.06	stability within the green trigger level of 5mm over two years.	Proposed
XR201002	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.63	-0.72	-0.81	stability within the green trigger level of 5mm over two years.	Proposed
XR201003	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.01	0.11	0.10	stability within the green trigger level of 5mm over two years.	Proposed
XR200901	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.30	0.15	-0.13	stability within the green trigger level of 5mm over two years.	Proposed
XR200902	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.00	0.00	0.00	stability within the green trigger level of 5mm over two years.	Proposed
XR200903	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.00	0.00	0.00	stability within the green trigger level of 5mm over two years.	Proposed
XR200801	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.02	0.02	-0.03	stability within the green trigger level of 5mm over two years.	Proposed
XR200802	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.26	0.26	0.08	stability within the green trigger level of 5mm over two years.	Proposed
XR200803	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.30	0.29	0.00	stability within the green trigger level of 5mm over two years.	Proposed
XR200701	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.04	0.06	0.06	stability within the green trigger level of 5mm over two years.	Proposed
XR200702	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.01	0.00	0.00	stability within the green trigger level of 5mm over two years.	Proposed
XR200703	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.03	0.00	0.00	stability within the green trigger level of 5mm over two years.	Proposed
XR200601	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.32	-0.19	-0.44	stability within the green trigger level of 5mm over two years.	Proposed
XR200602	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.01	-0.22	-0.33	stability within the green trigger level of 5mm over two years.	Proposed
XR200603	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.00	0.10	0.01	stability within the green trigger level of 5mm over two years.	Proposed
XR200501	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.04	-0.03	0.02	stability within the green trigger level of 5mm over two years.	Proposed
XR200502	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.01	0.01	0.00	stability within the green trigger level of 5mm over two years.	Proposed
XR200503	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.30	-0.20	-0.29	stability within the green trigger level of 5mm over two years.	Proposed
XR200401	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.23	0.21	0.02	stability within the green trigger level of 5mm over two years.	Proposed
XR200402	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.23	0.22	0.01	stability within the green trigger level of 5mm over two years.	Proposed
XR200403	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.03	0.07	-0.10	stability within the green trigger level of 5mm over two years.	Proposed
XR200301	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.04	0.02	-0.12	stability within the green trigger level of 5mm over two years.	Proposed
XR200302	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.03	0.03	0.09	stability within the green trigger level of 5mm over two years.	Proposed
XR200303	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.35	-0.37	-0.54	stability within the green trigger level of 5mm over two years.	Proposed
XR200201	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.03	0.09	0.04	stability within the green trigger level of 5mm over two years.	Proposed
XR200202	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.65	-1.05	-0.90	stability within the green trigger level of 5mm over two years.	Proposed
XR200203	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.02	-0.02	-0.22	stability within the green trigger level of 5mm over two years.	Proposed
XR200101	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.02	0.01	0.01	stability within the green trigger level of 5mm over two years.	Proposed
XR200102	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.23	0.22	0.01	stability within the green trigger level of 5mm over two years.	Proposed

XR200103	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.03	0.03	0.02	stability within the green trigger level of 5mm over two years.	Proposed
XR202101	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.27	-0.28	-0.09	stability within the green trigger level of 5mm over two years.	Proposed
XR202102	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.03	0.03	-0.35	stability within the green trigger level of 5mm over two years.	Proposed
XR202103	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.04	0.04	0.01	stability within the green trigger level of 5mm over two years.	Proposed
XR202201	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.09	0.04	-0.19	stability within the green trigger level of 5mm over two years.	Proposed
XR202202	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.65	-1.05	-0.90	stability within the green trigger level of 5mm over two years.	Proposed
XR202203	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.01	0.09	0.19	stability within the green trigger level of 5mm over two years.	Proposed
XR202301	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.01	-0.13	-0.25	stability within the green trigger level of 5mm over two years.	Proposed
XR202302	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.48	-0.50	0.05	stability within the green trigger level of 5mm over two years.	Proposed
XR202303	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	08/05/2014	0.04	0.17	0.07	stability within the green trigger level of 5mm over two years.	Proposed
XR202401	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.30	0.28	0.04	stability within the green trigger level of 5mm over two years.	Proposed
XR202402	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.01	0.01	0.16	stability within the green trigger level of 5mm over two years.	Proposed
XR202403	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.59	-0.57	-1.06	stability within the green trigger level of 5mm over two years.	Proposed
XR202501	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.02	0.01	0.11	stability within the green trigger level of 5mm over two years.	Proposed
XR202502	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.09	-0.19	-0.10	stability within the green trigger level of 5mm over two years.	Proposed
XR202503	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.27	0.25	0.05	stability within the green trigger level of 5mm over two years.	Proposed
XR202601	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.28	0.25	0.05	stability within the green trigger level of 5mm over two years.	Proposed
XR202602	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.05	0.07	0.04	stability within the green trigger level of 5mm over two years.	Proposed
XR202603	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.00	0.00	0.00	stability within the green trigger level of 5mm over two years.	Proposed
XR202701	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.30	0.30	0.11	stability within the green trigger level of 5mm over two years.	Proposed
XR202702	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.24	0.24	0.03	stability within the green trigger level of 5mm over two years.	Proposed
XR202703	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.05	0.03	0.03	stability within the green trigger level of 5mm over two years.	Proposed
XR202801	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.00	0.19	-0.06	stability within the green trigger level of 5mm over two years.	Proposed
XR202802	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.05	0.06	-0.05	stability within the green trigger level of 5mm over two years.	Proposed
XR202803	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.24	0.23	0.03	stability within the green trigger level of 5mm over two years.	Proposed
XR202901	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.30	0.30	0.02	stability within the green trigger level of 5mm over two years.	Proposed
XR202902	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.24	0.24	0.03	stability within the green trigger level of 5mm over two years.	Proposed
XR202903	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.29	0.27	0.04	stability within the green trigger level of 5mm over two years.	Proposed
XR203001	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.31	-0.08	-0.23	stability within the green trigger level of 5mm over two years.	Proposed
XR203002	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.02	0.02	0.02	stability within the green trigger level of 5mm over two years.	Proposed
XR203003	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.40	-0.28	-0.55	stability within the green trigger level of 5mm over two years.	Proposed
XR203101	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.28	-0.26	-0.13	stability within the green trigger level of 5mm over two years.	Proposed
XR203102	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.00	0.00	0.00	stability within the green trigger level of 5mm over two years.	Proposed
XR203103	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.08	0.27	0.11	stability within the green trigger level of 5mm over two years.	Proposed
XR203201	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.05	0.27	-0.02	stability within the green trigger level of 5mm over two years.	Proposed
XR203202	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.54	0.55	0.10	stability within the green trigger level of 5mm over two years.	Proposed
XR203203	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.00	0.12	0.04	stability within the green trigger level of 5mm over two years.	Proposed
XR203301	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.25	0.49	0.13	stability within the green trigger level of 5mm over two years.	Proposed
XR203302	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.50	0.51	-0.02	stability within the green trigger level of 5mm over two years.	Proposed
XR203303	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.31	0.41	0.09	stability within the green trigger level of 5mm over two years.	Proposed
XR203401	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.00	0.30	0.12	stability within the green trigger level of 5mm over two years.	Proposed
XR203402	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.24	0.23	0.07	stability within the green trigger level of 5mm over two years.	Proposed
XR203403	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.29	0.30	0.09	stability within the green trigger level of 5mm over two years.	Proposed
XR203501	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.22	0.18	-1.24	stability within the green trigger level of 5mm over two years.	Proposed
XR203502	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.04	0.08	0.00	stability within the green trigger level of 5mm over two years.	Proposed
XR203503	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.33	0.30	0.10	stability within the green trigger level of 5mm over two years.	Proposed
XR203601	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.27	0.26	0.06	stability within the green trigger level of 5mm over two years.	Proposed
XR203602	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.77	0.77	-0.01	stability within the green trigger level of 5mm over two years.	Proposed
XR203603	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.23	0.33	0.09	stability within the green trigger level of 5mm over two years.	Proposed
XR203701	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.00	0.33	0.07	stability within the green trigger level of 5mm over two years.	Proposed
XR203702	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	-0.61	-0.70	-0.67	stability within the green trigger level of 5mm over two years.	Proposed
XR203703	in-sewer	N/A	internal	Automated	XR	Extensometers	NESRS	15/10/2015	06/05/2016	0.20	0.31	0.10	stability within the green trigger level of 5mm over two years.	Proposed

Table 4- Blocks Decommissioning Status Tracker LP

21/04/2017

< 2.0 mm	< 3.5 mm	> 3.5 mm

AVERAGE SETTLEMENT TREND

C510 Sensor Name	Block	Int / Ext	Measurement Type	Sensor Type	Sensor Description	Asset/Location	Last Construction Date	Latest Surveyed Date	120 Days	180 Days	365 Days	General Comment	Decommissioning Status
C510-LB50527	Block 5	External	Manual	LB	BRE	Kempton Court	15/10/2015	16/01/2017	-5.0mm pA	-5.0mm pA	-3.2mm pA	contiune to monitoring, has not met 2mm/year	outstanding
C510-LP50526	Block 5	External	Manual	LP	Road Studs	Kempton Court /Durward Street	15/10/2015	24/02/2017	-4.0mm pA	-4.0mm pA	-2.9mm pA	contiune to monitoring, has not met 2mm/year	outstanding
C510-LP50547	Block 5	External	Manual	LP	Road Studs	Kempton Court	15/10/2015	24/02/2017	-2.3mm pA	-2.3mm pA	-1.6mm pA	This point has met 2mm/year	Proposed
C510-LP50548	Block 5	External	Manual	LP	Road Studs	Kempton Court	15/10/2015	24/02/2017	-2.1mm pA	-2.1mm pA	-1.4mm pA	This point has met 2mm/year	Proposed
C510-LP50549	Block 5	External	Manual	LP	Road Studs	Kempton Court	15/10/2015	24/02/2017	-1.7mm pA	-1.7mm pA	-1.1mm pA	This point has met 2mm/year	Proposed
C510-LP50550	Block 5	External	Manual	LP	Road Studs	Kempton Court	15/10/2015	24/02/2017	-0.5mm pA	-0.5mm pA	-0.5mm pA	This point has met 2mm/year	Proposed
C510-LP50551	Block 5	External	Manual	LP	Road Studs	Kempton Court	15/10/2015	13/04/2016	-1.8mm pA	-1.8mm pA	-1.8mm pA	This point has met 2mm/year	Proposed
C510-LP50552	Block 5	External	Manual	LP	Road Studs	Kempton Court /C512 Site	15/10/2015	05/07/2016	-0.2mm pA	-2.9mm pA	-3.9mm pA	Cover by C512+ Supplementary Evidence	Complete
C510-LP50553	Block 5	External	Manual	LP	Road Studs	Kempton Court /C512 Site	15/10/2015	02/10/2012	N/A	N/A	N/A	Trend not applicable, Cover by C512+ Supplementary Evidence	Complete
C510-LP50554	Block 5	External	Manual	LP	Road Studs	Kempton Court /C512 Site	15/10/2015	28/03/2013	N/A	N/A	N/A	Trend not applicable, Cover by C512+ Supplementary Evidence	Complete
C510-LP50555	Block 5	External	Manual	LP	Road Studs	Kempton Court /C512 Site	15/10/2015	02/04/2013	N/A	N/A	N/A	Trend not applicable, Cover by C512+ Supplementary Evidence	Complete
C510-LP50556	Block 5	External	Manual	LP	Road Studs	Kempton Court /C512 Site	15/10/2015	02/04/2013	N/A	N/A	N/A	Trend not applicable, Cover by C512+ Supplementary Evidence	Complete
C510-LP50557	Block 5	External	Manual	LP	Road Studs	Kempton Court /C512 Site	15/10/2015	08/09/2015	N/A	N/A	N/A	Trend not applicable, Cover by C512+ Supplementary Evidence	Complete
C510-LP50805	Block 8	External	Manual	LP	Road Studs	C512 Site /Durward Street	15/10/2015	06/01/2016	N/A	N/A	N/A	Trend not applicable, Cover by C512+ Supplementary Evidence	Complete
C510-LP50806	Block 8	External	Manual	LP	Road Studs	C512 Site /Durward Street	15/10/2015	08/10/2014	N/A	N/A	N/A	Trend not applicable, Cover by C512+ Supplementary Evidence	Complete
C510-LP50834	Block 8	External	Manual	LP	Road Studs	C512 Site /Durward Street	15/10/2015	06/10/2014	N/A	N/A	N/A	Trend not applicable, Cover by C512+ Supplementary Evidence	Complete
C510-LP50845	Block 8	External	Manual	LP	Road Studs	C512 Site /Durward Street	15/10/2015	24/02/2017	-2.4mm pA	-2.4mm pA	-0.9mm pA	This point has met 2mm/year	Proposed
C510-LP50846	Block 8	External	Manual	LP	Road Studs	C512 Site /Durward Street	15/10/2015	24/02/2017	-1.1mm pA	-1.1mm pA	-0.7mm pA	This point has met 2mm/year	Proposed
C510-LP52521	Block 25	External	Manual	LP	Road Studs	Durward Street	15/10/2015	24/02/2017	-5.4mm pA	-5.0mm pA	-3.7mm pA	contiune to monitor, has not met 2mm/year	outstanding
C510-XR50501-4	Block 5	External	Manual	XR	Extensometer	Kempton Court /C512 Site	15/10/2015	20/08/2015	N/A	N/A	N/A	Trend not applicable, Cover by C512+ Supplementary Evidence	Complete
C510-XR50501-9	Block 5	External	Manual	XR	Extensometer	Kempton Court /C512 Site	15/10/2015	20/08/2015	N/A	N/A	N/A	Trend not applicable, Cover by C512+ Supplementary Evidence	Complete
C510-XR50501-12.5	Block 5	External	Manual	XR	Extensometer	Kempton Court /C512 Site	15/10/2015	20/08/2015	N/A	N/A	N/A	Trend not applicable, Cover by C512+ Supplementary Evidence	Complete
C510-XR50501-17	Block 5	External	Manual	XR	Extensometer	Kempton Court /C512 Site	15/10/2015	20/08/2015	N/A	N/A	N/A	Trend not applicable, Cover by C512+ Supplementary Evidence	Complete
C510-XR50502-5	Block 5	External	Manual	XR	Extensometer	Kempton Court /C512 Site	15/10/2015	04/03/2016	-4.1mm pA	-4.1mm pA	-2.6mm pA	Cover by C512+ Supplementary Evidence	Complete
C510-XR50502-9	Block 5	External	Manual	XR	Extensometer	Kempton Court /C512 Site	15/10/2015	04/03/2016	-4.1mm pA	-4.1mm pA	-2.5mm pA	Cover by C512+ Supplementary Evidence	Complete
C510-XR50502-12.5	Block 5	External	Manual	XR	Extensometer	Kempton Court /C512 Site	15/10/2015	04/03/2016	-3.9mm pA	-3.9mm pA	-2.1mm pA	Cover by C512+ Supplementary Evidence	Complete
C510-XR50502-17	Block 5	External	Manual	XR	Extensometer	Kempton Court /C512 Site	15/10/2015	04/03/2016	-3.7mm pA	-3.7mm pA	-1.8mm pA	Cover by C512+ Supplementary Evidence	Complete

5.3 Supplementary Evidence for Decommissioning

In some cases supplementary evidence will be provided to support the decommissioning evidence.

Road Studs (LP) Manual Monitoring in Block 0 5 at Kempton Court - C512 site obstruction

Includes: C510-50552 - C510-50557

Reasons to propose decommissioning

Some road studs have not been measured for extended periods of time due to C512 site resurface concrete slab. These sensors are no longer accessible and provide no monitoring data in relation to recent construction. Figure7 shows the C512 site resurface concrete slab and the occupying crane where C510-50552 - C510-50557 installed. However, adjacent sensors C510-50547 - C510-50551 have met 2mm per annum as shown in Decommissioning Tracker Table 4.

Figure 7 -C512 Site Obstruction resurface concrete slab

Block 08 at Sport Centre C510-LP50805 - C510-LP50806 and C510-LP50834

C510-LP50805 sensors were covered by C512 site materials. Is shown in figure 8, and it is not possible to continue to monitoring.

Figure 8- C510-LP50805

C510-LP50806 and C510-LP50834, these sensors are been obstructed by C512 site entrance and equipment as of October 2014; it is not possible to continue to monitoring. Recently the site is now cleared from obstruction but the sensors were destroyed, is shown in figure 9. However, as numbers of studs in this vicinity are destroyed, the adjacent sensor C511-XR00004 the head showed stability: shown in APPENDIX A.

Figure 9- C510-LP50806 and C510-LP508034

Block 05 XR50501 at Kempton Court

XR50501 has not met the 2mm per annum specification and it is not possible to continue monitoring as the sensor is obstructed by C512 crane, is shows in figure 10.

Figure 10- XR50501

Block 01 XR50502 at Kempton Court

XR50502, has not met the 2mm per annum specification, and it is not possible to continue monitoring as the sensor is underneath C512 site container, is shows in figure 11.

Figure 11- XR50502

5.4 Reasons to propose decommissioning

Since majority of the sensors that are meant to monitor NESRS were destroyed, adjacent sensors were used to analyse decommission. These sensors are listed below and also included in Table 4 Decommissioning Tracker LP and Time graph.

- C510-LP50526 will continue to be monitor until the specified criteria is met.
- C510-LP50552 is adjacent to C510-LB50527; will continue to be monitor until the specified criteria is met.
- C510-LP50553-55 is adjacent to C510-LP50549; has met 2mm/year criteria.
- C510-LP50556 is adjacent to C510-LP50550; has met 2mm/year criteria.
- C510-LP50551 is adjacent to C510-LP50557; has met 2mm/year criteria.
- C510-LP50805-806 and C510-LP50834 is adjacent to C512-XR00004, the head showed stability over the period of 365days shown in APPENDIX A
- C510-LP50846 is adjacent to C511-XR000003 both sensors has met 2mm/year criteria.
- C510-LP52521 will continue to be monitor until the specified criteria is met.
- C510-XR50501 is adjacent to C510-LP50548; has met 2mm/year criteria.
- C510-XR50502 is adjacent to C510-LP50550; has met 2mm/year criteria.

The sensors that do not meet the specification will continue to be monitored until the specified criteria is met; (***highlighted in red in the above***) are to be continuing monitor.

6 Decommissioning Conclusion

Through the monitoring assessment process in Section 5, it is proposed that all automated NESRS in-tunnel monitoring sensors are to be decommissioned. Table 2 & 3 Decommissioning Tracker lists all automated NESRS monitoring sensor's decommissioning status with the supporting evidence showing their stability within the green trigger level of 5mm.

The assessment of the surface sensors within the vicinity of the sewer are shown in Table 4 Decommissioning Tracker which lists each monitoring sensor's supporting evidence, to help decommission the in-sewer monitoring instrumentation.

Majority of the sensors that were meant to monitor the NESRS were destroyed, but the adjacent sensors that have met 2mm/year criteria were used to analyses decommission and are listed in section 5.4.

However, the sensors that do not meet the specification will continue to be monitored until the specified criteria is met; these sensors are highlighted in red in section 5.4. A separate close out report will be issued for these; once settlement has met the specified criteria. These sensors will be included in WHI-Close-Out-Report, CRL Document Number: C510-BBM-C2-RGN-D061–50134.

CRL is currently liaising with Thames water to decommission the in-sewer monitoring equipment and instrumentation. Then surface cable, power and logger boxes will need to be decommissioned by BBMV and a subsequent H&S file will be handed over to Thames Water if they agree to decommission the in-sewer instruments. Also cables at the top of the access chamber will be label as part of CRL monitoring are now redundant.

7 APPENDIX A

The manual in-ground monitoring sensors provided by crossrail Contract C512 within their vicinity for the NESRS are listed below with plan view and time graphs: C511-XR000003, C511-XR000004, Level points C511-LP00008, C511-LP00011 and Inclinometer C511-IM00011.

For further information about manual monitoring that were within the vicinity of C512 compound, can be find in C511 – Final/Close –Out Monitoring Report for Durward Street Shaft with document number C512-BBM-C-GMS-D061-50139 Rev-01.

C512 Durward Street Shaft – Instrumentation