

		<b>C310 THAMES TUNNEL REPORT</b>			
EMPLOYER	CROSSRAIL	eB NO	C310-HTM-C-RGN-CR148-50022	Rev	6.0
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

ORIGINATOR COMPANY NAME	Hochtief Murphy JV
-------------------------	--------------------

CMDL: C09.006

REVISION	DOCUMENT APPROVAL / REVISION RECORD DETAILS	DATE
5.0	Issued for CRL Acceptance DRS comments incorporated	10/02/2015
6.0	Issued for CRL Acceptance DRS comments incorporated	07/04/2015

Stakeholder (.....) review required?    Yes ... No ...  
 This document has been reviewed by ..... in the capacity of ..... for coordination, compliance, integration, and acceptance as a safe system of work, output, control, sequence. This document is acceptable for transmittal to ..... for no objection to the works being executed as described.

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Stakeholder organization	Job Title	Name	Signature	Date	Acceptance

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<b>PREPARED BY: Monitoring Manager</b> Print: _____ Sign: _____ Date: 07-04-2015	<b>REVIEWED BY: HMJV Technical and Risk Manager</b> Print: _____ Sign: _____ Date: 07-04-2015
<b>REVIEWED BY: Construction Manager Tunnels</b> Print: _____ Sign: _____ Date: 07-04-2015	<b>APPROVED BY: HMJV Project Director</b> Print: _____ Sign: _____ Date: 07-04-2015

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 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

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## 1.0 INTRODUCTION

The purpose of this report is to compile the individual Close-out reports which summarise the monitoring data from the instrumentation within a monitoring area or of an asset and relates it to the construction activities which have produced any observed movement changes.

The data that is presented within the body the individual Close-out report is summarised in a cover sheet. This forms the basis for which the associated monitoring instrumentation is to be decommissioned. The values, comments and conclusions presented in the cover sheet of the individual Close-out report are derived from the monitoring data attached to the individual close-out report.

The content of the Close-out reports complies with what is required as per C122 – M&W Specification KX10 – Instrumentation & Monitoring C122-OVE-Z4-RSP-CR001-00007 Rev.7.0.

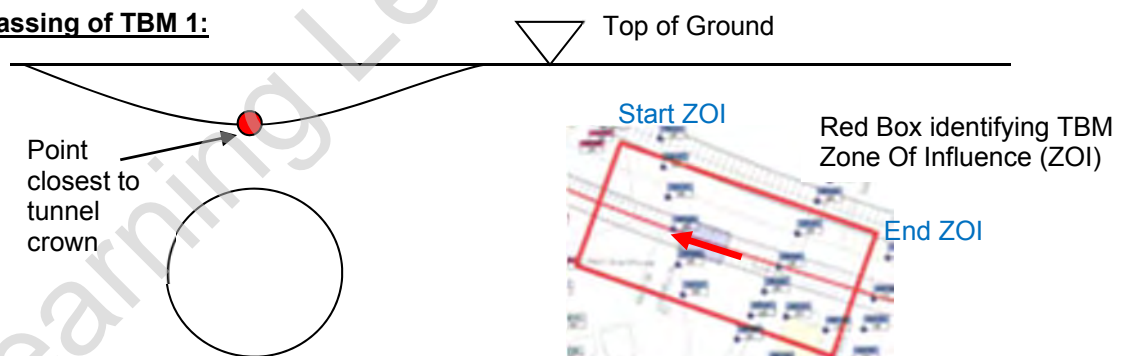
Each individual Close-out report contains

- a cover summary sheet
- monitoring point location plan
- Settlement-time plot and/or monitoring data spreadsheets

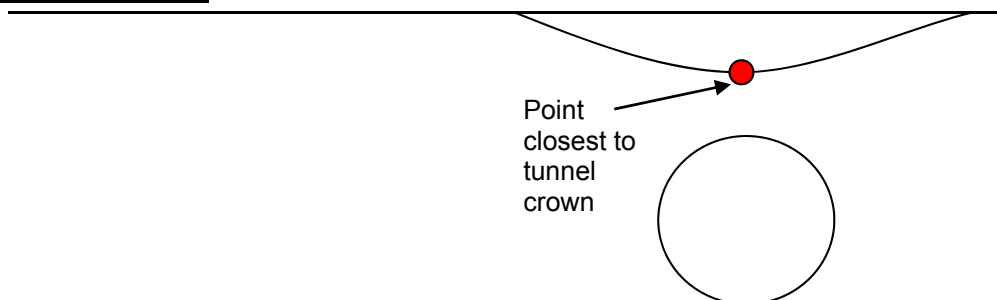
The Cover summary sheet entails:


- Information on location of Monitoring area and/or asset
- Reference C310 I&M drawing
- Relevant chainage
- Sensor type
- Trigger value
- Selected critical monitoring points following the logic illustrated below:

### Passing of TBM 1:



### Passing of TBM 2:

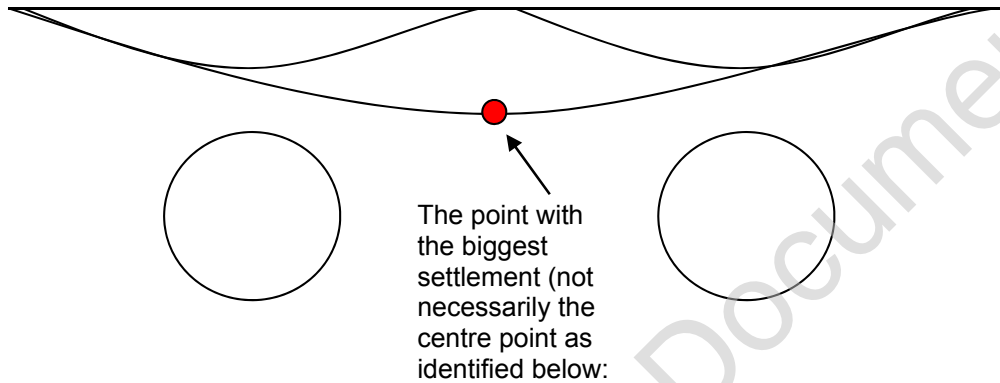


		<b>C310 THAMES TUNNEL REPORT</b>			
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- Start and end date of relevant construction activity (other than TBM-Drive), where applicable.

- Long-term: The monitoring point with the greatest confirmed value of vertical movement of the corresponding monitoring asset.

**After Passage of TBM 1 and TBM 2**



- Note on possible residual risks
- Supporting comments and conclusions

All close-out reports identified in the appendices form part of this report.

**2.0 REFERENCE DOCUMENTS**

MPCGM C310-HTM-Z-STP-CR148-50058 Rev. [15.0](#)

MPCGM NWP C310-HTM-Z-STP-CR146-50002 Rev. 4.0

HMJV I&M Drawings:


C310-HTM-C-DWG-CR148\_PT005-50010 Rev. 9.0

C310-HTM-C-DWG-CR146\_ST004-70001 Rev. 7.0

C310-HTM-C-DWG-CR146\_ST004-70002 Rev. 6.0


C310-HTM-C-DWG-CR146\_ST004-70003 Rev. 12.0

M&W Specification KX10 – Instrumentation & Monitoring / C122-OVE-Z4-RSP-CR001-00007 Rev. 7.0


		<b>C310 THAMES TUNNEL REPORT</b>			
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		<b>C310 THAMES TUNNEL REPORT</b>			
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 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
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**APPENDIX 00**

**Overall Register / Close out report**

Learning Legacy Document




**Close Out report: processing status**

last update: 07/02/2015

	No.	Name of Report	Installation Type	Passing with TBM 1	Passing with TBM 2	
Plumstead Portal	1	White Hard Depot Building	Hydrostatic Levelling Cell	destressing of ground anchors - approx. Mar 2015 removal of last props - Feb. 2015		
	2	White Hard Depot Building	Tiltmeter			
	3	APB posts	Levelling Studs			
Tunnel Drive T1 / Westbound & T2 / Eastbound	4	CS1 - Crane Platform / Headwall	Levelling Studs	10.01.2013	20.05.2013	
	5	CS2 - Crane Platform / Headwall	Levelling Studs	18.01.2013	24.05.2013	
	6	White Hard Road Bridge	Hydrostatic Levelling Cell	21.-25.01.2013	25.-27.05.2013	
	7	White Hard Road Bridge	Tiltmeter	21.-25.01.2013	25.-27.05.2013	
	8	White Hard Road	Levelling Studs	23.-25.01.2013	26.-27.05.2013	
	9	Cathedral Substation - HLC	Hydrostatic Levelling Cell	26.-28.01.2013	28.-29.05.2013	
	10	Cathedral Substation - TM	Tiltmeter	26.-28.01.2013	28.-29.05.2013	
	11	Cathedral Substation - Lev.St.	Levelling Studs	26.-28.01.2013	28.-29.05.2013	
	12	CS1 - Old Coalyard	Levelling Studs	30.01.2013	30.05.2013	
	13	CS2 - Old Coalyard	Levelling Studs	03.02.2013	09.06.2013	
	14	CS3 - Old Coalyard	Levelling Studs	25.02.2013	12.06.2013	
	15	CS4 - Old Coalyard	Levelling Studs	02.03.2013	16.06.2013	
	16	APB Sidings - Old Coalyard	Levelling Studs	30.01.-09.03.2013	30.05.-18.06.2013	
	17	Cross Passage 19	Levelling Studs	Excavation Nov.-Dec.2013		
	18	Geotechnical Cross Section 1	Levelling Studs	09.03.2013	18.06.2013	
	19	Southern Outfall Sewer 1	Levelling Studs	12.03.2013	18.06.2013	
	20	Southern Outfall Sewer 2	Levelling Studs	13.03.2013	19.06.2013	
	21	Southern Outfall Sewer 3	Levelling Studs	15.03.2013	21.06.2013	
	22	Southern Outfall Sewer Pumping Station	Levelling Studs	13.03.2013	20.06.2013	
	23	Southern Outfall Sewer Extensometer	Extensometer	17.03.2013	20.06.2013	
	24	CS 5 - Petment Crescent Bridge - Lev.St.	Levelling Studs	24.03.2013	28.6.2013	
	25	Petment Crescent Bridge - HLC	Hydrostatic Levelling Cell	24.-25.03.2013	28.-29.06.2013	
	26	Royal Mail	Hydrostatic Levelling Cell	27.-29.03.2013	30.06.-02.07.2013	
	27	Mc Donald	Hydrostatic Levelling Cell	26.-27.03.2013	30.06.-01.07.2013	
	28	CS6 - Bus Garage	Levelling Studs	29.03.2013	02.07.2013	
	29	Bus Garage	Hydrostatic Levelling Cell	01.-05.04.2013	05.-09.07.2013	
	30	Bus Garage	Tiltmeter	01.-05.04.2013	05.-09.07.2013	
	31	CS7 - Petment Cresent + Subway	Levelling Studs	05.-07.04.2013	09.-11.07.2013	
	32	SOS Plumstead Road South	Levelling Studs	05.04.-02.05.2013	10.07.-01.08.2013	
	33	SOS Plumstead Road North	Levelling Studs	16.04.-07.05.2013	17.07.-07.08.2013	
	34	SOS Plumstead Road Extensometer	Extensometer	20.04.-06.05.2013	20.07.-04.08.2013	
	35	Cross Passage 18	Levelling Studs	Excavation Jan.-Feb.2014		
	36	Gateway Business center	Levelling Studs	07.-16.04.2013	13.07.-17.07.2013	
	37	CS8 - Signature Industries	Levelling Studs	19.04.2013	19.07.2013	
	38	Signatute Industries	Levelling Studs	20.-26.04.2013	20.-24.07.2013	
	39	Geotechnical Cross Section 2	Levelling Studs	28.04.2013	28.07.2013	
	40	CS9 - Wall Marshgate Path	Levelling Studs	28.04.2013	28.07.2013	
	41	Wall Middle Gate House	Levelling Studs	30.04.2013	30.07.2013	
	42	Wall Plumstead Road	Levelling Studs	28.04.-06.05.2013	28.07.-05.08.2013	
	43	Middle Gate House	Hydrostatic Levelling Cell	01.-02.05.2013	30.-31.07.2013	
	44	Middle Gate House	Tiltmeter	01.-02.05.2013	30.-31.07.2013	
	45	DLR Down line Tunnel	Hydrostatic Levelling Cell	01.05.2013	30.07.2013	
	46	DLR Up line Tunnel	Hydrostatic Levelling Cell	02.05.2013	31.07.2013	
	47	CS10 - Footpath MGH to Plumstead Road	Levelling Studs	03.05.2013	01.08.2013	
	48	CS11 - I/O Center	Levelling Studs	05.05.2013	03.08.2013	
	49	I/O Center Building	Levelling Studs	05.-11.05.2013	02.-09.08.2013	
	50	I/O Center Car Park	Levelling Studs	08.-12.05.2013	07.-10.08.2013	
	51	CS12 - Cornwallis Road	Levelling Studs	12.05.2013	10.08.2013	
	52	CS13 - 1200 BH Sewer WSB	Levelling Studs	12.05.2013	10.08.2013	
	Woolwich Station Box	removal of last props - approx. Mar. 2015				


Tunnel Drive T3 / Westbound & T4 / Eastbound	53	Building 11	Hydrostatic Levelling Cell	WSB- removal of last props in Western Box: approx. Mar. 2015		
				13.-17.09.2013	04.-09.02.2014	
	54	CS 15 - BH Hoarding	Levelling Studs	18.09.2013	10.02.2014	
	55	Verbrueggens House	Levelling Studs	22.-23.09.2013	11.-12.02.2014	
	56	CS 16 - Footpath Royal Arsenal	Levelling Studs	23.09.2013	12.02.2014	
	57	CS 17 - Footpath Royal Arsenal	Levelling Studs	25.09.2013	16.02.2014	
	58	Main Guard House	Hydrostatic Levelling Cell	28.09.-01.10.2013	17.-18.02.2014	
	59	Main Guard House	Tiltmeter	28.09.-01.10.2013	17.-18.02.2014	
	60	Royal Brass Foundry	Hydrostatic Levelling Cell	27.-29.09.2013	16.-17.02.2014	
	61	Royal Brass Foundry	Tiltmeter	27.-29.09.2013	16.-17.02.2014	
	62	CS Royal Arsenal Listed Wall	Levelling Studs	02.10.2013	21.02.2014	
	63	CS 18 - Warren lane	Levelling Studs	03.10.2013	22.02.2014	
	64	Hotel Warren lane	Levelling Studs	07.-23.10.2013	23.02.-05.03.2014	
	65	CS 19 - Warren lane Carpark	Levelling Studs	26.10.2013	08.03.2014	
	66	CS 20 - Warren lane Carpark	Levelling Studs	27.10.2013	09.03.2014	
	67	CS 21 - Warren lane Carpark	Levelling Studs	29.10.2013	11.03.2014	
	68	CS 22 - Warren lane roundabout	Levelling Studs	31.10.2013	11.03.2014	
	69	Warren lane Carpark EB	Levelling Studs	26.-31.10.2013	08.-13.03.2014	
	70	Warren lane Carpark WB	Levelling Studs	26.-31.10.2013	08.-13.03.2014	
	71	Extensometer Warren lane Carpark	Extensometer	26.-31.10.2013	08.-13.03.2014	
	72	CS 23 - southside retaining wall footpath	Levelling Studs	06.11.2013	16.03.2014	
	73	Southside retaining wall	Prisms	06.11.2013	17.03.2014	
	74	Northside retaining wall	Prisms	11.12.2013	13.04.2014	
	75	Northside Flood Wall	Hydrostatic Levelling Cell	10.-11.12.2013	13.-15.04.2014	
	76	CS Pier Road	Levelling Studs	12.12.2013	17.04.2014	
	77	Old Station Museum	Hydrostatic Levelling Cell	12.-14.12.2013	17.-19.04.2014	
	78	Old Station Museum	Tiltmeter	12.-14.12.2013	17.-19.04.2014	
	79	Old Station Museum, Listed Wall	Hydrostatic Levelling Cell	18.12.2013-09.01.2014	21.-25.04.2014	
	80	CS 24 - CP 16 - CH 89210	Levelling Studs	17.12.2013	21.04.2014	
	81	CS CP 16	Levelling Studs	Excavation Jun.-Jul.2014		
	82	Geotechnical Cross Section 3	Levelling Studs	07.01.2014	23.04.2014	
	83	CS TRM	Levelling Studs	07.01.2014	23.04.2014	
	84	TRM Carpark	Levelling Studs	09.01.-15.01.2014	24.-30.04.2014	
	85	Siding Apartments 1-16	Hydrostatic Levelling Cell	14.12.2013-06.01.2014	19.-21.04.2014	
	86	Siding Apartments 1-16	Tiltmeter	14.12.2013-06.01.2014	19.-21.04.2014	
	87	Siding Apartments 17-74	Hydrostatic Levelling Cell	06.-11.01.2014	22.-26.04.2014	
	88	Siding Apartments 17-74	Tiltmeter	06.-11.01.2014	22.-26.04.2014	
	89	Albert Road Building 171-209	Hydrostatic Levelling Cell	12.-14.01.2014	26.-29.04.2014	
	90	Albert Road Building 171-209	Tiltmeter	12.-14.01.2014	26.-29.04.2014	
	91	Albert Road Building 211-217	Hydrostatic Levelling Cell	15.-16.01.2014	29.-30.04.2014	
	92	Albert Road Building 211-217	Tiltmeter	15.-16.01.2014	29.-30.04.2014	
	93	TW Pumping Station	Hydrostatic Levelling Cell	16.-17.01.2014	30.04.-01.05.2014	
	94	TW Pumping Station	Tiltmeter	16.-17.01.2014	30.04.-01.05.2014	
	95	CS 25 - Old Station 1 - CH 89155	Levelling Studs	09.01.2014	25.04.2014	
	96	CS 26 - Old Station 2 - CH 89120	Levelling Studs	10.01.2014	26.04.2014	
	97	CS 27 - Old Station 3 - CH 89075	Levelling Studs	11.01.2014	28.04.2014	
	98	CS 28 - Pumping station - CH 89055	Levelling Studs	14.01.2014	29.04.2014	
	99	CS 29 - Store Road Sewer	Levelling Studs	16.01.2014	30.04.2014	
	100	Store Road Sewer - SAA	SAA	16.01.2014	01.05.2014	
	101	Store Road Sewer - SG	Strain Gauges	16.01.2014	01.05.2014	
	102	Store Road Sewer - FO SG	FO-Strain Gauges	16.01.2014	01.05.2014	
	103	Store Road Sewer - Extensometer	Extensometer	17.01.2014	02.05.2014	
	104	CS 30 - Store Road Sewer CL - CH 89025	Levelling Studs	16.01.2014	01.05.2014	
	105	Albert Road "2"	Levelling Studs	14.-31.01.2014	28.04.-17.05.2015	
	106	CS 31 - Store Road Sewer West - CH 89000	Levelling Studs	18.01.2014	02.05.2014	
	107	CS 32 - Factory Road 1 - CH 88970	Levelling Studs	19.01.2014	03.05.2014	
	108	Factory Road Extensometer / SD	Extensometer	19.-25.01.2014	03.-10.05.2014	
	109	Geotechnical Cross Section 4	Levelling Studs	19.01.2014	01.-03.05.2014	
	110	CS 33 - Factory Road 2 - CH 88935	Levelling Studs	21.01.2014	04.05.2014	
	111	CS 34 - Factory Road 3 - CH 88900	Levelling Studs	23.01.2014	06.05.2014	
	112	CS 35 - Factory Road 4 - CH 88870	Levelling Studs	25.01.2014	08.05.2014	
	North Woolwich Portal	113	CS Headwall	Levelling Studs	remoaval of last props - approx. Feb. 2015	
		114	Albert Road "1"	Levelling Studs		
		115	Factory Road	Levelling Studs		
		116	CS Headwall	Levelling Studs		
		117	Crane Slab	Levelling Studs		
		118	Extensometer Portal NWP - RDS	Extensometer		

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
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TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDICES 01, 02 and 03**

**Not Used**

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 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
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**APPENDIX 04**

**CS1 – Crane Platform / Headwall**

Learning Legacy Document

<b>monitoring asset</b>	<b>Crane Platform / Headwall (Plumstead Portal)</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR148-PT005-50010		
<b>name of monitoring section:</b>	CS1 - Craneplatform / Headwall		
sensor type:	manual levelling studs		
chainage:	91800	point no.:	3004 0381- 3004 0385
<b>trigger values:</b> [mm]	green: +14 -14	amber: +17 -17	red: +21 -21
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments	
<b>baseline</b>	13/12/12	0.00			
<b>TBM 1</b>	start ZOI	09/01/13	-1.00	3004 0381	
	end ZOI	22/01/13	-1.20	3004 0381	breached not any trigger value
<b>TBM 2</b>	start ZOI	19/05/13	-0.08	3004 0383	
	end ZOI	26/05/13	-1.65	3004 0383	breached not any trigger value
<b>longterm</b>	23/07/13	-7.03	3004 0383	last reading post tunneling, Cross section not longer measurable due to the points were destroyed by crane operations. Recorded value for Point 3004 0383 is due to the crane operations.	

<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)

**summary / comments**

Some of the points were always covered due to crane operation which have started in Oct. 2012. With the start of TBM 2, the crane platform was re-constructed and therefore all points were new installed and re-baselined at 17.05.2013  
All points were destroyed after 23.07.2013 due to crane operation.  
Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
The rate of change in the monitoring data is less than the required standards as per the specifications and drawings up to the time when the instrumentations have been destroyed.

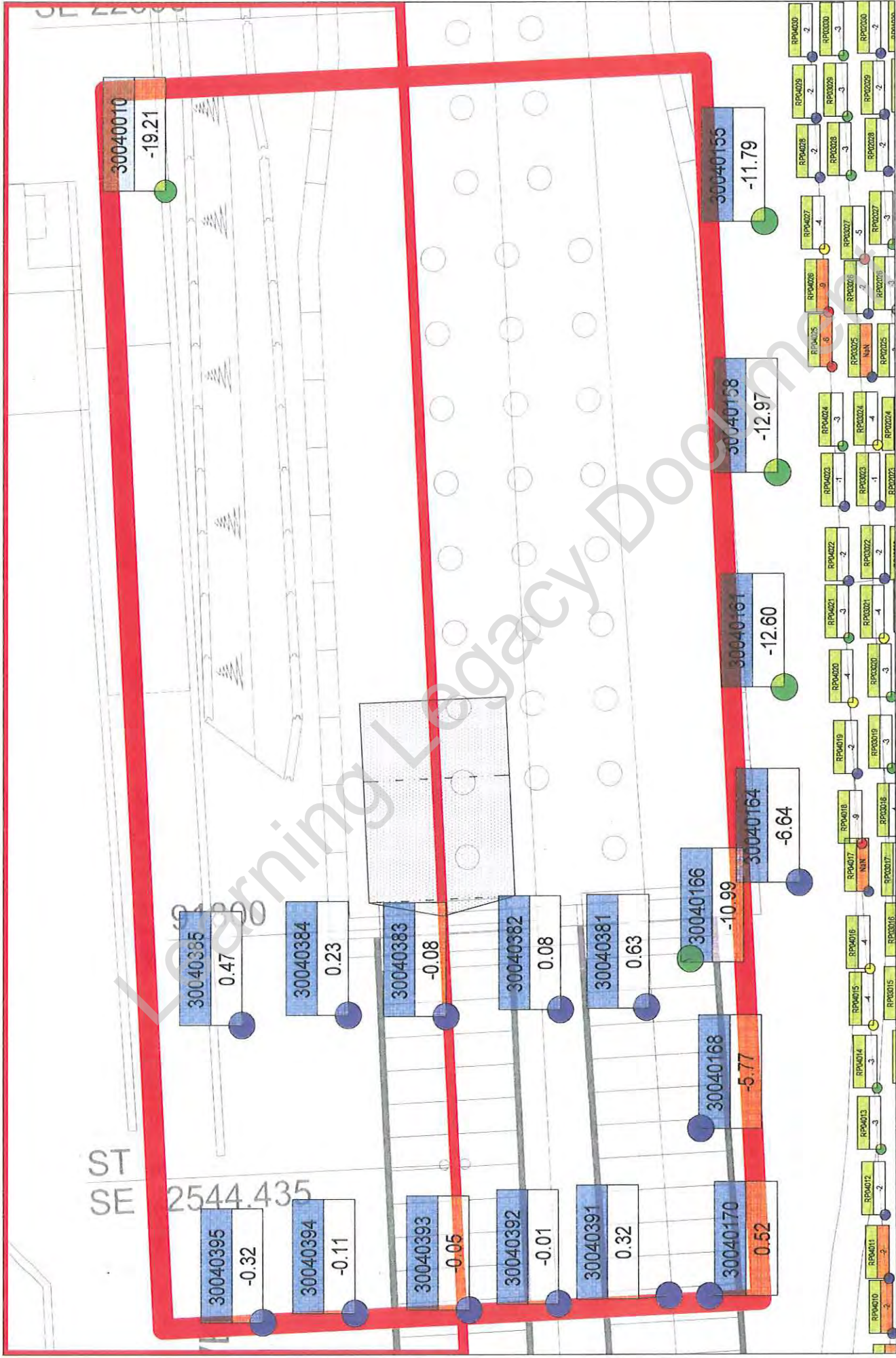
date / signature:

*14/01/15*

print name:

HMJV project role:

Monitoring & Survey engineer



ST  
SE 2544.435

Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

working activities: TBM drive  
current values: 19.05.2013 12:00

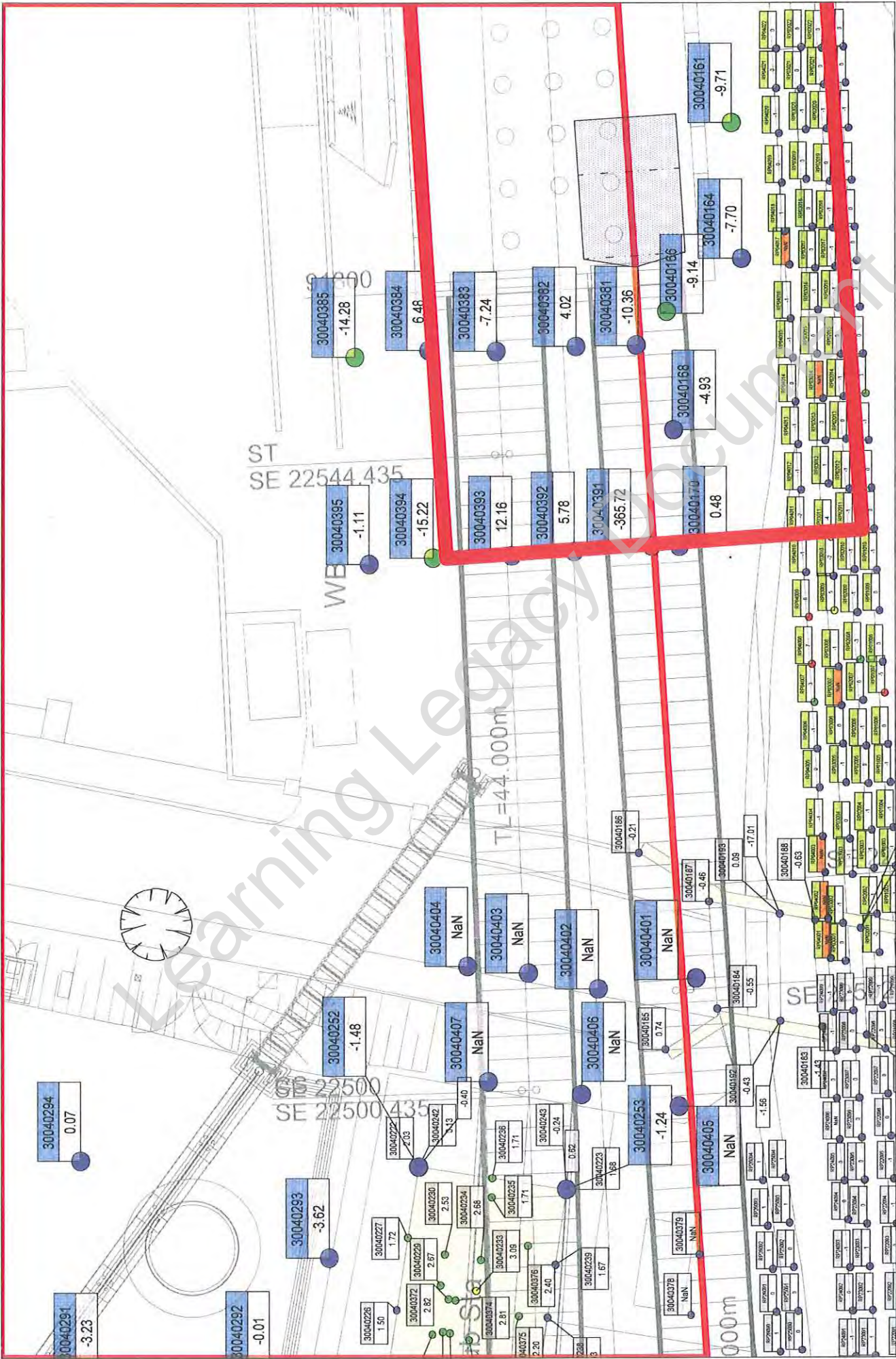


Point: 30040383



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - CS1 Craneplatform / Headwall 13.12.2012 - 23.07.2013  
date: 19.06.2014 11:39 current values: 19.06.2014 11:29



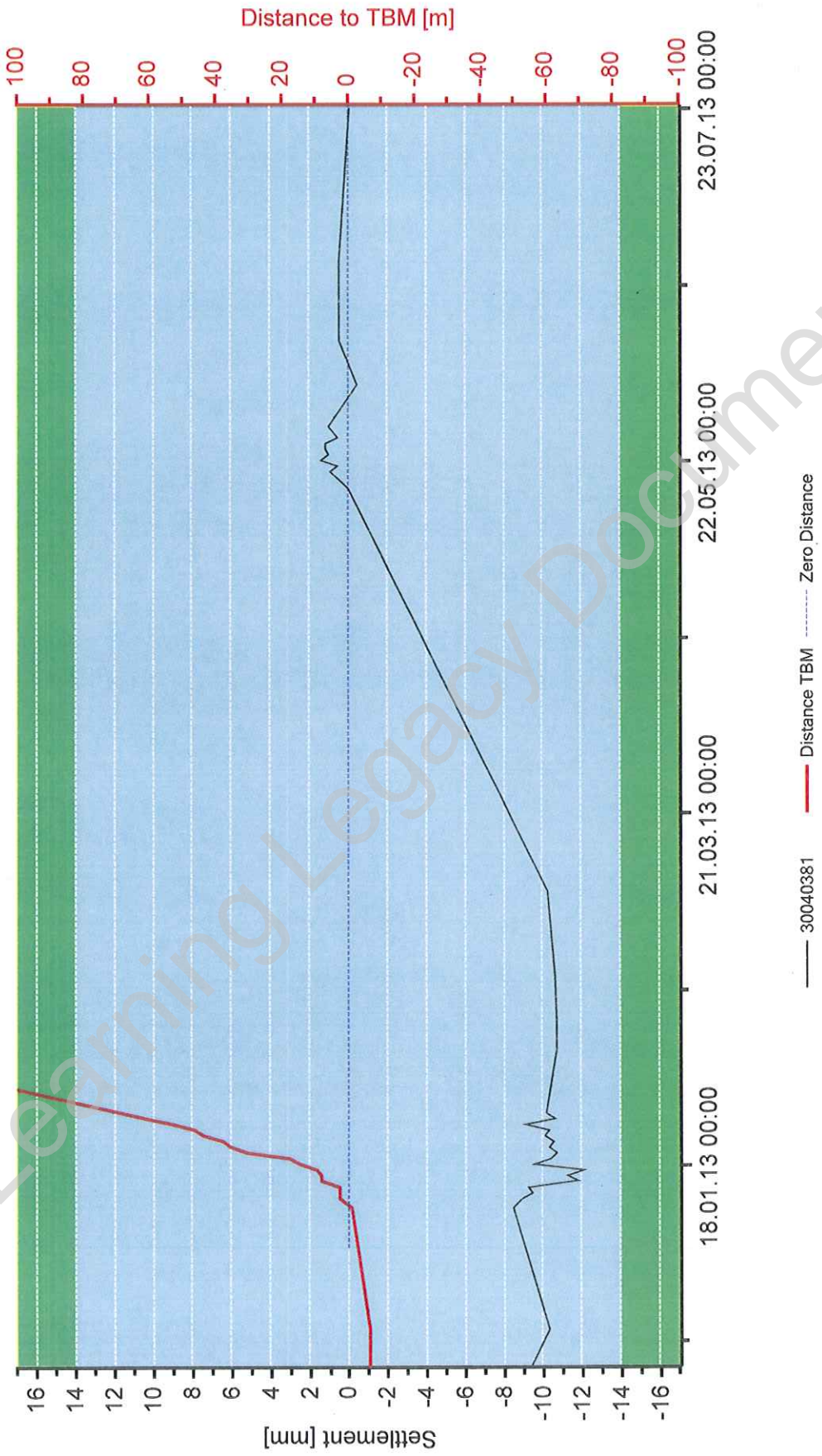


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive WB  
 current values: 09.01.2013 09:00





Point: 30040381



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - CS1 Craneplatform / Headwall 13.12.2012 - 23.07.2013  
date: 19.06.2014 11:55 current values: 19.06.2014 11:46



Joint Venture

project: C310 Thames Tunnel

Joint Venture

No. of reading	baseline		1. following		2. following		3. following		4. following		5. following		6. following		7. following		8. following		9. following		10. following		11. following		12. following											
	date	elevation	date	elevation	date	elevation	date	elevation	date	elevation	date	elevation	date	elevation	date	elevation	date	elevation	date	elevation	date	elevation	date	elevation	date	elevation										
	13/12/12	103.556	20/12/12	103.555	13/01/2013	103.556	2	1	103.556	0	0	103.556	0	0	103.553	-2	-2	103.554	1	-2	103.553	-1	-3	103.555	3	0	103.555	-1	-1	103.554	0	-1	103.555	0	-1	
3004 0381		103.555		covered		103.653	0	0	103.653	0	0	103.653	-2	-2	103.651	-1	-2	103.652	1	-1	103.651	-1	-2	103.653	2	0	103.652	0	-1	103.652	0	-1	103.652	0	-1	
3004 0382		103.725		103.724		103.718	-5	-7	103.719	1	-6	103.718	-1	-7	103.718	-1	-7	103.719	1	-6	103.718	-1	-7	103.719	2	-6	103.718	-1	-7	103.718	-1	-7	103.718	-1	-7	
3004 0383		103.751		covered		103.679	1	-2	103.679	1	-2	103.679	-1	-2	103.679	1	-1	103.679	1	-1	103.675	-5	-6	103.676	1	-5	103.751	0	0	103.750	-1	-1	103.750	0	-1	
3004 0384		103.681		103.678		103.679	1	-2	103.679	1	-2	103.679	-1	-2	103.679	1	-1	103.679	1	-1	103.675	-5	-6	103.676	1	-5										
3004 0391		103.589		destroyed																																
3004 0392		103.709		103.709		103.727	0	-1	103.728	1	0	103.727	-1	-2	103.727	0	-1	103.727	0	-1	103.727	0	-2	103.728	1	0	103.727	-1	-1	103.726	-1	-2	103.727	0	-1	
3004 0393		103.728		103.727		103.722	0	-1	103.722	0	0	103.722	-1	-1	103.722	2	1	103.723	2	1	103.722	-2	0	103.723	1	1	103.723	-1	0	103.722	-1	-1	103.722	0	0	
3004 0394		103.722		103.722		103.722	0	-1	103.722	0	0	103.722	-1	-1	103.722	0	0	103.722	0	0	103.722	-2	0	103.723	1	1	103.723	-1	0	103.722	-1	-1	103.722	0	0	
3004 0395		103.722		103.722		103.722	0	-1	103.722	0	0	103.722	-1	-1	103.722	0	0	103.722	0	0	103.722	-2	0	103.723	1	1	103.723	-1	0	103.722	-1	-1	103.722	0	0	

Legacy Document

project: C310 Thames Tunnel

Joint Venture

project: C310 Thames Tunnel

Joint Venture

No. of reading	14. following		15. following		16. following		17. following		18. following		19. following		20. following		21. following		22. following		23. following		24. following		
	date	elevation	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	
3004 0381	13/12/12	103.556	103.554	0	-1	103.555	0	-1	103.555	0	-1	103.555	0	-1	103.554	0	-1	103.554	0	-1	103.555	0	-1
3004 0382		103.653	103.653	0	0	103.653	0	-1	103.653	0	-1	103.653	0	-1	103.652	0	-1	103.652	0	-1	103.650	-2	-3
3004 0383		103.725	103.718	0	-7	103.718	0	-7	103.718	0	-7	103.718	1	-7	103.718	-0.79	-7	103.717	-1	-8	103.717	0	-8
3004 0384		103.751	103.748	-4	-5	103.748	0	-5	103.745	-1	-5	103.743	-2	-8	103.741	-3	-10	103.741	-3	-10	103.741	0	-8
3004 0385		103.881	103.874	2	-7	103.874	1	-7	103.873	-1	-8	103.873	-1	-8	103.873	-1	-8	103.873	-1	-8	103.873	-1	-8
3004 0391		103.589																					
3004 0392		103.709																					
3004 0393		103.728	103.727	1	-1	103.727	0	-1	103.727	-1	-1	103.727	-1	-1	103.727	-0.06	-1	103.727	-1	-1	103.727	-1	-1
3004 0394		103.738																					
3004 0395		103.722	103.722	0	0	103.722	0	0	103.722	0	0	103.722	0	0	103.722	0	0	103.722	0	0	103.722	0	0

project: C310 Thames Tunnel

Joint Venture

project: C310 Thames Tunnel

Joint Venture

No. of reading	25. following		26. following		27. following		28. following		29. following		30. following		31. following		32. following		33. following		34. following		35. following		36. following		
	baseline	elevation	baseline	elevation	baseline	elevation	baseline	elevation	baseline	elevation	baseline	elevation	baseline	elevation	baseline	elevation	baseline	elevation	baseline	elevation	baseline	elevation	baseline	elevation	
dB10	131212	104.556	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566
Point No.																									
3004 0381		104.556	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566	103.566
3004 0382		102.653	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649	102.649
3004 0383		103.725	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731	103.731
3004 0384		103.751	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745	103.745
3004 0391		103.681	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693	103.693
3004 0392		103.589	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955	103.955
3004 0393		103.709	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703	103.703
3004 0394		103.728	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715	103.715
3004 0395		103.738	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753	103.753
		103.722	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723	103.723

Legacy Document

monitoring table




Joint Venture

project: C310 Thames Tunnel

structure: Cross Section Crane platform Headwall - levelling studs

No. of reading	baseline	37. following		38. following		38. following		39. following		40. following		41. following		42. following	
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
5810	137212					2307203		0602204							
			2906203												
3004 0381	103.556	103.565	0	1	103.565	-1	0	destroyed							
3004 0382	103.653	103.647	1	-2	103.647	0	-2	destroyed							
3004 0383	103.725	103.723	1	-8	103.724	1	-7	destroyed							
3004 0384	103.751	103.744	0	-1	103.744	0	0	destroyed							
3004 0385	103.681	103.693	1	0	103.692	-1	0	destroyed							
3004 0391	103.589	103.592	2	-2	103.590	-2	-4	destroyed							
3004 0392	103.709	103.700	1	-3	103.698	-1	-5	destroyed							
3004 0393	103.728	103.711	1	-3				destroyed							
3004 0394	103.738	103.750	0	-3				destroyed							
3004 0395	103.722	103.721	0	-1	103.721	0	-2	destroyed							

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 05**

**CS2 – Crane Platform / Headwall**

Learning Legacy Document

<b>monitoring asset</b>	<b>Crane Platform / Headwall (Plumstead Portal)</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR148-PT005-50010		
<b>name of monitoring section:</b>	CS2 - Craneplatform / Headwall		
sensor type:	manual levelling studs		
chainage:	91800	point no.:	3004 0391 - 3004 0395
<b>trigger values:</b> [mm]	green: +14 -14	amber: +17 -17	red: +21 -21
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	13/12/12	0.00		
<b>TBM 1</b>	start ZOI	10/01/13	-0.67	3004 0392
	end ZOI	07/03/13	-4.68	3004 0392
<b>TBM 2</b>	start ZOI	20/05/13	0.30	3004 0393
	end ZOI	27/05/13	-3.79	3004 0393
<b>longterm</b>	23/07/13	-4.57	3004 0392	last reading post tunneling, Cross section not longer measurable due to the fact that the points were destroyed during crane operations
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV		
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)		

**summary / comments**

Some of the points were always covered due to crane operation which have started in Oct. 2012. Point 3004 0391 was destroyed directly after baseline reading, and not possible to re-install during TBM 1 operation.

With the start of TBM 2, the crane platform was re-constructed and therefore all points were new installed and re-baselined at 17.05.2013.

All points were destroyed after 23.07.2013 due to crane operation.

Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.

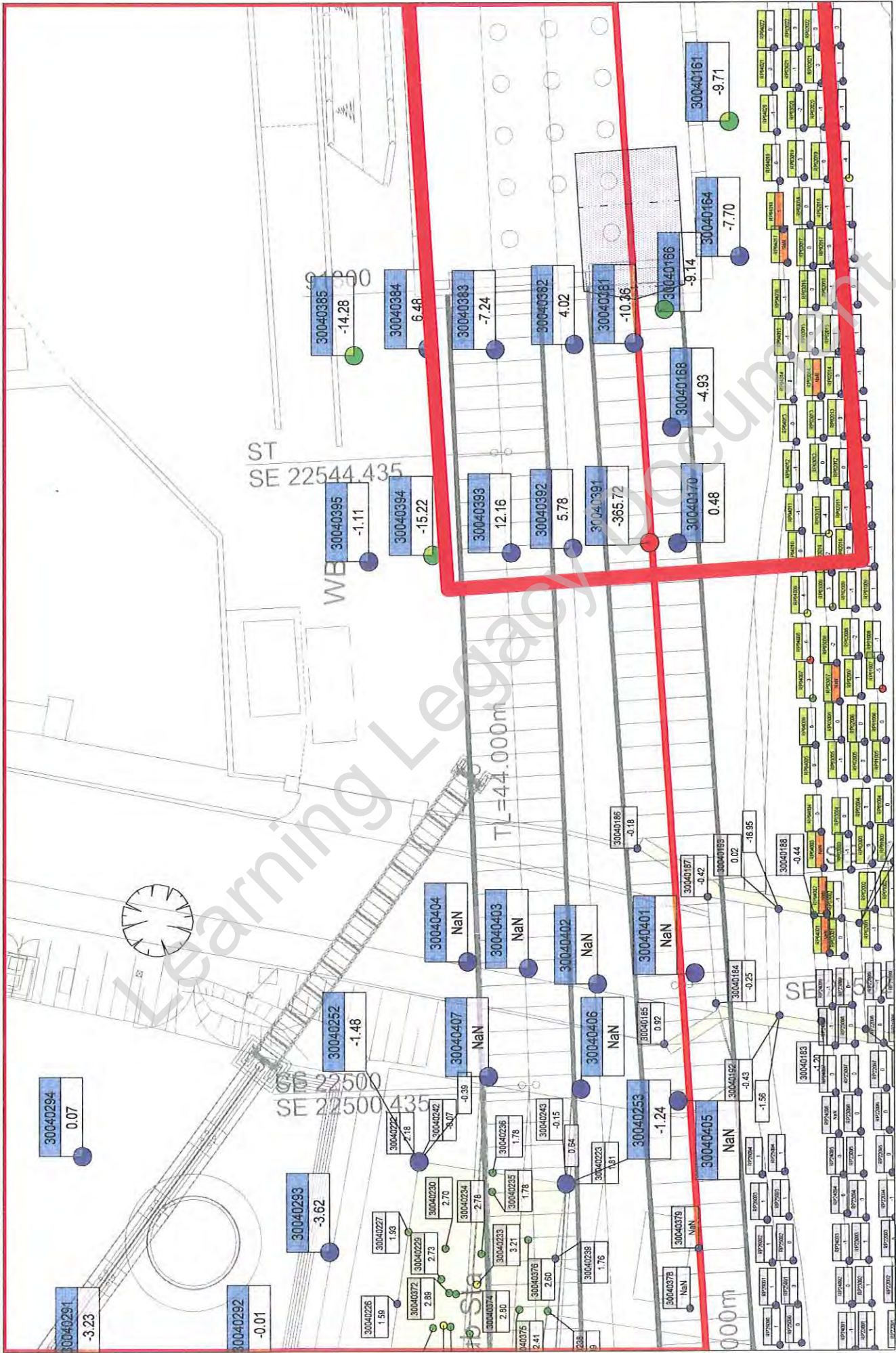
The rate of change in the monitoring data is less than the required standards as per the specifications and drawings up to the time when the instrumentations have been destroyed.

date / signature: 14/10/15

print name:

HMJV project role:

Monitoring & Survey engineer

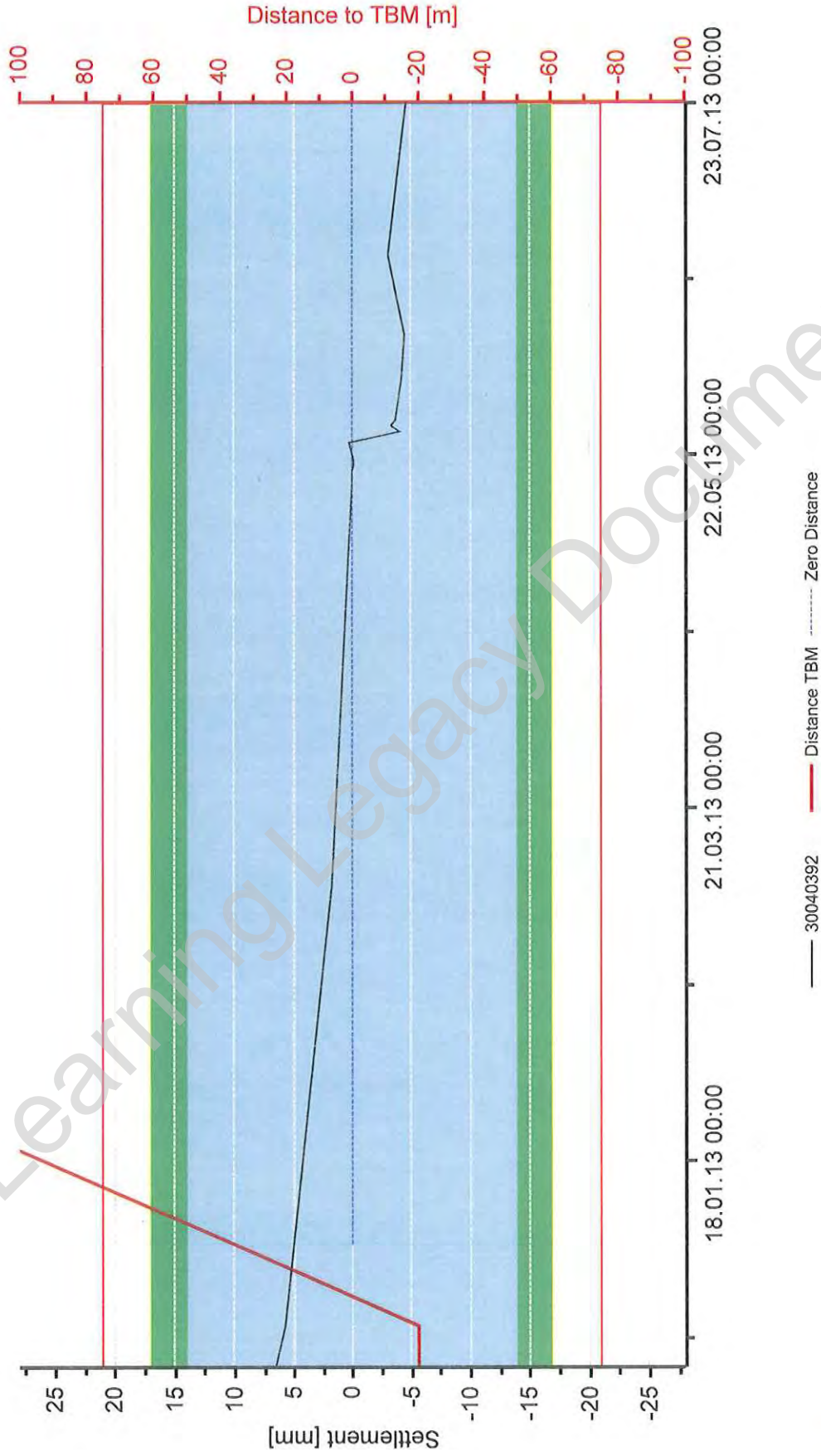


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive WB  
 current values: 10.01.2013 08:59





Point: 30040392



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - CS2 Craneplatform / Headwall 13.12.2012 - 23.07.2013  
Date: 18.10.2014 16:37 Current Values: 18.10.2014 16:26

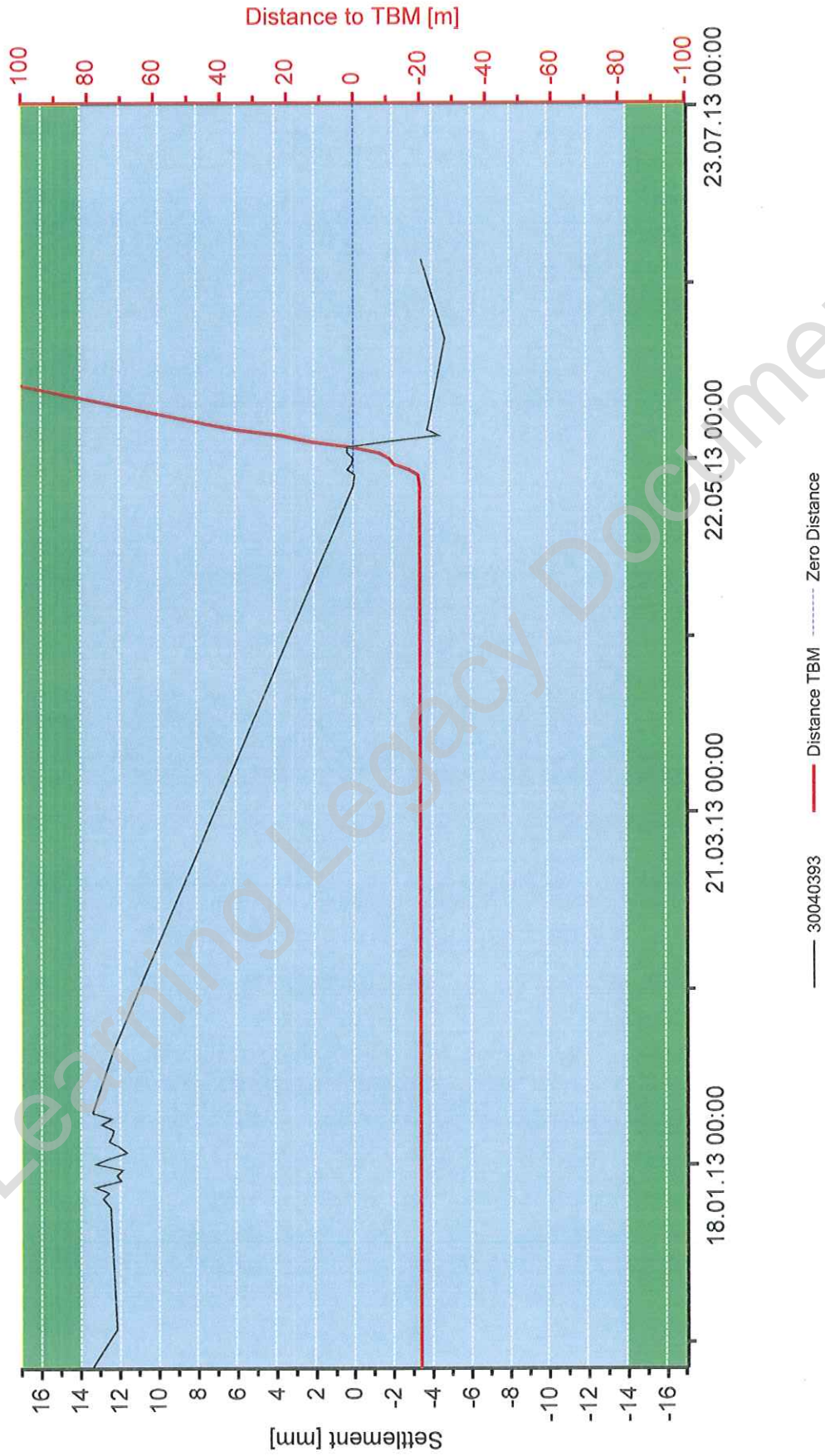




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 20.05.2013 17:48



Point: 30040393



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - CS2 Craneplatform / Headwall 13.12.2012 - 23.07.2013  
date: 19.06.2014 12:18 current values: 19.06.2014 12:10



Joint Venture

Joint Venture

project: C310 Thames Tunnel

project: C310 Thames Tunnel

structure: Cross Section Crane platform Headwall - levelling studs

structure: Cross Section Crane platform Headwall - levelling studs

No. of reading	baseline	1. following		2. following		3. following		4. following		5. following		5. following		7. following		8. following		9. following		10. following		11. following		12. following																											
		date	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline																										
	13/2/12																																																		
3004 0381	103.556	103.555	covered	-1	103.556	2	1	103.556	-1	0	103.555	1	0	103.555	1	0	103.555	-2	-2	103.553	0	0	103.553	-2	-2	103.554	1	-2	103.553	-1	-3	103.555	3	0	103.555	-1	-1	103.555	0	-1											
3004 0382	103.653	covered			103.653	0	0	103.653	0	0	103.653	0	0	103.653	0	0	103.653	-2	-2	103.652	1	0	103.652	-2	-2	103.652	1	-1	103.651	-1	-2	103.653	2	0	103.652	0	-1	103.652	0	-1											
3004 0383	103.725	103.724	covered	-1	103.719	1	-5	103.719	1	-6	103.719	1	-6	103.718	0	-6	103.719	-1	-7	103.719	1	-6	103.718	-1	-7	103.719	1	-6	103.718	-1	-7	103.719	2	-6	103.718	-1	-7	103.718	-1	-7	103.718	-1	-7								
3004 0384	103.751	covered			103.751	1	-2	103.679	1	-2	103.679	1	-2	103.679	1	-2	103.679	-1	-2	103.679	1	-2	103.679	-1	-2	103.679	1	-1	103.675	-5	-6	103.676	1	-5	103.675	1	-5	103.675	0	0	103.675	0	0								
3004 0391	103.589	destroyd																																																	
3004 0392	103.728	103.727	destroyd		103.727	0	-1	103.728	0	-1	103.727	0	-1	103.727	0	-1	103.727	-1	-2	103.727	0	0	103.728	1	0	103.727	-1	-2	103.727	0	-1	103.728	1	0	103.728	1	0	103.727	-1	-1	103.727	-1	-1	103.727	0	-1					
3004 0394	103.728	destroyd			103.722	0	-1	103.722	1	0	103.722	0	0	103.722	0	0	103.722	-1	-1	103.723	2	1	103.723	2	1	103.723	2	1	103.722	-2	0	103.723	1	1	103.723	1	1	103.723	-1	0	103.722	-1	0	103.722	-1	0					
3004 0395	103.722	103.722																																																	

project: C310 Thames Tunnel

Joint Venture

Joint Venture

No. of reading	baseline	13. following		14. following		15. following		16. following		17. following		18. following		19. following		20. following		21. following		22. following		23. following		24. following			
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline		
GD10	13/2/12	22/01/2013	23/01/2013	24/01/2013	25/01/2013	26/01/2013	27/01/2013	28/01/2013	29/01/2013	30/01/2013	31/01/2013	01/02/2013	02/02/2013	03/02/2013	04/02/2013	05/02/2013	06/02/2013	07/02/2013	08/02/2013	09/02/2013	10/02/2013	11/02/2013	12/02/2013	13/02/2013	14/02/2013		
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline		
3004 0381	103.556	103.554	0 -1	103.555	0 -1	103.555	0 -1	103.554	-2 -1	103.554	0 -1	103.555	0 -1	103.554	-0.52 -1	103.554	0 -1	103.554	0 -1	103.554	0 -1	103.555	0 -1	103.555	0 -1	103.565	0 -1
3004 0382	103.653	103.653	0 0	103.653	0 0	103.653	0 0	103.653	0 0	103.652	-1 -1	103.653	0 -1	103.652	-0.84 -1	103.652	0 -1	103.652	0 -1	103.652	0 -1	103.653	0 -1	103.653	0 -1	103.653	0 -1
3004 0383	103.725	103.718	0 -7	103.718	0 -7	103.718	0 -7	103.718	0 -7	103.718	0 -7	103.718	0 -7	103.718	-0.79 -7	103.718	0 -8	103.717	-1 -8	103.717	0 -8	103.717	0 -8	103.717	0 -8	103.731	0 -8
3004 0384	103.751	103.751	0 0	103.746	-5	103.746	0 -5	103.747	1 -4	103.745	-1 -5	103.743	-2 -8	103.743	-2 -8	103.741	-3 -10	103.741	-3 -10	103.741	-3 -10	103.741	-3 -10	103.741	-3 -10	103.744	-3 -10
3004 0385	103.661	103.674	2 -7	103.673	-1 -8	103.674	1 -7	103.674	0 -7	103.673	-1 -8	103.673	-1 -8	103.673	-1 -8	103.673	-1 -8	103.673	-1 -8	103.673	-1 -8	103.673	-1 -8	103.673	-1 -8	103.683	-1 -8
3004 0391	103.589	103.589	0 0	103.589	0 0	103.589	0 0	103.589	0 0	103.589	0 0	103.589	0 0	103.589	0 0	103.589	0 0	103.589	0 0	103.589	0 0	103.589	0 0	103.589	0 0	103.589	0 0
3004 0392	103.709	103.727	1 -1	103.727	0 -1	103.727	0 -1	103.728	1 -1	103.727	-1 -1	103.728	1 0	103.727	-1 -1	103.727	-0.06 -1	103.727	-0.06 -1	103.727	-0.06 -1	103.727	-0.06 -1	103.727	-0.06 -1	103.703	-4 -5
3004 0393	103.728	103.727	0 -1	103.727	0 -1	103.727	0 -1	103.728	1 -1	103.727	-1 -1	103.728	1 0	103.727	-1 -1	103.727	-0.06 -1	103.727	-0.06 -1	103.727	-0.06 -1	103.727	-0.06 -1	103.727	-0.06 -1	103.715	-5 -5
3004 0394	103.798	103.722	0 0	103.722	0 0	103.722	0 0	103.723	1 1	103.722	-1 0	103.722	0 0	103.722	0 0	103.722	0 0	103.722	0 0	103.722	0 0	103.722	0 0	103.722	0 0	103.753	0 0
3004 0395	103.722	103.722	0 0	103.722	0 0	103.722	0 0	103.723	1 1	103.722	-1 0	103.722	0 0	103.722	0 0	103.722	0 0	103.722	0 0	103.722	0 0	103.722	0 0	103.722	0 0	103.723	0 0

project: C310 Thames Tunnel

Joint Venture

project: C310 Thames Tunnel

Joint Venture

No. of reading	structure: Cross Section Crane platform Headwall - levelling studs																												
	baseline	25. following		26. following		27. following		28. following		29. following		30. following		31. following		32. following		33. following		34. following		35. following		36. following					
d510	131212	19/02/2013		20/02/2013		21/02/2013		22/02/2013		23/02/2013		24/02/2013		25/02/2013		26/02/2013		27/02/2013		28/02/2013		04/03/2013		12/03/2013					
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline				
3004 0381	103.556	103.566	1	103.566	0	103.565	0	103.566	1	103.566	0	103.566	0	103.566	0	103.565	-1	103.565	-1	103.565	0	103.566	0	103.564	-1	103.565	1	0	
3004 0382	103.653	103.649	0	103.649	0	103.648	-2	103.648	1	103.648	0	103.648	0	103.648	0	103.647	-1	103.647	-2	103.647	0	103.648	0	103.646	-2	103.648	-2	-3	
3004 0383	103.725	103.731	0	103.731	0	103.731	-1	103.731	0	103.731	0	103.730	0	103.730	0	103.729	-1	103.729	-2	103.729	0	103.730	0	103.729	-1	103.729	-2	103.723	-8
3004 0384	103.751	103.745	0	103.745	0	103.745	0	103.745	0	103.745	0	103.745	0	103.744	-1	103.744	-1	103.745	1	103.745	0	103.744	0	103.743	-1	103.744	1	-1	
3004 0385	103.681	103.693	0	103.693	0	103.693	0	103.693	0	103.693	0	103.693	0	103.693	0	103.693	-1	103.693	1	103.693	1	103.693	0	103.692	-1	103.692	0	0	
3004 0391	103.589	103.955	0	103.955	0	103.954	0	103.955	0	103.955	0	103.955	0	103.954	-1	103.951	-3	103.951	3	103.952	1	103.951	0	103.950	-1	103.950	0	-4	
3004 0392	103.709	103.703	0	103.703	0	103.703	0	103.703	0	103.703	0	103.703	0	103.701	-2	103.699	-2	103.699	-2	103.699	1	103.699	0	103.698	-1	103.698	0	-4	
3004 0393	103.728	103.715	0	103.715	0	103.715	0	103.715	0	103.715	0	103.715	0	103.713	-2	103.710	-3	103.710	3	103.711	1	103.711	0	103.711	0	103.710	-1	-5	
3004 0394	103.738	103.753	0	103.753	0	103.753	0	103.753	0	103.753	0	103.753	-1	103.751	-2	103.749	-2	103.749	-2	103.750	1	103.750	0	103.749	-1	103.749	0	-3	
3004 0395	103.722	103.723	0	103.723	1	103.723	0	103.723	0	103.723	0	103.722	0	103.723	0	103.721	-1	103.721	1	103.722	1	103.722	0	103.721	-1	103.722	1	-1	

monitoring table




Joint Venture

Project: C310 Thames Tunnel

Structure: Cross Section Crane platform Headwall - levelling studs

No. of reading	date	37. following		38. following		39. following		40. following		41. following		42. following	
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
	14/12/12		28062313		22072013		08252314						
Point No		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0381		103.556	0 1	103.565	-1 0								
3004 0382		103.652	103.647	103.647	0 -2								
3004 0383		103.725	103.723	103.724	1 -7								
3004 0384		103.751	103.744	103.744	0 0								
3004 0385		103.681	103.683	103.692	-1 0								
3004 0391		103.589	103.582	103.550	-2 -4								
3004 0392		103.709	103.700	103.698	-1 -5								
3004 0393		103.728	103.711										
3004 0394		103.738	103.750										
3004 0395		103.722	103.721	103.721	0 -2								



 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 06**

**White Hard Road Bridge – HLC**

Learning Legacy Document



<b>monitoring asset</b>	<b>White Hard Road Bridge</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR148-PT005-50010		
<b>name of monitoring section:</b>	White Hard Road Bridge		
sensor type:	Hydrostatic Levelling Cell		
chainage:	91760	point no.:	3004 0181- 3004 0190
<b>trigger values:</b> [mm]	green: +5 -5	amber: +11 -11	red: +17 -17
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	29/08/12	0		The Reference point for the HLC system is 3004 0181
<b>TBM 1</b>	start ZOI	16/01/13	-0.05	3004 0186
		20/01/13	0.86	3004 0185
	end ZOI	28/01/13	-6.09	3004 0186
		29/01/13	-0.35	3004 0185
breached the green trigger value with point 30040186 after passing with TBM 1, as per RIEPP C310-HTM-Z-STP-CR148-50027 App. D.1 monitoring frequency increased				
<b>TBM 2</b>	start ZOI	24/05/13	-7.33	3004 0186
		25/05/13	-1.20	3004 0185
	end ZOI	29/05/13	-7.76	3004 0186
		30/05/13	-1.76	3004 0185
breached the green trigger value. no more significant settlement due to passing of TBM 2, increased frequency continued				
<b>longterm</b>		13/07/13	-7.44	3004 0186
		13/07/13	-1.54	3004 0185
		13/09/13	4.72	3004 0186
		13/09/13	-1.05	3004 0185
last reading post tunneling, Cross section not longer measurable				
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV		
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)		

**summary / comments**

As of 13.07.2013 a daily influence of solar radiation due to the removal of the ballast and the cover of the sensors can be observed for the points 3004 0186-3004 0190. In the late afternoon the settlement values go up to +10 mm high and in the early morning hours on 10mm down. The points are all on the eastern side of the bridge. An influence of solar radiation is not dismissed, especially since the phenomenon of fluctuation of +/-10mm is not observed on the western side of the bridge. The stable data / trend for the points on the western side of the bridge are indicating the same for eastern side due to the fact that the trends of both sides showed also similar behaviour before that phenomenon.

After the 13.09.2013 the system was decommissioned in conjunction with the Cathedral Substation monitoring system were this system was linked to and the power supply was delivered from.

Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.

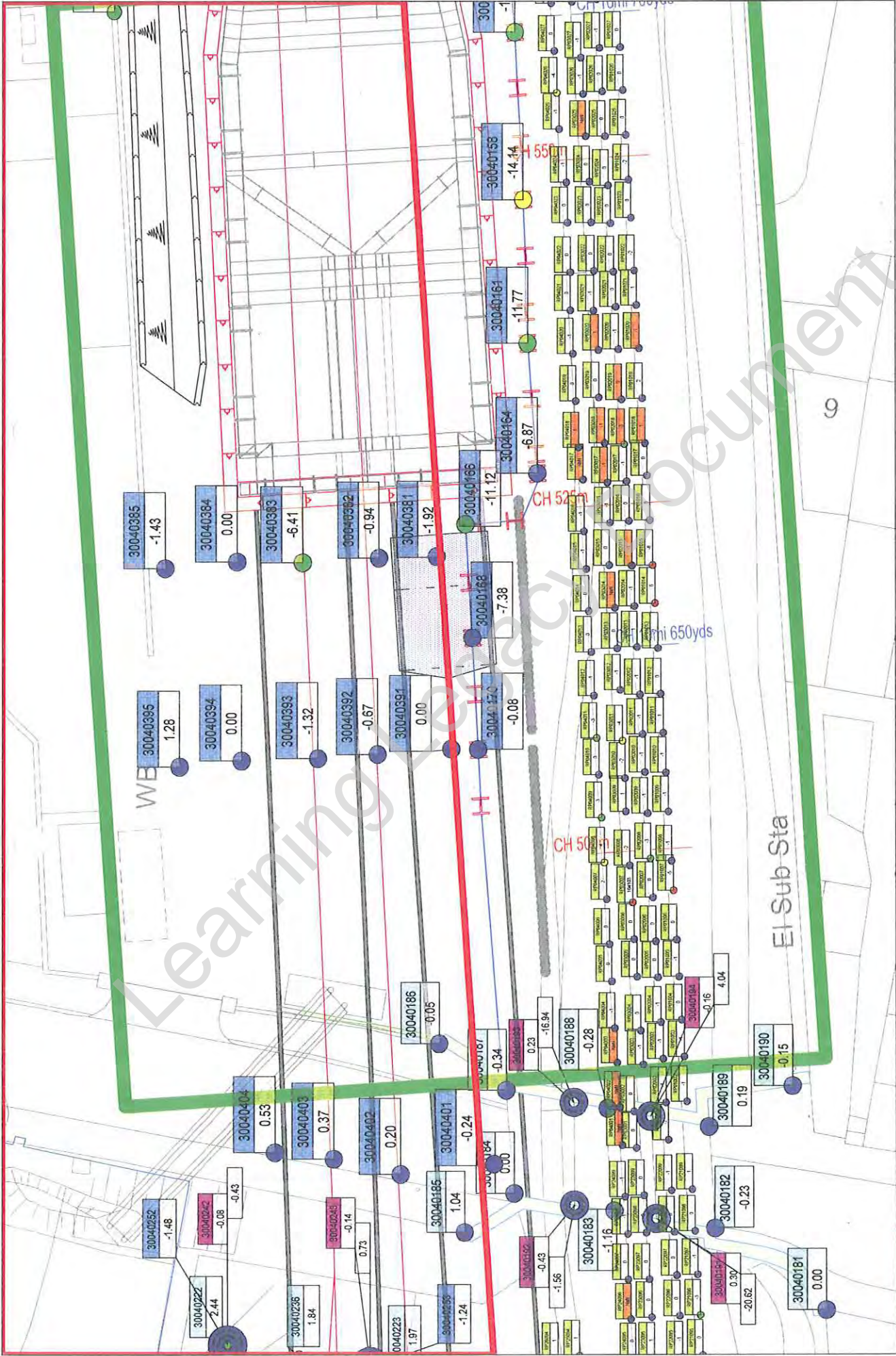
The rate of change in the monitoring data is less than the required standards as per the specifications and drawings up to the time when the instrumentations have been decommissioned.

date / signature: 31/03/2015

print name:

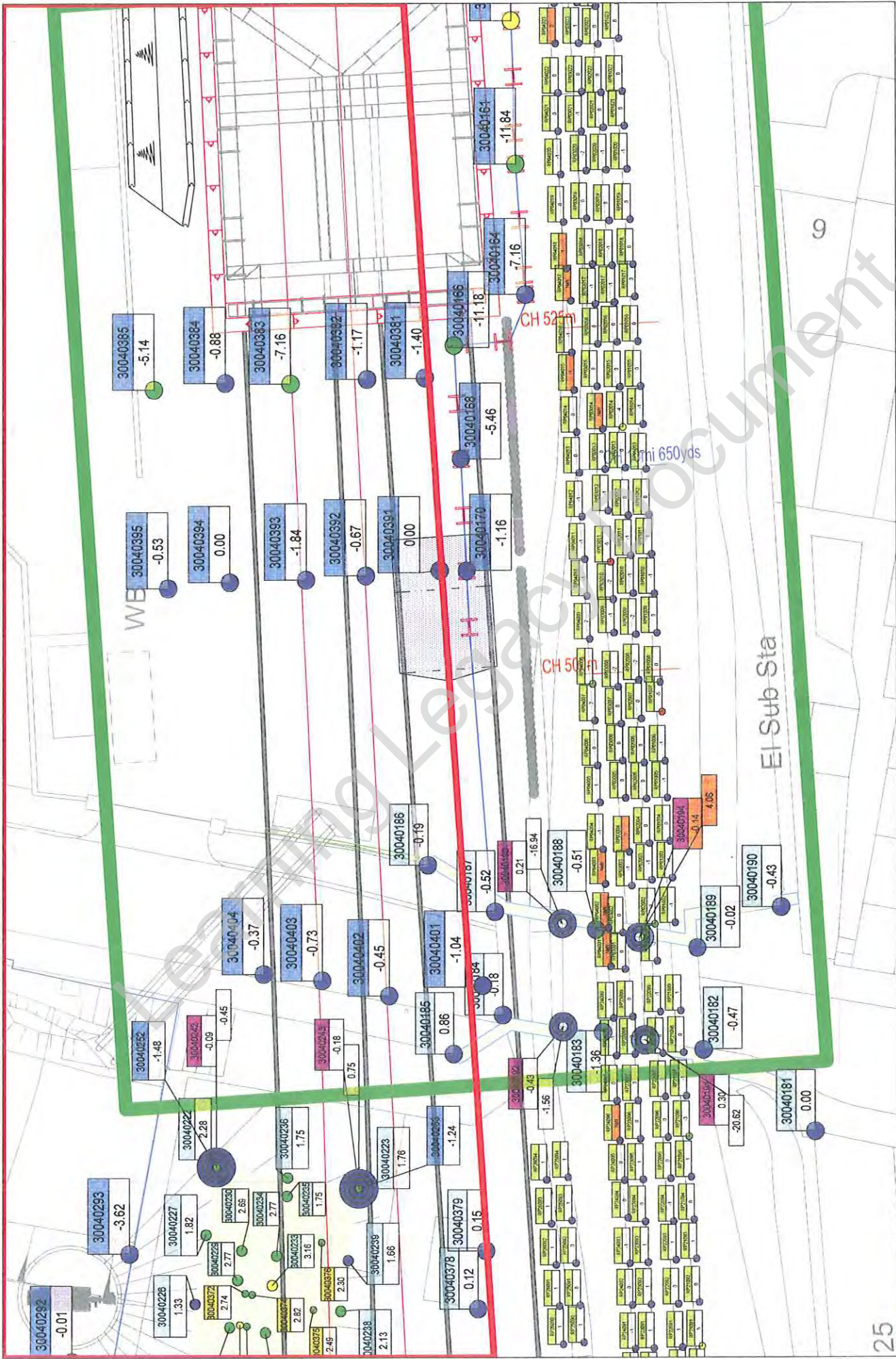
HMJV project role:

Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 16.01.2013 10:05

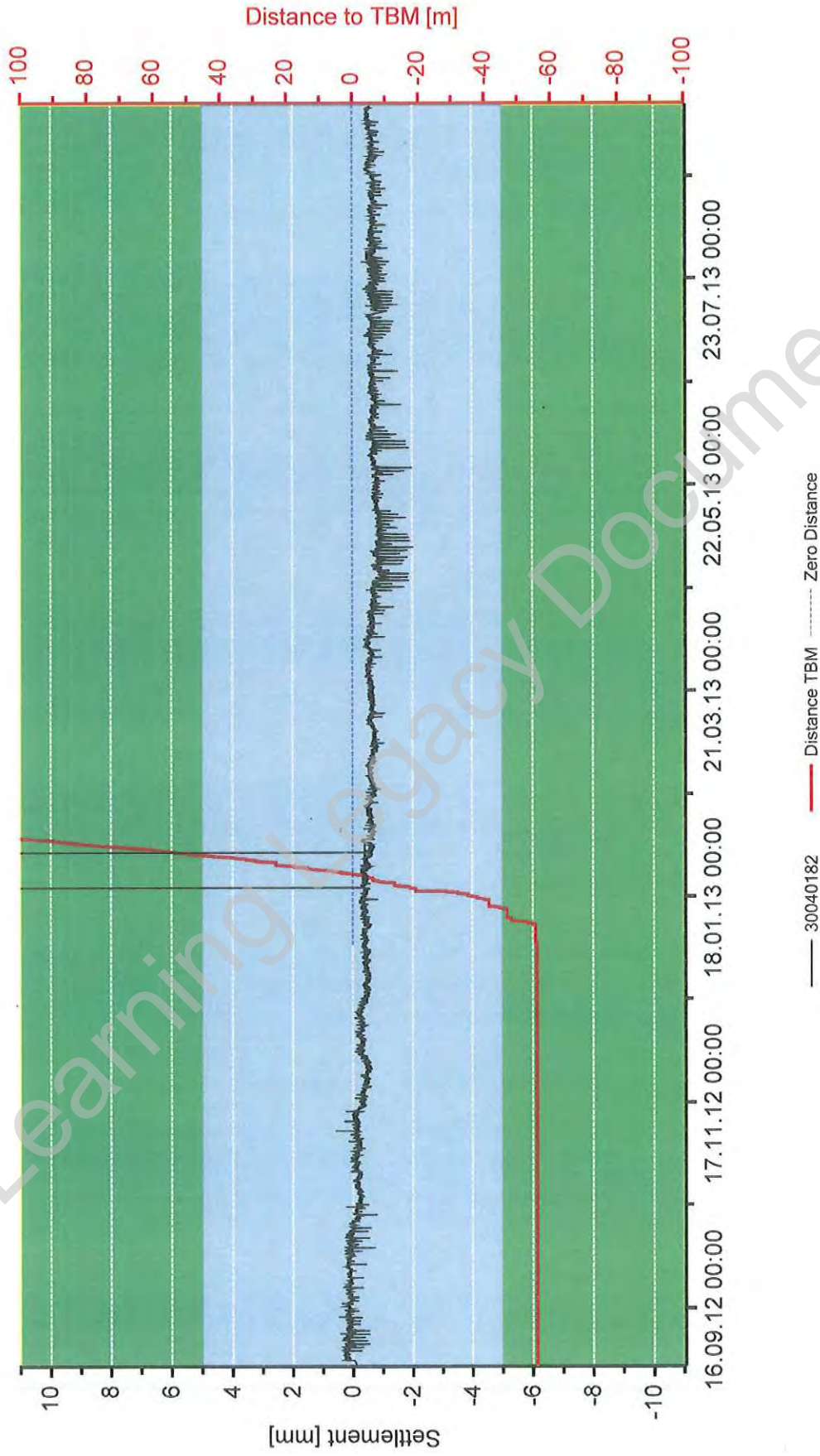




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 20.01.2013 09:56



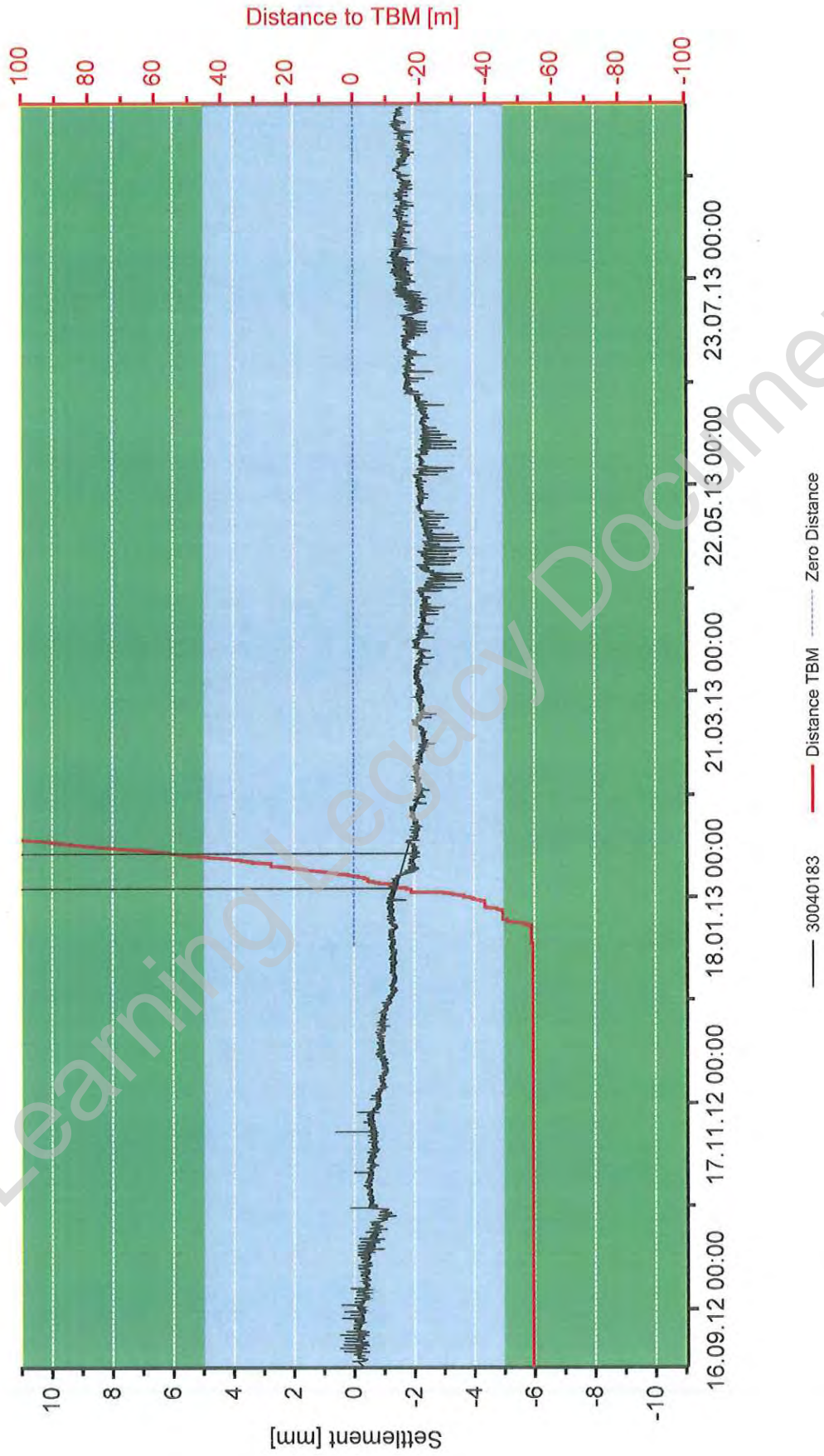
Point: 30040182



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - White Hard Road Bridge (HLC) 29.08.2012 - 13.09.2013  
date: 26.06.2014 13:10 current values: 26.06.2014 13:04



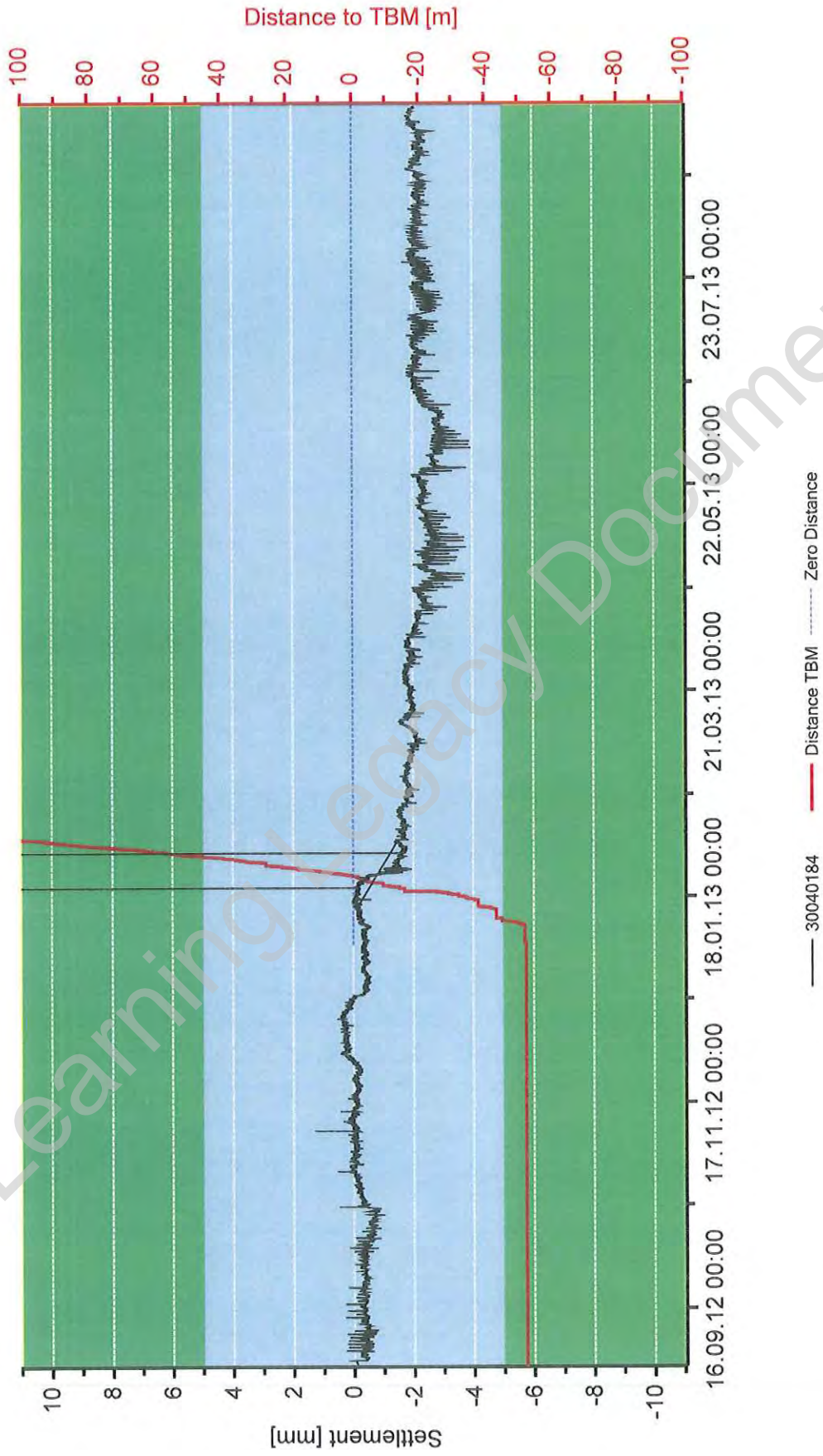
Point: 30040183



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - White Hard Road Bridge (HLC) 29.08.2012 - 13.09.2013  
date: 26.06.2014 13:13 current values: 26.06.2014 13:04



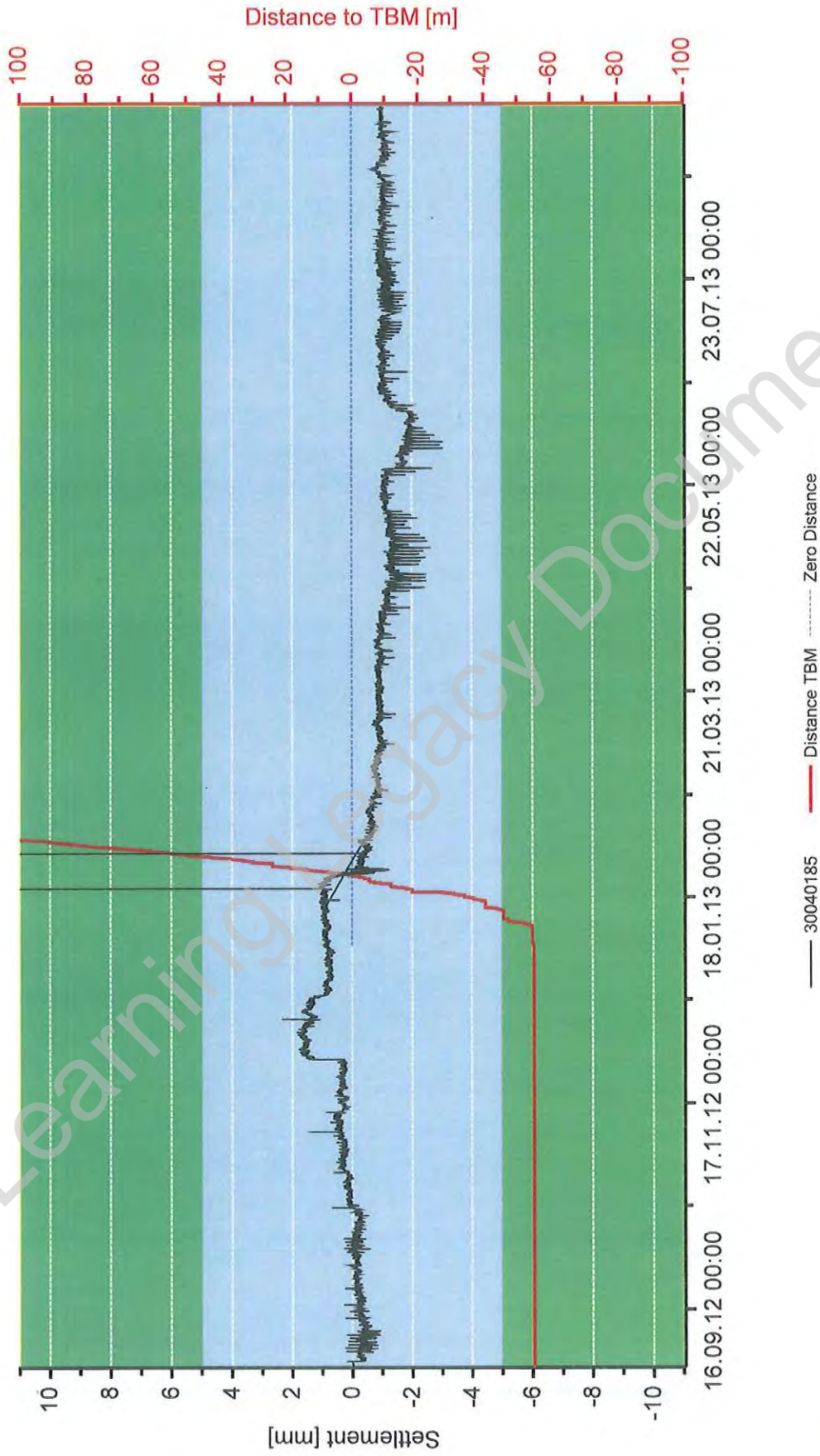
Point: 30040184



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - White Hard Road Bridge (HLC) 29.08.2012 - 13.09.2013  
date: 26.06.2014 13:23 current values: 26.06.2014 13:13



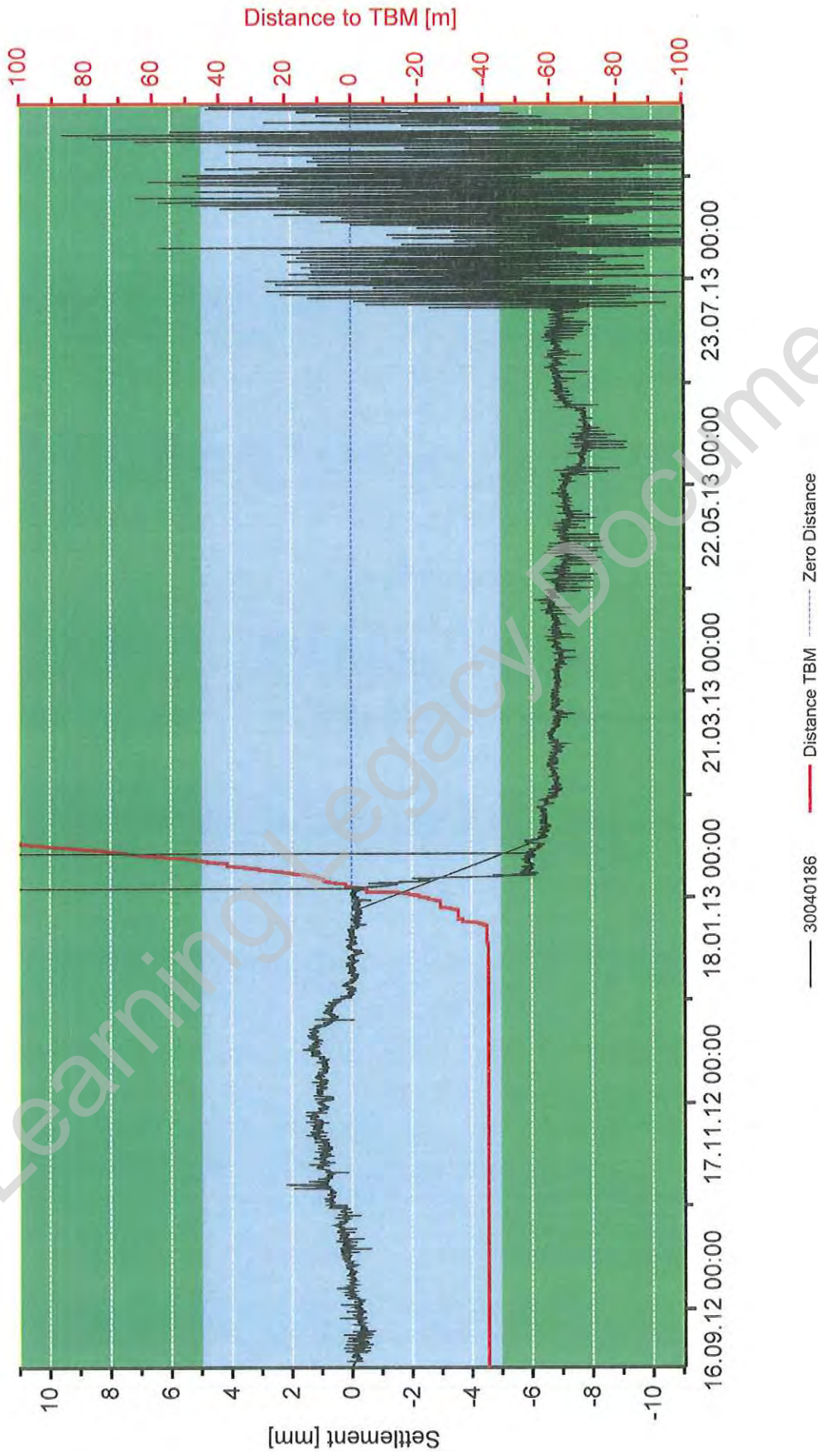
Point: 30040185



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - White Hard Road Bridge (HLC) 29.08.2012 - 13.09.2013  
date: 26.06.2014 13:26 current values: 26.06.2014 13:13



Point: 30040186

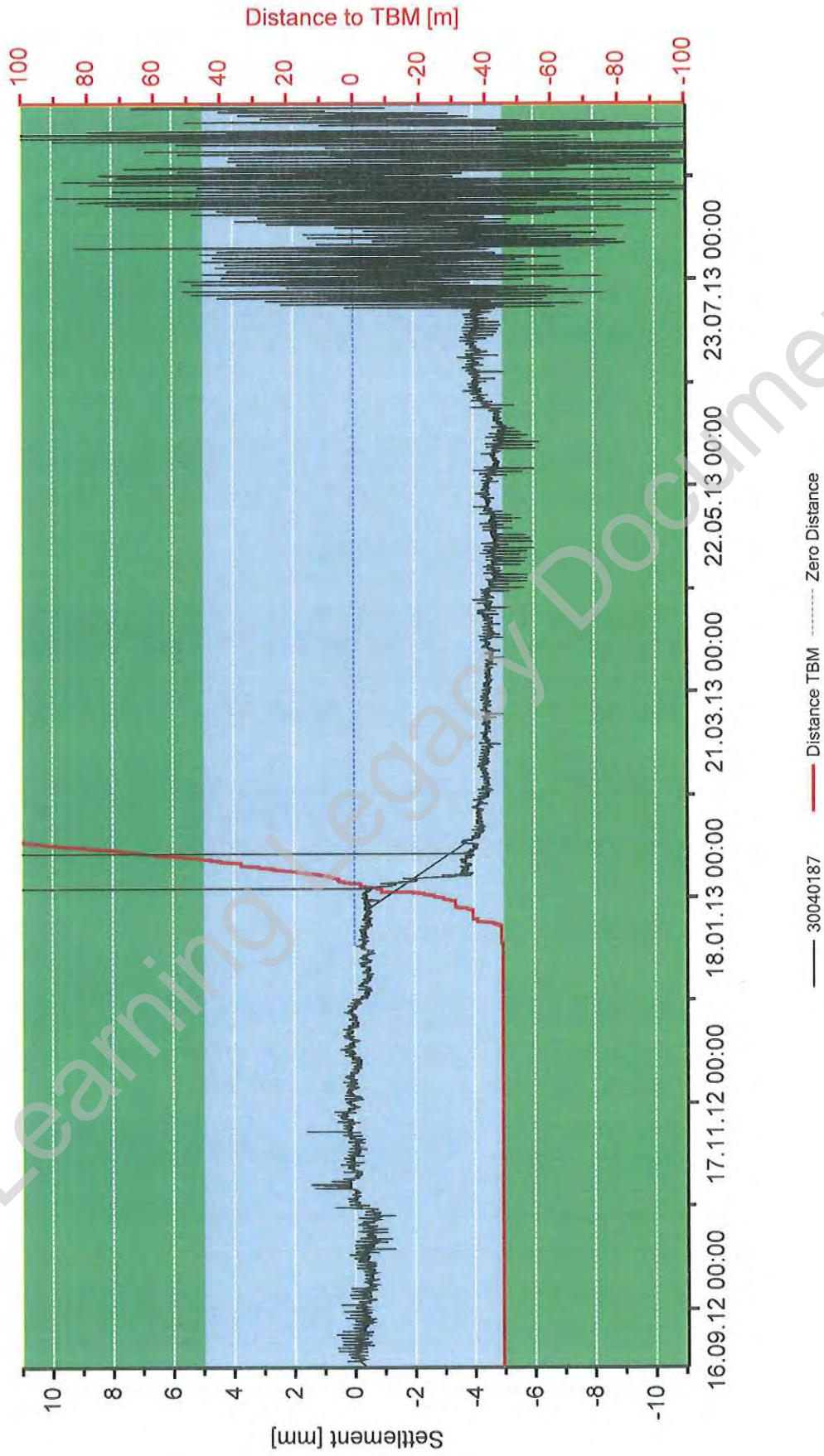


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - White Hard Road Bridge (HLC) 29.08.2012 - 13.09.2013  
date: 25.06.2014 17:49 current values: 25.06.2014 17:32





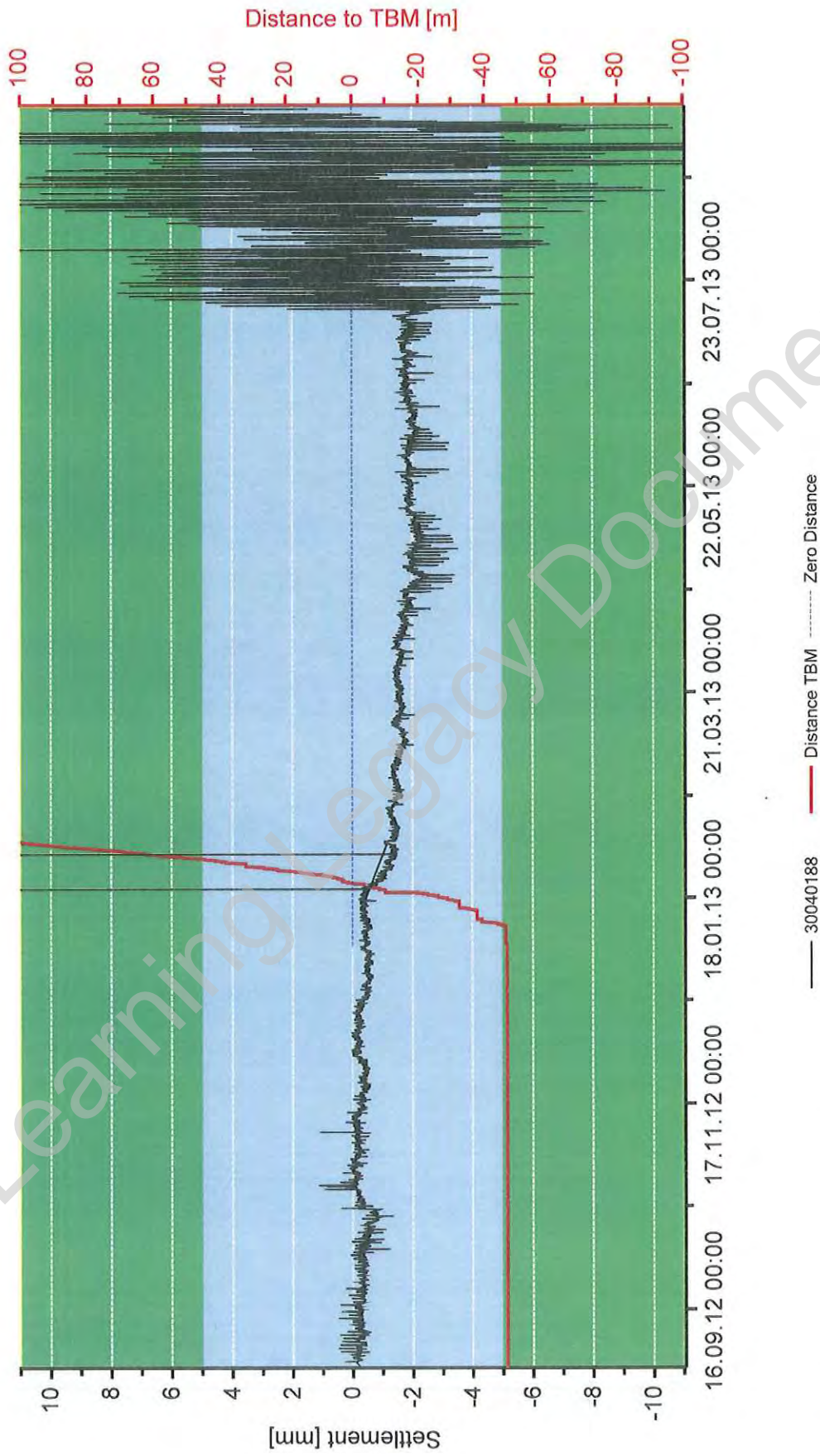
Point: 30040187



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - White Hard Road Bridge (HLC) 29.08.2012 - 13.09.2013  
date: 26.06.2014 13:29 current values: 26.06.2014 13:13



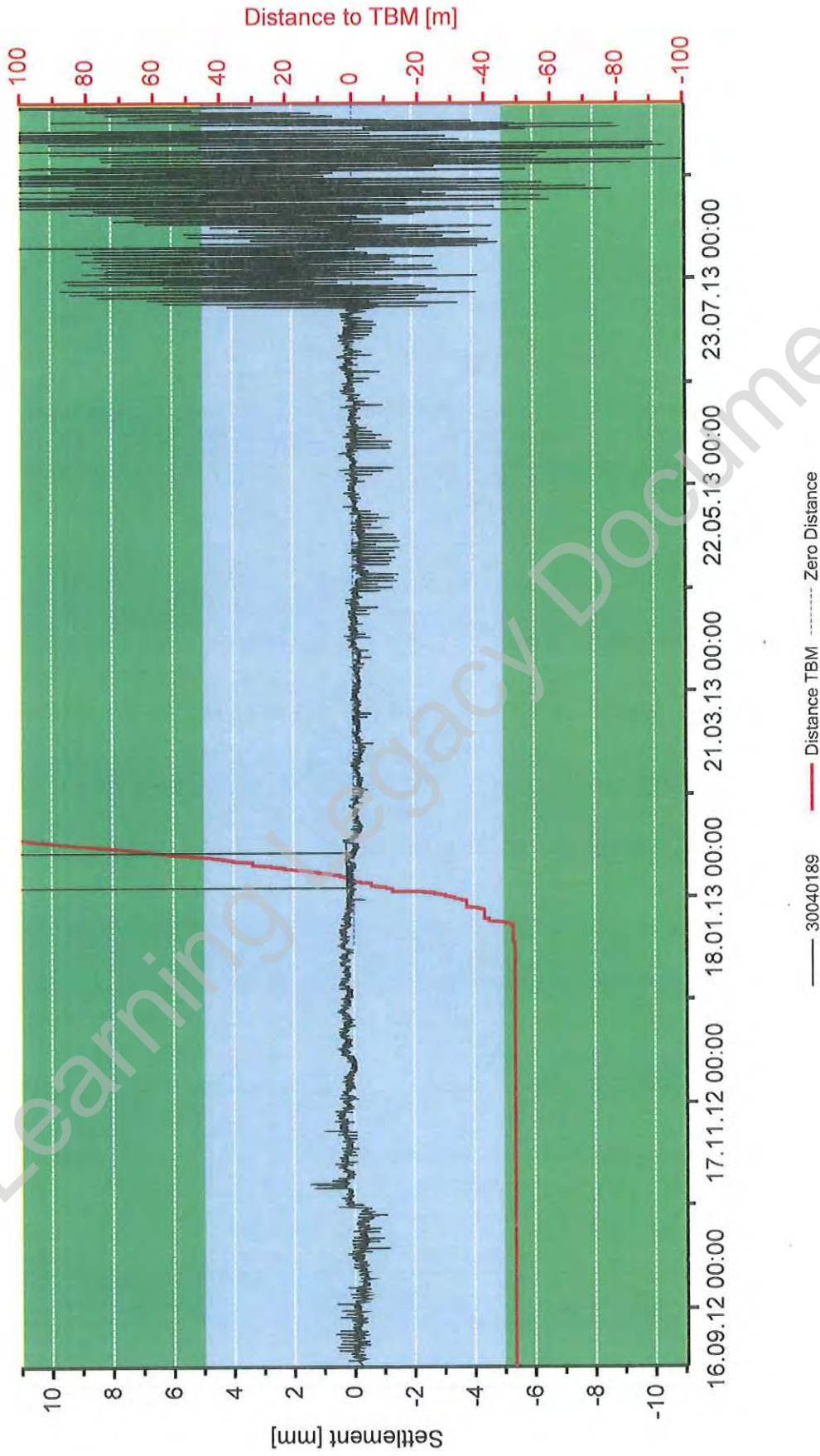
Point: 30040188



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - White Hard Road Bridge (HLC) 29.08.2012 - 13.09.2013  
date: 26.06.2014 13:32 current values: 26.06.2014 13:13



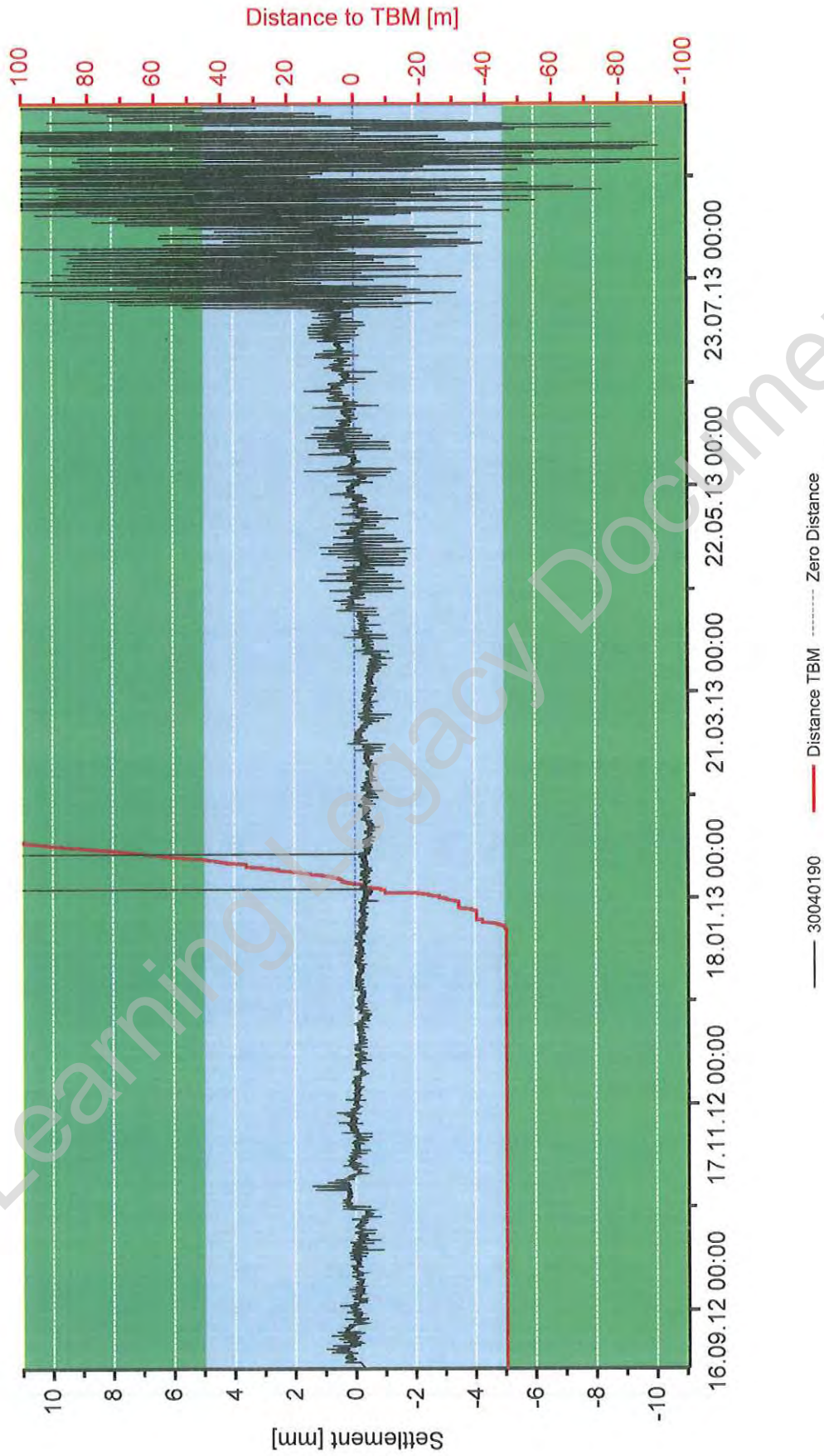
Point: 30040189



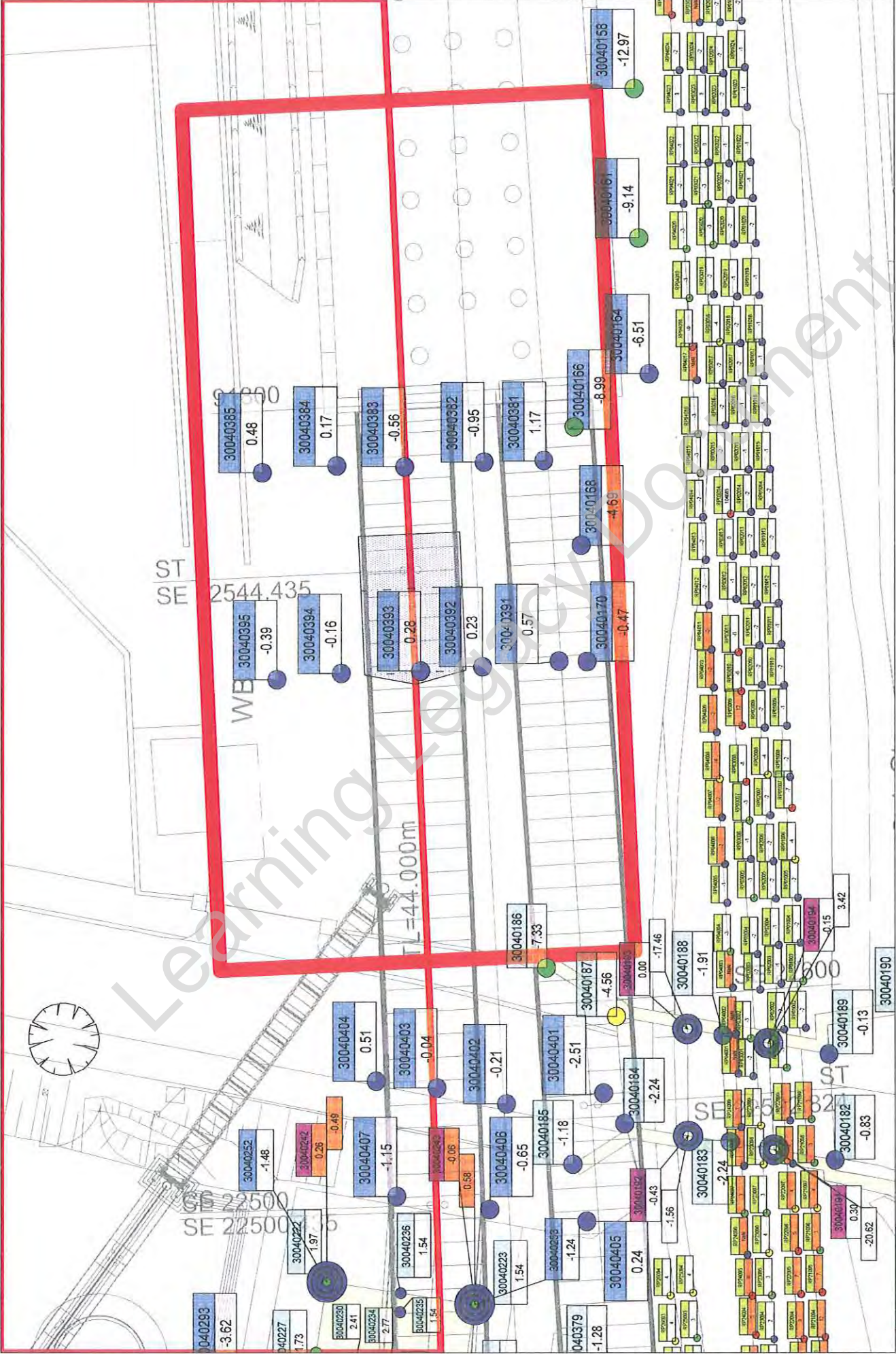
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - White Hard Road Bridge (HLC) 29.08.2012 - 13.09.2013  
date: 26.06.2014 13:36 current values: 26.06.2014 13:13



Point: 30040190



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - White Hard Road Bridge (HLC) 29.08.2012 - 13.09.2013  
date: 26.06.2014 13:38 current values: 26.06.2014 13:13

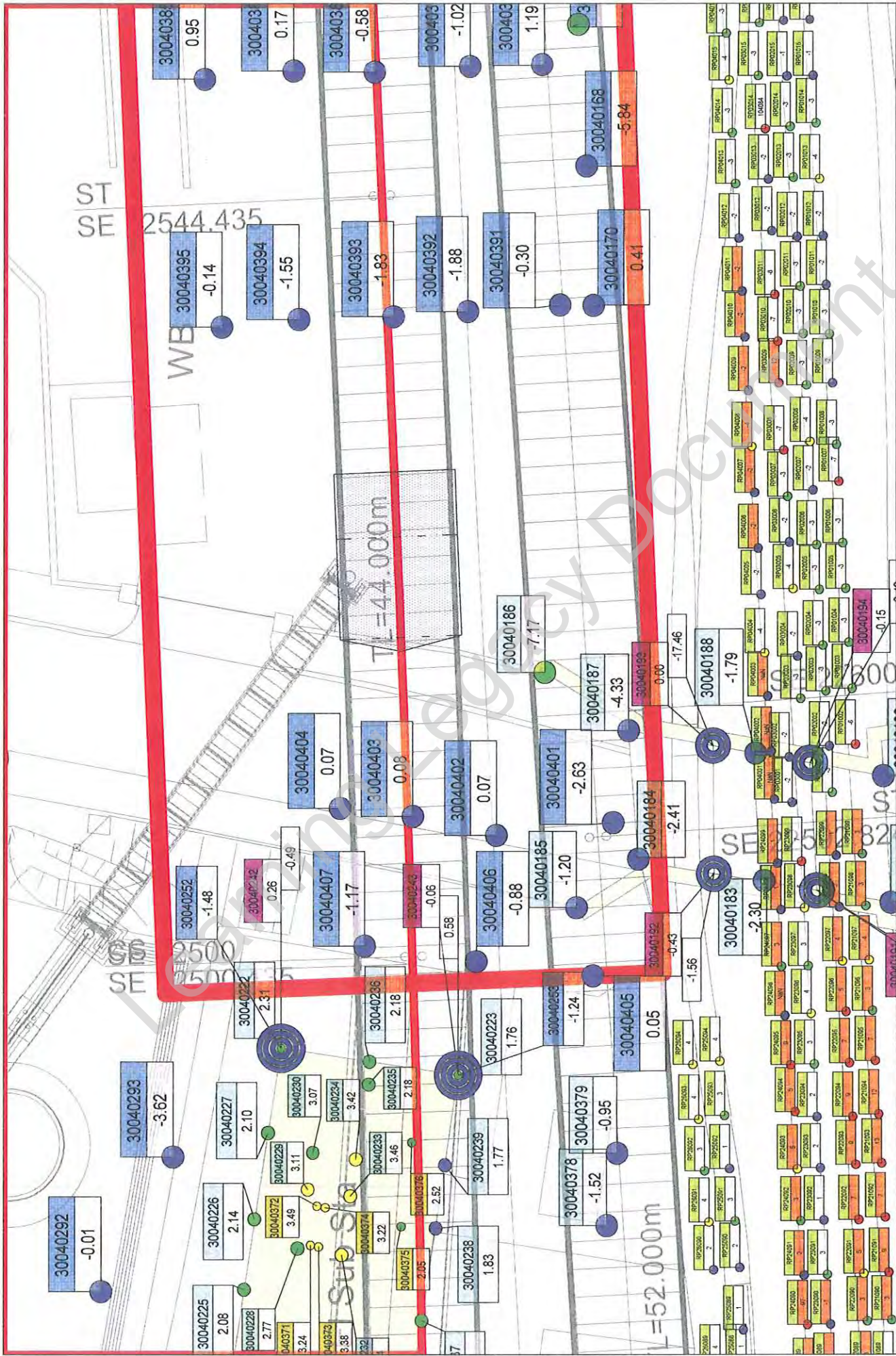


**Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal**

working activities: TBM drive

current values: 24.05.2013 09:00



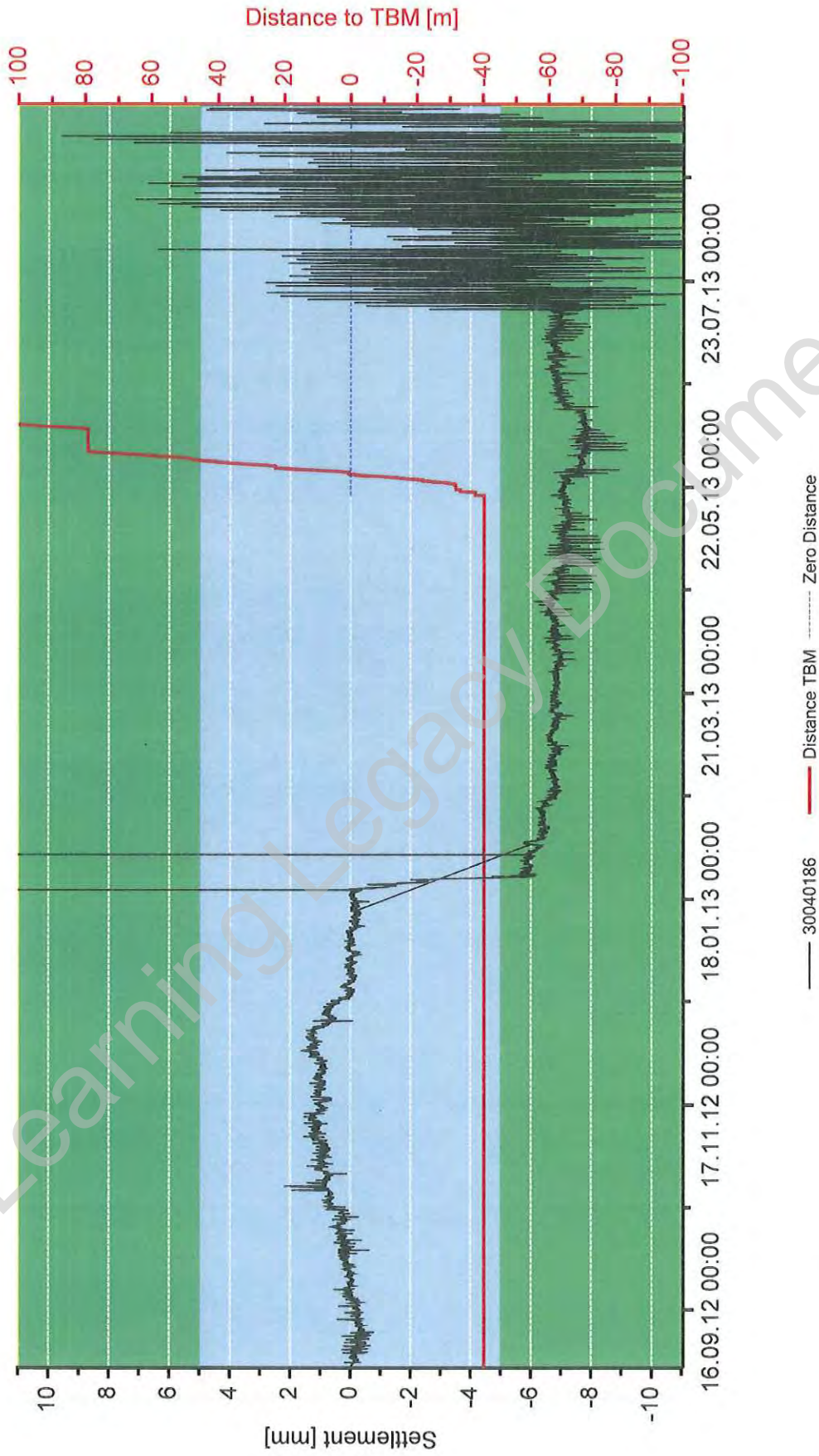


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

working activities: TBM drive


current values: 25.05.2013 17:59

Point: 30040186



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - White Hard Road Bridge (HLC) 29.08.2012 - 13.09.2013  
date: 25.06.2014 17:43 current values: 25.06.2014 17:32



 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	CROSSRAIL	eB NO	C310-HTM-C-RGN-CR148-50022	Rev	6.0
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 07**

**White Hard Road Bridge – TM**

Learning Legacy Document



**monitoring asset**

**White Hard Road Bridge**

reference monitoring drawing:

C310-HTM-C-DWG-CR148-PT005-50010

**name of monitoring section:**

White Hard Road Bridge

sensor type:

Tilt Meter

chainage:

91760

point no.:

3004 0191- 3004 0194

**trigger values:**  
[mm]

green: +5  
-5

amber: +9  
-9

red: +12  
-12

reference document for trigger values:

Management Plan for Control of Ground Movement

EB-no.:

C310-HTM-Z-STP-CR148-50058

Appendix:

AAA

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	29/08/12	0		
<b>TBM 1</b>	start ZOI	16/01/13	0.23	3004 0193
		20/01/13	-0.43	3004 0192
	end ZOI	28/01/13	0.04	3004 0193
		29/01/13	-0.43	3004 0192
<b>TBM 2</b>	start ZOI	24/05/13	0.0	3004 0193
		25/05/13	-0.43	3004 0192
	end ZOI	29/05/13	0.0	3004 0193
		30/05/13	-0.43	3004 0192
<b>longterm</b>	09/07/13	-0.03	3004 0193	last reading post tunneling, sensors destroyed, no more readings available
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV		
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)		

**summary / comments**

Points 3004 0191 / 3004 0192 got power failure from 19.12. / 25.12.2012 onwards. It was not possible to reinstall the power due to ballasting of the road, there was no access to the Tiltmeter.  
 During the removal of the ballastion of White Hart road the sensors were destroyed, therefore no more readings after the 09.07.14 were available. Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings up to the time when the instrumentations have been decommissioned.

date / signature: 09/01/15

print name:

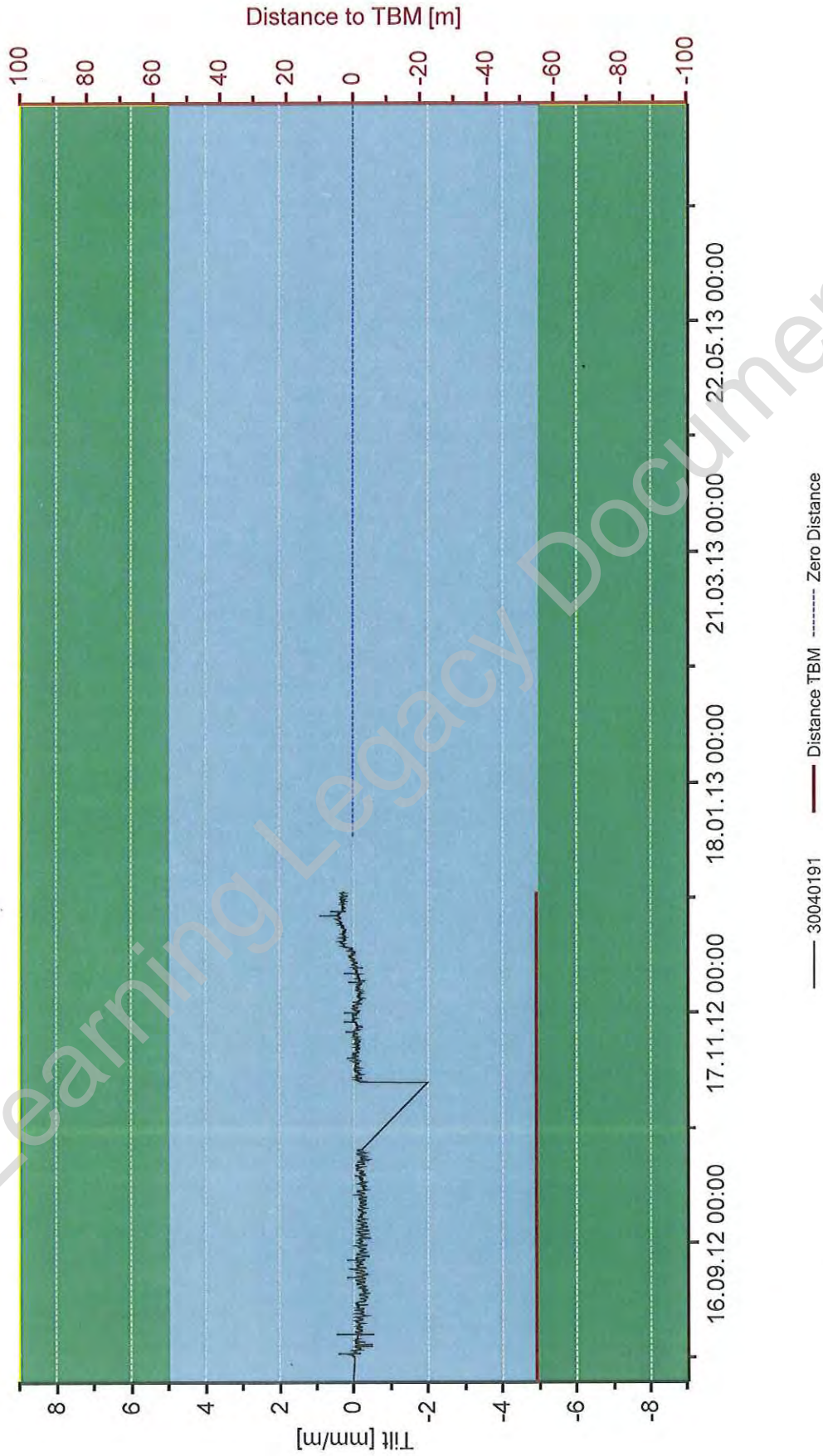
HMJV project role:

Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, lining walls and grouting  
 current values: 16.01.2013 10:05

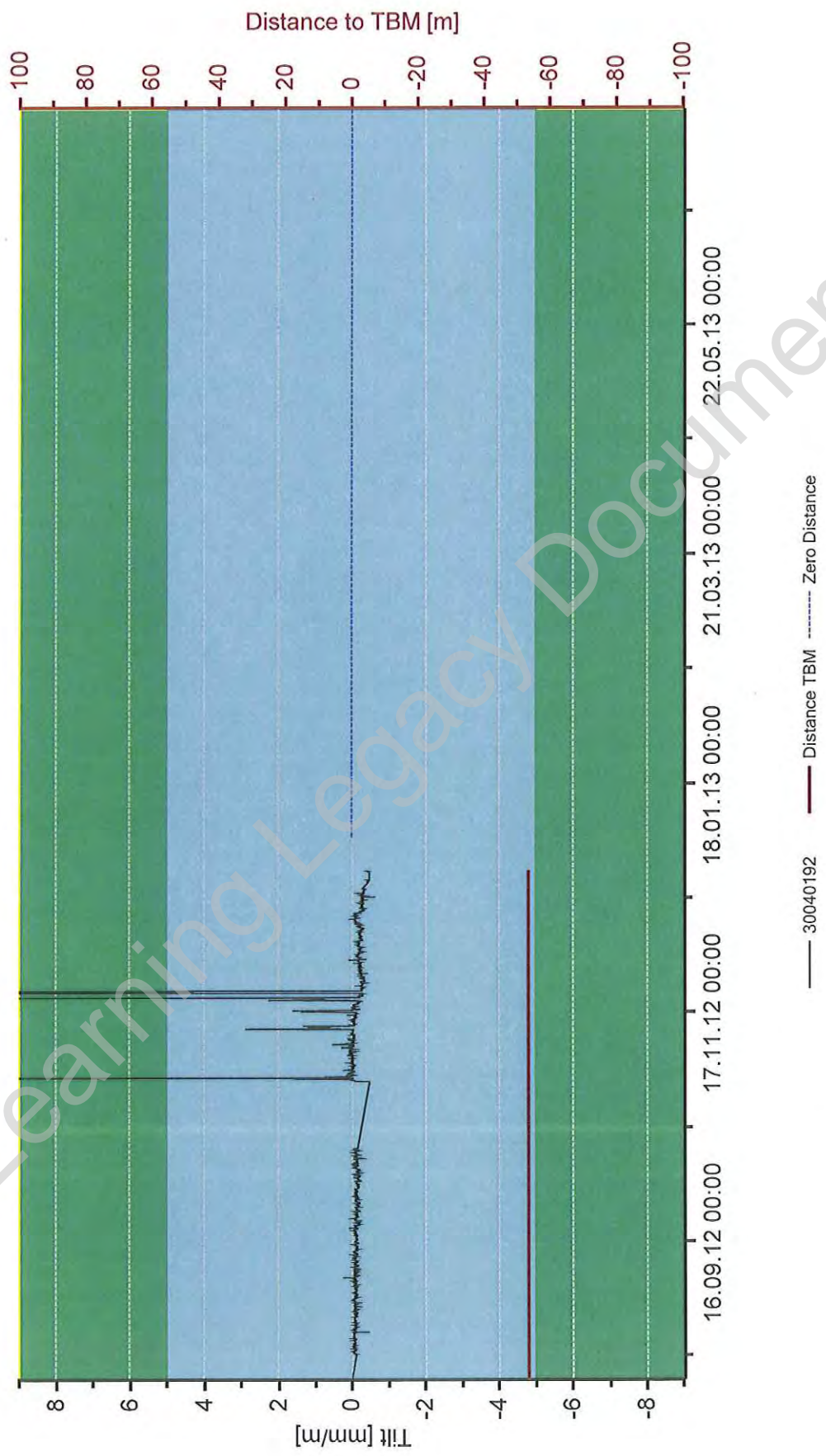
Point: 30040191



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - White Hard Road Bridge (TM) 09.08.2012 - 19.07.2013  
date: 30.06.2014 14:37 current values: 30.06.2014 14:34



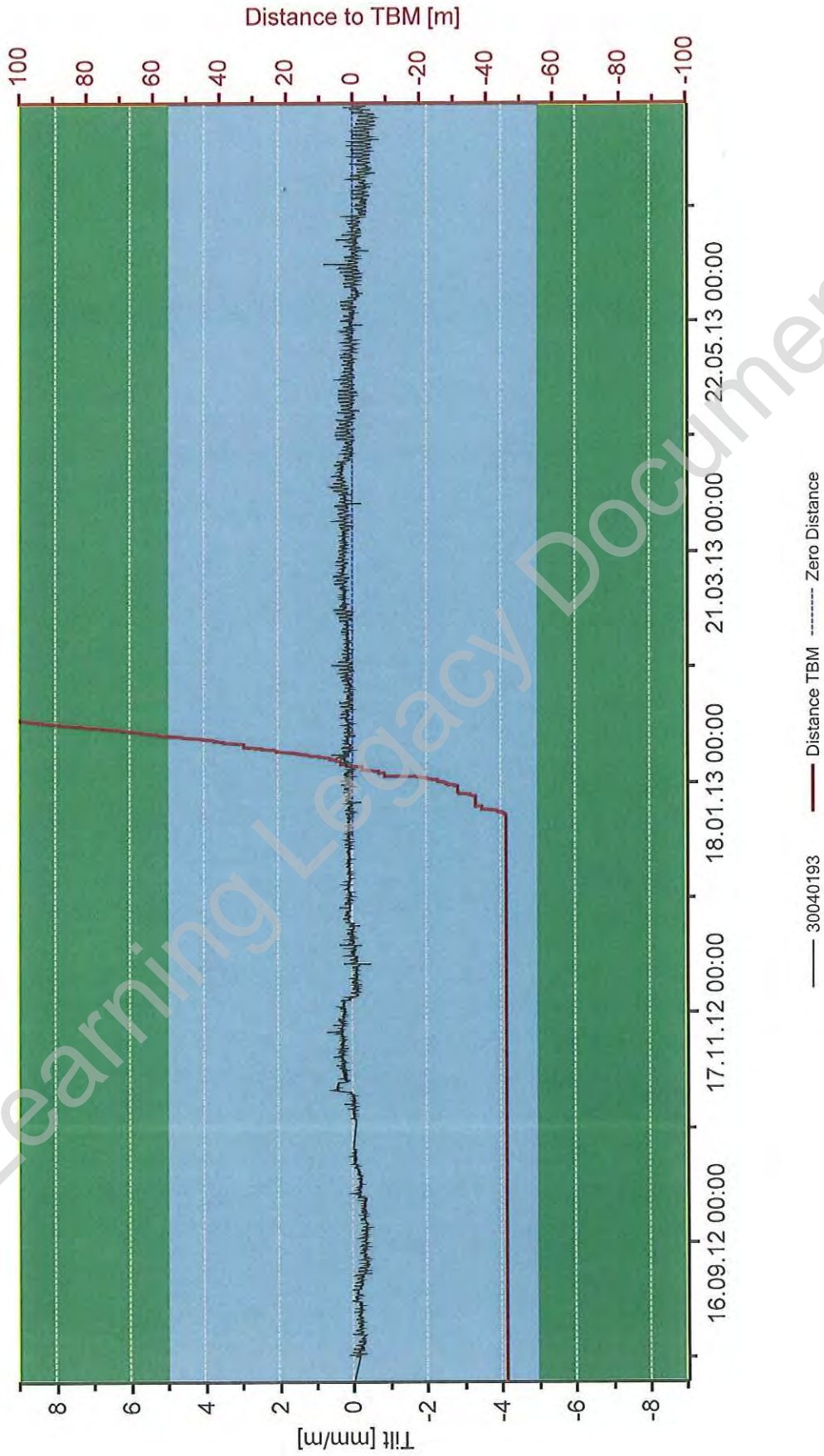
Point: 30040192



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - White Hard Road Bridge (TM) 09.08.2012 - 19.07.2013  
date: 30.06.2014 14:41 current values: 30.06.2014 14:34



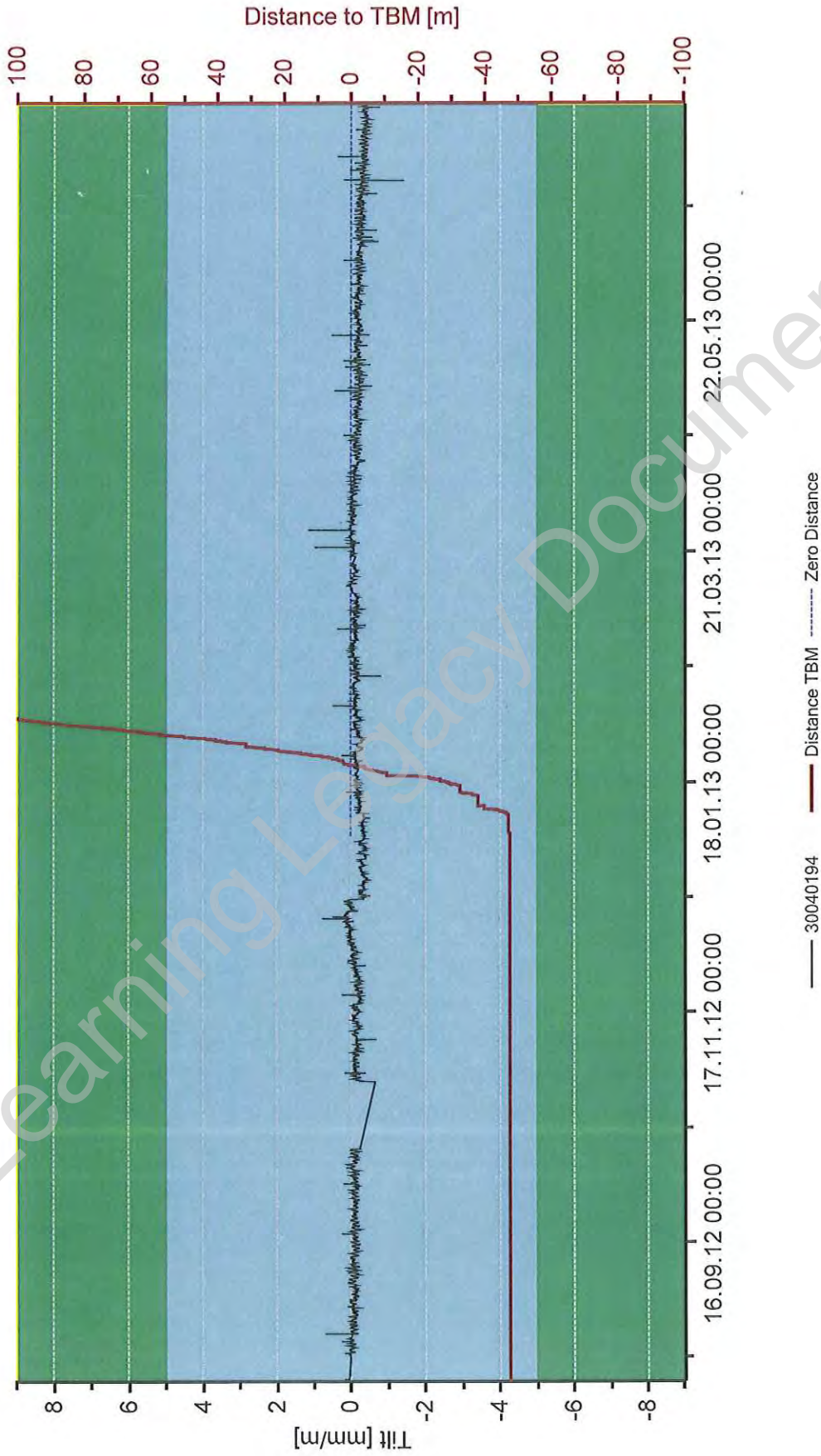
Point: 30040193



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - White Hard Road Bridge (TM) 09.08.2012 - 19.07.2013  
date: 29.06.2014 10:40 current values: 29.06.2014 10:33

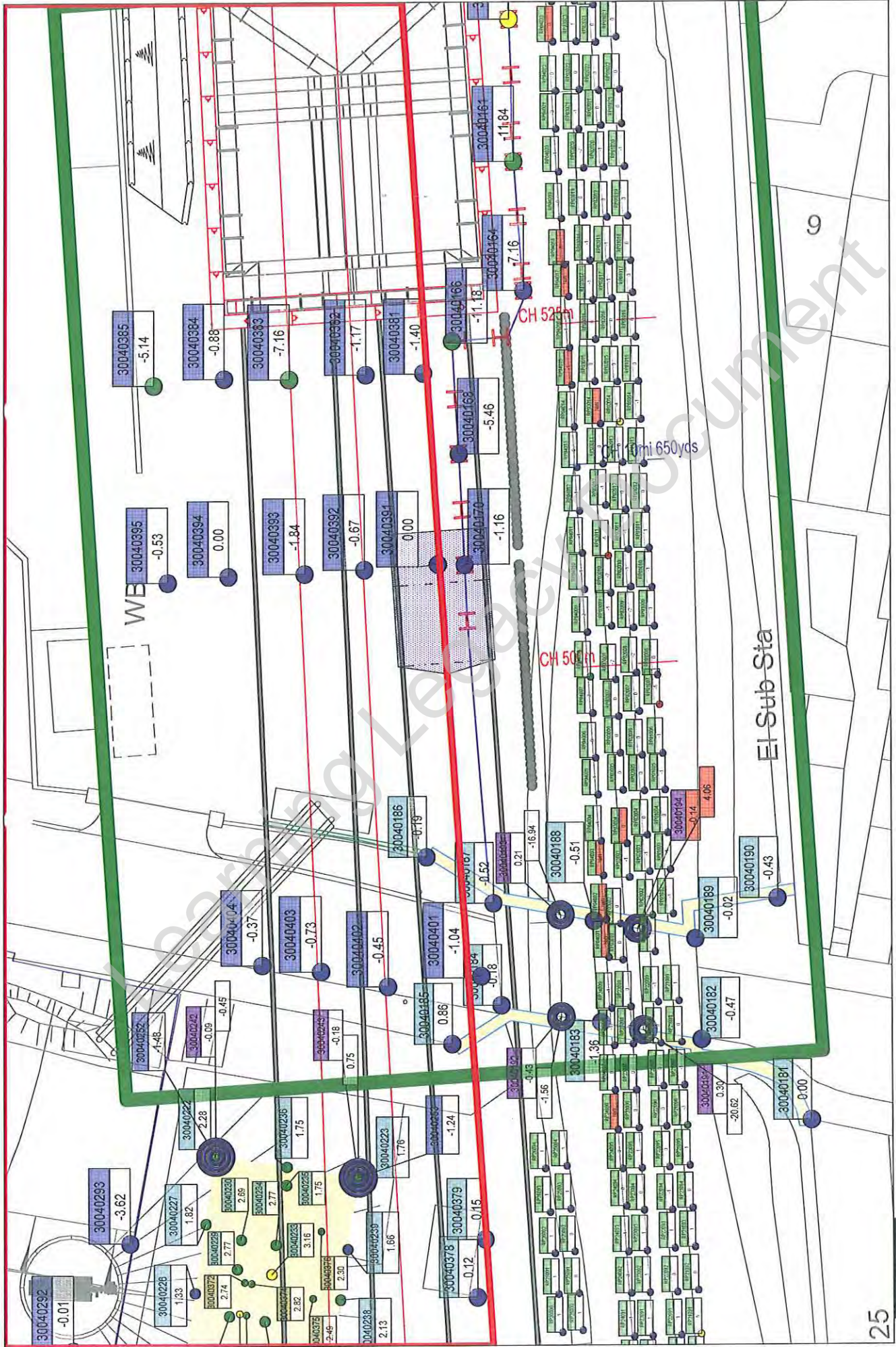


Point: 30040194



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - White Hard Road Bridge (TM) 09.08.2012 - 19.07.2013  
date: 30.06.2014 14:44 current values: 30.06.2014 14:39



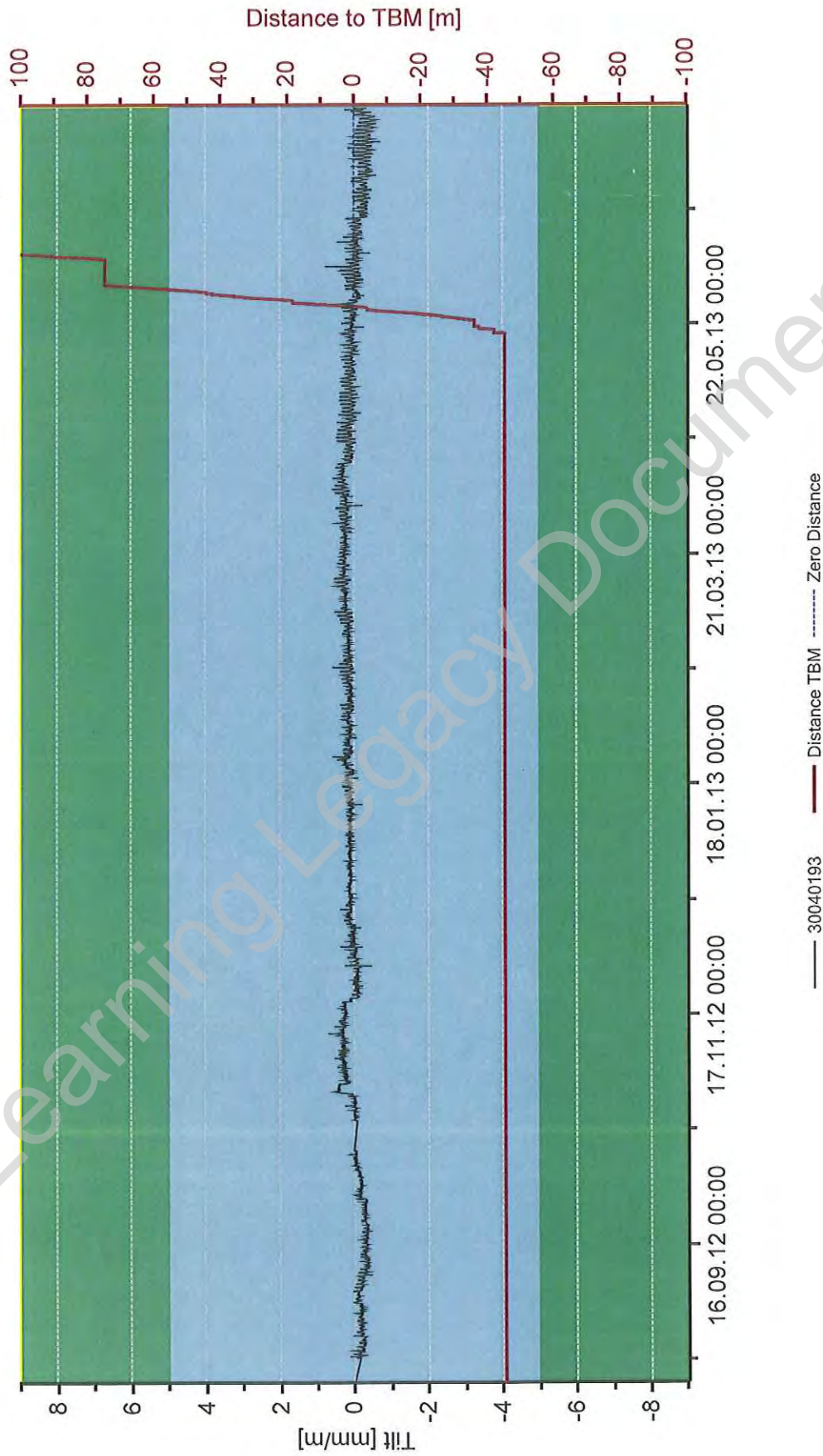




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 24.05.2013 09:00

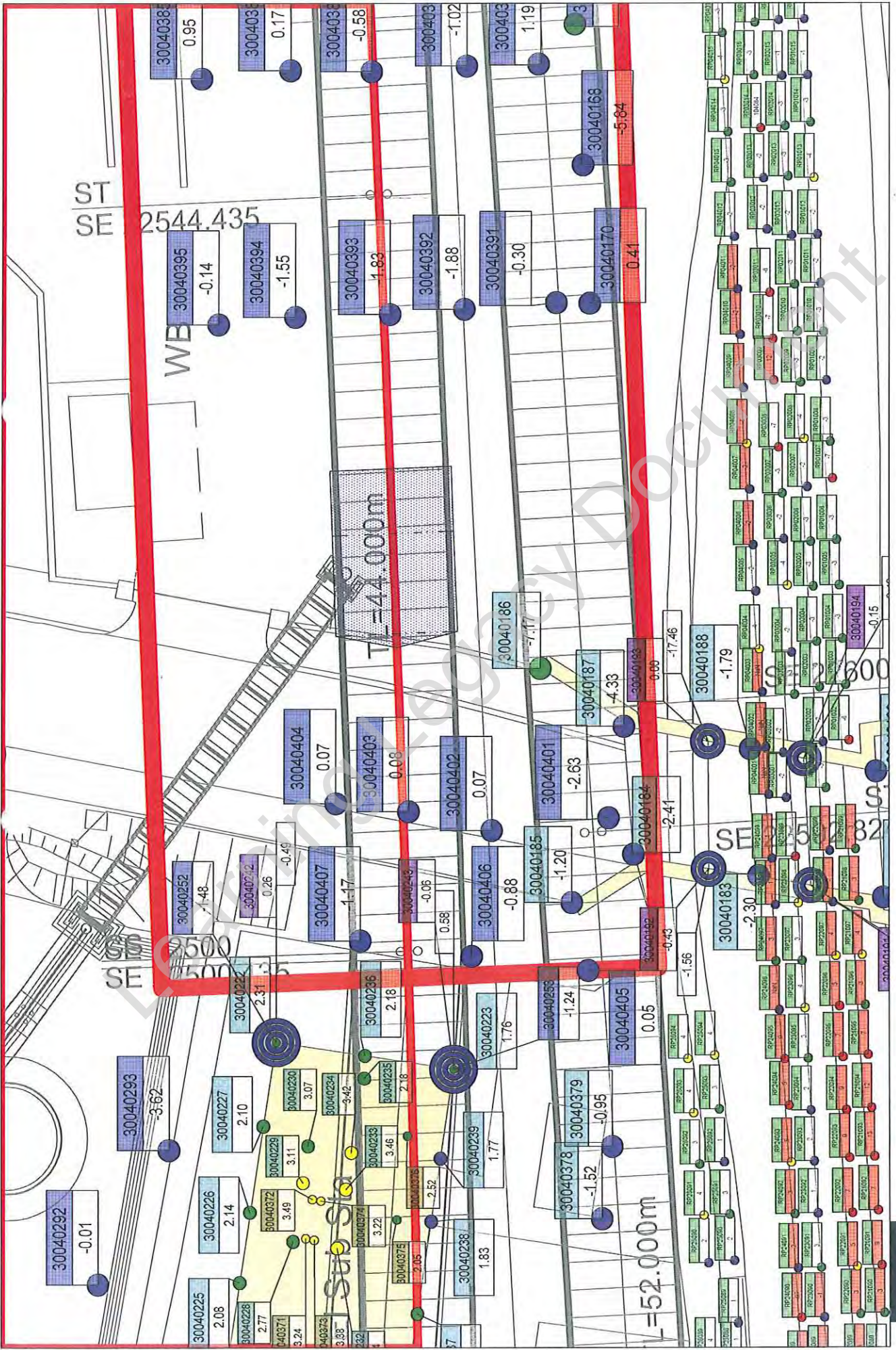


Point: 30040193



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - White Hard Road Bridge (TM) 09.08.2012 - 19.07.2013  
date: 30.06.2014 14:09 current values: 30.06.2014 13:54






Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
working activities: TBM drive  
current values: 25.05.2013 17:59



Joint Venture

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 08**  
**White Hard Road**

Learning Legacy Document

<b>monitoring asset</b>	<b>White Hart Road</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR148-PT005-50010		
<b>name of monitoring section:</b>	White Hart Road		
sensor type:	manual levelling studs		
chainage:	91760	point no.:	3004 0401- 3004 0407
<b>trigger values:</b> [mm]	green: +14 -14	amber: +17 -17	red: +21 -21
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments	
<b>baseline</b>	10/01/2013 21/01/2013	0.00			
<b>TBM 1</b>	start ZOI	18/01/13	-0.90	3004 0401	
	end ZOI	29/01/13	-2.11	3004 0401	breached not any trigger value
<b>TBM 2</b>	start ZOI	25/05/13	0.08	3004 0403	
	end ZOI	30/05/13	-4.48	3004 0403	breached not any trigger value
<b>longterm</b>	06/06/13	-4.66	3004 0403	last reading post tunneling, Cross section not longer measurable	
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	No residual risk since the Works have been completed by HMJV			
	<input type="checkbox"/>	Yes, residual risk (see comment below)			

**summary / comments**

Baseline reading for 3004 0401-0404 prior to TBM start on 10.01.2013  
 Baseline reading for 3004 0405-0407 on demand from CRL on 21.01.2013  
 Points 3004 0401-0404 digged out due to removal of ballasting the road.  
 No further Thames Water monitoring requirement on 381 and 457 sewer, due to the fact that sewers were renewed.

date / signature: 27/03/2015

print name:

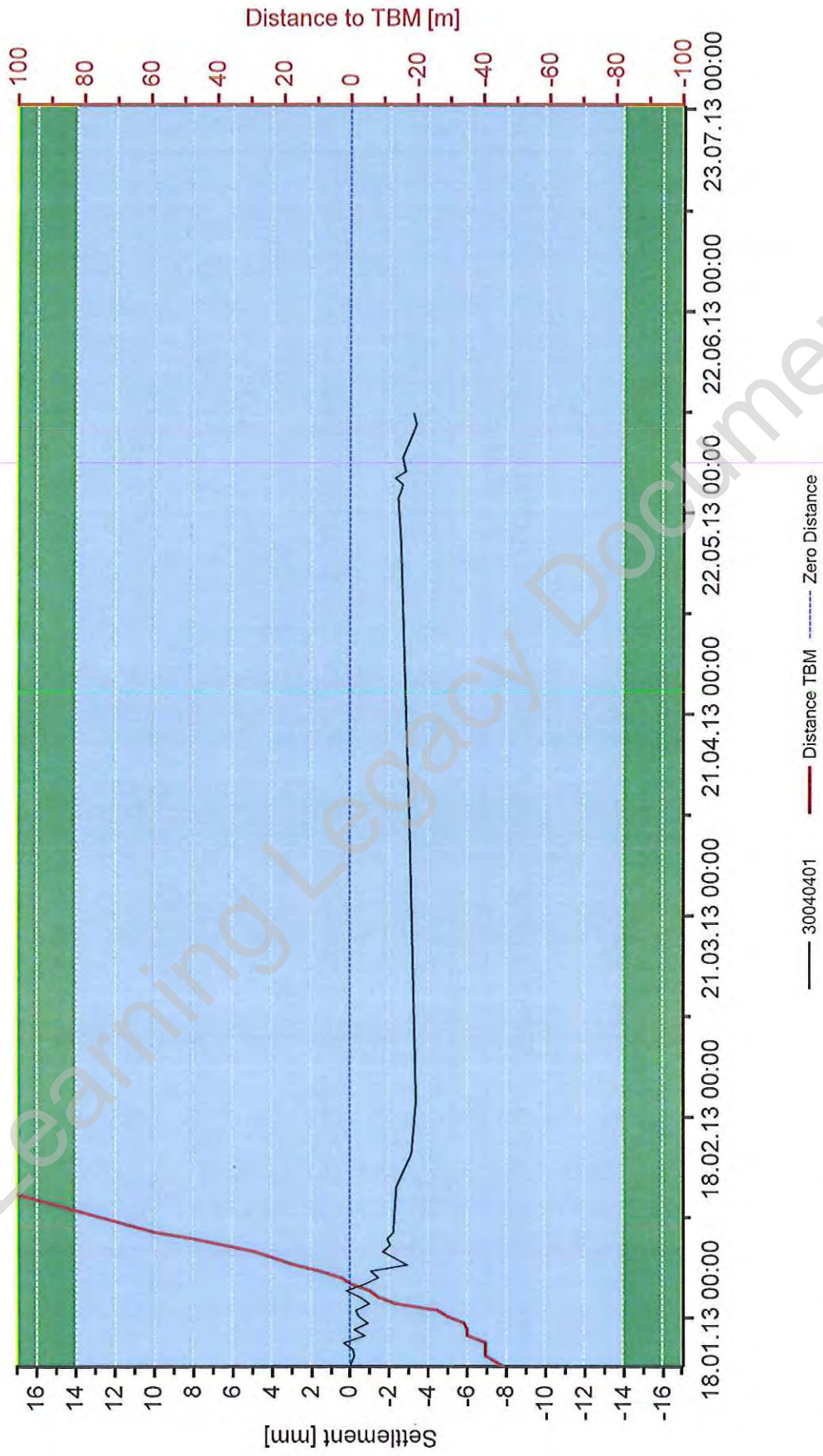
HMJV project role:

Monitoring & Survey engineer



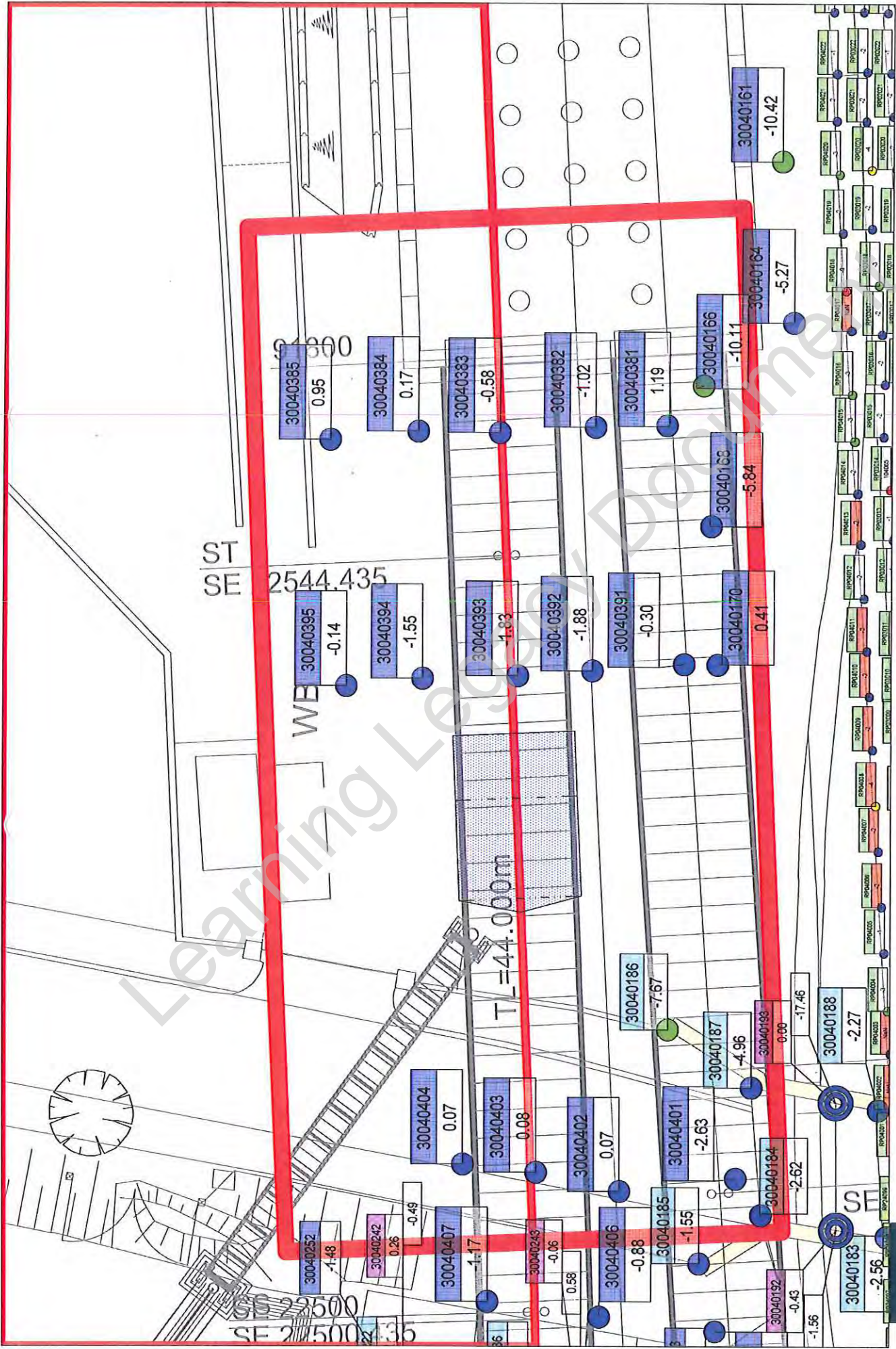
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 18.01.2013 09:59

Point: 30040401



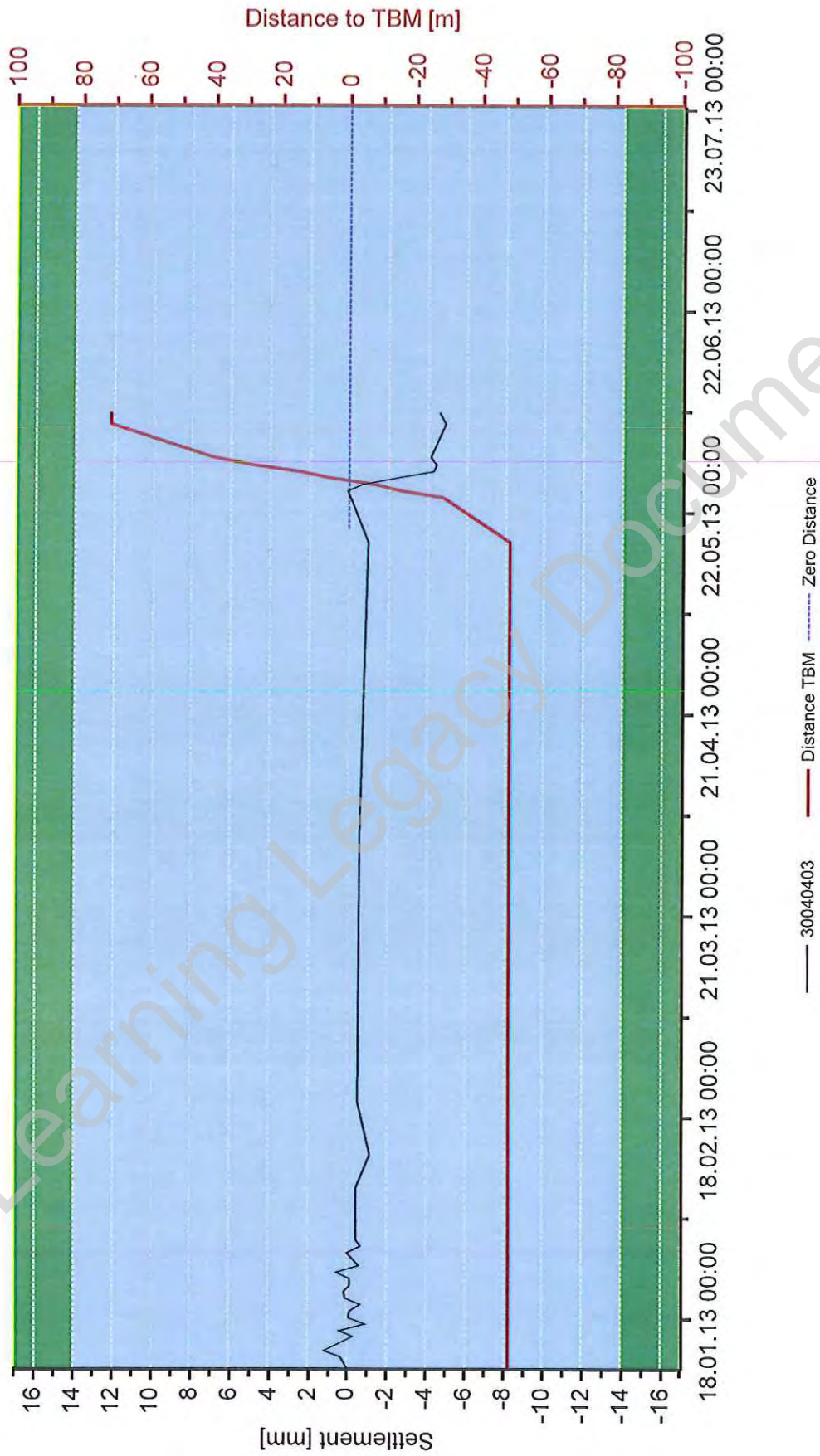
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - White Hard Road 10.01.2013 - 23.07.2013  
date: 20.06.2014 12:01 current values: 20.06.2014 11:51





**Project:** C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
**working activities:** TBM drive  
**current values:** 25.05.2013 09:00

Point: 30040403



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: EB Tunnel - White Hard Road 10.01.2013 - 23.07.2013

date: 20.06.2014 11:50 current values: 20.06.2014 11:44





project: C310 Thames Tunnel

Joint Venture

project: C310 Thames Tunnel

Joint Venture

No. of reading	structure: Cross Section WHR - levelling pins																										
	1. following		2. following		3. following		4. following		5. following		6. following		7. following		8. following		9. following		10. following		11. following		12. following				
date	baseline	12/01/2013	13/01/2013	14/01/2013	15/01/2013	16/01/2013	17/01/2013	18/01/2013	19/01/2013	20/01/2013	21/01/2013	22/01/2013	23/01/2013	24/01/2013	25/01/2013	26/01/2013	27/01/2013	28/01/2013	29/01/2013	30/01/2013	31/01/2013	01/02/2013	02/02/2013	03/02/2013			
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline		
3004 0401	103.382	103.382	0	103.382	0	103.382	-1	103.381	-1	103.382	1	103.382	-1	103.382	0	103.382	0	103.381	-1	103.382	0	103.382	0	103.381	-1	103.381	-1
3004 0402	103.586	103.586	0	103.586	0	103.586	-1	103.586	-1	103.586	1	103.586	0	103.586	0	103.586	0	103.586	0	103.586	0	103.586	0	103.586	0	103.586	-1
3004 0403	103.475	103.475	0	103.477	1	103.476	-1	103.475	-1	103.476	1	103.474	-1	103.475	0	103.475	0	103.475	-1	103.475	1	103.475	1	103.475	0	103.475	0
3004 0404	103.560	103.560	0	103.560	0	103.561	0	103.561	-1	103.561	1	103.561	-1	103.560	0	103.560	0	103.560	0	103.560	0	103.560	1	103.560	0	103.560	-1
3004 0405	103.349																										
3004 0406	102.882																										
3004 0407	102.534																										

Legacy Document

project: C310 Thames Tunnel

Joint Venture

project: C310 Thames Tunnel

Joint Venture

No. of reading	13. following		14. following		15. following		16. following		17. following		18. following		19. following		20. following		21. following		22. following		23. following		24. following				
	baseline	24/01/2013	29/01/2013	27/01/2013	29/01/2013	29/01/2013	29/01/2013	29/01/2013	29/01/2013	29/01/2013	29/01/2013	29/01/2013	29/01/2013	30/01/2013	31/01/2013	31/01/2013	07/02/2013	12/02/2013	12/02/2013	20/02/2013	20/02/2013	20/02/2013	02/04/2013				
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline			
3004 0401	103.382	103.381	-1	103.381	0	-1	103.381	2	-1	103.380	0	-2	103.380	0	-2	103.380	0	-2	103.379	-1	-3	103.379	0	-3	103.379	0	-3
3004 0402	103.586	103.586	0	103.587	1	1	103.587	1	1	103.587	0	0	103.586	-1	0	103.586	-1	0	103.585	-1	-1	103.586	1	0	103.586	0	0
3004 0403	103.475	103.475	0	103.476	1	1	103.476	1	0	103.475	0	-1	103.475	-1	0	103.475	0	0	103.474	-1	-1	103.475	1	-1	103.475	0	-1
3004 0404	103.560	103.560	0	103.561	1	1	103.561	1	1	103.560	-1	0	103.560	0	0	103.560	0	0	103.559	-1	-1	103.558	-1	-1	103.560	1	0
3004 0405	103.949	103.949	0	103.949	0	0	103.949	0	0	103.951	2	2	103.949	-2	0	103.949	3	0	103.947	-1	-2	103.948	0	-1	103.949	1	0
3004 0406	102.882	102.880	-2	102.880	1	-2	102.882	3	0	102.883	1	1	102.882	-1	0	102.879	-3	-3	102.880	-2	-2	102.881	1	-1	102.881	-1	-1
3004 0407	102.534	102.531	-3	102.531	0	-3	102.533	2	1	102.535	0	1	102.533	-2	-1	102.534	1	0	102.533	-2	-1	102.534	1	0	102.533	-1	-1

Legacy Document


project: C310 Thames Tunnel

project: C310 Thames Tunnel

Joint Venture

No. of reading	25. following		26. following		27. following		28. following		29. following		30. following		31. following		32. following		33. following		34. following		35. following		36. following		
	baseline	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
	10/1/2013	17/05/2013	103.382	0	103.379	-0.1	103.379	0	103.380	0	103.379	-1	103.379	0	103.379	0	103.379	-1	103.379	0	103.379	0	103.379	0	103.379
	21/01/2013	24/05/2013	103.586	0	103.586	0.3	103.586	-1	103.585	-1	103.583	-2	103.583	0	103.584	1	103.583	-1	103.583	0	103.583	0	103.583	0	103.583
3004 0401			103.475	0	103.475	0.1	103.475	-1	103.473	-2	103.471	-2	103.471	0	103.471	0	103.470	-1	103.470	0	103.471	0	103.471	0	103.471
3004 0402			103.560	0	103.560	-0.4	103.560	0	103.559	-1	103.558	-1	103.558	1	103.558	-1	103.557	-1	103.557	0	103.558	1	103.558	1	103.558
3004 0403			103.949	0	103.949	-0.2	103.949	0	103.949	0	103.948	-1	103.949	0	103.948	-1	103.947	-1	103.947	0	103.947	1	103.947	1	103.946
3004 0405			102.882	0	102.881	-0.2	102.882	1	102.883	1	102.881	-2	102.879	-2	102.879	0	102.879	0	102.879	0	102.878	0	102.880	2	102.880
3004 0407			102.534	-1	102.533	0.0	102.533	0	102.532	0	102.531	-1	102.532	-2	102.530	-4	102.531	-1	102.530	0	102.530	0	102.532	2	102.531

Legacy Document

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 09**

**Cathedral Substation – HLC**

Learning Legacy Document

<b>monitoring asset</b>	<b>Cathedral Substation</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR148-PT005-50010		
<b>name of monitoring section:</b>	Cathedral Substation		
sensor type:	Hydrostatic Levelling Cell		
chainage:	91730	point no.:	3004 0221 - 3004 0239 3004 0371 - 3004 0376 3004 0378 - 3004 0379
<b>trigger values:</b> [mm]	green: see MPCGM App. Z	amber: see MPCGM app. Z	red: see MPCGM App. Z
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	Y, Z		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	29/08/2012	0		The Reference point for the HLC system is 3004 0181
	23/11/2012	0		
	14/01/2013	0		
<b>TBM 1</b>	start ZOI	20/01/13 25/01/13	1.82 2.74	3004 0236 3004 0231
	end ZOI	31/01/13 01/02/13	1.89 2.69	3004 0236 3004 0231
<b>TBM 2</b>	start ZOI	26/05/13 28/05/13	1.50 2.20	3004 0236 3004 0231
	end ZOI	31/05/13 03/06/13	1.83 2.27	3004 0236 3004 0231
<b>longterm</b>	13/09/13	1.82	3004 0236	last reading post tunneling, sensors not any longer working
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV		
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)		

**summary / comments**

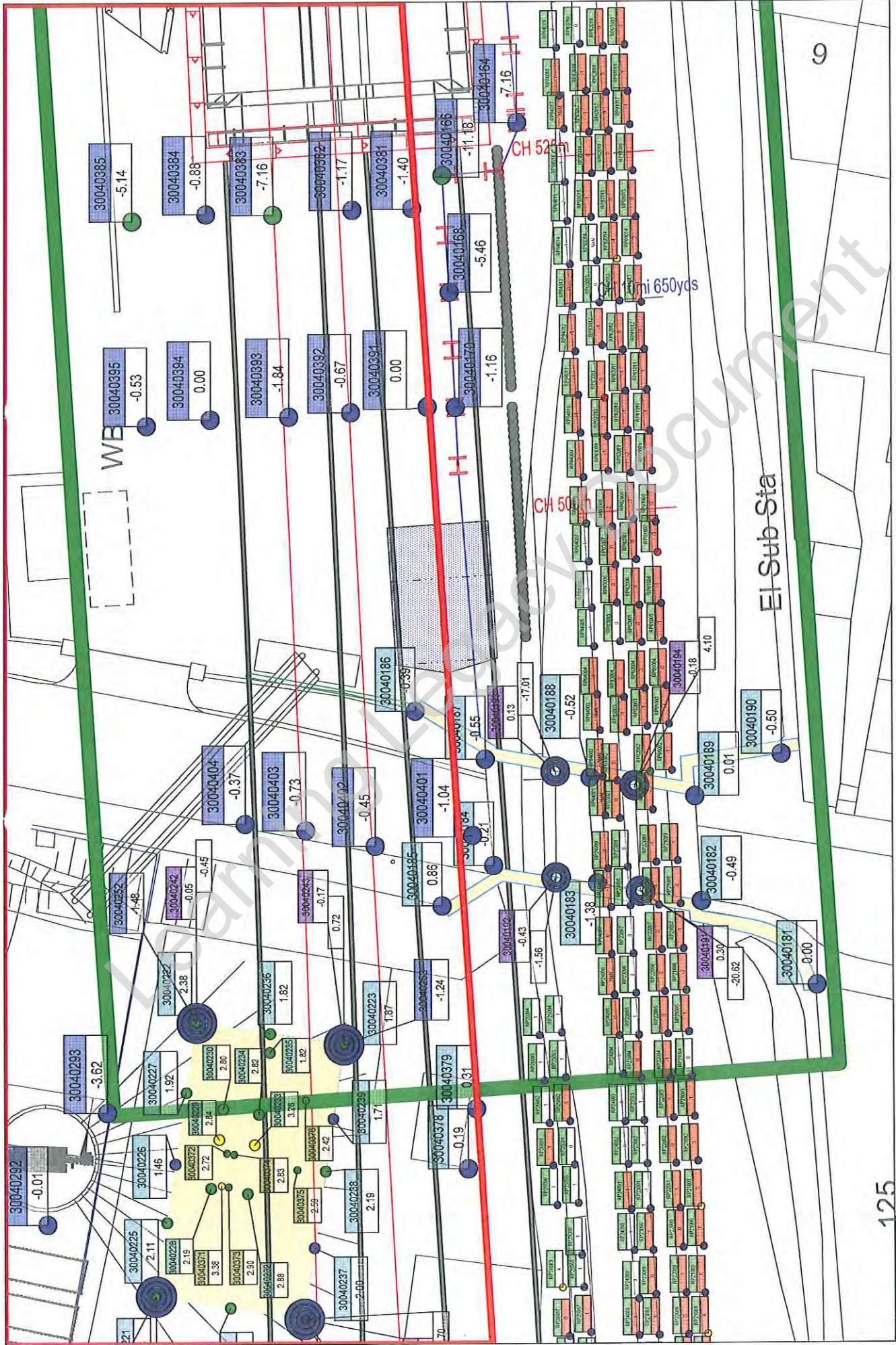
A special trigger value table was created to allow a max. movement (heave / settlement) of each point.  
 As a result of TAM drillings and pre-grouting, from app. 15.10.-18.12.2012, the entire building was lifted up by app. 3-4mm, to compensate the max. of 2mm predicted settlement.  
 The summary of the grouting operation is report ref. C310-HTM-C-RGN-CR146\_ST004-50020  
 To allow a handback of the asset to NR, all monitoring equipment had to be removed.  
 Under consideration of temperature differences, and the achievable accuracy of the system, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings up to the time when the instrumentations have been decommissioned.

date / signature: 12/01/15

print name:

HMJV project role:

Monitoring & Survey engineer

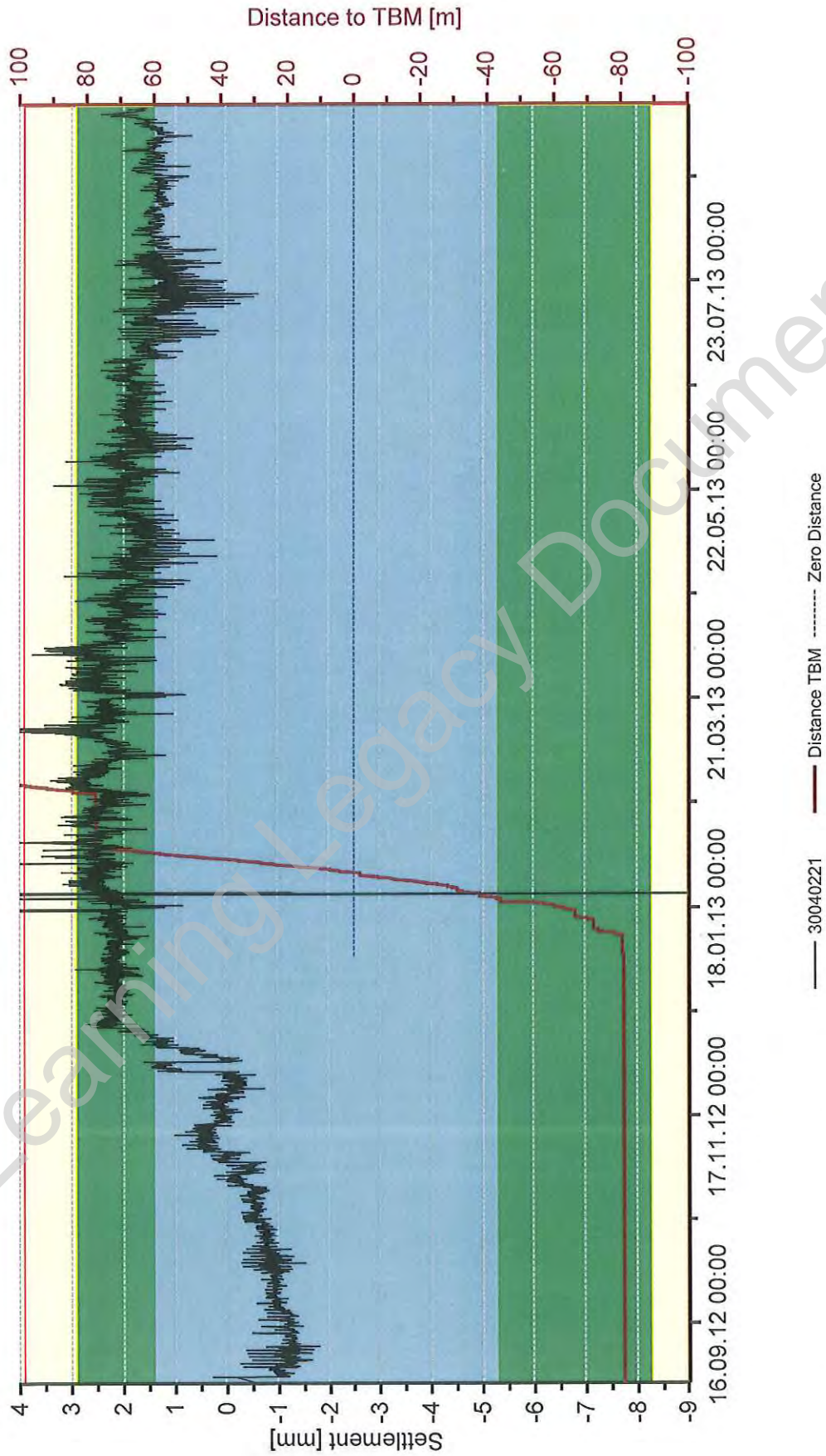


125

Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 20.01.2013 18:47



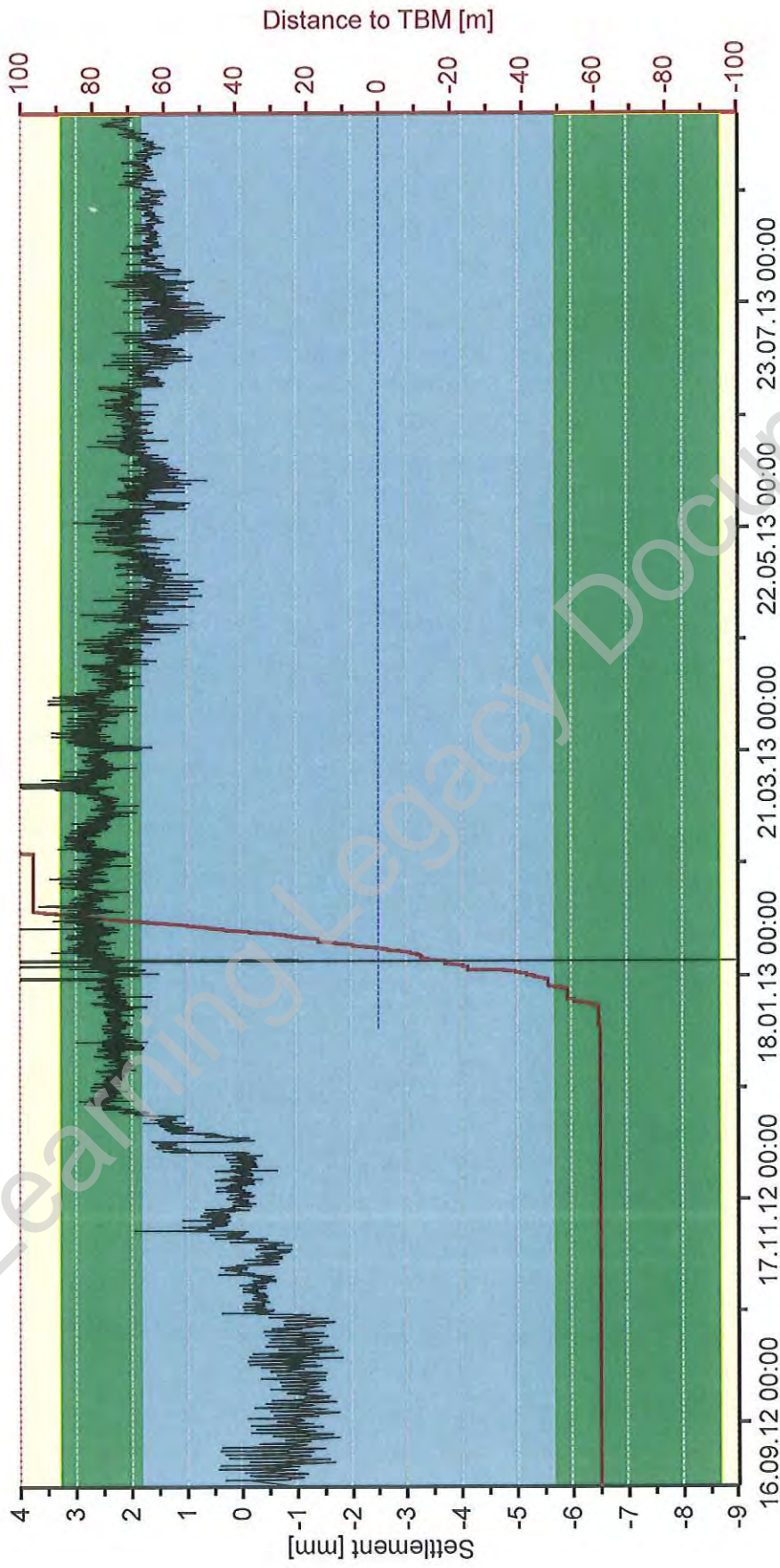
Point: 30040221



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 13:41 current values: 01.07.2014 13:34



Point: 30040222

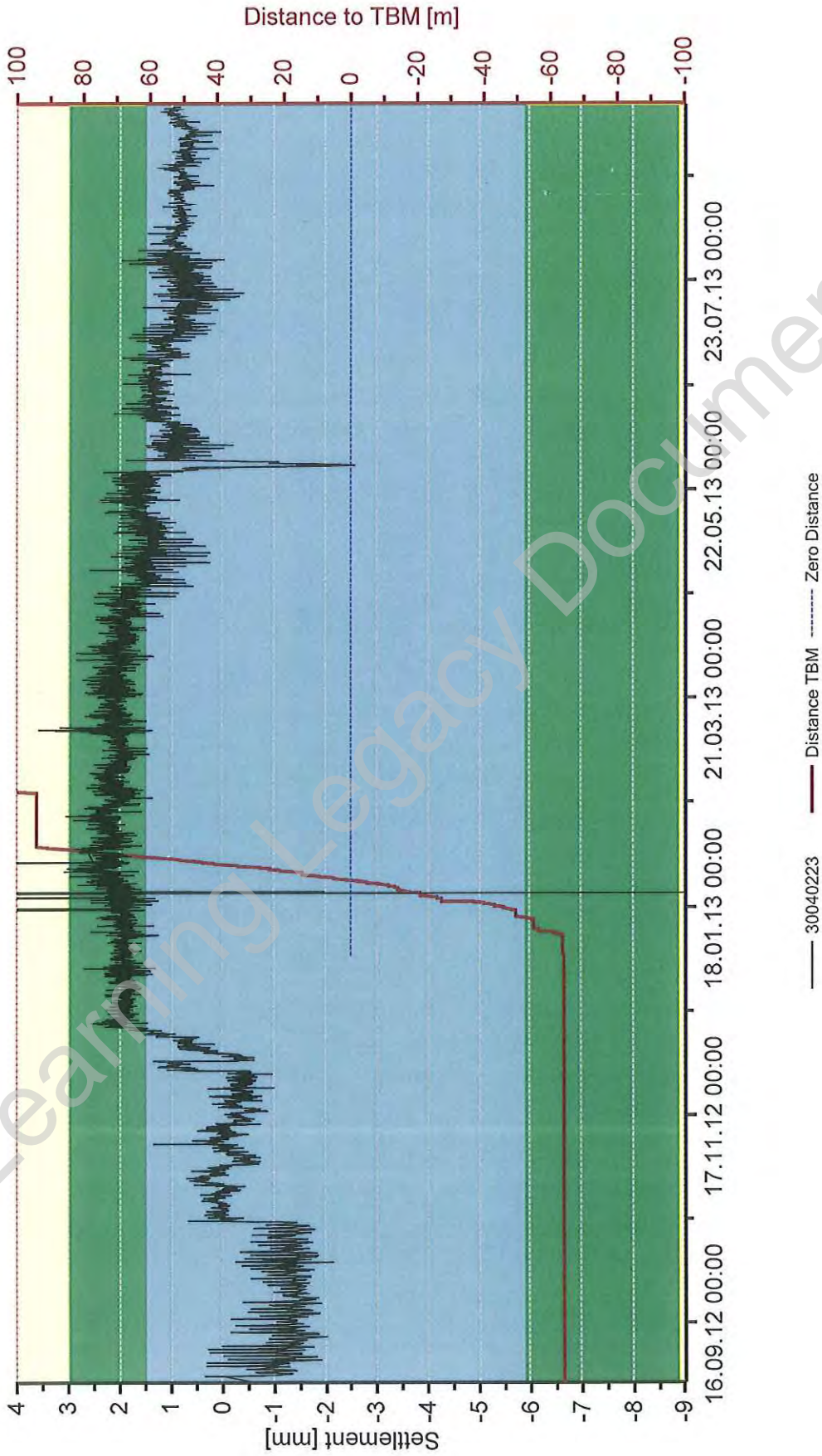


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 13:45 current values: 01.07.2014 13:34





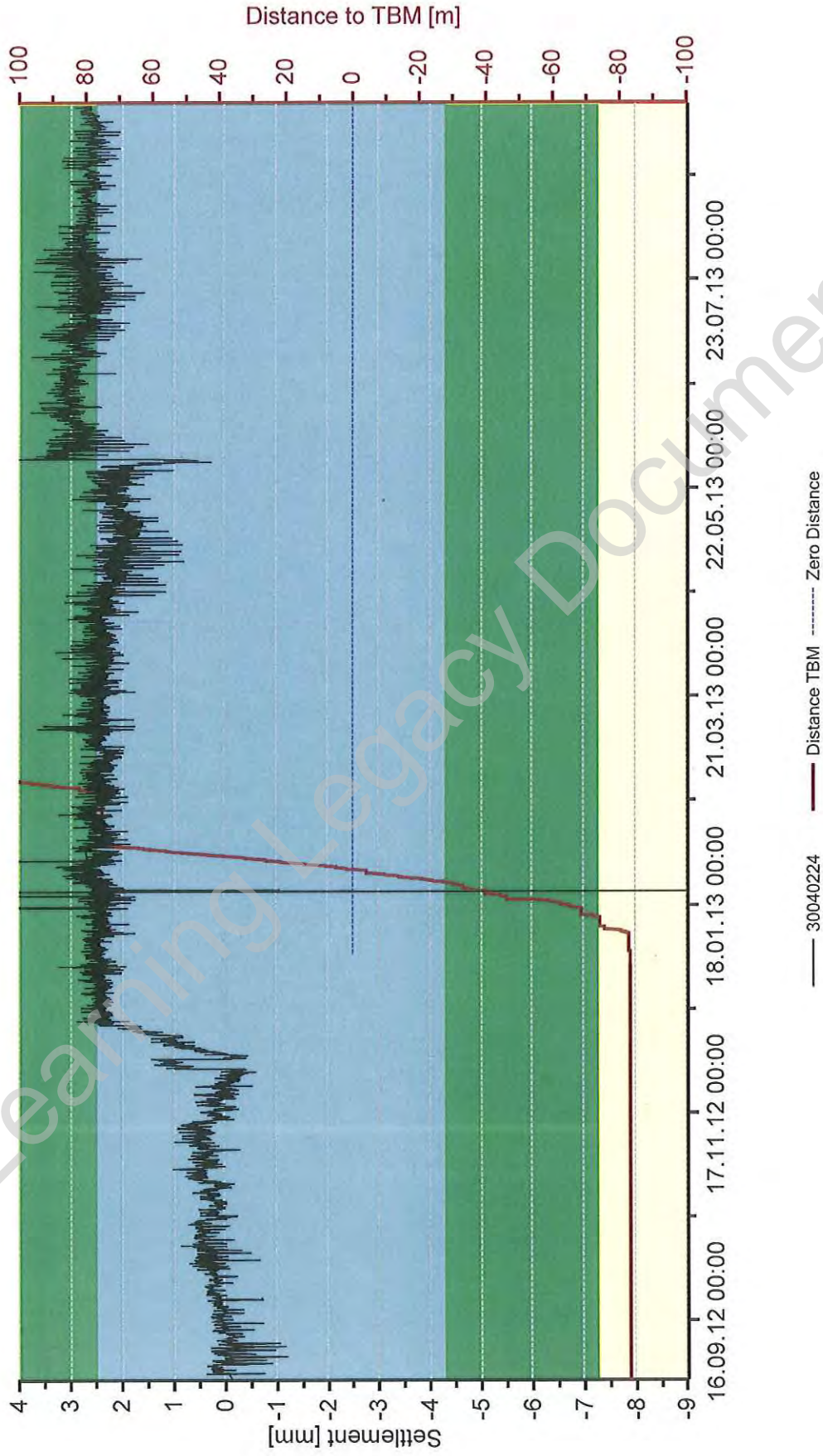
Point: 30040223



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 13:48 current values: 01.07.2014 13:43



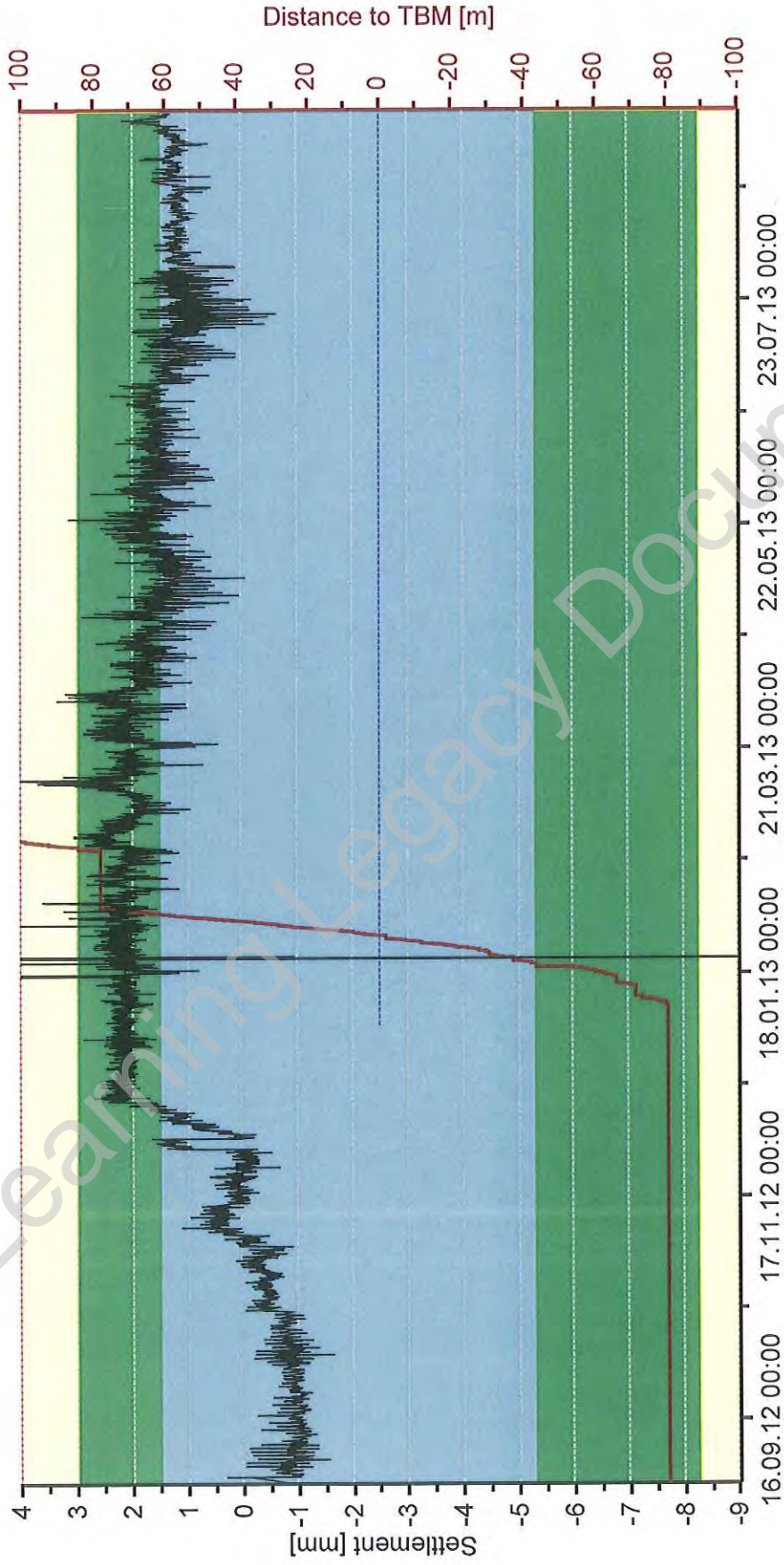
Point: 30040224



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 13:52 current values: 01.07.2014 13:43



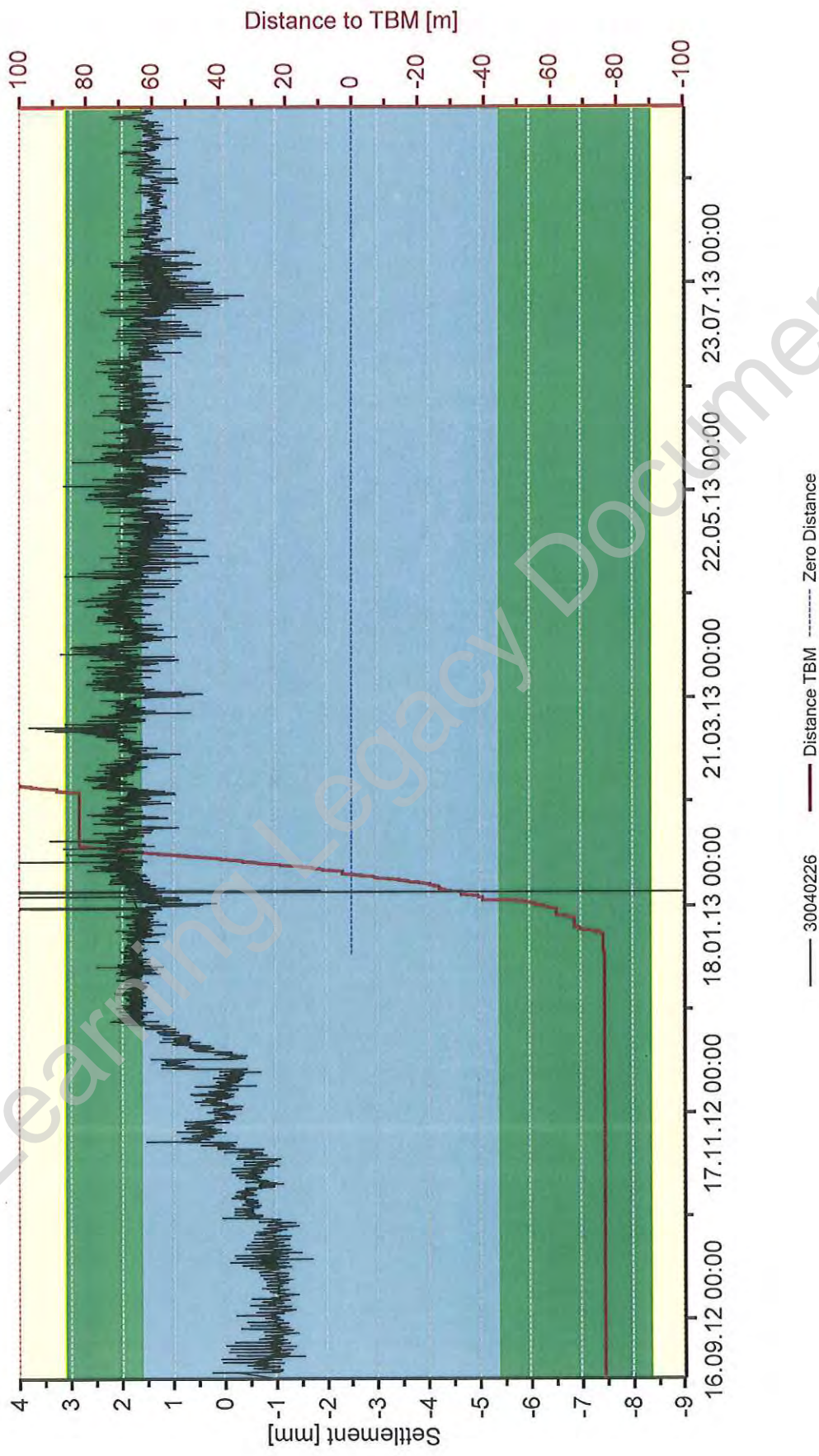
Point: 30040225



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 14:04 current values: 01.07.2014 13:58



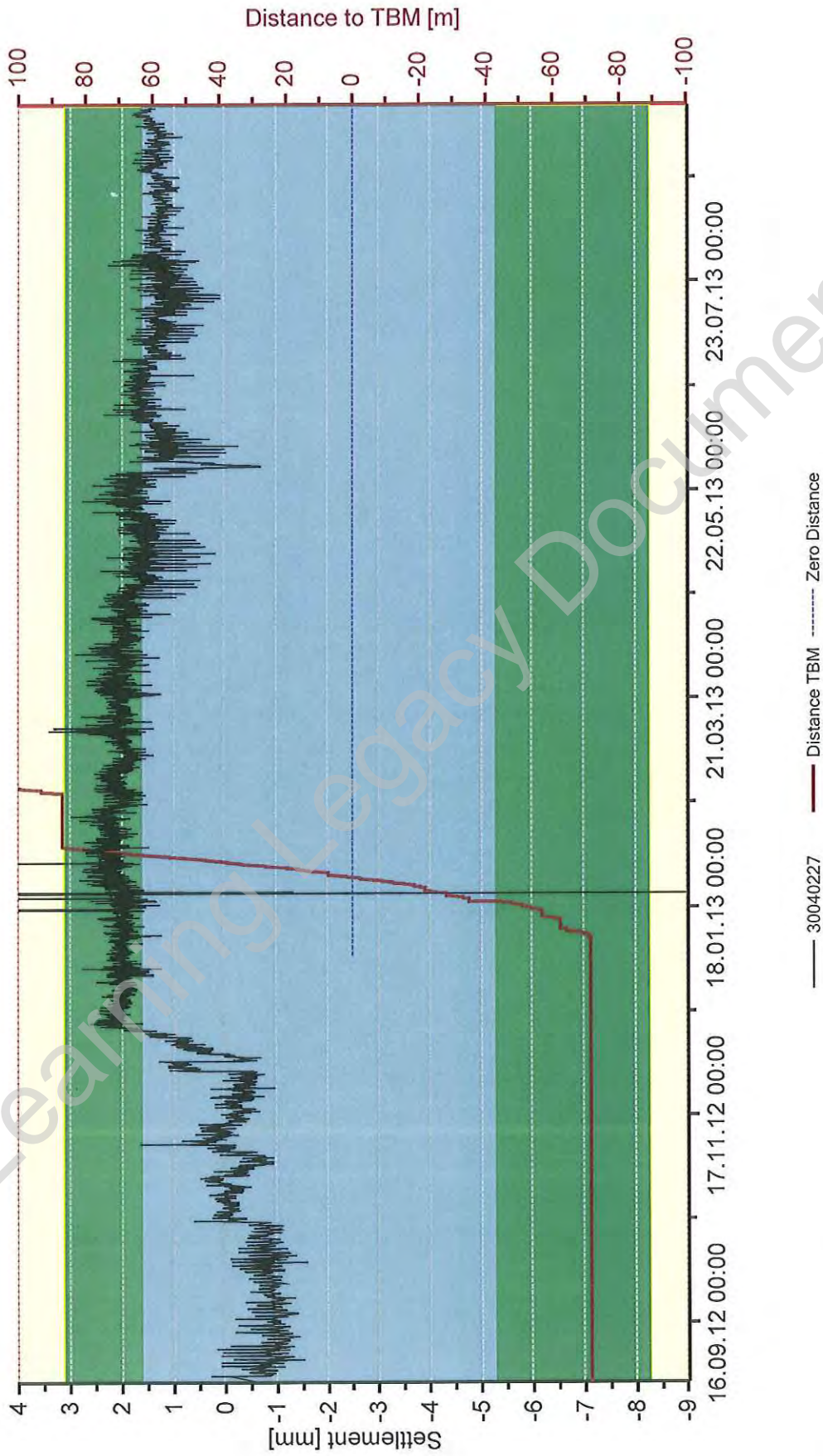
Point: 30040226



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 14:06 current values: 01.07.2014 13:58



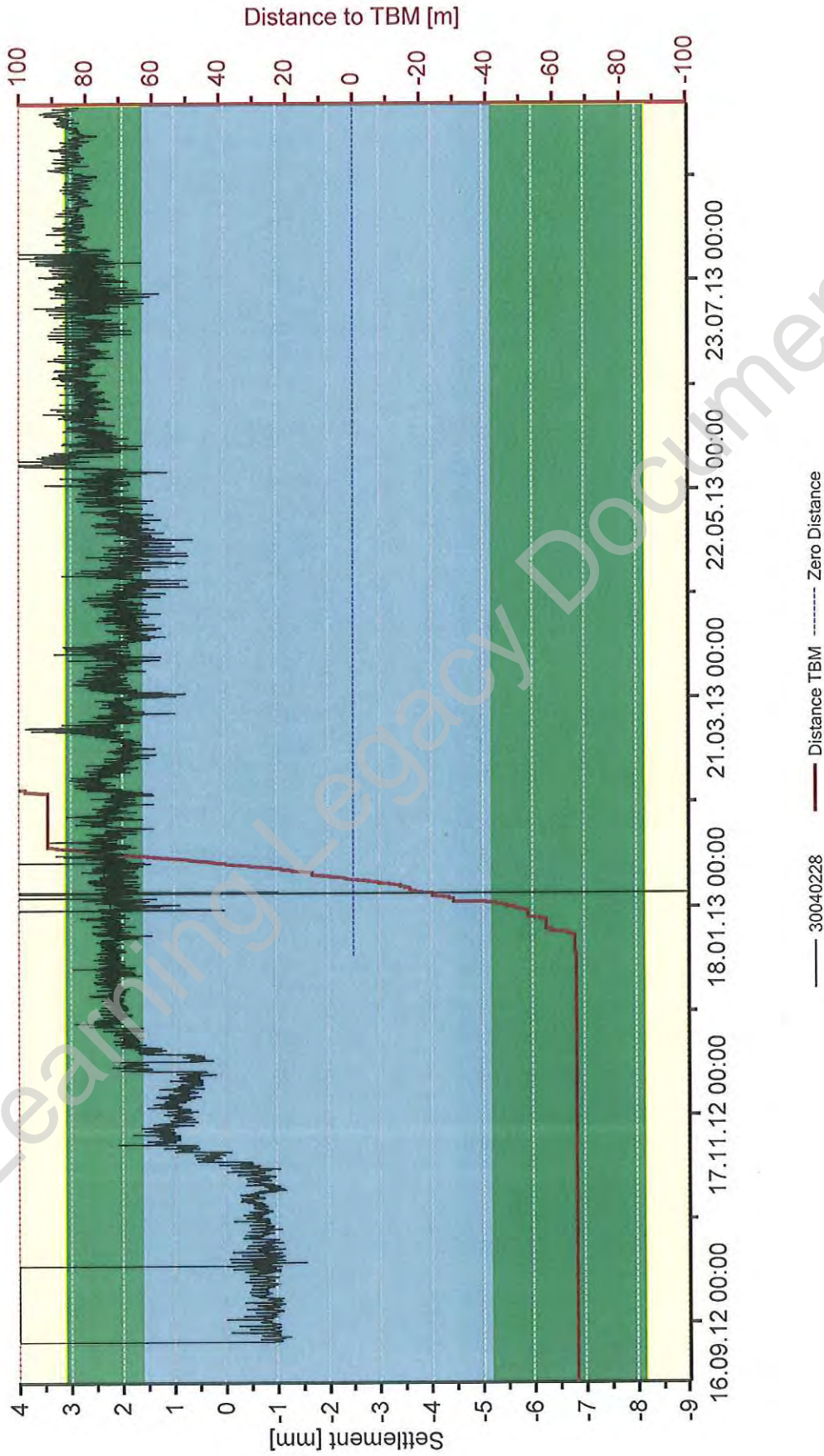
Point: 30040227



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 14:09 current values: 01.07.2014 14:03



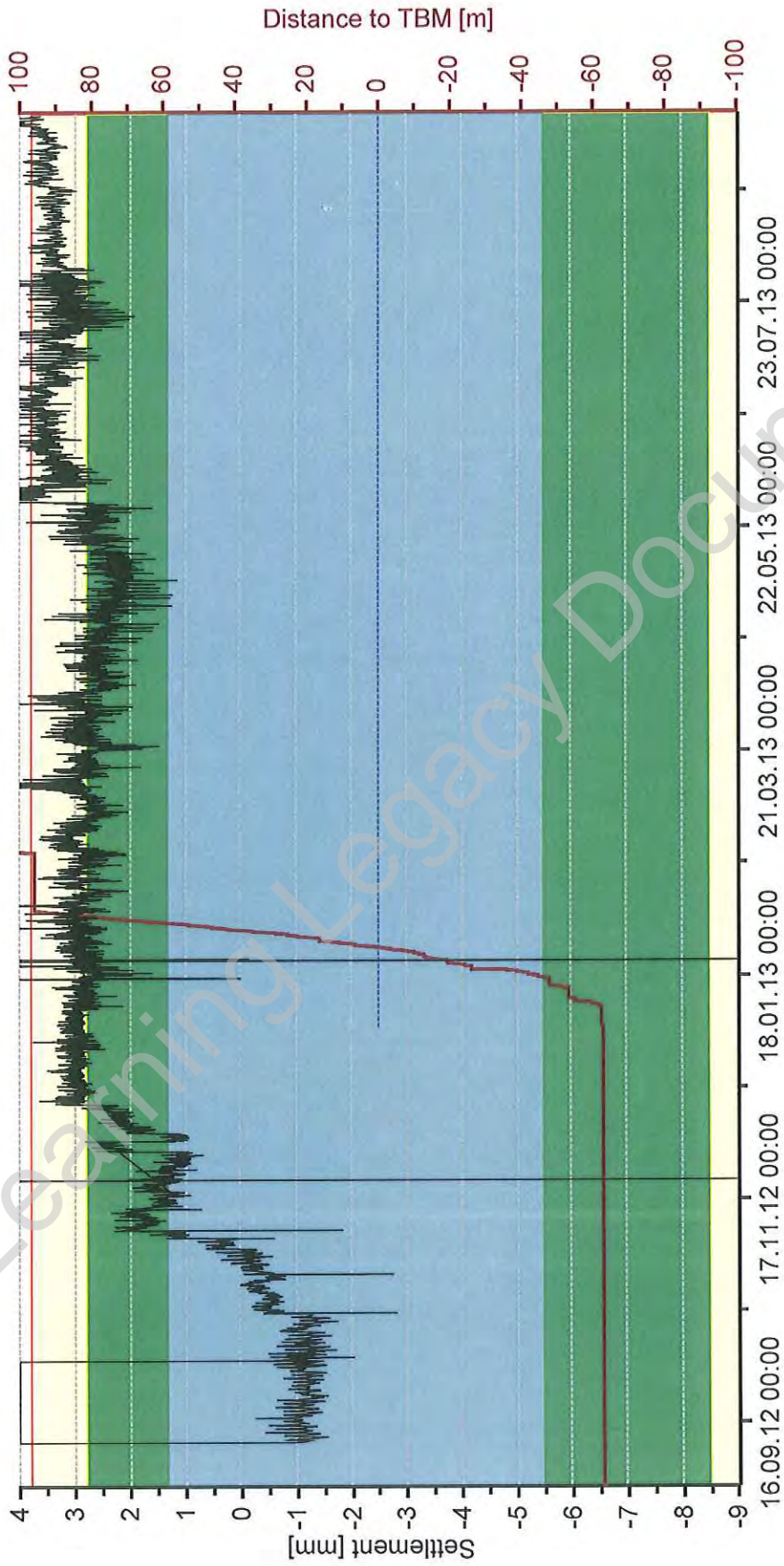
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Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 14:12 current values: 01.07.2014 14:03



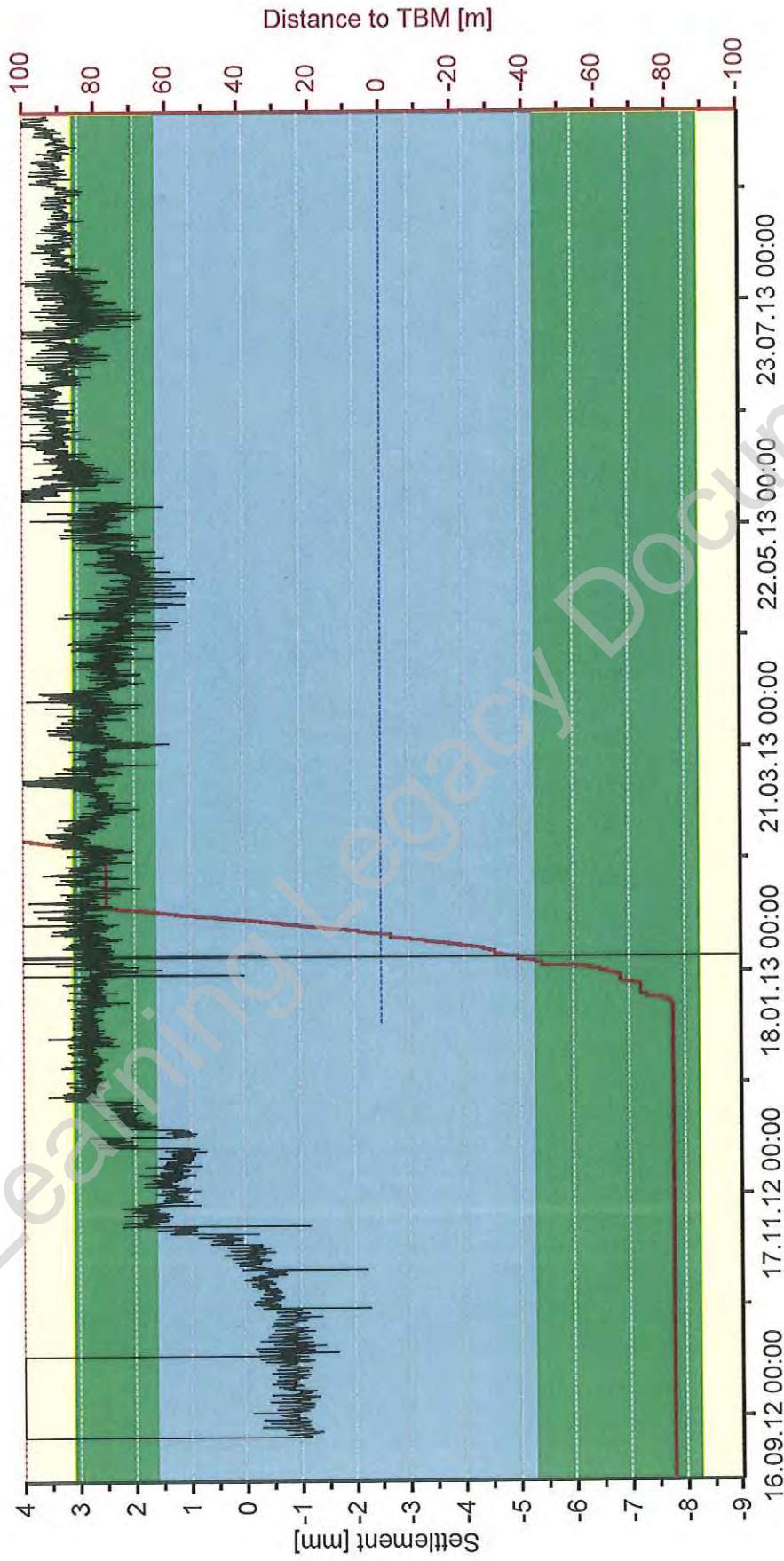
Point: 30040229



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 14:16 current values: 01.07.2014 14:03



Point: 30040230

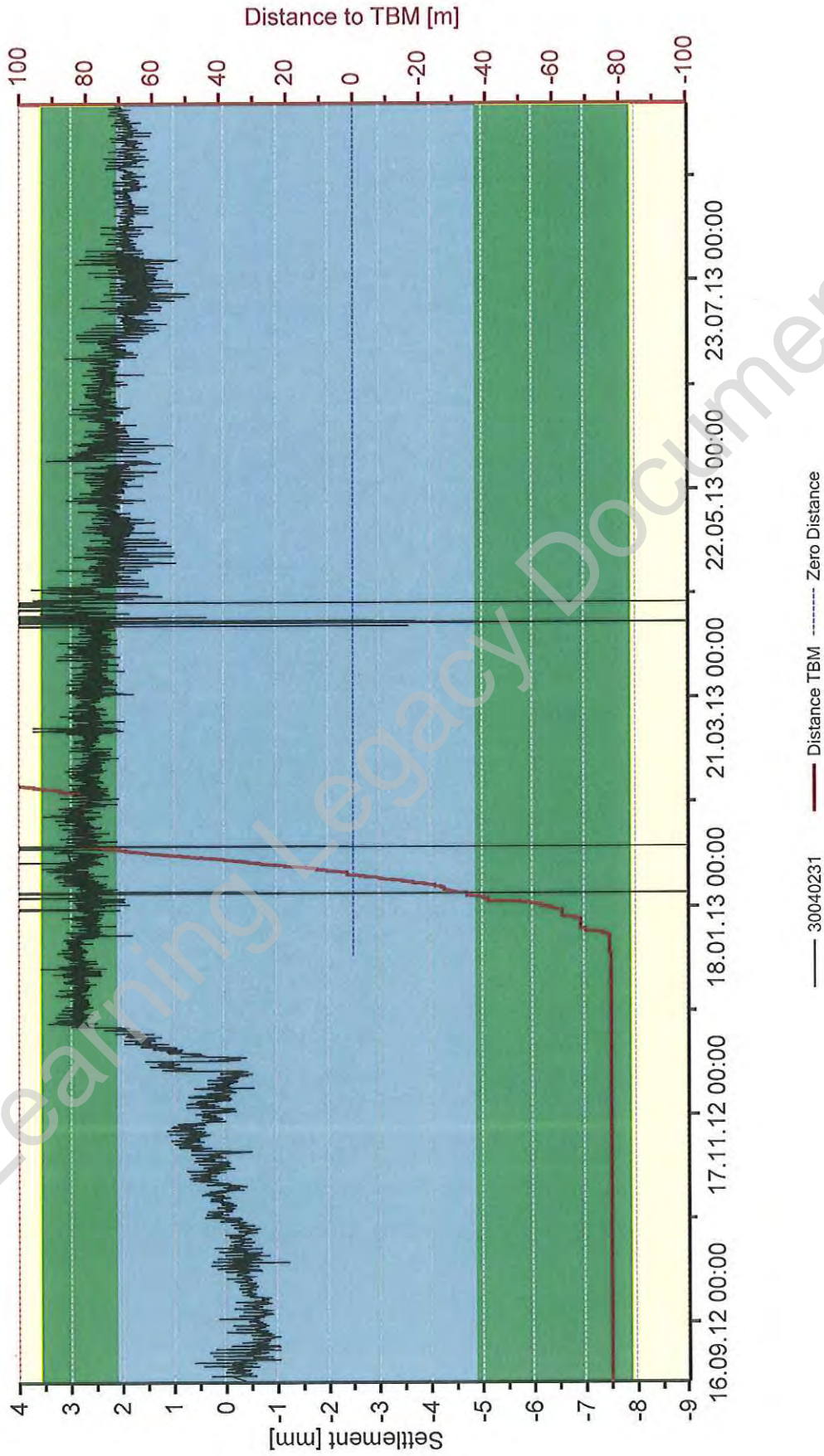


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 14:20 current values: 01.07.2014 14:13





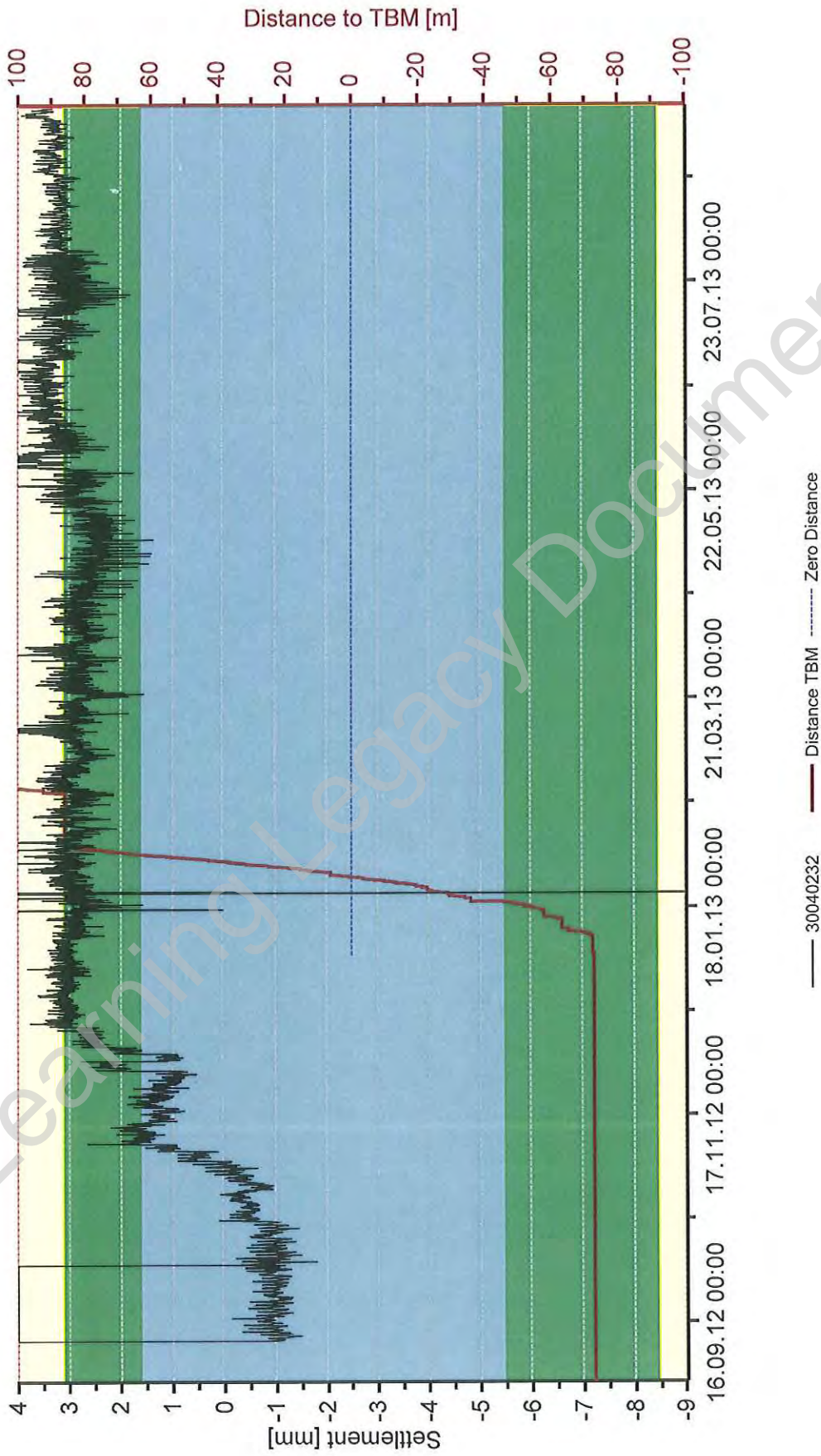
Point: 30040231



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 14:25 current values: 01.07.2014 14:18



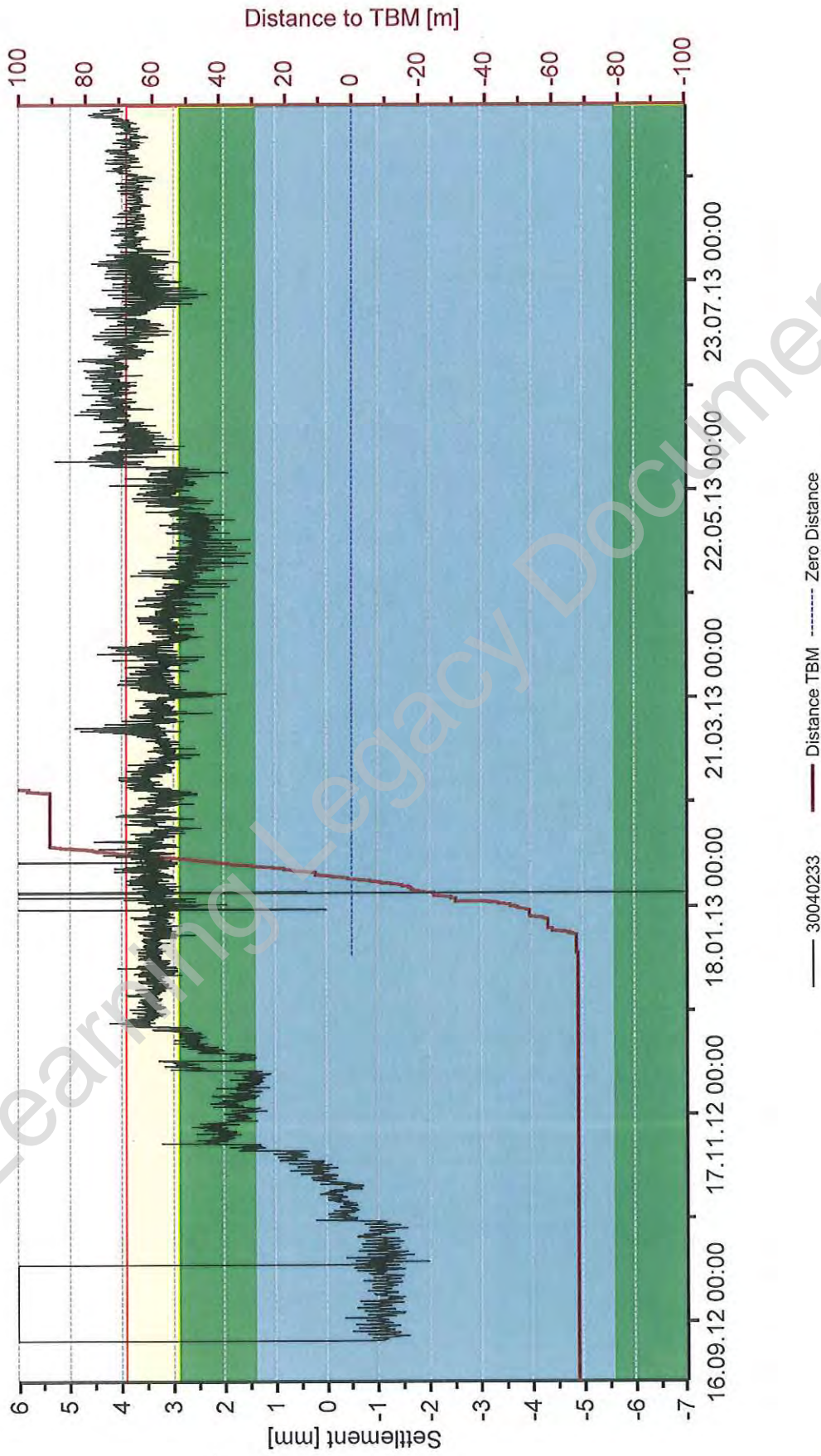
Point: 30040232



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 14:29 current values: 01.07.2014 14:18



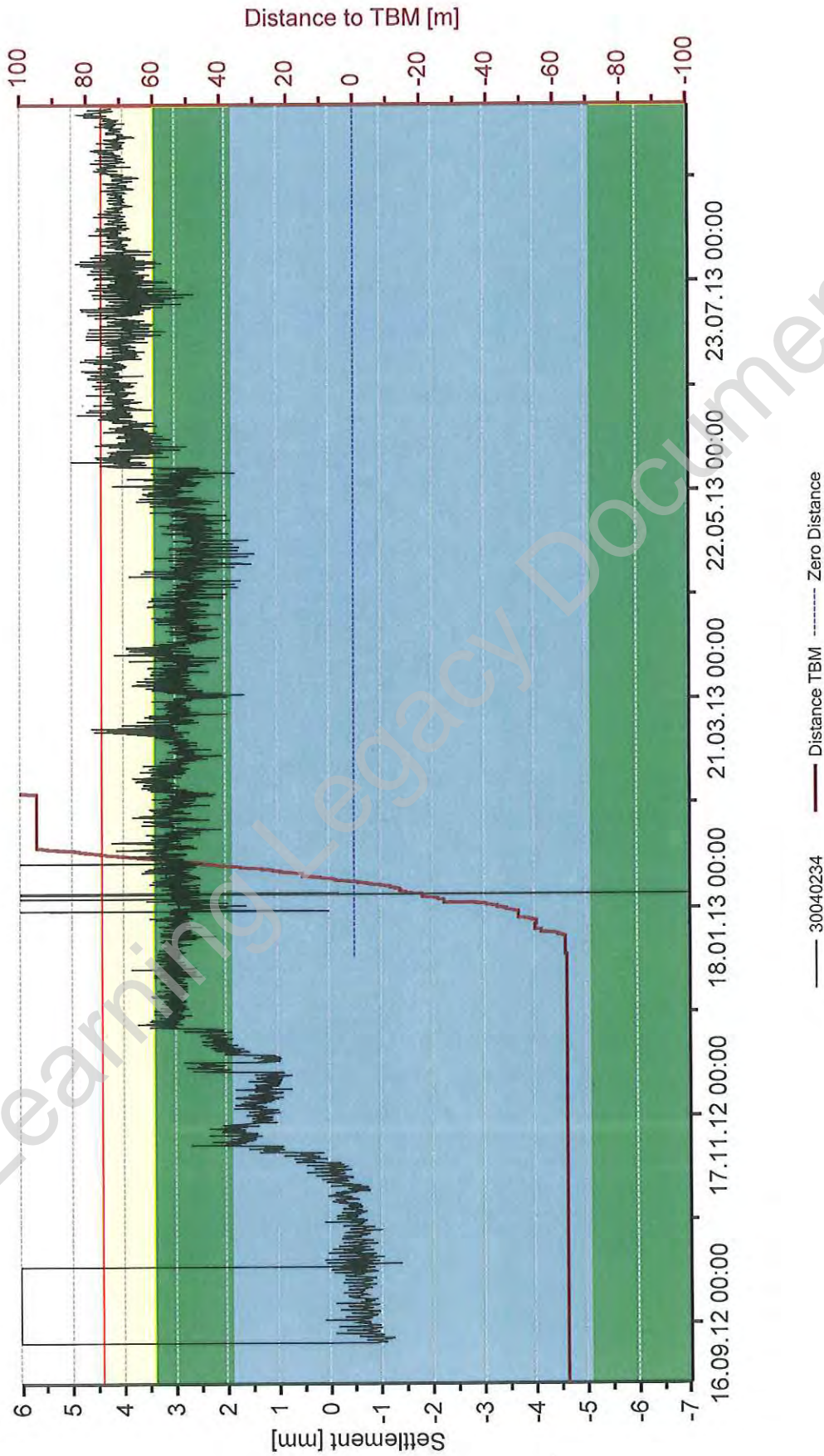
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Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 14:32 current values: 01.07.2014 14:18



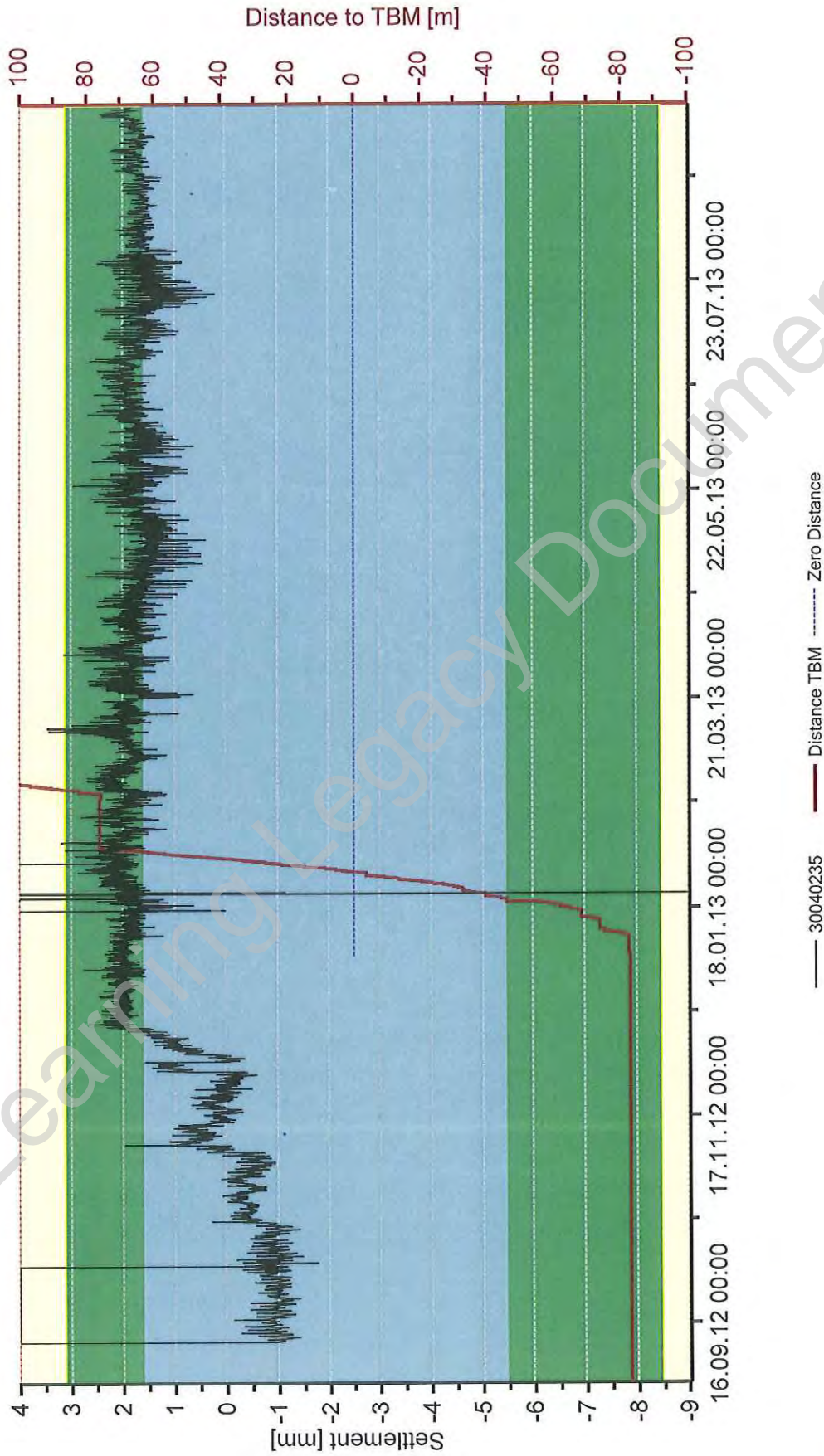
Point: 30040234



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 14:36 current values: 01.07.2014 14:28



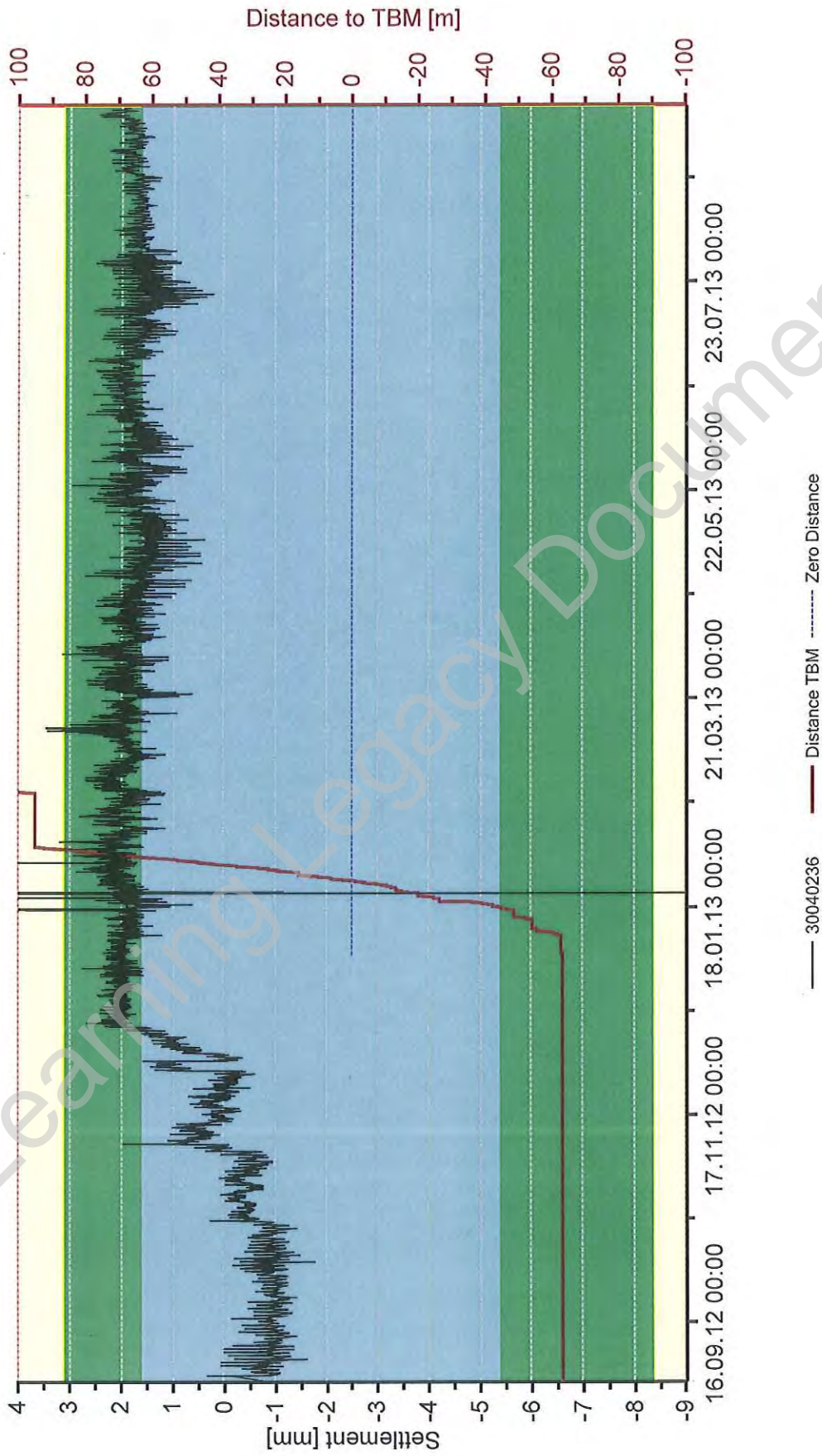
Point: 30040235



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 14:44 current values: 01.07.2014 14:34



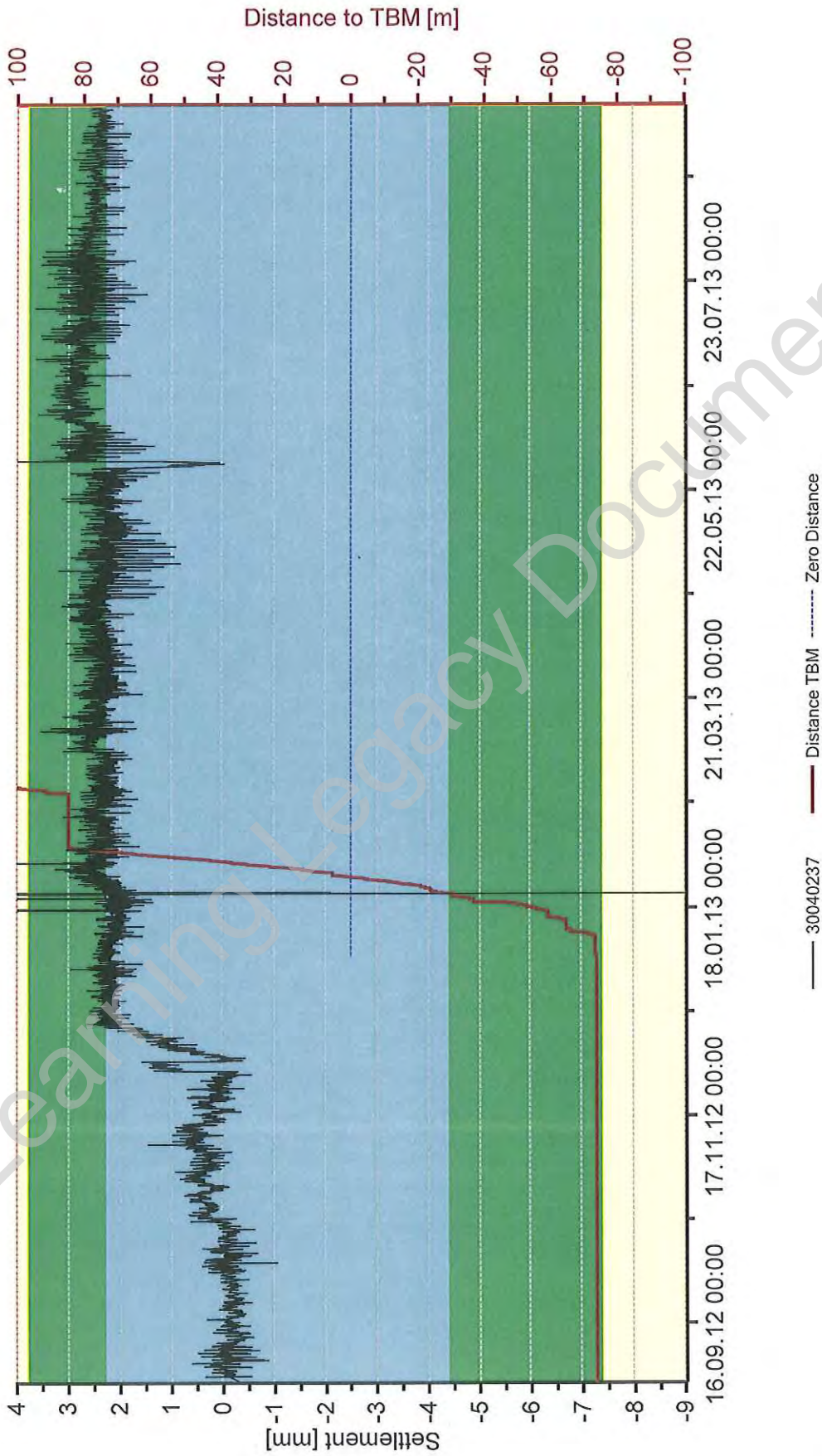
Point: 30040236



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 30.06.2014 17:42 current values: 30.06.2014 17:34



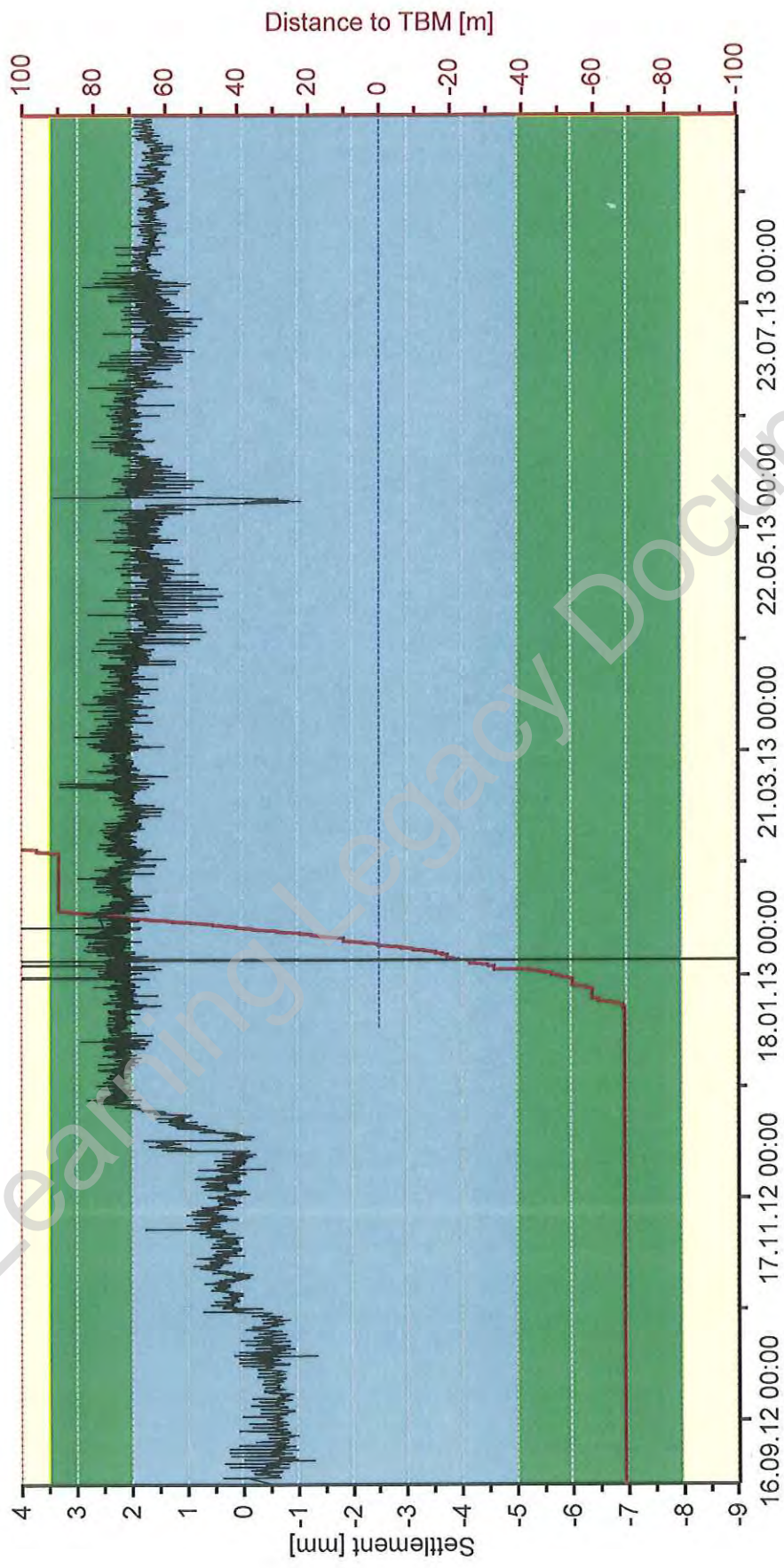
Point: 30040237



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 14:46 current values: 01.07.2014 14:34



Point: 30040238

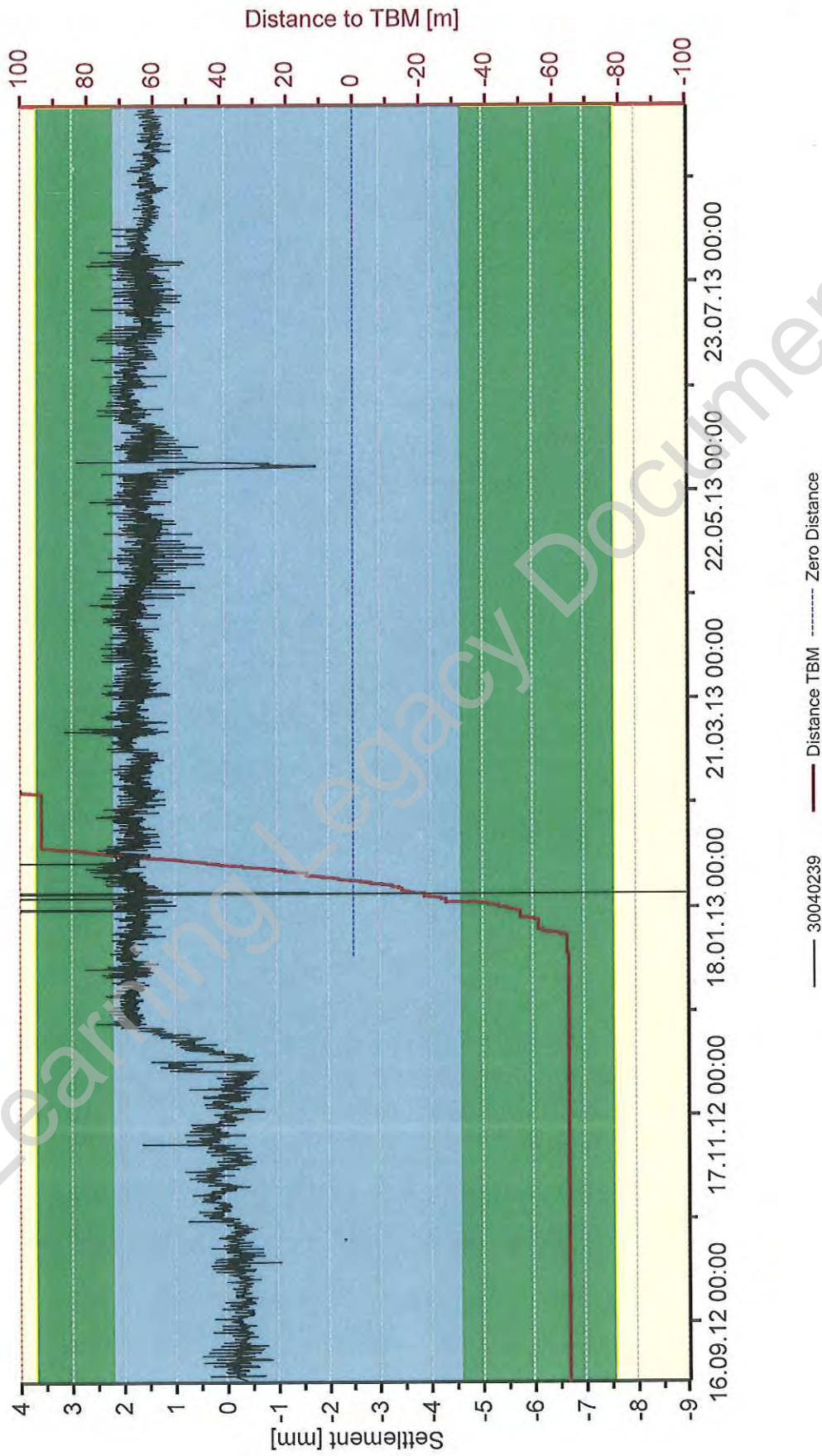


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 14:49 current values: 01.07.2014 14:34





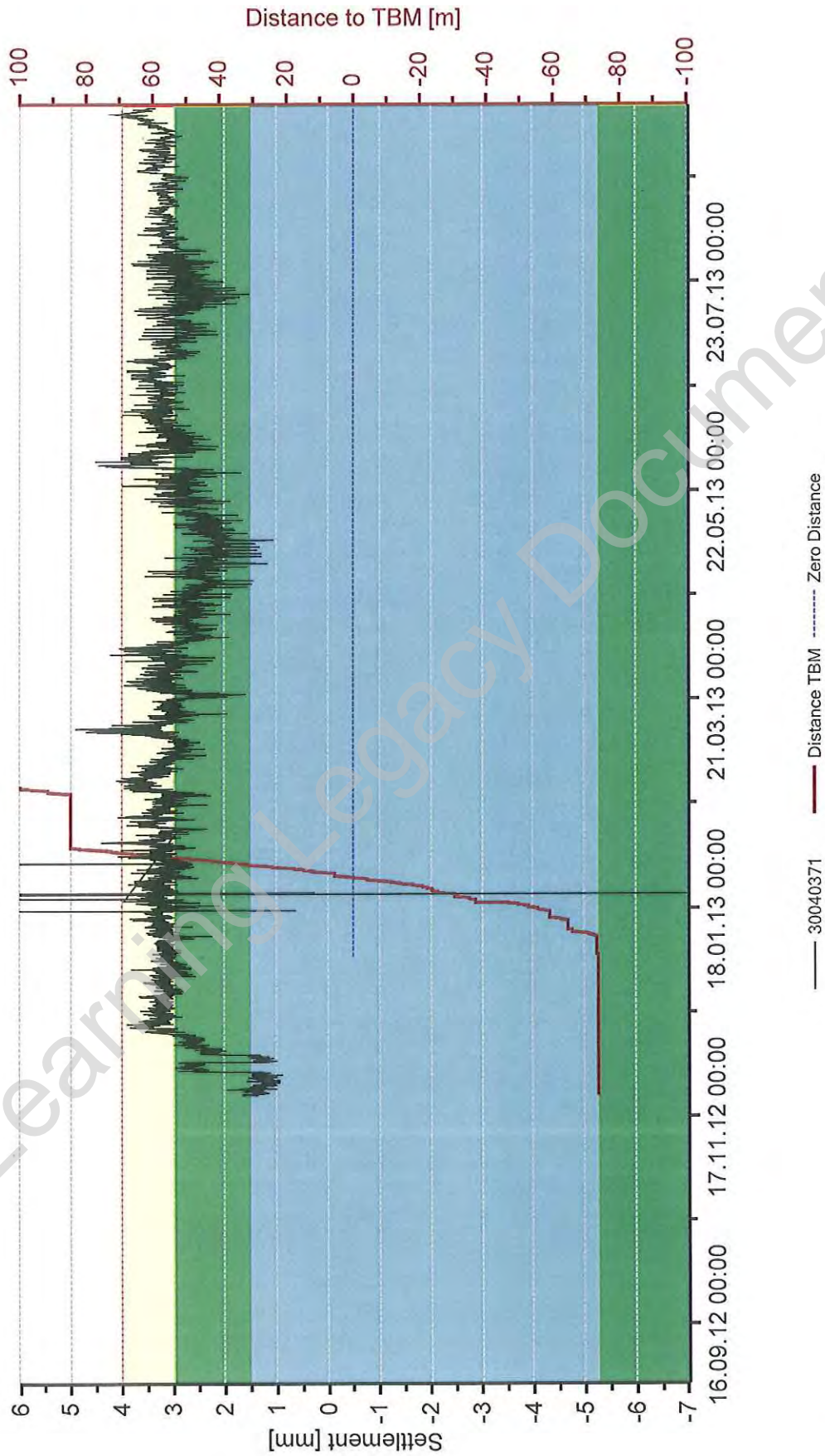
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Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 14:52 current values: 01.07.2014 14:43



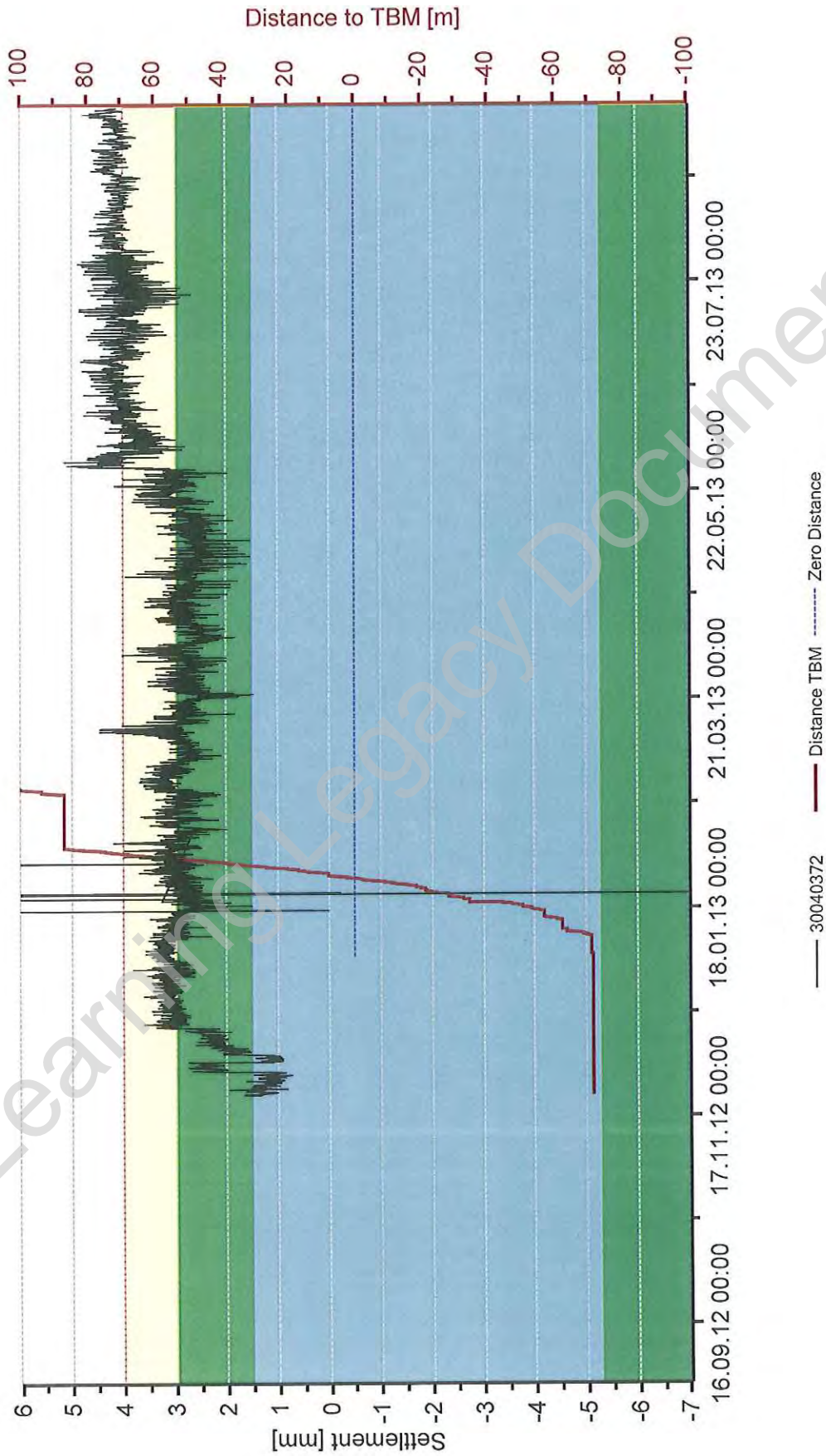
Point: 30040371



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 15:09 current values: 01.07.2014 15:08



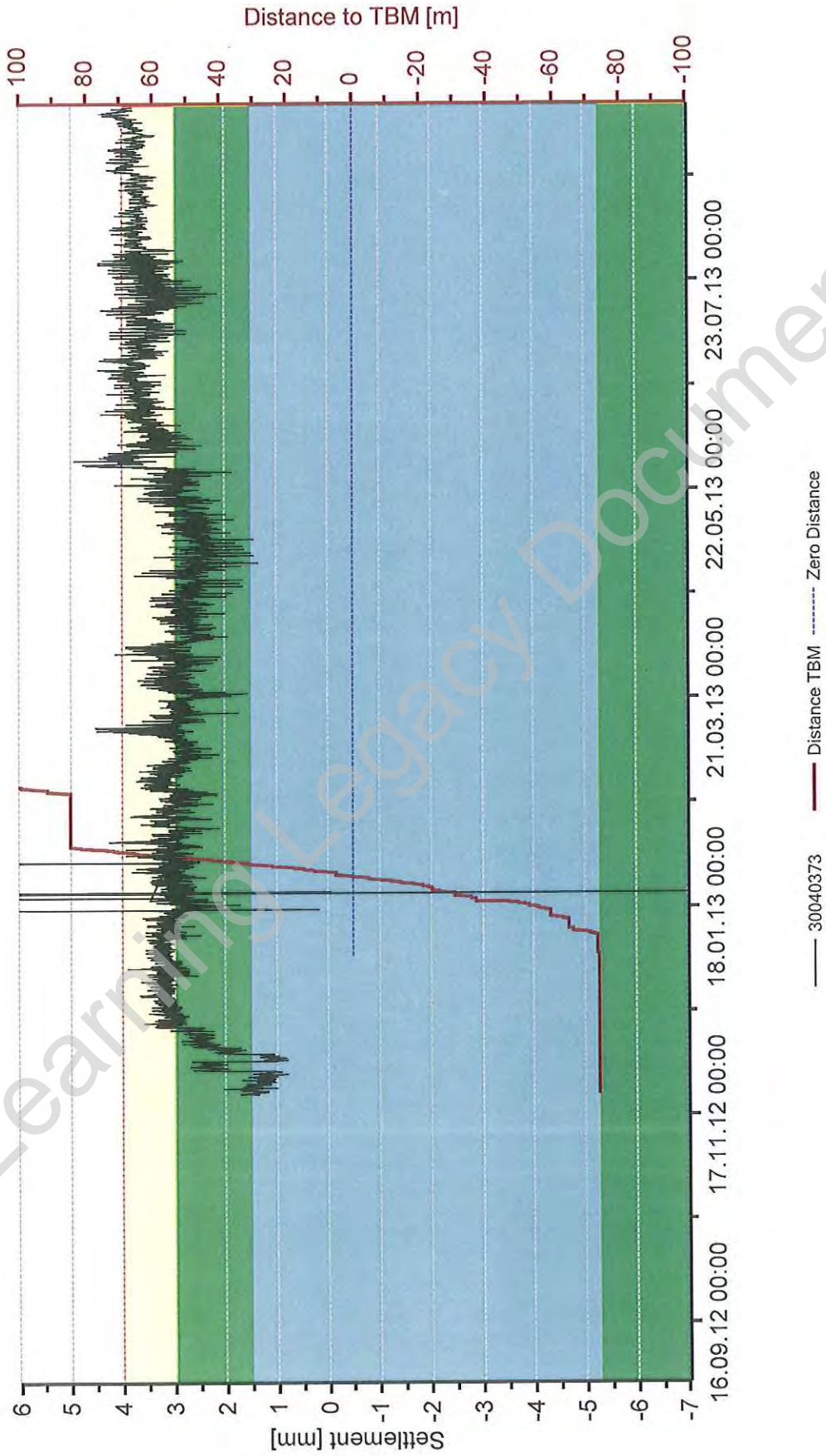
Point: 30040372



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 15:13 current values: 01.07.2014 15:08



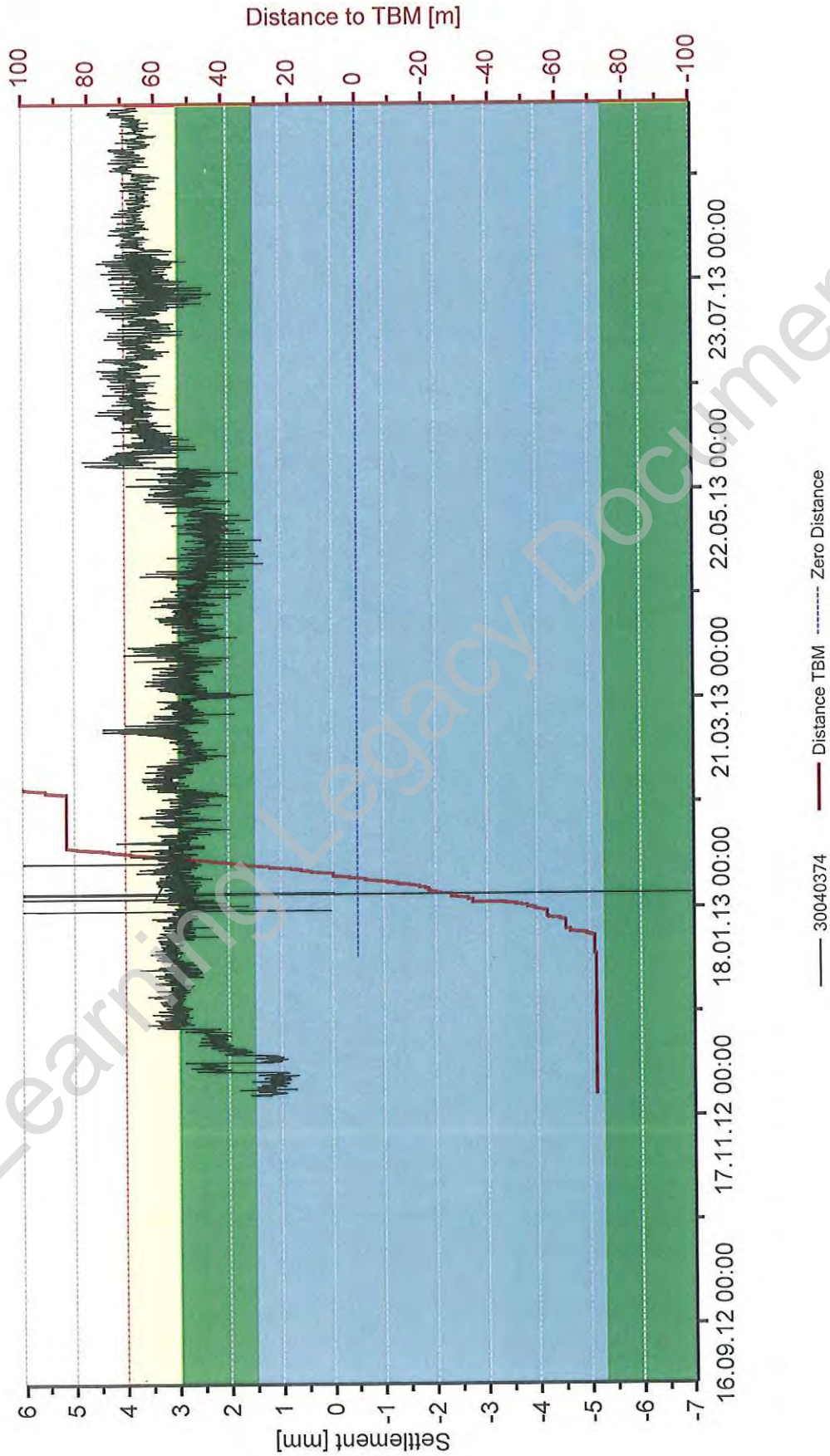
Point: 30040373



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 15:21 current values: 01.07.2014 15:14



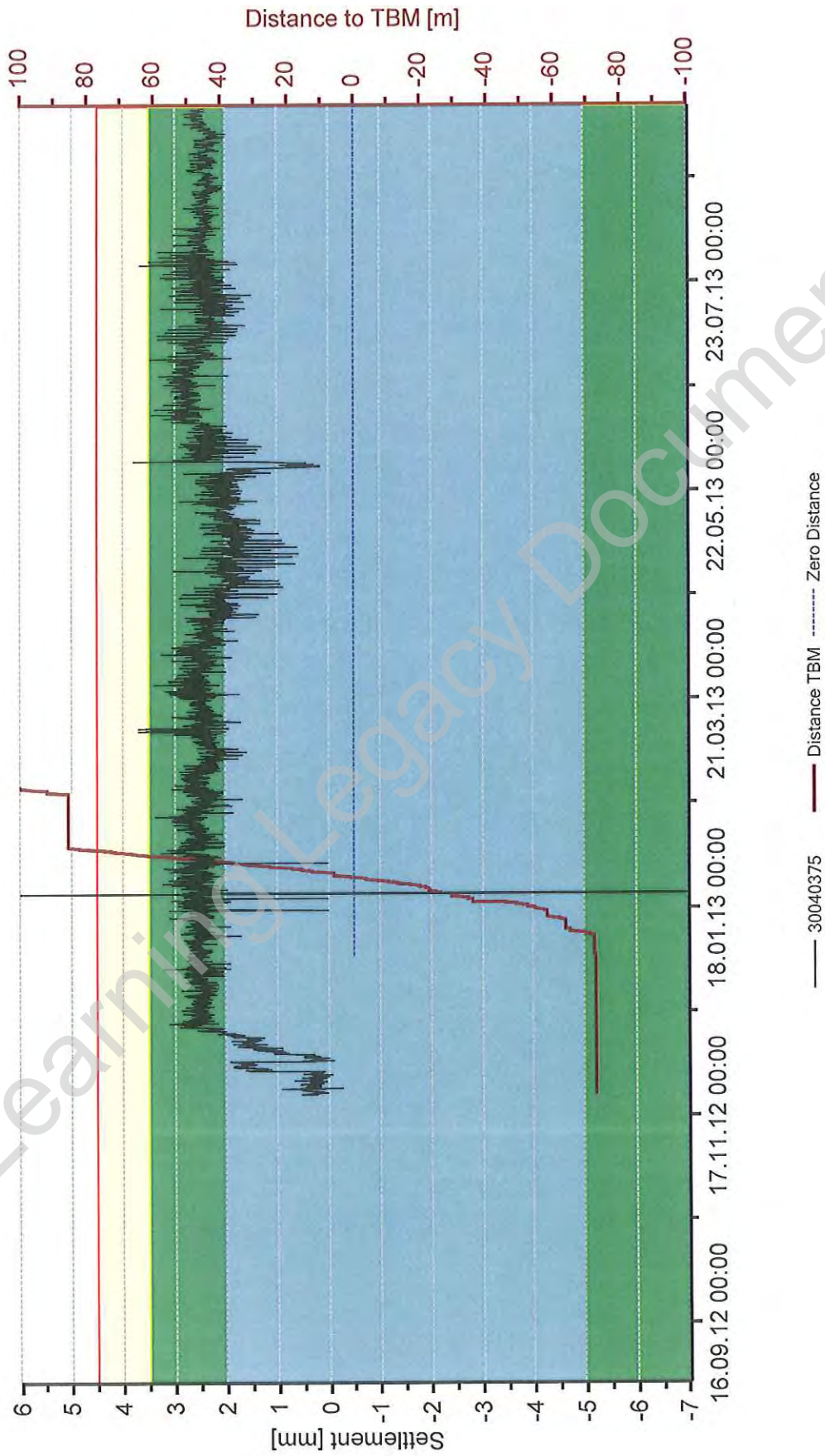
Point: 30040374



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 15:25 current values: 01.07.2014 15:23



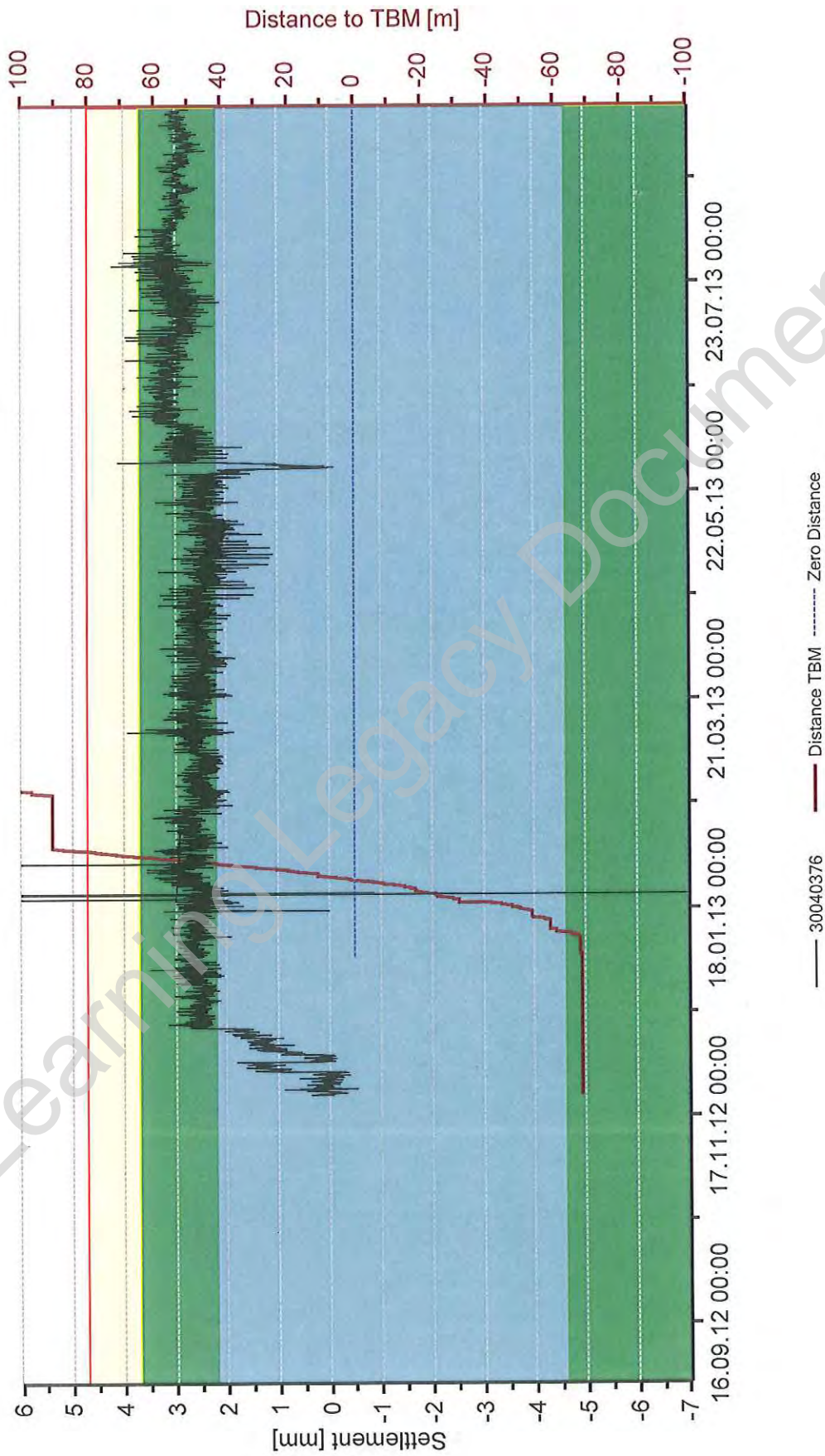
Point: 30040375



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 15:28 current values: 01.07.2014 15:23



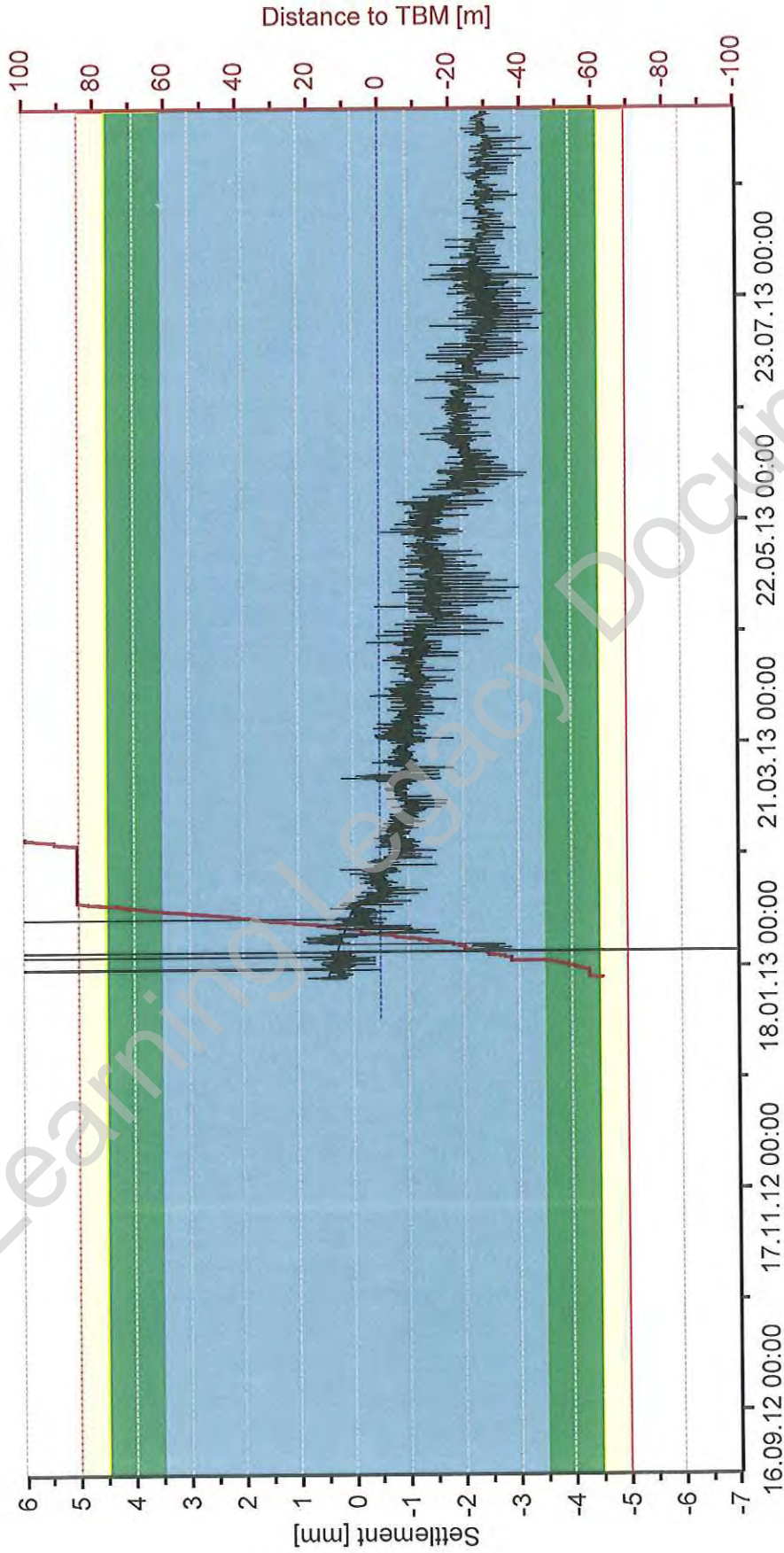
Point: 30040376



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 15:32 current values: 01.07.2014 15:23



Point: 30040378

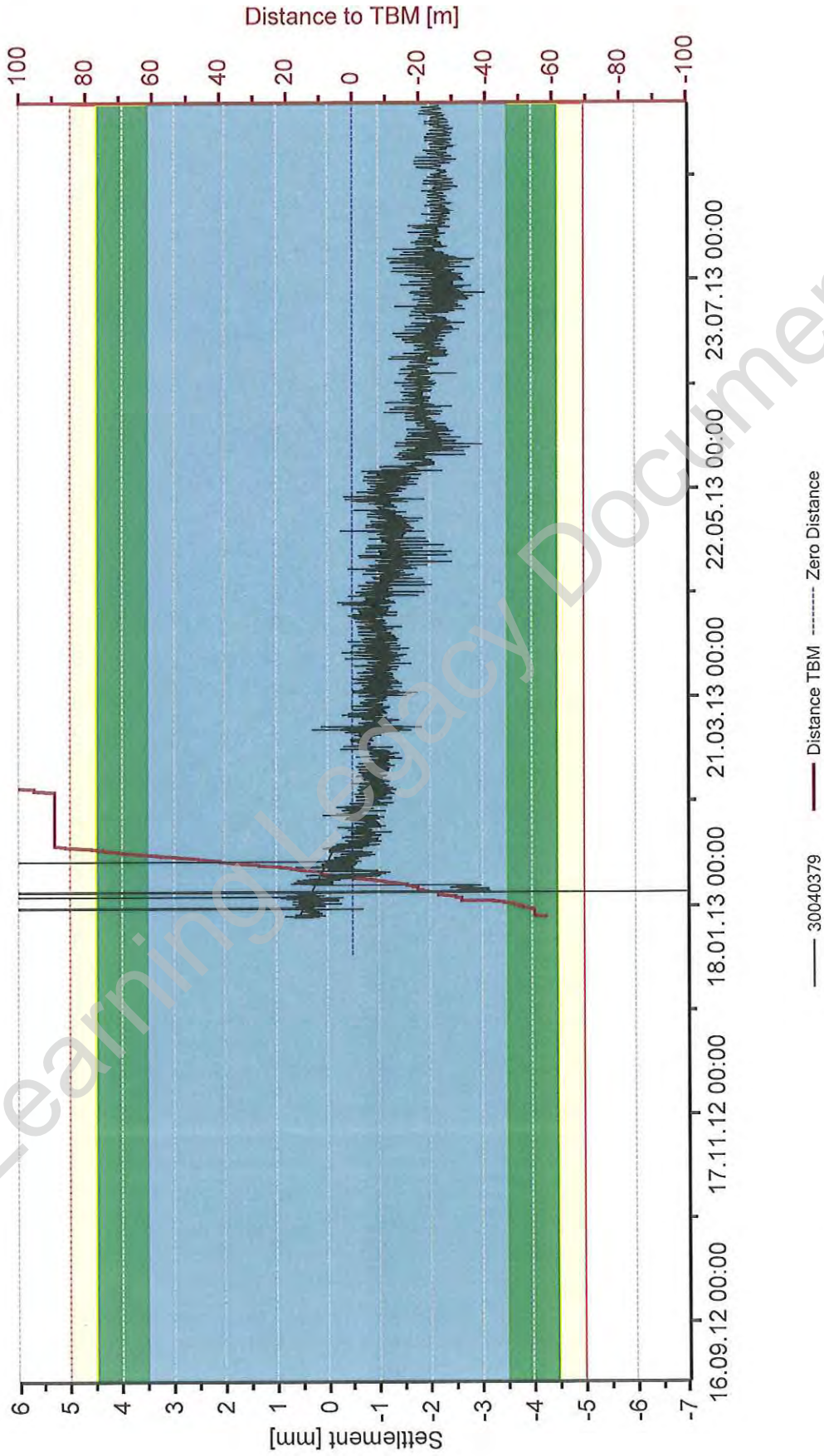


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 15:37 current values: 01.07.2014 15:33



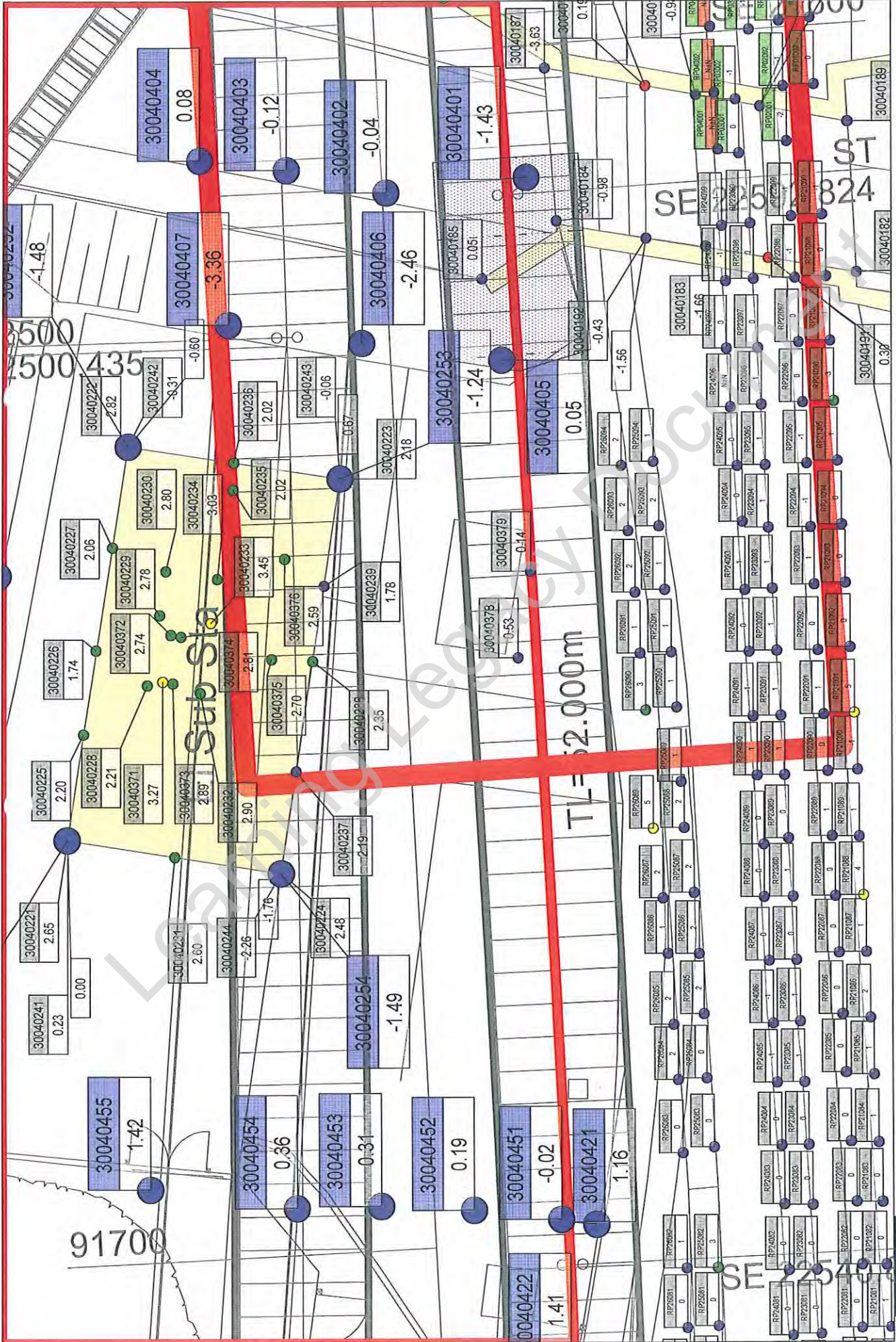


Point: 30040379



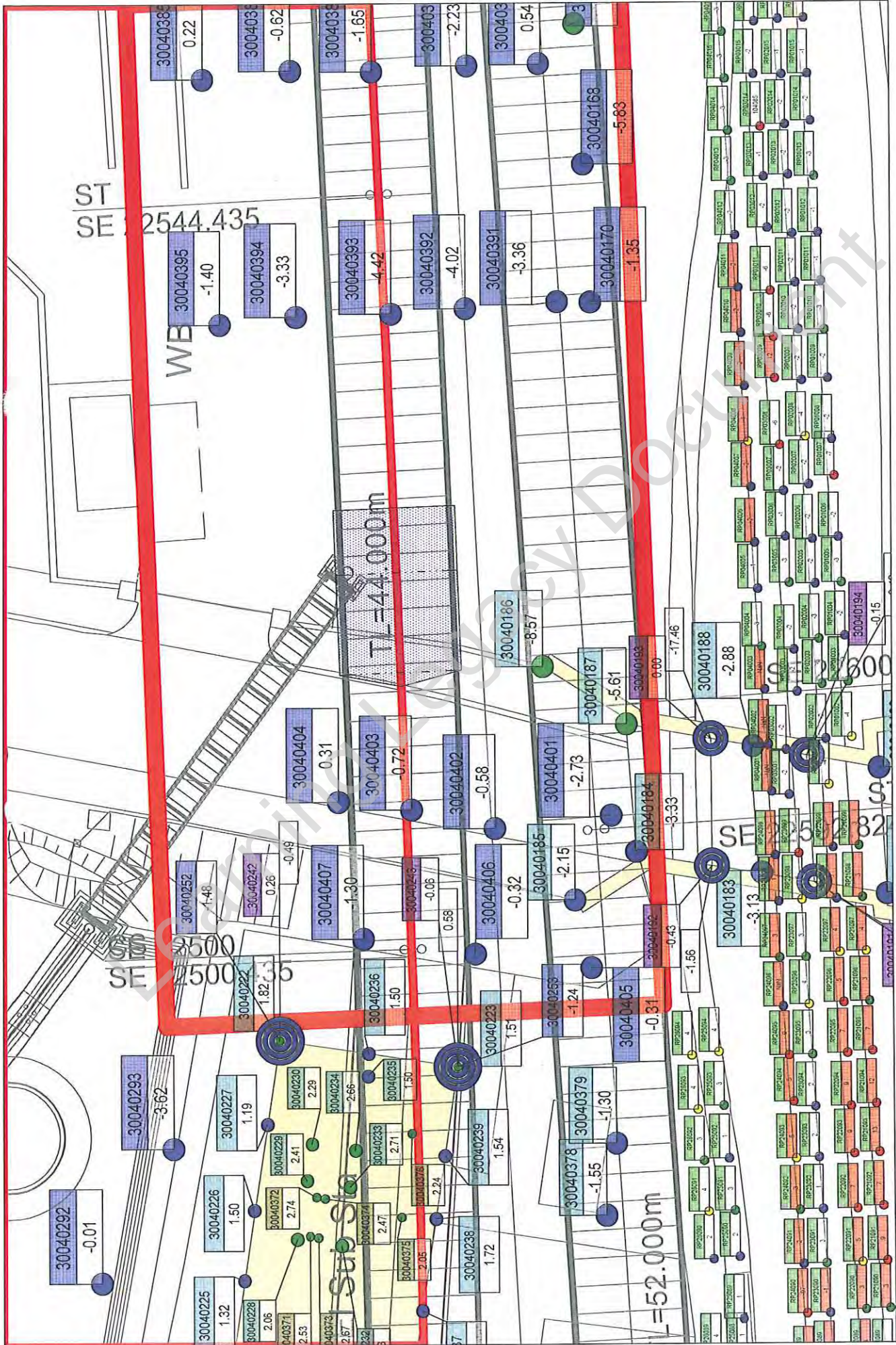
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 15:40 current values: 01.07.2014 15:38





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive WB  
 current values: 25.01.2013 06:59

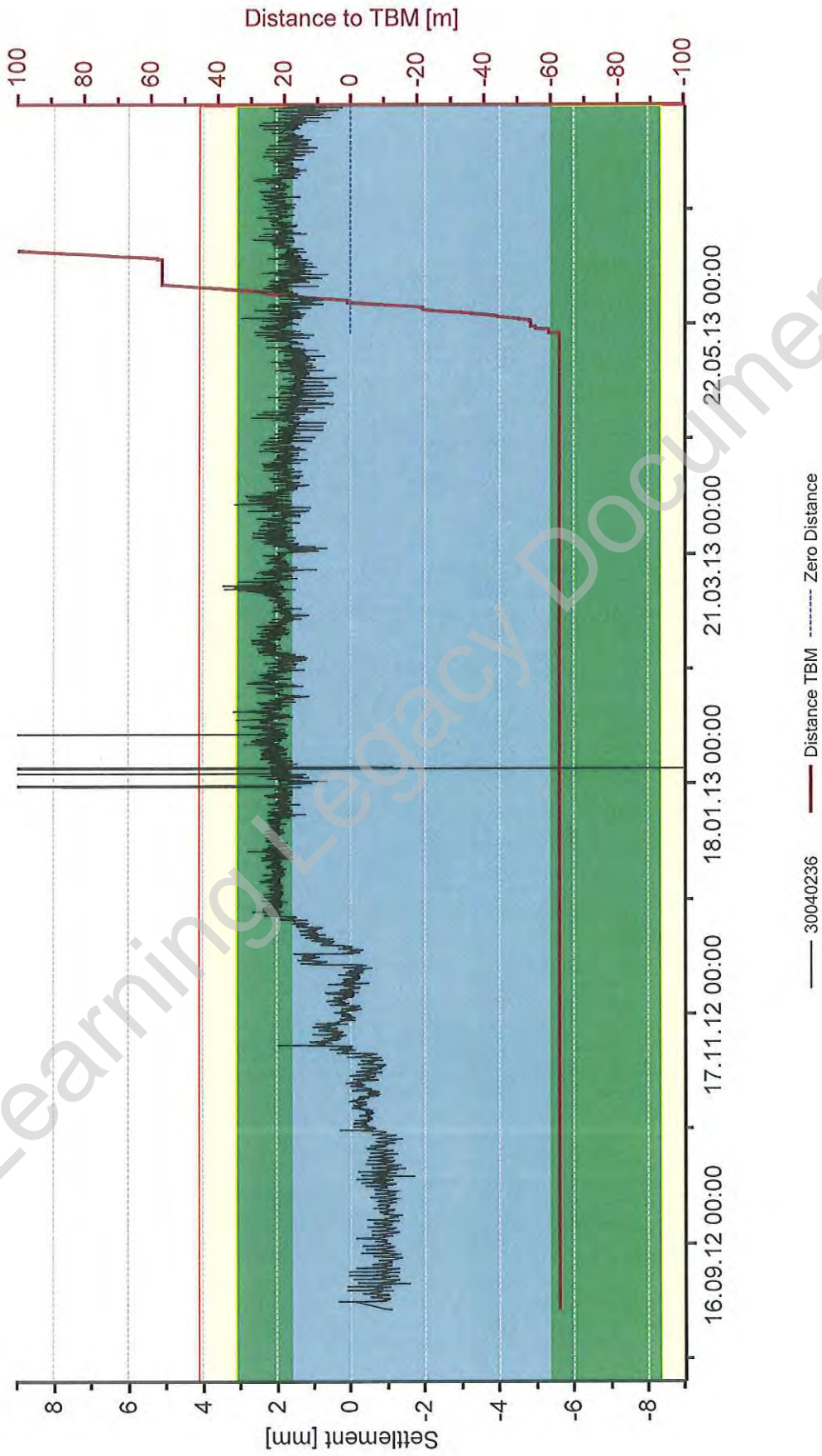




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 26.05.2013 09:07

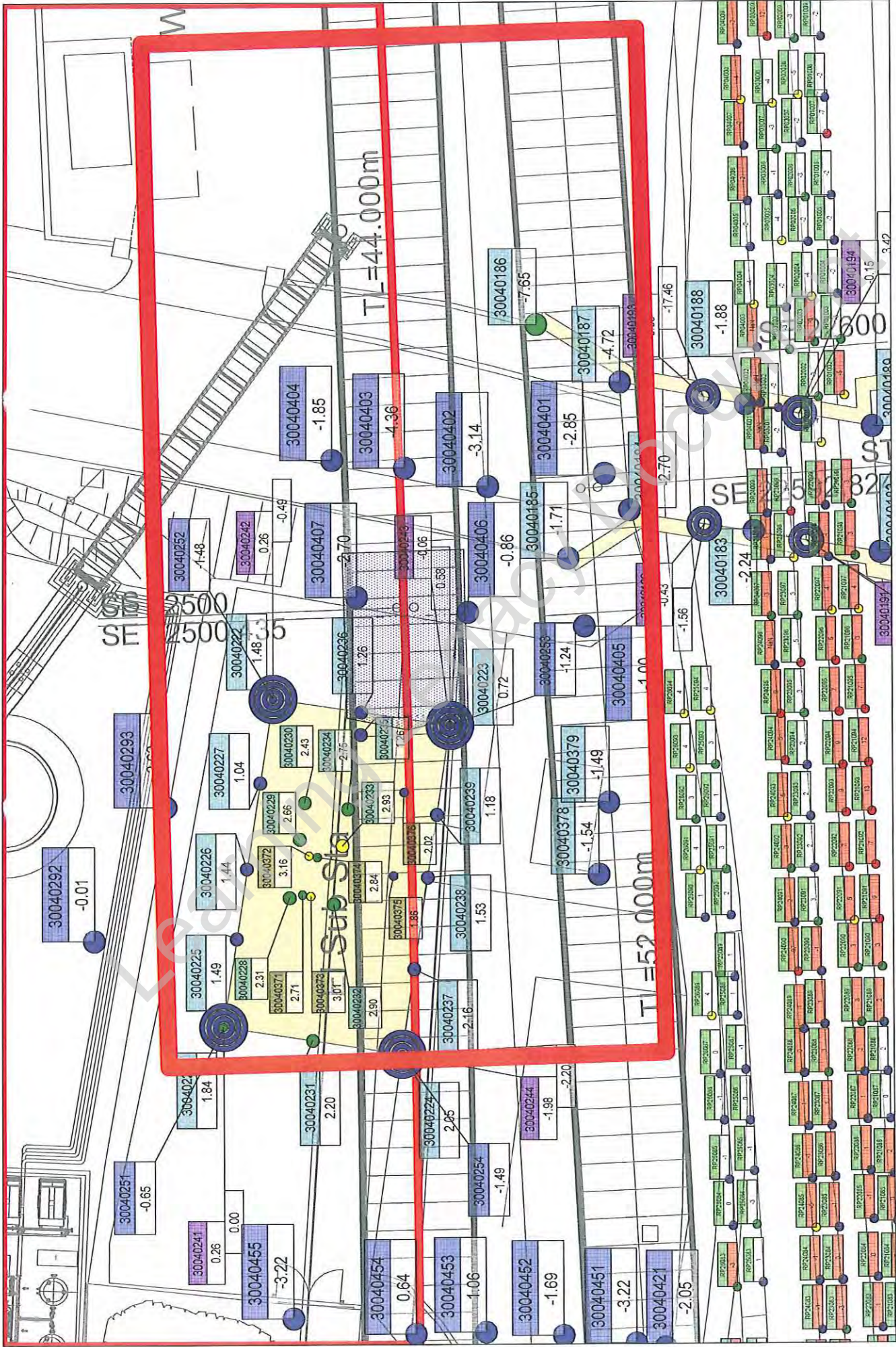


Point: 30040236



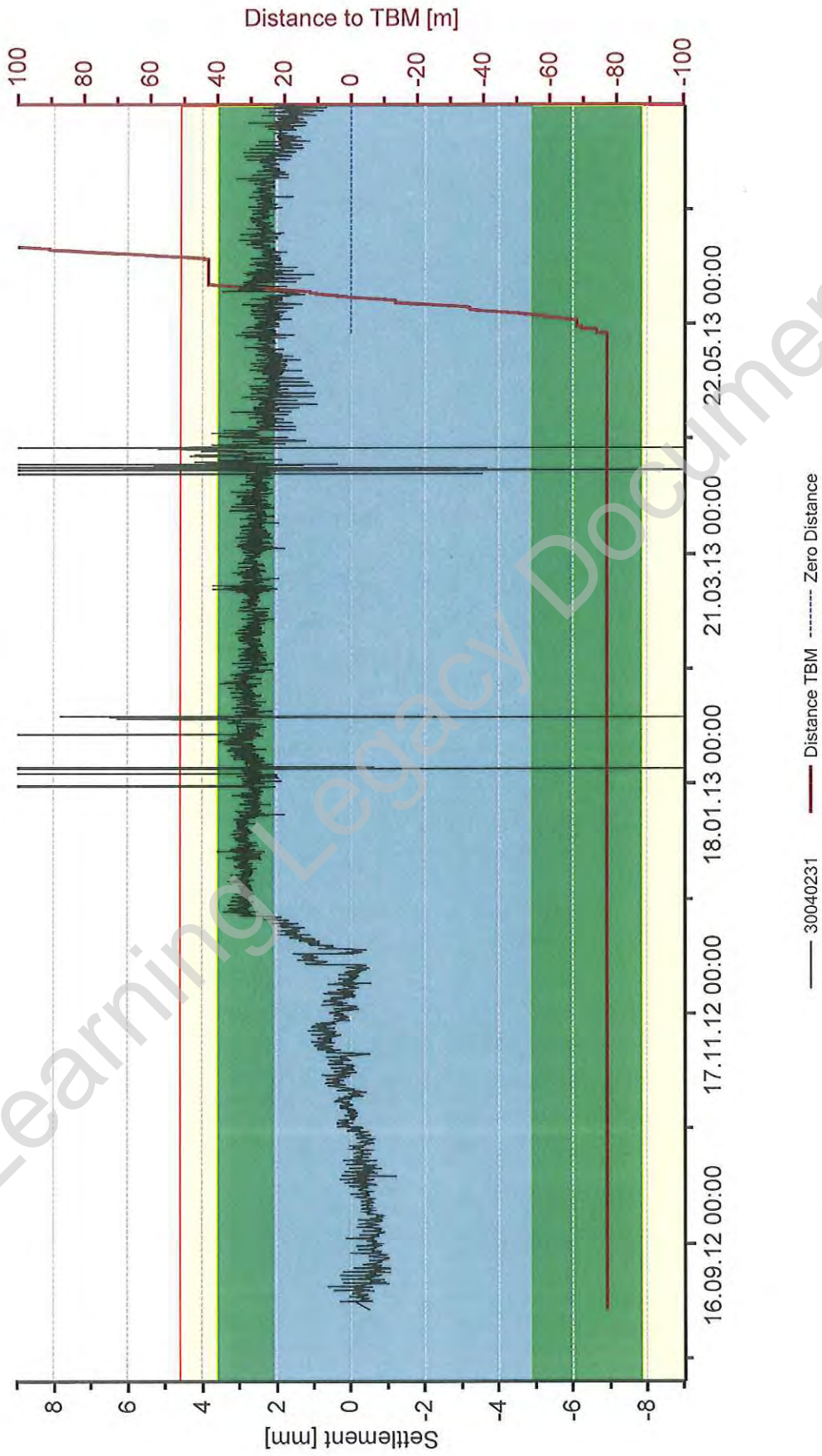
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 16:04 current values: 01.07.2014 15:59






Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 28.05.2013 09:00

Point: 30040231



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Cathedral Substation (HLC) 29.08.2012 - 13.09.2013  
date: 01.07.2014 16:06 current values: 01.07.2014 15:59



 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 10**  
**Cathedral Substation – TM**

Learning Legacy Document

<b>monitoring asset</b>	<b>Cathedral Substation</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR148-PT005-50010		
<b>name of monitoring section:</b>	Cathedral Substation		
sensor type:	Tilt Meter		
chainage:	91730	point no.:	3004 0241 - 3004 0244
<b>trigger values:</b> [mm]	green: +4 -4	amber: +7 -7	red: +9 -9
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	Y		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	22/08/12	0		
<b>TBM 1</b>	start ZOI	20/01/13	-0.17	3004 0243
		25/01/13	-2.26	3004 0244
	end ZOI	31/01/13	-0.07	3004 0243
		01/02/13	-2.37	3004 0244
breached not any trigger value				
<b>TBM 2</b>	start ZOI	26/05/13	-0.06	3004 0243
		28/05/13	-1.98	3004 0244
	end ZOI	31/05/13	-0.06	3004 0243
		03/06/13	-1.98	3004 0244
breached not any trigger value				
<b>longterm</b>	19/07/13	0.19	3004 0243	last reading post tunneling, Sensors not any longer working
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV		
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)		

**summary / comments**

There was nearly no movement observed during TAM drilling and pre-grouting (from 15.10.-18.12.2012). Tiltmeter 3004 0241-3004 0243 got signal reference problems in front of the data logger from 19.07.2013 onwards.

The summary of the grouting operation is report ref. C310-HTM-C-RGN-CR146\_ST004-50020

Tiltmeter 3004 0244 got power failure from 30.04. onwards.

Tiltmeter 3004 0244 was hit during cleaning works (trees, bushes and plants), therefore movement of around 2mm recorded.

Under consideration of temperature differences and the achievable accuracy of the system, HMJV has no concern to cease the monitoring.

The rate of change in the monitoring data is less than the required standards as per the specifications and drawings up to the time when the instrumentations have been decommissioned.

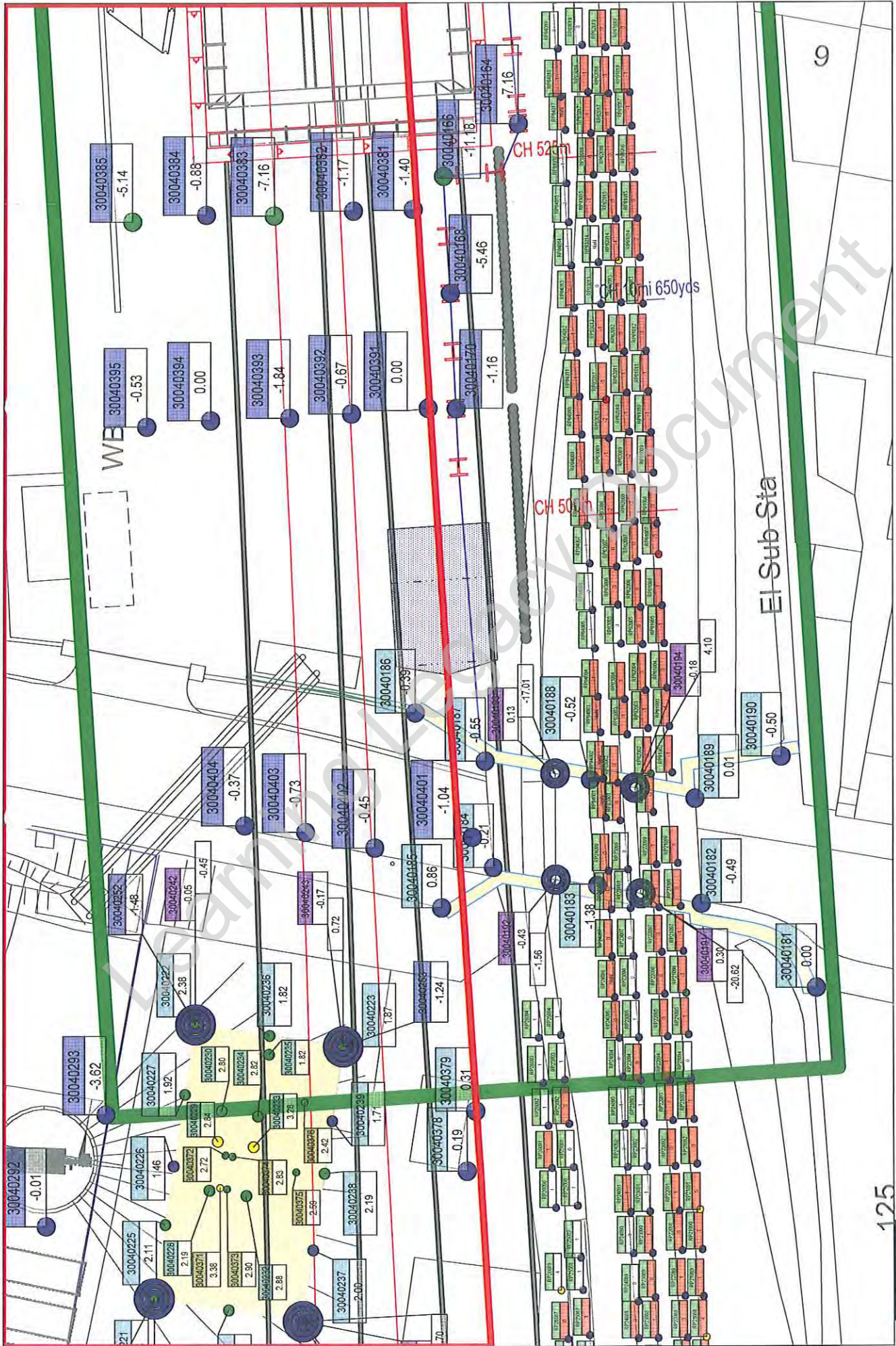
date / signature: 12/01/2015

print name:

HMJV project role:

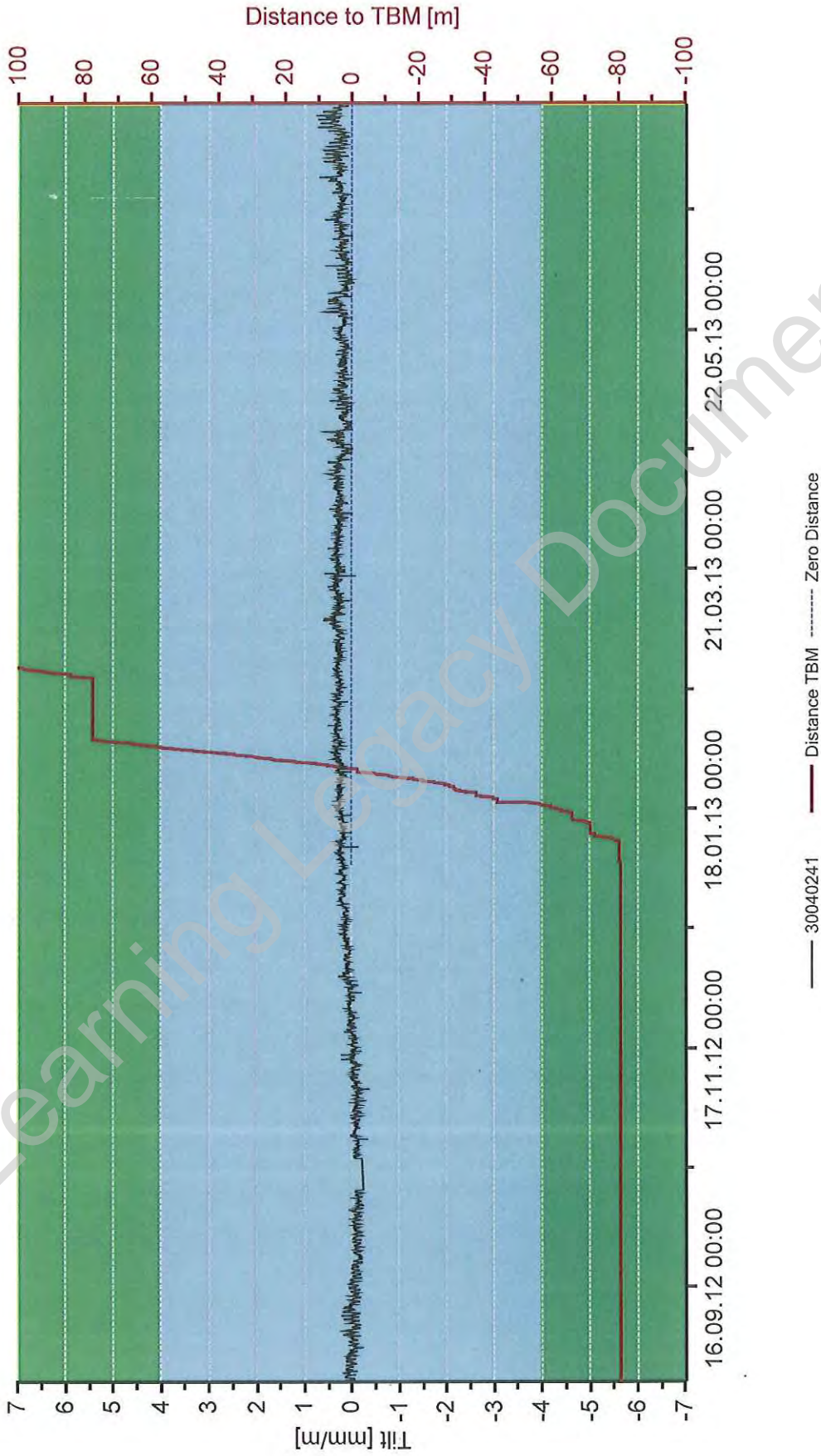
Monitoring & Survey engineer





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 20.01.2013 18:47

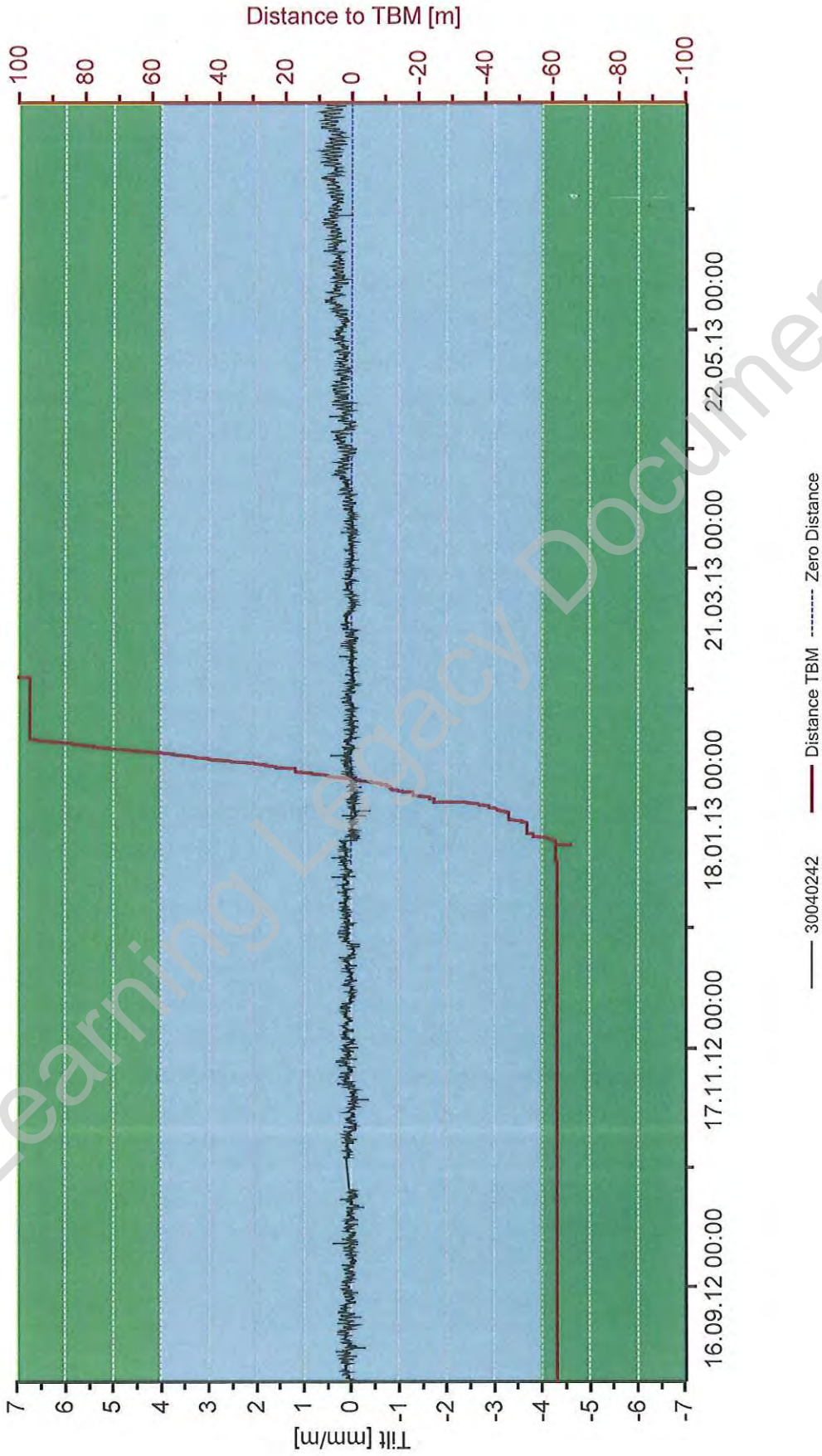
Point: 30040241



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (TM) 22.08.2012 - 19.07.2013  
date: 15.07.2014 09:57 current values: 15.07.2014 09:44



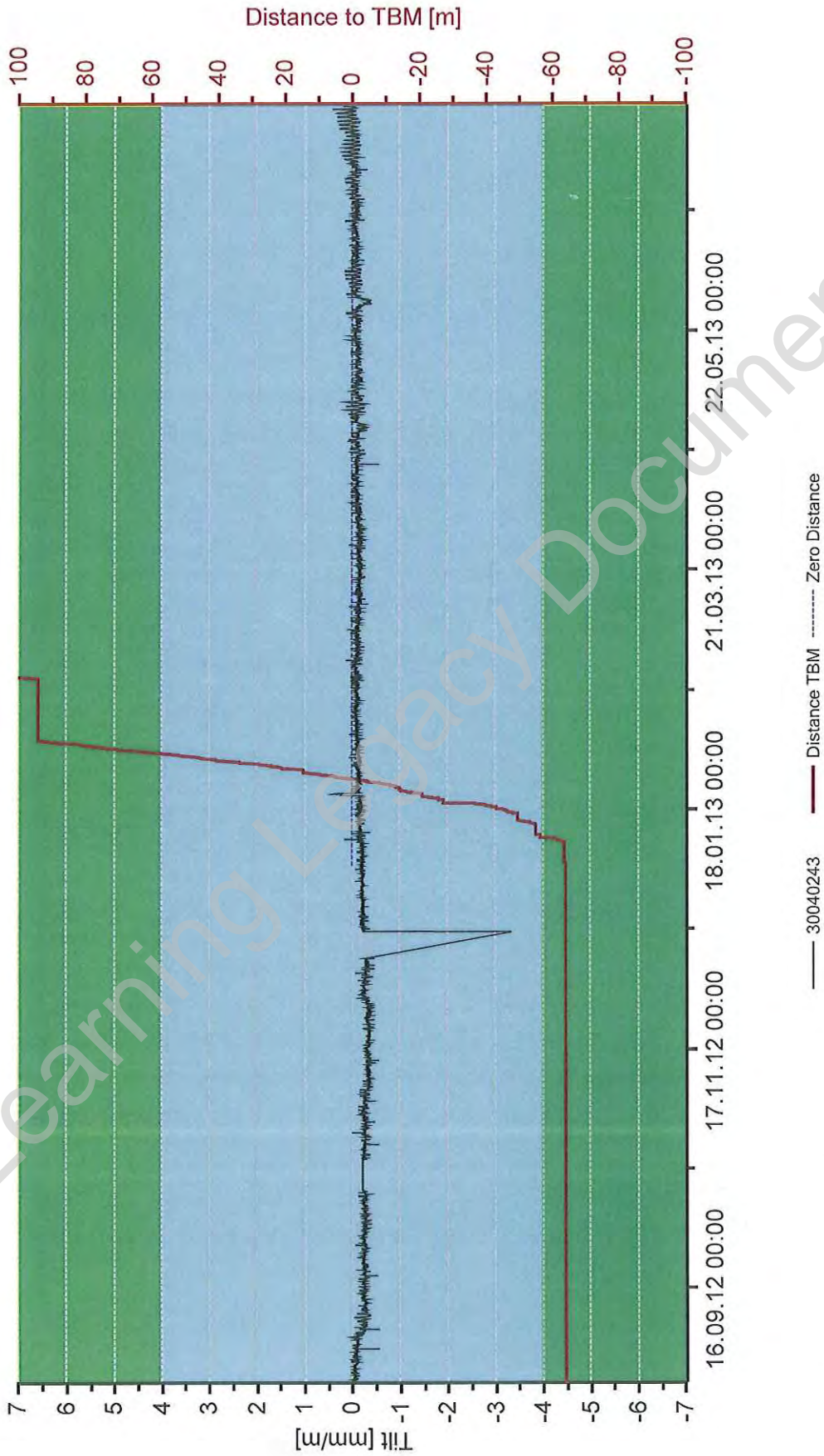
Point: 30040242



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (TM) 22.08.2012 - 19.07.2013  
date: 15.07.2014 10:00 current values: 15.07.2014 09:44



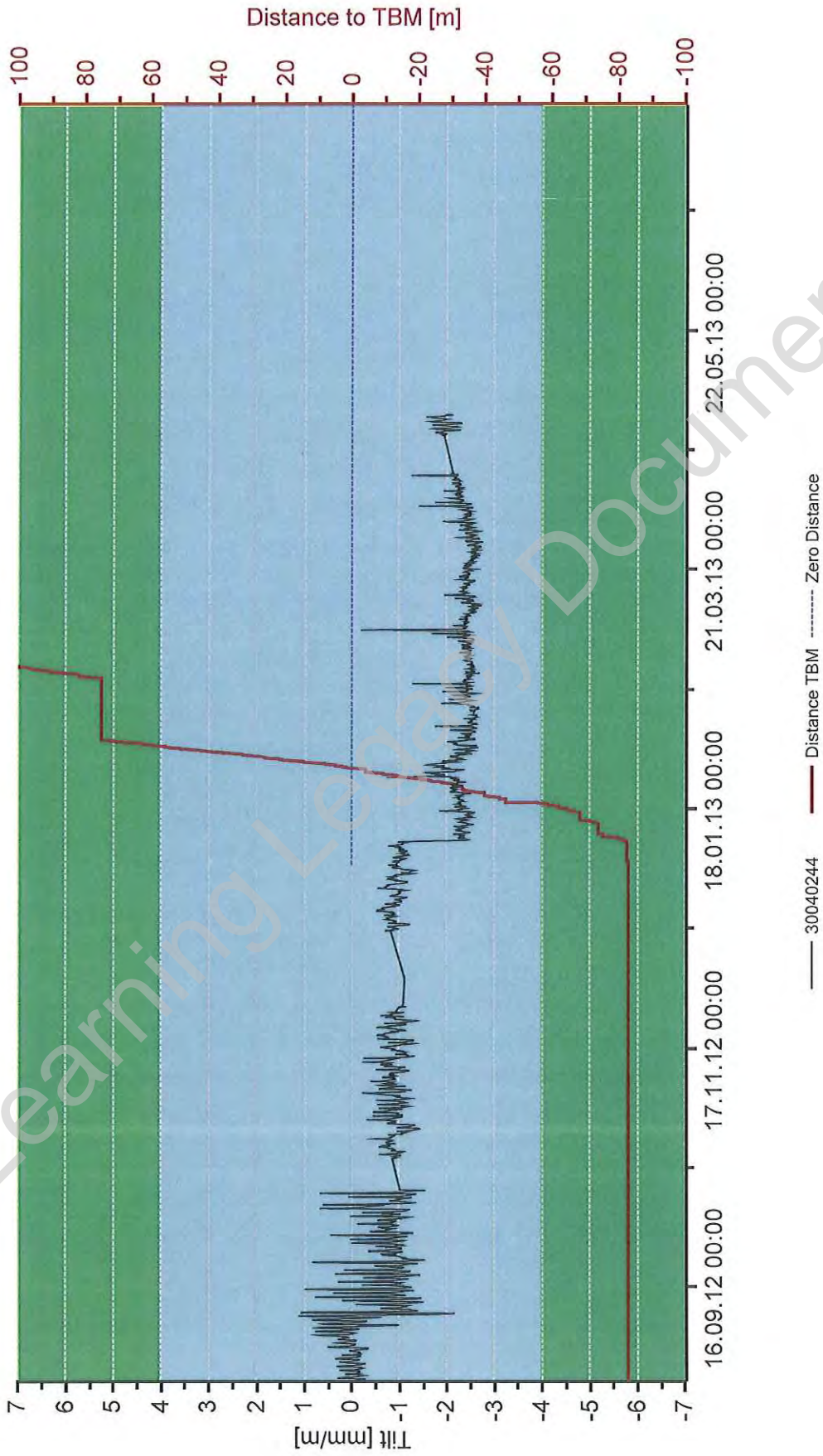
Point: 30040243



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (TM) 22.08.2012 - 19.07.2013  
date: 15.07.2014 10:03 current values: 15.07.2014 09:44

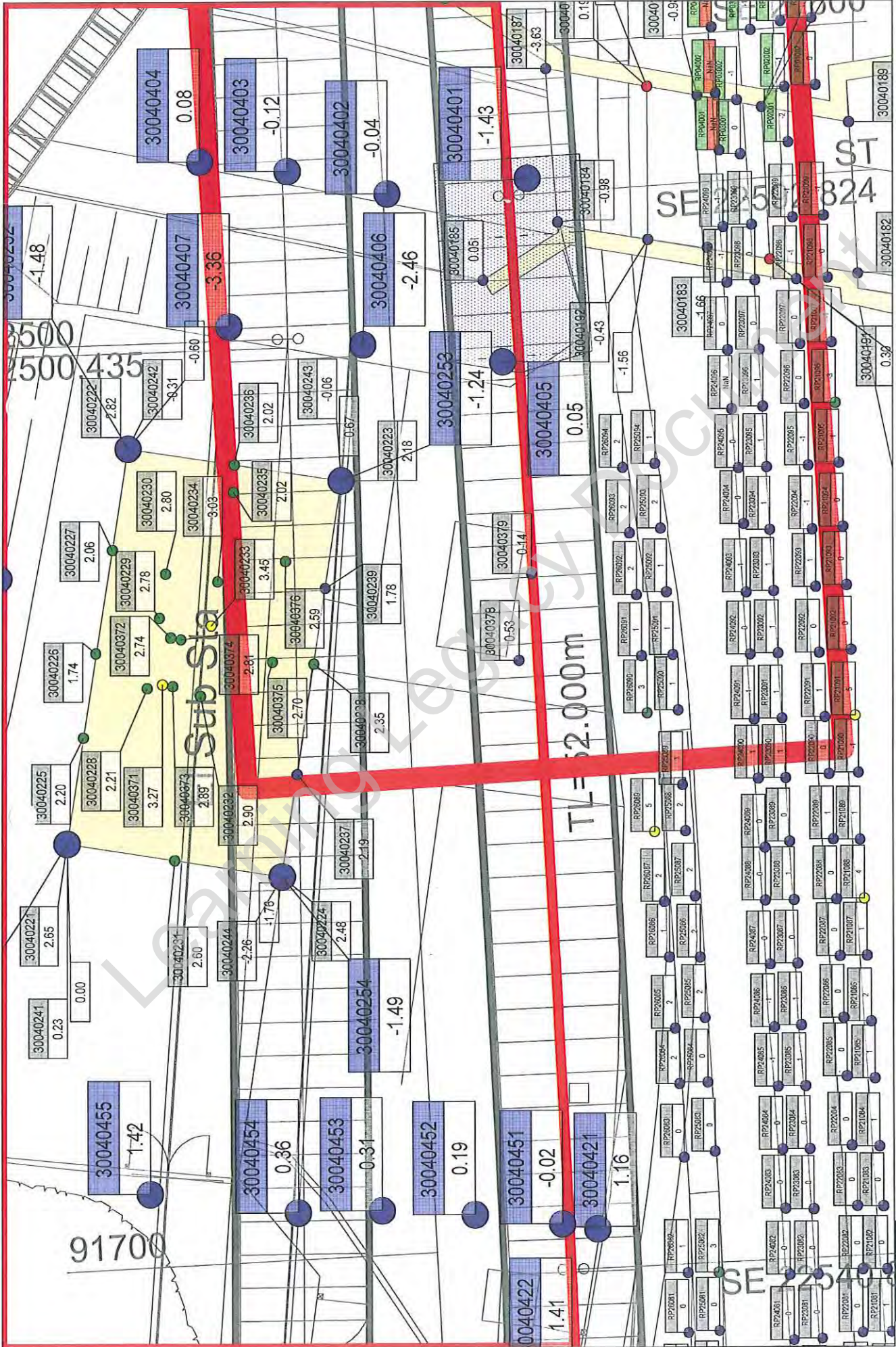


Point: 30040244



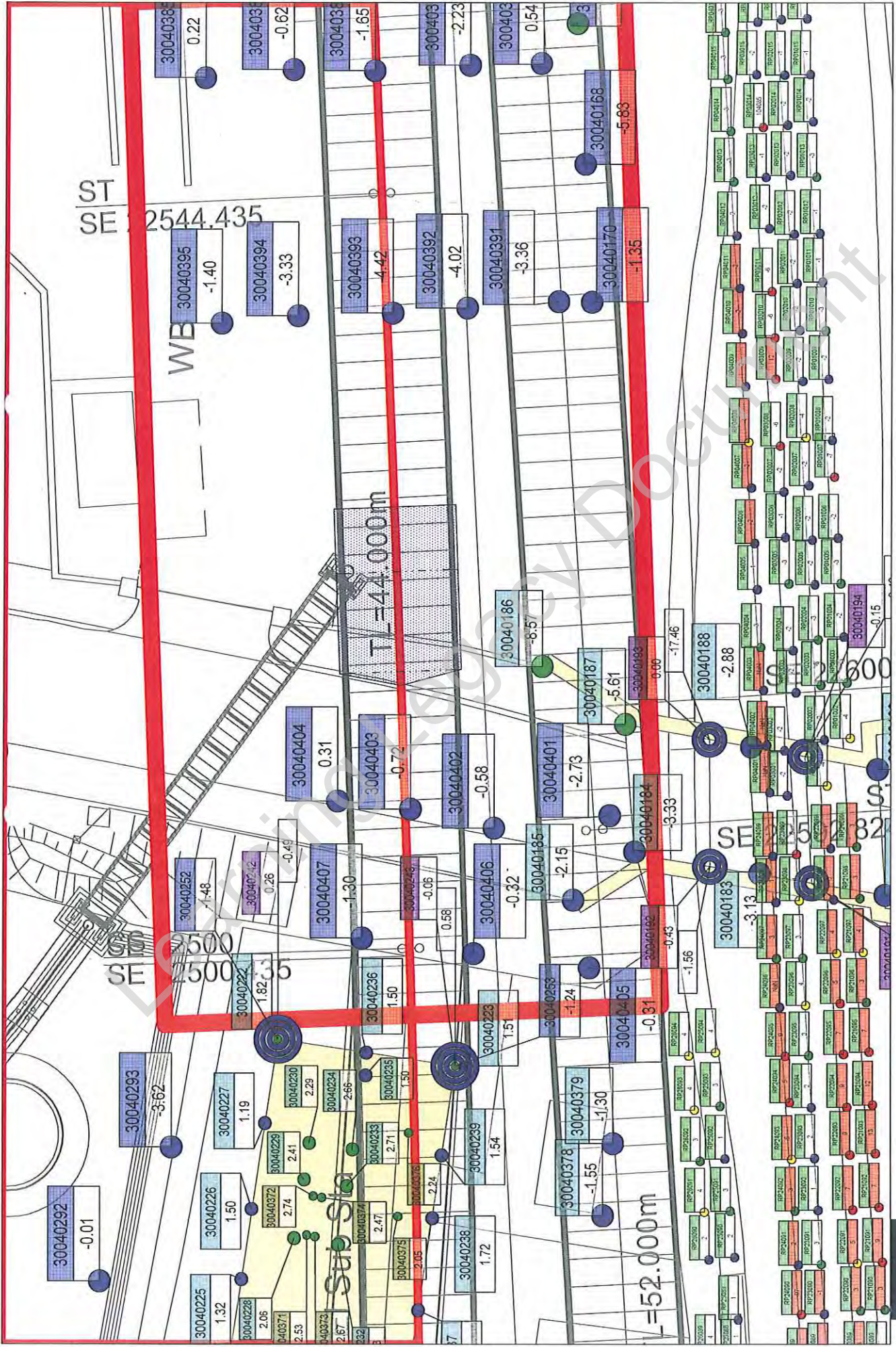
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (TM) 22.08.2012 - 19.07.2013  
date: 15.07.2014 10:05 current values: 15.07.2014 09:44





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive WB  
 current values: 25.01.2013 06:59

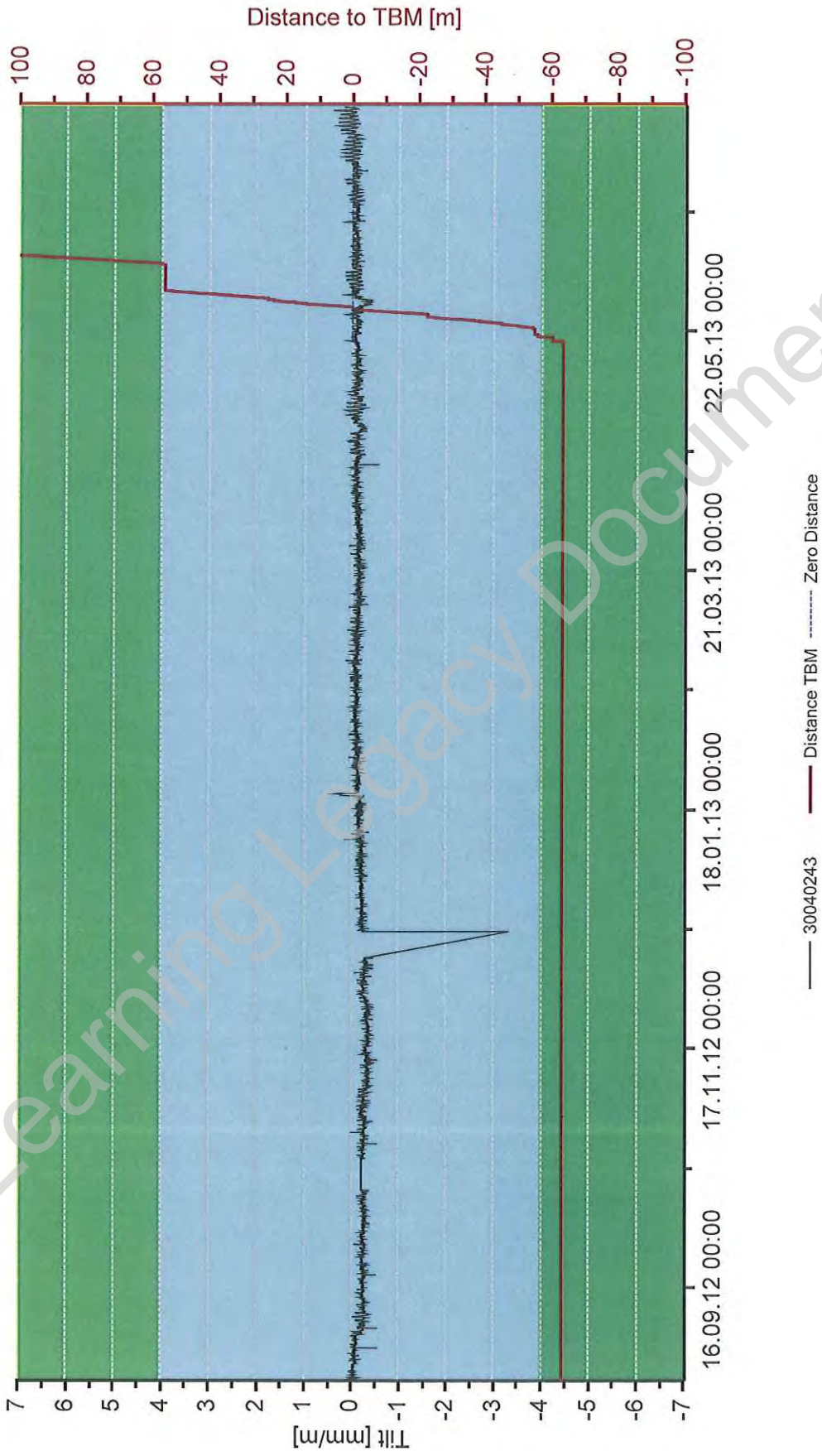




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 26.05.2013 09:07



Point: 30040243

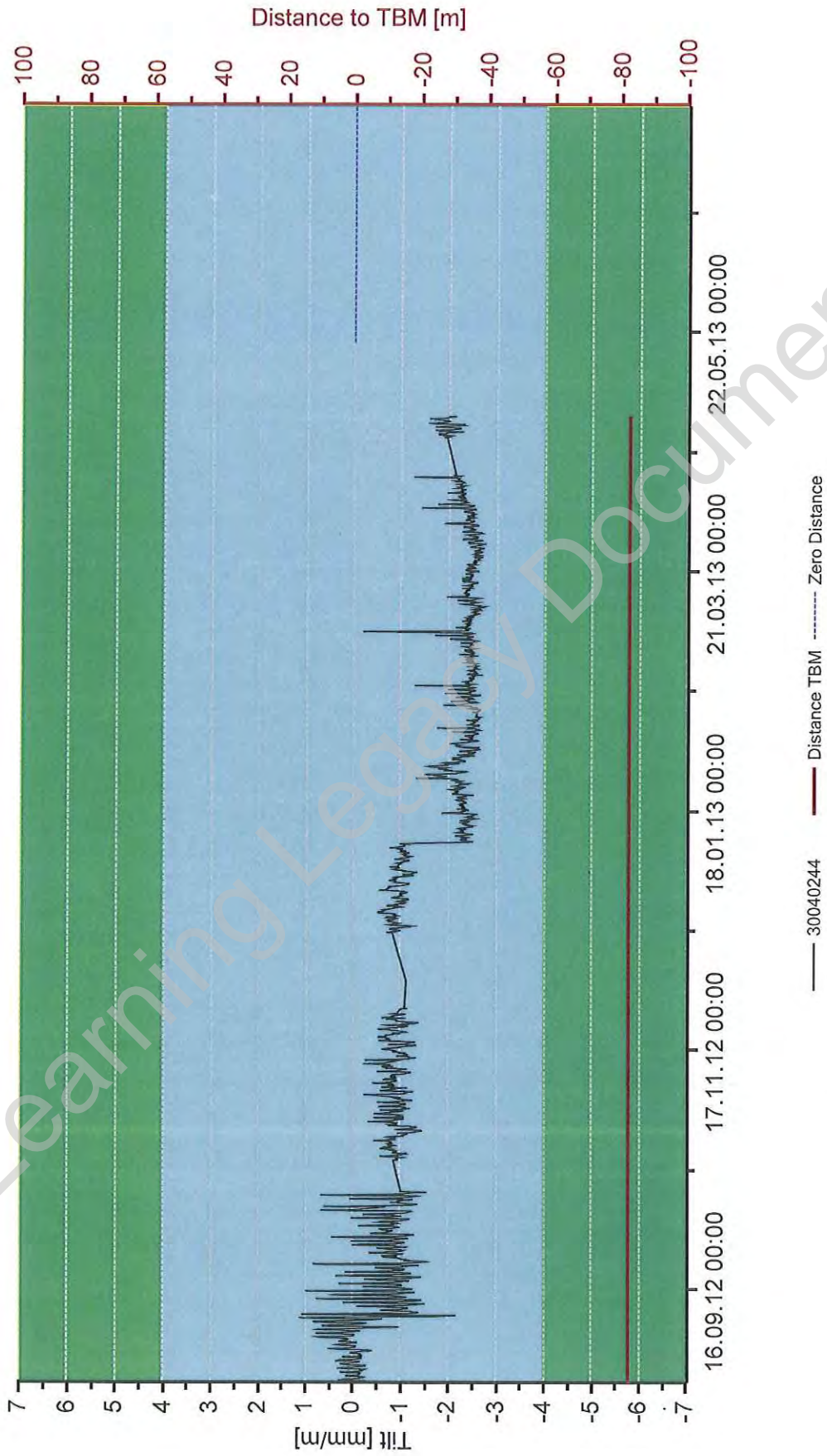


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Cathedral Substation (TM) 22.08.2012 - 19.07.2013  
date: 15.07.2014 10:11 current values: 15.07.2014 09:59



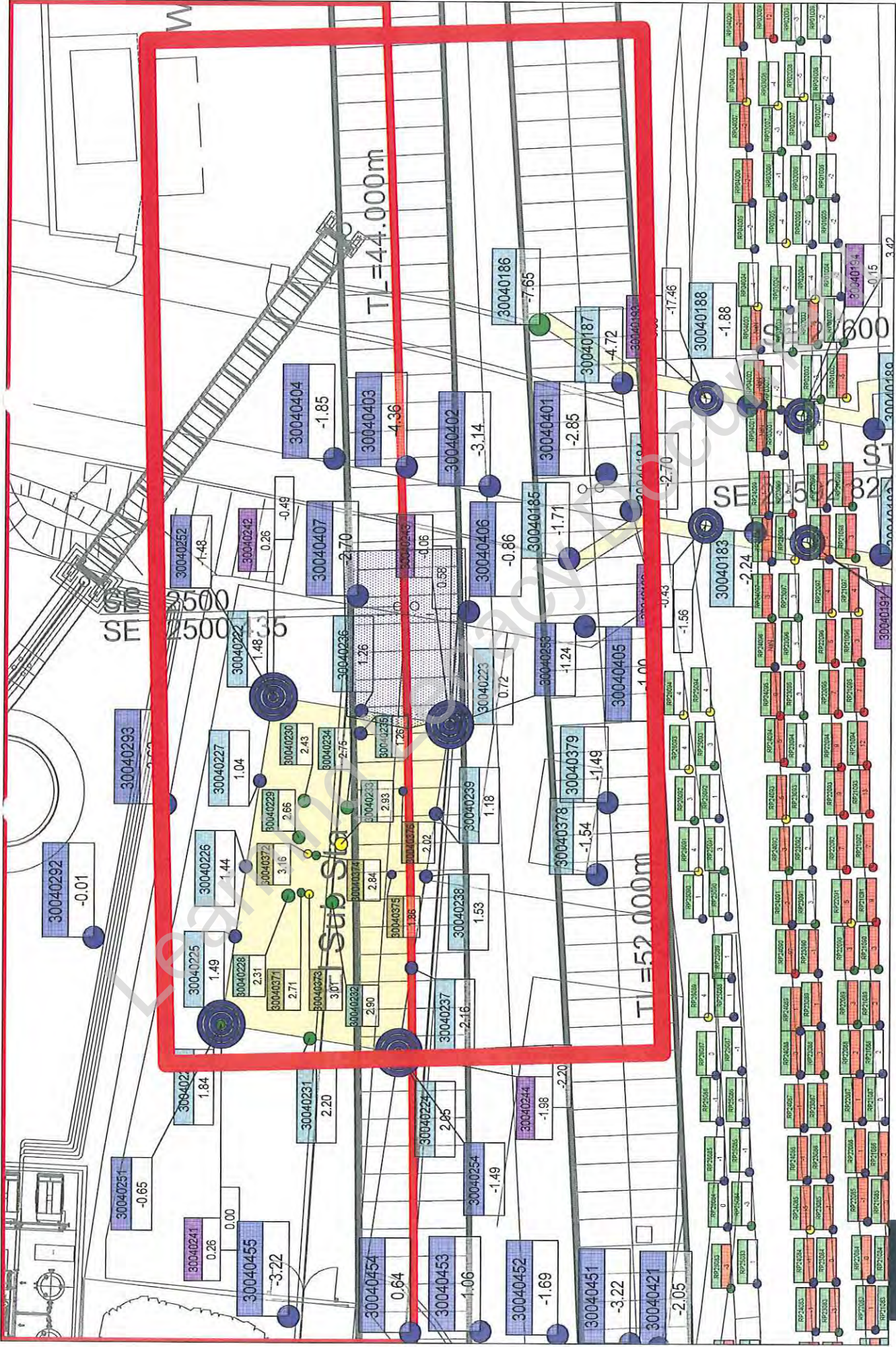


Point: 30040244

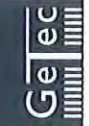



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Cathedral Substation (TM) 22.08.2012 - 19.07.2013  
date: 15.07.2014 10:14 current values: 15.07.2014 09:59





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 28.05.2013 09:00



 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 11**

**Cathedral Substation – Lev.St.**

Learning Legacy Document

monitoring asset

Cathedral Substation

reference monitoring drawing:

C310-HTM-C-DWG-CR148-PT005-50010

name of monitoring section:

Cathedral Substation

sensor type:

Levelling Studs

chainage:

91730

point no.:

3004 0251 - 3004 0254

trigger values:  
[mm]

green: +4  
-4

amber: +5  
-5

red: +6  
-6

reference document for trigger values:

Management Plan for Control of Ground Movement

EB-no.:

C310-HTM-Z-STP-CR148-50058

Appendix:

Y, AAA

monitoring data

	date	max. value	point no.	comments	
baseline	07/04/12	0			
TBM 1	start ZOI	20/01/13 25/01/13		During TBM drive no readings taken, due to automated HLC system in operation.	
	end ZOI	31/01/13 01/02/13			
TBM 2	start ZOI	26/05/13 28/05/13			
	end ZOI	31/05/13 03/06/13			
longterm	26/09/13	3.54	3004 0253		last reading post tunneling
Evaluation of any potential residual risks	<input checked="" type="checkbox"/>	No residual risk since the Works have been completed by HMJV			
	<input type="checkbox"/>	Yes, residual risk (see comment below)			

summary / comments

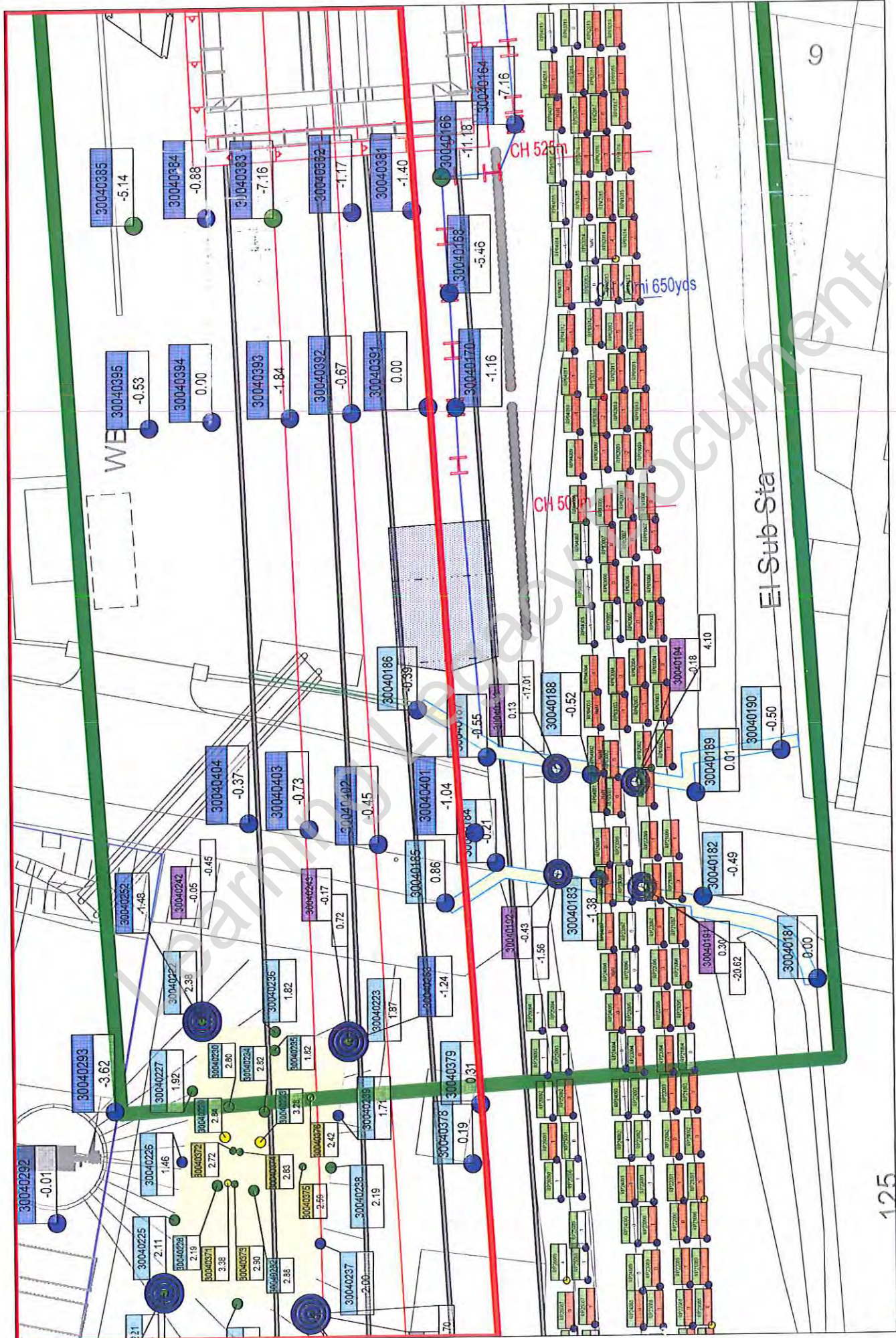
The levelling studs 3004 0251-3004 0254 are only a backup in case there is an total damage on the HLC system. The points are installed at each corner of the building adjacent to the HLC 3004 0221-3004 0224. As a result of TAM drillings and pre-grouting, from app. 15.10.-18.12.2012, the entire building was lifted up by app. 3-4mm, to compensate the max. of 2mm predicted settlement. Final readings were made after HLC and Tiltmeter were dismantled, to have a baseline in place in case any further manual monitoring of the building is required. The values of the studs showed similar deviation as the hydrostatic levelling cells. The summary of the grouting operation is report ref. C310-HTM-C-RGN-CR146\_ST004-50020. Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring. The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

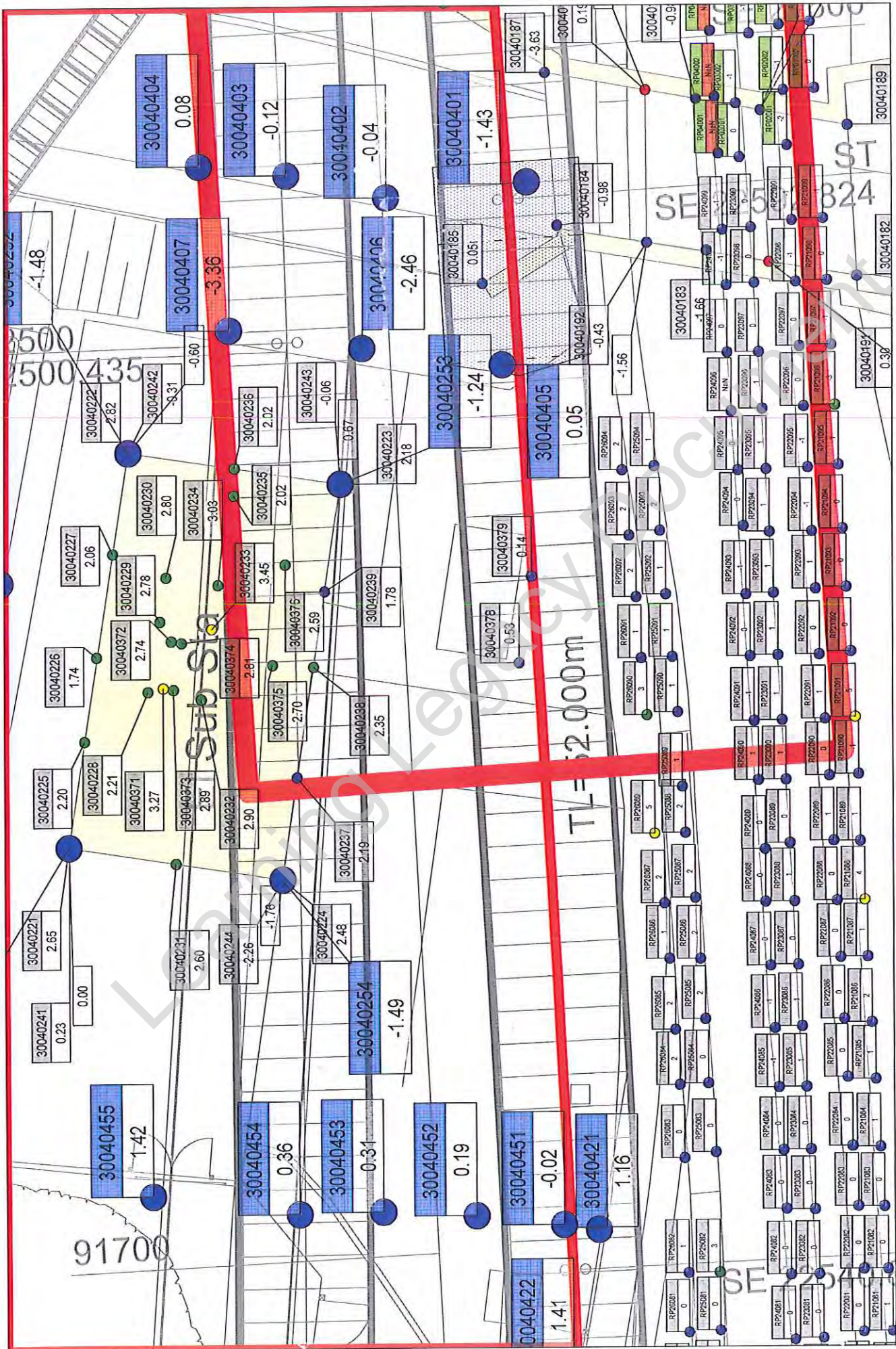
date / signature: 31/03/2015

print name:

HMJV project role:

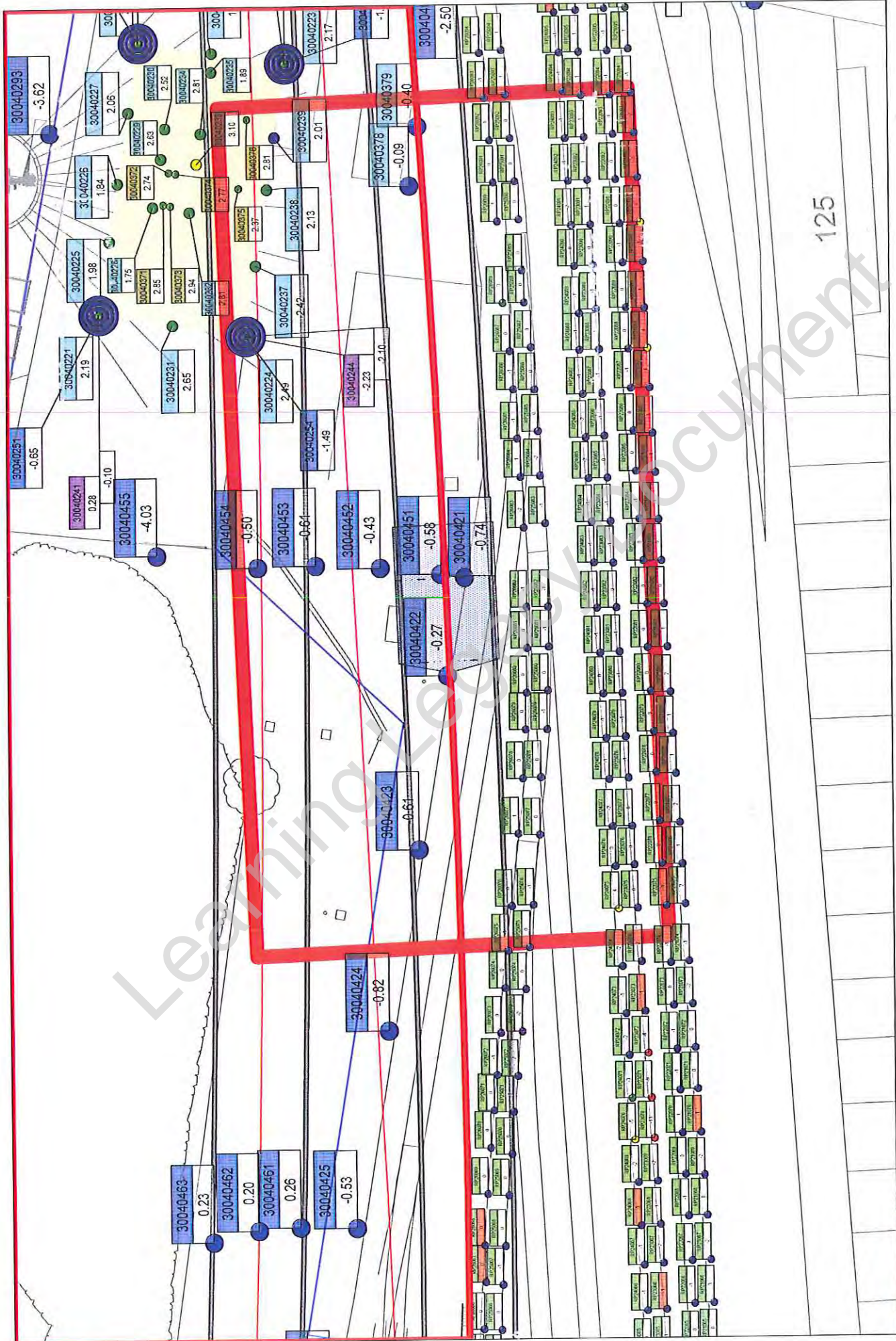
Monitoring & Survey engineer





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive WB  
 current values: 25.01.2013 06:59

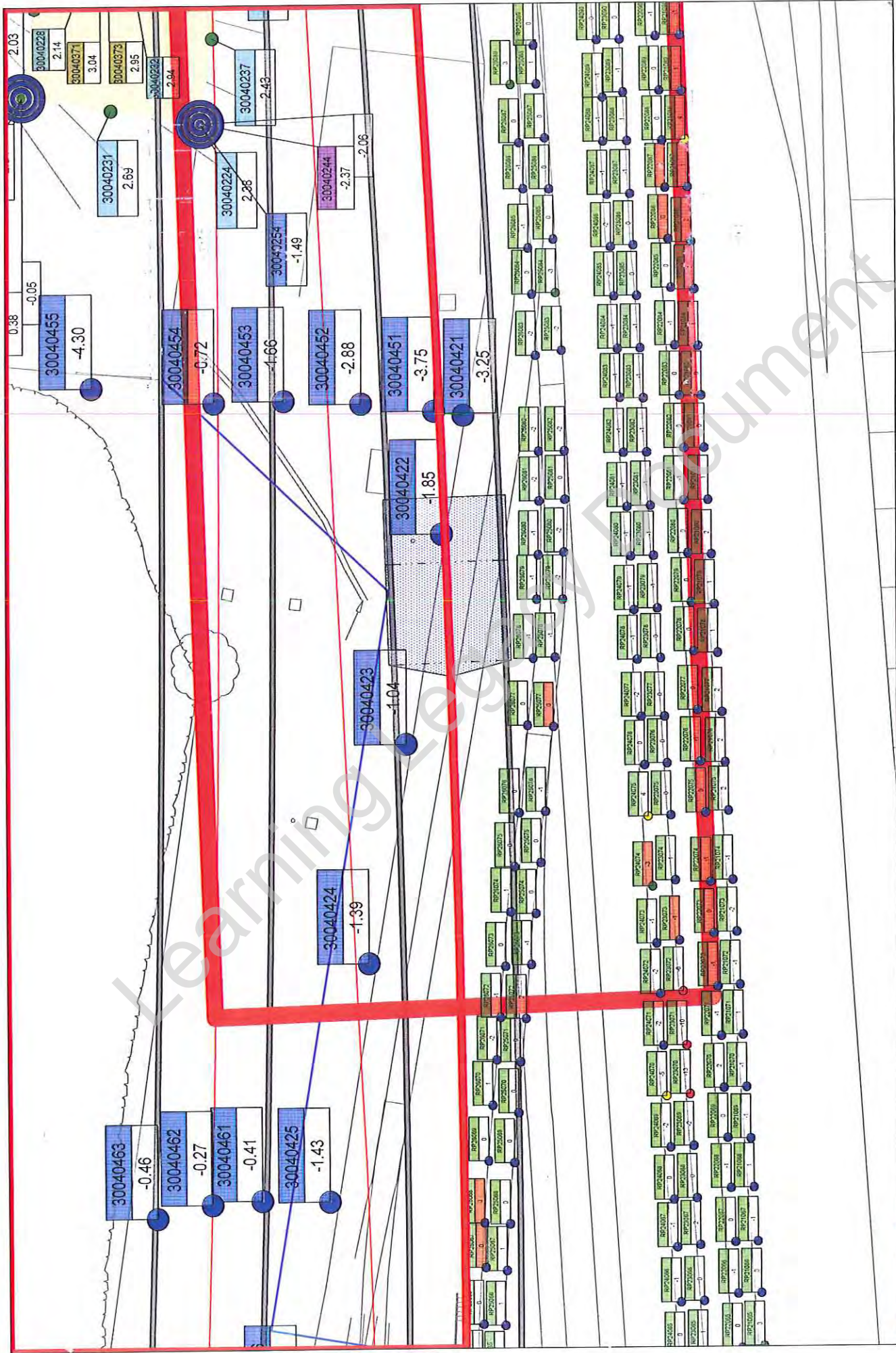




125

Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 31.01.2013 06:59





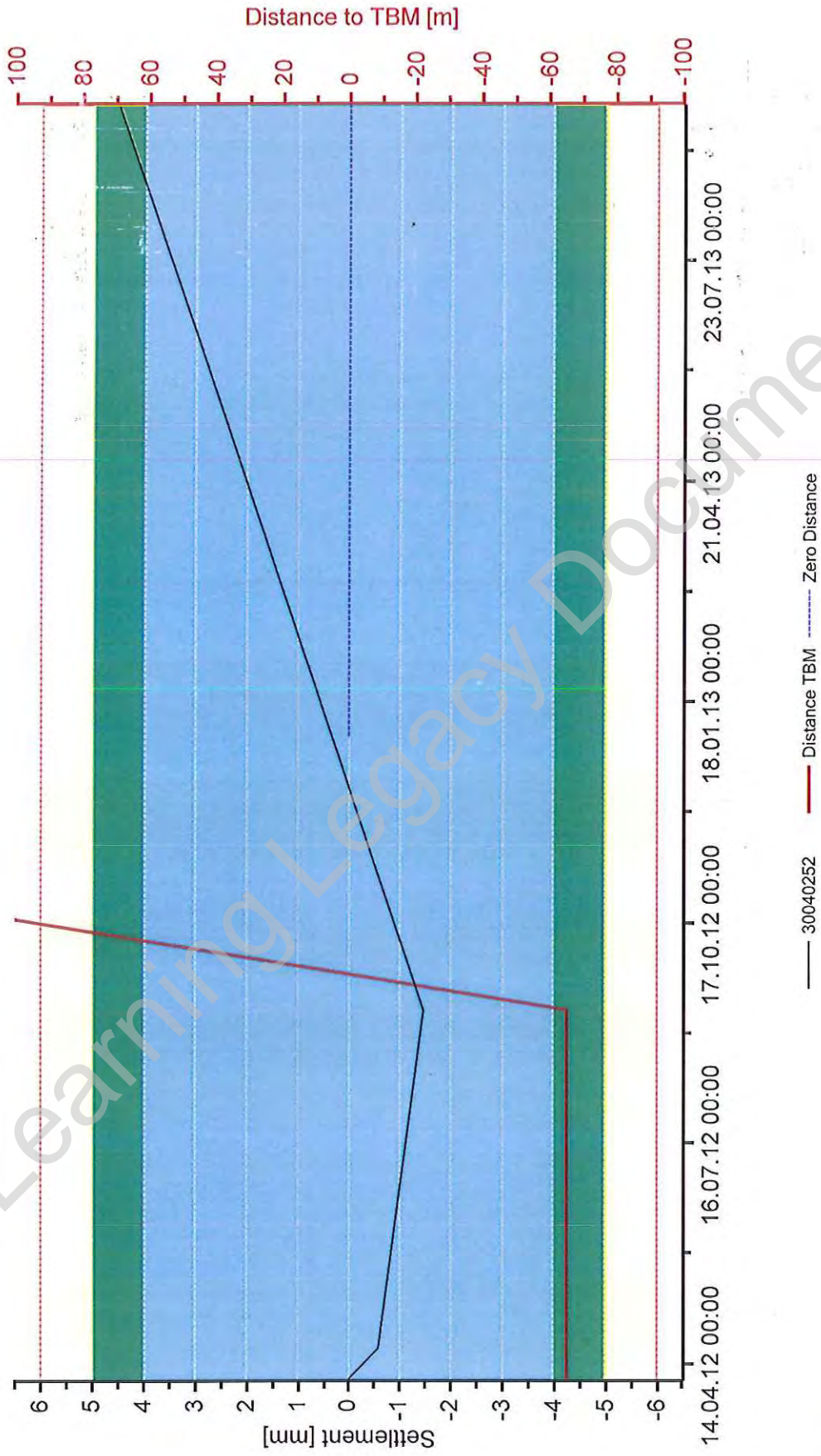
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 01.02.2013 06:59



Joint Venture



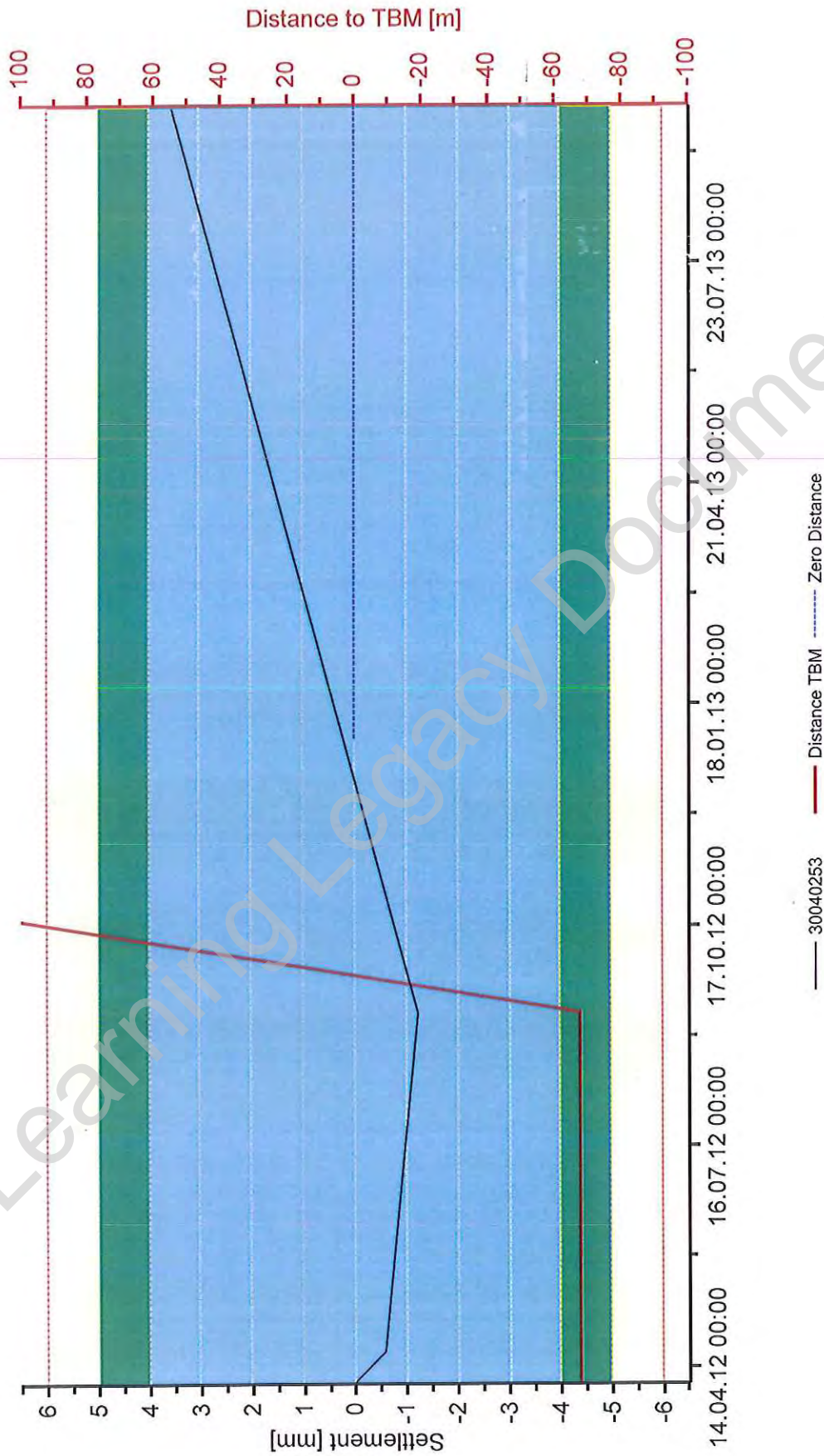
Point: 30040252



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (Lev.St.) 07.04.2012 - 26.09.2013  
date: 15.07.2014 11:45 current values: 15.07.2014 11:29



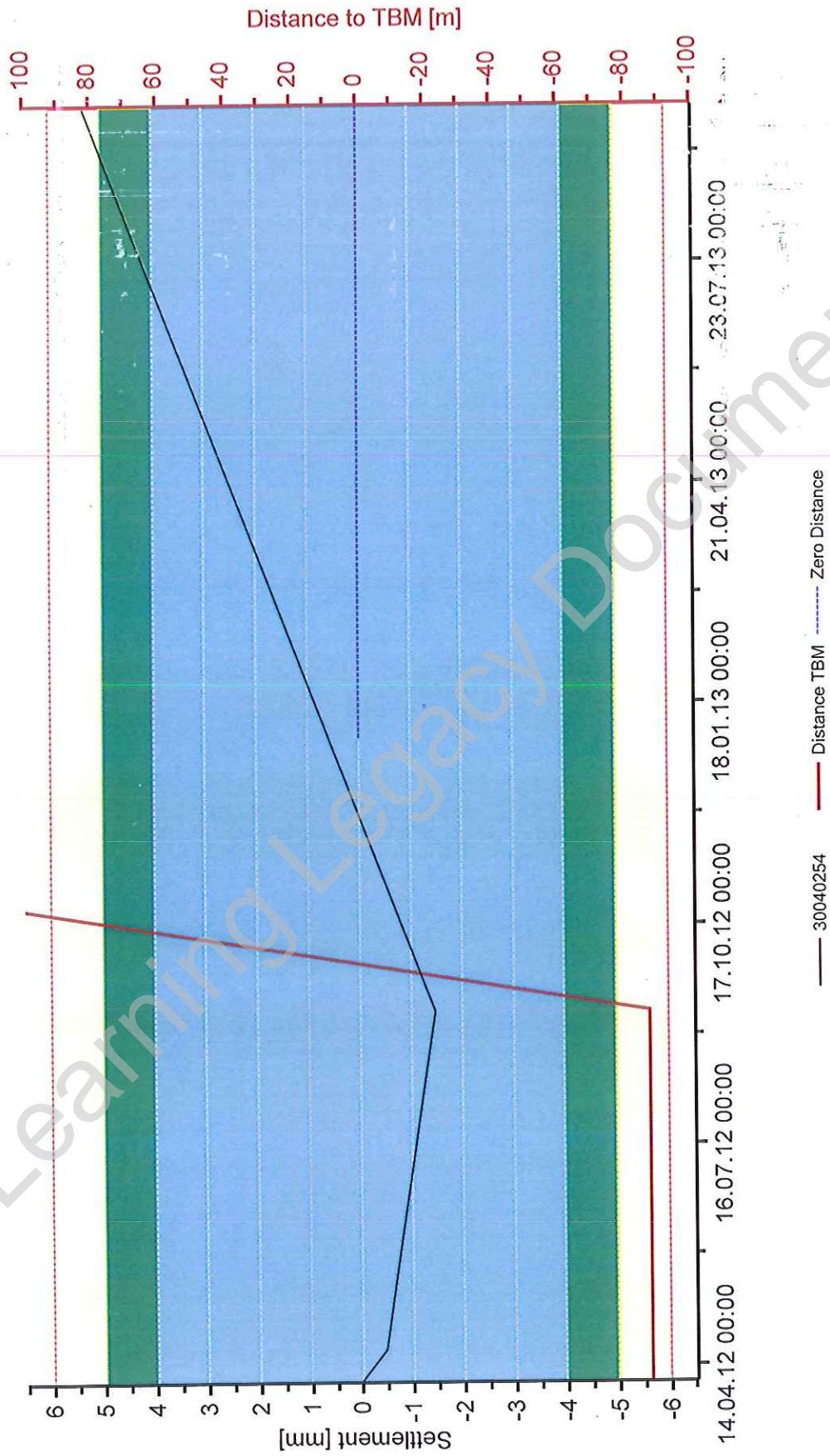
Point: 30040253



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (Lev.St.) 07.04.2012 - 26.09.2013  
date: 15.07.2014 11:48 current values: 15.07.2014 11:29

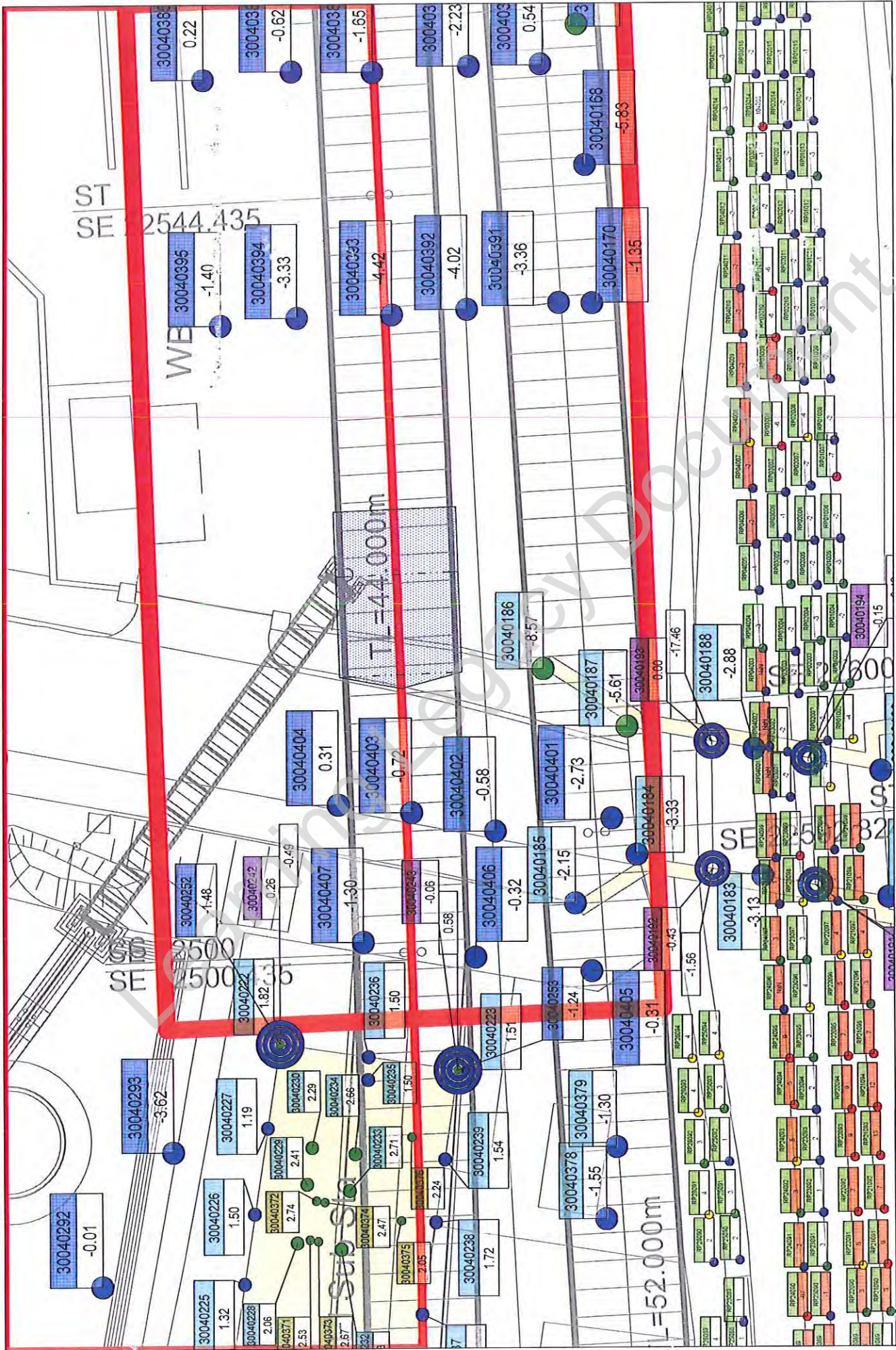


Point: 30040254



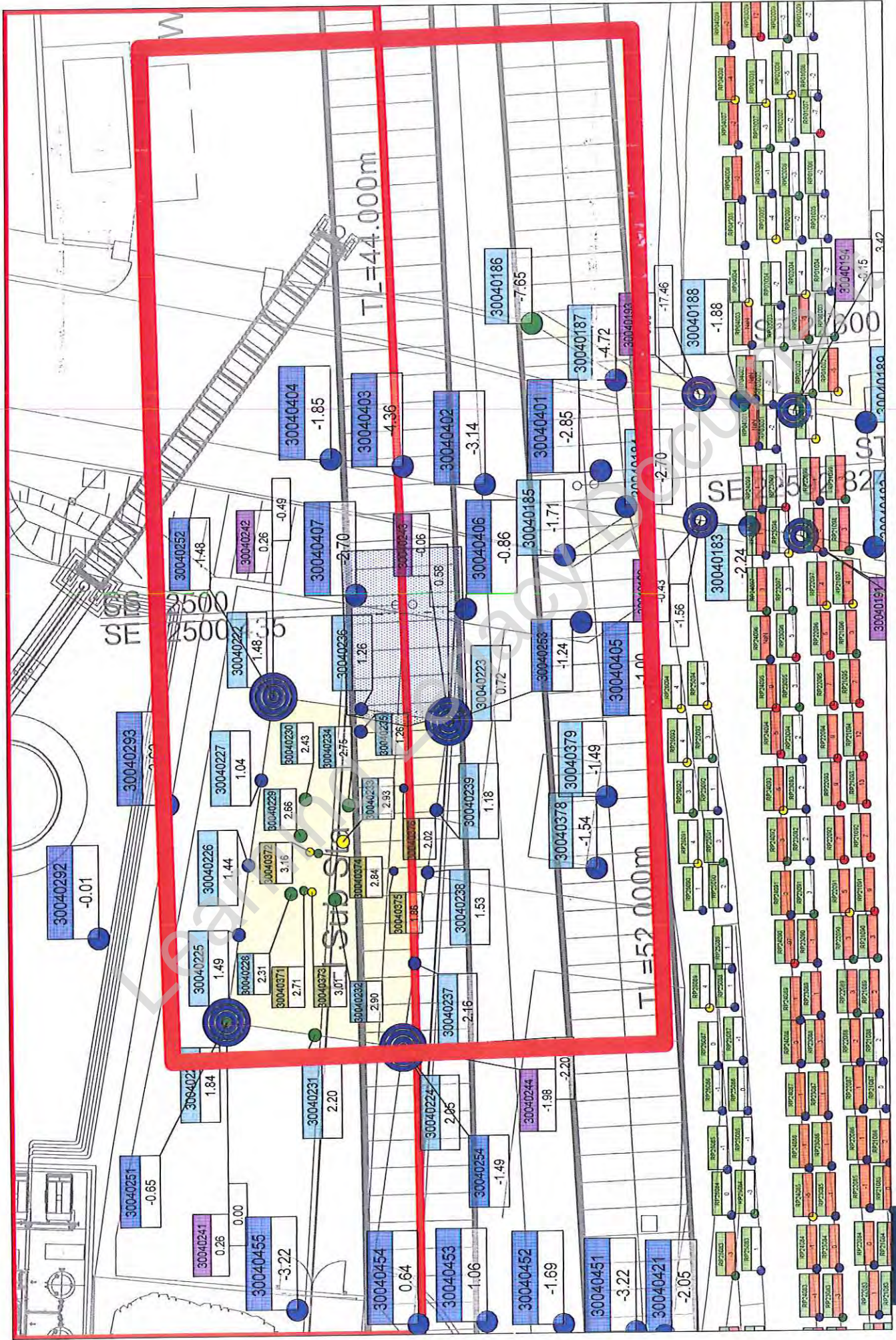
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (Lev.St.) 07.04.2012 - 26.09.2013  
date: 15.07.2014 11:56 current values: 15.07.2014 11:29





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 26.05.2013 09:07

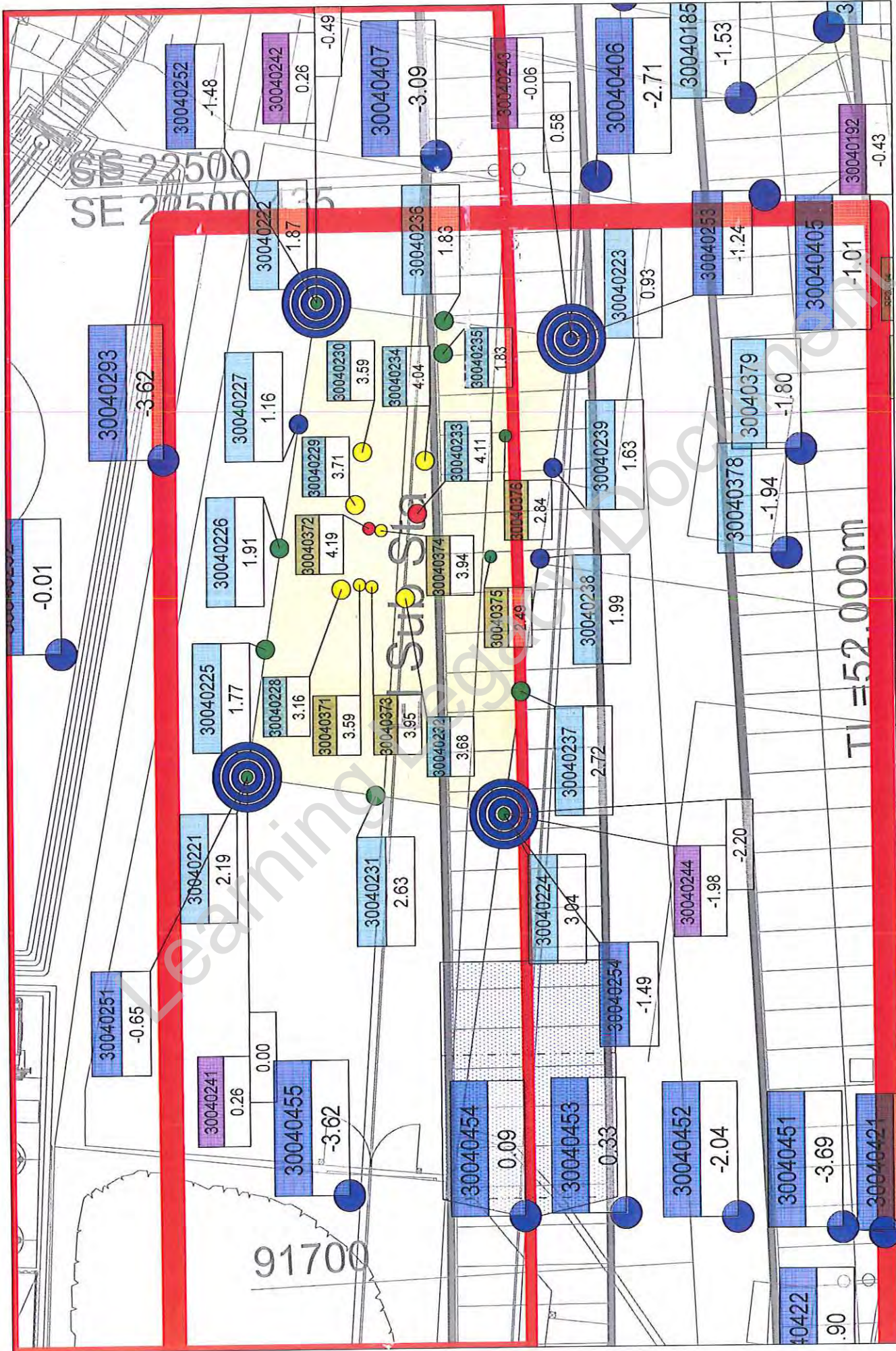




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

working activities: TBM drive

current values: 28.05.2013 09:00

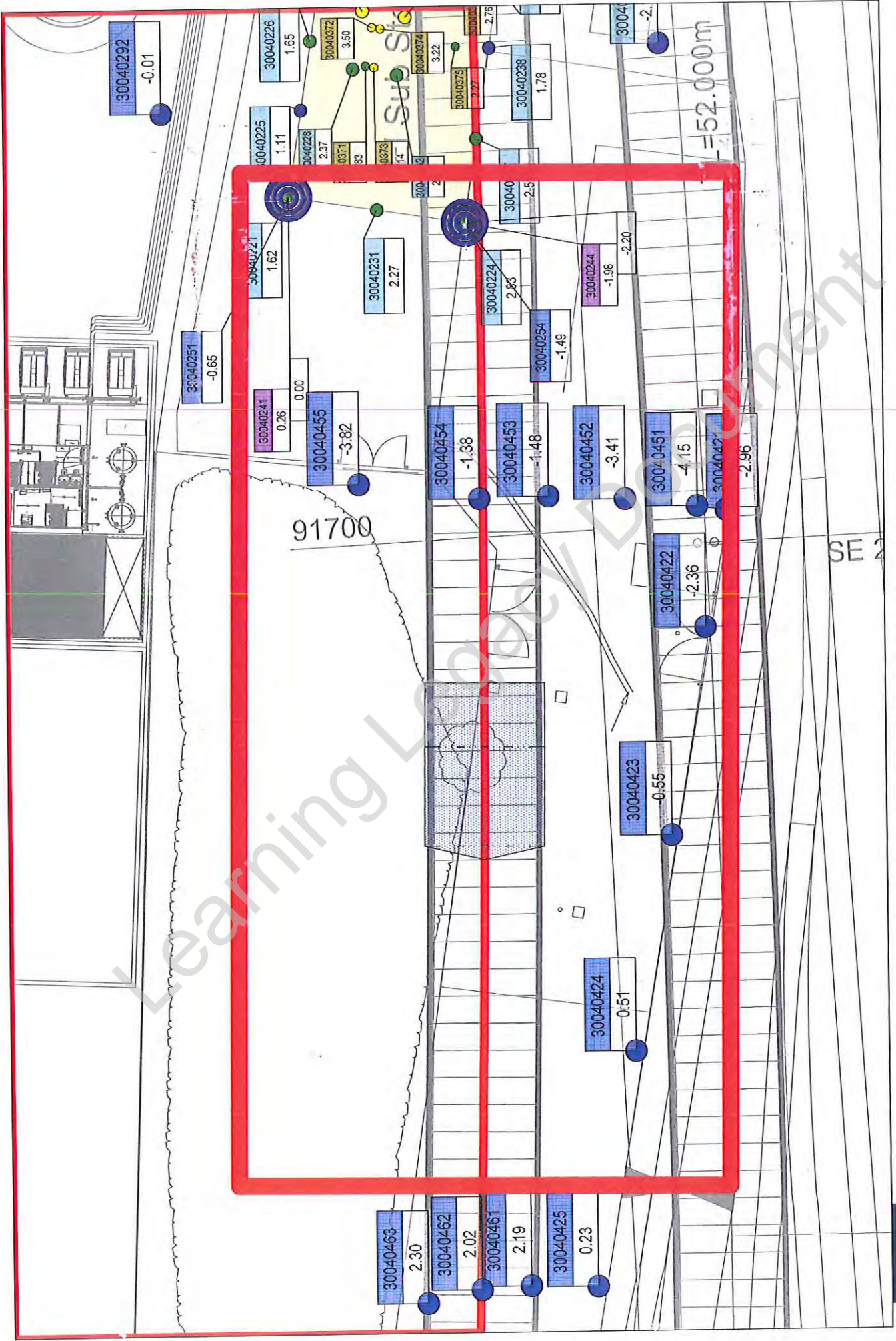


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: portal excavation, construction base slab and capping beam  
 current values: 31.05.2013 08:59

Point: 30040251



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Cathedral Substation (Lev.St.) 07.04.2012 - 26.09.2013  
date: 15.07.2014 11:40 current values: 15.07.2014 11:29

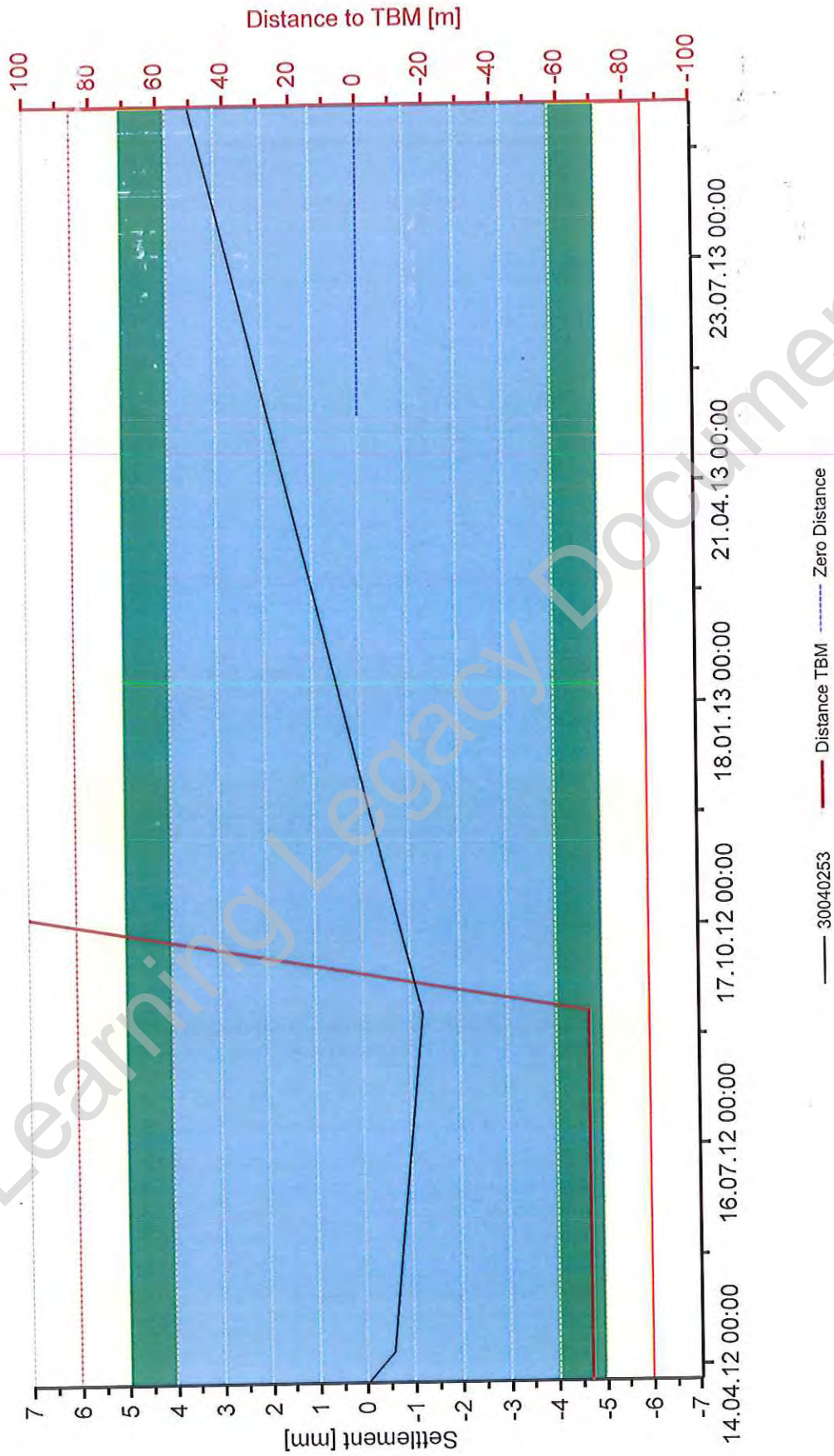


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 03.06.2013 09:00





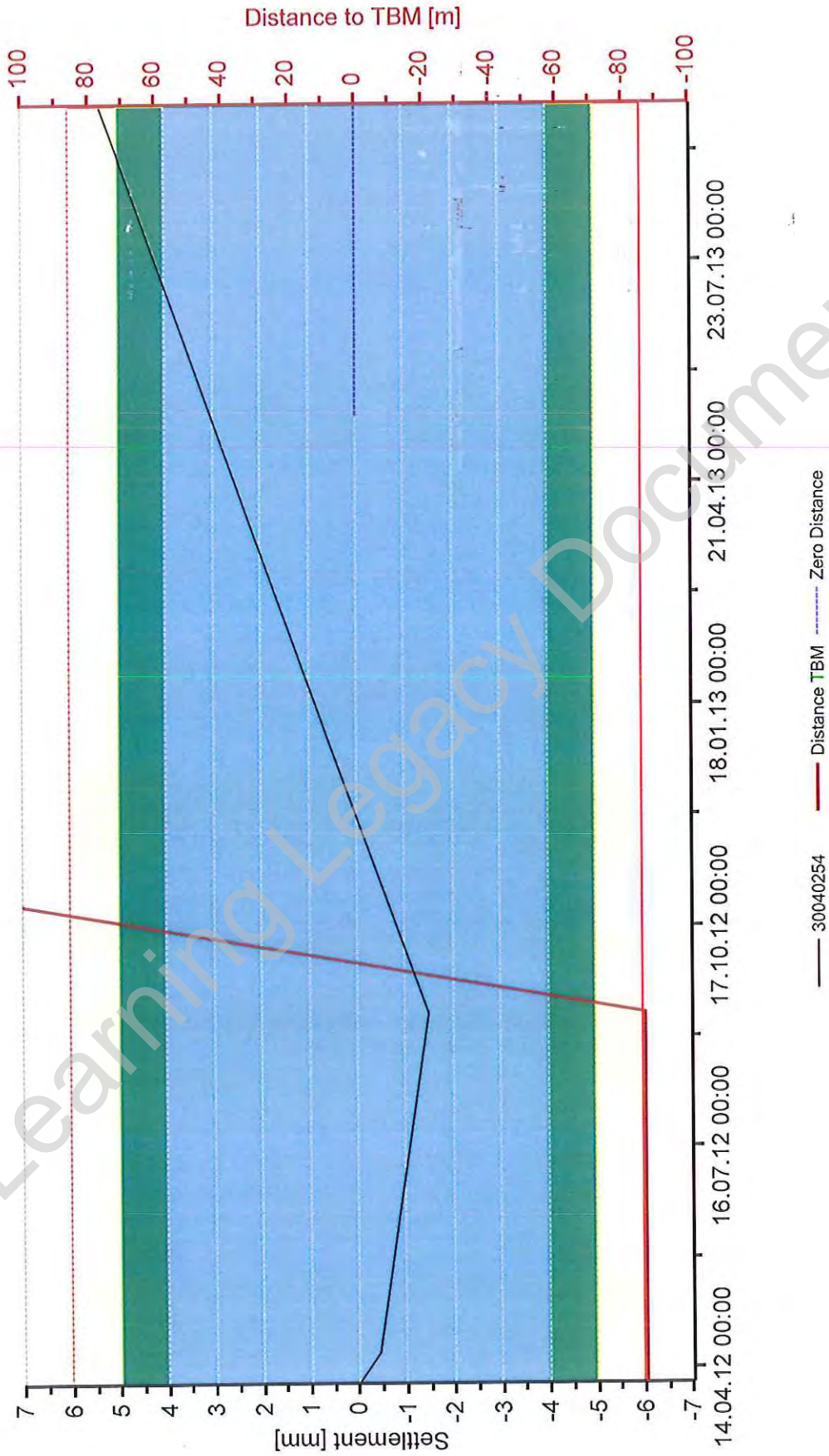
Point: 30040253



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Cathedral Substation (Lev.St.) 07.04.2012 - 26.09.2013  
date: 15.07.2014 12:28 current values: 15.07.2014 12:14




Point: 30040254



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Cathedral Substation (Lev.St.) 07.04.2012 - 26.09.2013  
date: 15.07.2014 12:31 current values: 15.07.2014 12:14



 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 12**  
**CS1 – Old Coal Yard**

Learning Legacy Document

<b>monitoring asset</b>	<b>Area of Old Coalyard</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR148-PT005-50010		
<b>name of monitoring section:</b>	CS1- Old Coalyard area		
sensor type:	manual levelling studs		
chainage:	91700	point no.:	3004 0451 - 3004 0455
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 -20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments	
<b>baseline</b>	15/12/12	0.00			
<b>TBM 1</b>	start ZOI	26/01/13	1.06	3004 0453	
	end ZOI	03/02/13	-4.20	3004 0451	breached not any trigger value
<b>TBM 2</b>	start ZOI	28/05/13	-3.22	3004 0451	
	end ZOI	09/06/13	-4.04	3004 0451	breached not any trigger value
<b>longterm</b>	24/09/13	-5.34	3004 0451	last reading 3 month post tunneling, Cross section not longer measurable	
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV			
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)			

**summary / comments**

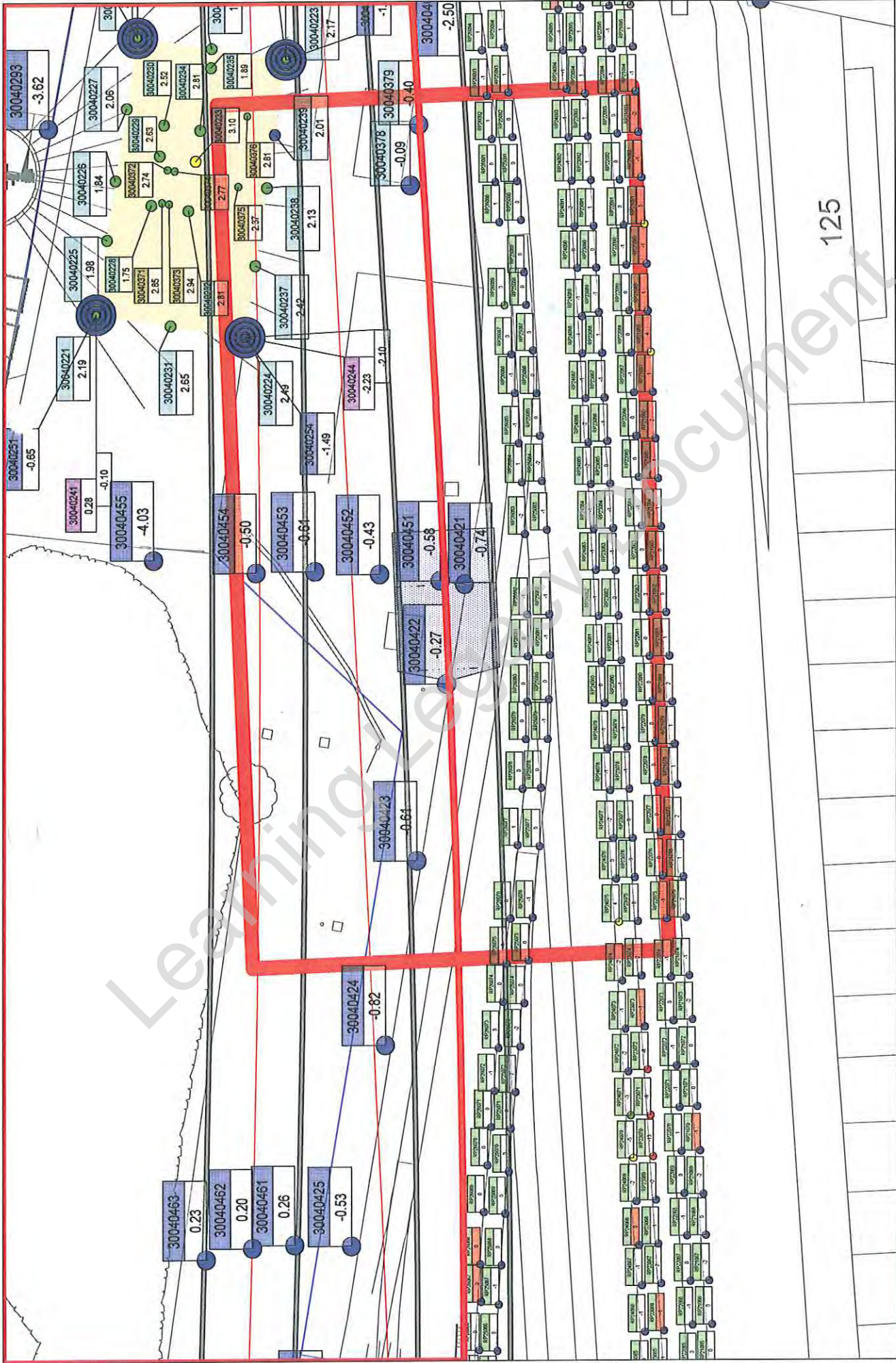
Cross section was no longer measureable due to no access (NR siding & CSS area)  
 Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 08/01/15

print name:

HMJV project role:

Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 31.01.2013 06:59

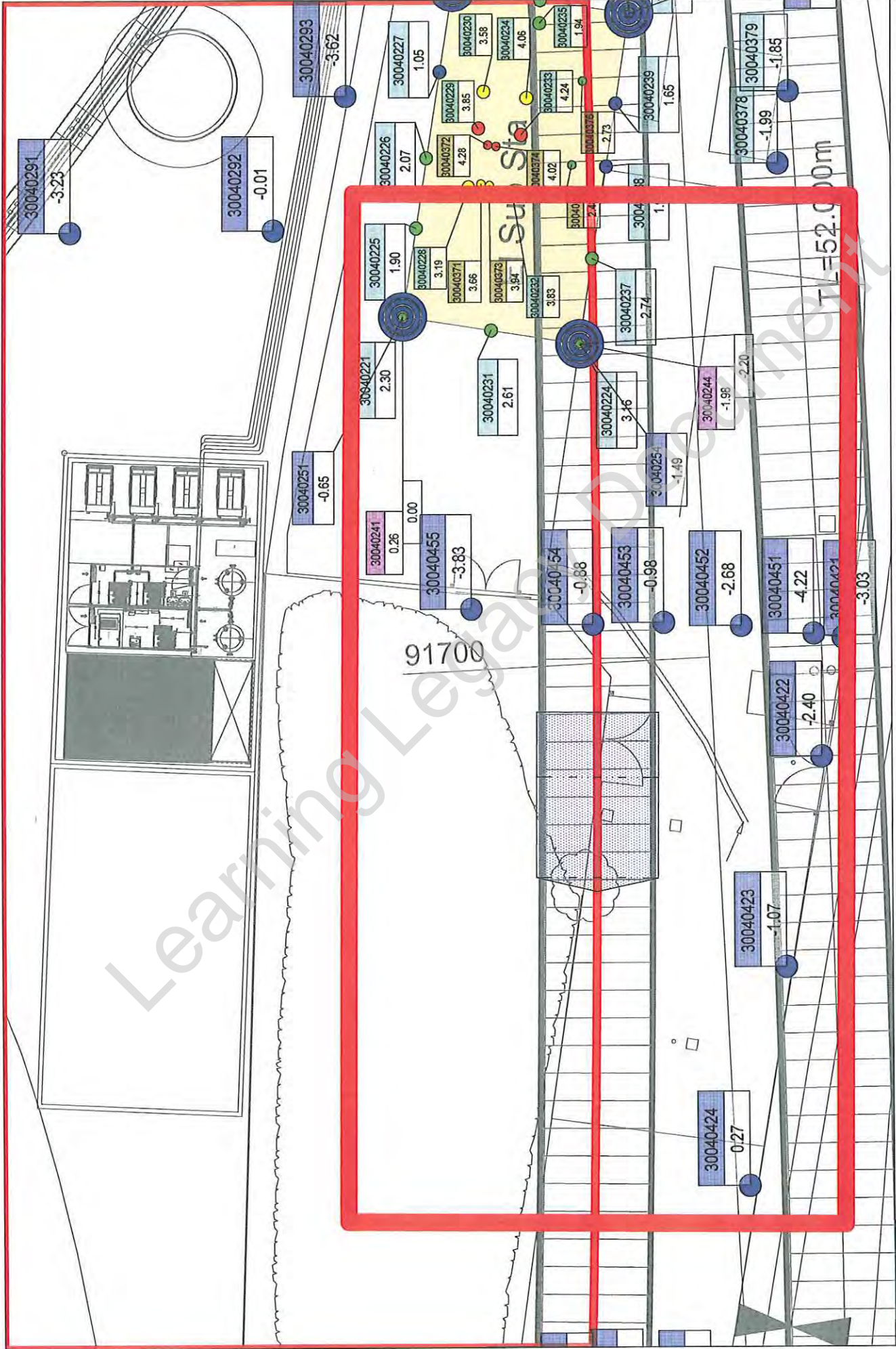


Point: 30040451



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - CS1 (Old Coalyard) 15.12.2012 - 24.09.2013  
date: 03.06.2014 13:57 current values: 03.06.2014 13:46





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 01.06.2013 09:00

Point: 30040451



— 30040451 — Distance TBM - - - - - Zero Distance

Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - CS1 (Old Coalyard) 15.12.2012 - 24.09.213  
date: 03.06.2014 13:49 current values: 03.06.2014 13:40





# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading date	baseline		1. following 12/01/2013		2. following 26/01/2013		3. following 27/01/2013		4. following 28/01/2013		5. following 29/01/2013		6. following 30/01/2013	
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885	0	103.886	1	103.884	-2	103.885	1	103.886	1	103.885	1	103.885	-1
3004 0452	103.884	0	103.885	1	103.883	-1	103.884	0	103.884	0	103.884	1	103.883	-1
3004 0453	103.711	0	103.712	1	103.710	-1	103.711	0	103.711	0	103.711	1	103.710	-1
3004 0454	103.431	0	103.432	0	103.431	-1	103.431	1	103.431	1	103.432	1	103.431	-1
3004 0455	103.224	1	103.224	-1	103.221	-3	103.221	0	103.221	0	103.222	0	103.220	-2
3004 0461	103.597	1	103.599	0	103.597	-2	103.597	0	103.597	0	103.598	1	103.598	0
3004 0462	103.540	1	103.541	0	103.539	-2	103.539	1	103.539	1	103.540	1	103.540	0
3004 0463	103.590	1	103.591	0	103.590	-1	103.590	0	103.590	0	103.591	1	103.591	0
3004 0471	103.807	-1	103.807	0	103.806	-1	103.806	0	103.806	0	103.806	0	103.806	0
3004 0472	103.528	0	103.529	1	103.527	-2	103.528	2	103.528	2	103.528	0	103.528	0
3004 0473	103.361	1	103.362	0	103.361	-1	103.361	1	103.362	1	103.362	0	103.362	0
3004 0474	103.174	0	103.173	-1	103.172	-1	103.172	0	103.172	0	103.172	0	103.360	-1
3004 0475	103.047	0												
3004 0481	103.321	1												
3004 0482	103.217	0												
3004 0483	103.164	0												
3004 0484	103.137	0												
3004 0485	103.115	0												
3004 0486	103.110	-1												
3004 0487	103.093	0												

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline		7. following		8. following		9. following		10. following		11. following		12. following		
	date	elevation	31/01/2013	deviation from last/ baseline	01/02/2013	deviation from last/ baseline	02/02/2013	elevation	deviation from last/ baseline	03/02/2013	elevation	deviation from last/ baseline	04/02/2013	elevation	deviation from last/ baseline
Point No.		elevation													
3004 0451		103.885	103.882	-3	103.881	-1	-4	103.881	0	-4	103.881	0	-4		
3004 0452		103.884	103.881	-2	103.881	0	-3	103.881	1	-3	103.881	0	-3		
3004 0453		103.711	103.709	-1	103.709	0	-1	103.710	1	-1	103.710	0	-1		
3004 0454		103.431	103.431	0	103.430	0	-1	103.431	1	0	103.432	1	0		
3004 0455		103.224	103.219	0	103.219	0	-4	103.220	1	-4	103.221	1	-3		
3004 0461		103.597	103.597	-1	103.597	0	0	103.598	1	1	103.599	1	1	103.598	-1
3004 0462		103.540	103.539	0	103.539	0	0	103.540	1	1	103.541	1	1	103.540	-1
3004 0463		103.590	103.590	-1	103.590	0	0	103.591	1	1	103.592	1	2	103.591	-1
3004 0471		103.807	103.805	-1	103.806	0	-2	103.806	1	-1	103.807	1	0	103.806	-1
3004 0472		103.528	103.527	0	103.528	1	0	103.529	1	1	103.529	0	1	103.528	-1
3004 0473		103.361	103.361	0	103.361	0	0	103.362	1	0	103.362	0	1	103.361	-1
3004 0474		103.174													
3004 0475		103.047													
3004 0481		103.321			103.319	-2	-1								
3004 0482		103.217			103.215	-2	-2								
3004 0483		103.164													
3004 0484		103.137			103.135	-2	-2								
3004 0485		103.115													
3004 0486		103.110													
3004 0487		103.093													

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	15/12/12		13. following		14. following		15. following		16. following		17. following		18. following	
	baseline	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
date														
Point No.														
3004 0451	103.885		103.883	1	-3									
3004 0452	103.884		103.883	2	-1									
3004 0453	103.711		103.712	2	1									
3004 0454	103.431		103.433	1	2									
3004 0455	103.224		103.222	1	-2									
3004 0461	103.597	103.599	103.599	1	1	103.599	0	2	103.599	0	2	103.599	-1	2
3004 0462	103.540	103.541	103.541	1	1	103.541	0	2	103.541	0	2	103.541	-1	1
3004 0463	103.590	103.592	103.592	1	2	103.592	0	2	103.592	0	2	103.592	-1	2
3004 0471	103.807	103.807	103.807	0	-1	103.807	1	0	103.807	0	0	103.807	0	0
3004 0472	103.528	103.529	103.529	0	1	103.529	0	1	103.529	0	1	103.529	-1	2
3004 0473	103.361	103.362	103.362	1	1	103.362	1	1	103.362	0	1	103.362	-1	1
3004 0474	103.174													
3004 0475	103.047													
3004 0481	103.321	103.321	103.321	2	0	103.321	0	0						
3004 0482	103.217	103.217	103.217	2	1	103.217	0	1						
3004 0483	103.164													
3004 0484	103.137	103.137	103.137	2	0	103.137	0	0						
3004 0485	103.115													
3004 0486	103.110													
3004 0487	103.093													

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	15/12/12		19. following		20. following		21. following		22. following		23. following		24. following		
	baseline	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
date	12/02/2013														
Point No.	13/02/2013		14/02/2013		15/02/2013		16/02/2013		17/02/2013						
3004 0451	103.885	103.882	103.882	0	103.600	0	103.600	0	103.597	-3	103.597	0	103.597	0	-1
3004 0452	103.884	103.882	103.882	0	103.542	0	103.542	0	103.539	-3	103.539	0	103.539	0	-1
3004 0453	103.711	103.712	103.712	0	103.593	0	103.593	0	103.590	-3	103.590	0	103.590	0	-1
3004 0454	103.431	103.432	103.432	0	103.808	0	103.808	0	103.806	-2	103.806	0	103.805	0	-2
3004 0455	103.224	103.221	103.221	-1	103.530	1	103.530	2	103.528	-3	103.528	0	103.527	0	-1
3004 0461	103.597	103.599	103.599	0	103.363	1	103.363	2	103.361	-3	103.361	0	103.360	0	-1
3004 0462	103.540	103.542	103.542	0											
3004 0463	103.590	103.593	103.593	0											
3004 0471	103.807	103.808	103.808	0											
3004 0472	103.528	103.530	103.530	-1											
3004 0473	103.361	103.363	103.363	-1											
3004 0474	103.174														
3004 0475	103.047														
3004 0481	103.321	103.320	103.320	-1											
3004 0482	103.217	103.216	103.216	-1											
3004 0483	103.164														
3004 0484	103.137	103.137	103.137	-1											
3004 0485	103.115														
3004 0486	103.110														
3004 0487	103.093														

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline		25. following		26. following		27. following		28. following		29. following		30. following	
	date	elevation	19/02/2013	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
Point No.		elevation		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline
3004 0451	15/12/12	103.885							103.879	-3	103.879	-3		
3004 0452		103.884						103.879	-3	103.879	-3			
3004 0453		103.711						103.708	-3	103.708	-3			
3004 0454		103.431						103.429	-3	103.429	-3			
3004 0455		103.224						103.218	-3	103.218	-3			
3004 0461		103.597			103.596	0	-1	103.596	0	103.596	0	-1	103.597	0
3004 0462		103.540			103.539	0	-1	103.538	0	103.539	0	-1	103.539	0
3004 0463		103.590			103.589	0	-1	103.589	0	103.590	0	-1	103.590	0
3004 0471		103.807			103.805	0	-3	103.805	0	103.804	0	-3	103.805	0
3004 0472		103.528			103.527	0	-1	103.527	0	103.527	0	-2	103.527	0
3004 0473		103.361			103.360	-1	-2	103.360	0	103.360	0	-1	103.360	0
3004 0474		103.174												
3004 0475		103.047												
3004 0481		103.321			103.321	0	0	103.321	0	103.321	0	0		
3004 0482		103.217			103.217	0	0	103.217	0					
3004 0483		103.164												
3004 0484		103.137												
3004 0485		103.115												
3004 0486		103.110												
3004 0487		103.093												

# monitoring table



Joint Venture

project: C310 Thames Tunnel

		structure: Cross Section 1 - 4 Area NR + Old Coalyard												
No. of reading	baseline	31. following		32. following		33. following		34. following		35. following		36. following		
	date	15/12/12	24/02/2013	25/02/2013	26/02/2013	27/02/2013	28/02/2013	01/03/2013	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
Point No.	elevation		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885													
3004 0452	103.884													
3004 0453	103.711													
3004 0454	103.431													
3004 0455	103.224													
3004 0461	103.597		103.596	-1										
3004 0462	103.540		103.538	-1										
3004 0463	103.590		103.589	-1										
3004 0471	103.807		103.805	0	103.805	0	103.806	1	103.804	-2	103.804	-2	103.804	0
3004 0472	103.528		103.528	1	103.527	-1	103.528	1	103.527	-1	103.527	-1	103.526	0
3004 0473	103.361		103.361	0	103.360	0	103.362	1	103.360	-1	103.360	-1	103.360	0
3004 0474	103.174													
3004 0475	103.047													
3004 0481	103.321													
3004 0482	103.217													
3004 0483	103.164													
3004 0484	103.137													
3004 0485	103.115													
3004 0486	103.110													
3004 0487	103.093													

# monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	37. following		38. following		39. following		40. following		41. following		42. following					
	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	07/03/2013				
3004 0451	15/12/12	103.885										103.880	0	-6		
3004 0452		103.884										103.880	1	-4		
3004 0453		103.711										103.709	0	-2		
3004 0454		103.431										103.430	1	-1		
3004 0455		103.224										103.219	1	-5		
3004 0461		103.597										103.597	0	-1		
3004 0462		103.540										103.539	0	-1		
3004 0463		103.590										103.590	0	-1		
3004 0471		103.807										103.806	0	-1		
3004 0472		103.528										103.527	-1	-1		
3004 0473		103.361										103.362	1	1		
3004 0474		103.174														
3004 0475		103.047														
3004 0481		103.321														
3004 0482		103.217	0	-3	103.212	-1	-5	103.212	0	-5	103.212	0	-5			
3004 0483		103.164	0	-8	103.155	-1	-9	103.155	0	-9	103.155	0	-9	103.155	0	-9
3004 0484		103.137	0	-6	103.131	-1	-6	103.131	0	-6	103.131	0	-6	103.131	0	-6
3004 0485		103.115	0	-4	103.110	0	-5	103.110	0	-5	103.110	0	-5	103.111	1	-5
3004 0486		103.110	0	-6	103.104	0	-6	103.104	0	-6	103.103	-1	-7	103.100	-3	-10
3004 0487		103.093														

# monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	43. following		44. following		45. following		46. following		47. following		48. following	
	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	date
3004 0451	15/12/12	103.885										21/05/2013
3004 0452		103.884						103.880	1	103.882	1	
3004 0453		103.711						103.881	1	103.882	1	
3004 0454		103.431						103.710	1	103.711	2	
3004 0455		103.224						103.431	1	103.432	1	
3004 0461		103.597						103.219	0	103.220	1	
3004 0462		103.540			103.597	0	-1	103.596	0	103.599	1	
3004 0463		103.590			103.539	0	-1	103.538	-1	103.541	1	
3004 0471		103.807			103.590	0	0	103.589	-1	103.593	2	
3004 0472		103.528			103.804	-2	-3	103.804	0	103.805	-1	
3004 0473		103.361			103.527	-1	-1	103.526	-1	103.529	2	
3004 0474		103.174			103.361	-1	0	103.360	-1	103.363	1	
3004 0475		103.047								103.143	-1	
3004 0481		103.321								103.115	0	
3004 0482		103.217								103.211	0	
3004 0483		103.164			103.213	1	-4	103.212	-1	103.170	-5	
3004 0484		103.137			103.155	1	-8	103.155	-1	103.127	-9	
3004 0485		103.115			103.132	0	-6	103.131	-1	103.107	-7	
3004 0486		103.110			103.110	0	-5	103.109	-1	103.094	-6	
3004 0487		103.093			103.099	-1	-11			103.098	-1	

Küster Document



# monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline		49. following		50. following		51. following		52. following		53. following		54. following		
	date	elevation	28/05/2013	deviation from last/ baseline	29/05/2013	deviation from last/ baseline	30/05/2013	elevation	deviation from last/ baseline	31/05/2013	elevation	deviation from last/ baseline	01/06/2013	elevation	deviation from last/ baseline
Point No.		elevation		deviation from last/ baseline		deviation from last/ baseline		elevation	deviation from last/ baseline		elevation	deviation from last/ baseline		elevation	deviation from last/ baseline
3004 0451	15/12/12	103.885	103.882	0 -3	103.882	0 -4	103.882	103.881	-1 -4	103.881	103.881	0 -4	103.881	103.881	0 -4
3004 0452		103.884	103.882	0 -2	103.882	0 -2	103.882	103.881	-1 -3	103.881	103.881	1 -3	103.881	103.881	0 -3
3004 0453		103.711	103.712	1 1	103.711	0 0	103.711	103.710	-1 -1	103.710	103.710	0 -1	103.709	103.709	-1 -2
3004 0454		103.431	103.432	0 1	103.431	0 0	103.431	103.430	-1 -1	103.430	103.430	0 -1	103.430	103.430	-1 -1
3004 0455		103.224	103.220	0 -3	103.220	-1 -4	103.220	103.219	-1 -4	103.219	103.220	1 -4	103.220	103.220	0 -4
3004 0461		103.597					103.599	103.599	0 1	103.599	103.599	0 1	103.598	103.598	0 1
3004 0462		103.540					103.541	103.541	0 1	103.541	103.541	0 1	103.541	103.541	0 1
3004 0463		103.590					103.592	103.592	-1 1	103.592	103.592	0 2	103.592	103.592	0 2
3004 0471		103.807					103.804	103.804	-1 -3	103.804	103.804	0 -3	103.805	103.805	0 -3
3004 0472		103.528					103.529	103.529	0 1	103.529	103.529	0 0	103.529	103.529	0 1
3004 0473		103.361					103.362	103.362	-1 1	103.362	103.362	0 1	103.362	103.362	0 1
3004 0474		103.174					103.141	103.141	-2 -3	103.141	103.142	0 -3	103.142	103.142	0 -3
3004 0475		103.047					destroyed								
3004 0481		103.321													
3004 0482		103.217													
3004 0483		103.164													
3004 0484		103.137													
3004 0485		103.115													
3004 0486		103.110													
3004 0487		103.093													

# monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline	55. following		56. following		57. following		58. following		59. following		60. following		
		date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
		15/12/12												
				03/06/2013		04/06/2013		05/06/2013		06/06/2013		07/06/2013		08/06/2013
Point No.	elevation		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885		103.881	0 -4	103.880	-1 -5	103.881	0 -5	103.881	0 -4	103.881	0 -4	103.881	1 -4
3004 0452	103.884		103.880	0 -3	103.880	-1 -4	103.880	0 -4	103.880	1 -3	103.880	0 -4	103.881	1 -2
3004 0453	103.711		103.709	0 -1	103.708	-1 -2	103.709	0 -2	103.709	0 -2	103.709	1 -2	103.710	1 -1
3004 0454	103.431		103.430	0 -1	103.429	-1 -2	103.429	0 -2	103.429	0 -2	103.429	0 -2	103.430	1 -1
3004 0455	103.224		103.220	0 -4	103.219	-1 -5	103.219	0 -5	103.219	0 -4	103.219	0 -4	103.220	1 -4
3004 0461	103.597		103.600	1 2	103.599	0 1	103.599	0 1	103.599	1 2	103.599	0 2	103.600	1 2
3004 0462	103.540		103.542	1 2	103.541	0 1	103.541	0 1	103.541	0 1	103.541	0 2	103.542	1 2
3004 0463	103.590		103.593	1 2	103.592	0 2	103.592	0 2	103.593	1 2	103.592	0 2	103.593	1 3
3004 0471	103.807		103.805	1 -2									103.806	0 -2
3004 0472	103.528		103.530	1 1									103.530	0 2
3004 0473	103.361		103.364	1 2									103.364	1 3
3004 0474	103.174				103.142	1 -2	103.142	0 -2	103.143	1 -2	103.143	0 0		
3004 0475	103.047													
3004 0481	103.321				103.213						103.213	-0.41 0		
3004 0482	103.217				103.150						103.150	-0.21 0		
3004 0483	103.164				103.120						103.120	-0.08 0		
3004 0484	103.137				103.102						103.102	-0.42 0		
3004 0485	103.115				103.090						103.090	-0.01 0		
3004 0486	103.110													
3004 0487	103.093													

Reinstalled

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading date	61. following 09/06/2013		62. following 10/06/2013		63. following 11/06/2013		64. following 12/06/2013		65. following 13/06/2013		66. following 14/06/2013	
	baseline elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885	0	103.881	-4								
3004 0452	103.884	0	103.881	-3								
3004 0453	103.711	0	103.710	-1								
3004 0454	103.431	0	103.430	-1								
3004 0455	103.224	0	103.220	-3								
3004 0461	103.597	1	103.599	2	103.598	0	103.598	0	103.598	0	103.598	0
3004 0462	103.540	1	103.542	2	103.540	1	103.541	1	103.540	0	103.540	0
3004 0463	103.590	1	103.593	3	103.592	0	103.592	0	103.591	0	103.591	0
3004 0471	103.807	0	103.806	-2	103.805	0	103.805	0	103.805	0	103.804	-1
3004 0472	103.528	0	103.529	1	103.529	0	103.529	0	103.529	-1	103.527	-1
3004 0473	103.361	-1	103.363	2	103.363	0	103.364	1	103.362	-2	103.361	-1
3004 0474	103.174	-1	103.142	-2	103.142	0	103.142	0	103.142	0	103.141	-1
3004 0475	103.047											
3004 0481	103.321											
3004 0482	103.217											
3004 0483	103.164											
3004 0484	103.137											
3004 0485	103.115											
3004 0486	103.110											
3004 0487	103.093											

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline		67. following		68. following		69. following		70. following		71. following		72. following	
	date	elevation	15/06/2013	deviation from last/ baseline	16/06/2013	deviation from last/ baseline	17/06/2013	deviation from last/ baseline	18/06/2013	deviation from last/ baseline	25/06/2013	deviation from last/ baseline	02/07/2013	deviation from last/ baseline
Point No.		elevation												
3004 0451		103.885												
3004 0452		103.884												
3004 0453		103.711												
3004 0454		103.431												
3004 0455		103.224												
3004 0461		103.597												
3004 0462		103.540												
3004 0463		103.590												
3004 0471		103.807												
3004 0472		103.528												
3004 0473		103.361												
3004 0474		103.174												
3004 0475		103.047												
3004 0481		103.321												
3004 0482		103.217												
3004 0483		103.164												
3004 0484		103.137												
3004 0485		103.115												
3004 0486		103.110												
3004 0487		103.093												

# monitoring table



## Joint Venture

project: C310 Thames Tunnel


structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	73. following		74. following		75. following		76. following		77. following		elevation	deviation from last/ baseline
	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation		
3004 0451	15/12/12	103.885	0	-4	103.881	0	-4	103.880	-1	-5		
3004 0452		103.884	0	-3	103.881	0	-3	103.880	-1	-4		
3004 0453		103.711	1	-1	103.710	0	-1	103.708	-2	-3		
3004 0454		103.431	1	-1	103.431	1	0	103.429	-2	-3		
3004 0455		103.224	1	-3	103.221	0	-3	103.219	-2	-5		
3004 0461		103.597	0	0	103.598	0	1	103.596	-2	-2		
3004 0462		103.540	0	0	103.540	0	0	103.538	-2	-2		
3004 0463		103.590	0	2	103.593	1	3	103.590	-2	0		
3004 0471		103.807	-1	-4	103.803	0	-4	103.801	-2	-6		
3004 0472		103.528	0	0	103.528	0	0	103.527	-1	-2	103.796	-6
3004 0473		103.361	0	0	103.361	0	-1	103.360	-1	-1	103.526	0
3004 0474		103.174			103.137	-2	-6	103.130	-6	-13	103.359	-1
3004 0475		103.047			destroyed			destroyed				
3004 0481		103.321	1	-2				103.210	0	-3		
3004 0482		103.217	103.146	-3				103.145	0	-5		
3004 0483		103.164	Tops of survey points 483-485 lost due to frontloading shovel					103.113	0	-7		
3004 0484		103.137	scraping surface					103.095	0	-7		
3004 0485		103.115						103.087	0	-3		
3004 0486		103.110						destroyed				
3004 0487		103.093						destroyed				

point No.474 damaged

point No.471 damaged

point No.471 damaged

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	CROSSRAIL	eB NO	C310-HTM-C-RGN-CR148-50022	Rev	6.0
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 13**  
**CS2 – Old Coal Yard**

Learning Legacy Document

<b>monitoring asset</b>	<b>Area of Old Coalyard</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR148-PT005-50010		
<b>name of monitoring section:</b>	CS2- Old Coalyard area		
sensor type:	manual levelling studs		
chainage:	91650	point no.:	3004 0461 - 3004 0463
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date		max. value	point no.	comments
<b>baseline</b>	15/12/12		0.00		
<b>TBM 1</b>	start ZOI	02/02/13	0.81	3004 0461	
	end ZOI	24/02/13	-1.38	3004 0461	breached not any trigger value
<b>TBM 2</b>	start ZOI	08/06/13	2.13	3004 0462	
	end ZOI	11/06/13	1.02	3004 0462	breached not any trigger value
<b>longterm</b>		24/09/13	-1.85	3004 0462	last reading 3 month post tunneling, Cross section not longer measurable

<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)

**summary / comments**

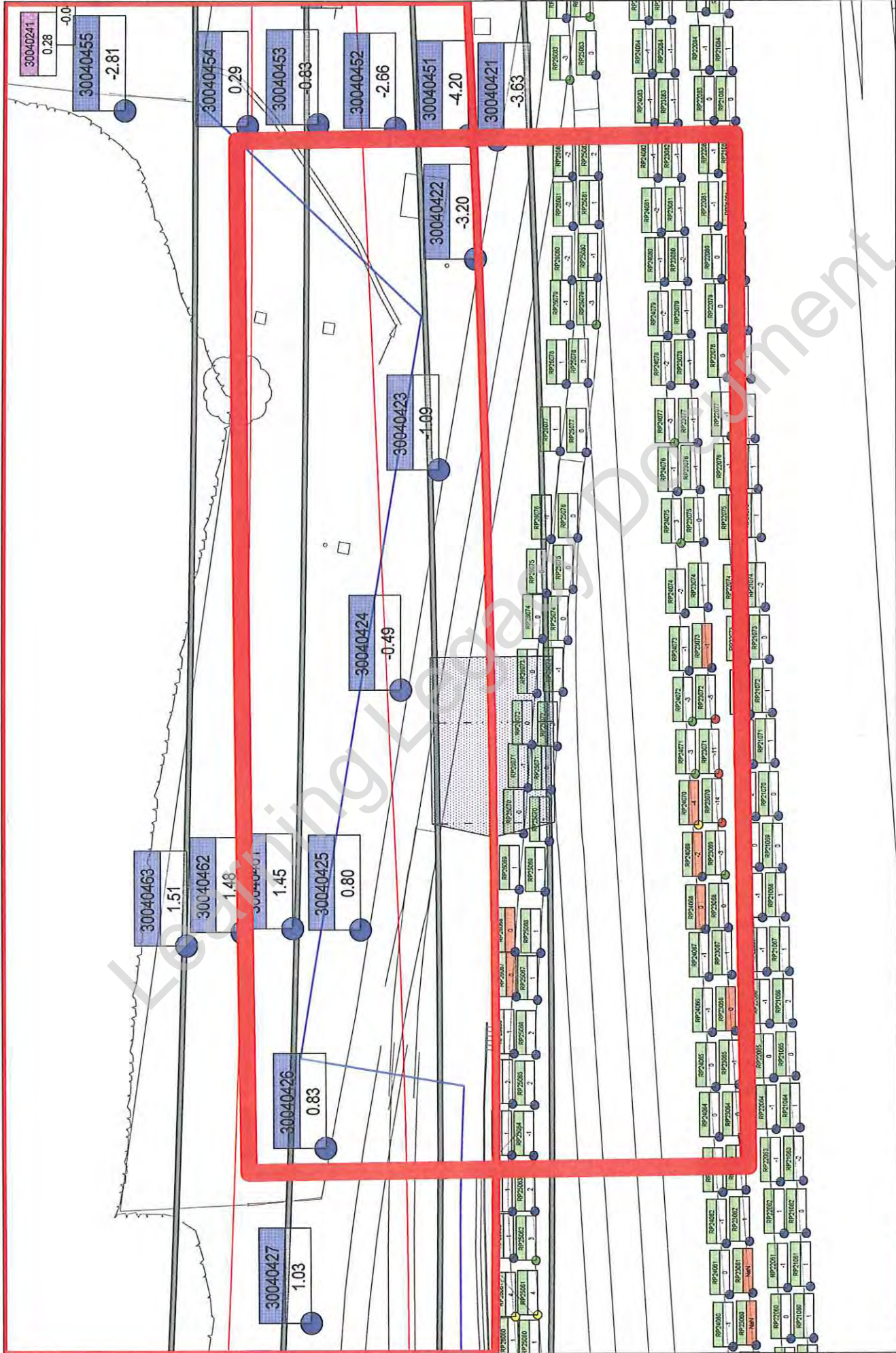
Cross section no longer measureable due to no access (NR siding & CSS area)  
 Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 09/01/15

print name:

HMJV project role:

Monitoring & Survey engineer

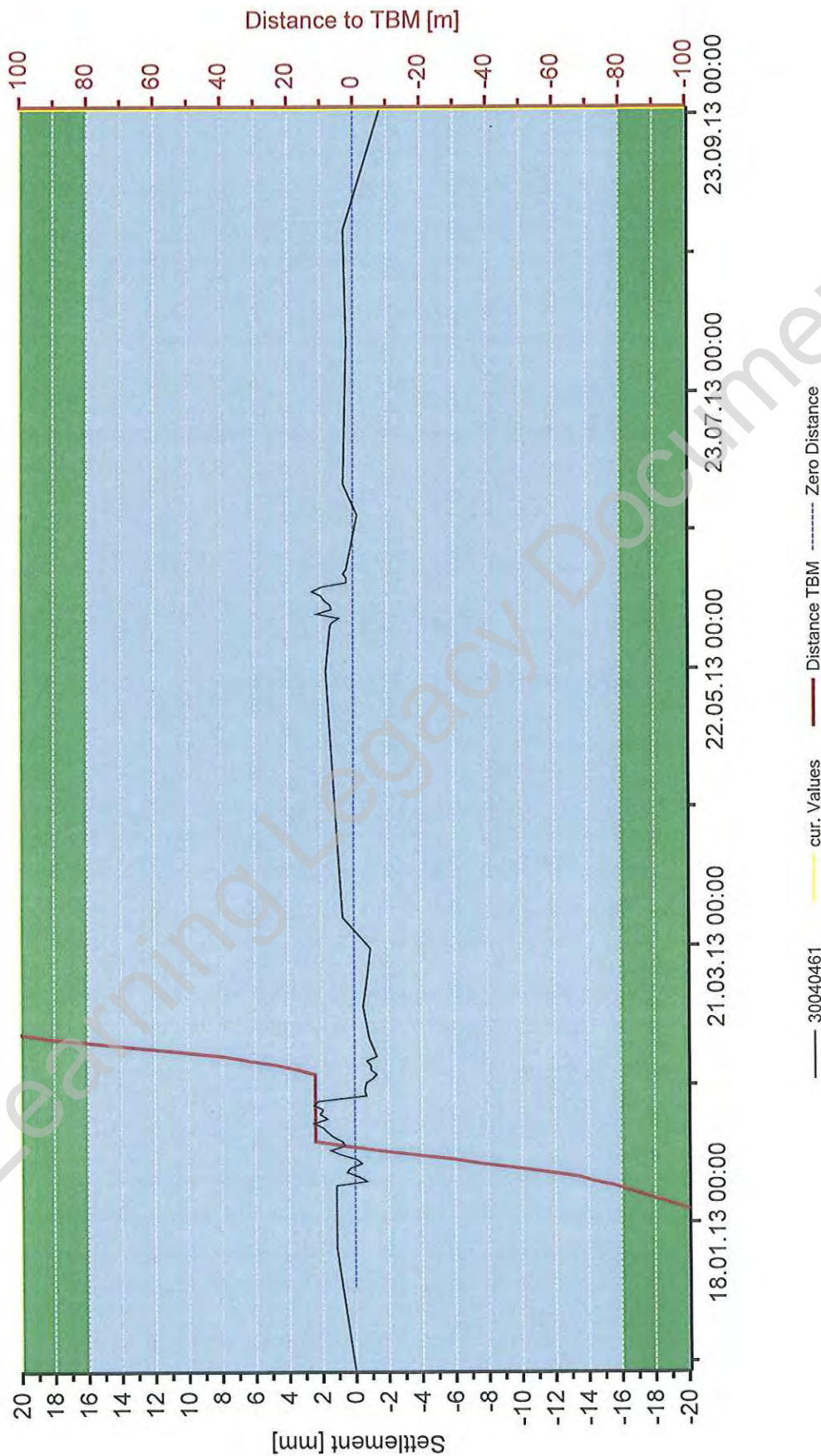


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 03.02.2013 10:48



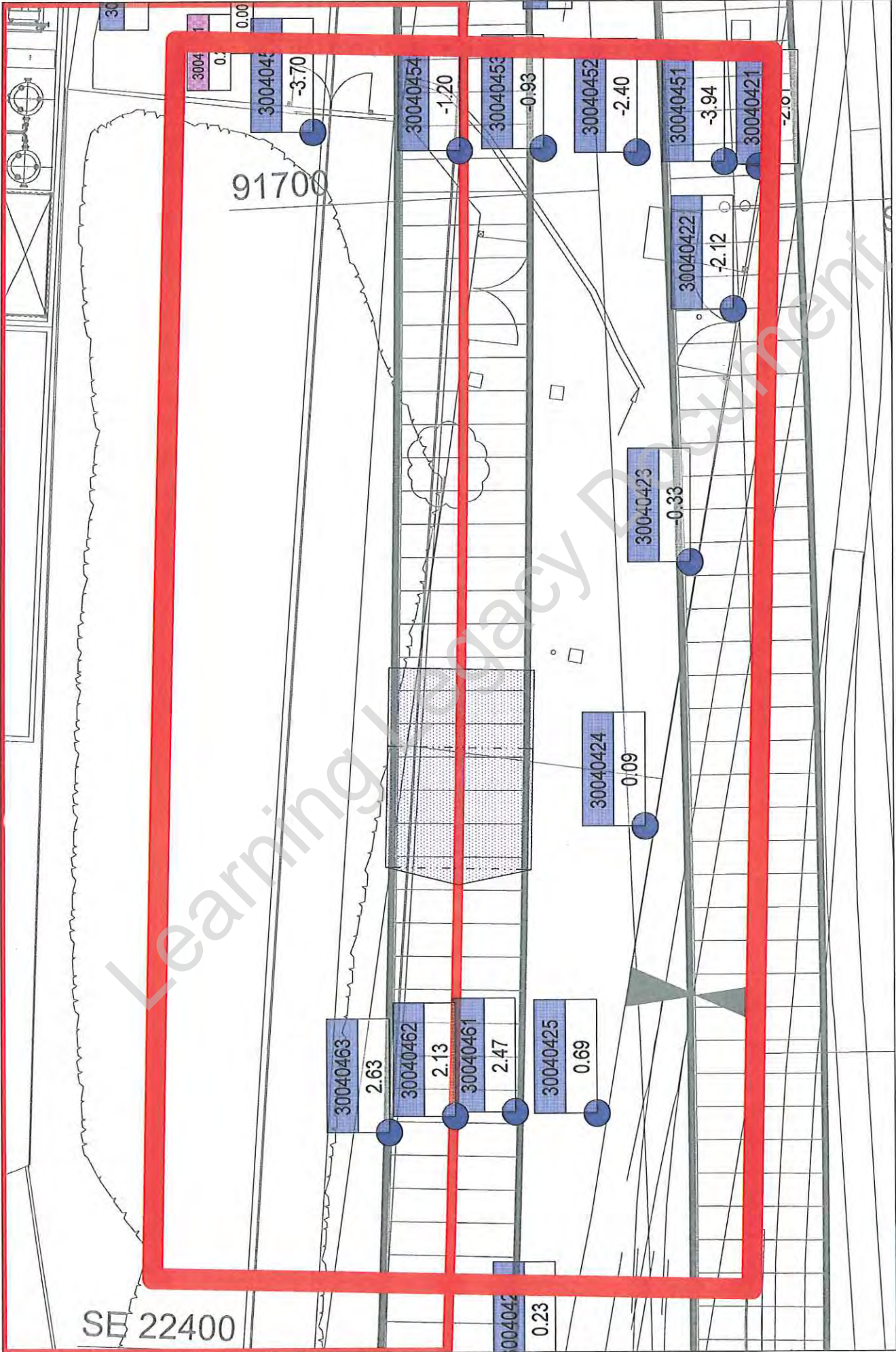


Point: 30040461



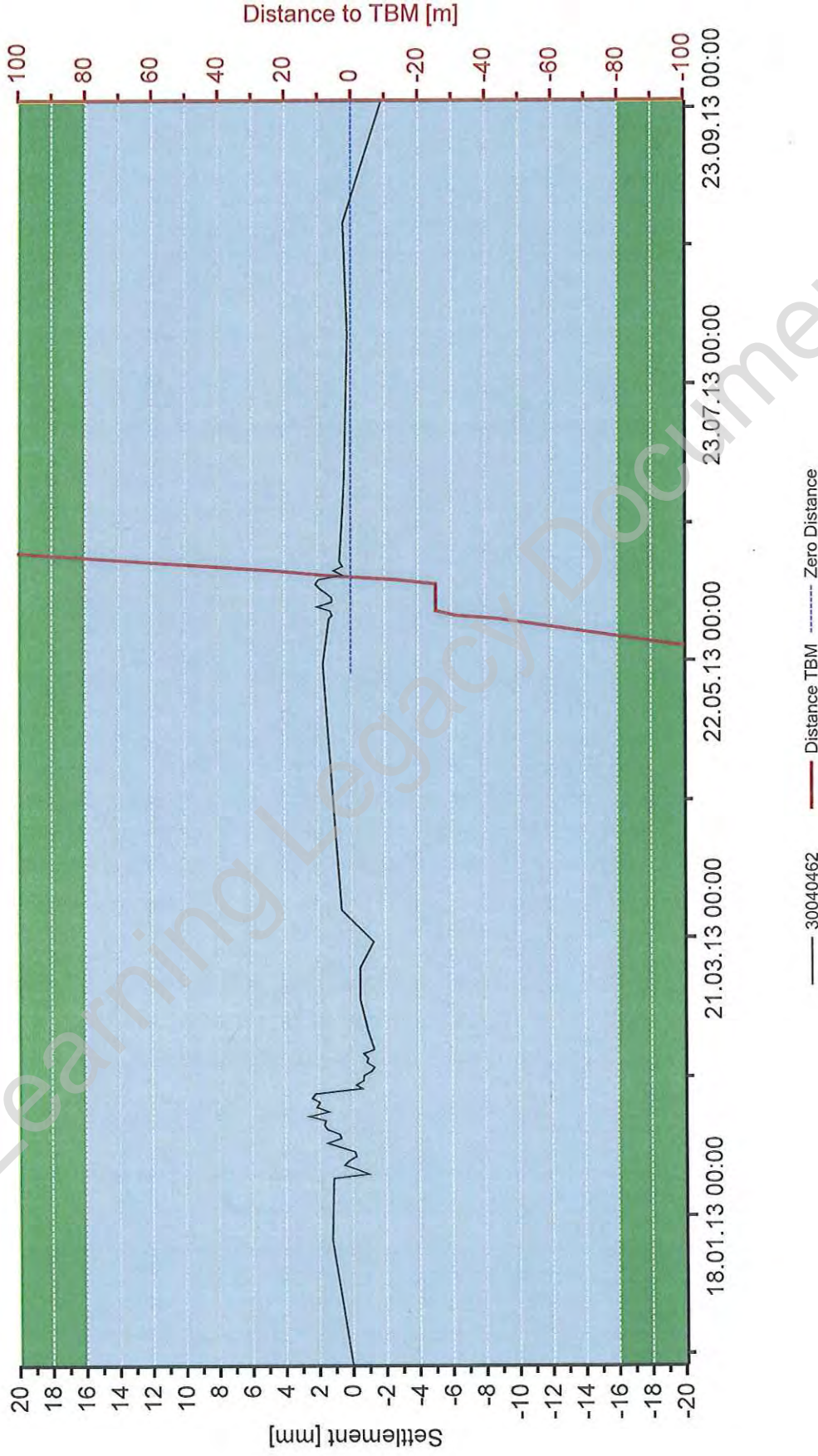
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - CS2 (Old Coalyard) 15.12.2012 - 24.09.2013  
date: 17.06.2014 11:40 current values: 17.06.2014 11:30





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 01.08.2013 09:00

Point: 30040462



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - CS2 (Old Coalyard) 15.12.2012 - 24.09.213  
date: 17.06.2014 11:46 current values: 17.06.2014 11:30



# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	15/12/12		1. following		2. following		3. following		4. following		5. following		6. following	
	baseline	12/01/2013	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
Point No.	elevation	12/01/2013	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885		103.885	0	103.886	1	103.884	-2	103.885	1	103.886	1	103.885	-1
3004 0452	103.884		103.884	0	103.885	1	103.883	-1	103.884	0	103.884	1	103.883	-1
3004 0453	103.711		103.711	0	103.712	1	103.710	-1	103.711	0	103.711	1	103.710	-1
3004 0454	103.431		103.431	0	103.432	0	103.431	-1	103.431	1	103.432	1	103.431	-1
3004 0455	103.224		103.224	1	103.224	-1	103.221	-3	103.221	0	103.222	0	103.220	-2
3004 0461	103.597		103.597	1	103.599	0	103.597	-2	103.597	0	103.598	1	103.598	0
3004 0462	103.540		103.541	1	103.541	0	103.539	-2	103.539	1	103.540	1	103.540	0
3004 0463	103.590		103.592	1	103.591	0	103.590	-1	103.590	0	103.591	1	103.591	0
3004 0471	103.807		103.807	-1	103.807	0	103.806	-1	103.806	0	103.806	0	103.806	0
3004 0472	103.528		103.528	0	103.529	1	103.527	-2	103.528	2	103.528	0	103.528	0
3004 0473	103.361		103.362	1	103.362	0	103.361	-1	103.362	1	103.362	0	103.362	0
3004 0474	103.174		103.174	0	103.173	-1	103.172	-1	103.172	0	103.172	0	103.360	-1
3004 0475	103.047		103.047	0										
3004 0481	103.321		103.322	1										
3004 0482	103.217		103.217	0										
3004 0483	103.164		103.164	0										
3004 0484	103.137		103.138	0										
3004 0485	103.115		103.115	0										
3004 0486	103.110		103.109	-1										
3004 0487	103.093		103.093	0										

# monitoring table



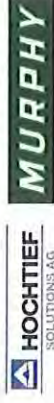
## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline		7. following		8. following		9. following		10. following		11. following		12. following	
	date	elevation	31/01/2013	deviation from last/ baseline	elevation	deviation from last/ baseline	02/02/2013	deviation from last/ baseline	elevation	deviation from last/ baseline	04/02/2013	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	15/12/12	103.885	103.882	-3	103.881	-1	103.881	0	103.881	0	103.881	0	103.881	0
3004 0452		103.884	103.881	-2	103.881	0	103.881	1	103.881	0	103.881	0	103.881	0
3004 0453		103.711	103.709	-1	103.709	0	103.710	1	103.710	0	103.710	0	103.710	0
3004 0454		103.431	103.431	0	103.430	0	103.431	1	103.432	1	103.432	1	103.432	1
3004 0455		103.224	103.219	0	103.219	0	103.220	1	103.221	1	103.221	1	103.221	1
3004 0461		103.597	103.597	-1	103.597	0	103.598	1	103.599	1	103.599	1	103.598	-1
3004 0462		103.540	103.539	0	103.539	0	103.540	1	103.541	1	103.541	1	103.540	-1
3004 0463		103.590	103.590	-1	103.590	0	103.591	1	103.592	1	103.592	1	103.591	-1
3004 0471		103.807	103.805	-1	103.806	0	103.806	1	103.807	1	103.807	1	103.806	-1
3004 0472		103.528	103.527	0	103.528	1	103.529	1	103.529	0	103.528	-1	103.529	0
3004 0473		103.361	103.361	0	103.361	0	103.362	1	103.362	0	103.361	-1	103.361	0
3004 0474		103.174												
3004 0475		103.047												
3004 0481		103.321			103.319	-2	103.319	-2						
3004 0482		103.217			103.215	-2	103.215	-2						
3004 0483		103.164												
3004 0484		103.137			103.135	-2	103.135	-2						
3004 0485		103.115												
3004 0486		103.110												
3004 0487		103.093												

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

No. of reading		structure: Cross Section 1 - 4 Area NR + Old Coalyard											
date	baseline	13. following		14. following		15. following		16. following		17. following		18. following	
	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885		103.883	1	-3								
3004 0452	103.884		103.883	2	-1								
3004 0453	103.711		103.712	2	1								
3004 0454	103.431		103.433	1	2								
3004 0455	103.224		103.222	1	-2								
3004 0461	103.597	103.599	1	1	103.599	0	2	103.599	0	2	103.600	1	2
3004 0462	103.540	103.541	1	1	103.541	0	2	103.541	0	2	103.542	1	3
3004 0463	103.590	103.592	1	2	103.592	0	2	103.592	0	2	103.593	1	2
3004 0471	103.807	103.807	0	-1	103.807	0	0	103.807	0	0	103.808	1	0
3004 0472	103.528	103.529	0	1	103.529	0	1	103.529	0	1	103.530	1	2
3004 0473	103.361	103.362	1	1	103.362	0	1	103.362	0	1	103.363	1	2
3004 0474	103.174												
3004 0475	103.047												
3004 0481	103.321	103.321	2	0	103.321	0	0						
3004 0482	103.217	103.217	2	1	103.217	0	1						
3004 0483	103.164												
3004 0484	103.137	103.137	2	0	103.137	0	0						
3004 0485	103.115												
3004 0486	103.110												
3004 0487	103.093												

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old CoalYard

No. of reading date	19. following 12/02/2013		20. following 13/02/2013		21. following 14/02/2013		22. following 15/02/2013		23. following 16/02/2013		24. following 17/02/2013	
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885	0	103.882	-3	103.600	2	103.597	-3	103.597	0	103.597	0
3004 0452	103.884	0	103.882	-1	103.542	2	103.539	-3	103.539	0	103.539	-1
3004 0453	103.711	0	103.712	1	103.593	2	103.590	-3	103.590	0	103.590	0
3004 0454	103.431	0	103.432	1	103.808	1	103.806	-2	103.805	0	103.805	0
3004 0455	103.224	-1	103.221	-2	103.530	2	103.528	-3	103.527	0	103.527	0
3004 0461	103.597	0	103.599	2	103.363	2	103.361	-3	103.360	-1	103.360	0
3004 0462	103.540	0	103.542	2	103.530	1	103.530	2	103.527	0	103.527	0
3004 0463	103.590	0	103.593	2	103.808	1	103.808	1	103.806	0	103.805	0
3004 0471	103.807	0	103.808	1	103.530	2	103.530	2	103.527	0	103.527	0
3004 0472	103.528	-1	103.530	2	103.363	2	103.361	-3	103.360	-1	103.360	0
3004 0473	103.361	-1	103.363	2								
3004 0474	103.174											
3004 0475	103.047											
3004 0481	103.321	-1	103.320	0								
3004 0482	103.217	-1	103.216	0								
3004 0483	103.164											
3004 0484	103.137	-1	103.137	-1								
3004 0485	103.115											
3004 0486	103.110											
3004 0487	103.093											

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline		25. following		26. following		27. following		28. following		29. following		30. following			
	date	elevation	18/02/2013	deviation from last/ baseline	19/02/2013	deviation from last/ baseline	20/02/2013	elevation	deviation from last/ baseline	21/02/2013	elevation	deviation from last/ baseline	22/02/2013	elevation	deviation from last/ baseline	
Point No.		elevation														
3004 0451		103.885								103.879	-3					
3004 0452		103.884								103.879	-3					
3004 0453		103.711								103.708	-3					
3004 0454		103.431								103.429	-3					
3004 0455		103.224								103.218	-3					
3004 0461		103.597	0	-1	103.596	0	-1	103.596	0	-1	103.596	0	-1	103.597	0	-1
3004 0462		103.540	0	-1	103.539	0	-1	103.538	0	-1	103.539	0	-1	103.539	0	-1
3004 0463		103.590	0	0	103.589	-1	-1	103.589	0	-1	103.590	0	-1	103.590	0	-1
3004 0471		103.807	0	-2	103.805	0	-3	103.805	0	-3	103.804	0	-3	103.805	0	-3
3004 0472		103.528	0	-1	103.527	0	-1	103.527	0	-2	103.527	0	-2	103.527	0	-2
3004 0473		103.361	-1	-2	103.360	1	-1	103.360	0	-1	103.360	0	-1	103.361	1	-1
3004 0474		103.174														
3004 0475		103.047														
3004 0481		103.321						103.321	0	0						
3004 0482		103.217						103.217	0	0						
3004 0483		103.164														
3004 0484		103.137						103.137	0	0						
3004 0485		103.115														
3004 0486		103.110														
3004 0487		103.093														



# monitoring table



## Joint Venture

project: C310 Thames Tunnel

No. of reading		structure: Cross Section 1 - 4 Area NR + Old Coalyard											
date	baseline	31. following		32. following		33. following		34. following		35. following		36. following	
	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885									103.879	0		
3004 0452	103.884									103.879	0		
3004 0453	103.711									103.709	0		
3004 0454	103.431									103.429	0		
3004 0455	103.224									103.218	0		
3004 0461	103.597	103.596	-1							103.596	0		
3004 0462	103.540	103.538	-1							103.539	0		
3004 0463	103.590	103.589	-1							103.590	0		
3004 0471	103.807	103.805	0	103.805	0	103.806	-1	103.804	-2	103.804	0	103.806	2.35
3004 0472	103.528	103.528	1	103.527	-1	103.528	1	103.527	-1	103.526	0	103.529	2.32
3004 0473	103.361	103.361	0	103.360	0	103.362	1	103.360	-1	103.360	0	103.361	1.28
3004 0474	103.174												
3004 0475	103.047												
3004 0481	103.321												
3004 0482	103.217							103.214	-3			103.213	0
3004 0483	103.164							103.156	-7	103.156	0	103.156	0
3004 0484	103.137							103.135	-3	103.135	0	103.132	-3
3004 0485	103.115							103.118	3	103.118	0	103.111	-7
3004 0486	103.110							103.104	-6	103.104	0	103.104	0
3004 0487	103.093												

# monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline		37. following		38. following		39. following		40. following		41. following		42. following		
	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
	15/12/12														
Point No.		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451		103.885												103.880	0
3004 0452		103.884												103.880	1
3004 0453		103.711												103.709	0
3004 0454		103.431												103.430	1
3004 0455		103.224												103.219	1
3004 0461		103.597												103.597	0
3004 0462		103.540												103.539	0
3004 0463		103.590												103.590	0
3004 0471		103.807												103.806	0
3004 0472		103.528												103.527	-1
3004 0473		103.361												103.362	1
3004 0474		103.174													
3004 0475		103.047													
3004 0481		103.321													
3004 0482		103.217	0	103.213	-1	103.212	0	103.212	0	103.212	0	103.212	0	103.212	0
3004 0483		103.164	0	103.156	-1	103.155	0	103.155	0	103.155	0	103.155	0	103.155	0
3004 0484		103.137	0	103.132	-1	103.131	0	103.131	0	103.131	0	103.131	0	103.131	0
3004 0485		103.115	0	103.111	0	103.110	0	103.111	0	103.110	0	103.110	0	103.111	1
3004 0486		103.110	0	103.104	-1	103.104	0	103.104	0	103.103	-1	103.100	-3		
3004 0487		103.093													

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	43. following		44. following		45. following		46. following		47. following		48. following		
	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
	15/12/12												
	08/03/2013												
Point No.		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451		103.885								103.880	1	103.882	1
3004 0452		103.884								103.881	1	103.882	1
3004 0453		103.711								103.710	1	103.711	2
3004 0454		103.431								103.431	1	103.432	1
3004 0455		103.224								103.219	0	103.220	1
3004 0461		103.597			103.597	0	-1	103.596	0	103.598	2	103.599	1
3004 0462		103.540			103.539	0	-1	103.538	-1	103.540	2	103.541	1
3004 0463		103.590			103.590	0	0	103.589	-1	103.591	2	103.593	2
3004 0471		103.807			103.804	-2	-3	103.804	0	103.806	2	103.805	-1
3004 0472		103.528			103.527	-1	-1	103.526	-1	103.529	2	103.529	2
3004 0473		103.361			103.361	-1	0	103.360	-1	103.362	2	103.363	1
3004 0474		103.174										103.143	-1
3004 0475		103.047										103.115	0
3004 0481		103.321										103.211	0
3004 0482		103.217	1	-4	103.213	1	-4	103.212	-1	-5		103.170	-5
3004 0483		103.164	0	-8	103.155	1	-8	103.155	-1	-9	103.155	0	-9
3004 0484		103.137	0	-6	103.131	0	-6	103.131	-1	-7	103.131	0	-7
3004 0485		103.115	0	-5	103.110	0	-5					103.107	-7
3004 0486		103.110	-1	-11								103.094	-6
3004 0487		103.093										103.098	-1
													-12

Kopie des Originaldokuments

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	49. following		50. following		51. following		52. following		53. following		54. following	
	baseline	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
		15/12/12										
Point No.	elevation	28/05/2013	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885		103.882	0	103.882	0	103.881	-1	103.881	0	103.881	0
3004 0452	103.884		103.882	0	103.882	0	103.881	-1	103.881	1	103.881	0
3004 0453	103.711		103.711	-1	103.711	0	103.710	-1	103.710	0	103.709	-1
3004 0454	103.431		103.431	-1	103.431	0	103.430	-1	103.430	0	103.430	-1
3004 0455	103.224		103.220	-1	103.220	0	103.219	-1	103.220	1	103.220	0
3004 0461	103.597						103.599	0	103.599	0	103.598	0
3004 0462	103.540						103.541	0	103.541	0	103.541	0
3004 0463	103.590						103.592	-1	103.592	0	103.592	0
3004 0471	103.807						103.804	-1	103.804	0	103.805	0
3004 0472	103.528						103.529	0	103.529	0	103.529	0
3004 0473	103.361						103.362	-1	103.362	0	103.362	0
3004 0474	103.174						103.141	-2	103.142	0	103.142	0
3004 0475	103.047						destroyed					
3004 0481	103.321											
3004 0482	103.217											
3004 0483	103.164											
3004 0484	103.137											
3004 0485	103.115											
3004 0486	103.110											
3004 0487	103.093											

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	55. following		56. following		57. following		58. following		59. following		60. following	
	baseline	03/05/2013	04/06/2013	05/06/2013	05/06/2013	05/06/2013	05/06/2013	05/06/2013	07/06/2013	07/06/2013	08/06/2013	08/06/2013
date	15/12/12	03/05/2013	04/06/2013	05/06/2013	05/06/2013	05/06/2013	05/06/2013	05/06/2013	07/06/2013	07/06/2013	08/06/2013	08/06/2013
Point No.	elevation	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885	103.881	103.880	-1	103.881	0	103.881	0	103.881	0	103.881	1
3004 0452	103.884	103.880	103.880	-1	103.880	0	103.880	0	103.880	0	103.881	1
3004 0453	103.711	103.709	103.708	-1	103.709	0	103.709	0	103.709	1	103.710	1
3004 0454	103.431	103.430	103.429	-1	103.429	0	103.429	0	103.429	0	103.430	1
3004 0455	103.224	103.220	103.219	-1	103.219	0	103.219	0	103.219	0	103.220	1
3004 0461	103.597	103.600	103.599	0	103.599	0	103.599	1	103.599	0	103.600	1
3004 0462	103.540	103.542	103.541	0	103.541	0	103.541	0	103.541	0	103.542	1
3004 0463	103.590	103.593	103.592	0	103.592	0	103.592	1	103.592	0	103.593	1
3004 0471	103.807	103.805										
3004 0472	103.528	103.530										
3004 0473	103.361	103.364										
3004 0474	103.174		103.142	1	103.142	0	103.142	0	103.143	0	103.143	0
3004 0475	103.047											
3004 0481	103.321		103.213						103.213	-0.41		
3004 0482	103.217		103.150						103.150	-0.21		
3004 0483	103.164		103.120						103.120	-0.08		
3004 0484	103.137		103.102						103.102	-0.42		
3004 0485	103.115		103.090						103.090	-0.01		
3004 0486	103.110											
3004 0487	103.093											

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline		61. following		62. following		63. following		64. following		65. following		66. following			
	15/12/12	elevation	09/06/2013	deviation from last/ baseline	10/06/2013	deviation from last/ baseline	11/06/2013	deviation from last/ baseline	12/06/2013	deviation from last/ baseline	13/06/2013	deviation from last/ baseline	14/06/2013	deviation from last/ baseline		
Point No.	elevation	elevation	deviation from last/ baseline	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline		
3004 0451	103.885	103.881	0	-4	103.598	-2	0	103.598	0	0	103.598	0	0	103.598	0	0
3004 0452	103.884	103.881	0	-3	103.540	-1	0	103.541	1	1	103.540	-1	0	103.540	0	1
3004 0453	103.711	103.710	0	-1	103.592	-2	1	103.592	0	1	103.591	0	1	103.591	0	1
3004 0454	103.431	103.430	0	-1	103.805	0	-2	103.805	0	-2	103.805	0	-3	103.804	-1	-4
3004 0455	103.224	103.220	0	-3	103.529	0	1	103.529	0	1	103.529	-1	1	103.527	-1	-1
3004 0461	103.597	103.599	1	2	103.363	0	2	103.364	1	3	103.362	-2	1	103.361	-1	-1
3004 0462	103.540	103.542	1	2	103.142	0	-3	103.142	0	-2	103.142	0	-1	103.141	-1	-2
3004 0463	103.590	103.593	1	3												
3004 0471	103.807	103.806	0	-2												
3004 0472	103.528	103.529	0	1												
3004 0473	103.361	103.363	-1	2												
3004 0474	103.174	103.142	-1	-2												
3004 0475	103.047															
3004 0481	103.321															
3004 0482	103.217															
3004 0483	103.164															
3004 0484	103.137															
3004 0485	103.115															
3004 0486	103.110															
3004 0487	103.093															

# monitoring table



## Joint Venture

project: **C310 Thames Tunnel**

structure: **Cross Section 1 - 4 Area NR + Old Coalyard**

No. of reading	67. following		68. following		69. following		70. following		71. following		72. following		
	baseline	15/06/2013	15/06/2013	16/06/2013	17/06/2013	18/06/2013	25/06/2013	02/07/2013					
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885									103.880	-1	103.881	0
3004 0452	103.884									103.879	-2	103.880	1
3004 0453	103.711									103.708	-2	103.709	1
3004 0454	103.431									103.429	-1	103.429	0
3004 0455	103.224									103.219	-1	103.220	1
3004 0461	103.597									103.597	-1	103.598	1
3004 0462	103.540									103.540	0	103.540	0
3004 0463	103.590									103.591	0	103.592	1
3004 0471	103.807									103.804	0	103.804	0
3004 0472	103.528		-3							103.527	0	103.528	0
3004 0473	103.361		-1							103.360	-2	103.361	1
3004 0474	103.174		0							103.139	-2		
3004 0475	103.047		-2										
3004 0481	103.321		0							103.212	-1	103.210	2
3004 0482	103.217		0							103.211	0		
3004 0483	103.164		0							103.148	-1		
3004 0484	103.137		0							103.118	0		
3004 0485	103.115		-1							103.100	0		
3004 0486	103.110		0							103.089	0		
3004 0487	103.093		0							103.083	-6		

# monitoring table



## Joint Venture

project: C310 Thames Tunnel


structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	73. following		74. following		75. following		76. following		77. following	
	baseline	04/09/2013	27/09/2013	28/09/2013	24/09/2013	06/02/2014	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885	0 -4	103.881	0 -4	103.880	-1 -5				
3004 0452	103.884	0 -3	103.881	0 -3	103.880	-1 -4				
3004 0453	103.711	1 -1	103.710	0 -1	103.708	-2 -3				
3004 0454	103.431	1 -1	103.431	1 0	103.429	-2 -3				
3004 0455	103.224	1 -3	103.221	0 -3	103.219	-2 -5				
3004 0461	103.597	0 0	103.598	0 1	103.596	-2 -2				
3004 0462	103.540	0 0	103.540	0 0	103.538	-2 -2				
3004 0463	103.590	0 2	103.593	1 3	103.590	-2 0				
3004 0471	103.807	1 -4	103.803	0 -4	103.801	-2 -6				
3004 0472	103.528	0 0	103.528	0 0	103.527	-1 -2				
3004 0473	103.361	0 0	103.361	0 -1	103.360	-1 -1				
3004 0474	103.174		103.137	-2 -6	103.130	-6 -13				
3004 0475	103.047			destroyed		destroyed				
3004 0481	103.321	1 -2	103.210	-1 -3	103.210	0 -3				
3004 0482	103.217	103.146 -3 -5	103.145	-1 -6	103.145	0 -5				
3004 0483	103.164	Tops of survey points 483-485 lost due to	103.113	-5 -8	103.113	0 -7				
3004 0484	103.137	frontloading shovel	103.095	-4 -7	103.095	0 -7				
3004 0485	103.115	scraping surface	103.086	-3 -4	103.087	0 -3				
3004 0486	103.110					destroyed				
3004 0487	103.093					destroyed				

point No.474 damaged

point No.471 damaged



 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	CROSSRAIL	eB NO	C310-HTM-C-RGN-CR148-50022	Rev	6.0
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 14**  
**CS3 – Old Coal Yard**

Learning Legacy Document

**monitoring asset**

**Area of Old Coalyard**

reference monitoring drawing: C310-HTM-C-DWG-CR148-PT005-50010

name of monitoring section: CS3- Old Coalyard area

sensor type: manual levelling studs

chainage: 91600 point no.: 3004 0471 - 3004 0475

trigger values: [mm] green: +16 -16 amber: +20 -20 red: +25 -25

reference document for trigger values: Management Plan for Control of Ground Movement

EB-no.: C310-HTM-Z-STP-CR148-50058

Appendix: AAA

**monitoring data**

	date	max. value	point no.	comments
baseline	15/12/12	0.00		
TBM 1	start ZOI	22/02/13	-3.03	3004 0471
	end ZOI	28/02/13	-3.42	3004 0471 breached not any trigger value
TBM 2	start ZOI	11/06/13	2.25	3004 0473
	end ZOI	15/06/13	0.45	3004 0473 breached not any trigger value
longterm	24/09/13	-1.93	3004 0472	

**Evaluation of any potential residual risks**

- No residual risk since the Works have been completed by HMJV
- Yes, residual risk (see comment below)

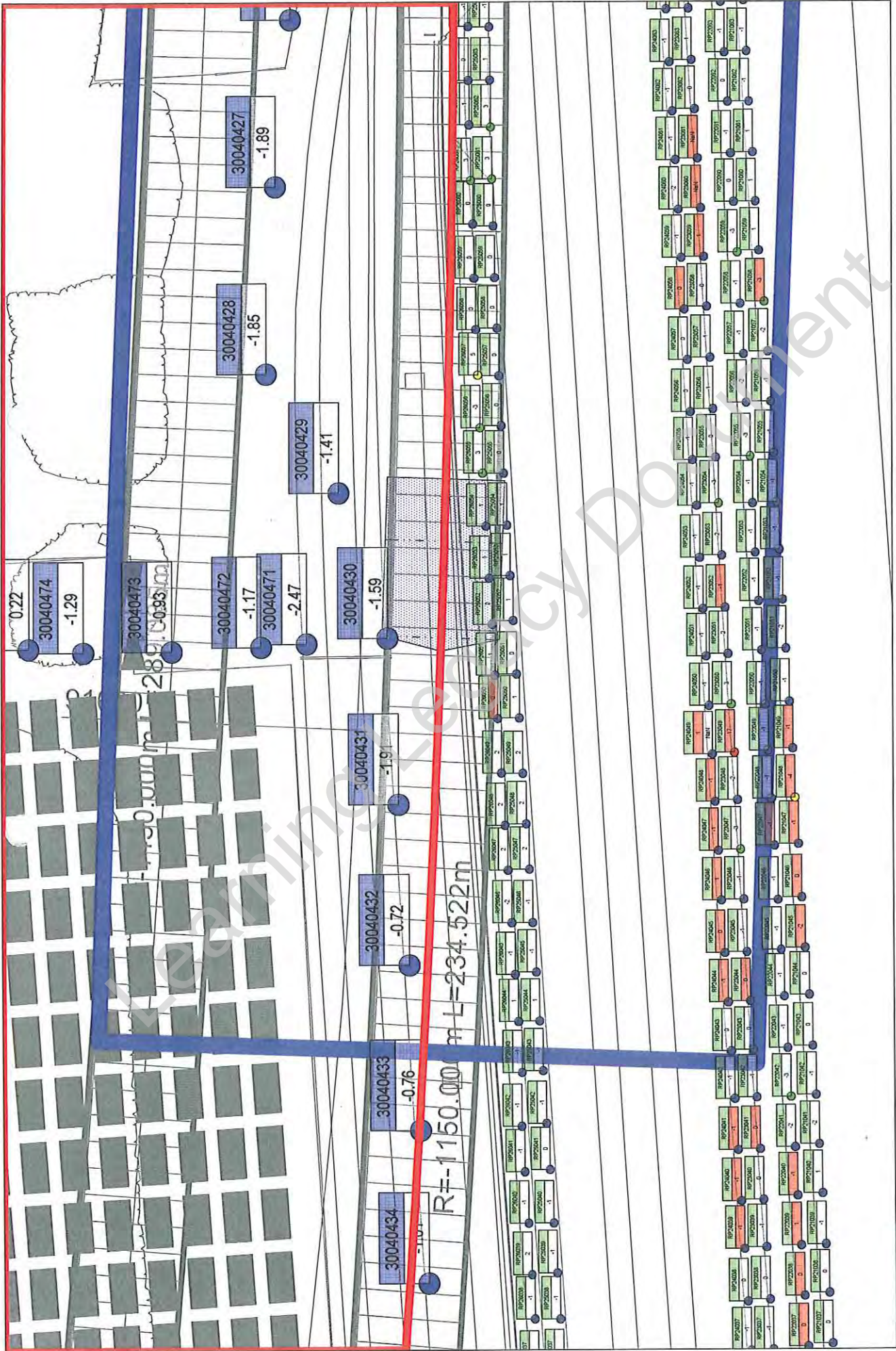
**summary / comments**

3004 0474 destroyed from 30.01.2013  
 3004 0475 destroyed from 26.01.2013  
 3004 0474-0475 reinstalled and rebaselined on 21.05.2013  
 3004 0475 2.nd time destroyed from 31.05.2013  
 3004 0471 damaged 24.09.2013 (not useable for longterm value)  
 Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 09/01/15

print name:

HMJV project role: Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 25.02.2013 10:39

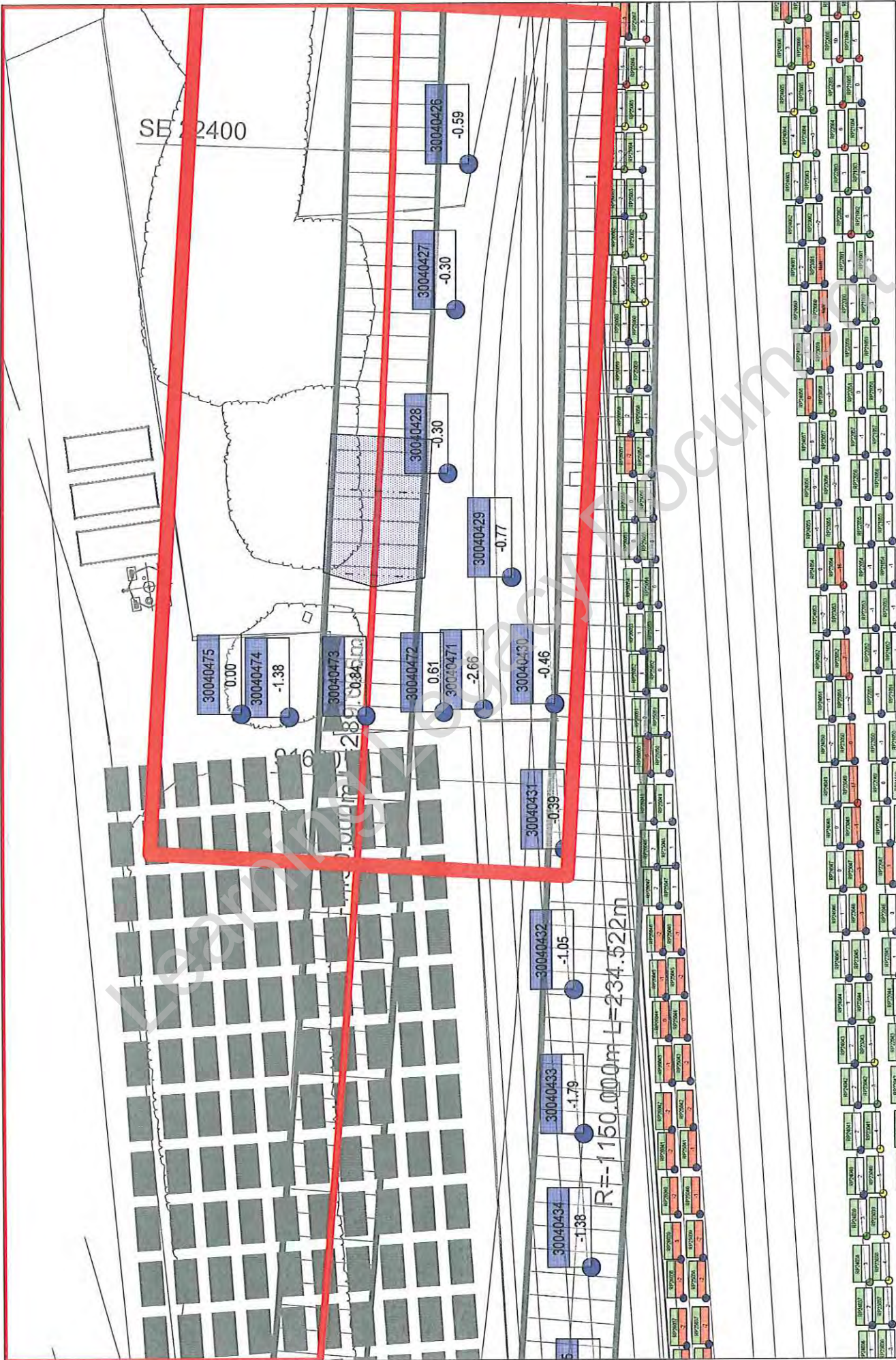


Point: 30040471



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - CS3 (Old Coalyard) 15.12.2012 - 24.09.2013  
date: 17.06.2014 13:21 current values: 17.06.2014 13:00





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 12.06.2013 09:00



Point: 30040473



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: EB Tunnel - CS3 (Old Coalyard) 15.12.2012 - 24.09.213

date: 17.06.2014 13:32 current values: 17.06.2014 13:22



# monitoring table



## Joint Venture

### project: C310 Thames Tunnel

#### structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline		1. following		2. following		3. following		4. following		5. following		6. following	
	date	elevation	12/01/2013	deviation from last/ baseline	26/01/2013	deviation from last/ baseline	27/01/2013	deviation from last/ baseline	28/01/2013	deviation from last/ baseline	29/01/2013	deviation from last/ baseline	30/01/2013	deviation from last/ baseline
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
3004 0451	103.885	103.885	0	103.886	1	103.884	-2	103.885	1	103.886	1	103.885	-1	
3004 0452	103.884	103.884	0	103.885	1	103.883	-1	103.884	0	103.884	1	103.883	-1	
3004 0453	103.711	103.711	0	103.712	1	103.710	-1	103.711	0	103.711	1	103.710	-1	
3004 0454	103.431	103.432	0	103.432	0	103.431	-1	103.431	1	103.432	1	103.431	-1	
3004 0455	103.224	103.225	1	103.224	-1	103.221	-3	103.221	0	103.222	0	103.220	-2	
3004 0461	103.597	103.599	1	103.599	0	103.597	-2	103.597	0	103.598	1	103.598	0	
3004 0462	103.540	103.541	1	103.541	0	103.539	-2	103.539	1	103.540	1	103.540	0	
3004 0463	103.590	103.592	1	103.591	0	103.590	-1	103.590	0	103.591	1	103.591	0	
3004 0471	103.807	103.807	-1	103.807	0	103.806	-1	103.806	0	103.806	0	103.806	0	
3004 0472	103.528	103.528	0	103.529	1	103.527	-2	103.528	2	103.528	0	103.528	-1	
3004 0473	103.361	103.362	1	103.362	0	103.361	-1	103.362	1	103.362	0	103.362	0	
3004 0474	103.174	103.174	0	103.173	-1	103.172	-1	103.172	0	103.172	0	103.172	-1	
3004 0475	103.047	103.047	0											
3004 0481	103.321	103.322	1											
3004 0482	103.217	103.217	0											
3004 0483	103.164	103.164	0											
3004 0484	103.137	103.138	0											
3004 0485	103.115	103.115	0											
3004 0486	103.110	103.109	-1											
3004 0487	103.093	103.093	0											

# monitoring table



## Joint Venture

### project: C310 Thames Tunnel

#### structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reacting date	15/12/12		31/01/2013		01/02/2013		02/02/2013		03/02/2013		04/02/2013		05/02/2013		
	baseline elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885	103.882	-3	103.881	-1	-4	103.881	0	-4	103.881	0	-4	103.881	0	-4
3004 0452	103.884	103.881	-2	103.881	0	-3	103.881	1	-3	103.881	0	-3	103.881	0	-3
3004 0453	103.711	103.709	-1	103.709	0	-1	103.710	1	-1	103.710	0	-1	103.710	0	-1
3004 0454	103.431	103.431	0	103.430	0	-1	103.431	1	0	103.432	1	0	103.432	1	0
3004 0455	103.224	103.219	0	103.219	0	-4	103.220	1	-4	103.221	1	-3	103.221	1	-3
3004 0461	103.597	103.597	-1	103.597	0	0	103.598	1	1	103.599	1	1	103.598	-1	1
3004 0462	103.540	103.539	0	103.539	0	0	103.540	1	1	103.541	1	1	103.540	-1	1
3004 0463	103.590	103.590	-1	103.590	0	0	103.591	1	1	103.592	1	2	103.591	-1	1
3004 0471	103.807	103.805	-1	103.806	0	-2	103.806	1	-1	103.807	1	0	103.806	-1	-1
3004 0472	103.528	103.527	0	103.528	1	0	103.529	1	1	103.529	0	1	103.528	-1	0
3004 0473	103.361	103.361	0	103.361	0	0	103.362	1	0	103.362	0	1	103.361	-1	0
3004 0474	103.174														
3004 0475	103.047														
3004 0481	103.321			103.319	-2	-1									
3004 0482	103.217			103.215	-2	-2									
3004 0483	103.164			103.135	-2	-2									
3004 0484	103.137														
3004 0485	103.115														
3004 0486	103.110														
3004 0487	103.093														



# monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline	13. following		14. following		15. following		16. following		17. following		18. following		
		date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
		15/12/12												
				06/02/2013		07/02/2013		08/02/2013		09/02/2013		10/02/2013		11/02/2013
Point No.	elevation		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885		103.883	1 -3										
3004 0452	103.884		103.883	2 -1										
3004 0453	103.711		103.712	2 1										
3004 0454	103.431		103.433	1 2										
3004 0455	103.224		103.222	1 -2										
3004 0461	103.597		103.599	0 2	103.599	0 2	103.599	0 2	103.600	1 2	103.599	-1 2	103.600	0 2
3004 0462	103.540		103.541	0 2	103.541	0 2	103.541	0 2	103.542	1 3	103.541	-1 1	103.542	1 2
3004 0463	103.590		103.592	0 2	103.592	0 2	103.592	0 2	103.593	1 2	103.592	-1 2	103.592	0 2
3004 0471	103.807		103.807	0 0	103.807	0 0	103.807	0 0	103.808	1 0	103.808	0 0	103.808	1 1
3004 0472	103.528		103.529	0 1	103.529	0 1	103.529	0 1	103.530	1 2	103.530	-1 2	103.530	1 2
3004 0473	103.361		103.362	1 1	103.362	0 1	103.362	0 1	103.363	1 2	103.363	-1 1	103.363	1 2
3004 0474	103.174													
3004 0475	103.047													
3004 0481	103.321		103.321	2 0	103.321	0 0								
3004 0482	103.217		103.217	2 1	103.217	0 1								
3004 0483	103.164													
3004 0484	103.137		103.137	2 0	103.137	0 0								
3004 0485	103.115													
3004 0486	103.110													
3004 0487	103.093													

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline elevation	19. following 12/02/2013		20. following 13/02/2013		21. following 14/02/2013		22. following 15/02/2013		23. following 16/02/2013		24. following 17/02/2013				
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline			
3004 0451	103.885	103.882	0	-3	103.600	0	2	103.600	0	2	103.597	-3	-1	103.597	0	-1
3004 0452	103.884	103.882	0	-1	103.542	0	2	103.542	0	2	103.539	-3	-1	103.539	0	0
3004 0453	103.711	103.712	0	1	103.593	0	2	103.593	0	2	103.590	-3	-1	103.590	0	0
3004 0454	103.431	103.432	0	1	103.808	0	1	103.808	0	1	103.806	-2	-2	103.805	0	-2
3004 0455	103.224	103.221	-1	-2	103.530	1	2	103.530	0	2	103.528	-3	-1	103.527	0	-1
3004 0461	103.597	103.599	0	2	103.363	1	2	103.364	0	2	103.361	-3	0	103.360	0	-1
3004 0462	103.540	103.542	0	2												
3004 0463	103.590	103.593	0	2												
3004 0471	103.807	103.808	0	1												
3004 0472	103.528	103.530	-1	2												
3004 0473	103.361	103.363	-1	1												
3004 0474	103.174															
3004 0475	103.047															
3004 0481	103.321	103.320	-1	0												
3004 0482	103.217	103.216	-1	0												
3004 0483	103.164															
3004 0484	103.137	103.137	-1	-1												
3004 0485	103.115															
3004 0486	103.110															
3004 0487	103.093															

# monitoring table



## Joint Venture

Project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	25. following		26. following		27. following		28. following		29. following		30. following		
	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
	15/12/12												
Point No.		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451		103.885						103.879	-3				
3004 0452		103.884						103.879	-3				
3004 0453		103.711						103.708	-3				
3004 0454		103.431						103.429	-3				
3004 0455		103.224						103.218	-3				
3004 0461		103.597	0	103.596	-1	103.596	0	103.596	0	103.596	0	103.597	0
3004 0462		103.540	0	103.539	-1	103.538	0	103.539	0	103.539	0	103.539	0
3004 0463		103.590	0	103.589	-1	103.589	0	103.590	0	103.590	0	103.590	0
3004 0471		103.807	0	103.805	-3	103.805	0	103.804	0	103.805	0	103.805	1
3004 0472		103.528	0	103.527	-1	103.527	0	103.527	0	103.527	0	103.527	1
3004 0473		103.361	-1	103.360	-2	103.360	1	103.360	0	103.360	0	103.361	1
3004 0474		103.174											
3004 0475		103.047											
3004 0481		103.321		103.321	0	103.321	0	103.321	0	103.321	0	103.321	0
3004 0482		103.217		103.217	0	103.217	0	103.217	0	103.217	0	103.217	0
3004 0483		103.164											
3004 0484		103.137											
3004 0485		103.115											
3004 0486		103.110											
3004 0487		103.093											

# monitoring table



## Joint Venture

Project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline		31. following		32. following		33. following		34. following		35. following		36. following				
	date	elevation	24/02/2013	deviation from last/ baseline	25/02/2013	elevation	deviation from last/ baseline	26/02/2013	elevation	deviation from last/ baseline	27/02/2013	elevation	deviation from last/ baseline	28/02/2013	elevation	deviation from last/ baseline	01/03/2013
Point No.																	
3004 0451	15/12/12	103.885															
3004 0452		103.884															
3004 0453		103.711															
3004 0454		103.431															
3004 0455		103.224															
3004 0461		103.597		-1		103.596	-1										
3004 0462		103.540		-1		103.538	-1										
3004 0463		103.590		-1		103.589	-1										
3004 0471		103.807		-2		103.805	0	103.805	1	-1	103.804	-2	103.804	0	-3	103.806	2.35
3004 0472		103.528		1		103.527	-1	103.528	1	0	103.527	-1	103.527	0	-2	103.529	2.32
3004 0473		103.361		0		103.360	0	103.362	1	0	103.360	-1	103.360	0	-1	103.361	1.28
3004 0474		103.174															
3004 0475		103.047															
3004 0481		103.321															
3004 0482		103.217															
3004 0483		103.164															
3004 0484		103.137															
3004 0485		103.115															
3004 0486		103.110															
3004 0487		103.093															

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline		37. following		38. following		39. following		40. following		41. following		42. following				
	date	elevation	date	deviation from last/ baseline	date	deviation from last/ baseline	date	deviation from last/ baseline	date	deviation from last/ baseline	date	deviation from last/ baseline	date	deviation from last/ baseline			
	15/12/12		02/03/2013		03/03/2013		04/03/2013		05/03/2013		06/03/2013		07/03/2013				
Point No.		elevation		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline			
3004 0451		103.885												103.880	0	-6	
3004 0452		103.884												103.880	1	-4	
3004 0453		103.711												103.709	0	-2	
3004 0454		103.431												103.430	1	-1	
3004 0455		103.224												103.219	1	-5	
3004 0461		103.597												103.597	0	-1	
3004 0462		103.540												103.539	0	-1	
3004 0463		103.590												103.590	0	-1	
3004 0471		103.807												103.806	0	-1	
3004 0472		103.528												103.527	-1	-1	
3004 0473		103.361												103.362	1	1	
3004 0474		103.174															
3004 0475		103.047															
3004 0481		103.321															
3004 0482		103.217	103.213	0	-3	103.212	-1	-5	103.212	0	-5	103.212	0	-5	103.212	0	-5
3004 0483		103.164	103.156	0	-8	103.155	-1	-9	103.155	0	-9	103.155	0	-9	103.155	0	-9
3004 0484		103.137	103.132	0	-6	103.131	-1	-6	103.131	0	-6	103.131	0	-6	103.131	0	-6
3004 0485		103.115	103.111	0	-4	103.110	0	-5	103.111	0	-5	103.110	0	-5	103.111	1	-5
3004 0486		103.110	103.104	0	-6	103.104	0	-6	103.104	0	-6	103.100	-3	-10	103.100	-3	-10
3004 0487		103.093															

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	43. following		44. following		45. following		46. following		47. following		48. following		
	baseline	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
date	08/03/2013		09/03/2013		14/03/2013		20/03/2013		27/03/2013		27/05/2013		
Point No.	elevation												
3004 0451	103.885								103.880	1	103.882	1	
3004 0452	103.884								103.881	1	103.882	1	
3004 0453	103.711								103.710	1	103.711	2	
3004 0454	103.431								103.431	1	103.432	1	
3004 0455	103.224								103.219	0	103.220	1	
3004 0461	103.597				103.597	0	-1	103.596	0	103.598	2	103.599	1
3004 0462	103.540				103.539	0	-1	103.538	-1	103.540	2	103.541	1
3004 0463	103.590				103.590	0	0	103.589	-1	103.591	2	103.593	2
3004 0471	103.807				103.804	-2	-3	103.804	0	103.806	2	103.805	-1
3004 0472	103.528				103.527	-1	-1	103.526	-1	103.529	2	103.529	2
3004 0473	103.361				103.361	-1	0	103.360	-1	103.362	2	103.363	1
3004 0474	103.174											103.143	-1
3004 0475	103.047											103.115	0
3004 0481	103.321											103.211	0
3004 0482	103.217	1	-4	103.212	0	-5	103.212	-1	-5			103.170	-5
3004 0483	103.164	0	-8	103.155	-1	-9	103.155	-1	-9	103.155	0	103.127	-9
3004 0484	103.137	0	-6	103.131	-1	-6	103.131	-1	-7	103.131	0	103.107	-7
3004 0485	103.115	0	-5	103.109	-1	-6						103.094	-6
3004 0486	103.110	103.099	-1							103.098	-1		
3004 0487	103.093												

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline		49. following		50. following		51. following		52. following		53. following		54. following		
	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
	15/12/12														
3004 0451		103.885	0	103.882	0	-3	103.882	0	-4	103.881	-1	-4	103.881	0	-4
3004 0452		103.884	0	103.882	0	-2	103.882	0	-2	103.881	-1	-3	103.881	1	-3
3004 0453		103.711	1	103.711	-1	0	103.711	0	0	103.710	-1	-1	103.710	0	-1
3004 0454		103.431	0	103.431	-1	0	103.431	0	0	103.430	-1	-1	103.430	0	-1
3004 0455		103.224	0	103.220	-1	-4	103.220	0	-4	103.219	-1	-4	103.220	1	-4
3004 0461		103.597								103.599	0	1	103.599	0	1
3004 0462		103.540								103.541	0	1	103.541	0	1
3004 0463		103.590								103.592	-1	1	103.592	0	2
3004 0471		103.807								103.804	-1	-3	103.804	0	-3
3004 0472		103.528								103.529	0	1	103.529	0	0
3004 0473		103.361								103.362	-1	1	103.362	0	1
3004 0474		103.174								103.141	-2	-3	103.142	0	-3
3004 0475		103.047								destroyed					
3004 0481		103.321													
3004 0482		103.217													
3004 0483		103.164													
3004 0484		103.137													
3004 0485		103.115													
3004 0486		103.110													
3004 0487		103.093													

# monitoring table



## Joint Venture

Project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline		55. following		56. following		57. following		58. following		59. following		60. following	
	date	elevation	03/06/2013	deviation from last/ baseline	04/06/2013	deviation from last/ baseline	05/06/2013	deviation from last/ baseline	06/06/2013	deviation from last/ baseline	07/06/2013	deviation from last/ baseline	08/06/2013	deviation from last/ baseline
Point No.		elevation		deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451		103.885	103.881	0 -4	103.880	-1 -5	103.881	0 -5	103.881	0 -4	103.881	0 -4	103.881	1 -4
3004 0452		103.884	103.880	0 -3	103.880	-1 -4	103.880	0 -4	103.880	1 -3	103.880	0 -4	103.881	1 -2
3004 0453		103.711	103.709	0 -1	103.708	-1 -2	103.709	0 -2	103.709	0 -2	103.709	1 -2	103.710	1 -1
3004 0454		103.431	103.430	0 -1	103.429	-1 -2	103.429	0 -2	103.429	0 -2	103.429	0 -2	103.430	1 -1
3004 0455		103.224	103.220	0 -4	103.219	-1 -5	103.219	0 -5	103.219	0 -4	103.219	0 -4	103.220	1 -4
3004 0461		103.597	103.600	1 2	103.599	0 1	103.599	0 1	103.599	1 2	103.599	0 2	103.600	1 2
3004 0462		103.540	103.542	1 2	103.541	0 1	103.541	0 1	103.541	0 1	103.541	0 2	103.542	1 2
3004 0463		103.590	103.593	1 2	103.592	0 2	103.592	0 2	103.593	1 2	103.592	0 2	103.593	1 3
3004 0471		103.807	103.805	1 -2									103.806	0 -2
3004 0472		103.528	103.530	1 1									103.530	0 2
3004 0473		103.361	103.364	1 2									103.364	1 3
3004 0474		103.174			103.142	1 -2	103.142	0 -2	103.143	1 -2	103.143	0 0		
3004 0475		103.047												
3004 0481		103.321			103.213						103.213	-0.41	0	
3004 0482		103.217			103.150						103.150	-0.21	0	
3004 0483		103.164			103.120						103.120	-0.08	0	
3004 0484		103.137			103.102						103.102	-0.42	0	
3004 0485		103.115			103.090						103.090	-0.01	0	
3004 0486		103.110												
3004 0487		103.093												



# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	61. following		62. following		63. following		64. following		65. following		66. following		
	baseline	09/06/2013	10/06/2013	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
Date	15/12/12	09/06/2013	10/06/2013	11/06/2013	12/06/2013	13/06/2013	14/06/2013						
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885	103.881	0	103.598	-2	103.598	0	103.598	0	103.598	0	103.598	0
3004 0452	103.884	103.881	0	103.540	-1	103.540	1	103.540	-1	103.540	0	103.540	0
3004 0453	103.711	103.710	0	103.592	-2	103.592	0	103.591	0	103.591	0	103.591	0
3004 0454	103.431	103.430	0	103.805	0	103.805	0	103.805	0	103.804	-1	103.803	0
3004 0455	103.224	103.220	0	103.529	0	103.529	0	103.529	-1	103.527	-1	103.527	0
3004 0461	103.597	103.599	1	103.363	0	103.364	1	103.362	-2	103.361	-1	103.360	0
3004 0462	103.540	103.542	1	103.142	0	103.142	0	103.142	0	103.141	-1	103.140	-1
3004 0463	103.590	103.593	1										
3004 0471	103.807	103.806	0										
3004 0472	103.528	103.529	0										
3004 0473	103.361	103.363	-1										
3004 0474	103.174	103.142	-1										
3004 0475	103.047												
3004 0481	103.321												
3004 0482	103.217												
3004 0483	103.164												
3004 0484	103.137												
3004 0485	103.115												
3004 0486	103.110												
3004 0487	103.093												

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old CoalYard

No. of reading	67. following		68. following		69. following		70. following		71. following		72. following		
	baseline	15/06/2013	16/06/2013	17/06/2013	18/06/2013	25/06/2013	02/07/2013						
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885												
3004 0452	103.884												
3004 0453	103.711												
3004 0454	103.431												
3004 0455	103.224												
3004 0461	103.597												
3004 0462	103.540												
3004 0463	103.590												
3004 0471	103.807	103.804	1	-3									
3004 0472	103.528	103.528	1	-1									
3004 0473	103.361	103.362	1	0									
3004 0474	103.174	103.141	0	-2									
3004 0475	103.047												
3004 0481	103.321	103.213	0	0	103.212	-1	-2	103.211	0	-2	103.210	2	-4
3004 0482	103.217	103.150	0	0	103.150	0	-1	103.148	-1	-2			
3004 0483	103.164	103.120	0	0	103.120	0	-2	103.118	0	-3			
3004 0484	103.137	103.102	0	-1	103.102	0	-2	103.100	0	-2			
3004 0485	103.115	103.090	0	0	103.090	0	-1	103.089	0	-1			
3004 0486	103.110												
3004 0487	103.093												

# monitoring table



## Joint Venture


project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	73. following		74. following		75. following		76. following		77. following	
	date	15/12/12	04/09/2013	27/08/2013	28/08/2013	24/09/2013	06/02/2014	elevation	deviation from last/ baseline	elevation
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885	0 -4	103.881	0 -4	103.880	-1 -5	103.880	-1 -5		
3004 0452	103.884	0 -3	103.881	0 -3	103.880	-1 -4	103.880	-1 -4		
3004 0453	103.711	1 -1	103.710	0 -1	103.708	-2 -3	103.708	-2 -3		
3004 0454	103.431	1 -1	103.430	1 -1	103.431	1 0	103.429	-2 -3		
3004 0455	103.224	1 -3	103.221	1 -3	103.221	0 -3	103.219	-2 -5		
3004 0461	103.597	0 0	103.598	0 0	103.598	0 1	103.596	-2 -2		
3004 0462	103.540	0 0	103.540	0 0	103.540	0 0	103.538	-2 -2		
3004 0463	103.590	0 2	103.592	0 2	103.593	1 3	103.590	-2 0		
3004 0471	103.807	-1 -4	103.803	-1 -4	103.803	0 -4	103.801	-2 -6		
3004 0472	103.528	0 0	103.528	0 0	103.528	0 0	103.527	-1 -2	103.796	-6 -11.82
3004 0473	103.361	0 0	103.361	0 0	103.361	0 -1	103.360	-1 -1	103.526	0 -1.98
3004 0474	103.174		103.137	-2 -6	103.137	-2 -6	103.130	-6 -13	103.359	-1 -1.83
3004 0475	103.047			destroyed		destroyed		destroyed		
3004 0481	103.321	1 -2	103.211	-1 -3	103.210	-1 -3	103.210	0 -3		
3004 0482	103.217	-3 -5	103.146	-3 -5	103.145	-1 -6	103.145	0 -5		
3004 0483	103.164		Tops of survey points 483-485 lost due to frontloading shovel		103.113	-5 -8	103.113	0 -7		destroyed
3004 0484	103.137		scraping surface		103.095	-4 -7	103.095	0 -7		
3004 0485	103.115		103.086	-3 -4			103.087	0 -3		
3004 0486	103.110					destroyed		destroyed		
3004 0487	103.093									

point No.474 damaged

point No.471 damaged

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	CROSSRAIL	eB NO	C310-HTM-C-RGN-CR148-50022	Rev	6.0
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 15**  
**CS4 – Old Coal Yard**

Learning Legacy Document

<b>monitoring asset</b>	<b>Area of Old Coalyard</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR148-PT005-50010		
<b>name of monitoring section:</b>	CS4- Old Coalyard area		
sensor type:	manual levelling studs		
chainage:	91520	point no.:	3004 0481 - 3004 0487
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 -20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date		max. value	point no.	comments
<b>baseline</b>	15/12/12		0.00		
<b>TBM 1</b>	start ZOI	01/03/13	-0.16	3004 0482	
	end ZOI	09/03/13	-1.51	3004 0482	breached not any trigger value
<b>TBM 2</b>	start ZOI	15/06/13	0.05	3004 0485	
	end ZOI	18/06/13	-0.54	3004 0485	breached not any trigger value
<b>longterm</b>	24/09/13		-5.37	3004 0482	last reading 3 month post tunneling, Cross section not longer measurable
<b>Evaluation of any potential residual risks</b>			<input checked="" type="checkbox"/>	No residual risk since the Works have been completed by HMJV	
			<input type="checkbox"/>	Yes, residual risk (see comment below)	

**summary / comments**

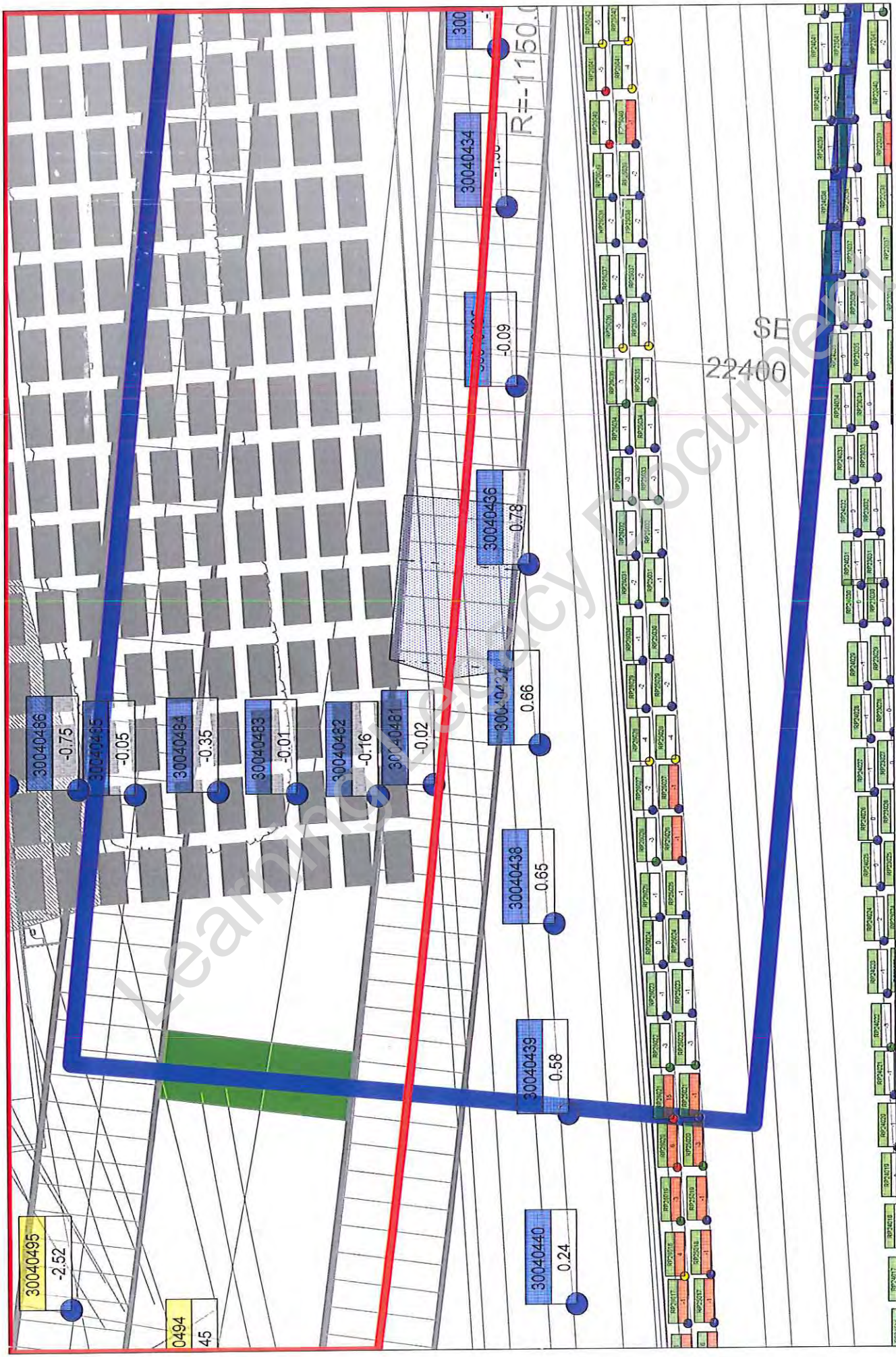
3004 0481 destroyed at 27.02.2013  
 3004 0481-0485 reinstalled and rebaselined at 21.05.2013  
 3004 0481-0485 2.nd time reinstalled and rebaselined at 04.06.2013  
 3004 0483-0485 destroyed at 04.08.2013  
 Cross section no longer measureable all points were destroyed.  
 Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings up to the time when the instrumentations have been damaged/destroyed.

date / signature: 31/03/2015

print name:

HMJV project role:

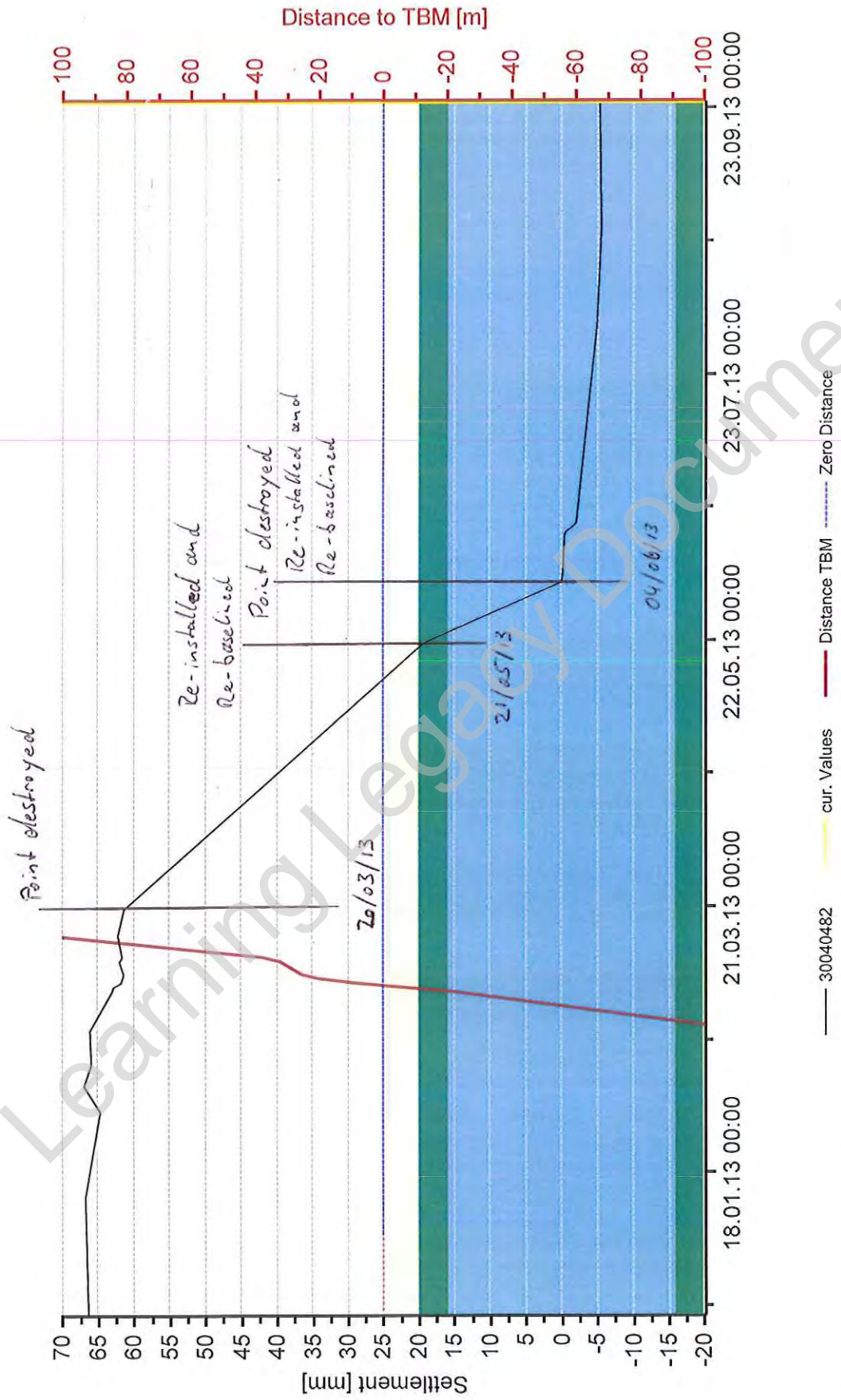
Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 02.03.2013 07:00

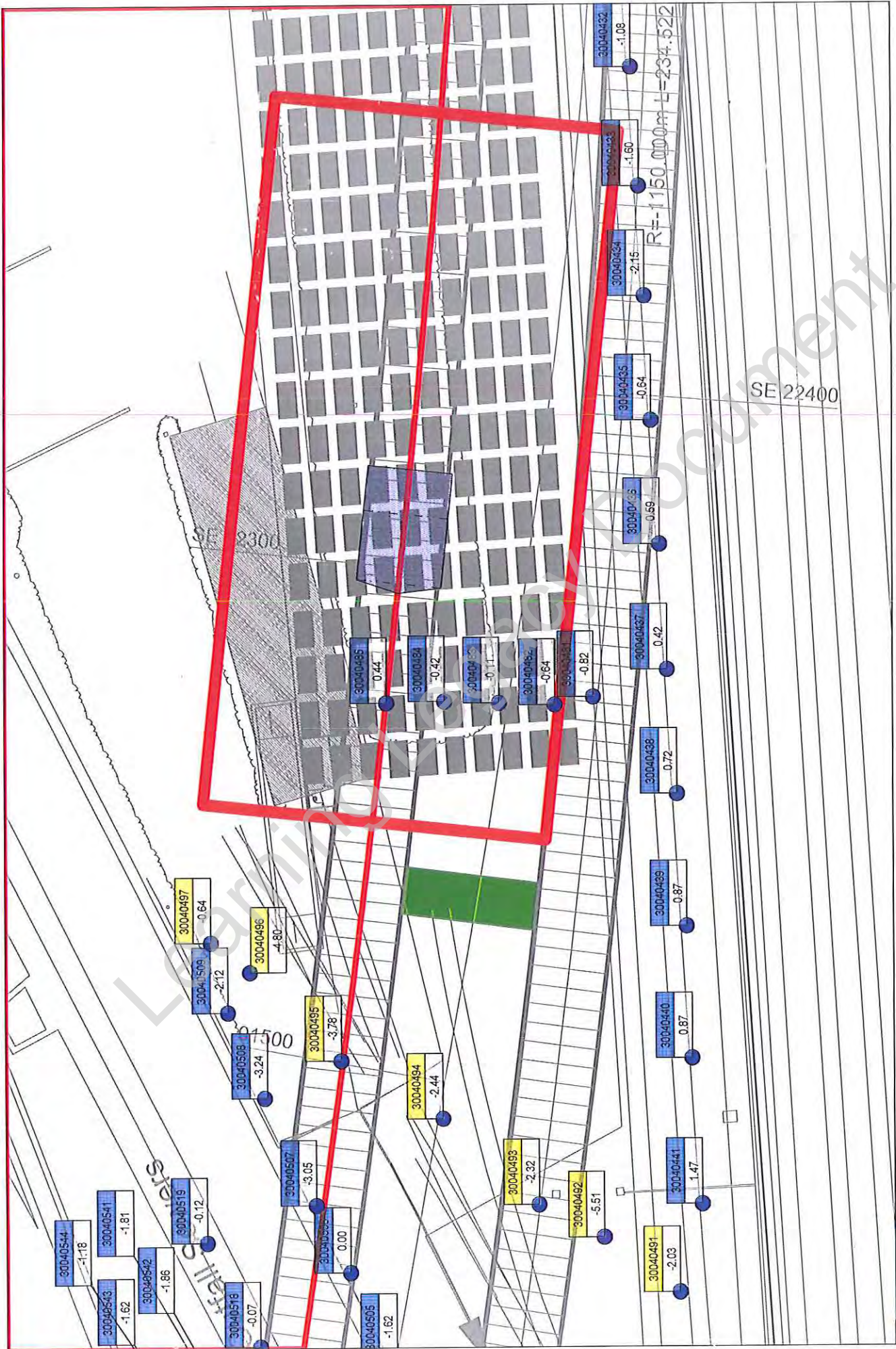


Point: 30040482



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - CS4 (Old Coalyard) 15.12.2012 - 24.09.2013  
date: 17.06.2014 15:57 current values: 17.06.2014 15:46





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 16.06.2013 09:00





Point: 30040485



— 30040485 — Distance TBM - - - - - Zero Distance

Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - CS4 (Old Coalyard) 15.12.2012 - 24.09.213  
date: 17.06.2014 16:03 current values: 17.06.2014 16:01



# monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old CoalYard

No. of reading	baseline	1. following		2. following		3. following		4. following		5. following		6. following	
		15/12/12	12/01/2013	26/01/2013	27/01/2013	28/01/2013	29/01/2013	30/01/2013	28/01/2013	29/01/2013	30/01/2013	28/01/2013	29/01/2013
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885	103.885	0	103.885	1	103.884	-2	103.885	1	103.886	1	103.885	-1
3004 0452	103.884	103.884	0	103.885	1	103.883	-1	103.884	0	103.884	1	103.883	-1
3004 0453	103.711	103.711	0	103.712	1	103.710	-1	103.711	0	103.711	1	103.710	-1
3004 0454	103.431	103.432	0	103.432	0	103.431	-1	103.431	1	103.432	1	103.431	-1
3004 0455	103.224	103.225	1	103.224	-1	103.221	-3	103.221	0	103.222	0	103.220	-2
3004 0461	103.597	103.599	1	103.599	0	103.597	-2	103.597	0	103.598	1	103.598	0
3004 0462	103.540	103.541	1	103.541	0	103.539	-2	103.539	1	103.540	1	103.540	0
3004 0463	103.590	103.592	1	103.591	0	103.590	-1	103.590	0	103.591	1	103.591	0
3004 0471	103.807	103.807	-1	103.807	0	103.806	-1	103.806	0	103.806	0	103.806	0
3004 0472	103.528	103.528	0	103.529	1	103.527	-2	103.528	2	103.528	0	103.528	-1
3004 0473	103.361	103.362	1	103.362	0	103.361	-1	103.362	1	103.362	0	103.360	-1
3004 0474	103.174	103.174	0	103.173	-1	103.172	-1	103.172	0	103.172	0	103.172	-1
3004 0475	103.047	103.047	0										
3004 0481	103.321	103.322	1										
3004 0482	103.217	103.217	0										
3004 0483	103.164	103.164	0										
3004 0484	103.137	103.138	0										
3004 0485	103.115	103.115	0										
3004 0486	103.110	103.109	-1										
3004 0487	103.093	103.093	0										

# monitoring table



## Joint Venture

### project: C310 Thames Tunnel

#### structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	7. following		8. following		9. following		10. following		11. following		12. following		
	baseline	31/01/2013	01/02/2013	02/02/2013	03/02/2013	04/02/2013	05/02/2013	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
date	15/12/12	31/01/2013	01/02/2013	02/02/2013	03/02/2013	04/02/2013	05/02/2013						
Point No.	elevation	elevation	elevation	elevation	elevation	elevation	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
		deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline		deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline
3004 0451	103.885	-3	-4	103.881	-1	-4	103.881	0	-4	103.881	0	-4	
3004 0452	103.884	-2	-3	103.881	0	-3	103.881	1	-3	103.881	0	-3	
3004 0453	103.711	-1	-2	103.709	0	-1	103.710	1	-1	103.710	0	-1	
3004 0454	103.431	0	-1	103.430	0	-1	103.431	1	0	103.432	1	0	
3004 0455	103.224	0	-4	103.219	0	-4	103.220	1	-4	103.221	1	-3	
3004 0461	103.597	-1	0	103.597	0	0	103.598	1	1	103.599	1	1	
3004 0462	103.540	0	0	103.539	0	0	103.540	1	1	103.541	1	1	
3004 0463	103.590	-1	0	103.590	0	0	103.591	1	1	103.592	1	2	
3004 0471	103.807	-1	-2	103.806	0	-2	103.806	1	-1	103.807	1	0	
3004 0472	103.528	0	-1	103.528	1	0	103.529	1	1	103.529	0	1	
3004 0473	103.361	0	-1	103.361	0	0	103.362	1	0	103.362	0	1	
3004 0474	103.174												
3004 0475	103.047												
3004 0481	103.321			103.319	-2	-1							
3004 0482	103.217			103.215	-2	-2							
3004 0483	103.164			103.135	-2	-2							
3004 0484	103.137												
3004 0485	103.115												
3004 0486	103.110												
3004 0487	103.093												

# monitoring table



## Joint Venture

project: **C310 Thames Tunnel**

structure: **Cross Section 1 - 4 Area NR + Old Coalyard**

No. of reading	baseline		13. following		14. following		15. following		16. following		17. following		18. following			
	date	elevation	05/02/2013	deviation from last/ baseline	07/02/2013	deviation from last/ baseline	08/02/2013	deviation from last/ baseline	09/02/2013	deviation from last/ baseline	10/02/2013	deviation from last/ baseline	11/02/2013	deviation from last/ baseline		
3004 0451	15/12/12	103.885			103.883	1	-3									
3004 0452		103.884			103.883	2	-1									
3004 0453		103.711			103.712	2	1									
3004 0454		103.431			103.433	1	2									
3004 0455		103.224			103.222	1	-2									
3004 0461		103.597			103.599	0	2	103.599	0	2	103.600	1	2	103.600	0	2
3004 0462		103.540			103.541	1	1	103.541	0	2	103.542	1	3	103.541	-1	1
3004 0463		103.590			103.592	1	2	103.592	0	2	103.593	1	2	103.592	-1	2
3004 0471		103.807			103.807	0	-1	103.807	0	0	103.808	1	0	103.808	0	0
3004 0472		103.528			103.529	0	1	103.529	0	1	103.530	1	2	103.530	-1	2
3004 0473		103.361			103.362	1	1	103.362	0	1	103.363	1	2	103.363	-1	1
3004 0474		103.174														
3004 0475		103.047														
3004 0481		103.321			103.321	2	0	103.321	0	0						
3004 0482		103.217			103.217	2	1	103.217	0	1						
3004 0483		103.164														
3004 0484		103.137			103.137	2	0	103.137	0	0						
3004 0485		103.115														
3004 0486		103.110														
3004 0487		103.093														

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	19. following		20. following		21. following		22. following		23. following		24. following		
	baseline	12/02/2013	13/02/2013	14/02/2013	15/02/2013	16/02/2013	17/02/2013	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
date	15/12/12	12/02/2013	13/02/2013	14/02/2013	15/02/2013	16/02/2013	17/02/2013	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885	103.882	0	-3									
3004 0452	103.884	103.882	0	-1									
3004 0453	103.711	103.712	0	1									
3004 0454	103.431	103.432	0	1									
3004 0455	103.224	103.221	-1	-2									
3004 0461	103.597	103.599	0	2	103.600	0	2	103.597	-3	103.597	0	103.597	0
3004 0462	103.540	103.542	0	2	103.542	0	2	103.539	-3	103.539	0	103.539	-1
3004 0463	103.590	103.593	0	2	103.593	0	2	103.590	-3	103.590	0	103.590	0
3004 0471	103.807	103.808	0	1	103.808	0	1	103.806	-2	103.805	0	103.805	0
3004 0472	103.528	103.530	-1	2	103.530	0	2	103.528	-3	103.527	0	103.527	0
3004 0473	103.361	103.363	-1	1	103.363	1	2	103.361	-3	103.360	-1	103.360	0
3004 0474	103.174												
3004 0475	103.047												
3004 0481	103.321	103.320	-1	0									
3004 0482	103.217	103.216	-1	0									
3004 0483	103.164												
3004 0484	103.137	103.137	-1	-1									
3004 0485	103.115												
3004 0486	103.110												
3004 0487	103.093												

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	25. following		26. following		27. following		28. following		29. following		30. following		
	baseline	18/02/2013	19/02/2013	20/02/2013	21/02/2013	22/02/2013	23/02/2013	24/02/2013	25/02/2013	26/02/2013	27/02/2013	28/02/2013	
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885							103.879	-3				
3004 0452	103.884							103.879	-3				
3004 0453	103.711							103.708	-3				
3004 0454	103.431							103.429	-3				
3004 0455	103.224							103.218	-3				
3004 0461	103.597	103.597	0	103.596	0	-1	103.596	0	-1	103.596	0	103.597	0
3004 0462	103.540	103.539	0	103.539	0	-1	103.538	0	-1	103.539	0	103.539	0
3004 0463	103.590	103.590	0	103.589	-1	-1	103.589	0	-1	103.590	0	103.590	0
3004 0471	103.807	103.805	0	103.805	0	-3	103.805	0	-3	103.804	0	103.805	1
3004 0472	103.528	103.527	0	103.527	0	-1	103.527	0	-2	103.527	0	103.527	1
3004 0473	103.361	103.360	-1	103.360	1	-1	103.360	0	-1	103.360	0	103.361	1
3004 0474	103.174												
3004 0475	103.047												
3004 0481	103.321			103.321	0	0							
3004 0482	103.217			103.217	0	0							
3004 0483	103.164												
3004 0484	103.137			103.137	0	0							
3004 0485	103.115												
3004 0486	103.110												
3004 0487	103.093												

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline		31. following		32. following		33. following		34. following		35. following		36. following	
	date	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
	15/12/12													
Point No.		elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451		103.885									103.879	0	-6	
3004 0452		103.884									103.879	0	-5	
3004 0453		103.711									103.709	0	-2	
3004 0454		103.431									103.429	0	-2	
3004 0455		103.224									103.218	0	-6	
3004 0461		103.597		-1							103.596	0	-1	
3004 0462		103.540		-1							103.539	0	-1	
3004 0463		103.590		-1							103.590	0	-1	
3004 0471		103.807		-2		103.805	0	-2		103.804	-2	-3	103.806	2.35
3004 0472		103.528		0		103.527	-1	-1		103.527	-1	-1	103.529	2.32
3004 0473		103.361		0		103.360	0	-1		103.360	-1	-1	103.361	1.28
3004 0474		103.174												
3004 0475		103.047												
3004 0481		103.321												
3004 0482		103.217								103.214	-3	-3	103.213	0
3004 0483		103.164								103.156	-7	-7	103.156	0
3004 0484		103.137								103.135	-3	-3	103.132	-3
3004 0485		103.115								103.118	3	3	103.111	-7
3004 0486		103.110								103.104	-6	-6	103.104	0
3004 0487		103.093												-6

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading date	37. following 02/03/2013		38. following 03/03/2013		39. following 04/03/2013		40. following 05/03/2013		41. following 06/03/2013		42. following 07/03/2013	
	baseline elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
Point No.	elevation											
3004 0451	103.885										103.880	0 -6
3004 0452	103.884										103.880	1 -4
3004 0453	103.711										103.709	0 -2
3004 0454	103.431										103.430	1 -1
3004 0455	103.224										103.219	1 -5
3004 0461	103.597										103.597	0 -1
3004 0462	103.540										103.539	0 -1
3004 0463	103.590										103.590	0 -1
3004 0471	103.807										103.806	0 -1
3004 0472	103.528										103.527	-1 -1
3004 0473	103.361										103.362	1 1
3004 0474	103.174											
3004 0475	103.047											
3004 0481	103.321											
3004 0482	103.217	0 -3	103.212	-1 -5	103.212	0 -5	103.212	0 -5	103.212	0 -5	103.155	0 -9
3004 0483	103.164	0 -8	103.155	-1 -9	103.155	0 -9	103.155	0 -9	103.155	0 -9	103.131	0 -6
3004 0484	103.137	0 -6	103.131	-1 -6	103.131	0 -6	103.131	0 -7	103.131	0 -6	103.111	1 -5
3004 0485	103.115	0 -4	103.110	0 -5	103.111	0 -5	103.110	0 -5	103.110	0 -5	103.111	1 -5
3004 0486	103.110	0 -6	103.104	0 -6	103.104	0 -6	103.103	-1 -7	103.100	-3 -10		
3004 0487	103.093											



# monitoring table



## Joint Venture

project: **C310 Thames Tunnel**

structure: **Cross Section 1 - 4 Area NR + Old Coalyard**

No. of reading	baseline		43. following		44. following		45. following		46. following		47. following		48. following			
	date	elevation	08/03/2013	deviation from last/ baseline	09/03/2013	deviation from last/ baseline	14/03/2013	deviation from last/ baseline	20/03/2013	deviation from last/ baseline	27/03/2013	deviation from last/ baseline	27/03/2013	deviation from last/ baseline		
Point No.		elevation		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		
3004 0451	15/12/12	103.885										103.880	1	103.882	1	-3
3004 0452		103.884										103.881	1	103.882	1	-2
3004 0453		103.711										103.710	1	103.711	2	1
3004 0454		103.431										103.431	1	103.432	1	0
3004 0455		103.224										103.219	0	103.220	1	-3
3004 0461		103.597					103.597	0	-1	103.596	0	-1	103.598	2	1	2
3004 0462		103.540					103.539	0	-1	103.538	-1	-1	103.540	2	1	2
3004 0463		103.590					103.590	0	0	103.589	-1	-1	103.591	2	1	2
3004 0471		103.807					103.804	-2	-3	103.804	0	-3	103.806	2	-1	-2
3004 0472		103.528					103.527	-1	-1	103.526	-1	-2	103.529	2	1	1
3004 0473		103.361					103.361	-1	0	103.360	-1	-1	103.362	2	1	2
3004 0474		103.174														-1
3004 0475		103.047														0
3004 0481		103.321														0
3004 0482		103.217	103.213	1	-4	103.212	0	-5	103.213	1	-4	103.212	-1	-5	103.170	-5
3004 0483		103.164	103.155	0	-8	103.155	-1	-9	103.155	1	-8	103.155	-1	-9	103.127	-9
3004 0484		103.137	103.132	0	-6	103.131	-1	-6	103.131	0	-6	103.131	-1	-7	103.107	-7
3004 0485		103.115	103.110	0	-5	103.109	-1	-6							103.094	-6
3004 0486		103.110	103.099	-1	-11							103.098	-1	-12		
3004 0487		103.093														

reinstalled and ebaselined

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline date	49. following 28/05/2013		50. following 29/05/2013		51. following 30/05/2013		52. following 31/05/2013		53. following 01/06/2013		54. following 02/06/2013	
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885	103.882	0 -3	103.882	0 -3	103.882	0 -4	103.881	-1 -4	103.881	0 -4	103.881	0 -4
3004 0452	103.884	103.882	0 -2	103.882	0 -2	103.882	0 -2	103.881	-1 -3	103.881	1 -3	103.881	0 -3
3004 0453	103.711	103.712	1 1	103.711	-1 0	103.711	0 0	103.710	-1 -1	103.710	0 -1	103.709	-1 -2
3004 0454	103.431	103.432	0 1	103.431	-1 0	103.431	0 0	103.430	-1 -1	103.430	0 -1	103.430	1 -1
3004 0455	103.224	103.220	0 -3	103.220	-1 -4	103.220	0 -4	103.219	-1 -4	103.220	1 -4	103.220	0 -4
3004 0461	103.597							103.599	0 1	103.599	0 1	103.598	0 1
3004 0462	103.540							103.541	0 1	103.541	0 1	103.541	0 1
3004 0463	103.590							103.592	-1 1	103.592	0 2	103.592	0 2
3004 0471	103.807							103.804	-1 -3	103.804	0 -3	103.805	0 -3
3004 0472	103.528							103.529	0 1	103.529	0 0	103.529	0 1
3004 0473	103.361							103.362	-1 1	103.362	0 1	103.362	0 1
3004 0474	103.174							103.141	-2 -3	103.142	0 -3	103.142	0 -3
3004 0475	103.047							destroyed					
3004 0481	103.321												
3004 0482	103.217												
3004 0483	103.164												
3004 0484	103.137												
3004 0485	103.115												
3004 0486	103.110												
3004 0487	103.093												

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	55. following		56. following		57. following		58. following		59. following		60. following				
	baseline	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline			
date	15/12/12			03/06/2013		04/06/2013		05/06/2013		06/06/2013		07/06/2013		08/06/2013	
3004 0451	103.885	103.881	103.880	-1	103.881	0	-5	103.881	0	103.881	0	-4	103.881	1	-4
3004 0452	103.884	103.880	103.880	-1	103.880	0	-4	103.880	0	103.880	0	-3	103.880	1	-2
3004 0453	103.711	103.709	103.708	-1	103.709	0	-2	103.709	0	103.709	0	-2	103.709	1	-1
3004 0454	103.431	103.430	103.429	-1	103.429	0	-2	103.429	0	103.429	0	-2	103.429	0	-1
3004 0455	103.224	103.220	103.219	-1	103.219	0	-5	103.219	0	103.219	0	-4	103.220	1	-4
3004 0461	103.597	103.600	103.599	0	103.599	0	1	103.599	0	103.599	0	2	103.600	1	2
3004 0462	103.540	103.542	103.541	0	103.541	0	1	103.541	0	103.541	0	1	103.542	1	2
3004 0463	103.590	103.593	103.592	0	103.592	0	2	103.592	0	103.592	0	2	103.593	1	3
3004 0471	103.807	103.805													
3004 0472	103.528	103.530													
3004 0473	103.361	103.364													
3004 0474	103.174		103.142	1	103.142	0	-2	103.143	1	103.143	0	0			
3004 0475	103.047														
3004 0481	103.321		103.213							103.213	-0.41	0			
3004 0482	103.217		103.150							103.150	-0.21	0			
3004 0483	103.164		103.120							103.120	-0.08	0			
3004 0484	103.137		103.102							103.102	-0.42	0			
3004 0485	103.115		103.090							103.090	-0.01	0			
3004 0486	103.110														
3004 0487	103.093														

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline elevation	61. following 09/05/2013		62. following 10/06/2013		63. following 11/06/2013		64. following 12/06/2013		65. following 13/06/2013		66. following 14/06/2013	
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885	103.881	0	-4									
3004 0452	103.884	103.881	0	-3									
3004 0453	103.711	103.710	0	-1									
3004 0454	103.431	103.430	0	-1									
3004 0455	103.224	103.220	0	-3									
3004 0461	103.597	103.599	1	2	103.598	-2	0	103.598	0	0	103.598	0	0
3004 0462	103.540	103.542	1	2	103.540	-1	0	103.541	1	1	103.540	-1	0
3004 0463	103.590	103.593	1	3	103.592	-2	1	103.592	0	1	103.591	0	1
3004 0471	103.807	103.806	0	-2	103.805	0	-2	103.805	0	-3	103.804	-1	-4
3004 0472	103.528	103.529	0	1	103.529	0	1	103.529	0	1	103.527	-1	-1
3004 0473	103.361	103.363	-1	2	103.363	0	2	103.364	1	3	103.361	-1	-1
3004 0474	103.174	103.142	-1	-2	103.142	0	-3	103.142	0	-2	103.141	-1	-2
3004 0475	103.047												
3004 0481	103.321												
3004 0482	103.217												
3004 0483	103.164												
3004 0484	103.137												
3004 0485	103.115												
3004 0486	103.110												
3004 0487	103.093												

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	baseline		67. following		68. following		69. following		70. following		71. following		72. following	
	date	elevation	15/06/2013	deviation from last/ baseline	16/06/2013	deviation from last/ baseline	17/06/2013	deviation from last/ baseline	18/06/2013	deviation from last/ baseline	25/06/2013	deviation from last/ baseline	02/07/2013	deviation from last/ baseline
3004 0451	103.885										103.880	-1	103.881	0
3004 0452	103.884										103.879	-2	103.880	1
3004 0453	103.711										103.708	-2	103.709	1
3004 0454	103.431										103.429	-1	103.429	0
3004 0455	103.224										103.219	-1	103.220	1
3004 0461	103.597										103.597	-1	103.598	1
3004 0462	103.540										103.540	0	103.540	0
3004 0463	103.590										103.591	0	103.592	1
3004 0471	103.807										103.804	0	103.804	0
3004 0472	103.528										103.527	0	103.528	0
3004 0473	103.361										103.362	1	103.361	1
3004 0474	103.174										103.174	0	103.174	0
3004 0475	103.047										103.139	-2		
3004 0481	103.321										103.213	0		
3004 0482	103.217										103.211	0	103.210	2
3004 0483	103.164										103.148	-1		
3004 0484	103.137										103.118	-2		
3004 0485	103.115										103.118	0		
3004 0486	103.110										103.100	0		
3004 0487	103.093										103.089	0	103.083	-6

# monitoring table



Joint Venture


project: C310 Thames Tunnel

structure: Cross Section 1 - 4 Area NR + Old Coalyard

No. of reading	73. following		74. following		75. following		76. following		77. following	
	baseline	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
		15/12/12								
		04/08/2013								05/02/2014
Point No.	elevation		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0451	103.885	0	103.881	-4	103.881	0	103.880	-1	103.880	-5
3004 0452	103.884	0	103.881	-3	103.881	0	103.880	-1	103.880	-4
3004 0453	103.711	1	103.710	-1	103.710	0	103.708	-2	103.708	-3
3004 0454	103.431	1	103.430	-1	103.431	1	103.429	-2	103.429	-3
3004 0455	103.224	1	103.221	-3	103.221	0	103.219	-2	103.219	-5
3004 0461	103.597	0	103.598	0	103.598	0	103.596	-2	103.596	-2
3004 0462	103.540	0	103.540	0	103.540	0	103.538	-2	103.538	-2
3004 0463	103.590	0	103.592	2	103.593	1	103.590	-2	103.590	0
3004 0471	103.807	-1	103.803	-4	103.803	0	103.801	-2	103.801	-6
3004 0472	103.528	0	103.528	0	103.528	0	103.527	-1	103.527	-2
3004 0473	103.361	0	103.361	0	103.361	0	103.360	-1	103.360	-1
3004 0474	103.174		103.137	-37	103.137	-2	103.130	-6	103.130	-13
3004 0475	103.047									
3004 0481	103.321	1	103.211	-110	103.210	-1	103.210	0	103.210	-3
3004 0482	103.217	-3	103.146	-71	103.145	-1	103.145	0	103.145	-5
3004 0483	103.164	483	Tops of survey points 483-485 lost due to frontloading shovel		103.113	-51	103.113	0	103.113	-7
3004 0484	103.137		103.095	-42	103.095	-4	103.095	0	103.095	-7
3004 0485	103.115		103.086	-29	103.086	-3	103.087	0	103.087	-3
3004 0486	103.110									
3004 0487	103.093									

point No.474 damaged  
point No.471 damaged

point No.474 damaged  
point No.471 damaged

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 16**

**APB Sidings – Old Coal Yard**

Learning Legacy Document

<b>monitoring asset</b>	<b>Area of Old Coalyard / NR sidings</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR148-PT005-50010		
<b>name of monitoring section:</b>	APB Sidings - Old Coalyard area		
sensor type:	manual levelling studs		
chainage:	91480 - 91700	point no.:	3004 0421 - 3004 0441
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 -20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

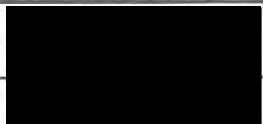
**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	15/12/12	0		
<b>TBM 1</b>	start ZOI	29/01/13 04/03/13	0.01 1.04	3004 0421 3004 0441
	end ZOI	03/02/13 12/03/13	2.09 -3.63	3004 0421 3004 0441
<b>TBM 2</b>	start ZOI	30/05/13 18/06/13	-2.66 1.13	3004 0421 3004 0441
	end ZOI	09/06/13 20/06/13	-2.81 0.63	3004 0421 3004 0441
<b>longterm</b>	06/02/14	-6.46	3004 0429	this is the localised settlement for this point only. Adjacent monitoring points show less than 1mm settlement between 09/2013-02/2014
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV		
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)		

**summary / comments**

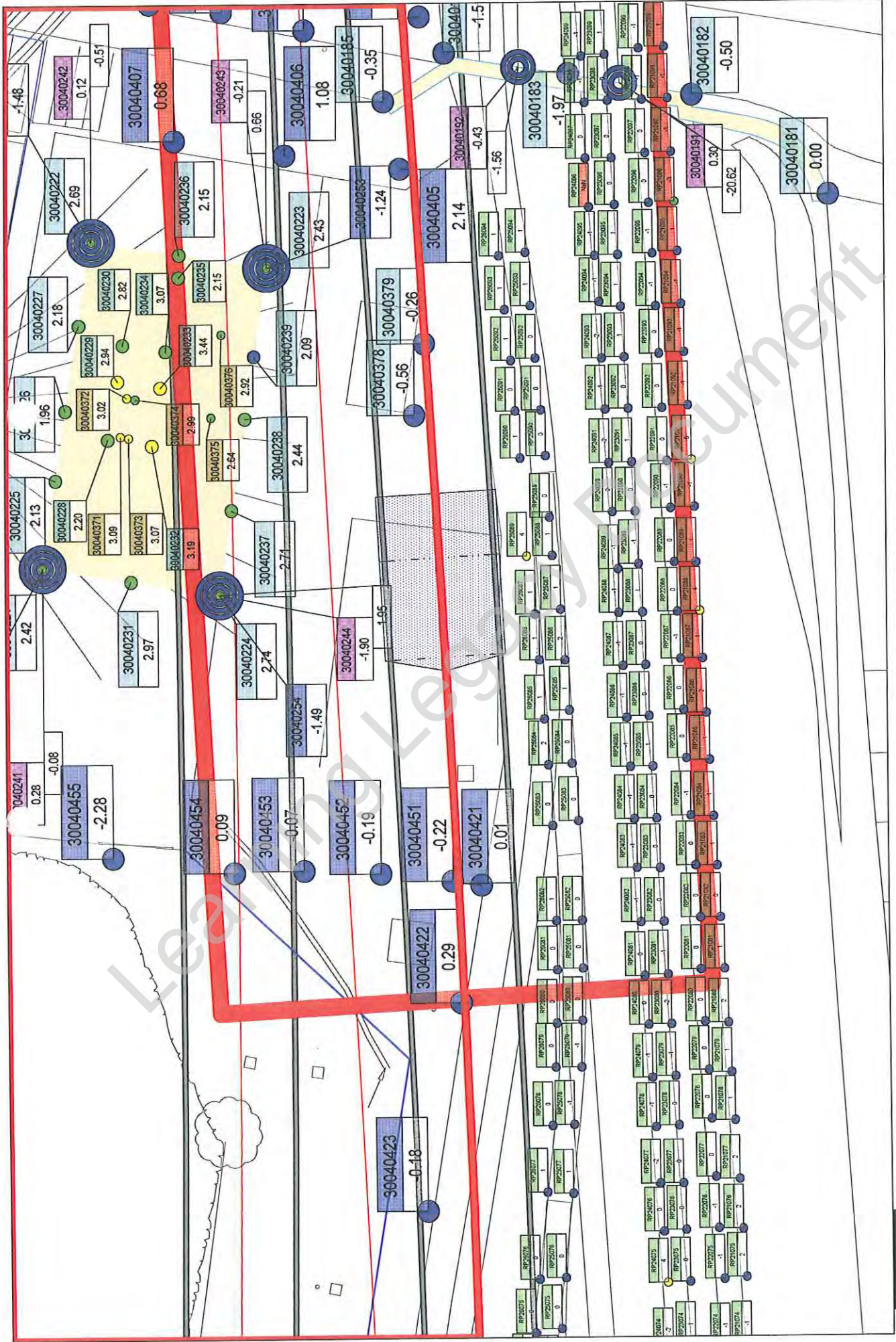
Points no. 3004 0440 & 3004 0441 were tracked over by heavy machine 24/09/2014.  
(not useable for longterm value)  
Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 08/01/2015

print name: 

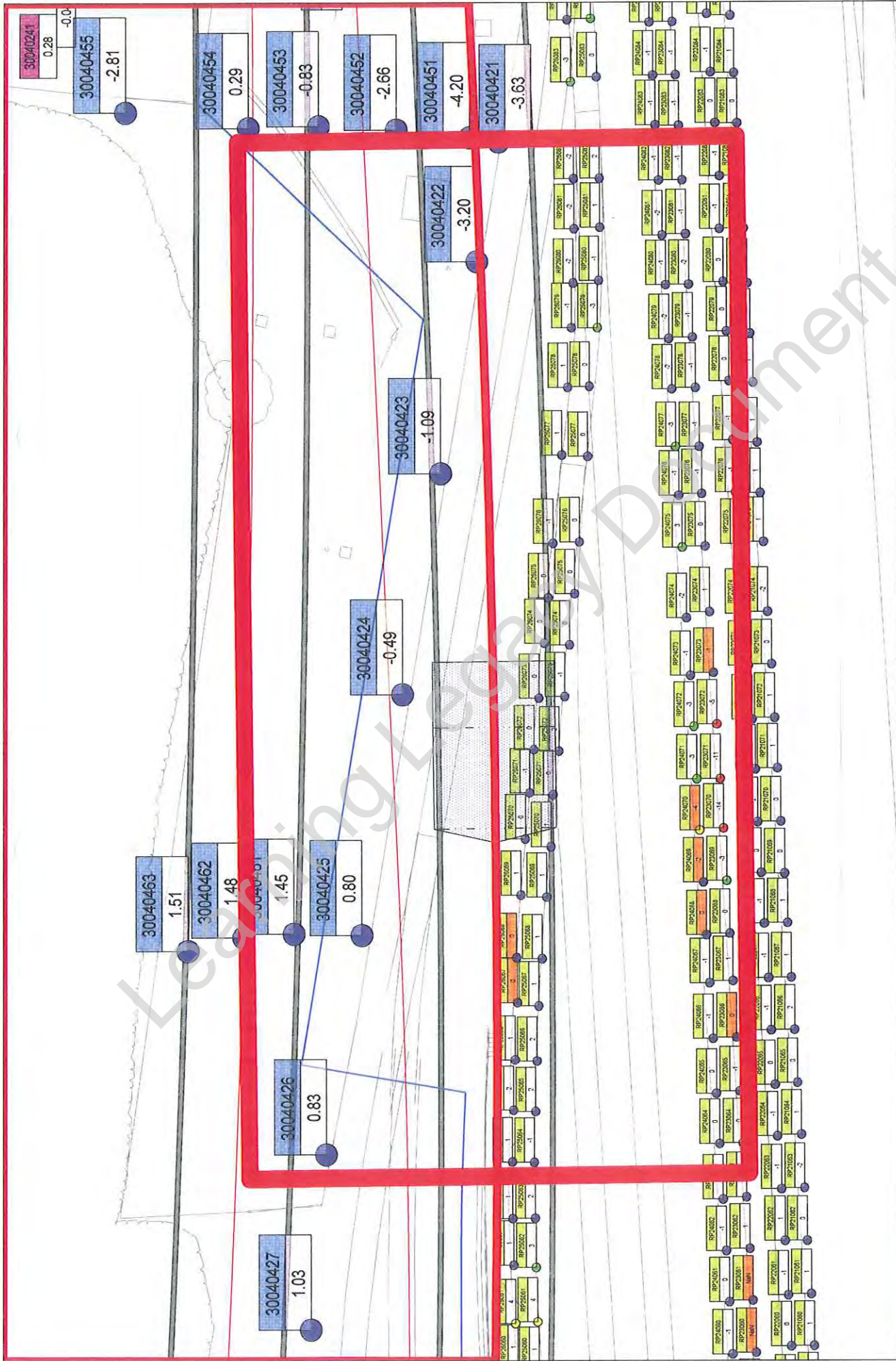
HMJV project role: Monitoring & Survey engineer

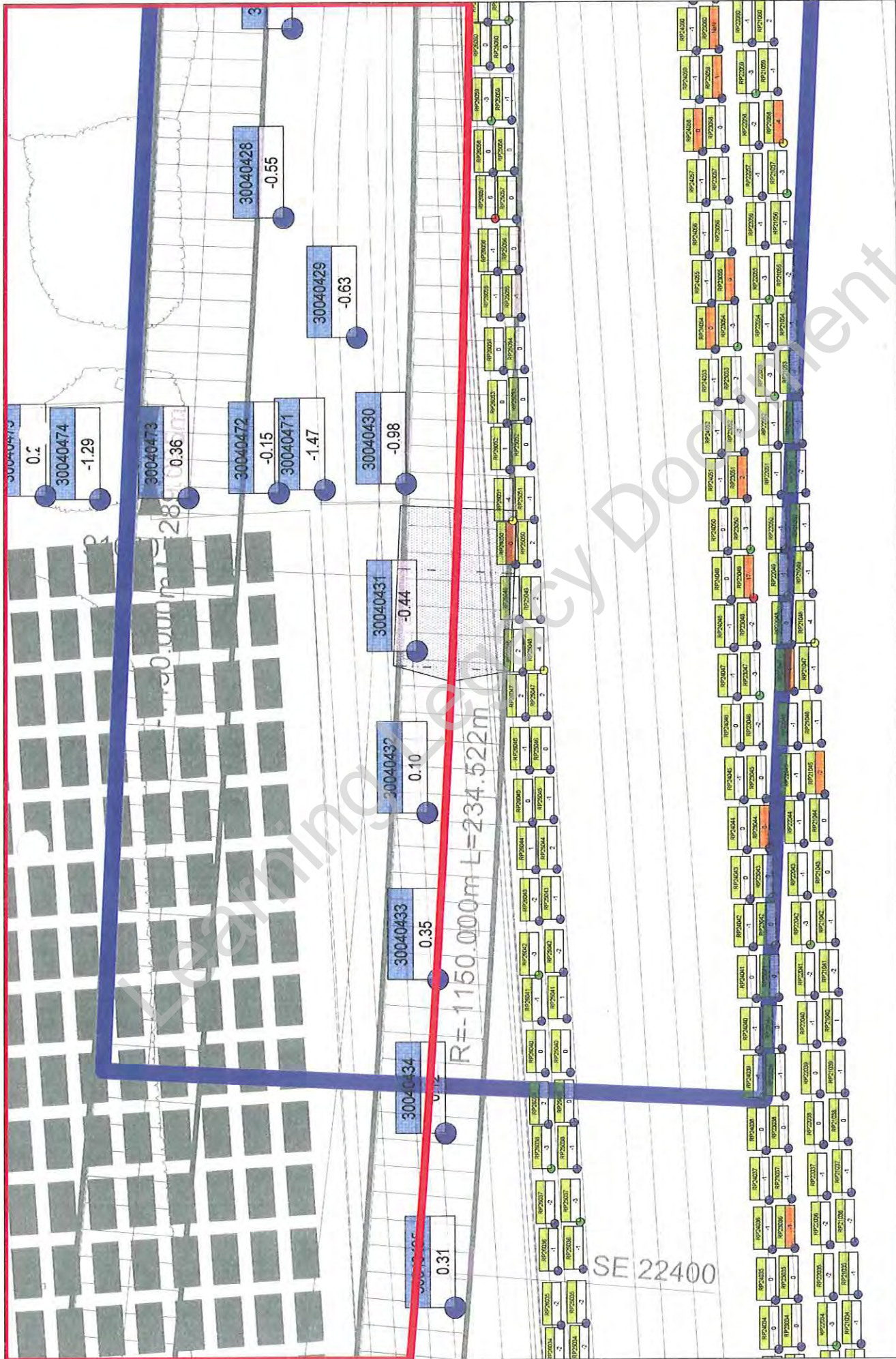




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 29.01.2013 07:00



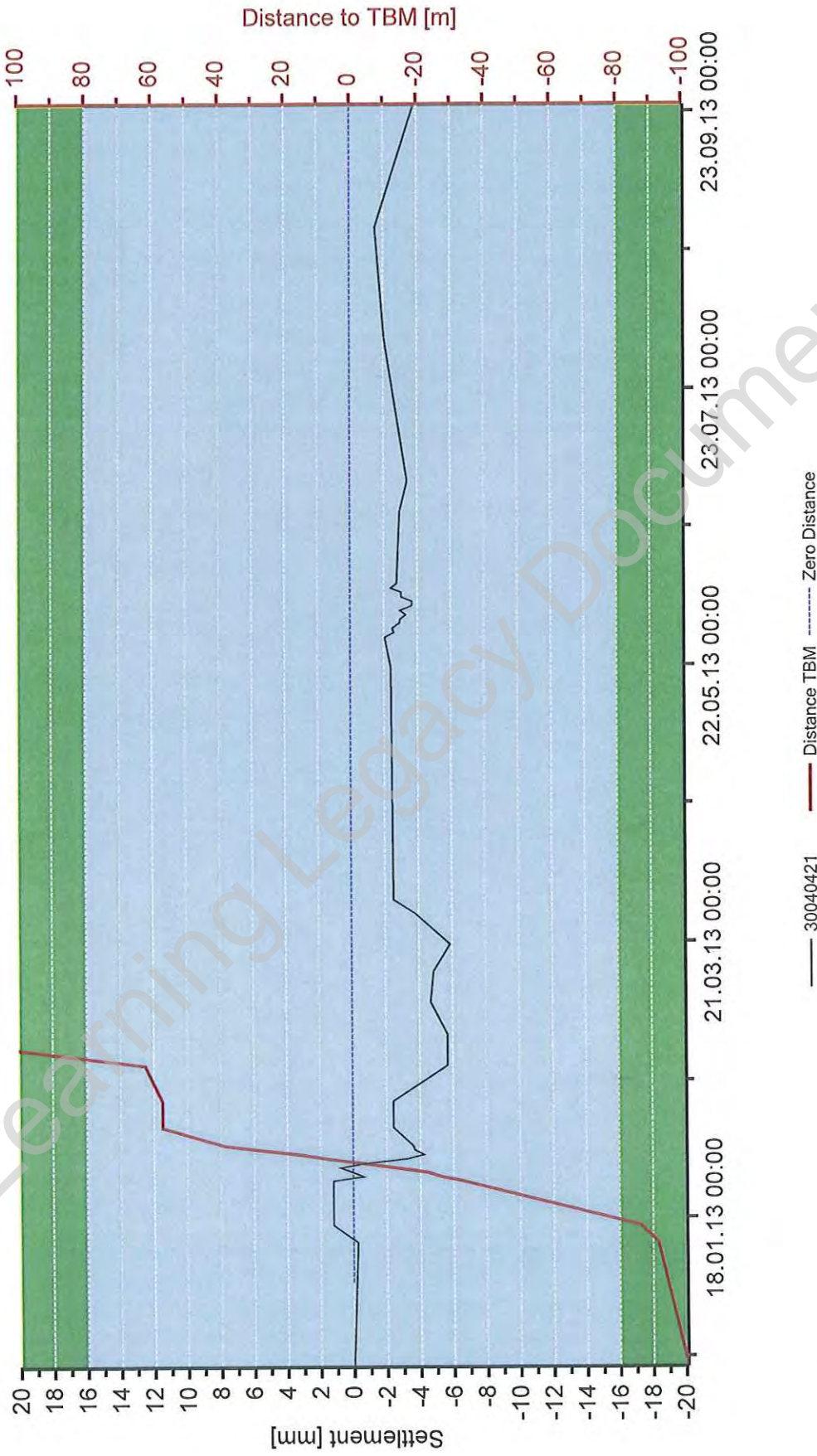




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 26.02.2013 09:38

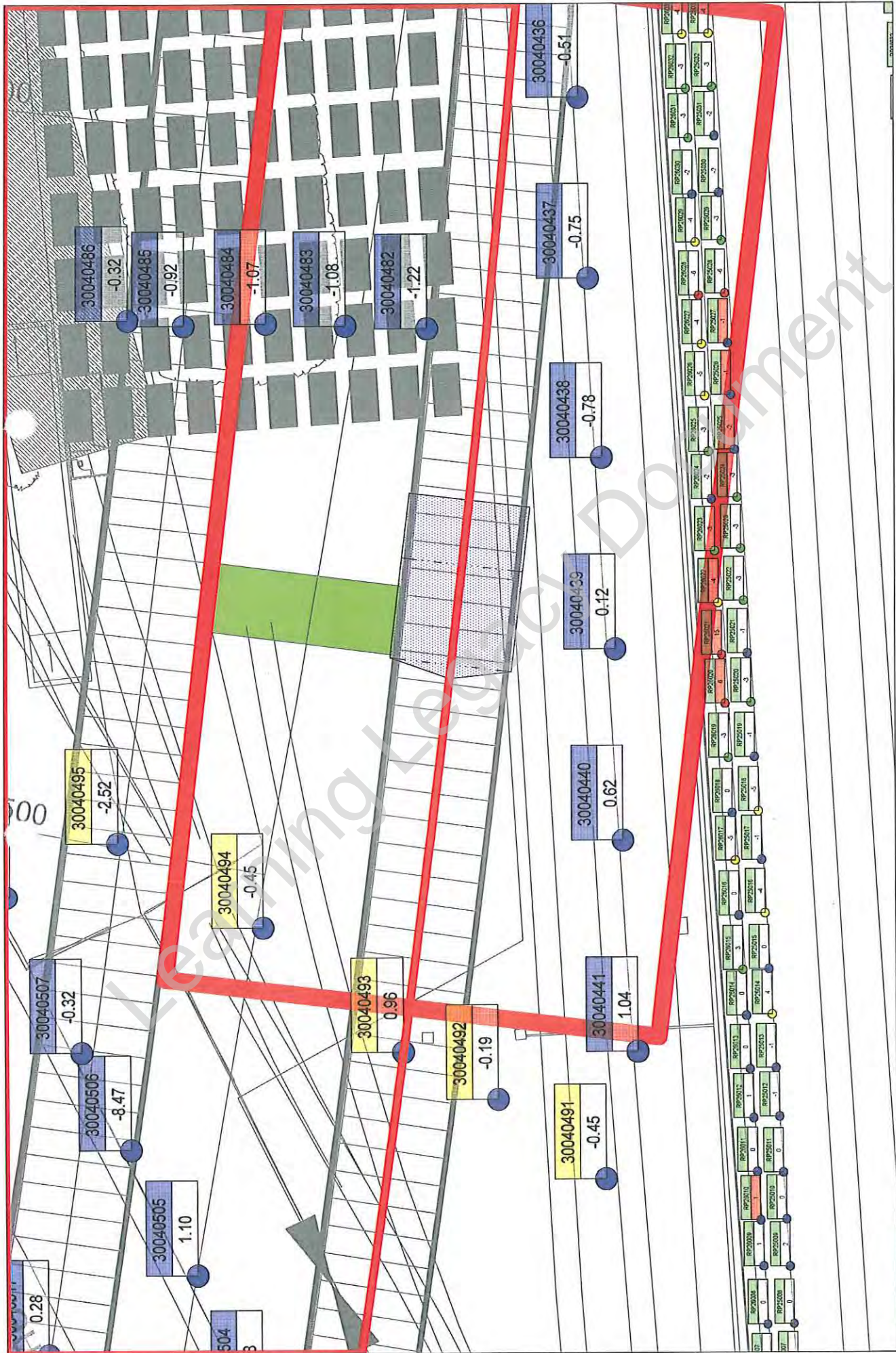


Point: 30040421



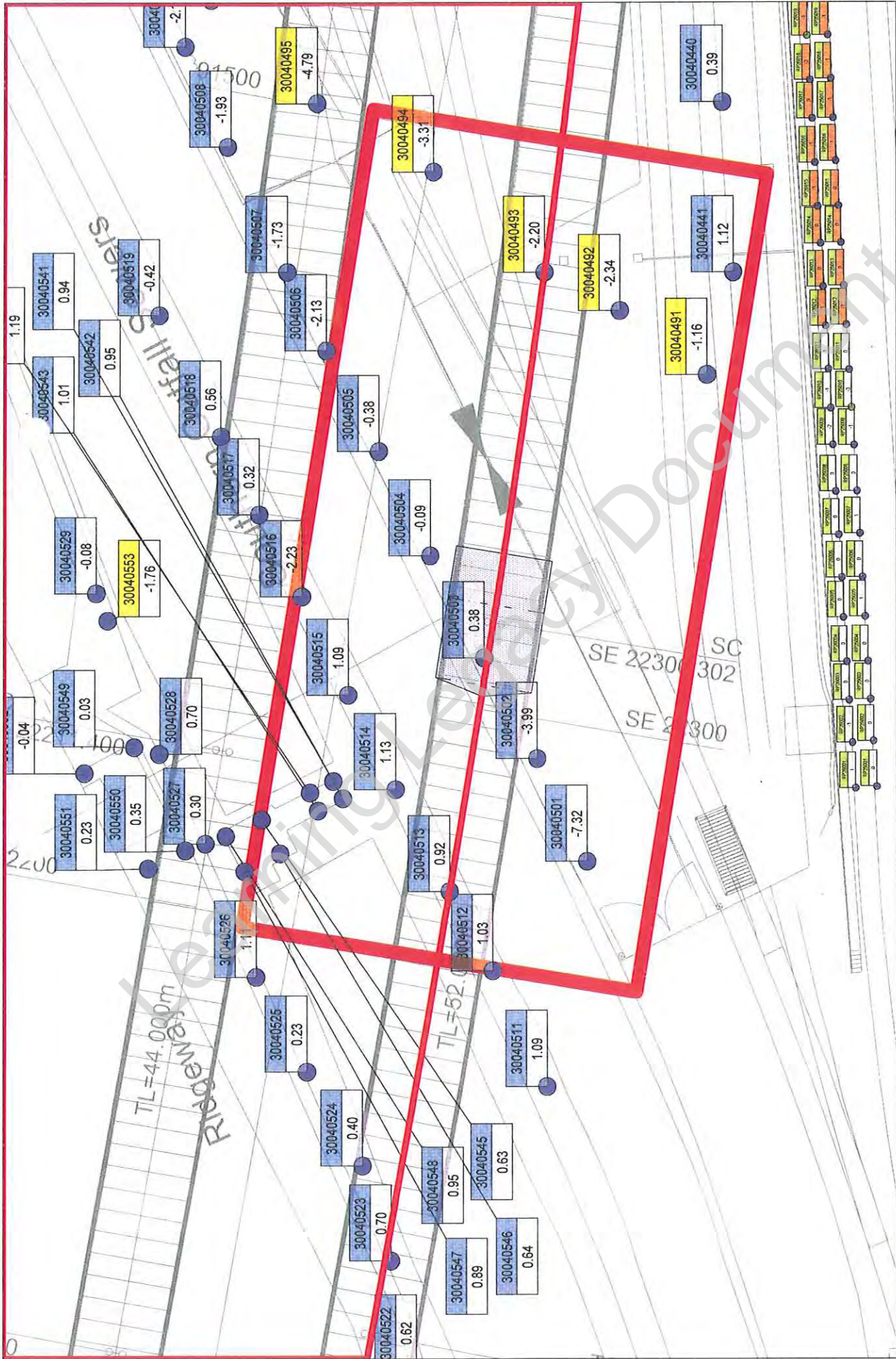
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - APB Sidings (Old Coalyard) 15.12.2012 - 24.09.2013  
date: 17.06.2014 17:32 current values: 17.06.2014 17:25





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 04.03.2013 08:56





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 12.03.2013 07:00

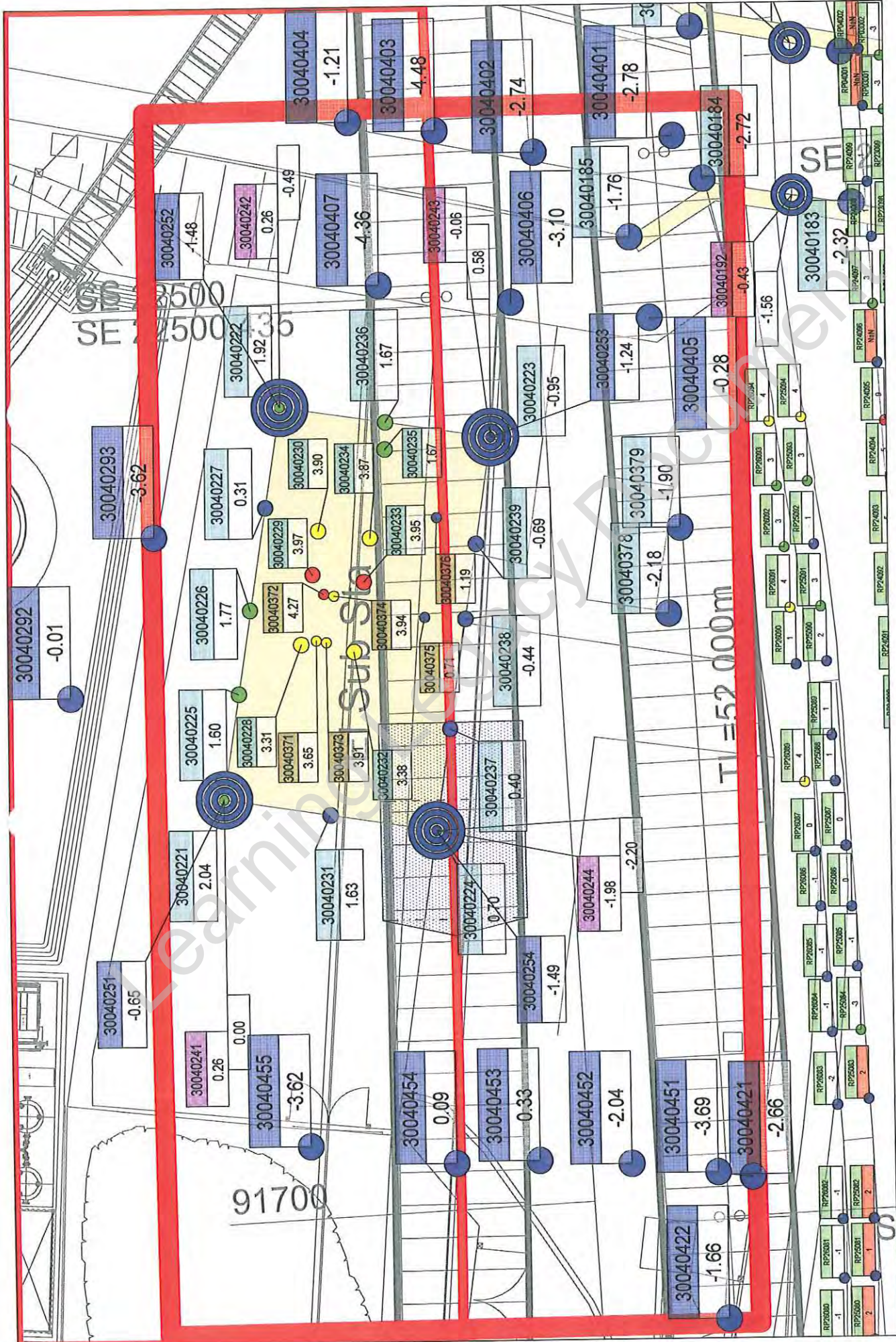


Point: 30040441



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - APB Sidings (Old Coalyard) 15.12.2012 - 24.09.2013  
date: 17.06.2014 17:39 current values: 17.06.2014 17:25



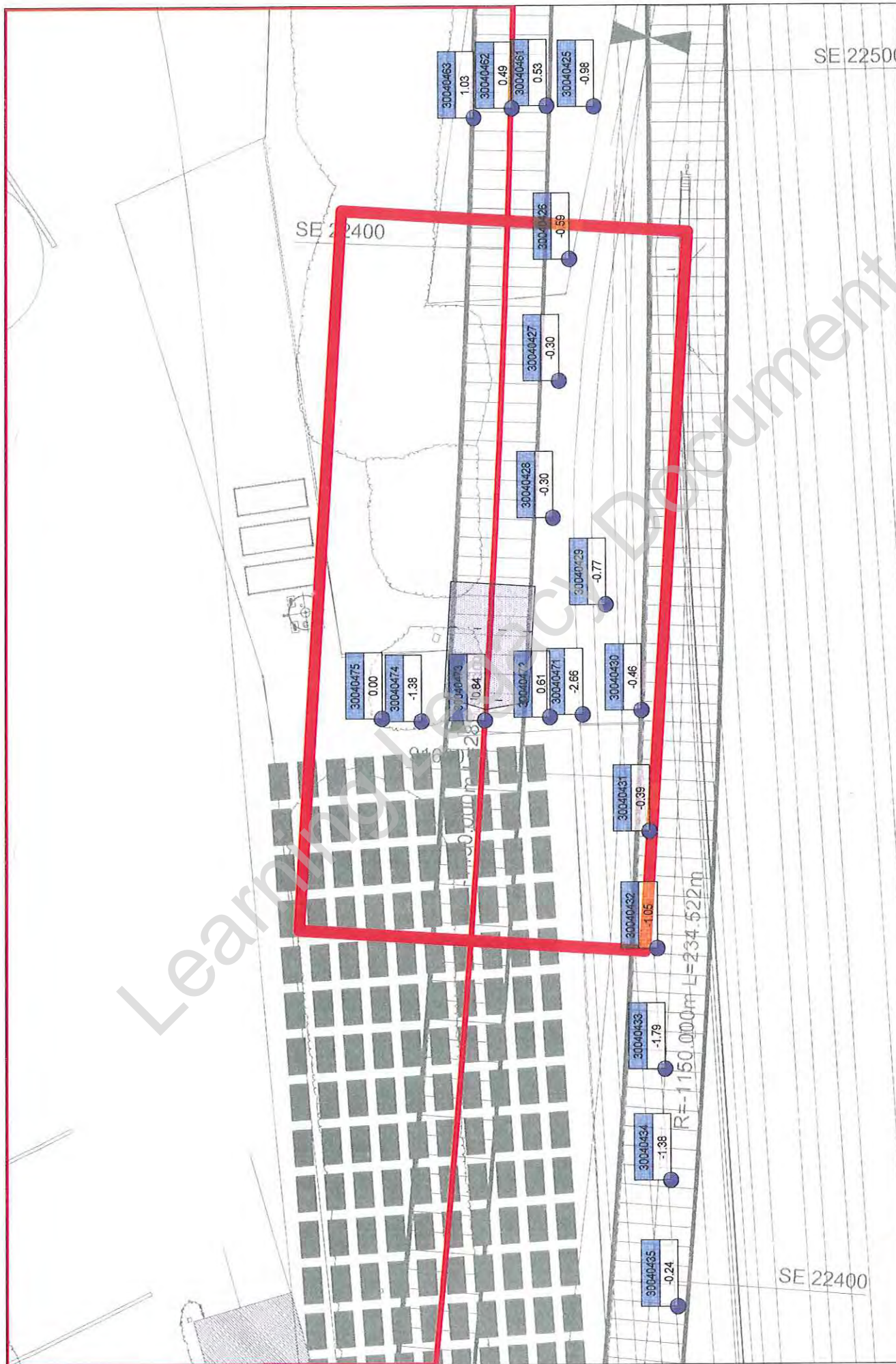


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

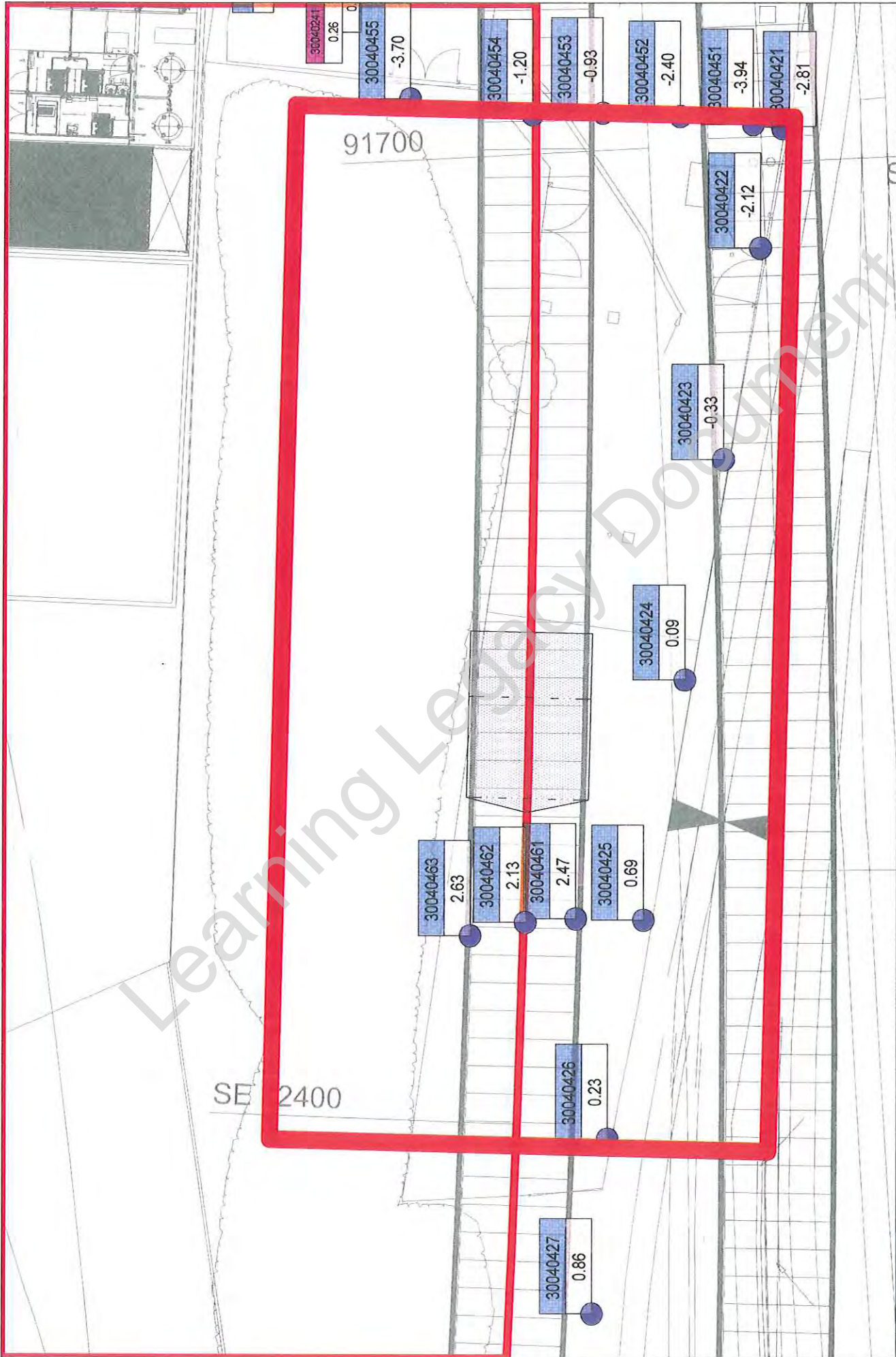
working activities: TBM drive

current values: 30.05.2013 09:00



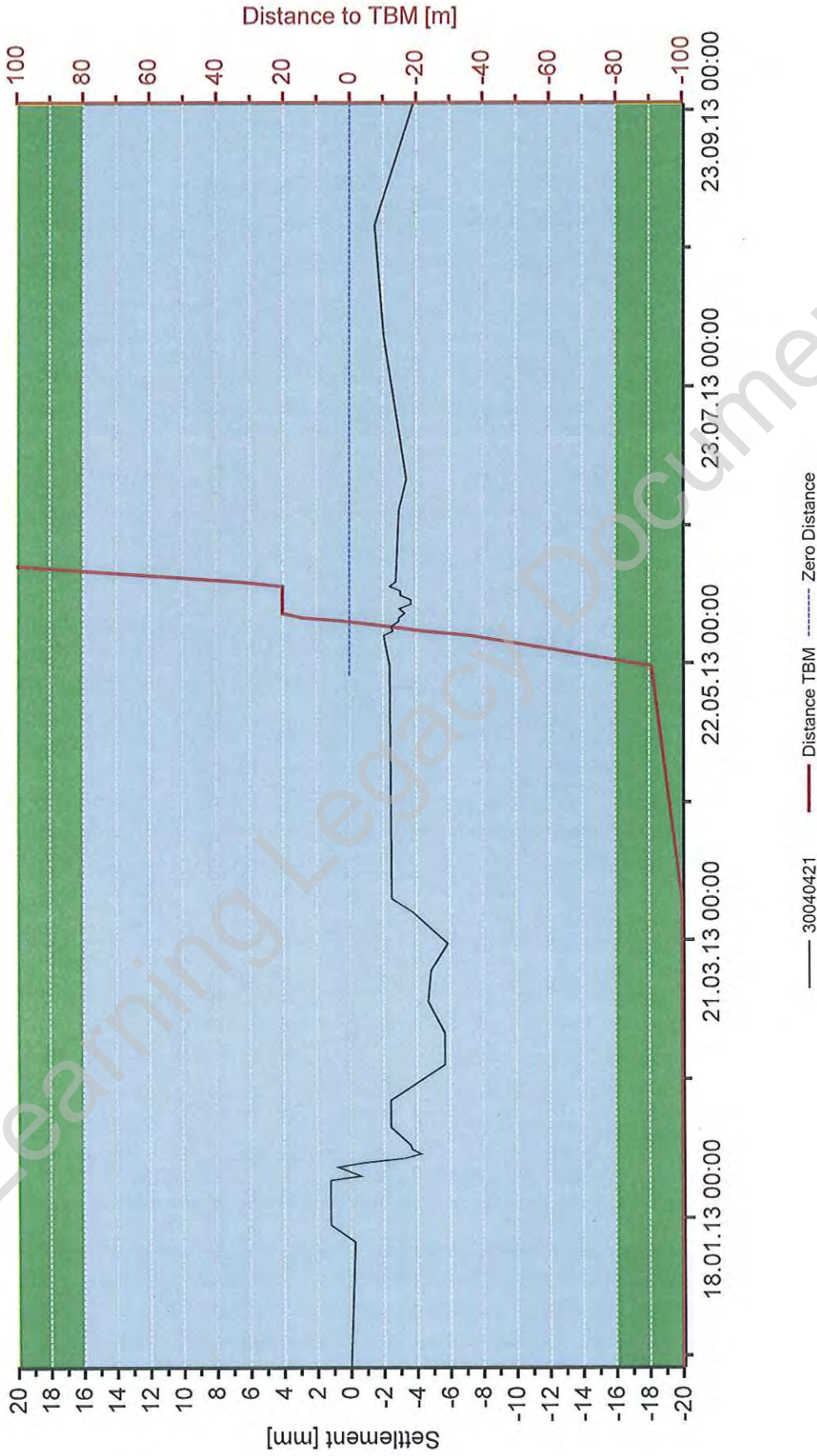


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 12.06.2013 17:59



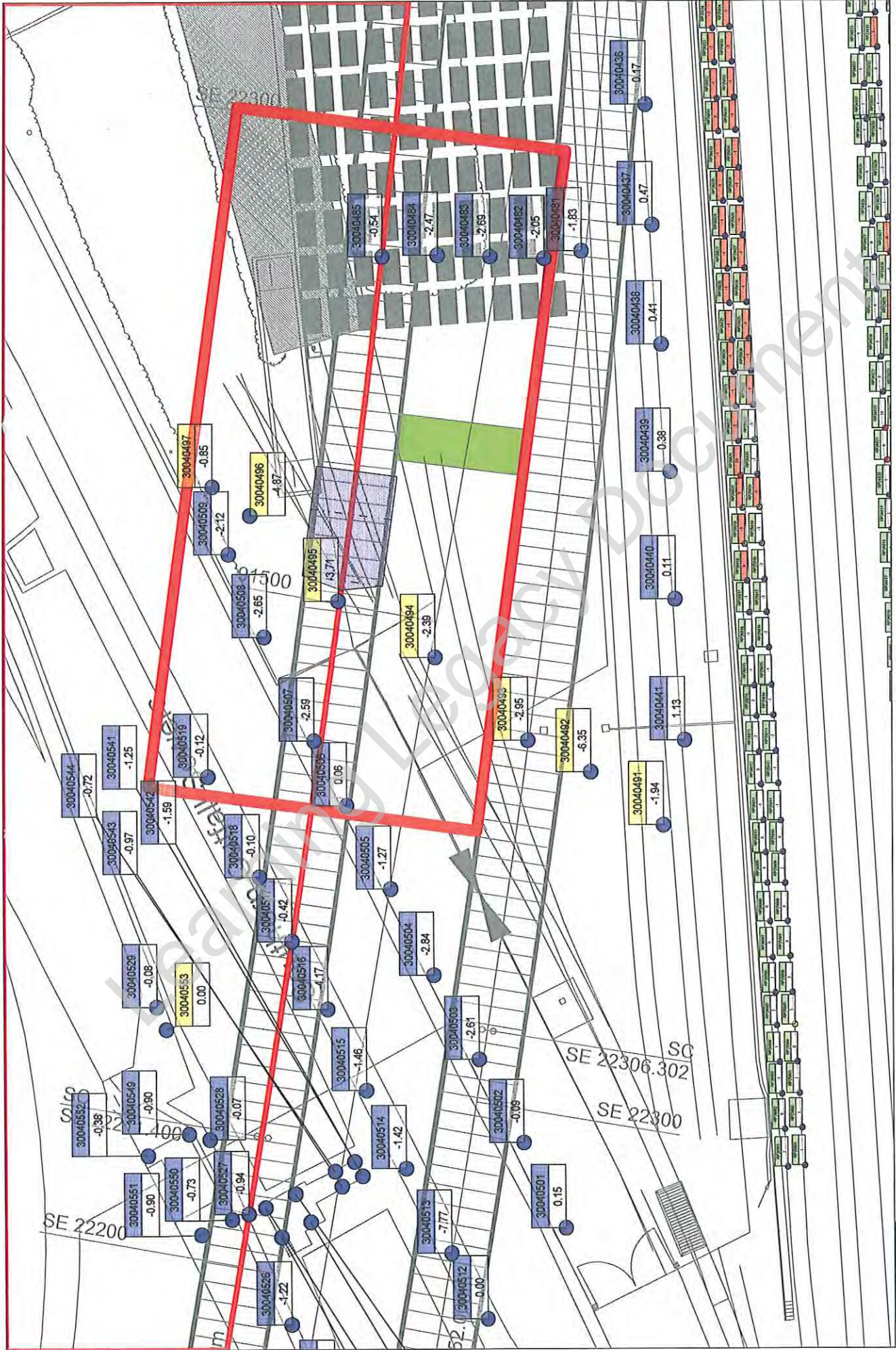
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 01.08.2013 09:00

Point: 30040421



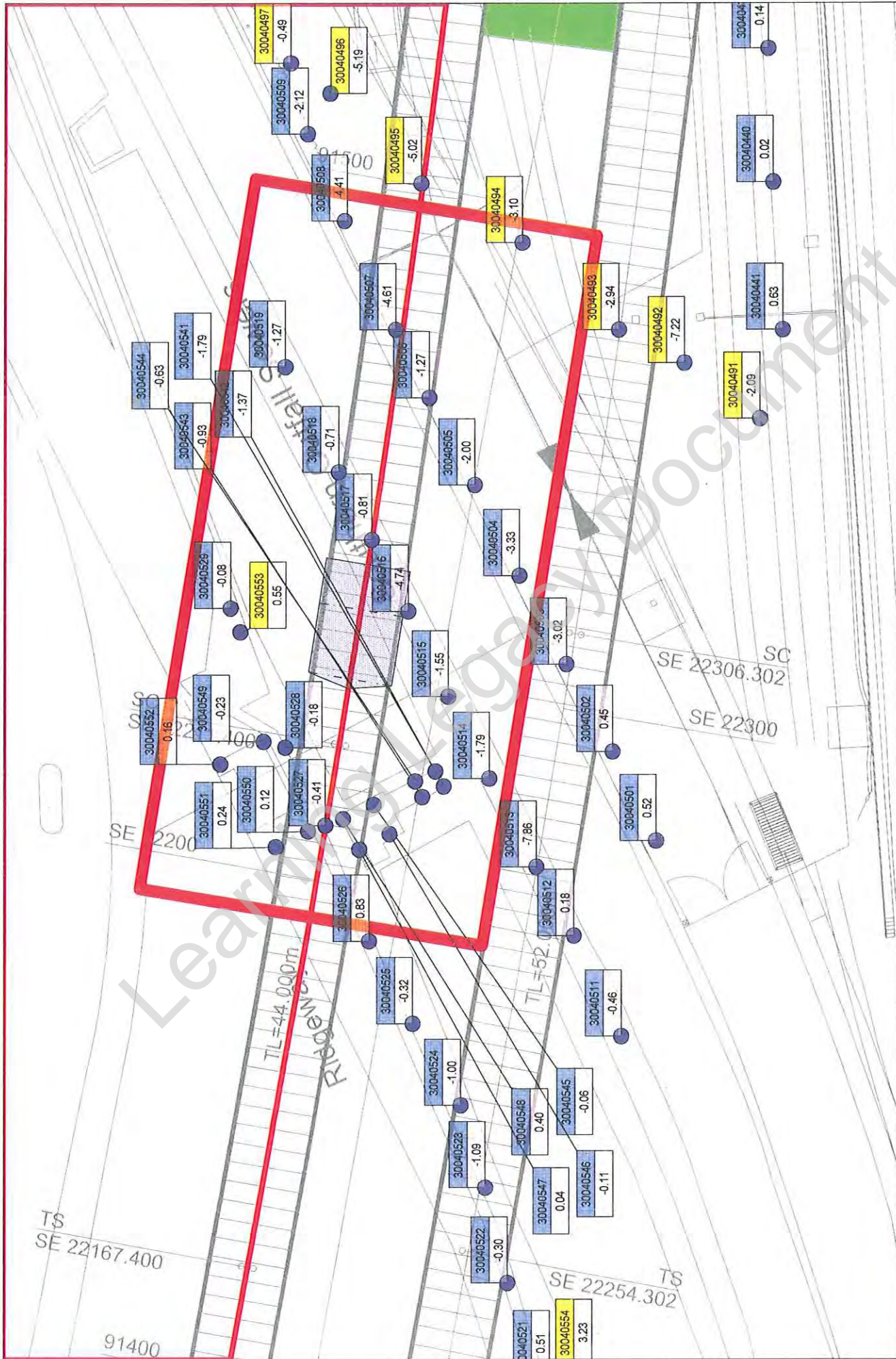
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - APB Sidings (Old Coalyard) 15.12.2012 - 24.09.213  
date: 18.06.2014 08:27 current values: 18.06.2014 08:19





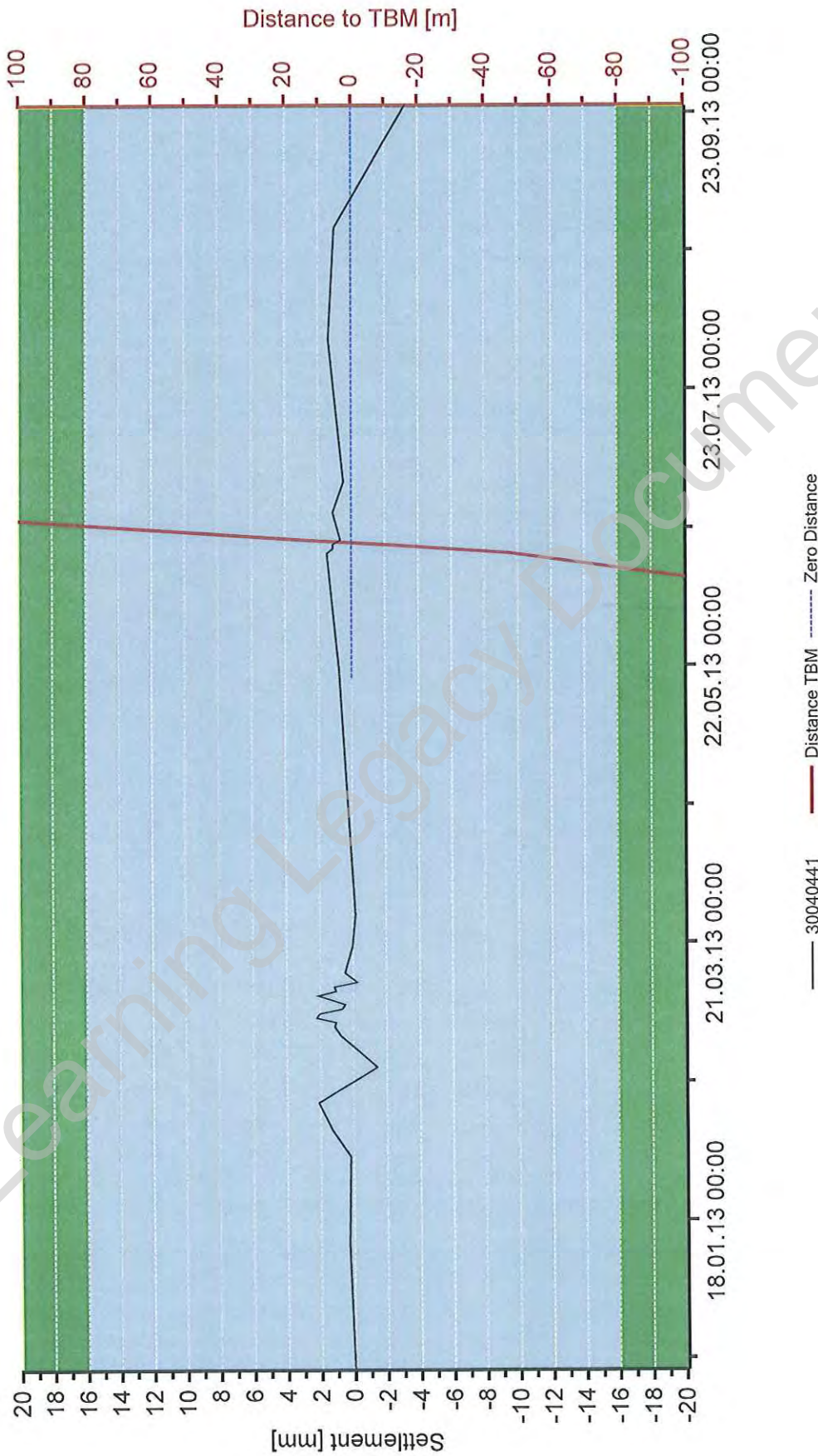
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 18.06.2013 09:00





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 20.06.2013 09:00

Point: 30040441



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - APB Sidings (Old Coalyard) 15.12.2012 - 24.09.213  
date: 18.06.2014 08:37 current values: 18.06.2014 08:19



# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: APB Near Sidings NR Area CSS - Old Coalyard

No. of reading	baseline	1. following		2. following		3. following		4. following		5. following		6. following	
		12/01/2013	12/01/2013	26/01/2013	26/01/2013	27/01/2013	27/01/2013	28/01/2013	28/01/2013	29/01/2013	29/01/2013	30/01/2013	30/01/2013
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0421	104.344	104.344	0	104.345	1	104.343	-2	104.344	1	104.345	1	104.343	-1
3004 0422	104.283	104.283	0	104.284	1	104.282	-2	104.283	1	104.283	1	104.282	-1
3004 0423	104.226	104.226	0	104.227	1	104.225	-2	104.226	1	104.226	1	104.225	-1
3004 0424	104.120	104.120	0	104.120	0	104.119	-1	104.120	1	104.120	1	104.119	-1
3004 0425	103.903	103.903	0	103.902	0	103.901	-2	103.902	1	103.902	1	103.902	0
3004 0426	103.881	103.882	1	103.881	-1	103.879	-2	103.881	2	103.881	1	103.880	-1
3004 0427	103.599	103.600	1	103.599	-1	103.599	-1	103.599	0	103.599	1	103.599	-1
3004 0428	103.593	103.594	0	103.593	0	103.593	-1	103.592	0	103.593	1	103.592	-1
3004 0429	103.989	103.990	0	103.990	0	103.989	-1	103.990	1	103.989	0	103.989	0
3004 0430	103.769	103.770	0	103.770	0	103.768	-1	103.769	1	103.769	0	103.768	-1
3004 0431	103.767	103.767	0										
3004 0432	103.740	103.739	-1										
3004 0433	103.721	103.721	0										
3004 0434	103.641	103.641	0										
3004 0435	103.616	103.617	1										
3004 0436	103.670	103.671	1										
3004 0437	103.603	103.603	0										
3004 0438	103.628	103.628	0										
3004 0439	103.551	103.551	0										
3004 0440	103.508	103.508	0										
3004 0441	103.419	103.419	0										

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: APB Near Sidings NR Area CSS - Old Coalyard

No. of reading	baseline date	7. following 31/01/2013		8. following 01/02/2013		9. following 02/02/2013		10. following 03/02/2013		11. following 04/02/2013		12. following 05/02/2013	
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0421	104.344	104.341	-3	104.340	-1	104.340	1	104.340	0	104.119	-1	104.119	0
3004 0422	104.283	104.281	-2	104.279	-2	104.279	1	104.279	0	103.902	-1	103.903	0
3004 0423	104.226	104.225	0	104.225	0	104.224	0	104.225	0	103.881	-1	103.881	0
3004 0424	104.120	104.119	-1	104.119	0	104.120	1	104.120	0	103.599	-1	103.600	0
3004 0425	103.903	103.901	-1	103.901	0	103.903	1	103.903	1	103.990	1	103.990	0
3004 0426	103.881	103.880	-1	103.880	0	103.882	2	103.882	0	103.769	-1	103.769	0
3004 0427	103.599	103.598	-1	103.598	0	103.600	2	103.600	0	103.593	-1	103.593	0
3004 0428	103.593	103.592	-1	103.593	1	103.594	1	103.594	1	103.990	1	103.990	0
3004 0429	103.989	103.988	-1	103.989	1	103.990	1	103.990	1	103.770	1	103.769	0
3004 0430	103.769	103.768	0	103.769	0	103.769	1	103.769	1				
3004 0431	103.767			103.767	0								
3004 0432	103.740			103.739	0								
3004 0433	103.721			103.721	0								
3004 0434	103.641			103.640	0								
3004 0435	103.616			103.616	-1								
3004 0436	103.670			103.671	-1								
3004 0437	103.603			103.603	0								
3004 0438	103.628			103.628	-1								
3004 0439	103.551			103.551	0								
3004 0440	103.508			103.508	0								
3004 0441	103.419			103.419	0								



# monitoring table



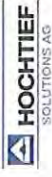
## Joint Venture

project: C310 Thames Tunnel

structure: APB Near Sidings NR Area CSS - Old Coalyard

No. of reading	baseline	13. following		14. following		15. following		16. following		17. following		18. following	
		date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation
		15/12/12											
Point No.	elevation	06/02/2013											
		07/02/2013											
		08/02/2013											
		09/02/2013											
		10/02/2013											
		11/02/2013											
3004 0421	104.344		104.341	1	-2								
3004 0422	104.283		104.281	1	-2								
3004 0423	104.226		104.226	1	0								
3004 0424	104.120		104.121	1	0	104.120	-1	0	104.121	1	1	104.120	1
3004 0425	103.903		103.903	0	0	103.903	0	0	103.904	1	1	103.903	0
3004 0426	103.881		103.882	0	1	103.882	0	1	103.883	1	2	103.883	1
3004 0427	103.599		103.600	0	1	103.600	0	1	103.601	1	2	103.601	1
3004 0428	103.593		103.594	1	1	103.594	0	1	103.595	1	2	103.596	1
3004 0429	103.989		103.990	0	1	103.990	0	1	103.991	1	2	103.992	1
3004 0430	103.769		103.770	0	1	103.770	0	1	103.771	1	2	103.771	1
3004 0431	103.767		103.769	2	1								
3004 0432	103.740		103.741	2	2								
3004 0433	103.721		103.723	2	2								
3004 0434	103.641		103.642	2	2								
3004 0435	103.616		103.617	1	2								
3004 0436	103.670		103.672	1	1								
3004 0437	103.603		103.605	1	1								
3004 0438	103.628		103.629	2	1								
3004 0439	103.551		103.553	2	2								
3004 0440	103.508		103.510	2	1								
3004 0441	103.419		103.420	1	1								

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: APB Near Sidings NR Area CSS - Old Coalyard

No. of reading	15/12/12		12/02/2013		13/02/2013		14/02/2013		15/02/2013		16/02/2013		17/02/2013	
	baseline	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
Point No.														
3004 0421	104.344	104.341	104.341	0	104.341	0	-2							
3004 0422	104.283	104.281	104.281	0	104.281	0	-2							
3004 0423	104.226	104.225	104.225	0	104.225	0	0							
3004 0424	104.120	104.120	104.120	0	104.120	0	0							
3004 0425	103.903	103.903	103.903	-1	103.903	1	1							
3004 0426	103.881	103.882	103.882	-1	103.883	0	1							
3004 0427	103.599	103.601	103.601	0	103.601	1	2							
3004 0428	103.593	103.595	103.595	-1	103.595	1	2							
3004 0429	103.989	103.991	103.991	-1	103.991	1	2							
3004 0430	103.769	103.770	103.770	-1	103.772	1	3							
3004 0431	103.767				103.769	1	2							
3004 0432	103.740				103.742	0	2							
3004 0433	103.721				103.723	0	2							
3004 0434	103.641				103.643	1	2							
3004 0435	103.616				103.618	1	3							
3004 0436	103.670				103.673	1	2							
3004 0437	103.603				103.605	0	1							
3004 0438	103.628				103.630	1	2							
3004 0439	103.551				103.554	1	2							
3004 0440	103.508				103.510	1	2							
3004 0441	103.419				103.421	1	2							

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: APB Near Sidings NR Area CSS - Old Coalyard

No. of reading	baseline		25. following		26. following		27. following		28. following		29. following		30. following	
	date	elevation	18/02/2013	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0421	15/12/12	104.344							104.338	-3	-6			
3004 0422		104.283						104.277	-3	-5				
3004 0423		104.226						104.223	-3	-3				
3004 0424		104.120	0	-2	104.117	-1	-3	104.117	0	-3		104.117	0	-3
3004 0425		103.903	0	-2	103.900	-1	-3	103.900	0	-3		103.900	0	-3
3004 0426		103.881	0	-2	103.879	-1	-2	103.879	0	-2		103.879	0	-2
3004 0427		103.599	0	-1	103.597	-1	-2	103.598	0	-2		103.597	0	-2
3004 0428		103.593	0	-1	103.592	0	-2	103.592	0	-2		103.592	0	-2
3004 0429		103.989	0	-1	103.988	0	-1	103.988	0	-1		103.988	0	-1
3004 0430		103.769	0	-1	103.767	0	-2	103.767	0	-2		103.767	0	-2
3004 0431		103.767						103.766	-3	-1		103.765	-1	-2
3004 0432		103.740						103.739	-3	-1				
3004 0433		103.721						103.720	-3	-1				
3004 0434		103.641						103.640	-3	-1				
3004 0435		103.616						103.615	-4	-1				
3004 0436		103.670						103.669	-3	-1				
3004 0437		103.603						103.602	-3	-1				
3004 0438		103.628						103.627	-3	-1				
3004 0439		103.551						103.550	-3	-1				
3004 0440		103.508						103.507	-4	-1				
3004 0441		103.419						103.418	-3.54	-1				

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: APB Near Sidings NR Area CSS - Old Coalyard

No. of reading	baseline		31. following		32. following		33. following		34. following		35. following		36. following	
	date	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
Point No.	15/12/12		24/02/2013	25/02/2013	26/02/2013	27/02/2013	28/02/2013	01/03/2013						
3004 0421		104.344												
3004 0422		104.283												
3004 0423		104.226												
3004 0424		104.120												
3004 0425		103.900		0 -3										
3004 0426		103.881		0 -2	103.879	0 -2	103.880	1 -1						
3004 0427		103.599		0 -2	103.597	0 -2	103.599	1 0	103.597	-2 -2	103.597	0 -2		
3004 0428		103.593		0 -1	103.591	-1 -2	103.593	1 -1	103.592	-1 -2	103.591	0 -2		
3004 0429		103.989		0 -1	103.988	0 -1	103.989	1 -1	103.986	-2 -3	103.987	1 -2		
3004 0430		103.769		0 -1	103.768	0 -2	103.768	1 -1	103.767	-1 -2	103.768	1 -2	103.769	1 0
3004 0431		103.767		-1 -2	103.766	0 -2	103.767	1 0	103.765	-2 -2	103.766	1 -2	103.766	0 -1
3004 0432		103.740					103.740	1 0	103.737	-3 -2	103.738	1 -2	103.739	1 -1
3004 0433		103.721					103.722	1 0	103.720	-2 -1	103.719	-1 -2	103.720	0 -2
3004 0434		103.641					103.641	1 0	103.639	-1 -1	103.639	0 -1	103.639	0 -2
3004 0435		103.616					103.616	1 0	103.615	-1 0	103.616	1 0	103.615	0 0
3004 0436		103.670							103.670	1 0	103.671	1 1	103.671	0 1
3004 0437		103.603							103.602	0 -1	103.603	1 0	103.604	1 1
3004 0438		103.628									103.628	1 0	103.629	1 1
3004 0439		103.551									103.551	1 0	103.552	1 1
3004 0440		103.508									103.508	2 0	103.508	1 1
3004 0441		103.419									103.420	2.13 1		

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: APB Near Sidings NR Area CSS - Old Coalyard

No. of reading	baseline		37. following		38. following		39. following		40. following		41. following		42. following		
	date	elevation	02/03/2013	deviation from last/ baseline	03/03/2013	deviation from last/ baseline	04/03/2013	deviation from last/ baseline	05/03/2013	deviation from last/ baseline	06/03/2013	deviation from last/ baseline	07/03/2013	deviation from last/ baseline	
3004 0421	15/12/12	104.344											104.339	1	-5
3004 0422		104.283											104.278	1	-4
3004 0423		104.226											104.224	1	-2
3004 0424		104.120											104.118	1	-2
3004 0425		103.903											103.900	0	-2
3004 0426		103.881											103.879	0	-2
3004 0427		103.599											103.598	1	-1
3004 0428		103.593											103.592	1	-1
3004 0429		103.989											103.988	1	-1
3004 0430		103.769	103.768	-1	103.767	0	-2						103.768	1	-1
3004 0431		103.767	103.766	0	-1								103.767	1	-1
3004 0432		103.740	103.738	0	-2								103.739	1	-1
3004 0433		103.721	103.719	-1	-2								103.720	1	-1
3004 0434		103.641	103.638	-1	-3	103.638	0	-3					103.639	2	-1
3004 0435		103.616	103.614	-1	-1	103.614	0	-1	103.616	1.53	0		103.615	-1	-1
3004 0436		103.670	103.670	-1	0	103.670	0	-1	103.671	1.50	1		103.671	-1	0
3004 0437		103.603	103.603	-1	0	103.603	-1	-1	103.604	0.51	0		103.603	1	0
3004 0438		103.628	103.628	-1	0	103.627	0	-1	103.629	1.85	1		103.627	0	-1
3004 0439		103.551	103.552	0	0	103.552	0	0	103.553	1.01	1		103.551	0	0
3004 0440		103.508	103.509	1	1	103.509	0	1	103.510	1.34	2		103.508	0	-1
3004 0441		103.419	103.420	0	1	103.420	0	1	103.421	1.13	2		103.419	0	0

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

No. of reading		43. following		44. following		45. following		46. following		47. following		48. following	
date		08/03/2013		09/03/2013		10/03/2013		11/03/2013		12/03/2013		14/03/2013	
Point No.		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0421	104.344											104.339	0
3004 0422	104.283											104.278	0
3004 0423	104.226											104.223	0
3004 0424	104.120											104.118	0
3004 0425	103.903											103.901	0
3004 0426	103.881											103.880	0
3004 0427	103.599											103.598	-1
3004 0428	103.593											103.591	-1
3004 0429	103.989											103.987	-1
3004 0430	103.769											103.767	-1
3004 0431	103.767											103.765	-2
3004 0432	103.740											103.737	-2
3004 0433	103.721											103.718	-2
3004 0434	103.641											103.637	-2
3004 0435	103.616											103.614	-1
3004 0436	103.670											103.670	-1
3004 0437	103.603	0	-1	103.603	1	0	103.601	-2	-2			103.602	1
3004 0438	103.628	0	-1	103.629	1	0	103.628	-1	-1			103.627	0
3004 0439	103.551	1	0	103.552	1	1	103.552	-1	0			103.551	0
3004 0440	103.508	1	1	103.509	0	1	103.509	0	0			103.508	1
3004 0441	103.419	1	1	103.421	1	2	103.420	-1	1			103.419	1

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: APB Near Sidings NR Area CSS - Old Coalyard

No. of reading	15/12/12		20/03/2013		27/03/2013		21/05/2013		28/05/2013		29/05/2013		30/05/2013						
	baseline elevation	49. following elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline				
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline					
3004 0421	104.344	-1	104.338	-6	104.340	2	-4	104.341	1	-2	104.342	0	-2	104.341	-1	-3	104.341	0	-3
3004 0422	104.283	-1	104.277	-5	104.279	2	-3	104.281	2	-2	104.281	0	-1	104.281	0	-2	104.281	0	-2
3004 0423	104.226	-1	104.222	-3	104.225	2	-1	104.226	2	0	104.227	1	1	104.226	-1	0	104.226	-1	0
3004 0424	104.120	-1	104.117	-3	104.119	2	-1	104.121	2	1							104.121	0	1
3004 0425	103.903	0	103.900	-2	103.902	2	-1	103.903	1	1							103.903	-1	0
3004 0426	103.881	-1	103.879	-2	103.881	2	-1	103.882	1	1									
3004 0427	103.599	-1	103.597	-2	103.599	2	-1	103.600	1	1									
3004 0428	103.593	-1	103.590	-3	103.593	3	0	103.595	2	2									
3004 0429	103.989	0	103.987	-2	103.989	2	0	103.990	1	1									
3004 0430	103.769	-1	103.766	-3	103.768	2	-1	103.769	1	0									
3004 0431	103.767	0	103.765	-3	103.766	1	-1	103.767	1	0									
3004 0432	103.740	-1	103.737	-3	103.738	1	-2	103.739	2	-1									
3004 0433	103.721	-1	103.717	-4	103.718	1	-3	103.720	2	-1									
3004 0434	103.641	-1	103.637	-4	103.637	1	-3	103.639	2	-1									
3004 0435	103.616	-1	103.613	-2	103.614	1	-2	103.615	1	0									
3004 0436	103.670	-1	103.669	-2	103.670	1	-1	103.671	1	0									
3004 0437	103.603	0	103.602	-1	103.602	0	-1	103.604	2	1									
3004 0438	103.628	-1	103.627	-2	103.627	0	-1	103.629	2	1									
3004 0439	103.551	0	103.551	0	103.551	0	-1	103.553	2	1									
3004 0440	103.508	0	103.507	-1	103.507	0	-1	103.509	2	1									
3004 0441	103.419	0	103.419	0	103.419	0	0	103.420	1	1									

# monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: APB Near Sidings NR Area CSS - Old Coalyard

No. of reading	baseline		55. following		56. following		57. following		58. following		59. following		60. following			
	date	elevation	31/05/2013	deviation from last/ baseline	01/06/2013	deviation from last/ baseline	02/06/2013	deviation from last/ baseline	03/05/2013	deviation from last/ baseline	04/06/2013	deviation from last/ baseline	05/06/2013	deviation from last/ baseline		
Point No.	elevation	elevation	deviation from last/ baseline	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline		
3004 0421	104.344	104.341	0	-3	104.341	0	-3	104.341	0	-3	104.340	-1	-4	104.340	0	-4
3004 0422	104.283	104.280	-1	-2	104.280	0	-2	104.280	0	-2	104.279	-1	-3	104.279	0	-3
3004 0423	104.226	104.225	0	0	104.225	-1	-1	104.225	1	0	104.224	-1	-1	104.224	0	-1
3004 0424	104.120	104.120	0	0	104.120	0	0	104.120	0	0	104.120	-1	0	104.120	0	0
3004 0425	103.903	103.902	0	0	103.903	0	0	103.902	0	0	103.903	1	0	103.902	0	0
3004 0426	103.881	103.882	0	0	103.882	0	1	103.882	0	0	103.882	1	1	103.881	-1	0
3004 0427	103.599	103.600	0	1	103.601	0	1	103.600	0	1	103.601	1	2	103.600	-1	0
3004 0428	103.593	103.594	-1	1	103.594	0	1	103.594	0	1	103.595	1	2			
3004 0429	103.989	103.989	-1	0	103.990	1	0	103.989	0	0	103.990	1	1			
3004 0430	103.769				103.769	0	0	103.768	-1	-1	103.769	1	0			
3004 0431	103.767															
3004 0432	103.740															
3004 0433	103.721															
3004 0434	103.641															
3004 0435	103.616															
3004 0436	103.670															
3004 0437	103.603															
3004 0438	103.628															
3004 0439	103.551															
3004 0440	103.508															
3004 0441	103.419															



# monitoring table



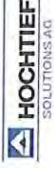
## Joint Venture

project: C310 Thames Tunnel

structure: APB Near Sidings NR Area CSS - Old Coalyard

No. of reading	baseline		61. following		62. following		63. following		64. following		65. following		66. following	
	15/12/12	elevation	06/06/2013	deviation from last/ baseline	07/06/2013	deviation from last/ baseline	08/06/2013	deviation from last/ baseline	09/06/2013	deviation from last/ baseline	10/06/2013	deviation from last/ baseline	11/06/2013	deviation from last/ baseline
Point No.	elevation	elevation	deviation from last/ baseline	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0421	104.344	104.341	-3	0	104.341	-3	104.341	1	104.341	0	104.280	-3	104.280	0
3004 0422	104.283	104.280	-3	0	104.280	-3	104.281	1	104.280	0	104.280	-1	104.280	-3
3004 0423	104.226	104.225	-1	0	104.225	-1	104.225	0	104.225	0	104.225	0	104.225	0
3004 0424	104.120	104.120	0	0	104.120	0	104.121	1	104.120	-1	104.120	0	104.120	0
3004 0425	103.903	103.903	0	1	103.903	1	103.903	0	103.903	0	103.902	-1	103.902	0
3004 0426	103.881	103.882	1	1	103.882	0	103.883	1	103.882	-1	103.882	-1	103.881	-1
3004 0427	103.599	103.600	1	1	103.600	0	103.601	1	103.600	-1	103.600	0	103.599	-1
3004 0428	103.593						103.595	0	103.595	-1	103.594	0	103.594	0
3004 0429	103.989						103.991	0	103.990	-1	103.989	0	103.989	0
3004 0430	103.769						103.770	0	103.769	-1	103.769	0	103.770	1
3004 0431	103.767												103.767	0
3004 0432	103.740													
3004 0433	103.721													
3004 0434	103.641													
3004 0435	103.616													
3004 0436	103.670													
3004 0437	103.603													
3004 0438	103.628													
3004 0439	103.551													
3004 0440	103.508													
3004 0441	103.419													

# monitoring table



## Joint Venture

project: **C310 Thames Tunnel**

structure: **APB Near Sidings NR Area CSS - Old Coalyard**

No. of reading	baseline 15/12/12	67. following 12/06/2013		68. following 13/06/2013		69. following 14/06/2013		70. following 15/06/2013		71. following 16/06/2013		72. following 17/06/2013	
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0421	104.344												
3004 0422	104.283												
3004 0423	104.226												
3004 0424	104.120	104.119	0	-1									
3004 0425	103.903	103.902	0	-1	103.902	0	-1						
3004 0426	103.881	103.881	0	0	103.881	0	0						
3004 0427	103.599	103.599	0	0	103.599	0	-1	103.598	0	-1			
3004 0428	103.593	103.593	-1	0	103.593	0	0	103.592	-1	-1			
3004 0429	103.989	103.988	0	-1	103.988	0	-1	103.988	-1	-1			
3004 0430	103.769	103.769	-1	0	103.768	-1	-1	103.768	0	-1	103.769	1	0
3004 0431	103.767	103.767	0	0	103.766	-1	-1	103.766	0	-2	103.767	1	0
3004 0432	103.740	103.739	0	-1	103.738	0	-1	103.738	-1	-2	103.739	1	-1
3004 0433	103.721	103.719	-1	-2	103.719	0	-2	103.719	0	-3	103.720	1	-2
3004 0434	103.641				103.638	-1	-2	103.638	-1	-3	103.639	1	-2
3004 0435	103.616				103.614	-1	-2	103.614	0	-2	103.615	2	0
3004 0436	103.670							103.671	0	1	103.671	0	1
3004 0437	103.603							103.604	0	1	103.604	0	1
3004 0438	103.628							103.629	0	1	103.629	0	1
3004 0439	103.551										103.552	0	1
3004 0440	103.508										103.509	0	1
3004 0441	103.419										103.420	1	1
											103.420	0	1

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: APB Near Sidings NR Area CSS - Old Coalyard

No. of reading	73. following		74. following		75. following		76. following		77. following		78. following			
	baseline	18/06/2013	elevation	deviation from last/ baseline	19/06/2013	elevation	deviation from last/ baseline	25/06/2013	elevation	deviation from last/ baseline	04/08/2013	elevation	deviation from last/ baseline	
date	15/12/12	18/06/2013											28/06/2013	
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0421	104.344				104.341	0 -3	104.340	-1 -3	104.342	1 -2	104.342	1 -2	104.342	1 -2
3004 0422	104.283				104.280	0 -3	104.279	0 -3	104.281	1 -2	104.281	1 -2	104.281	0 -2
3004 0423	104.226				104.224	-1 -1	104.224	0 -1	104.226	1 0	104.226	1 0	104.226	0 0
3004 0424	104.120				104.120	0 -1	104.120	0 0	104.121	1 0	104.121	1 0	104.121	1 1
3004 0425	103.903				103.902	0 -1	103.902	0 0	103.902	0 0	103.902	0 0	destroyed	
3004 0426	103.881				103.881	0 -1	103.881	0 -1	103.881	0 0	103.881	0 0	103.882	1 1
3004 0427	103.599				103.599	1 0	103.599	0 0	103.600	1 0	103.600	1 0	103.600	0 0
3004 0428	103.593				103.593	1 0	103.593	0 -1	103.593	1 0	103.593	1 0	103.593	-1 -1
3004 0429	103.989				103.989	1 -1	103.989	0 -1	103.989	0 -1	103.989	0 -1	103.989	0 -1
3004 0430	103.769				103.768	0 -1	103.768	0 -1	103.769	0 -1	103.769	0 -1	103.769	0 0
3004 0431	103.767				103.767	0 -1	103.766	0 -1	103.767	0 -1	103.767	0 -1	103.767	0 -1
3004 0432	103.740				103.738	-1 -2	103.738	0 -2	103.739	0 -1	103.739	0 -1	103.738	0 -1
3004 0433	103.721				103.719	0 -2	103.719	0 -2	103.720	0 -2	103.720	0 -2	103.718	-1 -3
3004 0434	103.641				103.638	0 -2	103.638	0 -2	103.639	0 -2	103.639	0 -2	103.637	-2 -4
3004 0435	103.616				103.614	-1 -1	103.614	0 -1	103.615	0 -1	103.615	0 -1	103.613	-2 -3
3004 0436	103.670	103.671	0 0		103.670	0 0	103.670	0 0	103.671	0 0	103.671	0 0	103.669	-2 -1
3004 0437	103.603	103.604	0 0		103.603	0 0	103.603	0 0	103.604	1 0	103.604	1 0	103.603	-1 -1
3004 0438	103.628	103.629	0 0	103.628	0 0	103.628	0 0	103.628	0 0	103.629	0 1	103.628	-1 0	
3004 0439	103.551	103.552	0 0	103.552	0 0	103.552	0 0	103.552	0 0	103.552	0 1	103.551	-1 0	
3004 0440	103.508	103.508	-1 0	103.508	0 0	103.508	-1 0	103.508	1 0	103.509	1 1	103.507	-2 -1	
3004 0441	103.419	103.420	0 1	103.420	-1 1	103.420	0 1	103.419	-1 0	103.420	1 1	103.420	0 1	

# monitoring table




Joint Venture

project: C310 Thames Tunnel

structure: APB Near Sidings NR Area CSS - Old Coalyard

No. of reading	79. following		80. following		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
	baseline	elevation	deviation from last/ baseline	elevation								
date	15/12/12		24/09/2013			06/02/2014						
Point No.	elevation	elevation	deviation from last/ baseline	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0421	104.344	104.340	-2	-4								
3004 0422	104.283	104.278	-3	-4								
3004 0423	104.226	104.223	-3	-3								
3004 0424	104.120	104.119	-3	-1								
3004 0425	103.903		destroyed									
3004 0426	103.881	103.879	-4	-3								
3004 0427	103.599	103.598	-2	-2								
3004 0428	103.593	103.592	0	-1								
3004 0429	103.989	103.987	-2	-2								
3004 0430	103.769	103.768	-1	-2								
3004 0431	103.767	103.766	-1	-1								
3004 0432	103.740	103.738	0	-2								
3004 0433	103.721	103.719	1	-2								
3004 0434	103.641	103.638	1	-3								
3004 0435	103.616	103.614	1	-2								
3004 0436	103.670	103.669	0	-1								
3004 0437	103.603	103.603	0	0								
3004 0438	103.628	103.628	0	0								
3004 0439	103.551	103.551	0	0								
3004 0440	103.508	103.498	-10	-11								
3004 0441	103.419	103.401	-19	-18								

points no. 440 & 441 were tracked over by heavy machine

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	CROSSRAIL	eB NO	C310-HTM-C-RGN-CR148-50022	Rev	6.0
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 17**  
**Cross Passage 19**

Learning Legacy Document

<b>monitoring asset</b>	<b>Surface at Cross Passage 19</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR148-PT005-50010		
<b>name of monitoring section:</b>	CP 19		
sensor type:	manual levelling studs		
chainage:	91510	point no.:	3004 1811 - 3004 1821
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 -20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments
baseline	11/11/13	0		
TBM 1	Manual levelling studs were not installed at the time of underpassing with TBM 1+2 the area of XP19			
TBM 2				
XP works	12/11/13	0.17	3004 1813	start excavation
		0.04	3004 1816	
	21/01/14	-1.92	3004 1813	inner lining completed
		-2.33	3004 1816	
longterm	31/03/2014	-1.54	3004 1813	last reading post XP 19 works, Cross section not longer measurable. breached not any trigger value
	6/04/2014	-1.98	3004 1816	
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV		
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)		

**summary / comments**

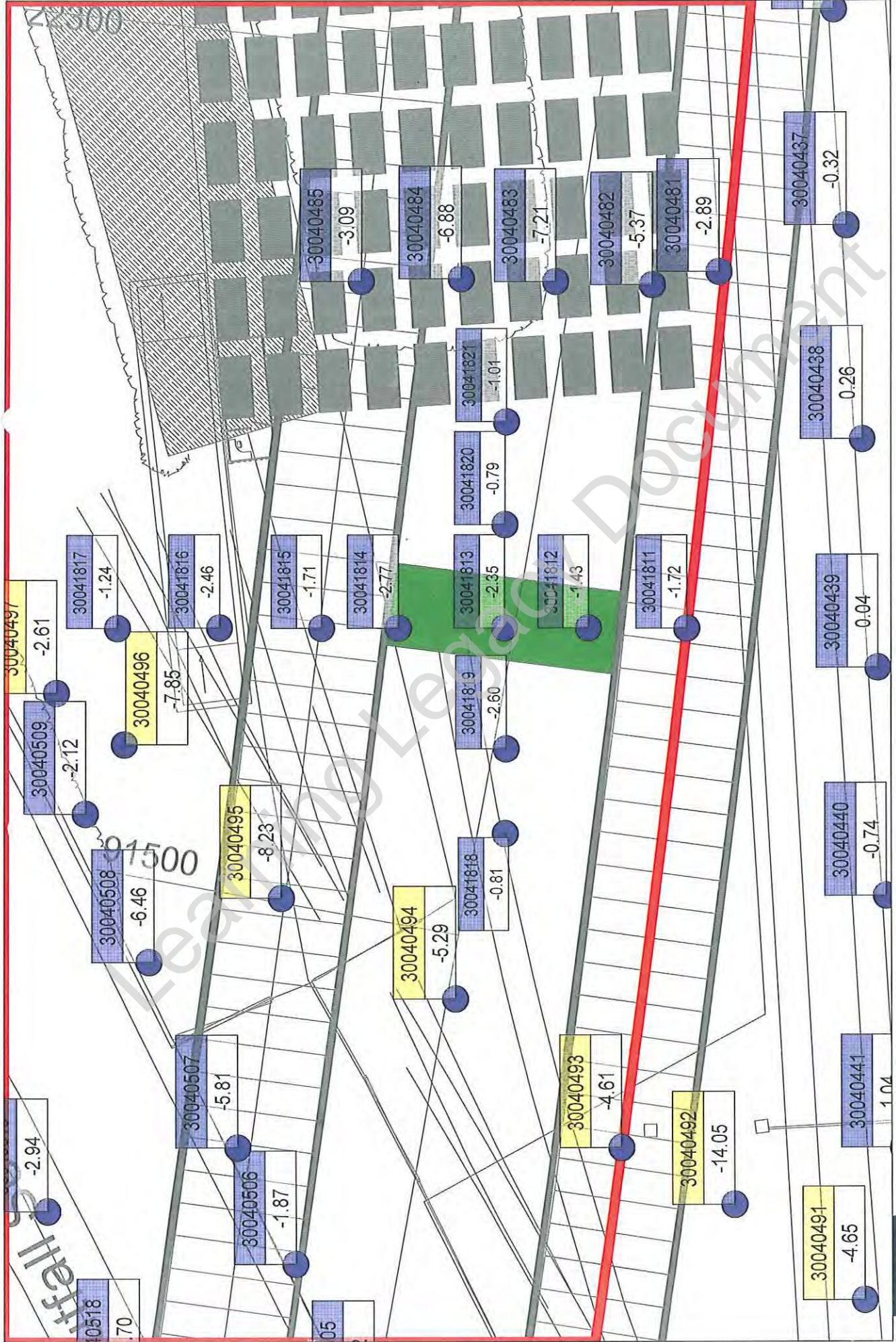
During the excavation of XP 19 often levelling points have been covered at the surface, either by excavation material of the TBM drive or steel structures (storage area).  
 Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 09/01/15

print name:

HMJV project role:

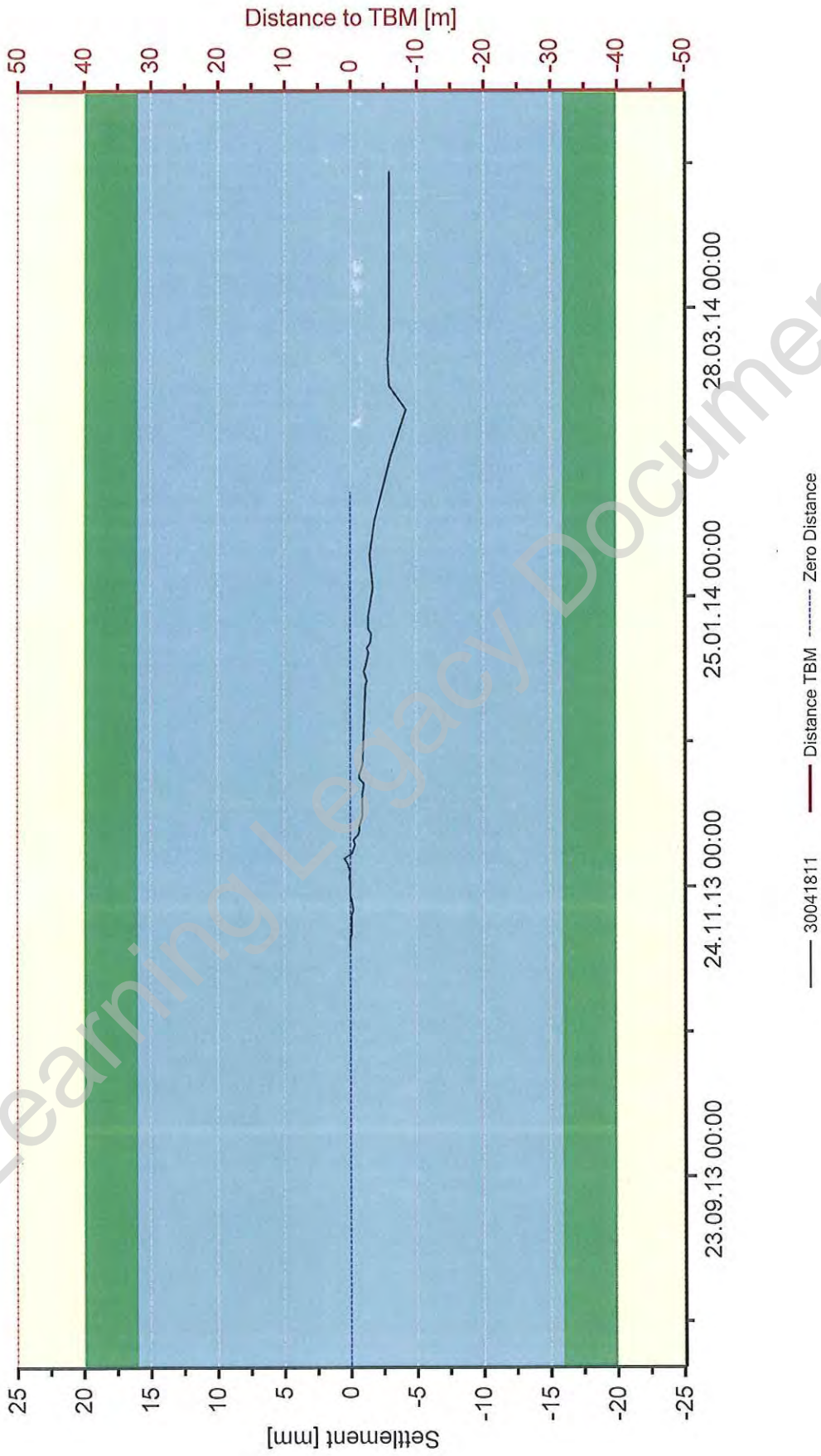
Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive WB  
 current values: 27.01.2014 09:00



Point: 30041811



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - CS 15 - BH Hoarding 13.08.2013 - 12.05.2014  
date: 08.11.2014 15:50 current values: 26.05.2014 15:32





monitoring table



monitoring table



project: C310 Thames Tunnel

Joint Venture

project: C310 Thames Tunnel

Joint Venture

No. of reading Point No.	1. following CP 19		2. following CP 19		3. following CP 19		4. following CP 19		5. following CP 19		6. following CP 19		7. following CP 19		8. following CP 19		9. following CP 19		10. following CP 19		11. following CP 19		12. following CP 19		
	baseline elevation	elevation	baseline elevation	elevation	baseline elevation	elevation	baseline elevation	elevation	baseline elevation	elevation	baseline elevation	elevation	baseline elevation	elevation	baseline elevation	elevation	baseline elevation	elevation	baseline elevation	elevation	baseline elevation	elevation	baseline elevation	elevation	
30041811	103.063	103.063	0	103.063	0	103.062	0	103.062	0	103.062	0	103.062	0	103.062	0	103.062	0	103.062	0	103.063	0	103.063	0	103.063	0
30041812	103.047	103.047	0	103.046	0	103.046	0	103.046	0	103.047	0	103.047	0	103.047	0	103.047	0	103.046	0	103.046	0	103.046	0	103.046	0
30041813	103.050	103.050	0	103.050	0	103.050	0	103.050	0	103.050	0	103.050	0	103.050	0	103.050	0	103.050	0	103.050	0	103.050	0	103.050	0
30041814	103.042	103.042	0	103.042	0	103.042	0	103.042	0	103.043	0	103.043	0	103.043	0	103.043	0	103.042	0	103.042	0	103.042	0	103.042	0
30041815	103.037	103.037	0	103.037	0	103.037	0	103.037	0	103.038	0	103.038	0	103.038	0	103.038	0	103.037	0	103.037	0	103.037	0	103.037	0
30041816	103.217	103.217	0	103.217	0	103.217	0	103.216	0	103.217	0	103.217	0	103.217	0	103.217	0	103.217	0	103.217	0	103.217	0	103.217	0
30041817	103.197	103.197	0	103.198	0	103.197	0	103.197	0	103.198	0	103.198	0	103.198	0	103.198	0	103.198	0	103.198	0	103.198	0	103.198	0
30041818	103.148	103.148	0	103.148	0	103.148	0	103.147	0	103.147	0	103.147	0	103.147	0	103.147	0	103.147	0	103.147	0	103.147	0	103.147	0
30041819	102.995	102.995	0	102.995	0	102.995	0	102.995	0	102.995	0	102.995	0	102.995	0	102.995	0	102.994	0	102.994	0	102.994	0	102.994	0
30041820	103.128	103.128	0	103.128	0	103.128	0	103.128	0	103.128	0	103.128	0	103.128	0	103.128	0	103.128	0	103.128	0	103.128	0	103.128	0
30041821	103.213	103.214	0	103.214	0	103.213	0	103.214	0	103.214	0	103.214	0	103.214	0	103.214	0	103.214	0	103.214	0	103.214	0	103.214	0

Legacy Document

monitoring table

monitoring table



Joint Venture

project: C310 Thames Tunnel  
structure: CP 19

Joint Venture

project: C310 Thames Tunnel  
structure: CP 19

No. of reading Date	13. following 20/11/2013		14. following 29/11/2013		15. following 07/12/2013		16. following 07/12/2013		17. following 02/12/2013		18. following 03/12/2013		19. following 04/12/2013		20. following 04/12/2013		21. following 04/12/2013		22. following 04/12/2013		23. following 08/12/2013		24. following 09/12/2013		
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
30041811	103.063	0	103.063	0	103.062	0	103.062	-1	103.062	0	103.062	0	103.062	0	103.062	0	103.062	0	103.062	0	103.062	0	103.062	0	-1
30041812	103.047	0	103.046	0	103.046	0	103.046	-1	103.046	0	103.046	0	103.046	0	103.046	0	103.045	0	103.045	0	103.045	0	103.045	0	-1
30041813	103.050	0	103.049	0	103.049	0	103.049	-1	103.049	0	103.049	0	103.049	0	103.049	0	103.049	0	103.049	0	103.049	0	103.049	0	-1
30041814	103.042	0	103.042	0	103.042	0	103.042	-1	103.042	0	103.041	0	103.041	0	103.041	0	103.041	0	103.041	0	103.041	0	103.041	0	-1
30041815	103.037	0	103.037	0	103.037	0	103.037	-1	103.037	0	103.037	0	103.036	0	103.036	0	103.036	0	103.036	0	103.036	0	103.036	0	-1
30041816	103.217	0	103.216	0	103.216	0	103.216	-1	103.216	0	103.216	0	103.216	0	103.216	0	103.215	0	103.215	0	103.215	0	103.215	0	-1
30041817	103.197	0	103.198	0	103.198	0	103.197	-1	103.198	0	103.198	0	103.197	0	103.197	0	103.197	0	103.197	0	103.197	0	103.197	0	0
30041818	103.148	Covered	102.995	1	102.994	-1	Covered	Covered	103.128	0	103.128	0	103.128	0	103.128	0	103.128	0	103.128	0	103.127	0	103.127	0	-1
30041819	103.126	0	103.126	0	103.126	0	103.126	0	103.126	0	103.126	0	103.126	0	103.126	0	103.126	0	103.126	0	103.126	0	103.126	0	0
30041820	103.213	0	103.214	0	103.214	0	103.214	-1	103.214	0	103.214	0	103.214	0	103.214	0	103.213	0	103.213	0	103.213	0	103.213	0	0
30041821	103.213	0	103.214	0	103.214	0	103.214	-1	103.214	0	103.214	0	103.213	0	103.214	0	103.213	0	103.213	0	103.213	0	103.213	0	0

Legacy Document

Joint Venture

Project: C310 Thames Tunnel  
Structure: CP 19

Joint Venture

Project: C310 Thames Tunnel  
Structure: CP 19

No. of reading	25. following		26. following		27. following		28. following		29. following		30. following		31. following		32. following		33. following		34. following		35. following		36. following					
	11/11/13	10/12/2013	14/12/2013	18/12/2013	22/12/2013	26/12/2013	30/12/2013	03/01/2014	07/01/2014	11/01/2014	15/01/2014	19/01/2014	23/01/2014	27/01/2014	31/01/2014	04/02/2014	08/02/2014	12/02/2014	16/02/2014	20/02/2014	24/02/2014	28/02/2014	03/03/2014	07/03/2014				
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline				
30041011	103.063	0	-1	103.062	0	-1	103.062	0	-1	103.062	0	-1	103.062	0	-1	103.062	0	-1	103.061	0	-1	103.061	0	-1	103.061	0	-1	
30041012	103.047	103.045	0	-1	103.045	0	-1	103.045	0	-1	103.045	0	-1	103.045	0	-1	103.045	0	-1	103.045	0	-1	103.045	0	-1	103.045	0	-1
30041013	103.050	103.048	0	-1	103.048	0	-1	103.048	0	-1	103.048	0	-1	103.048	0	-1	103.048	0	-1	103.048	0	-1	103.048	0	-1	103.048	0	-1
30041014	103.042	103.041	0	-1	103.041	0	-1	103.041	0	-1	103.041	0	-1	103.041	0	-1	103.041	0	-1	103.041	-1	-2	103.041	0	-2	103.041	0	-2
30041015	103.037	103.036	0	-1	103.036	0	-1	103.036	0	-1	103.036	0	-1	103.036	0	-1	103.036	0	-1	103.036	0	-1	103.036	0	-1	103.036	0	-1
30041016	103.217	103.215	0	-1	103.215	0	-1	103.215	0	-1	103.215	0	-1	103.215	0	-1	103.215	0	-1	103.215	0	-1	103.215	0	-1	103.215	0	-1
30041017	103.197	103.197	0	-1	103.197	0	-1	103.197	0	-1	103.197	0	-1	103.197	0	-1	103.197	0	-1	103.197	0	-1	103.197	0	-1	103.197	0	-1
30041018	103.148	Covered		Covered		Covered		Covered		Covered		Covered		Covered		Covered		Covered		Covered		Covered		Covered		Covered		Covered
30041019	103.205	Covered		Covered		Covered		Covered		Covered		Covered		Covered		Covered		Covered		Covered		Covered		Covered		Covered		Covered
30041020	103.128	103.127	0	-1	103.127	0	-1	103.127	0	-1	103.127	0	-1	103.127	0	-1	103.127	0	-1	103.127	0	-1	103.127	0	-1	103.127	0	-1
30041021	103.213	103.213	0	-1	103.213	0	-1	103.213	0	-1	103.213	0	-1	103.213	0	-1	103.213	0	-1	103.213	0	-1	103.213	0	-1	103.213	0	-1

Legacy Document

Joint Venture

project: C310 Thames Tunnel  
structure: CP 19

project: C310 Thames Tunnel  
structure: CP 19

No. of reading point	37. following		38. following		39. following		40. following		41. following		42. following		43. following		44. following		45. following		46. following		47. following		48. following								
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline							
30041811	103.063	0	-1	103.061	0	-1	103.061	0	-1	103.061	0	-1	103.061	0	-1	103.061	0	-1	103.061	0	-1	103.061	0	-2	103.061	0	-2				
30041812	103.047	103.045	0	-1	103.048	0	-2	103.048	0	-2	103.048	0	-2	103.048	0	-2	103.048	0	-2	103.048	0	-2	103.048	0	-2	103.048	0	-2			
30041813	103.050	103.048	0	-2	103.041	0	-2	103.040	0	-2	103.040	0	-2	103.040	0	-2	103.040	0	-2	103.040	0	-2	103.040	0	-2	103.040	0	-2			
30041814	103.042	103.041	0	-2	103.036	0	-2	103.035	0	-2	103.035	0	-2	103.035	0	-2	103.035	0	-2	103.035	0	-2	103.035	0	-2	103.035	0	-2			
30041815	103.037	103.036	0	-2	103.031	0	-2	103.030	0	-2	103.030	0	-2	103.030	0	-2	103.030	0	-2	103.030	0	-2	103.030	0	-2	103.030	0	-2			
30041816	103.217	103.215	0	-1	103.215	0	-2	103.215	0	-2	103.214	0	-2	103.214	0	-2	103.214	0	-2	103.214	0	-2	103.214	0	-2	103.214	0	-2			
30041817	103.197	103.197	0	-1	103.196	0	-1	103.196	0	-1	103.196	0	-1	103.196	0	-1	103.196	0	-1	103.196	0	-1	103.196	0	-1	103.196	0	-1			
30041818	103.148	103.148	covered	103.148	0	-1	103.148	0	-1	103.148	0	-1	103.148	0	-1	103.148	0	-1	103.148	0	-1	103.148	0	-1	103.148	0	-1	103.148	0	-1	
30041819	102.095	102.095	covered	102.093	-1	-1	102.093	0	-2	102.093	0	-2	102.093	0	-2	102.093	0	-2	102.093	0	-2	102.093	0	-2	102.093	0	-2	102.093	0	-2	
30041820	103.120	103.120	destroyed	103.120	0	-1	103.120	0	-1	103.120	0	-1	103.120	0	-1	103.120	0	-1	103.120	0	-1	103.120	0	-1	103.120	0	-1	103.120	0	-1	
30041821	103.213	103.213	0	0	103.213	0	-1	103.213	0	-1	103.213	0	-1	103.213	0	-1	103.213	0	-1	103.213	0	-1	103.213	0	-1	103.213	0	-1	103.213	0	-1

Legacy Document

project: C310 Thames Tunnel  
structure: CP 19


Joint Venture

project: C310 Thames Tunnel  
structure: CP 19

Joint Venture

No. of reading ID#	40. following 10/02/2014		50. following 1/02/2014		51. following 24/02/2014		52. following 06/03/2014		53. following 11/03/2014		54. following 17/03/2014		55. following 24/03/2014		56. following 31/03/2014		57. following 29/04/2014				
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline			
30041811	103.053	0	covered	103.059	-1	-3	103.059	+1	-4	103.060	1	-3	103.060	0	-3	103.060	0	-3	103.060	0	-3
30041812	103.047	covered	covered	103.045	0	-2	103.045	1	-1	103.045	0	-2	103.045	0	-2	103.045	0	-1	103.045	0	-1
30041813	103.050	covered	covered	103.048	0	-2	103.048	1	-1	103.048	0	-2	103.048	0	-2	103.048	0	-2	103.048	0	-2
30041814	103.042	covered	covered	103.040	0	-2	103.041	0	-2	103.040	0	-2	103.040	0	-2	103.040	0	-2	103.040	0	-2
30041815	103.037	destroyed	destroyed	103.037	destroyed	destroyed	103.037	destroyed	destroyed	103.037	destroyed	destroyed	103.037	destroyed	destroyed	103.037	destroyed	destroyed	103.037	destroyed	destroyed
30041816	103.217	covered	covered	103.215	0	-2	103.215	0	-1	103.215	0	-2	103.215	0	-2	103.215	0	-2	103.215	0	-2
30041817	103.197	covered	covered	103.197	0	0	103.197	0	0	103.197	-1	-1	103.197	-1	-1	103.197	-1	-1	103.197	0	-1
30041818	103.148	destroyed	destroyed	103.148	destroyed	destroyed	103.148	destroyed	destroyed	103.148	destroyed	destroyed	103.148	destroyed	destroyed	103.148	destroyed	destroyed	103.148	destroyed	destroyed
30041819	102.095	covered	covered	102.092	0	-3	102.092	1	-2	102.092	0	-2	102.092	0	-2	102.092	0	-2	102.092	0	-2
30041820	103.128	destroyed	destroyed	103.128	destroyed	destroyed	103.128	destroyed	destroyed	103.128	destroyed	destroyed	103.128	destroyed	destroyed	103.128	destroyed	destroyed	103.128	destroyed	destroyed
30041821	103.213	0	-1	103.213	0	-1	103.213	1	0	103.213	0	0	103.213	0	-1	103.213	0	-1	103.213	0	-1



 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	CROSSRAIL	eB NO	C310-HTM-C-RGN-CR148-50022	Rev	6.0
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 18**

**Geotechnical Cross section 1**

Learning Legacy Document

<b>monitoring asset</b>	<b>Area of Old Coalyard</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR148-PT005-50010		
<b>name of monitoring section:</b>	Geotechnical Cross Section 1		
sensor type:	manual levelling studs piezometer, inclinometer and extensometer		
chainage:	91500	point no.:	3004 0491 - 3004 0497
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 -20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments	
<b>baseline</b>	05/02/13	0.00			
<b>TBM 1</b>	start ZOI	04/03/13	0.96	3004 0493	
	end ZOI	12/03/13	-2.47	3004 0493	breached not any trigger value
<b>TBM 2</b>	start ZOI	17/06/13	-4.08	3004 495	
	end ZOI	20/06/13	-5.02	3004 0495	breached not any trigger value
<b>longterm</b>	06/02/14	-8.48	3004 0495	last reading 3 month post tunneling, Cross section not longer measurable	

<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)

**summary / comments**

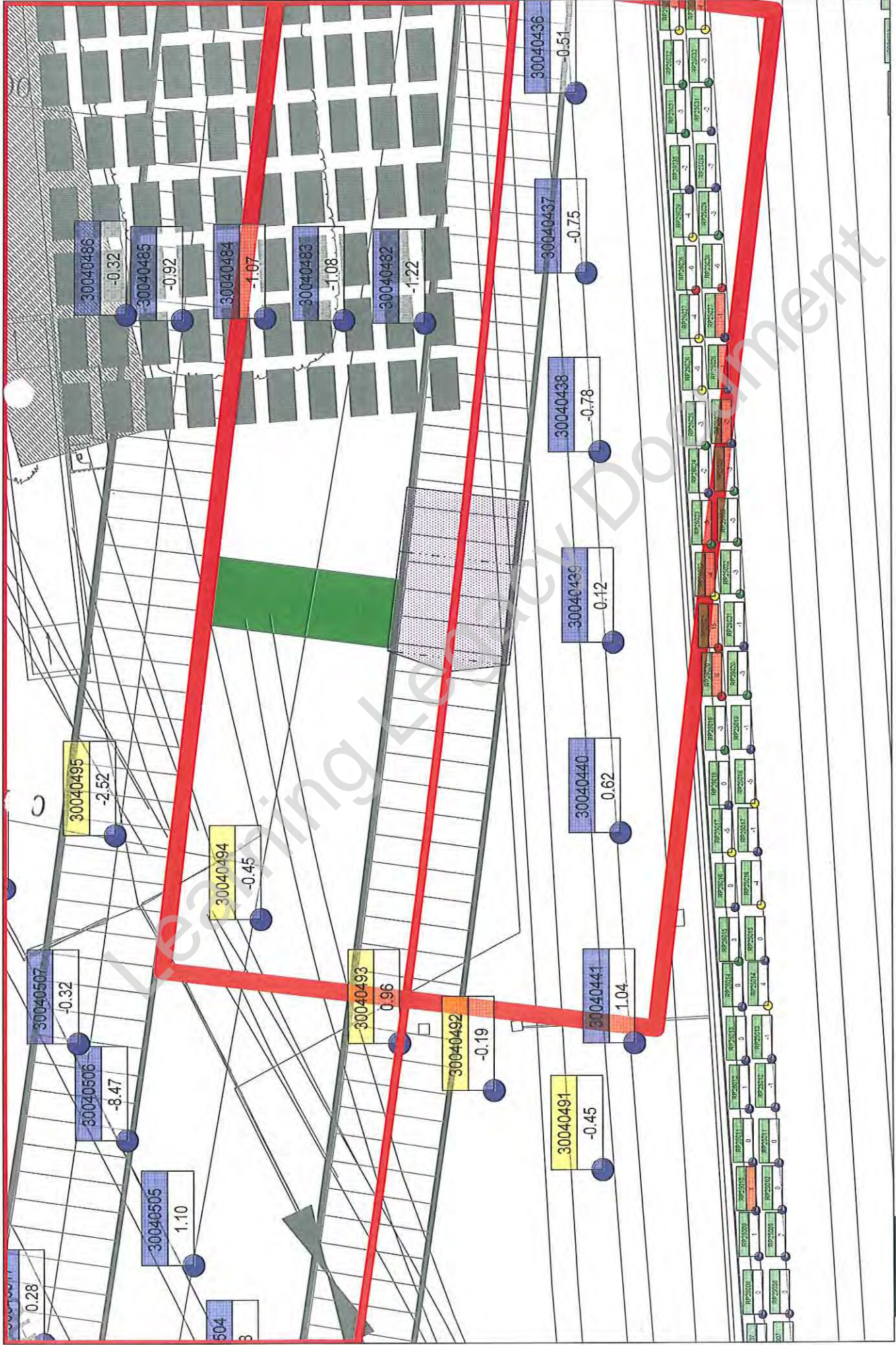
the Geotechnical Cross Section 1 depends out of 3no extensometer(3004 0493, 3004 0494 and 3004 0495), 2no inclinometer(3004 0492 and 3004 0496) and 2no piezometer(3004 0491 and 3004 0497) - on every location of the in-ground instruments is also a precise levelling surface point  
both of the inclinometer show a movement of less than +/- 2mm, the inclinometer tubes were since the 24/09/13 not usable any more.  
Under consideration of the temperatur differences, the related ground condition and the accuracy of the measurement HMJV has no concern to cease the monitoring.  
The rate of change in the monitoring data is less than the required standards as per the specifications and drawings

date / signature: 09/01/15

print name:

HMJV project role:

Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 04.03.2013 08:56





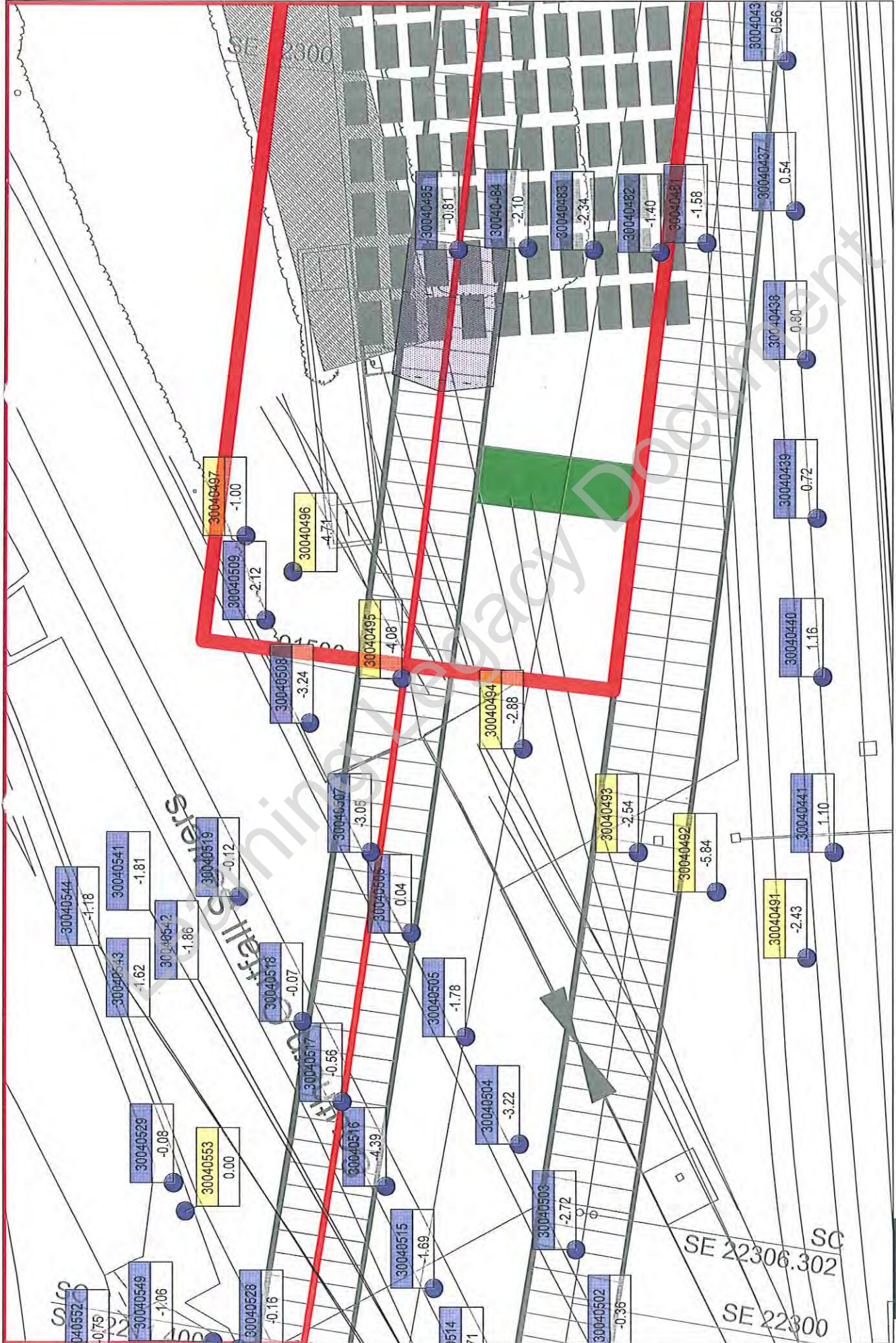
Point: 30040493



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Geotechnical Cross Section 1 05.02.2013 - 06.02.2014  
date: 17.07.2014 16:03 current values: 17.07.2014 15:53







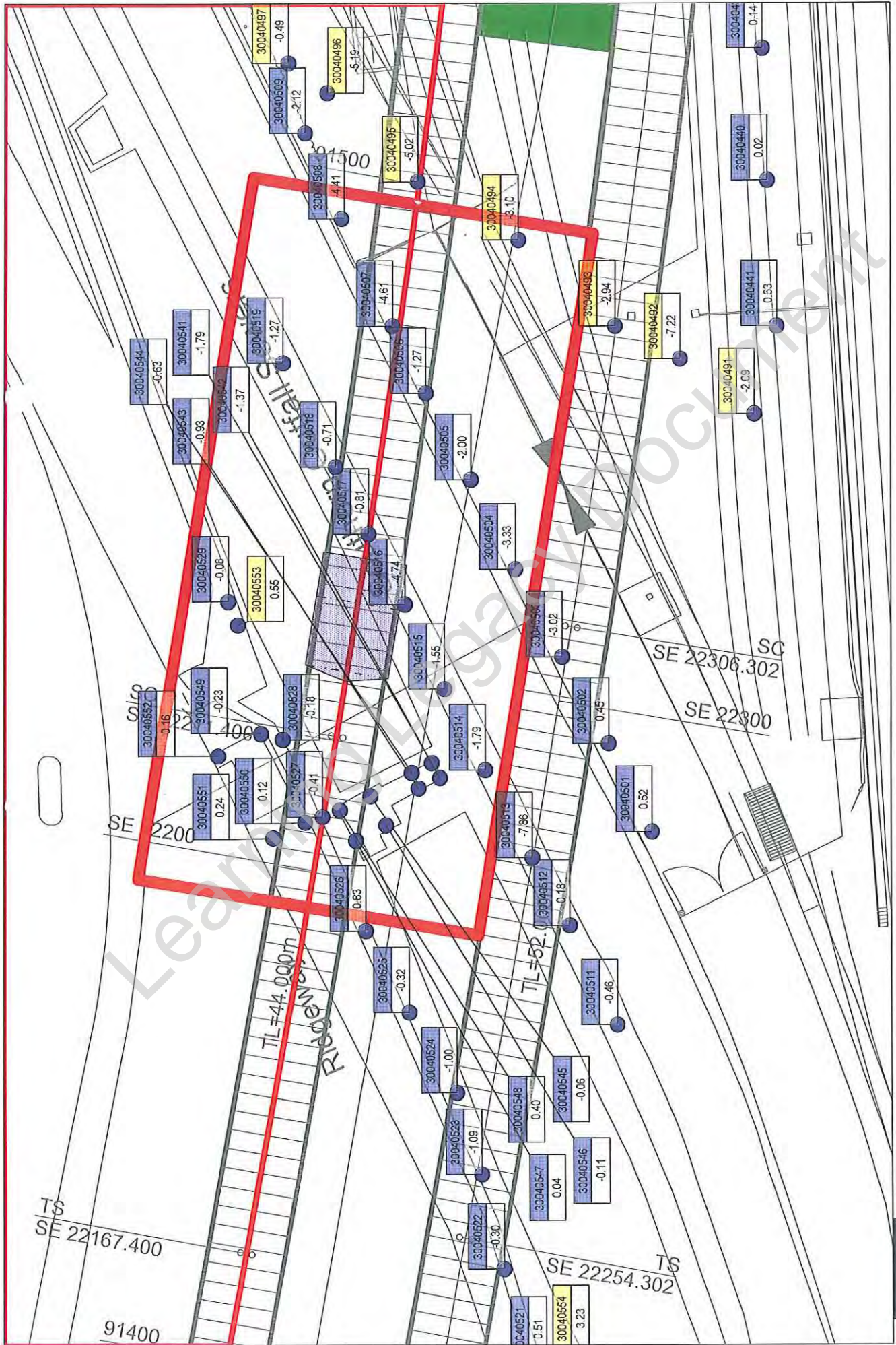
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 17.06.2013 09:00

Point: 30040495



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Geotechnical Cross section 1 05.02.2013 - 06.02.2014  
date: 21.07.2014 09:08 current values: 21.07.2014 08:57





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 20.06.2013 09:00

Joint Venture

project: C310 Thames Tunnel  
structure: Geotechnical Cross Section 1 (near CP 19)

Joint Venture

project: C310 Thames Tunnel  
structure: Geotechnical Cross Section 1 (near CP 19)

No. of reading	date	1. following		2. following		3. following		4. following		5. following		6. following		7. following		8. following		9. following		10. following		11. following		12. following		
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
		5.213	06/02/2013	2/02/2013	04/03/2013	06/03/2013	07/03/2013	08/03/2013	09/03/2013	10/03/2013	11/03/2013	12/03/2013	13/03/2013	14/03/2013	15/03/2013	16/03/2013	17/03/2013	18/03/2013	19/03/2013	20/03/2013	21/03/2013	22/03/2013	23/03/2013	24/03/2013	25/03/2013	
Point No.		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
3004 0491		103.559	0	103.559	0	103.559	0	103.559	0	103.558	-1	103.558	0	103.558	0	103.558	0	103.558	0	103.558	-1	103.558	0	103.557	0	-2
3004 0492		103.473	0	103.473	0	103.474	1	103.473	-1	103.474	2	103.474	0	103.474	1	103.474	0	103.474	1	103.472	-2	103.470	-2	103.470	0	-3
3004 0493		103.518	0	103.519	1	103.520	2	103.519	-1	103.518	0	103.518	1	103.518	0	103.519	0	103.519	0	103.517	-2	103.515	-2	103.515	0	-3
3004 0494		103.319	0	103.319	0	103.318	-1	103.318	0	103.318	0	103.318	1	103.318	0	103.316	-2	103.316	-2	103.317	1	103.316	-2	103.317	1	-2
3004 0495		103.395	0	103.392	-3	103.391	-4	103.391	-4	103.391	-4	103.391	0	103.392	1	103.390	-1	103.390	-1	103.392	1	103.392	1	103.391	1	-4
3004 0496		103.042	0	103.041	-1	103.037	-4	103.037	0	103.037	0	103.037	0	103.037	0	103.036	-1	103.036	-1	103.037	1	103.037	1	103.037	1	-5
3004 0497		102.997	0	102.997	0	102.996	-1	102.996	0	102.996	0	102.997	1	102.997	1	102.996	-1	102.996	-1	102.997	1	102.997	1	102.996	1	-1

Legacy Document

Joint Venture

project: C310 Thames Tunnel

Joint Venture

project: C310 Thames Tunnel

No. of reading	structure: Geotechnical Cross Section 1 (near CP 19)															
	baseline	13. following	14. following	15. following	16. following	17. following	18. following	19. following	20. following	21. following	22. following	23. following	24. following			
date	5/21/13	2/03/2013	2/7/2013	02/04/2013	1/10/2013	2/10/2013	1/03/2013	1/26/2013	1/30/2013	1/03/2013	2/06/2013	2/20/2013	02/07/2013			
Point No.	elevation	deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline				
		elevation	0	elevation	0	elevation	0	elevation	0	elevation	0	elevation	0			
3004 0491	103.559	103.557	0	-2	103.557	0	-2	103.557	0	-2	103.557	0	-2	103.556	-1	-3
3004 0492	103.473	103.469	0	-4	103.469	0	-4	103.467	-1	-6	103.466	-1	-7	103.465	0	-7
3004 0493	103.518	103.514	0	-4	103.514	0	-4	103.515	1	-2	103.515	1	-2	103.515	0	-3
3004 0494	103.319	103.316	0	-3	103.316	0	-3	103.317	0	-2	103.317	0	-2	103.316	-1	-3
3004 0495	103.395	103.390	0	-5	103.391	0	-4	103.391	0	-4	103.391	0	-4	103.390	-1	-5
3004 0496	103.042	103.036	0	-6	103.037	1	-4	103.037	0	-5	103.037	0	-5	103.036	-1	-6
3004 0497	102.997	102.996	0	-1	102.997	1	0	102.996	0	-1	102.996	0	-1	102.997	0	0

Legacy Document

monitoring table



Joint Venture

Project: C310 Thames Tunnel

No. of reading	structure: Geotechnical Cross Section 1 (near CP 19)												
	baseline	25. following		26. following		27. following		28. following		29. following			
date	15/11/13	16/01/2013		27/01/2013		29/01/2013		24/02/2013		06/02/2014			
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
	3004 0491	103.559	103.556	0 -3	103.554	-2	103.554	-5	103.554	0 -5	103.554	0 -5	
3004 0492	103.473	103.461	-3 -12	103.458	-3 -14	103.458	0 -14	103.458	0 -14	103.458	-1 -15		
3004 0493	103.518	103.515	1 -3	103.513	-2 -5	103.513	0 -5	103.513	0 -5	103.511	-2 -5		
3004 0494	103.319	103.315	0 -4	103.315	-1 -4	103.314	-1 -5	103.314	-1 -5	103.314	0 -5		
3004 0495	103.305	103.309	0 +6	103.308	-1 -7	103.306	-1 -8	103.306	-1 -8	103.306	0 -8		
3004 0496	103.042	103.036	0 -6	103.035	-1 -7	103.034	-1 -8	103.034	-1 -8	103.034	0 -8		
3004 0497	102.997	102.996	1 -1	102.995	-1 -2	102.994	-1 -3	102.994	-1 -3	102.994	0 -3		



Joint Venture

Joint Venture

project: C310 Thames Tunnel  
structure: Extensometer Geotechnical Cross Section no. 1

project: C310 Thames Tunnel  
structure: Extensometer Geotechnical Cross Section no. 1

No. of reading date	1. following 06/02/2013		2. following 20/02/2013		3. following 04/03/2013		4. following 09/03/2013		5. following 08/03/2013		6. following 07/02/2013		7. following 08/02/2013		8. following 09/02/2013		9. following 10/02/2013		10. following 11/02/2013		11. following 12/02/2013		12. following 13/02/2013			
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline		
30040493	103.518	0	103.519	1	103.520	1	103.519	-1	103.518	0	103.518	0	103.519	1	103.519	0	103.519	0	103.515	-2	103.515	0	103.515	0	103.515	-1
30040493-1	98.443	0	98.444	1	98.445	1	98.444	1	98.444	0	98.444	0	98.444	0	98.444	1	98.442	-2	98.439	-3	98.439	0	98.439	0	98.439	-1
30040493-2	93.448	0	93.448	1	93.450	0	93.448	1	93.448	-1	93.448	0	93.448	0	93.449	1	93.447	-2	93.445	-2	93.445	0	93.444	0	93.444	-1
30040493-3	89.442	0	89.443	1	89.444	1	89.443	0	89.443	0	89.444	0	89.442	0	89.442	0	89.442	-4	89.436	-3	89.436	-7	89.434	-1	89.434	-1
30040494	103.319	1	103.319	-1	103.318	-1	103.318	-2	103.316	-1	103.318	1	103.318	0	103.318	0	103.316	-2	103.316	-2	103.316	-2	103.317	1	103.316	-1
30040494-1	97.242	0	97.242	0	97.242	0	97.242	-1	97.241	-1	97.242	1	97.242	0	97.243	0	97.241	-2	97.240	-2	97.240	-2	97.242	2	97.241	-1
30040494-2	91.237	1	91.238	-1	91.237	0	91.237	-1	91.236	-1	91.237	0	91.237	0	91.237	0	91.236	-1	91.235	-2	91.235	-2	91.237	2	91.236	-1
30040494-3	85.240	1	85.240	-1	85.240	0	85.240	0	85.240	-1	85.240	1	85.240	1	85.241	1	85.239	-2	85.240	-1	85.239	-1	85.240	1	85.239	-1
30040495	103.395	0	103.392	-2	103.391	-1	103.391	-3	103.391	-1	103.391	0	103.391	-4	103.392	1	103.390	-2	103.390	-2	103.390	-5	103.391	1	103.390	0
30040495-1	98.308	-1	98.307	-3	98.304	-1	98.304	-4	98.303	-1	98.303	-5	98.304	-4	98.304	1	98.303	-1	98.302	-2	98.302	-6	98.303	1	98.303	0
30040495-2	93.314	0	93.311	-3	93.312	1	93.312	-2	93.312	-1	93.311	0	93.311	-2	93.312	1	93.311	-1	93.312	-2	93.310	-2	93.311	1	93.311	0
30040495-3	89.319	0	89.317	-2	89.318	1	89.318	-1	89.317	-1	89.317	0	89.317	0	89.318	1	89.317	-1	89.317	-2	89.317	-2	89.317	1	89.317	0

Legacy Document

Joint Venture

project: C310 Thames Tunnel  
structure: Extensometer Geotechnical Cross Section no. 1

project: C310 Thames Tunnel  
structure: Extensometer Geotechnical Cross Section no. 1

Joint Venture

No. of reading	baseline elevation	13. following		14. following		15. following		16. following		17. following		18. following		19. following		20. following		21. following		22. following		23. following		24. following					
		date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline			
30040493	103.518	27/02/2013	103.514	0	0	103.514	0	103.516	2	2	103.515	-2	-3	103.515	1	-2	103.515	0	-3	103.515	0	0	103.514	0	0	103.513	-1	-5	
30040493-1	98.443	30/03/2013	98.438	0	-5	98.438	0	98.440	2	-3	98.439	-2	-5	98.439	1	-4	98.439	0	-4	98.439	0	-4	98.439	0	-5	98.438	-1	-6	
30040493-2	93.448	02/04/2013	93.444	0	-4	93.443	0	93.445	2	-3	93.443	-2	-5	93.444	1	-5	93.444	0	-5	93.443	-1	-6	93.443	0	-6	93.442	-1	-7	
30040493-3	89.442	11/04/2013	89.433	0	-9	89.435	2	-8	89.435	2	-8	89.433	-2	-10	89.433	1	-9	89.433	0	-9	89.433	-1	-10	89.432	0	-10	89.431	-1	-11
30040494	103.319	02/04/2013	103.316	0	-3	103.317	1	-2	103.317	1	-2	103.316	-1	-3	103.317	0	-2	103.316	-1	-3	103.315	-1	-4	103.315	1	-4	103.314	-2	-5
30040494-1	97.242	07/04/2013	97.240	0	-2	97.242	0	-2	97.242	1	-1	97.241	-1	-1	97.242	0	-1	97.242	0	-1	97.240	-1	-2	97.241	1	-1	97.240	-1	-2
30040494-2	91.237	11/04/2013	91.236	0	-1	91.237	1	0	91.237	1	0	91.237	0	0	91.237	0	0	91.237	0	0	91.236	-1	-1	91.237	1	0	91.236	-1	-1
30040494-3	85.240	15/04/2013	85.239	0	-1	85.241	2	1	85.241	2	1	85.240	-1	0	85.241	1	1	85.241	0	1	85.240	0	0	85.240	1	0	85.239	-1	-1
30040495	103.395	17/05/2013	103.390	-1	-5	103.391	1	-4	103.392	1	-3	103.391	-1	-4	103.391	0	-4	103.391	0	-4	103.389	-2	-7	103.389	1	-6	103.388	-3	-8
30040495-1	98.308	19/05/2013	98.302	-1	-6	98.303	1	-5	98.304	1	-4	98.304	-1	-4	98.304	1	-4	98.304	0	-4	98.301	-2	-7	98.302	1	-5	98.300	-2	-8
30040495-2	93.314	21/05/2013	93.310	-1	-3	93.311	1	-2	93.313	1	-1	93.312	-1	-1	93.313	0	-1	93.313	0	-1	93.312	-2	-3	93.312	1	-2	93.311	-3	-5
30040495-3	89.319	16/06/2013	89.316	-1	-2	89.318	1	-1	89.319	1	0	89.319	1	0	89.319	1	0	89.319	0	0	89.316	-2	-3	89.317	1	-2	89.316	-2	-5

Legacy Document

monitoring table



Joint Venture

project: C310 Thames Tunnel

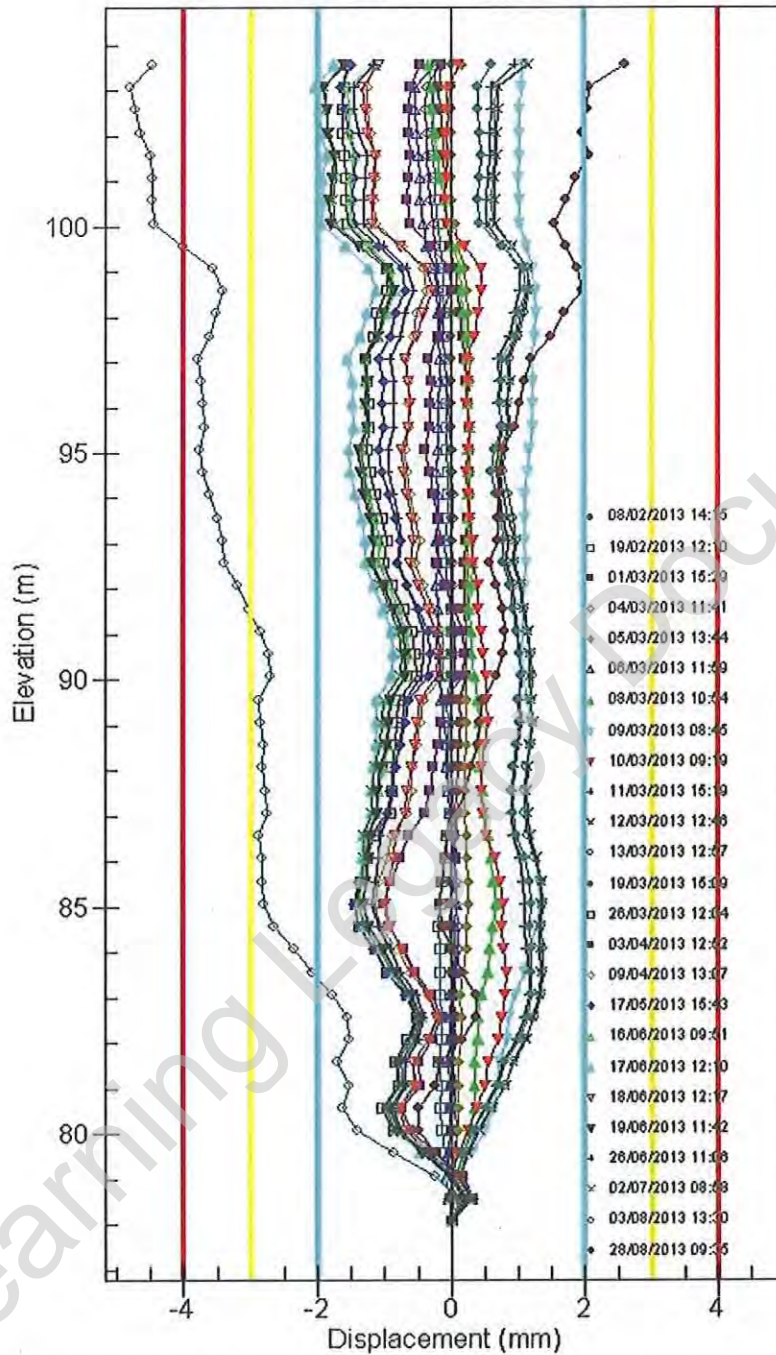
structure: Extensometer Geotechnical Cross Section no. 1

No. of reading	baseline	25. following		26. following		27. following		28. following		29. following		30. following	
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
date	5/2/13	06/02/2014											
Point No.		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
30040493		103.518	-2	103.511	-6								
30040493-1		98.443	-1	98.437	-7								
30040493-2		93.448	-2	93.440	-8								
30040493-3		89.442	-2	89.429	-13								
30040494		103.319	0	103.314	-5								
30040494-1		97.242	-3	97.240	-3								
30040494-2		91.237	-1	91.236	-1								
30040494-3		85.240	0	85.240	0								
30040495		103.395	0	103.386	-8								
30040495-1		98.308	-1	98.300	-8								
30040495-2		93.314	-4	93.309	-4								
30040495-3		89.319	0	89.313	-5								

Legacy Document

# c310:wb0492 - A Axis Cumulative

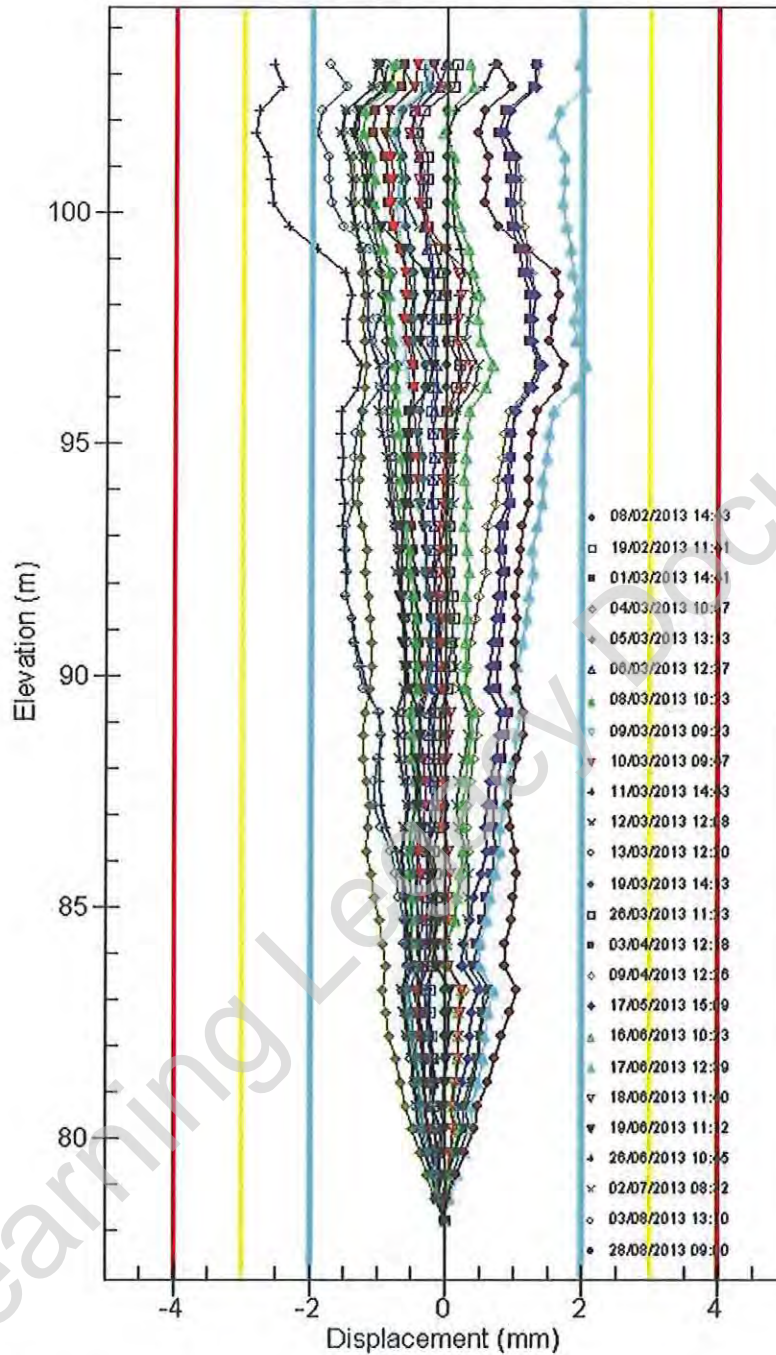
Initial survey: 08/02/2013 14:15



PROJECT: C310  
 SITE: Geotechnical Cross Section No.1  
 INSTALLATION: Inclinometer WB0492  
 COMPANY: HMJV  
 CLIENT: Crossrail  
 NOTE: Manual Inclinometer  
 Geotechnical Cross Section No. 1  
 westbound tunnel  
 Direction of displacement perpendicular to tunnel alignment  
 positive value - deviation towards tunnel center line

# c310:eb0496 - A Axis Cumulative

Initial survey: 08/02/2013 14:43



PROJECT: C310

SITE: Geotechnical Cross Section No.1

INSTALLATION: Inclinometer EB0496

COMPANY: HMJV

CLIENT: Crossrail

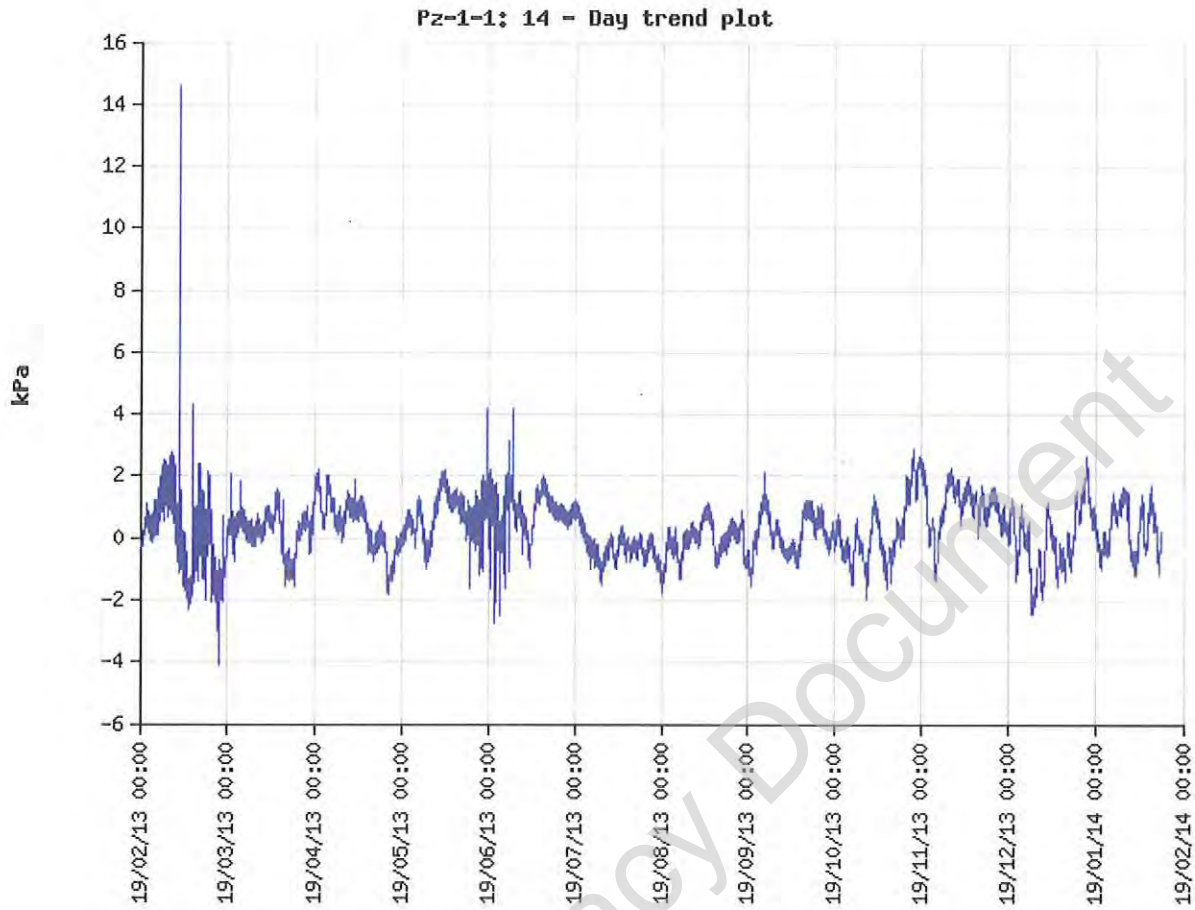
NOTE: Manual Inclinometer

Geotechnical Cross Section No. 1

eastbound tunnel

Direction of displacement perpendicular to tunnel alignment

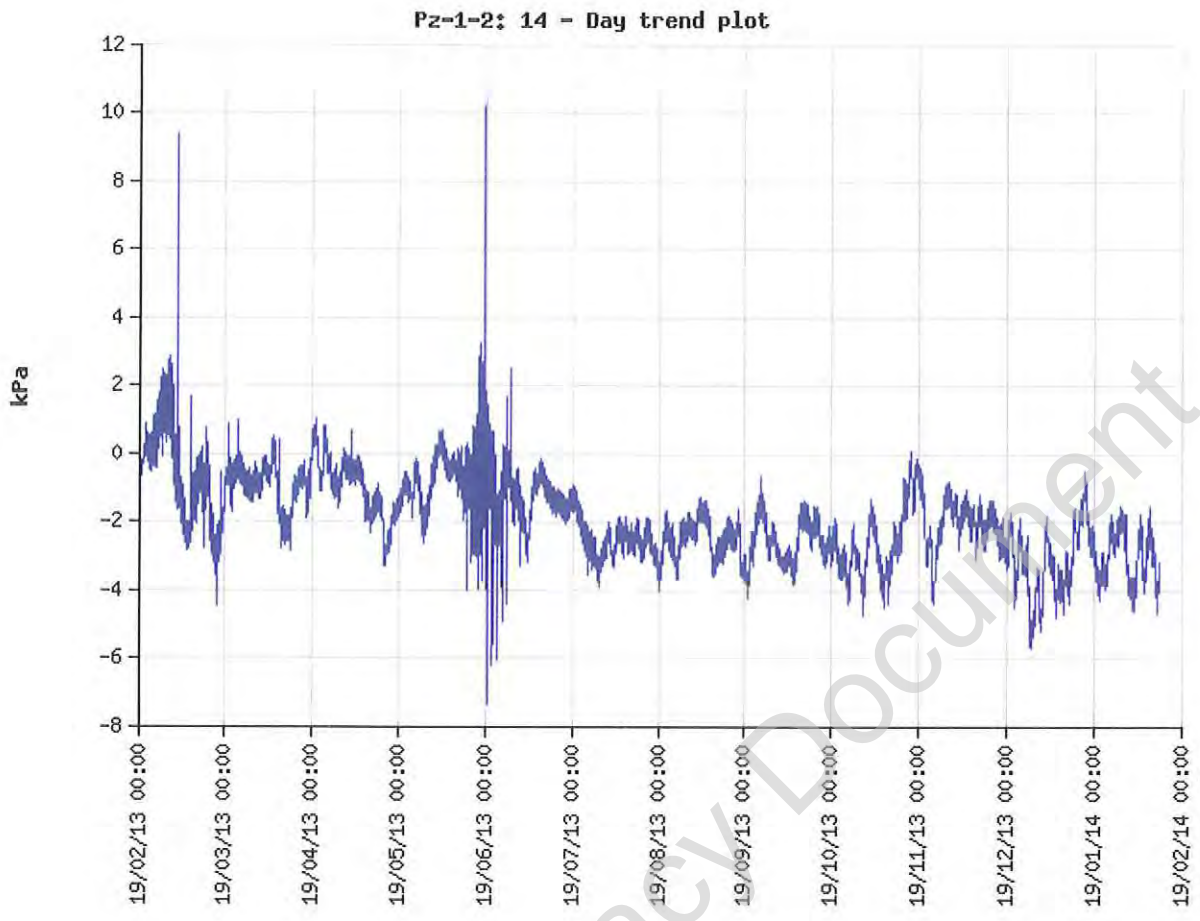
positive value - deviation towards tunnel center line



*Geotechnical Cross Section 1*

*Point no. 3004 & 491*


*Piezometer*



*Geotechnical Cross Section 1*

*Point no.: 3004 0497*

*Piezometer*

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	CROSSRAIL	eB NO	C310-HTM-C-RGN-CR148-50022	Rev	6.0
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 19**  
**Southern Outfall Sewer 1**

Learning Legacy Document



**monitoring asset**

**Southern Outfall Sewer (SOS) + Pumpstation**

reference monitoring drawing: C310-HTM-C-DWG-CR146-ST004-70001

name of monitoring section: Southern Outfall Sewer (SOS) 1

sensor type: manual levelling studs

chainage: 91470 point no.: 3004 0501 - 3004 0509

trigger values: [mm] green: +12 -12 amber: +15 -15 red: +18 -18

reference document for trigger values: Management Plan for Control of Ground Movement

EB-no.: C310-HTM-Z-STP-CR148-50058

Appendix: AAA

**monitoring data**

	date	max. value	point no.	comments
baseline	12/12/2012	0		
	12/01/2013	0		
TBM 1	start ZOI	10/03/13	0.29	3004 0503
	end ZOI	14/03/13	-1.75	3004 0503 breached not any trigger value
TBM 2	start ZOI	18/06/13	-2.59	3004 0507
	end ZOI	20/06/13	-4.61	3004 0507 breached not any trigger value
longterm	06/02/14	-7.32	3004 0508	last reading post tunneling, Cross section not longer measurable
Evaluation of any potential residual risks	<input checked="" type="checkbox"/>	No residual risk since the Works have been completed by HMJV		
	<input type="checkbox"/>	Yes, residual risk (see comment below)		

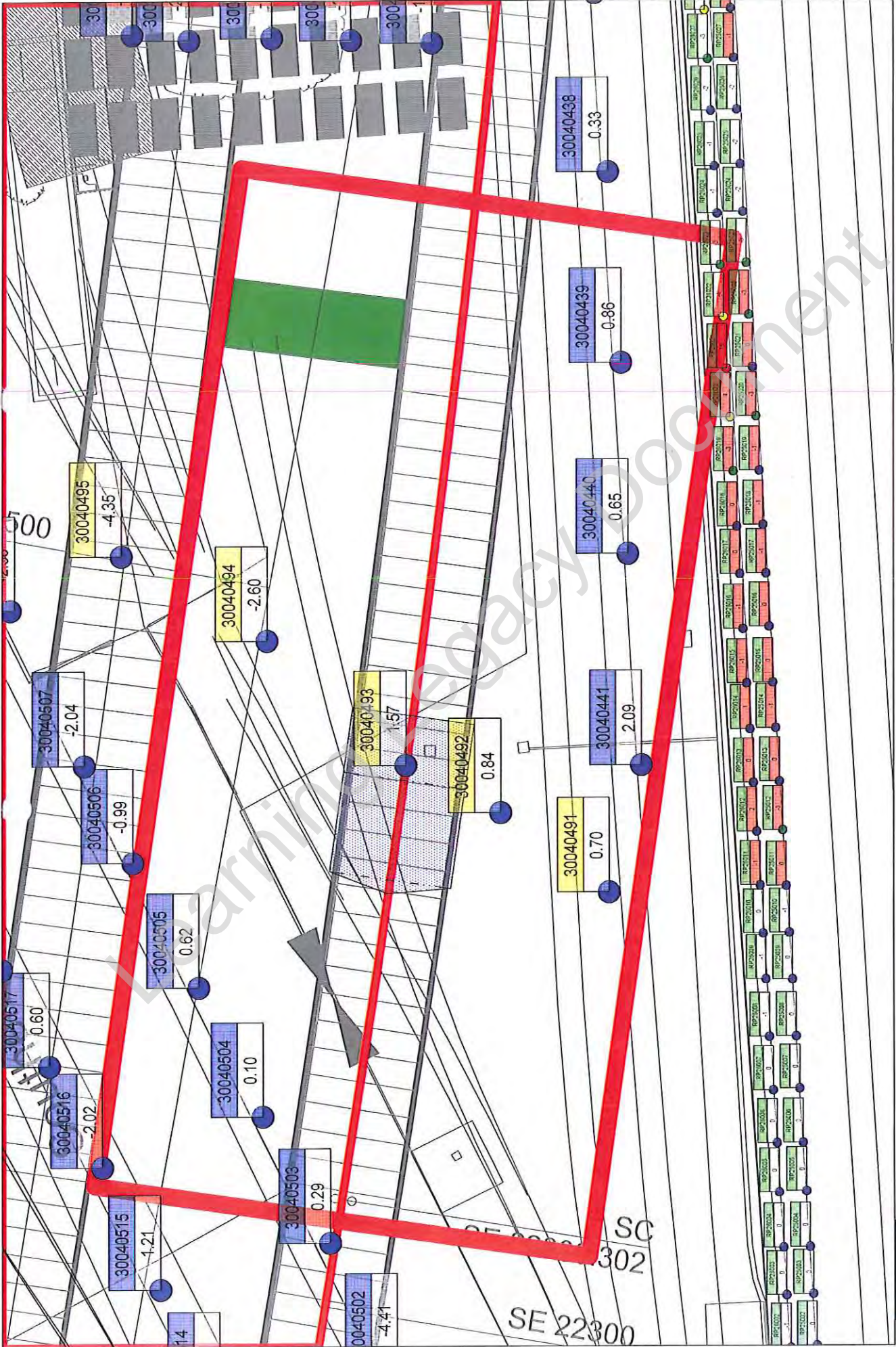
**summary / comments**

Several point where destroyed, reinstated and re-baselined during the time of monitoring. Overall, none of the points reached any trigger values. Over a period of approx. 6 month after TBM tunneling (TBM2) further settlement of approx. 2-3mm was observed. All points (including shallow datums) were destroyed due to Road reinstatement done by Others, shortly after last readings taken Feb 2014. Shallow datums demonstrate rate of change within specifications. Therefore C310 (HMJV & CRL) agreed to not reinstate and not continue monitoring.

date / signature: 27/03/2015

print name:

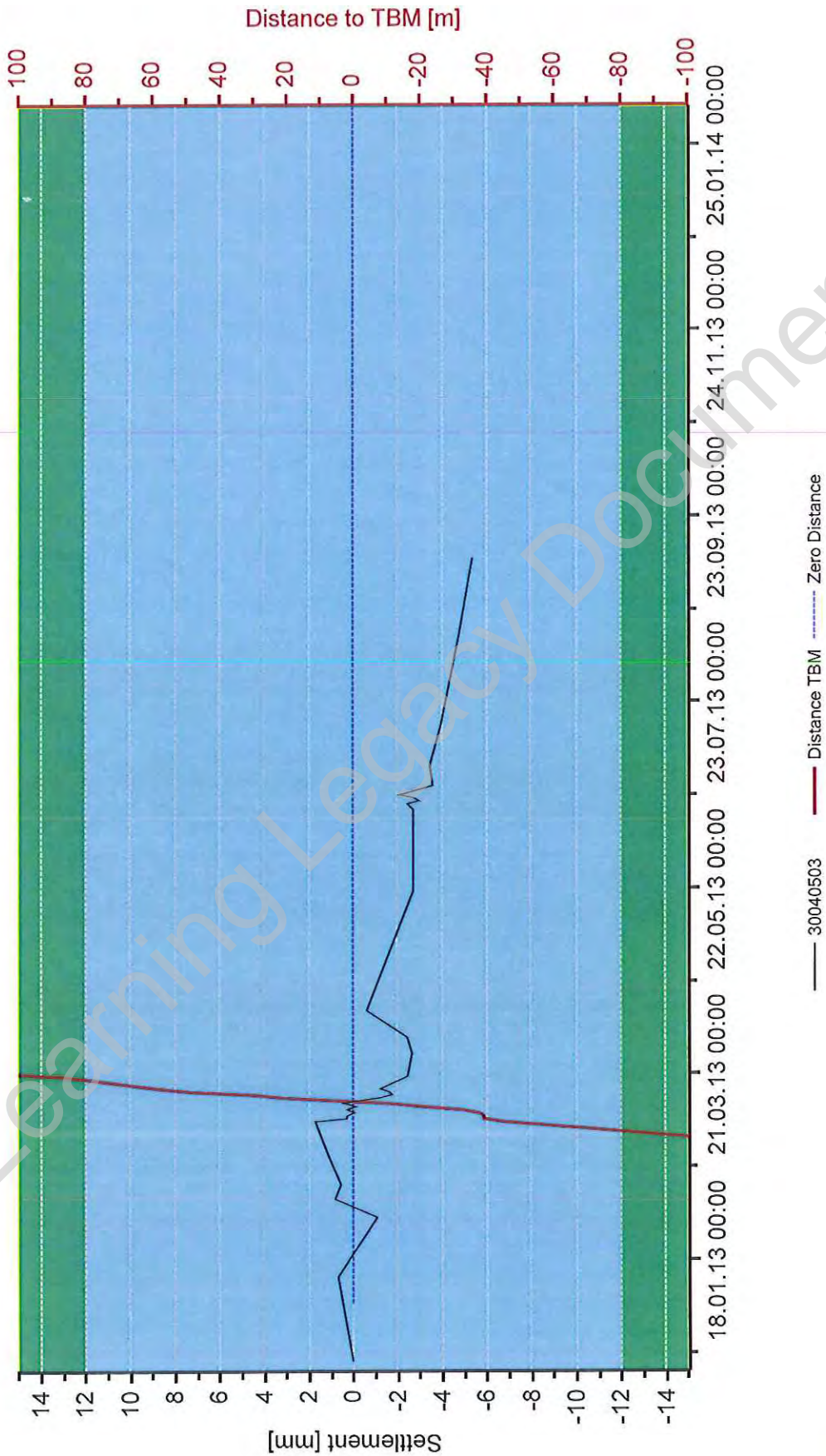
HMJV project role: Monitoring & Survey engineer



**Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal**

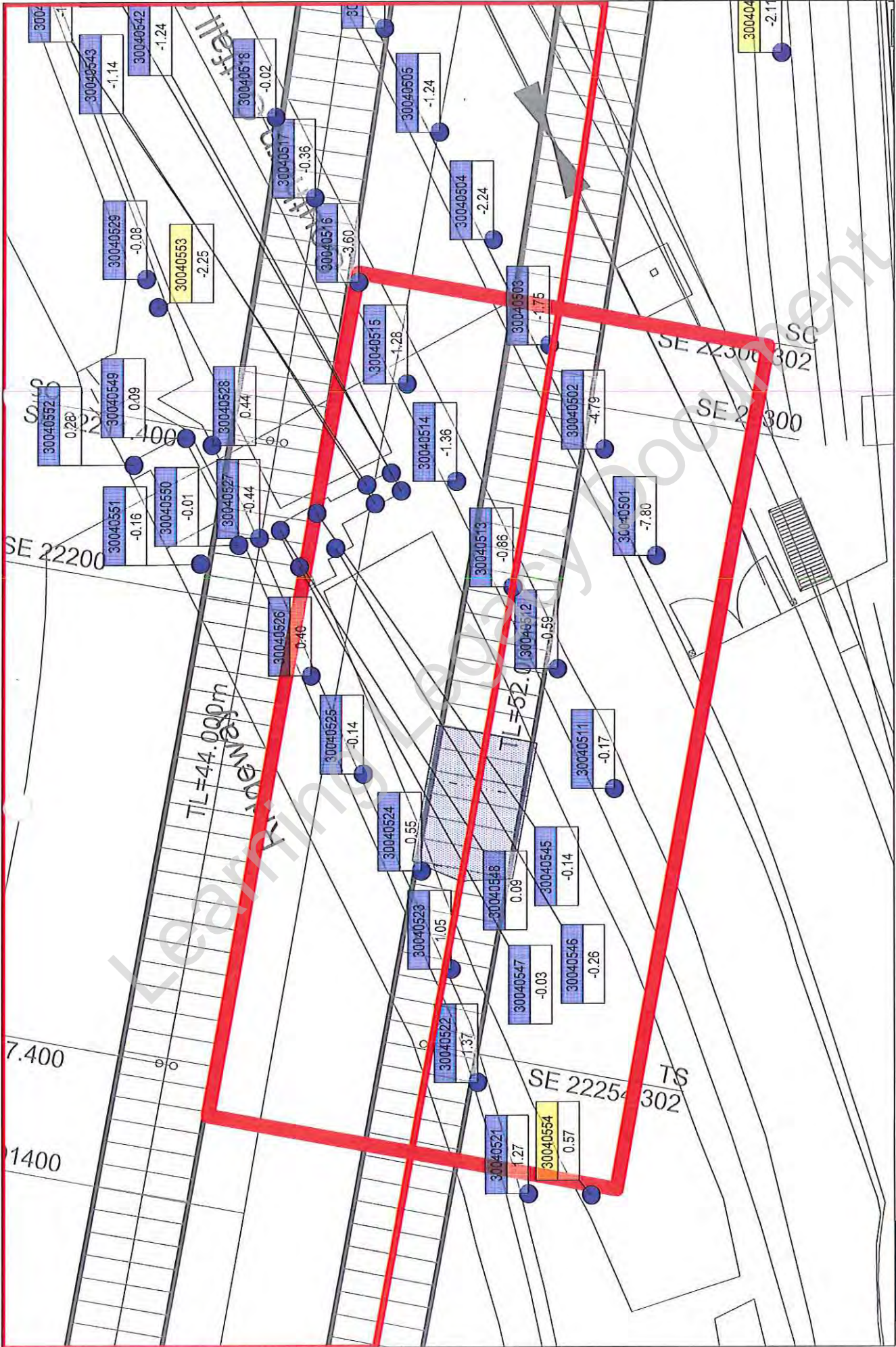
working activities: TBM drive, portal excavation, lining walls and grouting  
 current values: 10.03.2013 06:58

Point: 30040503

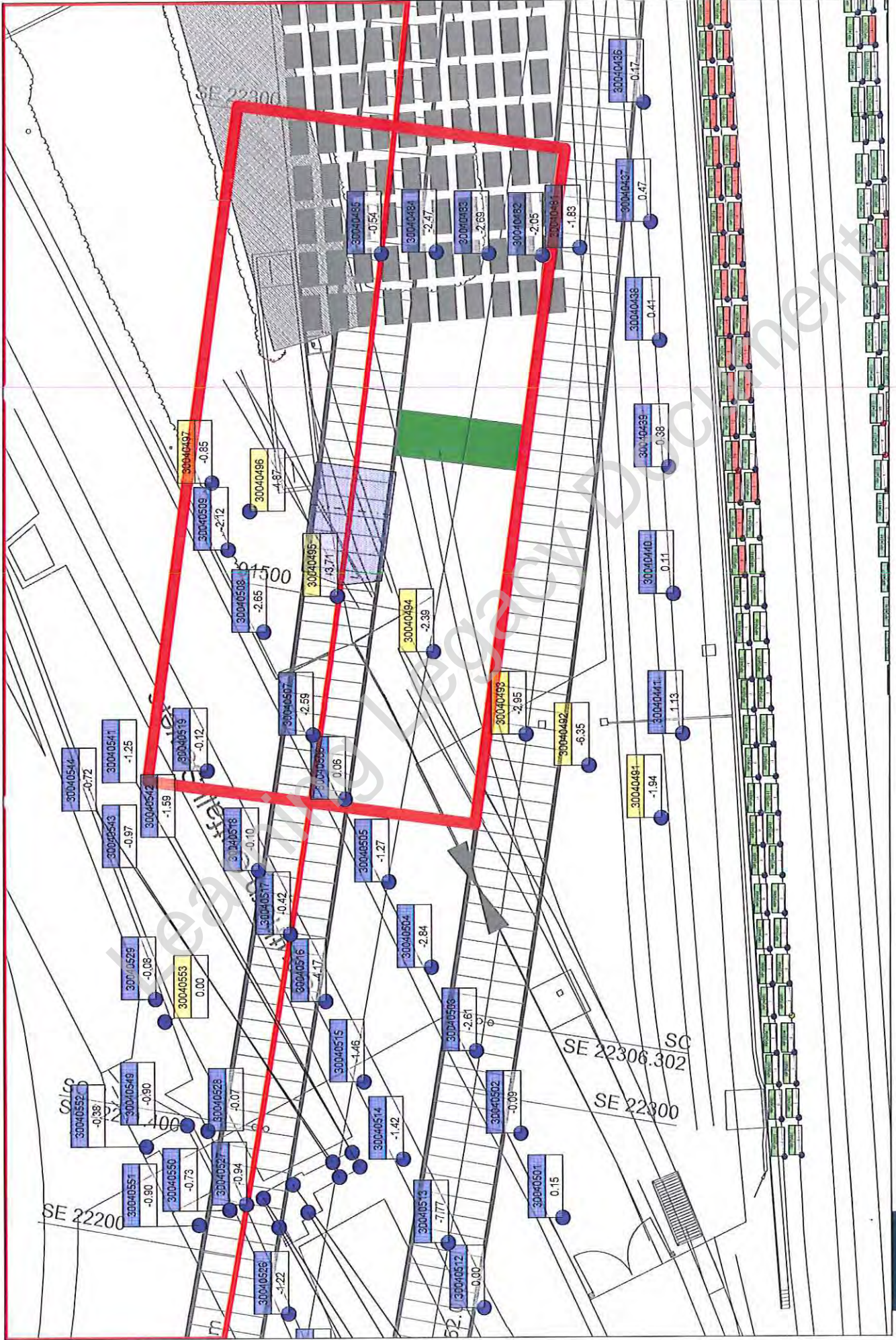


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Southern Outfall Sewer 1 12.12.2012 - 07.02.2014  
date: 21.07.2014 13:18 current values: 21.07.2014 13:09



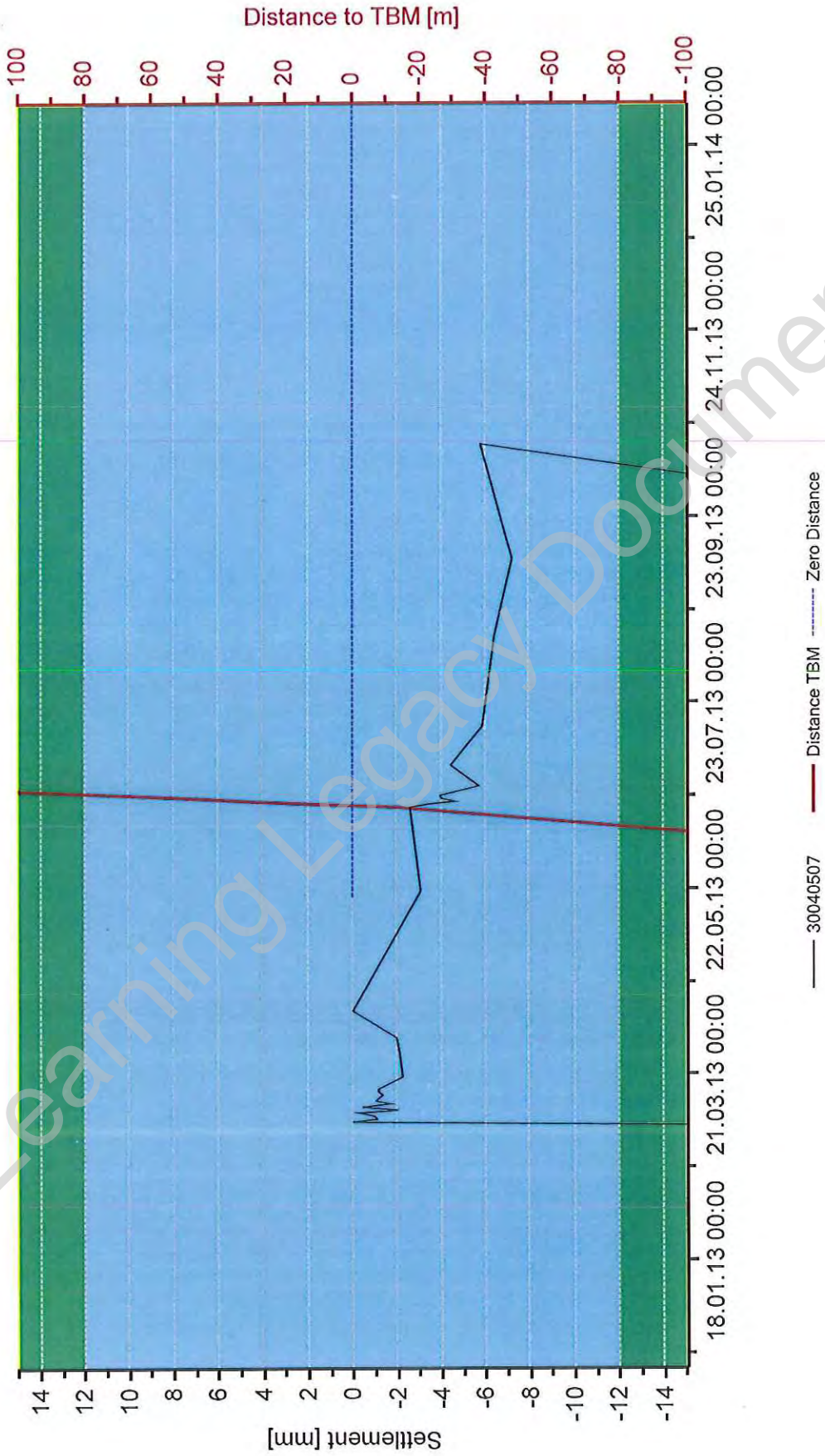


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 14.03.2013 18:46



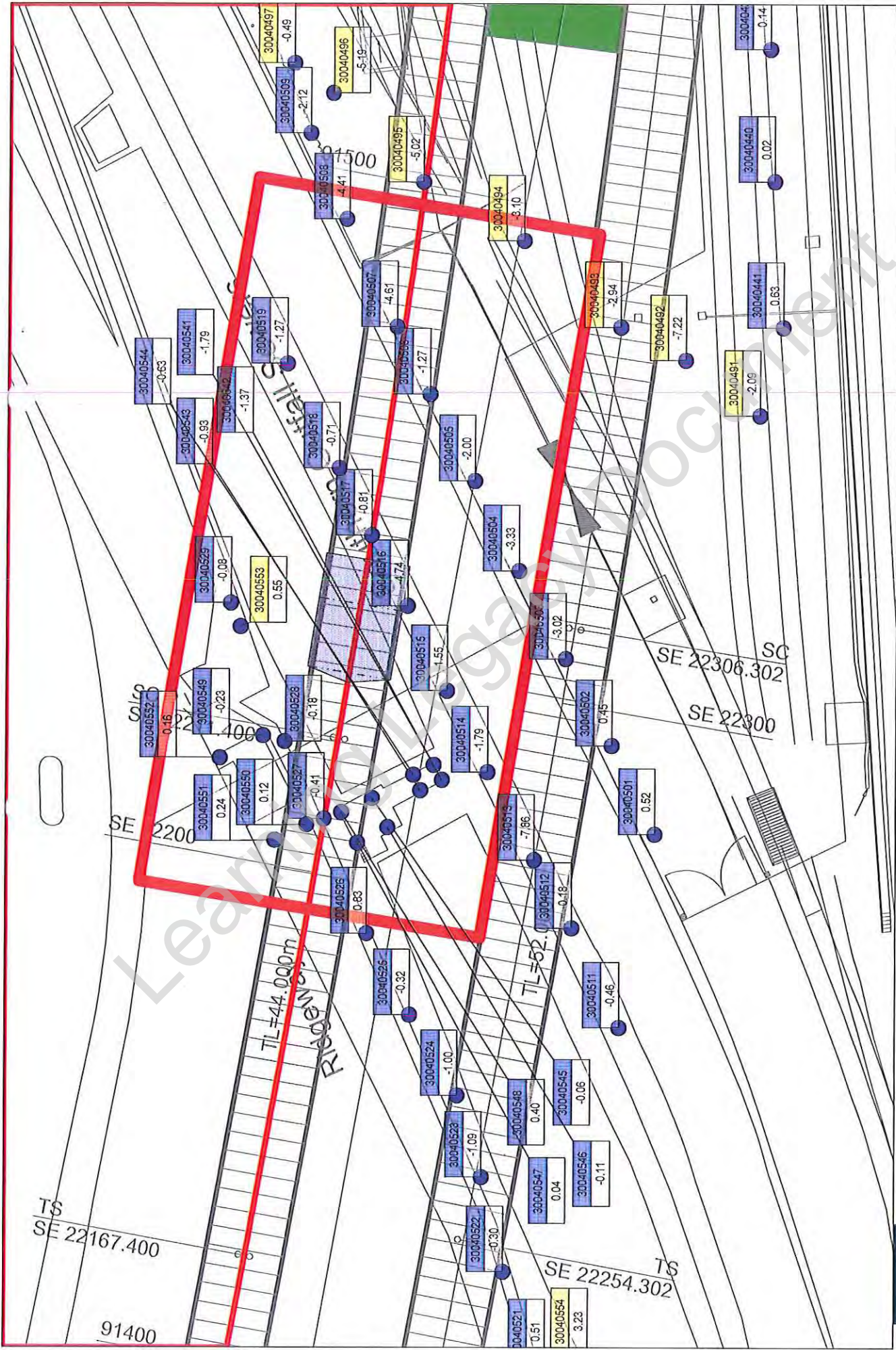
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 18.06.2013 09:00

Point: 30040507



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Southern Outfall Sewer 1 12.12.2012 - 07.02.2014  
date: 29.07.2014 08:51 current values: 29.07.2014 08:28





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 20.06.2013 09:00



monitoring table



Joint Venture

Project: C310 Thames Tunnel

structure: TW SOS 1 - 3

No. of reading	1. following		2. following		3. following		4. following		5. following		6. following	
	baseline	12/01/2013	19/01/2013	01/02/2013	06/02/2013	07/02/2013	12/02/2013					
date	15/12/2012	12/01/2013	19/01/2013	01/02/2013	06/02/2013	07/02/2013	12/02/2013					
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501	103.275	103.274			103.269	2	103.269	0	103.269	0	103.267	-2
3004 0502	103.238	103.238			103.235	2	103.235	0	103.235	0	103.234	-1
3004 0503	103.150	103.150			103.149	-2	103.150	2	103.150	0	103.150	0
3004 0504	103.118	103.119			103.117	-1	103.119	1	103.119	0	103.118	0
3004 0505	103.100	103.101			103.099	-2	103.101	2	103.101	0	103.100	0
3004 0506	102.996	102.997			102.995	-1	102.997	1	102.997	0	102.997	0
3004 0507	102.964	102.965			102.963	-2	102.965	2	102.965	0	102.964	-1
3004 0508	102.972	102.972			102.971	-2	102.972	2	102.972	0	102.972	0
3004 0509	102.972	102.972			102.970	-2	102.972	2	102.972	0	102.972	0
3004 0511	107.025		107.025	0	107.025	0	107.030	5	107.030	0	107.026	-4
3004 0512	107.000		107.000	0	107.000	0	107.005	5	107.005	0	107.001	-4
3004 0513	106.967		106.967	0	106.966	0	106.971	5	106.971	0	106.968	-3
3004 0514	107.007		107.007	0	107.006	-1	107.012	6	107.012	0	107.009	-3
3004 0515	107.038		107.038	0	107.037	-1	107.042	6	107.042	0	107.039	-3
3004 0516	106.944		106.944	0	106.944	0	106.949	5	106.949	0	106.945	-4
3004 0517	106.926		106.926	0	106.926	0	106.931	5	106.931	0	106.927	-4
3004 0518	106.957		106.956	0	106.957	0	106.961	4	106.961	0	106.958	-4
3004 0519	106.947		106.947	0	106.937	-1	106.942	5	106.942	0	106.938	-4
3004 0521	101.892		101.892	0	101.891	-1	101.891	0	101.891	0	101.891	0
3004 0522	101.809		101.809	0	101.808	-1	101.809	1	101.809	1	101.808	-1
3004 0523	101.822		101.822	0	101.821	-1	101.822	1	101.822	1	101.821	0
3004 0524	101.761		101.761	0	101.761	-1	101.761	0	101.761	0	101.761	0
3004 0525	101.796		101.787	0	101.795	-1	101.797	1	101.797	1	101.796	-1
3004 0526	101.869		101.870	1	101.869	-2	101.870	1	101.870	1	101.869	-1
3004 0527	101.821		101.822	0	101.821	-1	101.822	1	101.822	1	101.820	-1
3004 0528	101.840		101.840	0	101.824	-1	101.824	1	101.825	1	101.824	-1
3004 0529	101.979		101.979	0	destroyed							
3004 0541	106.956		106.956	0	106.955	-1	106.961	5	106.961	0	106.957	-4
3004 0542	106.943		106.943	0	106.943	-1	106.948	5	106.948	0	106.944	-4
3004 0543	106.932		106.932	0	106.931	-1	106.937	5	106.937	0	106.933	-3
3004 0544	106.937		106.937	0	106.937	-1	106.942	5	106.942	0	106.938	-4
3004 0545	102.996		102.997	0	102.996	-1	102.997	1	102.997	1	102.996	-1
3004 0546	103.000		103.000	0	102.999	-1	103.001	1	103.001	1	102.999	-1
3004 0547	103.008		103.009	0	103.008	-1	103.009	1	103.009	1	103.008	-1
3004 0548	102.976		102.977	1	102.976	-1	102.977	1	102.977	1	102.976	-1
3004 0549	101.795		101.795	0	101.794	-1	101.795	1	101.795	1	101.794	-1
3004 0550	101.819		101.820	1	101.819	-1	101.819	1	101.819	1	101.818	-1
3004 0551	101.818		101.818	0	101.817	0	101.818	0	101.818	0	101.817	-1
3004 0552	101.794		101.794	0	101.793	0	101.793	1	101.794	1	101.793	-1



monitoring table



Joint Venture

project: C310 Thames Tunnel

No. of reading	baseline		7. following		8. following		9. following		10. following		11. following		12. following			
	15/12/2012	12/01/2013	20/02/2013	deviation from last/ baseline	03/02/2013	deviation from last/ baseline	06/03/2013	deviation from last/ baseline	07/03/2013	deviation from last/ baseline	08/03/2013	deviation from last/ baseline	09/03/2013	deviation from last/ baseline		
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
3004 0501	103.275	103.268	1	1	103.269	1	2	103.267	-2	0	103.267	0	0	103.267	0	0
3004 0502	103.238	103.234	0	2	103.235	1	3	103.234	-2	1	103.234	0	1	103.234	0	1
3004 0503	103.150	103.151	1	1	103.151	1	2	103.150	-1	0	103.150	0	0	103.150	0	0
3004 0504	103.118	103.119	1	1	103.119	0	1	103.118	-2	0	103.118	0	0	103.118	0	0
3004 0505	103.100	103.101	1	1	103.102	0	1	103.100	-2	0	103.101	0	0	103.101	1	1
3004 0506	102.996	102.988	-8	-8	102.982	new Baseline	new Baseline	102.981	-1	-1	102.981	0	-1	102.981	1	0
3004 0507	102.964	102.964	0	0	103.249	new Baseline	new Baseline	103.248	-1	-1	103.248	0	-1	103.249	1	0
3004 0508	102.972	102.971	-1	-1	103.230	new Baseline	new Baseline	103.229	-2	-2	103.229	0	-1	103.229	0	-1
3004 0509	102.972	102.970	-2	-2				107.026	1	1						
3004 0510	107.000	107.001	-1	0				107.002	1	1						
3004 0511	106.967	106.967	-1	0				106.968	1	1						
3004 0512	107.007	107.007	-1	0				107.009	2	1						
3004 0513	107.038	107.038	-2	0				107.039	2	1						
3004 0514	106.944	106.941	-4	-3				106.942	1	-2						
3004 0515	106.926	106.926	-1	0				106.927	0	1						
3004 0516	106.957	106.957	-1	0				106.957	0	1						
3004 0517	106.947	106.938	-1	0				106.937	0	0						
3004 0518	101.892	101.891	0	0				101.893	2	1						
3004 0519	101.809	101.808	0	0				101.810	2	1						
3004 0520	101.822	101.822	0	0				101.823	2	1						
3004 0521	101.761	101.761	0	0				101.762	1	1						
3004 0522	101.796	101.796	1	0				101.797	1	0						
3004 0523	101.869	101.870	0	0				101.870	1	1						
3004 0524	101.821	101.822	1	0				101.822	1	1						
3004 0525	101.840	101.824	1	0				101.825	1	1						
3004 0526	101.979	101.979	0	0				103.000	0	0						
3004 0527	106.956	106.956	-1	-1				106.957	2	1						
3004 0528	106.943	106.943	-1	0				106.945	2	1						
3004 0529	106.932	106.932	-2	0				106.933	2	1						
3004 0530	106.937	106.937	-1	0				106.939	2	1						
3004 0531	102.996	102.996	1	0				102.997	1	1						
3004 0532	103.000	103.000	1	0				103.000	0	0						
3004 0533	103.008	103.008	1	0				103.009	0	1						
3004 0534	102.976	102.976	1	0				102.978	1	1						
3004 0535	101.795	101.794	1	0				101.795	1	1						
3004 0536	101.819	101.819	1	0				101.820	1	1						
3004 0537	101.818	101.818	1	0				101.818	1	1						
3004 0538	101.794	101.794	1	0				101.794	1	1						

monitoring table



Joint Venture

project: C310 Thames Tunnel  
structure: TW SOS 1 - 3

No. of reading	13. following		14. following		15. following		16. following		17. following		18. following	
	baseline	19/03/2013	11/03/2013	12/07/2013	13/03/2013	14/03/2013	15/03/2013	16/03/2013	17/03/2013	18/03/2013		
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501	103.275	0	103.267	0	103.268	0	103.267	0	103.267	0	103.267	0
3004 0502	103.238	0	103.234	0	103.234	0	103.234	0	103.234	0	103.233	0
3004 0503	103.150	0	103.150	0	103.149	-1	103.148	-1	103.148	0	103.148	0
3004 0504	103.118	0	103.118	0	103.117	-1	103.116	-2	103.116	0	103.116	0
3004 0505	103.100	0	103.100	0	103.099	-1	103.099	0	103.099	0	103.099	0
3004 0506	102.996	1	102.982	-2	102.980	-2	102.980	-2	102.980	0	102.980	0
3004 0507	102.964	2	103.248	-1	103.248	1	103.248	0	103.248	0	103.248	0
3004 0508	102.972	-1	103.228	-1	103.229	1	103.229	0	103.229	0	103.229	0
3004 0509	102.972											
3004 0511	107.025		107.026	0	107.026	0	107.025	0	107.025	0	107.023	-2
3004 0512	107.000		107.001	0	107.001	0	107.001	-1	107.000	-1	106.998	-2
3004 0513	106.967		106.968	0	106.967	0	106.967	0	106.966	-1	106.964	-2
3004 0514	107.007		107.008	0	107.007	-1	107.007	-1	107.006	-1	107.004	-3
3004 0515	107.038		107.039	0	107.039	-1	107.037	-1	107.037	0	107.035	-1
3004 0516	106.944		106.942	0	106.942	0	106.940	-1	106.940	0	106.940	-1
3004 0517	106.926		106.926	0	106.927	0	106.926	0	106.926	0	106.925	-1
3004 0518	106.957		106.957	0	106.957	0	106.957	-1	106.957	0	106.956	-1
3004 0519	106.947		106.937	0	106.938	1	106.937	-1	106.937	0	106.936	-1
3004 0521	101.892		101.893	0	101.893	0	101.892	0	101.893	1	101.892	-1
3004 0522	101.809		101.809	-1	101.810	0	101.810	0	101.810	1	101.809	-1
3004 0523	101.822		101.823	0	101.823	0	101.822	0	101.823	1	101.822	-1
3004 0524	101.761		101.762	-1	101.762	0	101.761	0	101.762	0	101.760	-1
3004 0525	101.796		101.797	0	101.797	0	101.796	-1	101.796	0	101.796	-1
3004 0526	101.869		101.870	0	101.871	0	101.869	-2	101.870	1	101.869	-1
3004 0527	101.821		101.822	0	101.822	0	101.821	-1	101.821	0	101.821	0
3004 0528	101.840		101.825	0	101.825	0	101.824	-1	101.825	1	101.824	0
3004 0529	101.979											
3004 0541	106.956		106.957	0	106.956	-1	106.955	-1	106.955	0	106.953	-1
3004 0542	106.943		106.944	0	106.943	-1	106.943	-1	106.943	-1	106.940	-2
3004 0543	106.932		106.933	0	106.932	-1	106.932	-1	106.931	-1	106.929	-2
3004 0544	106.937		106.938	0	106.937	-1	106.937	0	106.936	-1	106.935	-1
3004 0545	102.996		102.997	-1	102.997	0	102.996	0	102.996	0	102.996	0
3004 0546	103.000		103.000	0	103.001	0	102.999	-1	103.000	0	102.999	0
3004 0547	103.008		103.009	0	103.009	0	103.008	-1	103.008	0	103.008	0
3004 0548	102.976		102.977	0	102.977	0	102.976	-1	102.976	0	102.976	0
3004 0549	101.795		101.795	-1	101.795	0	101.794	-1	101.795	1	101.794	-1
3004 0550	101.819		101.819	-1	101.819	0	101.819	-1	101.819	0	101.819	0
3004 0551	101.818		101.818	-1	101.818	0	101.817	-1	101.817	0	101.817	0
3004 0552	101.794		101.794	-1	101.794	1	101.793	-1	101.794	1	101.794	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: TW SOS 1 - 3

No. of reading date	18/02/2013		19/02/2013		20/02/2013		21/02/2013		22/02/2013		23/02/2013		24/02/2013	
	baseline elevation	deviation from last/ baseline	baseline elevation	deviation from last/ baseline	baseline elevation	deviation from last/ baseline	baseline elevation	deviation from last/ baseline	baseline elevation	deviation from last/ baseline	baseline elevation	deviation from last/ baseline	baseline elevation	deviation from last/ baseline
3004 0501	103.275	0	103.287	-7										
3004 0502	103.238	1	103.234	-4										
3004 0503	103.150	0	103.148	-1										
3004 0504	103.118	0	103.116	-2										
3004 0505	103.100	0	103.099	-1										
3004 0506	102.996	0	102.980	-2										
3004 0507	102.964	0	102.948	-1										
3004 0508	102.972	0	102.929	-1										
3004 0509	102.972													
3004 0511	107.025	1	107.024	1	107.025	0	107.025	0	107.025	0	107.025	0	107.025	0
3004 0512	107.000	1	106.999	1	106.999	0	106.999	0	106.999	0	106.999	0	106.999	0
3004 0513	106.967	1	106.965	2	106.965	0	106.965	0	106.965	0	106.965	0	106.965	0
3004 0514	107.007	1	107.005	2	107.006	0	107.006	0	107.006	0	107.006	0	107.006	0
3004 0515	107.038	1	107.036	2	107.036	0	107.036	0	107.036	0	107.036	0	107.036	0
3004 0516	106.944	0	106.940	4	106.940	0	106.940	0	106.940	0	106.940	0	106.940	0
3004 0517	106.926	0	106.925	1	106.925	0	106.925	0	106.925	0	106.925	0	106.925	0
3004 0518	106.957	0	106.956	1	106.956	1	106.956	1	106.956	1	106.956	1	106.956	1
3004 0519	106.947	0	106.936	1	106.937	0	106.937	0	106.937	0	106.937	0	106.937	0
3004 0521	101.892	0	101.892	0	101.892	0	101.892	0	101.892	0	101.892	0	101.892	0
3004 0522	101.809	1	101.808	1	101.809	1	101.809	1	101.809	1	101.809	1	101.809	1
3004 0523	101.822	0	101.822	0	101.822	0	101.822	0	101.822	0	101.822	0	101.822	0
3004 0524	101.761	0	101.760	1	101.761	1	101.761	1	101.761	1	101.761	1	101.761	1
3004 0525	101.796	0	101.795	1	101.796	1	101.796	1	101.796	1	101.796	1	101.796	1
3004 0526	101.869	0	101.869	0	101.870	1	101.868	1	101.868	1	101.869	1	101.869	1
3004 0527	101.821	0	101.821	0	101.821	0	101.820	1	101.820	1	101.821	0	101.821	0
3004 0528	101.840	0	101.824	0	101.825	1	101.824	1	101.824	1	101.824	0	101.824	0
3004 0529	101.979													
3004 0541	106.956	1	106.954	2	106.955	0	106.955	1	106.955	1	106.955	1	106.955	1
3004 0542	106.943	1	106.942	1	106.942	0	106.942	0	106.942	0	106.942	0	106.942	0
3004 0543	106.932	1	106.931	1	106.931	0	106.931	0	106.931	0	106.931	0	106.931	0
3004 0544	106.937	1	106.936	1	106.936	0	106.936	0	106.936	0	106.936	0	106.936	0
3004 0545	102.996	0	102.995	1	102.996	0	102.995	1	102.995	1	102.995	0	102.995	0
3004 0546	103.000	0	102.999	1	102.999	0	102.999	0	102.999	0	102.999	0	102.999	0
3004 0547	103.008	0	103.008	0	103.007	0	103.007	0	103.007	0	103.007	0	103.007	0
3004 0548	102.976	0	102.976	0	102.976	1	102.976	1	102.976	1	102.976	0	102.976	0
3004 0549	101.795	0	101.794	1	101.794	0	101.794	0	101.794	0	101.794	0	101.794	0
3004 0550	101.819	0	101.818	1	101.819	1	101.818	1	101.818	1	101.818	0	101.818	0
3004 0551	101.818	0	101.817	1	101.818	1	101.817	1	101.817	1	101.817	0	101.817	0
3004 0552	101.794	0	101.793	1	101.793	0	101.793	0	101.793	0	101.793	0	101.793	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: TW SOS 1 - 3

No. of reading	25. following		26. following		27. following		28. following		29. following		30. following	
	baseline	25.03.2013	27.03.2013	27.03.2013	02.04.2013	11.04.2013	11.04.2013	21.05.2013	15.06.2013			
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
3004 0501	103.275	103.266	-3	103.266	0	103.258	2	103.258	-2	103.266	-8	
3004 0502	103.238	103.233	0	103.233	0	103.234	2	103.234	-2	103.232	-6	
3004 0503	103.150	103.147	0	103.147	0	103.149	2	103.147	-2	103.147	-3	
3004 0504	103.118	103.115	0	103.115	0	103.116	1	103.115	-2	103.115	-3	
3004 0505	103.100	103.097	-1	103.098	1	103.100	2	103.099	-2	103.099	-2	
3004 0506	102.996	102.979	0	102.980	0	102.981	1	102.981	0	103.150	new Baseline	
3004 0507	102.964	103.247	0	103.247	0	103.249	2	103.246	-3	103.246	-3	
3004 0508	102.972	103.228	1	103.228	0	103.229	1	103.227	-2	103.227	-3	
3004 0509	102.972	107.024	0	107.025	1	107.025	0	107.025	0	107.024	-1	
3004 0511	107.025	107.024	0	107.025	1	107.025	0	107.025	0	107.024	-1	
3004 0512	107.000	106.963	-2	106.963	0	106.959	-4	106.958	-1	106.972	new Baseline	
3004 0513	106.967	107.007	0	107.007	1	107.006	-1	107.005	-1	107.005	-2	
3004 0514	107.007	107.037	0	107.038	1	107.037	1	107.036	0	107.036	0	
3004 0515	106.944	106.940	-1	106.941	1	106.940	-1	106.940	0	106.940	-4	
3004 0516	106.926	106.925	-1	106.927	1	106.925	-1	106.926	0	106.926	0	
3004 0517	106.926	106.956	-1	106.956	2	106.957	-1	106.956	0	106.956	0	
3004 0518	106.957	106.937	0	106.938	1	106.937	-1	106.937	0	106.937	0	
3004 0519	106.947	101.892	0	101.892	0	101.891	0	101.892	1	101.891	-1	
3004 0521	101.892	101.892	0	101.891	0	101.892	1	101.892	1	101.891	-1	
3004 0522	101.809	101.809	0	101.808	-1	101.809	1	101.809	0	101.808	-1	
3004 0523	101.822	101.822	0	101.821	-1	101.821	0	101.821	-1	101.820	-2	
3004 0524	101.761	101.761	0	101.760	-1	101.760	0	101.761	1	101.760	-1	
3004 0525	101.796	101.796	0	101.795	-1	101.795	0	101.795	0	101.795	0	
3004 0526	101.869	101.870	0	101.869	-1	101.868	-1	101.870	2	101.868	-2	
3004 0527	101.821	101.821	0	101.821	-1	101.821	0	101.821	0	101.821	0	
3004 0528	101.840	101.825	1	101.824	-1	101.824	0	101.824	0	101.824	0	
3004 0529	101.979	106.955	0	106.955	1	106.955	-1	106.954	0	106.954	-2	
3004 0541	106.956	106.942	0	106.943	0	106.942	-1	106.942	0	106.942	-2	
3004 0542	106.943	106.932	0	106.932	1	106.931	-1	106.931	-1	106.931	-2	
3004 0543	106.932	106.936	0	106.937	1	106.936	-1	106.936	0	106.936	0	
3004 0544	106.937	102.996	0	102.996	1	102.995	-1	102.996	1	102.995	-1	
3004 0545	102.996	103.000	1	103.000	1	102.999	-1	102.999	0	103.000	1	
3004 0546	103.000	103.008	0	103.009	1	103.007	-1	103.008	0	103.008	0	
3004 0547	103.008	102.976	0	102.977	1	102.976	-1	102.977	1	102.976	-1	
3004 0548	102.976	101.795	1	101.794	-1	101.794	0	101.794	0	101.794	0	
3004 0549	101.795	101.819	0	101.819	0	101.819	0	101.819	1	101.819	1	
3004 0550	101.819	101.818	0	101.818	0	101.817	-1	101.817	0	101.817	0	
3004 0551	101.818	101.817	0	101.817	-1	101.817	-1	101.817	1	101.817	1	
3004 0552	101.794	101.794	0	101.794	0	101.794	-1	101.794	0	101.793	-1	

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: TW SOS 1 - 3

No. of reading	baseline		31. following		32. following		33. following		34. following		35. following		36. following		
	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
	15/12/2012														
	20/01/2013														
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501		103.275		103.267	0	-7	103.267	0	-7	103.267	0	-8	103.267	1	-7
3004 0502		103.238		103.233	0	-5	103.233	1	-5	103.233	0	-5	103.233	1	-5
3004 0503		103.150		103.147	0	-3	103.147	0	-2	103.147	-1	-3	103.147	0	-2
3004 0504		103.118		103.115	0	-3	103.115	0	-3	103.115	-1	-3	103.115	1	-3
3004 0505		103.100		103.098	0	-2	103.098	0	-1	103.098	-1	-2	103.098	0	-2
3004 0506		102.996		103.150	0	0	103.150	0	0	103.149	-1	-1	103.150	0	-1
3004 0507		102.964		103.247	0	-3	103.246	-1	-3	103.245	-1	-5	103.245	0	-4
3004 0508		102.972		103.228	1	-3	103.227	-1	-4	103.226	-1	-4	103.226	0	-4
3004 0509		102.972													
3004 0511		107.025		107.024	0	-1	107.024	0	-1	107.025	0	0	107.024	0	-1
3004 0512		107.000		106.972	0	0	106.972	0	0	106.972	0	0	106.972	1	1
3004 0513		106.967		106.959	1	-8	106.959	0	-8	106.959	0	-8	106.959	1	-8
3004 0514		107.007		107.006	0	-1	107.005	-1	-2	107.004	-1	-3	107.004	-1	-2
3004 0515		107.038		107.037	0	-1	107.036	0	-2	107.036	0	-2	107.035	1	-2
3004 0516		106.944		106.940	0	-4	106.939	-1	-5	106.938	-1	-5	106.939	0	-5
3004 0517		106.926		106.926	0	0	106.926	0	-1	106.924	0	-1	106.924	0	-2
3004 0518		106.957		106.956	0	0	106.956	0	-1	106.956	-1	-1	106.956	0	-1
3004 0519		106.947		106.936	-1	-1	106.936	-1	-1	106.936	-1	-2	106.935	0	-2
3004 0521		101.892		101.891	1	0	101.892	1	0	101.892	1	0	101.891	-1	-1
3004 0522		101.809		101.808	0	-1	101.807	-1	-2	101.808	1	0	101.808	0	0
3004 0523		101.822		101.820	0	-2	101.821	0	-2	101.821	0	-1	101.821	0	-1
3004 0524		101.761		101.759	0	-2	101.759	0	-2	101.760	1	-1	101.760	0	-1
3004 0525		101.796		101.795	0	-1	101.795	-1	-2	101.796	1	0	101.795	0	-1
3004 0526		101.869		101.868	0	-1	101.869	1	0	101.870	1	1	101.870	0	1
3004 0527		101.821		101.821	0	-1	101.820	0	-1	101.821	1	0	101.822	1	0
3004 0528		101.840		101.824	0	0	101.824	-1	-1	101.824	0	0	101.825	1	0
3004 0529		101.979													
3004 0541		106.956		106.955	-1	-1	106.954	0	-2	106.954	0	-2	106.955	1	-2
3004 0542		106.943		106.942	-1	-2	106.941	-1	-2	106.942	1	-1	106.942	1	-2
3004 0543		106.992		106.991	-1	-1	106.991	0	-1	106.991	0	-1	106.990	-1	-2
3004 0544		106.937		106.936	-1	-1	106.937	0	-1	106.936	-1	-1	106.936	1	-1
3004 0545		102.996		102.995	0	-1	102.995	0	-1	102.996	1	0	102.996	0	-1
3004 0546		103.000		102.999	0	-1	102.999	0	-1	103.000	1	0	103.000	0	-1
3004 0547		103.008		103.008	0	0	103.008	0	-1	103.008	1	0	103.008	0	0
3004 0548		102.976		102.976	0	0	102.976	0	-1	102.977	1	0	102.976	-1	-1
3004 0549		101.795		101.794	0	-1	101.793	0	-1	101.794	1	0	101.795	0	0
3004 0550		101.819		101.818	0	-1	101.818	0	-1	101.819	1	0	101.819	0	0
3004 0551		101.818		101.817	0	-1	101.816	0	-1	101.818	1	0	101.818	0	1
3004 0552		101.794		101.793	0	0	101.793	0	-1	101.794	1	0	101.794	0	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: TW SOS 1 - 3


No. of reading	baseline		37. following		38. following		39. following		40. following		41. following		42. following	
	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
	15/12/2012	103.275		103.266	-1	103.267	1	103.267	1	103.267	1	103.266	0	-9
3004 0501	15/12/2012	103.238		103.232	-1	103.232	1	103.232	1	103.232	1	103.232	0	-6
3004 0502	15/12/2012	103.150		103.146	-2	103.146	0	103.146	0	103.146	0	103.146	0	-4
3004 0503	15/12/2012	103.118		103.113	-2	103.114	1	103.114	1	103.114	1	103.113	-1	-5
3004 0504	15/12/2012	103.100		103.097	-2	103.097	1	103.097	1	103.097	1	103.097	-1	-3
3004 0505	15/12/2012	102.996		103.148	-2	103.148	2	103.148	2	103.148	2	103.148	-1	-2
3004 0506	15/12/2012	102.964		103.244	-2	103.245	1	103.245	1	103.245	1	103.244	-1	-6
3004 0507	15/12/2012	102.972		103.223	-3	103.226	3	103.226	3	103.226	3	103.224	-2	-6
3004 0508	15/12/2012	102.972		107.024	0	107.024	0	107.024	0	107.024	0	107.024	1	-1
3004 0509	15/12/2012	107.025		106.972	0	106.972	0	106.972	0	106.972	0	106.971	-1	0
3004 0510	15/12/2012	107.000		106.959	0	106.959	0	106.959	0	106.959	0	106.958	-1	-8
3004 0511	15/12/2012	106.967		107.007	0	107.007	0	107.007	0	107.007	0	107.004	-3	-3
3004 0512	15/12/2012	107.007		107.006	0	107.006	0	107.006	0	107.006	0	107.005	0	-3
3004 0513	15/12/2012	107.038		106.939	-5	106.939	-1	106.939	-1	106.939	-1	106.938	-1	-6
3004 0514	15/12/2012	106.944		106.925	1	106.925	1	106.925	1	106.925	1	106.924	-1	-2
3004 0515	15/12/2012	106.926		106.957	0	106.957	0	106.957	0	106.957	0	106.955	-1	-1
3004 0516	15/12/2012	106.957		106.936	0	106.936	0	106.936	0	106.936	0	106.935	-1	-2
3004 0517	15/12/2012	106.947		101.892	0	101.892	1	101.892	1	101.892	1	101.891	-1	-1
3004 0518	15/12/2012	101.892		101.808	0	101.808	0	101.808	0	101.808	0	101.808	0	-1
3004 0519	15/12/2012	101.809		101.820	-1	101.821	0	101.821	0	101.821	0	101.820	-1	-1
3004 0520	15/12/2012	101.822		101.759	-1	101.760	0	101.760	0	101.760	0	101.759	-1	-4
3004 0521	15/12/2012	101.761		101.795	0	101.795	0	101.795	0	101.795	0	101.794	-1	-2
3004 0522	15/12/2012	101.796		101.869	0	101.869	0	101.869	0	101.869	0	101.869	0	-1
3004 0523	15/12/2012	101.821		101.821	1	101.820	0	101.820	0	101.820	0	101.820	0	-2
3004 0524	15/12/2012	101.840		101.823	0	101.824	0	101.824	0	101.824	0	101.822	-1	-3
3004 0525	15/12/2012	101.979		106.954	0	106.954	0	106.954	0	106.954	0	106.954	0	-2
3004 0526	15/12/2012	106.956		106.941	-1	106.941	-1	106.941	-1	106.941	-1	106.941	0	-3
3004 0527	15/12/2012	106.943		106.931	0	106.931	0	106.931	0	106.931	0	106.931	1	-2
3004 0528	15/12/2012	106.932		106.935	-1	106.935	0	106.935	0	106.935	0	106.935	0	-2
3004 0529	15/12/2012	106.937		102.995	0	102.995	0	102.995	0	102.995	0	102.994	-1	-2
3004 0530	15/12/2012	102.996		103.000	-1	103.000	0	103.000	0	103.000	0	103.000	0	-2
3004 0531	15/12/2012	103.000		102.998	-1	102.998	0	102.998	0	102.998	0	102.998	0	-2
3004 0532	15/12/2012	103.008		103.007	-1	103.007	0	103.007	0	103.007	0	103.007	0	-1
3004 0533	15/12/2012	102.976		102.976	0	102.976	0	102.976	0	102.976	0	102.975	0	-1
3004 0534	15/12/2012	102.976		101.794	0	101.794	0	101.794	0	101.794	0	101.794	0	-1
3004 0535	15/12/2012	101.795		101.817	0	101.817	0	101.817	0	101.817	0	101.817	1	-1
3004 0536	15/12/2012	101.819		101.817	0	101.817	0	101.817	0	101.817	0	101.818	1	-1
3004 0537	15/12/2012	101.818		101.817	0	101.817	0	101.817	0	101.817	0	101.817	0	-1
3004 0538	15/12/2012	101.794		101.793	0	101.793	0	101.793	0	101.793	0	101.793	0	-1

Joint Venture

project: C310 Thames Tunnel

structure: TW SOS 1 - 3

No. of reading	43. following		44. following		45. following		46. following		47. following		48. following		49. following	
	baseline 15/02/2013 12/07/2013	14/09/2013	19/09/2013	06/09/2013	16/09/2013	18/10/2013	06/02/2014	07/02/2014	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501	103.275	103.266 0 -9		103.266 -1 -9		103.267 2 -8		103.267 2 -8		Point Lost				
3004 0502	103.238	103.231 -1 -7		103.231 -1 -7		points lost due new datum		points lost due new datum						
3004 0503	103.150	103.145 -1 -5		103.144 -1 -5		103.113 2 -5		103.112 -1.44 -6.39						
3004 0504	103.118	103.112 -1 -6		103.111 -1 -7		103.097 3 -3		103.096 -1.50 -4.32						
3004 0505	103.100	103.096 -1 -5		103.095 -1 -6		103.149 1 -2		103.147 -1.41 -3.28						
3004 0506	102.995	103.148 -1 -3		103.147 0 -3		Point Damaged								
3004 0507	102.964	103.243 -1 -6		103.242 -1 -7		103.224 0 -6		103.223 -0.86 -7.32						
3004 0508	102.972	103.224 0 -6		103.224 0 -7		point lost		point lost						
3004 0509	102.972					107.024 1 -1		107.024 1 -1						
3004 0510	107.025	107.023 -2 -2		107.023 -1 -2		106.971 1 -1		106.971 0 -1						
3004 0512	107.000	106.970 -2 -2		106.970 -1 -2		106.957 2 -9		106.956 -1 -10						
3004 0513	106.967	106.956 -3 -11		106.956 -2 -11		107.004 3 -3		107.004 -1 -4						
3004 0514	107.007	107.002 -3 -5		107.001 -3 -6		107.035 2 -3		107.033 -1 -5						
3004 0515	107.038	107.033 -2 -5		107.032 -3 -6		106.937 2 -7		106.937 0 -7						
3004 0516	106.944	106.936 -2 -8		106.935 -3 -9		106.954 1 -3		106.952 -1 -4						
3004 0517	106.826	106.922 -2 -4		106.925 -3 -9		106.954 1 -3		106.954 0 -3						
3004 0518	106.957	106.954 -2 -3		106.953 -2 -4		106.934 1 -3		106.934 0 -3						
3004 0519	106.947	106.934 -1 -3		106.934 -1 -4		101.988 -2 -4		101.988 -2 -4						
3004 0521	101.892					101.899 1 -2		101.899 1 -2						
3004 0522	101.809					101.805 -1 -3		101.805 -1 -3						
3004 0523	101.822					101.811 -2 -11		101.811 -2 -11						
3004 0524	101.761					101.751 -3 -10		101.753 2 -8						
3004 0525	101.796					101.790 -1 -7		101.791 2 -5						
3004 0526	101.869					101.864 0 -5		101.865 1 -4						
3004 0527	101.821					101.817 -1 -5		101.820 3 -2						
3004 0528	101.840					101.818 -2 -3		101.819 -1 -2						
3004 0529	101.840					101.818 -3 -6		101.819 3 -5						
3004 0541	106.956	106.952 -2 -5		106.951 -1 -5		point lost		point lost						
3004 0542	106.943	106.939 -2 -5		106.938 0 -5		106.953 2 -3		106.953 0 -4						
3004 0543	106.932	106.928 -3 -4		106.927 -1 -5		106.940 2 -3		106.940 -1 -4						
3004 0544	106.937	106.933 -2 -4		106.932 -1 -5		106.929 2 -3		106.929 -1 -3						
3004 0545	102.966					106.935 2 -3		106.934 -1 -3						
3004 0546	103.000					102.994 0 -2		102.994 -1 -2						
3004 0547	103.008					102.998 0 -2		102.998 -1 -3						
3004 0548	102.976					103.004 -2 -4		103.006 -1 -2						
3004 0549	101.795					102.975 -1 -2		102.975 2 -1						
3004 0550	101.819					101.791 -2 -4		101.794 3 -1						
3004 0551	101.818					101.815 -2 -4		101.817 3 -1						
3004 0552	101.784					101.814 -2 -4		101.817 3 -1						
						101.792 -1 -1		101.793 0 -1						

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 20**  
**Southern Outfall Sewer 2**

Learning Legacy Document



**monitoring asset**

**Southern Outfall Sewer (SOS) + Pumpstation**

reference monitoring drawing:

C310-HTM-C-DWG-CR146-ST004-70001

name of monitoring section:

Southern Outfall Sewer (SOS) 2

sensor type:

manual levelling studs

chainage:

9+450

point no.:

3004 0511 - 3004 0519

trigger values:

[mm]

green: +12  
-12

amber: +15  
-15

red: +18  
-18

reference document for trigger values:

Management Plan for Control of Ground Movement

EB-no.:

C310-HTM-Z-STP-CR148-50058

Appendix:

AAA

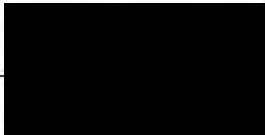
**monitoring data**

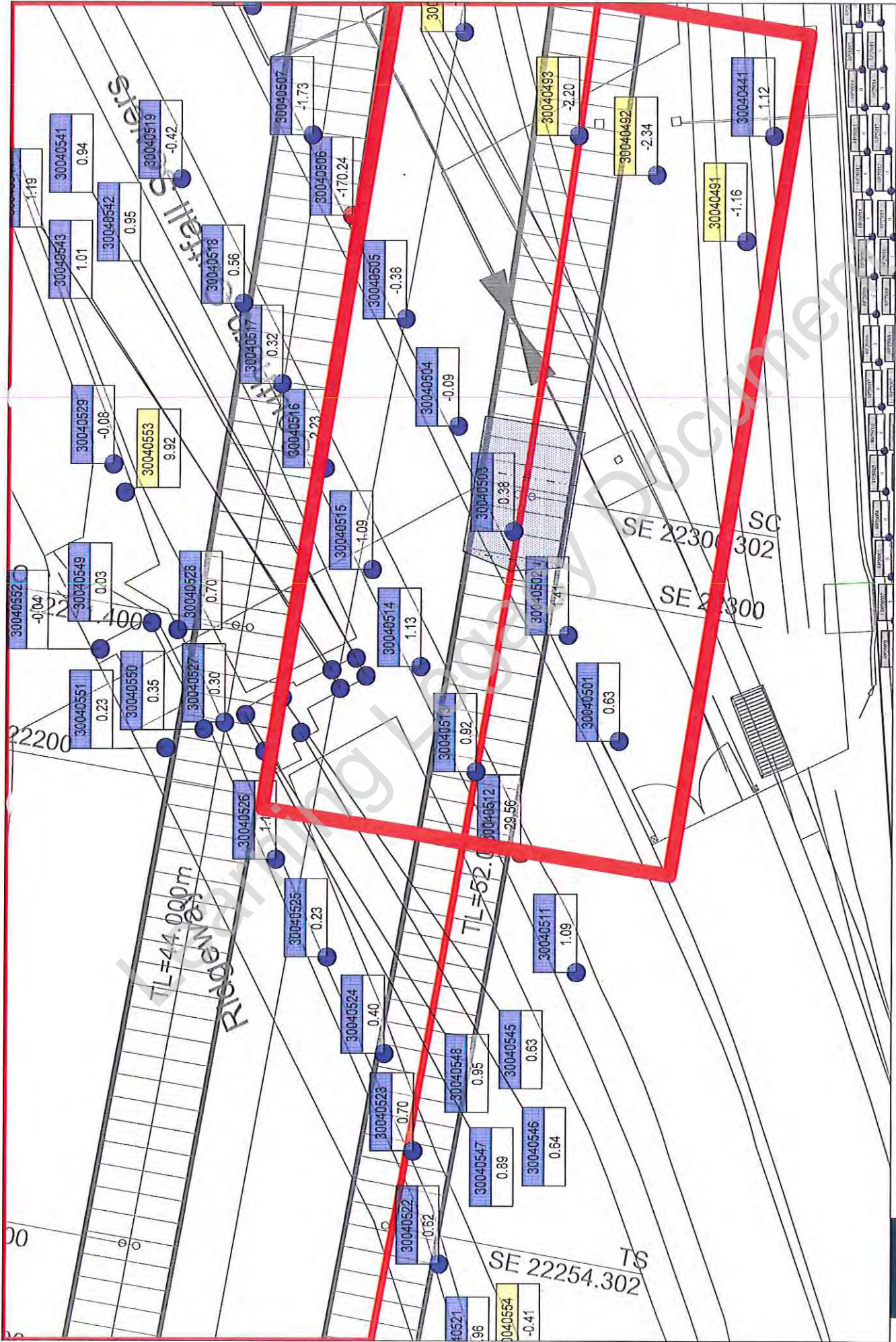
	date	max. value	point no.	comments
baseline	12/12/2012	0		
	12/01/2013	0		
TBM 1	start ZOI	12/03/13	0.92	3004 0513
	end ZOI	16/03/13	-1.96	3004 0513
TBM 2	start ZOI	18/06/13	-0.42	3004 0517
	end ZOI	22/06/13	-1.86	3004 0517
longterm	07/02/14	-7.33	3004 0516	last reading post tunneling, Cross section not longer measurable
Evaluation of any potential residual risks	<input checked="" type="checkbox"/>	No residual risk since the Works have been completed by HMJV		
	<input type="checkbox"/>	Yes, residual risk (see comment below)		

**summary / comments**

Several point where destroyed and re-baselined during the time of monitoring.  
Overall, none of the points reached any trigger value.  
All points (including shallow datums) were destroyed due to Road reinstatement done by Others, shortly after last readings taken Feb 2014.  
Shallow datums demonstrate rate of change within specifications. Therefore C310 (HMJV & CRL) agreed to not reinstate and not continue monitoring.

date / signature: 27/03/2015

print name: 



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive WB  
 current values: 12.03.2013 07:00

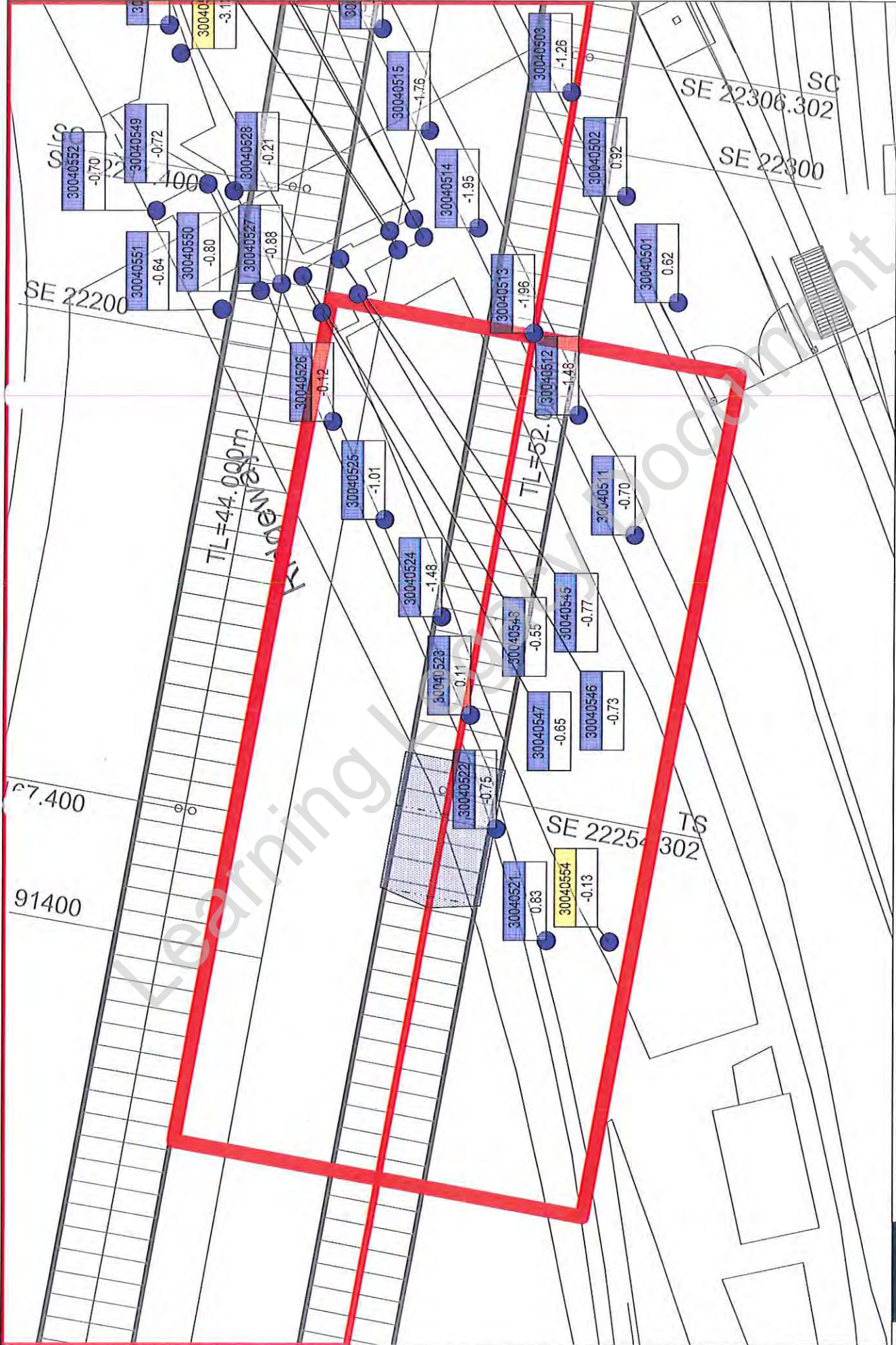


Point: 30040513



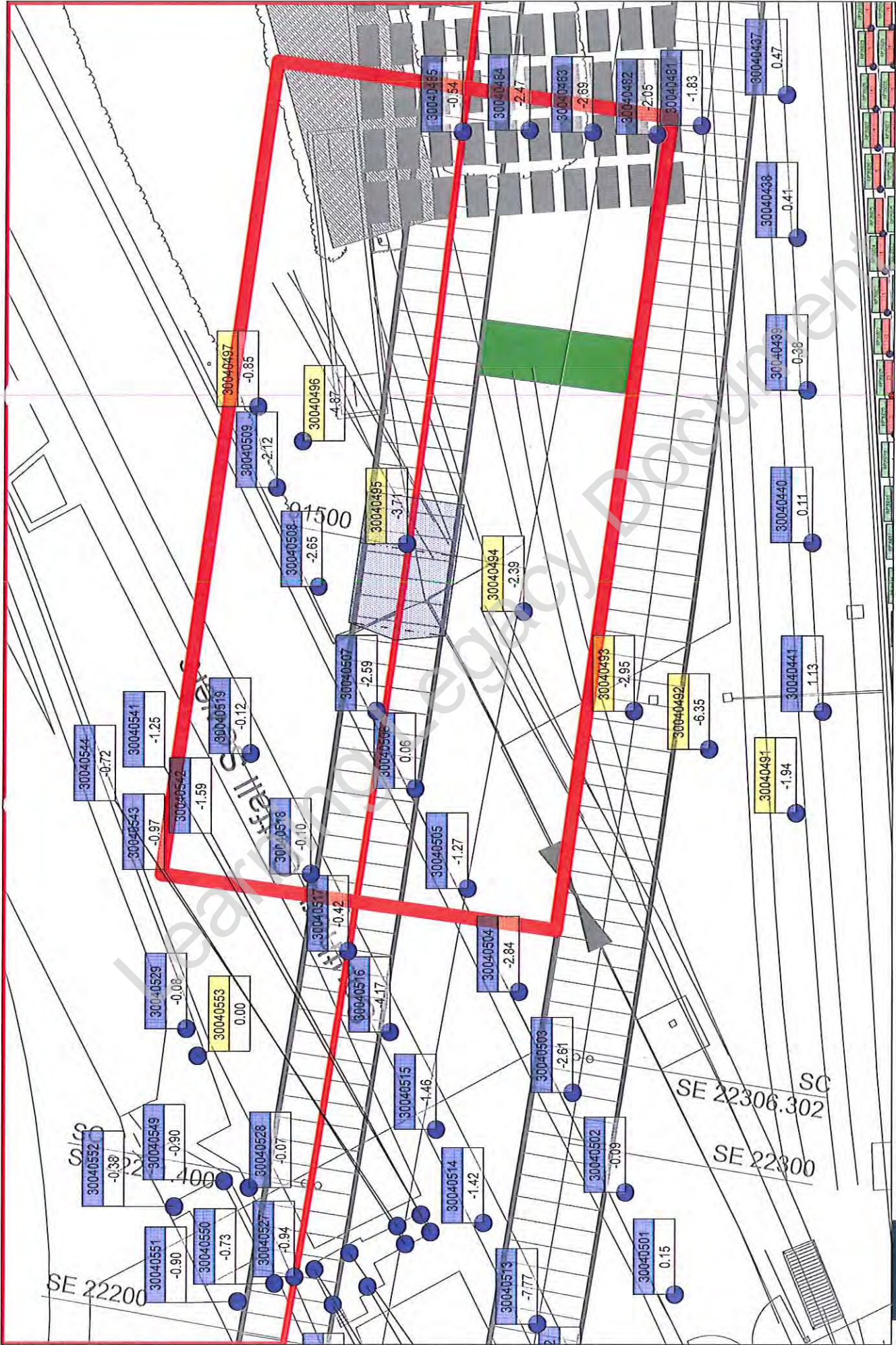
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Southern Outfall Sewer 2 12.12.2012 - 07.02.2014  
date: 21.07.2014 16:18 current values: 21.07.2014 16:09





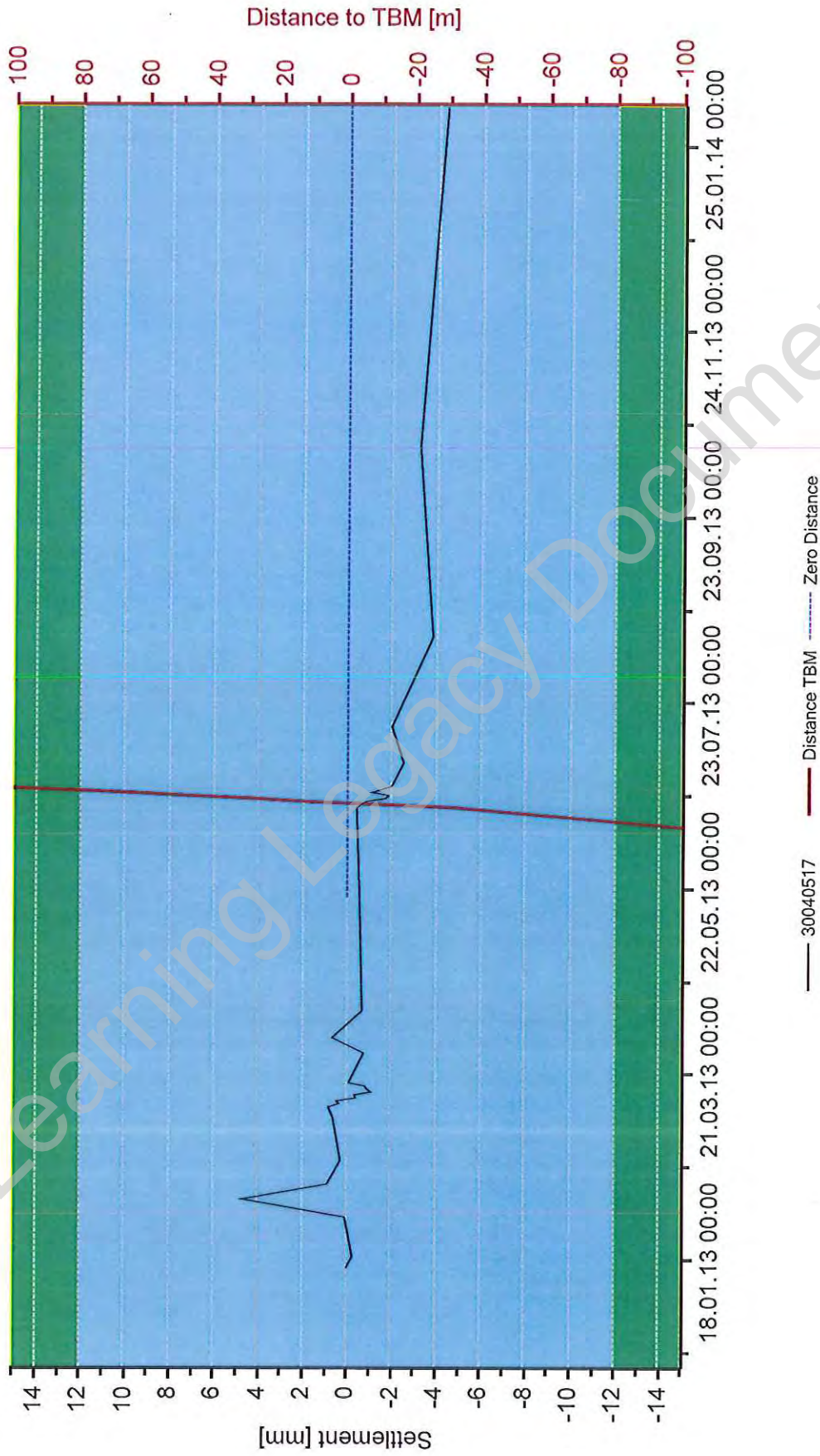
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 16.03.2013 09:00



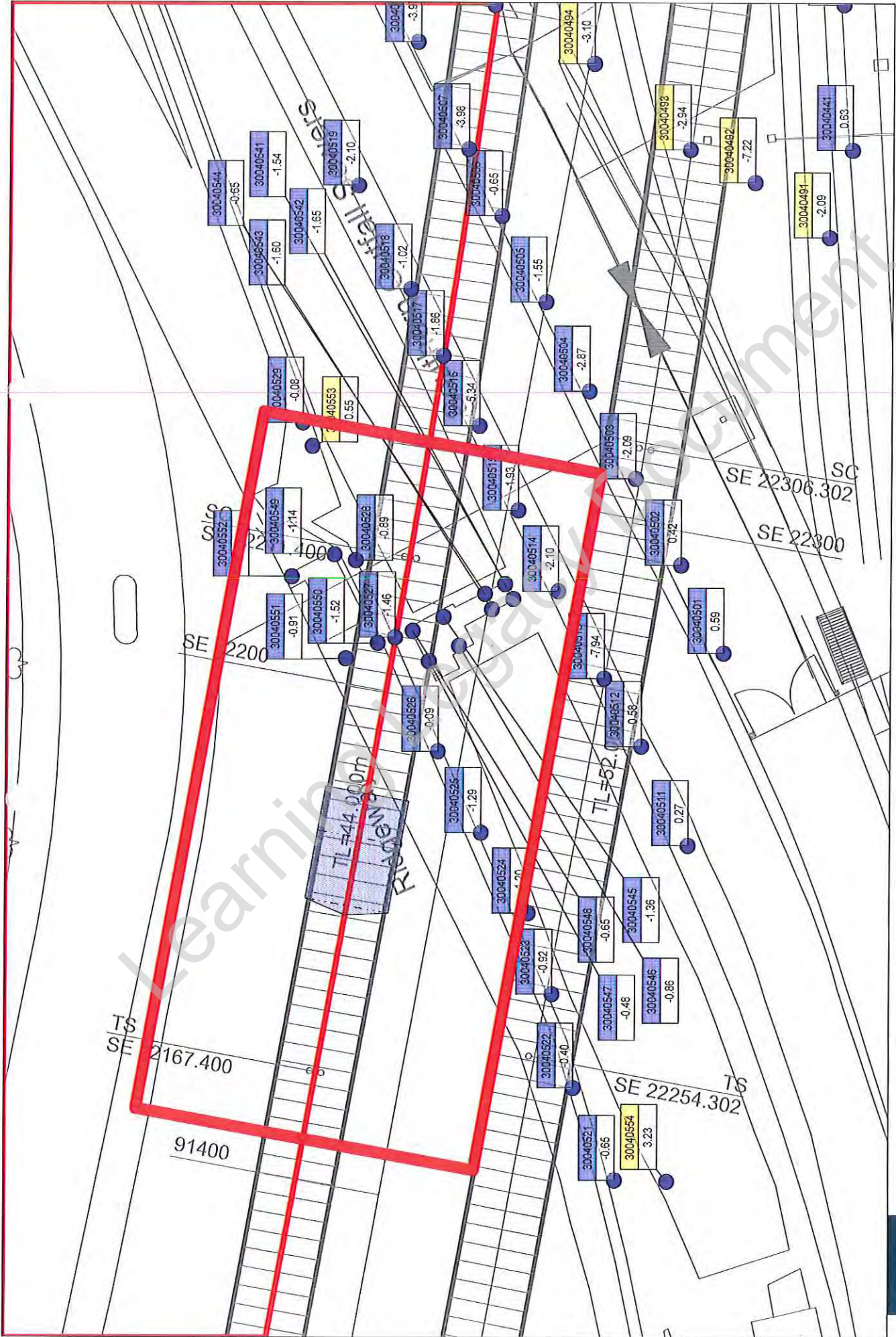


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 18.06.2013 17:48

Point: 30040517



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Southern Outfall Sewer 2 12.12.2012 - 07.02.2014  
date: 29.07.2014 08:46 current values: 29.07.2014 08:28



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 22.06.2013 09:00



# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: TW SOS 1 - 3

No. of reading	1. following		2. following		3. following		4. following		5. following		6. following	
	baseline elevation	12/01/2013	19/01/2013	01/02/2013	06/02/2013	07/02/2013	12/02/2013	12/02/2013	12/02/2013	12/02/2013	12/02/2013	12/02/2013
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501	105.275	0	103.267	new Baseline	103.269	2	103.269	0	2	103.267	-2	0
3004 0502	103.238	0	103.233	new Baseline	103.235	2	103.235	0	2	103.234	-1	2
3004 0503	103.150	1	103.149	-2	103.150	2	103.150	0	1	103.150	0	1
3004 0504	103.118	1	103.117	-1	103.119	1	103.119	0	1	103.118	0	0
3004 0505	103.100	1	103.099	-2	103.101	2	103.101	0	1	103.100	0	0
3004 0506	102.986	0	102.985	-1	102.987	1	102.987	0	0	102.987	0	0
3004 0507	102.964	0	102.963	-2	102.965	2	102.965	0	0	102.964	-1	0
3004 0508	102.972	0	102.971	-2	102.972	2	102.972	0	0	102.972	0	0
3004 0509	102.972	0	102.970	-2	102.972	2	102.972	0	0	102.972	0	-1
3004 0511	107.025	0	107.025	0	107.030	5	107.030	5	5	107.026	-4	1
3004 0512	107.000	0	107.000	0	107.005	5	107.005	5	5	107.001	-4	1
3004 0513	106.967	0	106.966	0	106.971	5	106.971	5	5	106.968	-3	1
3004 0514	107.007	0	107.006	-1	107.012	6	107.012	6	5	107.009	-3	1
3004 0515	107.038	0	107.037	-1	107.042	6	107.042	6	4	107.039	-3	1
3004 0516	106.944	0	106.944	0	106.949	5	106.949	5	5	106.945	-4	1
3004 0517	106.926	0	106.926	0	106.931	5	106.931	5	5	106.927	-4	1
3004 0518	106.957	0	106.956	0	106.961	4	106.961	4	5	106.958	-4	1
3004 0519	106.947	0	106.947	0	106.937	new Baseline	106.942	5	5	106.942	0	1
3004 0521	101.892	0	101.891	-1	101.892	0	101.892	0	0	101.891	-1	0
3004 0522	101.809	0	101.808	-1	101.809	0	101.808	-1	0	101.808	-1	-1
3004 0523	101.822	0	101.821	-1	101.822	0	101.822	0	0	101.821	0	-1
3004 0524	101.761	0	101.761	-1	101.761	0	101.761	0	0	101.761	0	0
3004 0525	101.796	0	101.797	0	101.795	-1	101.797	1	0	101.796	-1	-1
3004 0526	101.869	1	101.869	-2	101.869	-2	101.869	-2	0	101.870	1	0
3004 0527	101.821	0	101.821	-1	101.822	1	101.821	-1	0	101.822	1	0
3004 0528	101.840	0	101.824	new Baseline	101.824	0	101.824	0	0	101.820	-1	-1
3004 0529	101.979	0	101.979	0	101.979	0	101.979	0	0	101.979	0	0
3004 0541	106.956	0	106.956	0	106.955	-1	106.961	5	5	106.957	-4	1
3004 0542	106.943	0	106.943	0	106.943	-1	106.948	5	5	106.948	0	5
3004 0543	106.932	0	106.932	0	106.931	-1	106.937	5	5	106.933	-3	1
3004 0544	106.937	0	106.937	0	106.937	-1	106.942	5	5	106.942	0	5
3004 0545	102.996	0	102.997	0	102.996	-1	102.997	0	0	102.996	-1	-1
3004 0546	103.000	0	102.999	-1	103.000	0	103.000	0	0	102.999	-1	0
3004 0547	103.008	0	103.009	-1	103.008	-1	103.008	-1	0	103.009	1	0
3004 0548	102.976	0	102.977	1	102.976	-1	102.977	1	0	102.976	-1	0
3004 0549	101.795	0	101.795	0	101.794	-1	101.794	-1	0	101.795	1	0
3004 0550	101.819	0	101.820	1	101.819	-1	101.819	-1	0	101.819	1	0
3004 0551	101.818	0	101.817	0	101.817	0	101.817	0	0	101.817	0	-1
3004 0552	101.794	0	101.794	0	101.793	0	101.793	0	0	101.794	1	0



monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: TW-SOS 1-3

No. of reading date	baseline elevation	7. following 20/02/2013		8. following 05/03/2013		9. following 06/03/2013		10. following 07/03/2013		11. following 08/03/2013		12. following 09/03/2013			
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline		
3004 0501	105.275	105.268	1	1	105.269	1	2	103.267	0	0	103.267	0	0		
3004 0502	103.238	103.234	0	2	103.235	1	3	103.234	0	1	103.234	0	1		
3004 0503	103.150	103.151	1	1	103.151	1	2	-103.150	0	0	103.150	0	0		
3004 0504	103.118	103.119	1	1	103.119	0	1	103.118	0	0	103.118	0	0		
3004 0505	103.100	103.101	1	1	103.102	0	1	103.100	0	0	103.101	1	1		
3004 0506	102.986	102.988	-8	-8	102.982	new Baseline	102.981	-1	-1	102.981	1	0	102.981	-1	0
3004 0507	102.964				103.249	new Baseline	103.245	-1	-1	103.248	0	-1	103.247	-2	-1
3004 0508	102.972	102.971	-1	-1	103.230	new Baseline	103.229	-2	-2	103.229	0	-1	103.228	-1	-1
3004 0509	102.972	102.970	-2	-2											
3004 0511	107.025	107.025	-1	0				107.026	1	1					
3004 0512	107.000	107.001	-1	0				107.002	1	1					
3004 0513	106.967	106.967	-1	0				106.968	1	1					
3004 0514	107.007	107.007	-1	0				107.009	2	1					
3004 0515	107.038	107.038	-2	0				107.039	2	1					
3004 0516	106.944	106.941	-4	-3				106.942	1	-2					
3004 0517	106.926	106.926	-1	0				106.927	0	1					
3004 0518	106.957	106.957	-1	0				106.957	0	1					
3004 0519	106.947	106.938	-1	0				106.937	0	0					
3004 0521	101.892	101.891	0	0				101.893	2	1					
3004 0522	101.809	101.808	0	0				101.810	2	1					
3004 0523	101.822	101.822	0	0				101.823	2	1					
3004 0524	101.761	101.761	0	0				101.762	1	1					
3004 0525	101.796	101.796	1	0				101.797	1	0					
3004 0526	101.869	101.870	0	0				101.870	1	1					
3004 0527	101.821	101.822	1	0				101.822	1	1					
3004 0528	101.840	101.824	1	0				101.825	1	1					
3004 0529	101.979														
3004 0541	106.956	106.956	-1	-1				106.957	2	1					
3004 0542	106.943	106.943	-1	0				106.945	2	1					
3004 0543	106.932	106.932	-2	0				106.933	2	1					
3004 0544	106.937	106.937	-1	0				106.939	2	1					
3004 0545	102.996	102.996	1	0				102.997	1	1					
3004 0546	103.000	103.000	1	0				103.000	0	0					
3004 0547	103.008	103.008	1	0				103.009	0	1					
3004 0548	102.976	102.976	1	0				102.978	1	1					
3004 0549	101.795	101.794	1	0				101.795	1	1					
3004 0550	101.819	101.819	1	0				101.820	1	1					
3004 0551	101.819	101.818	1	0				101.818	1	1					
3004 0552	101.794	101.794	1	0				101.794	1	1					

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: TW SOS 1 - 3

No. of reading date	13. following 10/03/2013		14. following 11/03/2013		15. following 12/03/2013		16. following 13/03/2013		17. following 14/03/2013		18. following 15/03/2013	
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501	103.275	0	103.267	0	103.258	0	103.257	0	103.257	0	103.257	0
3004 0502	103.238	0	103.234	0	103.234	0	103.234	0	103.233	0	103.233	0
3004 0503	103.150	0	103.149	0	103.149	-1	103.148	-1	103.148	0	103.148	0
3004 0504	103.118	0	103.118	0	103.117	-1	103.116	-2	103.116	0	103.116	0
3004 0505	103.100	0	103.100	-1	103.099	-1	103.099	0	103.099	0	103.099	0
3004 0506	102.996	1	102.982	-2	102.980	-2	102.980	0	102.980	0	102.980	0
3004 0507	102.964	2	103.249	-1	103.248	-1	103.248	0	103.248	0	103.248	0
3004 0508	102.972	2	103.228	-1	103.229	1	103.229	0	103.229	0	103.229	0
3004 0509	102.972											
3004 0511	107.025		107.026	0	107.026	0	107.025	0	107.025	0	107.023	-2
3004 0512	107.000		107.001	0	107.001	0	107.001	-1	107.000	-1	106.998	-2
3004 0513	106.967		106.968	0	106.967	0	106.967	-1	106.966	-1	106.964	-2
3004 0514	107.007		107.008	0	107.007	-1	107.007	-1	107.006	-1	107.004	-3
3004 0515	107.038		107.039	0	107.038	-1	107.037	-1	107.037	0	107.035	-1
3004 0516	106.944		106.942	0	106.942	-2	106.940	-4	106.940	-4	106.940	-4
3004 0517	106.926		106.926	0	106.927	0	106.925	-1	106.926	0	106.925	-1
3004 0518	106.957		106.957	0	106.957	0	106.957	-1	106.957	0	106.956	-1
3004 0519	106.947		106.938	0	106.938	1	106.937	-1	106.937	0	106.936	-1
3004 0521	101.892		101.893	0	101.893	0	101.892	0	101.893	1	101.892	-1
3004 0522	101.809		101.809	-1	101.810	0	101.810	0	101.810	1	101.809	-1
3004 0523	101.822		101.823	0	101.823	0	101.822	0	101.823	1	101.822	-1
3004 0524	101.761		101.762	-1	101.762	0	101.761	0	101.762	0	101.760	-1
3004 0525	101.796		101.797	0	101.797	0	101.796	-1	101.796	0	101.796	-1
3004 0526	101.869		101.870	0	101.871	0	101.869	-2	101.870	1	101.869	-1
3004 0527	101.821		101.822	0	101.822	0	101.821	-1	101.821	0	101.821	0
3004 0528	101.840		101.825	0	101.825	0	101.824	-1	101.825	1	101.824	0
3004 0529	101.979											
3004 0541	106.956		106.957	0	106.956	-1	106.955	-1	106.955	0	106.953	-3
3004 0542	106.943		106.944	0	106.943	-1	106.943	-1	106.942	-1	106.940	-2
3004 0543	106.932		106.932	0	106.932	-1	106.932	-1	106.931	-1	106.929	-3
3004 0544	106.937		106.938	0	106.937	-1	106.937	0	106.936	-1	106.935	-1
3004 0545	102.996		102.997	-1	102.997	0	102.996	-1	102.996	0	102.996	0
3004 0546	103.000		103.000	0	103.001	0	102.999	-1	103.000	0	102.999	0
3004 0547	103.008		103.009	0	103.009	0	103.008	-1	103.008	0	103.008	0
3004 0548	102.976		102.977	0	102.977	0	102.976	-1	102.976	0	102.976	0
3004 0549	101.795		101.795	-1	101.795	0	101.794	-1	101.795	1	101.794	-1
3004 0550	101.819		101.819	-1	101.819	0	101.819	-1	101.819	0	101.819	0
3004 0551	101.818		101.818	-1	101.818	0	101.817	-1	101.817	0	101.818	0
3004 0552	101.784		101.784	-1	101.784	1	101.793	-1	101.794	1	101.794	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: TW SOS 1 - 3

No. of reading	19. following		20. following		21. following		22. following		23. following		24. following		
	baseline	16/03/2013	17/03/2013	18/03/2013	19/03/2013	20/03/2013	21/03/2013	22/03/2013	23/03/2013	24/03/2013			
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501	103.275	103.267	0 -7							103.269	2 -6		
3004 0502	103.238	103.234	1 -4							103.232	-1 -6		
3004 0503	103.150	103.148	0 -1							103.147	-1 -2		
3004 0504	103.118	103.116	0 -2							103.115	-1 -3		
3004 0505	103.100	103.099	0 -1							103.098	-1 -2		
3004 0506	102.996	102.980	0 -2							102.979	-1 -3		
3004 0507	102.964	103.248	0 -1							103.247	-1 -2		
3004 0508	102.972	103.229	0 -1							103.227	-2 -3		
3004 0509	102.972												
3004 0511	107.025	107.024	1 -1	107.025	0 0	107.025	0 0						
3004 0512	107.000	106.999	1 -1	106.999	0 -1	107.000	1 -1						
3004 0513	106.967	106.965	1 -2	106.965	0 -2	106.965	0 -1						
3004 0514	107.007	107.005	1 -2	107.006	0 -2	107.006	0 -1						
3004 0515	107.038	107.036	1 -2	107.036	0 -2	107.037	1 -1						
3004 0516	106.944	106.940	0 -4	106.940	0 -4	106.940	1 -4						
3004 0517	106.926	106.925	0 -1	106.925	0 -1	106.926	1 0						
3004 0518	106.957	106.956	0 -1	106.956	1 0	106.957	1 0						
3004 0519	106.947	106.936	0 -1	106.937	0 -1	106.937	1 0						
3004 0521	101.892	101.892	0 1	101.892	0 0	101.892	0 0	101.892	0 0	101.892	0 0	101.892	0 0
3004 0522	101.809	101.808	-1 -1	101.809	1 0	101.809	0 0	101.808	0 0	101.808	0 0	101.808	0 0
3004 0523	101.822	101.822	0 0	101.822	0 0	101.822	0 0	101.821	0 -1	101.821	0 -1	101.821	0 -1
3004 0524	101.761	101.760	-1 -1	101.761	1 0	101.761	0 -1	101.760	0 -1	101.760	0 -1	101.760	0 -1
3004 0525	101.796	101.795	0 -1	101.796	1 0	101.795	-1 -1	101.795	0 -1	101.795	0 -1	101.795	0 -1
3004 0526	101.869	101.869	0 0	101.870	1 1	101.868	-1 -1	101.869	0 0	101.869	1 0	101.869	0 0
3004 0527	101.821	101.821	0 -1	101.821	0 0	101.820	-1 -1	101.821	0 -1	101.821	0 -1	101.821	0 0
3004 0528	101.840	101.824	0 0	101.825	1 1	101.824	-1 0	101.824	0 0	101.824	0 0	101.824	0 0
3004 0529	101.979												
3004 0541	106.956	106.954	1 -2	106.955	0 -2	106.955	1 -1						
3004 0542	106.943	106.942	1 -2	106.942	0 -2	106.942	0 -1						
3004 0543	106.932	106.931	1 -1	106.931	0 -1	106.931	0 -1						
3004 0544	106.937	106.936	1 -1	106.936	0 -1	106.936	0 -1						
3004 0545	102.996	102.995	0 -1	102.996	0 0	102.995	-1 -1	102.995	0 -1	102.995	0 -1	102.995	0 -1
3004 0546	103.000	102.999	0 -1	102.999	0 0	102.999	-1 -1	102.999	0 -1	102.999	0 -1	102.999	0 -1
3004 0547	103.008	103.008	0 -1	103.007	0 -1	103.007	0 -1	103.008	0 -1	103.008	0 -1	103.008	0 0
3004 0548	102.978	102.978	0 -1	102.978	1 0	102.978	-1 -1	102.978	1 0	102.978	0 0	102.978	0 0
3004 0549	101.795	101.794	0 -1	101.794	0 0	101.794	0 0	101.794	0 0	101.794	0 0	101.794	0 -1
3004 0550	101.819	101.818	0 -1	101.819	1 0	101.818	0 -1	101.818	0 -1	101.818	0 -1	101.818	0 0
3004 0551	101.818	101.817	-1 -1	101.818	1 0	101.817	-1 -1	101.817	0 0	101.817	0 0	101.817	0 0
3004 0552	101.794	101.793	-1 -1	101.793	0 0	101.794	0 0	101.794	0 0	101.794	0 0	101.793	-1 0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: TW SOS 1 - 3

No. of reading	baseline elevation	25. following		26. following		27. following		28. following		29. following		30. following	
		date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline
3004 0501	103.275	103.275			103.266	0	-9	103.268	2	-7	103.266	-2	-8
3004 0502	103.238	103.238			103.233	0	-5	103.234	2	-4	103.232	-2	-6
3004 0503	103.150	103.150			103.147	0	-3	103.149	2	-1	103.147	-2	-3
3004 0504	103.118	103.118			103.115	0	-3	103.116	1	-2	103.115	-2	-3
3004 0505	103.100	103.097	-1	-3	103.098	1	-2	103.100	2	0	103.099	-2	-2
3004 0506	102.986	102.979	0	-3	102.980	0	-3	102.981	1	-2	103.150	new Baseline	
3004 0507	102.964	103.247	0	-2	103.247	0	-2	103.249	2	0	103.246	-3	-3
3004 0508	102.972	103.228	1	-2	103.228	0	-3	103.229	1	-1	103.227	-2	-3
3004 0509	102.972	102.972			102.972			102.972			102.972		
3004 0511	107.025	107.024	0	-1	107.025	1	0	107.025	0	0	107.024	-1	-1
3004 0512	107.000	106.983	-2	-4	106.983	0	-4	106.983	-4	-8	106.972	new Baseline	
3004 0513	106.967	107.006	0	-1	107.007	1	-1	107.008	-1	-1	106.958	-1	-9
3004 0514	107.007	107.037	0	-1	107.038	1	0	107.037	-1	-1	107.036	0	-2
3004 0515	107.038	106.940	-1	-4	106.941	-3	-3	106.940	-1	-4	106.940	0	-4
3004 0516	106.944	106.925	-1	-1	106.927	1	1	106.925	-1	-1	106.926	0	-1
3004 0517	106.926	106.956	-1	0	106.956	2	1	106.957	-1	0	106.956	0	0
3004 0518	106.957	106.937	0	-1	106.938	1	0	106.937	-1	0			
3004 0519	106.947	101.892	0	1	101.892	0	0	101.892	1	1	101.891	-1	0
3004 0521	101.892	101.892	0	0	101.891	0	0	101.892	1	1	101.891	-1	0
3004 0522	101.809	101.809	0	0	101.808	0	-1	101.809	1	0	101.808	-1	-1
3004 0523	101.822	101.822	0	0	101.821	-1	-1	101.822	1	0	101.821	-1	-1
3004 0524	101.761	101.761	0	0	101.760	-1	-1	101.761	1	0	101.760	-1	-2
3004 0525	101.796	101.796	0	-1	101.796	0	-1	101.795	0	-1	101.796	0	-1
3004 0526	101.869	101.870	0	0	101.869	0	1	101.868	-1	-1	101.870	2	1
3004 0527	101.821	101.821	0	-1	101.821	0	0	101.821	0	-1	101.821	1	0
3004 0528	101.840	101.825	1	0	101.824	0	1	101.824	0	0	101.824	0	0
3004 0529	101.979												
3004 0541	106.956	106.955	0	-1	106.955	1	-1	106.955	-1	-1	106.954	0	-2
3004 0542	106.943	106.942	0	-1	106.942	0	-1	106.942	-1	-1	106.942	0	-2
3004 0543	106.932	106.931	0	-1	106.932	1	0	106.931	-1	-1	106.931	-1	-2
3004 0544	106.937	106.936	0	-1	106.937	1	0	106.936	-1	-1	106.936	0	-1
3004 0545	102.986	102.986	0	0	102.986	1	0	102.985	0	-1	102.986	1	0
3004 0546	103.000	102.999	0	0	102.999	1	-1	102.999	0	-1	102.999	0	0
3004 0547	103.006	103.008	0	0	103.009	0	0	103.007	-1	-1	103.008	0	0
3004 0548	102.976	102.976	0	0	102.977	1	1	102.976	-1	0	102.977	1	0
3004 0549	101.795	101.795	1	0	101.795	0	0	101.794	-1	-1	101.794	0	0
3004 0550	101.819	101.819	0	0	101.819	0	0	101.819	0	0	101.819	1	0
3004 0551	101.818	101.817	0	0	101.817	0	0	101.817	-1	-1	101.818	1	0
3004 0552	101.794	101.794	0	0	101.794	0	0	101.793	0	0	101.794	0	0

monitoring table



Joint Venture

project: C310 Thames Tunnel  
structure: TW SOS 1-3

No. of reading	baseline elevation	31. following 17/06/2013		32. following 18/06/2013		33. following 19/06/2013		34. following 20/06/2013		35. following 21/06/2013		36. following 22/06/2013	
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501	103.275			103.267	1 -8	103.267	0 -7	103.267	0 -7	103.267	0 -8	103.267	1 -7
3004 0502	103.238			103.233	0 -5	103.233	1 -5	103.233	0 -5	103.233	-1 -6	103.233	1 -5
3004 0503	103.150			103.147	0 -3	103.147	0 -2	103.147	-1 -3	103.147	0 -3	103.148	1 -2
3004 0504	103.118			103.115	1 -3	103.116	0 -3	103.115	-1 -3	103.115	0 -3	103.115	1 -3
3004 0505	103.100			103.098	0 -2	103.099	0 -1	103.099	0 -1	103.098	0 -2	103.099	0 -2
3004 0506	102.986			103.150	0 0	103.150	0 0	103.149	-1 -1	103.150	-1 -1	103.150	0 -1
3004 0507	102.964			103.247	0 -3	103.246	-1 -3	103.245	-1 -3	103.245	-1 -4	103.245	0 -4
3004 0508	102.972			103.228	1 -3	103.227	-1 -4	103.226	-1 -4			103.226	0 -4
3004 0511	107.025					107.024	0 -1	107.025	0 0	107.024	0 -1	107.025	1 0
3004 0512	107.000					106.972	0 0	106.972	0 0	106.972	0 0	106.972	1 1
3004 0513	106.967			106.959	1 -8	106.959	0 -8	106.959	0 -8	106.958	-1 -9	106.959	1 -8
3004 0514	107.007			107.006	0 -1	107.005	-1 -2	107.005	0 -2	107.004	-1 -3	107.005	1 -2
3004 0515	107.038			107.037	0 -1	107.036	0 -2	107.036	0 -2	107.035	-1 -3	107.036	1 -2
3004 0516	106.944			106.940	0 -4	106.940	0 -4	106.939	-1 -5	106.938	-1 -6	106.939	0 -5
3004 0517	106.926			106.926	0 0	106.925	0 -1	106.925	0 -1	106.924	-1 -2	106.924	0 -2
3004 0518	106.957			106.956	0 0	106.957	0 0	106.956	-1 -1	106.956	0 -1	106.956	0 -1
3004 0519	106.947					106.936	-1 -1	106.936	0 -1	106.936	-1 -2	106.935	0 -2
3004 0521	101.892			101.890	-1 -1	101.891	1 0	101.892	1 1	101.892	0 0	101.891	-1 -1
3004 0522	101.809			101.808	0 -1	101.807	-1 -2	101.808	1 0	101.808	0 -1	101.808	0 0
3004 0523	101.822			101.820	0 -2	101.820	0 -2	101.821	1 -1	101.821	0 -1	101.821	0 -1
3004 0524	101.761			101.759	0 -2	101.759	0 -2	101.760	1 -1	101.760	1 -1	101.760	0 -1
3004 0525	101.796			101.795	0 -1	101.795	-1 -2	101.796	1 0	101.795	0 0	101.795	-1 -1
3004 0526	101.869			101.868	0 -1	101.869	1 0	101.870	1 1	101.870	0 1	101.869	-1 0
3004 0527	101.821			101.821	0 -1	101.820	0 -1	101.821	1 0	101.822	1 0	101.820	-2 -1
3004 0528	101.840			101.824	0 0	101.824	-1 -1	101.824	0 0	101.825	1 0	101.823	-1 -1
3004 0529	101.979												
3004 0541	106.956			106.955	-1 -1	106.954	0 -2	106.954	0 -2	106.954	0 -2	106.955	1 -2
3004 0542	106.943			106.942	-1 -2	106.941	-1 -2	106.942	1 -1	106.941	-1 -3	106.942	1 -2
3004 0543	106.932			106.931	-1 -1	106.931	0 -1	106.931	0 -1	106.930	-1 -2	106.931	-1 -2
3004 0544	106.937			106.936	-1 -1	106.937	0 -1	106.936	0 -1	106.936	-1 -1	106.936	1 -1
3004 0545	102.996			102.995	0 -1	102.995	0 -1	102.995	0 0	102.996	0 0	102.995	-1 -1
3004 0546	103.000			102.999	0 -1	102.999	0 -1	103.000	1 0	103.000	0 0	102.999	-1 -1
3004 0547	103.008			103.008	0 0	103.008	0 -1	103.008	1 0	103.008	-1 0	103.008	0 0
3004 0548	102.976			102.976	0 0	102.976	0 -1	102.977	1 0	102.976	0 0	102.976	-1 -1
3004 0549	101.795			101.794	0 -1	101.793	0 -1	101.794	1 0	101.795	0 0	101.793	-1 -1
3004 0550	101.819			101.818	0 -1	101.818	0 -1	101.819	1 0	101.819	0 0	101.819	-1 -2
3004 0551	101.818			101.817	0 -1	101.818	0 -1	101.818	1 0	101.818	1 0	101.817	-2 -1
3004 0552	101.794			101.793	0 0	101.793	0 -1	101.794	1 0	101.794	0 0	101.793	0 0

monitoring table



Joint Venture

Project: C310 Thames Tunnel

structure: TW SOS 1 - 3

No. of reading	baseline		37. following		38. following		39. following		40. following		41. following		42. following		
	date	elevation	date	deviation from last/ baseline	date	deviation from last/ baseline	date	deviation from last/ baseline	date	deviation from last/ baseline	date	deviation from last/ baseline	date	deviation from last/ baseline	
	15/12/2012		23/06/2013		24/06/2013		25/06/2013		02/07/2013		03/07/2013		15/07/2013		
Point No.		elevation		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline	
3004 0501		103.275					103.266	-1	-9	103.267	1	-8	103.266	0	-9
3004 0502		103.238					103.232	-1	-6	103.232	1	-6	103.232	0	-6
3004 0503		103.150					103.146	-2	-4	103.146	0	-3	103.146	0	-4
3004 0504		103.118					103.113	-2	-5	103.114	1	-4	103.113	-1	-5
3004 0505		103.100					103.097	-2	-4	103.097	1	-3	103.097	-1	-3
3004 0506		102.996					103.148	-2	-3	103.149	2	-1	103.148	-1	-2
3004 0507		102.964					103.244	-2	-6	103.245	1	-4	103.244	-1	-6
3004 0508		102.972					103.223	-3	-7	103.226	3	-4	103.224	-2	-6
3004 0509		102.972													
3004 0511		107.025		107.024	-1	-1	107.024	0	-1				107.024	0	-1
3004 0512		107.000		106.972	0	0	106.972	0	0				106.971	-1	-1
3004 0513		106.987		106.959	0	-8	106.958	0	-8				106.958	-1	-9
3004 0514		107.007		107.005	0	-2	107.004	-1	-3				107.004	0	-3
3004 0515		107.038		107.036	0	-2	107.036	-1	-3				107.035	0	-3
3004 0516		106.944		106.939	0	-5	106.938	-1	-6				106.938	0	-6
3004 0517		106.926		106.925	1	-1	106.924	-1	-2				106.924	-1	-3
3004 0518		106.957		106.955	0	-1	106.955	0	-1				106.955	-1	-2
3004 0519		106.947		106.936	0	-2	106.936	0	-1				106.935	-1	-3
3004 0521		101.892		101.891	0	-1	101.892	1	1				101.891	-1	0
3004 0522		101.809		101.808	0	0	101.808	0	0				101.808	0	-1
3004 0523		101.822		101.820	-1	-1	101.821	0	-1				101.820	0	-2
3004 0524		101.781		101.759	-1	-2	101.780	0	-1				101.759	0	-2
3004 0525		101.796		101.795	0	-1	101.795	0	-2				101.795	0	-1
3004 0526		101.869		101.869	0	0	101.869	0	0				101.869	0	0
3004 0527		101.821		101.821	1	1	101.820	0	-1				101.820	0	-2
3004 0528		101.840		101.823	0	-1	101.824	0	-1				101.822	-1	-2
3004 0529		101.979													
3004 0541		106.956		106.954	0	-2	106.954	-1	-3				106.954	0	-3
3004 0542		106.943		106.941	-1	-2	106.941	-1	-3				106.941	0	-2
3004 0543		106.932		106.931	0	-2	106.931	0	-2				106.931	-1	-2
3004 0544		106.937		106.935	-1	-2	106.935	0	-1				106.935	0	-2
3004 0545		102.996		102.995	0	-1	102.995	0	-1				102.995	0	-1
3004 0546		103.000		102.998	-1	-1							102.998	0	-2
3004 0547		103.008		103.007	-1	-1	103.007	0	-1				103.007	-1	-1
3004 0548		102.976		102.976	0	0	102.976	0	-1				102.975	0	-1
3004 0549		101.795		101.794	0	-1	101.794	0	-1				101.794	0	-1
3004 0550		101.819		101.817	0	-2	101.817	0	-2				101.817	-1	-1
3004 0551		101.818		101.817	0	-1	101.817	0	-1				101.818	1	0
3004 0552		101.794		101.793	0	0	101.793	0	-1				101.793	0	-1


monitoring table



Joint Venture

project: C310 Thames Tunnel  
structure: TW SOS 1 - 3

No. of reading	43. following		44. following		45. following		46. following		47. following		48. following		49. following	
	baseline	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
date	15/12/2012 12/01/2013	14/08/2013	19/08/2013	09/09/2013	16/09/2013	19/10/2013	06/02/2014	07/02/2014						
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501	103.275	0 -9	103.266	-1 -9	103.267	2 -8	Point Lost		103.267	2 -8	Point Lost			
3004 0502	103.238	-1 -7	103.231	-1 -7	103.231	-1 -7	point lost due new lammuc		103.231	-1 -7	point lost due new lammuc			
3004 0503	103.150	-1 -5	103.144	-1 -5	103.144	-1 -5			103.144	-1 -5				
3004 0504	103.118	-1 -6	103.112	-1 -6	103.111	-1 -7			103.111	-1 -7				
3004 0505	103.100	-1 -5	103.096	-1 -5	103.095	-1 -6			103.097	3 -3	103.112	-1.44	-6.39	
3004 0506	102.996	-1 -3	103.148	-1 -3	103.147	0 -3			103.097	3 -3	103.096	-1.50	-4.32	
3004 0507	102.964	-1 -6	103.243	-1 -6	103.242	-1 -7			103.148	1 -2	103.147	-1.41	-3.28	
3004 0508	102.972	0 -6	103.224	0 -7	103.224	0 -7			103.244	1 -6	Point Damaged			
3004 0509	102.972		103.224	0 -7	103.224	0 -7			103.224	0 -6	point lost			
3004 0511	107.025	-2 -2	107.023	-1 -2	107.023	-1 -2			point lost		point lost			
3004 0512	107.000	-2 -2	106.970	-2 -2	106.970	-1 -2			107.024	1 -1	107.024	0 -1		
3004 0513	106.967	-3 -11	106.956	-2 -11	106.956	-2 -11			106.971	1 -1	106.971	0 -1		
3004 0514	107.007	-3 -5	107.002	-3 -5	107.001	-3 -6			106.957	2 -9	106.956	-1 -10		
3004 0515	107.038	-2 -8	106.936	-2 -8	107.032	-3 -6			107.004	3 -3	107.004	-1 -4		
3004 0516	106.944	-2 -4	106.922	-2 -4	106.935	-3 -9			107.035	2 -3	107.033	-1 -5		
3004 0517	106.957	-2 -3	106.954	-2 -3	106.953	-2 -4			106.937	2 -7	106.937	0 -7		
3004 0518	106.947	-1 -3	106.934	-1 -3	106.934	-1 -4			106.923	1 -3	106.922	-1 -4		
3004 0519	101.892		101.890	0 -1	101.888	-2 -4			106.954	1 -3	106.954	0 -3		
3004 0521	101.889		101.806	-2 -3	101.805	-1 -3			106.935	1 -3	106.935	0 -3		
3004 0522	101.822		101.813	-5 -9	101.811	-2 -11			101.889	1 -2	101.891	1 -1		
3004 0524	101.761		101.754	-4 -7	101.751	-3 -10			101.806	1 -2	101.807	1 -1		
3004 0525	101.796		101.791	-4 -5	101.790	-1 -7			101.814	3 -8	101.820	6 -2		
3004 0526	101.869		101.864	-3 -5	101.864	0 -5			101.753	2 -8	101.760	6 -2		
3004 0527	101.821		101.818	-2 -3	101.817	-1 -5			101.791	2 -5	101.794	3 -2		
3004 0528	101.840		101.818	-3 -6	101.816	-2 -8			101.865	1 -4	101.868	3 -1		
3004 0529	101.979				101.816	-2 -8			101.820	3 -2	101.819	-1 -2		
3004 0541	106.956	-2 -5	106.952	-2 -5	106.951	-1 -5			point lost		point lost			
3004 0542	106.943	-2 -5	106.939	-2 -5	106.938	0 -5			106.953	2 -3	106.953	0 -4		
3004 0543	106.932	-3 -4	106.928	-3 -4	106.927	-1 -5			106.940	2 -3	106.940	-1 -4		
3004 0544	106.937	-2 -4	106.933	-2 -4	106.932	-1 -5			106.929	2 -3	106.929	-1 -3		
3004 0545	102.996		102.994	0 -2	102.992	-1 -5			106.935	2 -3	106.934	-1 -3		
3004 0546	103.000		102.998	0 -2	102.996	-2 -4			102.995	2 -2	102.994	-1 -2		
3004 0547	103.008		103.006	-1 -2	103.004	-2 -4			102.998	2 -2	102.997	-1 -3		
3004 0548	102.976		102.975	-1 -2	102.973	-2 -4			103.007	3 -1	103.005	-1 -2		
3004 0549	101.795		101.793	-1 -2	101.791	-2 -4			102.975	2 -1	102.974	-1 -2		
3004 0550	101.819		101.817	-1 -2	101.815	-2 -4			101.794	3 -1	101.793	-1 -1		
3004 0551	101.818		101.816	-1 -2	101.814	-2 -4			101.818	3 -1	101.817	-1 -2		
3004 0552	101.794		101.792	-1 -1	101.790	-2 -4			101.816	3 -1	101.816	-1 -2		
			101.792	-1 -1	101.790	-2 -4			101.793	3 0	101.793	0 -1		

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	CROSSRAIL	eB NO	C310-HTM-C-RGN-CR148-50022	Rev	6.0
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 21**  
**Southern Outfall Sewer 3**

Learning Legacy Document



**monitoring asset**

**Southern Outfall Sewer (SOS) + Pumpstation**

reference monitoring drawing: C310-HTM-C-DWG-CR146-ST004-70001

name of monitoring section: Southern Outfall Sewer (SOS) 3

sensor type: manual levelling studs

chainage: 91430 point no.: 3004 0521 - 3004 0529

trigger values: [mm] green: +12 -12 amber: +15 -15 red: +18 -18

reference document for trigger values: Management Plan for Control of Ground Movement

EB-no.: C310-HTM-Z-STP-CR148-50058

Appendix: AAA

**monitoring data**

	date		max. value	point no.	comments
baseline	12/01/13		0.00		
TBM 1	start ZOI	14/03/13	0.36	3004 0523	
	end ZOI	19/03/13	-0.60	3004 0523	breached not any trigger value
TBM 2	start ZOI	20/06/13	-0.41	3004 0527	
	end ZOI	23/06/13	-0.89	3004 0527	breached not any trigger value
longterm	07/02/14		-2.37	3004 0527	last reading post tunneling, Cross section not longer measurable

**Evaluation of any potential residual risks**



**No residual risk**  
since the Works have been completed by HMJV



**Yes, residual risk**  
(see comment below)

**summary / comments**

Several point where destroyed and re-baselined during the time of monitoring.  
Overall, none of the points reached any trigger value.  
Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
Shallow datums and the points of adjacent cross section - SOS 2 - demonstrate that the rate of change is within specifications. Therefore C310 (HMJV & CRL) agreed to not reinstate and not continue monitoring.

date / signature: 01/04/2015

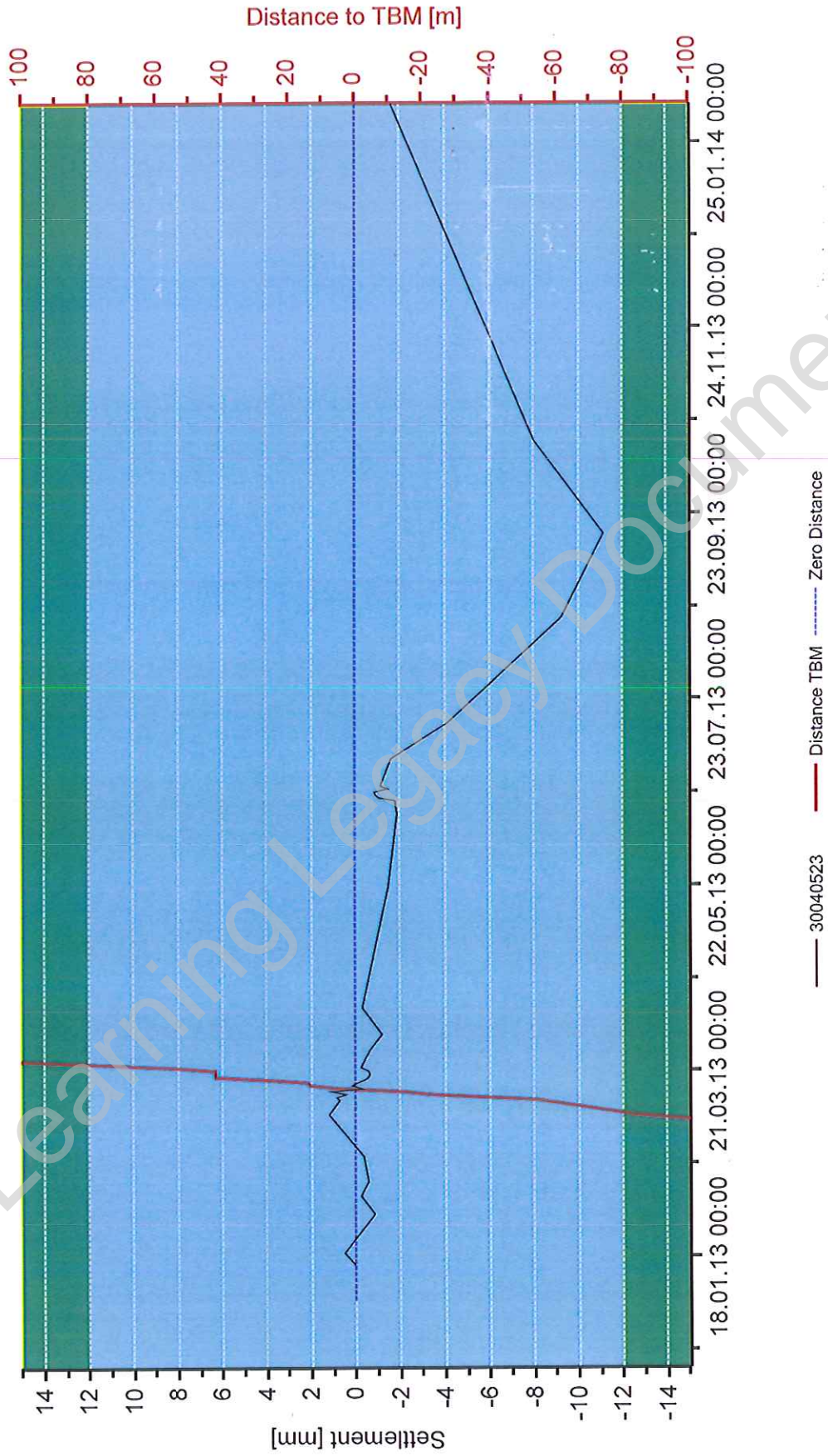
print name:

HMJV project role:

Monitoring & Survey engineer

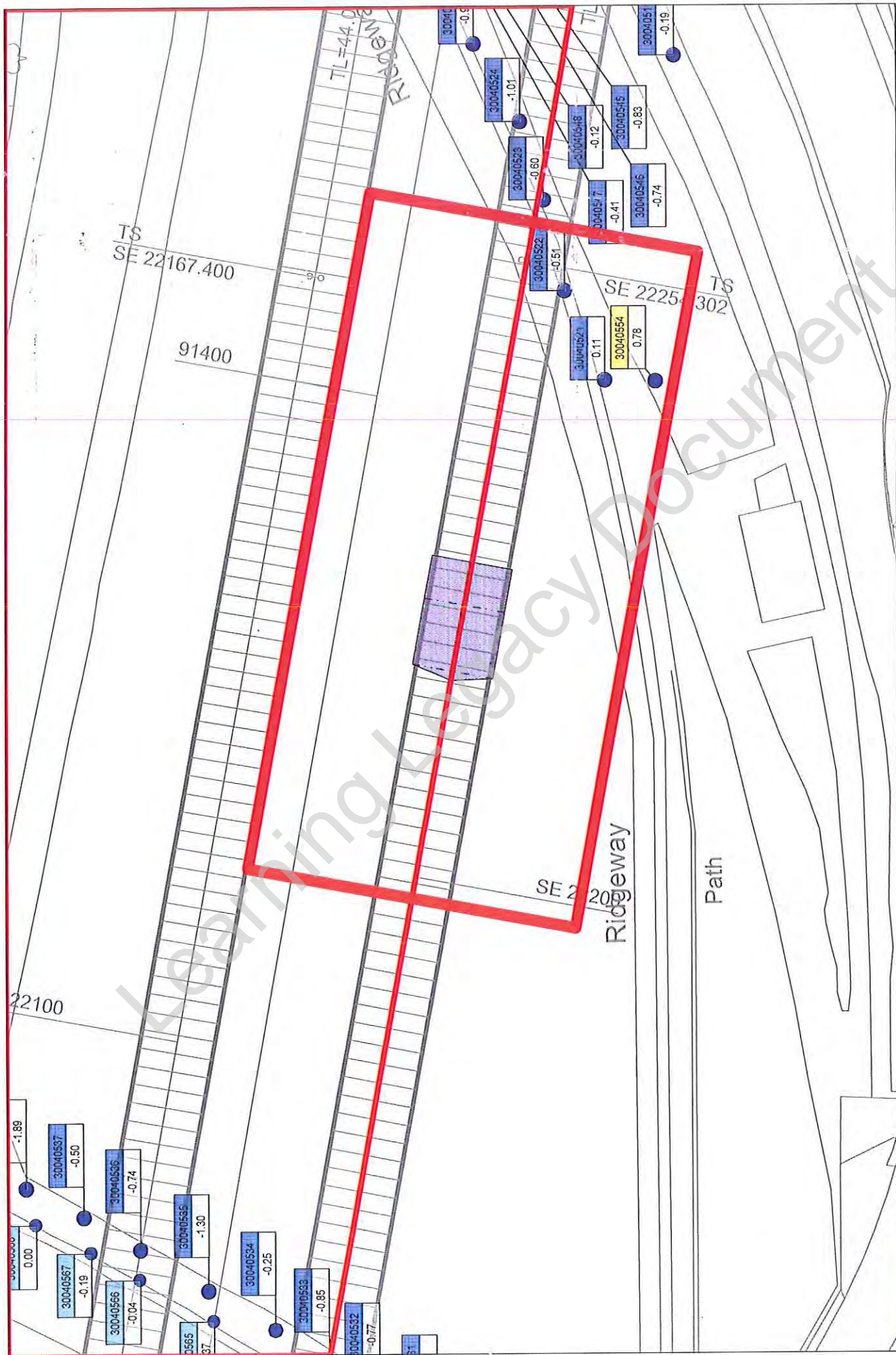


Point: 30040523



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Southern Outfall Sewer 3 12.12.2012 - 07.02.2014  
date: 22.07.2014 09:25 current values: 22.07.2014 09:17



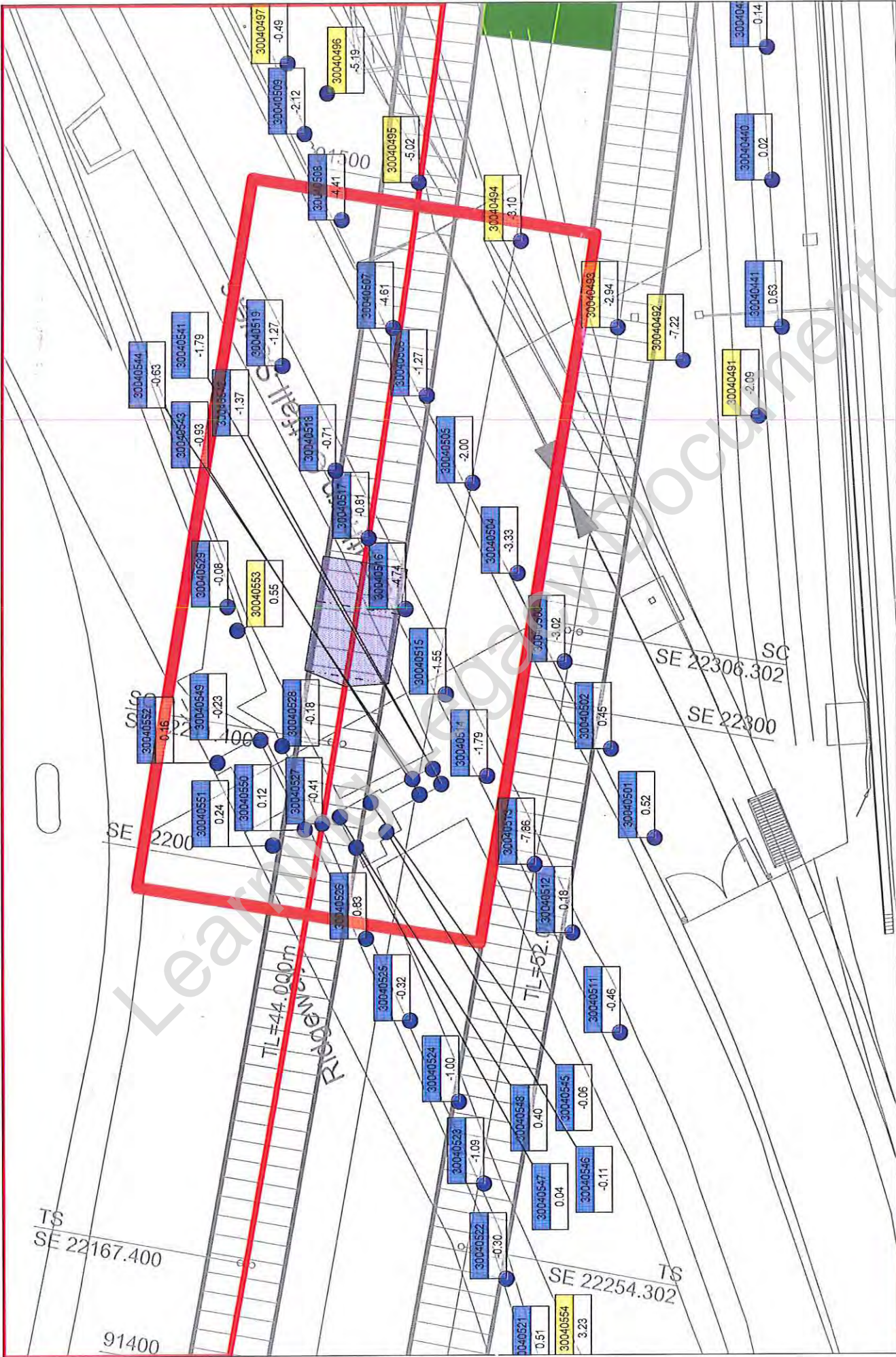


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting

current values: 19.03.2013 09:00





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 20.06.2013 09:00

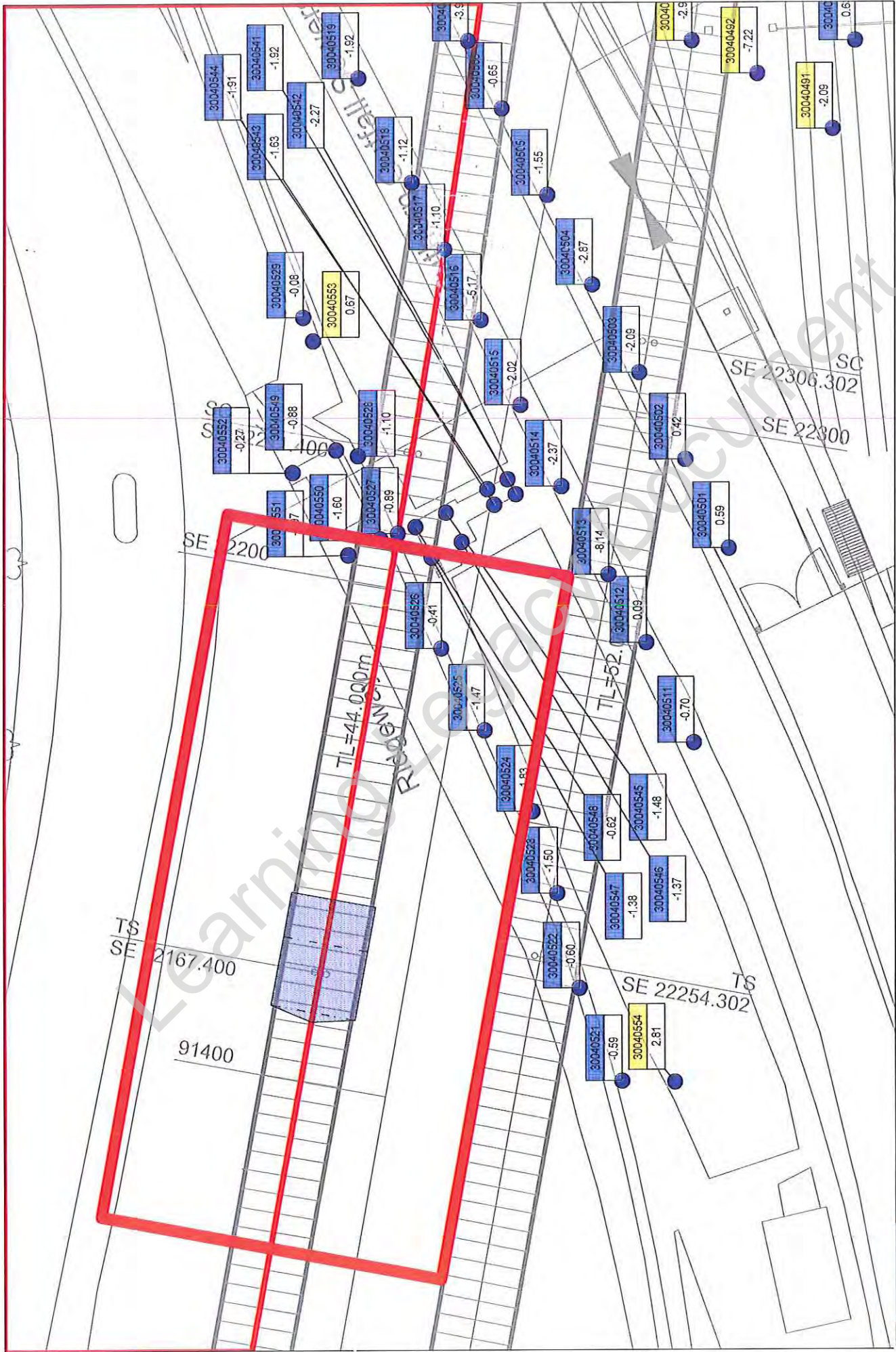


Point: 30040527



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Southern Outfall Sewer 3 12.12.2012 - 07.02.2014  
date: 29.07.2014 08:41 current values: 29.07.2014 08:28





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 23.06.2013 09:00

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: TV SOS 1 - 3

No. of reading date	baseline		1. following 12/01/2013		2. following 19/01/2013		3. following 01/02/2013		4. following 06/02/2013		5. following 07/02/2013		6. following 12/02/2013	
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501	103.275	0	103.274		103.267	new Baseline	103.269		103.269	2	103.269	0	103.267	-2
3004 0502	103.238	0	103.238		103.233	new Baseline	103.235		103.235	2	103.235	0	103.234	-1
3004 0503	103.150	1	103.150	1	103.149	-2	103.150	2	103.150	2	103.150	0	103.150	0
3004 0504	103.118	1	103.119	1	103.117	-1	103.119	1	103.119	1	103.119	0	103.118	0
3004 0505	103.100	1	103.101	1	103.099	-2	103.101	2	103.101	2	103.101	0	103.100	0
3004 0506	102.996	0	102.997	0	102.995	-1	102.997	1	102.997	0	102.997	0	102.997	0
3004 0507	102.964	0	102.965	0	102.963	-2	102.965	2	102.965	2	102.965	0	102.964	-1
3004 0508	102.972	0	102.972	0	102.971	-2	102.972	2	102.972	2	102.972	0	102.972	0
3004 0509	102.972	0	102.972	0	102.970	-2	102.972	2	102.972	2	102.972	0	102.972	0
3004 0511	107.025				107.025	0	107.030	5	107.030	5	107.030	0	107.026	-4
3004 0512	107.000				107.000	0	107.000	0	107.005	5	107.005	0	107.001	-4
3004 0513	106.967				106.967	0	106.966	0	106.971	5	106.971	0	106.968	-3
3004 0514	107.007				107.007	0	107.006	-1	107.012	6	107.012	0	107.009	-3
3004 0515	107.038				107.038	0	107.037	-1	107.042	6	107.042	0	107.042	0
3004 0516	106.944				106.944	0	106.944	0	106.949	5	106.949	0	106.945	-4
3004 0517	106.926				106.926	0	106.926	0	106.931	5	106.931	0	106.927	-4
3004 0518	106.957				106.956	0	106.957	0	106.961	4	106.961	0	106.958	-4
3004 0519	106.947				106.947	0	106.937	new Baseline	106.942	5	106.942	0	106.938	-4
3004 0521	101.892				101.892	0	101.891	-1	101.892	1	101.892	1	101.891	-1
3004 0522	101.809				101.809	0	101.808	-1	101.809	1	101.809	1	101.808	-1
3004 0523	101.822				101.822	0	101.821	-1	101.822	1	101.822	1	101.821	0
3004 0524	101.761				101.761	0	101.761	-1	101.761	0	101.761	0	101.761	0
3004 0525	101.796				101.797	0	101.795	-1	101.797	1	101.797	1	101.796	-1
3004 0526	101.869				101.870	1	101.869	-2	101.870	1	101.870	1	101.869	-1
3004 0527	101.821				101.822	1	101.821	-1	101.822	1	101.822	1	101.820	-1
3004 0528	101.840				101.840	0	101.824	new Baseline			101.825	1	101.824	-1
3004 0529	101.979				101.979	0	destroyed							
3004 0541	106.956				106.956	0	106.955	-1	106.961	5	106.961	0	106.957	-4
3004 0542	106.943				106.943	0	106.943	-1	106.948	5	106.948	0	106.944	-4
3004 0543	106.932				106.932	0	106.931	-1	106.937	5	106.937	0	106.933	-3
3004 0544	106.937				106.937	0	106.937	-1	106.942	5	106.942	0	106.938	-4
3004 0545	102.996				102.997	0	102.996	-1	102.997	1	102.997	1	102.996	-1
3004 0546	103.000				103.000	0	102.999	-1			103.001	1	102.999	-1
3004 0547	103.008				103.009	0	103.008	-1			103.009	1	103.003	-1
3004 0548	102.976				102.977	1	102.976	-1			102.977	1	102.976	-1
3004 0549	101.795				101.795	0	101.794	-1			101.795	1	101.794	-1
3004 0550	101.819				101.820	1	101.819	-1			101.819	1	101.818	-1
3004 0551	101.818				101.818	0	101.817	0			101.818	0	101.817	-1
3004 0552	101.794				101.794	0	101.793	0			101.794	1	101.793	-1



# monitoring table



## Joint Venture

project: C310 Thames Tunnel  
structure: TW SOS 1 - 3

No. of reading date	baseline 15/12/2012 12/01/2013		7. following 20/02/2013		8. following 05/03/2013		9. following 06/03/2013		10. following 07/03/2013		11. following 08/03/2013		12. following 09/03/2013	
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
Point No.														
3004 0501	103.275	1	103.268	1	103.269	1	103.267	-2	103.267	0	103.267	0	103.267	0
3004 0502	103.238	0	103.234	0	103.235	1	103.234	-2	103.234	0	103.234	0	103.234	0
3004 0503	103.150	1	103.151	1	103.151	1	103.150	-1	103.150	0	103.150	0	103.150	0
3004 0504	103.118	1	103.119	1	103.119	0	103.118	-2	103.118	0	103.118	0	103.118	0
3004 0505	103.100	1	103.101	1	103.102	0	103.100	-2	103.101	0	103.101	1	103.101	0
3004 0506	102.996	-9	102.988	-9	102.982	new Baseline	102.981	-1	102.981	0	102.982	0	102.981	0
3004 0507	102.964				103.249	new Baseline	103.248	-1	103.248	0	103.249	1	103.247	-2
3004 0508	102.972	-1	102.971	-1	103.230	new Baseline	103.229	-2	103.229	0	103.229	0	103.228	-1
3004 0509	102.972	-2	102.970	-2			destroyed							
3004 0511	107.025	-1	107.025	-1			107.026	1	107.026	1				
3004 0512	107.000	-1	107.001	-1			107.002	1	107.002	1				
3004 0513	106.967	-1	106.967	-1			106.968	1	106.968	1				
3004 0514	107.007	-1	107.007	-1			107.009	2						
3004 0515	107.038	-2	107.038	-2			107.039	2						
3004 0516	106.944	-4	106.941	-4			106.942	-2						
3004 0517	106.926	-1	106.926	-1			106.927	0						
3004 0518	106.957	-1	106.957	-1			106.957	0						
3004 0519	106.947	-1	106.938	-1			106.937	0						
3004 0521	101.892	0	101.891	0			101.893	2						
3004 0522	101.809	0	101.808	0			101.810	2						
3004 0523	101.822	0	101.822	0			101.823	2						
3004 0524	101.761	0	101.761	0			101.762	1						
3004 0525	101.796	1	101.796	1			101.797	1						
3004 0526	101.869	0	101.870	0			101.870	1						
3004 0527	101.821	0	101.822	1			101.822	1						
3004 0528	101.840	1	101.824	1			101.825	1						
3004 0529	101.979													
3004 0541	106.955	-1	106.956	-1			106.957	2						
3004 0542	106.943	-1	106.943	-1			106.945	2						
3004 0543	106.932	-2	106.932	-2			106.933	2						
3004 0544	106.937	-1	106.937	-1			106.939	2						
3004 0545	102.996	1	102.996	1			102.997	1						
3004 0546	103.000	1	103.000	1			103.000	0						
3004 0547	103.008	1	103.008	1			103.009	0						
3004 0548	102.976	1	102.976	1			102.978	1						
3004 0549	101.795	1	101.794	1			101.795	1						
3004 0550	101.819	1	101.819	1			101.820	1						
3004 0551	101.818	1	101.818	1			101.818	1						
3004 0552	101.794	1	101.794	1			101.794	1						

monitoring table



Joint Venture

project: C310 Thames Tunnel  
structure: TW SOS 1-3

No. of reading Point No.	13. following 10/02/2013		14. following 11/02/2013		15. following 12/02/2013		16. following 13/02/2013		17. following 14/02/2013		18. following 15/02/2013	
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501	103.275	0	103.267	0	103.268	0	103.267	0	103.267	0	103.267	0
3004 0502	103.228	0	103.234	0	103.234	0	103.234	0	103.233	0	103.233	0
3004 0503	103.150	0	103.149	0	103.149	-1	103.148	-1	103.148	0	103.148	-2
3004 0504	103.118	0	103.118	0	103.117	-1	103.116	-2	103.116	0	103.116	-2
3004 0505	103.100	0	103.100	-1	103.099	-1	103.099	0	103.099	0	103.099	-1
3004 0506	102.996	1	102.982	-2	102.980	-2	102.980	-2	102.980	0	102.980	-2
3004 0507	102.964	2	103.248	-2	103.248	1	103.248	0	103.248	0	103.248	-1
3004 0508	102.972	1	103.228	-1	103.229	1	103.229	0	103.229	0	103.229	-2
3004 0509	102.972											
3004 0511	107.025		107.026	0	107.026	0	107.025	0	107.025	0	107.025	-2
3004 0512	107.000		107.001	0	107.001	0	107.001	-1	107.000	-1	106.998	-2
3004 0513	106.967		106.968	0	106.967	0	106.967	-1	106.966	-1	106.964	-3
3004 0514	107.007		107.008	0	107.007	-1	107.007	-1	107.006	-1	107.004	-3
3004 0515	107.038		107.039	0	107.038	-1	107.037	-1	107.037	0	107.035	-1
3004 0516	106.944		106.942	-2	106.942	0	106.940	-4	106.940	0	106.940	-4
3004 0517	106.926		106.926	0	106.927	0	106.926	-1	106.926	0	106.925	-1
3004 0518	106.957		106.957	0	106.957	0	106.957	-1	106.957	0	106.956	-1
3004 0519	106.947		106.937	0	106.938	1	106.937	-1	106.937	0	106.936	-1
3004 0521	101.892		101.893	0	101.893	0	101.892	0	101.893	1	101.892	-1
3004 0522	101.809		101.809	-1	101.810	0	101.810	0	101.810	1	101.809	-1
3004 0523	101.822		101.823	0	101.823	0	101.822	0	101.822	1	101.822	-1
3004 0524	101.761		101.762	-1	101.762	0	101.761	0	101.762	0	101.760	-1
3004 0525	101.796		101.797	0	101.797	0	101.796	-1	101.796	0	101.796	-1
3004 0526	101.869		101.870	0	101.871	0	101.869	-2	101.870	1	101.869	-1
3004 0527	101.821		101.822	0	101.822	0	101.821	-1	101.821	0	101.821	0
3004 0528	101.840		101.825	0	101.825	0	101.824	-1	101.825	1	101.824	0
3004 0529	101.979											
3004 0541	106.956		106.957	0	106.956	-1	106.955	-1	106.955	0	106.953	-3
3004 0542	106.943		106.944	0	106.943	-1	106.943	-1	106.942	-1	106.940	-2
3004 0543	106.932		106.933	0	106.932	-1	106.932	-1	106.931	-1	106.929	-2
3004 0544	106.937		106.938	0	106.937	-1	106.937	0	106.936	-1	106.935	-2
3004 0545	102.996		102.997	-1	102.997	0	102.996	-1	102.996	0	102.995	0
3004 0546	103.000		103.000	0	103.001	0	102.999	-1	103.000	0	102.999	0
3004 0547	103.008		103.009	0	103.009	0	103.008	-1	103.008	0	103.008	0
3004 0548	102.976		102.977	0	102.977	0	102.976	-1	102.976	0	102.976	0
3004 0549	101.795		101.795	-1	101.795	0	101.794	-1	101.795	1	101.794	-1
3004 0550	101.819		101.819	-1	101.819	0	101.819	-1	101.819	0	101.819	0
3004 0551	101.818		101.818	-1	101.818	0	101.817	-1	101.817	0	101.817	0
3004 0552	101.794		101.794	-1	101.794	1	101.793	-1	101.794	1	101.794	0

monitoring table



Joint Venture

project: C310 Thames Tunnel  
structure: TW SOS 1 - 3

No. of reading	19. following		20. following		21. following		22. following		23. following		24. following		
	baseline	15/12/2012 12/01/2013	16/03/2013	17/03/2013	18/03/2013	19/03/2013	20/03/2013	21/03/2013	22/03/2013	23/03/2013	24/03/2013		
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
3004 0501	103.275	103.267	0	-7					103.269	2	-6		
3004 0502	103.238	103.234	1	-4					103.232	-1	-6		
3004 0503	103.150	103.148	0	-1					103.147	-1	-2		
3004 0504	103.118	103.116	0	-2					103.115	-1	-3		
3004 0505	103.100	103.099	0	-1					103.098	-1	-2		
3004 0506	102.996	102.980	0	-2					102.979	-1	-3		
3004 0507	102.964	103.248	0	-1					103.247	-1	-2		
3004 0508	102.972	103.229	0	-1					103.227	-2	-3		
3004 0509	102.972												
3004 0511	107.025	107.024	1	-1	107.025	0	0						
3004 0512	107.000	106.999	1	-1	106.999	0	-1	107.000	1	-1			
3004 0513	106.967	106.965	1	-2	106.965	0	-2	106.965	0	-1			
3004 0514	107.007	107.005	1	-2	107.006	0	-2	107.006	0	-1			
3004 0515	107.038	107.036	1	-2	107.036	0	-2	107.037	1	-1			
3004 0516	106.944	106.940	0	-4	106.940	0	-4	106.940	1	-4			
3004 0517	106.926	106.925	0	-1	106.925	0	-1	106.926	1	0			
3004 0518	106.957	106.956	0	-1	106.956	1	0	106.957	1	0			
3004 0519	106.947	106.936	0	-1	106.937	0	-1	106.937	1	0			
3004 0521	101.892	101.892	0	1	101.892	0	0	101.892	0	0	101.892	0	0
3004 0522	101.809	101.808	-1	-1	101.809	1	0	101.809	0	0	101.808	0	0
3004 0523	101.822	101.822	0	0	101.822	0	0	101.822	0	0	101.821	0	-1
3004 0524	101.761	101.760	-1	-1	101.761	1	0	101.760	0	-1	101.760	0	-1
3004 0525	101.796	101.795	0	-1	101.796	1	0	101.795	0	-1	101.795	0	-1
3004 0526	101.869	101.869	0	0	101.870	1	1	101.868	-1	-1	101.869	1	0
3004 0527	101.821	101.821	0	-1	101.821	0	0	101.820	-1	-1	101.821	0	0
3004 0528	101.840	101.824	0	0	101.825	1	1	101.824	-1	0	101.824	0	0
3004 0529	101.979												
3004 0541	106.956	106.954	1	-2	106.955	0	-2	106.955	1	-1			
3004 0542	106.943	106.942	1	-2	106.942	0	-2	106.942	0	-1			
3004 0543	106.932	106.931	1	-1	106.931	0	-1	106.931	0	-1			
3004 0544	106.937	106.936	1	-1	106.936	0	-1	106.936	0	-1			
3004 0545	102.996	102.995	0	-1	102.996	0	0	102.995	-1	-1	102.995	0	-1
3004 0546	103.000	102.999	0	-1	102.999	0	0	102.999	-1	-1	102.999	0	-1
3004 0547	103.008	103.008	0	0	103.007	0	-1	103.007	0	-1	103.008	0	0
3004 0548	102.976	102.976	0	-1	102.976	1	0	102.976	1	0	102.976	0	0
3004 0549	101.795	101.794	0	-1	101.794	0	0	101.794	0	0	101.794	0	-1
3004 0550	101.819	101.818	0	-1	101.819	1	0	101.818	0	-1	101.818	0	0
3004 0551	101.818	101.817	-1	-1	101.818	1	0	101.817	-1	-1	101.817	0	0
3004 0552	101.794	101.793	-1	-1	101.793	0	0	101.794	0	0	101.794	0	0

monitoring table



Joint Venture

project: C310 Thames Tunnel  
structure: TW SOS 1 - 3

No. of reading	25. following		26. following		27. following		28. following		29. following		30. following	
	baseline	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
date	15/12/2012 12/01/2013			27/03/2013		02/04/2013		11/04/2013		21/05/2013		15/06/2013
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501	103.275		103.266	-3	103.266	0	103.268	2	103.266	-2	103.266	-8
3004 0502	103.238		103.233	0	103.233	0	103.234	2	103.232	-2	103.232	-6
3004 0503	103.150		103.147	0	103.147	0	103.149	2	103.147	-2	103.147	-3
3004 0504	103.118		103.115	0	103.115	0	103.116	1	103.115	-2	103.115	-3
3004 0505	103.100		103.097	-1	103.098	1	103.100	2	103.099	-2	103.099	-2
3004 0506	102.996		102.979	0	102.980	0	102.981	1	102.981	0	103.150	new Baseline
3004 0507	102.964		103.247	0	103.247	0	103.249	2	103.246	-3	103.246	-3
3004 0508	102.972		103.228	1	103.228	0	103.229	1	103.229	-2	103.227	-3
3004 0509	102.972											
3004 0511	107.025		107.024	0	107.025	1	107.025	0	107.024	-1	107.024	-1
3004 0512	107.000		106.987	-13	106.987	-13	106.987	-13	106.987	-13	106.987	-13
3004 0513	106.967		106.963	-4	106.963	0	106.963	0	106.959	-4	106.959	-1
3004 0514	107.007		107.006	0	107.007	1	107.006	-1	107.005	-1	107.005	-2
3004 0515	107.038		107.037	0	107.038	1	107.037	-1	107.036	0	107.036	0
3004 0516	106.944		106.940	-4	106.941	1	106.940	-4	106.940	0	106.940	0
3004 0517	106.926		106.925	-1	106.927	1	106.925	-1	106.926	0	106.926	0
3004 0518	106.957		106.956	-1	106.959	2	106.957	-1	106.956	0	106.956	0
3004 0519	106.947		106.937	0	106.938	1	106.938	1	106.937	0	106.937	0
3004 0521	101.892		101.892	0	101.891	0	101.892	1	101.891	-1	101.891	0
3004 0522	101.809		101.808	0	101.808	0	101.808	0	101.808	-1	101.808	-1
3004 0523	101.822		101.821	0	101.821	0	101.821	0	101.821	-1	101.821	-1
3004 0524	101.761		101.760	-1	101.760	0	101.761	1	101.760	-1	101.759	-2
3004 0525	101.796		101.796	0	101.796	0	101.795	0	101.796	0	101.795	0
3004 0526	101.869		101.870	0	101.869	-1	101.869	-1	101.870	2	101.868	-2
3004 0527	101.821		101.821	0	101.821	0	101.821	0	101.821	1	101.821	-1
3004 0528	101.840		101.825	1	101.825	0	101.824	-1	101.824	0	101.824	0
3004 0529	101.979											
3004 0541	106.956		106.955	0	106.955	1	106.955	-1	106.954	0	106.954	-2
3004 0542	106.943		106.942	0	106.943	0	106.942	-1	106.942	0	106.942	-2
3004 0543	106.932		106.931	0	106.932	0	106.931	-1	106.931	-1	106.931	-2
3004 0544	106.937		106.936	0	106.937	1	106.936	-1	106.936	0	106.936	-1
3004 0545	102.996		102.996	0	102.996	1	102.995	-1	102.996	1	102.995	-1
3004 0546	103.000		103.000	0	102.999	-1	102.999	0	103.000	1	102.999	0
3004 0547	103.008		103.008	0	103.009	0	103.007	-1	103.008	0	103.008	0
3004 0548	102.976		102.976	0	102.977	1	102.976	-1	102.976	0	102.976	-1
3004 0549	101.795		101.795	1	101.795	0	101.794	-1	101.794	0	101.794	-1
3004 0550	101.819		101.819	0	101.819	0	101.819	0	101.819	1	101.819	0
3004 0551	101.818		101.817	0	101.818	0	101.817	-1	101.818	1	101.817	0
3004 0552	101.794		101.794	0	101.794	0	101.794	-1	101.793	0	101.794	-1

monitoring table



Joint Venture

project: C310 Thames Tunnel  
structure: TW SOS 1 - 3

No. of reading date	baseline 15/12/2012 12/01/2013		31. following 17/06/2013		32. following 18/06/2013		33. following 19/06/2013		34. following 20/06/2013		35. following 21/06/2013		36. following 22/06/2013	
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501	103.275		103.267	1 -8	103.267	0 -7	103.267	0 -7	103.267	0 -7	103.267	0 -8	103.267	1 -7
3004 0502	103.238		103.233	0 -5	103.233	1 -5	103.233	1 -5	103.233	0 -5	103.233	-1 -6	103.233	1 -5
3004 0503	103.150		103.147	0 -3	103.147	0 -3	103.147	0 -2	103.147	-1 -3	103.147	0 -3	103.148	1 -2
3004 0504	103.118		103.115	0 -3	103.115	1 -3	103.116	0 -3	103.115	-1 -3	103.115	0 -3	103.115	1 -3
3004 0505	103.100		103.098	0 -2	103.098	0 -1	103.099	0 -1	103.098	-1 -2	103.098	0 -2	103.099	0 -2
3004 0506	102.996		103.150	0 0	103.150	0 0	103.150	0 0	103.149	-1 -1	103.150	-1 -1	103.150	0 -1
3004 0507	102.964		103.247	0 -3	103.247	0 -3	103.245	-1 -3	103.245	-1 -5	103.245	-1 -4	103.245	0 -4
3004 0508	102.972		103.228	1 -3	103.228	1 -3	103.227	-1 -4	103.226	-1 -4			103.226	0 -4
3004 0509	102.972													
3004 0511	107.025				107.024	0 -1	107.024	0 -1	107.025	0 0	107.024	0 -1	107.025	1 0
3004 0512	107.000				106.972	0 -28	106.972	0 -28	106.972	0 -28	106.972	0 -28	106.972	1 -1
3004 0513	106.967		106.959	1 -8	106.959	1 -8	106.959	0 -8	106.959	0 -8	106.958	-1 -9	106.959	1 -8
3004 0514	107.007		107.006	0 -1	107.005	-1 -2	107.005	-1 -2	107.005	0 -2	107.004	-1 -3	107.005	1 -2
3004 0515	107.038		107.037	0 -1	107.036	0 -2	107.036	0 -2	107.036	0 -2	107.035	-1 -3	107.036	1 -2
3004 0516	106.944		106.940	0 -4	106.940	0 -4	106.940	0 -4	106.939	-1 -5	106.938	-1 -6	106.939	0 -5
3004 0517	106.925		106.926	0 0	106.926	0 0	106.926	0 -1	106.926	0 -1	106.924	-1 -2	106.924	0 -2
3004 0518	106.957		106.956	0 0	106.956	0 0	106.957	0 0	106.956	-1 -1	106.956	0 -1	106.956	0 -1
3004 0519	106.947				106.936	-1 -1	106.936	-1 -1	106.936	0 -1	106.936	-1 -2	106.935	0 -2
3004 0521	101.892		101.890	-1 -1	101.891	1 0	101.891	1 0	101.892	1 1	101.892	0 0	101.891	-1 -1
3004 0522	101.809		101.808	0 -1	101.807	-1 -2	101.808	1 0	101.808	1 0	101.808	0 -1	101.803	0 0
3004 0523	101.822		101.820	0 -2	101.820	0 -2	101.821	1 -1	101.821	1 -1	101.821	0 -1	101.821	0 -1
3004 0524	101.761		101.759	0 -2	101.759	0 -2	101.760	1 -1	101.760	1 -1	101.760	0 -1	101.760	0 -1
3004 0525	101.796		101.795	0 -1	101.795	-1 -2	101.796	1 0	101.796	1 0	101.796	0 0	101.795	-1 -1
3004 0526	101.869		101.868	0 -1	101.869	1 0	101.870	1 1	101.870	1 1	101.870	0 1	101.869	-1 0
3004 0527	101.821		101.821	0 -1	101.820	0 -1	101.820	0 -1	101.821	1 0	101.822	1 0	101.820	-2 -1
3004 0528	101.840		101.824	0 0	101.824	0 0	101.824	-1 -1	101.824	0 0	101.824	1 0	101.823	-1 -1
3004 0529	101.979													
3004 0541	106.956		106.955	-1 -1	106.954	0 -2	106.954	0 -2	106.954	0 -2	106.954	0 -2	106.955	1 -2
3004 0542	106.943		106.942	-1 -2	106.941	-1 -2	106.942	1 -1	106.942	1 -1	106.941	-1 -3	106.942	1 -2
3004 0543	106.932		106.931	-1 -1	106.931	0 -1	106.931	0 -1	106.931	0 -1	106.930	-1 -2	106.931	1 -2
3004 0544	106.937		106.936	-1 -1	106.937	0 -1	106.936	0 -1	106.936	0 -1	106.936	-1 -1	106.936	1 -1
3004 0545	102.996		102.995	0 -1	102.995	0 -1	102.996	1 0	102.996	1 0	102.996	0 0	102.995	-1 -1
3004 0546	103.000		102.999	0 -1	102.999	0 -1	103.000	1 0	103.000	1 0	103.000	0 0	102.999	-1 -1
3004 0547	103.008		103.008	0 0	103.008	0 -1	103.008	1 0	103.008	1 0	103.008	-1 0	103.008	0 0
3004 0548	102.976		102.976	0 0	102.976	0 -1	102.976	0 -1	102.977	1 0	102.976	0 0	102.976	-1 -1
3004 0549	101.795		101.794	0 -1	101.793	0 -1	101.794	1 0	101.794	1 0	101.795	0 0	101.793	-1 -1
3004 0550	101.819		101.818	0 -1	101.818	0 -1	101.818	0 -1	101.819	1 0	101.819	0 0	101.818	-1 -2
3004 0551	101.818		101.817	0 -1	101.816	0 -1	101.816	0 -1	101.818	1 0	101.818	0 1	101.817	-2 -1
3004 0552	101.794		101.793	0 0	101.793	0 -1	101.794	1 0	101.794	1 0	101.794	0 0	101.793	0 0

monitoring table



Joint Venture

project: C310 Thames Tunnel

No. of reading	baseline		37. following		38. following		39. following		40. following		41. following		42. following	
	date	elevation	date	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
	15/12/2013	103.275	23/06/2013											
	15/12/2013	103.238												
3004 0501		103.275			103.266	-1	103.267	1	103.267	1	103.267	0	103.267	0
3004 0502		103.238			103.232	-1	103.232	1	103.232	1	103.232	0	103.232	0
3004 0503		103.150			103.146	-2	103.146	0	103.146	0	103.146	0	103.146	0
3004 0504		103.118			103.113	-2	103.114	1	103.114	1	103.114	-1	103.113	-1
3004 0505		103.100			103.097	-2	103.097	1	103.097	1	103.097	-1	103.097	-1
3004 0506		102.996			103.148	-2	103.149	2	103.149	2	103.148	-1	103.148	-1
3004 0507		102.964			103.244	-2	103.245	1	103.245	1	103.244	-1	103.244	-1
3004 0508		102.972			103.223	-3	103.226	3	103.226	3	103.224	-2	103.224	-2
3004 0509		102.972												
3004 0511		107.025			107.024	0	107.024	0	107.024	0	107.024	0	107.024	0
3004 0512		107.000			106.972	0	106.972	0	106.972	0	106.971	-1	106.971	0
3004 0513		106.967			106.959	0	106.959	0	106.959	0	106.958	-1	106.959	1
3004 0514		107.007			107.004	-1	107.004	-1	107.004	-1	107.004	0	107.005	0
3004 0515		107.038			107.036	-1	107.036	-1	107.036	-1	107.035	0	107.036	1
3004 0516		106.944			106.938	-1	106.938	-1	106.938	-1	106.938	0	106.938	1
3004 0517		106.926			106.925	1	106.924	-1	106.924	-1	106.924	-1	106.924	1
3004 0518		106.957			106.955	0	106.955	0	106.955	0	106.955	-1	106.955	1
3004 0519		106.947			106.936	0	106.936	0	106.936	0	106.935	-1	106.935	0
3004 0521		101.892			101.891	0	101.892	1	101.892	1	101.891	-1	101.890	-1
3004 0522		101.809			101.808	0	101.808	0	101.808	0	101.808	0	101.808	0
3004 0523		101.822			101.820	-1	101.821	0	101.821	0	101.820	0	101.818	-3
3004 0524		101.761			101.759	-1	101.760	0	101.760	0	101.759	0	101.757	-2
3004 0525		101.796			101.795	0	101.795	0	101.795	0	101.795	0	101.794	-1
3004 0526		101.869			101.869	0	101.869	0	101.869	0	101.869	0	101.868	-1
3004 0527		101.821			101.821	1	101.820	0	101.820	0	101.820	0	101.820	0
3004 0528		101.840			101.823	0	101.824	0	101.824	0	101.822	-1	101.821	-1
3004 0529		101.979												
3004 0541		106.956			106.954	0	106.954	-1	106.954	-1	106.954	0	106.954	0
3004 0542		106.943			106.941	-1	106.941	-1	106.941	-1	106.941	0	106.941	0
3004 0543		106.932			106.931	0	106.931	0	106.931	0	106.930	-1	106.931	1
3004 0544		106.937			106.935	-1	106.936	0	106.936	0	106.935	0	106.935	0
3004 0545		102.996			102.995	0	102.995	0	102.995	0	102.995	0	102.994	-1
3004 0546		103.000			102.998	-1	102.999	0	102.999	0	102.998	0	102.998	0
3004 0547		103.008			103.007	-1	103.007	0	103.007	0	103.007	-1	103.007	0
3004 0548		102.976			102.976	0	102.976	0	102.976	0	102.975	0	102.975	0
3004 0549		101.795			101.794	0	101.794	0	101.794	0	101.794	0	101.794	0
3004 0550		101.819			101.817	0	101.817	0	101.817	0	101.817	-1	101.818	1
3004 0551		101.818			101.817	0	101.817	0	101.817	0	101.818	1	101.817	-1
3004 0552		101.794			101.793	0	101.793	0	101.793	0	101.793	0	101.793	0

monitoring table




Joint Venture

project: C310 Thames Tunnel

structure: TW SOS 1 - 3

No. of reading	baseline 15/12/2013 12/01/2013		43. following 14/09/2013		44. following 19/09/2013		45. following 09/09/2013		46. following 16/09/2013		47. following 19/10/2013		48. following 06/02/2014		49. following 07/02/2014	
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501	103.275	0 -9	103.266	-1 -9	103.267	2 -8	103.267	2 -8	103.267	2 -8	103.267	2 -8	103.267	2 -8	103.267	2 -8
3004 0502	103.238	-1 -7	103.231	-1 -7	103.231	-1 -7	103.231	-1 -7	103.231	-1 -7	103.231	-1 -7	103.231	-1 -7	103.231	-1 -7
3004 0503	103.150	-1 -5	103.145	-1 -5	103.144	-1 -5	103.144	-1 -5	103.144	-1 -5	103.144	-1 -5	103.144	-1 -5	103.144	-1 -5
3004 0504	103.118	-1 -6	103.112	-1 -6	103.111	-1 -7	103.111	-1 -7	103.111	-1 -7	103.111	-1 -7	103.111	-1 -7	103.111	-1 -7
3004 0505	103.100	-1 -5	103.096	-1 -5	103.095	-1 -6	103.095	-1 -6	103.095	-1 -6	103.097	3 -3	103.096	-1.50 -4.32	103.096	-1.50 -4.32
3004 0506	102.996	-1 -3	103.148	-1 -3	103.147	0 -3	103.147	0 -3	103.147	0 -3	103.149	-1 -2	103.147	-1.41 -3.28	103.147	-1.41 -3.28
3004 0507	102.964	-1 -6	103.243	-1 -6	103.242	-1 -7	103.242	-1 -7	103.242	-1 -7	103.244	1 -6	103.244	1 -6	103.244	1 -6
3004 0508	102.972	0 -6	103.224	0 -6	103.224	0 -7	103.224	0 -7	103.224	0 -7	103.224	0 -6	103.223	-0.86 -7.32	103.223	-0.86 -7.32
3004 0509	102.972		107.023		107.023		107.023		107.023		107.024		107.024		107.024	
3004 0511	107.025	-2 -2	106.970	-2 -2	106.970	-1 -2	106.970	-1 -2	106.970	-1 -2	106.971	1 -1	106.971	0 -1	106.971	0 -1
3004 0512	107.000	-2 -2	106.967	-2 -2	106.956	-2 -11	106.956	-2 -11	106.956	-2 -11	106.957	2 -9	106.957	2 -9	106.956	-1 -10
3004 0513	106.967	-3 -11	106.956	-3 -11	106.956	-2 -11	106.956	-2 -11	106.956	-2 -11	106.957	2 -9	106.957	2 -9	106.956	-1 -10
3004 0514	107.007	-3 -5	107.002	-3 -5	107.001	-3 -6	107.001	-3 -6	107.001	-3 -6	107.004	3 -3	107.004	3 -3	107.004	-1 -4
3004 0515	107.039	-2 -5	107.033	-2 -5	107.032	-3 -6	107.032	-3 -6	107.032	-3 -6	107.035	2 -3	107.033	-1 -5	107.033	-1 -5
3004 0516	106.944	-2 -8	106.936	-2 -8	106.935	-3 -9	106.935	-3 -9	106.935	-3 -9	106.937	2 -7	106.937	2 -7	106.937	0 -7
3004 0517	106.925	-2 -4	106.922	-2 -4	106.922	-2 -4	106.922	-2 -4	106.922	-2 -4	106.923	1 -3	106.923	1 -3	106.922	-1 -4
3004 0518	106.957	-2 -3	106.954	-2 -3	106.953	-2 -4	106.953	-2 -4	106.953	-2 -4	106.954	1 -3	106.954	1 -3	106.954	0 -3
3004 0519	106.947	-1 -3	106.934	-1 -3	106.934	-1 -4	106.934	-1 -4	106.934	-1 -4	106.935	1 -3	106.935	1 -3	106.935	0 -3
3004 0521	101.892		101.890	0 -1	101.888	-2 -4	101.888	-2 -4	101.888	-2 -4	101.889	1 -2	101.889	1 -2	101.889	1 -1
3004 0522	101.809		101.806	-2 -3	101.805	-1 -3	101.805	-1 -3	101.805	-1 -3	101.806	1 -2	101.806	1 -2	101.807	1 -1
3004 0523	101.822		101.813	-5 -9	101.811	-2 -11	101.811	-2 -11	101.811	-2 -11	101.814	3 -8	101.814	3 -8	101.820	6 -2
3004 0524	101.761		101.754	-4 -7	101.751	-3 -10	101.751	-3 -10	101.751	-3 -10	101.753	2 -8	101.753	2 -8	101.760	6 -2
3004 0525	101.796		101.791	-4 -5	101.790	-1 -7	101.790	-1 -7	101.790	-1 -7	101.791	2 -5	101.791	2 -5	101.794	3 -2
3004 0526	101.869		101.864	-3 -5	101.864	-3 -5	101.864	-3 -5	101.864	-3 -5	101.865	1 -4	101.865	1 -4	101.868	3 -1
3004 0527	101.821		101.818	-2 -3	101.817	-1 -5	101.817	-1 -5	101.817	-1 -5	101.820	3 -2	101.820	3 -2	101.819	-1 -2
3004 0528	101.840		101.818	-3 -6	101.816	-2 -8	101.816	-2 -8	101.816	-2 -8	101.819	3 -5	101.819	3 -5	101.822	3 -2
3004 0529	101.979															
3004 0541	106.955	-2 -5	106.952	-2 -5	106.951	-1 -5	106.951	-1 -5	106.951	-1 -5	106.953	2 -3	106.953	2 -3	106.953	0 -4
3004 0542	106.943	-2 -5	106.939	-2 -5	106.938	0 -5	106.938	0 -5	106.938	0 -5	106.940	2 -3	106.940	2 -3	106.940	-1 -4
3004 0543	106.932	-3 -4	106.928	-3 -4	106.927	-1 -5	106.927	-1 -5	106.927	-1 -5	106.929	2 -3	106.929	2 -3	106.929	-1 -3
3004 0544	106.937	-2 -4	106.933	-2 -4	106.932	-1 -5	106.932	-1 -5	106.932	-1 -5	106.935	2 -3	106.935	2 -3	106.934	-1 -3
3004 0545	102.996		102.994	0 -2	102.992	-2 -4	102.992	-2 -4	102.992	-2 -4	102.995	2 -2	102.995	2 -2	102.994	-1 -2
3004 0546	103.000		102.998	0 -2	102.998	0 -2	102.998	0 -2	102.998	0 -2	102.998	2 -2	102.998	2 -2	102.997	-1 -3
3004 0547	103.008		103.006	-1 -2	103.004	-2 -4	103.004	-2 -4	103.004	-2 -4	103.007	3 -1	103.007	3 -1	103.006	-1 -2
3004 0548	102.976		102.975	-1 -2	102.973	-2 -4	102.973	-2 -4	102.973	-2 -4	102.975	2 -1	102.975	2 -1	102.974	-1 -2
3004 0549	101.795		101.793	-1 -2	101.791	-2 -4	101.791	-2 -4	101.791	-2 -4	101.794	3 -1	101.794	3 -1	101.793	-1 -1
3004 0550	101.819		101.817	-1 -2	101.815	-2 -4	101.815	-2 -4	101.815	-2 -4	101.818	3 -1	101.818	3 -1	101.817	-1 -2
3004 0551	101.818		101.816	-1 -2	101.814	-2 -4	101.814	-2 -4	101.814	-2 -4	101.817	3 -1	101.817	3 -1	101.816	-1 -2
3004 0552	101.794		101.792	-1 -1	101.790	-2 -4	101.790	-2 -4	101.790	-2 -4	101.793	3 0	101.793	3 0	101.793	0 -1

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 22**

**Southern Outfall Sewer Pumping station**

Learning Legacy Document



<b>monitoring asset</b>	<b>Southern Outfall Sewer (SOS) + Pumpstation</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
<b>name of monitoring section:</b>	Southern Outfall Sewer Pumping Station		
sensor type:	manual levelling studs		
chainage:	91450	point no.:	3004 0541 - 3004 0552
<b>trigger values:</b> [mm]	green: +12 -12	amber: +15 -15	red: +18 -18
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	12/12/2012	0		
	12/01/2013	0		
<b>TBM 1</b>	start ZOI	11/03/13	0.94	3004 0541
	end ZOI	15/03/13	-2.66	3004 0541
<b>TBM 2</b>	start ZOI	19/06/13	-1.28	3004 0549
	end ZOI	23/06/13	-0.88	3004 0549
<b>longterm</b>	07/02/14	-3.61	3004 0542	
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV		
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)		

**summary / comments**

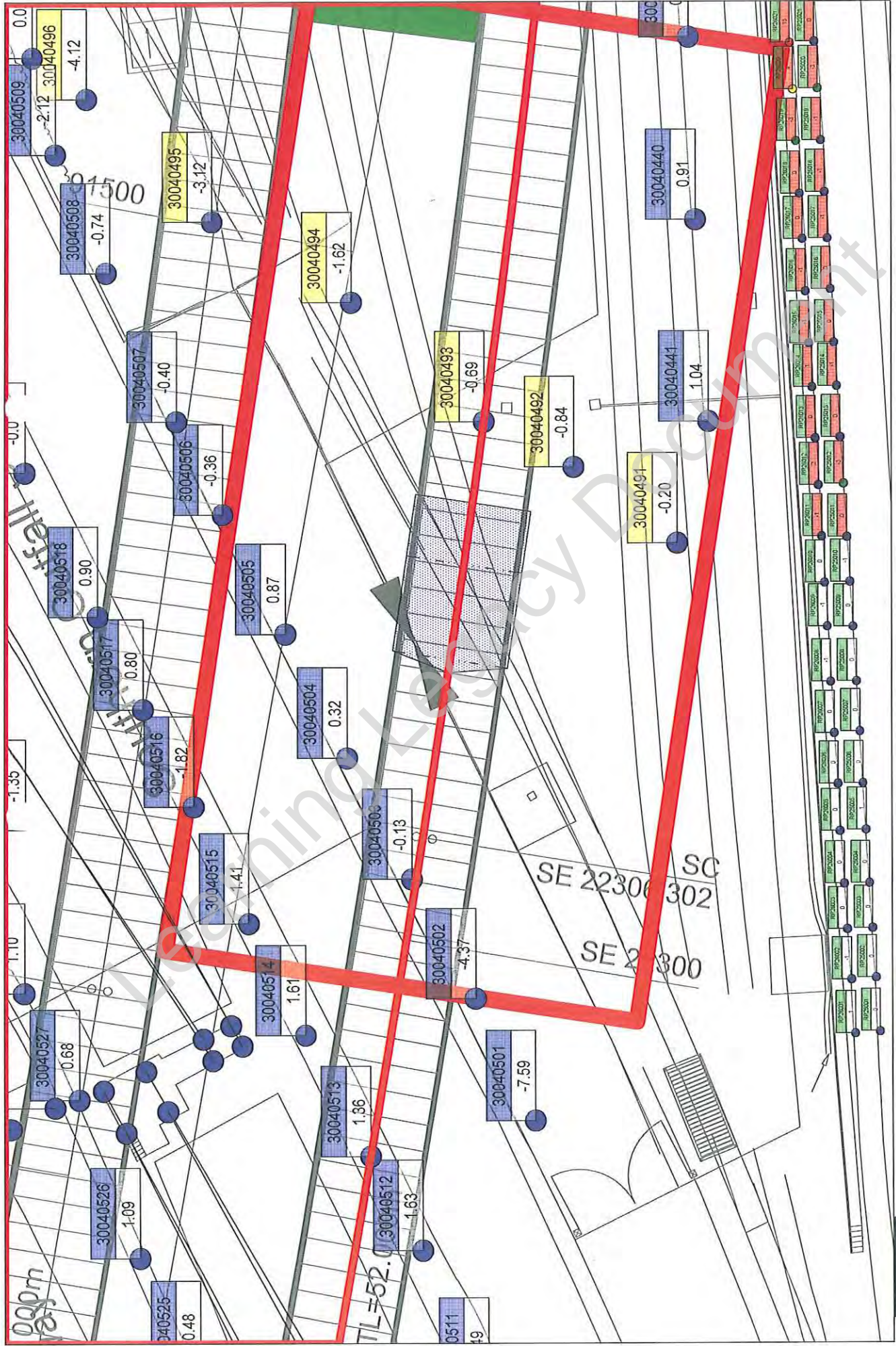
Overall, none of the points reached any trigger value.  
 Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 09/01/15

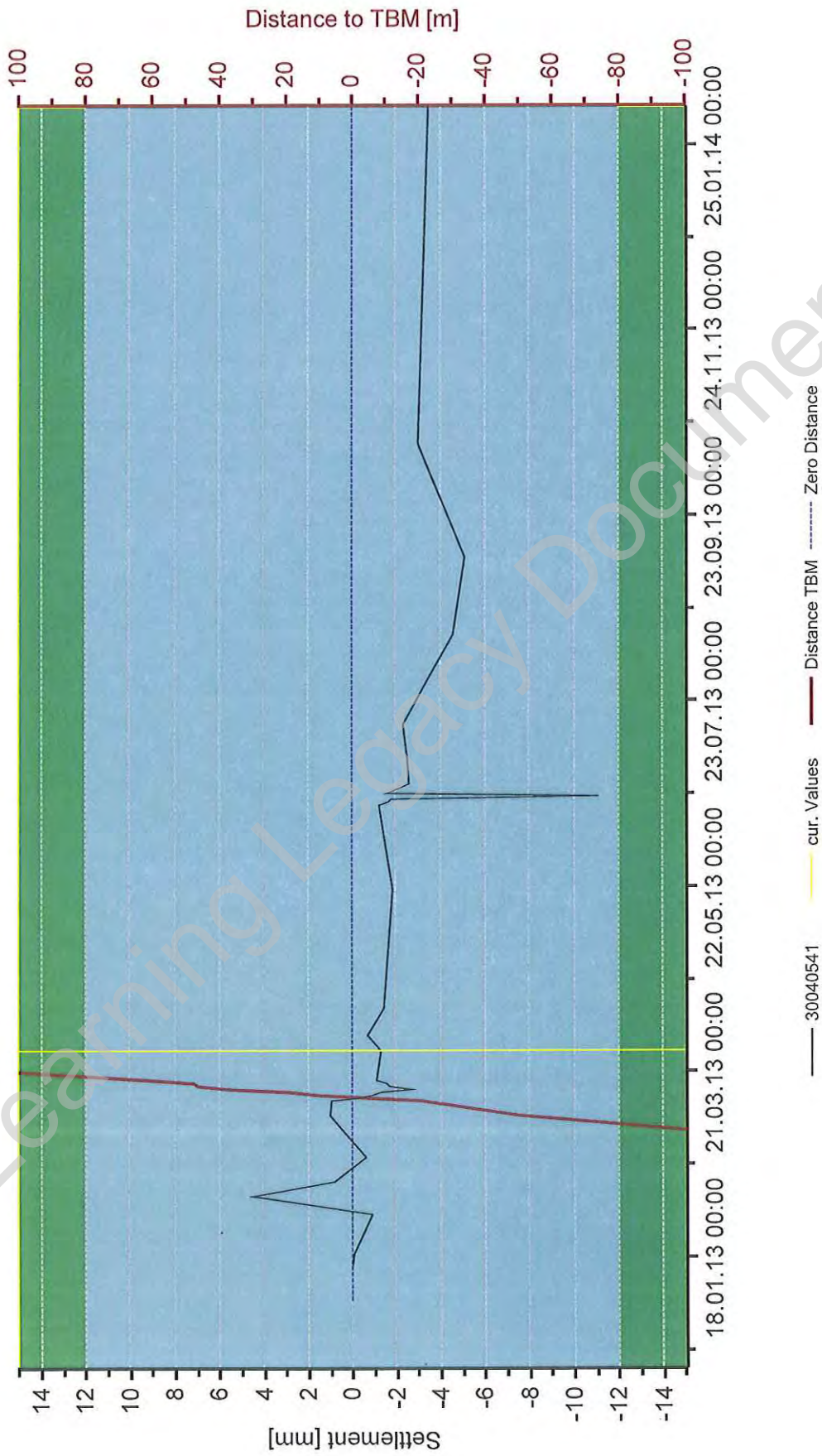
print name:

HMJV project role:

Monitoring & Survey engineer

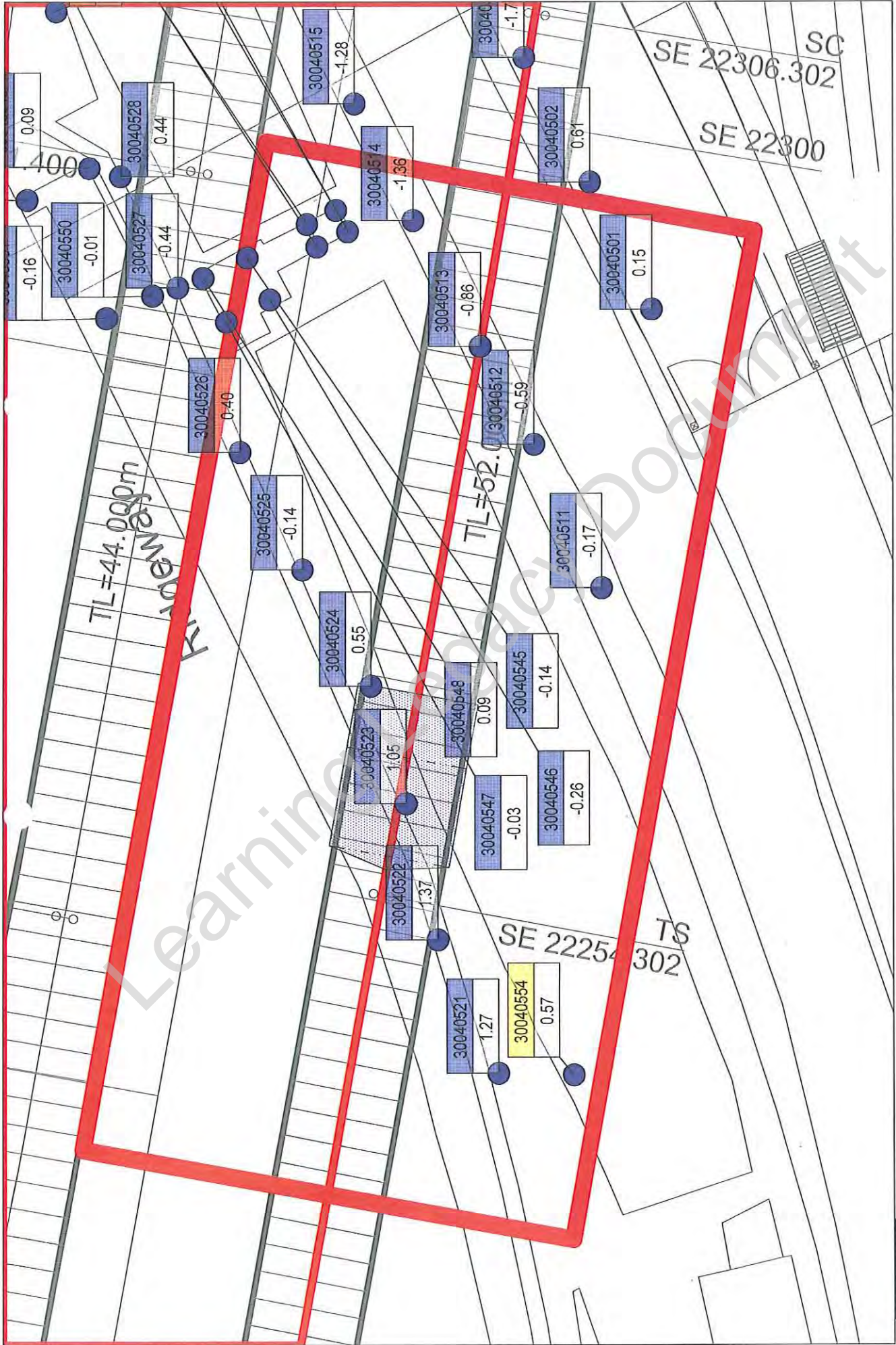


Point: 30040541



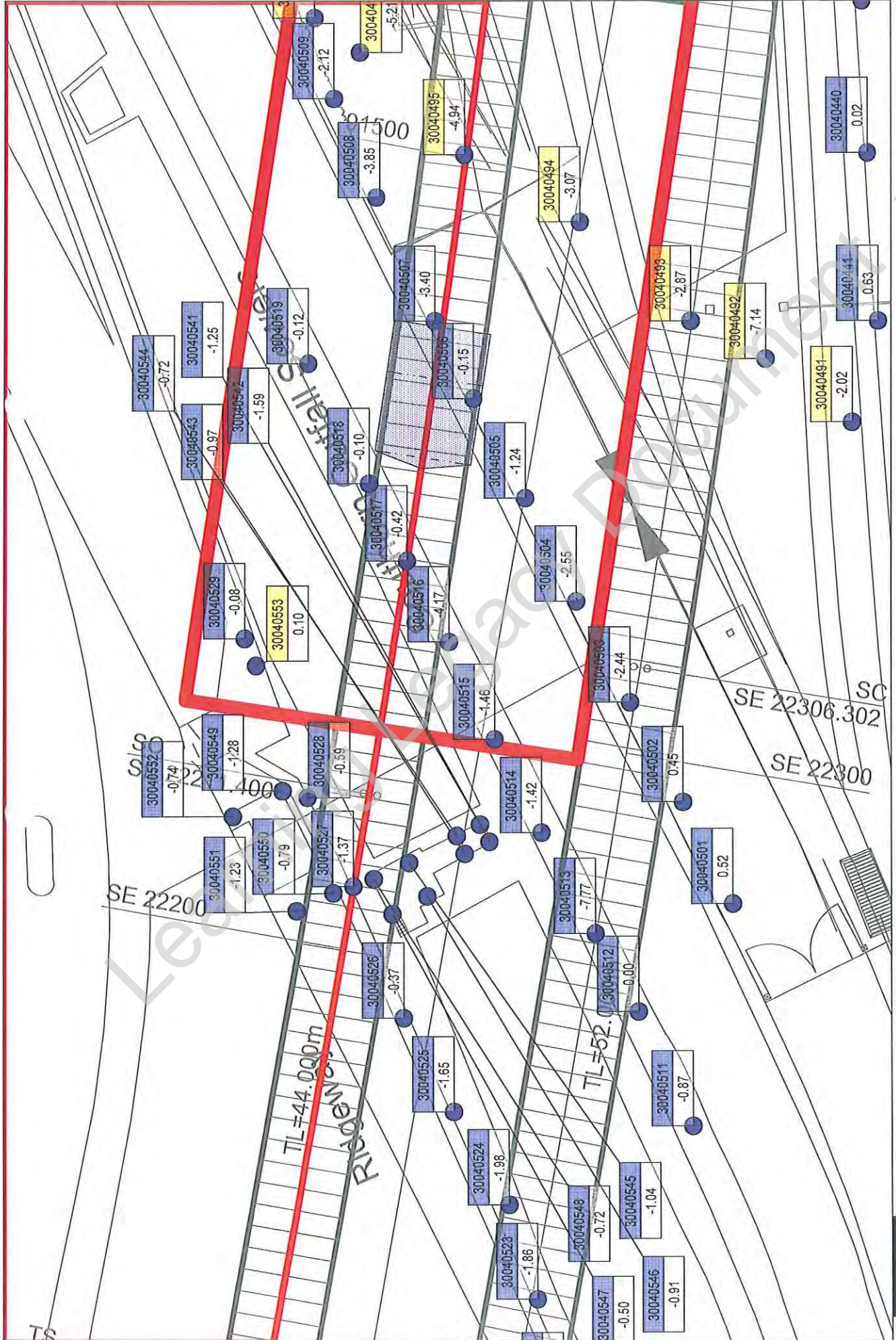
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Southern Outfall Sewer Pumping Station 12.12.2012 - 07.02.2014  
date: 28.07.2014 14:39 current values: 28.07.2014 14:26





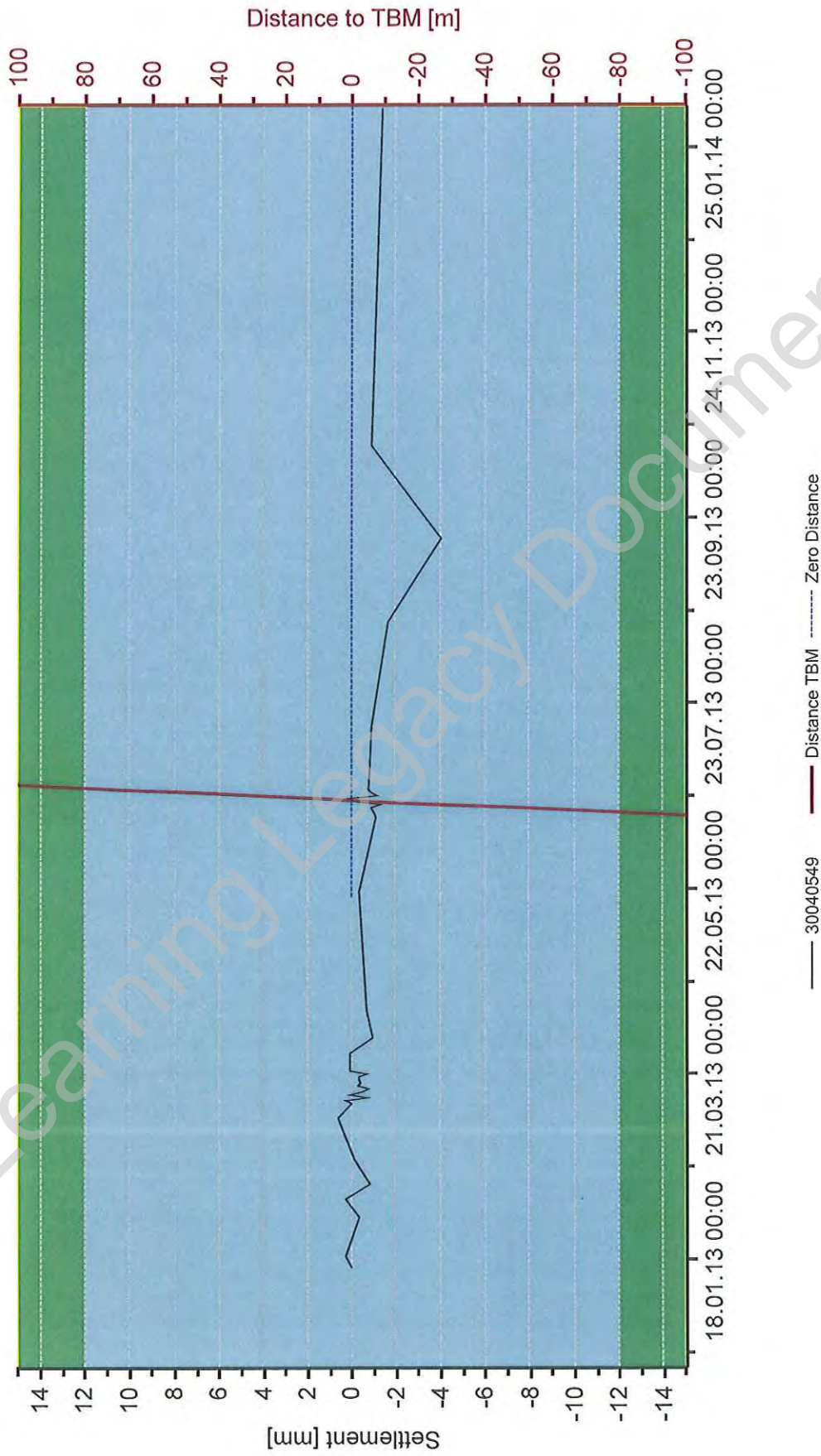
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, lining walls and grouting  
 current values: 15.03.2013 06:59





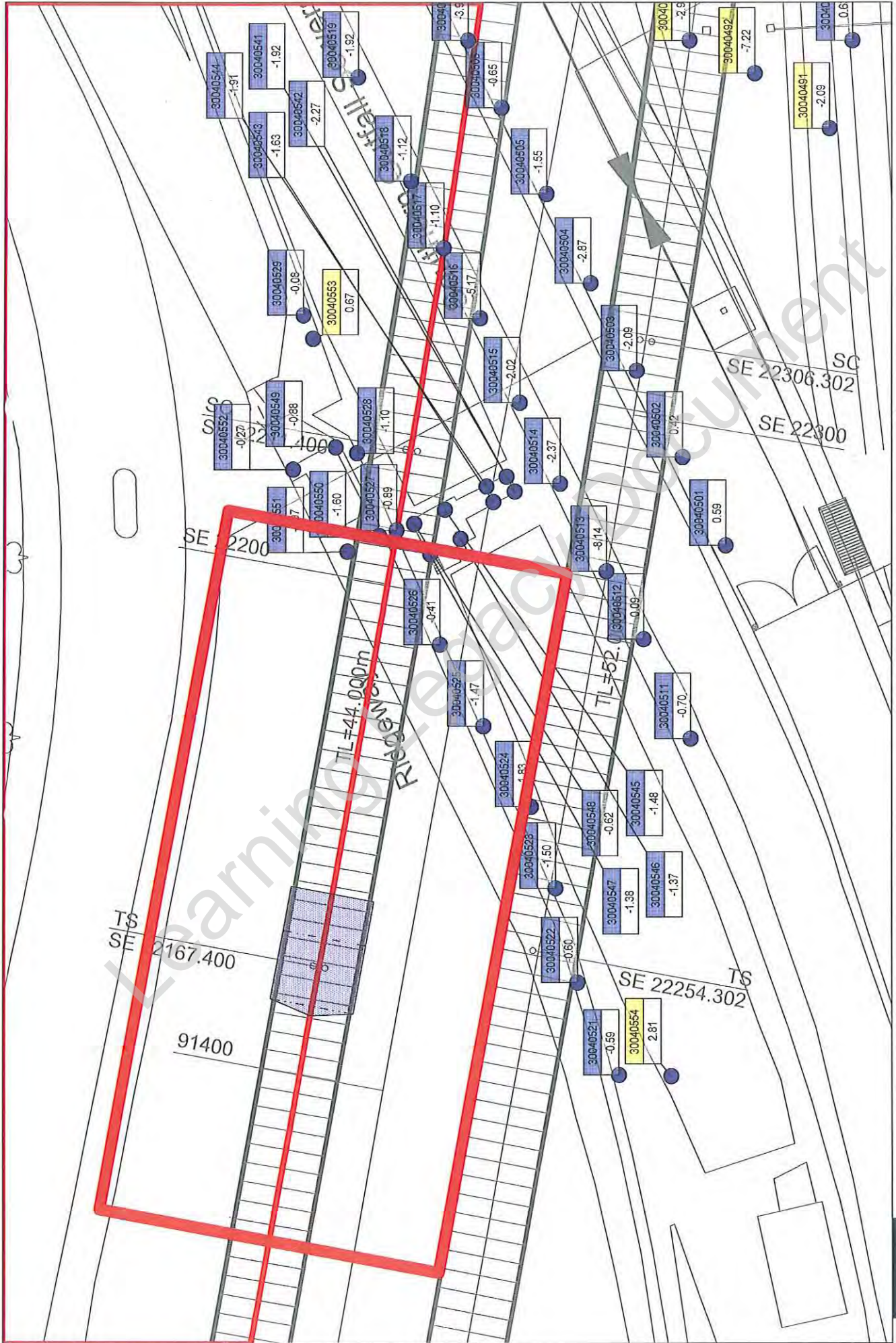
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 19.06.2013 09:00

Point: 30040549



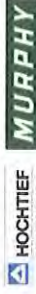
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Southern Outfall Sewer Pumping Station 12.12.2012 - 07.02.2014  
date: 29.07.2014 08:36 current values: 29.07.2014 08:13





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 23.06.2013 09:00

monitoring table



Joint Venture

project: C310 Thames Tunnel  
structure: TW SOS 1 - 3

No. of reading date	1. following 12/01/2013		2. following 19/01/2013		3. following 01/02/2013		4. following 06/02/2013		5. following 07/02/2013		6. following 12/02/2013	
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501	103.275	0	103.267	new Baseline	103.269	2	103.269	2	103.269	0	103.267	-2
3004 0502	103.238	0	103.233	new Baseline	103.235	2	103.235	2	103.235	0	103.234	-1
3004 0503	103.150	1	103.149	-2	103.150	2	103.150	2	103.150	0	103.150	0
3004 0504	103.118	1	103.117	-1	103.119	1	103.119	1	103.119	0	103.118	0
3004 0505	103.100	1	103.099	-2	103.101	2	103.101	2	103.101	0	103.100	0
3004 0506	102.996	0	102.995	-1	102.997	1	102.997	1	102.997	0	102.997	0
3004 0507	102.964	0	102.963	-2	102.965	2	102.965	2	102.965	0	102.964	-1
3004 0508	102.972	0	102.971	-2	102.972	2	102.972	2	102.972	0	102.972	0
3004 0509	102.972	0	102.970	-2	102.972	2	102.972	2	102.972	0	102.972	0
3004 0511	107.025	0	107.025	0	107.030	5	107.030	5	107.030	0	107.028	-4
3004 0512	107.000	0	107.000	0	107.000	0	107.005	5	107.005	0	107.001	-4
3004 0513	106.967	0	106.966	0	106.971	5	106.971	5	106.971	0	106.968	-3
3004 0514	107.007	0	107.007	0	107.006	-1	107.012	6	107.012	0	107.009	-3
3004 0515	107.038	0	107.037	-1	107.042	6	107.042	6	107.042	0	107.039	-3
3004 0516	106.944	0	106.944	0	106.949	5	106.949	5	106.949	0	106.945	-4
3004 0517	106.926	0	106.926	0	106.926	0	106.931	5	106.931	0	106.927	-4
3004 0518	106.957	0	106.955	0	106.957	0	106.961	4	106.961	0	106.958	-4
3004 0519	106.947	0	106.947	0	106.937	new Baseline	106.942	5	106.942	0	106.938	-4
3004 0521	101.892	0	101.891	-1	101.891	-1	101.892	1	101.892	1	101.891	-1
3004 0522	101.809	0	101.809	0	101.808	-1	101.809	1	101.809	1	101.808	-1
3004 0523	101.822	0	101.822	0	101.821	-1	101.822	1	101.822	1	101.821	0
3004 0524	101.761	0	101.761	0	101.761	-1	101.761	0	101.761	0	101.761	0
3004 0525	101.796	0	101.797	0	101.795	-1	101.797	1	101.797	1	101.796	-1
3004 0526	101.869	0	101.870	1	101.869	-2	101.870	1	101.870	1	101.869	-1
3004 0527	101.821	0	101.822	1	101.821	-1	101.821	0	101.822	1	101.820	-1
3004 0528	101.840	0	101.840	0	101.824	new Baseline			101.825	1	101.824	-1
3004 0529	101.979	0	101.979	0	destroyed							
3004 0541	106.956	0	106.956	0	106.955	-1	106.951	5	106.961	0	106.957	-4
3004 0542	106.943	0	106.943	0	106.943	-1	106.948	5	106.948	0	106.944	-4
3004 0543	106.932	0	106.932	0	106.931	-1	106.937	5	106.937	0	106.933	-3
3004 0544	106.937	0	106.937	0	106.937	-1	106.942	5	106.942	0	106.938	-4
3004 0545	102.996	0	102.997	0	102.996	-1	102.997	1	102.997	1	102.996	-1
3004 0546	103.000	0	103.000	0	102.999	-1	103.001	1	103.001	1	102.999	-1
3004 0547	103.008	0	103.009	0	103.008	-1	103.009	1	103.009	1	103.008	-1
3004 0548	102.975	0	102.977	1	102.976	-1	102.977	1	102.977	1	102.976	-1
3004 0549	101.795	0	101.795	0	101.794	-1	101.795	1	101.795	1	101.794	-1
3004 0550	101.819	0	101.820	1	101.819	-1	101.819	1	101.819	1	101.818	-1
3004 0551	101.818	0	101.818	0	101.817	0	101.818	0	101.818	0	101.817	-1
3004 0552	101.794	0	101.794	0	101.793	0	101.794	1	101.794	1	101.793	-1



monitoring table



Joint Venture

project: C310 Thames Tunnel  
structure: TW SOS 1 - 3

No. of reading	7. following		8. following		9. following		10. following		11. following		12. following					
	baseline	20/02/2013	26/02/2013	05/03/2013	06/03/2013	07/03/2013	08/03/2013	09/03/2013	10/03/2013	11/03/2013	12/03/2013					
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline			
3004 0501	103.275	103.268	1	103.269	1	2	103.267	-2	0	103.267	0	0	103.267	0	0	
3004 0502	103.238	103.234	0	103.235	1	3	103.234	-2	1	103.234	0	1	103.234	0	1	
3004 0503	103.150	103.151	1	103.151	1	2	103.150	-1	0	103.150	0	0	103.150	0	0	
3004 0504	103.118	103.119	1	103.119	0	1	103.118	-2	0	103.118	0	0	103.118	0	0	
3004 0505	103.100	103.101	1	103.102	0	1	103.100	-2	0	103.101	0	0	103.101	1	1	
3004 0506	102.986	102.988	-9	102.982	new Baseline	102.981	-1	-1	102.981	0	-1	102.981	0	-1	102.981	0
3004 0507	102.964			103.249	new Baseline	103.248	-1	-1	103.248	0	-1	103.249	1	0	103.247	-2
3004 0508	102.972	102.971	-1	103.230	new Baseline	103.229	-2	-2	103.229	0	-1	103.229	0	-1	103.228	-1
3004 0509	102.972	102.970	-2	-2												
3004 0511	107.025	107.025	-1	0			107.026	1	1							
3004 0512	107.000	107.001	-1	0			107.002	1	1							
3004 0513	106.967	106.967	-1	0			106.968	1	1							
3004 0514	107.007	107.007	-1	0			107.006	2	1							
3004 0515	107.038	107.038	-2	0			107.039	2	1							
3004 0516	106.944	106.941	-4	-3			106.942	1	-2							
3004 0517	106.926	106.926	-1	0			106.927	0	1							
3004 0518	106.957	106.957	-1	0			106.957	0	1							
3004 0519	106.947	106.938	-1	0			106.937	0	0							
3004 0521	101.832	101.831	0	0			101.833	2	1							
3004 0522	101.809	101.808	0	0			101.810	2	1							
3004 0523	101.822	101.822	0	0			101.823	2	1							
3004 0524	101.761	101.761	0	0			101.762	1	1							
3004 0525	101.796	101.796	1	0			101.797	1	0							
3004 0526	101.869	101.870	0	0			101.870	1	1							
3004 0527	101.821	101.822	1	0			101.822	1	1							
3004 0528	101.840	101.824	1	0			101.825	1	1							
3004 0529	101.979															
3004 0541	106.956	106.956	-1	-1			106.957	2	1							
3004 0542	106.943	106.943	-1	0			106.945	2	1							
3004 0543	106.932	106.932	-2	0			106.933	2	1							
3004 0544	106.937	106.937	-1	0			106.939	2	1							
3004 0545	102.996	102.996	1	0			102.997	1	1							
3004 0546	103.000	103.000	1	0			103.000	0	0							
3004 0547	103.008	103.008	1	0			103.009	0	1							
3004 0548	102.976	102.976	1	0			102.978	1	1							
3004 0549	101.795	101.794	1	0			101.795	1	1							
3004 0550	101.819	101.819	1	0			101.820	1	1							
3004 0551	101.818	101.818	1	0			101.818	1	1							
3004 0552	101.794	101.794	1	0			101.794	1	1							

monitoring table



Joint Venture

project: C310 Thames Tunnel  
structure: TW SOS 1 - 3

No. of reading	13. following		14. following		15. following		16. following		17. following		18. following	
	baseline elevation	15/12/2012 1201/2013	10/03/2013	11/03/2013	12/03/2013	13/03/2013	14/03/2013	15/03/2013	16/03/2013	17/03/2013	18/03/2013	19/03/2013
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0501	103.275	0	103.267	0	103.268	0	103.267	0	103.267	0	103.267	0
3004 0502	103.238	0	103.234	0	103.234	0	103.234	0	103.234	0	103.233	0
3004 0503	103.150	0	103.149	0	103.149	0	103.148	-1	103.148	-1	103.148	0
3004 0504	103.118	0	103.118	0	103.117	-1	103.116	-2	103.116	-2	103.116	0
3004 0505	103.100	0	103.100	0	103.099	-1	103.099	0	103.099	0	103.099	0
3004 0506	102.986	1	102.982	0	102.980	-2	102.980	0	102.980	0	102.980	0
3004 0507	102.964	2	102.949	0	102.948	-1	102.948	0	102.948	0	102.948	0
3004 0508	102.972	0	102.972	0	102.972	0	102.972	0	102.972	0	102.972	0
3004 0509	102.972	0	102.972	0	102.972	0	102.972	0	102.972	0	102.972	0
3004 0511	107.025	0	107.026	0	107.026	0	107.025	0	107.025	0	107.023	-2
3004 0512	107.000	0	107.001	0	107.001	0	107.001	0	107.000	-1	106.998	-2
3004 0513	106.967	0	106.967	0	106.967	0	106.967	0	106.966	-1	106.964	-2
3004 0514	107.007	0	107.008	0	107.007	-1	107.007	-1	107.006	-1	107.004	-1
3004 0515	107.038	0	107.039	0	107.038	-1	107.037	-1	107.037	0	107.035	-1
3004 0516	106.944	0	106.942	0	106.942	0	106.940	-2	106.940	0	106.940	-1
3004 0517	106.926	0	106.926	0	106.927	0	106.926	-1	106.926	0	106.925	-1
3004 0518	106.957	0	106.957	0	106.957	0	106.957	-1	106.957	0	106.956	-1
3004 0519	106.947	0	106.937	0	106.938	1	106.937	-1	106.937	0	106.936	-1
3004 0521	101.892	0	101.893	0	101.893	0	101.892	0	101.893	1	101.892	-1
3004 0522	101.809	0	101.809	0	101.810	0	101.810	0	101.810	1	101.809	-1
3004 0523	101.822	0	101.823	0	101.823	0	101.822	0	101.822	1	101.822	0
3004 0524	101.761	0	101.762	0	101.762	0	101.761	0	101.762	0	101.760	-1
3004 0525	101.796	0	101.797	0	101.797	0	101.796	-1	101.796	0	101.796	-1
3004 0526	101.869	0	101.870	0	101.871	0	101.869	-2	101.870	1	101.869	-1
3004 0527	101.821	0	101.822	0	101.822	0	101.821	-1	101.821	0	101.821	0
3004 0528	101.840	0	101.825	0	101.825	0	101.824	-1	101.824	1	101.824	0
3004 0529	101.979	0	101.979	0	101.979	0	101.979	0	101.979	0	101.979	0
3004 0541	106.956	0	106.957	0	106.956	-1	106.955	-1	106.955	0	106.953	-1
3004 0542	106.943	0	106.944	0	106.943	-1	106.943	-1	106.942	-1	106.940	-2
3004 0543	106.932	0	106.933	0	106.932	-1	106.932	-1	106.931	-1	106.929	-2
3004 0544	106.937	0	106.938	0	106.937	-1	106.937	0	106.936	-1	106.935	-1
3004 0545	102.996	0	102.997	0	102.997	0	102.996	-1	102.996	0	102.996	0
3004 0546	103.000	0	103.000	0	103.001	0	102.999	-1	103.000	0	102.999	0
3004 0547	103.008	0	103.009	0	103.009	0	103.008	-1	103.008	0	103.008	0
3004 0548	102.976	0	102.977	0	102.977	0	102.976	0	102.976	0	102.976	0
3004 0549	101.795	0	101.795	0	101.795	0	101.794	-1	101.795	1	101.794	-1
3004 0550	101.819	0	101.819	0	101.819	0	101.819	0	101.819	0	101.819	0
3004 0551	101.818	0	101.818	0	101.818	0	101.817	-1	101.817	0	101.818	0
3004 0552	101.794	0	101.794	0	101.794	0	101.793	-1	101.793	1	101.794	0

monitoring table



Joint Venture

project: C310 Thames Tunnel  
structure: TW SOS 1-3

No. of reading	19. following		20. following		21. following		22. following		23. following		24. following	
	baseline elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
date	15/12/2012		17/03/2013		18/03/2013		19/03/2013		20/03/2013		21/03/2013	
Point No.												
3004 0501	103.275	0 -7							103.269	2 -6		
3004 0502	103.238	103.234 -4							103.232	-1 -6		
3004 0503	103.150	103.148 0 -2							103.147	-1 -3		
3004 0504	103.118	103.116 0 -2							103.115	-1 -3		
3004 0505	103.100	103.099 0 -1							103.098	-1 -2		
3004 0506	102.936	102.980 0 -4							102.979	-1 -3		
3004 0507	102.964	103.248 0 -1							103.247	-1 -2		
3004 0508	102.972	103.229 0 -1							103.227	-2 -3		
3004 0509	102.972											
3004 0511	107.025	107.024 1 -1	107.025	0 0	107.025	0 0						
3004 0512	107.000	106.999 1 -1	106.999	0 -1	107.000	1 -1						
3004 0513	106.967	106.965 1 -2	106.965	0 -2	106.965	0 -1						
3004 0514	107.007	107.005 1 -2	107.006	0 -2	107.006	0 -1						
3004 0515	107.038	107.036 1 -2	107.036	0 -2	107.037	1 -1						
3004 0516	106.944	106.940 0 -4	106.940	0 -4	106.940	1 -4						
3004 0517	106.926	106.925 0 -1	106.925	0 -1	106.926	1 0						
3004 0518	106.957	106.956 0 -1	106.956	1 0	106.957	1 0						
3004 0519	106.947	106.936 0 -1	106.937	0 -1	106.937	1 0						
3004 0521	101.892	101.892 0 0	101.892	0 0	101.892	0 0	101.892	0 0	101.892	0 0	101.892	0 0
3004 0522	101.809	101.808 -1	101.809	1 0	101.809	0 0	101.808	0 -1	101.808	0 0	101.808	0 0
3004 0523	101.822	101.822 0 0	101.822	0 0	101.822	0 0	101.821	0 -1	101.821	0 -1	101.821	0 -1
3004 0524	101.761	101.760 -1	101.761	1 0	101.760	0 -1	101.760	0 -1	101.760	0 -1	101.760	0 -1
3004 0525	101.796	101.795 0 -1	101.796	1 0	101.795	-1 -1	101.795	0 -1	101.795	0 -1	101.795	0 -1
3004 0526	101.869	101.869 0 0	101.870	1 1	101.868	-1 -1	101.869	0 0	101.869	1 0	101.869	0 0
3004 0527	101.821	101.821 0 -1	101.821	0 0	101.820	-1 -1	101.821	0 -1	101.821	0 -1	101.821	0 0
3004 0528	101.840	101.824 0 0	101.825	1 1	101.824	-1 0	101.824	0 0	101.824	0 0	101.824	0 0
3004 0529	101.979											
3004 0541	106.956	106.954 1 -2	106.955	0 -2	106.955	1 -1						
3004 0542	106.943	106.942 1 -2	106.942	0 -2	106.942	0 -1						
3004 0543	106.932	106.931 1 -1	106.931	0 -1	106.931	0 -1						
3004 0544	106.937	106.936 1 -1	106.936	0 -1	106.936	0 -1						
3004 0545	102.996	102.995 0 -1	102.996	0 -1	102.995	-1 -1	102.995	0 -1	102.995	0 -1	102.995	0 -1
3004 0546	103.000	102.999 0 -1	102.999	0 0	102.999	-1 -1	102.999	0 -1	102.999	0 -1	102.999	0 -1
3004 0547	103.008	103.008 0 -1	103.007	0 -1	103.007	0 -1	103.008	0 0	103.008	0 -1	103.008	0 0
3004 0548	102.976	102.976 0 -1	102.976	1 0	102.976	-1 -1	102.976	1 0	102.976	0 0	102.976	0 0
3004 0549	101.795	101.794 0 -1	101.794	0 0	101.794	0 0	101.794	0 0	101.794	0 0	101.794	0 -1
3004 0550	101.819	101.818 0 -1	101.819	1 0	101.818	0 -1	101.818	0 -1	101.818	0 -1	101.819	0 0
3004 0551	101.818	101.817 -1	101.818	1 0	101.817	-1 -1	101.817	0 0	101.817	0 0	101.817	0 0
3004 0552	101.794	101.793 -1	101.793	0 0	101.794	0 0	101.794	0 0	101.794	0 0	101.794	-1 0

monitoring table



Joint Venture

project: C310 Thames Tunnel  
structure: TW SOS 1-3

No. of reading	baseline		25. following		26. following		27. following		28. following		29. following		30. following		
	date	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
	15/12/2012	103.275													
	12/01/2013	103.238													
3004 0501		103.266			103.266	-3	-8	103.266	0	-9	103.268	2	-7	103.266	-2
3004 0502		103.233			103.233	0	-5	103.233	0	-6	103.234	2	-4	103.232	-2
3004 0503		103.150			103.147	0	-3	103.147	0	-2	103.149	2	-1	103.147	-2
3004 0504		103.118			103.115	0	-3	103.115	0	-3	103.116	1	-2	103.115	-2
3004 0505		103.100			103.097	-1	-3	103.098	1	-2	103.100	2	0	103.099	-2
3004 0506		102.996			102.979	0	-3	102.980	0	-3	102.981	1	-2	103.150	new Baseline
3004 0507		102.964			103.247	0	-2	103.247	0	-2	103.249	2	0	103.246	-3
3004 0508		102.972			103.228	1	-2	103.228	0	-3	103.229	1	-1	103.227	-2
3004 0511		107.025			107.024	0	-1	107.025	1	0	107.025	0	0	107.024	-1
3004 0512		107.000			106.993	-2	-4	106.993	0	-4	106.959	-4	-8	106.958	-1
3004 0513		106.967			107.006	0	-1	107.007	1	-1	107.006	-1	-1	107.005	-1
3004 0514		107.007			107.037	0	-1	107.038	1	0	107.037	0	-1	107.036	0
3004 0515		107.038			106.940	-1	-4	106.941	1	-3	106.940	-1	-4	106.940	0
3004 0516		106.944			106.925	-1	-1	106.927	1	1	106.925	-1	-1	106.926	0
3004 0517		106.926			106.956	-1	0	106.958	2	1	106.957	-1	0	106.956	0
3004 0518		106.957			106.937	0	-1	106.938	1	0	106.937	-1	0		
3004 0519		106.947			101.892	0	0	101.891	0	0	101.892	1	0	101.891	-1
3004 0521		101.892			101.892	0	0	101.891	0	0	101.891	0	0	101.891	0
3004 0522		101.809			101.808	0	0	101.808	-1	-1	101.809	1	0	101.808	-1
3004 0523		101.822			101.821	0	-1	101.821	-1	-1	101.822	1	0	101.821	-1
3004 0524		101.761			101.760	-1	-1	101.760	0	-1	101.761	1	-1	101.760	-1
3004 0525		101.796			101.796	0	-1	101.795	-1	-1	101.795	0	-1	101.796	0
3004 0526		101.869			101.870	0	1	101.869	-1	0	101.868	-1	-1	101.870	2
3004 0527		101.821			101.821	0	0	101.821	-1	-1	101.821	0	-1	101.821	1
3004 0528		101.840			101.825	1	0	101.824	-1	0	101.824	0	0	101.825	0
3004 0529		101.979													
3004 0541		106.956			106.955	0	-1	106.955	1	-1	106.955	-1	-1	106.954	0
3004 0542		106.943			106.942	0	-1	106.943	0	-1	106.942	-1	-1	106.942	0
3004 0543		106.932			106.931	0	-1	106.932	1	0	106.931	-1	-1	106.931	-1
3004 0544		106.937			106.936	0	-1	106.937	1	0	106.936	-1	-1	106.936	0
3004 0545		102.996			102.996	0	0	102.995	-1	-1	102.995	0	-1	102.996	1
3004 0546		103.000			103.000	1	0	102.999	-1	-1	102.999	0	-1	103.000	1
3004 0547		103.008			103.008	0	0	103.007	-1	-1	103.008	0	0	103.008	0
3004 0548		102.976			102.976	1	1	102.976	-1	-1	102.976	0	0	102.977	1
3004 0549		101.795			101.795	1	0	101.794	-1	-1	101.794	0	-1	101.794	0
3004 0550		101.819			101.819	0	0	101.819	0	0	101.818	0	-1	101.819	1
3004 0551		101.818			101.817	0	0	101.817	-1	-1	101.817	0	0	101.817	0
3004 0552		101.794			101.794	0	0	101.794	-1	0	101.793	0	0	101.794	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: TW SOS 1 - 3

No. of reading	baseline date	31. following		32. following		33. following		34. following		35. following		36. following	
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
	15/12/2012												
	12/01/2013												
3004 0501	103.275	103.267	1 -8	103.267	0 -7	103.267	0 -7	103.267	0 -7	103.267	0 -8	103.267	1 -7
3004 0502	103.238	103.233	0 -5	103.233	1 -5	103.233	1 -5	103.233	1 -5	103.233	-1 -6	103.233	1 -5
3004 0503	103.150	103.147	0 -3	103.147	0 -3	103.147	0 -3	103.147	-1 -3	103.147	0 -3	103.148	1 -2
3004 0504	103.118	103.115	0 -3	103.115	1 -3	103.115	0 -3	103.115	-1 -3	103.115	0 -3	103.115	1 -3
3004 0505	103.100	103.098	0 -2	103.099	0 -1	103.099	0 -1	103.098	-1 -2	103.098	0 -2	103.099	0 -2
3004 0506	102.996	103.150	0 0	103.150	0 0	103.149	-1 -1	103.149	-1 -1	103.150	-1 -1	103.150	0 -1
3004 0507	102.964	103.247	0 -3	103.247	0 -3	103.246	-1 -3	103.245	-1 -5	103.245	-1 -4	103.245	0 -4
3004 0508	102.972	103.228	1 -3	103.227	-1 -4	103.227	-1 -4	103.226	-1 -4			103.226	0 -4
3004 0509	102.972												
3004 0511	107.025			107.024	0 -1	107.024	0 -1	107.025	0 0	107.024	0 -1	107.025	1 0
3004 0512	107.000			106.972	0 0	106.972	0 0	106.972	0 0	106.972	0 0	106.972	1 1
3004 0513	106.967			106.959	1 -8	106.959	0 -8	106.959	0 -8	106.959	-1 -9	106.959	1 -8
3004 0514	107.007			107.006	0 -1	107.005	-1 -2	107.005	0 -2	107.004	-1 -3	107.005	1 -2
3004 0515	107.038			107.037	0 -1	107.036	0 -2	107.036	0 -2	107.035	-1 -3	107.036	1 -2
3004 0516	106.944			106.940	0 -4	106.940	0 -4	106.939	-1 -5	106.938	-1 -6	106.939	0 -5
3004 0517	106.926			106.926	0 0	106.926	0 -1	106.925	0 -1	106.924	-1 -2	106.924	0 -2
3004 0518	106.957			106.956	0 0	106.957	0 0	106.956	-1 -1	106.956	0 -1	106.956	0 -1
3004 0519	106.947			106.936	-1 -1	106.936	-1 -1	106.936	0 -1	106.936	0 -1	106.935	0 -2
3004 0521	101.892			101.890	-1 -1	101.891	1 0	101.892	1 0	101.892	0 0	101.891	-1 -1
3004 0522	101.809			101.808	0 -1	101.807	-1 -2	101.808	1 0	101.808	0 -1	101.808	0 0
3004 0523	101.822			101.820	0 -2	101.820	0 -2	101.821	1 -1	101.821	0 -1	101.821	0 -1
3004 0524	101.761			101.759	0 -2	101.759	0 -2	101.760	1 -1	101.760	0 -1	101.760	0 -1
3004 0525	101.796			101.795	0 -1	101.795	-1 -2	101.796	1 0	101.796	0 -1	101.795	-1 -1
3004 0526	101.869			101.868	0 -1	101.869	1 0	101.870	1 1	101.870	0 1	101.869	-1 0
3004 0527	101.821			101.821	0 -1	101.820	0 -1	101.821	1 0	101.822	1 0	101.820	-2 -1
3004 0528	101.840			101.824	0 0	101.824	-1 -1	101.824	0 0	101.825	1 0	101.823	-1 -1
3004 0529	101.979												
3004 0541	106.956			106.955	-1 -1	106.954	0 -2	106.954	0 -2	106.954	0 -2	106.955	1 -2
3004 0542	106.943			106.942	-1 -2	106.941	-1 -2	106.942	1 -1	106.941	-1 -3	106.942	1 -2
3004 0543	106.932			106.931	-1 -1	106.931	0 -1	106.931	0 -1	106.930	-1 -2	106.931	1 -2
3004 0544	106.937			106.936	-1 -1	106.937	0 -1	106.936	0 -1	106.936	-1 -1	106.936	-1 -1
3004 0545	102.996			102.995	0 -1	102.995	0 -1	102.996	1 0	102.996	0 0	102.995	-1 -1
3004 0546	103.000			102.999	0 -1	102.999	0 -1	103.000	1 0	103.000	0 0	102.999	-1 -1
3004 0547	103.008			103.008	0 0	103.008	0 -1	103.008	1 0	103.008	-1 0	103.008	0 0
3004 0548	102.976			102.976	0 0	102.976	0 -1	102.977	1 0	102.976	0 0	102.976	-1 -1
3004 0549	101.795			101.794	0 -1	101.793	0 -1	101.794	1 0	101.794	0 0	101.793	-1 -1
3004 0550	101.819			101.818	0 -1	101.818	0 -1	101.819	1 0	101.819	0 0	101.818	-1 -2
3004 0551	101.818			101.817	0 -1	101.816	0 -1	101.818	1 0	101.818	0 1	101.817	-2 -1
3004 0552	101.794			101.793	0 0	101.793	0 -1	101.794	1 0	101.794	0 0	101.793	0 0

monitoring table

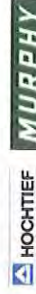


Joint Venture

project: C310 Thames Tunnel  
structure: TW SOS 1 - 3

No. of reading date	baseline 15/12/2012 12/01/2013		37. following 23/06/2013		38. following 24/06/2013		39. following 25/06/2013		40. following 02/07/2013		41. following 03/07/2013		42. following 15/07/2013	
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
Point No.														
3004 0501	103.275		103.266	-1	103.267	1	103.266	-1	103.267	1	103.266	0	103.266	0
3004 0502	103.238		103.232	-1	103.232	0	103.232	-1	103.232	0	103.232	0	103.232	0
3004 0503	103.150		103.146	-2	103.146	0	103.146	-2	103.146	0	103.146	0	103.146	0
3004 0504	103.118		103.113	-2	103.114	1	103.113	-2	103.114	1	103.113	-1	103.113	-1
3004 0505	103.100		103.097	-2	103.097	1	103.097	-2	103.097	1	103.097	-1	103.097	-1
3004 0506	102.996		103.148	-2	103.148	2	103.148	-2	103.148	2	103.148	-1	103.148	-1
3004 0507	102.964		103.244	-2	103.245	1	103.244	-2	103.245	1	103.244	-1	103.244	-1
3004 0508	102.972		103.223	-3	103.226	3	103.223	-3	103.226	3	103.224	-2	103.224	-2
3004 0509	102.972													
3004 0511	107.025	-1	107.024	-1	107.024	1	107.024	0	107.024	1	107.024	0	107.024	1
3004 0512	107.000	0	106.972	0	106.972	0	106.972	0	106.972	0	106.971	-1	106.971	0
3004 0513	106.967	0	106.959	0	106.958	0	106.958	0	106.958	0	106.958	-1	106.959	1
3004 0514	107.007	0	107.005	0	107.004	-1	107.004	-1	107.004	-1	107.004	0	107.005	0
3004 0515	107.038	0	107.036	0	107.036	-1	107.036	-1	107.036	-1	107.035	0	107.036	1
3004 0516	106.944	0	106.939	0	106.938	-1	106.938	-1	106.938	-1	106.938	0	106.938	1
3004 0517	106.926	0	106.925	0	106.924	-1	106.924	-1	106.924	-1	106.924	-1	106.924	1
3004 0518	106.957	0	106.955	0	106.955	0	106.955	0	106.955	0	106.955	-1	106.955	0
3004 0519	106.947	0	106.936	0	106.936	0	106.936	0	106.936	0	106.935	-1	106.935	0
3004 0521	101.892	0	101.891	0	101.892	1	101.892	0	101.892	1	101.891	-1	101.890	-1
3004 0522	101.809	0	101.808	0	101.808	0	101.808	0	101.808	0	101.808	0	101.808	0
3004 0523	101.822	-1	101.820	-1	101.821	0	101.821	-1	101.821	0	101.820	-2	101.818	-3
3004 0524	101.761	-1	101.759	-1	101.760	0	101.760	-1	101.760	0	101.759	-2	101.757	-2
3004 0525	101.796	0	101.795	0	101.795	0	101.795	0	101.795	0	101.795	0	101.794	-1
3004 0526	101.869	0	101.869	0	101.869	0	101.869	0	101.869	0	101.869	0	101.868	-1
3004 0527	101.821	0	101.821	0	101.820	0	101.820	0	101.820	0	101.820	0	101.820	0
3004 0528	101.840	0	101.823	0	101.824	0	101.824	0	101.824	0	101.822	-1	101.821	-1
3004 0529	101.979													
3004 0541	106.956	0	106.954	0	106.954	-1	106.954	-1	106.954	-1	106.954	0	106.954	0
3004 0542	106.943	-1	106.941	-1	106.941	-1	106.941	-1	106.941	-1	106.941	0	106.941	0
3004 0543	106.932	0	106.931	0	106.931	0	106.931	0	106.931	0	106.930	-1	106.931	0
3004 0544	106.937	-1	106.935	-1	106.935	-1	106.935	-1	106.935	-1	106.935	0	106.935	0
3004 0545	102.996	0	102.995	0	102.995	0	102.995	0	102.995	0	102.995	0	102.994	-1
3004 0546	103.000	-1	102.998	-1	102.999	0	102.999	-1	102.999	0	102.998	-1	102.998	0
3004 0547	103.008	0	103.007	0	103.007	0	103.007	0	103.007	0	103.007	-1	103.007	0
3004 0548	102.976	0	102.976	0	102.976	0	102.976	0	102.976	0	102.975	0	102.975	0
3004 0549	101.795	0	101.794	0	101.794	0	101.794	0	101.794	0	101.794	0	101.794	0
3004 0550	101.819	0	101.817	0	101.817	0	101.817	0	101.817	0	101.817	-1	101.818	1
3004 0551	101.818	0	101.817	0	101.817	0	101.817	0	101.817	0	101.818	1	101.817	-1
3004 0552	101.794	0	101.793	0	101.793	0	101.793	0	101.793	0	101.793	0	101.793	0

monitoring table




Joint Venture

Project: C310 Thames Tunnel

structure: TW SOS 1 - 3

No. of reading	baseline	43. following		44. following		45. following		46. following		47. following		48. following		49. following	
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
date	15/12/2012 12/01/2013	14/02/2013	19/02/2013	09/03/2013	16/03/2013	19/10/2013	06/02/2014	07/02/2014							
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
3004 0501	103.275	103.266	-1	103.266	-1	103.266	-1	103.267	2	-8	Point Lost				
3004 0502	103.238	103.231	-7	103.231	-7	103.231	-7	103.231	-7	points lost due new turnmic					
3004 0503	103.150	103.145	-5	103.144	-6	103.144	-6	103.144	-6	103.113	2	-5	103.112	-1.44	-6.39
3004 0504	103.118	103.112	-6	103.111	-7	103.111	-7	103.111	-7	103.097	3	-3	103.096	-1.50	-4.32
3004 0505	103.100	103.096	-4	103.095	-5	103.095	-5	103.095	-5	103.149	1	-2	103.147	-1.41	-3.28
3004 0506	102.996	103.148	-1	103.147	0	-3	103.242	-1	-7	103.244	1	-6	Point Damaged		
3004 0507	102.964	103.243	-1	103.242	-1	-7	103.224	0	-7	103.224	0	-6	103.223	-0.86	-7.32
3004 0508	102.972	103.224	0	103.224	0	-7	point lost			point lost					
3004 0509	102.972														
3004 0511	107.025	107.023	-2	107.023	-1	-2	107.024	1	-1	107.024	1	-1	107.024	0	-1
3004 0512	107.000	106.970	-3	106.970	-3	-11	106.971	1	-1	106.971	1	-1	106.971	0	-1
3004 0513	106.967	106.956	-11	106.956	-11	-11	106.957	2	-9	106.957	2	-9	106.956	-1	-10
3004 0514	107.007	107.002	-5	107.001	-6	-6	107.004	3	-3	107.004	3	-3	107.004	-1	-4
3004 0515	107.038	107.033	-5	107.032	-6	-6	107.035	2	-3	107.035	2	-3	107.033	-1	-5
3004 0516	106.944	106.936	-8	106.935	-9	-9	106.937	2	-7	106.937	2	-7	106.937	0	-7
3004 0517	106.926	106.922	-4	106.925	-3	-9	106.923	1	-3	106.923	1	-3	106.922	-1	-4
3004 0518	106.957	106.954	-3	106.953	-4	-4	106.954	1	-3	106.954	1	-3	106.954	0	-3
3004 0519	106.947	106.934	-13	106.934	-13	-4	106.935	1	-3	106.935	1	-3	106.935	0	-3
3004 0521	101.892			101.890	0	-1	101.888	-2	-4	101.888	-2	-4	101.889	1	-1
3004 0522	101.809			101.806	-3	-3	101.805	-1	-3	101.806	1	-2	101.807	1	-1
3004 0523	101.822			101.813	-9	-9	101.811	-2	-11	101.814	3	-8	101.820	6	-2
3004 0524	101.761			101.754	-7	-7	101.751	-3	-10	101.753	2	-8	101.760	6	-2
3004 0525	101.796			101.791	-5	-5	101.790	-1	-7	101.791	2	-5	101.794	3	-2
3004 0526	101.869			101.864	-5	-5	101.864	0	-5	101.865	1	-4	101.868	3	-1
3004 0527	101.821			101.818	-3	-3	101.817	-1	-5	101.820	3	-2	101.819	-1	-2
3004 0528	101.840			101.818	-3	-6	101.816	-2	-8	101.819	3	-5	101.822	3	-2
3004 0529	101.979						point lost			point lost			point lost		
3004 0541	106.956	106.952	-4	106.951	-5	-5	106.953	2	-3	106.953	2	-3	106.953	0	-4
3004 0542	106.943	106.939	-4	106.938	-5	-5	106.940	2	-3	106.940	2	-3	106.940	-1	-4
3004 0543	106.932	106.928	-4	106.927	-5	-5	106.929	2	-3	106.929	2	-3	106.929	-1	-3
3004 0544	106.937	106.933	-4	106.932	-5	-5	106.935	2	-3	106.935	2	-3	106.934	-1	-3
3004 0545	102.996			102.994	0	-2	102.992	-2	-4	102.995	2	-2	102.994	-1	-2
3004 0546	103.000			102.998	0	-2	102.996	-2	-4	102.998	2	-2	102.997	-1	-3
3004 0547	103.008			103.006	-2	-2	103.004	-2	-4	103.007	3	-1	103.006	-1	-2
3004 0548	102.976			102.975	-1	-2	102.973	-2	-4	102.975	2	-1	102.974	-1	-2
3004 0549	101.795			101.793	-2	-2	101.791	-2	-4	101.794	3	-1	101.793	-1	-1
3004 0550	101.819			101.817	-2	-2	101.815	-2	-4	101.818	3	-1	101.817	-1	-2
3004 0551	101.818			101.816	-2	-2	101.814	-2	-4	101.817	3	-1	101.816	-1	-2
3004 0552	101.794			101.792	-2	-1	101.790	-2	-4	101.793	3	0	101.793	0	-1

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	CROSSRAIL	eB NO	C310-HTM-C-RGN-CR148-50022	Rev	6.0
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 23**

**Southern Outfall Sewer Extensometer**

Learning Legacy Document



<b>monitoring asset</b>	<b>Southern Outfall Sewer (SOS) + Pumpstation</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
<b>name of monitoring section:</b>	Southern Outfall Sewer Pumping Station		
sensor type:	Extensometer		
chainage:	91410 / 91460	point no.:	3004 0553 - 3004 0554
<b>trigger values:</b> [mm]	green: +12 -12	amber: +15 -15	red: +18 -18
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	30/01/2013 07/02/2013	0 0		
<b>TBM 1</b>	start ZOI 14/03/13	0.57	3004 0554	
	end ZOI 22/03/13	0.38	3004 0554	breached not any trigger value
<b>TBM 2</b>	start ZOI 19/06/13	0.10	3004 0553	
	end ZOI 22/06/13	0.55	3004 0553	breached not any trigger value
<b>longterm</b>	07/02/14	-0.60 +3.04	3004 0553 3004 0554	
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV		
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)		

**summary / comments**

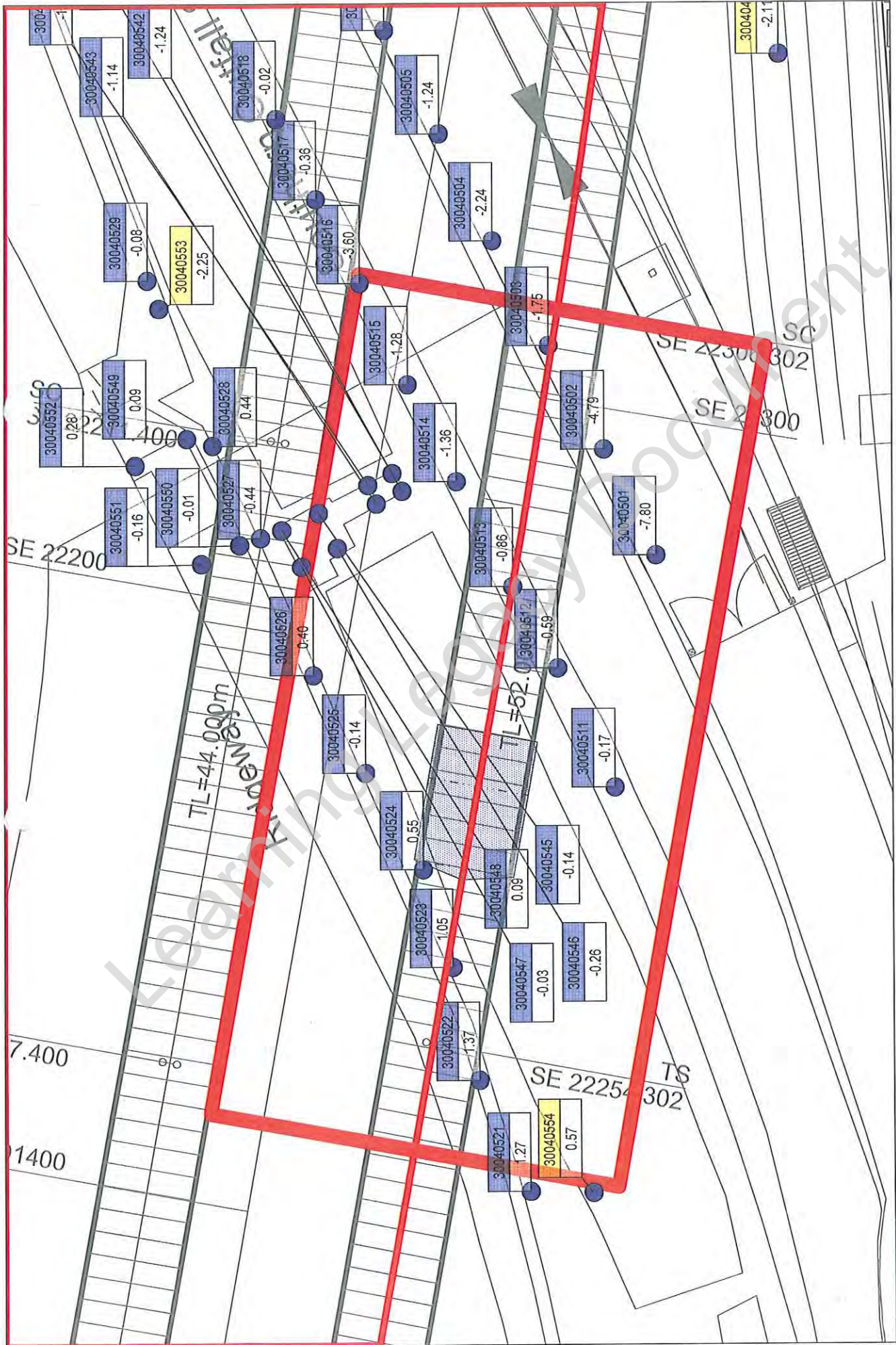
Both of the points were destroyed direct after installation, and point 3004 0553 a 2nd time on 22.05. and new baselined 15.06.2013  
 Overall, none of the points reached any trigger value.  
 Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.  
 Monitoring data shows that shallow datum movements behaved similar to those on the surface.

date / signature: 22/01/2015

print name:

HMJV project role:

Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 14.03.2013 18:46



Point: 30040554

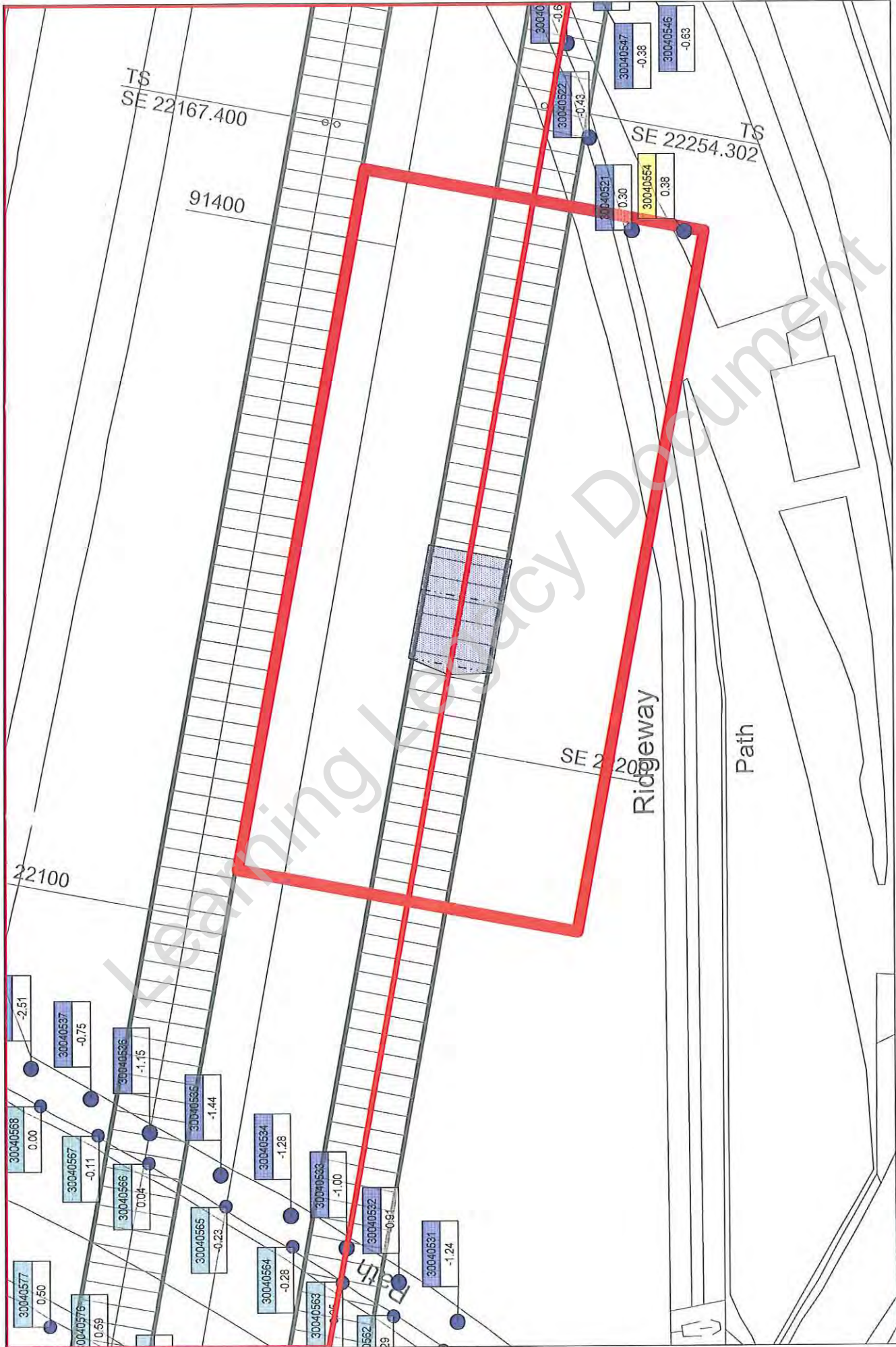


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Southern Outfall Sewer Extensometer 12.12.2012 - 07.02.2014

date: 28.07.2014 16:03 current values: 28.07.2014 15:52

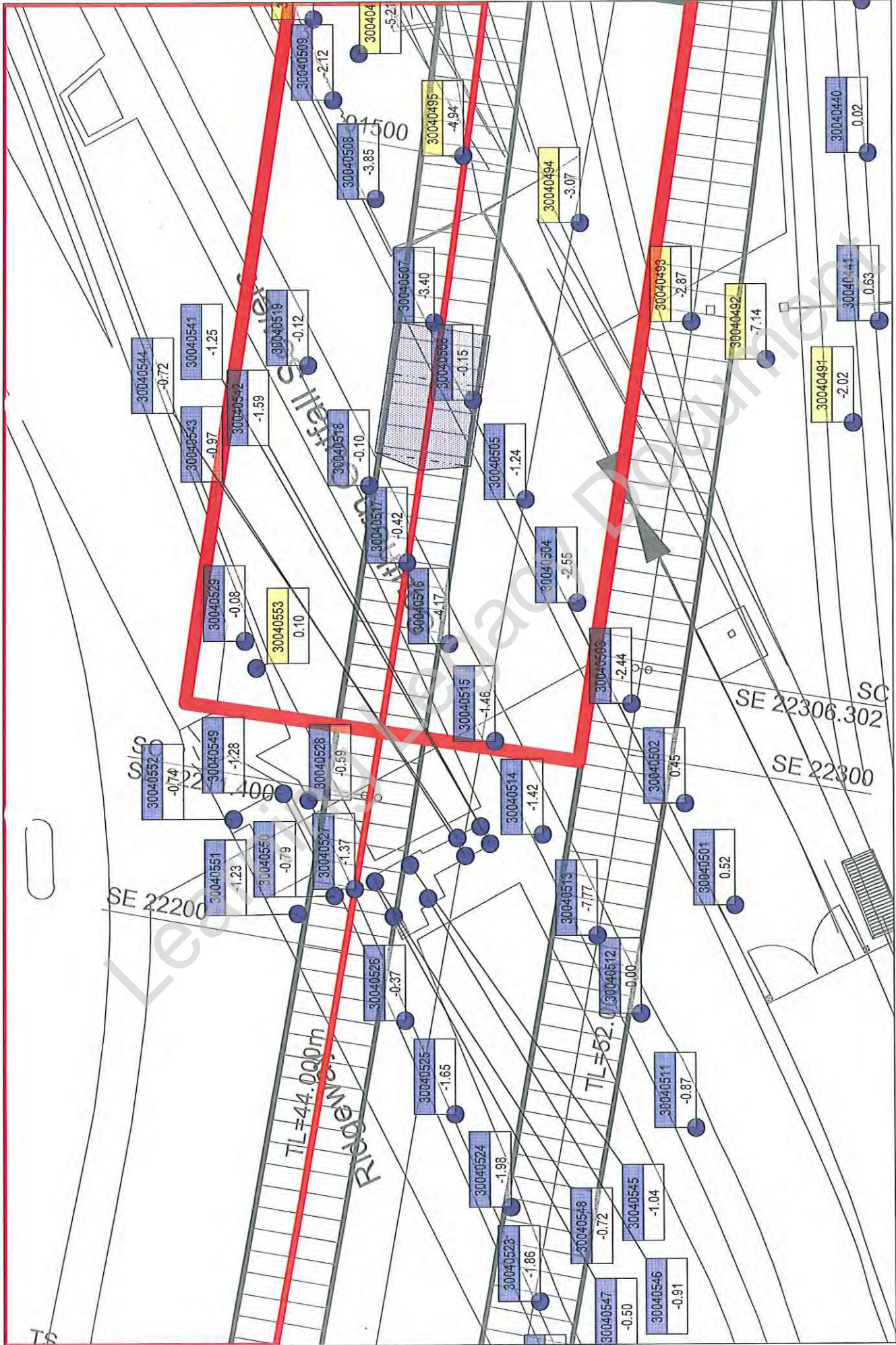




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 22.03.2013 08:17



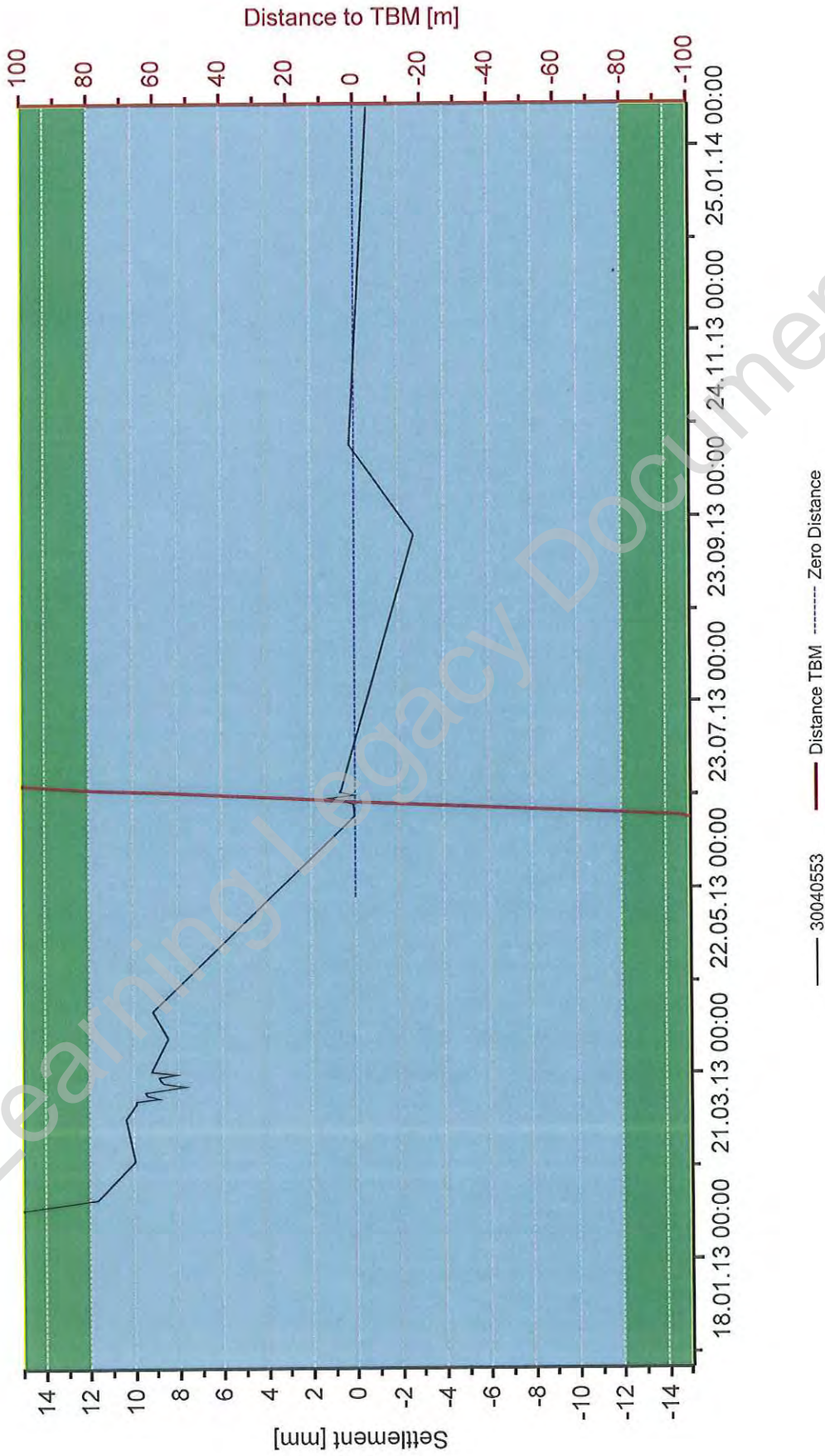
Hochtief and Murphy Joint Venture



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 19.06.2013 09:00

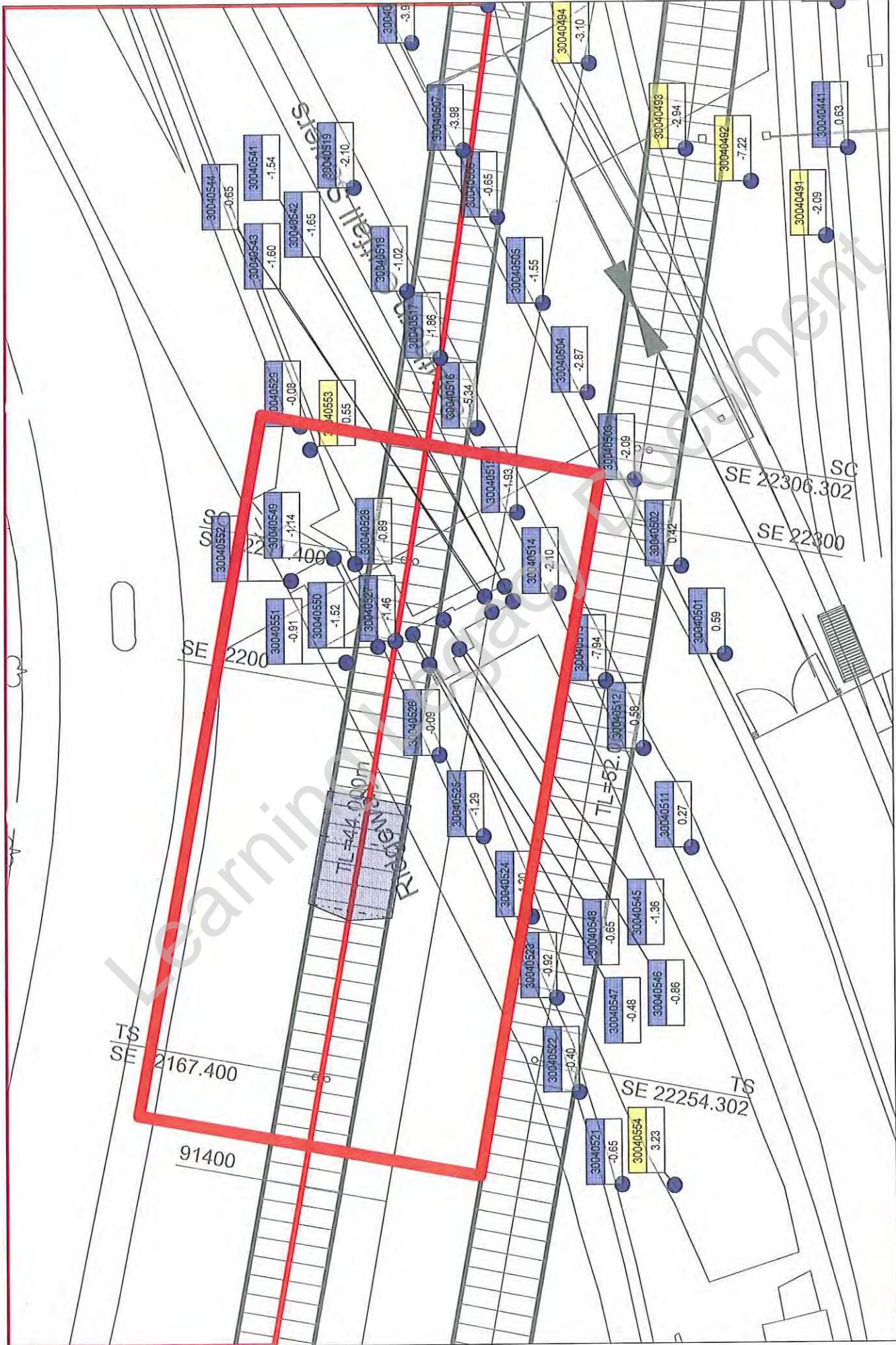


Point: 30040553



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Southern Outfall Sewer Extensometer 12.12.2012 - 07.02.2014  
date: 29.07.2014 08:31 current values: 29.07.2014 08:13





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 22.06.2013 09:00





4. following			5. following			6. following			7. following			8. following		
11/03/2013			12/03/2013			13/03/2013			14/03/2013			15/03/2013		
elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD
102.37844	107.26	96.27118	102.37853	107.36	96.27117	102.37756	107.41	96.27015	102.37817	107.48	96.27069	102.37833	107.56	96.27077
102.39268	110.64	96.28204	102.39274	110.11	96.28263	102.39241	109.99	96.28242	102.39314	110.12	96.28302	102.39245	109.69	96.28276

Legacy Document

9. following			10. following			11. following			12. following			13. following		
16/03/2013			17/03/2013			18/03/2013			19/03/2013			20/03/2013		
elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD
102.37771	107.90	96.26981	102.37698	108.03	96.26895	102.37816	108.26	96.26990	102.37832	108.28	96.27004	102.37828	108.19	96.27009
102.39170	109.38	96.28232	102.39222	108.40	96.28382	102.39194	108.97	96.28297	102.39227	109.04	96.28323	102.39223	109.31	96.28292

Legacy Document

14. following			15. following			16. following			17. following			18. following		
21/03/2013			22/03/2013			28/03/2013			02/04/2013			11/04/2013		
elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD
102.37768	108.34	96.26934	102.37877	108.30	96.27047	102.37872	108.02	96.27070	102.37820	108.47	96.26973	102.37912	108.73	96.27039
102.39200	109.17	96.28283	102.39266	108.88	96.28378	102.39441	108.92	96.28549	102.39213	108.85	96.28328	102.39315	109.66	96.28349

Legacy Document

19. following				20. following				21. following				22. following				23. following			
22/05/2013				15/06/2013				18/06/2013				19/06/2013				20/06/2013			
elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD		elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD		elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD		elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD		elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	
destroyed				102.38773	126.47	96.26126		102.38829	126.40	96.26189		102.38789	126.53	96.26136		102.38856	126.75	96.26181	
102.39421	108.86	96.28535		102.39491	110.09	96.28482		102.39494	109.91	96.28503		102.39498	110.26	96.28472		102.39608	110.40	96.28568	

Legacy Document

24. following			25. following			26. following			27. following			28. following		
21/06/2013			22/06/2013			23/06/2013			24/06/2013			03/07/2013		
elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD	elevation of head in mATD	calliper reading in mm	toe level of extensometer in mATD
102.38913	126.68	96.26245	102.38779	126.47	96.26132	102.38823	126.30	96.26193	102.38824	126.34	96.26190	102.38809	126.53	96.26156
102.39566	110.77	96.28489	102.39620	110.45	96.28575	102.39566	110.40	96.28526	102.39625	109.84	96.28641	102.39588	109.19	96.28669

Legacy Document

29. following				30. following				31. following				32. following			
elevation of head in mATD		calliper reading in mm	toe level of extensor in mATD	elevation of head in mATD		calliper reading in mm	toe level of extensor in mATD	elevation of head in mATD		calliper reading in mm	toe level of extensor in mATD	elevation of head in mATD		calliper reading in mm	toe level of extensor in mATD
102.38849		126.75	96.26174	102.38470	126.10	96.25860	102.38750	126.06	96.26144	102.38716	126.50	96.26066	102.39489	109.40	96.28549
102.39647		109.50	96.28697	102.39314	109.80	96.28334	102.39408	109.40	96.28468						

Legacy Document

project: C310 Thames Tunnel

structure: Extensometer / Shallow Datum in SOS

structure: Extensometer / Shallow Datum in SOS

No. of reading date	1. following 05/03/2013		2. following 07/03/2013		3. following 09/03/2013		4. following 06/03/2013		5. following 11/03/2013		6. following 12/03/2013		7. following 13/03/2013		8. following 14/03/2013		9. following 15/03/2013		10. following 16/03/2013		11. following 17/03/2013		12. following 18/03/2013				
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline			
30040553	96.281	0	96.275	-2	96.271	-2	96.272	0	96.271	0	96.271	0	96.271	-1	96.271	1	96.271	0	96.271	-1	96.270	-1	96.269	-1	96.270	1	-3
30040554	96.287	0	96.282	-3	96.280	-3	96.282	2	96.282	0	96.283	1	96.282	0	96.282	1	96.283	0	96.283	0	96.282	0	96.284	1	96.284	1	1

Engineering Legacy Document

Joint Venture

Joint Venture

project: C310 Thames Tunnel

project: C310 Thames Tunnel

No. of reading GRIJ	Structure: Extensometer / Shallow Datum in SOS											
	13. following 13/05/2013	14. following 20/05/2013	15. following 27/05/2013	16. following 22/06/2013	17. following 29/06/2013	18. following 07/07/2013	19. following 14/07/2013	20. following 21/07/2013	21. following 28/07/2013	22. following 04/08/2013	23. following 11/08/2013	24. following 18/08/2013
baseline 30/1/13	elevation 96.281	elevation 96.270	elevation 96.269	elevation 96.270	elevation 96.271	elevation 96.270	elevation 96.270	elevation 96.270	elevation 96.261	elevation 96.262	elevation 96.261	elevation 96.262
	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline
30040553	0	-3	-1	0	0	-1	-3	0	NEW	1	1	0
30040554	0	0	0	1	2	-2	1	3	-1	0	0	2
	96.283	96.283	96.283	96.284	96.285	96.283	96.283	96.285	96.285	96.285	96.285	96.286

Warning Legacy Document



Joint Venture


project: C310 Thames Tunnel  
structure: Extensometer / Shallow Datum in SOS

Joint Venture

project: C310 Thames Tunnel  
structure: Extensometer / Shallow Datum in SOS

No. of reading Point No.	25. following 21/06/2011		26. following 22/06/2011		27. following 23/06/2011		28. following 24/06/2011		29. following 05/07/2011		30. following 12/07/2011		31. following 18/07/2011		32. following 17/08/2011		33. following 07/09/2011		34. following		35. following		36. following			
	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline		
30040553	96.281	1	96.282	1	96.282	1	96.282	0	96.282	0	96.282	0	96.282	0	96.281	3	96.281	0	96.281	-1	96.281	-1				
30040554	96.287	2	96.286	1	96.285	0	96.286	1	96.287	0	96.287	0	96.287	-4	96.285	1	96.285	2	96.285	1	96.285	3				

Engineering Legacy Document

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 24**

**CS5 – Petment Crescent Bridge – Lev.St.**

Learning Legacy Document

<b>monitoring asset</b>	<b>Petment Crescent Bridge / Nathan Ridgeway Path</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
<b>name of monitoring section:</b>	Petment Crescent Bridge		
sensor type:	manual levelling studs		
chainage:	91320	point no.:	3004 0531 - 3004 0538
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 -20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	19/01/13	0.00		
<b>TBM 1</b>	start ZOI	23/03/13	-1.02	3004 0533
	end ZOI	27/03/13	-1.77	3004 0533
<b>TBM 2</b>	start ZOI	26/06/13	-1.78	3004 0536
	end ZOI	30/06/13	-3.66	3004 0536
<b>longterm</b>	07/02/14	-4.72	3004 0536	
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV		
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)		

**summary / comments**

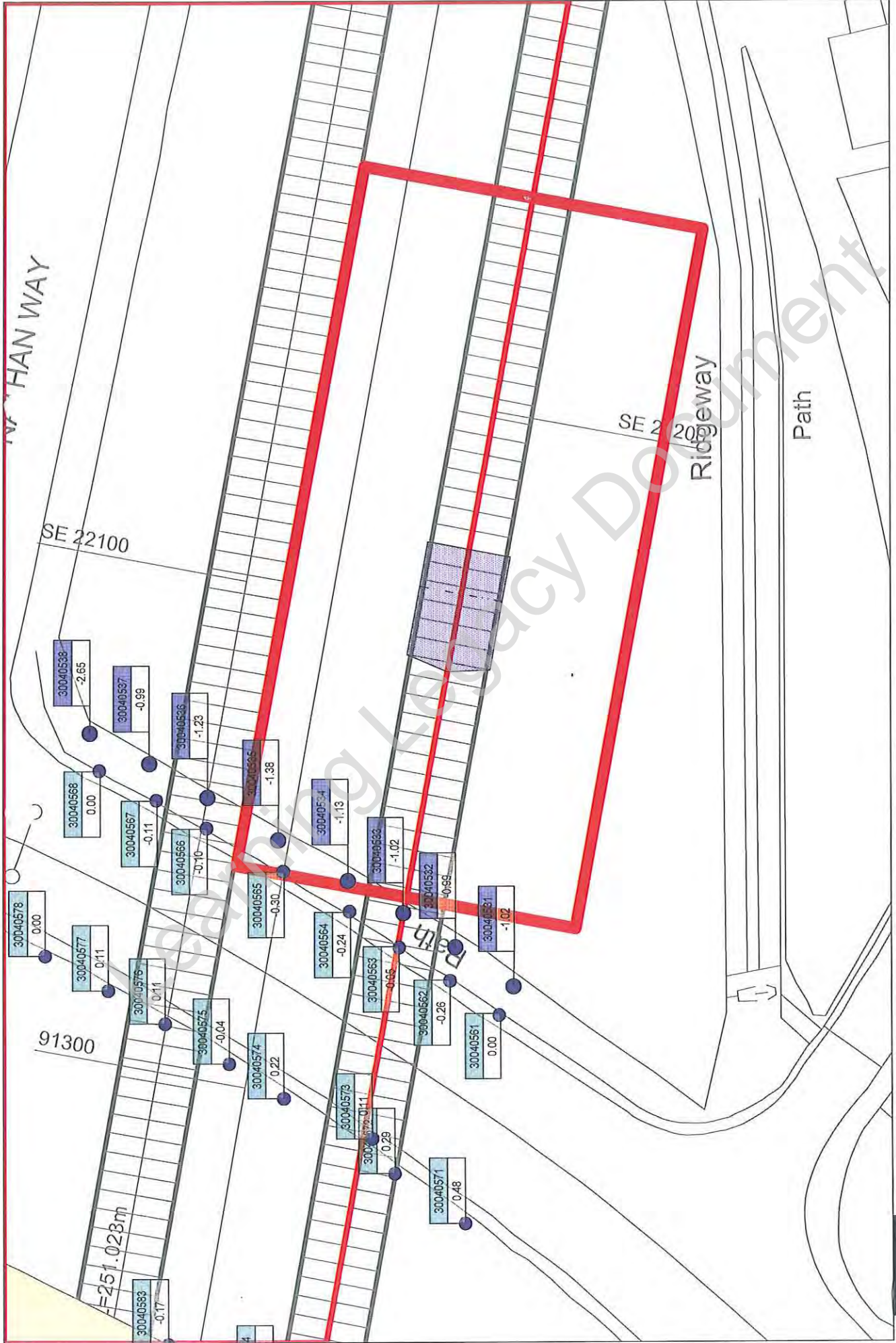
Overall, none of the points reached any trigger value.  
 Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 09/01/15

print name:

HMJV project role:

Monitoring & Survey engineer

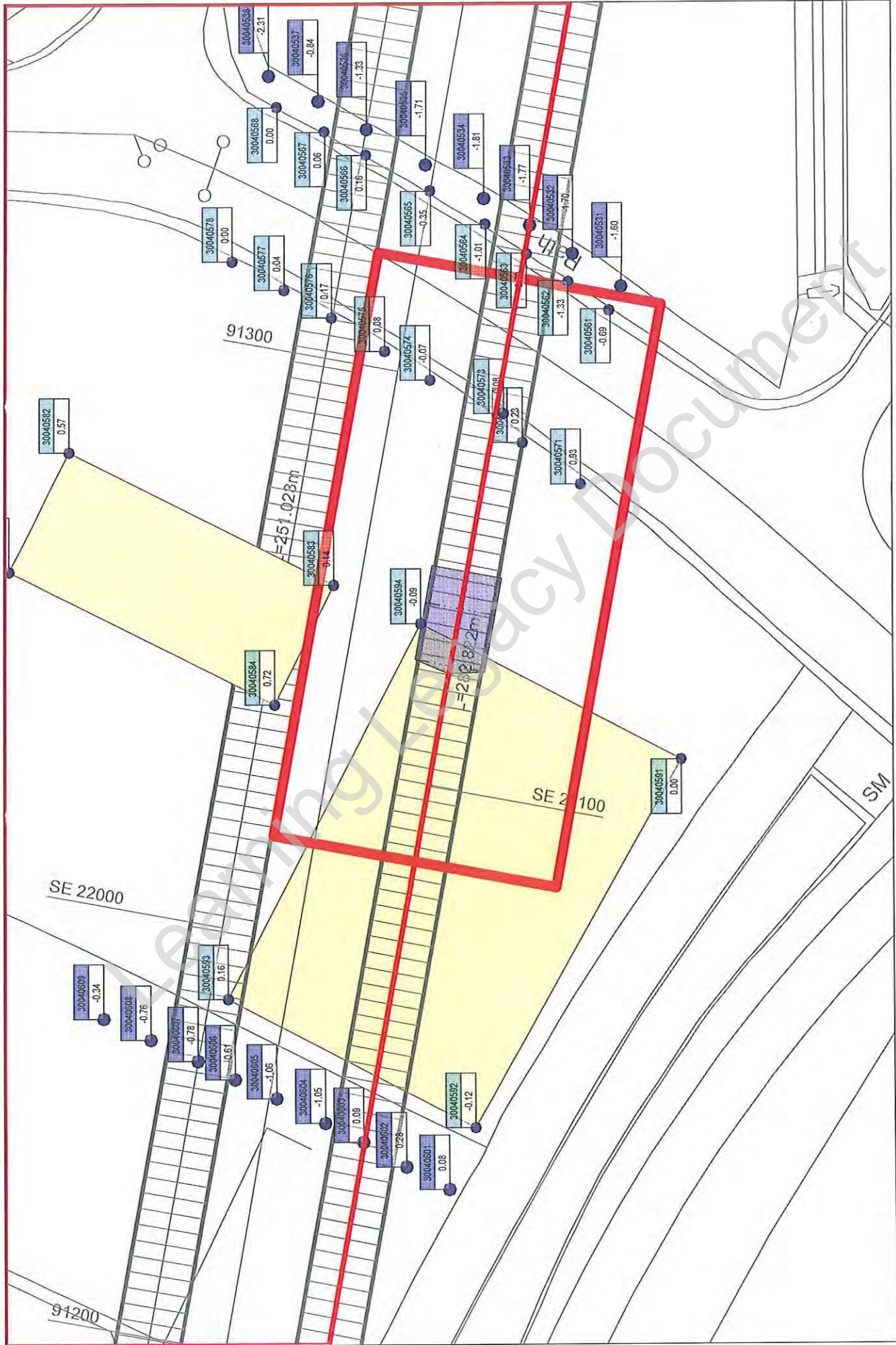


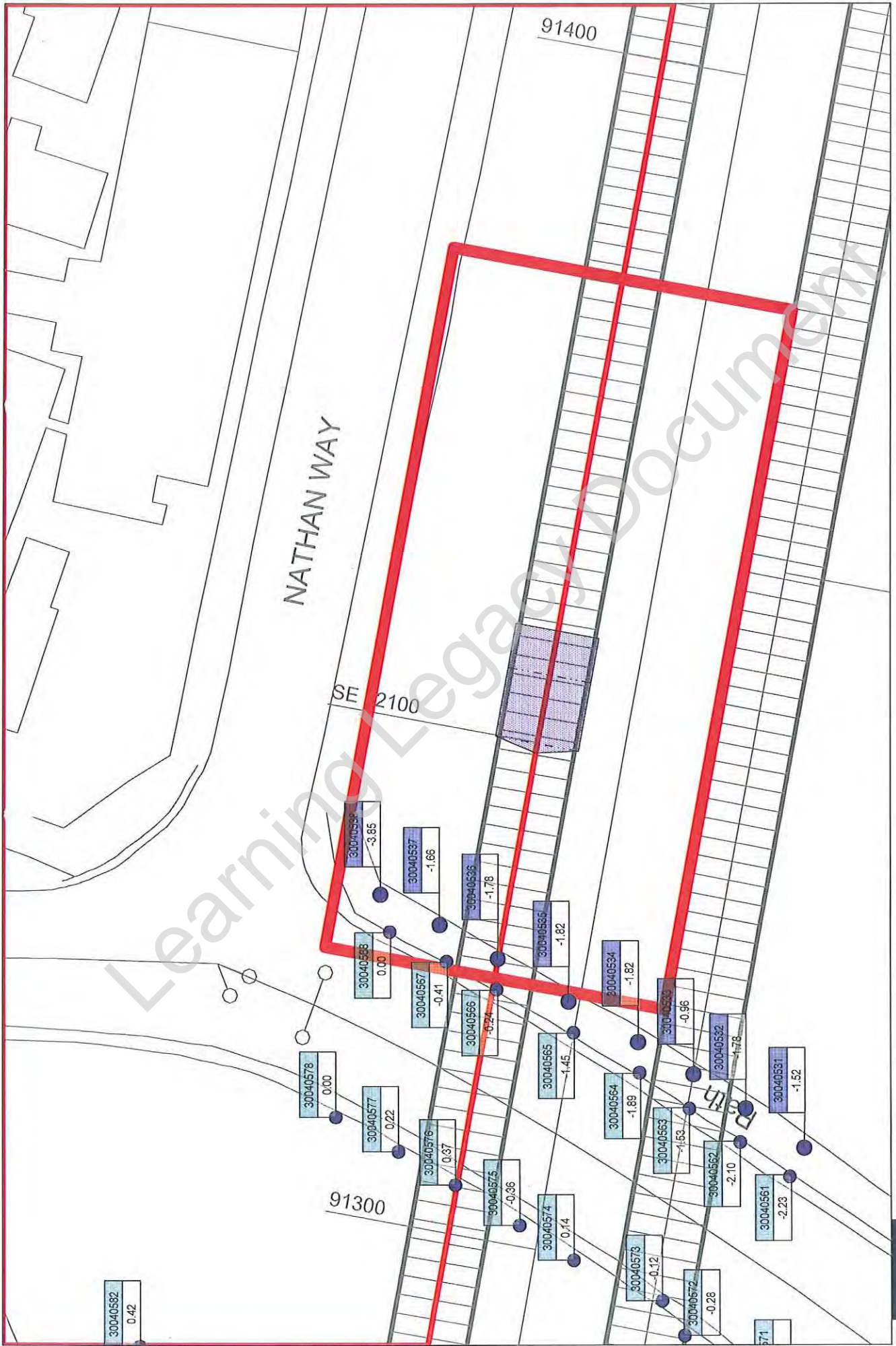
Point: 30040533



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge Lev.St. 19.01.2013 - 07.02.2014  
date: 29.07.2014 07:47 current values: 29.07.2014 07:35







Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 DLR monitoring: hydrostatic levelling cells  
 current values: 26.06.2013 09:00



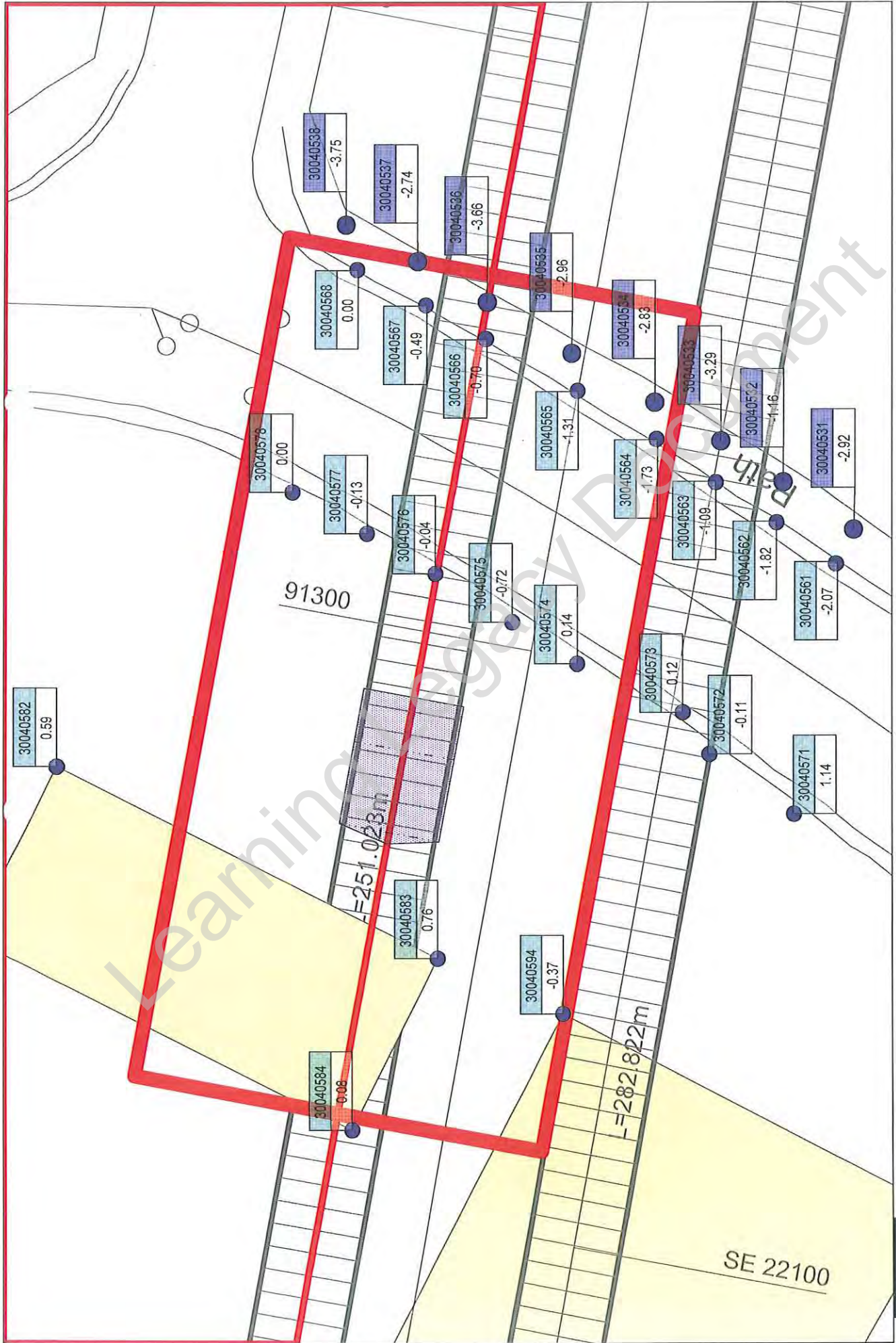
Point: 30040536



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Petment Crescent Bridge Lev.St. 19.01.2013 - 07.02.2014  
date: 29.07.2014 08:04 current values: 29.07.2014 07:58







Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 30.06.2013 09:00

project: C310 Thames Tunnel

project: C310 Thames Tunnel

No. of reading	1. following		2. following		3. following		4. following		5. following		6. following		7. following		8. following		9. following		10. following		11. following		12. following			
	baseline	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline		
	18/07/2013	20/07/2013	06/08/2013	06/08/2013	06/08/2013	12/08/2013	20/08/2013	04/09/2013	21/08/2013	29/08/2013	29/08/2013	29/08/2013	29/08/2013	29/08/2013	29/08/2013	29/08/2013	29/08/2013	29/08/2013	29/08/2013	29/08/2013	29/08/2013	29/08/2013	29/08/2013	29/08/2013		
Point No.																										
3004 0531	102.384	102.384	0	102.384	0	102.384	0	-1	102.384	0	-1	102.383	0	-1	102.383	0	-1	102.383	0	-1	102.383	0	-1	102.383	-1	
3004 0532	102.382	102.381	0	102.381	0	102.381	0	-1	102.381	0	-1	102.381	0	-1	102.381	0	-1	102.381	0	-1	102.381	0	-1	102.381	-1	
3004 0533	102.375	102.374	0	102.375	0	102.375	0	-1	102.374	0	-1	102.374	0	-1	102.374	0	-1	102.374	0	-1	102.374	0	-1	102.374	-1	
3004 0534	102.366	102.365	-1	102.365	0	102.365	0	-1	102.365	0	-1	102.365	0	-1	102.365	0	-1	102.365	0	-1	102.365	0	-1	102.365	-1	
3004 0535	102.361	102.360	-1	102.361	1	102.360	0	-1	102.360	0	-1	102.359	0	-1	102.359	0	-2	102.359	0	-1	102.359	0	-1	102.359	0	
3004 0536	102.367	102.367	0	102.367	0	102.367	0	-1	102.367	0	-1	102.366	0	-1	102.366	0	-1	102.366	0	-1	102.366	0	-1	102.366	0	
3004 0537	102.369	102.368	0	102.369	0	102.368	0	0	102.368	0	0	102.368	0	-1	102.368	0	-1	102.368	0	-1	102.368	0	-1	102.368	0	
3004 0538	102.401	102.401	0	102.400	-1	-2	102.400	0	-2	102.400	0	-2	102.399	-1	-3	102.399	0	-3	102.399	0	-3	102.399	0	-2	102.399	0

structure: Petment Crescent Bridge

structure: Petment Crescent Bridge

Legacy Document

Joint Venture

project: C310 Thames Tunnel  
structure: Peimont Crescent Bridge

Joint Venture

project: C310 Thames Tunnel  
structure: Peimont Crescent Bridge

No. of reading	13. following		14. following		15. following		16. following		17. following		18. following		19. following		20. following		21. following		22. following		23. following		24. following		
	baseline	10/01/2013	12/04/2013	10/04/2013	10/04/2013	10/04/2013	25/04/2013	20/05/2013	20/05/2013	20/05/2013	20/05/2013	25/05/2013	20/06/2013	20/06/2013	27/06/2013	29/06/2013	29/06/2013	29/06/2013	29/06/2013	29/06/2013	29/06/2013	29/06/2013	29/06/2013	29/06/2013	
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0531	102.384	102.383	0	-2	102.383	0	-2	102.383	0	-2	102.382	0	-2	102.382	0	-2	102.382	0	-2	102.382	-1	-2	102.382	0	-3
3004 0532	102.382	102.380	0	-2	102.380	1	-2	102.380	0	-2	102.380	0	-2	102.380	0	-2	102.380	0	-2	102.380	0	-2	102.380	0	-2
3004 0533	102.375	102.373	0	-2	102.373	0	-2	102.373	0	-2	102.373	0	-2	102.374	0	-1	102.374	0	-1	102.374	0	-1	102.373	0	-2
3004 0534	102.365	102.364	0	-2	102.364	0	-2	102.364	0	-2	102.364	0	-2	102.364	0	-2	102.364	0	-2	102.364	0	-2	102.364	0	-2
3004 0535	102.361	102.359	0	-2	102.359	1	-1	102.359	0	-2	102.359	0	-2	102.359	0	-2	102.359	0	-2	102.359	0	-2	102.359	0	-2
3004 0536	102.357	102.356	0	-1	102.356	0	-1	102.356	0	-1	102.356	0	-1	102.356	0	-2	102.356	0	-2	102.356	0	-2	102.356	0	-2
3004 0537	102.359	102.358	0	-1	102.358	0	-1	102.358	0	-1	102.358	0	-1	102.358	0	-1	102.357	0	-1	102.357	0	-2	102.357	0	-2
3004 0538	102.401	102.399	0	-2	102.399	0	-2	102.399	0	-2	102.399	0	-2	102.399	0	-3	102.399	0	-3	102.399	0	-3	102.398	0	-4

Legacy Document

Joint Venture


project: C310 Thames Tunnel

Joint Venture

project: C310 Thames Tunnel

No. of reading	baseline	25. following		26. following		27. following		28. following		29. following		30. following		31. following		32. following	
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
date	11/01/2013	30/06/2013	08/07/2013	16/07/2013	24/07/2013	19/08/2013	16/09/2013	17/10/2013	07/02/2014								
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
3004 0531	102.384	102.381	0 -3	102.382	0 -3	102.381	0 -3	102.381	0 -3	102.383	0 -2	102.382	-1 -2	102.381	-1 -3		
3004 0532	102.382	102.380	-1 -2	102.379	-1 -2	102.379	-1 -3	102.379	0 -3	102.380	0 -2	102.379	-1 -3	102.379	0 -3		
3004 0533	102.375	102.372	0 -3	102.372	1 -2	102.372	-1 -3	102.372	0 -3	102.373	0 -2	102.372	-1 -3	102.372	0 -3		
3004 0534	102.366	102.363	0 -3	102.363	0 -2	102.363	0 -2	102.363	0 -3	102.363	0 -3	102.363	0 -3	102.362	0 -4		
3004 0535	102.361	102.358	0 -3	102.358	0 -3	102.357	-1 -3	102.358	0 -3	102.357	0 -3	102.357	0 -3	102.357	0 -4		
3004 0536	102.367	102.363	0 -4	102.364	1 -3	102.363	-1 -4	102.363	0 -4	102.362	0 -5	102.363	0 -4	102.362	0 -5		
3004 0537	102.369	102.366	0 -3	102.366	0 -3	102.365	-1 -4	102.365	0 -4	102.364	0 -5	102.365	1 -4	102.365	0 -4		
3004 0538	102.401	102.398	1 -4	102.397	0 -4	102.397	-1 -5	102.397	0 -5	102.396	-1 -6	102.395	-1 -5	102.396	1 -6		

Legacy Document

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 25**

**Petment Crescent Bridge – HLC**

Learning Legacy Document

<b>monitoring asset</b>	<b>Petment Crescent Bridge</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
<b>name of monitoring section:</b>	Petment Crescent Bridge		
sensor type:	Hydrostatic Levelling Cell		
chainage:	91320	point no.:	3004 0561 - 3004 0578
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	01/02/13	0.00		
<b>TBM 1</b>	start ZOI	23/03/13	-0.05	3004 0563
		25/03/13	0.28	3004 0573
	end ZOI	27/03/13	-0.70	3004 0563
		28/03/13	-1.12	3004 0573
breached not any trigger value				
<b>TBM 2</b>	start ZOI	26/06/13	-0.24	3004 0566
		28/06/13	0.26	3004 0576
	end ZOI	30/06/13	-0.70	3004 0566
		01/07/13	-0.07	3004 0576
breached not any trigger value				
<b>longterm</b>		10/12/13	-0.18	3004 0566
		31/08/13	-0.41	3004 0576
last reading 3 month post tunneling for hlcs 571-578 (see "summary" for explanation)				
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV		
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)		

**summary / comments**

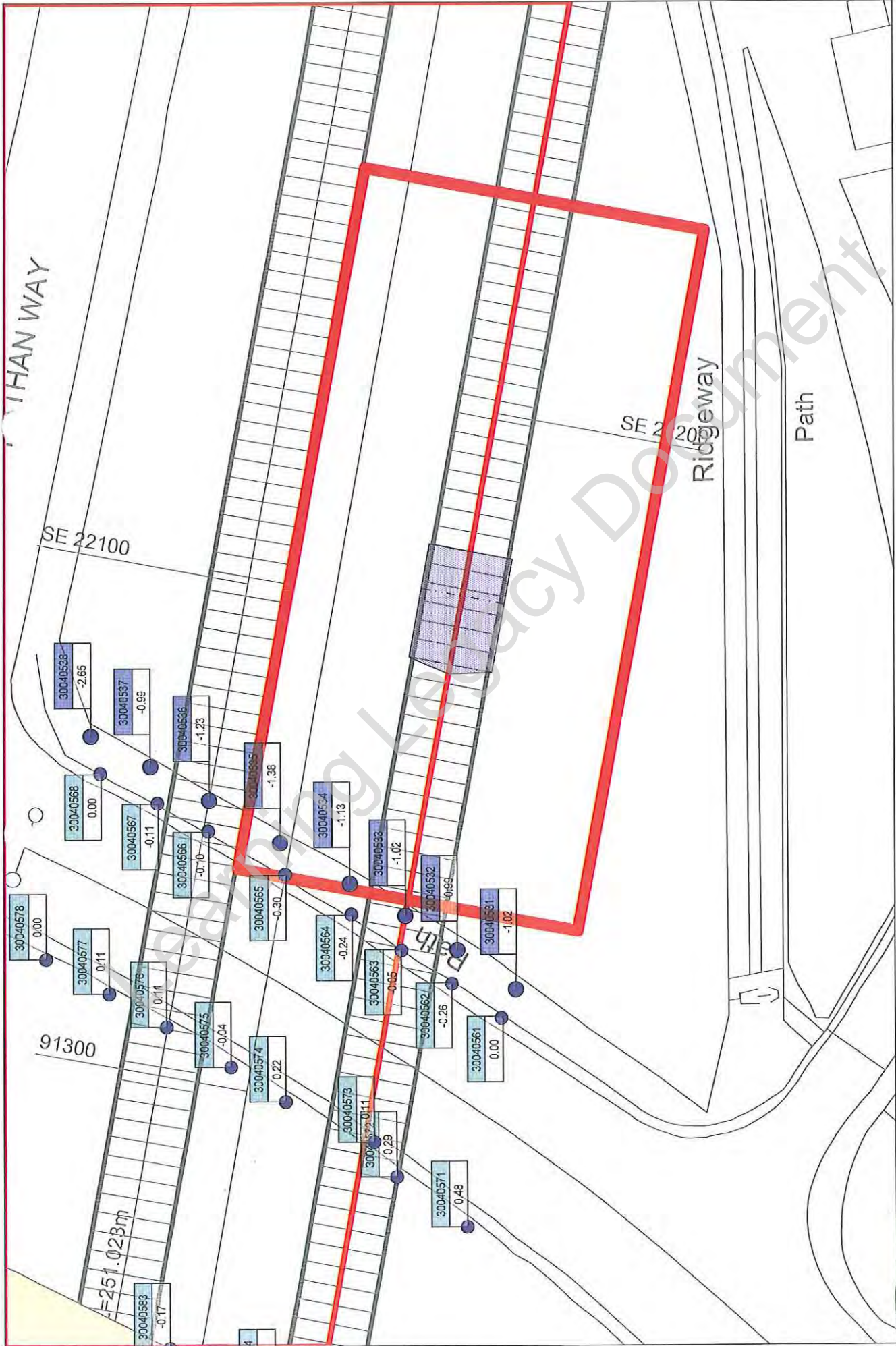
Overall, none of the points reached any trigger value.  
 The recording of the data from points 30040571 to 30040578 ceases due to vandalism on 31.08.2013. Various data cable and air or water tubes were forcibly torn from the HLC and data logger.  
 Under consideration of temperature differences and the achievable accuracy of the system, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 12/01/15

print name:

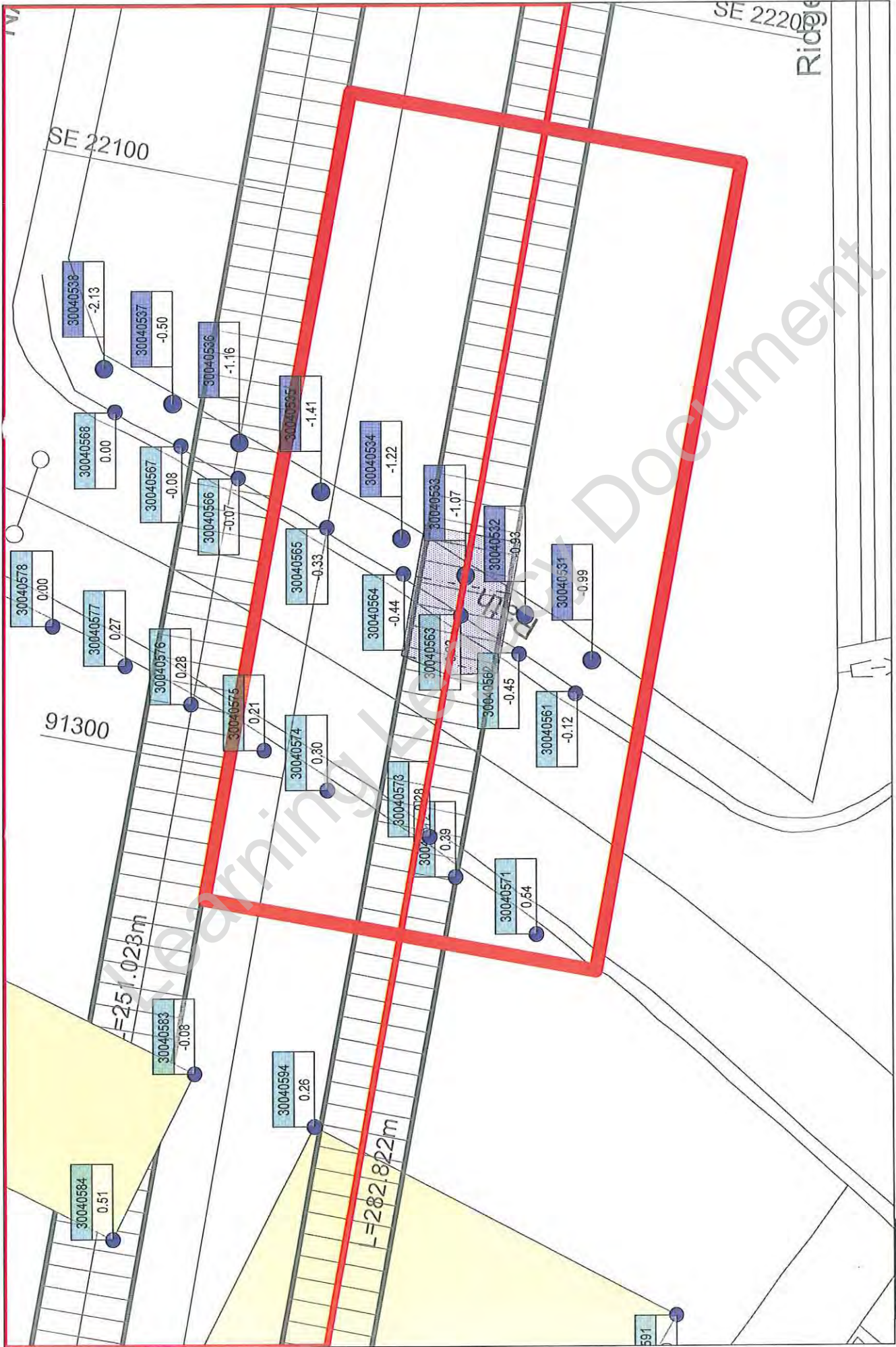
HMJV project role:

Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 23.03.2013 17:57





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, lining walls and grouting Joint Venture  
 current values: 25.03.2013 09:34





Point: 30040561



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 12:52 current values: 29.07.2014 12:43



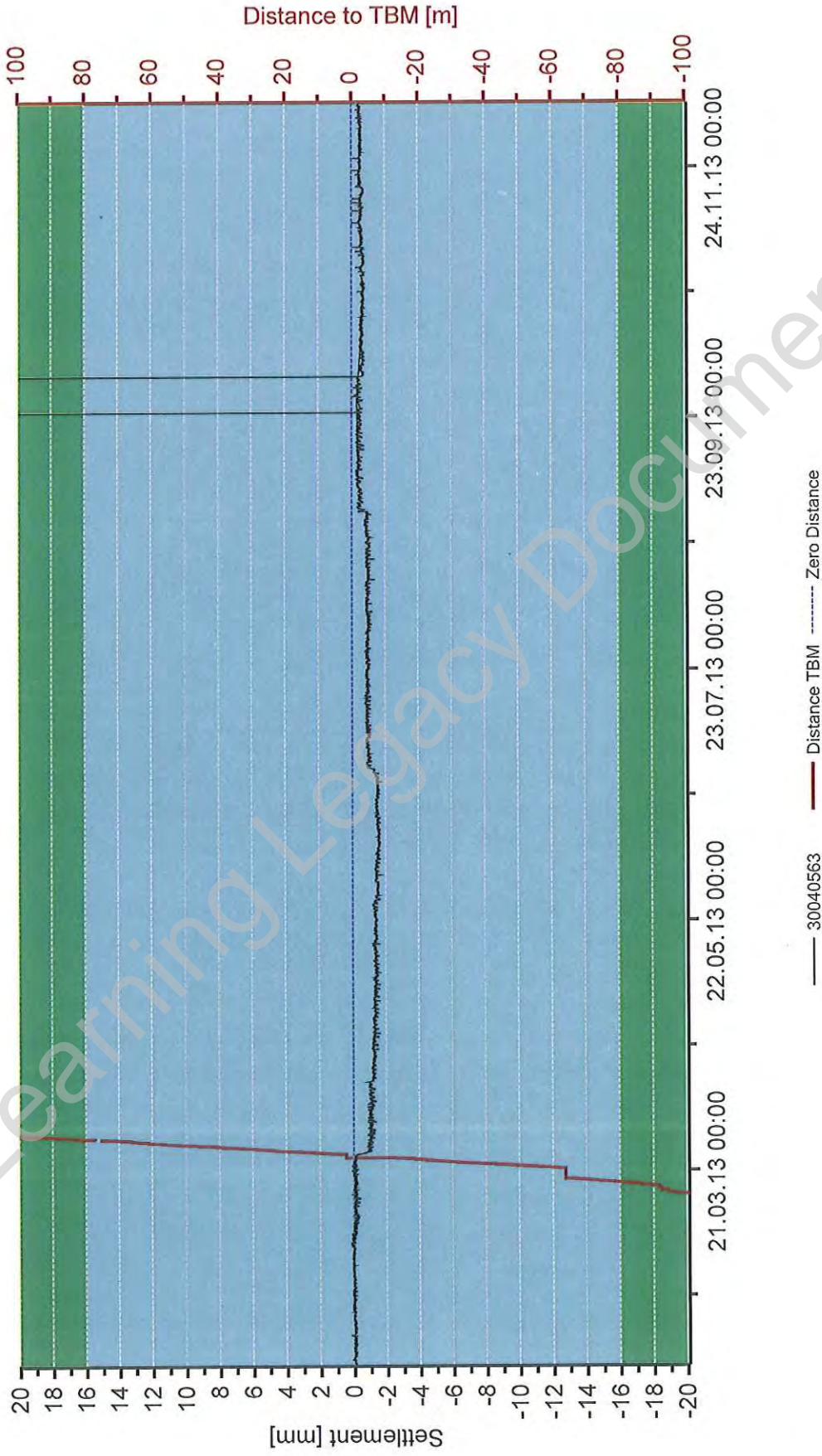
Point: 30040562



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 12:55 current values: 29.07.2014 12:43



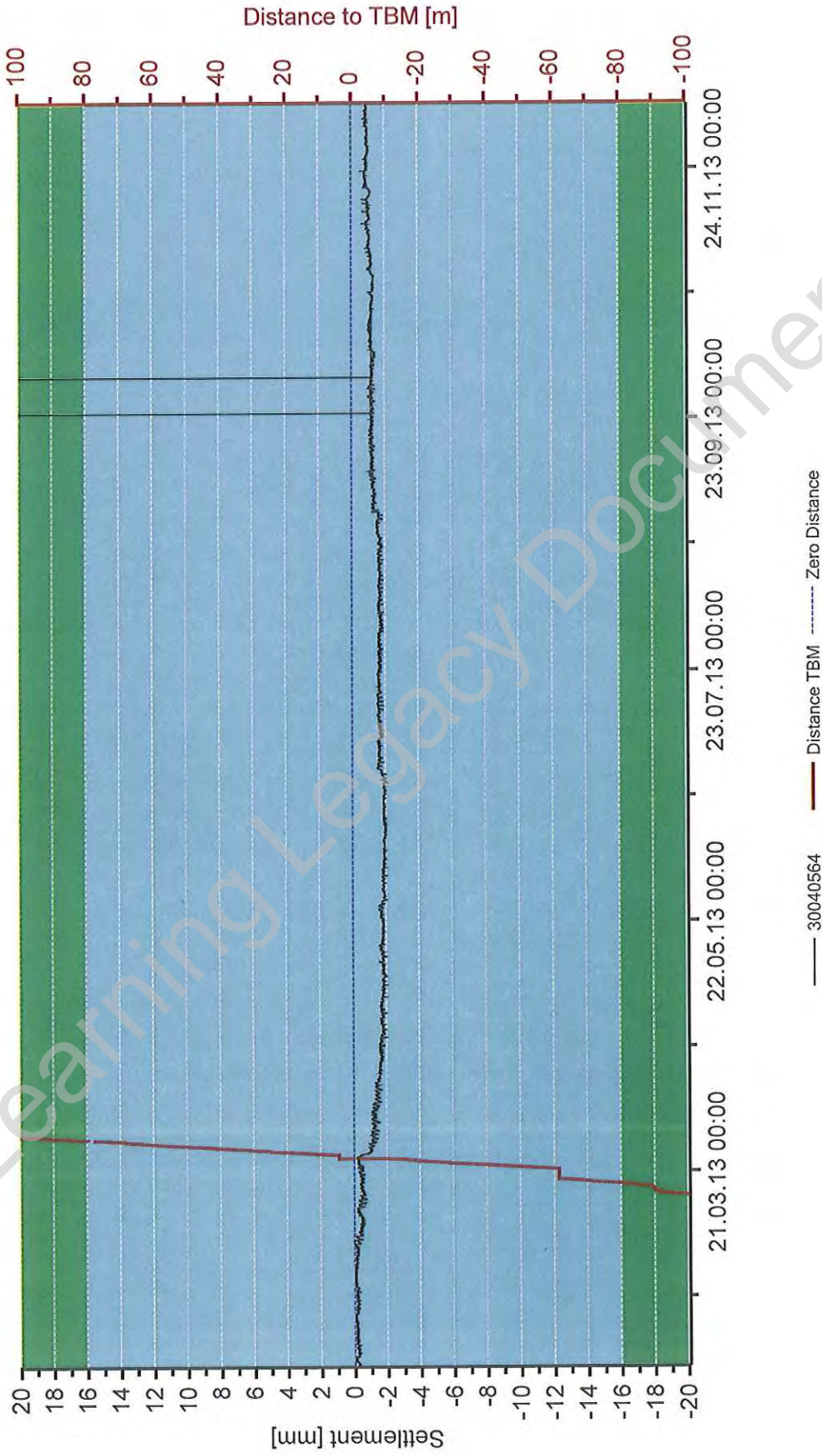
Point: 30040563



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 12:58 current values: 29.07.2014 12:43



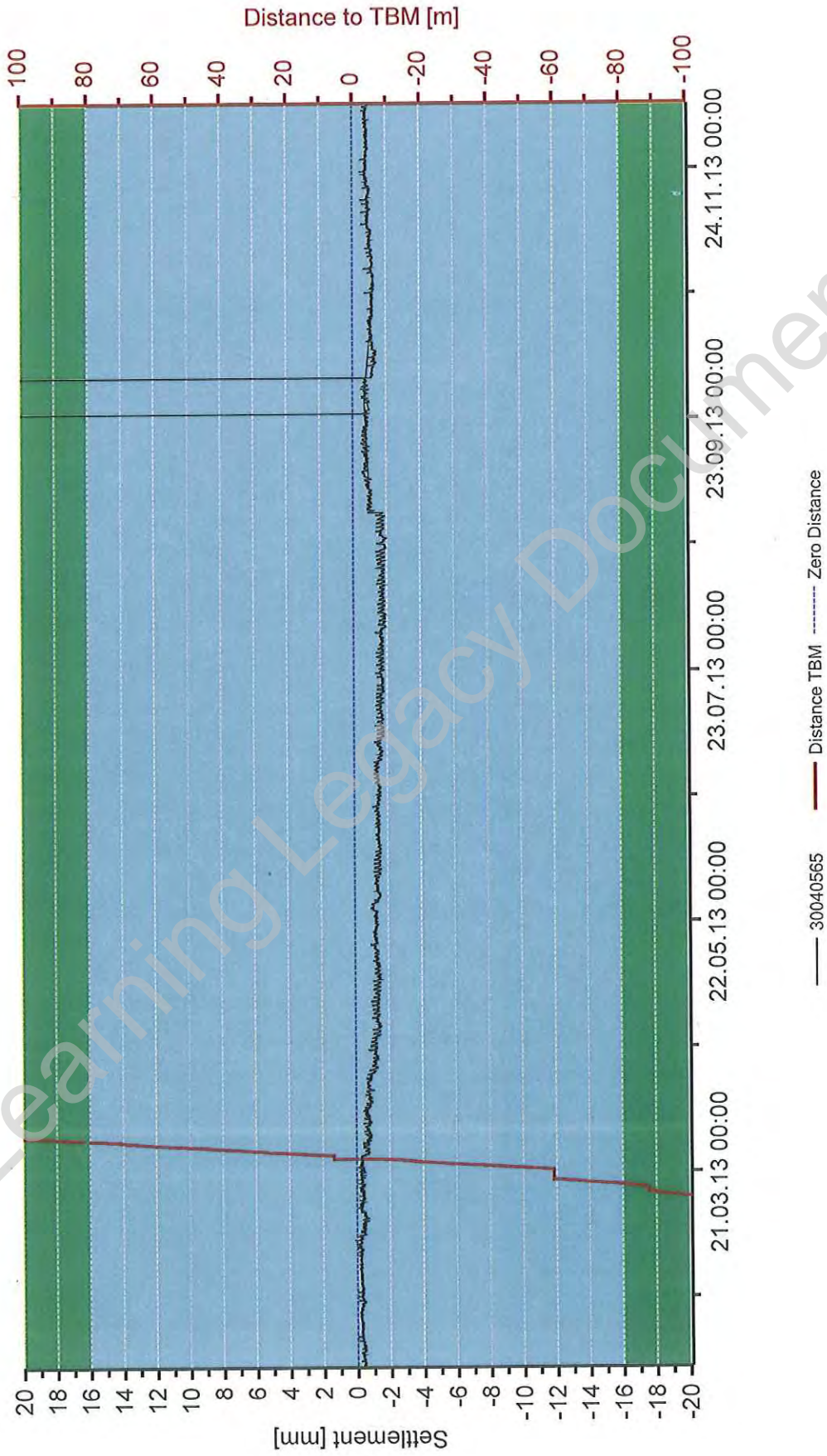
Point: 30040564



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 13:12 current values: 29.07.2014 12:43



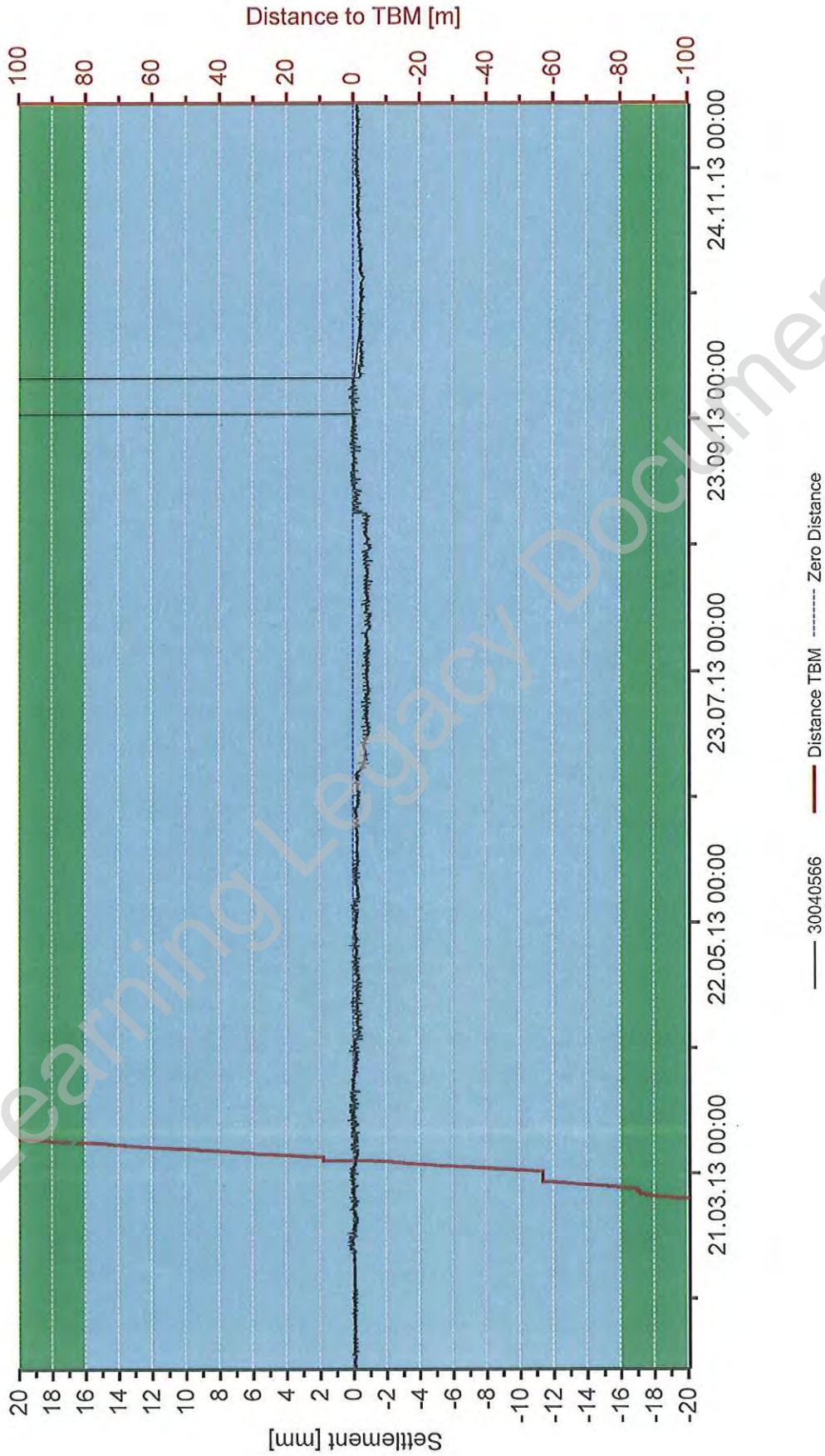
Point: 30040565



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 13:14 current values: 29.07.2014 12:43



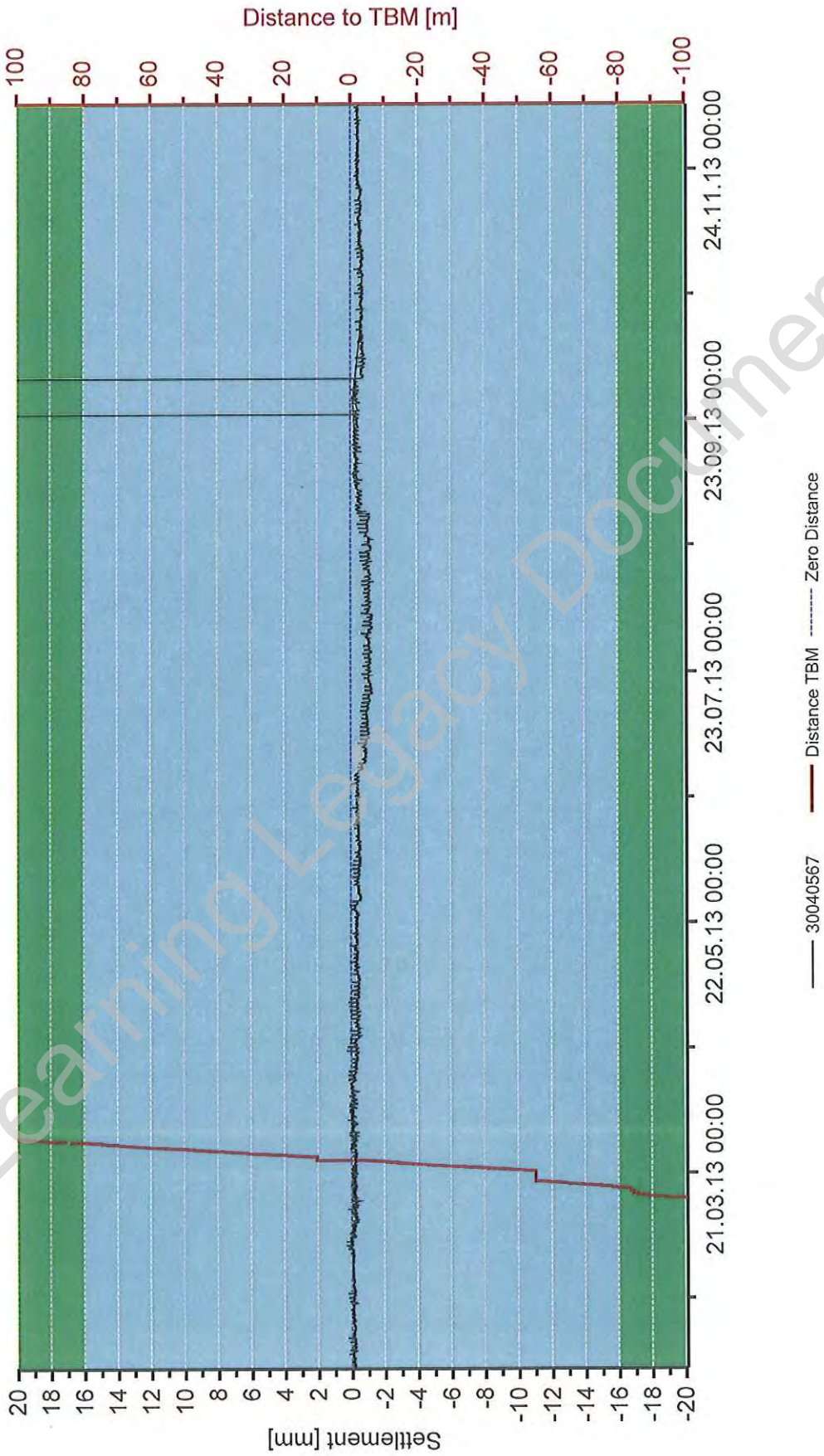
Point: 30040566



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 13:17 current values: 29.07.2014 12:43



Point: 30040567



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 13:20 current values: 29.07.2014 12:43

Point: 30040568

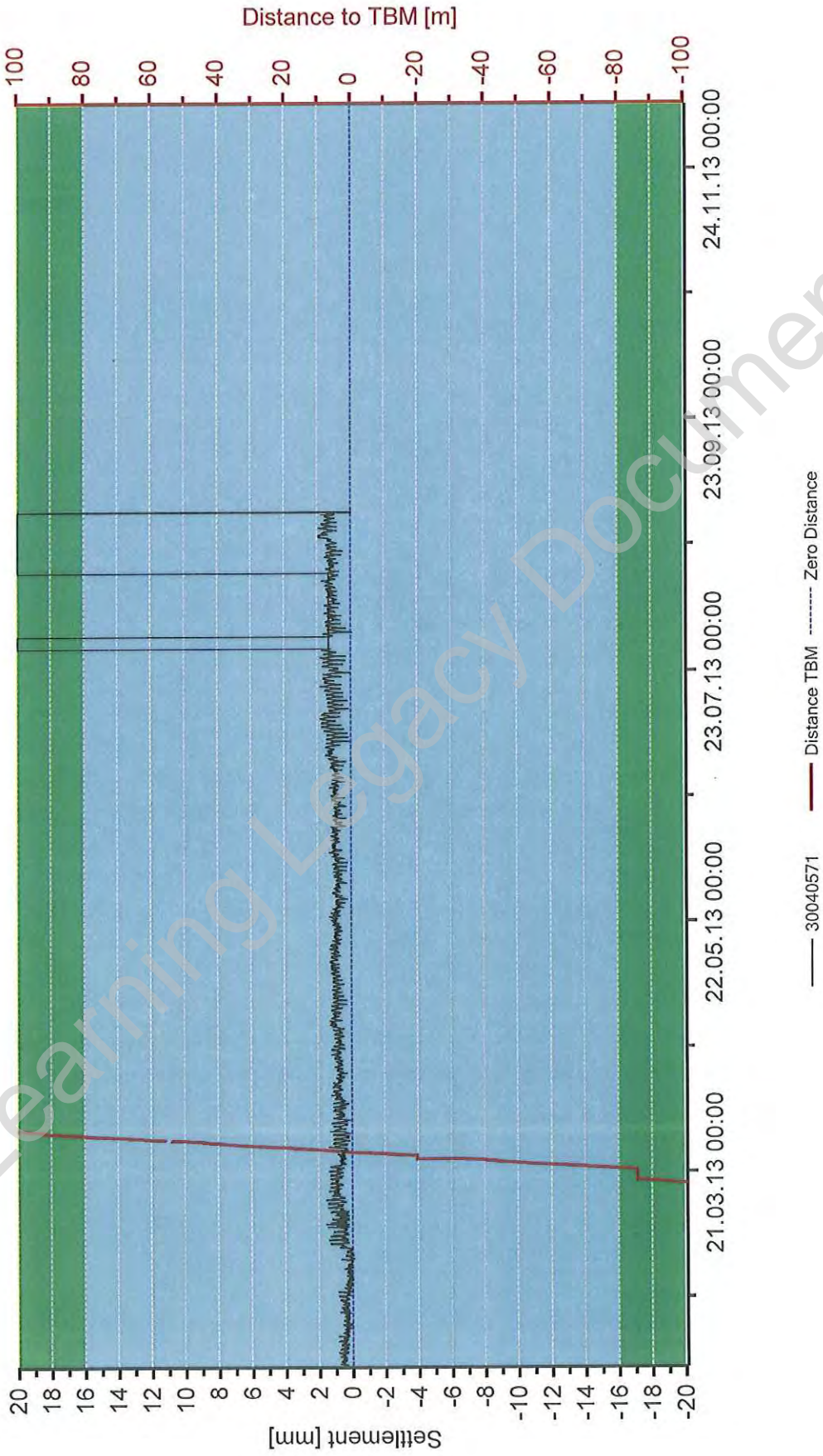


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 13:22 current values: 29.07.2014 12:43





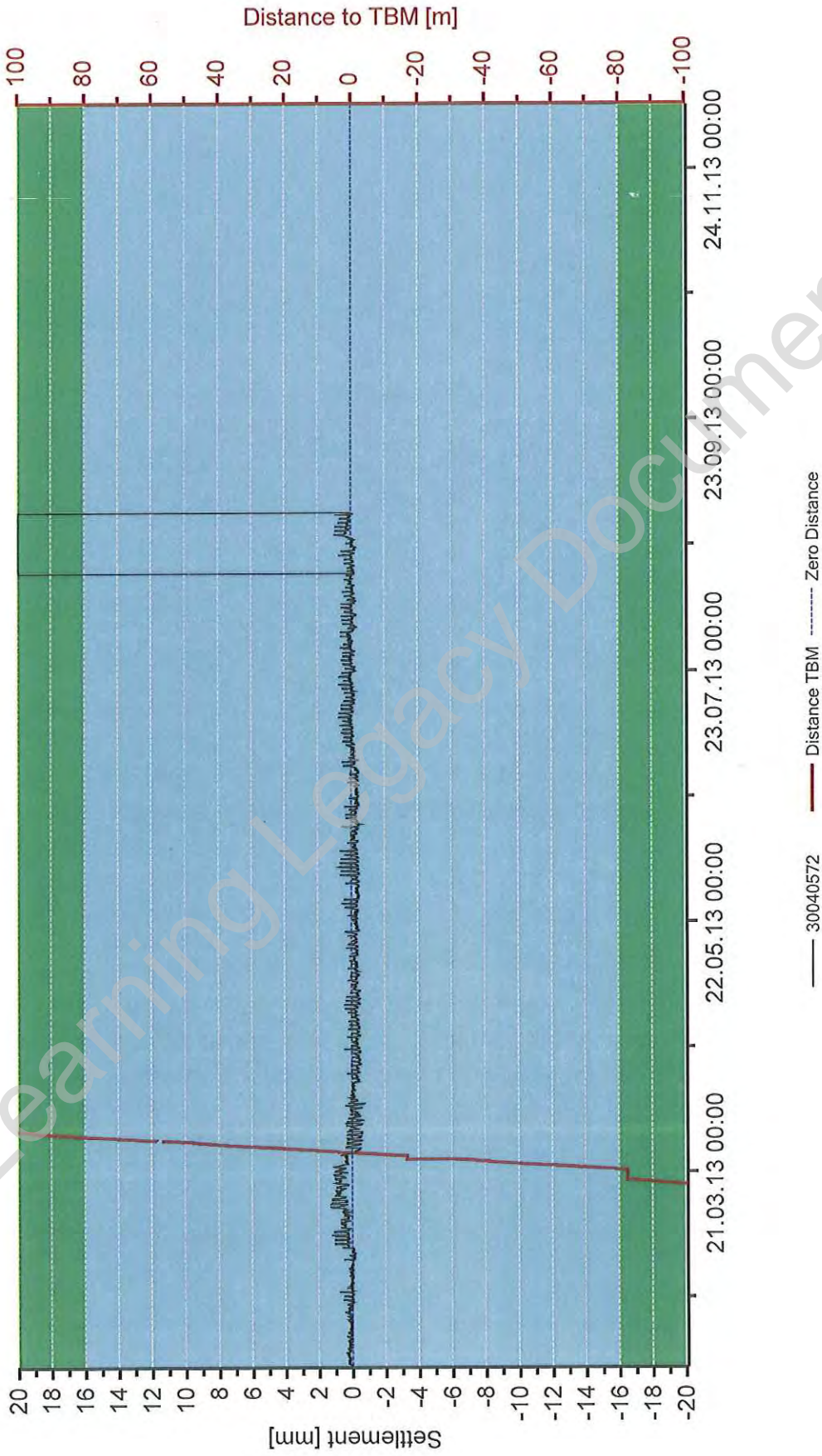
Point: 30040571



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 13:28 current values: 29.07.2014 12:43



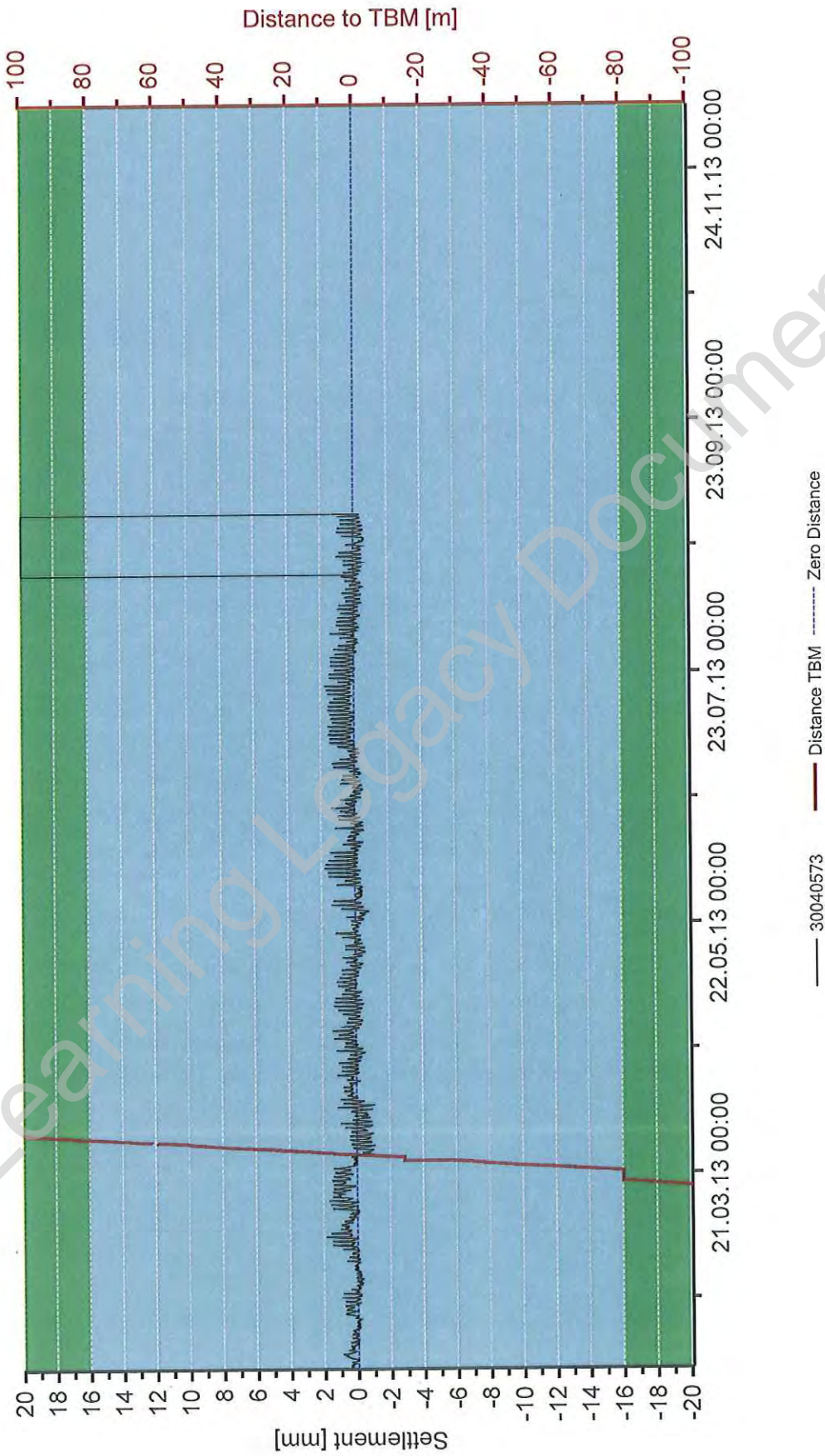
Point: 30040572



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 13:31 current values: 29.07.2014 12:43



Point: 30040573



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 13:33 current values: 29.07.2014 12:43

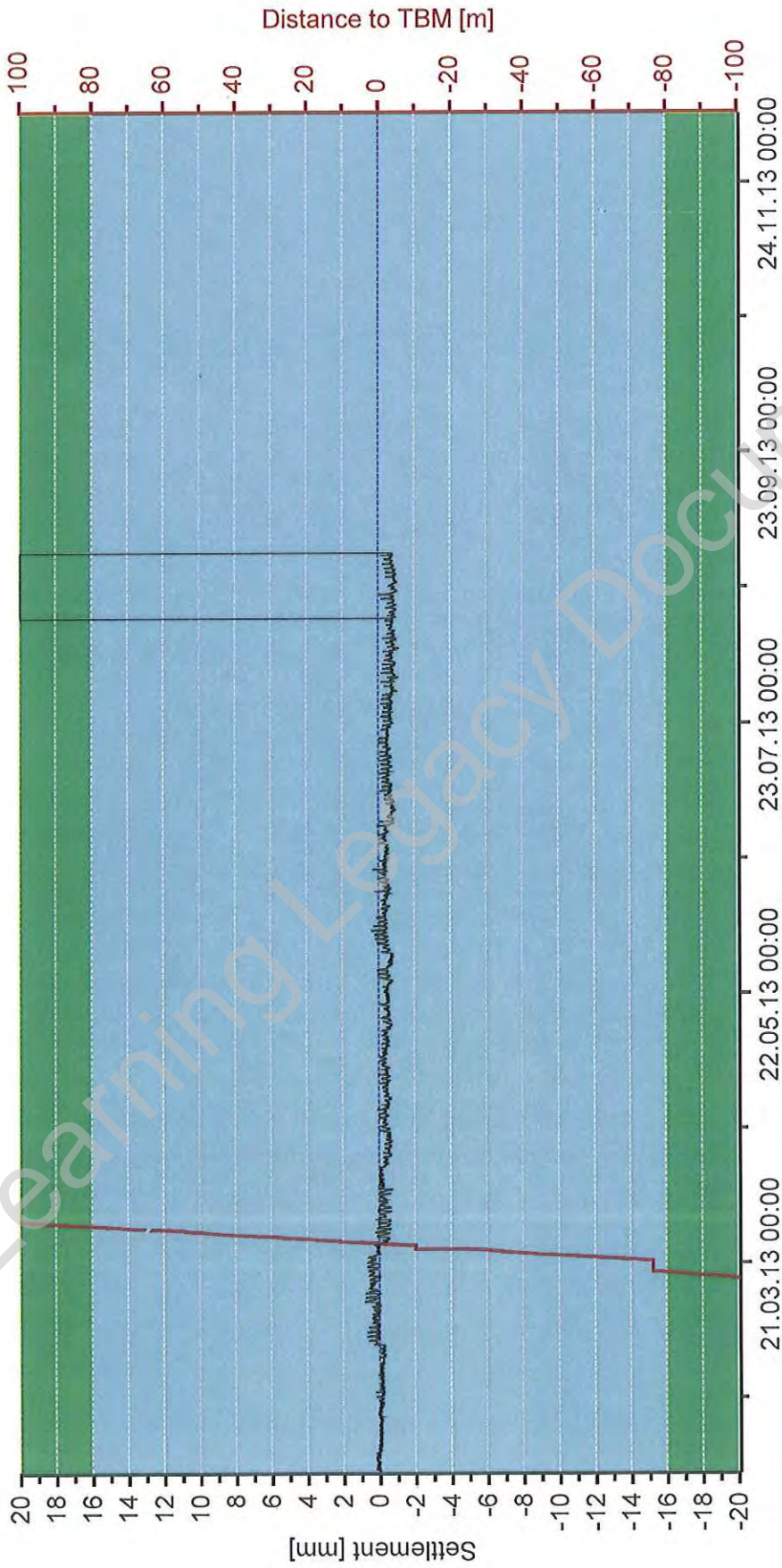


Point: 30040574



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 13:36 current values: 29.07.2014 12:43

Point: 30040575



— 30040575 — Distance TBM - - - - - Zero Distance

Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 13:39 current values: 29.07.2014 12:43



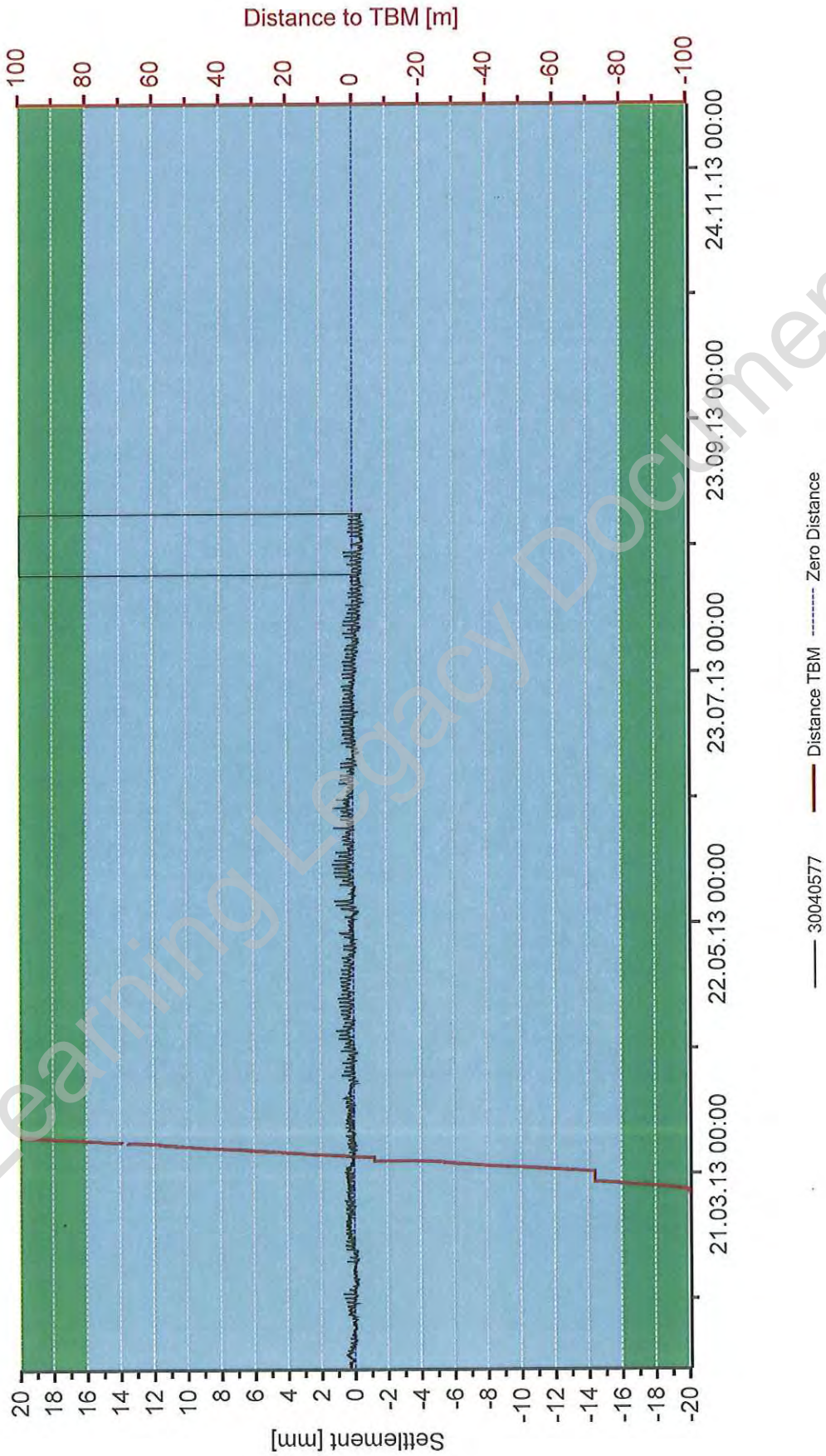
Point: 30040576



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 13:42 current values: 29.07.2014 12:43



Point: 30040577



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 13:47 current values: 29.07.2014 12:43



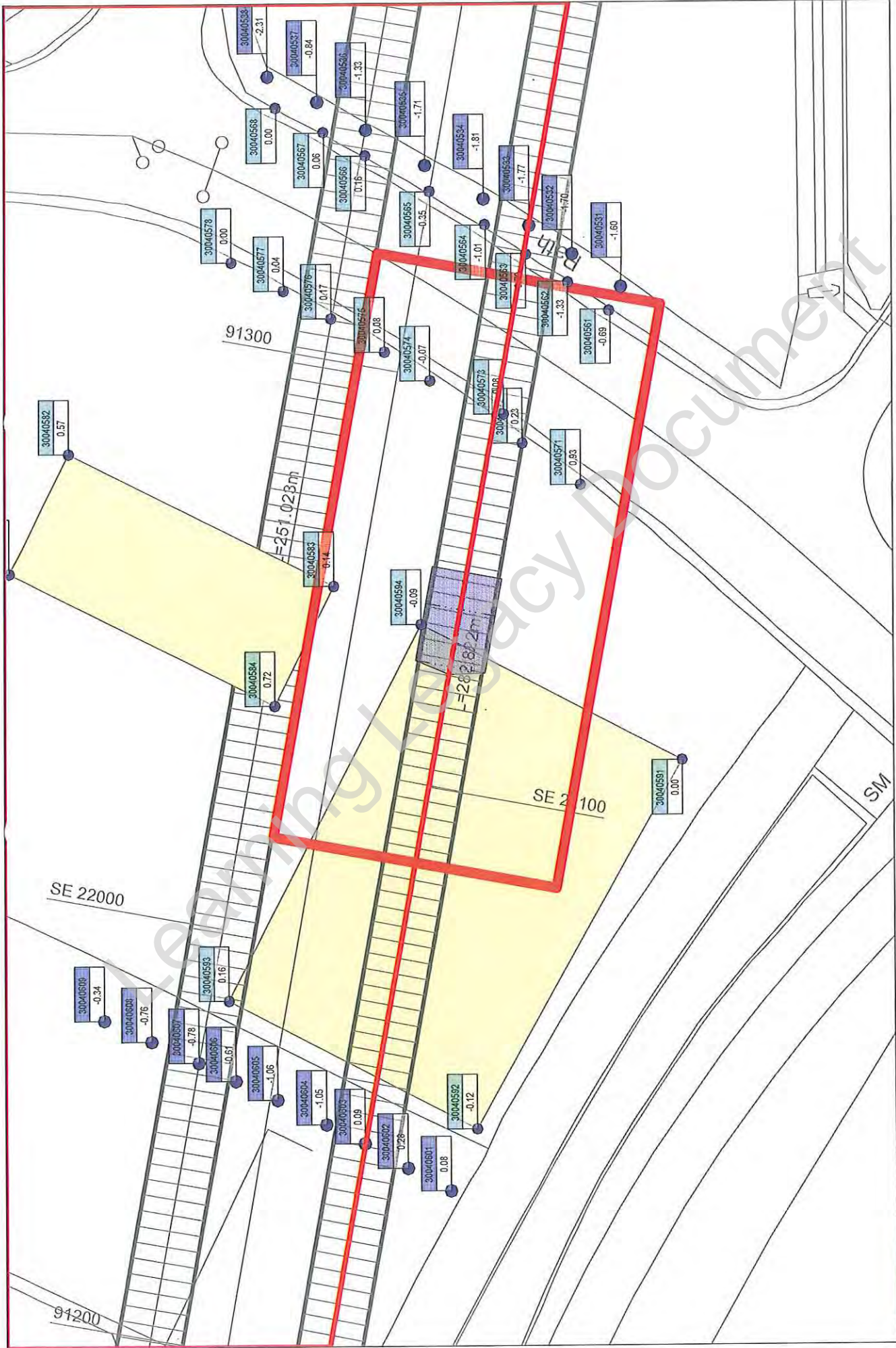
Point: 30040578



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 16:58 current values: 29.07.2014 12:43

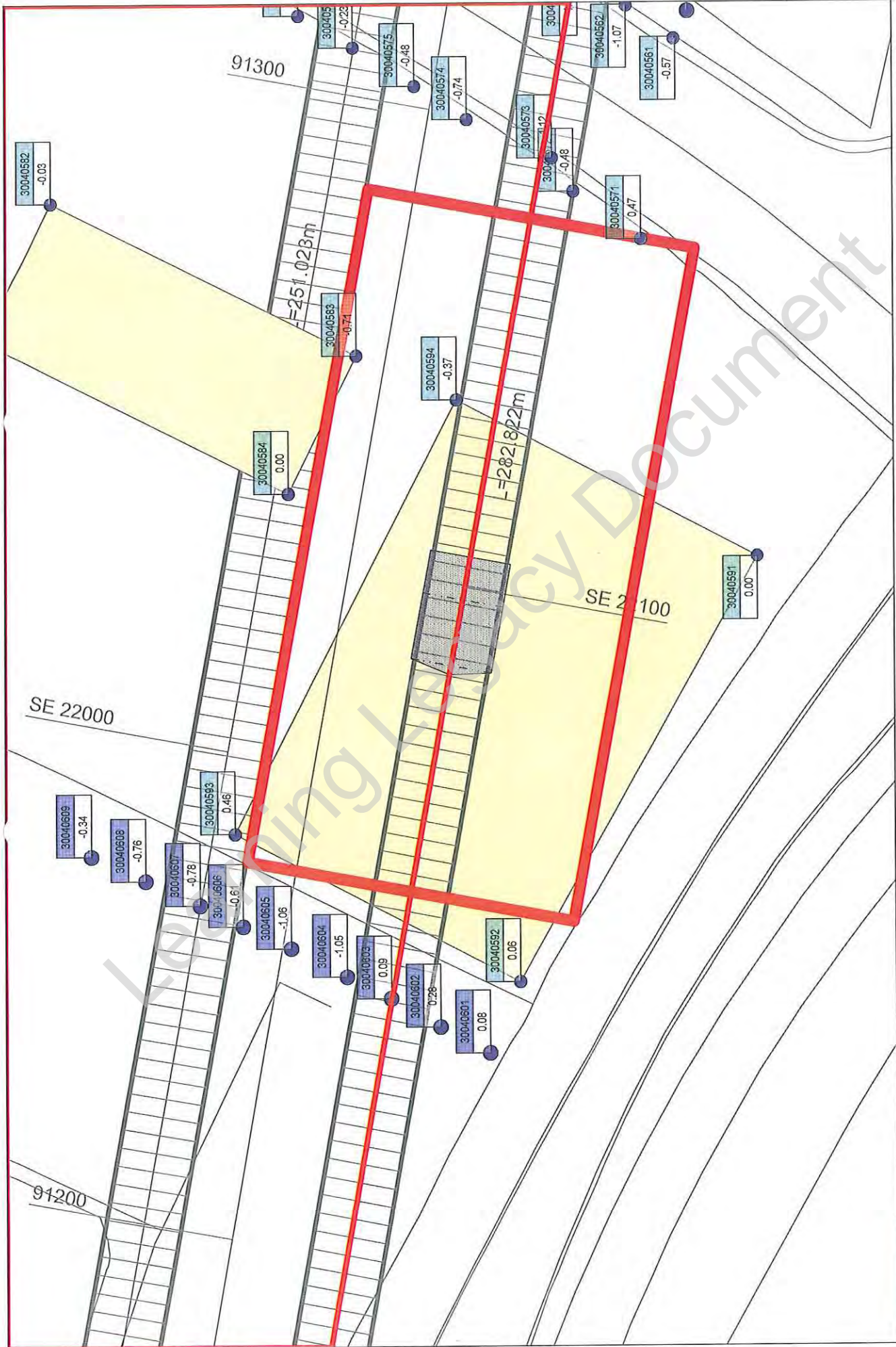


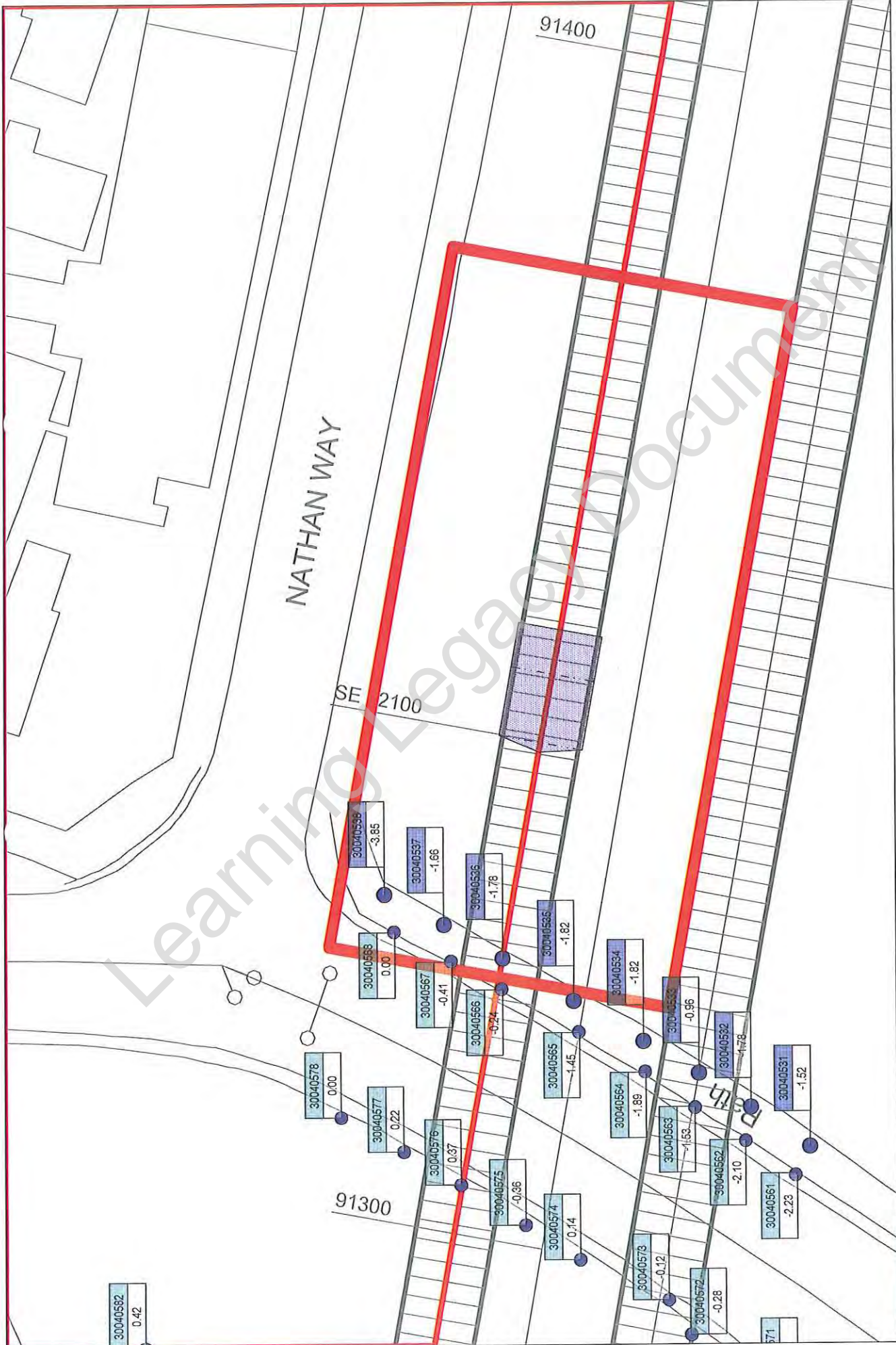




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 27.03.2013 09:22

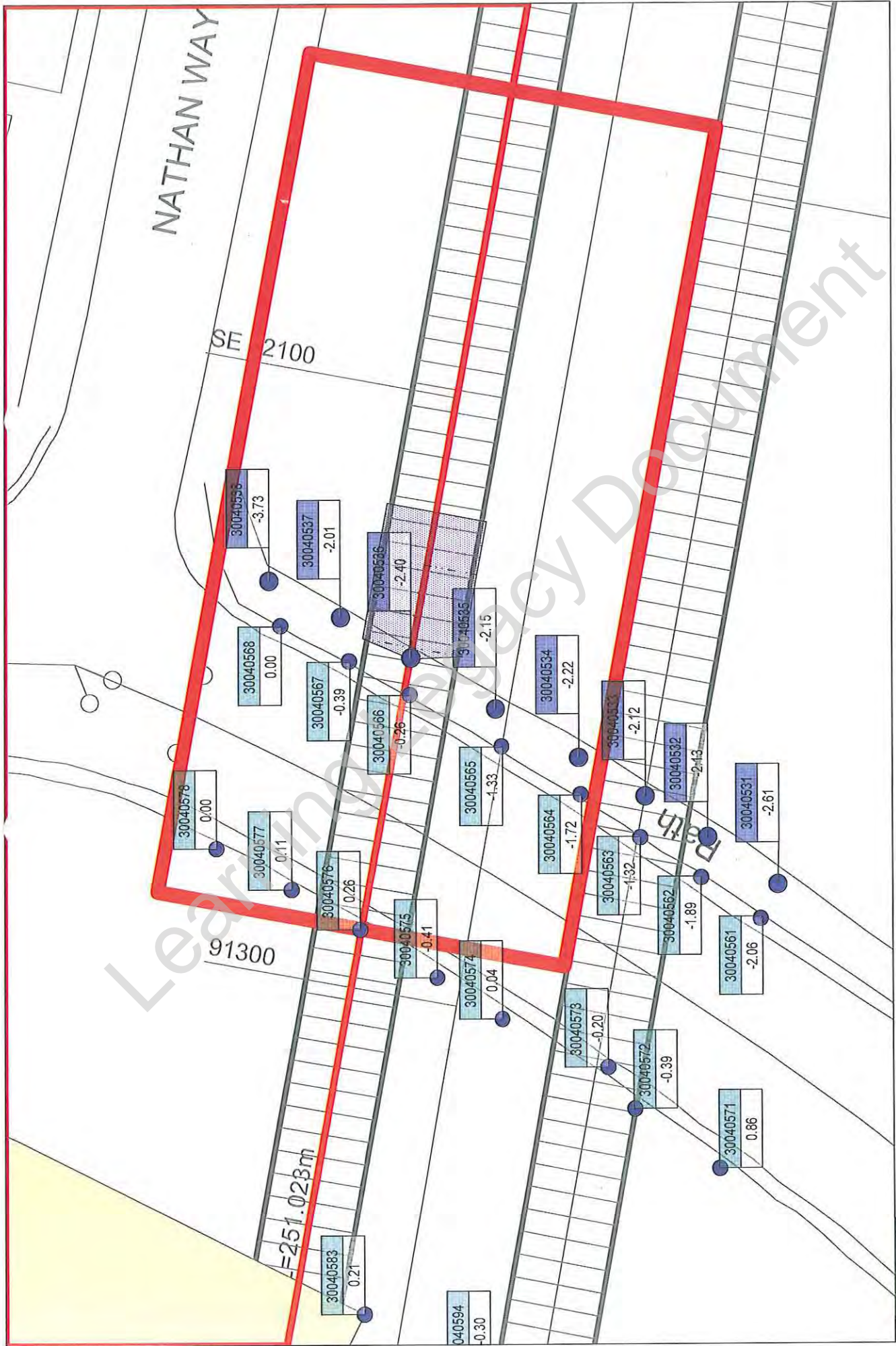






Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 DLR monitoring: hydrostatic levelling cells  
 current values: 26.06.2013 09:00

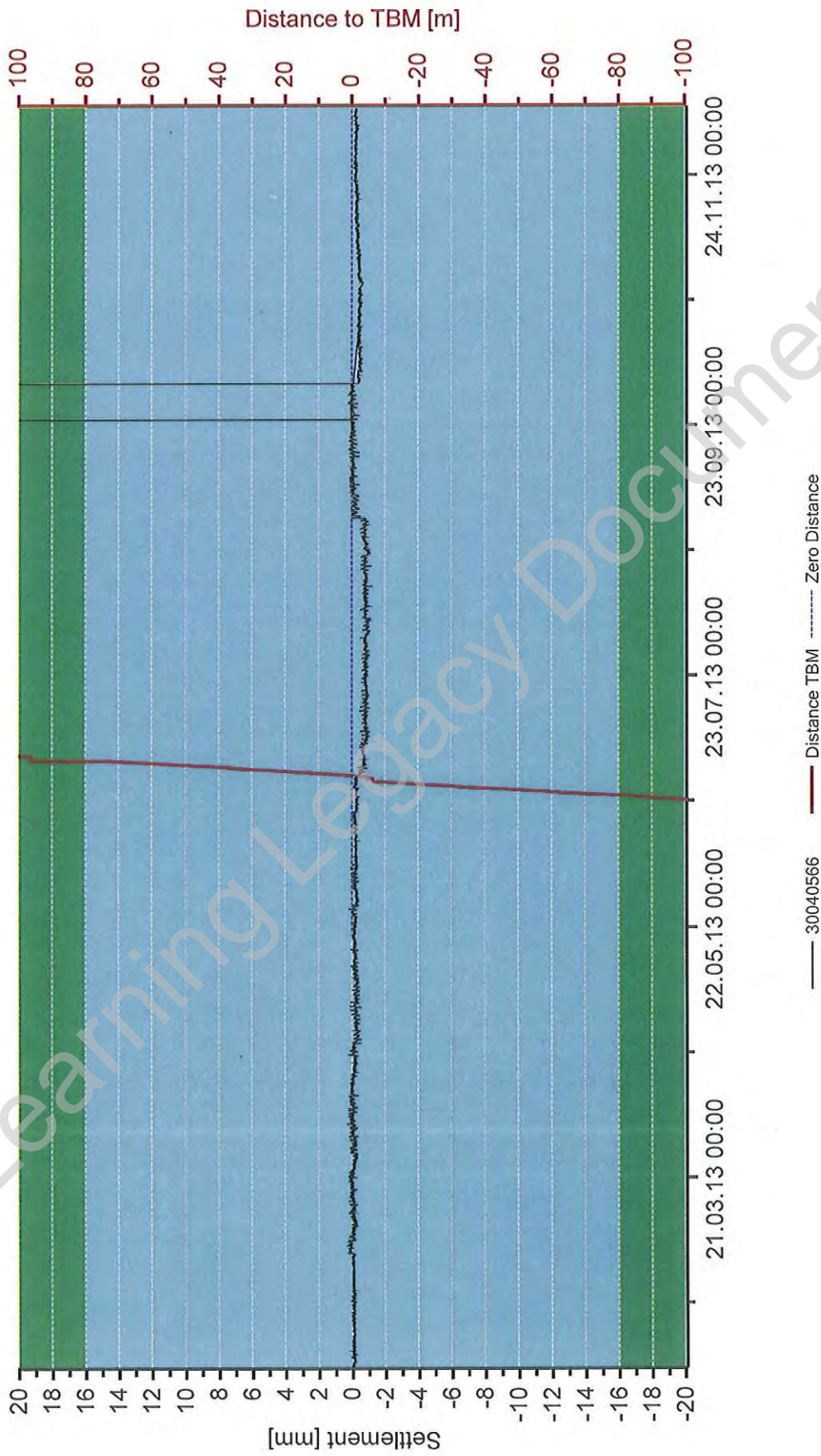




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 28.06.2013 09:00



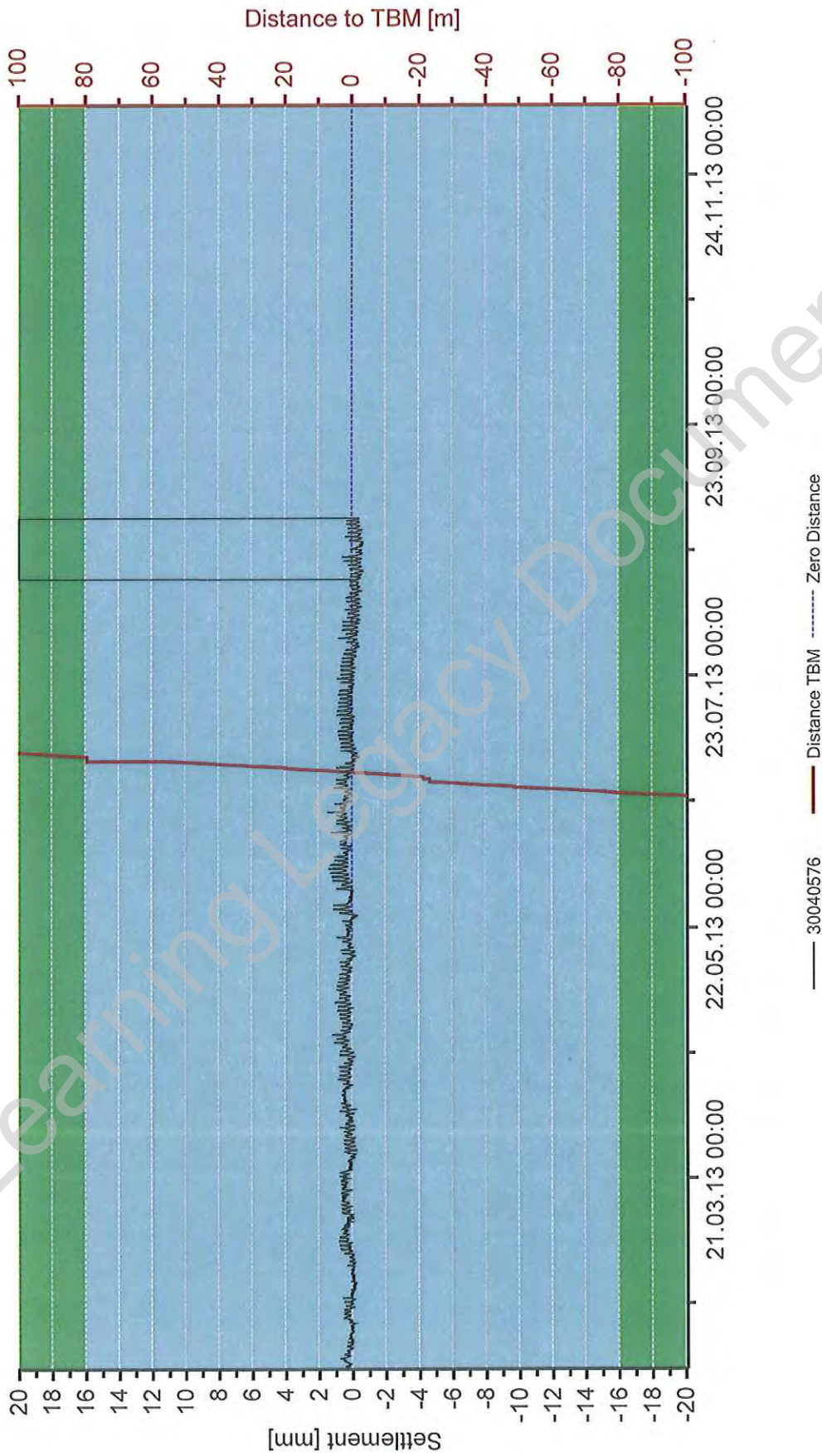
Point: 30040566



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 17:21 current values: 29.07.2014 16:58

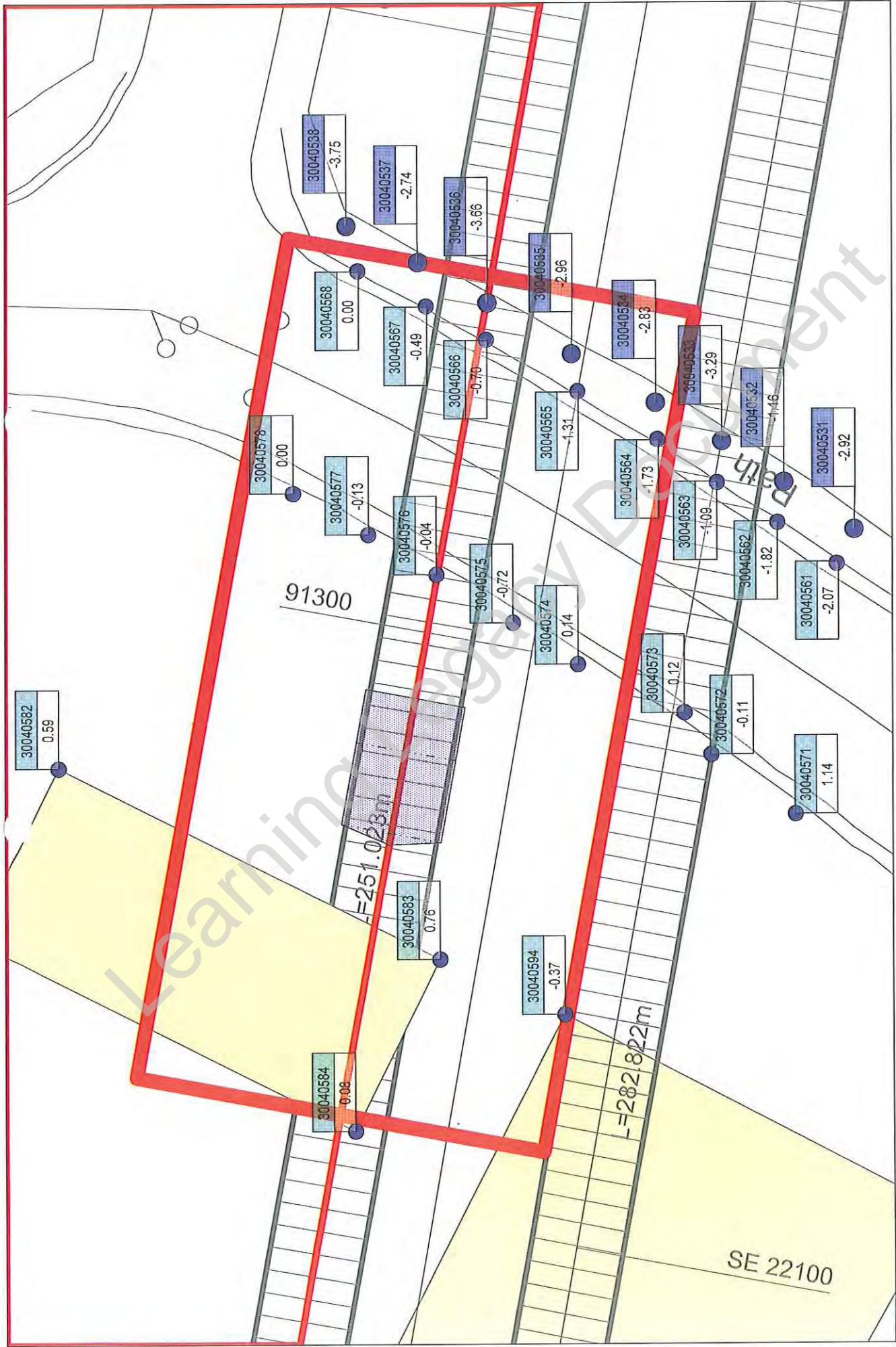


Point: 30040576

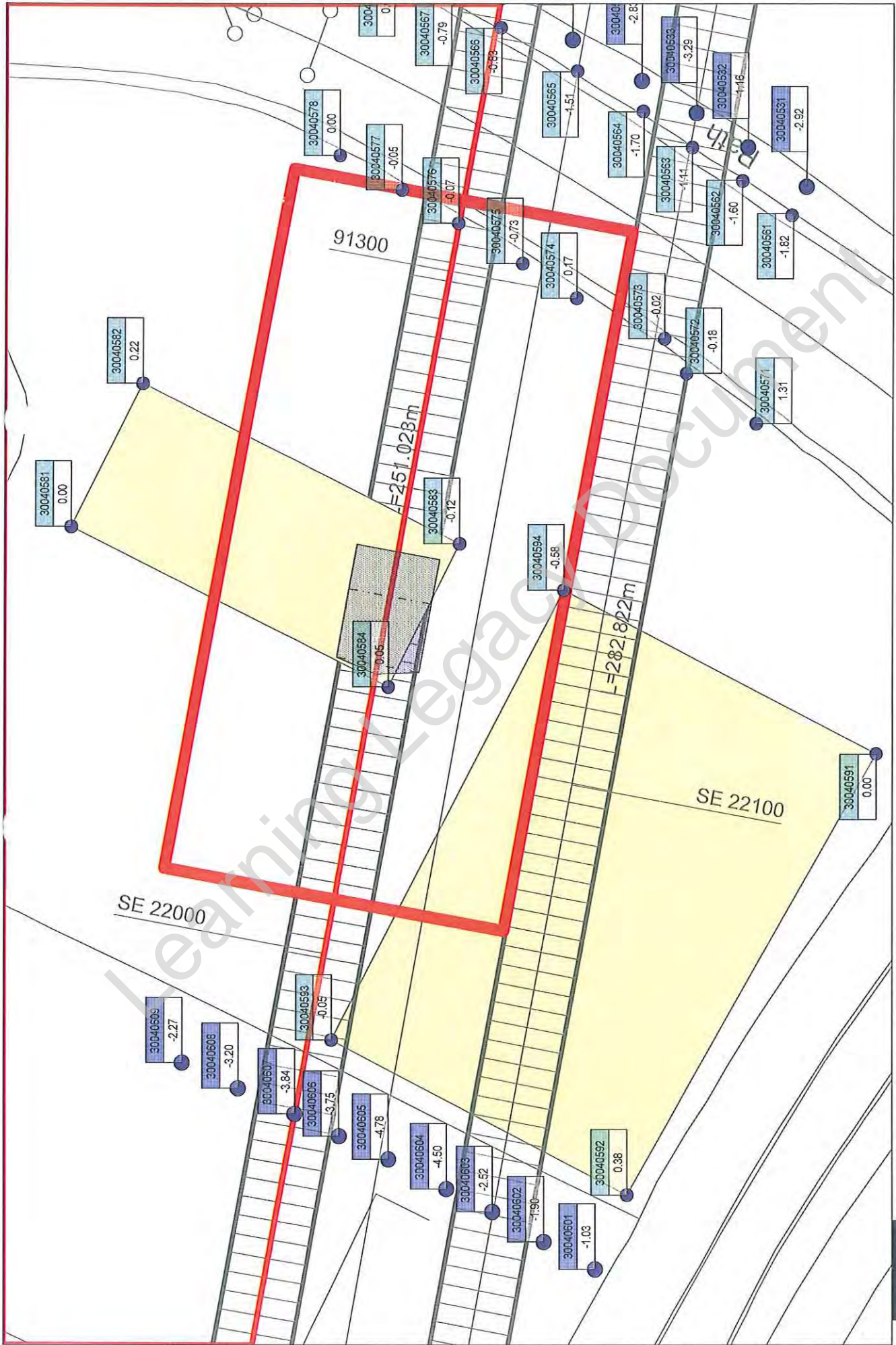


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Petment Crescent Bridge HLC 01.02.2013 - 10.12.2013  
date: 29.07.2014 17:24 current values: 29.07.2014 16:58






Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 30.06.2013 09:00



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 01.07.2013 09:00



 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 26**

**Royal Mail**

Learning Legacy Document

<b>monitoring asset</b>	<b>Royal Mail</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
<b>name of monitoring section:</b>	Royal Mail		
sensor type:	Hydrostatic Levelling Cell		
chainage:	91250	point no.:	3004 0591 - 3004 0594
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 -20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	01/02/13	0.00		
<b>TBM 1</b>	start ZOI	26/03/13	0.16	3004 0594
		28/03/13	0.06	3304 0592
	end ZOI	29/03/13	-0.27	3004 0594
		31/03/13	-0.14	3304 0592
breached not any trigger value				
<b>TBM 2</b>	start ZOI	29/06/13	-0.56	3004 0594
		01/07/13	-0.10	3304 0593
	end ZOI	03/07/13	-0.42	3004 0594
		04/07/13	-0.64	3304 0593
breached not any trigger value				
<b>longterm</b>	10/12/13	-0.77 -1.34	3004 0594 3304 0593	last reading 5 month post tunneling,
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>		<b>No residual risk</b> since the Works have been completed by HMJV	
	<input type="checkbox"/>		<b>Yes, residual risk</b> (see comment below)	

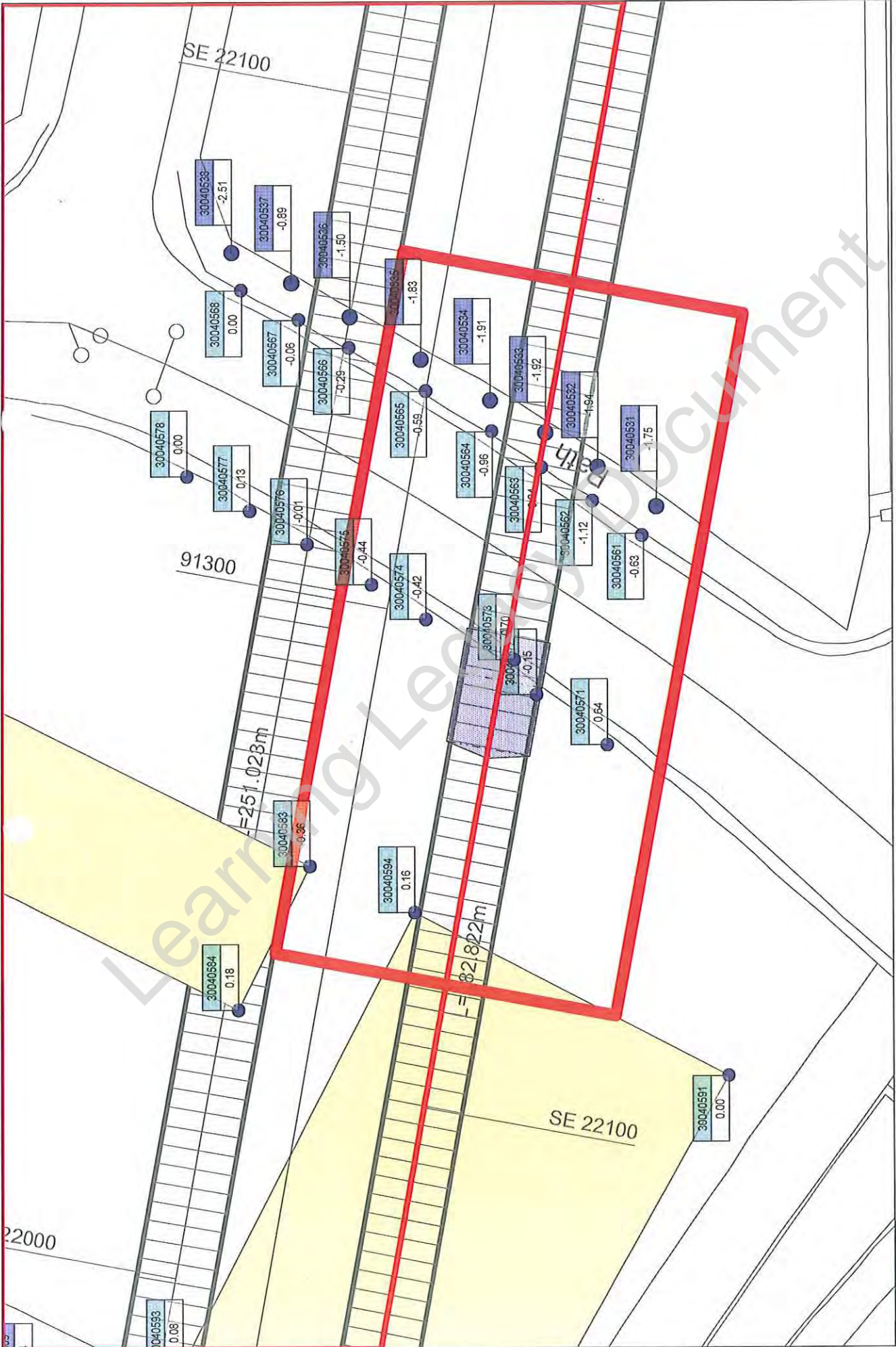
**summary / comments**

Overall, none of the points reached any trigger value.  
 In the period from 22.07.2013 - 02.08.2013 no data recording took place because a water or air tube was disconnected.  
 Under consideration of temperature differences and the achievable accuracy of the system, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 12/01/15

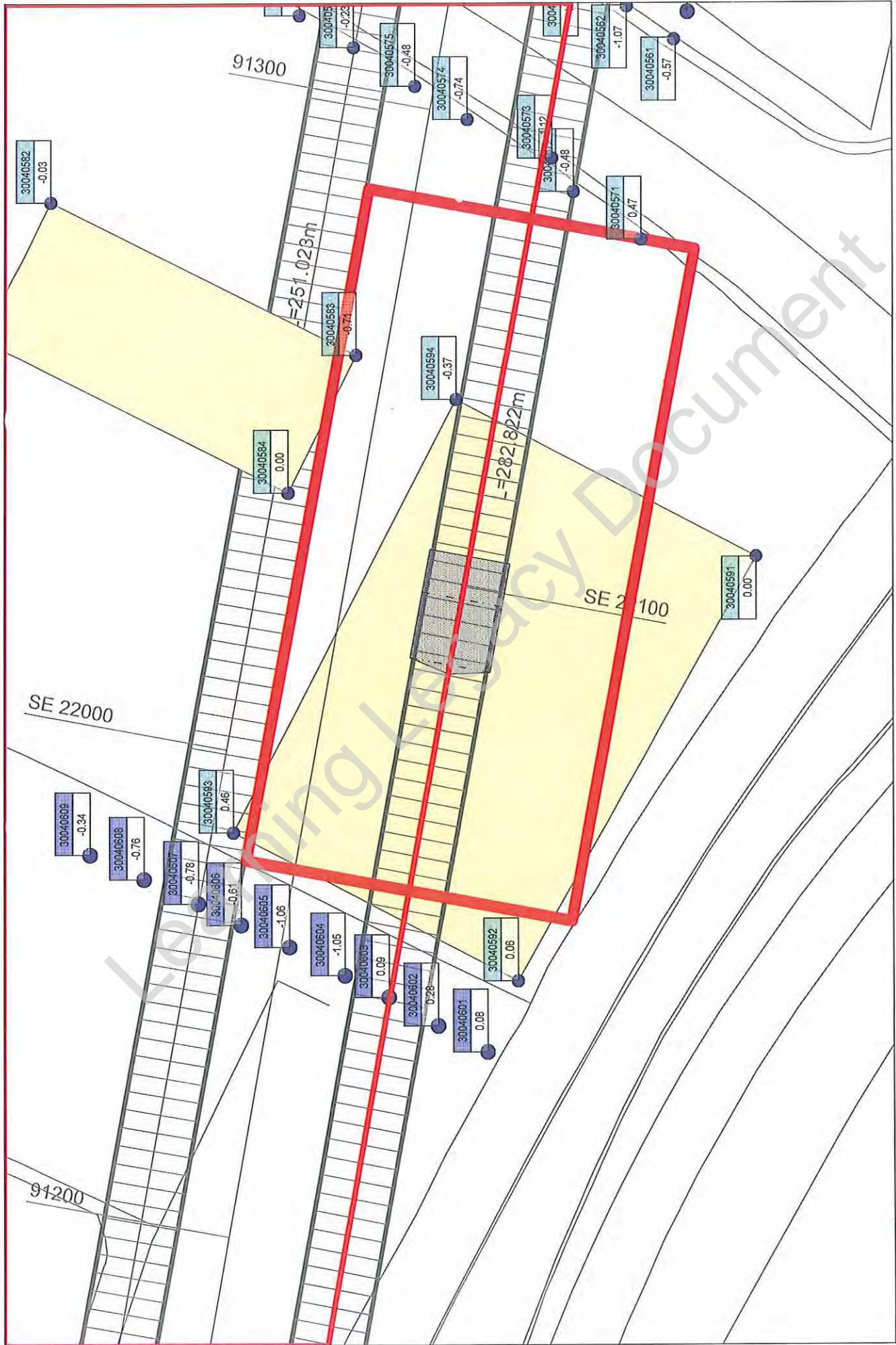
print name:

HMJV project role: Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 26.03.2013 09:29





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, lining walls and grouting  
 current values: 28.03.2013 06:38



Point: 30040591



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Royal Mail HLC 01.02.2013 - 10.12.2013

date: 30.07.2014 10:43 current values: 30.07.2014 10:31



Point: 30040592



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Royal Mail HLC 01.02.2013 - 10.12.2013

date: 30.07.2014 10:47 current values: 30.07.2014 10:31



Point: 30040593



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Royal Mail HLC 01.02.2013 - 10.12.2013

date: 30.07.2014 10:49 current values: 30.07.2014 10:31



Point: 30040594



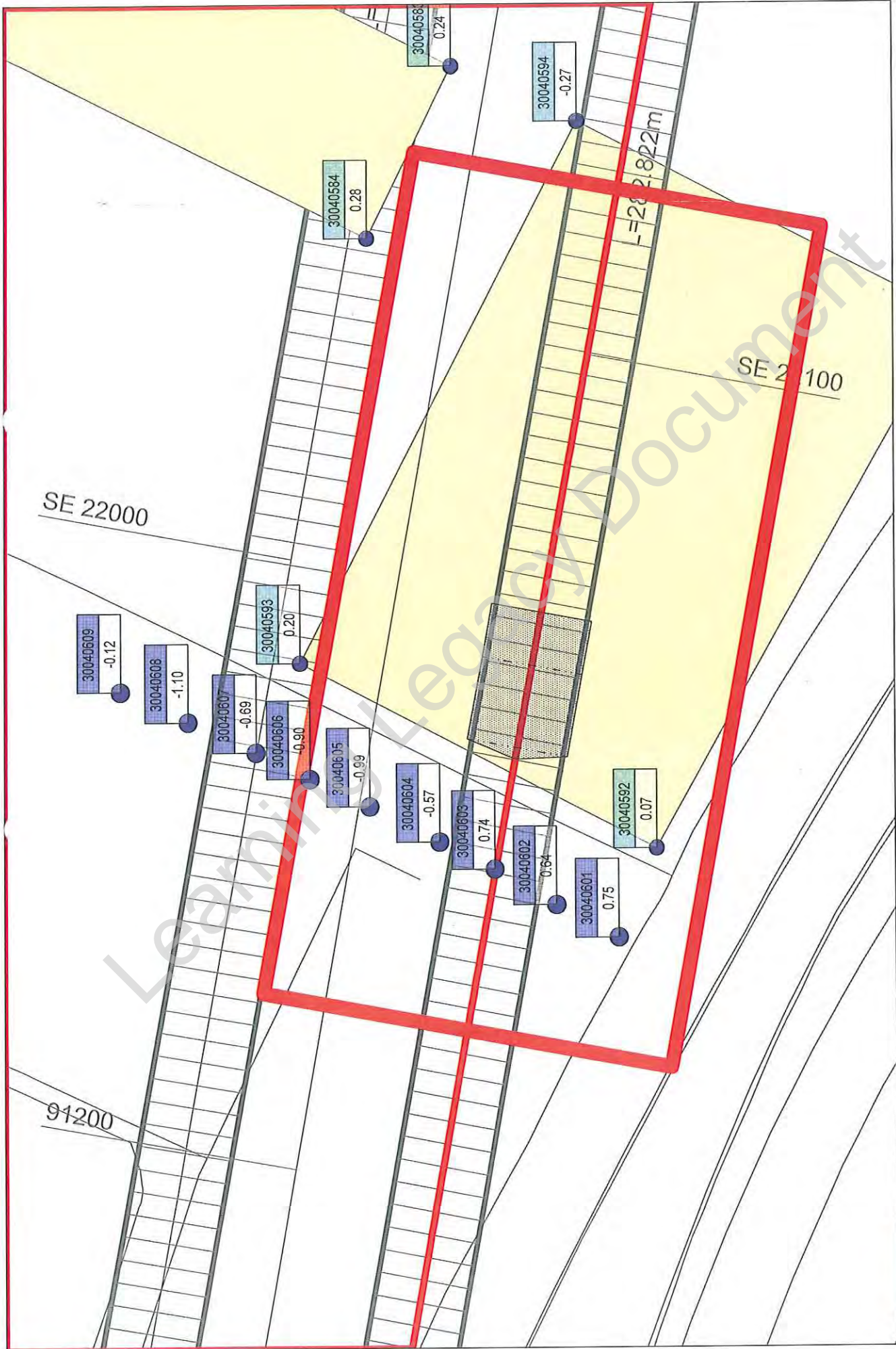
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

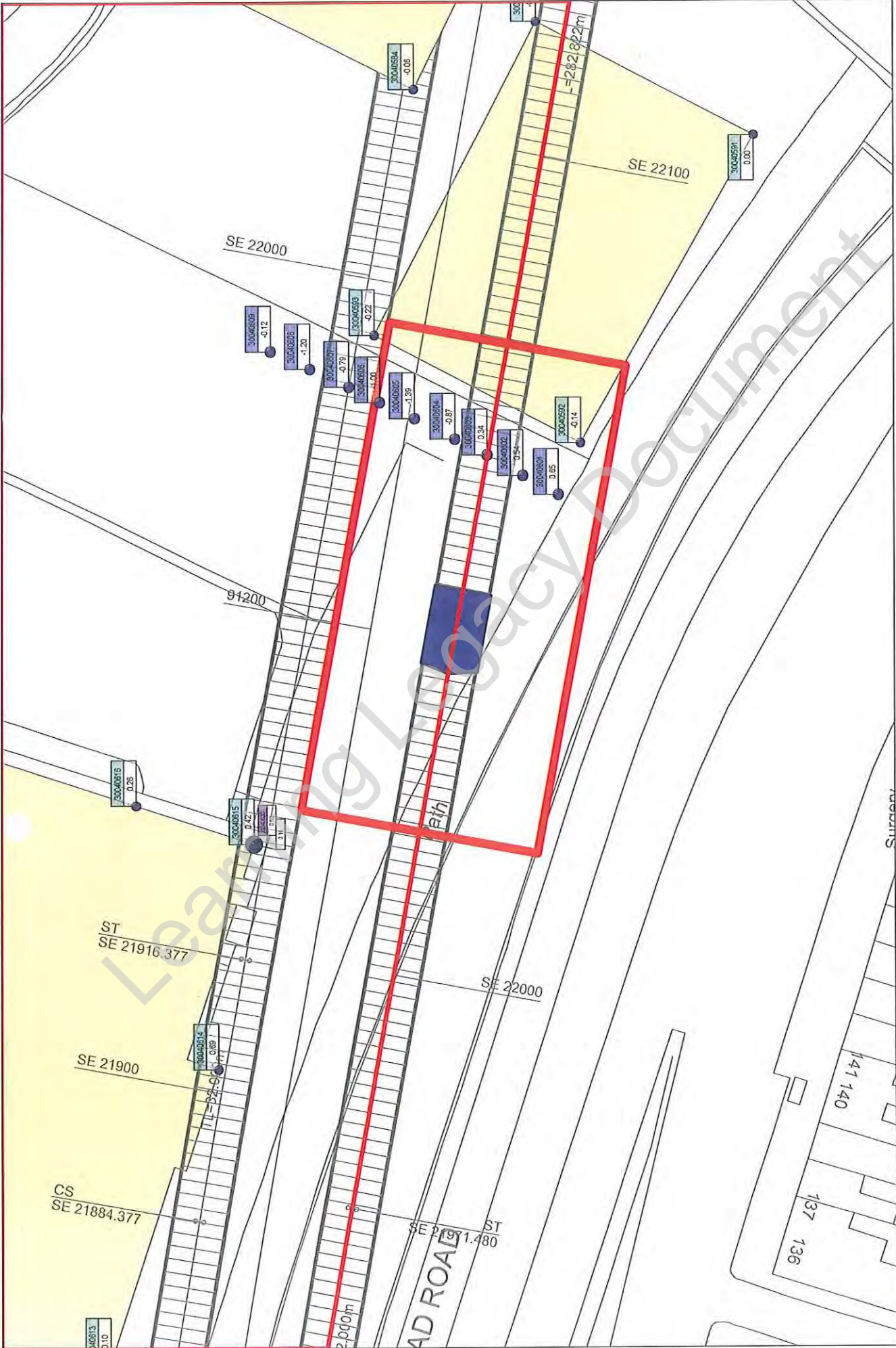
Close Out Report: WB Tunnel - Royal Mail HLC 01.02.2013 - 10.12.2013

date: 30.07.2014 10:52 current values: 30.07.2014 10:31



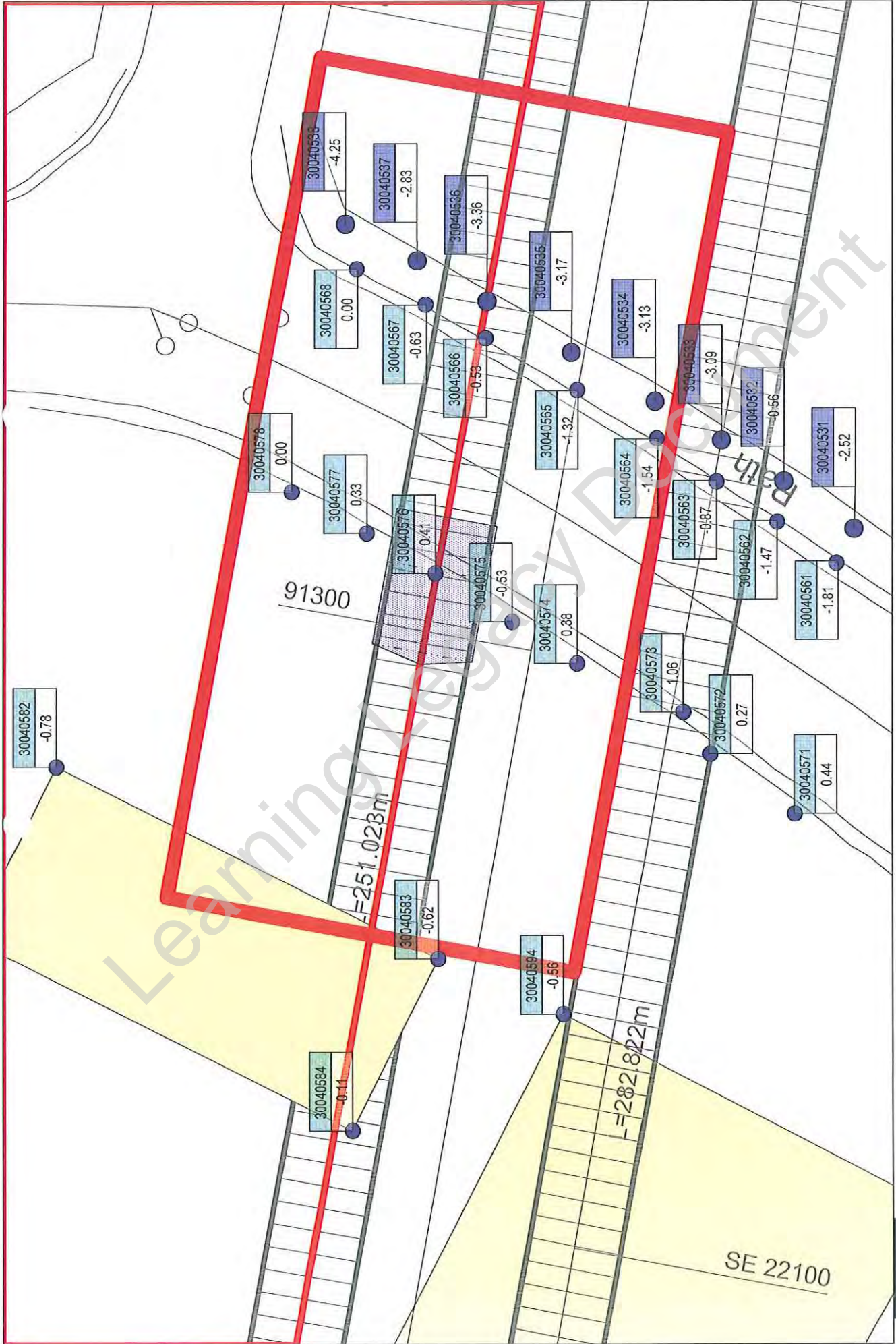




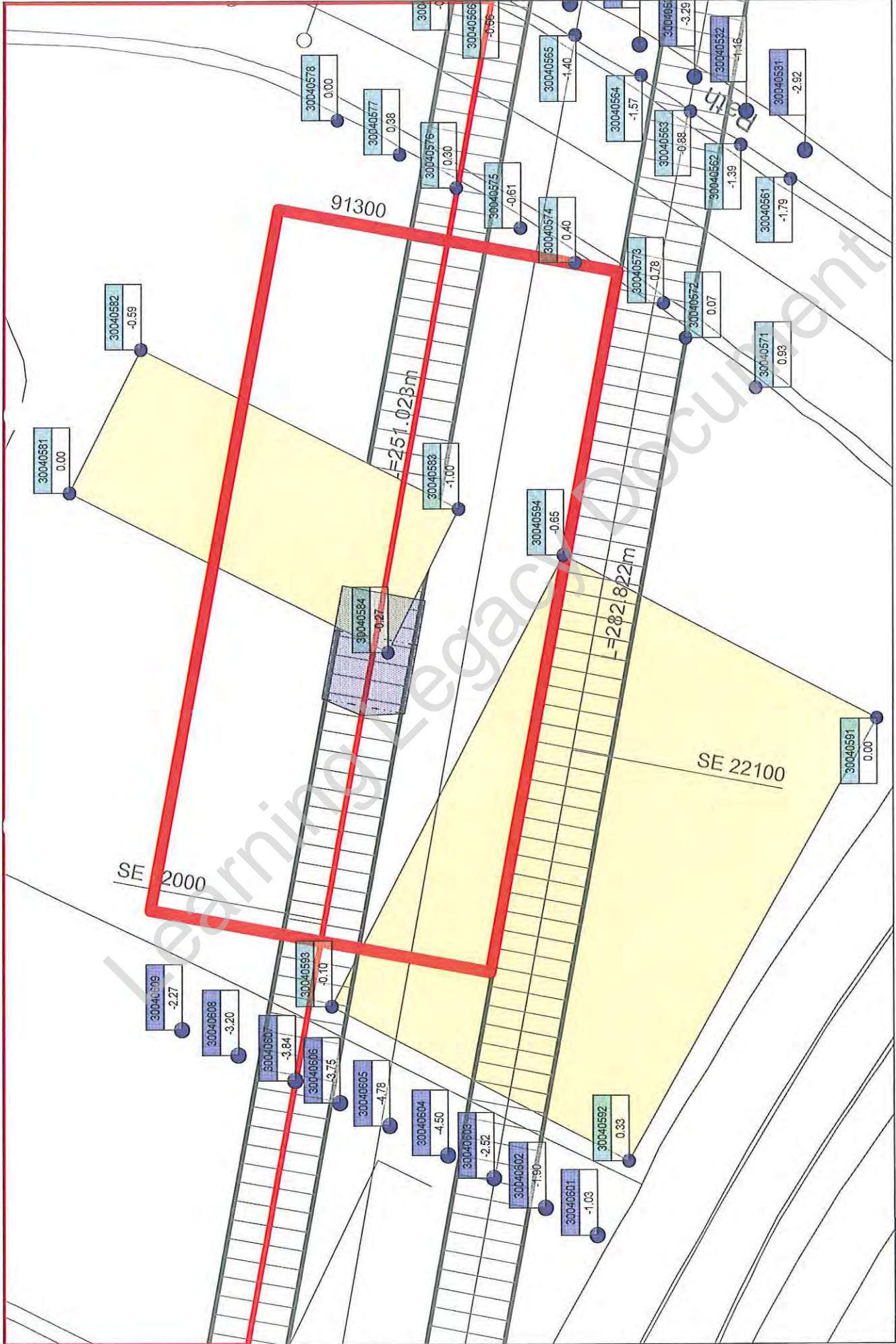


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 31.03.2013 06:50



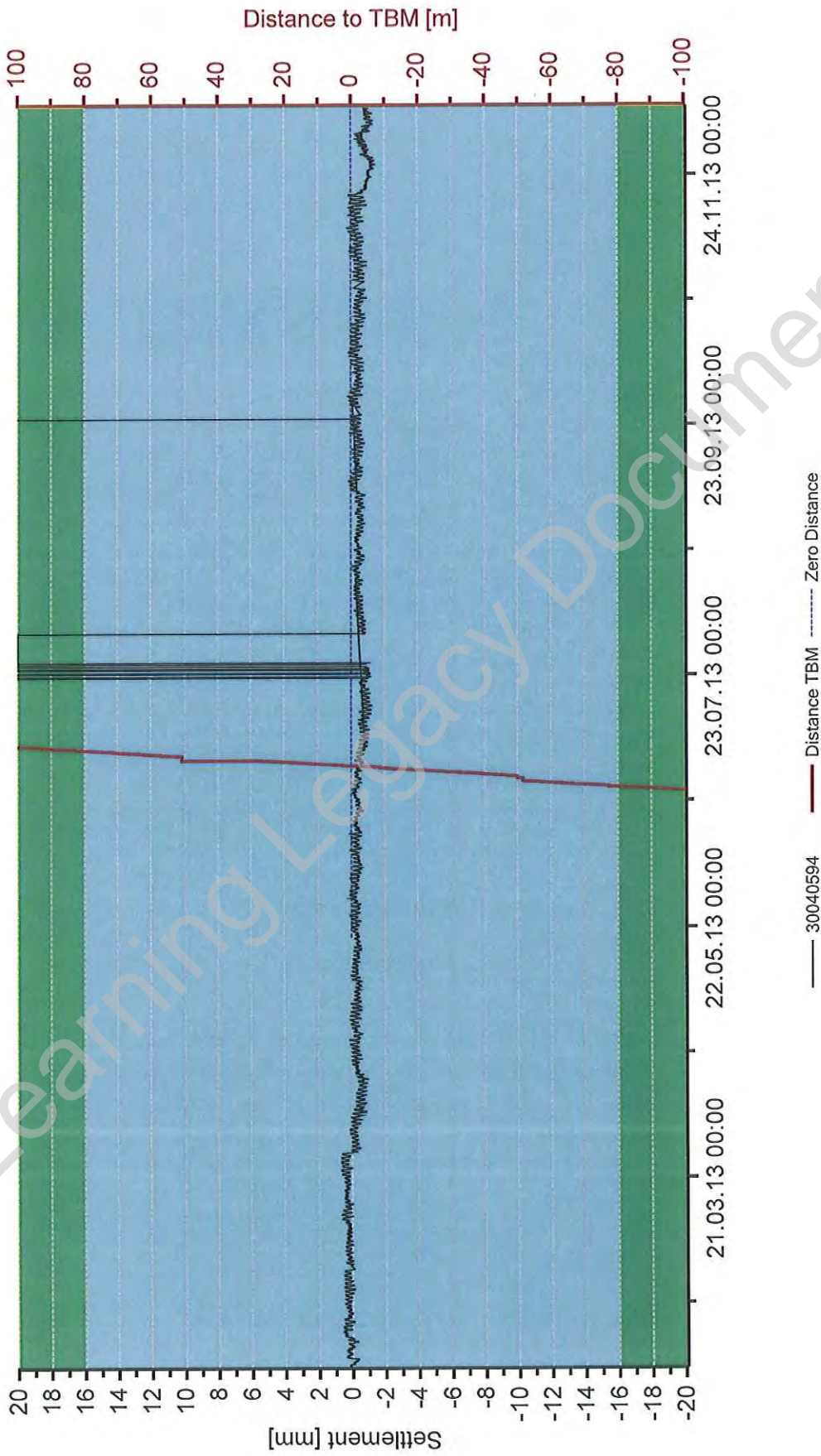


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 29.06.2013 17:37



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 01.07.2013 17:59

Point: 30040594



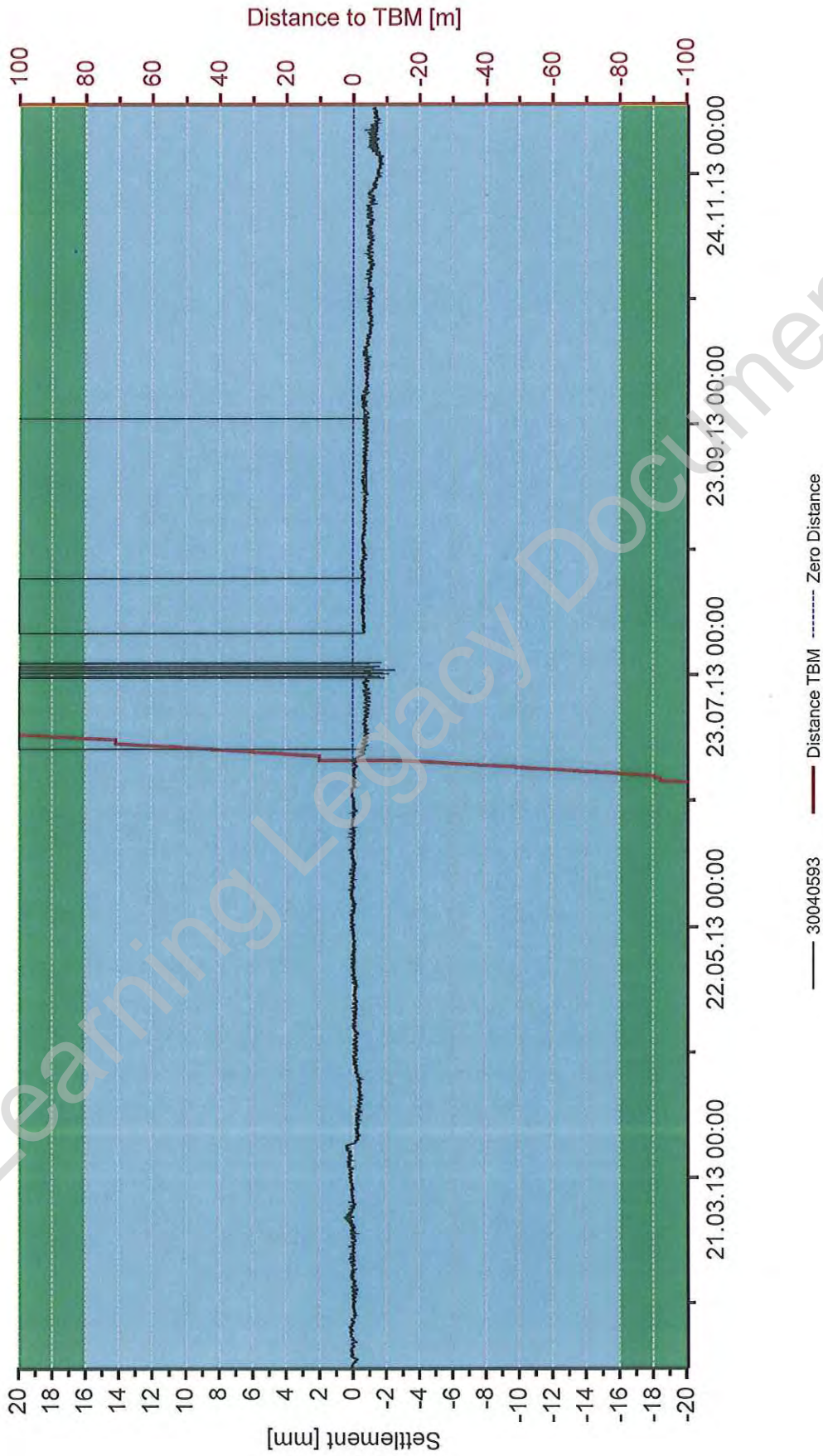
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: EB Tunnel - Royal Mail HLC 01.02.2013 - 10.12.2013

date: 30.07.2014 11:35 current values: 30.07.2014 11:27



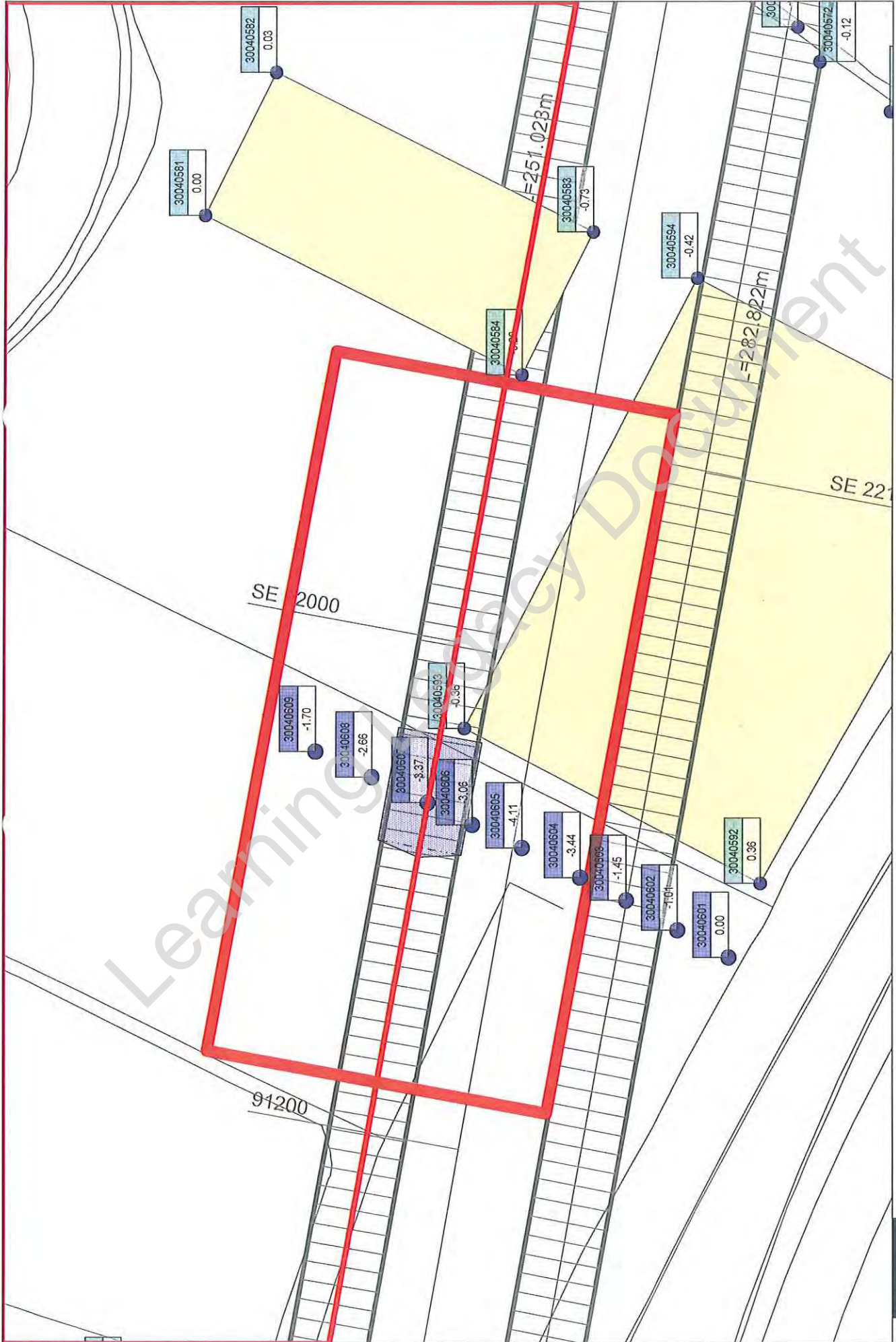
Point: 30040593



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

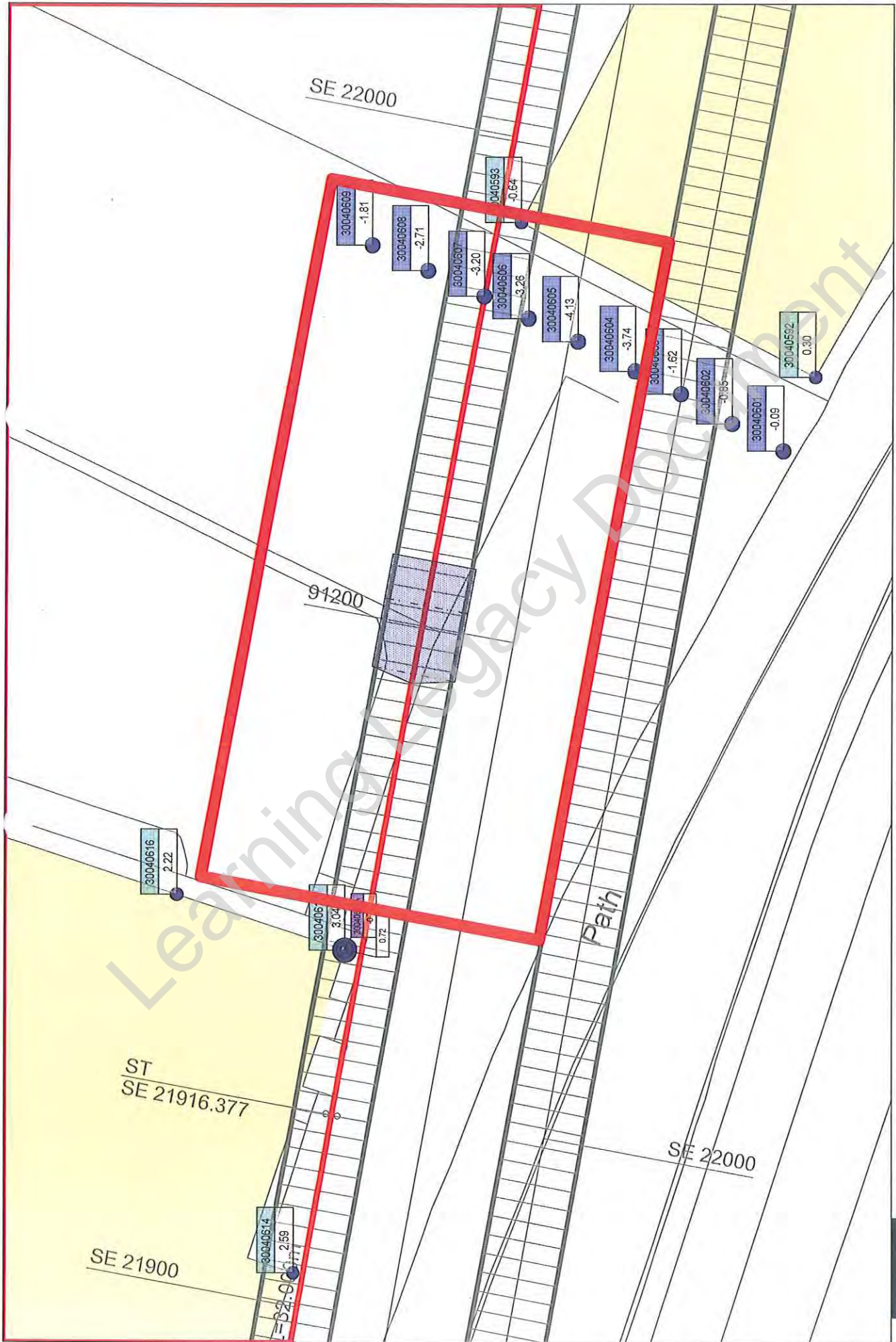
Close Out Report: EB Tunnel - Royal Mail HLC 01.02.2013 - 10.12.2013

date: 30.07.2014 11:29 current values: 30.07.2014 11:16




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 03.07.2013 09:00





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 04.07.2013 18:52



 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 27**

**McDonalds**

Learning Legacy Document

<b>monitoring asset</b>	<b>Mc Donald</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
<b>name of monitoring section:</b>	Mc Donald		
sensor type:	Hydrostatic Levelling Cell		
chainage:	91260	point no.:	3004 0581 - 3004 0584
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 -20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	01/02/13	0.00		
<b>TBM 1</b>	start ZOI	25/03/13	-0.22	3004 0583
		26/03/13	+0.08	3304 0584
	end ZOI	28/03/13	-0.72	3004 0583
		29/03/13	-0.26	3304 0584
breached not any trigger value				
<b>TBM 2</b>	start ZOI	29/06/13	-0.62	3004 0583
		30/06/13	+0.38	3304 0584
	end ZOI	02/07/13	-0.71	3004 0583
		03/07/13	-0.28	3304 0584
breached not any trigger value				
<b>longterm</b>	10/12/13	-1.33 +0.35	3004 0583 3304 0584	last reading 5 month post tunneling, Cross section not longer measurable
<b>Evaluation of any potential residual risks</b>		<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV	
		<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)	

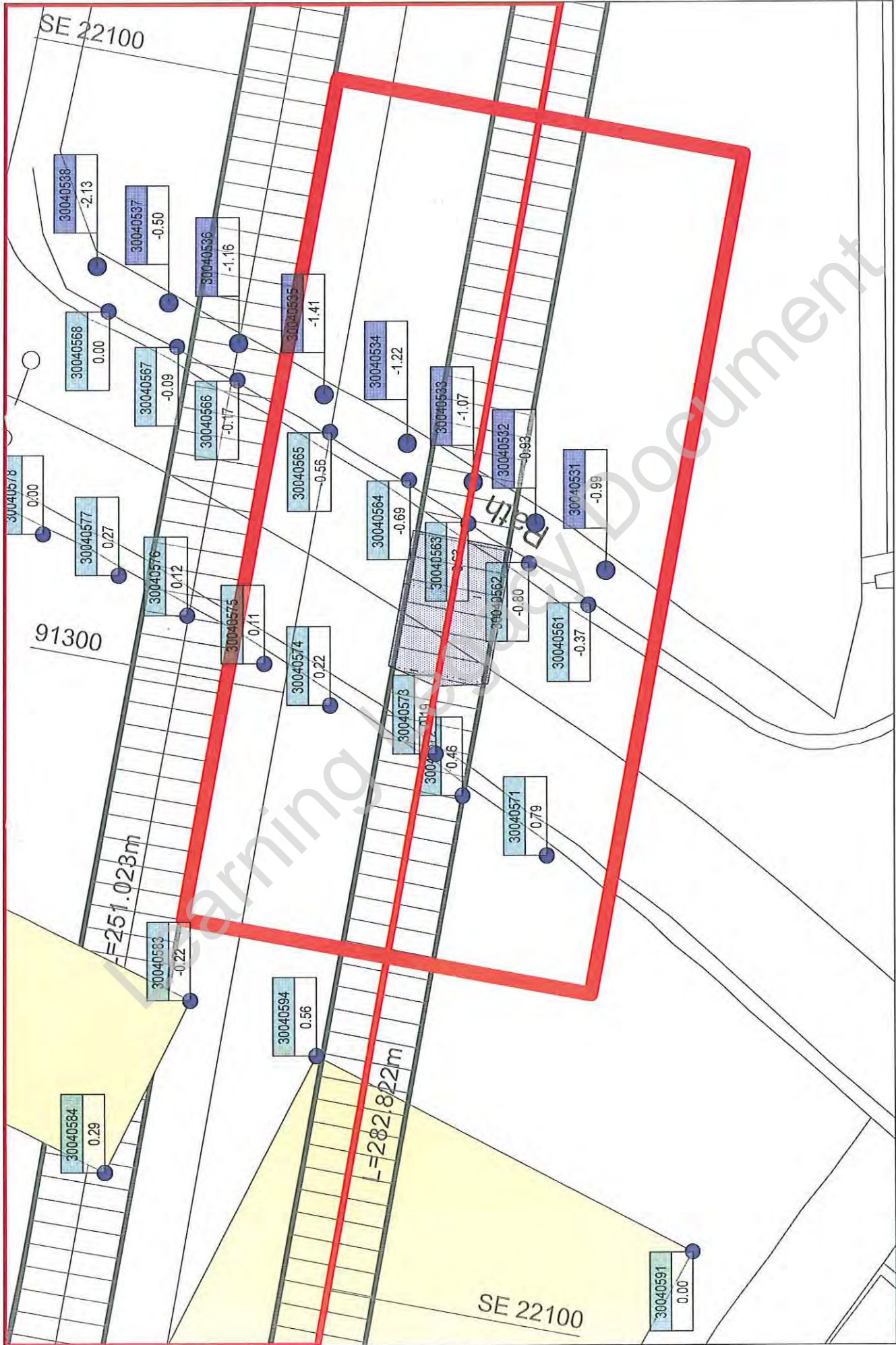
**summary / comments**

Overall, none of the points reached any trigger value.  
 In the period from 22.07.2013 - 02.08.2013 no data recording took place for the points 3004 0582 - 3004 0583 because a water/air tube was disconnected.  
 Under consideration of temperature differences and the achievable accuracy of the system, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 12/01/15

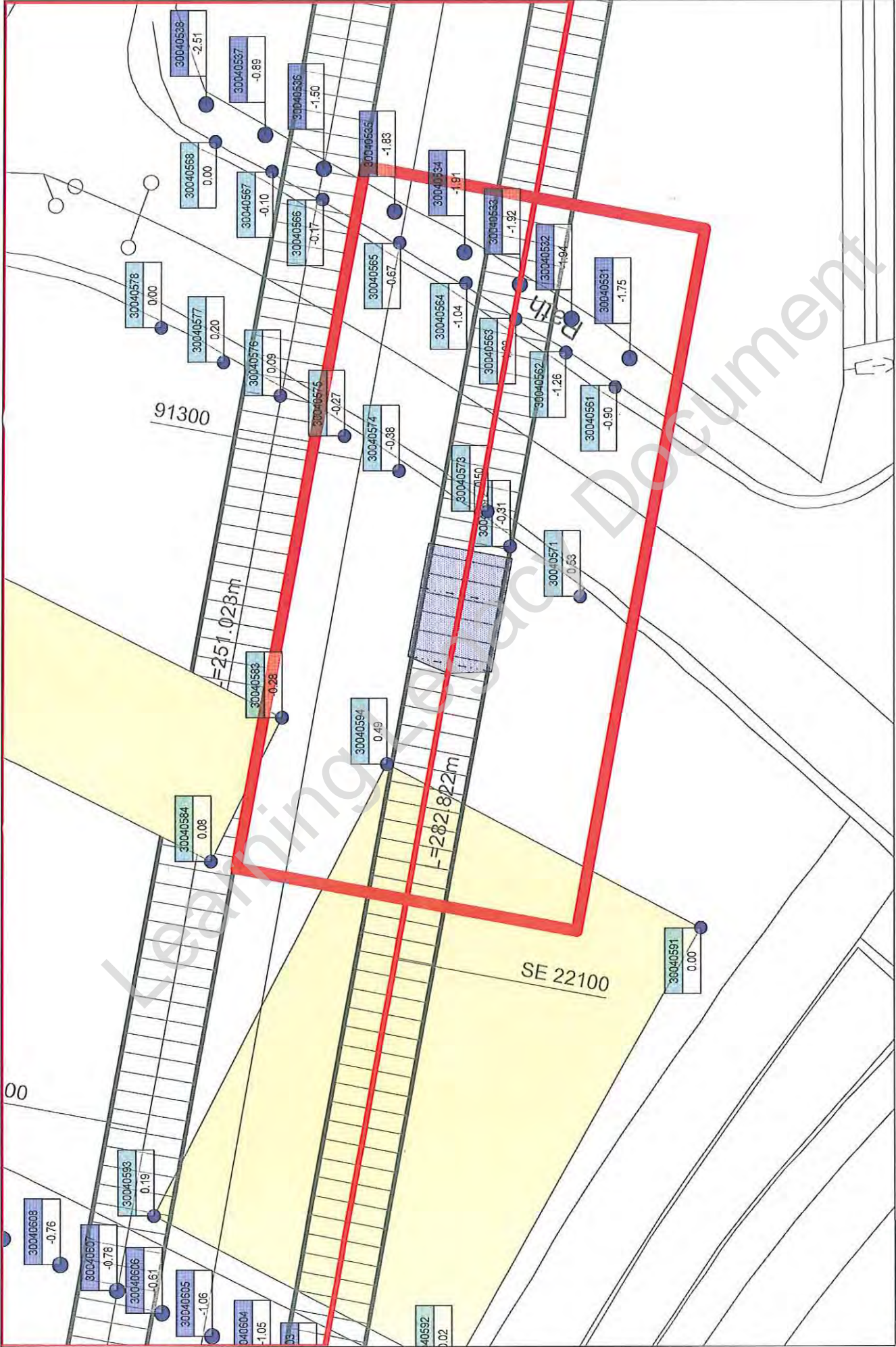
print name:

HMJV project role: Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 25.03.2013 17:58

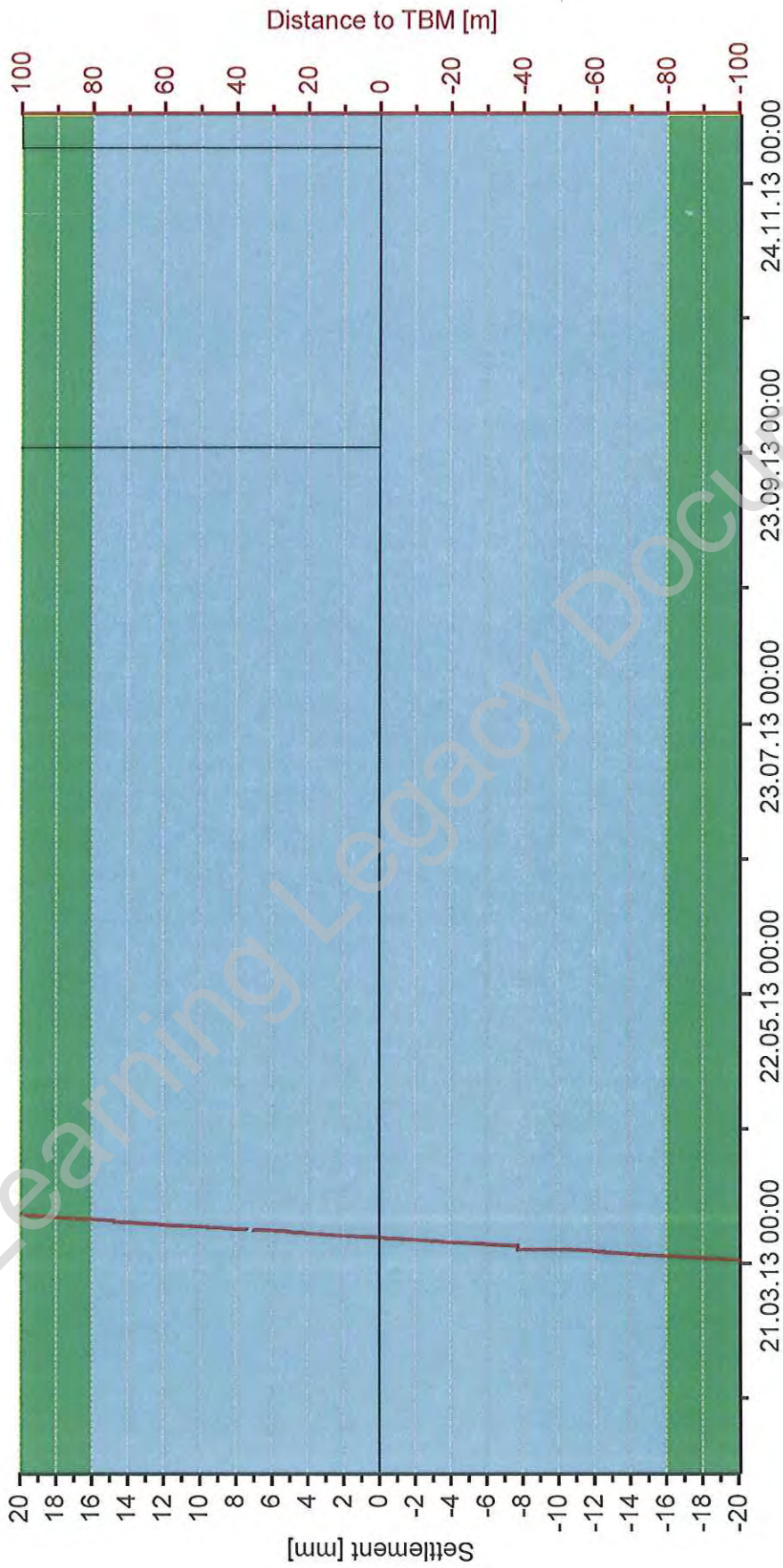




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 26.03.2013 17:49



Point: 30040581



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Mc Donald HLC 01.02.2013 - 10.12.2013

date: 30.07.2014 14:05 current values: 30.07.2014 13:46



Point: 30040582



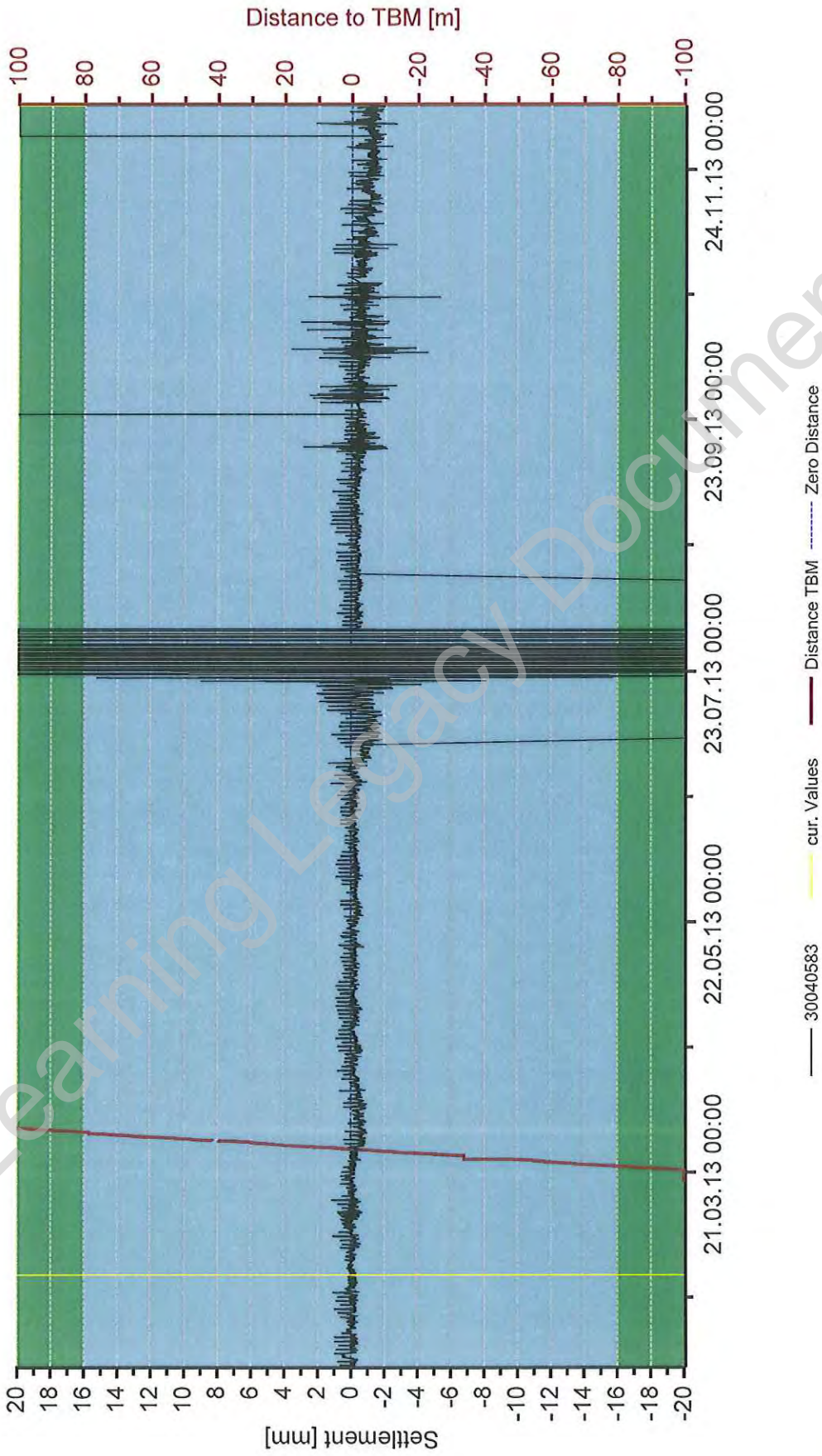
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Mc Donald HLC 01.02.2013 - 10.12.2013

date: 30.07.2014 14:09 current values: 30.07.2014 13:46



Point: 30040583



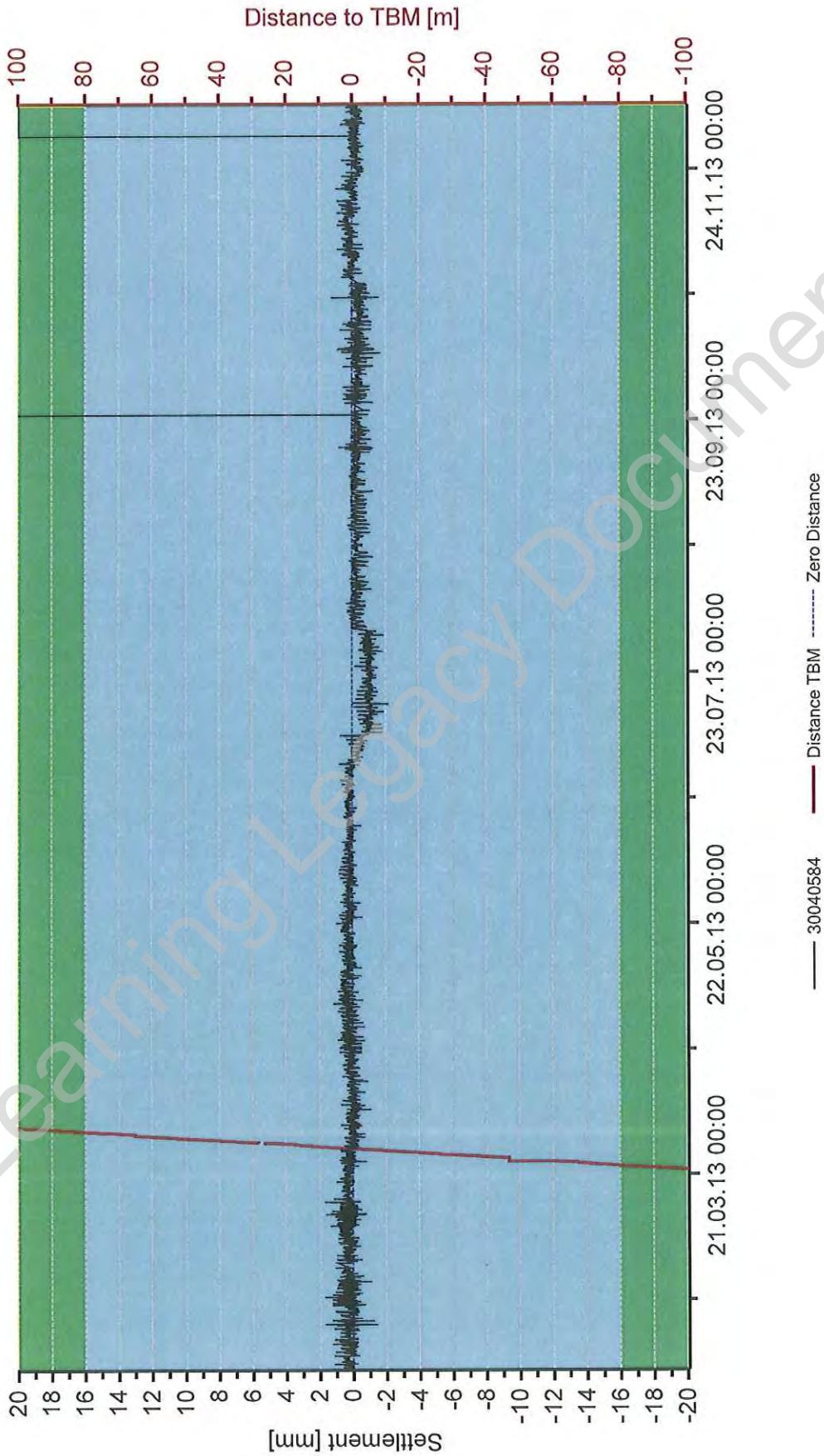
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Mc Donald HLC 01.02.2013 - 10.12.2013

date: 30.07.2014 14:15 current values: 30.07.2014 13:46



Point: 30040584



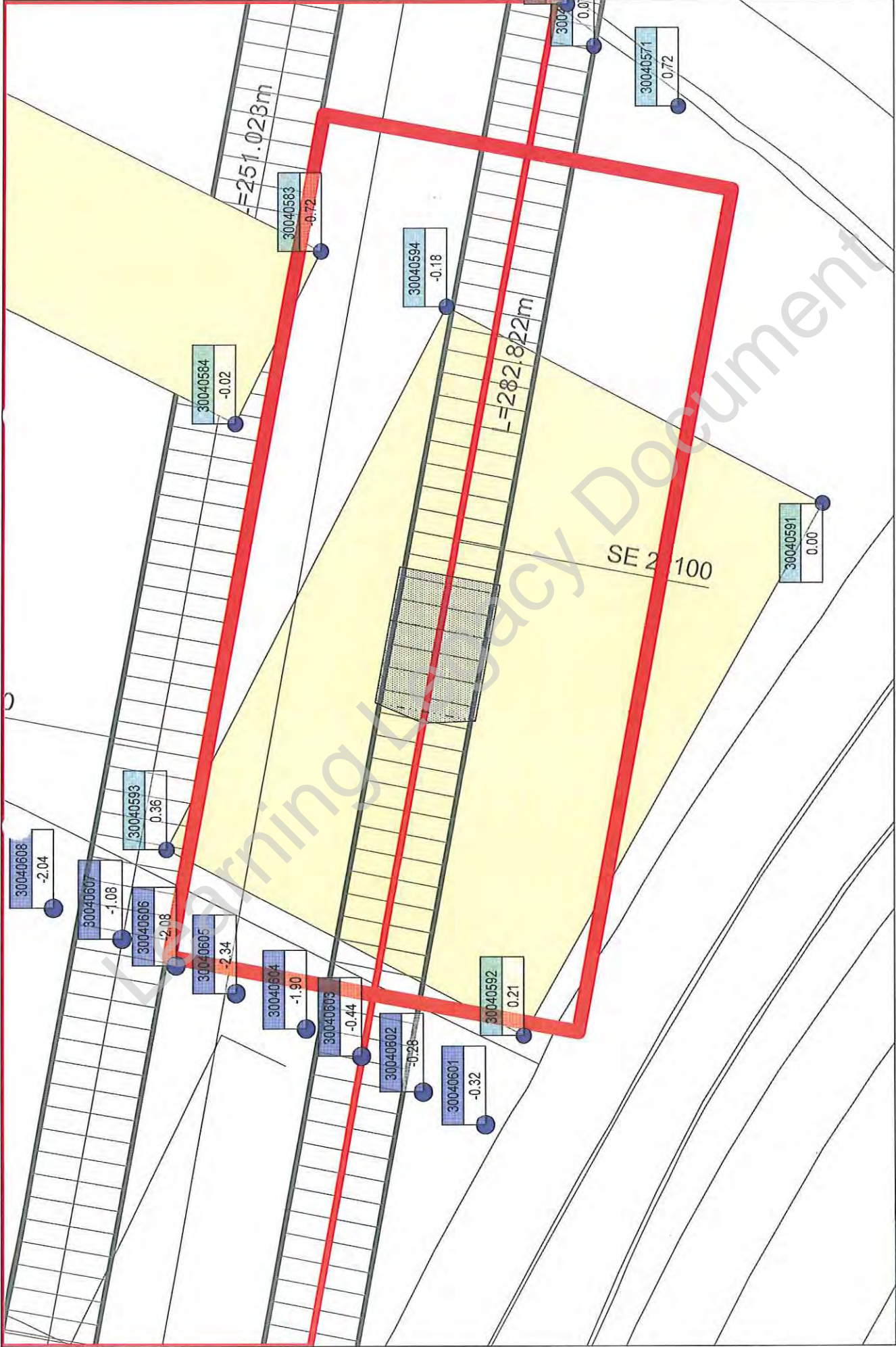
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Mc Donald HLC 01.02.2013 - 10.12.2013

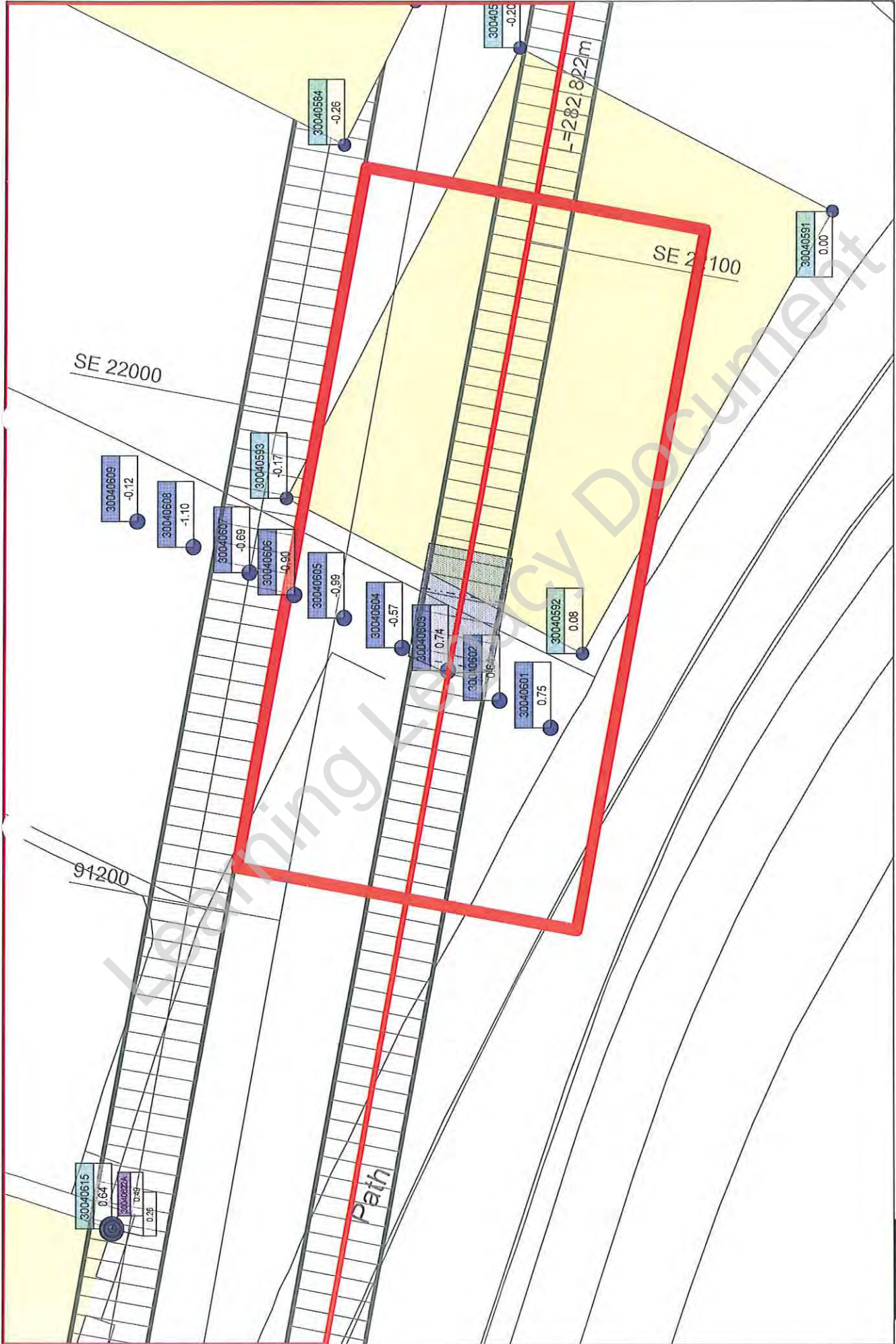
date: 30.07.2014 14:19 current values: 30.07.2014 13:46





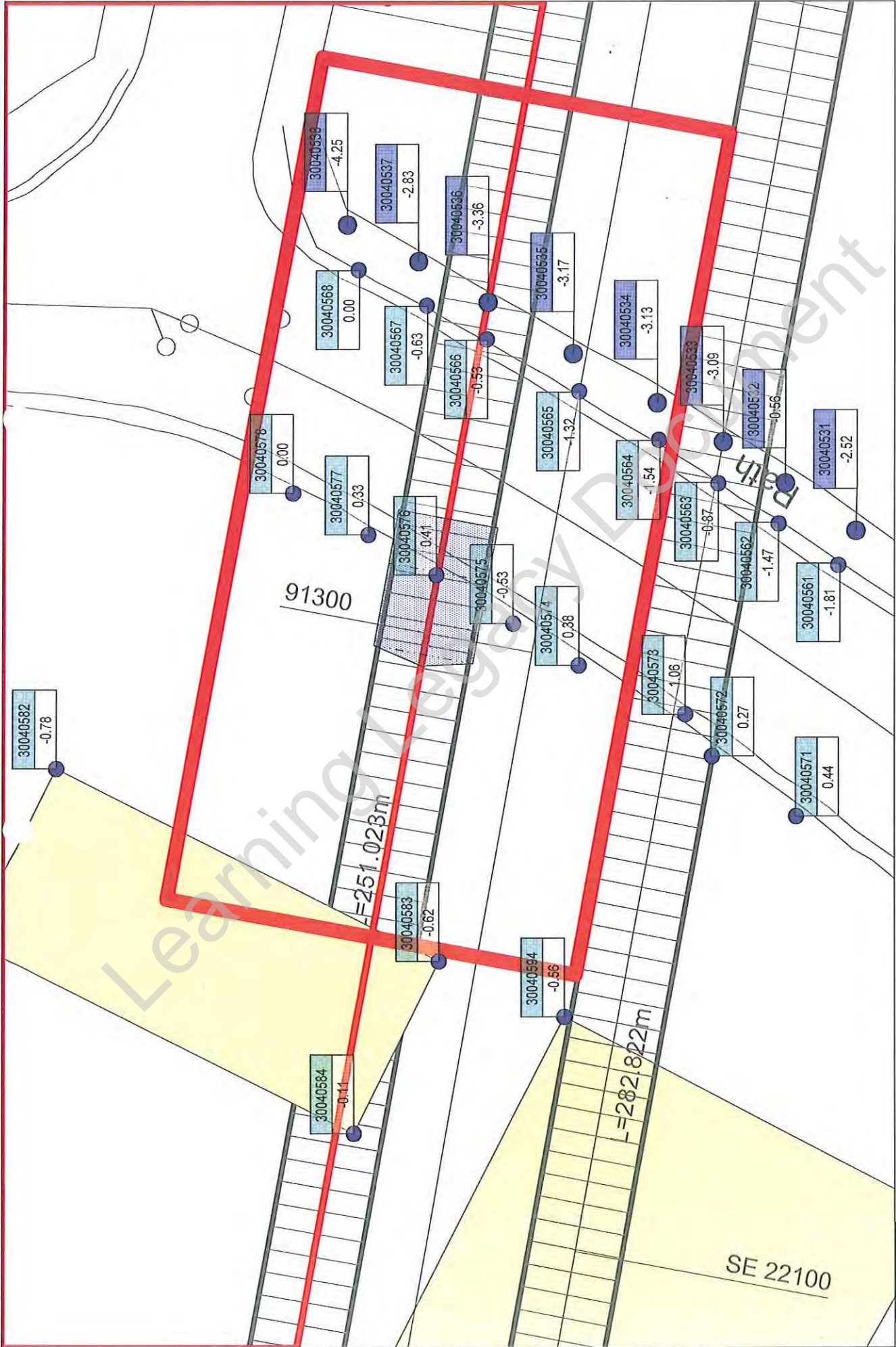


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 28.03.2013 18:22

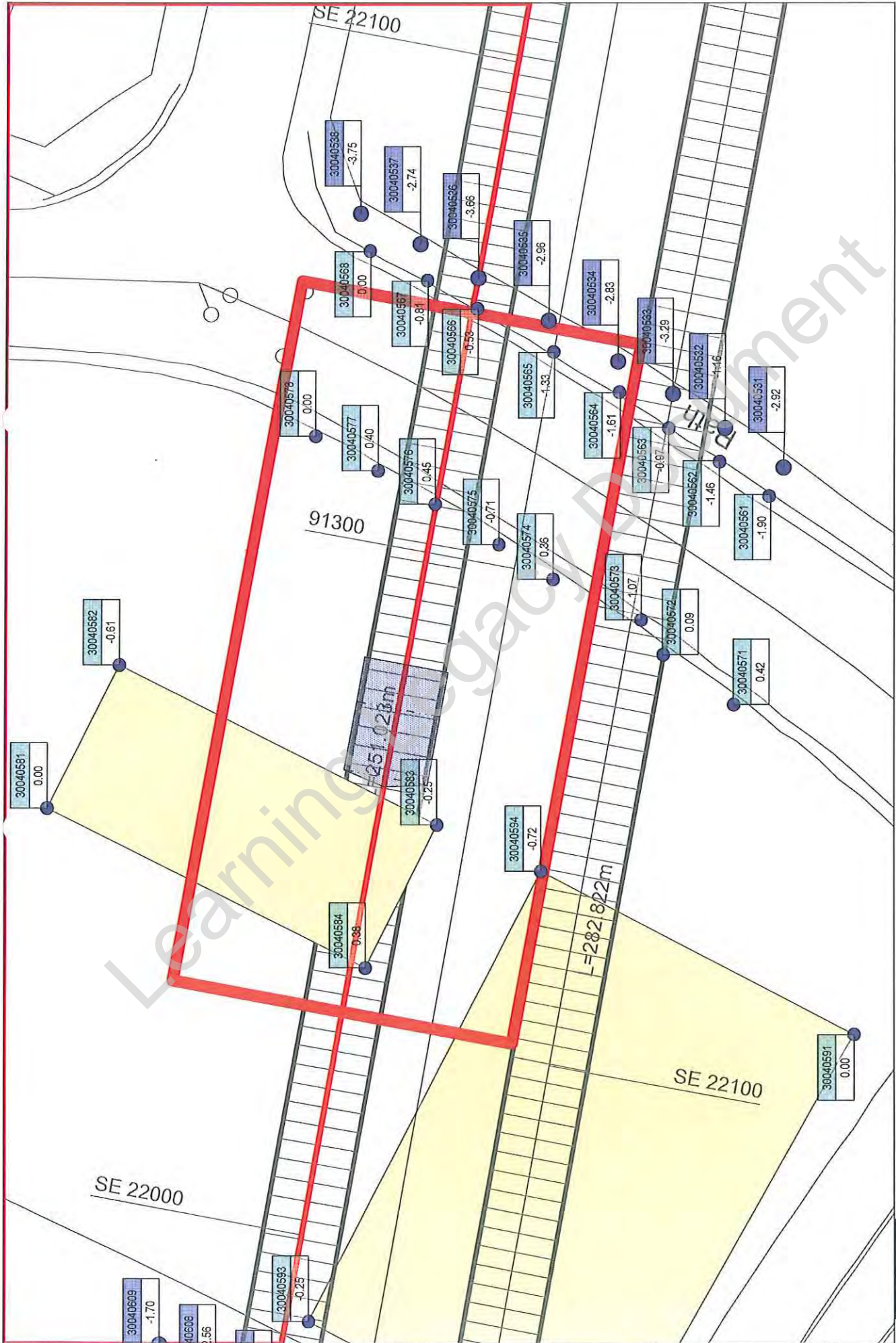


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 29.03.2013 18:25





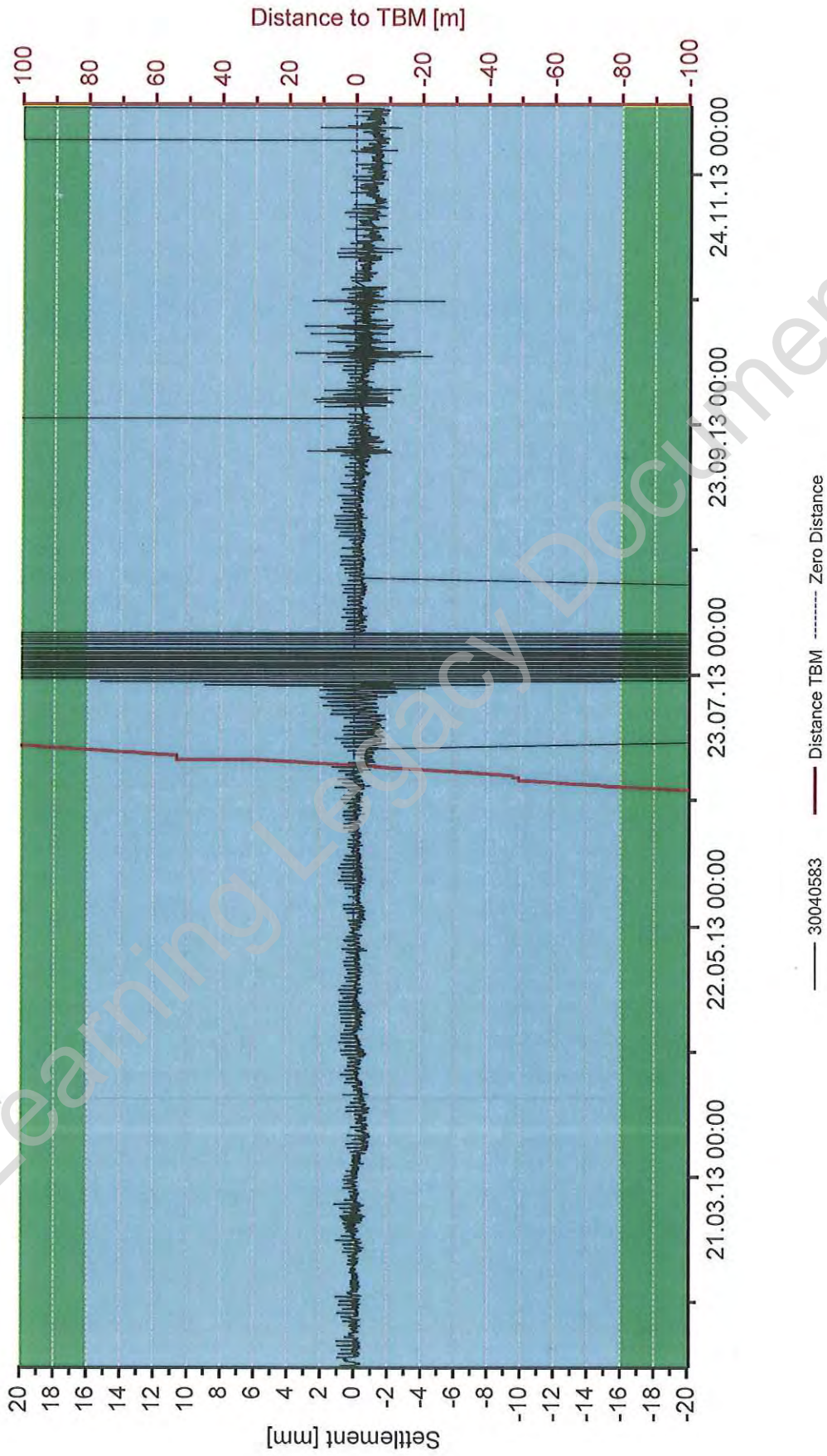
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 29.06.2013 17:37



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 30.06.2013 17:47



Point: 30040583



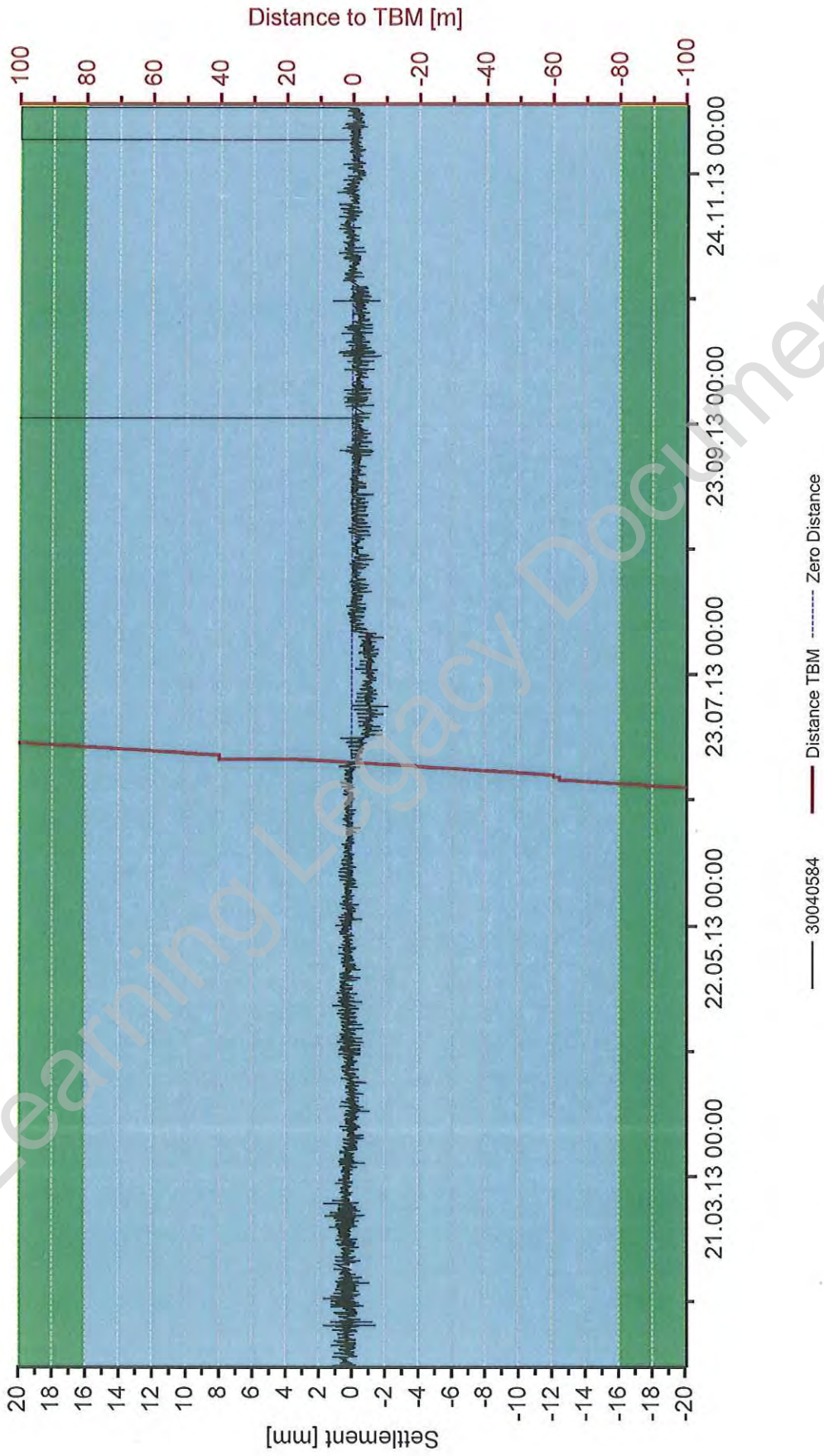
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: EB Tunnel - Mc Donald HLC 01.02.2013 - 10.12.2013

date: 30.07.2014 14:28 current values: 30.07.2014 14:16

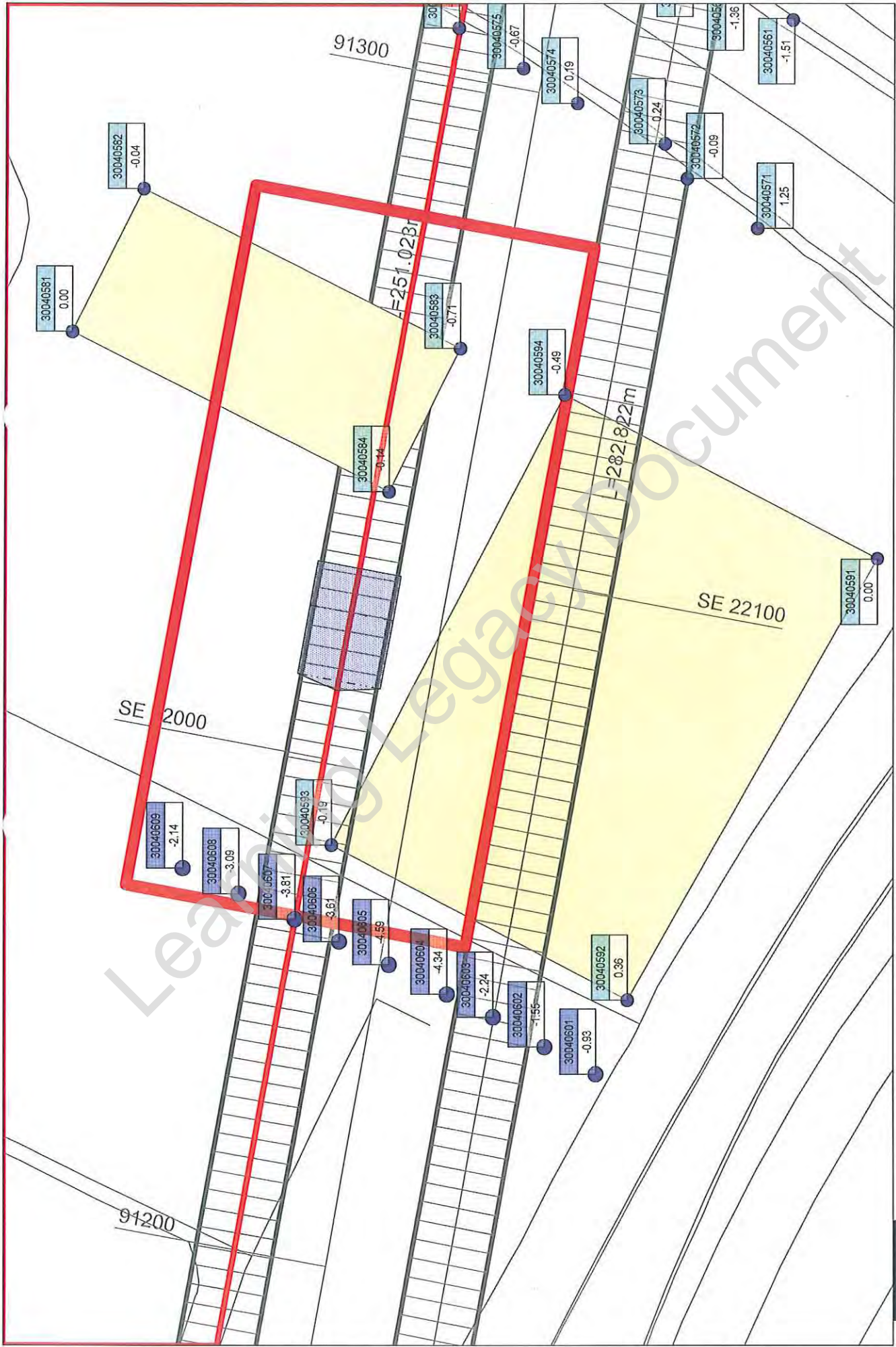


Point: 30040584



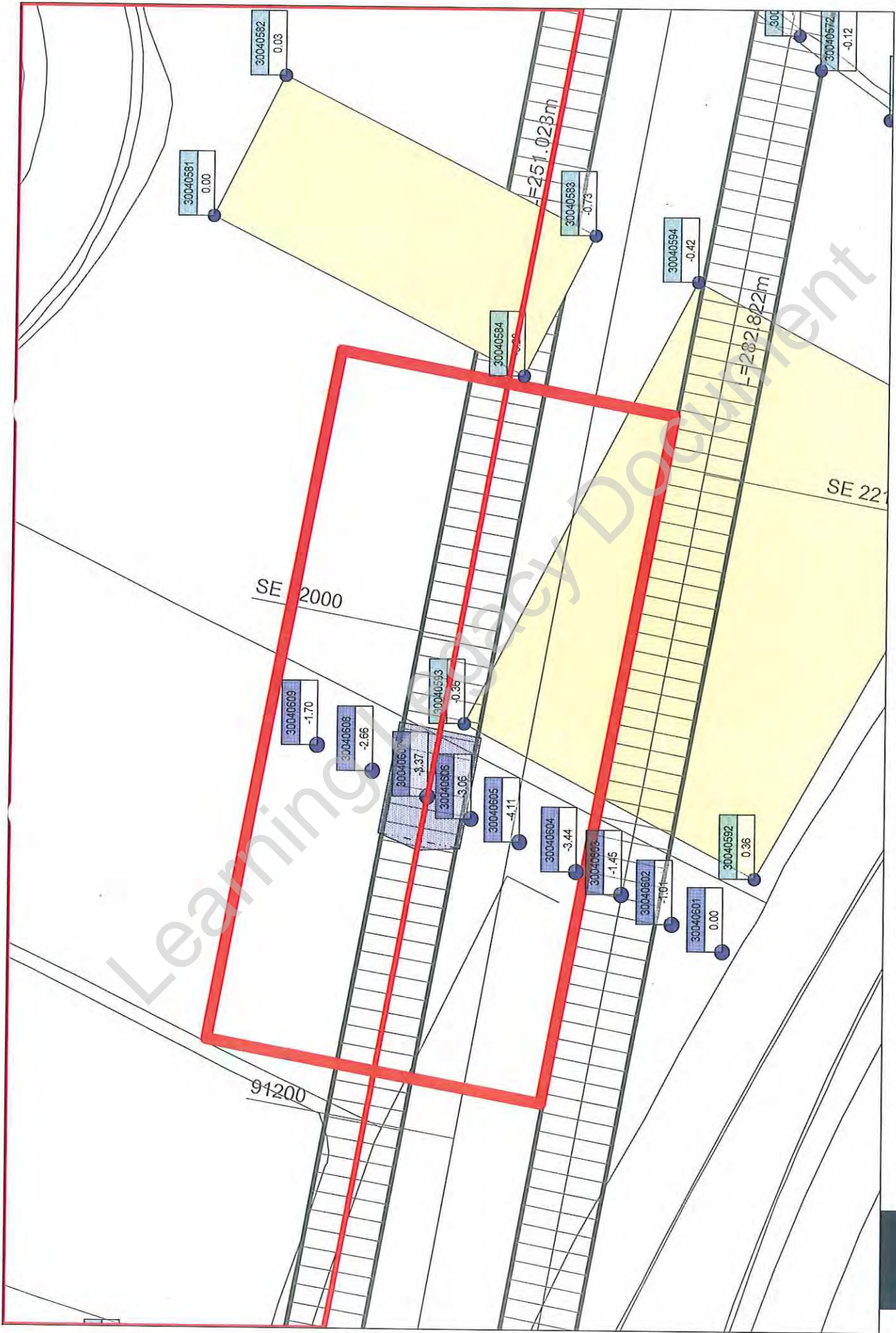
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Mc Donald HLC 01.02.2013 - 10.12.2013  
date: 30.07.2014 14:38 current values: 30.07.2014 14:16






Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 02.07.2013 18:02





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 03.07.2013 09:00



 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	CROSSRAIL	eB NO	C310-HTM-C-RGN-CR148-50022	Rev	6.0
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 28**  
**CS6 – Bus Garage**

Learning Legacy Document

<b>monitoring asset</b>	<b>Parking Lot Bus Garage</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
<b>name of monitoring section:</b>	CS 6 Bus Garage		
sensor type:	manual levelling studs		
chainage:	91220	point no.:	3004 0601 - 3004 0609
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 -20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	04/02/13	0.00		
<b>TBM 1</b>	start ZOI	28/03/13	-0.44	3004 0603
	end ZOI	31/03/13	0.34	3004 0603
<b>TBM 2</b>	start ZOI	02/07/13	-3.81	3004 0607
	end ZOI	04/07/13	-3.20	3004 0607
<b>longterm</b>	07/02/14	-5.41	3004 0605	
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV		
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)		

**summary / comments**

Overall, none of the points reached any trigger value.  
 Under consideration of temperature differences, the surrounded ground conditions and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

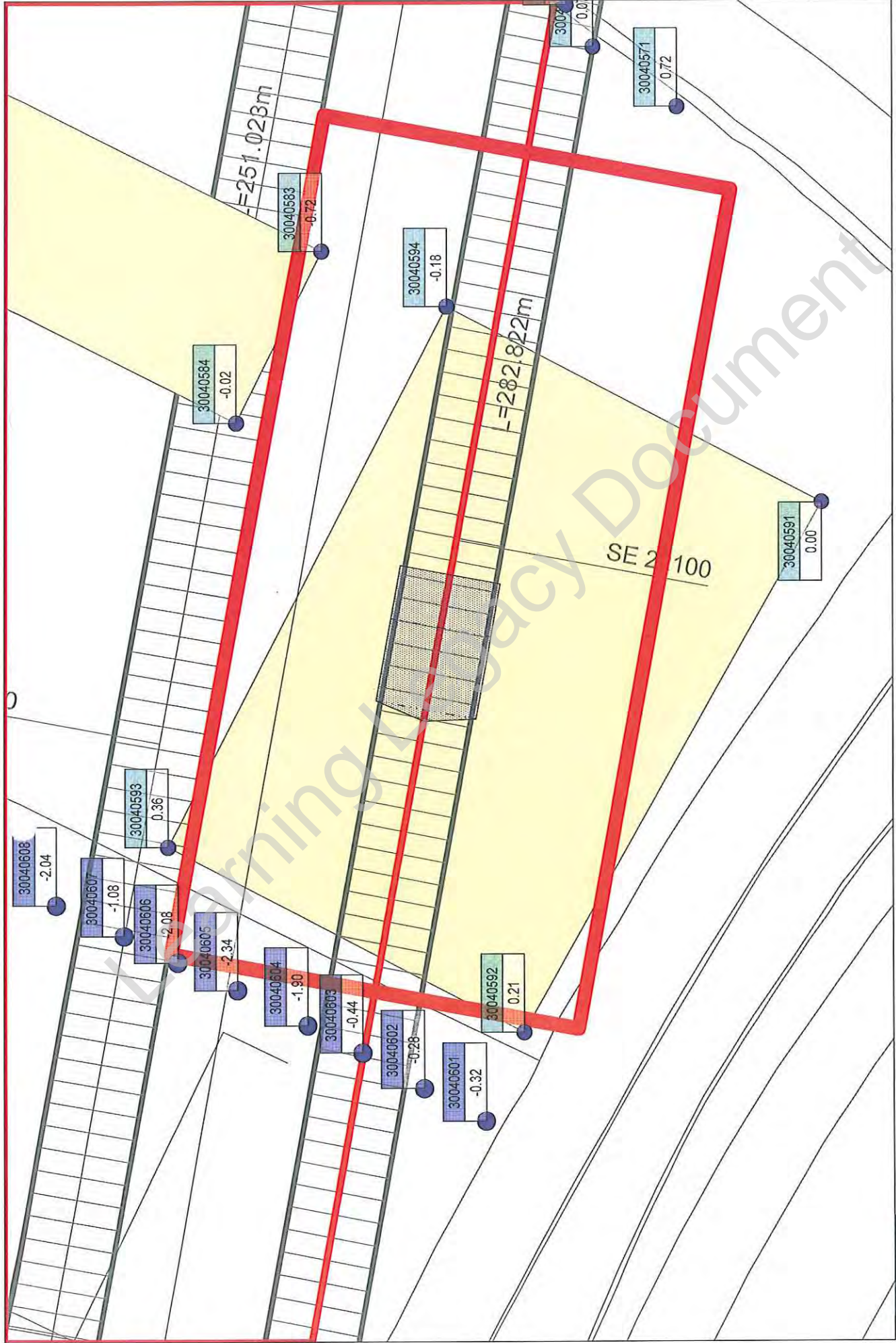
date / signature:

12/01/15

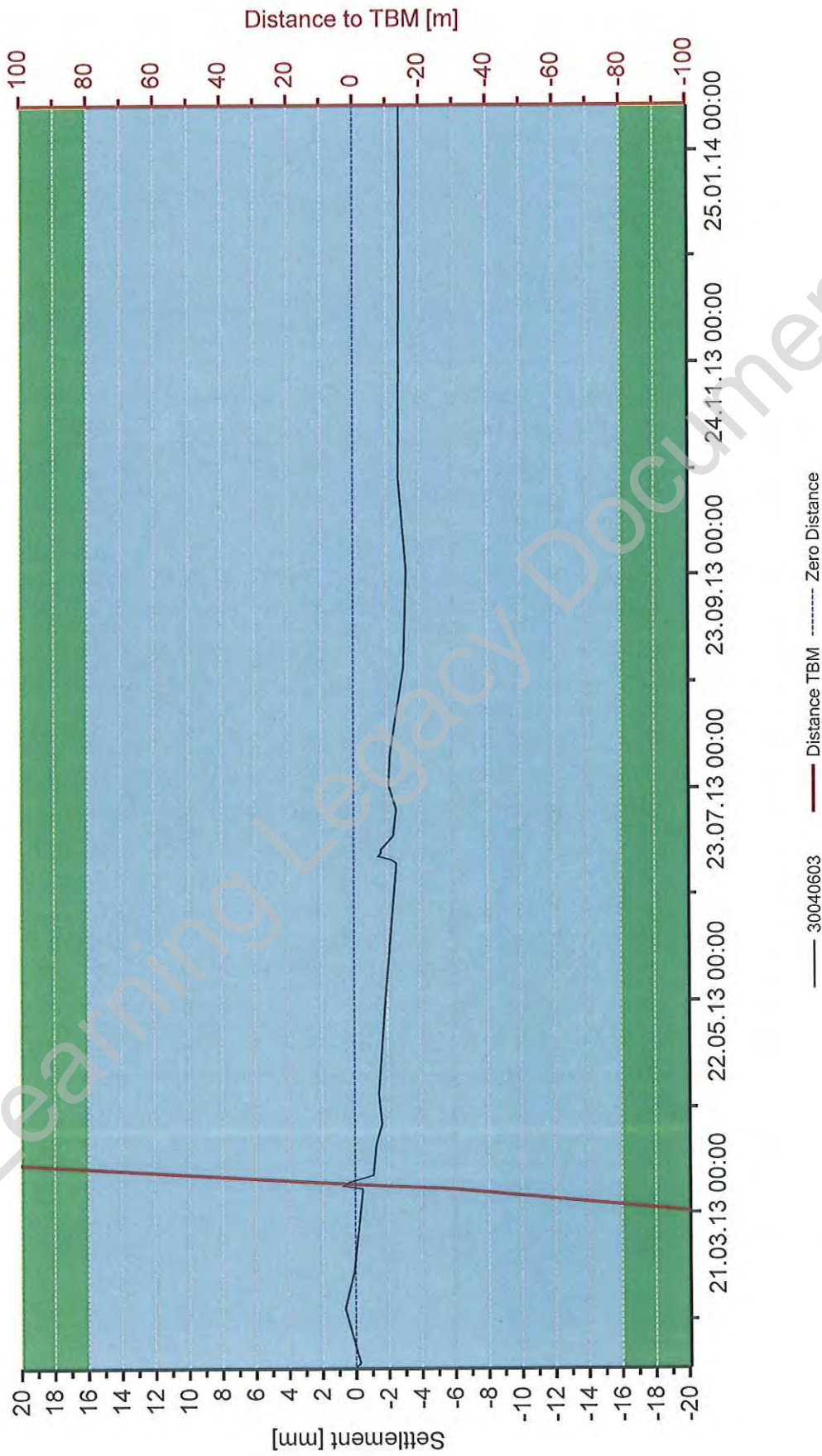
print name:

HMJV project role:

Monitoring & Survey engineer

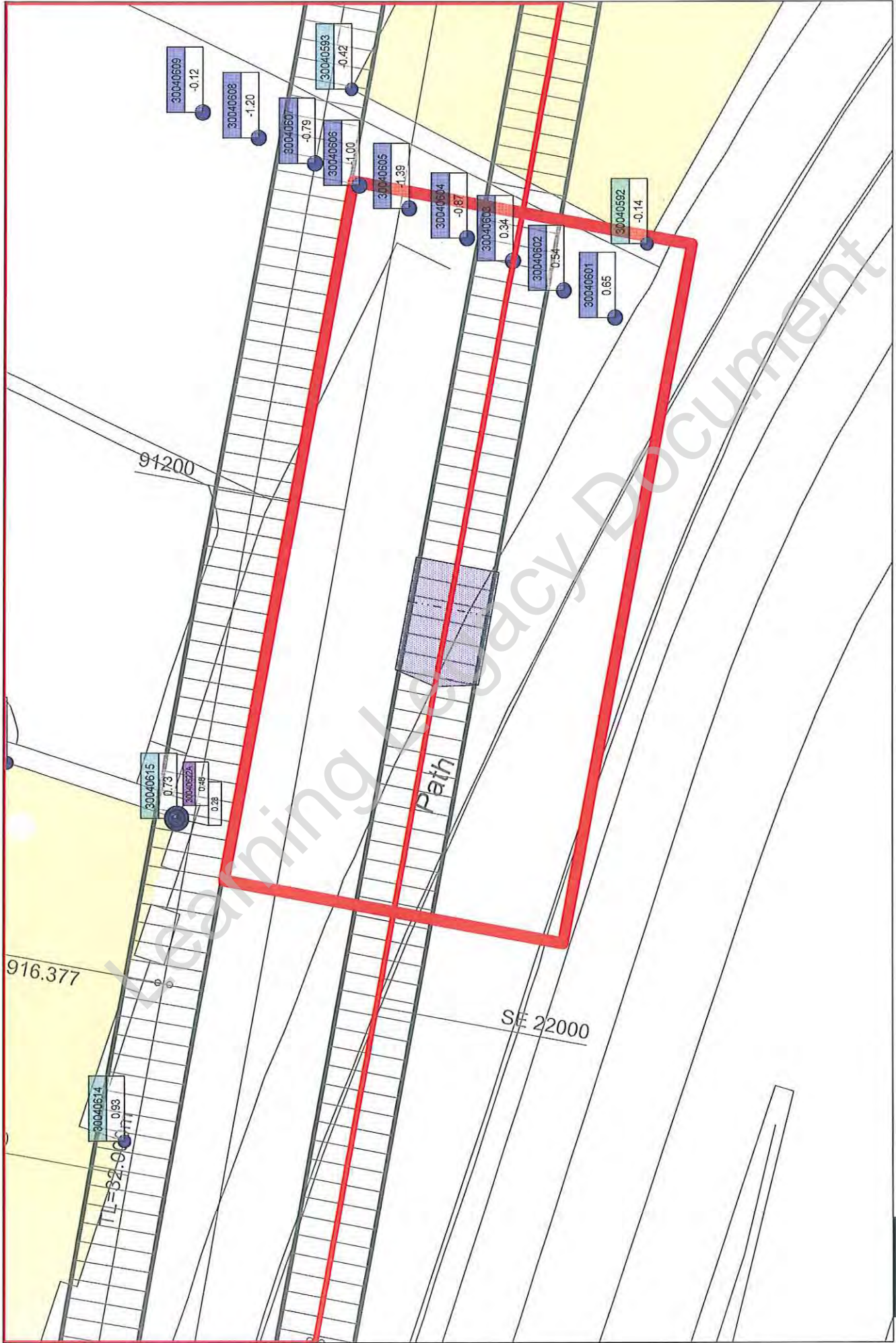


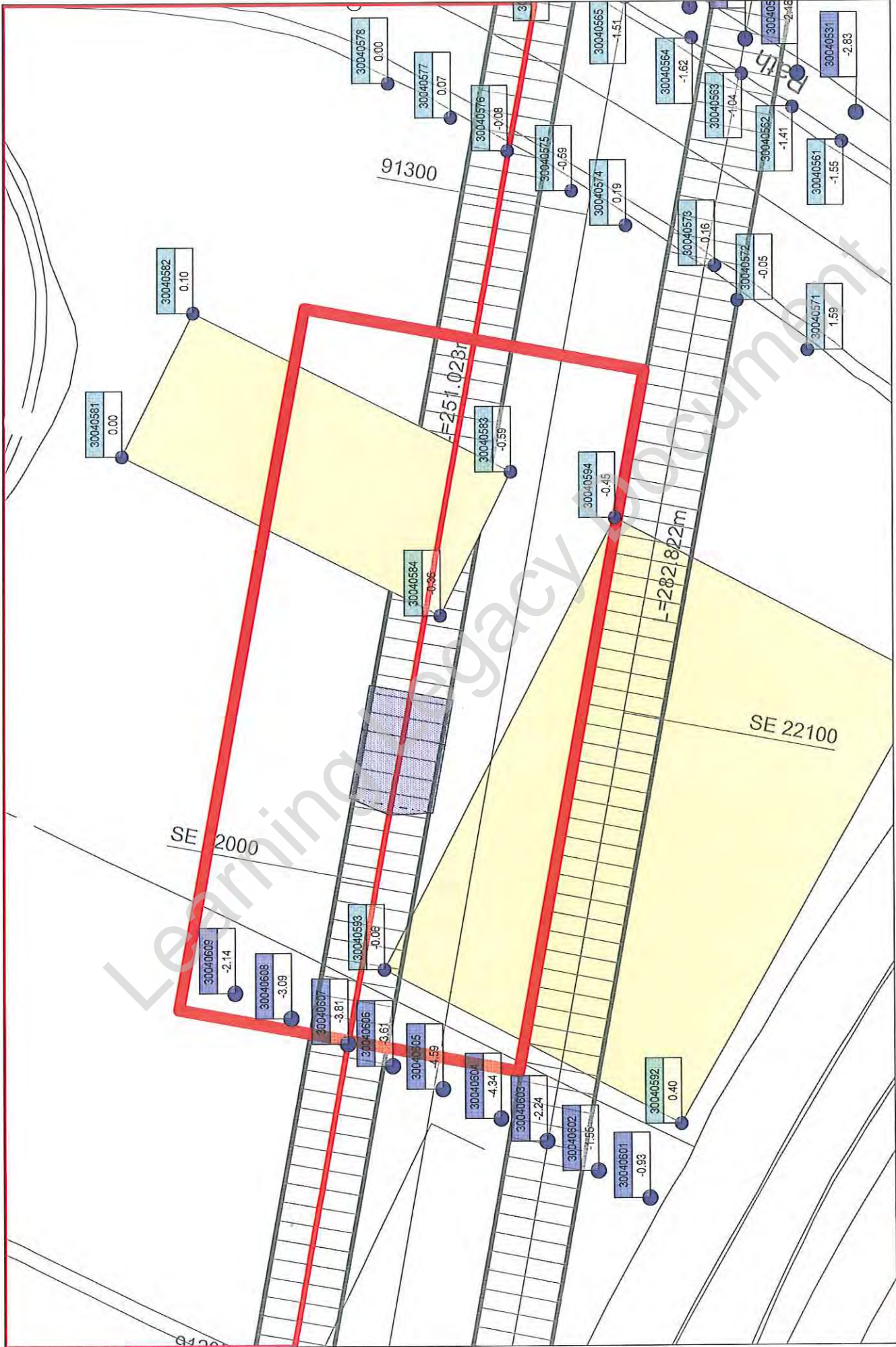
Point: 30040603



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - CS 6 - Bus Garage 04.02.2013 - 07.02.2014  
date: 30.07.2014 15:43 current values: 30.07.2014 15:32







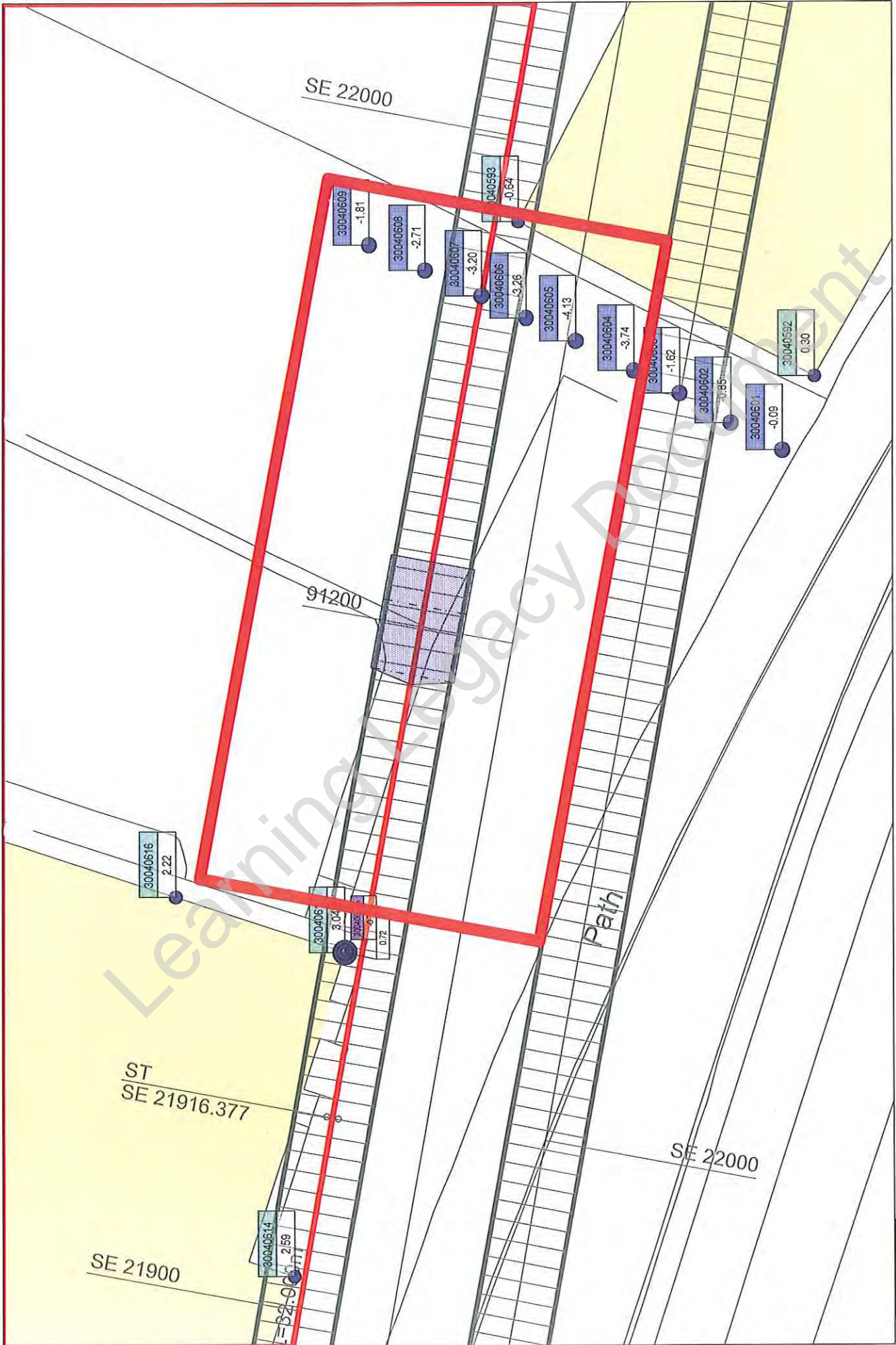
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 02.07.2013 09:00

Point: 30040607



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - CS 6 - Bus Garage 04.02.2013 - 07.02.2014  
date: 30.07.2014 15:52 current values: 30.07.2014 15:32





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 04.07.2013 18:52



Joint Venture

project: C310 Thames Tunnel  
structure: Cross Section Bus Garage

Joint Venture

project: C310 Thames Tunnel  
structure: Cross Section Bus Garage

No. of reading	date	1. following		2. following		3. following		4. following		5. following		6. following		7. following		8. following		9. following		10. following		11. following		12. following		
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
3004 0601	4/21/13	103.066	0	103.067	1	0	103.067	0	103.066	-2	1	103.066	0	1	103.066	0	1	103.066	0	1	103.066	0	1	103.066	0	-1
3004 0602		103.051	0	103.051	1	0	103.051	0	103.051	-1	1	103.051	0	1	103.050	-1	1	103.050	0	-1	103.050	0	-1	103.050	0	-1
3004 0603		103.030	0	103.031	1	0	103.031	0	103.030	-1	1	103.031	0	0	103.030	-1	1	103.030	0	-2	103.029	0	-2	103.029	0	-2
3004 0604		103.032	-1	103.032	0	0	103.031	-1	103.030	-1	-1	103.032	0	-1	103.030	-2	-3	103.029	0	-3	103.029	0	-3	103.029	0	-4
3004 0605		103.030	0	103.029	0	0	103.029	-1	103.027	-1	-2	103.029	0	-1	103.027	-2	-3	103.027	0	-3	103.026	0	-3	103.026	0	-4
3004 0606		103.027	0	103.027	0	0	103.026	-1	103.025	-1	-1	103.026	0	-1	103.025	-1	-2	103.025	0	-2	103.024	0	-3	103.024	0	-4
3004 0607		103.017	0	103.017	0	0	103.016	-1	103.016	0	-1	103.016	0	-1	103.015	-1	-2	103.015	0	-2	103.014	0	-3	103.014	0	-4
3004 0608		103.023	0	103.023	0	0	103.022	-1	103.021	-1	-2	103.022	0	-1	103.021	-1	-2	103.021	0	-2	103.020	0	-3	103.020	0	-3
3004 0609		103.034	0	103.034	0	0	103.033	-1	103.033	0	-1	103.034	0	0	103.033	-1	-1	103.033	0	-1	103.032	0	-1	103.032	0	-2

project: C310 Thames Tunnel


Joint Venture

project: C310 Thames Tunnel

Joint Venture

No. of reading	Bauwerk: Cross Section Bus Garage															
	baseline	13. following	14. following	15. following	16. following	17. following	18. following	19. following	20. following	21. following	22. following	23. following	24. following			
date	4/21/13	02/07/2013	03/07/2013	04/07/2013	05/07/2013	06/07/2013	07/07/2013	24/07/2013	02/08/2013	27/08/2013	25/09/2013	22/10/2013	07/02/2014			
Point No.	elevation	deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline		deviation from last/ baseline				
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline			
3004 0601	103.067	103.065	0	-1	103.067	0	0	103.066	0	0	103.066	0	0	103.065	0	-1
3004 0602	103.051	103.049	0	-2	103.050	0	-1	103.049	0	-2	103.049	0	-2	103.048	0	-3
3004 0603	103.031	103.029	0	-2	103.028	0	-2	103.028	0	-2	103.028	0	-3	103.028	0	-3
3004 0604	103.032	103.028	0	-4	103.029	0	-4	103.028	0	-4	103.028	0	-5	103.027	0	-5
3004 0605	103.030	103.025	0	-5	103.025	0	-4	103.025	0	-5	103.025	0	-5	103.024	0	-5
3004 0606	103.027	103.023	0	-4	103.024	0	-3	103.023	0	-4	103.023	0	-4	103.023	0	-4
3004 0607	103.017	103.013	0	-4	103.014	0	-3	103.013	0	-4	103.013	0	-4	103.012	0	-5
3004 0608	103.023	103.020	0	-3	103.020	0	-3	103.019	0	-4	103.019	0	-4	103.018	0	-5
3004 0609	103.034	103.032	0	-2	103.032	0	-2	103.031	0	-3	103.031	0	-3	103.030	0	-3

Legacy Document

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 29**  
**Bus Garage – HLC**

Learning Legacy Document

<b>monitoring asset</b>	<b>Bus Garage</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
<b>name of monitoring section:</b>	Bus Garage		
sensor type:	Hydrostatic Levelling Cell		
chainage:	91150	point no.:	3004 0611 - 3004 0616
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	01/02/13	0.00		
<b>TBM 1</b>	start ZOI	31/03/13	0.42	3004 0615
		03/04/13	0.10	3004 0613
	end ZOI	03/04/13	0.61	3004 0615
		06/04/13	0.16	3004 0613
breached not any trigger value				
<b>TBM 2</b>	start ZOI	04/07/13	3.04	3004 0615
		08/07/13	0.69	3004 0613
	end ZOI	08/07/13	2.26	3004 0615
		11/07/13	0.60	3004 0613
breached not any trigger value				
<b>longterm</b>		11/09/13	2.15	3004 0615
		10/12/13	0.43	3004 0613
last reading 3 month post tunneling, Cross section not longer measurable				
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>		<b>No residual risk</b> since the Works have been completed by HMJV	
	<input type="checkbox"/>		<b>Yes, residual risk</b> (see comment below)	

**summary / comments**

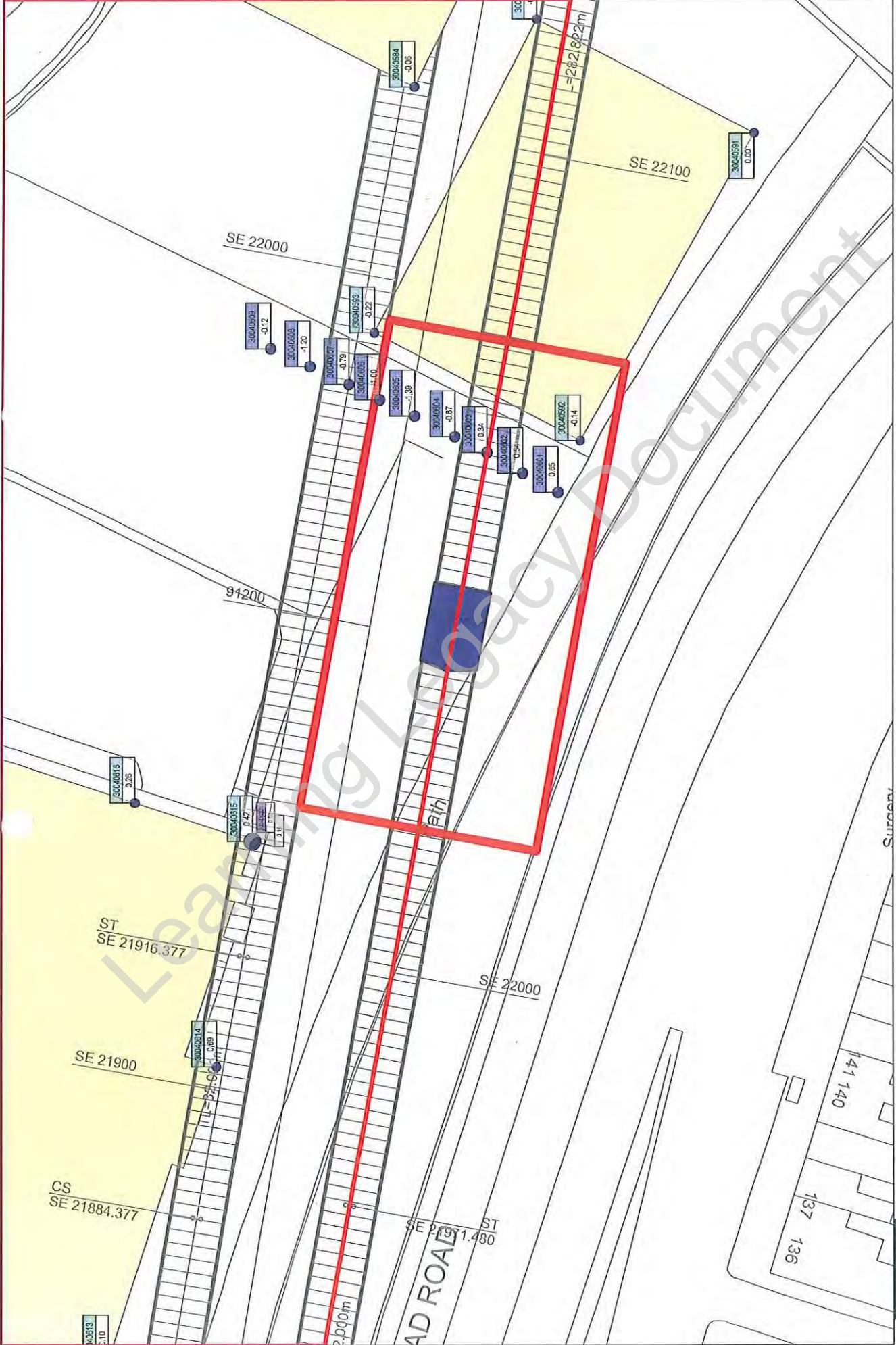
Overall, none of the points reached any trigger value.  
Under consideration of temperature differences and the achievable accuracy of the system, HMJV has no concern to cease the monitoring.  
The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 12/01/15

print name:

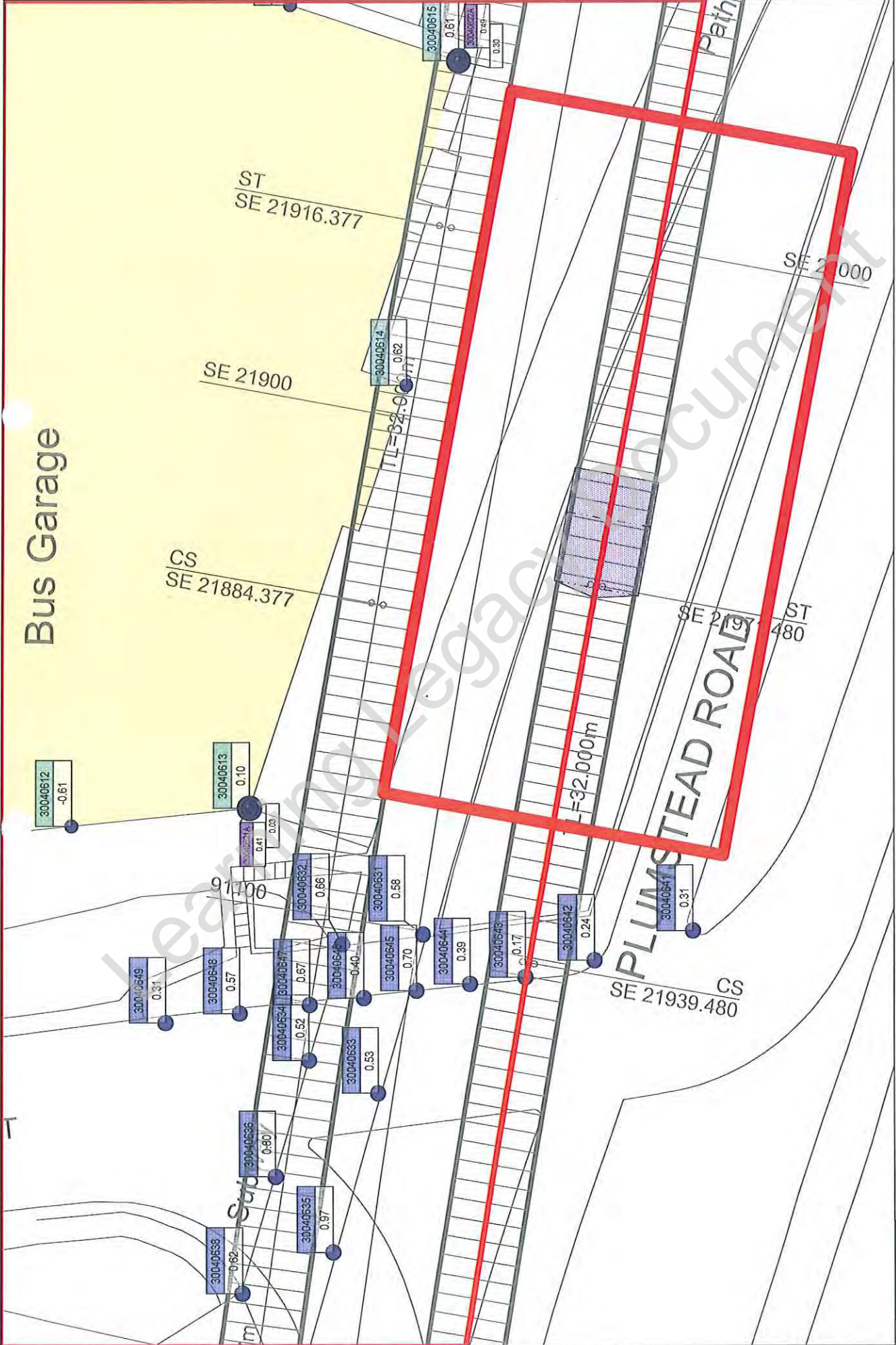
HMJV project role:

Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 31.03.2013 06:50





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 03.04.2013 09:00

Point: 30040611



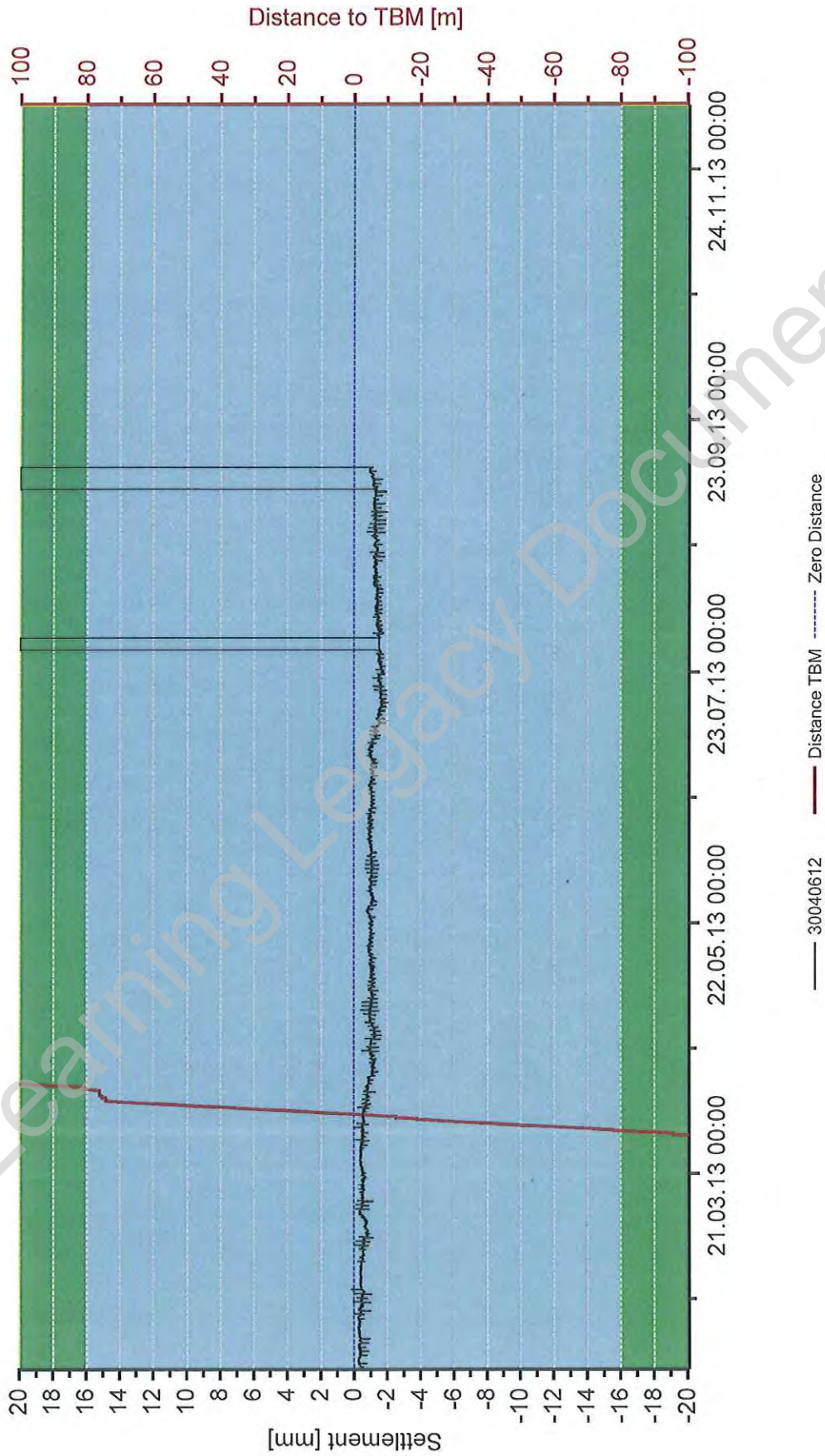
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Bus Garage 01.02.2013 - 10.12.2013

date: 30.07.2014 17:09 current values: 30.07.2014 16:57



Point: 30040612



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

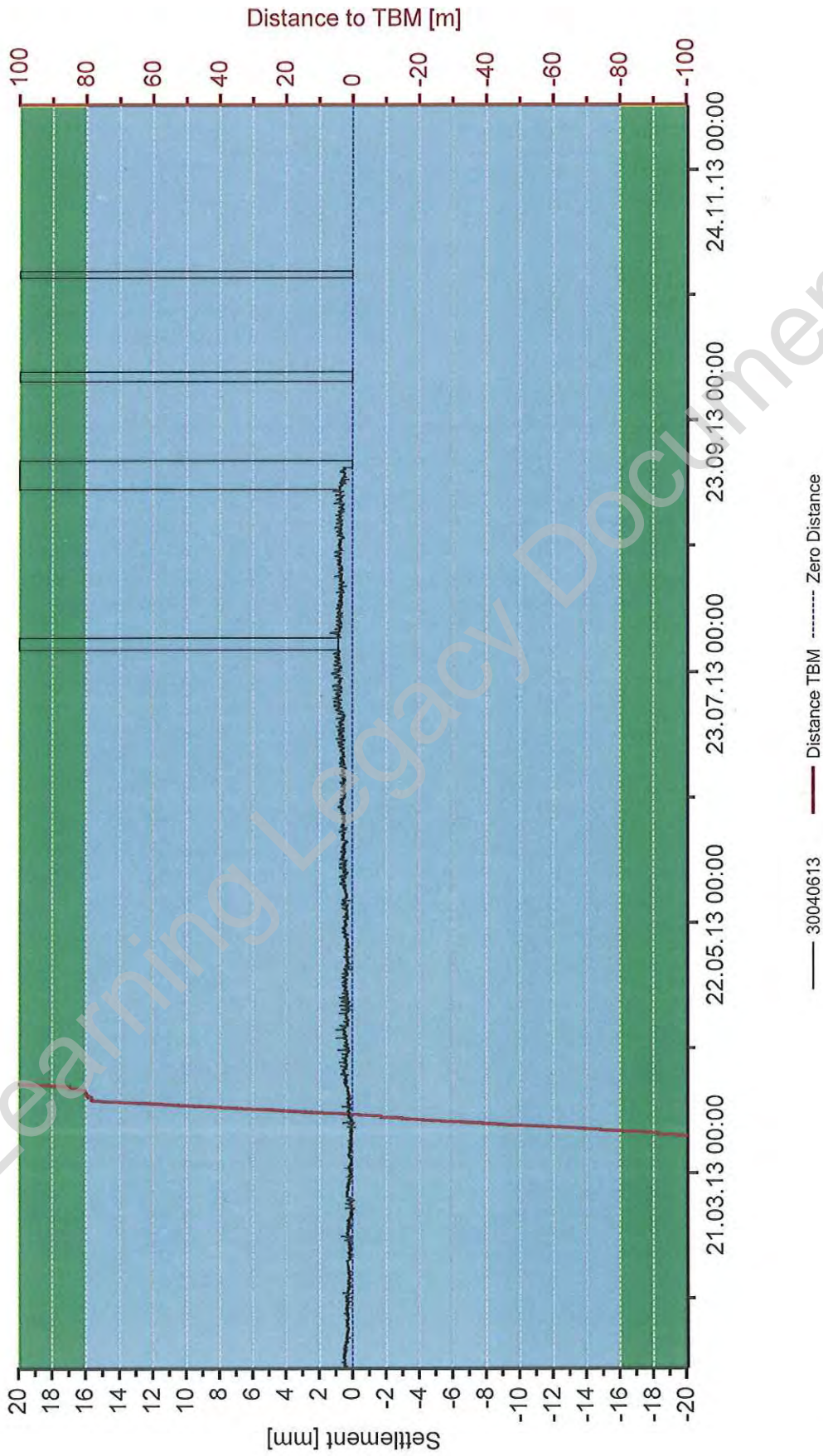
Close Out Report: WB Tunnel - Bus Garage 01.02.2013 - 10.12.2013

date: 30.07.2014 17:13 current values: 30.07.2014 16:57





Point: 30040613



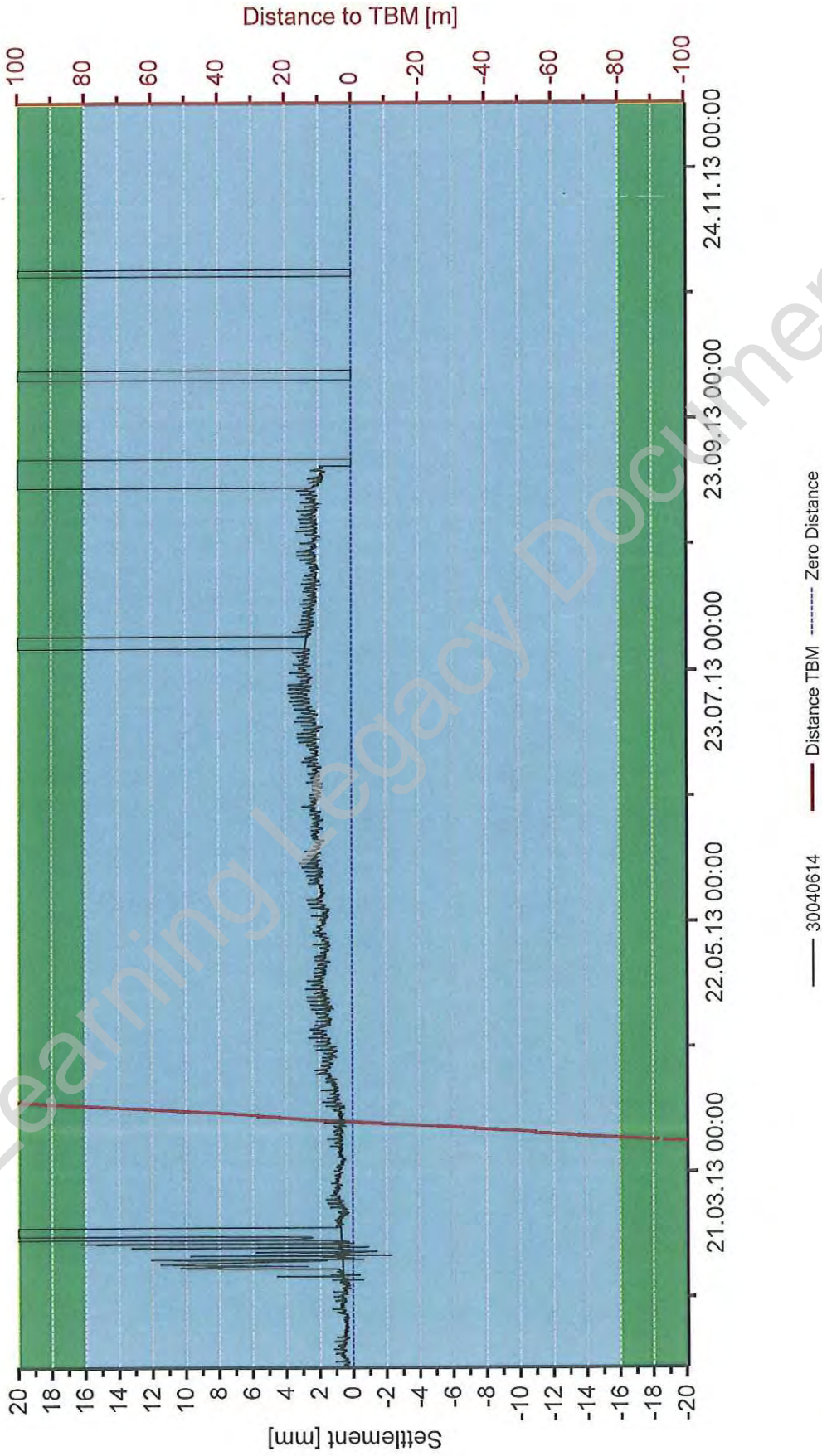
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Bus Garage 01.02.2013 - 10.12.2013

date: 30.07.2014 17:17 current values: 30.07.2014 16:57



Point: 30040614



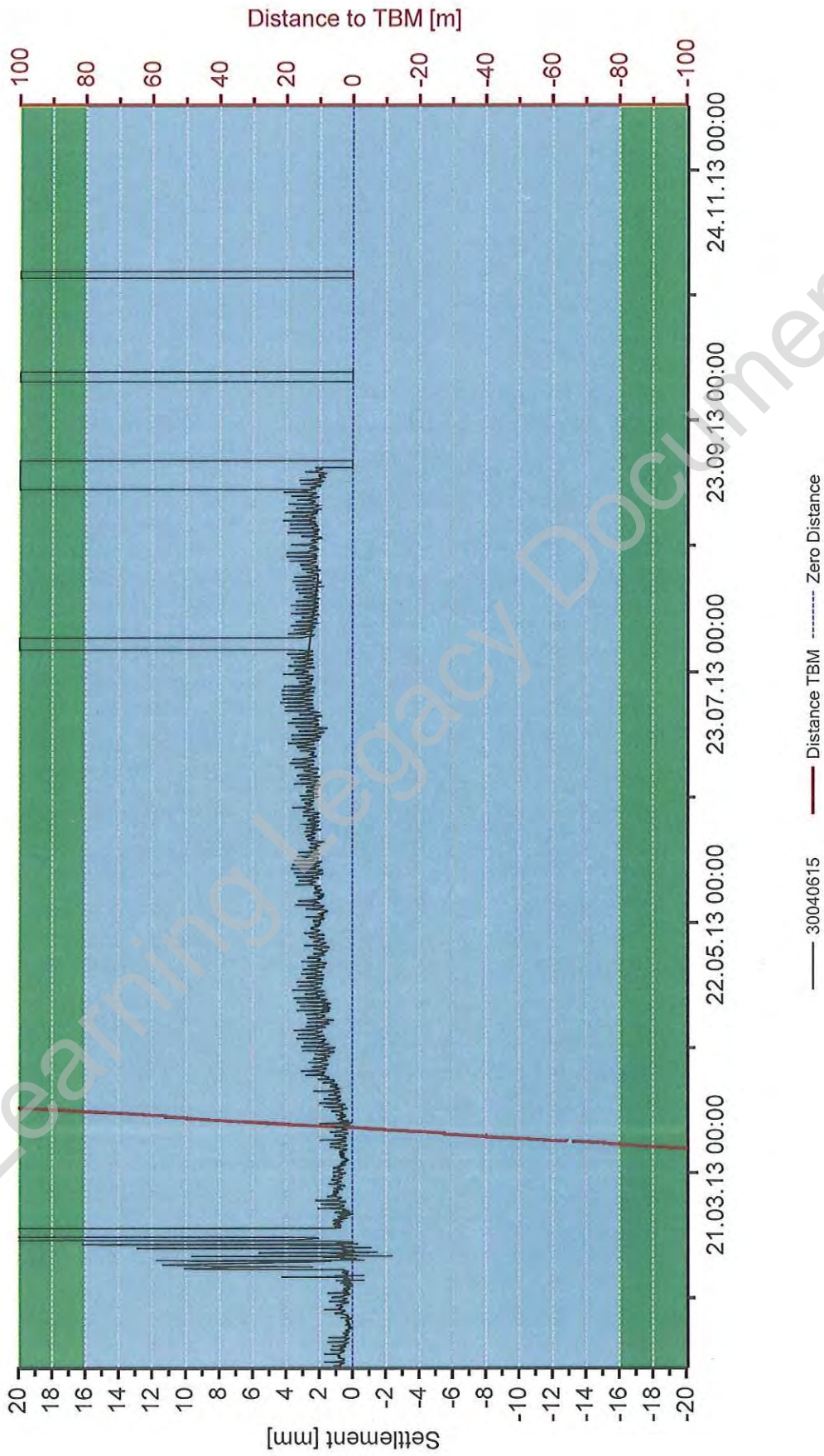
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Bus Garage 01.02.2013 - 10.12.2013

date: 30.07.2014 17:20 current values: 30.07.2014 16:57



Point: 30040615



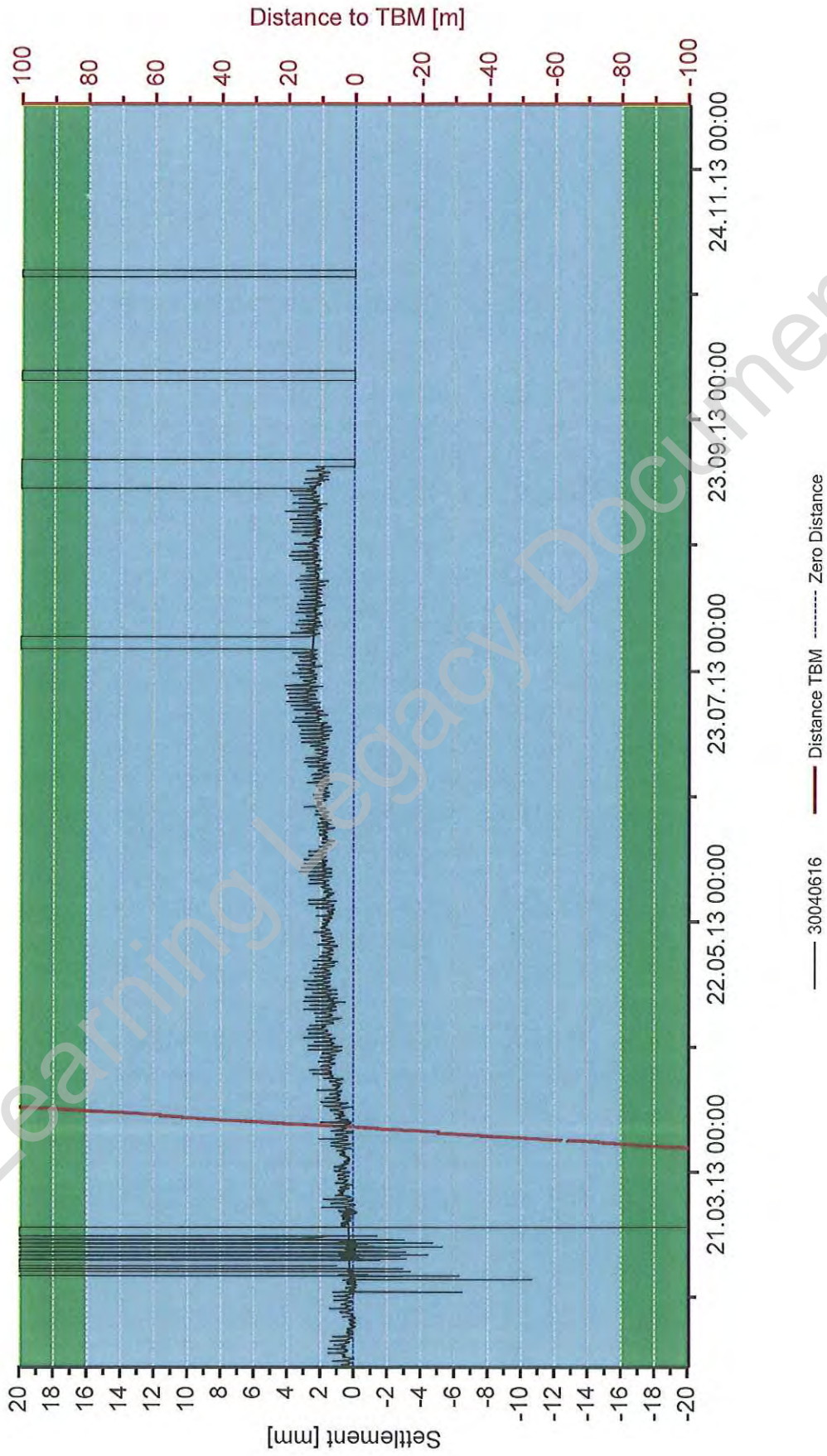
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Bus Garage 01.02.2013 - 10.12.2013

date: 30.07.2014 17:24 current values: 30.07.2014 16:57



Point: 30040616

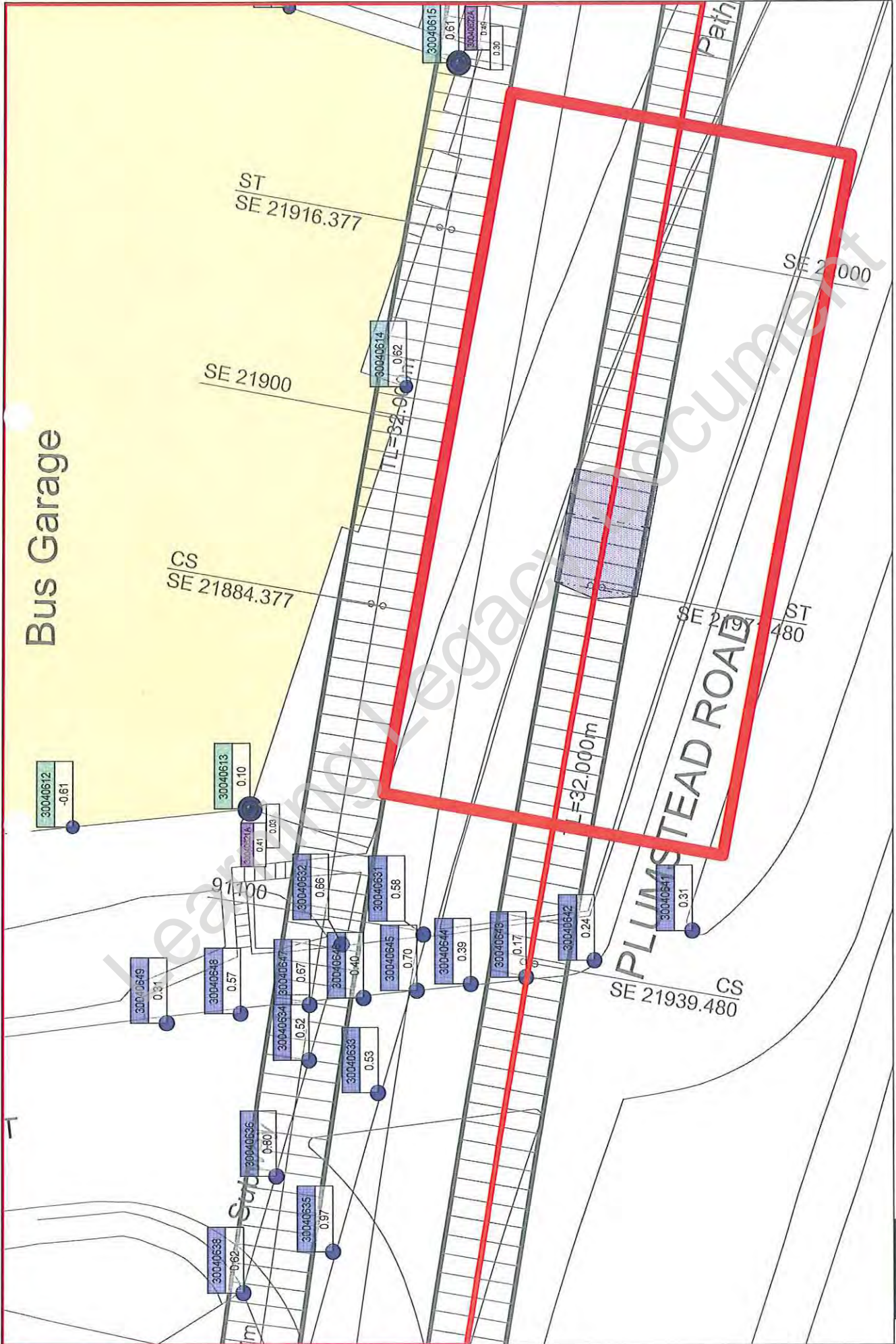


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Bus Garage 01.02.2013 - 10.12.2013

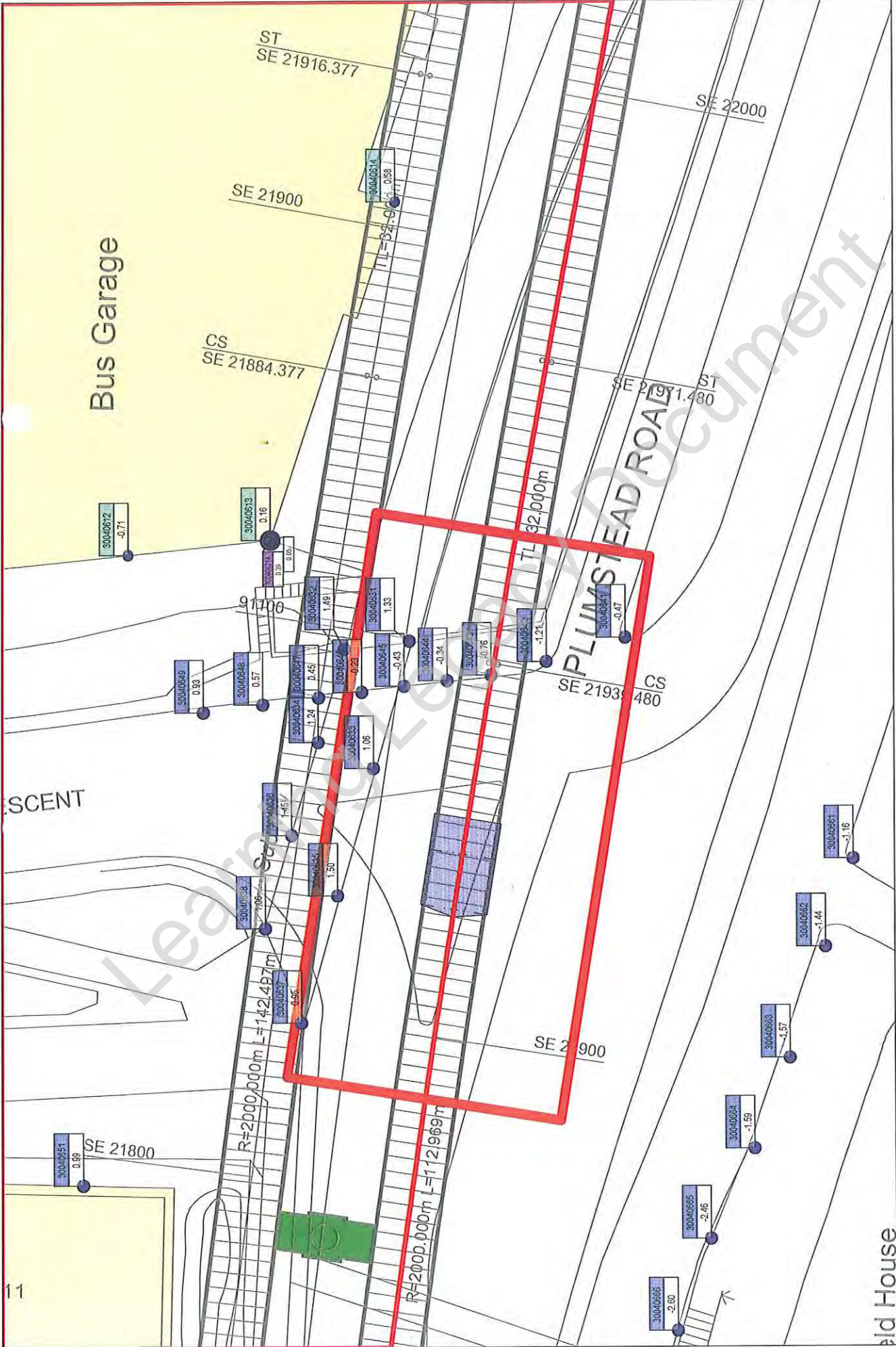
date: 30.07.2014 17:27 current values: 30.07.2014 16:57



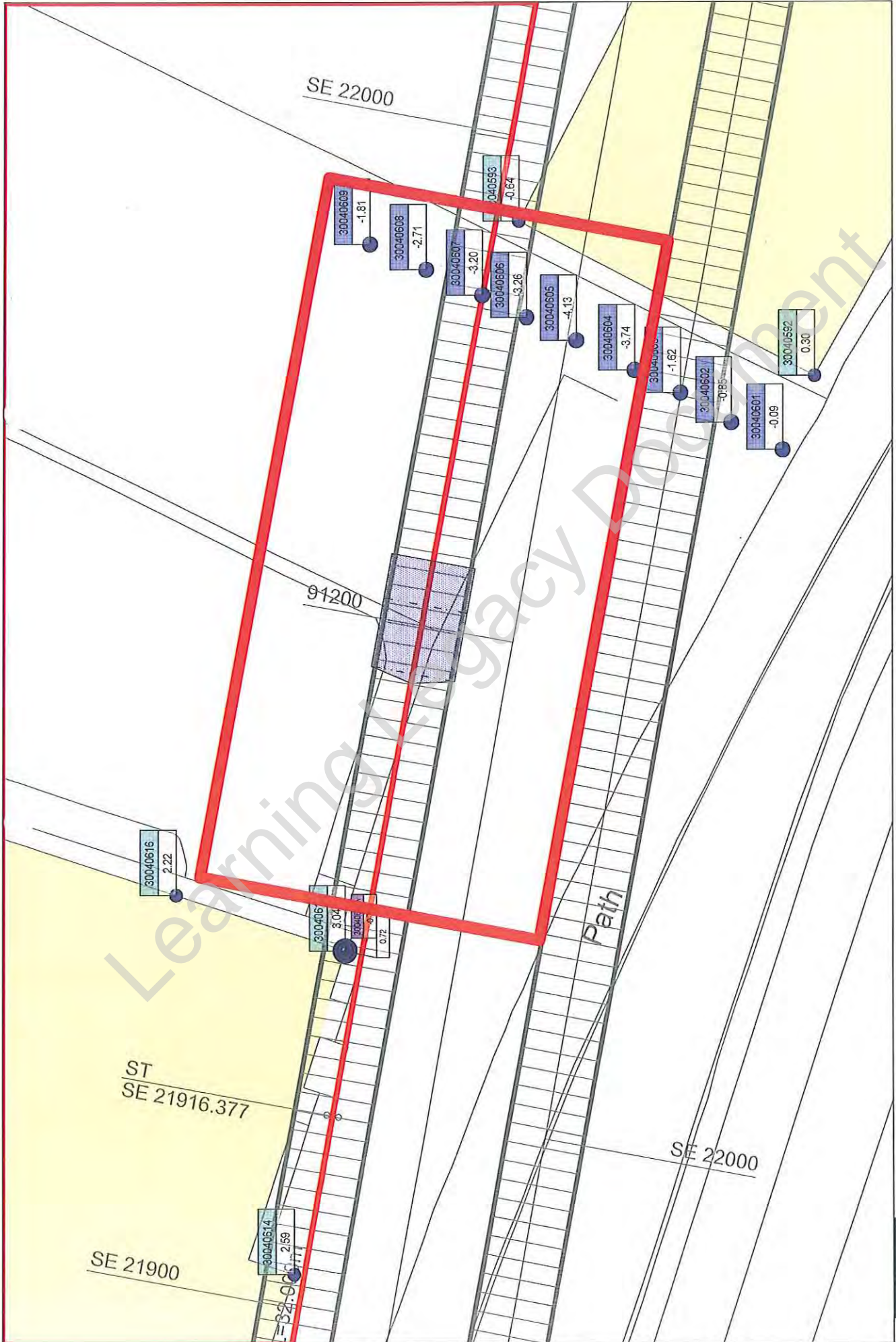


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 03.04.2013 09:00

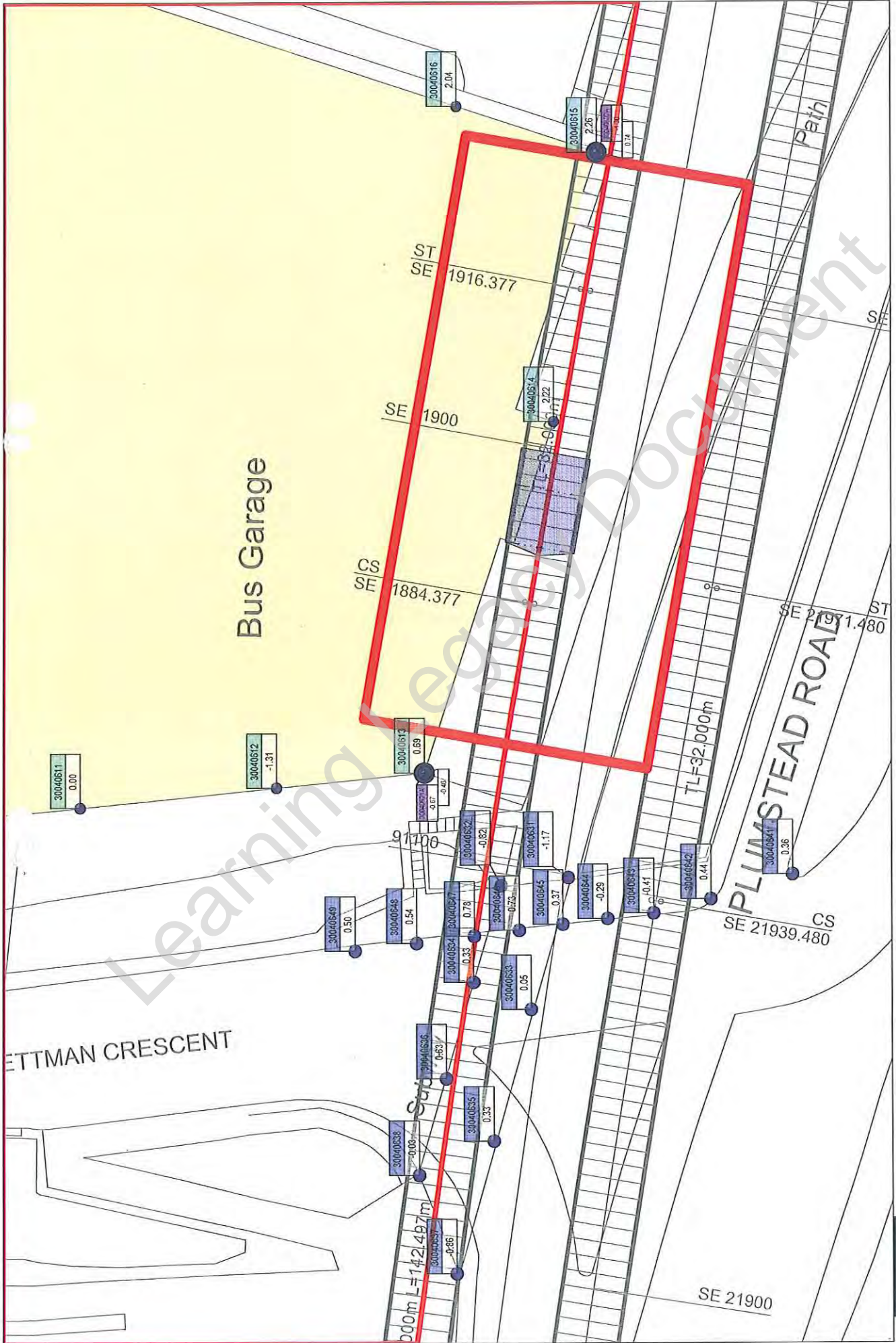




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 06.04.2013 09:00



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 04.07.2013 18:52

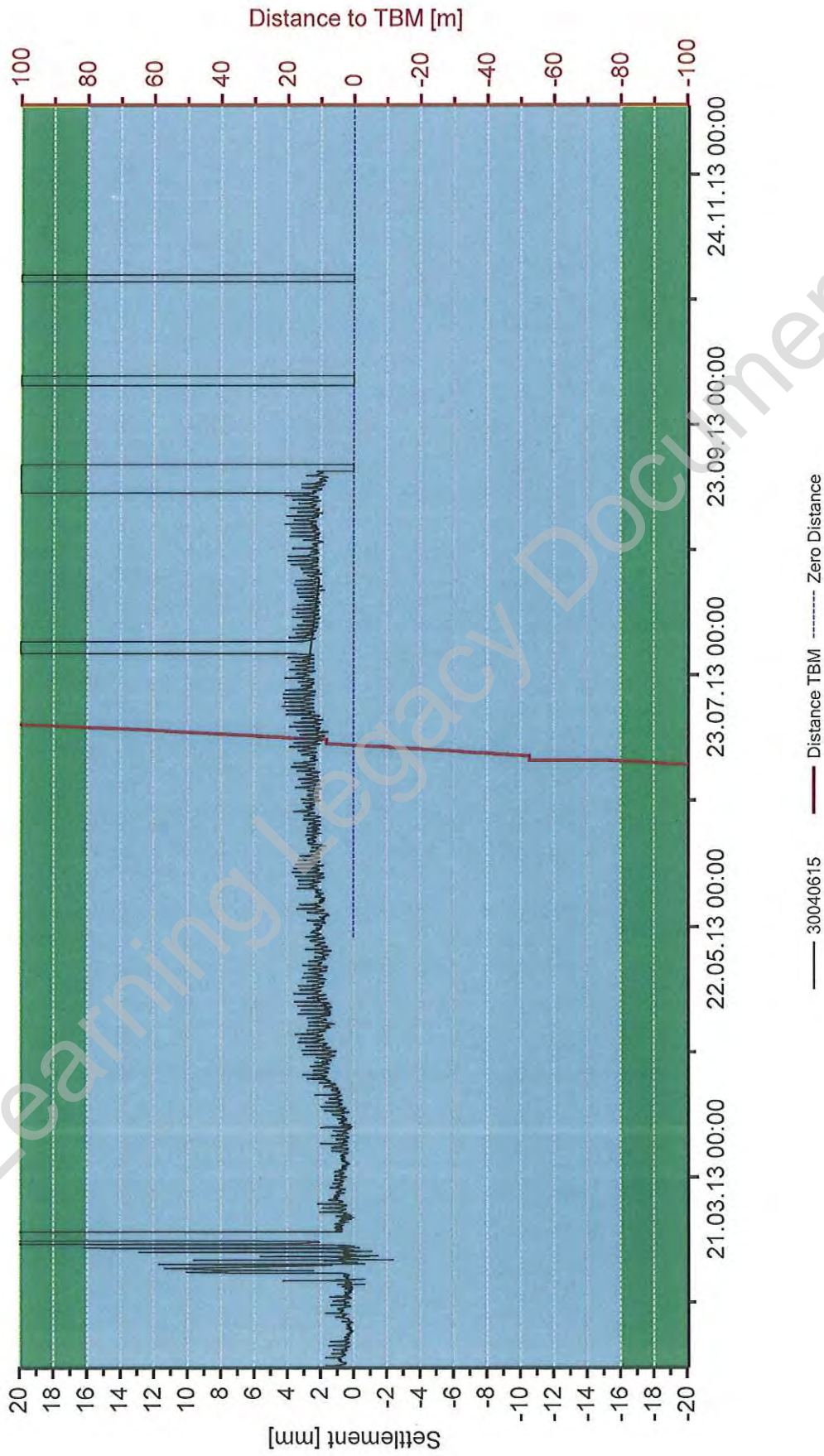


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 08.07.2013 17:47





Point: 30040615



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: EB Tunnel - Bus Garage 01.02.2013 - 10.12.2014

date: 31.07.2014 08:22 current values: 31.07.2014 08:12



Point: 30040613

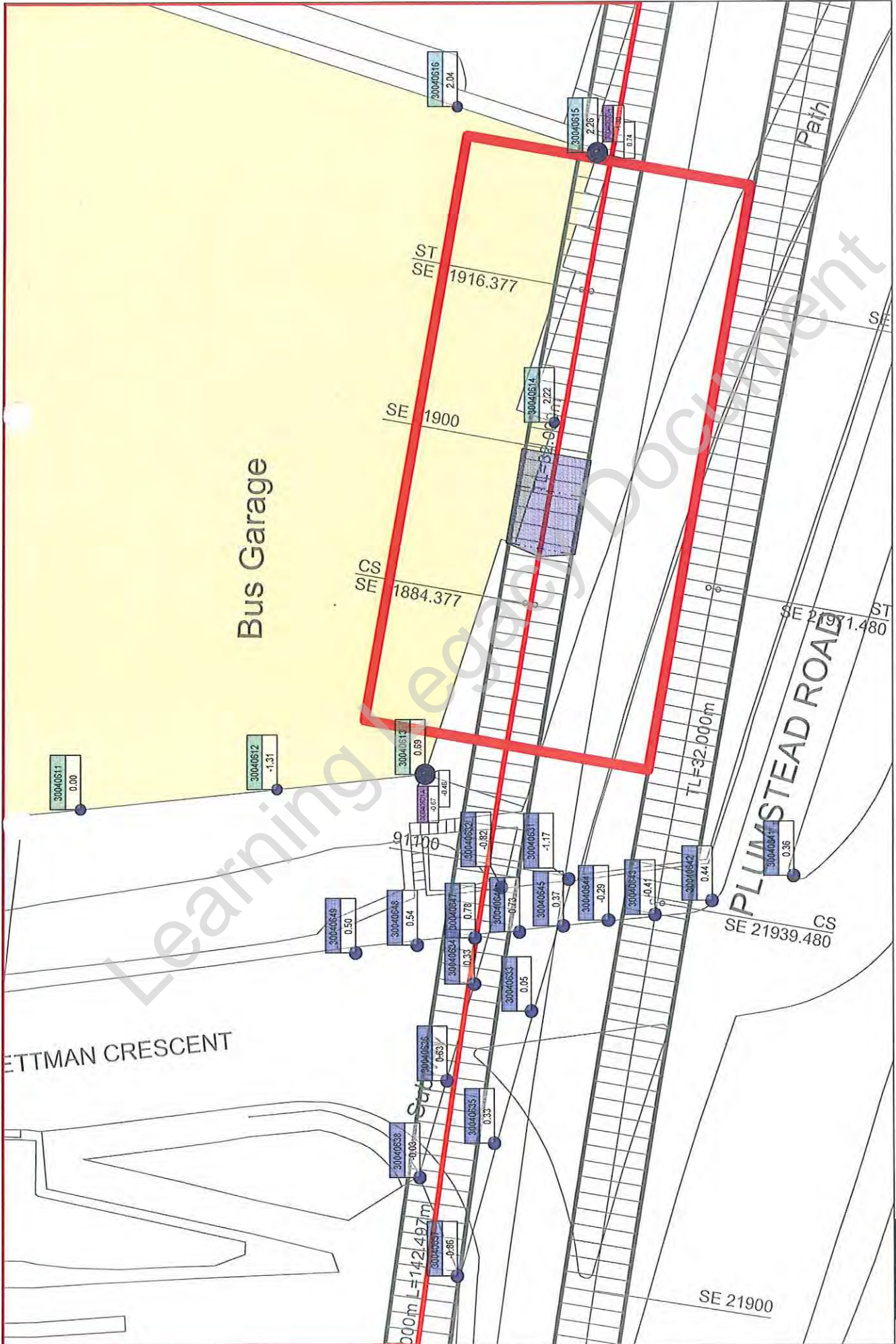


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: EB Tunnel - Bus Garage 01.02.2013 - 10.12.2014

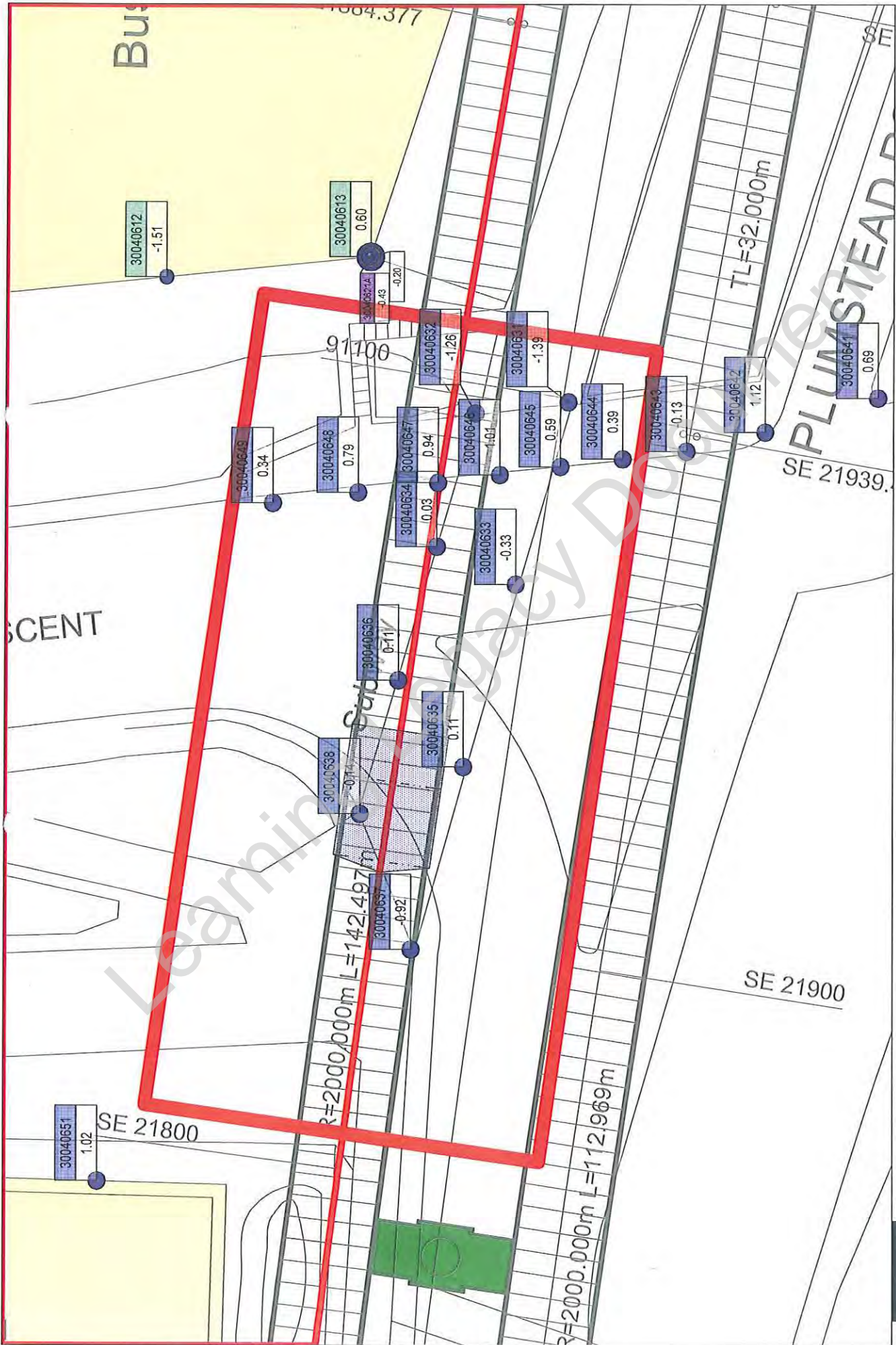
date: 31.07.2014 08:25 current values: 31.07.2014 08:12






Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 08.07.2013 17:47





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 11.07.2013 09:00

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	CROSSRAIL	eB NO	C310-HTM-C-RGN-CR148-50022	Rev	6.0
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 30**  
**Bus Garage – TM**

Learning Legacy Document

<b>monitoring asset</b>	<b>Bus Garage</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
<b>name of monitoring section:</b>	Bus Garage		
sensor type:	Tiltmeter		
chainage:	91150	point no.:	3004 0621 - 3004 0622
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	01/02/13	0.00		
<b>TBM 1</b>	start ZOI	31/03/13	0.16	3004 0622
		03/04/13	0.03	3004 0621
	end ZOI	03/04/13	0.49	3004 0622
		06/04/13	0.05	3004 0621
<b>TBM 2</b>	start ZOI	04/07/13	0.72	3004 0622
		08/07/13	-0.46	3004 0621
	end ZOI	08/07/13	0.74	3004 0622
		11/07/13	-0.20	3004 0621
<b>longterm</b>		11/09/13	-0.10	3004 0622
		10/12/13	-0.10	3004 0621

<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)

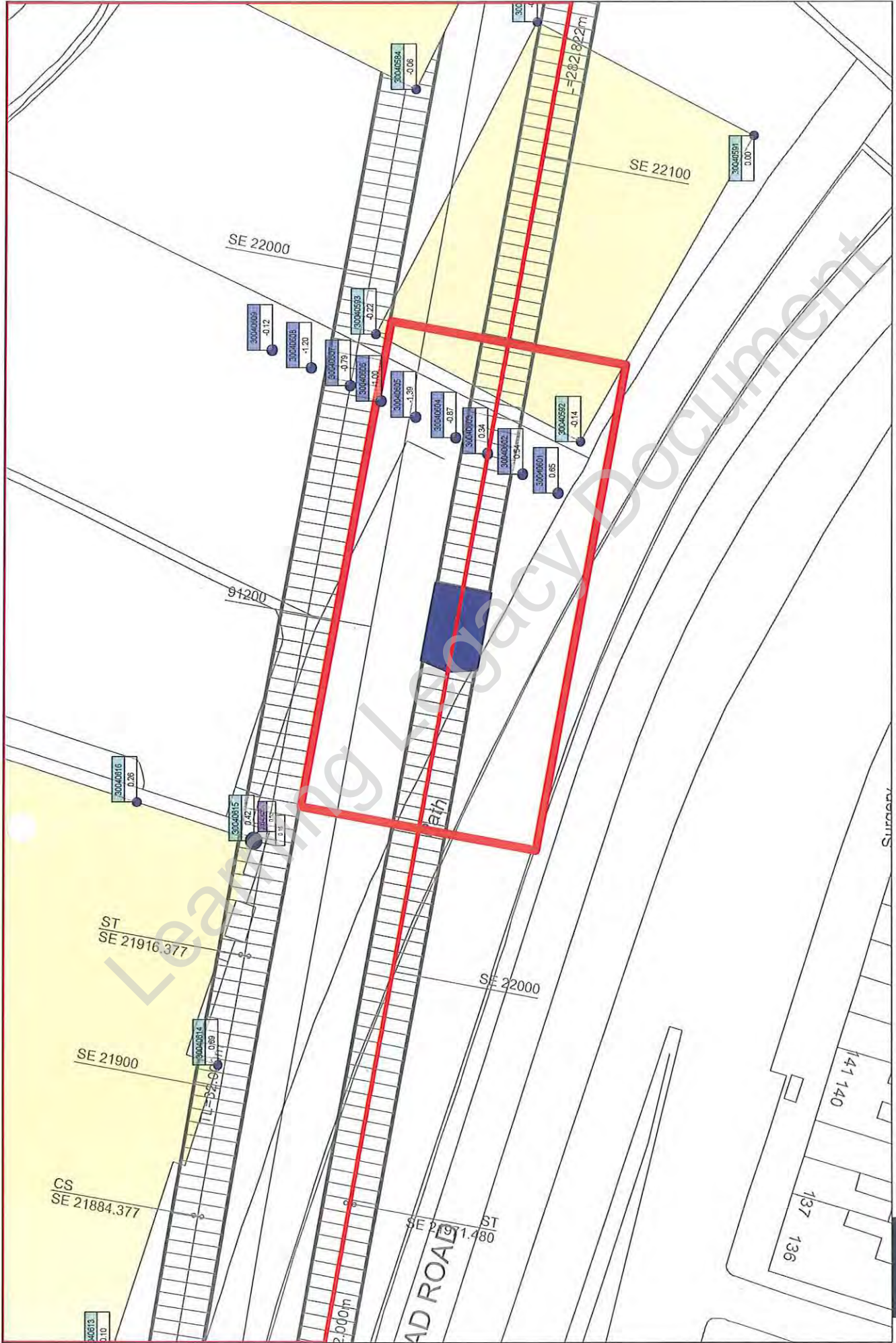
**summary / comments**

Overall, none of the points reached any trigger value.  
 Under consideration of temperature differences and the achievable accuracy of the system, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 12/01/15

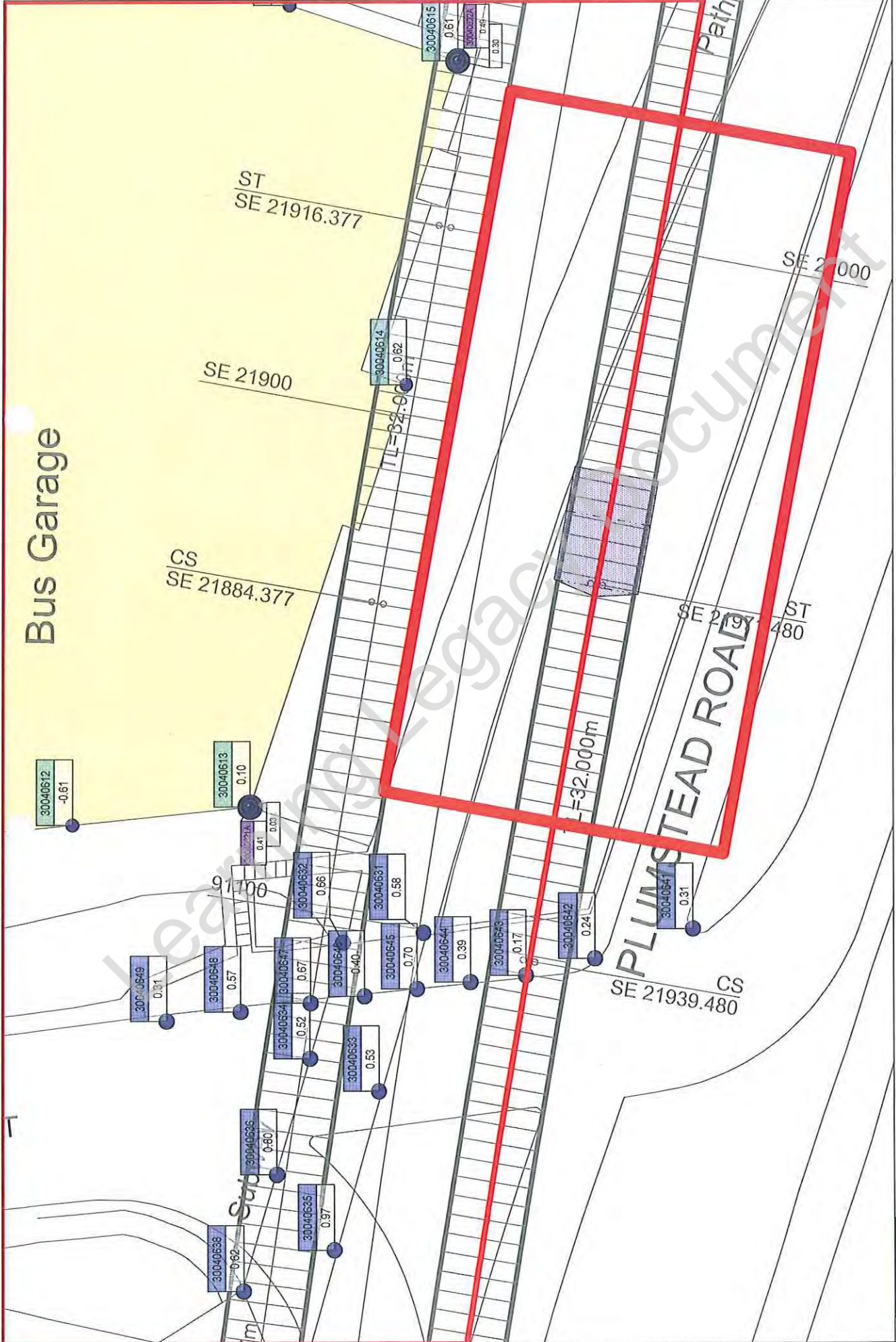
print name:

HMJV project role: Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 31.03.2013 06:50



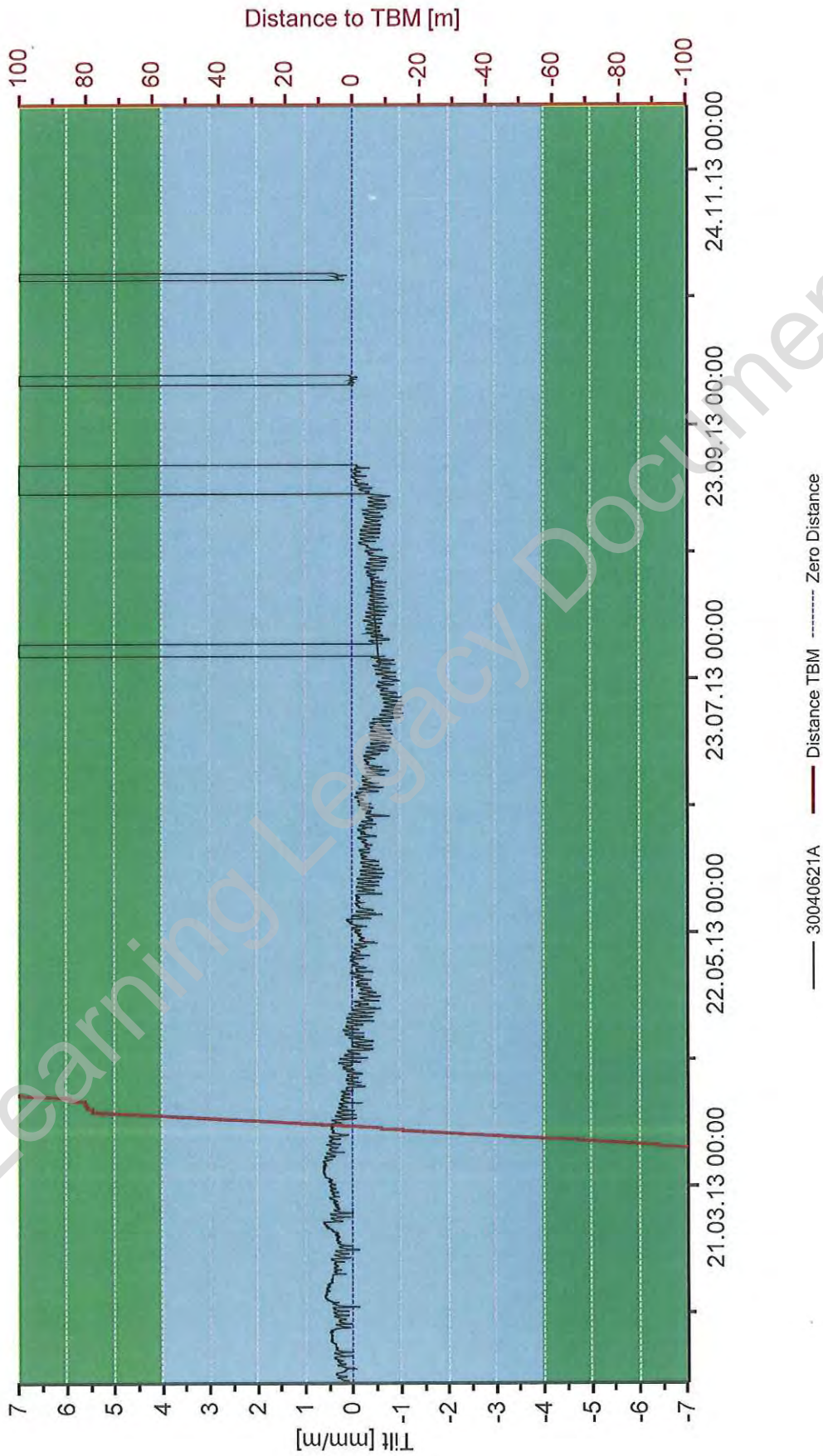


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive, portal excavation, construction base slab, lining walls and grouting  
 current values: 03.04.2013 09:00





Point: 30040621A



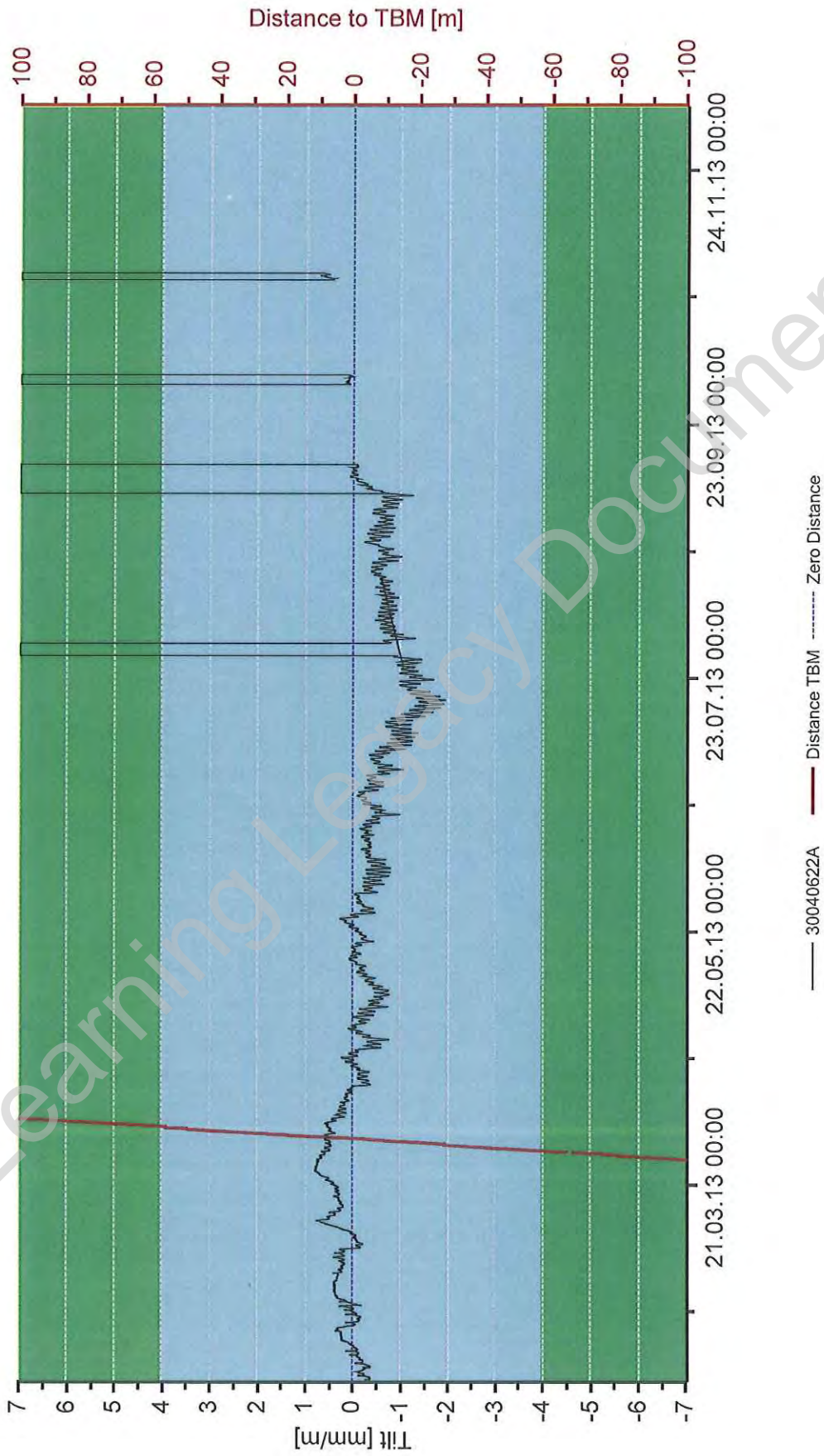
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Bus Garage (TM) 01.02.2013 - 10.12.2013

date: 31.07.2014 09:39 current values: 31.07.2014 09:20



Point: 30040622A



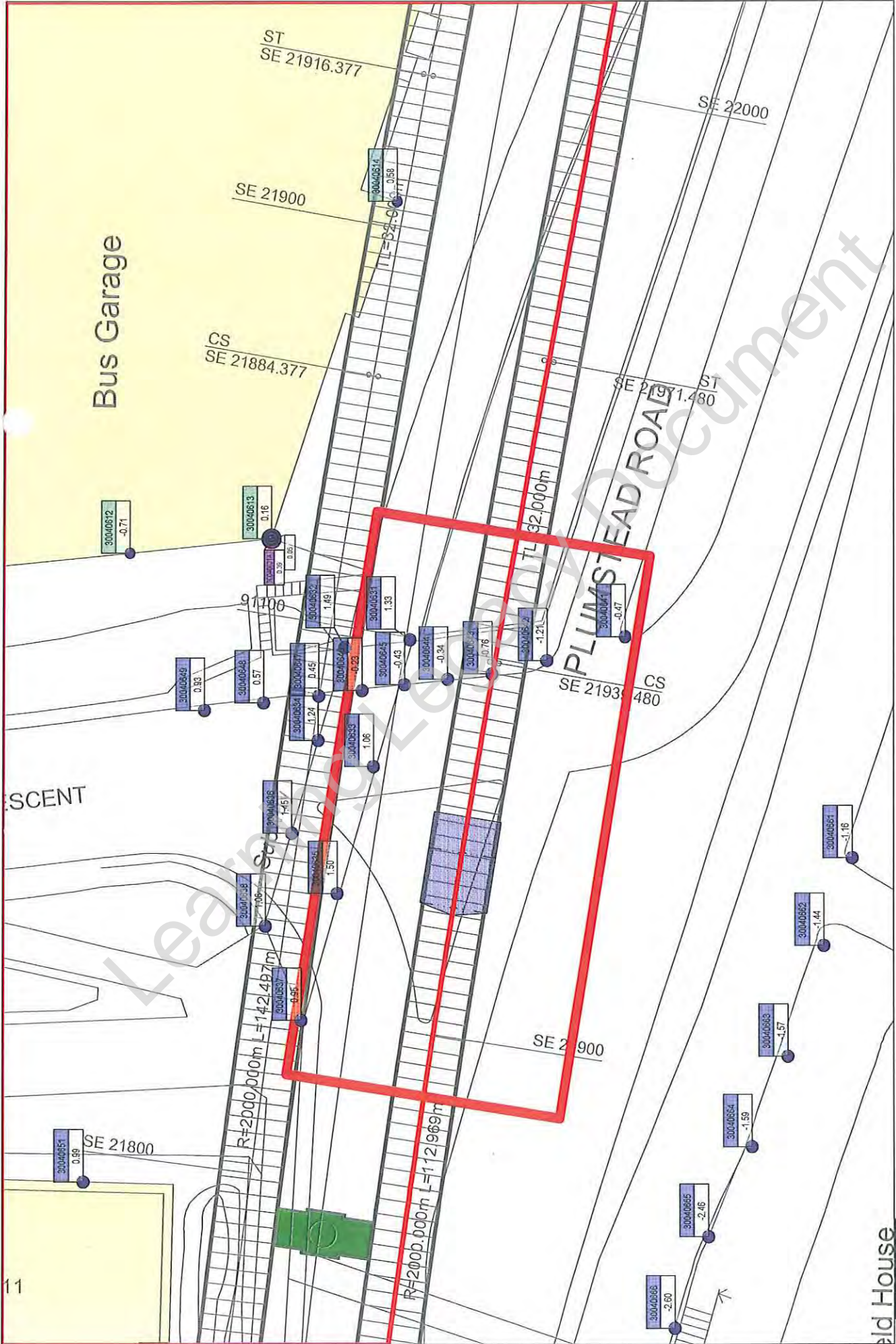
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Bus Garage (TM) 01.02.2013 - 10.12.2013

date: 31.07.2014 09:42 current values: 31.07.2014 09:20







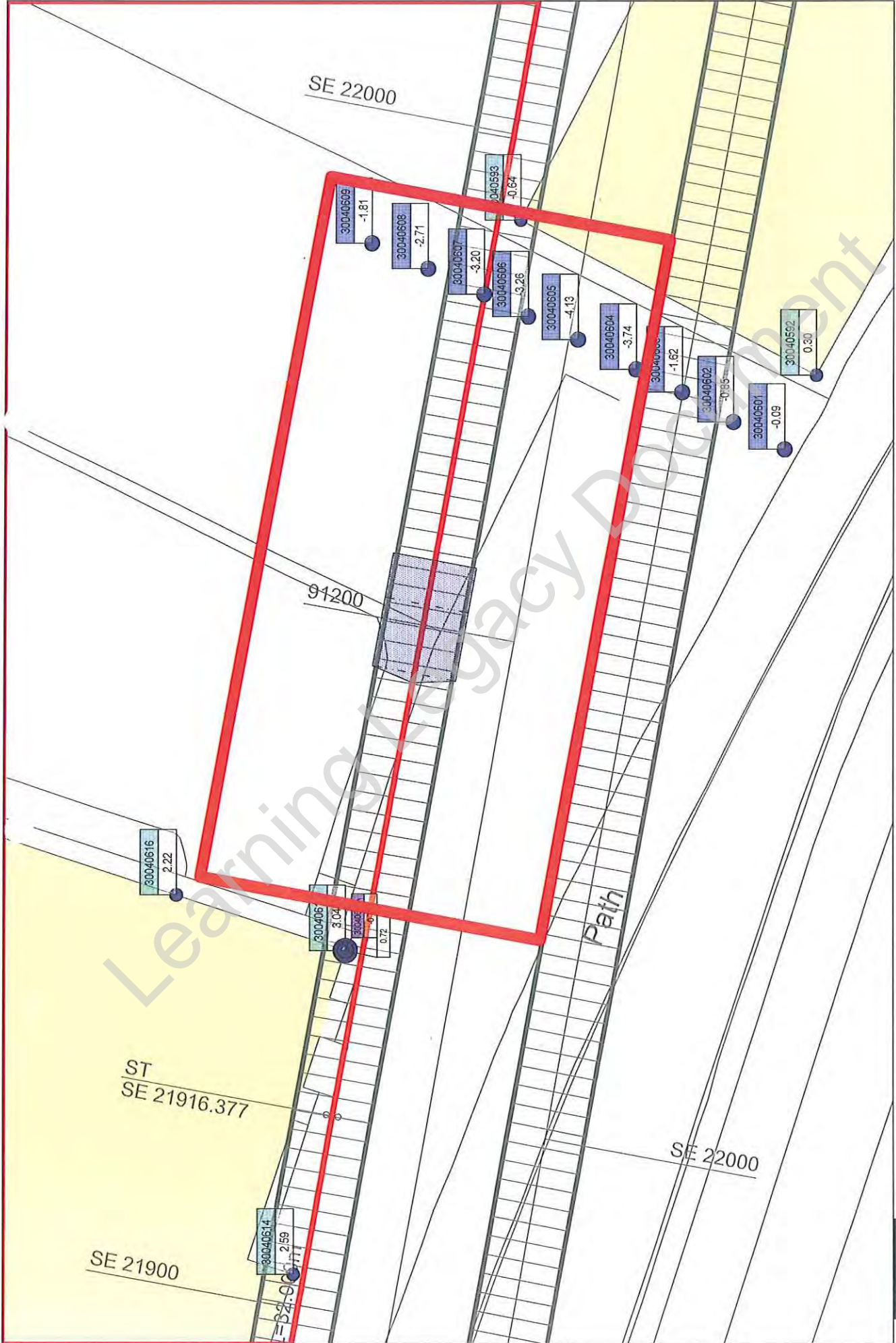
Bus Garage

SCENT

PLUMSTEAD ROAD

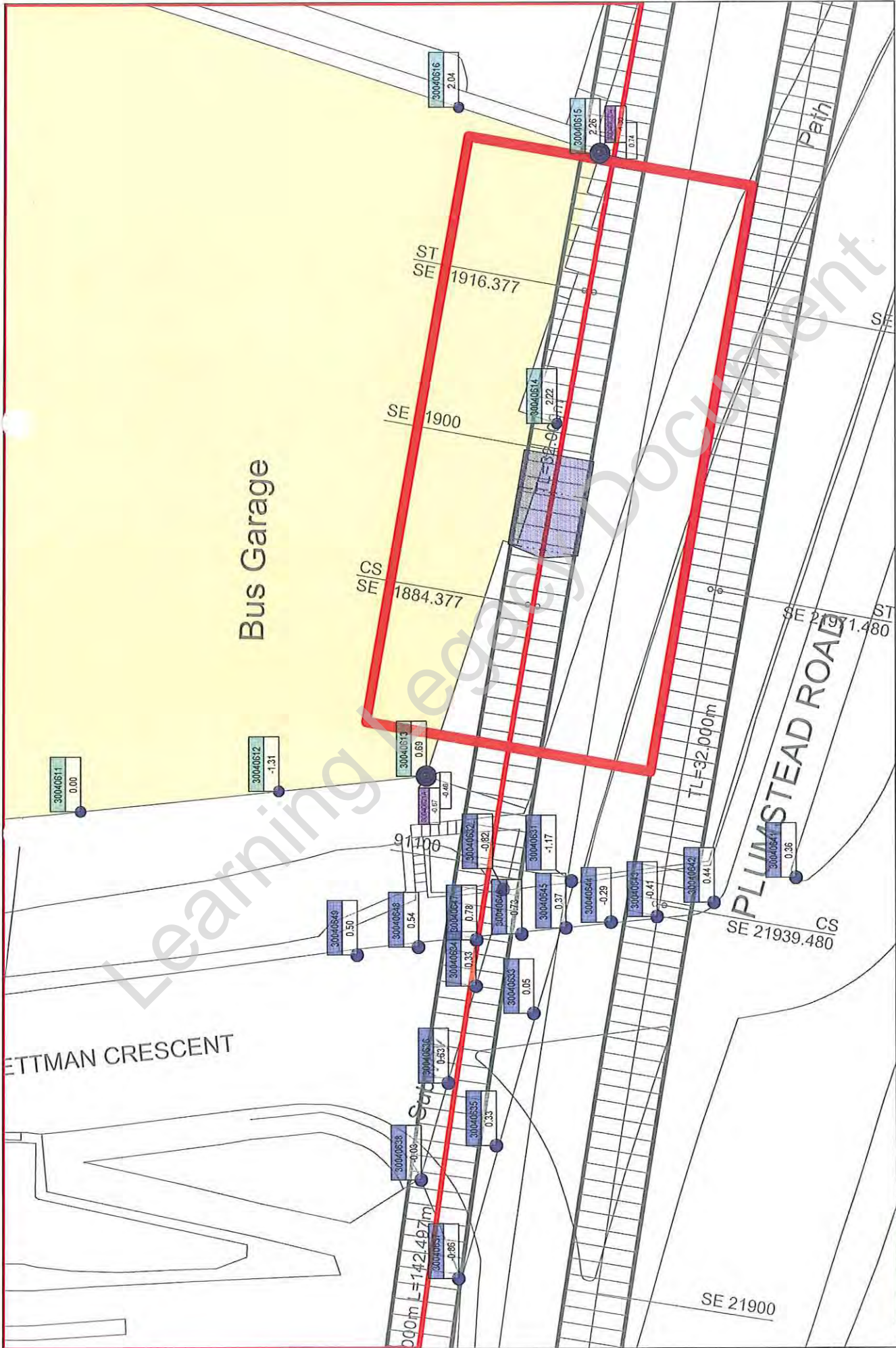
Old House

Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 06.04.2013 09:00



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 04.07.2013 18:52

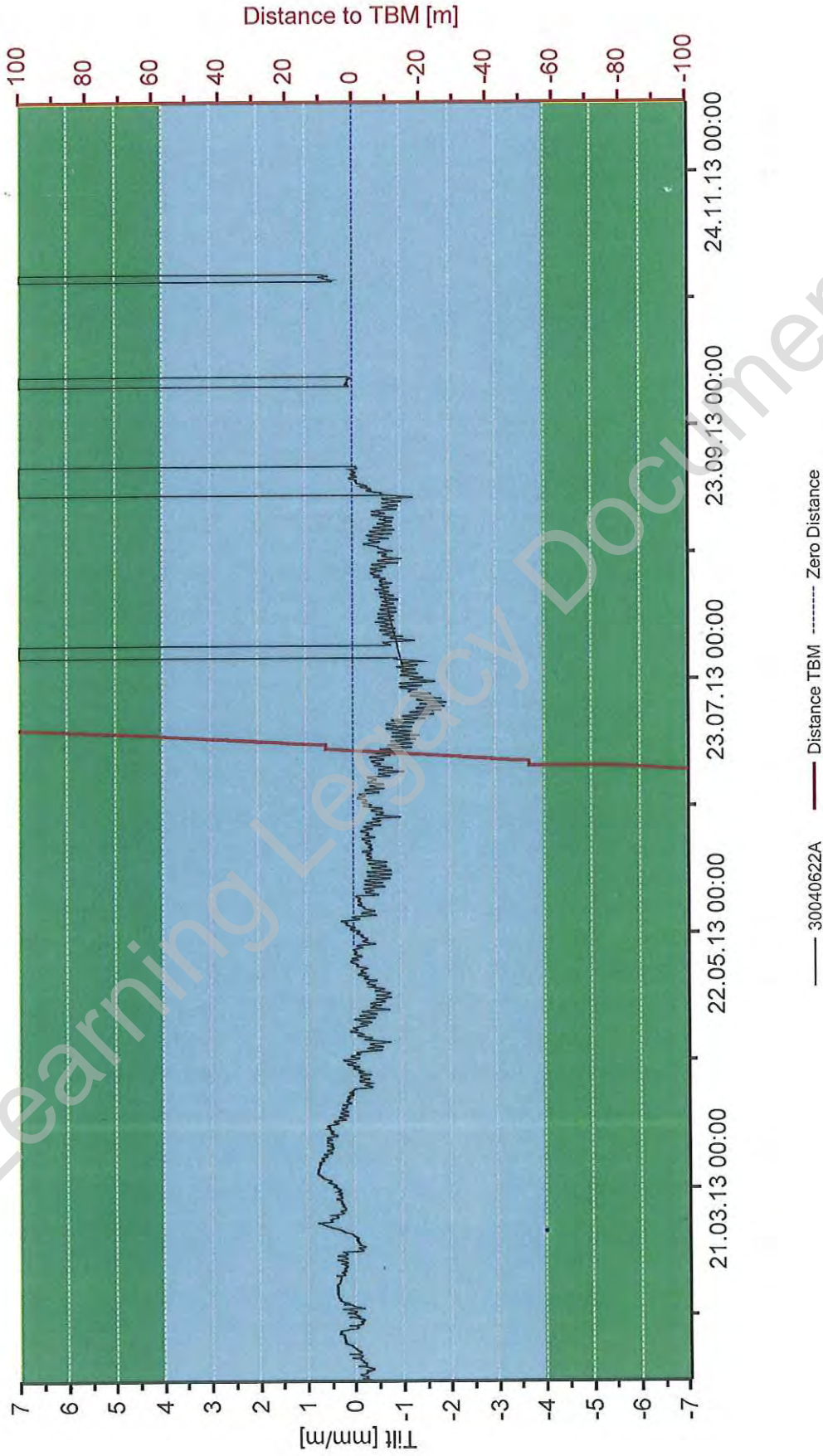




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 08.07.2013 17:47



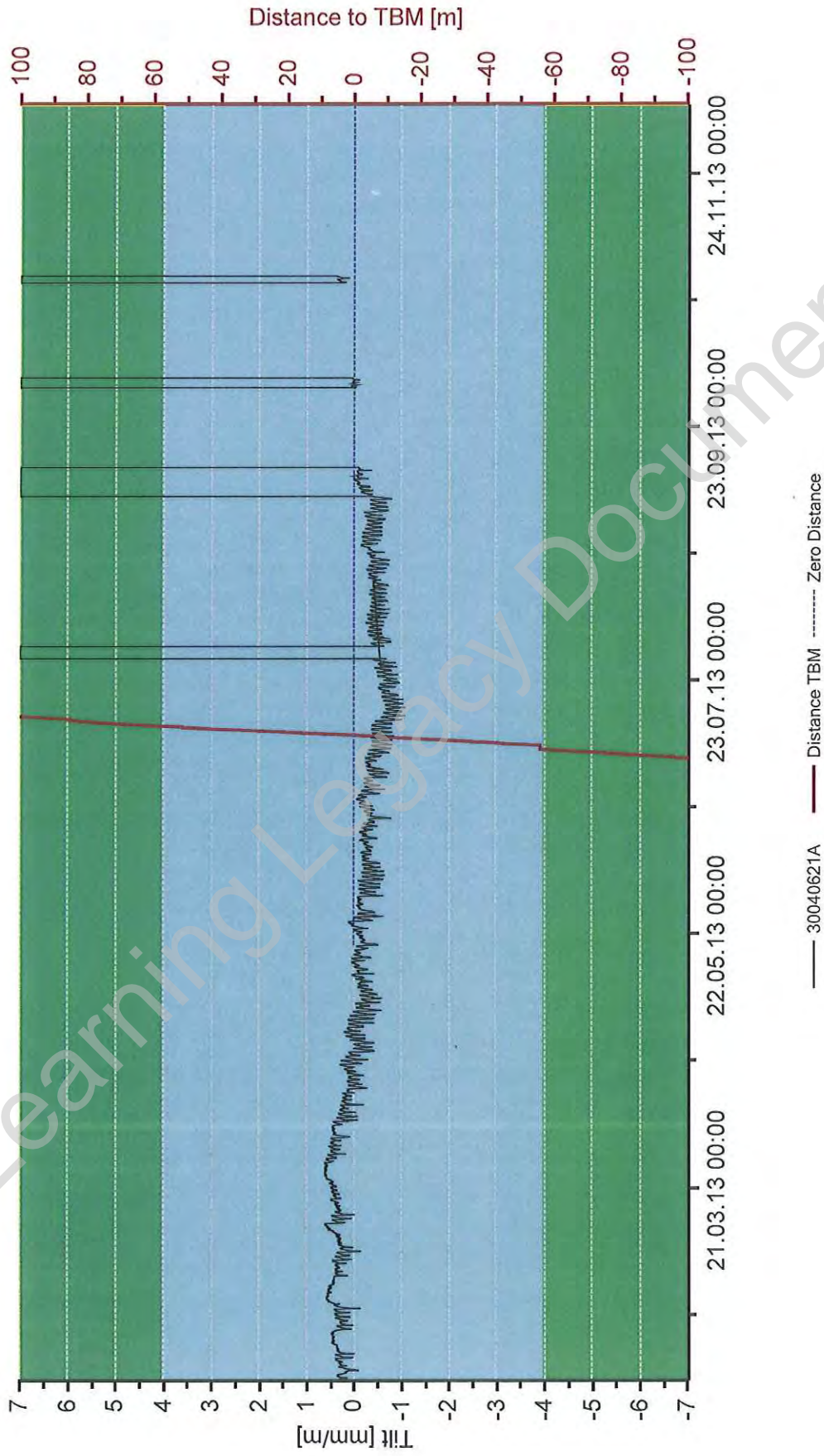
Point: 30040622A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Bus Garage (TM) 01.02.2013 - 10.12.2014  
date: 31.07.2014 11:30 current values: 31.07.2014 11:12



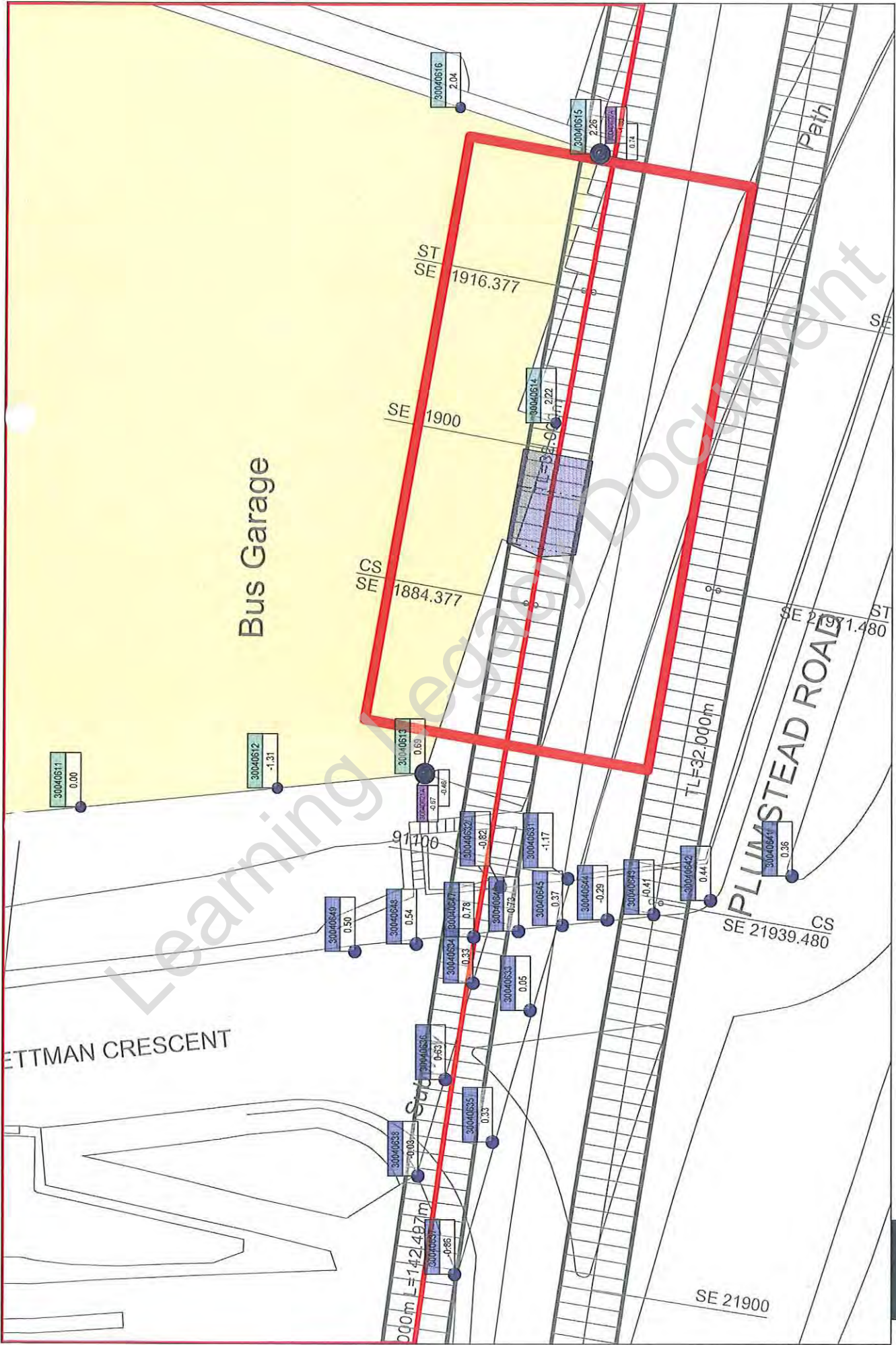
Point: 30040621A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Bus Garage (TM) 01.02.2013 - 10.12.2014  
date: 31.07.2014 11:27 current values: 31.07.2014 11:12

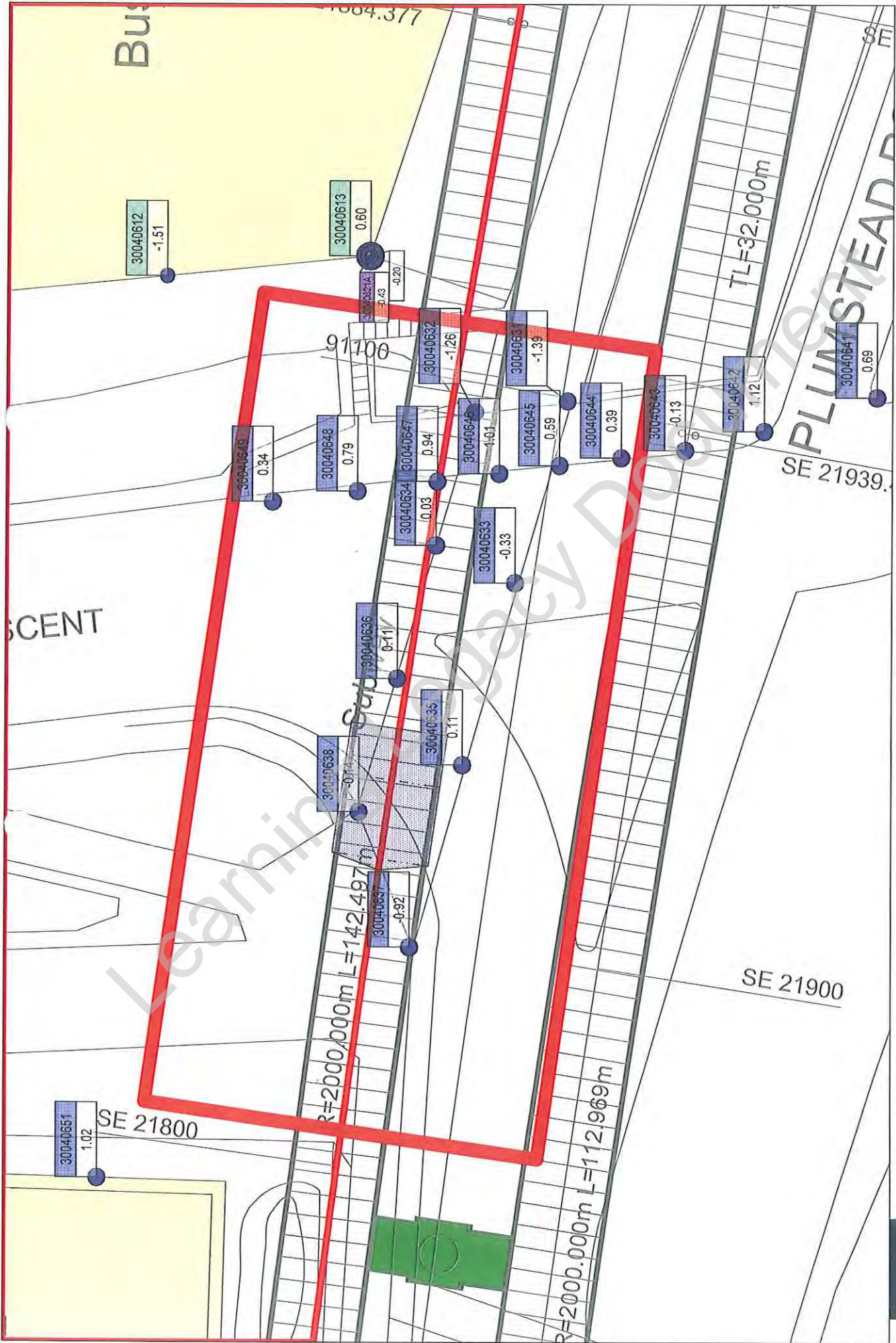







Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 08.07.2013 17:47





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 11.07.2013 09:00



 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 31**

**CS7 – Petment Crescent + Subway**

Learning Legacy Document

<b>monitoring asset</b>	<b>Petment Crescent Road + Subway</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
<b>name of monitoring section:</b>	CS Petment Crescent + Subway		
sensor type:	manual levelling studs		
chainage:	91100	point no.:	3004 0631 - 3004 0649
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 -20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

		date	max. value	point no.	comments
<b>baseline</b>		04/02/13	0.00		
<b>TBM 1</b>	start ZOI	04/04/13	0.05	3004 0643	
	end ZOI	07/04/13	0.73	3004 0643	breached not any trigger value
<b>TBM 2</b>	start ZOI	09/07/13 10/07/13	-0.72 -1.47	3004 0632 3004 0637	
	end ZOI	11/07/13 13/07/13	-1.26 -1.43	3004 0632 3004 0637	breached not any trigger value
<b>longterm</b>		07/02/14	-0.43	3004 0632	
			-1.39	3004 0637	

<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)

**summary / comments**

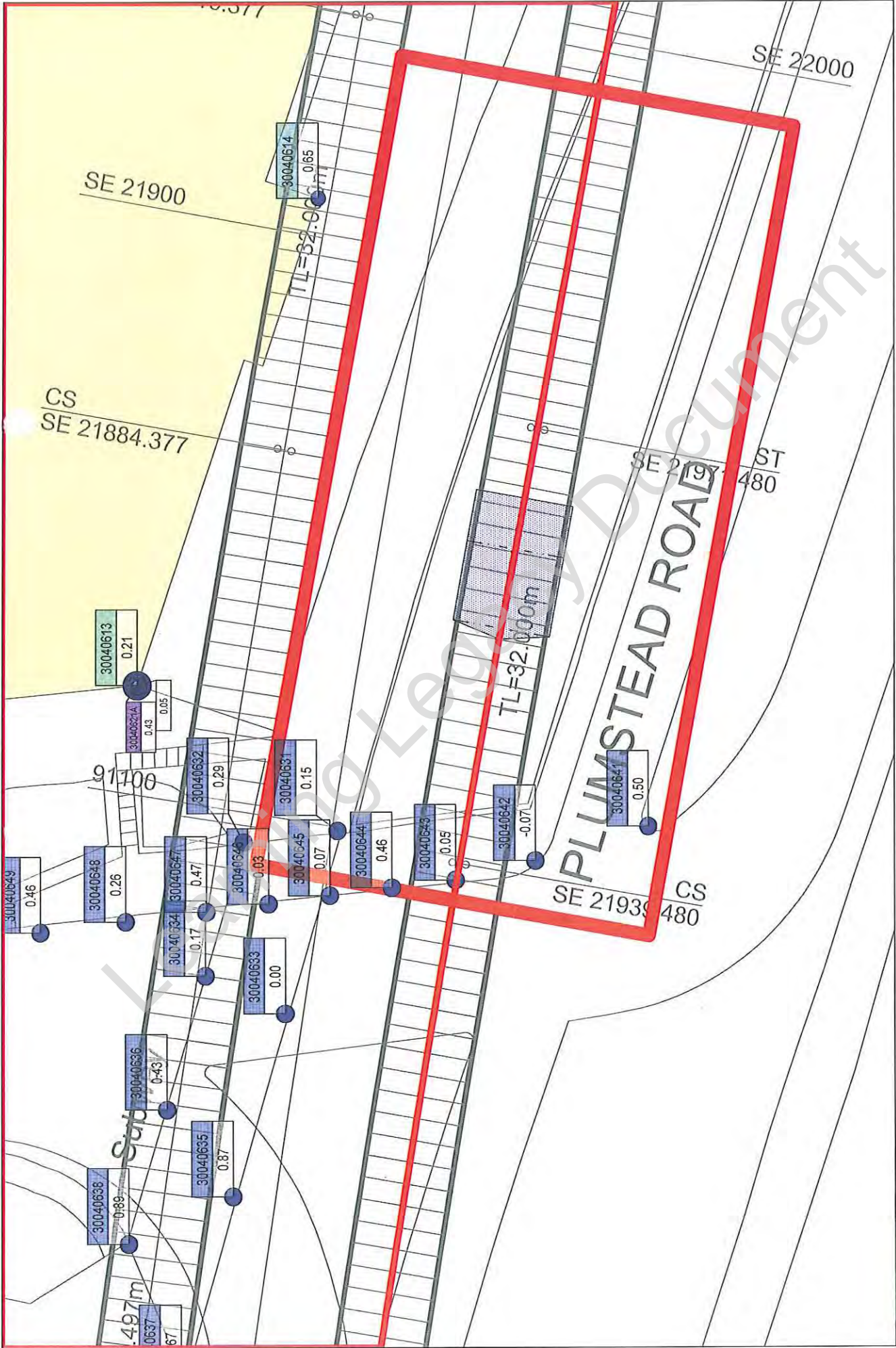
Overall, none of the points reached any trigger value.  
 Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 12/01/15

print name:

HMJV project role:

Monitoring & Survey engineer

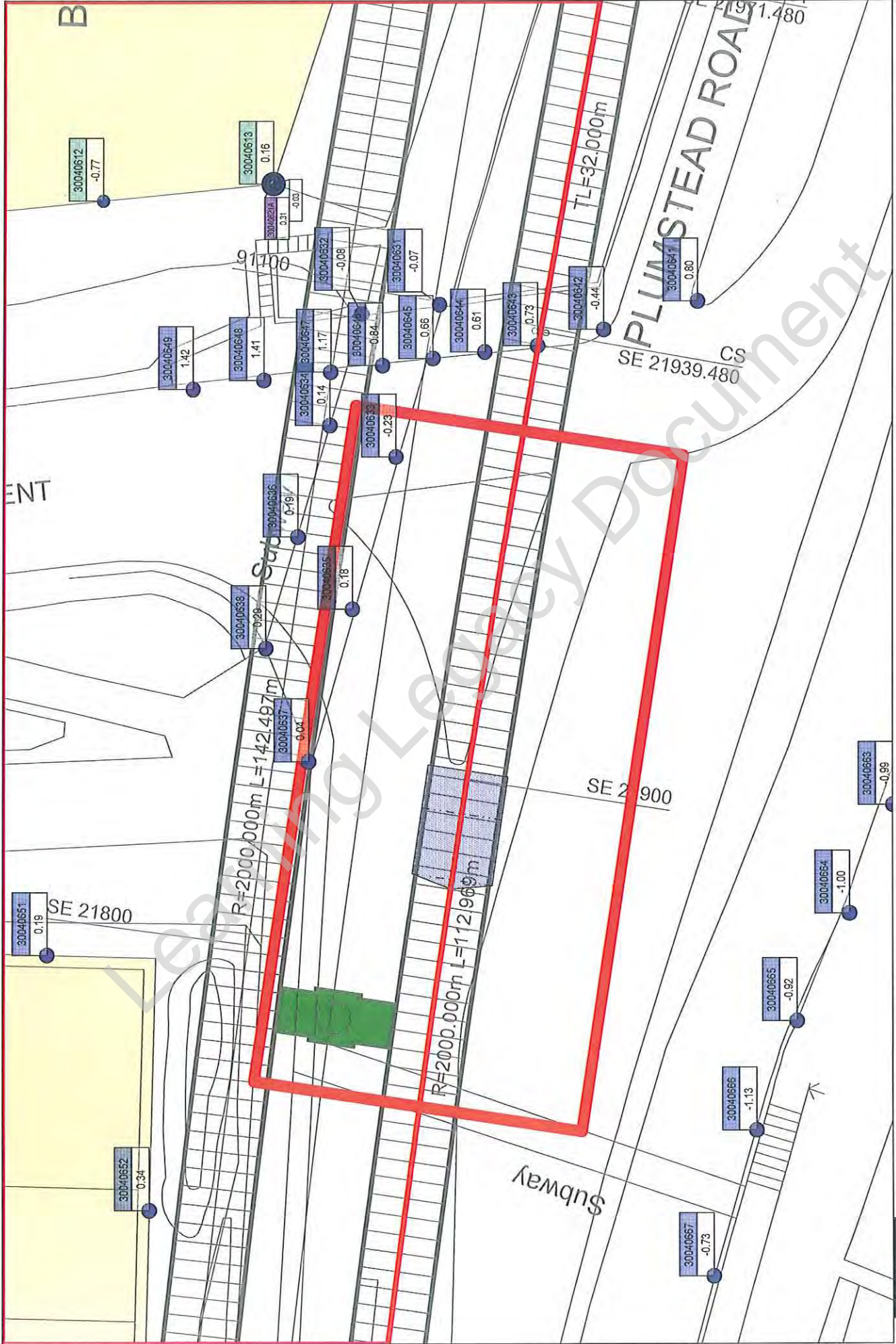


Point: 30040643

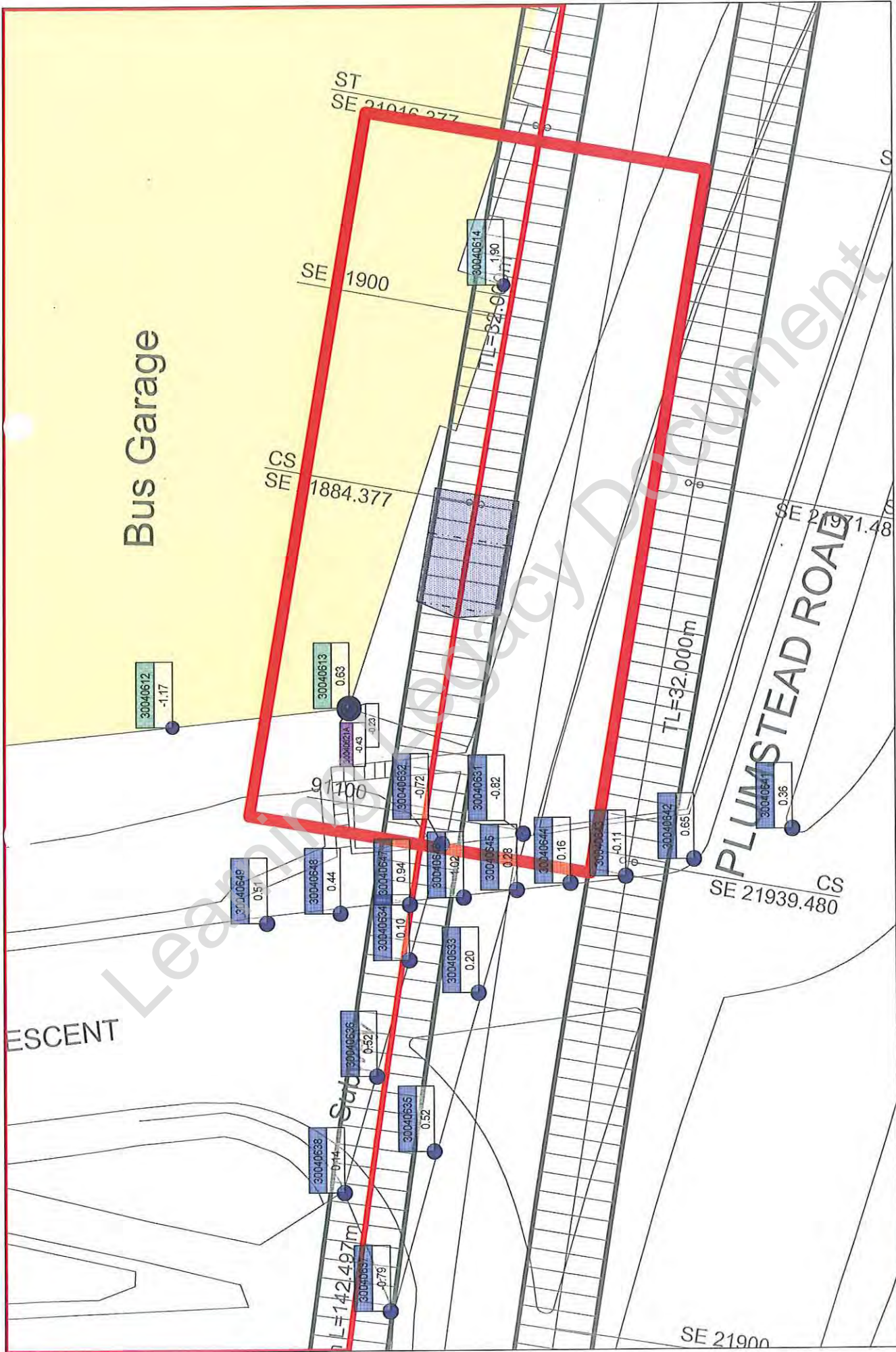


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Petment Crescent Road + Subway 04.02.2013 - 07.02.2014  
date: 04.08.2014 15:08 current values: 04.08.2014 14:28





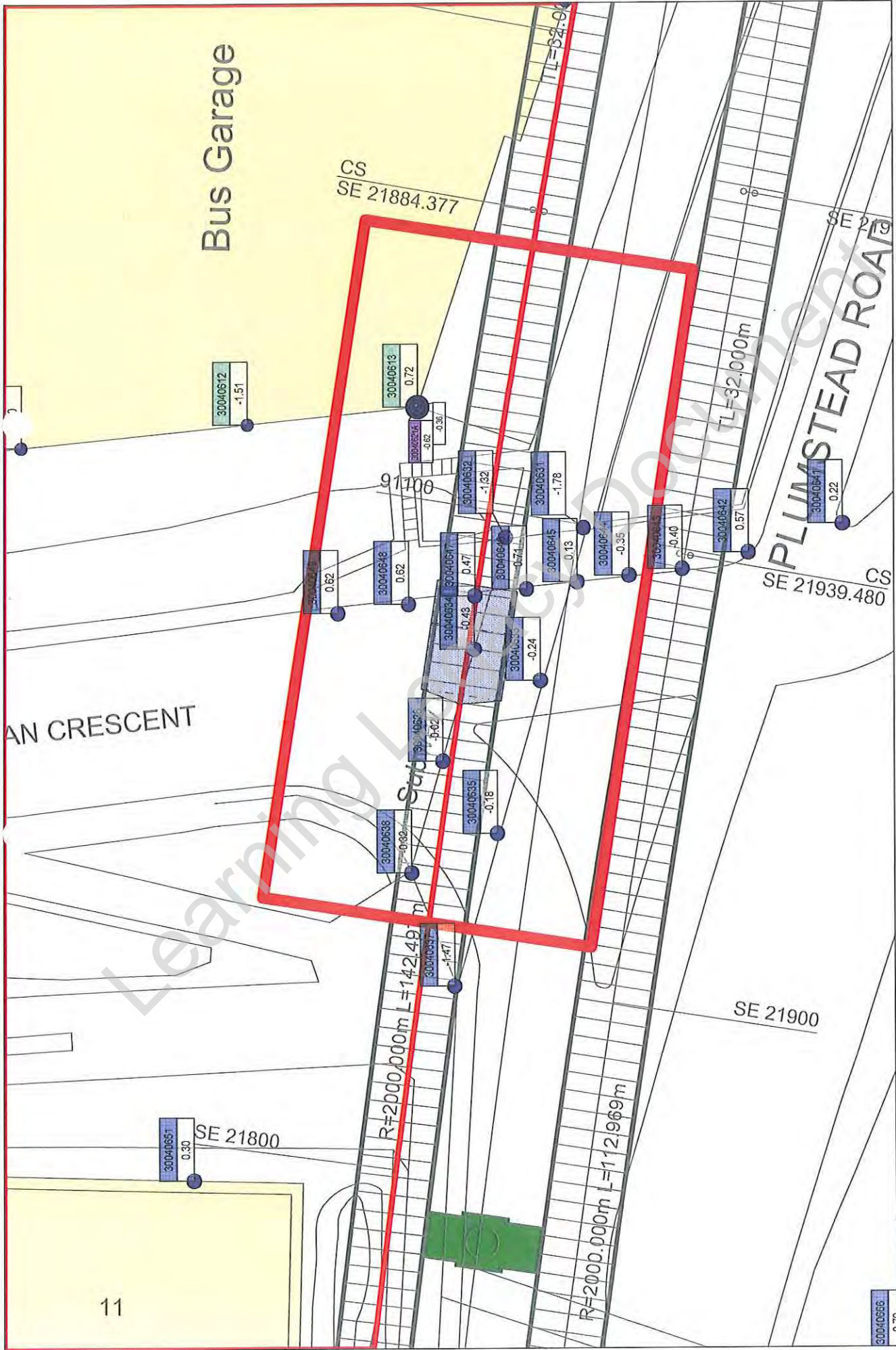
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 07.04.2013 09:00



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 09.07.2013 09:00







Point: 30040632



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Petment Crescent Road + Subway 04.02.2013 - 07.02.2014  
date: 04.08.2014 15:21 current values: 04.08.2014 14:58

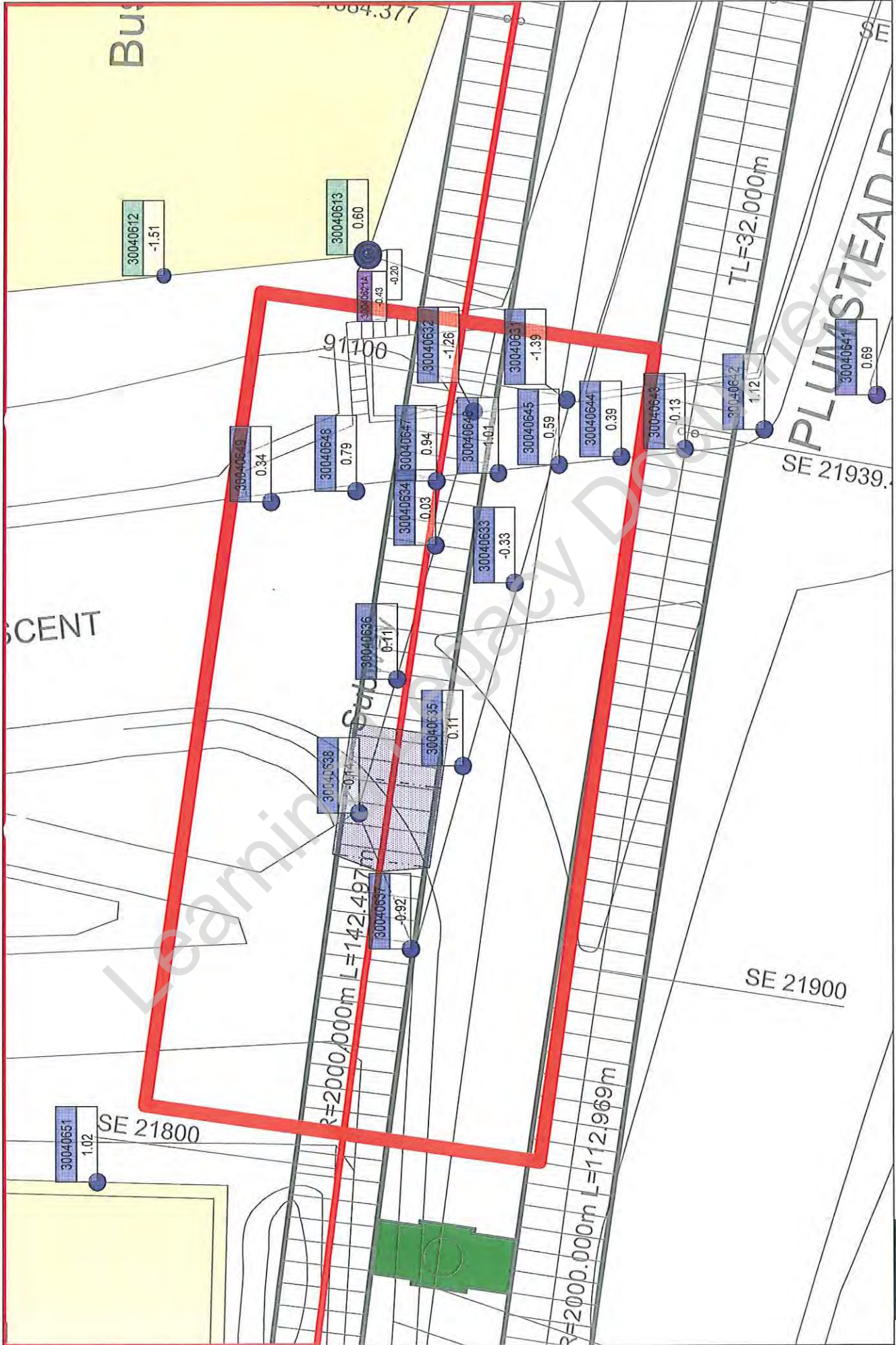


Point: 30040637

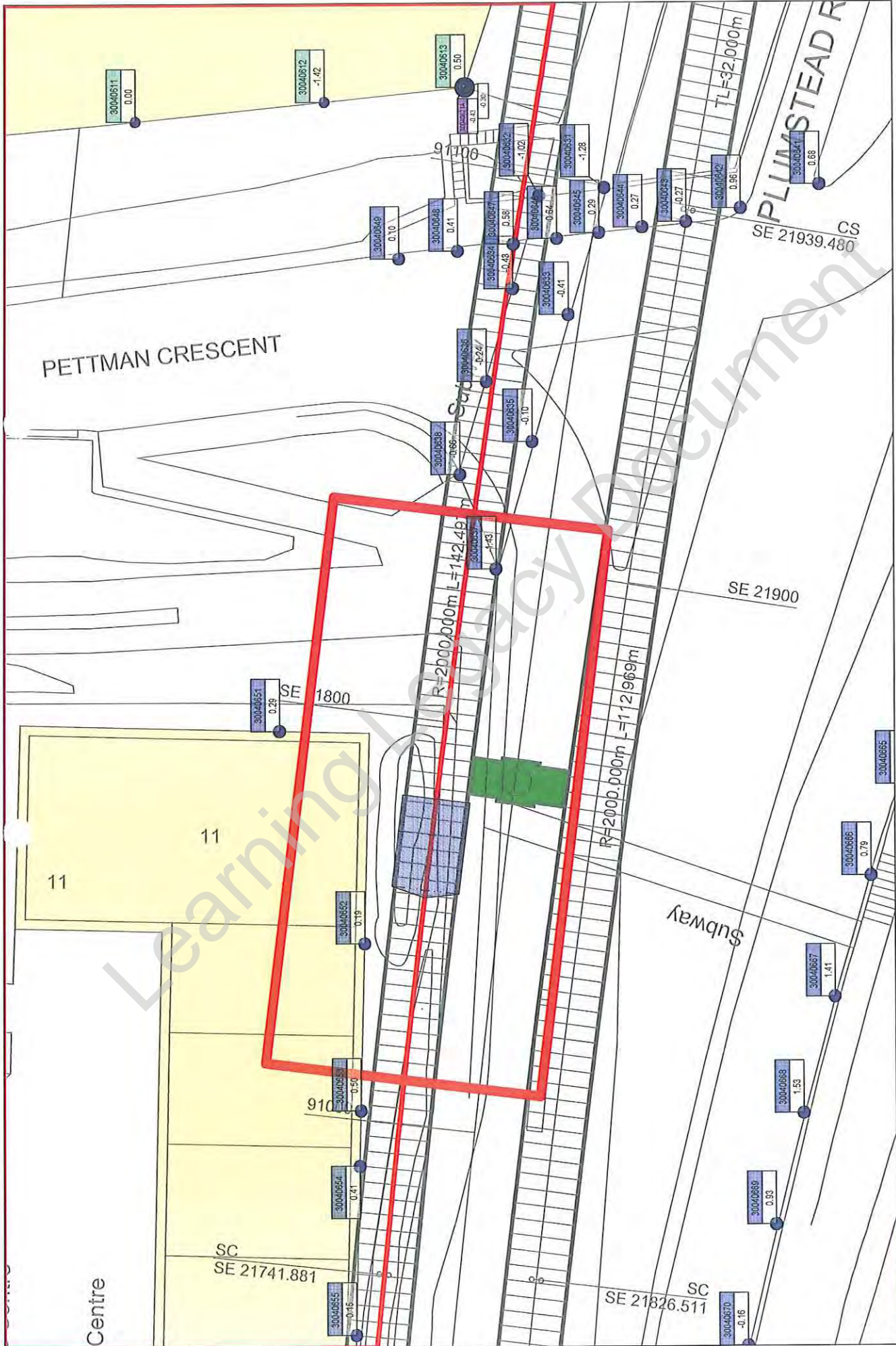


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Petment Crescent Road + Subway 04.02.2013 - 07.02.2014  
date: 04.08.2014 15:24 current values: 04.08.2014 14:58





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 11.07.2013 09:00



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 13.07.2013 09:00



monitoring table



monitoring table



project: C310 Thames Tunnel  
structure: CS Pettman Crescent + Subway

Joint Venture

project: C310 Thames Tunnel  
structure: CS Pettman Crescent + Subway

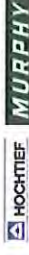
Joint Venture

No. of reading	date	1. following		2. following		3. following		4. following		5. following		6. following		7. following		8. following		9. following		10. following		11. following		12. following						
		baseline	06/02/2013	06/02/2013	21/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013	06/02/2013				
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline			
3004 0631	102.925	102.925	0	102.925	0	102.925	0	102.925	0	102.925	0	102.925	0	102.925	0	102.925	0	102.925	0	102.925	0	102.925	0	102.925	0	102.925	0	102.925	0	
3004 0632	102.988	102.988	0	102.988	0	102.988	0	102.988	0	102.988	0	102.988	0	102.988	0	102.988	0	102.988	0	102.988	0	102.988	0	102.988	0	102.988	0	102.988	0	
3004 0633	102.774	102.775	0	102.774	-1	102.774	0	102.774	0	102.774	-1	102.774	0	102.774	0	102.774	0	102.774	0	102.774	0	102.774	0	102.774	0	102.774	0	102.774	-1	0
3004 0634	102.880	102.881	0	102.881	0	102.881	0	102.881	0	102.881	0	102.881	0	102.881	0	102.882	1	102.881	-1	102.881	0	102.880	0	102.881	1	102.881	0	102.881	0	0
3004 0635	102.652	102.652	0	102.653	0	102.653	0	102.653	0	102.653	0	102.653	-1	102.653	0	102.654	1	102.652	-1	102.652	0	102.652	0	102.653	1	102.652	-1	0	0	
3004 0636	102.790	102.790	0	102.790	0	102.790	0	102.790	0	102.790	0	102.790	0	102.790	0	102.791	1	102.790	-1	102.790	0	102.790	0	102.790	0	102.790	0	102.790	0	0
3004 0638	102.595	102.595	0	102.595	0	102.595	0	102.595	0	102.595	0	102.595	0	102.595	0	102.596	1	102.595	-1	102.595	0	102.594	0	102.594	0	102.594	0	102.594	0	0
3004 0641	106.654	106.655	0	106.654	0	106.655	0	106.655	0	106.655	0	106.655	0	106.655	0	106.654	-1	106.654	0	106.655	1	106.654	0	106.655	1	106.655	0	106.655	0	0
3004 0642	106.770	106.770	0	106.770	0	106.770	0	106.770	0	106.770	0	106.770	0	106.770	0	106.768	-2	106.768	-1	106.768	0	106.768	0	106.768	0	106.770	2	106.770	0	0
3004 0643	106.731	106.732	0	106.732	0	106.732	0	106.732	0	106.731	0	106.732	0	106.732	0	106.731	-1	106.732	1	106.732	1	106.732	1	106.732	1	106.731	-1	0	0	
3004 0644	106.708	106.708	0	106.708	0	106.708	0	106.708	0	106.708	0	106.708	0	106.708	0	106.709	1	106.708	-1	106.708	1	106.708	1	106.708	1	106.708	0	106.708	0	0
3004 0645	106.555	106.555	0	106.555	0	106.555	0	106.555	0	106.555	-1	106.555	0	106.555	0	106.554	-1	106.554	0	106.555	1	106.555	1	106.555	1	106.555	0	106.555	0	0
3004 0646	106.636	106.636	0	106.636	0	106.636	0	106.636	0	106.636	0	106.636	0	106.636	0	106.636	-1	106.636	-1	106.636	1	106.636	1	106.636	1	106.636	0	106.636	0	0
3004 0647	106.599	106.600	0	106.600	0	106.600	0	106.600	0	106.600	0	106.600	0	106.600	0	106.600	0	106.600	0	106.600	0	106.601	1	106.601	1	106.600	-1	0	0	
3004 0648	106.567	106.567	0	106.567	0	106.567	0	106.567	0	106.567	0	106.568	1	106.567	0	106.567	0	106.568	1	106.567	0	106.568	1	106.568	1	106.567	-1	0	0	
3004 0649	106.524	106.525	0	106.524	0	106.525	0	106.525	0	106.525	0	106.525	0	106.525	0	106.525	0	106.525	0	106.525	0	106.525	0	106.525	0	106.525	-1	0	0	

monitoring table



monitoring table



Joint Venture

Joint Venture

project: C310 Thames Tunnel  
Bauwerk: CS Pettman Crescent + Subway

project: C310 Thames Tunnel  
Bauwerk: CS Pettman Crescent + Subway

No. of reading	13. following		14. following		15. following		16. following		17. following		18. following		19. following		20. following		21. following		22. following		23. following		24. following			
	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
3004 0631	102.925	102.924	0	102.924	0	-1	102.924	0	-1	102.924	0	-1	102.924	0	-1	102.923	-1	102.923	0	-1	102.923	0	-1	102.923	0	-2
3004 0632	102.988	102.988	0	102.987	0	-1	102.987	0	-1	102.987	0	-1	102.987	0	-1	102.987	-1	102.987	0	-1	102.987	0	-1	102.986	0	-2
3004 0633	102.774	102.774	0	102.774	0	0	102.774	0	0	102.774	0	0	102.774	0	0	102.774	0	102.774	0	0	102.774	0	0	102.773	-1	-1
3004 0634	102.880	102.881	0	102.880	0	0	102.880	0	0	102.881	0	0	102.881	0	0	102.880	-1	102.880	0	0	102.880	0	0	102.880	0	-1
3004 0635	102.642	102.642	0	102.642	0	0	102.642	0	0	102.642	0	0	102.642	0	0	102.642	-1	102.642	0	0	102.642	0	0	102.641	0	-1
3004 0636	102.700	102.700	0	102.700	0	0	102.700	0	0	102.700	0	0	102.700	0	0	102.700	-1	102.700	0	0	102.700	0	0	102.699	0	0
3004 0637	102.585	102.584	0	102.584	0	-1	102.584	0	-1	102.584	0	-1	102.584	0	-1	102.584	-1	102.584	0	-1	102.583	-1	-1	102.582	-1	-3
3004 0638	102.704	102.704	0	102.704	0	0	102.704	0	0	102.704	0	0	102.704	0	0	102.704	0	102.704	0	0	102.704	-1	-1	102.703	0	-1
3004 0641	106.654	106.654	0	106.654	0	0	106.654	0	0	106.655	1	1	106.655	0	0	106.654	0	106.654	0	0	106.655	0	1	106.654	-1	0
3004 0642	106.770	106.770	0	106.770	0	0	106.770	0	0	106.770	0	0	106.770	0	0	106.770	0	106.770	0	0	106.771	1	1	106.770	0	1
3004 0643	106.731	106.731	0	106.731	0	-1	106.731	0	-1	106.731	-1	-1	106.731	-1	-1	106.731	0	106.731	0	0	106.731	0	0	106.731	0	0
3004 0644	106.708	106.708	0	106.708	0	0	106.708	0	0	106.708	0	0	106.708	0	0	106.708	0	106.708	0	0	106.708	0	0	106.708	0	0
3004 0645	106.555	106.555	0	106.555	0	0	106.555	0	0	106.555	0	0	106.555	0	0	106.555	0	106.555	0	0	106.555	0	0	106.555	0	0
3004 0646	106.636	106.636	0	106.636	0	0	106.636	0	0	106.636	-1	-1	106.636	-1	-1	106.636	0	106.636	0	0	106.636	0	0	106.635	0	1
3004 0647	106.599	106.599	0	106.599	0	0	106.599	0	0	106.599	0	0	106.599	0	0	106.599	0	106.599	0	0	106.599	0	0	106.599	0	0
3004 0648	106.567	106.567	0	106.567	0	0	106.567	0	0	106.567	-1	-1	106.567	-1	-1	106.567	0	106.567	0	0	106.567	0	0	106.567	0	0
3004 0649	106.524	106.524	0	106.524	0	0	106.524	0	0	106.525	0	0	106.525	0	0	106.525	0	106.524	0	0	106.524	0	0	106.524	0	0

monitoring table



monitoring table



Joint Venture


Joint Venture

project: C310 Thames Tunnel CS Pettman Crescent + Subway

project: C310 Thames Tunnel CS Pettman Crescent + Subway

No. of reading	baseline	25. following		26. following		27. following		28. following		29. following		30. following		31. following		32. following		33. following		
		date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline	
3004 0631	102.025	102.023	0 -2	102.924	1	0	102.924	0 -1	102.924	0 -1	102.924	0 -1	102.924	0 -1	102.924	0 -1	102.923	0 -1	102.923	0 -1
3004 0632	102.098	102.986	0 -2	102.987	1	0	102.987	-1 -1	102.987	0 -1	102.987	0 -1	102.985	-2 -3	102.987	2 -1	102.987	1 0	102.987	1 0
3004 0633	102.774	102.779	0 -1	102.774	0	0	102.774	0 0	102.773	-1 -1	102.773	-1 -1	102.773	0 -2	102.773	1 -1	102.772	-1 -2	102.772	-1 -2
3004 0634	102.890	102.890	0 -1	102.890	0	0	102.890	0 -1	102.879	-1 -1	102.879	-1 -1	102.879	-1 -2	102.879	1 -1	102.879	0 -2	102.879	0 -2
3004 0635	102.662	102.661	0 -1	102.661	0	-1	102.661	0 -1	102.660	-1 -2	102.660	-1 -2	102.660	0 -2	102.661	1 -1	102.661	0 -1	102.661	0 -1
3004 0636	102.790	102.789	0 -1	102.789	0	0	102.789	0 -1	102.788	-1 -2	102.788	-1 -2	102.787	-1 -2	102.788	1 -1	102.788	0 -2	102.788	0 -2
3004 0637	102.585	102.586	1 -2	102.583	0	-1	102.583	0 -2	102.583	0 -2	102.583	0 -2	102.583	0 -2	102.584	1 -1	102.584	0 -1	102.584	0 -1
3004 0638	102.704	102.703	0 -1	102.703	0	-1	102.703	0 -1	102.702	-1 -2	102.702	-1 -2	102.702	0 -2	102.703	1 -1	102.703	0 -1	102.703	0 -1
3004 0641	106.654	106.654	0 -1	106.655	0	1	106.655	0 1	106.654	-1 0	106.654	-1 0	106.654	0 0	106.654	0 0	106.654	0 0	106.655	0 0
3004 0642	106.770	106.771	1 1	106.771	0	1	106.771	0 1	106.770	-1 0	106.770	-1 0	106.769	0 0	106.770	1 1	106.770	1 1	106.770	1 1
3004 0643	106.791	106.791	0 0	106.791	0	1	106.791	0 1	106.790	-1 0	106.790	-1 0	106.790	0 -1	106.790	0 -1	106.791	1 1	106.791	1 1
3004 0644	106.798	106.798	1 1	106.798	-1	0	106.798	-1 0	106.797	-1 -1	106.797	-1 -1	106.797	0 -1	106.797	0 -1	106.797	0 -1	106.797	0 -1
3004 0645	106.555	106.555	0 1	106.554	-1	0	106.554	-1 0	106.554	0 -1	106.554	0 -1	106.554	0 -1	106.554	0 -1	106.554	0 -1	106.554	0 -1
3004 0646	106.636	106.637	0 1	106.635	-1	-1	106.635	-1 -1	106.635	0 -1	106.635	0 -1	106.635	0 -1	106.635	0 -1	106.635	0 -1	106.635	0 -1
3004 0647	106.599	106.599	0 1	106.599	-1	-1	106.599	-1 -1	106.599	0 0	106.599	0 0	106.599	0 -1	106.599	0 -1	106.599	0 -1	106.599	0 -1
3004 0648	106.567	106.567	0 1	106.566	-1	-1	106.566	-1 -1	106.566	0 -1	106.566	0 -1	106.566	-1 -1	106.566	0 -1	106.566	0 -1	106.566	0 -1
3004 0649	106.524	106.524	1 0	106.523	-2	-1	106.523	-2 -1	106.523	1 -1	106.523	1 -1	106.523	0 -1	106.523	0 -1	106.524	1 0	106.524	0 0



 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 32**  
**SOS Plumstead Road south**

Learning Legacy Document

**monitoring asset**

**Southern Outfall Sewer under Plumstead Road**

reference monitoring drawing:

C310-HTM-C-DWG-CR146-ST004-70001

name of monitoring section:

SOS levelling studs Plumstead Road South

sensor type:

manual levelling studs

chainage:

90600 - 91100

point no.:

3004 0661 - 3004 0697

trigger values:  
[mm]

green: +12  
-12

amber: +15  
-15

red: +18  
-18

reference document for trigger values:

Management Plan for Control of Ground Movement

EB-no.:

C310-HTM-Z-STP-CR148-50058

Appendix:

AAA

**monitoring data**

		date	max. value	point no.	comments
baseline		25/02/13	0.00		
TBM 1	start ZOI	04/04/13	0.71	3004 0661	
		16/04/13	-0.30	3004 0679	
		30/04/13	0.26	3004 0697	
	end ZOI	07/04/13	-0.62	3004 0661	breached not any trigger value
		22/04/13	-0.55	3004 0679	
		04/05/13	0.65	3004 0697	
TBM 2	start ZOI	09/07/13	1.45	3004 0661	
		17/07/13	-1.06	3004 0679	
		30/07/13	0.74	3004 0697	
	end ZOI	11/07/13	1.45	3004 0661	breached not any trigger value
		22/07/13	-1.62	3004 0679	
		02/08/13	-0.23	3004 0697	
longterm		10/03/15	-1.44	3004 0661	
		10/03/15	-1.09	3004 0679	
		13/11/13	-0.40	3004 0697	

Evaluation of any potential residual risks

No residual risk since the Works have been completed by HMJV

Yes, residual risk (see comment below)

**summary / comments**

After passing with the first TBM it was jointly agreed between Thames Water, CRL and HMJV to continue monitoring only for the points 3004 0677 - 3004 0697 during and after 2nd TBM drive.

The points 3004 0693 - 3004 0697 were damaged after the 13.11.2014 due to road works (curb stone renewal).

Overall, none of the points reached any trigger value.

Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.

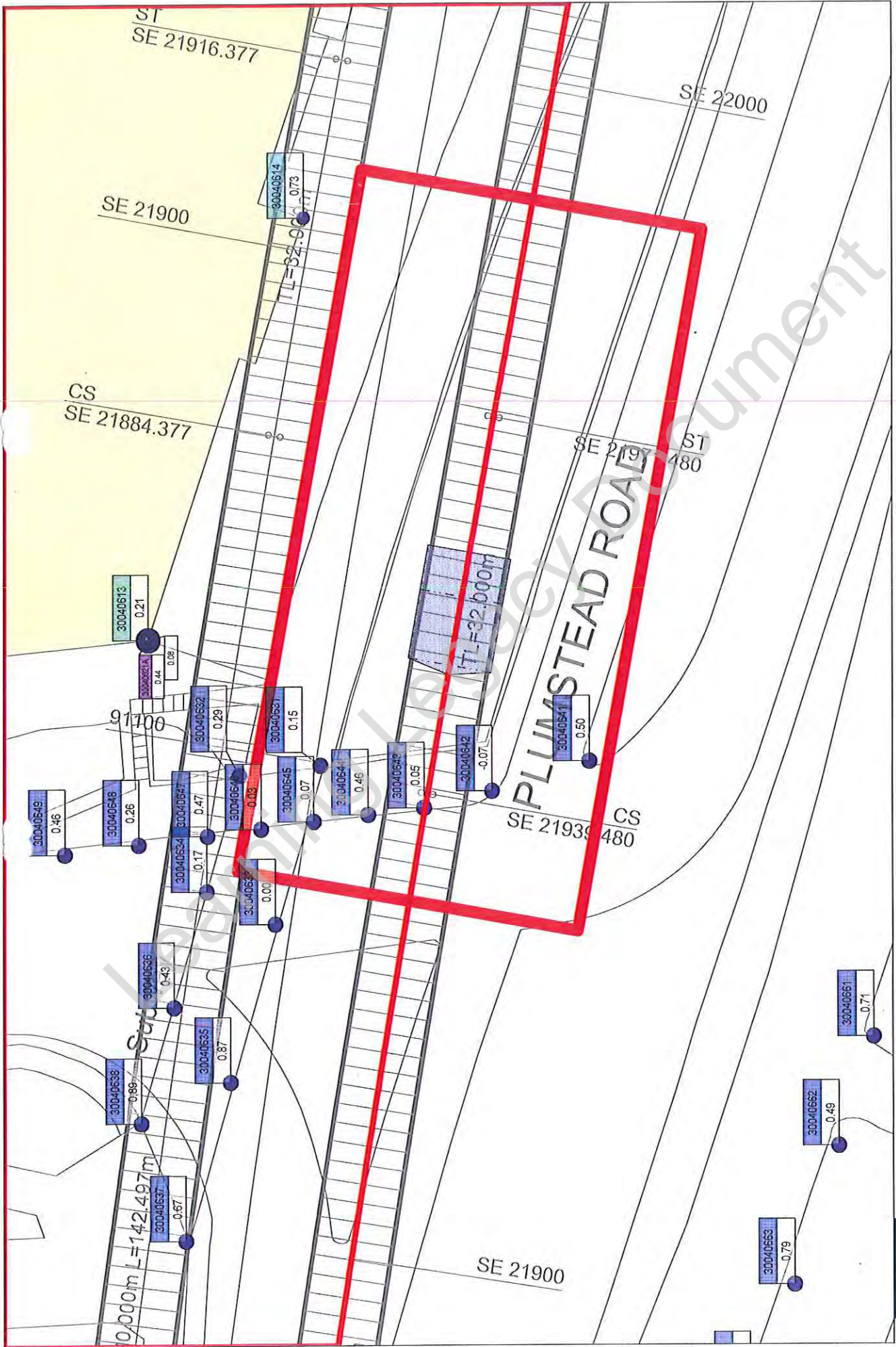
The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 12/05/2015

print name:

HMJV project role:

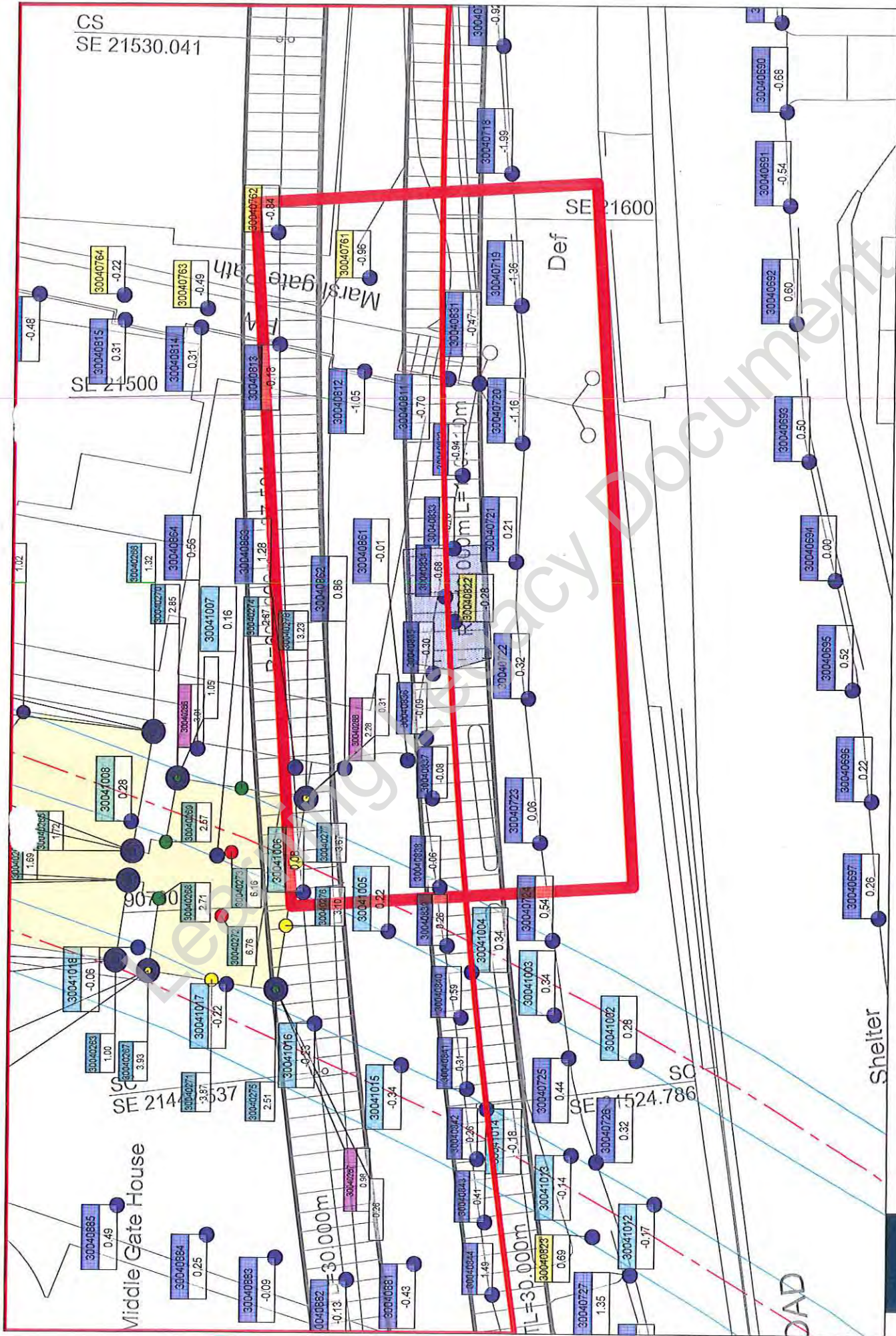
Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

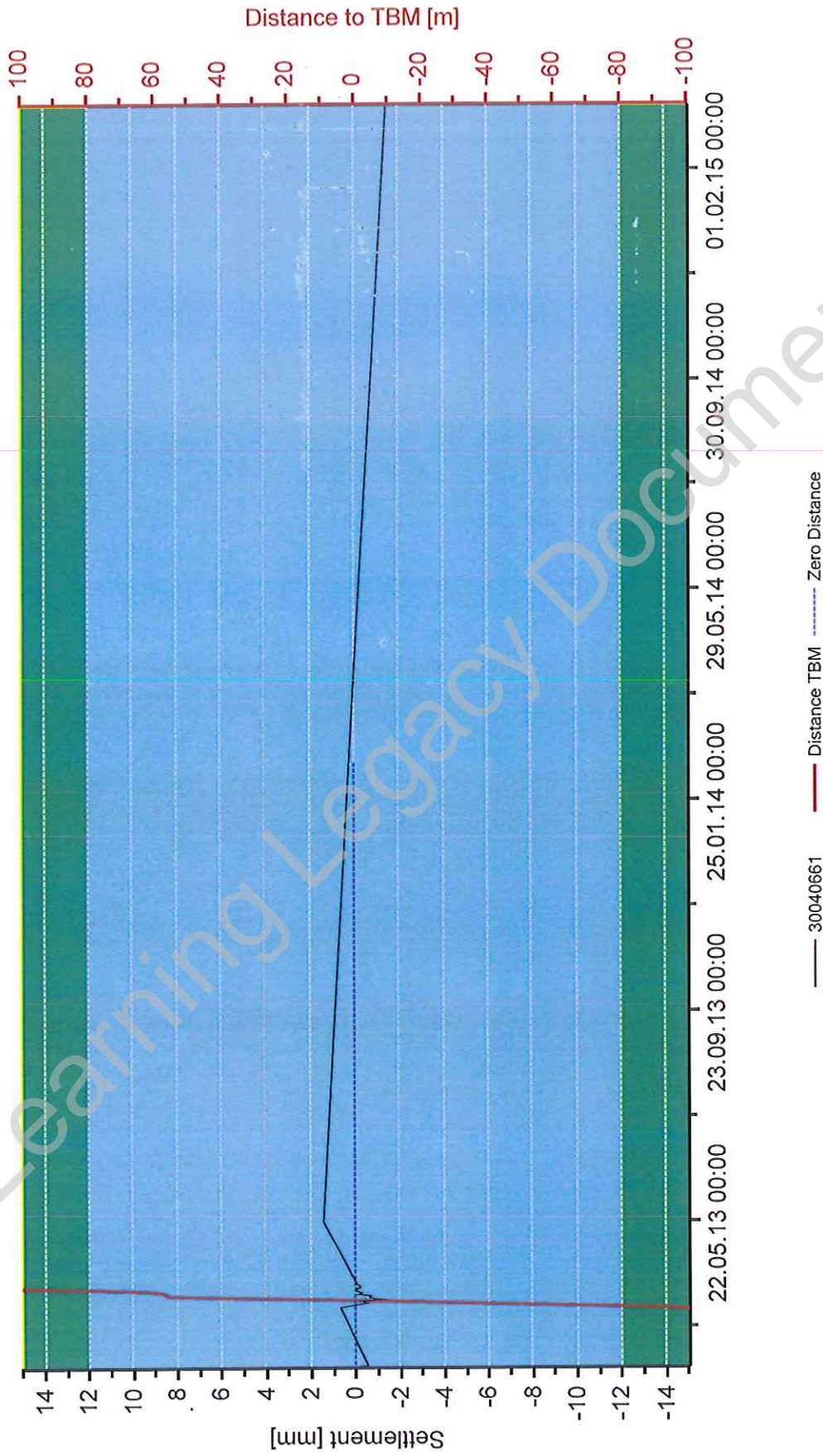
DLR monitoring - hydrostatic levelling cells

current values: 04.04.2013 17:56



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 30.04.2013 09:00

**Profile: Measurement Point 30040661**



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 Close Out Report: WB Tunnel- Plumstead Road South - 25.02.2013 - 10.03.2015  
 Date: 27.03.2015 15:54 Current Values: 27.03.2015 14:23

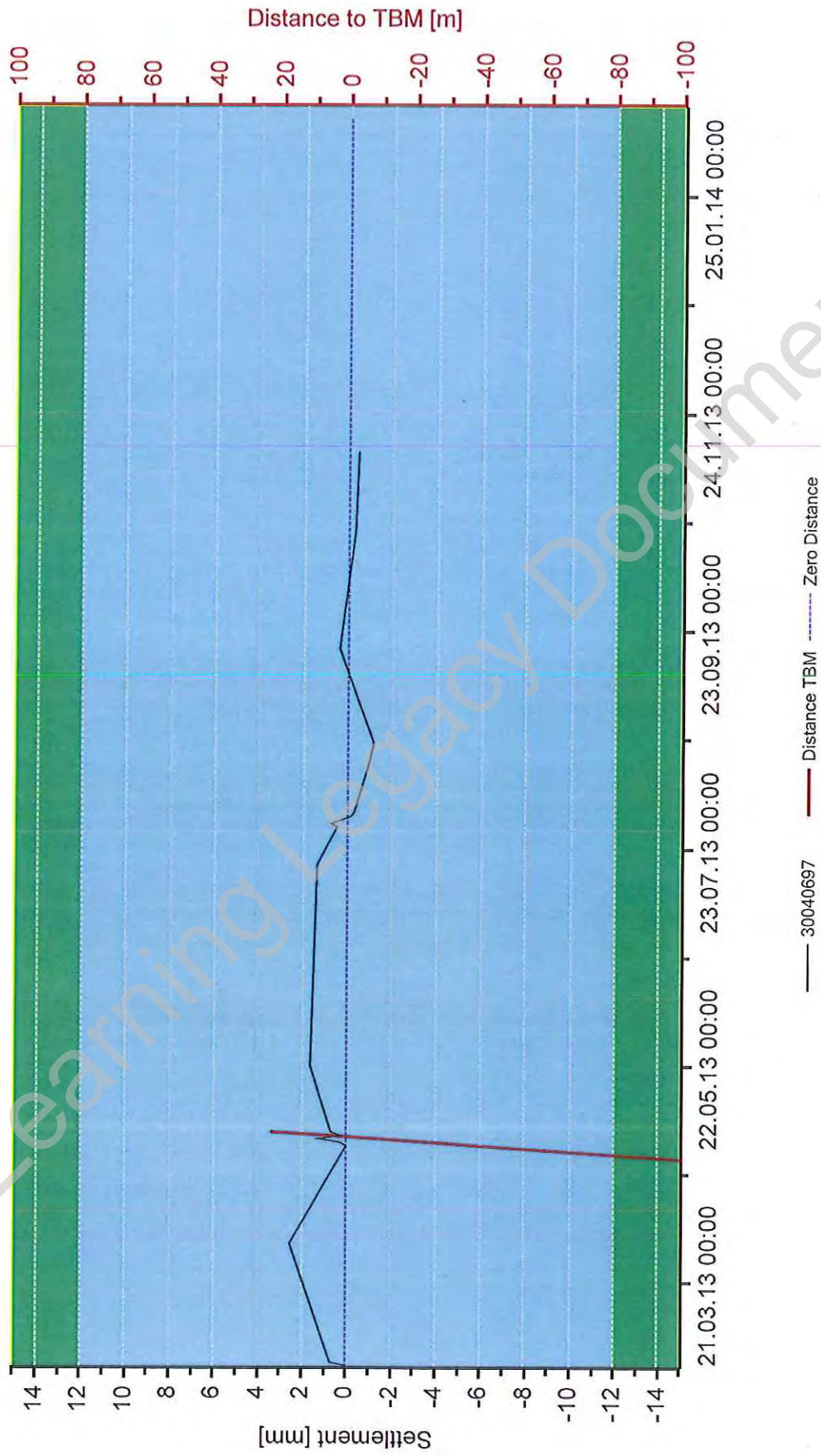


**Profile: Measurement Point 30040679**



**Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal**  
**Close Out Report: WB Tunnel- Plumstead Road South - 25.02.2013 - 10.03.2015**  
**Date: 27.03.2015 15:52 Current Values: 27.03.2015 14:23**

Point: 30040697

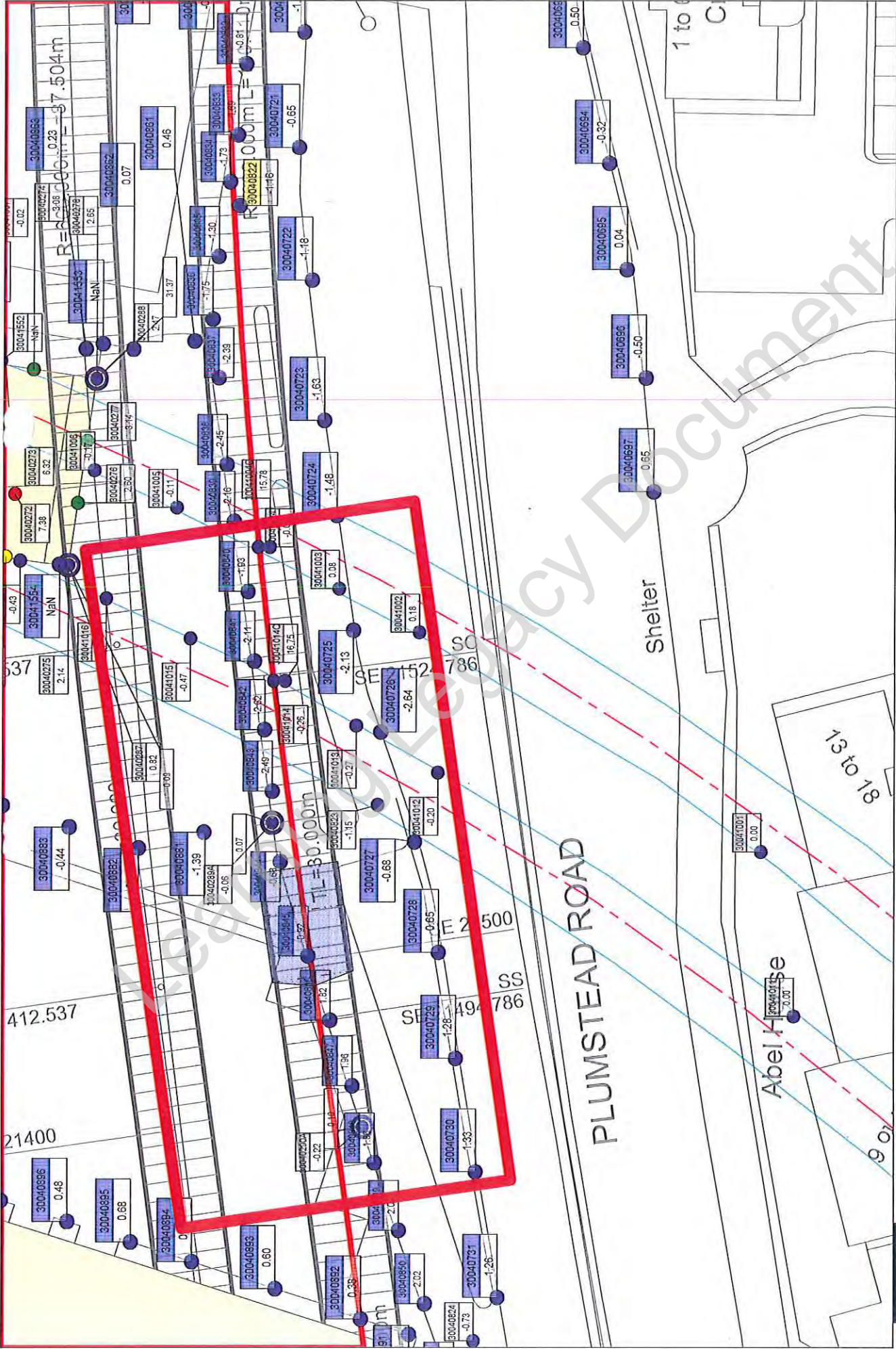


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Plumstead Road South 25.02.2013 - 20.02.2014  
date: 06.08.2014 08:54 current values: 06.08.2014 08:34



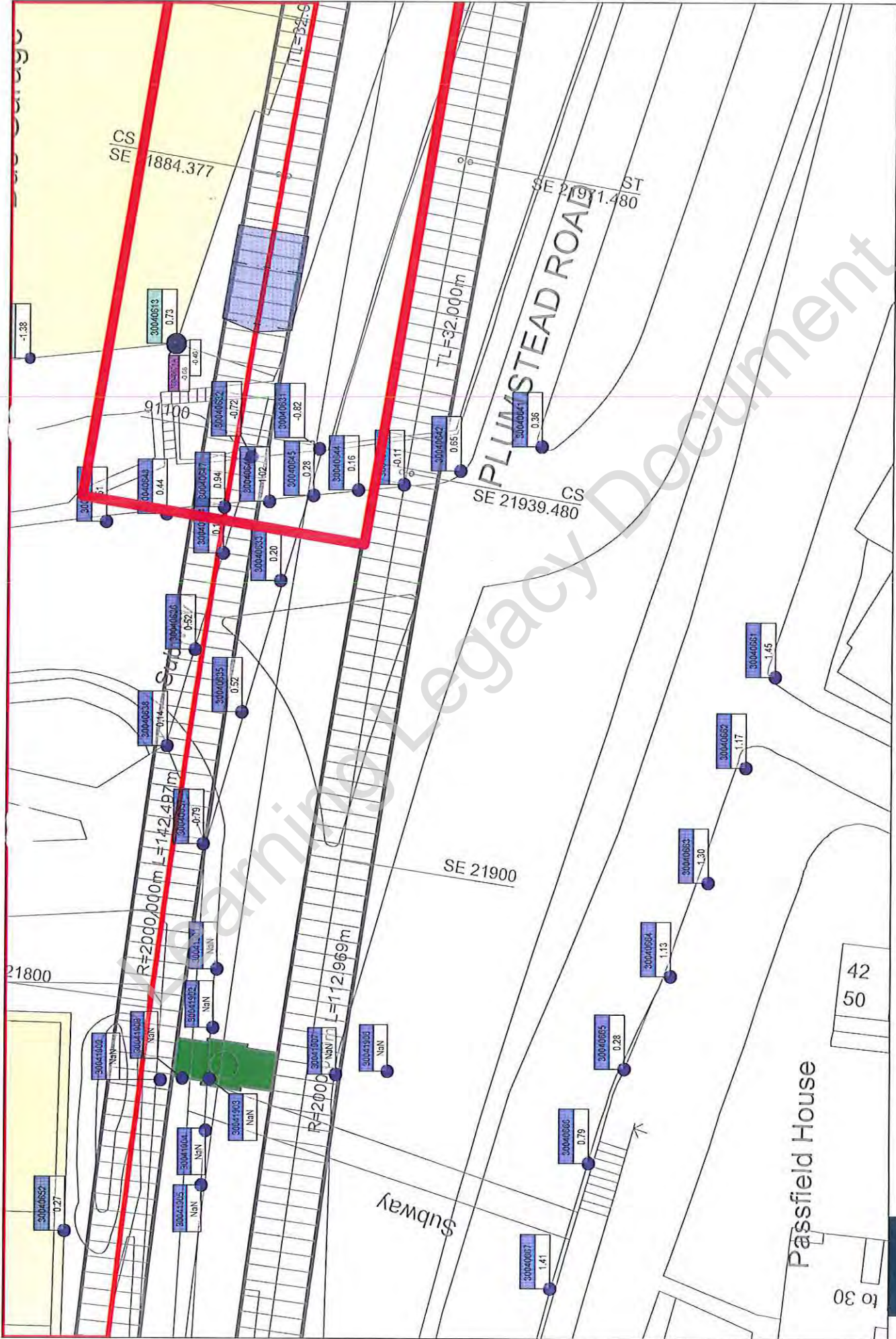






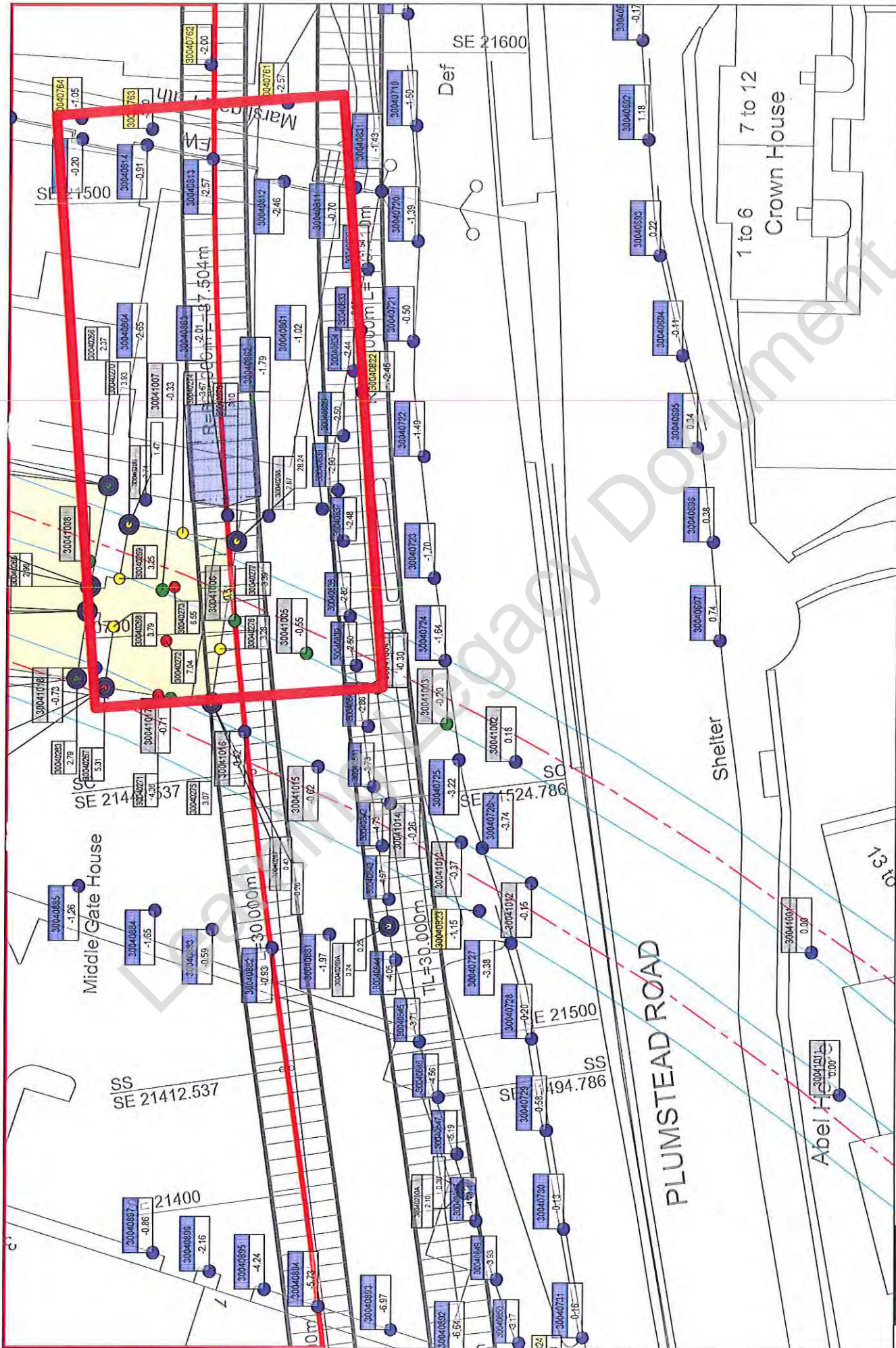
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive WB  
 current values: 04.05.2013 09:00





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 Working activities: portal excavation, construction base slab and capping beam  
 current values: 09.07.2013 17:59





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 Working activities: portal excavation, construction base slabs and capping beam  
 current values: 30.07.2013 09:00



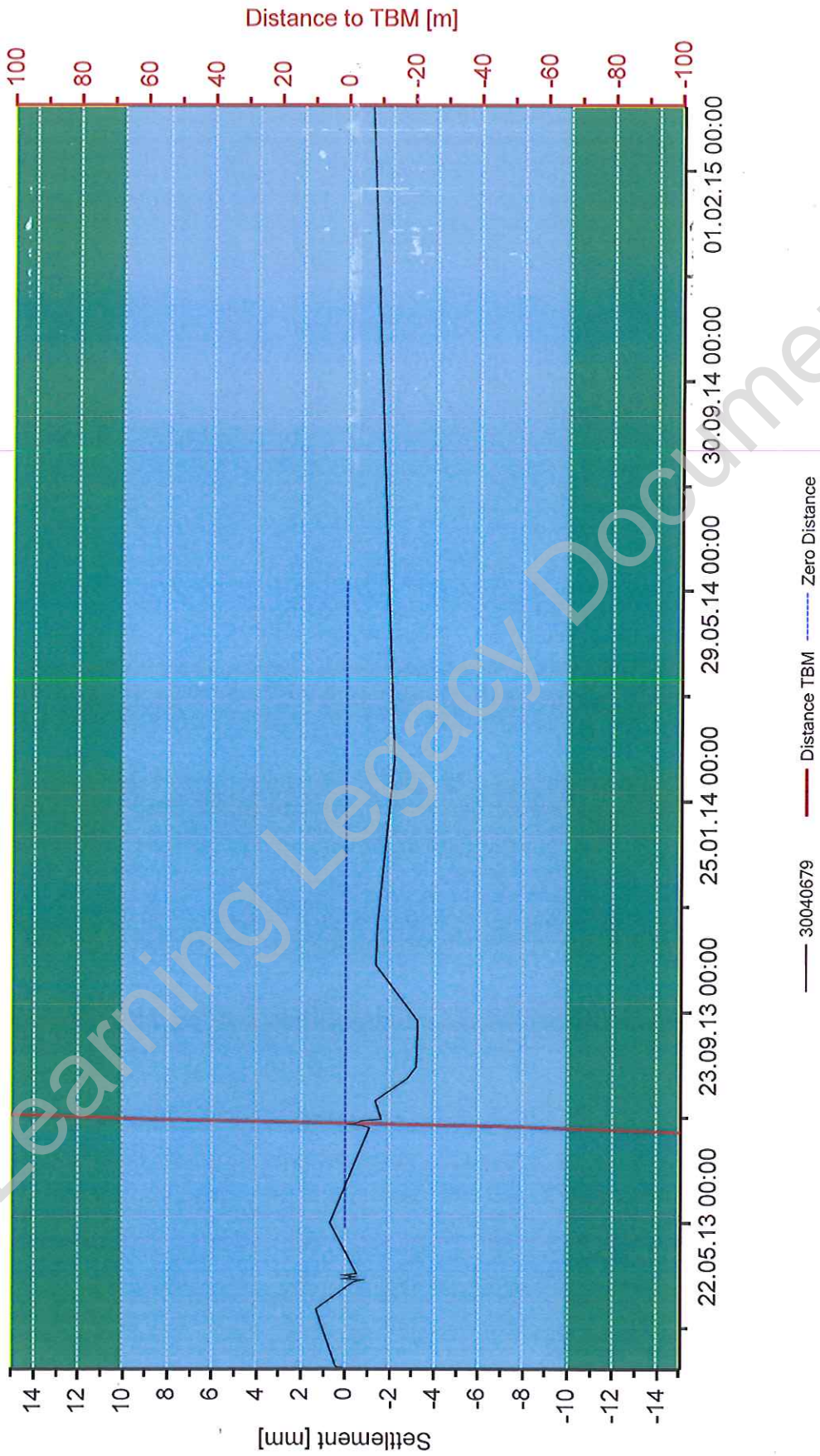
Profile: Measurement Point 30040661



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Plumstead Road South - 25.02.2013 - 10.03.2015  
date: 27.03.2015 15:22 current values: 27.03.2015 14:23



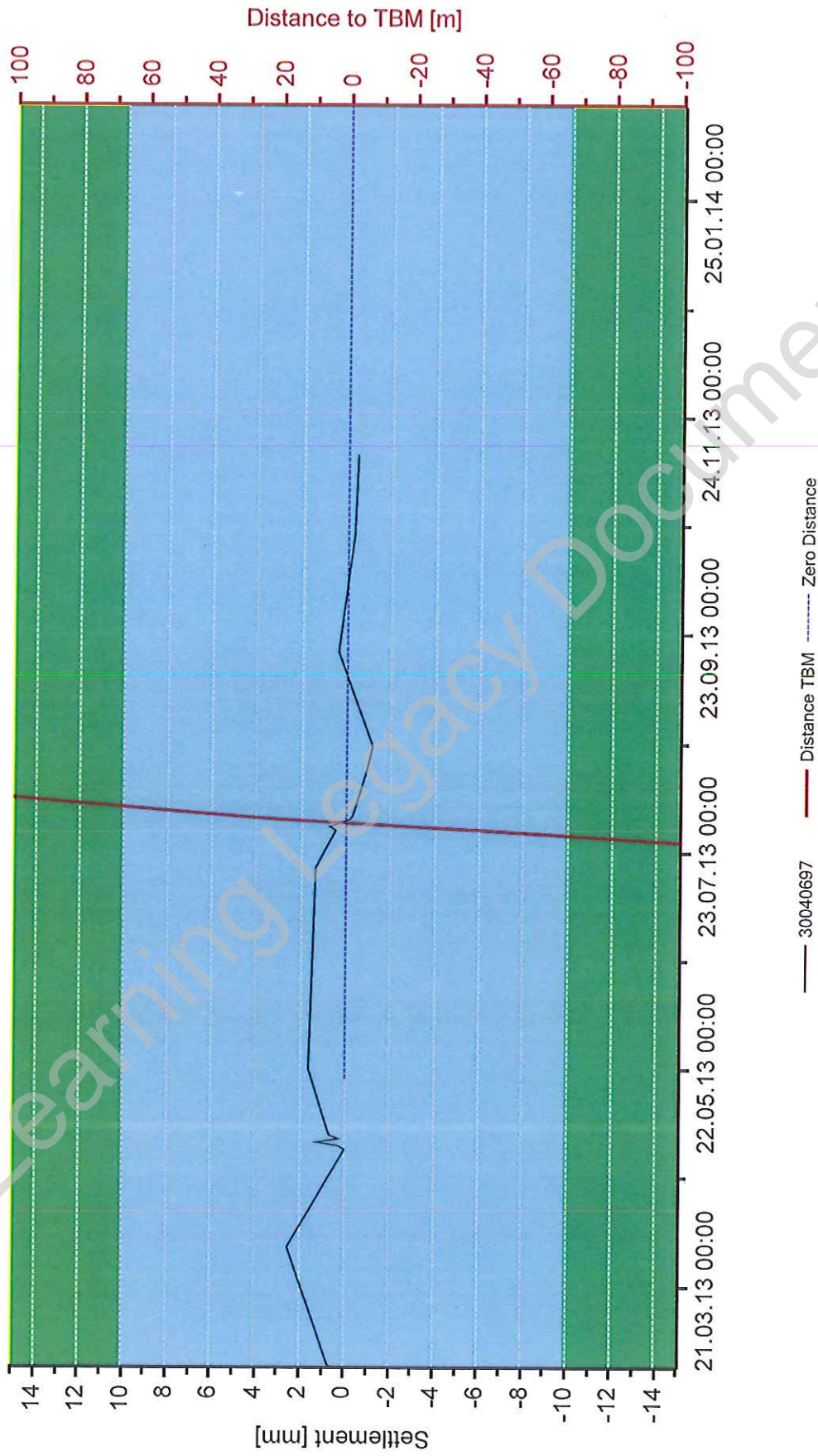
**Profile: Measurement Point 30040679**



**Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal**  
**Close Out Report: EB Tunnel - Plumstead Road South - 25.02.2013 - 10.03.2015**  
**date: 27.03.2015 15:20 current values: 27.03.2015 14:23**

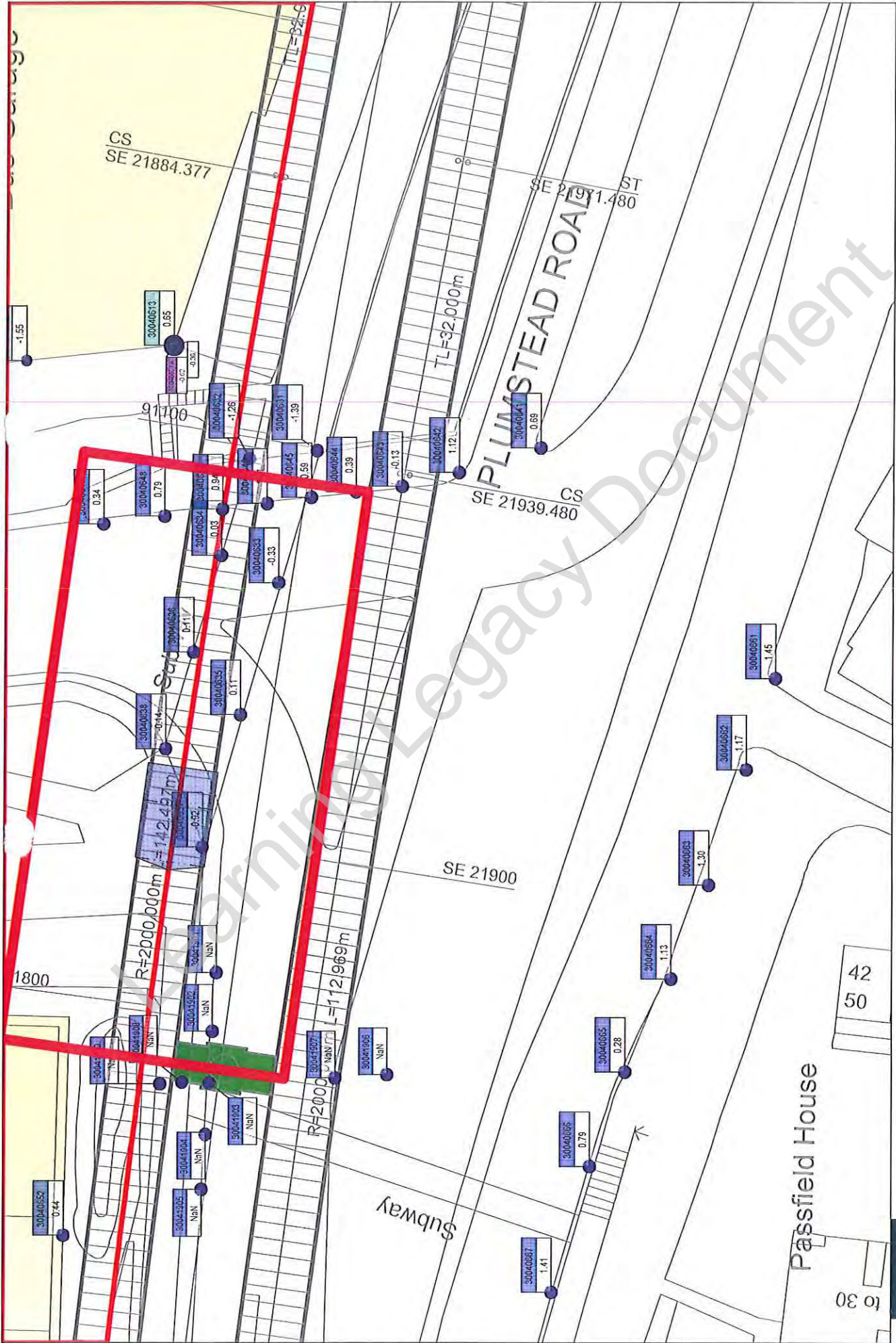


Point: 30040697



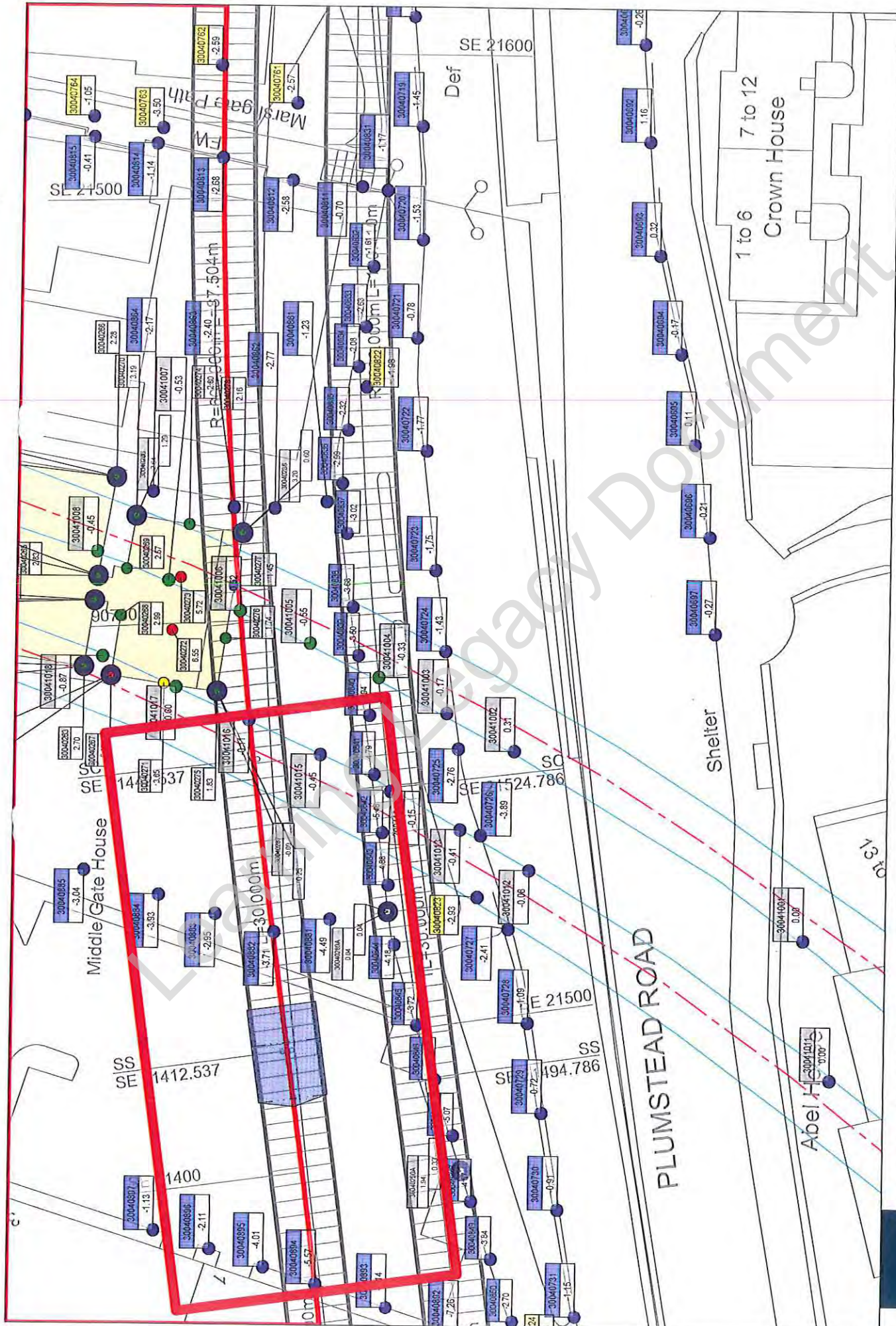
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Plumstead Road South 25.02.2013 - 20.02.2014  
date: 06.08.2014 09:18 current values: 06.08.2014 08:49





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 Working activities: portal excavation, construction base slab and capping beam  
 current values: 11.07.2013 19:29





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 Working activities: portal excavation, construction base slabs and capping beam  
 current values: 02.08.2013 18:59





monitoring table



monitoring table



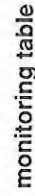
Project: C310 Thames Tunnel Joint Venture  
 structure: TW Plumstead Road Southside

No. of reading Date	1. following 24/02/2013		2. following 01/03/2013		3. following 08/03/2013		4. following 15/03/2013		5. following 22/03/2013		6. following 29/03/2013		7. following 05/04/2013		8. following 12/04/2013		9. following 19/04/2013		10. following 26/04/2013		11. following 03/05/2013		12. following 10/05/2013					
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline				
30040661	106.501	106.501	106.502	1	106.501	-1	106.501	0	106.500	-1	106.501	1	106.501	0	106.501	0	106.501	1	106.501	0	106.501	0	106.501	0	106.501	0		
30040662	106.495	106.495	106.496	1	106.495	-1	106.495	0	106.494	-1	106.495	1	106.495	0	106.495	0	106.495	0	106.494	-1	106.494	0	106.494	0	106.494	0		
30040663	106.310	106.310	106.311	1	106.311	0	106.309	-2	106.309	-1	106.311	-2	106.310	0	106.310	0	106.310	0	106.310	0	106.310	0	106.310	0	106.310	0	106.310	0
30040664	106.217	106.218	106.216	0	106.216	-2	106.216	0	106.216	-1	106.217	-2	106.216	0	106.217	0	106.217	0	106.217	0	106.217	0	106.217	0	106.217	0	106.217	0
30040665	106.153	106.152	106.153	0	106.153	0	106.152	-1	106.150	-2	106.151	-2	106.151	-1	106.151	0	106.151	0	106.151	0	106.151	0	106.151	0	106.151	0	106.151	0
30040666	106.085	106.084	106.085	0	106.085	0	106.085	0	106.082	-3	106.084	1	106.083	0	106.083	0	106.083	0	106.083	0	106.083	0	106.083	0	106.083	0	106.083	0
30040667	106.030	106.030	106.031	1	106.031	1	106.031	1	106.030	-1	106.030	-1	106.030	0	106.030	0	106.030	0	106.030	0	106.030	0	106.030	0	106.030	0	106.030	0
30040668	105.977	105.977	105.977	0	105.977	0	105.977	0	105.977	0	105.976	-2	105.976	-2	105.976	-2	105.976	-2	105.976	-2	105.976	-2	105.976	-2	105.976	-2	105.976	-2
30040669	105.943	105.943	105.944	1	105.944	1	105.944	1	105.944	1	105.944	1	105.944	1	105.944	1	105.944	1	105.944	1	105.944	1	105.944	1	105.944	1	105.944	1
30040670	105.959	105.958	105.959	0	105.959	1	105.959	1	105.959	1	105.959	1	105.959	1	105.959	1	105.959	1	105.959	1	105.959	1	105.959	1	105.959	1	105.959	1
30040671	105.063	105.063	105.064	1	105.064	1	105.064	1	105.064	1	105.064	1	105.064	1	105.064	1	105.064	1	105.064	1	105.064	1	105.064	1	105.064	1	105.064	1
30040672	105.961	105.961	105.961	0	105.961	0	105.961	0	105.961	0	105.961	0	105.961	0	105.961	0	105.961	0	105.961	0	105.961	0	105.961	0	105.961	0	105.961	0
30040673	105.960	105.961	105.962	1	105.962	1	105.962	1	105.962	1	105.962	1	105.962	1	105.962	1	105.962	1	105.962	1	105.962	1	105.962	1	105.962	1	105.962	1
30040674	106.061	106.061	106.061	0	106.061	0	106.061	0	106.061	0	106.061	0	106.061	0	106.061	0	106.061	0	106.061	0	106.061	0	106.061	0	106.061	0	106.061	0
30040675	106.104	106.104	106.105	1	106.105	1	106.105	1	106.105	1	106.105	1	106.105	1	106.105	1	106.105	1	106.105	1	106.105	1	106.105	1	106.105	1	106.105	1
30040676	106.118	106.118	106.118	0	106.118	0	106.118	0	106.118	0	106.118	0	106.118	0	106.118	0	106.118	0	106.118	0	106.118	0	106.118	0	106.118	0	106.118	0
30040677	106.040	106.040	106.040	0	106.040	0	106.040	0	106.040	0	106.040	0	106.040	0	106.040	0	106.040	0	106.040	0	106.040	0	106.040	0	106.040	0	106.040	0
30040678	105.977	105.979	105.979	0	105.979	0	105.979	0	105.979	0	105.979	0	105.979	0	105.979	0	105.979	0	105.979	0	105.979	0	105.979	0	105.979	0	105.979	0
30040679	105.987	105.988	105.988	0	105.988	0	105.988	0	105.988	0	105.988	0	105.988	0	105.988	0	105.988	0	105.988	0	105.988	0	105.988	0	105.988	0	105.988	0
30040680	106.090	106.090	106.090	0	106.090	0	106.090	0	106.090	0	106.090	0	106.090	0	106.090	0	106.090	0	106.090	0	106.090	0	106.090	0	106.090	0	106.090	0
30040801	106.170	106.169	106.170	0	106.170	1	106.170	1	106.170	1	106.170	1	106.170	1	106.170	1	106.170	1	106.170	1	106.170	1	106.170	1	106.170	1	106.170	1
30040802	106.261	106.261	106.261	0	106.262	1	106.262	1	106.262	1	106.262	1	106.262	1	106.262	1	106.262	1	106.262	1	106.262	1	106.262	1	106.262	1	106.262	1
30040803	106.319	106.318	106.319	1	106.319	1	106.319	1	106.319	1	106.319	1	106.319	1	106.319	1	106.319	1	106.319	1	106.319	1	106.319	1	106.319	1	106.319	1
30040804	106.576	106.576	106.576	0	106.577	1	106.577	1	106.577	1	106.577	1	106.577	1	106.577	1	106.577	1	106.577	1	106.577	1	106.577	1	106.577	1	106.577	1
30040805	106.574	106.574	106.574	0	106.576	1	106.576	1	106.576	1	106.576	1	106.576	1	106.576	1	106.576	1	106.576	1	106.576	1	106.576	1	106.576	1	106.576	1
30040806	106.546	106.546	106.546	0	106.548	2	106.548	2	106.548	2	106.548	2	106.548	2	106.548	2	106.548	2	106.548	2	106.548	2	106.548	2	106.548	2	106.548	2
30040807	106.592	106.592	106.592	0	106.594	2	106.594	2	106.594	2	106.594	2	106.594	2	106.594	2	106.594	2	106.594	2	106.594	2	106.594	2	106.594	2	106.594	2
30040808	106.601	106.601	106.601	0	106.602	1	106.602	1	106.602	1	106.602	1	106.602	1	106.602	1	106.602	1	106.602	1	106.602	1	106.602	1	106.602	1	106.602	1
30040809	106.795	106.795	106.795	0	106.797	2	106.797	2	106.797	2	106.797	2	106.797	2	106.797	2	106.797	2	106.797	2	106.797	2	106.797	2	106.797	2	106.797	2
30040810	106.746	106.746	106.746	0	106.748	2	106.748	2	106.748	2	106.748	2	106.748	2	106.748	2	106.748	2	106.748	2	106.748	2	106.748	2	106.748	2	106.748	2
30040811	106.864	106.865	106.865	1	106.867	2	106.867	2	106.867	2	106.867	2	106.867	2	106.867	2	106.867	2	106.867	2	106.867	2	106.867	2	106.867	2	106.867	2
30040812	106.836	106.837	106.837	1	106.839	2	106.839	2	106.839	2	106.839	2	106.839	2	106.839	2	106.839	2	106.839	2	106.839	2	106.839	2	106.839	2	106.839	2
30040813	106.833	106.834	106.835	1	106.835	1	106.835	1	106.835	1	106.835	1	106.835	1	106.835	1	106.835	1	106.835	1	106.835	1	106.835	1	106.835	1	106.835	1
30040814	107.002	107.002	107.002	0	107.004	2	107.004	2	107.004	2	107.004	2	107.004	2	107.004	2	107.004	2	107.004	2	107.004	2	107.004	2	107.004	2	107.004	2
30040815	107.059	107.059	107.059	0	107.061	2	107.061	2	107.061	2	107.061	2	107.061	2	107.061	2	107.061	2	107.061	2	107.061	2	107.061	2	107.061	2	107.061	2
30040816	107.106	107.107	107.107	1	107.109	2	107.109	2	107.109	2	107.109	2	107.109	2	107.109	2	107.109	2	107.109	2	107.109	2	107.109	2	107.109	2	107.109	2

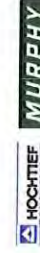
monitoring table



Joint Venture



Joint Venture

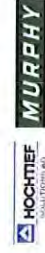


Joint Venture

No. of reading	project: C310 Thames Tunnel				project: C310 Thames Tunnel				project: TW Plumstead Road Southside				
	baseline	12. following	14. following	15. following	15. following	17. following	18. following	19. following	20. following	21. following	22. following	23. following	24. following
GNSS	20/02/2018	04/04/2018	18/04/2018	14/05/2018	14/05/2018	19/06/2018	17/08/2018	10/07/2018	16/08/2018	14/09/2018	14/10/2018	12/11/2018	27/04/2019
Point No.	elevation	elevation	elevation	elevation	elevation	elevation	elevation	elevation	elevation	elevation	elevation	elevation	elevation
		deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline
30040661	106.501	0	0	0	0	0	0	0	0	0	0	0	0
30040662	106.405	0	-1	106.404	-1	106.405	0	-1	106.405	0	-2	106.361	0
30040663	106.310	0	-1	106.310	0	-1	106.310	0	-1	106.310	0	-1	106.310
30040664	106.217	0	-1	106.217	0	-1	106.217	0	-1	106.217	0	-1	106.217
30040665	106.151	0	-1	106.151	0	-2	106.151	0	-2	106.151	0	-2	106.151
30040666	106.085	0	-2	106.084	0	-1	106.084	0	-1	106.084	0	-1	106.084
30040667	106.030	0	-1	106.030	0	0	106.030	0	0	106.030	0	0	106.030
30040668	105.977	0	0	105.976	0	0	105.976	0	0	105.976	0	0	105.976
30040669	105.943	0	-1	105.942	0	-1	105.942	0	-1	105.942	0	-1	105.942
30040670	105.958	0	-1	105.957	0	-2	105.957	0	-2	105.957	0	-2	105.957
30040671	105.923	0	-1	105.922	0	-1	105.922	0	-1	105.922	0	-1	105.922
30040672	105.951	0	-2	105.950	0	-1	105.950	0	-1	105.950	0	-1	105.950
30040673	105.950	0	-2	105.950	0	-1	105.950	0	-1	105.950	0	-1	105.950
30040674	106.051	0	-1	106.050	0	-2	106.050	0	-2	106.050	0	-2	106.050
30040675	106.104	0	-1	106.103	0	-2	106.103	0	-2	106.103	0	-2	106.103
30040676	106.118	0	-1	106.117	0	-2	106.117	0	-2	106.117	0	-2	106.117
30040677	106.040	0	-1	106.040	0	-1	106.040	0	-1	106.040	0	-1	106.040
30040678	105.977	0	-1	105.977	0	-1	105.977	0	-1	105.977	0	-1	105.977
30040679	105.987	0	-1	105.987	0	-1	105.987	0	-1	105.987	0	-1	105.987
30040680	106.030	0	-1	106.030	0	-1	106.030	0	-1	106.030	0	-1	106.030
30040681	106.170	0	-1	106.170	0	-1	106.170	0	-1	106.170	0	-1	106.170
30040682	106.261	0	-1	106.261	0	-1	106.261	0	-1	106.261	0	-1	106.261
30040683	106.319	0	-1	106.319	0	-1	106.319	0	-1	106.319	0	-1	106.319
30040684	106.377	0	-1	106.377	0	-1	106.377	0	-1	106.377	0	-1	106.377
30040685	106.576	0	-1	106.576	0	-1	106.576	0	-1	106.576	0	-1	106.576
30040686	106.576	0	-1	106.576	0	-1	106.576	0	-1	106.576	0	-1	106.576
30040687	106.546	0	-1	106.546	0	-1	106.546	0	-1	106.546	0	-1	106.546
30040688	106.502	0	-1	106.502	0	-1	106.502	0	-1	106.502	0	-1	106.502
30040689	106.601	0	-1	106.601	0	-1	106.601	0	-1	106.601	0	-1	106.601
30040690	106.795	0	-1	106.795	0	-1	106.795	0	-1	106.795	0	-1	106.795
30040691	106.746	0	-1	106.746	0	-1	106.746	0	-1	106.746	0	-1	106.746
30040692	106.664	0	-1	106.664	0	-1	106.664	0	-1	106.664	0	-1	106.664
30040693	106.836	0	-1	106.836	0	-1	106.836	0	-1	106.836	0	-1	106.836
30040694	106.933	0	-1	106.933	0	-1	106.933	0	-1	106.933	0	-1	106.933
30040695	107.002	0	-1	107.002	0	-1	107.002	0	-1	107.002	0	-1	107.002
30040696	107.059	0	-1	107.059	0	-1	107.059	0	-1	107.059	0	-1	107.059
30040697	107.106	0	-1	107.106	0	-1	107.106	0	-1	107.106	0	-1	107.106

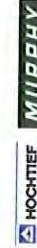
monitoring table

monitoring table



No. of reading	25. following		26. following		27. following		28. following		29. following		30. following		31. following		32. following		33. following		34. following		35. following		36. following		
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
30040661	106.501																								
30040662	106.405																								
30040663	106.310																								
30040664	106.217																								
30040665	106.152																								
30040666	106.095																								
30040667	106.030																								
30040668	105.977																								
30040669	105.924																								
30040670	105.868																								
30040671	105.813																								
30040672	105.851																								
30040673	105.930																								
30040674	106.001																								
30040675	106.104																								
30040676	106.118																								
30040677	106.049																								
30040678	105.977																								
30040679	105.897																								
30040680	106.000																								
30040681	106.170																								
30040682	106.261																								
30040683	106.319																								
30040684	106.377																								
30040685	106.576																								
30040686	106.574																								
30040687	106.546																								
30040688	106.502																								
30040689	106.601																								
30040690	106.785																								
30040691	106.746																								
30040692	106.664																								
30040693	106.606																								
30040694	106.533																								
30040695	107.022																								
30040696	107.009																								
30040697	107.106																								

monitoring table



project: C310 Thames Tunnel		project: C310 Thames Tunnel																									
Bauwerk: TW Plumstead Road Southside		Bauwerk: TW Plumstead Road Southside																									
No. of reading data	Point No.	37. following		38. following		39. following		40. following		41. following		42. following		43. following		44. following		45. following		46. following		47. following		48. following			
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline		
30040661	106.501																										
30040662	106.455																										
30040663	106.310																										
30040664	106.217																										
30040665	106.163																										
30040666	106.095																										
30040667	106.030																										
30040668	105.977																										
30040669	105.943																										
30040670	105.898																										
30040671	105.803																										
30040672	105.901																										
30040673	105.960																										
30040674	106.061																										
30040675	106.104																										
30040676	106.118																										
30040677	106.040																										
30040678	105.977																										
30040679	105.987																										
30040680	106.090																										
30040681	106.170																										
30040682	106.261																										
30040683	106.310																										
30040684	106.377																										
30040685	106.576																										
30040686	106.574																										
30040687	106.546																										
30040688	106.592																										
30040689	106.691																										
30040690	106.785																										
30040691	106.746																										
30040692	106.664																										
30040693	106.956																										
30040694	106.923																										
30040695	107.002																										
30040696	107.059																										
30040697	107.105																										


Project: C310 Thames Tunnel  
Bauwerk: TW Plumstead Road Southside

Joint Venture

Project: C310 Thames Tunnel  
Bauwerk: TW Plumstead Road Southside

Joint Venture

No. of reading Date	baseline elevation	49. following 29/07/2013		50. following 30/07/2013		51. following 01/08/2013		52. following 02/08/2013		53. following 15/08/2013		54. following 22/08/2013		55. following 18/09/2013		56. following 23/10/2013		57. following 12/11/2013		58. following 20/12/2013		59. following 10/01/2015		
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
30040661	106.501																							
30040662	106.495																							
30040663	106.310																							
30040664	106.217																							
30040665	106.153																							
30040666	106.085																							
30040667	106.030																							
30040668	105.977																							
30040669	105.943																							
30040670	105.958																							
30040671	105.963																							
30040672	105.961																							
30040673	105.960																							
30040674	106.061																							
30040675	106.104																							
30040676	106.118																							
30040677	106.040																							
30040678	105.977																							
30040679	105.987																							
30040680	106.090																							
30040681	106.170																							
30040682	106.251																							
30040683	106.319																							
30040684	106.377																							
30040685	106.576																							
30040686	106.574																							
30040687	106.546																							
30040688	106.592																							
30040689	106.691																							
30040690	106.795																							
30040691	106.746																							
30040692	106.664																							
30040693	106.836																							
30040694	106.933																							
30040695	107.002																							
30040696	107.059																							
30040697	107.106																							

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 33**  
**SOS Plumstead Road North**

Learning Legacy Document

**monitoring asset**

**Southern Outfall Sewer under Plumstead Road**

reference monitoring drawing:

C310-HTM-C-DWG-CR146-ST004-70001

name of monitoring section:

SOS levelling studs Plumstead Road North

sensor type:

manual levelling studs

chainage:

90600 - 91100

point no.:

3004 0701 - 3004 0734

trigger values:  
[mm]

green: +12  
-12

amber: +15  
-15

red: +18  
-18

reference document for trigger values:

Management Plan for Control of Ground Movement

EB-no.:

C310-HTM-Z-STP-CR148-50058

Appendix:

AAA

**monitoring data**

		date	max. value	point no.	comments
<b>baseline</b>		25/02/13	0.00		
<b>TBM 1</b>	start ZOI	14/04/13	1.12	3004 0701	
		06/05/13	0.73	3004 0734	
	end ZOI	19/04/13	-0.26	3004 0701	breached not any trigger value
		09/05/13	2.20	3004 0734	
<b>TBM 2</b>	start ZOI	16/07/13	-0.11	3004 0701	
		05/08/13	-0.15	3004 0734	
	end ZOI	19/07/13	-1.75	3004 0701	breached not any trigger value
		08/08/13	0.78	3004 0734	
<b>longterm</b>		10/03/15	-3.27	3004 0701	
			-0.45	3004 0734	
<b>Evaluation of any potential residual risks</b>			<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV	
			<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)	

**summary / comments**

Overall, none of the points reached any trigger value.

Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.

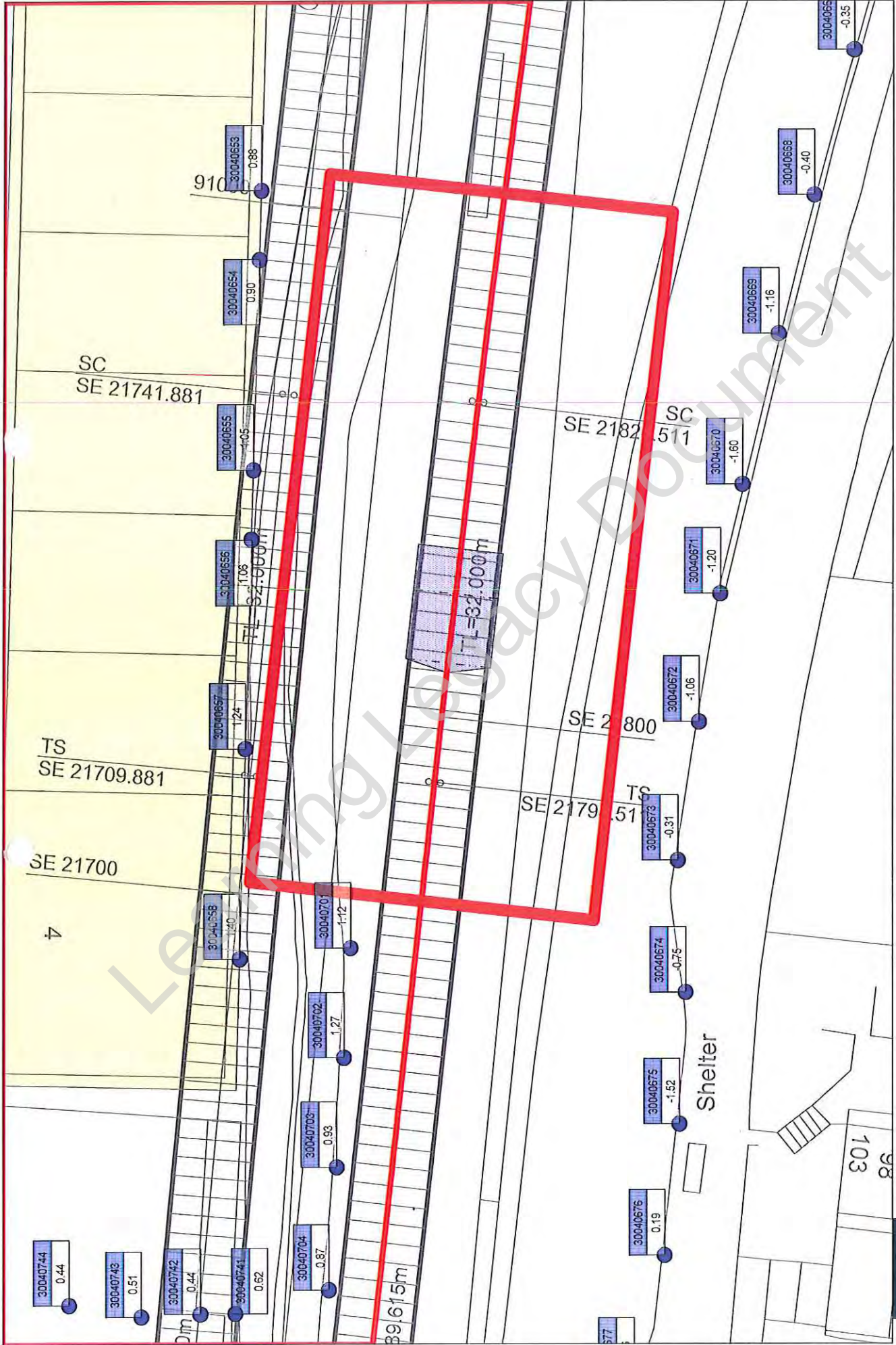
The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 12/03/2015

print name:

HMJV project role:

Monitoring & Survey engineer

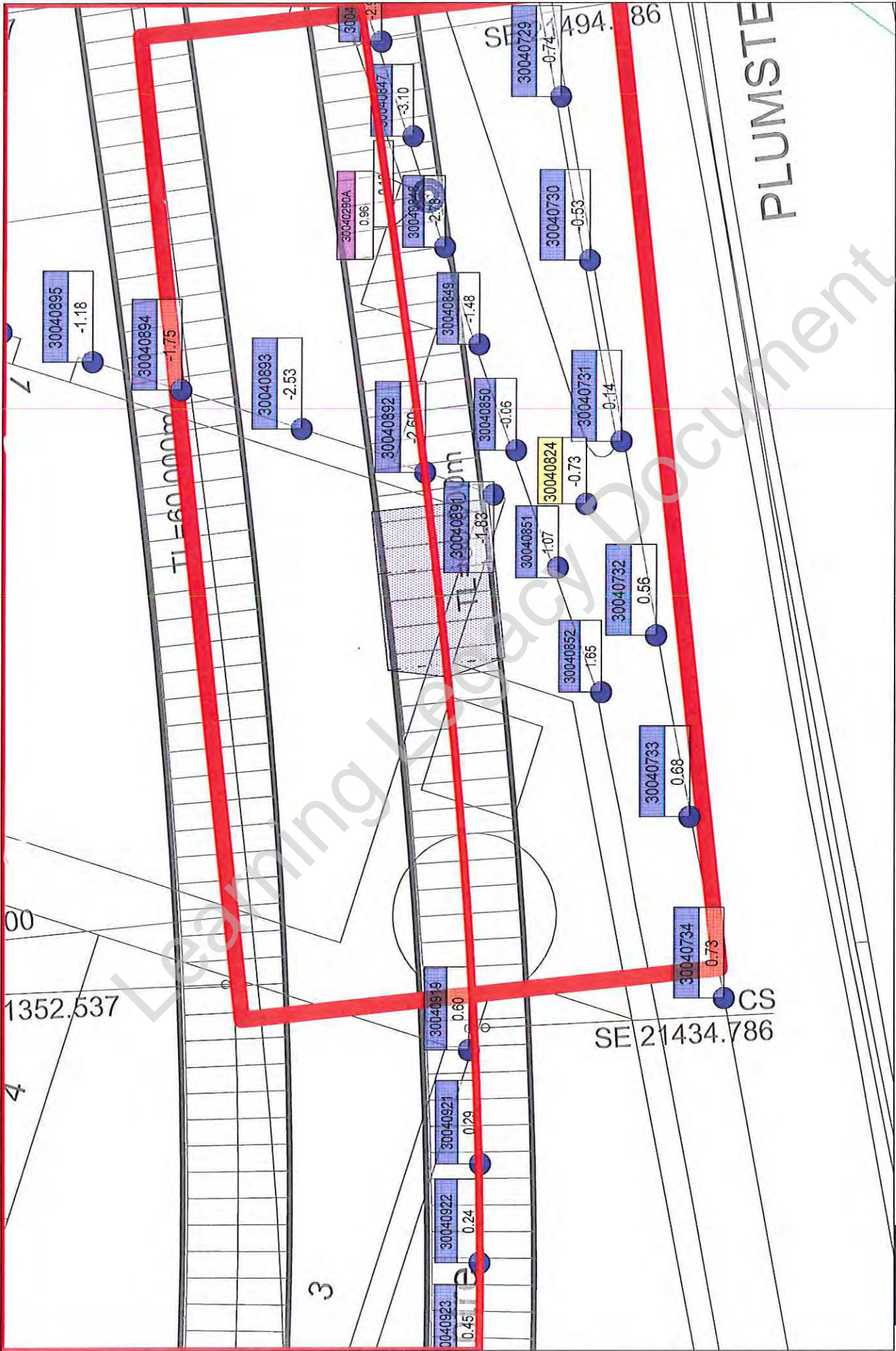


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

working activities: TBM drive

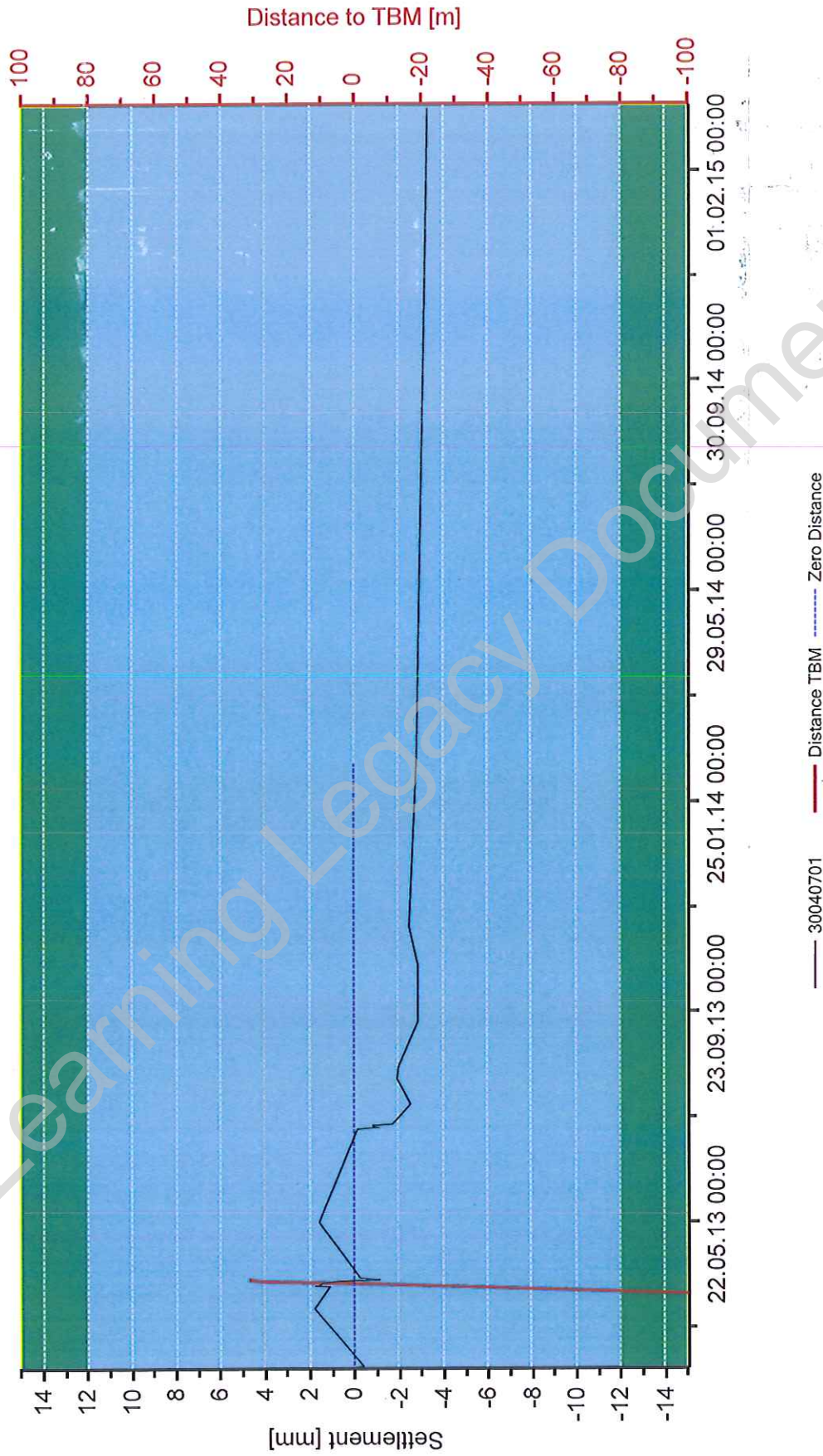
current values: 14.04.2013 17:59





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 06.05.2013 18:00

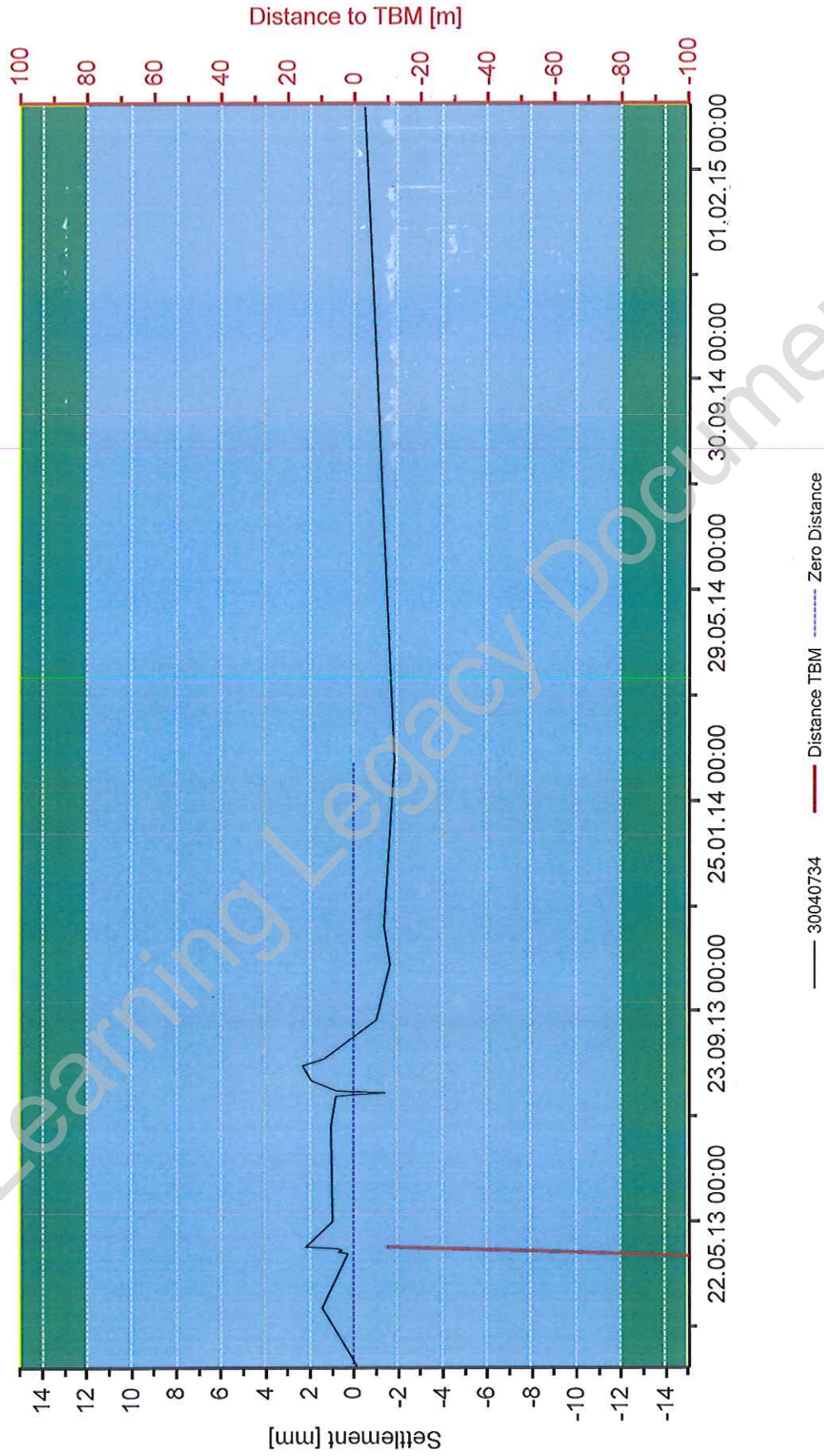
**Profile: Measurement Point 30040701**



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 Close Out Report: WB Tunnel- Plumstead Road North - 25.02.2013 - 10.03.2015  
 Date: 27.03.2015 15:58 Current Values: 27.03.2015 14:23



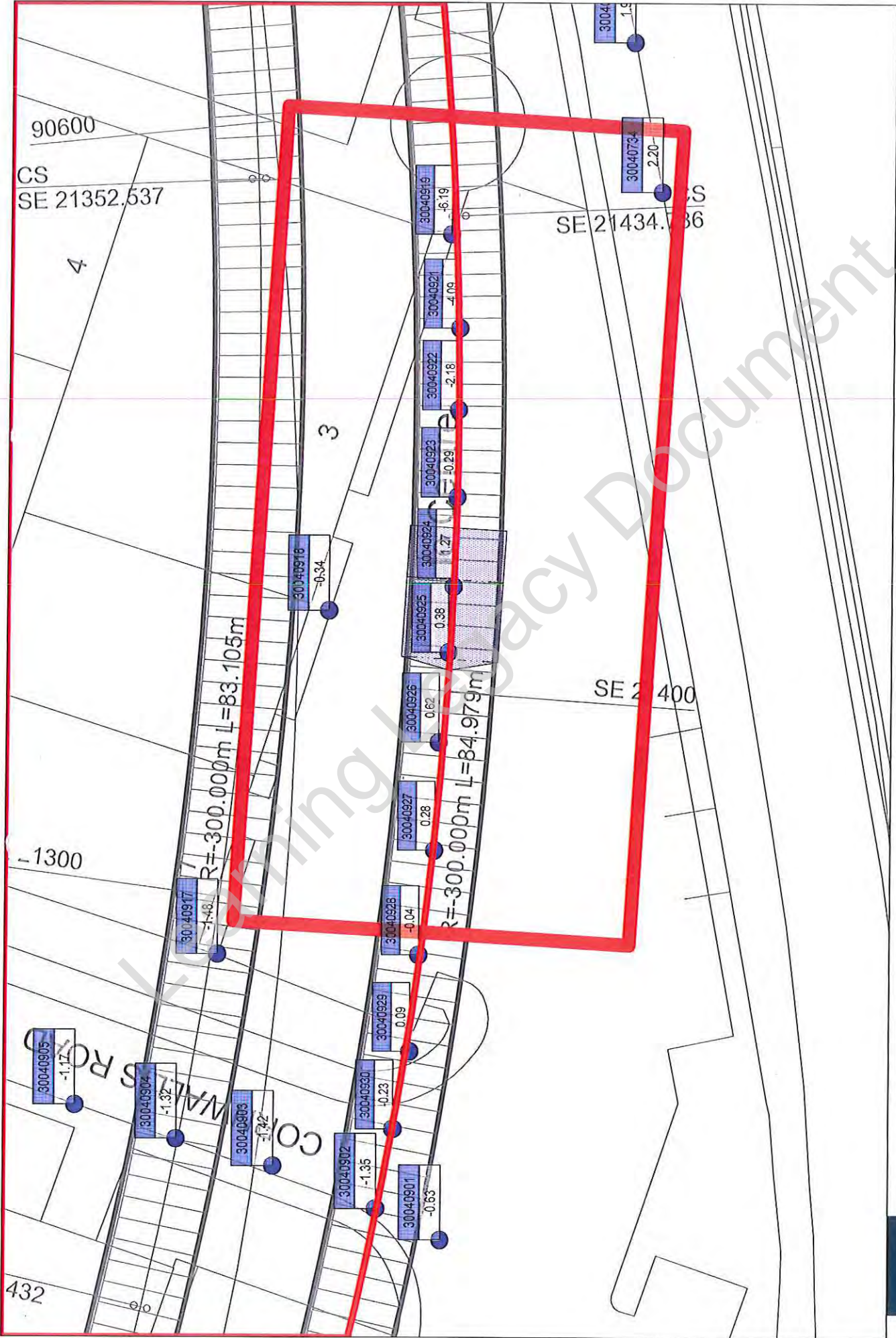
**Profile: Measurement Point 30040734**



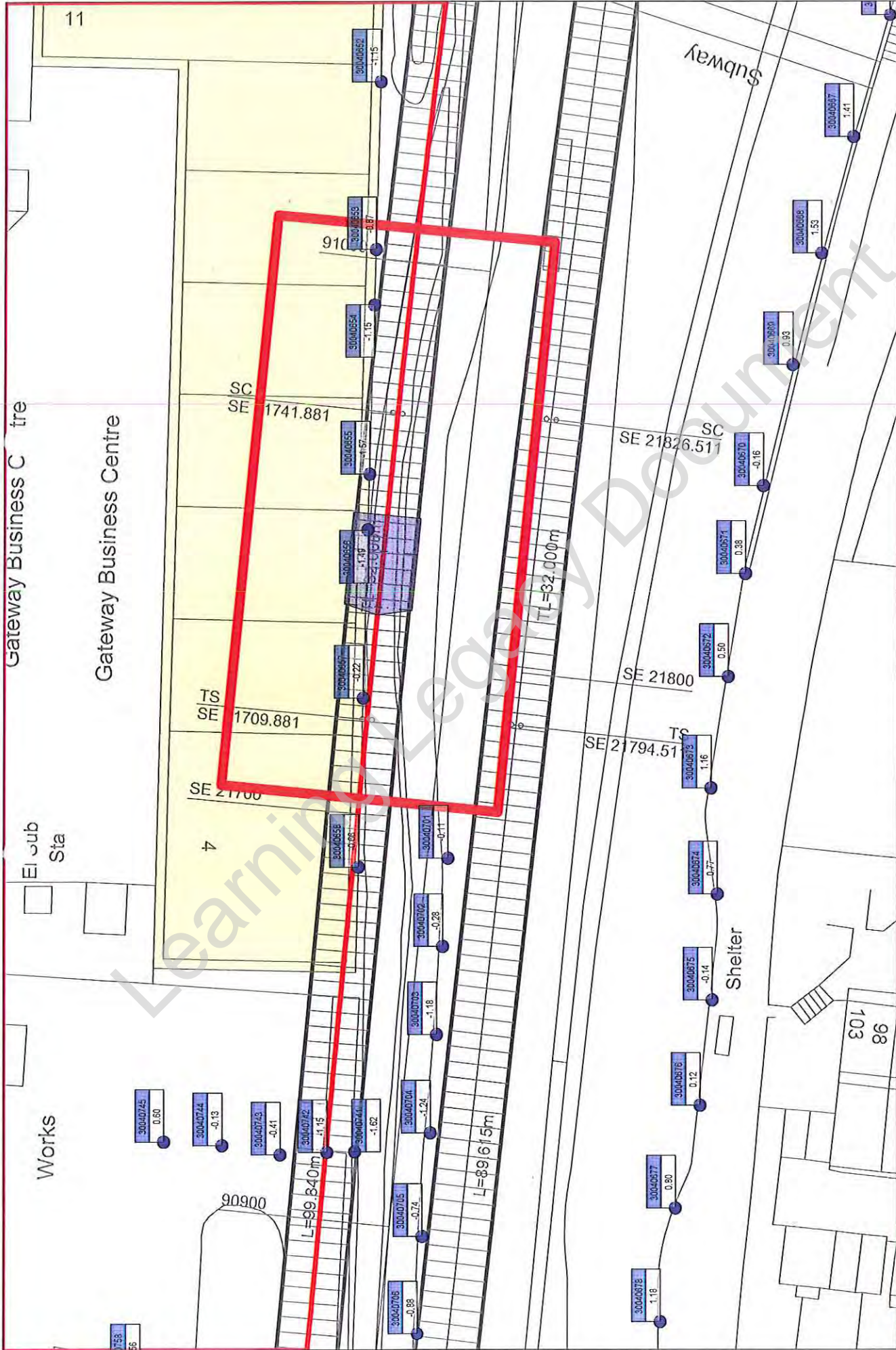
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 Close Out Report: WB Tunnel- Plumstead Road North - 25.02.2013 - 10.03.2015  
 Date: 27.03.2015 16:00 Current Values: 27.03.2015 14:23





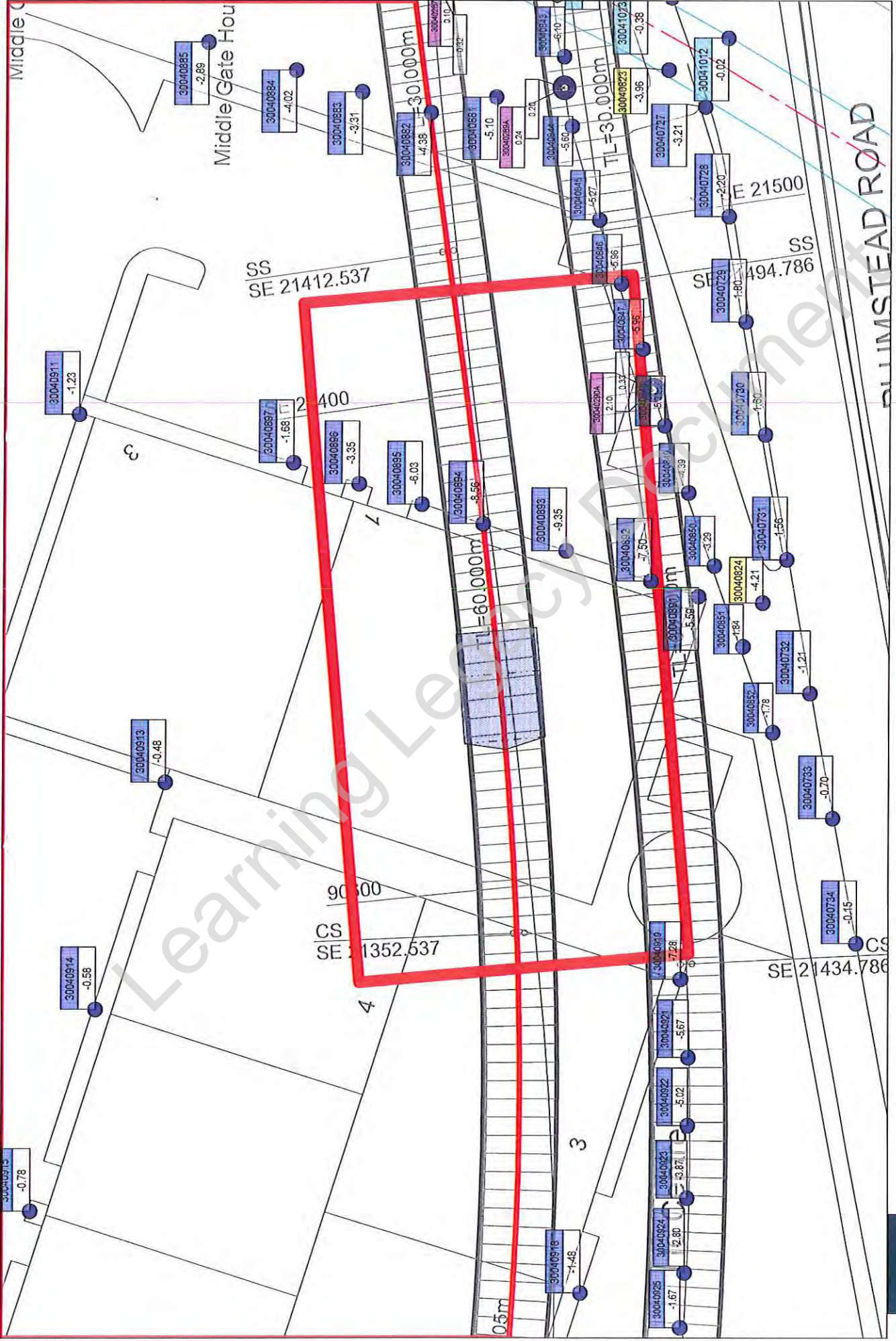


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 09.05.2013 18:48



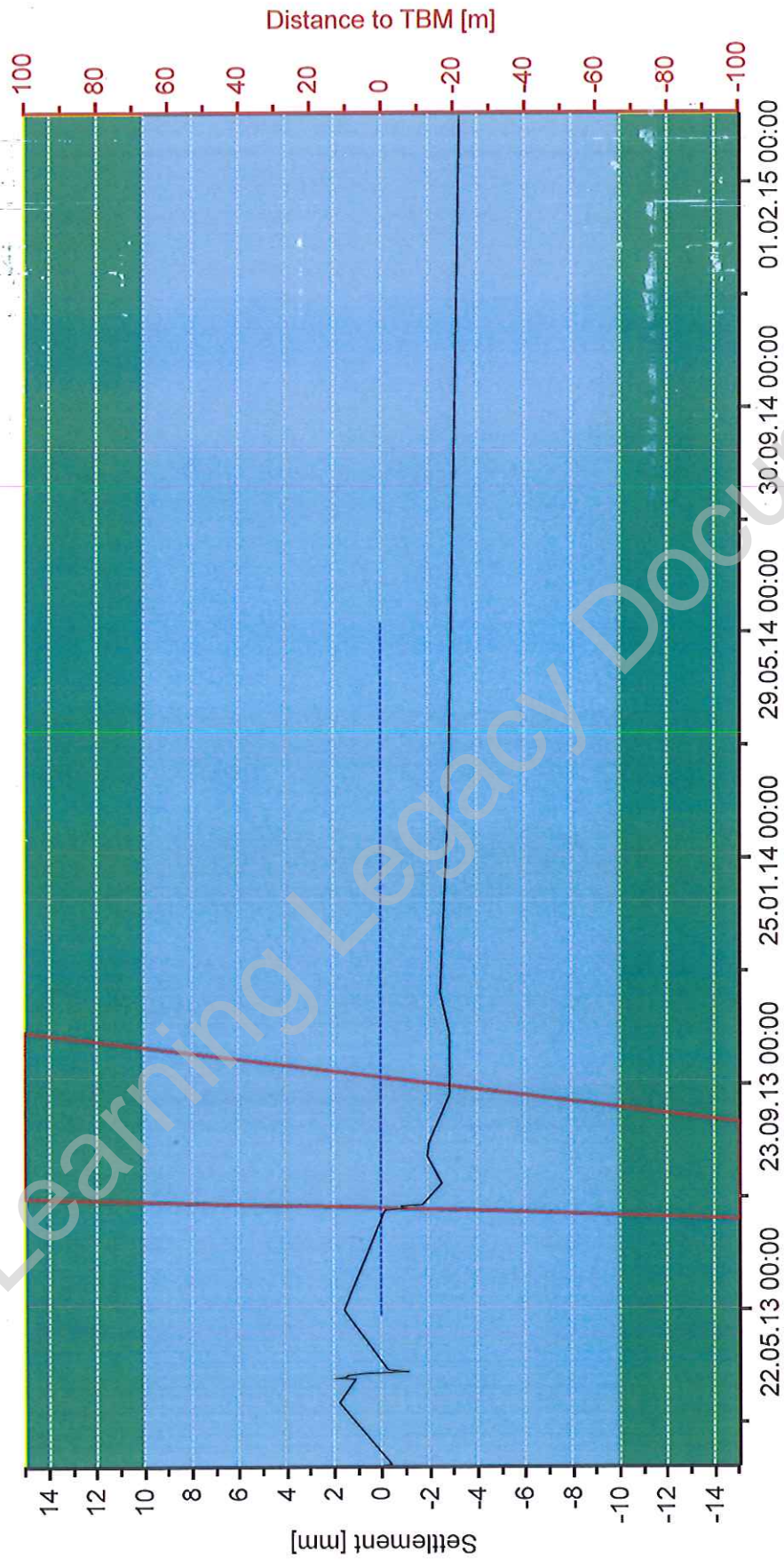
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 16.07.2013 09:00





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 05.08.2013 09:00

**Profile: Measurement Point 30040701**



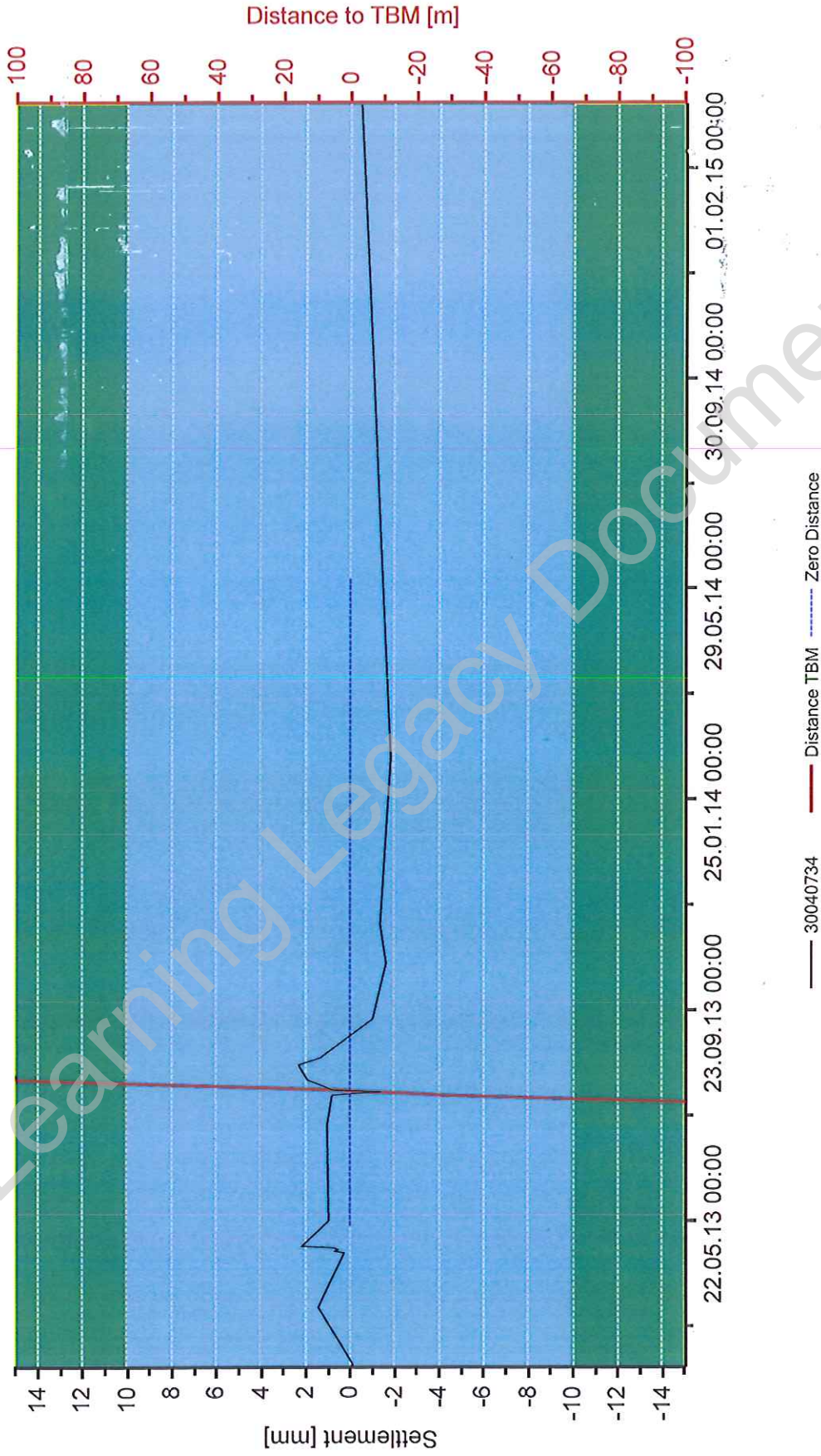
— 30040701    — Distance TBM    - - - - - Zero Distance

Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 Close Out Report: EB Tunnel - Plumstead Road North - 25.02.2013 - 10.03.2015  
 date: 27.03.2015 15:12 current values: 27.03.2015 14:23



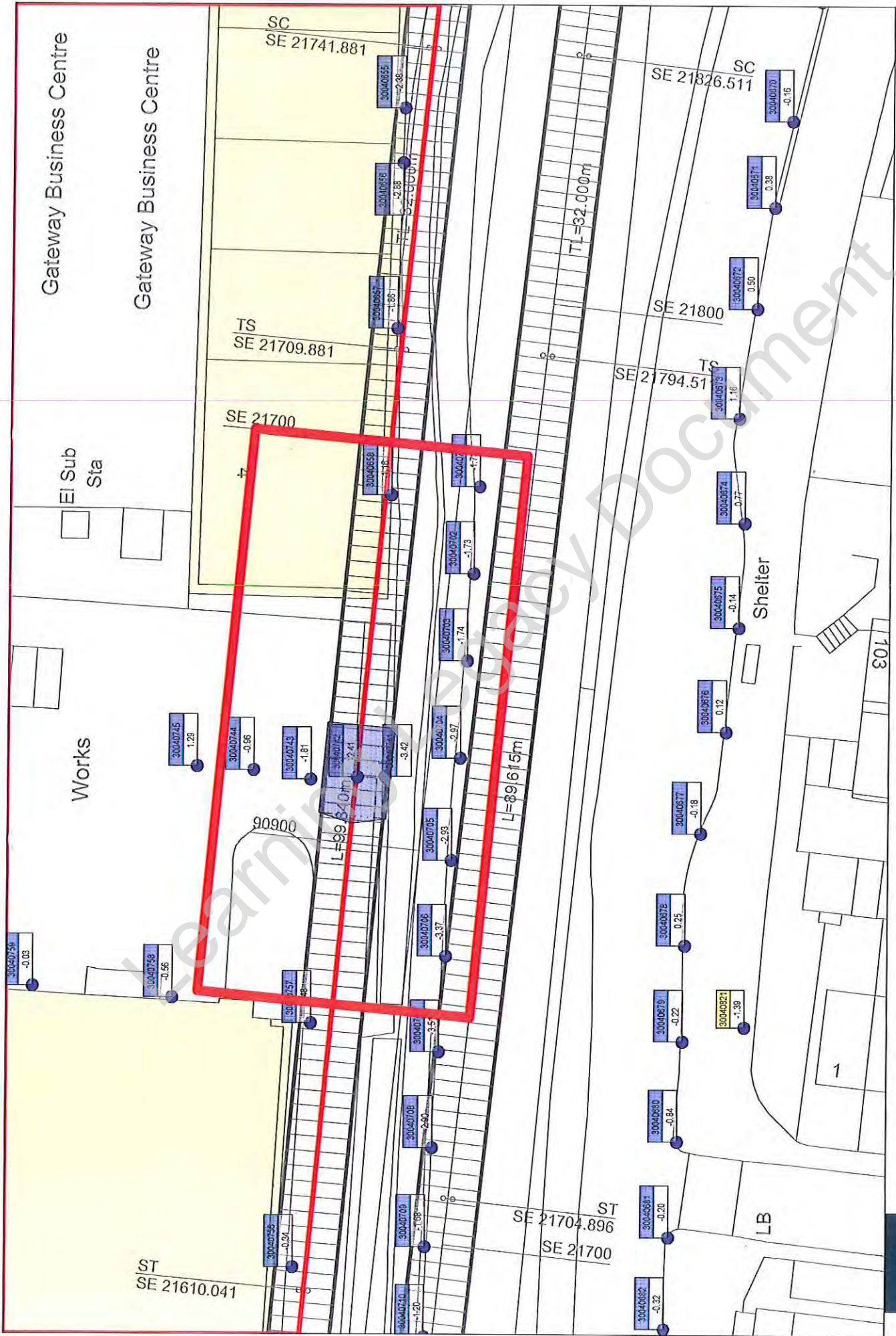


Profile: Measurement Point 30040734

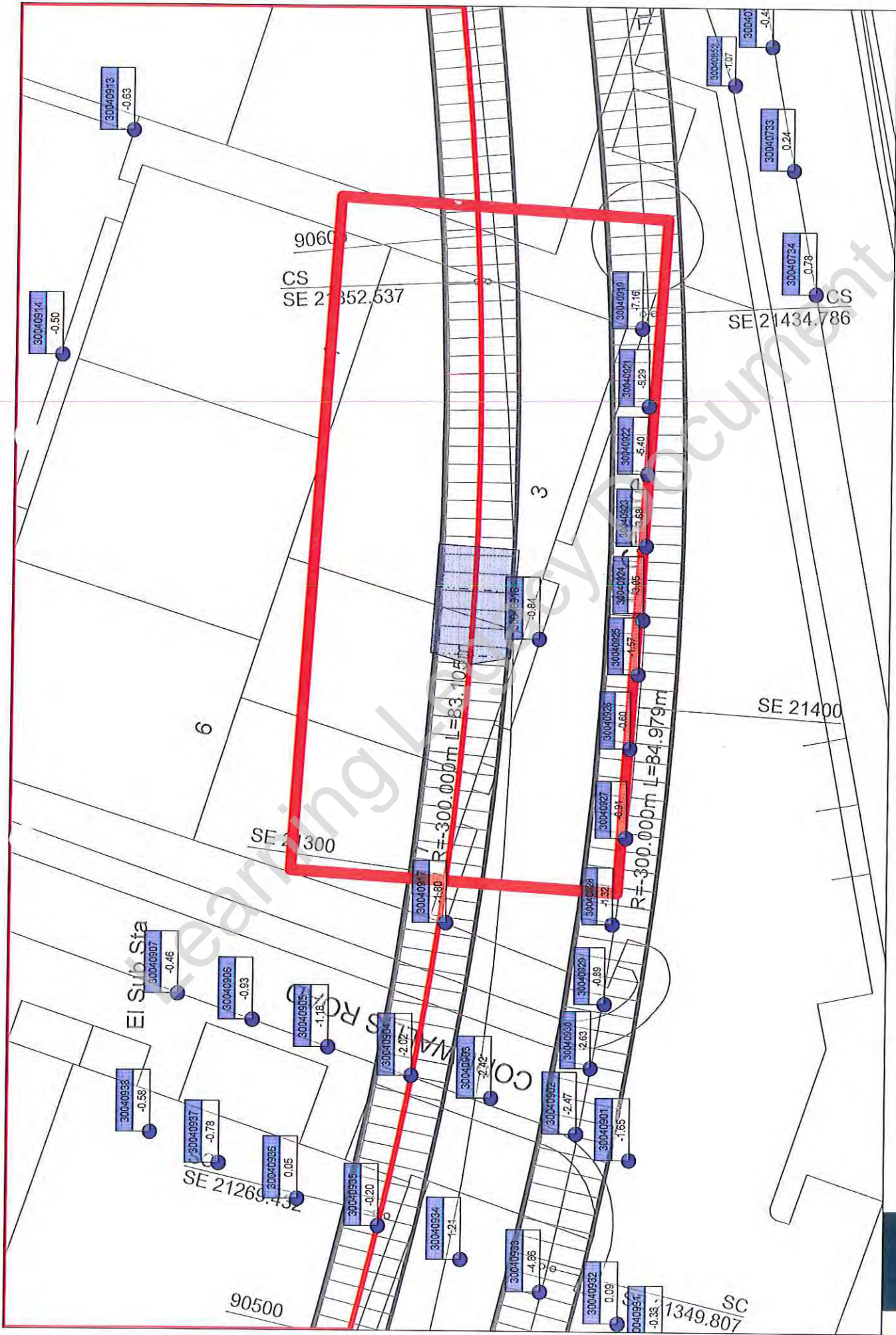


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Plumstead Road North - 25.02.2013 - 10.03.2015  
date: 27.03.2015 15:15 current values: 27.03.2015 14:23





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 19.07.2013 09:00



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 08.08.2013 18:04



Joint Venture

Joint Venture

project: C310 Thames Tunnel

project: C310 Thames Tunnel

structure: TW Plumstead Road Northside

structure: TW Plumstead Road Northside

No. of reading Date	1. following 24.02.2013		2. following 01.03.2013		3. following 14.03.2013		4. following 14.03.2013		5. following 14.03.2013		6. following 14.03.2013		7. following 17.04.2013		8. following 18.04.2013		9. following 18.04.2013		10. following 20.04.2013		11. following 21.04.2013		12. following 22.04.2013		
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
30040701	106.634	106.634	0	106.636	2	2	106.636	1	2	106.636	0	2	106.635	-1	1	106.633	-2	-1	106.634	1	0				
30040702	106.624	106.624	0	106.627	2	2	106.626	0	2	106.626	0	2	106.626	0	2	106.623	-2	-1	106.624	0	-1				
30040703	106.625	106.625	0	106.626	2	1	106.626	0	1	106.626	0	2	106.626	-1	1	106.623	-2	-2	106.623	0	-2				
30040704	106.598	106.598	0	106.599	1	1	106.599	0	1	106.599	0	1	106.599	0	1	106.596	-2	-1	106.596	0	-2				
30040705	106.571	106.571	0	106.572	1	1	106.572	0	1	106.573	0	2	106.572	0	1	106.571	-2	-1	106.570	0	-1				
30040706	106.554	106.554	0	106.555	2	2	106.555	2	2	106.555	0	2	106.555	0	2	106.554	-1	0	106.554	0	0				
30040708	106.600	106.600	0	106.610	2	2	106.610	2	2	106.610	2	2	106.610	2	2	106.608	-2	-1	106.608	0	0				
30040709	106.635	106.635	0	106.637	2	1	106.637	2	1	106.637	2	1	106.637	2	1	106.635	-2	-1	106.634	0	0				
30040710	106.719	106.719	0	106.721	2	1	106.721	2	1	106.721	2	1	106.721	2	1	106.719	-2	-1	106.719	0	0				
30040711	106.801	106.801	0	106.802	2	1	106.802	2	1	106.802	2	1	106.802	2	1	106.800	-2	-1	106.800	0	0				
30040712	106.878	106.878	0	106.879	1	1	106.879	1	0	106.879	1	0	106.879	1	0	106.878	-1	0	106.878	-1	0				
30040713	106.972	106.972	0	106.973	1	0	106.973	1	0	106.973	1	0	106.973	1	0	106.972	-1	0	106.972	-1	0				
30040714	107.021	107.021	0	107.022	1	1	107.022	1	1	107.022	1	1	107.022	1	1	107.022	1	1	107.022	1	1				
30040715	107.057	107.057	0	107.057	2	2	107.057	2	2	107.057	2	2	107.057	2	2	107.056	-1	0	107.056	0	0				
30040716	107.058	107.058	0	107.060	2	2	107.060	2	2	107.060	2	2	107.060	2	2	107.059	-1	0	107.059	0	0				
30040717	107.040	107.040	0	107.041	1	1	107.041	1	1	107.041	1	1	107.041	1	1	107.040	-1	0	107.040	0	0				
30040718	106.951	106.952	0	106.952	0	1	106.952	0	1	106.952	0	1	106.952	0	1	106.951	-1	0	106.951	-1	0				
30040719	106.987	106.986	0	106.987	1	0	106.987	1	0	106.987	1	0	106.987	1	0	106.987	1	0	106.987	1	0				
30040720	106.924	106.924	0	106.925	2	1	106.925	2	1	106.925	2	1	106.925	2	1	106.924	-1	0	106.924	0	0				
30040721	106.965	106.966	0	106.968	2	2	106.968	2	2	106.968	2	2	106.968	2	2	106.968	2	2	106.968	2	2				
30040722	106.974	106.974	0	106.976	2	2	106.976	2	2	106.976	2	2	106.976	2	2	106.975	-1	0	106.975	0	0				
30040723	107.007	107.007	0	107.007	2	2	107.007	2	2	107.007	2	2	107.007	2	2	107.007	2	2	107.007	2	2				
30040724	107.040	107.040	0	107.042	2	2	107.042	2	2	107.042	2	2	107.042	2	2	107.042	2	2	107.042	2	2				
30040725	107.090	107.090	0	107.092	2	2	107.092	2	2	107.092	2	2	107.092	2	2	107.092	2	2	107.092	2	2				
30040726	107.105	107.104	0	107.107	2	2	107.107	2	2	107.107	2	2	107.107	2	2	107.107	2	2	107.107	2	2				
30040727	107.123	107.122	0	107.124	2	1	107.124	2	1	107.124	2	1	107.124	2	1	107.124	2	1	107.124	2	1				
30040728	107.172	107.172	0	107.173	2	1	107.173	2	1	107.173	2	1	107.173	2	1	107.173	2	1	107.173	2	1				
30040729	107.256	107.256	0	107.258	2	2	107.258	2	2	107.258	2	2	107.258	2	2	107.258	2	2	107.258	2	2				
30040730	107.344	107.344	0	107.346	2	2	107.346	2	2	107.346	2	2	107.346	2	2	107.346	2	2	107.346	2	2				
30040731	107.440	107.440	0	107.442	2	2	107.442	2	2	107.442	2	2	107.442	2	2	107.442	2	2	107.442	2	2				
30040732	107.483	107.482	-1	107.483	1	0	107.483	1	0	107.483	1	0	107.483	1	0	107.483	1	0	107.483	1	0				
30040733	107.488	107.488	0	107.488	2	2	107.488	2	2	107.488	2	2	107.488	2	2	107.488	2	2	107.488	2	2				
30040734	107.504	107.504	0	107.505	2	1	107.505	2	1	107.505	2	1	107.505	2	1	107.505	2	1	107.505	2	1				

Joint Venture

Project: C310 Thames Tunnel  
Bauwerk: TW Plumstead Road Northside

Joint Venture

Project: C310 Thames Tunnel  
Bauwerk: TW Plumstead Road Northside

No. of reading	baseline	13. following		14. following		15. following		17. following		18. following		19. following		20. following		21. following		22. following		23. following		24. following	
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
GNIP	222913	25.04.2013	24.04.2013	24.04.2013	24.04.2013	26.04.2013	26.04.2013	27.04.2013	28.04.2013	29.04.2013	30.04.2013	30.04.2013	01.05.2013	02.05.2013	03.05.2013	04.05.2013	04.05.2013	05.05.2013	06.05.2013	07.05.2013	08.05.2013	09.05.2013	10.05.2013
Point No.																							
30040701	106.634																						
30040702	106.624																						
30040703	106.625																						
30040704	106.598																						
30040705	106.571																						
30040706	106.554																						
30040707	106.554	106.552	-1	106.551	0	-3																	
30040708	106.609	106.607	0	106.606	0	-2																	
30040709	106.635	106.634	0	106.634	-1	-2	106.633	-1	-2														
30040710	106.719	106.718	0	106.718	-1	-2	106.717	0	-2	106.717	-1	-3											
30040711	106.801	106.801	-1	106.800	-1	-1	106.800	-1	-2	106.800	0	-1											
30040712	106.878	106.878	-1	106.877	-1	-1	106.877	0	-2	106.877	0	-1											
30040713	106.972	106.972	-1	106.972	0	-1	106.971	-1	-2	106.971	-1	-2											
30040714	107.021	107.021	-1	107.021	0	0	107.020	-1	-1	107.020	-1	-2											
30040715	107.057	107.057	-2	107.057	0	0	107.056	-1	-2	107.056	-1	-2											
30040716	107.056	107.056	-2	107.056	0	0	107.056	0	0	107.057	-1	-1											
30040717	107.040																						
30040718	106.951																						
30040719	106.987																						
30040720	106.924																						
30040721	106.965																						
30040722	106.974																						
30040723	107.007																						
30040724	107.040																						
30040725	107.000																						
30040726	107.105																						
30040727	107.123																						
30040729	107.256																						
30040730	107.344																						
30040731	107.440																						
30040732	107.463																						
30040733	107.488																						
30040734	107.504																						

Joint Venture

Project: C310 Thames Tunnel  
Bauwerk: TW Plumstead Road Northside

Joint Venture

No. of reading Stüte	25. following 05/05/2013		26. following 06/05/2013		27. following 07/05/2013		28. following 22/05/2013		29. following 14/07/2013		30. following 17/07/2013		31. following 14/07/2013		32. following 14/07/2013		33. following 09/07/2013		34. following 21/07/2013		35. following 22/07/2013		36. following 05/07/2013			
	elevation	deviation from last baseline	elevation	deviation from last baseline	elevation	deviation from last baseline	elevation	deviation from last baseline	elevation	deviation from last baseline	elevation	deviation from last baseline	elevation	deviation from last baseline	elevation	deviation from last baseline	elevation	deviation from last baseline	elevation	deviation from last baseline	elevation	deviation from last baseline	elevation	deviation from last baseline		
30040701	106.634		106.636	2	2	106.633	-1	106.623	-2	106.624	0	106.623	-1	106.623	-1	106.622	-1	106.623	-1	106.623	-1	106.623	-1	106.623	-1	
30040702	106.624		106.625	1	1	106.623	-1	106.623	-2	106.624	0	106.623	-1	106.623	-1	106.623	-1	106.623	-1	106.623	-1	106.623	-1	106.623	-1	
30040703	106.625		106.625	0	0	106.623	-2	106.624	-1	106.624	1	106.623	-1	106.623	-1	106.623	-1	106.623	-1	106.623	-1	106.623	-1	106.623	-1	
30040704	106.598		106.597	-1	-1	106.595	-2	106.595	-1	106.595	0	106.595	-1	106.595	-1	106.595	-1	106.595	-2	106.595	-1	106.595	-1	106.595	-1	
30040705	106.571		106.571	0	0	106.569	-2	106.569	-2	106.569	0	106.568	-1	106.568	-1	106.568	-1	106.568	-2	106.568	-1	106.568	-1	106.568	-1	
30040706	106.554		106.553	-1	-1	106.553	2	106.550	-3	106.551	1	106.551	-1	106.551	-1	106.551	-1	106.550	-1	106.549	-1	106.548	-1	106.547	-1	
30040707	106.554		106.553	-1	-1	106.553	2	106.550	-3	106.551	1	106.551	-1	106.551	-1	106.550	-1	106.550	-1	106.549	-1	106.548	-1	106.547	-1	
30040708	106.600		106.600	0	0	106.600	1	106.600	1	106.600	1	106.600	1	106.600	1	106.600	1	106.600	1	106.600	1	106.600	1	106.600	1	
30040709	106.635		106.635	0	0	106.635	1	106.635	1	106.634	-1	106.634	-1	106.634	-1	106.634	-1	106.633	-1	106.633	-1	106.631	-1	106.632	0	
30040710	106.719		106.719	0	0	106.719	0	106.719	0	106.717	-2	106.718	1	106.718	1	106.718	1	106.718	0	106.717	-1	106.716	-1	106.716	0	
30040711	106.801		106.801	0	0	106.802	2	106.802	2	106.802	2	106.802	2	106.802	2	106.802	2	106.802	2	106.802	2	106.802	2	106.802	2	
30040712	106.870		106.870	0	0	106.870	2	106.870	2	106.870	2	106.870	2	106.870	2	106.870	2	106.870	2	106.870	2	106.870	2	106.870	2	
30040713	106.972		106.972	0	0	106.973	3	106.973	3	106.973	3	106.973	3	106.973	3	106.973	3	106.973	3	106.973	3	106.973	3	106.973	3	
30040714	107.021		107.021	0	0	107.021	2	107.021	2	107.021	2	107.021	2	107.021	2	107.021	2	107.021	2	107.021	2	107.021	2	107.021	2	
30040715	107.057		107.057	0	0	107.057	1	107.057	1	107.057	1	107.057	1	107.057	1	107.057	1	107.057	1	107.057	1	107.057	1	107.057	1	
30040716	107.058		107.058	0	0	107.058	1	107.058	1	107.058	1	107.058	1	107.058	1	107.058	1	107.058	1	107.058	1	107.058	1	107.058	1	
30040717	107.040		107.041	2	2	107.041	2	107.041	2	107.041	2	107.041	2	107.041	2	107.041	2	107.041	2	107.041	2	107.041	2	107.041	2	
30040718	106.951		106.952	2	2	106.952	2	106.952	2	106.952	2	106.952	2	106.952	2	106.952	2	106.952	2	106.952	2	106.952	2	106.952	2	
30040719	106.987		106.987	0	0	106.987	2	106.987	2	106.987	2	106.987	2	106.987	2	106.987	2	106.987	2	106.987	2	106.987	2	106.987	2	
30040720	106.924		106.924	0	0	106.924	1	106.924	1	106.924	1	106.924	1	106.924	1	106.924	1	106.924	1	106.924	1	106.924	1	106.924	1	
30040721	106.965	106.964	0	-1	106.966	2	106.966	2	106.966	2	106.966	2	106.966	2	106.966	2	106.966	2	106.966	2	106.966	2	106.966	2	106.966	2
30040722	106.974	106.972	0	-2	106.974	2	106.974	2	106.974	2	106.974	2	106.974	2	106.974	2	106.974	2	106.974	2	106.974	2	106.974	2	106.974	2
30040723	107.007	107.005	-1	-2	107.005	1	107.005	1	107.005	1	107.005	1	107.005	1	107.005	1	107.005	1	107.005	1	107.005	1	107.005	1	107.005	1
30040724	107.040	107.038	-1	-2	107.038	1	107.038	1	107.038	1	107.038	1	107.038	1	107.038	1	107.038	1	107.038	1	107.038	1	107.038	1	107.038	1
30040725	107.090	107.087	-1	-3	107.088	1	107.088	1	107.088	1	107.088	1	107.088	1	107.088	1	107.088	1	107.088	1	107.088	1	107.088	1	107.088	1
30040726	107.105	107.101	-1	-4	107.102	1	107.102	1	107.102	1	107.102	1	107.102	1	107.102	1	107.102	1	107.102	1	107.102	1	107.102	1	107.102	1
30040727	107.123	107.121	-1	-2	107.122	1	107.122	1	107.122	1	107.122	1	107.122	1	107.122	1	107.122	1	107.122	1	107.122	1	107.122	1	107.122	1
30040728	107.172	107.171	-1	-1	107.171	1	107.171	1	107.171	1	107.171	1	107.171	1	107.171	1	107.171	1	107.171	1	107.171	1	107.171	1	107.171	1
30040729	107.256	107.256	0	0	107.255	0	107.255	0	107.255	0	107.255	0	107.255	0	107.255	0	107.255	0	107.255	0	107.255	0	107.255	0	107.255	0
30040730	107.344	107.344	0	0	107.343	-1	107.343	-1	107.344	1	107.344	1	107.344	1	107.344	1	107.344	1	107.344	1	107.344	1	107.344	1	107.344	1
30040731	107.440	107.441	0	1	107.440	-1	107.440	-1	107.440	0	107.441	1	107.441	1	107.441	1	107.441	1	107.441	1	107.441	1	107.441	1	107.441	1
30040732	107.483	107.484	0	1	107.484	0	107.484	0	107.484	1	107.484	1	107.484	1	107.484	1	107.484	1	107.484	1	107.484	1	107.484	1	107.484	1
30040733	107.488	107.489	0	1	107.489	0	107.489	0	107.489	1	107.489	1	107.489	1	107.489	1	107.489	1	107.489	1	107.489	1	107.489	1	107.489	1
30040734	107.504	107.504	0	0	107.504	0	107.504	0	107.504	1	107.506	2	107.506	2	107.506	2	107.506	2	107.506	2	107.506	2	107.506	2	107.506	2

Joint Venture

Joint Venture

Joint Venture

project: C310 Thames Tunnel

project: C310 Thames Tunnel

project: C310 Thames Tunnel

project: C310 Thames Tunnel

No. of reading	baseline	37. following		38. following		39. following		40. following		41. following		42. following		43. following		44. following		45. following		46. following		47. following		48. following	
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
30040701	106.634																								
30040702	106.624																								
30040703	106.625																								
30040704	106.598																								
30040705	106.571																								
30040706	106.554																								
30040707	106.544																								
30040708	106.609	0	-6																						
30040709	106.635	0	-4																						
30040710	106.719	0	-3																						
30040711	106.801	106.799	0	-2																					
30040712	106.879	106.877	0	-2	106.876	0	-2																		
30040713	106.872	106.870	0	-2	106.870	0	-2																		
30040714	107.021	107.019	0	-2	107.019	0	-2	107.019	0	-1	107.010	0	-2												
30040715	107.057	107.056	0	-1	107.056	0	-1	107.057	1	-1	107.058	1	-1												
30040716	107.058	107.057	0	-1	107.057	0	-1	107.058	1	-1	107.058	1	-1												
30040717	107.040	107.039	0	-1	107.039	0	-1	107.040	1	-1	107.040	0	-2												
30040718	106.951	106.950	1	-1	106.950	0	-1	106.951	0	0	106.951	0	0	107.008	-1	-2									
30040719	106.987	106.986	1	-1	106.986	0	-1	106.986	0	0	106.986	1	0	106.985	0	-1									
30040720	106.924	106.923	0	-1	106.923	0	-1	106.923	1	-1	106.923	0	0	106.922	-1	-2									
30040721	106.965	106.965	0	0	106.964	-1	-1	106.965	1	-1	106.965	0	0	106.964	-2	-1	106.965	0	-1	106.964	0	-1			
30040722	106.974	106.973	0	-1	106.972	-1	-2	106.973	1	-1	106.974	1	0	106.972	-1	-2	106.972	0	-2	106.972	0	-2			
30040723	107.007	107.006	0	-1	107.006	0	-1	107.005	-1	-2	107.005	0	-2	107.005	0	-2	107.005	1	-2	107.005	1	-2			
30040724	107.040																								
30040725	107.090																								
30040726	107.105																								
30040727	107.123																								
30040728	107.172																								
30040729	107.256																								
30040730	107.344																								
30040731	107.440																								
30040732	107.483																								
30040733	107.488																								
30040734	107.504																								

project: C310 Thames Tunnel


Joint Venture

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Joint Venture

No. of reading	49. following		50. following		51. following		52. following		53. following		54. following		55. following		56. following		57. following		58. following		59. following		60. following				
	baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline		
date	25/02/13	05/04/2013	05/04/2013	13/06/2013	13/06/2013	13/06/2013	22/08/2013	22/08/2013	22/08/2013	22/08/2013	22/08/2013	10/09/2013	10/09/2013	10/09/2013	10/09/2013	10/09/2013	23/10/2013	23/10/2013	13/11/2013	13/11/2013	20/02/2014	20/02/2014	10/05/2015	10/05/2015			
30040701	106.634			106.632	1	-2	106.632	0	-2	106.631	-1	-3	106.631	0	-3	106.631	0	-3	106.632	0	-2	106.631	0	-3	106.631	0	-3.27
30040702	106.624			106.622	0	-3	106.622	0	-2	106.621	-1	-4	106.621	-1	-4	106.621	-1	-4	106.621	0	-3	106.621	-1	-3	106.621	0	-3.87
30040703	106.625			106.621	0	-4	106.621	0	-4	106.619	-2	-5	106.621	1	-4	106.621	0	-4	106.621	0	-4	106.621	-1	-5	106.621	0	-4.86
30040704	106.598			106.592	-1	-6	106.592	0	-6	106.591	-1	-7	106.592	1	-6	106.592	1	-6	106.592	0	-6	106.591	-1	-7	106.590	-1	-7.84
30040705	106.571			106.563	-1	-8	106.563	-1	-9	106.563	-1	-8	106.563	-1	-8	106.564	1	-7	106.564	0	-7	106.563	-1	-9	106.562	-1	-9.23
30040706	106.554			106.545	-2	-9	106.545	0	-9	106.546	1	-8	106.546	0	-8	106.546	0	-8	106.546	0	-8	106.545	-1	-9	106.544	-1	-9.54
30040707	106.554			106.546	-2	-9	106.546	0	-9	106.547	1	-7	106.547	0	-8	106.547	0	-8	106.547	0	-8	106.546	-1	-8	106.546	-1	-8.72
30040708	106.609			106.601	-2	-8	106.601	1	-7	106.602	1	-7	106.602	1	-7	106.602	0	-7	106.602	0	-7	106.601	0	-7	106.601	0	-7.59
30040709	106.635			106.630	-1	-5	106.630	0	-5	106.630	0	-5	106.631	0	-5	106.631	0	-5	106.631	0	-5	106.631	-1	-5	106.631	0	-4.51
30040710	106.719			106.714	-2	-5	106.714	0	-5	106.715	1	-5	106.716	1	-4	106.714	-1	-5	106.714	-1	-5	106.715	1	-4	106.715	0	-4.24
30040711	106.801			106.799	-3	-5	106.796	0	-5	106.798	2	-3	106.798	1	-3	106.798	0	-2	106.798	0	-2	106.798	-1	-3	106.798	0	-2.91
30040712	106.878			106.873	-3	-5	106.873	0	-5	106.875	2	-3	106.875	0	-3	106.875	0	-3	106.875	0	-3	106.875	0	-3	106.875	0	-2.92
30040713	106.972			106.966	-4	-6	106.966	0	-6	106.969	3	-3	106.969	0	-3	106.969	0	-3	106.969	0	-3	106.969	0	-3	106.969	0	-3.02
30040714	107.021			107.016	-3	-5	107.016	0	-5	107.019	3	-2	107.019	3	-2	107.019	3	-2	107.019	3	-2	107.018	-1	-3	107.018	0	-2.80
30040715	107.057			107.053	-2	-4	107.053	0	-4	107.056	3	-2	107.056	3	-2	107.056	3	-2	107.056	3	-2	107.055	-1	-3	107.055	0	-2.58
30040716	107.058			107.055	-2	-3	107.055	1	-3	107.056	1	-2	107.056	1	-2	107.056	1	-2	107.056	1	-2	107.055	-1	-3	107.055	0	-2.26
30040717	107.040			107.036	-2	-4	107.036	0	-4	107.037	1	-3	107.037	1	-3	107.037	1	-3	107.037	1	-3	107.037	0	-2	107.037	-1	-2.19
30040718	106.951			106.947	-3	-4	106.947	-1	-5	106.949	2	-3	106.949	2	-3	106.949	2	-3	106.949	2	-3	106.949	0	-2	106.948	-1	-1.90
30040719	106.987			106.982	-3	-4	106.982	0	-5	106.983	1	-4	106.984	1	-3	106.984	0	-2	106.984	0	-2	106.984	-1	-3	106.985	1	-1.58
30040720	106.924			106.922	0	-2	106.922	-1	-2	106.920	-2	-4	106.922	2	-2	106.922	2	-2	106.922	2	-2	106.922	0	-2	106.921	-1	-1.61
30040721	106.985			106.984	0	-1	106.984	0	-1	106.981	-3	-4	106.984	2	-1	106.984	2	-1	106.984	2	-1	106.984	0	-2	106.984	1	-1.15
30040722	106.974			106.972	0	-2	106.972	0	-2	106.970	-2	-4	106.971	1	-3	106.971	1	-3	106.971	1	-3	106.971	0	-3	106.971	1	-2.44
30040723	107.007			107.005	-1	-2	107.005	0	-2	107.003	-2	-4	107.003	0	-4	107.003	0	-4	107.003	0	-4	107.003	0	-3	107.004	1	-3.09
30040724	107.040			107.038	0	-2	107.038	0	-2	107.036	-2	-3	107.036	-2	-3	107.036	-2	-3	107.036	-2	-3	107.036	0	-3	107.036	0	-2.84
30040725	107.090			107.087	0	-3	107.087	-1	-4	107.088	1	-3	107.088	1	-3	107.088	1	-3	107.088	1	-3	107.088	0	-5	107.088	0	-4.79
30040726	107.105			107.101	0	-4	107.101	0	-4	107.101	0	-4	107.098	-3	-7	107.099	0	-6	107.099	0	-6	107.099	-1	-7	107.099	1	-5.80
30040727	107.123			107.120	-1	-3	107.120	0	-3	107.120	0	-3	107.118	-2	-5	107.119	1	-4	107.119	1	-4	107.119	0	-4	107.119	1	-3.84
30040728	107.172			107.169	-1	-2	107.171	2	-1	107.170	-1	-2	107.168	-2	-4	107.170	1	-3	107.170	1	-3	107.169	-1	-4	107.170	1	-2.61
30040729	107.256			107.254	-2	-2	107.255	-1	-1	107.254	-1	-1	107.252	-2	-4	107.254	2	-2	107.254	2	-2	107.253	-1	-3	107.254	1	-1.78
30040730	107.344			107.342	-1	-2	107.343	0	-1	107.343	0	-1	107.343	0	-1	107.343	0	-1	107.343	0	-1	107.342	2	-2	107.342	1	-1.63
30040731	107.440			107.437	-1	-2	107.437	-1	-3	107.439	2	-1	107.440	0	-1	107.439	-1	-1	107.438	-3	-4	107.438	2	-2	107.437	0	-1.50
30040732	107.483			107.482	-1	-1	107.481	-1	-2	107.483	2	0	107.483	0	0	107.482	-1	-1	107.482	-1	-1	107.481	-1	-2	107.481	1	-1.49
30040733	107.488			107.487	-1	-1	107.488	1	0	107.489	0	1	107.489	0	1	107.488	-1	-1	107.488	-1	-1	107.486	0	-2	107.486	0	-1.03
30040734	107.504			107.504	-1	0	107.502	-1	-1	107.505	-1	1	107.506	0	2	107.505	-1	-1	107.505	-1	-1	107.502	0	-1	107.502	0	-0.45



 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 34**

**SOS Plumstead Road Extensometer**

Learning Legacy Document

**monitoring asset**

**Southern Outfall Sewer under Plumstead Road**

reference monitoring drawing:

C310-HTM-C-DWG-CR146-ST004-70001

name of monitoring section:

SOS Extensometer Plumstead Road

sensor type:

Extensometer

chainage:

90600 - 91100

point no.:

3004 0821 - 3004 0824

trigger values:  
[mm]

green: +12  
-12

+15  
-15

red: +18  
-18

reference document for trigger values:

Management Plan for Control of Ground Movement

EB-no.:

C310-HTM-Z-STP-CR148-50058

Appendix:

AAA

**monitoring data**

	date	max. value	point no.	comments
baseline	14/03/13	0.00		
TBM 1	start ZOI	19/04/13 05/05/13	-0.23 -0.73	3004 0821 3004 0824
	end ZOI	22/04/13 08/05/13	-0.74 -1.56	3004 0821 3004 0824
TBM 2	start ZOI	19/07/13 03/08/13	-1.39 -3.37	3004 0821 3004 0824
	end ZOI	21/07/13 07/08.13	-1.48 -3.66	3004 0821 3004 0824
longterm	19/03/15	-3.98	3004 0821	breached not any trigger value
		-6.31	3004 0824	
Evaluation of any potential residual risks	<input checked="" type="checkbox"/>	No residual risk since the Works have been completed by HMJV		
	<input type="checkbox"/>	Yes, residual risk (see comment below)		

**summary / comments**

Overall, none of the points reached any trigger value.

Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.

The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

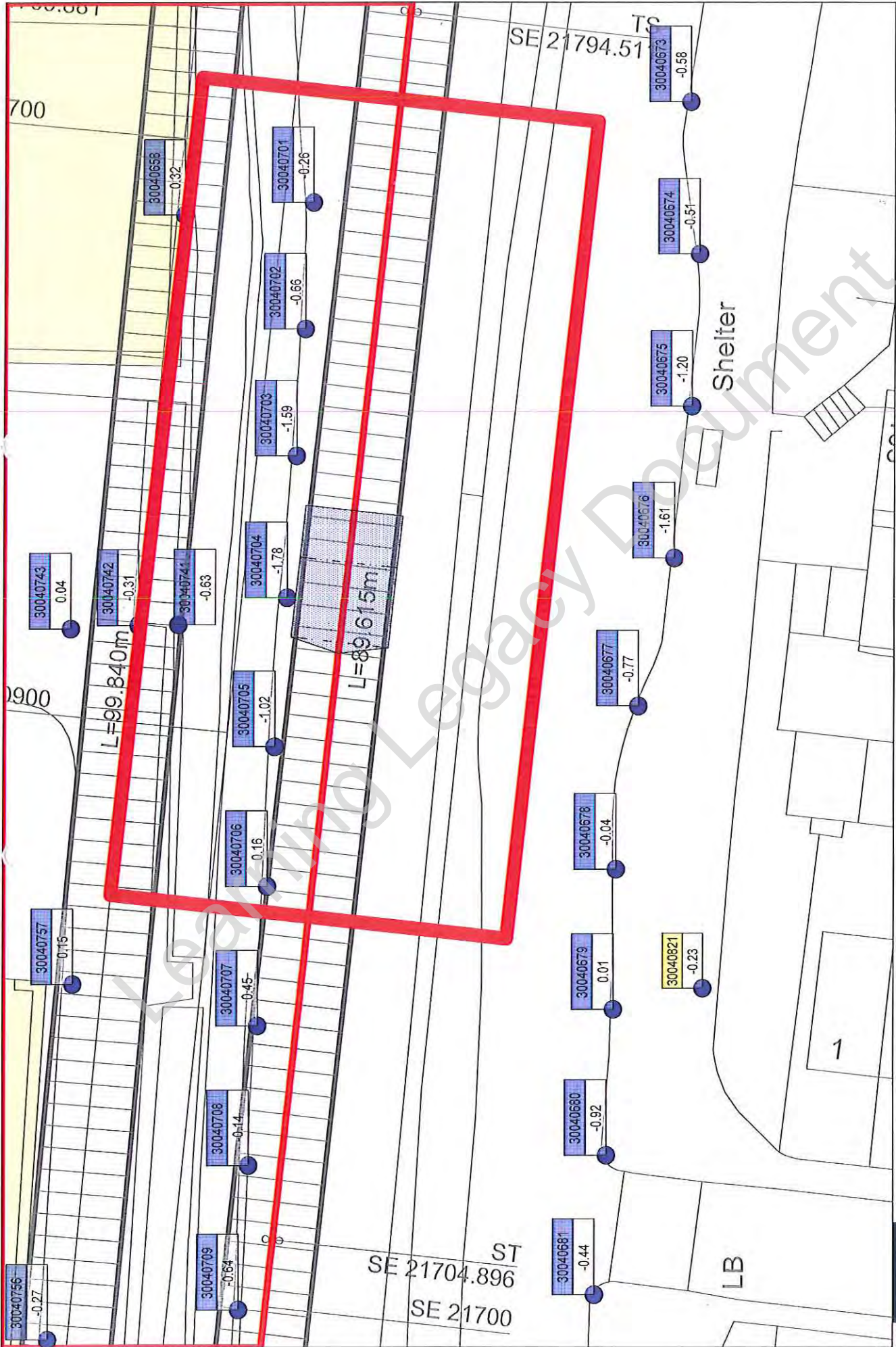
Monitoring data shows that shallow datum movements behaved similar to those on the surface.

date / signature: 20/03/2015

print name:

HMJV project role:

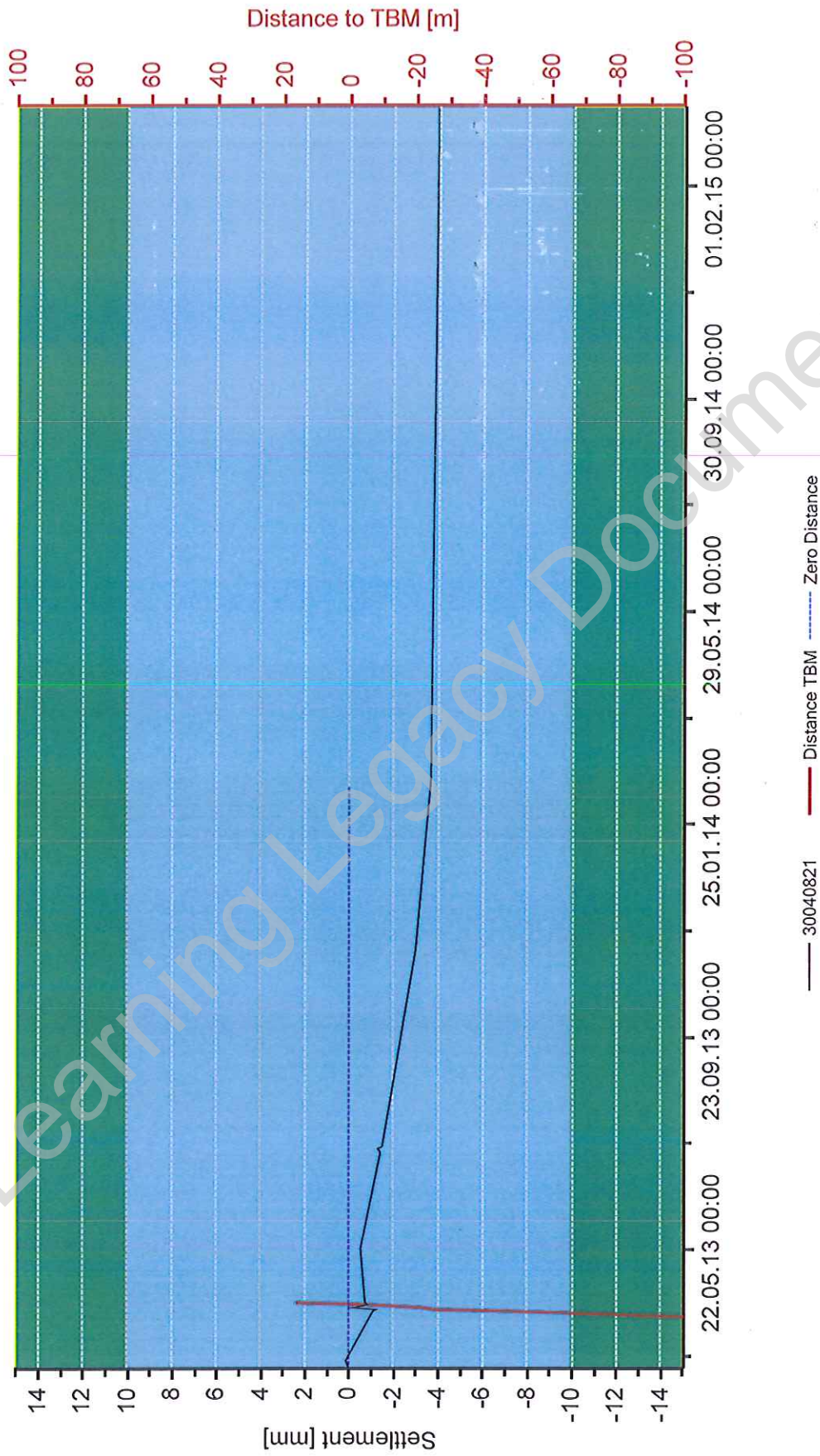
Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive WB  
 current values: 19.04.2013 09:00

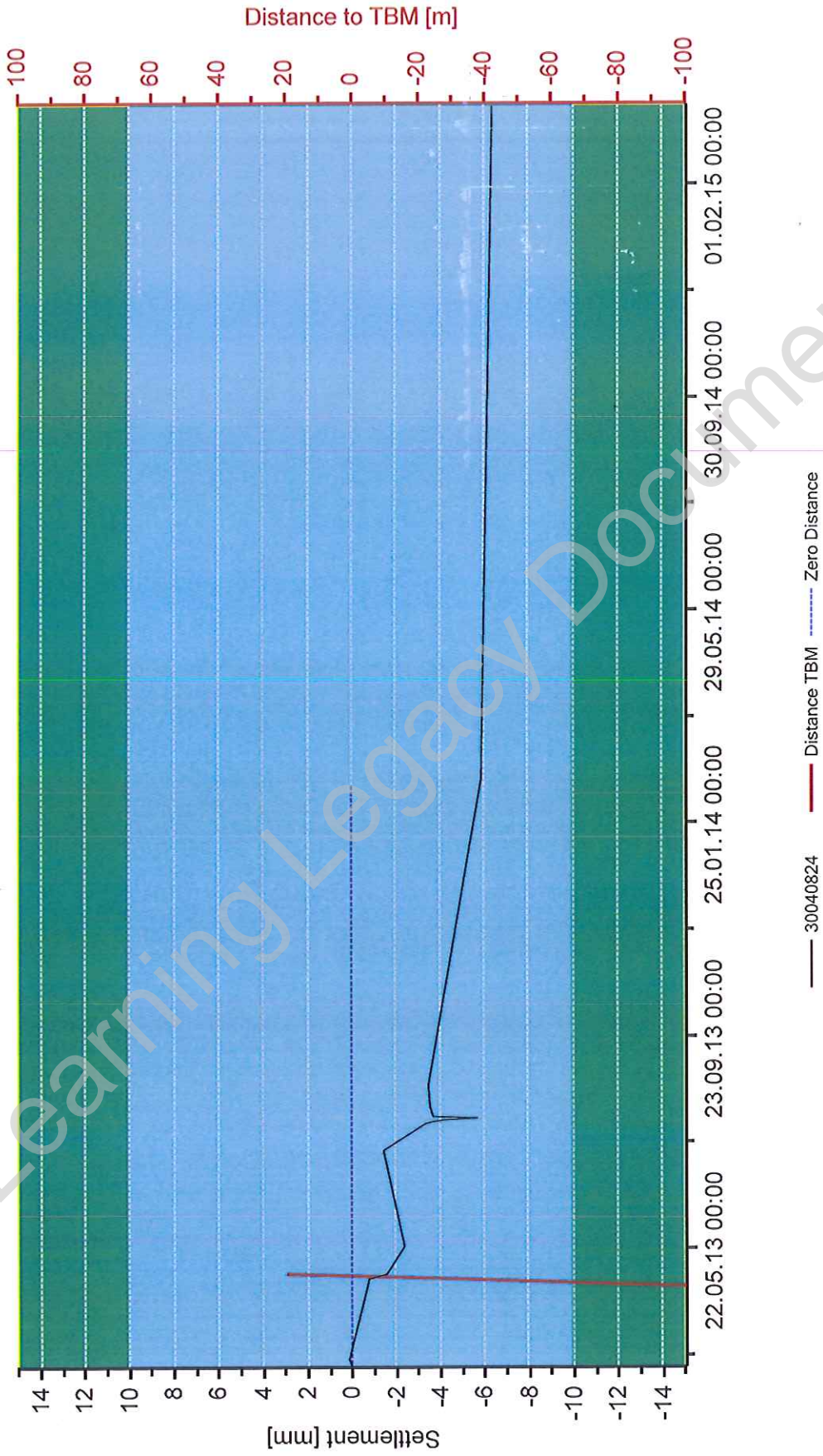


**Profile: Measurement Point 30040821**



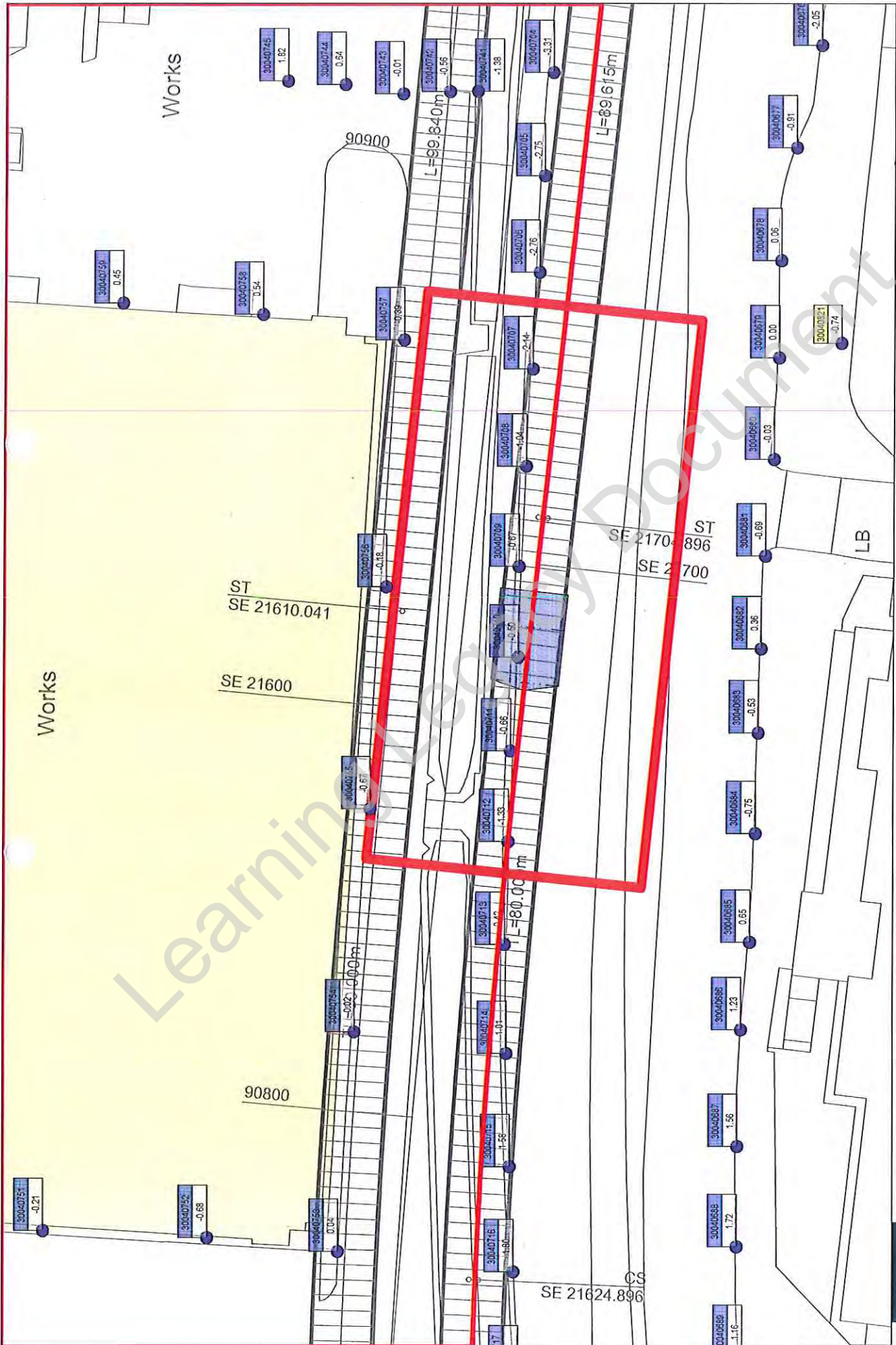
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 Close Out Report: WB Tunnel- Plumstead Road Extensometer - 14.03.2013 - 19.03.2015  
 Date: 27.03.2015 16:06 Current Values: 27.03.2015 14:23

Profile: Measurement Point 30040824



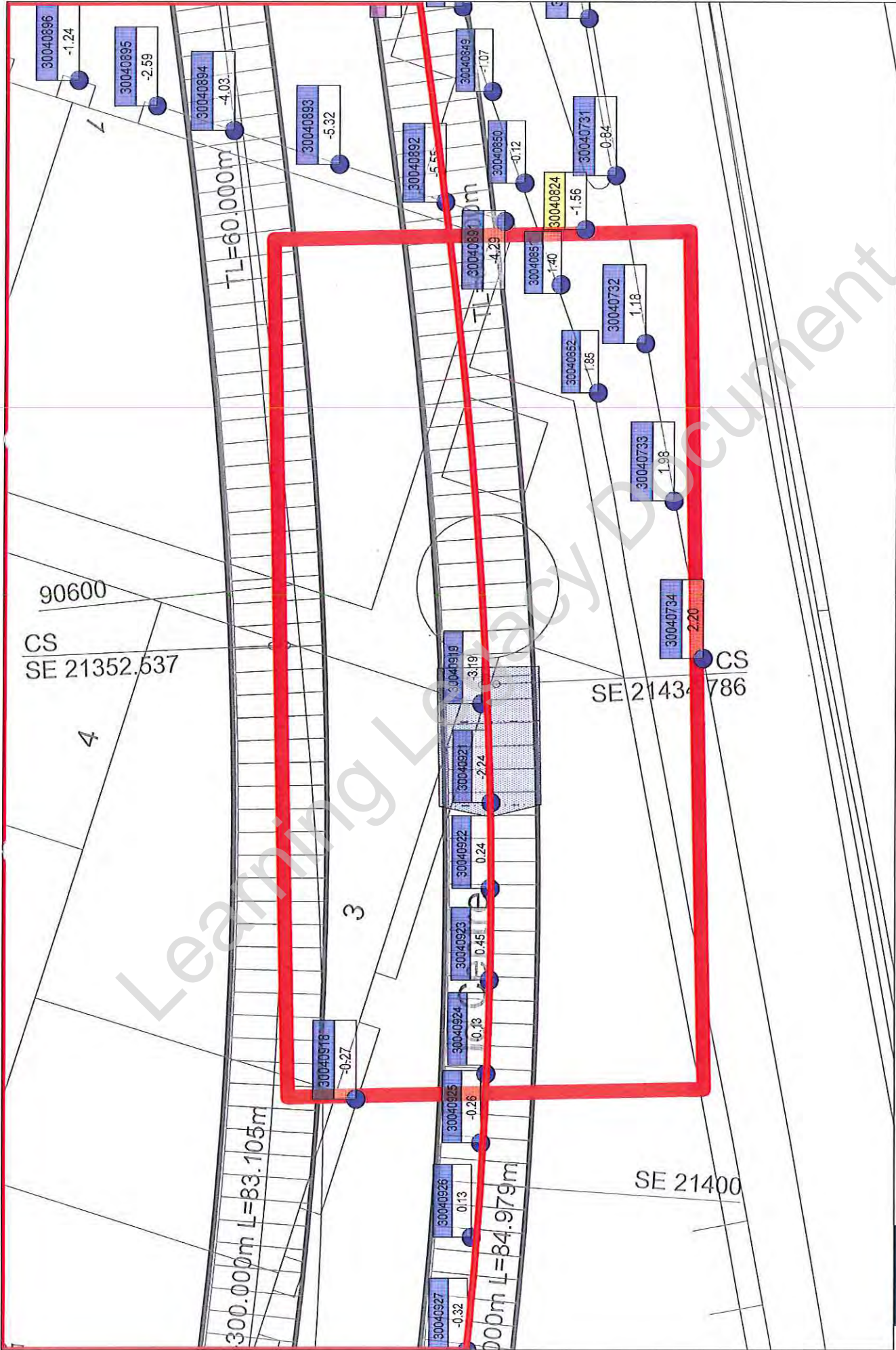
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel- Plumstead Road Extensometer - 14.03.2013 - 19.03.2015  
Date: 27.03.2015 16:05 Current Values: 27.03.2015 14:23





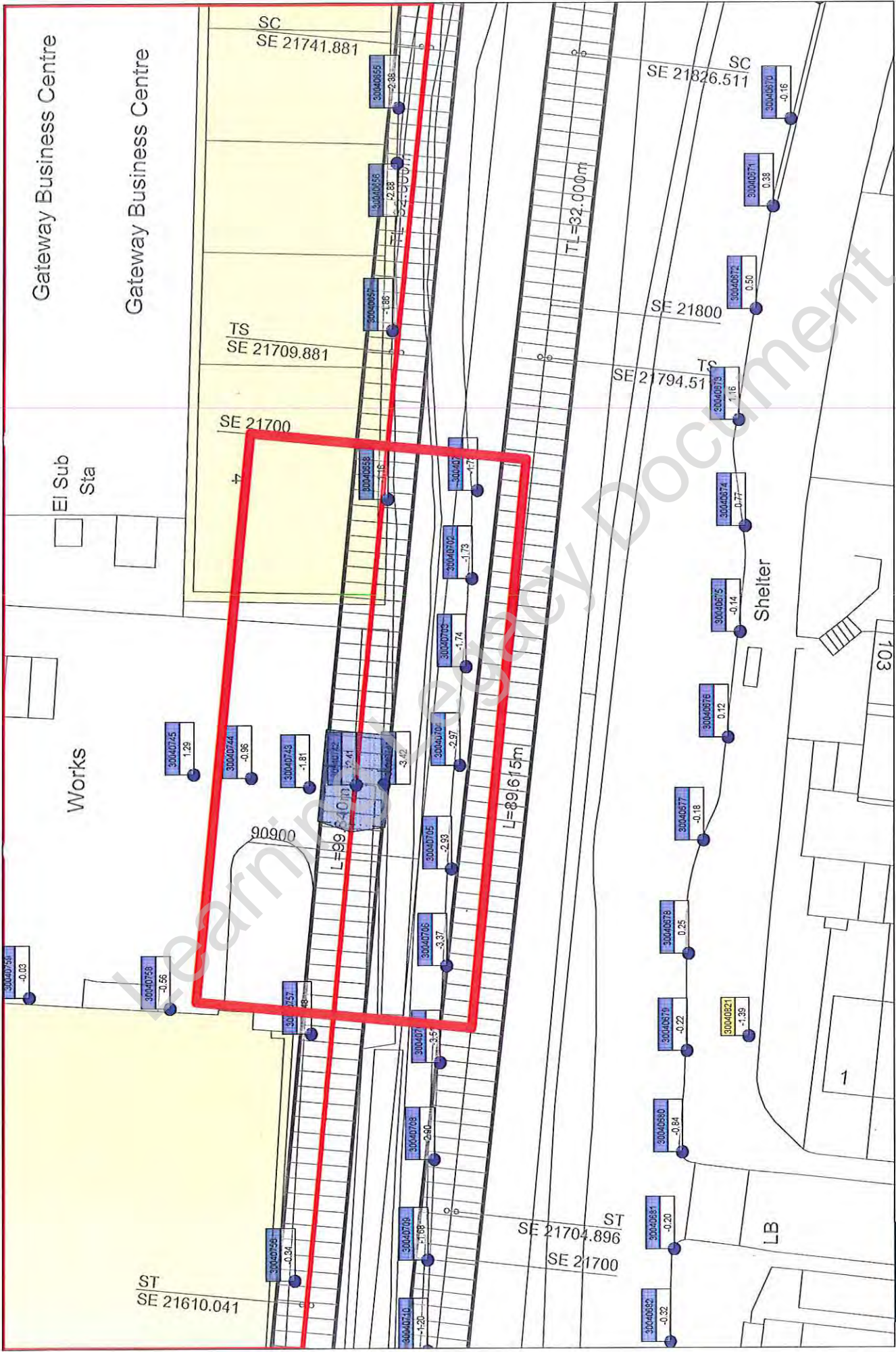
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

working activities: TBM drive  
 current values: 22.04.2013 06:59



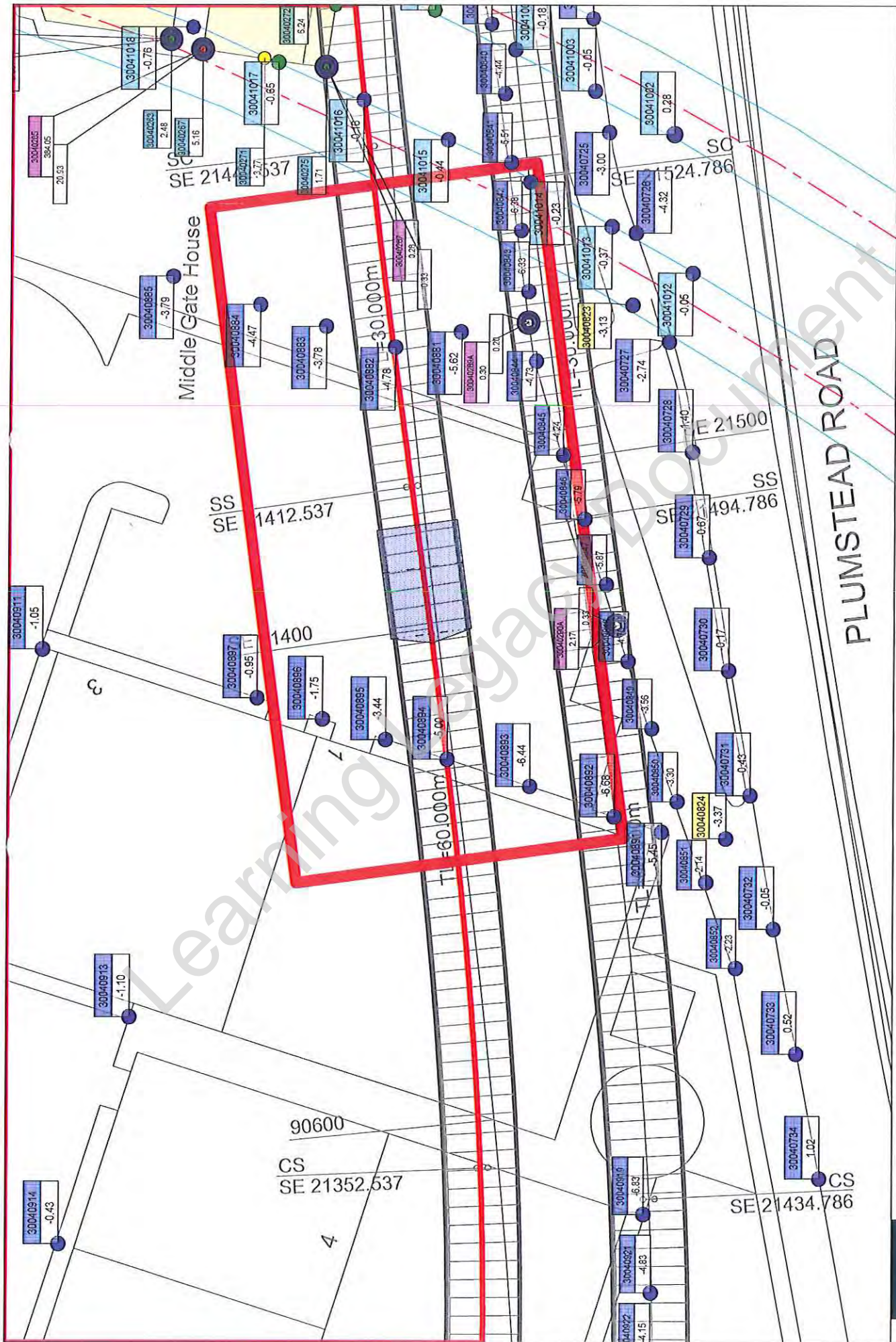
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 08.05.2013 09:00





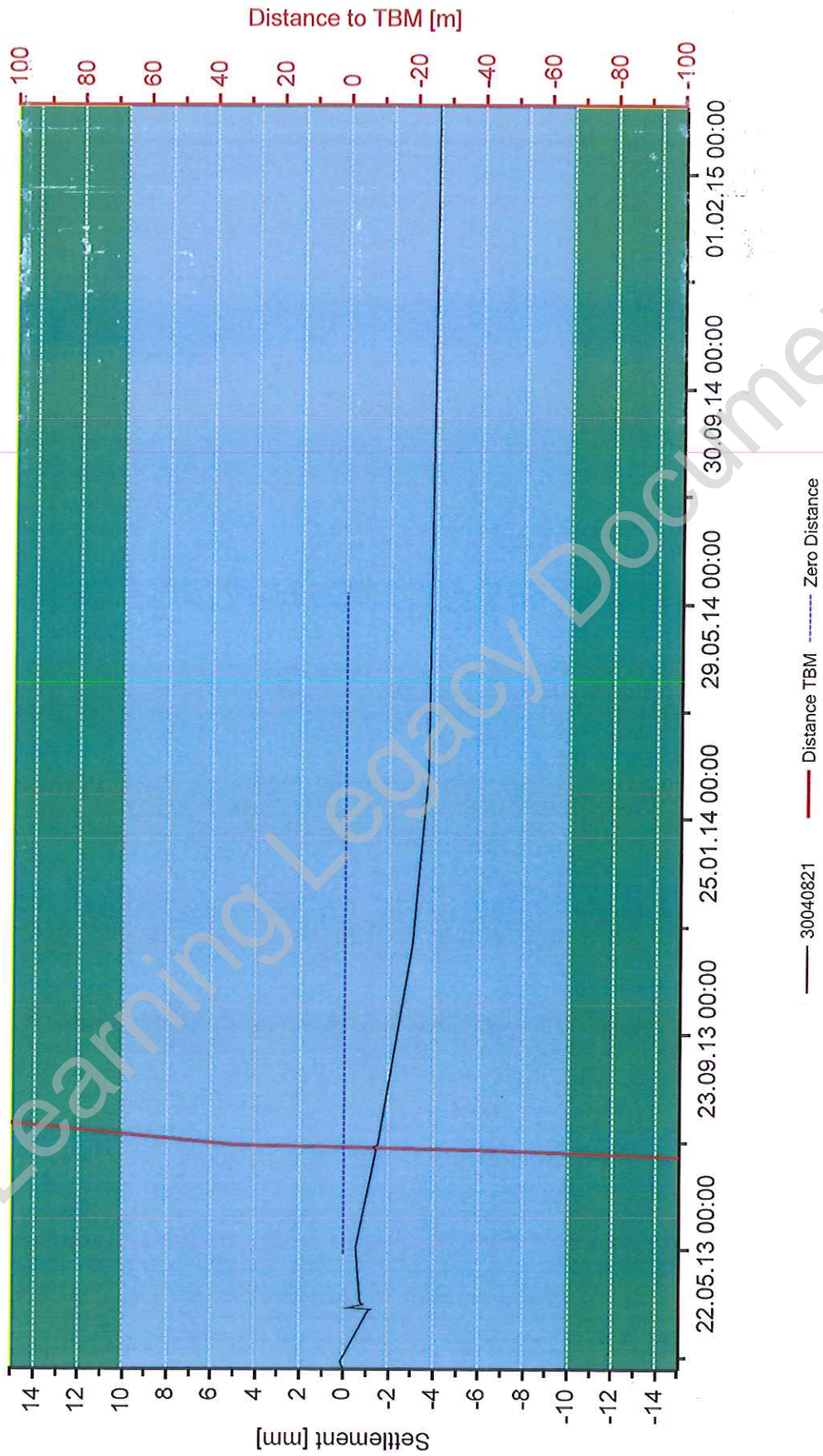
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 19.07.2013 09:00





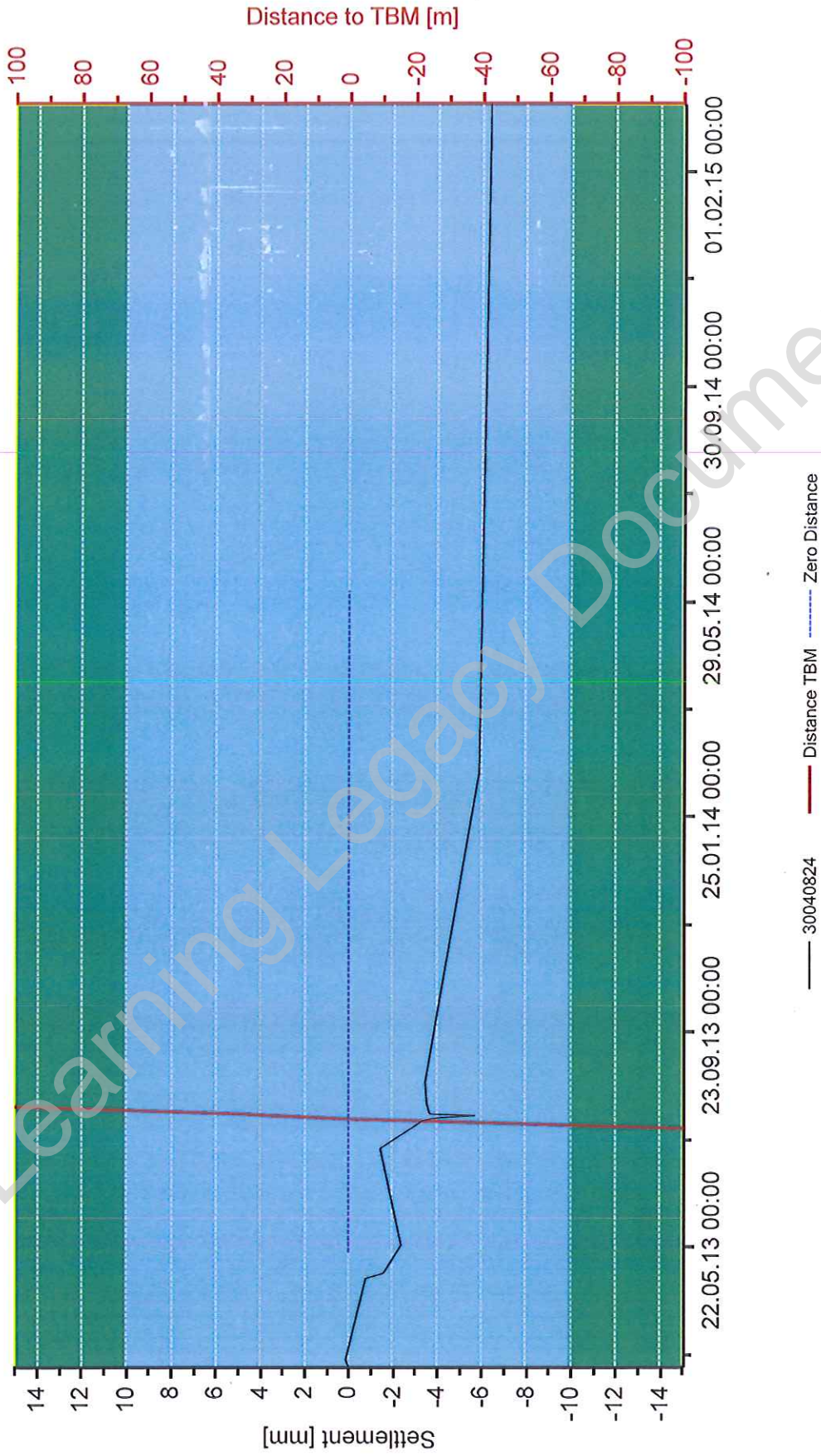
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 03.08.2013 09:00

# Profile: Measurement Point 30040821



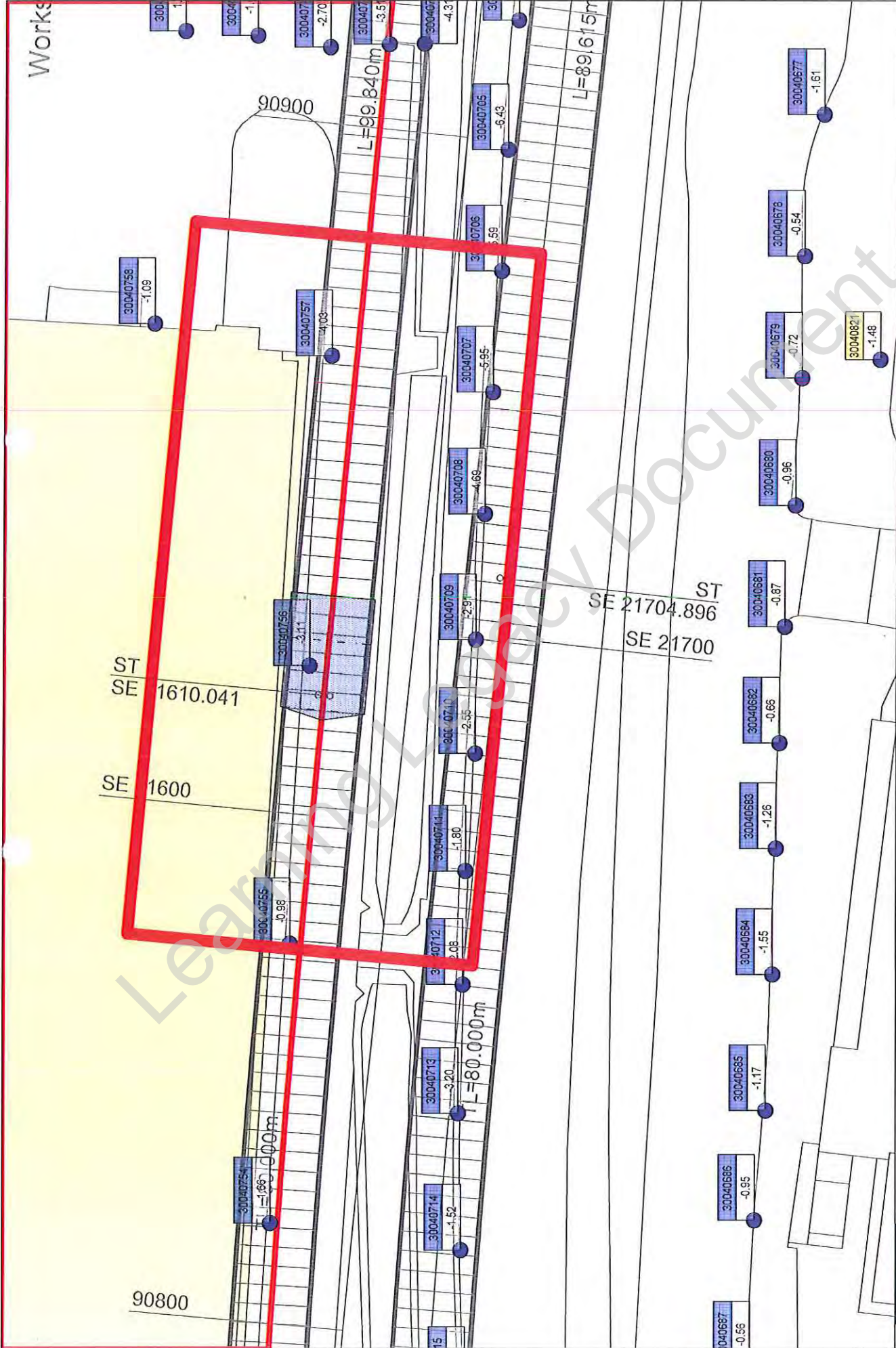
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Plumstead Road Extensometer - 14.03.2013 - 19.03.2015  
date: 27.03.2015 15:04 current values: 27.03.2015 14:23

Profile: Measurement Point 30040824



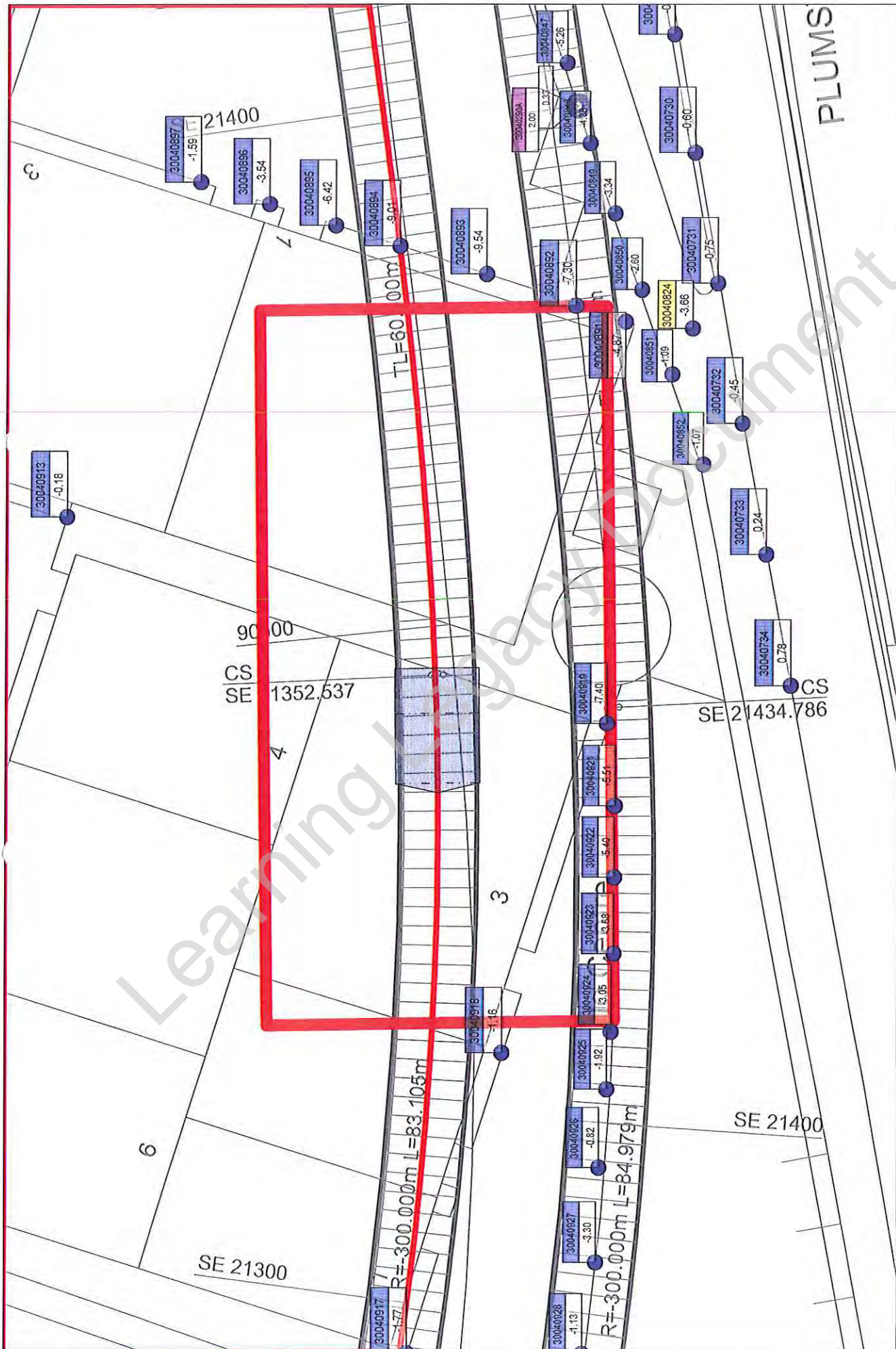
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Plumstead Road Extensometer - 14.03.2013 - 19.03.2015  
date: 27.03.2015 15:01 current values: 27.03.2015 14:23





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 21.07.2013 09:00





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 07.08.2013 18:04



Joint Venture

Joint Venture

project: C310 Thames Tunnel

project: C310 Thames Tunnel

No. of reading GMP	baseline 14/2/13		1. following 19/2/2013		2. following 1/04/2013		3. following 10/04/2013		4. following 17/04/2013		5. following 10/04/2013		6. following 30/04/2013		7. following 27/04/2013		8. following 27/04/2013		9. following 20/04/2013		10. following 29/04/2013		11. following 30/04/2013		12. following 01/05/2013					
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline				
30040821	95.852	0	95.861	-1	95.861	0	95.861	0	95.861	-1	95.861	-1	95.861	0	95.861	0	95.861	0	95.861	1	95.861	1	95.861	0	95.861	0	95.861	0		
30040822	96.641	0	96.643	2	96.640	0	96.643	2	96.640	0	96.641	0	96.641	0	96.641	0	96.641	0	96.641	0	96.642	0	96.642	0	96.641	-1	96.641	0		
30040823	96.823	0	96.826	2	96.824	1	96.826	2	96.824	0	96.823	-1	96.823	0	96.823	0	96.823	0	96.823	0	96.823	0	96.823	0	96.823	0	96.823	0	96.825	-1
30040824	96.749	0	96.748	-1	96.749	0	96.748	-1	96.749	0	96.749	0	96.749	0	96.749	0	96.749	0	96.749	0	96.749	0	96.749	0	96.749	0	96.749	0	96.749	0

Mining Legacy Document

Joint Venture

Joint Venture

project: C310 Thames Tunnel

project: C310 Thames Tunnel

Joint Venture

No. of reading date	13. following		14. following		15. following		16. following		17. following		18. following		19. following		20. following		21. following		22. following		23. following		24. following			
	baseline	structure:	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline		
30040821	95.852		95.852	0	95.861	-1	95.861	0	95.861	-1	95.861	-1	95.861	0	95.861	-1	95.861	0	95.861	0	95.861	-1	95.861	0	95.861	
30040822	96.641		96.639	-1	96.640	1	96.640	1	96.640	1	96.640	-1	96.640	1	96.640	1	96.640	1	96.640	1	96.640	1	96.640	1	96.640	
30040823	96.823		96.825	2	96.824	-1	96.822	-2	96.823	1	96.822	-1	96.822	1	96.822	1	96.822	1	96.822	1	96.822	1	96.822	1	96.822	1
30040824	96.749		96.749	0	96.748	-1	96.748	-1	96.747	-1	96.748	1	96.748	1	96.748	1	96.748	1	96.748	1	96.748	1	96.748	1	96.748	1

Legacy Document



Joint Venture

Joint Venture

project: C310 Thames Tunnel  
structure: Extensometer / Shallow Datum for SOS in Plumstead Road

No. of reading	baseline elevation	25. following		26. following		27. following		28. following		29. following		30. following		31. following		32. following		33. following		34. following		35. following		36. following	
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
4511	95.822																								
30040821	95.822	96.839	0	96.820	-2	96.819	-1	96.818	-1	96.819	0	96.820	1	96.820	0	96.819	-1	96.819	-1	96.819	0	96.820	1	96.819	-1
30040822	96.823	96.820	-2	96.820	0	96.820	0	96.820	0	96.820	0	96.820	0	96.820	0	96.820	0	96.820	0	96.820	0	96.820	0	96.820	0
30040823	96.823	96.820	-2	96.820	0	96.820	0	96.820	0	96.820	0	96.820	0	96.820	0	96.820	0	96.820	0	96.820	0	96.820	0	96.820	0
30040824	96.748	96.746	-2	96.746	-2	96.745	-1	96.744	-2	96.744	-2	96.744	-2	96.746	2	96.746	2	96.746	0	96.746	0	96.746	0	96.743	-3

Engineering Legacy Document


# monitoring table



Joint Venture

project: C310 Thames Tunnel

No. of reading	structure:		37. following		38. following		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
	baseline	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline								
	14/3/13	19/03/2015												
Point No.	elevation	date	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
30040821	95.862		95.858	-1	95.858	0	-3.98							
30040822	96.641		96.637	0	96.638	1	-2.46							
30040823	96.823		96.818	0	96.819	1	-4.04							
30040824	96.749		96.743	1	96.743	0	-6.31							

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 35**  
**Cross Passage 18**

Learning Legacy Document

<b>monitoring asset</b>	<b>Surface at Cross Passage 18</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
<b>name of monitoring section:</b>	XP 18		
sensor type:	manual levelling studs		
chainage:	91040	point no.:	3004 1901 - 3004 1909
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 -20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	17/01/14	0.00		
<b>TBM 1</b>	Manual levelling studs were not installed at the time of underpassing with TBM 1+2 the area of XP18			
<b>TBM 2</b>				
<b>XP works</b>	20/01/14	-0.38	3004 1908	start excavation
	01/05/14	-0.59	3004 1906	inner lining finished
<b>longterm</b>	28/10/14	-1.33	3004 1906	last reading breached not any trigger value
<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV		
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)		

**summary / comments**

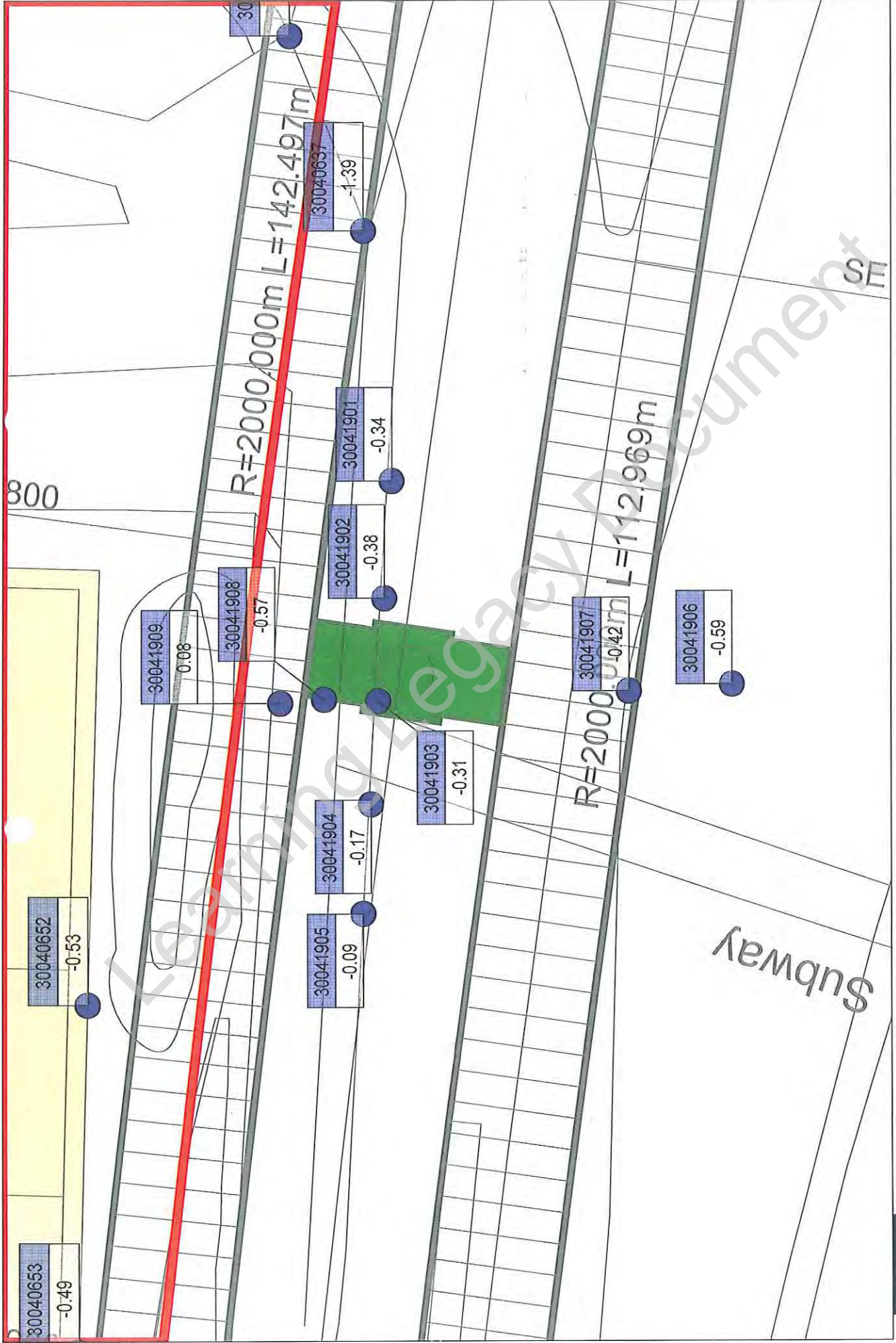
None off the points were damaged.  
 All points are stable and no trigger value was exceeded.  
 Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 12/01/2015

print name:

HMJV project role:

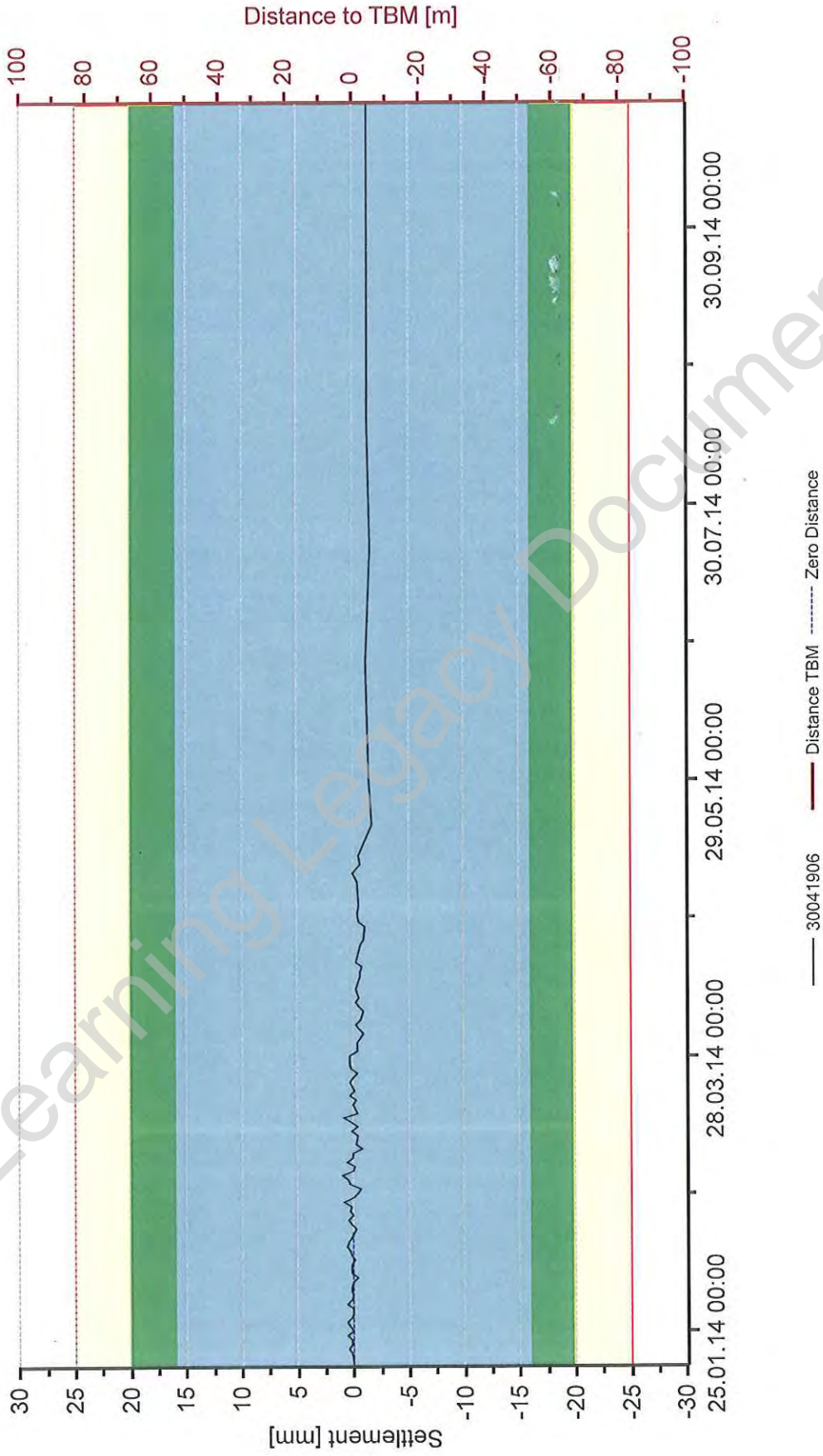
Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 01.05.2014 09:00



Point: 30041906



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: Surface at Cross Passage 18 - 17.01.2014 - 28.10.2014

Date: 06.11.2014 11:47 Current Values: 06.11.2014 11:30



# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Passage 18

No. of reading	baseline	1. following		2. following		3. following		4. following		5. following		6. following	
		elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline
date	17/1/14	20/01/2014											
No.		21/01/2014											
		22/01/2014											
		23/01/2014											
		24/01/2014											
30041901	106.518	106.518	0	106.518	0	106.518	0	106.518	0	106.518	0	106.519	0
30041902	106.538	106.538	0	106.539	0	106.539	0	106.538	-1	106.539	0	106.539	0
30041903	106.588	106.588	0	106.588	0	106.588	0	106.588	-1	106.588	0	106.588	0
30041904	106.593	106.593	0	106.594	0	106.594	0	106.593	-1	106.593	0	106.594	0
30041905	106.606	106.606	0	106.606	0	106.606	0	106.606	0	106.606	0	106.606	0
30041906	106.525	106.525	0	106.525	0	106.526	0	106.525	0	106.526	0	106.526	0
30041907	106.689	106.689	0	106.689	0	106.689	0	106.689	0	106.689	0	106.689	0
30041908	103.860	103.860	0	103.859	0	103.860	0	103.859	0	103.860	0	103.859	0
30041909	103.728	103.728	0	103.728	0	103.728	0	103.728	0	103.728	0	103.728	0

Document

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Passage 18

No. of reading	baseline		7. following		8. following		9. following		10. following		11. following		12. following	
	date	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline
	17/1/14		25/01/2014		27/01/2014		28/01/2014		29/01/2014		30/01/2014		31/01/2014	
30041901		106.518	106.518	0	106.519	1	106.518	-1	106.518	0	106.518	0	106.519	0
30041902		106.538	106.539	0	106.539	0	106.539	0	106.539	0	106.539	0	106.539	0
30041903		106.588	106.588	0	106.589	1	106.588	0	106.588	0	106.588	0	106.589	0
30041904		106.593	106.594	0	106.594	0	106.594	0	106.594	0	106.594	0	106.594	0
30041905		106.606	106.606	0	106.606	0	106.606	0	106.606	0	106.606	0	106.606	0
30041906		106.525	106.525	0	106.526	1	106.525	-1	106.525	0	106.526	0	106.526	0
30041907		106.689	106.689	0	106.690	1	106.689	-1	106.689	0	106.689	0	106.689	0
30041908		103.860	103.860	0	103.860	0	103.860	0	103.860	0	103.860	0	103.860	0
30041909		103.728	103.728	0	103.728	0	103.728	0	103.728	0	103.728	0	103.728	0

Document



# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Passage 18

No. of reading	baseline		13. following		14. following		15. following		16. following		17. following		18. following	
	date	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline
	17/1/14													
30041901		106.518	106.518	0	106.518	0	106.518	0	106.518	0	106.518	0	106.518	0
30041902		106.538	106.539	0	106.539	0	106.539	0	106.539	0	106.539	0	106.538	0
30041903		106.588	106.588	0	106.588	0	106.588	0	106.588	0	106.588	0	106.588	0
30041904		106.593	106.594	0	106.594	0	106.594	0	106.594	0	106.594	0	106.594	0
30041905		106.606	106.606	0	106.606	0	106.606	0	106.606	0	106.606	0	106.606	0
30041906		106.525	106.526	0	106.525	0	106.525	0	106.525	0	106.525	0	106.525	0
30041907		106.689	106.689	0	106.689	0	106.689	0	106.689	0	106.689	0	106.689	-1
30041908		103.860	103.860	0	103.860	0	103.860	0	103.860	0	103.860	0	103.860	0
30041909		103.728	103.728	0	103.728	0	103.728	0	103.728	0	103.728	0	103.728	0

Document

# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Passage 18

No. of reading	baseline		19. following		20. following		21. following		22. following		23. following		24. following		
		17/1/14	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
Date		17/1/14		07/02/2014		08/02/2014		09/02/2014		10/02/2014		11/02/2014		12/02/2014	
No.	elevation		deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
30041901	106.518	106.519	1	106.518	0	106.518	0	106.518	0	106.518	0	106.518	0	106.519	0
30041902	106.538	106.539	1	106.539	0	106.539	0	106.539	0	106.539	0	106.539	0	106.539	0
30041903	106.588	106.589	1	106.588	0	106.588	0	106.588	0	106.588	0	106.588	0	106.588	0
30041904	106.593	106.594	0	106.594	0	106.594	0	106.594	0	106.594	0	106.594	0	106.594	0
30041905	106.606	106.606	0	106.606	0	106.606	0	106.606	0	106.606	0	106.606	0	106.606	0
30041906	106.525	106.525	0	106.525	0	106.525	0	106.525	0	106.525	0	106.525	0	106.525	0
30041907	106.689	106.689	1	106.689	0	106.689	0	106.689	0	106.689	0	106.689	0	106.689	0
30041908	103.860	103.860	0	103.860	0	103.860	0	103.860	0	103.860	0	103.860	0	103.860	0
30041909	103.728	103.728	0	103.728	0	103.728	0	103.728	0	103.728	0	103.728	0	103.728	0

Document





# monitoring table



Joint Venture

project: **C310 Thames Tunnel**  
structure: **Cross Passage 18**

No. of reading	baseline		37. following		38. following		39. following		40. following		41. following		42. following	
	date	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
	17/1/14													
30041901		106.518	106.517	0	106.519	1	106.518	0	106.519	1	106.518	-1	106.518	0
30041902		106.538	106.538	0	106.539	1	106.539	0	106.539	0	106.539	-1	106.538	0
30041903		106.588	106.587	-1	106.588	1	106.589	0	106.589	1	106.588	-1	106.588	0
30041904		106.593	106.593	0	106.594	1	106.594	0	106.595	1	106.594	-1	106.594	0
30041905		106.606	106.605	0	106.606	1	106.606	0	106.607	1	106.606	-1	106.606	0
30041906		106.525	106.525	0	106.526	1	106.526	0	106.526	1	106.525	-1	106.525	0
30041907		106.689	106.688	0	106.689	1	106.689	0	106.690	1	106.689	-1	106.689	0
30041908		103.860	103.860	0	103.860	0	103.860	0	103.860	0	103.860	0	103.859	-1
30041909		103.728	103.728	0	103.728	0	103.728	0	103.729	1	103.728	0	103.728	-1

HOCHTIEF SOLUTIONS AG

# monitoring table



## Joint Venture

project: **C310 Thames Tunnel**  
structure: **Cross Passage 18**

No. of reading	baseline		43. following		44. following		45. following		46. following		47. following		48. following	
	date	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
	17/1/14													
30041901		106.518	106.519	1	106.518	0	0	106.518	-1	106.518	-1	106.518	1	106.518
30041902		106.538	106.539	1	106.539	-1	0	106.539	0	106.538	-1	106.539	1	106.538
30041903		106.588	106.589	1	106.588	0	0	106.588	0	106.587	-1	106.588	1	106.588
30041904		106.593	106.594	1	106.594	0	0	106.594	0	106.593	-1	106.594	1	106.593
30041905		106.606	106.606	1	106.606	0	0	106.606	0	106.605	-1	106.606	1	106.605
30041906		106.525	106.526	1	106.525	0	0	106.525	0	106.525	-1	106.525	0	106.525
30041907		106.689	106.689	0	106.689	0	0	106.689	0	106.688	-1	106.689	0	106.689
30041908		103.860	103.860	1	103.859	-1	0	103.860	0	103.860	0	103.860	0	103.859
30041909		103.728	103.728	1	103.728	-1	0	103.728	0	103.728	0	103.728	0	103.728

Document







# monitoring table



## Joint Venture

project: C310 Thames Tunnel

structure: Cross Passage 18

No. of reading	baseline		61. following		62. following		63. following		64. following		65. following		66. following	
	17/1/14		24/03/2014	deviation from last/baseline	elevation	deviation from last/baseline	elevation	elevation	deviation from last/baseline	elevation	elevation	deviation from last/baseline	elevation	deviation from last/baseline
Date	17/1/14		24/03/2014		25/03/2014		26/03/2014		28/03/2014		29/03/2014		30/03/2014	
30041901	106.518		106.518	0	106.518	0	106.518	0	106.518	0	106.518	-1	106.518	0
30041902	106.538		106.539	0	106.539	0	106.539	0	106.539	0	106.538	-1	106.538	0
30041903	106.588		106.588	0	106.588	0	106.589	0	106.589	0	106.588	-1	106.588	0
30041904	106.593		106.594	0	106.594	0	106.594	0	106.594	0	106.593	-1	106.593	0
30041905	106.606		106.606	0	106.606	0	106.606	0	106.606	0	106.606	-1	106.606	0
30041906	106.525		106.525	0	106.525	0	106.526	0	106.526	0	106.525	-1	106.525	0
30041907	106.689		106.689	0	106.689	0	106.689	0	106.689	0	106.689	-1	106.689	0
30041908	103.860		103.860	0	103.860	0	103.860	0	103.860	0	103.859	-1	103.860	0
30041909	103.728		103.728	0	103.728	0	103.728	0	103.729	0	103.728	-1	103.728	0

Project Document











# monitoring table




Joint Venture

project: C310 Thames Tunnel

No. of reading		97. following		98. following									
date		18/08/2014		28/10/2014									
No.	baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline
	30041901	106.518	106.518	-1	106.517	0	-1						
30041902	106.538	106.538	0	106.538	0	-1							
30041903	106.588	106.587	-1	106.588	0	-1							
30041904	106.593	106.593	-1	106.593	0	0							
30041905	106.606	106.605	-1	106.605	0	-1							
30041906	106.525	106.524	0	106.524	0	-1							
30041907	106.689	106.689	0	106.688	0	-1							
30041908	103.860	103.859	-1	103.859	1	0							
30041909	103.728	103.727	-1	103.728	0	0							

Archiving Legacy Document

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 36**  
**Gateway Business Centre**

Learning Legacy Document



<b>monitoring asset</b>	<b>Gateway Business Center</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
<b>name of monitoring section:</b>	Gateway Business Center		
sensor type:	manual levelling studs		
chainage:	90930 - 91040	point no.:	3004 0651 - 3004 0658
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 -20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	05/02/13	0.00		
<b>TBM 1</b>	start ZOI	07/04/13	0.19	3004 0651
		15/04/13	1.22	3004 0658
	end ZOI	12/04/13	1.04	3004 0651
		19/04/13	0.32	3004 0658
				breached not any trigger value
<b>TBM 2</b>	start ZOI	11/07/13	1.02	3004 0651
		16/07/13	-0.66	3004 0658
	end ZOI	14/07/13	0.91	3004 0651
		19/07/13	-1.16	3004 0658
				breached not any trigger value
<b>longterm</b>	10/02/14	0.86 -2.34	3004 0651 3004 0658	

<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)

**summary / comments**

Overall, none of the points reached any trigger value.  
 Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

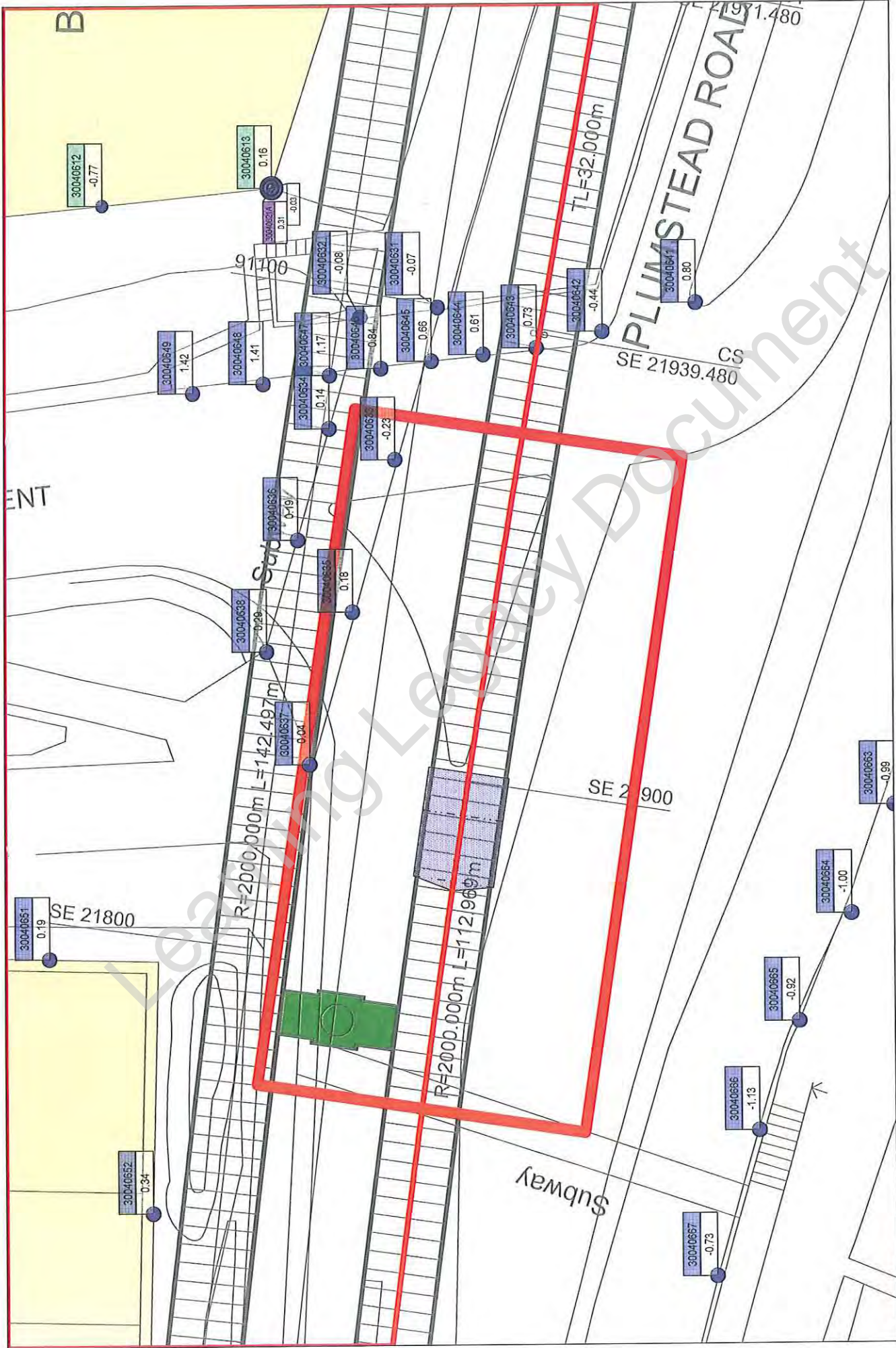
date / signature:

12/01/15

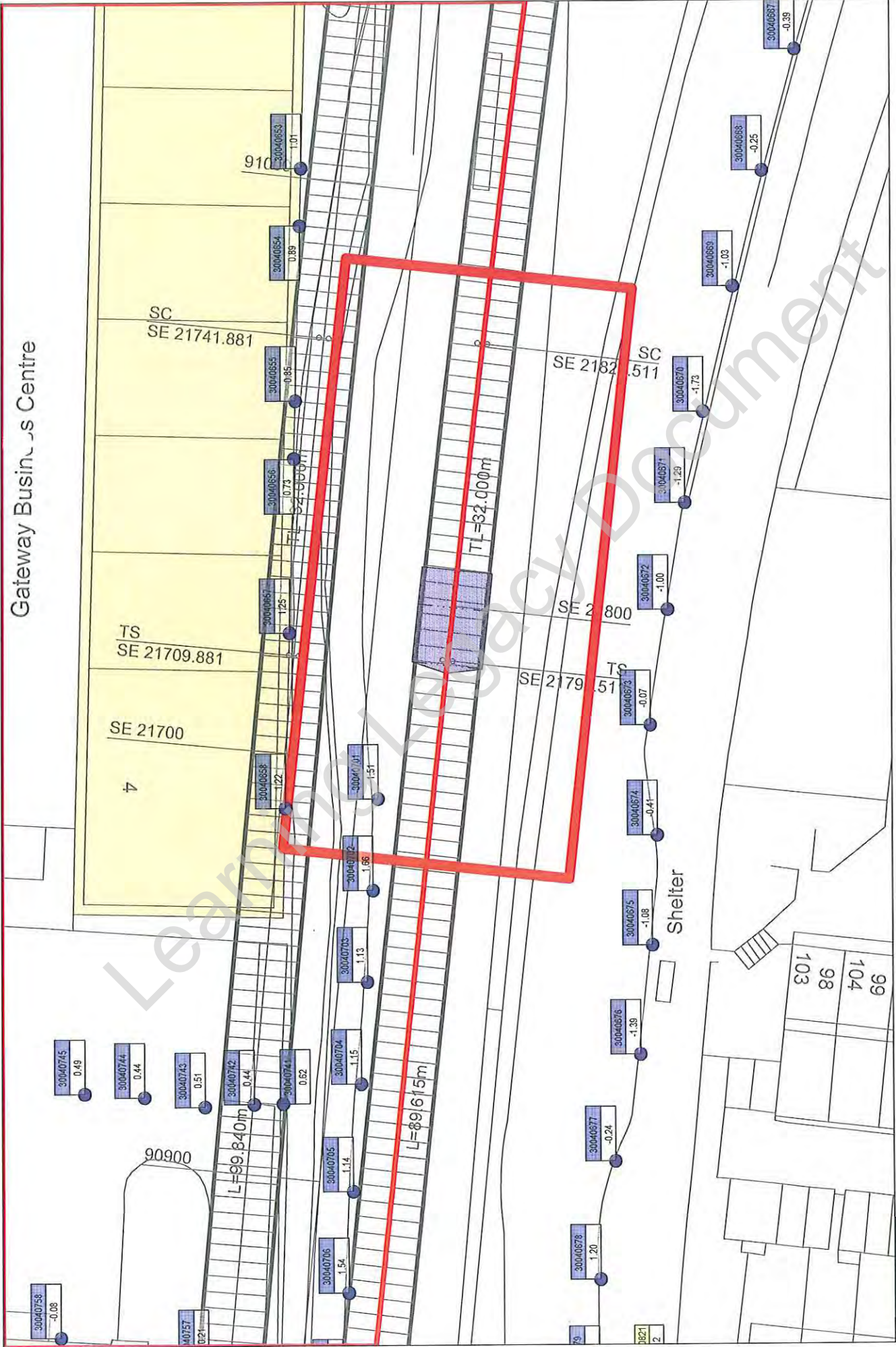
print name:

HMJV project role:

Monitoring & Survey engineer



Gateway Business Centre



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

working activities: TBM drive

current values: 15.04.2013 09:00

Point: 30040651



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Gateway Business Center 05.02.2013 - 10.02.2014  
date: 08.08.2014 07:52 current values: 08.08.2014 07:08

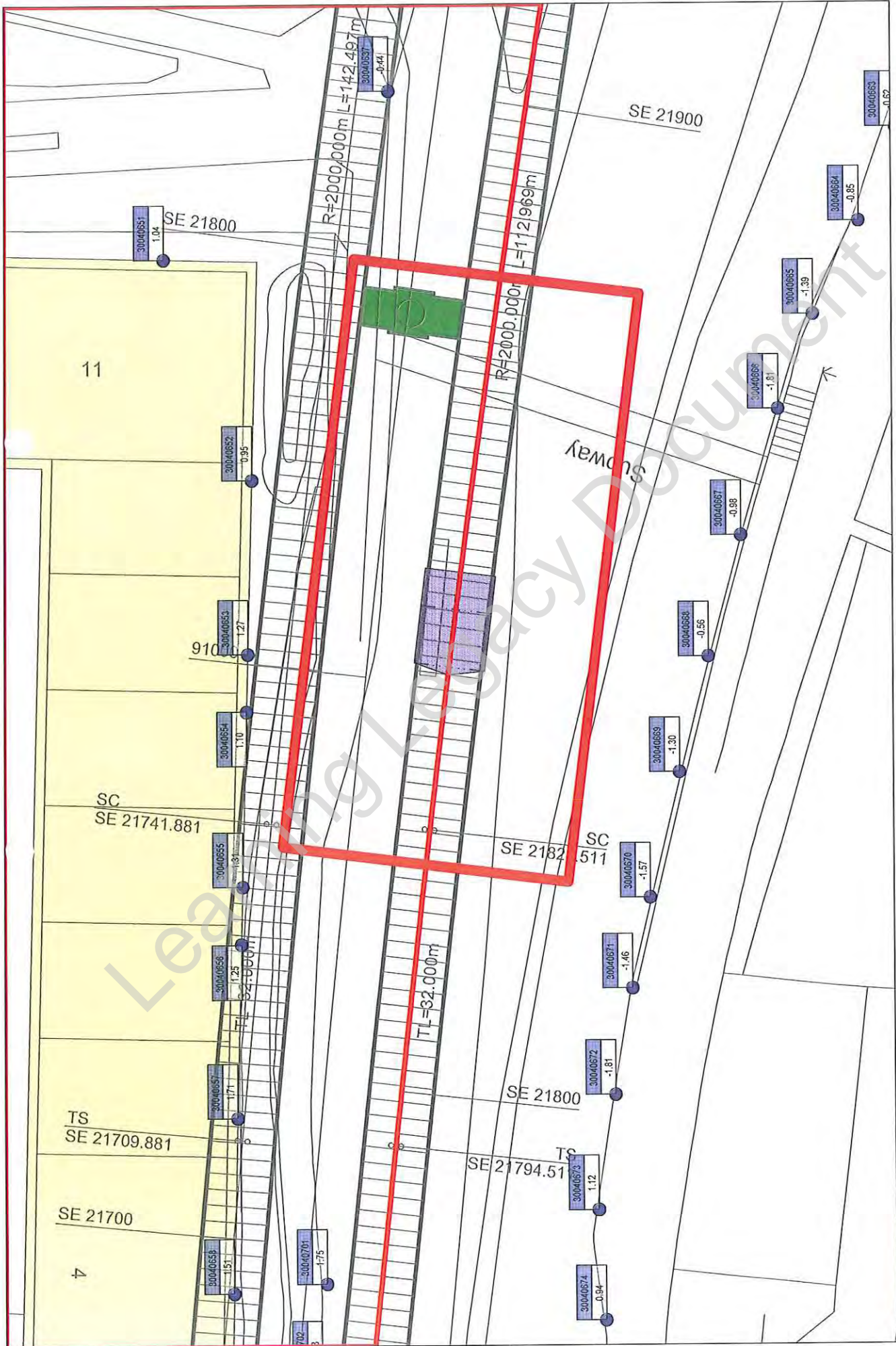


Point: 30040658

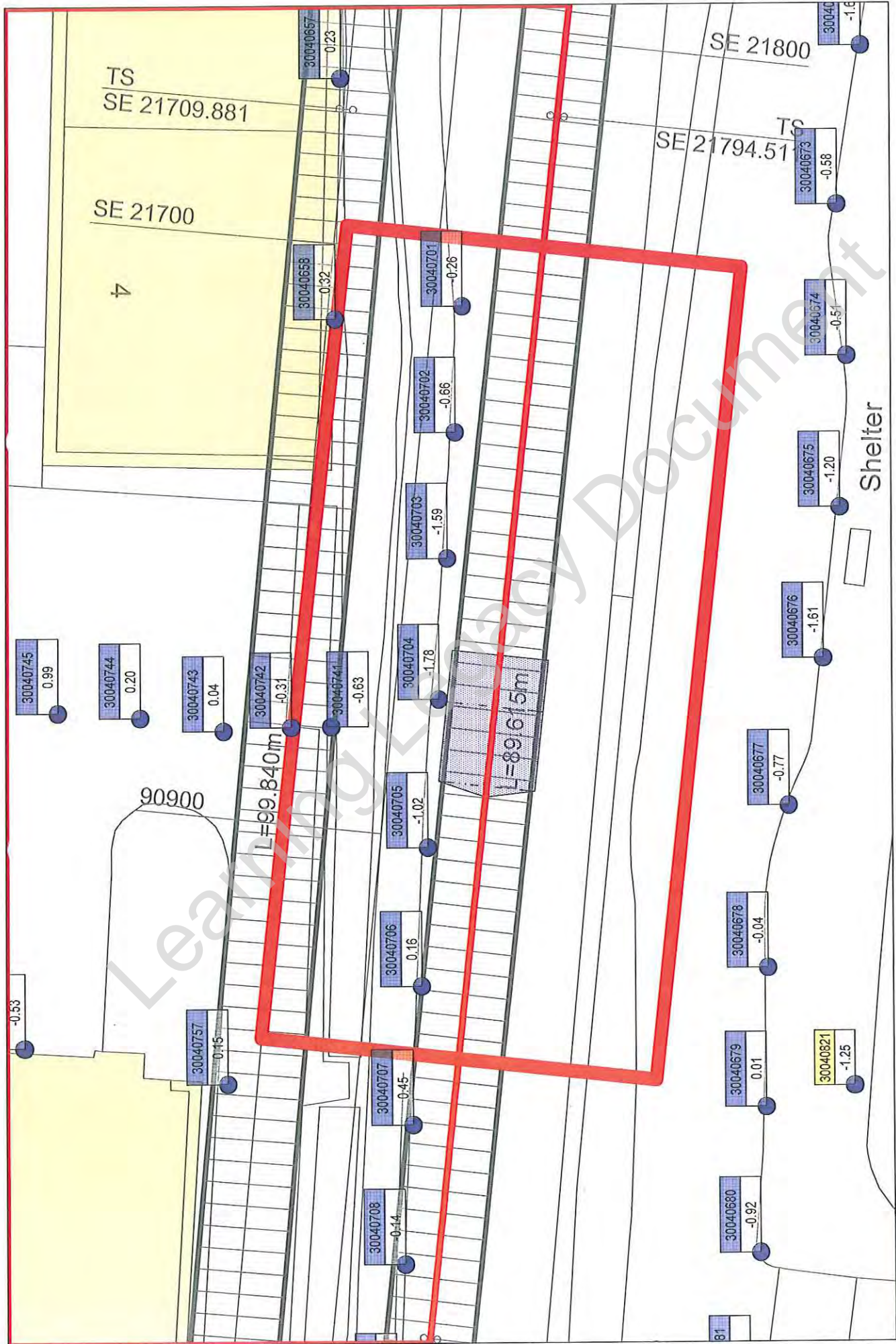


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Gateway Business Center 05.02.2013 - 10.02.2014  
date: 08.08.2014 07:55 current values: 08.08.2014 07:08

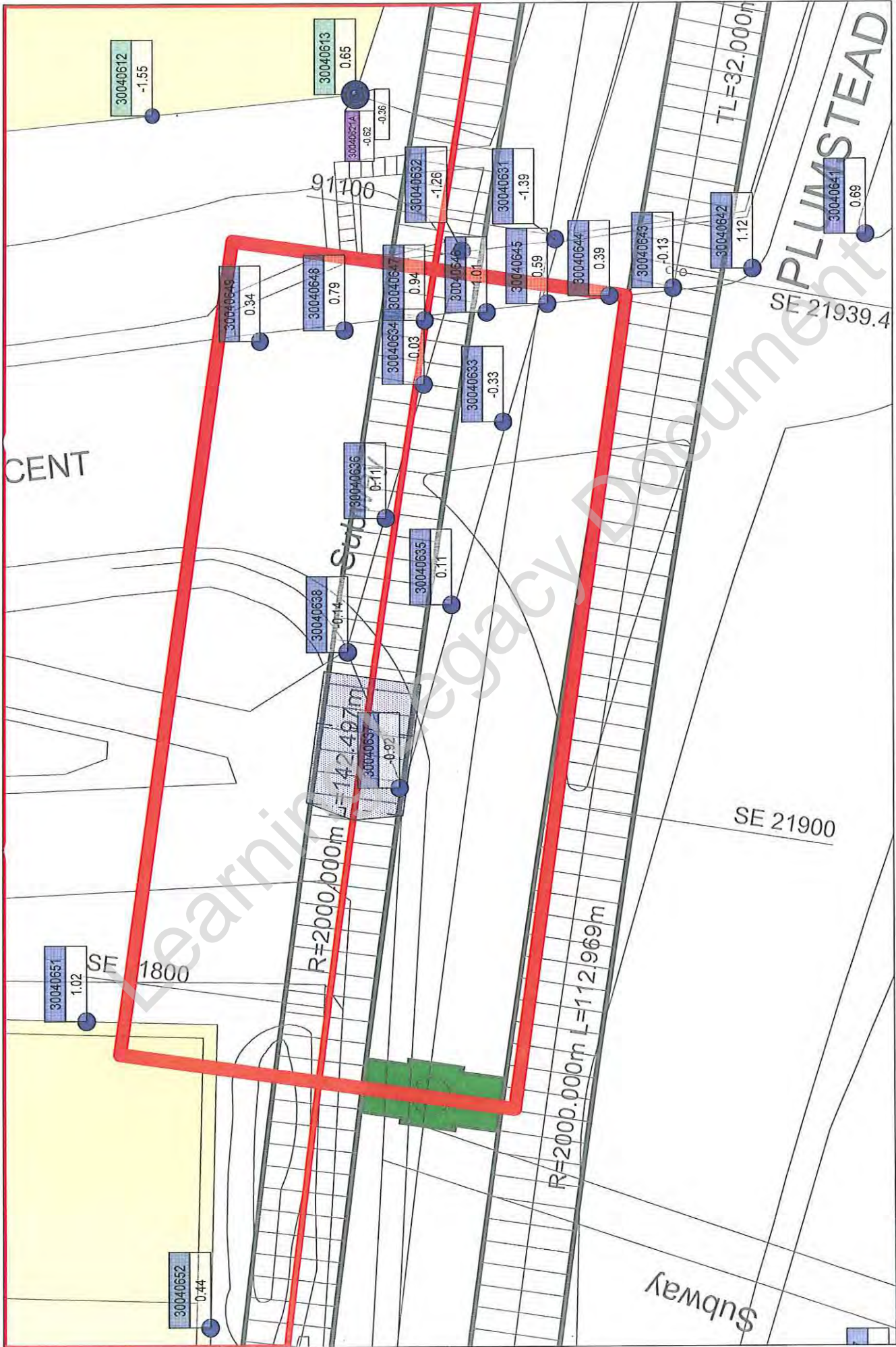




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 12.04.2013 17:44

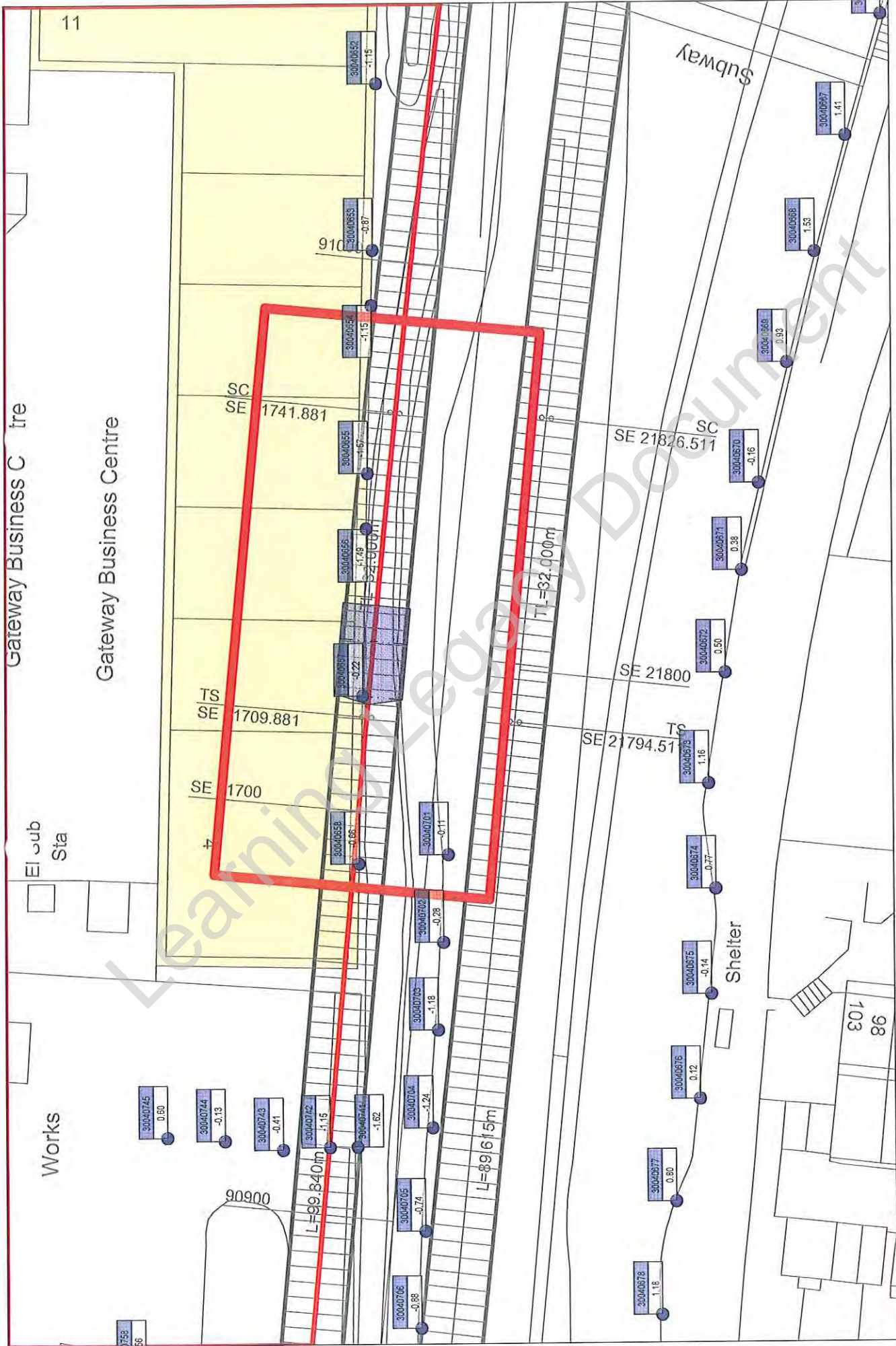


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 19.04.2013 17:33



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 11.07.2013 19:17





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 16.07.2013 18:24



Point: 30040651



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Gateway Business Center 05.02.2013 - 10.02.2014  
date: 08.08.2014 08:03 current values: 08.08.2014 07:49

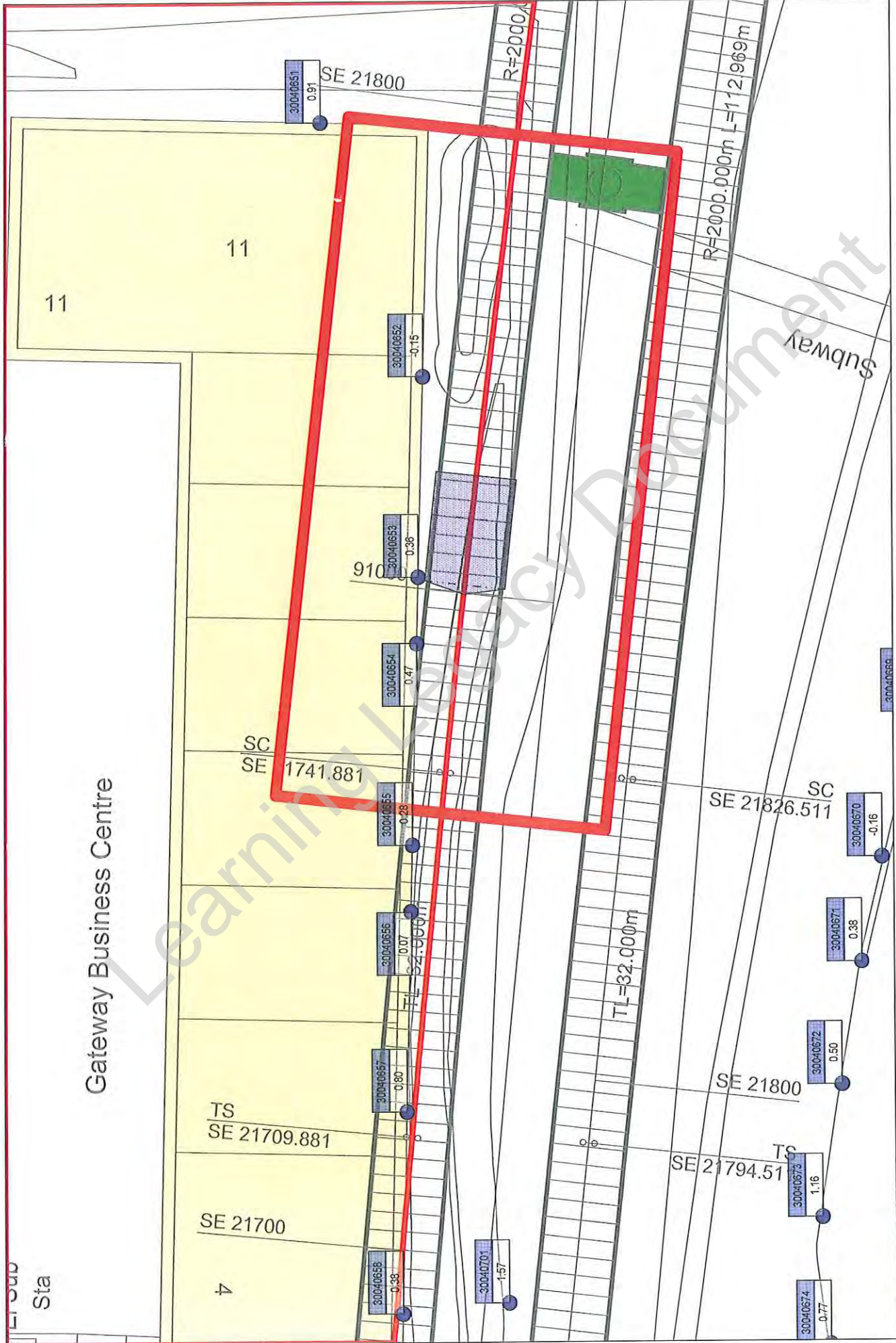


Point: 30040658



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Gateway Business Center 05.02.2013 - 10.02.2014  
date: 08.08.2014 08:07 current values: 08.08.2014 07:49





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 14.07.2013 17:53





Joint Venture

Joint Venture

project: C310 Thames Tunnel

structure: Gateway Business Centre Levelling studs

project: C310 Thames Tunnel

structure: Gateway Business Centre Levelling studs

No. of reading	date	1. following		2. following		3. following		4. following		5. following		6. following		7. following		8. following		9. following		10. following		11. following		12. following		
		baseline	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
3004 0651	104.920	104.920	0	104.920	0	104.920	0	104.920	0	104.920	0	104.920	0	104.920	0	104.920	0	104.920	0	104.920	0	104.920	0	104.920	0	104.920
3004 0652	104.922	104.922	0	104.922	0	104.922	0	104.922	0	104.922	0	104.922	0	104.922	0	104.922	0	104.922	0	104.922	0	104.922	0	104.922	0	104.922
3004 0653	104.923	104.923	0	104.923	0	104.923	0	104.923	0	104.923	0	104.923	0	104.923	0	104.923	0	104.923	0	104.923	0	104.923	0	104.923	0	104.923
3004 0654	104.912	104.912	0	104.912	0	104.912	0	104.912	0	104.912	0	104.912	0	104.912	0	104.912	0	104.912	0	104.912	0	104.912	0	104.912	0	104.912
3004 0655	104.944	104.944	0	104.944	0	104.944	0	104.944	0	104.944	0	104.944	0	104.944	0	104.944	0	104.944	0	104.944	0	104.944	0	104.944	0	104.944
3004 0656	104.959	104.959	0	104.959	0	104.959	0	104.959	0	104.959	0	104.959	0	104.959	0	104.959	0	104.959	0	104.959	0	104.959	0	104.959	0	104.959
3004 0657	104.973	104.973	0	104.973	0	104.973	0	104.973	0	104.973	0	104.973	0	104.973	0	104.973	0	104.973	0	104.973	0	104.973	0	104.973	0	104.973
3004 0658	104.979	104.979	0	104.979	0	104.979	0	104.979	0	104.979	0	104.979	0	104.979	0	104.979	0	104.979	0	104.979	0	104.979	0	104.979	0	104.979

Legacy Document

Joint Venture

project: C310 Thames Tunnel  
structure: Gateway Business Centre Levelling aids

Joint Venture

project: C310 Thames Tunnel  
structure: Gateway Business Centre Levelling aids

No. of reading	13. following		14. following		15. following		16. following		17. following		18. following		19. following		20. following		21. following		22. following		23. following		24. following			
	date	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline		
	5/7/13																									
3004 0651		104.929	104.930	0	1	104.931	0	1	104.931	0	1	104.930	0	1	104.931	0	1	104.930	-1	0	104.930	1	1	104.930	1	1
3004 0652		104.932	104.933	0	1	104.933	0	1	104.933	0	1	104.933	0	1	104.932	0	0	104.932	0	0	104.932	1	0	104.932	0	0
3004 0653		104.923	104.924	0	1	104.924	-1	1	104.924	0	1	104.924	0	1	104.924	0	1	104.923	0	0	104.924	0	1	104.924	0	0
3004 0654		104.912	104.913	0	1	104.913	0	1	104.913	0	1	104.913	0	1	104.912	0	1	104.912	0	0	104.912	0	1	104.912	0	0
3004 0655		104.944	104.945	0	1	104.945	0	1	104.945	0	1	104.945	0	1	104.944	0	0	104.944	0	0	104.944	0	0	104.944	0	0
3004 0656		104.958	104.960	0	1	104.960	0	1	104.960	0	1	104.960	0	1	104.960	0	1	104.959	-1	0	104.959	0	0	104.959	0	0
3004 0657		104.973	104.974	0	1	104.974	-1	1	104.973	0	0	104.974	1	1	104.974	0	1	104.973	0	0	104.973	0	0	104.973	0	1
3004 0658		104.979	104.980	0	1	104.980	0	1	104.979	0	1	104.980	1	1	104.979	-1	1	104.979	-1	0	104.979	0	0	104.979	0	0

Legacy Document

monitoring table



monitoring table



Joint Venture


project: C310 Thames Tunnel  
structure: Gateway Business Centre Levelling studs

Joint Venture

project: C310 Thames Tunnel  
structure: Gateway Business Centre Levelling studs

No. of reading	date	25. following		26. following		27. following		28. following		20. following		30. following		31. following		32. following		33. following		34. following		35. following		
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
3004 0651	14/07/2013	104.973	104.931	104.930	-1	104.929	-1	104.929	0	104.929	0	104.930	0	104.930	0	104.929	-1	104.930	1	104.930	0	104.930	0	1
3004 0652	14/07/2013	104.932	104.922	104.921	-1	104.920	-1	104.921	0	104.921	-1	104.921	0	104.922	1	104.922	0	104.921	0	104.921	0	104.922	0	1
3004 0653	14/07/2013	104.923	104.924	104.922	-1	104.922	0	104.922	0	104.922	1	104.922	0	104.922	0	104.922	0	104.922	0	104.922	0	104.922	0	-1
3004 0654	14/07/2013	104.912	104.912	104.911	-2	104.910	0	104.910	0	104.910	1	104.910	0	104.910	0	104.910	0	104.910	0	104.910	0	104.910	0	0
3004 0655	14/07/2013	104.944	104.945	104.942	-2	104.942	-1	104.942	0	104.942	0	104.942	0	104.942	0	104.942	0	104.942	0	104.942	0	104.942	0	-2
3004 0656	14/07/2013	104.959	104.960	104.958	-2	104.957	-1	104.956	0	104.958	1	104.957	0	104.957	0	104.957	0	104.957	0	104.957	0	104.957	0	-1
3004 0657	14/07/2013	104.973	104.973	104.972	-1	104.972	-1	104.971	-1	104.971	1	104.971	0	104.971	0	104.970	-1	104.971	0	104.971	0	104.971	0	-2
3004 0658	14/07/2013	104.970	104.970	104.978	-1	104.978	0	104.978	-1	104.978	0	104.977	0	104.977	-1	104.977	0	104.977	1	104.977	-1	104.976	0	-2



 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 37**

**CS8 – Signature Industries**

Learning Legacy Document

<b>monitoring asset</b>	<b>Parking Lot at Signature Industries</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
<b>name of monitoring section:</b>	CS8 Signature Industries		
sensor type:	manual levelling studs		
chainage:	90910	point no.:	3004 0741 - 3004 0745
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 -20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

	date	max. value	point no.	comments
<b>baseline</b>	14/03/13	0.00		
<b>TBM 1</b>	start ZOI	16/04/13	-0.06	3004 0741
	end ZOI	21/04/13	-0.24	3004 0741
<b>TBM 2</b>	start ZOI	18/07/13	-0.19	3004 0742
	end ZOI	20/07/13	-3.51	3004 0742
<b>longterm</b>	10/02/14	-5.30	3004 0742	

<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)

**summary / comments**

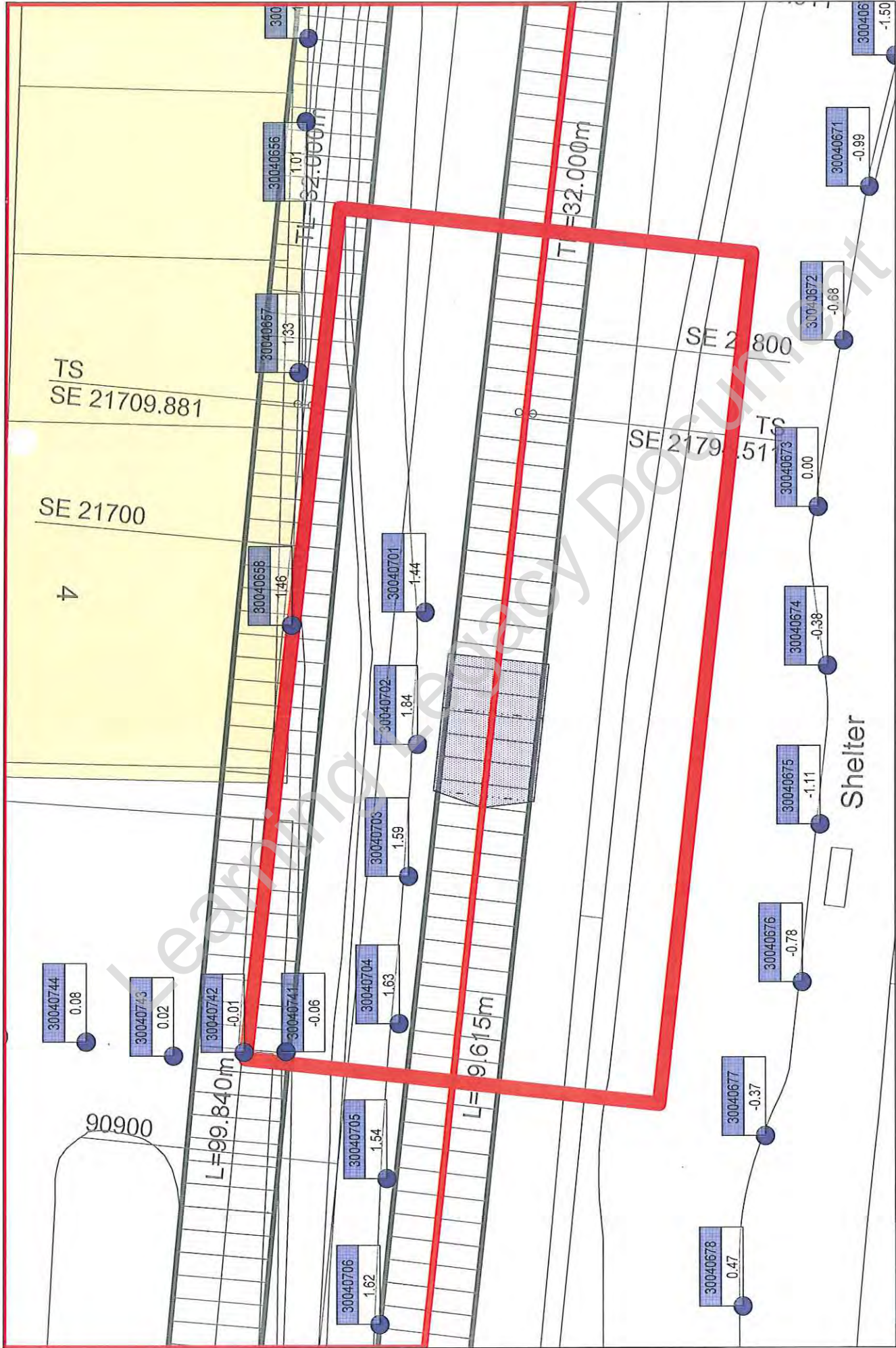
Overall, none of the points reached any trigger value.  
Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 12/01/15

print name:

HMJV project role:

Monitoring & Survey engineer

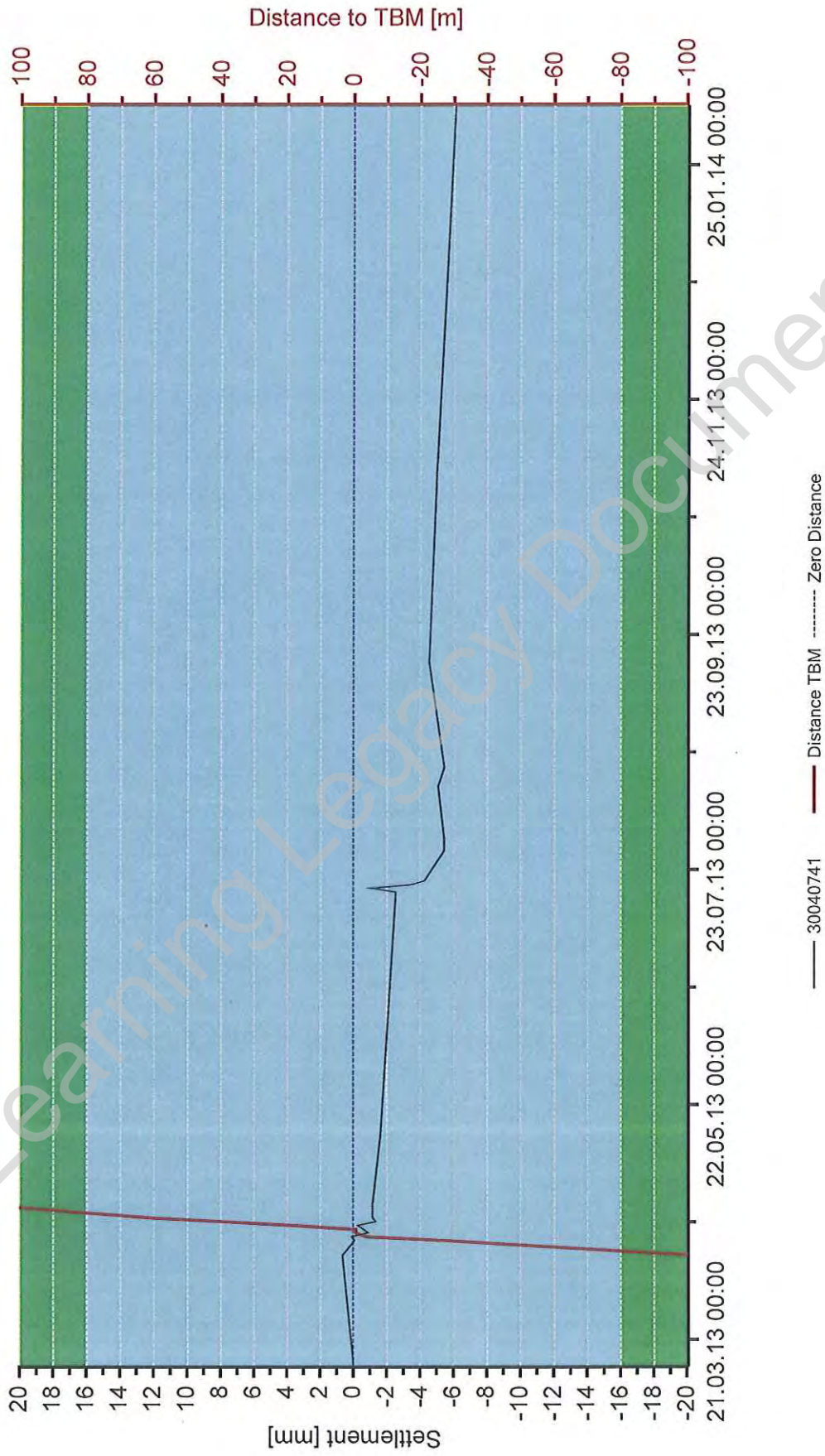


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

working activities: TBM drive

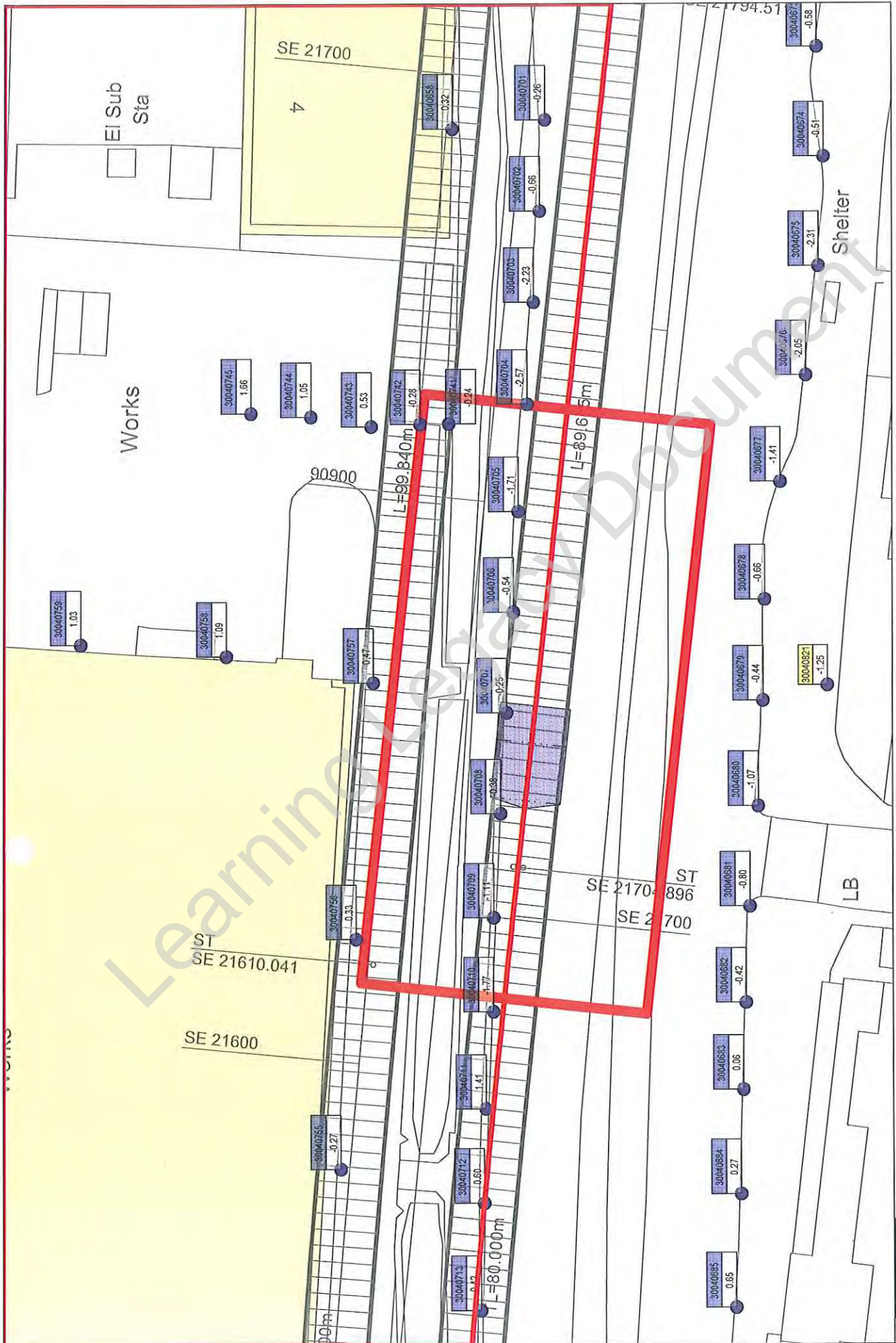
current values: 16.04.2013 17:57

Point: 30040741

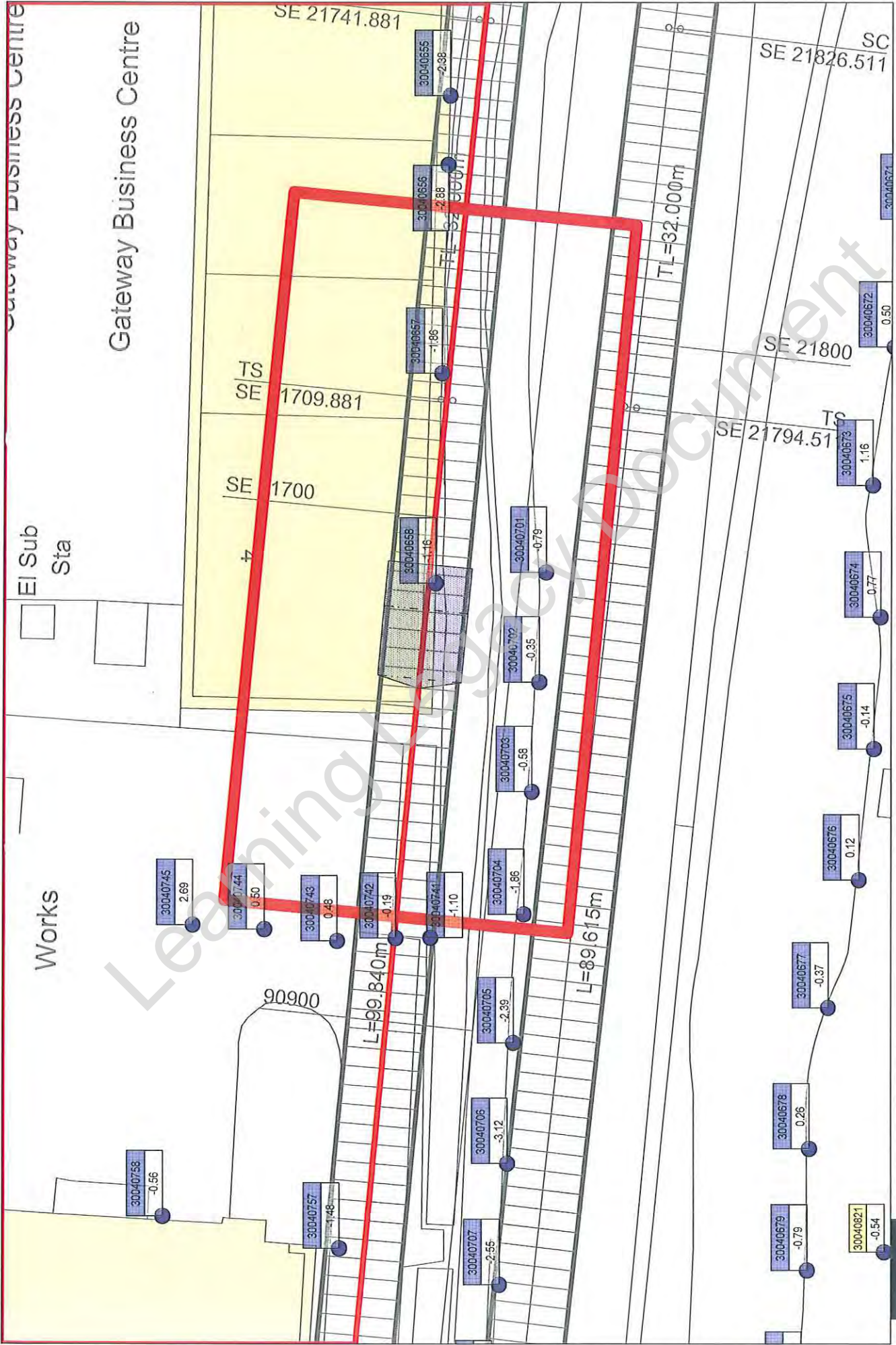


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - CS8 Signature Industries 14.03.2013 - 10.02.2014  
date: 08.08.2014 13:34 current values: 08.08.2014 13:24





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 21.04.2013 06:54



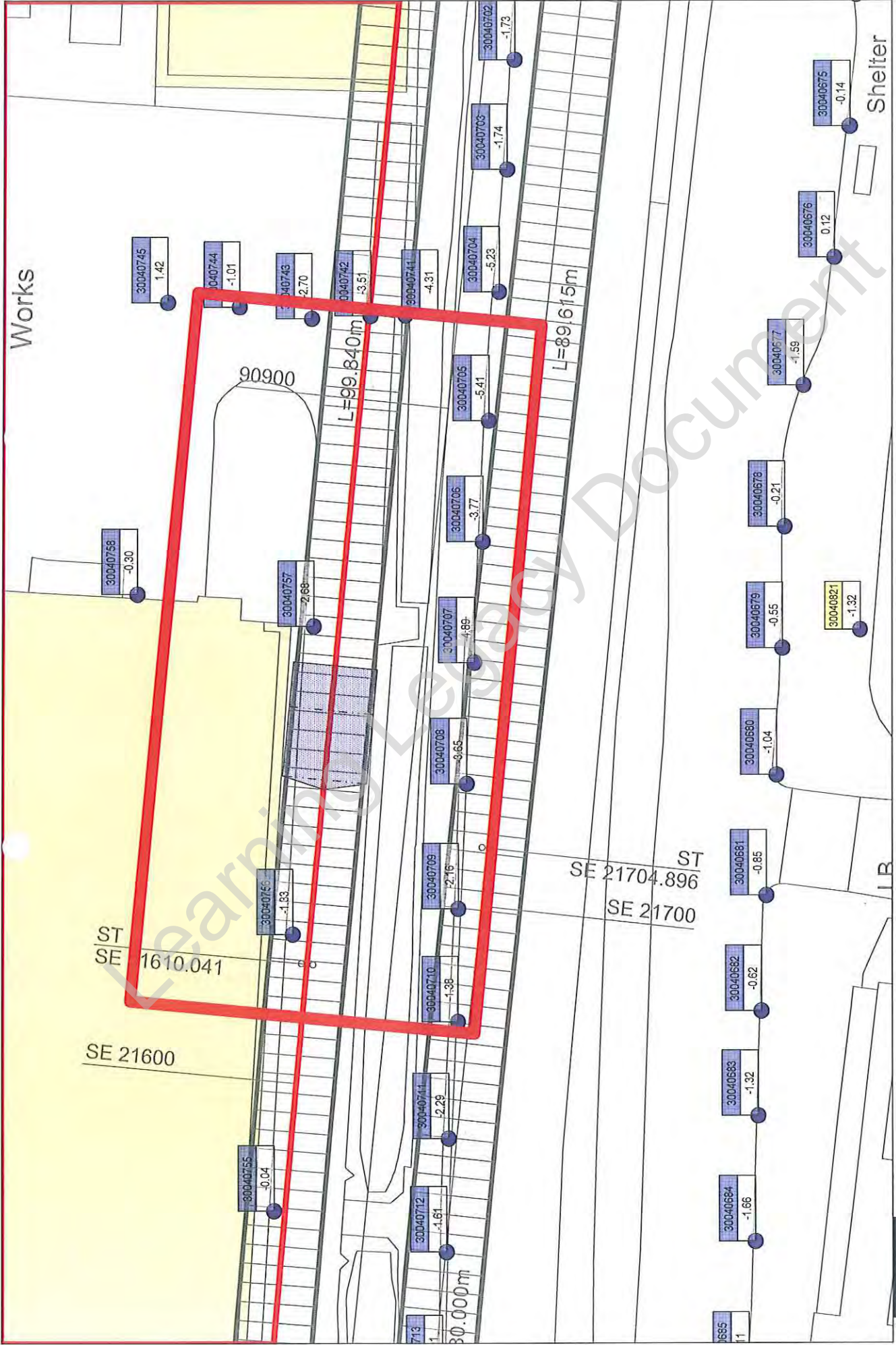
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 18.07.2013 09:00

Point: 30040742



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - CS8 Signature Industries 14.03.2013 - 10.02.2014  
date: 08.08.2014 13:43 current values: 08.08.2014 13:24





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 20.07.2013 17:44



Joint Venture

Joint Venture

project: C310 Thames Tunnel

project: C310 Thames Tunnel

No. of reading	Signature Industries Cross Section Levelling Studs																									
	baseline	1. following		2. following		3. following		4. following		5. following		6. following		7. following		8. following		9. following		10. following		11. following		12. following		
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
db16	1429.12	1502.2013	1234.2013	1794.2013	1864.2013	1934.2013	2004.2013	2164.2013	2234.2013	2304.2013	2464.2013	2534.2013	2604.2013	2674.2013	2744.2013	2814.2013	2884.2013	2954.2013	3024.2013	3094.2013	3164.2013	3234.2013	3304.2013	3374.2013	3444.2013	3514.2013
3004 0741	105.326	105.326	0	105.326	0	105.326	0	105.326	0	105.326	0	105.326	0	105.326	0	105.326	0	105.326	0	105.326	0	105.326	0	105.326	0	105.326
3004 0742	105.163	105.163	0	105.163	0	105.163	0	105.163	0	105.163	0	105.163	0	105.163	0	105.163	0	105.163	0	105.163	0	105.163	0	105.163	0	105.163
3004 0743	105.921	105.921	0	105.921	0	105.921	0	105.921	0	105.921	0	105.921	0	105.921	0	105.921	0	105.921	0	105.921	0	105.921	0	105.921	0	105.921
3004 0744	104.741	104.741	0	104.741	0	104.741	0	104.741	0	104.741	0	104.741	0	104.741	0	104.741	0	104.741	0	104.741	0	104.741	0	104.741	0	104.741
3004 0745	104.695	104.695	0	104.695	0	104.695	0	104.695	0	104.695	0	104.695	0	104.695	0	104.695	0	104.695	0	104.695	0	104.695	0	104.695	0	104.695

Legacy Document

Joint Venture


project: C310 Thames Tunnel  
structure: Signature Industries Cross Section Levelling Studs

Joint Venture

project: C310 Thames Tunnel  
structure: Signature Industries Cross Section Levelling Studs

No. of reading	13. following		14. following		15. following		16. following		17. following		18. following		19. following		20. following		21. following		22. following		23. following		
	baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
date	14/3/13	105.326	105.324	105.322	-2	105.321	-1	-4	105.320	0	-5	105.320	0	-5	105.330	0	-5	105.330	0	-5	105.329	-1	-6
Point No.		105.163	105.163	105.161	-2	105.160	-1	-4	105.159	0	-4	105.160	1	-4	105.159	1	-3	105.159	1	-5	105.158	-1	-5
		105.021	105.021	105.019	-2	105.018	-1	-3	105.018	0	-3	105.018	0	-3	105.018	0	-3	105.018	0	-3	105.017	-1	-1
		104.741	104.741	104.740	-1	104.740	0	-1	104.739	-1	-2	104.740	1	-1	104.740	0	-1	104.739	-1	-2	104.739	-1	-2
		104.695	104.698	104.696	-1	104.697	0	1	104.694	-3	-1	104.696	2	1	104.697	1	2	104.694	-1	-1	104.696	1	0
3004 0741																							
3004 0742																							
3004 0743																							
3004 0744																							
3004 0745																							

Legacy Document

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	<b>CROSSRAIL</b>	eB NO	<b>C310-HTM-C-RGN-CR148-50022</b>	Rev	<b>6.0</b>
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 38**  
**Signature Industries**

Learning Legacy Document

<b>monitoring asset</b>	<b>Signature Industries</b>		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
<b>name of monitoring section:</b>	Signature Industries		
sensor type:	manual levelling studs		
chainage:	90780 - 90880	point no.:	3004 0751 - 3004 0759
<b>trigger values:</b> [mm]	green: +16 -16	amber: +20 20	red: +25 -25
reference document for trigger values:	Management Plan for Control of Ground Movement		
EB-no.:	C310-HTM-Z-STP-CR148-50058		
Appendix:	AAA		

**monitoring data**

		date	max. value	point no.	comments
<b>baseline</b>		14/03/13	0.00		
<b>TBM 1</b>	start ZOI	19/04/13	0.15	3004 0757	
		25/04/13	-0.52	3004 0753	
	end ZOI	22/04/13	-0.39	3004 0757	breached not any trigger value
		28/04/13	-0.01	3004 0753	
<b>TBM 2</b>	start ZOI	19/07/13	-1.48	3004 0757	
		23/07/13	-0.07	3004 0753	
	end ZOI	21/07/13	-4.03	3004 0757	breached not any trigger value
		28/07/13	-1.69	3004 0753	
<b>longterm</b>		10/02/14	-5.81	3004 0757	
			-1.89	3004 0753	

<b>Evaluation of any potential residual risks</b>	<input checked="" type="checkbox"/>	<b>No residual risk</b> since the Works have been completed by HMJV
	<input type="checkbox"/>	<b>Yes, residual risk</b> (see comment below)

**summary / comments**

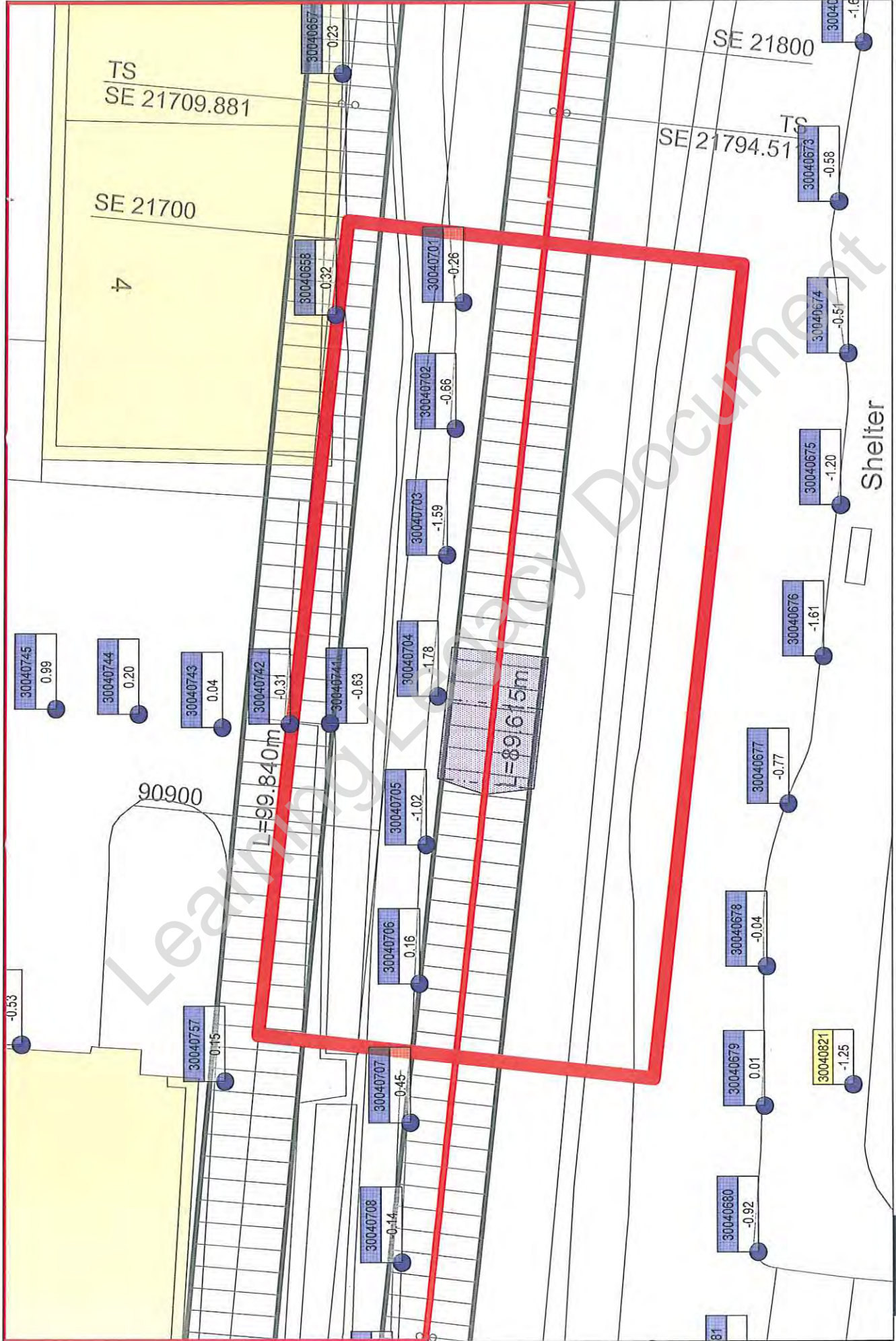
Overall, none of the points reached any trigger value.  
Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.  
The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 12/01/15

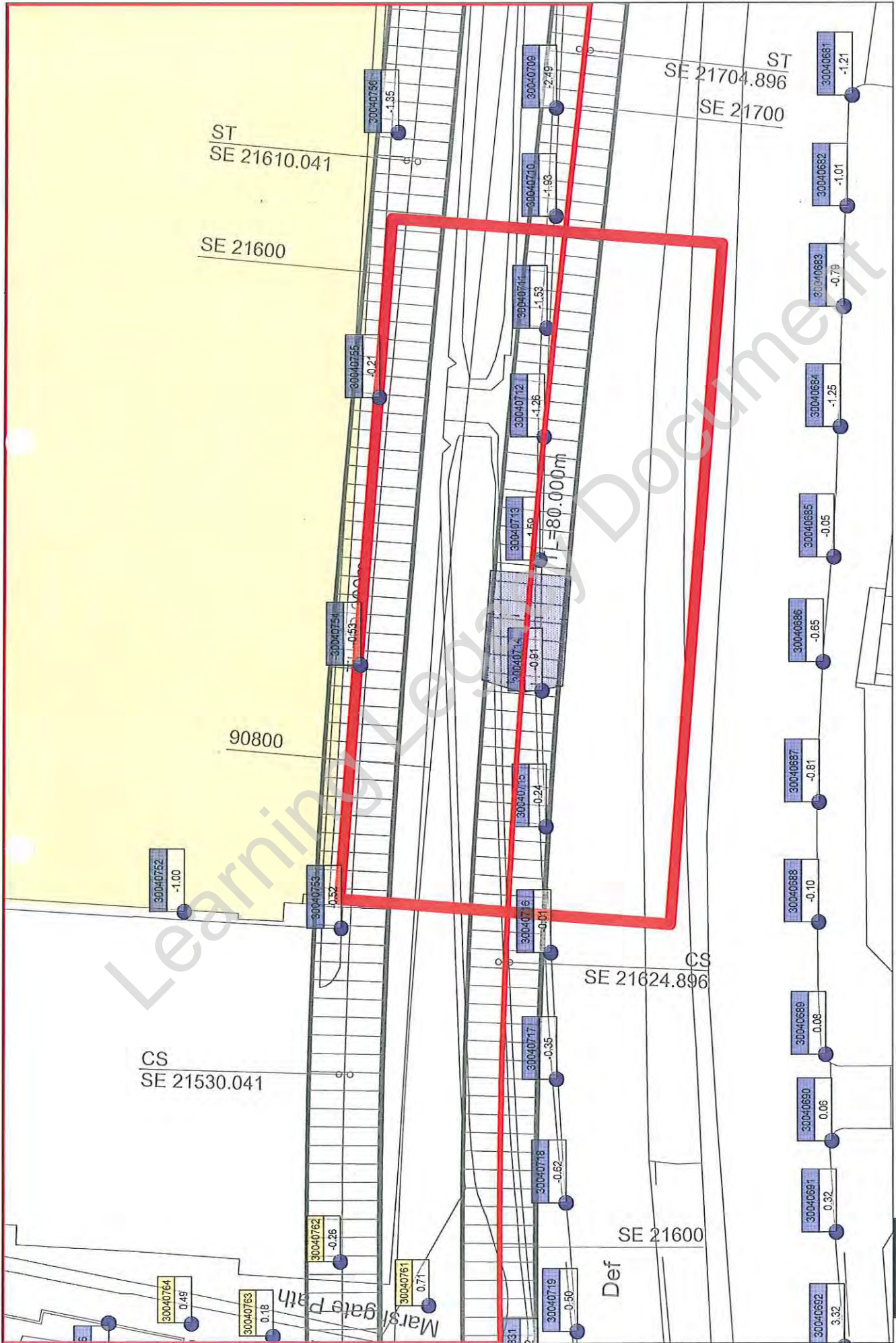
print name:

HMJV project role:

Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 19.04.2013 17:33



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 25.04.2013 09:00

Point: 30040757



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Signature Industries 14.03.2013 - 10.02.2014  
date: 08.08.2014 14:57 current values: 08.08.2014 14:47



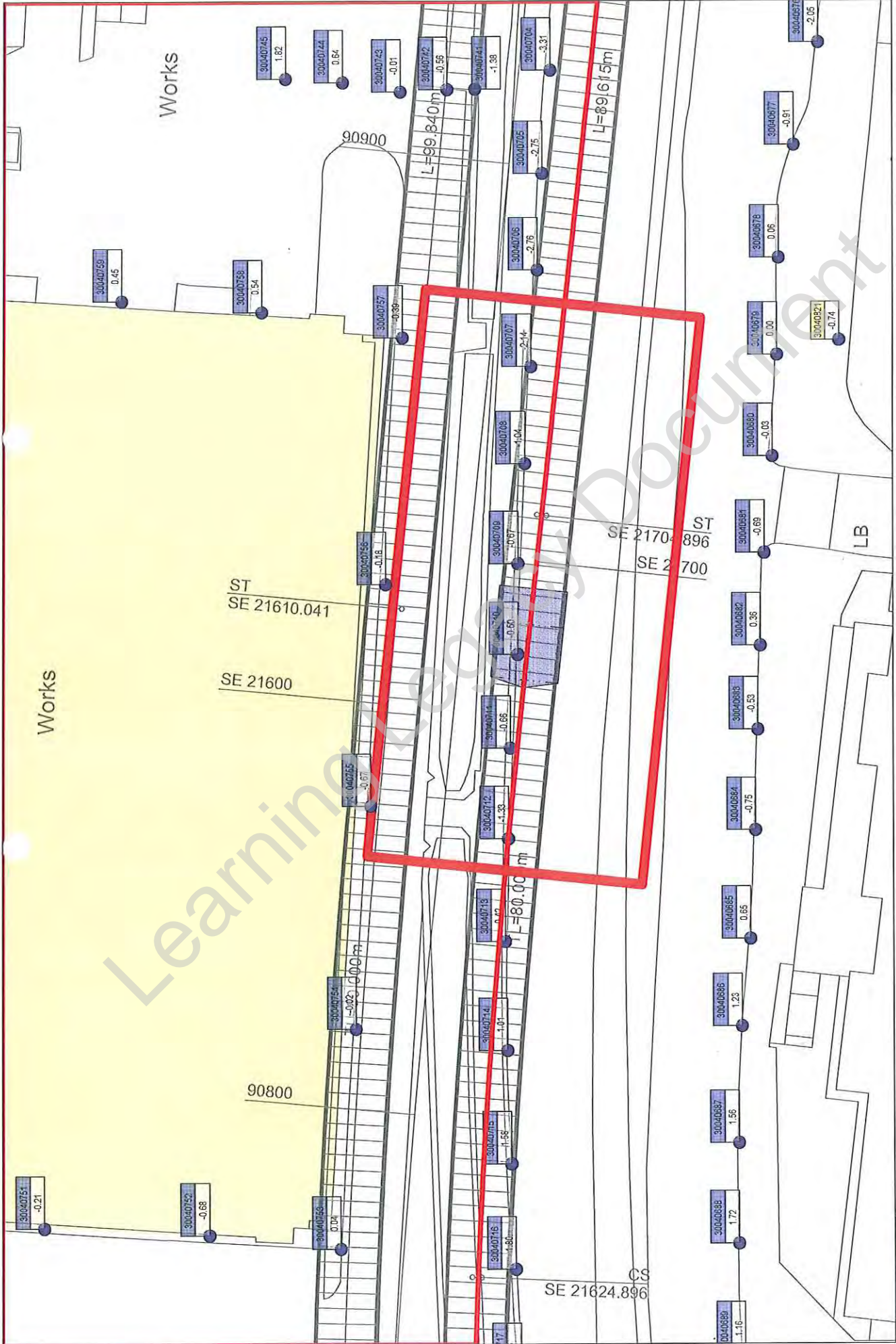
Point: 30040753



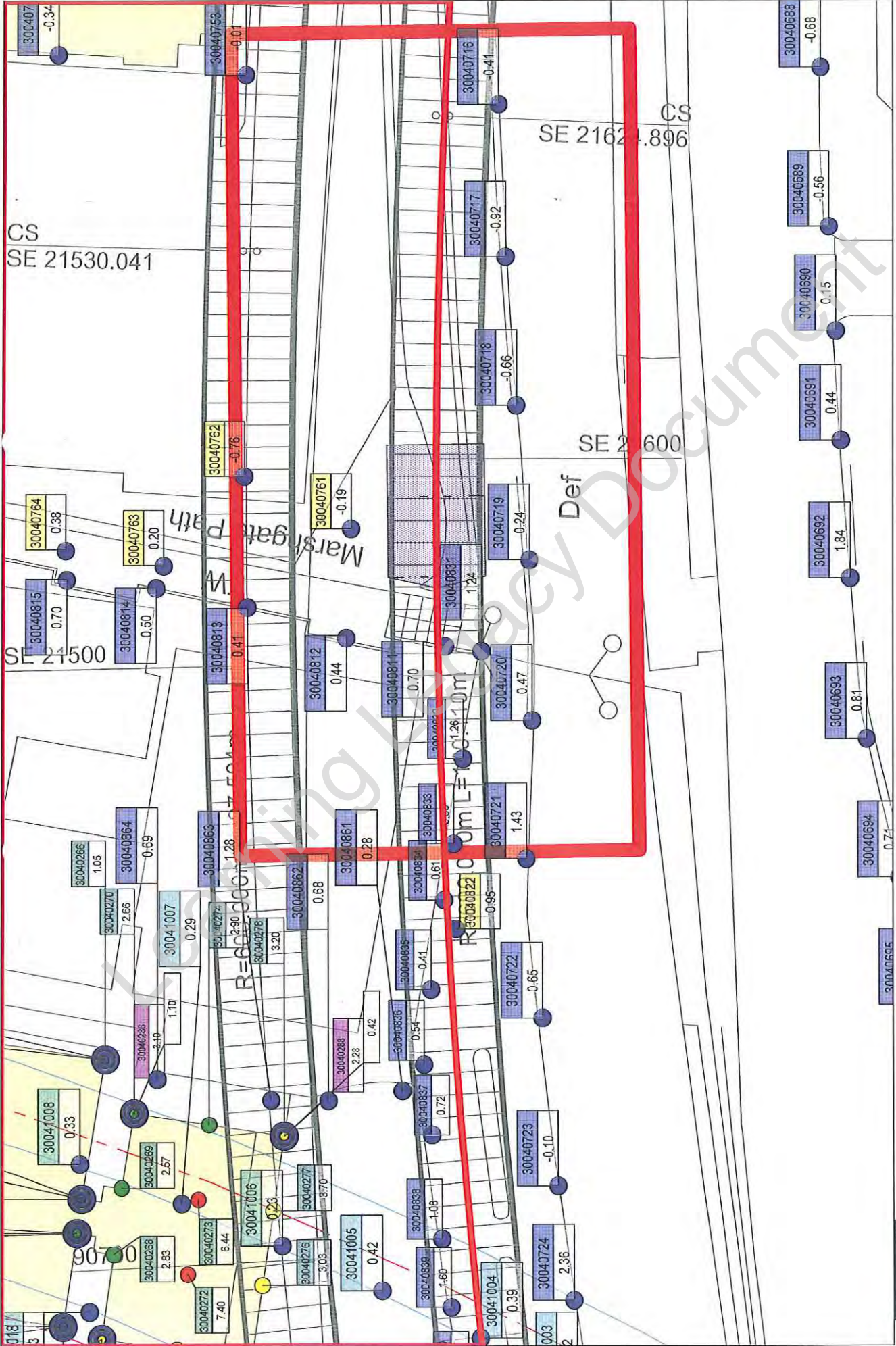
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: WB Tunnel - Signature Industries 14.03.2013 - 10.02.2014  
date: 08.08.2014 15:09 current values: 08.08.2014 14:47



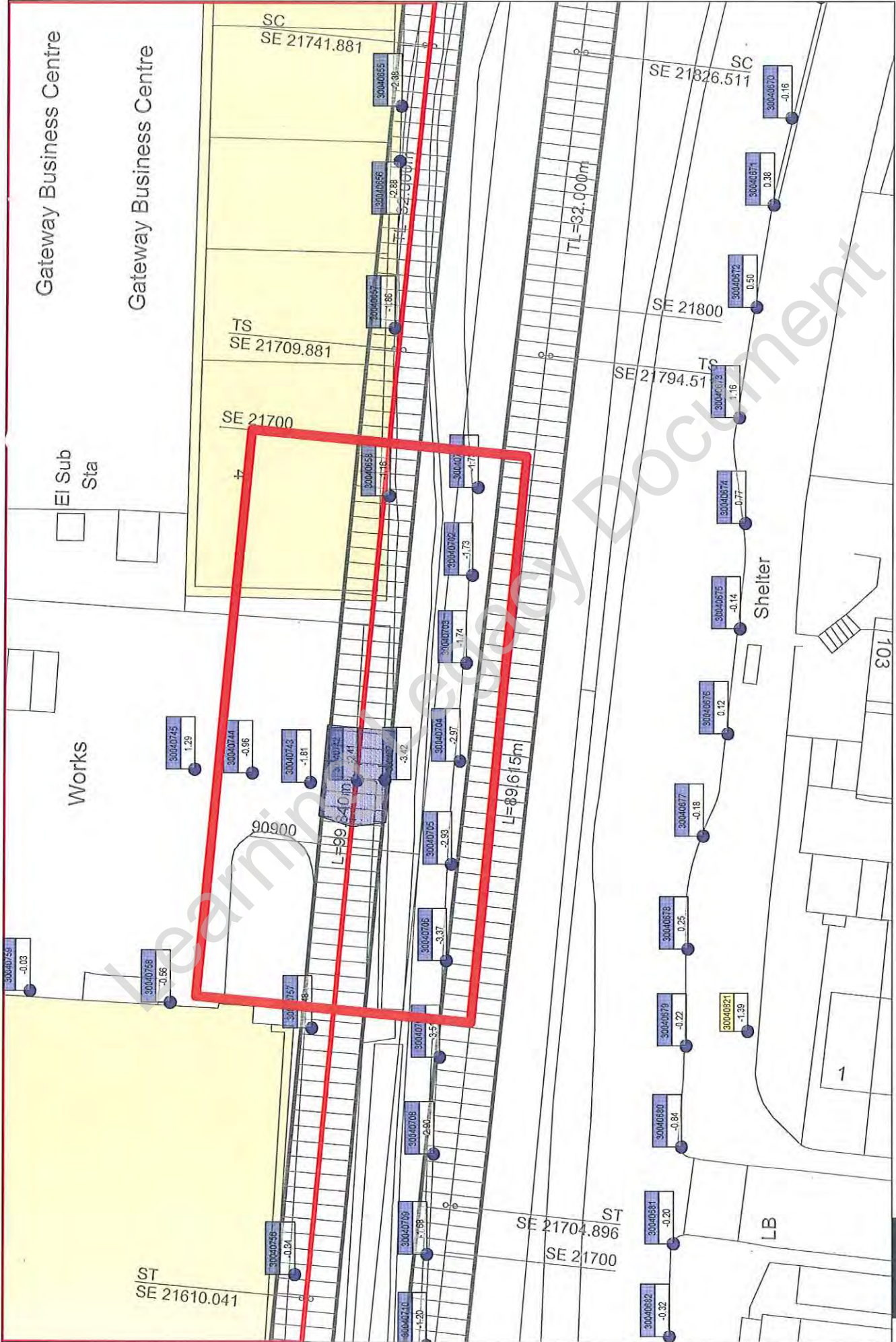




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 22.04.2013 06:59



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: TBM drive  
 current values: 28.04.2013 09:00

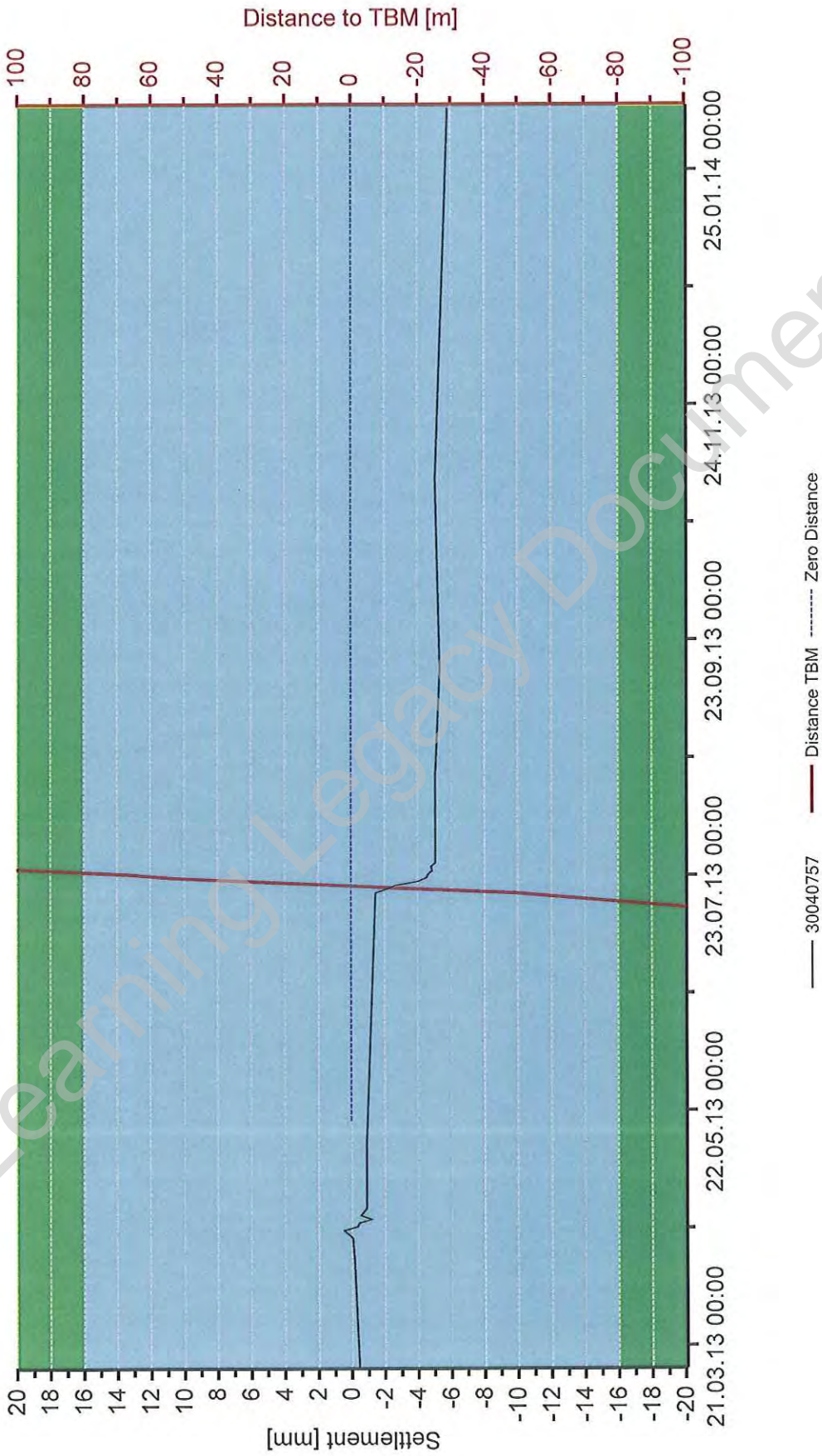


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 19.07.2013 09:00



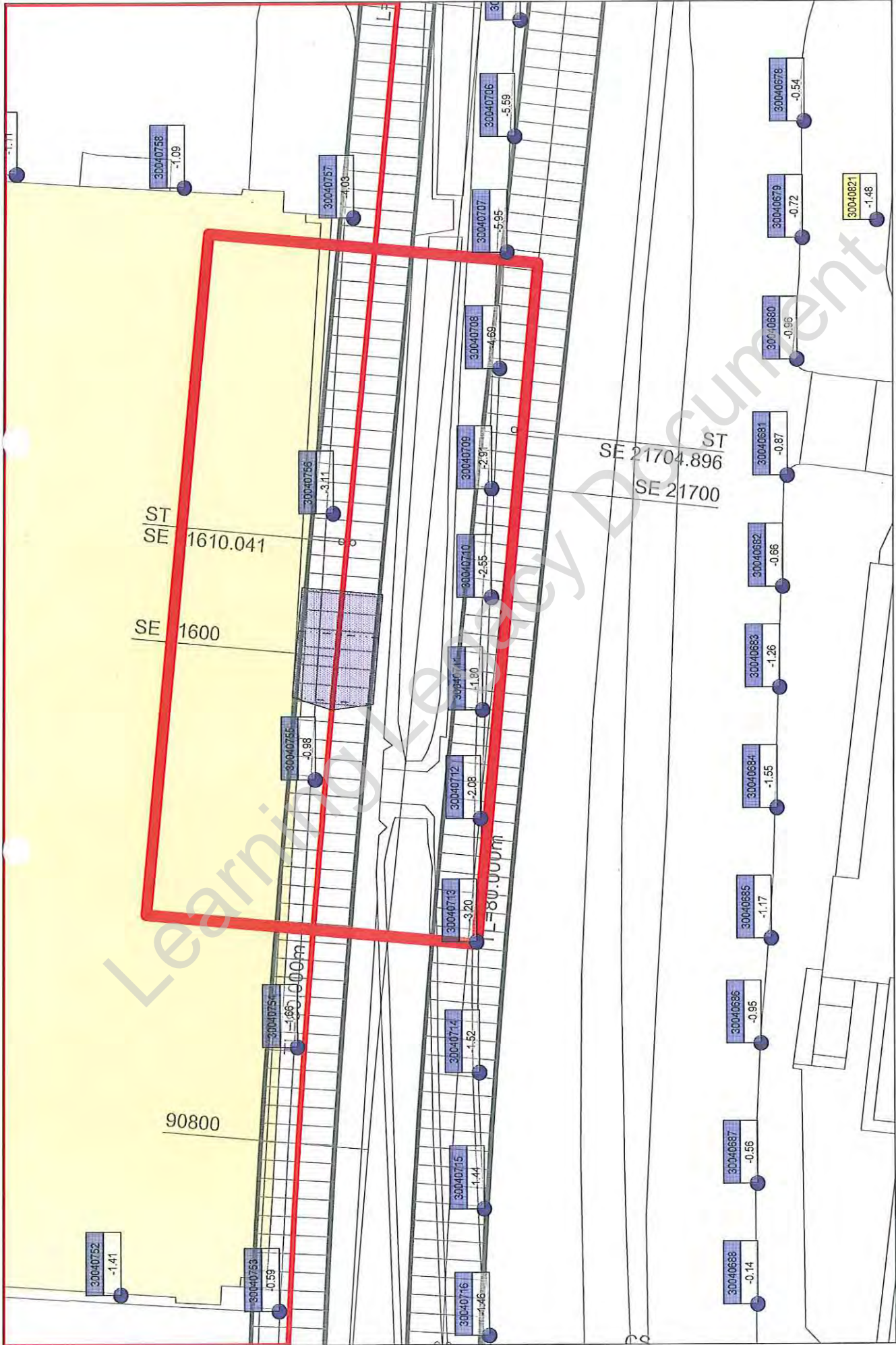


Point: 30040757



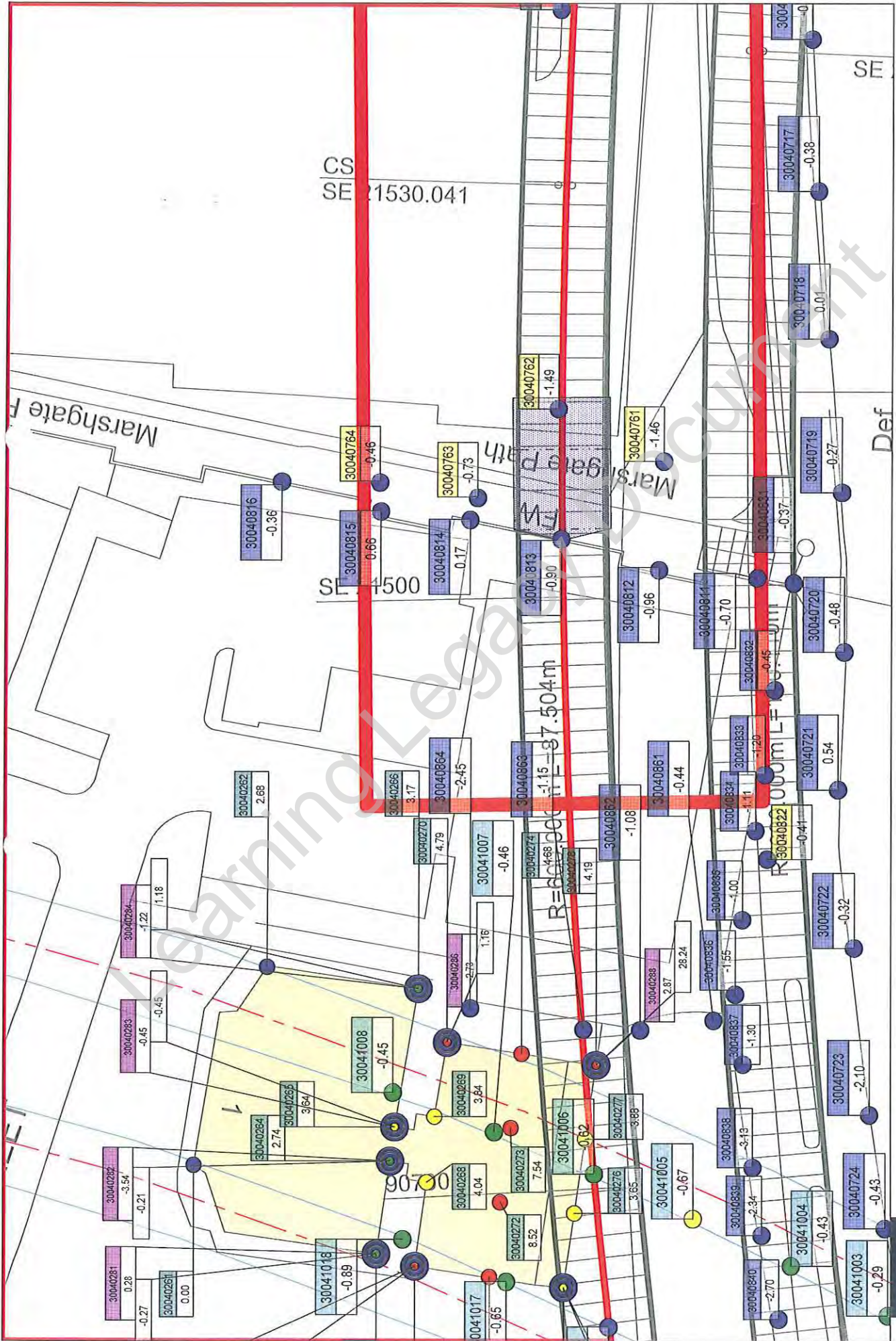
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
Close Out Report: EB Tunnel - Signature Industries 14.03.2013 - 10.02.2014  
date: 08.08.2014 15:25 current values: 08.08.2014 15:17





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 21.07.2013 19:29





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal  
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab  
 current values: 28.07.2013 17:34



Joint Venture

project: C310 Thames Tunnel

Joint Venture

project: C310 Thames Tunnel

Joint Venture

No. of reading	baseline	1. following		2. following		3. following		4. following		5. following		6. following		7. following		8. following		9. following		10. following		11. following		12. following									
		date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline					
	14913	15/03/2013	12/04/2013	17/04/2013	18/04/2013	19/04/2013	20/04/2013	21/04/2013	22/04/2013	23/04/2013	24/04/2013	25/04/2013	26/04/2013	27/04/2013	28/04/2013	29/04/2013	30/04/2013	01/05/2013	02/05/2013	03/05/2013	04/05/2013	05/05/2013	06/05/2013	07/05/2013	08/05/2013	09/05/2013	10/05/2013	11/05/2013	12/05/2013				
Point No.	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline				
3004 0751	104.688	104.688	0	104.688	0	104.688	0	104.688	0	104.688	0	104.688	0	104.688	0	104.688	0	104.688	0	104.688	0	104.688	0	104.688	0	104.688	0	104.688	0	104.688	0		
3004 0752	104.704	104.702	-1	104.703	1	-1	104.703	1	-1	104.703	1	-1	104.703	1	-1	104.703	1	-1	104.703	1	-1	104.703	1	-1	104.703	1	-1	104.703	1	-1	104.704	1	0
3004 0753	105.281	105.280	0	105.281	0	0	105.281	0	0	105.281	0	0	105.281	0	0	105.281	0	0	105.281	0	0	105.281	0	0	105.281	0	0	105.281	0	0	105.281	0	0
3004 0754	105.289	105.289	0	105.289	0	0	105.289	0	0	105.289	0	0	105.289	0	0	105.289	0	0	105.289	0	0	105.289	0	0	105.289	0	0	105.289	0	0	105.289	0	0
3004 0755	105.277	105.275	-1	105.277	0	0	105.277	0	0	105.277	0	0	105.277	0	0	105.277	0	0	105.277	0	0	105.277	0	0	105.277	0	0	105.277	0	0	105.277	0	0
3004 0756	105.279	105.279	0	105.279	0	0	105.279	0	0	105.279	0	0	105.279	0	0	105.279	0	0	105.279	0	0	105.279	0	0	105.279	0	0	105.279	0	0	105.279	0	0
3004 0757	105.262	105.261	0	105.262	0	0	105.262	0	0	105.262	0	0	105.262	0	0	105.262	0	0	105.262	0	0	105.262	0	0	105.262	0	0	105.262	0	0	105.262	0	0
3004 0758	104.661	104.660	0	104.660	0	0	104.660	0	0	104.660	0	0	104.660	0	0	104.660	0	0	104.660	0	0	104.660	0	0	104.660	0	0	104.660	0	0	104.661	0	0
3004 0759	104.679	104.679	0	104.679	0	0	104.679	0	0	104.679	0	0	104.679	0	0	104.679	0	0	104.679	0	0	104.679	0	0	104.679	0	0	104.679	0	0	104.679	0	0

Legacy Document



Joint Venture

project: C310 Thames Tunnel  
structure: Signature Industries Building Levelling Studs

Joint Venture

project: C310 Thames Tunnel  
structure: Signature Industries Building Levelling Studs

No. of reading	date	13. following		14. following		15. following		16. following		17. following		18. following		19. following		20. following		21. following		22. following		23. following		24. following				
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline			
3004 0751	14/5/13	104.688	0	104.688	0	104.687	0	104.687	0	104.687	0	104.687	0	104.688	1	104.688	0	104.688	0	104.688	0	104.687	-1	104.687	-1	104.688	1	0
3004 0752		104.704	0	104.704	0	104.702	-1	104.702	0	104.702	0	104.702	0	104.702	0	104.702	0	104.702	0	104.702	-1	104.702	0	104.702	0	104.702	1	-1
3004 0753		105.280	0	105.281	1	105.280	0	105.280	0	105.280	0	105.280	0	105.280	0	105.280	0	105.280	0	105.280	0	105.279	-1	105.279	0	105.279	0	-1
3004 0754		105.289	0	105.289	0	105.288	-1	105.288	-1	105.288	-1	105.288	-1	105.288	1	105.288	0	105.288	0	105.287	-1	105.287	0	105.287	0	105.287	0	-1
3004 0755		105.277	0	105.277	0	105.276	-1	105.277	0	105.276	-1	105.276	-1	105.276	-1	105.275	-2	105.275	0	105.275	0	105.274	-2	105.274	0	105.274	0	-2
3004 0756		105.279	0	105.279	0	105.278	-1	105.278	-1	105.278	-1	105.278	-1	105.278	0	105.276	-2	105.276	0	105.276	0	105.276	0	105.276	0	105.276	0	-4
3004 0757		105.252	0	105.251	0	105.250	-1	105.250	-1	105.250	-1	105.250	-1	105.250	-1	105.250	-1	105.250	-1	105.250	-1	105.250	-1	105.250	0	105.250	0	-5
3004 0758		104.651	-1	104.650	-1	104.650	-1	104.650	-1	104.650	-1	104.650	-1	104.650	-1	104.650	-1	104.650	-1	104.650	-1	104.650	-1	104.650	0	104.650	0	-1
3004 0759		104.679	0	104.679	0	104.679	-1	104.679	-1	104.679	-1	104.679	-1	104.679	1	104.679	0	104.679	0	104.679	0	104.679	-1	104.679	0	104.679	1	0



monitoring table



monitoring table




Joint Venture

Joint Venture

No. of reading	baseline	project: C310 Thames Tunnel															
		structure: Signature Industries Building Levelling Studs					structure: Signature Industries Building Levelling Studs										
date	14/01/13	25. following		26. following		27. following		28. following		29. following		30. following		31. following		32. following	
		2007/2013	31/07/2013	14/08/2013	22/09/2013	10/09/2013	07/10/2013	05/11/2013	10/02/2014	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
Point No.	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	
3004 0751	104.688	0	104.687	-1	104.688	0	104.688	0	104.687	-1	104.688	1	0	104.688	0	0	
3004 0752	104.704	0	104.702	-1	104.702	0	104.702	-1	104.701	0	104.703	2	-1	104.703	0	-1	
3004 0753	105.281	0	105.279	0	105.279	0	105.279	0	105.279	-1	105.279	1	-1	105.279	-1	-2	
3004 0754	105.289	0	105.287	0	105.286	-1	105.287	1	105.286	-1	105.285	-1	-2	105.286	-1	-3	
3004 0755	105.277	0	105.274	0	105.273	-1	105.275	1	105.273	-2	105.273	0	-4	105.274	-1	-3	
3004 0756	105.279	0	105.276	0	105.275	-1	105.276	1	105.274	-2	105.274	0	-5	105.275	1	-4	
3004 0757	105.282	0	105.257	0	105.257	0	105.257	0	105.257	0	105.255	-2	-7	105.257	0	-6	
3004 0758	104.651	0	104.650	-1	104.650	0	104.650	1	104.650	-1	104.650	0	-2	104.650	0	-1	
3004 0759	104.679	0	104.678	-1	104.678	0	104.678	1	104.678	-1	104.677	0	-2	104.679	2	0	

Legacy Document

 <b>HOCHTIEF MURPHY</b> <b>Joint Venture</b>		<b>C310 THAMES TUNNEL</b> <b>REPORT</b>			
EMPLOYER	CROSSRAIL	eB NO	C310-HTM-C-RGN-CR148-50022	Rev	6.0
TITLE	<b>Monitoring Close-Out Reports relating to Tunnelling Works</b> <b>Plumstead Portal – Woolwich Station Box - North Woolwich Portal (Store Rd)</b>				

**APPENDIX 39**

**Geotechnical Cross Section 2**

Learning Legacy Document