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

APPENDIX 39

Geotechnical Cross Section 2

Learning Legacy Document

monitoring asset	Area of Marshgate Path (MGH)		
reference monitoring drawing:	C310-HTM-C-DWG-CR148-PT005-50010		
name of monitoring section:	Geotechnical Cross Section 2 (GCS2)		
sensor type:	manual levelling studs piezometer, inclinometer and extensometer		
chainage:	90750	point no.:	3004 0461 - 3004 0464
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	22/03/13	0.00		
TBM 1	start ZOI	26/04/13	0.71	3004 0761
	end ZOI	30/04/13	-0.96	3004 0761
TBM 2	start ZOI	24/07/13	-0.48	3004 0762
	end ZOI	30/07/13	-2.00	3004 0762
longterm	11/02/14	-2.79	3004 0761	
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

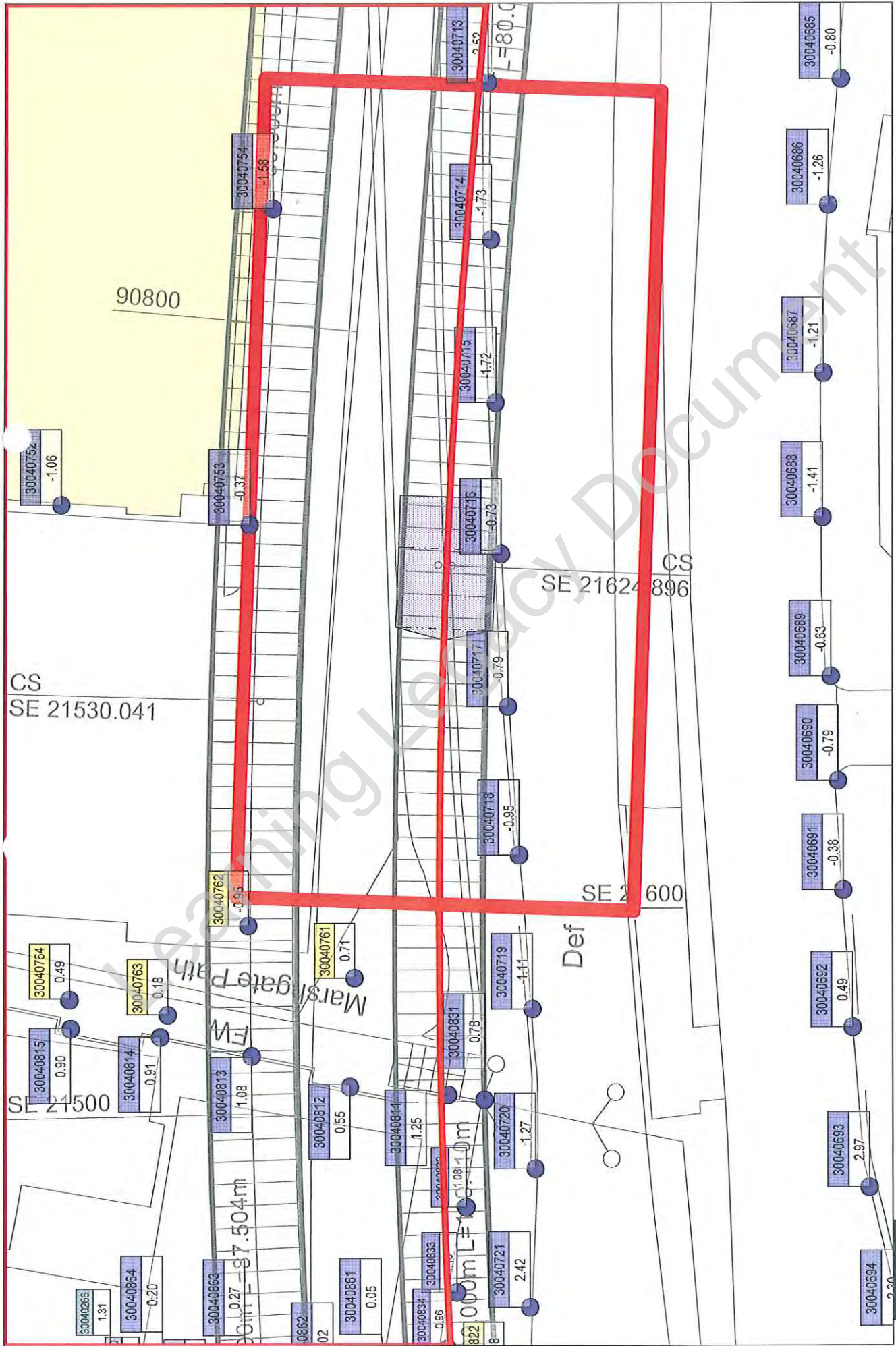
the Geotechnical Cross Section 2 depends out of 2no. extensometer (3004 0761 and 3004 0762), 1no inclinometer (3004 0763) and 1 no piezometer (3004 0764) - on every loction of the in-ground instruments is also a precise levelling surface point
 Points 3004 0762 - 3004 0764 were damaged after 22.11.2013 due to surface works at the footpath (new tarmac).
 The inclinometer shows a movement of less than +/- 2mm
 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



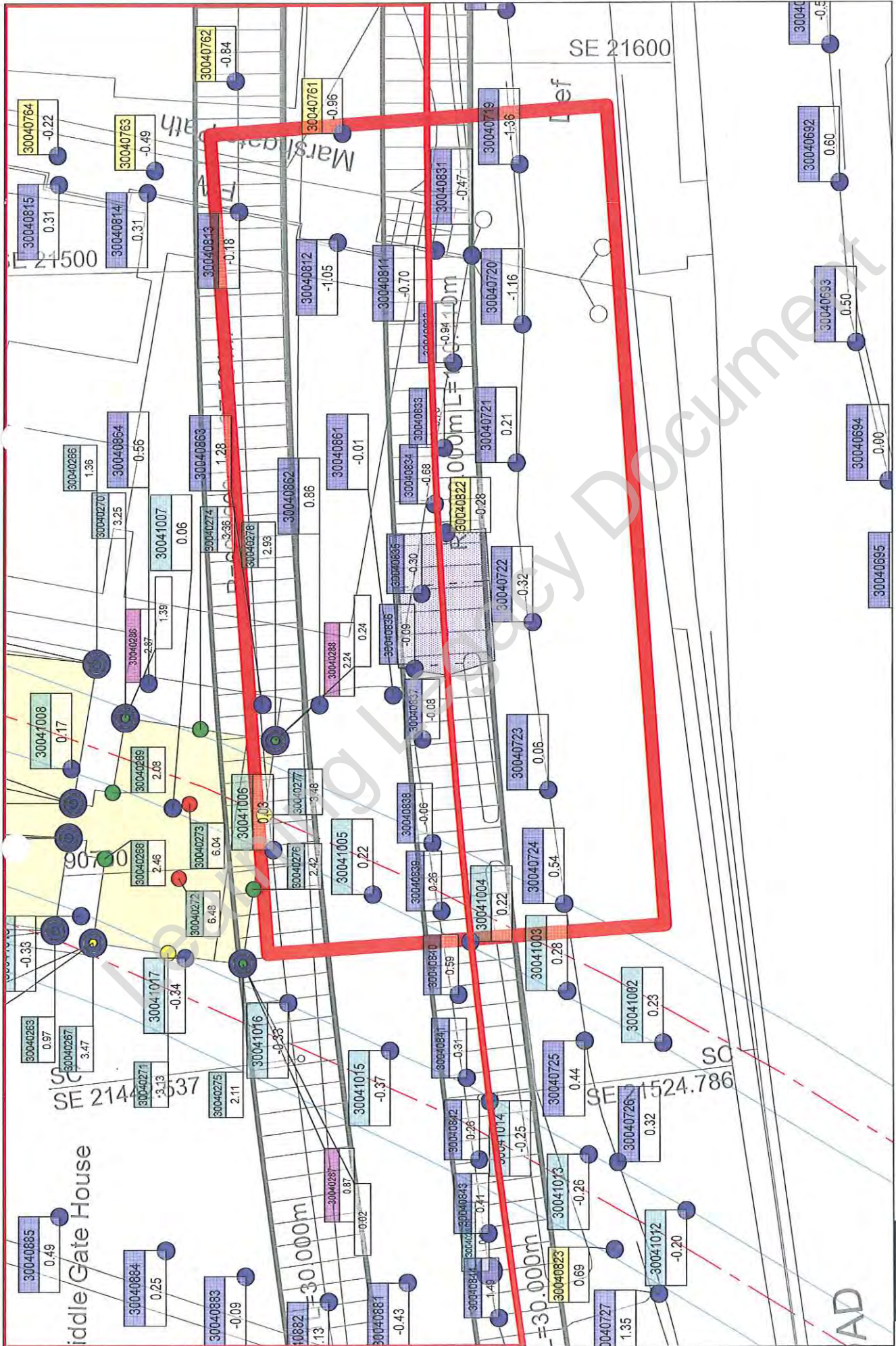
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 26.04.2013 17:34

Point: 30040761



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Geotechnical Cross Section 2 22.03.2013 - 11.02.2014
date: 09.08.2014 08:41 current values: 09.08.2014 08:19

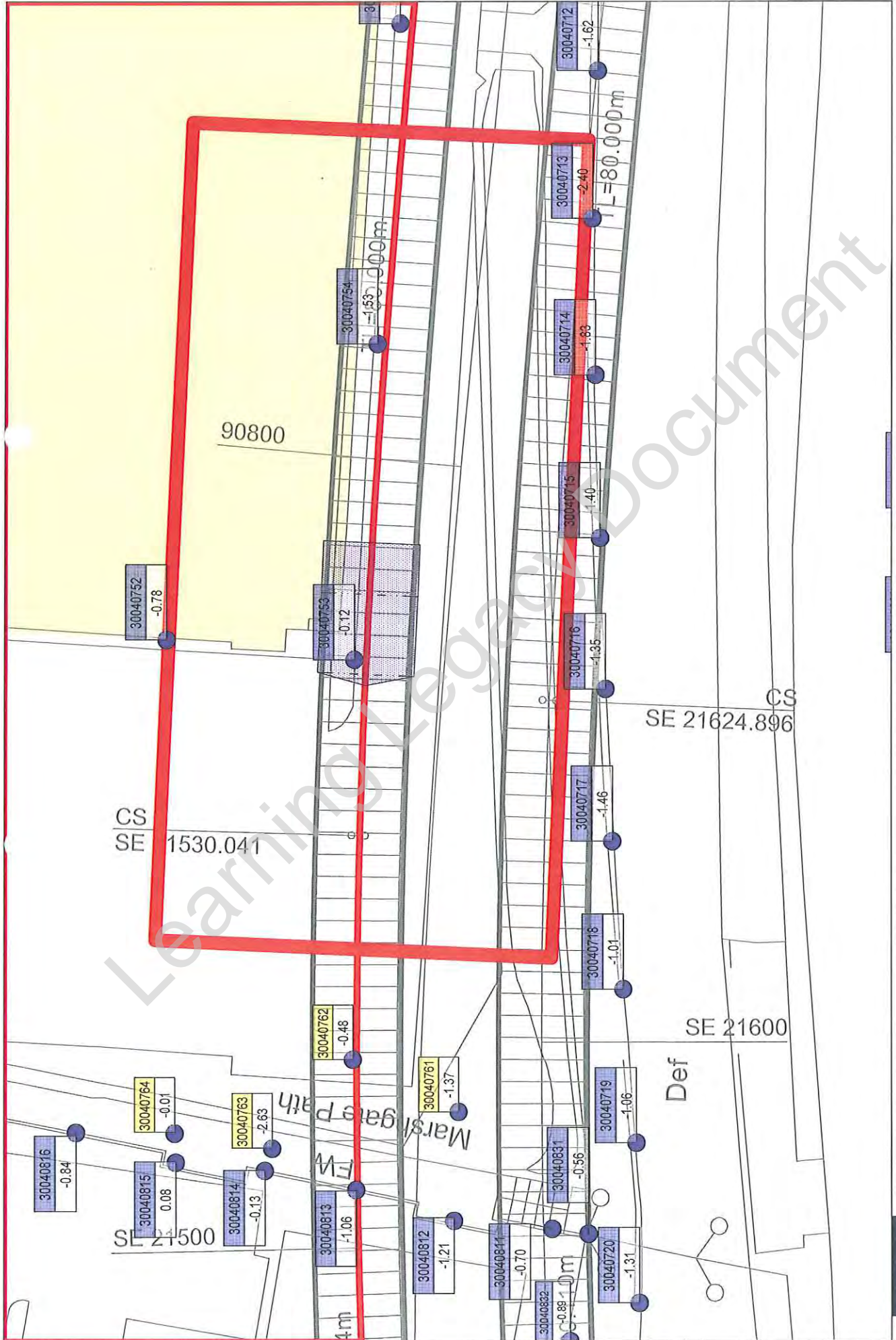




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

DLR monitoring - hydrostatic levelling cells

current values: 30.04.2013 17:45



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 24.07.2013 17:43

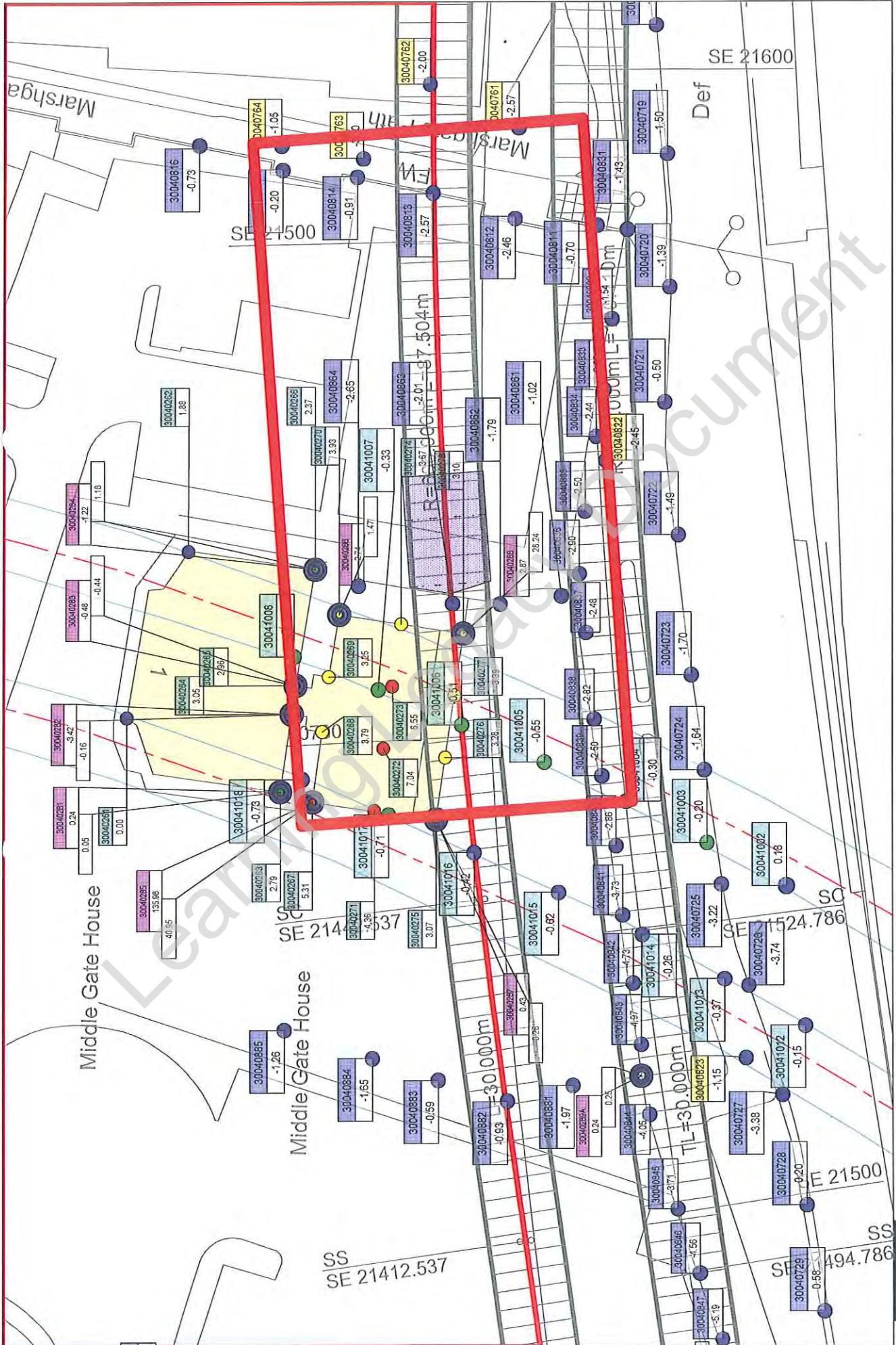


Point: 30040762



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Geotechnical Cross Section 2 22.03.2013 - 11.02.2014
date: 09.08.2014 08:51 current values: 09.08.2014 08:34





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 30.07.2013 09:00



Joint Venture

project: C310 Thames Tunnel

Joint Venture

project: C310 Thames Tunnel

Joint Venture

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	22/3/13	11/4/13	17/4/13	25/4/13	27/4/13	30/4/13	30/4/13	30/4/13	30/4/13	30/4/13	30/4/13	30/4/13	30/4/13	30/4/13	30/4/13	30/4/13	30/4/13	30/4/13	30/4/13	30/4/13	30/4/13	30/4/13	30/4/13	30/4/13		
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	elevation	deviation from last/ baseline	
3004 0761	105.363	0.17	105.363	0	105.364	0	105.363	-1	105.363	0	105.362	0	105.362	0	105.363	1	105.362	-1	105.361	0	105.361	0	105.361	0	105.361	0	-2
3004 0762	104.863	-0.17	104.863	0	104.863	-1	104.863	1	104.863	-1	104.863	0	104.863	0	104.863	1	104.863	0	104.863	0	104.863	0	104.863	0	104.863	0	-1
3004 0763	105.161	0.27	105.161	0	105.161	0	105.160	-1	105.161	1	105.161	0	105.161	0	105.161	1	105.160	-2	105.159	-2	105.159	-1	105.159	0	105.159	0	-3
3004 0764	105.477	0.46	105.476	0	105.476	0	105.475	-1	105.476	1	105.476	0	105.476	0	105.477	1	105.476	0	105.477	-1	105.477	-1	105.477	1	105.476	0	-1

structure: Geotechnical Cross Section 2

structure: Geotechnical Cross Section 2



monitoring table



monitoring table



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		25. following		26. following				
	baseline	27/7/13	28/7/13	29/7/13	30/7/13	31/7/13	1/8/13	2/8/13	3/8/13	4/8/13	5/8/13	6/8/13	7/8/13	8/8/13	9/8/13	10/8/13	11/8/13	12/8/13	13/8/13	14/8/13	15/8/13	16/8/13	17/8/13	18/8/13	19/8/13	20/8/13	21/8/13	22/8/13			
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	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline			
3004 0761	105.352	105.351	0	-2	105.352	1	-1	105.351	0	-1	105.350	0	-3	105.350	0	-2	105.350	0	-2	105.351	0	-2	105.350	0	-2	105.350	0	-2	105.350	0	-2
3004 0762	104.863	104.862	0	-1	104.862	0	-1	104.861	-1	-2	104.861	-1	-3	104.862	1	-1	104.862	0	-1	104.862	0	-1	104.862	0	-1	104.862	0	-1	104.862	0	-1
3004 0763	105.151	105.150	0	-3	105.150	1	-2	105.150	2	-1	105.150	0	-4	105.150	2	-1	105.150	2	-1	105.150	0	-1	105.150	0	-1	105.150	0	-1	105.150	0	-1
3004 0764	105.477	105.476	0	-1	105.477	1	0	105.476	0	-1	105.476	0	-1	105.477	1	0	105.477	1	0	105.477	0	0	105.477	0	0	105.477	0	0	105.477	0	0

No. of reading dhw	1. following 22/02/2013		2. following 12/04/2013		3. following 27/04/2013		4. following 27/04/2013		5. following 29/04/2013		6. following 29/04/2013		7. following 30/04/2013		8. following 14/05/2013		9. following 14/05/2013		10. following 24/07/2013		11. following 24/07/2013		12. following 30/07/2013		
	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	
30040761	105.363	0	105.363	0	105.364	0	105.363	-1	105.362	0	105.362	0	105.362	0	105.362	0	105.361	-2	105.361	0	105.361	0	105.361	0	-2
30040761-A	87.260	0	87.261	0	87.261	0	87.260	0	87.260	0	87.260	0	87.259	-1	87.261	2	87.260	-1	87.261	1	87.261	1	87.261	0	1
30040761-D	93.260	0	93.260	0	93.260	0	93.259	0	93.260	0	93.259	0	93.259	0	93.260	1	93.259	-1	93.259	0	93.259	0	93.259	0	-1
30040761-F	99.261	0	99.262	0	99.262	0	99.261	0	99.261	0	99.261	0	99.261	0	99.262	1	99.260	-1	99.262	2	99.260	-2	99.260	0	-1
30040762	104.863	0	104.863	0	104.863	0	104.863	0	104.863	-1	104.863	0	104.863	0	104.863	1	104.863	0	104.863	0	104.863	0	104.862	0	-1
30040762-A	91.765	0	91.765	-1	91.765	0	91.765	0	91.765	-1	91.764	0	91.765	0	91.765	-3	91.765	2	91.765	0	91.766	1	91.765	0	0
30040762-D	95.762	0	95.762	0	95.762	0	95.762	0	95.762	-1	95.761	0	95.762	0	95.761	0	95.762	2	95.762	0	95.762	1	95.762	0	-1
30040762-F	99.765	0	99.765	0	99.765	0	99.765	0	99.765	-1	99.764	0	99.765	0	99.765	-2	99.765	2	99.765	0	99.765	0	99.765	0	-1

Legacy Document

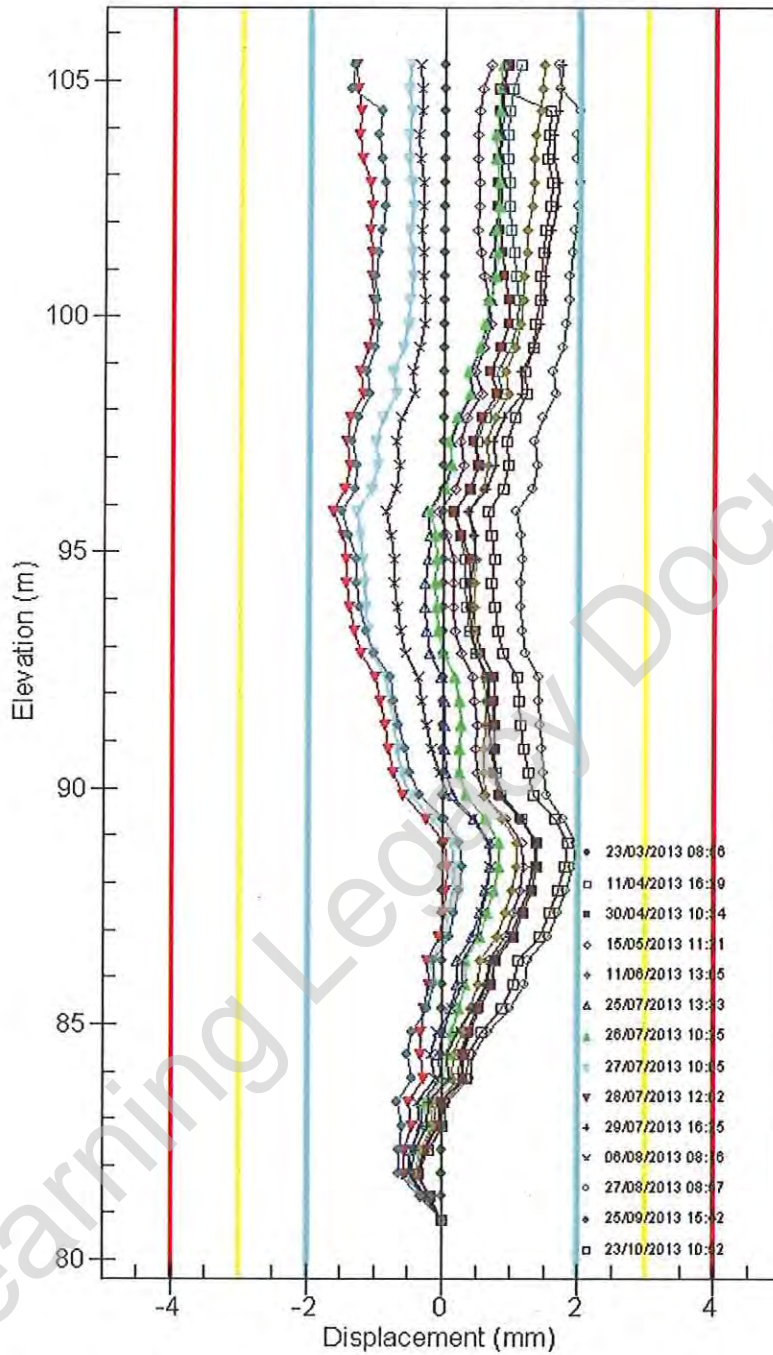
project: C310 Thames Tunnel structure: Extensometer Geotechnical Cross Section no. 2

No. of reading	date	13. following		14. following		15. following		16. following		17. following		18. following		19. following		20. following		deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline	deviation from last/ baseline
		baseline	elevation	baseline	elevation	baseline	elevation	baseline	elevation	baseline	elevation	baseline	elevation	baseline	elevation	baseline	elevation						
30040761		105,253	105,252	0	-1	105,250	-1	-1	105,250	0	-1	105,250	0	-3	105,250	0	-2	105,250	0	-2			
30040761-A		87,260	87,261	0	1	87,261	0	0	87,261	0	1	87,261	0	1	87,261	0	1	87,261	0	1			
30040761-D		90,250	90,250	0	-1	90,250	0	-1	90,250	0	-1	90,250	0	-1	90,250	0	-1	90,250	0	-1			
30040761-F		90,251	90,250	0	-1	90,250	0	-1	90,250	0	-2	90,250	0	-3	90,250	1	-2	90,250	1	-1			
30040762		104,863	104,863	0	-1	104,861	-1	-2	104,862	1	-1	104,862	1	-1	104,862	1	-1	104,862	1	-1			
30040762-A		91,765	91,765	0	-1	91,765	-1	-1	91,765	1	0	91,765	1	0	91,765	1	0	91,765	1	0			
30040762-D		95,763	95,762	0	-1	95,761	-1	-1	95,761	0	-1	95,761	0	-1	95,761	0	-1	95,761	0	-1			
30040762-F		90,765	90,765	0	-1	90,765	0	-1	90,765	0	-1	90,764	0	-1	90,764	0	-1	90,764	0	-1			

Legacy Document

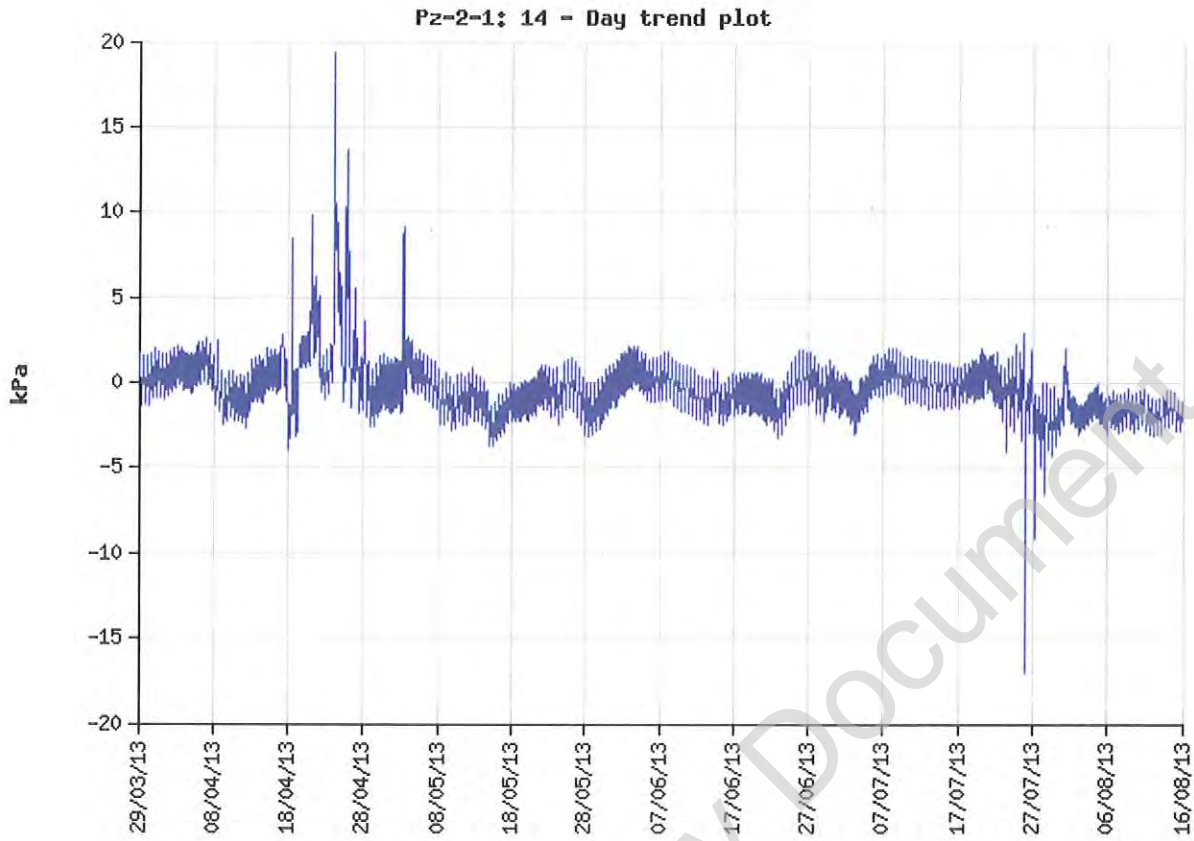
gcs2:eb 763 - A Axis Cumulative

Initial survey: 23/03/2013 08:56




PROJECT: C310
 SITE: gcs2
 INSTALLATION: eb 763
 COMPANY: HMJV
 CLIENT: Crossrail

NOTE: Manual Inclinator
 Geotechnical Cross Section No. 2
 eastbound tunnel
 Direction of displacement perpendicular to tunnel alignment
 positive value - deviation towards tunnel center line



Geotechnical Cross Section 2
Point no. 3004 0764
Piezometer

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

APPENDIX 40

CS9 – Wall Marshgate Path

Learning Legacy Document

monitoring asset	Footpath Marshgate Path		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
name of monitoring section:	CS9 Wall Marshgate Path		
sensor type:	manual levelling studs		
chainage:	90750	point no.:	3004 0811 - 3004 0816
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	14/03/13	0.00			
TBM 1	start ZOI	27/04/13	-0.35	3004 0812	
	end ZOI	01/05/13	-1.05	3004 0812	breached not any trigger value
TBM 2	start ZOI	25/07/13	-1.25	3004 0813	
	end ZOI	30/07/13	-2.57	3004 0813	breached not any trigger value
longterm	20/02/14	-2.40	3004 0813		
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)			

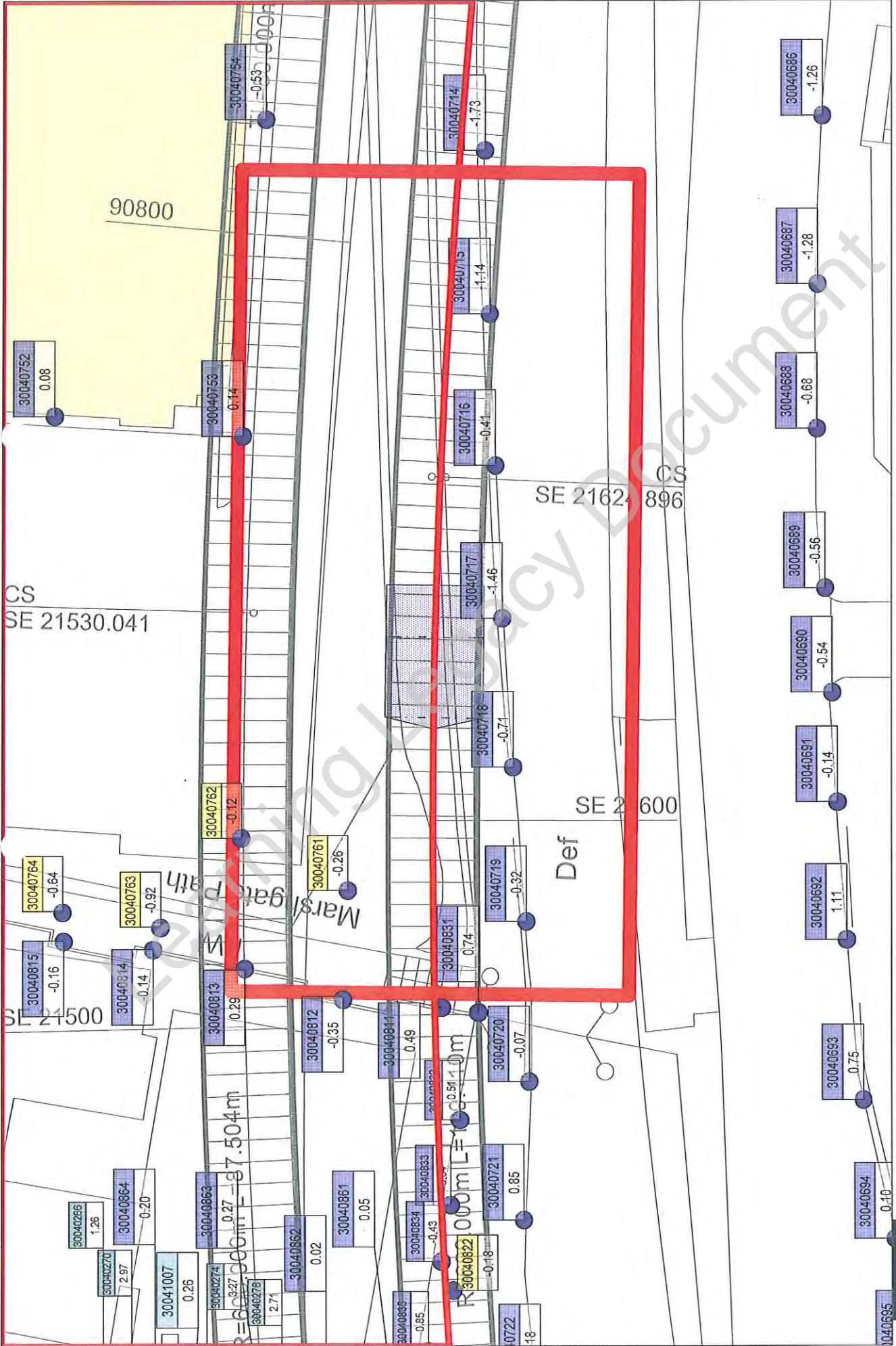
summary / comments

Point 3004 0811 was damaged due to surface works at the footpath. The stairs at the south end of the path were renewed.
 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

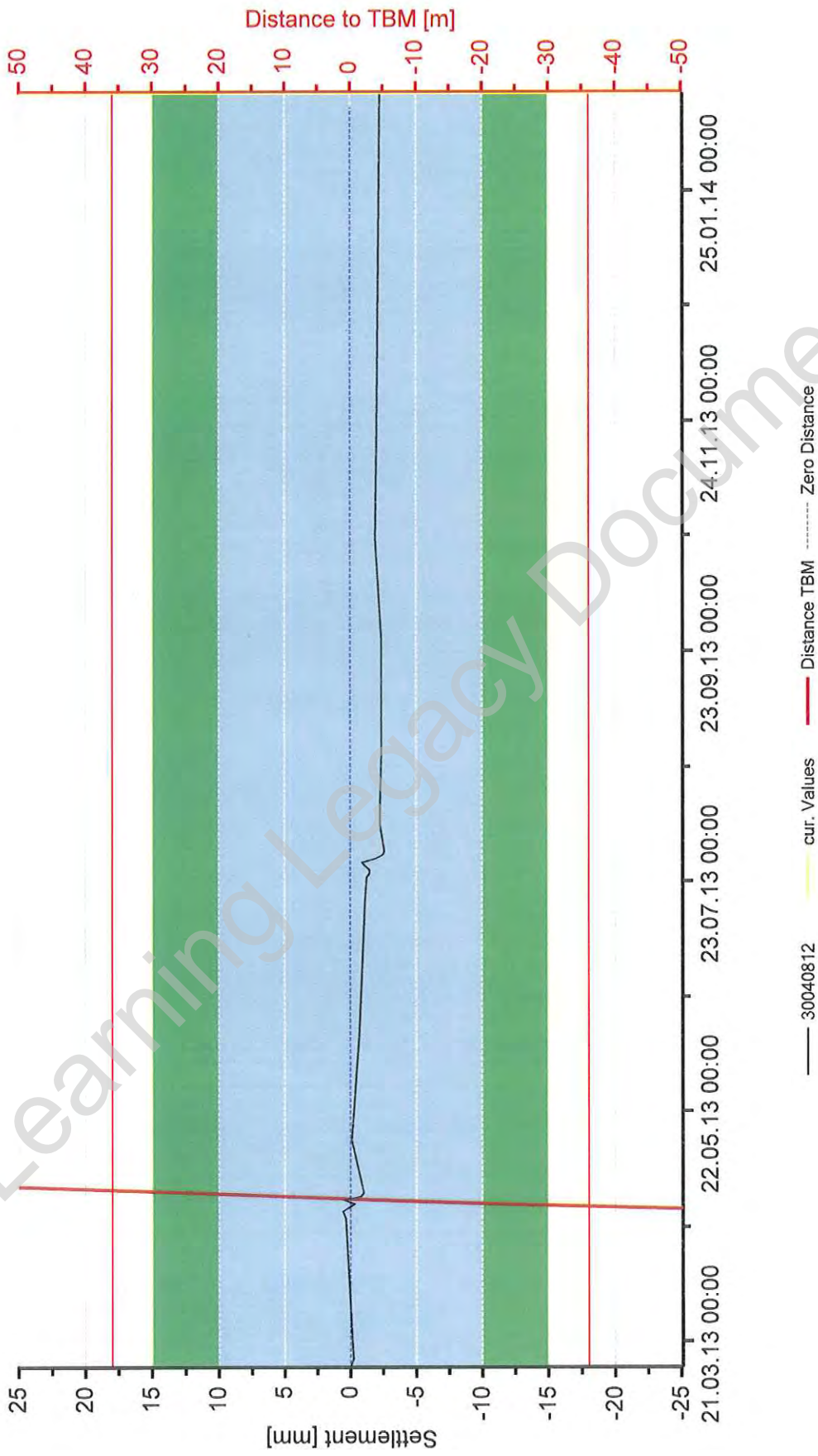
print name:

HMJV project role: Monitoring & Survey engineer



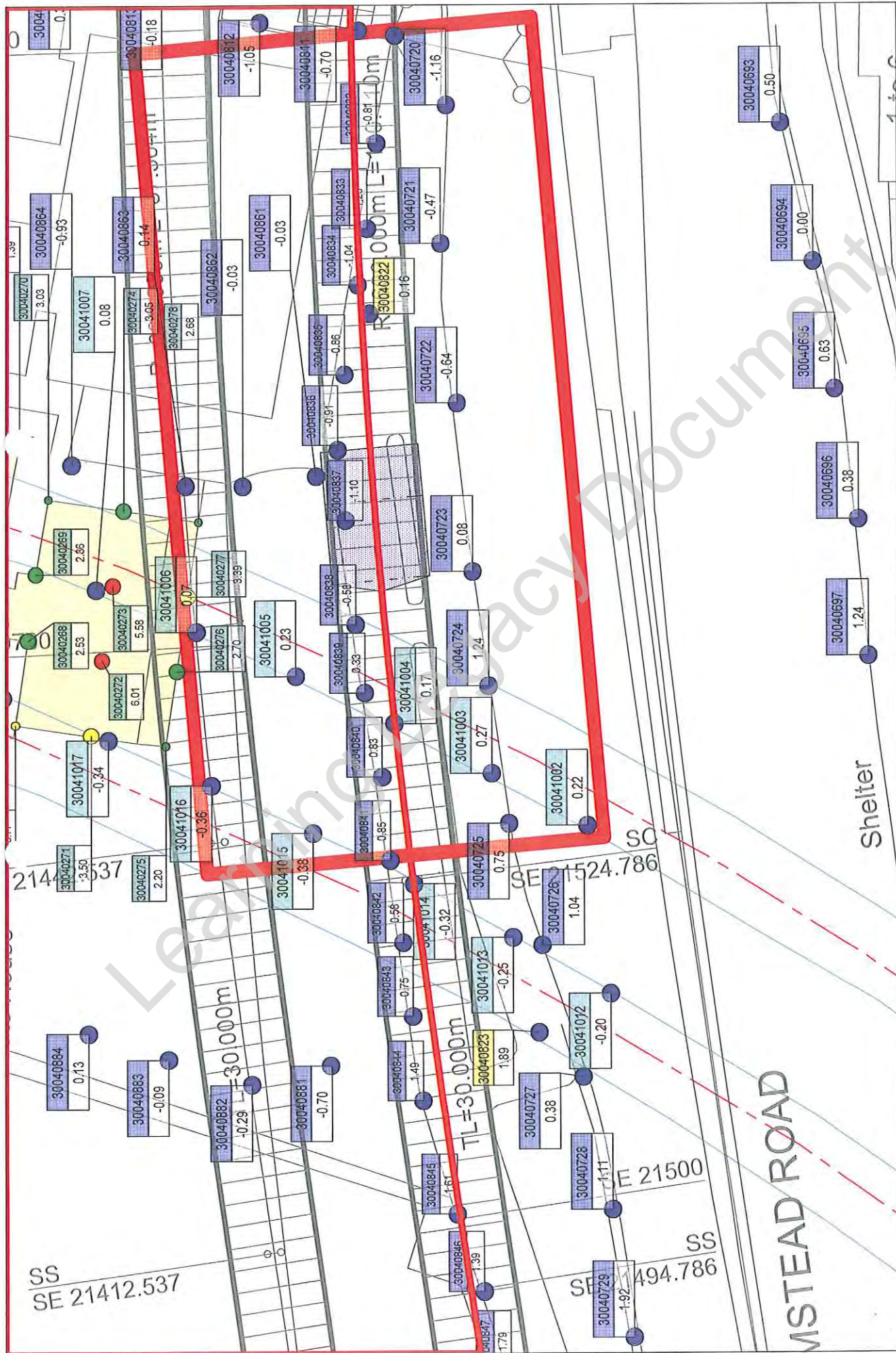
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 27.04.2013 09:00

Point: 30040812



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - CS9 - Marshgate Path 14.03.2013 - 20.02.2014
date: 07.01.2015 13:45 current values: 07.01.2015 13:23





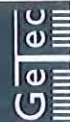
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

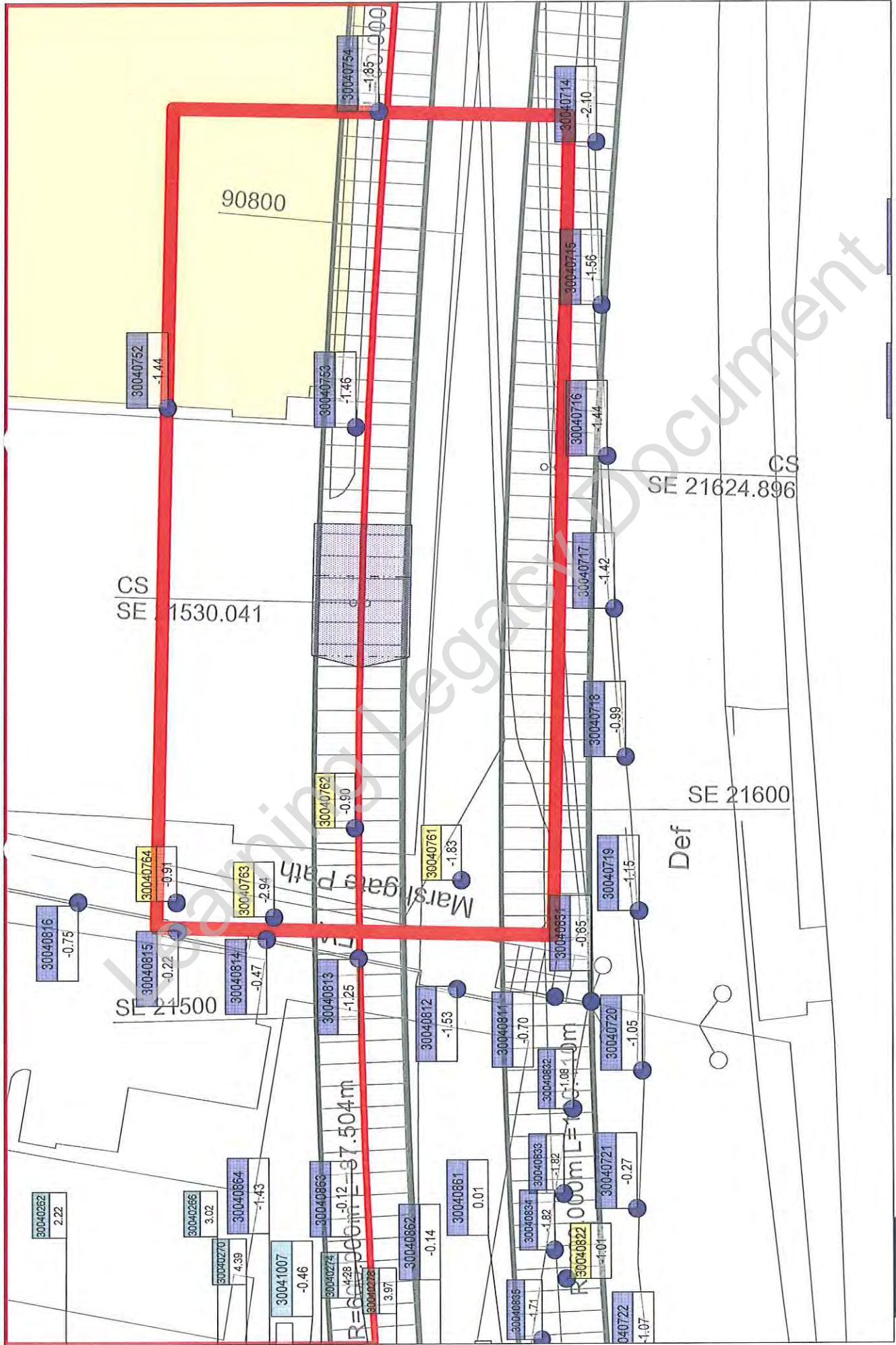
working activities: TBM drive

current values: 01.05.2013 09:00



Joint Venture

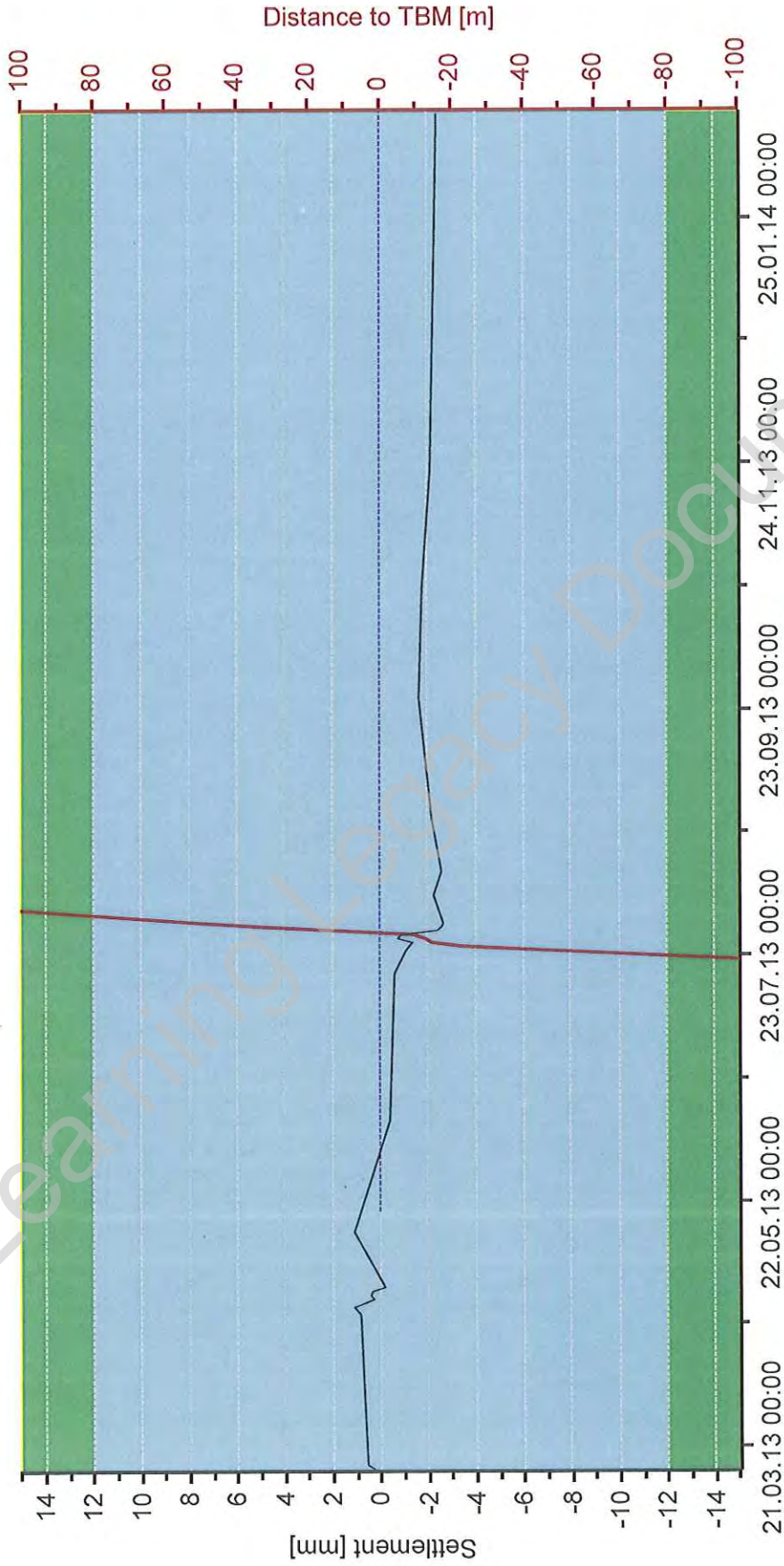




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 25.07.2013 09:00



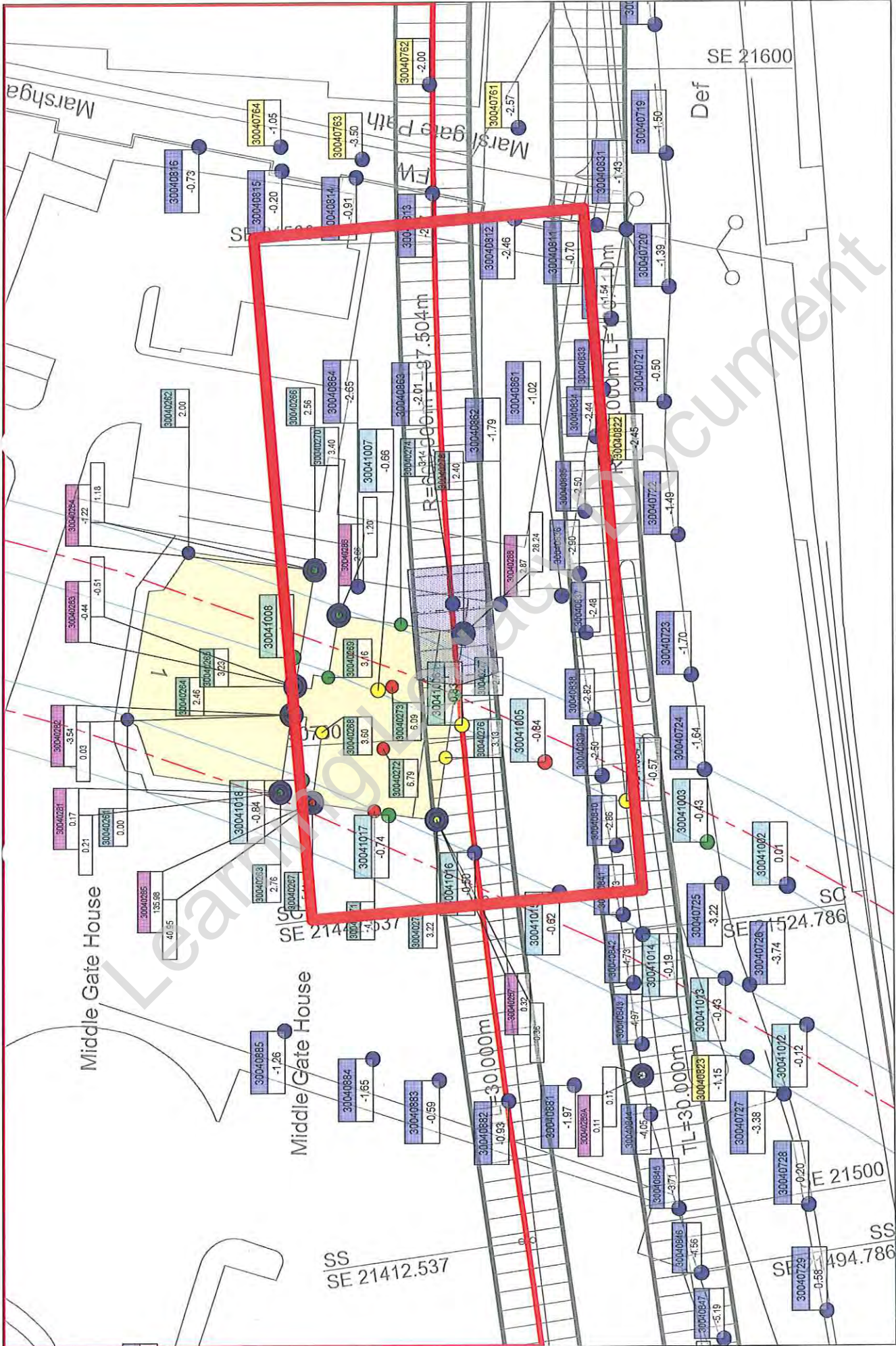
Point: 30040813



— 30040813 — Distance TBM - - - - - Zero Distance

Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - CS9 Marshgate Path 14.03.2013 - 20.02.2014
date: 09.08.2014 11:21 current values: 09.08.2014 11:04





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 30.07.2013 18:00

Joint Venture

project: C310 Thames Tunnel
structure: Cross Section 9 Wall Marshgate Path

Joint Venture

project: C310 Thames Tunnel
structure: Cross Section 9 Wall Marshgate Path

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	14/03/2013	elevation	deviation from last/ baseline	20/04/2013	elevation	deviation from last/ baseline	27/04/2013	elevation	deviation from last/ baseline	25/04/2013	elevation	deviation from last/ baseline	30/04/2013	elevation	deviation from last/ baseline	14/05/2013	elevation	deviation from last/ baseline	18/07/2013	elevation	deviation from last/ baseline	24/07/2013	elevation	deviation from last/ baseline		
Point No.																											
30040811	105.649	105.649	0	105.650	1	105.651	1	105.650	0	105.650	0	105.649	-1	105.649	0	105.649	0	-1	105.649	0	-1	105.649	0	-1	105.649	0	-1
30040812	105.375	105.375	0	105.377	0	105.377	0	105.375	-1	105.377	1	105.376	-1	105.375	0	105.375	0	-1	105.375	0	-1	105.375	0	-1	105.375	0	-2
30040813	105.694	105.694	0	105.694	0	105.695	0	105.694	-1	105.694	0	105.694	0	105.694	-1	105.695	1	0	105.695	-1	0	105.693	0	-1	105.693	0	-1
30040814	105.619	105.619	0	105.619	0	105.619	0	105.619	-1	105.619	1	105.619	0	105.619	0	105.619	1	1	105.619	-1	1	105.618	-1	0	105.618	0	0
30040815	105.539	105.539	0	105.540	1	105.540	0	105.539	-1	105.540	1	105.540	0	105.539	0	105.540	1	1	105.540	0	1	105.539	-1	0	105.539	0	0
30040816	105.397	105.397	0	105.397	0	105.397	0	105.396	-1	105.397	1	105.397	0	105.397	0	105.397	1	0	105.397	0	0	105.397	-1	0	105.396	-1	-1

Legacy Document

Joint Venture

project: C310 Thames Tunnel
Bauwerk: Cross Section 9 Wall Marshgate Path

Joint Venture

project: C310 Thames Tunnel
Bauwerk: Cross Section 9 Wall Marshgate Path

No. of reading Point No.	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 14.07.13	elevation 105.675	deviation from last/ baseline	elevation 105.675	deviation from last/ baseline	elevation 105.675	deviation from last/ baseline	elevation 105.675	deviation from last/ baseline	elevation 105.675	deviation from last/ baseline	elevation 105.675	deviation from last/ baseline	elevation 105.675	deviation from last/ baseline	elevation 105.675	deviation from last/ baseline	elevation 105.675	deviation from last/ baseline	elevation 105.675	deviation from last/ baseline	elevation 105.675	deviation from last/ baseline	elevation 105.675	deviation from last/ baseline	
30040811	105.649	105.649		105.649	0	0	105.649	0	0	105.649	0	0	105.649	0	0	105.649	0	0	105.649	0	0	105.649	0	0	105.649	0
30040812	105.672	105.672	0	105.672	0	-1	105.672	-1	-2	105.672	-1	-2	105.672	-1	-2	105.672	-1	-2	105.672	-1	-2	105.672	-1	-2	105.672	-1
30040813	105.694	105.694	0	105.693	1	-1	105.693	0	-1	105.691	0	-3	105.691	0	-3	105.691	0	-2	105.692	0	-2	105.692	0	-2	105.692	0
30040814	105.618	105.617	0	105.618	1	0	105.617	-1	-1	105.617	0	-1	105.617	0	-1	105.617	0	0	105.617	0	0	105.618	0	0	105.618	0
30040815	105.539	105.539	0	105.540	1	1	105.540	0	1	105.539	0	0	105.539	-1	0	105.540	1	1	105.540	1	1	105.540	0	1	105.540	0
30040816	105.397	105.396	0	105.397	1	0	105.397	0	-1	105.396	0	-1	105.396	0	-1	105.397	1	0	105.397	1	0	105.397	1	0	105.397	1

Legacy Document

monitoring table




Joint Venture

Project: C310 Thames Tunnel

No. of reading Point No.	baseline		25. following		deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
	14/01/13	20/02/2014	20/02/2014	20/02/2014											
30040811	105.649	105.649	105.649	105.649	0	105.649	0	105.649	0	105.649	0	105.649	0	105.649	0
30040812	105.672	105.674	105.674	105.674	0	105.674	0	105.674	0	105.674	0	105.674	0	105.674	0
30040813	105.694	105.691	105.691	105.691	-2	105.691	-2	105.691	-2	105.691	-2	105.691	-2	105.691	-2
30040814	105.616	105.618	105.618	105.618	0	105.618	0	105.618	0	105.618	0	105.618	0	105.618	0
30040815	105.539	105.540	105.540	105.540	0	105.540	0	105.540	0	105.540	0	105.540	0	105.540	0
30040816	105.597	105.597	105.597	105.597	0	105.597	0	105.597	0	105.597	0	105.597	0	105.597	0

Legacy Document

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

APPENDIX 41
Wall Middle Gate House

Learning Legacy Document

monitoring asset	Wall Middle Gate House		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
name of monitoring section:	Wall MGH		
sensor type:	manual levelling studs		
chainage:	90710	point no.:	3004 0861 - 3004 0864
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	14/03/13	0.00			
TBM 1	start ZOI	29/04/13	0.31	3004 0861	
	end ZOI	03/05/13	0.46	3004 0861	breached not any trigger value
TBM 2	start ZOI	29/07/13	-1.20	3004 0863	
	end ZOI	01/08/13	-2.40	3004 0863	breached not any trigger value
longterm	20/02/14	-3.35	3004 0863		

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

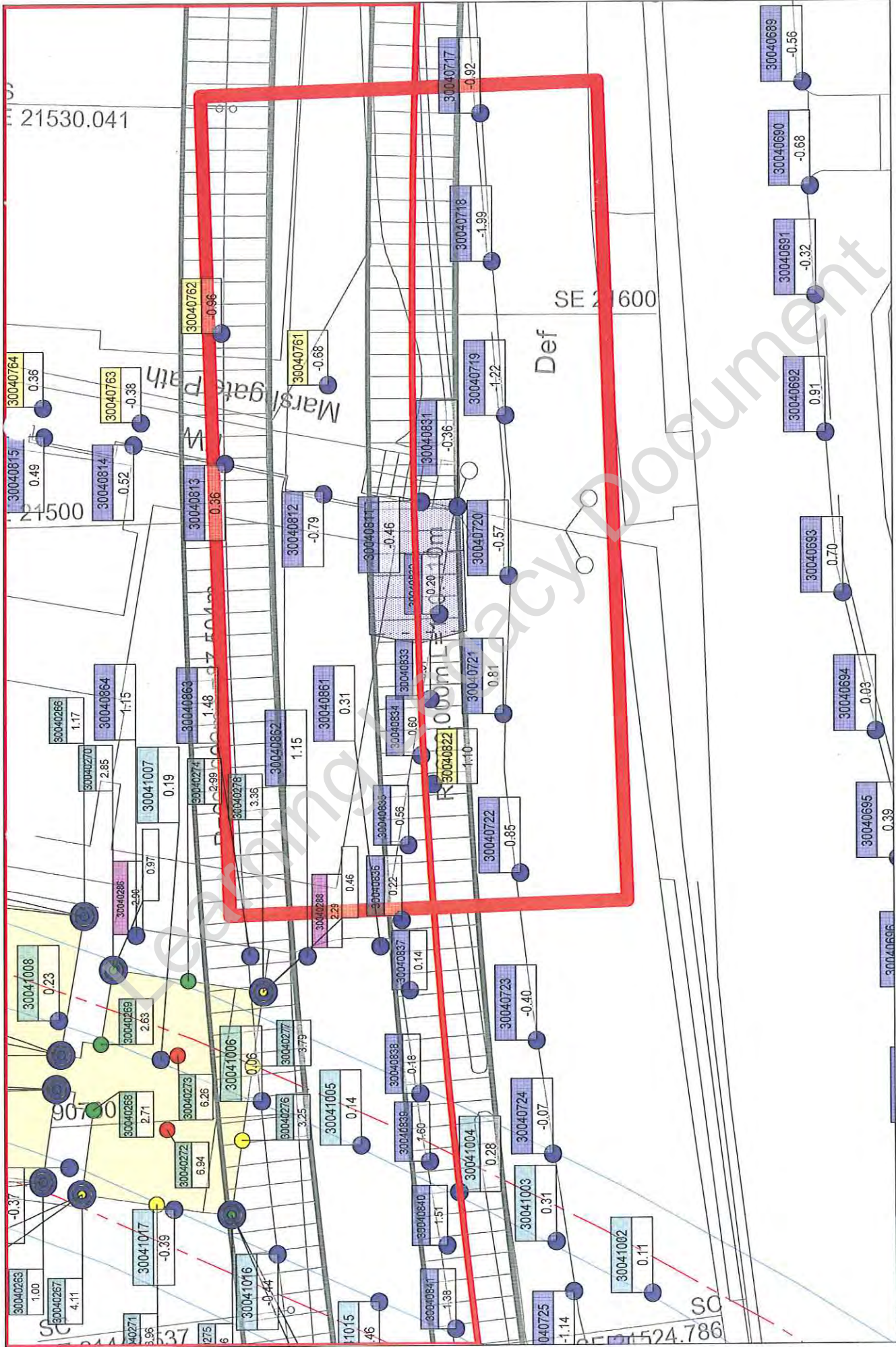
Overall, none of the points reached any trigger value.
 Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.
 The rate of change in the monitoring data is less than the required standards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

date / signature: 12/01/15

print name:

HMJV project role:

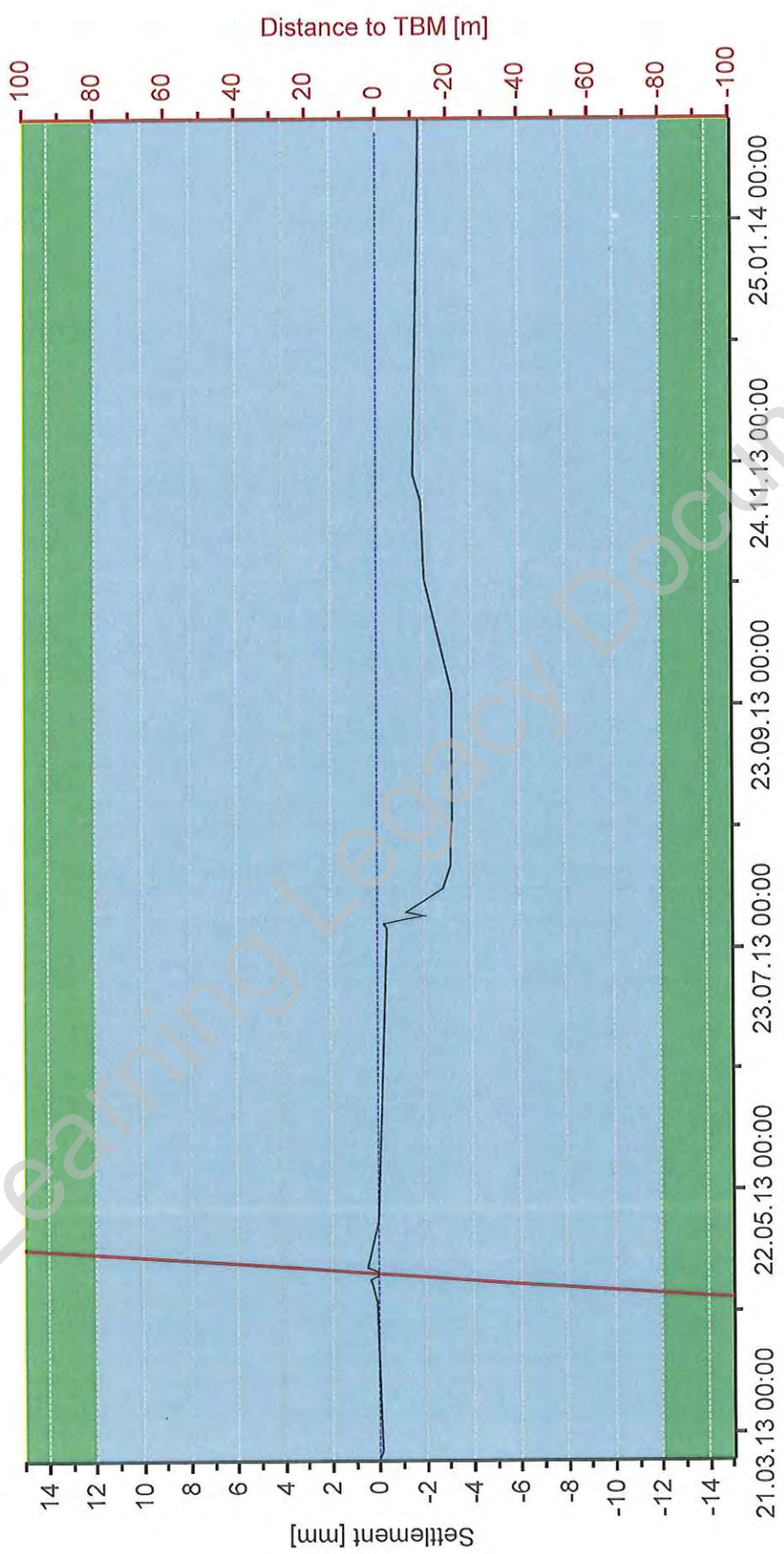
Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 29.04.2013 09:00



Point: 30040861



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Wall Middle Gate House 14.03.2013 - 20.02.2014
date: 09.08.2014 13:05 current values: 09.08.2014 12:49





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 29.07.2013 09:00

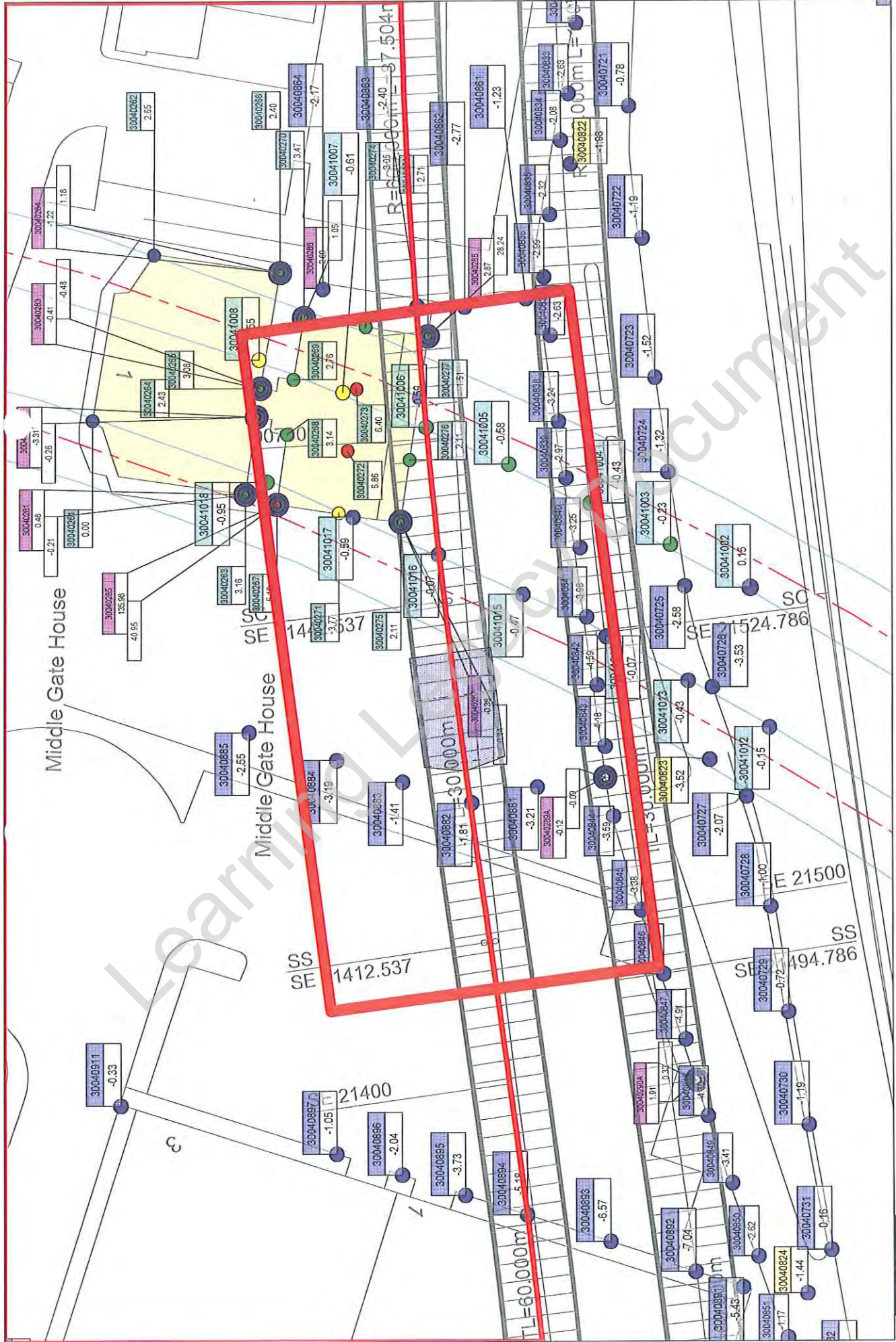


Point: 30040863



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Wall Middle Gate House 14.03.2013 - 20.02.2014
date: 09.08.2014 13:11 current values: 09.08.2014 12:59





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 19:00



No. of reading date	1. following 14/05/2013		2. following 22/06/2013		3. following 30/06/2013		4. following 27/08/2013		5. following 30/08/2013		6. following 01/09/2013		7. following 02/09/2013		8. following 14/09/2013		9. following 24/09/2013		10. following 29/09/2013		11. following 30/09/2013		12. following 31/09/2013		
	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	
30040861	105.691	0	105.691	0	105.691	0	105.691	0	105.691	0	105.691	0	105.691	0	105.691	0	105.691	0	105.691	0	105.690	-1	105.689	-1	-2
30040862	106.221	0	106.221	0	106.222	1	106.223	0	106.222	0	106.221	-1	106.221	0	106.220	-1	106.220	0	106.220	0	106.220	-1	106.218	-2	-3
30040863	107.007	0	107.007	0	107.008	1	107.008	0	107.008	0	107.007	-1	107.007	0	107.007	0	107.006	-1	107.005	0	107.005	-1	107.004	-1	-3
30040864	107.123	0	107.123	0	107.123	0	107.124	0	107.123	-1	107.122	-1	107.122	0	107.122	0	107.121	-1	107.120	0	107.120	0	107.119	0	-3

Copyright Legacy Document

Joint Venture


project: C310 Thames Tunnel
Bauwerk: Wall MGH

Joint Venture

project: C310 Thames Tunnel
Bauwerk: Wall MGH

No. of reading Date	13. following		14. following		15. following		16. following		17. following		18. following		19. following		20. following		21. following		22. 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	
30040861	105.691	1	105.689	-2	105.689	0	105.688	-1	105.689	0	105.688	0	105.689	1	105.689	0	105.689	0	105.689	0	-2
30040862	106.221	1	106.217	-2	106.216	0	106.216	0	106.216	0	106.216	0	106.216	2	106.218	0	106.218	0	106.218	0	-4
30040863	107.007	1	107.002	-2	107.002	0	107.002	0	107.002	-1	107.002	0	107.002	2	107.003	0	107.004	0	107.003	0	-3
30040864	107.123	1	107.118	-2	107.118	-1	107.117	0	107.118	0	107.117	0	107.117	1	107.119	1	107.120	0	107.119	0	-3

Copyright Legacy Document

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

APPENDIX 42

Wall Plumstead Road

Learning Legacy Document

monitoring asset

Wall Plumstead Road

reference monitoring drawing:

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

name of monitoring section:

Wall Plumstead Road

sensor type:

manual levelling studs

chainage:

90610 - 90750

point no.:

3004 0831 - 3004 0852

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	14/03/13	0.00		
TBM 1	start ZOI	27/04/13	0.74	3004 0831
		30/04/13	0.31	3004 0841
		05/05/13	1.63	3004 0852
end ZOI	01/05/13	-0.47	3004 0831	breached not any trigger value
	06/05/13	-2.76	3004 0841	
	08/05/13	1.85	3004 0852	
TBM 2	start ZOI	25/07/13	-0.65	3004 0831
		30/07/13	-3.73	3004 0841
		03/08/13	-2.23	3004 0852
end ZOI	30/07/13	-1.43	3004 0831	breached not any trigger value
	03/08/13	-5.51	3004 0841	
	08/08/13	-1.07	3004 0852	
longterm	11/03/15	-1.15	3004 0831	
		-4.58	3004 0841	
		-0.81	3004 0852	

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

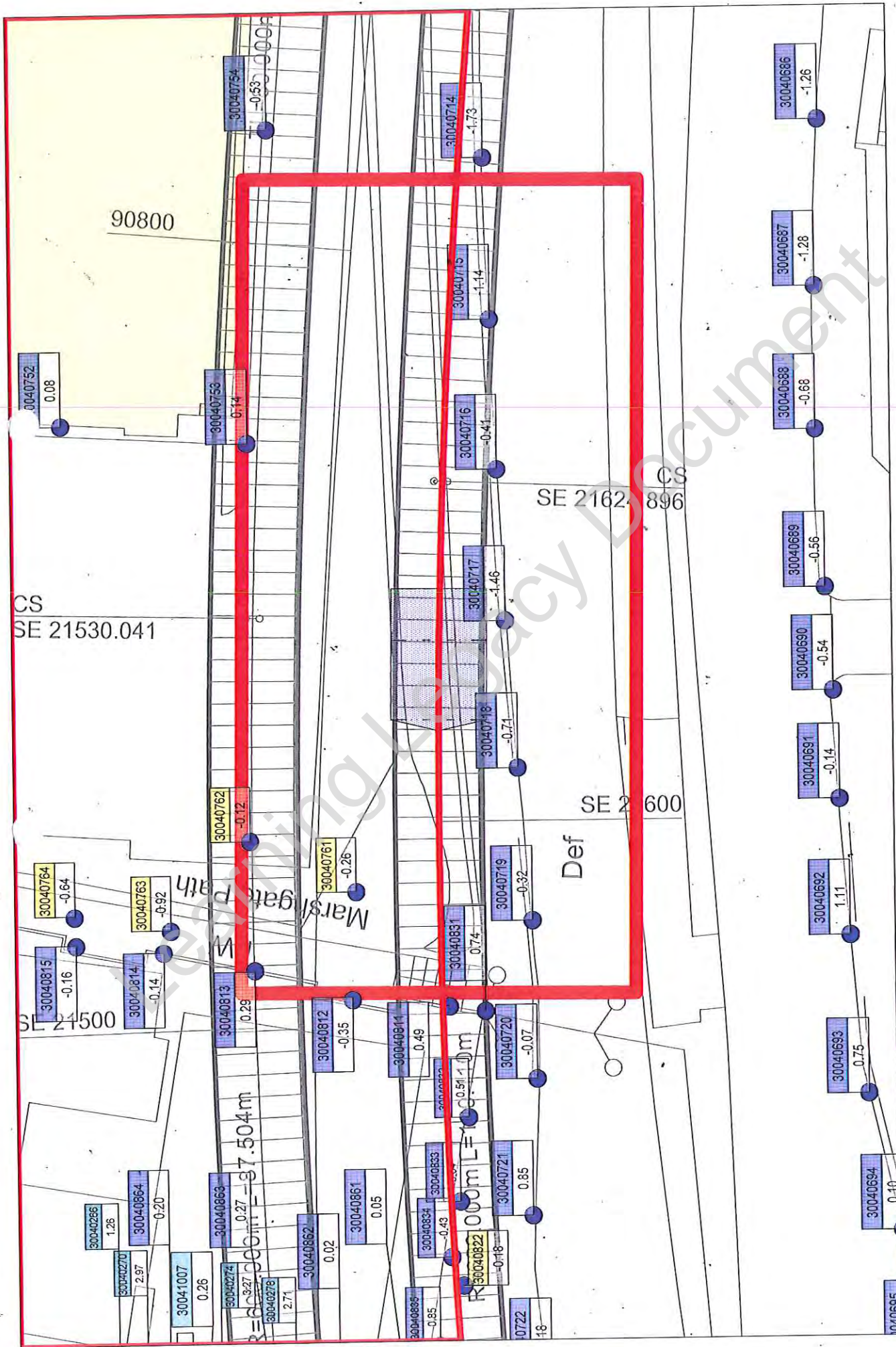
Overall, none of the points reached any trigger value. Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring. The rate of change in the monitoring data is less than the required standards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

date / signature: 12/05/2015

print name:

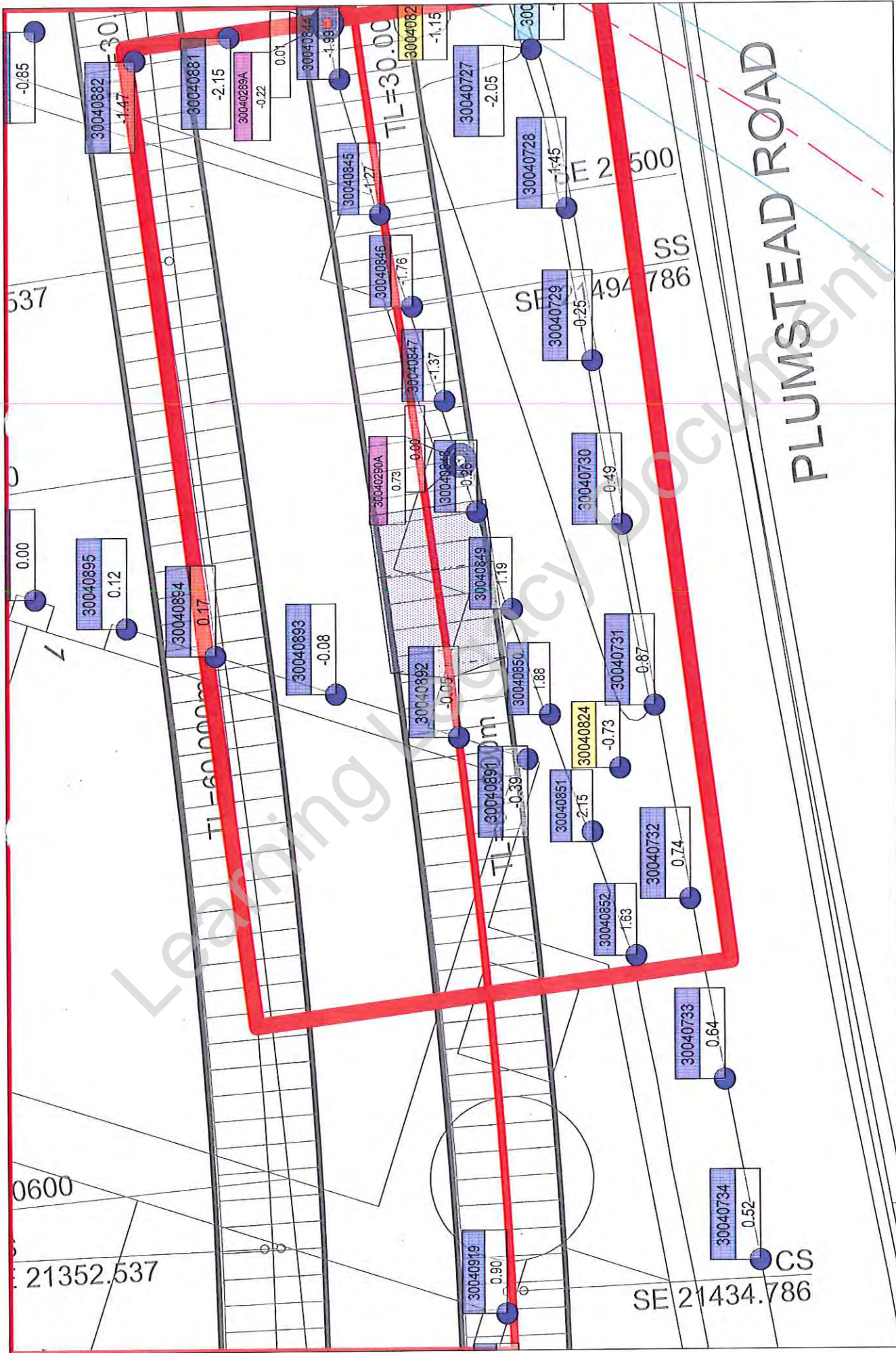
HMJV project role:

Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 27.04.2013 09:00





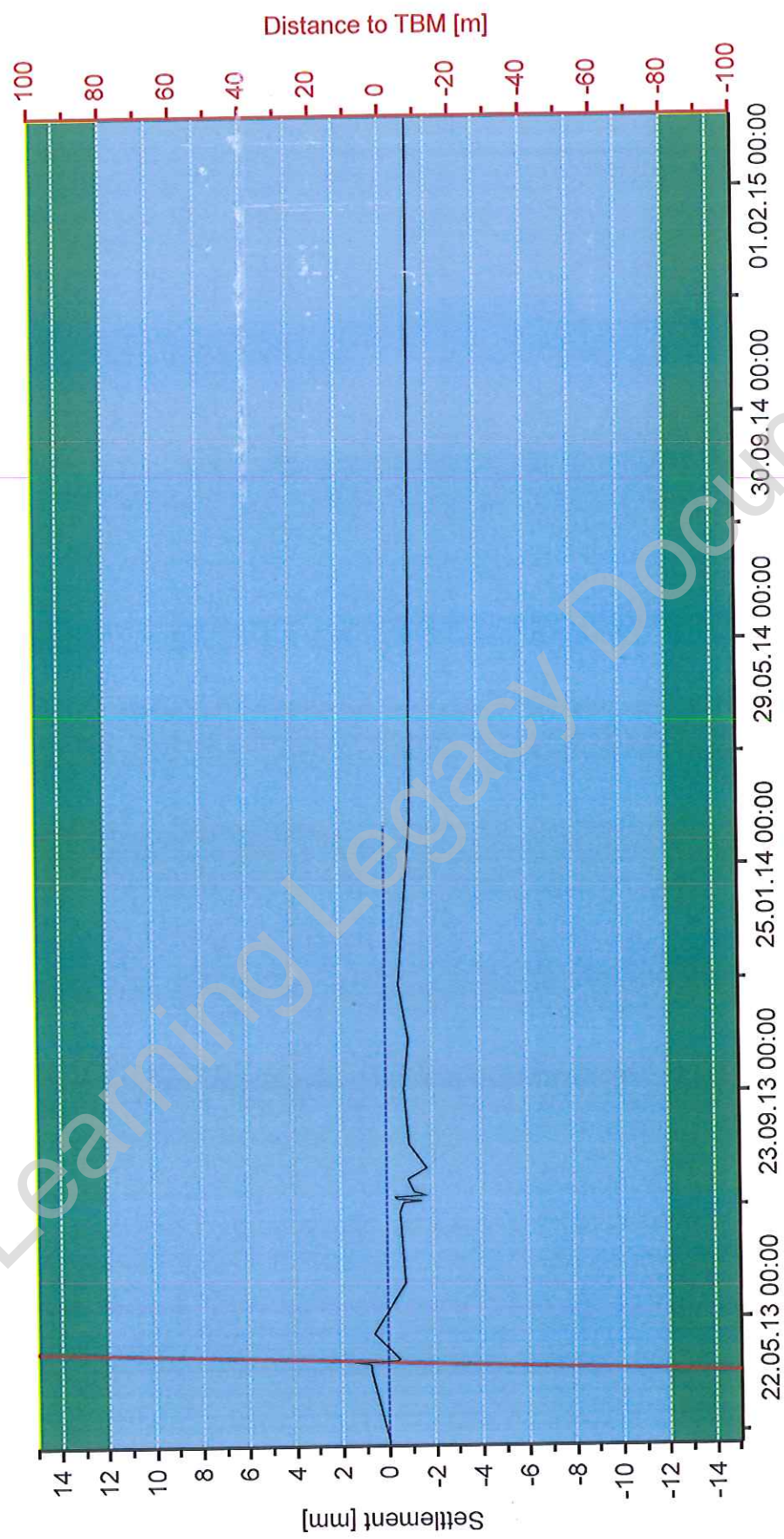
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

working activities: TBM drive

current values: 05.05.2013 17:59



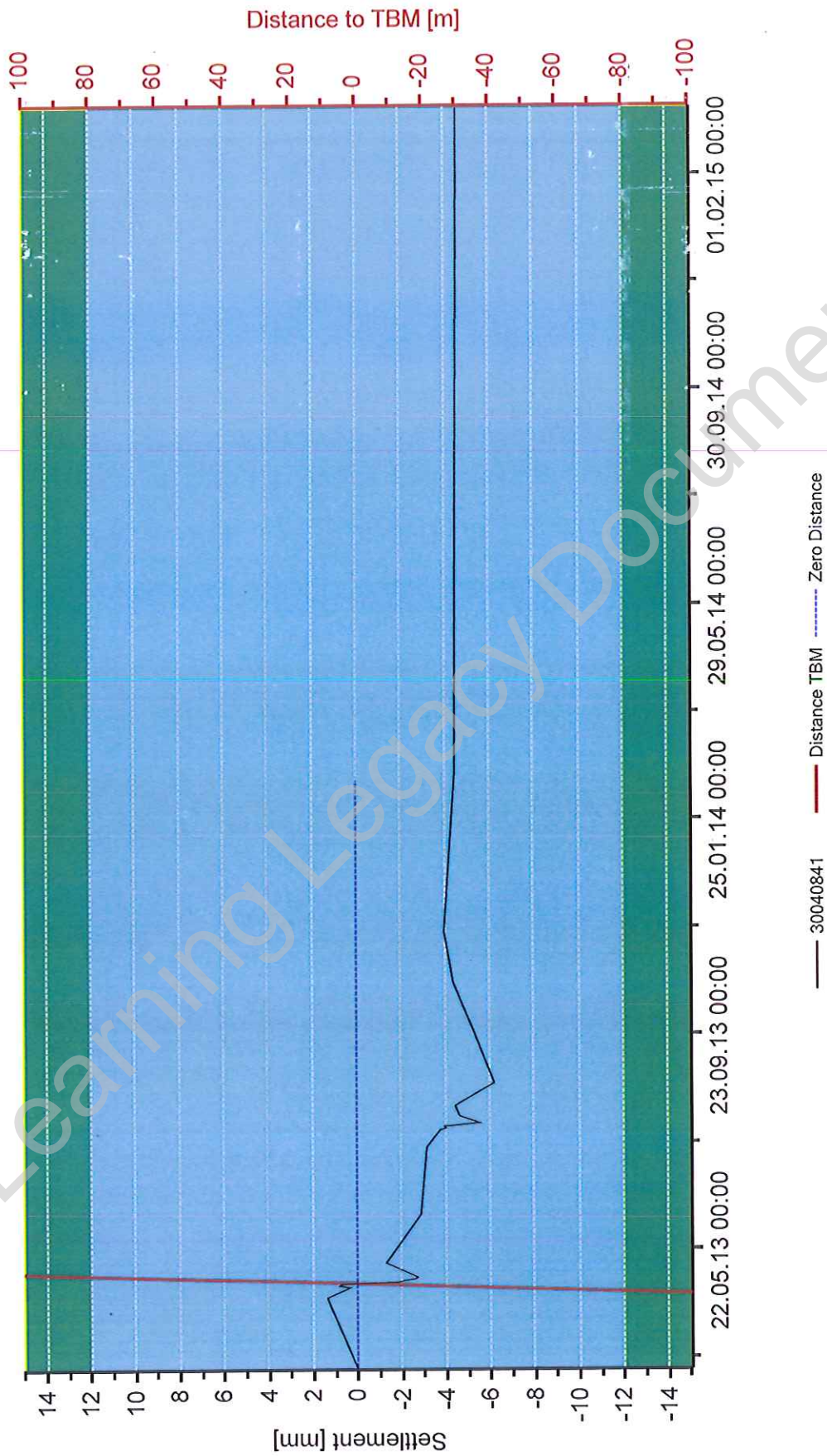
Profile: Measurement Point 30040831



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel- Wall Plumstead Road - 14.03.2013 - 11.03.2015
Date: 27.03.2015 16:10 Current Values: 27.03.2015 14:23



Profile: Measurement Point 30040841



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel- Wall Plumstead Road - 14.03.2013 - 11.03.2015
Date: 27.03.2015 16:12 Current Values: 27.03.2015 14:23

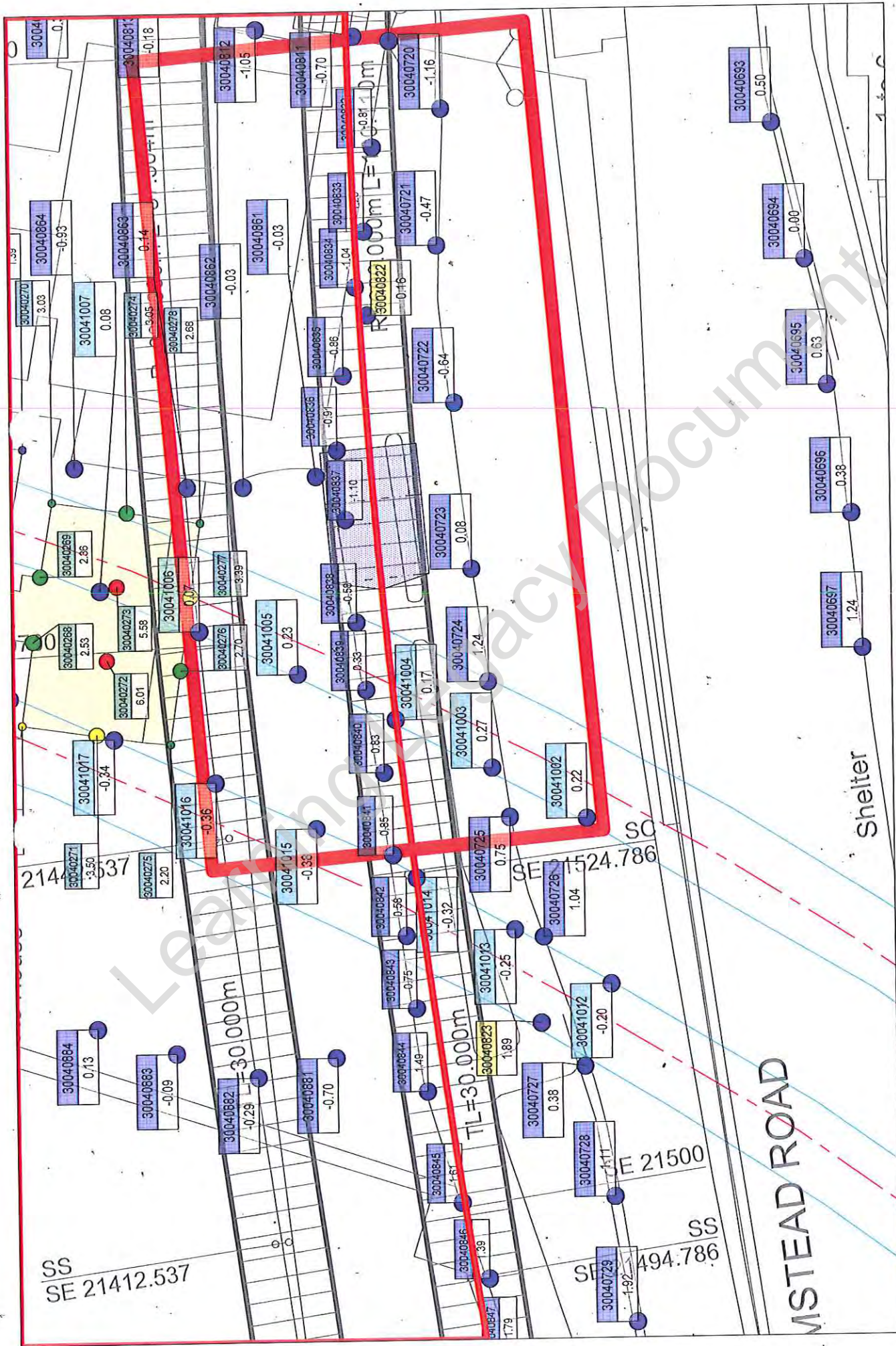


Profile: Measurement Point 30040852

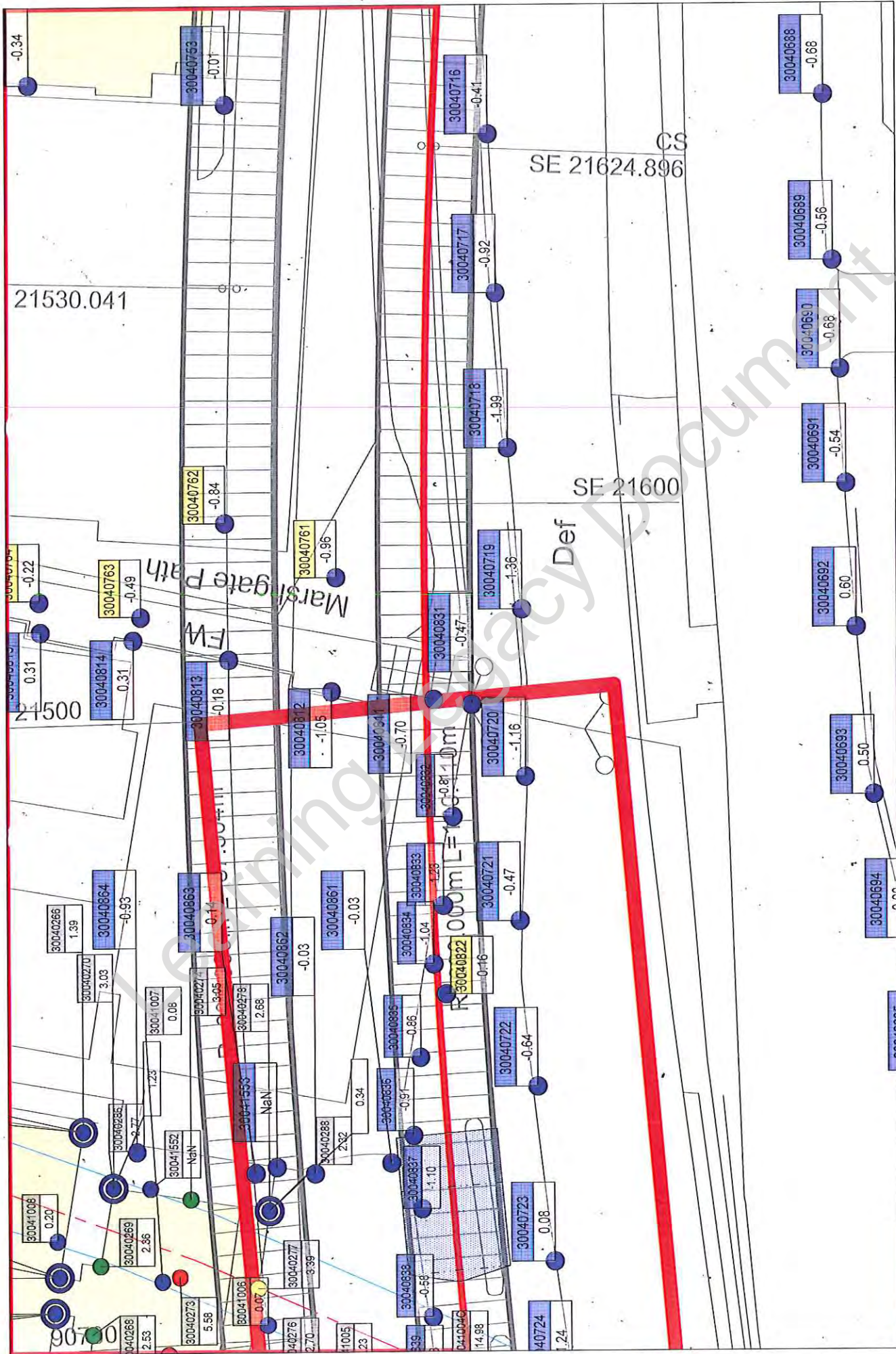


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel- Wall Plumstead Road - 14.03.2013 - 11.03.2015
Date: 27.03.2015 16:13 Current Values: 27.03.2015 14:23





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 01.05.2013 09:00

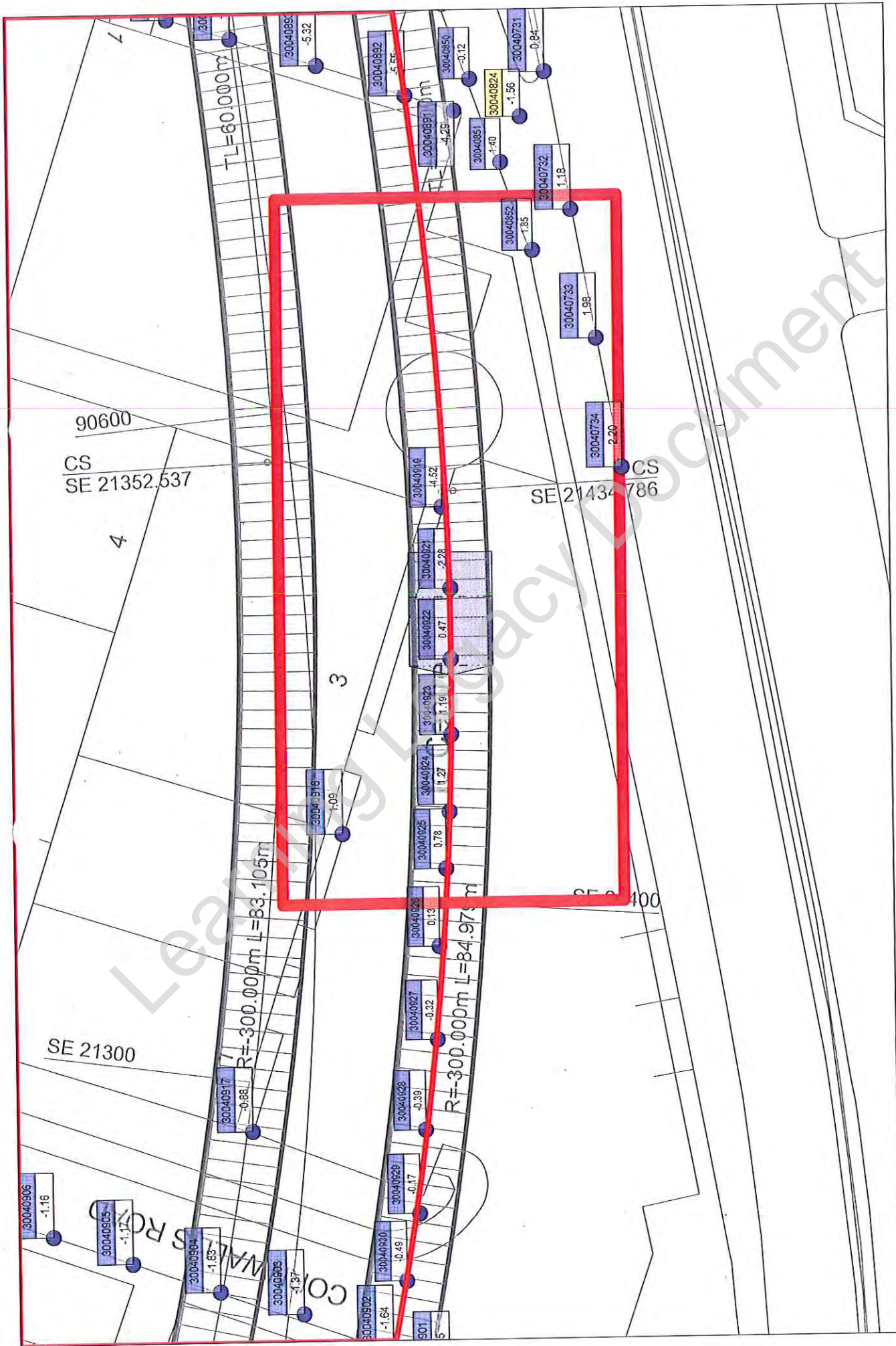


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

working activities: TBM drive WB.

current values: 01.05.2013 09:00

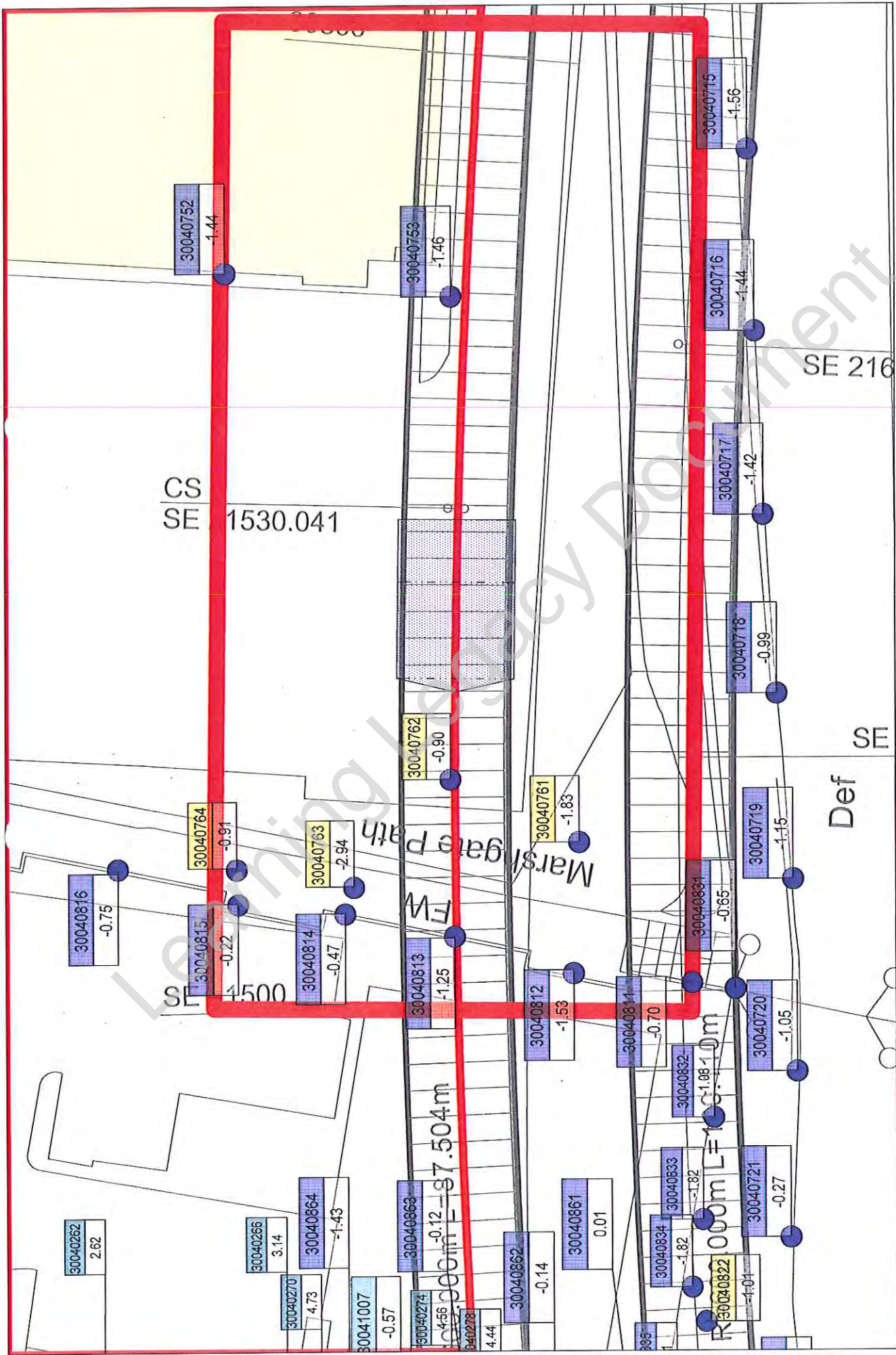




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

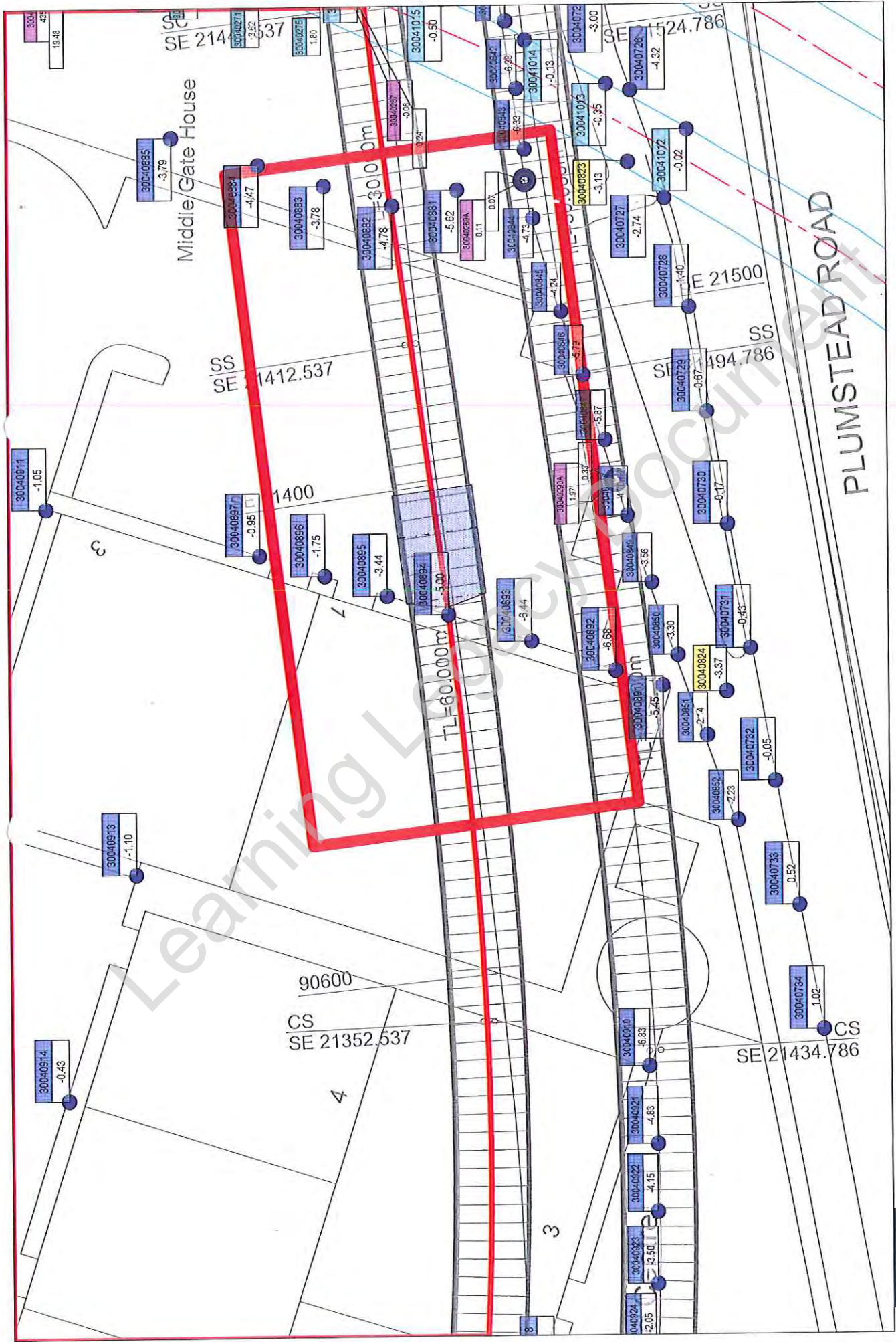
working activities: TBM drive
 current values: 08.05.2013 17:47





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 25.07.2013 19:09

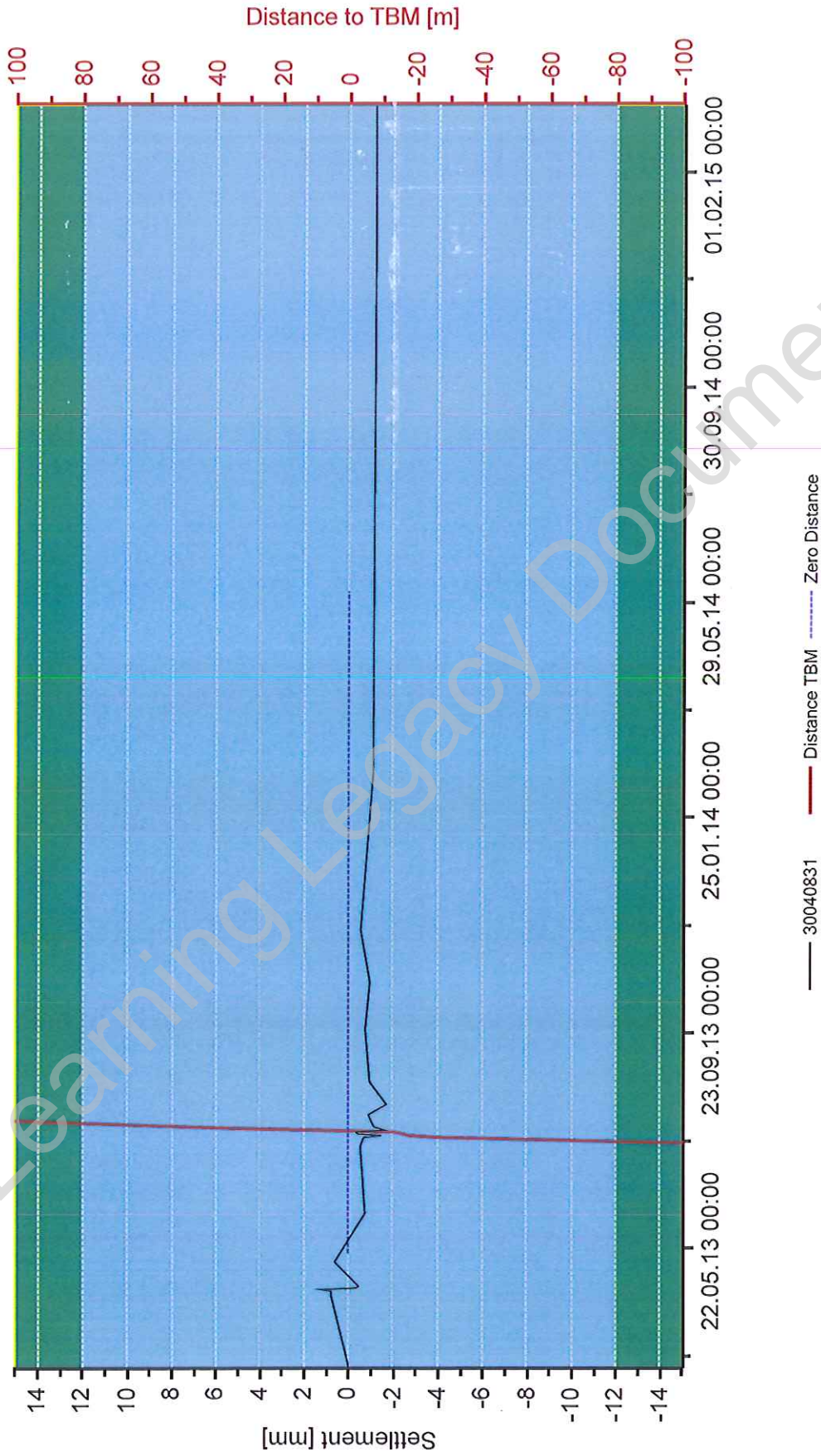




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 03.08.2013 18:06

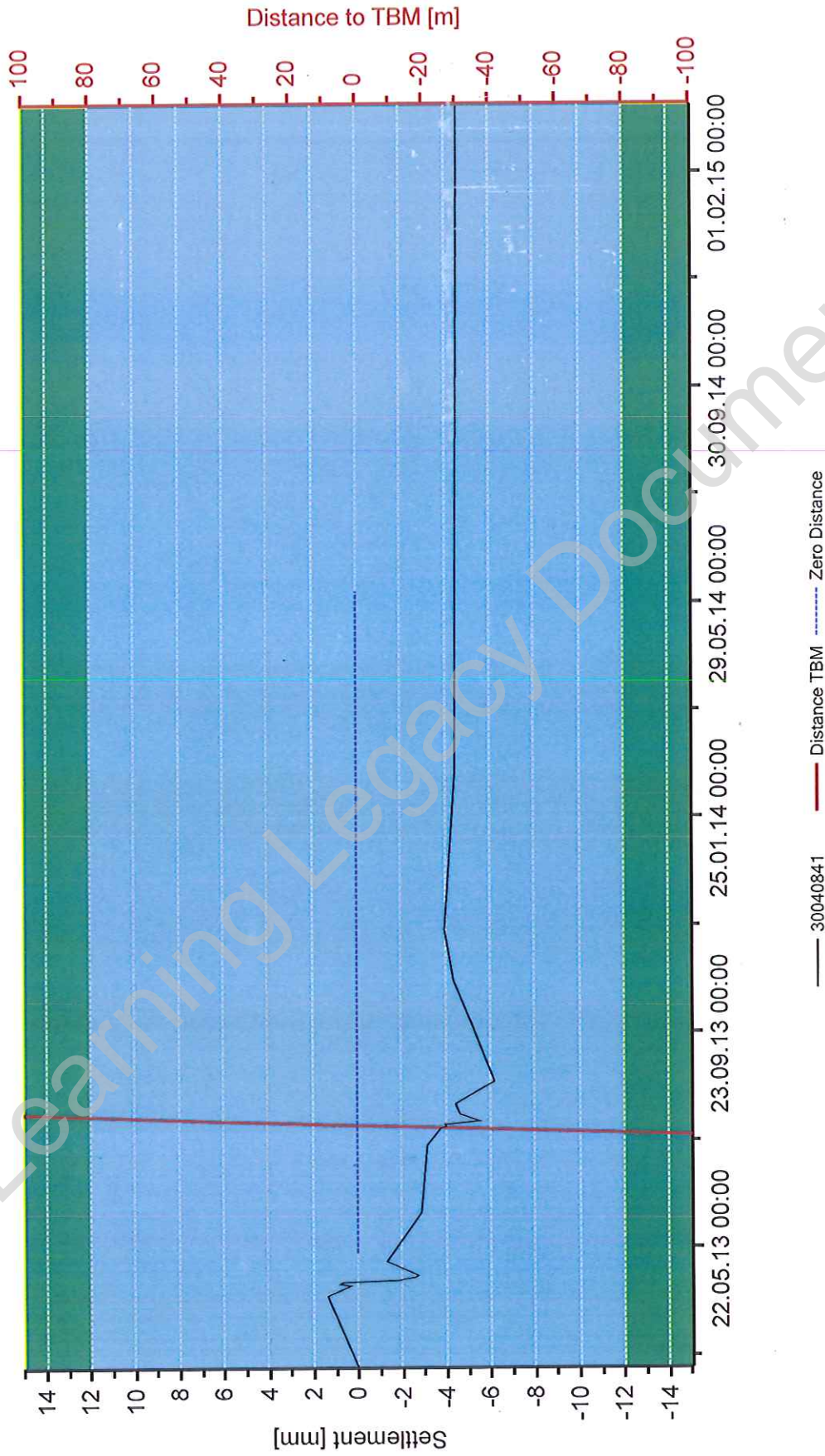


Profile: Measurement Point 30040831



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Wall Plumstead Road - 14.03.2013 - 11.03.2015
date: 27.03.2015 14:52 current values: 27.03.2015 14:23

Profile: Measurement Point 30040841



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Wall Plumstead Road - 14.03.2013 - 11.03.2015
date: 27.03.2015 14:50 current values: 27.03.2015 14:23

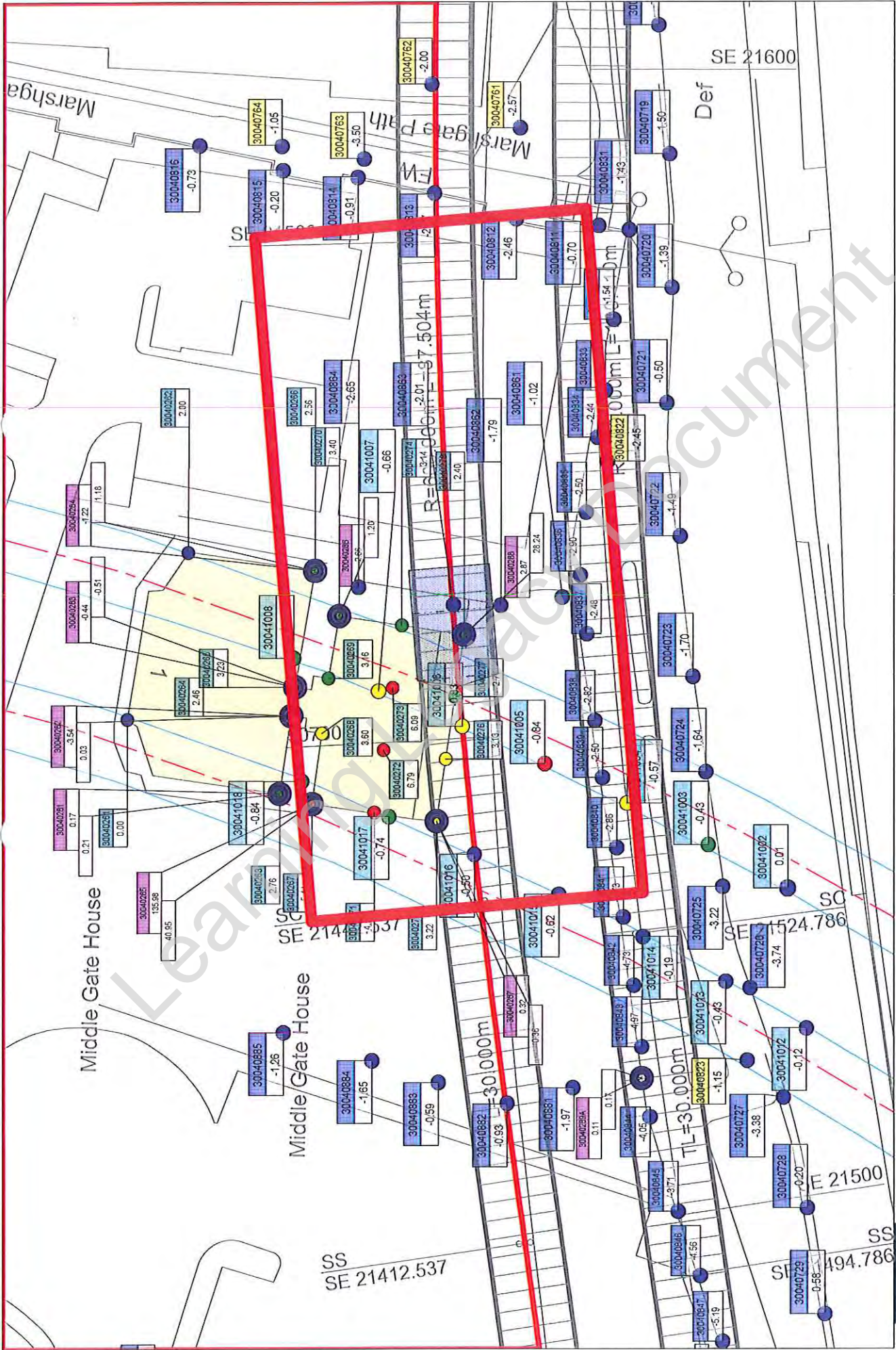


Profile: Measurement Point 30040852



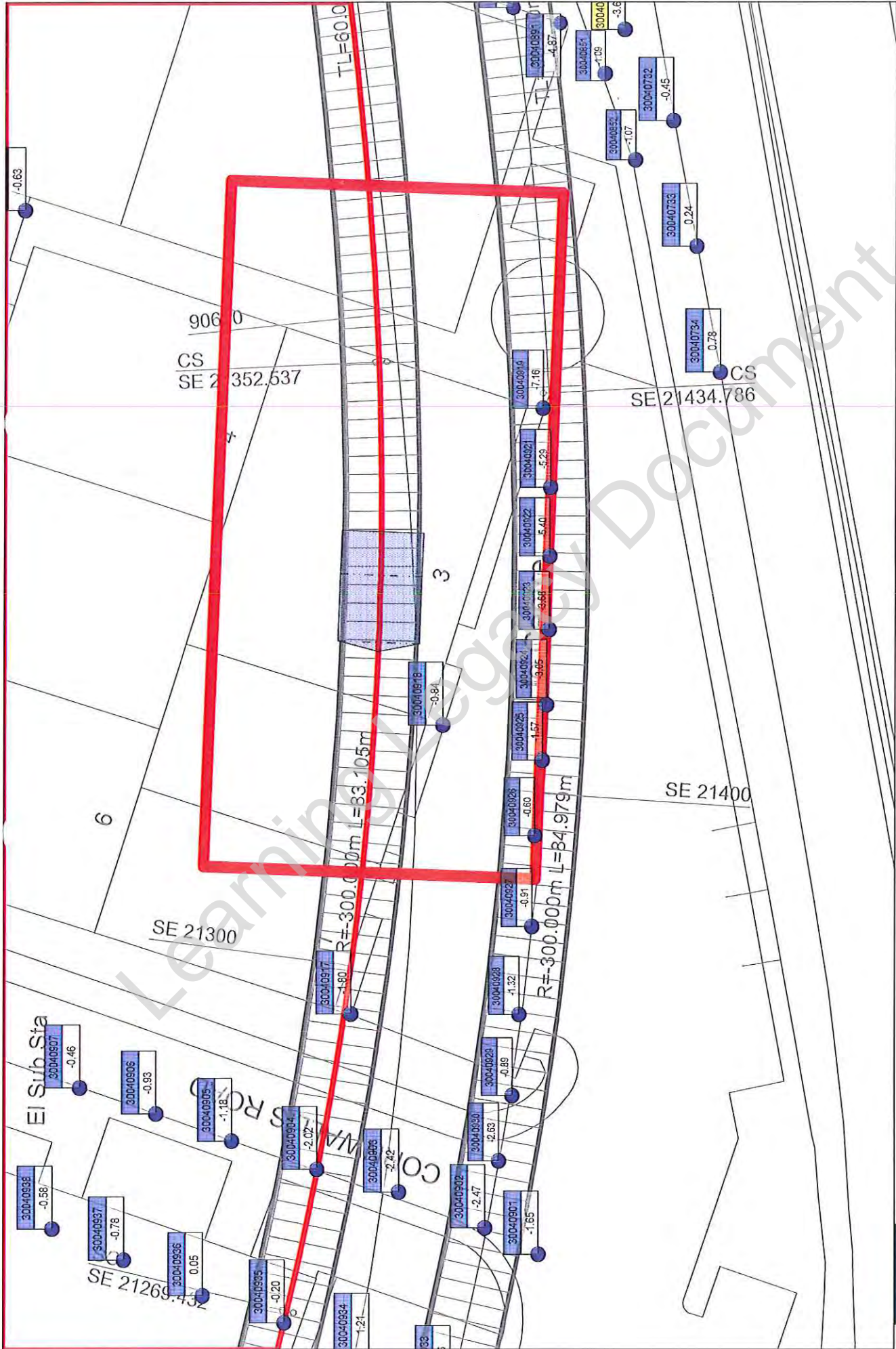
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Wall Plumstead Road - 14.03.2013 - 11.03.2015
date: 27.03.2015 14:45 current values: 27.03.2015 14:23





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 30.07.2013 18:00





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 09:00

monitoring table



monitoring table



Joint Venture

project: C310 Thames Tunnel
structure: Wall Plumstead Road

Joint Venture

project: C310 Thames Tunnel
structure: Wall Plumstead Road

No. of reading ID10	Point No.	1. following 14/01/13		2. following 20/04/13		3. following 27/08/13		4. following 29/04/13		5. following 29/04/13		6. following 30/04/13		7. following 01/05/13		8. following 03/05/13		9. following 03/05/13		10. following 04/05/13		11. following 04/05/13		12. following 06/05/13					
		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline				
30040031	107,046	107,046	0	107,046	0	107,046	0	107,047	0	107,047	0	107,047	0	107,042	0	107,042	0	107,042	0	107,042	0	107,042	0	107,042	0	107,042	0		
30040032	107,043	107,043	1	107,044	1	107,043	-1	107,043	-1	107,043	-1	107,043	-1	107,042	0	107,042	0	107,042	0	107,042	0	107,042	0	107,042	0	107,042	0	107,042	0
30040033	107,018	107,018	1	107,019	1	107,018	1	107,018	1	107,018	1	107,018	1	107,017	0	107,017	0	107,017	0	107,017	0	107,017	0	107,017	0	107,017	0	107,017	0
30040034	107,013	107,013	1	107,014	1	107,013	-1	107,013	-1	107,013	-1	107,013	-1	107,012	0	107,012	0	107,012	0	107,012	0	107,012	0	107,012	0	107,012	0	107,012	0
30040035	107,021	107,021	1	107,022	1	107,021	0	107,021	0	107,021	0	107,021	0	107,020	-1	107,020	-1	107,020	-1	107,020	-1	107,020	-1	107,020	-1	107,020	-1	107,020	-1
30040036	107,002	107,002	1	107,003	1	107,002	0	107,002	0	107,002	0	107,002	0	107,002	0	107,002	0	107,002	0	107,002	0	107,002	0	107,002	0	107,002	0	107,002	0
30040037	106,989	106,989	1	106,990	1	106,989	0	106,989	0	106,989	0	106,989	0	106,988	-1	106,988	-1	106,988	-1	106,988	-1	106,988	-1	106,988	-1	106,988	-1	106,988	-1
30040038	106,950	106,950	1	106,951	1	106,950	-1	106,950	-1	106,950	-1	106,950	-1	106,949	-1	106,949	-1	106,949	-1	106,949	-1	106,949	-1	106,949	-1	106,949	-1	106,949	-1
30040039	106,908	106,908	1	106,909	1	106,908	0	106,908	0	106,908	0	106,908	0	106,908	0	106,908	0	106,908	0	106,908	0	106,908	0	106,908	0	106,908	0	106,908	0
30040040	106,843	106,843	1	106,844	1	106,843	-1	106,843	-1	106,843	-1	106,843	-1	106,843	0	106,843	0	106,843	0	106,843	0	106,843	0	106,843	0	106,843	0	106,843	0
30040041	106,802	106,802	1	106,803	1	106,802	0	106,802	0	106,802	0	106,802	0	106,803	1	106,803	1	106,803	1	106,803	1	106,803	1	106,803	1	106,803	1	106,803	1
30040042	106,756	106,756	1	106,757	1	106,756	0	106,756	0	106,756	0	106,756	0	106,757	1	106,757	1	106,757	1	106,757	1	106,757	1	106,757	1	106,757	1	106,757	1
30040043	106,889	106,889	1	106,890	1	106,889	0	106,889	0	106,889	0	106,889	0	106,889	0	106,889	0	106,889	0	106,889	0	106,889	0	106,889	0	106,889	0	106,889	0
30040044	106,880	106,880	1	106,882	1	106,881	-1	106,881	-1	106,881	-1	106,881	-1	106,881	-1	106,881	-1	106,881	-1	106,881	-1	106,881	-1	106,881	-1	106,881	-1	106,881	-1
30040045	106,877	106,877	1	106,879	1	106,877	0	106,877	0	106,877	0	106,877	0	106,878	1	106,878	1	106,878	1	106,878	1	106,878	1	106,878	1	106,878	1	106,878	1
30040046	106,949	106,949	1	106,951	1	106,950	-1	106,950	-1	106,950	-1	106,950	-1	106,949	-1	106,949	-1	106,949	-1	106,949	-1	106,949	-1	106,949	-1	106,949	-1	106,949	-1
30040047	107,005	107,005	1	107,007	1	107,006	0	107,006	0	107,006	0	107,006	0	107,006	0	107,006	0	107,006	0	107,006	0	107,006	0	107,006	0	107,006	0	107,006	0
30040048	107,102	107,102	1	107,104	1	107,103	-1	107,103	-1	107,103	-1	107,103	-1	107,103	-1	107,103	-1	107,103	-1	107,103	-1	107,103	-1	107,103	-1	107,103	-1	107,103	-1
30040049	107,237	107,237	1	107,239	1	107,238	-1	107,238	-1	107,238	-1	107,238	-1	107,239	0	107,239	0	107,239	0	107,239	0	107,239	0	107,239	0	107,239	0	107,239	0
30040050	107,314	107,314	1	107,316	1	107,315	-1	107,315	-1	107,315	-1	107,315	-1	107,316	0	107,316	0	107,316	0	107,316	0	107,316	0	107,316	0	107,316	0	107,316	0
30040051	107,440	107,441	1	107,443	1	107,442	-1	107,442	-1	107,442	-1	107,442	-1	107,443	0	107,443	0	107,443	0	107,443	0	107,443	0	107,443	0	107,443	0	107,443	0
30040052	107,543	107,544	1	107,545	1	107,544	-1	107,544	-1	107,544	-1	107,544	-1	107,545	0	107,545	0	107,545	0	107,545	0	107,545	0	107,545	0	107,545	0	107,545	0

monitoring table

monitoring table



Joint Venture

Project: C310 Thames Tunnel

Joint Venture

Project: C310 Thames Tunnel

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	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline			
30040031	107.048	107.048	1	107.047	-1	107.047	0	-1	107.047	0	-1	107.046	-1	107.046	0	-1	107.045	0	-1	107.046	0	-1	107.046	0	-1	107.045	0	-1
30040032	107.043	107.043	1	107.042	-2	107.042	0	-1	107.042	0	-1	107.041	-1	107.041	0	-2	107.041	0	-2	107.041	0	-2	107.041	0	-2	107.041	0	-2
30040033	107.018	107.018	2	107.017	-1	107.016	-1	-2	107.016	0	-2	107.015	-1	107.016	0	-1	107.016	0	-1	107.016	0	-2	107.015	0	-3	107.015	0	-3
30040034	107.013	107.014	2	107.012	-2	107.011	-1	-2	107.011	0	-2	107.011	-1	107.012	1	-1	107.012	0	-1	107.011	-1	-2	107.010	0	-3	107.010	0	-3
30040035	107.021	107.021	2	107.019	-2	107.018	-1	-2	107.018	0	-2	107.018	-1	107.019	1	-1	107.019	0	-1	107.018	-1	-2	107.018	0	-3	107.018	0	-3
30040036	107.002	107.002	1	107.000	-2	106.999	-1	-3	106.999	1	-2	107.000	-1	107.001	1	-2	107.001	1	-2	107.000	-1	-3	106.999	-1	-4	106.999	1	-3
30040037	106.989	106.989	2	106.987	-2	106.986	-1	-3	106.987	1	-2	106.987	-1	106.988	1	-1	106.988	1	-1	106.987	0	-2	106.986	-1	-3	106.987	1	-3
30040038	106.950	106.949	1	106.946	-1	106.947	-1	-3	106.946	1	-2	106.947	-1	106.947	1	-1	106.947	0	-3	106.947	0	-3	106.947	-1	-4	106.947	-1	-4
30040039	106.908	106.907	1	106.905	-1	106.905	-1	-2	106.905	-1	-2	106.905	-1	106.905	-1	-2	106.905	0	-3	106.905	-1	-3	106.905	-1	-3	106.905	-1	-3
30040040	106.843	106.842	2	106.841	-1	106.840	-1	-3	106.840	-1	-3	106.840	-1	106.840	-1	-3	106.840	0	-3	106.839	0	-3	106.839	0	-3	106.839	0	-3
30040041	106.822	106.801	1	106.799	-2	106.799	0	-3	106.799	0	-3	106.799	0	106.799	0	-4	106.798	-1	-4	106.798	0	-4	106.798	0	-4	106.798	0	-4
30040042	106.756	106.754	1	106.752	-2	106.752	-2	-4	106.752	-1	-5	106.752	-1	106.752	-1	-5	106.751	0	-5	106.751	0	-5	106.751	0	-5	106.751	0	-5
30040043	106.899	106.886	1	106.884	-2	106.884	-2	-4	106.884	0	-5	106.884	0	106.884	0	-5	106.884	0	-5	106.884	0	-5	106.884	0	-5	106.884	0	-5
30040044	106.890	106.879	1	106.877	-2	106.876	0	-4	106.876	0	-4	106.876	0	106.876	0	-4	106.876	0	-4	106.876	0	-4	106.876	0	-4	106.876	0	-4
30040045	106.827	106.865	1	106.864	-2	106.864	-2	-3	106.863	-1	-4	106.863	-1	106.863	-1	-4	106.863	-1	-4	106.863	-1	-4	106.863	-1	-4	106.863	-1	-4
30040046	106.049	106.047	1	106.045	-2	106.045	-2	-4	106.045	0	-5	106.045	0	106.044	-1	-5	106.044	-1	-5	106.044	-1	-5	106.044	-1	-5	106.044	-1	-5
30040047	107.065	107.062	0	107.060	-2	107.060	-2	-5	107.060	0	-5	107.060	0	107.060	0	-5	107.060	0	-5	107.060	0	-5	107.060	0	-5	107.060	0	-5
30040048	107.102	107.100	1	107.100	0	107.100	0	-4	107.100	0	-4	107.100	0	107.100	0	-4	107.100	0	-4	107.100	0	-4	107.100	0	-4	107.100	0	-4
30040049	107.237	107.235	0	107.233	-2	107.233	-2	-4	107.233	0	-4	107.233	0	107.233	0	-4	107.233	0	-4	107.233	0	-4	107.233	0	-4	107.233	0	-4
30040050	107.314	107.314	0	107.311	-2	107.311	-2	-3	107.311	0	-3	107.311	0	107.311	0	-3	107.311	0	-3	107.311	0	-3	107.311	0	-3	107.311	0	-3
30040051	107.460	107.442	0	107.439	-2	107.438	0	-2	107.438	0	-2	107.438	0	107.438	0	-2	107.438	0	-2	107.438	0	-2	107.438	0	-2	107.438	0	-2
30040052	107.543	107.545	0	107.542	-2	107.541	-1	-2	107.541	-1	-2	107.541	-1	107.541	-1	-2	107.541	-1	-2	107.541	-1	-2	107.541	-1	-2	107.541	-1	-2

monitoring table



monitoring table



Joint Venture

project: C310 Thames Tunnel
Bauwerk: Wall Plumstead Road

project: C310 Thames Tunnel
Bauwerk: Wall Plumstead Road

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	
	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
30040031	107.048		107.047	0	107.046	-1	107.047	1	107.047	0	107.047	0	107.047	0	107.047	0	107.047	0	107.047	0	107.047	0	107.046	-1
30040032	107.042		107.042	0	107.041	0	107.042	0	107.042	0	107.042	0	107.042	0	107.042	0	107.042	0	107.042	0	107.042	0	107.042	0
30040033	107.018		107.016	0	107.015	0	107.016	0	107.016	0	107.016	0	107.016	0	107.016	0	107.016	0	107.016	0	107.016	0	107.015	-1
30040034	107.013		107.011	-1	107.010	-1	107.011	0	107.011	0	107.011	0	107.011	0	107.011	0	107.011	0	107.011	0	107.011	0	107.012	1
30040035	107.021		107.018	0	107.017	-1	107.017	0	107.017	0	107.017	0	107.017	0	107.017	0	107.017	0	107.017	0	107.017	0	107.019	2
30040036	107.002		106.999	0	106.998	-1	106.997	-2	106.997	-2	106.997	-2	106.997	-2	106.997	-2	106.997	-2	106.997	-2	106.997	-2	106.999	1
30040037	106.989		106.986	0	106.985	-1	106.987	-2	106.987	-2	106.987	-2	106.987	-2	106.987	-2	106.987	-2	106.987	-2	106.987	-2	106.989	1
30040038	106.950		106.947	0	106.946	-1	106.946	-1	106.946	-1	106.946	-1	106.946	-1	106.946	-1	106.946	-1	106.946	-1	106.946	-1	106.948	2
30040039	106.908		106.904	-1	106.904	0	106.904	0	106.904	0	106.904	0	106.904	0	106.904	0	106.904	0	106.904	0	106.904	0	106.905	1
30040040	106.843		106.839	-1	106.838	0	106.838	0	106.838	0	106.838	0	106.838	0	106.838	0	106.838	0	106.838	0	106.838	0	106.840	2
30040041	106.802		106.797	-1	106.797	-1	106.797	-1	106.797	-1	106.797	-1	106.797	-1	106.797	-1	106.797	-1	106.797	-1	106.797	-1	106.798	1
30040042	106.756		106.751	-1	106.750	-1	106.750	0	106.750	0	106.750	0	106.750	0	106.750	0	106.750	0	106.750	0	106.750	0	106.751	1
30040043	106.889		106.884	-1	106.882	-1	106.882	-1	106.882	-1	106.882	-1	106.882	-1	106.882	-1	106.882	-1	106.882	-1	106.882	-1	106.884	2
30040044	106.890		106.876	-1	106.875	-1	106.875	0	106.875	0	106.875	0	106.875	0	106.875	0	106.875	0	106.875	0	106.875	0	106.876	1
30040045	106.867		106.863	0	106.863	-1	106.862	-1	106.862	-1	106.862	-1	106.862	-1	106.862	-1	106.862	-1	106.862	-1	106.862	-1	106.863	0
30040046	106.849		106.844	0	106.843	-1	106.843	-1	106.843	-1	106.843	-1	106.843	-1	106.843	-1	106.843	-1	106.843	-1	106.843	-1	106.844	0
30040047	107.005		107.000	0	107.000	0	107.000	0	107.000	0	107.000	0	107.000	0	107.000	0	107.000	0	107.000	0	107.000	0	107.001	1
30040048	107.162		107.157	0	107.157	0	107.157	0	107.157	0	107.157	0	107.157	0	107.157	0	107.157	0	107.157	0	107.157	0	107.158	1
30040049	107.237		107.230	0	107.230	0	107.230	0	107.230	0	107.230	0	107.230	0	107.230	0	107.230	0	107.230	0	107.230	0	107.231	1
30040050	107.314		107.311	0	107.311	0	107.311	0	107.311	0	107.311	0	107.311	0	107.311	0	107.311	0	107.311	0	107.311	0	107.312	1
30040051	107.440		107.439	0	107.439	0	107.439	0	107.439	0	107.439	0	107.439	0	107.439	0	107.439	0	107.439	0	107.439	0	107.440	1
30040052	107.543		107.542	0	107.542	0	107.542	0	107.542	0	107.542	0	107.542	0	107.542	0	107.542	0	107.542	0	107.542	0	107.543	1

monitoring table




Joint Venture

project: C310 Thames Tunnel

Bauwerk: Wall Plumstead Road

No. of reading	baseline		37. following		deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation
	14/3/13	elevation	11/03/2015	deviation from last/ baseline												
Point No.	elevation	elevation	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
30040831	107.048	107.046	0	-1.15												
30040832	107.043	107.042	0	-1.01												
30040833	107.018	107.016	0	-2.41												
30040834	107.013	107.012	0	-1.37												
30040835	107.021	107.020	1	-0.84												
30040836	107.002	107.001	1	-1.85												
30040837	106.989	106.992	3	2.34												
30040838	106.950	106.949	1	-1.08												
30040839	106.908	106.906	1	-1.89												
30040840	106.843	106.839	0	-3.59												
30040841	106.802	106.797	0	-4.58												
30040842	106.756	destroyed														
30040843	106.889	106.885	0	-3.79												
30040844	106.880	106.876	0	-4.04												
30040845	106.867	106.862	-1	-5.21												
30040846	106.949	106.944	0	-5.20												
30040847	107.065	107.060	0	-4.57												
30040848	107.162	107.158	0	-3.92												
30040849	107.237	107.233	0	-3.61												
30040850	107.314	107.311	0	-2.95												
30040851	107.440	107.440	0	-0.97												
30040852	107.543	107.543	0	-0.81												

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

APPENDIX 43

Middle Gate House – HLC

Learning Legacy Document

monitoring asset

Middle Gate House

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

name of monitoring section: Middle Gate House

sensor type: Hydrostatic Levelling Cell

chainage: 90690 - 90720 point no.: 3004 0261 - 3004 0278

trigger values: [mm] green: see special table amber: see special table red: see special table

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

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

Appendix: KK, LL, BBB

monitoring data

	date	max. value	point no.	comments
baseline	13/09/12	0.00		
TBM 1	start ZOI	29/04/13	3.33	3004 0278
		30/04/13	2.11	3004 0275
	end ZOI	03/05/13	3.02	3004 0278
		04/05/13	2.14	3004 0275
TBM 2	start ZOI	29/07/13	4.25	3004 0278
		30/07/13	3.07	3004 0275
	end ZOI	01/08/13	2.71	3004 0278
		02/08/13	1.90	3004 0275
longterm	15/10/13	-0.15	3004 0278	last reading approx. 3 month post tunneling, (see "summary" for explanation)
		0.17	3004 0275	

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

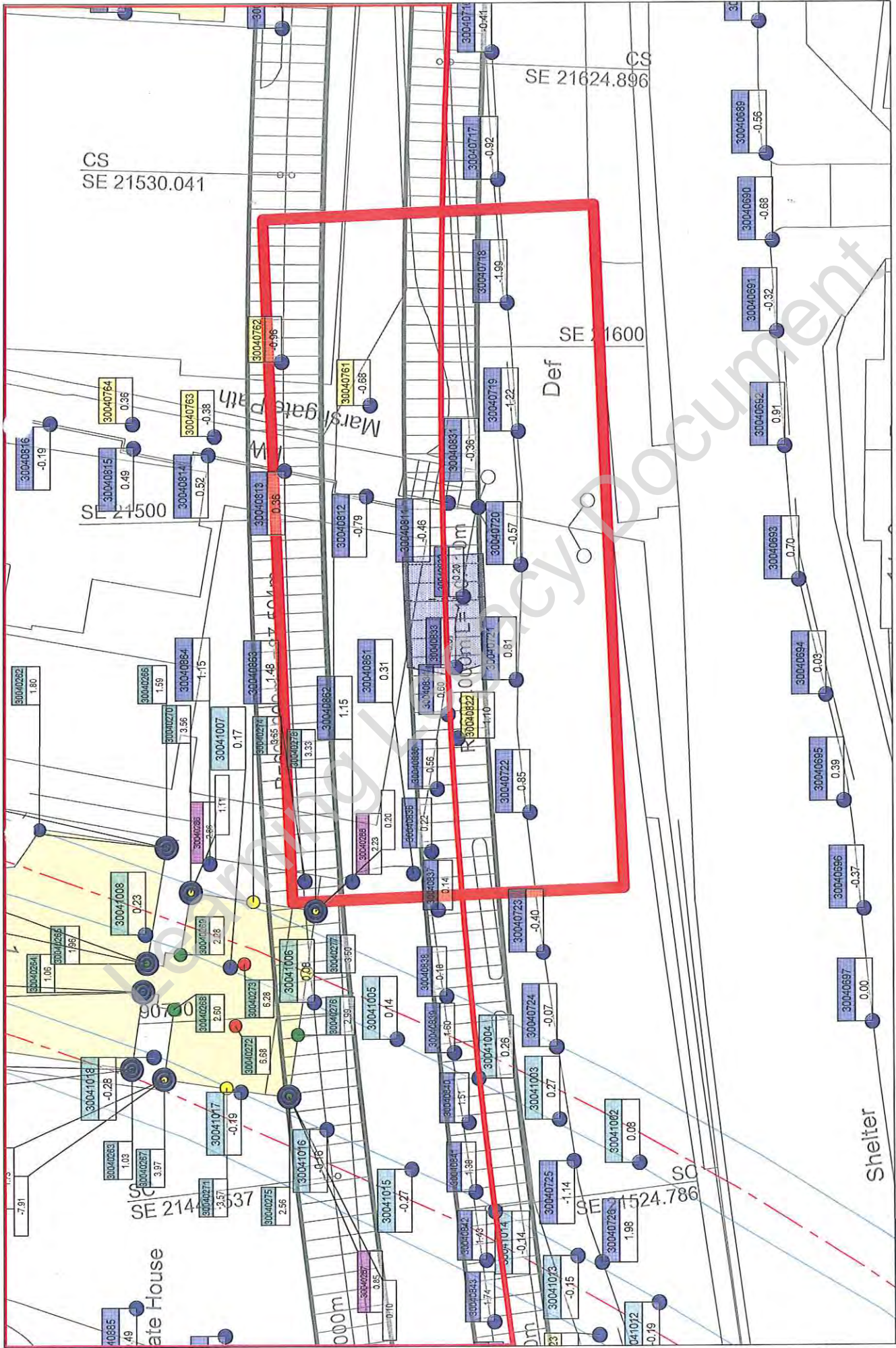
A special trigger value table was created to allow a max. movement (heave / settlement) of each point. As a result of TAM drillings and pre-grouting, from app. 07.01.-20.02.2013, the entire southern part of the building was lifted up by app.3-5mm, to compensate the max. of 5mm predicted settlement. The northern part of the building was lifted up by app. 2mm.
The summary of the grouting operation is report ref. C310-HTM-C-RGN-CR146_ST004-50023
Overall, none of the points reached at the end any trigger value.
Due to reinstatement works around MGH, it was agreed in CTC to decommission the system before longterm reading (after 6month) could be done.
Under consideration of temperature differences 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: 12/10/15

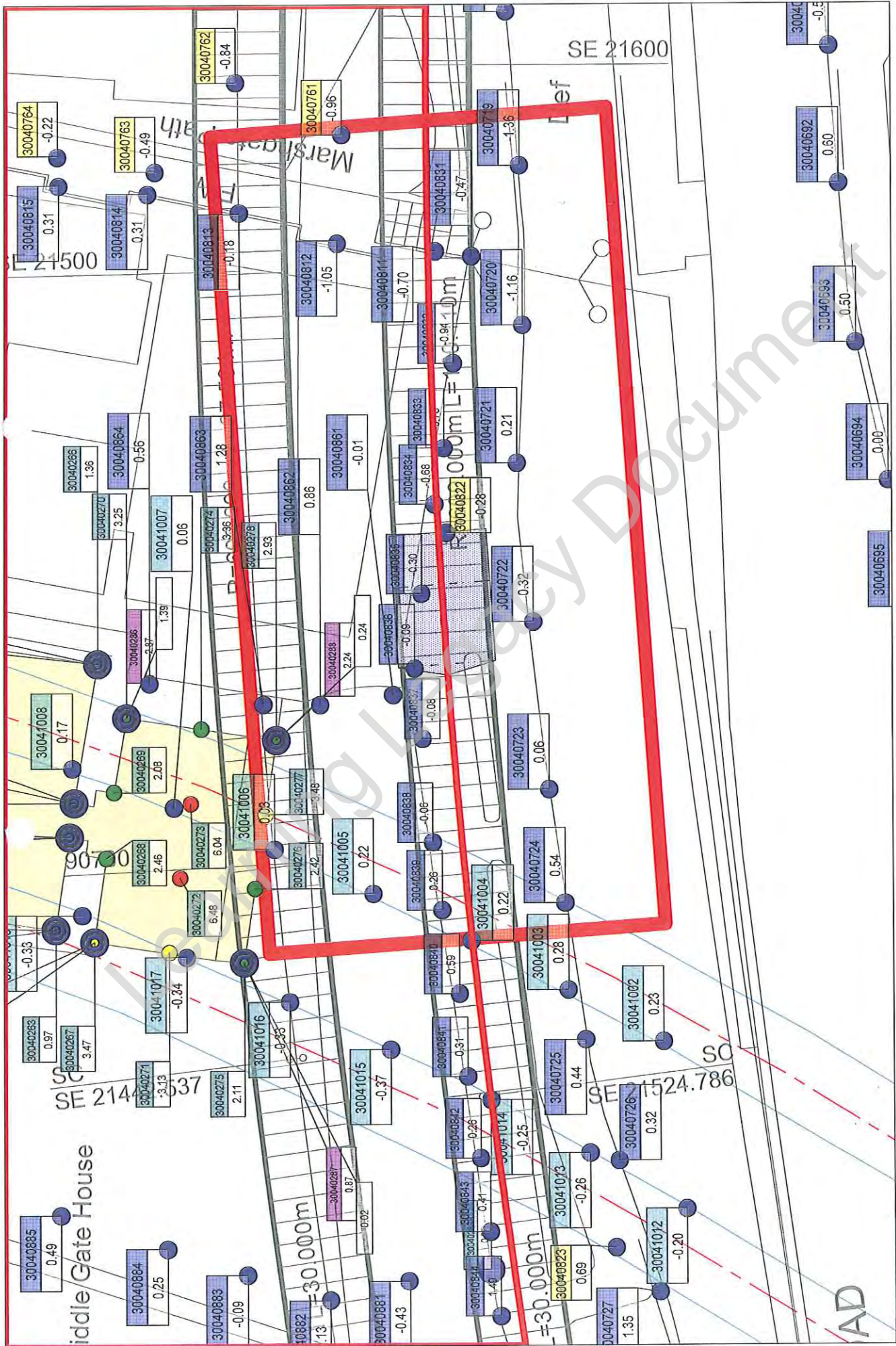
print name:

HMJV project role:

Monitoring & Survey engineer

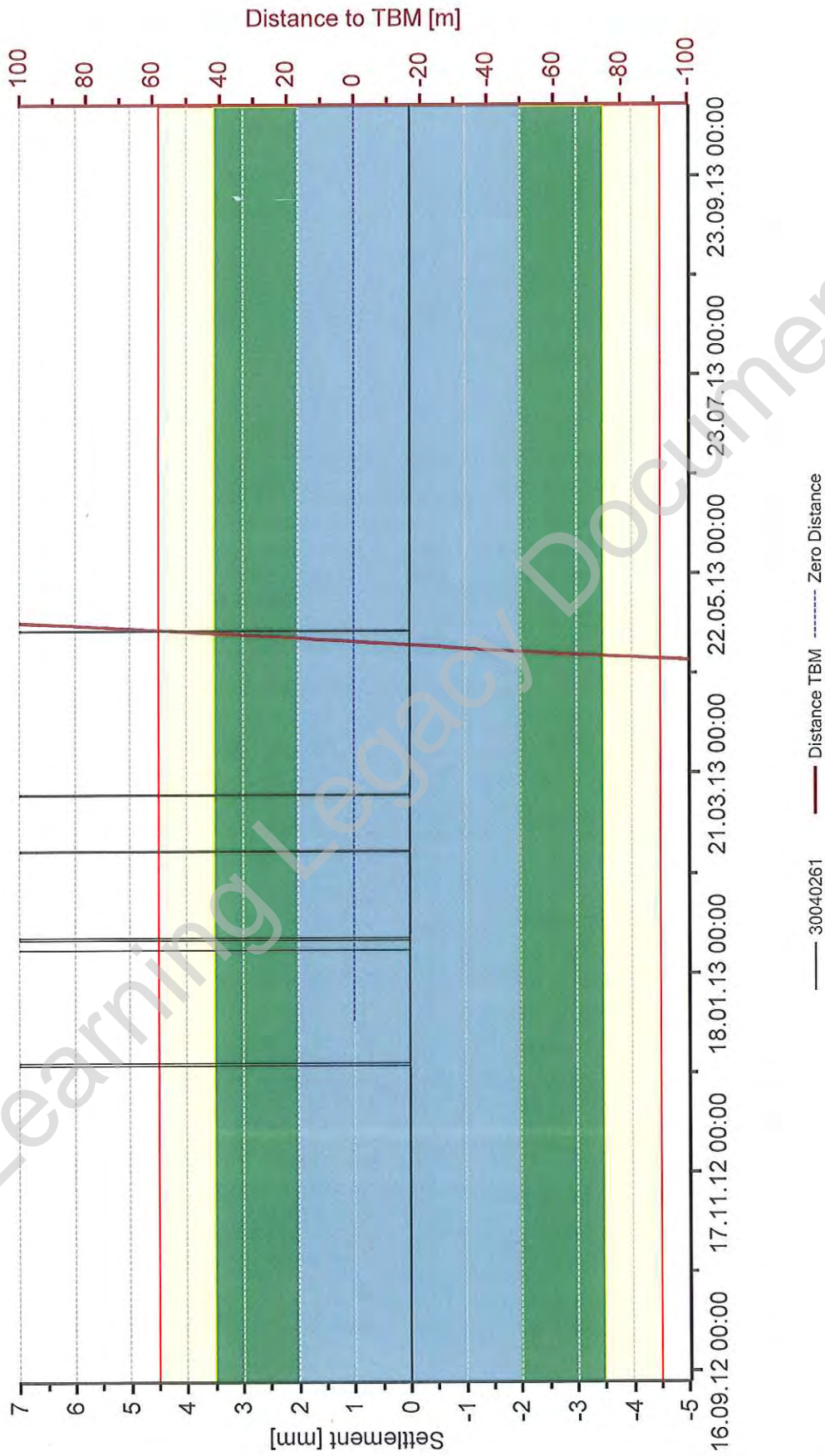


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 29.04.2013 17:45



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 DLR monitoring - hydrostatic levelling cells
 current values: 30.04.2013 17:45

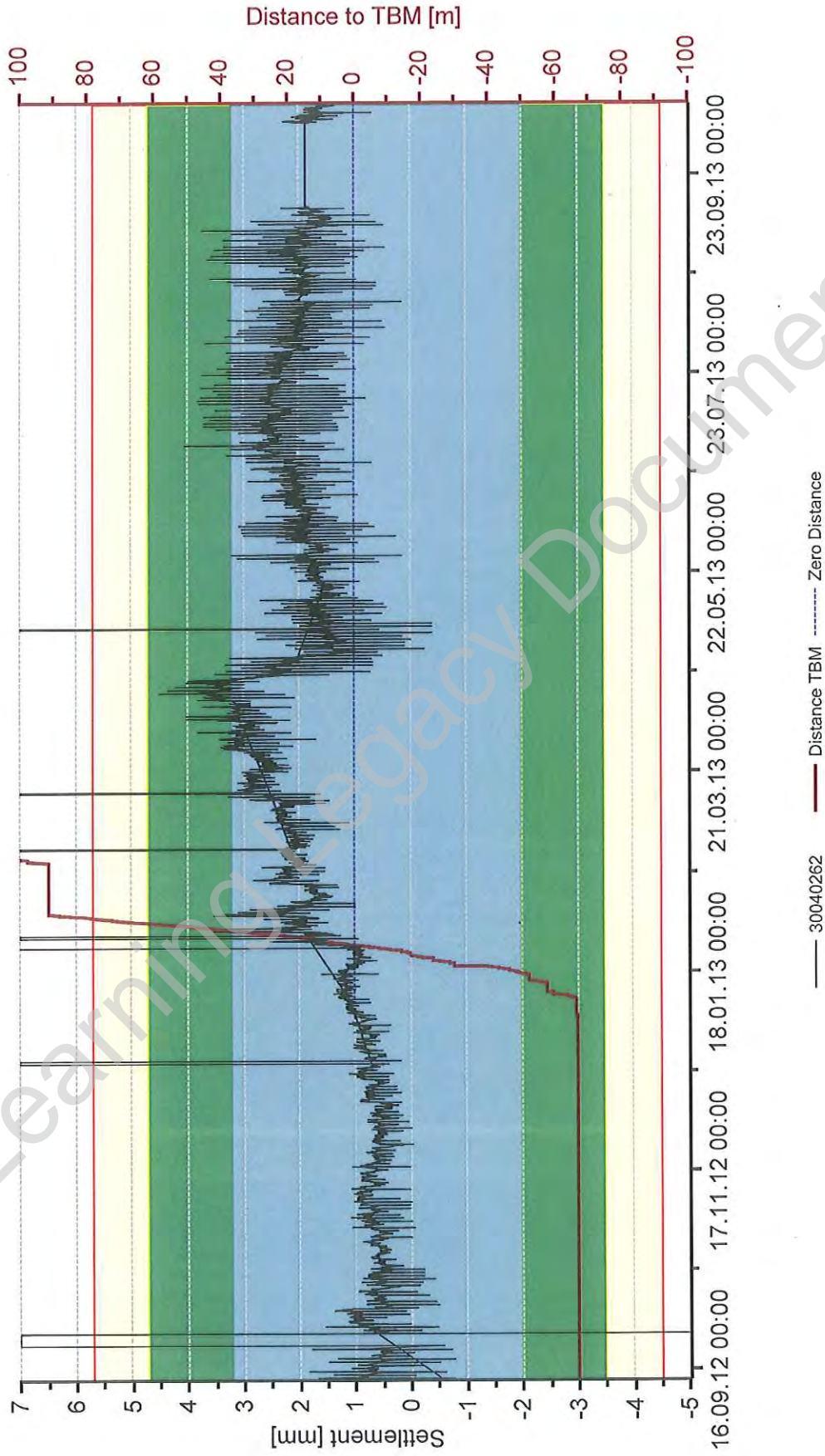
Point: 30040261



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 11:37 current values: 10.08.2014 11:03



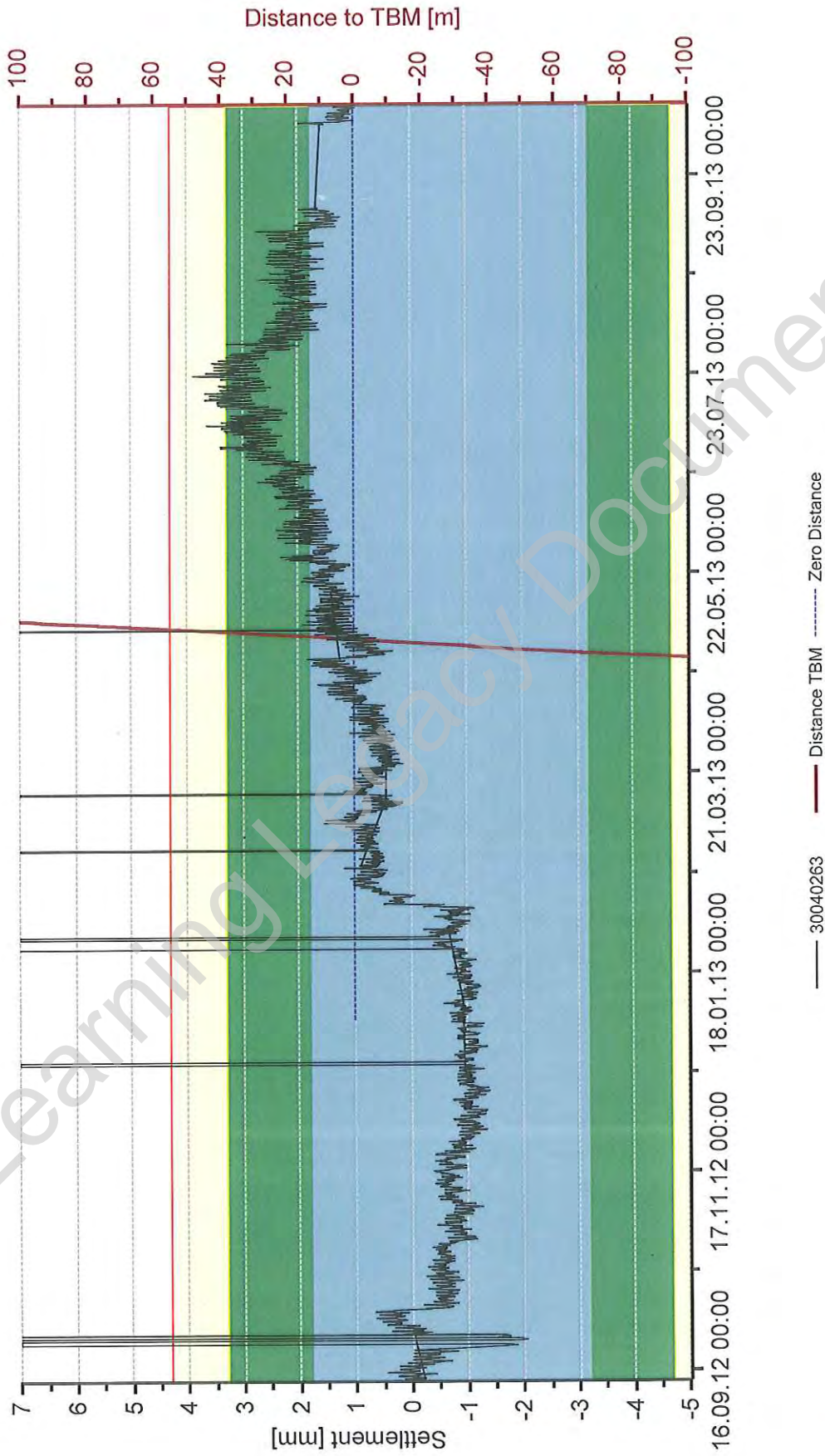
Point: 30040262



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 11:41 current values: 10.08.2014 11:03



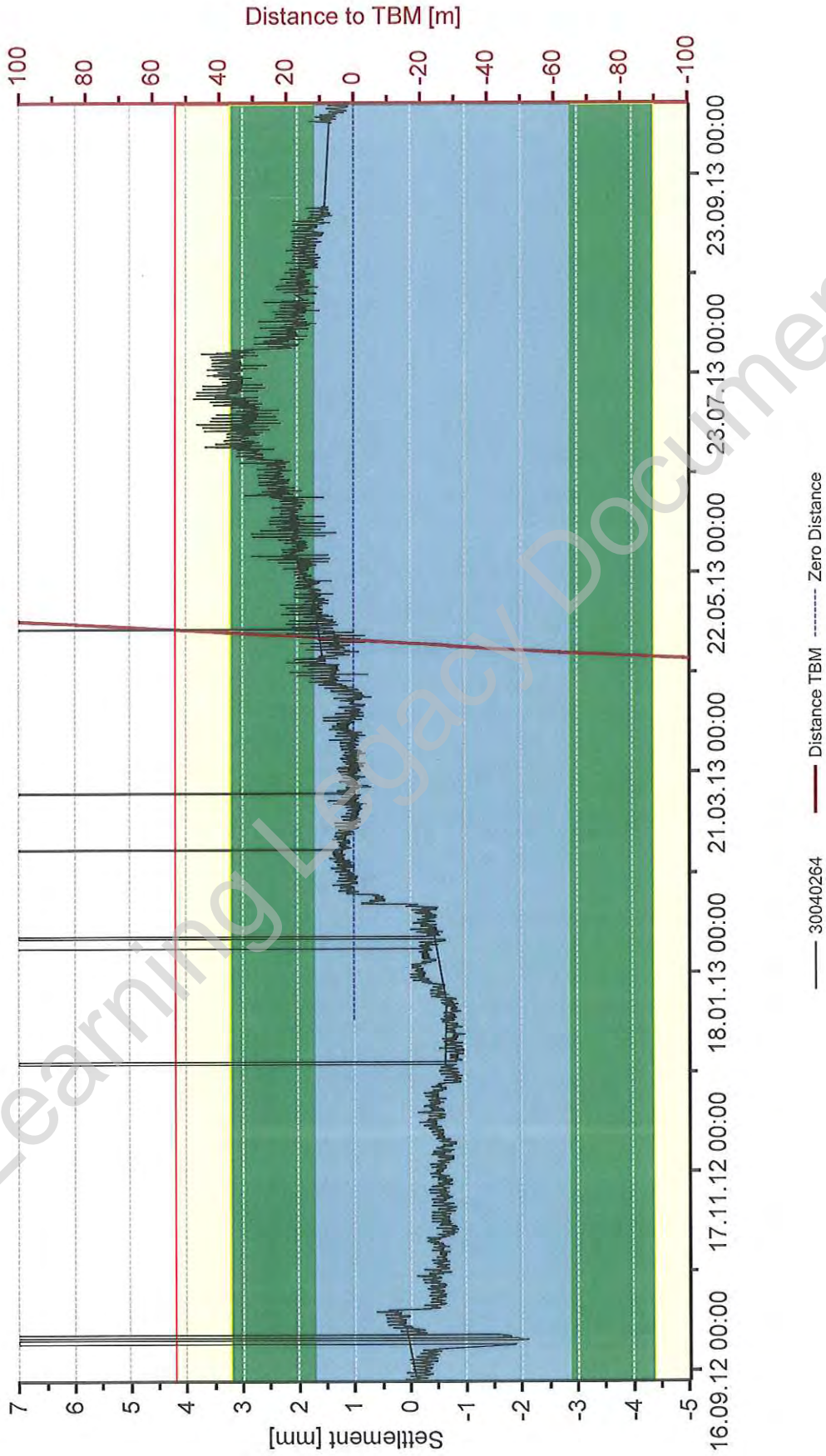
Point: 30040263



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 11:46 current values: 10.08.2014 11:03



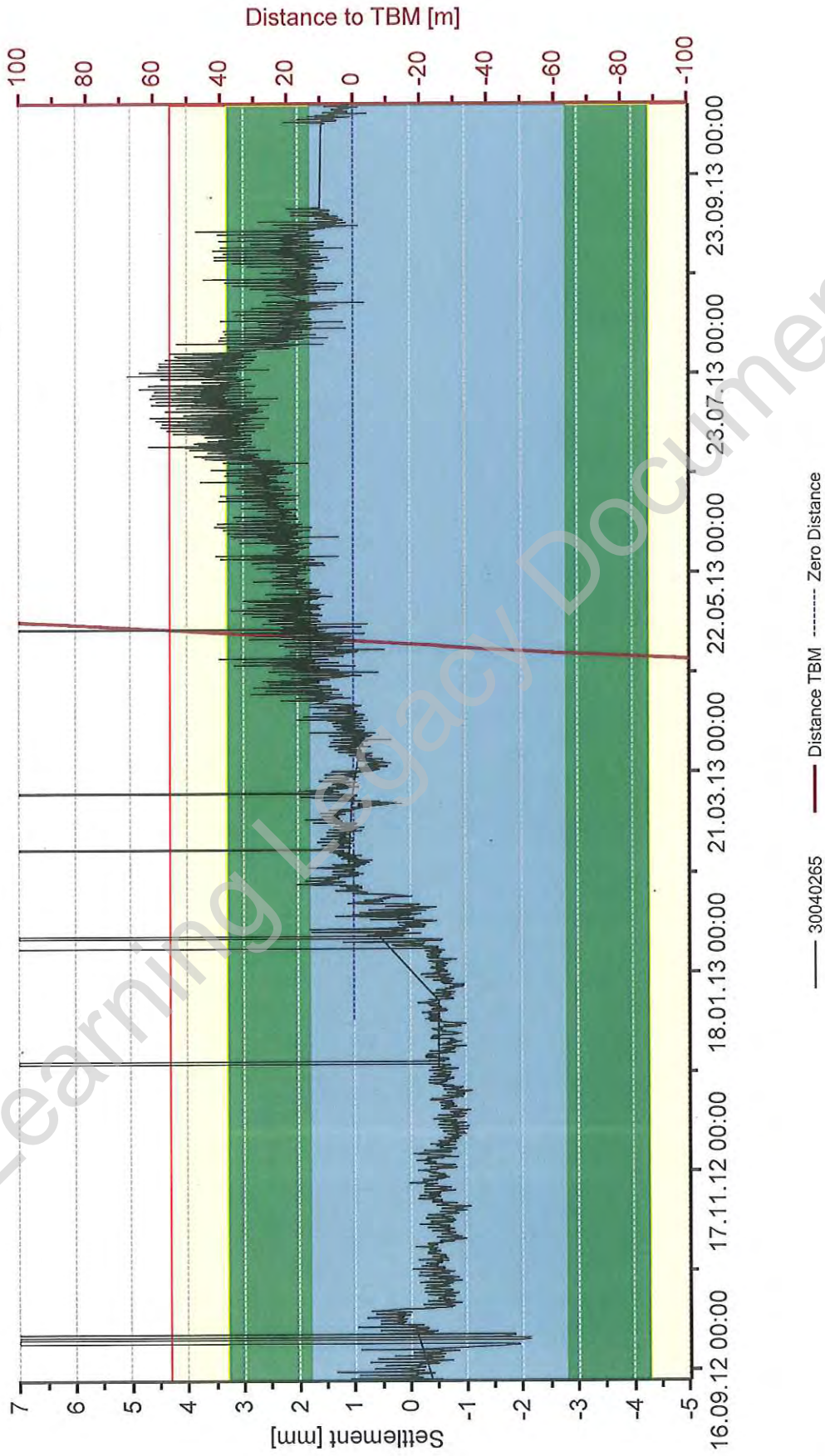
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Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 11:50 current values: 10.08.2014 11:03



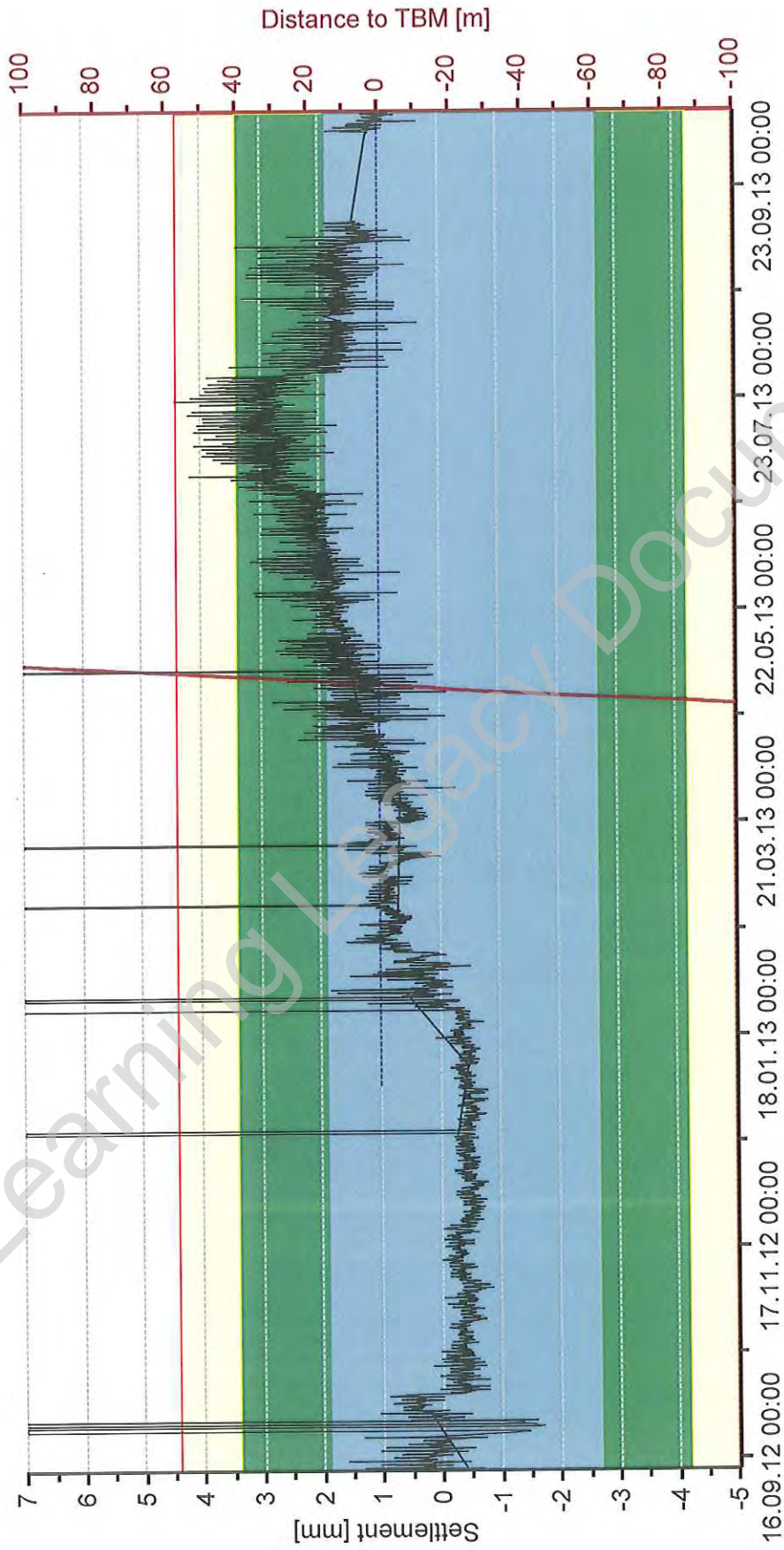
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Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 11:53 current values: 10.08.2014 11:03



Point: 30040266

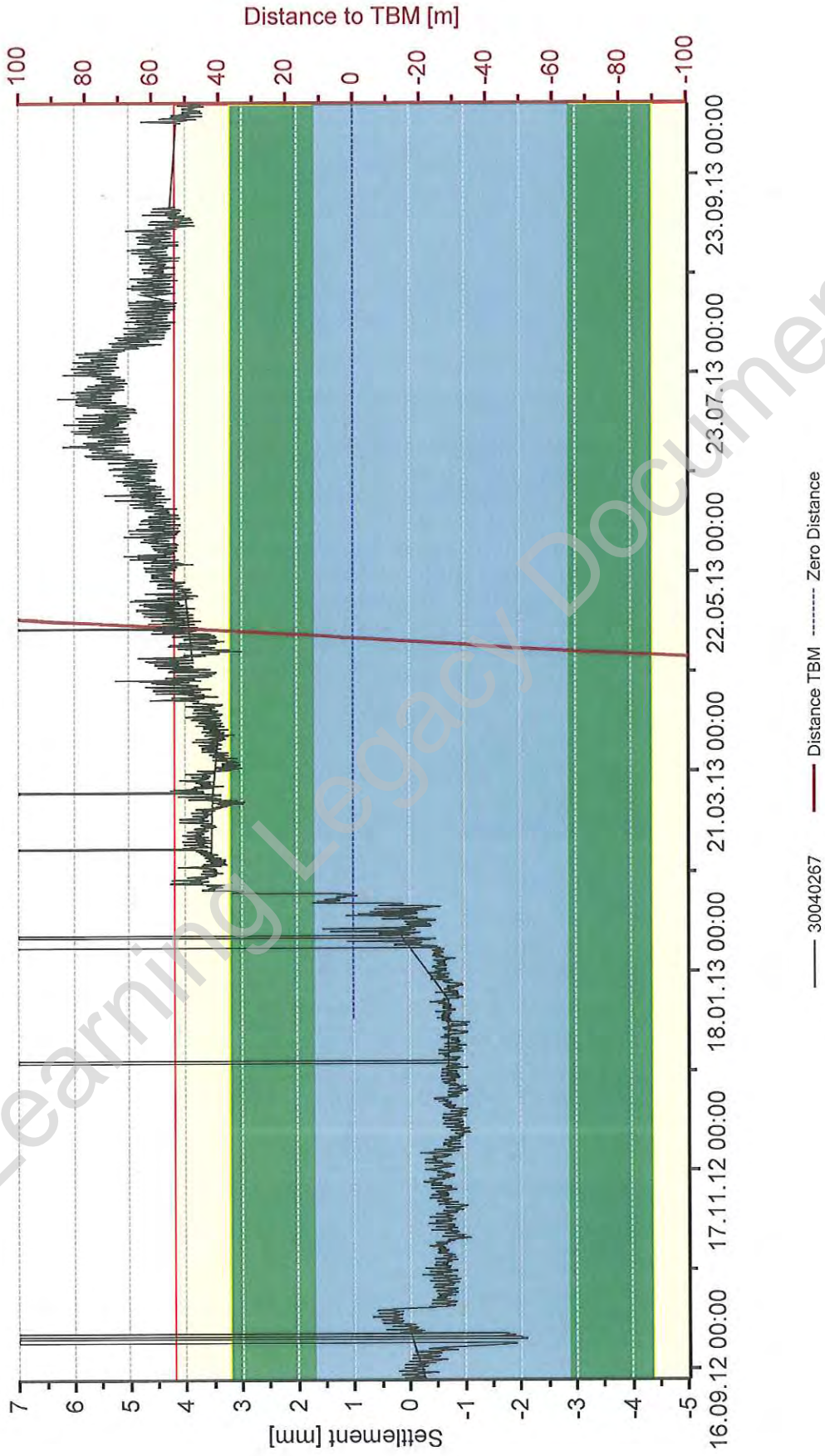


— 30040266 — Distance TBM - - - - - Zero Distance

Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 11:56 current values: 10.08.2014 11:03



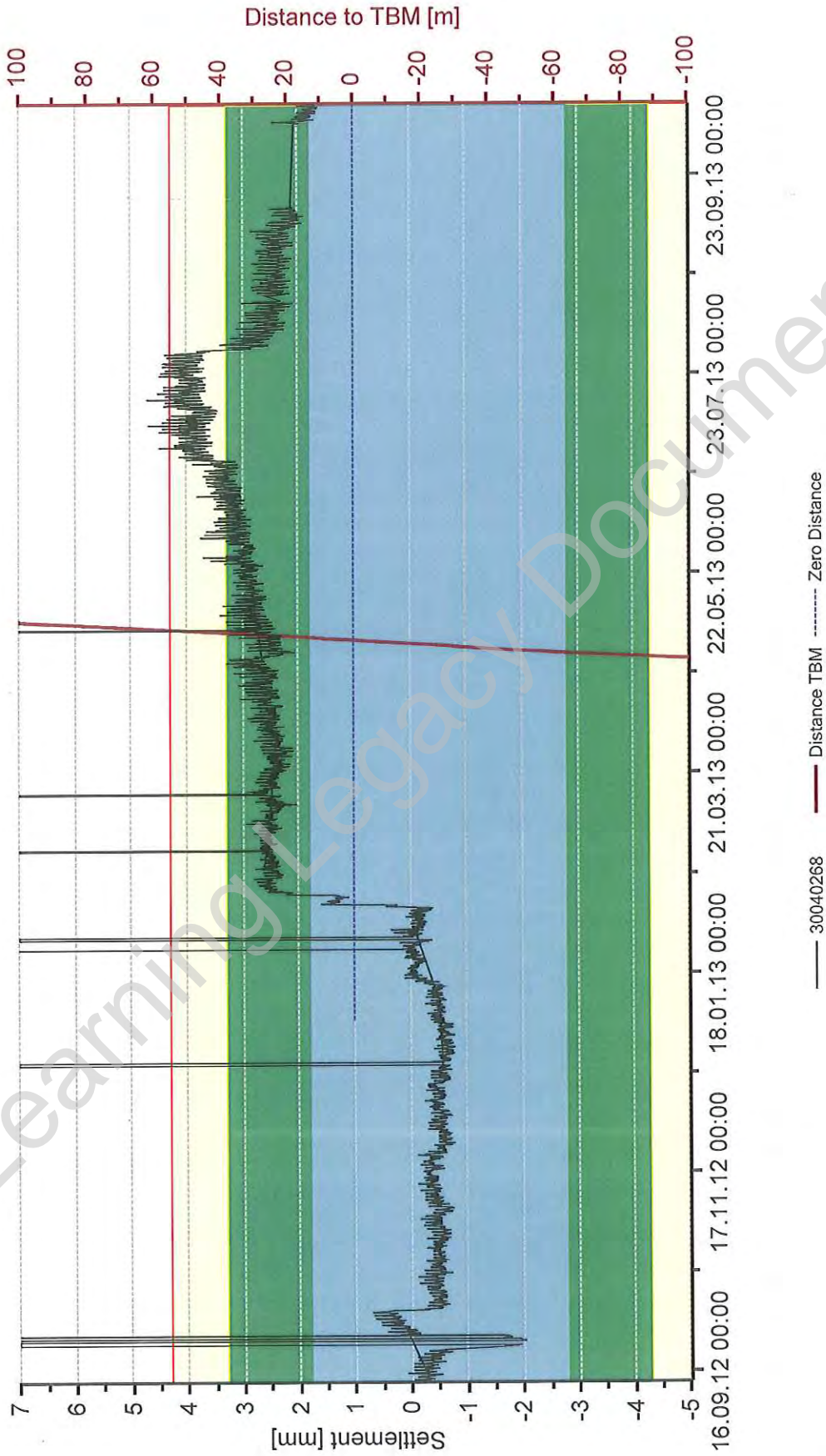
Point: 30040267



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 12:00 current values: 10.08.2014 11:03



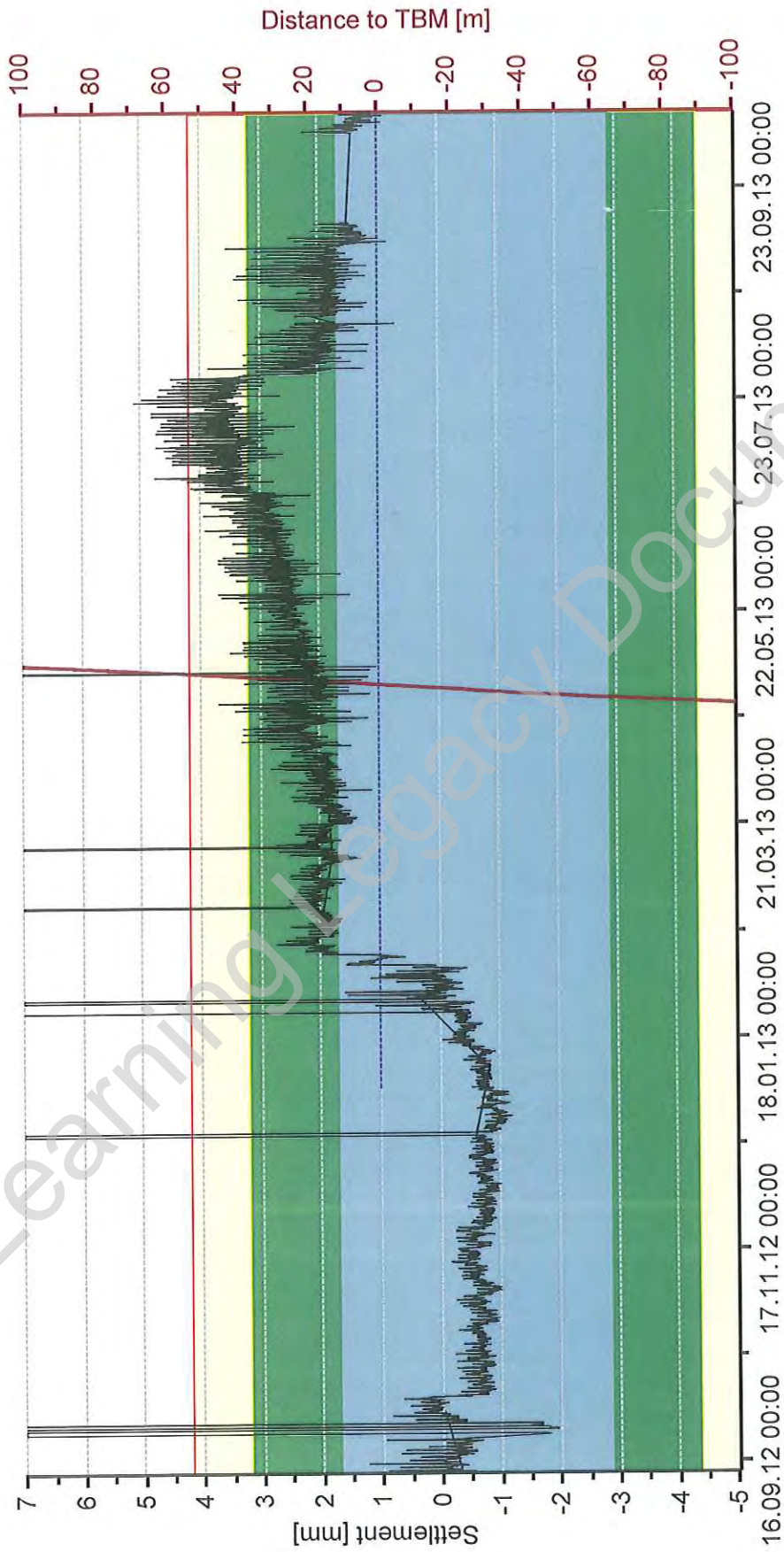
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Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 12:04 current values: 10.08.2014 11:03



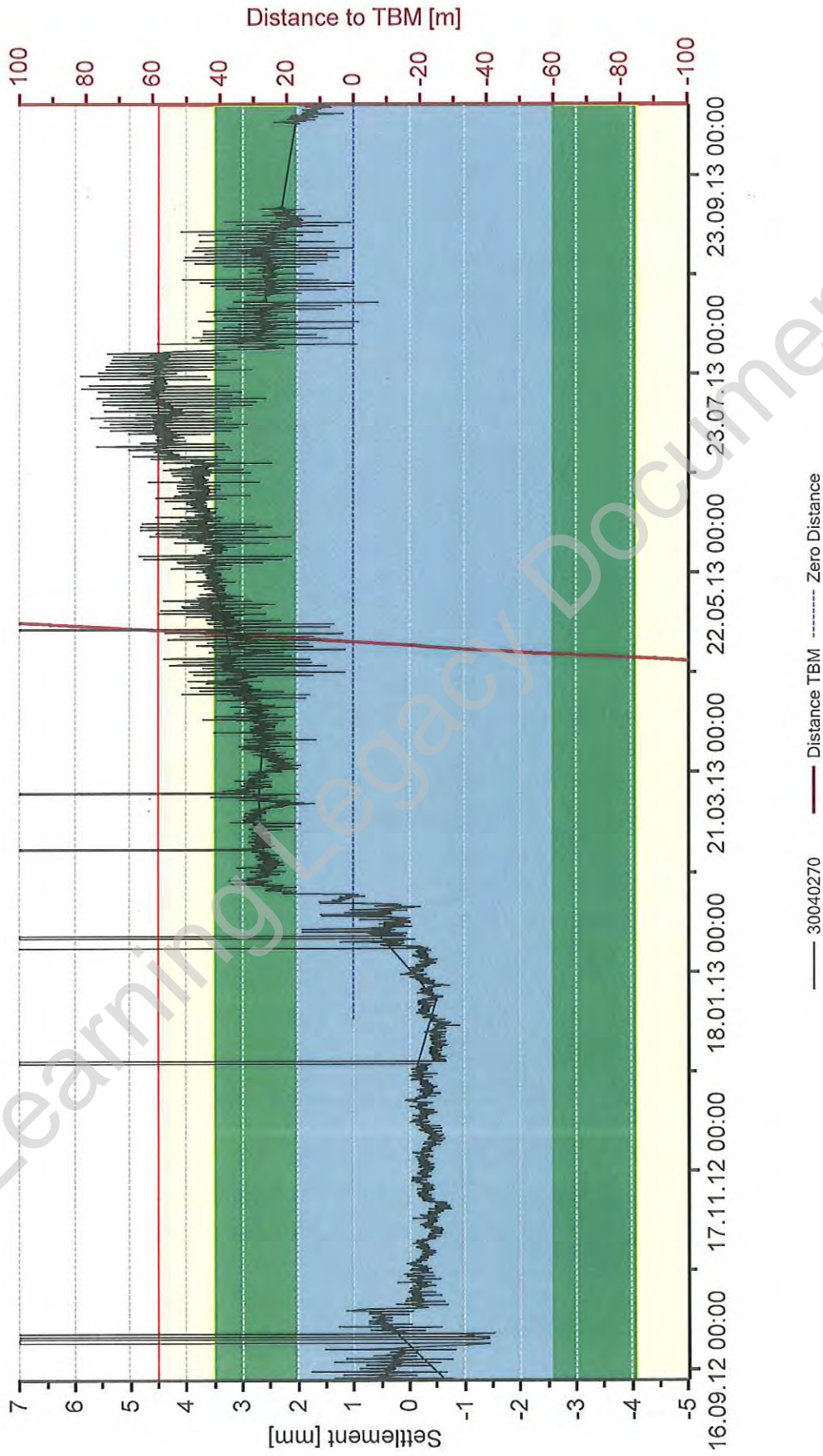
Point: 30040269



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 12:06 current values: 10.08.2014 11:03



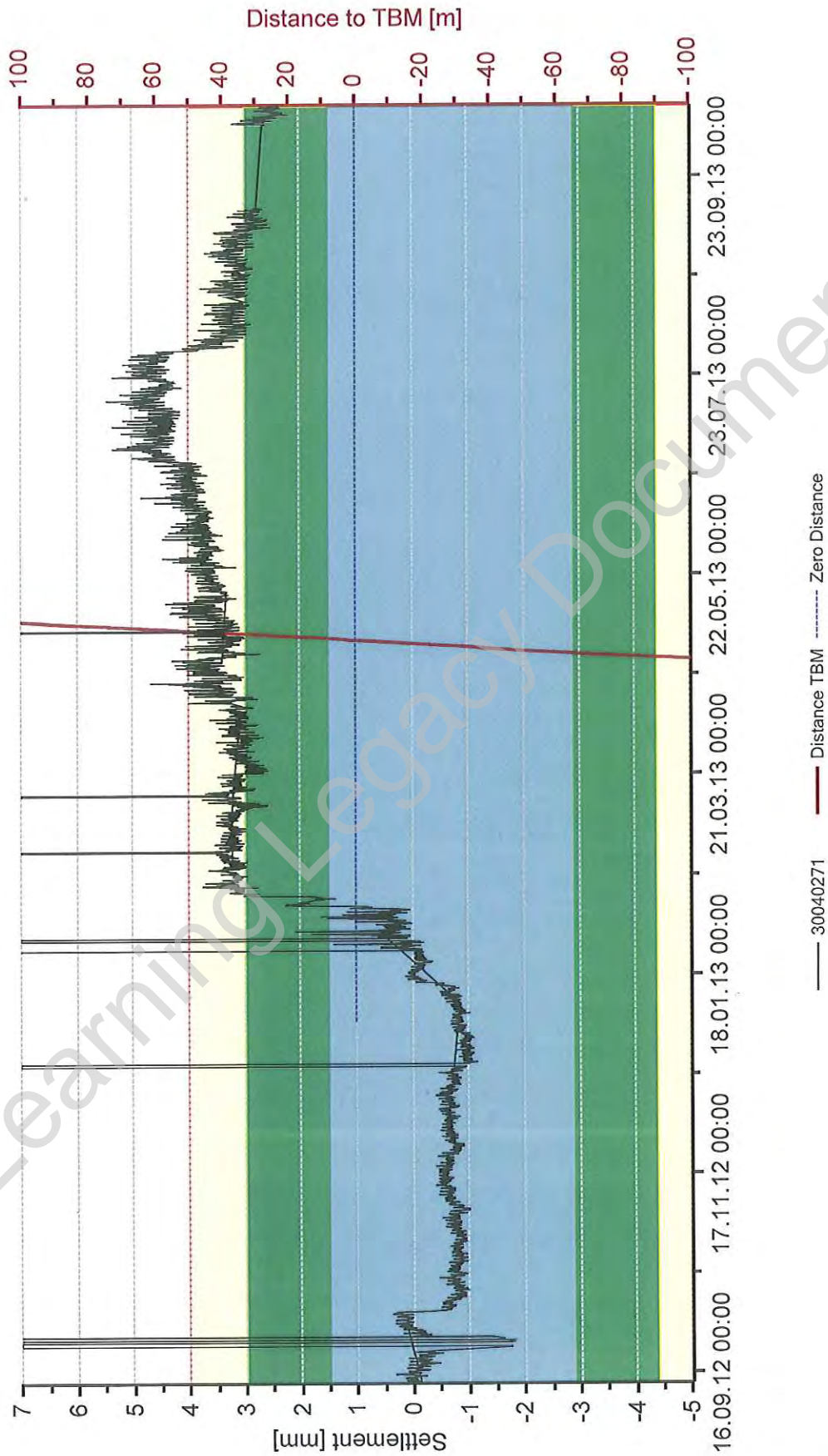
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Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 12:09 current values: 10.08.2014 11:03



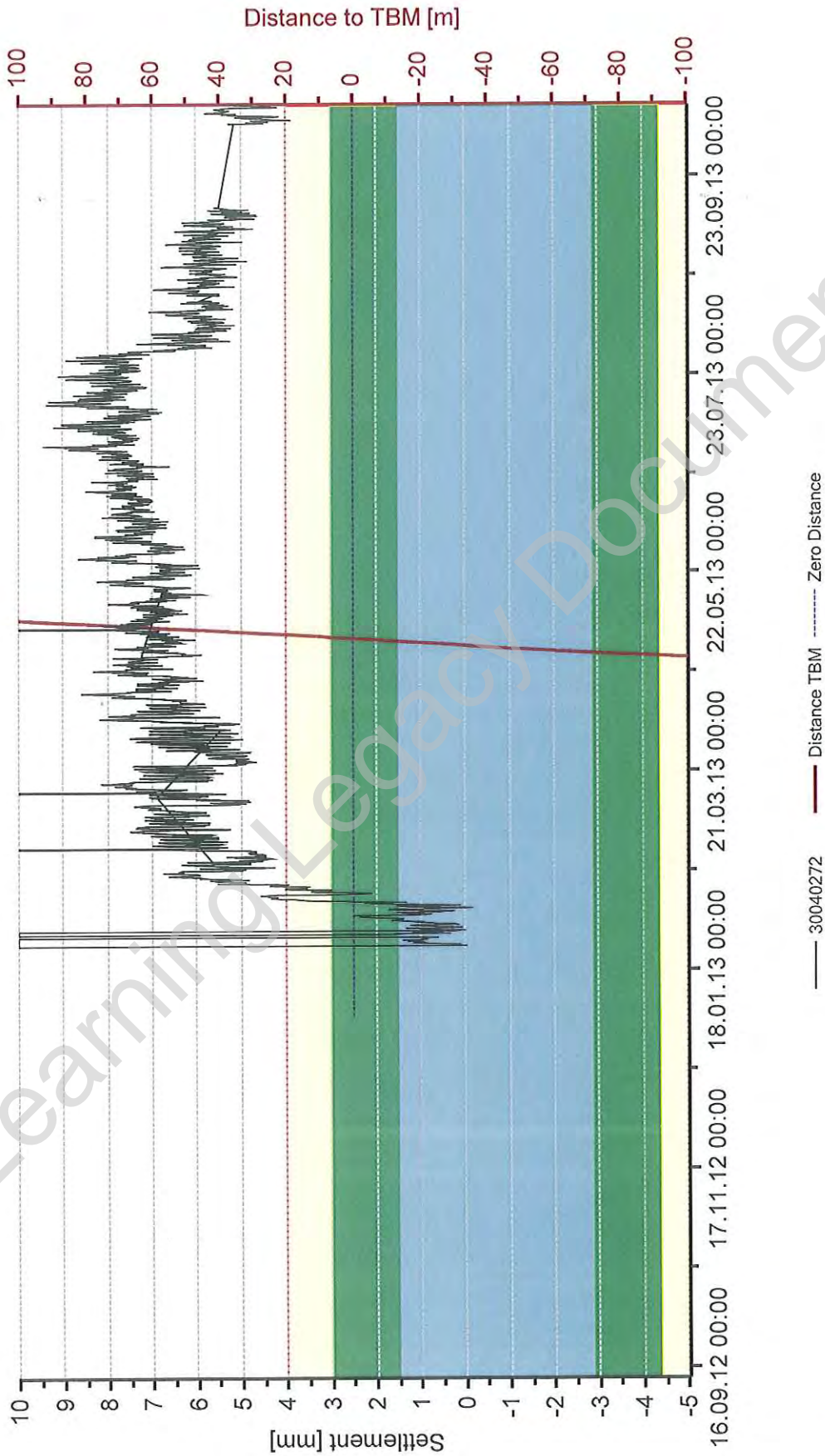
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Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 12:13 current values: 10.08.2014 11:03



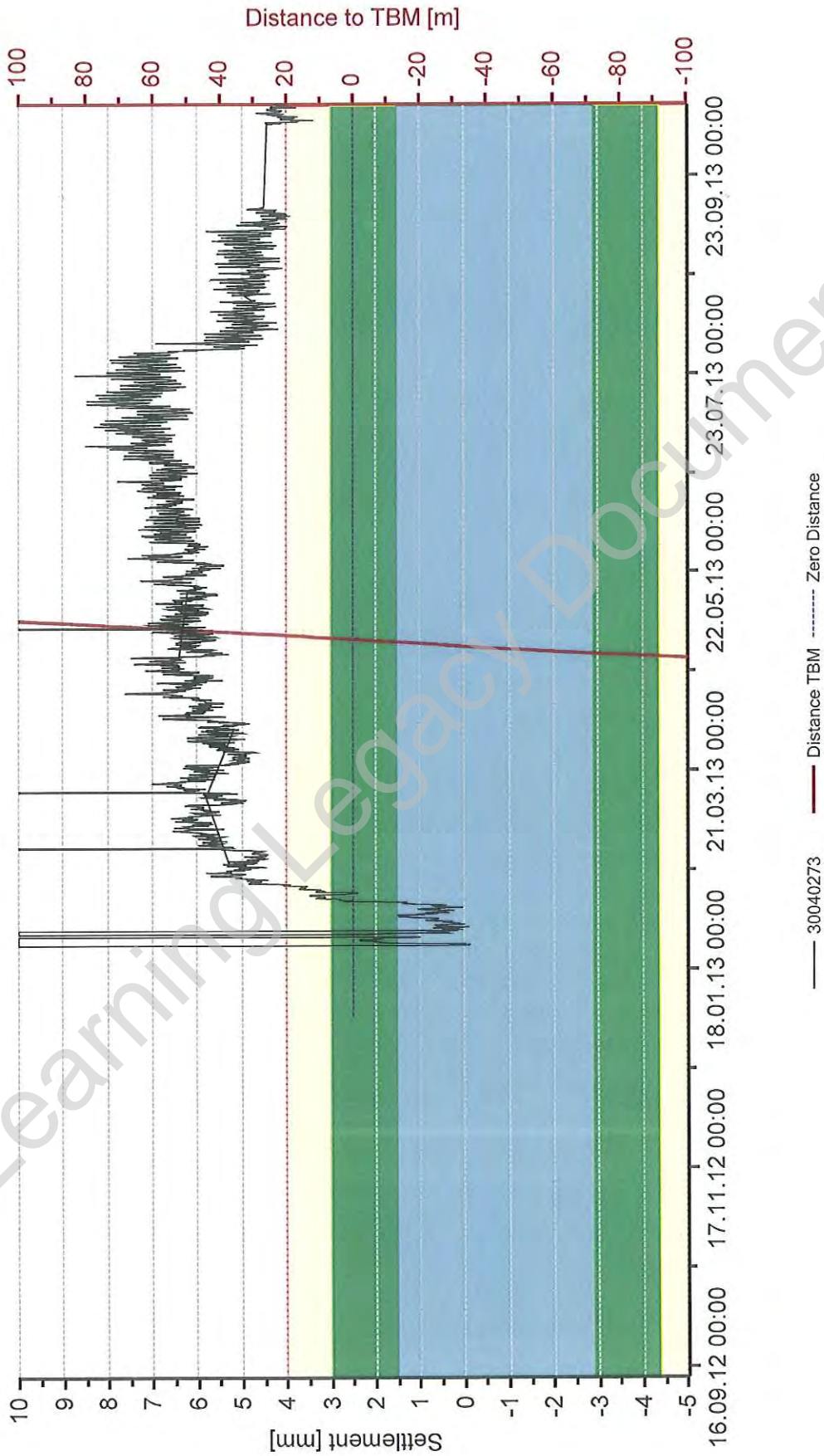
Point: 30040272



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 12:17 current values: 10.08.2014 11:03



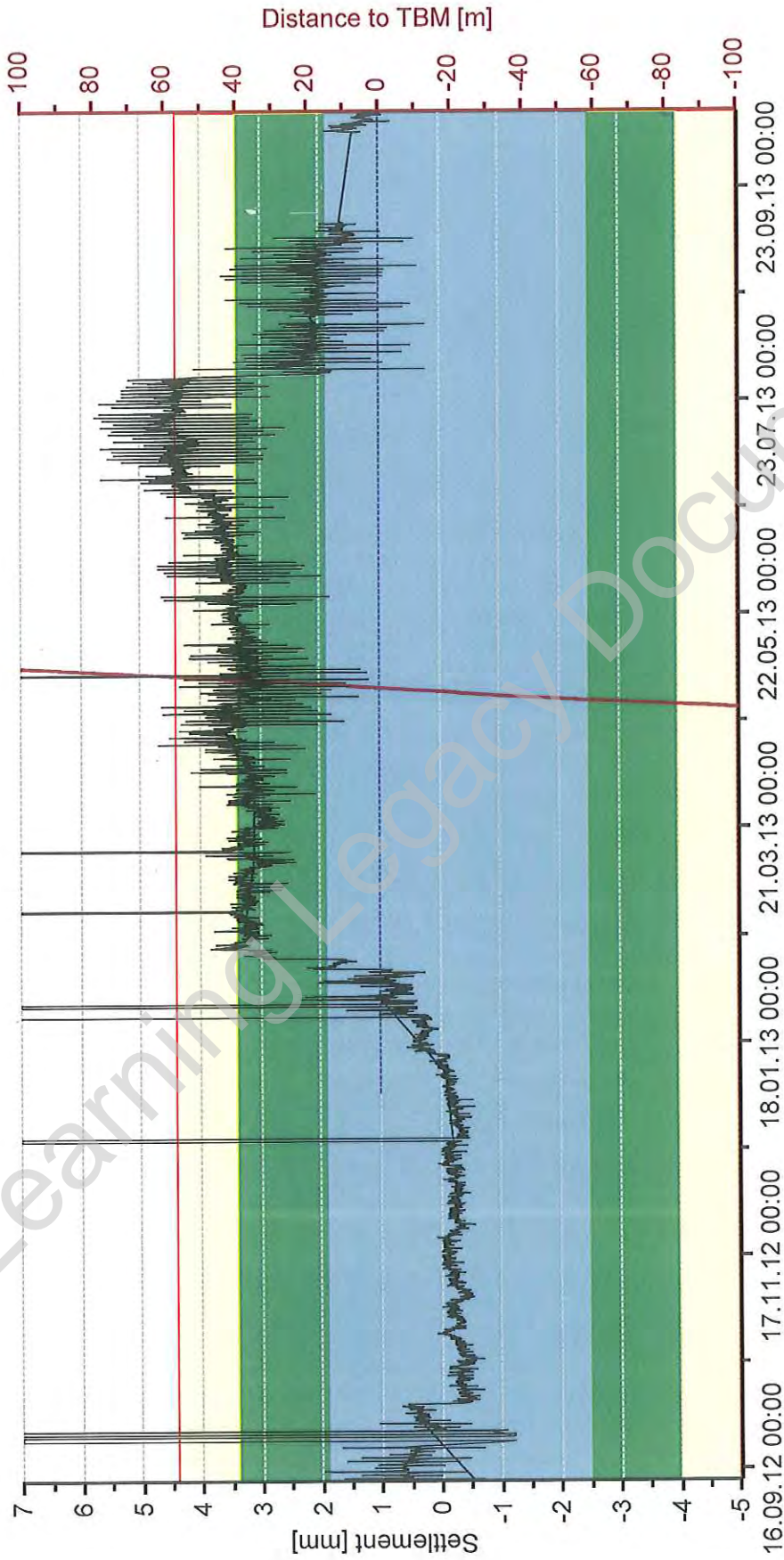
Point: 30040273



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 12:20 current values: 10.08.2014 11:03



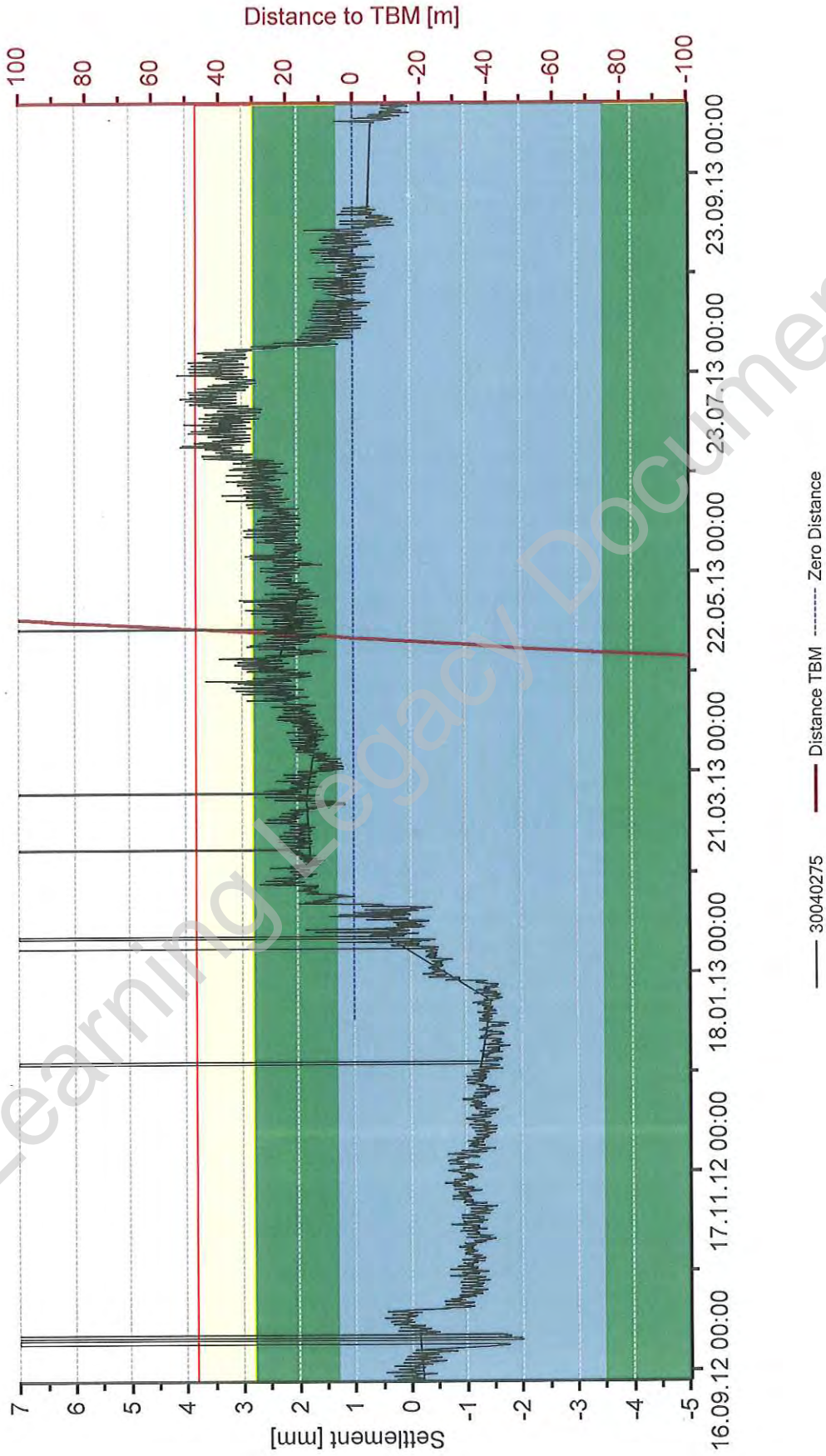
Point: 30040274



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 12:22 current values: 10.08.2014 11:03



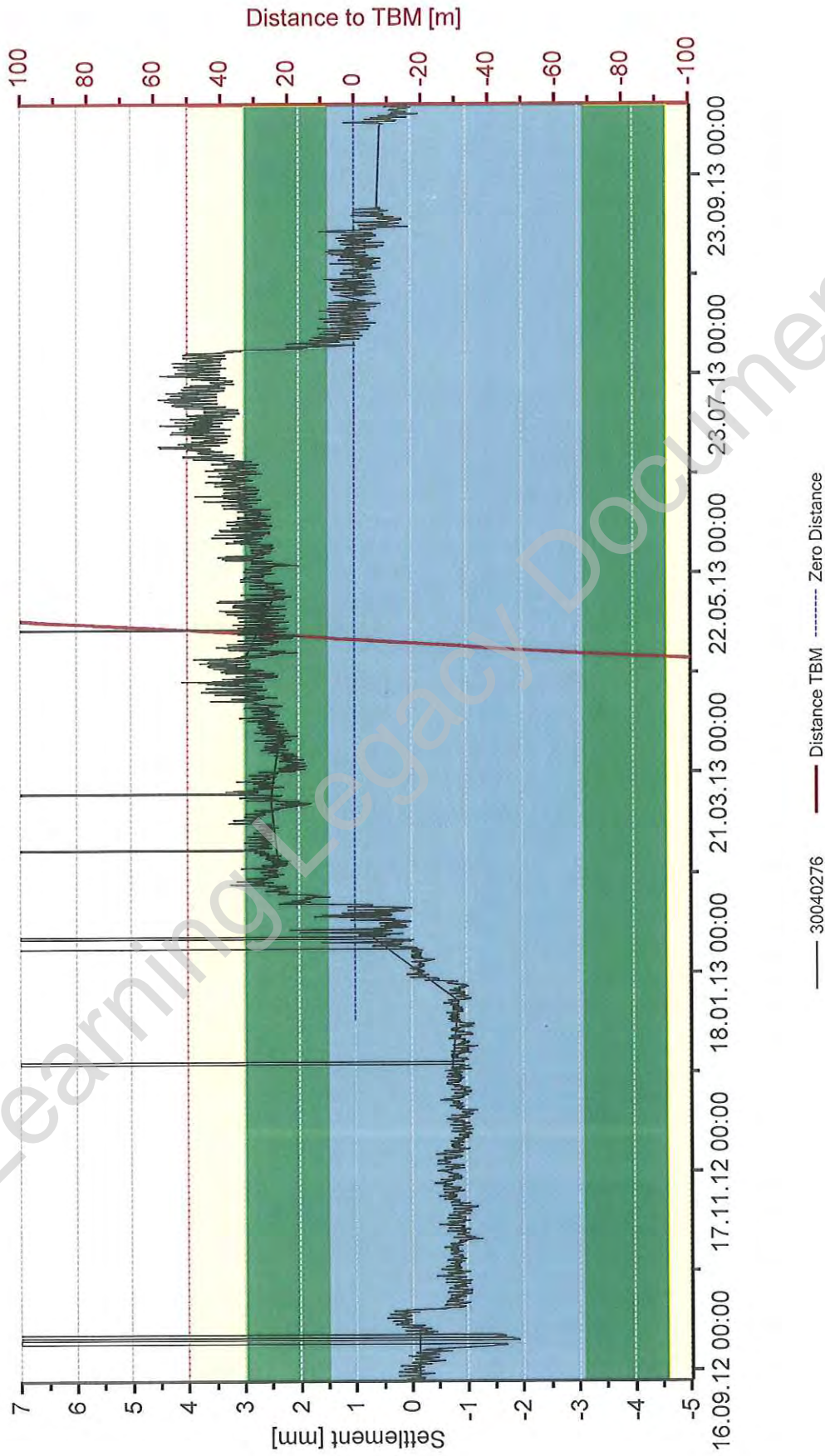
Point: 30040275



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 12:25 current values: 10.08.2014 11:03



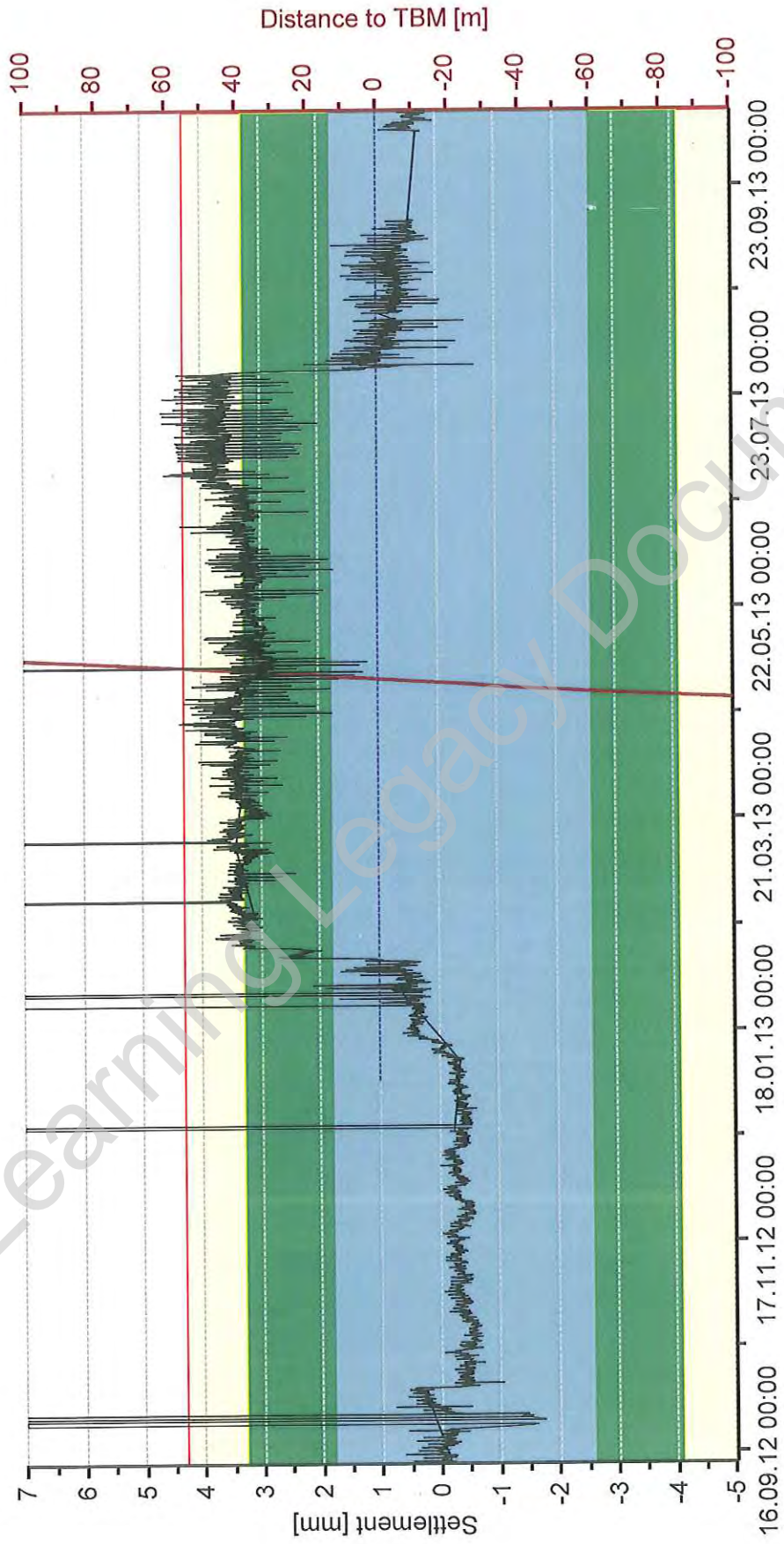
Point: 30040276



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 12:28 current values: 10.08.2014 11:03



Point: 30040277

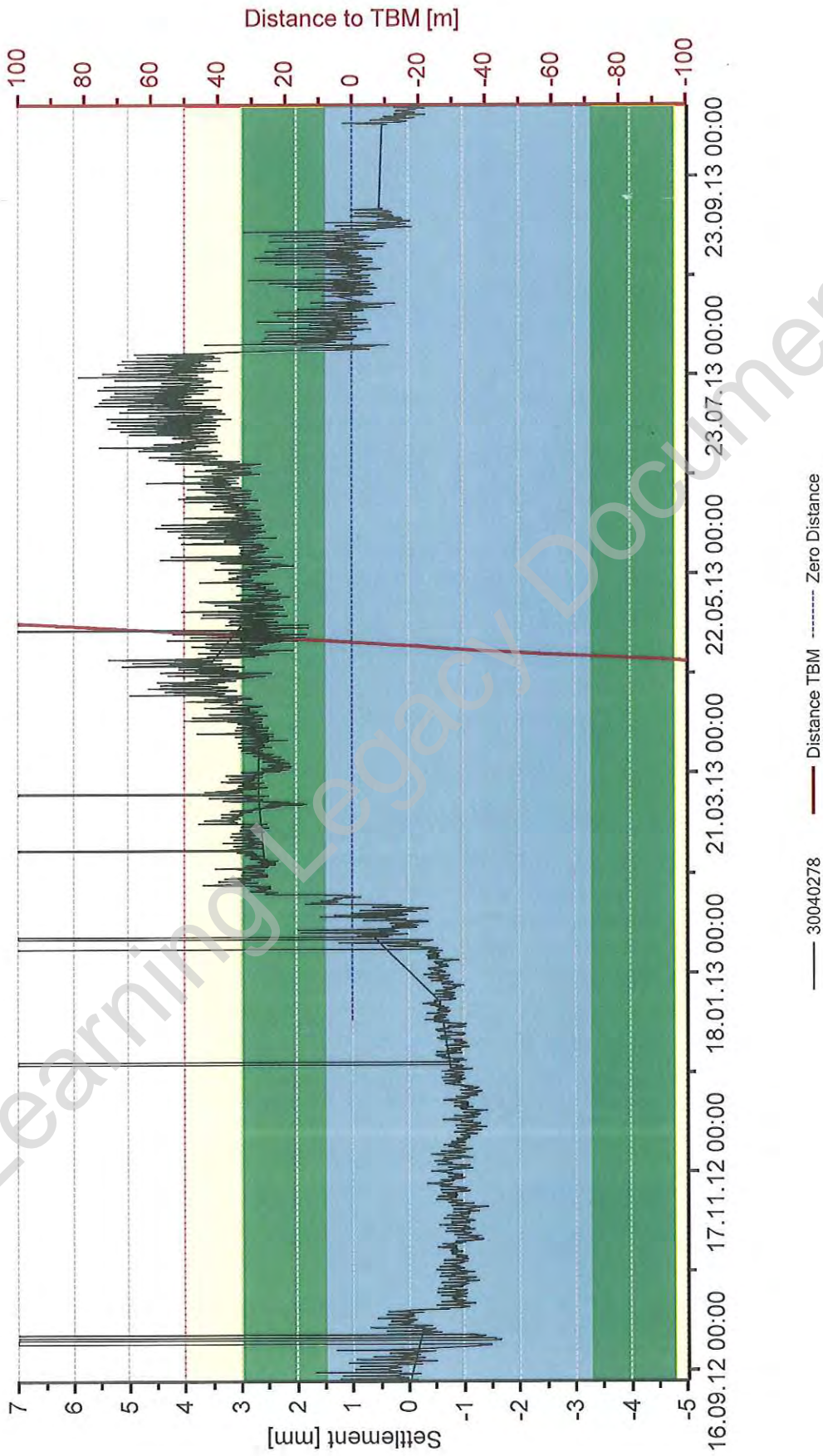


—— 30040277 ——— Distance TBM - - - - - Zero Distance

Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 12:31 current values: 10.08.2014 11:03

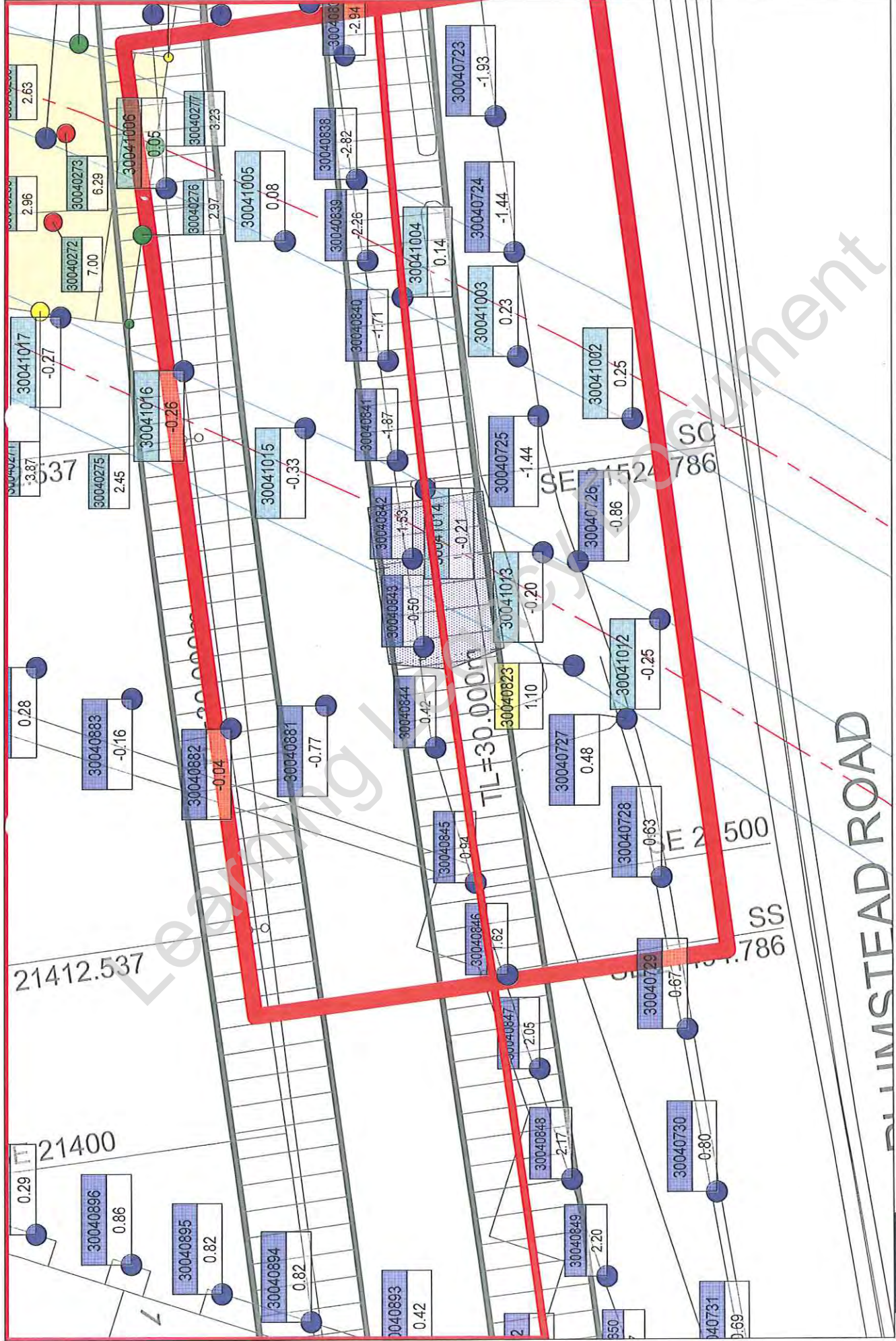


Point: 30040278

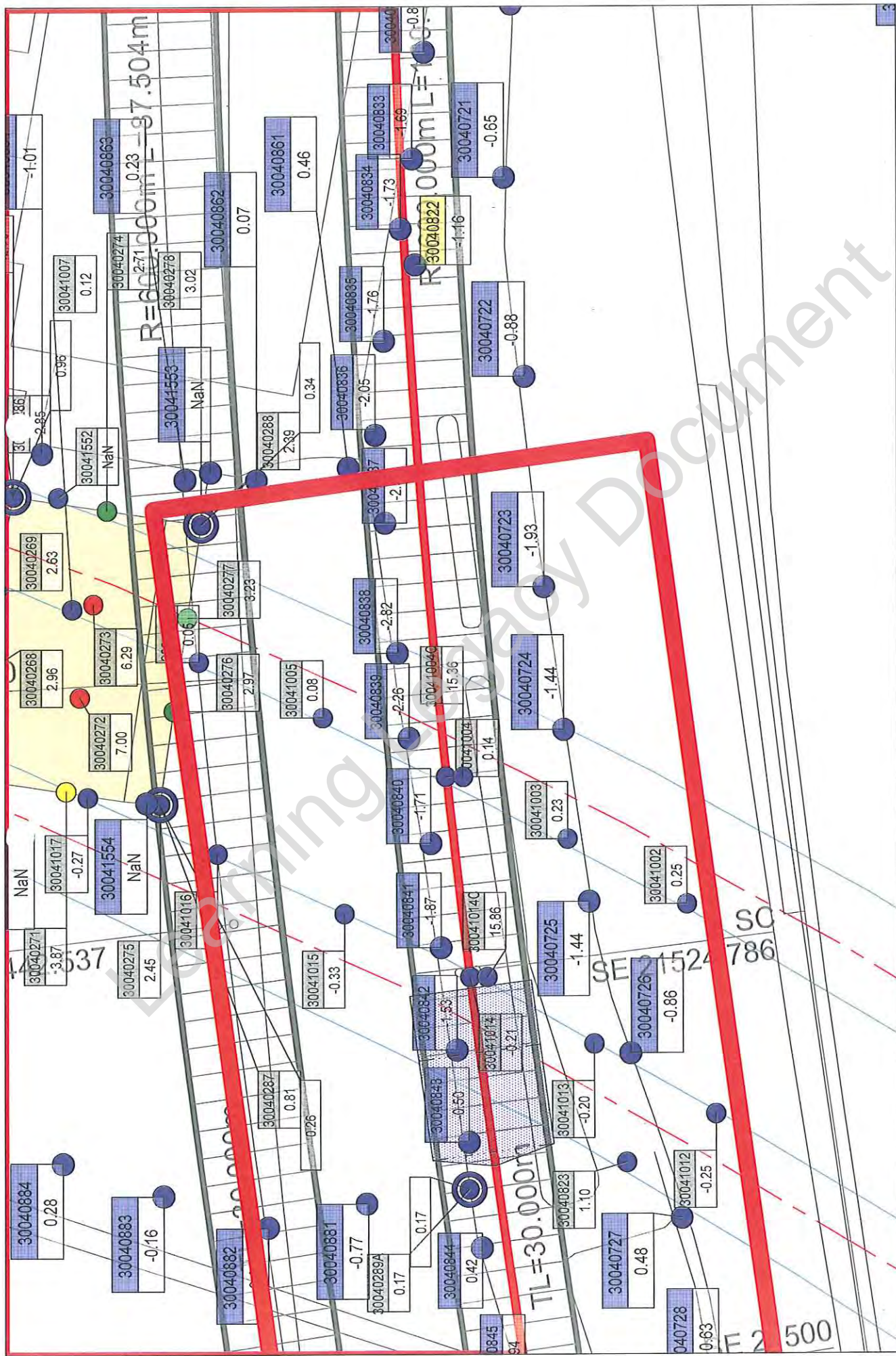


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 10.08.2014 12:33 current values: 10.08.2014 11:03



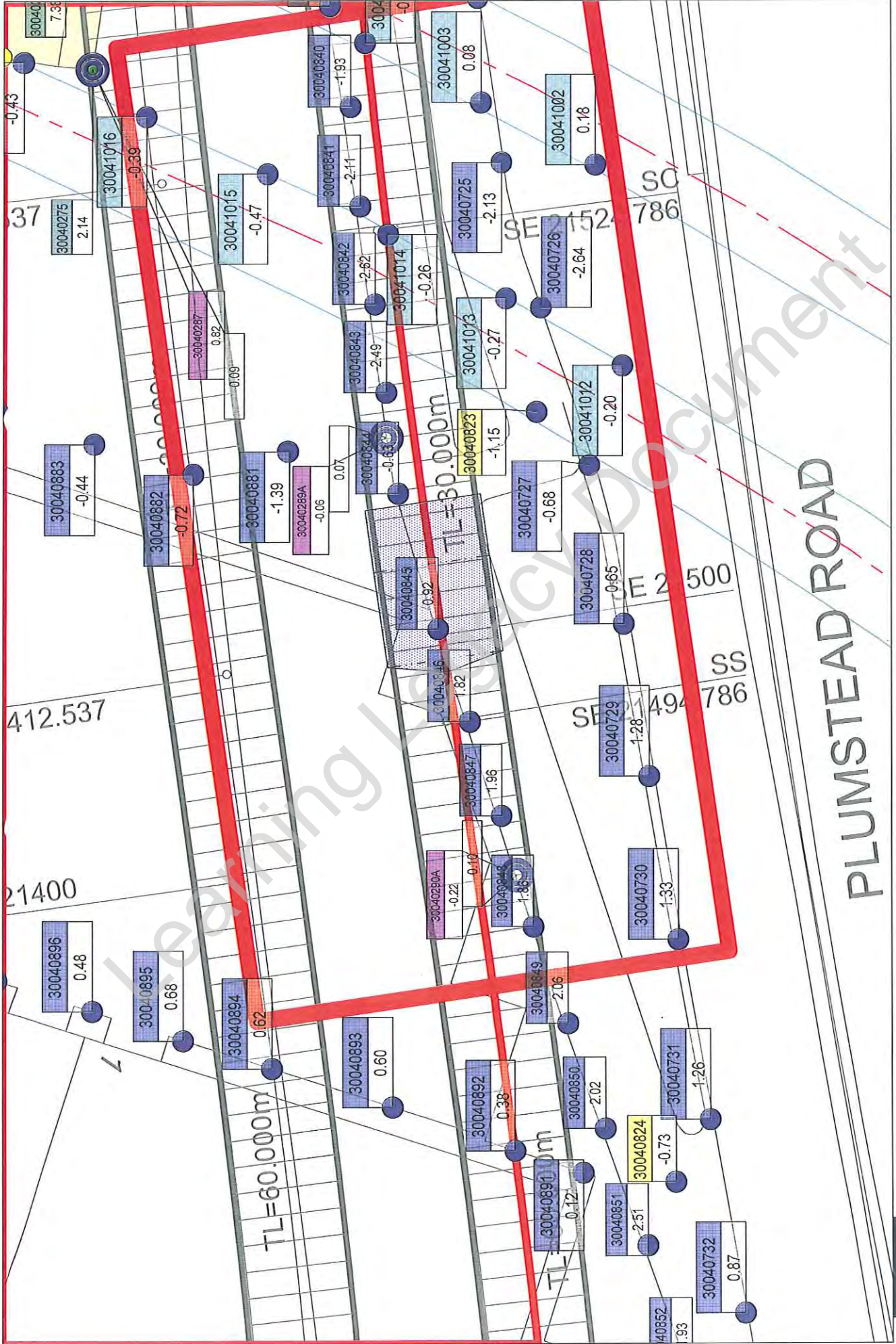


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 03.05.2013 09:00

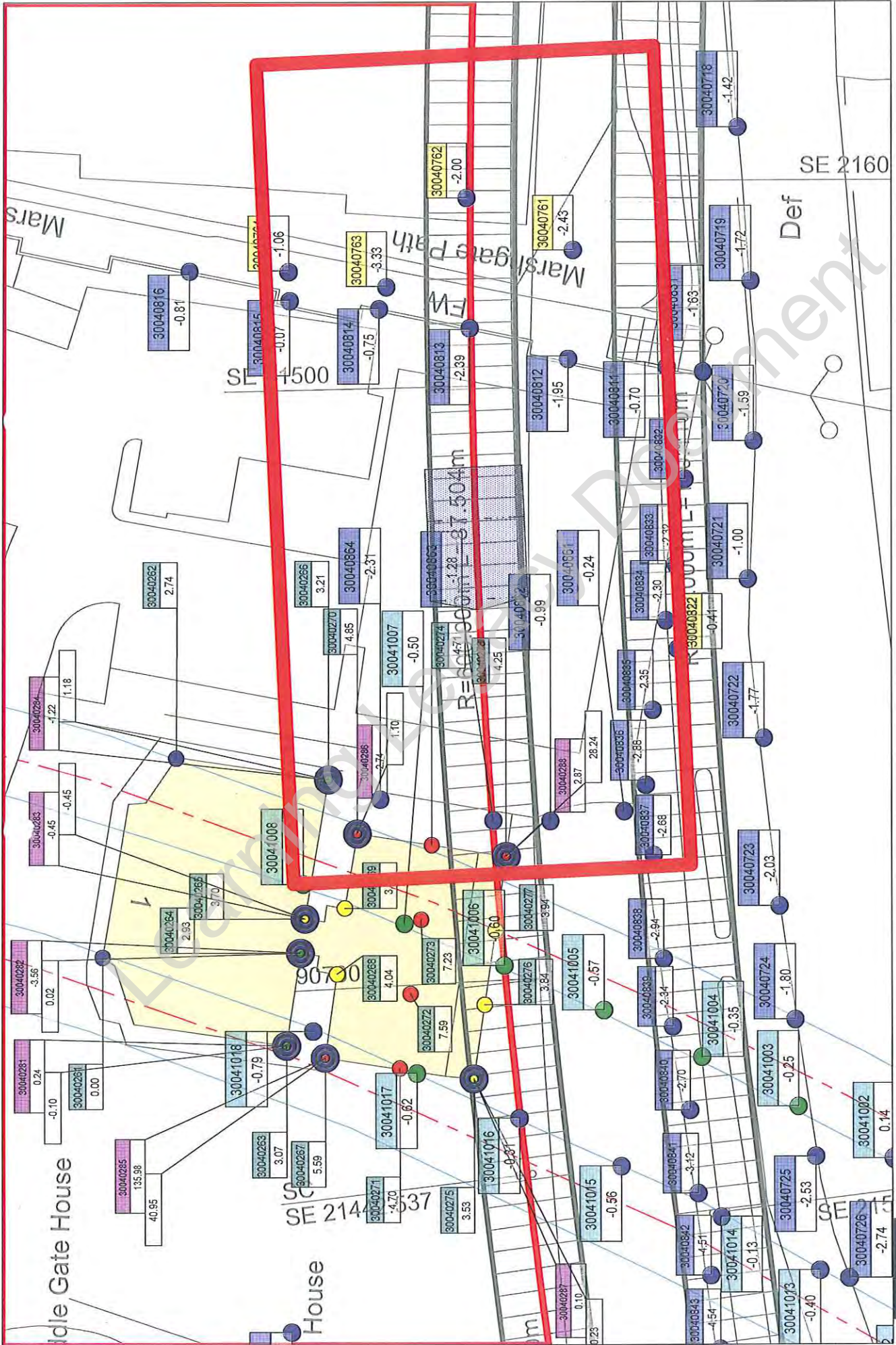


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 03.05.2013 09:00



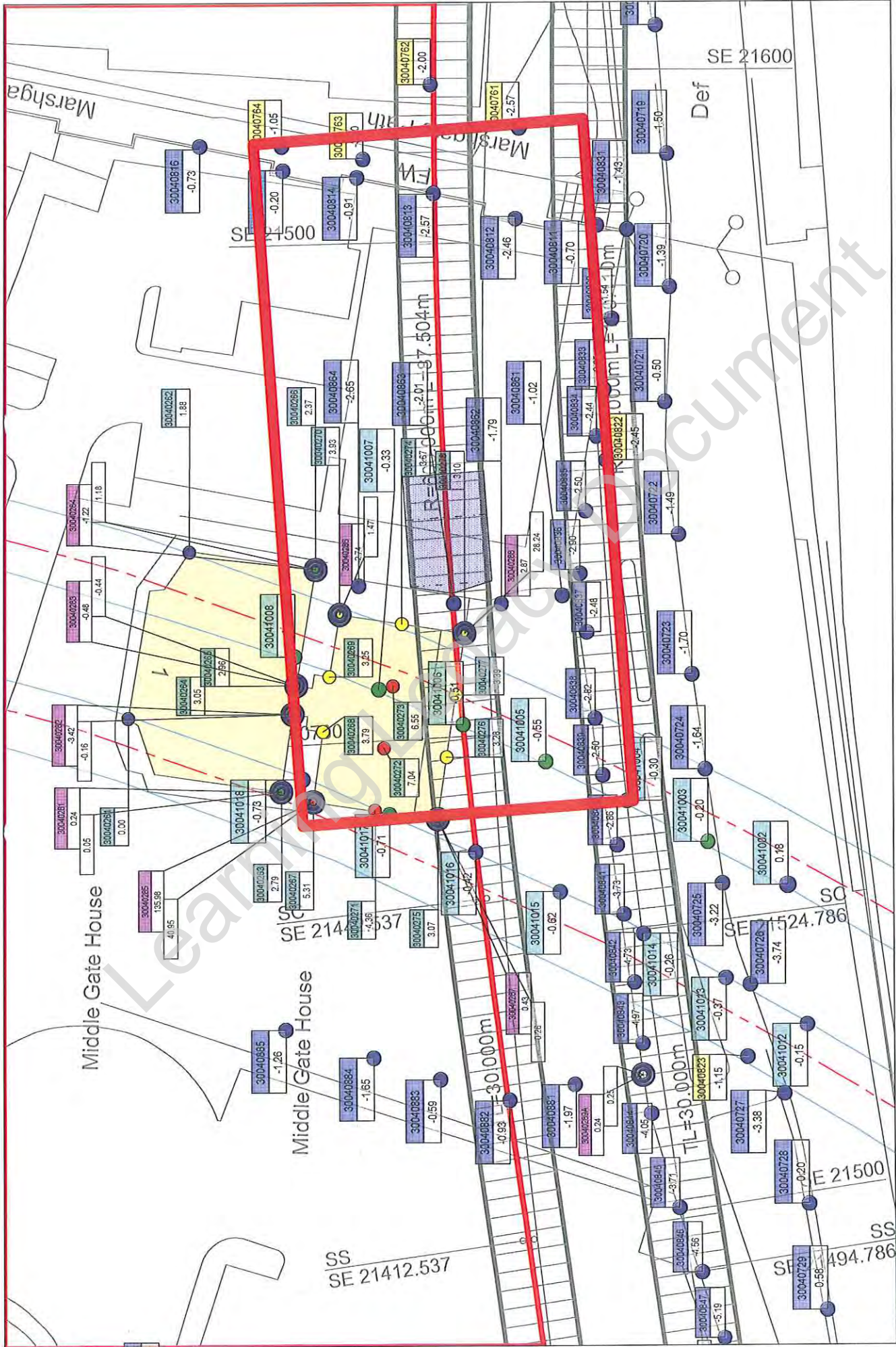


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 04.05.2013 09:01



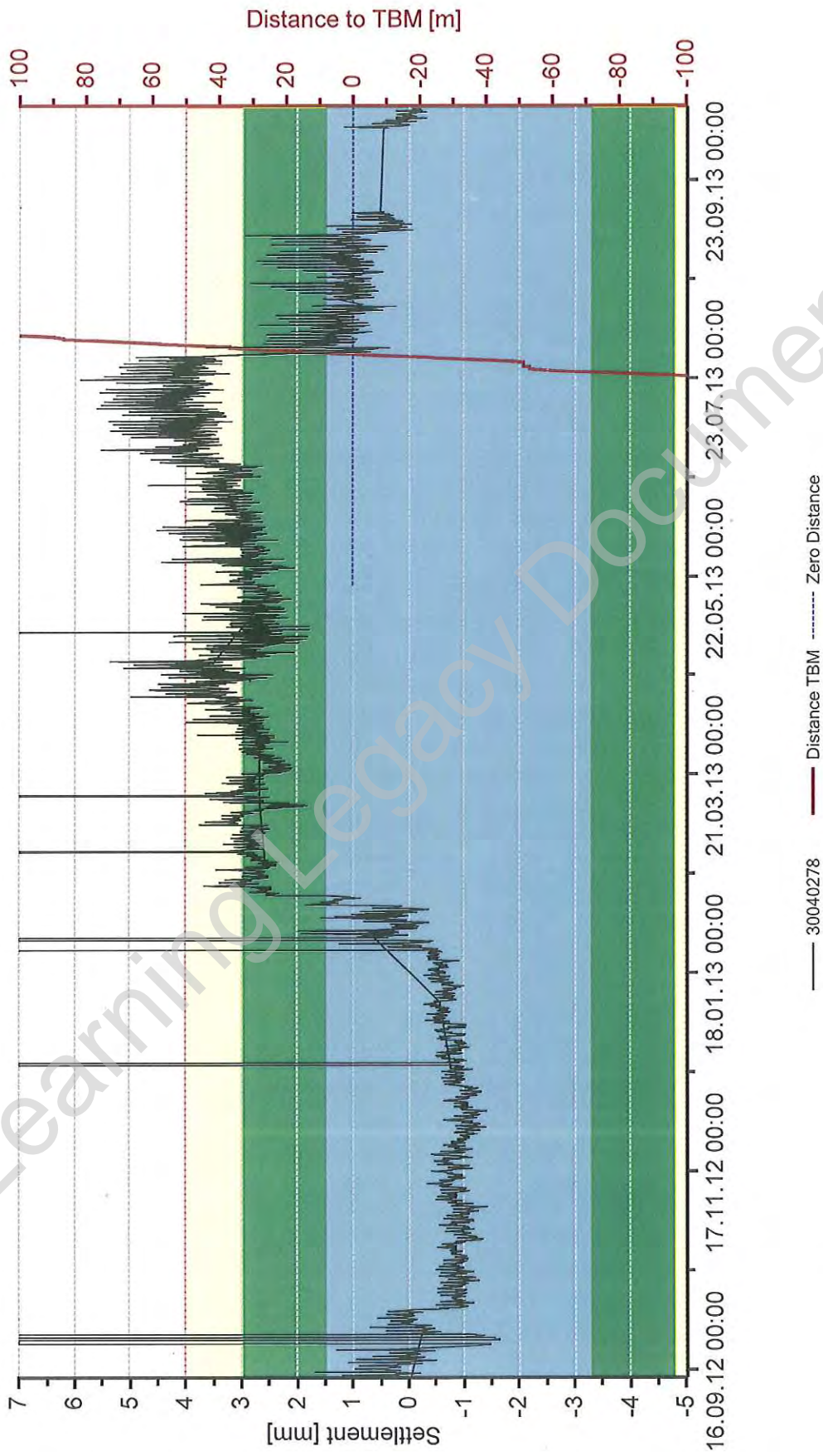
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 29.07.2013 18:23





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 30.07.2013 09:00

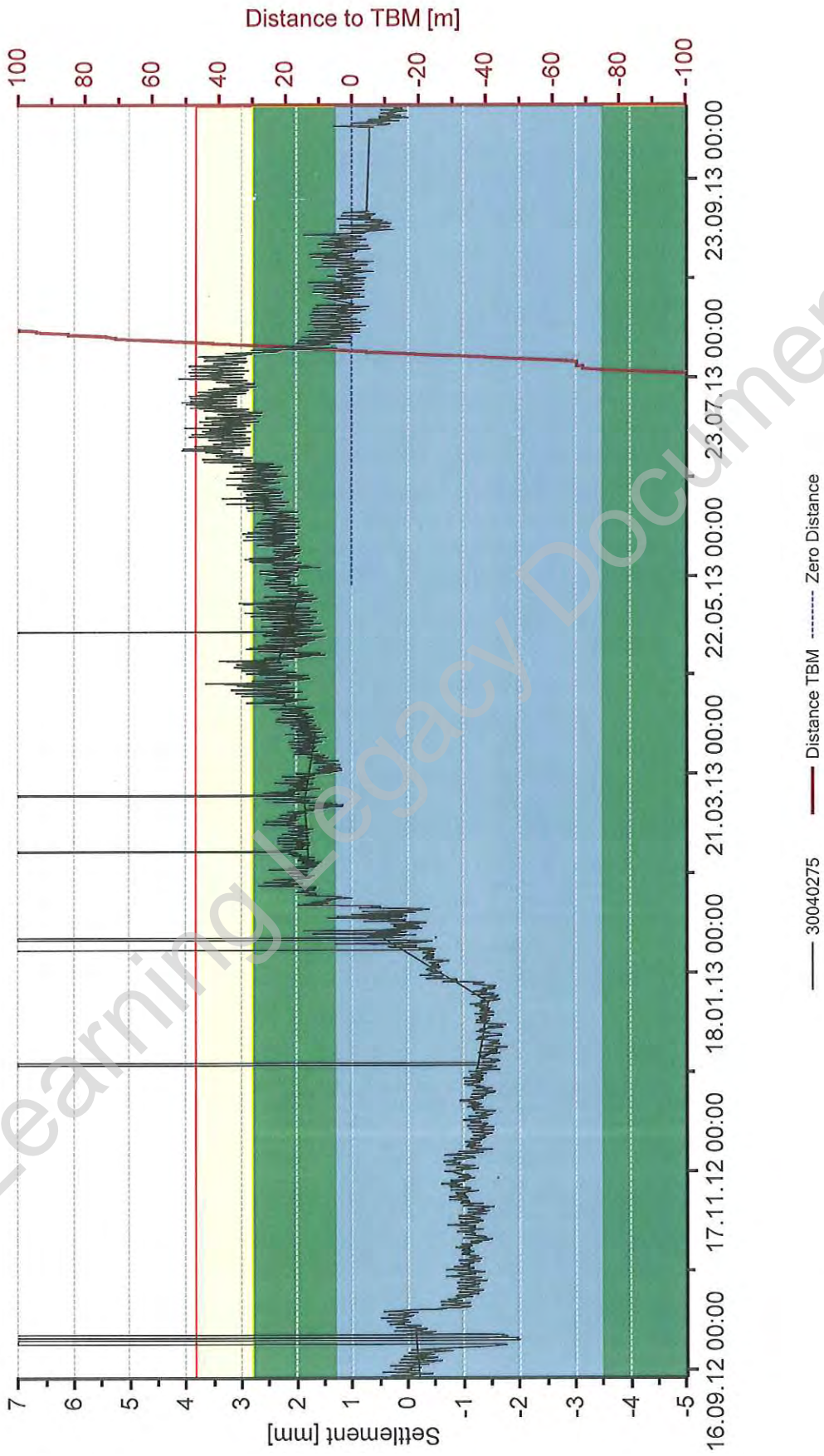
Point: 30040278



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 11.08.2014 07:40 current values: 11.08.2014 07:23

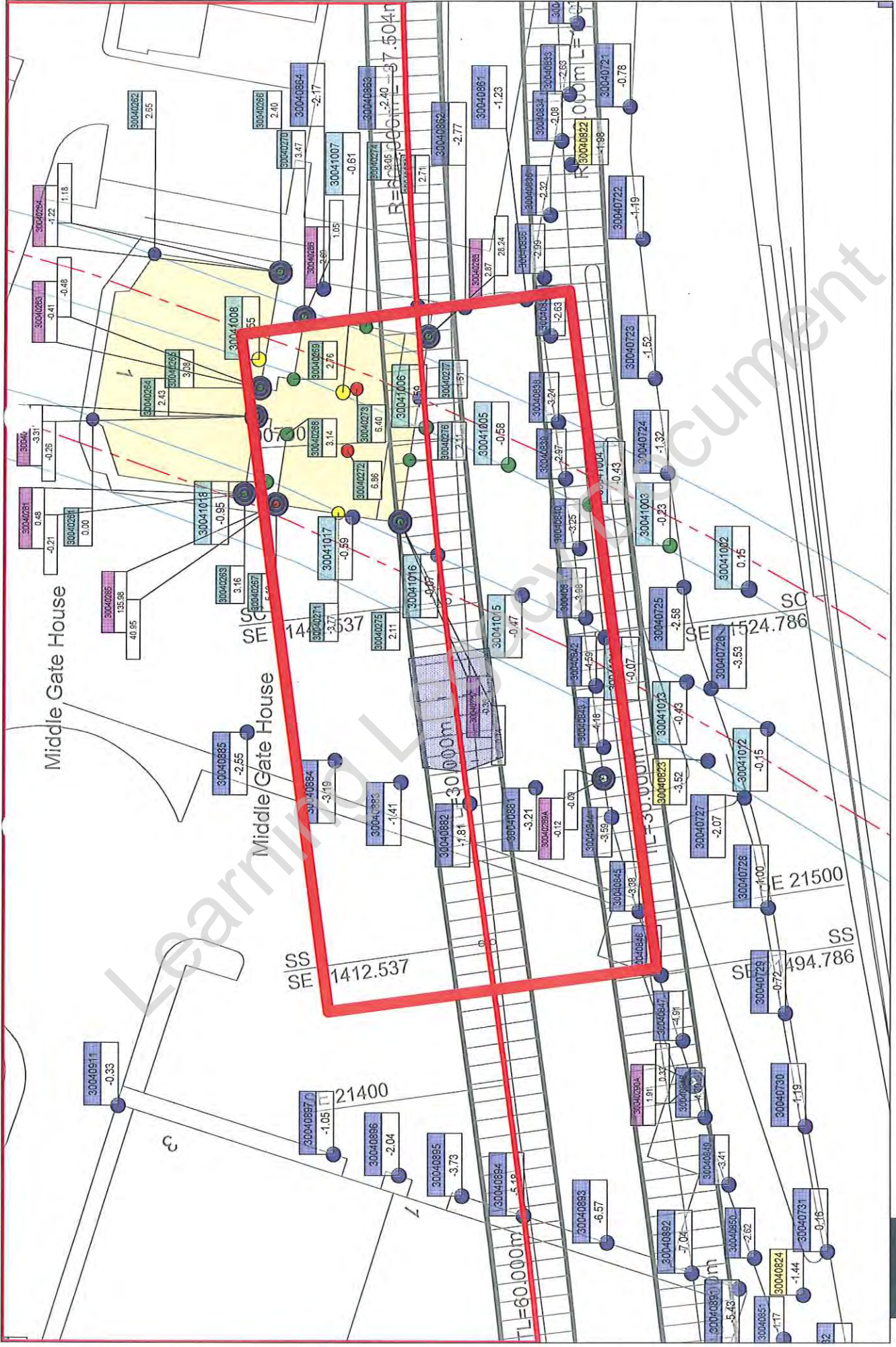


Point: 30040275



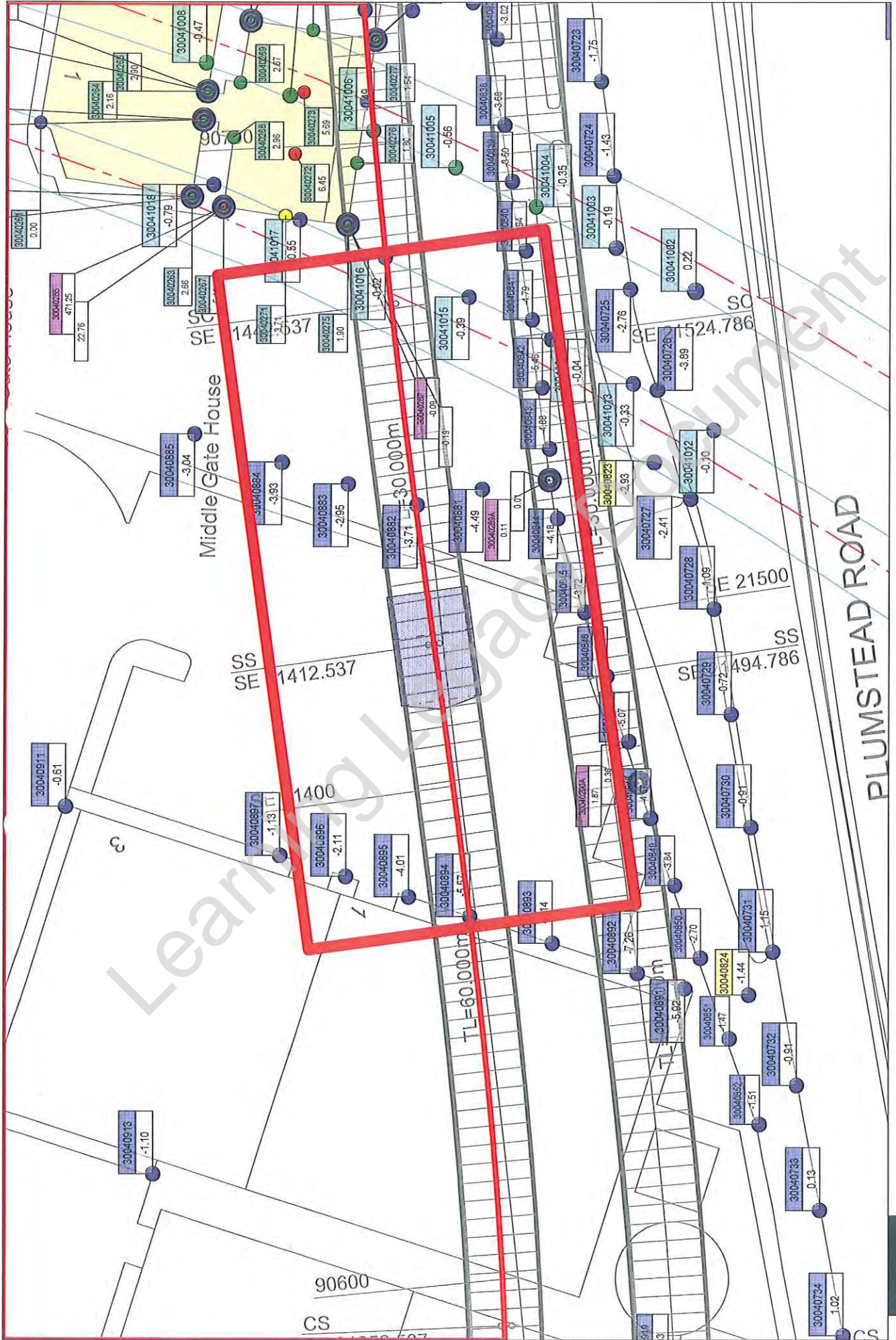
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Middle Gate House 13.09.2012 - 15.10.2013
date: 11.08.2014 07:46 current values: 11.08.2014 07:23






Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 01.08.2013 19:00





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 02.08.2013 18:44



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

APPENDIX 44

Middle Gate House – Tiltmeter

Learning Legacy Document

monitoring asset	Middle Gate House		
reference monitoring drawing:	C310-HTM-C-DWG-CR148-PT005-50010		
name of monitoring section:	Middle Gate House		
sensor type:	Tilt Meter		
chainage:	90690 - 90720	point no.:	3004 0281 - 3004 0290
trigger values: [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:	BBB		

monitoring data

	date	max. value	point no.	comments
baseline	18/09/12	0		
TBM 1	start ZOI	29/04/13	2.23	3004 0288
		30/04/13	0.87	3004 0287
	end ZOI	03/05/13	2.39	3004 0288
		04/05/13	-0.09	3004 0287
TBM 2	start ZOI	29/07/13	2.87	3004 0288
		30/07/13	0.43	3004 0287
	end ZOI	01/08/13	2.87	3004 0288
		02/08/13	-0.09	3004 0287
longterm		15/08/13	3.02	3004 0288
		15/10/13	0.22	3004 0287
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

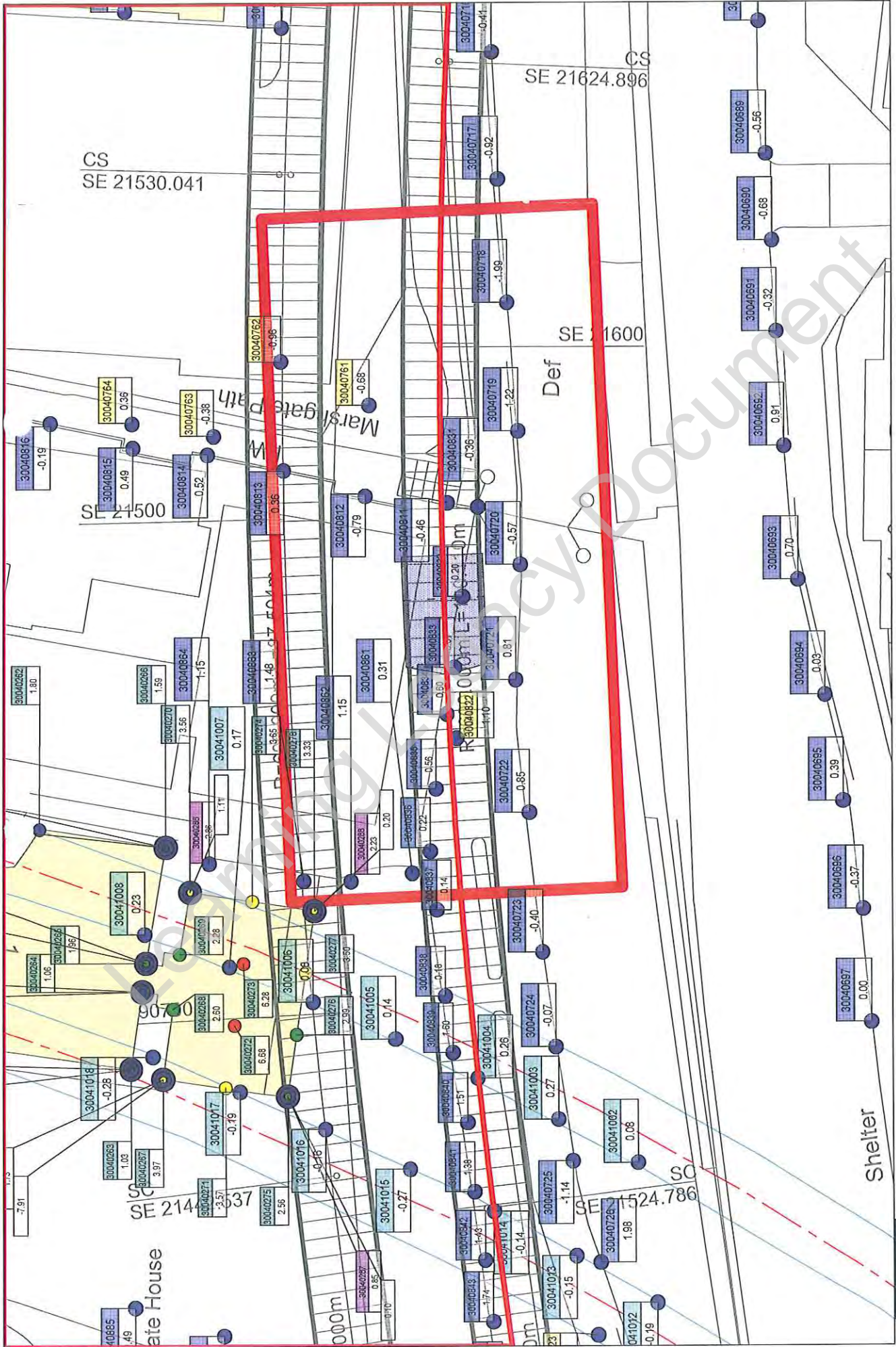
There was nearly no movement observed during TAM drilling and pre-grouting (from 07.01.-20.02.2013). Also during underpassing with TBM's there were negligible movements observed.
 The summary of the grouting operation is report ref. C310-HTM-C-RGN-CR146_ST004-50023 A9
 Several point got a change up to -0.5 - -4.0mm/m with no explanation, because there were no activities at the building at that time.
 Under consideration of temperature differences 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: 12/01/15

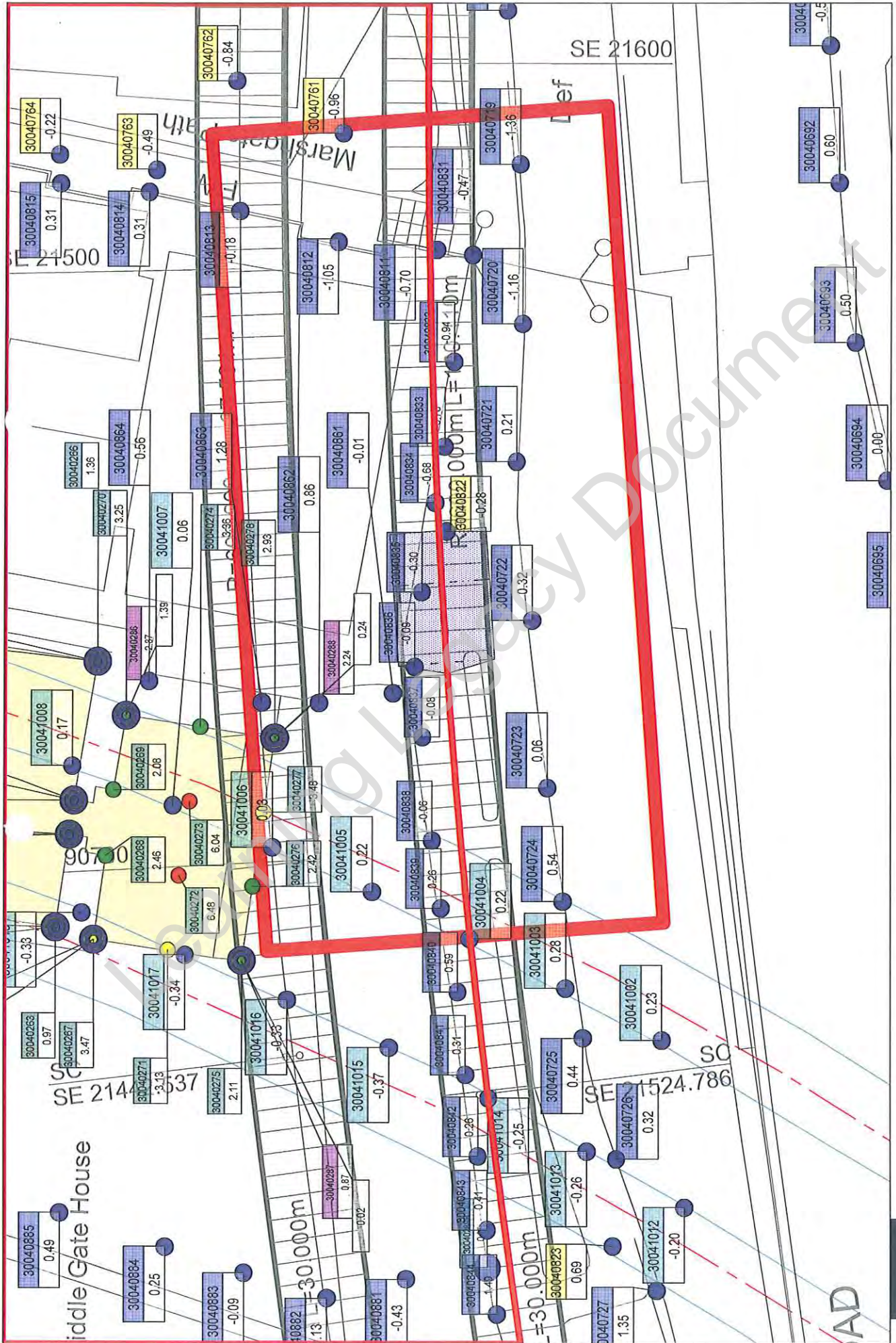
print name:

HMJV project role:

Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 29.04.2013 17:45

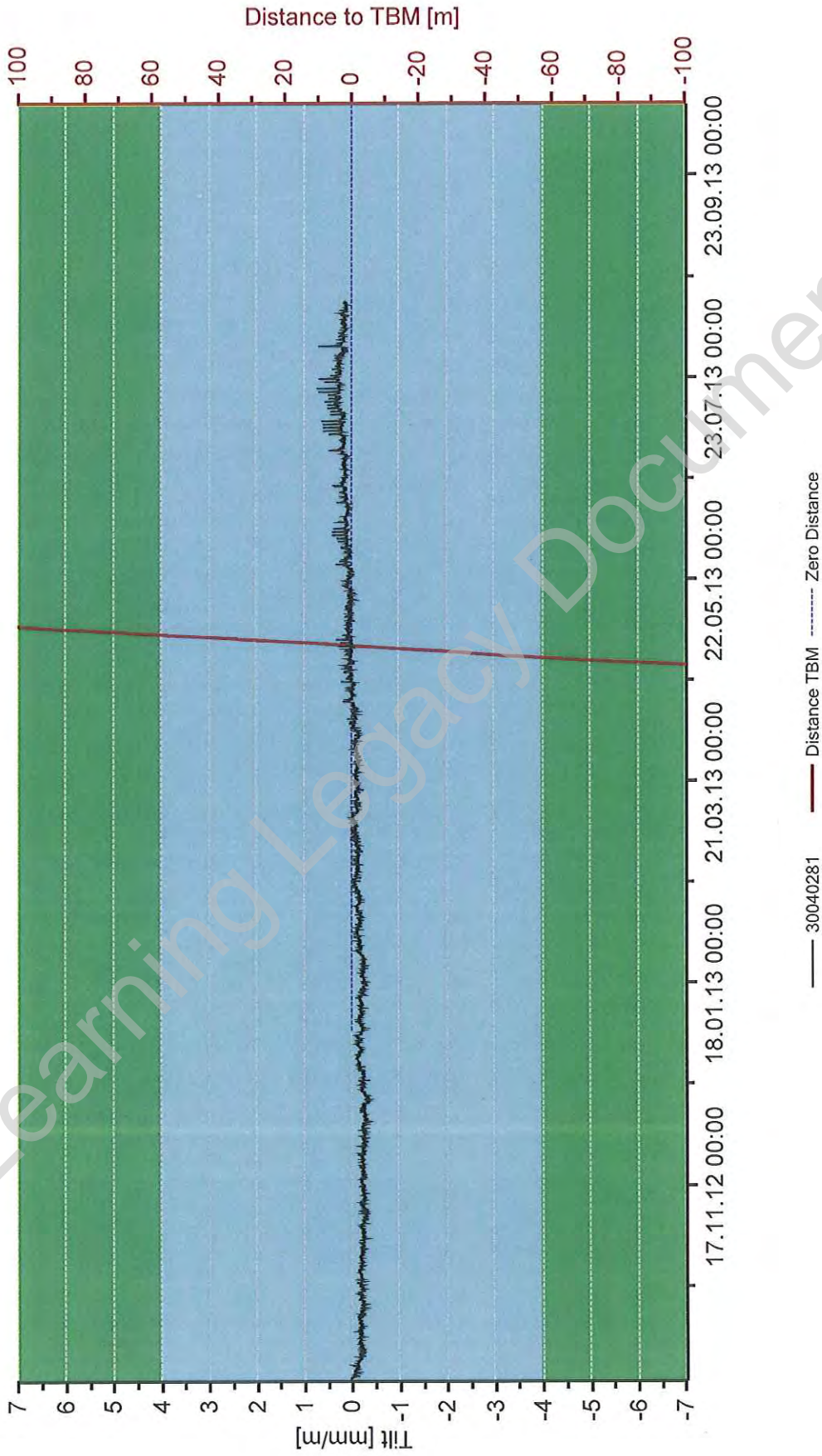


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

DLR monitoring - hydrostatic levelling cells

current values: 30.04.2013 17.45

Point: 30040281



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House (TM) 18.09.2012 - 15.10.2013
date: 11.08.2014 12:48 current values: 11.08.2014 12:38



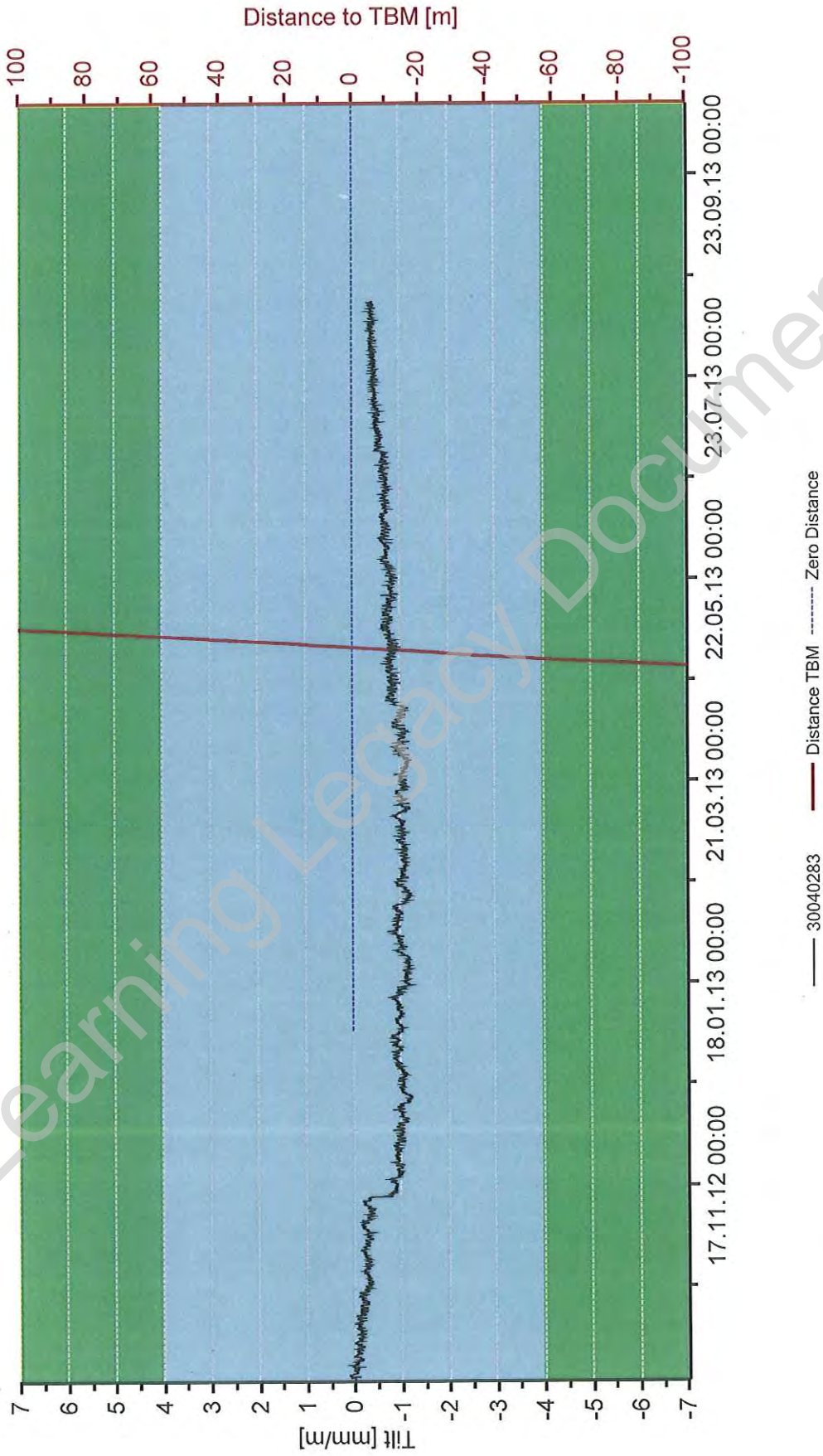
Point: 30040282



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House (TM) 18.09.2012 - 15.10.2013
date: 11.08.2014 12:51 current values: 11.08.2014 12:38



Point: 30040283



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House (TM) 18.09.2012 - 15.10.2013
date: 11.08.2014 12:54 current values: 11.08.2014 12:38



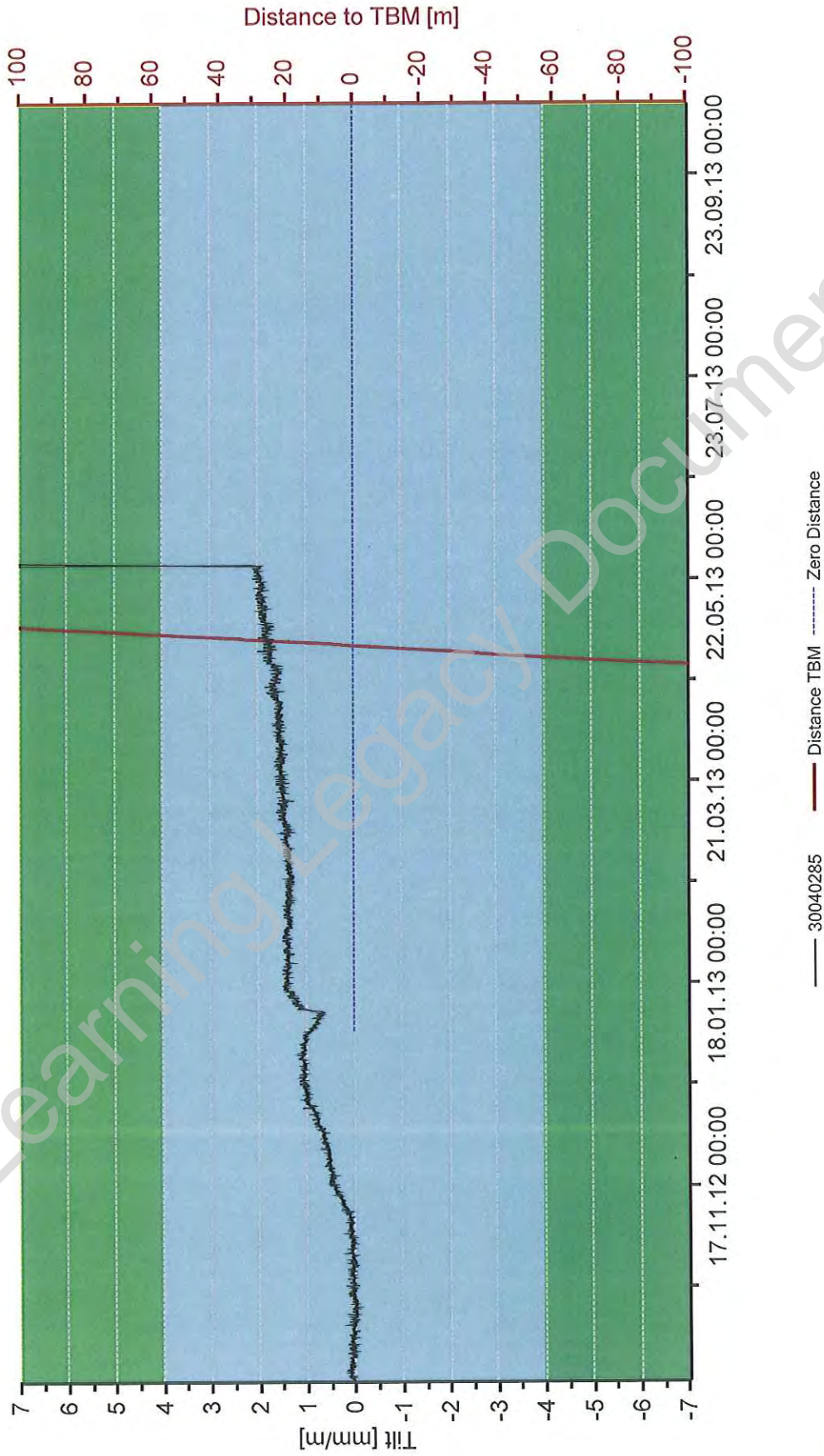
Point: 30040284



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House (TM) 18.09.2012 - 15.10.2013
date: 11.08.2014 12:57 current values: 11.08.2014 12:38



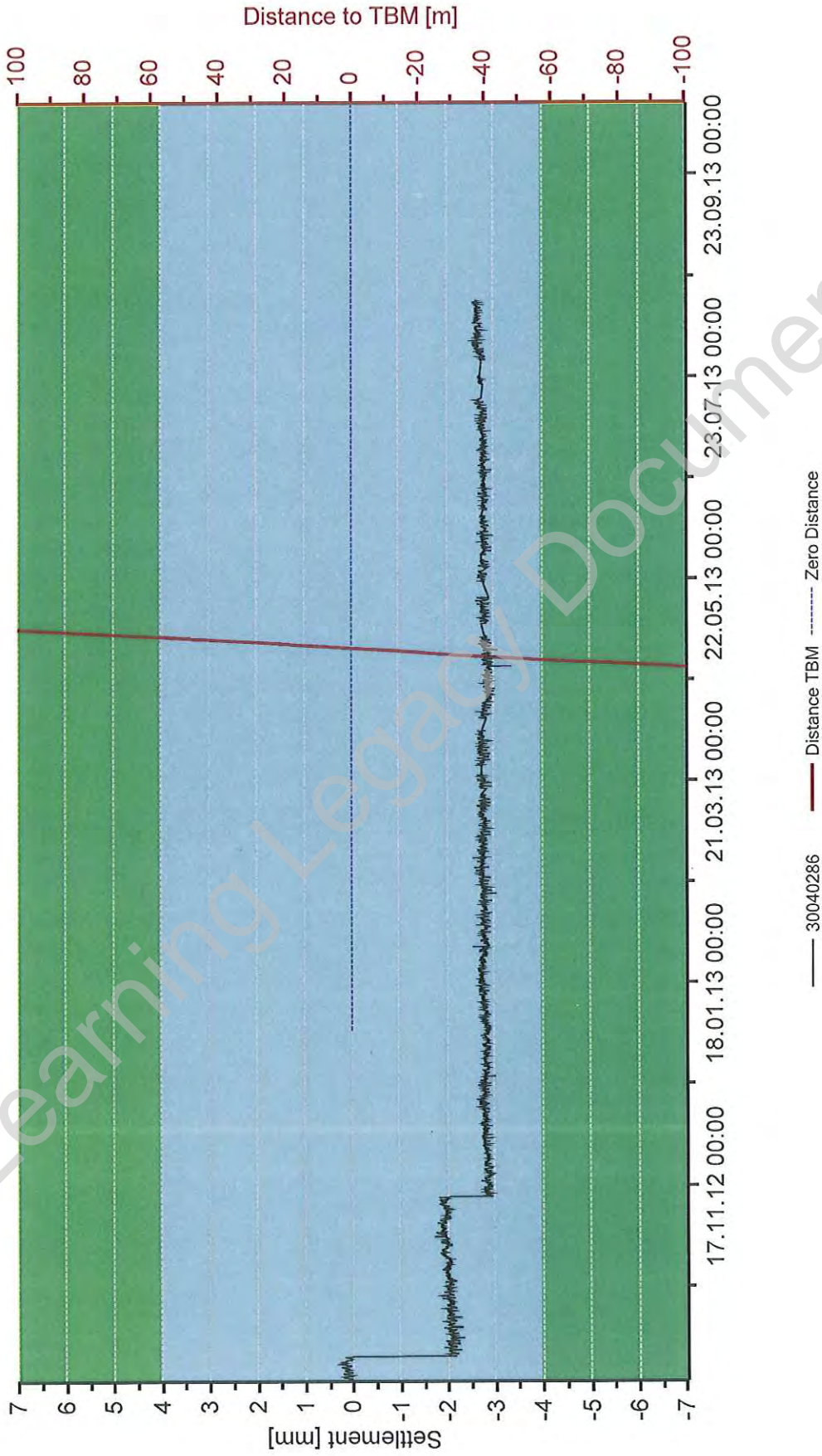
Point: 30040285



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House (TM) 18.09.2012 - 15.10.2013
date: 11.08.2014 13:01 current values: 11.08.2014 12:38



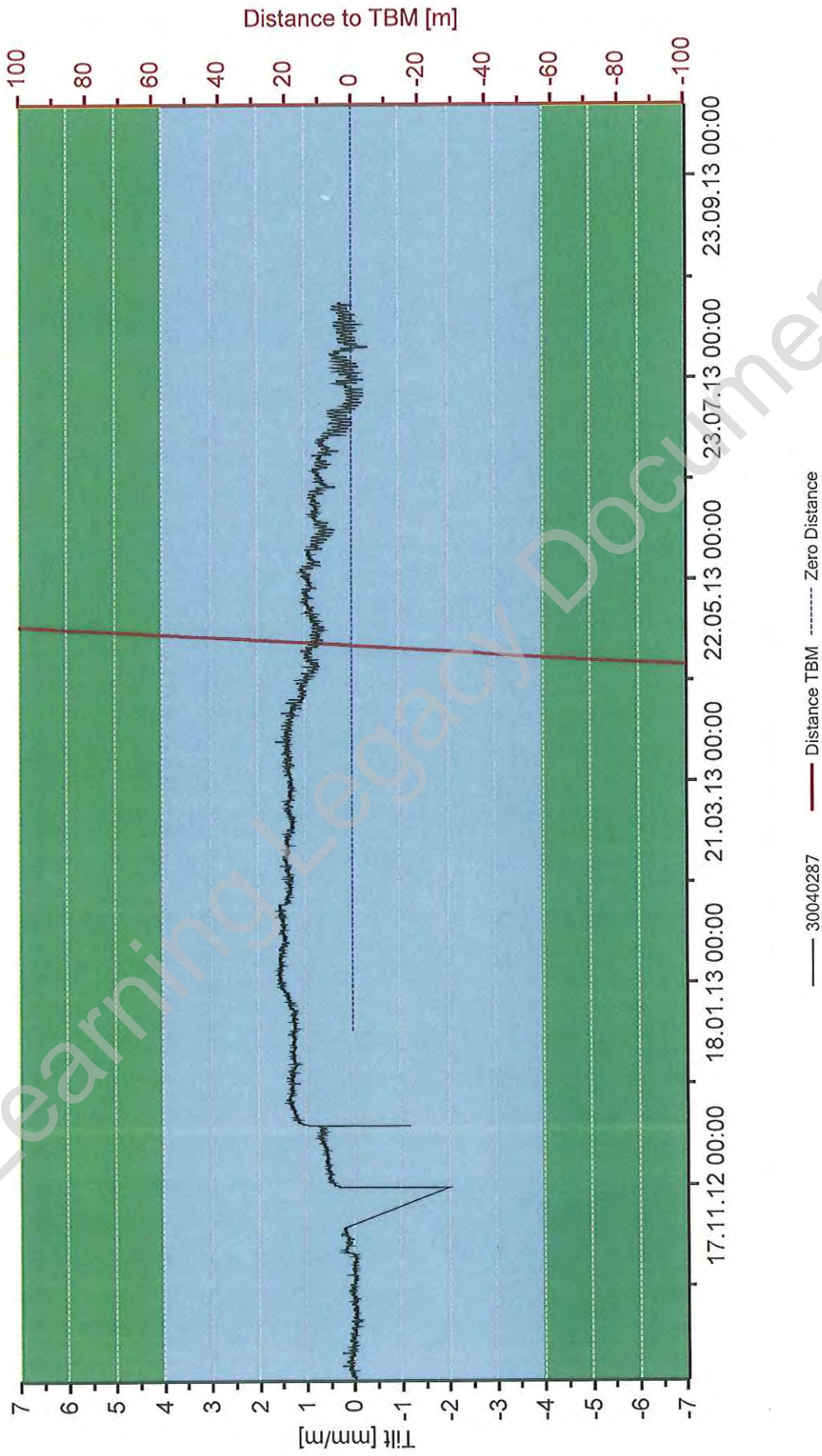
Point: 30040286



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House (TM) 18.09.2012 - 15.10.2013
date: 11.08.2014 13:08 current values: 11.08.2014 12:38



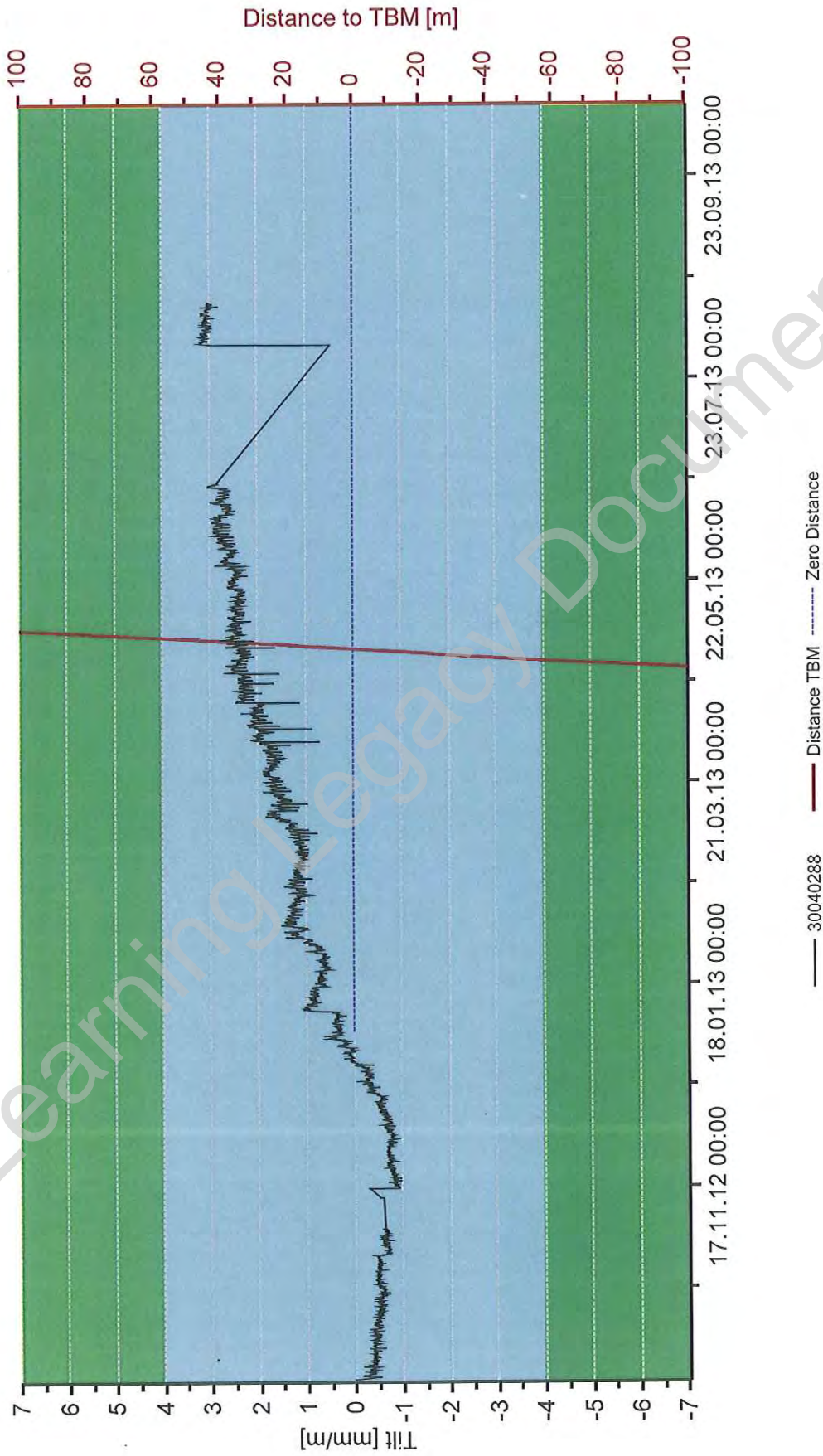
Point: 30040287



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House (TM) 18.09.2012 - 15.10.2013
date: 11.08.2014 13:11 current values: 11.08.2014 12:38



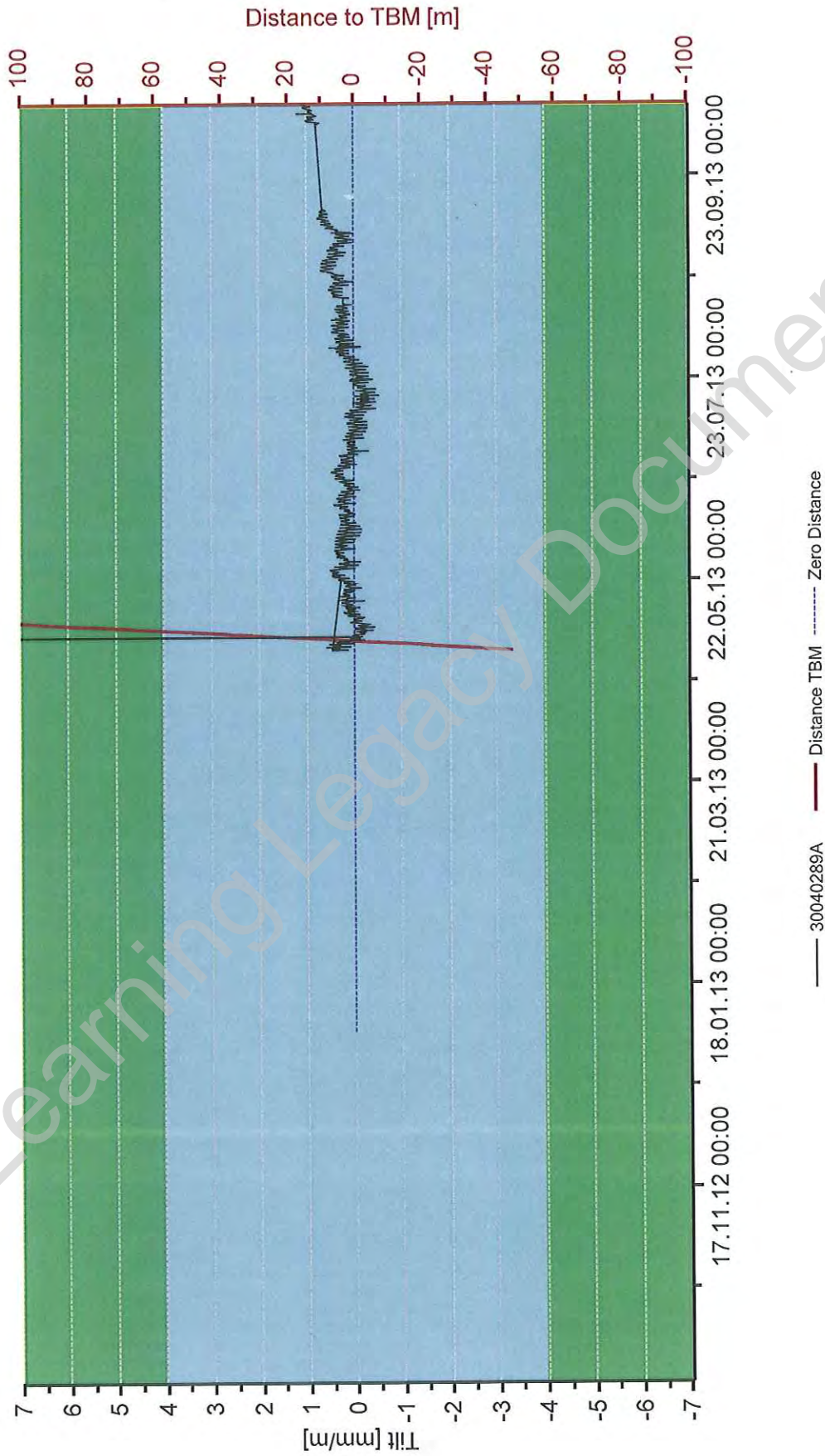
Point: 30040288



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House (TM) 18.09.2012 - 15.10.2013
date: 11.08.2014 13:14 current values: 11.08.2014 12:38



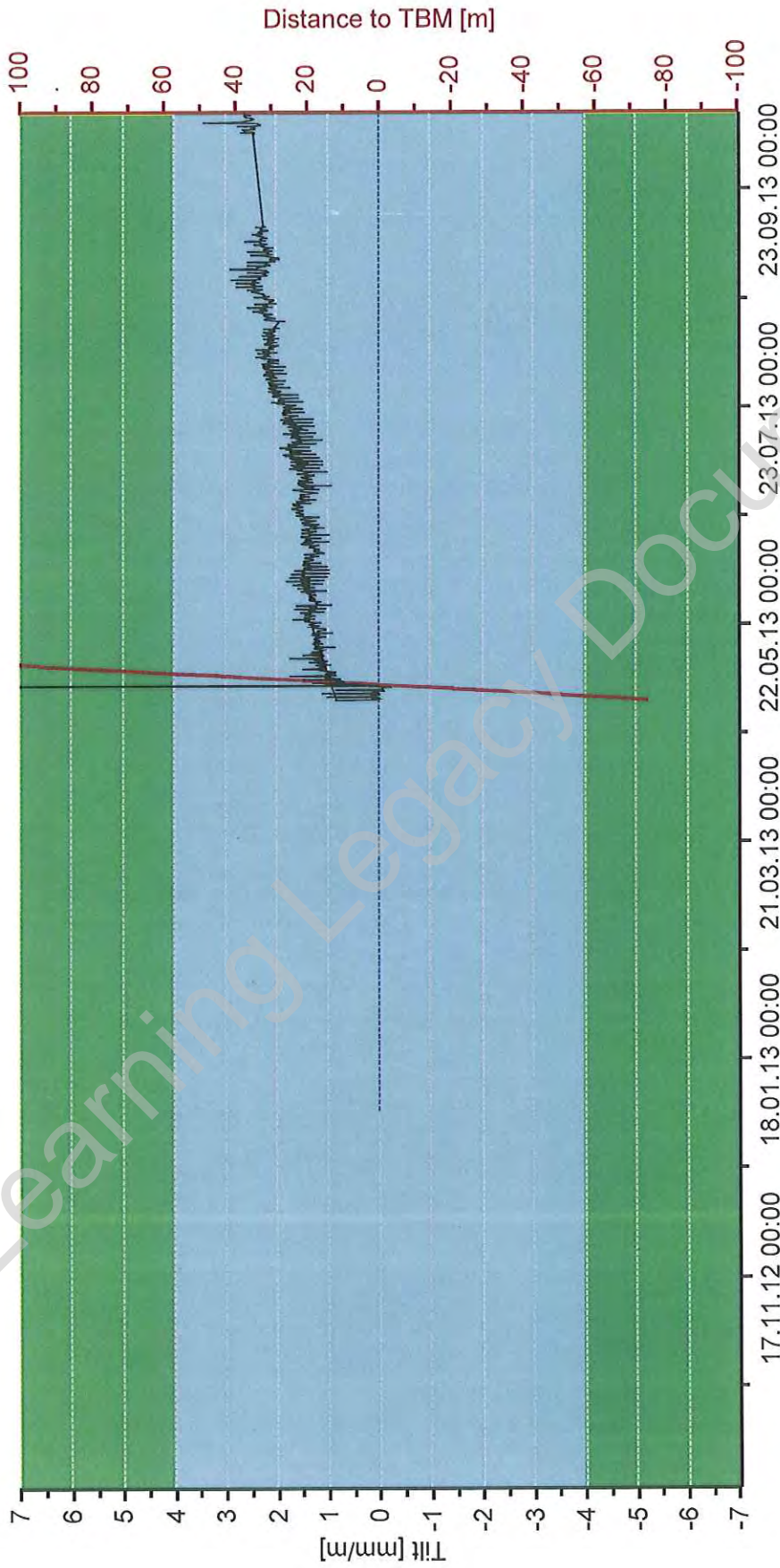
Point: 30040289A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House (TM) 18.09.2012 - 15.10.2013
date: 11.08.2014 13:20 current values: 11.08.2014 12:38



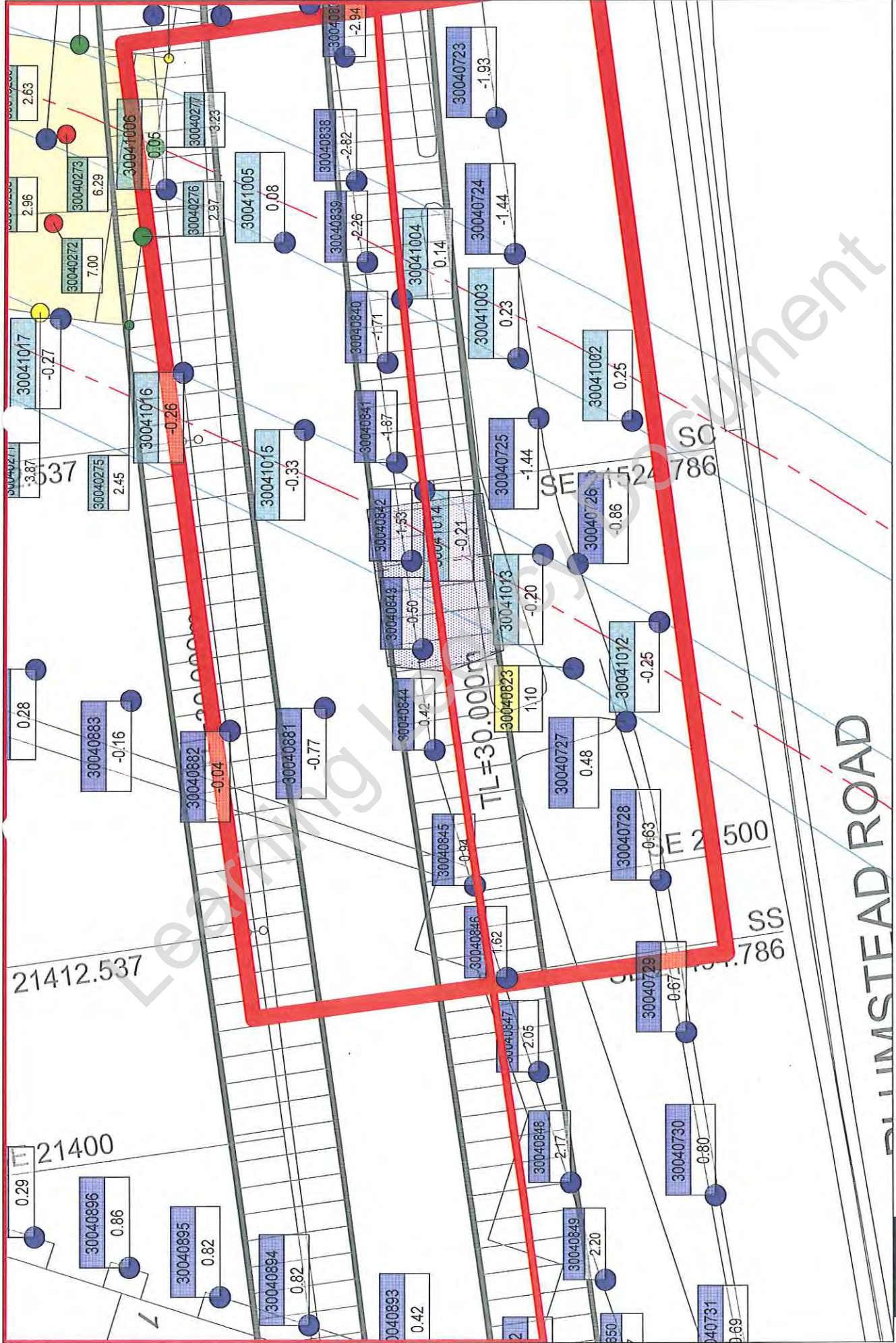
Point: 30040290A



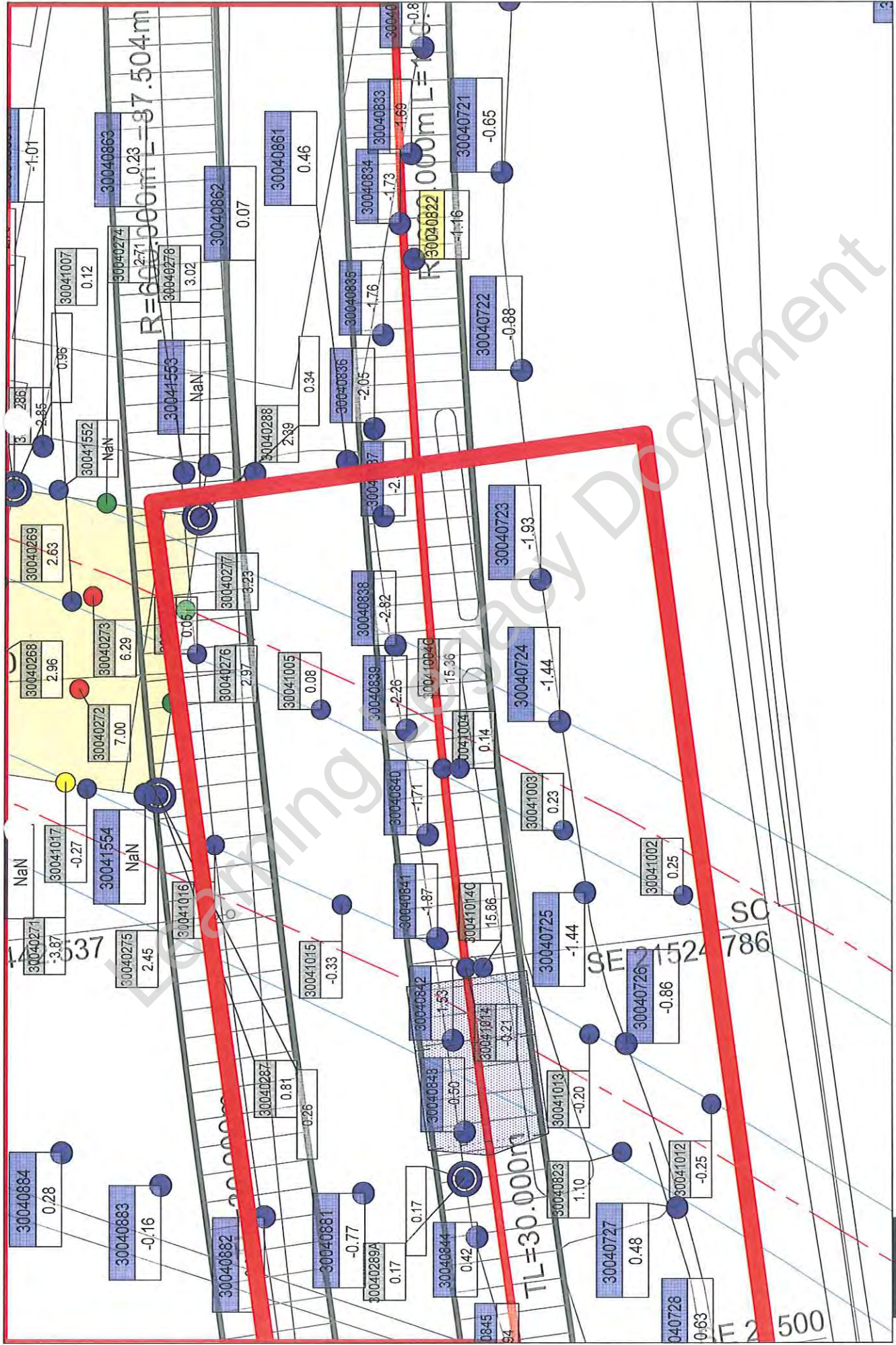
— 30040290A — Distance TBM - - - - - Zero Distance

Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Middle Gate House (TM) 18.09.2012 - 15.10.2013
date: 11.08.2014 13:23 current values: 11.08.2014 12:38



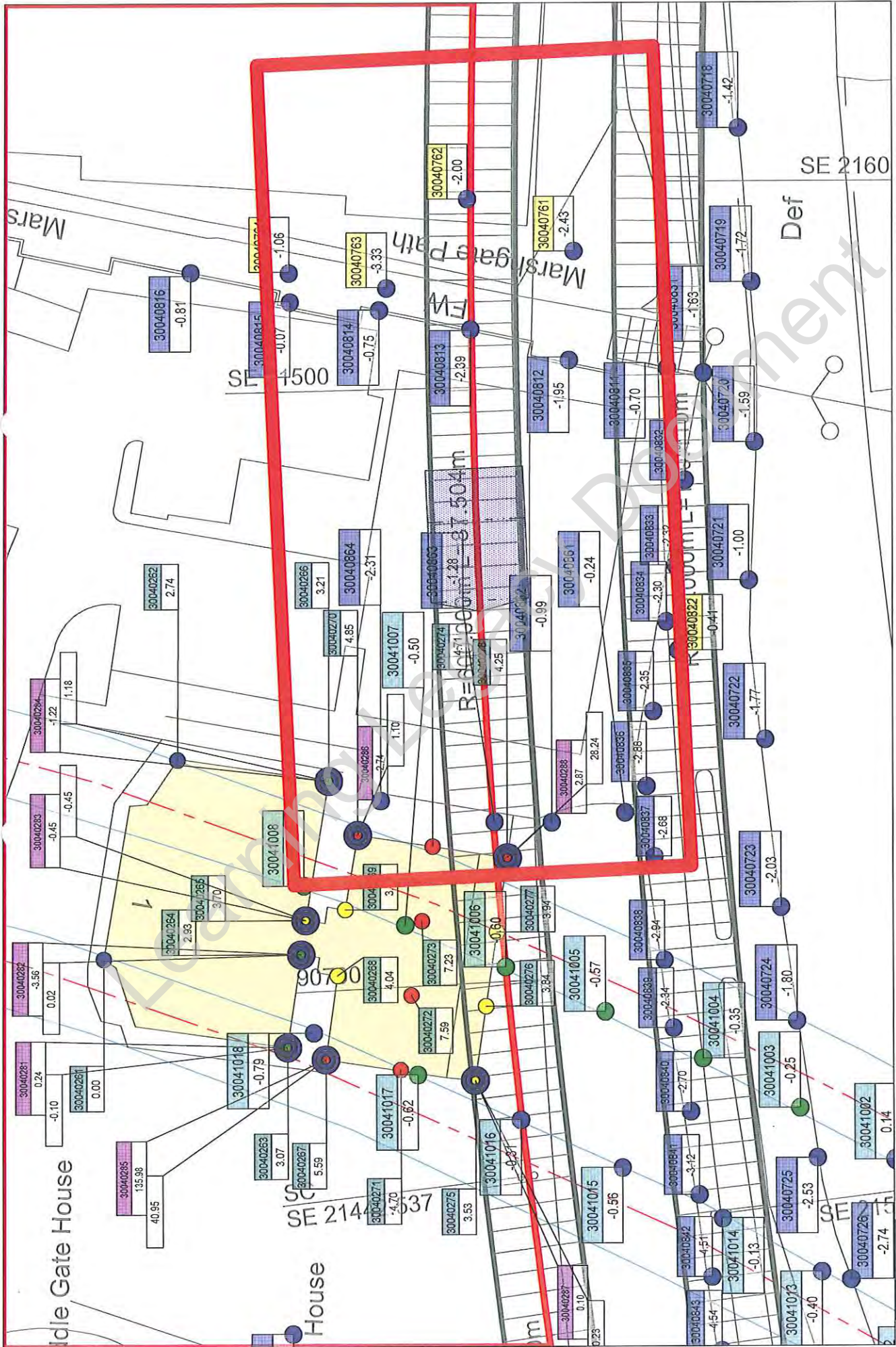


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 03.05.2013 09:00

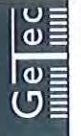


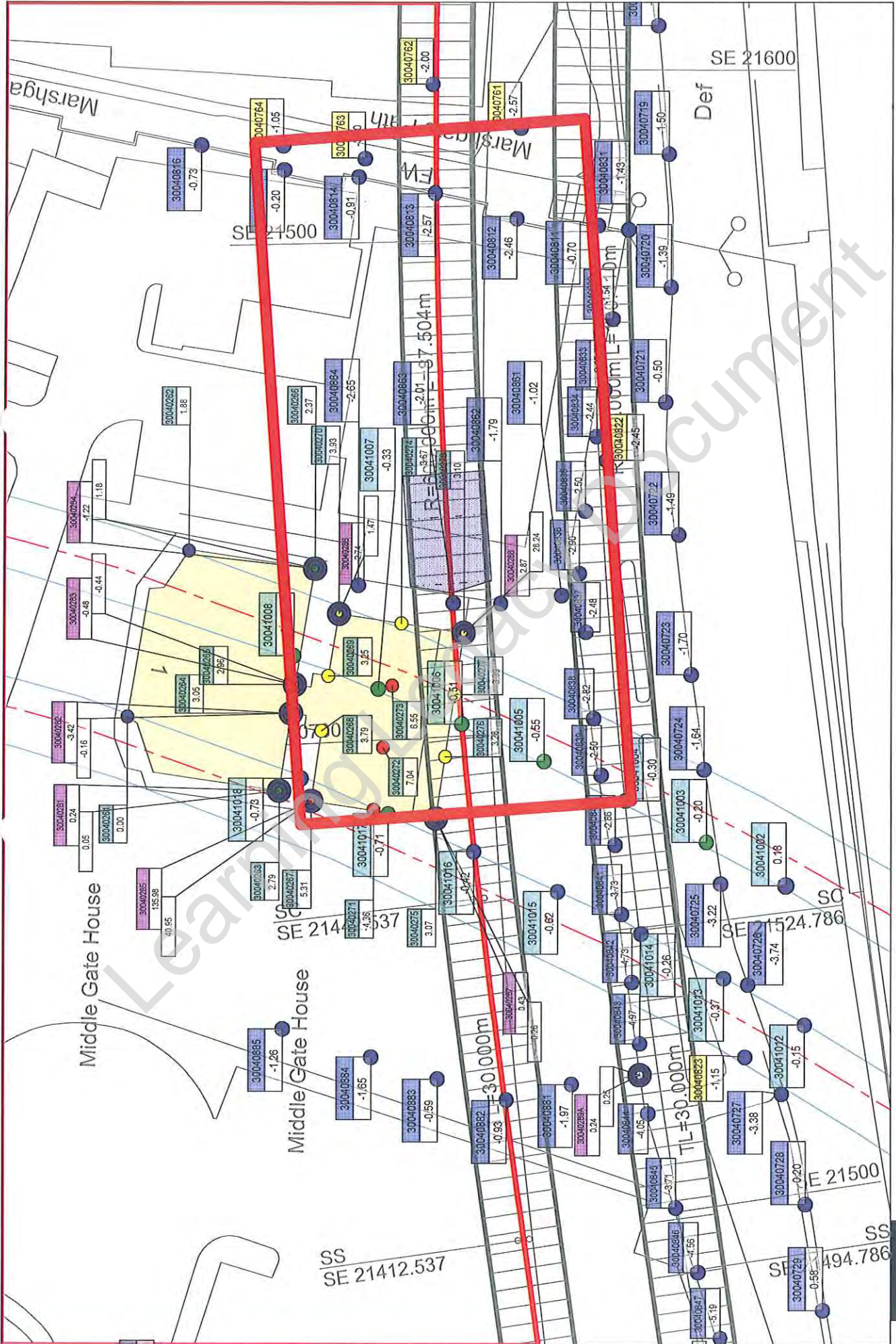
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 03.05.2013 09:00





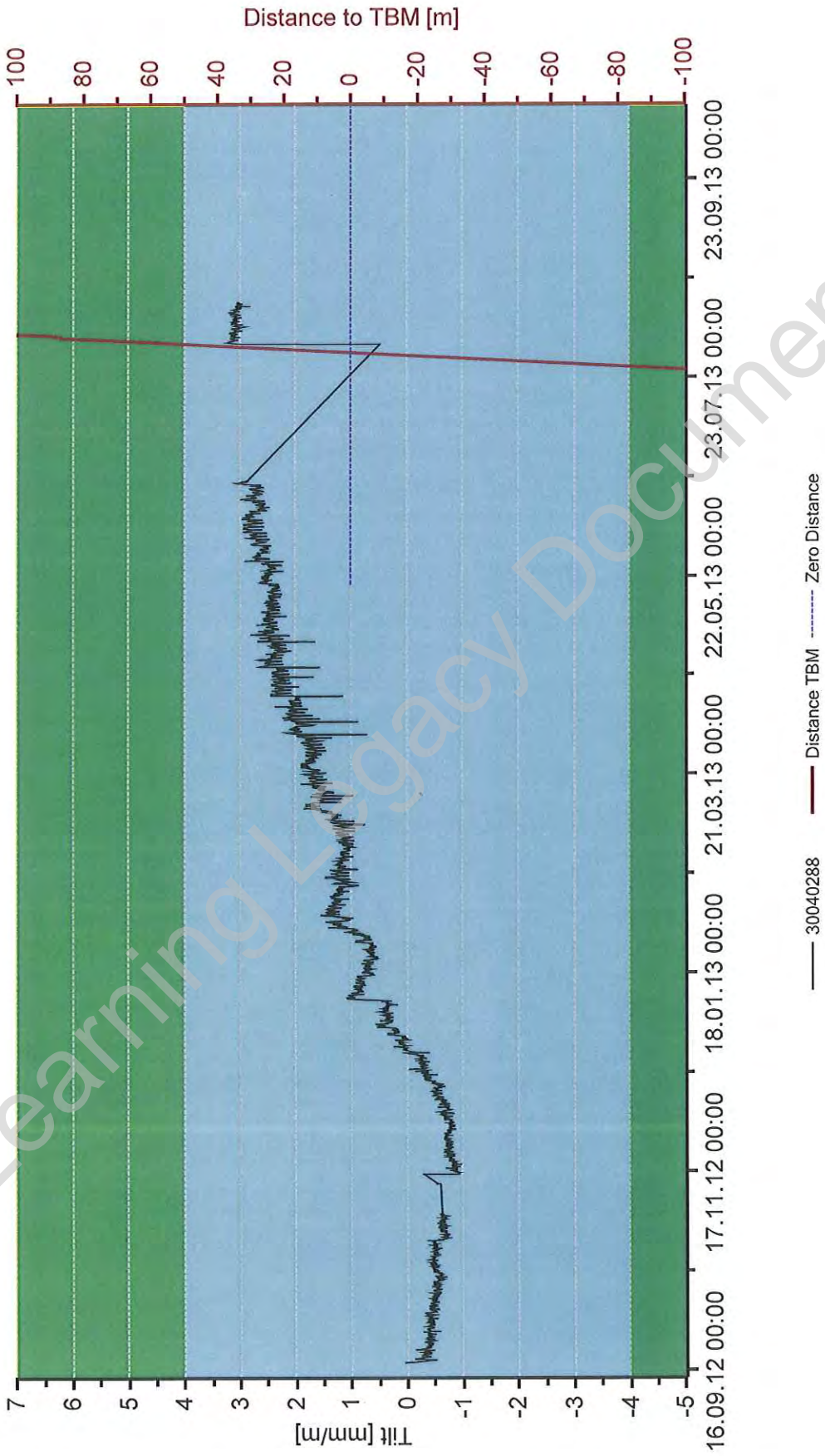
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 29.07.2013 18:23





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 30.07.2013 09:00

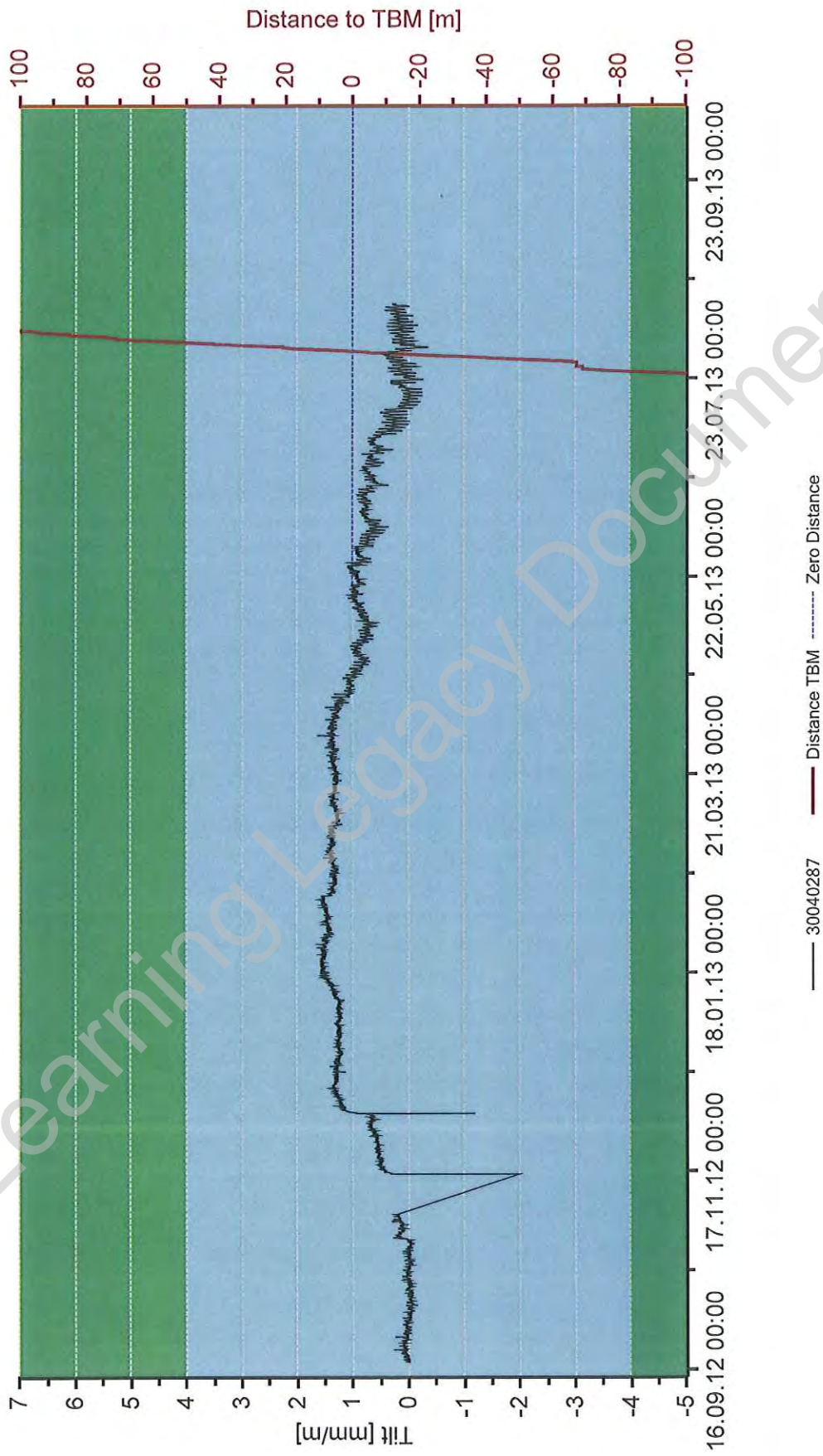
Point: 30040288



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Middle Gate House (TM) 18.09.2012 - 15.10.2013
date: 11.08.2014 13:59 current values: 11.08.2014 13:46

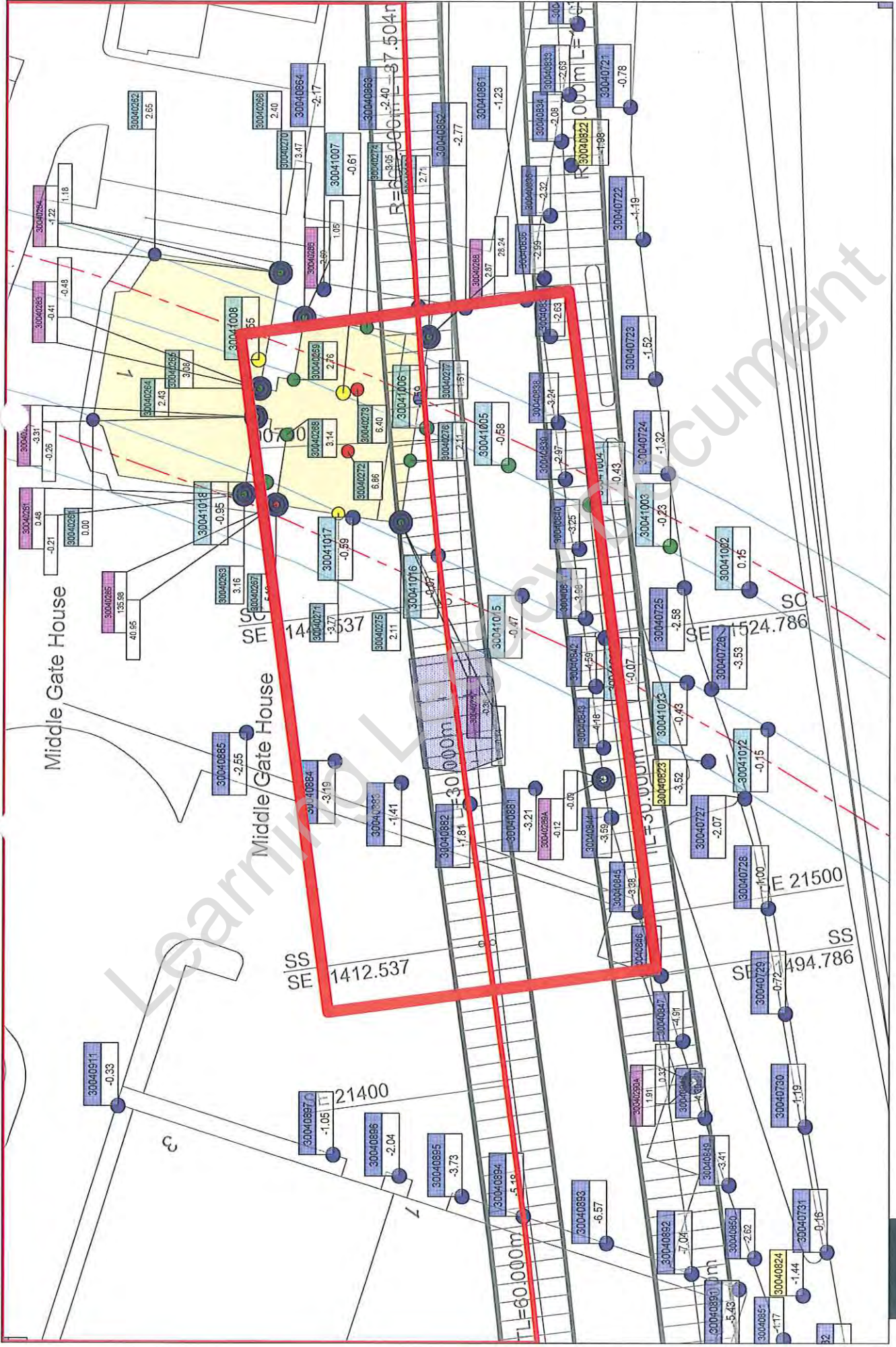


Point: 30040287



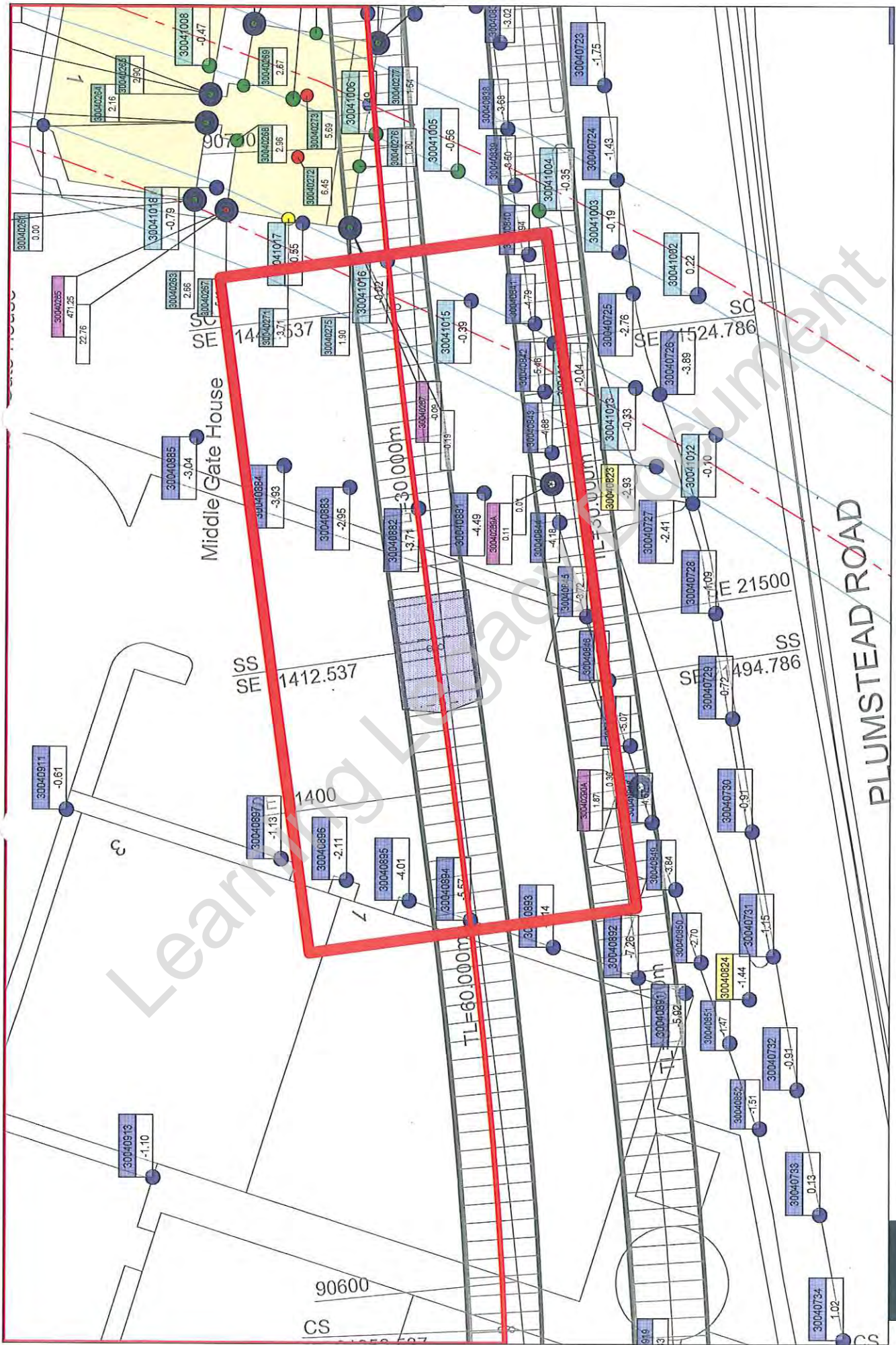
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Middle Gate House (TM) 18.09.2012 - 15.10.2013
date: 11.08.2014 14:03 current values: 11.08.2014 13:46






Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 01.08.2013 19:00





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 02.08.2013 18:44



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

APPENDIX 45
DLR Up Line Tunnel

Learning Legacy Document

monitoring asset	DLR Downline Tunnel		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
name of monitoring section:	DLR Downline Tunnel		
sensor type:	Hydrostatic Levelling Cell		
chainage:	90710	point no.:	3004 1001 - 3004 1008
trigger values: [mm]	green: see special table	amber: see special table	red: see special table
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	27/06/12		0.00		
TBM 1	start ZOI	30/04/13	0.22	3004 1004	
	end ZOI	04/05/13	-0.02	3004 1004	breached not any trigger value
TBM 2	start ZOI	29/07/13	-0.60	3004 1006	
	end ZOI	02/08/13	-0.69	3004 1006	breached not any trigger value
longterm		30/10.13	-0.32	3004 1006	last reading 3 month 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

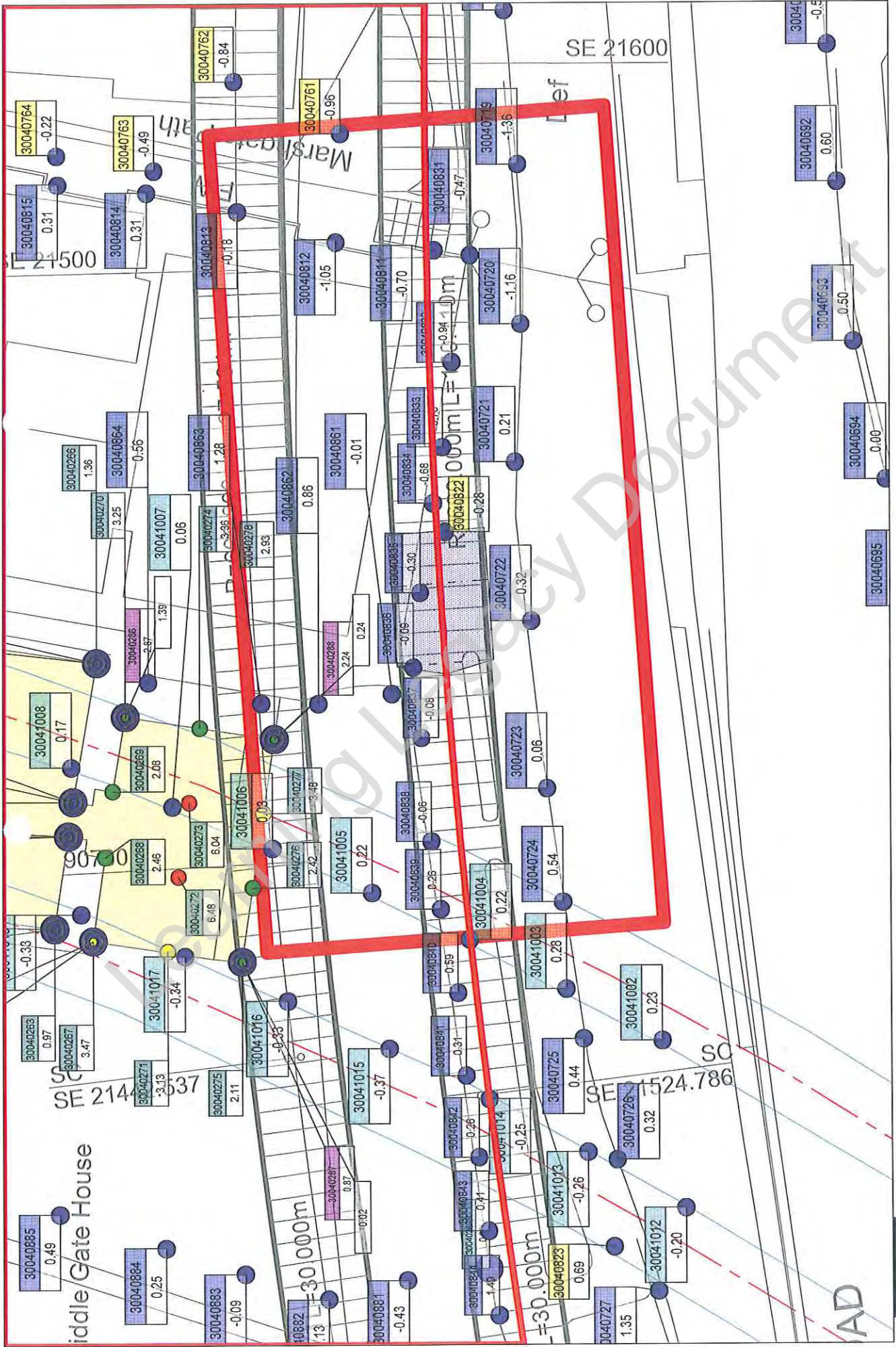
A special trigger value table was created to allow a max. movement (heave / settlement) of each point. See attached a temperature curve in the tunnel for 15 month under point no. 3004 1004c. Overall, none of the points reached at the end any trigger value. A compilation of the other monitoring methods used to monitor the DLR tunnels please find in DLR close out report ref: C310-XRL-C-RGN-CR146-50001.

date / signature: 12/01/15

print name:

HMJV project role:

Monitoring & Survey engineer



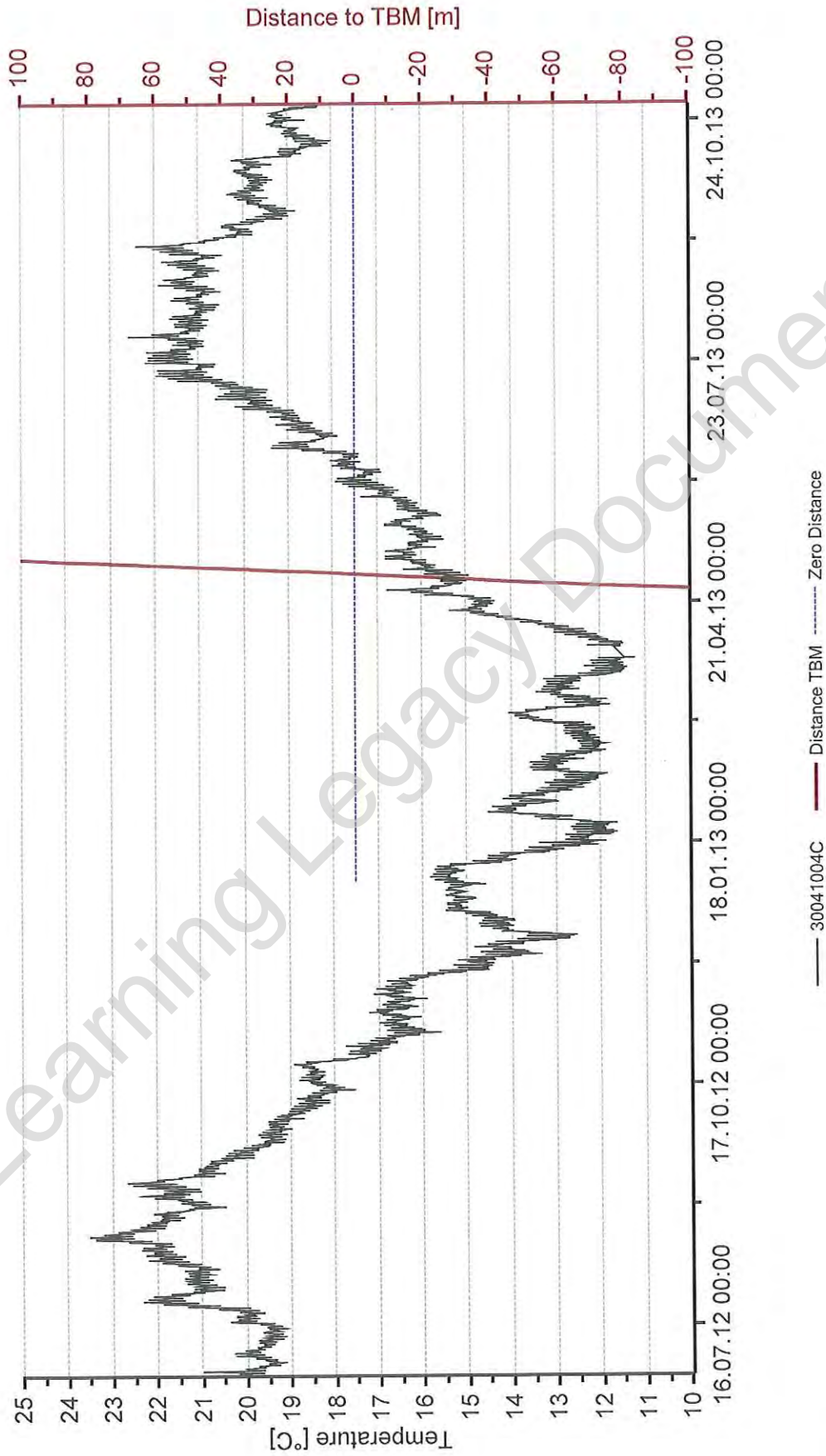
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

DLR monitoring - hydrostatic leveling cells

current values: 30.04.2013 17:45

AD

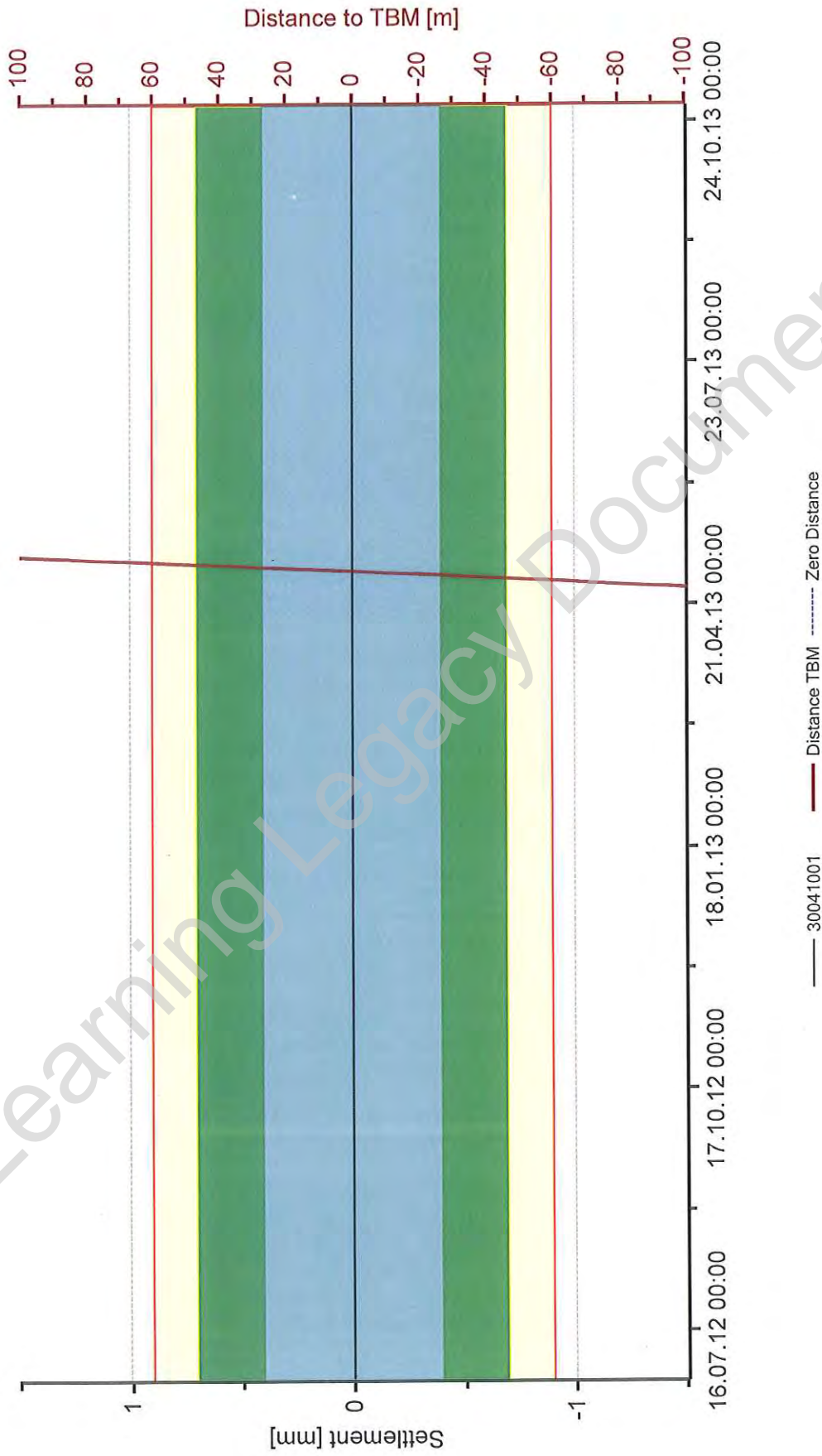
Point: 30041004C



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - DLR Downline Tunnel 27.06.2012 - 30.10.2013
date: 11.08.2014 16:55 current values: 11.08.2014 16:49



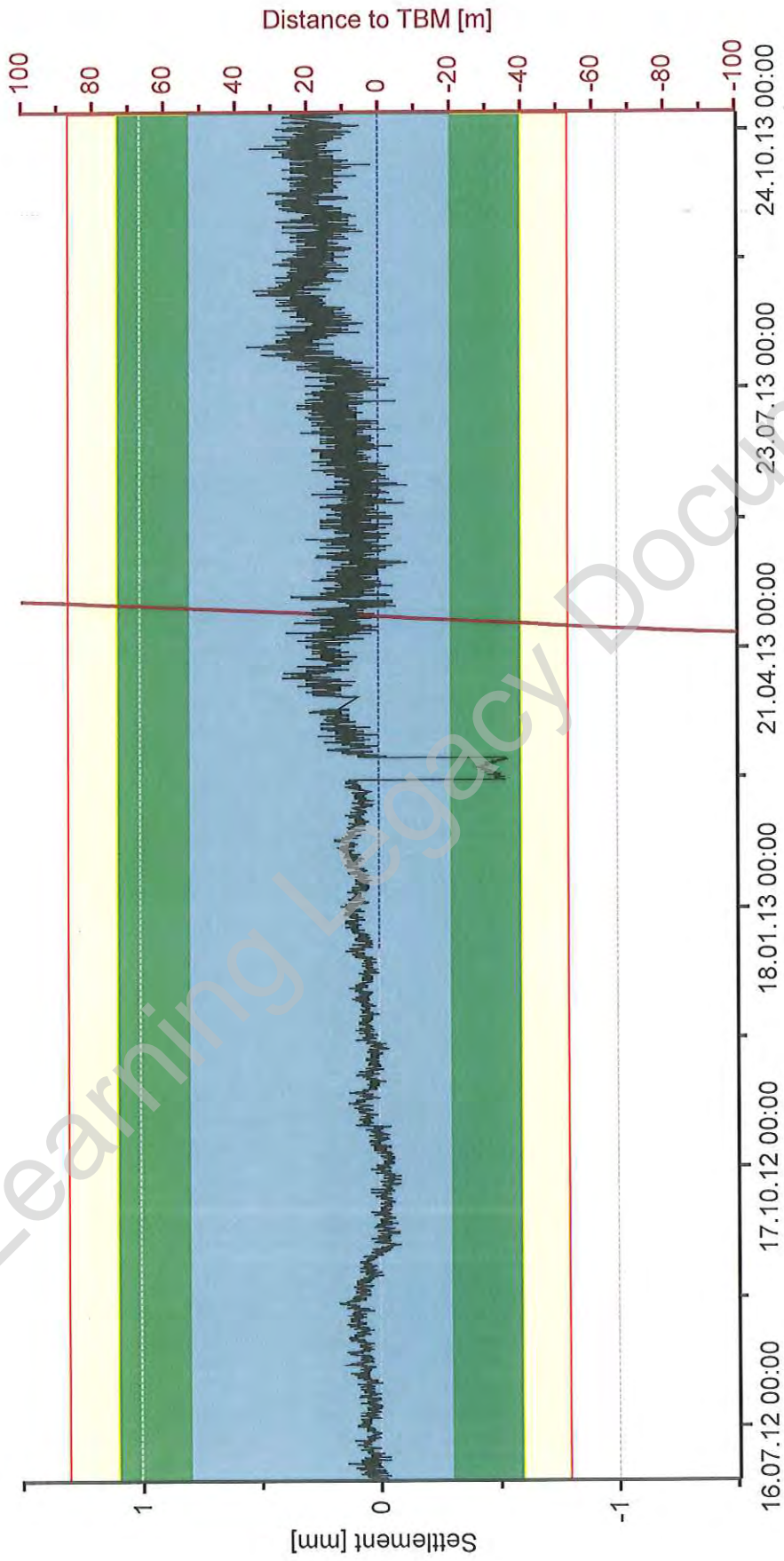
Point: 30041001



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - DLR Downline Tunnel 27.06.2012 - 30.10.2013
date: 11.08.2014 16:11 current values: 11.08.2014 15:54



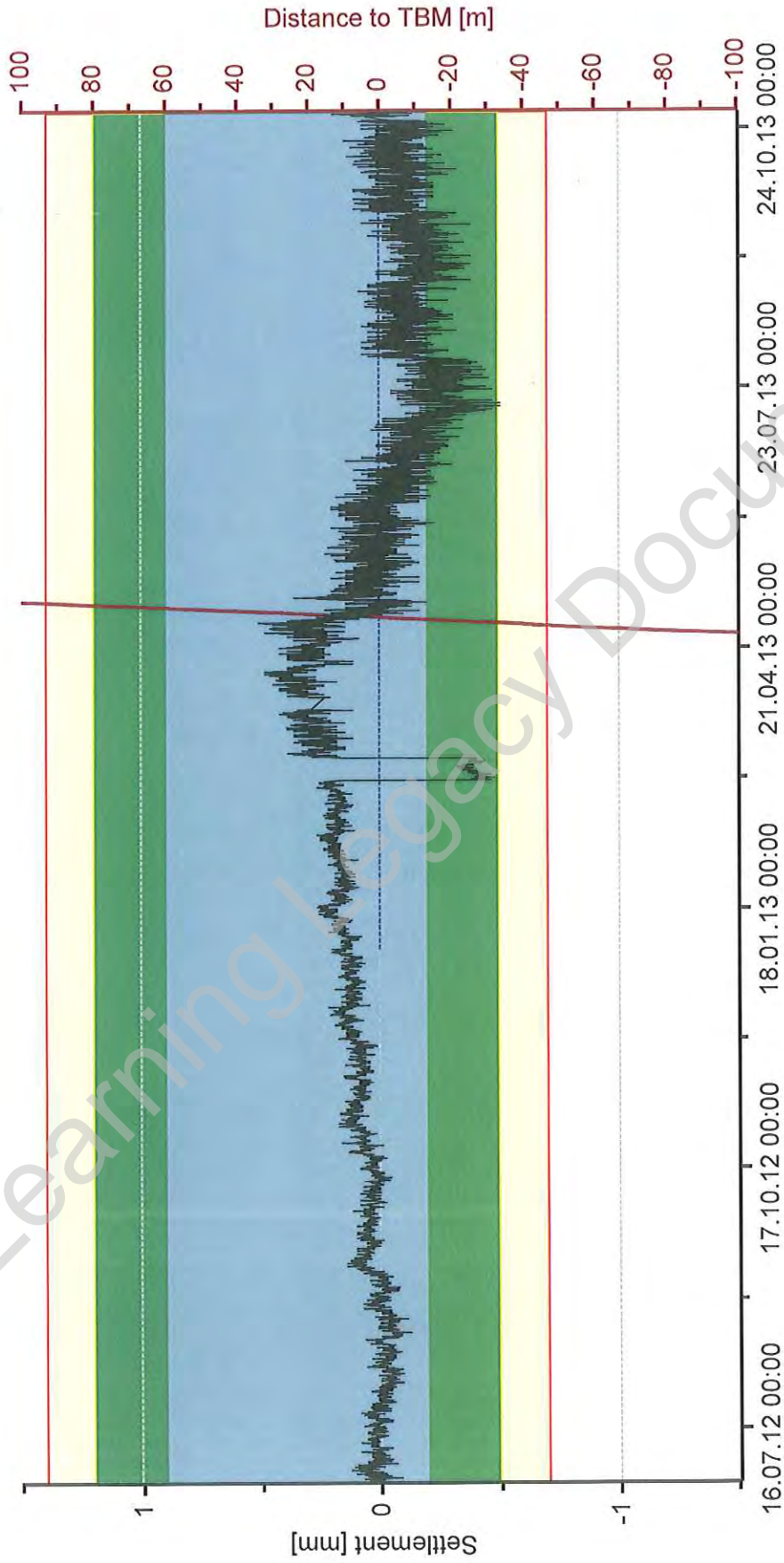
Point: 30041002



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - DLR Downline Tunnel 27.06.2012 - 30.10.2013
date: 11.08.2014 16:14 current values: 11.08.2014 15:54



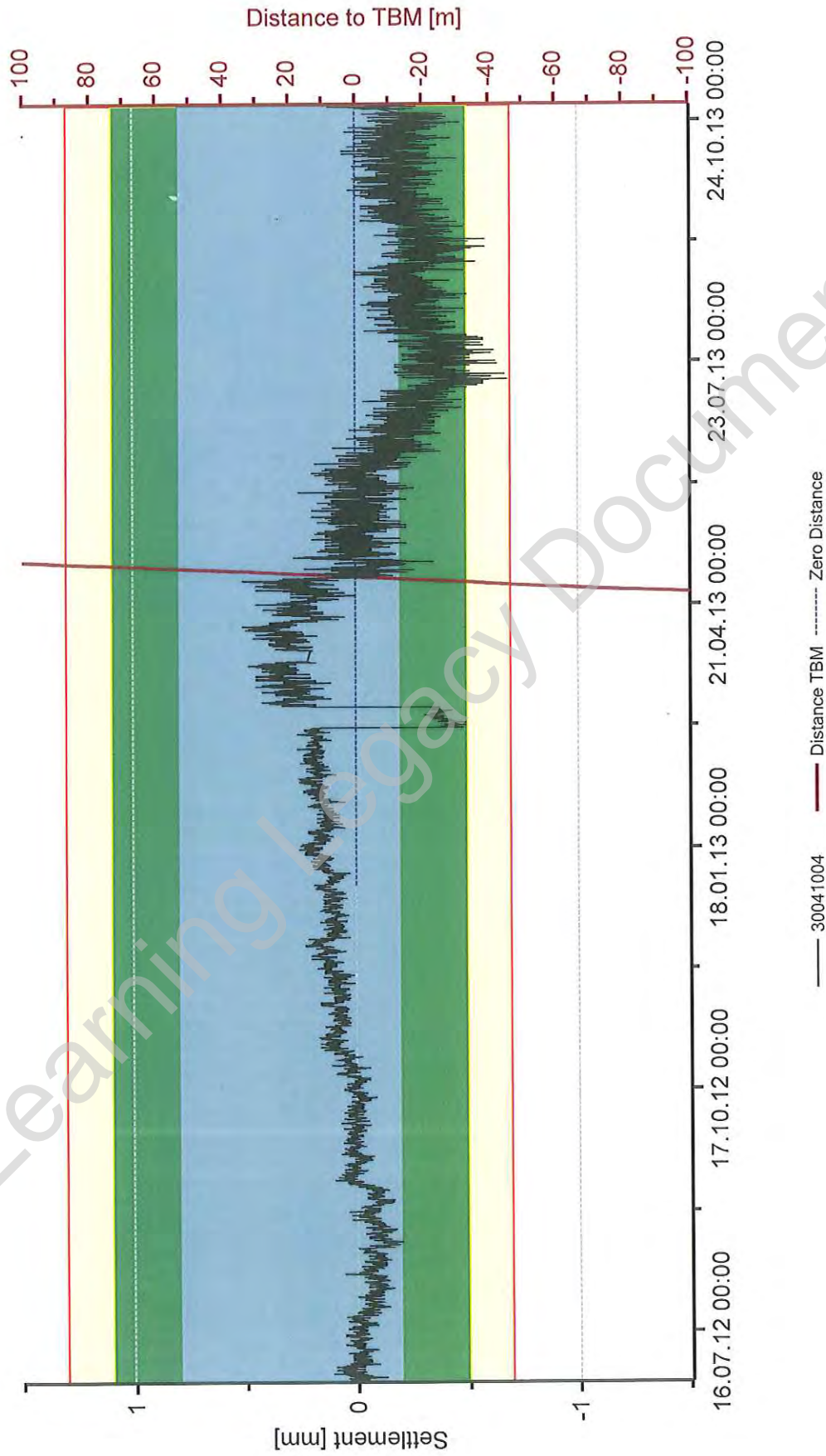
Point: 30041003



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - DLR Downline Tunnel 27.06.2012 - 30.10.2013
date: 11.08.2014 16:19 current values: 11.08.2014 15:54



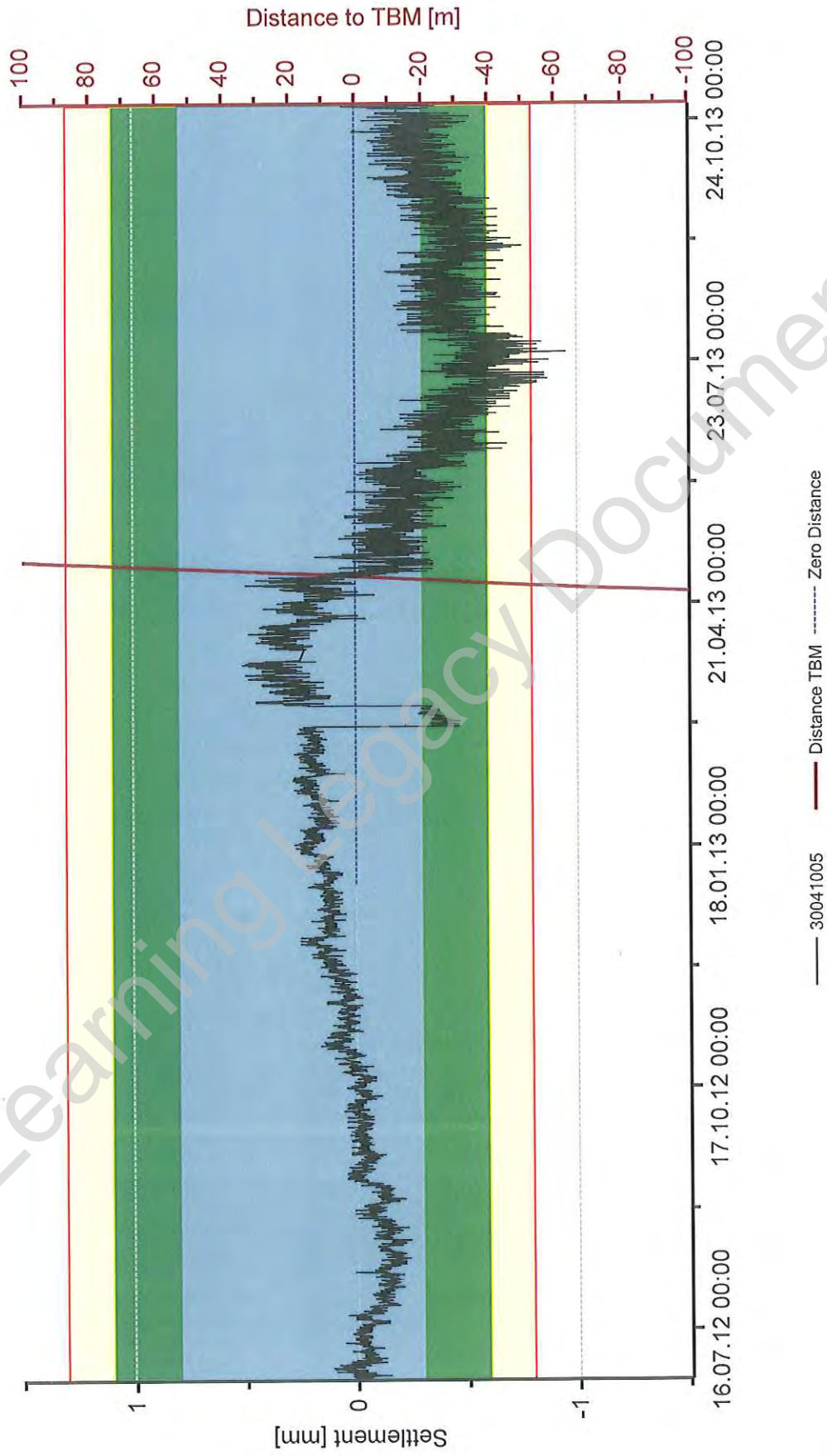
Point: 30041004



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - DLR Downline Tunnel 27.06.2012 - 30.10.2013
date: 11.08.2014 16:17 current values: 11.08.2014 15:54



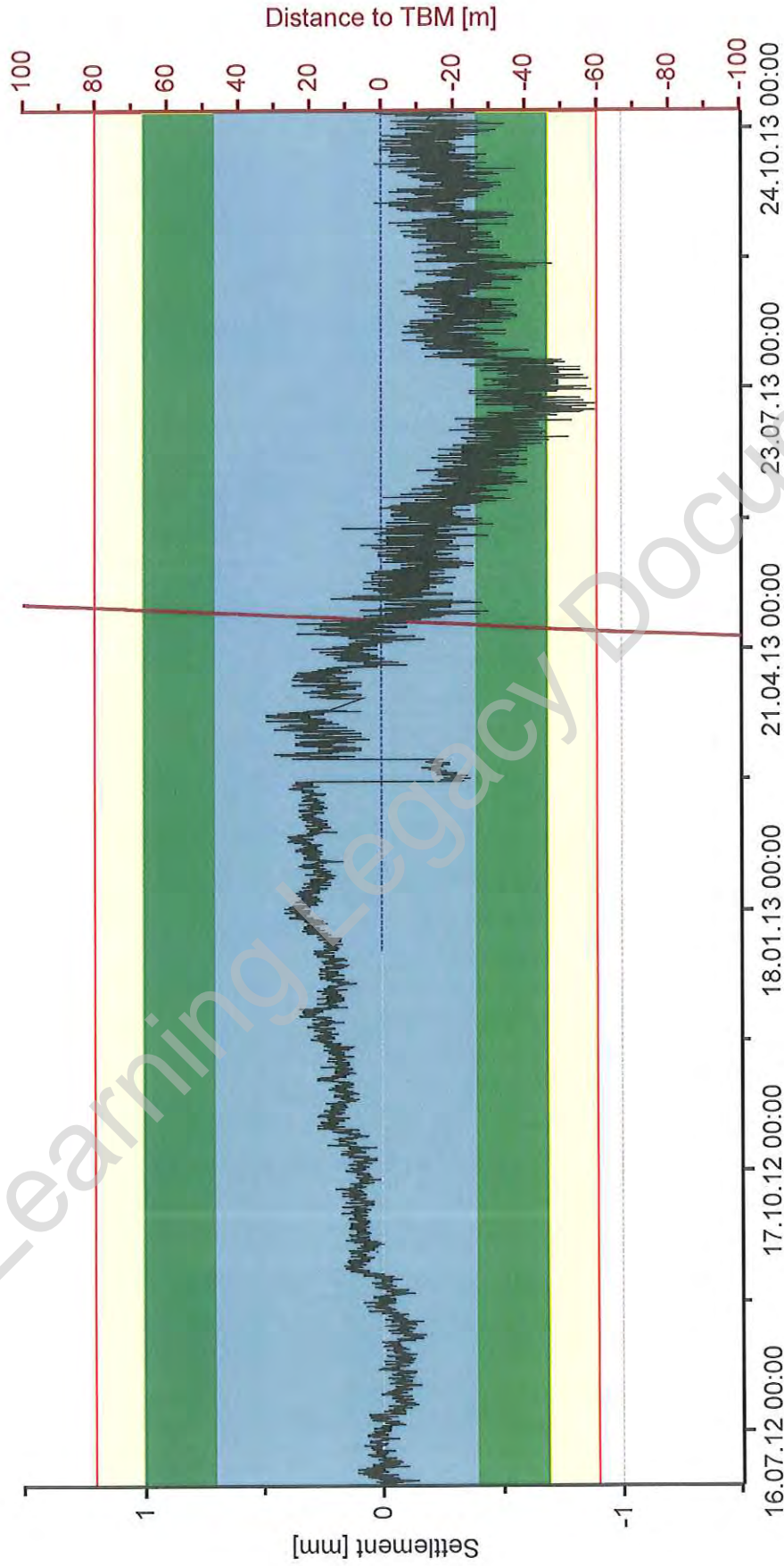
Point: 30041005



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - DLR Downline Tunnel 27.06.2012 - 30.10.2013
date: 11.08.2014 16:26 current values: 11.08.2014 15:54



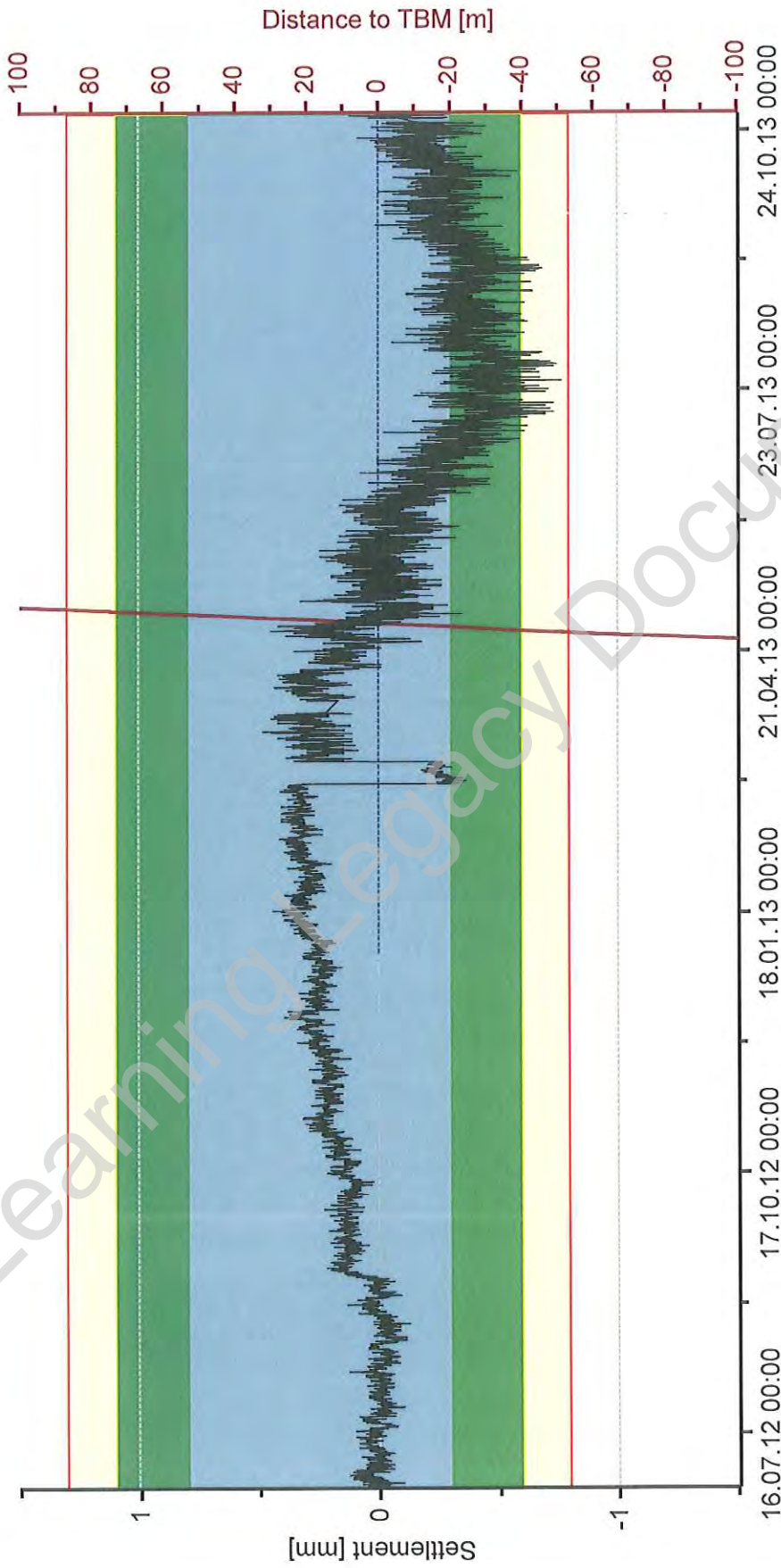
Point: 30041006



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - DLR Downline Tunnel 27.06.2012 - 30.10.2013
date: 11.08.2014 16:29 current values: 11.08.2014 15:54



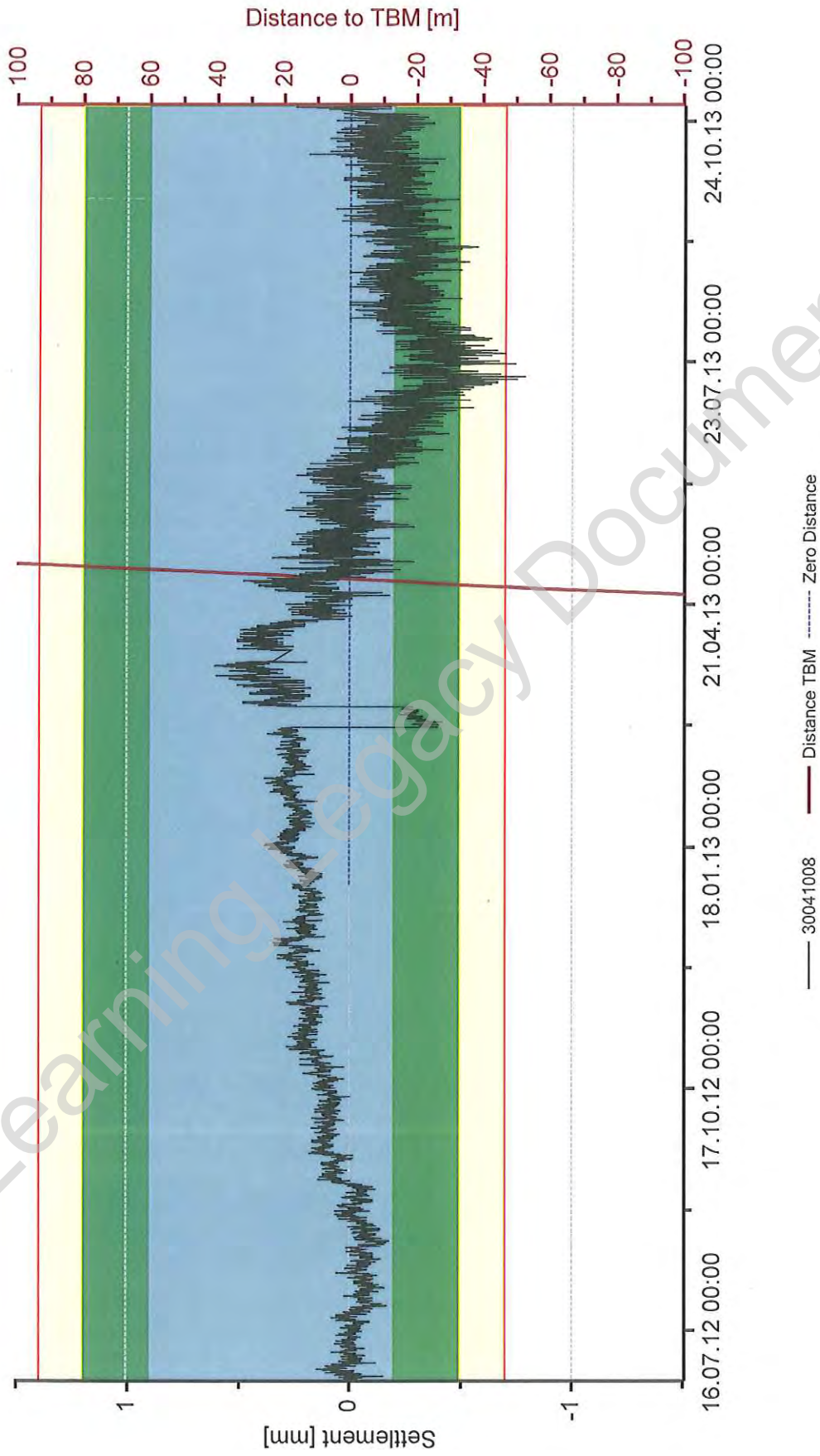
Point: 30041007



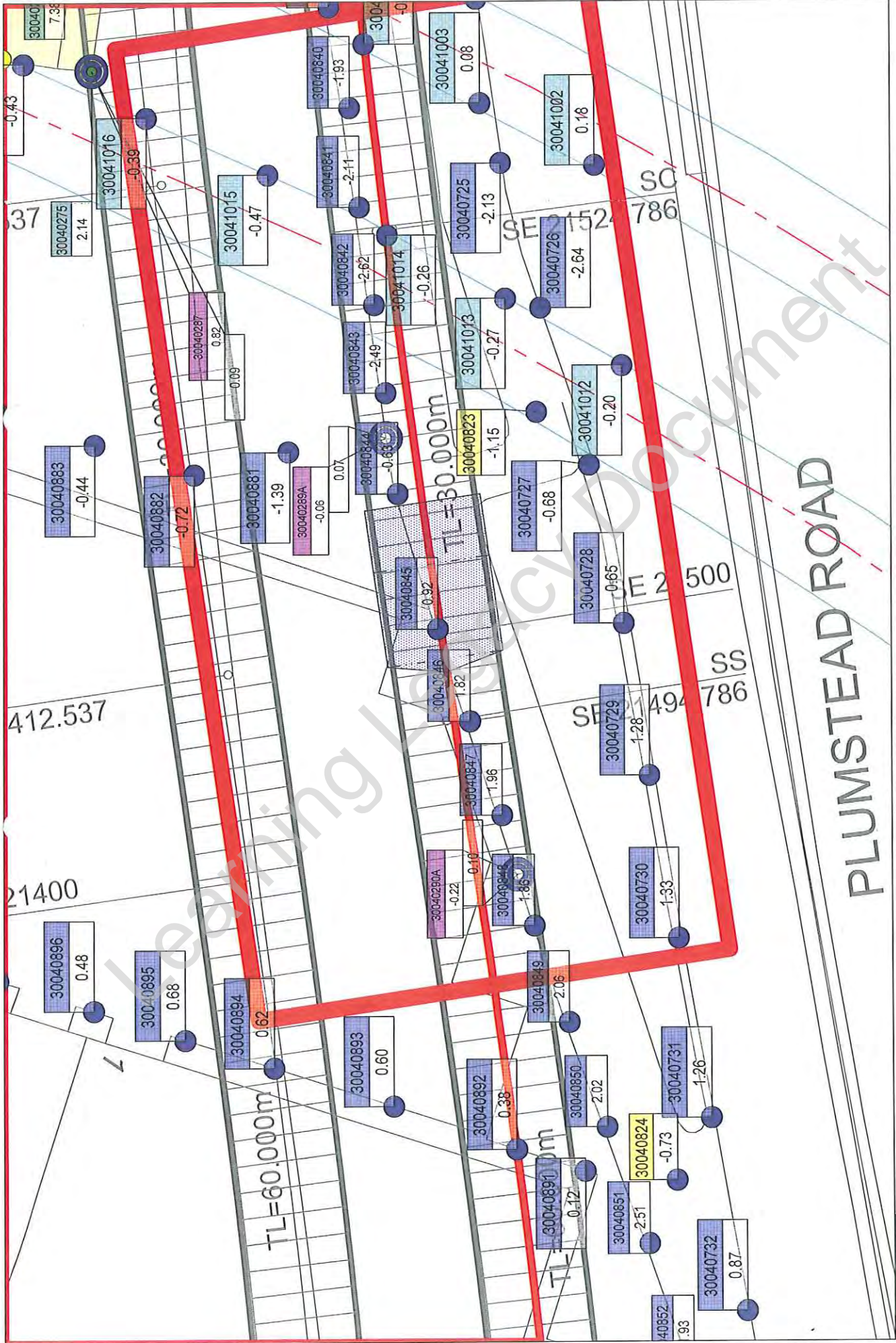
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - DLR Downline Tunnel 27.06.2012 - 30.10.2013
date: 11.08.2014 16:35 current values: 11.08.2014 15:54



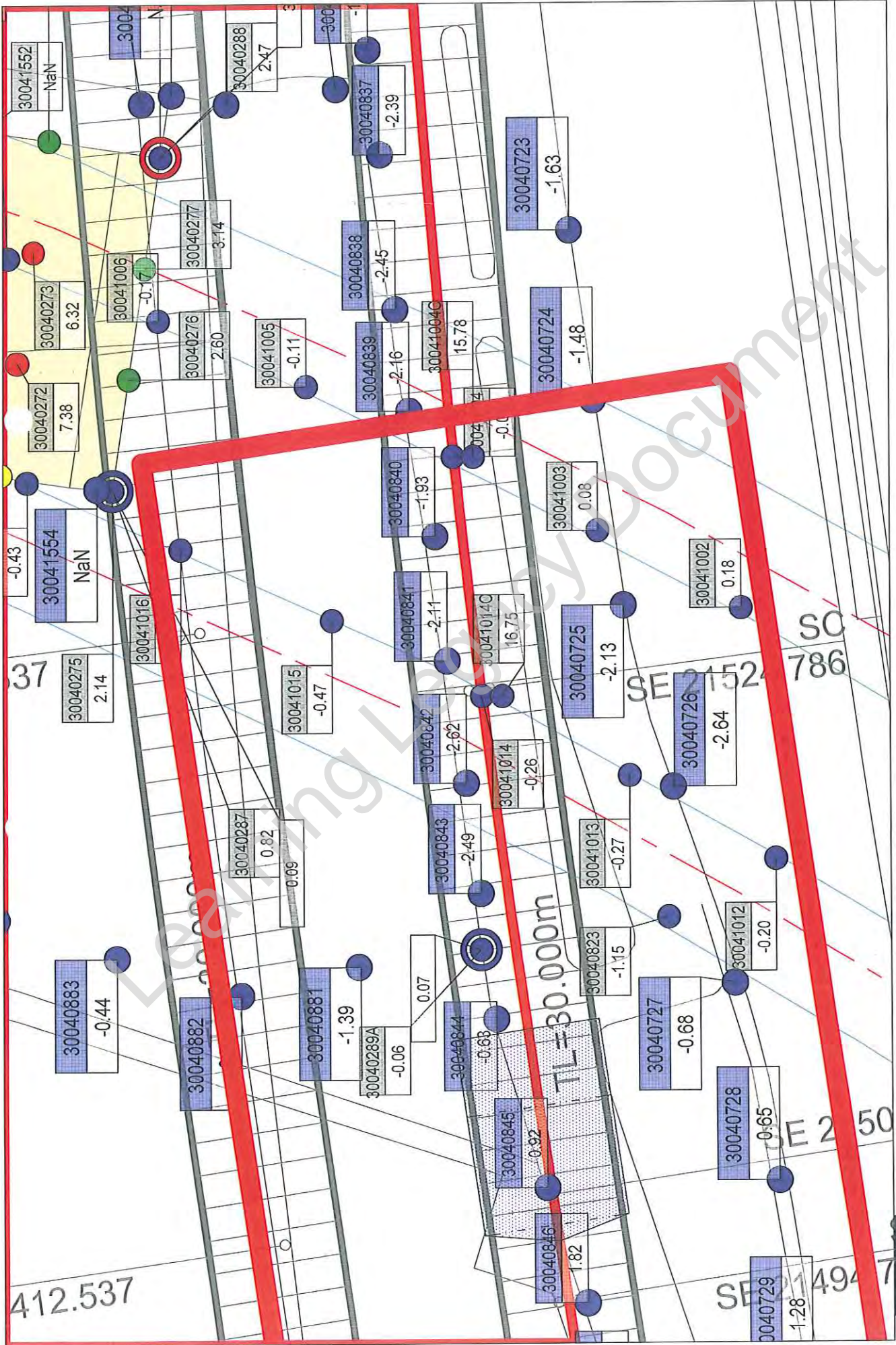
Point: 30041008



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - DLR Downline Tunnel 27.06.2012 - 30.10.2013
date: 11.08.2014 16:39 current values: 11.08.2014 15:54

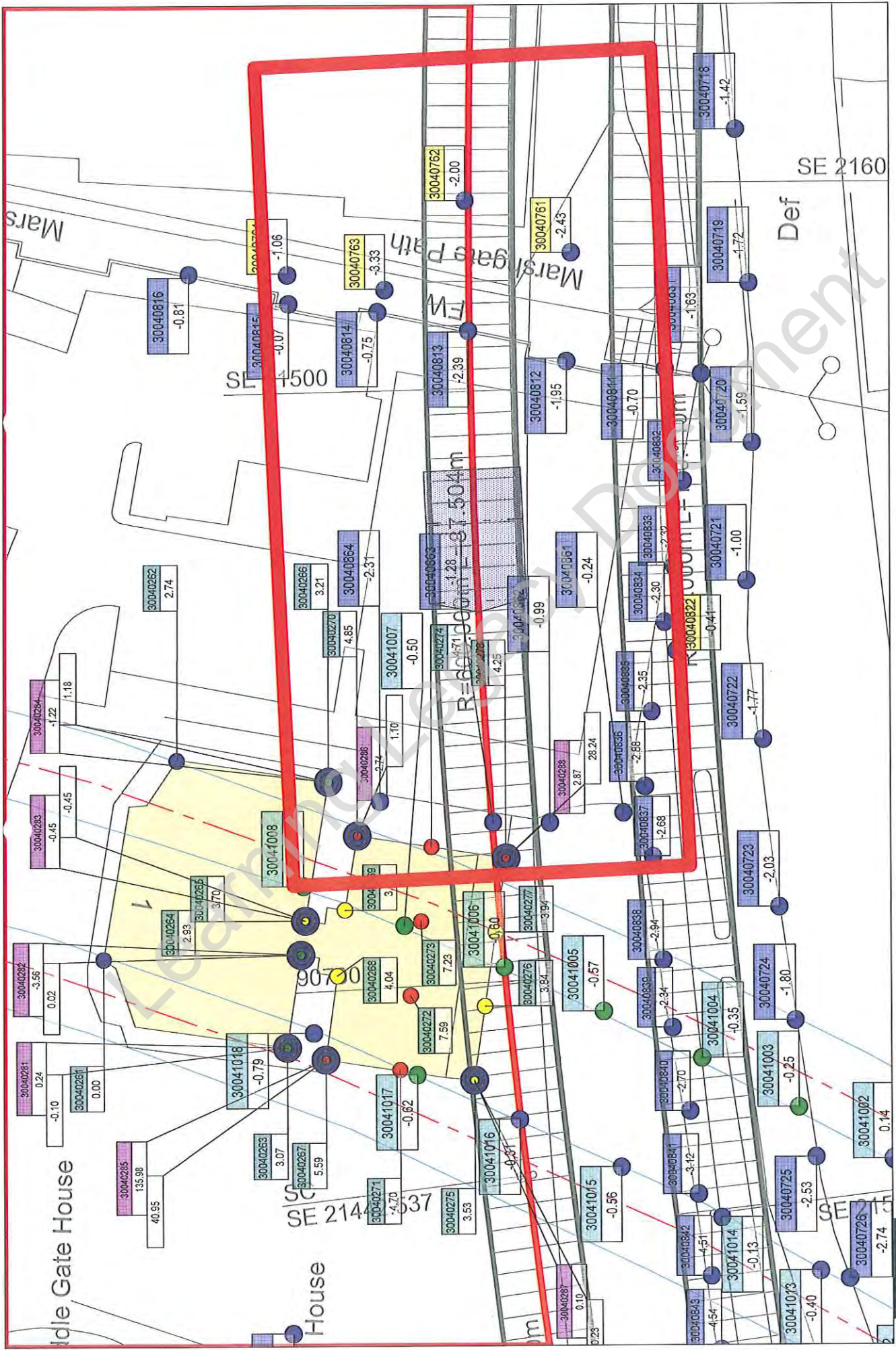


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 04.05.2013 09:01



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

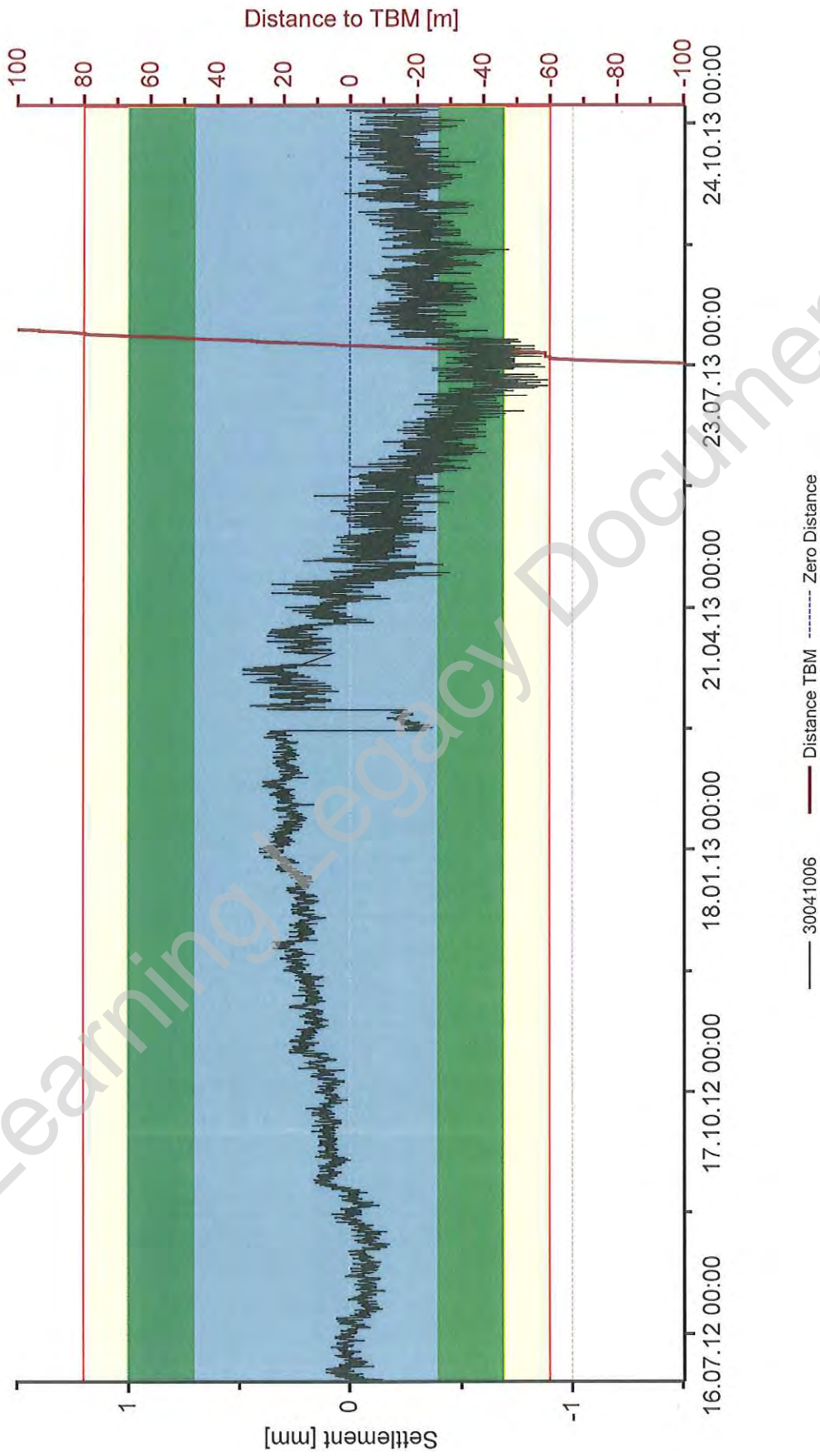




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 29.07.2013 18:23

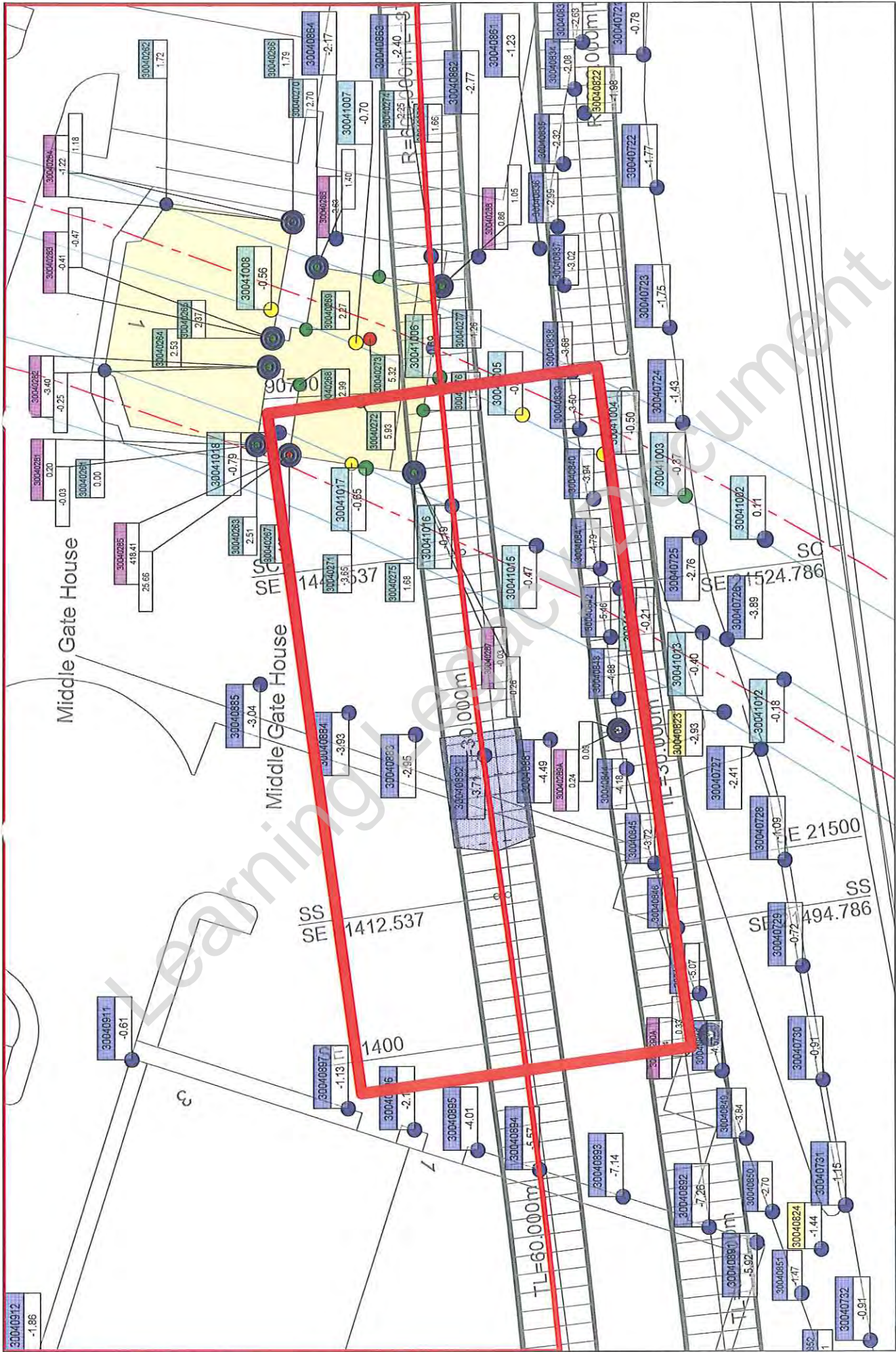


Point: 30041006




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - DLR Downline Tunnel 27.06.2012 - 30.10.2013
date: 11.08.2014 16:49 current values: 11.08.2014 16:39





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 02.08.2013 09:00



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

APPENDIX 46
DLR Down Line Tunnel

Learning Legacy Document

monitoring asset	DLR Upline Tunnel		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
name of monitoring section:	DLR Upline Tunnel		
sensor type:	Hydrostatic Levelling Cell		
chainage:	90680	point no.:	3004 1011 - 3004 1018
trigger values: [mm]	green: see special table	amber: see special table	red: see special table
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	27/06/12	0.00			
TBM 1	start ZOI	01/05/13	-0.32	3004 1014	
	end ZOI	05/05/13	-0.32	3004 1014	breached not any trigger value
TBM 2	start ZOI	30/07/13	-0.42	3004 1016	
	end ZOI	03/08/13	-0.16	3004 1016	breached not any trigger value
longterm	30/10/13	-0.41	3004 1016	last reading 3 month 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

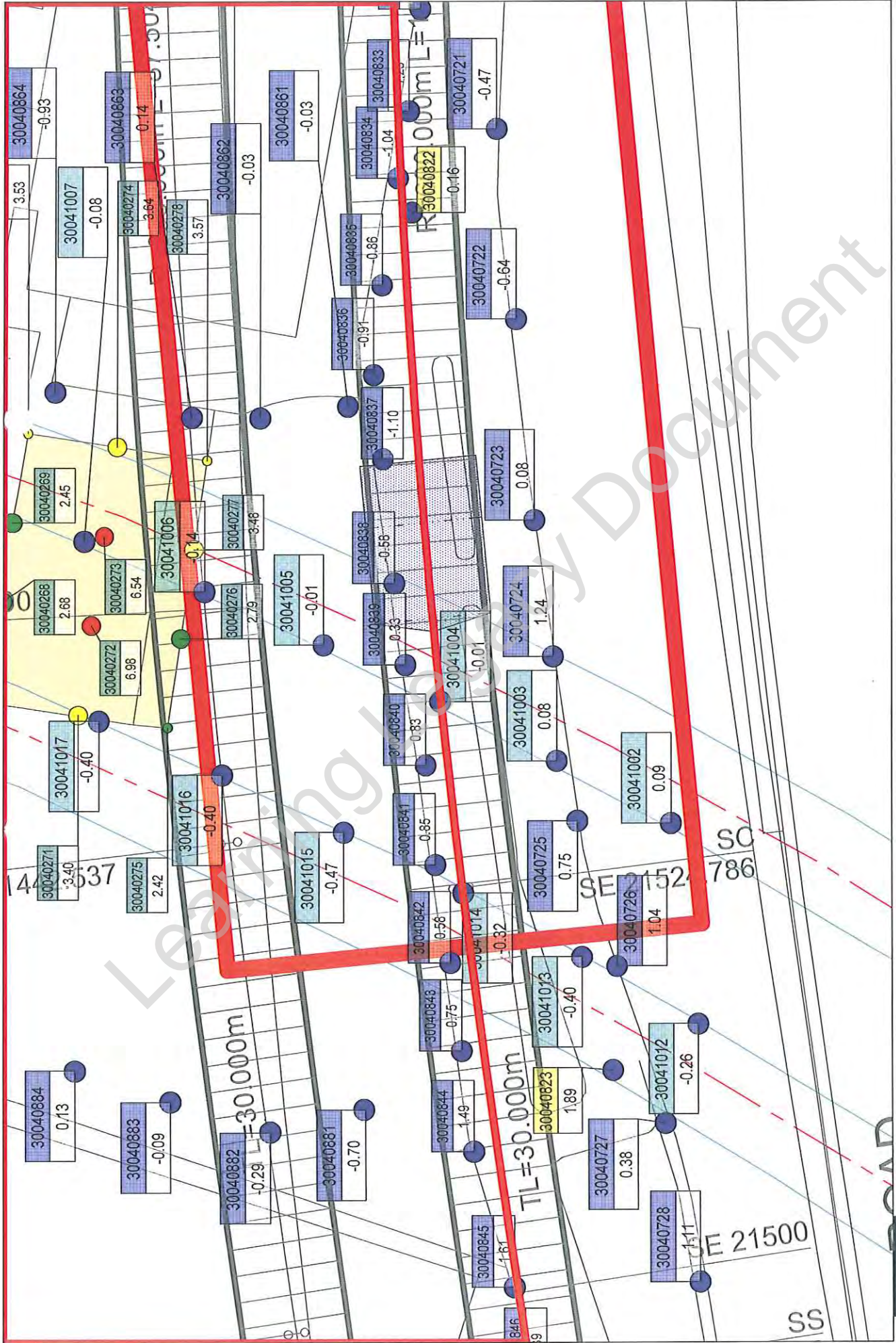
A special trigger value table was created to allow a max. movement (heave / settlement) of each point. See attached a temperature curve in the tunnel for 15 month under point no. 3004 1014c. Overall, none of the points reached at the end any trigger value. A compilation of the other monitoring methods used to monitor the DLR tunnels please find in DLR close out report ref: C310-XRL-C-RGN-CR146-50001.

date / signature: 12/01/15

print name:

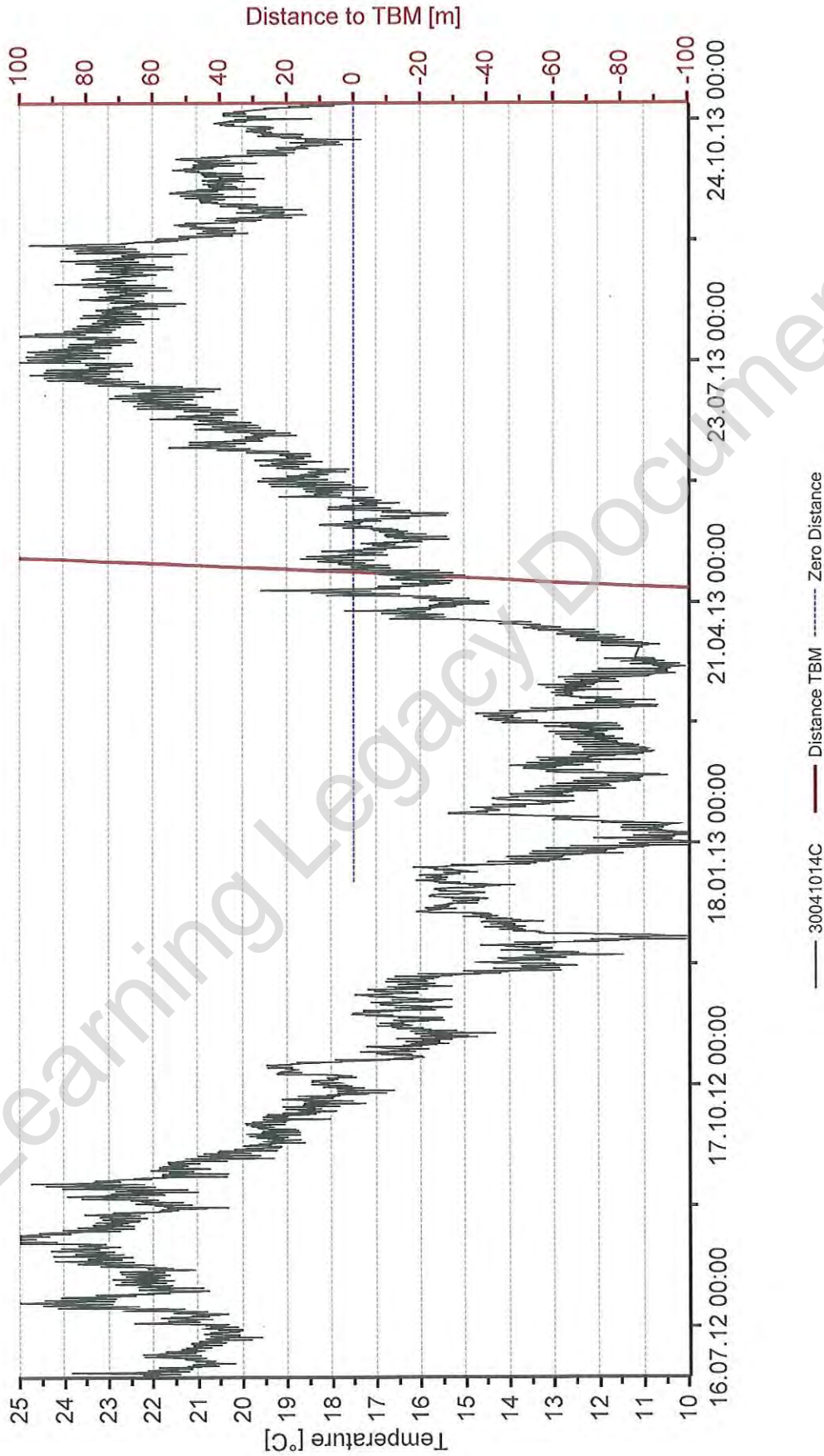
HMJV project role:

Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 01.05.2013 17:59

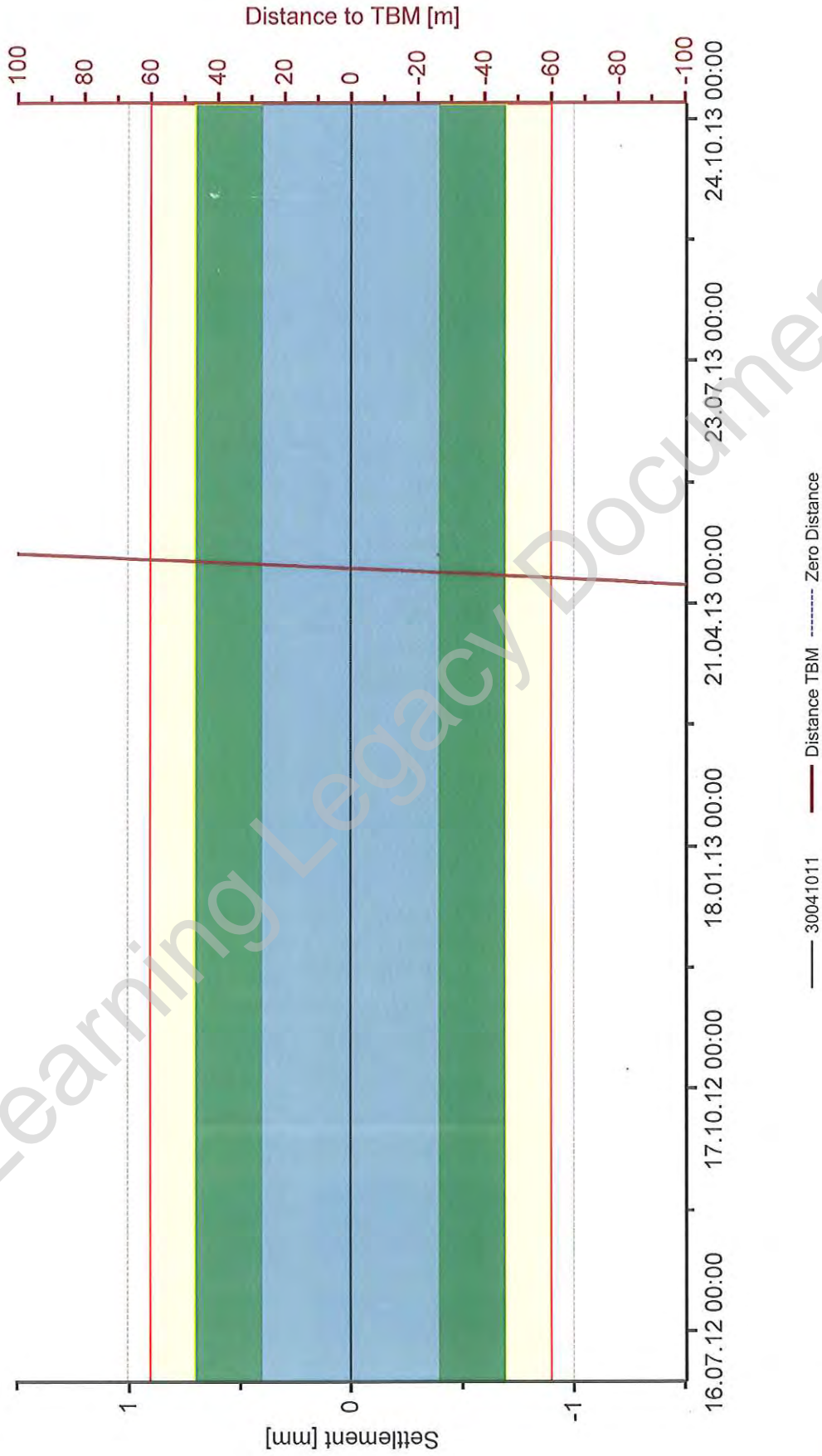
Point: 30041014C



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - DLR Upline Tunnel 27.06.2012 - 30.10.2013
date: 12.08.2014 15:07 current values: 12.08.2014 14:58



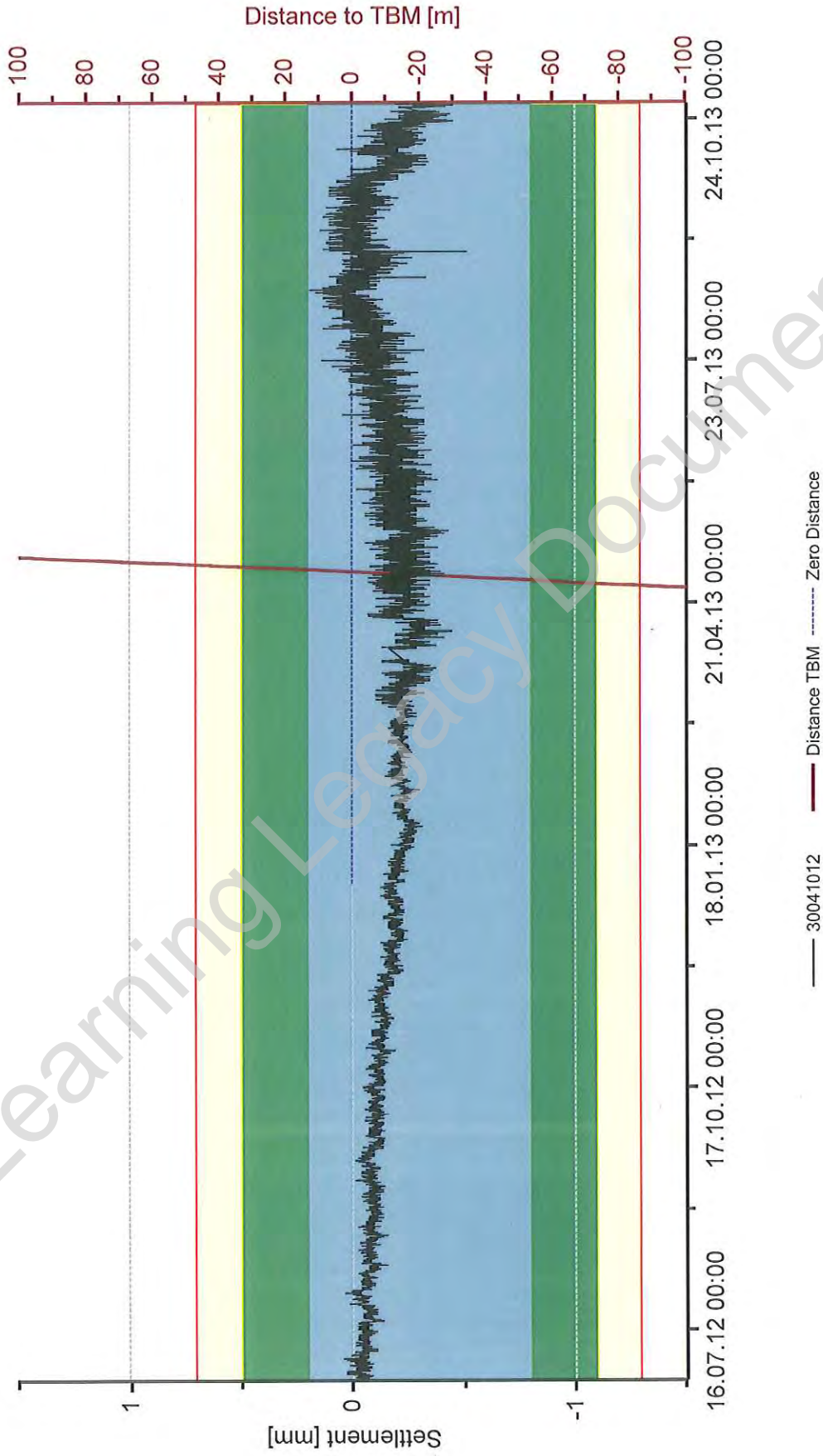
Point: 30041011



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - DLR Upline Tunnel 27.06.2012 - 30.10.2013
date: 12.08.2014 14:24 current values: 12.08.2014 14:19



Point: 30041012



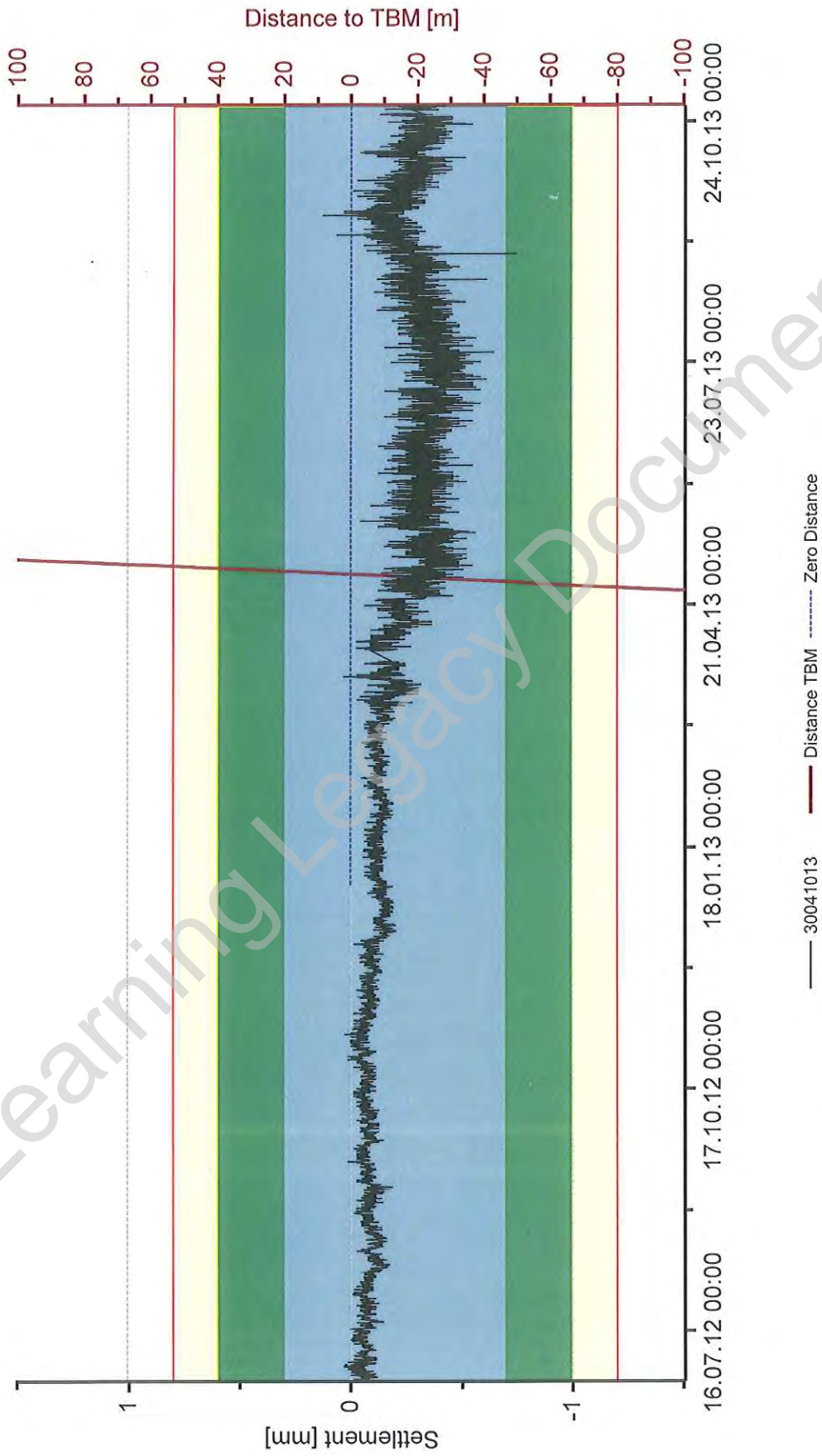
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - DLR Upline Tunnel 27.06.2012 - 30.10.2013

date: 12.08.2014 14:32 current values: 12.08.2014 14:25



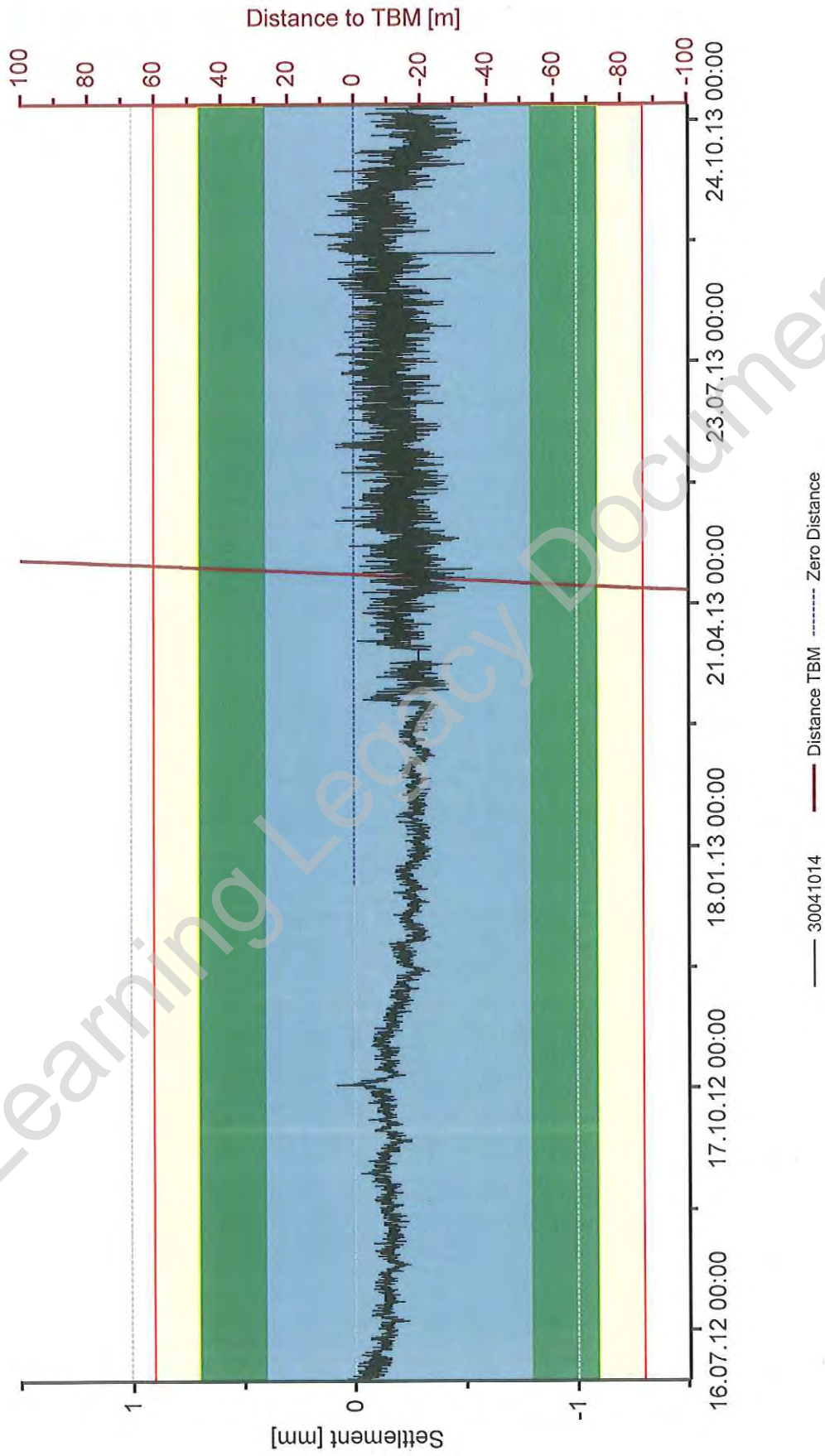
Point: 30041013



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - DLR Upline Tunnel 27.06.2012 - 30.10.2013
date: 12.08.2014 14:34 current values: 12.08.2014 14:27



Point: 30041014



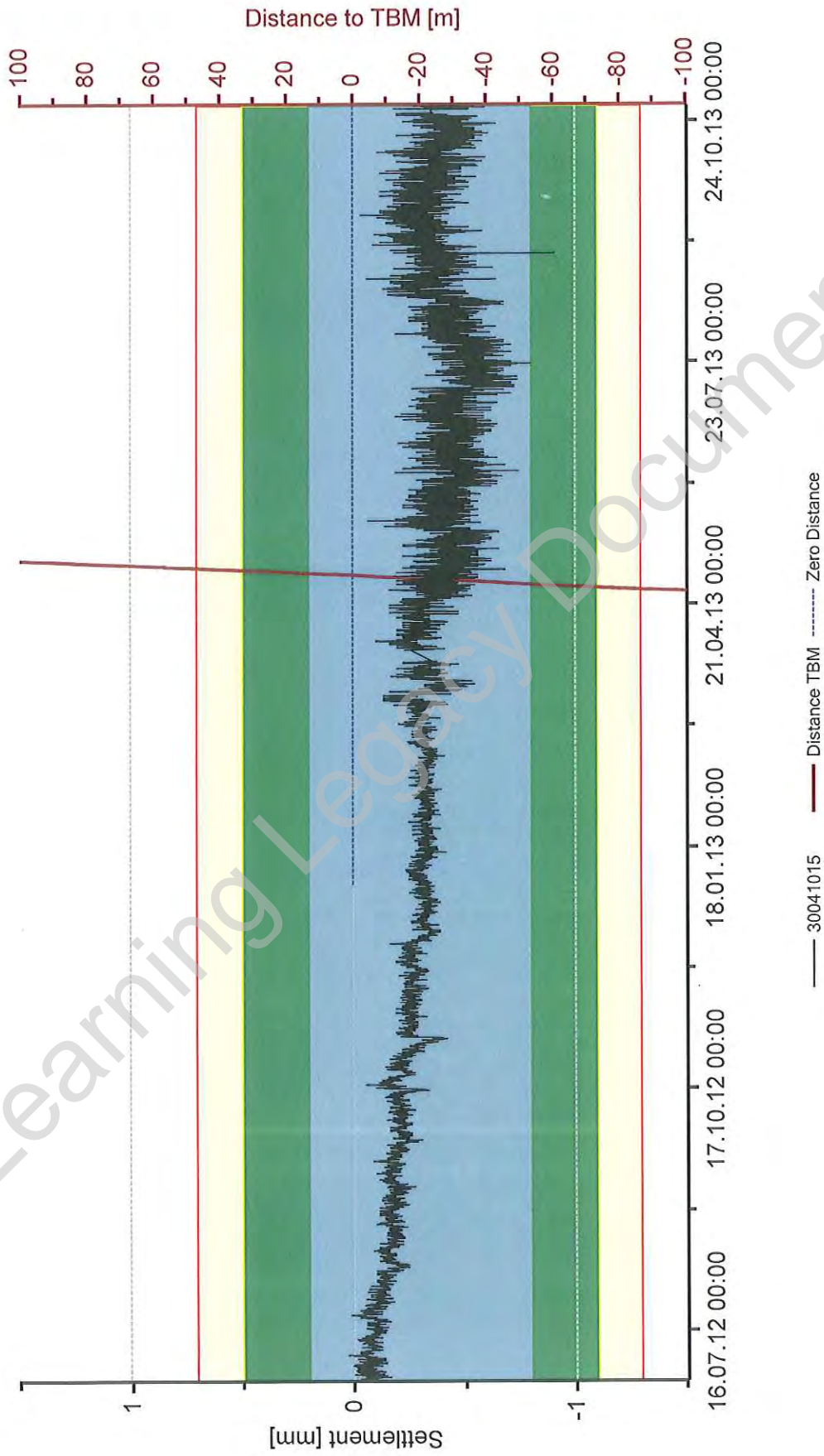
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - DLR Upline Tunnel 27.06.2012 - 30.10.2013

date: 12.08.2014 14:43 current values: 12.08.2014 14:34



Point: 30041015



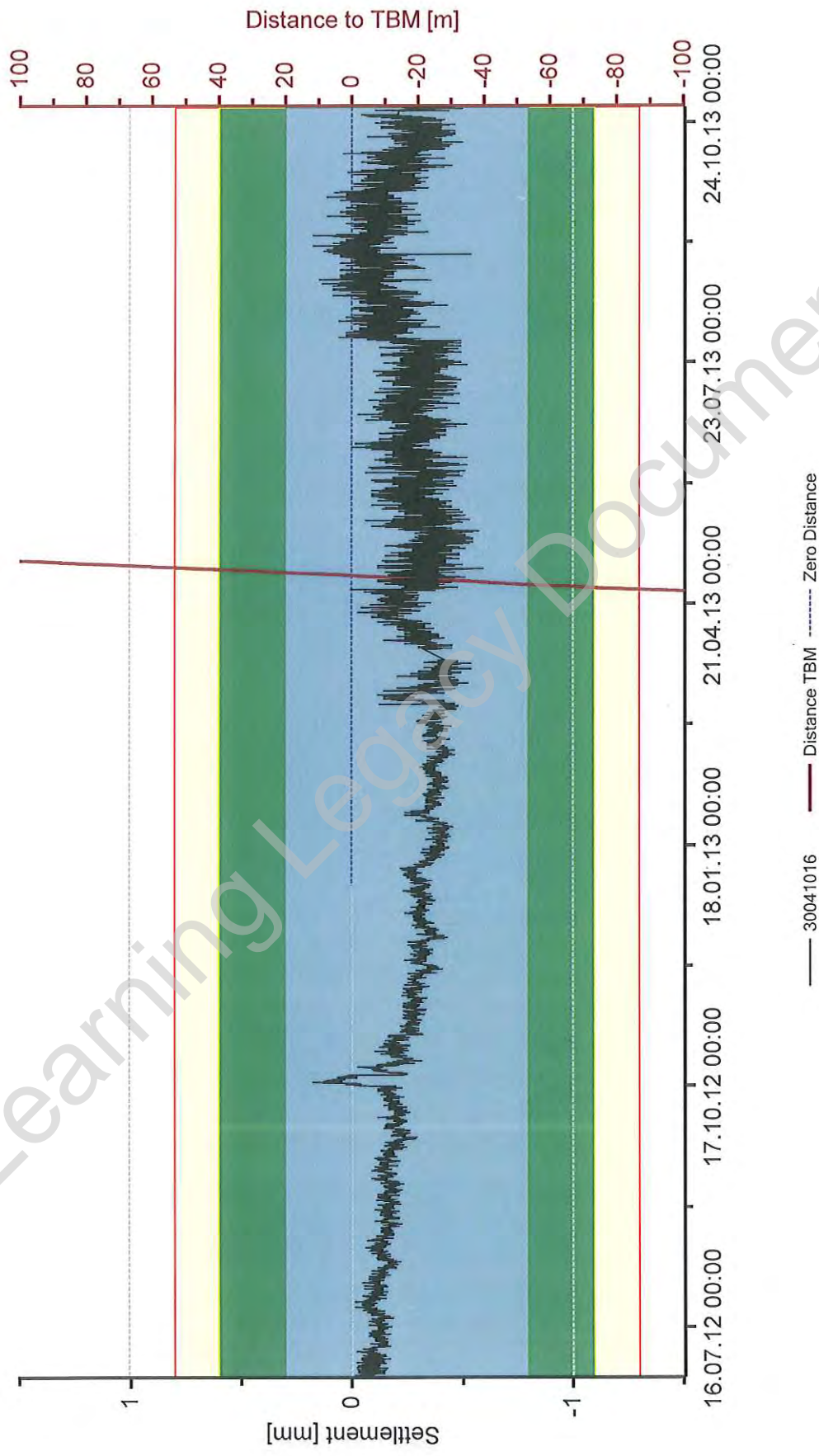
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - DLR Upline Tunnel 27.06.2012 - 30.10.2013

date: 12.08.2014 14:47 current values: 12.08.2014 14:40



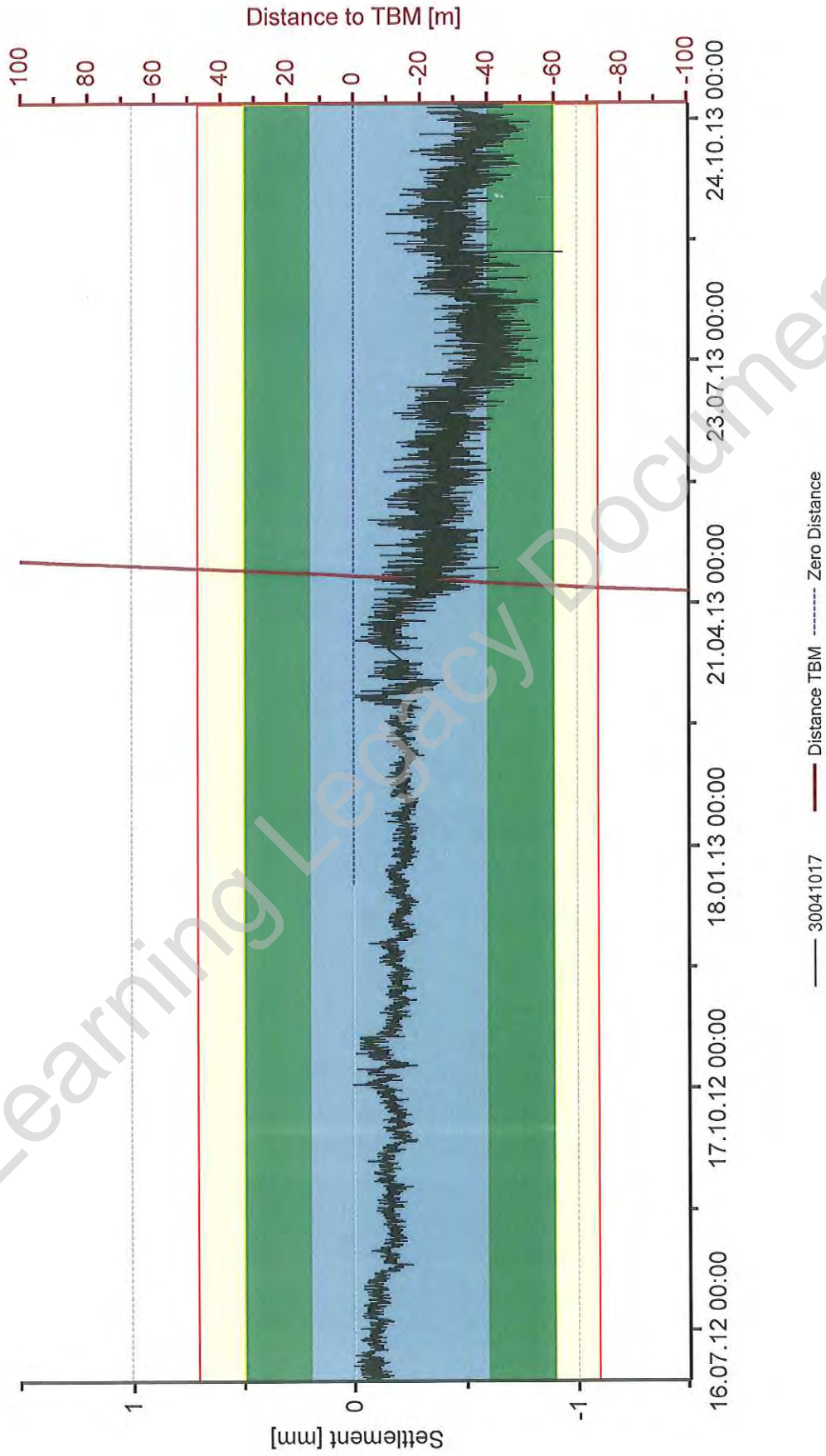
Point: 30041016



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - DLR Upline Tunnel 27.06.2012 - 30.10.2013
date: 12.08.2014 14:53 current values: 12.08.2014 14:46



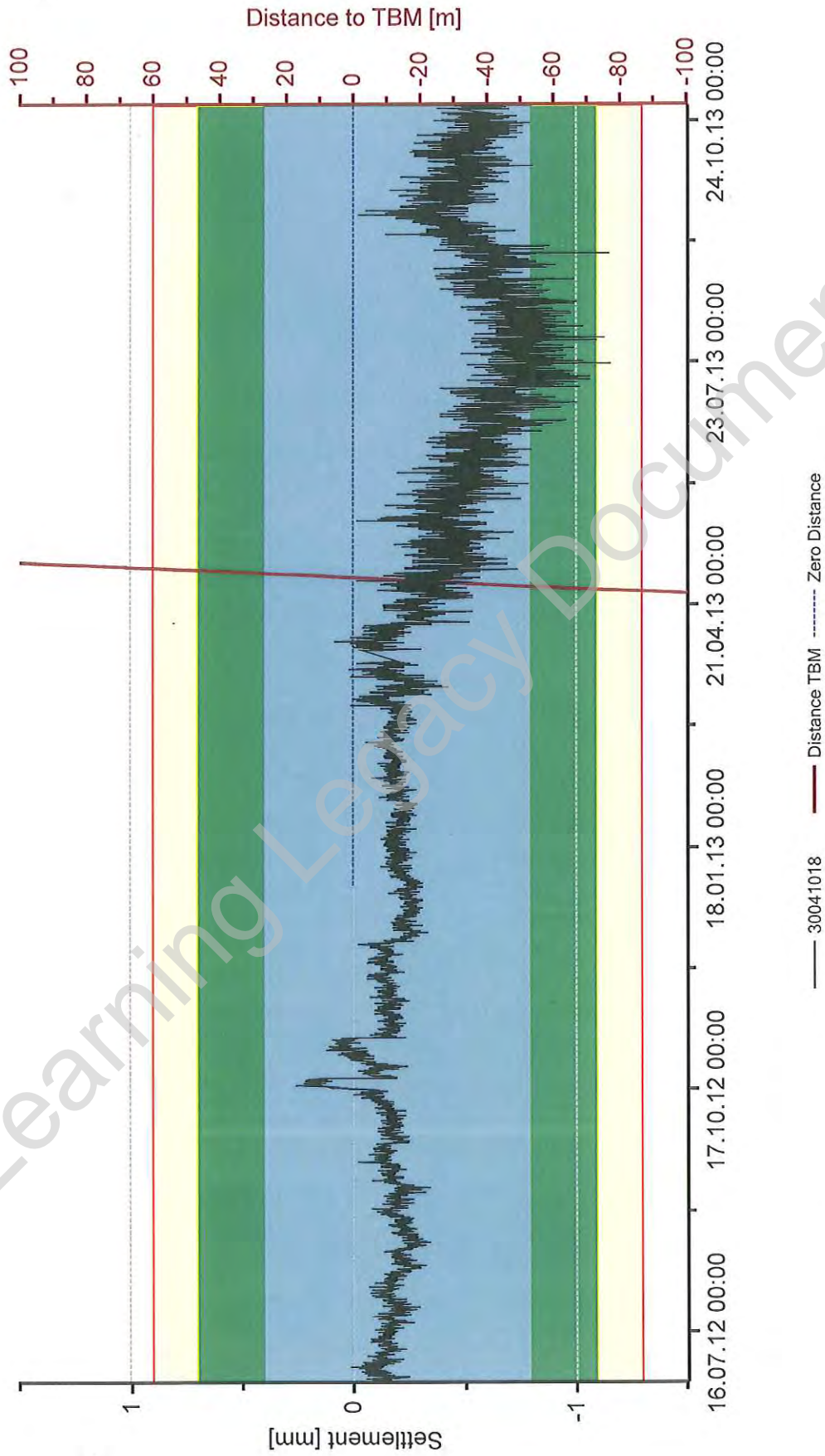
Point: 30041017



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - DLR Upline Tunnel 27.06.2012 - 30.10.2013
date: 12.08.2014 14:55 current values: 12.08.2014 14:49

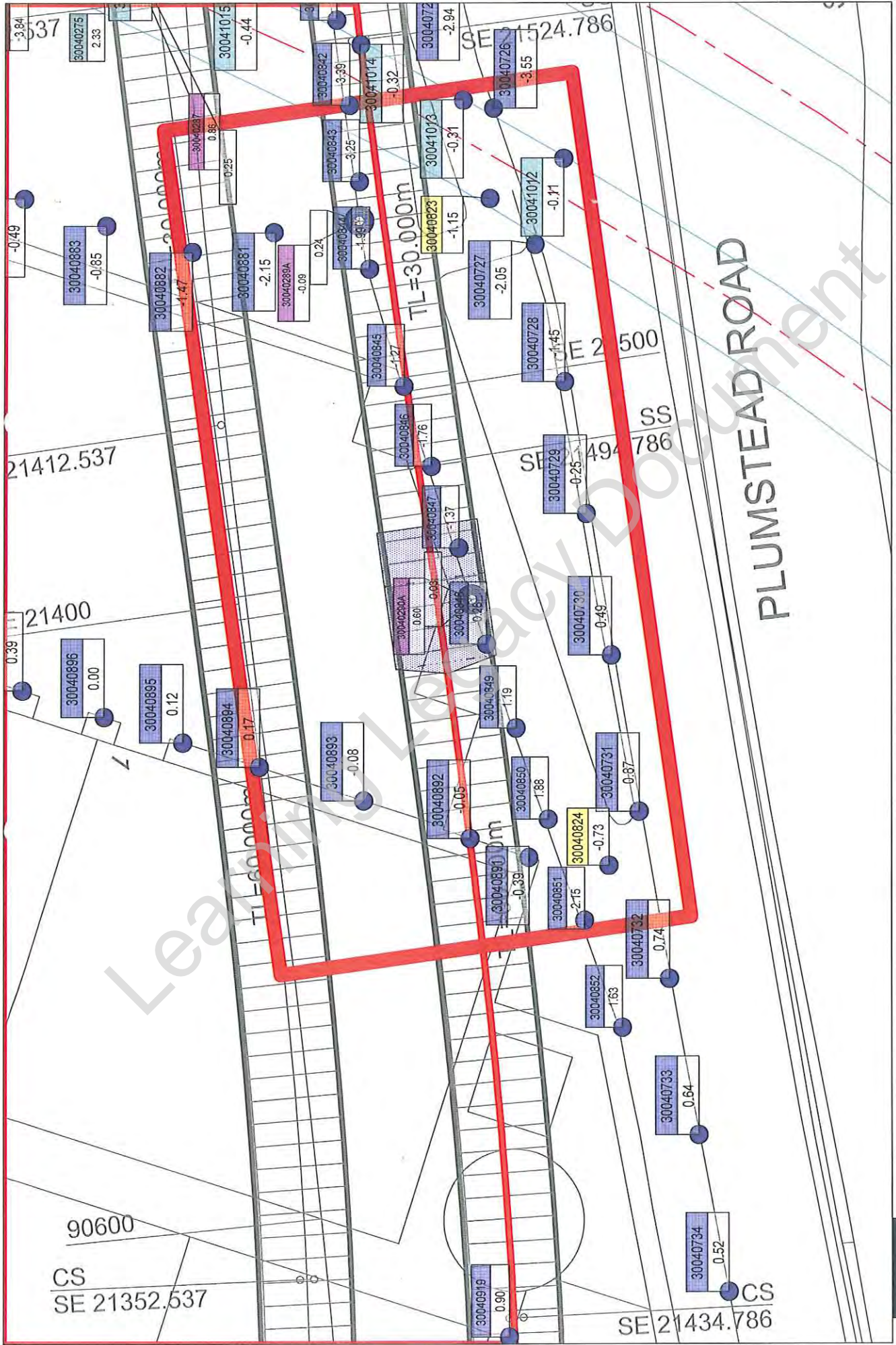


Point: 30041018

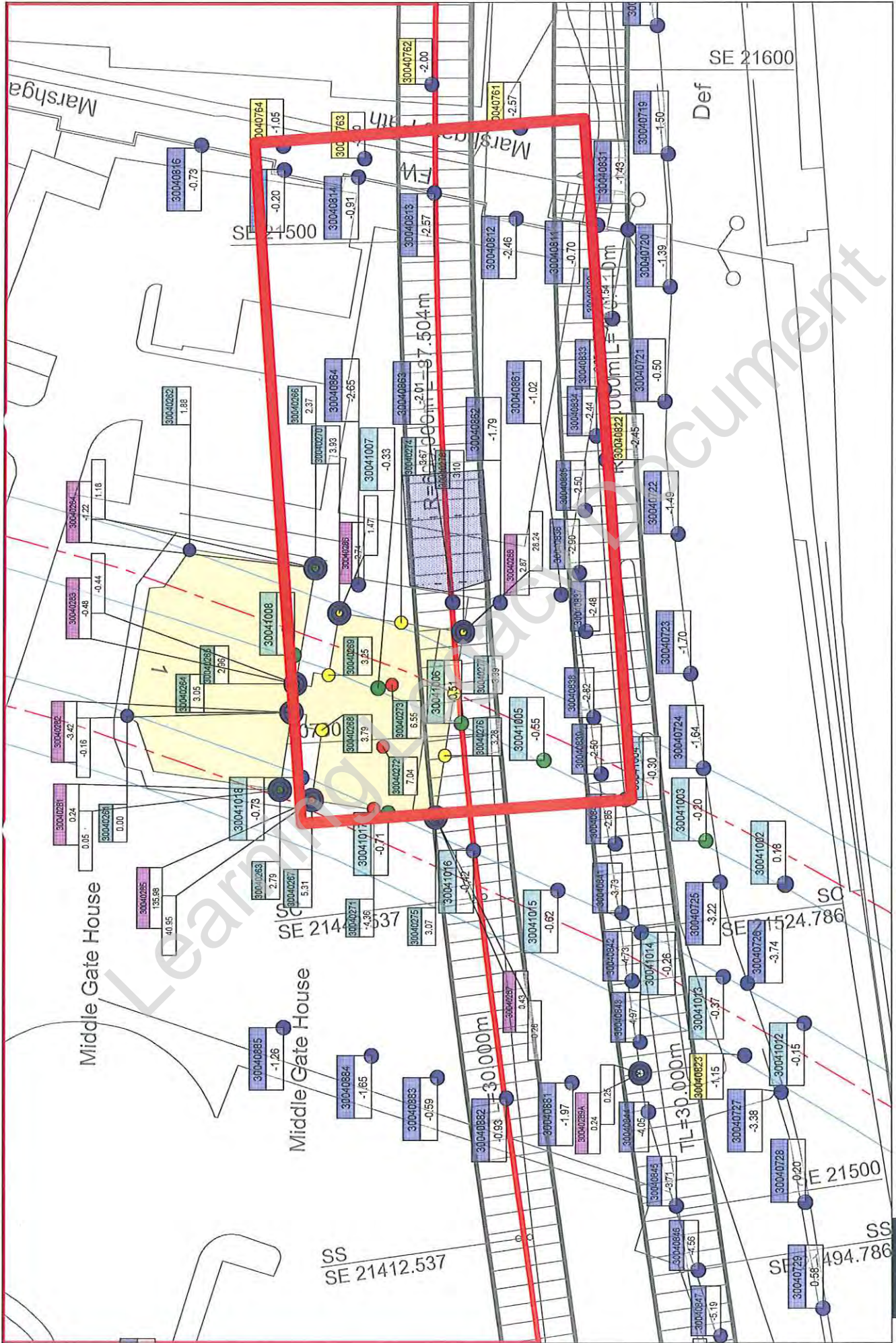


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - DLR Upline Tunnel 27.06.2012 - 30.10.2013
date: 12.08.2014 14:58 current values: 12.08.2014 14:49



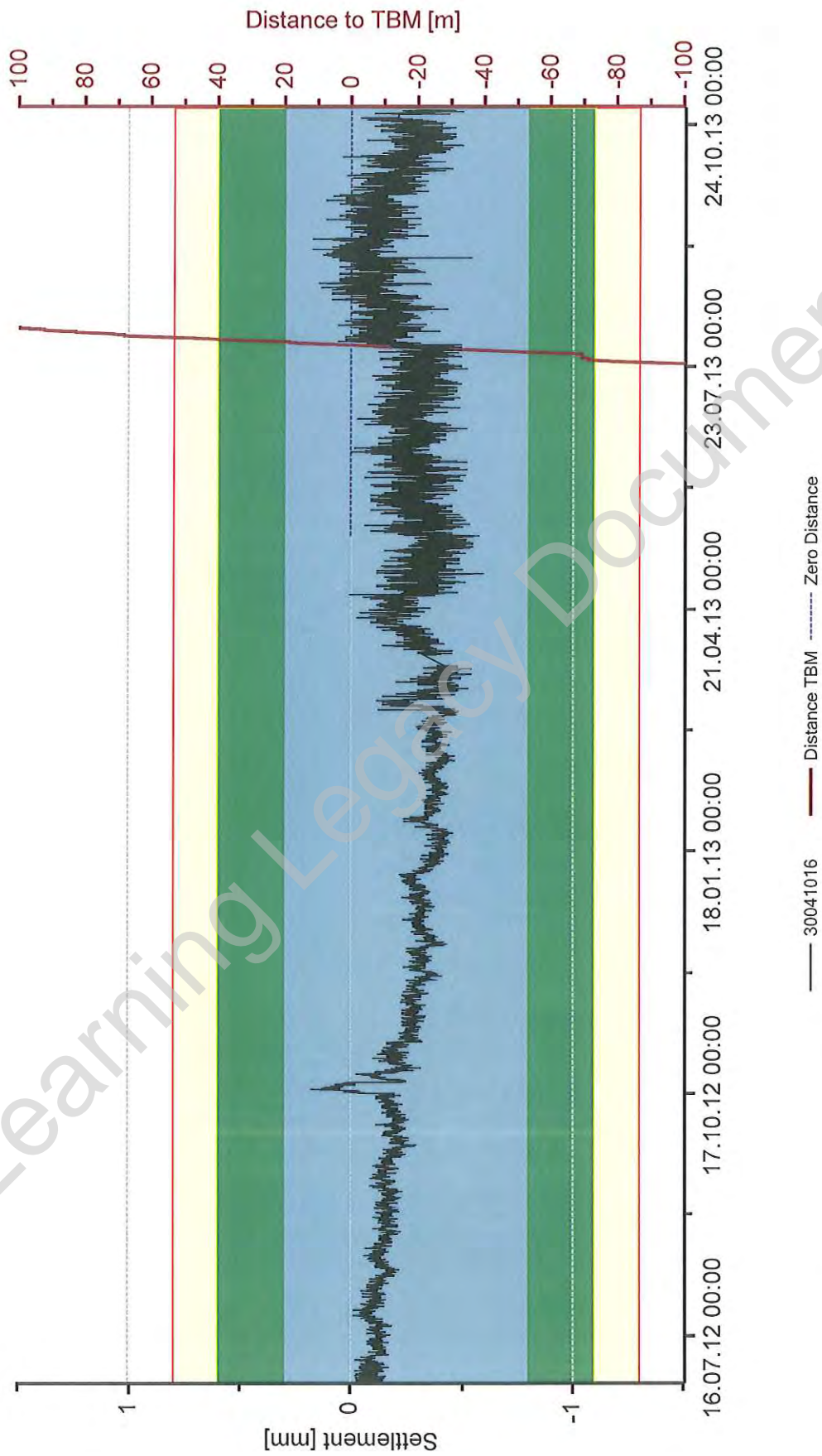


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 05.05.2013 09:00



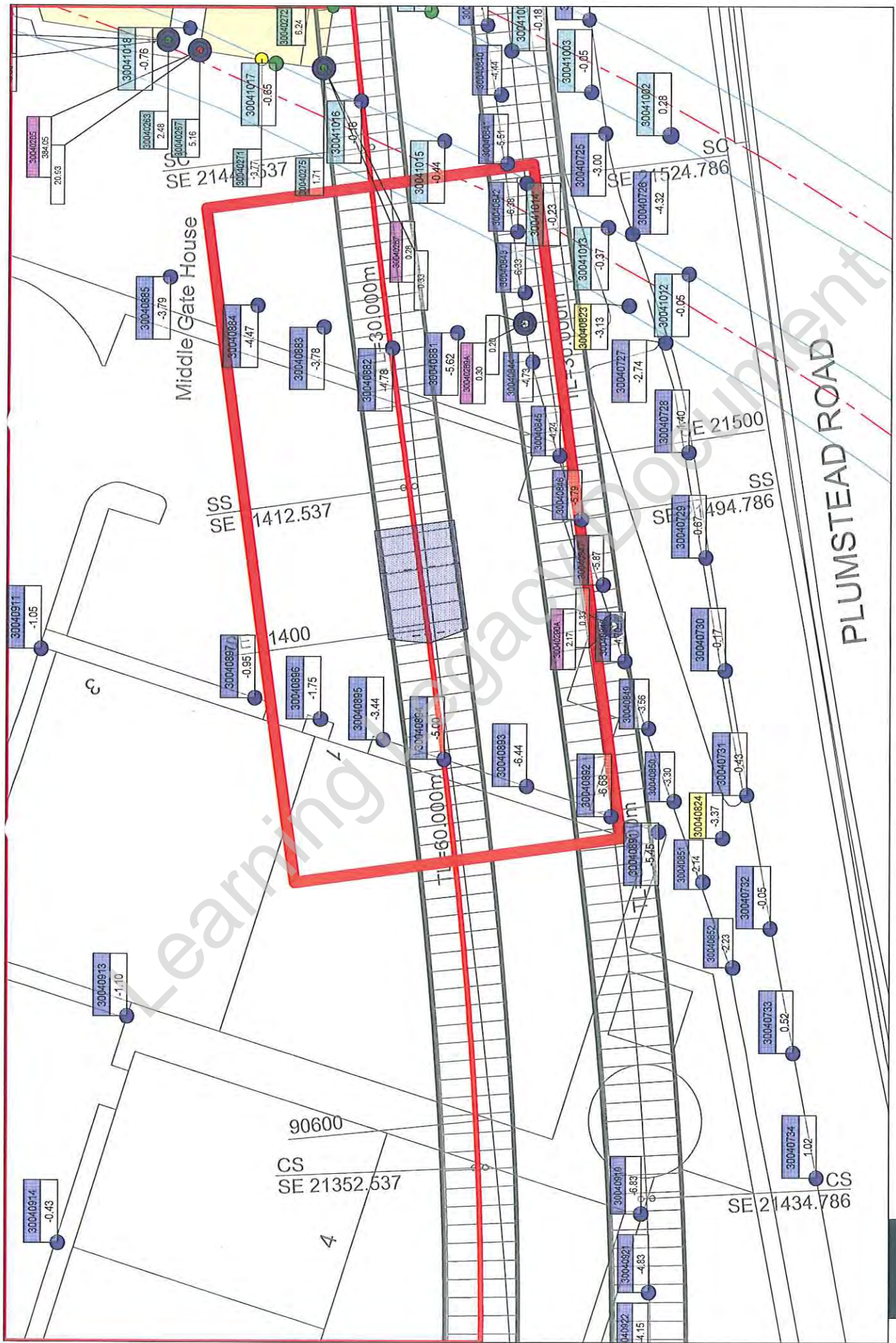
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 30.07.2013 09:09

Point: 30041016




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - DLR Upline Tunnel 27.06.2012 - 30.10.2013
date: 12.08.2014 15:03 current values: 12.08.2014 14:49





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

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

APPENDIX 47

CS10 – Footpath MGH to Plumstead Road

Learning Legacy Document

monitoring asset	Footpath MGH to Plumstead Road		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001		
name of monitoring section:	CS10 - Footpath MGH to Plumstead Road Wall		
sensor type:	manual levelling studs		
chainage:	90660	point no.:	3004 0881 - 3004 0885
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		25/03/13	0.00		
TBM 1	start ZOI	02/05/13	-0.22	3004 0881	
	end ZOI	05/05/13	-2.15	3004 0881	breached not any trigger value
TBM 2	start ZOI	31/07/13	-2.04	3004 0883	
	end ZOI	03/08/13	-4.78	3004 0883	breached not any trigger value
longterm		10/02/14	-4.20	3004 0883	

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

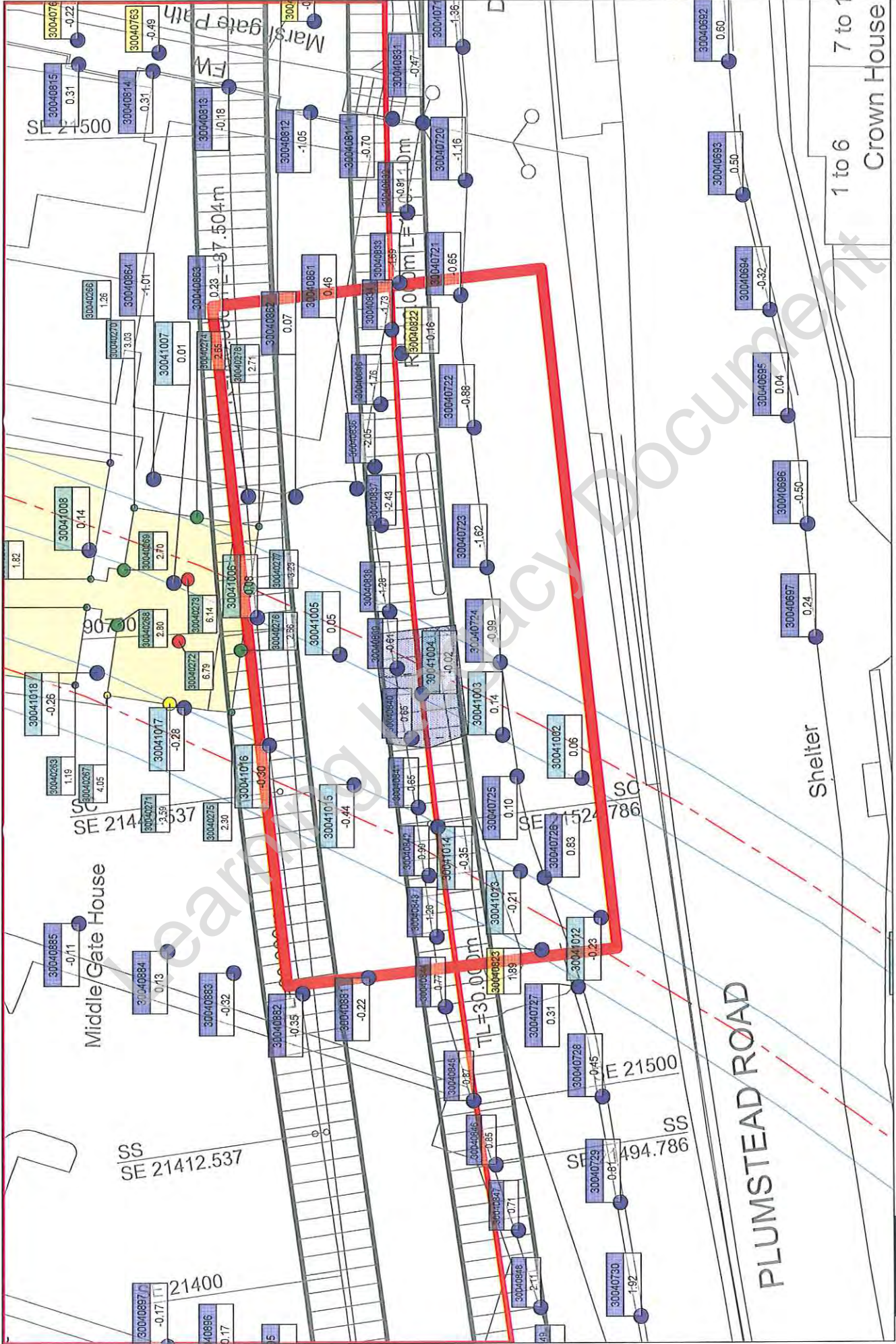
Overall, none of the points reached any trigger value.
 Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.
 The rate of change in the monitoring data is less than the required standards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

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: 02.05.2013 09:00

Point: 30040881



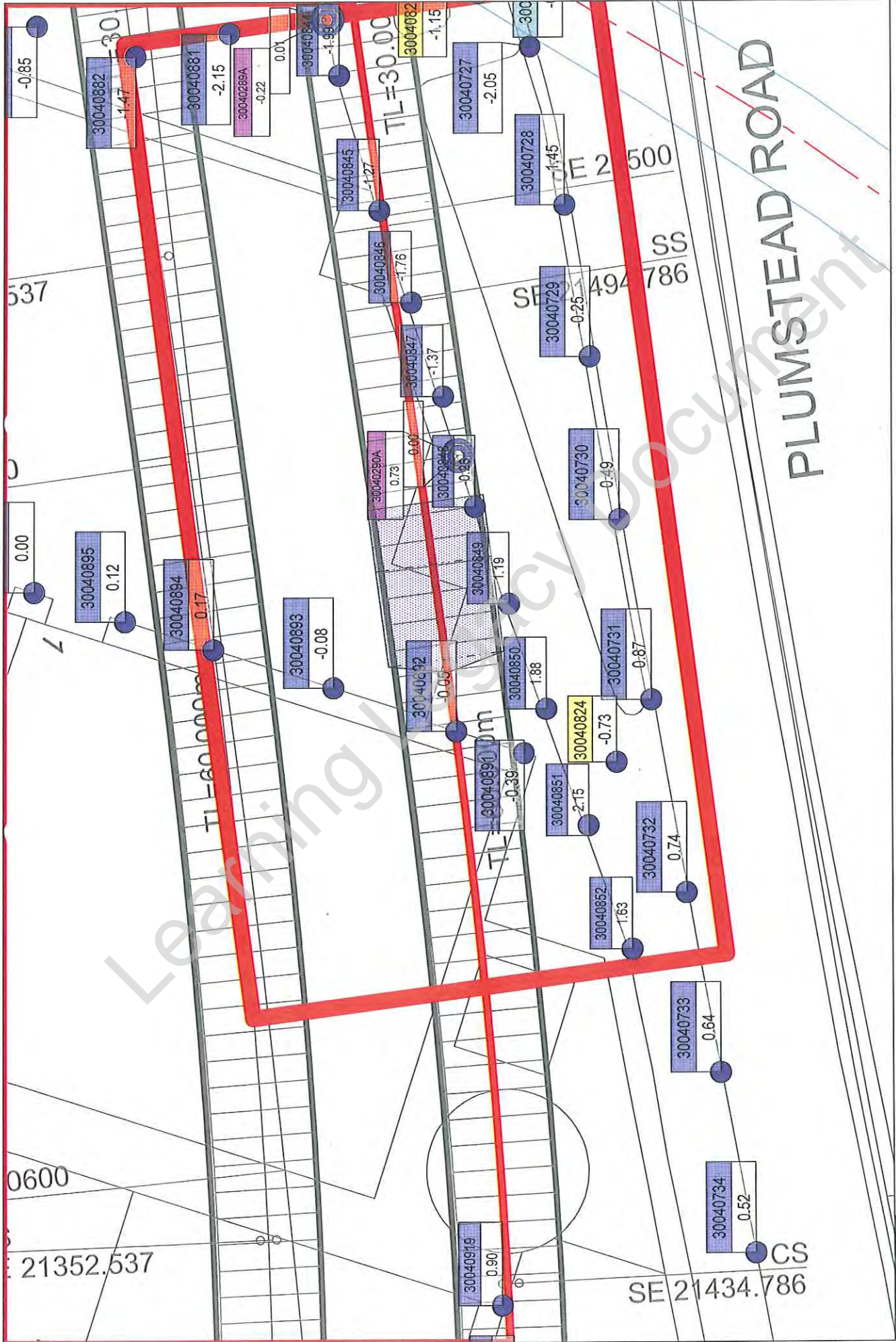
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Footpath MGH to Plumstead Road 25.03.2013 - 10.02.2014
date: 13.08.2014 08:02 current values: 13.08.2014 07:49



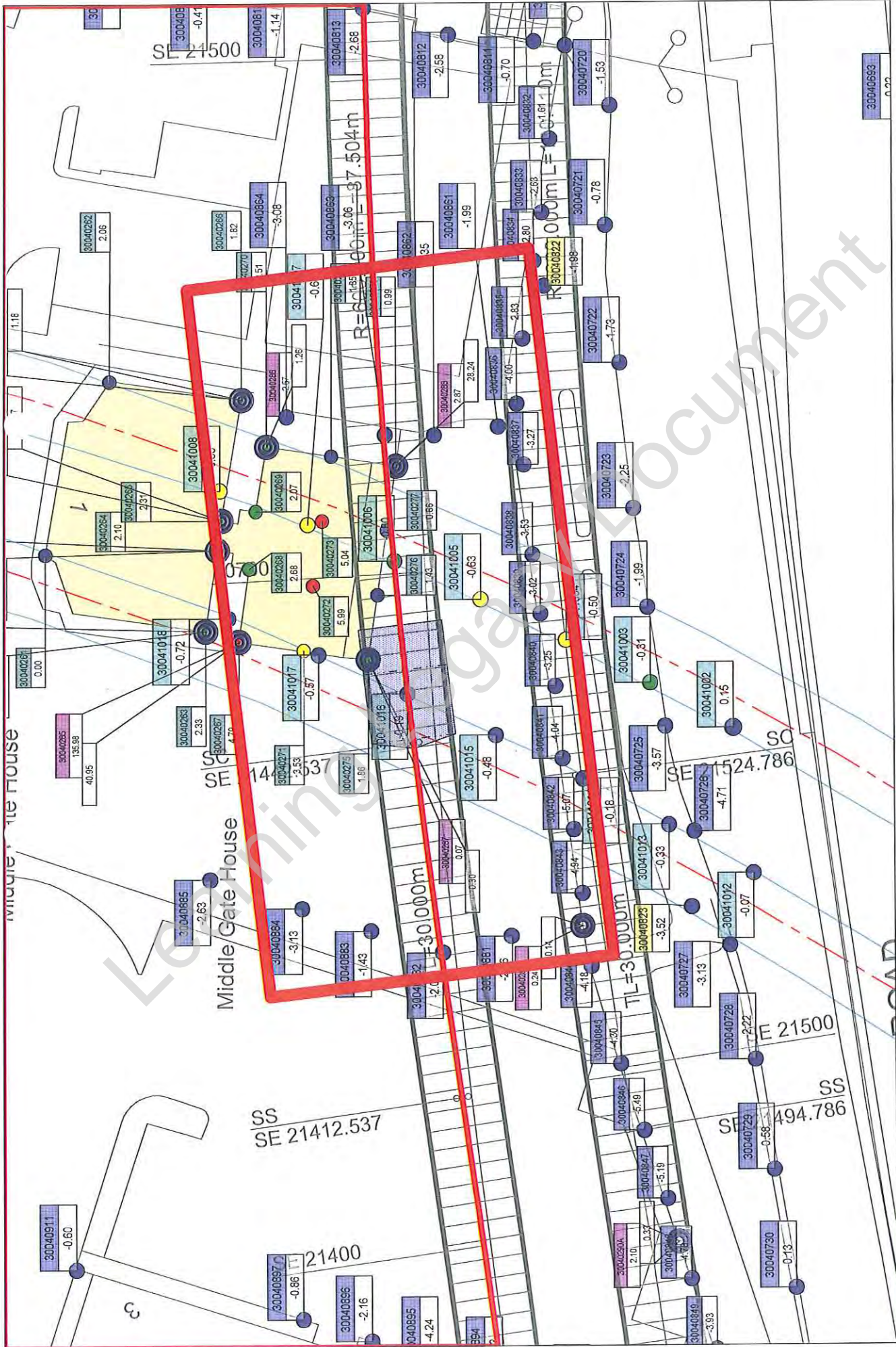
Point: 30040882



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Footpath MGH to Plumstead Road 25.03.2013 - 10.02.2014
date: 13.08.2014 08:05 current values: 13.08.2014 07:49



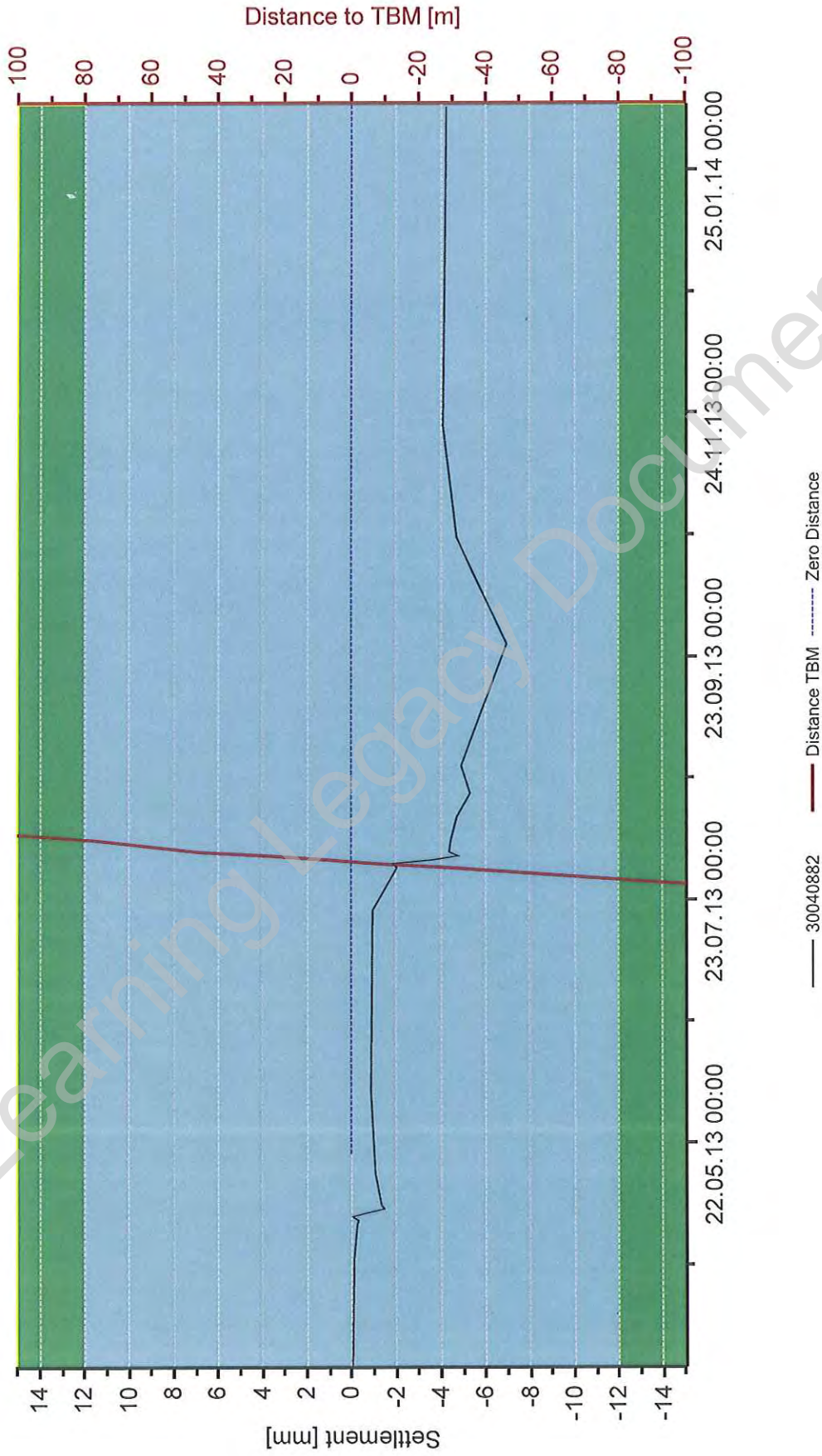
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 05.05.2013 17:59



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 31.07.2013 20:19

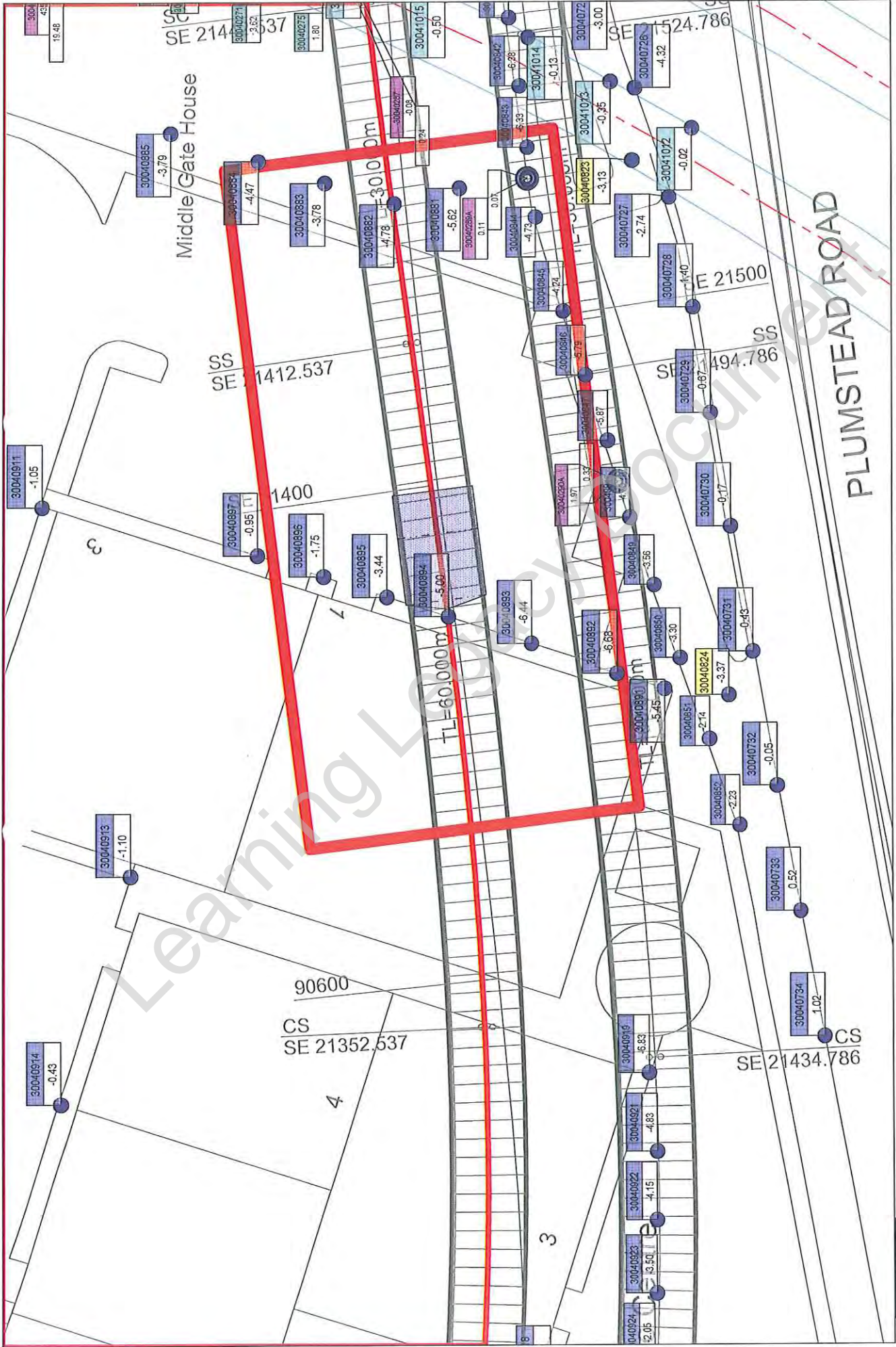


Point: 30040882



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Footpath MGH to Plumstead Road 25.03.2013 - 10.02.2014
date: 13.08.2014 08:12 current values: 13.08.2014 08:04





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 18:06



Joint Venture

project: C310 Thames Tunnel
structure: CS Footpath MGH / Plumstead Road Wall

Joint Venture

project: C310 Thames Tunnel
structure: CS Footpath MGH / Plumstead Road Wall

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	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	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 0881	106.542	2003/2013	106.542	0	106.541	-1	106.542	0	106.540	-1	106.540	-1	106.539	-2	106.540	-1	106.540	0	106.540	0	106.540	0	106.540	0	106.539	-1	106.539	-1	-3
3004 0882	106.240	2003/2013	106.240	0	106.240	0	106.239	0	106.239	0	106.240	0	106.238	-1	106.239	0	106.239	0	106.239	0	106.239	0	106.239	0	106.238	-1	106.238	-1	-2
3004 0883	106.080	2003/2013	106.080	0	106.080	0	106.080	0	106.080	0	106.080	0	106.080	0	106.079	-1	106.079	0	106.079	1	106.080	0	106.080	0	106.079	0	106.079	-1	-1
3004 0884	105.931	2003/2013	105.931	0	105.931	0	105.931	0	105.931	0	105.931	0	105.930	-1	105.930	0	105.930	0	105.930	0	105.930	0	105.931	0	105.929	-2	105.928	-1	-3
3004 0885	105.737	2003/2013	105.737	0	105.737	0	105.737	0	105.736	-1	105.737	0	105.736	-1	105.736	0	105.736	0	105.737	0	105.737	0	105.737	0	105.735	-2	105.734	-1	-3

Legacy Document

Joint Venture


project: C310 Thames Tunnel
structure: CS Footpath MGH / Plumstead Road Wall

Joint Venture

project: C310 Thames Tunnel
structure: CS Footpath MGH / Plumstead Road Wall

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	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	
3004 0881	105.542	26/2/13	105.539	0	105.537	-1	105.536	-1	105.537	0	105.536	0	105.536	0	105.536	0	105.534	-2	105.537	2	105.537	1	105.537	0	-5
3004 0882	105.240	01/08/2013	105.238	0	105.236	-2	105.235	-1	105.235	0	105.235	0	105.235	0	105.234	-1	105.233	-2	105.235	2	105.235	1	105.236	0	-4
3004 0883	105.080	02/08/2013	105.079	0	105.077	-2	105.076	-1	105.077	0	105.076	0	105.076	0	105.076	-1	105.074	-3	105.076	3	105.076	0	105.077	0	-3
3004 0884	105.931	01/08/2013	105.928	0	105.927	-1	105.926	-1	105.926	0	105.926	0	105.926	0	105.925	-1	105.924	-2	105.927	3	105.927	3	105.928	1	-2
3004 0885	105.737	01/08/2013	105.734	0	105.733	-1	105.733	-1	105.733	-1	105.733	0	105.733	0	105.732	-1	105.732	-1	105.732	3	105.734	3	105.735	1	0

Engineering Legacy Document

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

APPENDIX 48
CS11 – I/O Centre

Learning Legacy Document

monitoring asset

Walkway infront of I/O Center

reference monitoring drawing:

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

name of monitoring section:

CS11 - I/O Center

sensor type:

manual levelling studs

chainage:

90630

point no.:

3004 0891 - 3004 0897

trigger values:

[mm]

green: +22
-22

amber: +28
-28

red: +35
-35

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	25/03/13		0.00		
TBM 1	start ZOI	04/05/13	0.36	3004 0892	
	end ZOI	08/05/13	-5.55	3004 0892	breached not any trigger value
TBM 2	start ZOI	02/08/13	-5.57	3004 0894	
	end ZOI	07/08/13	-9.54	3004 0894	breached not any trigger value
longterm	20/02/14		-10.56	3004 0894	

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

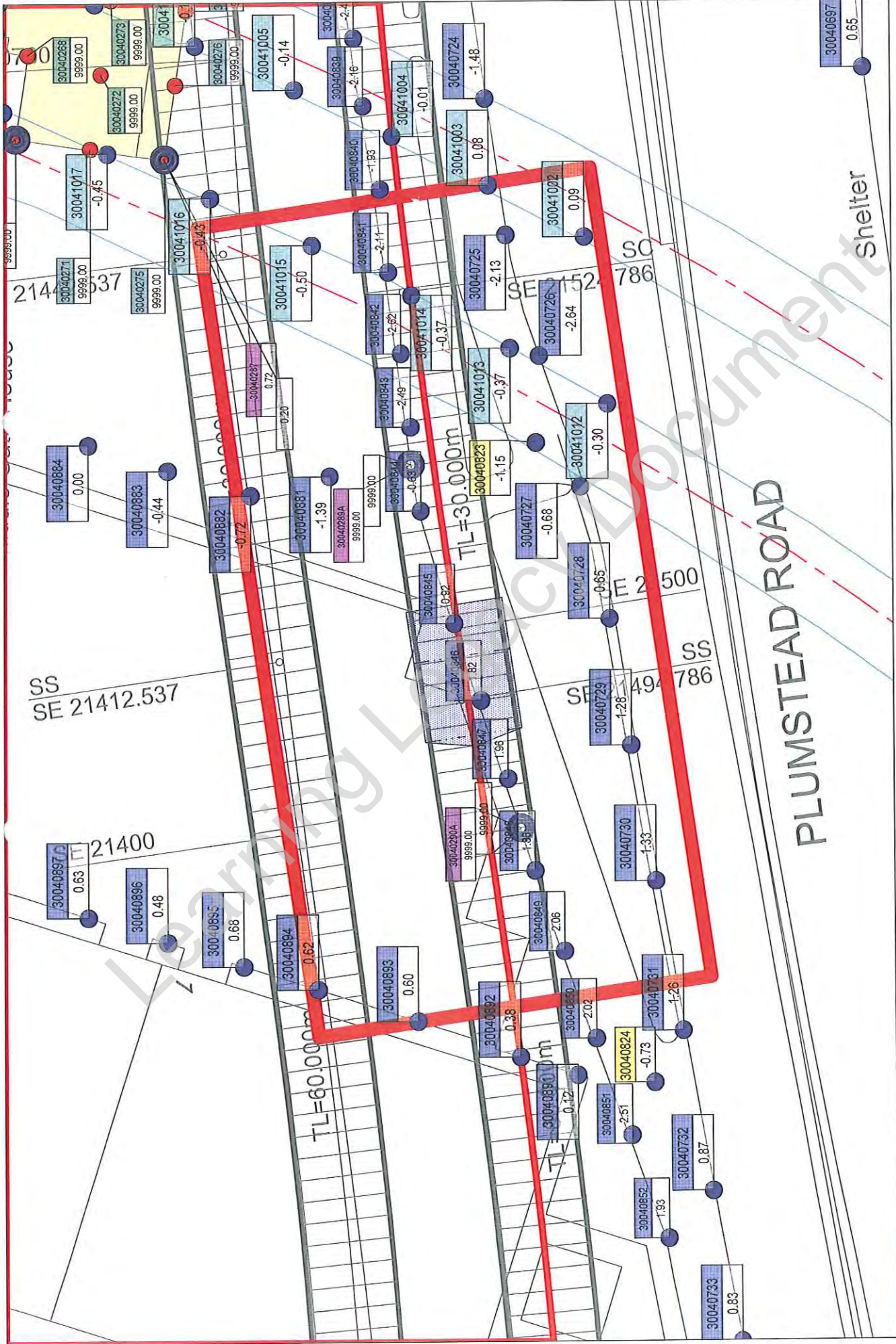
Overall, none of the points reached any trigger value.
Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.
The rate of change in the monitoring data is less than the required standards 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: 04.05.2013 16:25

Point: 30040892



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

Close Out Report: WB Tunnel - CS11 - I/O Center 25.03.2013 - 20.02.2014

date: 13.08.2014 10:33 current values: 13.08.2014 10:18



Point: 30040894

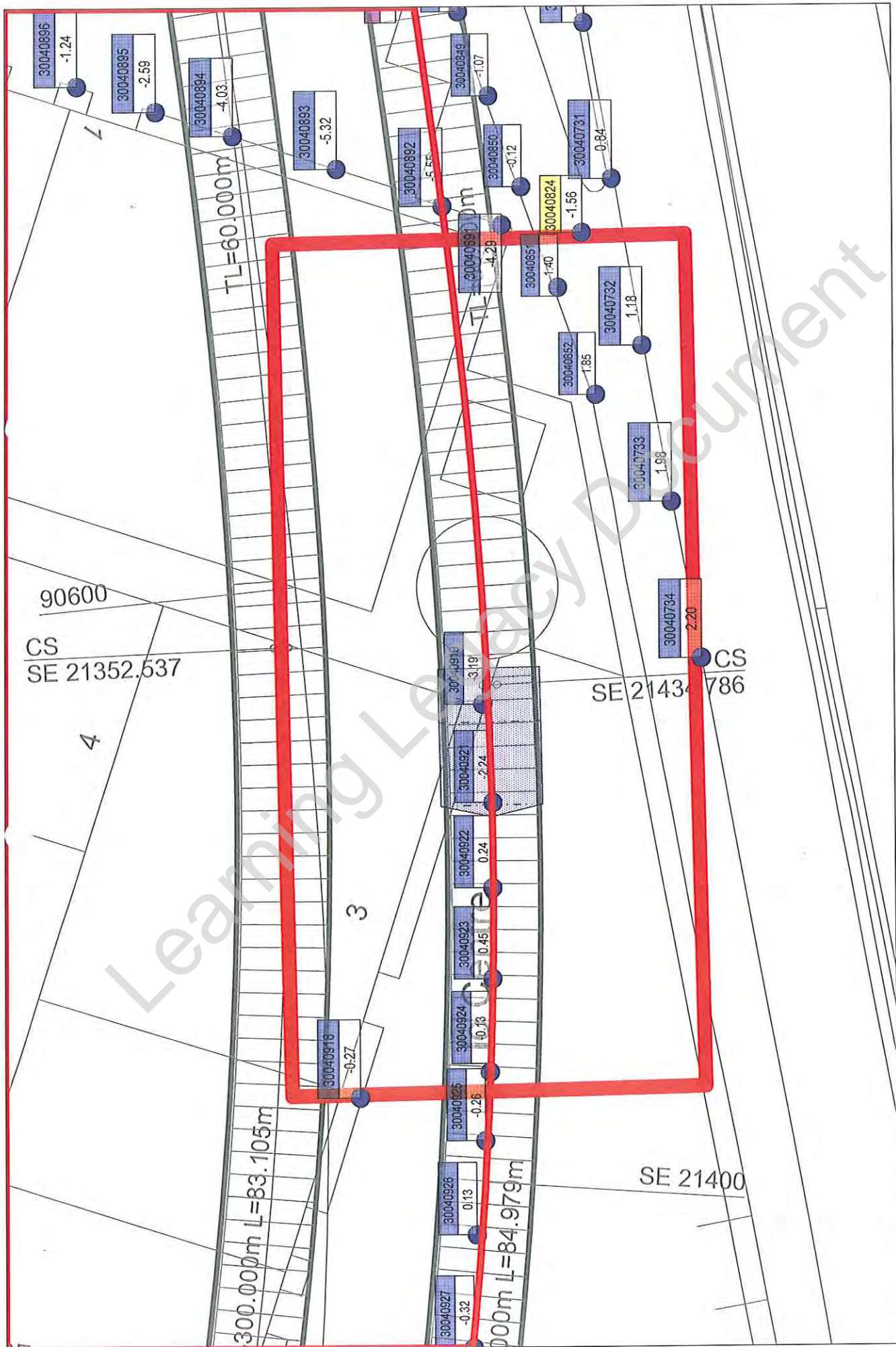


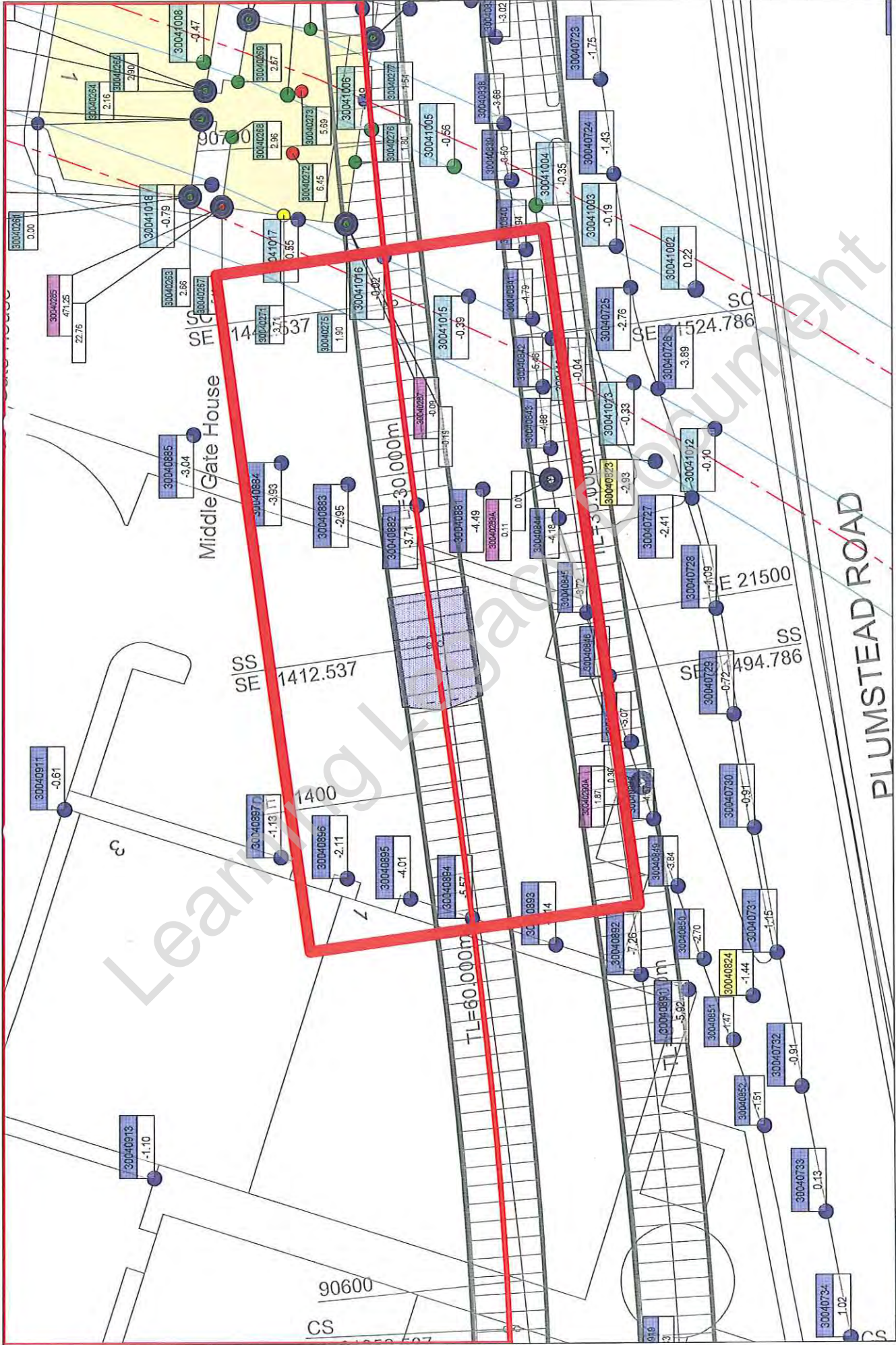
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - CS11 - I/O Center 25.03.2013 - 20.02.2014

date: 13.08.2014 10:36 current values: 13.08.2014 10:18







Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 02.08.2013 18:44



Point: 30040894



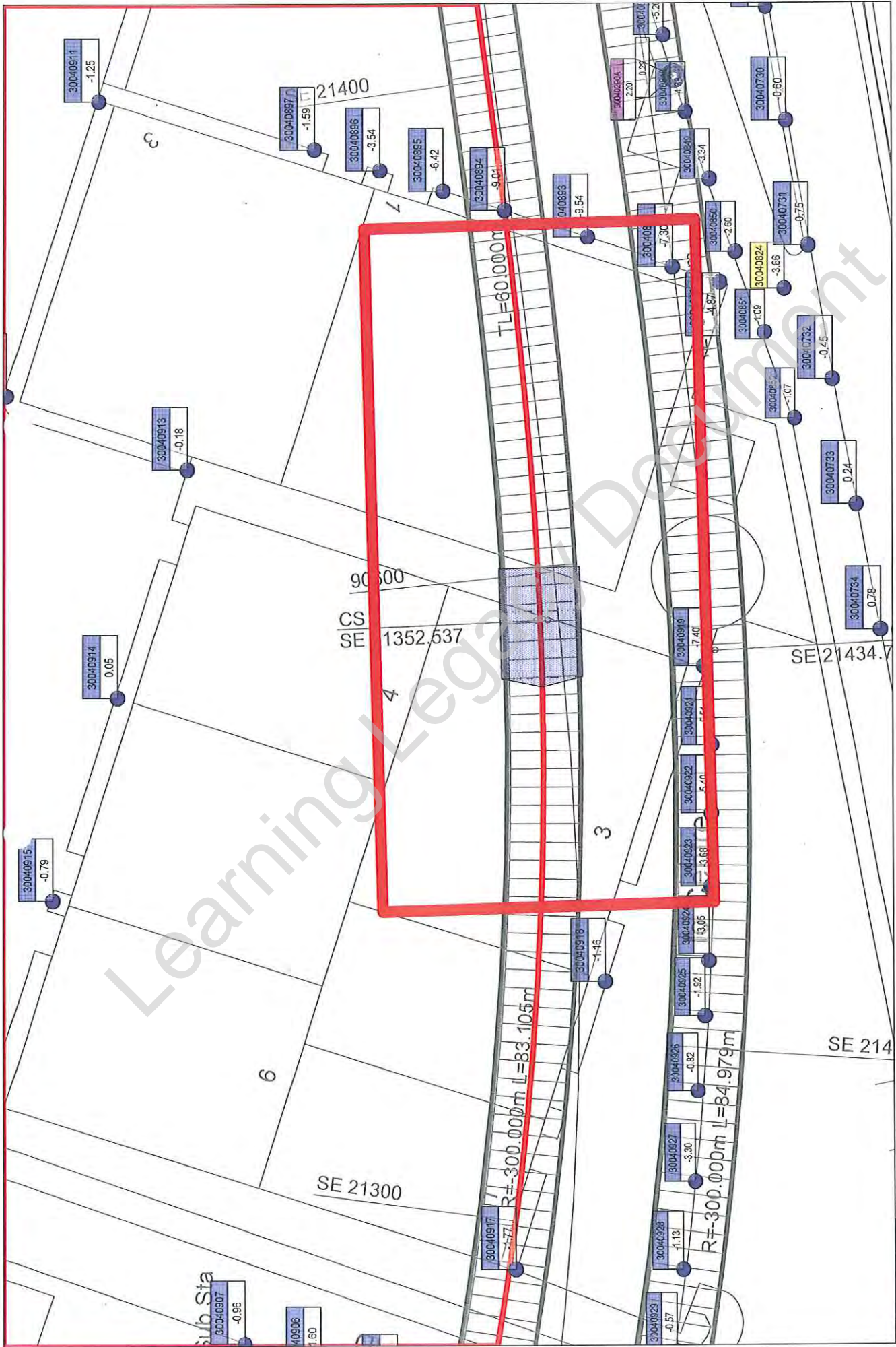
— 30040894 — Distance TBM - - - - - Zero Distance

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

Close Out Report: EB Tunnel - CS11 - I/O Center 25.03.2013 - 20.02.2014

date: 13.08.2014 10:42 current values: 13.08.2014 10:33





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 07.08.2013 09:00



Joint Venture

project: C310 Thames Tunnel

Joint Venture

project: C310 Thames Tunnel

Joint Venture

No. of reading	date	1. following		2. following		3. following		4. following		5. following		5. 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 0891	25/01/13	105.829	0	105.829	-1	105.826	-1	105.829	0	105.829	0	105.827	-1	105.826	-2	105.825	-1	105.824	0	105.824	-1	105.824	0	105.824	0	105.824	0
3004 0892	25/01/13	105.827	0	105.827	-1	105.828	0	105.828	0	105.827	0	105.825	-3	105.822	-3	105.821	-5	105.822	-1	105.821	-5	105.821	0	105.821	0	105.820	-7
3004 0893	22/04/2013	105.798	0	105.798	-1	105.798	0	105.799	0	105.798	-1	105.798	-2	105.793	-2	105.793	-5	105.793	0	105.792	-6	105.792	-1	105.791	-7	105.791	0
3004 0894	22/04/2013	105.828	0	105.828	-1	105.829	0	105.829	0	105.829	0	105.829	-2	105.824	-2	105.824	-4	105.824	0	105.824	0	105.824	0	105.823	-1	105.823	-5
3004 0895	22/04/2013	105.828	1	105.827	-1	105.828	0	105.828	0	105.828	-1	105.826	-1	105.825	-1	105.825	-2	105.825	-1	105.825	0	105.825	0	105.825	-1	105.824	-4
3004 0896	22/04/2013	105.726	1	105.726	-1	105.727	0	105.726	0	105.726	0	105.725	0	105.724	0	105.724	0	105.724	0	105.724	0	105.724	0	105.724	-1	105.724	0
3004 0897	22/04/2013	105.826	1	105.826	-1	105.827	0	105.827	0	105.827	0	105.826	-1	105.825	0	105.825	0	105.825	0	105.825	0	105.825	0	105.825	0	105.825	-1

Legacy Document

Joint Venture

project: C310 Thames Tunnel
structure: CS 1/c Centre

Joint Venture

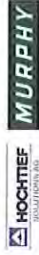
project: C310 Thames Tunnel
structure: CS 1/c Centre

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			
3004 0891	105.829	105.823	0	-6	105.824	0	-5	105.824	-1	-6	105.824	0	-5	105.825	0	-4	105.825	0	-4	105.825	0	-5	105.824	0	-5	105.824	-1	-6
3004 0892	105.827	105.820	0	-7	105.821	1	-7	105.820	-1	-8	105.820	0	-8	105.820	0	-7	105.820	0	-7	105.820	0	-7	105.820	0	-7	105.819	-1	-8
3004 0893	105.798	105.791	-1	-7	105.791	1	-6	105.789	-1	-9	105.788	0	-10	105.788	0	-10	105.788	0	-10	105.788	0	-10	105.788	0	-10	105.787	-1	-11
3004 0894	105.828	105.823	0	-5	105.823	1	-5	105.820	-1	-9	105.819	-1	-9	105.819	0	-9	105.819	0	-9	105.819	0	-9	105.819	0	-9	105.818	0	-10
3004 0895	105.828	105.824	0	-4	105.824	1	-3	105.822	-1	-6	105.821	-1	-7	105.821	0	-6	105.821	0	-6	105.821	0	-7	105.820	0	-7	105.820	0	-7
3004 0896	105.726	105.724	0	-2	105.724	0	-2	105.722	0	-3	105.722	0	-4	105.722	0	-4	105.722	0	-4	105.722	0	-4	105.722	0	-4	105.722	0	-4
3004 0897	105.830	105.825	0	-1	105.825	0	-1	105.825	0	-2	105.825	0	-1	105.825	0	-2	105.824	0	-2	105.824	0	-2	105.824	0	-2	105.824	0	-2

Legacy Document

monitoring table




Joint Venture

project: C310 Thames Tunnel
structure: CS10 Centre

No. of reading	baseline	25. following		26. following		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
		25/01/10	10/01/2010	20/02/2014	20/02/2014								
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 0891	105.829	105.824	0 -6	105.823	-1 -6								
3004 0892	105.827	105.819	0 -8	105.819	0 -8								
3004 0893	105.798	105.787	0 -11	105.787	0 -11								
3004 0894	105.828	105.818	0 -10	105.818	0 -11								
3004 0895	105.828	105.820	0 -7	105.820	0 -8								
3004 0896	105.726	105.722	0 -4	105.722	0 -4								
3004 0897	105.825	105.825	0 -1	105.825	0 -1								

Legacy Document

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

APPENDIX 49
I/O Centre Building

Learning Legacy Document

monitoring asset	I/O Center Building		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70001 C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	I/O Center Building		
sensor type:	manual levelling studs		
chainage:	90540 - 90630	point no.:	3004 0911 - 3004 0919
trigger values: [mm]	green: +22 -22	amber: +28 -28	red: +35 -35
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	25/03/13	0.00		
TBM 1	start ZOI	06/05/13 09/05/13	0.60 -1.48	3004 0919 3004 0917
	end ZOI	09/05/13 14/05/13	-6.19 -1.75	3004 0919 3004 0917
TBM 2	start ZOI	02/08/13 08/08/13	-0.61 -1.80	3004 0911 3004 0917
	end ZOI	05/08/13 11/08/13	-1.23 -1.61	3004 0911 3004 0917
longterm		20/02/14	-0.03 -0.23	3004 0911 3004 0917

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

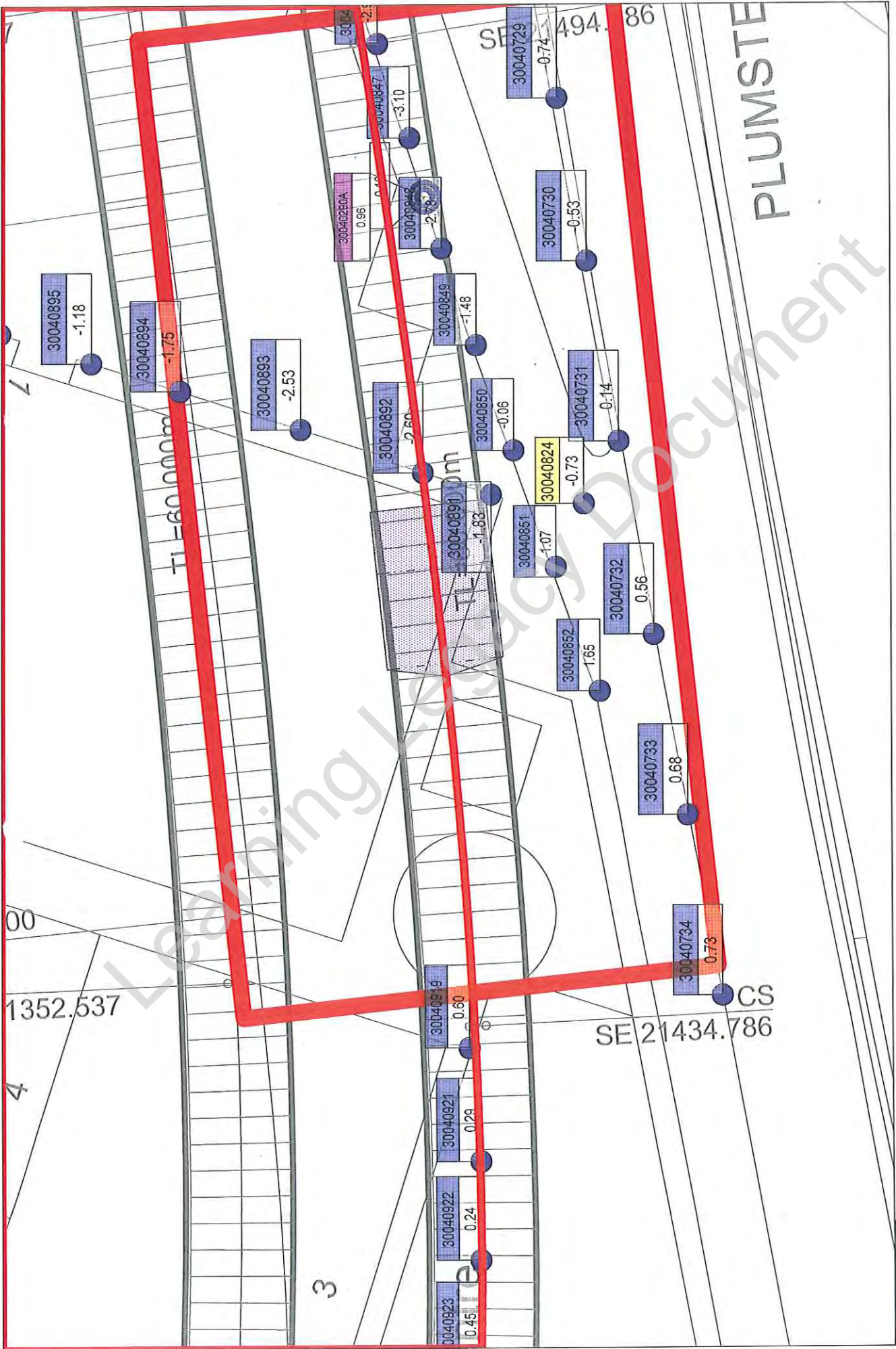
Overall, none of the points reached any trigger value.
Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.
The rate of change in the monitoring data is less than the required standards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

date / signature: 12/01/15

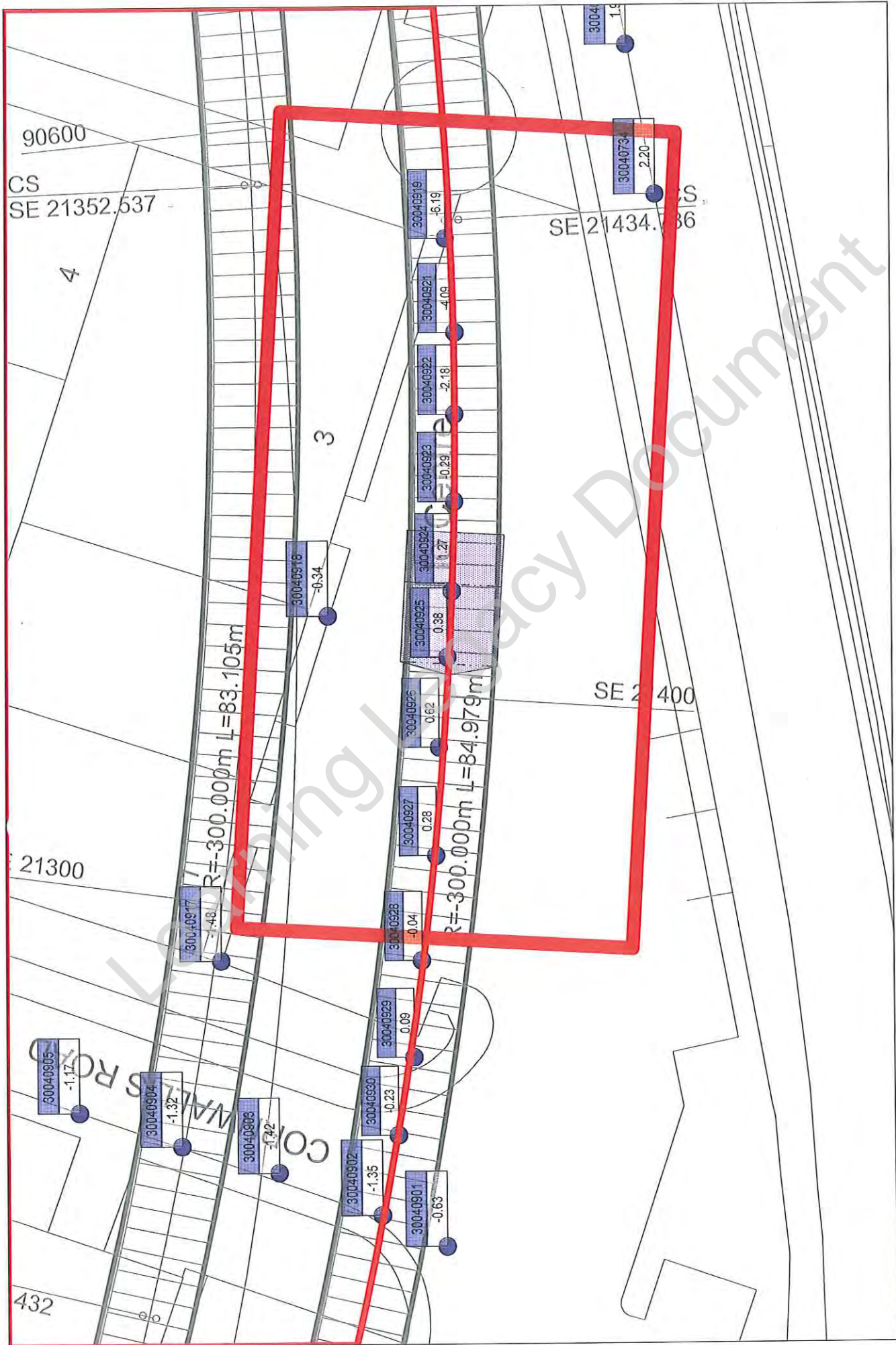
print name:

HMJV project role:

Monitoring & Survey engineer



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



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

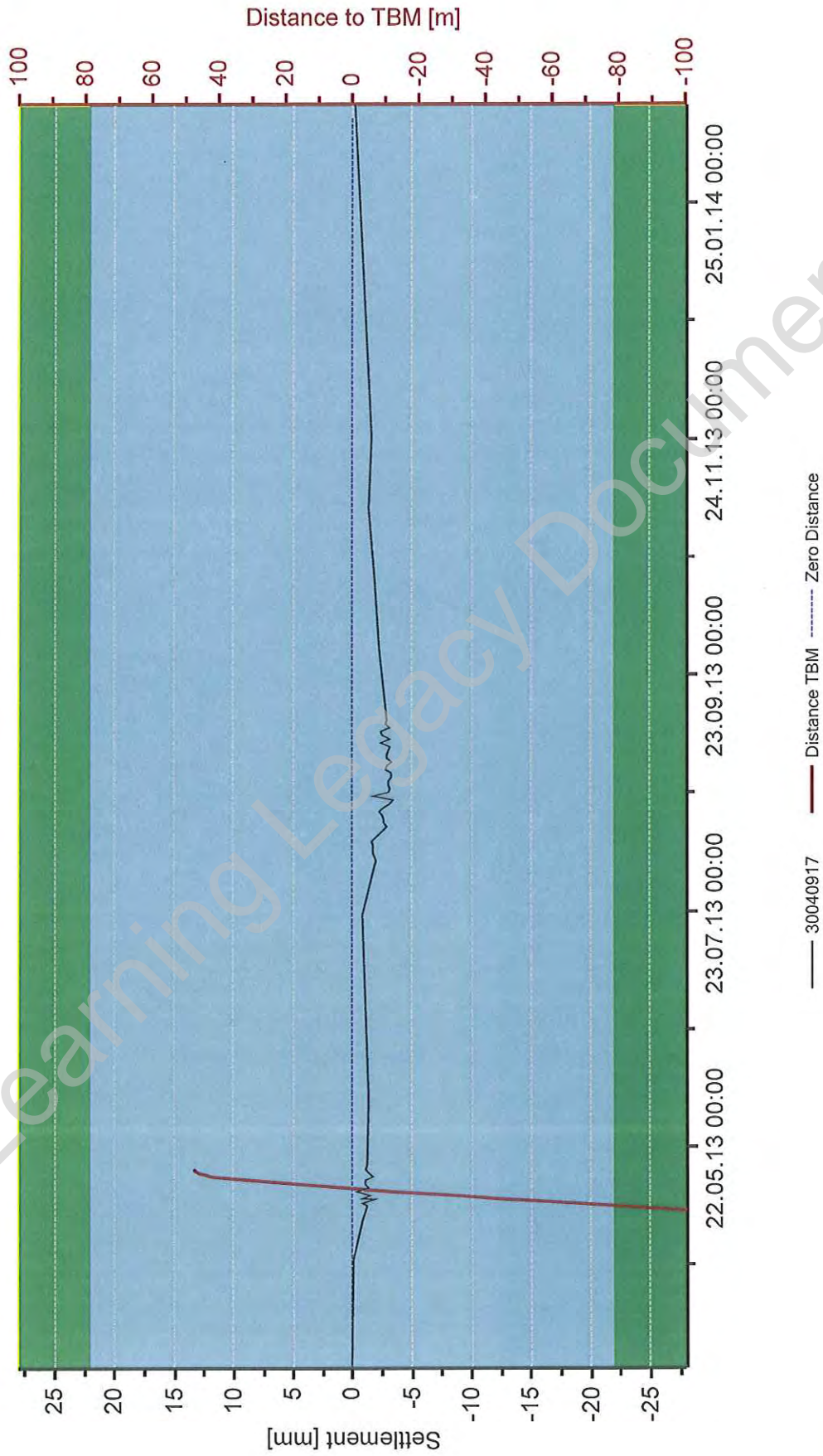
Point: 30040919



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - I/O Center Building 25.03.2013 - 20.02.2014
date: 18.08.2014 12:53 current values: 18.08.2014 12:38

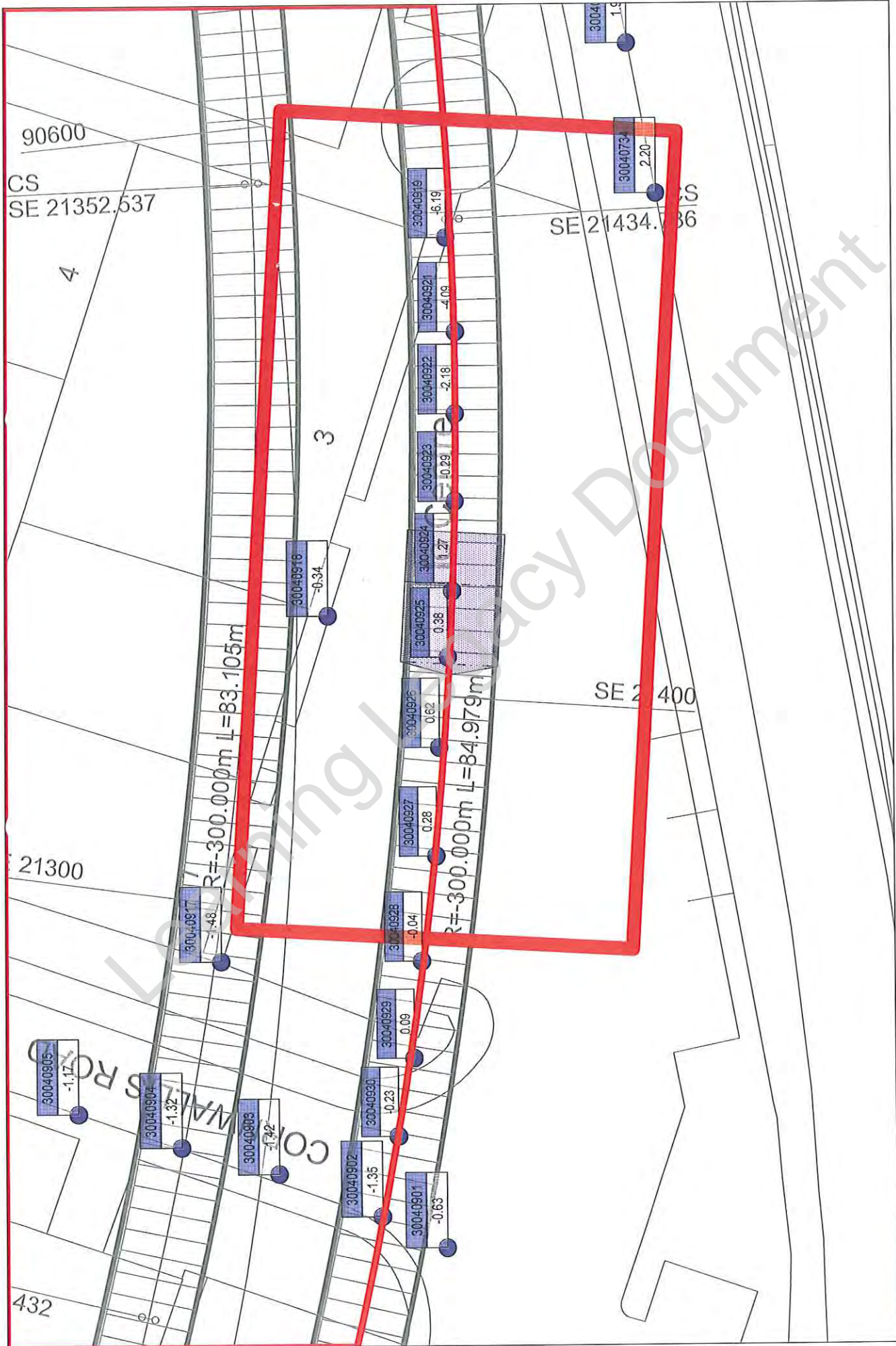


Point: 30040917



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - I/O Center Building 25.03.2013 - 20.02.2014
date: 18.08.2014 12:57 current values: 18.08.2014 12:38

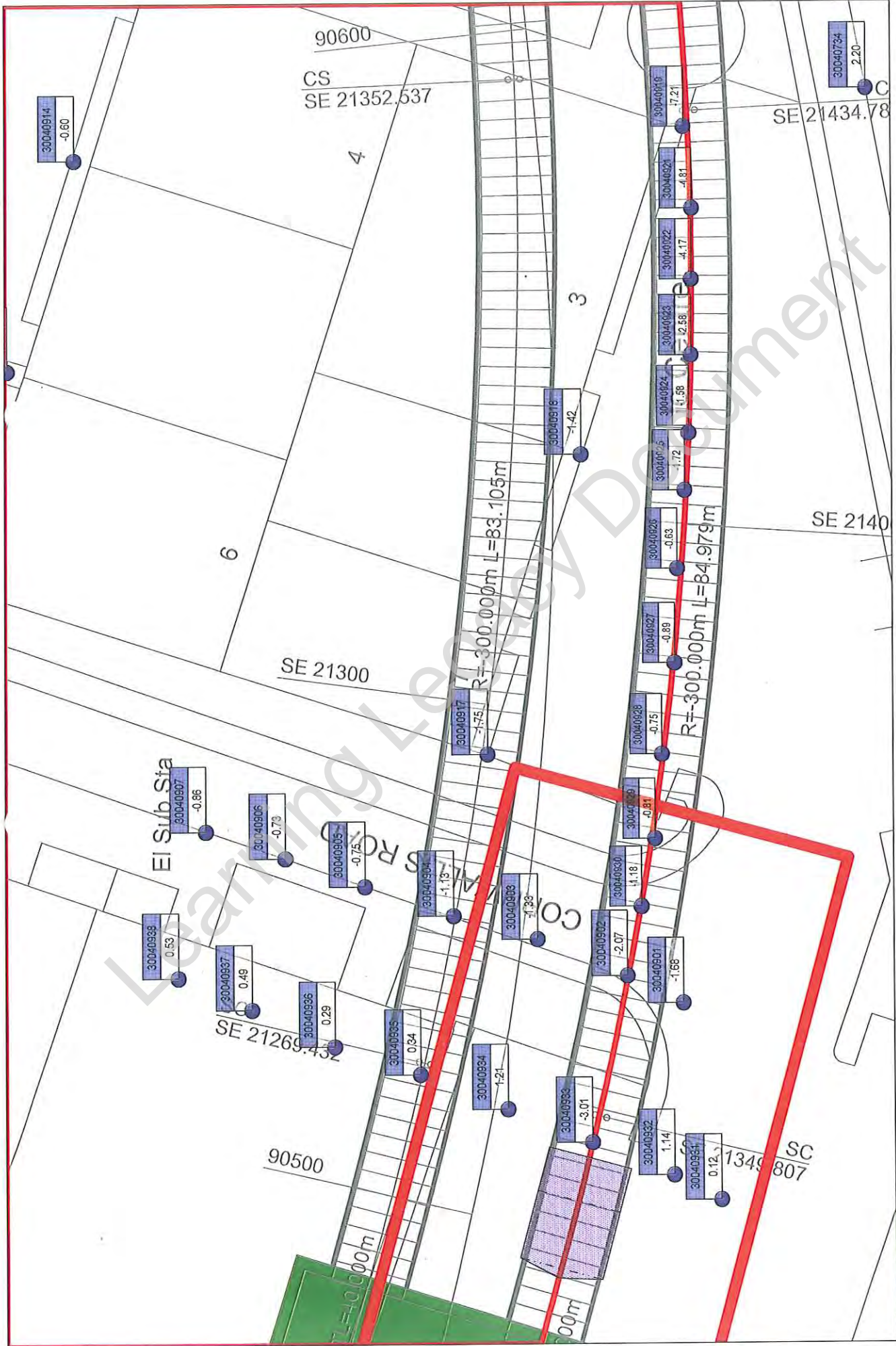




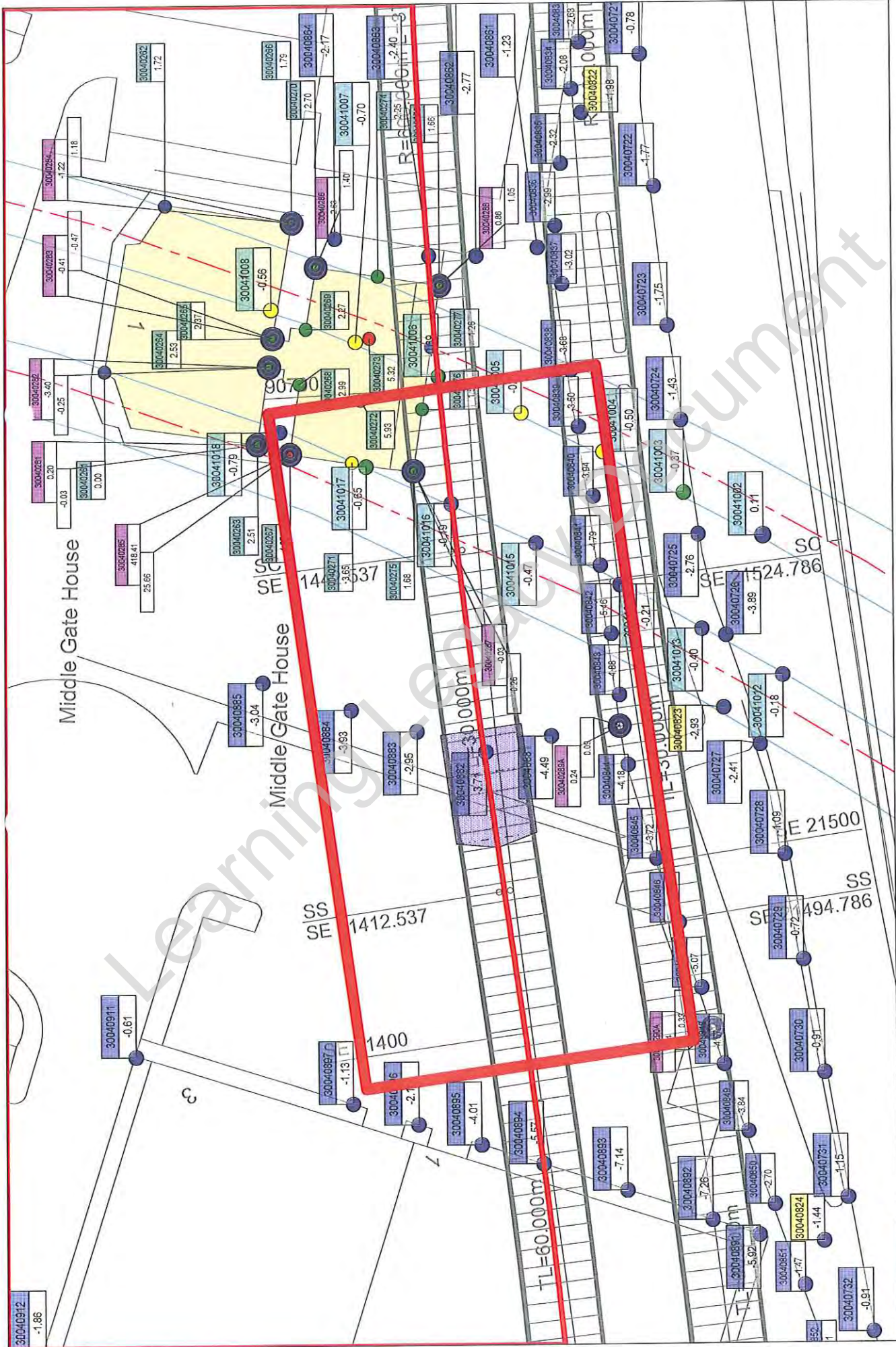
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

working activities: TBM drive

current values: 09.05.2013 18:48

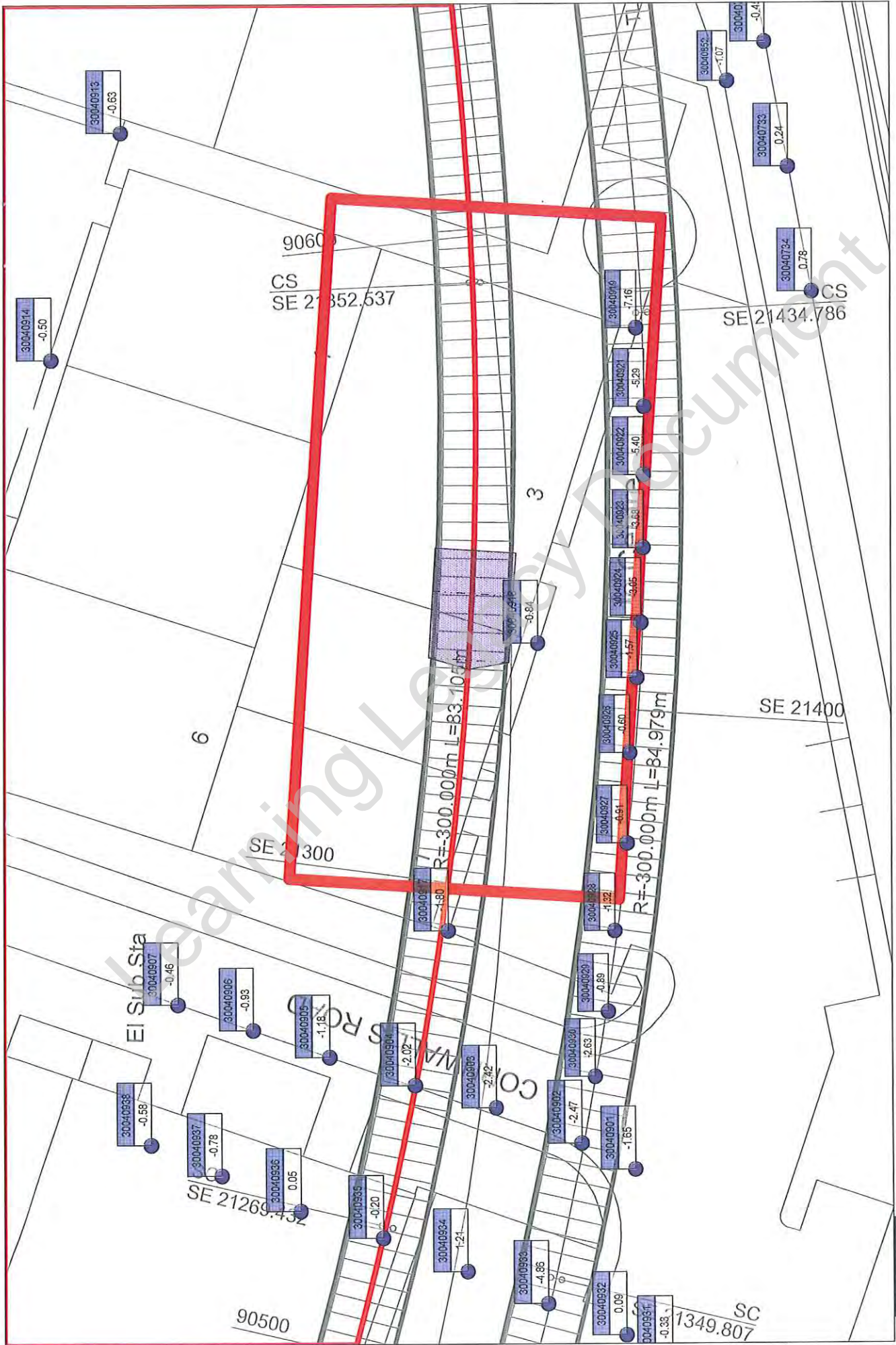


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 14.05.2013 09:00



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 02.08.2013 09:00

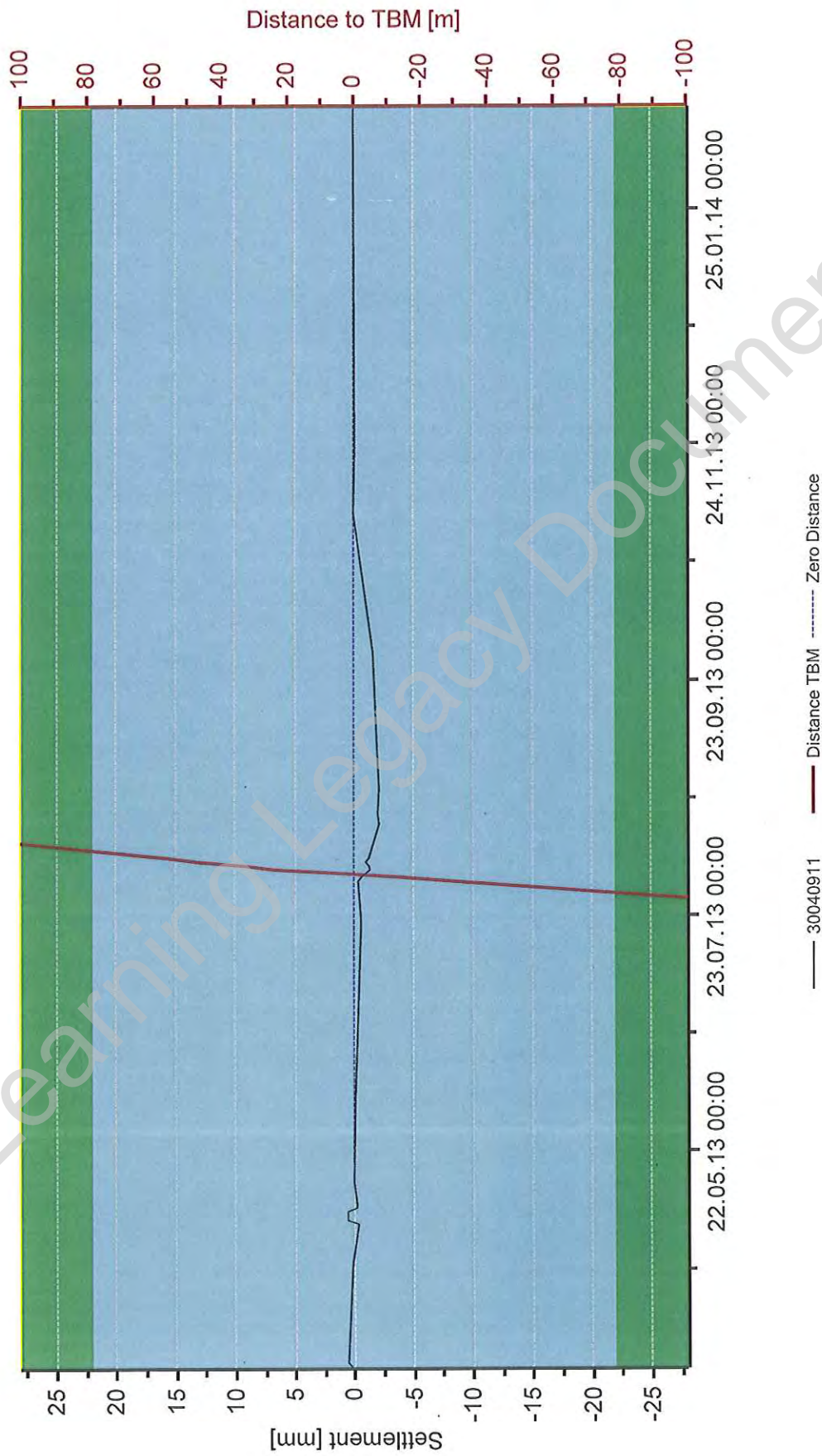




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 08.08.2013 18:04

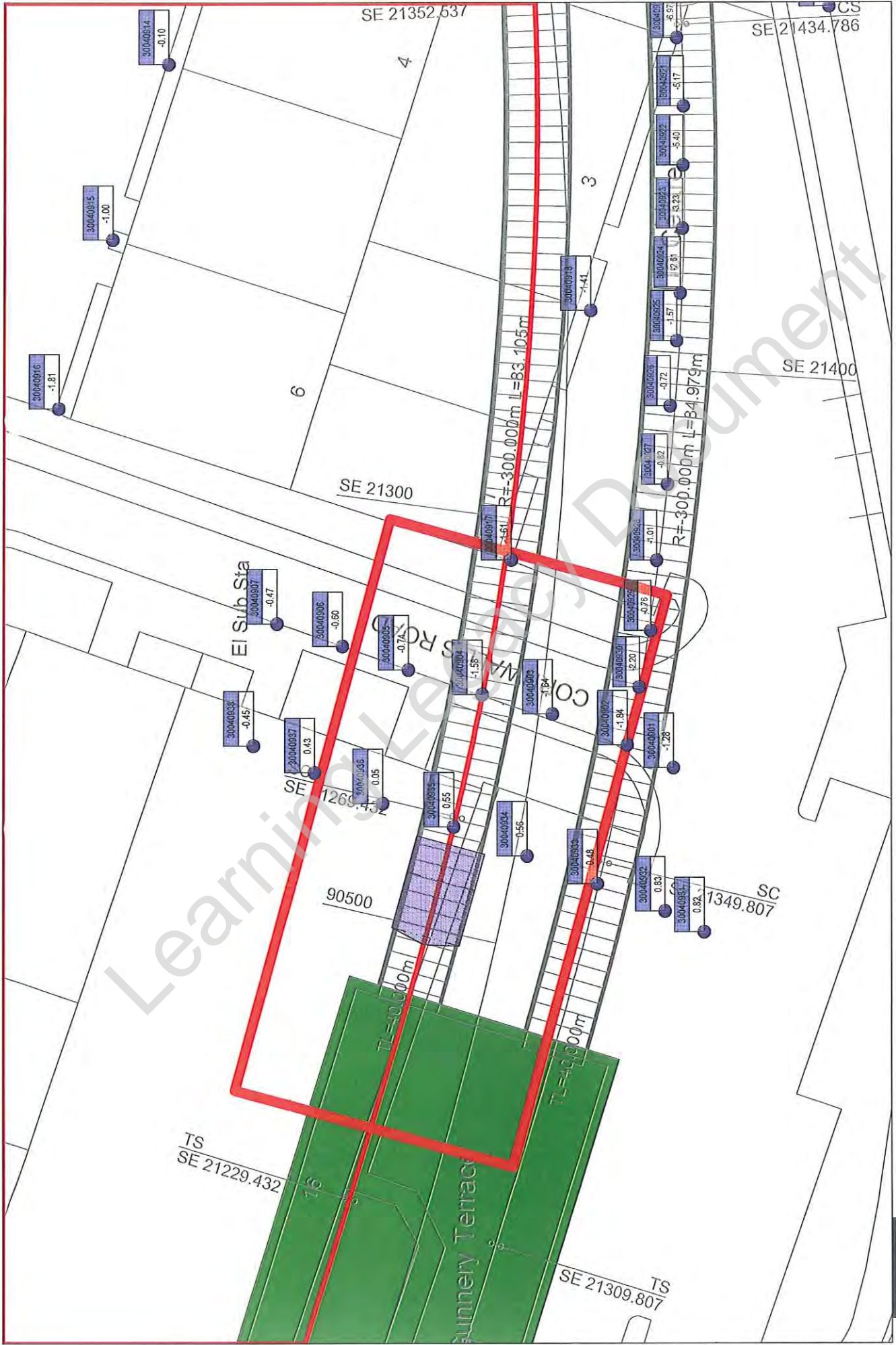


Point: 30040911

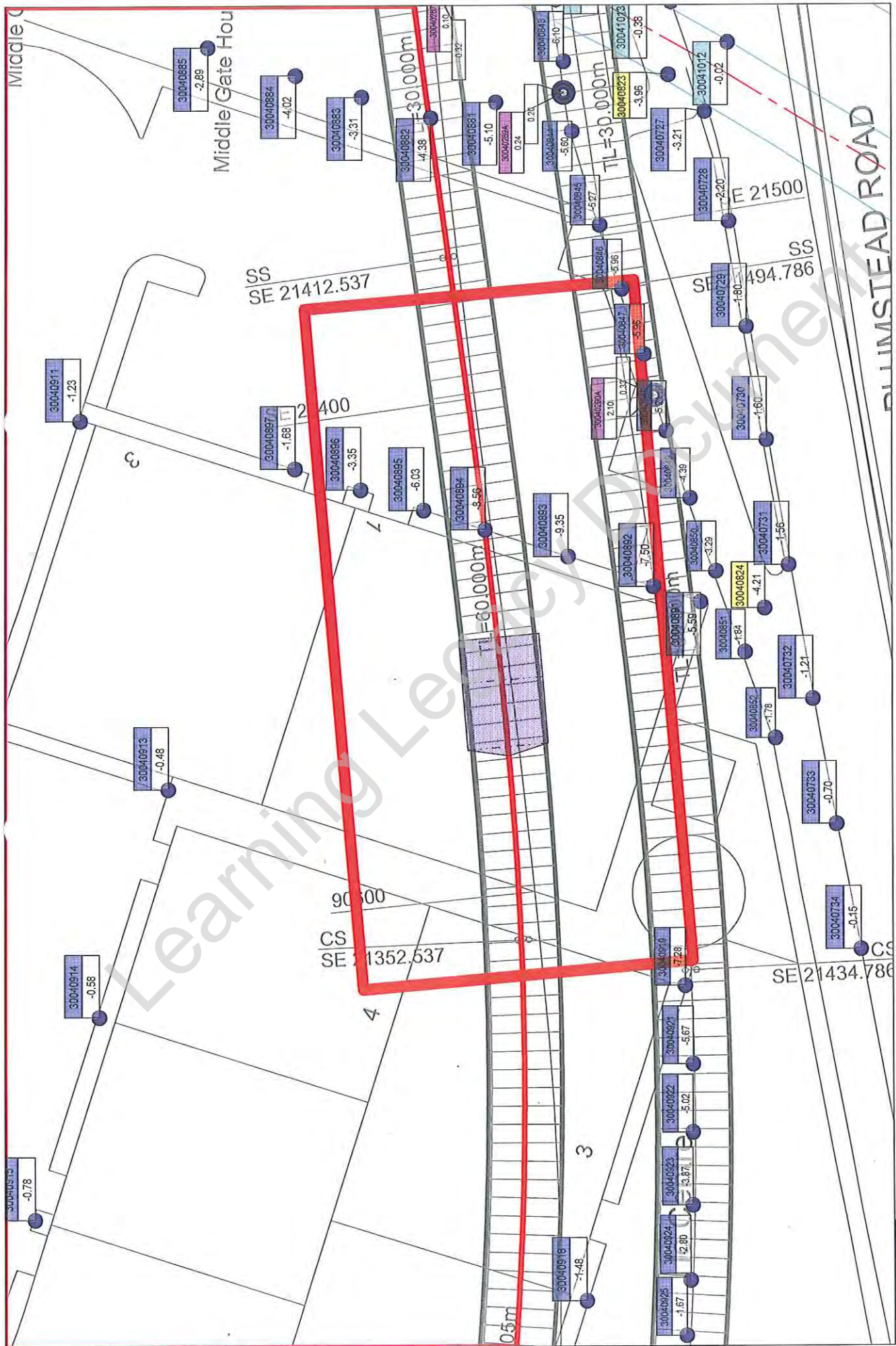


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - I/O Center Building 25.03.2013 - 20.02.2014
date: 18.08.2014 13:03 current values: 18.08.2014 12:53





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 11.08.2013 17:42



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



Joint Venture

project: C310 Thames Tunnel
structure: IO Centre Building

Joint Venture

project: C310 Thames Tunnel
structure: IO Centre Building

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	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	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 0911	105.614	25/01/13	105.615	1	105.614	0	105.614	0	105.615	0	105.615	0	105.615	0	105.614	0	105.614	0	105.614	0	105.614	0	105.614	0	105.614	0	105.614	0		
3004 0912	105.740		105.740	0	105.740	0	105.739	0	105.739	0	105.739	0	105.739	0	105.739	0	105.739	0	105.739	0	105.739	0	105.739	0	105.739	0	105.739	0		
3004 0913	106.081		106.081	1	106.081	0	106.081	0	106.079	-1	106.079	-1	106.079	-1	106.079	-1	106.079	-1	106.079	-1	106.079	-1	106.079	-1	106.079	-1	106.079	-1	106.079	-1
3004 0914	106.087		106.087	1	106.087	0	106.086	-1	106.086	-1	106.086	-1	106.086	-1	106.086	-1	106.086	-1	106.086	-1	106.086	-1	106.086	-1	106.086	-1	106.086	-1	106.086	-1
3004 0915	105.981		105.980	0	105.980	0	105.980	-1	105.980	-1	105.980	-1	105.980	-1	105.980	-1	105.980	-1	105.980	-1	105.980	-1	105.980	-1	105.980	-1	105.980	-1	105.980	-1
3004 0916	106.088		106.087	-1	106.087	0	106.088	0	106.088	0	106.088	0	106.088	0	106.088	0	106.088	0	106.088	0	106.088	0	106.088	0	106.088	0	106.088	0	106.088	0
3004 0917	106.086		106.086	0	106.086	0	106.085	-1	106.085	-1	106.085	-1	106.085	-1	106.085	-1	106.084	-1	106.085	-1	106.085	-1	106.085	-1	106.085	-1	106.085	-1	106.085	-1
3004 0918	106.083		106.085	1	106.084	-1	106.084	-1	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	106.083	0	106.083	0
3004 0919	106.080		106.081	1	106.080	-1	106.080	-1	106.080	-1	106.080	-1	106.080	-1	106.081	1	106.081	1	106.081	1	106.081	1	106.081	1	106.081	1	106.081	1	106.081	1

Engineering Legacy Document

monitoring table



monitoring table



Joint Venture

project: C310 Thames Tunnel
structure: IO Centre Building

Joint Venture

project: C310 Thames Tunnel
structure: IO Centre Building

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	25/2/13	13/02/2013	elevation	deviation from last/ baseline	1/03/2013	elevation	deviation from last/ baseline	1/03/2013	elevation	deviation from last/ baseline	1/03/2013	elevation	deviation from last/ baseline	05/03/2013	elevation	deviation from last/ baseline	07/03/2013	elevation	deviation from last/ baseline	07/03/2013	elevation	deviation from last/ baseline	04/04/2013	elevation	deviation from last/ baseline
Point No.	elevation	105.614	105.614	0	0	105.614	0	0	105.614	0	0	105.614	0	0	105.614	0	0	105.614	0	0	105.614	0	0	105.613	0	-1
3004 0011																										
3004 0012																										
3004 0013																										
3004 0014																										
3004 0015																										
3004 0016																										
3004 0017																										
3004 0018																										
3004 0019																										

Joint Venture

Joint Venture

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		
	date	elevation	elevation	deviation from last/ baseline	elevation	elevation	deviation from last/ baseline	elevation	elevation	deviation from last/ baseline	elevation	elevation	deviation from last/ baseline	elevation	elevation	deviation from last/ baseline	elevation	elevation	deviation from last/ baseline	elevation	elevation	deviation from last/ baseline	elevation	elevation	deviation from last/ baseline
3004 0011	105.614	105.613	0	-1	105.613	0	-1	105.613	0	-1	105.613	0	-1	105.612	-1	-2	105.612	-1	-2	105.612	-1	-2	105.612	-1	-2
3004 0012	105.740	105.739	0	-1	105.739	0	-1	105.739	0	-1	105.739	0	-1	105.739	0	-1	105.739	0	-1	105.739	0	-1	105.739	0	-1
3004 0013	106.081	106.080	0	0	106.080	0	0	106.080	0	0	106.081	1	0	106.081	1	0	106.081	1	0	106.081	1	0	106.081	1	0
3004 0014	106.087	106.086	0	-1	106.086	0	-1	106.086	0	-1	106.087	0	0	106.087	0	0	106.086	0	0	106.086	0	0	106.086	0	0
3004 0015	105.981	105.980	1	-1	105.980	0	-1	105.980	0	-1	105.980	0	-1	105.980	0	-1	105.980	0	-1	105.979	-1	-2	105.979	-1	-2
3004 0016	106.088	106.087	0	-1	106.087	0	-1	106.087	0	-1	106.087	0	-2	106.087	0	-2	106.088	0	-1	106.088	0	-1	106.088	0	-1
3004 0017	106.086	106.084	0	-2	106.084	0	-2	106.085	0	-2	106.085	0	-2	106.087	1	-1	106.088	0	-1	106.088	0	-1	106.088	0	-1
3004 0018	106.083	106.082	0	-1	106.082	0	-1	106.082	0	-1	106.082	0	-1	106.082	0	-1	106.083	-1	-2	106.083	-1	-2	106.084	0	-2
3004 0019	106.080	106.072	0	-7	106.072	0	-7	106.072	0	-7	106.072	0	-7	106.072	0	-7	106.072	0	-7	106.071	-2	-9	106.071	-2	-9

Legacy Document

monitoring table



monitoring table



project: C310 Thames Tunnel
structure: IO Centre Building

Joint Venture

project: C310 Thames Tunnel
structure: IO Centre Building

Joint Venture

No. of reading	date	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
3004 0911	105.614	105.612	0	-2																					
3004 0912	105.740	105.738	0	-1																					
3004 0913	106.081	106.080	0	0																					
3004 0914	106.087	106.086	0	0																					
3004 0915	105.981	105.979	0	-2																					
3004 0916	106.088	106.086	0	-2	106.086	0	-2	106.086	0	-2	106.086	0	-2	106.086	0	-2	106.086	0	-2	106.086	0	-2	106.086	0	-2
3004 0917	106.086	106.084	0	-2	106.083	0	-3	106.085	2	-2	106.083	-1	-3	106.083	0	-3	106.083	-1	-3	106.083	0	-3	106.084	1	-3
3004 0918	106.083	106.082	1	-1																					
3004 0919	106.080	106.072	1	-8																					

Legacy Document

monitoring table



monitoring table



Joint Venture

project: C310 Thames Tunnel
structure: IO Centre Building

Joint Venture

project: C310 Thames Tunnel
structure: IO Centre Building

No. of reading	baseline	48. following		50. following		51. following		52. following		53. following		54. following		55. following		56. following		57. following		58. following		59. following		60. 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 0911	105.574	105.512	0 -2	105.739	0 -2	106.080	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2
3004 0912	105.740	106.080	0 -1	106.086	0 0	106.086	0 0	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2
3004 0913	106.081	106.086	0 0	106.086	0 0	106.086	0 0	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2
3004 0914	106.087	106.086	0 0	106.086	0 0	106.086	0 0	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2
3004 0915	105.981	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2
3004 0916	106.088	106.086	0 -3	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2	106.086	0 -2
3004 0917	106.086	106.083	0 -3	106.083	0 -3	106.083	0 -3	106.083	0 -3	106.083	0 -3	106.083	0 -3	106.083	0 -3	106.083	0 -3	106.083	0 -3	106.083	0 -3	106.083	0 -3	106.083	0 -3
3004 0918	106.083	106.081	2 -2	106.071	0 -2	106.071	0 -2	106.071	0 -2	106.071	0 -2	106.071	0 -2	106.071	0 -2	106.071	0 -2	106.071	0 -2	106.071	0 -2	106.071	0 -2	106.071	0 -2
3004 0919	106.080	106.071	0 -8	106.071	0 -8	106.071	0 -8	106.071	0 -8	106.071	0 -8	106.071	0 -8	106.071	0 -8	106.071	0 -8	106.071	0 -8	106.071	0 -8	106.071	0 -8	106.071	0 -8

Legacy Document

monitoring table



monitoring table



Joint Venture


Joint Venture

project: C310 Thames Tunnel
structure: IO Centre Building

project: C310 Thames Tunnel
structure: IO Centre Building

No. of reading	date	61. following		62. following		63. following		64. following		65. following		deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ 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									
		25/2/13		18/12/2013		08/11/2013		29/11/2013		20/02/2014										
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									
3004 0011		105.614	0 -2	105.614	2 0	105.614	2 0	105.614	0 0	105.614	0 0									
3004 0012		105.740	105.739 0 -1	105.740	1 0	105.740	0 0	105.740	0 0	105.740	0 0									
3004 0013		106.081	106.080 -1 -1	106.081	1 0	106.081	1 0	106.081	1 0	106.081	0 0									
3004 0014		106.087	106.086 0 0	106.087	1 0	106.087	1 0	106.087	1 0	106.087	0 0									
3004 0015		105.011	105.079 0 -2	105.011	2 0	105.011	2 0	105.011	2 0	105.011	0 0									
3004 0016		106.080	106.086 0 -2	106.080	1 -1	106.080	1 0	106.080	0 -1	106.080	1 1									
3004 0017		106.085	106.084 1 -2	106.085	0 -1	106.085	0 -1	106.085	0 -2	106.085	1 0									
3004 0018		106.093	106.091 0 -2	106.093	1 -1	106.093	1 -1	106.093	1 -2	106.093	0 -1									
3004 0019		106.080	106.071 0 -8	106.080	1 -7	106.072	1 -8	106.071	-1 -8	106.072	1 -8									

Legacy Document

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

APPENDIX 50
I/O Centre Car Park

Learning Legacy Document

monitoring asset	Water Main under I/O Center Car Park		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	I/O Center Car Park		
sensor type:	manual levelling studs		
chainage:	90530 - 90590	point no.:	3004 0921 - 3004 0930
trigger values: [mm]	green: +22 -22	amber: +28 -28	red: +35 -35
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	22/04/13	0.00		
TBM 1	start ZOI	07/05/13	0.69	3004 0921
		10/05/13	-0.02	3004 0930
	end ZOI	10/05/13	-4.31	3004 0921
		14/05/13	-1.18	3004 0930
TBM 2	start ZOI	05/08/13	-5.67	3004 0921
		09/08/13	-2.63	3004 0930
	end ZOI	09/08/13	-5.29	3004 0921
		12/08/13	-2.20	3004 0930
longterm	20/02/14	-5.66 -1.46	3004 0921 3004 0930	points no. 3004 0921 + 3004 0930 were not accessible/covered, highest value point no 3004 0922 with -4.83mm settlement

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)

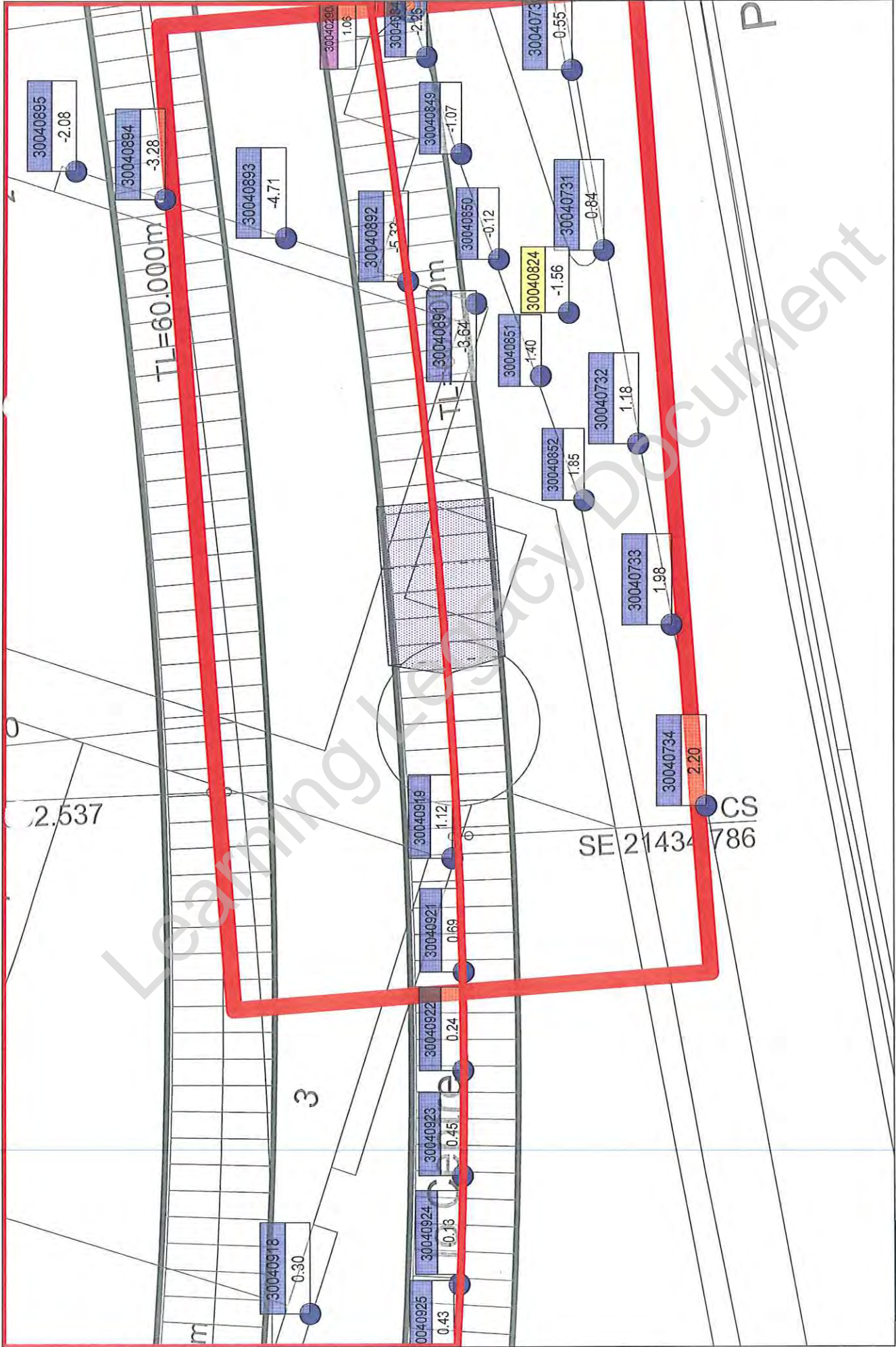
summary / comments

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.

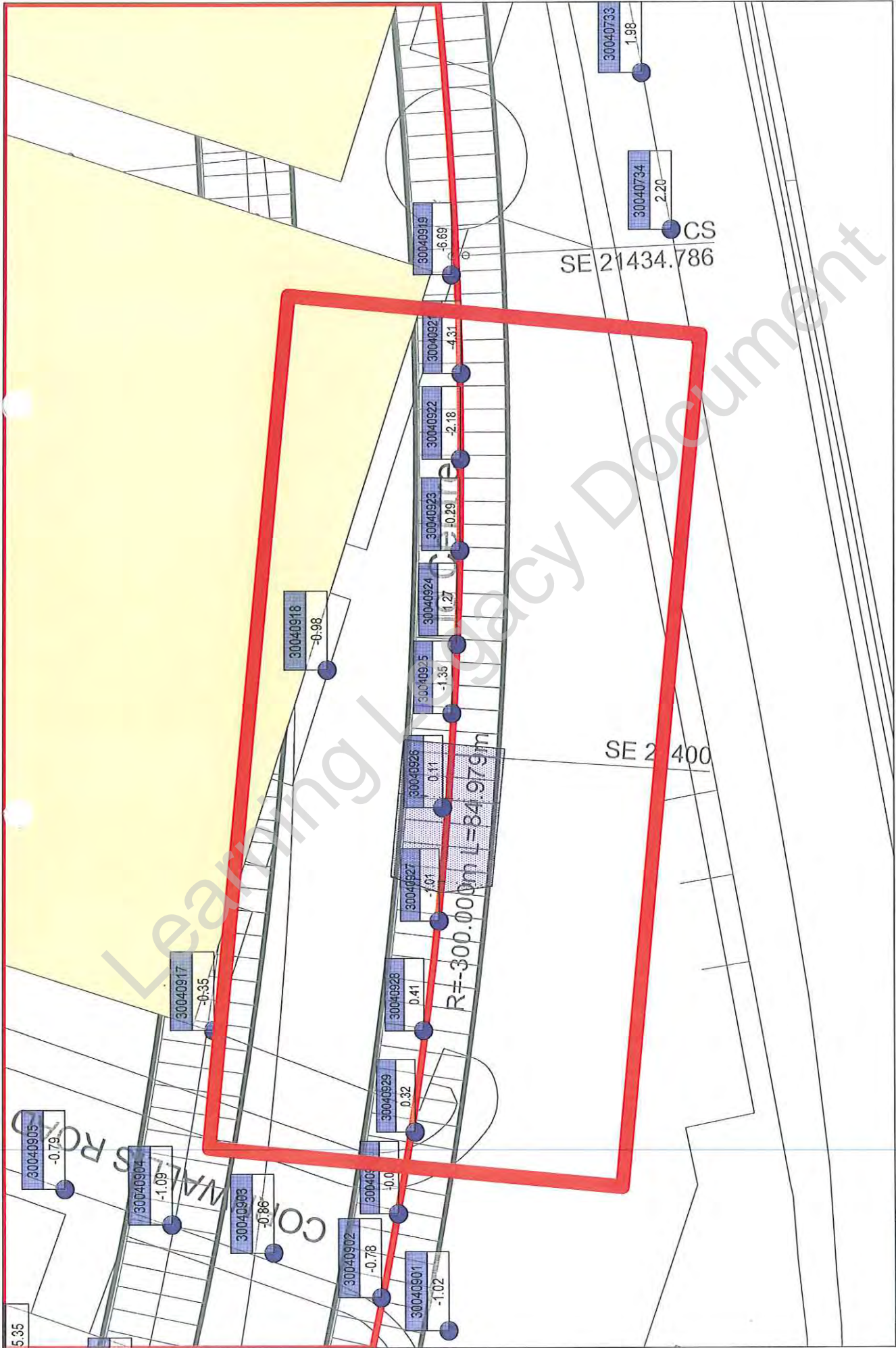
date / signature: 12/03/2015

print name:

HMJV project role: Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 07.05.2013 09:00



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 10.05.2013 09:00

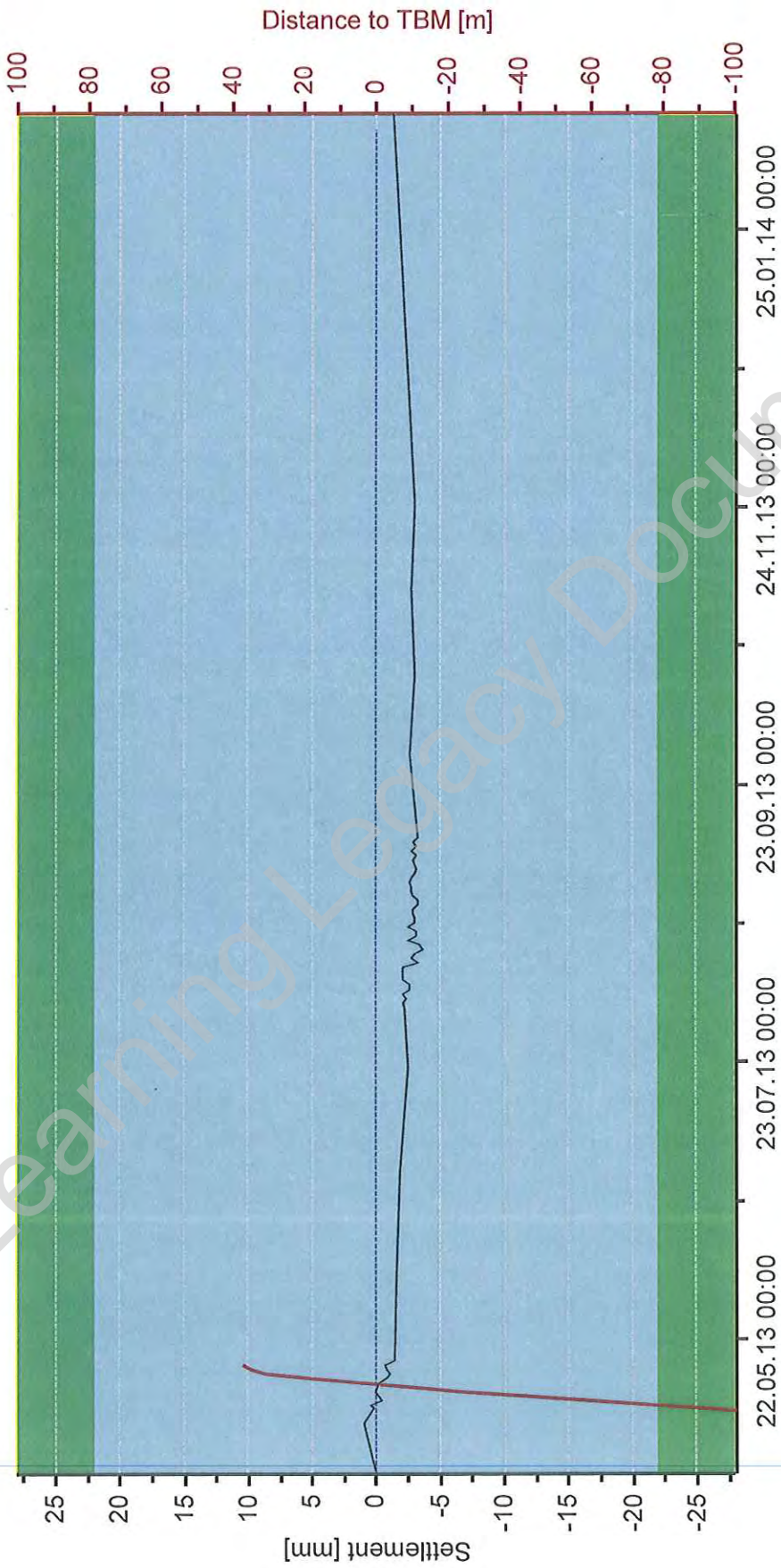


Point: 30040921



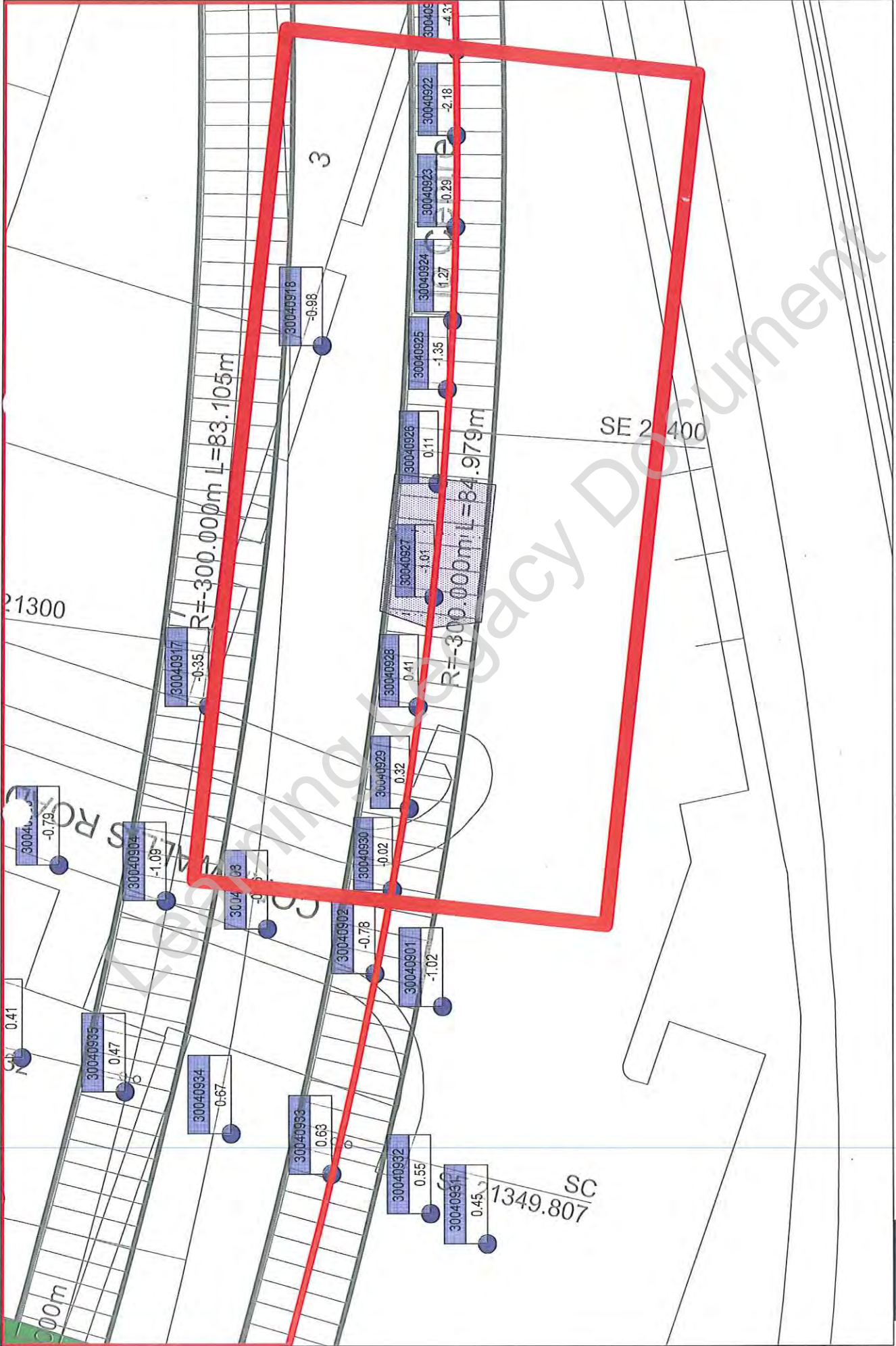
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - I/O Center Car Park 22.04.2013 - 20.02.2014
date: 18.08.2014 14:46 current values: 18.08.2014 14:23

Point: 30040930



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - I/O Center Car Park 22.04.2013 - 20.02.2014
date: 18.08.2014 14:49 current values: 18.08.2014 14:23

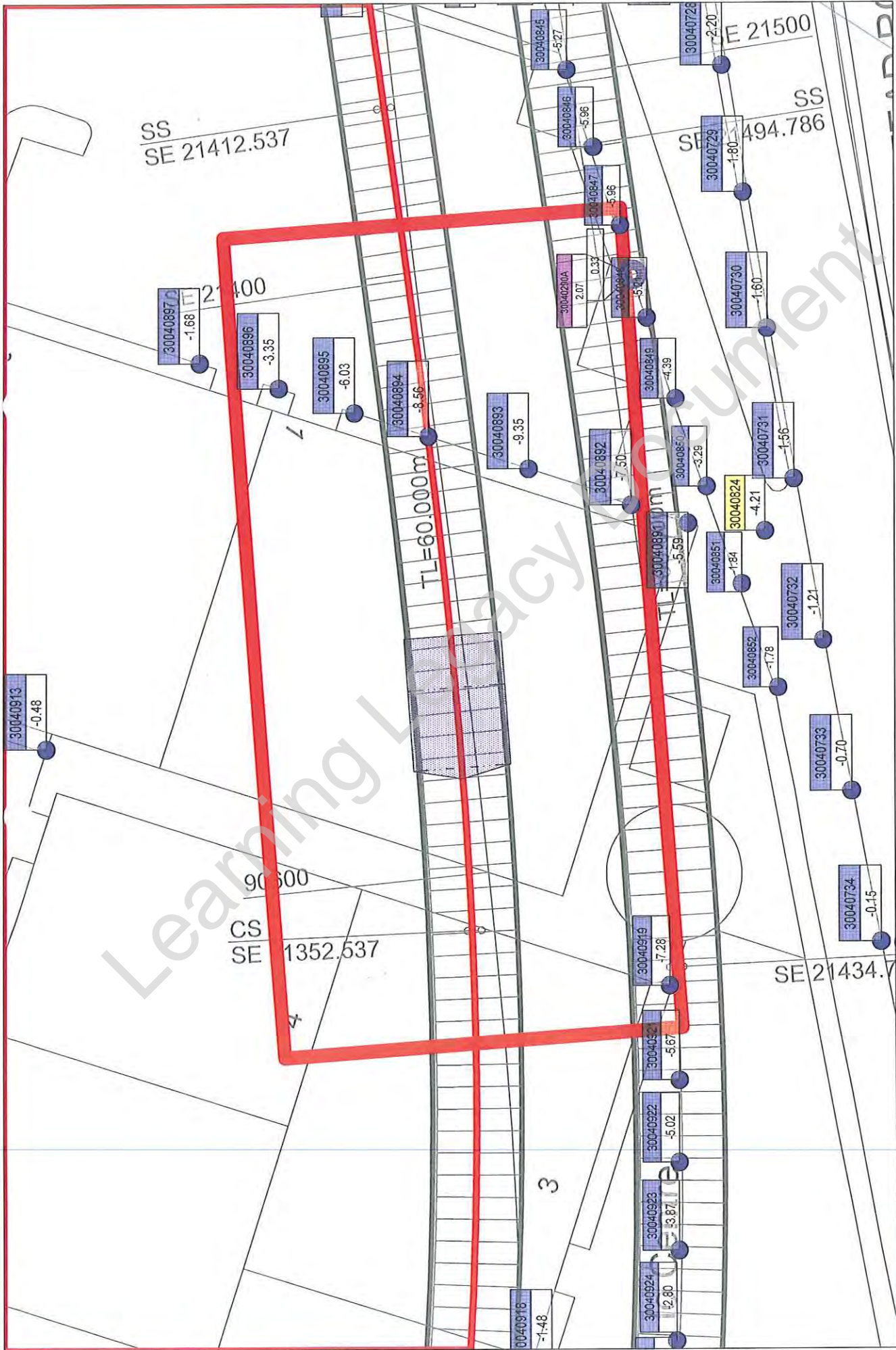




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 10.05.2013 18:37



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 14.05.2013 17:34



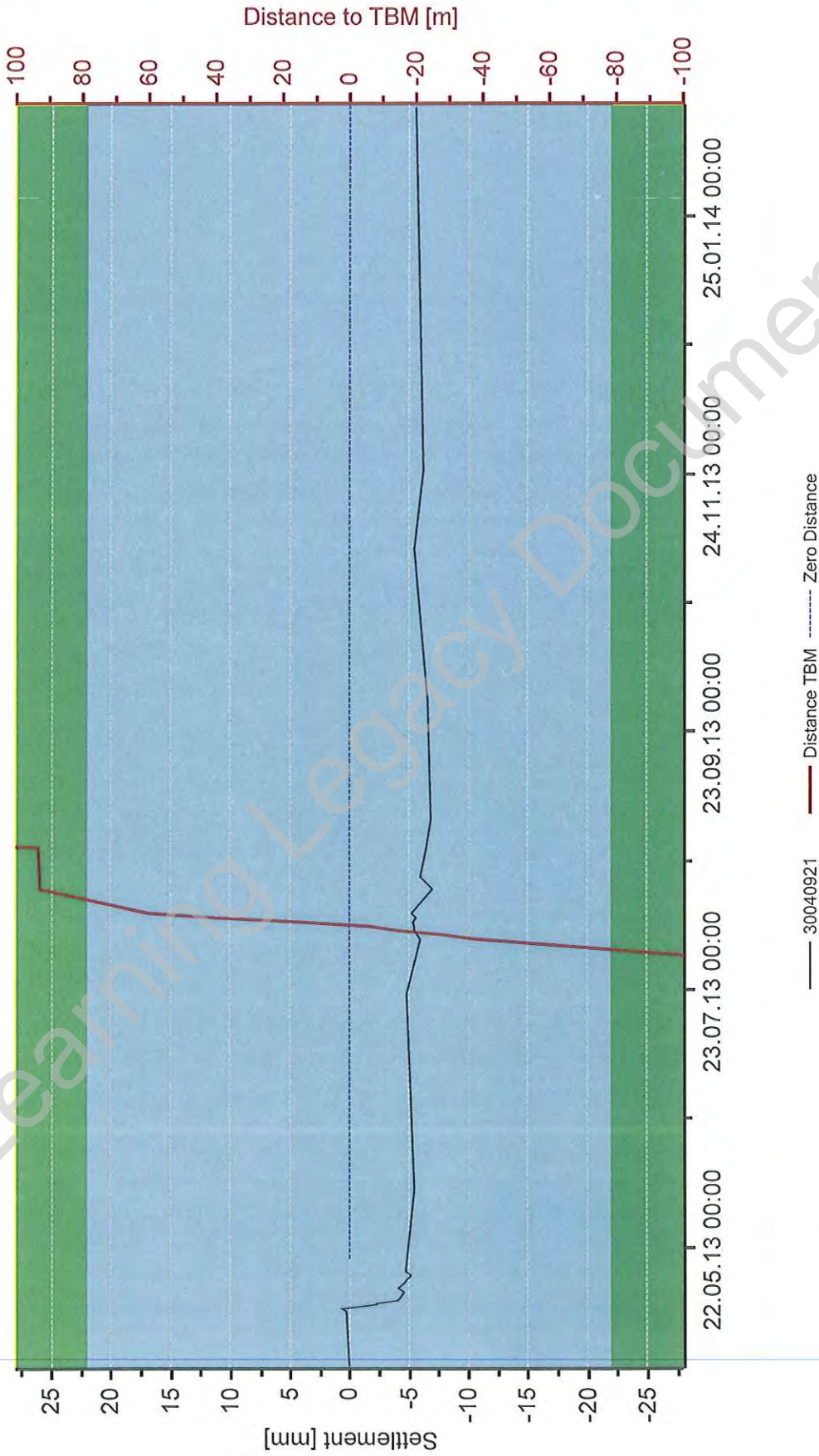
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 05.08.2013 17:56



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 09.08.2013 08:36



Point: 30040921



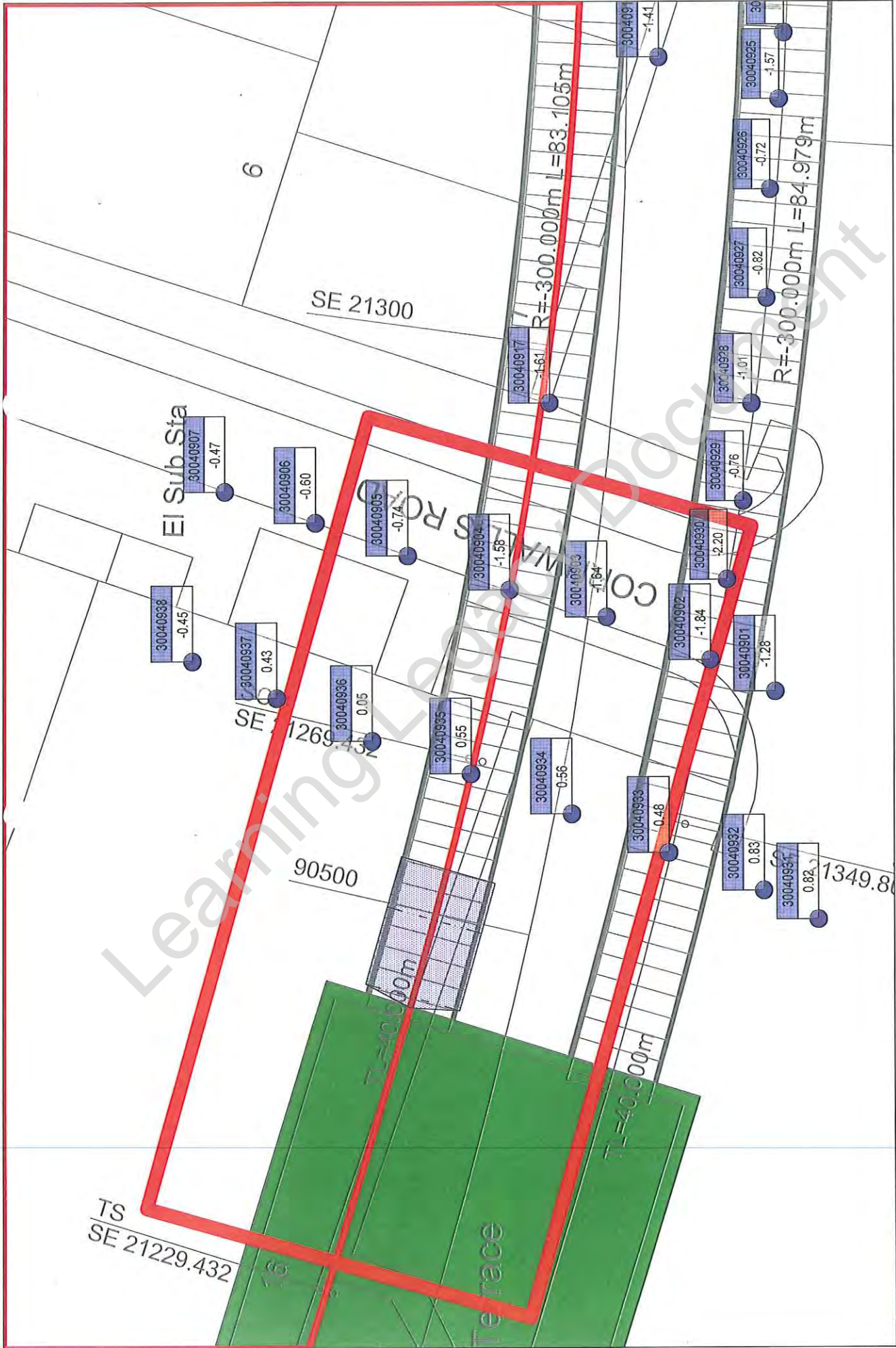
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - I/O Center Car Park 22.04.2013 - 20.02.2014
date: 18.08.2014 15:29 current values: 18.08.2014 15:11





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 09.08.2013 08:36





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 12.08.2013 09:23

project: C310 Thames Tunnel

Joint Venture

project: C310 Thames Tunnel

Joint Venture

No. of reading	baseline	structure: IO Centre car park																
		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	29/4/13	08/02/2013	08/02/2013	08/02/2013	08/02/2013	08/02/2013	10/02/2013	11/02/2013	13/02/2013	13/02/2013	14/02/2013	14/02/2013	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			
3004 0921	106.042	106.042	0	106.043	0	-1	106.040	-3	-2	106.040	-2	106.038	-2	106.037	-1	106.037	0	-5
3004 0922	106.118	106.119	0	106.119	0	0	106.119	0	0	106.116	-3	106.116	1	106.115	-1	106.114	-1	-4
3004 0923	106.187	106.188	0	106.187	0	0	106.187	-1	0	106.187	-1	106.187	-1	106.185	-2	106.185	1	-3
3004 0924	106.263	106.263	0	106.263	0	0	106.263	0	0	106.263	0	106.263	0	106.261	-2	106.262	1	-1
3004 0925	106.284	106.283	0	106.284	1	1	106.283	-1	0	106.284	0	106.284	0	106.283	0	106.283	0	-1
3004 0926	106.343	106.343	0	106.343	1	1	106.343	-1	0	106.343	1	106.343	0	106.343	0	106.344	1	1
3004 0927	106.445	106.445	0	106.445	1	0	106.444	-1	0	106.445	1	106.444	-1	106.445	1	106.445	0	0
3004 0928	106.646	106.647	0	106.647	0	0	106.646	-1	0	106.646	0	106.647	0	106.647	0	106.647	0	0
3004 0929	107.070	107.070	-1	107.070	0	1	107.069	-1	0	107.070	0	107.070	0	107.070	0	107.070	0	-1
3004 0930	107.035	107.036	-1	107.036	0	0	107.035	-1	0	107.035	0	107.035	0	107.035	0	107.035	0	-1

Legacy Document

project: C310 Thames Tunnel

Joint Venture

project: C310 Thames Tunnel

Joint Venture

No. of reading	date	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		
3004 0921	29/4/13	106.042	106.037	106.037	106.036	106.037	106.036	106.037	106.036	106.036	106.036	106.036	106.037	106.037	106.037	106.037	106.037	106.037	106.037	106.037	106.037	106.036	106.036	0	-6
3004 0922		106.118		106.114	106.114	106.114	106.114	106.114	106.114	106.114	106.114	106.113	106.113	106.113	106.113	106.113	106.113	106.113	106.113	106.113	106.113	106.114	106.114	0	-4
3004 0923		106.187		106.184	106.184	106.184	106.184	106.184	106.184	106.184	106.184	106.183	106.183	106.184	106.184	106.184	106.184	106.184	106.184	106.184	106.184	106.184	106.184	0	-4
3004 0924		106.253	106.251	106.250	106.251	106.250	106.251	106.250	106.250	106.251	106.250	106.250	106.250	106.250	106.250	106.250	106.250	106.250	106.250	106.250	106.250	106.250	106.250	0	-3
3004 0925		106.284	106.283	106.282	106.282	106.282	106.282	106.282	106.282	106.282	106.282	106.281	106.281	106.282	106.282	106.282	106.282	106.282	106.282	106.282	106.282	106.282	106.282	0	-2
3004 0926		106.343	106.343	106.342	106.342	106.342	106.342	106.342	106.342	106.342	106.342	106.342	106.342	106.342	106.342	106.342	106.342	106.342	106.342	106.342	106.342	106.342	106.342	0	-2
3004 0927		106.445	106.444	106.444	106.444	106.444	106.444	106.443	106.443	106.444	106.444	106.443	106.443	106.443	106.444	106.444	106.443	106.443	106.441	106.441	106.444	106.444	106.444	0	-1
3004 0928		106.646	106.646	106.645	106.645	106.645	106.645	106.645	106.645	106.645	106.645	106.645	106.645	106.645	106.645	106.645	106.645	106.645	106.645	106.645	106.645	106.645	106.645	0	-1
3004 0929		107.070	107.069	107.068	107.068	107.068	107.068	107.068	107.068	107.068	107.068	107.069	107.069	107.069	107.069	107.069	107.069	107.069	107.069	107.069	107.069	107.069	107.069	0	-1
3004 0930		107.035	107.035	107.035	107.035	107.034	107.034	107.034	107.034	107.034	107.033	107.033	107.033	107.033	107.033	107.033	107.033	107.033	107.033	107.033	107.033	107.033	107.033	0	-3

Legacy Document

Joint Venture

project: C310 Thames Tunnel
structure: IO Centre car park

Joint Venture

project: C310 Thames Tunnel
structure: IO Centre car park

No. of reading	date	25. following		26. following		27. following		28. 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		
3004 0921	22/4/13	106.042	0	-5	106.037	0	-5	106.035	-2	-7	106.035	-2	-7	106.035	-2	-7	106.026	1	-6	106.026	1	-6	106.026	1	-6
3004 0922		106.116	1	-4	106.114	1	-4	106.114	1	-5	106.114	1	-5	106.114	1	-5	106.114	1	-5	106.114	1	-5	106.114	1	-5
3004 0923		106.167	1	-3	106.184	1	-3	106.281	0	-2	106.281	0	-2	106.281	0	-2	106.281	0	-2	106.281	0	-2	106.281	0	-2
3004 0924		106.203	1	-3	106.201	1	-3	106.281	0	-2	106.281	0	-2	106.281	0	-2	106.281	0	-2	106.281	0	-2	106.281	0	-2
3004 0925		106.284	1	-3	106.282	1	-3	106.281	0	-2	106.281	0	-2	106.281	0	-2	106.281	0	-2	106.281	0	-2	106.281	0	-2
3004 0926		106.343	1	-2	106.342	1	-2	106.341	0	-2	106.342	0	-2	106.342	0	-2	106.342	0	-1	106.342	0	-1	106.342	0	-1
3004 0927		106.445	1	-2	106.444	1	-2	106.443	0	-2	106.444	0	-2	106.444	0	-2	106.444	0	-1	106.444	0	-1	106.444	0	-1
3004 0928		106.646	1	-2	106.645	1	-2	106.644	0	-2	106.644	0	-2	106.644	0	-2	106.645	1	-1	106.645	1	-1	106.645	1	-1
3004 0929		107.070	1	-2	107.069	1	-2	107.068	0	-1	107.069	0	-1	107.068	0	-2	107.068	0	-2	107.068	0	-2	107.068	0	-2
3004 0930		107.035	1	-2	107.033	1	-2	107.033	1	-3	107.032	0	-3	107.032	0	-3	107.032	0	-3	107.032	0	-3	107.032	0	-3

Legacy Document

monitoring table



monitoring table



project: C310 Thames Tunnel

Joint Venture

project: C310 Thames Tunnel

Joint Venture

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				
		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			
3004 0921	106.042	29/01/13	106.042	0	29/08/2013	106.036	-7	29/08/2013	106.113	0	27/08/2013	106.113	0	28/08/2013	106.182	0	30/08/2013	106.182	0	31/08/2013	106.035	0	01/09/2013	106.281	1	03/09/2013	106.035	-7
3004 0922	106.118																											
3004 0923	106.187																											
3004 0924	106.263																											
3004 0925	106.294																											
3004 0926	106.343																											
3004 0927	106.445																											
3004 0928	106.646																											
3004 0929	107.070	107.069	0	-1	107.068	-1	-1	107.068	0	-1	107.068	0	-2	107.068	0	-2	107.069	0	-1	107.068	0	-1	107.068	0	-1	107.068	-1	-2
3004 0930	107.035	107.032	-1	-3	107.032	0	-3	107.033	0	-3	107.032	0	-3	107.032	0	-3	107.033	0	-3	107.033	0	-3	107.033	0	-3	107.033	0	-3

Legacy Document

monitoring table



monitoring table



Joint Venture

project: C310 Thames Tunnel

Joint Venture

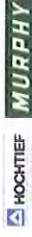
project: C310 Thames Tunnel

Joint Venture

No. of reading	baseline	48. following		50. following		51. following		52. following		53. following		54. following		55. following		56. following		57. following		58. following		59. following		60. 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
	22/4/13																								
Point No.																									
3004 0921	106.042																								
3004 0922	106.118																								
3004 0923	106.187																								
3004 0924	106.263																								
3004 0925	106.284																								
3004 0926	106.343																								
3004 0927	106.445																								
3004 0928	106.646																								
3004 0929	107.070	107.068	0	-1	107.068	0	-1	107.068	0	-1	107.068	0	-1	107.068	0	-1	107.068	0	-1	107.068	0	-1	107.068	0	-1
3004 0930	107.035	107.032	0	-3	107.032	0	-3	107.032	0	-3	107.032	0	-3	107.032	0	-3	107.032	0	-3	107.032	0	-3	107.032	0	-3

Legacy Document

monitoring table




Joint Venture

project: C310 Thames Tunnel

structure: IO Centre car park

No. of reading	date	61. following		62. following		elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline
		baseline	22/4/13	20/02/2014	11/03/2015								
Point No.	elevation	106.042	106.036	1	-5.69	covered							
3004 0921	106.118	106.114	1	-4.71	106.114	0	-4.83						
3004 0922	106.187	106.183	0	-3.89	106.183	0	-4.08						
3004 0924	106.263	106.261	1	-2.61	106.261	0	-2.64						
3004 0925	106.284	Covered			106.281	-1	-2.36						
3004 0926	106.343	106.344	1	0.57	covered								
3004 0927	106.445	106.445	1	0.05	covered								
3004 0928	106.646	106.647	2	0.25	106.646	-1	-0.33						
3004 0929	107.070	107.071	2	0.94	107.068	-2	-1.43						
3004 0930	107.035	107.034	2	-1.46	covered								

Legacy Document

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

APPENDIX 51
CS12 – Cornwallis Road

Learning Legacy Document

monitoring asset	Cornwallis Road		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	CS12 - Cornwallis Road		
sensor type:	manual levelling studs		
chainage:	90520	point no.:	3004 0901 - 3004 0907
trigger values: [mm]	green: +22 -22	amber: +28 -28	red: +35 -35
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	25/03/13		0.00		
TBM 1	start ZOI	11/05/13	-0.96	3004 0902	
	end ZOI	19/05/13	-2.11	3004 0902	breached not any trigger value
TBM 2	start ZOI	09/08/13	-2.02	3004 0904	
	end ZOI	17/08/13	-2.24	3004 0904	breached not any trigger value
longterm	20/02/14		-1.58	3004 0904	
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

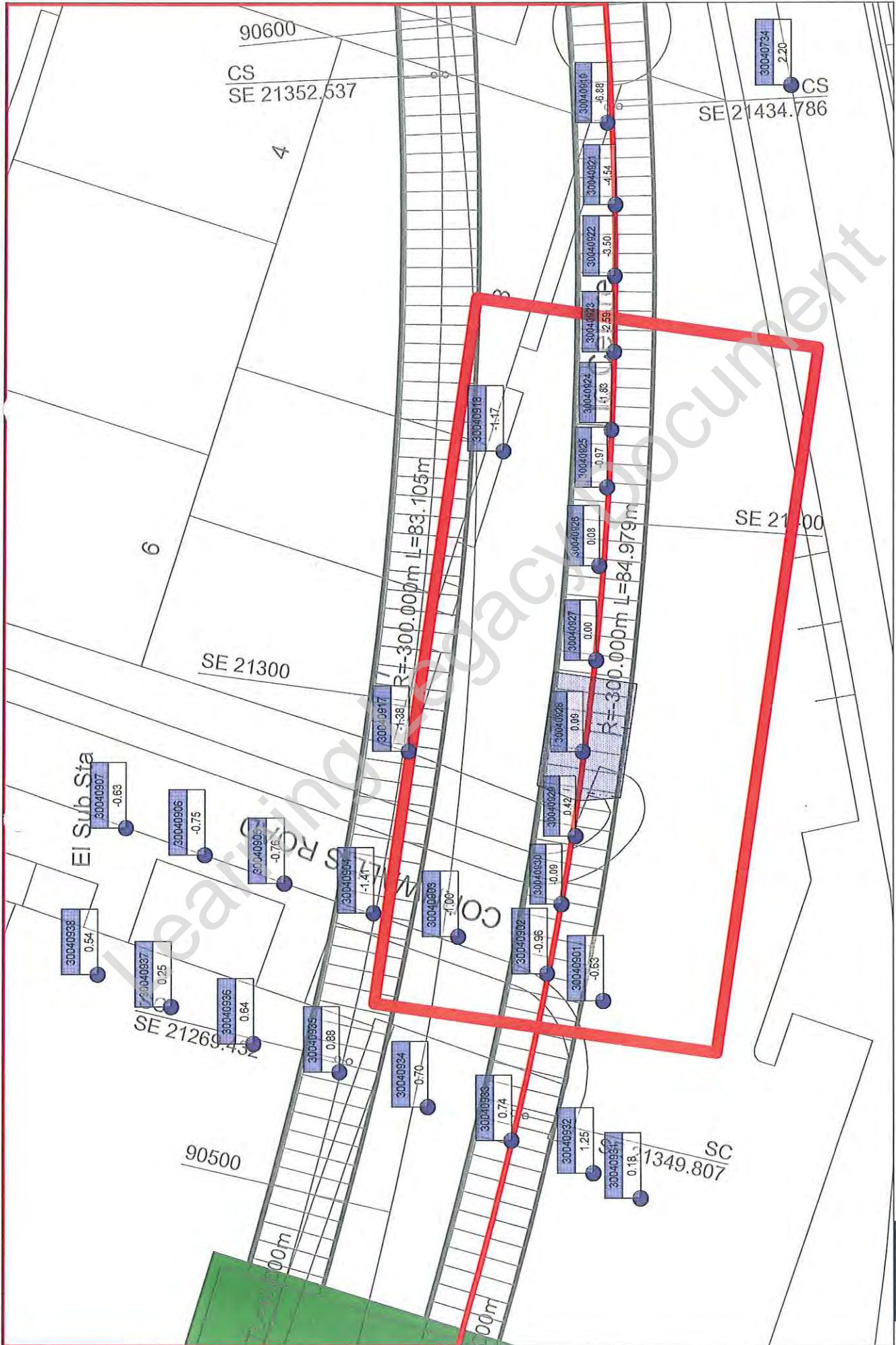
Overall, none of the points reached any trigger value.
 Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.
 The rate of change in the monitoring data is less than the required standards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

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: 11.05.2013 09:01

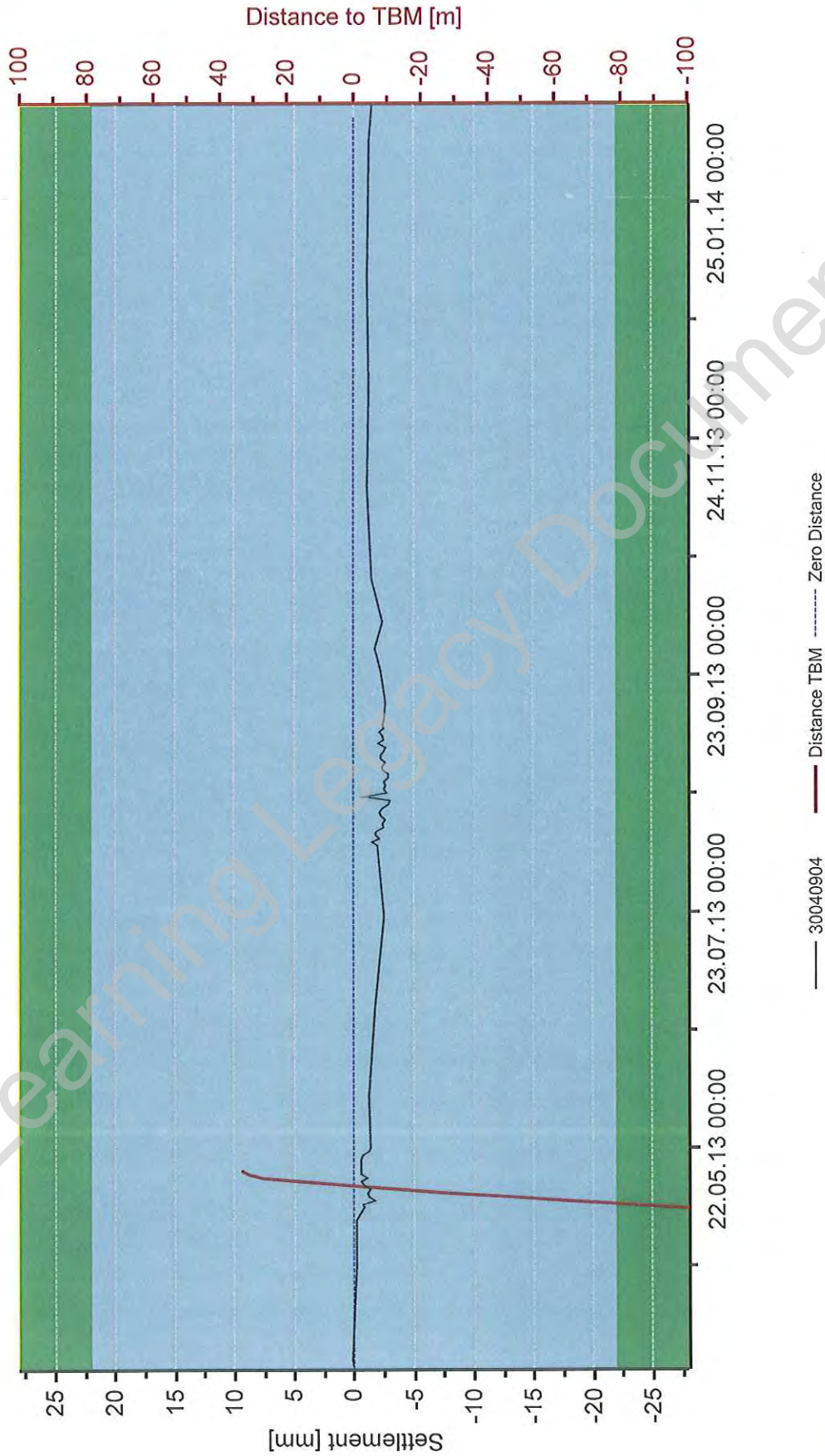
Point: 30040902



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - CS12 - Cornwallis Road 25.03.2013 - 20.02.2014
date: 18.08.2014 16:36 current values: 18.08.2014 16:24

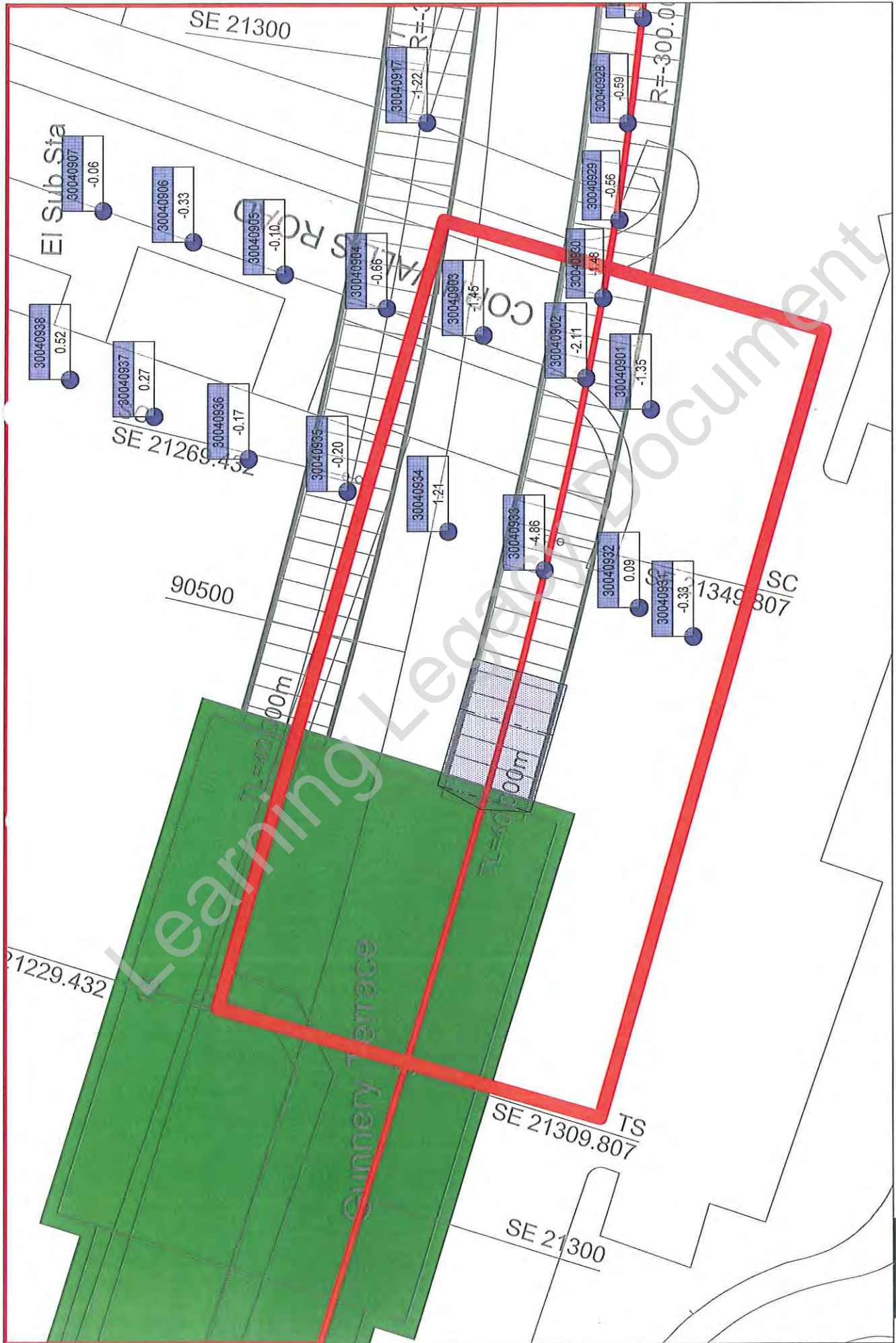


Point: 30040904



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - CS12 - Cornwallis Road 25.03.2013 - 20.02.2014
date: 18.08.2014 16:39 current values: 18.08.2014 16:24





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 19.05.2013 10:00



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 09.08.2013 08:36



Point: 30040904



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - CS12 - Cornwallis Road 25.03.2013 - 20.02.2014
date: 18.08.2014 16:31 current values: 18.08.2014 16:24





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 17.08.2013 09:00

Joint Venture

project: C310 Thames Tunnel
structure: CS Cornwallis Road

Joint Venture

project: C310 Thames Tunnel
structure: CS Cornwallis Road

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	27/02/2013	27/02/2013	27/02/2013	06/03/2013	06/03/2013	06/03/2013	06/03/2013	06/03/2013	06/03/2013	06/03/2013	06/03/2013	06/03/2013	06/03/2013	06/03/2013	06/03/2013	06/03/2013	06/03/2013	12/05/2013	12/05/2013	12/05/2013	12/05/2013	12/05/2013	14/05/2013					
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 0901	107.195	0	107.194	0	-1	107.196	1	107.194	0	-1	107.194	-1	-1	107.194	1	-1	107.194	0	-1	107.195	1	0	107.194	-1	-1	107.193	0	-2	
3004 0902	107.057	0	107.057	0	-1	107.058	1	107.057	0	-1	107.056	-1	-2	107.057	0	-1	107.056	0	-1	107.057	1	0	107.056	-2	-2	107.055	0	-2	
3004 0903	106.868	0	106.868	0	0	106.868	0	106.867	-1	-1	106.867	0	-1	106.866	0	-1	106.867	0	-1	106.867	1	0	106.867	0	-1	106.867	0	-1	
3004 0904	106.740	0	106.740	0	0	106.740	0	106.739	-1	-1	106.739	0	-1	106.739	1	-1	106.739	0	-1	106.739	0	-1	106.739	0	-1	106.740	0	-1	
3004 0905	106.651	0	106.651	0	0	106.651	0	106.651	0	0	106.650	-1	-1	106.651	0	-1	106.650	0	-1	106.651	0	-1	106.651	0	-1	106.651	1	0	
3004 0906	106.600	0	106.600	0	0	106.600	-1	-1	106.600	-1	-1	106.599	-1	-1	106.600	0	-1	106.600	0	-1	106.600	0	-1	106.600	1	0	106.600	-1	-1
3004 0907	106.335	0	106.335	0	0	106.334	-1	-1	106.335	-1	-1	106.334	-1	-1	106.335	0	-1	106.335	0	-1	106.335	0	0	106.335	0	0	106.334	-1	-1

Legacy Document

Joint Venture

Project: C310 Thames Tunnel
Structure: CS Cornwallis Road

Joint Venture

Project: C310 Thames Tunnel
Structure: CS Cornwallis Road

No. of reading	date	13. following		14. following		15. following		15. following		17. following		18. 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		
3004 0901	25/01/13	107.194	0	107.194	0	107.194	0	107.194	0	107.193	0	107.193	0	107.193	0	107.193	0	107.193	0	107.193	0	107.193	0	107.193	0
3004 0902	10/02/2013	107.057	0	107.056	0	107.055	0	107.055	0	107.055	0	107.055	0	107.054	0	107.054	0	107.055	0	107.055	0	107.055	0	107.055	0
3004 0903	15/06/2013	106.868	0	106.867	0	106.866	0	106.865	0	106.866	0	106.866	0	106.866	0	106.866	0	106.866	0	106.865	0	106.865	0	106.866	0
3004 0904	19/05/2013	106.740	0	106.740	0	106.740	0	106.740	0	106.740	0	106.739	0	106.739	0	106.739	0	106.739	0	106.738	-1	106.738	0	106.738	0
3004 0905	17/06/2013	106.651	0	106.651	0	106.651	0	106.651	0	106.651	0	106.651	0	106.651	0	106.651	0	106.651	0	106.650	-1	106.650	0	106.650	0
3004 0906	16/02/2013	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	106.600	0	106.600	0
3004 0907	10/05/2013	106.335	0	106.335	0	106.335	0	106.335	0	106.335	0	106.335	0	106.335	0	106.335	0	106.335	0	106.334	-1	106.335	0	106.335	0

Legacy Document

Joint Venture

Project: C310 Thames Tunnel
Structure: CS Cornwallis Road

Joint Venture

Project: C310 Thames Tunnel
Structure: CS Cornwallis Road

No. of reading date	baseline 2/2/13	25. following 10/02/2013		26. following 11/02/2013		27. following 12/02/2013		28. following 13/02/2013		29. following 14/02/2013		30. following 15/02/2013		31. following 16/02/2013		32. following 17/02/2013		33. following 18/02/2013		34. following 19/02/2013		35. following 20/02/2013		36. following 21/02/2013							
		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						
3004 0901	107.195	107.194	1	-1	107.193	-1	-2	107.194	1	-1	107.192	-2	-3	107.194	1	-2	107.193	0	-1	107.193	0	-2	107.194	1	-1	107.193	0	-2	107.193	0	-2
3004 0902	107.057	107.056	1	-2	107.055	-1	-3	107.056	1	-2	107.055	-1	-3	107.055	0	-2	107.054	-1	-3	107.055	0	-2	107.055	0	-2	107.055	0	-2	107.055	0	-2
3004 0903	106.868	106.866	1	-2	106.865	-1	-3	106.866	1	-2	106.865	-1	-3	106.865	0	-3	106.865	0	-3	106.865	0	-3	106.865	0	-3	106.865	0	-3	106.865	0	-3
3004 0904	106.740	106.739	0	-2	106.738	-1	-2	106.739	0	-2	106.738	-1	-3	106.738	0	-2	106.738	0	-3	106.738	0	-2	106.738	0	-2	106.738	0	-2	106.737	-1	-3
3004 0905	106.651	106.650	1	-1	106.650	0	-1	106.649	0	-2	106.649	0	-2	106.649	0	-2	106.649	0	-2	106.649	0	-1	106.649	0	-1	106.649	0	-1	106.648	0	-3
3004 0906	106.501	106.500	0	-1	106.500	0	-1	106.500	0	-1	106.500	-1	-2	106.500	-1	-2	106.500	2	-1	106.500	0	-1	106.500	0	-1	106.500	0	-1	106.500	0	-3
3004 0907	106.335	106.335	0	0	106.335	0	-1	106.333	0	-1	106.333	0	-2	106.333	0	-2	106.335	2	-1	106.335	0	-1	106.335	0	-1	106.335	0	-1	106.332	0	-3

Joint Venture

project: C310 Thames Tunnel
structure: CS Cornwallis Road

Joint Venture

project: C310 Thames Tunnel
structure: CS Cornwallis Road

No. of reading	baseline	37. following		38. following		39. following		40. following		41. following		42. following		43. following		44. following		45. 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	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline		
3004 0901	107.195	107.194	1	-1	107.193	-1	-2	107.194	0	-1	107.194	0	-2	107.193	0	-2	107.194	0	-1	107.194	0	-1	107.194	0	-1
3004 0902	107.057	107.055	1	-2	107.055	-1	-3	107.055	0	-2	107.055	0	-3	107.055	0	-3	107.055	1	-2	107.055	0	-2	107.055	0	-2
3004 0903	106.868	106.866	1	-2	106.865	-1	-3	106.865	0	-3	106.865	0	-3	106.865	0	-3	106.865	0	-3	106.865	0	-3	106.865	0	-3
3004 0904	106.740	106.739	2	-1	106.738	-2	-3	106.738	0	-3	106.737	0	-3	106.737	0	-3	106.738	1	-2	106.738	0	-2	106.738	0	-2
3004 0905	106.651	106.651	2	0	106.649	-2	-2	106.649	0	-2	106.649	0	-2	106.649	0	-2	106.649	1	-2	106.649	0	-2	106.649	0	-2
3004 0906	106.601	106.600	2	0	106.598	-2	-3	106.598	0	-3	106.598	0	-3	106.598	0	-3	106.599	1	-1	106.598	-1	-2	106.598	1	-2
3004 0907	106.335	106.335	2	-1	106.333	-2	-3	106.333	0	-2	106.332	0	-3	106.333	0	-3	106.335	2	-1	106.333	-2	-2	106.332	0	-3

monitoring table



monitoring table



Joint Venture

Joint Venture

project: C310 Thames Tunnel
structure: CS Cornwallis Road

project: C310 Thames Tunnel
structure: CS Cornwallis Road

Joint Venture

No. of reading	baseline date	43. following		50. following		51. following		52. following		53. following		54. following		55. following		56. following		57. following		58. following		59. following		60. 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 0001	107,195	107,193	0	-1	107,194	0	-1	107,194	0	-1	107,194	0	-1	107,194	0	-1	107,194	0	-1	107,194	0	-1	107,194	0	-1	107,194	0	-1
3004 0002	107,057	107,055	-1	-3	107,055	0	-2	107,055	0	-2	107,055	0	-2	107,055	0	-2	107,055	0	-2	107,055	0	-2	107,055	0	-2	107,055	0	-2
3004 0003	106,868	106,865	0	-3	106,865	0	-3	106,865	0	-3	106,865	0	-3	106,865	0	-3	106,865	0	-3	106,865	0	-3	106,865	0	-3	106,865	0	-3
3004 0004	106,740	106,738	0	-3	106,738	0	-3	106,738	0	-3	106,738	0	-3	106,738	0	-3	106,738	0	-3	106,738	0	-3	106,738	0	-3	106,738	0	-3
3004 0005	106,651	106,649	0	-2	106,650	1	-1	106,649	-1	-2	106,649	-1	-2	106,649	-1	-2	106,649	-1	-2	106,649	-1	-2	106,649	-1	-2	106,649	-1	-2
3004 0006	106,601	106,598	0	-3	106,598	0	-3	106,598	0	-3	106,598	0	-3	106,598	0	-3	106,598	0	-3	106,598	0	-3	106,598	0	-3	106,598	0	-3
3004 0007	106,335	106,333	-1	-2	106,333	0	-3	106,333	-1	-2	106,333	-1	-2	106,333	-1	-2	106,333	-1	-2	106,333	-1	-2	106,333	-1	-2	106,333	-1	-2

monitoring table




Joint Venture

project: C310 Thames Tunnel

No. of reading	structure: CS Cornwallis Road		52. following		54. following		55. following		56. following		57. following		structure: CS Cornwallis Road	
	baseline	252313	07/10/2013	16/10/2013	09/12/2013	07/01/2014	10/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014	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 0901	107.185	0	107.194	0	107.194	0	107.195	1	107.194	0	107.194	0	107.194	0
3004 0902	107.057	-1	107.055	0	107.055	0	107.055	0	107.055	0	107.055	0	107.055	0
3004 0903	106.868	-1	106.866	1	106.866	0	106.866	0	106.866	0	106.866	0	106.866	0
3004 0904	106.740	-1	106.739	1	106.739	0	106.739	0	106.739	0	106.739	0	106.739	0
3004 0905	106.651	-1	106.650	1	106.650	0	106.650	0	106.650	0	106.650	0	106.650	0
3004 0906	106.601	-1	106.600	1	106.600	0	106.600	0	106.600	0	106.600	0	106.600	0
3004 0907	106.335	-1	106.335	2	106.335	0	106.335	0	106.335	0	106.335	0	106.335	0

Legacy Document

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

APPENDIX 52

CS13 – 1200BH Sewer WSB

Learning Legacy Document

monitoring asset	Woolwich Station Box, Sewer Diversion		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	CS13 - 1200BH Sewer WSB		
sensor type:	manual levelling studs		
chainage:	90510	point no.:	3004 0931 - 3004 0938
trigger values: [mm]	green: +22 -22	amber: +28 -28	red: +35 -35
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	08/05/13	0.00			
TBM 1	start ZOI	11/05/13	0.74	3004 0933	
	end ZOI	16/05/13	-5.02	3004 0933	breached not any trigger value
TBM 2	start ZOI	09/08/13	-0.19	3004 0935	
	end ZOI	14/08/13	-3.18	3004 0935	breached not any trigger value
longterm	30/09/13	0.02	3004 0935	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

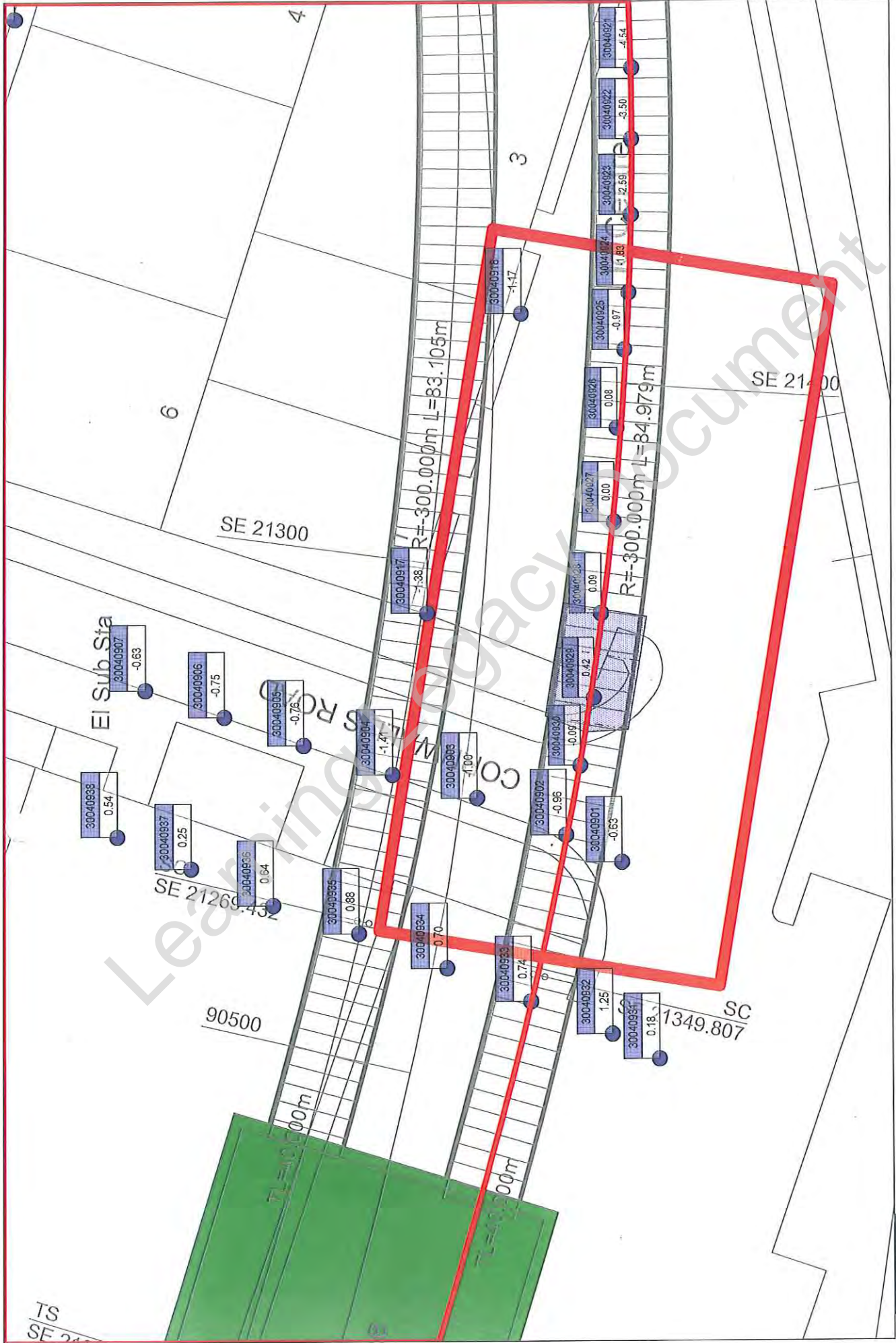
3004 0931 - 3004 0936 were destroyed, re-installed and re-baselined several times due to removal and replacing of ballast in the closed proximity of the reception area of Woolwich Station Box.
A trigger value was not exceeded
Under consideration of temperature differences, the surrounding ground condition 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 up to the time when the instrumentations have been destroyed.

date / signature: 12/01/15

print name:

HMJV project role:

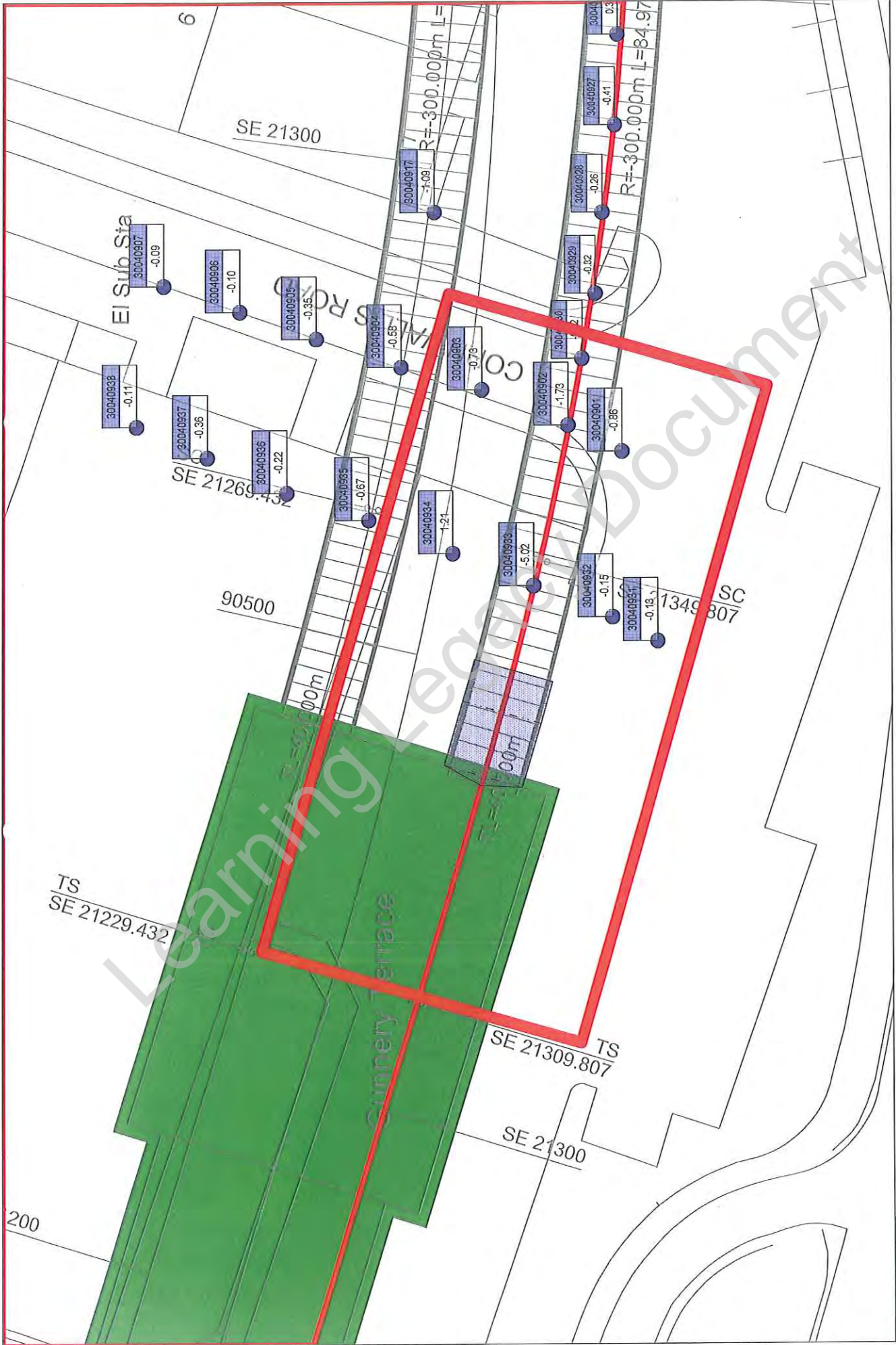
Monitoring & Survey engineer



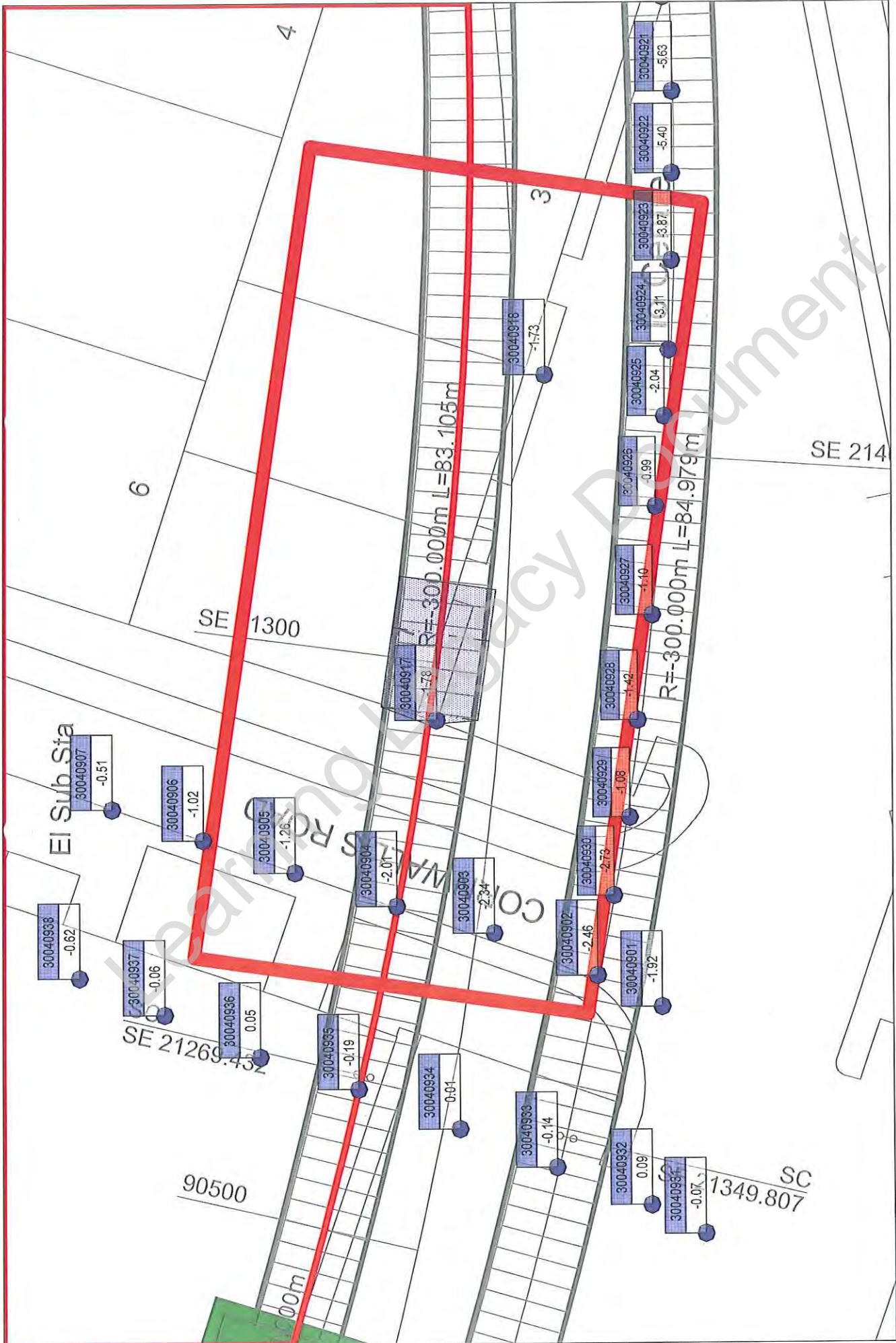
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

working activities: TBM drive

current values: 11.05.2013 18:49



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive
 current values: 16.05.2013 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: 09.08.2013 18:06



Point: 30040933



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - CS13 - 1200BH Sewer WSB 08.05.2013 - 30.09.2013
date: 19.08.2014 08:47 current values: 19.08.2014 08:35



Point: 30040935



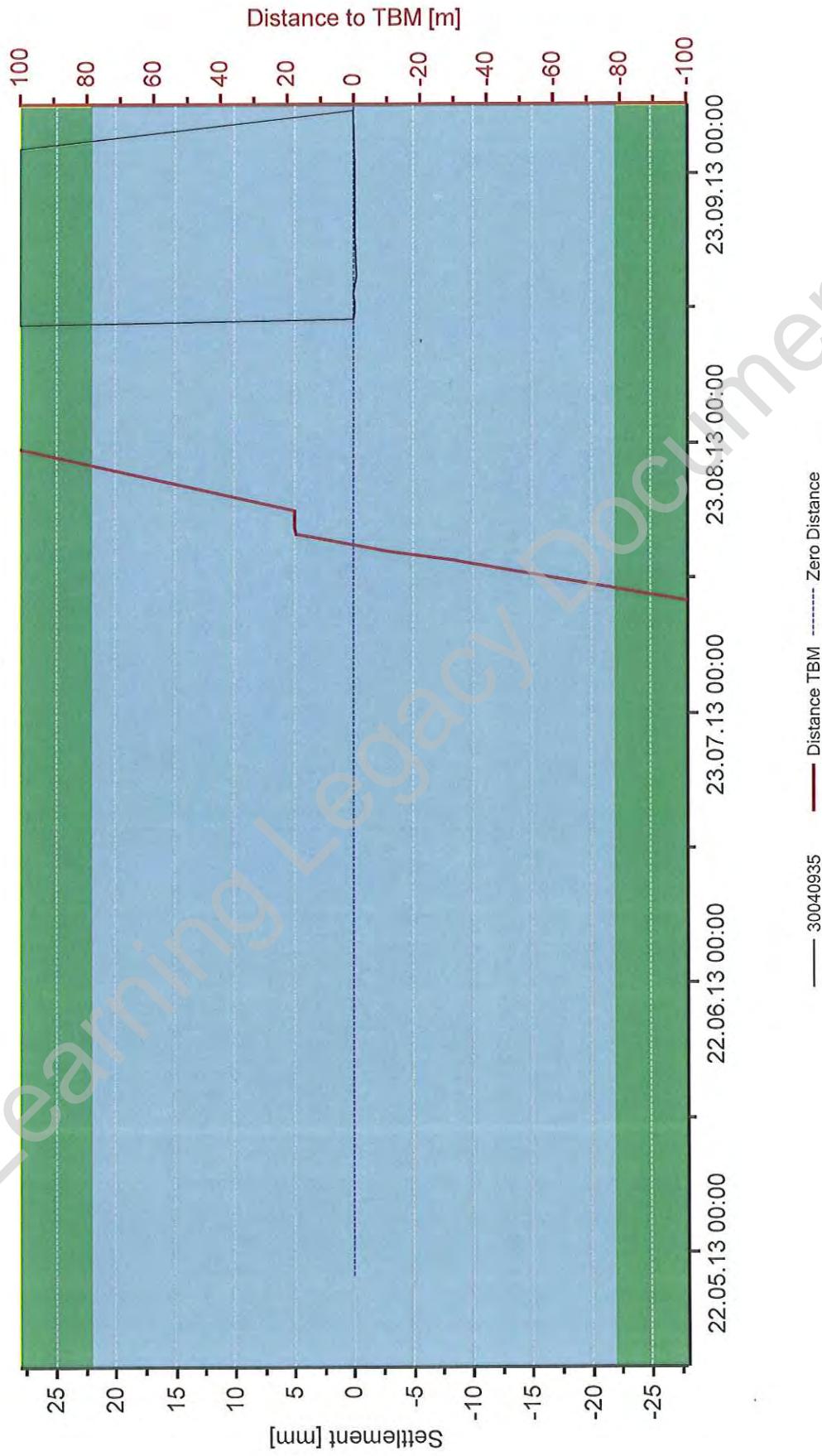
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - CS13 - 1200BH Sewer WSB 08.05.2013 - 30.09.2013
date: 19.08.2014 08:49 current values: 19.08.2014 08:35





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 14.08.2013 09:00

Point: 30040935



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - CS13 - 1200BH Sewer WSB 08.05.2013 - 30.09.2013
date: 19.08.2014 08:41 current values: 19.08.2014 08:28



monitoring table

monitoring table



Joint Venture

Joint Venture

project: C310 Thames Tunnel
structure: CS - 1200 BH sewer WSB

project: C310 Thames Tunnel
structure: CS - 1200 BH sewer WSB

No. of reading	baseline	25. following		26. following		27. following		28. following		29. following		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						
3004 0931	107.455	107.450	0	107.450	0	107.449	0	107.449	0	107.449	0	covered					
3004 0932	108.326	107.308	0	107.307	0	107.307	0	107.308	0	107.308	0	1					
3004 0933	108.258	107.007	0	107.006	0	107.007	0	107.006	0	107.006	0	2					
3004 0934	108.137	107.100	0	107.100	0	107.100	0	107.100	0	107.100	0	destroyed					
3004 0935	108.048	107.124	0	107.124	0	107.124	0	107.124	0	107.124	0	0					
3004 0936	108.125	107.010	0	107.010	0	107.010	0	107.010	0	107.010	0	0					
3004 0937	106.876	106.821	0	106.821	0	106.820	0	106.820	0	106.820	0	covered with rails					
3004 0938	106.821	106.821	0	106.821	0	106.820	0	106.820	0	106.820	0	0					

monitoring table



monitoring table



Joint Venture

Joint Venture

project: C310 Thames Tunnel
structure: CS - 1200 BH sewer WSB

project: C310 Thames Tunnel
structure: CS - 1200 BH sewer WSB

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 0931	107.455	107.590	0	107.591	0	107.591	0	107.592	2	107.591	0	107.591	0	107.591	0	107.591	0	107.591	0	107.449	0	107.449	0	107.449	0
3004 0932	108.206	107.631	0	107.631	0	107.631	0	107.631	0	107.631	0	107.631	0	107.631	0	107.631	0	107.631	0	107.307	0	107.307	0	107.307	0
3004 0933	188.258	138.057	0	138.057	0	138.057	0	138.057	0	138.057	0	138.057	0	138.057	0	138.057	0	138.057	0	107.006	0	107.006	0	107.006	0
3004 0934	188.137	138.212	0	138.212	0	138.212	0	138.212	-1	138.212	0	138.212	-1	138.212	0	138.212	0	138.212	0	107.109	0	107.109	0	107.109	0
3004 0935	188.048	138.051	0	138.051	0	138.051	0	138.051	-2	138.051	0	138.051	-2	138.051	0	138.051	0	138.051	0	107.124	0	107.124	0	107.124	0
3004 0936	188.125	138.052	0	138.052	0	138.052	0	138.052	1	138.052	0	138.052	1	138.052	0	138.052	0	138.052	0	107.010	0	107.010	0	107.010	0
3004 0937	106.876	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0
3004 0938	106.821	106.820	0	106.820	0	106.820	0	106.820	-1	106.820	0	106.820	0	106.820	0	106.820	0	106.820	0	106.820	0	106.820	0	106.820	0

monitoring table



monitoring table




Joint Venture

project: C310 Thames Tunnel
structure: CS - 1200 BH sewer WSB

Joint Venture

project: C310 Thames Tunnel
structure: CS - 1200 BH sewer WSB

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	
		BS/13	08/05/2013	11/05/2013	13/05/2013	14/05/2013	16/05/2013	16/05/2013	16/05/2013	17/05/2013	18/05/2013	19/05/2013	20/05/2013	21/05/2013	21/05/2013	22/05/2013	22/05/2013	23/05/2013	23/05/2013	24/05/2013	24/05/2013	25/05/2013	25/05/2013	26/05/2013	26/05/2013
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
3004 0031	107.455	107.456	0	107.457	1	107.455	-1	107.455	-1	107.455	0	107.455	0	107.455	0	107.455	0	107.455	0	107.455	0	107.455	0	107.455	0
3004 0032	108.426	108.425	1	108.427	1	108.428	1	108.427	0	108.427	1	108.425	-1	108.425	0	108.425	0	108.425	0	108.425	0	108.425	0	108.425	0
3004 0033	108.258	108.259	0	108.259	0	108.260	1	108.258	-1	108.255	-3	108.255	-3	108.255	-3	108.253	-2	108.253	-2	108.253	-2	108.253	-2	108.253	-2
3004 0034	108.137	108.138	1	108.139	1	108.139	1	108.138	-1	108.129	-7	108.129	-7	108.129	-7	108.122	-5	108.122	-5	108.122	-5	108.122	-5	108.122	-5
3004 0035	108.048	108.049	0	108.049	0	108.050	1	108.048	-1	108.048	0	108.048	0	108.048	0	108.048	0	108.048	0	108.048	0	108.048	0	108.048	0
3004 0036	108.125	108.125	0	108.125	0	108.125	0	108.125	0	108.125	0	108.125	0	108.125	0	108.125	0	108.125	0	108.125	0	108.125	0	108.125	0
3004 0037	106.876	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0	106.876	0
3004 0038	106.821	106.821	0	106.821	0	106.821	0	106.821	-1	106.821	1	106.821	1	106.821	1	106.821	0	106.821	0	106.821	0	106.821	0	106.821	0

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

APPENDIX 54
CS15 – BH Hoarding

Learning Legacy Document

monitoring asset	Headwall Area Woolwich Station Box		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	CS15 - BH Hoarding		
sensor type:	manual levelling studs		
chainage:	90210	point no.:	3004 1181 - 3004 1188
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	13/08/13	0.00			
TBM 1	start ZOI	13/09/13	-1.14	3004 1184	
	end ZOI	25/09/13	-1.17	3004 1184	breached not any trigger value
TBM 2	start ZOI	04/02/14	-0.27	3004 1186	
	end ZOI	13/02/14	-1.01	3004 1186	breached not any trigger value
longterm	12/05/14	-0.70	3004 1185	last reading 3 month 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)			

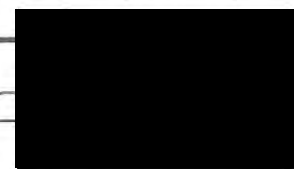
summary / comments

3004 1181 - 3004 1188 were destroyed due to relocation of BH Hoarding (17/06/2014)
 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:

08/01/15

print name:



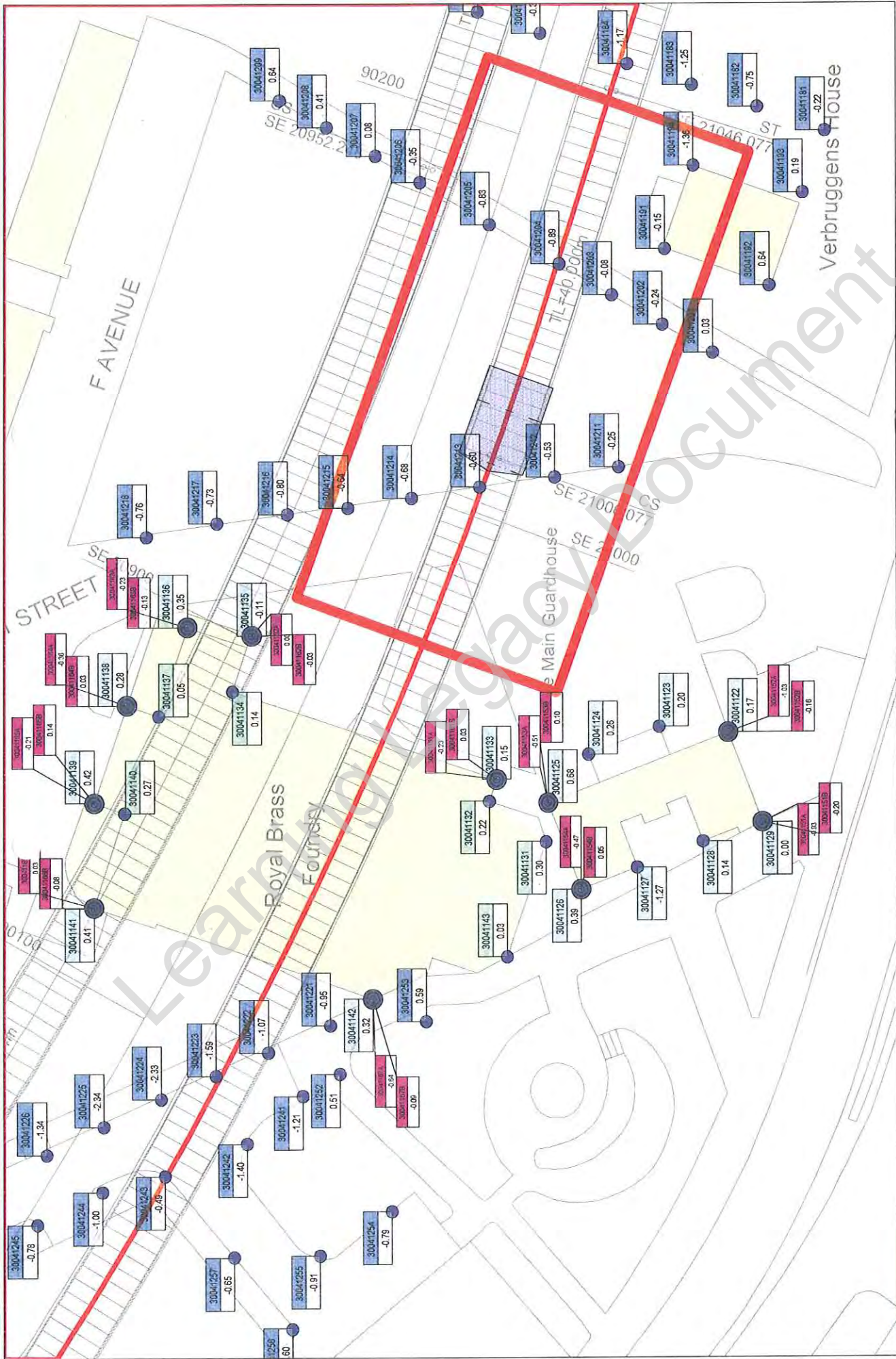
HMJV project role:

Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 13.09.2013 17:38

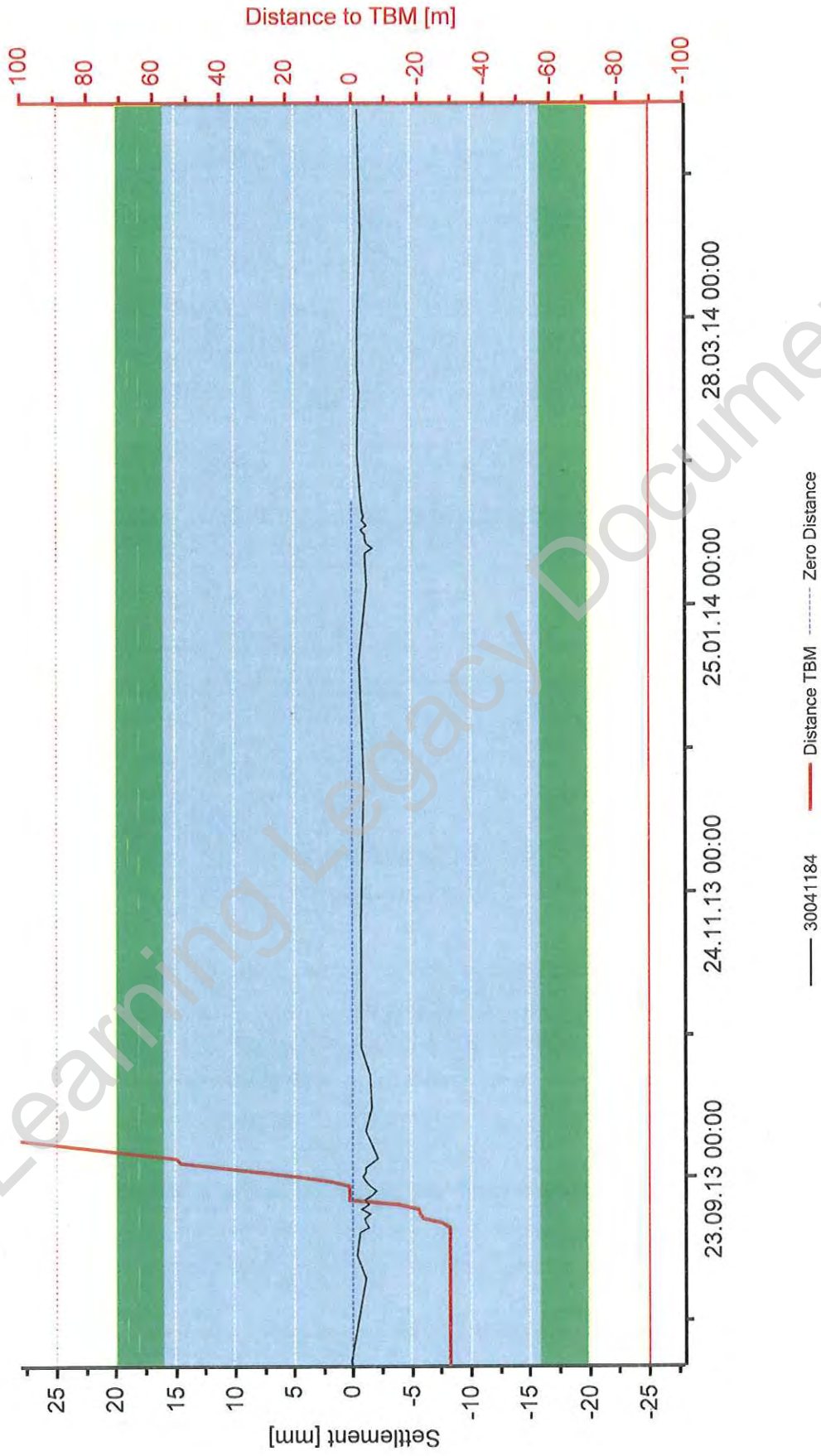




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 25.09.2013 09:05

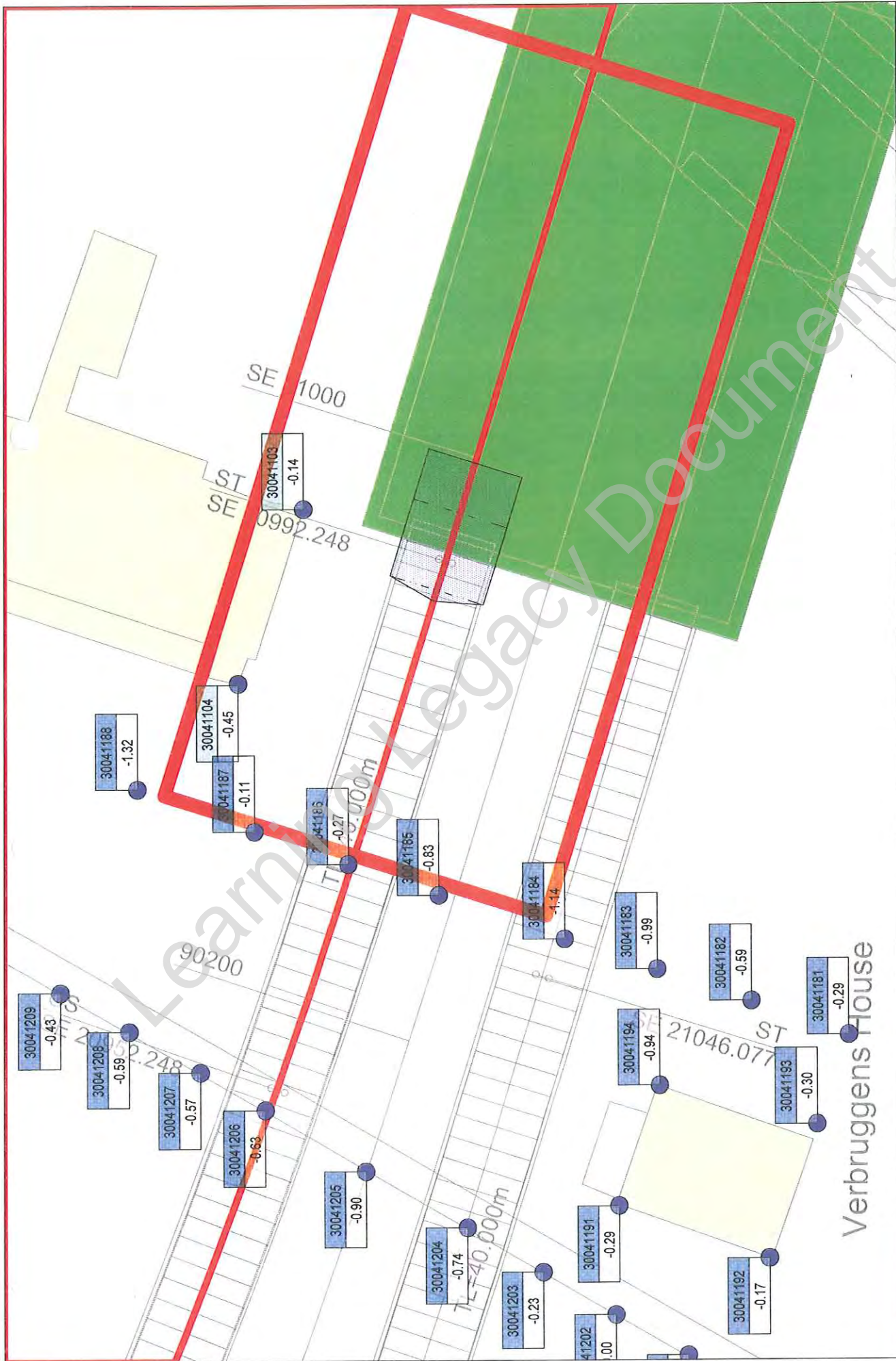


Point: 30041184

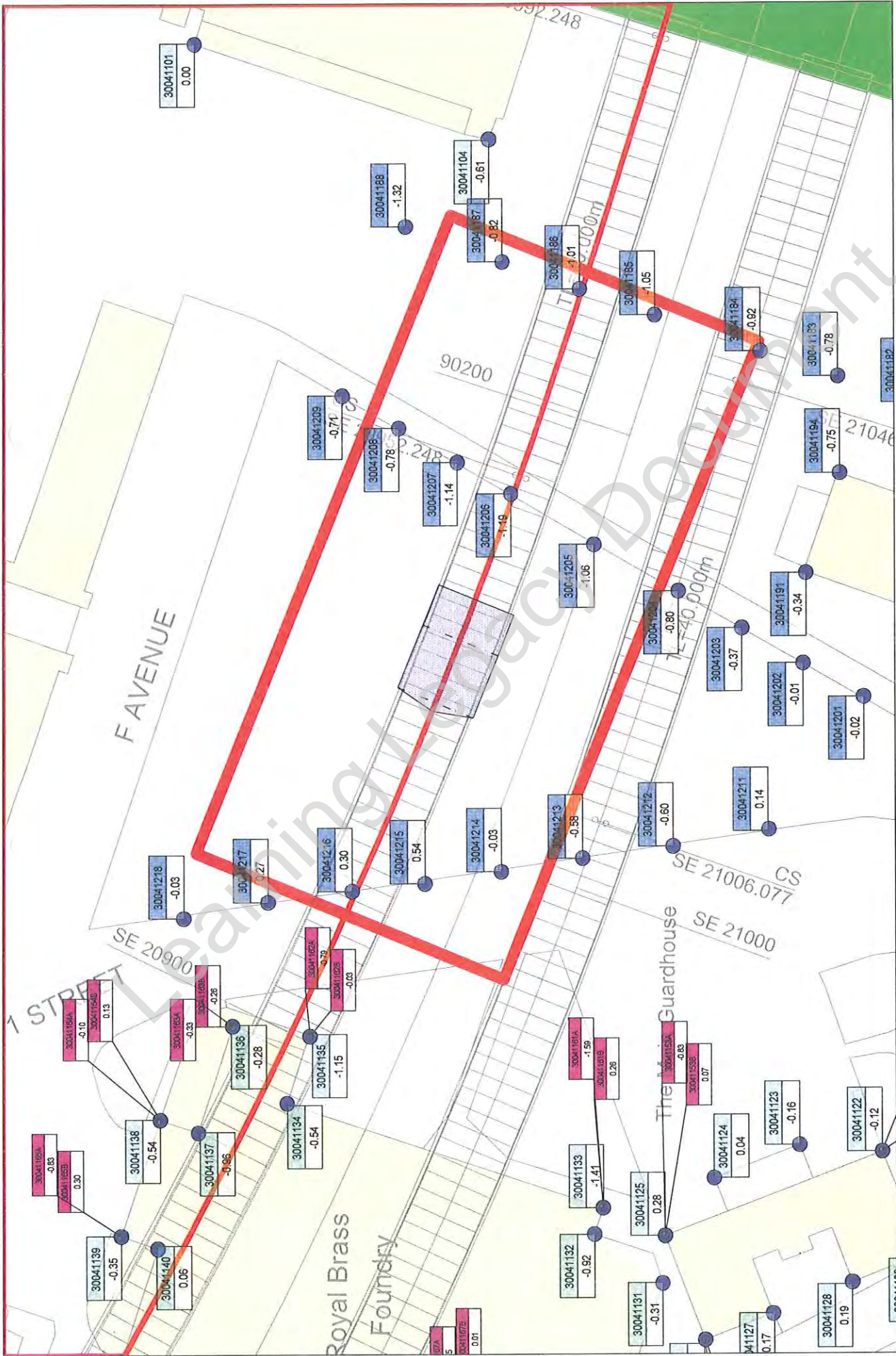


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - CS 15 - BH Hoarding 13.08.2013 - 12.05.2014
Date: 22.10.2014 18:12 Current Values: 22.10.2014 17:46





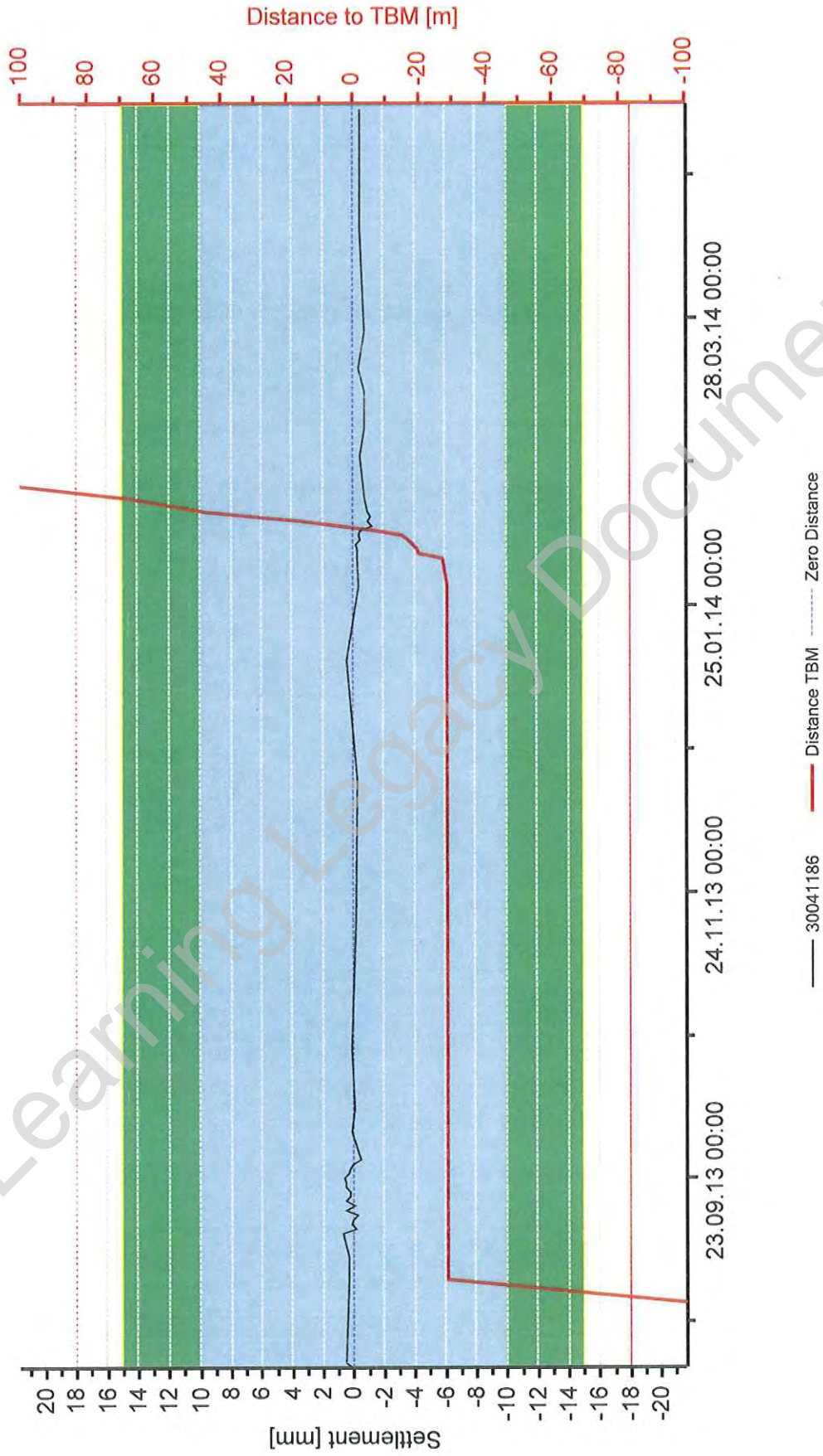
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 04.02.2014 17:53



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 13.02.2014 17:36



Point: 30041186



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - CS 15 - BH Hoarding 13.08.2013 - 12.05.2014
date: 19.10.2014 15:35 current values: 19.10.2014 15:19



Joint Venture

project: C310 Thames Tunnel
structure: CS15 Berkeley Homes Hoarding

project: C310 Thames Tunnel
structure: CS15 Berkeley Homes Hoarding

Joint Venture

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			
		14/06/2013	14/06/2013	21/06/2013	21/06/2013	28/06/2013	28/06/2013	05/07/2013	05/07/2013	12/07/2013	12/07/2013	19/07/2013	19/07/2013	26/07/2013	26/07/2013	02/08/2013	02/08/2013	09/08/2013	09/08/2013	16/08/2013	16/08/2013	23/08/2013	23/08/2013	30/08/2013	30/08/2013		
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 1161	109.282
3004 1162	109.143	109.143	0	109.142	-1	109.143	1	109.142	-1	109.142	0	-1	109.142	0	-1	109.143	0	109.143	0	109.142	0	-1	109.142	0	109.142	0	-1
3004 1163	108.985	108.985	0	108.983	-1	108.984	1	108.983	-1	108.983	0	-1	108.983	0	-1	108.984	0	108.984	0	108.984	0	-1	108.983	0	108.983	0	-2
3004 1164	108.937	108.937	0	108.936	-1	108.937	1	108.936	-1	108.935	0	-1	108.935	0	-1	108.936	0	108.936	0	108.936	0	-1	108.935	0	108.935	0	-2
3004 1165	108.761	108.761	0	108.762	1	108.762	1	108.761	-1	108.761	0	0	108.761	0	0	108.761	0	108.761	0	108.761	0	-1	108.761	0	108.761	0	-1
3004 1166	108.728	108.728	0	108.728	0	108.728	0	108.728	0	108.728	-1	0	108.728	-1	0	108.728	0	108.728	0	108.728	0	0	108.728	0	108.728	0	0
3004 1167	108.543	108.543	0	108.543	0	108.543	0	108.543	0	108.543	-1	0	108.543	-1	0	108.543	0	108.543	0	108.543	0	0	108.543	0	108.543	0	0
3004 1168	108.426	108.426	0	108.426	0	108.426	0	108.426	0	108.426	-1	0	108.426	-1	0	108.426	0	108.426	0	108.426	0	0	108.426	0	108.426	0	0



Joint Venture

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	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					
CS10	13/07/13	109.282	109.282	0	20/08/2013	109.282	0	23/09/2013	109.282	0	24/09/2013	109.282	0	26/09/2013	109.282	0	01/10/2013	109.282	0	08/10/2013	109.281	0	15/10/2013	109.281	0	21/10/2013	109.281	0	
3004 1181		109.282	109.282	0	0	109.282	0	0	109.282	0	0	109.282	0	0	109.281	0	-1	109.282	0	0	109.281	0	-1	109.281	0	0	109.281	0	-1
3004 1182		109.143	109.143	0	-1	109.143	0	-1	109.143	0	-1	109.143	0	-1	109.142	0	-1	109.143	0	-1	109.142	0	-1	109.142	0	-1	109.143	0	-1
3004 1183		108.985	108.985	0	-1	108.984	0	-1	108.984	0	-1	108.983	0	-1	108.983	0	-2	108.984	0	-2	108.983	0	-2	108.983	0	-1	108.983	0	-2
3004 1184		108.937	108.935	0	-2	108.936	0	-1	108.936	0	-1	108.936	0	-1	108.935	0	-2	108.936	0	-2	108.935	-1	-2	108.935	0	-2	108.936	0	-1
3004 1185		108.761	108.761	0	0	108.761	0	0	108.761	0	0	108.761	0	0	108.761	0	-1	108.761	0	-1	108.760	0	-1	108.761	0	-1	108.761	0	0
3004 1186		108.728	108.728	0	0	108.729	0	1	108.729	0	1	108.728	0	0	108.728	0	0	108.728	0	0	108.728	0	0	108.728	0	0	108.728	0	0
3004 1187		108.543	108.543	0	1	108.544	0	1	108.544	0	1	108.543	0	1	108.543	0	0	108.543	0	0	108.543	0	0	108.543	0	0	108.543	0	0
3004 1188		108.426	108.426	0	1	108.427	0	1	108.427	0	1	108.426	0	1	108.426	0	1	108.426	0	0	108.426	0	0	108.426	0	0	108.425	-1	0

Legacy Document

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	19/11/2013	elevation	deviation from last/ baseline	19/11/2013	elevation	deviation from last/baseline	29/07/2014	elevation	deviation from last/baseline	04/02/2014	elevation	deviation from last/baseline	04/02/2014	elevation	deviation from last/ baseline	07/02/2014	elevation	deviation from last/baseline	09/02/2014	elevation	deviation from last/baseline	10/02/2014	elevation	deviation from last/baseline	11/02/2014		
3004 1181	109.282	109.281	0	-1	109.282	0	0	109.281	-1	109.282	0	0	109.282	0	0	109.282	0	-1	109.281	0	0	109.282	0	0	109.282	0	0	
3004 1182	109.143	109.143	0	-1	109.143	0	0	109.142	-1	109.143	0	-1	109.142	-2	109.143	0	-1	109.142	1	109.143	0	-1	109.143	0	0	109.143	0	-1
3004 1183	108.985	108.984	1	-1	108.984	0	-1	108.983	-1	108.984	0	-1	108.983	0	-1	108.984	0	-1	108.983	0	-1	108.984	0	-1	108.984	0	-1	
3004 1184	108.937	108.936	0	-1	108.936	0	-1	108.936	-1	108.936	0	-1	108.936	0	-1	108.936	-2	108.936	0	-1	108.936	0	-1	108.936	0	-1	108.936	-1
3004 1185	108.761	108.761	0	-1	108.761	1	0	108.760	-1	108.761	0	-1	108.760	0	-1	108.760	0	-1	108.760	0	-1	108.760	0	-1	108.761	0	-1	
3004 1186	108.728	108.728	0	0	108.728	0	0	108.728	-1	108.728	0	0	108.728	0	0	108.728	0	0	108.728	0	0	108.728	0	0	108.728	0	0	
3004 1187	108.543	108.542	-1	0	108.543	0	0	108.542	-1	108.543	0	0	108.543	0	0	108.543	0	0	108.542	0	0	108.542	0	0	108.542	0	-1	
3004 1188	108.426	108.424	-1	-1																								

Legacy Document

Joint Venture

project: C310 Thames Tunnel


Joint Venture

project: C310 Thames Tunnel

Joint Venture

No. of reading date	baseline elevation	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
3004 1181	109.282	109.282	0	109.281	0	109.282	0	109.282	0	109.282	0	109.282	0	109.282	0	109.282	0	109.282	0	109.282	0	109.282	0	109.282	0
3004 1182	105.143	105.143	0	105.143	0	105.143	0	105.143	0	105.143	0	105.143	0	105.143	0	105.143	0	105.143	0	105.143	0	105.143	0	105.143	0
3004 1183	106.964	106.964	0	106.964	0	106.964	0	106.964	0	106.964	0	106.964	0	106.964	0	106.964	0	106.964	0	106.964	0	106.964	0	106.964	0
3004 1184	106.936	106.936	0	106.936	0	106.936	0	106.936	0	106.936	0	106.936	0	106.936	0	106.936	0	106.936	0	106.936	0	106.936	0	106.936	0
3004 1185	108.761	108.760	0	108.760	0	108.760	0	108.760	0	108.761	0	108.761	0	108.761	0	108.761	0	108.761	0	108.761	0	108.761	0	108.761	0
3004 1186	106.728	106.727	0	106.727	0	106.727	0	106.727	0	106.728	0	106.728	0	106.727	0	106.727	0	106.728	0	106.728	0	106.728	0	106.728	0
3004 1187	106.543	106.542	0	106.542	0	106.542	0	106.542	0	106.543	0	106.542	0	106.542	0	106.542	0	106.543	0	106.542	0	106.542	0	106.542	0
3004 1188	106.426																								

Legacy Document

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

APPENDIX 55
Verbruggens House

Learning Legacy Document

monitoring asset	Area Royal Arsenal		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	Verbrueggens House		
sensor type:	manual levelling studs		
chainage:	90200	point no.:	3004 1191 - 3004 1194
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	13/08/13	0.00		
TBM 1	start ZOI	17/09/13	-1.87	3004 1194
	end ZOI	26/09/13	-1.74	3004 1194
TBM 2	start ZOI	08/02/14	-1.20	3004 1194
	end ZOI	16/02/14	-0.71	3004 1194
longterm	24/09/14	-2.19	3004 1194	

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

3004 1191 - 3004 1194

Overall, none of the points reached any trigger value.

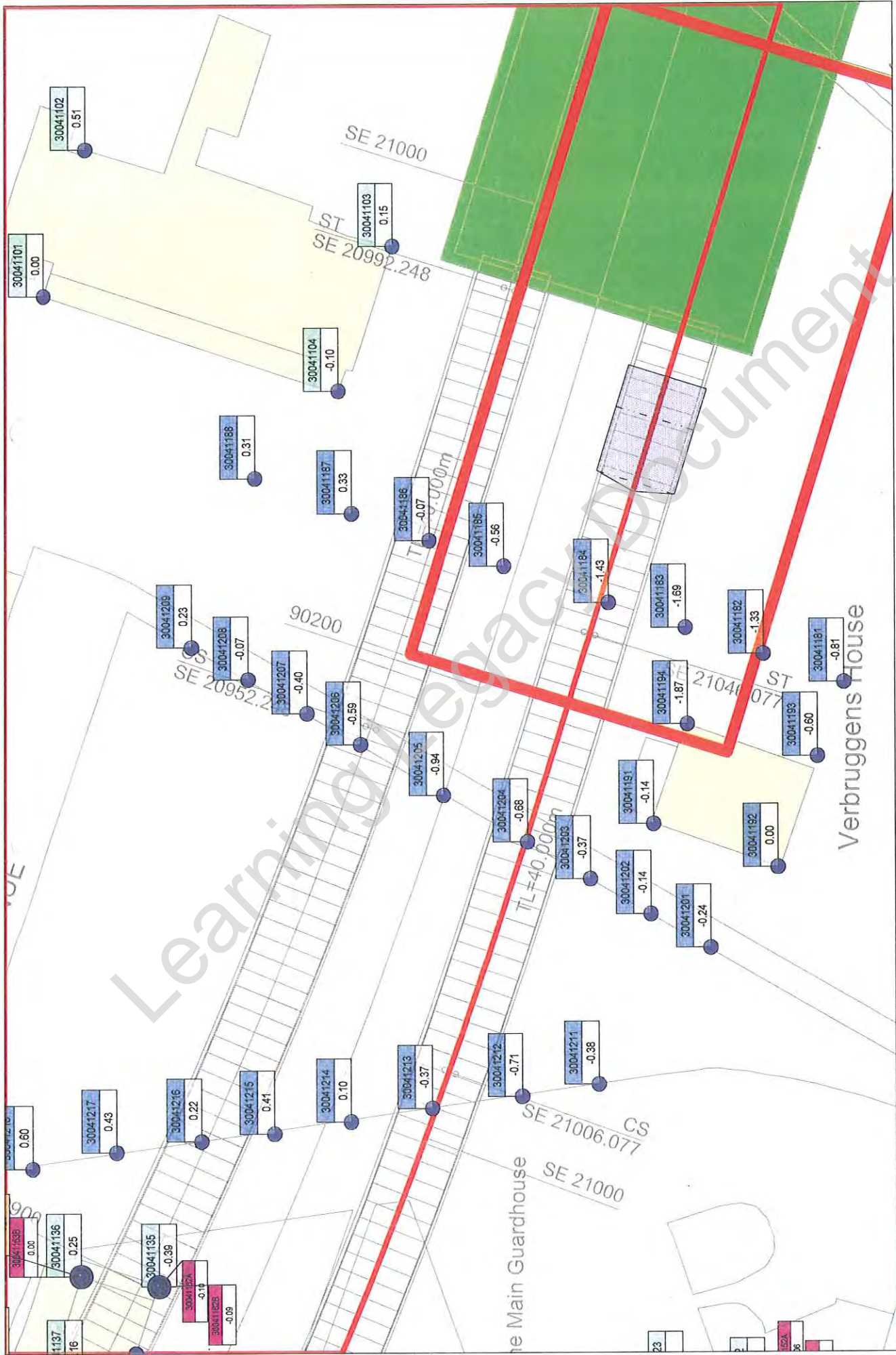
Under consideration of temperature differences and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.

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

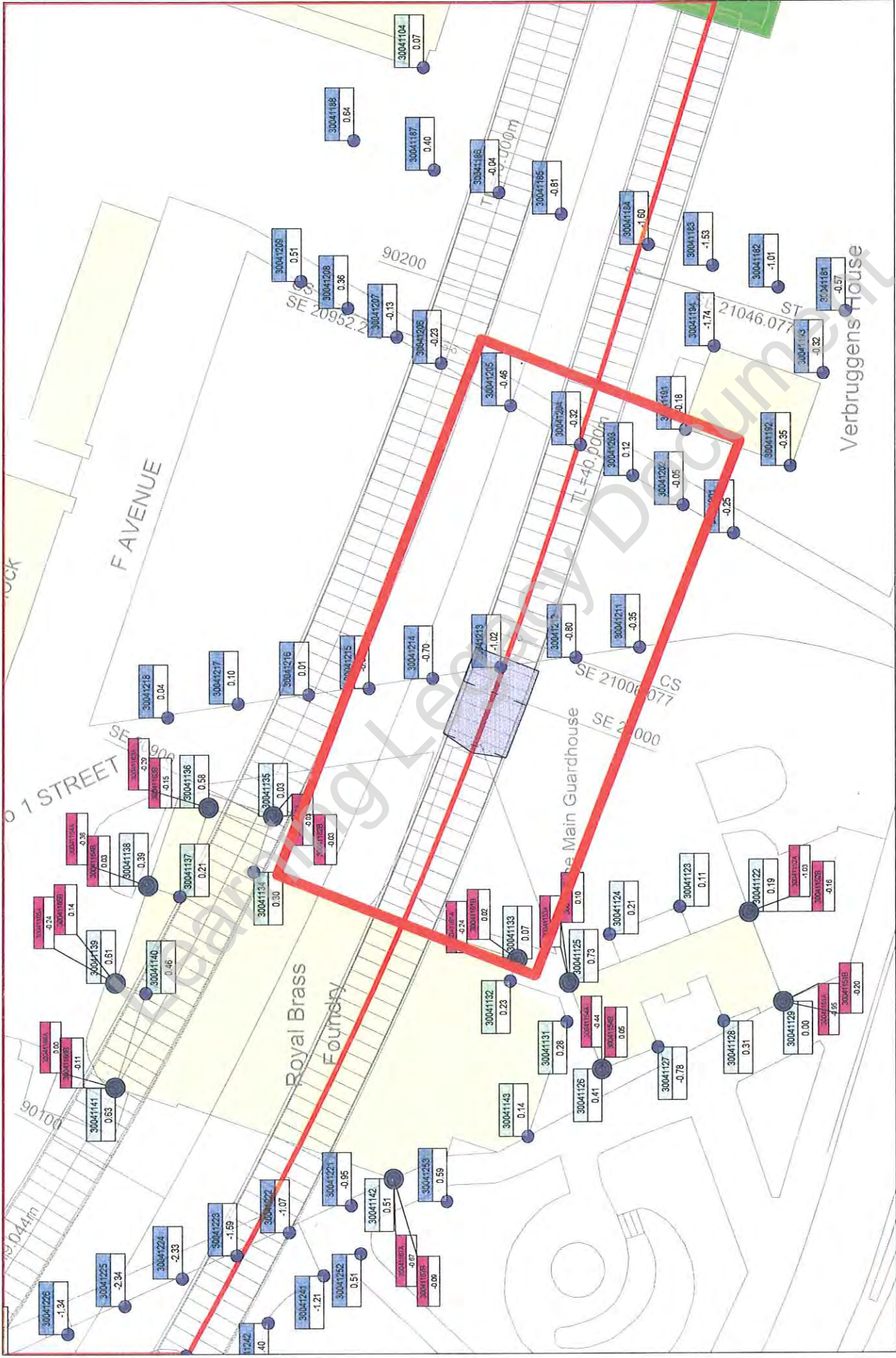
print name: 

HMJV project role: Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 17.09.2013 09:00

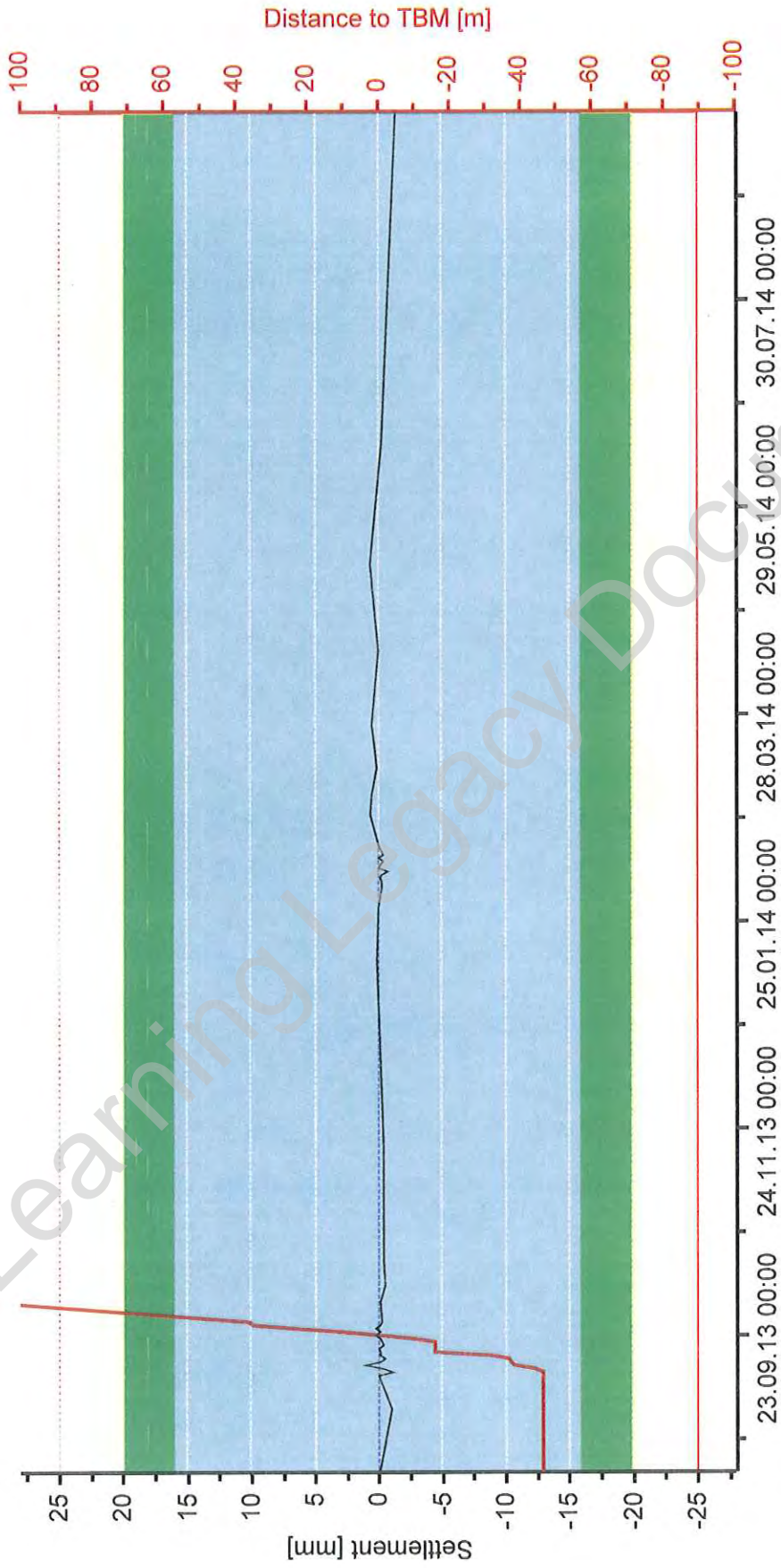




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 26.09.2013 09:00



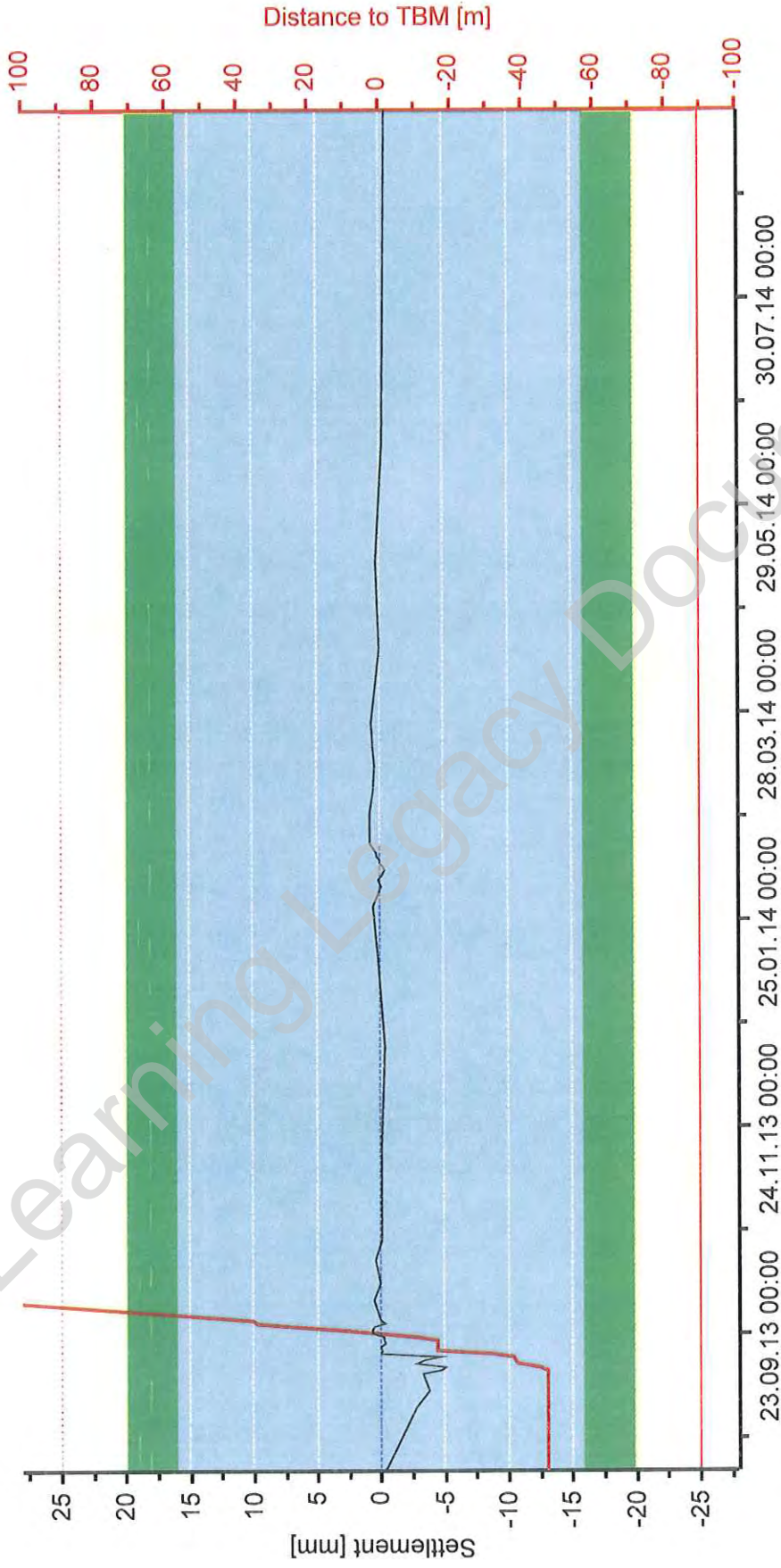
Point: 30041191



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Verbruggen House 13.08.2013 - 24.09.2014
Date: 23.10.2014 13:45 Current Values: 23.10.2014 13:33



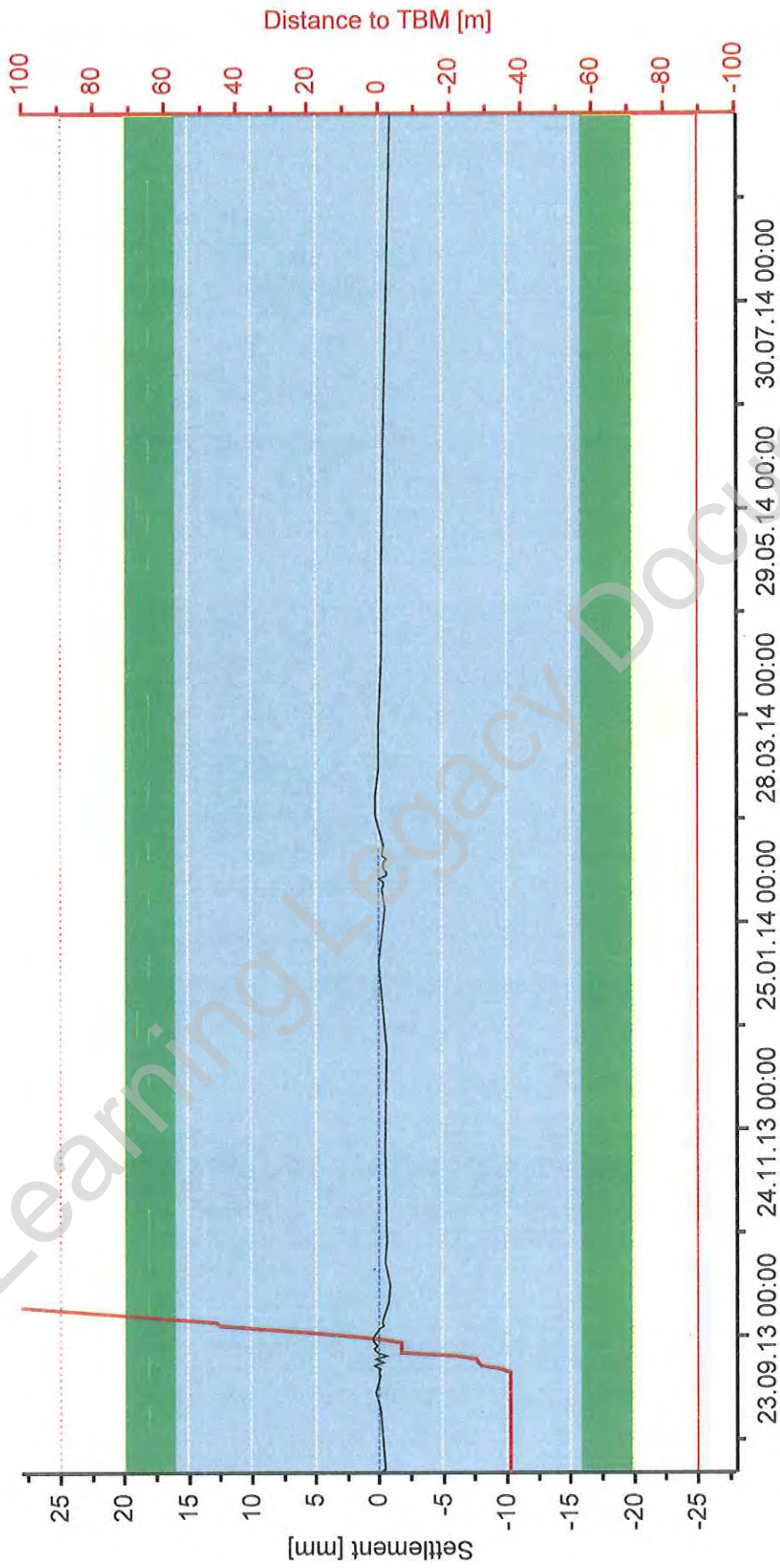
Point: 30041192



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Verbruggen House 13.08.2013 - 24.09.2014
Date: 23.10.2014 13:46 Current Values: 23.10.2014 13:33

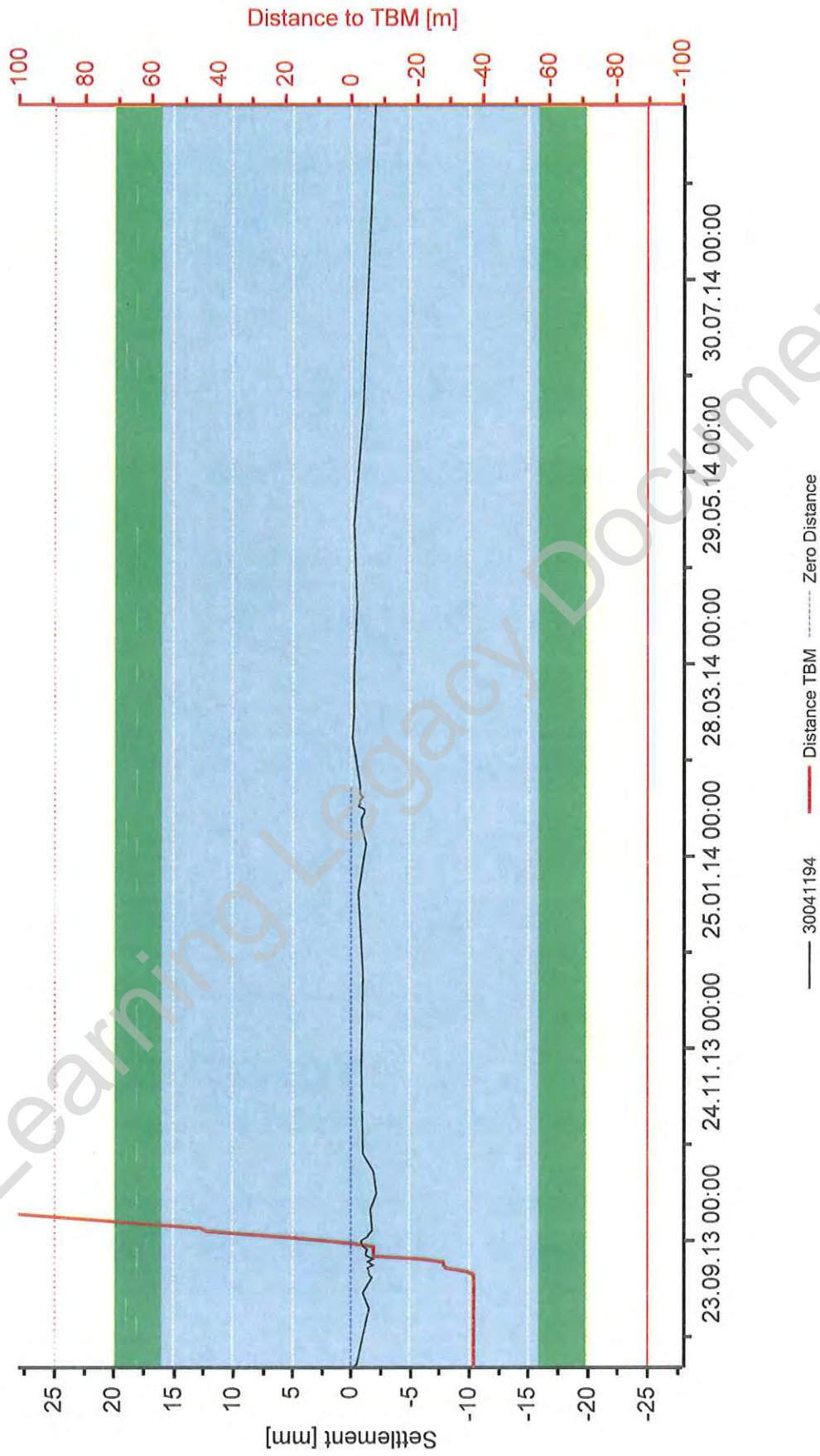


Point: 30041193



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Verbruggen House 13.08.2013 - 24.09.2014
Date: 23.10.2014 13:41 Current Values: 23.10.2014 13:33

Point: 30041194

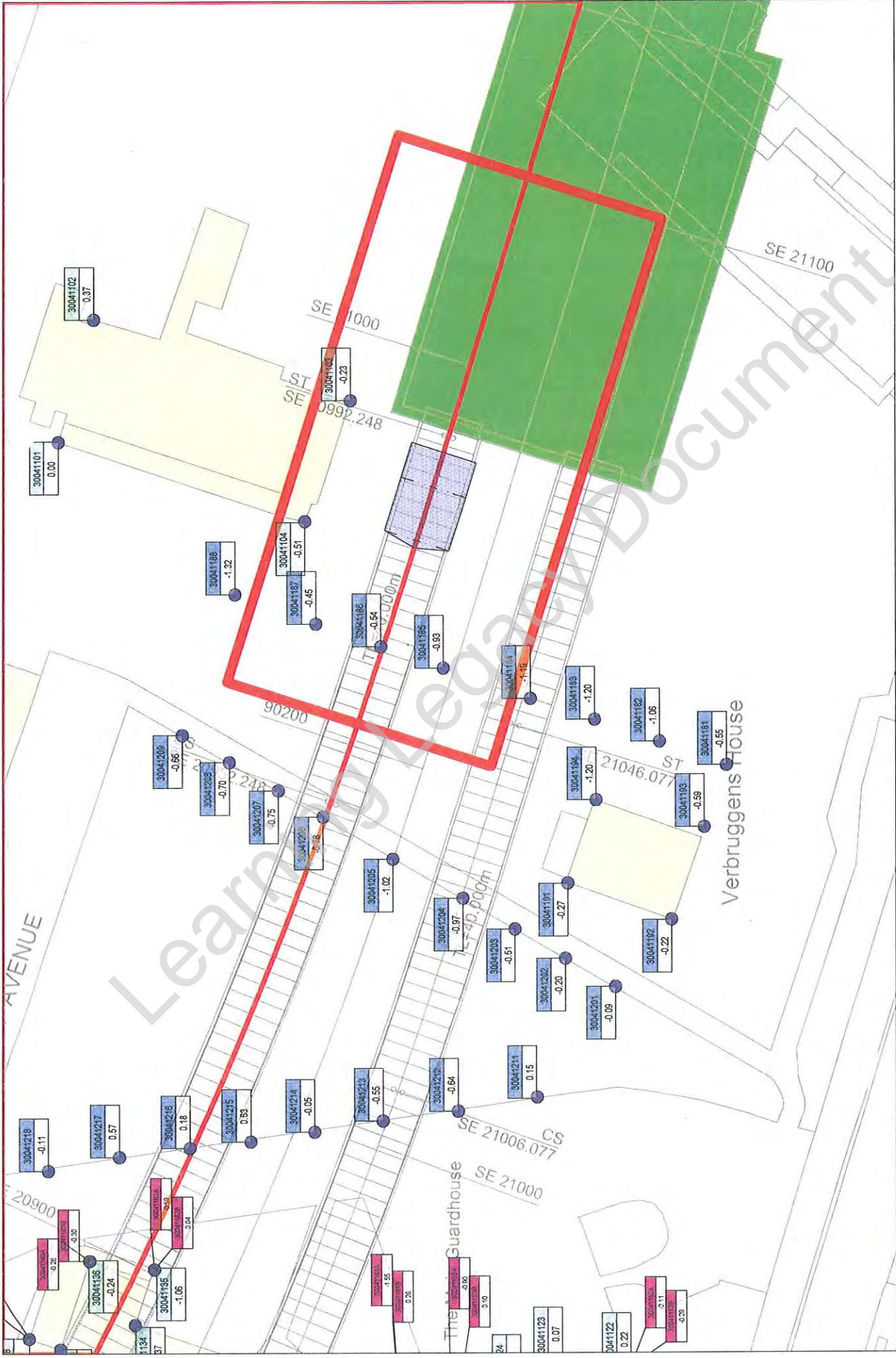


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Verbruggen House 13.08.2013 - 24.09.2014

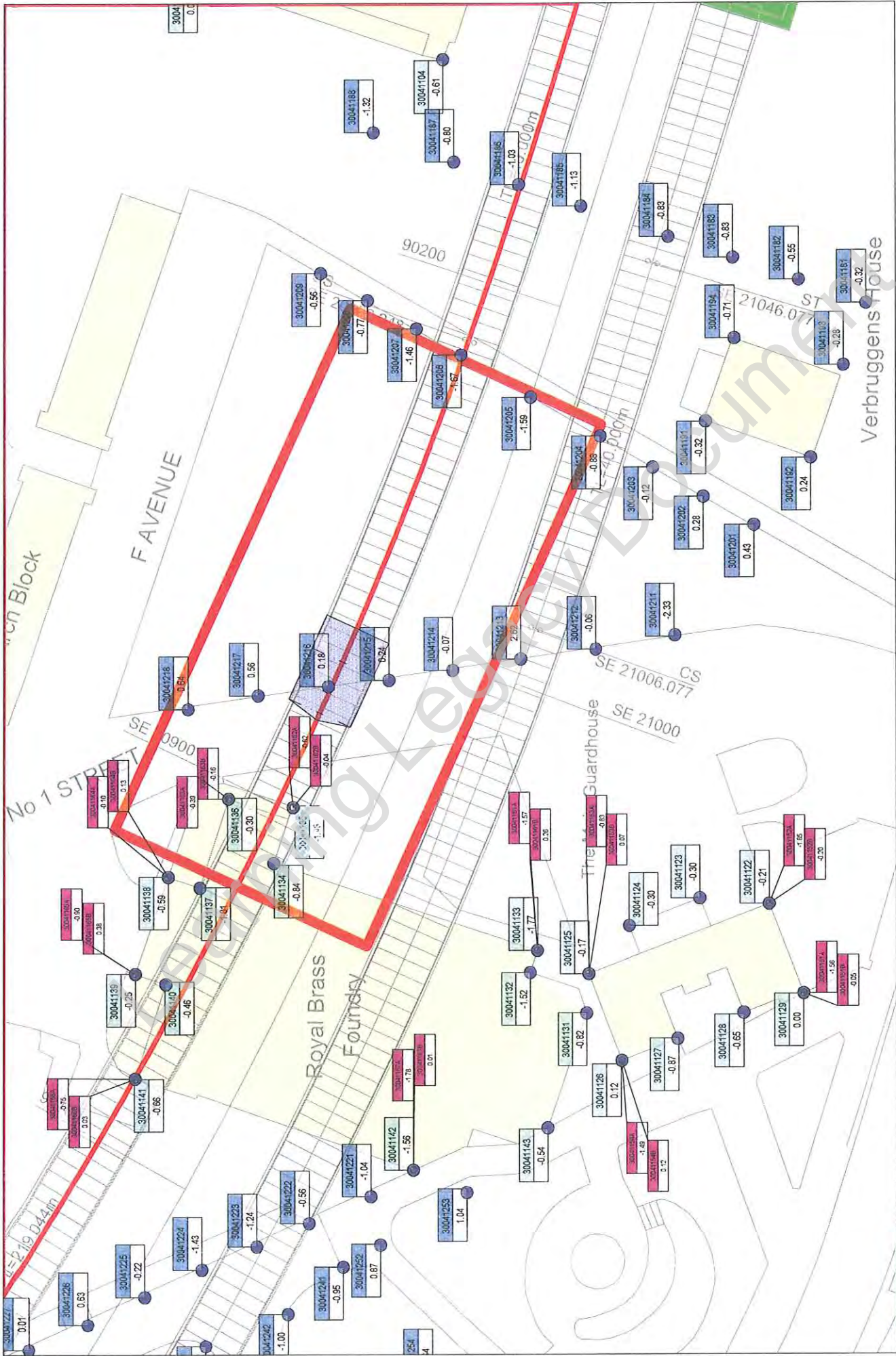
Date: 23.10.2014 13:43 Current Values: 23.10.2014 13:33





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 08.02.2014 15:35

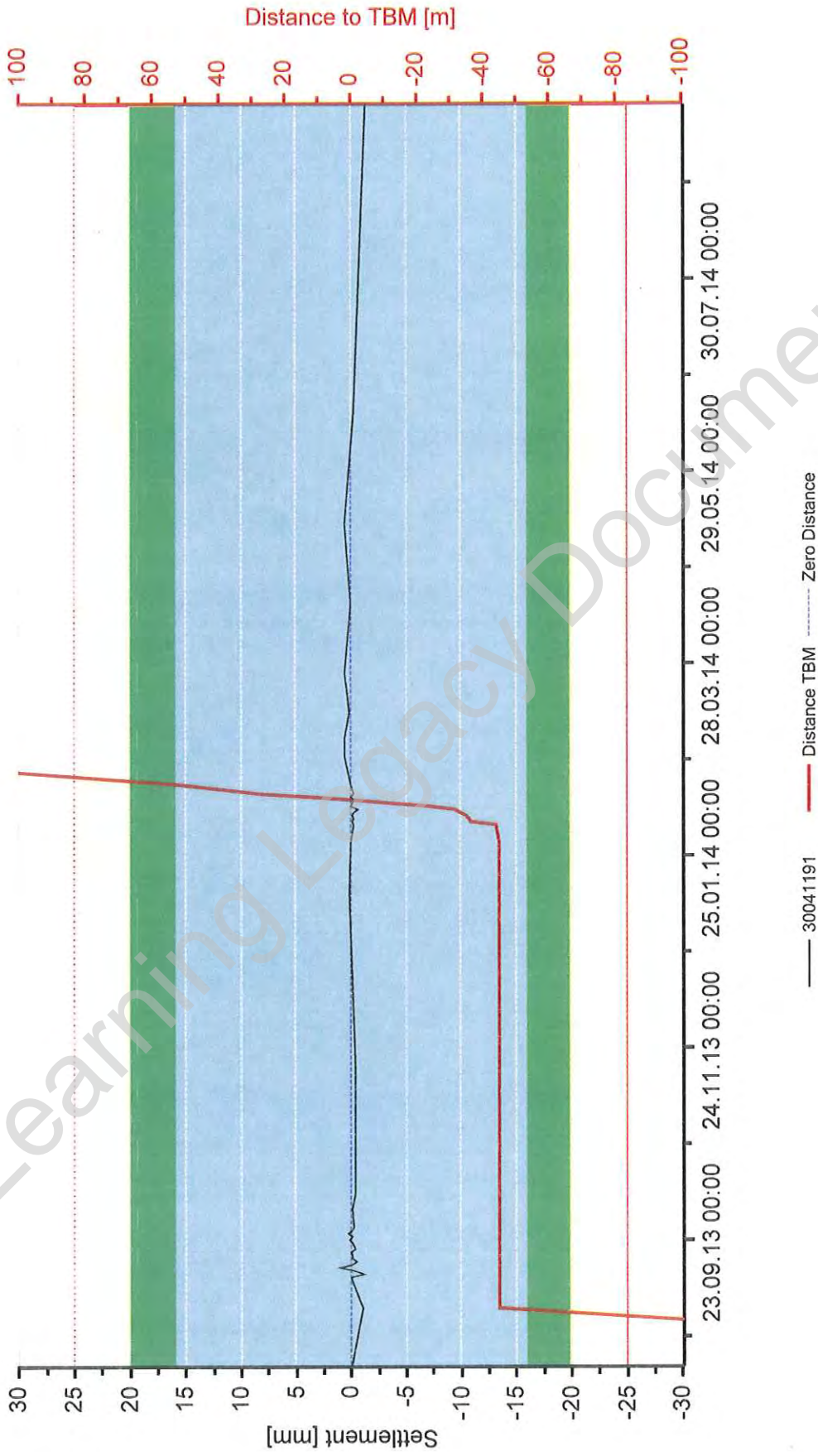




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 16.02.2014 09:00



Point: 30041191



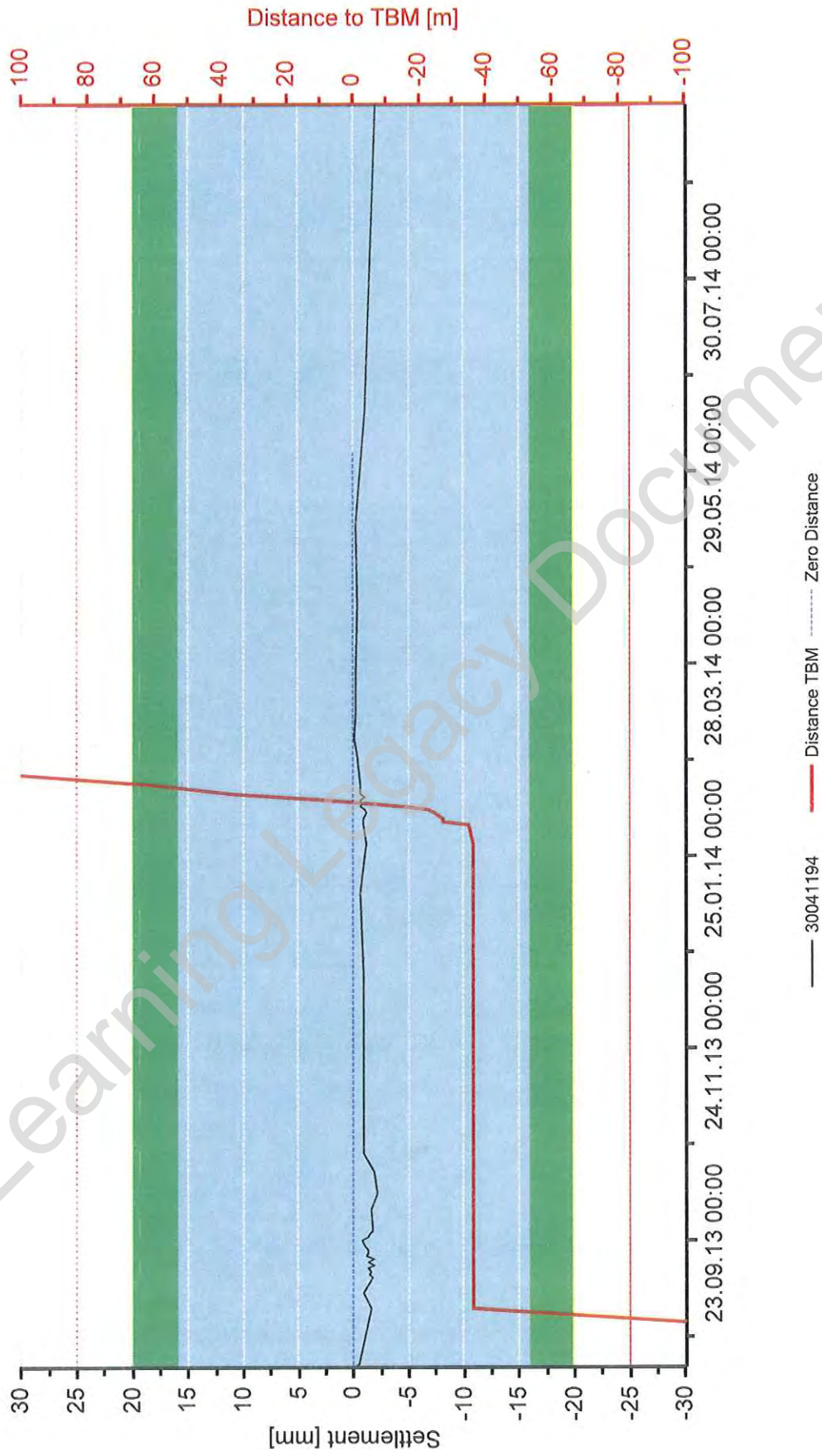
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: EB Tunnel - Verbruggen House 13.08.2013 - 24.09.2014

date: 23.10.2014 09:55 current values: 23.10.2014 09:41



Point: 30041194



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Verbruggen House 13.08.2013 - 24.09.2014
date: 23.10.2014 09:53 current values: 23.10.2014 09:41



monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: Verbruggens House																			
No. of reading	baseline	1. following		2. following		3. following		4. following		5. following		6. 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						
		13/8/13			01/09/2013			06/09/2013			11/09/2013			12/09/2013			13/09/2013		
	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 1191	109.958		109.958	0	109.957	-1	109.957	0	109.958	1	109.957	-1	109.957	1	109.957	-1	109.957	1	0
3004 1192	110.102		110.102	0	110.100	-2	110.099	-1	110.099	1	110.098	-1	110.098	0	110.098	-1	110.098	0	-5
3004 1193	110.015		110.015	0	110.015	0	110.016	0	110.015	0	110.015	0	110.015	0	110.015	0	110.015	0	0
3004 1194	109.578		109.577	-1	109.576	-1	109.577	1	109.576	-1	109.576	-1	109.576	0	109.576	0	109.576	0	-2

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: Verbruggens House

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
	13/8/13													
3004 1191		109.958	109.959	1	109.958	-1	0	109.957	0	109.958	0	109.958	0	0
3004 1192		110.102	110.100	2	110.099	-1	-3	110.098	-1	110.103	new baseline	110.103	0	0
3004 1193		110.015	110.016	0	110.015	-1	0	110.016	1	110.015	-1	110.016	1	0
3004 1194		109.578	109.576	0	109.576	-1	-2	109.576	1	109.576	0	109.576	1	-1

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: Verbruggens House

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	
	13/8/13														
		20/09/2013											25/09/2013		
3004 1191	109.958	109.957	0	0	109.958	0	0	109.958	0	0	109.958	0	109.958	0	0
3004 1192	110.102	110.102	0	0	110.102	0	0	110.103	1	1	110.103	0	110.103	0	1
3004 1193	110.015	110.015	0	0	110.016	0	0	110.016	0	0	110.016	0	110.015	0	0
3004 1194	109.578	109.576	0	-1	109.577	0	-1	109.577	0	-1	109.576	-1	109.576	0	-2

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **Verbruggens House**

No. of reading	19. following		20. following		21. following		22. following		23. following		24. 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
	13/8/13	25/09/2013										
3004 1191	109.958		109.958	0	109.958	0	109.958	0	109.957	0	109.957	0
3004 1192	110.102		110.102	-1	110.103	0	110.103	-1	110.103	0	110.103	0
3004 1193	110.015		110.015	0	110.015	0	110.015	0	110.015	0	110.015	0
3004 1194	109.578		109.576	0	109.576	0	109.575	-1	109.576	0	109.577	1

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: Verbruggens House

No. of reading	baseline	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
	13/8/13												
3004 1191	109.958	18/11/2013	109.957	0	18/12/2013	109.958	0	13/01/2014	109.958	0	04/02/2014	109.958	0
3004 1192	110.102		110.103	0		110.102	0		110.103	1		110.103	0
3004 1193	110.015		110.015	0		110.015	0		110.015	1		110.015	0
3004 1194	109.578		109.577	0		109.577	0		109.576	-1		109.577	0

Confidentiality Document

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: Verbruggens House

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
	13/6/13													
3004 1191		109.958	109.957	0	109.958	0	109.958	0	109.957	0	109.958	1	109.958	0
3004 1192		110.102	110.103	0	110.103	0	110.102	0	110.102	0	110.102	0	110.103	0
3004 1193		110.015	110.015	0	110.015	0	110.015	-1	110.015	0	110.015	0	110.015	0
3004 1194		109.578	109.577	0	109.577	0	109.576	-1	109.576	0	109.577	0	109.577	-1

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: Verbruggens House

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
	13/6/13													
	12/02/2014													04/03/2014
	13/02/2014													26/02/2014
	17/02/2014													
	14/02/2014													
	109.958	109.957	109.958	0	109.957	0	109.958	0	109.958	0	109.958	1	109.958	0
3004 1191	109.958	109.957	109.958	0	109.957	0	109.958	0	109.958	0	109.958	1	109.958	0
3004 1192	110.102	110.103	110.103	0	110.103	0	110.103	0	110.103	1	110.103	0	110.103	0
3004 1193	110.015	110.015	110.015	0	110.015	0	110.015	0	110.015	0	110.016	1	110.016	0
3004 1194	109.578	109.577	109.577	0	109.577	0	109.577	0	109.577	0	109.577	0	109.577	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

No. of reading	43. following		44. following		45. following		46. following		47. following		48. following	
	baseline	12/03/2014	17/03/2014	25/03/2014	16/04/2014	12/05/2014	17/06/2014					
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 1191	109.958	109.958	0	109.958	0	109.958	-1	109.958	1	109.958	-1	0
3004 1192	110.102	110.103	0	110.103	0	110.103	-1	110.103	0	110.103	0	0
3004 1193	110.015	110.015	0	110.015	0	110.015	0	110.015	0	110.015	0	0
3004 1194	109.578	109.577	0	109.577	0	109.577	0	109.577	0	109.577	0	-1


monitoring table



Joint Venture

project: C310 Thames Tunnel

No. of reading	baseline		49. following									
	date	13/8/13	24/09/2014		elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline
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 1191	109.958		109.956	-1								
3004 1192	110.102		110.102	0								
3004 1193	110.015		110.014	-1								
3004 1194	109.578		109.575	-1								

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

APPENDIX 56

CS16 – Footpath Royal Arsenal

Learning Legacy Document

monitoring asset	Area Royal Arsenal		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	CS 16 - Footpath Royal Arsenal		
sensor type:	manual levelling studs		
chainage:	90190	point no.:	3004 1201 - 3004 1209
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	13/08/13	0.00		
TBM 1	start ZOI	19/09/13	-0.61	3004 1204
	end ZOI	28/09/13	-0.44	3004 1204
TBM 2	start ZOI	10/02/14	-0.53	3004 1206
	end ZOI	16/02/14	-1.67	3004 1206
longterm	24/09/14	-2.49	3004 1206	
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

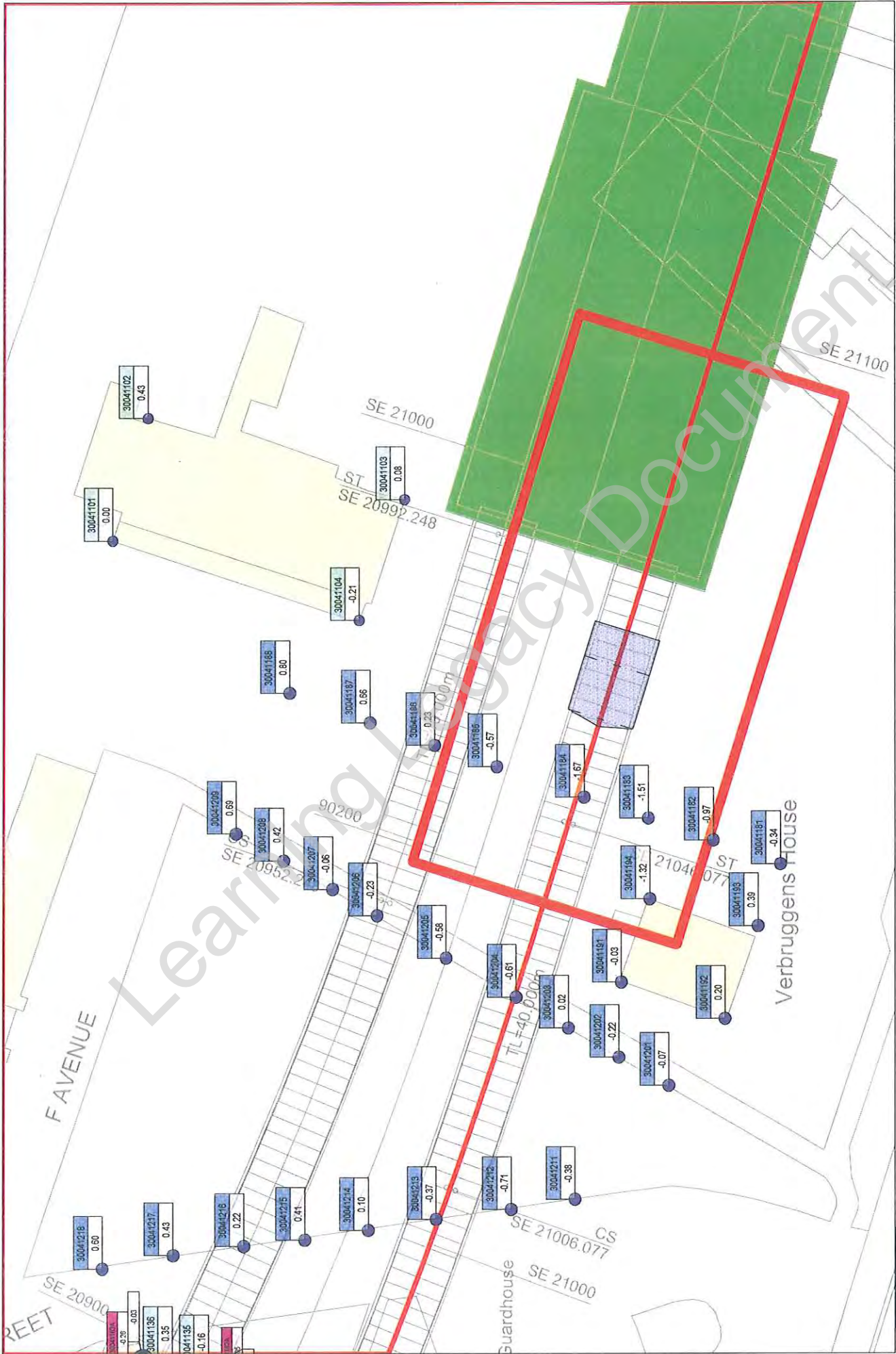
3004 1201 - 3004 1209
 Overall, none of the points reached any trigger value.
 Under consideration of temperature differences, the surrounding ground condition and the achievable accuracy of the measurement, HMJV has no concern to cease the monitoring.
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 08/01/15

print name:

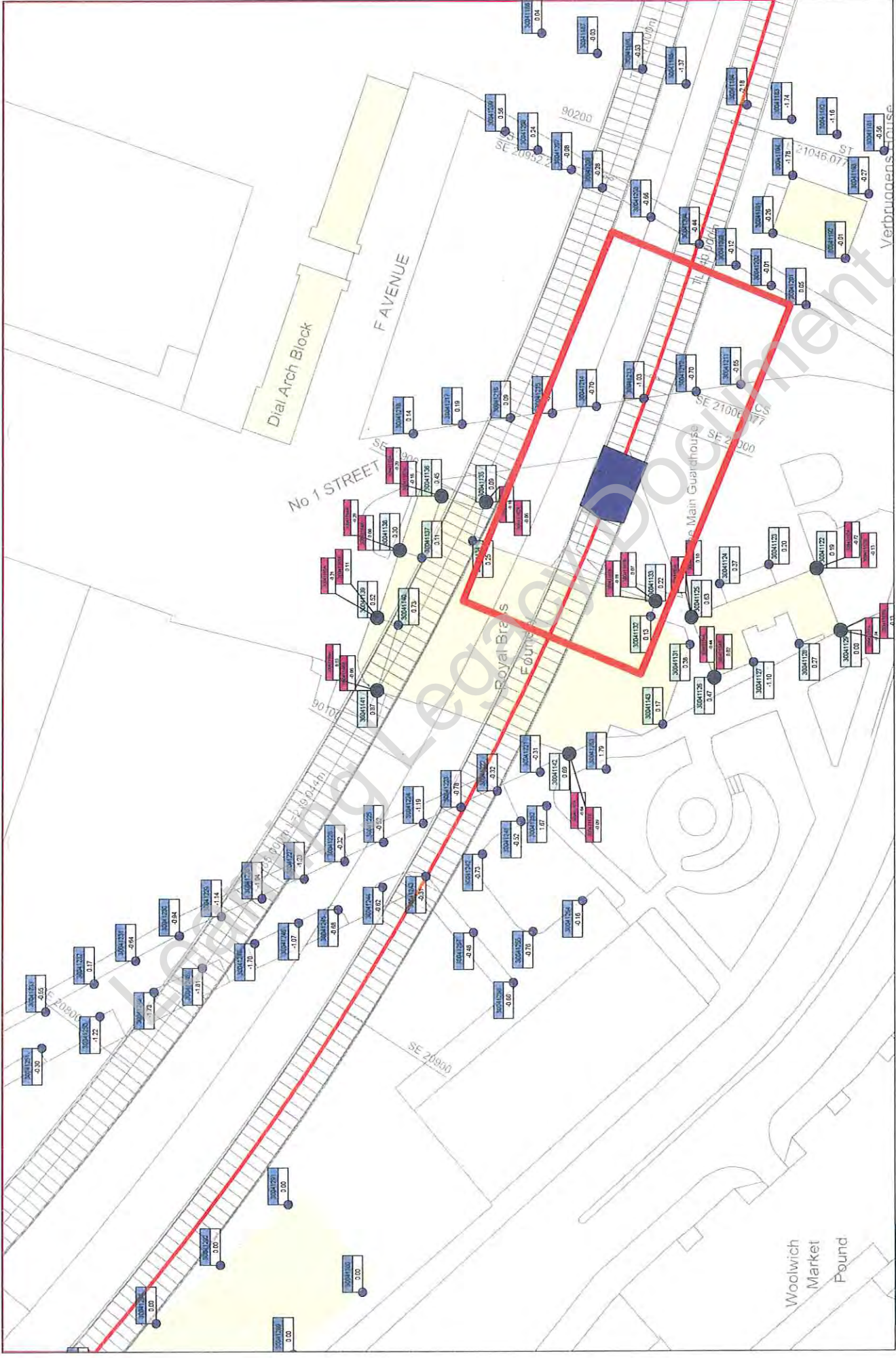
HMJV project role:

Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: portal excavation, construction base slab and capping beam
 current values: 19.09.2013 09:00

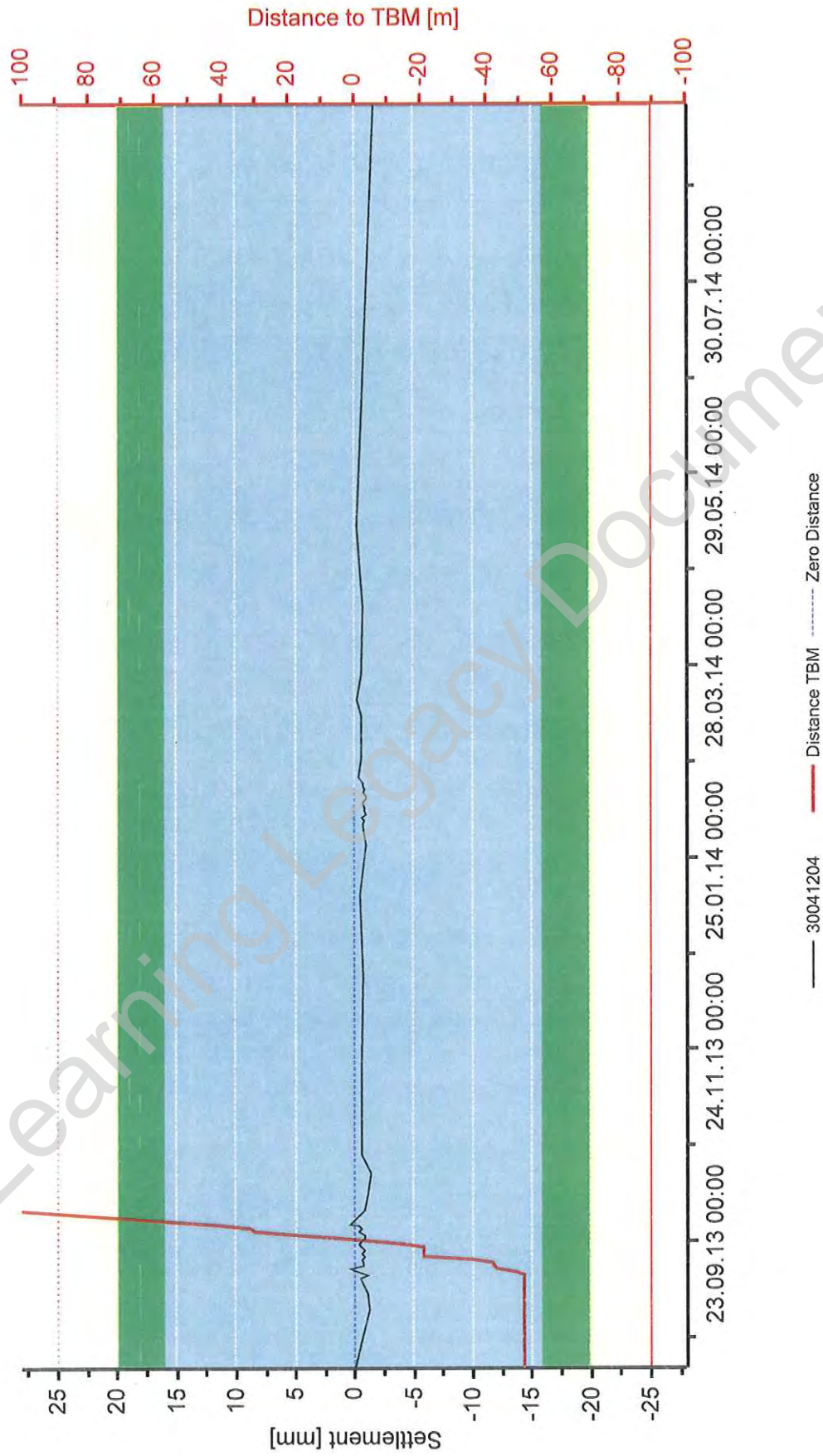




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 28.09.2013 09:59

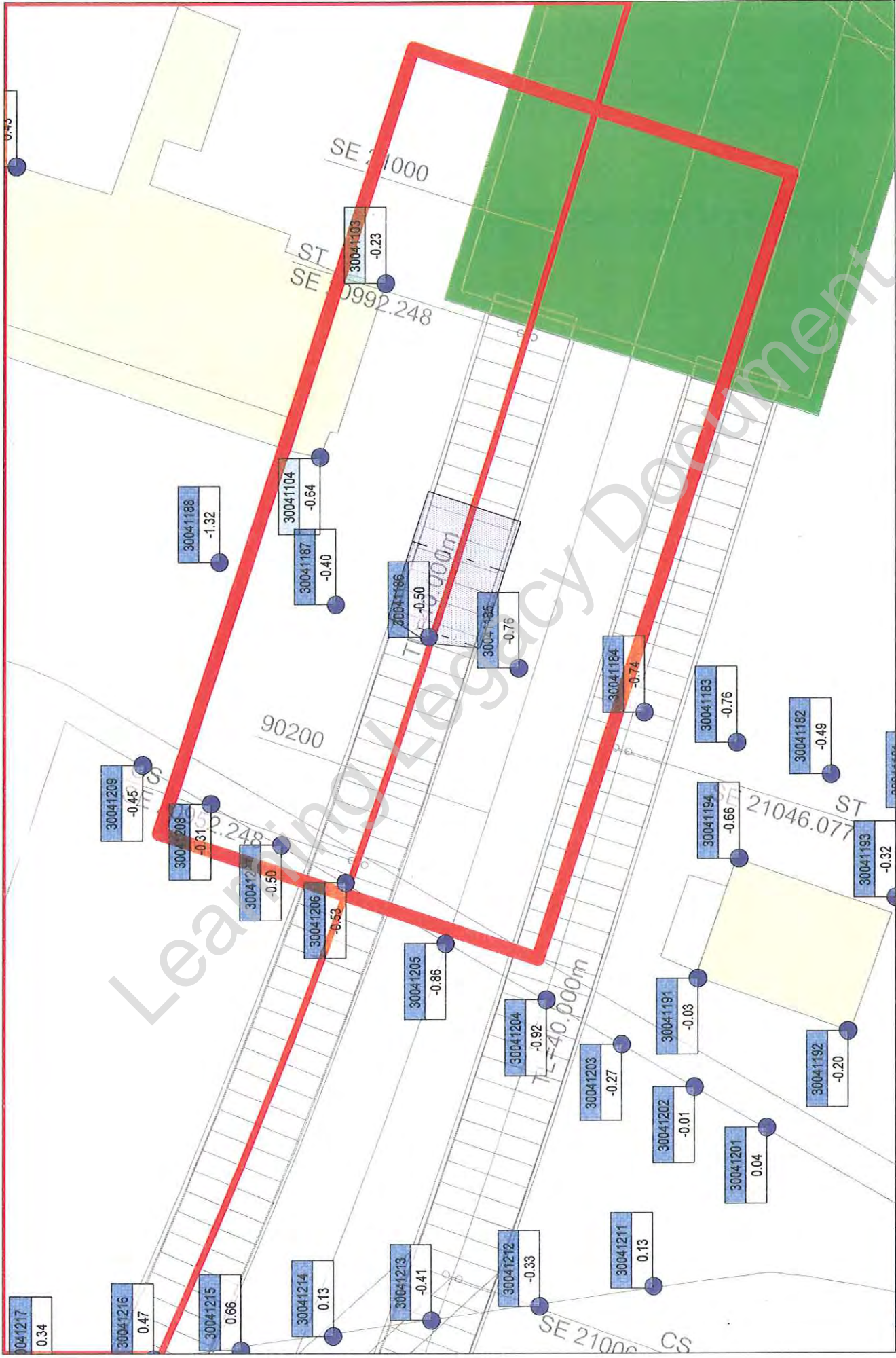


Point: 30041204



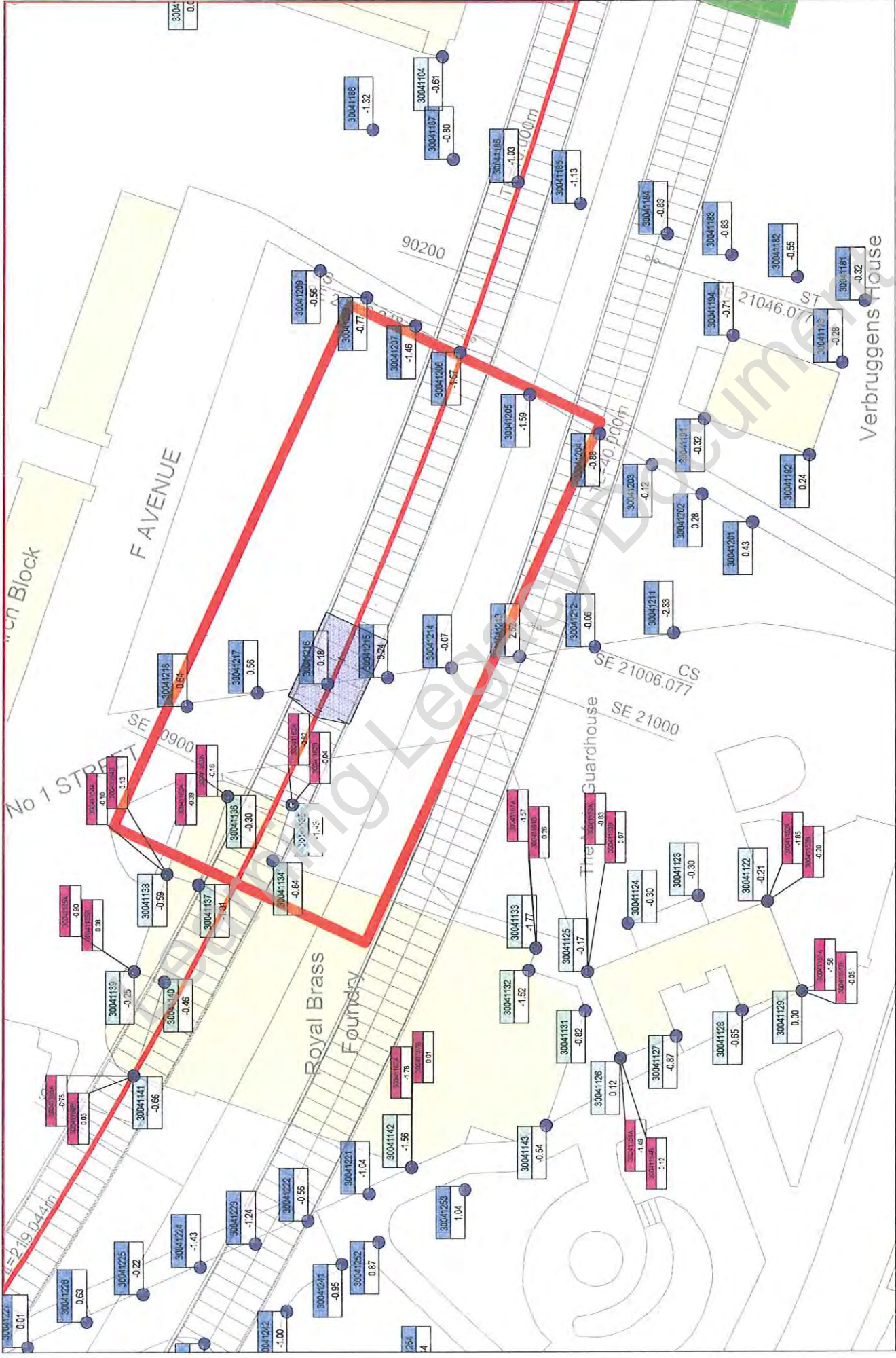
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - CS 16 - Footpath Royal Arsenal 13.08.2013 - 24.09.2014
Date: 22.10.2014 18:19 Current Values: 22.10.2014 18:01





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 10.02.2014 17:36

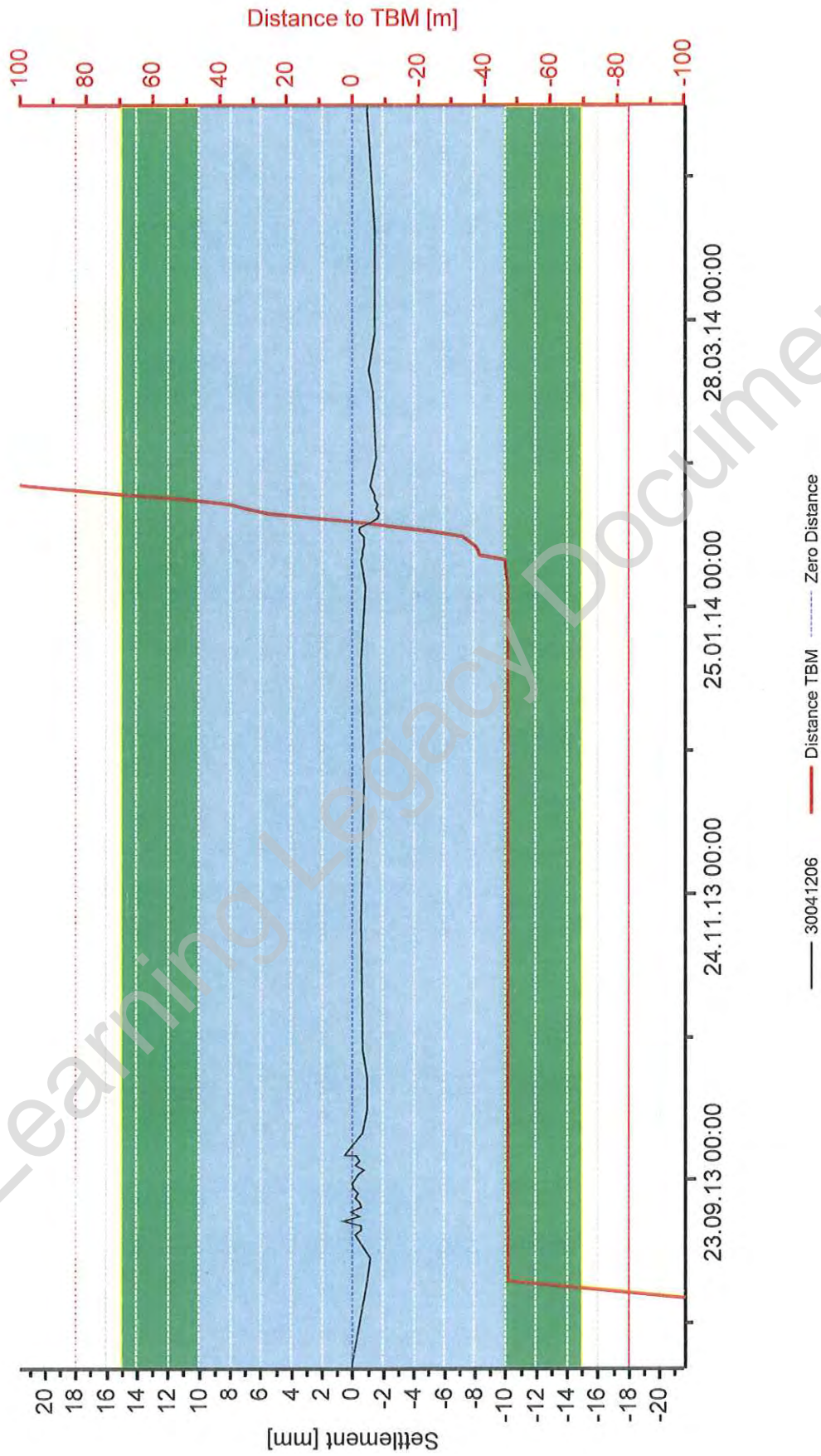




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 16.02.2014 09:00



Point: 30041206



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - CS 16 - Footpath Royal Arsenal 13.08.2013 - 24.09.2014
date: 19.10.2014 15:43 current values: 19.10.2014 15:34



monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS16 Footpath, Royal Arsenal**

No. of reading	baseline	1. following		2. following		3. following		4. following		5. following		6. 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
	13/8/13													
		14/08/2013											13/09/2013	
			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 1201	109.572	109.572	0	0	109.571	-1	109.572	1	109.572	0	109.571	-1	109.572	1
3004 1202	109.501	109.501	0	0	109.500	-1	109.502	2	109.501	-1	109.501	0	109.501	1
3004 1203	109.434	109.434	0	0	109.433	-1	109.433	0	109.434	0	109.433	-1	109.434	1
3004 1204	109.366	109.366	0	0	109.365	-1	109.365	0	109.365	-1	109.365	-1	109.366	1
3004 1205	109.280	109.280	0	0	109.279	-1	109.279	0	109.280	1	109.279	0	109.280	0
3004 1206	109.181	109.181	0	0	109.180	-1	109.180	0	109.181	1	109.180	0	109.180	0
3004 1207	109.111	109.111	0	0	109.111	-1	109.110	0	109.111	1	109.111	0	109.111	0
3004 1208	108.993	108.993	0	0	108.992	-1	108.992	0	108.993	1	108.993	0	108.993	0
3004 1209	108.878	108.878	0	0	108.878	0	108.878	0	108.879	1	108.879	0	108.879	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS16 Footpath, Royal Arsenal

No. of reading	baseline		7. following		8. following		9. following		10. following		11. following		12. following				
	date	elevation	date	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	
	13/8/13		14/09/2013		15/09/2013			16/09/2013		17/09/2013			18/09/2013			19/09/2013	
		elevation		elevation		elevation		elevation		elevation		elevation		elevation		elevation	
3004 1201		109.572		109.573		109.572		109.571		109.572		109.572		109.572		109.572	
3004 1202		109.501		109.502		109.501		109.502		109.501		109.501		109.501		109.501	
3004 1203		109.434		109.435		109.434		109.433		109.434		109.434		109.434		109.434	
3004 1204		109.366		109.366		109.365		109.365		109.365		109.365		109.365		109.365	
3004 1205		109.280		109.281		109.279		109.280		109.279		109.280		109.280		109.280	
3004 1206		109.181		109.182		109.180		109.181		109.180		109.181		109.181		109.181	
3004 1207		109.111		109.112		109.111		109.111		109.111		109.111		109.111		109.111	
3004 1208		108.993		108.994		108.993		108.993		108.993		108.993		108.993		108.993	
3004 1209		108.878		108.880		108.879		108.879		108.879		108.879		108.879		108.879	

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS16 Footpath, Royal Arsenal

No. of reading	baseline		13. following		14. following		15. following		16. following		17. following		18. following	
	date	elevation	date	elevation	date	elevation	date	elevation	date	elevation	date	elevation	date	elevation
No.				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 1201	13/8/13	109.572	20/09/2013	109.572	21/09/2013	109.572	22/09/2013	109.572	23/09/2013	109.572	24/09/2013	109.572	25/09/2013	109.573
3004 1202		109.501		0		109.501		109.501		109.501		109.501		109.501
3004 1203		109.434		-1		109.434		109.434		109.434		109.434		109.434
3004 1204		109.366		0		109.365		109.366		109.365		109.365		109.365
3004 1205		109.280		-1		109.280		109.280		109.280		109.280		109.279
3004 1206		109.181		0		109.181		109.181		109.181		109.181		109.180
3004 1207		109.111		0		109.111		109.112		109.111		109.111		109.111
3004 1208		108.993		0		108.993		108.993		108.993		108.993		108.993
3004 1209		108.878		0		108.879		108.879		108.879		108.879		108.879

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS16 Footpath, Royal Arsenal**

No. of reading	baseline	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
date	13/8/13	26/09/2013		27/09/2013		28/09/2013		28/09/2013		03/10/2013		08/10/2013	
3004 1201	109.572	109.572	-1	109.572	0	109.572	0	109.572	1	109.572	-1	109.572	0
3004 1202	109.501	109.501	0	109.501	0	109.501	0	109.502	1	109.501	-1	109.501	0
3004 1203	109.434	109.434	0	109.434	0	109.434	0	109.435	1	109.434	-1	109.434	0
3004 1204	109.366	109.366	1	109.365	0	109.366	0	109.366	1	109.365	-1	109.365	0
3004 1205	109.280	109.280	1	109.280	0	109.280	0	109.281	1	109.279	-1	109.279	0
3004 1206	109.181	109.181	1	109.181	0	109.181	0	109.181	1	109.180	-1	109.180	0
3004 1207	109.111	109.111	0	109.111	0	109.111	0	109.112	1	109.111	-1	109.110	-1
3004 1208	108.993	108.993	0	108.993	0	108.993	0	108.994	1	108.993	-1	108.992	0
3004 1209	108.878	108.879	0	108.879	0	108.879	0	108.880	1	108.879	-1	108.878	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS16 Footpath, Royal Arsenal**

No. of reading	baseline		25. following		26. following		27. following		28. following		29. following		30. following				
	date	13/8/13	15/10/2013	elevation	deviation from last/ baseline	21/10/2013	elevation	deviation from last/baseline	18/11/2013	elevation	deviation from last/baseline	13/01/2014	elevation	deviation from last/baseline	29/01/2014	elevation	deviation from last/baseline
No.	elevation																
3004 1201	109.572	109.572	0	0	109.572	0	0	109.572	0	0	109.572	0	0	109.572	0	0	0
3004 1202	109.501	109.501	0	0	109.501	0	0	109.501	0	0	109.501	0	0	109.501	0	0	0
3004 1203	109.434	109.433	0	-1	109.434	1	0	109.434	0	0	109.434	0	0	109.434	0	0	0
3004 1204	109.366	109.365	0	-1	109.365	1	-1	109.365	0	-1	109.365	0	-1	109.365	0	-1	-1
3004 1205	109.280	109.279	0	-2	109.280	1	-1	109.280	0	-1	109.279	0	-1	109.279	0	-1	-1
3004 1206	109.181	109.180	0	-1	109.180	0	-1	109.180	0	-1	109.180	0	-1	109.180	0	-1	-1
3004 1207	109.111	109.111	0	-1	109.111	0	-1	109.111	0	-1	109.111	0	-1	109.111	0	-1	-1
3004 1208	108.993	108.992	0	0	108.992	0	0	108.992	0	-1	108.992	0	-1	108.992	1	0	-1
3004 1209	108.878	108.878	0	0	108.878	-1	0	108.878	0	-1	108.878	0	-1	108.878	1	0	-1

monitoring table



project: **C310 Thames Tunnel**

Joint Venture

structure: **CS16 Footpath, Royal Arsenal**

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
3004 1201	13/8/13	109.572	109.572	0	109.572	0	109.572	0	109.572	0	109.572	0	109.572	0
3004 1202		109.501	109.501	0	109.501	0	109.501	0	109.501	0	109.501	0	109.501	0
3004 1203		109.434	109.434	0	109.434	0	109.434	0	109.434	0	109.434	0	109.434	0
3004 1204		109.366	109.365	0	109.365	-1	109.365	-1	109.365	-1	109.365	-1	109.365	-1
3004 1205		109.280	109.279	0	109.279	-1	109.279	-1	109.279	-1	109.279	-1	109.279	-1
3004 1206		109.181	109.180	0	109.180	-1	109.180	-1	109.180	-1	109.180	-1	109.180	-1
3004 1207		109.111	109.111	0	109.111	0	109.111	0	109.111	0	109.111	0	109.111	0
3004 1208		108.993	108.992	0	108.992	-1	108.992	-1	108.992	-1	108.992	-1	108.992	-1
3004 1209		108.878	108.878	0	108.878	0	108.878	0	108.878	0	108.878	0	108.878	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS16 Footpath, Royal Arsenal

No. of reading	baseline	37. following		38. following		39. following		40. following		41. following		42. following	
		13/8/13	10/02/2014	11/02/2014	12/02/2014	13/02/2014	14/02/2014	15/02/2014					
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 1201	109.572	109.572	0	109.572	0	109.572	0	109.572	0	109.572	0	109.573	0
3004 1202	109.501	109.501	0	109.501	0	109.501	0	109.501	0	109.501	0	109.501	0
3004 1203	109.434	109.434	0	109.434	0	109.434	0	109.434	0	109.434	0	109.434	0
3004 1204	109.366	109.365	0	109.365	-1	109.365	0	109.365	-1	109.365	0	109.365	0
3004 1205	109.280	109.280	0	109.280	0	109.279	0	109.279	0	109.279	0	109.279	0
3004 1206	109.181	109.180	0	109.180	-1	109.180	-1	109.179	0	109.179	0	109.179	0
3004 1207	109.111	109.111	0	109.111	0	109.110	-1	109.110	0	109.110	0	109.110	0
3004 1208	108.993	108.992	0	108.992	-1	108.992	0	108.992	0	108.992	0	108.992	1
3004 1209	108.878	108.878	0	108.878	0	108.878	0	108.878	0	108.878	0	108.878	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS16 Footpath, Royal Arsenal**

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
	13/8/13													
3004 1201		109.572	109.573	0	109.573	0	0	109.573	0	109.573	0	1	109.573	0
3004 1202		109.501	109.501	0	109.501	0	0	109.501	0	109.502	0	1	109.502	0
3004 1203		109.434	109.434	0	109.434	0	0	109.434	0	109.434	0	0	109.434	0
3004 1204		109.366	109.365	0	109.365	0	-1	109.365	0	109.366	0	0	109.365	0
3004 1205		109.280	109.279	0	109.279	0	-1	109.279	0	109.279	0	-1	109.279	0
3004 1206		109.181	109.179	0	109.180	0	-1	109.180	0	109.180	0	-1	109.179	0
3004 1207		109.111	109.110	0	109.110	0	-1	109.110	0	109.110	0	-1	109.110	0
3004 1208		108.993	108.992	0	108.992	0	-1	108.992	0	108.992	0	-1	108.992	0
3004 1209		108.878	108.878	0	108.878	0	0	108.878	0	108.878	0	0	108.878	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS16 Footpath, Royal Arsenal**

No. of reading	baseline		49. following		50. following		51. following		52. following		53. following		54. 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
	13/8/13													
3004 1201		109.572	109.573	0	109.573	0	1	109.573	0	109.573	0	0	109.573	0
3004 1202		109.501	109.502	0	109.502	0	1	109.502	0	109.502	0	0	109.502	0
3004 1203		109.434	109.434	0	109.435	0	0	109.434	0	109.434	0	0	109.434	0
3004 1204		109.366	109.365	0	109.366	0	-1	109.365	0	109.365	0	-1	109.365	0
3004 1205		109.280	109.279	0	109.280	0	-1	109.279	0	109.279	0	-1	109.279	0
3004 1206		109.181	109.180	0	109.180	0	-1	109.180	0	109.180	0	-1	109.179	-1
3004 1207		109.111	109.110	0	109.111	1	-1	109.110	0	109.110	0	-1	109.110	-1
3004 1208		108.993	108.993	1	108.993	-1	0	108.992	-1	108.992	0	0	108.992	0
3004 1209		108.878	108.878	0	108.879	1	0	108.878	-1	108.878	0	0	108.878	0

monitoring table




Joint Venture

project: C310 Thames Tunnel

structure: CS16 Footpath, Royal Arsenal

No. of reading	baseline		55. following													
	date	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	
	13/8/13		24/09/2014													
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 1201	109.572		109.571	-1												
3004 1202	109.501		109.500	-1												
3004 1203	109.434		109.433	-1												
3004 1204	109.366		109.364	-1	-2											
3004 1205	109.280		109.278	-1	-2											
3004 1206	109.181		109.179	-1	-2											
3004 1207	109.111		109.109	-1	-2											
3004 1208	108.993		108.991	-1	-2											
3004 1209	108.878		108.878	-1	-1											

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

APPENDIX 57

CS17 – Footpath Royal Arsenal

Learning Legacy Document

monitoring asset	Area Royal Arsenal		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	CS 17 - Footpath Royal Arsenal		
sensor type:	manual levelling studs		
chainage:	90160	point no.:	3004 1211 - 3004 1219
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

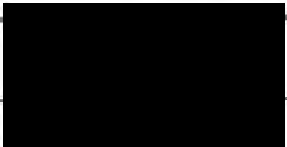
	date	max. value	point no.	comments
baseline	26/08/13	0.00		
TBM 1	start ZOI	23/09/13	-0.29	3004 1213
	end ZOI	30/09/13	-1.27	3004 1213
TBM 2	start ZOI	13/02/14	0.54	3004 1215
	end ZOI	18/02/14	-0.56	3004 1215
longterm	24/09/14	-1.44	3004 1213	

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)

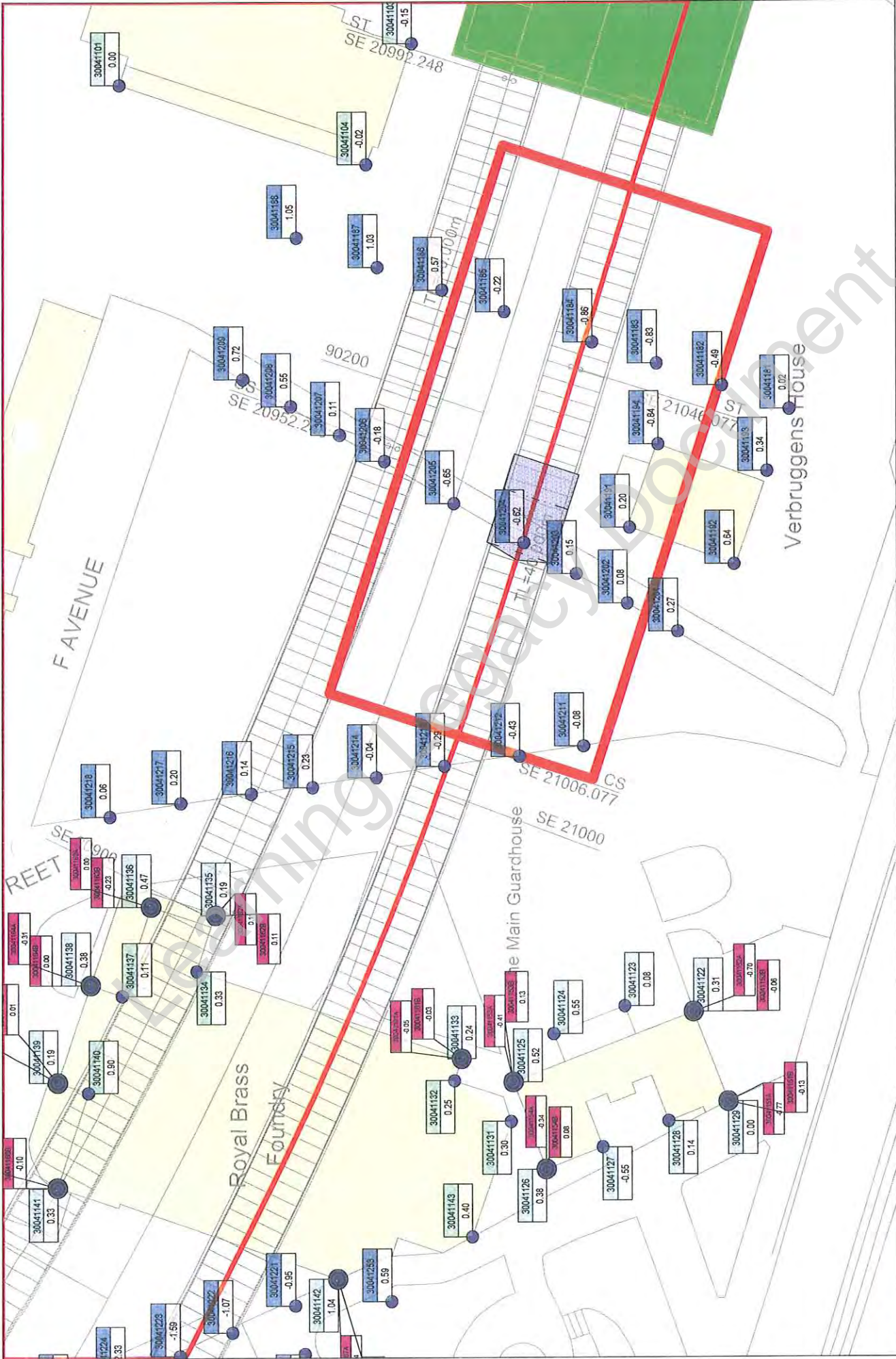
summary / comments

3004 1211 - 3004 1219
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: 08/01/15

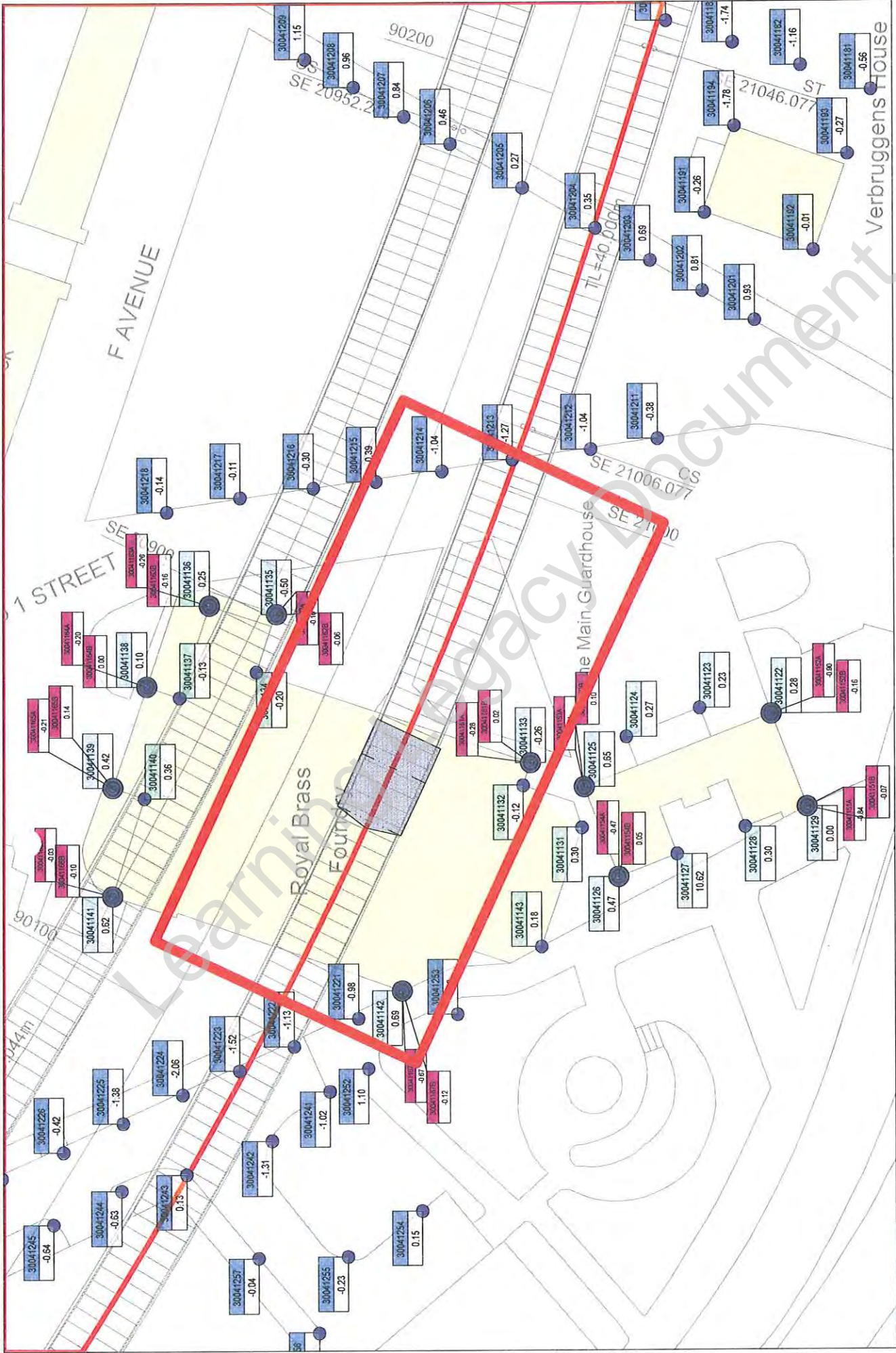
print name: 

HMJV project role: Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 23.09.2013 17:25

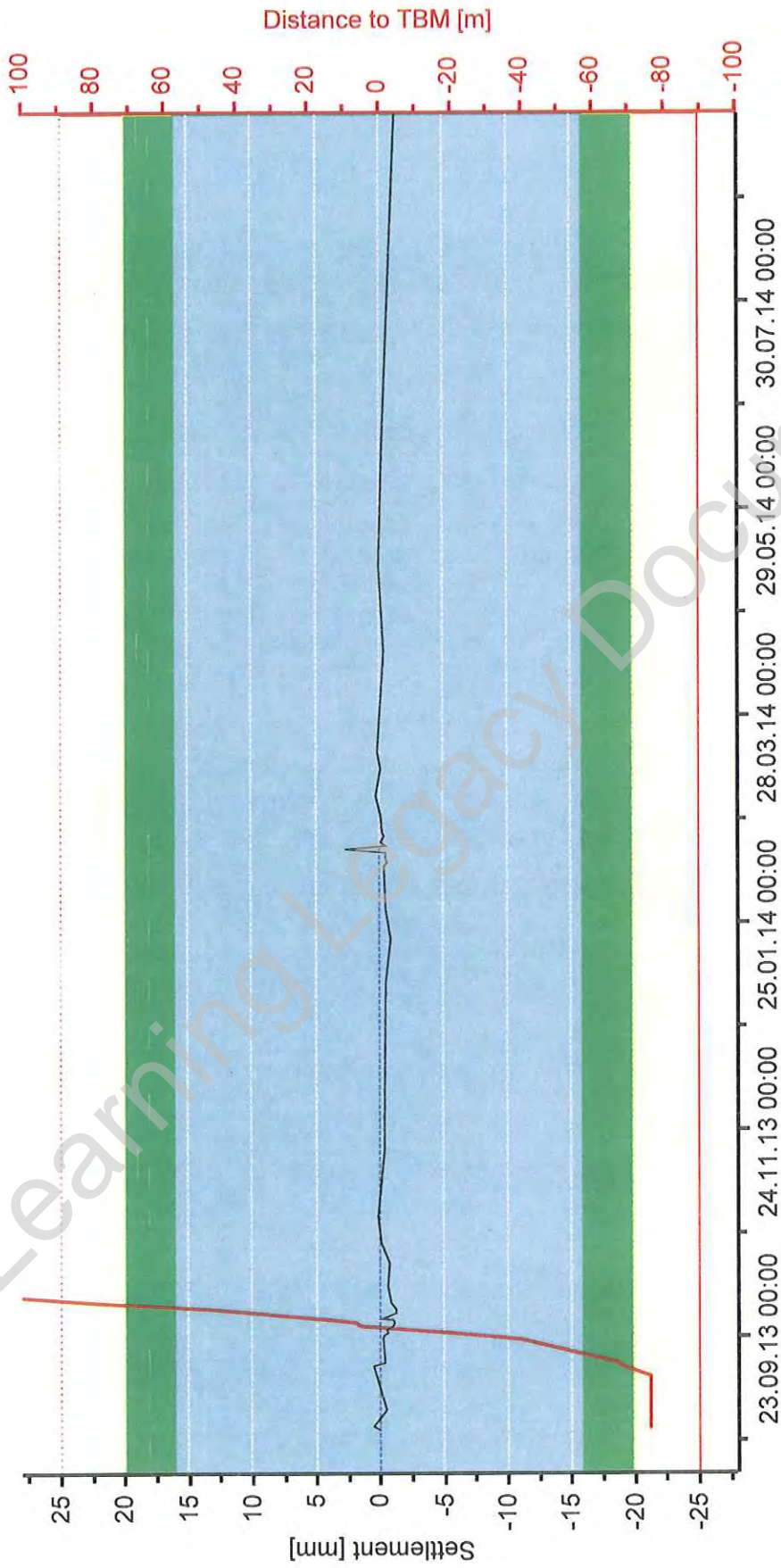




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 30.09.2013 09:00

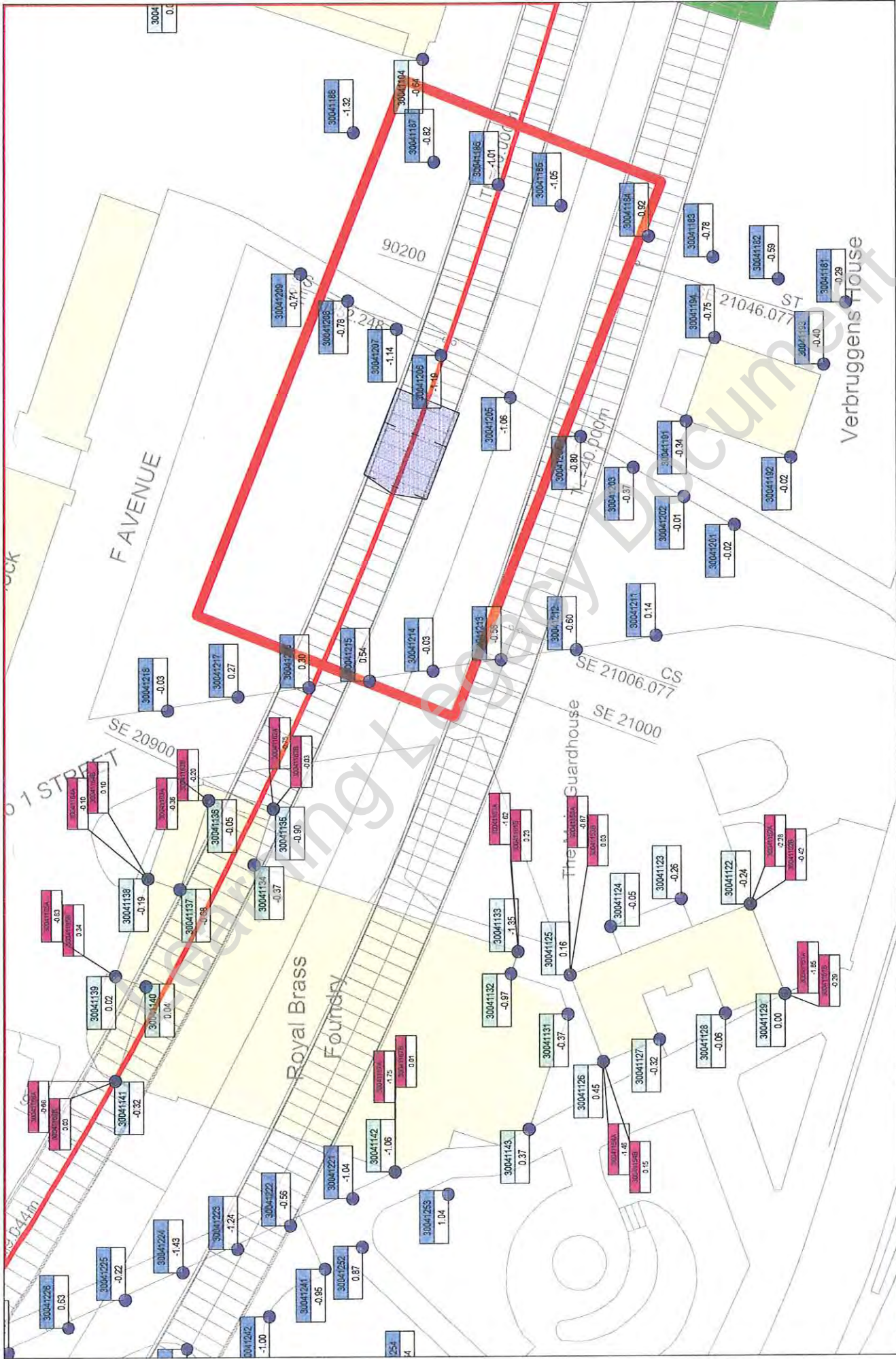


Point: 30041213



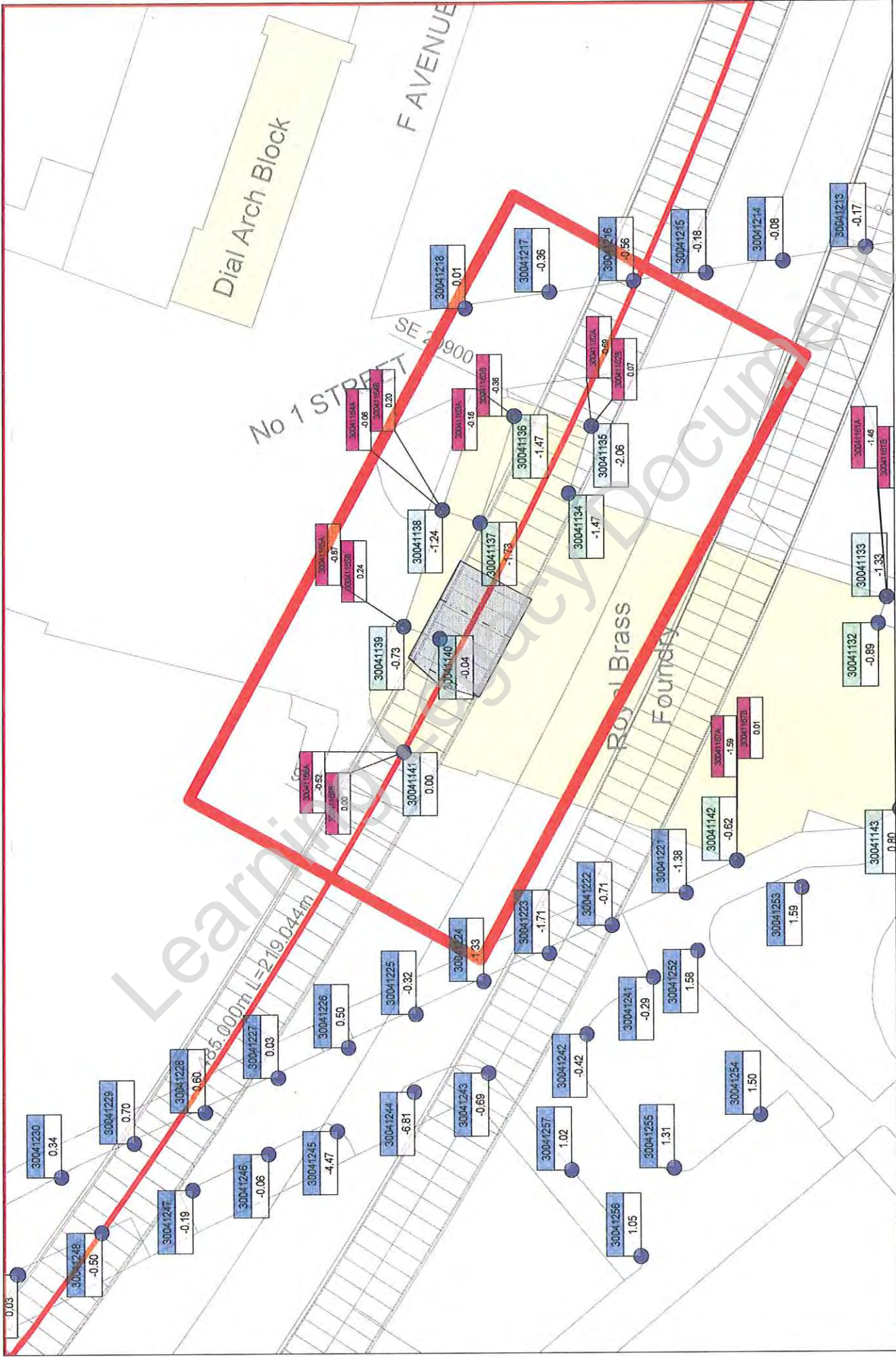
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - CS 17 - Footpath Royal Arsenal 13.08.2013 - 24.09.2014
Date: 22.10.2014 18:25 Current Values: 22.10.2014 18:16





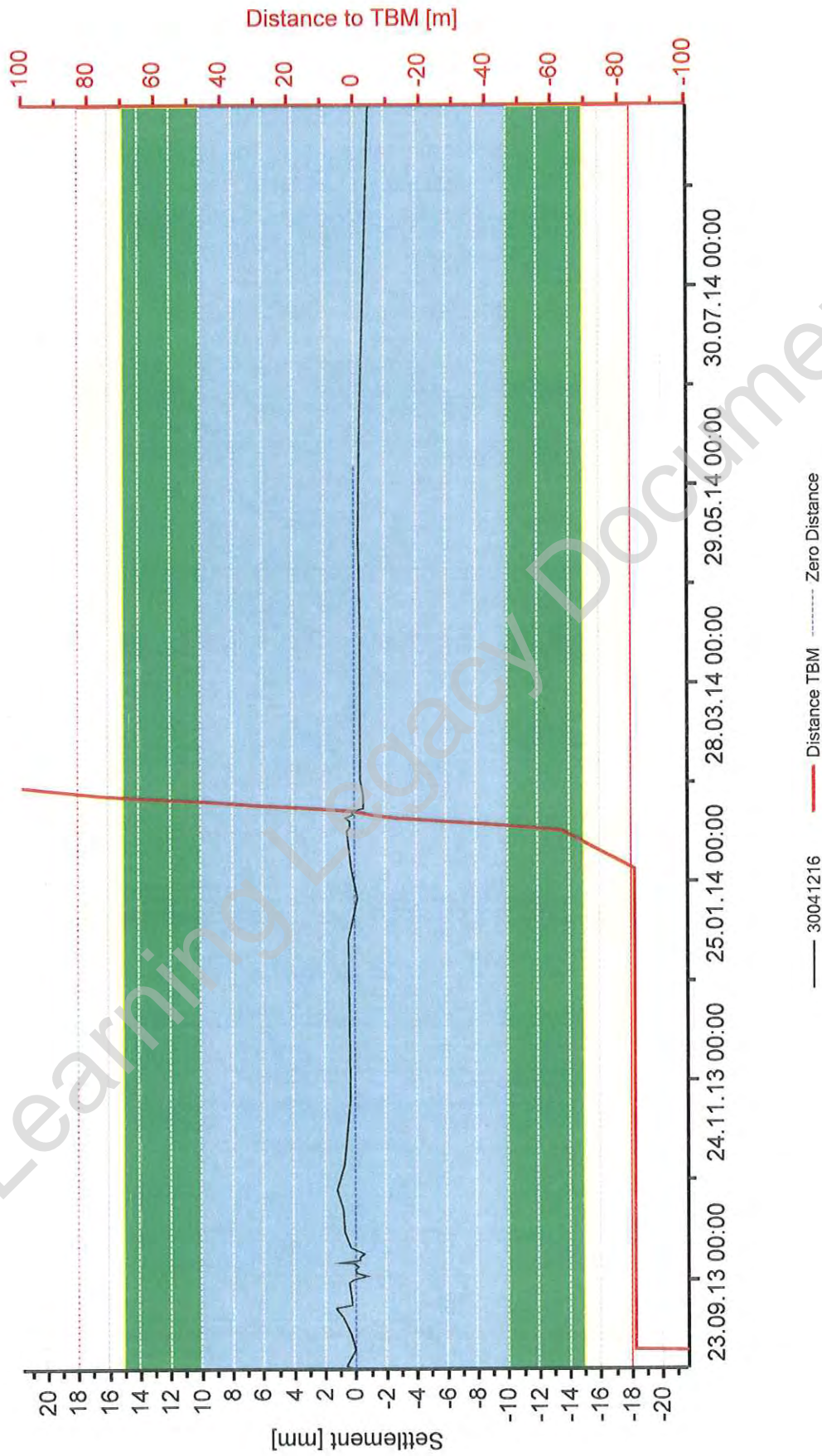
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 13.02.2014 08:59





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 18.02.2014 17:30

Point: 30041216



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - CS 17 - Footpath Royal Arsenal 26.08.2013 - 24.09.2014
date: 19.10.2014 15:51 current values: 19.10.2014 15:34



monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS17 Footpath, Royal Arsenal**

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	26/8/13	27/08/2013		01/09/2013		06/09/2013		11/09/2013		14/09/2013		15/09/2013	
3004 1211	109.470	109.469	0	109.468	-1	109.469	1	109.469	0	109.469	0	109.469	0
3004 1212	109.407	109.407	0	109.406	-1	109.407	1	109.407	0	109.407	0	109.407	-1
3004 1213	109.465	109.465	0	109.464	-1	109.465	0	109.465	0	109.465	0	109.464	-1
3004 1214	109.401	109.402	1	109.401	-1	109.401	0	109.402	1	109.402	0	109.401	-1
3004 1215	109.278	109.279	1	109.278	-1	109.278	0	109.279	1	109.280	0	109.279	-1
3004 1216	109.200	109.201	1	109.200	-1	109.200	0	109.201	0	109.201	0	109.200	-1
3004 1217	109.247	109.247	0	109.247	0	109.247	0	109.247	1	109.248	0	109.247	-1
3004 1218	109.403	109.402	0	109.402	0	109.402	0	109.403	1	109.404	1	109.403	-1

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS17 Footpath, Royal Arsenal**

No. of reading	baseline	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
date	26/8/13	22/09/2013		23/09/2013		24/09/2013		25/09/2013		26/09/2013		27/09/2013	
3004 1211	109.470	109.469	0	109.470	0	109.469	0	109.469	0	109.469	0	109.469	0
3004 1212	109.407	109.407	0	109.407	0	109.407	0	109.407	0	109.407	0	109.407	0
3004 1213	109.465	109.464	0	109.464	0	109.464	0	109.464	0	109.464	-1	109.464	0
3004 1214	109.401	109.402	0	109.401	0	109.401	-1	109.401	0	109.401	0	109.401	0
3004 1215	109.278	109.279	0	109.278	0	109.278	-1	109.278	1	109.278	0	109.278	0
3004 1216	109.200	109.200	0	109.200	0	109.199	-1	109.200	1	109.200	0	109.200	0
3004 1217	109.247	109.247	0	109.247	0	109.246	-1	109.247	1	109.247	0	109.247	0
3004 1218	109.403	109.403	0	109.403	0	109.402	-1	109.402	1	109.403	0	109.403	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS17 Footpath, Royal Arsenal**

No. of reading	baseline date	13. following 28/09/2013		14. following 28/09/2013		15. following 29/09/2013		16. following 30/09/2013		17. following 01/10/2013		18. following 03/10/2013	
		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 1211	109.470	109.469	0	109.469	0	109.469	0	109.469	0	109.469	0	109.469	0
3004 1212	109.407	109.407	0	109.407	0	109.407	0	109.406	-1	109.406	0	109.407	0
3004 1213	109.465	109.464	0	109.464	1	109.464	0	109.463	-1	109.463	0	109.464	0
3004 1214	109.401	109.401	0	109.401	1	109.401	0	109.400	-1	109.400	0	109.401	1
3004 1215	109.278	109.278	0	109.279	1	109.278	-1	109.278	0	109.277	-1	109.278	1
3004 1216	109.200	109.200	0	109.201	1	109.200	-1	109.200	0	109.199	0	109.200	1
3004 1217	109.247	109.247	0	109.248	1	109.246	-1	109.247	0	109.246	0	109.247	1
3004 1218	109.403	109.403	0	109.403	1	109.403	-1	109.402	0	109.402	0	109.403	1

monitoring table



Joint Venture

project: **C310 Thames Tunnel**
 structure: **CS17 Footpath, Royal Arsenal**

No. of reading	baseline		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
	26/8/13													
3004 1211		109.470	109.469	0	109.469	0	0	109.470	0	109.470	0	0	109.470	0
3004 1212		109.407	109.407	0	109.406	0	-1	109.407	1	109.407	0	0	109.407	0
3004 1213		109.465	109.464	0	109.464	0	-1	109.464	1	109.465	0	0	109.464	0
3004 1214		109.401	109.401	0	109.401	0	0	109.402	0	109.402	0	1	109.401	0
3004 1215		109.278	109.279	0	109.279	0	1	109.279	0	109.279	0	1	109.279	0
3004 1216		109.200	109.201	0	109.201	0	1	109.201	0	109.201	0	1	109.200	0
3004 1217		109.247	109.248	0	109.248	0	1	109.247	-1	109.247	0	1	109.247	0
3004 1218		109.403	109.403	0	109.404	1	1	109.402	-1	109.403	1	0	109.402	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**
 structure: **CS17 Footpath, Royal Arsenal**

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	25/8/13	07/01/2014		20/01/2014		29/01/2014		10/02/2014		11/02/2014		12/02/2014	
3004 1211	109.470	109.470	0	109.470	0	109.470	0	109.470	0	109.470	0	109.470	0
3004 1212	109.407	109.407	0	109.407	-1	109.407	0	109.407	0	109.407	0	109.407	0
3004 1213	109.465	109.464	0	109.464	-1	109.464	0	109.464	0	109.464	0	109.464	0
3004 1214	109.401	109.401	0	109.401	-1	109.401	0	109.401	0	109.401	0	109.401	0
3004 1215	109.278	109.279	0	109.278	-1	109.279	1	109.279	0	109.279	0	109.279	0
3004 1216	109.200	109.200	0	109.200	-1	109.200	0	109.200	0	109.200	0	109.200	0
3004 1217	109.247	109.247	0	109.247	0	109.247	1	109.247	0	109.247	0	109.247	0
3004 1218	109.403	109.403	0	109.403	0	109.403	0	109.403	0	109.403	0	109.403	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**
 structure: **CS17 Footpath, Royal Arsenal**

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	
		26/8/13													
				13/02/2014		14/02/2014		15/02/2014		16/02/2014		17/02/2014	18/02/2014		
3004 1211	109.470	109.470	0	0	109.470	0	0	109.467	-3	109.470	3	1	109.470	0	1
3004 1212	109.407	109.407	0	0	109.407	0	0	109.407	0	109.407	0	0	109.407	0	0
3004 1213	109.465	109.464	0	-1	109.464	0	-1	109.467	3	109.464	-3	0	109.464	0	0
3004 1214	109.401	109.401	0	0	109.401	0	0	109.401	0	109.401	0	0	109.401	0	0
3004 1215	109.278	109.279	0	1	109.279	0	1	109.278	0	109.278	0	0	109.278	0	0
3004 1216	109.200	109.200	0	0	109.201	0	1	109.200	-1	109.199	-1	-1	109.199	0	-1
3004 1217	109.247	109.247	0	0	109.247	0	1	109.247	0	109.247	-1	0	109.246	0	0
3004 1218	109.403	109.403	0	0	109.403	0	0	109.403	0	109.403	0	1	109.403	0	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**
 structure: **CS17 Footpath, Royal Arsenal**

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		
	26/8/13	19/02/2014	20/02/2014	21/02/2014	26/02/2014	04/03/2014	12/03/2014									
3004 1211	109.470	109.470	0	1	109.470	0	1	109.471	0	1	109.471	0	1	109.470	0	1
3004 1212	109.407	109.407	0	0	109.407	0	0	109.408	0	0	109.408	0	0	109.408	0	0
3004 1213	109.465	109.464	0	0	109.464	0	0	109.465	0	0	109.465	0	0	109.465	0	0
3004 1214	109.401	109.401	0	0	109.401	0	0	109.401	0	0	109.402	0	0	109.401	0	0
3004 1215	109.278	109.278	0	0	109.278	0	0	109.278	0	0	109.278	0	0	109.278	0	0
3004 1216	109.200	109.199	0	-1	109.199	0	-1	109.200	0	0	109.200	0	0	109.200	0	0
3004 1217	109.247	109.246	0	0	109.246	0	0	109.247	0	0	109.247	0	0	109.246	0	0
3004 1218	109.403	109.403	0	0	109.403	0	0	109.403	0	0	109.403	0	0	109.402	0	0

monitoring table




Joint Venture

project: **C310 Thames Tunnel**

structure: **CS17 Footpath, Royal Arsenal**

No. of reading	baseline	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		
	26/8/13															
		17/03/2014														
		25/03/2014														
		12/05/2014														
		17/06/2014														
		24/09/2014														
3004 1211	109.470	109.470	0	1	109.470	0	1	109.470	0	1	109.470	0	1	109.470	0	0
3004 1212	109.407	109.408	0	0	109.408	0	0	109.408	0	0	109.407	0	0	109.406	-1	-1
3004 1213	109.465	109.465	0	0	109.465	0	0	109.465	0	0	109.464	0	0	109.463	-1	-1
3004 1214	109.401	109.401	0	0	109.401	0	0	109.401	0	0	109.401	0	0	109.400	-1	-1
3004 1215	109.278	109.278	0	0	109.278	0	0	109.278	0	0	109.278	0	0	109.277	-1	-1
3004 1216	109.200	109.200	0	0	109.200	0	0	109.200	0	0	109.200	0	0	109.199	-1	-1
3004 1217	109.247	109.246	0	0	109.246	0	0	109.247	0	0	109.246	0	0	109.245	-1	-1
3004 1218	109.403	109.403	0	0	109.403	0	0	109.403	0	0	109.403	0	0	109.402	-1	-1

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

APPENDIX 58

Main Guard House – hydrostatic levelling cells

Learning Legacy Document

monitoring asset	Area Royal Arsenal		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	Main Guard House		
sensor type:	hydrostatic levelling cell (hlc)		
chainage:	90140	point no.:	3004 1122 - 3004 1128
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	27/08/13	0.00		
TBM 1	start ZOI	25/09/13	0.68	3004 1125
	end ZOI	02/10/13	0.35	3004 1125
TBM 2	start ZOI	13/02/14	0.28	3004 1125
	end ZOI	21/02/14	0.22	3004 1125
longterm	21/10/14	0.65	3004 1128	

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

3004 1122 - 3004 1128

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.

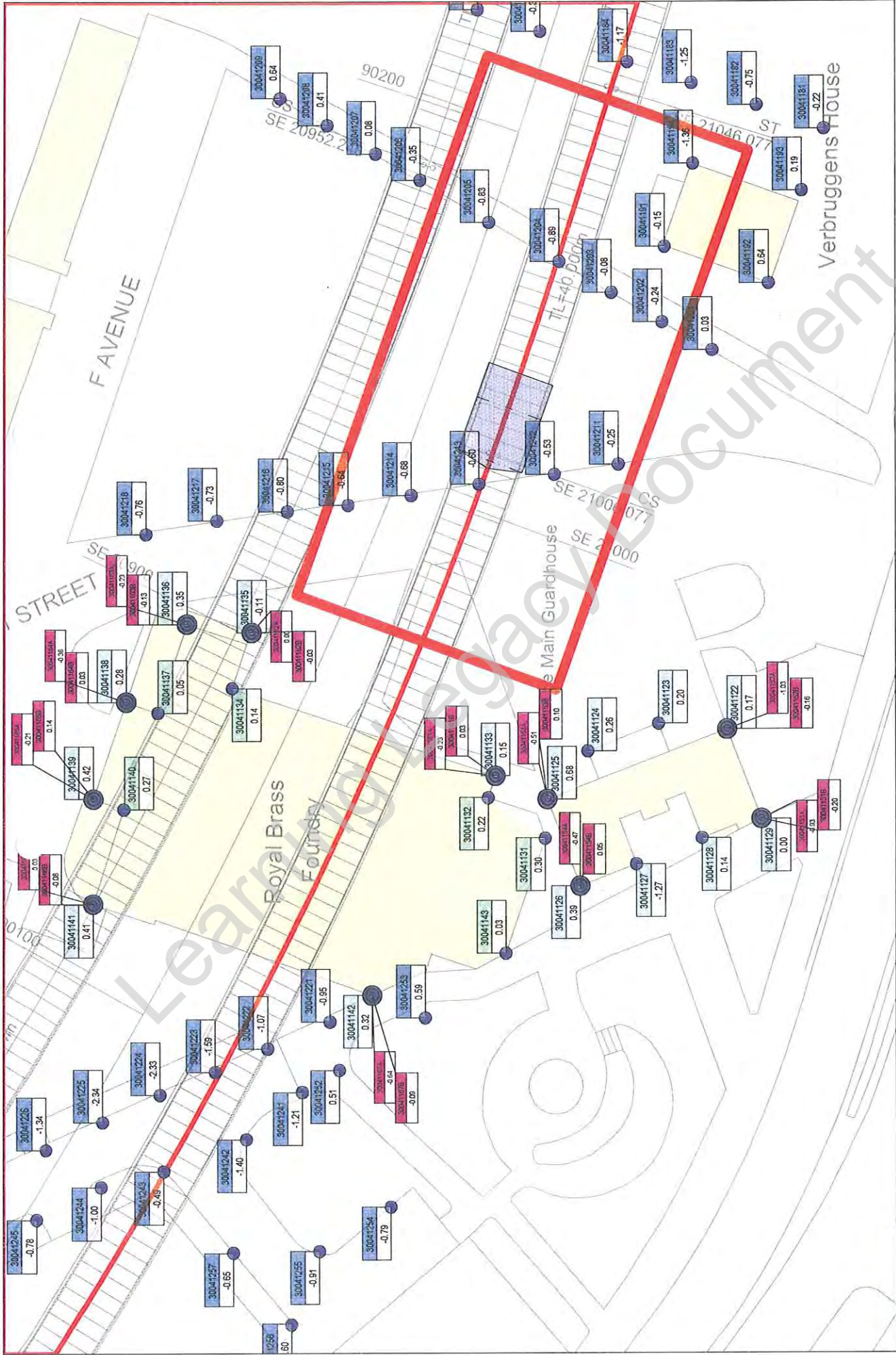
date / signature:

08/01/15

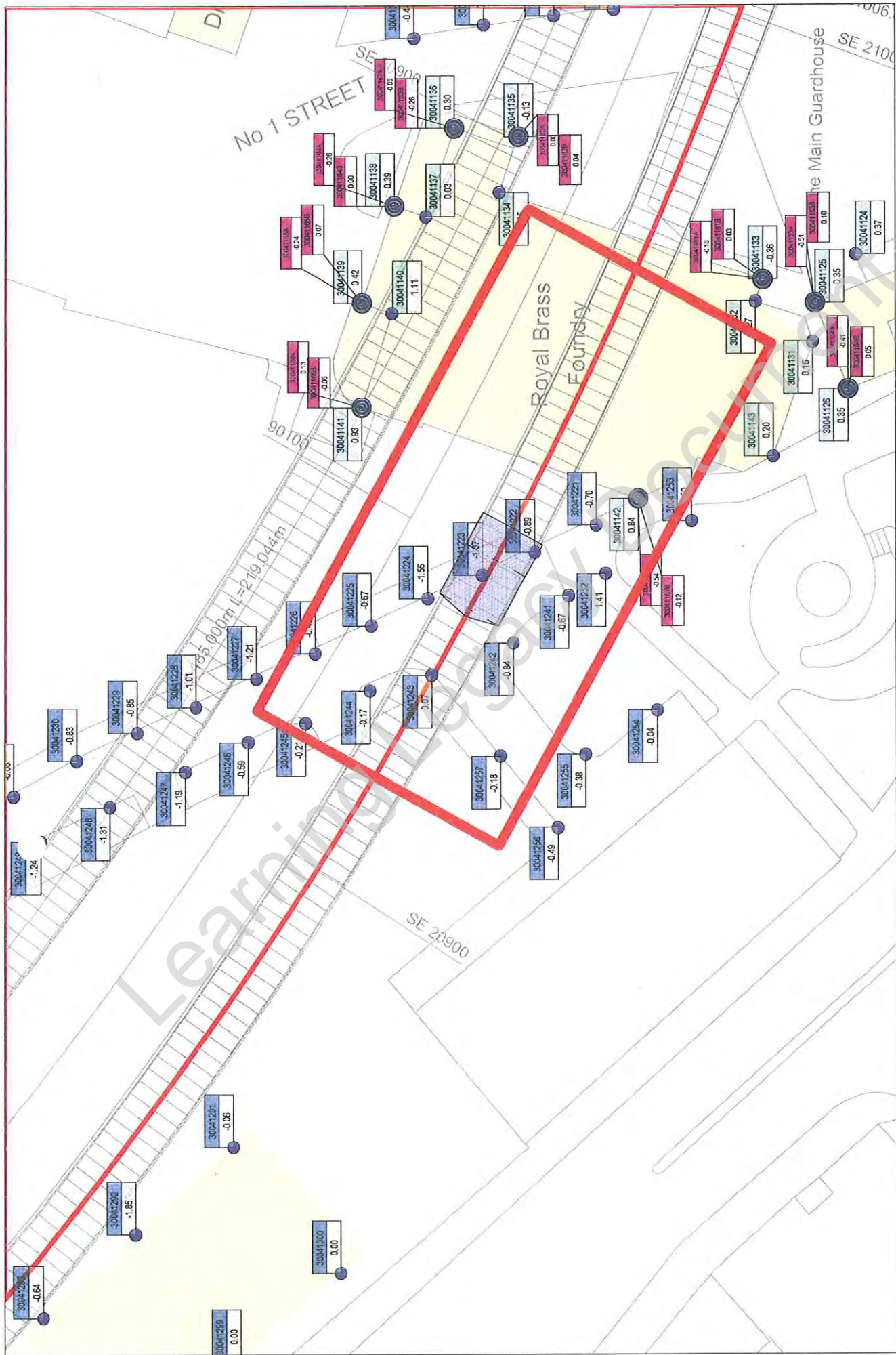
print name:

HMJV project role:

Monitoring & Survey Engineer

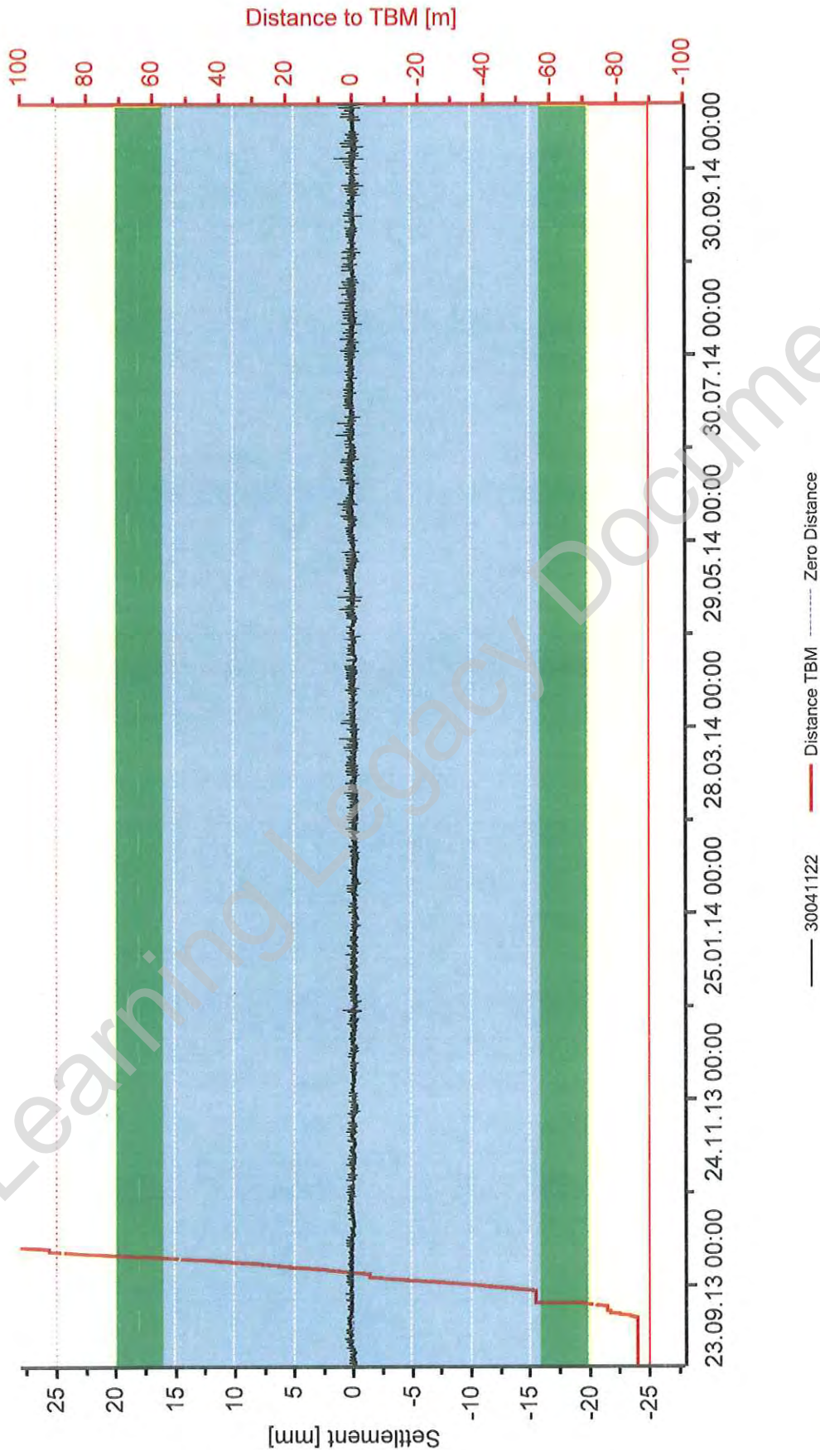


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 25.09.2013 09:05



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 02.10.2013 17:55

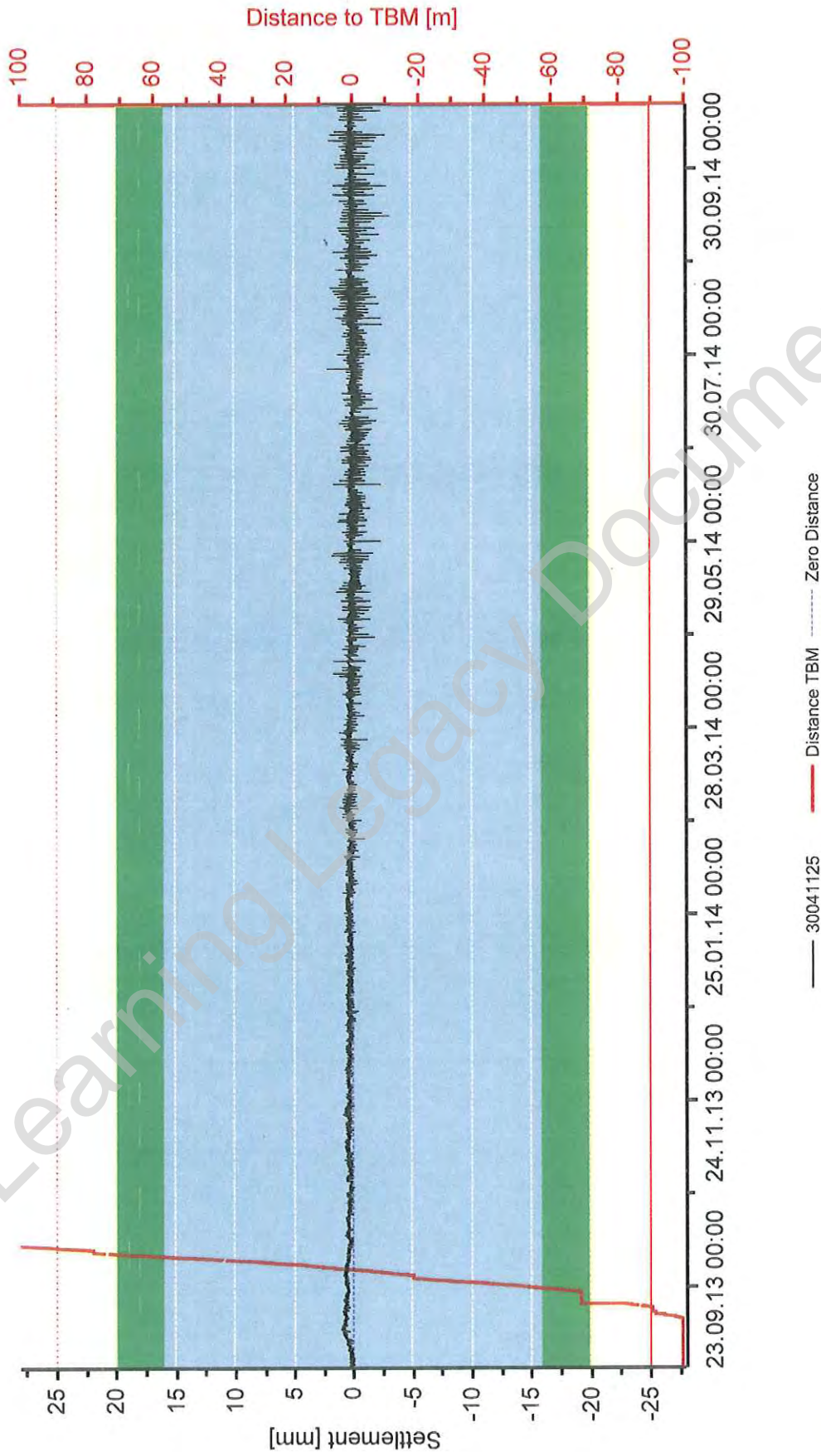
Point: 30041122



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014
Date: 23.10.2014 15:14 Current Values: 23.10.2014 15:03



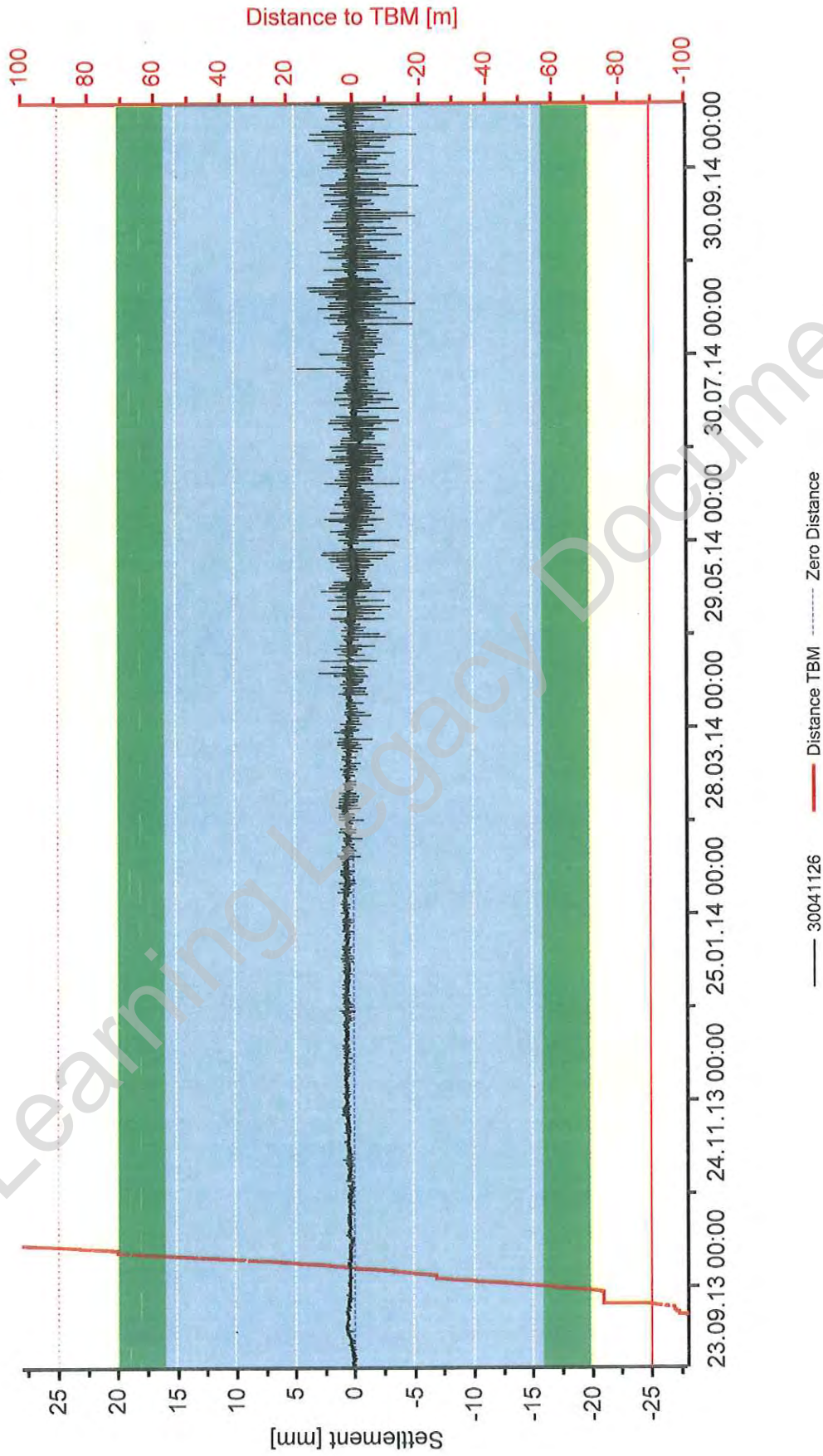
Point: 30041125



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014
Date: 23.10.2014 15:16 Current Values: 23.10.2014 15:03



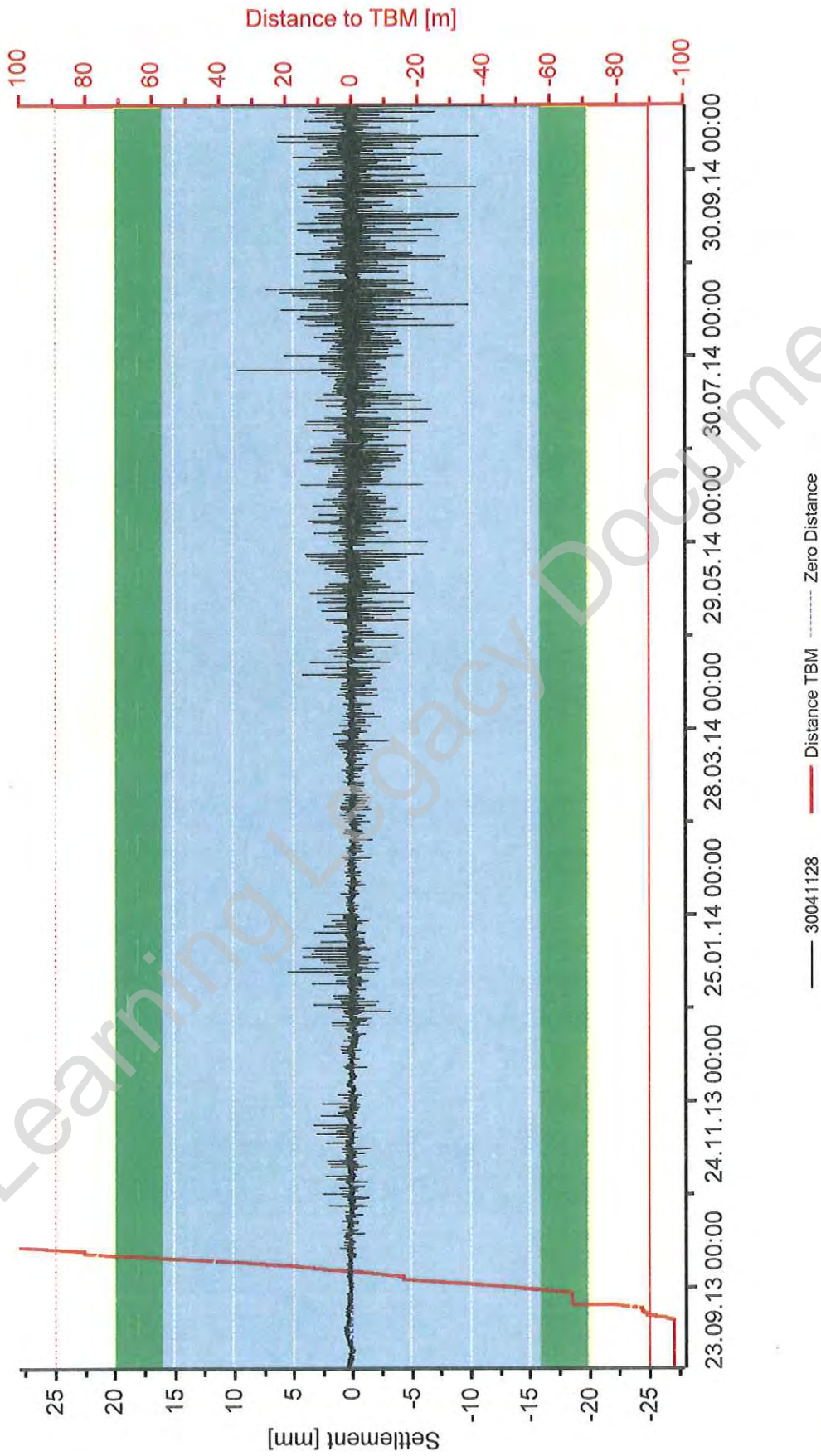
Point: 30041126



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014
Date: 23.10.2014 15:18 Current Values: 23.10.2014 15:03

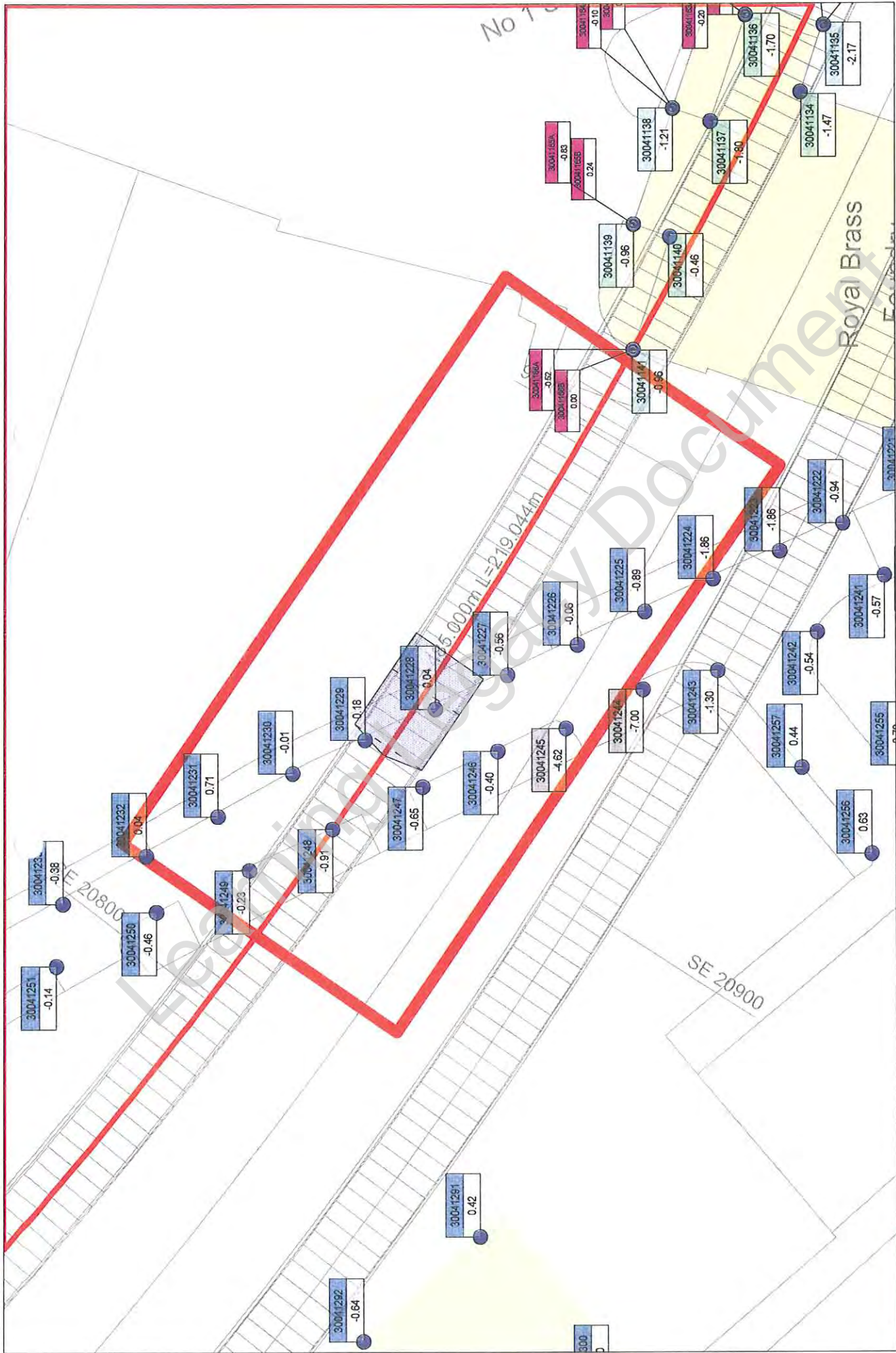


Point: 30041128



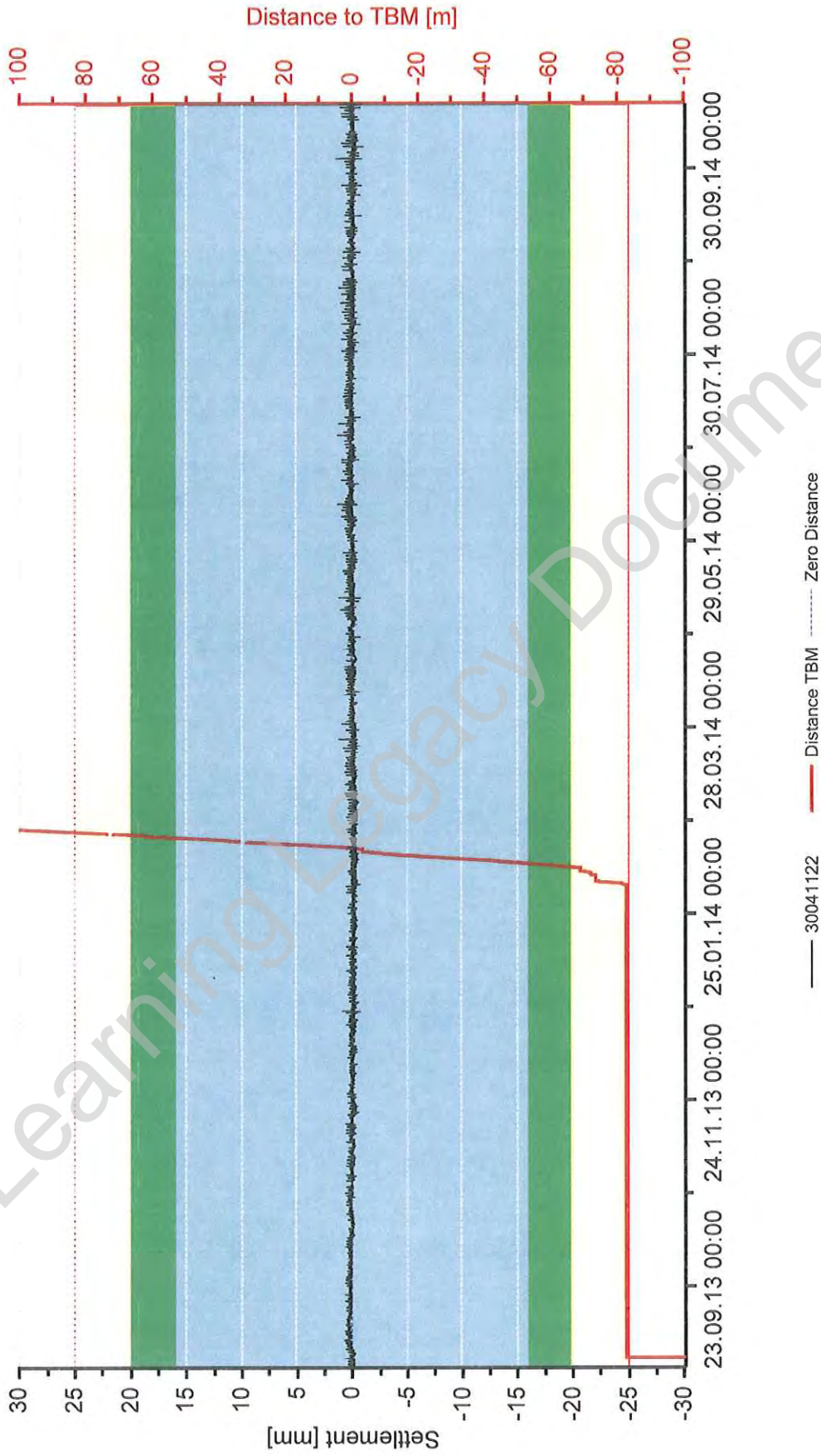
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014
Date: 23.10.2014 15:20 Current Values: 23.10.2014 15:03





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 21.02.2014 17:05

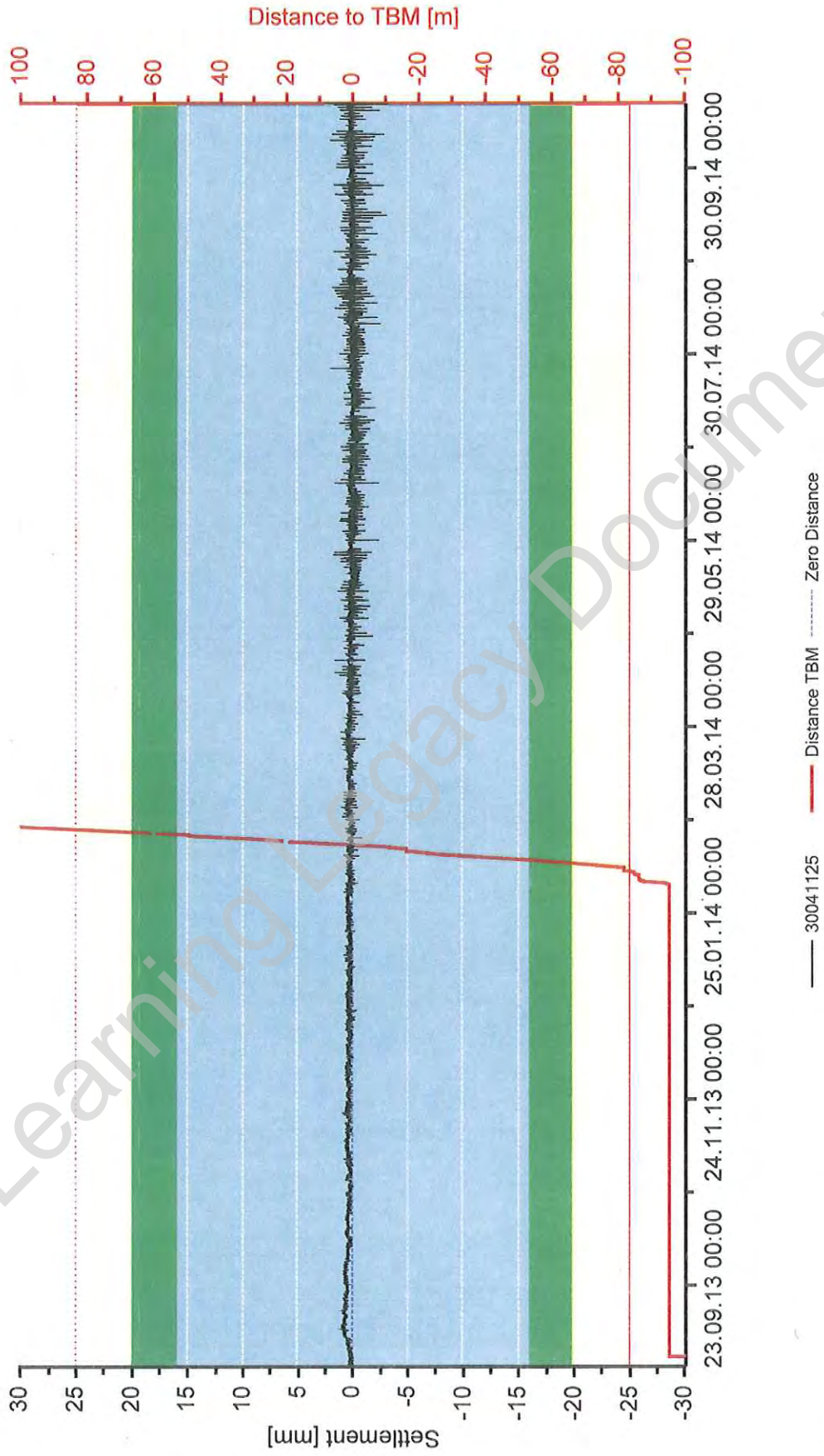
Point: 30041122



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014
date: 23.10.2014 10:34 current values: 23.10.2014 10:26

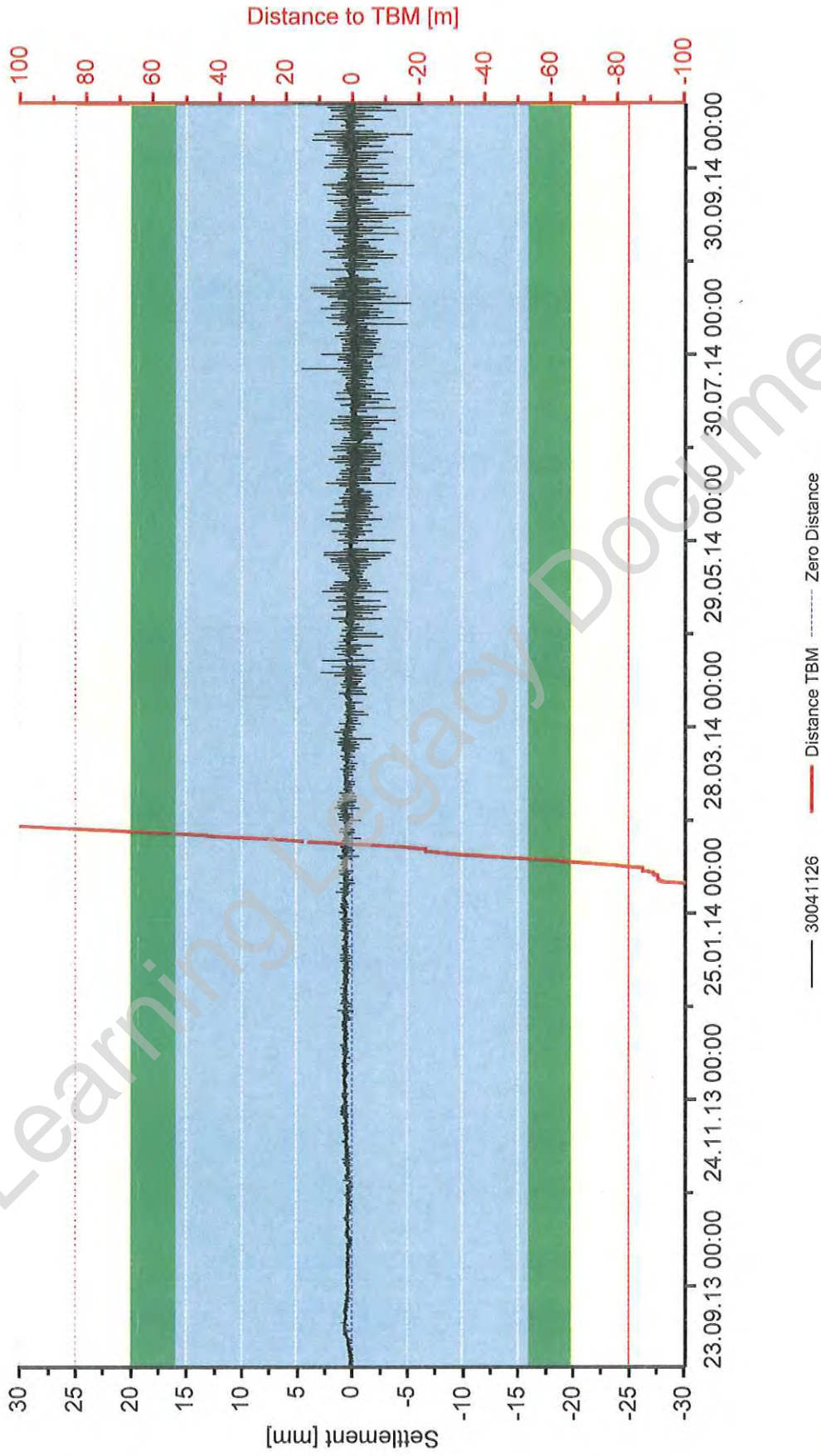


Point: 30041125



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014
date: 23.10.2014 10:39 current values: 23.10.2014 10:26

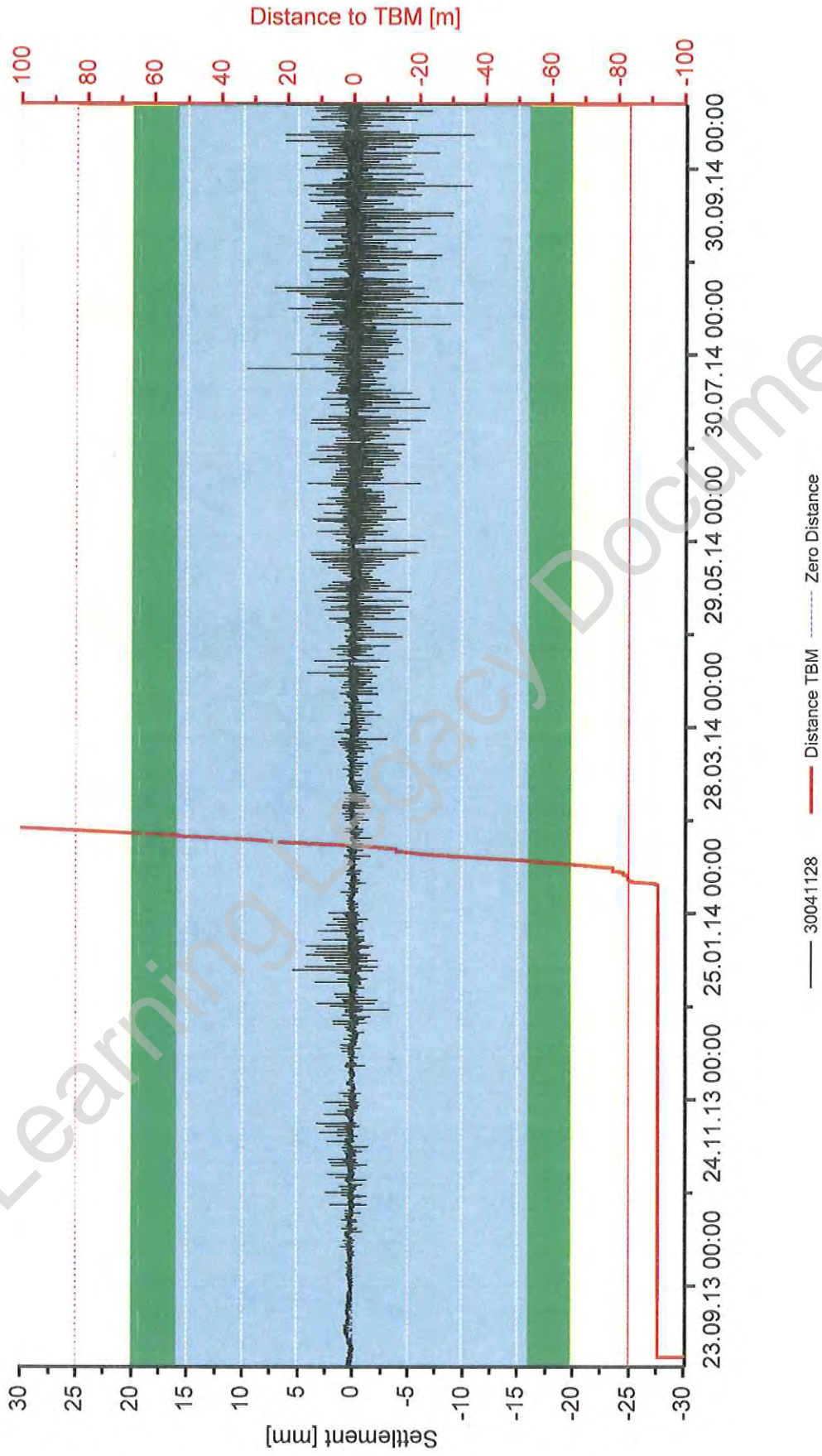
Point: 30041126



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014
date: 23.10.2014 10:48 current values: 23.10.2014 10:26




Point: 30041128



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014
date: 23.10.2014 10:52 current values: 23.10.2014 10:26



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

APPENDIX 59

Main Guard House – tiltmeter

Learning Legacy Document

monitoring asset	Area Royal Arsenal		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	Main Guard House		
sensor type:	tiltmeter		
chainage:	90140	point no.:	3004 1151 - 3004 1154
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			0.00		
TBM 1	start ZOI	25/09/13	-0.51	3004 1153A	
	end ZOI	02/10/13	-0.51	3004 1153A	breached not any trigger value
TBM 2	start ZOI	13/02/14	-0.83	3004 1153A	
	end ZOI	21/02/14	-0.80	3004 1153A	breached not any trigger value
longterm		21/10/14	-1.69	3004 1152A	
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

3004 1151 - 3004 1154

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.

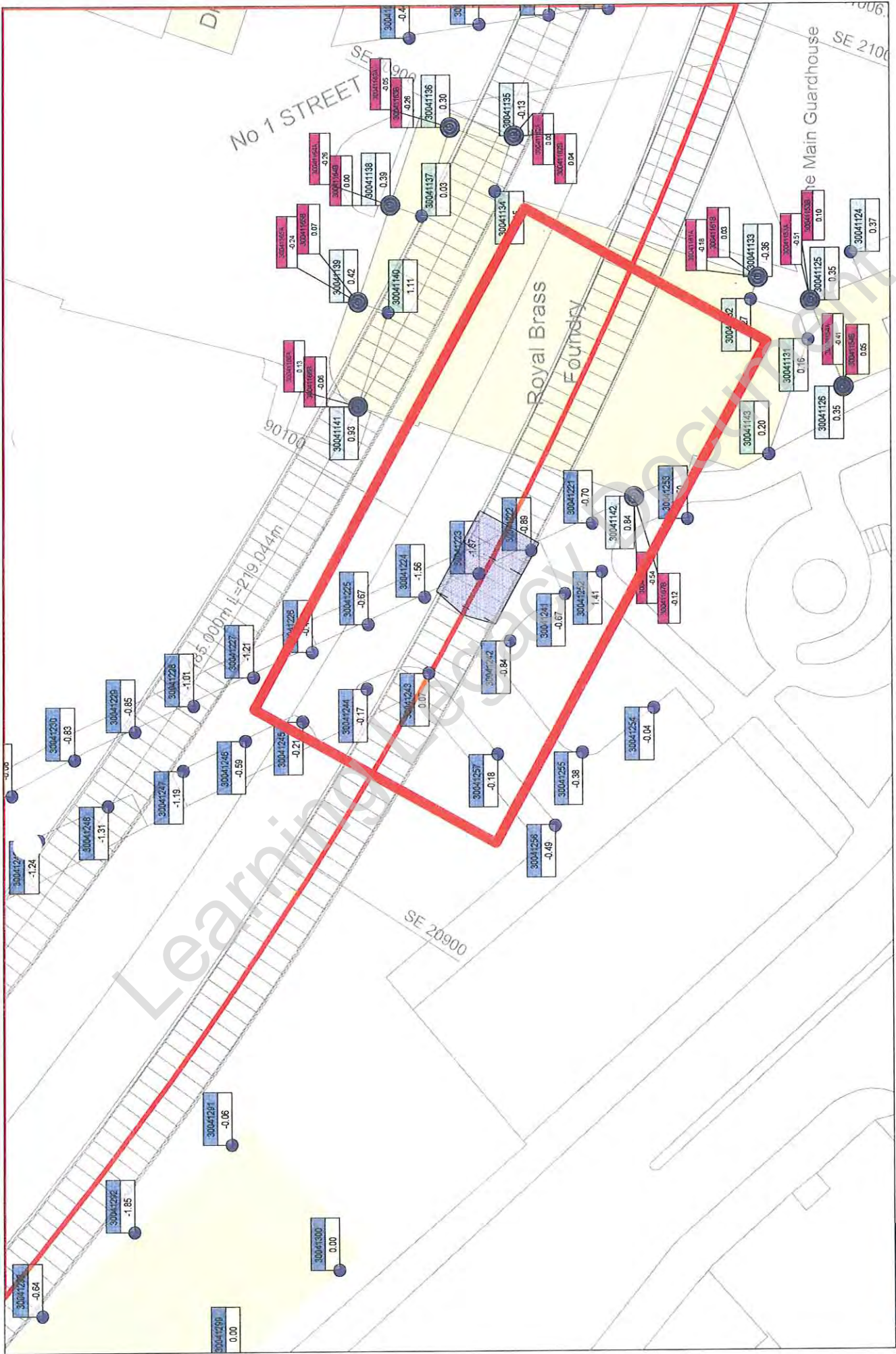
date / signature:

08/01/15

print name:

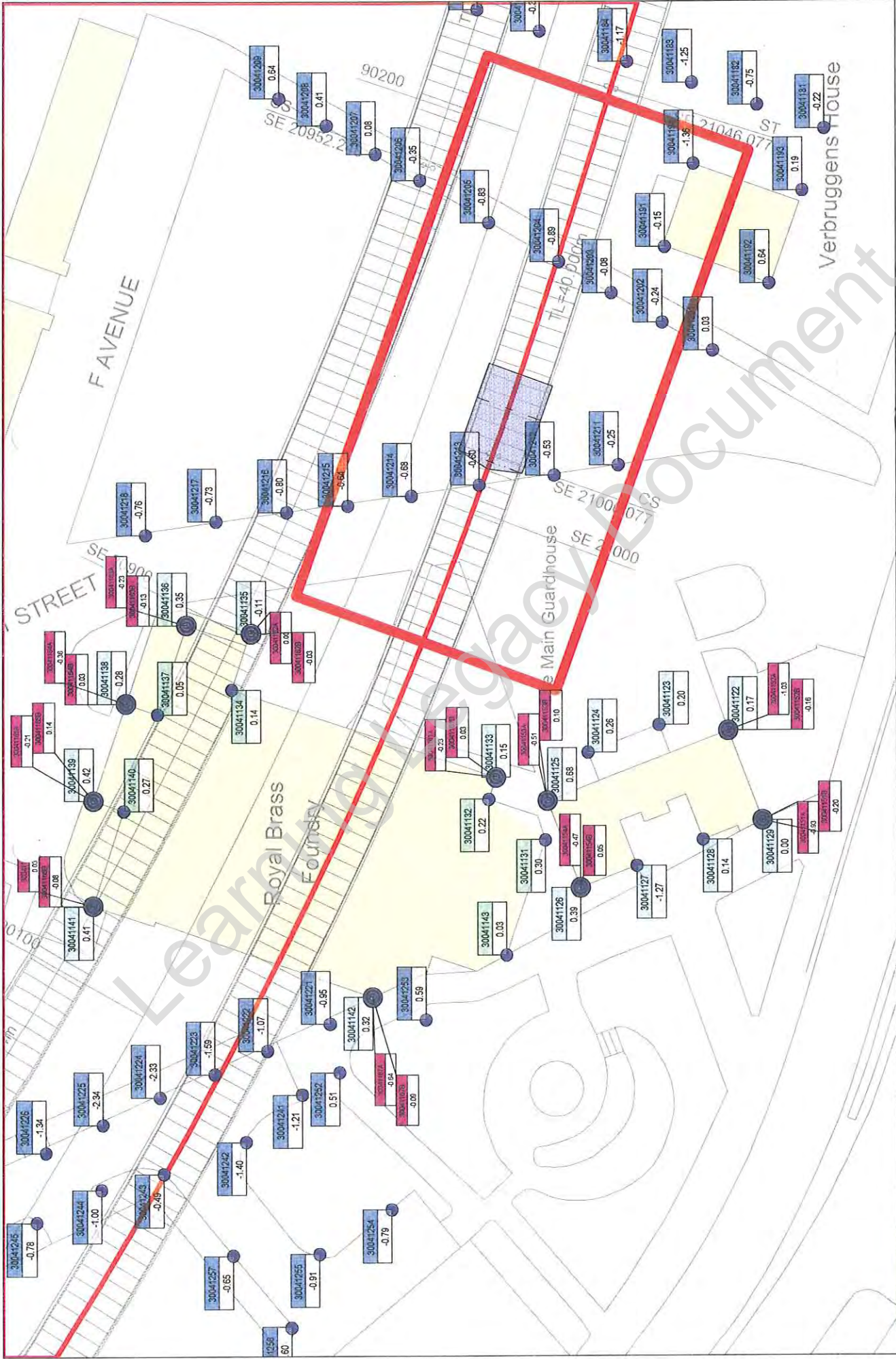
HMJV project role:

Monitoring & Survey Engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 02.10.2013 17:55

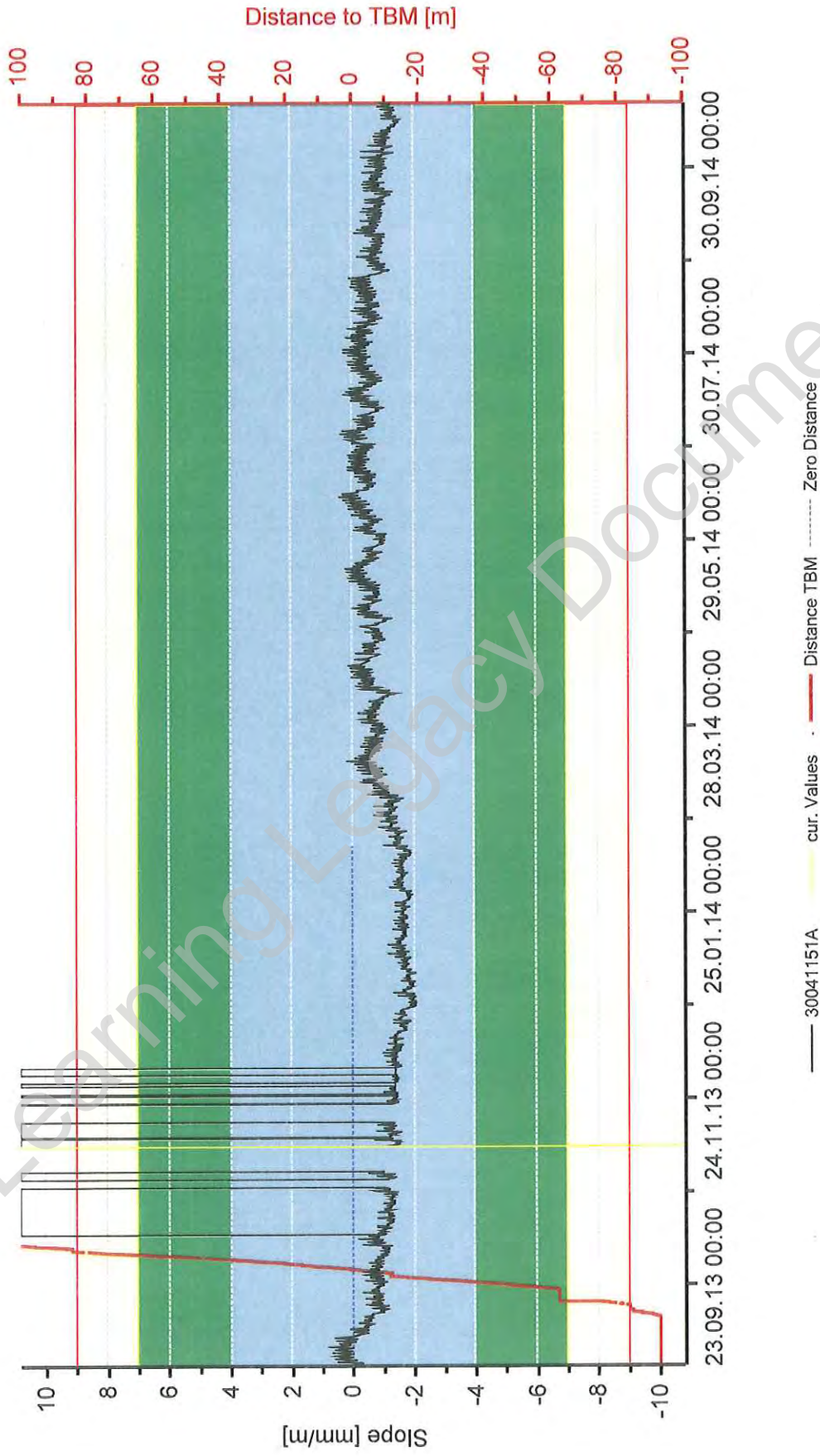




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 25.09.2013 09:05



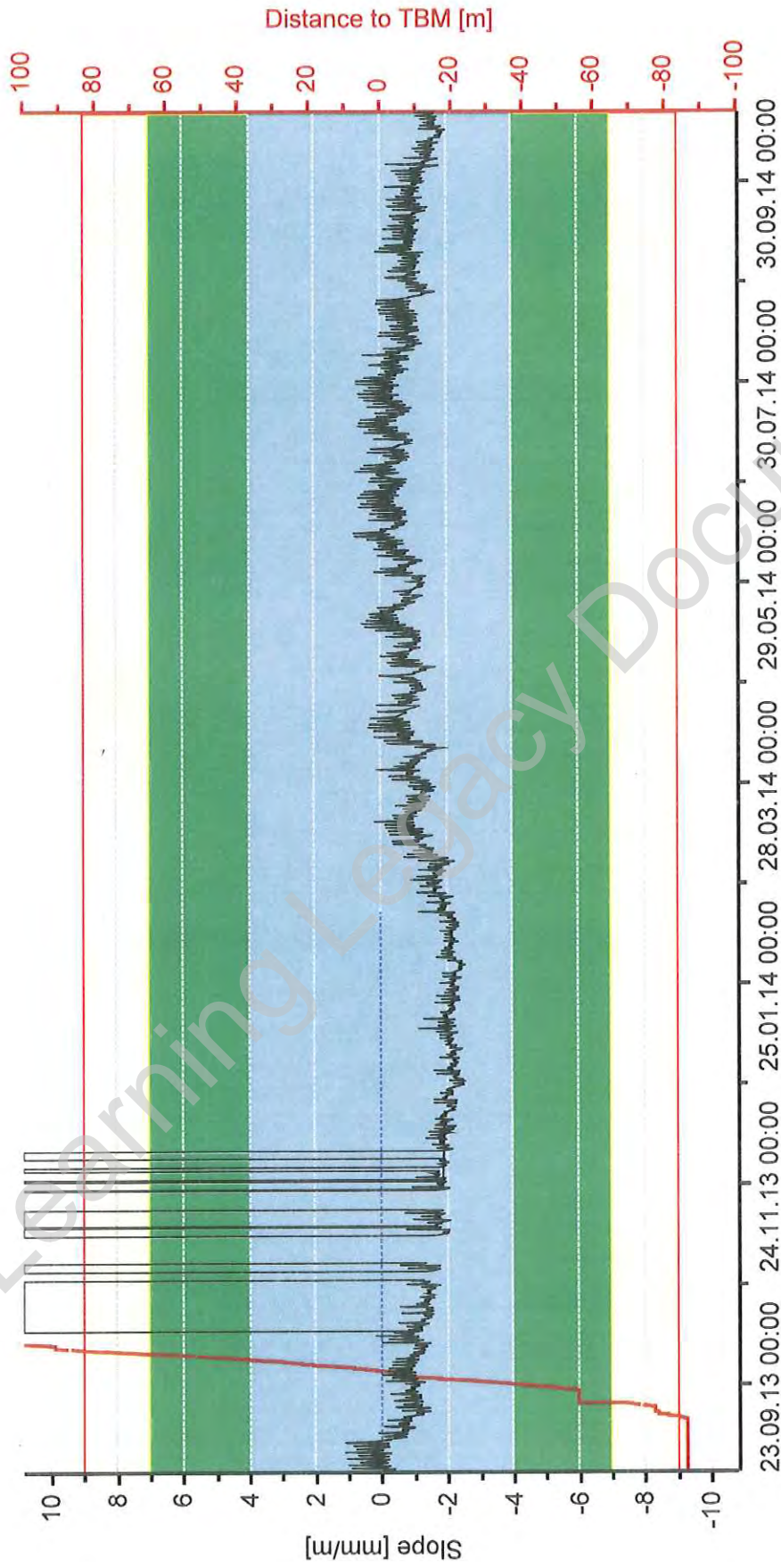
Point: 30041151A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014
Date: 23.10.2014 16:03 Current Values: 23.10.2014 15:49



Point: 30041152A



— 30041152A — Distance TBM - - - - - Zero Distance

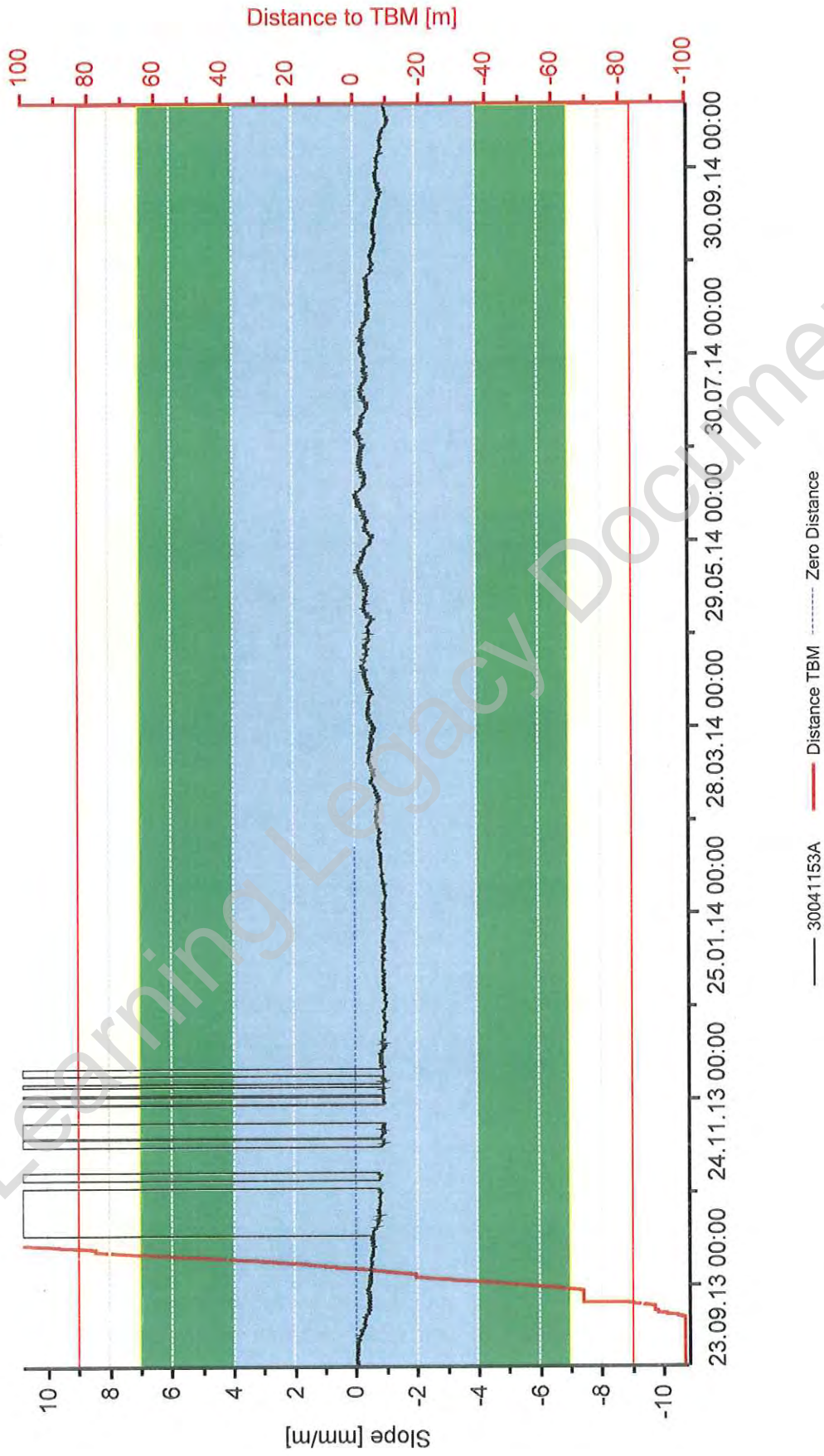
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014

Date: 23.10.2014 16:05 Current Values: 23.10.2014 15:49



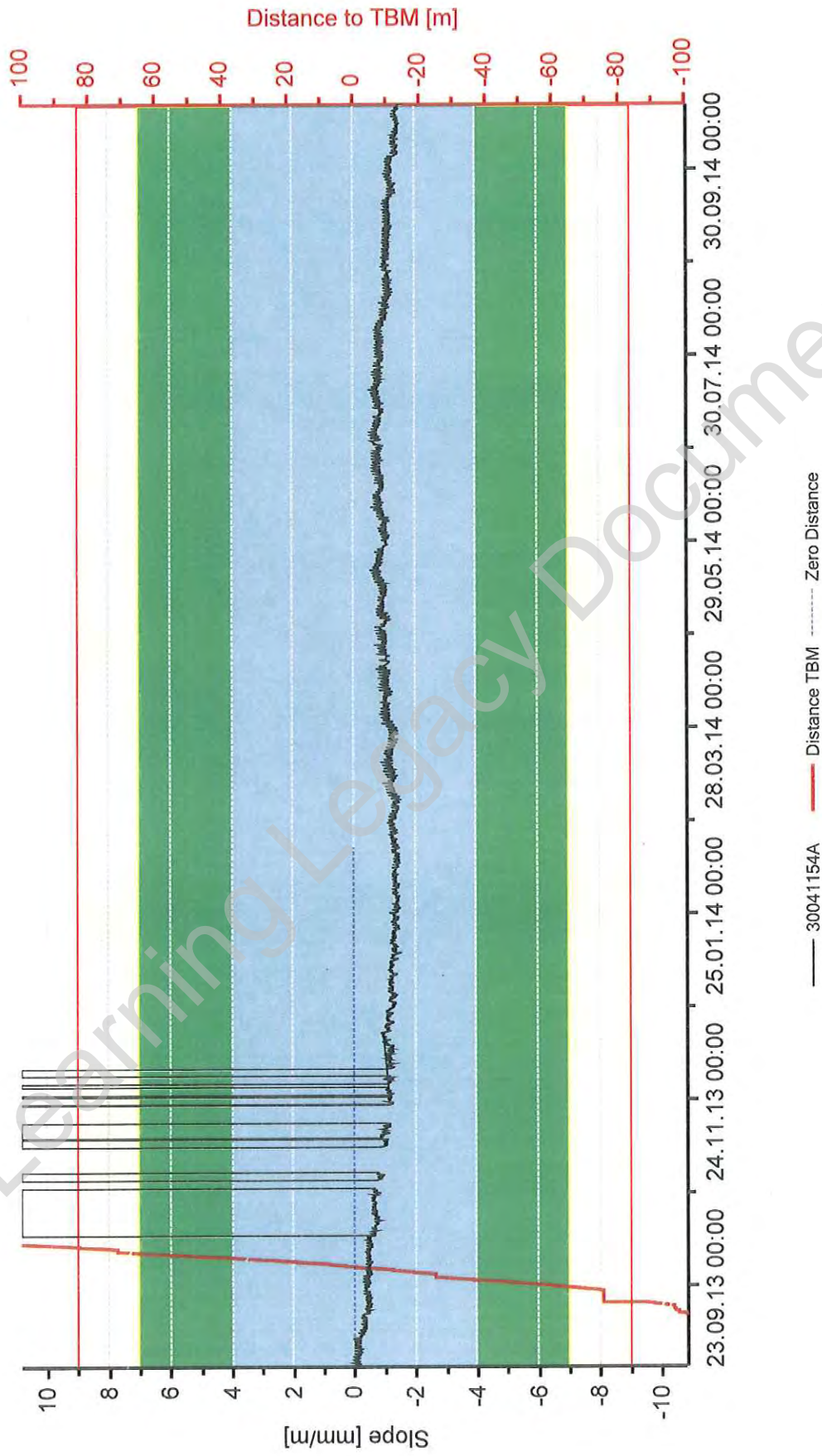
Point: 30041153A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014
Date: 23.10.2014 16:08 Current Values: 23.10.2014 16:04

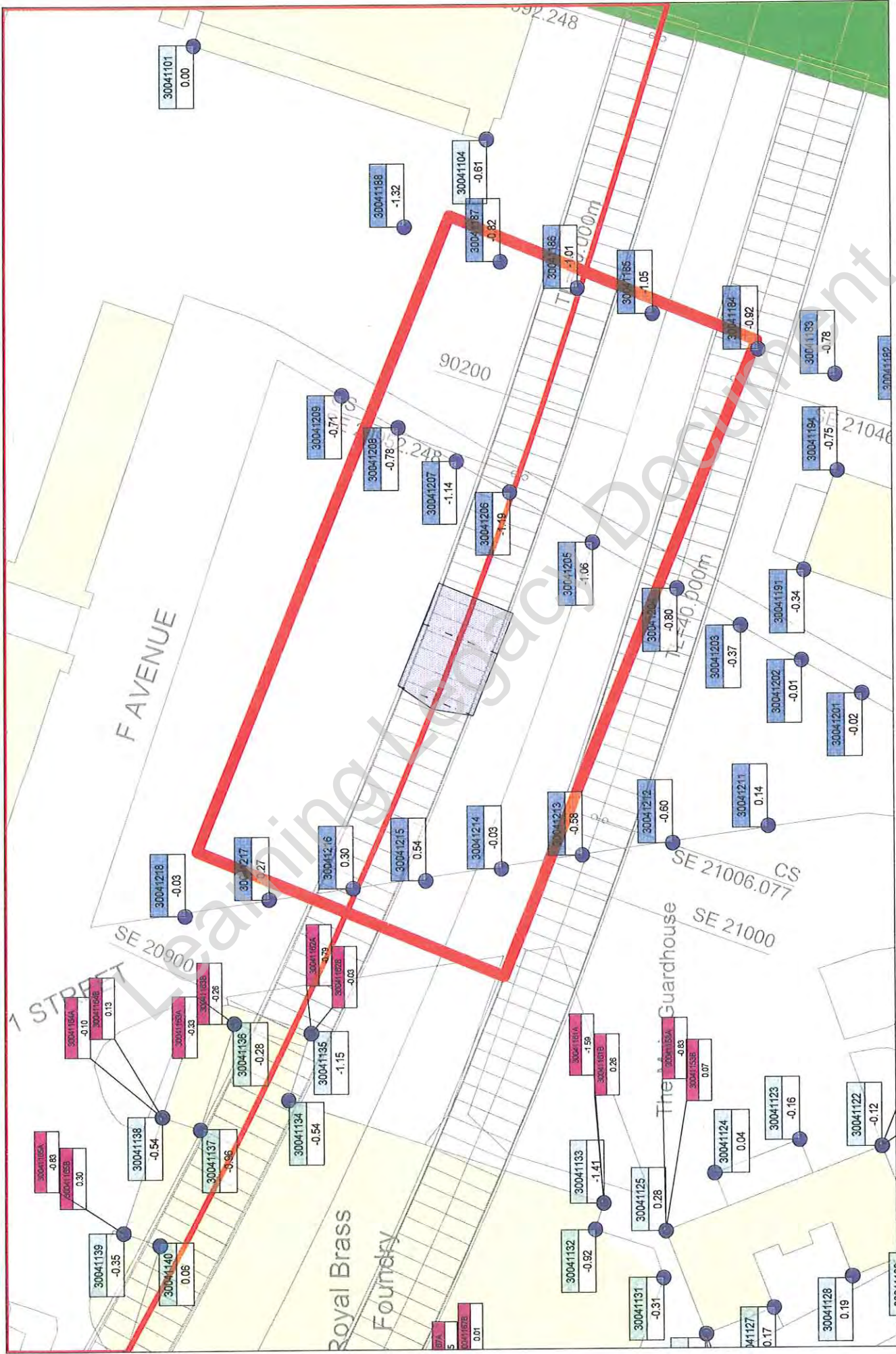


Point: 30041154A



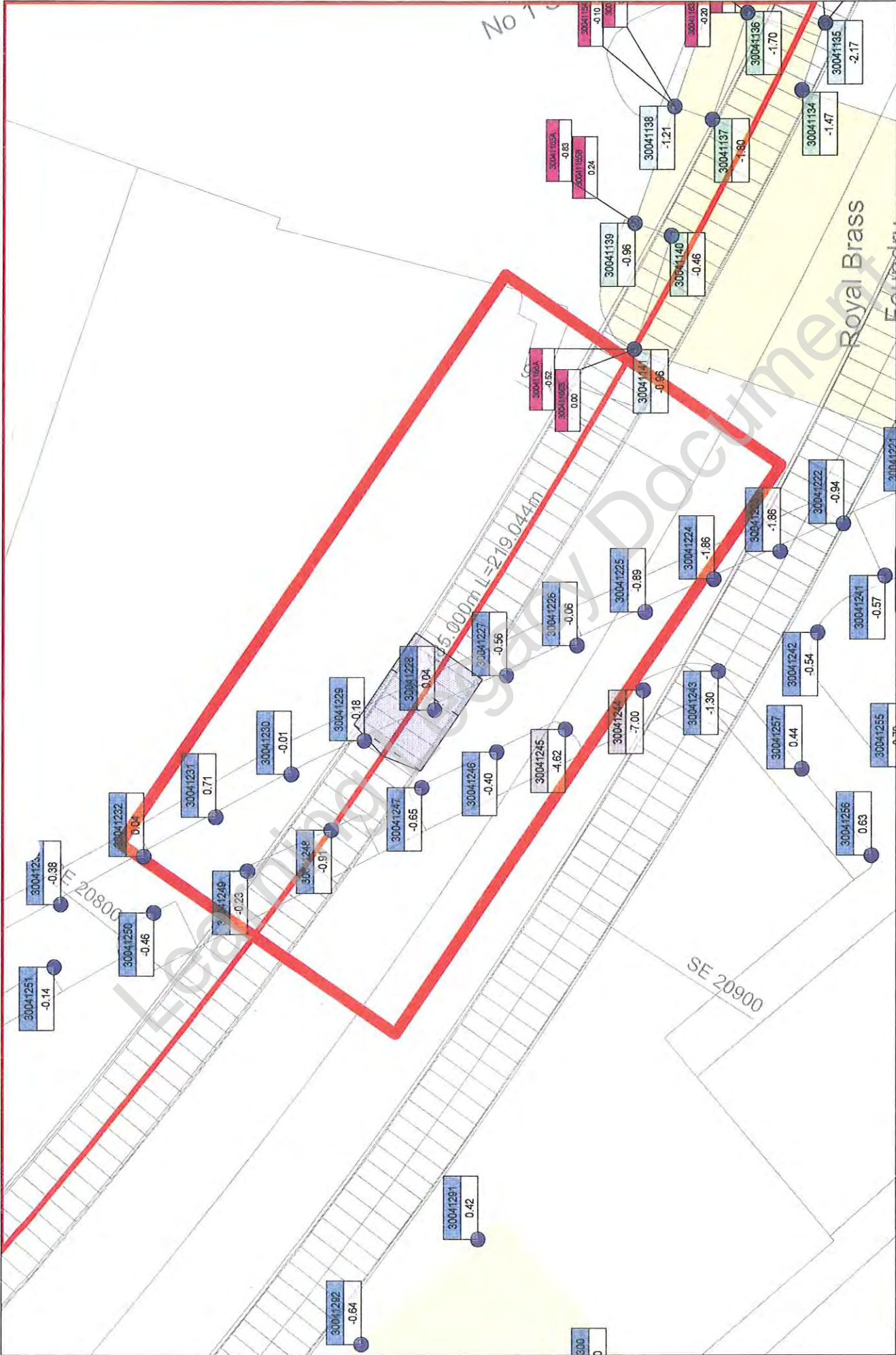
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014
Date: 23.10.2014 16:10 Current Values: 23.10.2014 16:04





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 13.02.2014 17:36

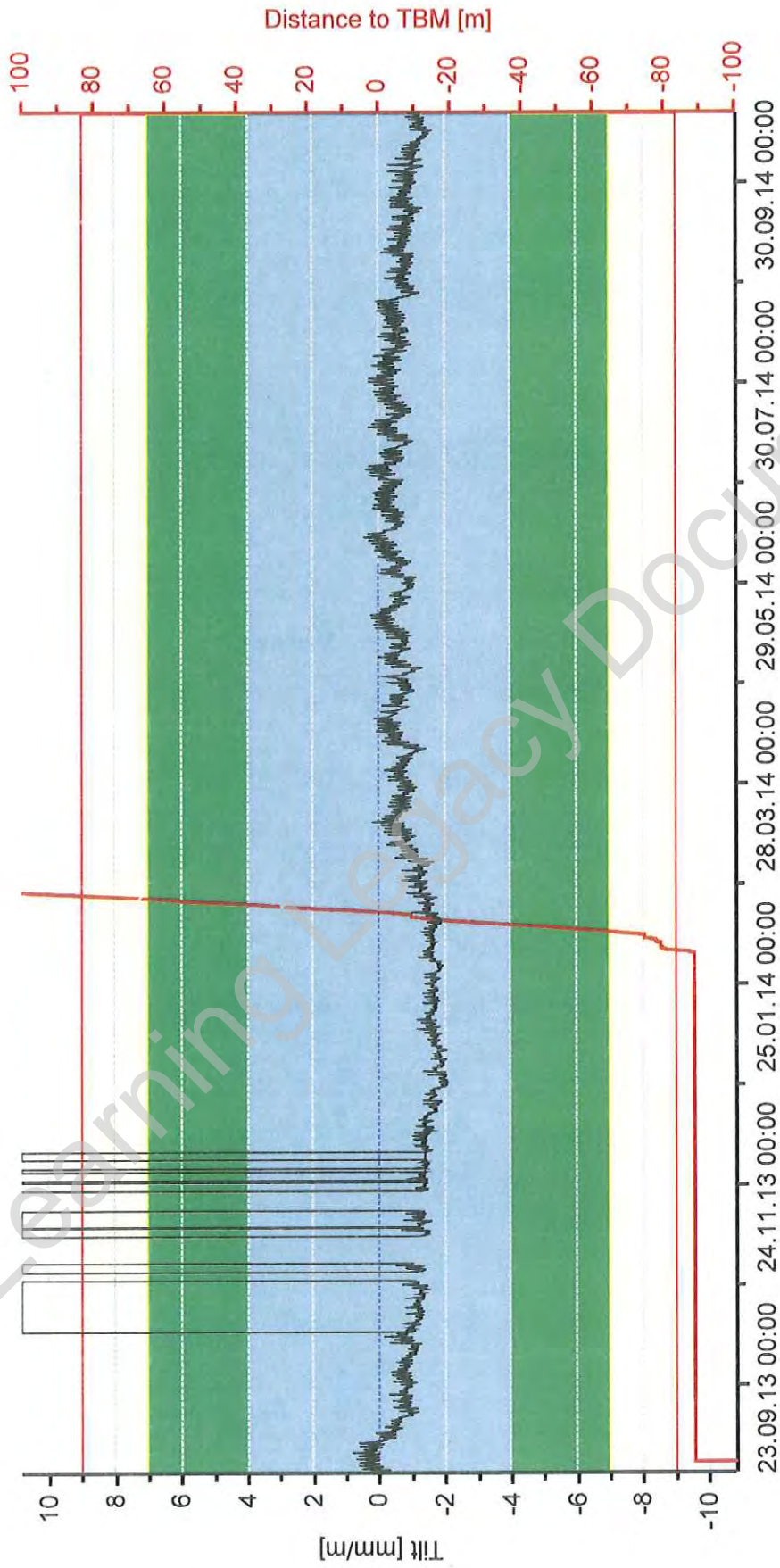




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 21.02.2014 17:05



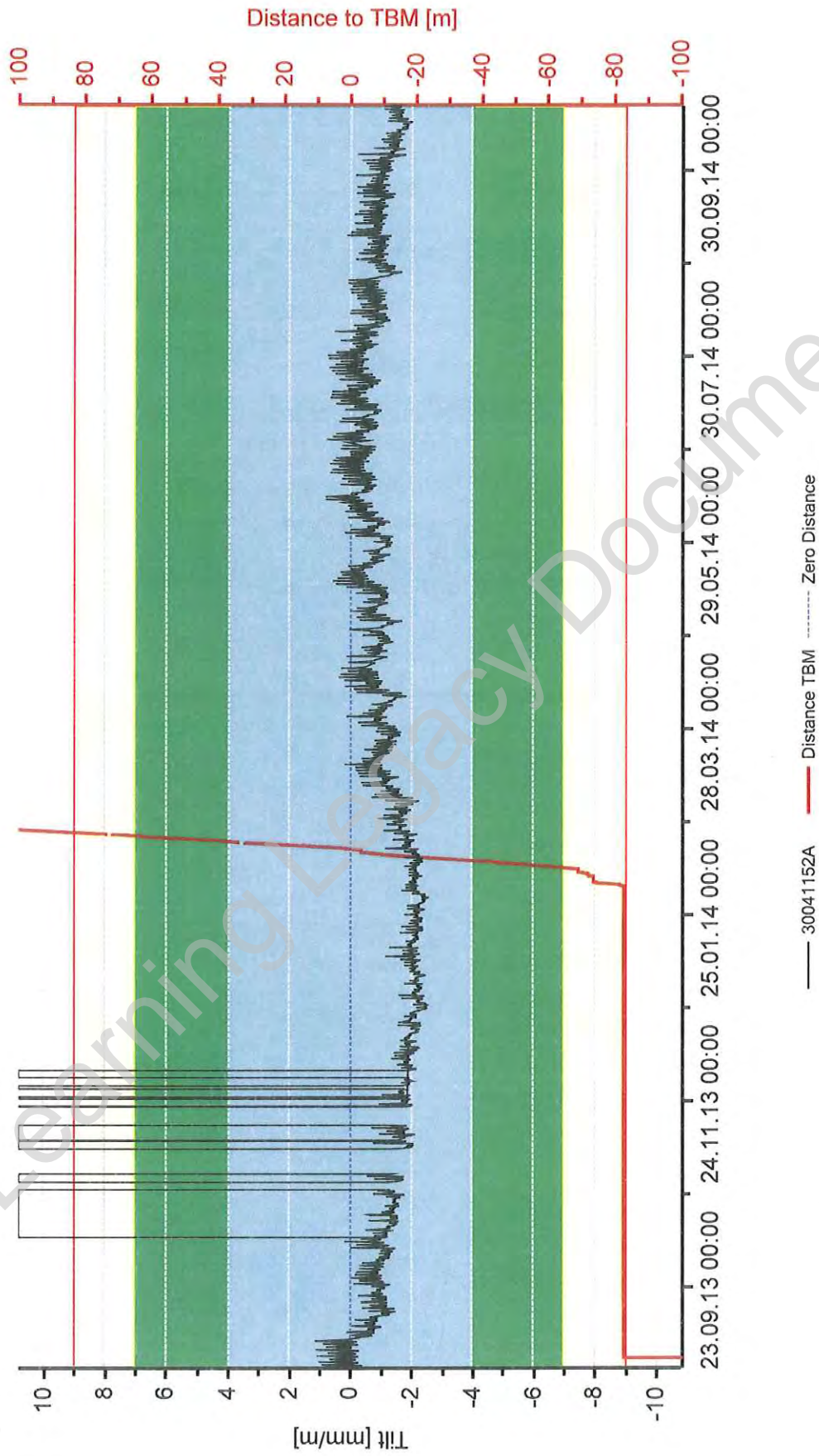
Point: 30041151A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014
date: 24.10.2014 11:15 current values: 24.10.2014 10:59



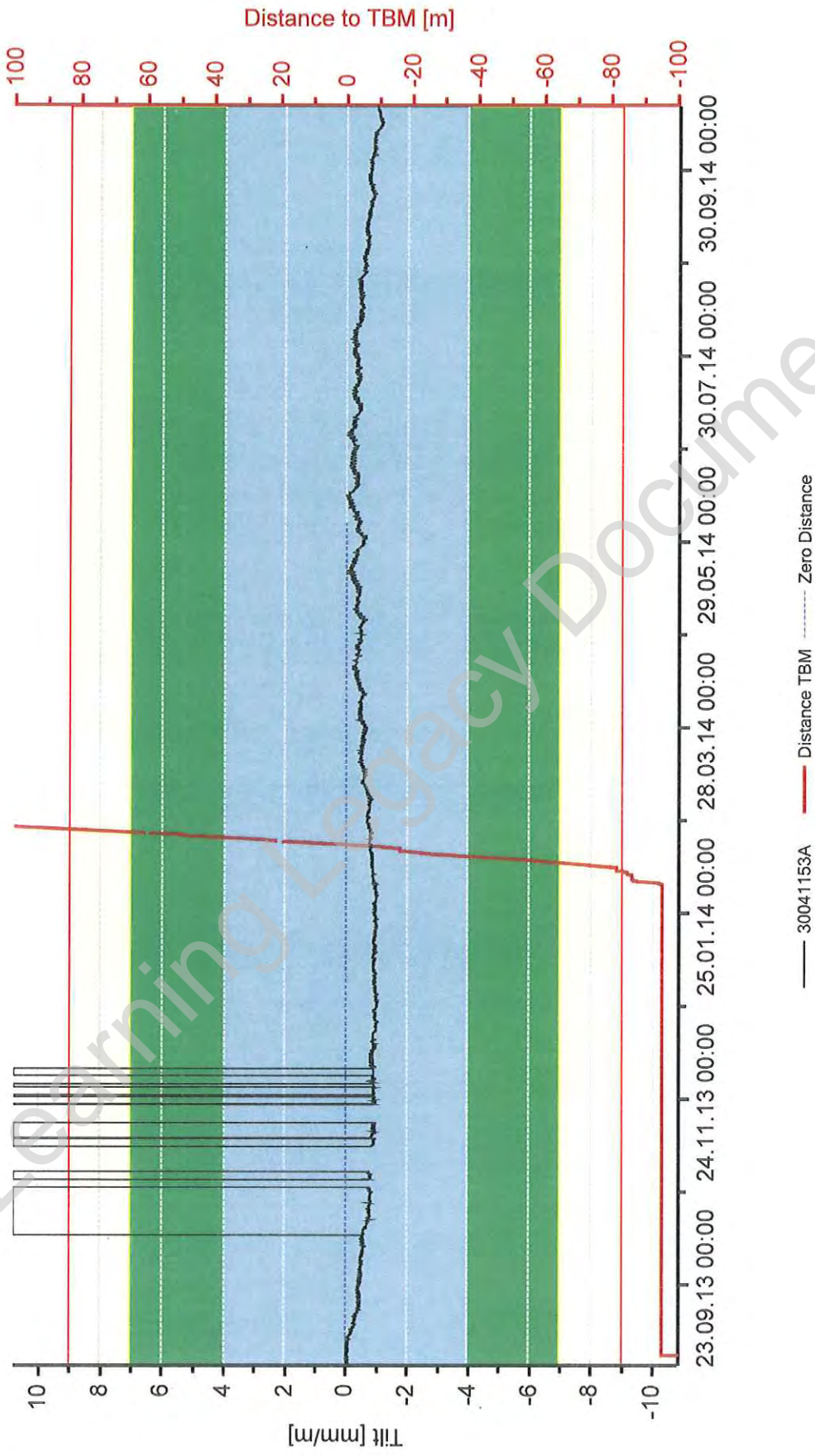
Point: 30041152A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014
date: 24.10.2014 11:19 current values: 24.10.2014 10:59



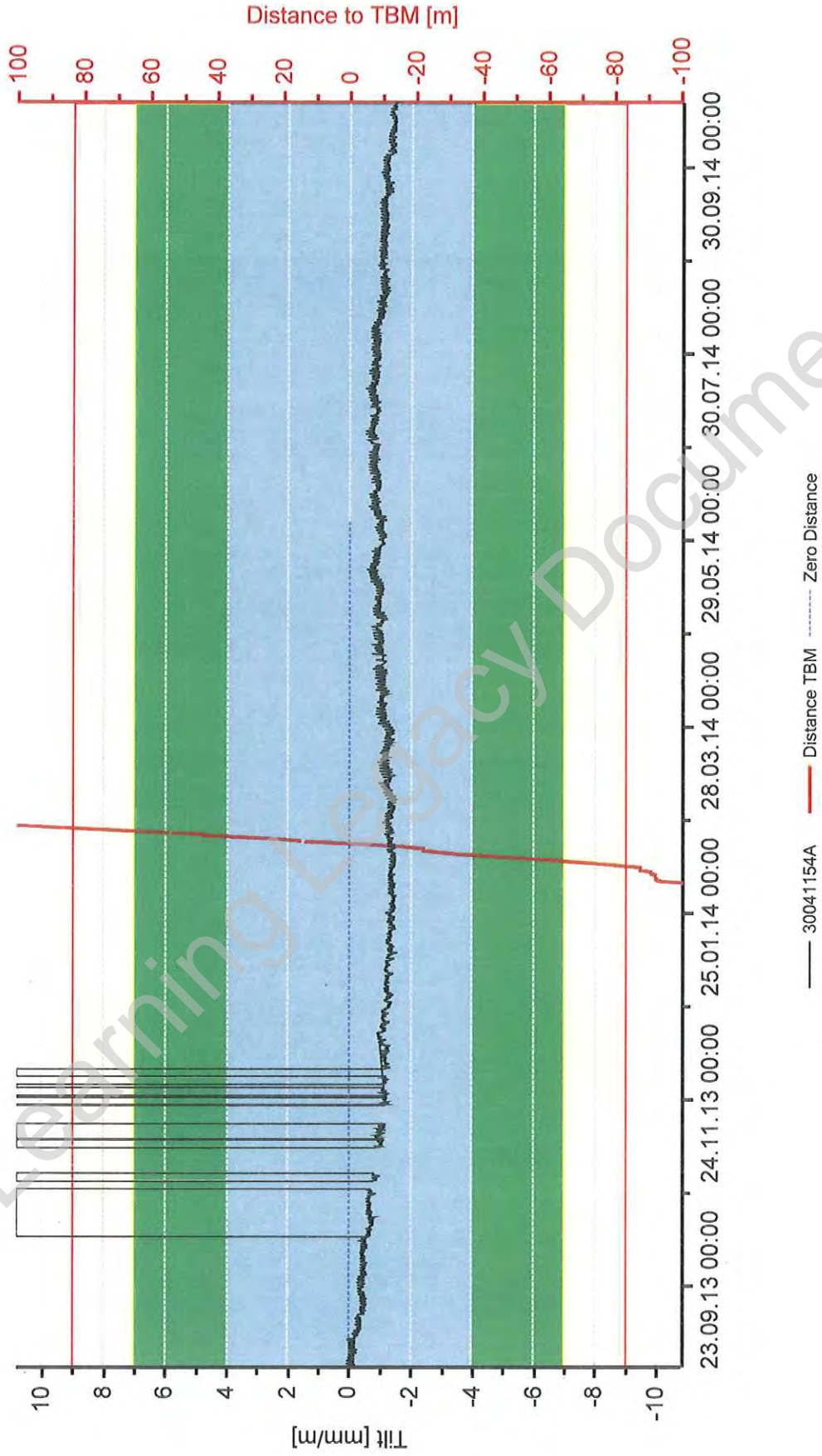
Point: 30041153A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014
date: 24.10.2014 11:22 current values: 24.10.2014 10:59



Point: 30041154A




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

Close Out Report: EB Tunnel - Main Guardhouse 27.08.2013 - 21.10.2014

date: 24.10.2014 11:25 current values: 24.10.2014 11:14



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

APPENDIX 60

Royal Brass Foundry – hydrostatic levelling cells

Learning Legacy Document

monitoring asset	Area Royal Arsenal		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	Royal Brass Foundry		
sensor type:	hydrostatic levelling cell (hlc)		
chainage:	90140	point no.:	3004 1131 - 3004 1143
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	27/08/13		0.00		
TBM 1	start ZOI	25/09/13	0.38 1.01	3004 1133 3004 1142	
	end ZOI	04/10/13	-0.36 0.82	3004 1133 3004 1142	breached not any trigger value
TBM 2	start ZOI	14/02/14	-1.02 -0.33	3004 1135 3004 1141	
	end ZOI	21/02/14	-2.17 -0.96	3004 1135 3004 1141	breached not any trigger value
longterm	21/10/14		-2.45	3004 1135	

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

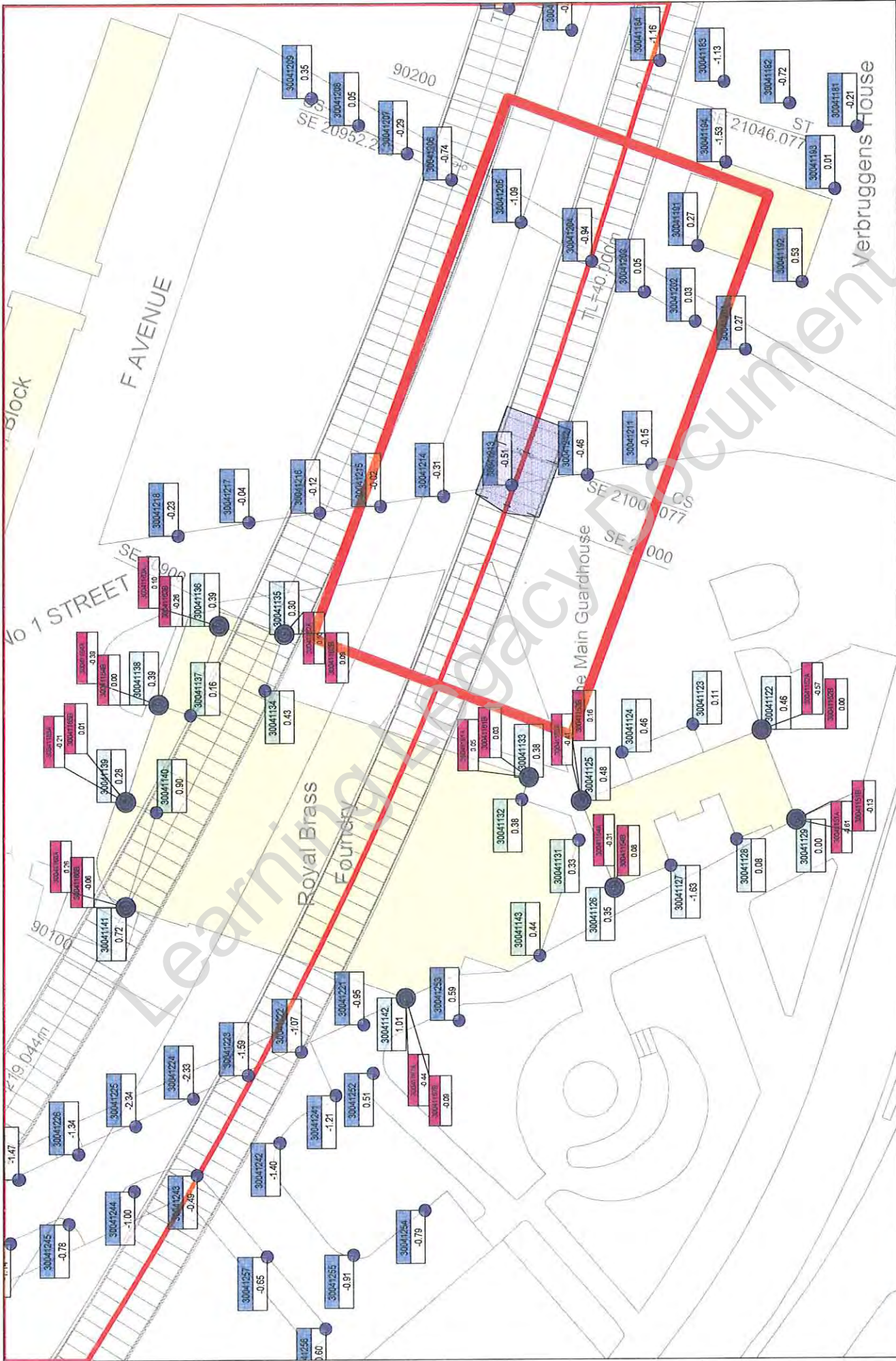
3004 1131 - 3004 1143
 Overall, none of the points reached any trigger value.
 Under consideration of temperature differences and the achievable accuracy of the system HMJV has no concern to cease the monitoring.
 The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 08/10/15

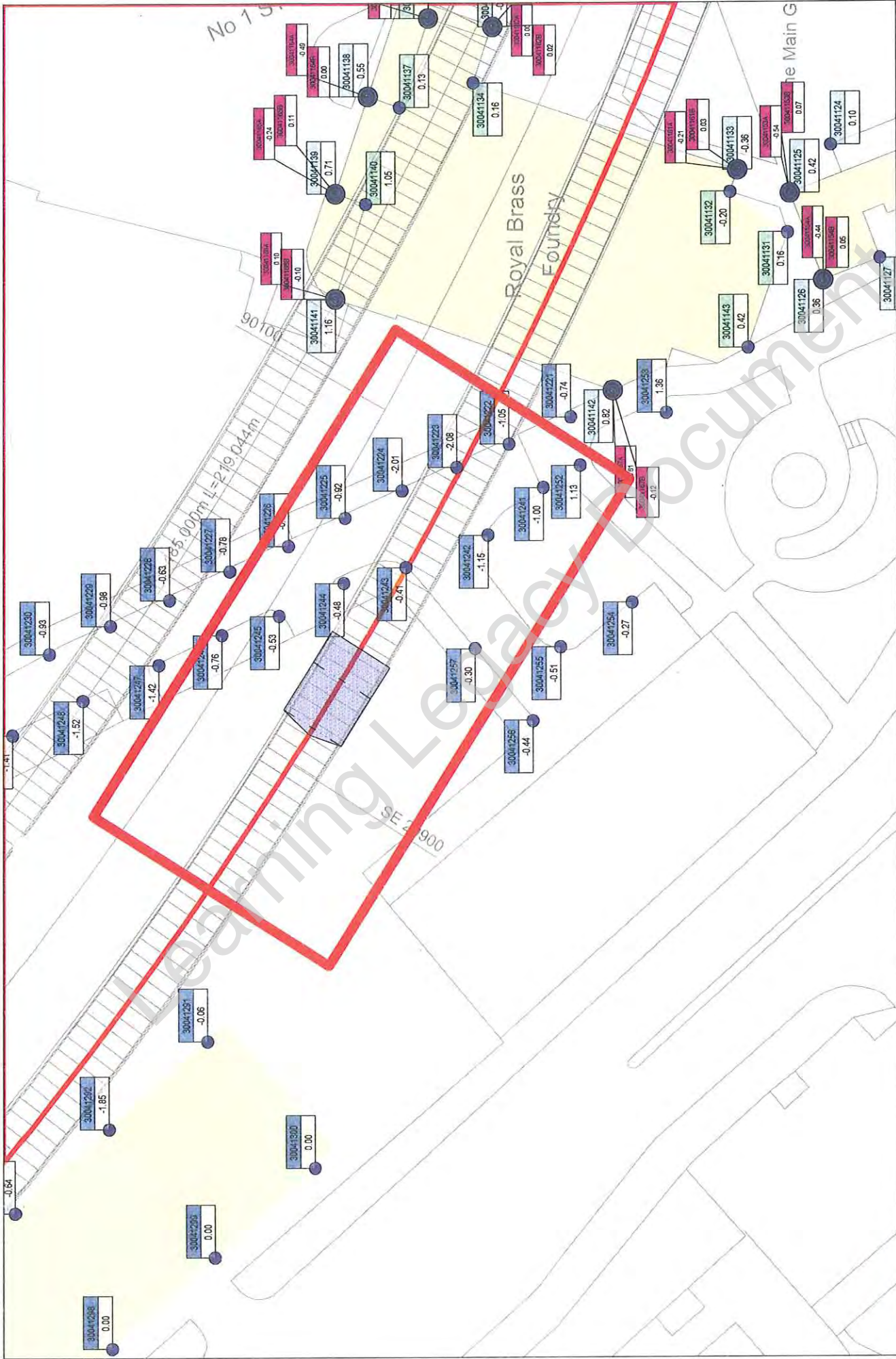
print name:

HMJV project role:

Monitoring & Survey Engineer

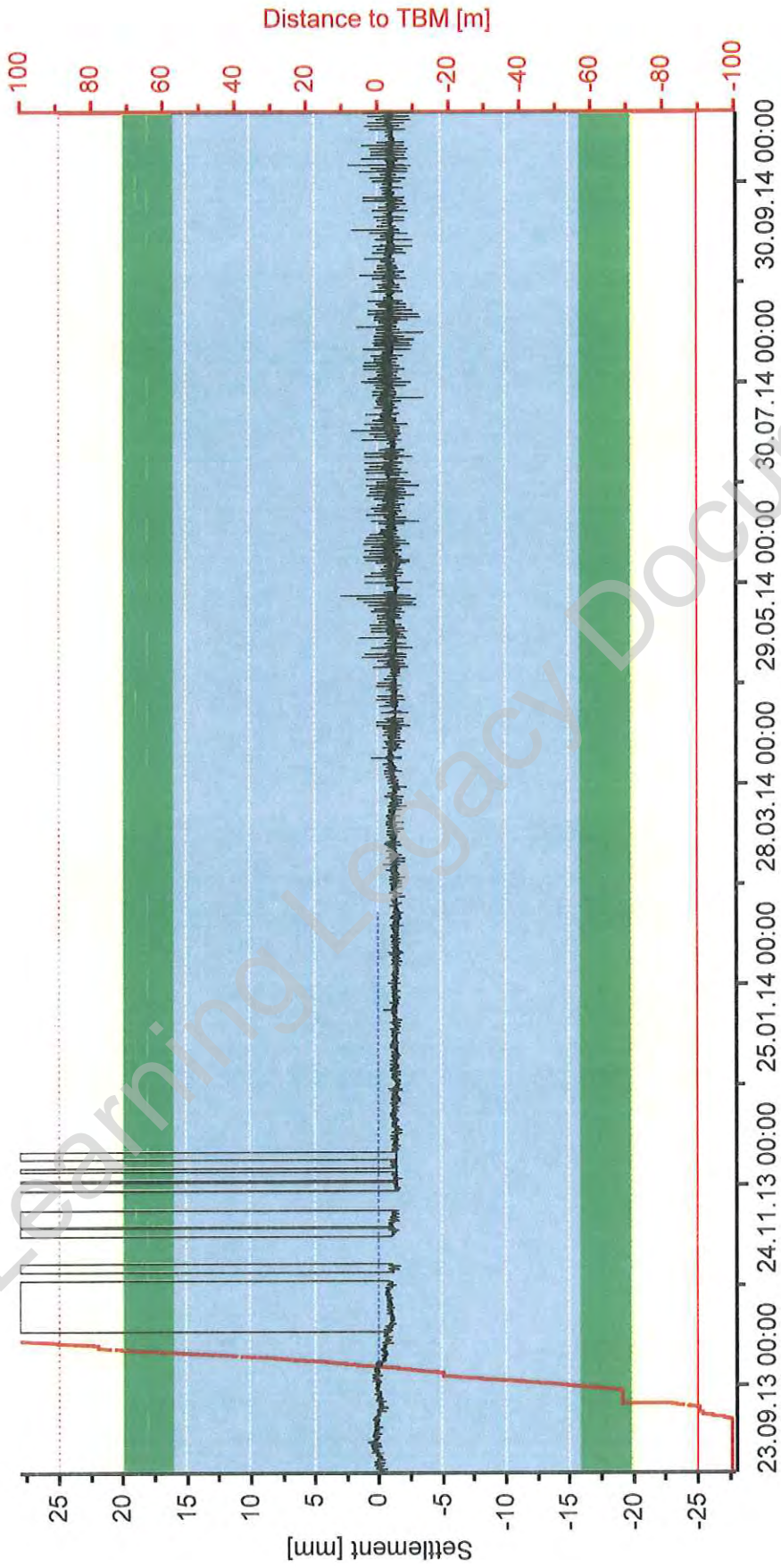


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 25.09.2013 17:55



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 04.10.2013 08:47

Point: 30041133

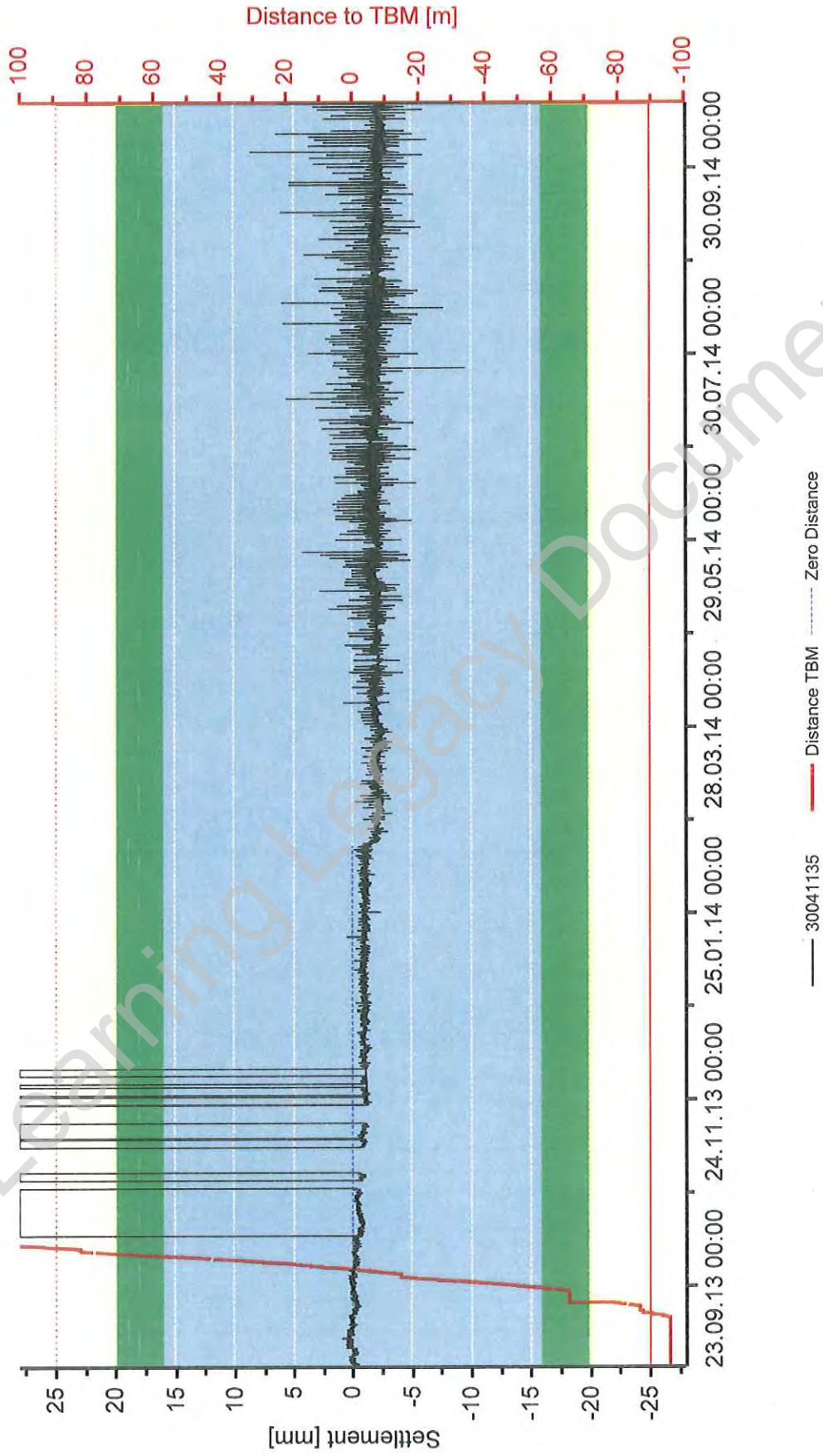


— 30041133 — Distance TBM Zero Distance

Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
Date: 23.10.2014 14:08 Current Values: 23.10.2014 14:03



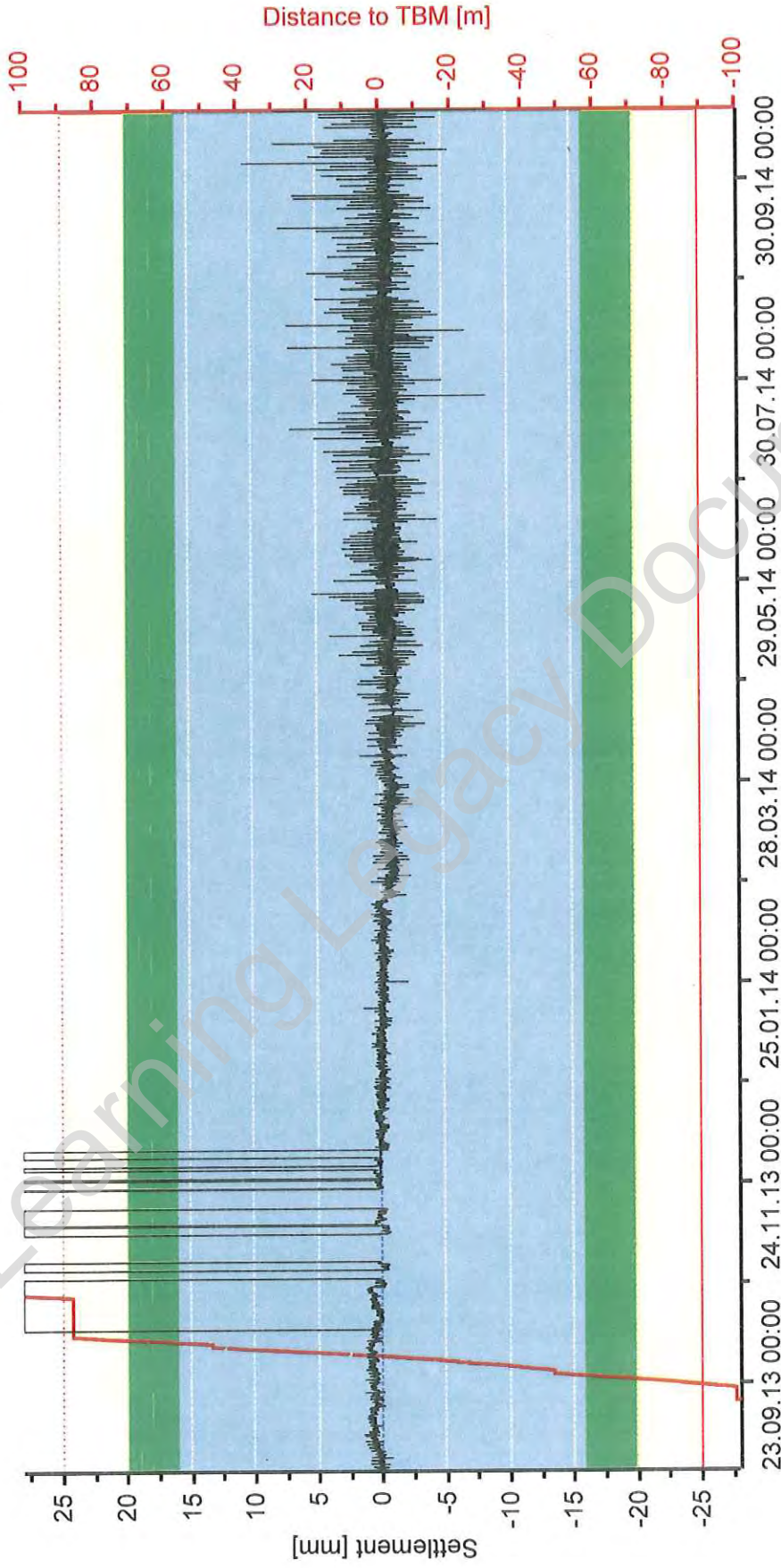
Point: 30041135



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
Date: 23.10.2014 14:01 Current Values: 23.10.2014 13:48



Point: 30041141



— 30041141 — Distance TBM Zero Distance

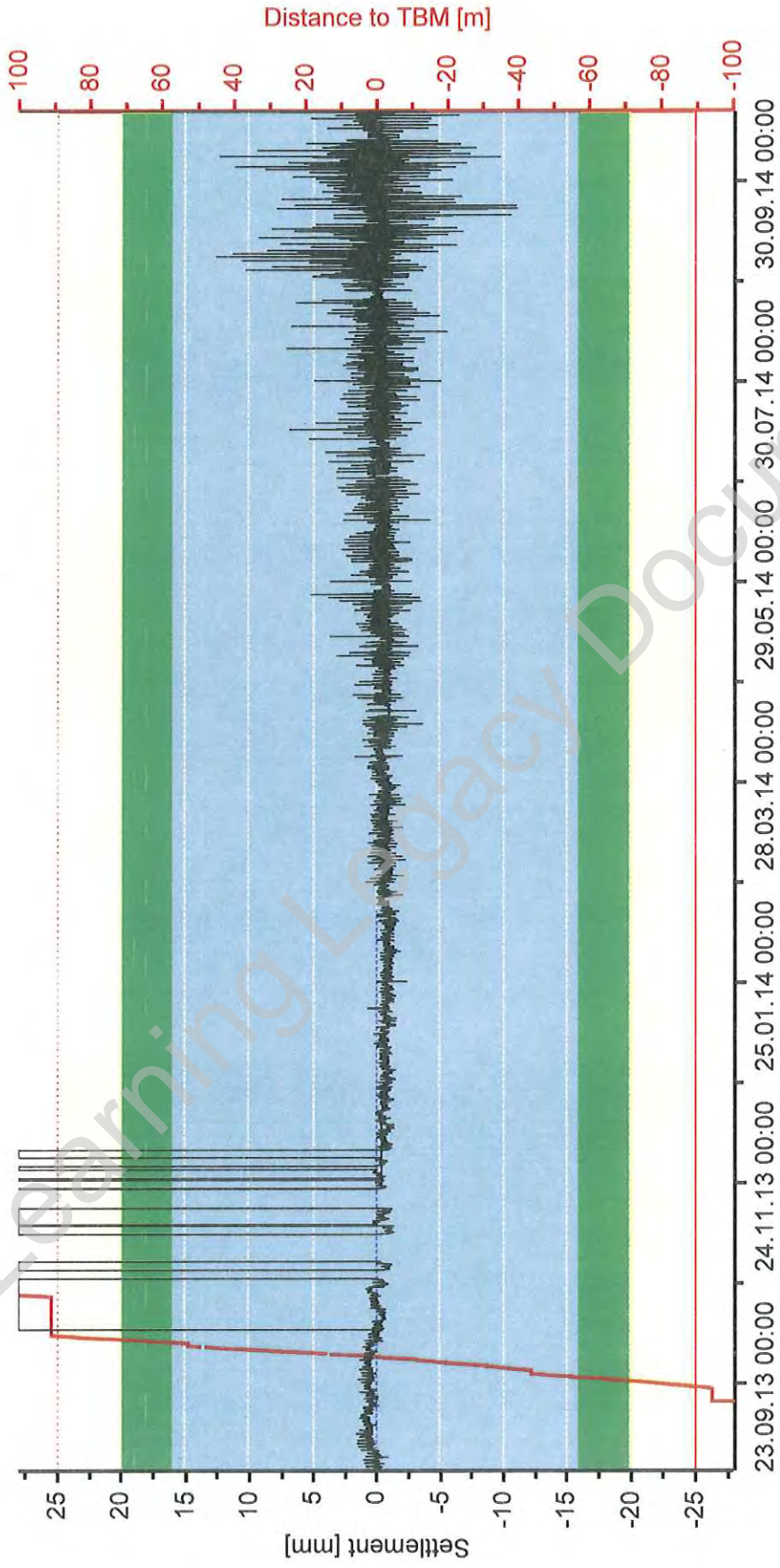
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014

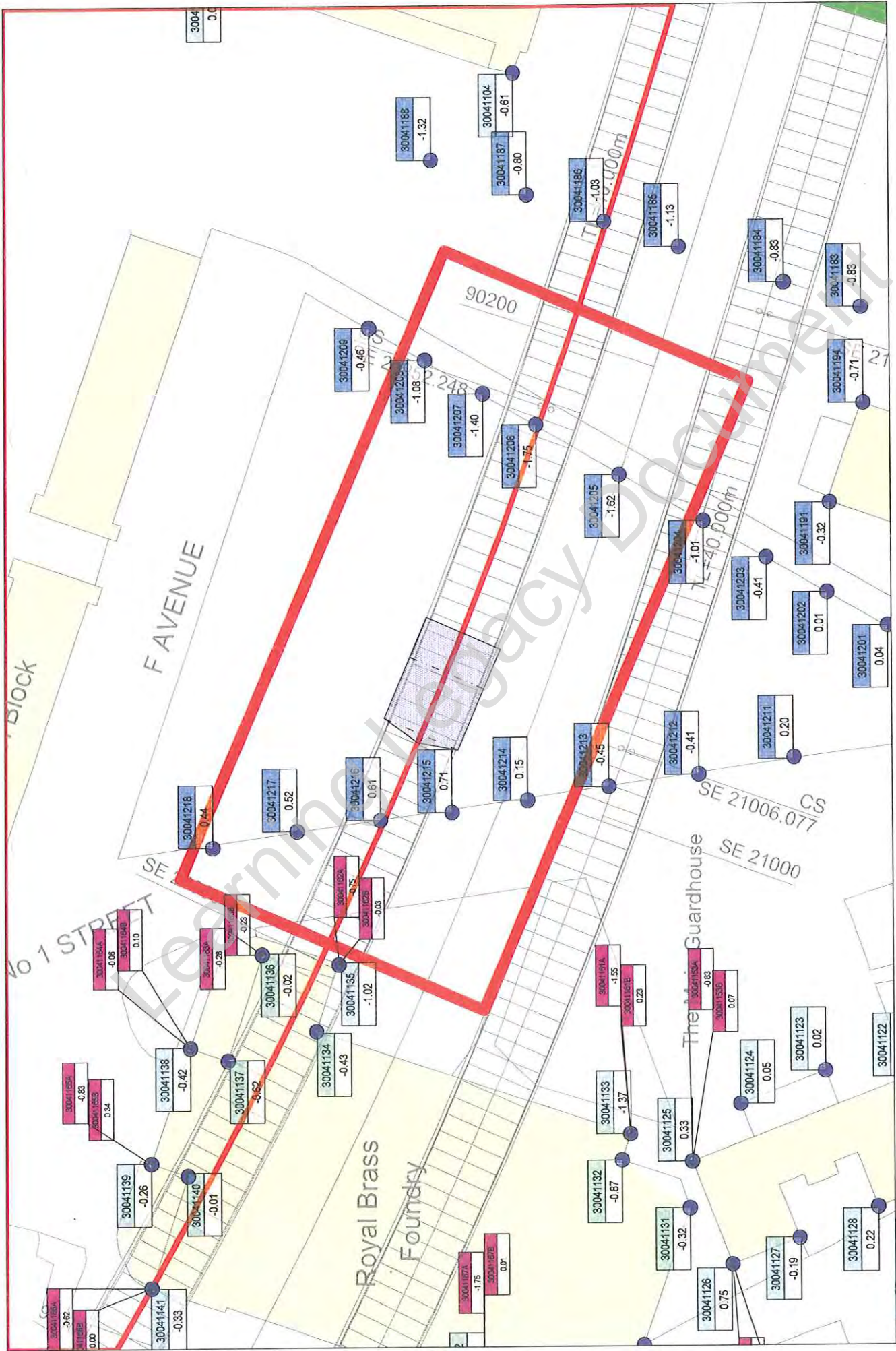
Date: 23.10.2014 14:04 Current Values: 23.10.2014 13:48



Point: 30041142

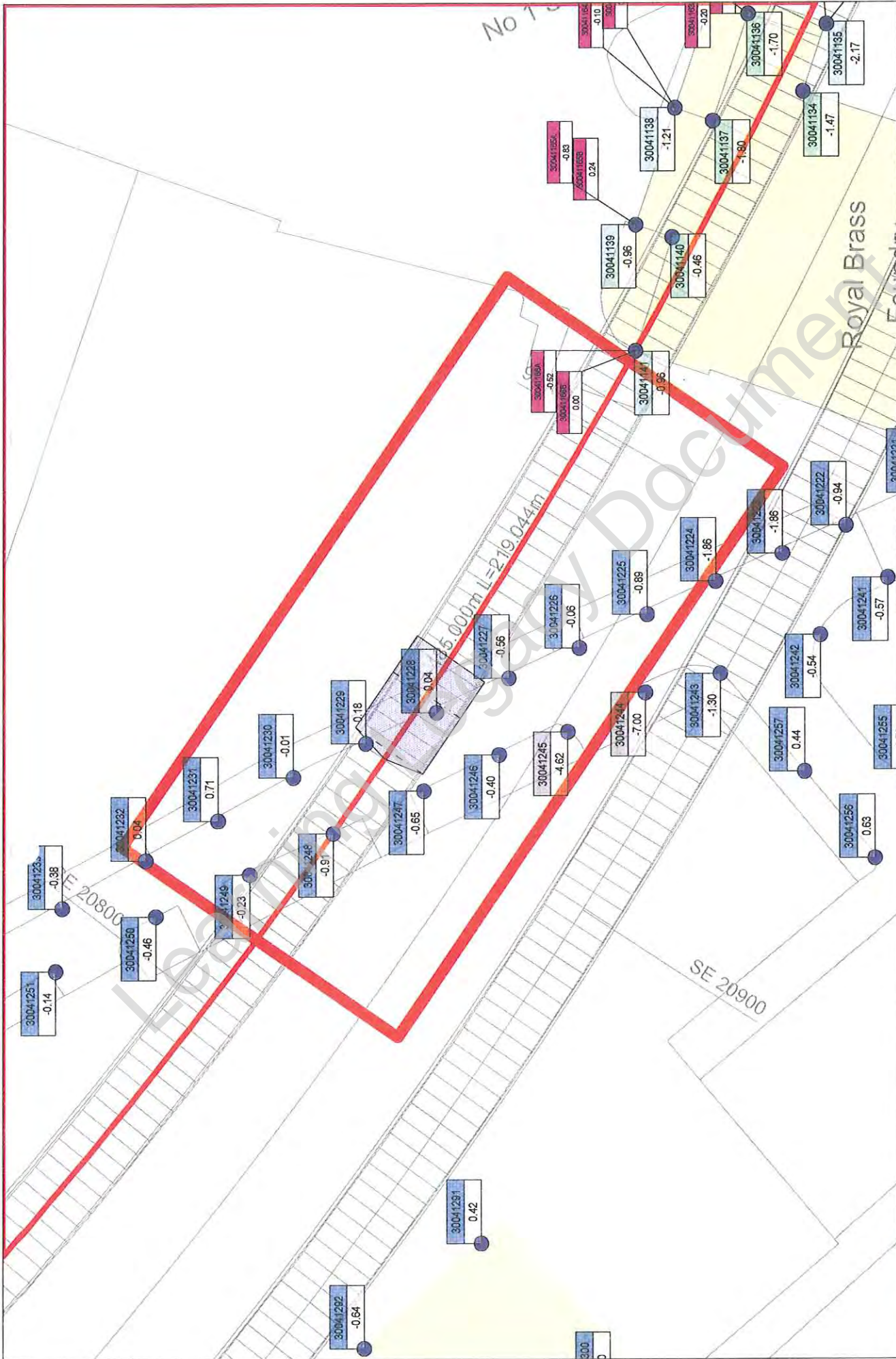


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
Date: 23.10.2014 14:06 Current Values: 23.10.2014 14:03



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 14.02.2014 09:00

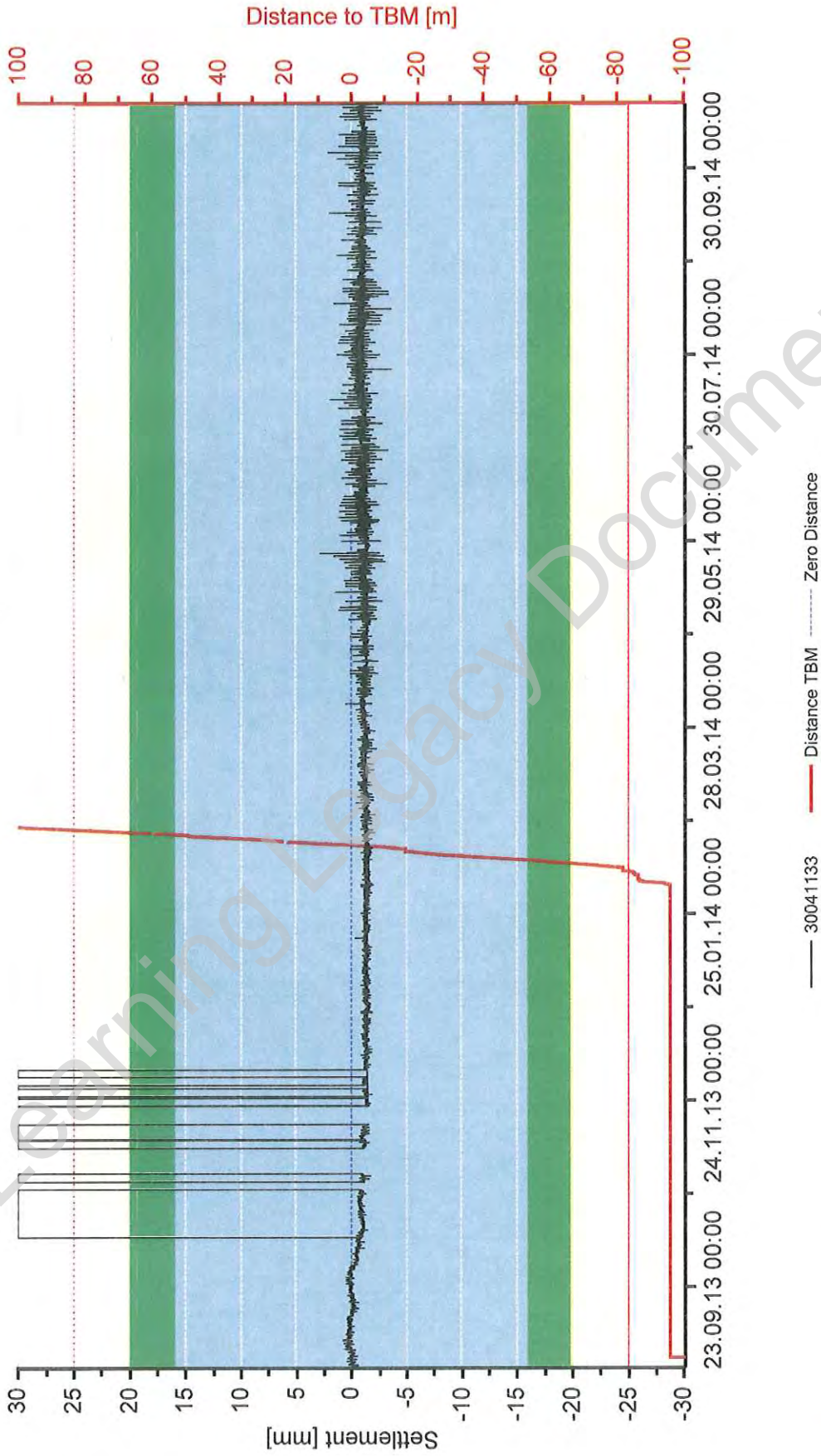




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 21.02.2014 17:05



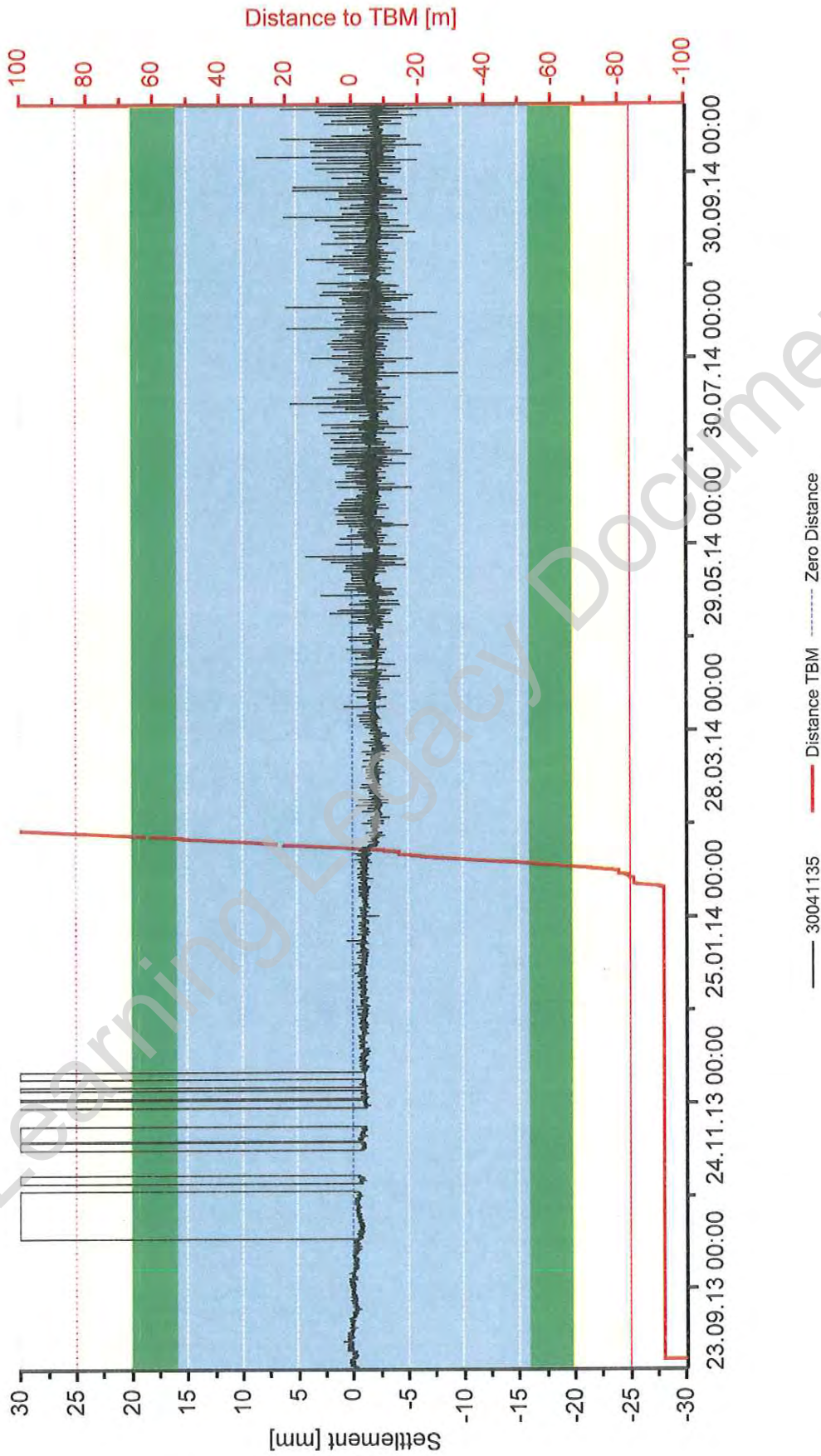
Point: 30041133



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
date: 23.10.2014 10:30 current values: 23.10.2014 10:11



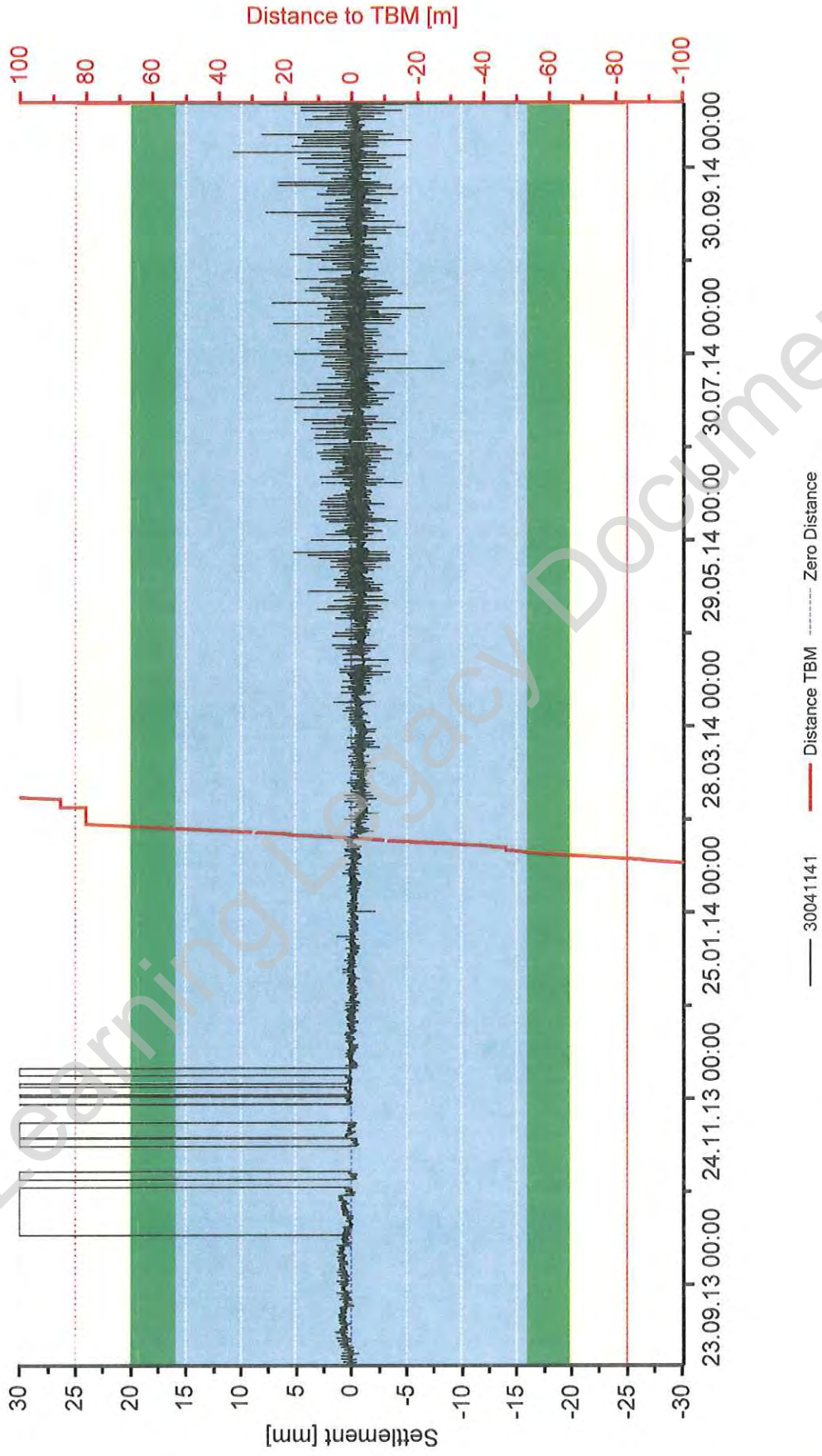
Point: 30041135



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
date: 23.10.2014 10:23 current values: 23.10.2014 10:11

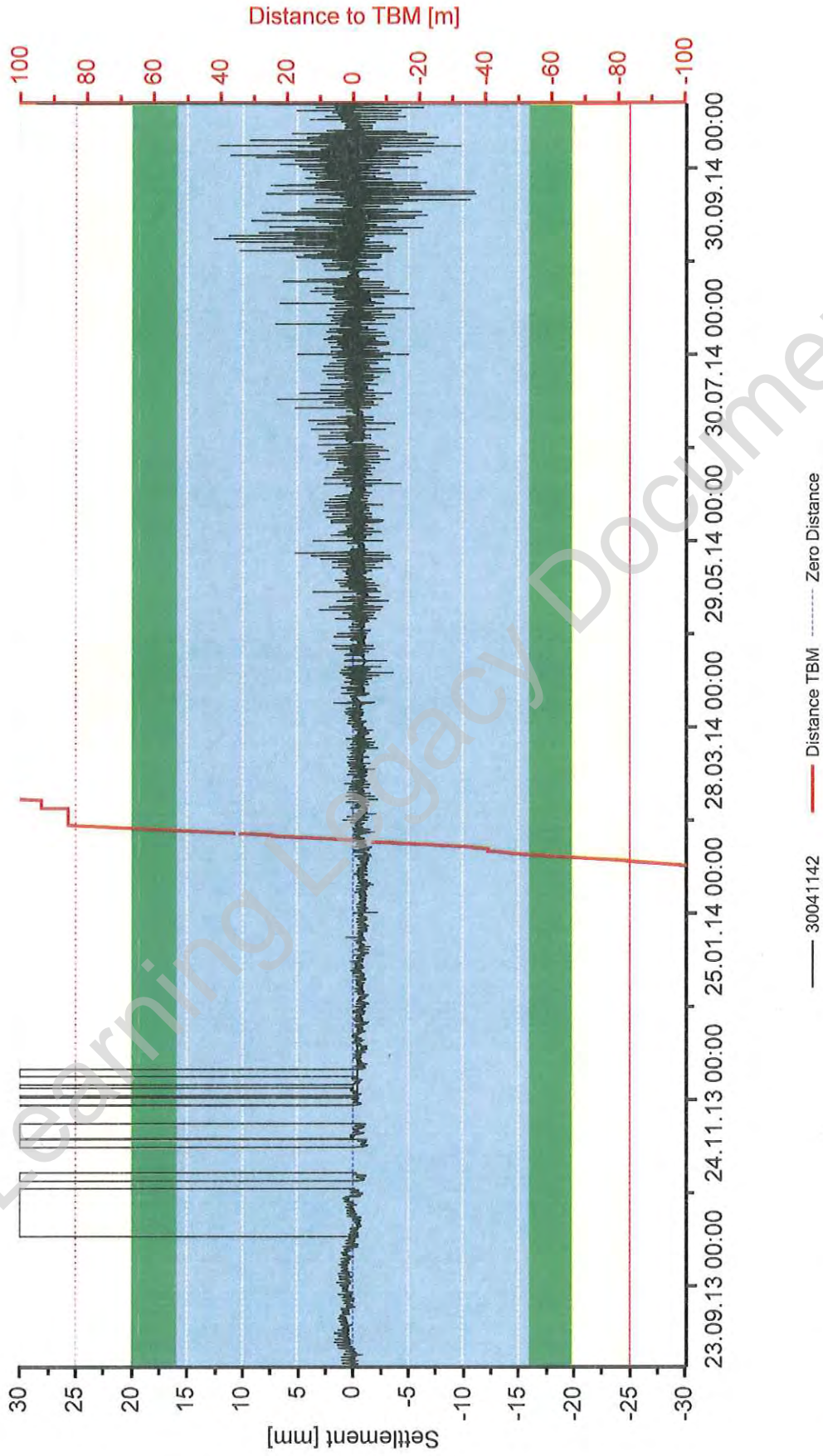


Point: 30041141




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
date: 23.10.2014 10:26 current values: 23.10.2014 10:11

Point: 30041142



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
date: 23.10.2014 10:28 current values: 23.10.2014 10:11

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

APPENDIX 61

Royal Brass Foundry – tiltmeter

Learning Legacy Document

monitoring asset	Area Royal Arsenal		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	Royal Brass Foundry		
sensor type:	tiltmeter		
chainage:	90140	point no.:	3004 1161 - 3004 1167
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	27/08/13		0.00		
TBM 1	start ZOI	25/09/13	0.05 -0.44	3004 1161A 3004 1167A	
	end ZOI	04/10/13	-0.21 -0.61	3004 1161A 3004 1167A	breached not any trigger value
TBM 2	start ZOI	14/02/14	-0.28 -0.62	3004 1163A 3004 1166A	
	end ZOI	21/02/14	-0.20 -0.52	3004 1163A 3004 1166A	breached not any trigger value
longterm	21/10/14		-1.82	3004 1167A	

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

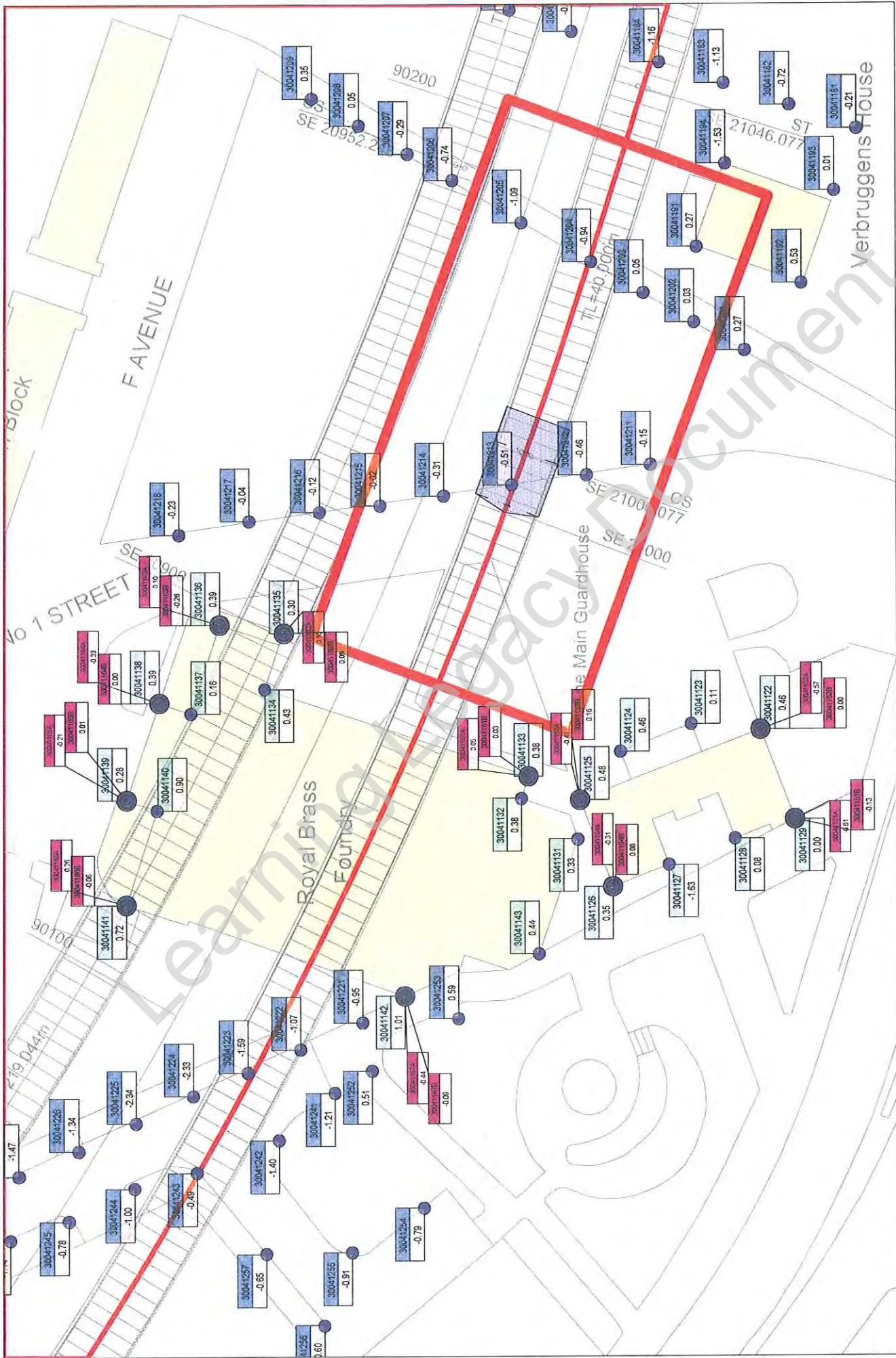
3004 1161 - 3004 1167
Overall, none of the points reached any trigger value.
Under consideration of temperature differences and the achievable accuracy of the system HMJV has no concern to cease the monitoring.
The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 08/01/15

print name:

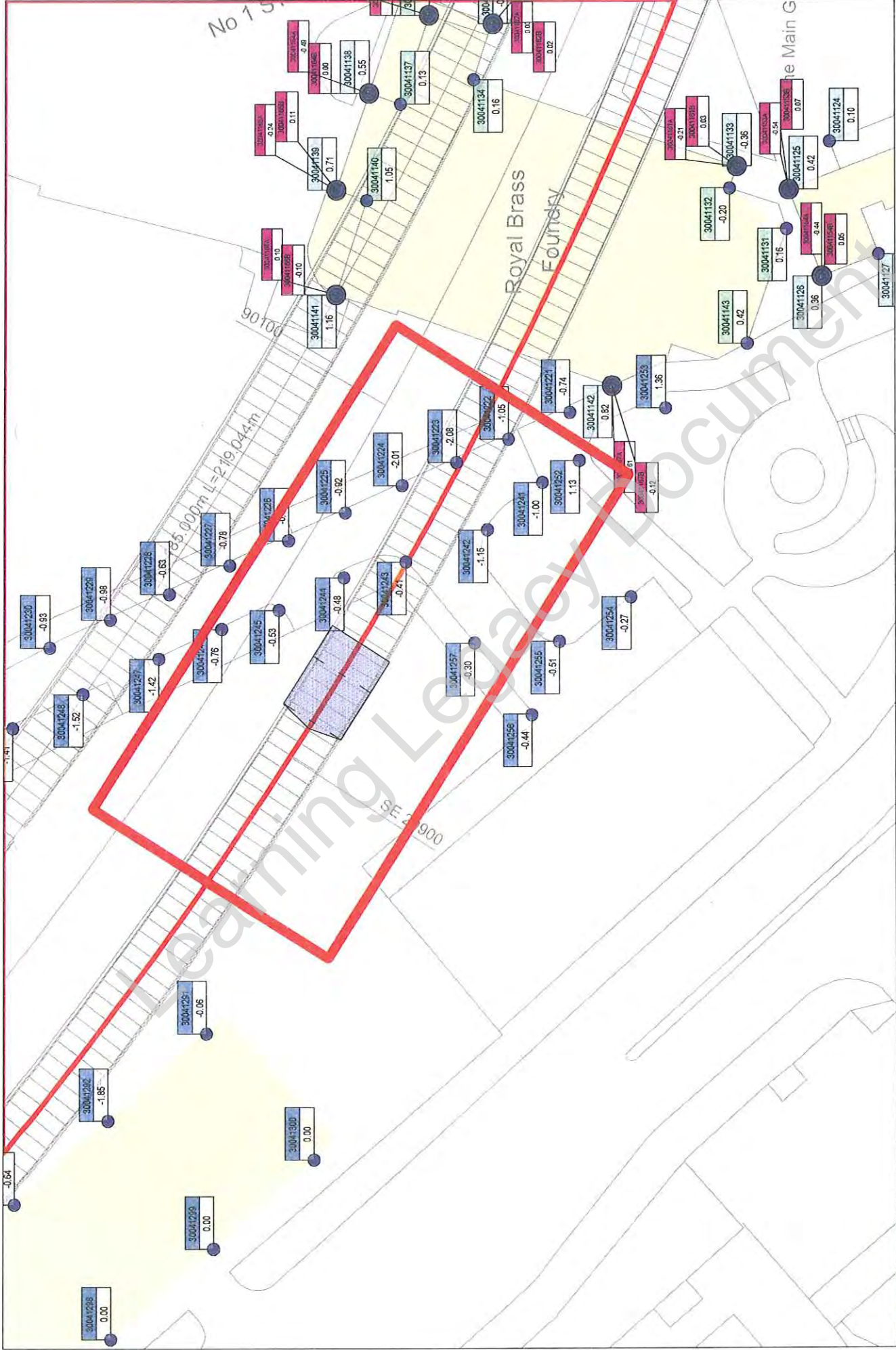
HMJV project role:

Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 25.09.2013 17:55

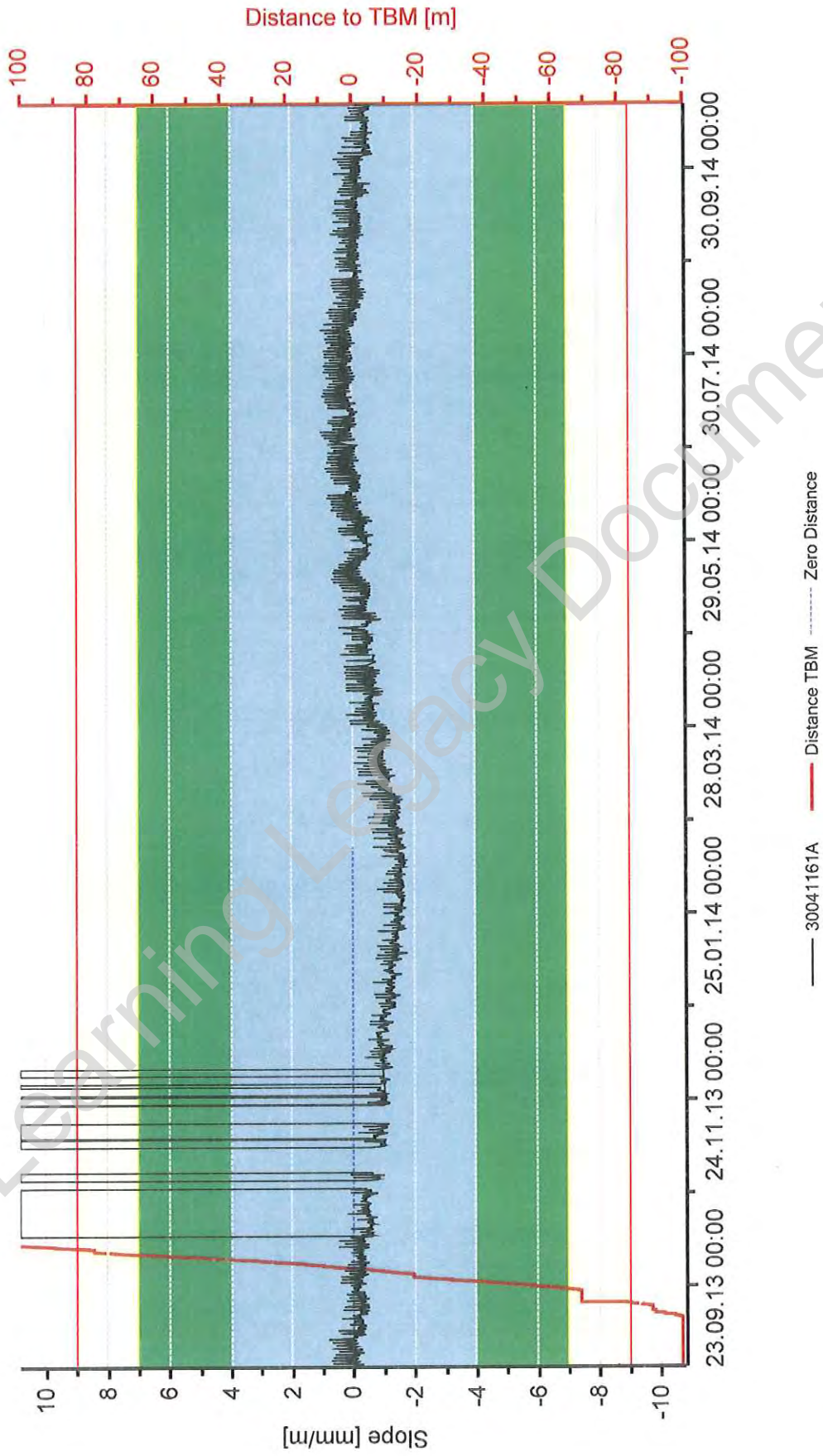




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 04.10.2013 08:47



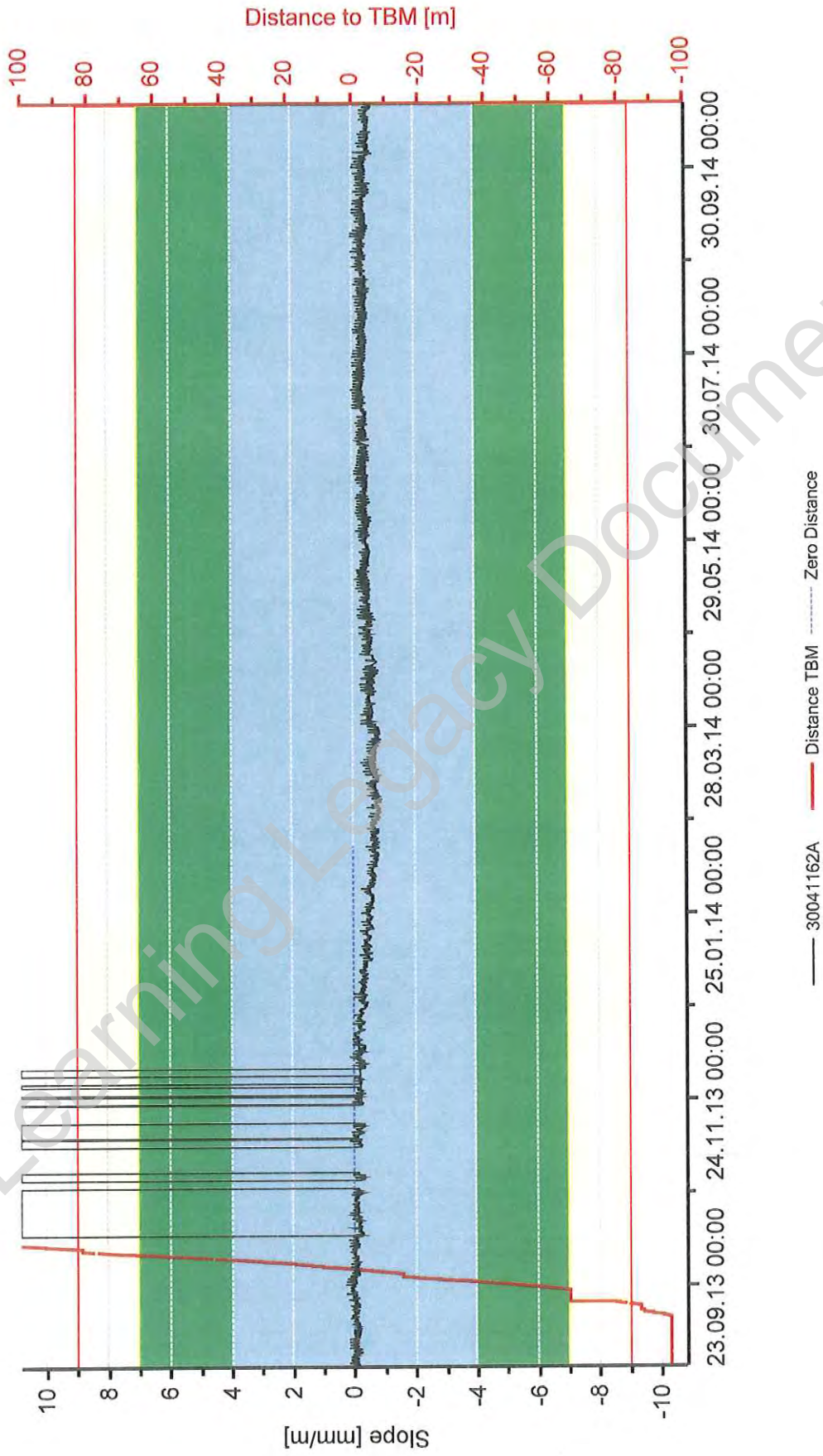
Point: 30041161A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
Date: 23.10.2014 16:25 Current Values: 23.10.2014 16:19



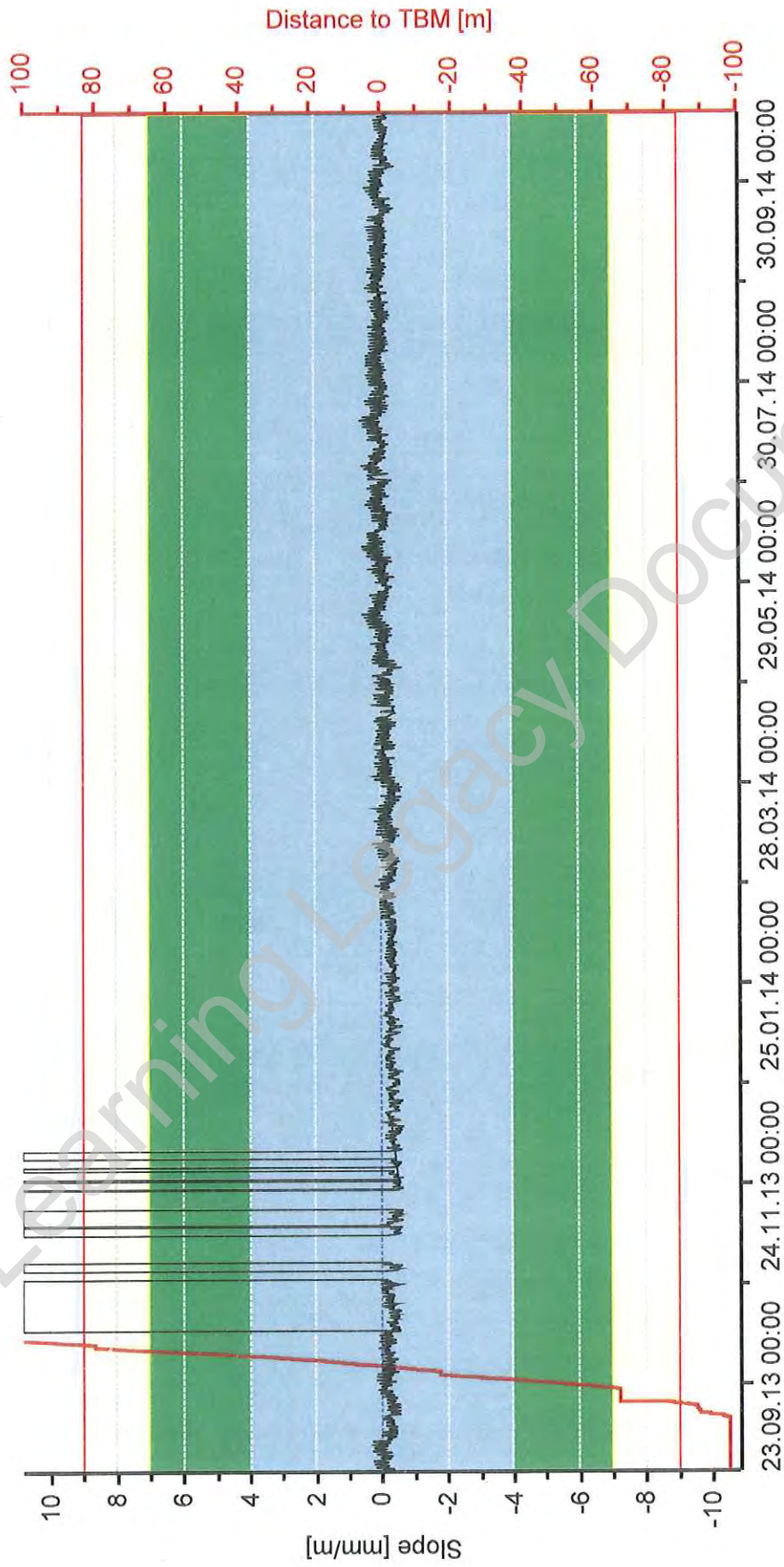
Point: 30041162A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
Date: 23.10.2014 16:27 Current Values: 23.10.2014 16:19



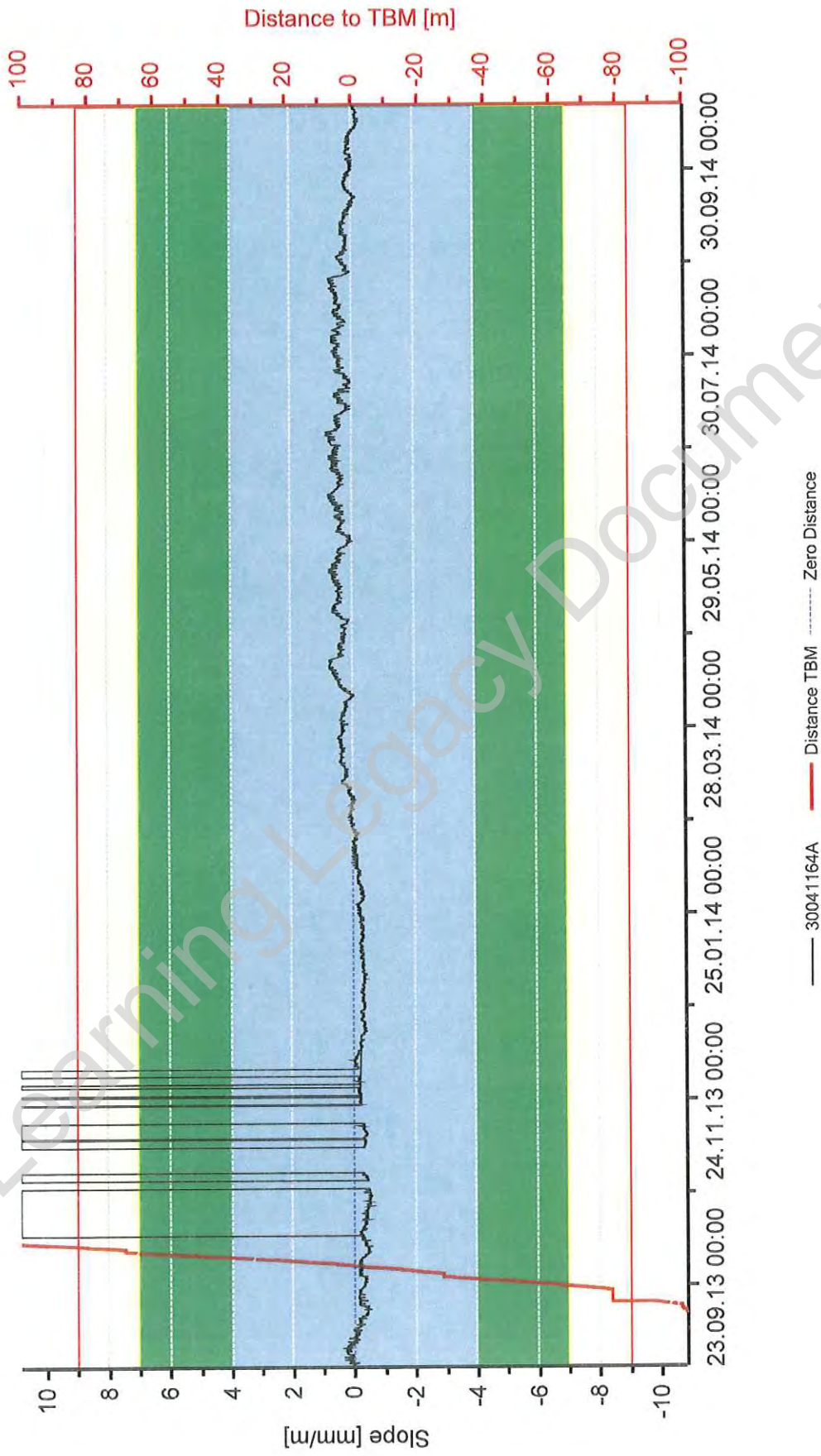
Point: 30041163A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
Date: 23.10.2014 16:30 Current Values: 23.10.2014 16:19



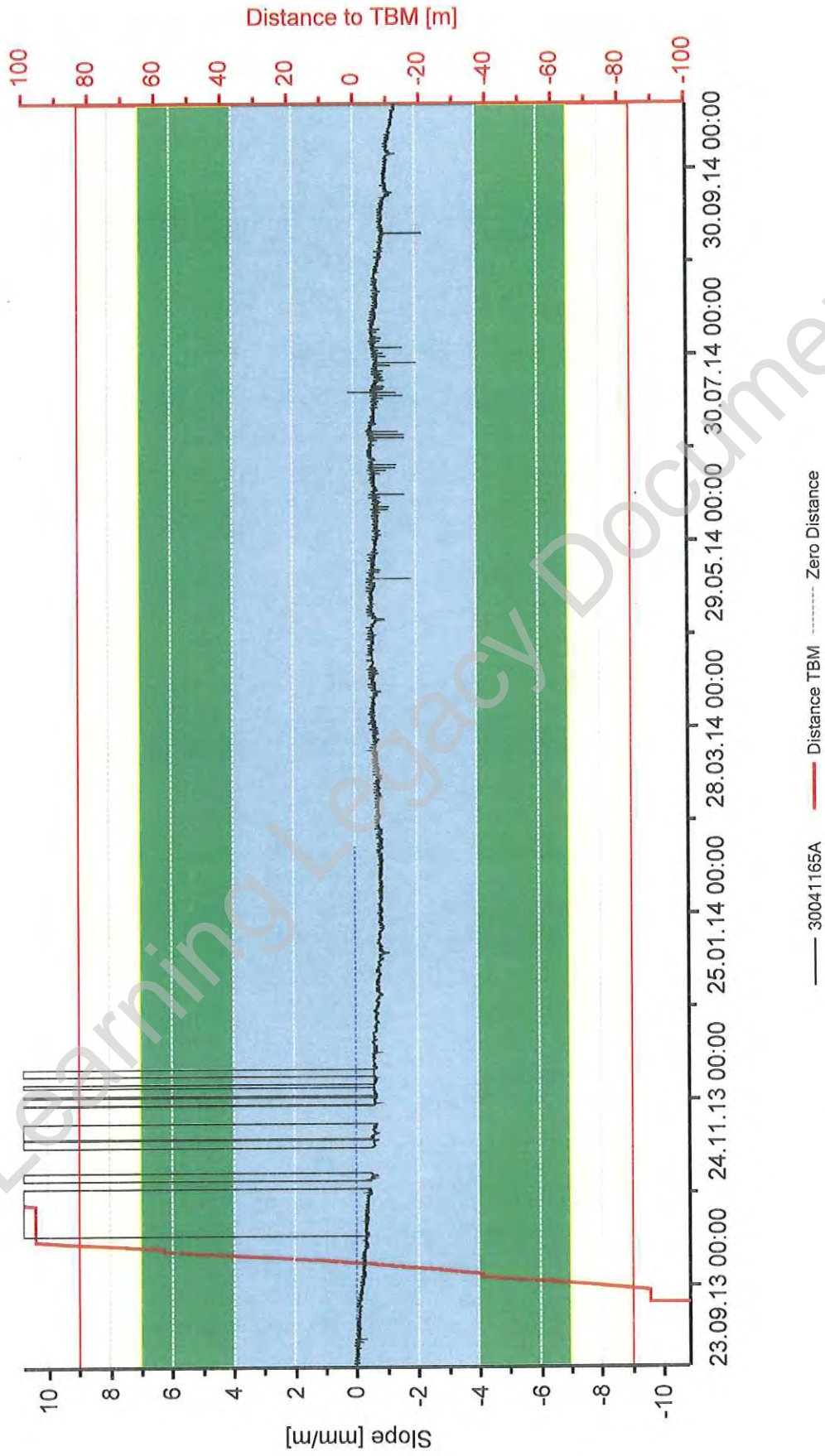
Point: 30041164A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
Date: 23.10.2014 17:24 Current Values: 23.10.2014 17:04



Point: 30041165A



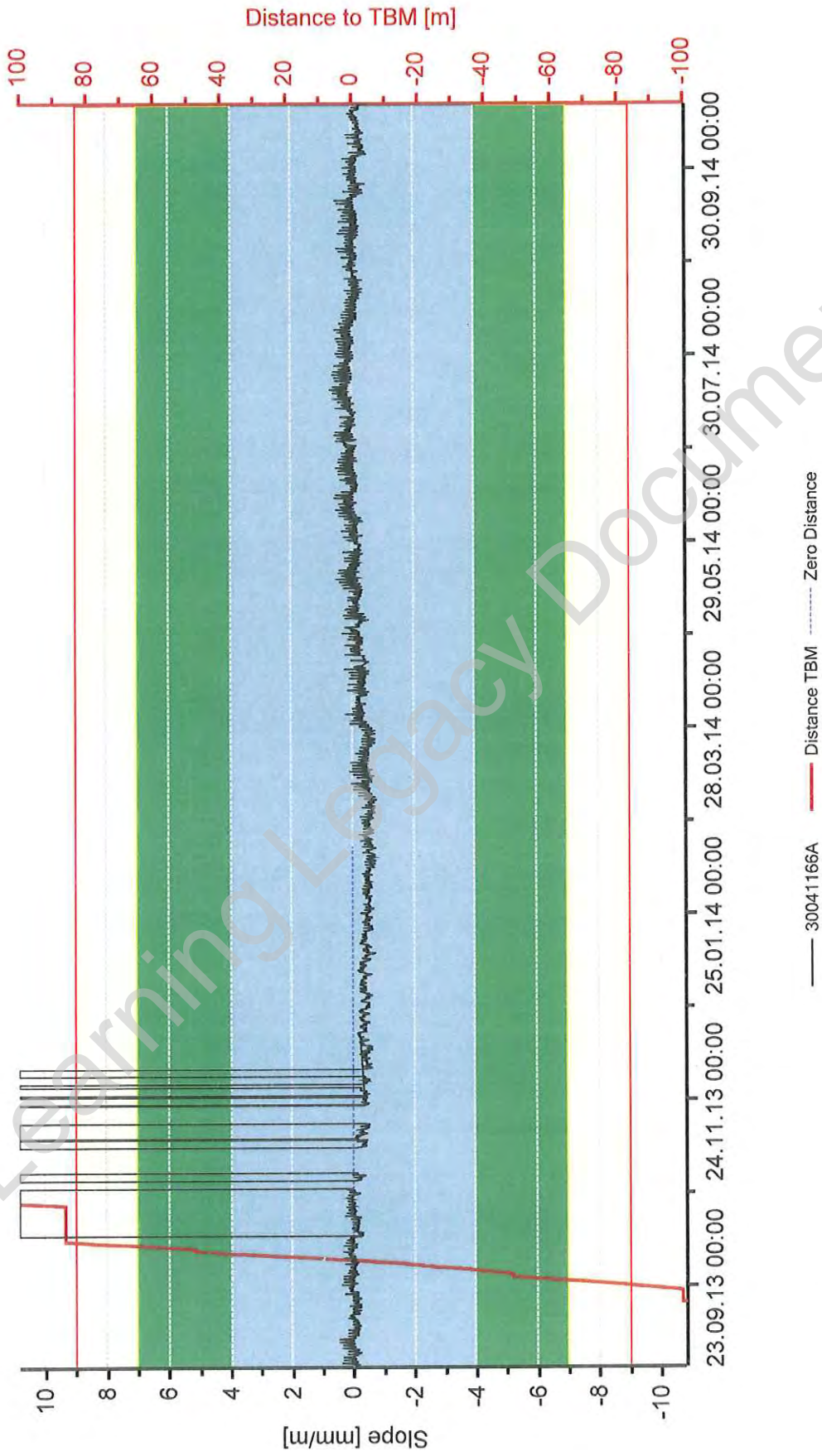
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

Close Out Report: WB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014

Date: 23.10.2014 17:26 Current Values: 23.10.2014 17:19



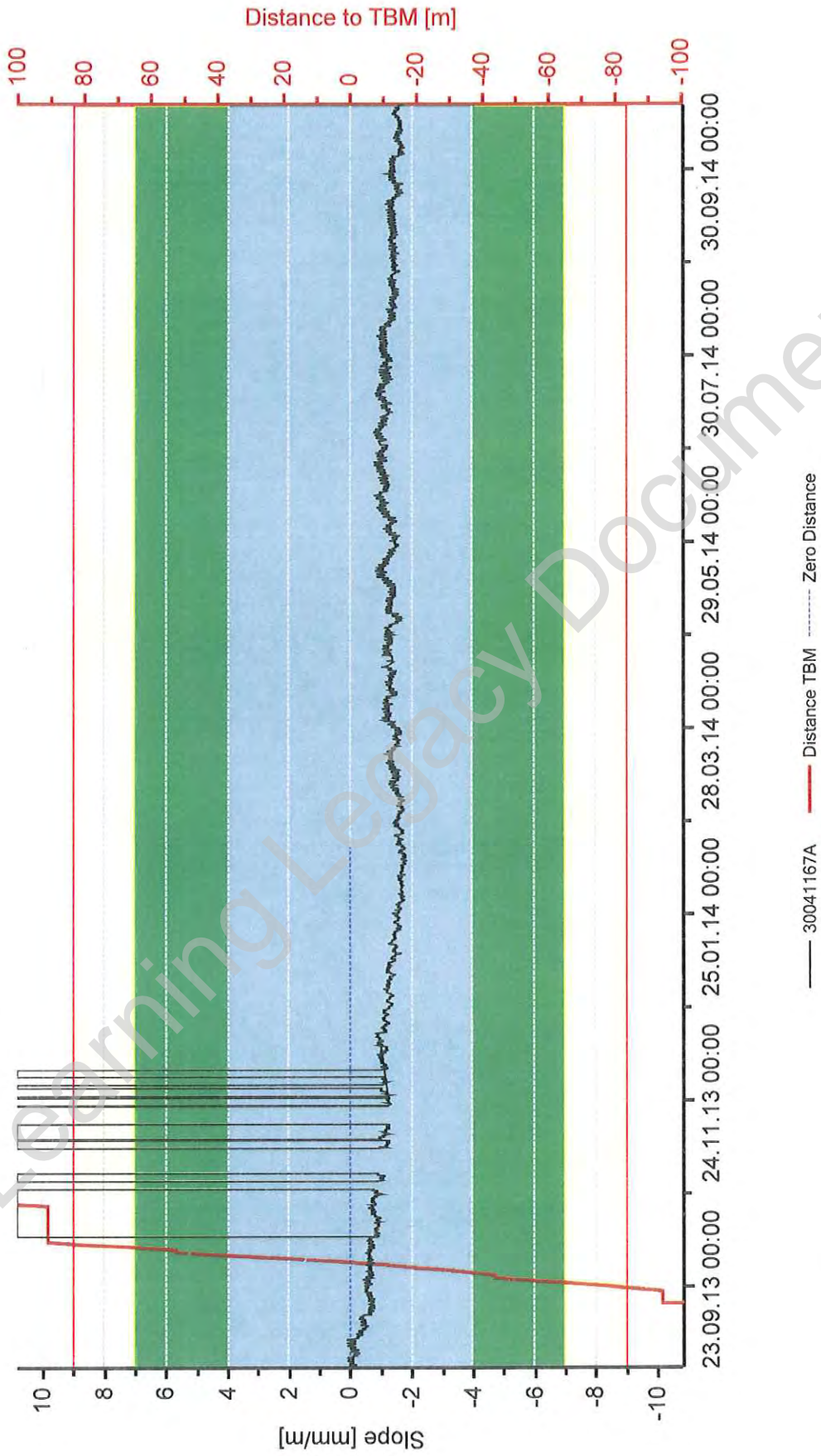
Point: 30041166A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
Date: 23.10.2014 17:28 Current Values: 23.10.2014 17:19

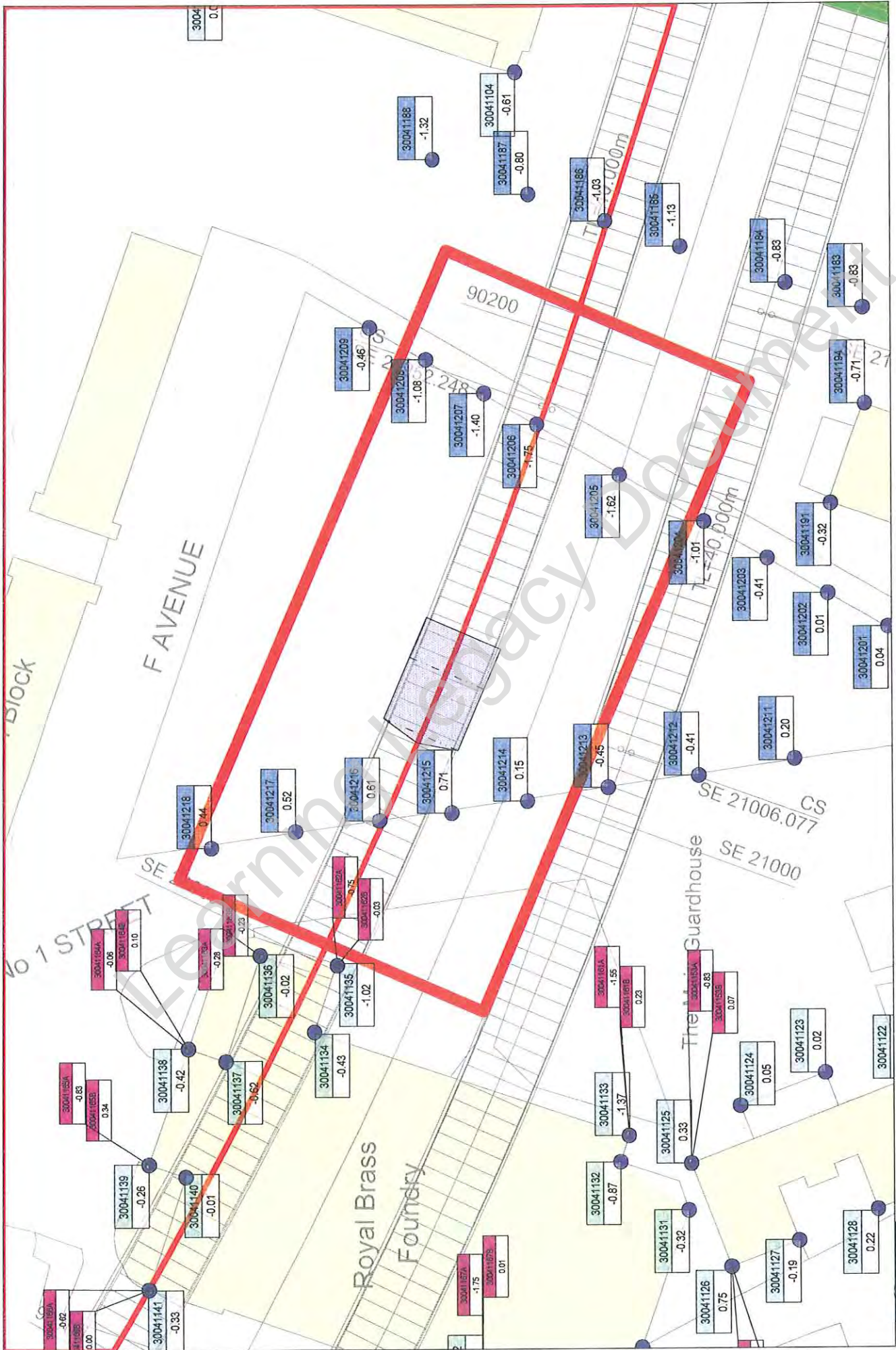


Point: 30041167A



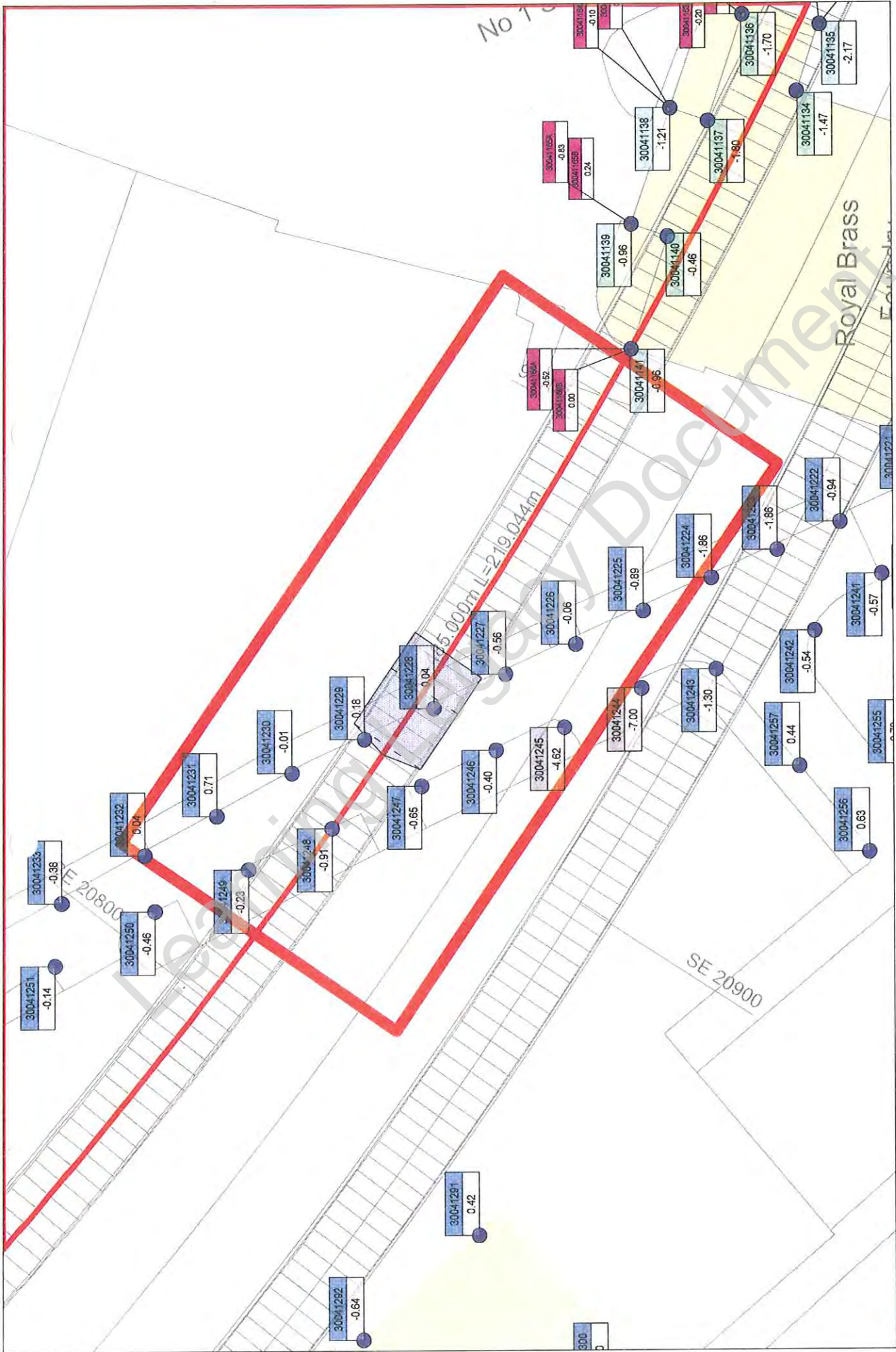
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
Date: 23.10.2014 16:23 Current Values: 23.10.2014 16:04





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 14.02.2014 09:00

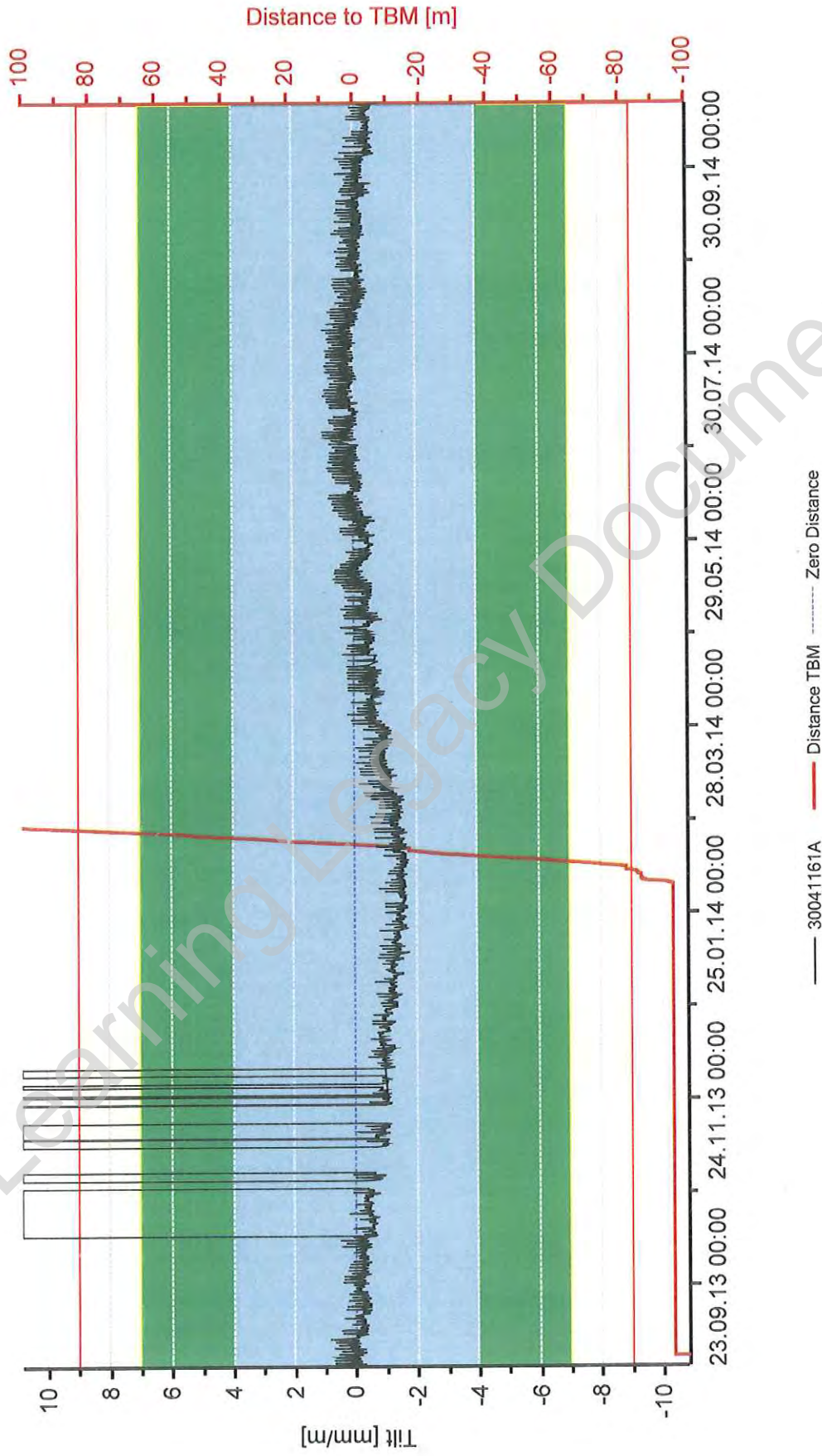




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 21.02.2014 17:05

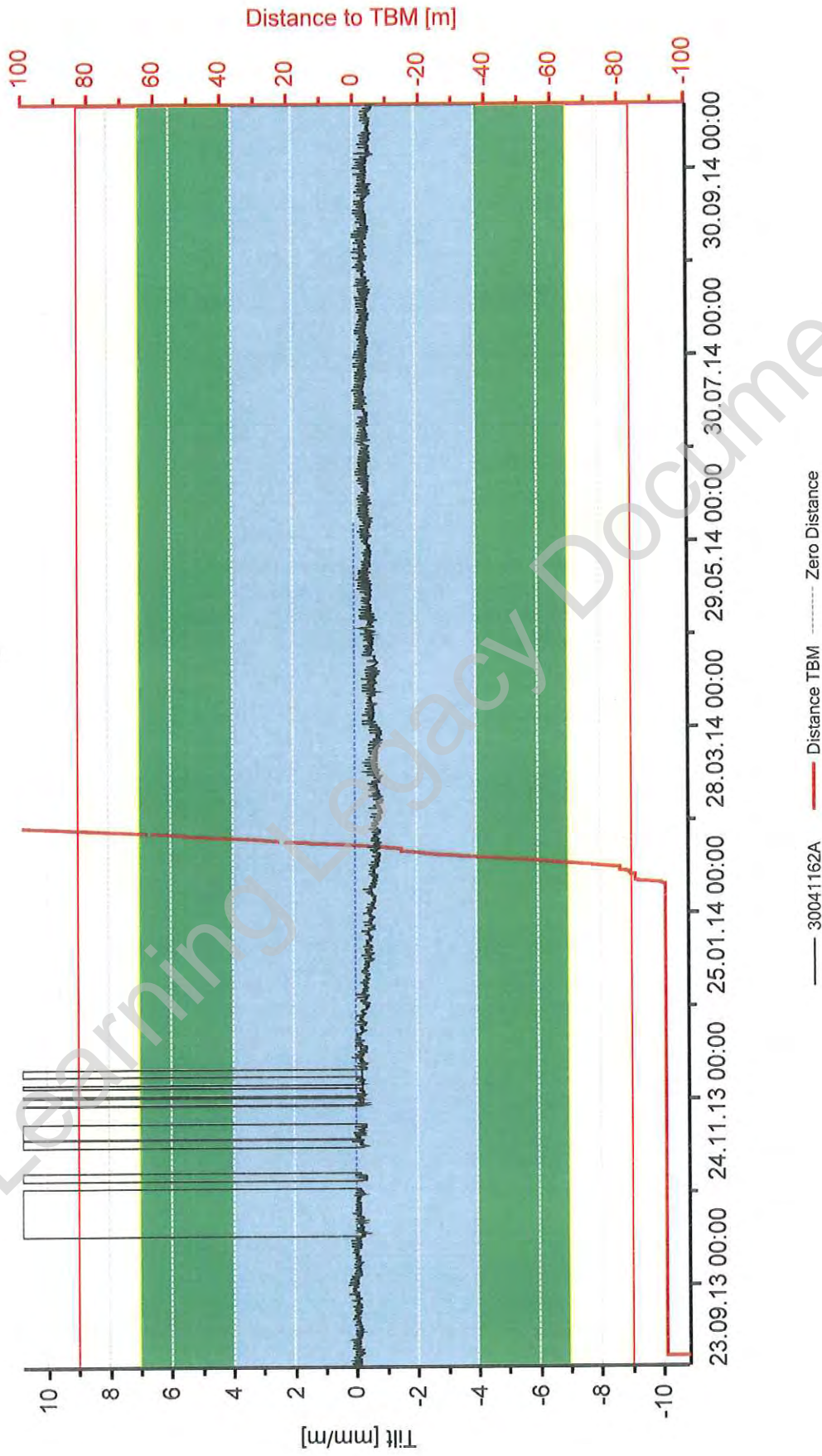


Point: 30041161A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
date: 24.10.2014 11:38 current values: 24.10.2014 11:29

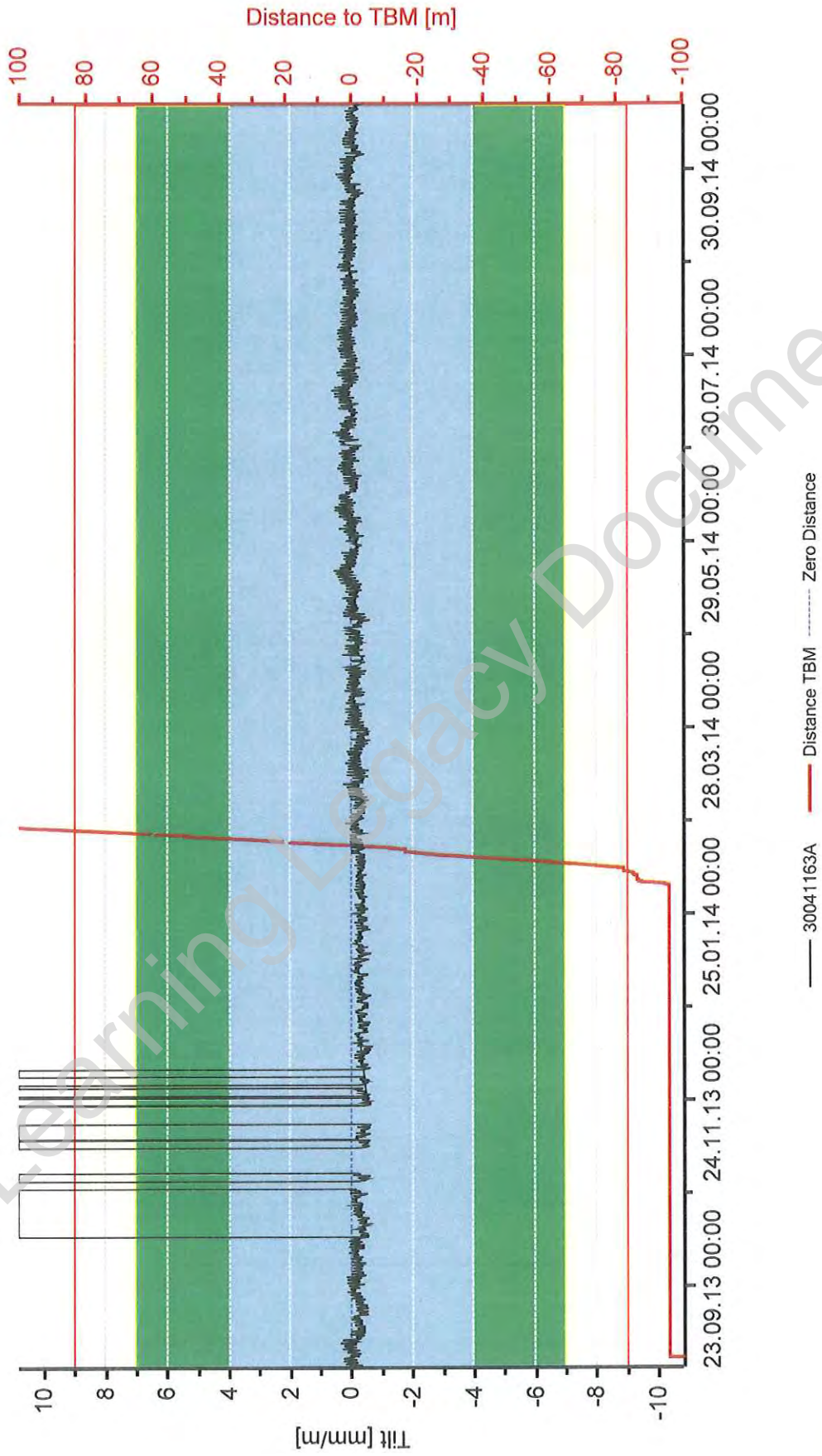
Point: 30041162A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
date: 24.10.2014 11:42 current values: 24.10.2014 11:29



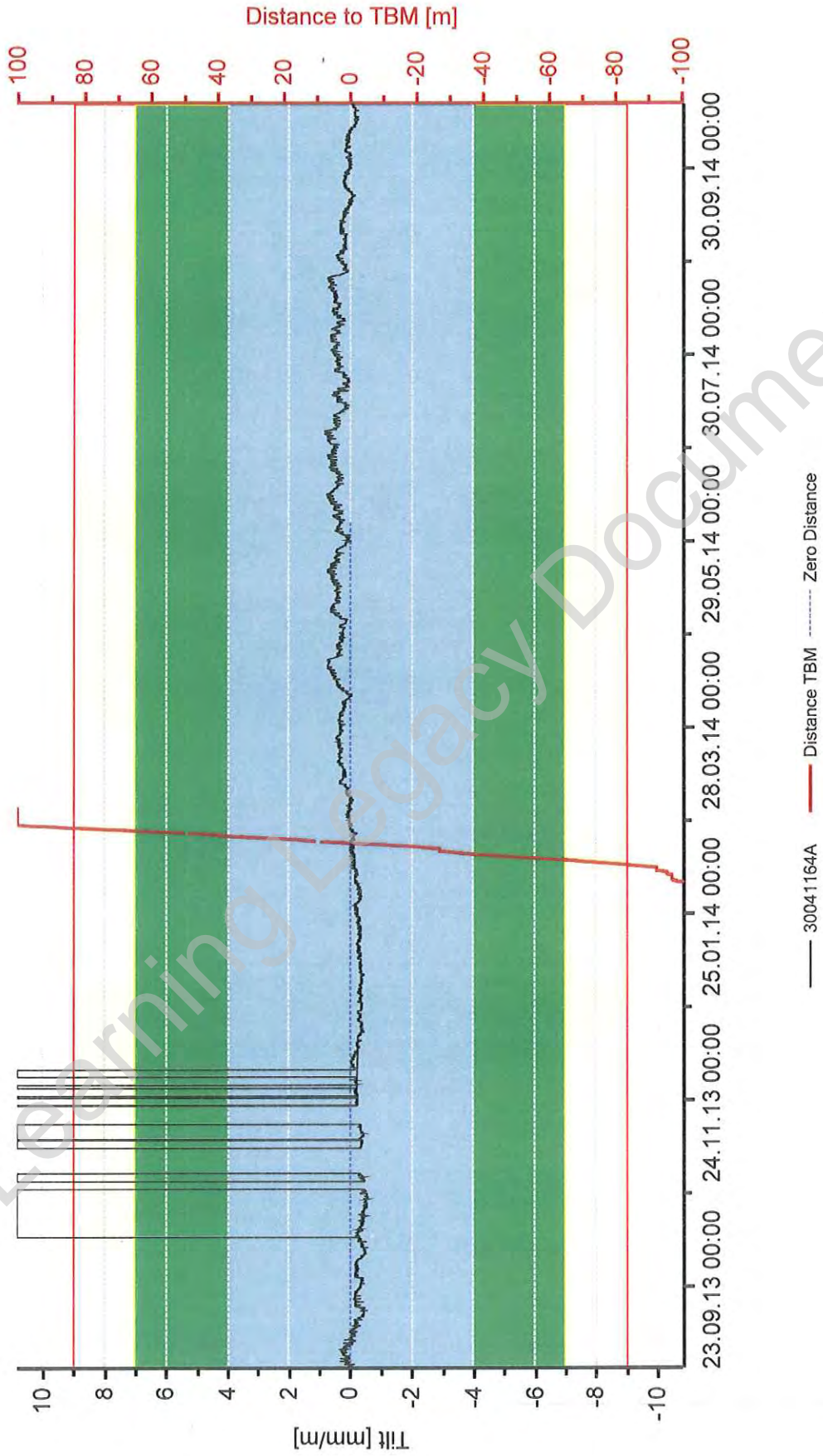
Point: 30041163A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
date: 24.10.2014 11:51 current values: 24.10.2014 11:29



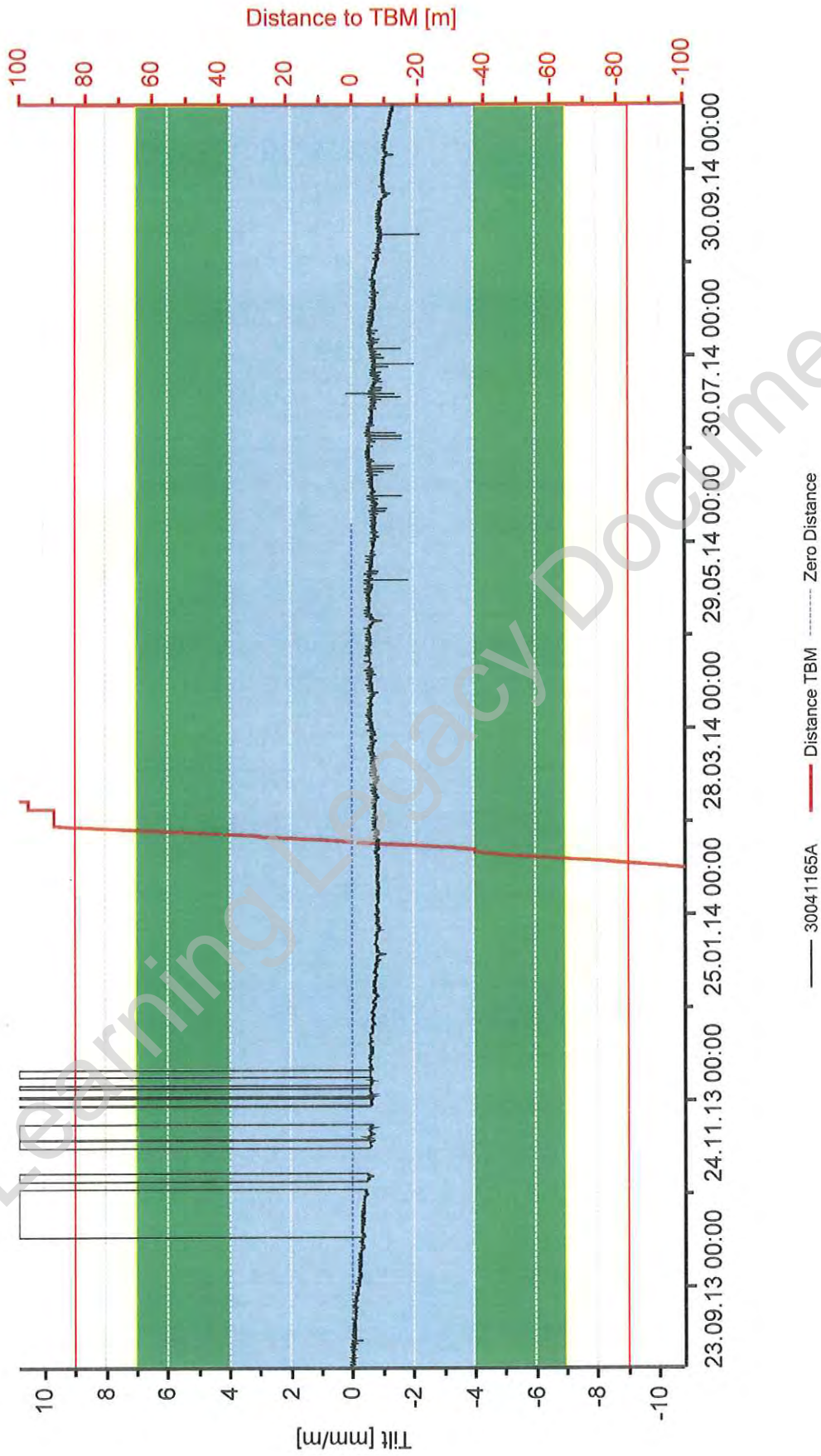
Point: 30041164A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
date: 24.10.2014 11:47 current values: 24.10.2014 11:29



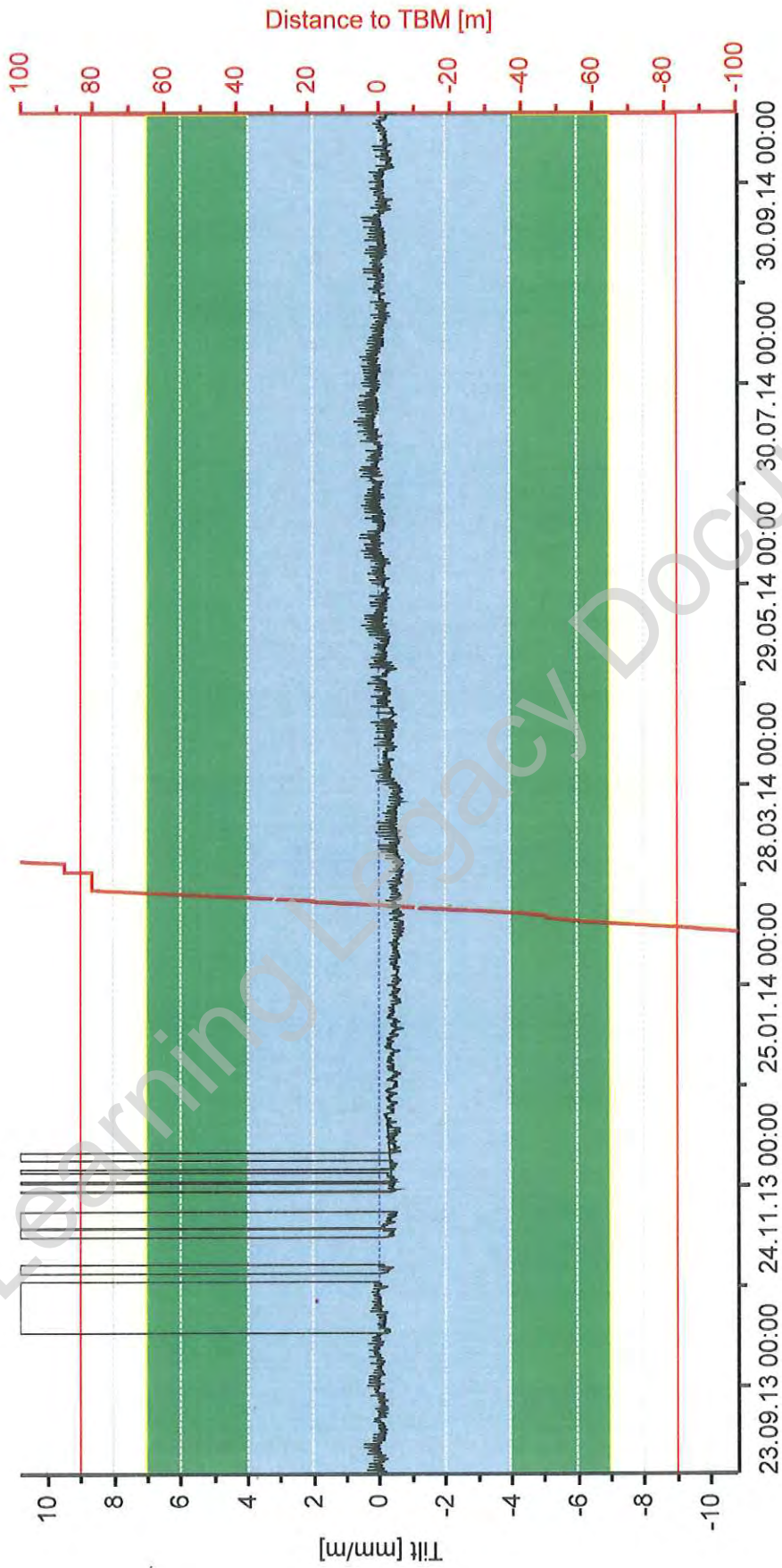
Point: 30041165A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
date: 24.10.2014 11:45 current values: 24.10.2014 11:29



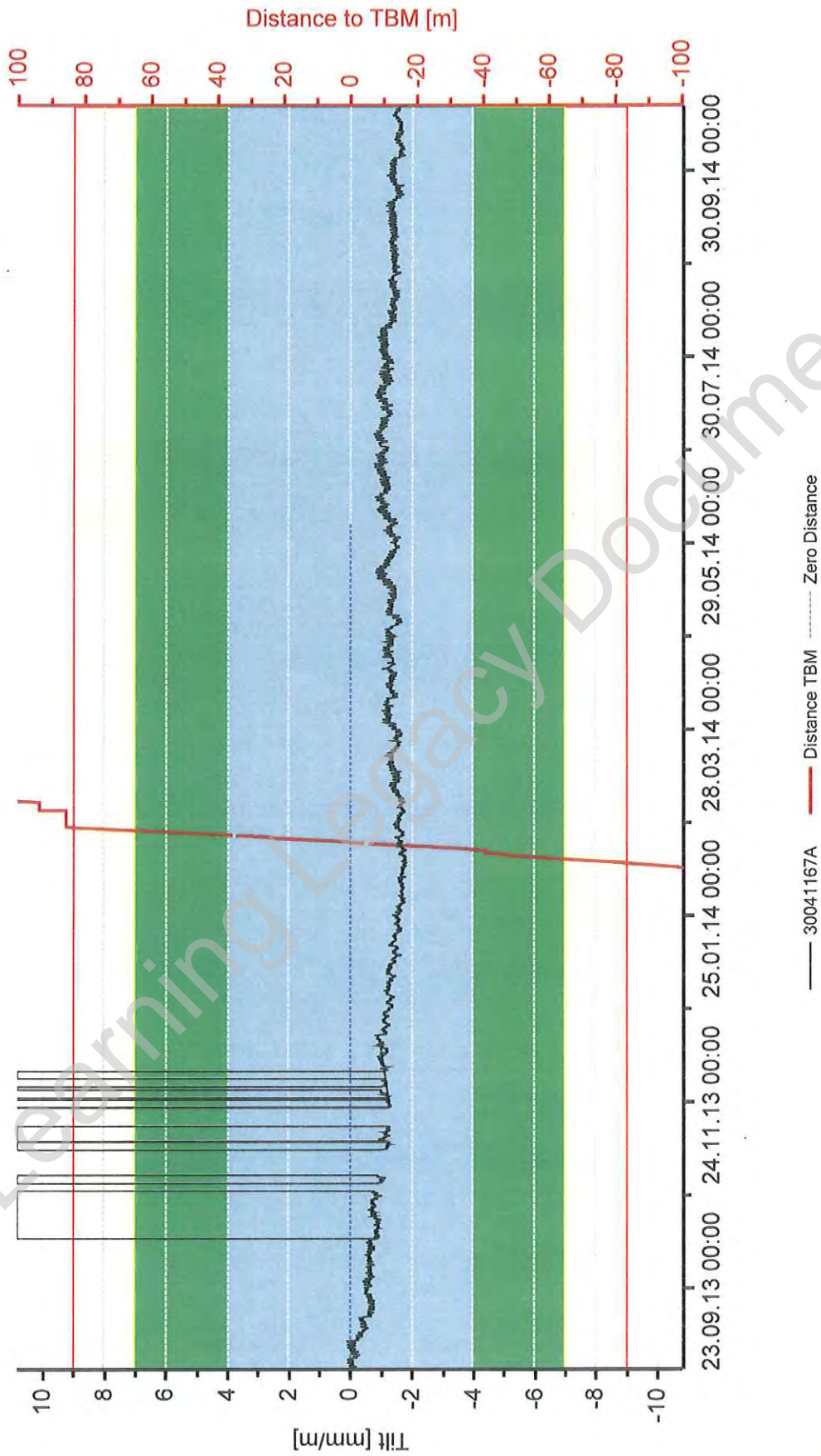
Point: 30041166A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
date: 24.10.2014 11:43 current values: 24.10.2014 11:29




Point: 30041167A



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Royal Brass Foundry 27.08.2013 - 21.10.2014
date: 24.10.2014 11:40 current values: 24.10.2014 11:29



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

APPENDIX 62

Listed Wall Royal Arsenal

Learning Legacy Document

monitoring asset	Area Royal Arsenal		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	Royal Arsenal - listed Wall		
sensor type:	manual levelling studs		
chainage:	90040 - 90110	point no.:	3004 1221 - 3004 1233
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	13/08/13	0.00			
TBM 1	start ZOI	30/09/13	-1.52	3004 1223	
	end ZOI	05/10/13	-3.15	3004 1223	breached not any trigger value
TBM 2	start ZOI	19/02/13	0.50	3004 1228	
	end ZOI	01/03/14	-0.58	3004 1228	breached not any trigger value
longterm	24/09/14	-2.48	3004 1225		
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

3004 1221 - 3004 1233

Overall, none of the points reached any trigger value.

Under consideration of temperature differences 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.

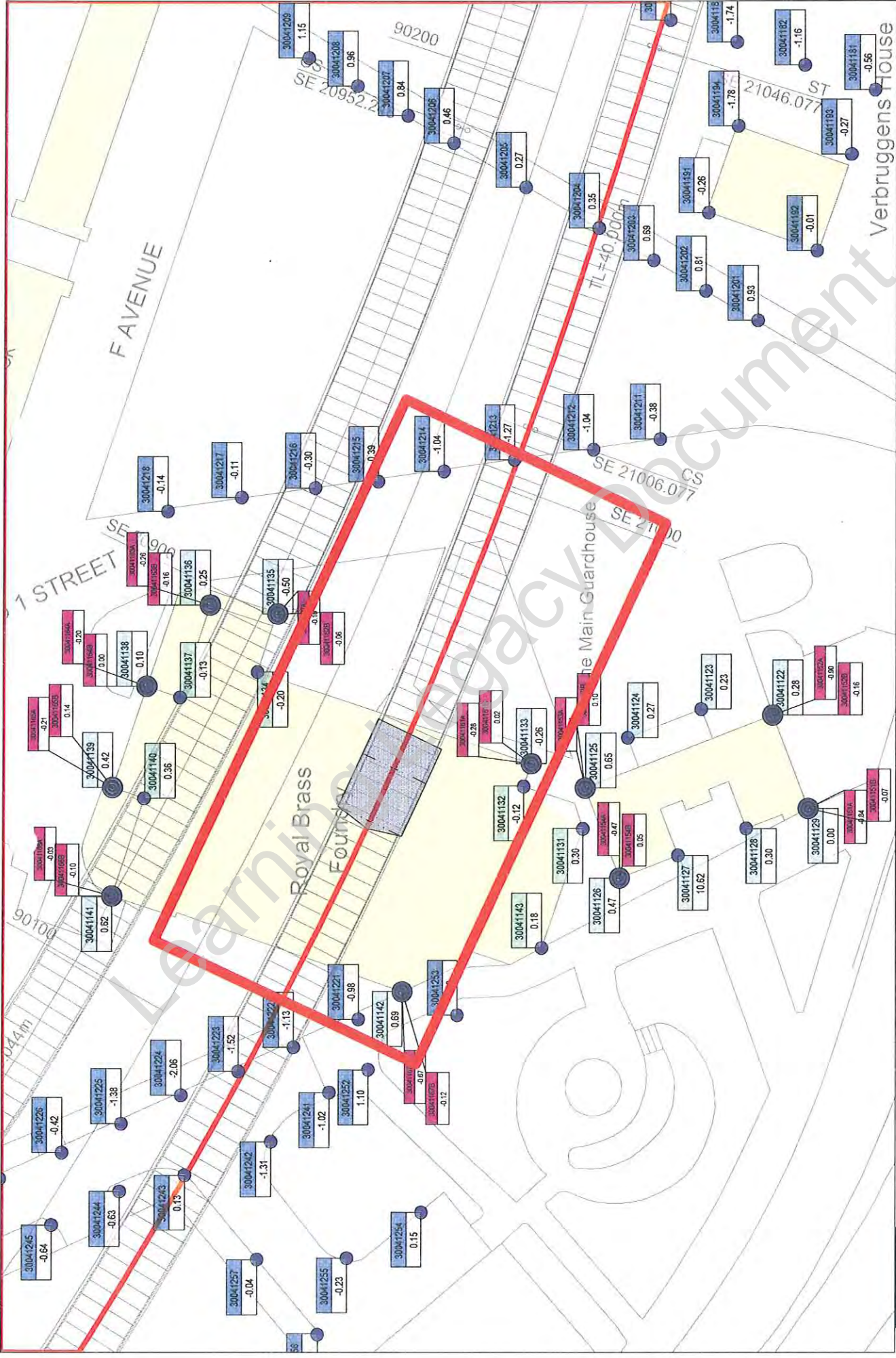
date / signature:

08/10/15

print name:

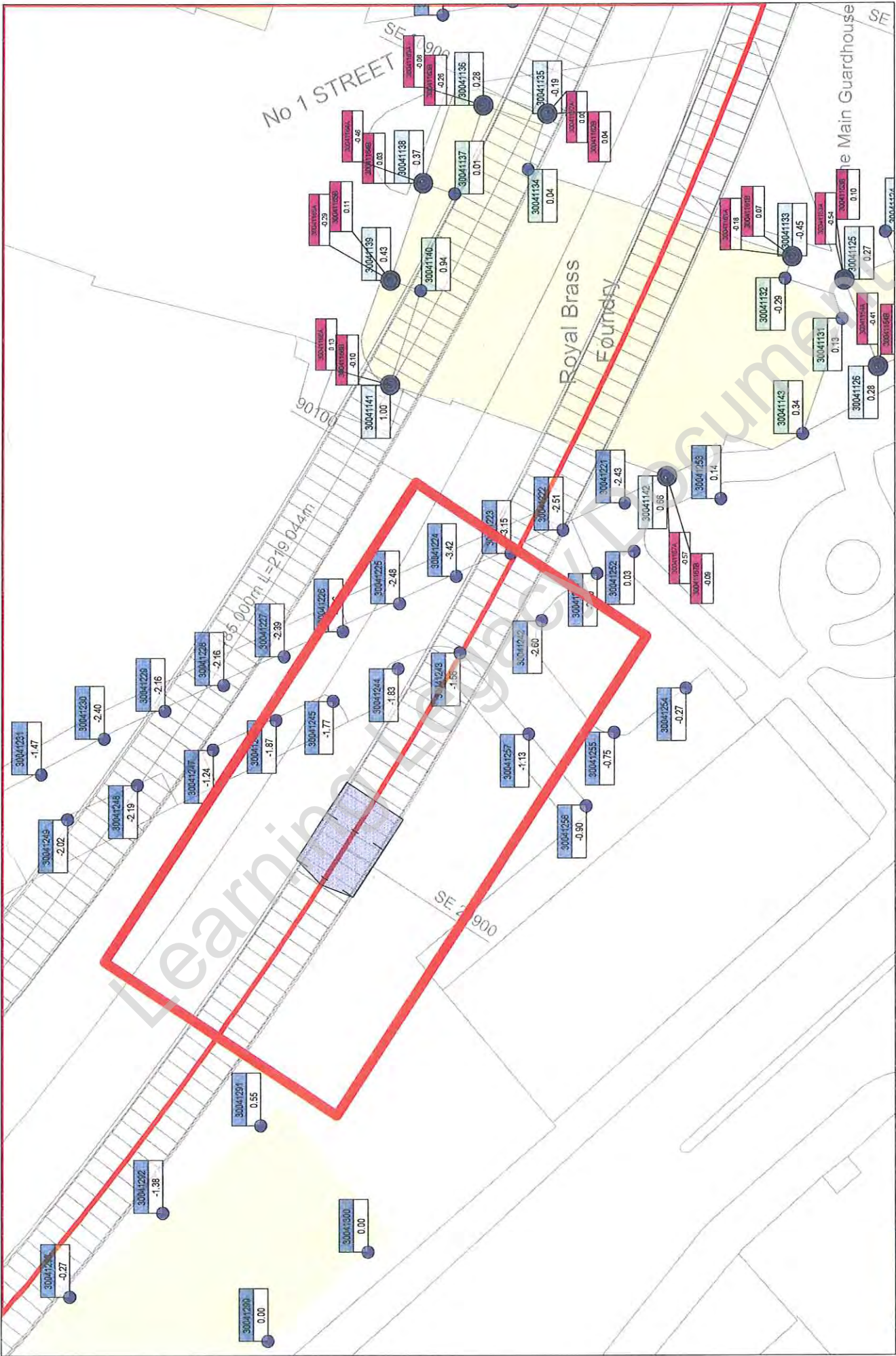
HMJV project role:

Monitoring & Survey engineer



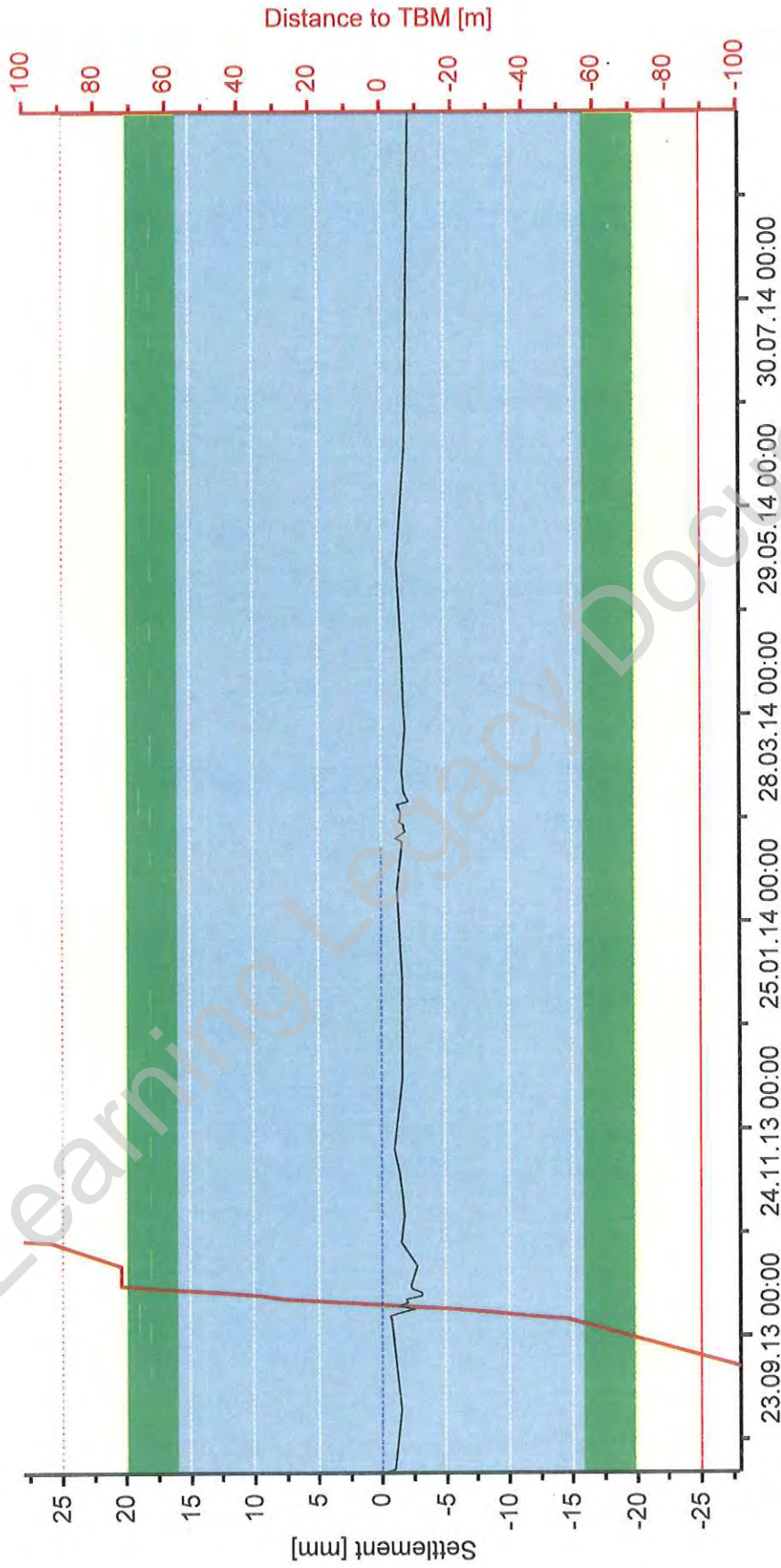
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 30.09.2013 09:00





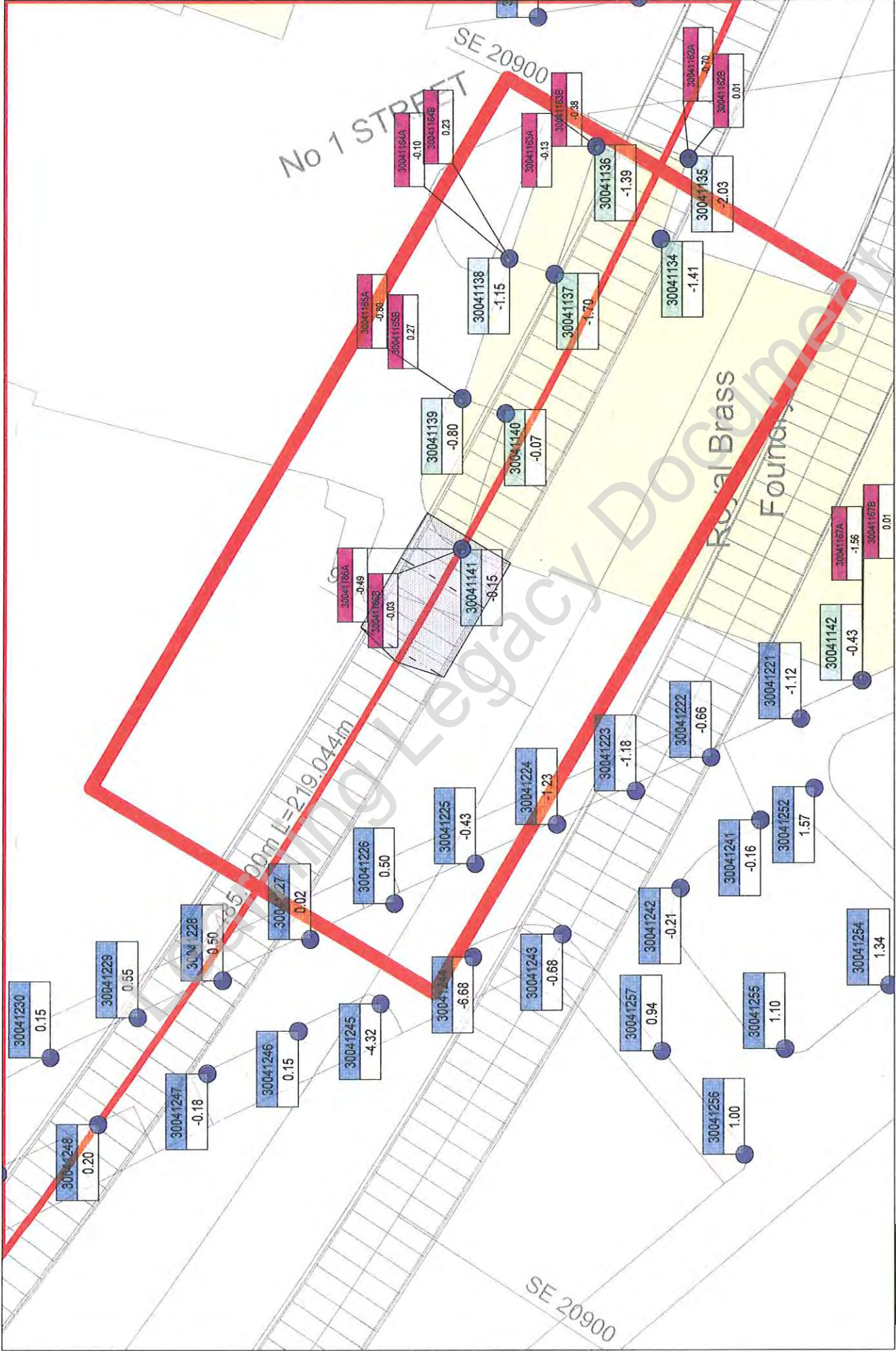
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 05.10.2013 17:42

Point: 30041223

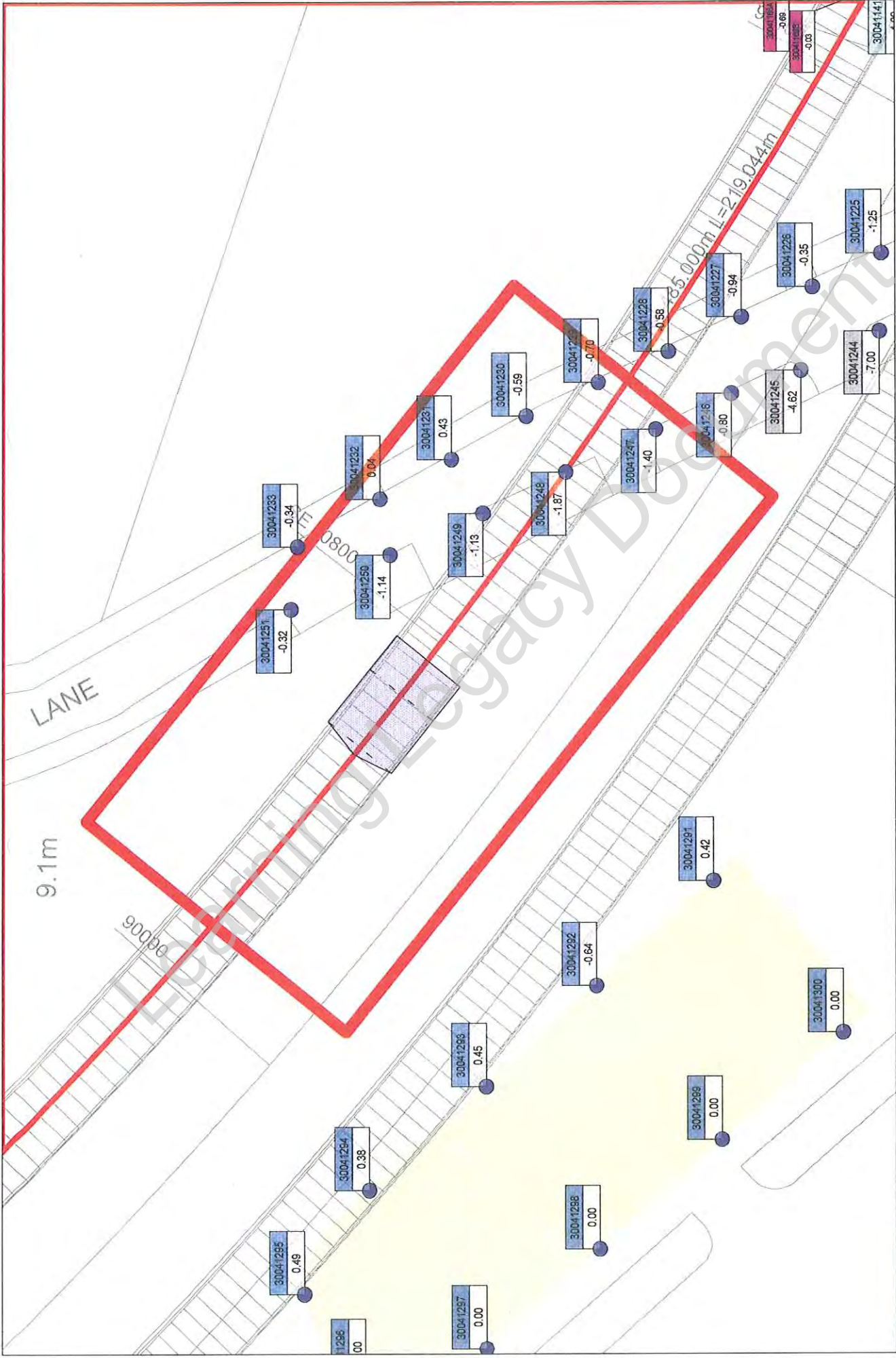


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - CS Royal Arsenal Listed Wall 13.08.2013 - 24.09.2014
Date: 23.10.2014 13:51 Current Values: 23.10.2014 13:33





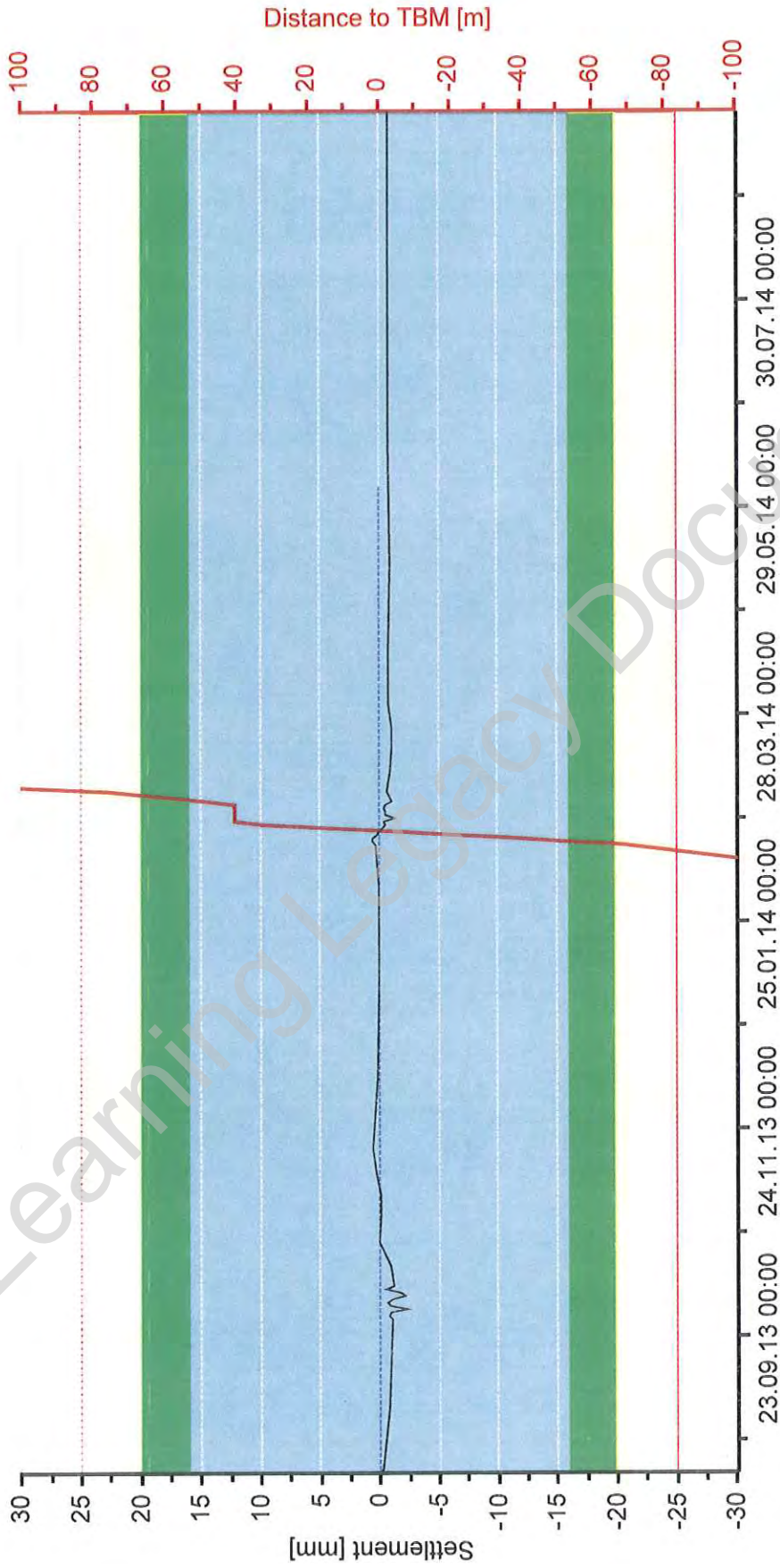
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 19.02.2014 17:37



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 01.03.2014 09:00



Point: 30041228



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

Close Out Report: EB Tunnel - CS Royal Arsenal Listed Wall 13.08.2013 - 24.09.2014

date: 19.10.2014 16:23 current values: 19.10.2014 15:56



monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **Royal Arsenal Listed Wall**

No. of reading	baseline date	1. following 14/08/2013		2. following 01/09/2013		3. following 23/09/2013		4. following 28/09/2013		5. following 29/09/2013		6. following 01/10/2013	
		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 1221	110.822	110.822	-1	110.822	0	110.823	1	110.822	-1	110.822	0	110.821	-2
3004 1222	110.660	110.660	-1	110.659	0	110.660	1	110.660	0	110.660	-1	110.658	-1
3004 1223	110.593	110.592	-1	110.592	-1	110.593	1	110.593	0	110.593	0	110.591	-2
3004 1224	110.509	110.508	-1	110.506	-1	110.508	1	110.508	0	110.508	0	110.506	-2
3004 1225	110.474	110.473	-1	110.472	-1	110.474	2	110.473	0	110.473	0	110.472	-2
3004 1226	110.526	110.525	-1	110.524	-1	110.526	2	110.525	-1	110.526	0	110.524	-2
3004 1227	110.483	110.483	0	110.482	-1	110.483	1	110.482	-1	110.482	0	110.481	-1
3004 1228	110.384	110.384	0	110.383	-1	110.385	1	110.383	-2	110.383	0	110.382	-2
3004 1229	110.377	110.377	0	110.376	-2	110.378	3	110.376	-2	110.376	0	110.375	-2
3004 1230	110.250	110.250	0	110.250	0	110.251	1	110.249	-2	110.250	0	110.248	-2
3004 1231	110.173	110.173	0	110.173	0	110.174	1	110.172	-1	110.173	0	110.171	-2
3004 1232	110.350	110.349	0	110.350	0	110.350	0	110.350	0	110.349	-1	110.349	-1
3004 1233	110.122	110.121	-1	110.122	0	110.122	0	110.121	0	110.122	0	110.120	-2

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: Royal Arsenal Listed Wall

No. of reading	baseline elevation	7. following 02/10/2013		8. following 03/10/2013		9. following 04/10/2013		10. following 05/10/2013		11. following 06/10/2013		12. following 07/10/2013	
		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 1221	110.822	110.822	1	110.822	0	110.821	0	110.820	-1	110.820	0	110.821	1
3004 1222	110.660	110.659	-1	110.659	0	110.659	-1	110.658	-1	110.658	0	110.659	1
3004 1223	110.593	110.592	-1	110.591	-1	110.591	0	110.590	-1	110.590	0	110.591	1
3004 1224	110.509	110.507	-2	110.507	0	110.506	0	110.505	-1	110.505	0	110.506	1
3004 1225	110.474	110.473	-1	110.473	0	110.472	-1	110.472	-1	110.472	0	110.472	0
3004 1226	110.526	110.525	-1	110.525	0	110.525	-1	110.524	-1	110.524	0	110.525	0
3004 1227	110.483	110.482	-1	110.483	0	110.482	-1	110.481	-1	110.481	0	110.482	1
3004 1228	110.384	110.383	-1	110.384	0	110.383	0	110.382	-1	110.382	0	110.384	1
3004 1229	110.377	110.376	-1	110.376	0	110.376	0	110.375	-1	110.376	0	110.377	1
3004 1230	110.250	110.250	0	110.249	-1	110.249	-1	110.248	-1	110.249	1	110.249	0
3004 1231	110.173	110.173	0	110.173	0	110.172	-1	110.172	-1	110.172	1	110.172	0
3004 1232	110.350	110.350	0	110.350	0	110.349	-1	110.349	0	110.349	0	110.349	0
3004 1233	110.122	110.121	-1	110.122	1	110.121	-1	110.121	0	110.121	0	110.121	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **Royal Arsenal Listed Wall**

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		
	13/8/13															
		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 1221	110.822	110.821	0	-1	110.821	0	-2	110.821	0	-2	110.821	0	-2	110.821	1	-1
3004 1222	110.660	110.659	0	-2	110.659	0	-2	110.659	0	-1	110.659	0	-1	110.660	1	-1
3004 1223	110.593	110.591	0	-2	110.592	0	-3	110.592	0	-2	110.592	0	-2	110.592	0	-1
3004 1224	110.509	110.506	0	-3	110.507	0	-3	110.507	0	-2	110.507	0	-2	110.507	1	-2
3004 1225	110.474	110.472	0	-2	110.473	0	-2	110.473	0	-1	110.473	0	-1	110.473	0	-1
3004 1226	110.526	110.525	0	-1	110.525	0	-1	110.525	0	0	110.525	0	0	110.526	1	0
3004 1227	110.483	110.482	-1	-1	110.483	0	-1	110.483	0	-1	110.483	0	-1	110.483	1	0
3004 1228	110.384	110.383	-1	-1	110.384	0	-1	110.384	0	0	110.384	0	0	110.384	0	0
3004 1229	110.377	110.376	-1	-2	110.377	0	-1	110.377	0	0	110.377	0	0	110.378	0	0
3004 1230	110.250	110.249	0	-2	110.249	0	-1	110.250	0	0	110.250	0	0	110.251	0	0
3004 1231	110.173	110.172	0	-1	110.173	0	0	110.174	1	1	110.174	0	0	110.174	0	1
3004 1232	110.350	110.349	0	-1	110.350	0	0	110.350	0	0	110.350	0	0	110.350	0	0
3004 1233	110.122	110.121	0	-1	110.122	0	-1	110.122	0	0	110.122	0	0	110.122	0	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **Royal Arsenal Listed Wall**

No. of reading	baseline	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
date	13/8/13	18/11/2013		09/12/2013		08/01/2014		04/02/2014		17/02/2014		18/02/2014	
3004 1221	110.822	110.821	0	110.821	-1	110.821	0	110.821	0	110.821	0	110.821	0
3004 1222	110.660	110.660	0	110.659	-1	110.659	0	110.660	0	110.660	0	110.660	0
3004 1223	110.593	110.592	0	110.592	-1	110.592	0	110.592	0	110.592	0	110.592	0
3004 1224	110.509	110.508	0	110.507	-1	110.507	0	110.507	0	110.507	0	110.507	0
3004 1225	110.474	110.474	0	110.473	-1	110.473	0	110.474	1	110.473	0	110.474	0
3004 1226	110.526	110.526	0	110.526	0	110.526	0	110.526	1	110.526	-1	110.526	0
3004 1227	110.483	110.483	0	110.483	0	110.483	0	110.483	0	110.483	0	110.483	0
3004 1228	110.384	110.385	0	110.384	0	110.384	0	110.384	0	110.384	0	110.385	0
3004 1229	110.377	110.378	0	110.378	0	110.377	0	110.378	0	110.378	0	110.378	0
3004 1230	110.250	110.251	0	110.251	0	110.250	0	110.250	0	110.250	0	110.251	0
3004 1231	110.173	110.174	0	110.174	0	110.174	0	110.174	0	110.174	0	110.174	0
3004 1232	110.350	110.350	0	110.350	0	110.350	0	110.350	0	110.350	0	110.350	0
3004 1233	110.122	110.122	0	110.122	0	110.122	0	110.122	0	110.122	0	110.122	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **Royal Arsenal Listed Wall**

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	13/8/13	19/02/2014		20/02/2014		21/02/2014		22/02/2014		23/02/2014		24/02/2014	
3004 1221	110.822	110.821	0	110.821	0	110.821	0	110.821	0	110.821	0	110.821	0
3004 1222	110.660	110.660	0	110.659	0	110.659	0	110.659	0	110.659	0	110.660	0
3004 1223	110.593	110.592	1	110.592	0	110.591	0	110.592	0	110.592	0	110.592	0
3004 1224	110.509	110.508	0	110.507	-1	110.507	0	110.507	0	110.507	0	110.507	0
3004 1225	110.474	110.474	0	110.473	0	110.473	0	110.473	0	110.473	0	110.473	0
3004 1226	110.526	110.526	0	110.526	0	110.526	0	110.525	0	110.525	0	110.526	0
3004 1227	110.483	110.483	0	110.483	0	110.483	0	110.483	0	110.482	0	110.482	0
3004 1228	110.384	110.385	0	110.384	0	110.384	0	110.384	0	110.384	0	110.384	0
3004 1229	110.377	110.378	0	110.378	0	110.378	0	110.378	0	110.377	0	110.377	0
3004 1230	110.250	110.251	0	110.250	0	110.250	0	110.250	0	110.250	0	110.250	0
3004 1231	110.173	110.174	0	110.174	0	110.174	0	110.174	0	110.174	0	110.174	0
3004 1232	110.350	110.350	0	110.350	0	110.350	0	110.350	0	110.350	0	110.350	0
3004 1233	110.122	110.122	0	110.122	0	110.122	0	110.122	0	110.122	0	110.122	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **Royal Arsenal Listed Wall**

No. of reading	baseline	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
date	13/8/13	25/02/2014		26/02/2014		27/02/2014		28/02/2014		01/03/2014		02/03/2014	
3004 1221	110.822	110.821	0	110.821	0	110.821	0	110.821	0	110.821	0	110.820	-1
3004 1222	110.660	110.660	0	110.660	0	110.660	0	110.660	0	110.660	0	110.659	-1
3004 1223	110.593	110.592	0	110.592	0	110.592	0	110.592	0	110.592	0	110.591	-1
3004 1224	110.509	110.507	0	110.507	0	110.507	0	110.507	0	110.507	0	110.507	-1
3004 1225	110.474	110.473	0	110.473	0	110.473	0	110.473	0	110.473	-1	110.472	0
3004 1226	110.526	110.525	0	110.525	0	110.525	0	110.525	0	110.525	0	110.525	0
3004 1227	110.483	110.482	0	110.482	0	110.482	0	110.482	0	110.482	0	110.482	-1
3004 1228	110.384	110.383	-1	110.384	1	110.384	0	110.384	0	110.384	0	110.383	-1
3004 1229	110.377	110.377	0	110.377	0	110.377	0	110.377	0	110.377	0	110.376	-1
3004 1230	110.250	110.250	0	110.250	0	110.250	0	110.250	0	110.250	0	110.249	-1
3004 1231	110.173	110.173	0	110.173	0	110.174	0	110.174	0	110.173	0	110.173	0
3004 1232	110.350	110.350	0	110.350	0	110.350	0	110.350	0	110.350	0	110.349	-1
3004 1233	110.122	110.122	0	110.122	0	110.122	0	110.122	0	110.122	0	110.121	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **Royal Arsenal Listed Wall**

No. of reading	baseline	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
date	13/8/13	05/03/2014		11/03/2014		18/03/2014		24/03/2014		31/03/2014		16/04/2014	
3004 1221	110.822	110.821	0	110.821	0	110.821	0	110.821	0	110.821	0	110.821	0
3004 1222	110.660	110.659	0	110.659	0	110.659	0	110.659	0	110.659	0	110.659	0
3004 1223	110.593	110.591	0	110.592	0	110.591	0	110.591	0	110.592	0	110.592	0
3004 1224	110.509	110.507	0	110.507	0	110.507	0	110.507	0	110.507	0	110.507	0
3004 1225	110.474	110.473	1	110.473	0	110.473	0	110.473	0	110.473	0	110.473	0
3004 1226	110.526	110.525	0	110.525	0	110.525	0	110.525	0	110.525	0	110.525	0
3004 1227	110.483	110.482	1	110.482	0	110.482	0	110.482	0	110.482	0	110.482	0
3004 1228	110.384	110.383	0	110.383	0	110.383	0	110.383	0	110.383	0	110.383	0
3004 1229	110.377	110.376	1	110.376	0	110.376	0	110.376	0	110.377	0	110.376	0
3004 1230	110.250	110.250	1	110.250	0	110.249	0	110.249	0	110.250	0	110.249	-1
3004 1231	110.173	110.173	0	110.173	0	110.173	0	110.173	0	110.173	0	110.173	-1
3004 1232	110.350	110.350	0	110.350	0	110.349	-1	110.350	0	110.350	0	110.350	0
3004 1233	110.122	110.122	0	110.122	0	110.122	0	110.121	-1	110.122	0	110.122	0

monitoring table




Joint Venture

project: C310 Thames Tunnel

structure: Royal Arsenal Listed Wall

No. of reading	baseline		43. following		44. following		45. following								
	date	13/8/13	elevation	12/05/2014	elevation	17/06/2014	elevation	24/09/2014	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	
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 1221		110.822	0	110.821	-1	110.820	-1	110.820	-2						
3004 1222		110.660	0	110.659	-1	110.659	0	110.659	-2						
3004 1223		110.593	0	110.591	-1	110.591	0	110.591	-2						
3004 1224		110.509	1	110.507	0	110.507	0	110.507	-2						
3004 1225		110.474	0	110.473	-1	110.472	-1	110.472	-2						
3004 1226		110.526	0	110.525	0	110.523	-1	110.523	-2						
3004 1227		110.483	0	110.482	0	110.481	-1	110.481	-2						
3004 1228		110.384	0	110.383	0	110.383	0	110.383	-1						
3004 1229		110.377	0	110.376	0	110.376	0	110.376	-1						
3004 1230		110.250	1	110.250	0	110.249	0	110.249	-1						
3004 1231		110.173	1	110.173	0	110.173	0	110.173	0						
3004 1232		110.350	0	110.350	0	110.349	0	110.349	0						
3004 1233		110.122	-1	110.121	-1	110.121	0	110.121	-1						

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

APPENDIX 63
CS18 – Warren Lane

Learning Legacy Document

monitoring asset	Services underneath Warren lane		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	CS 18 Warren lane		
sensor type:	manual levelling studs		
chainage:	90030 - 90110	point no.:	3004 1241 - 3004 1254
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	13/08/13	0.00			
TBM 1	start ZOI	01/10/13	-0.95	3004 1243	
	end ZOI	06/10/13	-1.51	3004 1243	breached not any trigger value
TBM 2	start ZOI	21/02/14	-0.91	3004 1248	
	end ZOI	04/03/14	-2.10	3004 1248	breached not any trigger value
longterm	24/09/14	-3.47	3004 1248		
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)			

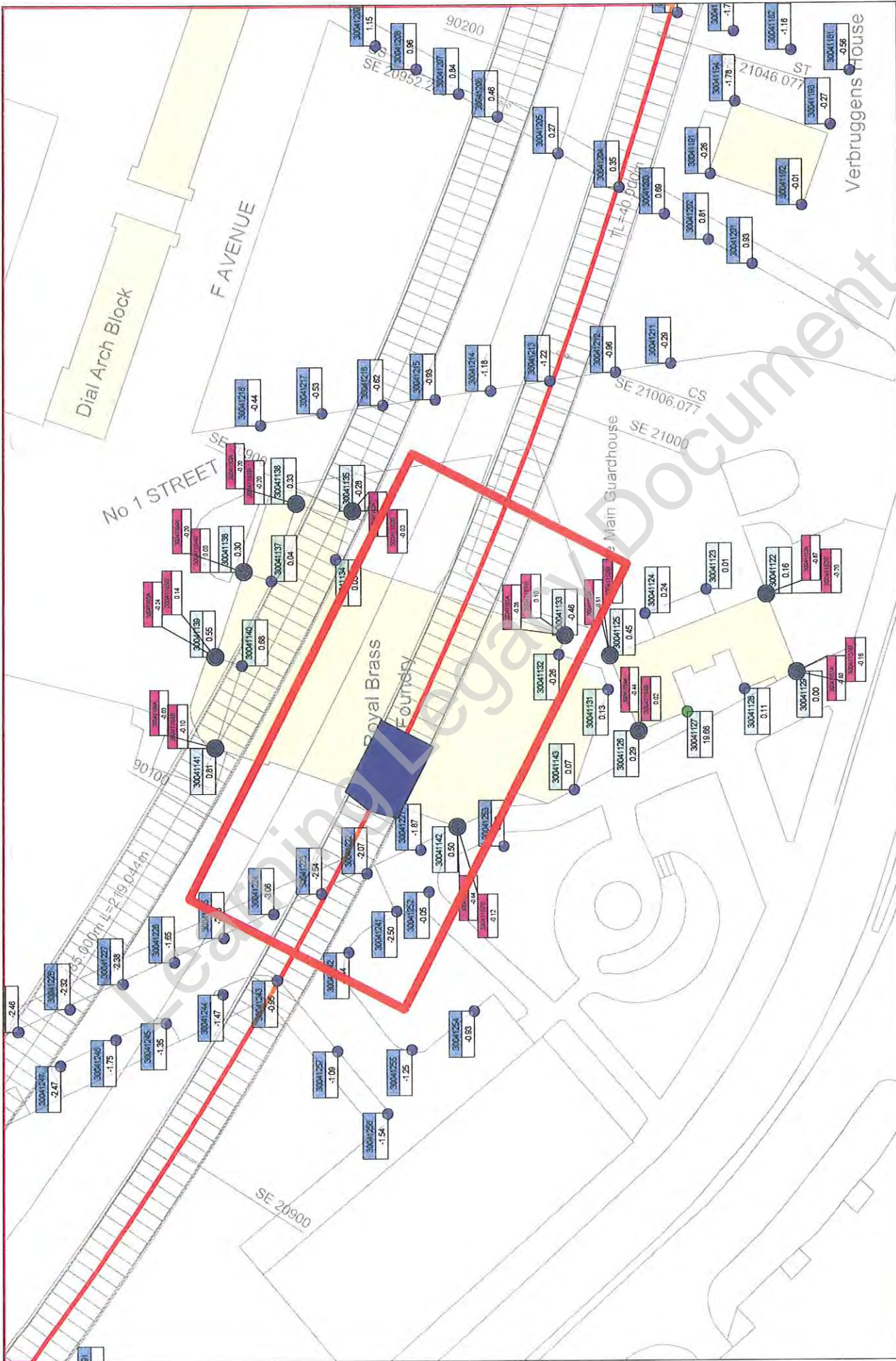
summary / comments

3004 1241 - 3004 1254
 Point nos. 3004 1244 + 3004 1245 were destroyed caused by site traffic (gate/entry to site 21/02/2013).
 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.

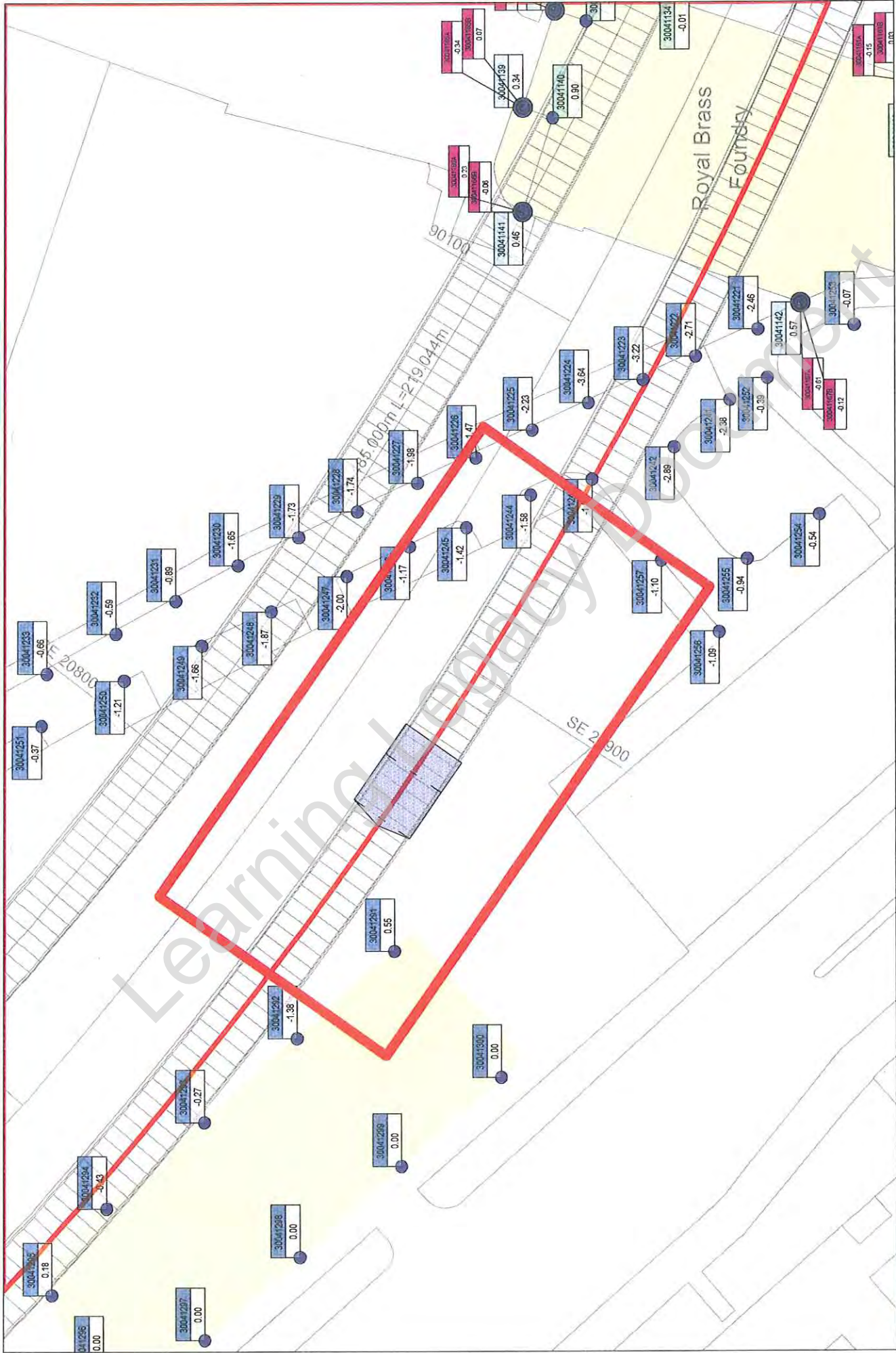
date / signature: 08/01/15

print name:

HMJV project role: Monitoring & Survey engineer

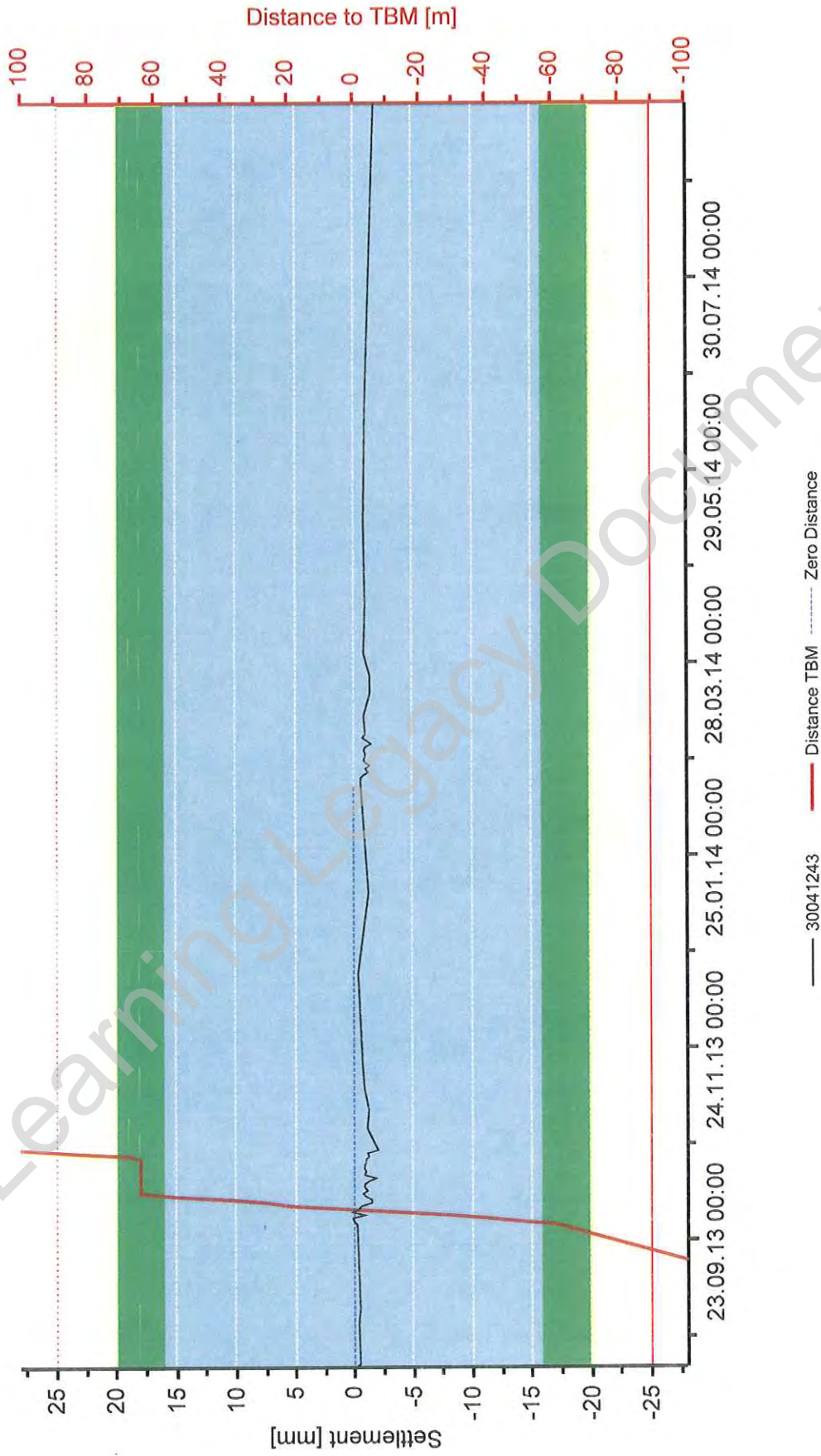


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 01.10.2013 19:28



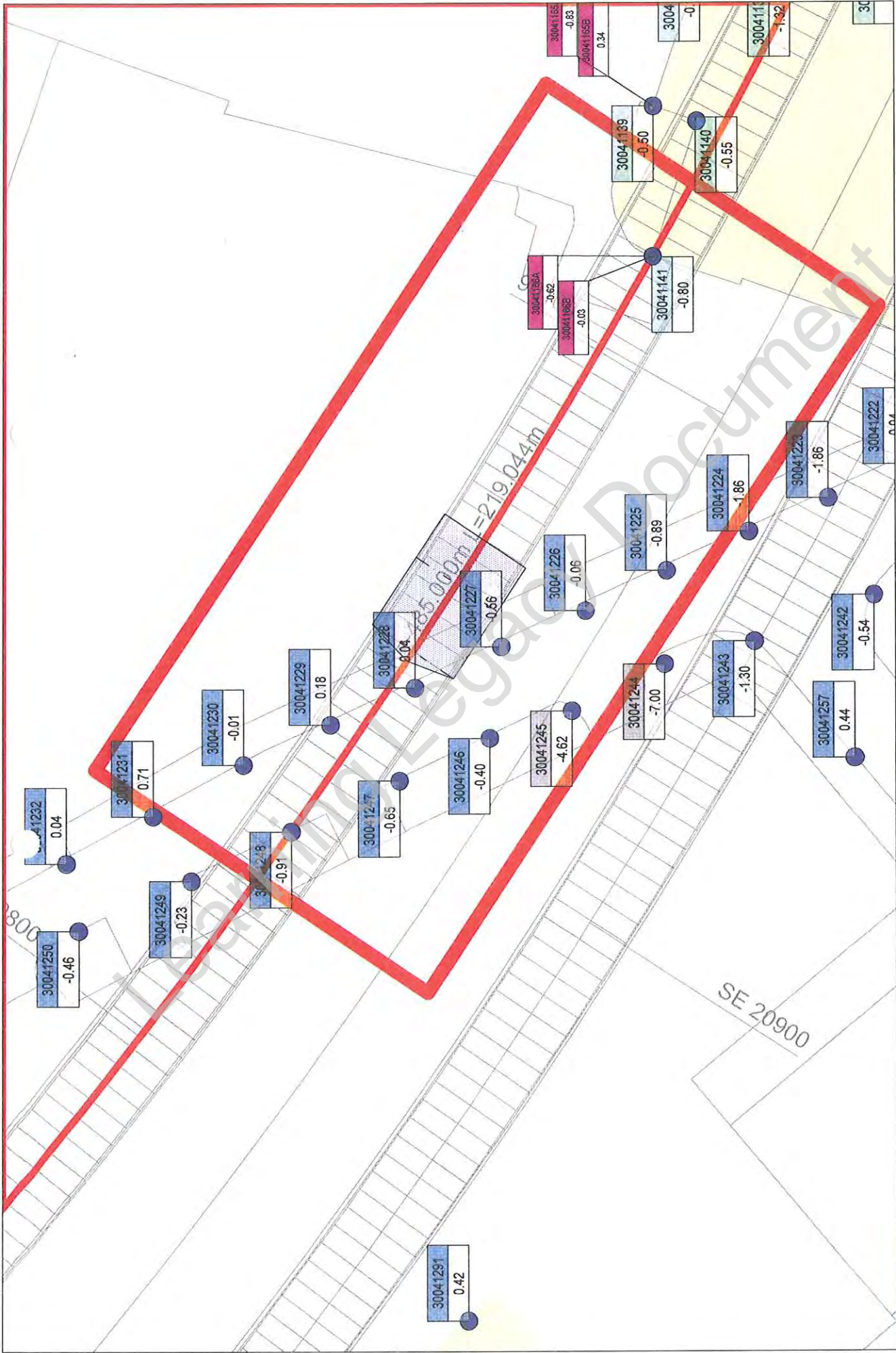
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 06.10.2013 17:49

Point: 30041243



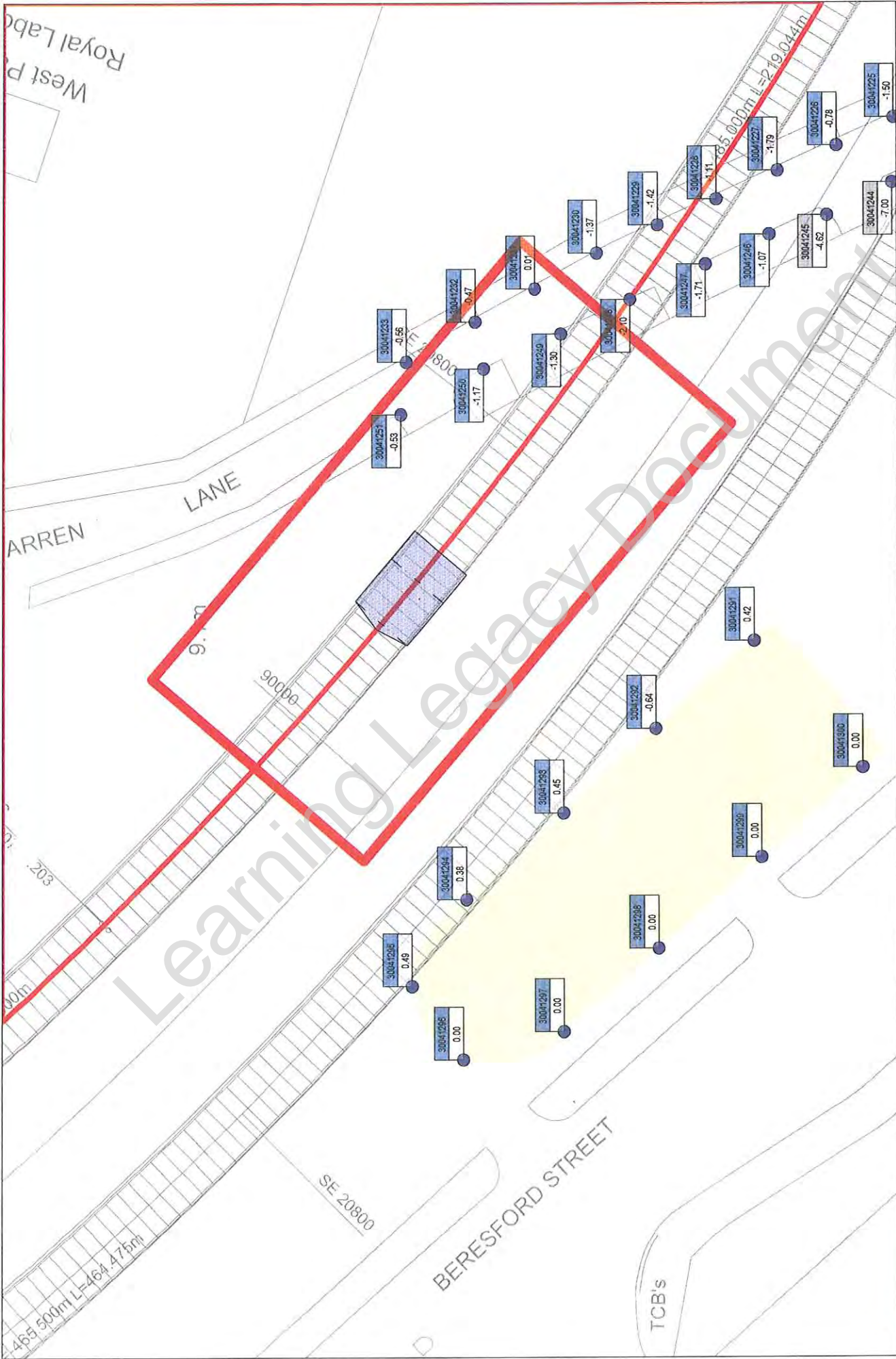
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - CS 18 - Warren Lanel 13.08.2013 - 24.09.2014
Date: 23.10.2014 13:55 Current Values: 23.10.2014 13:33





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 21.02.2014 09:00

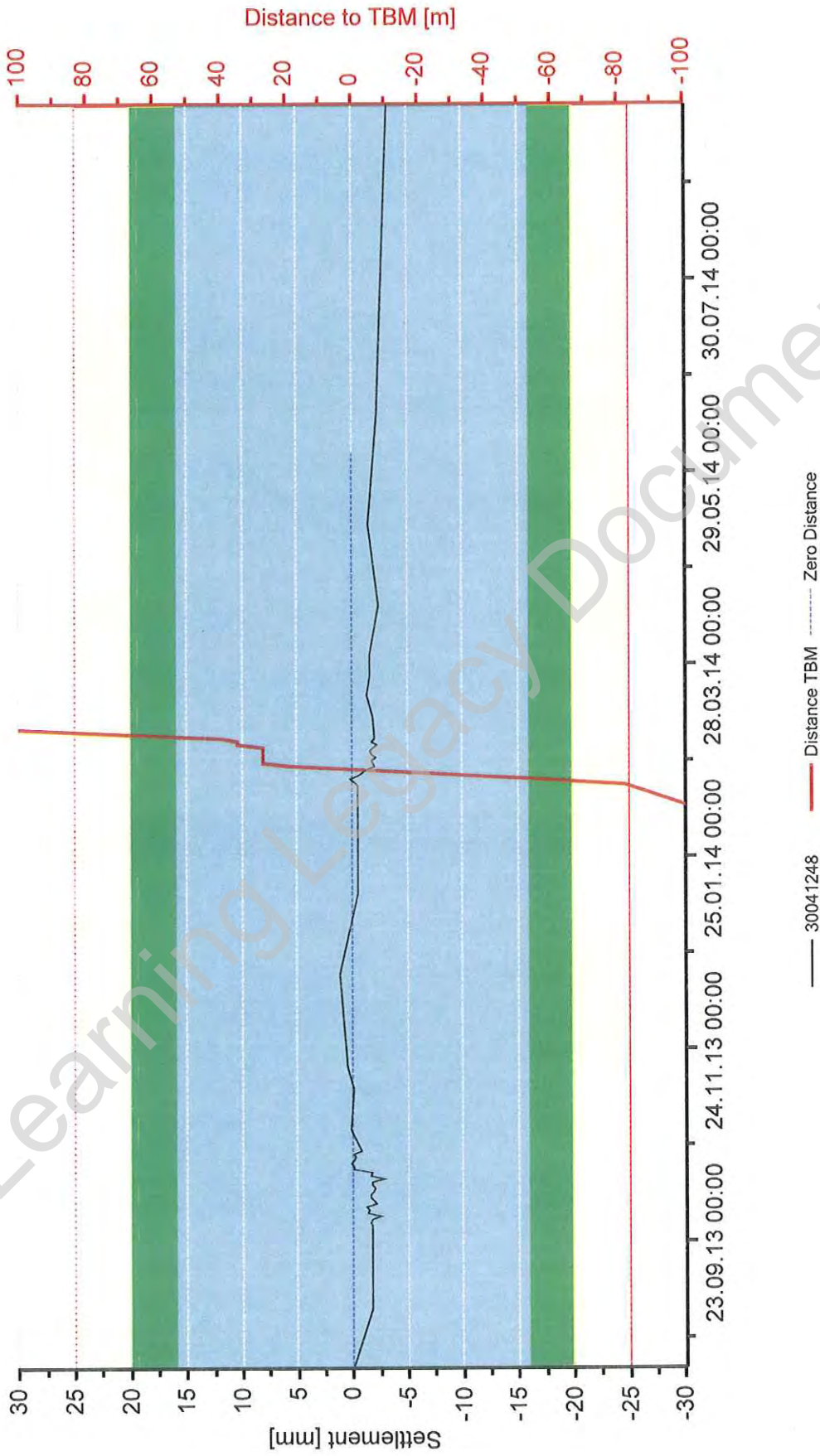




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 04.03.2014 09:00



Point: 30041248



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - CS 18 - Warren Lane 13.08.2013 - 24.09.2014
date: 19.10.2014 16:27 current values: 19.10.2014 16:11



monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS18 Warren Lane

No. of reading	baseline date	1. following 14/08/2013		2. following 26/08/2013		3. following 27/08/2013		4. following 01/09/2013		5. following 23/09/2013		6. following 28/09/2013	
		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 1241	110.602	110.602	-1	110.600	-1	110.601	1	110.601	0	110.602	0	110.602	0
3004 1242	110.612	110.612	-1			110.611		110.611	-1	110.612	0	110.612	0
3004 1243	110.384	110.384	-1			110.384	0	110.384	0	110.384	0	110.384	0
3004 1244	110.304	110.304	0			110.303	-1	110.303	-1	110.304	0	110.304	0
3004 1245	110.246	110.246	0			110.245	-1	110.245	-1	110.246	0	110.245	0
3004 1246	110.169	110.169	0			110.168	-1	110.168	-1	110.169	0	110.168	0
3004 1247	110.098	110.099	0			110.097	-2	110.097	-2	110.097	0	110.097	0
3004 1248	109.967	109.967	0			109.966	-2	109.966	-2	109.966	0	109.965	0
3004 1249	109.842	109.842	0			109.841	0	109.841	0	109.841	0	109.840	0
3004 1250	109.675	109.674	-1			109.674	0	109.674	0	109.674	0	109.674	0
3004 1251	109.542	109.542	-1	109.542	1	109.542	0	109.542	0	109.542	0	109.542	0
3004 1252	110.668					110.668	0	110.668	0	110.670	0	110.670	0
3004 1253	110.755					110.756	1	110.755	0	110.757	0	110.757	0
3004 1254	110.741							110.740	-1	110.741	0	110.741	0
3004 1255	110.868							110.867	-1	110.868	0	110.867	0
3004 1256	110.735							110.735	-1	110.735	0	110.734	0
3004 1257	110.598							110.598	-1	110.598	0	110.598	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

Structure: CS18 Warren Lane

No. of reading	baseline	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
date	13/8/13	29/09/2013		30/09/2013		01/10/2013		02/10/2013		03/10/2013		04/10/2013	
3004 1241	110.602	110.602	0	110.601	0	110.600	0	110.602	0	110.601	0	110.601	0
3004 1242	110.612	110.612	0	110.611	0	110.610	0	110.612	0	110.611	0	110.611	0
3004 1243	110.384	110.384	0	110.385	0	110.383	0	110.384	0	110.384	0	110.384	0
3004 1244	110.304	110.304	0	110.304	0	110.303	0	110.304	0	110.304	0	110.303	0
3004 1245	110.246	110.246	0	110.245	0	110.245	0	110.246	0	110.246	0	110.245	0
3004 1246	110.169	110.169	0	110.168	0	110.168	0	110.169	0	110.169	0	110.169	0
3004 1247	110.098	110.097	0	110.097	0	110.096	0	110.097	0	110.097	0	110.097	0
3004 1248	109.967	109.966	0	109.966	0	109.965	0	109.966	0	109.966	0	109.966	0
3004 1249	109.842	109.841	0	109.841	0	109.840	0	109.841	0	109.841	0	109.841	0
3004 1250	109.675	109.674	0	109.674	0	109.673	0	109.674	0	109.674	0	109.674	0
3004 1251	109.542	109.542	0	109.542	0	109.541	0	109.542	0	109.542	0	109.542	0
3004 1252	110.668	110.670	0	110.669	0	110.668	0	110.669	0	110.669	0	110.669	0
3004 1253	110.755	110.757	0	110.756	0	110.755	0	110.756	0	110.756	0	110.756	0
3004 1254	110.741	110.741	0	110.741	0	110.740	0	110.741	0	110.741	0	110.741	0
3004 1255	110.868	110.868	0	110.868	0	110.867	0	110.868	0	110.868	0	110.868	0
3004 1256	110.735	110.735	0	110.735	0	110.734	0	110.735	0	110.735	0	110.735	0
3004 1257	110.598	110.598	0	110.598	0	110.597	0	110.598	0	110.598	0	110.598	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS18 Warren Lane**

No. of reading	baseline	13. following		14. following		15. following		16. following		17. following		18. 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	13/8/13	05/10/2013		06/10/2013		07/10/2013		08/10/2013		09/10/2013		10/10/2013	
3004 1241	110.602	110.600	0	110.600	0	110.601	0	110.601	0	110.601	0	110.601	0
3004 1242	110.612	110.610	0	110.609	0	110.611	0	110.611	0	110.610	0	110.611	0
3004 1243	110.384	110.383	0	110.383	0	110.383	0	110.384	0	110.383	0	110.383	0
3004 1244	110.304	110.302	0	110.303	0	110.303	0	110.303	0	110.303	0	110.303	0
3004 1245	110.246	110.244	0	110.245	0	110.245	0	110.245	0	110.245	0	110.245	0
3004 1246	110.169	110.167	0	110.168	0	110.168	0	110.168	0	110.168	0	110.168	0
3004 1247	110.098	110.097	0	110.096	0	110.097	0	110.097	0	110.097	0	110.097	0
3004 1248	109.967	109.965	0	109.965	0	109.966	0	109.966	0	109.965	0	109.965	0
3004 1249	109.842	109.840	0	109.841	0	109.841	0	109.841	0	109.840	0	109.840	0
3004 1250	109.675	109.674	0	109.674	0	109.674	0	109.674	0	109.674	0	109.674	0
3004 1251	109.542	109.542	0	109.542	0	109.542	0	109.542	0	109.542	0	109.542	0
3004 1252	110.668	110.668	0	110.668	0	110.669	0	110.669	0	110.669	0	110.669	0
3004 1253	110.755	110.755	0	110.755	0	110.756	0	110.756	0	110.756	0	110.756	0
3004 1254	110.741	110.741	0	110.740	0	110.740	0	110.741	0	110.740	0	110.740	0
3004 1255	110.868	110.867	0	110.867	0	110.867	0	110.867	0	110.867	0	110.868	0
3004 1256	110.735	110.734	0	110.734	0	110.735	0	110.735	0	110.734	0	110.735	0
3004 1257	110.598	110.597	0	110.597	0	110.598	0	110.598	0	110.598	0	110.598	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS18 Warren Lane

No. of reading	baseline	19. following		20. following		21. following		22. following		23. following		24. following	
		13/8/13	11/10/2013	12/10/2013	13/10/2013	14/10/2013	15/10/2013	16/10/2013					
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 1241	110.602	110.601	0	110.601	0	110.602	0	110.601	-1	110.601	0	110.602	1
3004 1242	110.612	110.611	0	110.610	0	110.611	0	110.611	-1	110.611	0	110.612	1
3004 1243	110.384	110.384	0	110.383	0	110.383	0	110.383	-1	110.383	0	110.384	0
3004 1244	110.304	110.303	0	110.303	0	110.302	0	110.303	-1	110.303	0	110.303	1
3004 1245	110.246	110.245	0	110.245	0	110.244	0	110.245	-1	110.245	0	110.246	1
3004 1246	110.169	110.168	0	110.168	0	110.167	0	110.168	-1	110.168	0	110.169	1
3004 1247	110.098	110.097	0	110.097	0	110.095	0	110.097	-2	110.097	0	110.098	1
3004 1248	109.967	109.965	0	109.966	0	109.964	0	109.966	-2	109.966	0	109.967	2
3004 1249	109.842	109.841	0	109.841	0	109.840	0	109.841	-2	109.841	0	109.842	1
3004 1250	109.675	109.674	0	109.674	0	109.673	0	109.674	-1	109.674	0	109.675	1
3004 1251	109.542	109.542	0	109.542	0	109.541	0	109.542	-1	109.542	0	109.542	0
3004 1252	110.668	110.669	0	110.669	0	110.669	0	110.669	0	110.669	0	110.669	0
3004 1253	110.755	110.756	0	110.756	0	110.756	0	110.756	0	110.756	0	110.756	0
3004 1254	110.741	110.741	0	110.740	0	110.741	0	110.741	0	110.741	0	110.742	1
3004 1255	110.868	110.868	0	110.867	0	110.868	0	110.868	0	110.868	0	110.869	1
3004 1256	110.735	110.735	0	110.734	0	110.735	0	110.735	0	110.735	0	110.736	1
3004 1257	110.598	110.598	0	110.598	0	110.598	0	110.598	0	110.598	0	110.599	1

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS18 Warren Lane

No. of reading	baseline	25. following		26. following		27. following		28. following		29. following		30. following	
	13/8/13	17/10/2013	18/10/2013	19/10/2013	20/10/2013	21/10/2013	22/10/2013	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline
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 1241	110.602	110.602	0	110.601	0	110.602	0	110.601	0	110.601	0	110.600	-1
3004 1242	110.612	110.612	0	110.611	0	110.611	0	110.611	0	110.611	0	110.610	-1
3004 1243	110.384	110.383	0	110.383	0	110.383	0	110.383	0	110.383	0	110.382	-1
3004 1244	110.304	110.303	0	110.303	0	110.303	0	110.303	0	110.303	0	110.302	-1
3004 1245	110.246	110.246	0	110.246	0	110.246	0	110.246	0	110.246	0	110.245	-1
3004 1246	110.169	110.169	0	110.169	0	110.169	0	110.169	0	110.169	0	110.168	-1
3004 1247	110.098	110.098	0	110.098	0	110.098	0	110.098	0	110.098	0	110.098	-1
3004 1248	109.967	109.967	0	109.967	0	109.967	0	109.967	0	109.967	0	109.966	-1
3004 1249	109.842	109.842	0	109.842	0	109.842	0	109.842	0	109.842	0	109.841	-1
3004 1250	109.675	109.675	0	109.675	0	109.675	0	109.675	0	109.675	0	109.674	-1
3004 1251	109.542	109.542	0	109.542	0	109.542	0	109.542	0	109.542	0	109.541	-1
3004 1252	110.668	110.669	0	110.669	0	110.669	0	110.669	0	110.669	0	110.668	-1
3004 1253	110.755	110.756	0	110.756	0	110.756	0	110.756	0	110.756	0	110.754	-1
3004 1254	110.741	110.742	0	110.742	0	110.742	0	110.742	0	110.742	0	110.740	-1
3004 1255	110.868	110.869	0	110.869	0	110.869	0	110.869	0	110.868	0	110.868	-1
3004 1256	110.735	110.736	0	110.736	0	110.736	0	110.736	0	110.736	0	110.735	-1
3004 1257	110.598	110.599	0	110.598	0	110.598	0	110.598	0	110.599	0	110.597	-1

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS18 Warren Lane

No. of reading	baseline	31. following		32. following		33. following		34. following		35. following		36. following		
	13/8/13	elevation	deviation from last/ baseline	elevation	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	29/10/2013	18/11/2013												
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 1241	110.602	1	-1	110.601	0	-1	110.602	1	0	110.602	0	0	110.601	-1
3004 1242	110.612	1	-1	110.611	0	-1	110.612	1	0	110.612	0	0	110.611	-1
3004 1243	110.384	1	-1	110.383	0	-1	110.384	1	-1	110.384	0	-1	110.383	-1
3004 1244	110.304	1	-1	110.303	0	-1	110.304	1	-1	110.304	0	-1	110.300	-4
3004 1245	110.246	1	0	110.246	0	0	110.246	1	-1	110.246	0	0	110.244	-2
3004 1246	110.169	1	0	110.169	0	0	110.170	1	0	110.170	0	0	110.169	-2
3004 1247	110.098	1	0	110.098	0	0	110.098	1	0	110.099	0	0	110.098	-2
3004 1248	109.967	1	0	109.967	0	0	109.967	1	0	109.968	1	0	109.967	-2
3004 1249	109.842	1	0	109.842	0	0	109.842	1	0	109.842	0	0	109.842	-2
3004 1250	109.675	1	0	109.674	0	-1	109.675	1	0	109.675	0	0	109.675	-1
3004 1251	109.542	1	0	109.542	0	0	109.542	1	0	109.542	0	0	109.542	-1
3004 1252	110.668	1	1	110.669	0	1	110.669	1	1	110.670	0	2	110.669	-1
3004 1253	110.755	1	1	110.756	0	1	110.756	1	1	110.757	0	2	110.756	-1
3004 1254	110.741	1	1	110.742	0	1	110.742	1	1	110.742	0	1	110.742	-1
3004 1255	110.868	1	1	110.869	0	0	110.869	1	1	110.869	0	1	110.869	-1
3004 1256	110.735	1	1	110.736	0	0	110.736	1	1	110.736	0	1	110.735	-1
3004 1257	110.598	1	0	110.599	0	0	110.599	1	1	110.599	0	1	110.599	-1

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS18 Warren Lane**

No. of reading	baseline	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
date	13/8/13	17/02/2014		19/02/2014		20/02/2014		21/02/2014		22/02/2014		23/02/2014	
3004 1241	110.602	110.602	1	110.602	0	110.602	0	110.602	0	110.602	0	110.601	0
3004 1242	110.612	110.612	1	110.612	0	110.612	0	110.612	0	110.612	0	110.612	0
3004 1243	110.384	110.384	1	110.384	0	110.384	0	110.384	0	110.383	0	110.383	0
3004 1244	110.304	110.297	-3	110.297	0	110.297	0	110.297	0	110.383	0	110.383	0
3004 1245	110.246	110.242	-3	110.242	0	110.241	0	110.241	0	110.383	0	110.383	0
3004 1246	110.169	110.169	0	110.169	0	110.169	0	110.169	0	110.169	0	110.168	0
3004 1247	110.098	110.098	1	110.098	0	110.098	0	110.098	0	110.098	-1	110.097	-1
3004 1248	109.967	109.967	0	109.967	1	109.967	-1	109.967	-1	109.966	0	109.965	-1
3004 1249	109.842	109.842	1	109.842	0	109.842	0	109.842	0	109.842	0	109.841	-1
3004 1250	109.675	109.675	0	109.675	0	109.675	0	109.675	0	109.675	0	109.674	0
3004 1251	109.542	109.542	0	109.542	0	109.542	0	109.542	0	109.542	0	109.542	0
3004 1252	110.668	110.670	1	110.670	0	110.669	0	110.669	0	110.669	0	110.669	0
3004 1253	110.755	110.756	1	110.757	0	110.756	0	110.756	0	110.756	0	110.756	0
3004 1254	110.741	110.742	1	110.742	0	110.742	0	110.742	0	110.742	0	110.742	-1
3004 1255	110.868	110.869	1	110.869	0	110.869	0	110.869	0	110.869	0	110.869	0
3004 1256	110.735	110.736	1	110.736	0	110.736	0	110.736	0	110.736	0	110.735	0
3004 1257	110.598	110.599	1	110.599	0	110.599	0	110.599	0	110.599	0	110.599	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS18 Warren Lane**

No. of reading	baseline	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
date	13/8/13	24/02/2014		25/02/2014		26/02/2014		27/02/2014		28/02/2014		01/03/2014	
No.	elevation												
3004 1241	110.602	110.602	0	110.602	0	110.602	0	110.602	0	110.602	0	110.602	0
3004 1242	110.612	110.612	1	110.612	0	110.612	0	110.612	0	110.612	0	110.612	0
3004 1243	110.384	110.383	0	110.384	0	110.383	0	110.383	0	110.383	0	110.383	0
3004 1244	110.304	destroyed		destroyed		destroyed		destroyed		destroyed		destroyed	
3004 1245	110.246	destroyed		destroyed		destroyed		destroyed		destroyed		destroyed	
3004 1246	110.169	110.168	0	110.169	0	110.168	0	110.169	0	110.169	0	110.169	0
3004 1247	110.098	110.097	0	110.097	0	110.097	0	110.097	0	110.097	0	110.097	0
3004 1248	109.967	109.965	0	109.965	0	109.965	0	109.965	0	109.966	0	109.965	0
3004 1249	109.842	109.841	0	109.841	0	109.841	0	109.841	0	109.841	0	109.841	0
3004 1250	109.675	109.674	0	109.674	0	109.674	0	109.674	0	109.674	0	109.674	0
3004 1251	109.542	109.542	0	109.542	0	109.542	0	109.542	0	109.542	0	109.542	0
3004 1252	110.668	110.669	0	110.670	0	110.669	0	110.669	0	110.670	0	110.670	0
3004 1253	110.755	110.757	1	110.757	0	110.756	0	110.756	0	110.757	0	110.757	0
3004 1254	110.741	110.742	1	110.742	0	110.742	0	110.742	0	110.742	0	110.742	0
3004 1255	110.868	110.869	1	110.869	0	110.869	0	110.869	0	110.869	0	110.870	0
3004 1256	110.735	110.736	1	110.736	0	110.736	-1	110.736	0	110.736	0	110.736	0
3004 1257	110.598	110.599	1	110.599	0	110.599	0	110.599	0	110.599	0	110.599	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS18 Warren Lane**

No. of reading	baseline	49. following		50. following		51. following		52. following		53. following		54. 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	13/8/13	02/03/2014		03/03/2014		04/03/2014		05/03/2014		11/03/2014		18/03/2014	
3004 1241	110.602	110.601	-1	110.602	0	110.602	0	110.602	0	110.602	0	110.601	0
3004 1242	110.612	110.611	-1	110.612	0	110.612	0	110.612	0	110.612	0	110.612	0
3004 1243	110.384	110.383	-1	110.384	1	110.384	1	110.383	0	110.383	0	110.383	0
3004 1244	110.304	destroyed		destroyed		destroyed		destroyed		destroyed		destroyed	
3004 1245	110.246	destroyed		destroyed		destroyed		destroyed		destroyed		destroyed	
3004 1246	110.169	110.168	0	110.169	1	110.168	0	110.168	0	110.169	0	110.168	0
3004 1247	110.098	110.096	-1	110.097	1	110.097	0	110.097	0	110.097	0	110.097	0
3004 1248	109.967	109.965	0	109.966	1	109.965	0	109.965	0	109.965	0	109.966	0
3004 1249	109.842	109.841	0	109.841	1	109.841	0	109.841	0	109.841	0	109.841	0
3004 1250	109.675	109.674	0	109.674	0	109.674	0	109.674	0	109.674	0	109.674	0
3004 1251	109.542	109.542	0	109.542	0	109.542	0	109.542	0	109.542	0	109.542	0
3004 1252	110.668	110.669	-1	110.669	0	110.670	0	110.669	0	110.669	0	110.669	0
3004 1253	110.755	110.756	-1	110.756	1	110.757	0	110.757	0	110.757	0	110.756	0
3004 1254	110.741	110.742	-1	110.742	0	110.742	0	110.742	0	110.742	0	110.742	0
3004 1255	110.868	110.869	-1	110.869	0	110.869	0	110.869	0	110.869	0	110.869	0
3004 1256	110.735	110.736	-1	110.736	0	110.736	0	110.736	0	110.736	0	110.735	0
3004 1257	110.598	110.599	-1	110.599	0	110.599	0	110.599	0	110.599	0	110.599	0


monitoring table



Joint Venture

project: C310 Thames Tunnel

No. of reading	CS18 Warren Lane		55. following		56. following		57. following		58. following		59. following		60. following				
	baseline	13/8/13	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline			
No.	date		24/03/2014		31/03/2014		16/04/2014		12/05/2014		17/06/2014		24/09/2014				
3004 1241	110.602	110.601	0	-1	110.602	0	0	-1	110.602	0	0	0	110.601	-1	110.601	0	-1
3004 1242	110.612	110.612	0	-1	110.612	0	0	-1	110.612	1	0	0	110.612	-1	110.611	-1	-2
3004 1243	110.384	110.383	0	-1	110.383	0	-1	-1	110.384	0	-1	0	110.383	0	110.382	-1	-2
3004 1244	110.304	destroyed		destroyed		destroyed		destroyed		destroyed		destroyed		destroyed		destroyed	
3004 1245	110.246	destroyed		destroyed		destroyed		destroyed		destroyed		destroyed		destroyed		destroyed	
3004 1246	110.169	110.168	0	-1	110.169	0	-1	-1	110.169	1	-1	0	110.168	0	110.168	-1	-2
3004 1247	110.098	110.097	0	-1	110.097	0	-1	-2	110.098	1	-1	0	110.097	-1	110.096	-1	-2
3004 1248	109.967	109.966	0	-2	109.966	0	-2	-2	109.966	1	-1	0	109.965	-1	109.964	-1	-3
3004 1249	109.842	109.841	0	-1	109.841	0	-1	-2	109.842	1	-1	0	109.841	-1	109.840	-1	-2
3004 1250	109.675	109.674	0	-1	109.674	0	-1	-2	109.674	1	-1	0	109.673	-1	109.672	-1	-3
3004 1251	109.542	109.542	0	-1	109.542	0	0	0	109.542	0	0	0	109.542	0	109.542	0	0
3004 1252	110.668	110.669	0	1	110.669	0	1	1	110.669	0	1	0	110.669	0	110.669	0	1
3004 1253	110.755	110.756	0	1	110.756	0	1	1	110.756	0	1	2	110.756	-1	110.755	-1	0
3004 1254	110.741	110.742	0	1	110.742	0	1	1	110.742	0	1	0	110.742	-1	110.741	-1	0
3004 1255	110.868	110.869	0	1	110.869	0	1	1	110.869	0	1	0	110.869	-1	110.868	-1	0
3004 1256	110.735	110.736	0	1	110.736	0	1	1	110.736	0	1	0	110.736	-1	110.734	-1	-1
3004 1257	110.598	110.599	0	0	110.599	0	1	1	110.599	0	1	0	110.599	-1	110.598	-1	-1

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

APPENDIX 64
Hotel Building

Learning Legacy Document

monitoring asset	Hotel building Warren Lane		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	Hotel building		
sensor type:	manual levelling studs		
chainage:	89990 - 90040	point no.:	3004 1291 - 3004 1300
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	30/08/13	0.00		
TBM 1	start ZOI	17/10/13	0.35	3004 1291
		21/10/13	0.82	3004 1295
	end ZOI	21/10/13	0.01	3004 1291
		24/10/13	0.33	3004 1295
breached not any trigger value				
TBM 2	start ZOI	22/02/14	0.42	3004 1291
		04/03/14	0.49	3004 1295
	end ZOI	04/03/14	0.42	3004 1291
		07/03/14	0.49	3004 1295
breached not any trigger value				
longterm	19/06/14	-0.58	3004 1291	
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

3004 1291 - 3004 1300
 Point nos. 3004 1296 - 3004 1300 were lost after Baseline reading (no access)
 Point nos. 3004 1291 - 3004 1295 were lost before long terme reading could be done (no access)
 Overall, none of the points reached any trigger value.
 Under consideration of temperature differences 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.

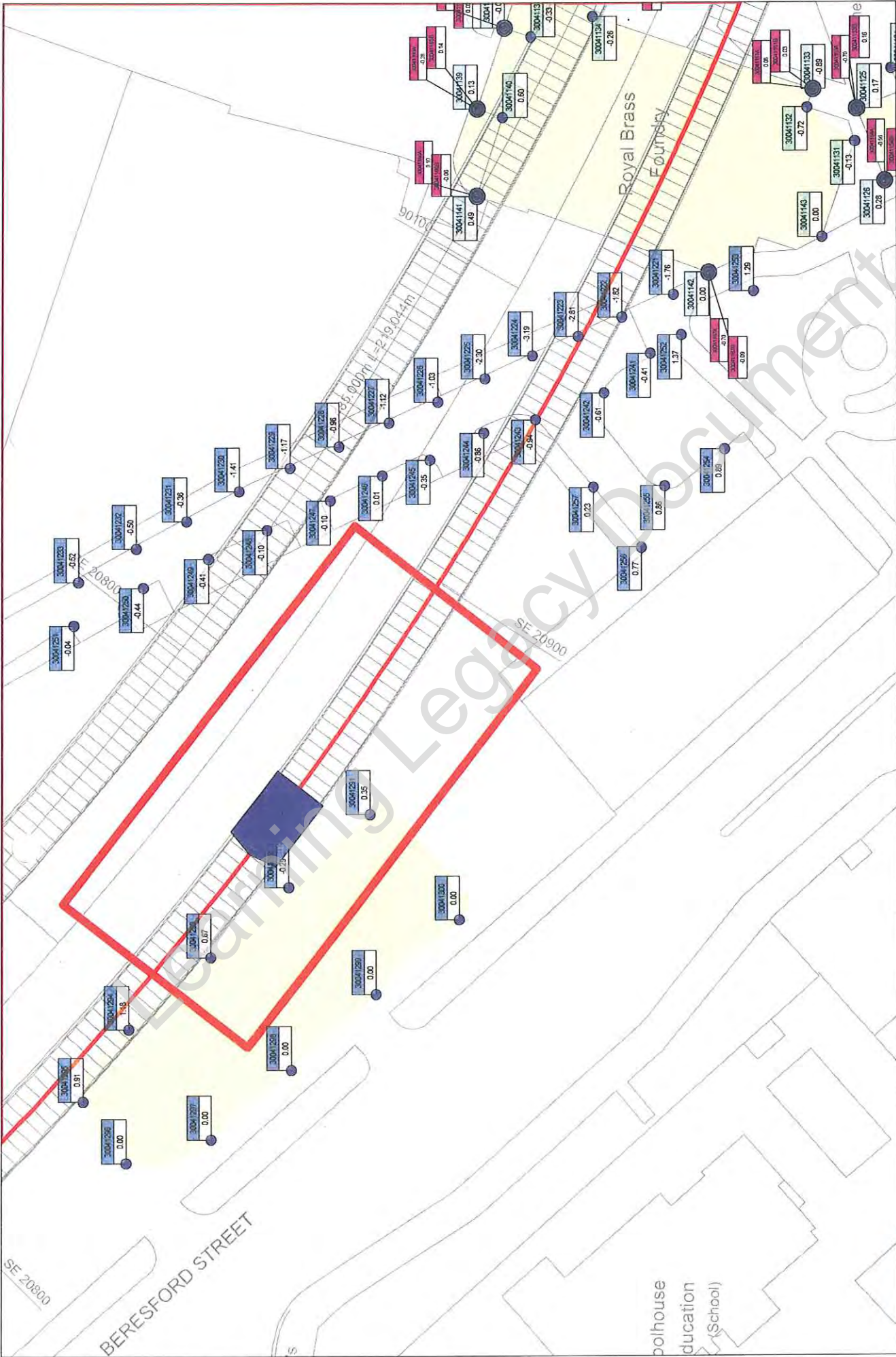
date / signature:

09/01/15

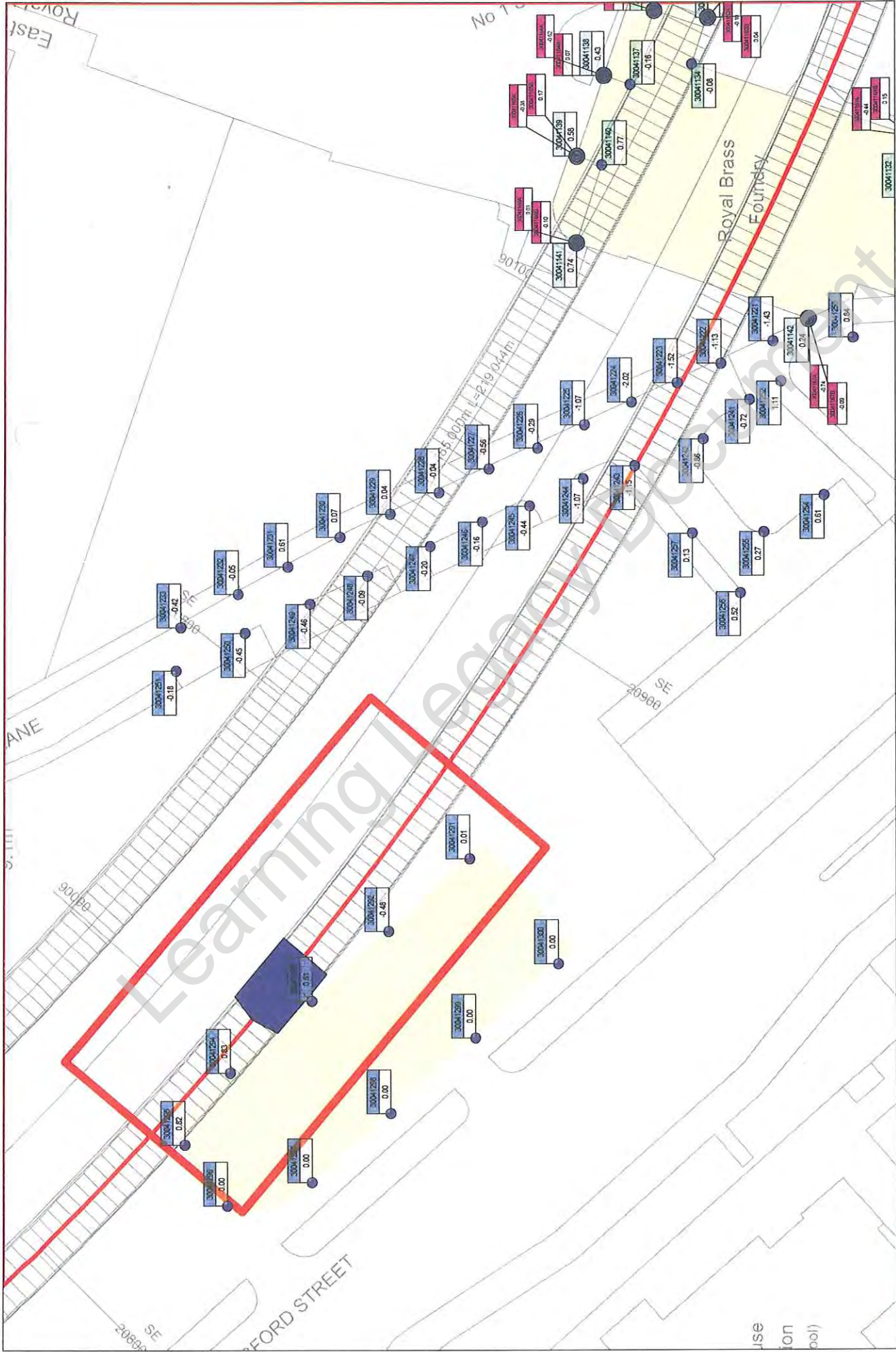
print name:

HMJV project role:

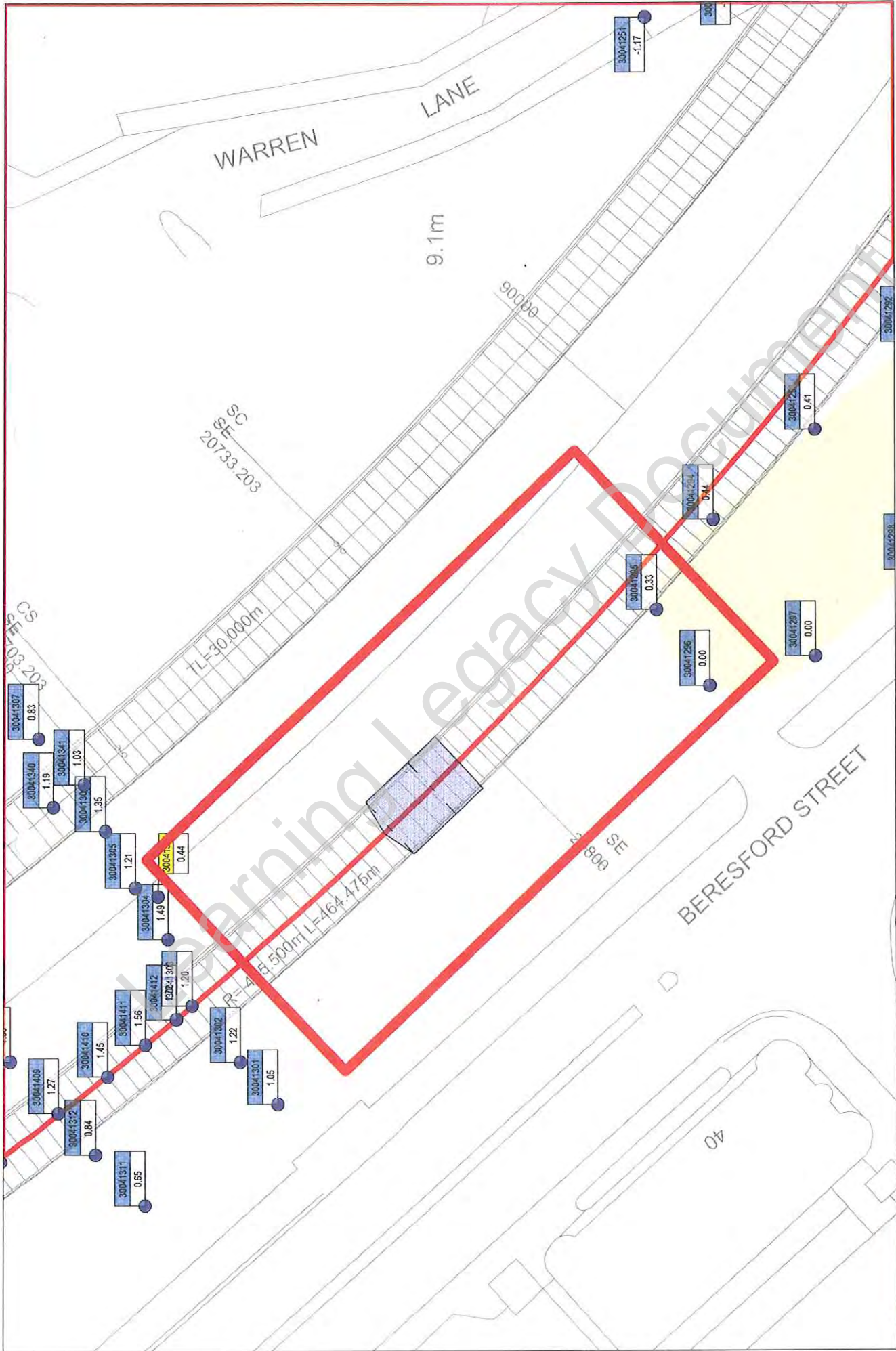
Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 17.10.2013 13:11

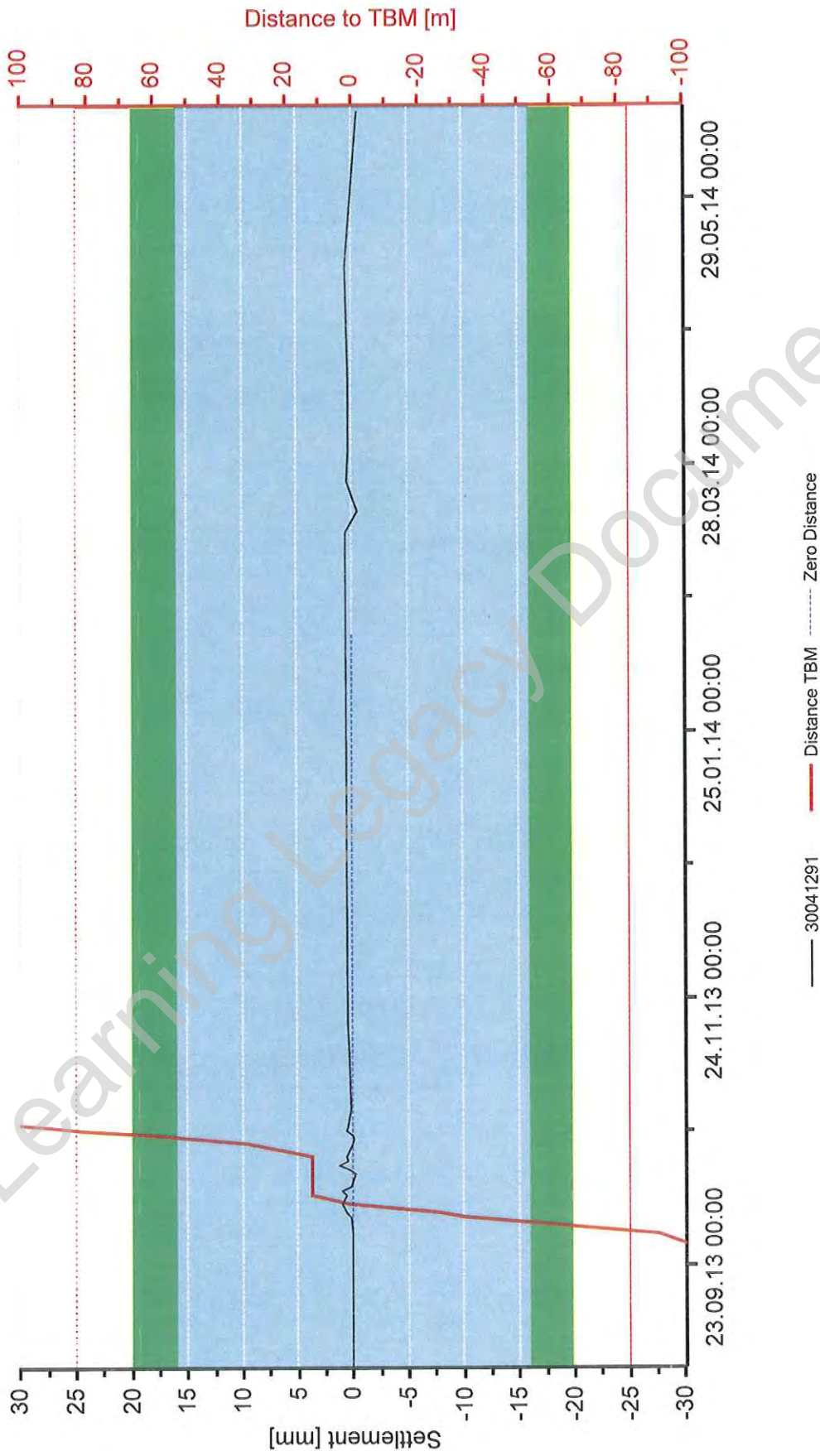


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 21.10.2013 09:00



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 24.10.2013 18:30

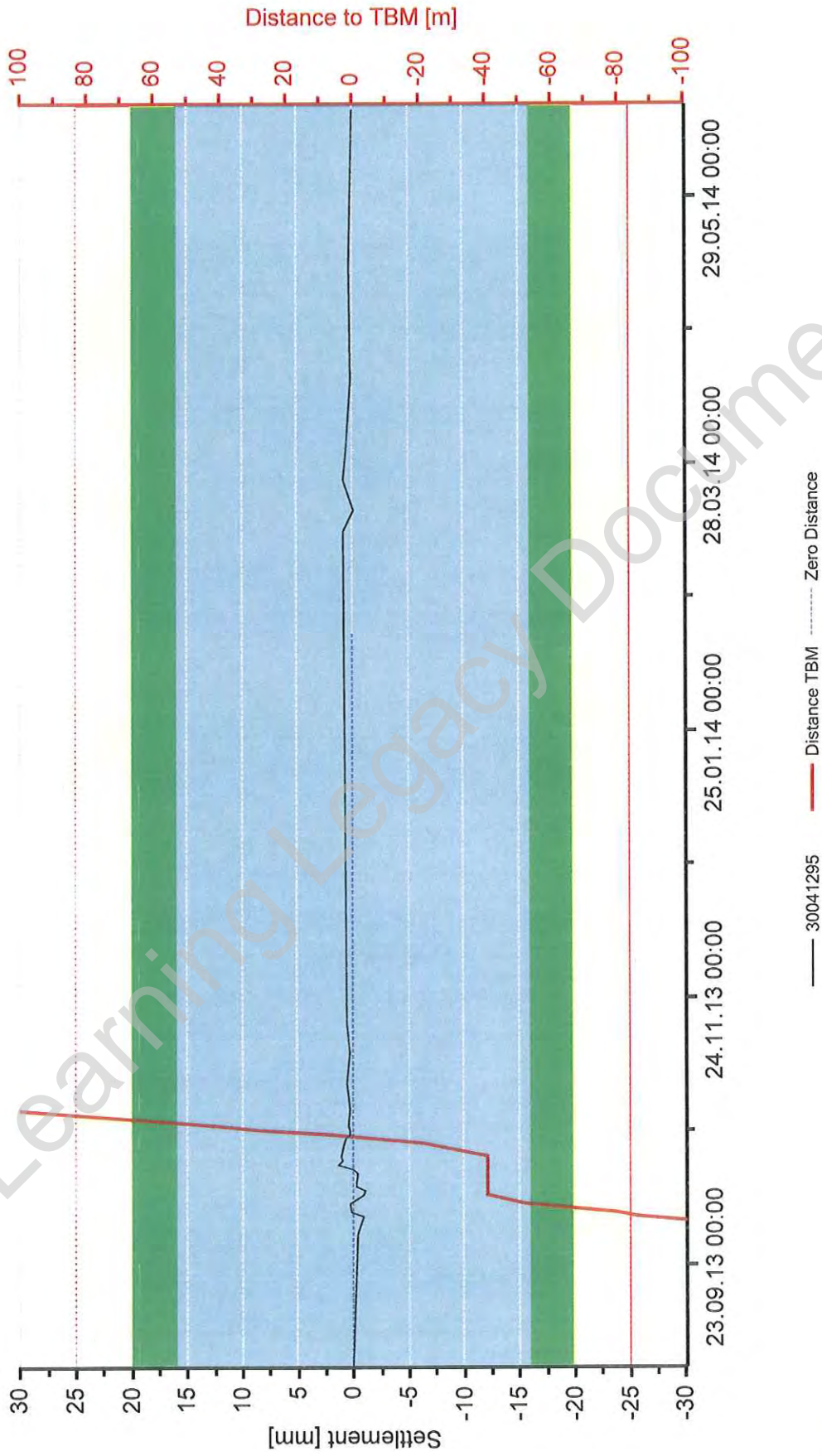
Point: 30041291



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Hotel Warren Lane 30.08.2013 - 19.06.2014
Date: 23.10.2014 18:16 Current Values: 23.10.2014 18:04

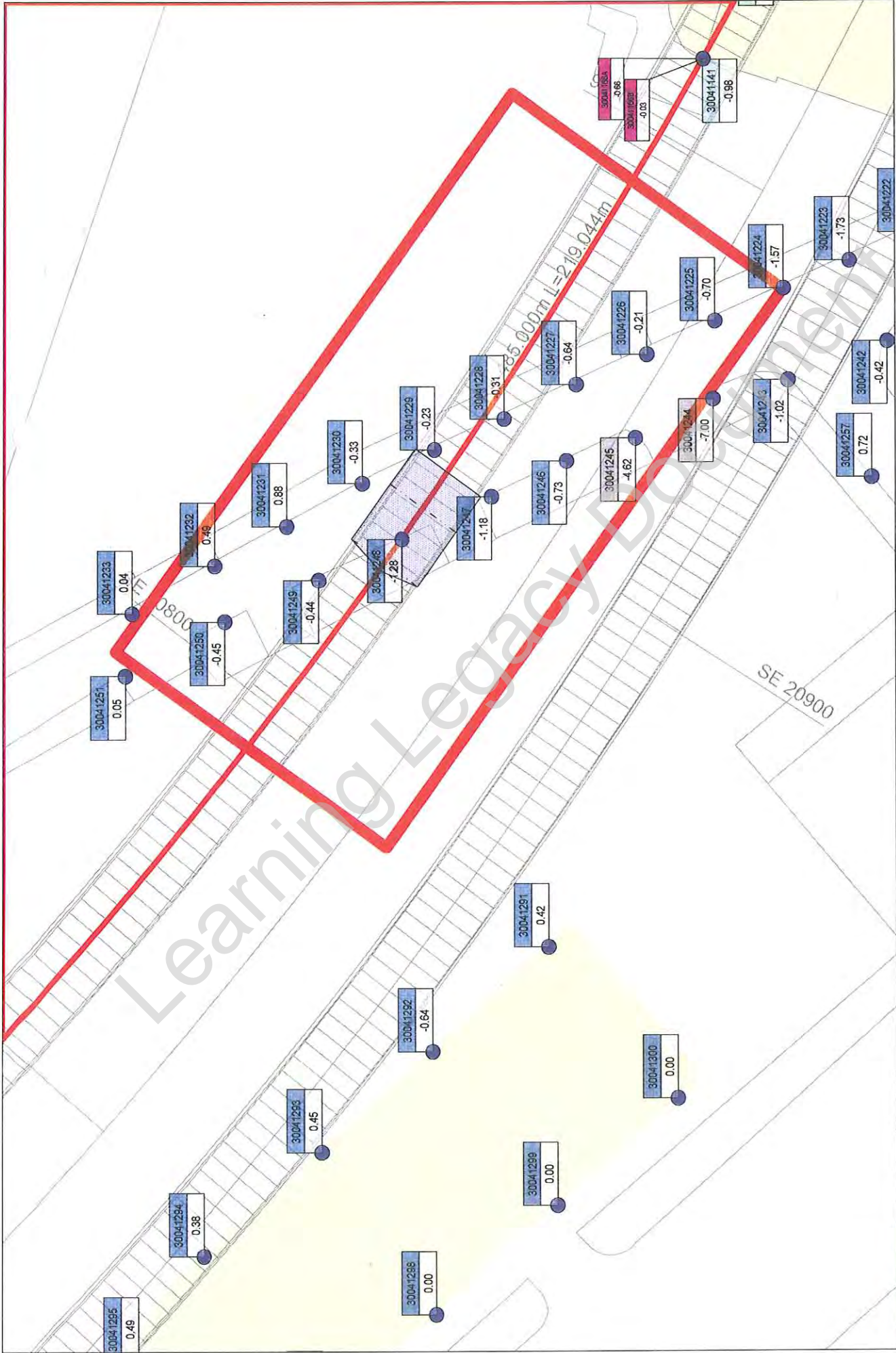


Point: 30041295

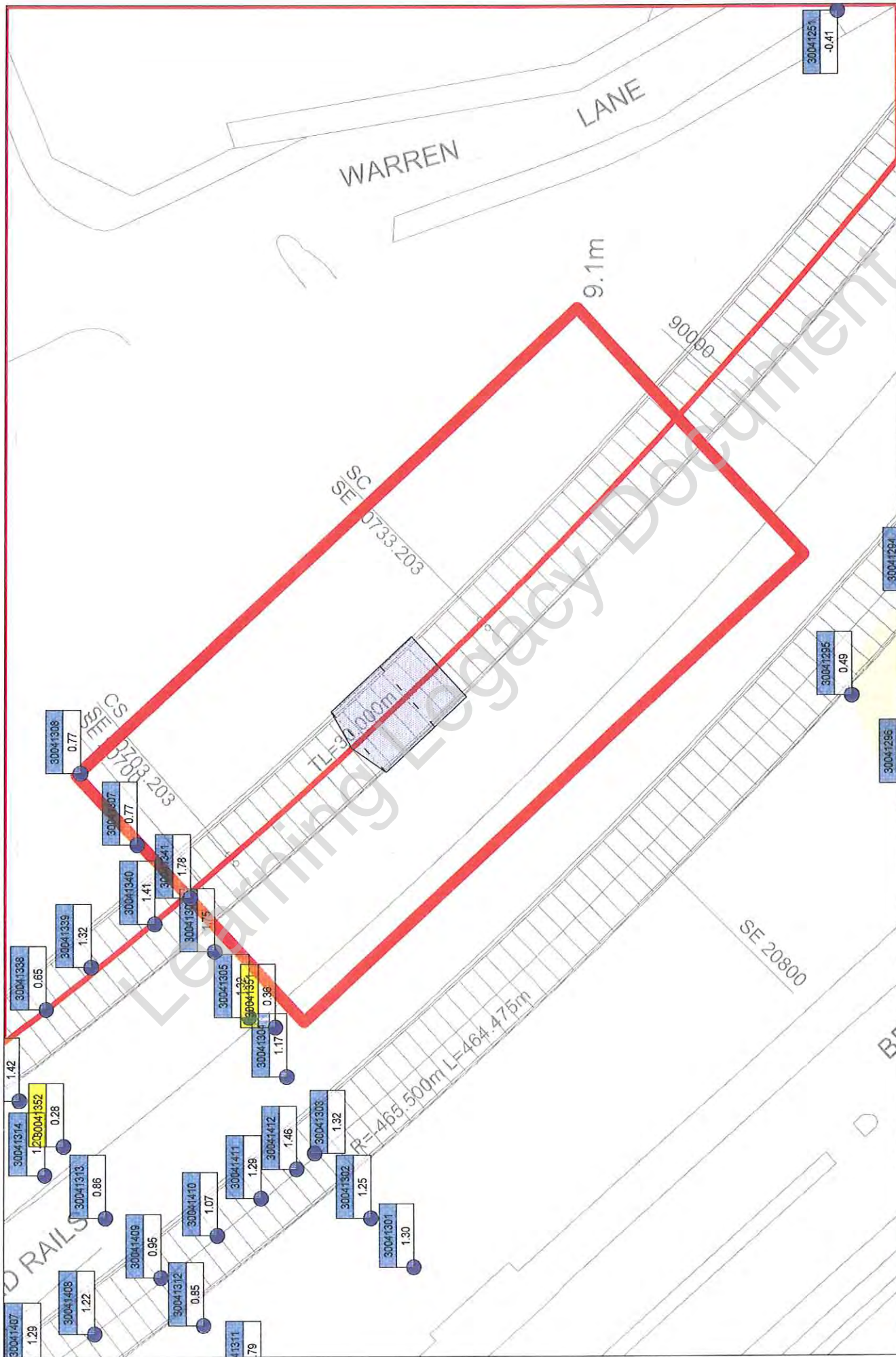


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Hotel Warren Lane 30.08.2013 - 19.06.2014
Date: 23.10.2014 18:15 Current Values: 23.10.2014 18:04



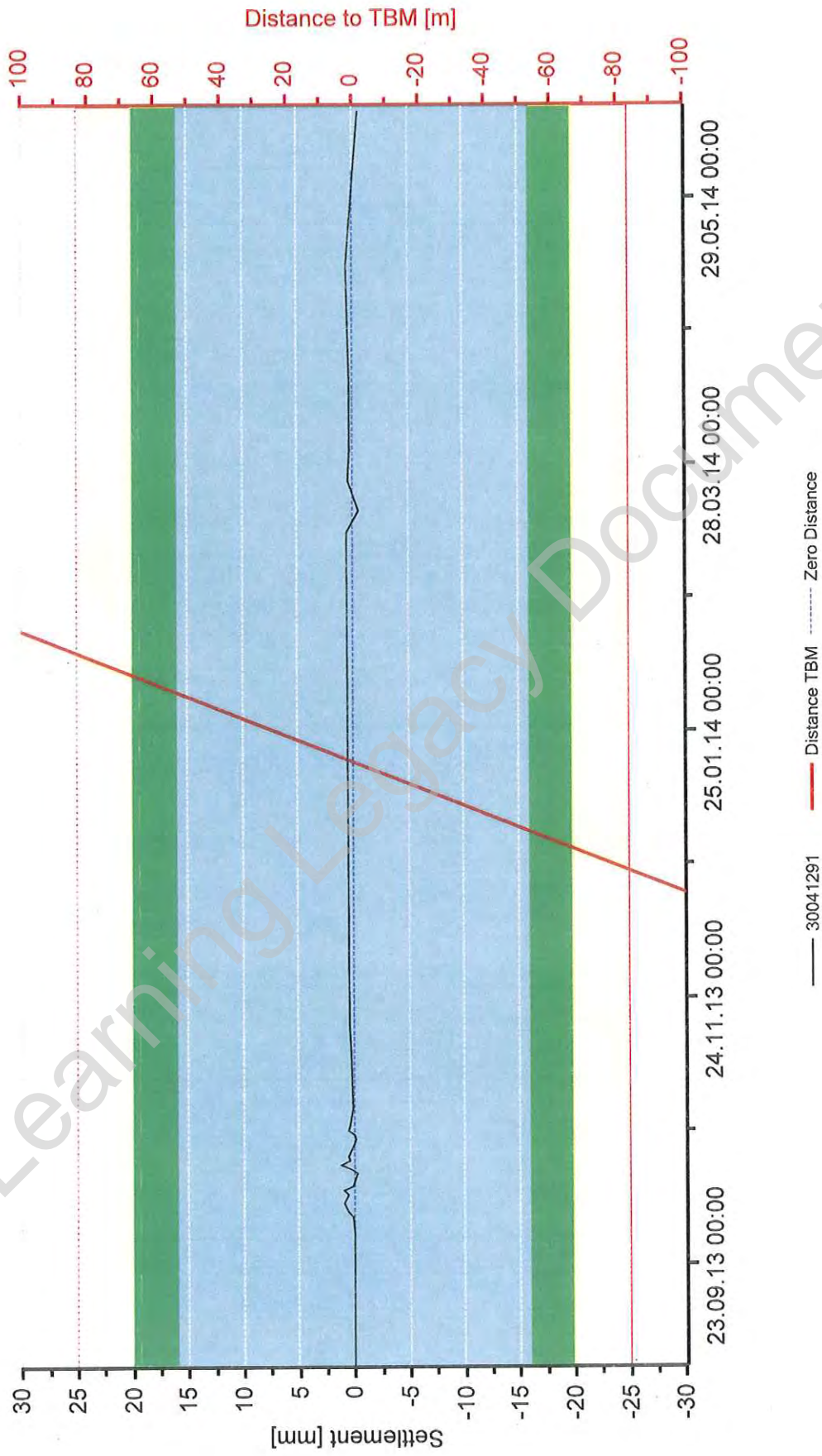


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 22.02.2014 09:00



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 09.03.2014 15:59

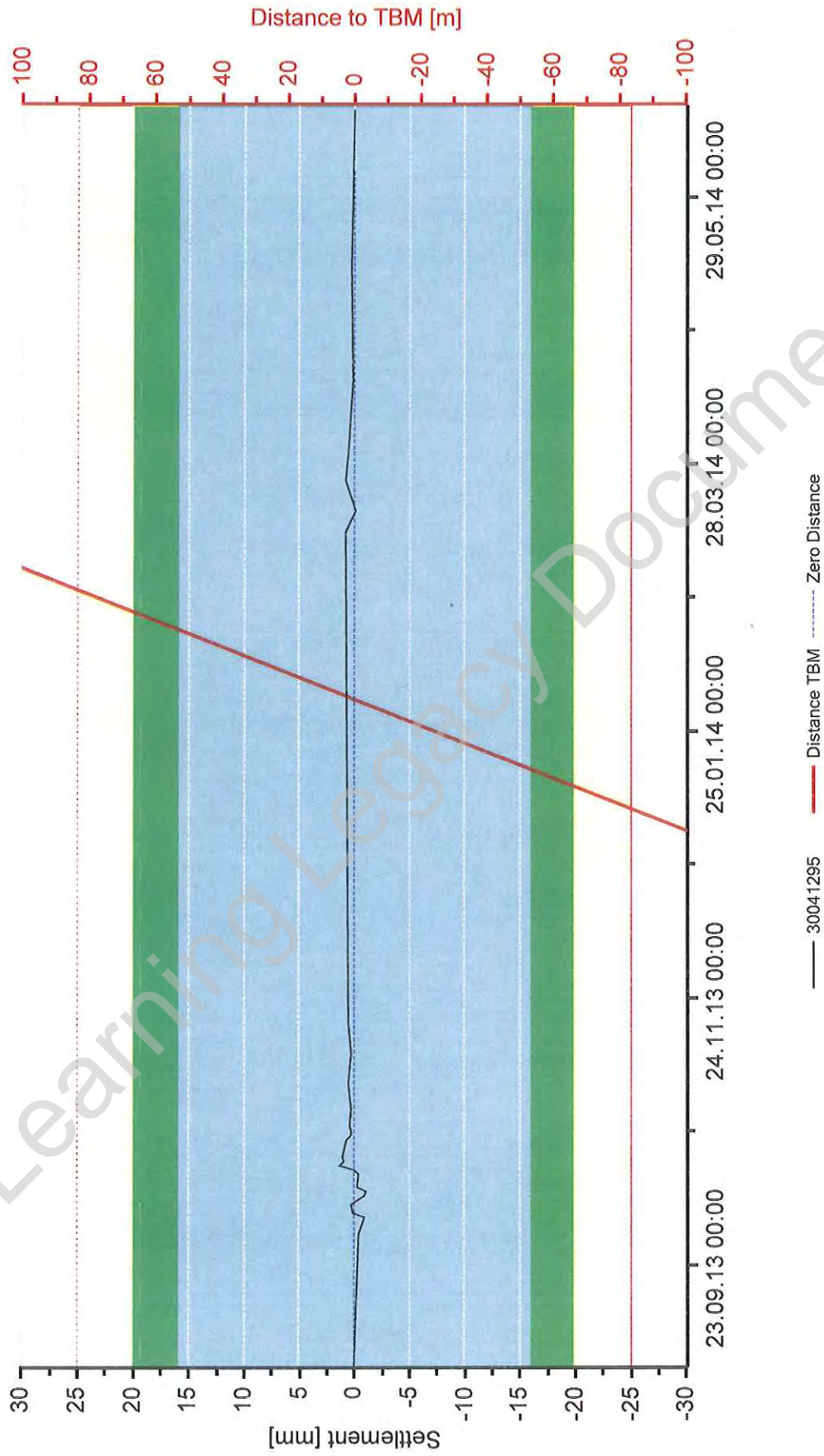
Point: 30041291



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Hotel Warren Lane 30.08.2013 - 19.06.2014
date: 22.10.2014 14:56 current values: 22.10.2014 14:44



Point: 30041295



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Hotel Warren Lane 30.08.2013 - 19.06.2014
date: 22.10.2014 14:54 current values: 22.10.2014 14:44



monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: Hotel

No. of reading	baseline	1. following		2. following		3. following		4. following		5. following		6. 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
	30/8/13		30/09/2013		04/10/2013		05/10/2013		07/10/2013		09/10/2013		10/10/2013	
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 1291	110.201	110.201	0	0	110.201	0	1	110.202	0	1	110.201	0	0	1
3004 1292	110.038	110.037	-2	-1	110.037	1	-1	110.038	1	0	110.038	0	0	0
3004 1293	110.050	110.049	-1	-1	110.049	0	0	110.050	0	0	110.050	0	0	0
3004 1294	110.029	110.028	-1	-1	110.028	0	-1	110.029	0	0	point covered	0	0	-1
3004 1295	110.077	110.076	0	0	110.076	0	-1	110.077	1	0	110.076	-1	-1	0
3004 1296	110.090													
3004 1297	110.123													
3004 1298	110.165													
3004 1299	110.100													
3004 1300	110.154													
				points lost		points lost		points lost		points lost		points lost		points lost

monitoring table

Joint Venture

project: C310 Thames Tunnel

structure: Hotel

No. of reading	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			
	30/8/13	11/10/2013										18/10/2013			
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 1291	110.201		-1	110.201	0	110.201	1	110.202	1	110.201	-1	110.202	0		
3004 1292	110.038		-1	110.037	0	110.037	0	110.039	1	110.038	-1	110.038	0		
3004 1293	110.050		1	110.050	0	110.049	-1	110.051	2	110.050	-1	110.051	0		
3004 1294	110.029		2	110.029	-1	110.029	0	110.030	2	110.030	0	110.030	0		
3004 1295	110.077		1	110.076	0	110.077	0	110.078	1	110.077	0	110.078	0		
3004 1296	110.090														
3004 1297	110.123														
3004 1298	110.165														
3004 1299	110.100														
3004 1300	110.154														
				points lost				points lost				points lost			

monitoring table

Joint Venture

project: **C310 Thames Tunnel**

structure: Hotel

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
	30/8/13												
3004 1291	110.201	110.201	-1	0	110.201	0	0	110.201	1	1	110.201	0	0
3004 1292	110.038	110.038	0	0	110.037	-1	-1	110.038	1	0	110.038	0	0
3004 1293	110.050	110.050	0	0	110.050	0	0	110.050	0	0	110.050	0	0
3004 1294	110.029	110.030	0	1	110.029	0	0	110.029	0	0	110.030	1	1
3004 1295	110.077	110.077	0	1	110.077	0	0	110.077	0	0	110.077	0	0
3004 1296	110.090												
3004 1297	110.123												
3004 1298	110.165												
3004 1299	110.100												
3004 1300	110.154												

Copyright Document

monitoring table




Joint Venture

project: C310 Thames Tunnel

structure: Hotel

No. of reading	31. following		32. following		33. following		34. following		elevation	deviation from last/baseline
	baseline	date	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline		
	30/8/13	16/04/2014		13/05/2014		19/06/2014		29/09/2014		
No.	elevation		elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline
3004 1291	110.201	0	110.202	0 1	110.200	-1 -1				
3004 1292	110.038	0	110.038	0 0	110.038	0 -1				
3004 1293	110.050	-1	110.050	1 0	110.050	-1 0				
3004 1294	110.029	0	110.030	0 0	110.029	-1 0				
3004 1295	110.077	0	110.077	0 0	110.077	0 0				
3004 1296	110.090									
3004 1297	110.123									
3004 1298	110.165									
3004 1299	110.100									
3004 1300	110.154									
				points lost		points lost		points lost		

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

APPENDIX 65

CS19 – Warren Lane Car park

Learning Legacy Document

monitoring asset	Services underneath Warren Lane Carpark		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	CS 19 - Warren Lane Carpark		
sensor type:	manual levelling studs		
chainage:	89930	point no.:	3004 1301 - 3004 1308
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	26/08/13	0.00		
TBM 1	start ZOI	24/10/13	1.20	3004 1303
	end ZOI	28/10/13	0.85	3004 1303
TBM 2	start ZOI	07/03/14	1.75 0.77	3004 1306 3004 1307
	end ZOI	10/03/14	1.13 -0.02	3004 1306 3004 1307
longterm	08/10/14	-1.40	3004 1304	

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

3004 1301 - 3004 1308

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.

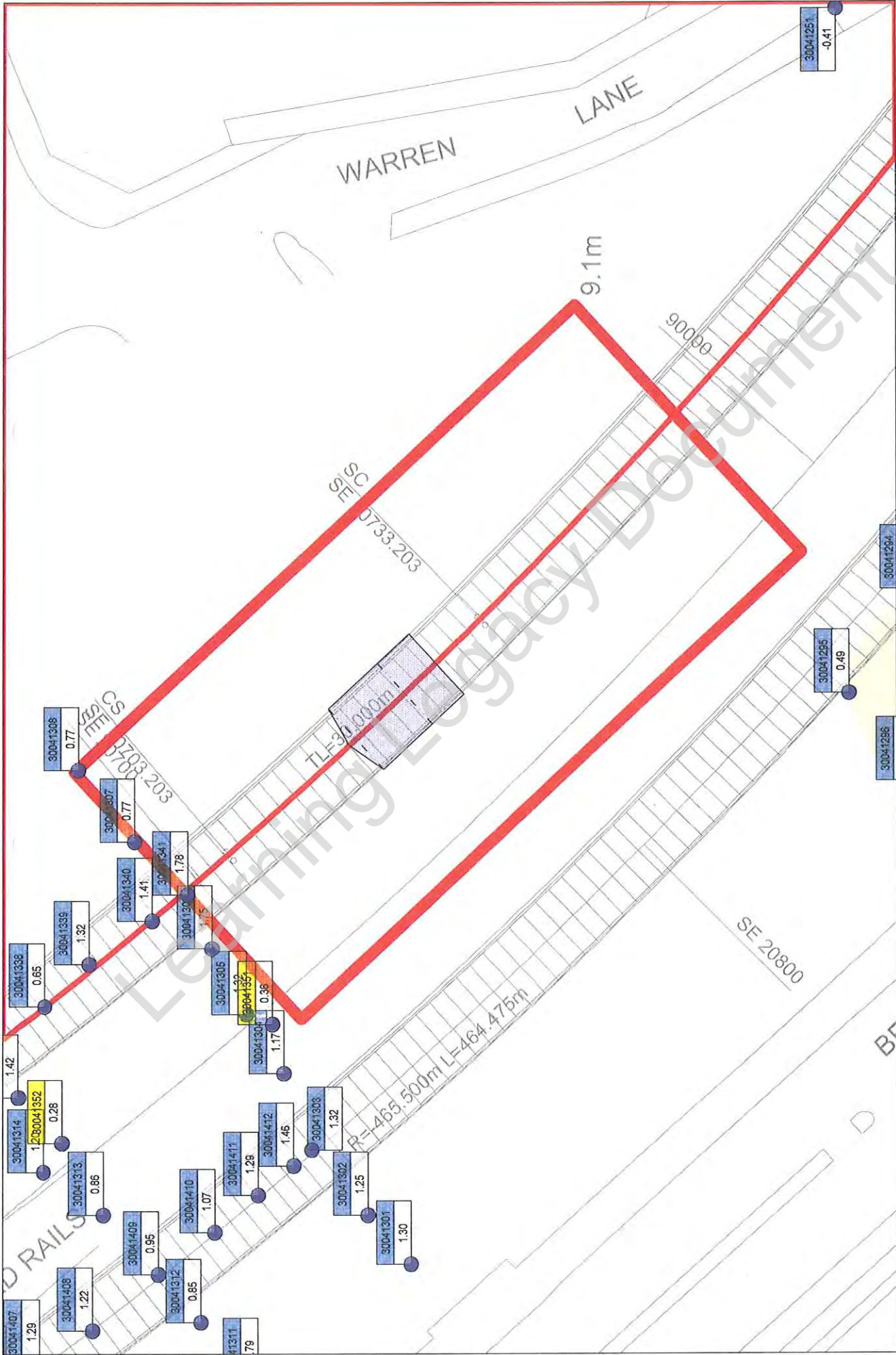
date / signature:

09/01/15

print name:

HMJV project role:

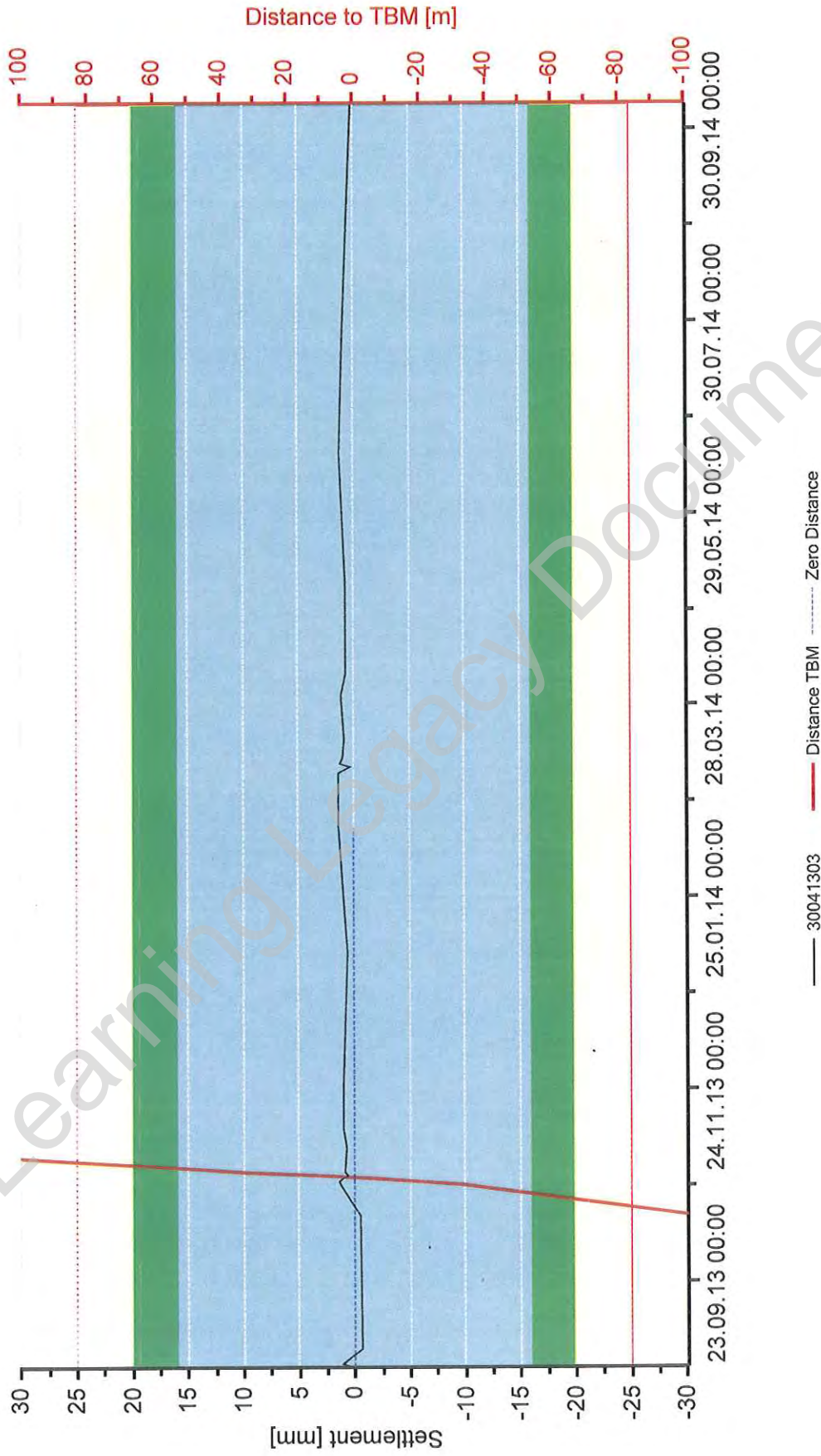
Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 09.03.2014 15:59

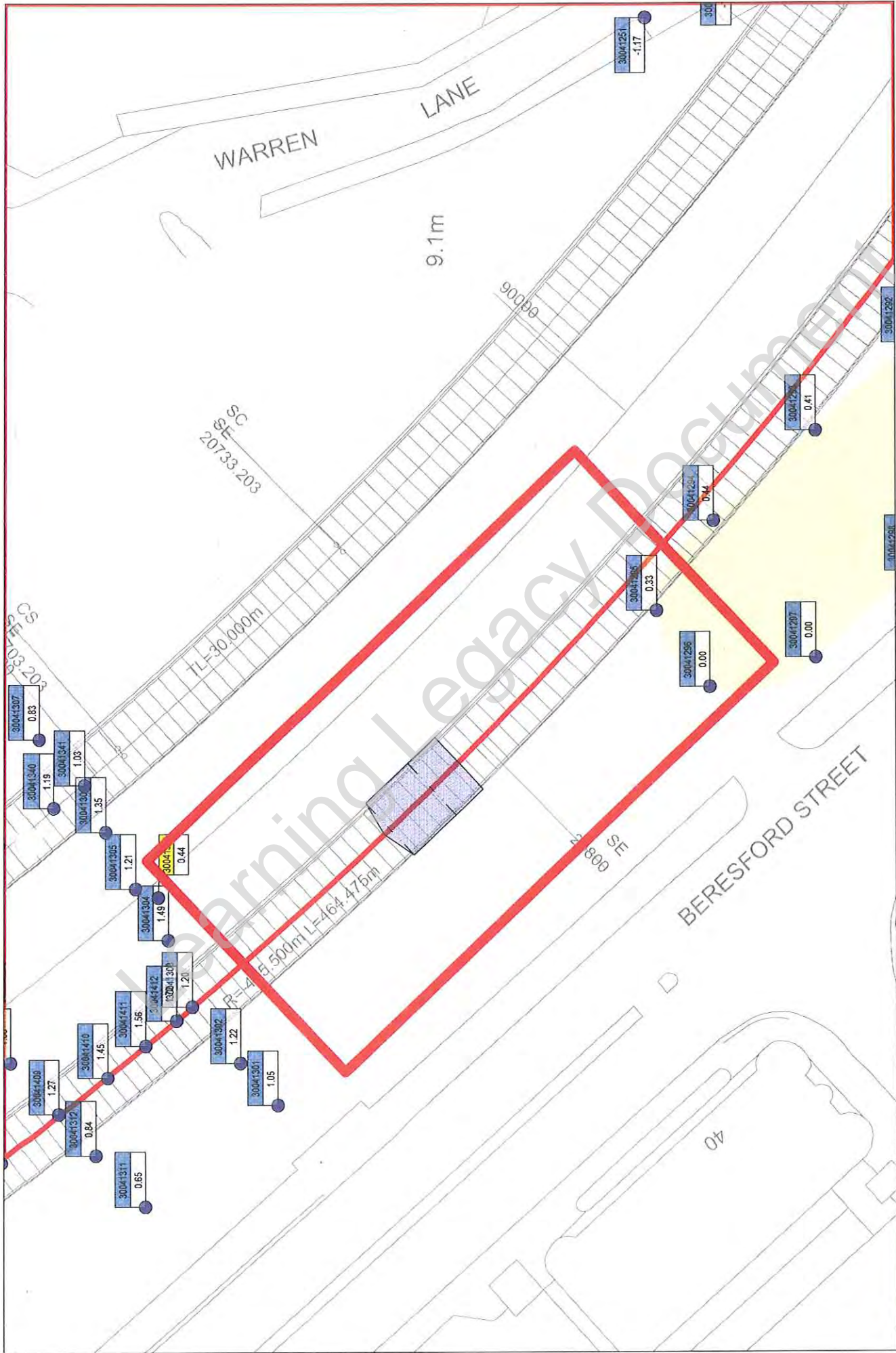


Point: 30041303

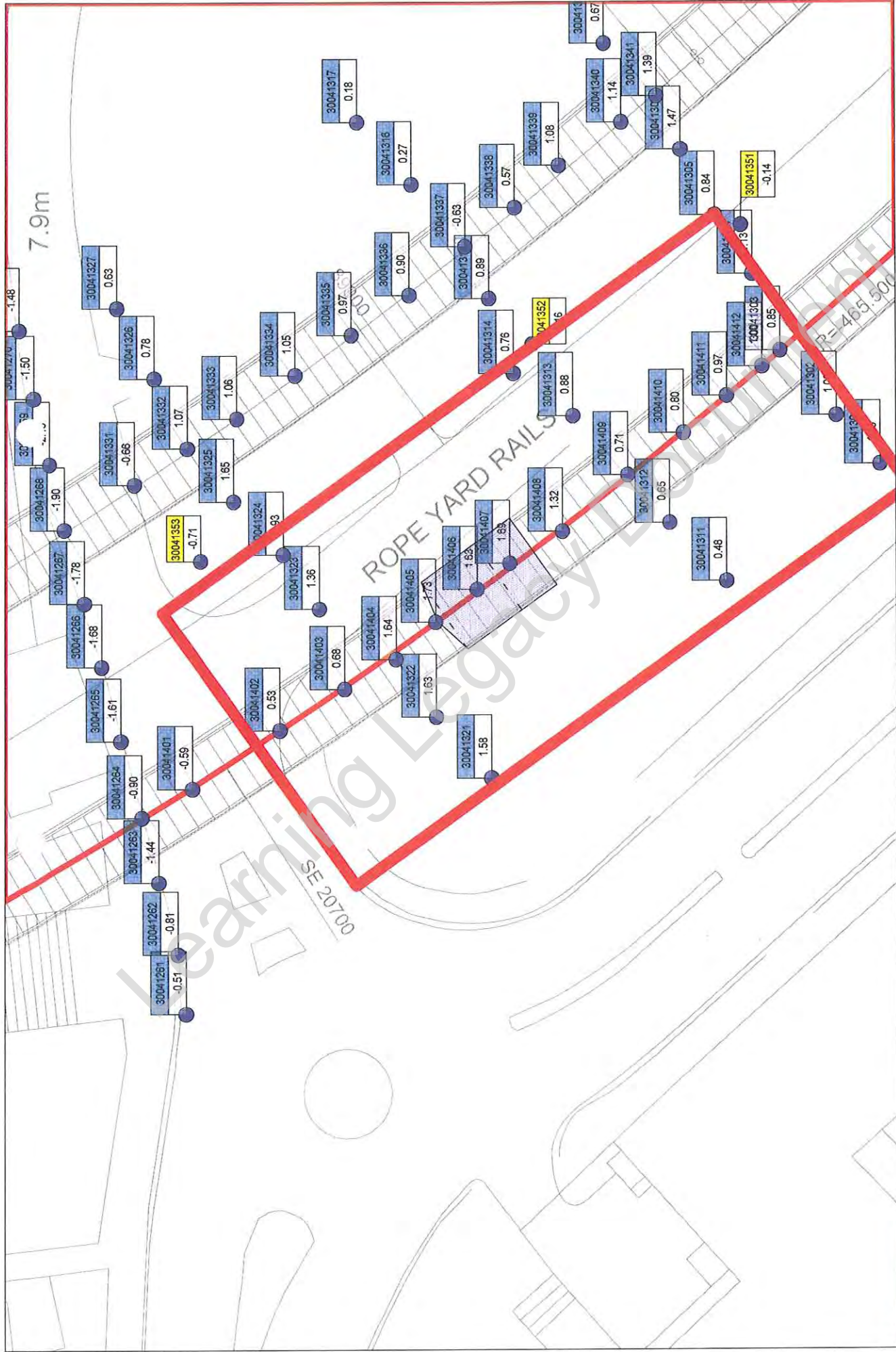


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - CS 19 - Warren Lane Carpark 26.08.2013 - 08.10.2014
Date: 23.10.2014 17:56 Current Values: 23.10.2014 17:49





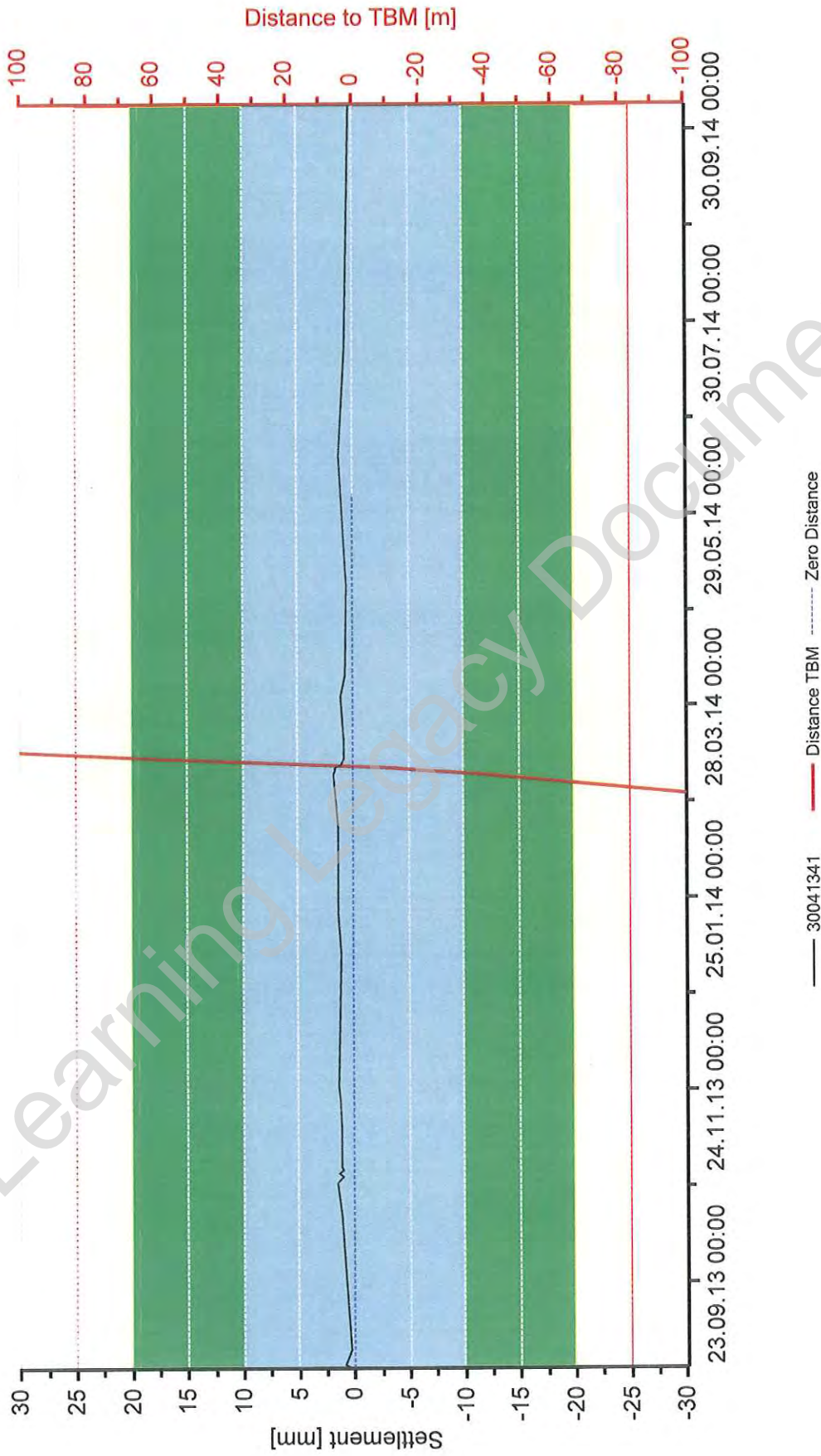
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 24.10.2013 18:30



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 28.10.2013 18:06



Point: 30041341



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - CS 19 - Warren Lane Carpark 26.08.2013 - 08.10.2014
date: 19.10.2014 17:08 current values: 19.10.2014 16:56



monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS19 WarrenLane CarPark

No. of reading date	baseline 26/8/13		7. following 26/10/2013		8. following 27/10/2013		9. following 28/10/2013		10. following 29/10/2013		11. following 05/11/2013		12. following 11/11/2013	
	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 1301	109.514	0	109.515	0	109.514	-1	109.515	1	109.514	0	109.514	0	109.515	0
3004 1302	109.360	0	109.361	0	109.361	-1	109.361	1	109.361	0	109.361	0	109.361	0
3004 1303	109.318	0	109.319	0	109.318	-1	109.319	0	109.319	0	109.319	0	109.319	0
3004 1304	109.348	0	109.350	0	109.349	-1	109.350	0	109.349	0	109.349	0	109.349	0
3004 1305	109.414	0	109.415	0	109.415	0	109.415	0	109.415	0	109.415	0	109.415	0
3004 1306	109.217	0	109.218	0	109.218	0	109.219	1	109.218	0	109.218	0	109.219	0
3004 1307	108.885	0	108.885	0	108.885	0	108.885	0	108.885	0	108.885	0	108.885	0
3004 1308	108.876	0	108.876	0	108.876	0	108.876	0	108.876	0	108.876	0	108.876	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS19 WarrenLane CarPark

No. of reading	13. following		14. following		15. following		16. following		17. following		18. 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		
		26/8/13												
		21/11/2013										06/03/2014		
		25/11/2013										17/02/2014		
		20/01/2014												
		07/01/2014												
		17/02/2014												
		06/03/2014												
3004 1301	109.514		109.515	0	1	109.515	0	1	109.515	0	1	109.515	0	1
3004 1302	109.360		109.361	0	1	109.361	0	1	109.361	1	1	109.362	0	1
3004 1303	109.318		109.319	0	1	109.319	0	1	109.319	0	1	109.319	0	1
3004 1304	109.348		109.349	0	1	109.349	0	1	109.349	0	0	109.349	1	1
3004 1305	109.414		109.415	0	1	109.415	0	1	109.415	0	1	109.416	0	1
3004 1306	109.217		109.219	0	1	109.219	0	1	109.219	0	1	109.219	0	2
3004 1307	108.885		108.885	0	0	108.885	0	1	108.885	0	1	108.885	0	1
3004 1308	108.876		108.876	0	0	108.876	0	0	108.876	0	0	108.877	0	1

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS19 WarrenLane CarPark

No. of reading	date	19. following		20. following		21. following		22. following		23. following		24. following		
		baseline	26/8/13	elevation	deviation from last/ baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation
			07/03/2014		08/03/2014		09/03/2014		10/03/2014		11/03/2014		17/03/2014	
3004 1301		109.514	109.515	0	1	109.515	0	1	109.515	0	1	109.515	0	1
3004 1302		109.360	109.361	0	1	109.361	0	1	109.361	0	1	109.361	0	1
3004 1303		109.318	109.319	-1	1	109.318	-1	0	109.319	0	1	109.319	0	1
3004 1304		109.348	109.349	0	1	109.349	0	1	109.349	0	1	109.349	0	1
3004 1305		109.414	109.415	0	1	109.416	0	1	109.415	-1	1	109.415	0	1
3004 1306		109.217	109.219	0	1	109.219	0	2	109.218	0	1	109.218	0	1
3004 1307		108.885	108.885	0	0	108.885	0	1	108.884	0	0	108.884	0	0
3004 1308		108.876	108.876	0	1	108.877	0	1	108.877	0	1	108.876	0	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS19 WarrenLane CarPark**

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	26/8/13	24/03/2014		31/03/2014		07/04/2014		06/05/2014		17/06/2014		22/07/2014	
3004 1301	109.514	109.515	0	109.515	0	109.515	0	109.515	0	109.515	1	109.515	-1
3004 1302	109.360	109.361	0	109.361	0	109.361	0	109.361	0	109.362	1	109.361	0
3004 1303	109.318	109.319	0	109.319	0	109.319	0	109.319	0	109.319	1	109.319	0
3004 1304	109.348	109.349	0	109.350	0	109.349	-1	109.349	0	109.349	0	109.348	-1
3004 1305	109.414	109.415	0	109.415	0	109.415	-1	109.415	0	109.415	0	109.415	0
3004 1306	109.217	109.218	0	109.218	0	109.218	-1	109.218	0	109.218	0	109.217	0
3004 1307	108.885	108.884	0	108.885	0	108.884	0	108.884	0	108.885	0	108.884	0
3004 1308	108.876	108.876	0	108.876	0	108.876	0	108.876	0	108.877	0	108.876	0

monitoring table




Joint Venture

project: C310 Thames Tunnel

structure: CS19 WarrenLane CarPark

No. of reading	baseline	31. following		deviation from last/ baseline	elevation	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	08/10/2014											
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 1301	109.514	109.514	-1	0										
3004 1302	109.360	109.361	0	0										
3004 1303	109.318	109.318	-1	0										
3004 1304	109.348	109.347	-1	-1										
3004 1305	109.414	109.414	-1	0										
3004 1306	109.217	109.217	0	0										
3004 1307	108.885	108.884	0	0										
3004 1308	108.876	108.876	0	0										

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

APPENDIX 66

CS20 – Warren Lane Car park

Learning Legacy Document

monitoring asset	Services underneath Warren Lane Carpark		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	CS 20 - Warren Lane Carpark		
sensor type:	manual levelling studs		
chainage:	89910	point no.:	3004 1311 - 3004 1317
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	26/08/14	0.00			
TBM 1	start ZOI	26/10/13	1.14	3004 1409	
	end ZOI	30/10/13	0.38	3004 1409	breached not any trigger value
TBM 2	start ZOI	09/03/14	0.99	3004 1336	
	end ZOI	11/03/14	0.23	3004 1336	breached not any trigger value
longterm	08/10/14	1.41 -1.19	3004 1315 3004 1312		
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

3004 1311 - 3004 1317

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.

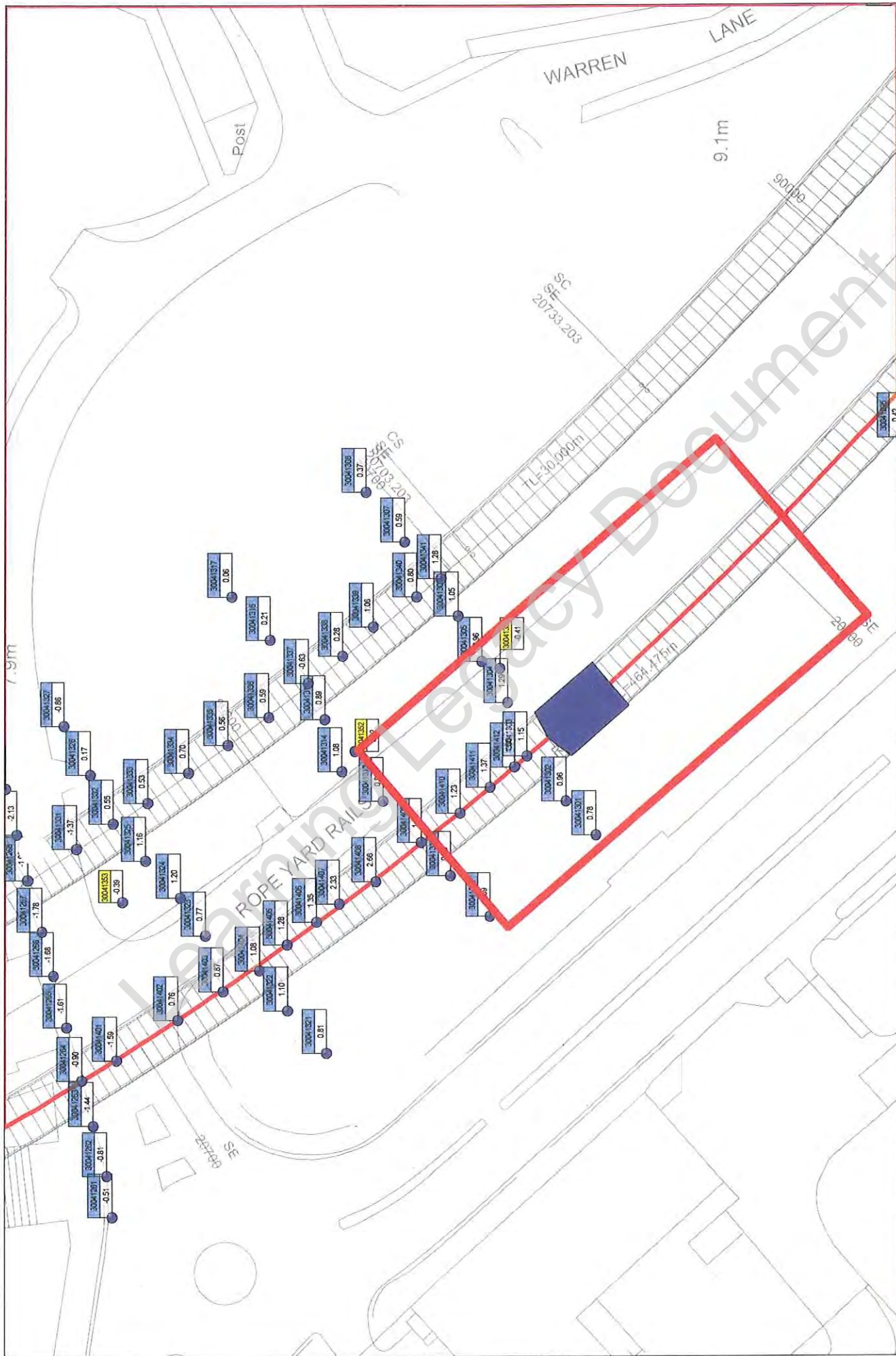
The rate of change in the monitoring data is less than the required standards as per the specifications and drawings.

date / signature: 08/10/15

print name:

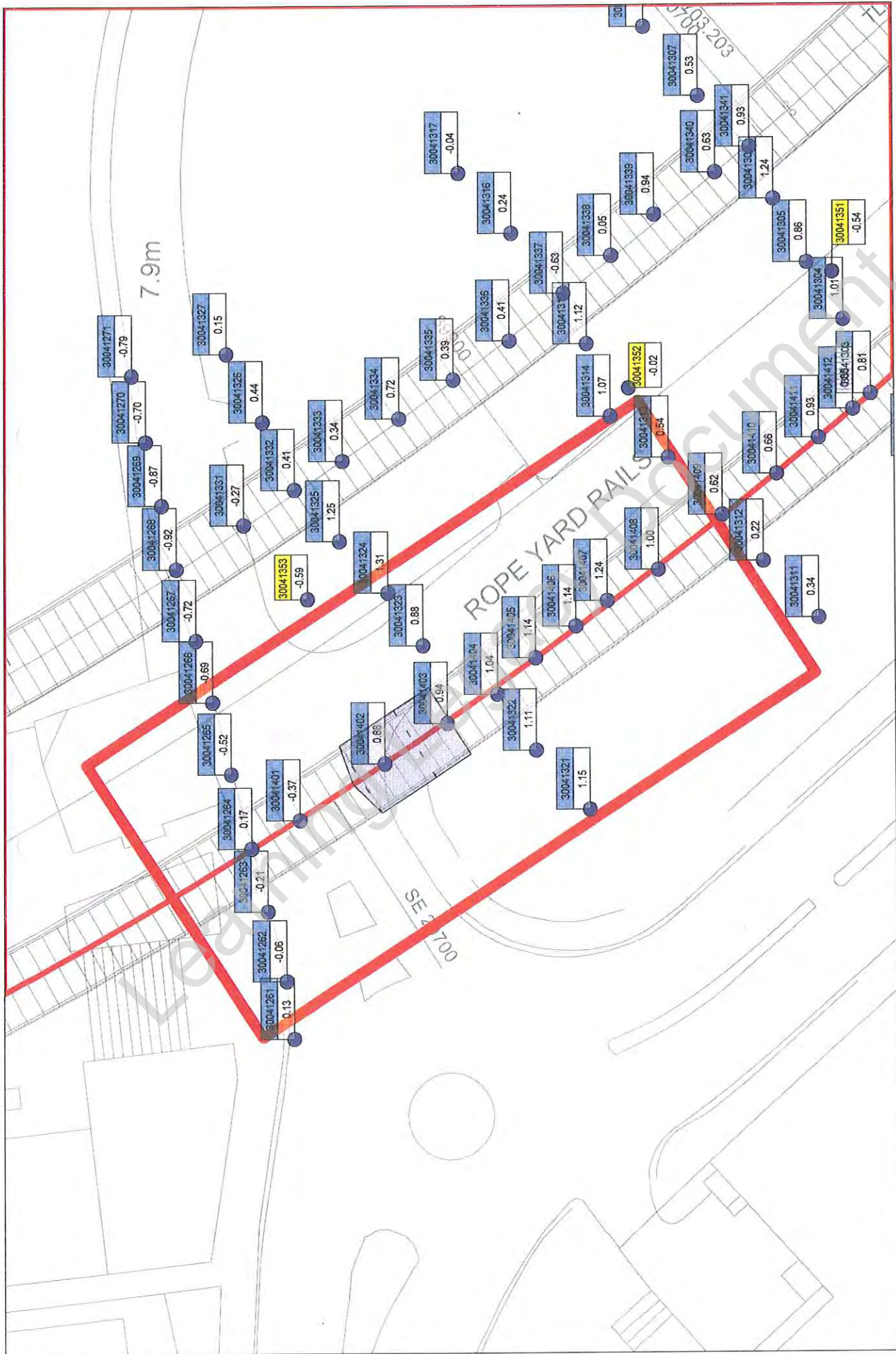
HMJV project role:

Monitoring & Survey engineer



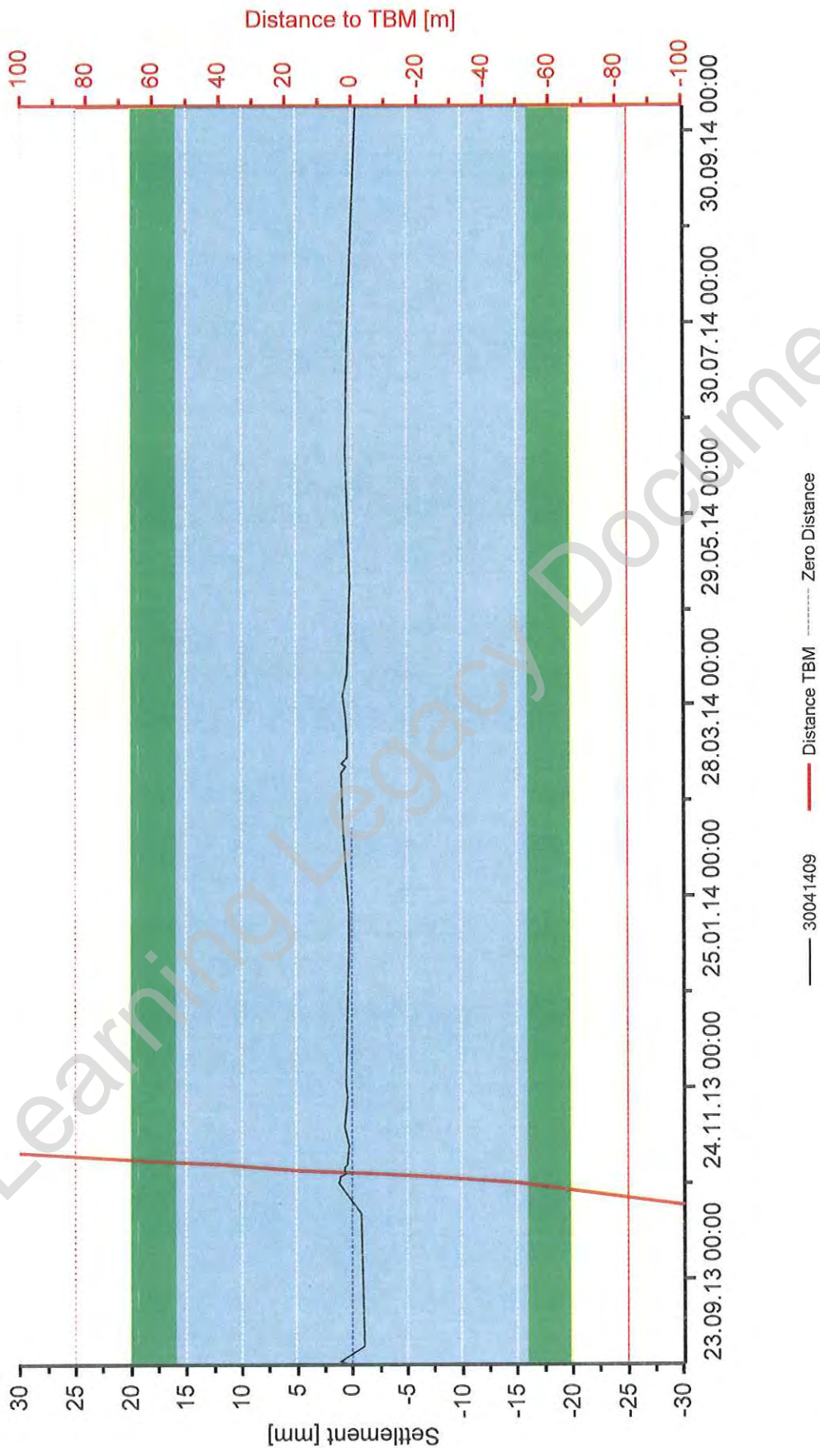
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 26.10.2013 09:00



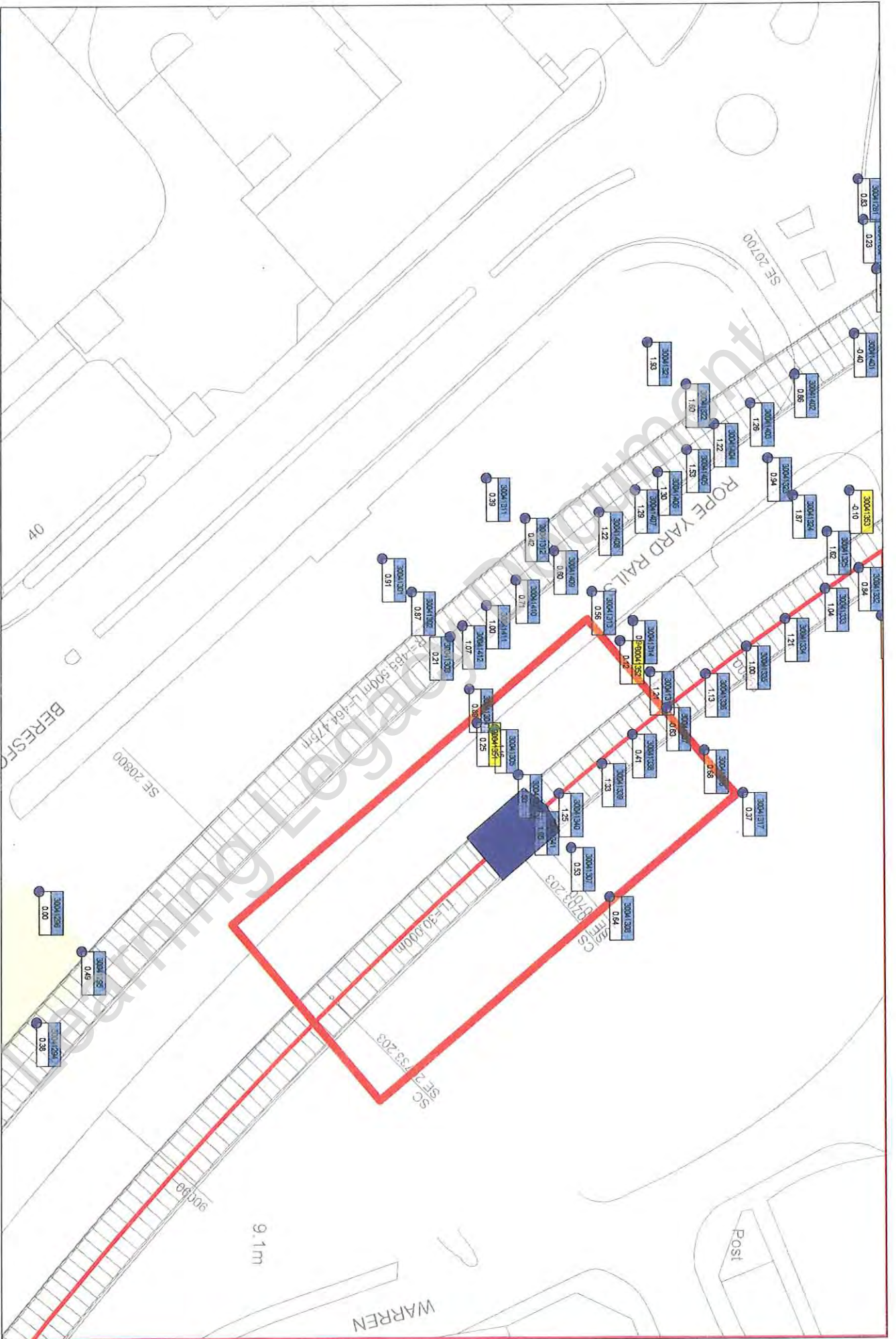


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 30.10.2013 07:00

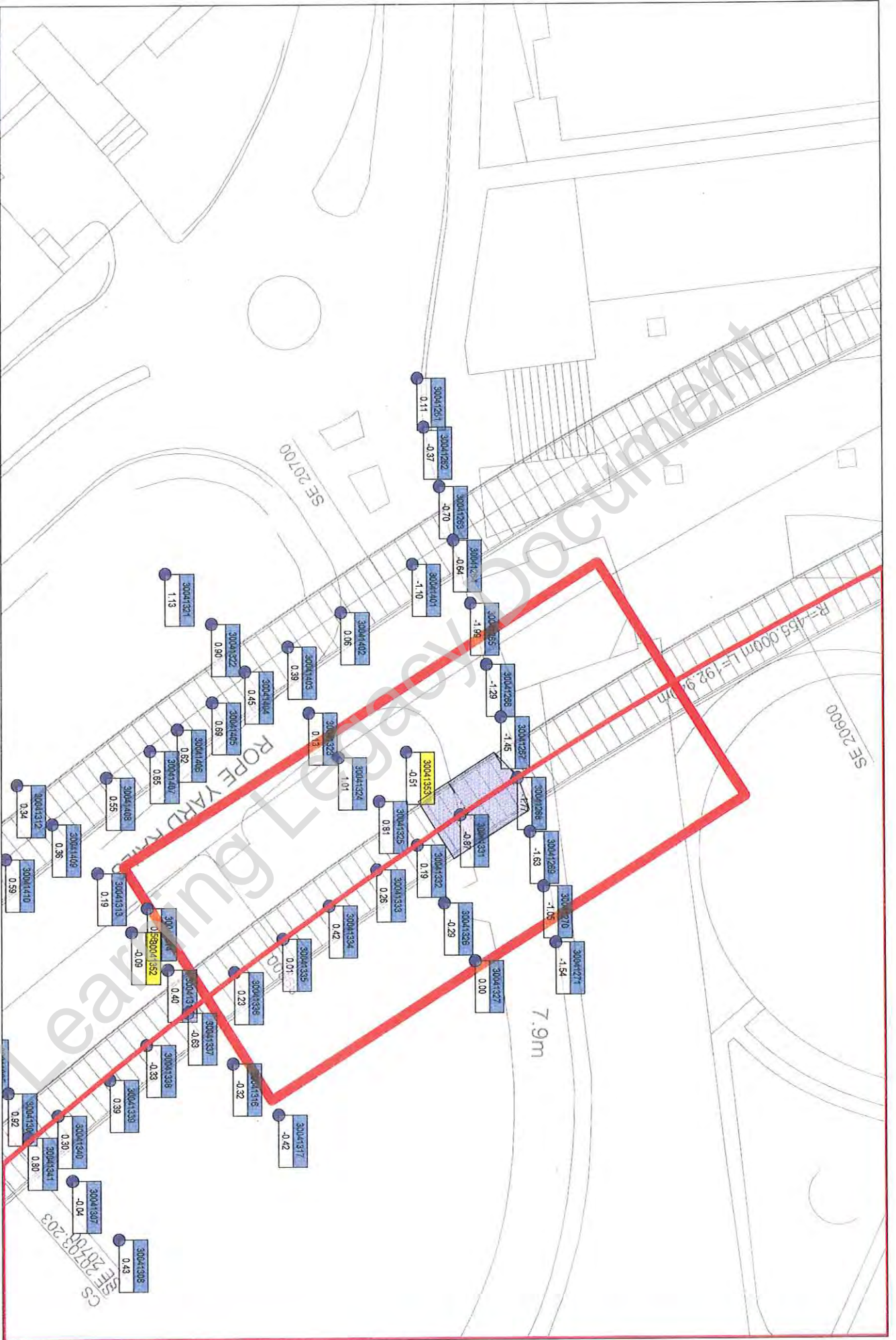
Point: 30041409



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - CS 20 - Warren Lane Carpark 26.08.2013 - 08.10.2014
Date: 23.10.2014 17:54 Current Values: 23.10.2014 17:34



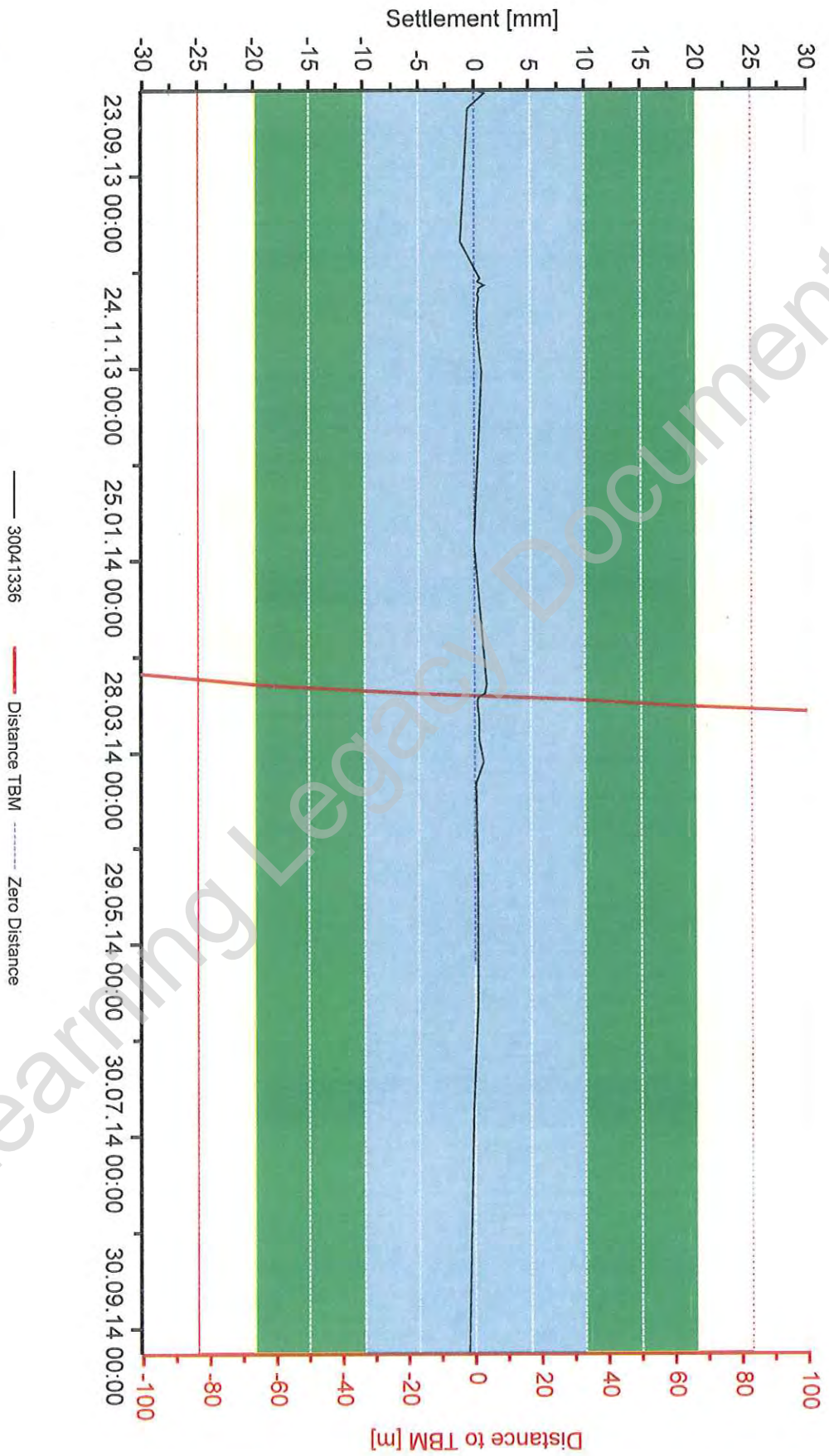
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 09.03.2014 15:59



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 11.03.2014 18:04



Point: 30041336



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - CS 20 - Warren Lane Carpark 26.08.2013 - 08.10.2014
date: 19.10.2014 17:05 current values: 19.10.2014 16:56

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS20 WarrenLane CarPark

No. of reading	baseline		1. following		2. following		3. following		4. following		5. following		6. following		
	date	elevation	26/8/13	elevation	27/08/2013	elevation	01/09/2013	elevation	23/09/2013	elevation	14/10/2013	elevation	24/10/2013	elevation	25/10/2013
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 1311		109.350	0	0	109.349	-1	109.350	1	0	109.349	-1	109.351	2	109.351	0
3004 1312		109.176	1	1	109.175	-2	109.176	1	0	109.175	-1	109.177	2	109.176	0
3004 1313		109.239	1	1	109.238	-2	109.240	1	1	109.238	-2	109.240	2	109.240	0
3004 1314		109.366	0	0	109.366	-1	109.367	1	1	109.366	-1	109.367	2	109.367	0
3004 1315		108.997	1	1	108.996	-2	108.998	1	1	108.996	-1	108.998	2	108.998	0
3004 1316		108.713	1	1	108.713	-1	108.714	1	1	108.712	-1	108.713	1	108.713	0
3004 1317		108.656	0	0	108.656	0	108.656	1	1	108.655	-1	108.656	1	108.655	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS20 WarrenLane CarPark

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
	26/8/13													
3004 1311		109.350	109.351	0	109.350	0	109.351	0	109.351	0	109.350	0	109.351	0
3004 1312		109.176	109.176	0	109.176	0	109.177	0	109.176	0	109.176	0	109.176	0
3004 1313		109.239	109.240	0	109.240	0	109.240	0	109.240	0	109.239	0	109.239	0
3004 1314		109.366	109.367	0	109.367	0	109.367	0	109.367	0	109.367	0	109.367	0
3004 1315		108.997	108.998	0	108.997	0	108.998	0	108.998	0	108.997	0	108.997	0
3004 1316		108.713	108.713	0	108.713	0	108.713	0	108.713	0	108.713	-1	108.713	0
3004 1317		108.656	108.656	0	108.655	0	108.656	0	108.655	0	108.655	0	108.655	0

Woolwich Box to Thames Southside levelling

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS20 WarrenLane CarPark

No. of reading	baseline	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					
		26/8/13			08/03/2014			09/03/2014			10/03/2014			11/03/2014			17/03/2014		
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 1311	109.350		109.351	0	1	109.351	0	0	1	109.351	0	1	109.351	0	0	109.351	0	0	0
3004 1312	109.176		109.177	0	1	109.176	0	0	1	109.176	0	1	109.176	0	0	109.176	0	0	0
3004 1313	109.239		109.240	0	1	109.240	0	1	1	109.240	0	0	109.239	0	0	109.239	0	0	0
3004 1314	109.366		109.367	0	1	109.367	0	1	1	109.367	0	1	109.367	0	1	109.367	0	0	0
3004 1315	108.997		108.998	0	1	108.998	0	1	1	108.997	-1	1	108.997	0	0	108.997	0	1	1
3004 1316	108.713		108.714	0	1	108.714	0	1	1	108.714	0	0	108.713	0	0	108.713	0	0	0
3004 1317	108.656		108.656	0	0	108.656	0	0	0	108.655	0	0	108.655	0	0	108.655	0	0	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS20 WarrenLane CarPark

No. of reading	baseline	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
	26/8/13												
3004 1311	109.350	109.351	0	0	109.351	0	0	109.350	0	0	109.351	0	0
3004 1312	109.176	109.176	0	0	109.177	1	0	109.176	0	0	109.175	-1	0
3004 1313	109.239	109.239	0	0	109.240	0	0	109.239	0	0	109.240	1	0
3004 1314	109.366	109.367	0	1	109.367	0	1	109.367	0	0	109.367	1	1
3004 1315	108.997	108.997	0	1	108.998	0	1	108.997	0	0	108.997	0	1
3004 1316	108.713	108.713	0	0	108.713	0	0	108.713	0	0	108.713	0	0
3004 1317	108.656	108.656	0	0	108.655	-1	-1	108.656	1	0	108.656	0	0

Learning Key Document

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS20 WarrenLane CarPark

No. of reading	baseline	31. 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
		date	08/10/2014										
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 1311	109.350	109.350	-1 0										
3004 1312	109.176	109.175	-1 -1										
3004 1313	109.239	109.239	-1 0										
3004 1314	109.366	109.366	-1 0										
3004 1315	108.997	108.998	1 1										
3004 1316	108.713	108.713	0 0										
3004 1317	108.656	108.655	0 0										

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: WarrenLane CarPark Eastbound

No. of reading	7. following		8. following		9. following		10. following		11. following		12. following	
	baseline	26/8/13	26/10/2013	27/10/2013	28/10/2013	29/10/2013	30/10/2013	31/10/2013				
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 1331	108.404		108.404	1			108.404	0	108.404	0	108.404	0
3004 1332	108.698	2	108.699	0	108.699	1	108.699	-1	108.699	0	108.699	0
3004 1333	108.649	2	108.650	0	108.650	1	108.649	-1	108.649	0	108.649	0
3004 1334	108.711	2	108.712	0	108.712	0	108.712	0	108.712	0	108.712	0
3004 1335	108.755	2	108.756	0	108.756	1	108.756	-1	108.756	0	108.756	0
3004 1336	108.808	0	108.808	0	108.808	1	108.808	0	108.808	0	108.808	0
3004 1337	108.849	destroyed		destroyed		destroyed		destroyed		destroyed		destroyed
3004 1338	108.913	0	108.913	0	108.913	1	108.913	-1	108.913	0	108.913	0
3004 1339	108.951	0	108.952	0	108.952	0	108.951	0	108.951	0	108.951	0
3004 1340	109.047	0	109.047	0	109.048	1	109.047	-1	109.047	0	109.047	0
3004 1341	109.090	0	109.091	0	109.091	0	109.090	0	109.091	0	109.091	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: WarrenLane CarPark Eastbound

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
	26/8/13													07/01/2014
3004 1331		108.404	108.404	0	108.404	0	0	108.404	0	108.404	0	0	108.404	0
3004 1332		108.698	108.699	0	108.699	0	0	108.699	0	108.699	0	0	108.699	0
3004 1333		108.649	108.649	0	108.649	0	0	108.649	0	108.649	0	0	108.649	0
3004 1334		108.711	108.712	0	108.712	0	1	108.711	0	108.712	0	0	108.712	0
3004 1335		108.755	108.756	0	108.756	0	0	108.756	0	108.756	0	0	108.756	-1
3004 1336		108.808	108.808	0	108.808	0	0	108.808	0	108.808	0	0	108.808	-1
3004 1337		108.849		destroyed		destroyed		destroyed			destroyed			destroyed
3004 1338		108.913	108.913	0	108.913	0	0	108.913	0	108.913	0	0	108.913	-1
3004 1339		108.951			108.951	0	1	108.951	0	108.952	0	1	108.951	-1
3004 1340		109.047			109.047	0	1	109.047	0	109.048	0	1	109.047	0
3004 1341		109.090			109.091	0	1	109.091	0	109.091	0	1	109.091	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: WarrenLane CarPark Eastbound

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	26/8/13		20/01/2014		17/02/2014		06/03/2014		07/03/2014		08/03/2014		09/03/2014	
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
3004 1331	108.404	0	108.404	0	108.404	0	108.404	0						
3004 1332	108.698	0	108.699	0	108.699	0	108.699	0			108.699	0	1	
3004 1333	108.649	0	108.650	1	108.650	1	108.650	0			108.650	0	1	
3004 1334	108.711	0	108.712	1	108.712	1	108.712	0			108.712	0	1	
3004 1335	108.755	0	108.756	1	108.756	1	108.756	0			108.757	0	1	
3004 1336	108.808	0	108.808	1	108.808	1	108.809	0			108.809	0	1	
3004 1337	108.849	destroyed		destroyed		destroyed		destroyed				destroyed		
3004 1338	108.913	0	108.913	0	108.913	0	108.913	0	108.913	0	108.913	0	1	
3004 1339	108.951	0	108.952	0	108.952	0	108.952	0	108.952	0	108.952	0	1	
3004 1340	109.047	0	109.048	0	109.048	0	109.048	0	109.048	0	109.048	0	1	
3004 1341	109.090	0	109.091	0	109.091	0	109.091	0	109.091	0	109.091	0	1	

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Eastbound**

No. of reading	baseline	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	
		26/8/13													
				10/03/2014		11/03/2014		12/03/2014		13/03/2014		17/03/2014	24/03/2014		
3004 1331	108.404	108.404	0	0	108.404	-1	108.403	0	108.403	0	108.404	1	108.404	0	-1
3004 1332	108.698	108.699	0	1	108.698	-1	108.698	0	108.698	0	108.699	0	108.699	0	1
3004 1333	108.649	108.650	0	1	108.649	0	108.649	0	108.649	0	108.650	0	108.650	0	1
3004 1334	108.711	108.712	0	1	108.712	0	108.712	0	108.712	0	108.712	0	108.712	0	1
3004 1335	108.755	108.756	-1	0	108.755	0	108.756	0	108.756	0	108.756	0	108.756	0	0
3004 1336	108.808	108.808	-1	0	108.808	0	108.808	0	108.808	0	108.808	0	108.808	0	0
3004 1337	108.849			destroyed		destroyed		destroyed		destroyed		destroyed		destroyed	
3004 1338	108.913	108.913	-1	0	108.912	0	108.913	0	108.913	0	108.913	0	108.913	0	0
3004 1339	108.951	108.951	-1	0	108.951	0					108.951	0	108.951	0	0
3004 1340	109.047	109.047	0	0	109.047	0					109.047	0	109.047	0	0
3004 1341	109.090	109.091	0	1	109.090	0					109.090	0	109.091	0	1

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: WarrenLane CarPark Eastbound

No. of reading	baseline	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
date	26/8/13	31/03/2014		07/04/2014		06/05/2014		17/06/2014		22/07/2014		08/10/2014	
	elevation												
3004 1331	108.404	108.404	0	108.404	0	108.403	0	108.403	0	108.404	0	108.403	-1
3004 1332	108.698	108.699	0	108.699	0	108.699	0	108.699	0	108.699	0	108.698	-1
3004 1333	108.649	108.650	0	108.650	0	108.650	0	108.649	0	108.649	0	108.649	0
3004 1334	108.711	108.712	0	108.712	0	108.712	0	108.711	0	108.711	0	108.711	0
3004 1335	108.755	108.756	0	108.756	0	108.756	0	108.755	0	108.755	0	108.755	0
3004 1336	108.808	108.808	0	108.808	-1	108.808	0	108.808	0	108.807	0	108.807	0
3004 1337	108.849	destroyed		destroyed		destroyed		destroyed		destroyed		destroyed	
3004 1338	108.913	108.913	0	108.912	-1	108.912	0	108.912	0	108.912	0	108.912	0
3004 1339	108.951	108.951	0	108.951	-1	108.951	0	108.951	0	108.951	0	108.950	-1
3004 1340	109.047	109.047	0	109.047	-1	109.047	0	109.047	0	109.047	0	109.046	-1
3004 1341	109.090	109.091	0	109.090	0	109.090	0	109.091	1	109.090	0	109.090	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: WarrenLane CarPark Westbound

No. of reading	baseline		1. following		2. following		3. following		4. following		5. following		6. 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	
	26/8/13													25/10/2013	
3004 1401	109.250	109.251	0	0	109.250	-1	0	109.249	-1	-1	109.249	-1	-2		
3004 1402	109.298	109.299	1	1	109.298	-1	0	109.297	-1	0	109.297	-1	-1		
3004 1403	109.446	109.447	1	1	109.447	-1	1	109.446	-1	-1	109.445	-1	-1		
3004 1404	109.355	109.356	1	1	109.355	-1	0	109.354	-1	0	109.354	0	-1		
3004 1405	109.250	109.251	1	1	109.250	-1	0	109.250	0	0	109.249	0	-1		
3004 1406	109.322	109.322	0	0	109.322	0	0	109.322	0	0	109.322	0	0		
3004 1407	109.145	109.145	1	1	109.145	0	0	109.145	0	0	109.144	0	0		
3004 1408	109.140	109.142	1	1	109.140	-2	0	109.141	1	0	109.140	0	0		109.146
3004 1409	109.236	109.237	1	1	109.235	-2	-1	109.236	1	0	109.235	-1	-1		109.142
3004 1410	109.248	109.249	1	1	109.247	-2	-1	109.248	2	1	109.247	-1	-1		109.237
3004 1411	109.277	109.277	1	1	109.276	-2	-1	109.277	2	1	109.276	-1	-1		109.249
3004 1412	109.305	109.307	1	1	109.305	-2	-1	109.306	1	1	109.305	-1	-1		109.278
															109.307

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: WarrenLane CarPark Westbound

No. of reading	7. following		8. following		9. following		10. following		11. following		12. following			
	baseline	26/10/2013	27/10/2013	28/10/2013	29/10/2013	29/10/2013	29/10/2013	29/10/2013	29/10/2013	29/10/2013	30/10/2013	30/10/2013		
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 1401	109.250			109.250	1	-1		109.250	0	0		109.250	0	0
3004 1402	109.298	109.299	2	109.298	0	1		109.299	1	1		109.298	0	0
3004 1403	109.446	109.447	2	109.447	0	1		109.447	0	1		109.447	0	1
3004 1404	109.355	109.356	2	109.356	0	1	109.356	1	2	109.356	0	109.355	0	1
3004 1405	109.250	109.251	2	109.251	0	1	109.252	1	2	109.251	0	109.251	0	1
3004 1406	109.322	109.324	2	109.323	0	1	109.324	1	2	109.323	0	109.323	0	1
3004 1407	109.145	109.147	1	109.145	-1	1	109.146	1	2	109.146	0	109.145	0	1
3004 1408	109.140	109.143	1	109.141	-2	1	109.142	0	1	109.141	0	109.141	0	1
3004 1409	109.236	109.237	0	109.237	-1	1	109.237	0	1	109.237	0	109.237	0	0
3004 1410	109.248	109.249	0	109.248	-1	1	109.249	0	1	109.248	0	109.248	0	0
3004 1411	109.277	109.278	0	109.277	-1	1	109.277	0	1	109.277	0	109.277	0	1
3004 1412	109.305	109.307	0	109.306	-1	1	109.306	0	1	109.306	0	109.306	0	1

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: WarrenLane CarPark Westbound

No. of reading	baseline		13. following		14. following		15. following		16. following		17. following		18. following	
	date	elevation	date	elevation	date	elevation	date	elevation	date	elevation	date	elevation	date	elevation
No.														
	26/8/13	109.250	31/10/2013	109.249	01/11/2013	109.250	0	05/11/2013	109.249	11/11/2013	109.250	21/11/2013	109.250	25/11/2013
3004 1401		109.250		109.249		109.250	0		109.249		109.250		109.250	
3004 1402		109.298		109.298		109.298	0		109.298		109.298		109.299	
3004 1403		109.446		109.447		109.447	0		109.447		109.447		109.447	
3004 1404		109.355		109.355		109.355	0		109.355		109.356		109.356	
3004 1405		109.250		109.251		109.251	0		109.251		109.251		109.251	
3004 1406		109.322		109.323		109.323	0		109.323		109.323		109.323	
3004 1407		109.145		109.145		109.145	0		109.145		109.145		109.146	
3004 1408		109.140		109.141		109.141	0		109.141		109.141		109.141	
3004 1409		109.236		109.237		109.236	0		109.236		109.237		109.237	
3004 1410		109.248		109.248		109.248	0		109.248		109.249		109.248	
3004 1411		109.277		109.277		109.277	0		109.277		109.278		109.277	
3004 1412		109.305		109.306		109.306	0		109.306		109.307		109.307	

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Westbound**

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
	26/8/13													
3004 1401		109.250	109.250	0	109.249	-1	109.249	-1	109.249	0	109.249	0	109.250	0
3004 1402		109.298	109.299	0	109.298	-1	109.298	-1	109.298	0	109.298	0	109.298	0
3004 1403		109.446	109.447	0	109.446	-1	109.447	0	109.447	0	109.447	0	109.447	0
3004 1404		109.355	109.356	0	109.356	0	109.355	0	109.356	0	109.355	0	109.356	0
3004 1405		109.250	109.251	0	109.251	0	109.251	-1	109.251	0	109.251	0	109.251	0
3004 1406		109.322	109.323	0	109.323	0	109.323	-1	109.323	0	109.323	0	109.323	0
3004 1407		109.145	109.146	0	109.146	0	109.145	-1	109.146	0	109.145	0	109.146	0
3004 1408		109.140	109.141	0	109.141	0	109.141	0	109.141	0	109.141	0	109.141	0
3004 1409		109.236	109.237	0	109.237	0	109.237	0	109.237	0	109.237	0	109.237	0
3004 1410		109.248	109.249	0	109.249	0	109.248	0	109.248	0	109.248	0	109.248	0
3004 1411		109.277	109.278	0	109.278	0	109.277	0	109.277	0	109.277	0	109.277	0
3004 1412		109.305	109.307	0	109.307	0	109.306	0	109.306	0	109.306	0	109.306	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**
 structure: **WarrenLane CarPark Westbound**

No. of reading	baseline	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
date	26/8/13	24/03/2014		31/03/2014		07/04/2014		05/05/2014		17/06/2014		22/07/2014	
3004 1401	109.250	109.250	0	109.250	0	109.249	0	109.250	0	109.250	0	109.249	-1
3004 1402	109.298	109.298	0	109.299	0	109.298	-1	109.298	1	109.299	0	109.298	0
3004 1403	109.446	109.447	0	109.447	0	109.446	-1	109.447	0	109.447	0	109.447	-1
3004 1404	109.355	109.356	0	109.356	0	109.355	-1	109.356	0	109.356	0	109.355	-1
3004 1405	109.250	109.251	0	109.251	0	109.251	-1	109.251	0	109.251	0	109.251	0
3004 1406	109.322	109.323	0	109.323	0	109.323	-1	109.323	0	109.324	0	109.323	-1
3004 1407	109.145	109.145	0	109.146	0	109.145	0	109.146	0	109.146	0	109.146	0
3004 1408	109.140	109.141	0	109.141	1	109.141	-1	109.141	0	109.141	1	109.141	0
3004 1409	109.236	109.237	0	109.237	0	109.237	0	109.236	0	109.237	0	109.237	0
3004 1410	109.248	109.248	0	109.249	0	109.248	0	109.248	0	109.248	0	109.248	0
3004 1411	109.277	109.277	0	109.278	0	109.277	-1	109.277	0	109.277	0	109.277	0
3004 1412	109.305	109.306	0	109.307	0	109.306	0	109.306	0	109.307	0	109.306	0


monitoring table



Joint Venture

project: **C310 Thames Tunnel**
 structure: **WarrenLane CarPark Westbound**

No. of reading	baseline		37. following		deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation
	date	elevation	date	deviation from last/ baseline										
	26/8/13		08/10/2014											
No.	elevation		elevation	deviation from last/ baseline		elevation	deviation from last/baseline		elevation	deviation from last/baseline		elevation	deviation from last/baseline	
3004 1401	109.250		109.248	0 -2										
3004 1402	109.298		109.298	-1 0										
3004 1403	109.446		109.446	-1 0										
3004 1404	109.355		109.355	0 0										
3004 1405	109.250		109.250	-1 0										
3004 1406	109.322		109.322	-1 0										
3004 1407	109.145		109.145	-1 0										
3004 1408	109.140		109.140	-1 0										
3004 1409	109.236		109.236	-1 0										
3004 1410	109.248		109.247	-1 -1										
3004 1411	109.277		109.277	0 0										
3004 1412	109.305		109.305	-1 0										

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

APPENDIX 67

CS21 – Warren Lane Car park

Learning Legacy Document

monitoring asset	Services underneath Warren Lane Carpark		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	CS 21 - Warren Lane Carpark		
sensor type:	manual levelling studs		
chainage:	89880	point no.:	3004 1321 - 3004 1327
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	26/08/14	0.00		
TBM 1	start ZOI	27/10/13	0.74	3004 1404
	end ZOI	31/10/13	0.51	3004 1404
TBM 2	start ZOI	09/03/14	0.63	3004 1332
	end ZOI	12/03/14	0.19	3004 1332
longterm	08/10/14	0.44	3004 1324	
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

3004 1321 - 3004 1327

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.

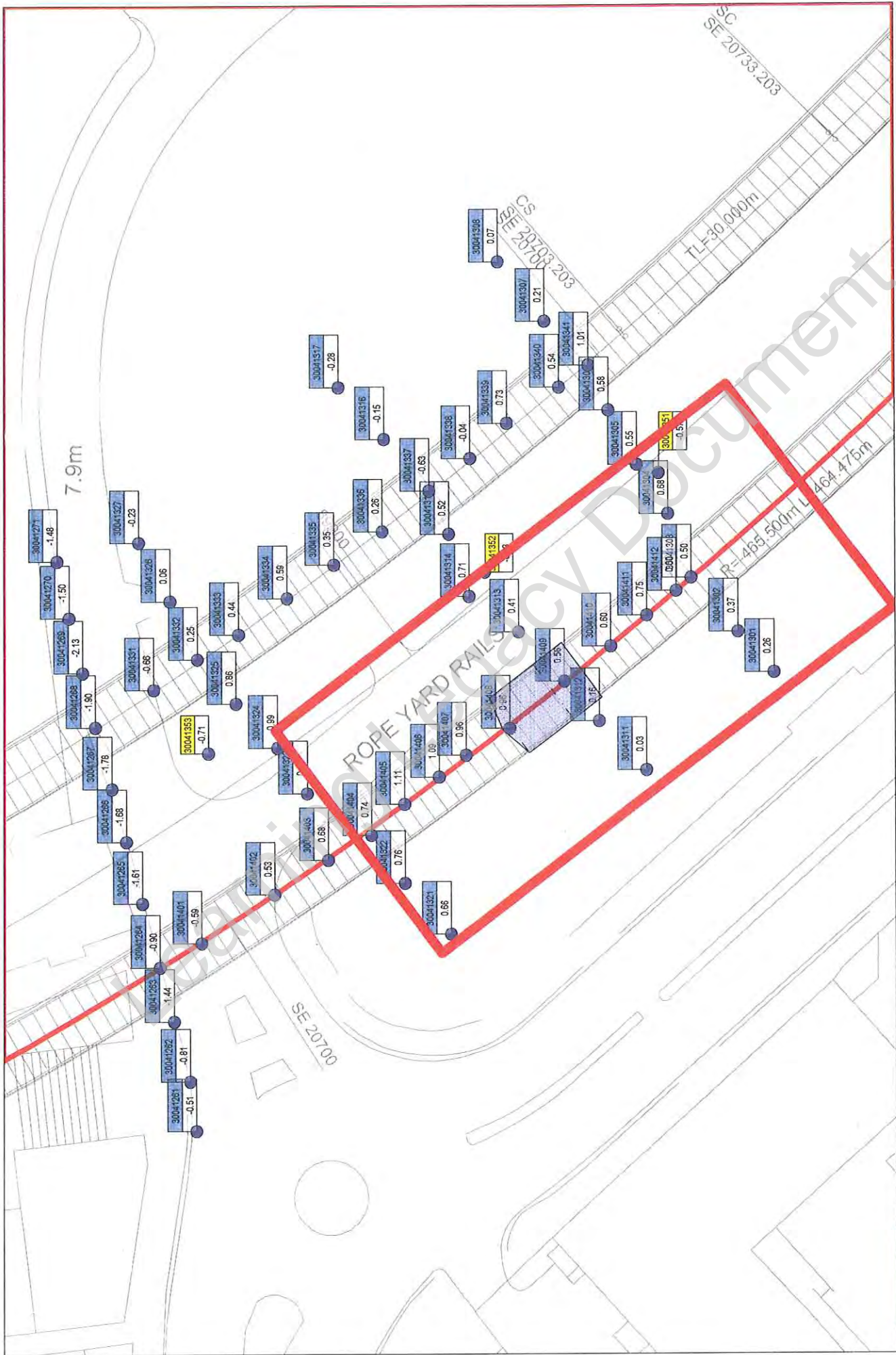
date / signature:

08/11/15

print name:

HMJV project role:

Monitoring & Survey engineer

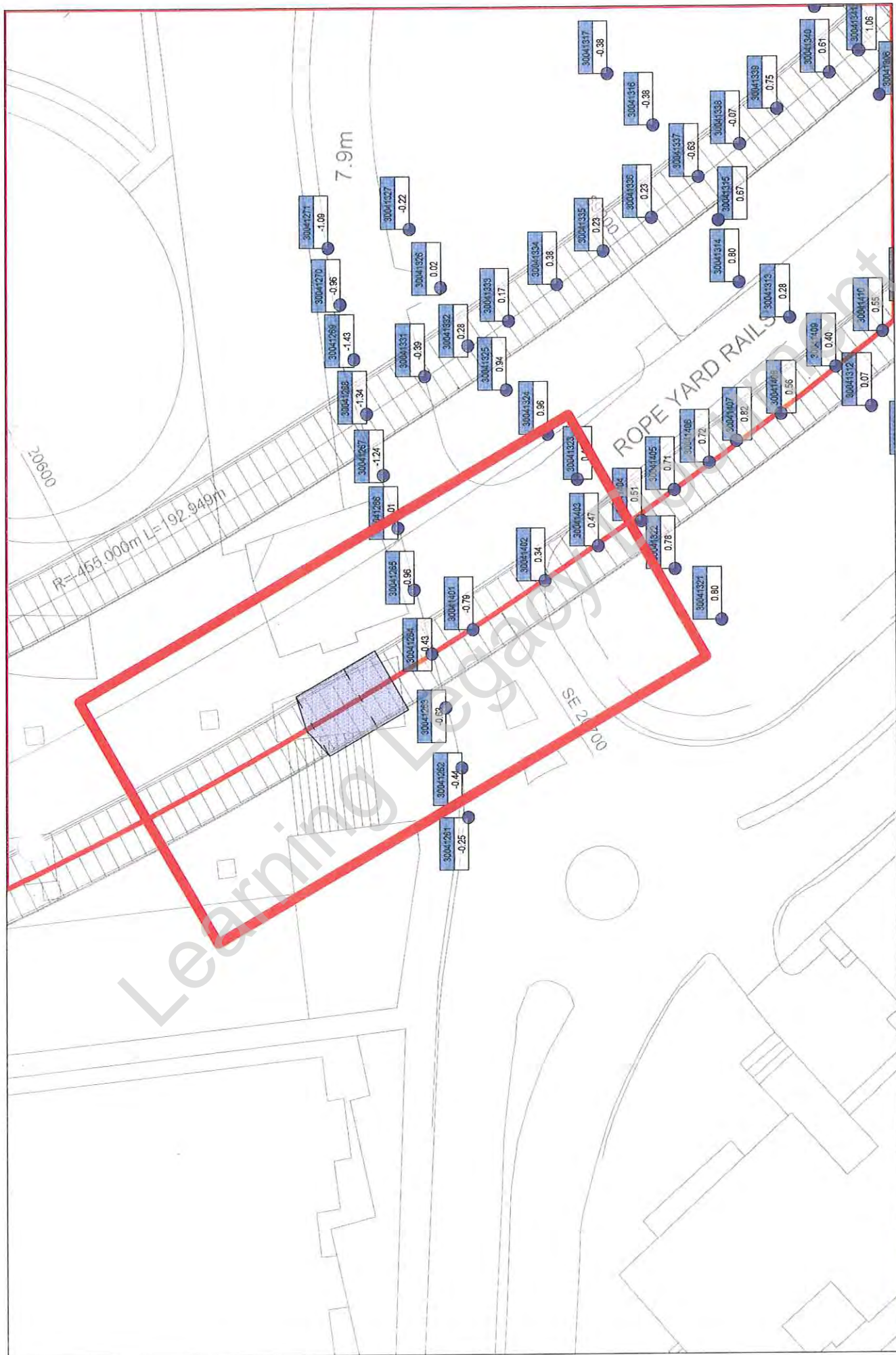


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

working activities: TBM drive WB

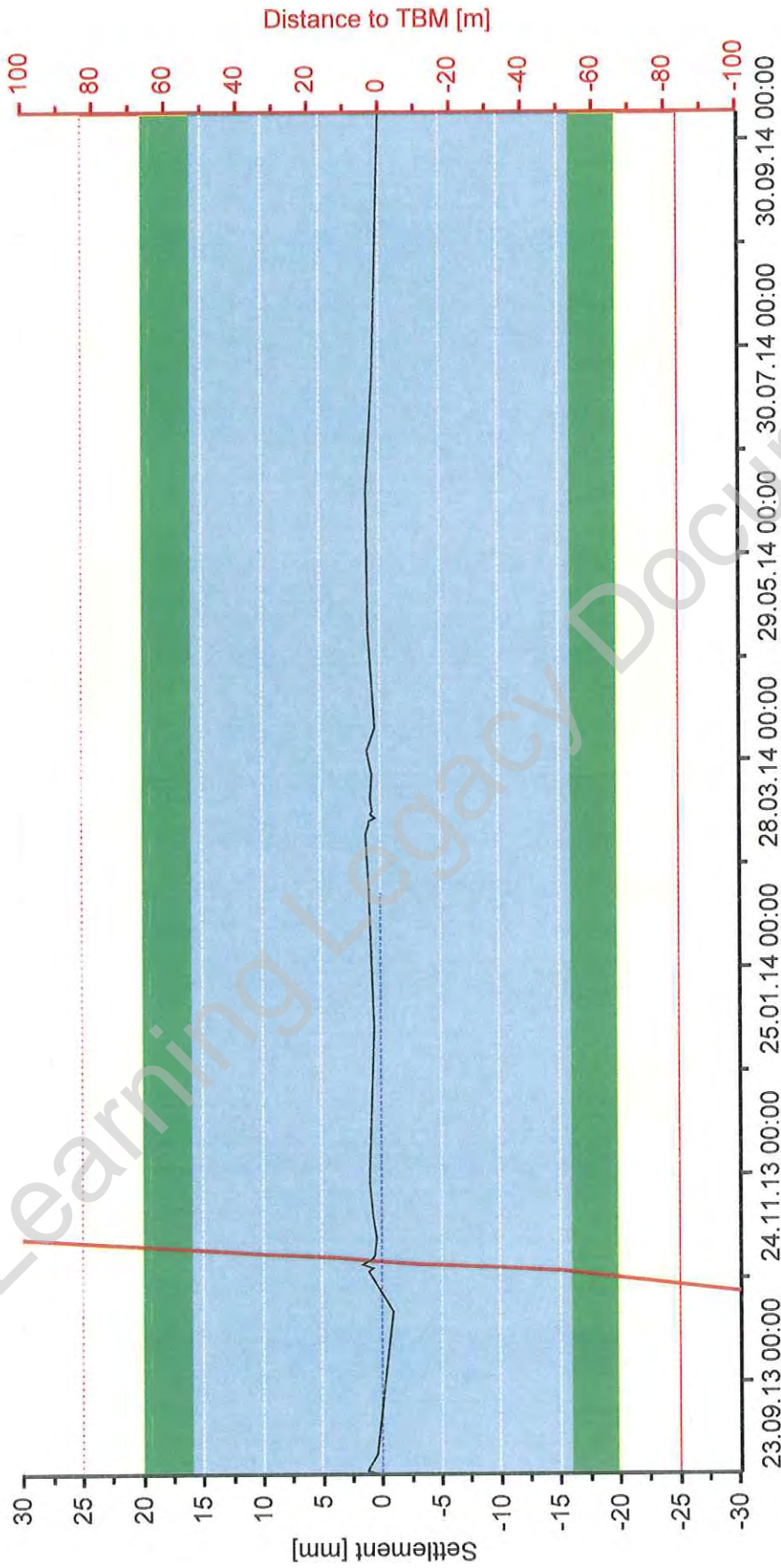
current values: 27.10.2013 18:23





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: portal excavation, construction base slab and capping beam
 current values: 31.10.2013 17:35

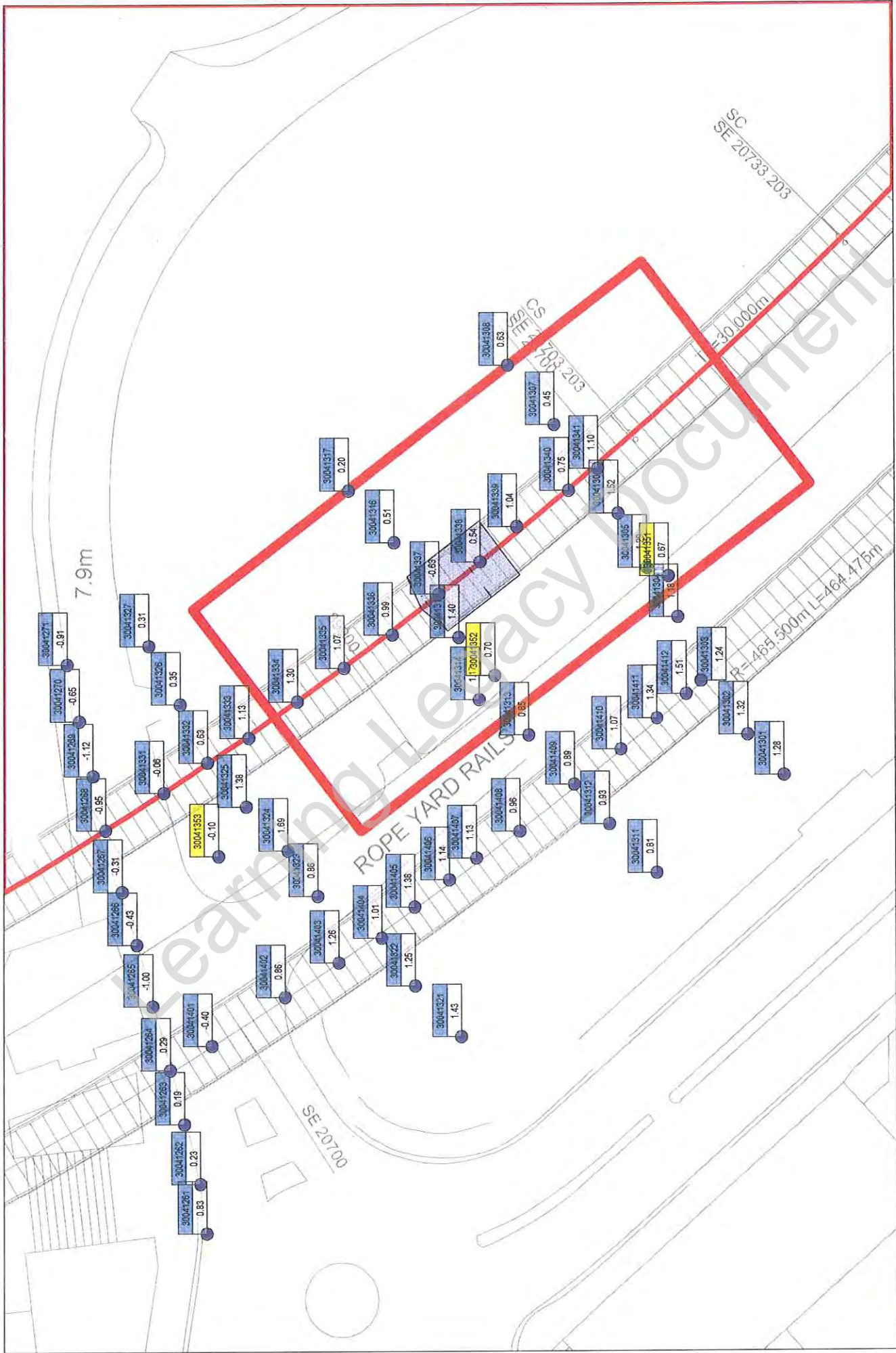
Point: 30041404



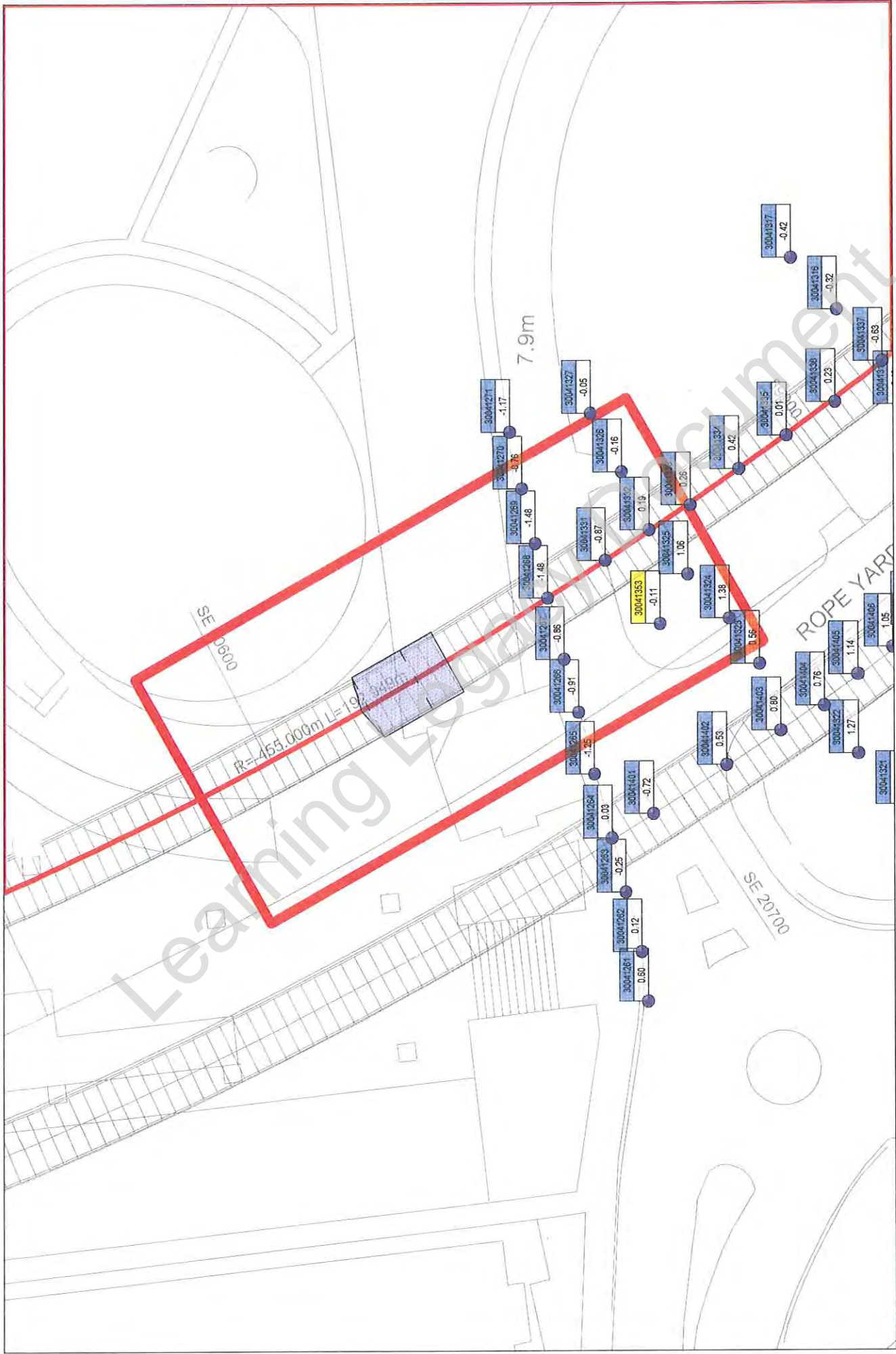
— 30041404 — Distance TBM - - - - - Zero Distance

Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - CS 21 - Warren Lane Carpark 26.08.2013 - 08.10.2014
Date: 23.10.2014 17:50 Current Values: 23.10.2014 17:34



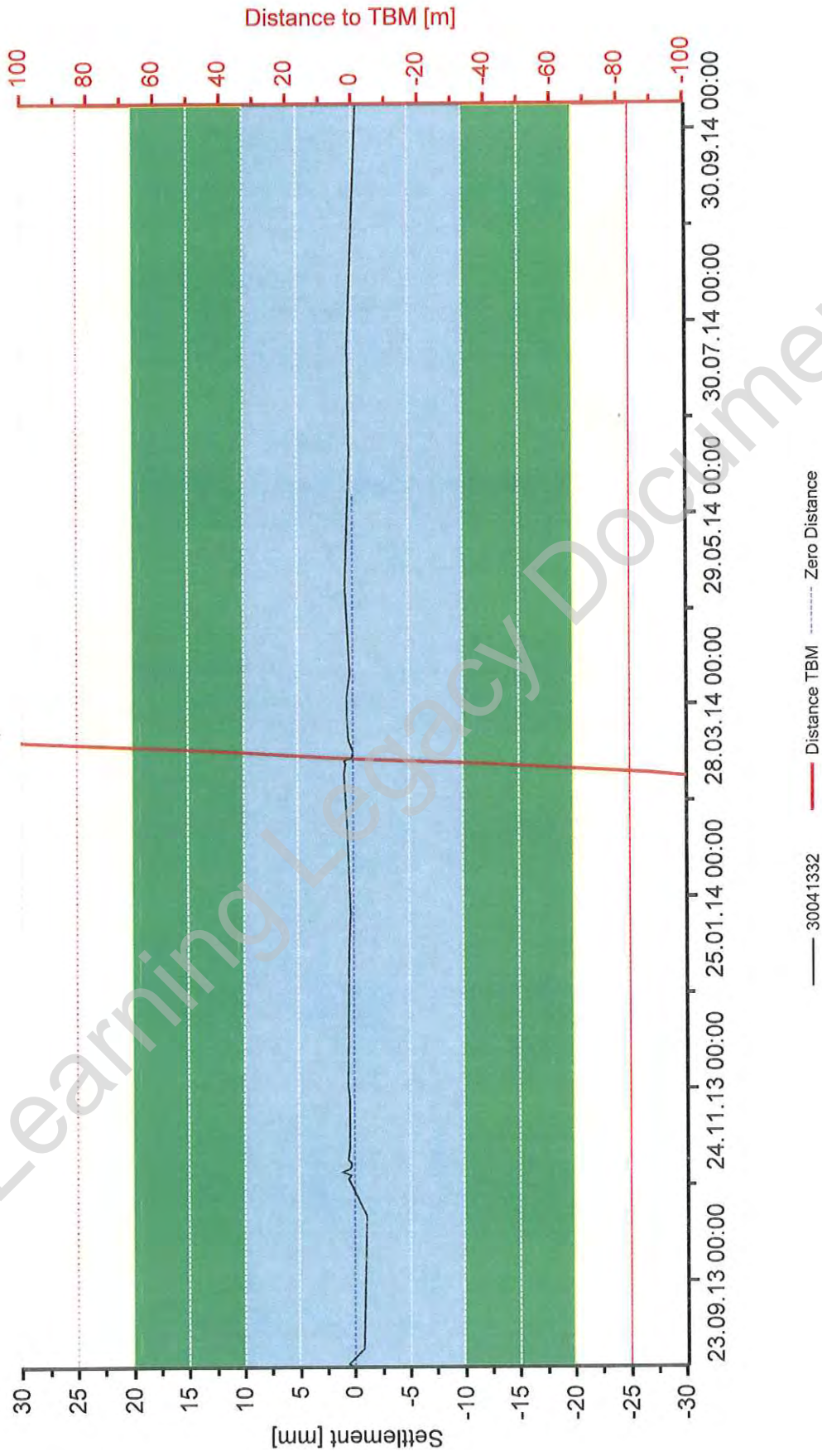


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 09.03.2014 17:10



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 12.03.2014 17:22

Point: 30041332



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - CS 21 - Warren Lane Carpark 26.08.2013 - 08.10.2014
date: 19.10.2014 16:55 current values: 19.10.2014 16:41



monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS21 WarrenLane CarPark**

No. of reading	baseline	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
date	26/8/13	28/10/2013		29/10/2013		29/10/2013		30/10/2013		31/10/2013		01/11/2013	
3004 1321	110.068	110.070	1	2	110.069	0	1	110.069	0	1	110.069	0	1
3004 1322	109.893	109.894	1	2	109.894	0	1	109.893	0	1	109.893	0	1
3004 1323	109.165	109.167	1	1	109.166	0	1	109.166	0	1	109.166	0	0
3004 1324	109.145	109.147	1	2	109.147	0	1	109.146	0	1	109.146	0	1
3004 1325	108.905	108.907	1	2	108.907	0	2	108.906	0	1	108.906	0	1
3004 1326	108.709	108.710	1	1	108.709	0	0	108.709	0	0	108.709	0	0
3004 1327	108.393	108.393	1	1	108.393	0	0	108.393	0	0	108.393	0	0

Woolwich Box to Thames Southside levelling

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS21 WarrenLane CarPark

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
	26/8/13												
		05/11/2013		11/11/2013		21/11/2013		25/11/2013		07/01/2014		20/01/2014	
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 1321	110.068	110.069	0 1	110.069	0 1	110.069	0 1	110.070	0 2	110.069	-1 1	110.071	2 3
3004 1322	109.893	109.893	0 1	109.893	0 1	109.894	0 1	109.894	0 1	109.893	-1 1	109.894	0 1
3004 1323	109.165	109.166	0 1	109.166	0 1	109.166	0 1	109.166	0 1	109.165	-1 0	109.166	0 1
3004 1324	109.145	109.146	0 1	109.147	1 1	109.147	0 1	109.147	0 2	109.147	0 1	109.147	0 1
3004 1325	108.905	108.906	0 1	108.906	0 1	108.906	0 1	108.906	0 1	108.906	0 1	108.906	0 1
3004 1326	108.709	108.709	0 0	108.709	0 0	108.709	0 0	108.709	0 0	108.709	0 0	108.709	0 0
3004 1327	108.393	108.393	0 0	108.393	0 0	108.393	0 0	108.393	0 0	108.393	0 0	108.393	0 0

Document

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS21 WarrenLane CarPark**

No. of reading	baseline	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		
	26/8/13															
		17/02/2014			06/03/2014			09/03/2014		10/03/2014			11/03/2014			12/03/2014
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 1321	110.068		110.070	-1	110.070	0	110.070	-1	110.070	0	110.069	-1	110.070	0	110.070	0
3004 1322	109.893		109.894	0	109.894	0	109.894	0	109.894	0	109.893	-1	109.894	0	109.894	0
3004 1323	109.165		109.166	0	109.166	0	109.166	0	109.166	0	109.165	-1	109.166	0	109.166	0
3004 1324	109.145		109.147	0	109.147	0	109.147	0	109.147	0	109.146	-1	109.147	0	109.147	0
3004 1325	108.905		108.906	0	108.907	0	108.906	0	108.906	0	108.906	-1	108.906	0	108.906	0
3004 1326	108.709		108.709	0	108.709	0	108.709	0	108.709	0	108.709	-1	108.709	0	108.709	0
3004 1327	108.393		108.393	0	108.393	0	108.393	0	108.393	0	108.393	0	108.393	0	108.393	0

Woolwich Box to Thames Southside levelling

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS21 WarrenLane CarPark**

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	26/8/13	13/03/2014		17/03/2014		24/03/2014		31/03/2014		07/04/2014		06/05/2014							
3004 1321	110.068	110.070	0	2	110.069	-1	1	110.069	-1	1	110.070	1	2	110.069	0	1	110.070	0	1
3004 1322	109.893	109.894	0	1	109.894	0	1	109.894	0	1	109.894	0	1	109.893	-1	1	109.894	0	1
3004 1323	109.165	109.165	0	0	109.166	0	1	109.166	0	1	109.166	0	1	109.165	-1	0	109.166	0	1
3004 1324	109.145	109.146	0	1	109.147	0	1	109.147	0	1	109.147	0	2	109.146	-1	1	109.147	0	1
3004 1325	108.905	108.906	0	1	108.906	0	1	108.906	0	1	108.906	0	1	108.906	-1	1	108.906	1	1
3004 1326	108.709	108.709	0	0	108.709	0	0	108.709	0	0	108.709	0	0	108.709	0	0	108.709	0	0
3004 1327	108.393	108.393	0	0	108.393	0	0	108.393	0	0	108.393	0	0	108.393	0	0	108.393	0	0

Document

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS21 WarrenLane CarPark

No. of reading	baseline		31. following 17/06/2014		32. following 22/07/2014		33. following 08/10/2014					
	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
3004 1321	110.068	0	110.069	0	110.069	0	110.068	-1	110.068	-1		
3004 1322	109.893	0	109.894	0	109.894	0	109.893	-1	109.893	-1		
3004 1323	109.165	0	109.166	0	109.166	0	109.165	0	109.165	0		
3004 1324	109.145	0	109.147	0	109.147	0	109.146	-1	109.146	-1		
3004 1325	108.905	0	108.906	0	108.906	0	108.905	-1	108.905	-1		
3004 1326	108.709	0	108.709	0	108.710	0	108.709	0	108.709	0		
3004 1327	108.393	0	108.393	0	108.393	0	108.393	0	108.393	0		

Monitoring Document

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Westbound**

No. of reading	1. following		2. following		3. following		4. following		5. following		6. following	
	baseline	26/8/13	elevation	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	27/08/2013		01/09/2013		23/09/2013		14/10/2013		24/10/2013		25/10/2013	
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 1401	109.250	109.251	0	0	109.249	-1	109.249	-1	109.249	-1		
3004 1402	109.298	109.299	1	1	109.297	-1	109.297	-1	109.297	-1		
3004 1403	109.446	109.447	1	1	109.446	-1	109.446	-1	109.445	-1		
3004 1404	109.355	109.356	1	1	109.354	-1	109.354	0	109.354	0		
3004 1405	109.250	109.251	1	1	109.250	-1	109.250	0	109.249	-1		
3004 1406	109.322	109.322	0	0	109.322	0	109.322	0	109.322	0		
3004 1407	109.145	109.145	1	1	109.145	0	109.144	0	109.144	0		2
3004 1408	109.140	109.142	1	1	109.140	-2	109.141	1	109.140	0	109.142	2
3004 1409	109.236	109.237	1	1	109.236	-1	109.236	1	109.235	-1	109.237	2
3004 1410	109.248	109.249	1	1	109.248	-2	109.248	2	109.247	-1	109.249	2
3004 1411	109.277	109.277	1	1	109.277	-2	109.277	2	109.276	-1	109.278	2
3004 1412	109.305	109.307	1	1	109.306	-2	109.306	1	109.305	-1	109.307	2

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: WarrenLane CarPark Westbound

No. of reading	7. following		8. following		9. following		10. following		11. following		12. following			
	baseline	26/8/13	26/10/2013	27/10/2013	28/10/2013	29/10/2013	29/10/2013	29/10/2013	29/10/2013	29/10/2013	30/10/2013	30/10/2013		
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 1401	109.250			109.250	1	-1		109.250	0	0		109.250	0	0
3004 1402	109.298	109.299	2	1	0	1		109.299	1	1		109.298	0	0
3004 1403	109.446	109.447	2	1	0	1		109.447	0	1		109.447	0	1
3004 1404	109.355	109.356	2	1	0	1	109.356	1	2	0	1	109.355	0	1
3004 1405	109.250	109.251	2	1	0	1	109.251	2	0	1	109.251	0	1	
3004 1406	109.322	109.324	2	1	0	1	109.324	2	0	1	109.323	0	1	
3004 1407	109.145	109.147	1	2	-1	1	109.146	1	2	0	1	109.145	0	1
3004 1408	109.140	109.143	1	3	-2	1	109.142	0	1	0	1	109.141	0	1
3004 1409	109.236	109.237	0	1	-1	1	109.237	0	1	0	1	109.237	0	0
3004 1410	109.248	109.249	0	1	-1	1	109.249	0	1	0	1	109.248	0	0
3004 1411	109.277	109.278	0	1	-1	1	109.277	0	1	0	1	109.277	0	1
3004 1412	109.305	109.307	0	2	-1	1	109.306	0	1	0	1	109.306	0	1

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: WarrenLane CarPark Westbound

No. of reading	baseline	13. following		14. following		15. following		16. following		17. following		18. 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	26/8/13	31/10/2013		01/11/2013		05/11/2013		11/11/2013		21/11/2013		25/11/2013	
3004 1401	109,250	109,249	0	109,250	0	109,249	0	109,250	0	109,250	0	109,250	0
3004 1402	109,298	109,298	0	109,298	0	109,298	0	109,298	0	109,298	0	109,299	0
3004 1403	109,446	109,447	0	109,447	0	109,447	0	109,447	0	109,447	0	109,447	0
3004 1404	109,355	109,355	0	109,355	0	109,355	0	109,356	0	109,356	0	109,356	0
3004 1405	109,250	109,251	0	109,251	0	109,251	0	109,251	0	109,251	0	109,251	0
3004 1406	109,322	109,323	0	109,323	0	109,323	0	109,323	0	109,323	0	109,323	0
3004 1407	109,145	109,145	0	109,145	0	109,145	0	109,145	0	109,146	0	109,146	0
3004 1408	109,140	109,141	0	109,141	0	109,141	0	109,141	0	109,141	0	109,141	0
3004 1409	109,236	109,237	0			109,236	0	109,237	0	109,237	0	109,237	0
3004 1410	109,248	109,248	0			109,248	0	109,249	0	109,248	0	109,248	0
3004 1411	109,277	109,277	0			109,277	0	109,278	0	109,277	0	109,277	0
3004 1412	109,305	109,306	0			109,306	0	109,307	0	109,306	-1	109,307	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Westbound**

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	26/8/13												
		09/03/2014		10/03/2014		11/03/2014		12/03/2014		13/03/2014		17/03/2014	
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
3004 1401	109.250			109.249	-1	109.249	0	109.249	0	109.249	0	109.250	0
3004 1402	109.298			109.298	-1	109.298	0	109.298	0	109.298	0	109.298	0
3004 1403	109.446			109.446	-1	109.447	0	109.447	0	109.447	0	109.447	0
3004 1404	109.355	0	1	109.356	0	109.355	0	109.356	0	109.355	0	109.356	0
3004 1405	109.250	0	1	109.251	0	109.251	0	109.251	0	109.251	0	109.251	0
3004 1406	109.322	0	1	109.323	0	109.323	0	109.323	0	109.323	0	109.323	0
3004 1407	109.145	0	1	109.146	0	109.145	0	109.146	0	109.145	0	109.146	0
3004 1408	109.140	0	1	109.141	0	109.141	0	109.141	0	109.141	0	109.141	0
3004 1409	109.236	0	1	109.237	0	109.237	0	109.237	0	109.237	0	109.237	0
3004 1410	109.248	0	1	109.249	0	109.248	0	109.248	0	109.248	0	109.248	0
3004 1411	109.277	0	1	109.278	0	109.277	0	109.277	0	109.277	0	109.277	0
3004 1412	109.305	0	2	109.307	0	109.306	0	109.306	0	109.306	0	109.306	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Westbound**

No. of reading	baseline	31. following		32. following		33. following		34. following		35. following		36. following				
	26/8/13	24/03/2014	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline	elevation	deviation from last/ baseline			
No.																
3004 1401	109.250	109.250	0	-1	109.250	0	0	109.249	0	-1	109.250	0	-1	109.249	-1	-2
3004 1402	109.298	109.298	0	1	109.299	0	1	109.298	-1	0	109.299	0	1	109.298	0	1
3004 1403	109.446	109.447	0	1	109.447	0	1	109.446	-1	0	109.447	0	1	109.447	-1	0
3004 1404	109.355	109.356	0	1	109.356	0	1	109.355	-1	0	109.356	0	1	109.355	-1	0
3004 1405	109.250	109.251	0	1	109.251	0	1	109.251	-1	1	109.251	0	1	109.251	0	1
3004 1406	109.322	109.323	0	1	109.323	0	1	109.323	-1	1	109.323	0	1	109.323	-1	1
3004 1407	109.145	109.145	0	1	109.146	0	1	109.145	0	1	109.146	0	1	109.146	0	1
3004 1408	109.140	109.141	0	1	109.141	1	1	109.141	-1	1	109.141	0	1	109.141	0	1
3004 1409	109.236	109.237	0	1	109.237	0	1	109.237	0	0	109.237	0	1	109.237	0	0
3004 1410	109.248	109.248	0	1	109.249	0	1	109.248	0	1	109.248	0	1	109.248	0	0
3004 1411	109.277	109.277	0	1	109.278	0	1	109.277	-1	1	109.277	0	1	109.277	0	1
3004 1412	109.305	109.306	0	1	109.307	0	1	109.306	0	1	109.307	0	1	109.306	0	1

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: WarrenLane CarPark Westbound

No. of reading	baseline	37. 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
		date	08/10/2014										
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 1401	109.250	109.246	0	-2									
3004 1402	109.298	109.298	-1	0									
3004 1403	109.446	109.446	-1	0									
3004 1404	109.355	109.355	0	0									
3004 1405	109.250	109.250	-1	0									
3004 1406	109.322	109.322	-1	0									
3004 1407	109.145	109.145	-1	0									
3004 1408	109.140	109.140	-1	0									
3004 1409	109.236	109.236	-1	0									
3004 1410	109.248	109.247	-1	-1									
3004 1411	109.277	109.277	0	0									
3004 1412	109.305	109.305	-1	0									

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Eastbound**

No. of reading	baseline		1. following		2. following		3. following		4. following		5. following		6. following	
	date	elevation	27/08/2013	deviation from last/baseline	01/09/2013	deviation from last/baseline	23/09/2013	deviation from last/baseline	14/10/2013	deviation from last/baseline	24/10/2013	deviation from last/baseline	25/10/2013	deviation from last/baseline
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 1331	108.404	108.405	0	108.403	-1	108.403	0	108.403	0	108.403	0	108.403	0	
3004 1332	108.698	108.699	1	108.697	-1	108.697	-1	108.697	0	108.697	0	108.697	0	
3004 1333	108.649	108.649	0	108.648	-1	108.648	-1	108.648	0	108.648	0	108.648	0	
3004 1334	108.711	108.711	0	108.711	0	108.710	-1	108.710	0	108.710	0	108.710	0	
3004 1335	108.755	108.756	1	108.756	-1	108.754	-2	108.754	0	108.754	0	108.754	0	
3004 1336	108.808	108.808	1	108.807	-1	108.806	-1	108.806	1	108.806	1	108.806	2	
3004 1337	108.849	108.851	1	108.849	-2	108.847	-2	108.847	covered	108.806	covered	108.808	destroyed	
3004 1338	108.913	108.913	0	108.912	-1	108.911	-1	108.911	1	108.912	1	108.913	0	
3004 1339	108.951	108.951	0	108.951	0	108.950	-1	108.950	1	108.951	1	108.952	0	
3004 1340	109.047	109.048	1	109.047	-2	109.046	0	109.046	1	109.047	1	109.048	0	
3004 1341	109.090	109.090	1	109.090	-1	109.091	1	109.091	0	109.091	0	109.091	0	

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Eastbound**

No. of reading	baseline	7. following		8. following		9. following		10. following		11. following		12. following	
	26/8/13	elevation	deviation from last/ baseline	elevation	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	26/10/2013	31/10/2013											
3004 1331	108.404			108.404	1	-1							
3004 1332	108.698	108.699	2	1	108.699	0	0	1	108.699	-1	0	108.699	0
3004 1333	108.649	108.650	2	1	108.649	0	0	1	108.649	-1	0	108.649	0
3004 1334	108.711	108.712	2	1	108.712	0	1	1	108.712	0	1	108.712	0
3004 1335	108.755	108.756	2	1	108.756	0	0	1	108.756	-1	0	108.756	0
3004 1336	108.808	108.808	0	1	108.808	0	0	1	108.808	0	0	108.808	0
3004 1337	108.849	destroyed											
3004 1338	108.913	108.913	0	0	108.913	0	0	1	108.913	-1	0	108.913	0
3004 1339	108.951	108.952	0	1	108.951	0	1	1	108.951	0	1	108.951	0
3004 1340	109.047	109.047	0	1	109.047	0	1	1	109.047	-1	1	109.047	0
3004 1341	109.090	109.091	0	1	109.091	0	1	1	109.090	0	1	109.091	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Eastbound**

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
	28/8/13													
3004 1331		108.404	108.404	0	108.404	0	108.404	0	108.404	0	108.404	0	108.404	0
3004 1332		108.698	108.699	0	108.699	0	108.699	0	108.699	0	108.699	0	108.699	0
3004 1333		108.649	108.649	0	108.649	0	108.649	0	108.649	0	108.650	0	108.649	0
3004 1334		108.711	108.712	0	108.712	0	108.711	0	108.712	0	108.712	0	108.712	0
3004 1335		108.755	108.756	0	108.756	0	108.756	0	108.756	0	108.756	0	108.756	-1
3004 1336		108.808	108.808	0	108.808	0	108.808	0	108.808	0	108.808	0	108.808	-1
3004 1337		108.849		destroyed		destroyed		destroyed		destroyed		destroyed		destroyed
3004 1338		108.913	108.913	0	108.913	0	108.913	0	108.913	0	108.913	0	108.913	-1
3004 1339		108.951			108.951	0	108.951	0	108.952	0	108.952	0	108.951	-1
3004 1340		109.047			109.047	0	109.047	0	109.048	0	109.047	0	109.047	0
3004 1341		109.090			109.091	0	109.091	0	109.091	0	109.091	0	109.091	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Eastbound**

No. of reading	baseline		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
	28/8/13													
3004 1331		108.404	108.404	0	108.404	0	108.404	0	108.404	0				
3004 1332		108.698	108.699	0	108.699	0	108.699	0	108.699	0			108.699	0
3004 1333		108.649	108.649	0	108.650	1	108.650	0	108.650	0			108.650	0
3004 1334		108.711	108.712	0	108.712	1	108.712	0	108.712	0			108.712	0
3004 1335		108.755	108.756	0	108.756	1	108.756	0	108.756	0			108.757	0
3004 1336		108.808	108.808	0	108.808	1	108.808	0	108.809	0			108.809	0
3004 1337		108.849		destroyed		destroyed		destroyed						destroyed
3004 1338		108.913	108.913	0	108.913	0	108.913	0	108.913	0			108.913	0
3004 1339		108.951	108.951	0	108.952	0	108.952	0	108.952	0			108.952	0
3004 1340		109.047	109.048	0	109.048	0	109.048	0	109.048	0			109.047	-1
3004 1341		109.090	109.091	0	109.091	0	109.091	0	109.091	0			109.091	-1

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Eastbound**

No. of reading	25. following		26. following		27. following		28. following		29. following		30. following						
	baseline	10/03/2014	11/03/2014	12/03/2014	13/03/2014	17/03/2014	24/03/2014										
date	26/8/13	10/03/2014		11/03/2014		12/03/2014		13/03/2014		17/03/2014		24/03/2014					
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 1331	108.404	108.404	0	108.404	-1	108.403	0	-1	108.403	0	-1	108.404	1	0	108.404	0	-1
3004 1332	108.698	108.699	0	108.698	-1	108.698	0	0	108.698	0	0	108.699	0	0	108.699	0	1
3004 1333	108.649	108.650	0	108.649	0	108.649	0	0	108.649	0	0	108.650	0	1	108.650	0	1
3004 1334	108.711	108.712	0	108.712	0	108.712	0	1	108.712	0	1	108.712	0	1	108.712	0	1
3004 1335	108.755	108.756	-1	108.755	0	108.756	0	0	108.756	0	0	108.756	0	0	108.756	0	0
3004 1336	108.808	108.808	-1	108.808	0	108.808	0	0	108.808	0	0	108.808	0	0	108.808	0	0
3004 1337	108.849	destroyed		destroyed		destroyed		destroyed		destroyed		destroyed					
3004 1338	108.913	108.913	-1	108.912	0	108.913	0	0	108.913	0	0	108.913	0	0	108.913	0	0
3004 1339	108.951	108.951	-1	108.951	0	108.951	0	0	108.951	0	0	108.951	0	1	108.951	0	0
3004 1340	109.047	109.047	0	109.047	0	109.047	0	0	109.047	0	0	109.047	0	1	109.047	0	0
3004 1341	109.090	109.091	0	109.090	0	109.090	0	1	109.090	0	1	109.090	0	1	109.091	0	1

monitoring table




Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Eastbound**

No. of reading	baseline		31. following		32. following		33. following		34. following		35. following		36. following	
	date	elevation	26/8/13	31/03/2014	07/04/2014	06/05/2014	17/06/2014	22/07/2014	08/10/2014					
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
3004 1332	108.698	0	0	108.699	0	0	108.699	0	0	108.699	0	0	108.698	-1
3004 1333	108.649	0	1	108.650	0	1	108.650	0	1	108.649	0	0	108.649	0
3004 1334	108.711	0	1	108.712	0	1	108.712	0	1	108.711	0	0	108.711	0
3004 1335	108.755	0	1	108.756	0	0	108.756	0	0	108.755	0	0	108.755	0
3004 1336	108.808	0	1	108.808	0	0	108.808	0	0	108.808	0	0	108.807	0
3004 1337	108.849	destroyed			destroyed			destroyed			destroyed			destroyed
3004 1338	108.913	0	0	108.912	0	-1	108.912	0	0	108.912	0	0	108.912	0
3004 1339	108.951	0	1	108.951	0	-1	108.951	0	0	108.951	0	0	108.950	-1
3004 1340	109.047	0	1	109.047	0	-1	109.047	0	0	109.047	0	0	109.046	-1
3004 1341	109.090	0	1	109.090	0	1	109.090	0	1	109.091	1	1	109.090	0

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

APPENDIX 68

CS22 – Warren Lane roundabout

Learning Legacy Document

monitoring asset	Area Royal Arsenal		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	CS 22 - Warren Lane roundabout		
sensor type:	manual levelling studs		
chainage:	89880	point no.:	3004 1261 - 3004 1271
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	13/08/13	0.00		
TBM 1	start ZOI	29/10/13	0.37	3004 1264
	end ZOI	02/11/13	0.14	3004 1264
TBM 2	start ZOI	10/03/14	-0.84	3004 1268
	end ZOI	13/03/14	-1.44	3004 1268
longterm	24/09/14	-1.51	3004 1268	
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

3004 1261 - 3004 1271

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.

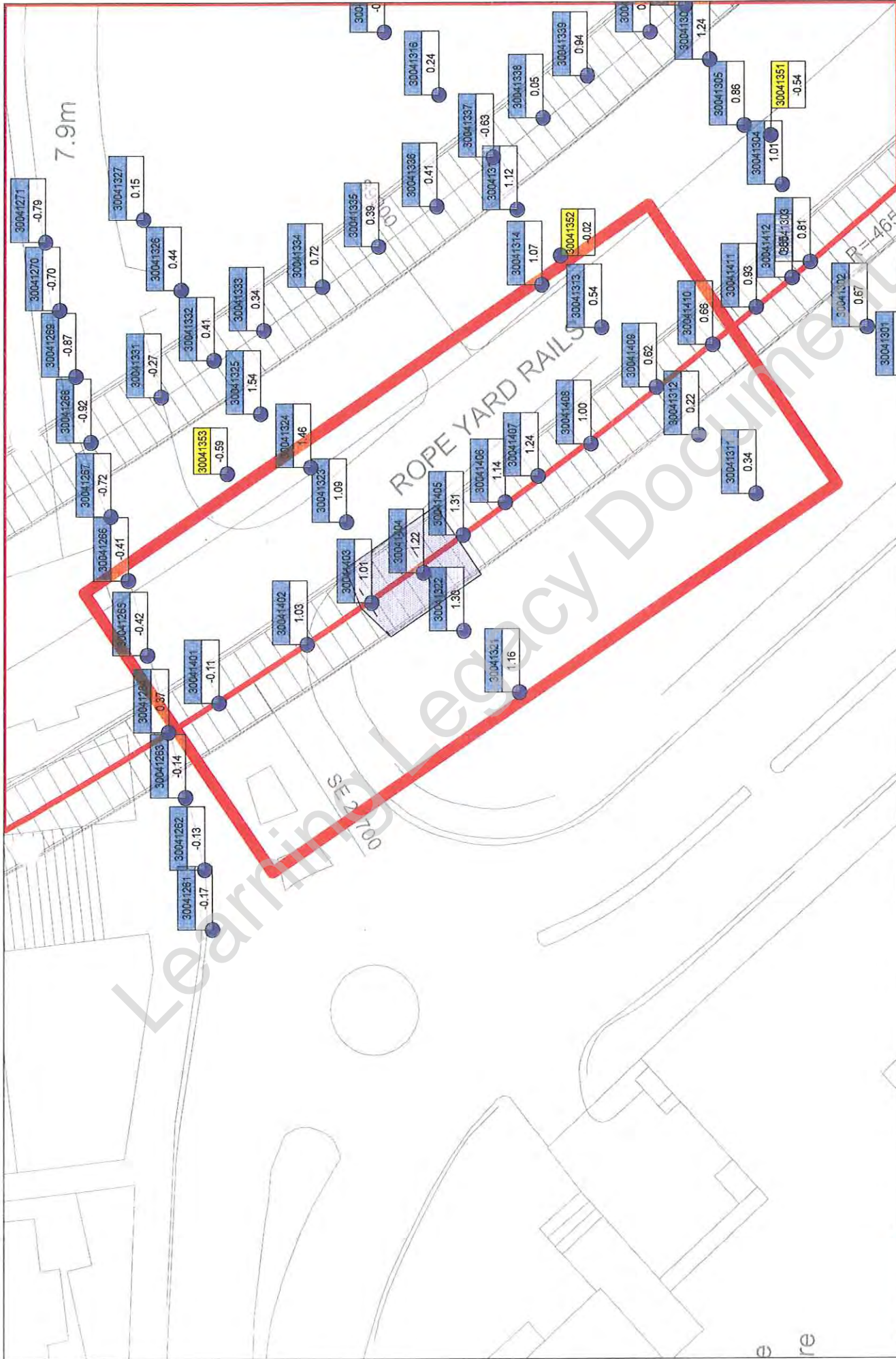
date / signature:

08/10/15

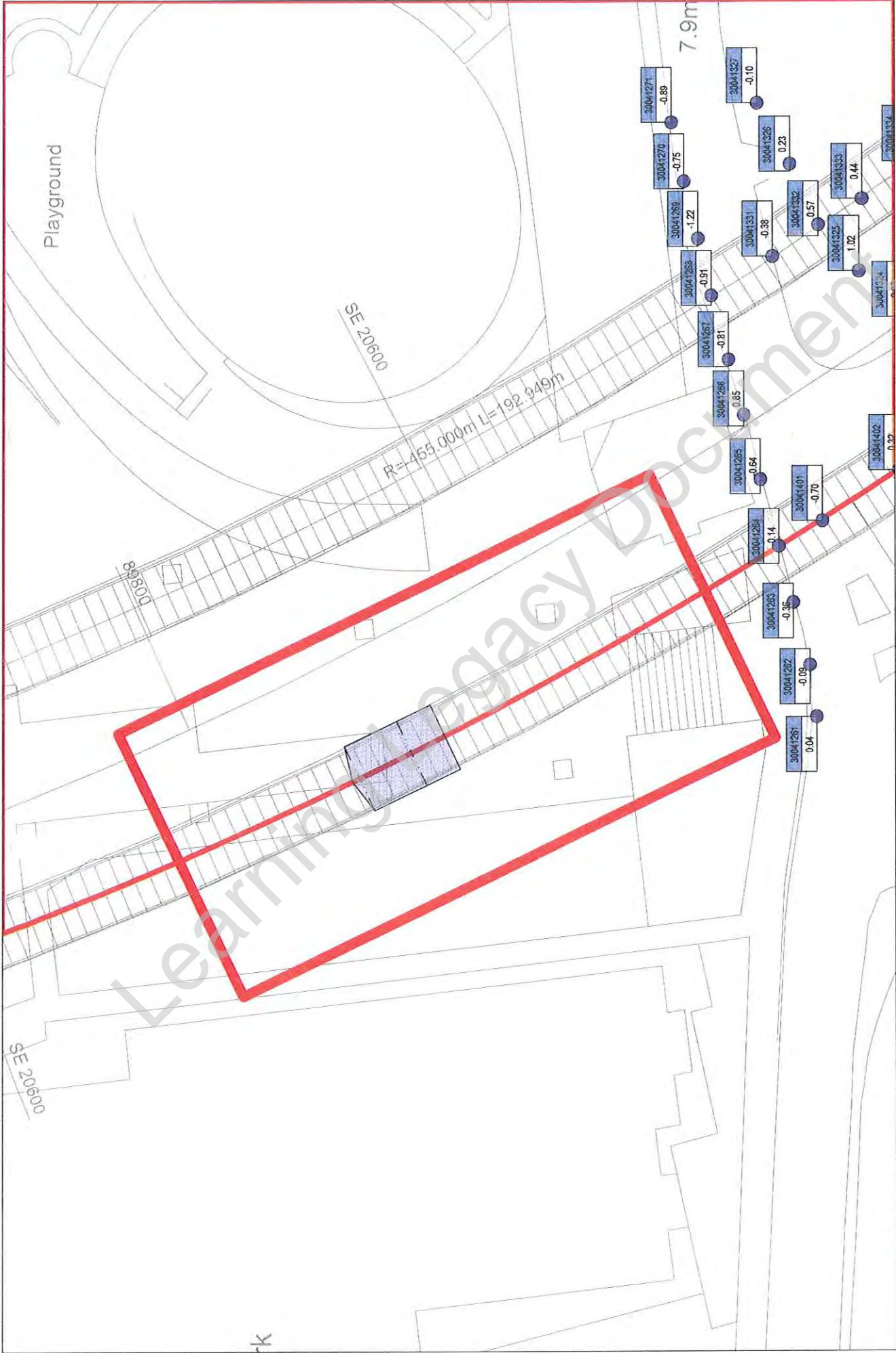
print name:

HMJV project role:

Monitoring & Survey engineer

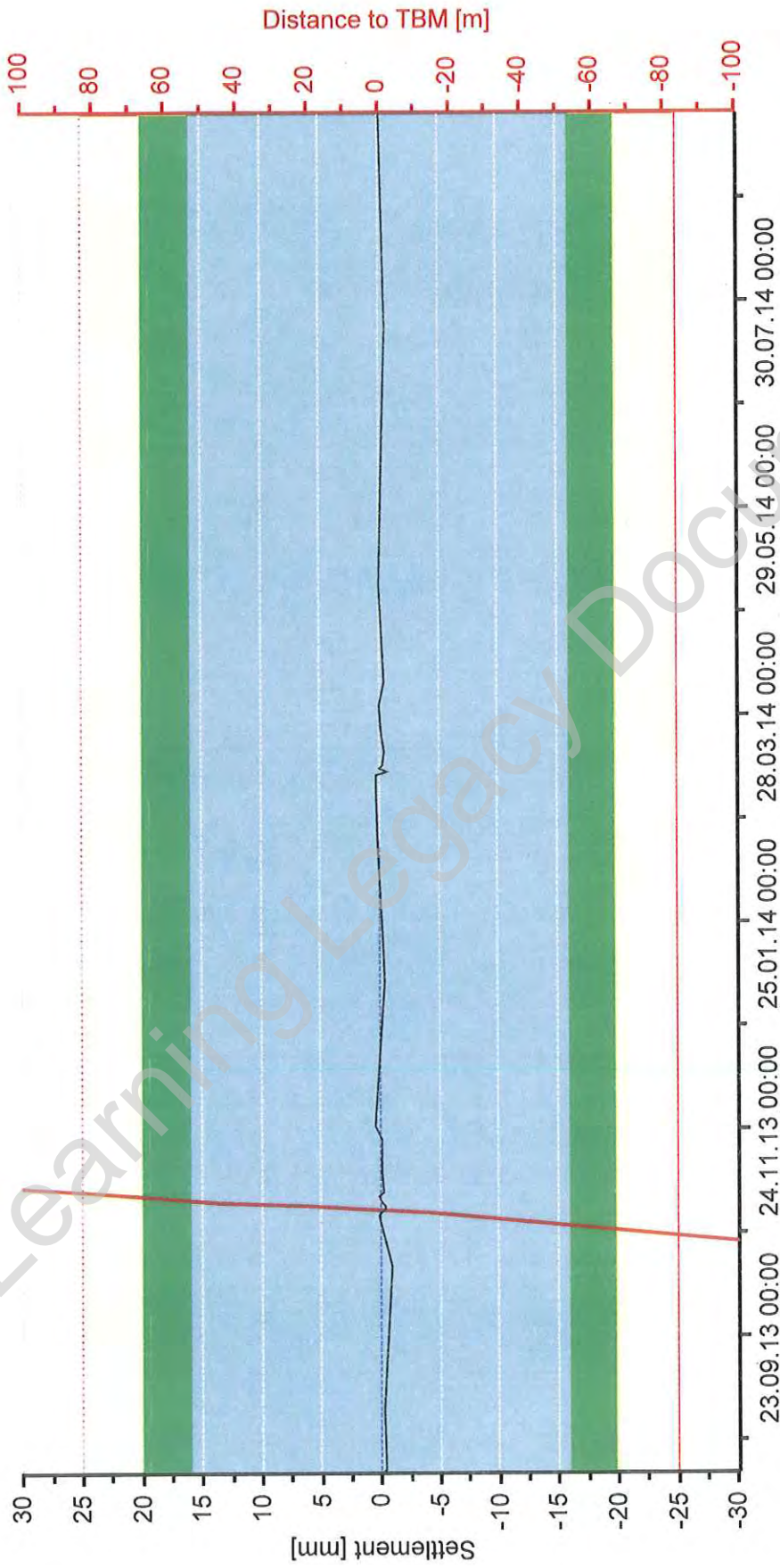


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
working activities: TBM drive WB
current values: 29.10.2013 09:00



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: portal excavation, construction base slab and capping beam
 current values: 02.11.2013 09:00

Point: 30041264

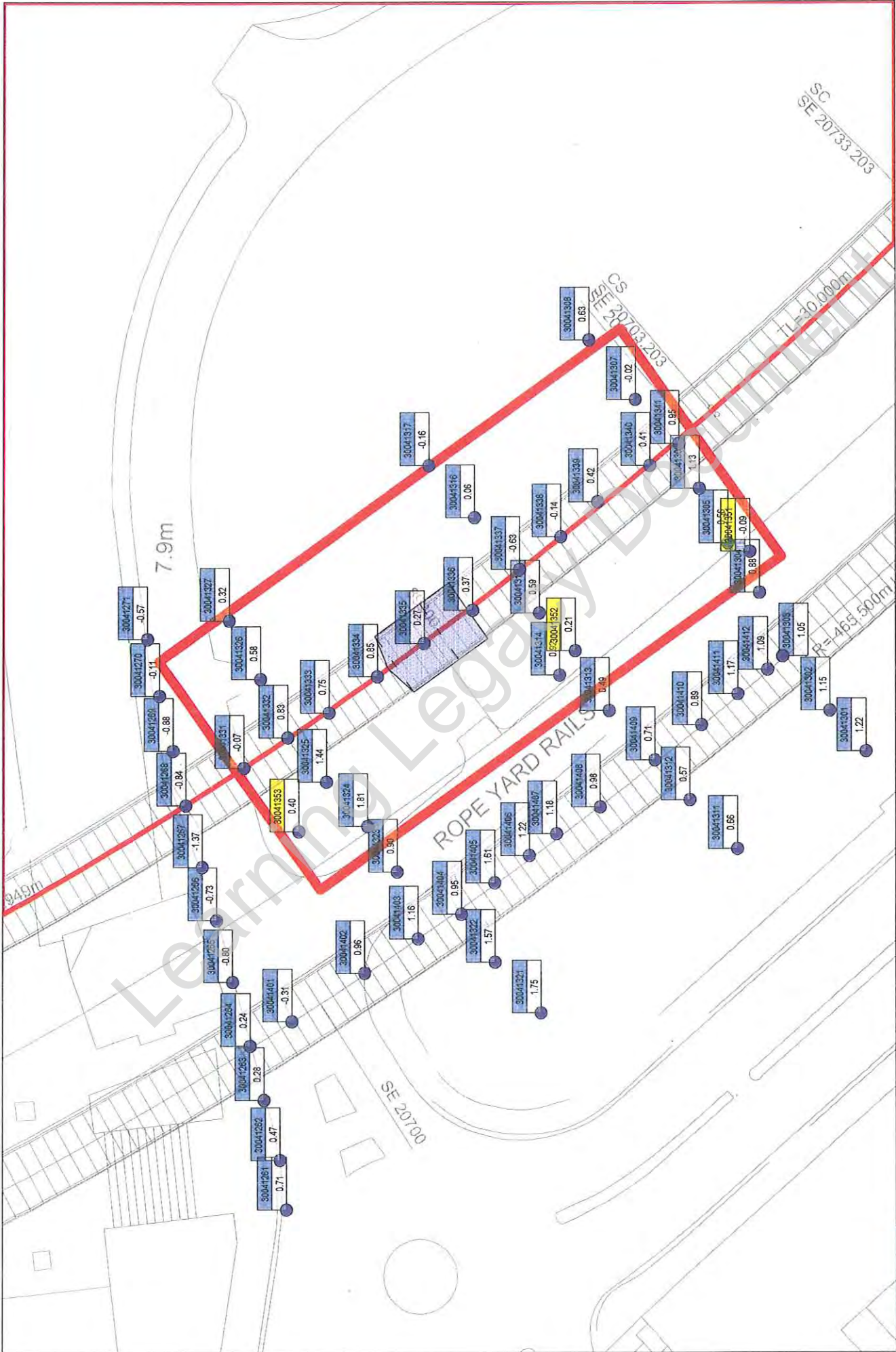


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

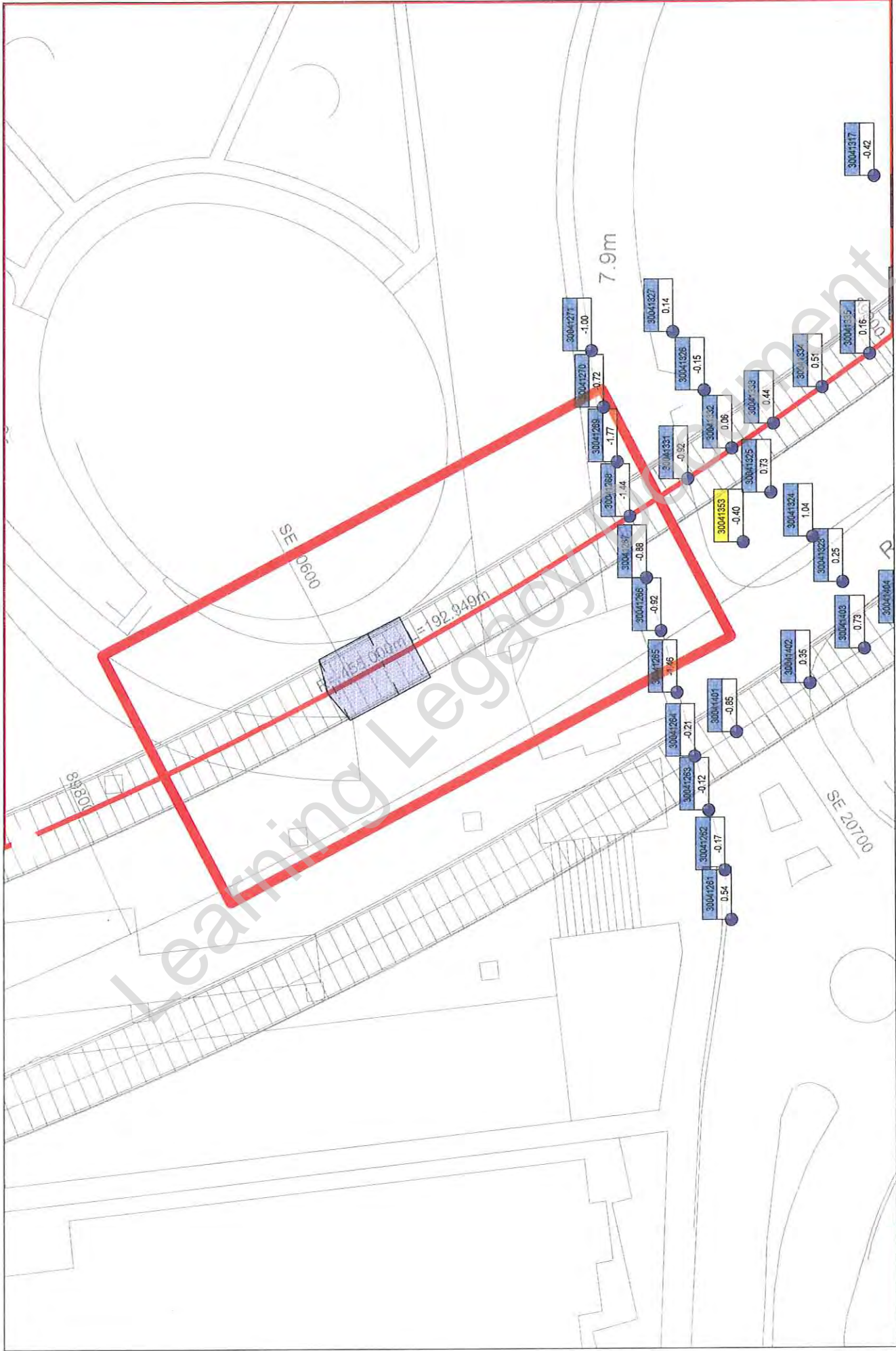
Close Out Report: WB Tunnel - CS 22 - Warren Lane Roundabout 13.08.2013 - 24.09.2014

Date: 23.10.2014 17:40 Current Values: 23.10.2014 17:19



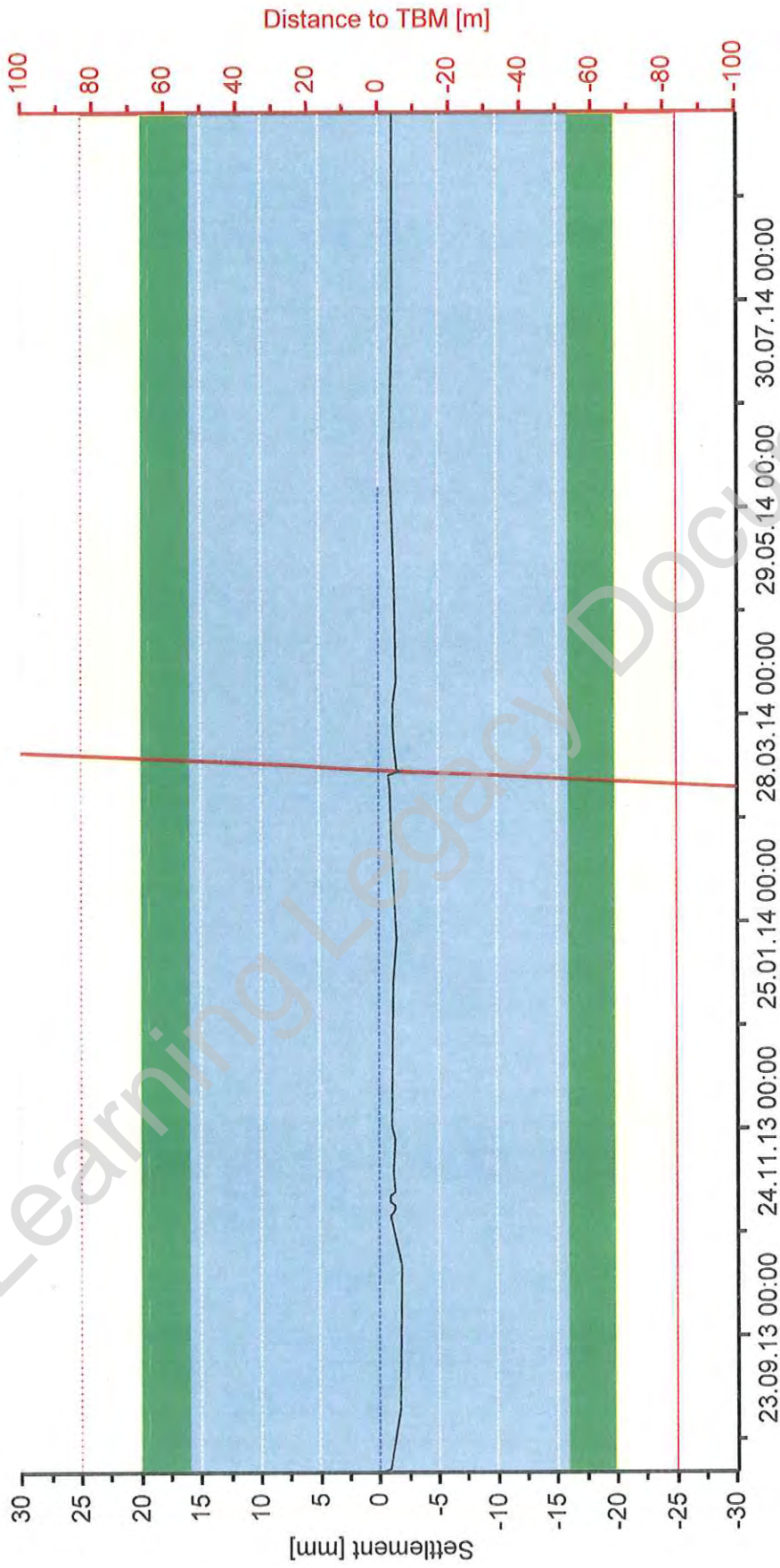


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 10.03.2014 09:00



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 13.03.2014 17:59

Point: 30041268



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - CS 22 - Warren Lane Roundabout 13.08.2013 - 24.09.2014
date: 19.10.2014 16:51 current values: 19.10.2014 16:41



monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS22 WarrenLane Roundabout**

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	13/8/13	14/08/2013		01/09/2013		23/09/2013		14/10/2013		29/10/2013		29/10/2013	
	elevation												
3004 1261	109.964	109.964	0	109.964	0	109.964	0	109.963	-1	109.964	0	109.964	0
3004 1262	109.688	109.688	0	109.688	0	109.688	0	109.687	-1	109.688	1	109.688	0
3004 1263	109.423	109.422	0	109.423	0	109.423	0	109.421	-2	109.422	1	109.422	0
3004 1264	109.167	109.166	0	109.166	0	109.167	0	109.166	-1	109.167	1	109.167	0
3004 1265	108.942	108.941	-1	108.940	-1	108.941	0	108.940	-1	108.941	1	108.941	0
3004 1266	108.661	108.660	-1	108.659	-1	108.659	0	108.659	0	108.660	1	108.660	0
3004 1267	108.584	108.583	-1	108.582	-1	108.582	0	108.582	0	108.583	1		
3004 1268	108.484	108.483	-1	108.483	-1	108.482	0	108.482	0	108.483	1		
3004 1269	108.439	108.438	-1	108.437	-1	108.437	0	108.437	0	108.438	1		
3004 1270	108.400	108.399	-1	108.399	0	108.399	0	108.399	0	108.400	1		
3004 1271	108.356	108.355	-1	108.355	0	108.355	-1	108.355	0	108.356	1		

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS22 WarrenLane Roundabout

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
	13/8/13													
		109.964	109.964	0	109.964	0	109.964	0	109.964	0	109.964	0	109.964	0
3004 1261		109.688	109.688	0	109.688	0	109.688	0	109.688	0	109.688	0	109.688	0
3004 1262		109.423	109.422	0	109.422	0	109.422	0	109.422	0	109.422	0	109.422	0
3004 1263		109.167	109.166	0	109.166	0	109.167	1	109.166	-1	109.166	0	109.167	0
3004 1264		108.942	108.941	0	108.941	0	108.941	0	108.940	-1	108.940	0	108.940	0
3004 1265		108.661	108.660	0	108.660	0	108.660	0	108.660	0	108.660	0	108.660	0
3004 1266		108.584	108.583	0	108.583	0	108.583	1	108.583	0	108.583	0	108.583	0
3004 1267		108.484	108.483	0	108.483	0	108.483	0	108.483	0	108.483	0	108.483	0
3004 1268		108.439	108.438	0	108.438	0	108.438	0	108.438	0	108.438	0	108.438	0
3004 1269		108.400	108.399	0	108.399	0	108.400	0	108.399	-1	108.400	0	108.400	0
3004 1270		108.356	108.355	0	108.355	0	108.355	0	108.355	0	108.355	0	108.355	0
3004 1271														

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS22 WarrenLane Roundabout

No. of reading	baseline		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			
	13/8/13																
3004 1261		109.964	109.965	1	109.964	0	1	109.964	-1	0	1	109.964	0	1	109.964	-1	0
3004 1262		109.688	109.688	0	109.688	0	0	109.688	-1	0	0	109.688	0	0	109.688	0	0
3004 1263		109.423	109.423	0	109.423	0	0	109.422	-1	-1	0	109.422	0	0	109.422	0	0
3004 1264		109.167	109.167	0	109.167	0	0	109.166	-1	-1	0	109.166	0	0	109.166	0	0
3004 1265		108.942	108.941	1	108.941	0	-1	108.940	-1	-2	1	108.940	0	-1	108.940	0	-1
3004 1266		108.661	108.660	0	108.660	0	-1	108.659	-1	-1	0	108.660	0	-1	108.660	0	-1
3004 1267		108.584	108.584	0	108.583	-1	-1	108.583	0	-1	1	108.583	0	-1	108.583	0	-1
3004 1268		108.484	108.483	0	108.483	0	-1	108.482	-1	-2	0	108.483	0	-1	108.483	0	-1
3004 1269		108.439		Covered	108.438	0	-1	108.437	-1	-2	0	108.438	0	-1	108.438	0	-1
3004 1270		108.400		Covered	108.400	1	0	108.399	-1	-1	0	108.400	0	-1	108.400	0	0
3004 1271		108.356		Covered	108.356	0	-1	108.355	-1	-2	0	108.355	0	-1	108.356	0	-1

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **CS22 WarrenLane Roundabout**

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	13/8/13	24/03/2014		31/03/2014		07/04/2014		06/05/2014		17/06/2014		22/07/2014	
3004 1261	109.964	109.964	0	109.964	0	109.964	0	109.964	0	109.965	1	109.963	-1
3004 1262	109.688	109.688	0	109.688	0	109.688	0	109.688	0	109.688	0	109.688	0
3004 1263	109.423	109.422	0	109.422	0	109.422	0	109.422	0	109.423	1	109.422	-1
3004 1264	109.167	109.166	0	109.167	0	109.166	-1	109.167	0	109.166	0	109.166	0
3004 1265	108.942	108.940	0	108.941	0	108.940	-1	108.941	0	108.941	0	108.940	-1
3004 1266	108.661	108.660	0	108.660	0	108.660	0	108.660	0	108.660	0	108.660	0
3004 1267	108.584	108.583	0	108.583	0	108.583	0	108.583	0	108.583	0	108.583	0
3004 1268	108.484	108.483	0	108.483	0	108.483	0	108.483	0	108.483	0	108.483	0
3004 1269	108.439	108.438	0	108.438	0	108.438	0	108.437	-2	108.438	1	108.438	0
3004 1270	108.400	108.400	0	108.400	0	108.400	0	108.400	0	108.400	0	108.400	0
3004 1271	108.356	108.356	0	108.355	0	108.356	0	108.356	0	108.356	0	108.356	0


monitoring table



Joint Venture

project: **C310 Thames Tunnel**
 structure: **CS22 WarrenLane Roundabout**

No. of reading	baseline		31. following		deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation
	13/8/13	24/09/2014	deviation from last/ baseline	deviation from last/baseline										
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 1261	109.964	109.965	1	1										
3004 1262	109.688	109.688	0	0										
3004 1263	109.423	109.422	0	0										
3004 1264	109.167	109.167	1	0										
3004 1265	108.942	108.941	0	-1										
3004 1266	108.661	108.660	0	-1										
3004 1267	108.584	108.583	0	-1										
3004 1268	108.484	108.483	0	-1										
3004 1269	108.439	108.438	0	-2										
3004 1270	108.400	108.399	-1	-1										
3004 1271	108.356	108.355	-1	-1										

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

APPENDIX 69

Warren Lane Car park EB

Learning Legacy Document

monitoring asset	Services underneath Warren Lane Carpark		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	Warren lane Carpark EB Tunnel		
sensor type:	manual levelling studs		
chainage:	89880 - 89930	point no.:	3004 1331 - 3004 1341
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	26/08/13	0.00		
TBM 1	start ZOI	24/10/13	1.03	3004 1341
		28/10/13	-0.66	3004 1331
	end ZOI	29/10/13	0.93	3004 1341
		01/11/13	-0.38	3004 1331
breached not any trigger value				
TBM 2	start ZOI	07/03/14	1.78	3004 1341
		10/03/14	0.07	3004 1331
	end ZOI	10/03/14	0.95	3004 1341
		13/03/14	-0.92	3004 1331
breached not any trigger value				
longterm	08/10/14	-1.44	3004 1331	

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)

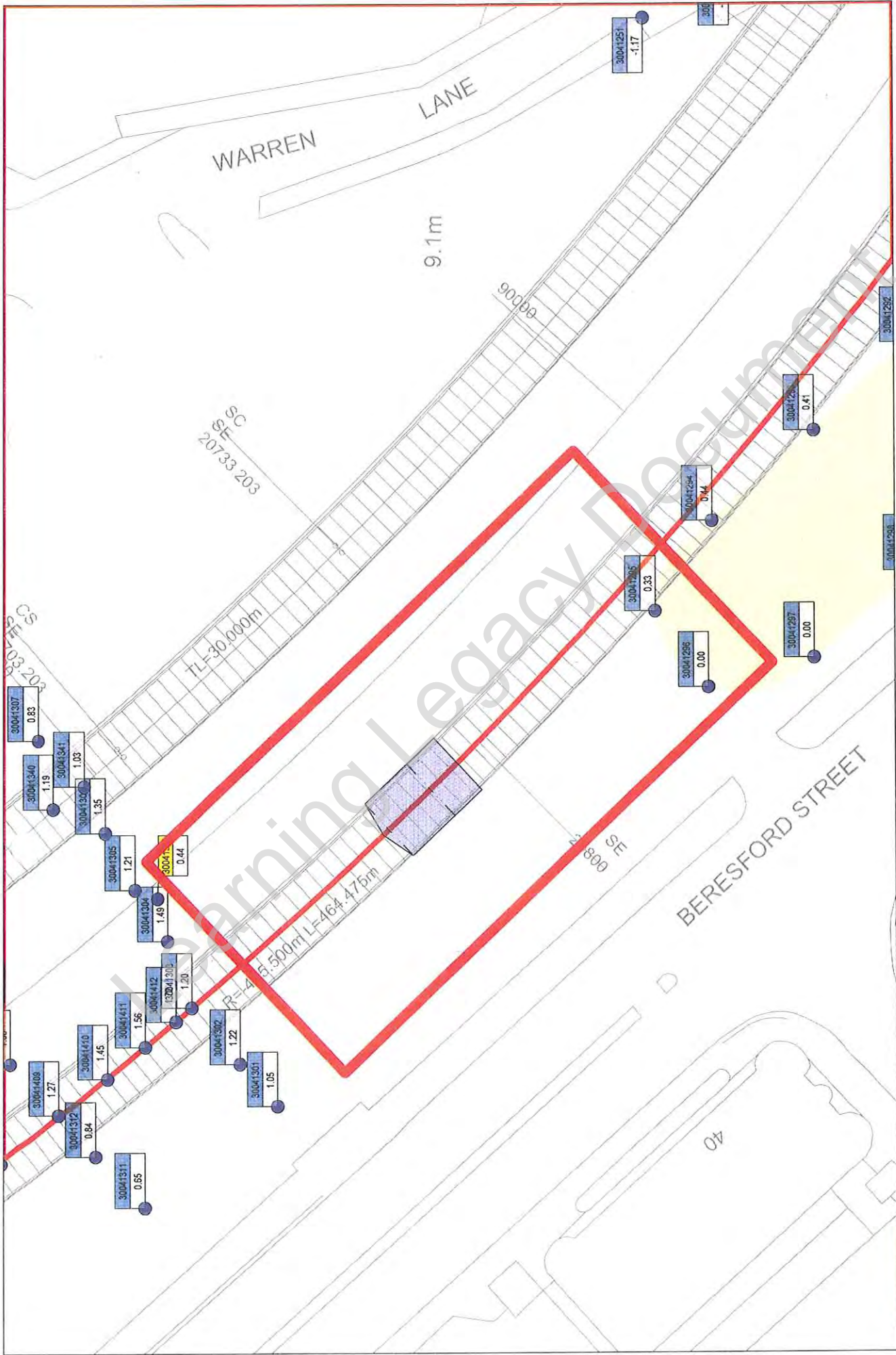
summary / comments

3004 1331 - 3004 1341
 Point no. 3004 1337 destroyed
 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.

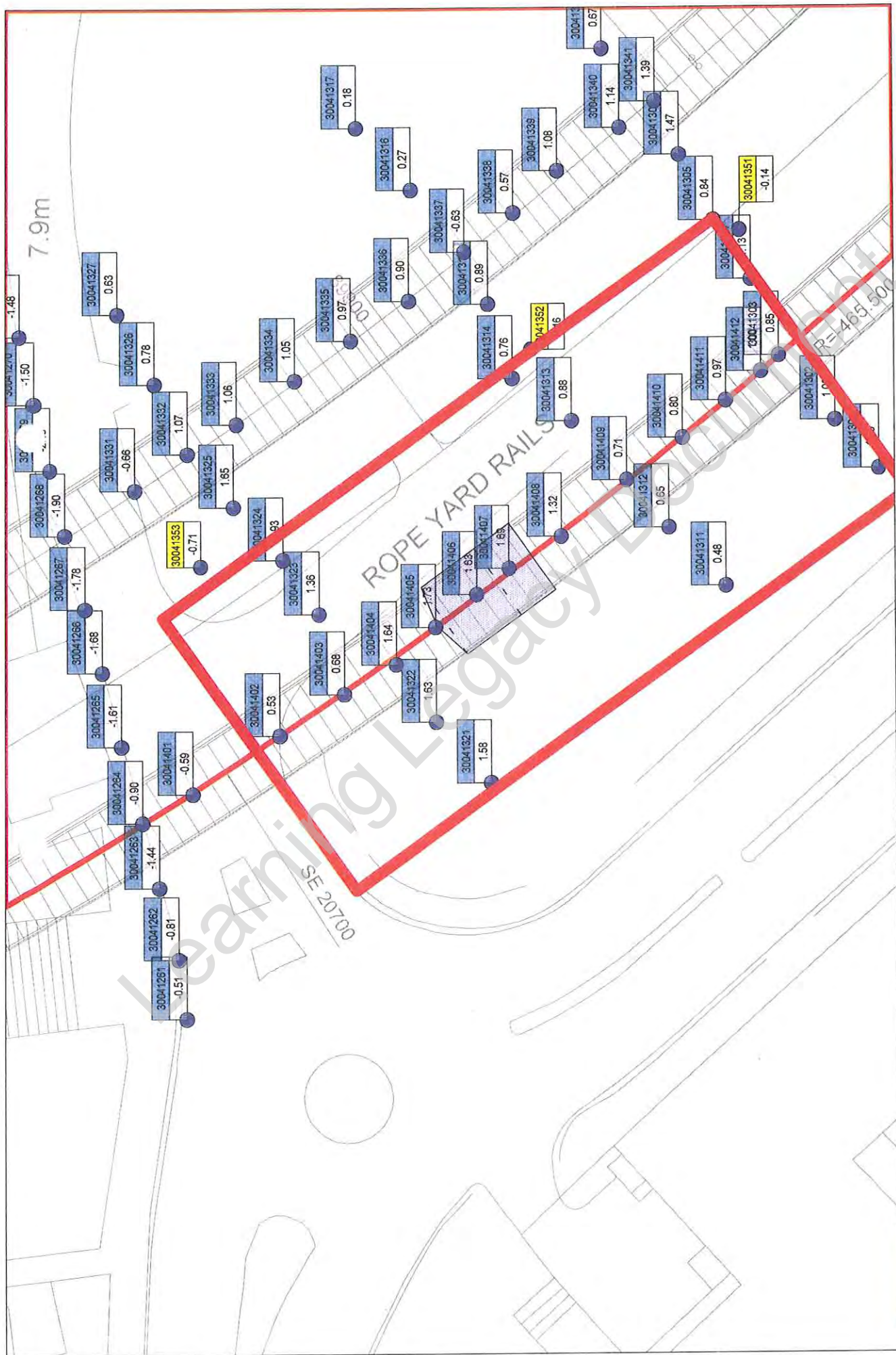
date / signature: 08/01/15

print name: 

HMJV project role: Monitoring & Survey engineer

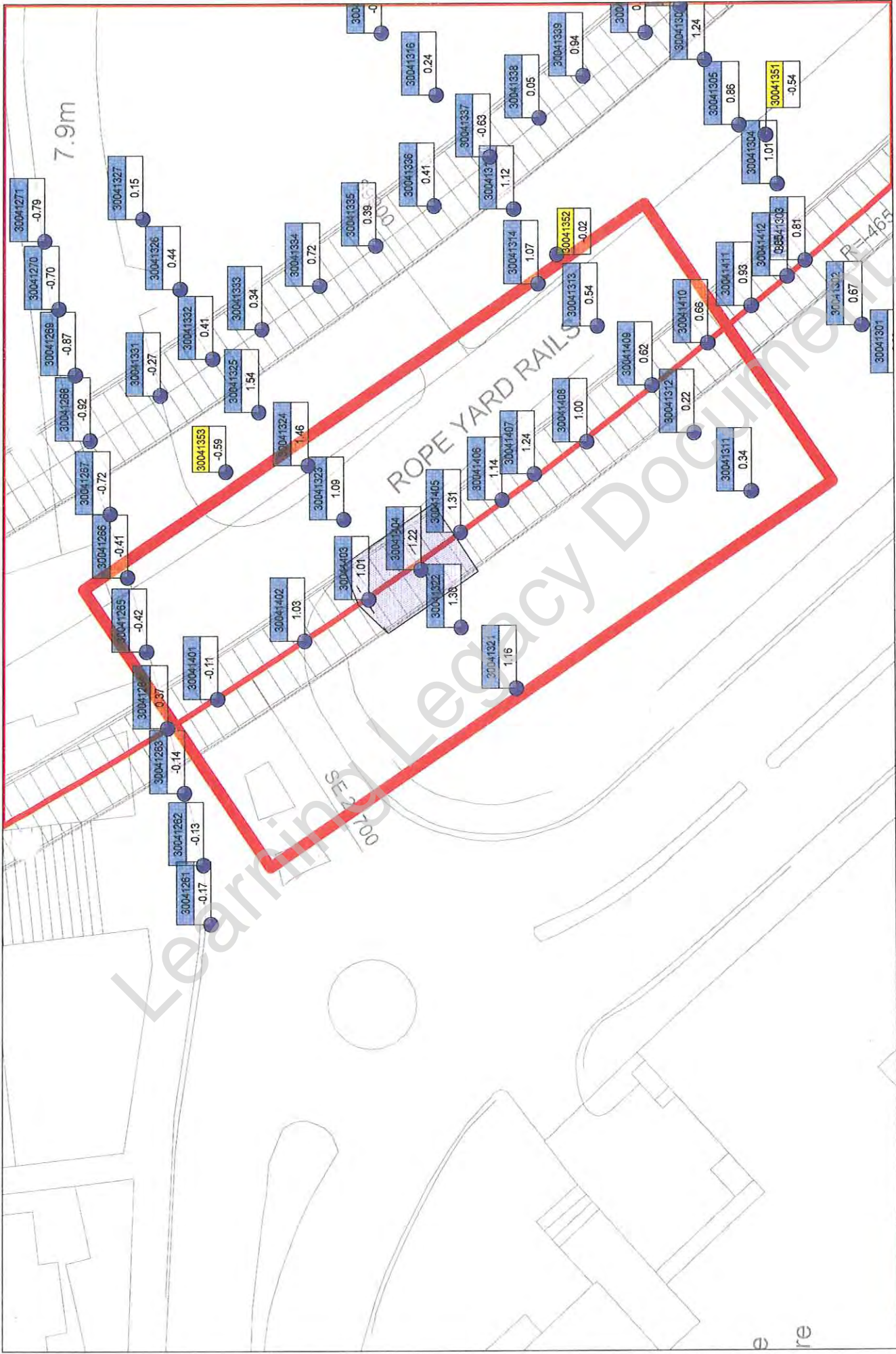


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 24.10.2013 18:30



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 28.10.2013 18:06



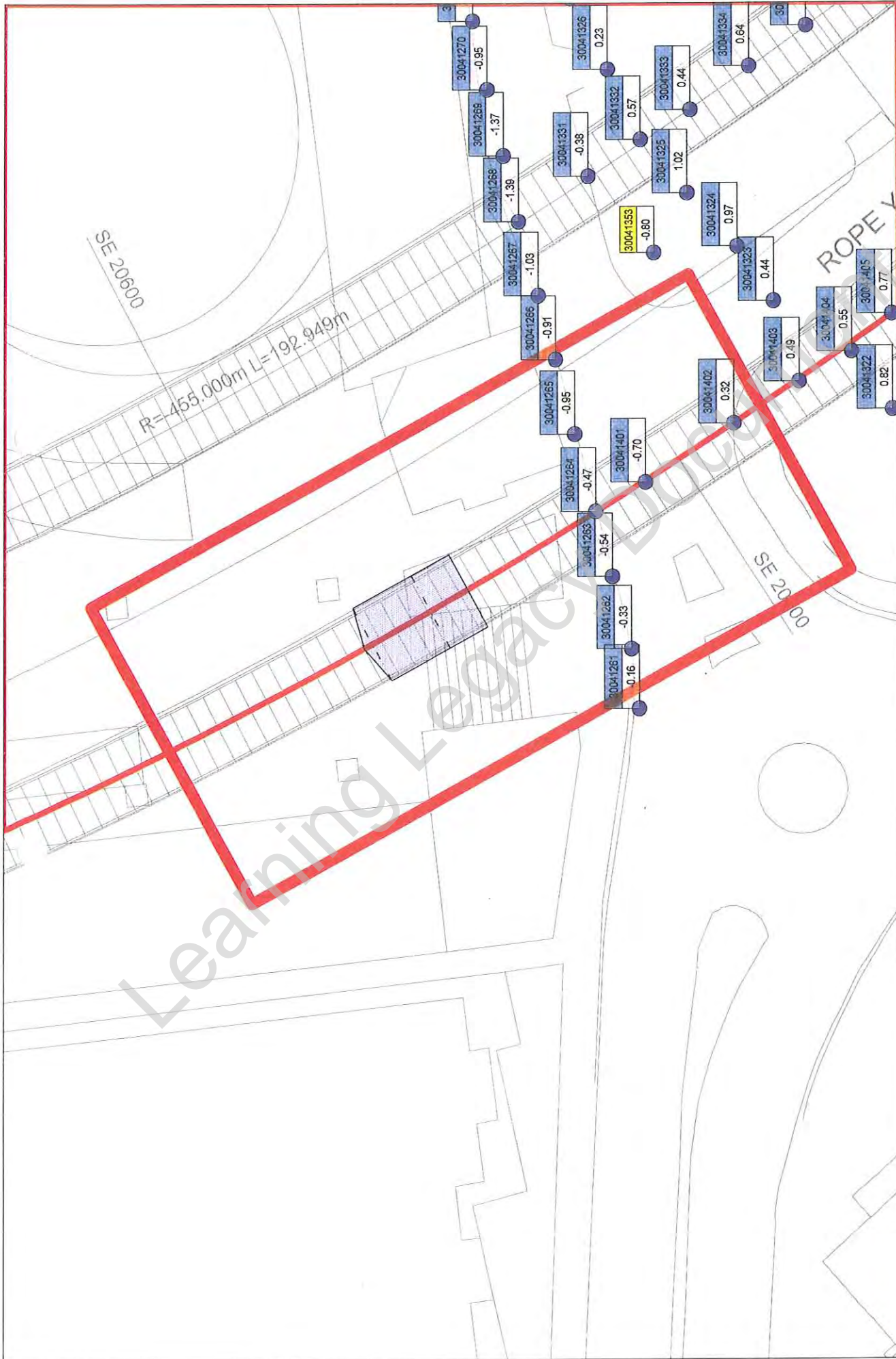


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

working activities: TBM drive WB

current values: 29.10.2013 09:00

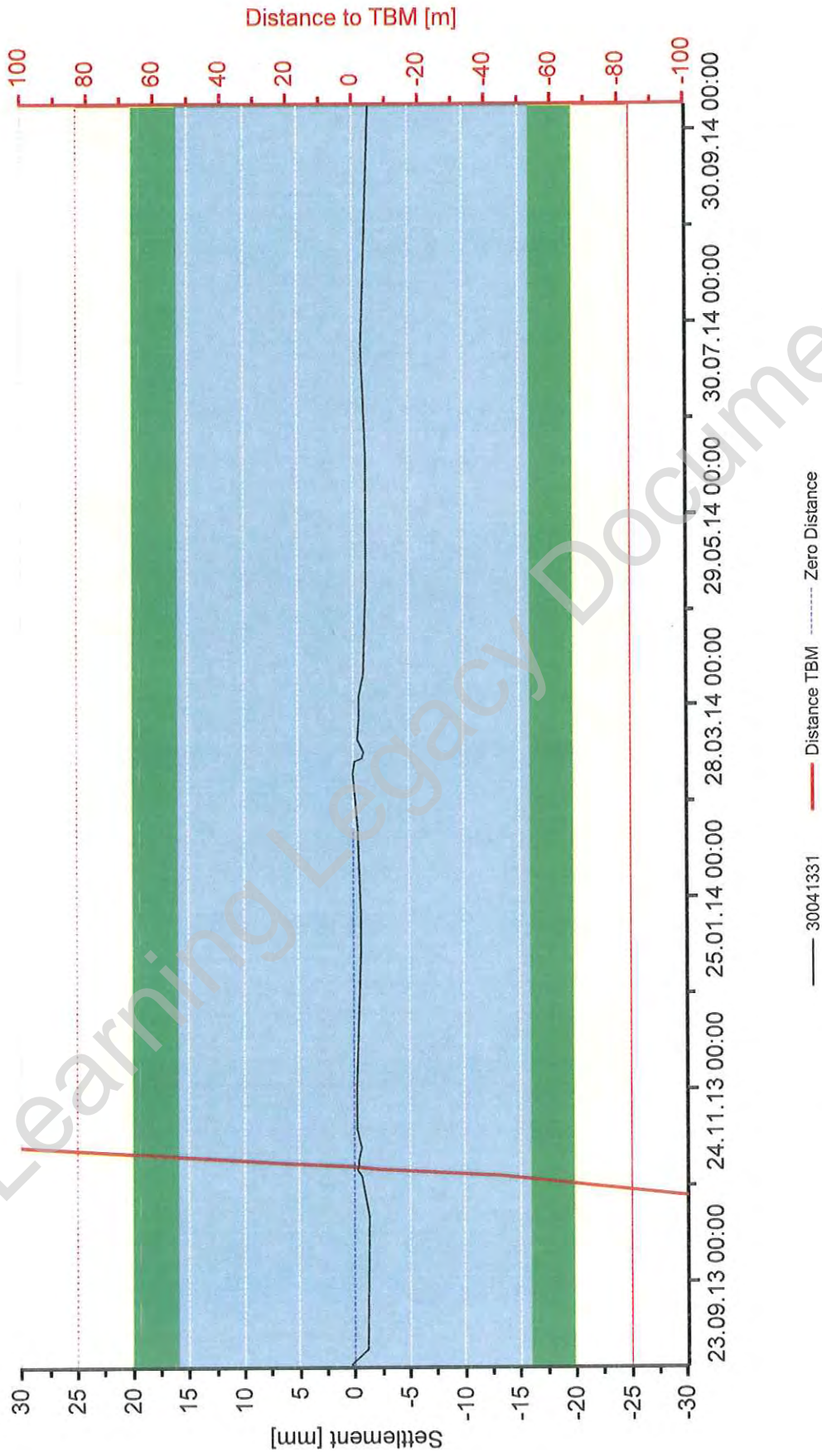




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 01.11.2013 09:00



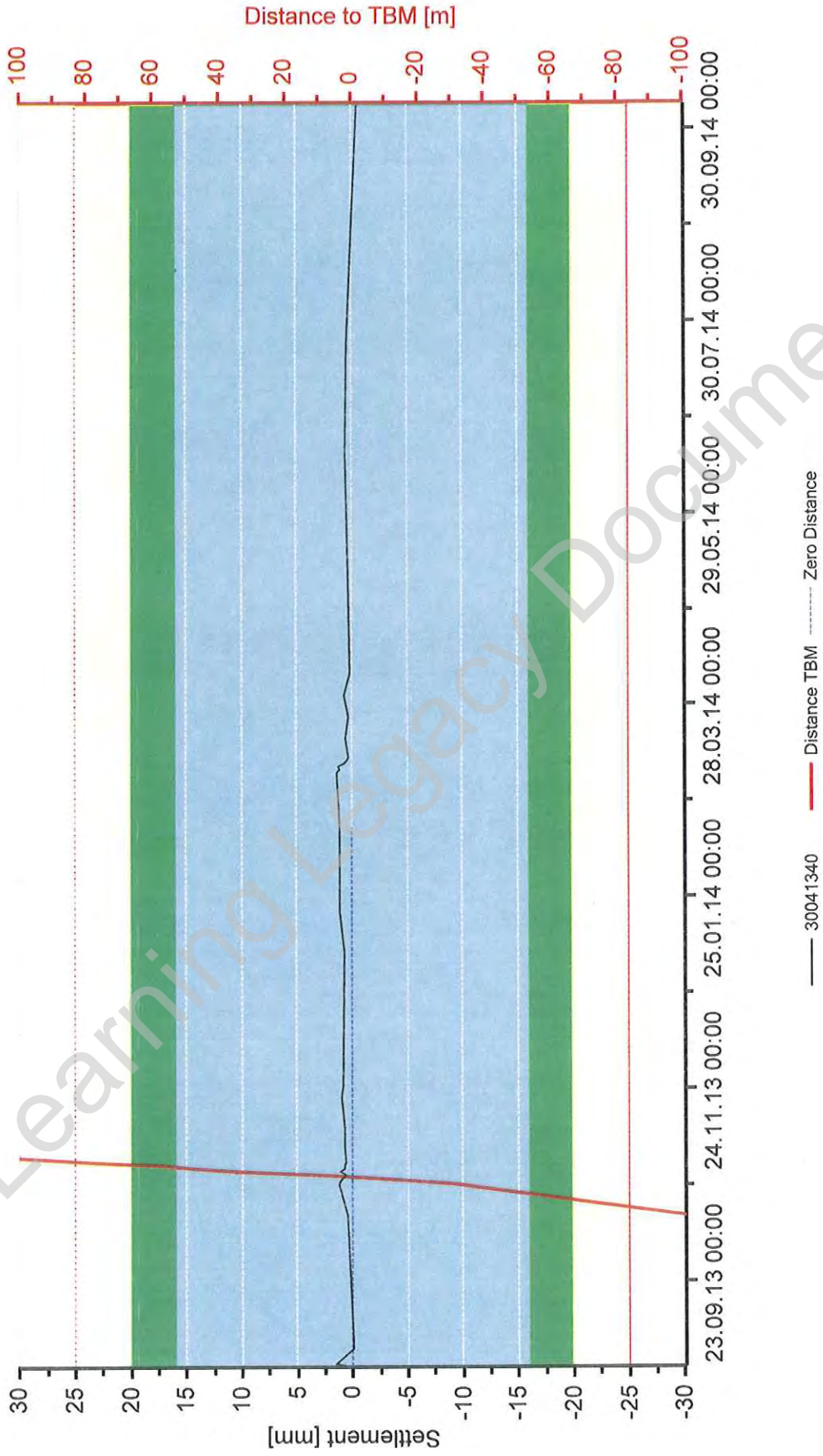
Point: 30041331



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Warren Lane Carpark EB 26.08.2013 - 08.10.2014
Date: 28.10.2014 08:54 Current Values: 28.10.2014 08:34

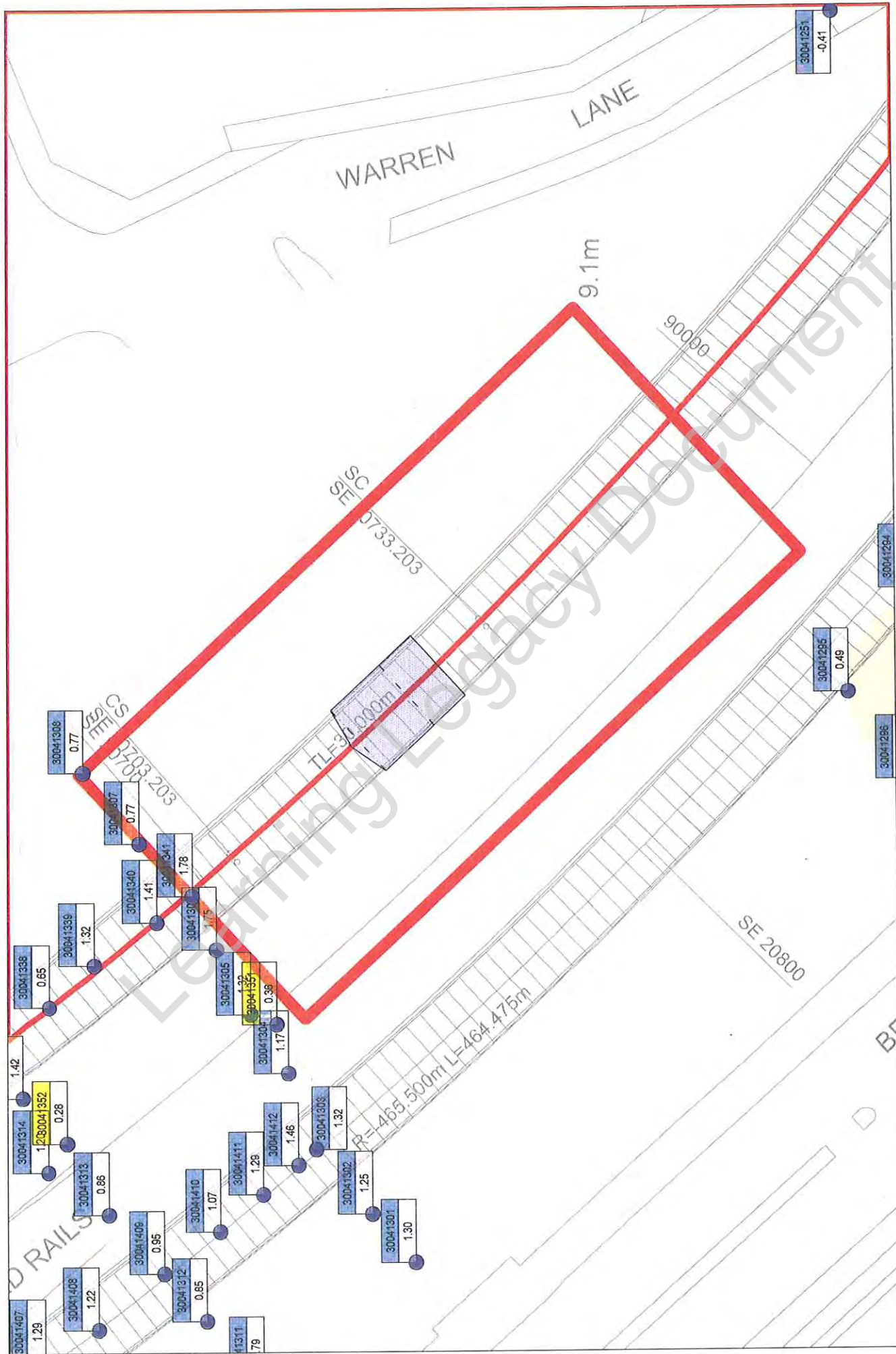


Point: 30041340

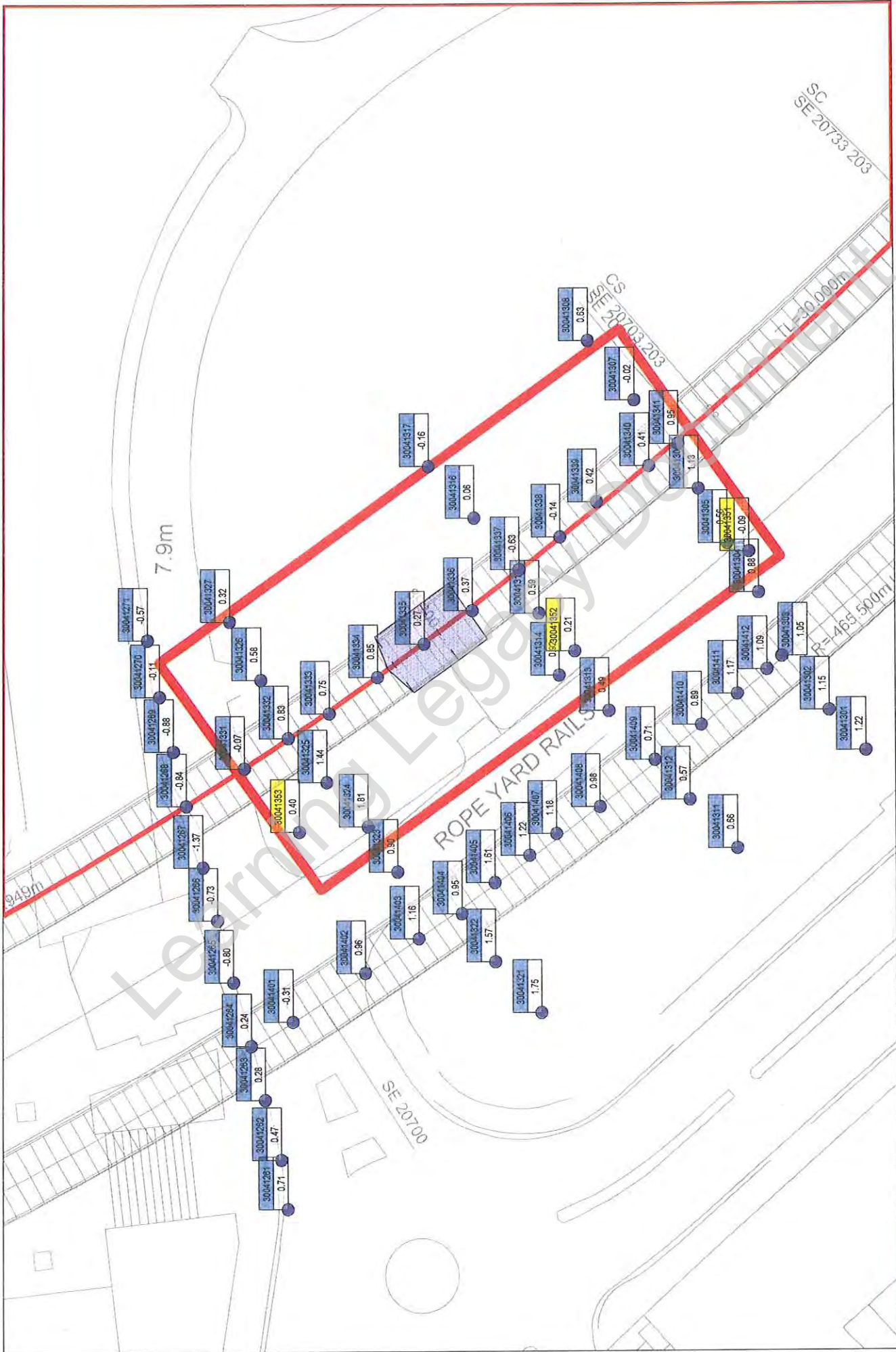


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Warren Lane Carpark EB 26.08.2013 - 08.10.2014
Date: 28.10.2014 08:55 Current Values: 28.10.2014 08:49



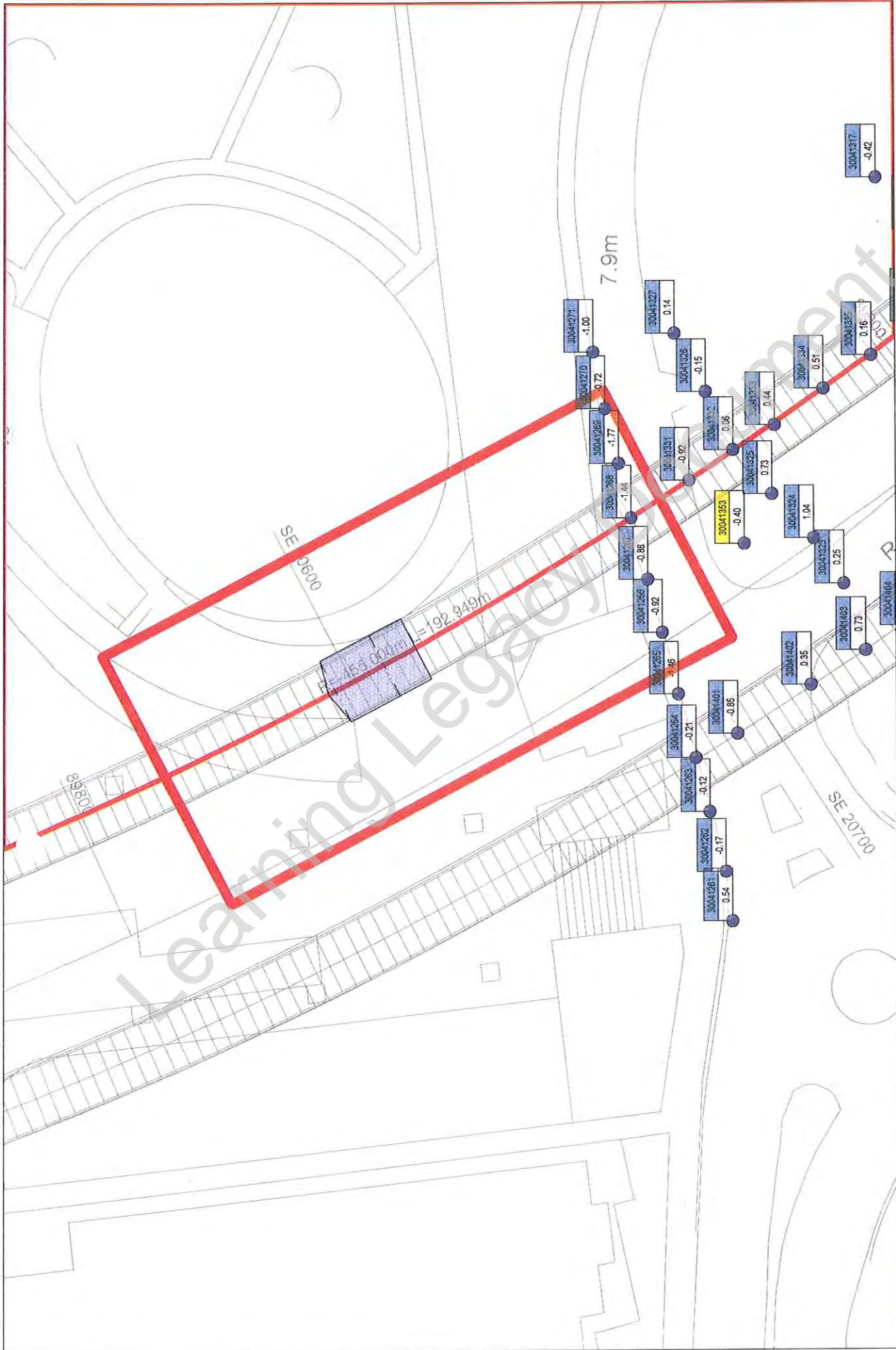


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 09.03.2014 15:59



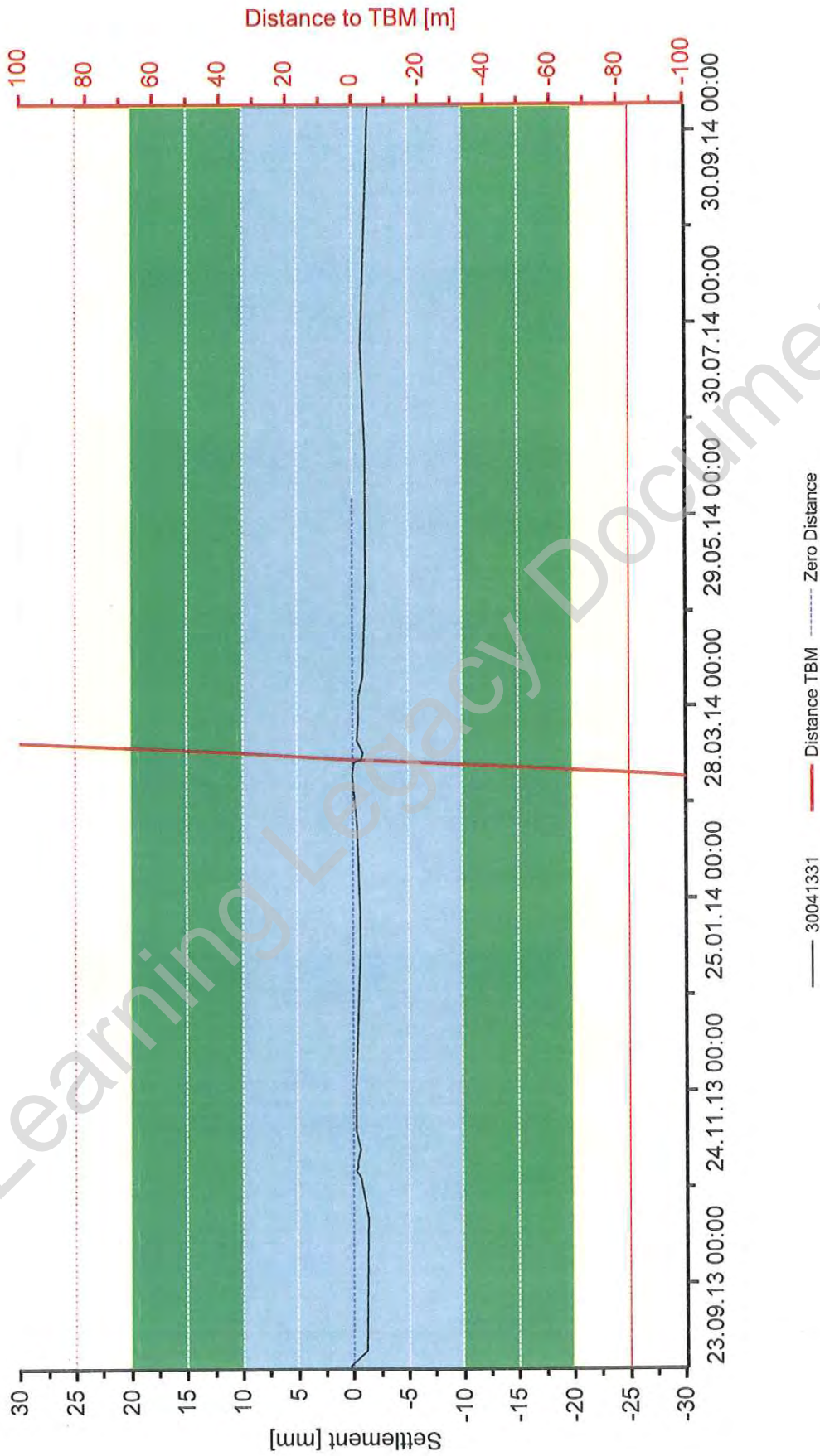
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 10.03.2014 09:00





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 13.03.2014 17:59

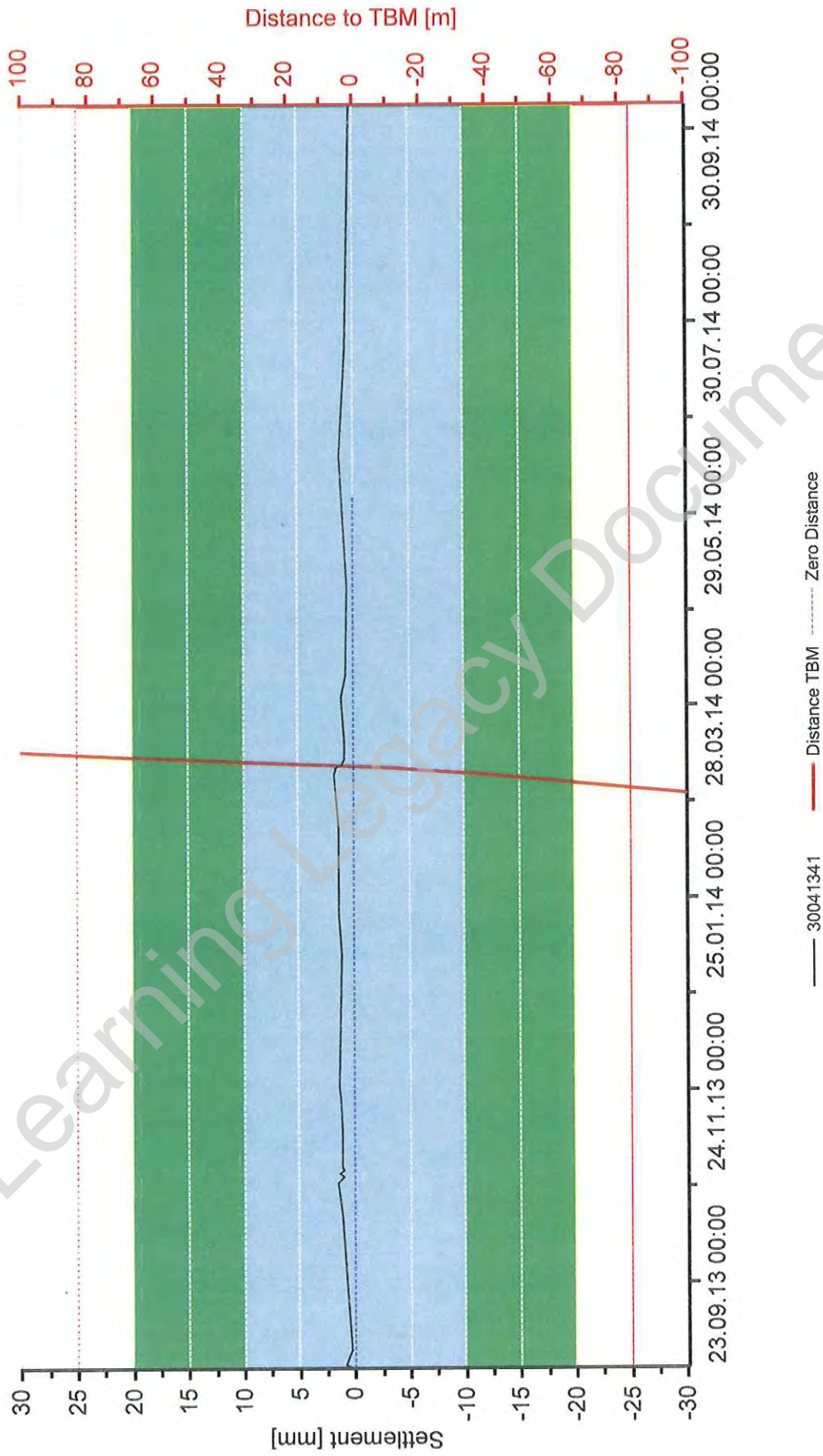
Point: 30041331



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Warren Lane Carpark EB 26.08.2013 - 08.10.2014
date: 22.10.2014 12:32 current values: 22.10.2014 12:28



Point: 30041341



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Warren Lane Carpark EB 26.08.2013 - 08.10.2014
date: 22.10.2014 12:33 current values: 22.10.2014 12:28



monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: WarrenLane CarPark Eastbound

No. of reading	baseline date	1. following 27/08/2013		2. following 01/09/2013		3. following 23/09/2013		4. following 14/10/2013		5. following 24/10/2013		6. following 25/10/2013	
		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 1331	108.404	108.405	0	108.403	-1								
3004 1332	108.698	108.699	1	108.697	-1	108.697	-1	108.697	0	-1			
3004 1333	108.649	108.649	0	108.646	-1	108.648	-1	108.648	0	-1			
3004 1334	108.711	108.711	0	108.711	0	108.710	-1	108.710	0	-2			
3004 1335	108.755	108.756	1	108.756	-1	108.754	-2	108.754	0	-2			
3004 1336	108.808	108.808	1	108.807	-1	108.806	-1	108.806	1	-1			108.808
3004 1337	108.849	108.851	1	108.849	-2	108.847	-1	108.847			destroyed		destroyed
3004 1338	108.913	108.913	0	108.912	-1	108.911	-1	108.912	1	-1	108.913	1	108.913
3004 1339	108.951	108.951	0	108.951	0	108.950	-1	108.950	1	0	108.952	1	108.952
3004 1340	109.047	109.048	1	109.047	-2	109.046	0	109.046	1	0	109.048	1	109.048
3004 1341	109.090	109.090	1	109.090	-1	109.091	1	109.091	0	1	covered		109.091

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: WarrenLane CarPark Eastbound

No. of reading	7. following		8. following		9. following		10. following		11. following		12. following	
	baseline	26/10/2013	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	26/10/2013		27/10/2013		28/10/2013		29/10/2013		30/10/2013		31/10/2013	
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 1331	108.404		108.404	1			108.404	0	108.404	0	108.404	0
3004 1332	108.698	2	108.699	0	108.699	1	108.699	-1	108.699	0	108.699	0
3004 1333	108.649	2	108.649	0	108.650	1	108.649	-1	108.649	0	108.649	0
3004 1334	108.711	2	108.712	0	108.712	0	108.712	0	108.712	0	108.712	0
3004 1335	108.755	2	108.756	0	108.756	1	108.756	-1	108.756	0	108.756	0
3004 1336	108.808	0	108.808	0	108.808	1	108.808	0	108.808	0	108.808	0
3004 1337	108.849	destroyed		destroyed		destroyed		destroyed		destroyed		destroyed
3004 1338	108.913	0	108.913	0	108.913	1	108.913	-1	108.913	0	108.913	0
3004 1339	108.951	0	108.952	0	108.952	0	108.951	0	108.951	0	108.951	0
3004 1340	109.047	0	109.047	0	109.048	1	109.047	-1	109.047	0	109.047	0
3004 1341	109.090	0	109.091	0	109.091	0	109.090	0	109.091	0	109.091	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Eastbound**

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
	28/8/13													07/01/2014
3004 1331		108.404	108.404	0	108.404	0	108.404	0	108.404	0	108.404	0	108.404	0
3004 1332		108.698	108.699	0	108.699	0	108.699	0	108.699	0	108.699	0	108.699	0
3004 1333		108.649	108.649	0	108.649	0	108.649	0	108.649	0	108.650	0	108.649	0
3004 1334		108.711	108.712	0	108.712	0	108.711	0	108.712	0	108.712	0	108.712	0
3004 1335		108.755	108.756	0	108.756	0	108.756	0	108.756	0	108.756	0	108.756	-1
3004 1336		108.808	108.808	0	108.808	0	108.808	0	108.808	0	108.808	0	108.808	-1
3004 1337		108.849		destroyed		destroyed		destroyed		destroyed		destroyed		destroyed
3004 1338		108.913	108.913	0	108.913	0	108.913	0	108.913	0	108.913	0	108.913	-1
3004 1339		108.951			108.951	0	108.951	0	108.952	0	108.952	0	108.951	-1
3004 1340		109.047			109.047	0	109.047	0	109.048	0	109.047	0	109.047	0
3004 1341		109.090			109.091	0	109.091	0	109.091	0	109.091	0	109.091	0

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Eastbound**

No. of reading	19. following		20. following		21. following		22. following		23. following		24. 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
	26/8/13	20/01/2014										09/03/2014
No.	elevation											
3004 1331	108.404	108.404	0	-1	108.404	0	0	108.404	0	0		
3004 1332	108.698	108.699	0	0	108.699	0	0	108.699	0	1	108.699	0
3004 1333	108.649	108.649	0	0	108.650	1	1	108.650	0	1	108.650	0
3004 1334	108.711	108.712	0	0	108.712	1	1	108.712	0	1	108.712	0
3004 1335	108.755	108.756	0	0	108.756	1	1	108.756	0	1	108.757	0
3004 1336	108.808	108.808	0	0	108.808	1	1	108.809	0	1	108.809	0
3004 1337	108.849			destroyed			destroyed					destroyed
3004 1338	108.913	108.913	0	0	108.913	0	0	108.913	0	1	108.913	0
3004 1339	108.951	108.951	0	1	108.952	0	1	108.952	0	1	108.952	0
3004 1340	109.047	109.048	0	1	109.048	0	1	109.048	0	1	109.047	-1
3004 1341	109.090	109.091	0	1	109.091	0	1	109.091	0	2	109.091	-1

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Eastbound**

No. of reading	25. following		26. following		27. following		28. following		29. following		30. following				
	baseline	10/03/2014	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			
date	26/8/13											24/03/2014			
3004 1331	108.404	108.404	0	0	108.404	-1	108.403	0	-1	108.404	1	0	108.404	0	-1
3004 1332	108.698	108.699	0	1	108.698	-1	108.698	0	0	108.699	0	0	108.699	0	1
3004 1333	108.649	108.650	0	1	108.649	0	108.649	0	0	108.650	0	1	108.650	0	1
3004 1334	108.711	108.712	0	1	108.712	0	108.712	0	1	108.712	0	1	108.712	0	1
3004 1335	108.755	108.756	-1	0	108.755	0	108.756	0	0	108.756	0	0	108.756	0	0
3004 1336	108.808	108.808	-1	0	108.808	0	108.808	0	0	108.808	0	0	108.808	0	0
3004 1337	108.849														
3004 1338	108.913	108.913	-1	0	108.912	0	108.913	0	0	108.913	0	0	108.913	0	0
3004 1339	108.951	108.951	-1	0	108.951	0				108.951	0	1	108.951	0	0
3004 1340	109.047	109.047	0	0	109.047	0				109.047	0	1	109.047	0	0
3004 1341	109.090	109.091	0	1	109.090	0				109.090	0	1	109.091	0	1

monitoring table




Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Eastbound**

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	
	26/8/13														
3004 1331		108.404	108.404	0	108.404	0	-1	108.403	0	-1	108.403	0	-1	108.403	-1
3004 1332		108.698	108.699	0	108.699	0	0	108.699	0	1	108.699	0	0	108.698	-1
3004 1333		108.649	108.650	0	108.650	0	1	108.650	0	1	108.649	0	0	108.649	0
3004 1334		108.711	108.712	0	108.712	0	1	108.712	0	1	108.711	0	0	108.711	0
3004 1335		108.755	108.756	0	108.756	0	0	108.756	0	0	108.755	0	0	108.755	0
3004 1336		108.808	108.808	0	108.808	0	0	108.808	0	0	108.808	0	0	108.807	0
3004 1337		108.849		destroyed		destroyed			destroyed			destroyed			destroyed
3004 1338		108.913	108.913	0	108.912	-1	0	108.912	0	0	108.912	0	0	108.912	0
3004 1339		108.951	108.951	0	108.951	-1	0	108.951	0	0	108.951	0	1	108.950	-1
3004 1340		109.047	109.047	0	109.047	-1	0	109.047	0	0	109.047	0	0	109.046	-1
3004 1341		109.090	109.091	0	109.090	0	1	109.090	0	1	109.091	1	1	109.090	0

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

APPENDIX 70

Warren Lane Car park WB

Learning Legacy Document

monitoring asset

Services underneath Warren Lane Carpark

reference monitoring drawing:

C310-HTM-C-DWG-CR146-ST004-70002

name of monitoring section:

Warren lane Carpark WB Tunnel

sensor type:

manual levelling studs

chainage:

89880 - 89930

point no.:

3004 1401 - 3004 1414

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		26/08/13	0.00		
TBM 1	start ZOI	25/10/13	1.66	3004 1412	
		28/10/13	-0.59	3004 1401	
	end ZOI	29/10/13	0.85	3004 1412	breached not any trigger value
		01/11/13	-0.70	3004 1401	
TBM 2	start ZOI	07/03/14	0.98	3004 1412	
		10/03/14	-0.31	3004 1401	
	end ZOI	10/03/14	1.09	3004 1412	breached not any trigger value
		13/03/14	-0.85	3004 1401	
longterm		08/10/14	-1.94	3004 1401	

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 1401 - 3004 1414

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.

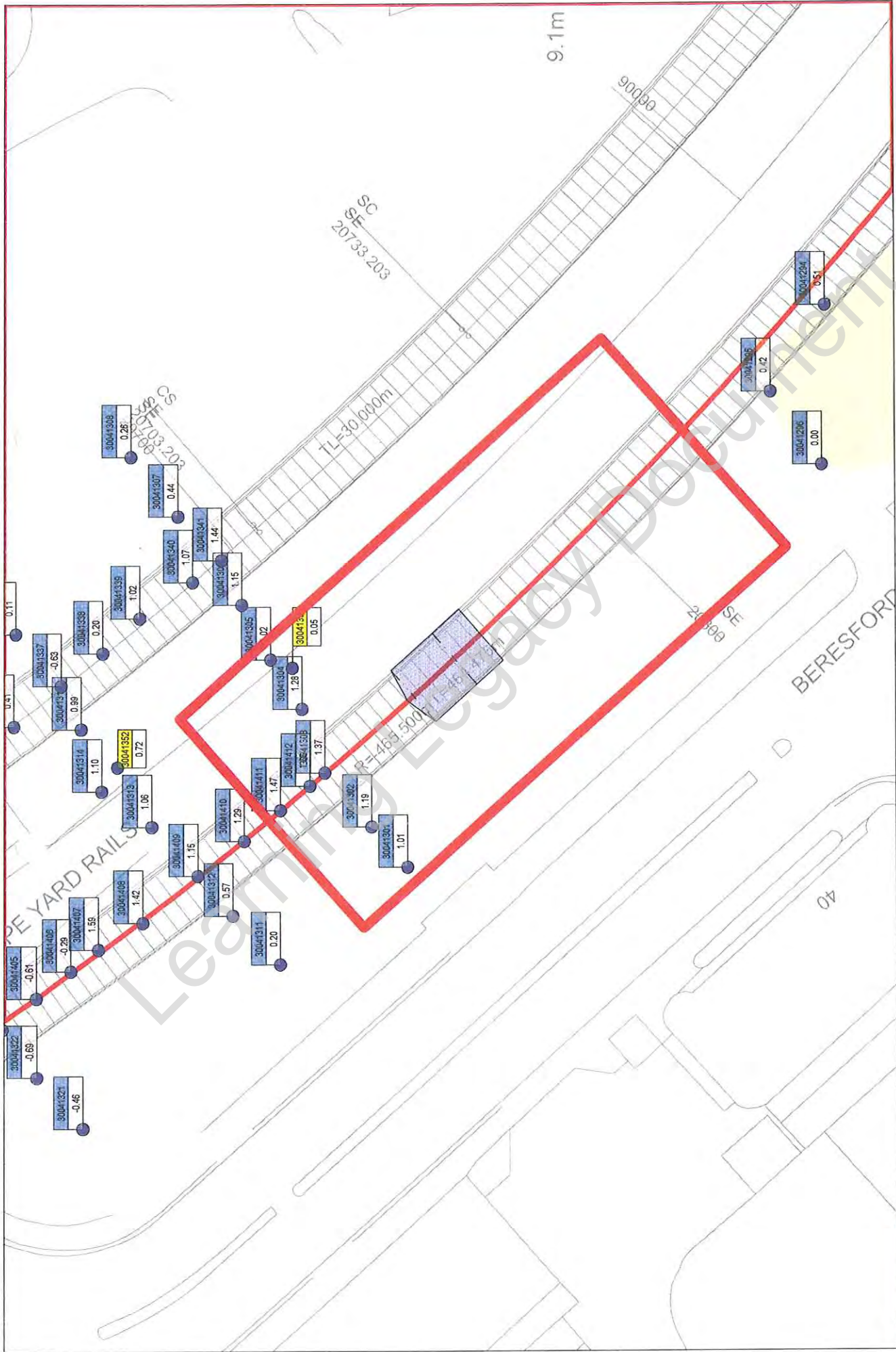
date / signature:

09/10/14

print name:

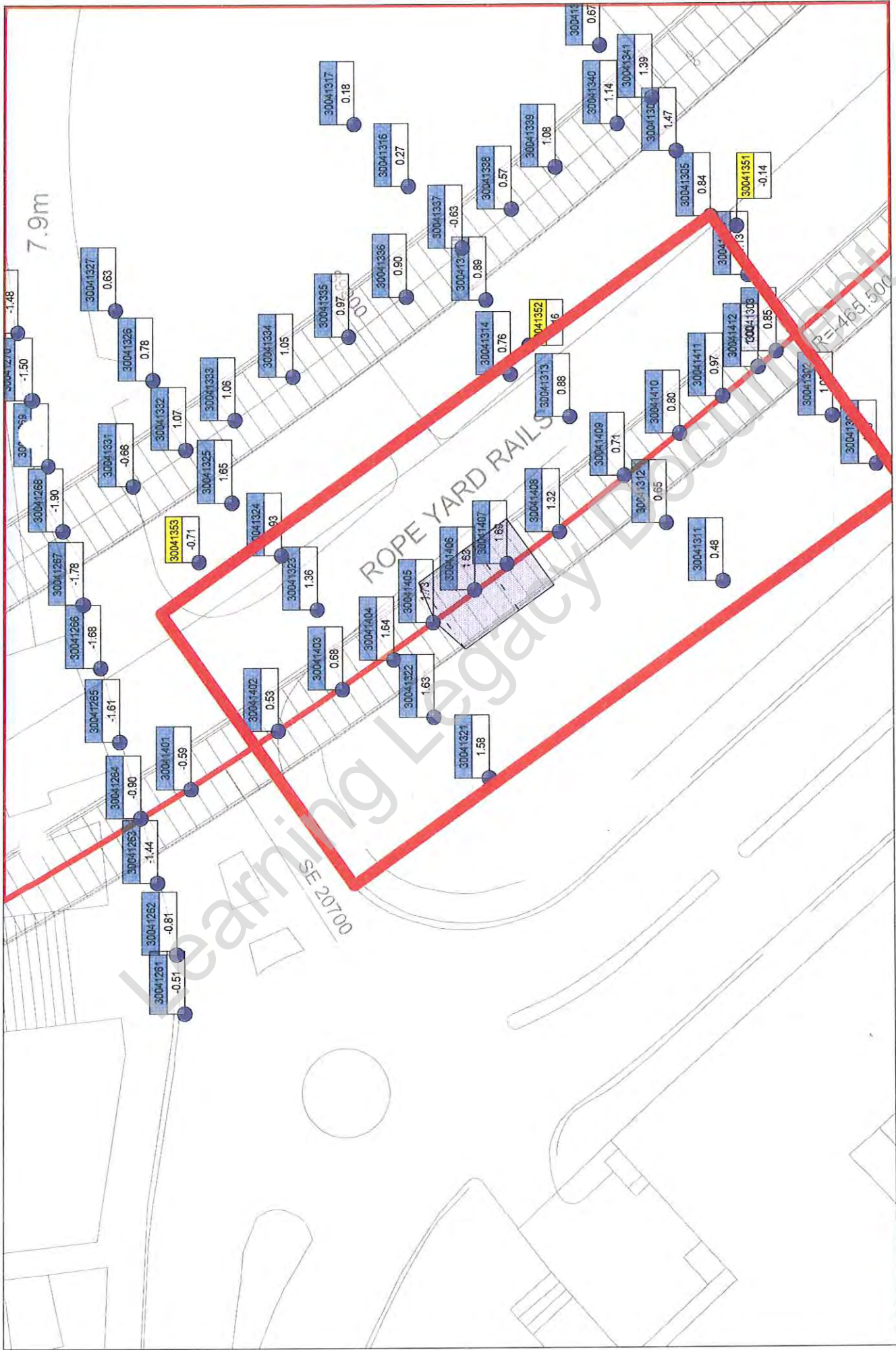
HMJV project role:

Monitoring & Survey engineer



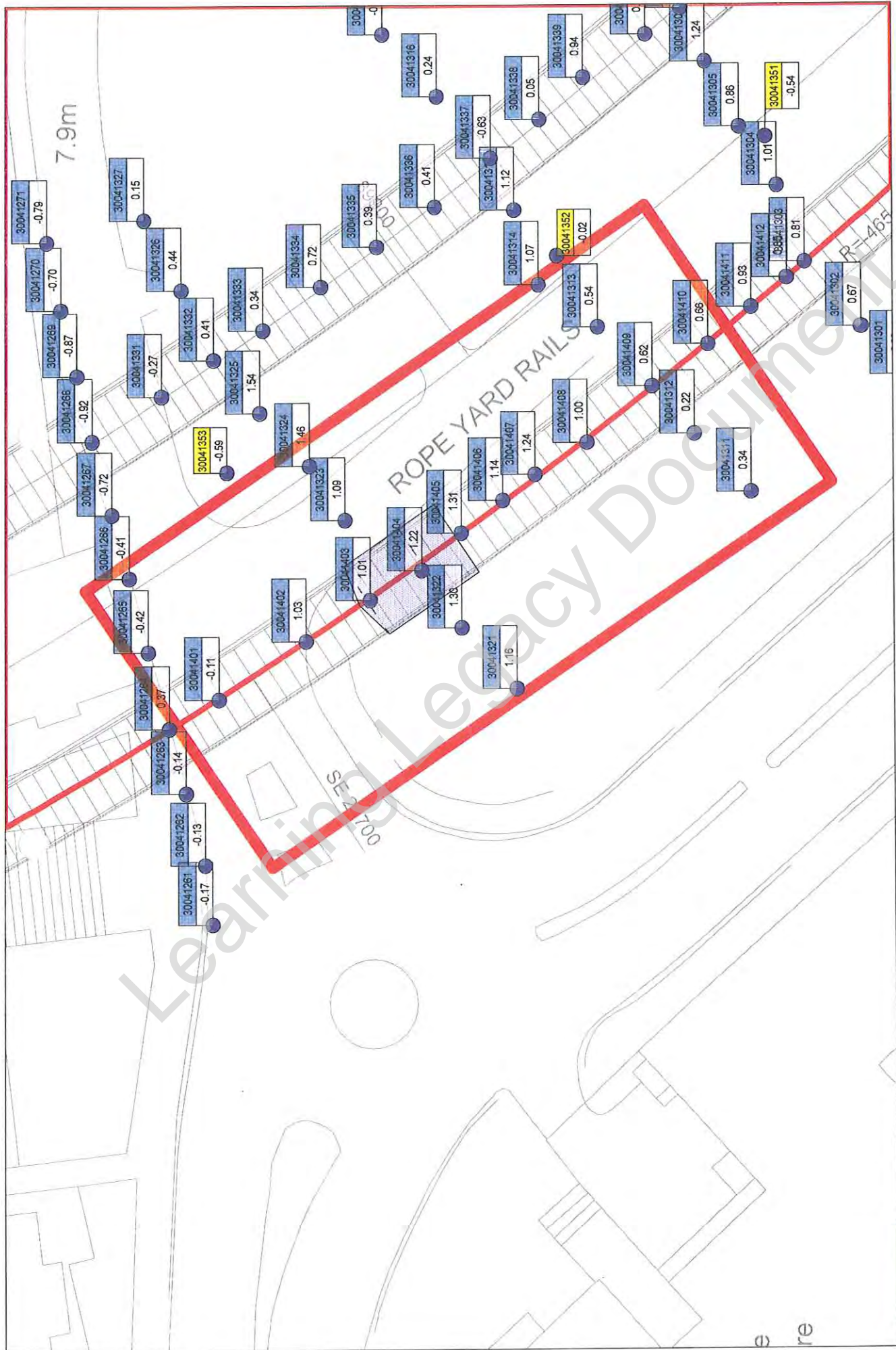
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 25.10.2013 18:42



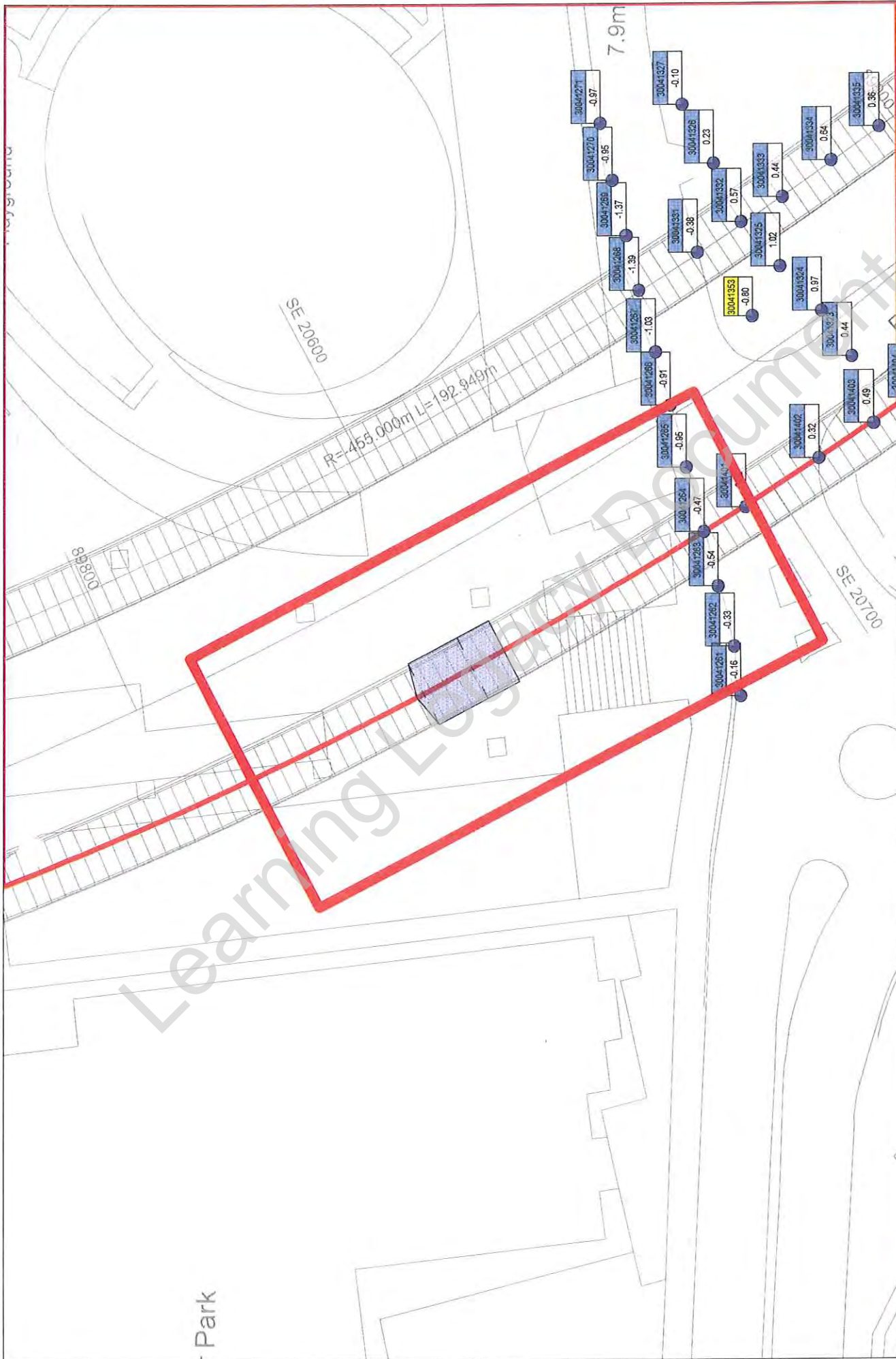


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 28.10.2013 18:06





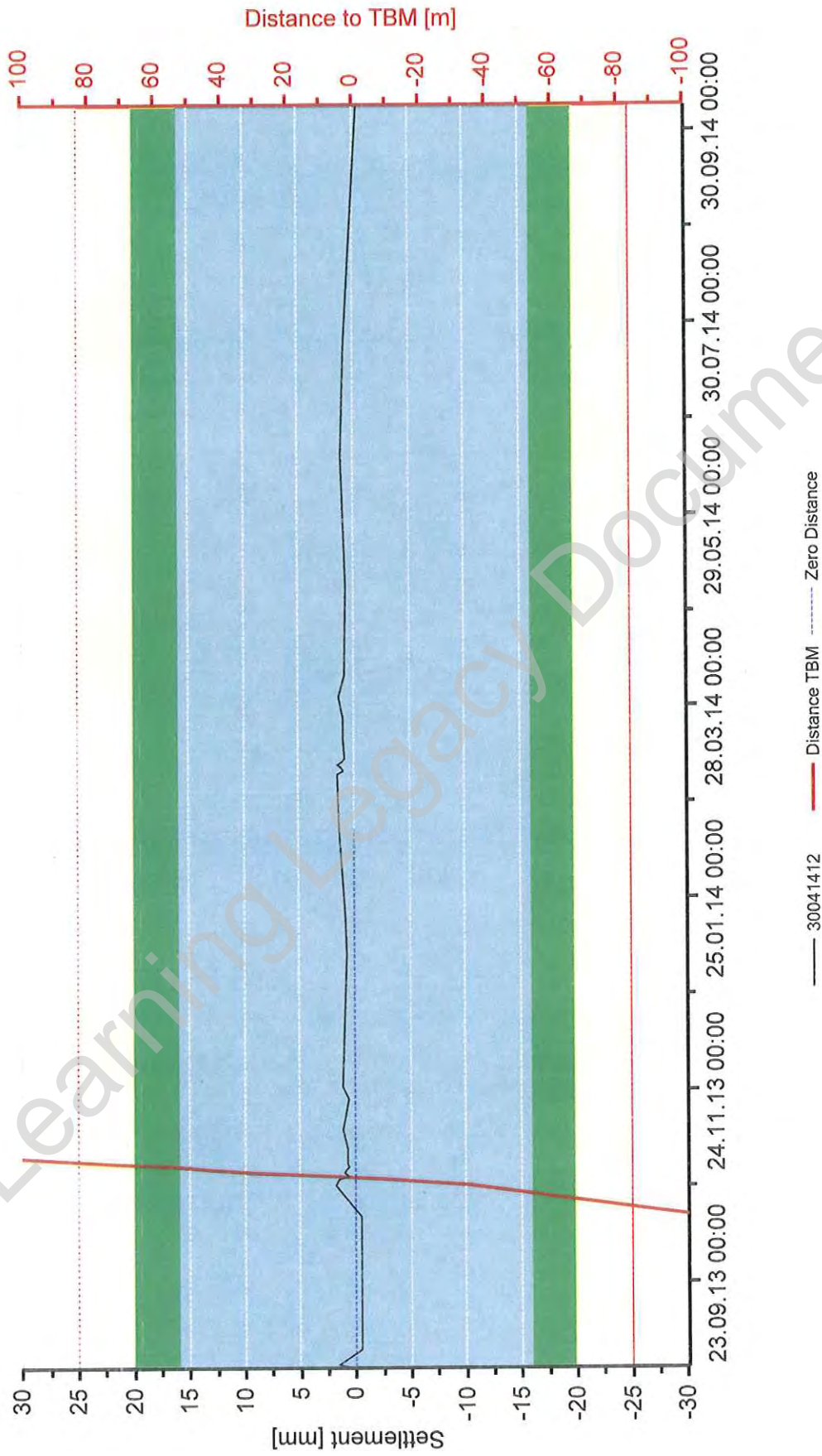
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 29.10.2013 09:00



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 01.11.2013 18:05



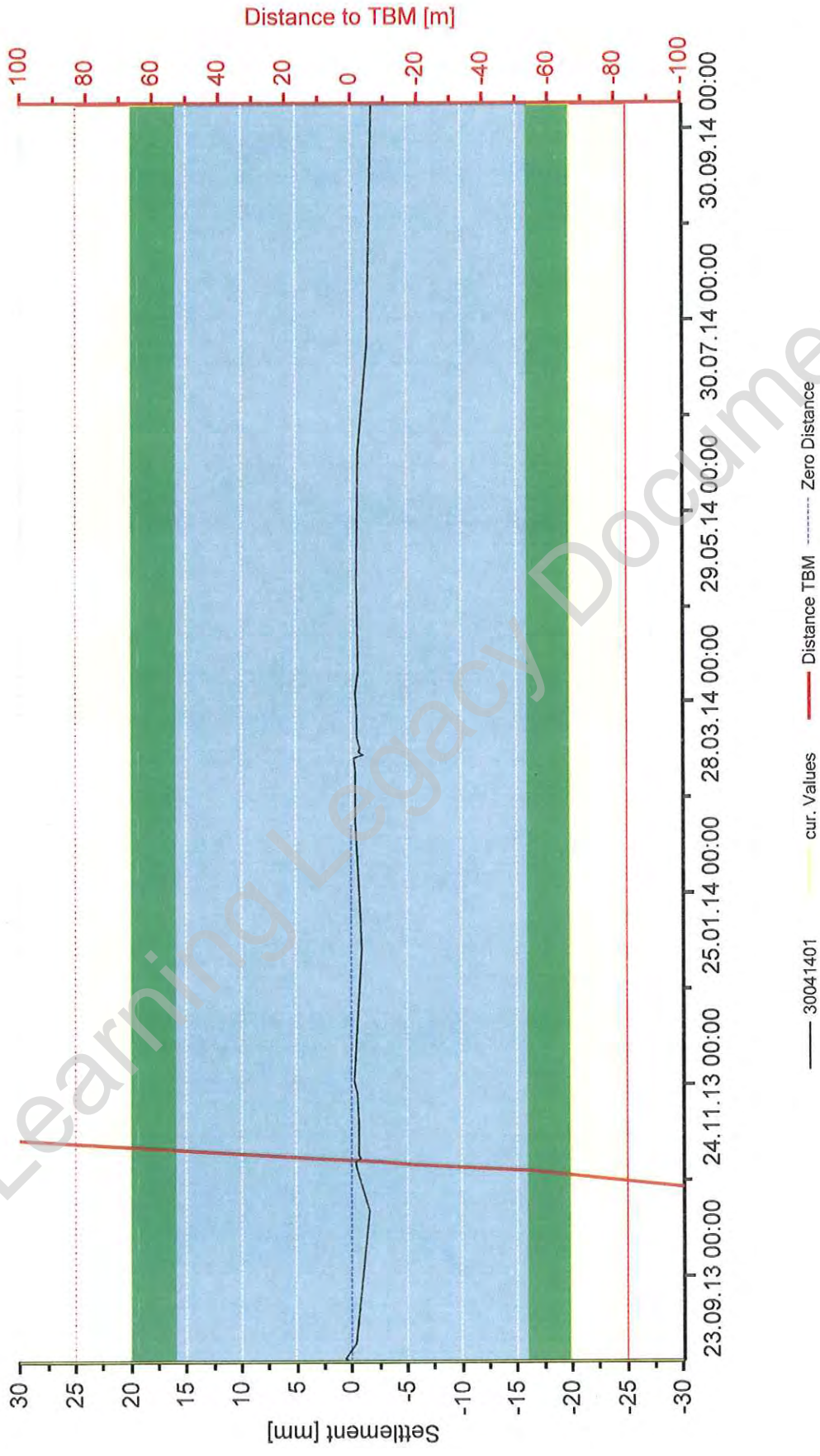
Point: 30041412



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Warren Lane Carpark WB 26.08.2013 - 08.10.2014
Date: 28.10.2014 08:51 Current Values: 28.10.2014 08:34

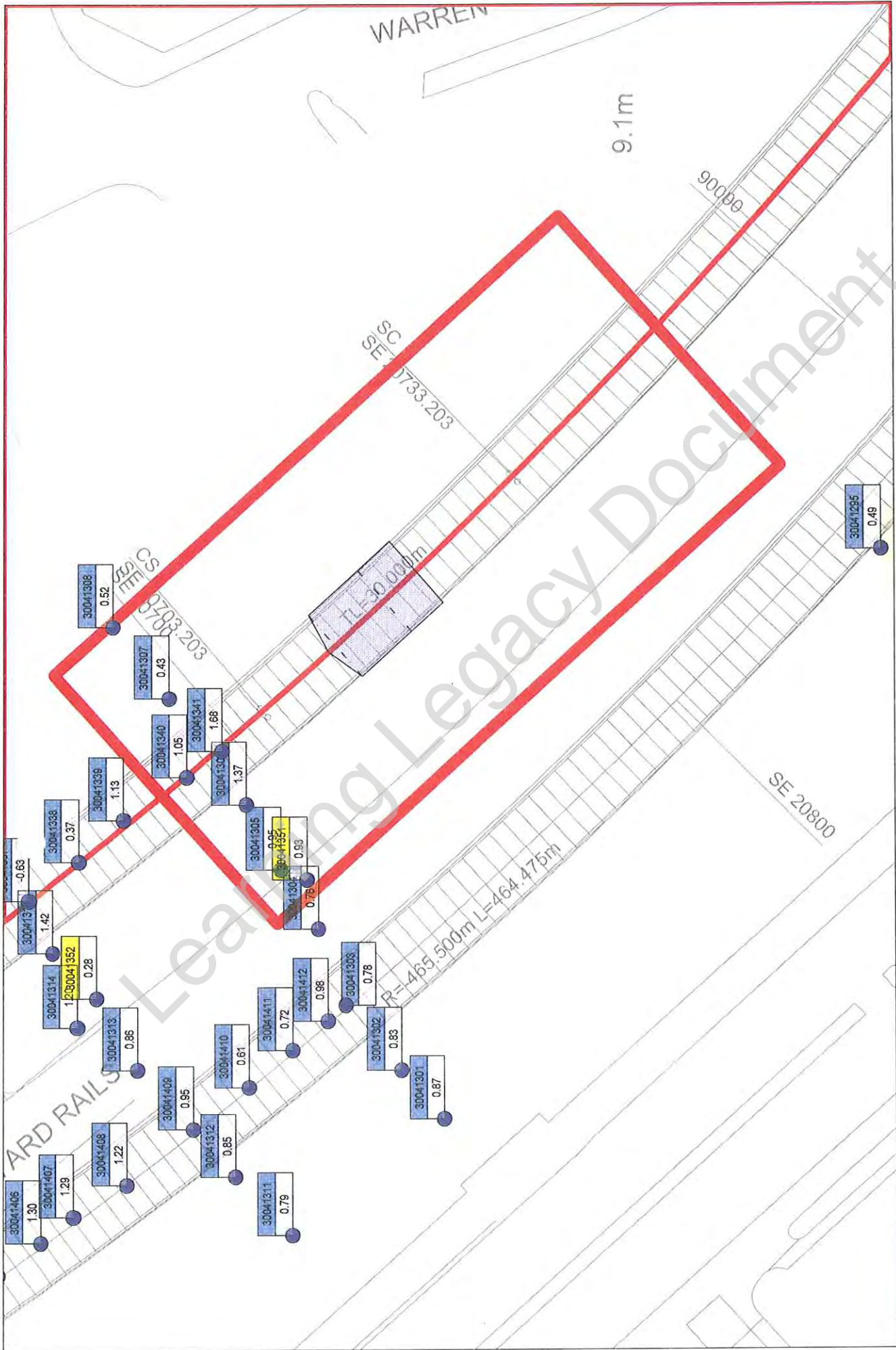


Point: 30041401

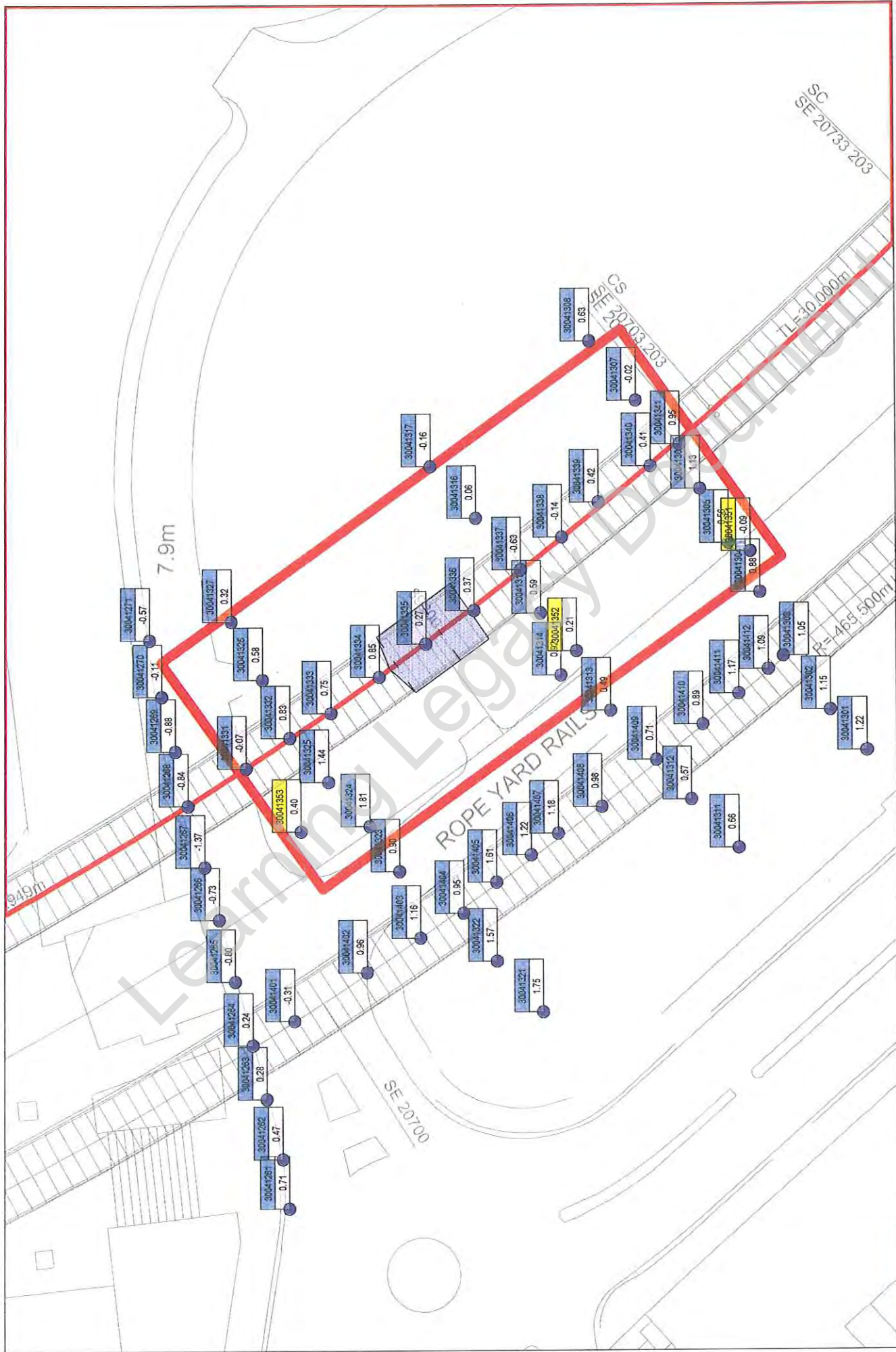


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Warren Lane Carpark WB 26.08.2013 - 08.10.2014
Date: 28.10.2014 08:45 Current Values: 28.10.2014 08:34



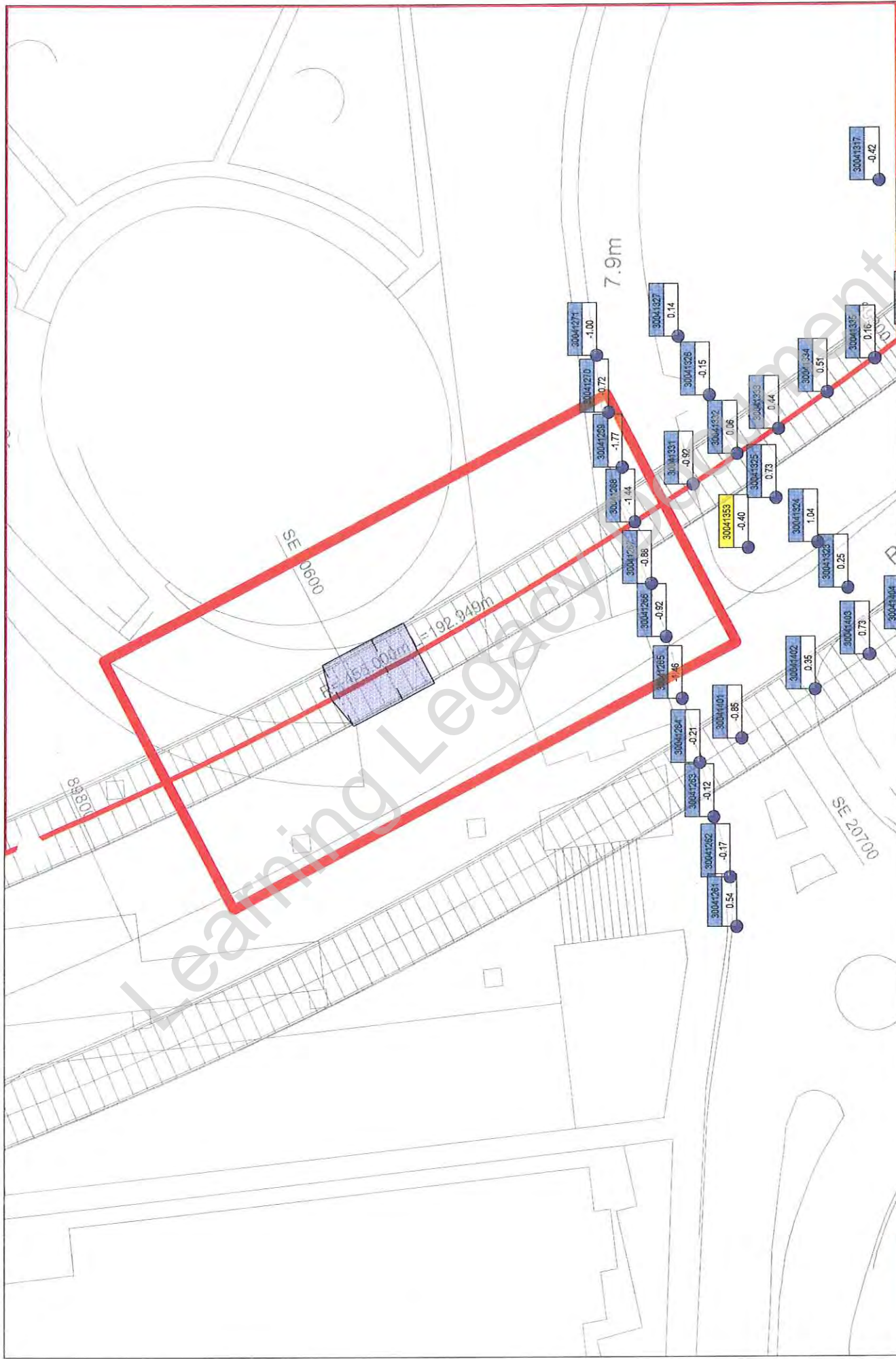


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 09.03.2014 15:59



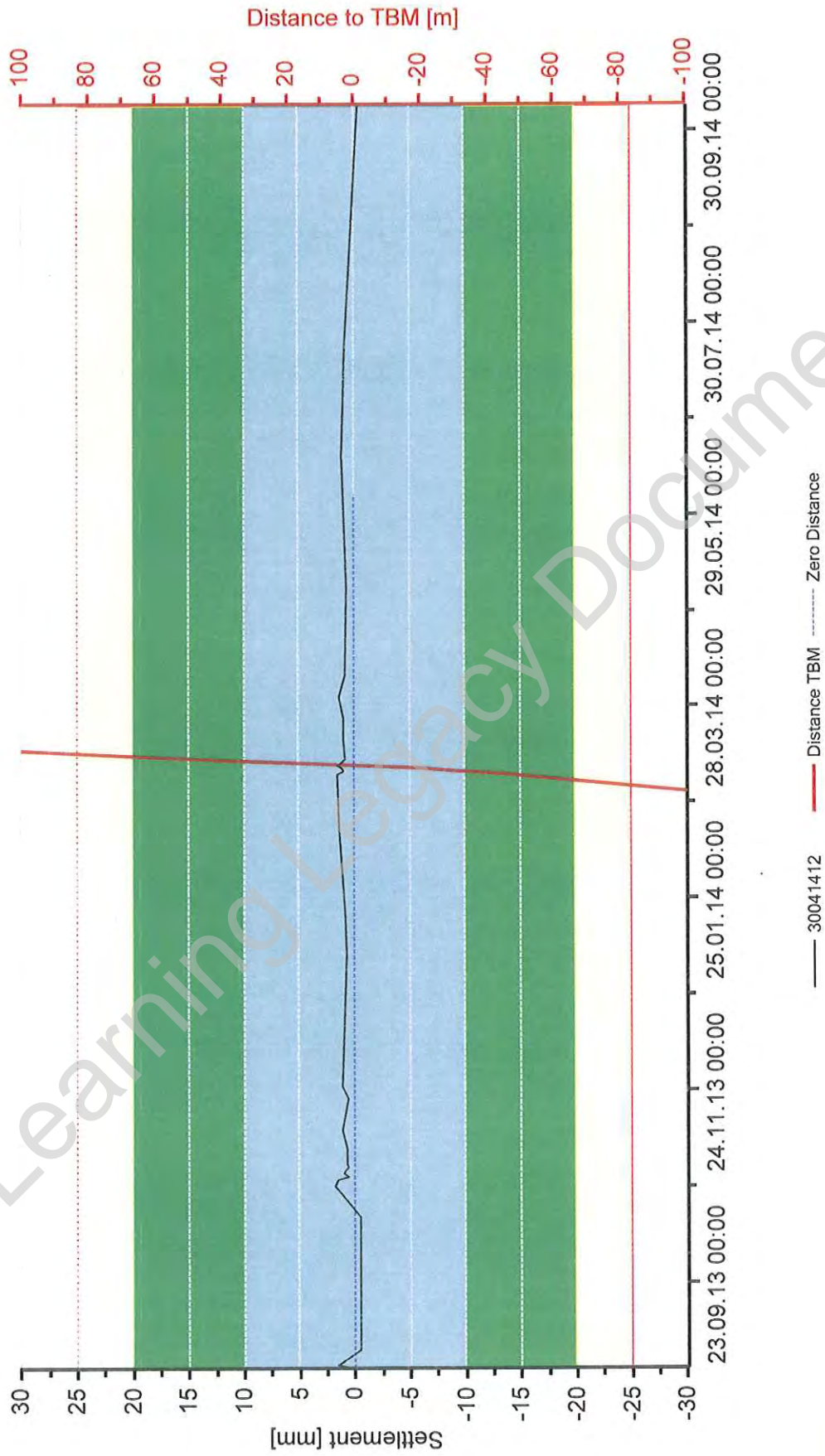
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 10.03.2014 09:00





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
current values: 13.03.2014 17:59

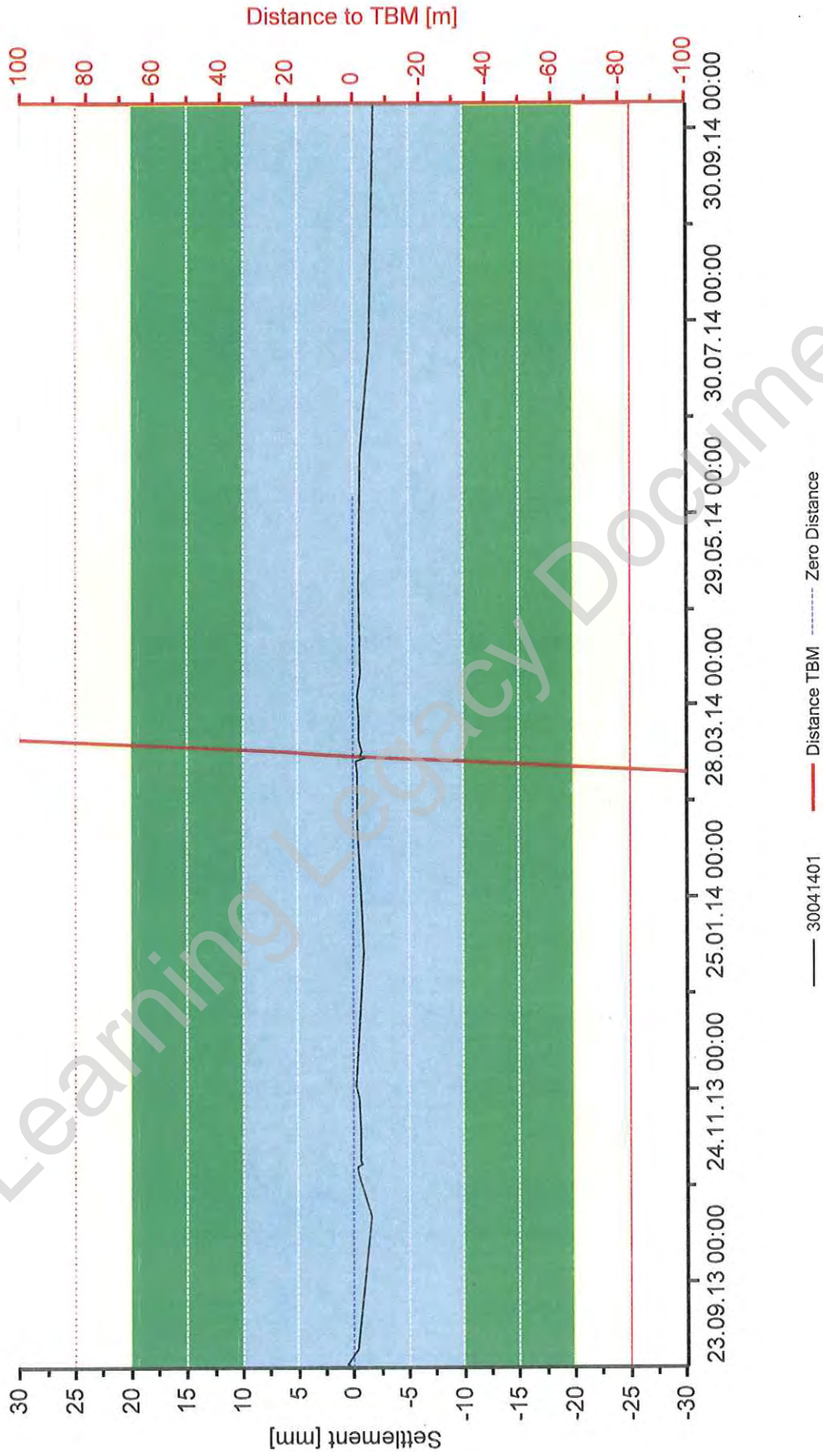
Point: 30041412



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Warren Lane Carpark WB 26.08.2013 - 08.10.2014
date: 22.10.2014 12:40 current values: 22.10.2014 12:28



Point: 30041401



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Warren Lane Carpark WB 26.08.2013 - 08.10.2014
date: 22.10.2014 12:38 current values: 22.10.2014 12:28



monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: WarrenLane CarPark Westbound

No. of reading	baseline		1. following		2. following		3. following		4. following		5. following		6. following	
	date	elevation	27/08/2013	deviation from last/baseline	01/09/2013	deviation from last/baseline	23/09/2013	deviation from last/baseline	14/10/2013	deviation from last/baseline	24/10/2013	deviation from last/baseline	25/10/2013	deviation from last/baseline
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 1401	109.250	109.251	0	109.250	-1	0	109.249	-1	109.249	-1	-2			
3004 1402	109.298	109.299	1	109.298	-1	0	109.297	-1	109.297	-1	-1			
3004 1403	109.446	109.447	1	109.447	-1	1	109.446	-1	109.445	-1	-1			
3004 1404	109.355	109.356	1	109.355	-1	0	109.354	-1	109.354	0	-1			
3004 1405	109.250	109.251	1	109.250	-1	0	109.250	0	109.249	0	-1			
3004 1406	109.322	109.322	0	109.322	0	0	109.322	0	109.322	0	0			
3004 1407	109.145	109.145	1	109.145	0	0	109.145	0	109.144	0	0	109.146	2	
3004 1408	109.140	109.142	1	109.140	-2	0	109.141	1	109.140	0	0	109.142	2	
3004 1409	109.236	109.237	1	109.235	-2	-1	109.236	1	109.235	-1	-1	109.237	2	
3004 1410	109.248	109.249	1	109.247	-2	-1	109.248	2	109.247	-1	-1	109.249	2	
3004 1411	109.277	109.277	1	109.276	-2	-1	109.277	2	109.276	-1	-1	109.278	2	
3004 1412	109.305	109.307	1	109.305	-2	-1	109.306	1	109.305	-1	-1	109.307	2	

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: WarrenLane CarPark Westbound

No. of reading	7. following		8. following		9. following		10. following		11. following		12. following			
	date	26/10/2013	27/10/2013	27/10/2013	28/10/2013	29/10/2013	29/10/2013	29/10/2013	29/10/2013	29/10/2013	30/10/2013	30/10/2013		
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	
	3004 1401	109.250			109.250	1			109.250	0	0		109.250	0
3004 1402	109.298	109.299	2	109.298	0	1		109.299	1	1		109.298	0	0
3004 1403	109.446	109.447	2	109.447	0	1		109.447	0	1		109.447	0	1
3004 1404	109.355	109.356	2	109.356	0	1	109.356	0	1	1		109.356	0	1
3004 1405	109.250	109.251	2	109.251	0	1	109.252	1	2	1		109.251	0	1
3004 1406	109.322	109.324	2	109.323	0	1	109.324	1	2	1		109.323	0	1
3004 1407	109.145	109.147	1	109.145	-1	1	109.146	1	2	1		109.145	0	1
3004 1408	109.140	109.143	1	109.141	-2	1	109.142	0	1	1		109.141	0	1
3004 1409	109.236	109.237	0	109.237	-1	1	109.237	0	1	1		109.237	0	0
3004 1410	109.248	109.249	0	109.248	-1	1	109.249	0	1	1		109.248	0	0
3004 1411	109.277	109.278	0	109.277	-1	1	109.277	0	1	1		109.277	0	1
3004 1412	109.305	109.307	0	109.306	-1	1	109.306	0	1	1		109.306	0	1

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Westbound**

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
	28/8/13	109.250	109.249	0	-1	109.250	0	-1	109.250	0	-1	109.250	0	-1
3004 1401		109.250	109.249	0	-1	109.250	0	-1	109.250	0	-1	109.250	0	-1
3004 1402		109.298	109.298	0	0	109.298	0	0	109.298	0	0	109.298	0	0
3004 1403		109.446	109.447	0	0	109.447	0	0	109.447	0	0	109.447	0	0
3004 1404		109.355	109.355	0	1	109.355	0	0	109.356	0	1	109.356	0	1
3004 1405		109.250	109.251	0	1	109.251	0	1	109.251	0	1	109.251	0	1
3004 1406		109.322	109.323	0	1	109.323	0	1	109.323	0	1	109.323	0	1
3004 1407		109.145	109.145	0	1	109.145	0	1	109.145	0	1	109.146	0	1
3004 1408		109.140	109.141	0	1	109.141	0	1	109.141	0	1	109.141	0	1
3004 1409		109.236	109.237	0	0				109.237	0	1	109.237	0	1
3004 1410		109.248	109.248	0	1				109.249	0	1	109.248	0	1
3004 1411		109.277	109.277	0	1				109.278	0	1	109.277	0	1
3004 1412		109.305	109.306	0	1				109.307	0	1	109.306	-1	1

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **WarrenLane CarPark Westbound**

No. of reading	baseline	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
	26/8/13													
3004 1401	109.250		109.250	0	0	109.249	-1	-1	109.249	0	-1	109.250	0	-1
3004 1402	109.298		109.299	0	1	109.298	-1	0	109.298	0	1	109.298	0	0
3004 1403	109.446		109.447	0	1	109.446	-1	0	109.447	0	1	109.447	0	1
3004 1404	109.355		109.356	0	1	109.355	0	0	109.356	0	1	109.356	0	1
3004 1405	109.250		109.251	0	2	109.251	-1	1	109.251	0	1	109.251	0	1
3004 1406	109.322		109.323	0	1	109.323	-1	1	109.323	0	1	109.323	0	1
3004 1407	109.145		109.146	0	1	109.145	-1	1	109.146	0	1	109.146	0	1
3004 1408	109.140		109.141	0	1	109.141	0	1	109.141	0	1	109.141	0	1
3004 1409	109.236		109.237	0	1	109.237	0	0				109.237	0	0
3004 1410	109.248		109.249	0	1	109.248	0	1				109.248	0	0
3004 1411	109.277		109.278	0	1	109.277	0	1				109.277	0	1
3004 1412	109.305		109.307	0	2	109.306	0	1				109.306	0	1

monitoring table



Joint Venture

project: **C310 Thames Tunnel**
structure: **WarrenLane CarPark Westbound**

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
	26/8/13													
3004 1401		109.250	109.250	0	109.250	0	109.249	0	109.250	0	109.250	0	109.249	-1
3004 1402		109.298	109.298	0	109.299	0	109.298	-1	109.298	1	109.299	0	109.298	0
3004 1403		109.446	109.447	0	109.447	0	109.446	-1	109.447	0	109.447	0	109.447	-1
3004 1404		109.355	109.356	0	109.356	0	109.355	-1	109.356	0	109.356	0	109.355	-1
3004 1405		109.250	109.251	0	109.251	0	109.251	-1	109.251	0	109.251	0	109.251	0
3004 1406		109.322	109.323	0	109.323	0	109.323	-1	109.323	0	109.324	0	109.323	-1
3004 1407		109.145	109.145	0	109.146	0	109.145	0	109.146	0	109.146	0	109.146	0
3004 1408		109.140	109.141	0	109.141	1	109.141	-1	109.141	0	109.141	1	109.141	0
3004 1409		109.236	109.237	0	109.237	0	109.237	0	109.236	0	109.237	0	109.237	0
3004 1410		109.248	109.248	0	109.249	0	109.248	0	109.248	0	109.248	0	109.248	0
3004 1411		109.277	109.277	0	109.278	0	109.277	-1	109.277	0	109.277	0	109.277	0
3004 1412		109.305	109.306	0	109.307	0	109.306	0	109.306	0	109.307	0	109.306	0

monitoring table




Joint Venture

project: C310 Thames Tunnel

structure: WarrenLane CarPark Westbound

No. of reading	baseline		37. following		deviation from last/baseline	elevation	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	26/8/13	08/10/2014	deviation from last/ baseline											
No.	elevation	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 1401	109.250	109.248	109.248	0	-2										
3004 1402	109.298	109.298	109.298	-1	0										
3004 1403	109.446	109.446	109.446	-1	0										
3004 1404	109.355	109.355	109.355	0	0										
3004 1405	109.250	109.250	109.250	-1	0										
3004 1406	109.322	109.322	109.322	-1	0										
3004 1407	109.145	109.145	109.145	-1	0										
3004 1408	109.140	109.140	109.140	-1	0										
3004 1409	109.236	109.236	109.236	-1	0										
3004 1410	109.248	109.247	109.247	-1	-1										
3004 1411	109.277	109.277	109.277	0	0										
3004 1412	109.305	109.305	109.305	-1	0										

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

APPENDIX 71

Warren Lane Car park – Shallow datums

Learning Legacy Document

monitoring asset

Services underneath Warren Lane Carpark

reference monitoring drawing:

C310-HTM-C-DWG-CR146-ST004-70002

name of monitoring section:

Warren lane Carpark Shallow datum

sensor type:

manual levelling studs

chainage:

89880 - 89930

point no.:

3004 1351 - 3004 1353

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	23/09/13	0.00		
TBM 1	start ZOI	07/03/13	0.34	3004 1351
		07/03/13	0.19	3004 1352
		10/03/13	-0.71	3004 1353
	end ZOI	10/03/13	-0.14	3004 1351
		10/03/13	-0.24	3004 1352
		13/03/13	-0.80	3004 1353
TBM 2	start ZOI	07/03/13	0.36	3004 1351
		07/03/13	0.28	3004 1352
		10/03/13	0.40	3004 1353
	end ZOI	10/03/13	-0.09	3004 1351
		10/03/13	0.21	3004 1352
		13/03/13	-0.40	3004 1353
longterm	08/10/14	-0.58	3004 1351	
		0.73	3004 1353	

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 1351 - 3004 1353

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.

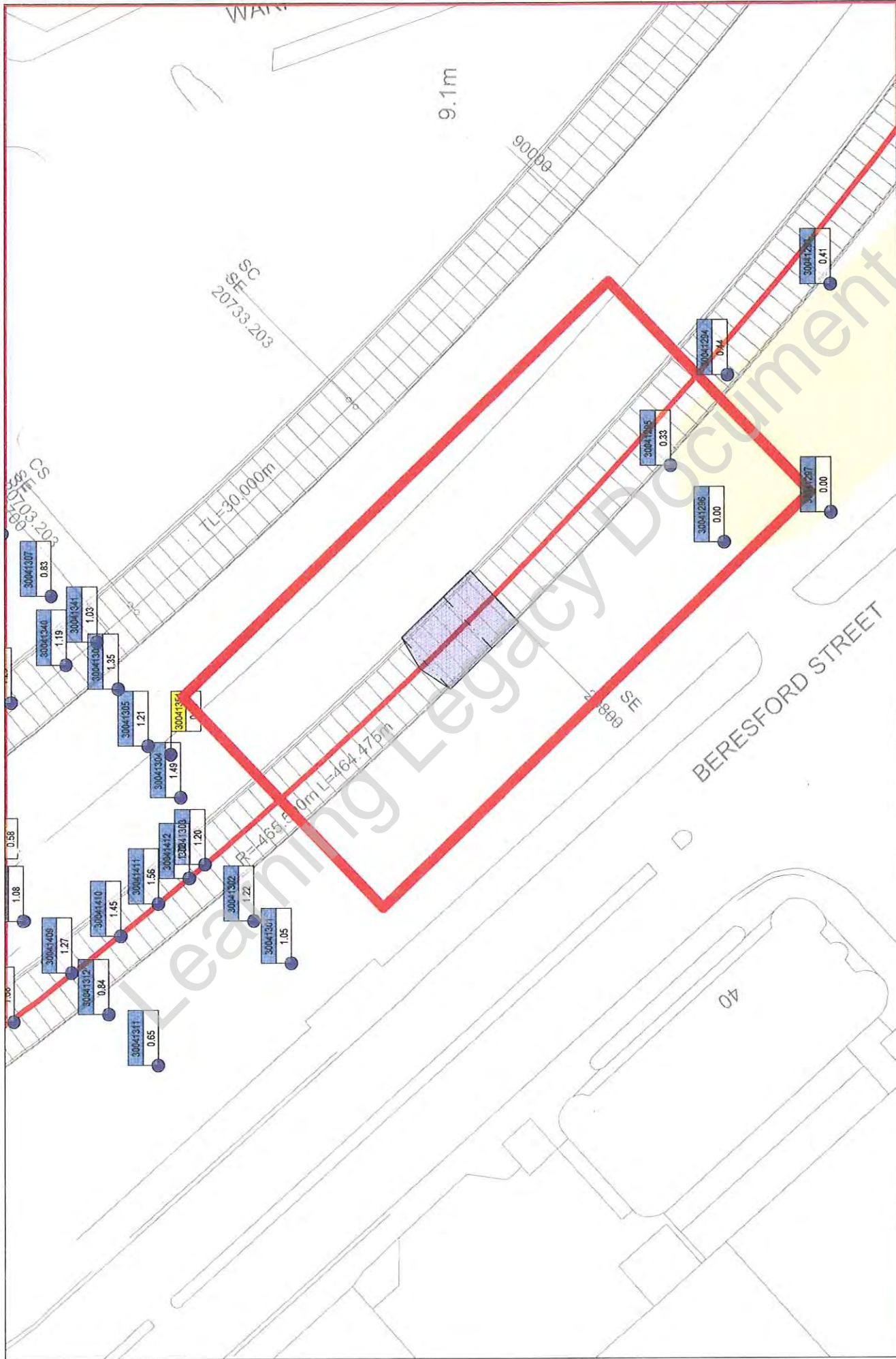
Monitoring data shows that shallow datum movements behaved similar to those on the surface.

date / signature: 22/01/2015

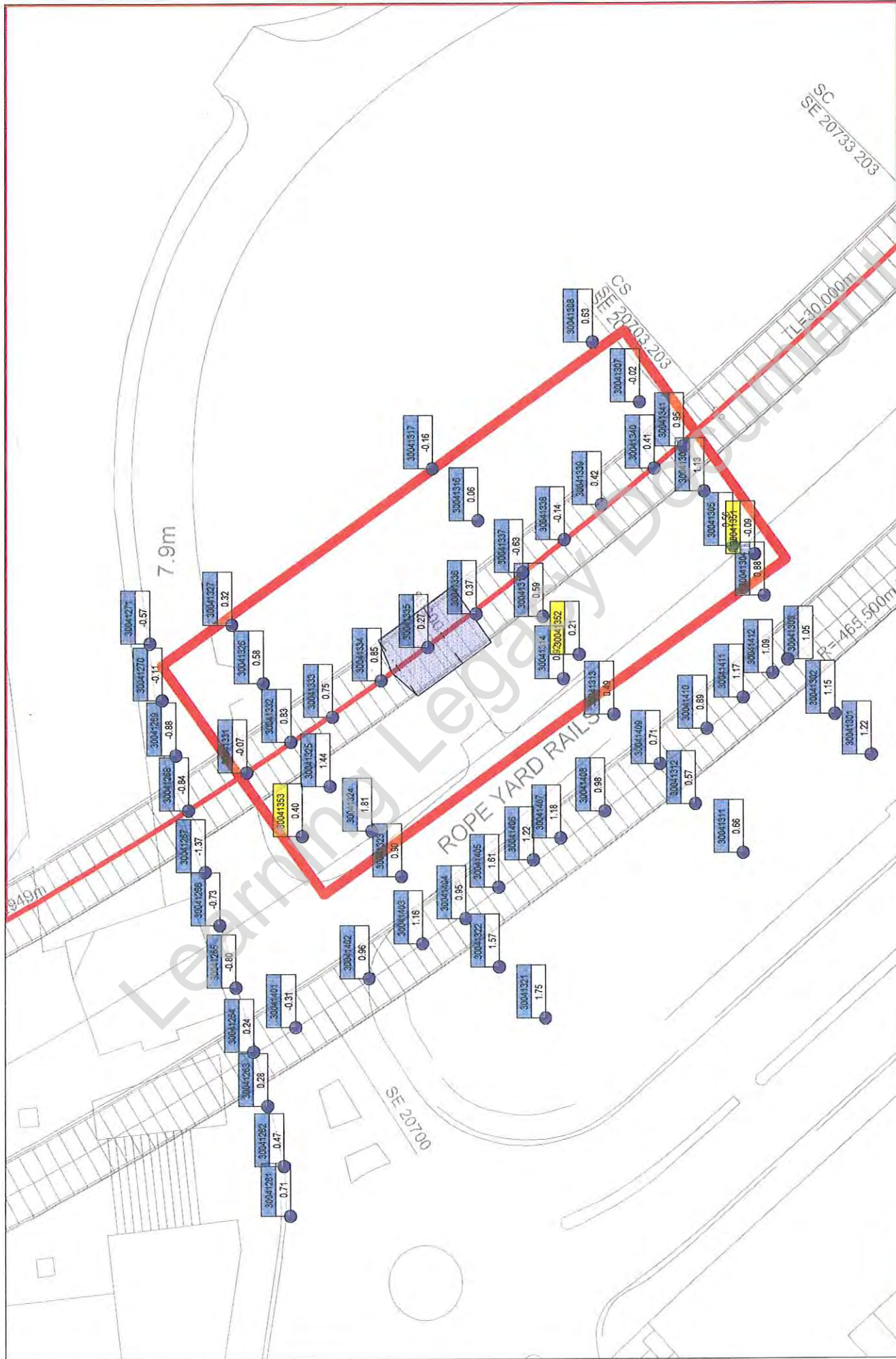
print name:

HMJV project role:

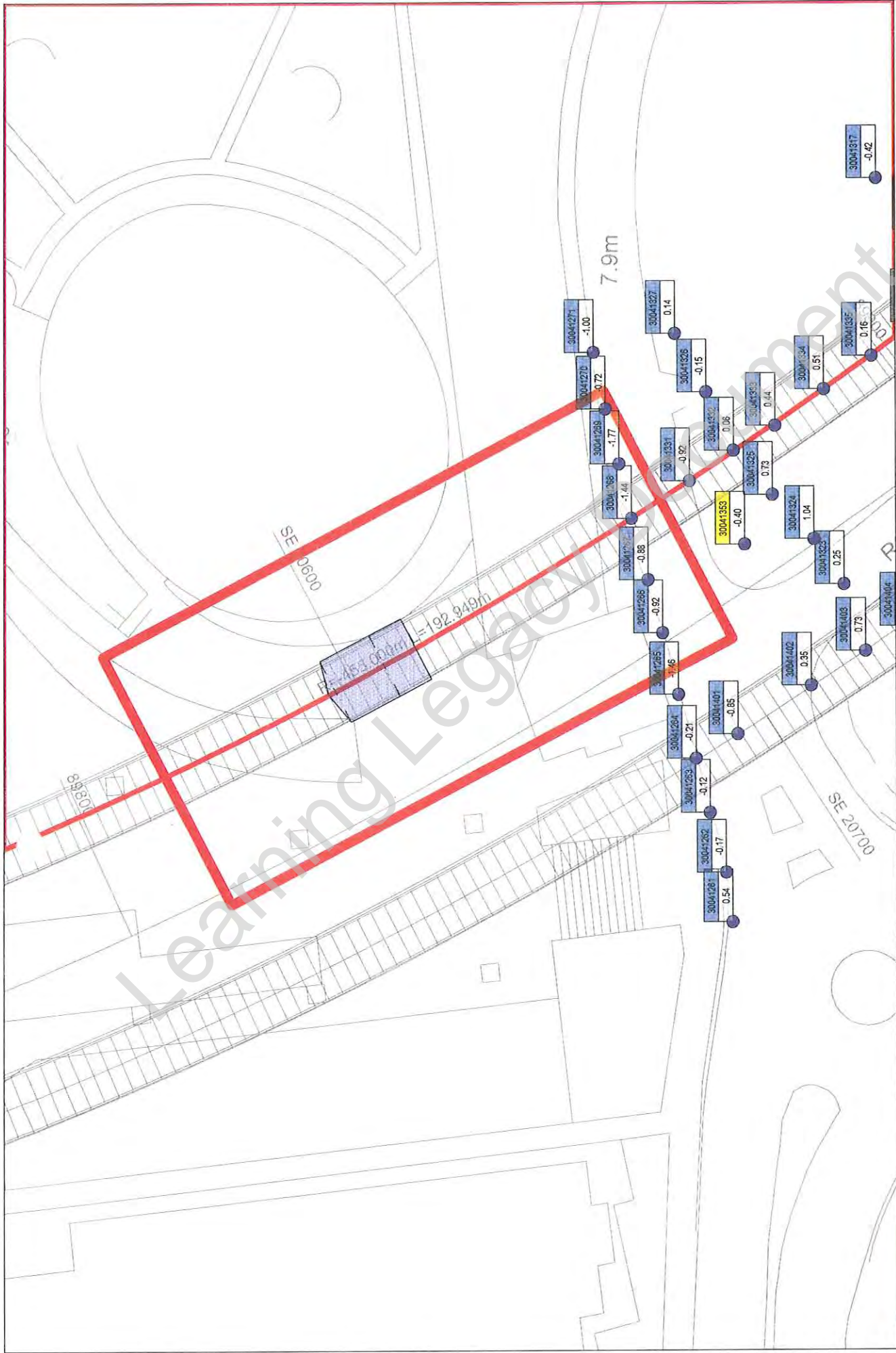
Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 24.10.2013 09:00



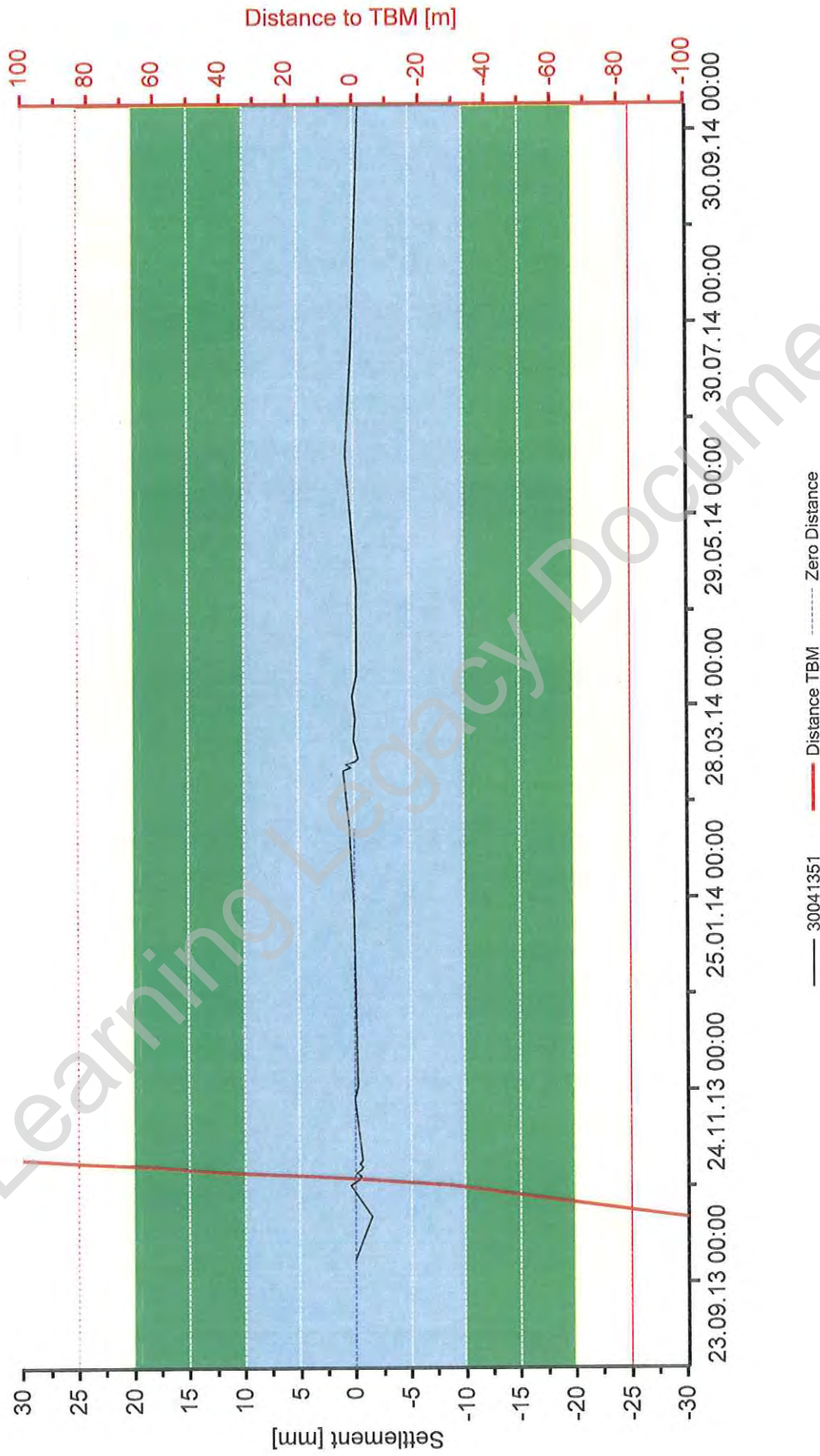
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 10.03.2014 09:00



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 13.03.2014 17:59



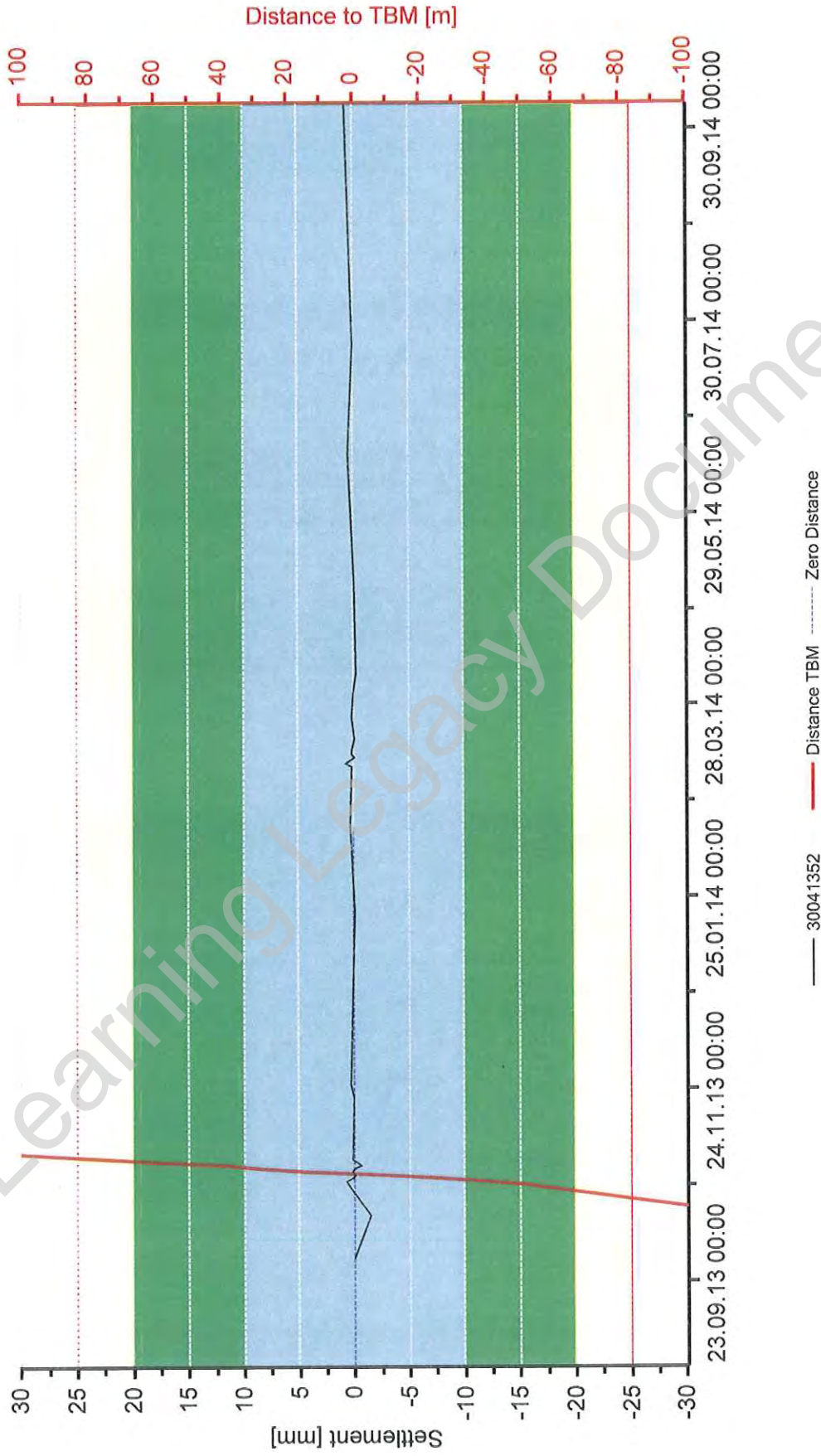
Point: 30041351



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Shallow Datum Warren Lane Carpark 23.09.2013 - 08.10.2014
Date: 23.10.2014 18:05 Current Values: 23.10.2014 17:49



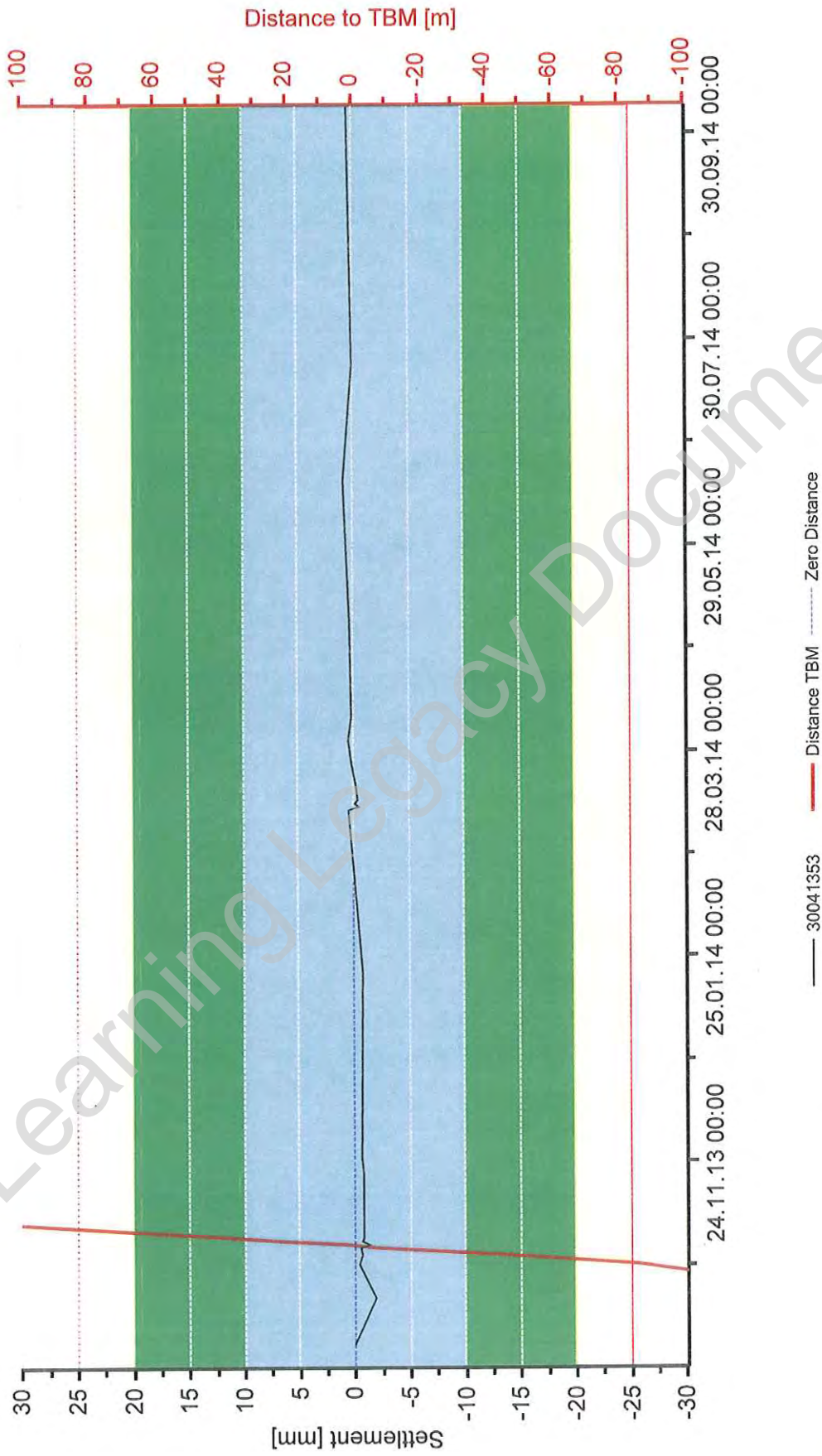
Point: 30041352



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Shallow Datum Warren Lane Carpark 23.09.2013 - 08.10.2014
Date: 23.10.2014 18:07 Current Values: 23.10.2014 17:49

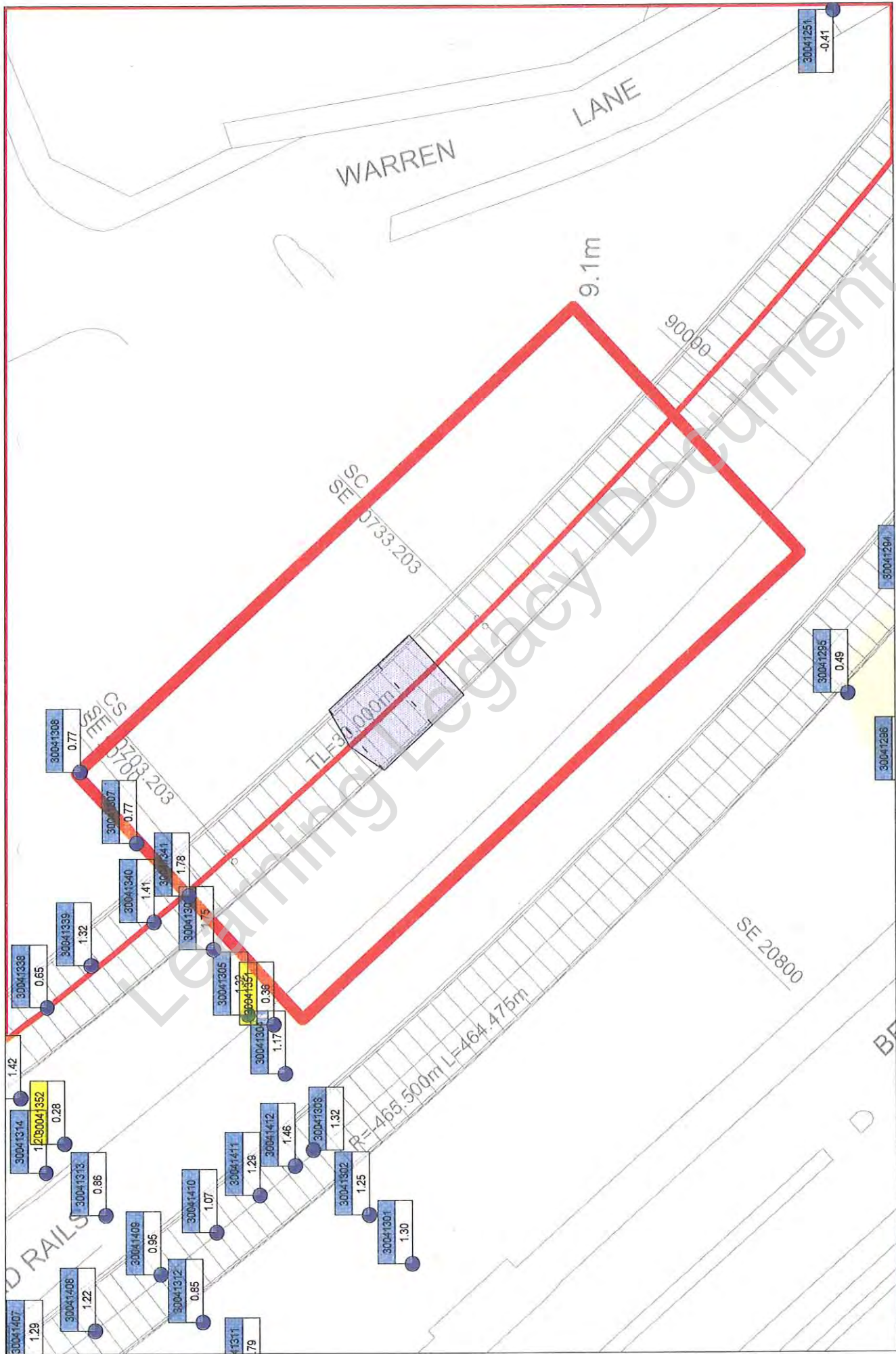


Point: 30041353



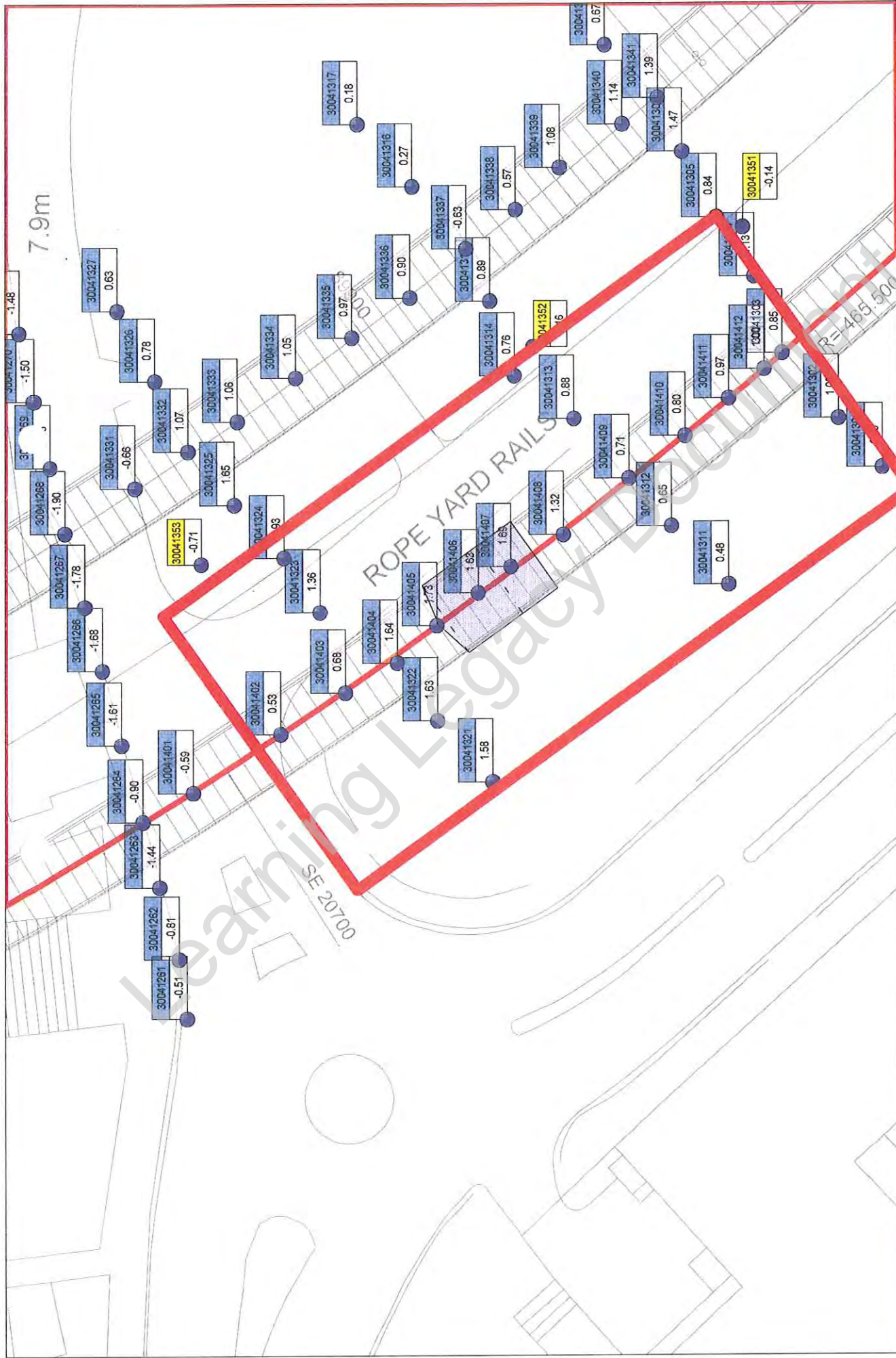
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Shallow Datum Warren Lane Carpark 23.09.2013 - 08.10.2014
Date: 23.10.2014 18:09 Current Values: 23.10.2014 18:04





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 09.03.2014 15:59



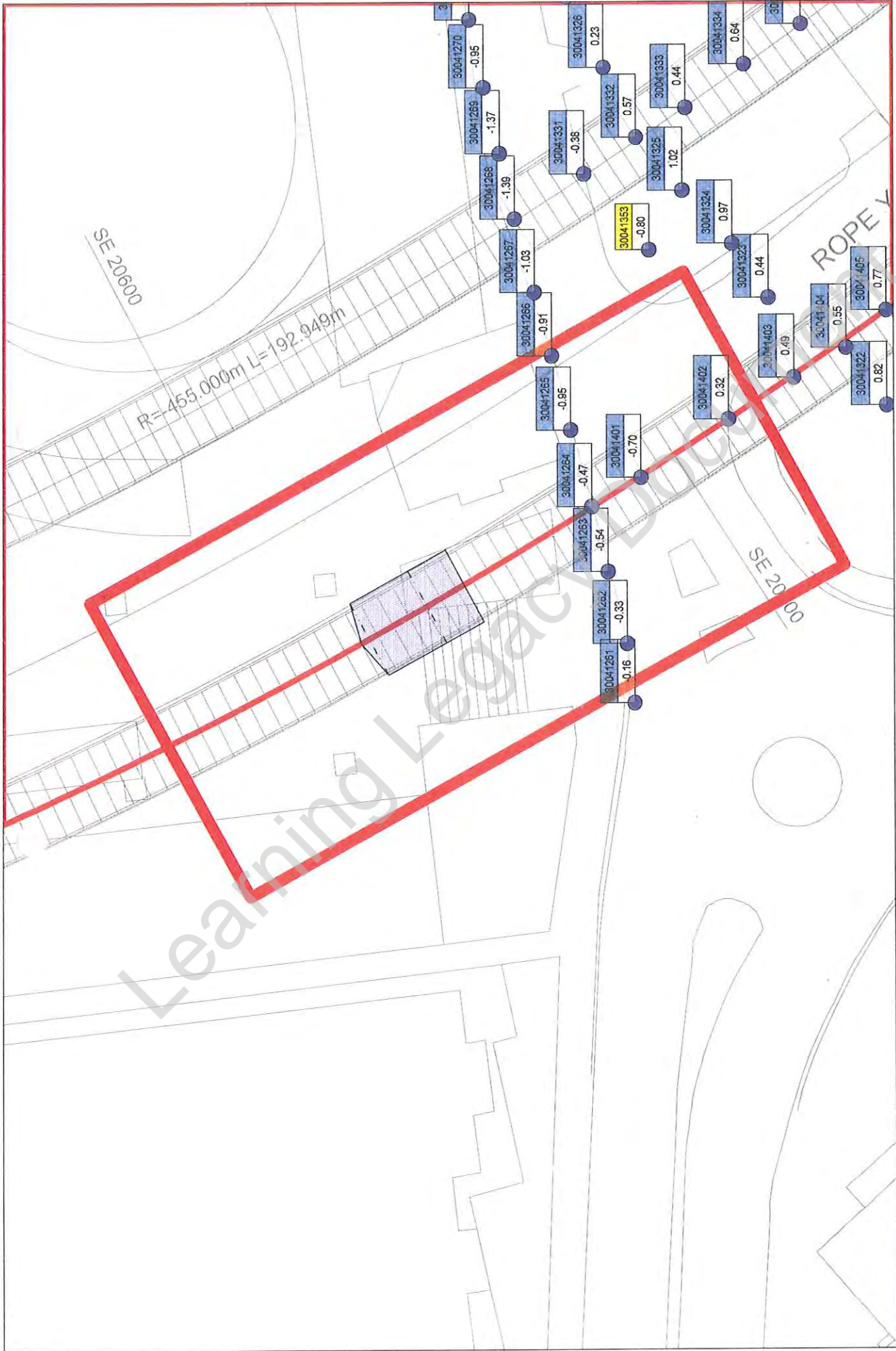


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal

working activities: TBM drive WB

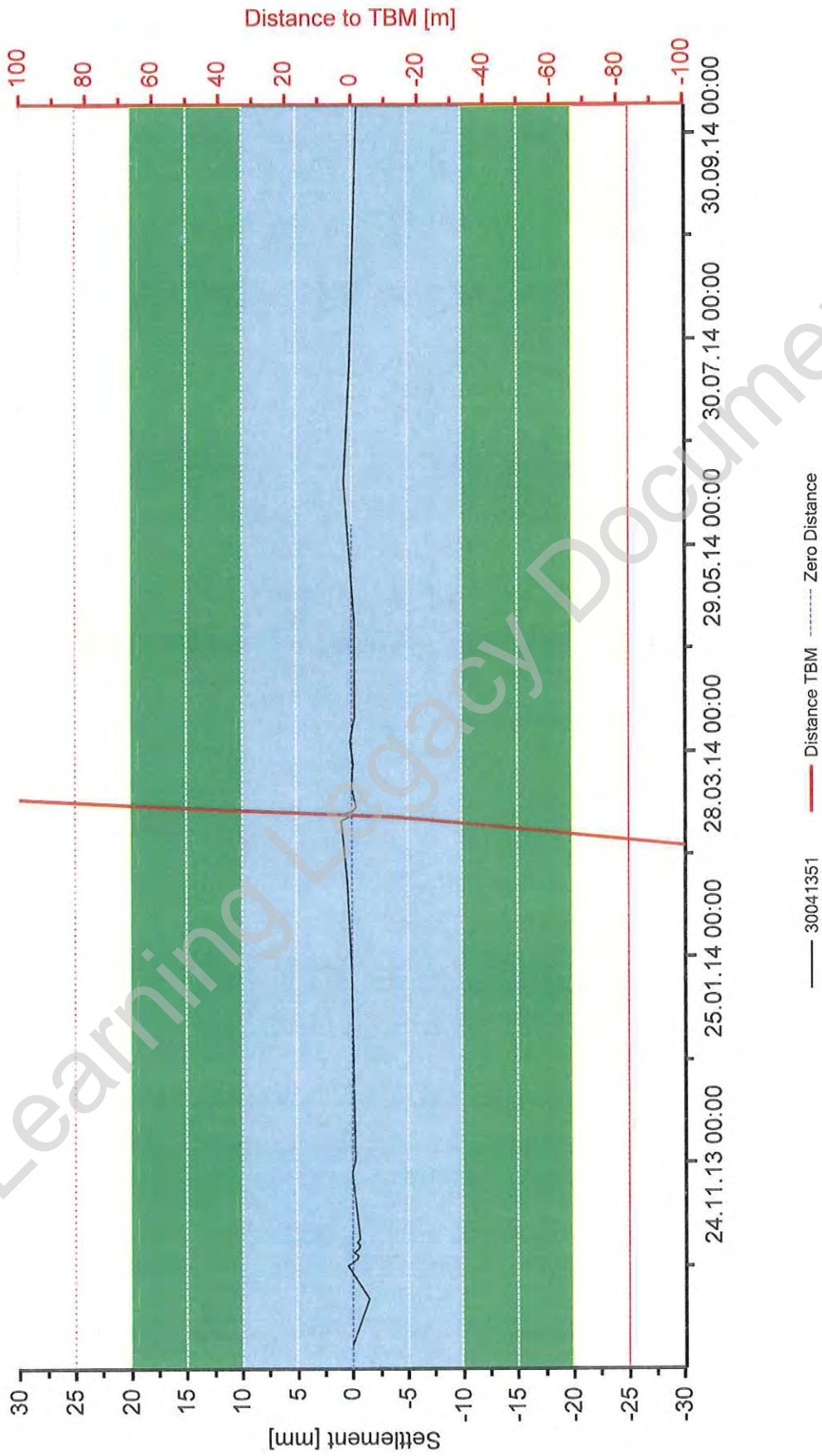
current values: 28.10.2013 18:06





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 01.11.2013 09:00

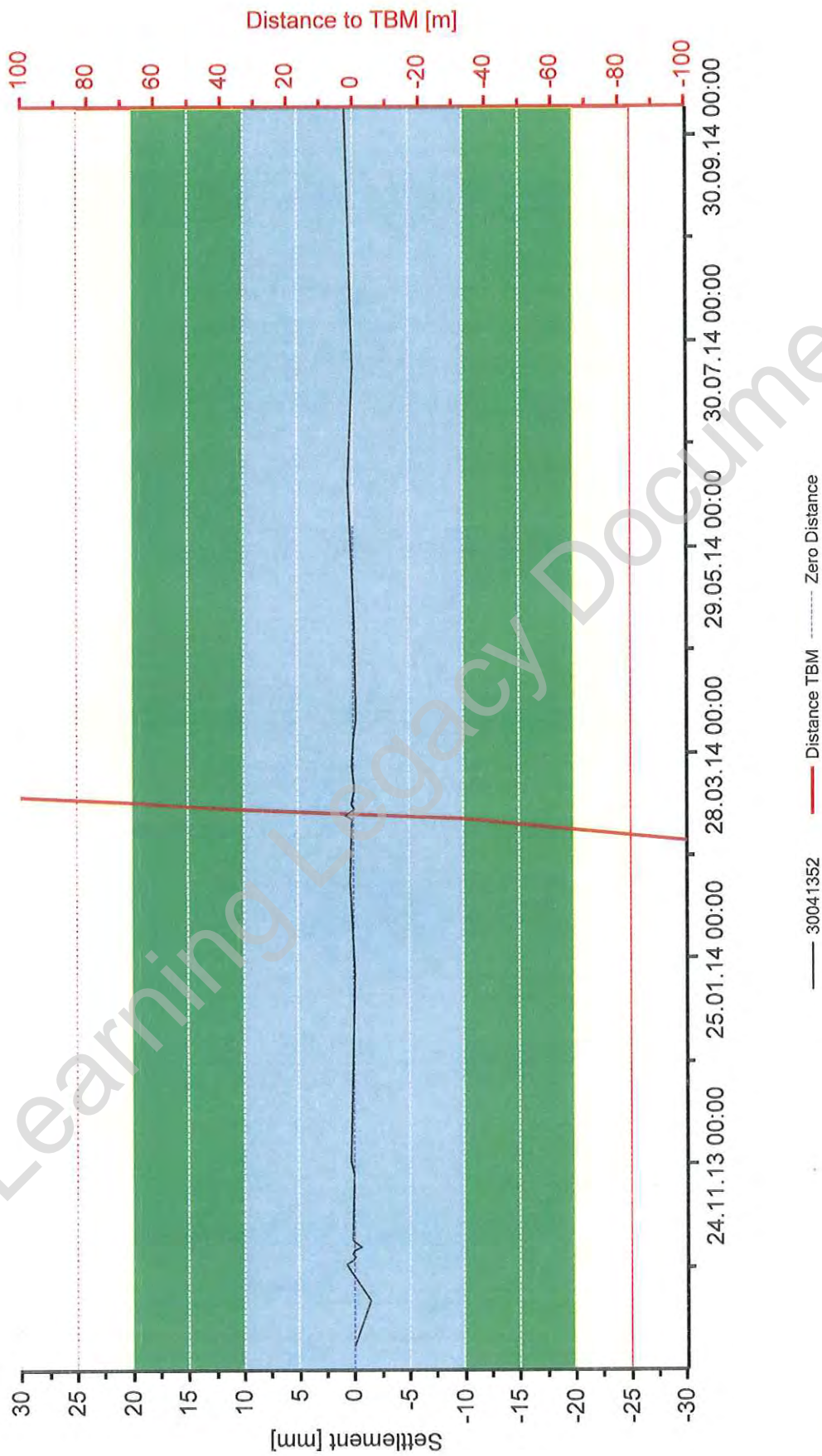
Point: 30041351



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Shallow Datum Warren Lane Carpark 23.09.2013 - 08.10.2014
date: 22.10.2014 12:23 current values: 22.10.2014 12:13



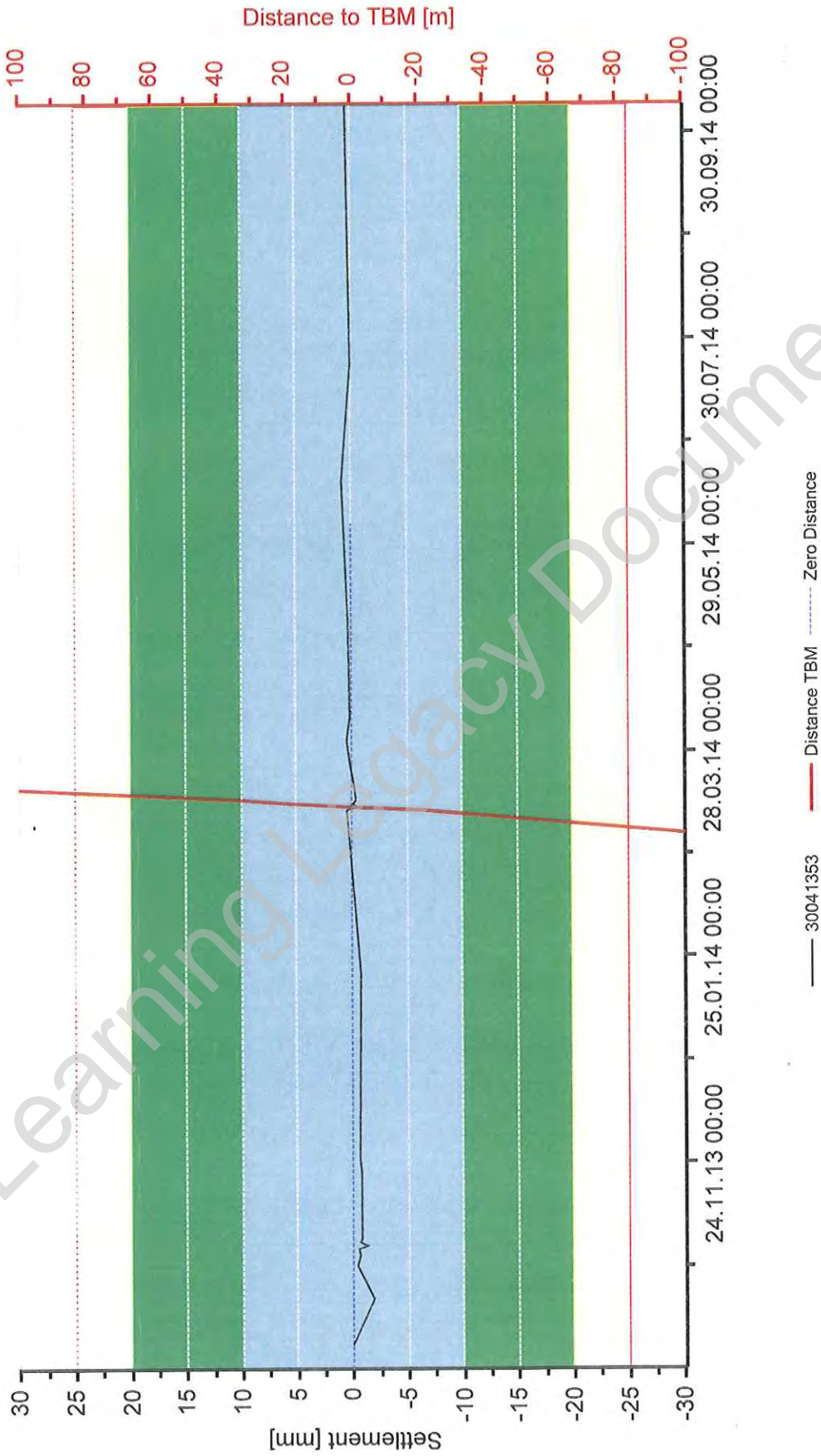
Point: 30041352



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Shallow Datum Warren Lane Carpark 23.09.2013 - 08.10.2014
date: 22.10.2014 12:26 current values: 22.10.2014 12:13



Point: 30041353



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Shallow Datum Warren Lane Carpark 23.09.2013 - 08.10.2014
date: 22.10.2014 12:25 current values: 22.10.2014 12:13



monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: Warrenlane Shallow Datums

No. of reading	baseline		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
No.														
	23/9/13		27/10/2013		28/10/2013		29/10/2013		30/10/2013		31/10/2013		01/11/2013	
		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 1351		102.688	102.688	0	102.688	0	102.688	0	102.688	0	102.688	0	102.688	0
3004 1352		102.437	102.436	0	102.436	0	102.436	0	102.436	-1	102.436	0	102.436	0
3004 1353		102.040	102.040	0	102.040	0	102.040	0	102.039	-1	102.040	1	102.040	0

Legacy Document

monitoring table



Joint Venture

project: **C310 Thames Tunnel**

structure: **Warrenlane Shallow Datums**

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
	23/9/13													
			05/11/2013		11/11/2013		21/11/2013		25/11/2013		07/01/2014		20/01/2014	
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
3004 1351	102.688	102.688	0 -1	102.688	0 0	102.688	0 0	102.688	0 0	102.688	0 0	102.688	0 0	102.688
3004 1352	102.437	102.436	0 0	102.436	0 0	102.436	0 0	102.436	0 0	102.436	0 -1	102.436	0 -1	102.436
3004 1353	102.040	102.040	0 0	102.040	0 -1	102.040	0 -1	102.040	0 0	102.040	0 -1	102.040	0 -1	102.040

monitoring table




Joint Venture

project: **C310 Thames Tunnel**

structure: Warrenlane Shallow Datums														
No. of reading	baseline	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
	23/9/13	17/02/2014	102.688	0	102.690	1	102.689	-1	102.689	-1	102.689	0	102.688	-1
3004 1351	102.688	102.689	102.689	0	102.690	1	102.689	-1	102.689	-1	102.689	0	102.688	-1
3004 1352	102.437	102.437	102.437	0	102.437	0	102.437	0	102.436	0	102.437	1	102.436	0
3004 1353	102.040	102.040	102.040	1	102.041	1	102.041	1	102.041	1	102.041	1	102.041	0

Legacy Document

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

APPENDIX 72

CS23 – Southside retaining walls footpath

Learning Legacy Document

monitoring asset	River Thames Southside		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	CS 23 - south side retaining walls footpath		
sensor type:	manual levelling studs		
chainage:	89765	point no.:	3004 1281 - 3004 1290
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	13/08/13		0.00		
TBM 1	start ZOI	04/11/13	0.11	3004 1287	
	end ZOI	09/11/13	-0.26	3004 1287	breached not any trigger value
TBM 2	start ZOI	15/03/14	0.74	3004 1284	
	end ZOI	19/03/14	0.06	3004 1284	breached not any trigger value
longterm	19/09/14		-0.68	3004 1285	

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

3004 1281 - 3004 1290
 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.

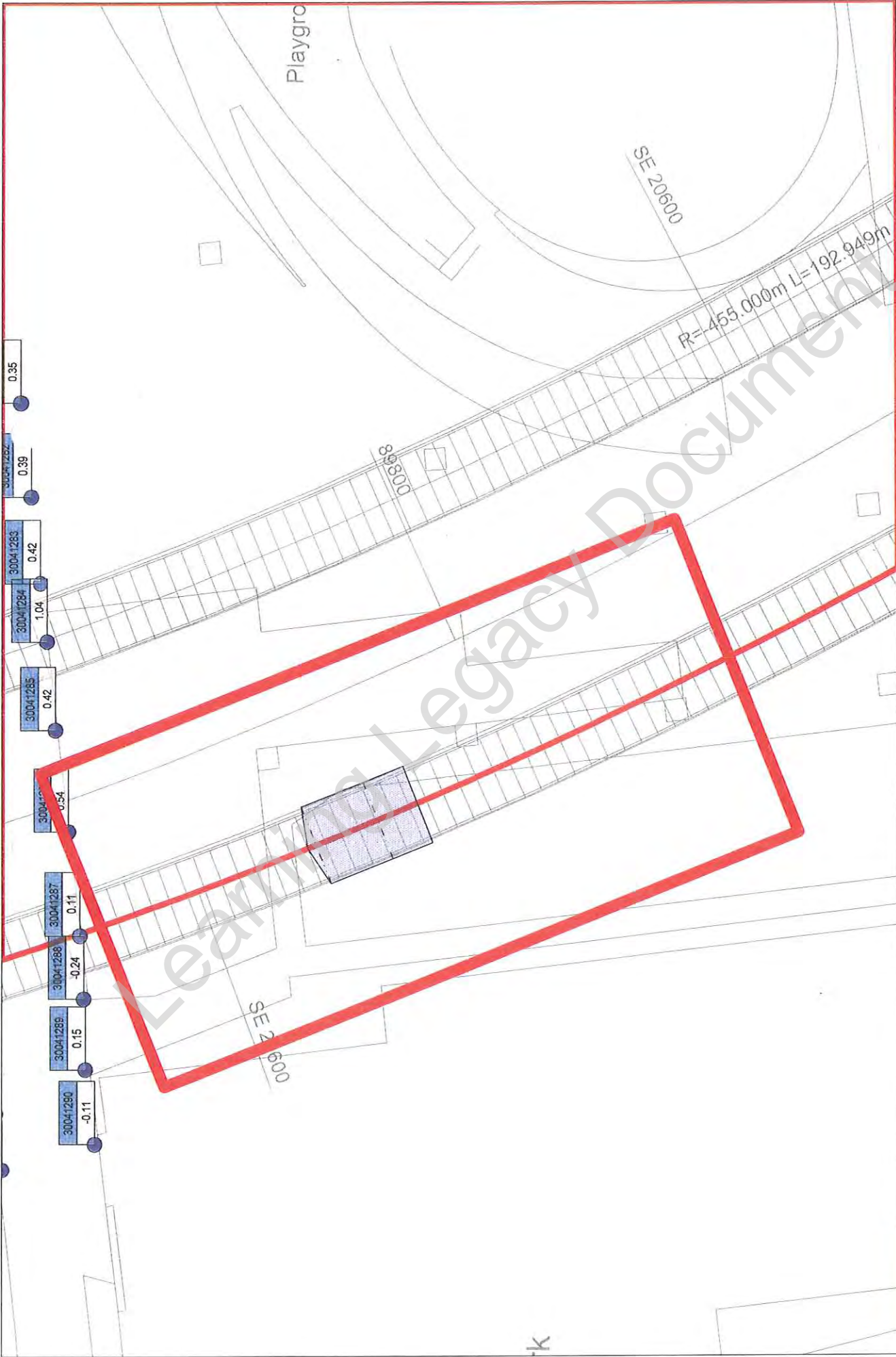
date / signature:

09/10/15

print name:

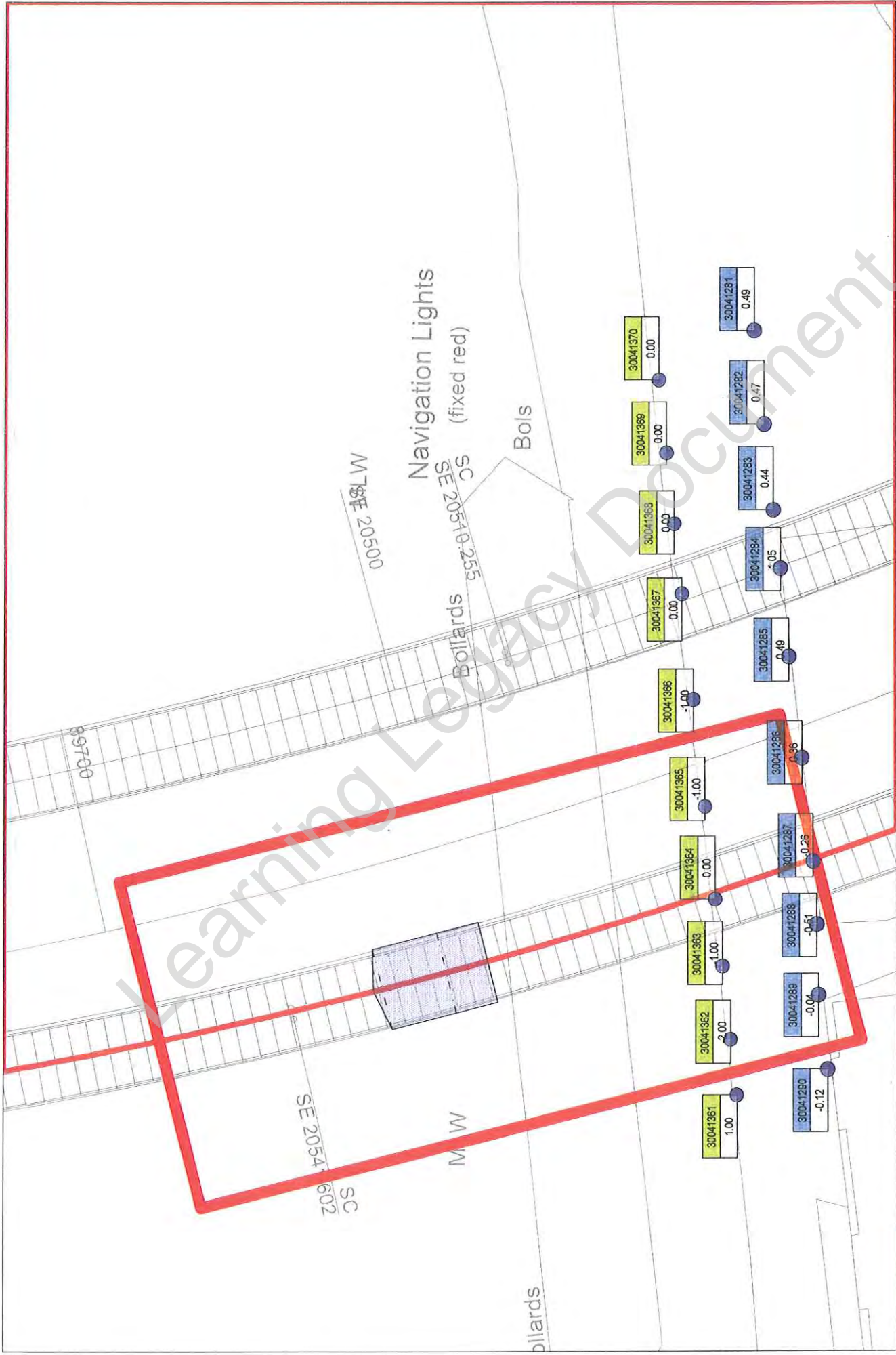
HMJV project role:

Monitoring & Survey engineer



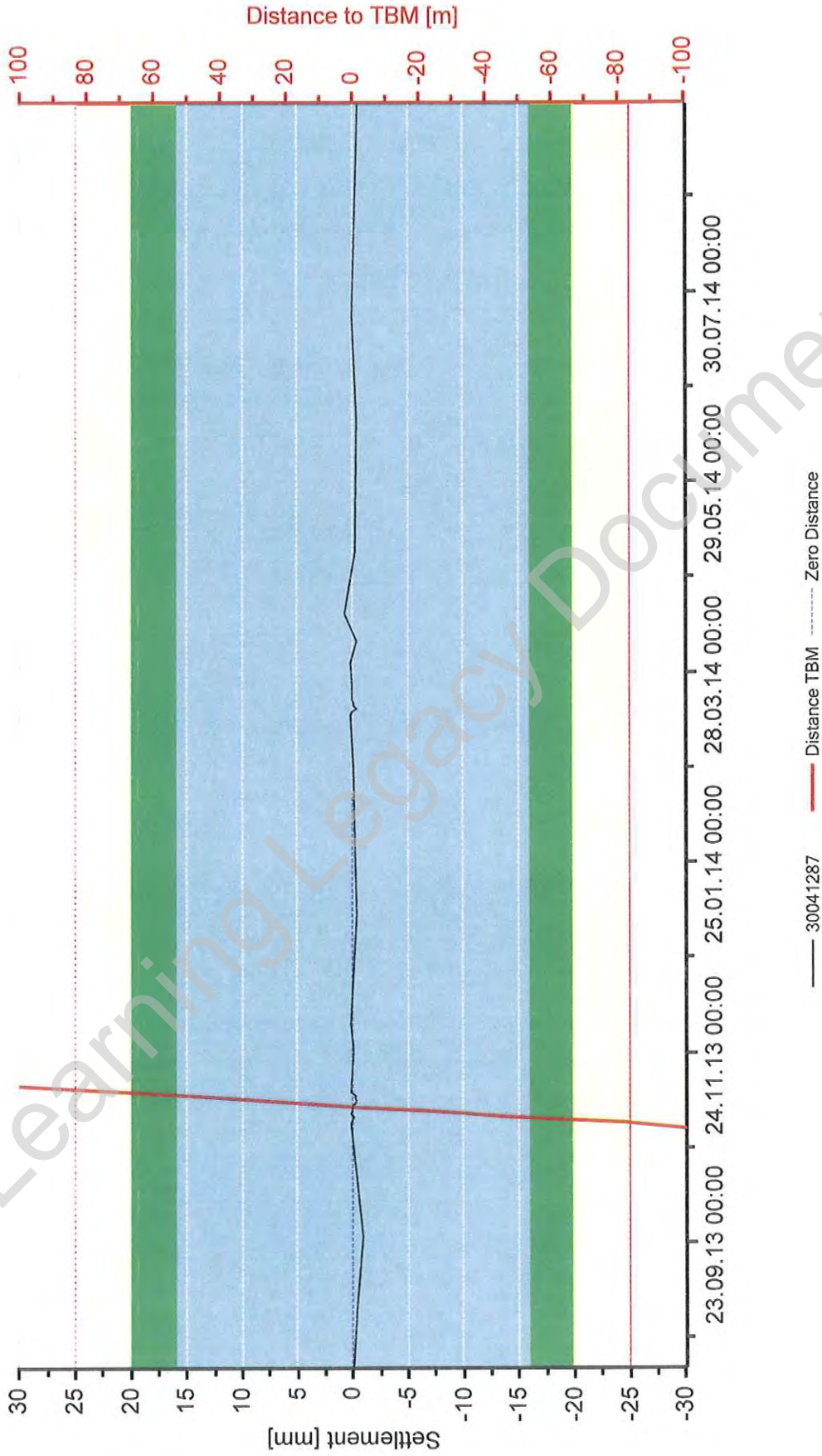
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 04.11.2013 17:52



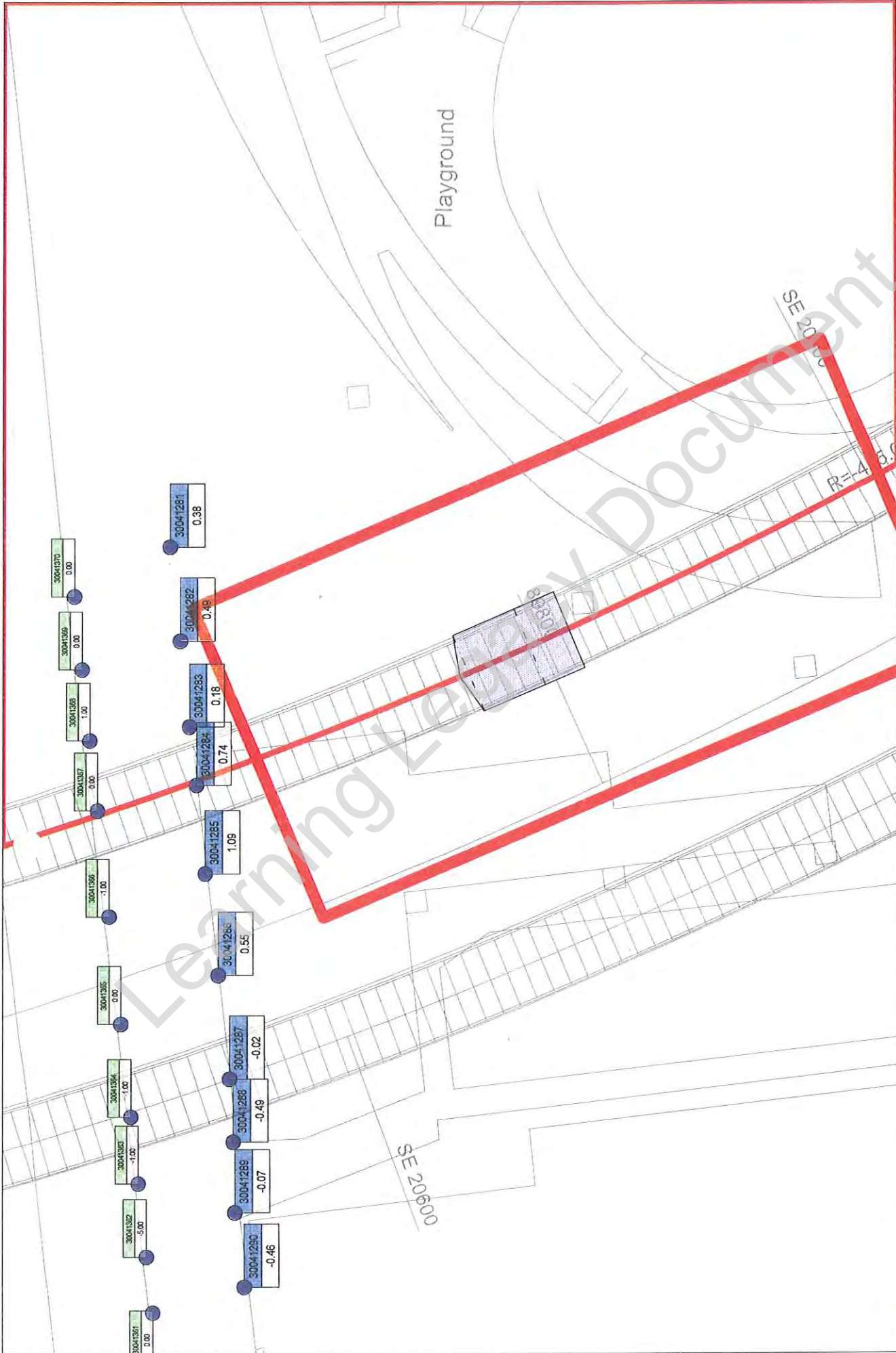


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 09.11.2013 09:00

Point: 30041287

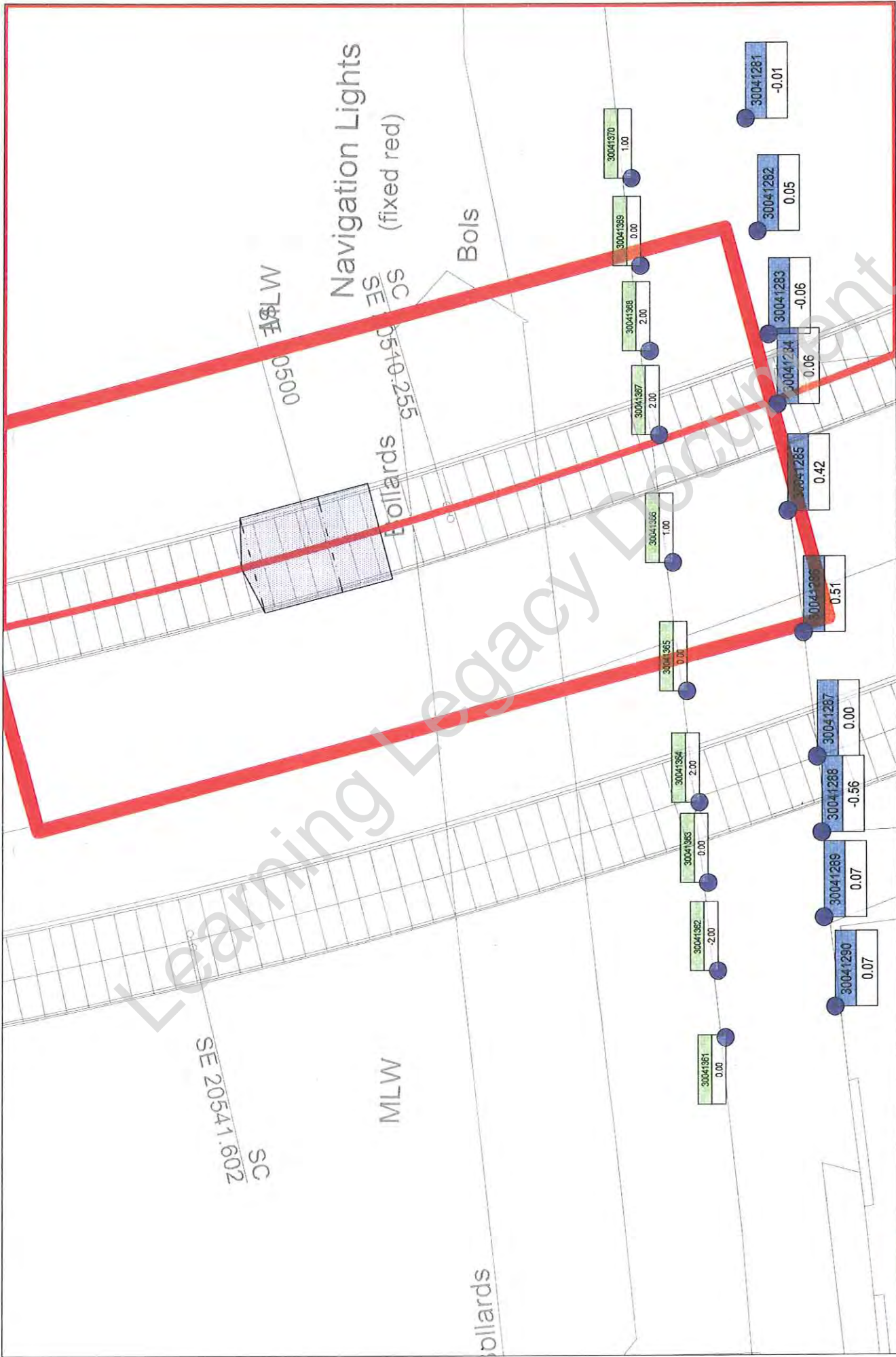


Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - CS 23 - Southside Retaining Wall Footpath 13.08.2013 - 29.09.2014
Date: 23.10.2014 17:33 Current Values: 23.10.2014 17:19



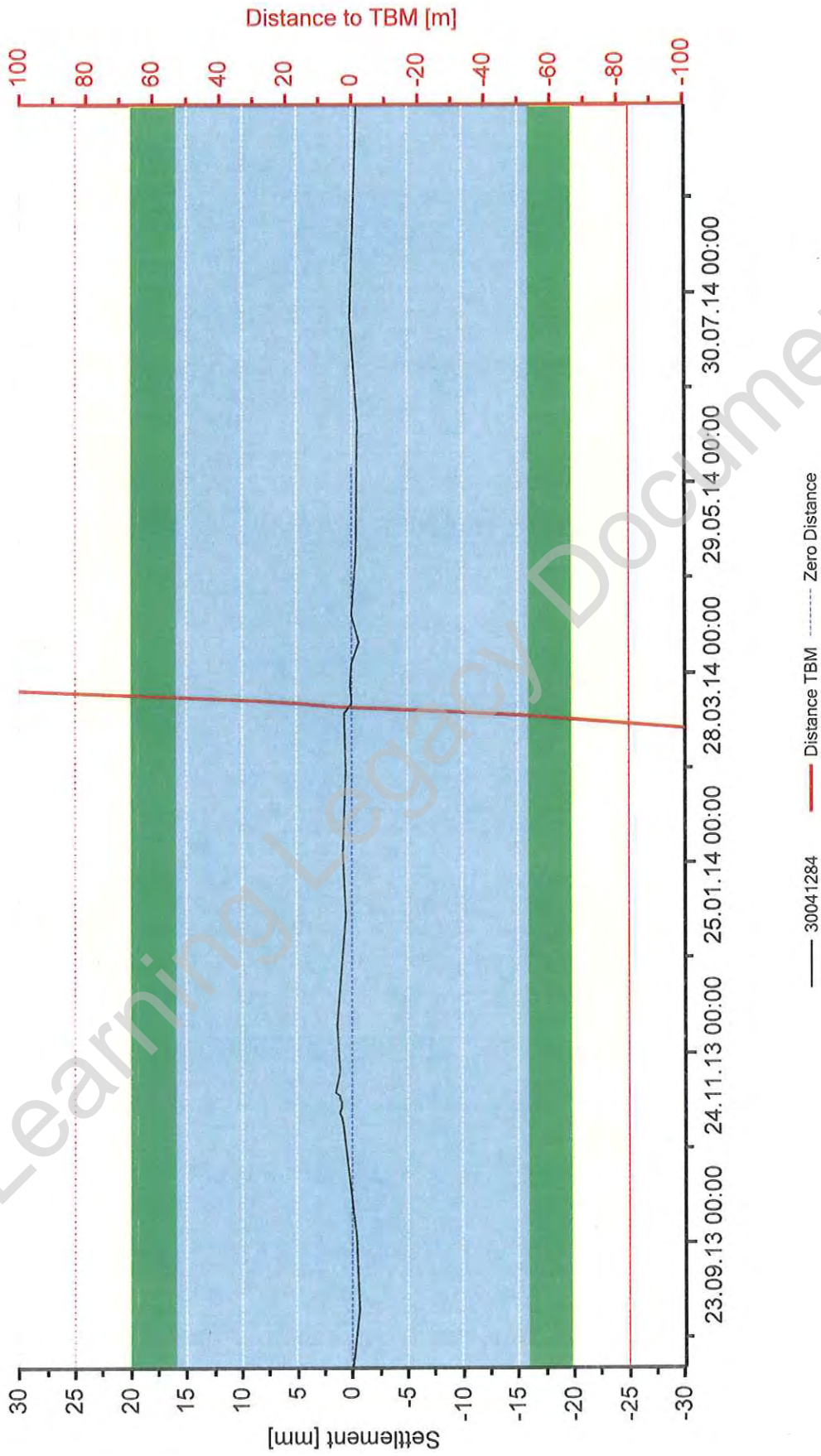
Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 15.03.2014 17:38





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 19.03.2014 17:52

Point: 30041284



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - CS 23 - Southside Retaining Wall Footpath 13.08.2013 - 29.09.2014
date: 19.10.2014 16:33 current values: 19.10.2014 16:26



monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS23 Southside Retaining Wall Footpath

No. of reading	1. following		2. following		3. following		4. following		5. following		6. following			
	baseline	14/08/2013	01/09/2013	25/09/2013	01/11/2013	03/11/2013	04/11/2013							
date	13/8/13	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	
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 1281	105.416	0	105.416	0	105.416	0	105.416	1	105.416	0	105.416	0	105.416	0
3004 1282	105.427	0	105.426	0	105.426	0	105.427	1	105.427	0	105.427	0	105.427	0
3004 1283	105.413	0	105.412	0	105.412	0	105.413	1	105.413	0	105.413	0	105.413	0
3004 1284	105.421	0	105.420	0	105.420	0	105.421	1	105.421	0	105.421	0	105.422	0
3004 1285	105.411	0	105.410	0	105.410	0	105.412	2	105.412	0	105.412	0	105.412	0
3004 1286	105.420	0	105.419	0	105.419	0	105.420	2	105.420	0	105.420	0	105.420	0
3004 1287	105.410	0	105.410	0	105.409	-1	105.410	1	105.410	0	105.410	0	105.410	0
3004 1288	105.403	0	105.403	0	105.402	-1	105.403	1	105.403	0	105.403	0	105.403	0
3004 1289	105.420	0	105.420	0	105.419	-1	105.420	1	105.420	0	105.420	0	105.420	0
3004 1290	105.530	0	105.530	0	105.529	-1	105.530	1	105.530	0	105.530	0	105.530	0

Document

monitoring table



Joint Venture

project: C310 Thames Tunnel

No. of reading		structure: CS23 Southside Retaining Wall Footpath																	
date	baseline	7. following		8. following		9. following		10. following		11. following		12. following							
		05/11/2013	06/11/2013	07/11/2013	08/11/2013	09/11/2013	10/11/2013	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline						
3004 1281	105.416	105.416	0	0	105.416	0	0	105.417	0	0	105.416	0	0	105.417	0	0	105.417	0	1
3004 1282	105.427	105.427	0	0	105.427	0	0	105.427	0	0	105.427	0	0	105.427	0	0	105.427	0	0
3004 1283	105.413	105.413	0	0	105.413	0	0	105.413	0	0	105.413	0	0	105.413	0	0	105.413	0	0
3004 1284	105.421	105.422	0	1	105.421	0	1	105.421	0	1	105.421	0	1	105.422	0	1	105.422	0	1
3004 1285	105.411	105.412	0	0	105.412	0	1	105.412	0	0	105.411	0	0	105.412	0	0	105.412	0	1
3004 1286	105.420	105.420	0	1	105.420	0	1	105.420	0	0	105.420	0	0	105.420	0	0	105.420	0	0
3004 1287	105.410	105.410	0	0	105.410	0	0	105.410	0	0	105.410	0	0	105.410	0	0	105.410	0	0
3004 1288	105.403	105.402	0	0	105.403	0	0	105.402	0	0	105.402	0	-1	105.402	0	-1	105.402	0	-1
3004 1289	105.420	105.420	0	0	105.420	0	0	105.420	0	0	105.419	0	0	105.420	0	0	105.420	0	0
3004 1290	105.530	105.529	0	0	105.530	0	0	105.530	0	0	105.529	0	0	105.530	0	0	105.530	0	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS23 Southside Retaining Wall Footpath

No. of reading	13. following		14. following		15. following		16. following		17. following		18. following					
	baseline	11/11/2013	18/11/2013	25/11/2013	03/12/2013	09/01/2014	28/01/2014									
date	13/08/13	11/11/2013		18/11/2013		25/11/2013		03/12/2013		09/01/2014		28/01/2014				
No.	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			
			elevation	0	1	0	1	0	1	0	1	0	1	0	1	
3004 1281	105.416	105.417	0	1	105.417	0	1	105.417	0	1	105.416	-1	0	105.417	0	1
3004 1282	105.427	105.427	0	1	105.427	0	1	105.427	0	1	105.427	-1	0	105.427	0	0
3004 1283	105.413	105.414	0	1	105.413	0	1	105.414	0	1	105.413	0	0	105.413	0	0
3004 1284	105.421	105.422	0	1	105.422	0	1	105.422	0	1	105.421	-1	0	105.421	0	1
3004 1285	105.411	105.412	0	1	105.412	0	1	105.412	0	1	105.412	-1	1	105.412	0	0
3004 1286	105.420	105.420	1	1	105.420	0	1	105.421	0	1	105.420	-1	0	105.420	0	0
3004 1287	105.410	105.410	0	0	105.410	0	0	105.410	0	0	105.410	-1	0	105.410	0	0
3004 1288	105.403	105.403	0	0	105.402	0	0	105.403	0	0	105.402	-1	-1	105.402	0	-1
3004 1289	105.420	105.420	0	0	105.420	0	0	105.420	0	0	105.419	-1	0	105.420	0	0
3004 1290	105.530	105.530	0	0	105.530	0	0	105.530	0	0	105.530	0	0	105.530	0	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS23 Southside Retaining Wall Footpath

No. of reading	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
	13/8/13	105.416	105.416	0	105.416	0	105.416	0	105.416	0	105.416	0
		105.427	105.427	0	105.427	0	105.427	0	105.427	0	105.427	0
		105.413	105.413	0	105.413	0	105.413	0	105.413	0	105.413	0
		105.421	105.421	0	105.421	0	105.421	0	105.421	0	105.421	0
		105.411	105.412	0	105.412	0	105.412	-1	105.412	0	105.412	0
		105.420	105.420	0	105.420	0	105.420	0	105.420	0	105.420	0
		105.410	105.410	0	105.410	0	105.410	0	105.410	0	105.410	0
		105.403	105.402	0	105.402	0	105.402	0	105.402	0	105.402	0
		105.420	105.419	0	105.420	0	105.419	0	105.419	0	105.419	0
		105.530	105.530	0	105.529	0	105.529	0	105.530	0	105.530	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS23 Southside Retaining Wall Footpath

No. of reading	25. following		26. following		27. following		28. following		29. following		30. following		
	baseline	19/03/2014	24/03/2014	31/03/2014	07/04/2014	16/04/2014	06/05/2014						
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 1281	105.416	105.416	0	105.416	0	105.416	0	105.416	0	105.417	1	105.416	-1
3004 1282	105.427	105.427	0	105.427	0	105.427	0	105.426	0	105.427	1	105.426	-1
3004 1283	105.413	105.413	0	105.413	0	105.413	0	105.412	-1	105.413	1	105.412	-1
3004 1284	105.421	105.421	0	105.421	0	105.421	0	105.420	-1	105.421	1	105.420	0
3004 1285	105.411	105.412	0	105.412	0	105.412	0	105.411	-1	105.412	1	105.411	-1
3004 1286	105.420	105.420	0	105.420	0	105.420	0	105.420	-1	105.421	1	105.420	-1
3004 1287	105.410	105.410	0	105.410	0	105.410	0	105.410	-1	105.411	1	105.410	-1
3004 1288	105.403	105.402	0	105.402	0	105.402	0	105.402	0	105.403	1	105.402	-1
3004 1289	105.420	105.420	0	105.420	0	105.420	0	105.419	0	105.420	1	105.420	-1
3004 1290	105.530	105.530	0	105.530	0	105.530	0	105.529	0	105.530	0	105.529	0

Document

monitoring table




Joint Venture

project: C310 Thames Tunnel

structure: CS23 Southside Retaining Wall Footpath

No. of reading	baseline	31. following		32. following		33. following		elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline
		date	elevation	deviation from last/ baseline	date	elevation	deviation from last/ baseline						
		13/8/13											
				19/06/2014		22/07/2014				29/09/2014			
No.	elevation												
3004 1281	105.416	105.416	0	0	105.416	0	0	105.417	0	0			
3004 1282	105.427	105.426	0	0	105.427	0	0	105.427	0	0			
3004 1283	105.413	105.412	0	-1	105.413	1	0	105.413	0	0			
3004 1284	105.421	105.420	0	-1	105.421	1	0	105.420	-1	-1			
3004 1285	105.411	105.411	-1	-1	105.412	1	0	105.411	-1	-1			
3004 1286	105.420	105.420	0	0	105.420	1	0	105.419	-1	-1			
3004 1287	105.410	105.410	0	0	105.410	0	0	105.410	-1	-1			
3004 1288	105.403	105.402	0	-1	105.403	1	0	105.402	0	-1			
3004 1289	105.420	105.419	0	0	105.420	1	0	105.419	-1	0			
3004 1290	105.530	105.529	0	-1	105.530	0	0	105.530	1	1			

Document

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

APPENDIX 73

Southside retaining walls prisms

Learning Legacy Document

monitoring asset	River Thames Southside		
reference monitoring drawing:	C310-HTM-C-DWG-CR146-ST004-70002		
name of monitoring section:	Southside retaining walls		
sensor type:	prism		
chainage:	89760	point no.:	3004 1361 - 3004 1370
trigger values: [mm]	green: n/a	amber: n/a	red: n/a
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	02/10/13	0.00		
TBM 1	start ZOI	05/11/13	1.00	3004 1364
	end ZOI	10/11/13	-1.00	3004 1364
TBM 2	start ZOI	16/03/14	0.00	3004 1367
	end ZOI	20/03/14	1.00	3004 1367
longterm	29/10/14	-3.00	3004 1362	
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 values of the prisms show the horizontal deflection of the retaining walls
Under consideration of temperature differences, the surrounding ground condition, tidal effects 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.

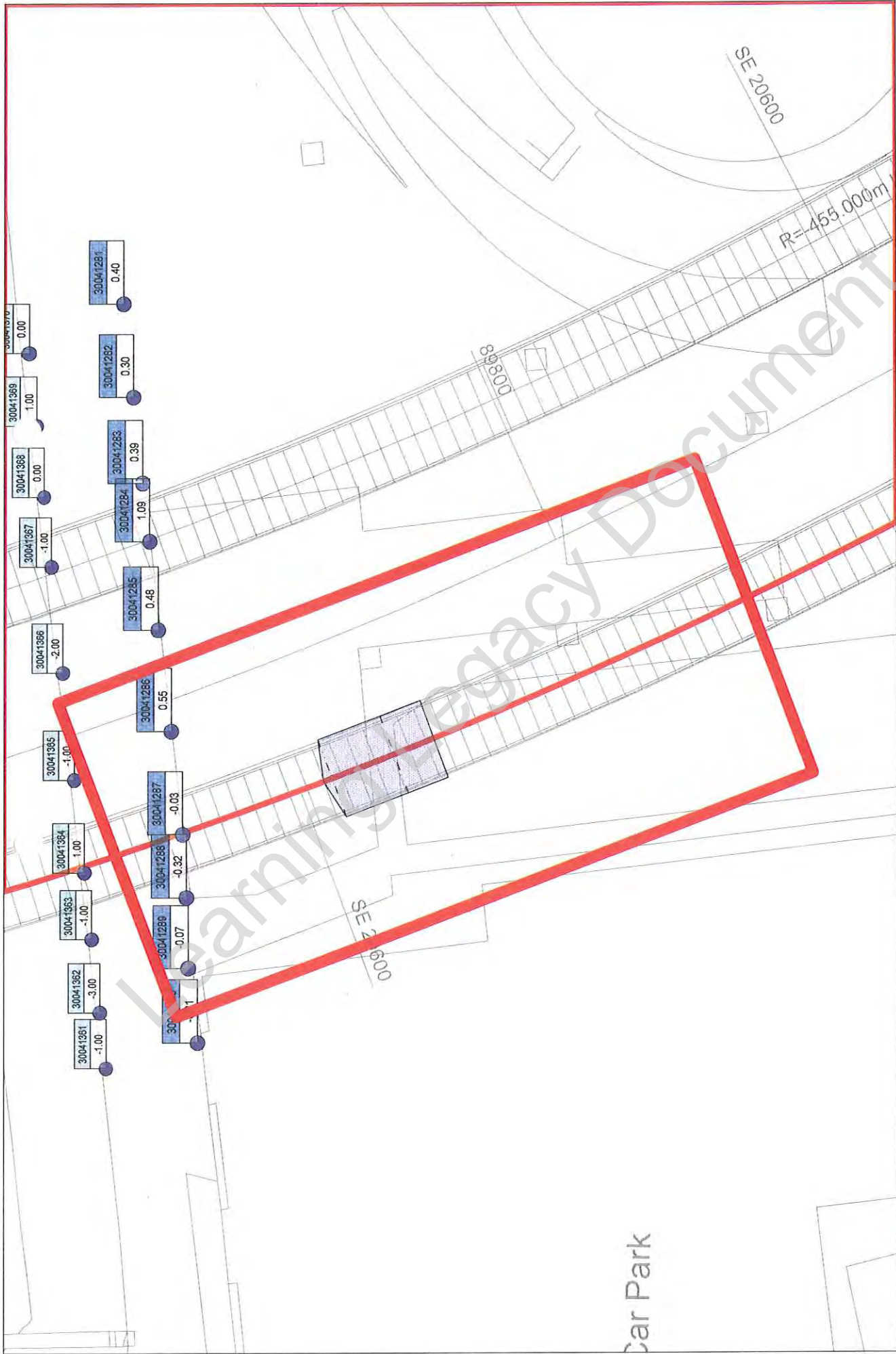
date / signature:

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 WB
 current values: 05.11.2013 17:56

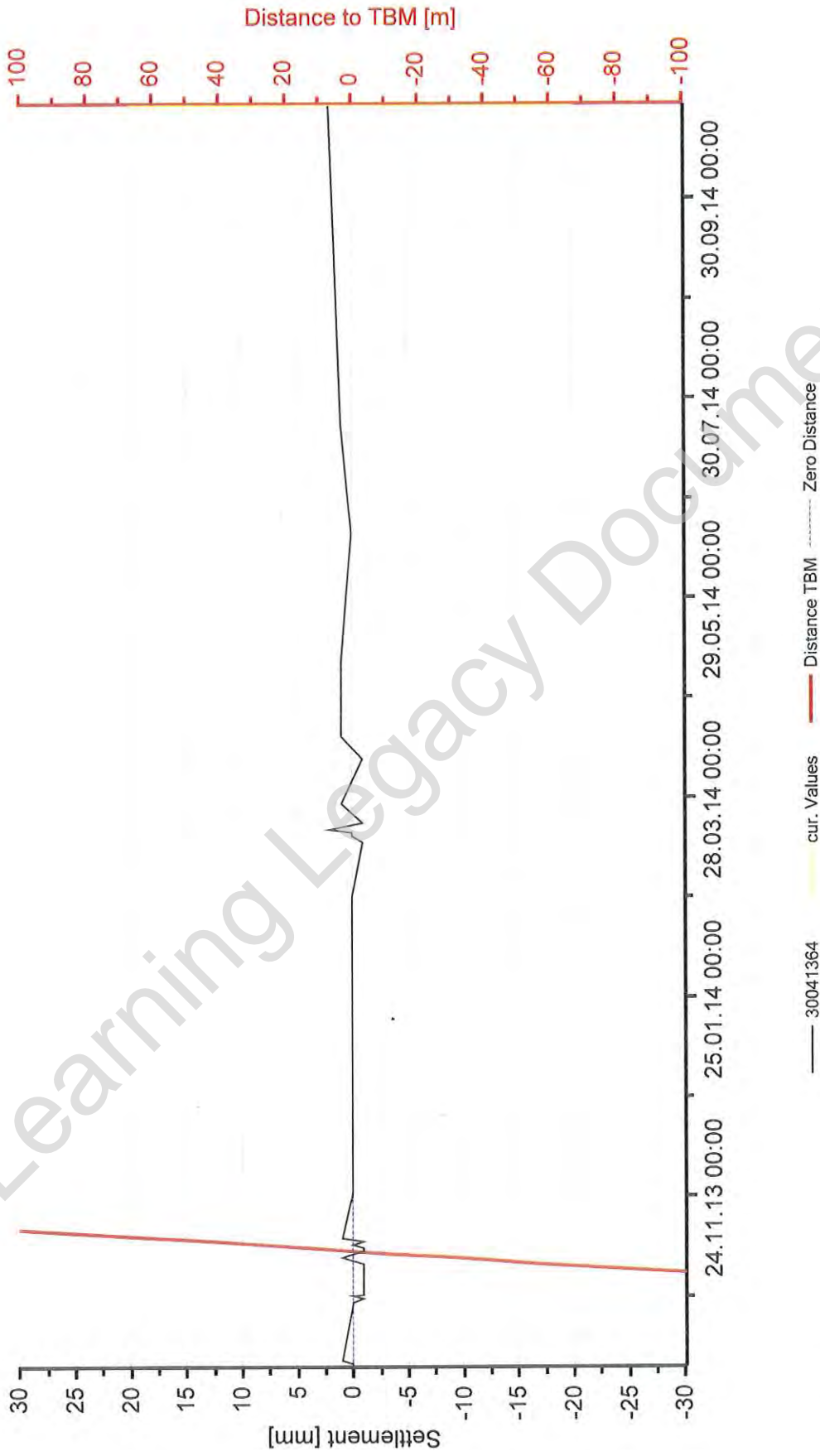




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 10.11.2013 09:00



Point: 30041364



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: WB Tunnel - Southside River Thames Retaining Wall 02.10.2013 - 29.10.2014
Date: 30.10.2014 09:15 Current Values: 30.10.2014 09:04





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 16.03.2014 09:00

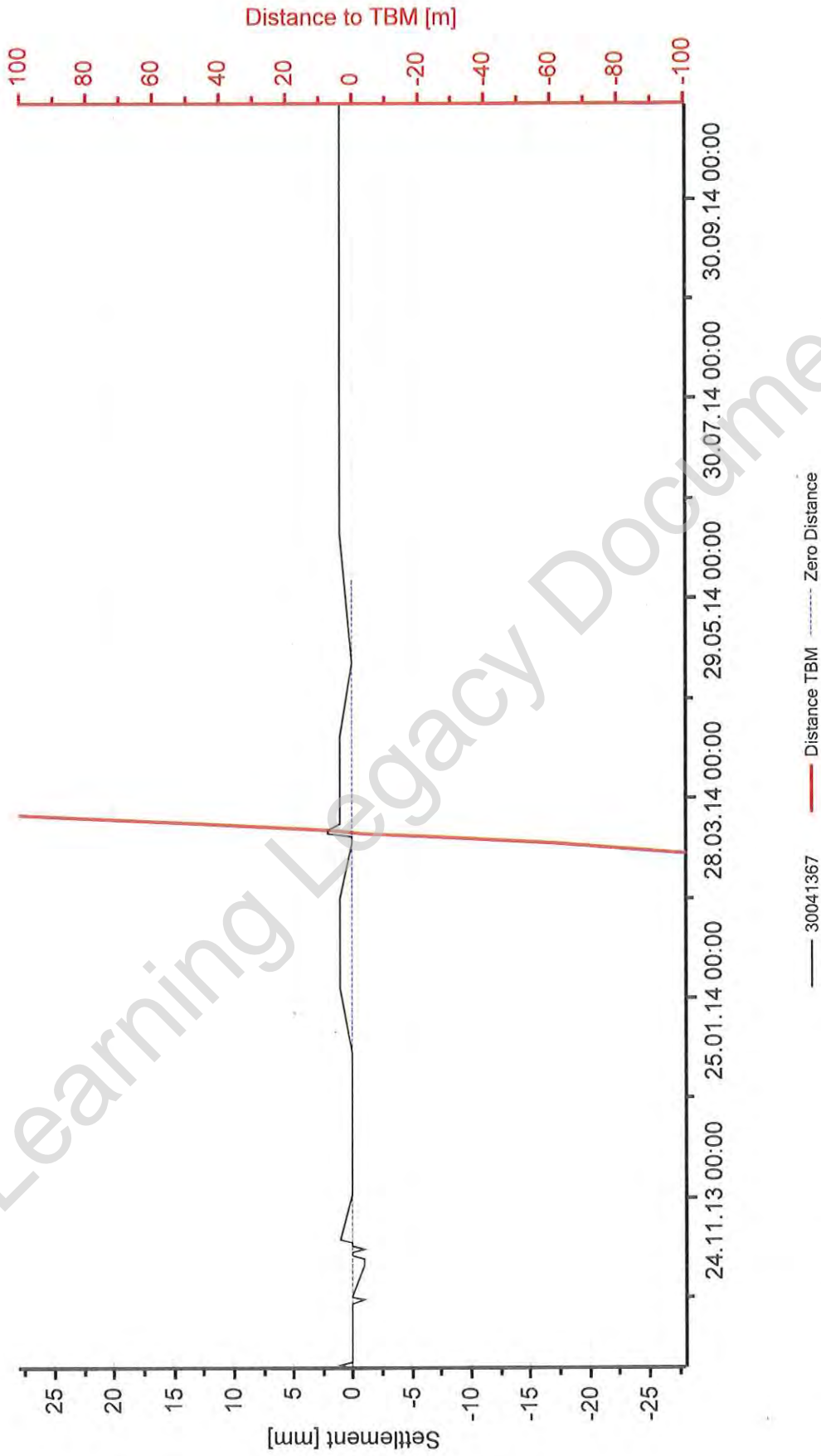




Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 20.03.2014 09:00



Point: 30041367



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
Close Out Report: EB Tunnel - Southside River Thames Retaining Wall 02.10.2013 - 29.10.2014
date: 30.10.2014 09:33 current values: 30.10.2014 09:19



monitoring table

Note: if deviation is negative value, retaining wall is leaning towards the River Thames



Joint Venture

project: **C310 Thames Tunnel**

structure: **Southside Retaining Wall (Prisms)**

No. of reading	baseline		1. following		2. following		3. following		4. following		5. following		6. following						
	reference line offset	2/10/13	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline					
date			03/10/2013		04/10/2013		21/10/2013		22/10/2013		23/10/2013		23/10/2013						
3004 1361	-0.404	-0.403	1	1	-0.404	-1	0	-0.405	-1	-1	-0.405	0	-1	-0.404	1	0	-0.404	0	0
3004 1362	-0.413	-0.414	-1	-1	-0.413	1	0	-0.417	-4	-4	-0.416	1	-3	-0.416	0	-3	-0.416	0	-3
3004 1363	-0.416	-0.417	-1	-1	-0.414	3	2	-0.418	-4	-2	-0.417	1	-1	-0.417	0	-1	-0.417	0	-1
3004 1364	-0.411	-0.411	0	0	-0.410	1	1	-0.411	-1	0	-0.411	0	0	-0.411	0	0	-0.412	-1	-1
3004 1365	-0.407	-0.408	-1	-1	-0.407	1	0	-0.409	-2	-2	-0.408	1	-1	-0.408	0	-1	-0.408	0	-1
3004 1366	-0.398	-0.397	1	1	-0.399	-2	-1	-0.399	0	-1	-0.398	1	0	-0.397	1	1	-0.399	-2	-1
3004 1367	-0.385	-0.384	1	1	-0.385	-1	0	-0.385	0	0	-0.385	0	0	-0.383	2	2	-0.386	-3	-1
3004 1368	-0.390	-0.390	0	0	-0.390	0	0	-0.390	0	0	-0.389	1	1	-0.389	0	1	-0.390	-1	0
3004 1369	-0.382	-0.382	0	0	-0.382	0	0	-0.382	0	0	-0.382	0	0	-0.381	1	1	-0.382	-1	0
3004 1370	-0.346	-0.345	1	1	-0.346	-1	0	-0.346	0	0	-0.345	1	1	-0.345	0	1	-0.346	-1	0

monitoring table

Note: if deviation is negative value, retaining wall is leaning towards the River Thames



Joint Venture

project: C310 Thames Tunnel

structure: Southside Retaining Wall (Prisms)

No. of reading	7. following		8. following		9. following		10. following		11. following		12. following				
	baseline	24/10/2013	24/10/2013	03/11/2013	04/11/2013	05/11/2013	06/11/2013								
No.	reference line offset	elevation	deviation from last/ baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline		
	3004 1361	-0.404	-0.404	0	0	-1	-0.405	0	-1	0	-0.405	0	-1	-0.404	1
3004 1362	-0.413	-0.416	0	-3	-1	-0.417	0	-4	1	-0.416	0	-3	-0.416	0	-3
3004 1363	-0.416	-0.417	0	-1	0	-0.418	0	-2	2	-0.416	0	0	-0.417	-1	0
3004 1364	-0.411	-0.411	1	0	-1	-0.412	0	-1	1	-0.411	0	0	-0.410	1	0
3004 1365	-0.407	-0.408	0	-1	0	-0.409	0	-2	1	-0.408	0	-1	-0.408	0	-1
3004 1366	-0.398	-0.398	1	0	-2	-0.398	0	-2	1	-0.399	0	-1	-0.400	-1	-1
3004 1367	-0.385	-0.385	1	0	-1	-0.386	0	-1	0	-0.386	0	-1	-0.386	0	0
3004 1368	-0.390	-0.389	1	1	-1	-0.390	-1	-1	1	-0.390	0	0	-0.390	0	1
3004 1369	-0.382	-0.381	1	1	-2	-0.383	0	0	1	-0.381	1	1	-0.381	0	0
3004 1370	-0.346	-0.345	1	1	0	-0.346	0	0	1	-0.345	1	1	-0.346	-1	0

monitoring table

Note: if deviation is negative value, retaining wall is leaning towards the River Thames



Joint Venture

project: C310 Thames Tunnel

structure: Southside Retaining Wall (Prisms)

No. of reading	baseline date	13. following 07/11/2013		14. following 08/11/2013		15. following 09/11/2013		16. following 10/11/2013		17. following 11/11/2013		18. following 25/11/2013							
		reference line offset	elevation	deviation from last/ baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline					
3004 1361	-0.404	-0.404	0	0	-0.405	-1	-1	-0.403	2	1	-0.405	-2	-1	-0.402	3	2	-0.404	-2	0
3004 1362	-0.413	-0.416	0	-3	-0.415	1	-2	-0.415	0	-2	-0.416	-1	-3	-0.414	2	-1	-0.416	-2	-3
3004 1363	-0.416	-0.418	-2	-2	-0.417	1	-1	-0.417	0	-1	-0.417	0	-1	-0.416	1	0	-0.417	-1	-1
3004 1364	-0.411	-0.412	-1	-1	-0.412	0	-1	-0.411	1	0	-0.412	-1	-1	-0.410	2	1	-0.411	-1	0
3004 1365	-0.407	-0.408	0	-1	-0.409	-1	-2	-0.408	1	-1	-0.409	-1	-2	-0.407	2	0	-0.408	-1	-1
3004 1366	-0.398	-0.400	-1	-2	-0.399	1	-1	-0.399	0	-1	-0.399	0	-1	-0.396	3	2	-0.397	-1	1
3004 1367	-0.385	-0.385	0	0	-0.386	-1	-1	-0.385	1	0	-0.385	0	0	-0.384	1	1	-0.385	-1	0
3004 1368	-0.390	-0.390	-1	0	-0.391	-1	-1	-0.390	1	0	-0.390	0	0	-0.388	2	2	-0.389	-1	1
3004 1369	-0.382	-0.382	0	0	-0.382	0	0	-0.382	0	0	-0.382	0	0	-0.381	1	1	-0.380	1	2
3004 1370	-0.346	-0.346	0	0	-0.346	0	0	-0.346	0	0	-0.346	0	0	-0.345	1	1	-0.345	0	1

monitoring table

Note: if deviation is negative value, retaining wall is leaning towards the River Thames



Joint Venture

project: C310 Thames Tunnel

structure: Southside Retaining Wall (Prisms)

No. of reading	baseline	19. following		20. following		21. following		22. following		23. following		24. following		
		date	elevation	deviation from last/ baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	
		2/10/13												
				04/12/2013		08/01/2014		28/01/2014		04/03/2014		14/03/2014		16/03/2014
3004 1361	-0.404	-0.404	0	0	1	1	-0.402	1	2	-0.402	0	2	-0.404	0
3004 1362	-0.413	-0.416	0	-3	2	-1	-0.413	1	0	-0.416	-3	-3	-0.418	-2
3004 1363	-0.416	-0.416	1	0	-1	-1	-0.415	2	1	-0.417	-2	-1	-0.417	0
3004 1364	-0.411	-0.411	0	0	0	0	-0.411	0	0	-0.411	0	0	-0.412	-1
3004 1365	-0.407	-0.408	0	-1	-1	-2	-0.408	1	-1	-0.408	0	-1	-0.407	1
3004 1366	-0.398	-0.398	-1	0	0	0	-0.398	0	0	-0.398	0	0	-0.399	-1
3004 1367	-0.385	-0.385	0	0	0	0	-0.384	1	1	-0.384	0	1	-0.385	-1
3004 1368	-0.390	-0.389	0	1	1	2	-0.388	0	2	-0.388	0	2	-0.389	-1
3004 1369	-0.382	-0.382	-2	0	1	1	-0.382	-1	0	-0.381	1	1	-0.382	-1
3004 1370	-0.346	-0.346	-1	0	0	0	-0.346	0	0	-0.345	1	1	-0.346	-1

monitoring table

Note: if deviation is negative value, retaining wall is leaning towards the River Thames



Joint Venture

project: **C310 Thames Tunnel**

structure: **Southside Retaining Wall (Prisms)**

No. of reading	baseline	25. following		26. following		27. following		28. following		29. following		30. following							
		date	elevation	deviation from last/ baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline					
	2/10/13																		
3004 1361	-0.404	-0.405	-1	-1	-0.404	1	0	-0.403	1	1	-0.404	-1	0	-0.404	0	0	-0.403	1	1
3004 1362	-0.413	-0.416	-1	-3	-0.415	1	-2	-0.415	0	-2	-0.415	0	-2	-0.414	1	-1	-0.417	-3	-4
3004 1363	-0.416	-0.417	0	-1	-0.416	1	0	-0.417	-1	-1	-0.417	0	-1	-0.416	1	0	-0.414	2	2
3004 1364	-0.411	-0.411	0	0	-0.409	2	2	-0.411	-2	0	-0.412	-1	-1	-0.410	2	1	-0.409	1	2
3004 1365	-0.407	-0.407	0	0	-0.407	0	0	-0.407	0	0	-0.408	-1	-1	-0.407	1	0	-0.405	2	2
3004 1366	-0.398	-0.397	1	1	-0.397	0	1	-0.397	0	1	-0.398	-1	0	-0.398	1	1	-0.395	2	3
3004 1367	-0.385	-0.383	2	2	-0.383	0	2	-0.384	-1	1	-0.384	0	1	-0.384	0	1	-0.382	2	3
3004 1368	-0.390	-0.387	2	3	-0.388	-1	2	-0.389	-1	1	-0.389	0	1	-0.389	0	1	-0.388	1	2
3004 1369	-0.382	-0.380	1	2	-0.382	-2	0	-0.382	0	0	-0.382	0	0	-0.381	1	1	-0.380	1	2
3004 1370	-0.346	-0.345	1	1	-0.345	0	1	-0.350	-5	-4	-0.350	0	-4	-0.351	-1	-5	-0.345	6	1

monitoring table

Note: if deviation is negative value, retaining wall is leaning towards the River Thames




Joint Venture

project: **C310 Thames Tunnel**

structure: **Southside Retaining Wall (Prisms)**

No. of reading	baseline	31. following		32. following		33. following		34. following		35. following		36. following					
		date	elevation	deviation from last/ baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline	ref. line offset	deviation from last/baseline			
		2/10/13															
				09/04/2014	16/04/2014	09/05/2014	19/06/2014	22/07/2014	29/10/2014								
3004 1361	-0.404	-0.404	-1	0	1	-0.403	0	1	-0.404	-1	0	-0.403	1	1	-0.404	-1	0
3004 1362	-0.413	-0.415	2	-2	1	-0.414	0	-1	-0.415	-1	-2	-0.415	0	-2	-0.416	-1	-3
3004 1363	-0.416	-0.417	-3	-1	0	-0.416	0	0	-0.417	-1	-1	-0.416	1	0	-0.416	0	0
3004 1364	-0.411	-0.412	-3	-1	2	-0.410	0	1	-0.411	-1	0	-0.410	1	1	-0.409	1	2
3004 1365	-0.407	-0.408	-3	-1	1	-0.407	-1	-1	-0.408	0	-1	-0.407	1	0	-0.408	-1	-1
3004 1366	-0.398	-0.399	-4	-1	2	-0.397	-2	-1	-0.398	1	0	-0.397	1	1	-0.398	-1	0
3004 1367	-0.385	-0.384	-2	1	0	-0.384	-1	0	-0.384	1	1	-0.384	0	1	-0.384	0	1
3004 1368	-0.390	-0.389	-1	1	0	-0.389	-1	0	-0.390	0	0	-0.389	1	1	-0.388	1	2
3004 1369	-0.382	-0.381	-1	1	0	-0.381	0	1	-0.382	-1	0	-0.381	1	1	-0.380	1	2
3004 1370	-0.346	-0.349	-4	-3	0	-0.349	0	-3	-0.348	1	-2	-0.348	0	-2	-0.347	1	-1

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

APPENDICIES 99 - 104

Store Road Sewer

Learning Legacy Document

monitoring asset		Store Road Sewer		
reference monitoring drawing:		C310-HTM-C-DWG-CR146-ST004-70003		
name of monitoring section:		manuel levelling studs:	CS29 Store Road Sewer incl. shallow datum CS30 Store Road Sewer CL (CH 89025)	
sensor type:		automated monitoring:	Shape Accelerator Arrays (SAA) Fibre Optic Strain Gauges Strain Gauges	
chainage:	89025	point no.:	3004 1051 - 3004 1055, 3004 1061, 3004 1062 3004 1831 - 3004 1842 53008_00 - 53008_35	
trigger values: [mm]		green: N/A	amber: N/A	red: N/A
reference document for trigger values:		Management Plan for Control of Ground Movement		
EB-no.:		C310-HTM-Z-STP-CR148-50058		
Appendix:		NNN		

monitoring data

	date	max. value	point no.	comments
baseline	14/11/13	0.00		
TBM 1	start ZOI	15/01/14	-0.37	3004 1052
	end ZOI	19/01/14	-8.54	3004 1835
TBM 2	start ZOI	29/04/14	-3.92	3004 1054
	end ZOI	02/05/14	-6.38	3004 1839
longterm	27/08/14	-16.67	3004 1836	last reading 3 month 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)	

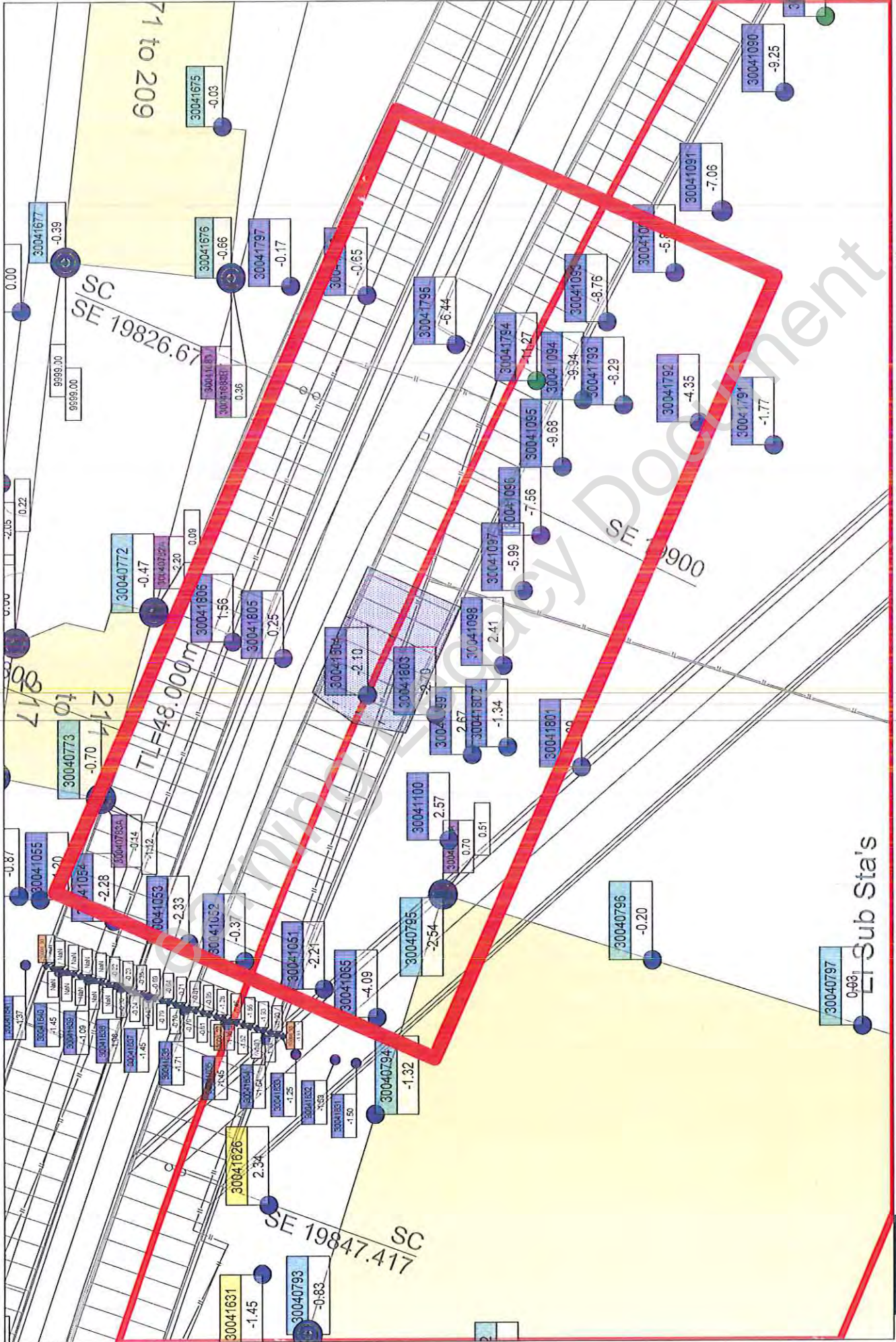
summary / comments

close out report refers to:
Monitoring Close Out Report Thames Water Asset: Store Road Inlet
Document Number: C310-XRL-C-RGN-CR146-50002

date / signature: 09/11/2014

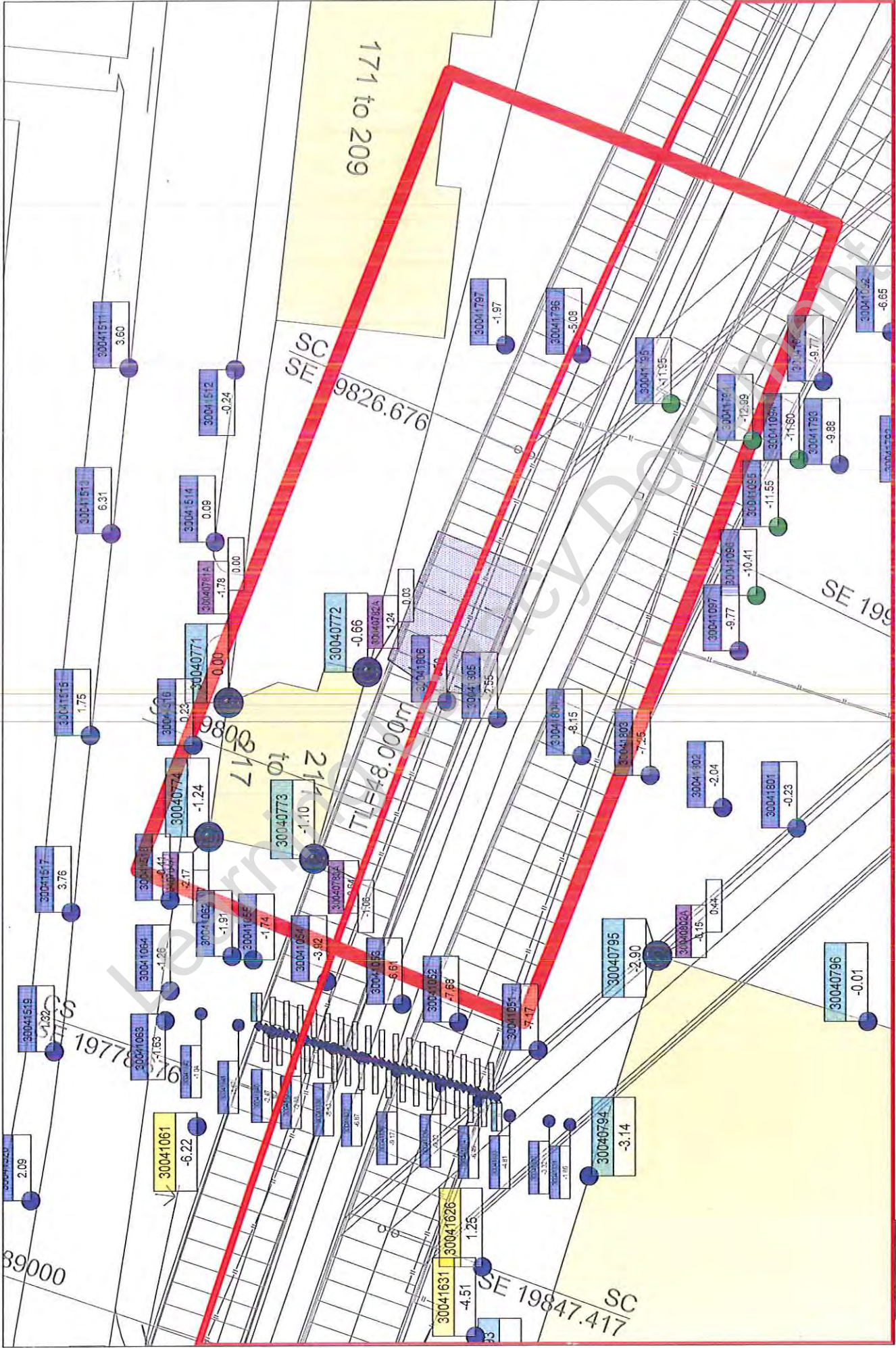
print name:

HMJV project role: Monitoring & Survey engineer



Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: TBM drive WB
 current values: 15.01.2014 10:00





Project: C310 Thames Tunnel - Plumstead Portal to North Woolwich Portal
 working activities: C310 EB tunnel drive; NWP: portal excavation, construction base slab
 current values: 29.04.2014 17:41



monitoring table

Joint Venture

project: C310 Thames Tunnel

structure: CS29 Store Road

No. of reading	baseline	1. following		2. following		3. following		4. following		5. following		6. 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						
	14/11/13				10/12/2013			14/01/2014			15/01/2014			16/01/2014					
30041051	101.058	101.057	-1	-1	101.056	-1	-2	101.055	-1	-3	101.056	1	-2	101.055	-1	-3	101.054	-1	-4
30041052	101.011	101.010	-1	-1	101.011	0	-1	101.010	0	-1	101.011	1	0	101.010	-1	-1	101.008	-2	-3
30041053	101.004	101.002	-1	-1	101.002	0	-2	101.001	-1	-3	101.001	0	-2	101.000	-1	-3	101.000	0	-4
30041054	100.901	100.900	-1	-1	100.899	-1	-2	100.898	-1	-3	100.899	0	-2	100.898	0	-3	100.898	0	-3
30041055	101.052	101.051	-1	-1	101.051	0	-1	101.053	1	1	101.053	0	1	101.054	0	2	101.053	0	1
30041062	101.026	101.025	-1	-1	101.025	0	0	101.024	-1	-1	101.025	0	-1	101.024	-1	-2	101.024	0	-2
30041063	101.043	101.043	0	0	101.044	0	0	101.042	-1	-1	101.043	0	-1	101.042	0	-1	101.042	0	-1
30041064	100.911	100.911	0	0	100.911	0	0	100.911	0	0	100.910	0	0	100.910	-1	-1	100.910	1	0
30041065	101.473	101.471	-1	-1	101.470	-1	-3	101.469	-1	-4				101.468	0	-4	101.468	0	-4
30041061 (SD)	101.133	101.133	0	0	101.132	0	0	101.133	0	0	101.133	0	0	101.133	0	0			

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS29 Store Road

No. of reading	7. following		8. following		9. following		10. following		11. following		12. 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	14/11/13														
No.															
30041051	101.058	101.053	-1	101.052	0	-5	101.052	0	-6	101.052	0	-6	101.052	-1	-6
30041052	101.011	101.006	-3	101.005	-1	-6	101.004	-1	-7	101.005	0	-6	101.004	0	-7
30041053	101.004	100.998	-2	100.998	0	-6	100.998	0	-6	100.998	0	-6	100.997	-1	-6
30041054	100.901	100.898	0	100.898	0	-3	100.898	-1	-3	100.898	0	-3	100.897	-1	-4
30041055	101.052	101.055	2	101.055	0	3	101.054	-1	2	101.053	-1	0	101.052	-1	0
30041062	101.026	101.024	0	101.024	0	-2	101.024	0	-2	101.024	0	-2	101.024	0	-2
30041063	101.043	101.042	0	101.042	0	-1	101.042	0	-1	101.042	0	-1	101.042	0	-1
30041064	100.911	100.910	0	100.910	-1	-1	100.909	0	-1	100.909	0	-1	100.910	1	-1
30041065	101.473	101.468	0	101.468	0	-5	101.468	0	-5	101.468	0	-5	101.468	0	-5
30041061 (SD)	101.133	101.133	0	101.133	0	0	101.133	0	0	101.133	0	0	101.133	0	0

28/01/2014

23/01/2014

19/01/2014

18/01/2014

17/01/2014

17/01/2014

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS29 Store Road

No. of reading	baseline	13. following		14. following		15. following		16. following		17. following		18. 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	14/11/13	03/02/2014		12/02/2014		11/03/2014		07/04/2014		29/04/2014		30/04/2014	
30041051	101.058	101.053	1	101.052	-1	101.052	0	101.052	0	101.052	-2	101.051	0
30041052	101.011	101.005	1	101.005	-1	101.005	0	101.005	0	101.003	-1	101.004	0
30041053	101.004	100.998	1	100.998	-1	100.998	1	100.998	0	100.997	-1	100.997	0
30041054	100.901	100.898	1	100.898	0	100.898	0	100.898	-1	100.897	-1	100.897	0
30041055	101.052	101.053	2	101.053	-1	101.052	-1	101.052	0	101.050	-1	101.050	0
30041062	101.026	101.025	1	101.024	-1	101.025	1	101.025	0	101.024	-1	101.024	0
30041063	101.043	101.043	1	101.043	-1	101.043	1	101.043	0	101.042	-2	101.042	0
30041064	100.911	100.910	1	100.909	-1	100.911	1	100.910	0	100.909	-1	100.909	0
30041065	101.473	101.468	1	101.468	0	101.468	0	101.468	0	101.467	-1	101.467	0
30041061 (SD)	101.133	101.133	1	101.133	-1	101.130	-3	101.129	-1	101.127	-2	101.127	0

monitoring table



project: **C310 Thames Tunnel**

Joint Venture

structure: **CS29 Store Road**

No. of reading	25. following		26. following		27. following		28. following		29. following		deviation from last/baseline
	baseline	elevation	deviation from last/ baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	
date	14/11/13										
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
30041051	101.058	101.050	0 -8	101.048	-2 -10	101.048	0 -10	101.047	-1 -11	destroyed	due to reinstatementworks
30041052	101.011	101.002	0 -9	101.000	-2 -11	101.000	0 -11	100.999	-1 -12	destroyed	due to reinstatementworks
30041053	101.004	100.994	0 -10	100.991	-2 -12	100.991	-1 -13	100.990	-1 -14	destroyed	due to reinstatementworks
30041054	100.901	100.892	0 -9	100.889	-3 -12	100.889	0 -12	100.888	-1 -13	destroyed	due to reinstatementworks
30041055	101.052	101.051	3 -1	101.048	-2 -4	101.048	0 -4	101.048	0 -4	destroyed	due to reinstatementworks
30041062	101.026	101.021	-1 -5	101.020	-1 -6	101.019	0 -6	101.019	-1 -7	destroyed	due to reinstatementworks
30041063	101.043	101.040	0 -3	101.038	-2 -5	101.038	0 -5	101.037	-1 -6	destroyed	due to reinstatementworks
30041064	100.911	100.908	0 -3	100.905	-3 -5	100.905	0 -6	100.904	-1 -6	destroyed	due to reinstatementworks
30041065	101.473	101.465	0 -7	101.463	-2 -10	101.463	0 -10	101.462	-1 -10	destroyed	due to reinstatementworks
30041061 (SD)	101.133	101.127	2 -6	101.128	1 -5	101.129	1 -4	101.129	0 -4	destroyed	due to reinstatementworks

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS 30 Store Road center

No. of reading	baseline	1. following		2. following		3. following		4. following		5. following		6. 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	
		10/12/13			11/12/2013			15/01/2014			16/01/2014			17/01/2014
No.	elevation		elevation	deviation from last/baseline		elevation	deviation from last/baseline		elevation	deviation from last/baseline		elevation	deviation from last/baseline	
30041831	101.048		101.048	0	101.046	-2	101.047	1	101.046	-1	101.046	0	101.046	0
30041832	101.056		101.056	0	101.055	-2	101.055	0	101.055	0	101.055	0	101.053	-1
30041833	101.053		101.053	0	101.051	-1	101.052	-1	101.051	0	101.051	0	101.049	-2
30041834	101.089		101.089	0	101.087	-2	101.088	1	101.087	-1	101.087	0	101.084	-3
30041835	101.210		101.210	0	101.209	-2	101.209	0	101.208	-1	101.208	0	101.204	-4
30041836	101.166		101.166	0	101.164	-2	101.165	0	101.164	-1	101.164	0	101.160	-4
30041837	101.156		101.156	0	101.154	-2	101.155	0	101.154	-1	101.154	0	101.152	-2
30041838	101.096		101.096	0	101.094	-2	101.095	1	101.094	0	101.094	0	101.093	-1
30041839	101.161		101.161	0	101.160	-1	101.160	0	101.160	-1	101.159	0	101.159	-1
30041840	101.186		101.186	0	101.184	-2	101.184	0	101.184	0	101.184	0	101.183	-1
30041841	101.081		101.081	0	101.079	-1	101.080	0	101.079	0	101.079	0	101.079	0
30041842	100.877		100.877	0	100.876	-1	100.876	1	100.876	-1	100.876	0	100.876	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS 30 Store Road center

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		
	10/12/13													03/02/2014		
30041831		101.048	101.046	0	101.046	0	-2	101.046	0	-2	101.047	1	-1	101.047	1	-1
30041832		101.056	101.053	-1	101.053	0	-3	101.053	0	-3	101.054	1	-3	101.054	1	-2
30041833		101.053	101.048	-1	101.048	0	-4	101.048	0	-5	101.049	1	-4	101.049	1	-3
30041834		101.089	101.083	-1	101.083	0	-6	101.083	0	-6	101.083	0	-6	101.084	1	-5
30041835		101.210	101.202	-1	101.202	-1	-8	101.202	0	-9	101.202	1	-8	101.202	1	-8
30041836		101.166	101.159	-1	101.158	-1	-8	101.158	0	-8	101.159	0	-8	101.159	1	-7
30041837		101.156	101.151	-1	101.150	-1	-6	101.150	0	-6	101.150	0	-5	101.150	1	-5
30041838		101.096	101.092	-1	101.092	0	-4	101.092	0	-4	101.092	0	-4	101.091	1	-4
30041839		101.161	101.158	0	101.158	0	-2	101.158	0	-2	101.159	0	-2	101.158	1	-1
30041840		101.186	101.184	0	101.183	0	-2	101.184	0	-2	101.184	0	-2	101.183	1	-1
30041841		101.081	101.079	0	101.079	0	-2	101.079	0	-2	101.079	1	-1	101.079	1	-1
30041842		100.877	100.876	0	100.876	0	-1	100.876	0	-1	100.876	1	-1	100.876	1	0

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS 30 Store Road center

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
		10/2/13												
				12/02/2014		11/03/2014		07/04/2014		29/04/2014		30/04/2014		01/05/2014
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
30041831	101.048		101.046	-1	101.047	1	101.047	0	101.046	-1	101.046	0	101.046	0
30041832	101.056		101.053	-1	101.054	1	101.054	0	101.053	-1	101.053	0	101.053	0
30041833	101.053		101.048	-1	101.049	1	101.049	0	101.048	-1	101.048	0	101.047	-1
30041834	101.089		101.083	-1	101.083	1	101.083	0	101.082	-1	101.082	0	101.082	0
30041835	101.210		101.201	-1	101.202	1	101.202	0	101.201	-1	101.201	0	101.199	-1
30041836	101.166		101.158	-1	101.158	0	101.158	0	101.157	-1	101.157	0	101.155	-2
30041837	101.156		101.150	-1	101.150	0	101.150	0	101.149	-1	101.149	0	101.145	-4
30041838	101.096		101.092	-1	101.092	1	101.092	0	101.091	-1	101.091	0	101.087	-4
30041839	101.161		101.158	-1	101.159	1	101.159	0	101.158	-1	101.158	0	101.154	-4
30041840	101.186		101.184	-1	101.185	1	101.185	0	101.183	-1	101.184	0	101.180	-3
30041841	101.081		101.079	-1	101.080	1	101.080	0	101.079	-1	101.079	0	101.078	-2
30041842	100.877		100.876	-1	100.877	1	100.877	0	100.876	-1	100.876	0	100.875	-1

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS 30 Store Road center

No. of reading	baseline	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
date	10/12/13	02/05/2014		03/05/2014		07/05/2014		13/05/2014		20/05/2014		27/05/2014	
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
30041831	101.048	101.046	0 -2	101.046	1 -2	101.046	-1 -2	101.046	0 -2	101.045	-1 -3	101.045	0 -3
30041832	101.056	101.053	0 -3	101.053	0 -3	101.053	0 -4	101.053	0 -3	101.052	-1 -4	101.051	-1 -5
30041833	101.053	101.048	0 -5	101.048	0 -5	101.047	-1 -5	101.047	0 -5	101.047	-1 -6	101.046	-1 -7
30041834	101.089	101.081	0 -7	101.082	0 -7	101.081	0 -7	101.081	0 -7	101.081	-1 -8	101.081	0 -8
30041835	101.210	101.199	0 -11	101.200	0 -10	101.199	-1 -11	101.199	0 -11	101.199	-1 -12	101.198	-1 -12
30041836	101.166	101.155	0 -11	101.155	0 -11	101.155	0 -12	101.154	0 -12	101.154	-1 -13	101.154	0 -13
30041837	101.156	101.145	0 -10	101.146	0 -10	101.145	0 -11	101.145	0 -11	101.144	-1 -12	101.144	0 -12
30041838	101.096	101.087	0 -9	101.087	0 -9	101.087	0 -9	101.086	0 -10	101.086	-1 -10	101.085	0 -11
30041839	101.161	101.154	0 -6	101.155	0 -6	101.154	-1 -7	101.154	0 -7	101.153	-1 -7	101.153	0 -8
30041840	101.186	101.181	0 -5	101.181	0 -5	101.181	0 -5	101.181	0 -5	101.180	-1 -6	101.179	0 -6
30041841	101.081	101.077	0 -3	101.078	0 -3	101.077	0 -4	101.077	0 -3	101.076	-1 -4	101.076	-1 -5
30041842	100.877	100.875	0 -2	100.875	0 -2	100.875	-1 -2	100.875	1 -2	100.874	-1 -3	100.874	0 -3

monitoring table



Joint Venture

project: C310 Thames Tunnel

structure: CS 30 Store Road center

No. of reading	baseline	25. following		26. following		27. following		28. following	
		elevation	deviation from last/ baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline
date	10/12/13	26/06/2014		31/07/2014		27/08/2014		29/09/2014	
	elevation	elevation	deviation from last/ baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline	elevation	deviation from last/baseline
30041831	101.048	101.042	-3	101.041	-1	101.041	0	destroyed	due to reinstatementworks
30041832	101.056	101.049	-2	101.049	-1	101.048	0	destroyed	due to reinstatementworks
30041833	101.053	101.044	-2	101.043	-1	101.043	-1	destroyed	due to reinstatementworks
30041834	101.089	101.078	-2	101.077	-1	101.077	-1	destroyed	due to reinstatementworks
30041835	101.210	101.196	-2	101.195	-1	101.195	-1	destroyed	due to reinstatementworks
30041836	101.166	101.151	-3	101.150	0	101.150	-1	destroyed	due to reinstatementworks
30041837	101.156	101.142	-2	101.141	0	101.140	-1	destroyed	due to reinstatementworks
30041838	101.096	101.083	-2	101.082	-1	101.081	-1	destroyed	due to reinstatementworks
30041839	101.161	101.151	-2	101.150	-1	101.149	-1	destroyed	due to reinstatementworks
30041840	101.186	101.177	-2	101.177	-1	101.176	-1	destroyed	due to reinstatementworks
30041841	101.081	101.074	-2	101.073	0	101.072	-1	destroyed	due to reinstatementworks
30041842	100.877	100.871	-2	100.871	-1	100.870	-1	destroyed	due to reinstatementworks

Learning Document