APPENDIX AVAILABLE ON REQUEST

Research Report 155

The Impact of the Congestion Charging Scheme on Air Quality in London

Part 1. Emissions Modeling and Analysis of Air Pollution Measurements

Frank Kelly et al.

Appendix G. Summary Statistics and Time-Series Charts of Key Indicator Sites

Note: Appendices Available on the Web may appear in a different order than in the original Investigators' Report, and some remnants of their original names may appear in Table and Figure numbers. HEI has not changed the content of these documents, only the letter identifier.

Appendix G was originally Appendix E.

Correspondence may be addressed to Dr. Frank Kelly, Professor of Environmental Health, Environmental Research Group, MRC-HPA Centre for Environment & Health, School of Biomedical Sciences, King's College London, 150 Stamford Street, London SE1 9NH, U.K.
Tel ++44 20 7848 4004 Fax ++44 20 7848 3891 frank.kelly@kcl.ac.uk.

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APPENDIX G

Summary Statistics and Time-Series Charts of Key Indicator Sites

Figure G1. Site details for Shaftesbury Avenue

Name: Shaftesbury Avenue	**Code: CD3**
Class: Within Charging Zone - Roadside	
Address: Shaftesbury Avenue, Camden	**Grid ref:** 530030, 181251
Monitoring start date: April 2000	**Monitoring end date: -**
Pollutants monitored: NO_2, PM_{10}	

Species	Capture pre (%)	Capture post (%)	Data retrievable? (<75% only)
NO	97	94	
NO_2	97	94	
NO_X	97	94	
PM_{10}	98	98	
$PM_{2.5}$	-	-	
CO	-	-	

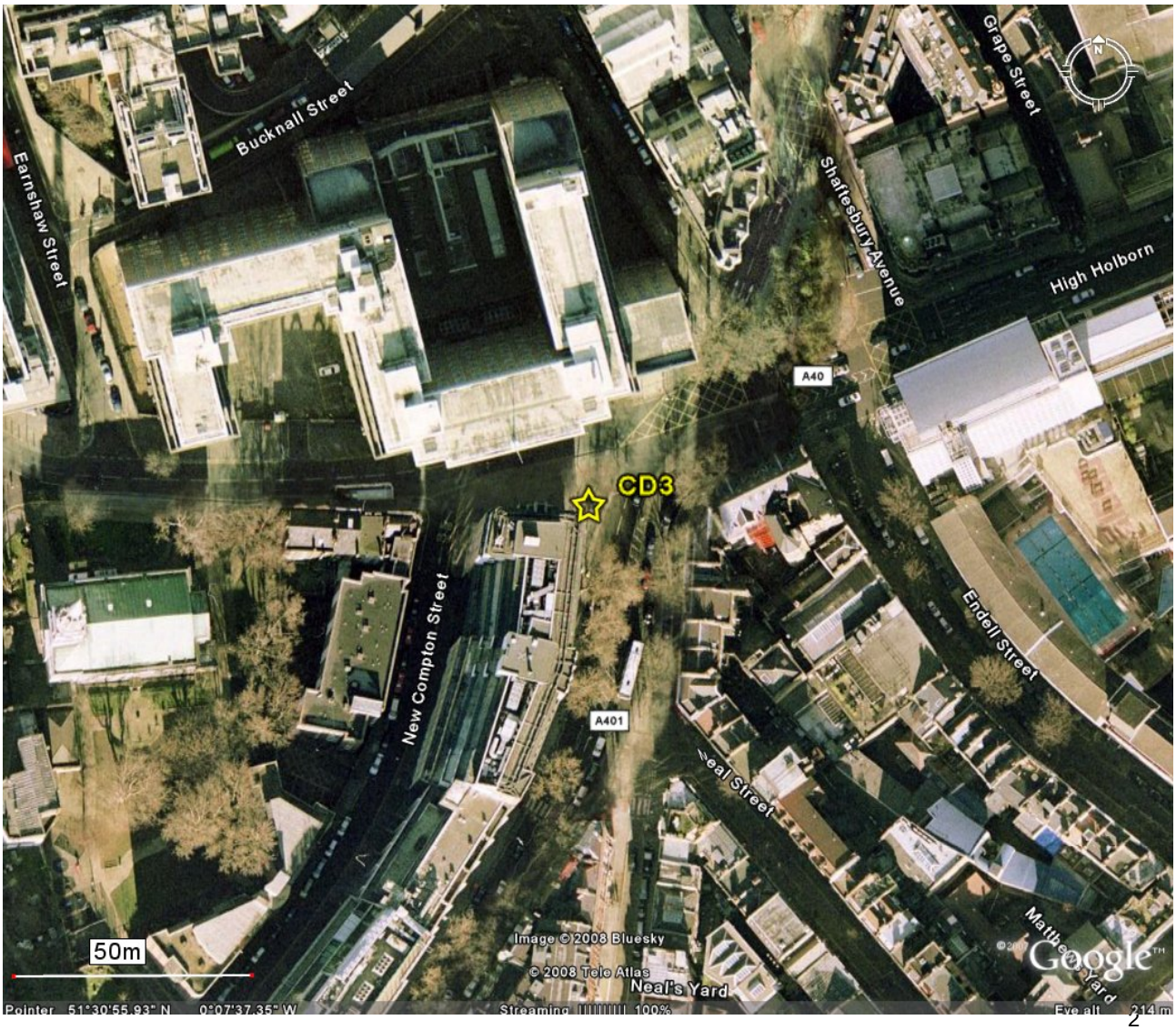
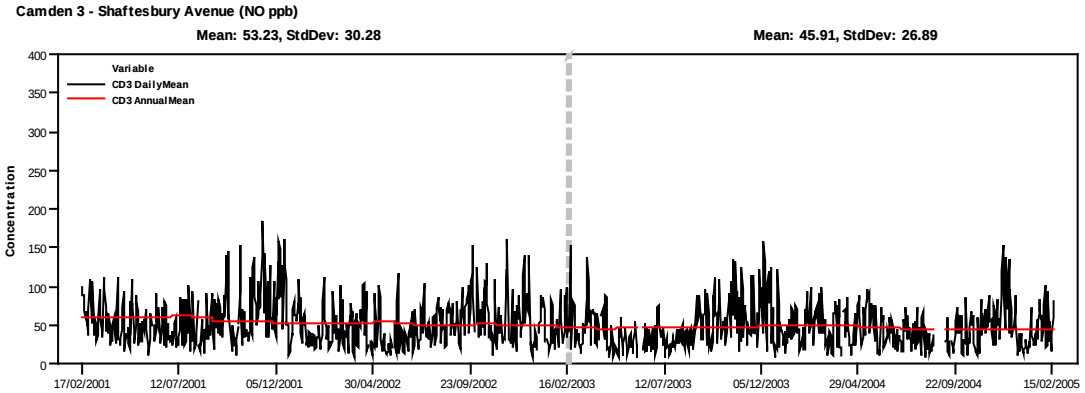
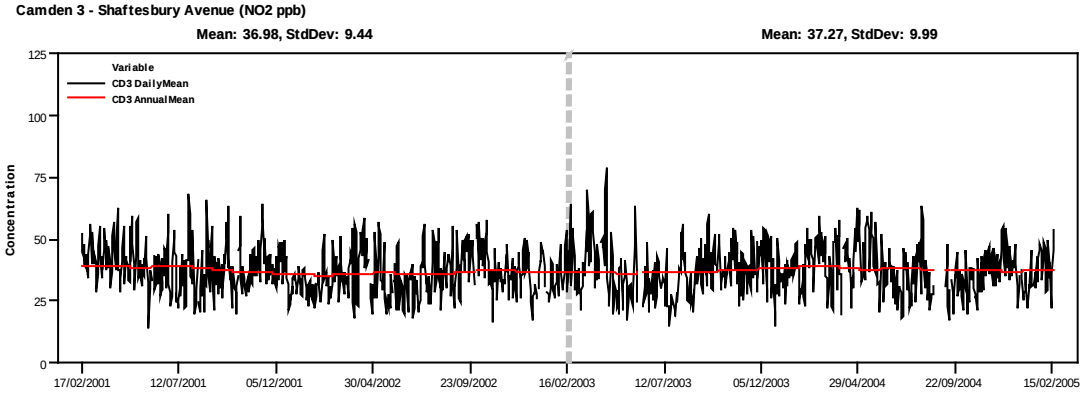
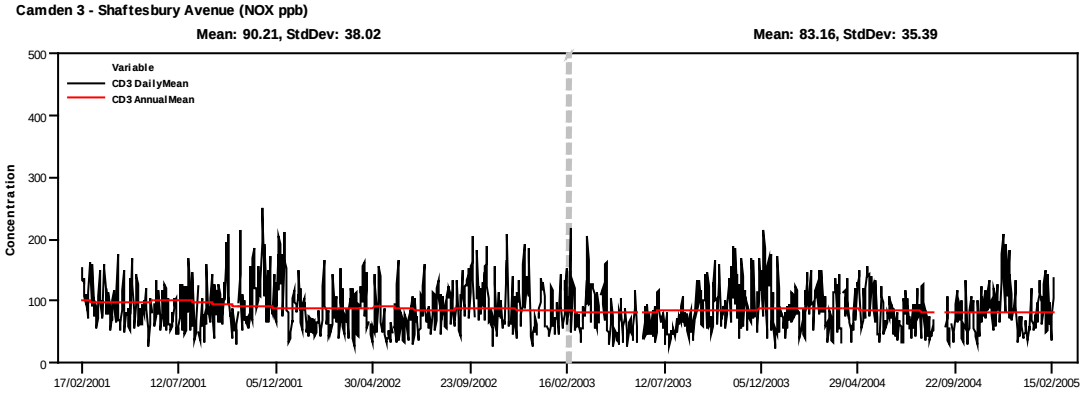


Figure G2. Time series plots for Shaftesbury Avenue







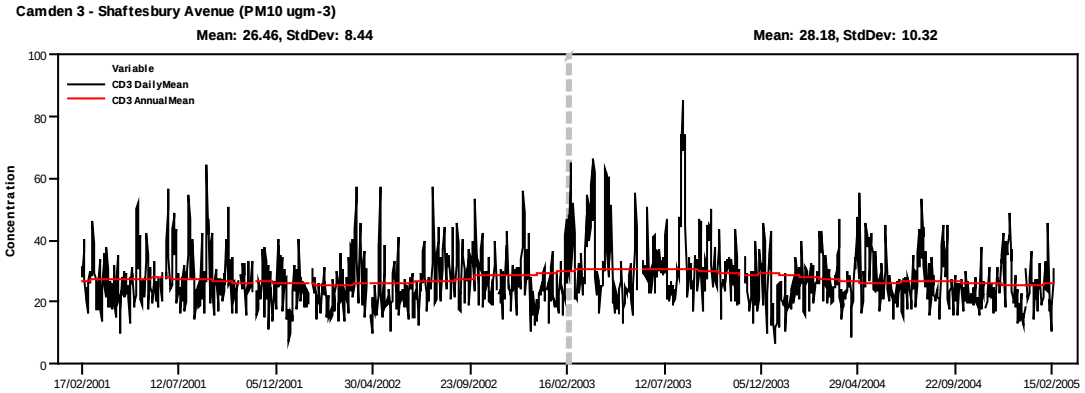


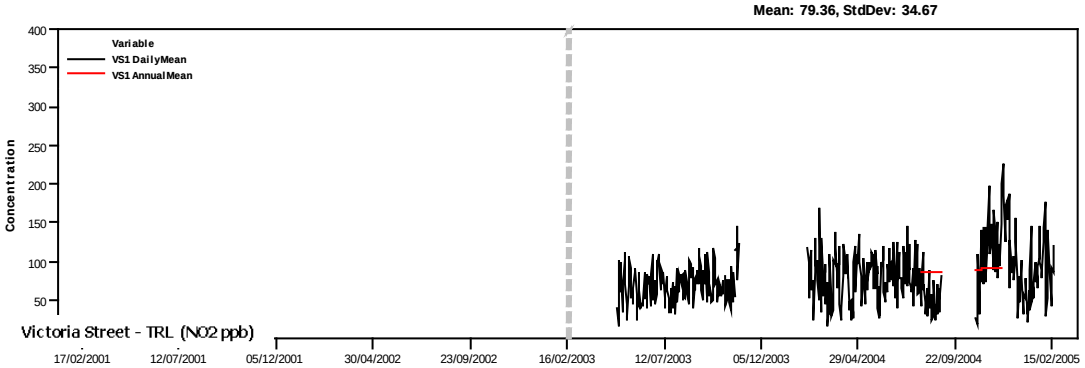
Figure G3. Site details for Victoria Street

Name: Victoria Street	**Code: VS1**
Class: Within Charging Zone - Roadside	
Address: Victoria Street, Westminster	**Grid ref:** 529810, 179470
Monitoring start date: April 2003	**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10} (gravimetric), $PM_{2.5}$ (gravimetric), CO	

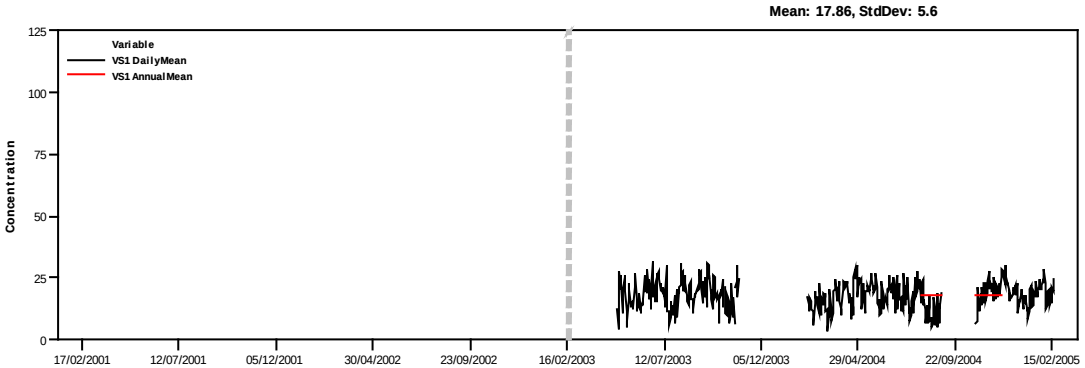
Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	0	68	No – not in operation
NO_2	0	68	No – not in operation
NO_X	0	68	No – not in operation
PM_{10}	0	49	No – not in operation
$PM_{2.5}$	0	49	No – not in operation
CO	0	85	No – not in operation

Figure G4. Time series plots for Victoria Street

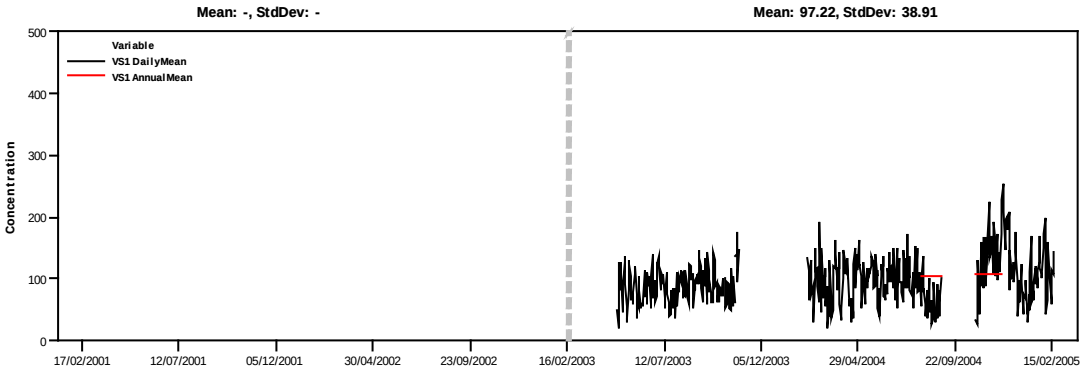
Victoria Street - TRL (NO ppb)



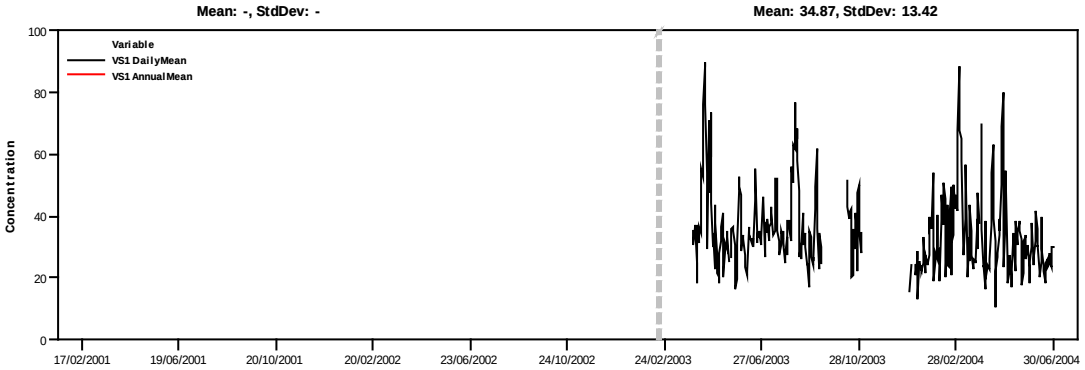
Victoria Street - TRL (NO2 ppb)



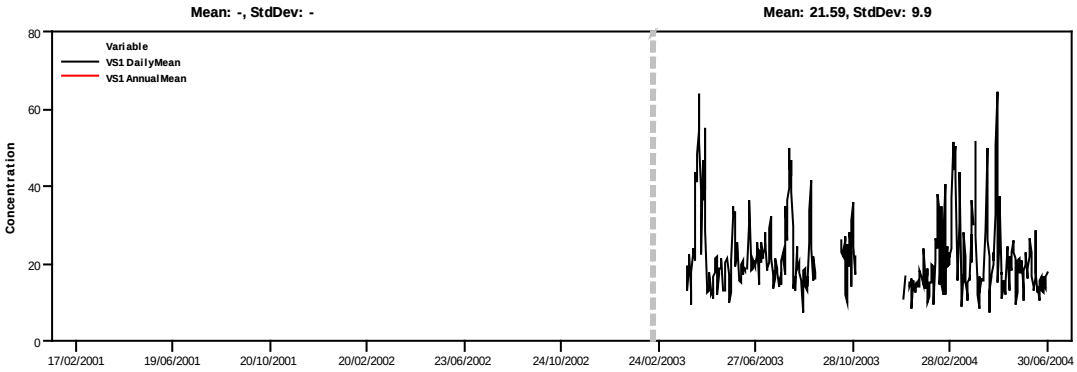
Victoria Street - TRL (NOX ppb)



Victoria Street - TRL (PM10 ugm-3)



Victoria Street - TRL (PM25 ugm-3)



Victoria Street - TRL (CO ppm)

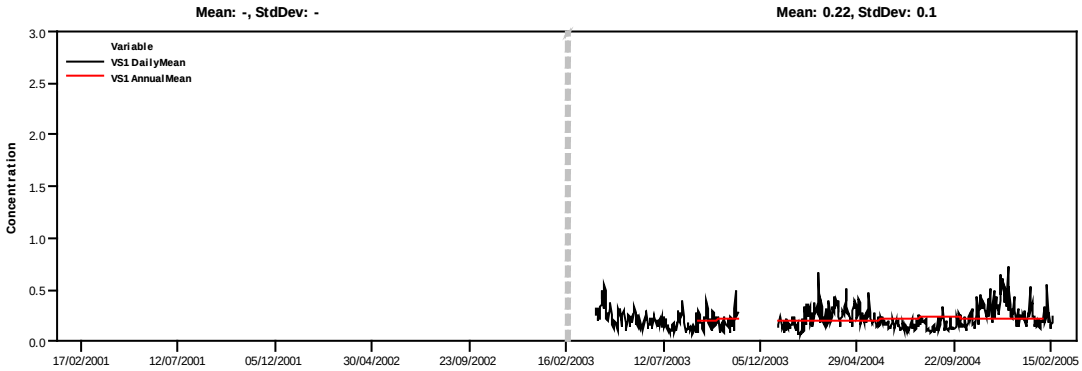


Figure G5. Site details for Russell Square

Name: Russel Square	**Code: BL0**
Class: Within Charging Zone – Urban Background	
Address: Russell Square, Bloomsbury	**Grid ref:** 530200, 182000
Monitoring start date: Jan 1993	**Monitoring end date:** -
Pollutants monitored: NO_x, PM_{10}, $PM_{2.5}$, CO	

Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	45	87	Minor leak in NOX/NO channel switching valve 05/02 to 04/03. Under read in NO channel could, in theory, be modelled allowing recovery of data at lower quality standard.
NO_2	43	87	
NO_X	84	87	Switching valve leak did not affect NOX readings.
PM_{10}	60	84	Analyser fault 06/02 to 05/03. Data not retrievable.
$PM_{2.5}$	99	97	-
CO	93	93	-

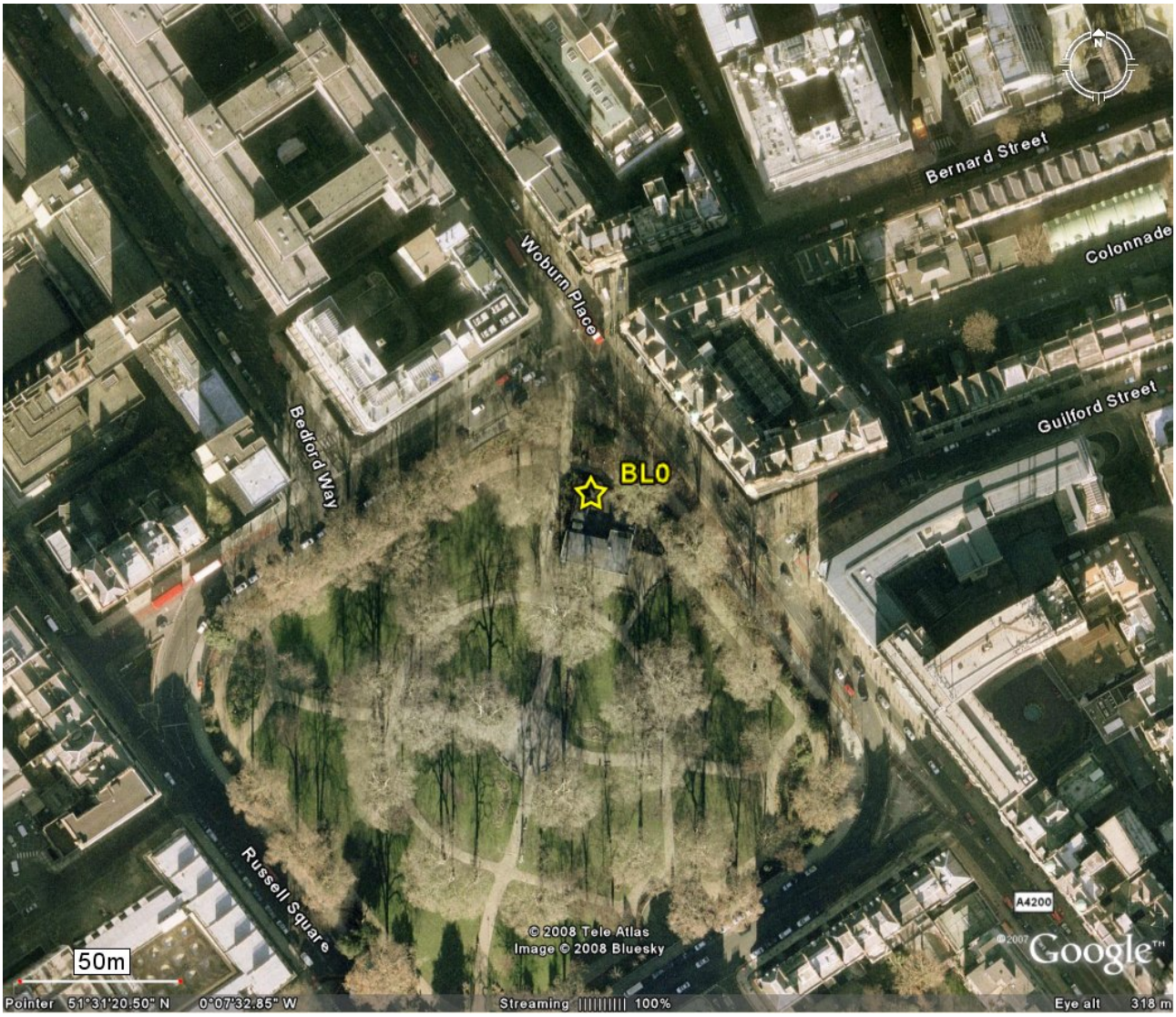
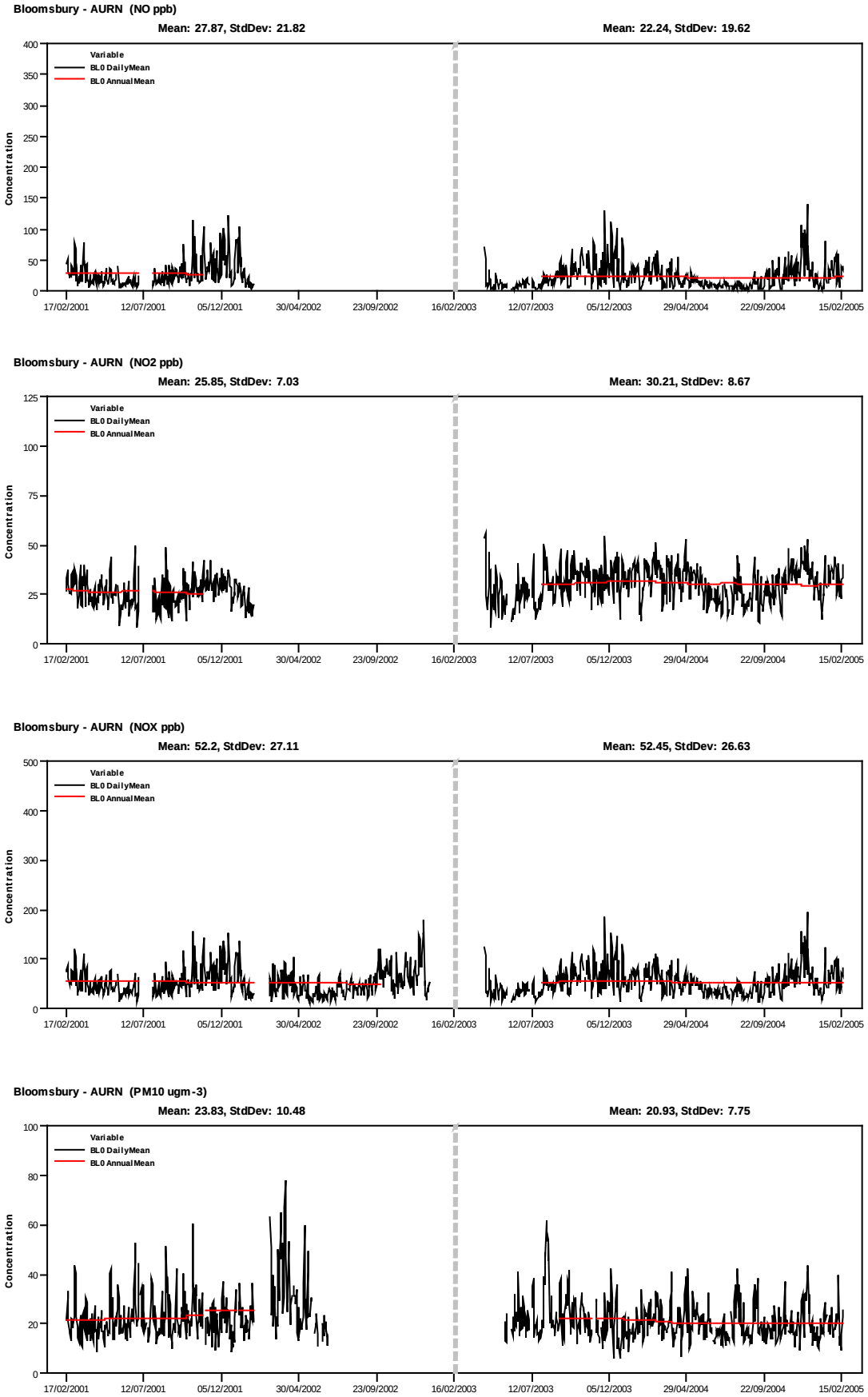
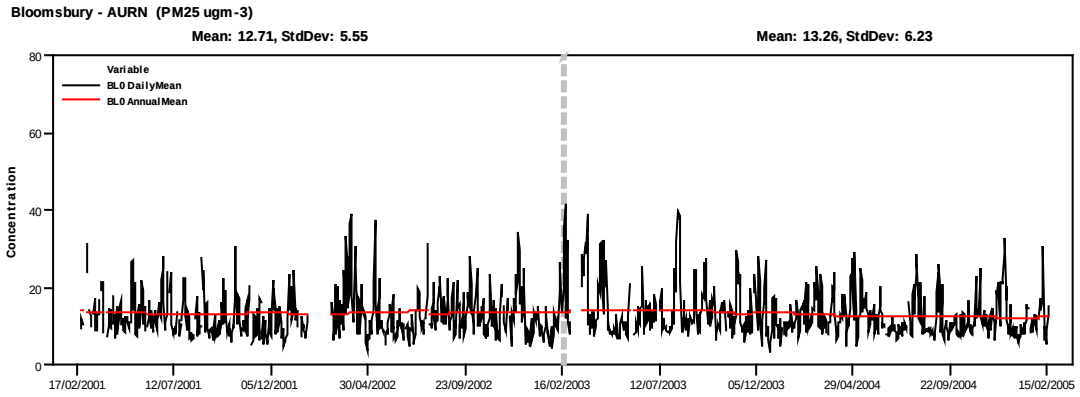


Figure G6. Time series plots for Russell Square




Bloomsbury - AURN (PM25 ugm-3)
Mean: 12.71, StdDev: 5.55
Mean: 13.26, StdDev: 6.23
Variable
BL0 DailyMean
BL0 AnnualMean
Concentration
80
60
40
20
0
17/02/2001
12/07/2001
05/12/2001
30/04/2002
23/09/2002
16/02/2003
12/07/2003
05/12/2003
29/04/2004
22/09/2004
15/02/2005

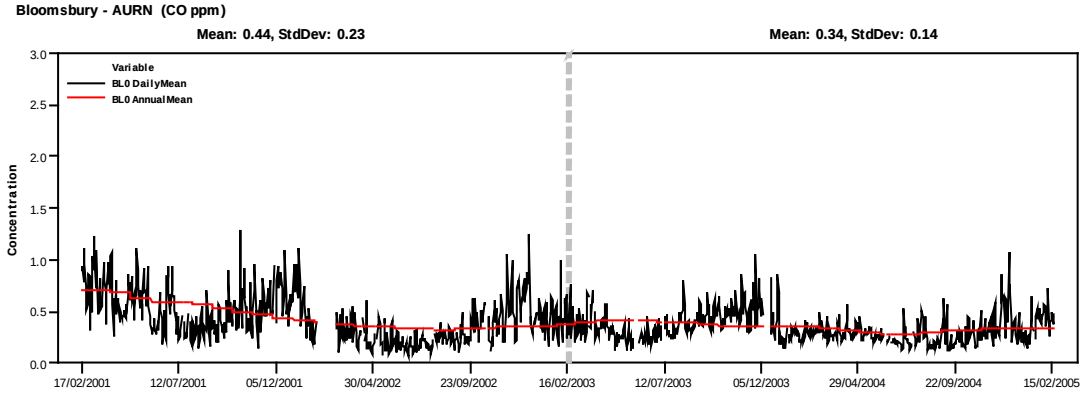
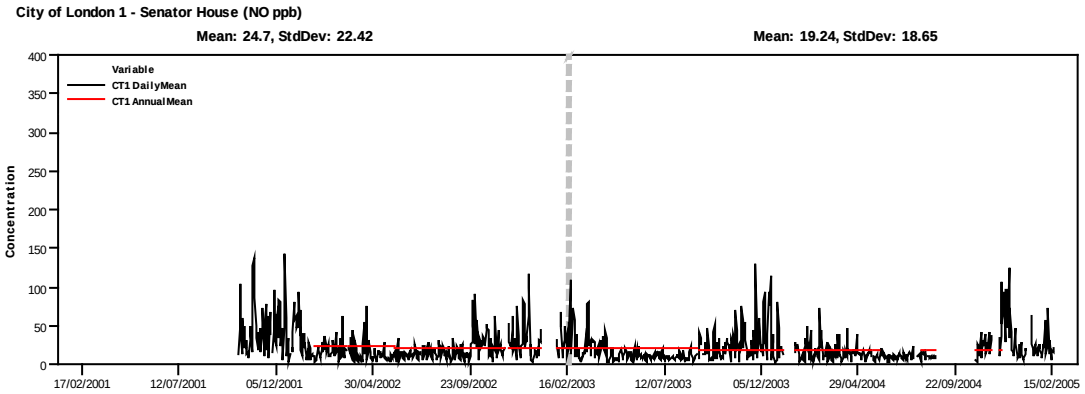

Bloomsbury - AURN (CO ppm)
Mean: 0.44, StdDev: 0.23
Mean: 0.34, StdDev: 0.14
Variable
BL0 DailyMean
BL0 AnnualMean
Concentration
3.0
2.5
2.0
1.5
1.0
0.5
0.0
17/02/2001
12/07/2001
05/12/2001
30/04/2002
23/09/2002
16/02/2003
12/07/2003
05/12/2003
29/04/2004
22/09/2004
15/02/2005

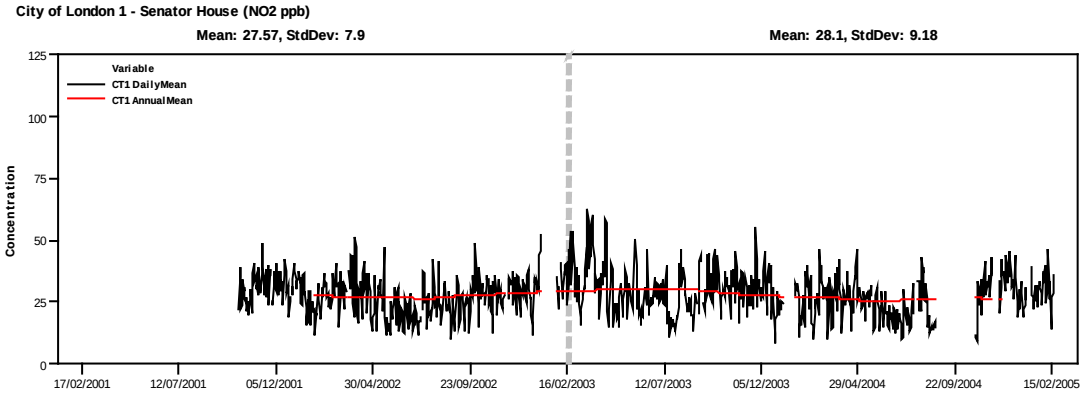
Figure G7. Site details for Senator House

Name: Senator House	**Code: CT1**
Class: Within Charging Zone – Urban Background	
Address: Senator House, City of London	**Grid ref:** 532242, 180894
Monitoring start date: October 2001	**Monitoring end date: -**
Pollutants monitored: NO_X	

Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	62	84	No – not in operation, but may be usable for studies using a shorter analysis period.
NO_2	62	84	No – not in operation, but may be usable for studies using a shorter analysis period.
NO_X	62	84	No – not in operation, but may be usable for studies using a shorter analysis period.
PM_{10}	-	-	
$PM_{2.5}$	-	-	
CO	-	-	

Figure G8. Time series plots for Senator House





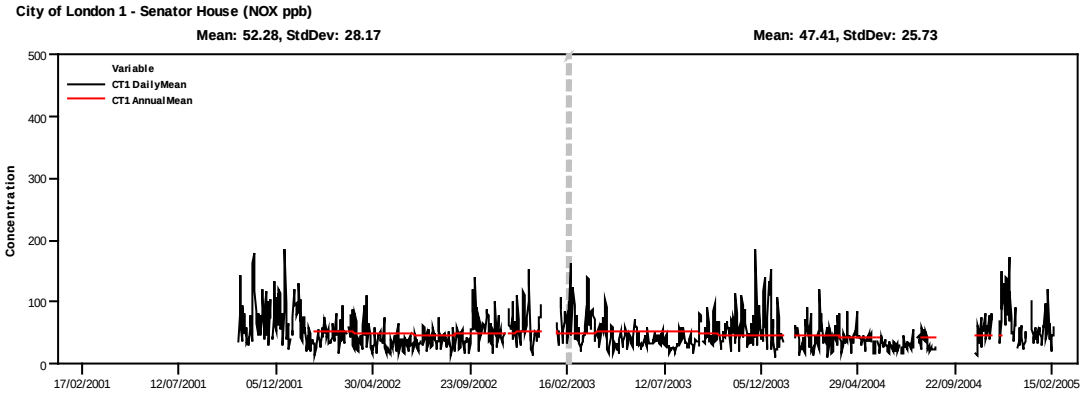
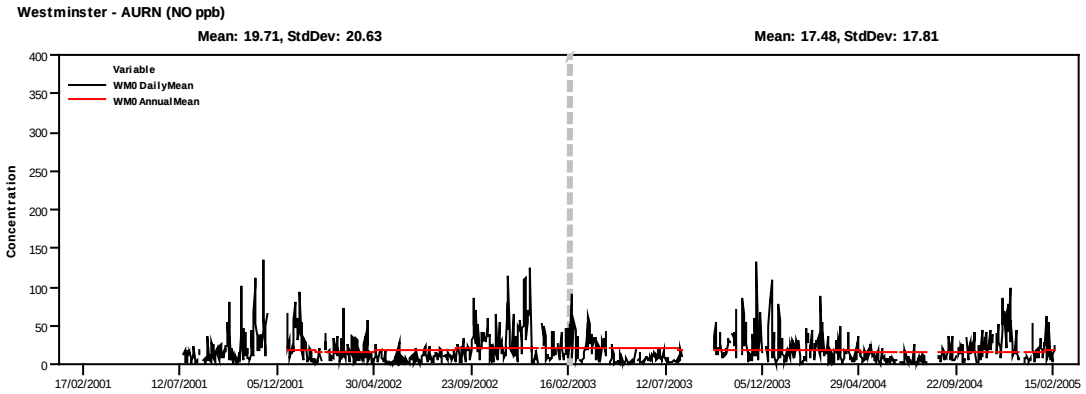


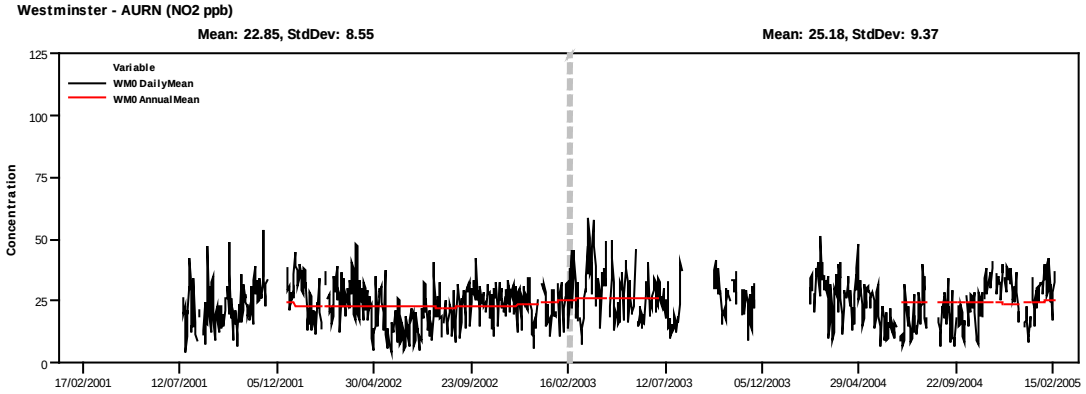
Figure G9. Site details for Horseferry Road

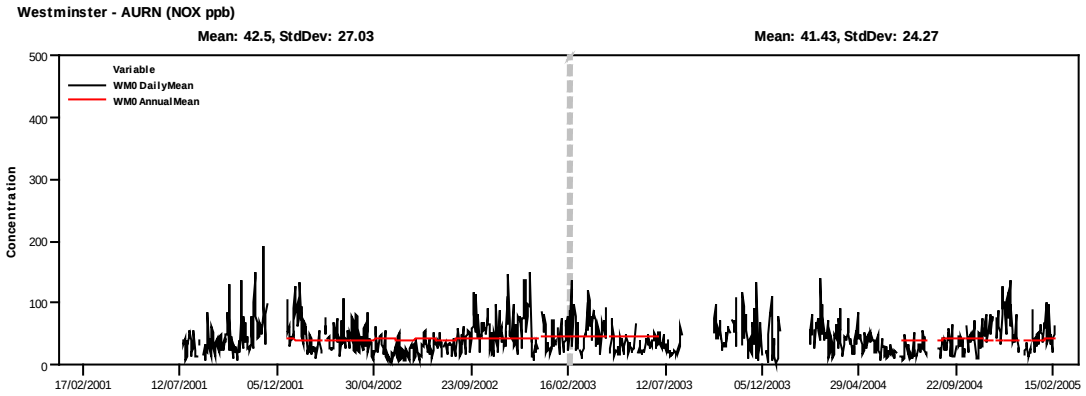
Name: Horseferry Road	**Code: WM0**
Class: Within Charging Zone – Urban Background	
Address: Horseferry Road, Westminster	**Grid ref:** 529802, 178962
Monitoring start date: July 2001	**Monitoring end date: -**
Pollutants monitored: NO_x, CO	

Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	71	83	No – not in operation, but may be usable for studies using a shorter analysis period.
NO_2	71	77	No – not in operation, but may be usable for studies using a shorter analysis period.
NO_X	71	77	No – not in operation, but will be usable for studies using a shorter analysis period.
PM_{10}	-	-	-
$PM_{2.5}$	-	-	-
CO	76	92	-

Figure G10. Time series plots for Horseferry Road







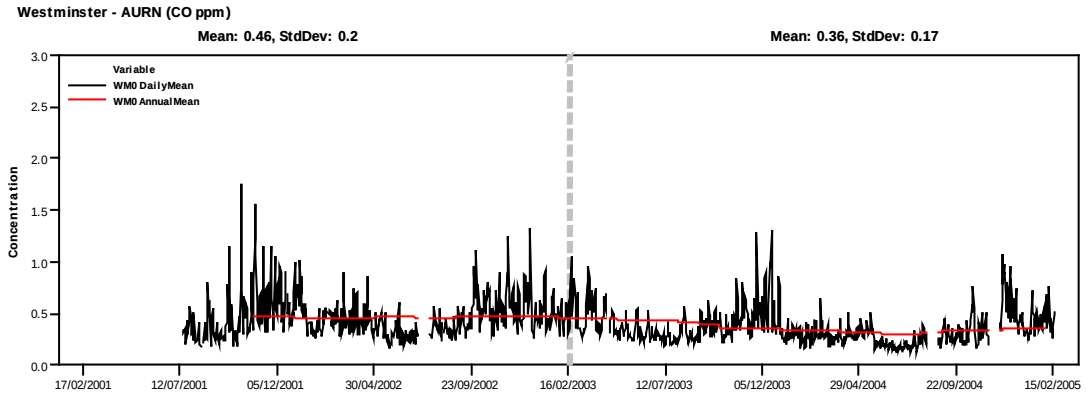
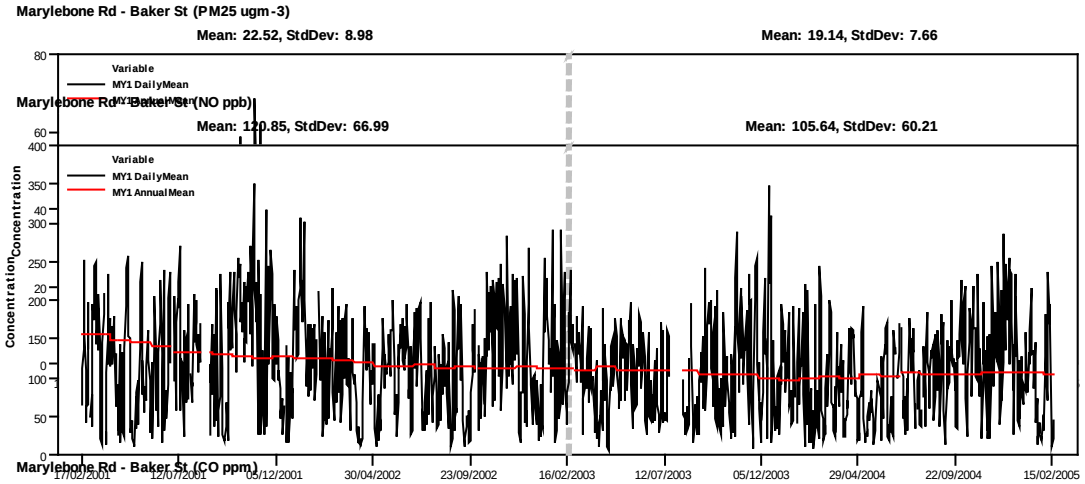


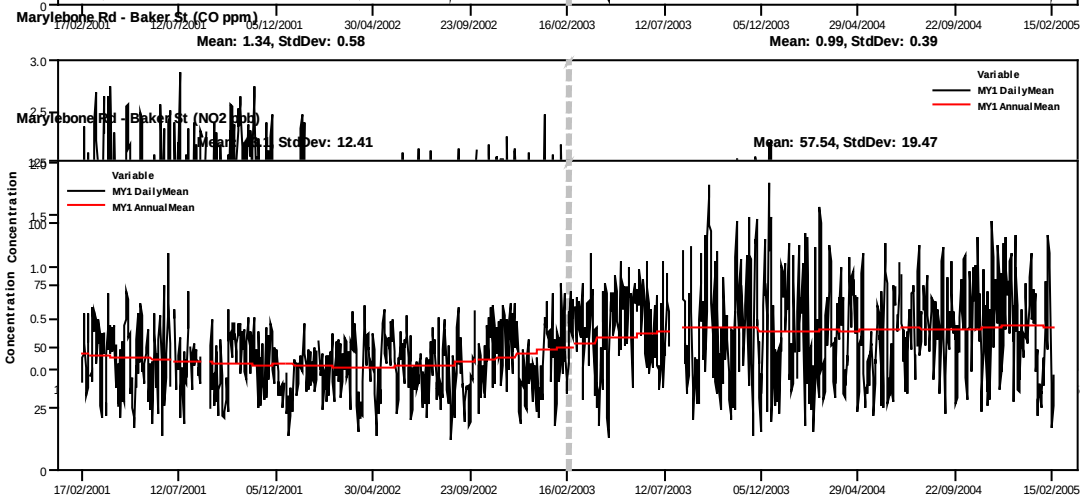
Figure G11. Site details for Marylebone Road

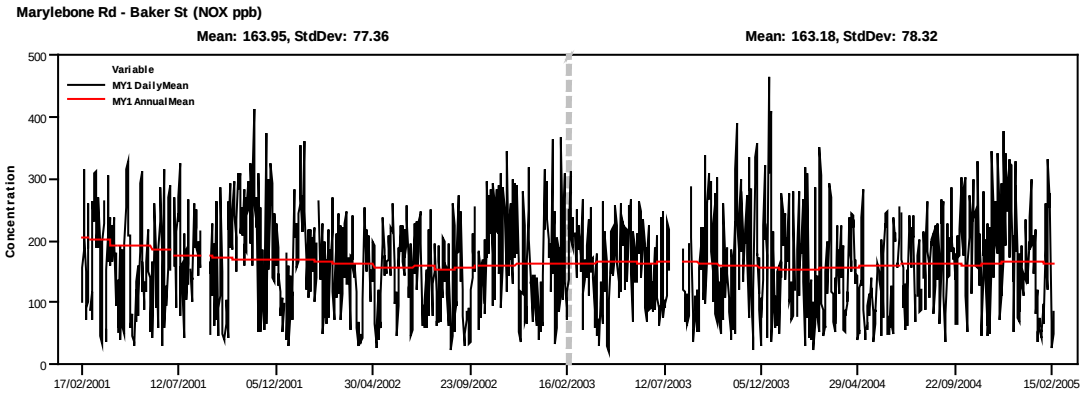
Name: Marylebone Road	**DBCode: MY1**
Class: Inner Ring Road (CCZ Boundary)	
Address: Marylebone Road, Westminster	**Grid ref:** 528120, 182000
Monitoring start date: May 1997	**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10}, $PM_{2.5}$, CO, Black Smoke	

Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	94	94	
NO_2	94	94	
NO_X	94	94	
PM_{10}	94	99	
$PM_{2.5}$	98	98	
CO	95	95	

Figure G12. Time series plots for Marylebone Road







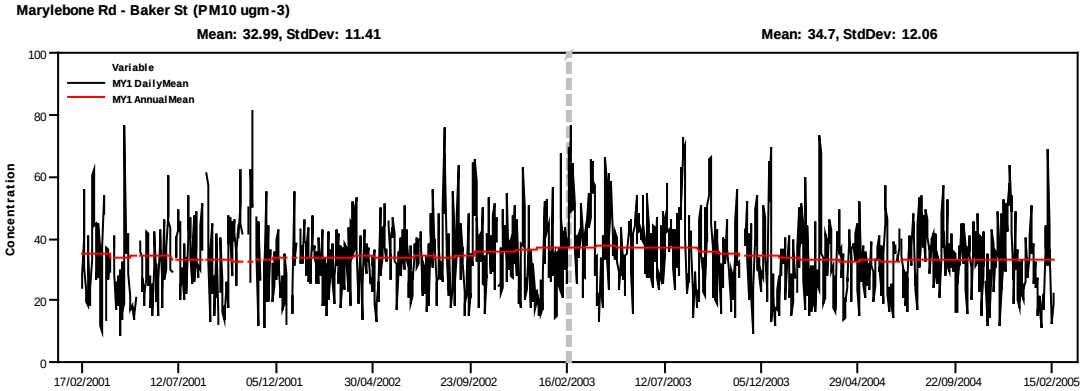
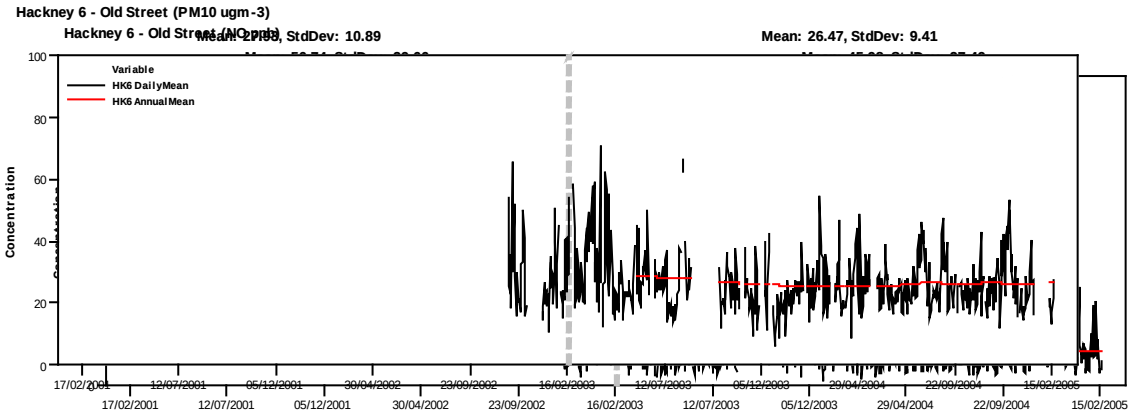
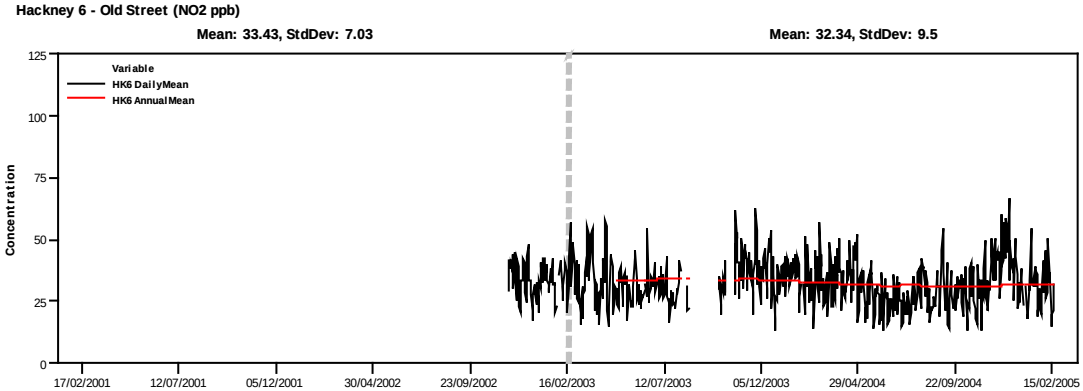


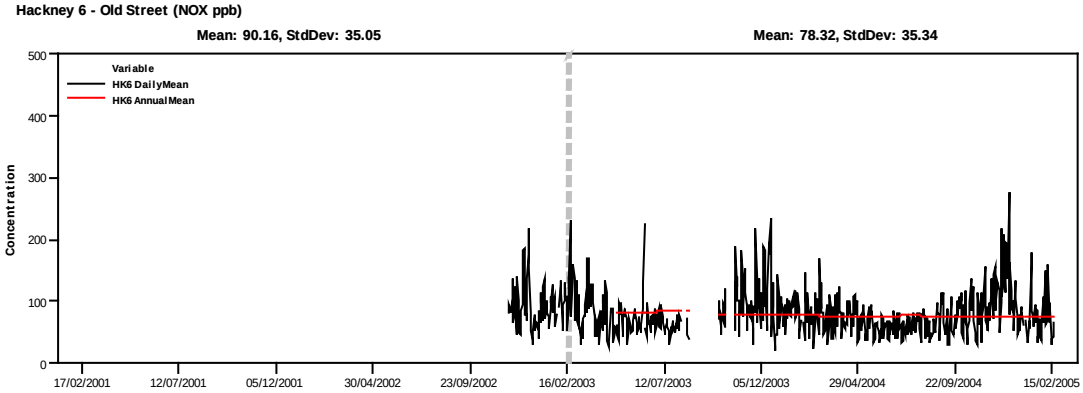
Figure G13. Site details for Old Street

Name: Old Street			**Code: HK6**
Class: Inner Ring Road (CCZ Boundary)			
Address: Old Street, Hackney			**Grid ref:** 532900, 182600
Monitoring start date: November 2002			**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10}			
Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	12	89	No – not in operation
NO_2	12	89	No – not in operation
NO_X	12	89	No – not in operation
PM_{10}	9	84	No – not in operation
$PM_{2.5}$	-	-	
CO	-	-	

Figure G14. Time series plots for Old Street







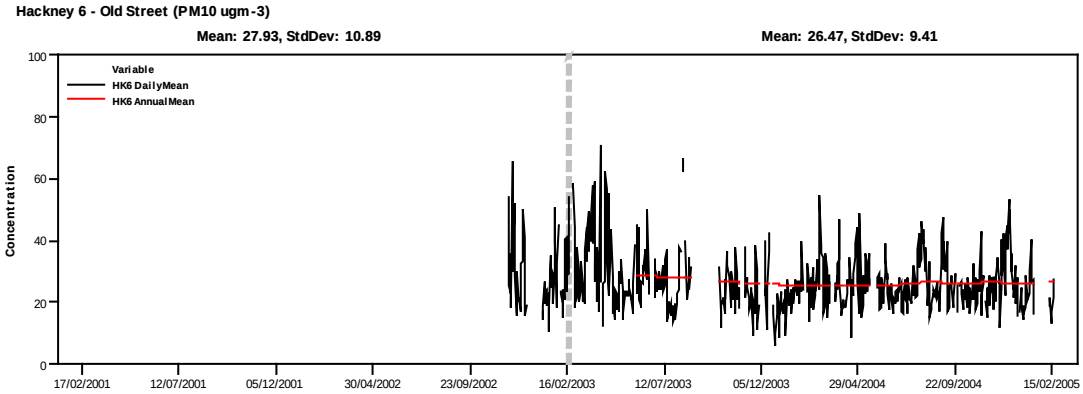
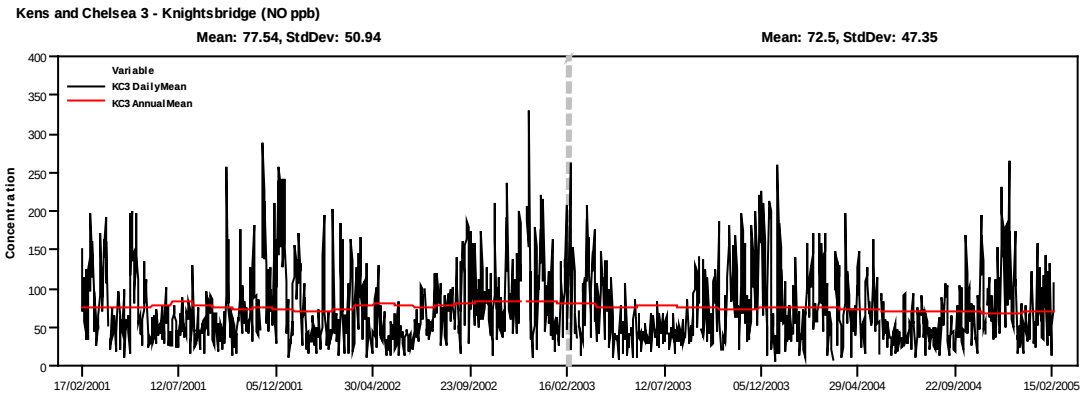
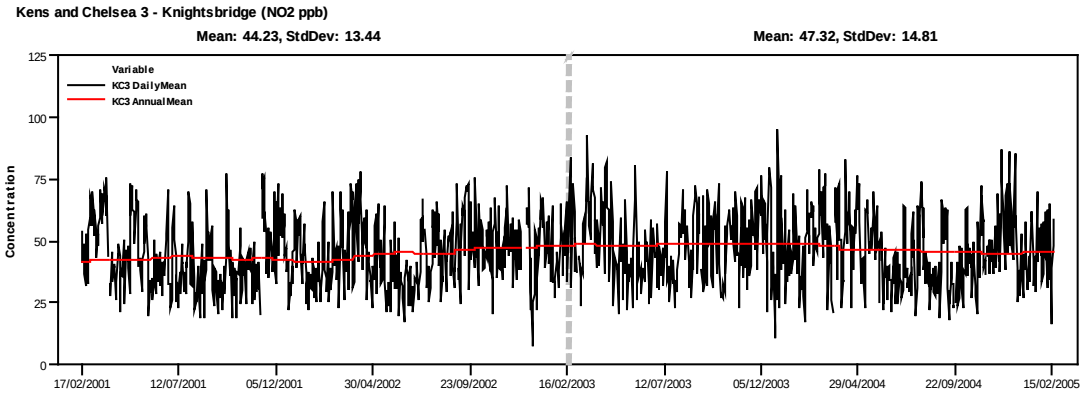


Figure G15. Site details for Knightsbridge

Name: Knightsbridge			**Code: KC3**
Class: Inner London – Roadside			
Address: Harrods, Knightsbridge, Kensington			**Grid ref:** 527551, 179425
Monitoring start date: September 2000			**Monitoring end date: -**
Pollutants monitored: NO_X			
Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	96	97	
NO_2	96	97	
NO_X	96	97	
PM_{10}	-	-	
$PM_{2.5}$	-	-	
CO	-	-	

Figure G16. Time series plots for Knightsbridge





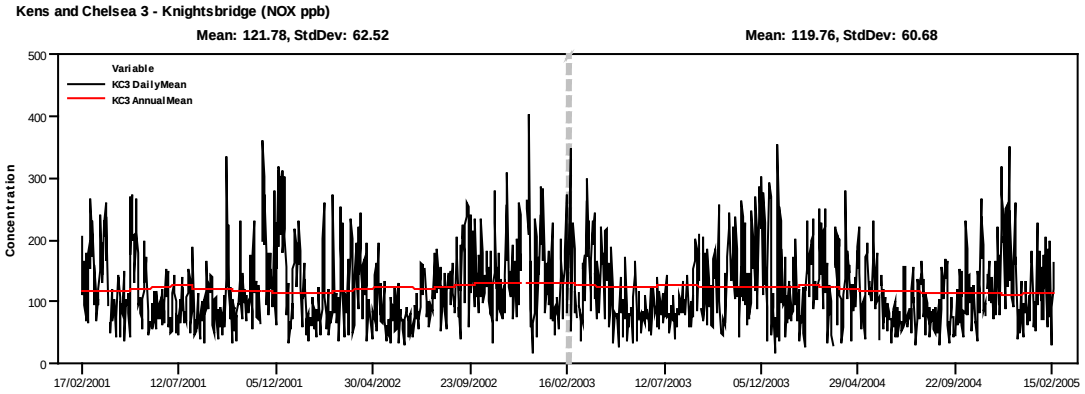
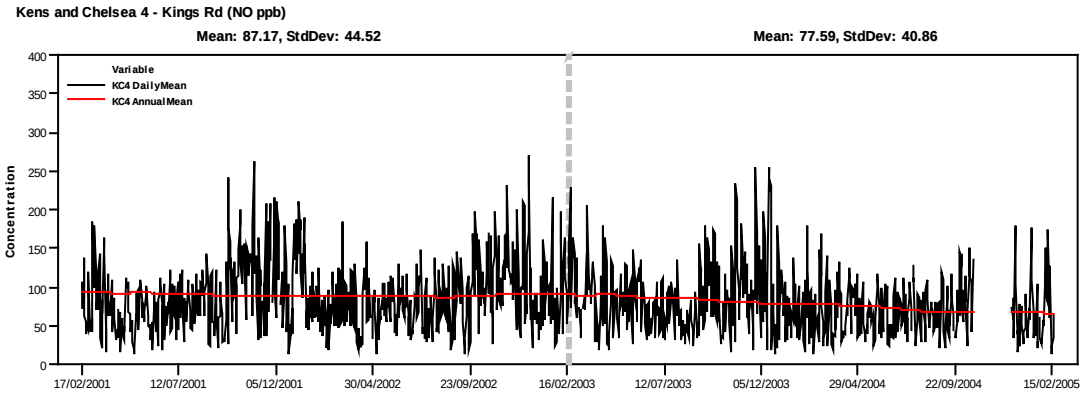


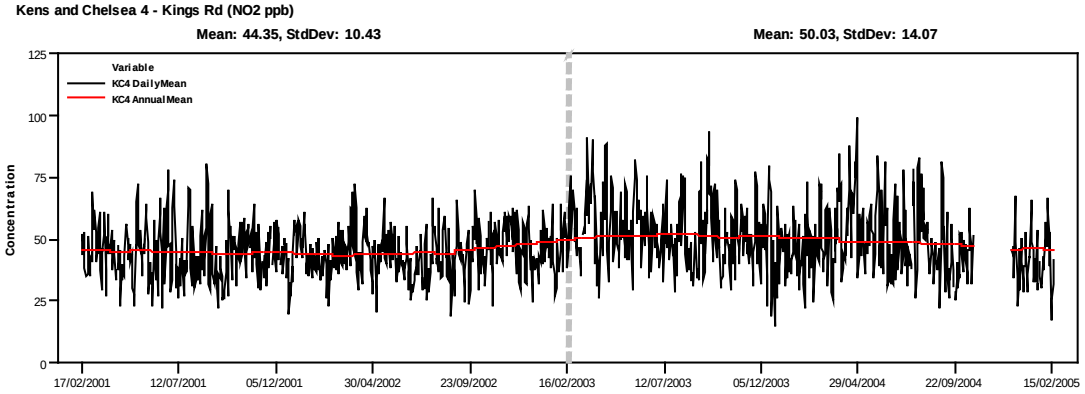
Figure G17. Site details for King's Road

Name: King's Road	**Code: KC4**
Class: Inner London - Roadside	
Address: Chelsea Town Hall, King's Road, Chelsea	**Grid ref:** 527264, 178086
Monitoring start date: March 2000	**Monitoring end date: -**
Pollutants monitored: NO_X	

Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	96	89	
NO_2	96	89	
NO_X	96	89	
PM_{10}	-	-	
$PM_{2.5}$	-	-	
CO	-	-	

Figure G18. Time series plots for King's Road





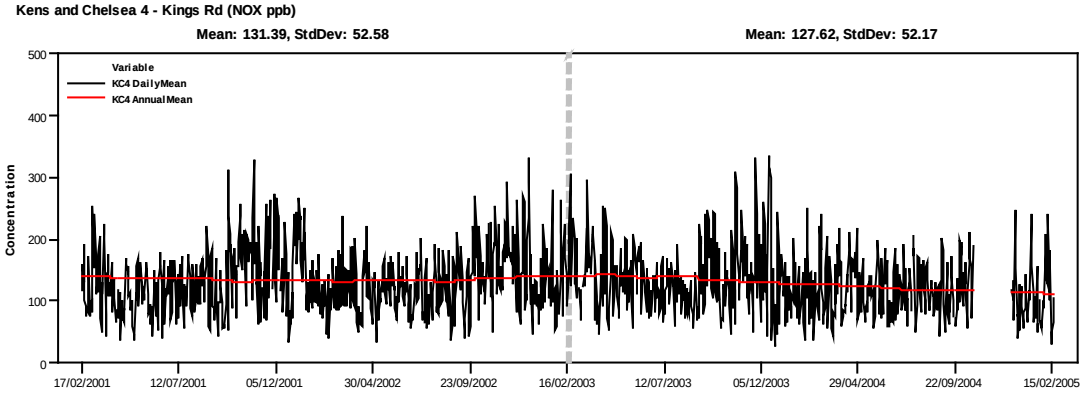
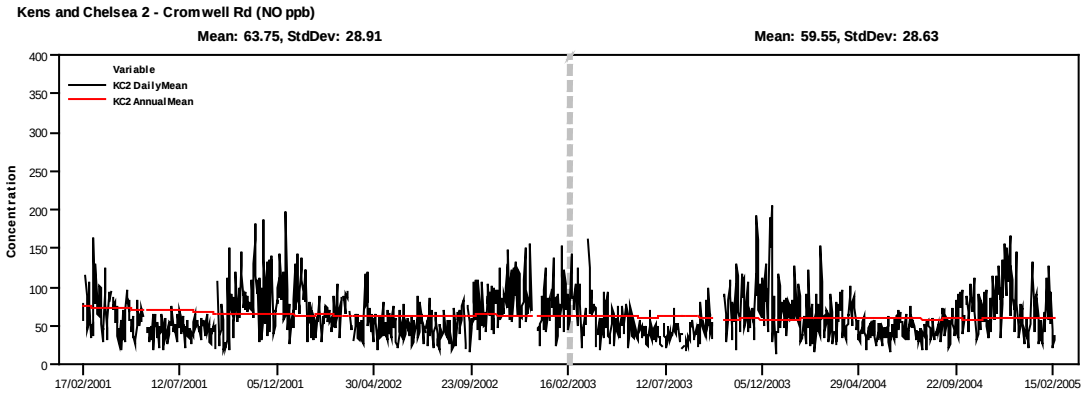
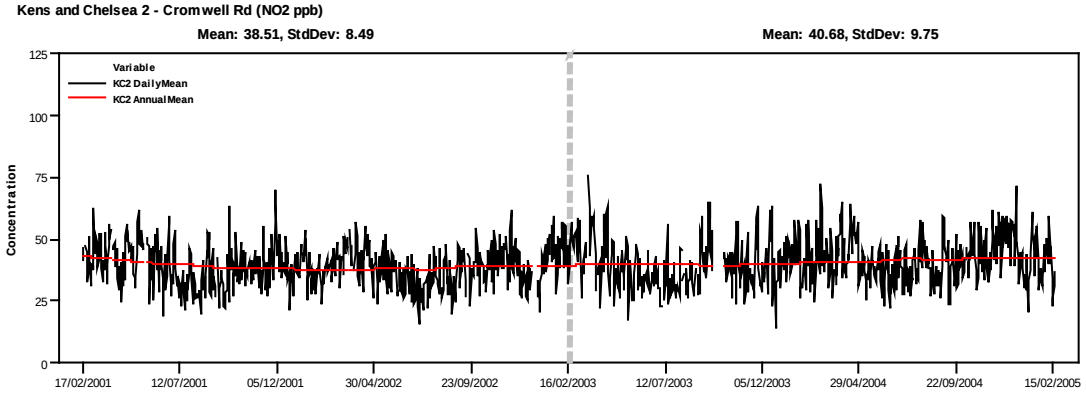


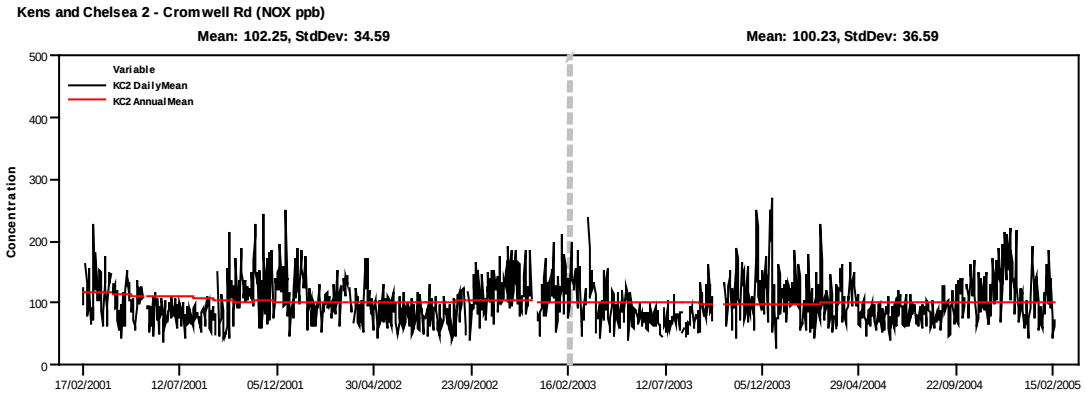
Figure G19. Site details for Cromwell Road

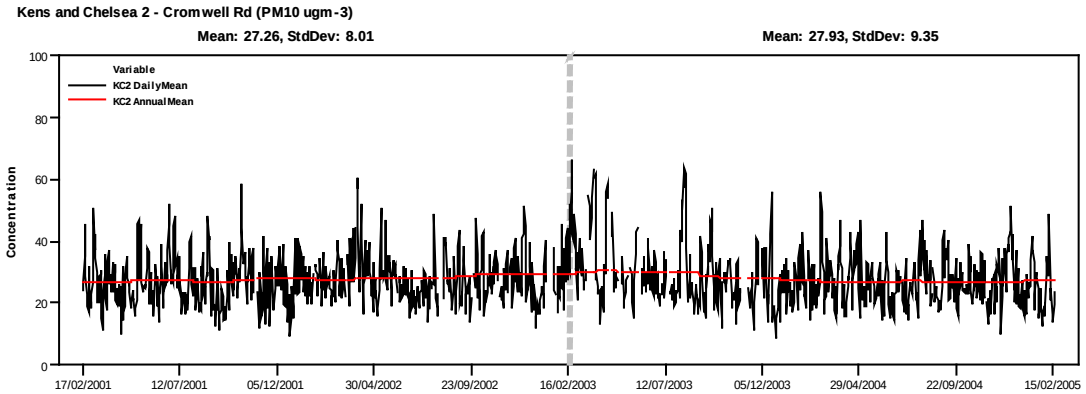
Name: Cromwell Road			**Code: KC2**
Class: Inner London - Roadside			
Address: Cromwell Road, Kensington			**Grid ref:** 526510, 178970
Monitoring start date: May 1998			**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10}, CO			
Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	96	94	
NO_2	96	94	
NO_X	96	94	
PM_{10}	96	95	
$PM_{2.5}$	-	-	
CO	95	92	

Figure G20. Time series plots for Cromwell Road









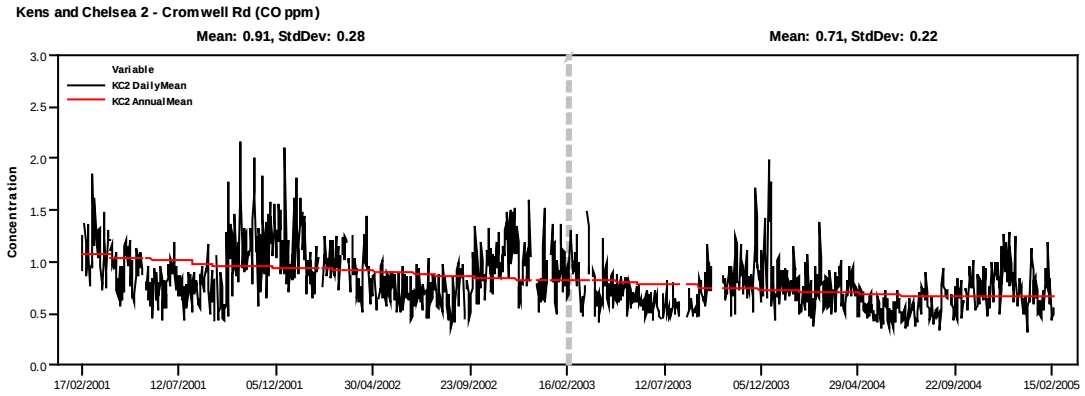
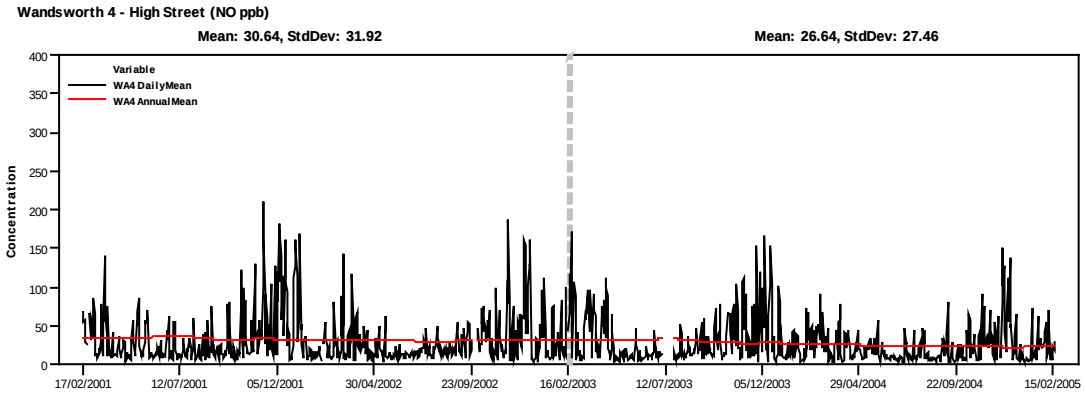
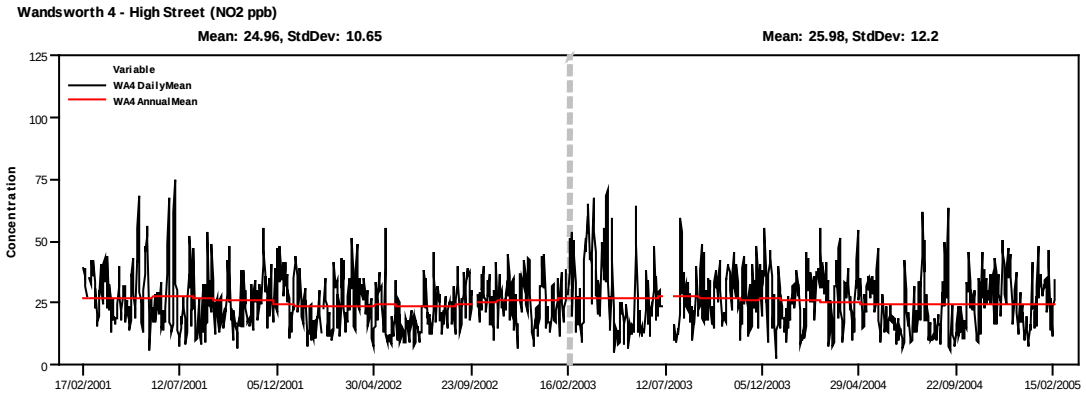


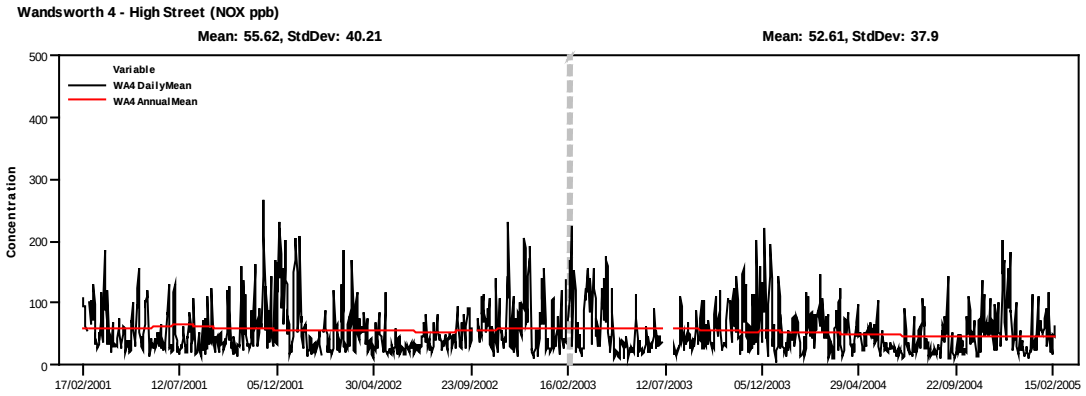
Figure G21. Site details for Wandsworth High Street

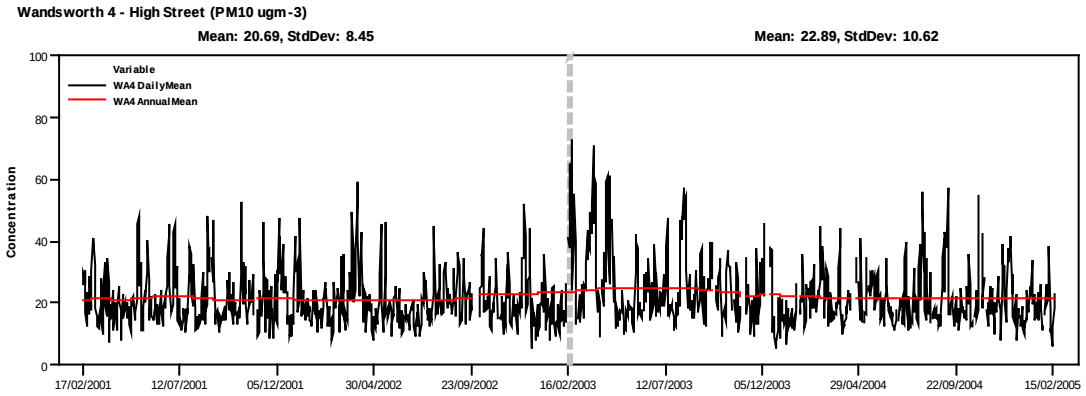
Name: Wandsworth High Street			**Code: WA4**
Class: Inner London Roadside			
Address: High Street, Wandsworth			**Grid ref:** 525760, 174570
Monitoring start date: February 1998			**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10}, CO			
Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	96	95	
NO_2	95	95	
NO_X	96	95	
PM_{10}	98	96	
$PM_{2.5}$	-	-	
CO	92	95	

Figure G22. Time series plots for Wandsworth High Street









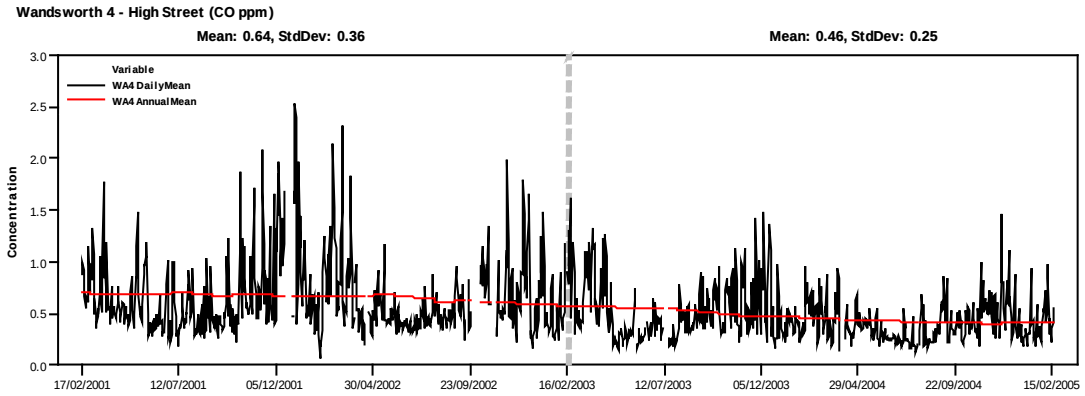
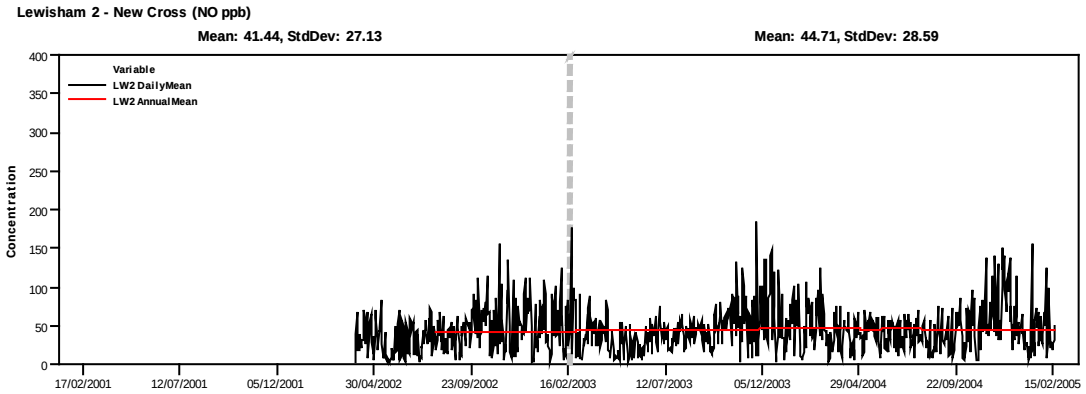
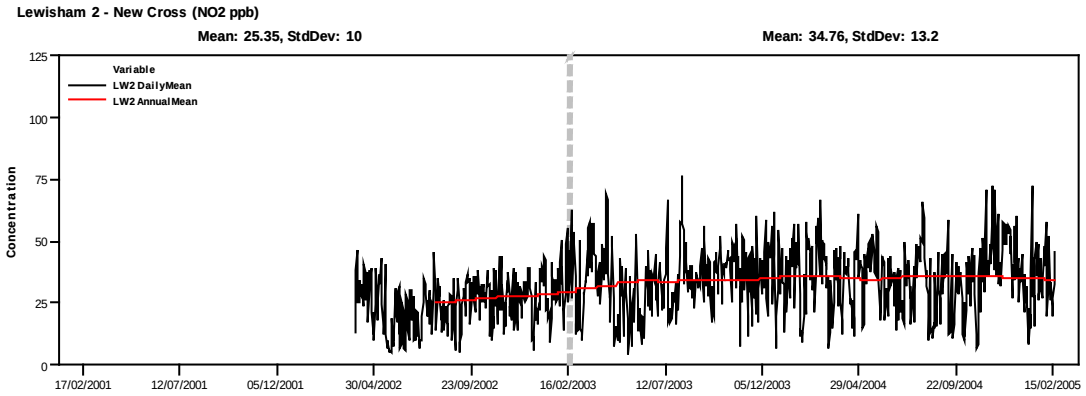


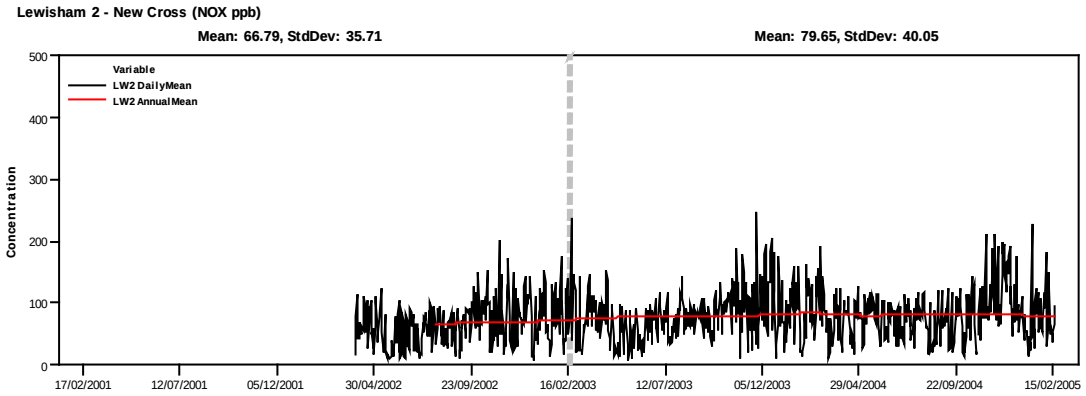
Figure G23. Site details for New Cross

Name: New Cross			**Code: LW2**
Class: Inner London - Roadside			
Address: New Cross, Lewisham			**Grid ref:** 536246, 176922
Monitoring start date: March 2002			**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10}			
Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	43	98	No – not in operation
NO_2	43	98	No – not in operation
NO_X	43	98	No – not in operation
PM_{10}	33	93	No – not in operation
$PM_{2.5}$	-	-	
CO	-	-	

Figure G24. Time series plots for New Cross







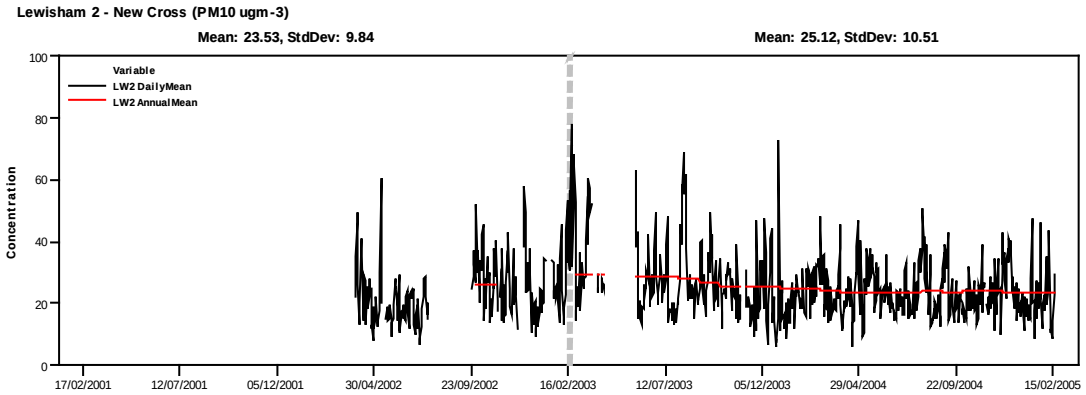
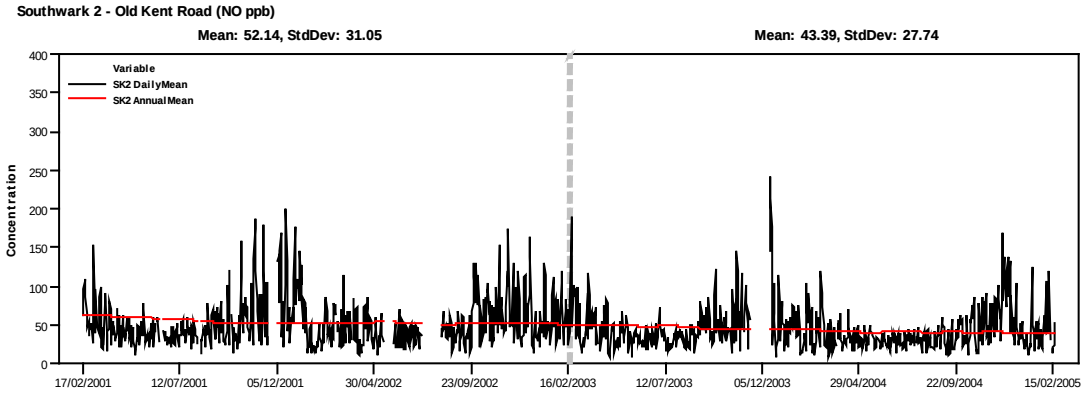


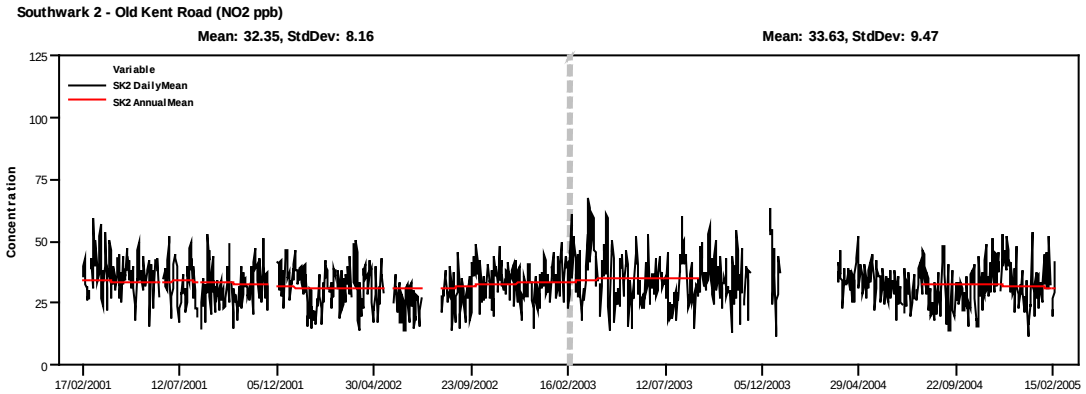
Figure G25. Site details for Old Kent Road

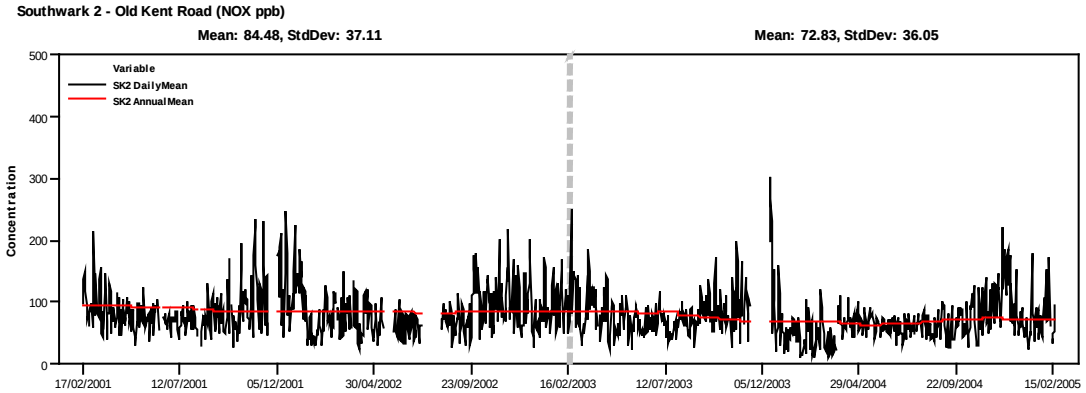
Name: Old Kent Road	**Code: SK2**
Class: Inner London - Roadside	
Address: Old Kent Road, Southwark	**Grid ref:** 534620, 177670
Monitoring start date: May 1994	**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10} (from November 2002), CO	

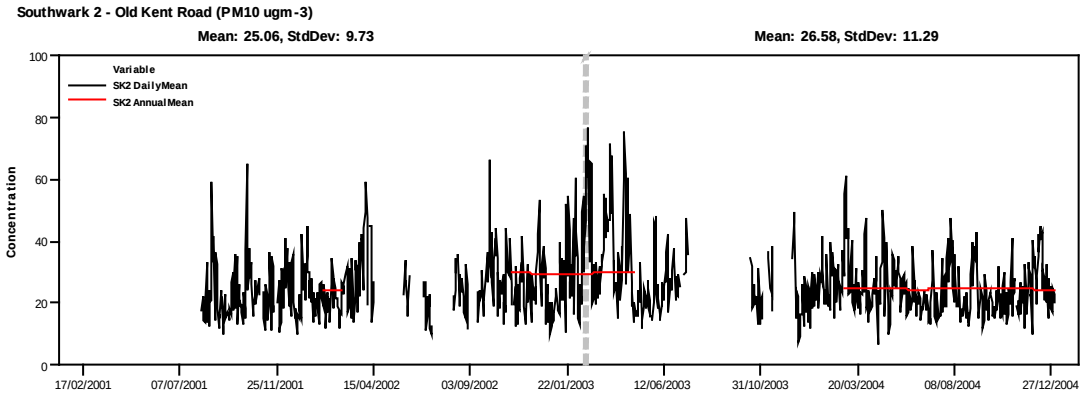
Species	Capture pre (%)	Capture post (%)	Data retrievable? (<75% only)
NO	88	93	
NO_2	88	81	
NO_X	88	93	
PM_{10}	62	76	No – not in operation, plus intermittent errors.
$PM_{2.5}$	-	-	
CO	86	67	No – IR source fault between 04/03 and 10/03

Figure G26. Time series plots for Old Kent Road









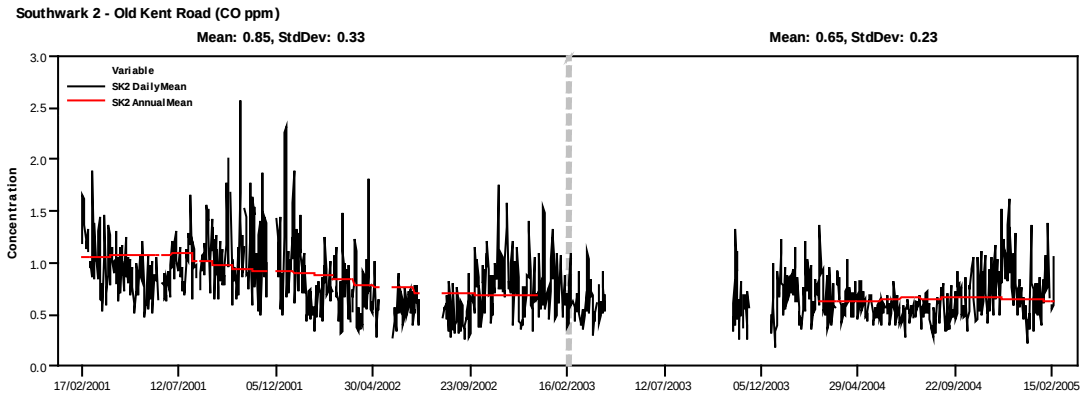
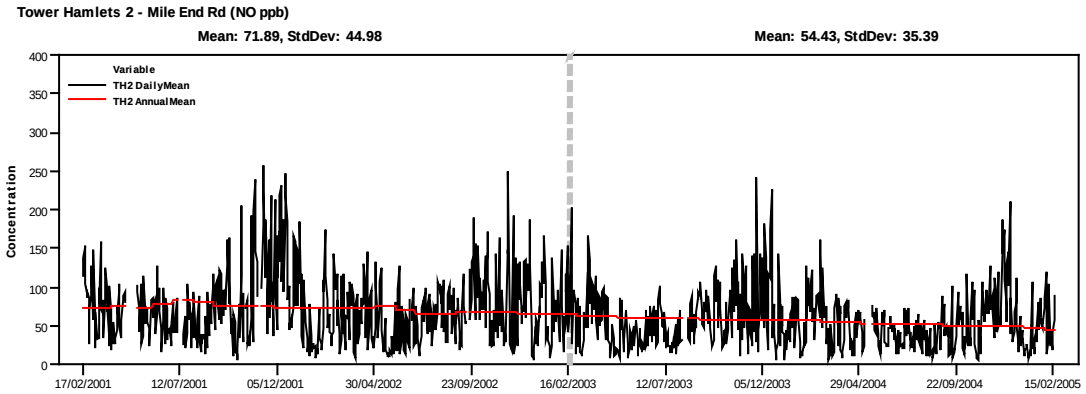
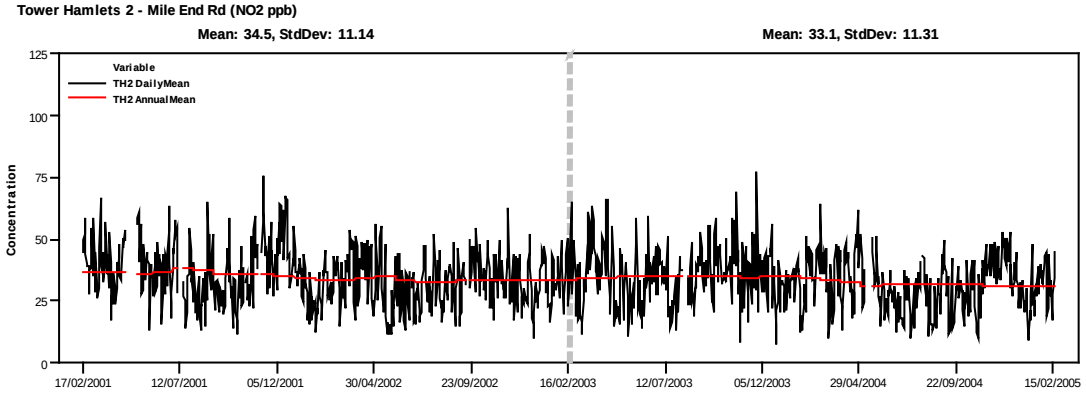


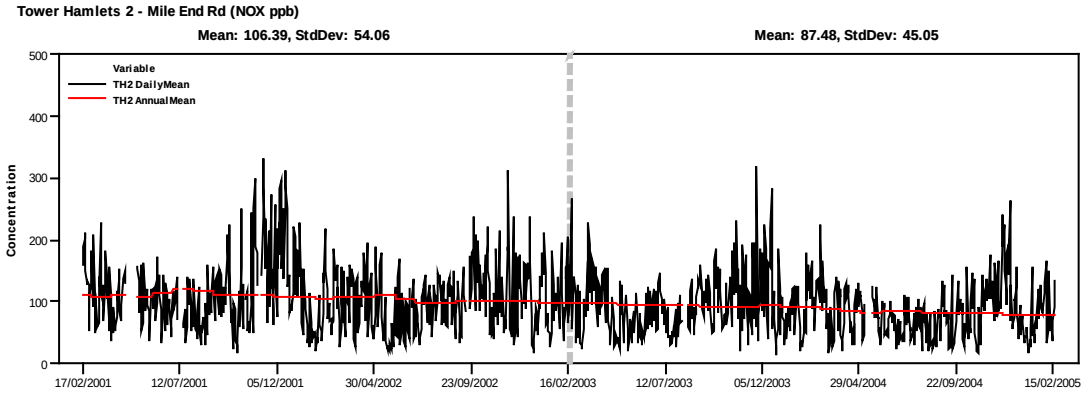
Figure G27. Site details for Mile End Road

Name: Mile End Road			**Code: TH2**
Class: Inner London - Roadside			
Address: Mile End Road, Tower Hamlets			**Grid ref:** 535910, 182220
Monitoring start date: March 2002			**Monitoring end date: -**
Pollutants monitored: NO_x, CO			
Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	93	95	
NO_2	93	95	
NO_X	93	95	
PM_{10}	-	-	
$PM_{2.5}$	-	-	
CO	96	86	

Figure G28. Time series plots for Mile End Road







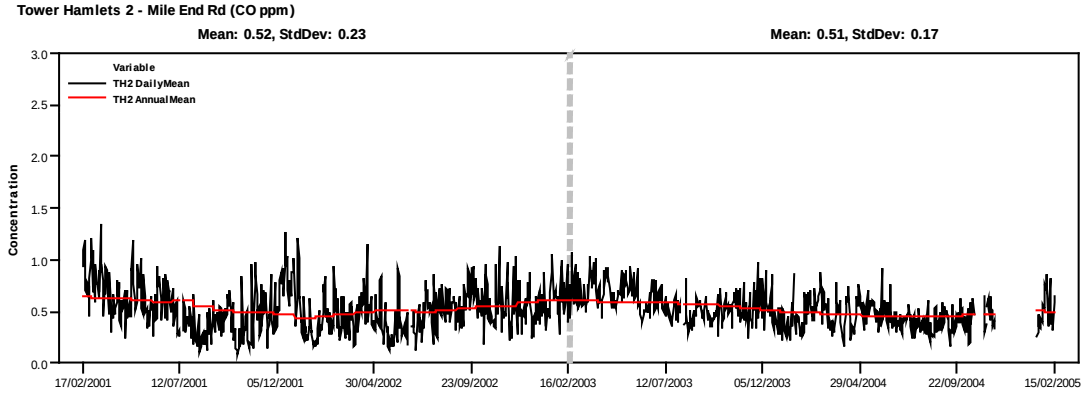
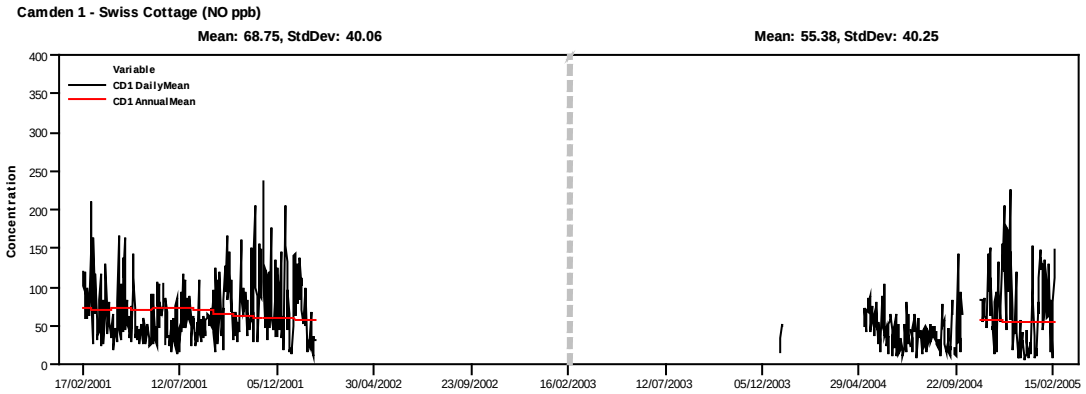
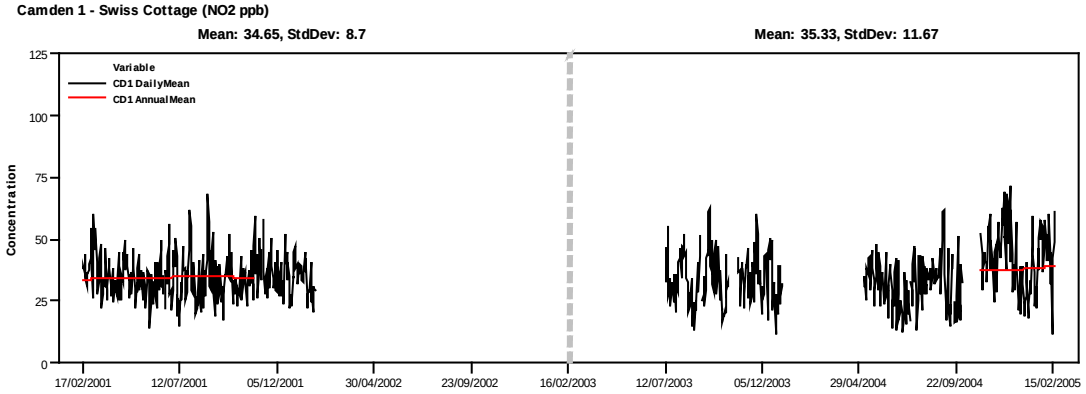


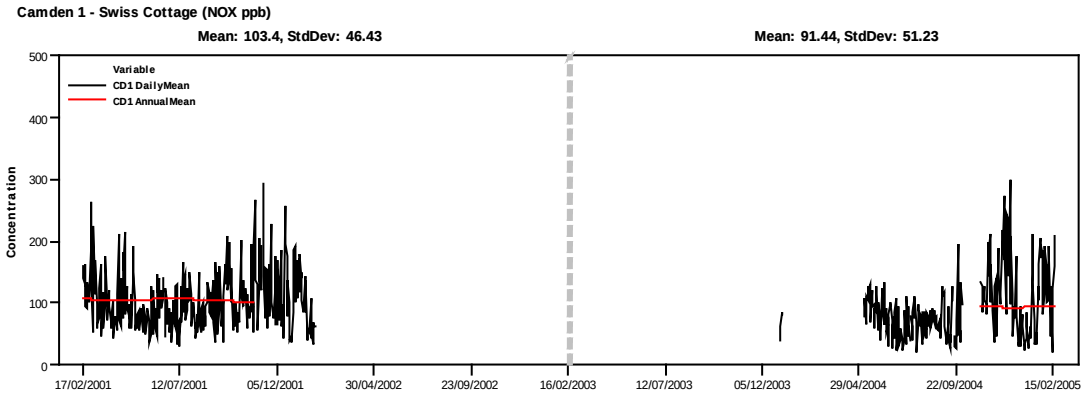
Figure G29. Site details for Swiss Cottage

Name: Swiss Cottage			**Code: CD1**
Class: Inner London - Roadside			
Address: Swiss Cottage, Camden			**Grid ref:** 526650, 184460
Monitoring start date: April 1996			**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10}			
Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	46	35	Baseline clipping of NOX channel 02/02 to 05/04, data may be retrievable though modelling of low level concentrations.
NO_2	46	56	Baseline clipping of NOX channel 02/02 to 05/04, data may be retrievable though modelling of low level concentrations.
NO_X	46	35	Baseline clipping of NOX channel 02/02 to 05/04, data may be retrievable though modelling of low level concentrations.
PM_{10}	99	97	-
$PM_{2.5}$	-	-	-
CO	-	-	-

Figure G30. Time series plots for Swiss Cottage







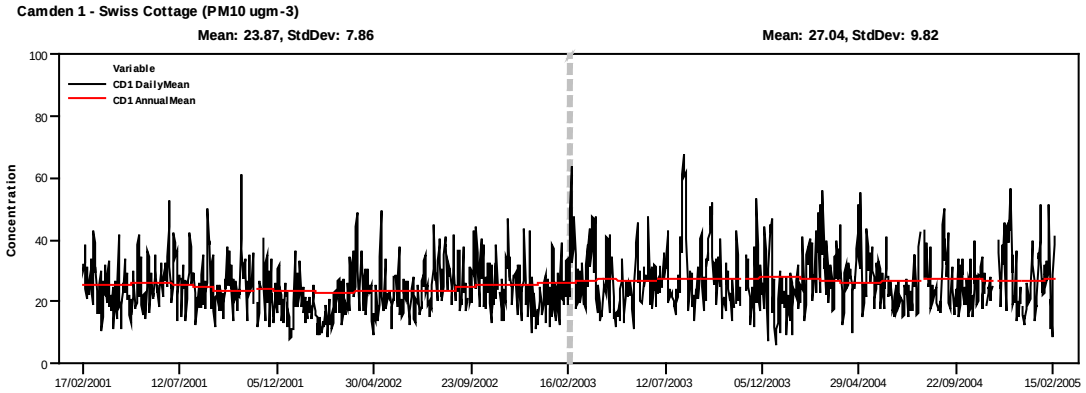
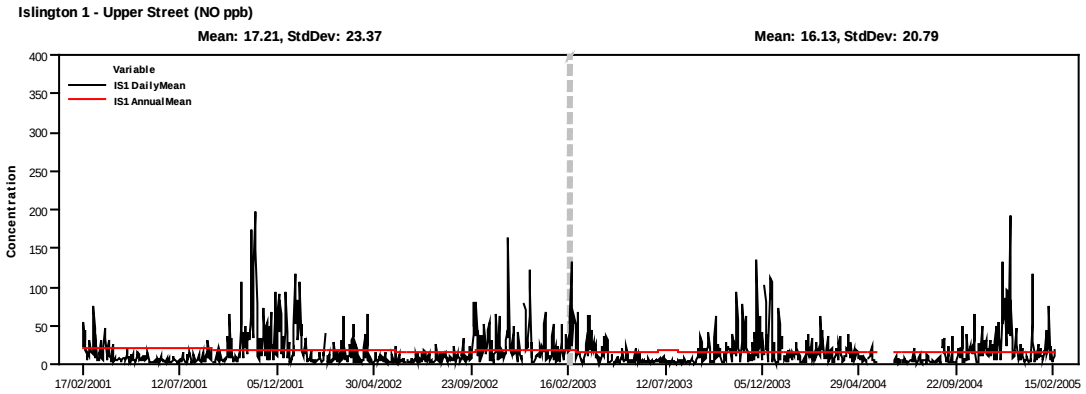
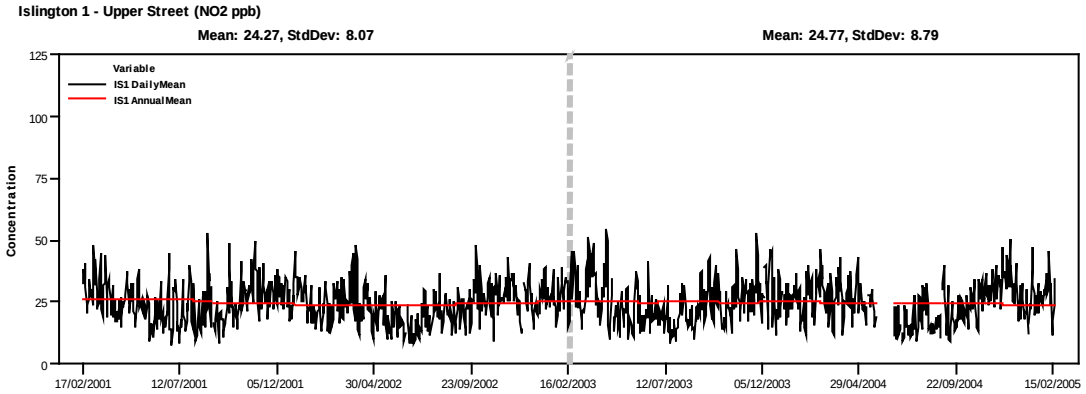


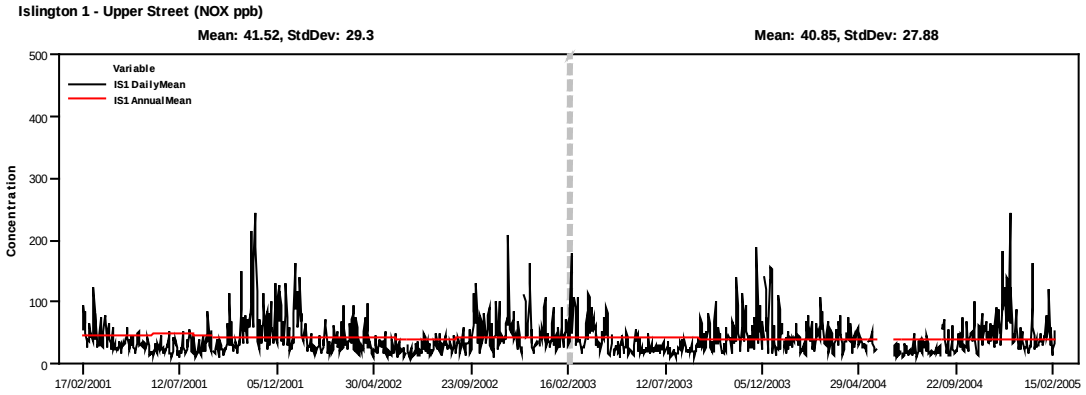
Figure G31. Site details for Upper Street, Islington

Name: Upper Street			**Code: IS1**
Class: Inner London - Background			
Address: Upper Street, Islington			**Grid ref:** 531635, 184130
Monitoring start date: May 1994			**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10}			
Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	96	94	
NO_2	96	93	
NO_X	96	93	
PM_{10}	99	97	
$PM_{2.5}$	-	-	
CO	-	-	

Figure G32. Time series plots for Upper Street







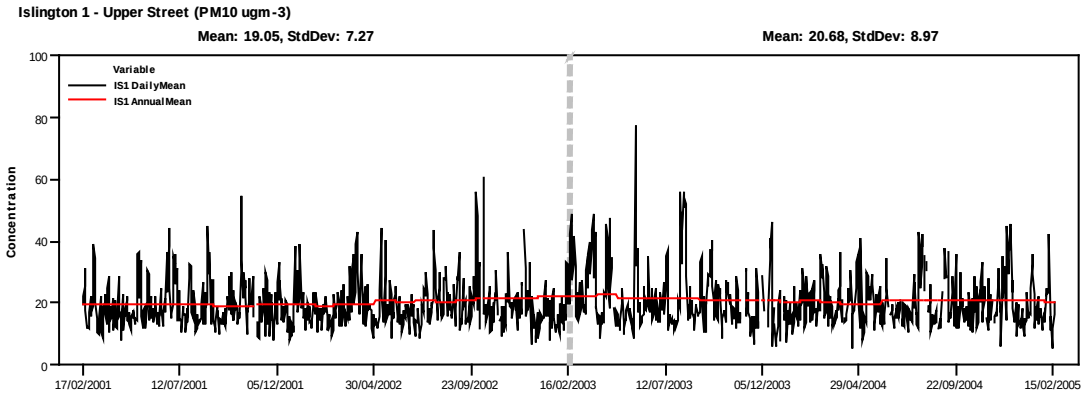
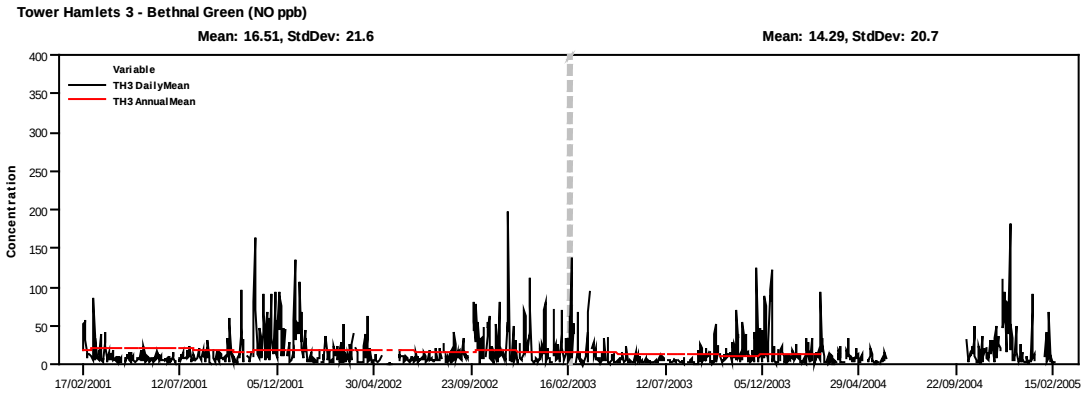


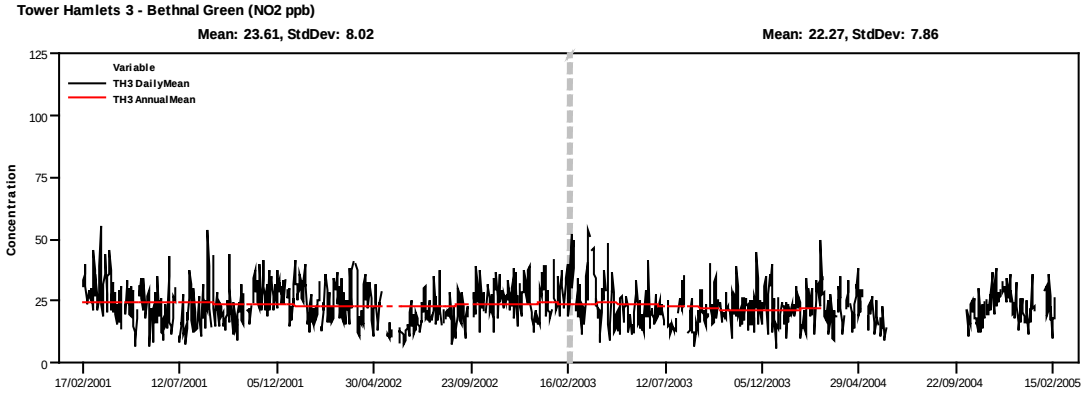
Figure G33. Site details for Bethnal Green

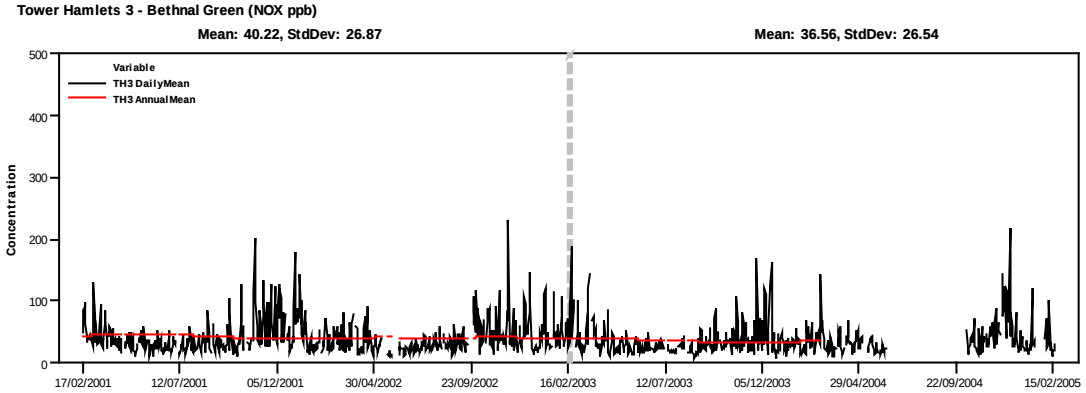
Name: Bethnal Green	**Code: TH3**
Class: Inner London - Background	
Address: Bethnal Green, Tower Hamlets	**Grid ref:** 535100, 182650
Monitoring start date: October 1999	**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10}	

Species	Capture pre (%)	Capture post (%)	Data retrievable? (<75% only)
NO	92	76	
NO_2	92	76	
NO_X	92	76	
PM_{10}	92	88	
$PM_{2.5}$	-	-	
CO	-	-	

Figure G34. Time series plots for Bethnal Green







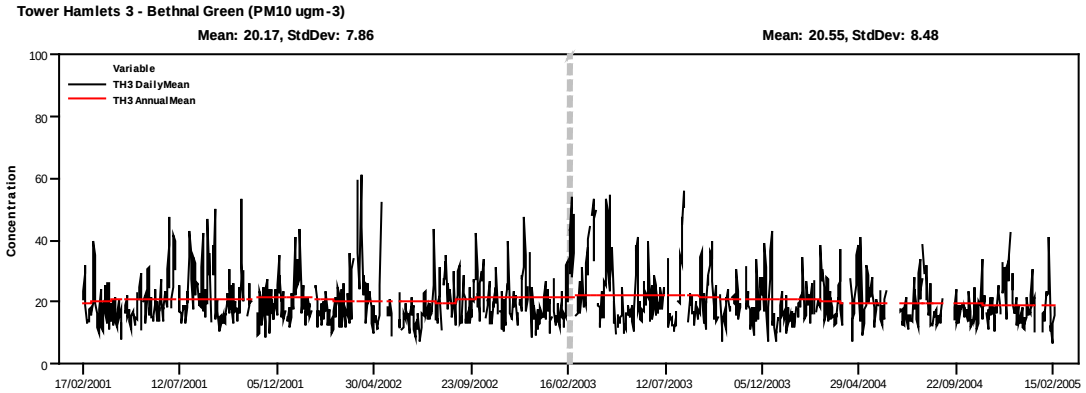
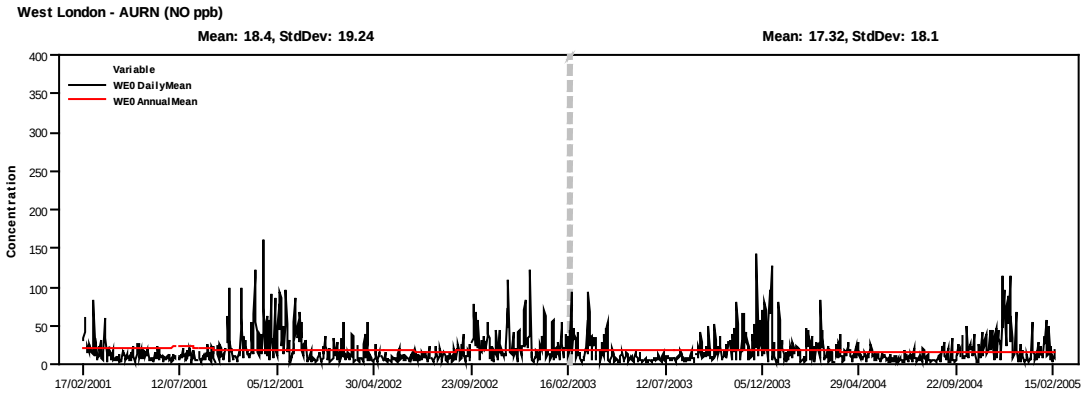


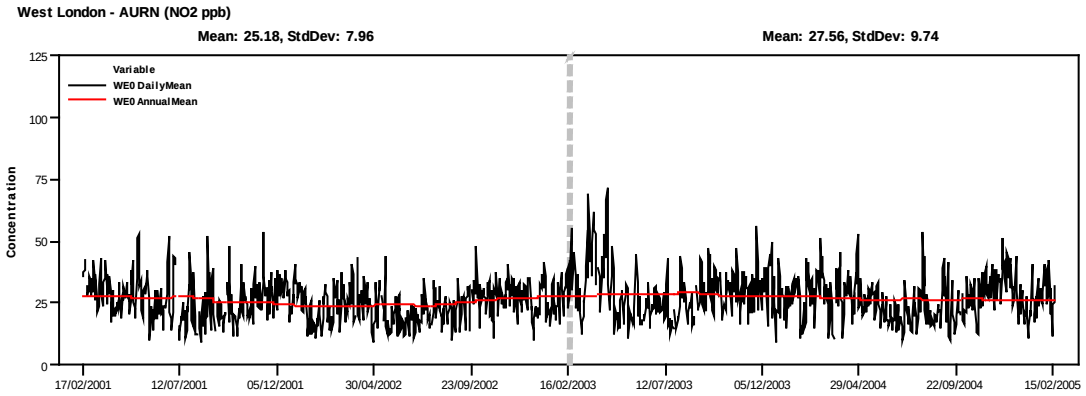
Figure G35. Site details for Pembroke Road

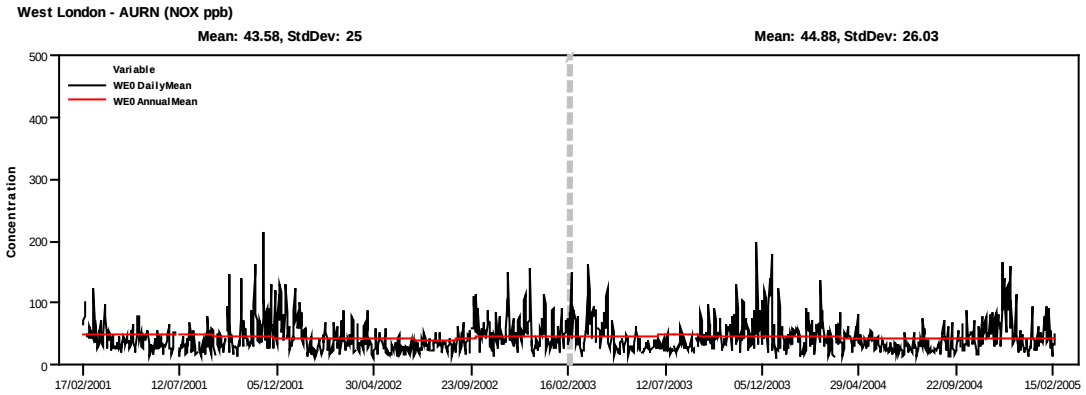
Name: Pembroke Road	**Code: WE0**
Class: Inner London - Background	
Address: Pembroke Road, Kensington	**Grid ref:** 525100, 178800
Monitoring start date: January 1993	**Monitoring end date: -**
Pollutants monitored: NO_x, CO	

Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	97	96	
NO_2	97	96	
NO_X	97	96	
PM_{10}	-	-	
$PM_{2.5}$	-	-	
CO	97	95	

Figure G36. Time series plots for Pembroke Road







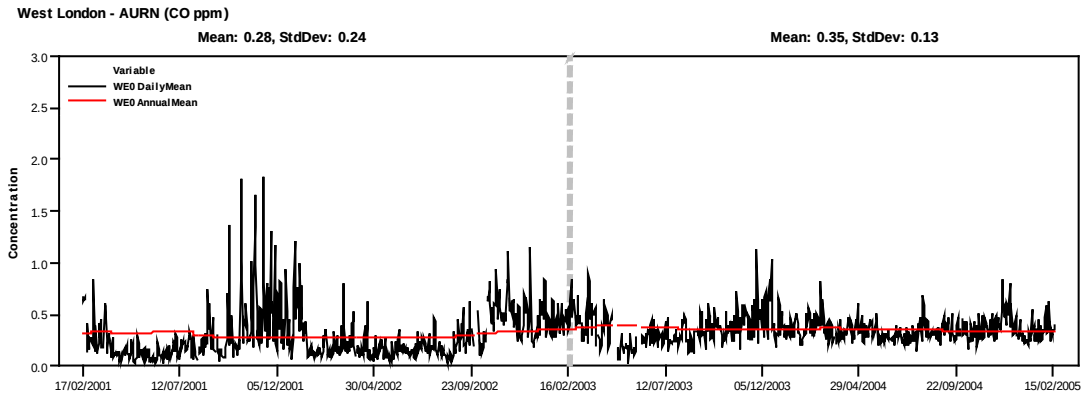
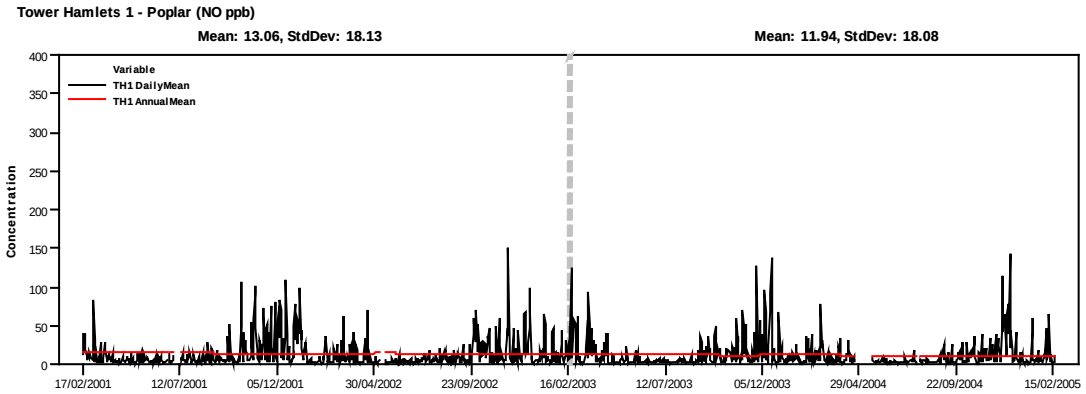


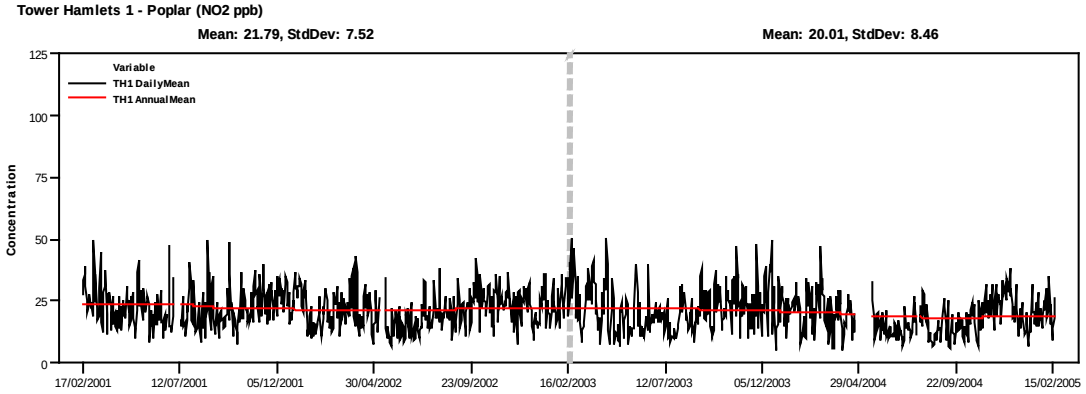
Figure G37. Site details for Poplar

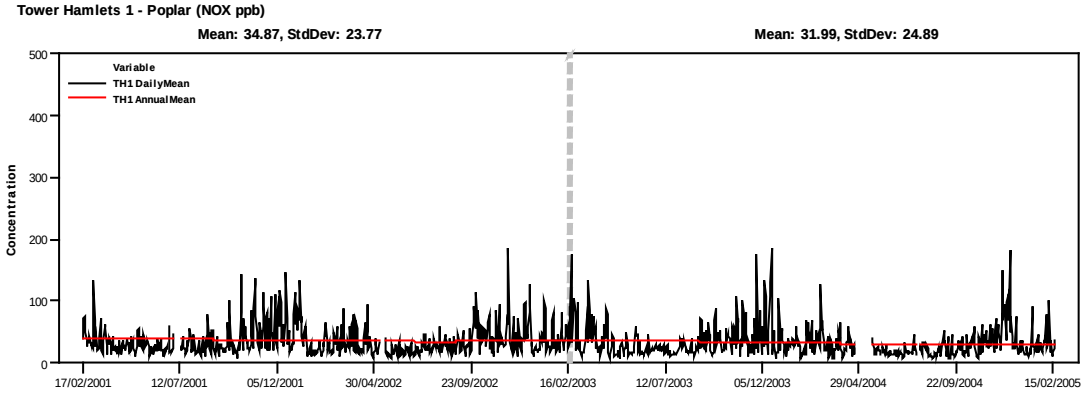
Name: Poplar	**Code: TH1**
Class: Inner London - Background	
Address: Poplar, Tower Hamlets	**Grid ref:** 537510, 180870
Monitoring start date: February 1994	**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10}	

Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	95	94	
NO_2	95	94	
NO_X	95	94	
PM_{10}	97	96	
$PM_{2.5}$	-	-	
CO	-	-	

Figure G38. Time series plots for Poplar







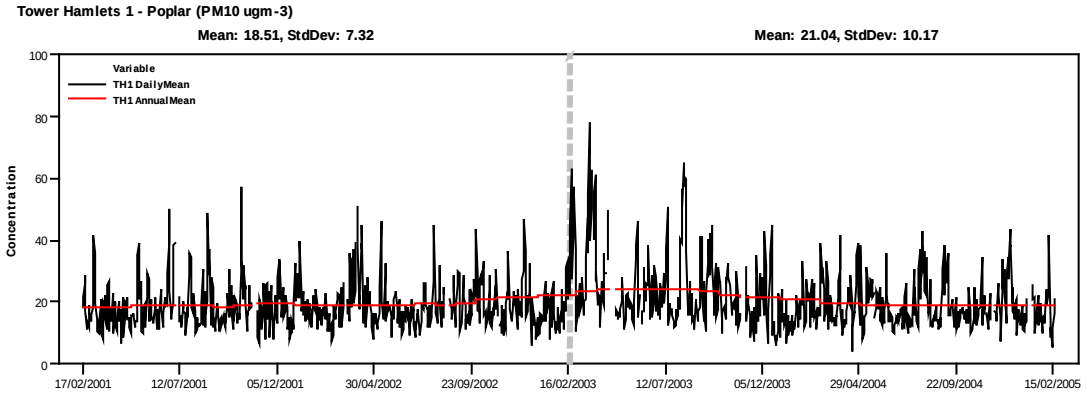
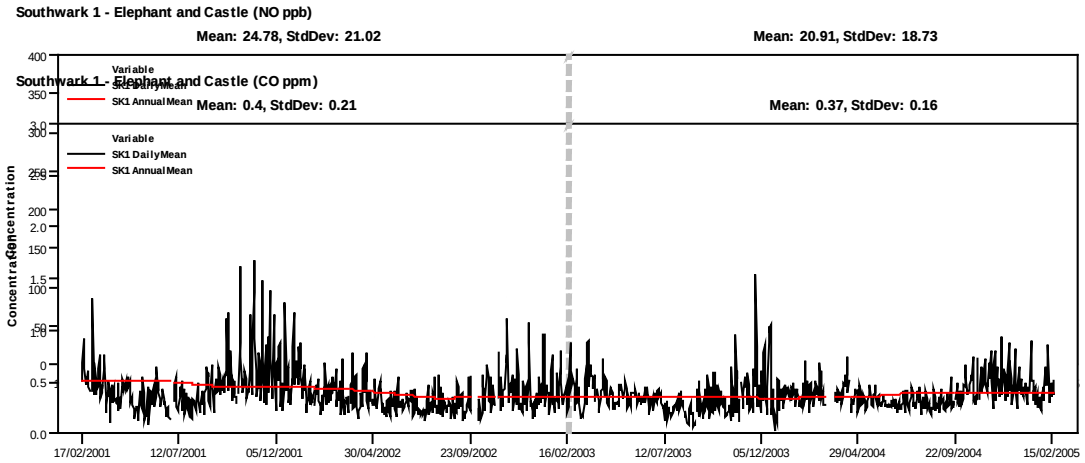
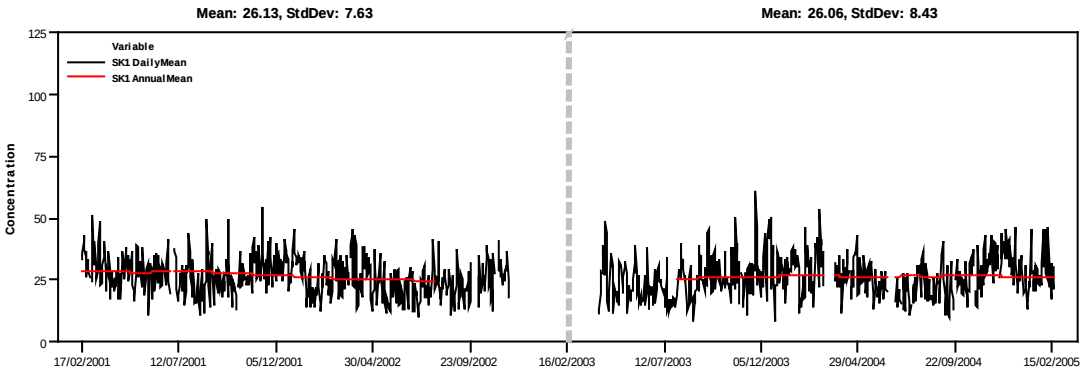


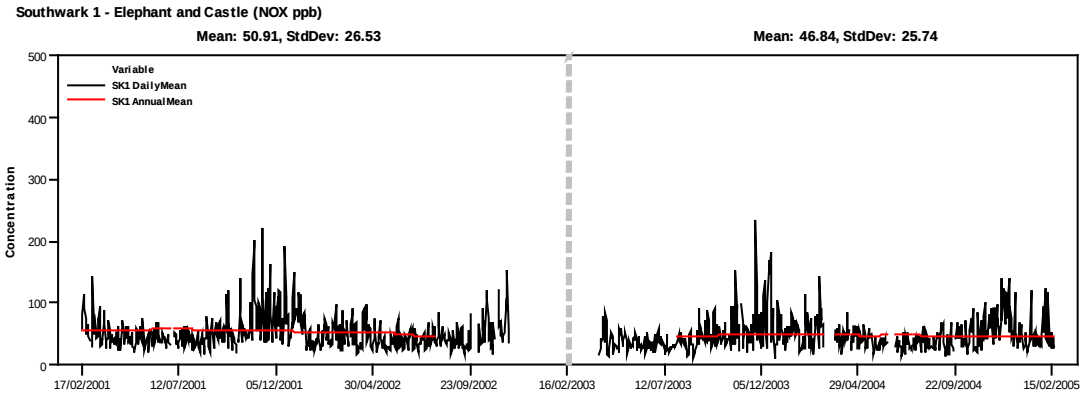
Figure G39. Site details for Elephant and Castle

Name: Elephant and Castle			**Code: SK1**
Class: Inner London - Background			
Address: Elephant and Castle, Southwark			**Grid ref:** 532245, 178565
Monitoring start date: May 1993			**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10} (from March 2002), CO			
Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	83	86	
NO_2	83	86	
NO_X	83	86	
PM_{10}	15	93	No, analyser not in operation
$PM_{2.5}$	-	-	
CO	94	94	

Figure G40. Time series plots for Elephant and Castle







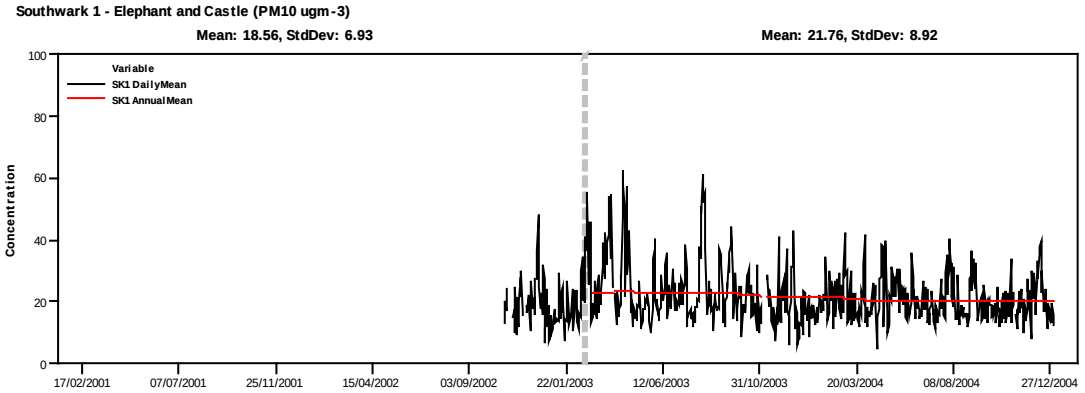
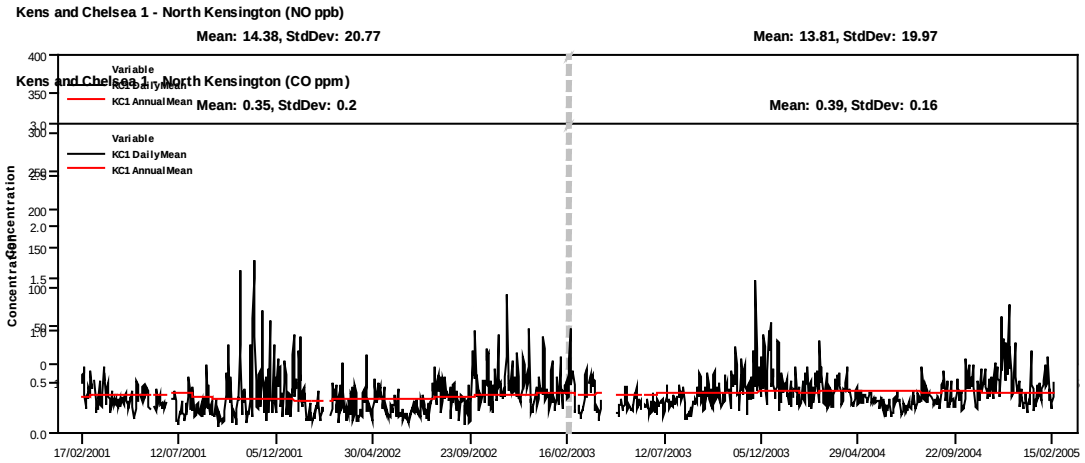
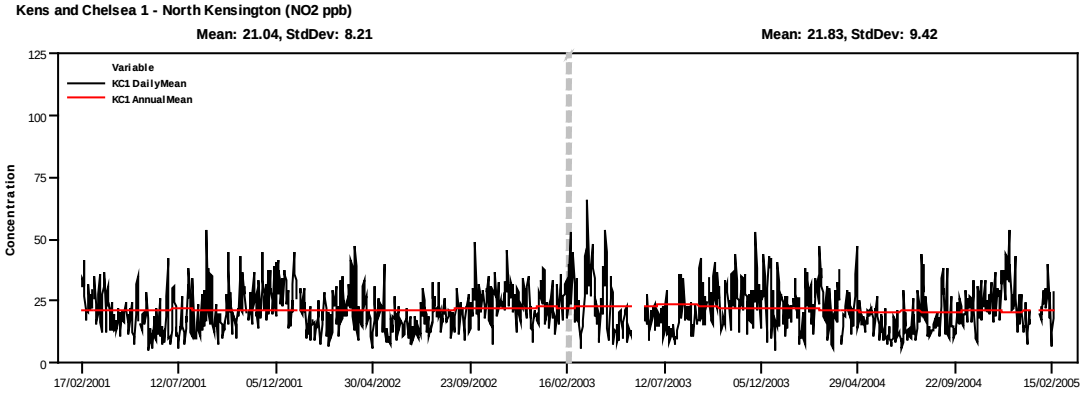


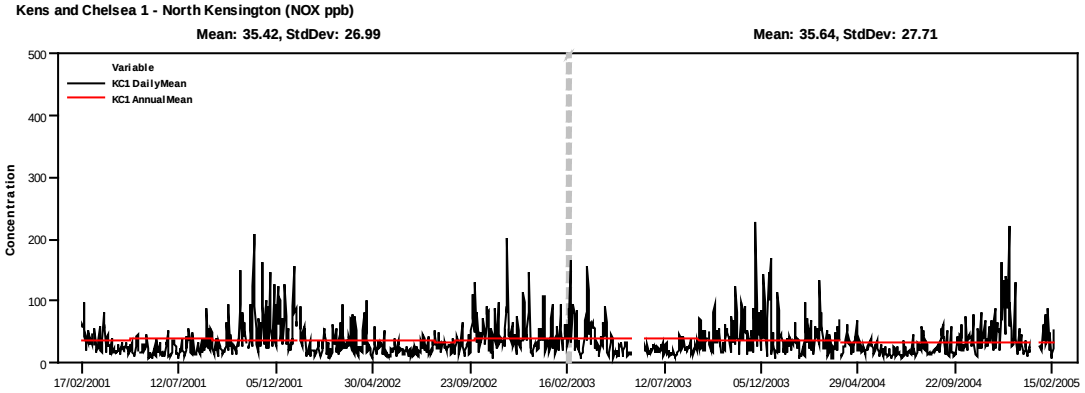
Figure G41. Site details for North Kensington

Name: North Kensington			**Code: KC1**
Class: Inner London - Background			
Address: Ladborke Grove, North Kensington			**Grid ref:** 524040, 181740
Monitoring start date: March 1995			**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10}			
Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	96	93	
NO_2	96	93	
NO_X	96	93	
PM_{10}	98	97	
$PM_{2.5}$	-	-	
CO	93	94	

Figure G42. Time series plots for North Kensington







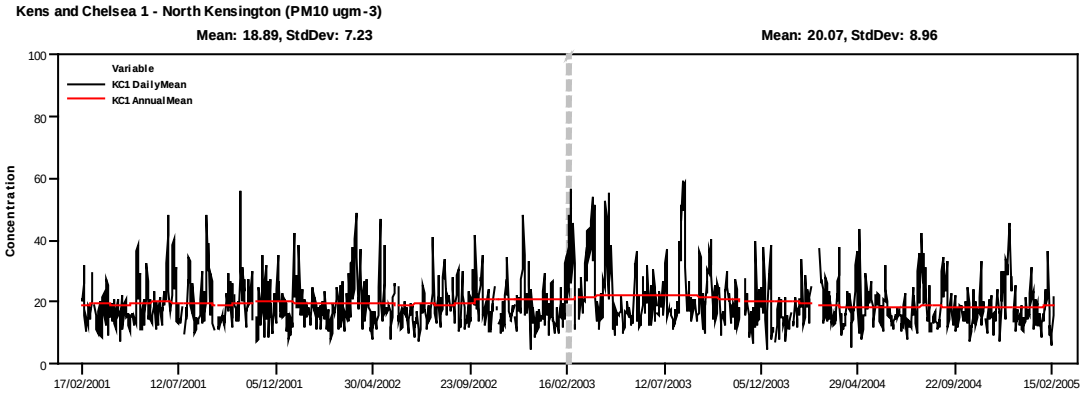


Figure G43. Site details for Teddington

Name: Teddington | **Code: TD0**

Class: Suburban

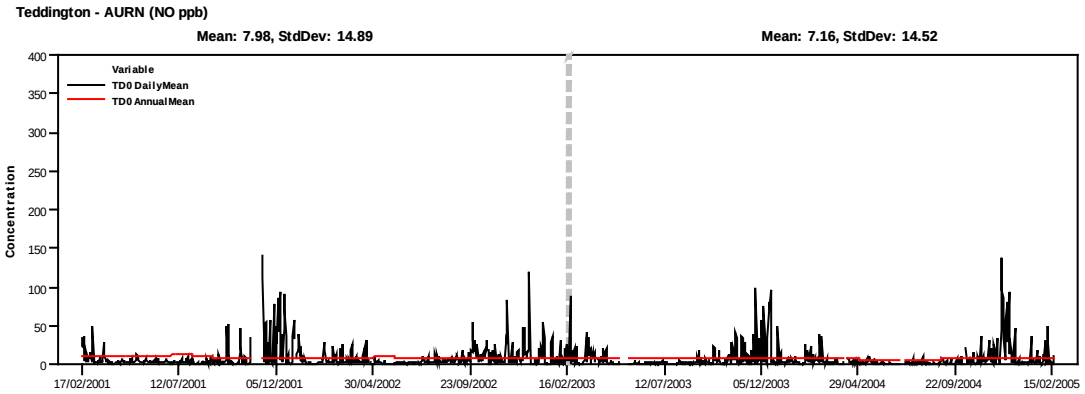
Address: Teddington, Richmond-upon-Thames | **Grid ref:** 515600, 170600

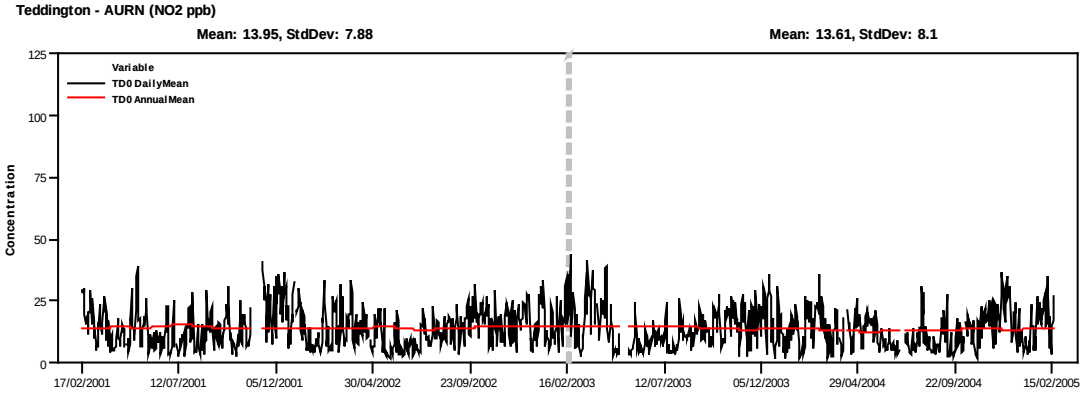
Monitoring start date: August 1996 | **Monitoring end date: -**

Pollutants monitored: NO_x

Species	Capture pre (%)	Capture post (%)	Data retrievable? (<75% only)
NO	96	93	
NO_2	96	93	
NO_X	96	93	
PM_{10}	-	-	
$PM_{2.5}$	-	-	
CO	-	-	

Figure G44. Time series plots for Teddington





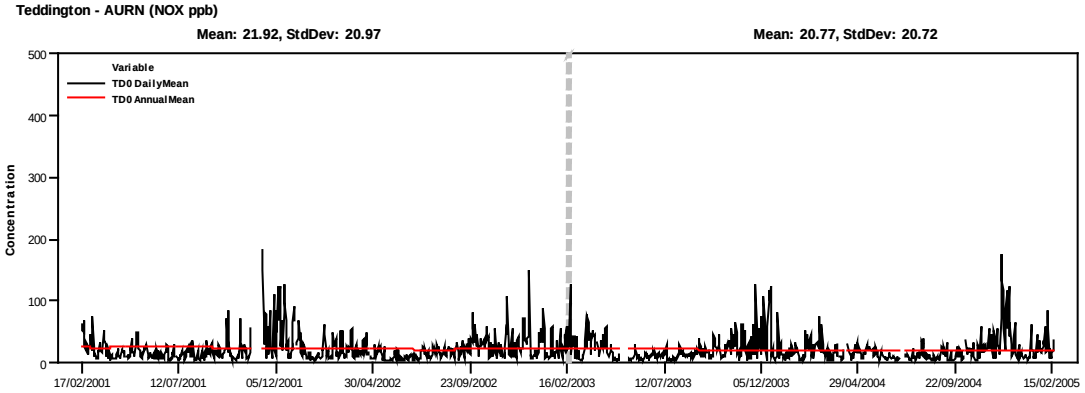
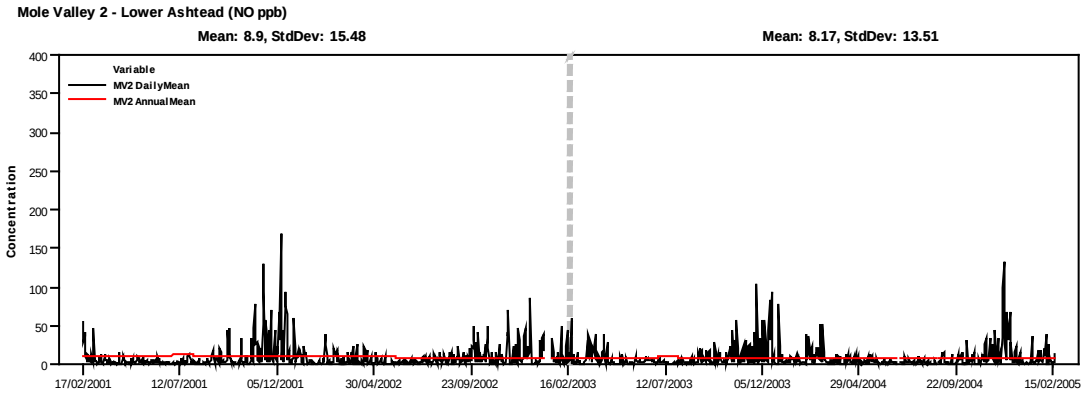
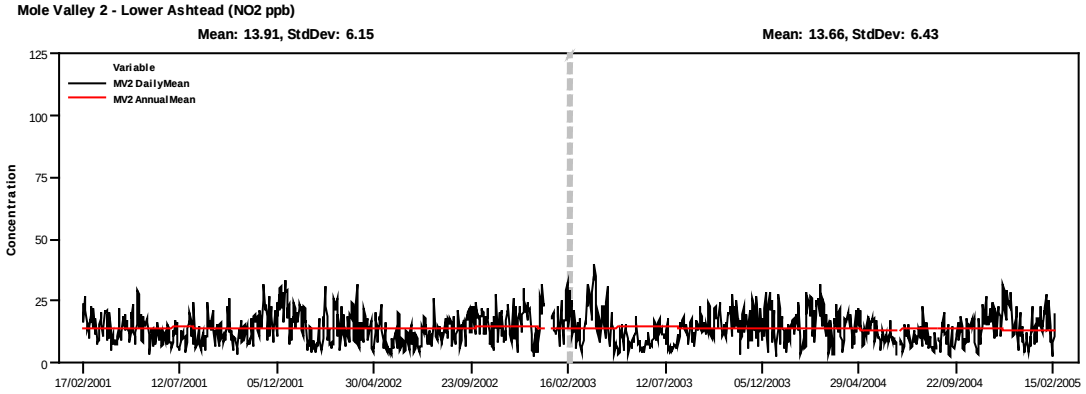


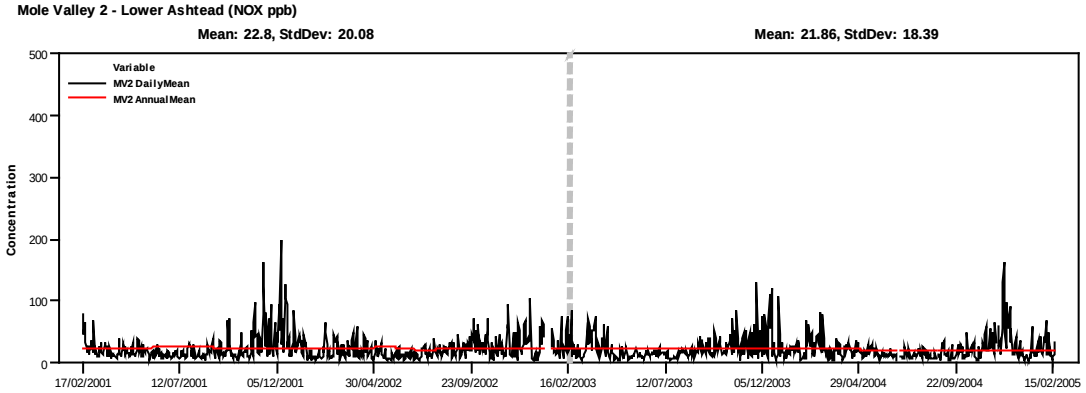
Figure G45. Site details for Mole Valley

Name: Mole Valley			**Code: MV2**
Class: Suburban			
Address: Lower Ashstead, Mole Valley			**Grid ref:** 518160, 157750
Monitoring start date: April 1997			**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10}			
Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	96	97	
NO_2	96	97	
NO_X	96	97	
PM_{10}	98	99	
$PM_{2.5}$	-	-	
CO	-	-	

Figure G46. Time series plots for Mole Valley







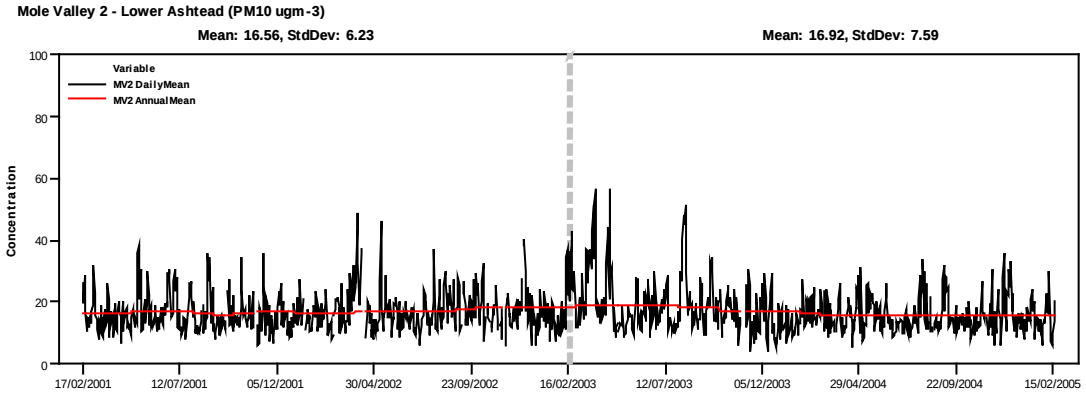
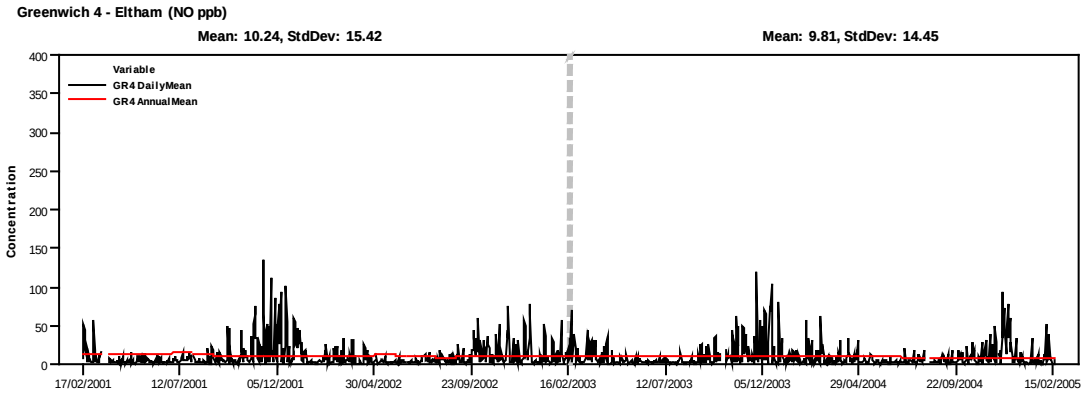


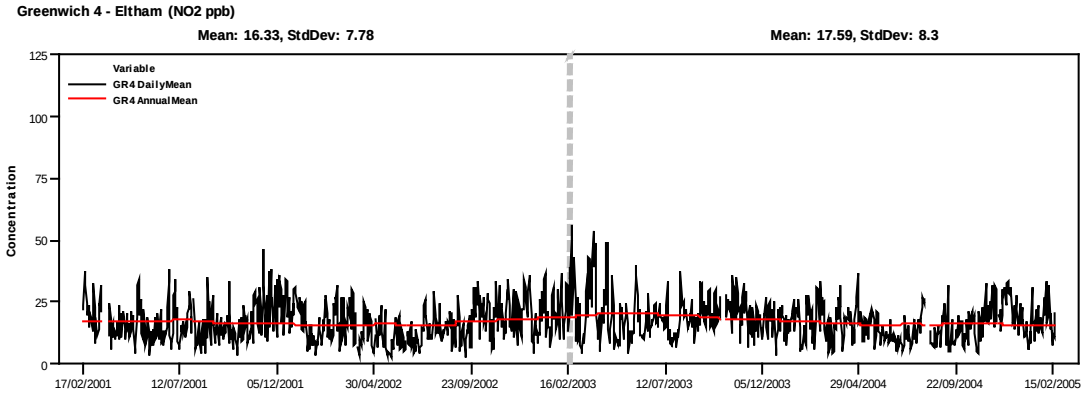
Figure G47. Site details for Eltham

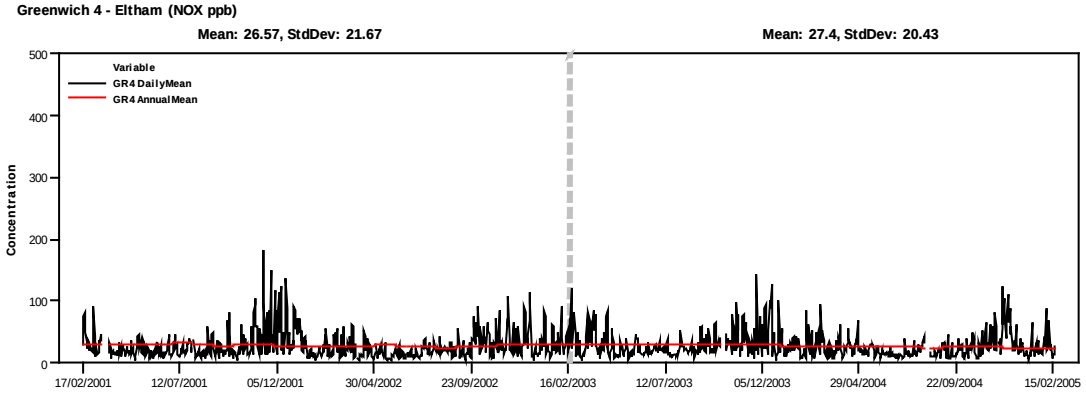
Name: Eltham	**Code: GR4**
Class: Suburban	
Address: Eltham, Greenwich	**Grid ref:** 543982, 174676
Monitoring start date: January 1994	**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10}	

Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	96	95	
NO_2	96	95	
NO_X	96	95	
PM_{10}	96	94	
$PM_{2.5}$	-	-	
CO	-	-	

Figure G48. Time series plots for Eltham







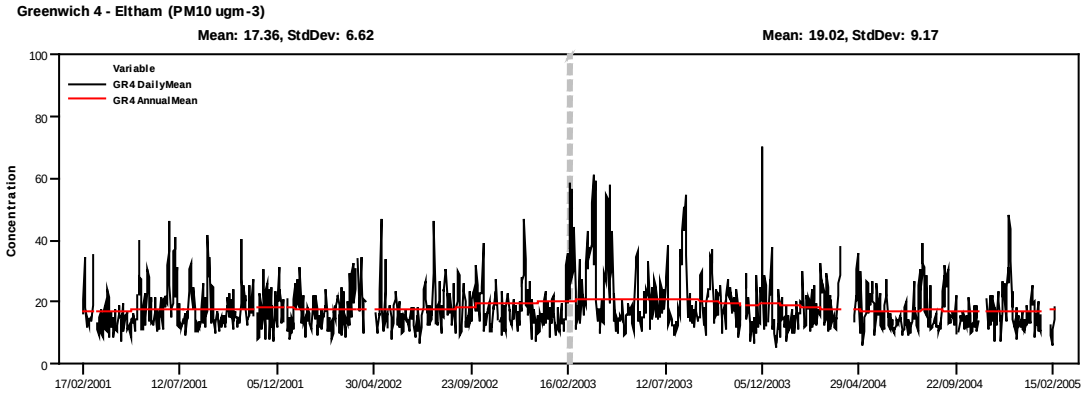
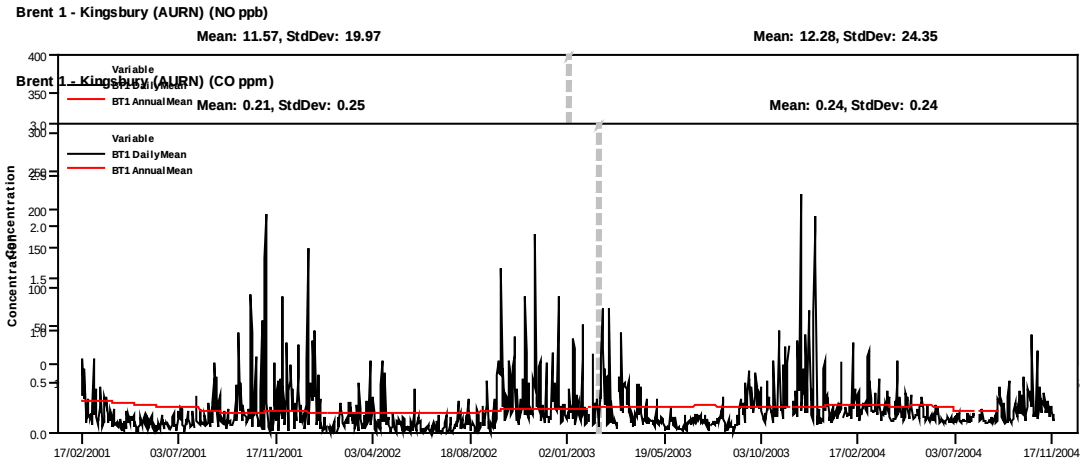


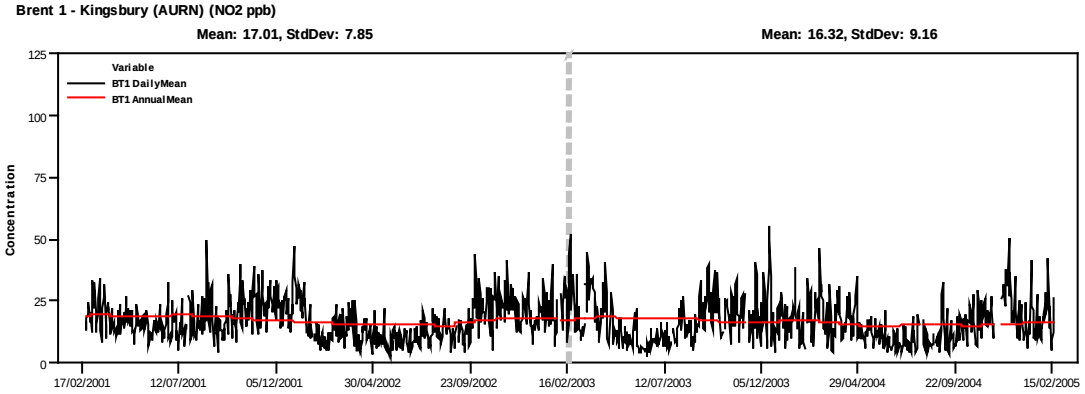
Figure G49. Site details for Kingsbury

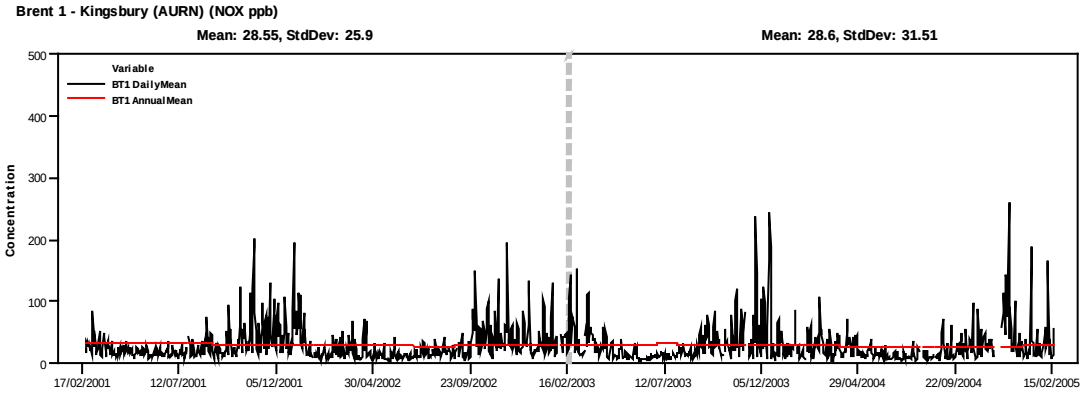
Name: Kingsbury	**Code: BT1**
Class: Suburban	
Address: Kingsbury, Brent	**Grid ref:** 519600, 189300
Monitoring start date: January 1996	**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10}	

Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	96	93	
NO_2	96	93	
NO_X	96	93	
PM_{10}	98	95	
$PM_{2.5}$	-	-	
CO	99	84	

Figure G50. Time series plots for Kingsbury







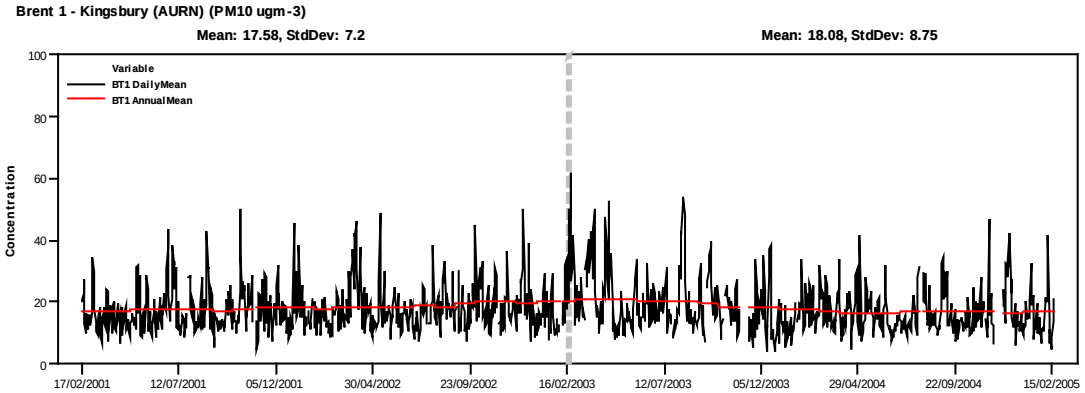
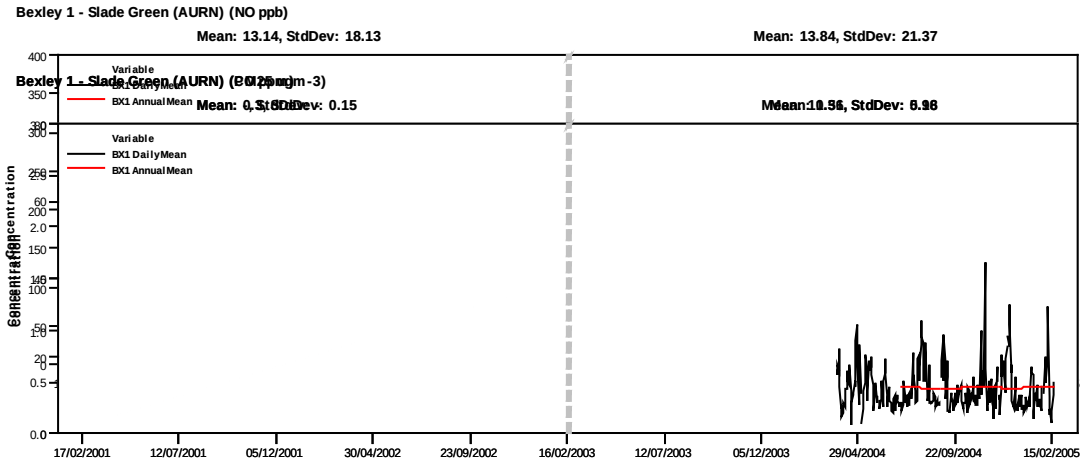


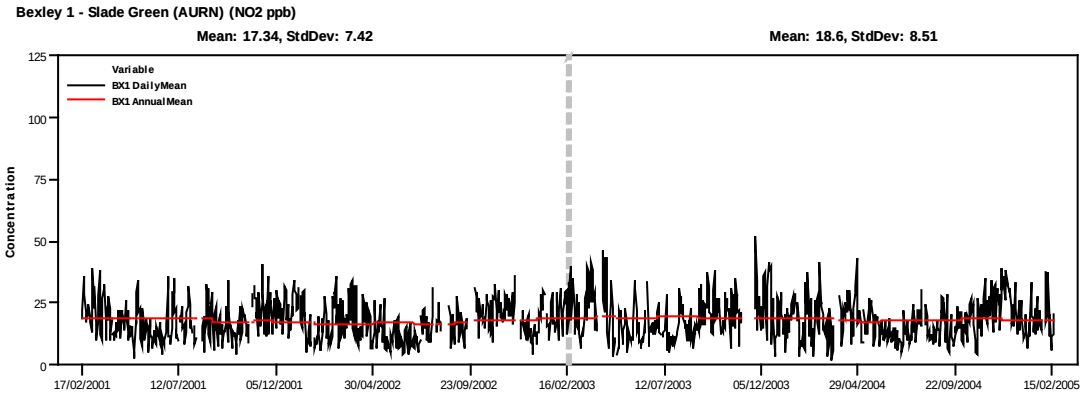
Figure G51. Site details for Slade Green

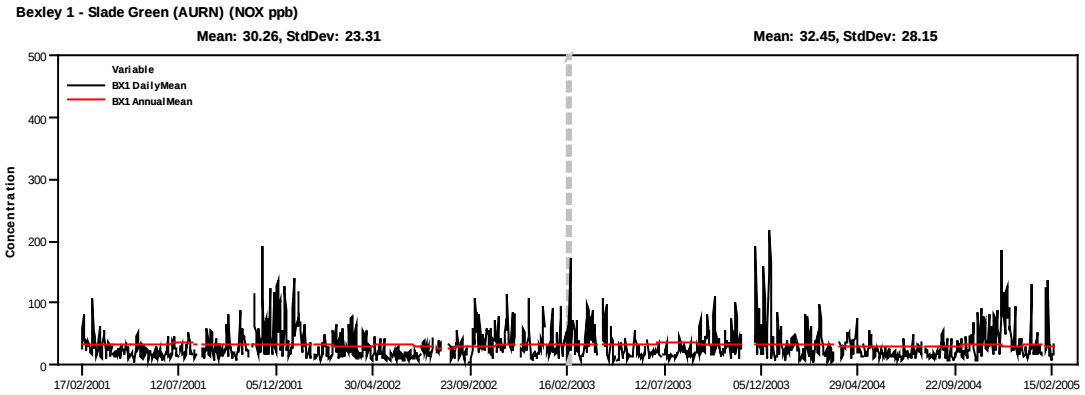
Name: Slade Green	**Code: BX1**
Class: Suburban	
Address: Slade Green, Bexley	**Grid ref:** 551862, 176380
Monitoring start date: May 1994	**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10}, CO	

Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	93	91	
NO_2	92	91	
NO_X	93	91	
PM_{10}	97	94	
$PM_{2.5}$	-	-	
CO	93	93	

Figure G52. Time series plots for Slade Green







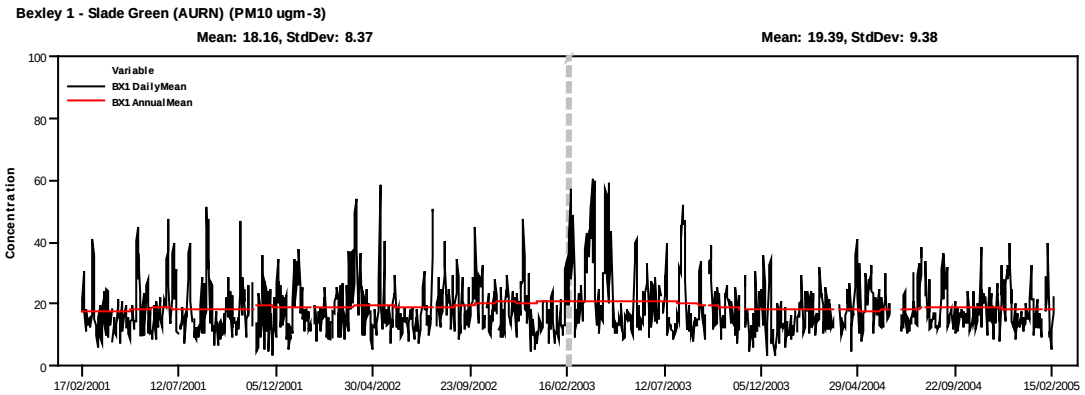


Figure G53. Site details for Belvedere

Name: Belvedere	**Code: BX2**
Class: Suburban	
Address: Belvedere, Bexley	**Grid ref:** 550000, 179070
Monitoring start date: January 1998	**Monitoring end date: -**
Pollutants monitored: NO_x, PM_{10}, CO	

Species	**Capture pre (%)**	**Capture post (%)**	**Data retrievable? (<75% only)**
NO	-	-	
NO_2	-	-	
NO_X	-	-	
PM_{10}	-	-	
$PM_{2.5}$	98	97	
CO	-	-	

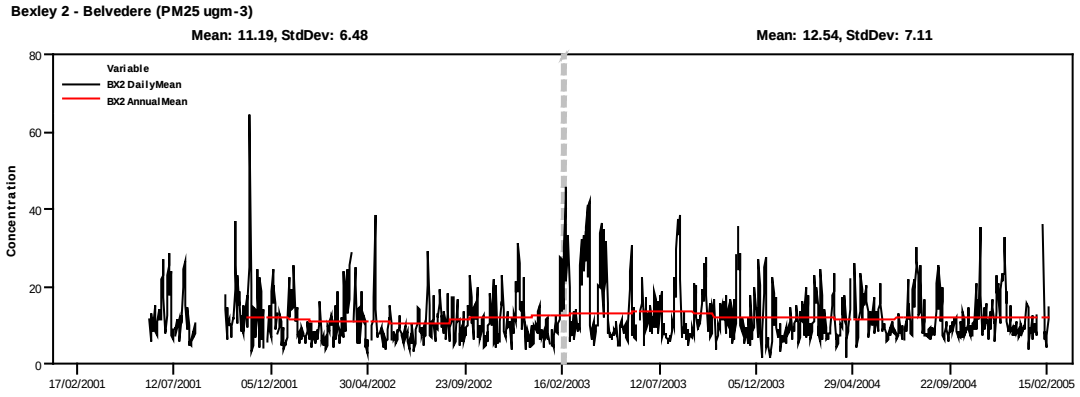



Figure G54. Time series plots for Belvedere.