

Docksway Disposal Site

Annual Environmental Review for Area 2 - 2015

On behalf of **Newport City Council**



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1 Introduction

1.1 Background

Docksway Disposal Site is located approximately 3km south of Newport City Centre, Gwent, and is centred on National Grid Reference ST 305 853. The site is operated by Newport City Council, referred to hereafter as NCC. The location of the site is shown on **Figure 1**.

The site is approximately split into a northern half (Area 1) and a southern half (Area 2). Area 1 is an unlined ('dilute and disperse') landfill that was operated under Waste Management Licence (WML) number EAWML30058 and is now closed and in the aftercare phase. Area 2 is an engineered containment landfill that is active and operated under Pollution Prevention Control (PPC) Permit No. DP3733BK. Variation Notice Number MP3730MJ.

It is a requirement of the PPC Permit for Area 2 (Condition 4.2.1) that a report is provided to Natural Resources Wales (NRW – formerly the Environment Agency) on an annual basis in order to report on the environmental performance of the site. This report is called an Annual Environmental Review.

1.2 Scope

This document reviews the data produced by various environmental monitoring programmes and management systems and provides an analysis of any trends in the data over the preceding 12 month period. The data review and analysis is used to provide a review of the environmental risks associated with Area 2 of the site. This document includes the following:

- Review and analysis of the Area 2 environmental monitoring results collated over the past 12 months.
- Comments on temporal trends observed in the longer term monitoring data collected.
- A review of the potential risks to sensitive environmental receptors.

Guidance for readers of this report is given in **Section 10** of this report.

1.3 Related Work

Much of the environmental data commented on in this report has been passed to NRW previously in the form of monthly or quarterly interim environmental monitoring reports.

2 Surface Water Quality Monitoring

2.1 Current Monitoring Programme

A surface water monitoring programme commenced at Docksway Disposal site in September 2003, in accordance with the requirements of Condition 62 of the Area 1 WML. Whilst (with the exception of the surface water discharge locations) the surface water monitoring requirements could have been amended following definitive closure, NCC has opted to continue monthly sampling at all surface water monitoring locations and report the results to NRW on a monthly basis. Details of the monitoring programme for the site, (including the range of chemical testing suites used and the laboratory test methods and detection limits), are presented in the Monitoring Plan for Area 1, updated in August 2011^[1].

A total of six monitoring locations have been used for assessing the surface water quality over the past 12 months, the locations of which are shown on **Figure 2**, and details are tabulated below;

Table 2.1 – Details of Surface Water Locations Monitored During 2015

Position Monitored	Location
SW1A	Ebbw Upstream
SW11	North Pond
SW23	Discharge to Maes Glas Pill from Docks Drain Outfall (Disused Culvert)
SW24	Oxbow Lake Position 1
SW25	Surface Water Management System Discharge Point
SW26	Area 2 Surface Water

It should be noted that the surface water monitoring location SW02 (River Ebbw Downstream) has not been monitored or sampled since October 2012 due to ongoing safety concerns regarding the access to this location, and is hence excluded from this AER.

2.2 Surface Water Hydrochemistry over the Preceding 12 Months

2.2.1 Trigger Levels

It is not a requirement of the Area 1 WML to set surface water compliance limits for the site, and consequently none have been set by NRW (formerly EA). Therefore, comments on the surface water hydrochemistry with respect to compliance limits are not presented in this report. Instead, only the data and any temporal trends in the data are presented and commented upon.

The exceptions to this are surface water sampling points SW25 and SW26 which are subject to discharge consents (Consent Number AN0394301 and AN0401301 respectively) with limit values as set by NRW (formerly EA). The chemical test results for SW25 and SW26 are therefore assessed against the discharge consent limits.

2.2.2 SW25

In the last 12 months, SW25 has been sampled on seven occasions (Jan to Mar, and Sep to Dec) and recorded as dry on each of the remaining monthly monitoring visits.

The following provides commentary on the consented limit values:

- On the seven occasions that SW25 was sampled, the results were significantly below the discharge consent limit (30mg/l) for Ammoniacal Nitrogen, and ranged between 0.354mg/l and 4.83mg/l. The concentrations of Ammoniacal Nitrogen recorded in SW25 appear to have been gradually reducing since commencement of monitoring in 2004.
- There were no exceedances of the discharge limit (40mg/l) for Biological Oxygen Demand (BOD) during the seven monitoring events in 2015 for SW25.
- The recorded pH values were within the required limits of between 6 and 9, for each sampling round.
- In relation to Total Suspended Solids (TSS), the discharge consent limit (60mg/l) was exceeded on only one occasion (February 2015) with a concentration of 440mg/l. This returned to a concentration below the discharge consent limit on the following monitoring visit and has remained within the discharge limit since.

2.2.3 SW26

Surface water monitoring point SW26 was included in the monitoring programme for Area 1 at the start of 2013, and has been sampled on eleven out of thirty six occasions since commencement (and recorded as dry on each other occasion).

During 2015, SW26 was sampled on only six occasions (Jan, Feb, Sep-Dec), with the remaining months being recorded as dry.

The following provides commentary on the consented limit values:

- The results of the testing undertaken indicate concentrations of Ammoniacal Nitrogen of 217mg/l and 86.6mg/l in January and February 2015 respectively. Results from samples obtained between September and December 2015 indicate that concentrations of Ammoniacal Nitrogen were lower than earlier in the year, generally below 11mg/l. There is no limit for Ammoniacal Nitrogen in the discharge consent for SW26.
- The results of the testing undertaken on the six samples obtained from SW26 during 2015 indicate that there was one marginal exceedance of the discharge consent limit for TSS (60mg/l) in January, with a recorded concentration of 66mg/l. The concentration of TSS has decreased since January 2015, being recorded below the discharge consent limit on each occasion.
- During 2015, pH values were not recorded outside of the required limits of between 6 and 9, in accordance with the discharge consent.

There is currently insufficient data to be able to determine any temporal trends in the data.

2.2.4 Ammoniacal Nitrogen

Appendix 1/1 presents the results of Ammoniacal Nitrogen concentrations since 2003 at each of the surface water monitoring locations. It can be seen that Ammoniacal Nitrogen concentrations in SW1A have predominantly been recorded below 0.4mg/l including several times below the method detection limit (MDL) for the laboratory (0.2mg/l) in the last 12 months. This is consistent with the longer term dataset.

In SW11 the Ammoniacal Nitrogen concentrations have been recorded below the method detection limit (MDL) for the laboratory (0.2mg/l) in the last 12 months and concentrations have predominantly been recorded below 1mg/l since commencement of monitoring.

In SW23 the Ammoniacal Nitrogen concentrations have been relatively consistent over the last 4 to 5 years, continuing a general gradual decrease in concentrations since 2003, and below 50mg/l in the last 4 years.

The remaining surface water monitoring point (SW24) shows a generally stable trend over the last 3 years, with concentrations predominantly below 1mg/l.

2.2.5 BOD and COD

Appendices 1/2 and 1/3 present Biological and Chemical Oxygen Demand concentrations since 2003 at each of the Area 1 surface water monitoring locations.

All locations appear to be displaying a generally stable trend in BOD concentrations with most results recorded at concentrations below 10mg/l in the last 5 years.

In general, COD concentrations appeared to be relatively stable at most monitoring locations during 2015 with results generally below or around 100mg/l. The exception to this is SW23 which has recorded fluctuating concentrations of COD in the last half of 2014 and first half of 2015 (up to 545mg/l). However in the last 6 months, concentrations of COD in SW23 have been recorded below 60mg/l.

2.2.6 DO and Chloride

Appendix 1/4 presents the results of Dissolved Oxygen (DO) monitoring since 2005 at each of the current Area 1 surface water monitoring locations. In the last 12 months, DO has predominantly been recorded between 5mg/l and 12mg/l, and there appears to be a generally stable trend at each monitoring location.

Appendix 1/5 presents Chloride concentrations at each of the surface water monitoring locations since 2003. The data indicates that most surface water monitoring locations are showing a generally stable trend of Chloride concentrations over the last 12 months with concentrations predominantly below 150mg/l. The exceptions to this are SW23 and SW26 where concentrations of Chloride have fluctuated significantly (from below 60mg/l to over 6000mg/l) from month to month, as they have done since monitoring commenced.

2.2.7 pH and Electrical Conductivity

Appendix 1/6 presents the results of pH monitoring of surface water since 2003 at each of the current Area 1 surface water monitoring locations. In the past 12 months all of the pH readings have been consistently recorded between pH 7.5 and pH 8.5.

Appendix 1/7 presents Electrical Conductivity (EC) readings in each of the surface water monitoring locations since 2003. The data indicates a stable trend of Electrical Conductivity readings, generally below 5mS/cm at all monitoring locations in the last 12 months with the exception of SW26, which presented an increased result in October 2015 (7mS/cm) and also at SW23 in June (15mS/cm) and November 2015 (6mS/cm).

2.2.8 Total Suspended Solids

Appendix 1/8 presents the concentrations of Total Suspended Solids at SW25 since 2007 and SW26 since 2013. The data indicates that whilst there appeared to be a trend of decreasing concentrations in SW25 between 2010 and 2014, with concentrations generally below 10mg/l, in the last 12 months the concentrations have fluctuated between about 3mg/l and 450mg/l. These values are within the range of the dataset overall.

2.3 Review of Risks and Future Monitoring

The environmental data for surface water does not indicate any significant adverse trends developing in surface water quality, and over the last 12 months does not indicate any significant decrease in surface water quality since the previous Environmental Performance Report.

3 Groundwater Quality Monitoring

3.1 Monitoring Programme

A groundwater monitoring/sampling programme commenced at Docksway Disposal Site in September 2003 to monitor groundwater quality within the underlying River Terrace Gravel deposits present beneath the site.

Details of the monitoring methodology and protocols for the site (including the frequency of testing, the range of chemical testing suites used and the laboratory test methods and detection limits), are presented in the Monitoring Plan for Area 2: Landfill Extension, dated 2005, which has previously been submitted to the EA (PBA, 2005)^[2].

The locations of the boreholes used in the current monitoring and sampling programme are indicated on **Figure 2**.

Interim groundwater quality reports have previously been provided to NRW on a quarterly basis (in accordance with the PPC Permit Conditions 3.6.1 and 3.6.2) providing both factual data and interpretive comments.

3.2 Monitoring Locations and Compliance Levels

There are fourteen compliance monitoring wells across Area 2, although only eleven of these currently have agreed compliance limits. It is intended that the remaining three wells (GW12_30, GW12_33 and GW12_38) will have compliance limits set once sufficient baseline data has been collected.

Table 3.1 – Groundwater Monitoring Locations

Monitoring Location	National Grid Reference
GW07_40	ST310852 (331007E, 185204N)
GW12_30	ST311852 (331089E, 185194N)
GW09_31	ST312851 (331165E, 185095N)
GW03_09	ST312850 (331166E, 184999N)
GW09_32	ST311849 (331118E, 184919N)
GW12_33	ST311848 (331055E, 184834N)
GW06_34	ST310847 (331015E, 184732N)
GW09_35	ST309848 (330904E, 184755N)
GW06_36	ST308848 (330811E, 184777N)
GW06_37	ST307848 (330715E, 184801N)
GW06_13	ST306849 (330602E, 184887N)
GW12_38	ST307850 (330705E, 184986N)
GW06_14a	ST308851 (330829E, 185098N)
GW06_39	ST309851 (330932E, 185137N)

Control and Compliance limits for eight of the compliance monitoring wells were proposed as part of the four yearly review of the Hydrogeological Risk Assessment (HRA) for Area 2 produced in December 2010^[3] and accepted by NRW in August 2013. In addition, Control and Compliance limits for the three 'GW09' compliance wells (31, 32, and 35) were proposed in September 2013, and following amendment were subsequently accepted by NRW.

The current control and compliance levels are reproduced in Table 3.2.

Table 3.2 – Accepted Area 2 Groundwater PPC Permit Compliance Limits for Emissions to Groundwater

Monitoring Well	Benzene	Naphthalene	Xylene	Arsenic
	Compliance Limit	Compliance Limit	Compliance Limit	Compliance Limit
	ug/l	ug/l	ug/l	ug/l
GW03_09	2	5	3	35
GW06_13	2	5	3	50
GW06_14a	2	5	3	25
GW06_34	2	5	3	65
GW06_36	2	5	3	30
GW06_37	2	5	3	60
GW06_39	2	5	3	50
GW07_40	2	5	3	35
GW09_31	13	5	3	80
GW09_32	3	5	3	30
GW09_35	2	5	3	50

Monitoring Well	Nickel		Potassium		Ammoniacal Nitrogen	
	Control Level	Compliance Limit	Control Level	Compliance Limit	Control Level	Compliance Limit
	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l
GW03_09	8	10	160	180	30	35
GW06_13	12	14	100	110	30	35
GW06_14a	12	14	160	180	53	60
GW06_34	12	14	310	350	30	35
GW06_36	8	10	100	110	20	23
GW06_37	8	10	100	110	30	35
GW06_39	26.4	30	100	110	20	23
GW07_40	8	10	39.6	45	20	23
GW09_31	8	10	100	110	50	50
GW09_32	8	10	160	180	50	50
GW09_35	8	10	100	110	30	35

3.3 Groundwater Quality

3.3.1 Ammoniacal Nitrogen

Appendices 2/1 to 2/4 present the recorded concentrations of Ammoniacal Nitrogen since 2003 for the Area 2 groundwater monitoring locations. Ammoniacal Nitrogen concentrations in all compliance wells have been relatively consistent in the last 12 months and longer term, and with the exception of GW06_37, there are no distinct trends in the data sets.

Two compliance limit exceedances were recorded in GW06_37 during 2015; a concentration of 37.1mg/l was recorded in March 2015, and a concentration of 35.5mg/l was recorded in GW06_37 (compliance limit 35 mg/l) in September 2015. All other monitoring locations remained below the control and compliance limits throughout the monitoring period. The longer term dataset for GW06_37 indicates that concentrations of Ammoniacal Nitrogen have been rising since 2012. It is not considered that at the current time this trend represents a significant risk to the groundwater because the concentrations recorded are predominantly below the Compliance Limit.

3.3.2 Arsenic

Appendices 2/5 to 2/14 present the results of Arsenic concentration since 2003 for the current Area 2 groundwater monitoring locations. Arsenic concentrations at the majority of Area 2 groundwater monitoring wells are consistent with generally no distinct trends or exceedances of the well specific compliance limits in the last 12 months. However, there have been exceedances of the compliance limits in GW06_14a, GW09_32 and GW06_37.

In GW09_32 concentrations of Arsenic exceeded the compliance limit (30ug/l) on two occasions, March (34.3ug/l) and September (31.2ug/l), and appear to be gradually rising. In GW06_14a, the Arsenic concentration (31.5ug/l) exceeded the compliance limit (25ug/l) in December 2015 having been recorded below the compliance limit on the other three occasions it was sampled.

The concentrations of Arsenic recorded in GW06_14a have fluctuated since 2012 but there does appear to be a gradually rising trend.

Arsenic concentrations in GW06_37 exceeded the compliance limit (60ug/l) three out of the four times that the monitoring well was sampled in 2015, recording concentrations of between 70ug/l in December and 176ug/l in September. The data indicates that there may be a gradually rising trend, although the monitoring well was not sampled in 2014 due to being described as 'unavailable' by the monitoring engineer.

All three of the monitoring wells that have recorded exceedances of the compliance limit for Arsenic in the last 12 months will be closely monitored in 2016.

3.3.3 Benzene, Naphthalene and O-Xylene

Appendices 2/15 to 2/22 present the results of Benzene, Naphthalene and O-Xylene concentrations.

Benzene concentrations in all Area 2 compliance wells have been consistent in the last 12 months, with no exceedances of the compliance limits and most results being below the method detection limit (MDL)

All current Area 2 groundwater monitoring locations are showing stable trends of Naphthalene and O-Xylene concentrations at or below the MDL.

Note that the laboratory MDL has changed a number of times since 2004 for Benzene, Naphthalene and O-xylene which gives a false impression that some of the results have occasionally exceeded the Compliance Limit, because the Compliance Limit tracks the MDL.

3.3.4 Extractable Petroleum Hydrocarbons

Appendices 2/23 to 2/24 present the results of Extractable Petroleum Hydrocarbons (EPH) concentrations. Concentrations of EPH have generally been recorded below 200µg/l in all of the monitoring wells in Area 2 during 2015, with the exception of GW06_14a and GW06_37.

The concentrations of EPH recorded in GW06_14a have varied between <50ug/l to 5000ug/l in the last 12 months and in GW06_37 have varied between <50ug/l and 3000ug/l. There are no distinct long term trends in the datasets for these two locations but the concentrations in the last 12 months have been higher than previous years. There are no compliance limits required for EPH.

3.3.5 Nickel and Potassium

Appendices 2/25 to 2/33 present the results of Nickel and Potassium concentrations in the monitoring wells.

The majority of current Area 2 groundwater monitoring locations show stable trends of Potassium with no exceedances of the compliance limits in the last 12 months. The exception to this is within GW07_40, which recorded a concentration of 162mg/l in December 2015, and therefore exceeded the compliance limit for Potassium in this well of 45mg/l.

Nickel concentrations at the majority of the compliance wells have remained relatively stable in the last 12 months and no distinct trends are evident. The exceptions to this are GW09_35 and GW07_40 which exceeded the compliance limit (10ug/l) on one occasion each (September – 18.2ug/l and December – 31.1ug/l respectively) during 2015. Nickel concentrations within these wells appear to be gradually increasing, with distinct fluctuations occurring.

3.4 Review of Risks and Future Monitoring

The environmental data obtained for the groundwater compliance wells in Area 2 indicates that in general the River Terrace Gravel groundwater chemistry is in a stable condition and that there is therefore no significant deterioration in water quality since the previous Annual Environmental Review.

There are some monitoring wells where certain parameters appear to be rising and where some exceedances of the compliance limits have occurred in the last 12 months. However, these are not currently considered to represent a significant risk to the groundwater because they are not consistently exceeding the compliance limits. Future monitoring in 2016, will enable determination as to whether wells GW06_37, GW06_14a and GW07_40 continue to exceed compliance limits and whether adverse trends are developing.

4 Leachate Monitoring

4.1 Leachate Control Measures and Management System

In accordance with Conditions 2.10.13 and 2.10.16 of the PPC Permit, leachate levels are recorded monthly (when access permits) at five locations in Cell 1 and three locations in Cell 2 with samples recovered for analytical testing on a quarterly basis at LF08_07 located within Cell 1 of Area 2, and C2B (when access permits) within Cell 2 of Area 2. Cell 1 began receiving waste in 2007 and ceased temporarily in 2010 when a part permanent, part temporary cap was constructed.

Cell 2 in Area 2 began receiving waste in 2010, and in 2012 analytical testing commenced on leachate samples obtained from Cell 2 on a quarterly basis.

Leachate generated in Area 2 is pumped directly to tankers and removed off site for disposal.

4.2 Leachate Measurements

Leachate head levels at LF08_07, C1A, C1B, C1D, C1E (Cell 1), C2A, C2B and C2C (Cell 2) are recorded on a monthly basis at the site. In accordance with Condition 2.10.15 of the PPC Permit, leachate head levels should not exceed 2m above the base of any cell.

Leachate volumes removed from Area 2 and associated leachate head levels in all cells, recorded over the last 12 months, are presented in Table 4.1.

Table 4.1 – Leachate Measurements at Cell 1 and Cell 2

Monitoring Round	Leachate Head Level above base of cell (m)								Leachate Removed (tonnes)
	LF08_07 (Cell 1)	C1A (Cell 1)	C1B (Cell 1)	C1D (Cell 1)	C1E (Cell 1)	C2A (Cell 2)	C2B (Cell 2)	C2C (Cell 2)	
January 2015	3.27	4.80	4.11	2.17	2.66	n/a	n/a	n/a	12,387
February 2015	3.38	4.85	4.08	2.47	2.76	n/a	n/a	n/a	
March 2015	3.25	4.88	3.55	2.32	2.61	n/a	n/a	n/a	
April 2015	3.26	4.80	2.81	n/a	2.56	n/a	n/a	n/a	
May 2015	3.20	4.80	2.87	2.41	2.46	n/a	n/a	n/a	
June 2015	3.13	4.69	2.48	2.42	2.51	n/a	n/a	n/a	
July 2015	3.11	4.30	2.31	2.42	2.46	n/a	n/a	n/a	
August 2015	3.13	4.25	2.31	2.47	2.56	n/a	n/a	n/a	
September 2015	3.27	4.30	n/a	2.25	2.54	n/a	n/a	n/a	
October 2015	2.43	4.23	n/a	n/a	3.52	n/a	n/a	n/a	
November 2015	3.18	4.38	n/a	2.32	3.51	n/a	n/a	n/a	
December 2015	3.33	4.45	n/a	2.32	n/a	n/a	n/a	n/a	

Leachate head levels in Cell 1 in 2015 have been relatively stable during the last 12 months, and similar to previous years. There have been slight increases in some locations within Cell 1 and slight decreases in other areas.

Cell 2 wells were not accessible during any of the monitoring rounds in 2015 due to landfilling operations in close proximity to the wells.

4.3 Leachate Chemistry

During 2015, only LF08_07 (Cell 1) was sampled in Area 2, due to Cell 2 wells being inaccessible. Therefore, the following leachate chemistry relates only to samples from this well.

4.3.1 Ammoniacal Nitrogen

Appendix 3/1 presents the results of Ammoniacal Nitrogen concentrations. Ammoniacal Nitrogen concentrations at LF08_07 have been relatively consistent during 2015 and are indicating a trend of decreasing concentrations with time.

4.3.2 Arsenic

Appendix 3/2 presents the results of Arsenic concentrations over time in leachate in Area 2. Arsenic concentrations in LF08_07 have remained stable in 2015, below 8ug/l.

4.3.3 Benzene and Naphthalene

Appendices 3/3 and **3/4** present the results of Benzene and Naphthalene concentrations in LF08_07 and Cell 2.

Benzene concentrations in LF08_07 are indicating a gradually decreasing trend with concentrations below 5µg/l in 2015.

Naphthalene concentrations in LF08_07 have been recorded below the MDL on all rounds since 2013.

4.3.4 O-Xylene and EPH

Appendices 3/5 and **3/6** present the results of O-Xylene and EPH concentrations in the Area 2 leachate.

O-Xylene concentrations in LF08_07 have been recorded below the MDL since 2013.

EPH concentrations in LF08_07 are generally indicating a gradually decreasing trend and typically below 2000ug/l, with the exception of the sampling round in September 2015 when a concentration spike was recorded at 5940ug/l. The concentration of EPH has since been recorded at 172ug/l in December 2015.

4.3.5 Nickel and Potassium

Appendices 3/7 and **3/8** present the results of Nickel and Potassium concentrations at LF08_07 and Cell 2 since commencement of monitoring.

Both Nickel and Potassium concentrations in LF08_07 indicate a gradually decreasing trend, with recorded concentrations typically below 60ug/l for Nickel and 300ug/l for Potassium.

4.4 Review of Risks and Future Monitoring

The environmental monitoring data for LF08_07 indicates that in general the leachate chemistry in Cell 1 is in a stable condition and that there is therefore no significant increase in risk since the previous

Annual Environmental Review. Many of the data sets indicate steady or generally decreasing trends since Cell 1 was capped.

There is no leachate chemistry data available for Cell 2 in 2015 due to access restrictions to the sampling locations, and we are therefore unable to provide comment on the nature of the leachate composition in Cell 2.

Leachate head levels have been recorded above the target level of 2m above the cell base and NCC are currently working to reduce levels where possible. NCC will continue to monitor (and report) leachate head levels closely and take action where appropriate.

5 External Landfill Gas Monitoring

5.1 Gas Monitoring Locations

There are currently thirteen purpose drilled gas monitoring boreholes present around the perimeter of Area 2. The locations of the boreholes are shown on Figure 2 and coordinates of the gas monitoring points are shown within Table 5.1.

Table 5.1 – Area 2 Landfill Gas Monitoring Boreholes

Monitoring Point	Easting	Northing
GP03_06	331150	185227
GP06_08a	331830	185104
GP05_14	331172	185144
GP05_15	331187	185055
GP05_16	331153	184977
GP05_17	331091	184884
GP09_18	331033	184804
GP05_20	330676	184817
GP05_21	330602	184887
GP05_22	330649	184963
GP12_23	330781	185028
GP06_24	330973	185165
GP06_25	331060	185236

These boreholes all have their response zones situated in the shallow strata (the Alluvial Deposits and the Made Ground above where present). Monitoring started at these boreholes prior to the commencement of landfilling in Cell 1 to enable comparison of the historical (baseline) soil gas regime around the perimeter of the site with the regime once waste disposal operations had commenced.

It should be recognised that wells GP06_24 and GP06_25 are constructed on the Area 2 side of the in-ground barrier installed between Area 1 and Area 2.

5.2 Monitoring Requirements and Compliance Levels

Landfill gas monitoring has generally been undertaken on a monthly basis with reports being produced for the EA quarterly in accordance with Condition 2.10.11 of the PPC Permit.

Compliance Levels for all the Area 2 wells have previously been submitted to and accepted by the EA.

Well specific compliance levels for landfill gas as set out in the PPC Permit are presented in Table 5.2 below.

Table 5.2 – Well Specific Compliance Levels for Landfill Gas Monitoring for Area 2

Well	Methane (%Volume)	Carbon Dioxide (%Volume)
GP03_06	1.0	6.1
GP06_08A	1.0	2.4
GP05_14	1.0	2.2
GP05_15	1.0	10.4
GP05_16	1.0	7.7
GP05_17	1.0	13.5
GP09_18	1.0	19.0
GP05_20	1.5	n/a
GP05_21	1.5	n/a
GP05_22	1.0	8.3
GP06_24	n/a	n/a
GP06_25	n/a	n/a

5.3 External Landfill Gas Monitoring

5.3.1 Methane

Appendices 4/1, 4/2 and 4/3 present the results of Methane concentrations in the Area 2 gas monitoring wells since commencement of monitoring. **Appendix 4/1** indicates that majority of the Area 2 wells did not typically detect Methane above the trigger level of 1%. There have been four exceptions to this, in three monitoring wells in the last 12 months although none of these trigger level exceedances were above 4% methane.

Appendix 4/2 presents the Methane concentrations in GP06_24 and GP06_25, constructed on the Area 2 side of the in-ground barrier installed between Area 1 and Area 2. Methane concentrations have typically fluctuated significantly in GP06_24 since mid-2008 and in GP06_25 since the start of 2012. GP06_24 has recorded a maximum Methane concentration of 93.1%v/v during 2015 and has generally recorded higher Methane concentrations in the last 18 months than previously. GP06_25 typically recorded Methane concentrations in the range 1% to 42% during 2015 which is consistent with the data recorded during the last 4 years.

It is not known why GP06_24 is recording elevated Methane concentrations, however the well response zone is constructed in the lower alluvial deposits, between approximately 3.5mbgl and 6.5mbgl. It is possible therefore that the elevated concentrations may be linked with the generation of natural marsh gas in the Alluvium.

It is not currently known why Methane concentrations in GP06_25 have started fluctuating in the last 4 years.

5.3.2 Carbon Dioxide

Carbon Dioxide concentrations have varied with time since the commencement of the landfill gas monitoring programme in the thirteen Area 2 monitoring wells. The majority of the wells recorded Carbon Dioxide concentrations below the well specific Compliance Levels during 2015, with the exception of a marginal exceedance in GP05_16 in October 2015. Carbon Dioxide graphs showing well specific Compliance Levels are presented in **Appendices 4/4 to 4/15**.

The graphs indicate that in general the data sets all show stable or gradually decreasing trends.

5.4 Review of Risks and Future Monitoring

Adverse trends (rising or uncommonly fluctuating concentrations) have been observed in GP06_24 and GP06_25 (Methane) in the last 12 months, although the range of methane concentrations recorded in GP06_25 is consistent with the overall dataset. No other adverse trends in landfill gas concentrations have been observed. It is considered that ground gas concentrations in these wells should continue to be monitored closely to determine whether these adverse trends continue and whether further investigative or remedial action is required.

The only monitoring location that has consistently recorded significant Methane concentrations is GP06_24. This well is located some considerable distance away from the part of the Area 2 site that has to date been used for waste disposal. The elevated Methane concentrations recorded at GP06_24 were present at the time that the in-ground gas barrier was constructed (separating the Area 1 and Area 2 sites) and may therefore represent background concentrations, or natural marsh gas in the Alluvium.

Landfill gas will continue to be monitored on a monthly basis and gas conditions will continue to be reported to NRW on a quarterly basis in accordance with the PPC Permit.

6 Landfill Gas Generation and Usage

6.1 Landfill Gas Utilisation Plant

Docksway Disposal Site has a Landfill Gas Utilisation Plant, which currently comprises one 1MW Jenbacher (320) engine together with one 1500m³/hr flare. Information from Infinis Energy indicates that the plant capacity was reduced in January 2014, with a 330kW Jenbacher (208) engine removed as a result of a reduction in gas availability at the site.

Infinis Energy are currently responsible for the general running and minor routine maintenance of the gas plant and has provided information to assist in the compilation of this section of the report. The Infinis annual report is presented as **Appendix 5**.

Monitoring of the plant performance and volumes of gas extracted from the gas utilisation plant has been undertaken on a regular basis since 2005 by Novera/Infinis, and the data collected over the last 12 months has been reported directly to NRW.

6.2 Landfill Gas Extraction

In 2015, the total production of energy from the Landfill Gas Utilisation Plant was about 6833MWh with a site efficiency of 33.4%. In 2014 by comparison, the total production of energy was about 6045MWh with a site efficiency of 31.3%. The site efficiency and total energy produced have therefore increased in the last 12 months compared to the previous year.

Engine downtime hours in 2015 were 584, compared to 670 in 2014 which represents a decrease in engine downtime from 2014. Engine operation time in 2015 was 8176 hours which is a slight increase over the 8090 hours in 2014.

The flare only operated in 2015 during periods when the engine was down for maintenance or during a period of excess landfill gas production. The flare was operating for 699 hours during 2015 based on the availability of the engine, compared to 1283 hours in 2014. This is a decrease from 2014 and is potentially due to landfill gas availability.

Environmental Performance Indicators, provided by Infinis Energy, indicate that there has been a slight decrease in Carbon Monoxide emissions in 2015 compared to 2014, and total Oxides of Nitrogen emissions decreased slightly in the same period. Emissions data critically depends on a number of factors including run hours of engines and availability of landfill gas to them, and whilst are presented as EPI they should be treated with caution. The Annual Report provided by Infinis is presented in Appendix 5.

6.3 Monitoring of Extracted Gas

The PPC Permit (LP3135SB) for the gas installation at the site requires that 'emissions to air from the engine stacks, fugitive emissions, and odour are monitored and reported annually'. This data is collated and presented directly to the EA by Infinis Energy.

Flare monitoring is only required if the flare is in operation greater than 10% of the time, in accordance with Condition 58 of the WML. Infinis have indicated that the flare was operational for greater than 10% of the time between April 2014 and April 2015, and therefore emissions testing was carried out and reported directly to NRW.

Monitoring and reporting will continue by Infinis in accordance with the PPC Permit and the WML.

7 Annual Production / Treatment and Performance Parameters

7.1 Annual Production/Treatment

Table 7.1 – Annual production/treatment reported by NCC and Infinis (Landfill gas)

Leachate:	Tonnes/year
Disposed of off-site (Area 2)	12,387
Disposed of to any onsite effluent treatment plant	None
Re-circulated into the waste mass	None
Surface water and/or groundwater:	Cubic metres/year
Disposed of off site	None
Disposed of to any onsite effluent treatment plant	None
Landfill Gas: (Whole site)	Normalised cubic metres/year
Combustion in flares	297,122
Combustion in gas engines	3,475,352
Other methods of gas utilisation	None

7.1 Performance Parameters

Table 7.2 – Performance parameters reported by NCC (Whole site)

Parameter	Frequency of Assessment	Annual Total	Unit
Potable Water Use	Annually	5,500	Cubic metres
Energy Used (including for leachate treatment, Excluding electricity generated)	Annually	141,844	kWh of electricity
Non Potable Water Use	Annually	0	Cubic metres

7.2 Topographic Surveys

The topographical surface of Area 2 of Docksway Disposal Site was surveyed during January 2016 and the results of the survey are presented in **Figure 3**.

It has been calculated by NCC that 74,745 m³ of waste was placed in Cell 2 in 2015. As of January 2016, the total waste volume deposited in Area 2 was 786,127m³.

8 Conclusions

8.1 Assessment of Environmental Performance Trends

This document reviews the environmental data from the last 12 months and also provides an indication of data trends both over the last 12 months and since the various monitoring programmes commenced.

Surface water monitoring indicates generally relatively stable trends since the previous Environmental Performance Review, with no significant adverse trends developing. SW25 and SW26 have generally performed within the discharge consent limits in the last 12 months. It is considered that there has been no significant deterioration of surface water quality in the last 12 months.

Data from the groundwater monitoring wells in Area 2 indicate generally stable trends in the groundwater chemistry since the previous Environmental Performance Review, with only occasional exceedances of the compliance limits in the last 12 months. It is considered that remedial action is not required for any of these compliance wells at the current time, and that these compliance wells should be closely monitored in the next 6 to 12 months to determine whether there are continued exceedances or adverse trends developing.

Leachate levels in Cell 1 have been recorded above the trigger level of 2m above the cell base (up to 5m above cell base) in the last 12 months, and it is recommended that active leachate management continues as appropriate.

The Environmental monitoring data for LF08_07 indicates that in general the leachate chemistry is in a steady state condition and that there is therefore no significant increase in risk since the previous Annual Environmental Review.

There is no leachate chemistry data available for Cell 2 as the wells were inaccessible during the monitoring period.

Landfill gas concentrations around Area 2 are indicating generally stable trends, although concentrations of methane appear to be rising in GP06_24 and GP06_25 and the reasons for this are currently unknown although GP06_25 may be picking up methane from naturally occurring sources. These wells will continue to be monitored.

8.2 Future Monitoring Requirements

It is intended that the Docksway Disposal Site Area 2 monitoring programmes shall continue in line with the Permit requirements (and as approved by NRW), providing data which will enable the ongoing assessment of the environmental performance of the site and the provision of environmental performance reports on an annual basis.

9 References

- [1] PBA (2011) Docksway Disposal Site, Newport. 2011 Monitoring Plan for Area 1. Peter Brett Associates, August 2011.
- [2] PBA (2004). Docksway Disposal Site, Newport. Monitoring Plan for Area 2: Landfill Extension. Peter Brett Associates LLP report reference 14739/010B/CBH. October 2004.
- [3] PBA (2010) Docksway Disposal Site, Newport. Review of the Hydrogeological Risk Assessment for Area 2. Peter Brett Associates, December 2010.

10 Guidance for Readers of the Report

This report has been prepared within an agreed timeframe and to an agreed budget that will necessarily apply some constraints on its content and usage. The remarks below are presented to assist the reader in understanding the context of this report and any general limitations or constraints. If there are any specific limitations and constraints they are described in the report text.

- 1 The opinions and recommendations expressed in this report are based on statute, guidance, and appropriate practice current at the date of its preparation. Peter Brett Associates LLP (PBA) does not accept any liability whatsoever for the consequences of any future legislative changes or the release of subsequent guidance documentation, etc. Such changes may render some of the opinions and advice in this report inappropriate or incorrect and we will be pleased to advise if any report requires revision due to changing circumstances, especially those over one year old. Following delivery of any report PBA has no obligation to advise the Client or any other party of such changes or their repercussions.
- 2 Some of the conclusions in this report may be based on third party data. No guarantee can be given for the accuracy or completeness of any of the third party data used.
- 3 The conclusions and recommendations made in this report and the opinions expressed are based on the information reviewed and/or the ground conditions encountered in exploratory holes and the results of any field or laboratory testing undertaken. There may be ground conditions at the site that have not been disclosed by the information reviewed or by the investigative work undertaken. Such undisclosed conditions cannot be taken into account in any analysis and reporting.
- 4 It should be noted that groundwater levels, groundwater chemistry, surface water levels, surface water chemistry, soil gas concentrations and soil gas flow rates can vary due to seasonal, climatic, tidal and manmade effects.
- 5 This report has been written for the sole use of the Client stated at the front of the report. This report shall not be relied upon or transferred to any other party without the express written authorisation of PBA. Any such party relies upon the report at its own risk.
- 6 The interpretation carried out in this report is based on scientific and engineering appraisal carried out by suitably experienced and qualified technical consultants based on the scope of our engagement. We have not taken into account the perceptions of, for example, banks, insurers, other funders, lay people, etc., unless the report has been prepared specifically for that purpose. Advice from other specialists may be required such as the legal, planning and architecture professions, whether specifically recommended in our report or not.
- 7 Public or legal consultations or enquiries, or consultation with any Regulatory Bodies (such as Natural Resources Wales, Natural England or Local Authority) have taken place only as part of this work where specifically stated.

Figures

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Site Grid Reference: ST 309 852

Client
NEWPORT CITY COUNCIL

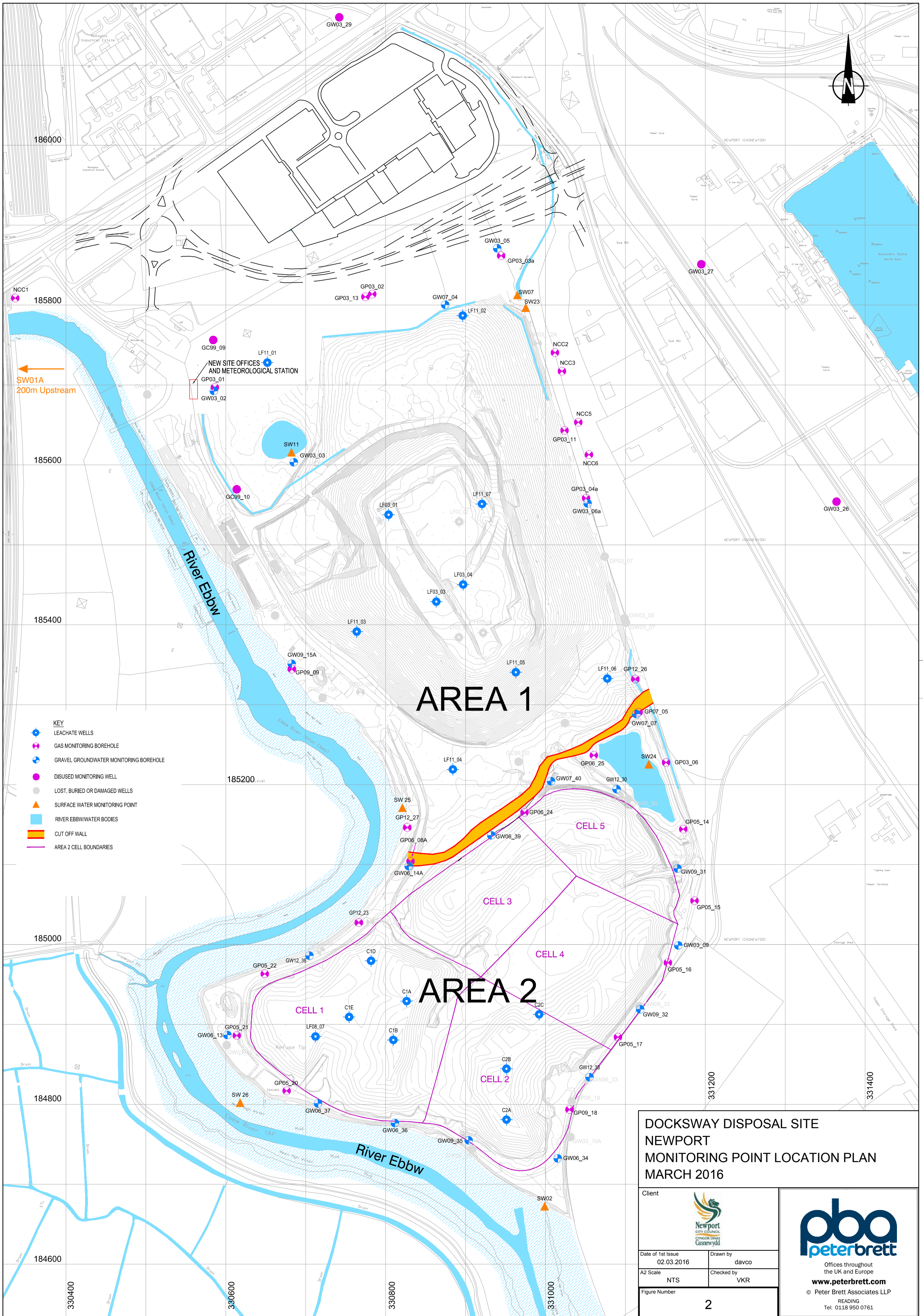
Contains Ordnance Survey data © Crown copyright and database right 2014.

**DOCKSWAY DISPOSAL SITE
 NEWPORT**

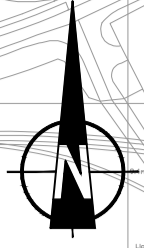
SITE LOCATION PLAN

Date	01.04.2015
A4 Scale	1:50 000
Drawn by	davco
Checked by	VKR
Revision	0

FIGURE 1



186000
185800
185600
185400
185200
185000
184800
184600





- KEY**
- LEACHATE WELLS
 - GAS MONITORING BOREHOLE
 - GRAVEL GROUNDWATER MONITORING BOREHOLE
 - DISUSED MONITORING WELL
 - LOST, BURIED OR DAMAGED WELLS
 - ▲ SURFACE WATER MONITORING POINT
 - RIVER EBBW WATER BODIES
 - CUT OFF WALL
 - AREA 2 CELL BOUNDARIES

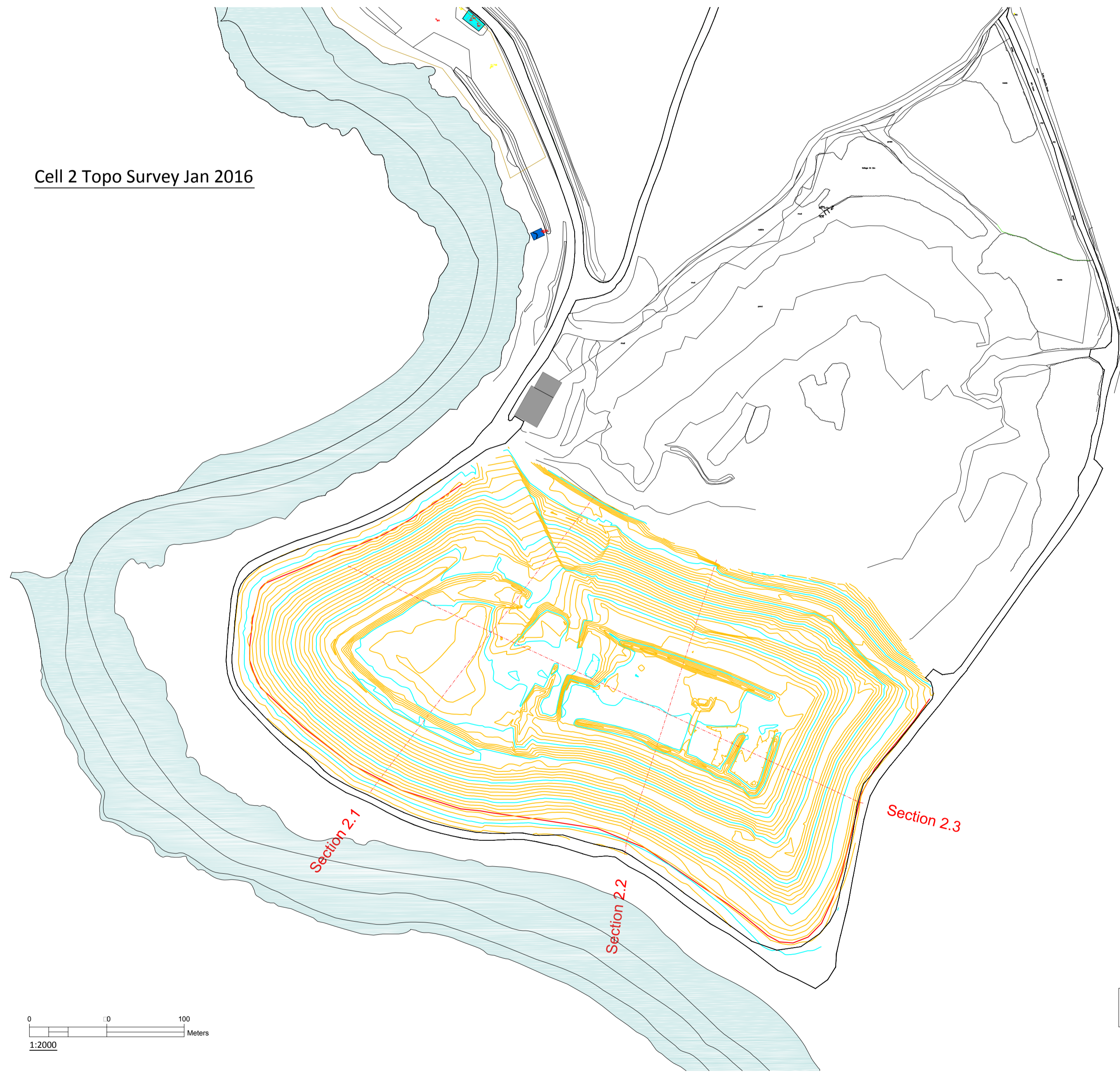
AREA 1

AREA 2

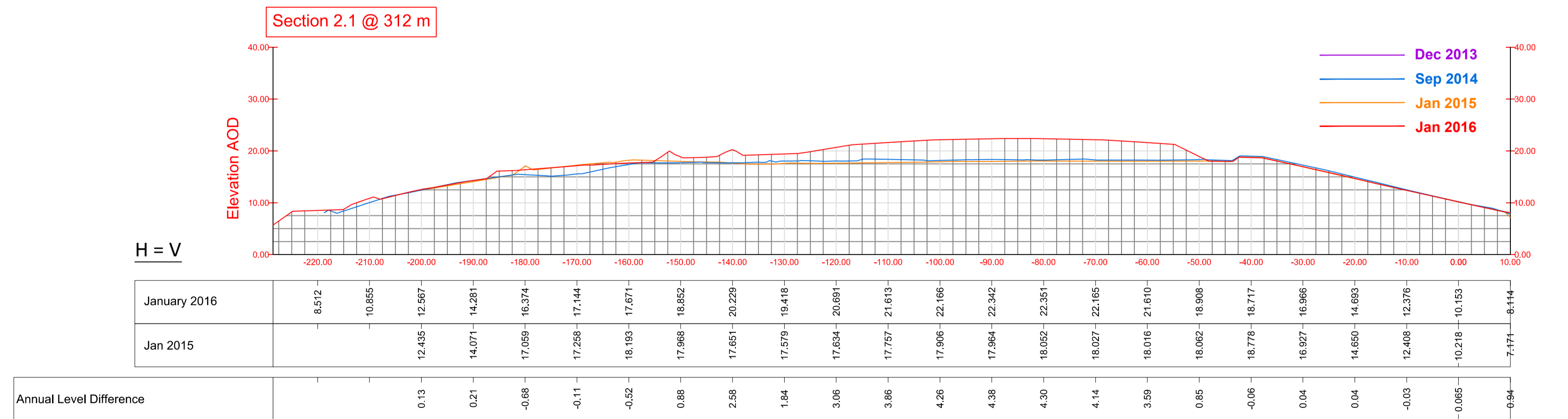
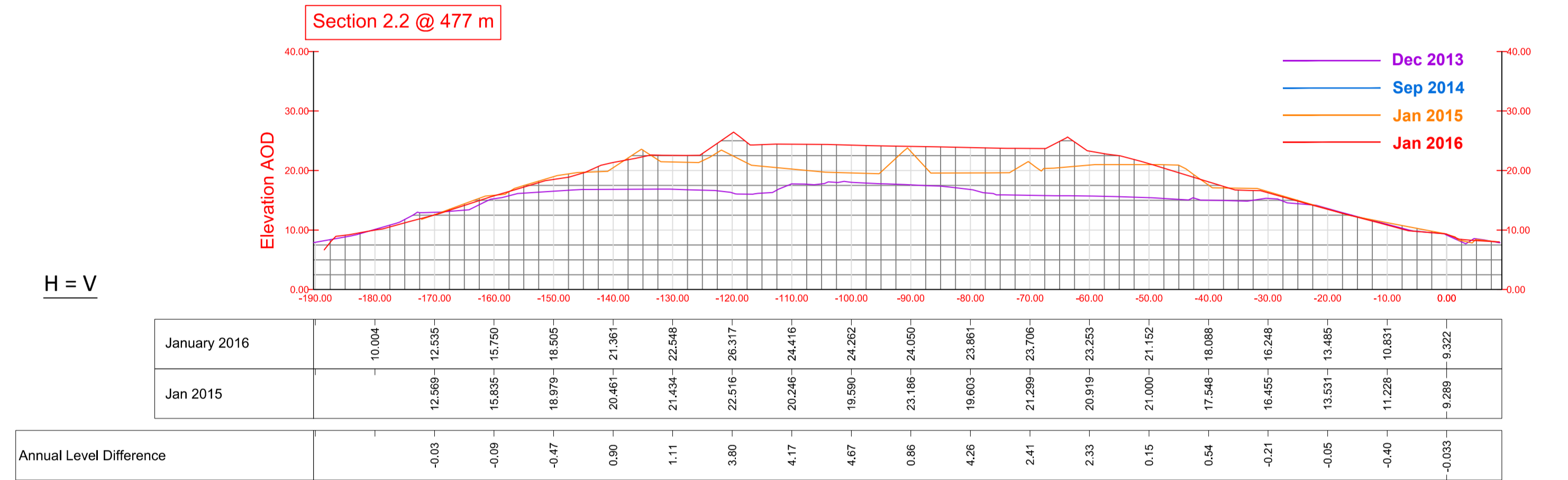
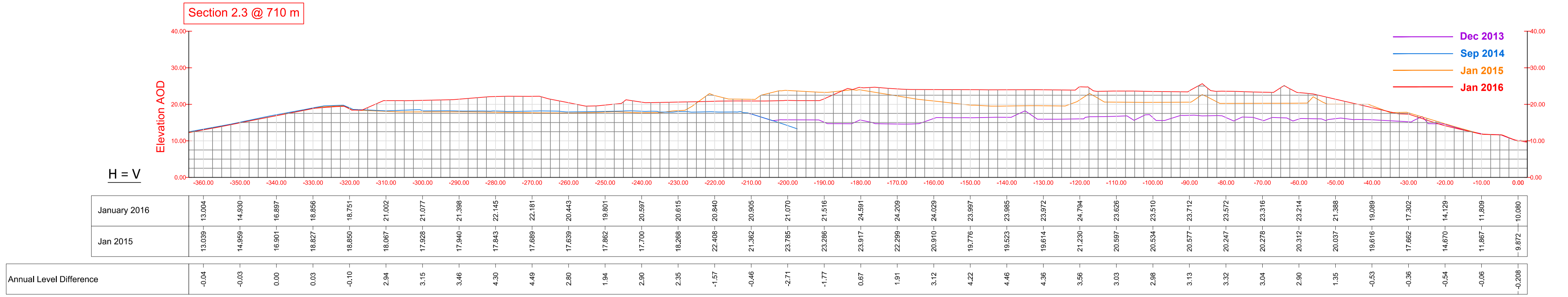
**DOCKSWAY DISPOSAL SITE
NEWPORT
MONITORING POINT LOCATION PLAN
MARCH 2016**

Client		 Newport City Council Casnewydd
Date of 1st Issue	Drawn by	
A2 Scale	Checked by	
Figure Number		
		 Offices throughout the UK and Europe www.peterbrett.com © Peter Brett Associates LLP READING Tel: 0118 950 0761

2



Cell 2 Topo Survey Jan 2016



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Docksway Waste Disposal Site		
Cells 1 & 2 Volume Summary 2016		
Period	Inlet Volume (m ³)	Cumulative Volume (m ³)
Jan 2016 to Jan 2017	113,200	113,200
Jan 2017 to Jan 2018	612,000	725,200
Total Waste Disposed 2016	612,000	612,000

Rev	Details	Dr	Ch	A.I.	Date

Streetscene
 Andrew Morris CEng, MICE
 Head of Streetscene
 Newport City Council
 Civic Centre, Newport
 South Wales, NP20 4UR.
 Telephone: 01633 656656
 Email: streetscene@newport.gov.uk



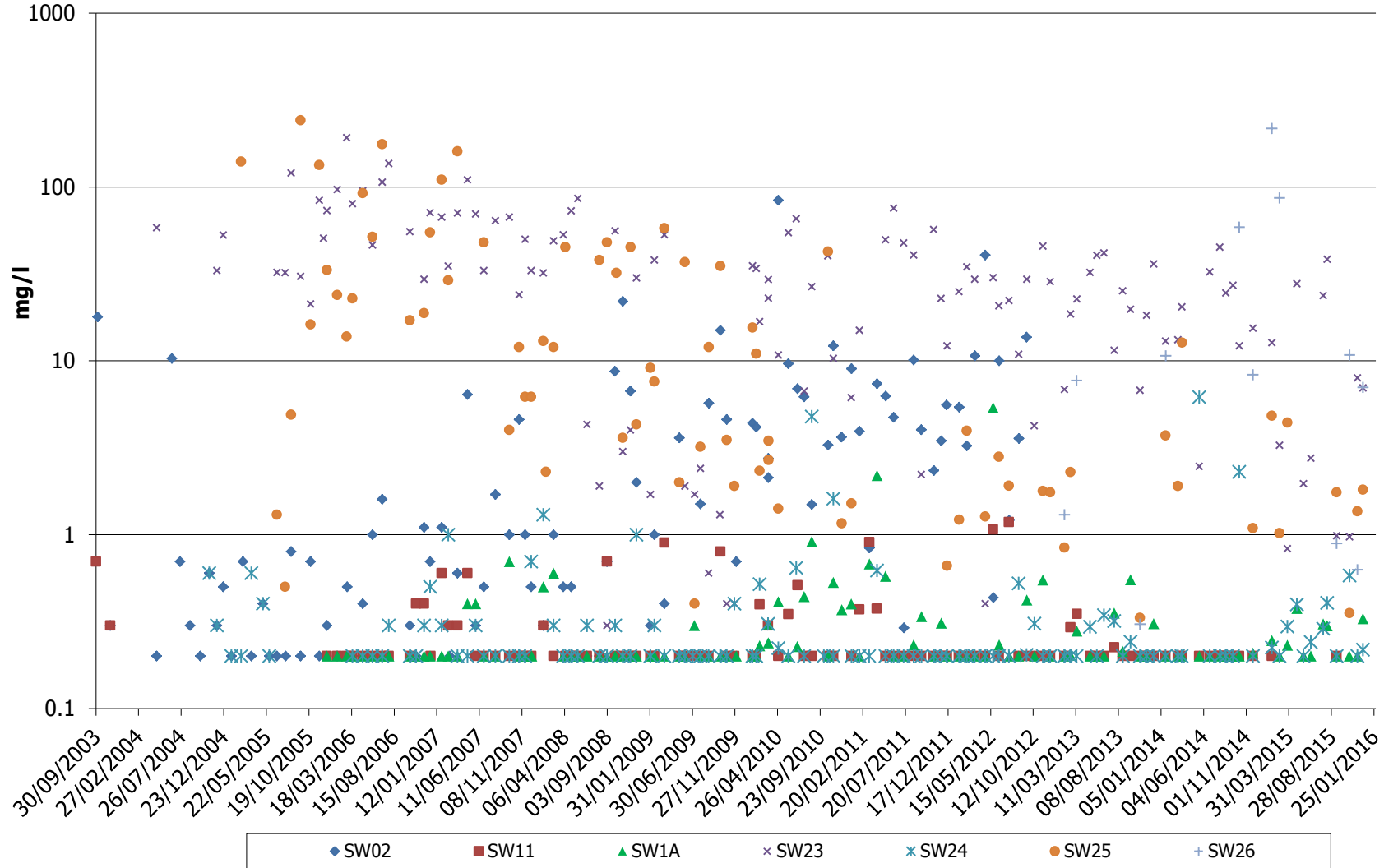
Project
 Docksway Waste Disposal Site
 Cells 1 & 2 TOPO Survey January 2016
 Cell 2 Waste Levels January 2016 to January 2016

File No. NA1016	Status For Consultation
Drawn by MDH	Checked by A.I.
Date Jan 2016	Date
Scales 1:2000	
Drawing No. 1016-C2-AEPR 2016	

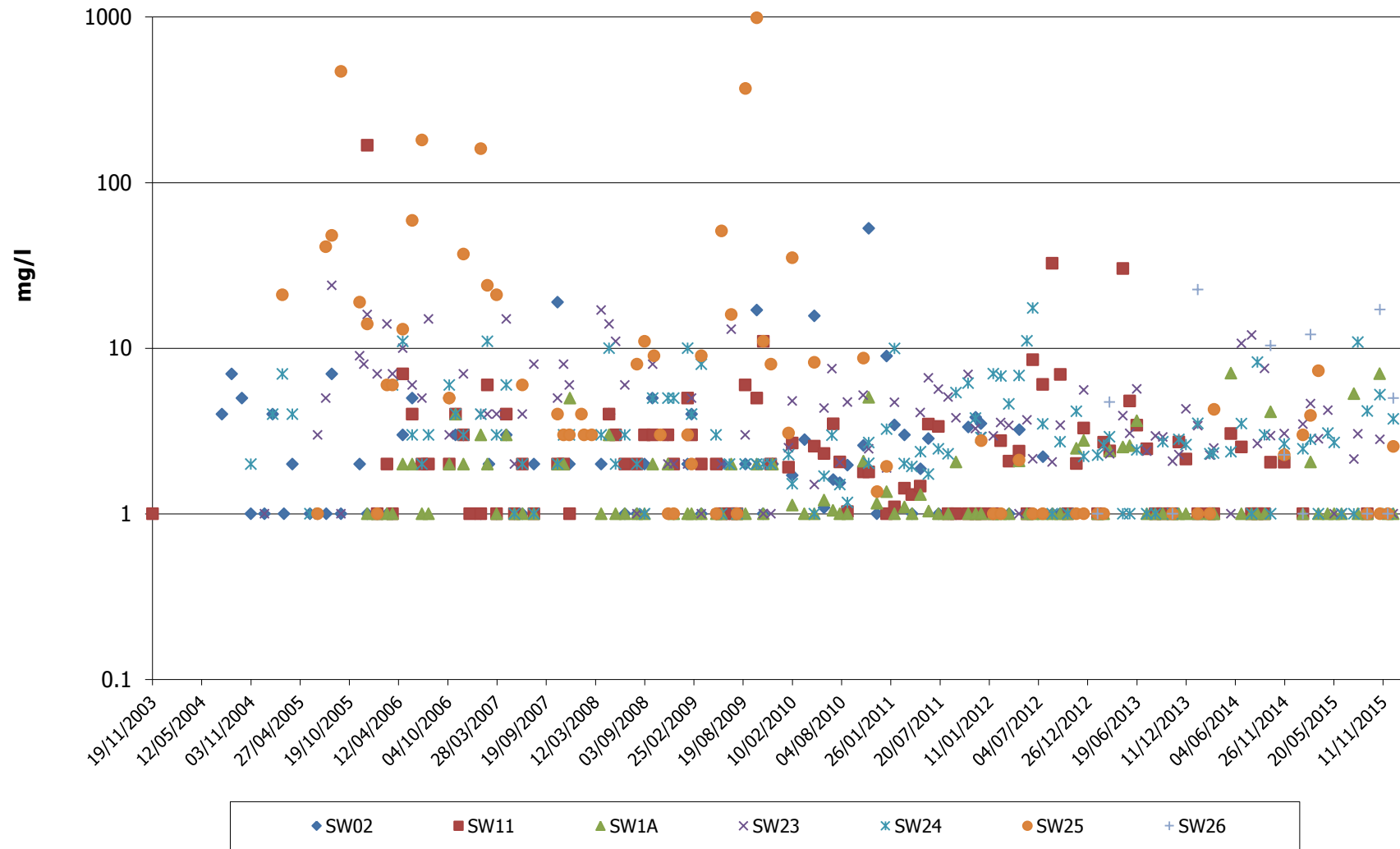
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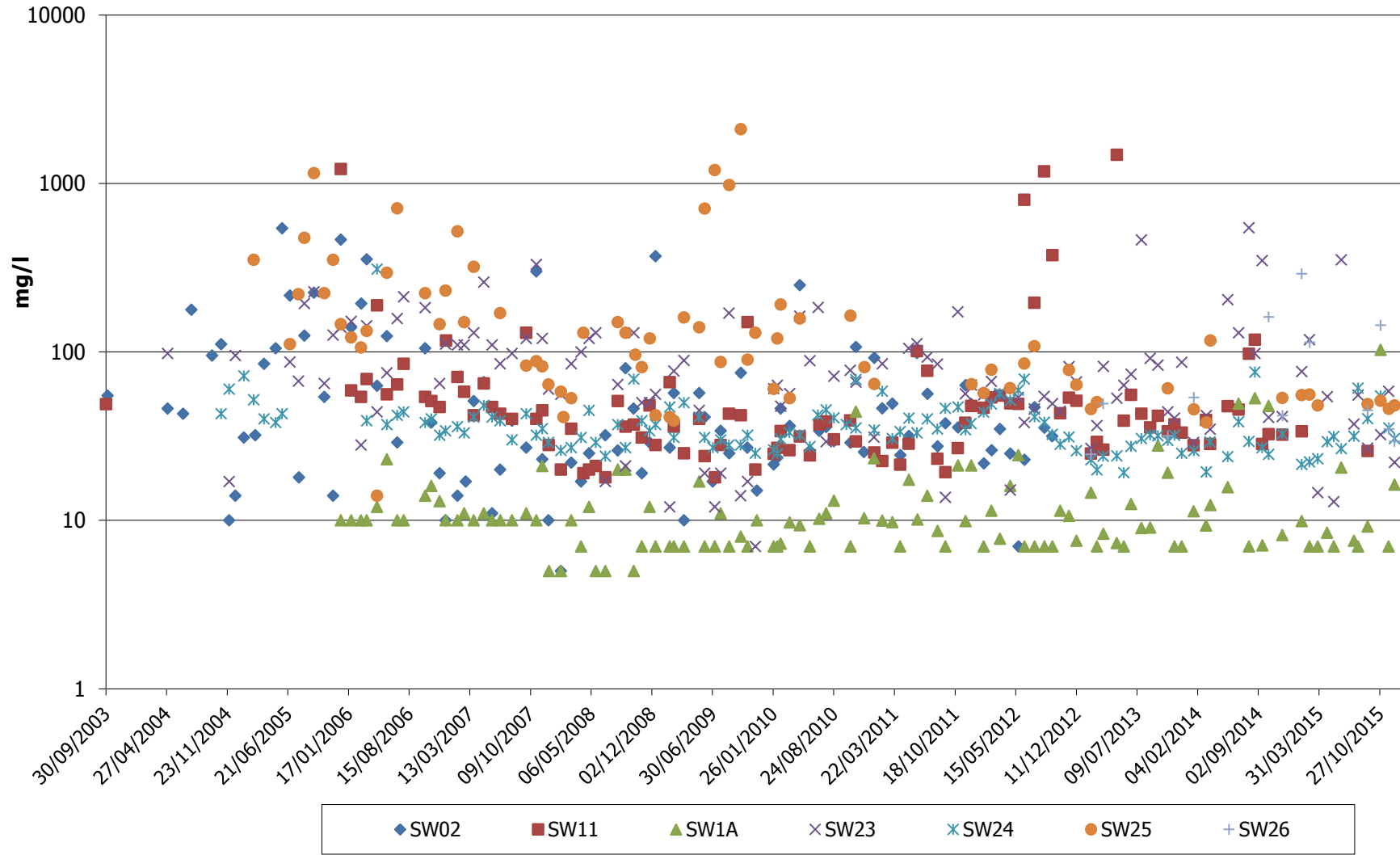
Appendix 1/1
Docksway Disposal Site - Ammoniacal Nitrogen in Surface Water



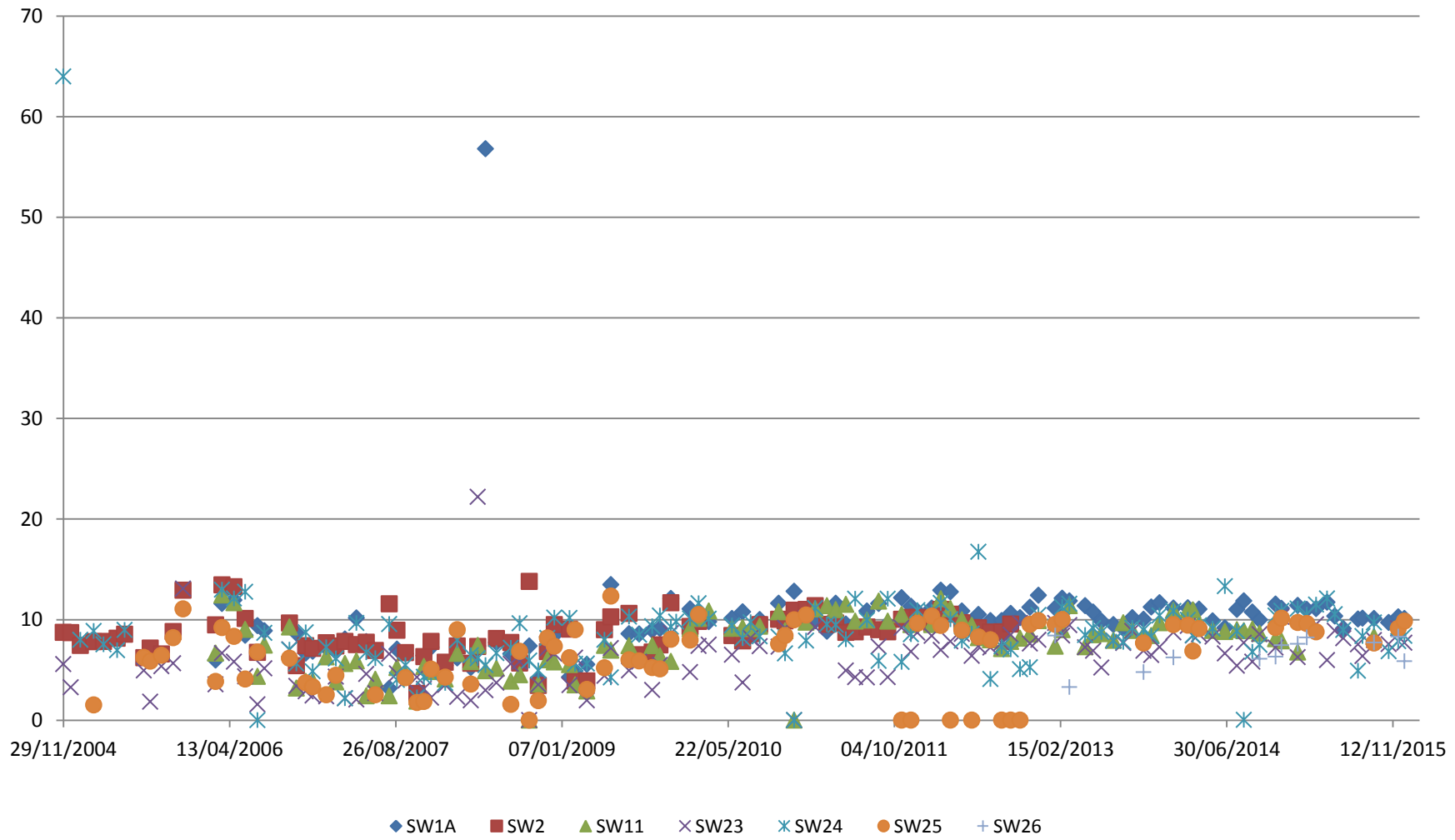
Appendix 1/2
Dockway Disposal Site - Biochemical Oxygen Demand in Surface Water



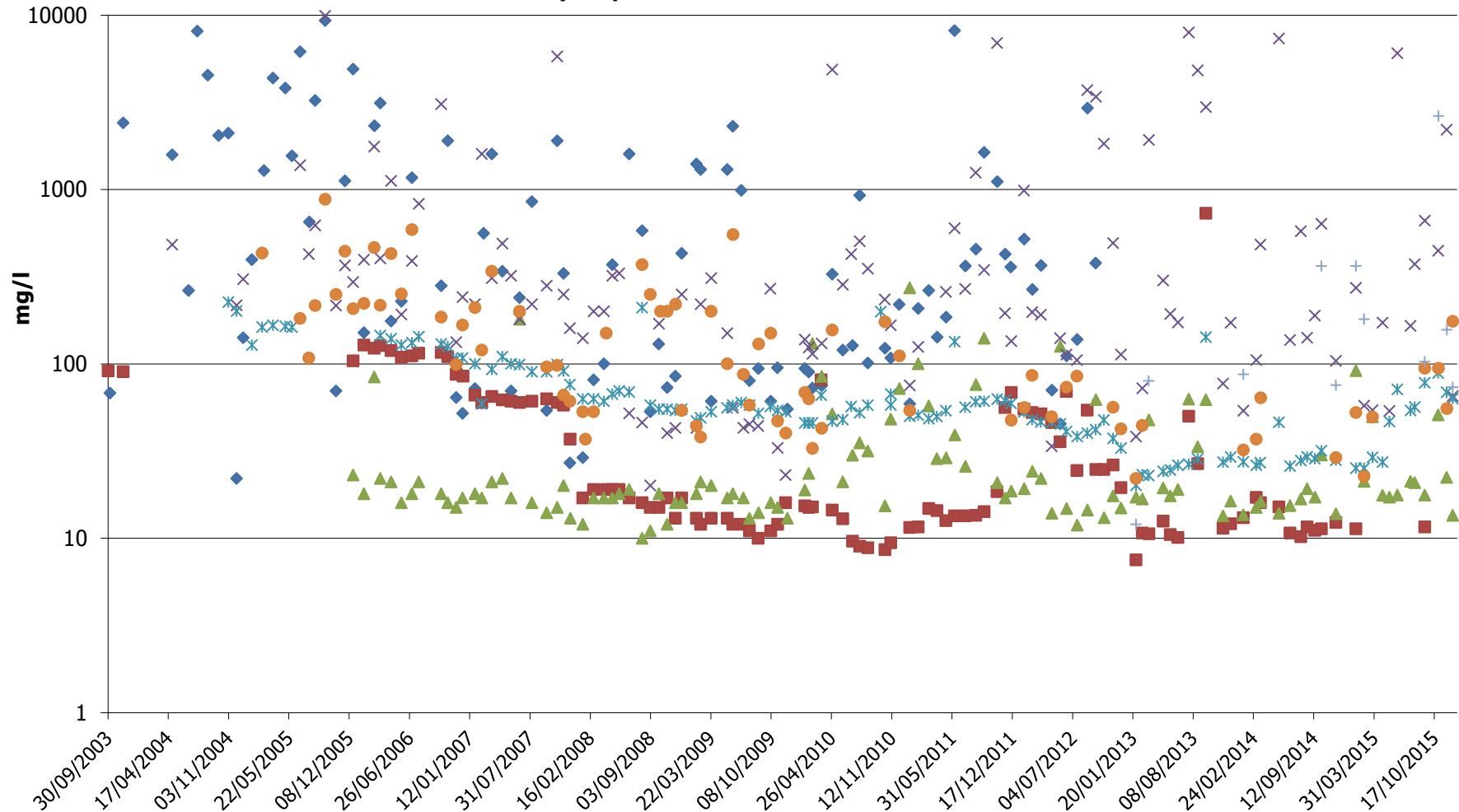
Appendix 1/3
Docksway Disposal Site - Chemical Oxygen Demand in Surface Water



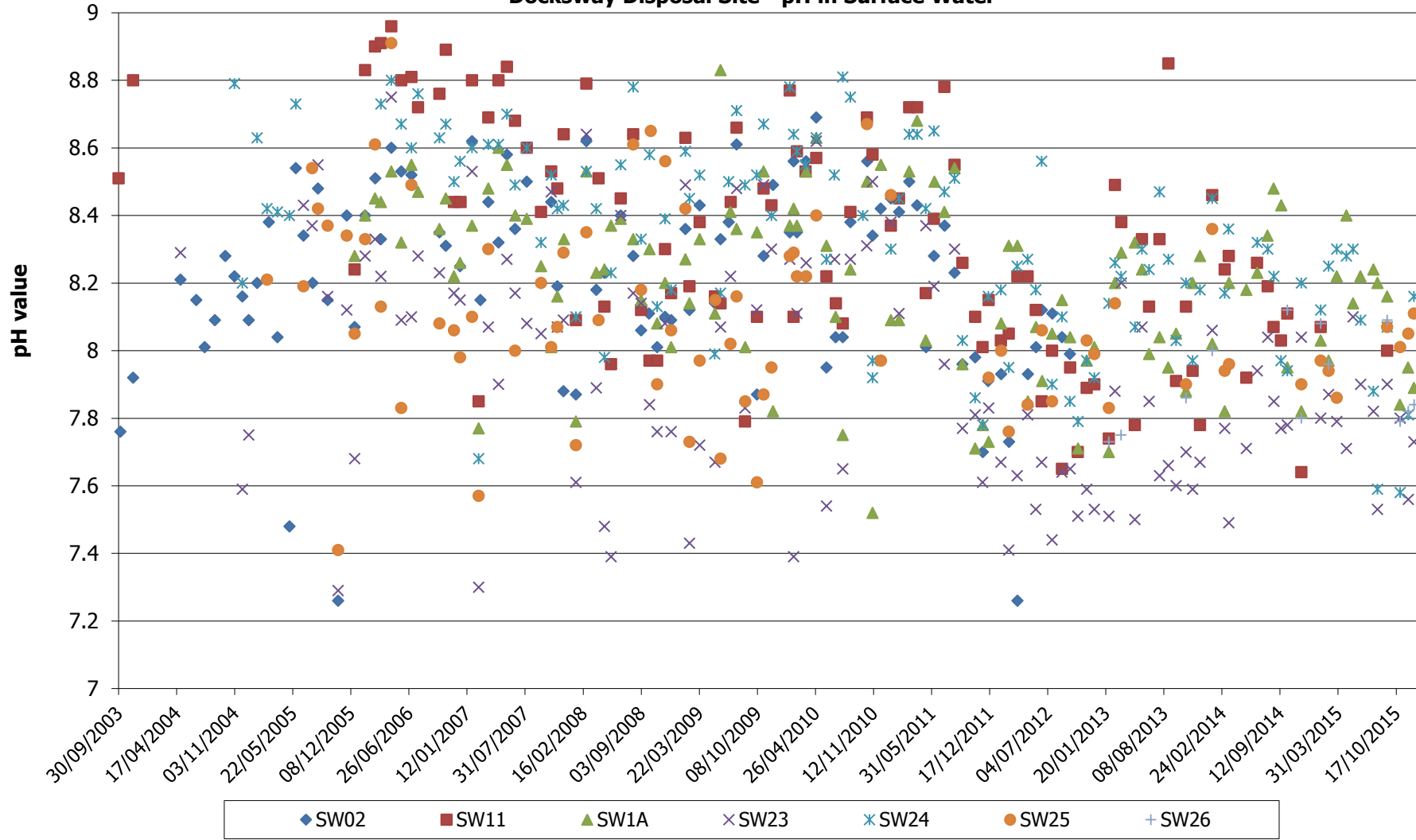
Appendix 1/4
Docksway Disposal Site - Dissolved Oxygen in Surface Water (mg/l)



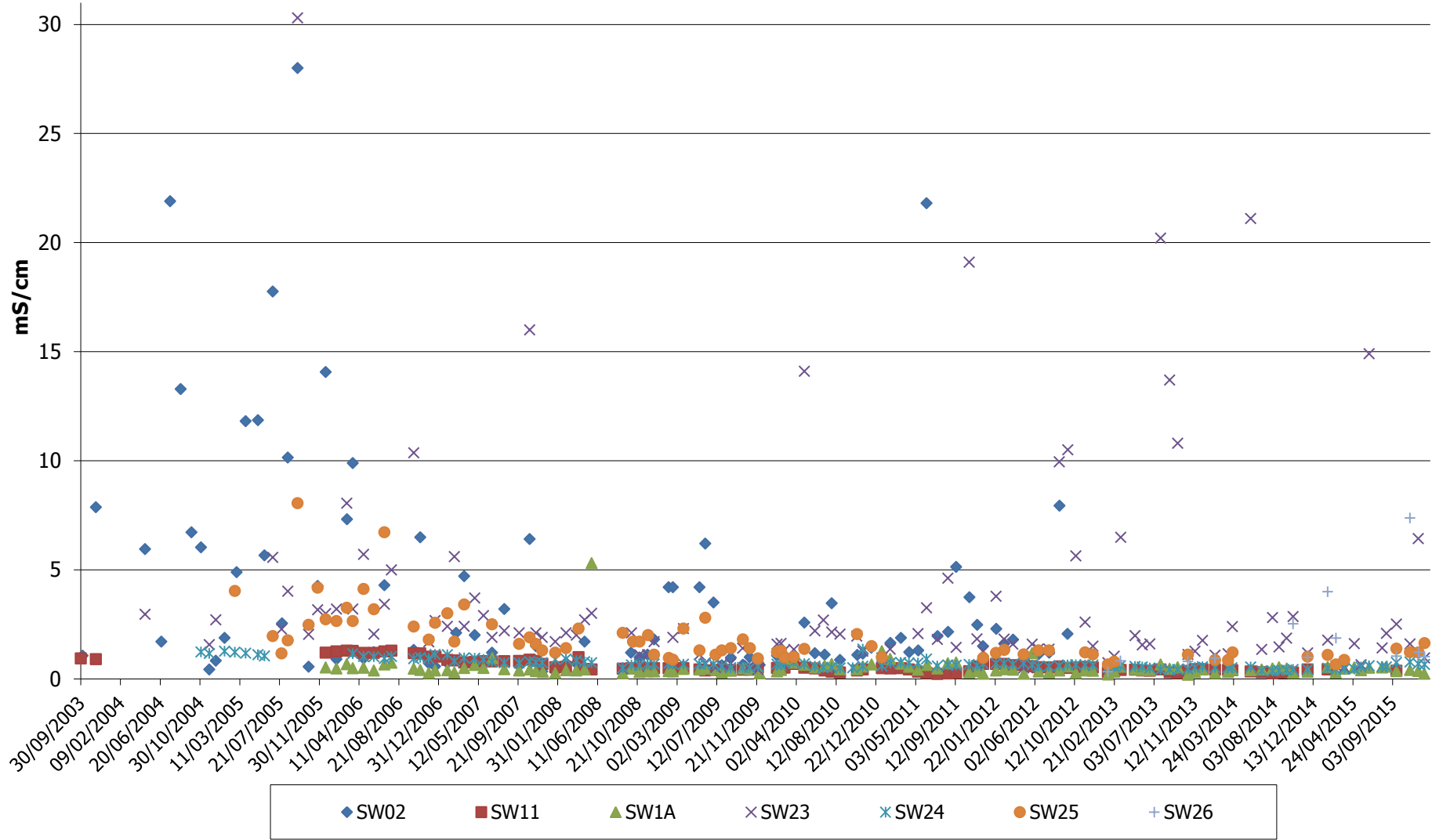
Appendix 1/5
Dockway Disposal Site - Chloride in Surface Water



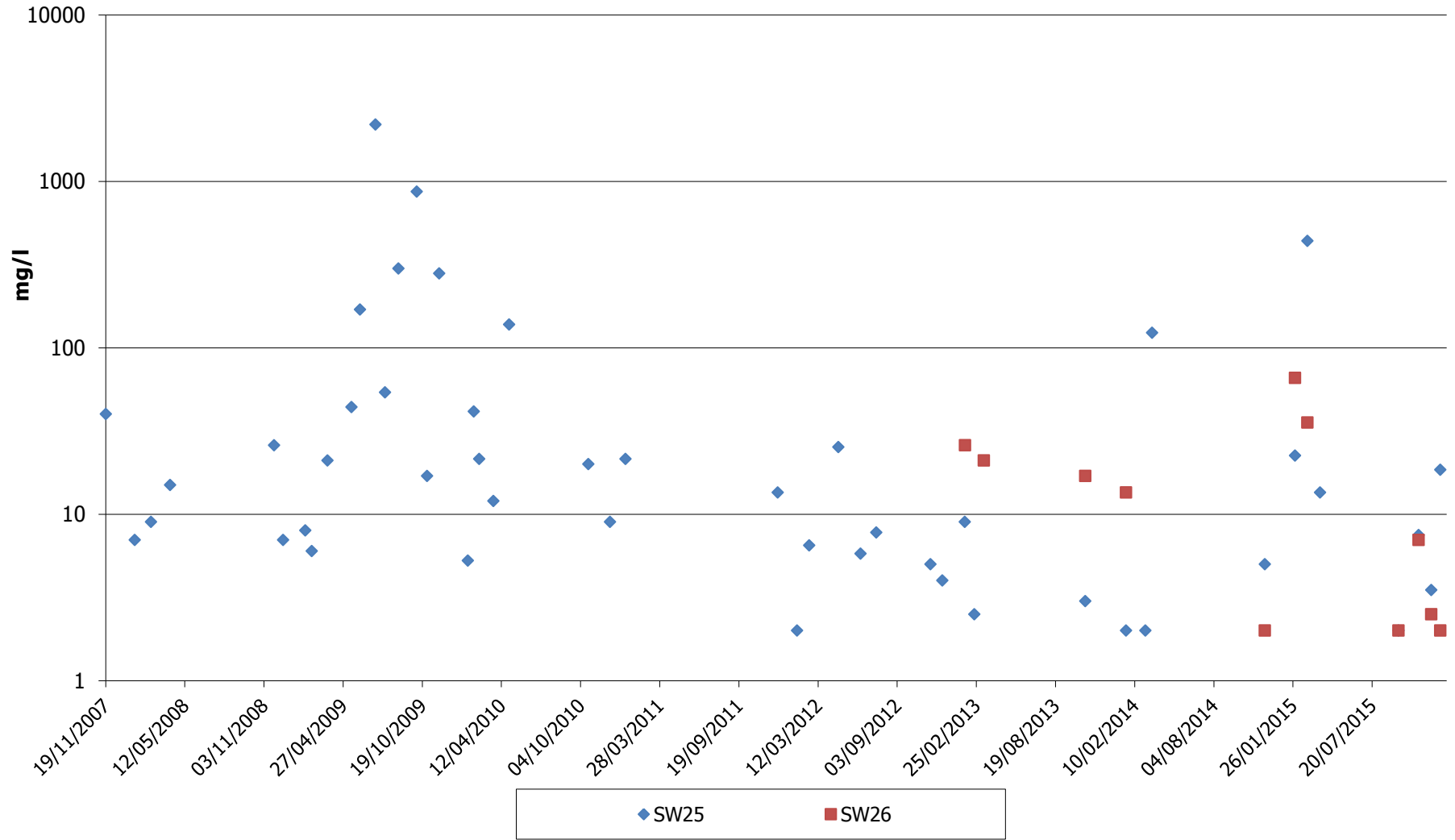
Appendix 1/6
Docksway Disposal Site - pH in Surface Water



Appendix 1/7
Docksway Disposal Site - Electrical Conductivity in Surface Water



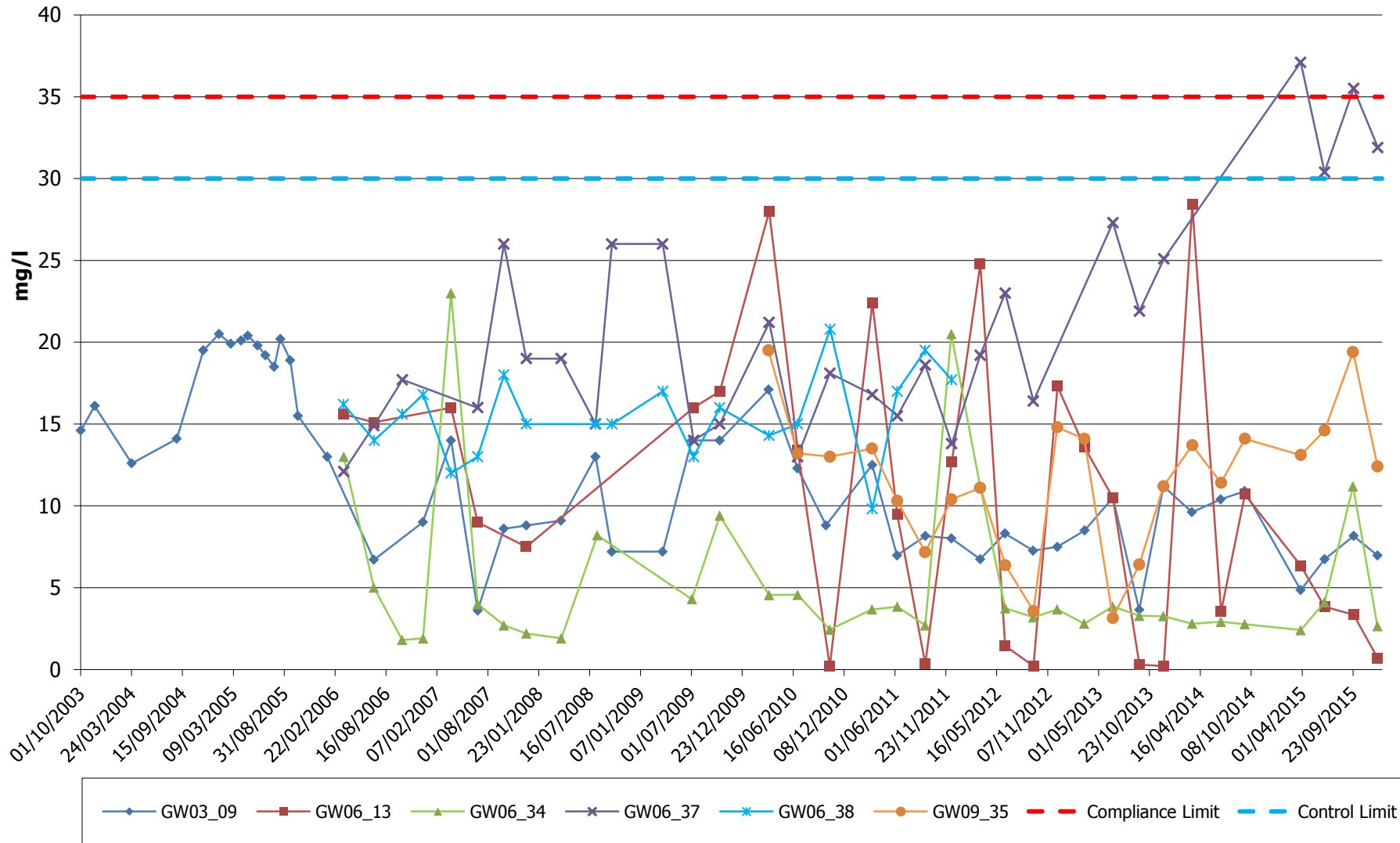
Appendix 1/8
Docksway Disposal Site - Total Suspended Solids in Surface Water



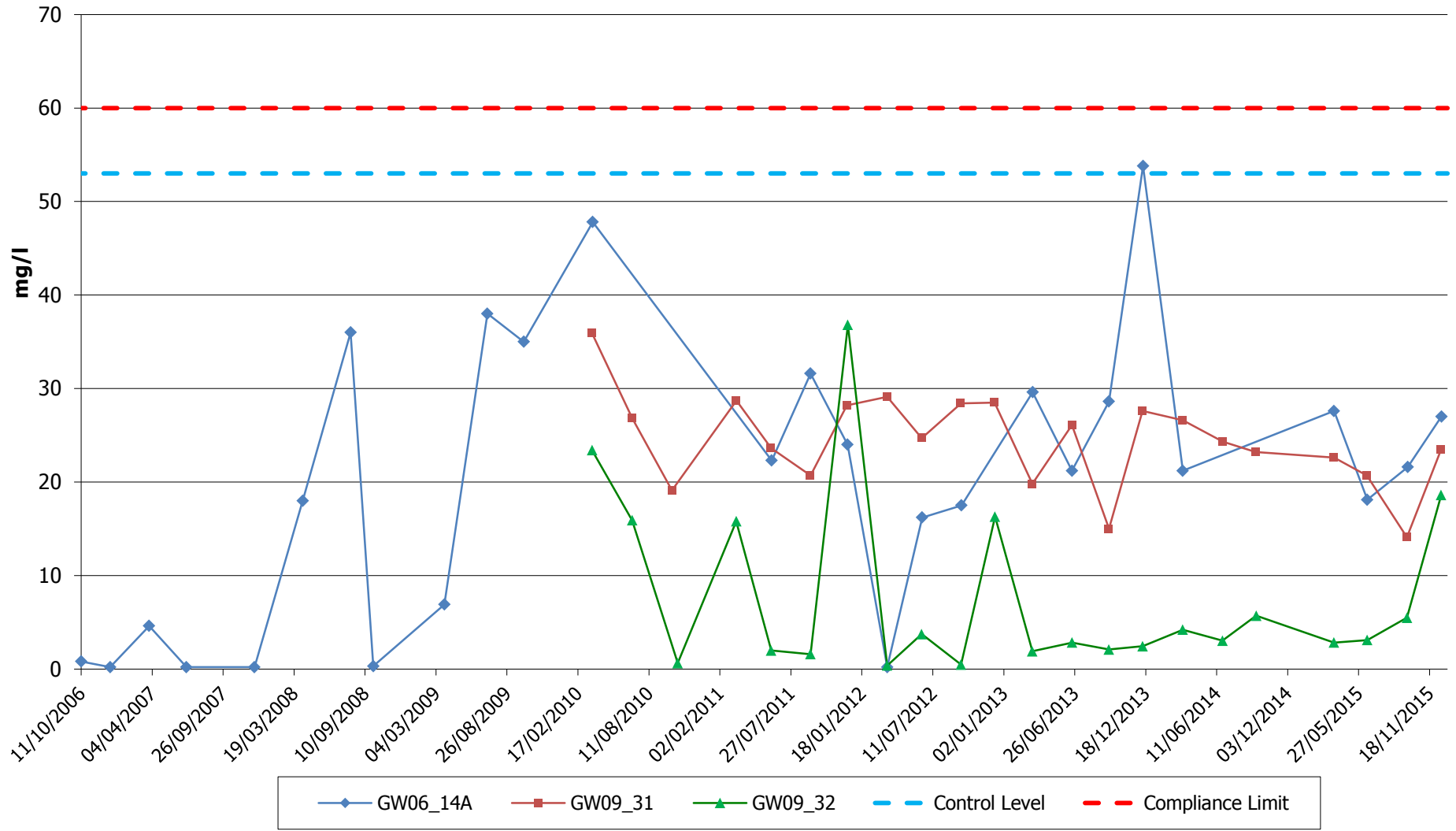
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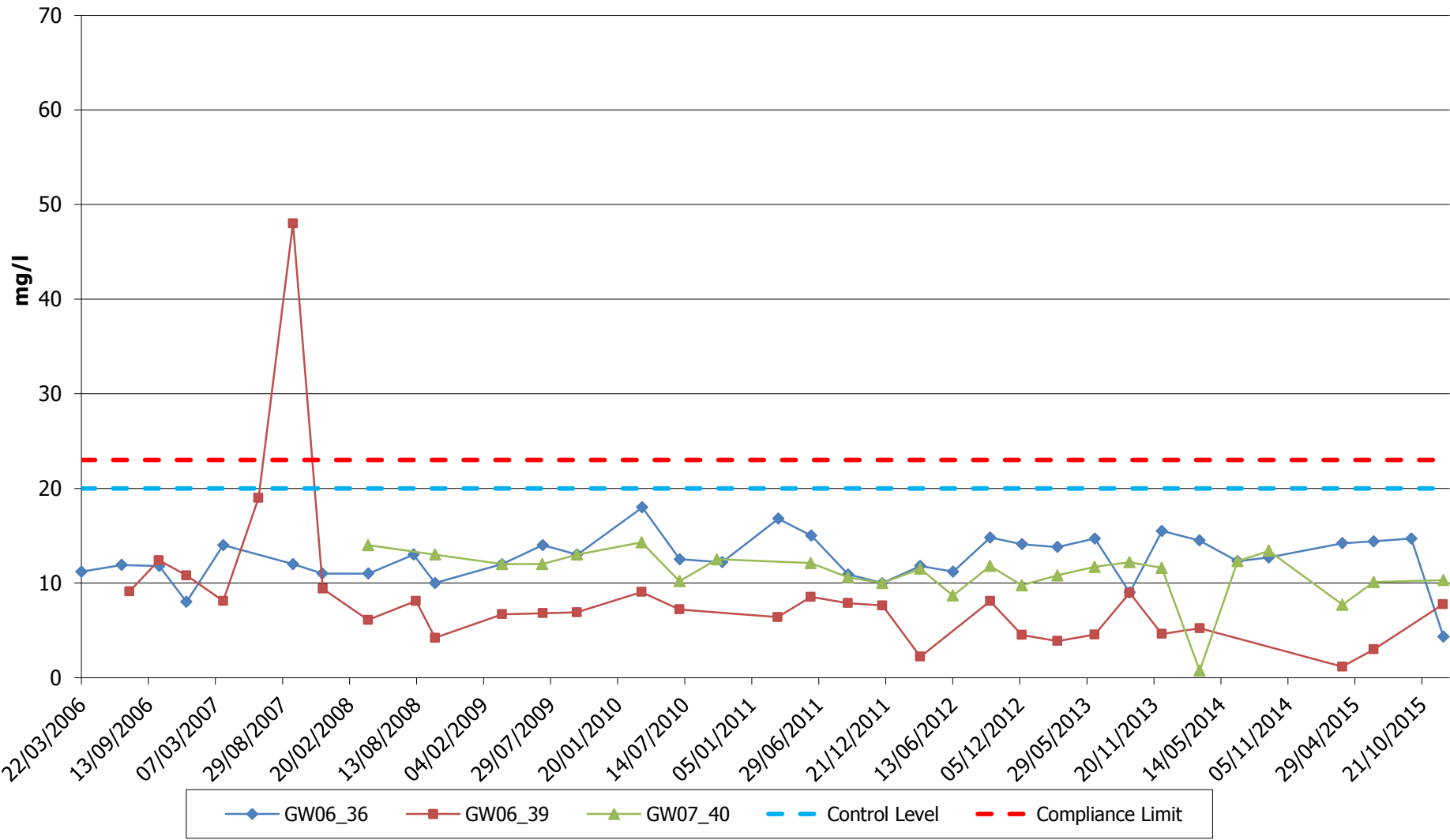
**Appendix 2/1
Docksway Disposal Site - Ammoniacal Nitrogen in Groundwater**



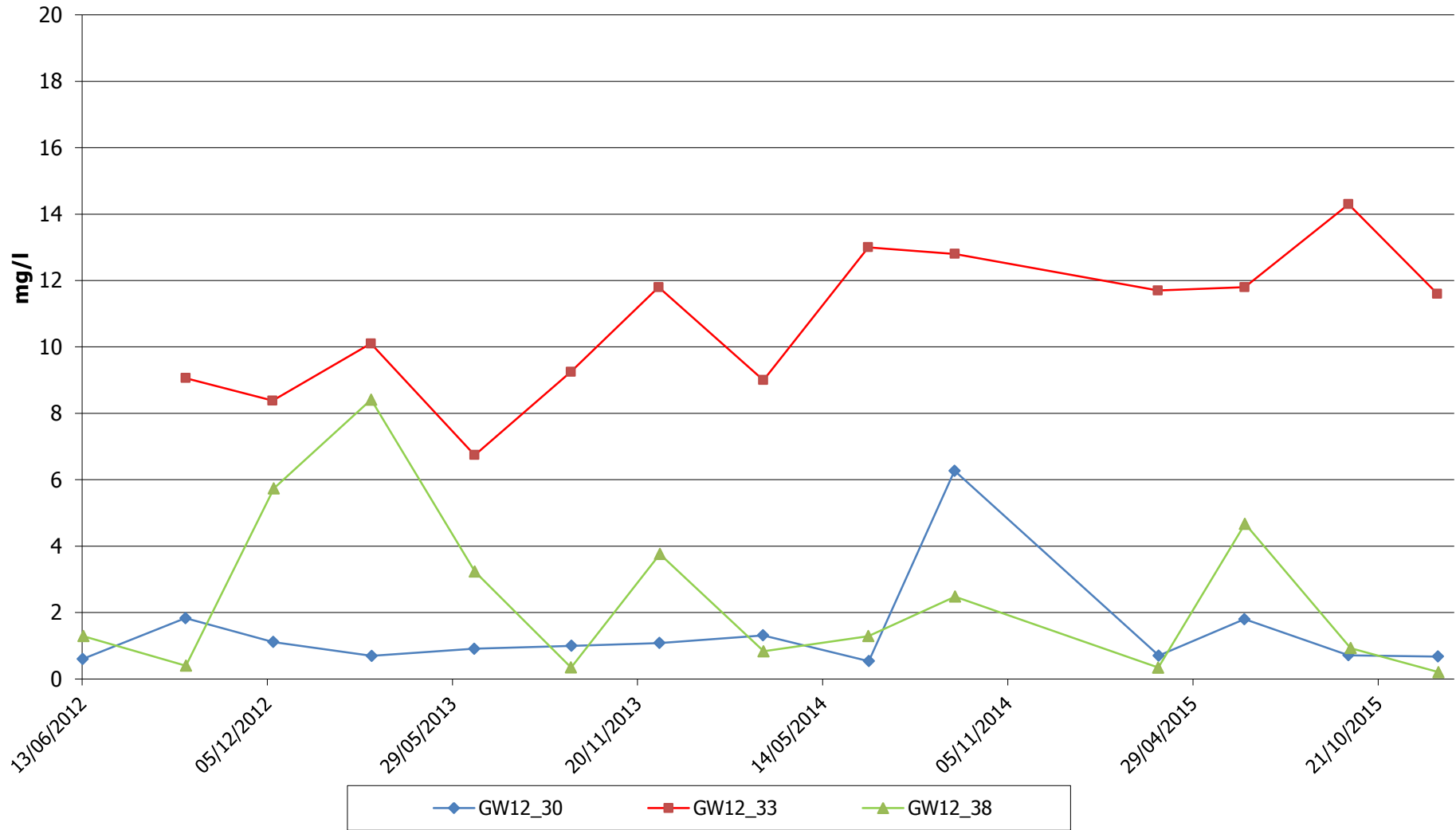
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Docksway Disposal Site - Ammoniacal Nitrogen in Groundwater



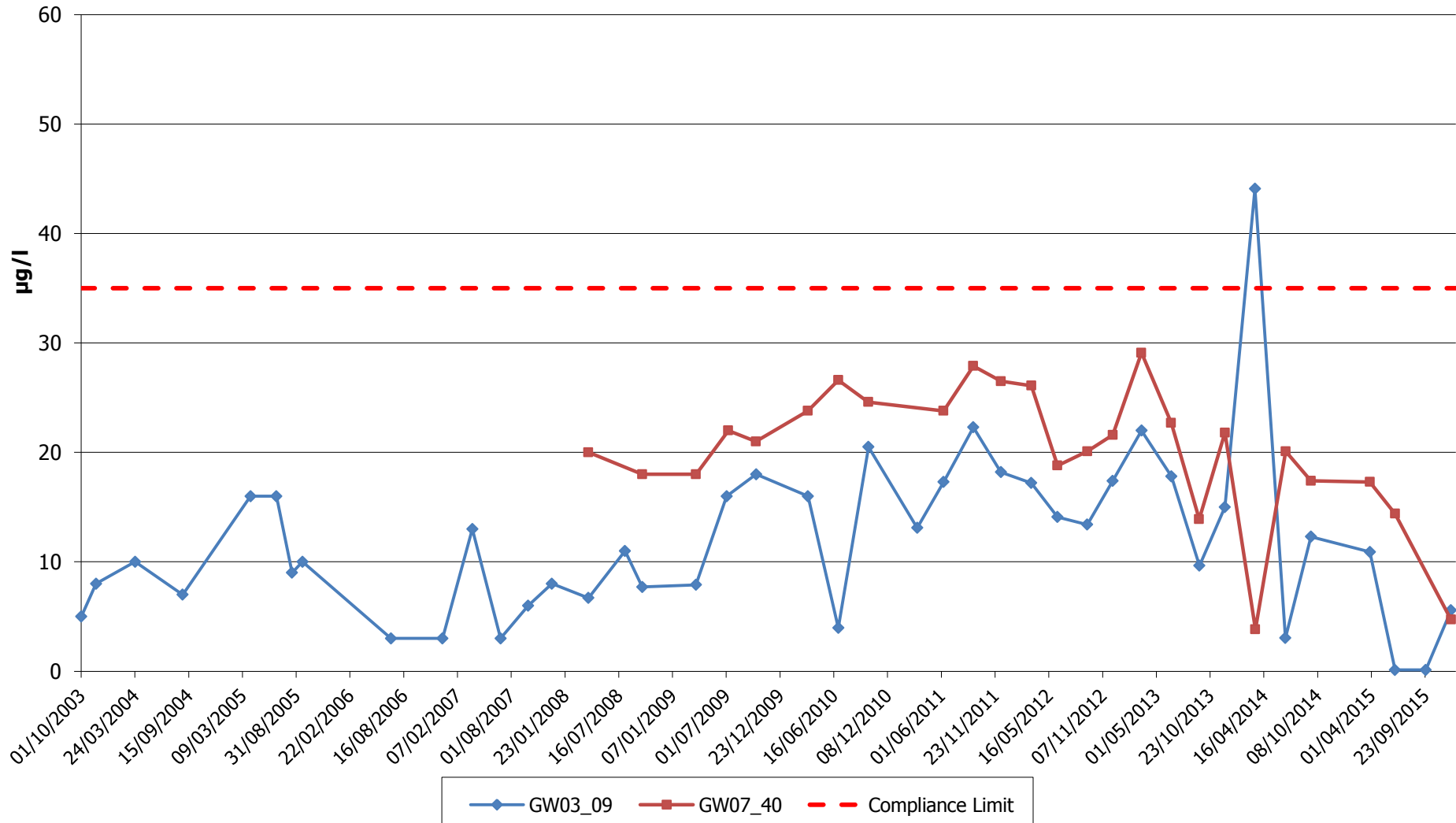
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Docksway Disposal Site - Ammoniacal Nitrogen in Groundwater



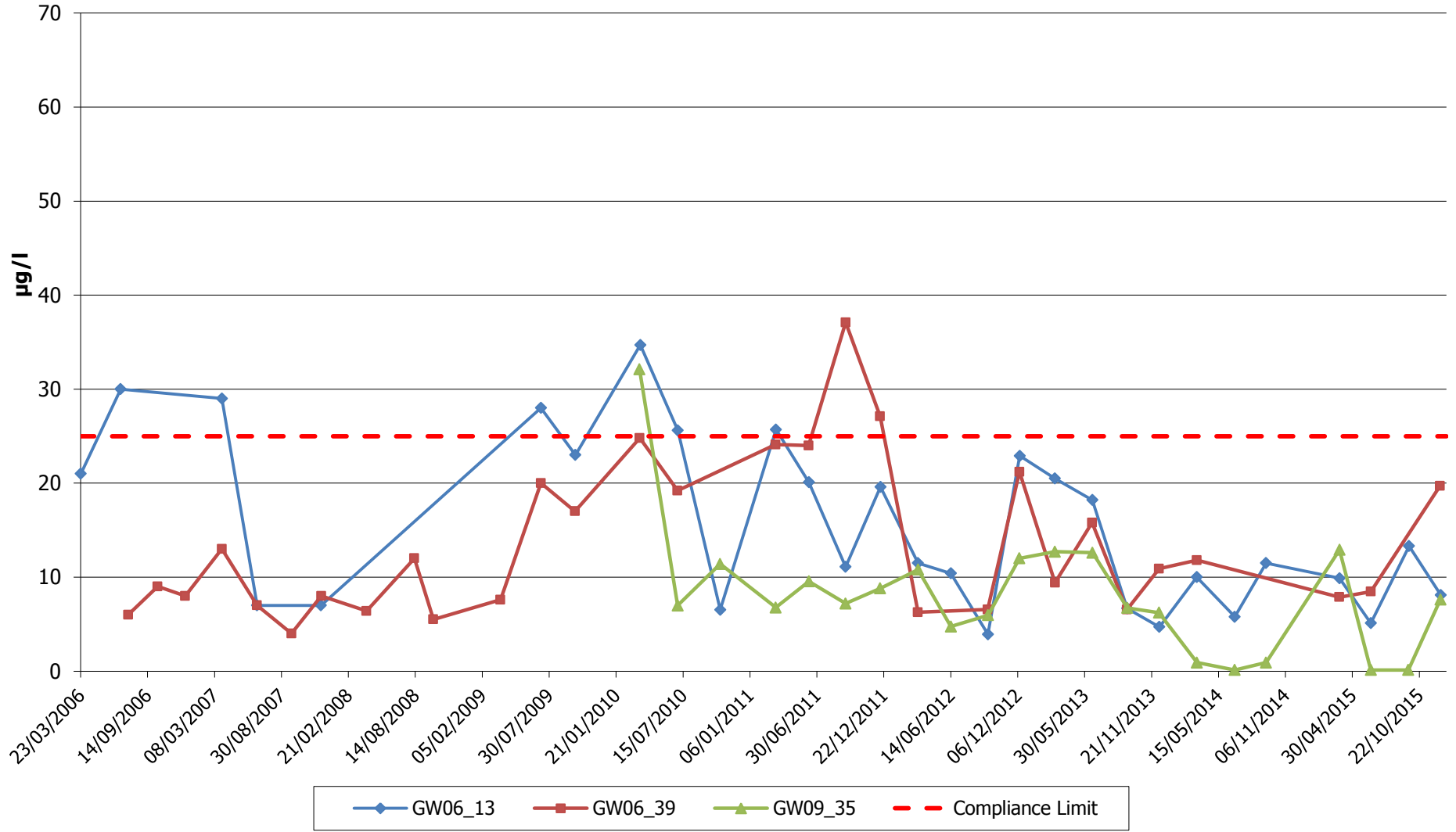
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Docksway Disposal Site - Ammoniacal Nitrogen in Groundwater



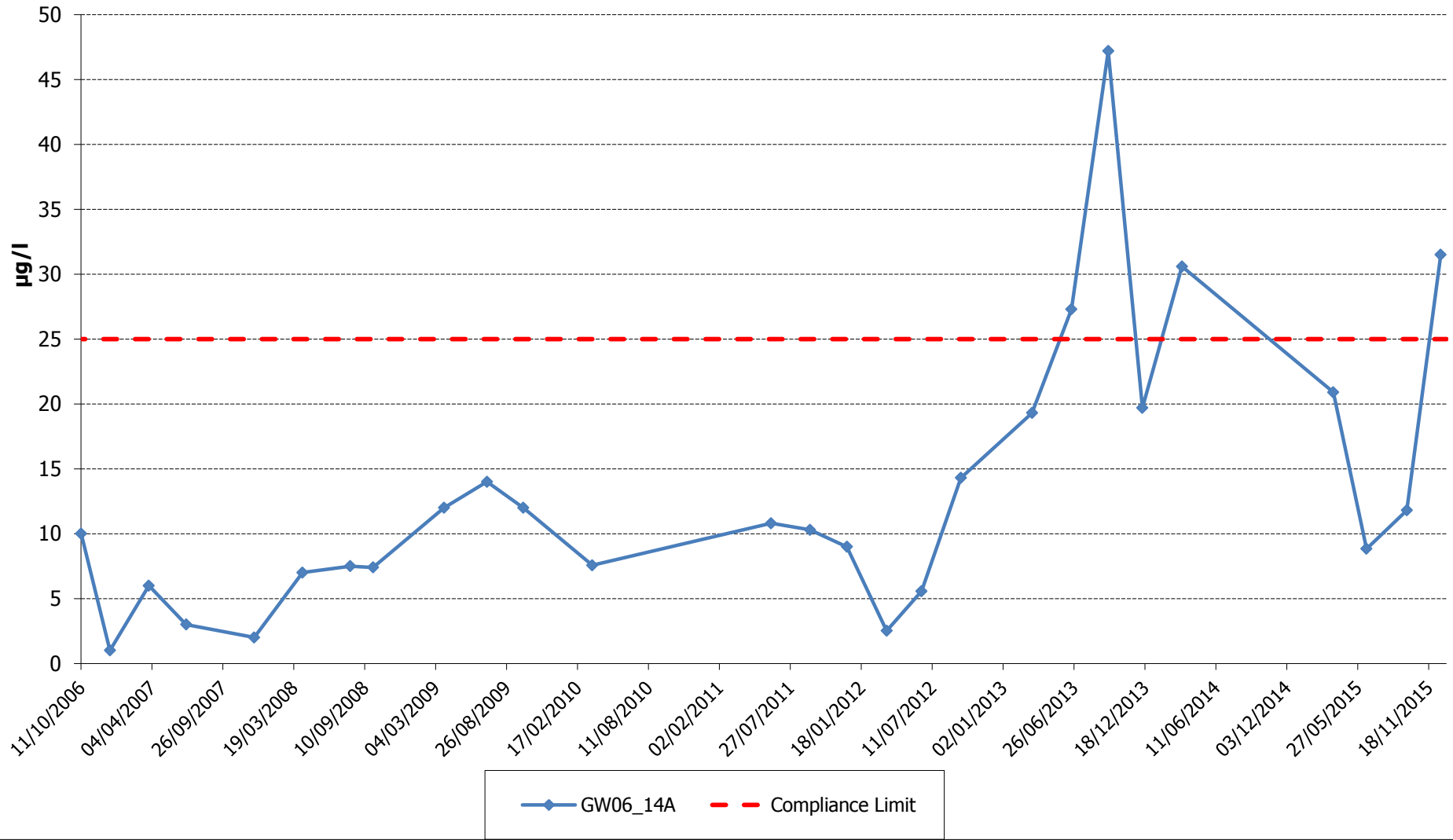
Appendix 2/5
Docksway Disposal Site - Arsenic in Groundwater



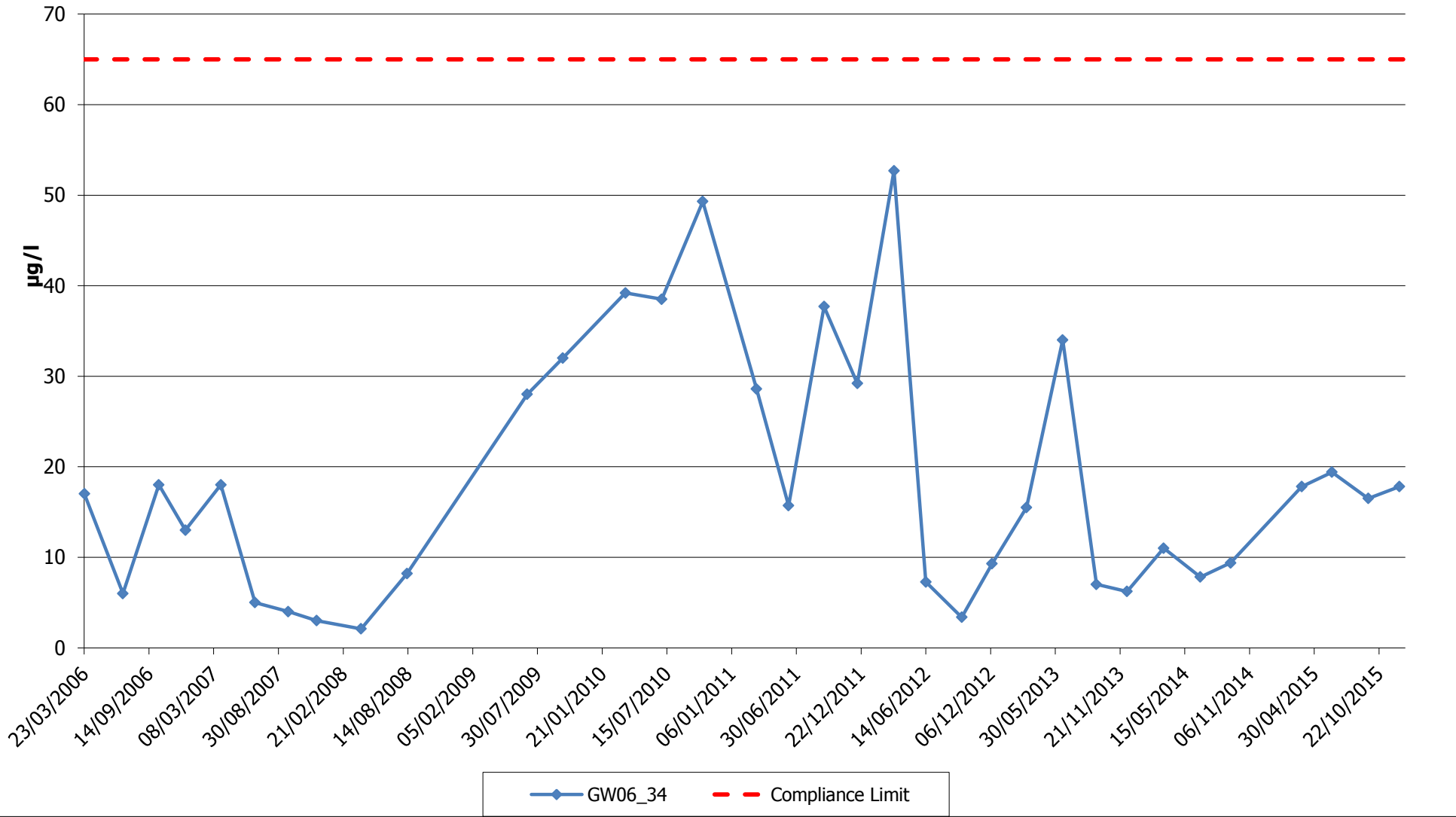
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Docksway Disposal Site - Arsenic in Groundwater



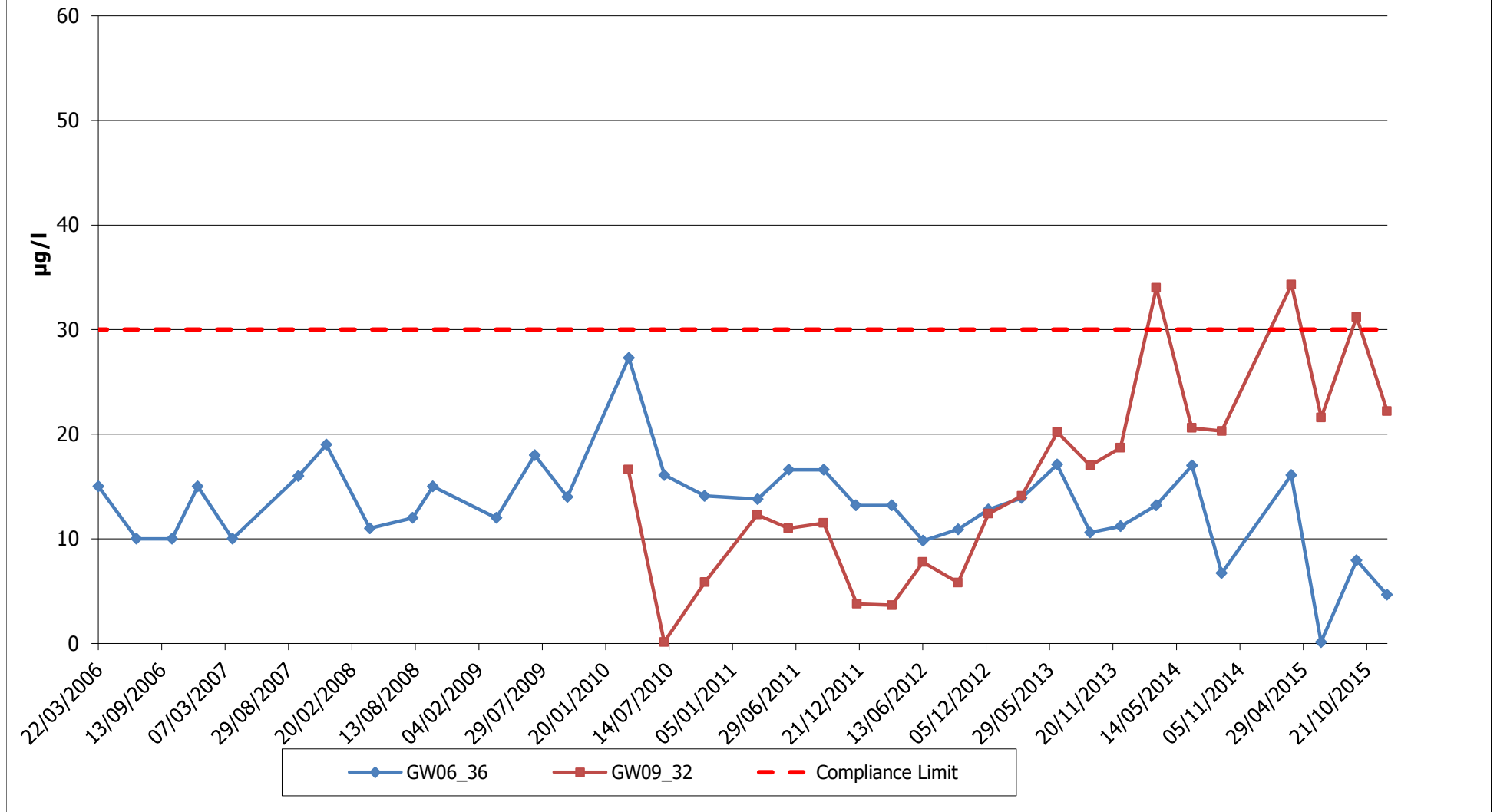
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Docksway Disposal Site - Arsenic in Groundwater



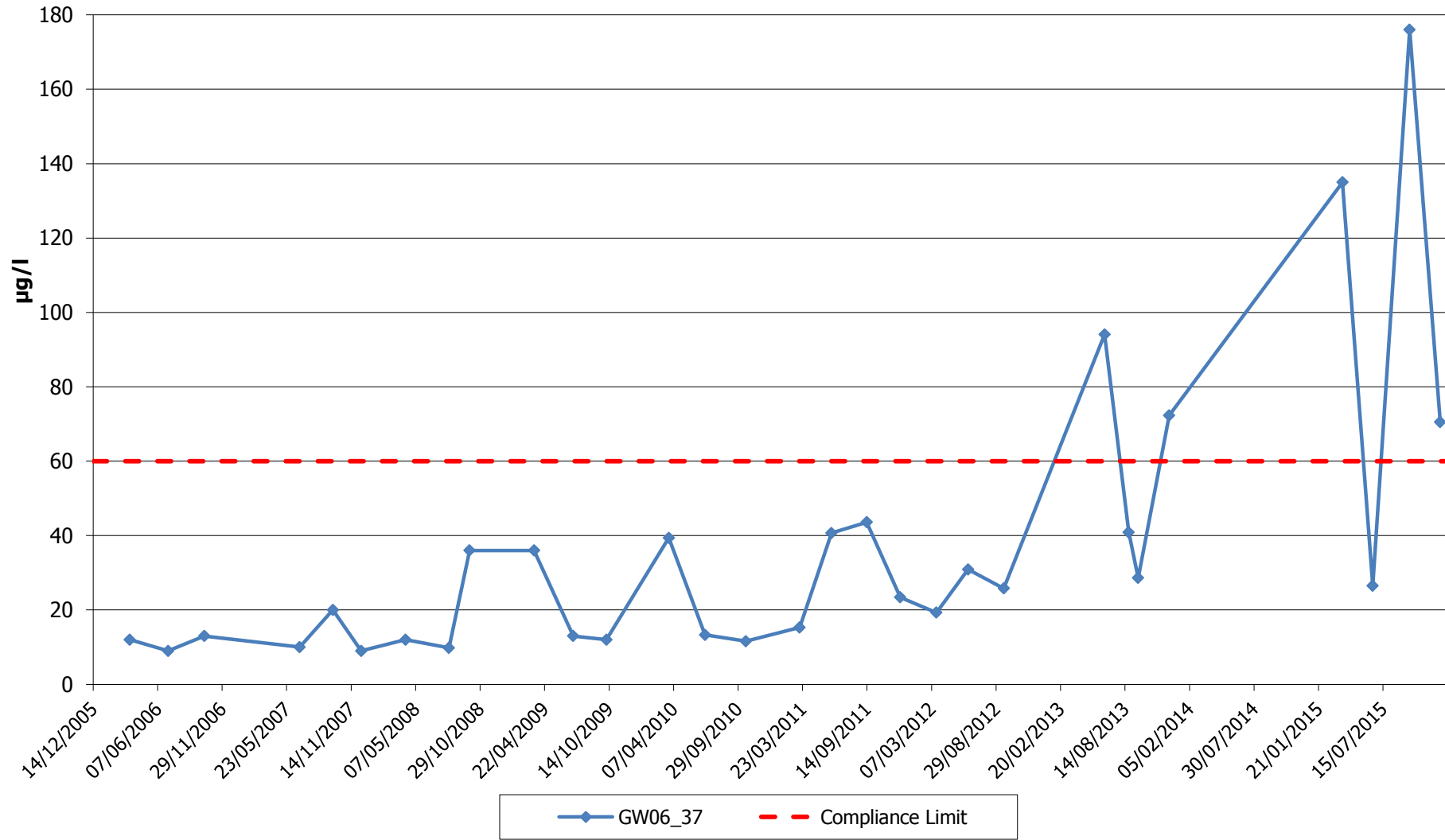
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Docksway Disposal Site - Arsenic in Groundwater



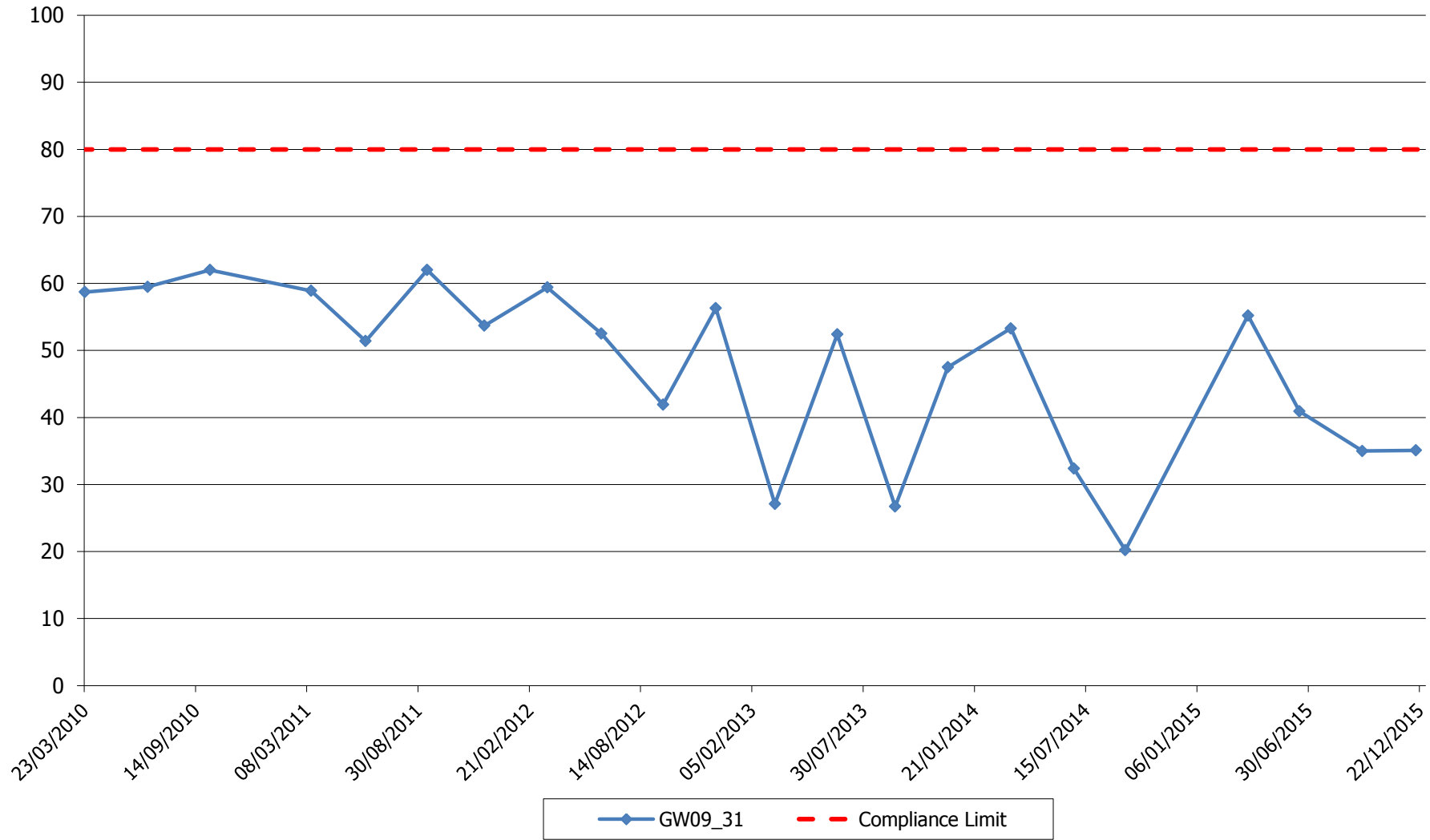
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Docksway Disposal Site - Arsenic in Groundwater



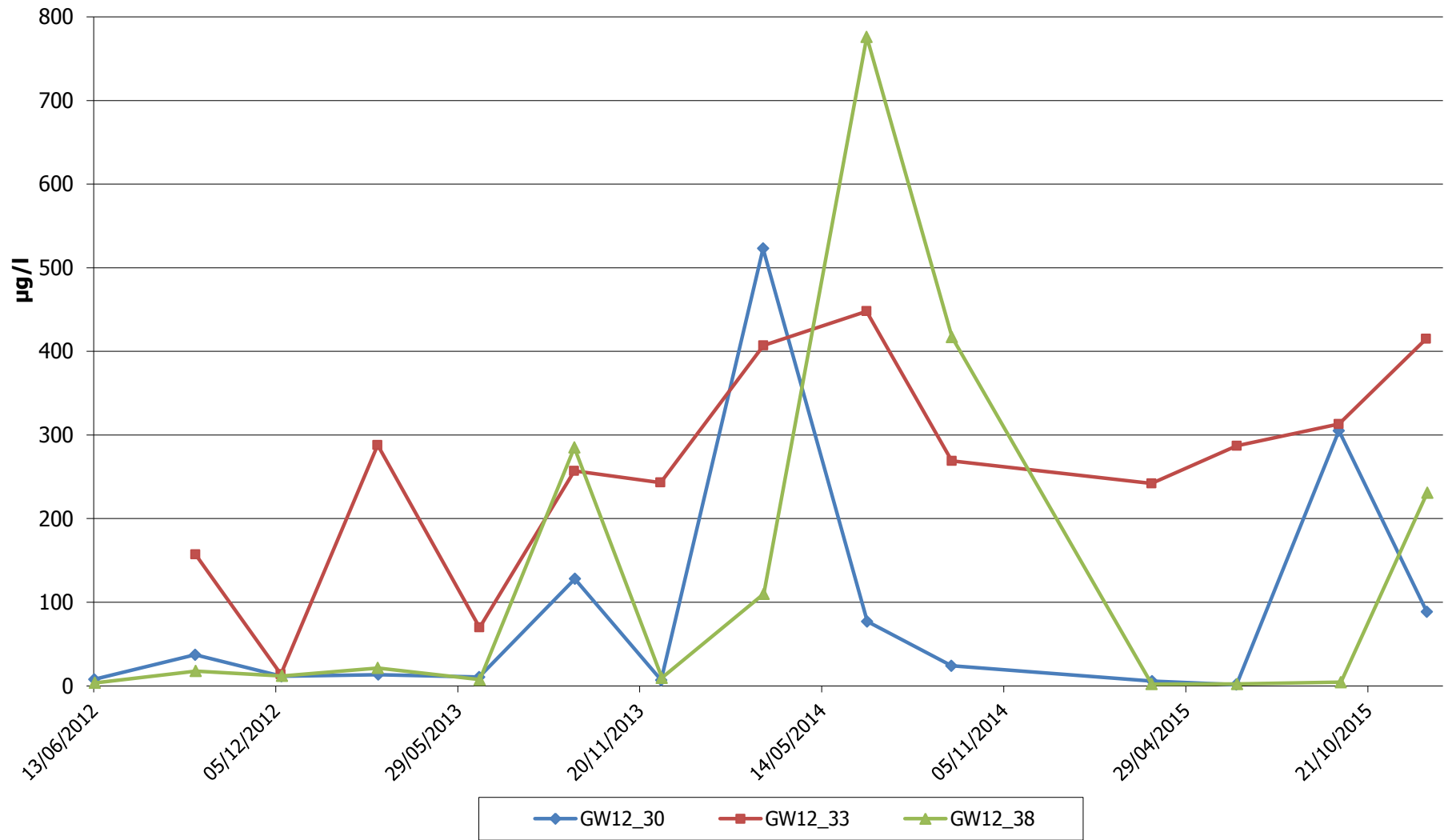
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Docksway Disposal Site - Arsenic in Groundwater



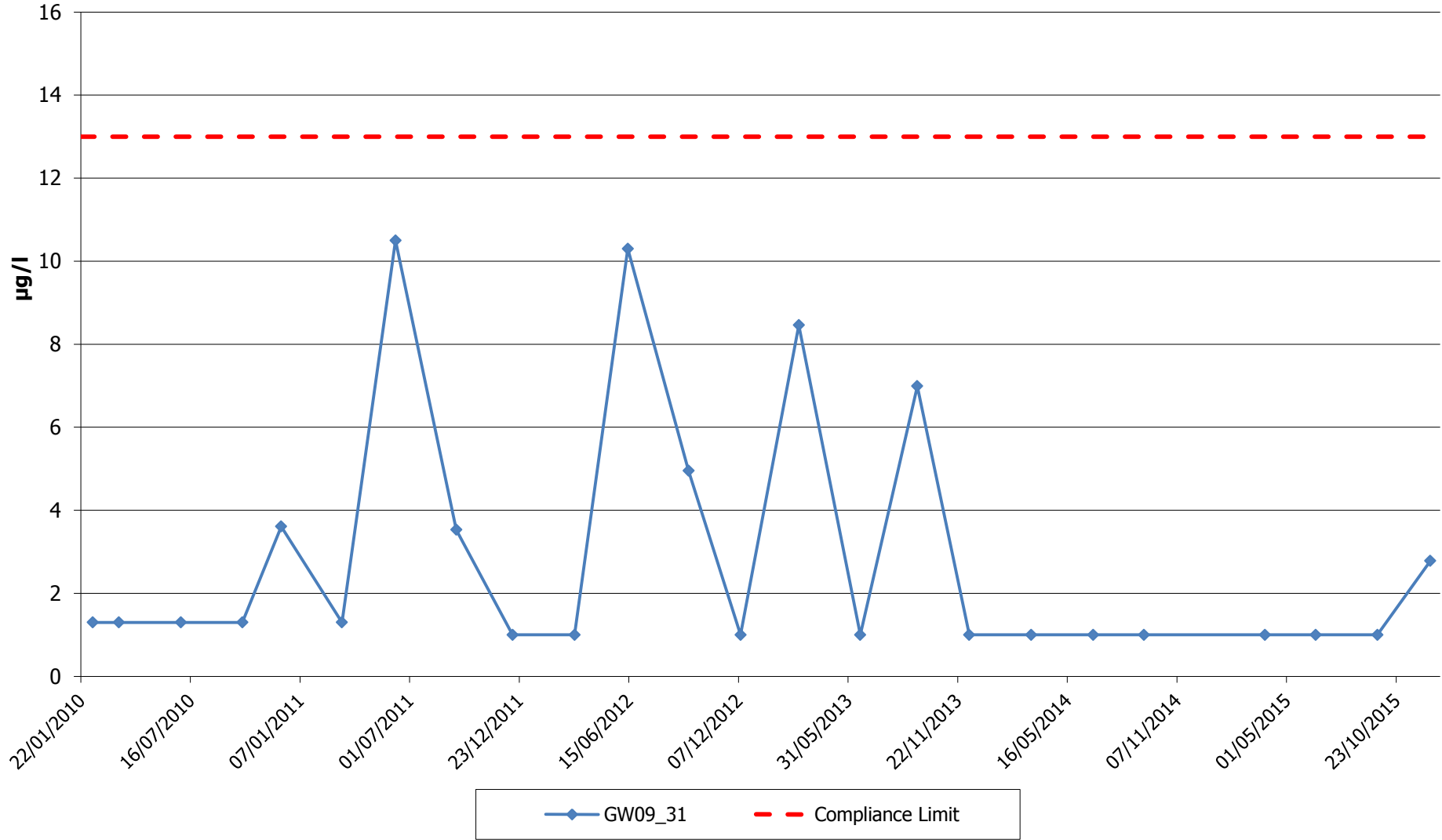
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Docksway Disposal Site - Arsenic in Groundwater



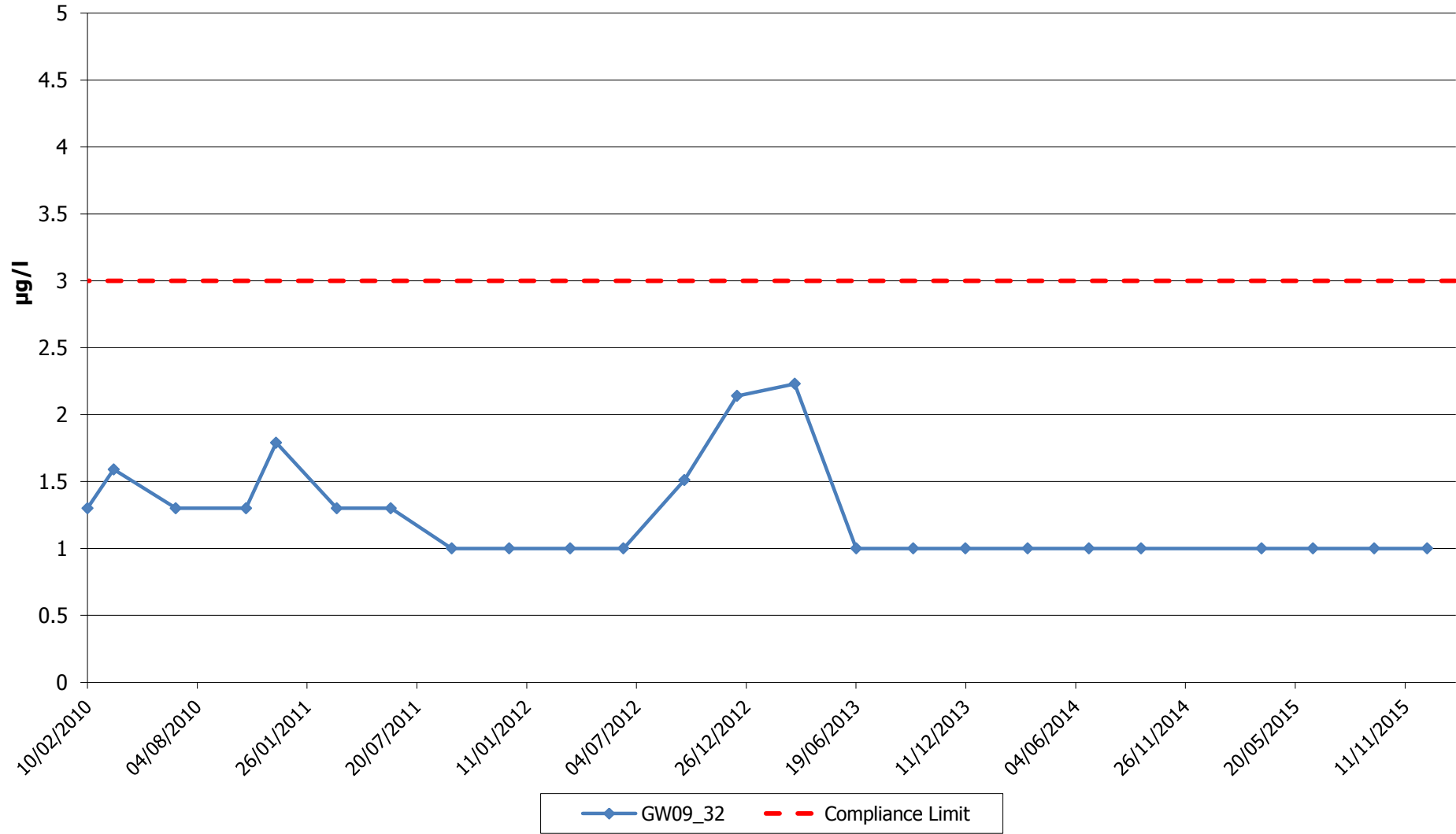
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Docksway Disposal Site - Arsenic in Groundwater



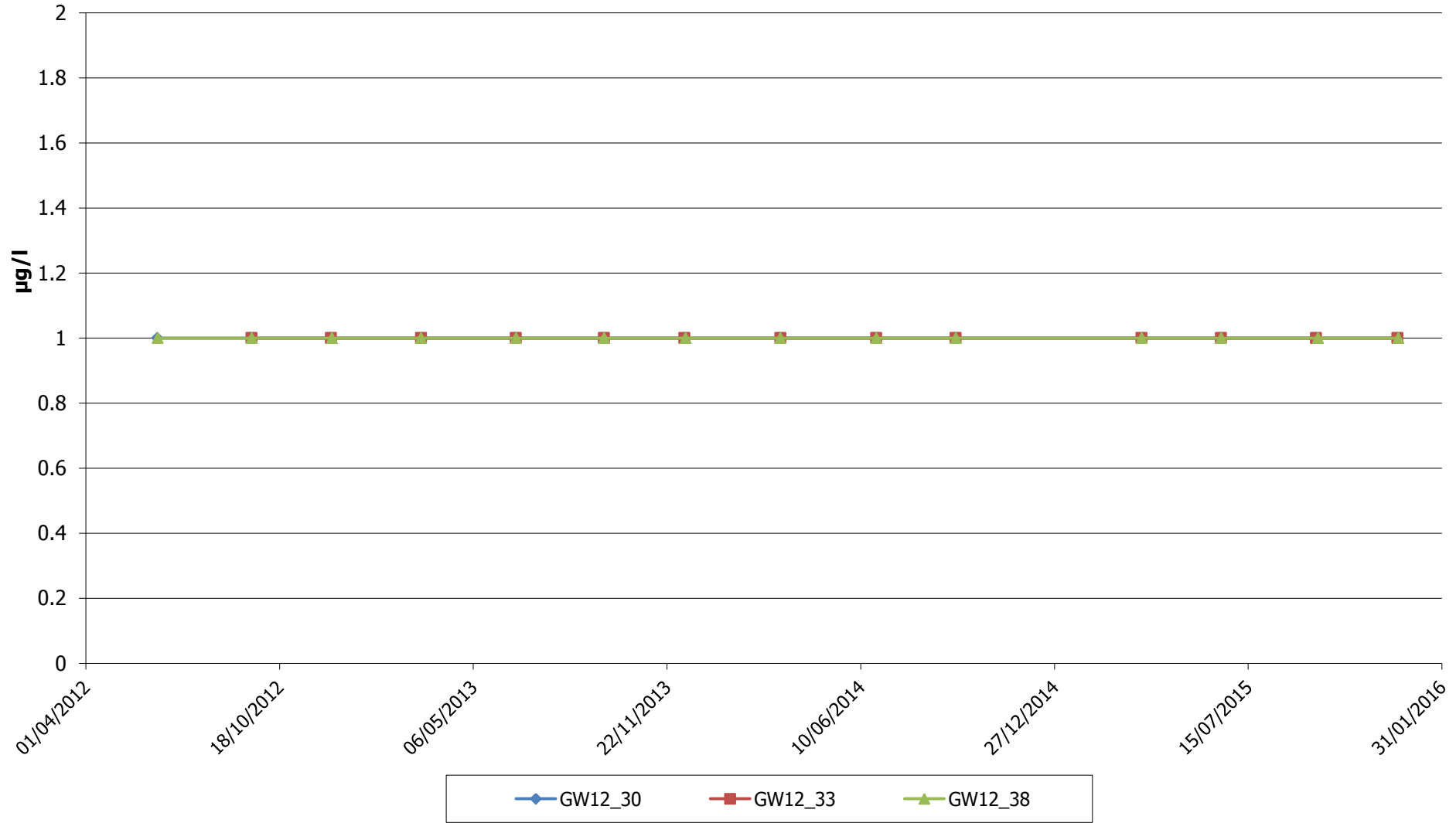
Appendix 2/14
Dockway Disposal Site - Benzene in Groundwater



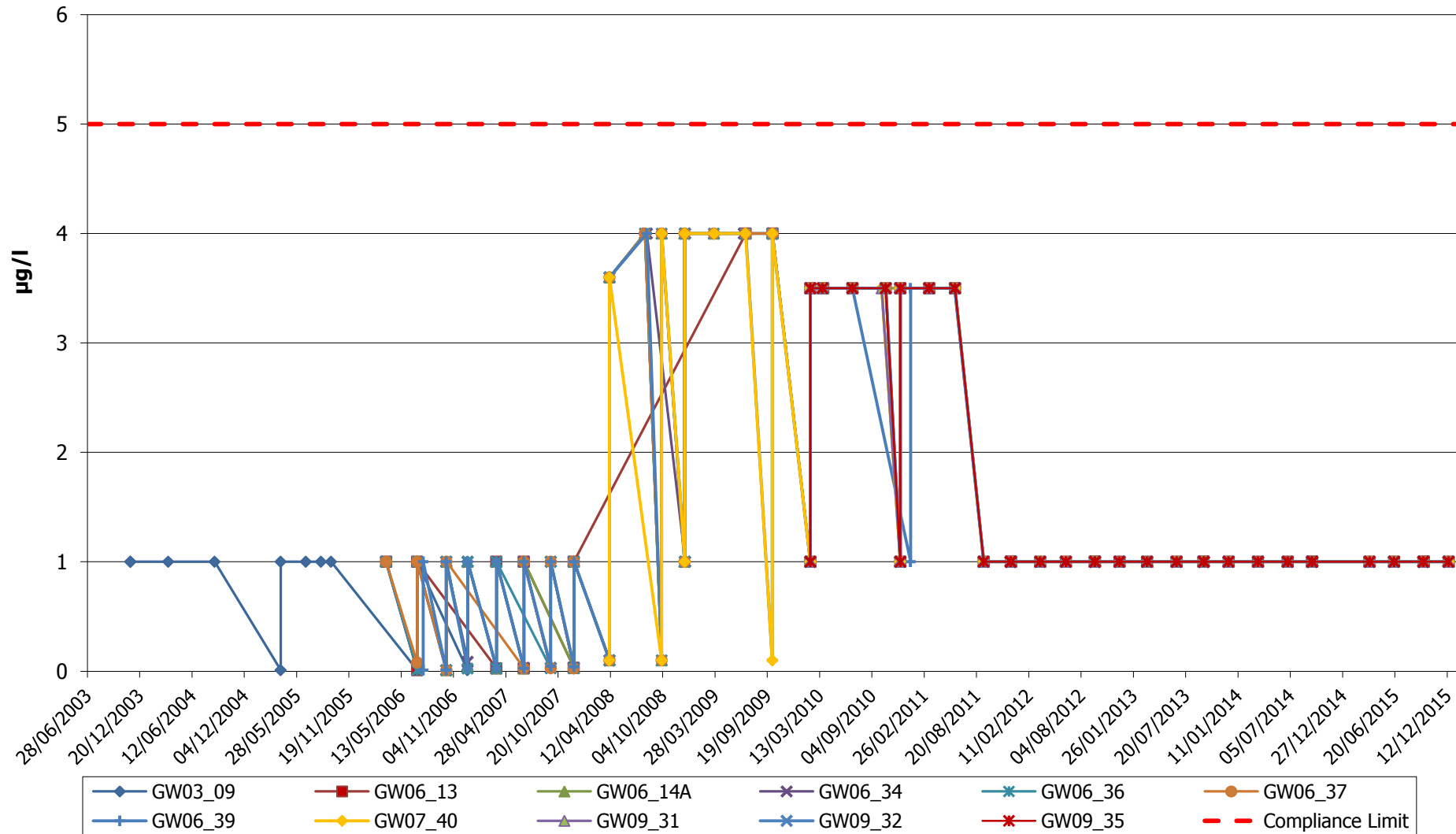
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Docksway Disposal Site - Benzene in Groundwater



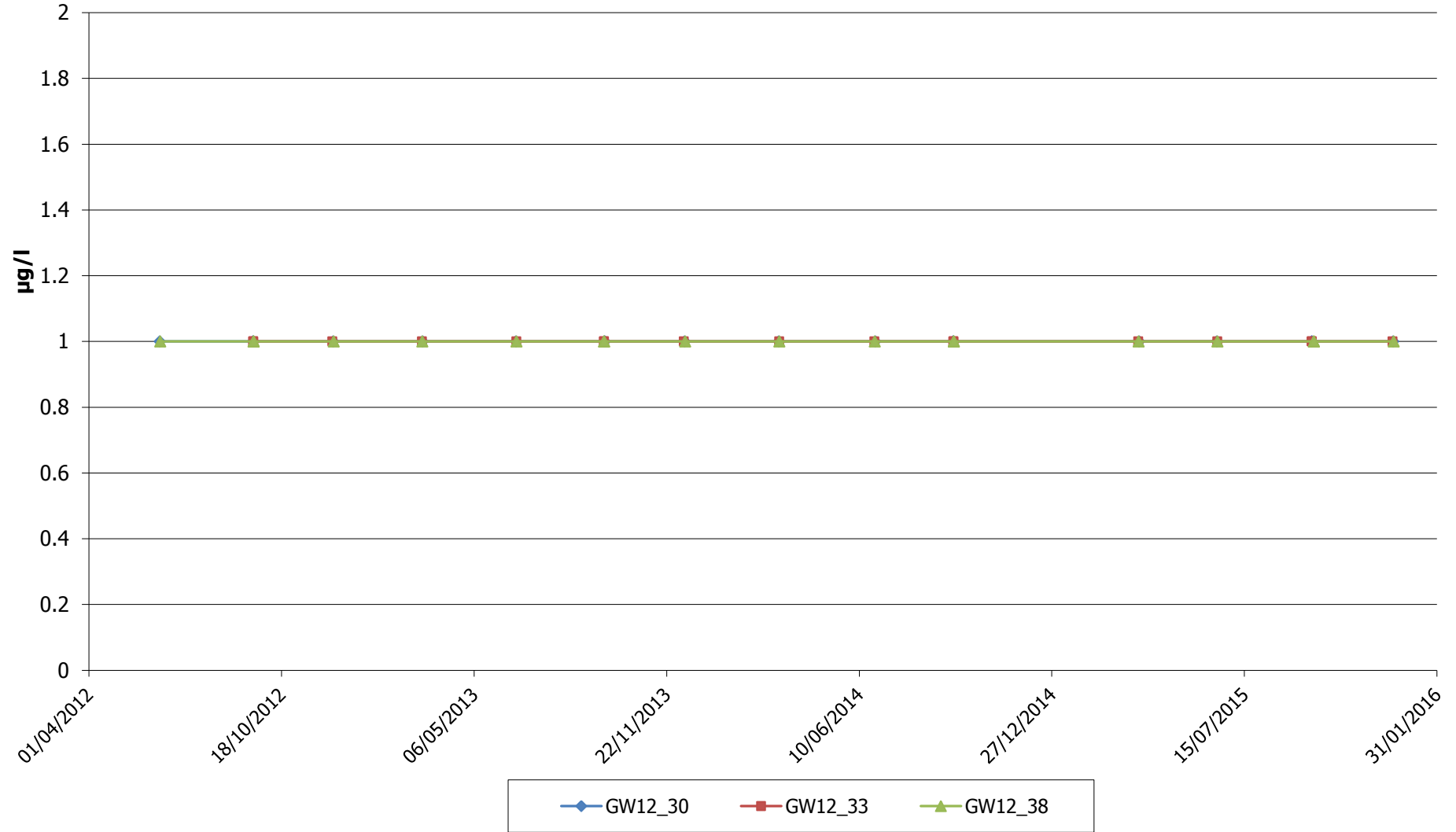
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Docksway Disposal Site - Benzene in Groundwater



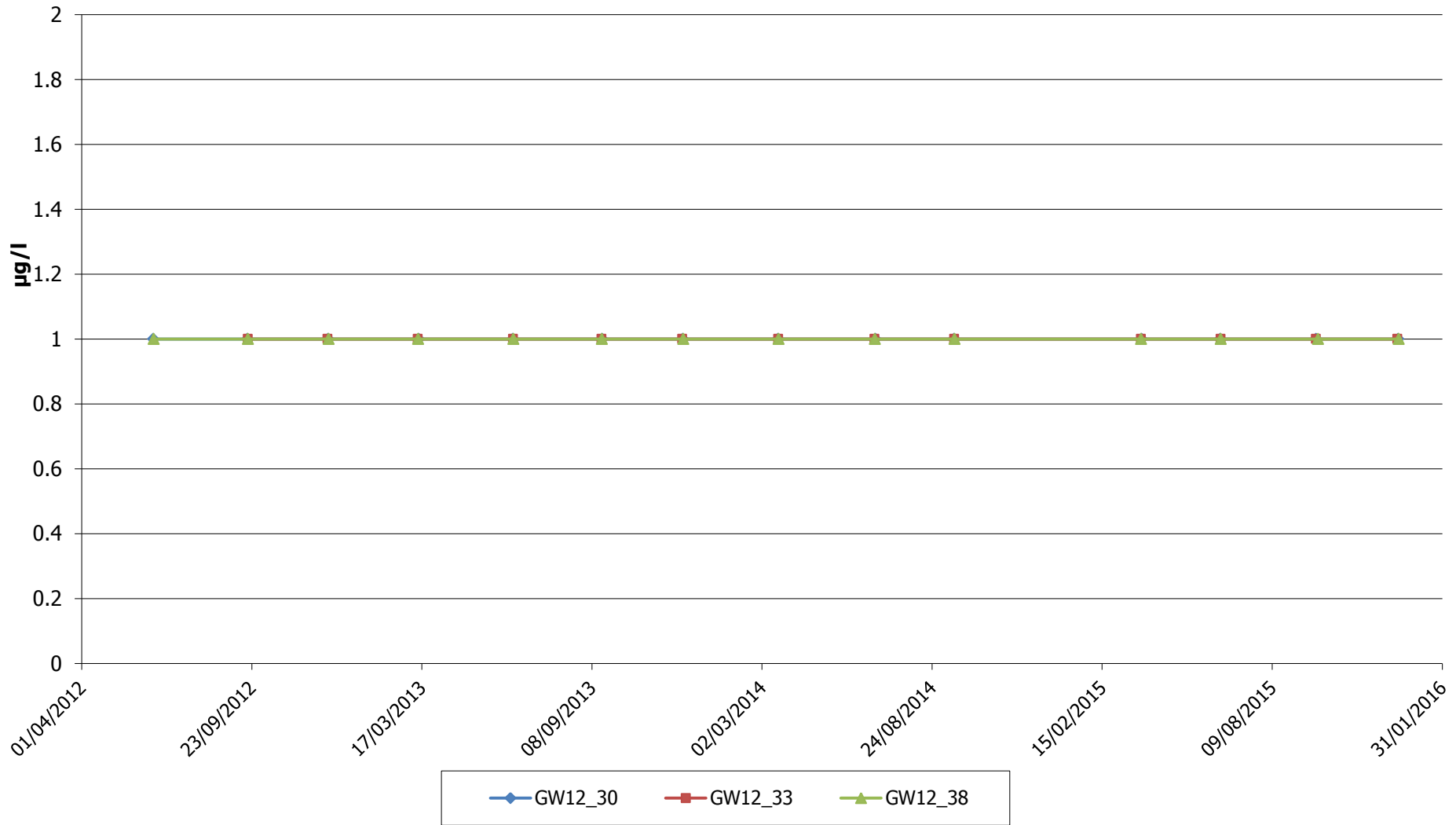
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Docksway Disposal Site - Naphthalene in Groundwater**



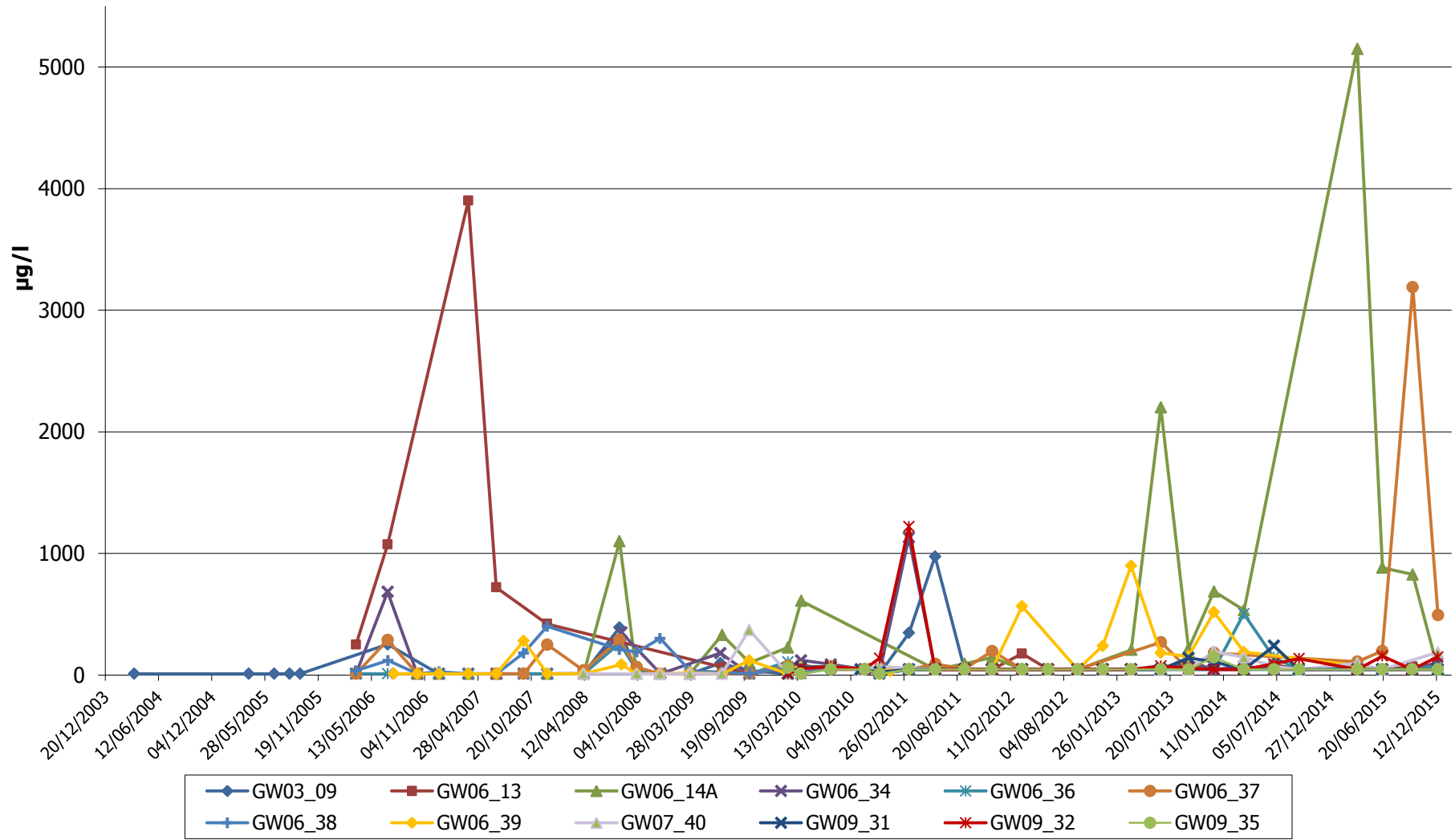
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Docksway Disposal Site - Naphthalene in Groundwater



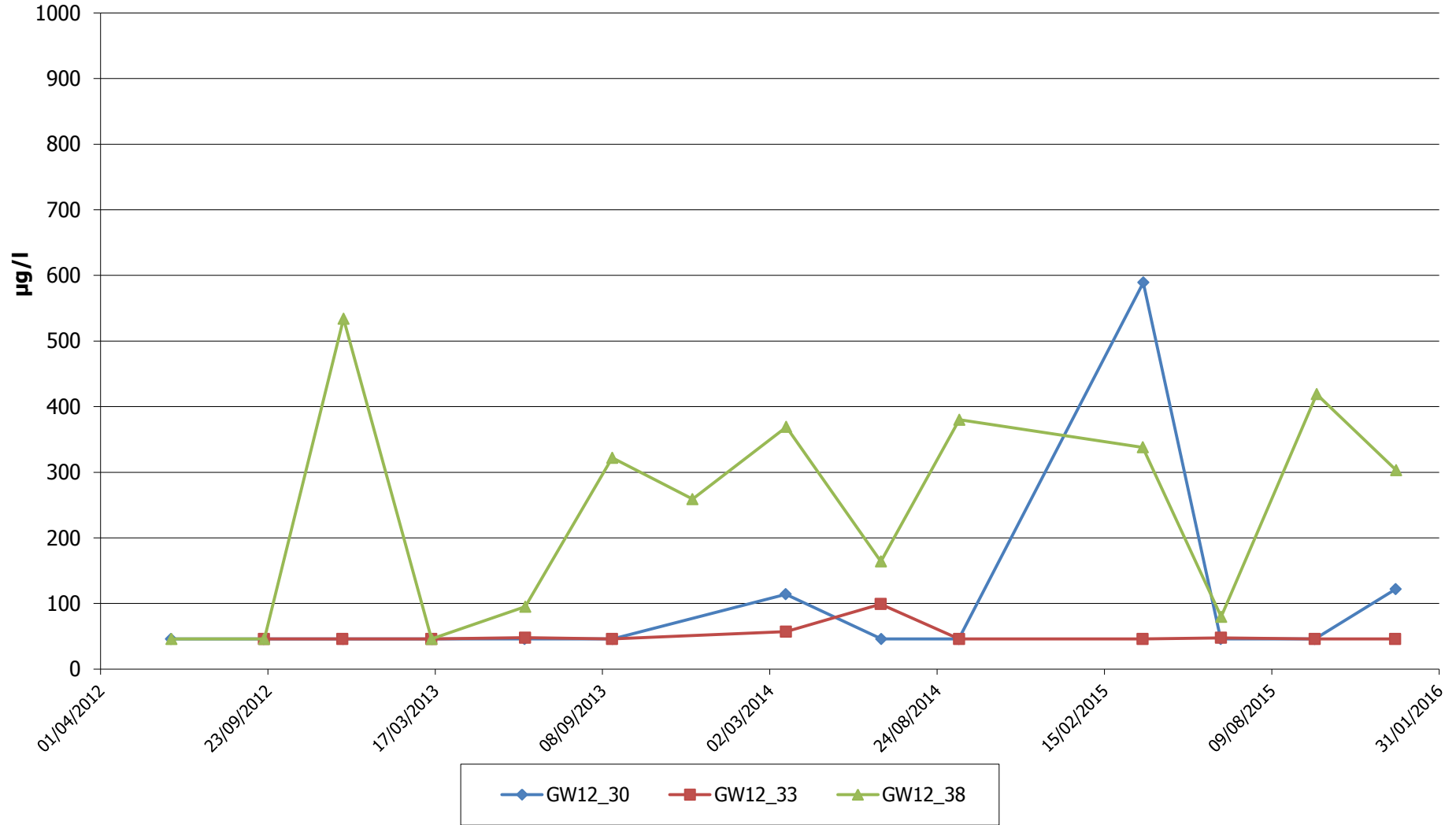
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Docksway Disposal Site - O-Xylene in Groundwater



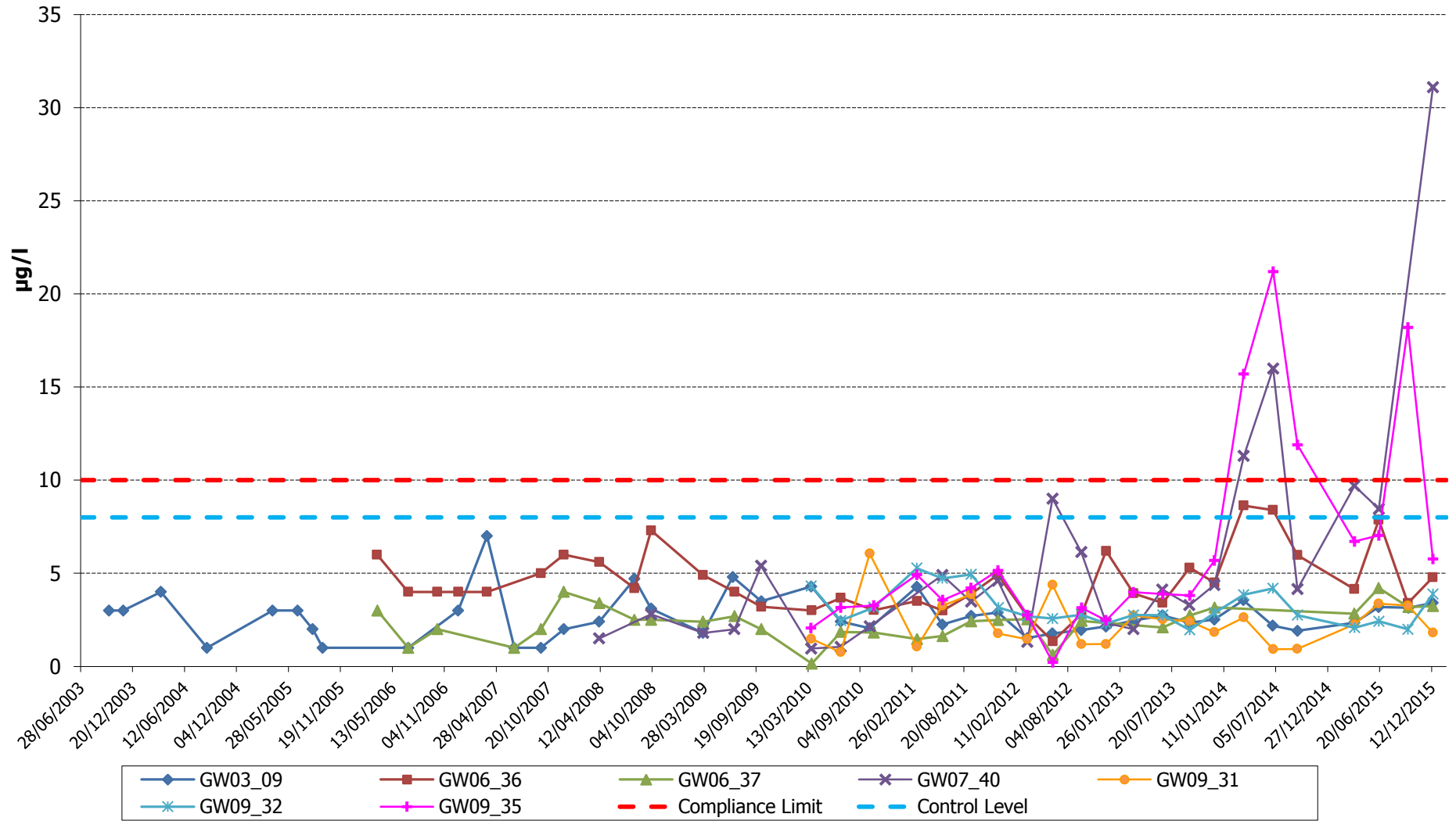
**Appendix 2/21
Docksway Disposal Site - EPH in Groundwater**



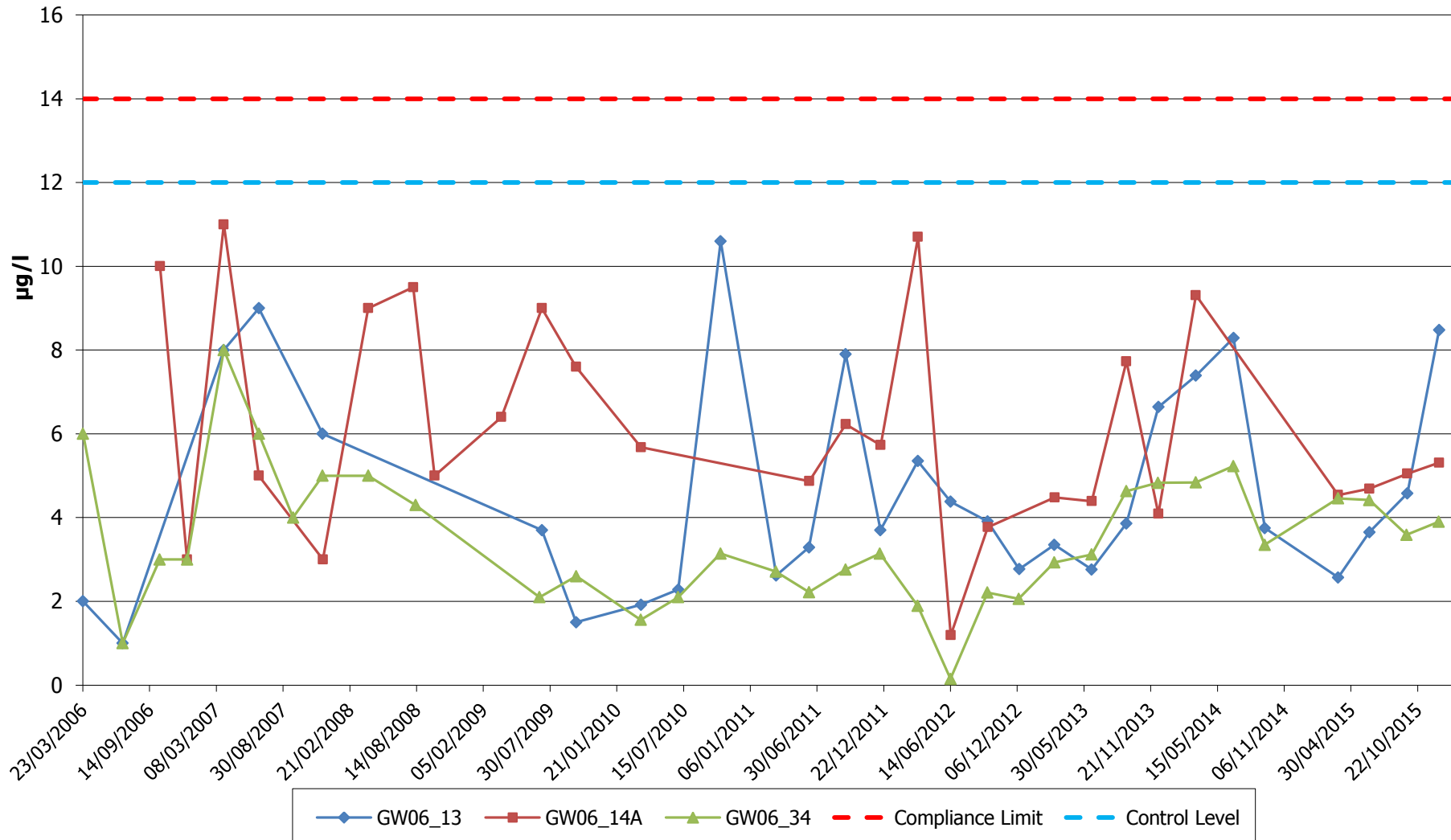
Appendix 2/22
Docksway Disposal Site - EPH in Groundwater



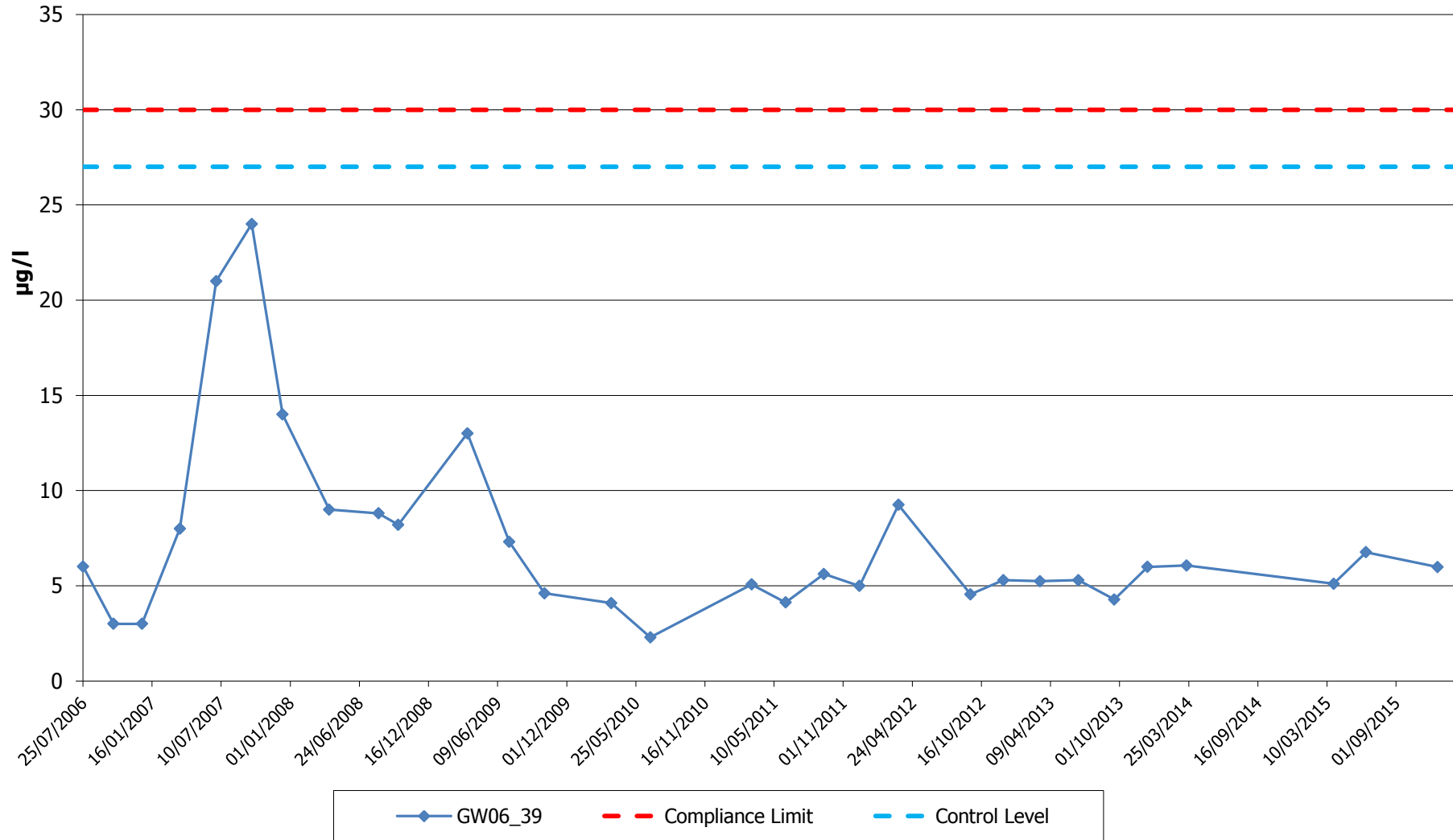
**Appendix 2/23
Docksway Disposal Site - Nickel in Groundwater**



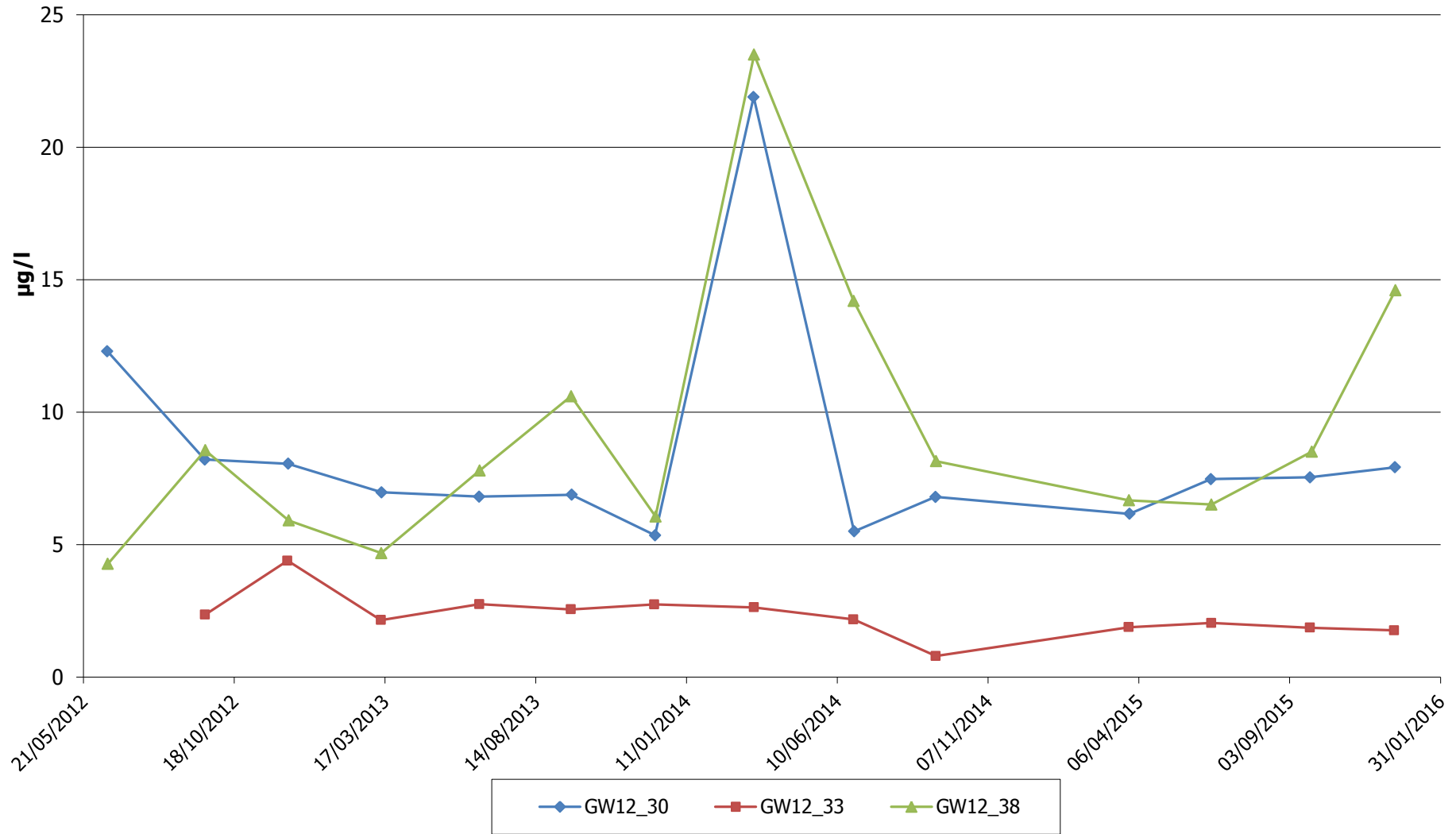
Appendix 2/24
Docksway Disposal Site - Nickel in Groundwater



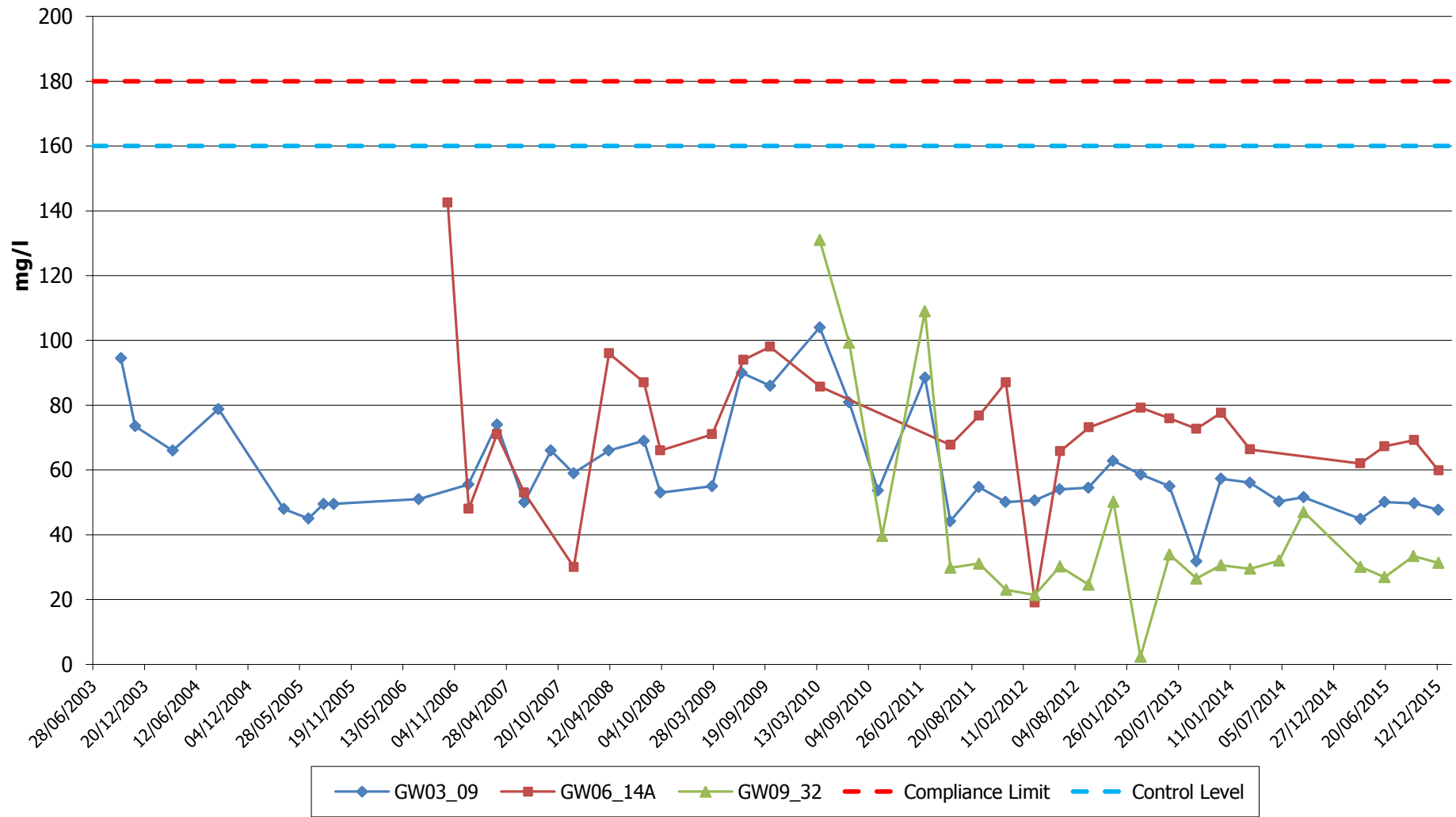
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Docksway Disposal Site - Nickel in Groundwater



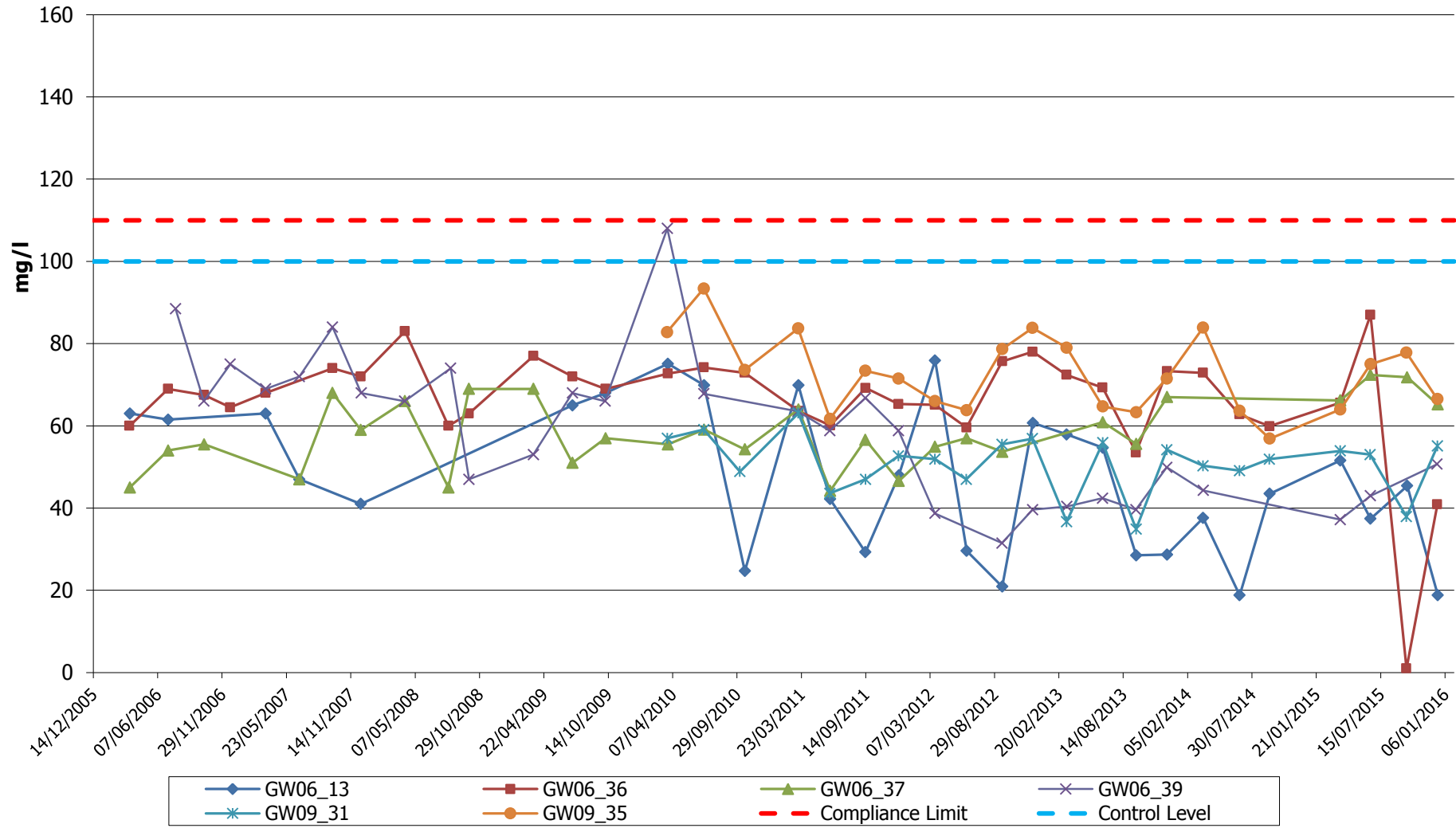
Appendix 2/26
Docksway Disposal Site - Nickel in Groundwater



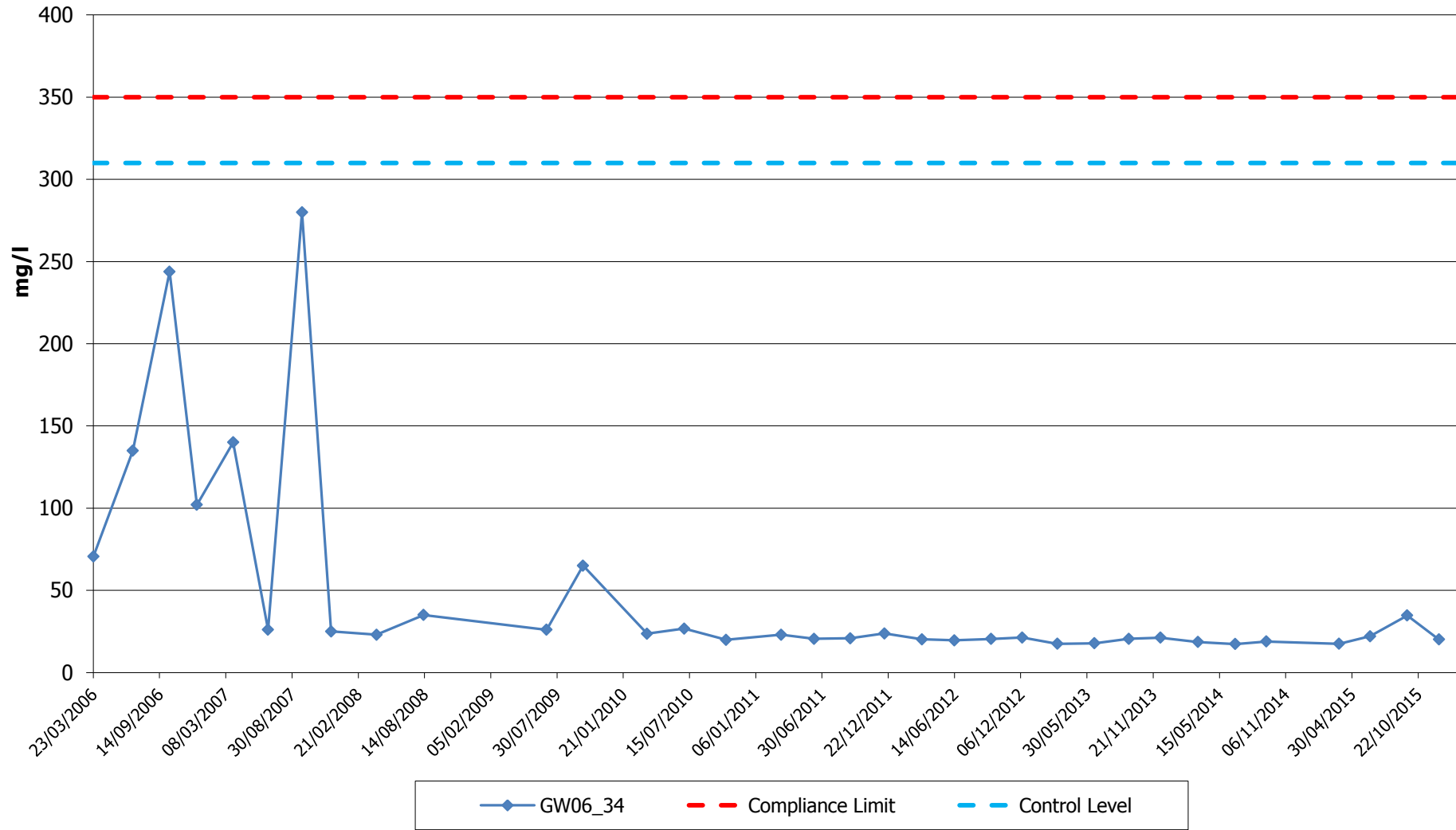
Appendix 2/27
Docksway Disposal Site - Potassium in Groundwater



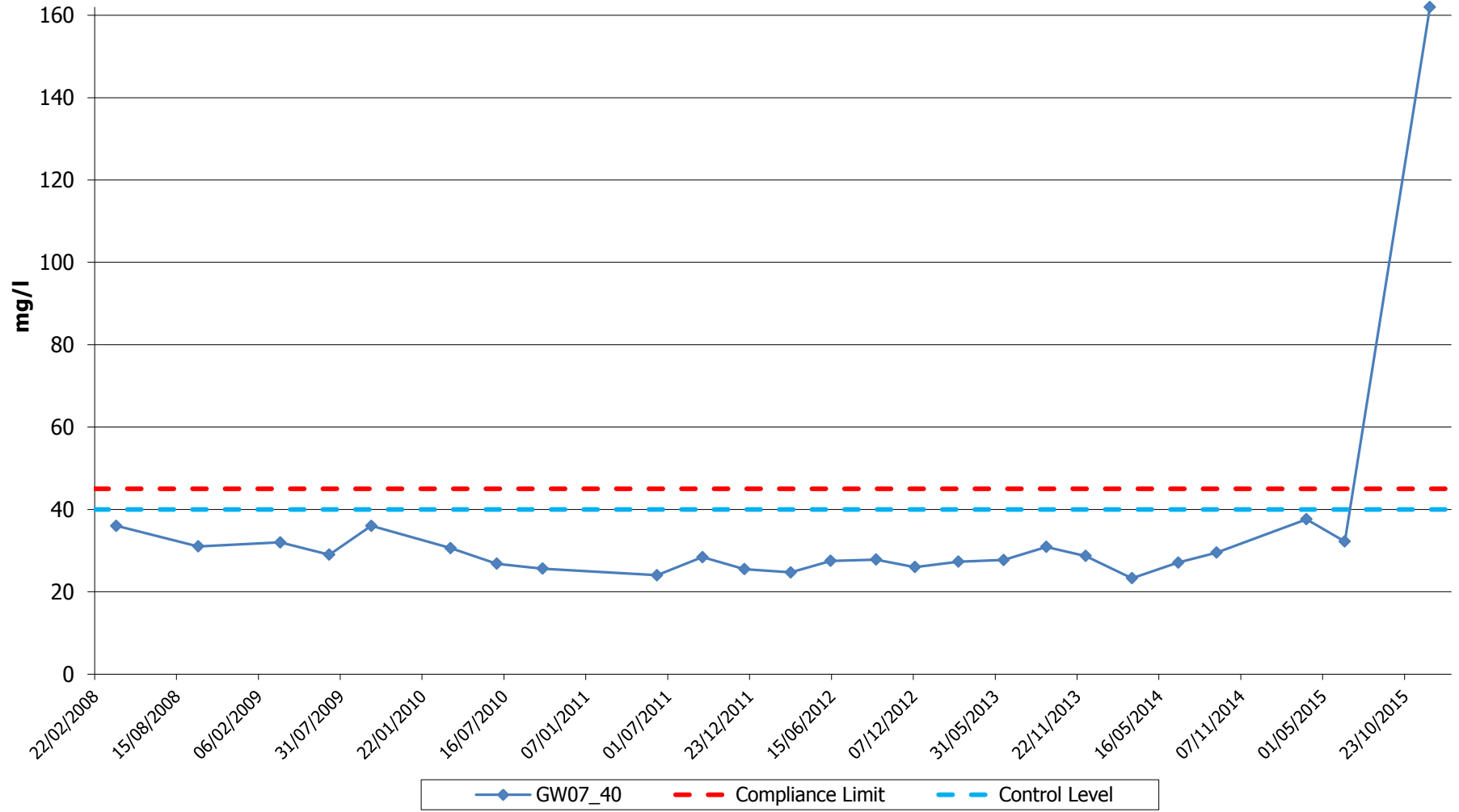
Appendix 2/28
Docksway Disposal Site - Potassium in Groundwater



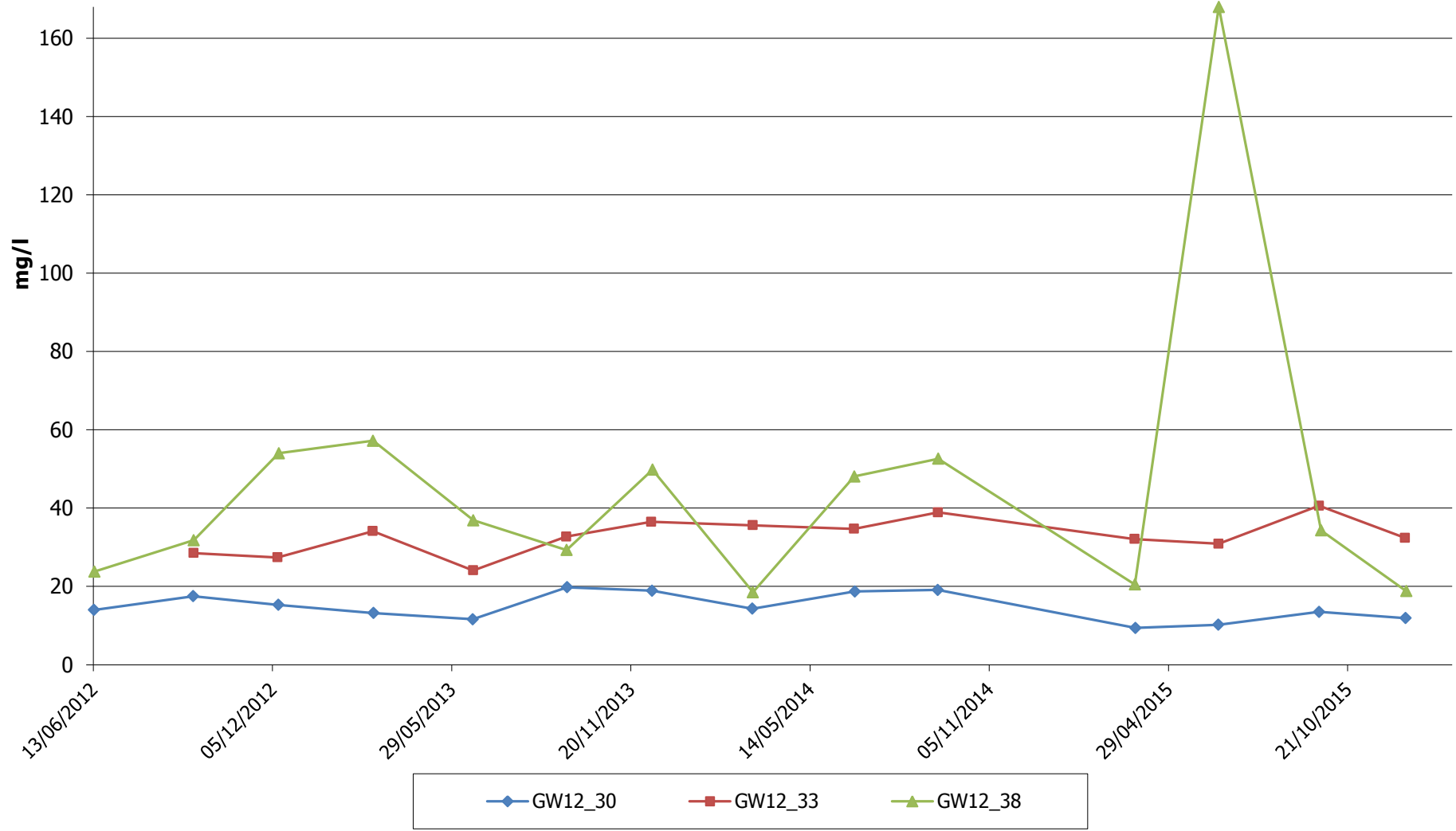
Appendix 2/29
Docksway Disposal Site - Potassium in Groundwater



Appendix 2/30
Docksway Disposal Site - Potassium in Groundwater



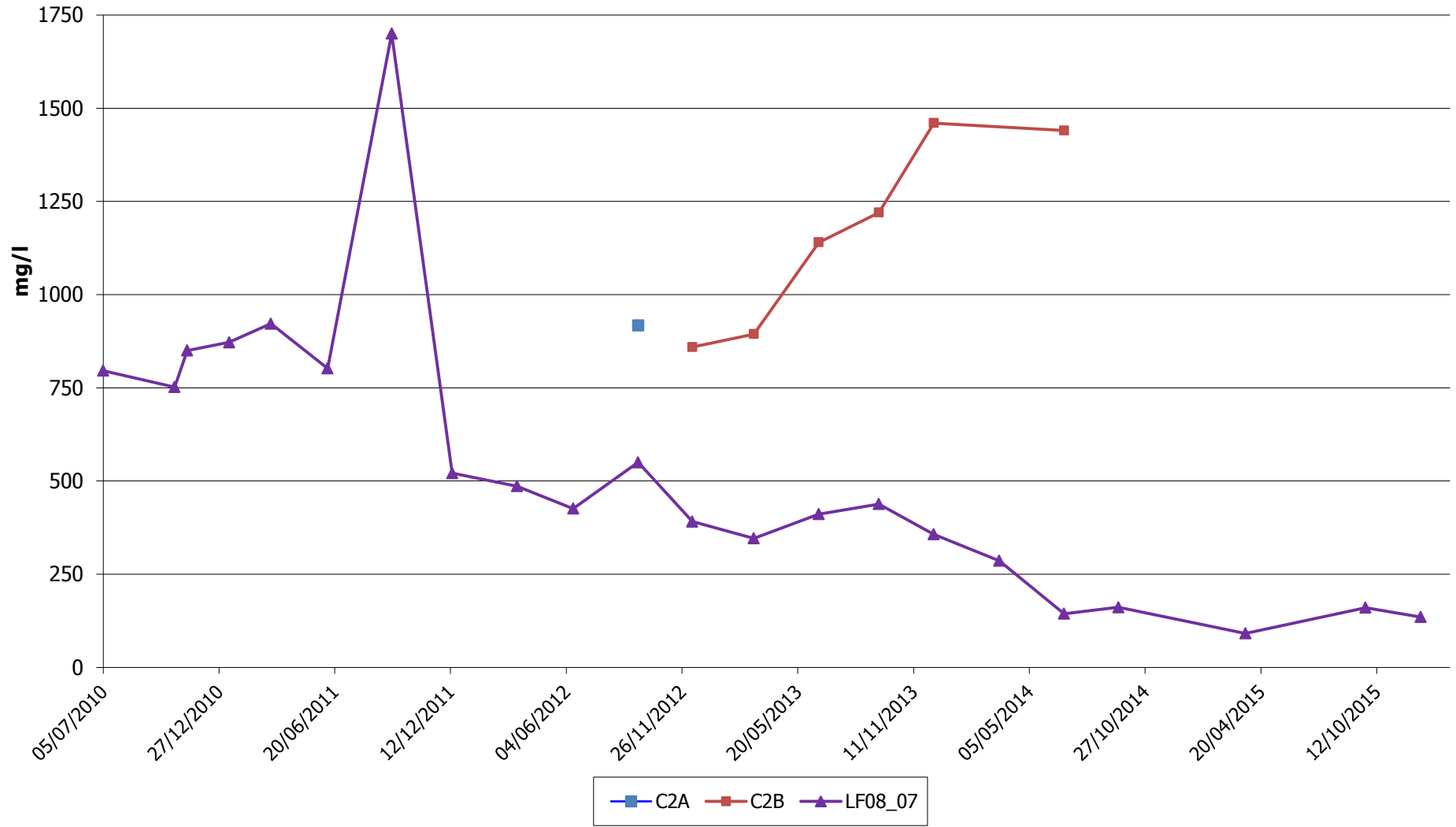
Appendix 2/31
Docksway Disposal Site - Potassium in Groundwater



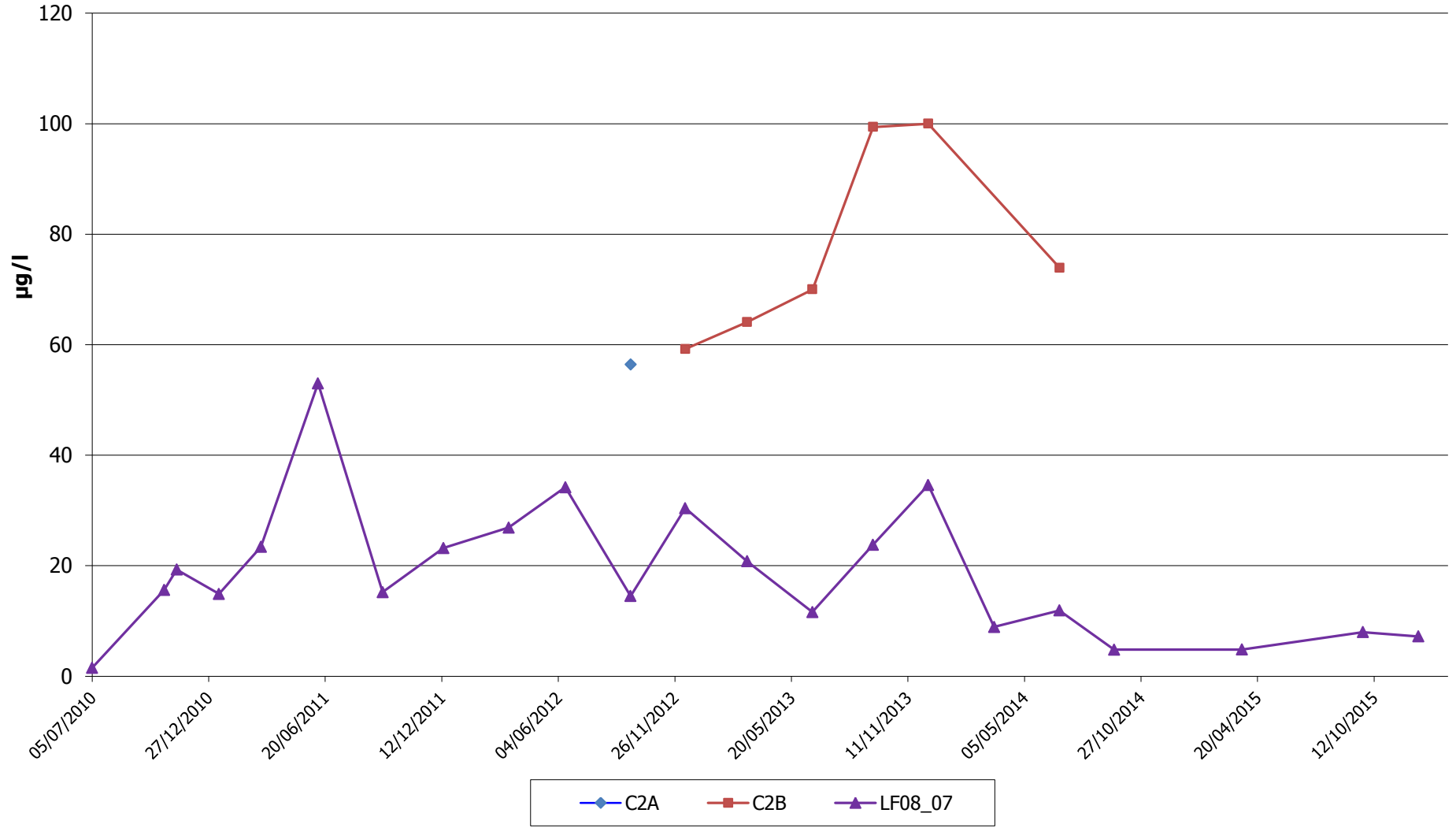
Appendix 3

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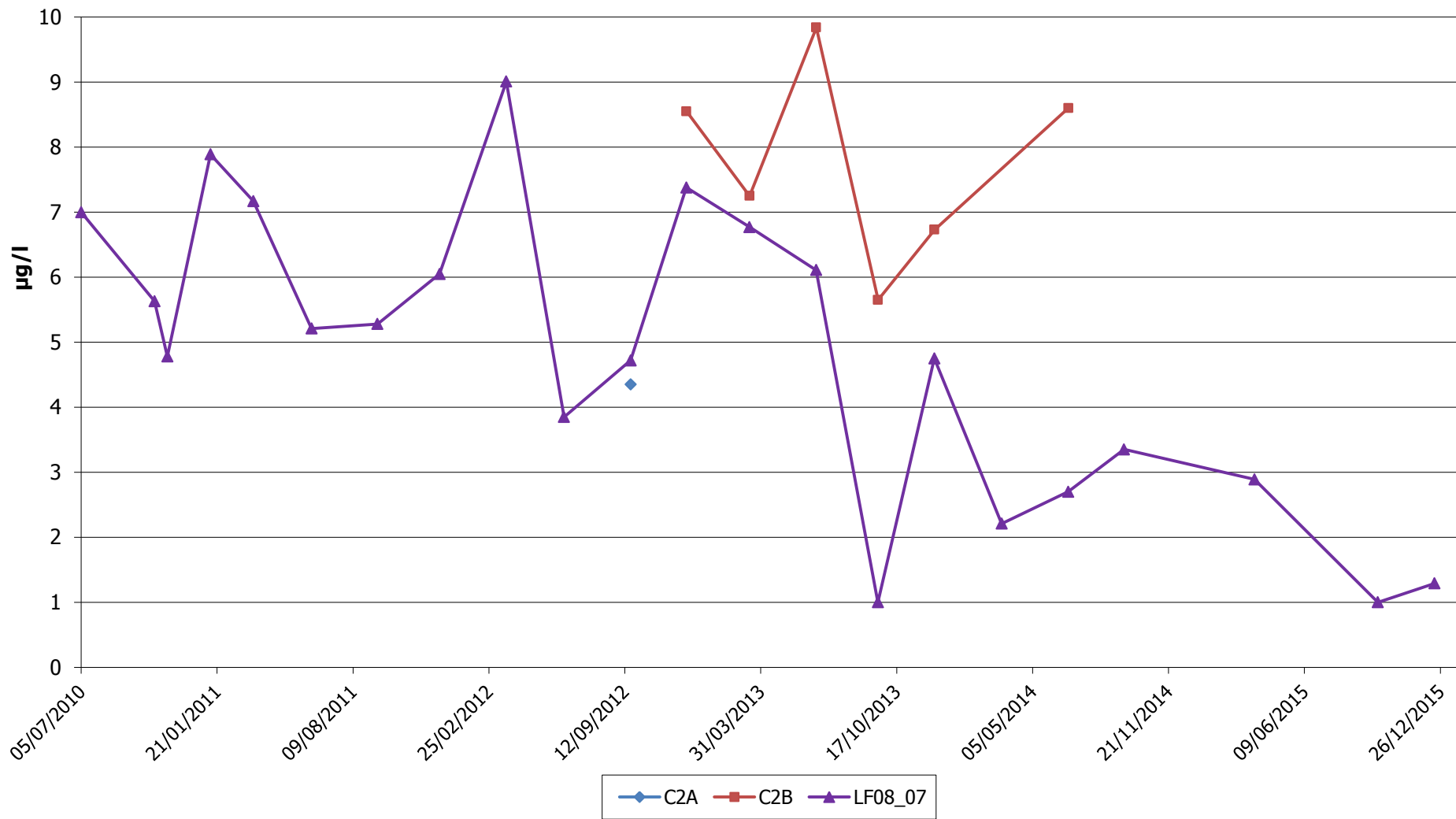
Appendix 3/1
Docksway Disposal Site - Ammoniacal Nitrogen in Leachate



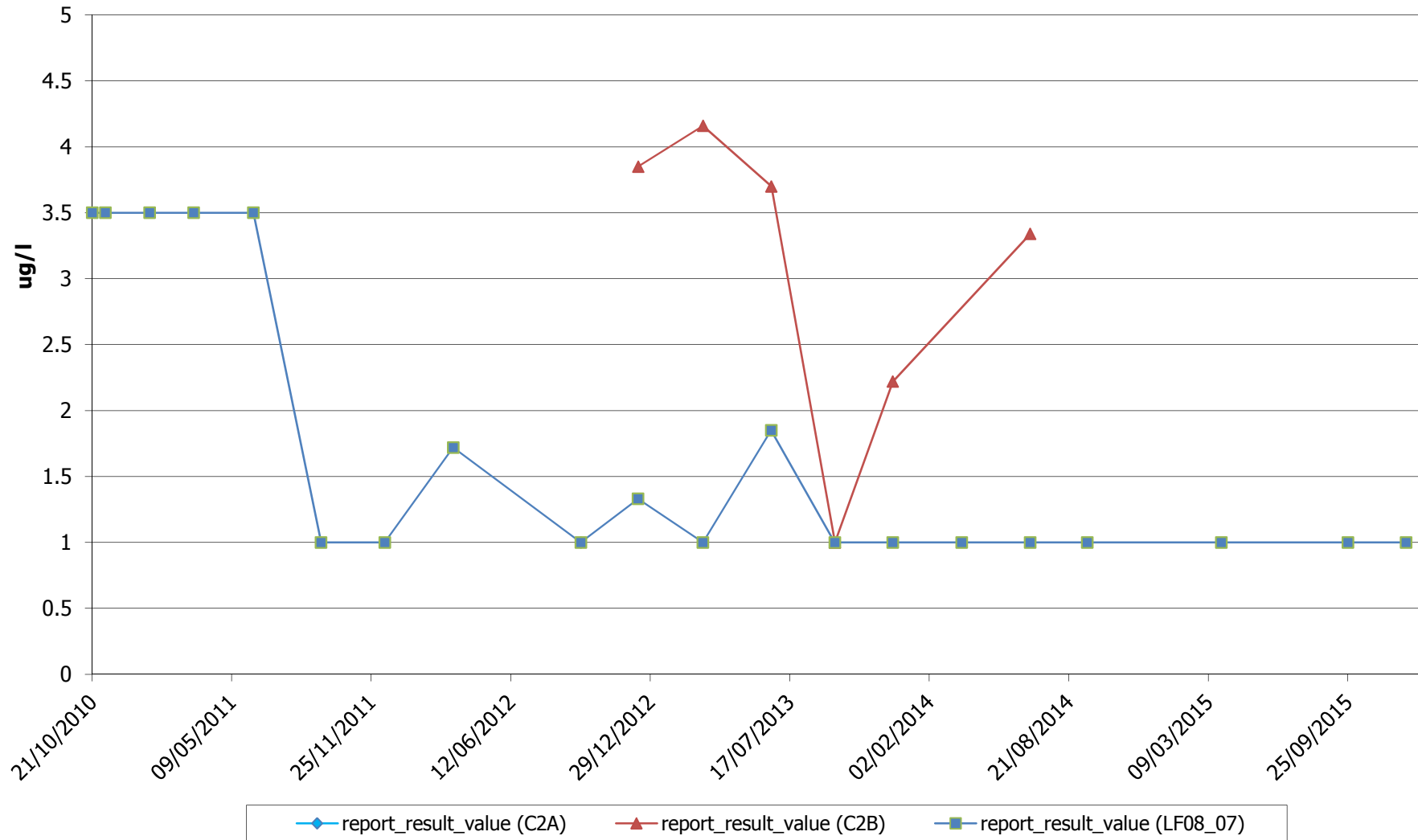
Appendix 3/2
Docksway Disposal Site - Arsenic in Leachate



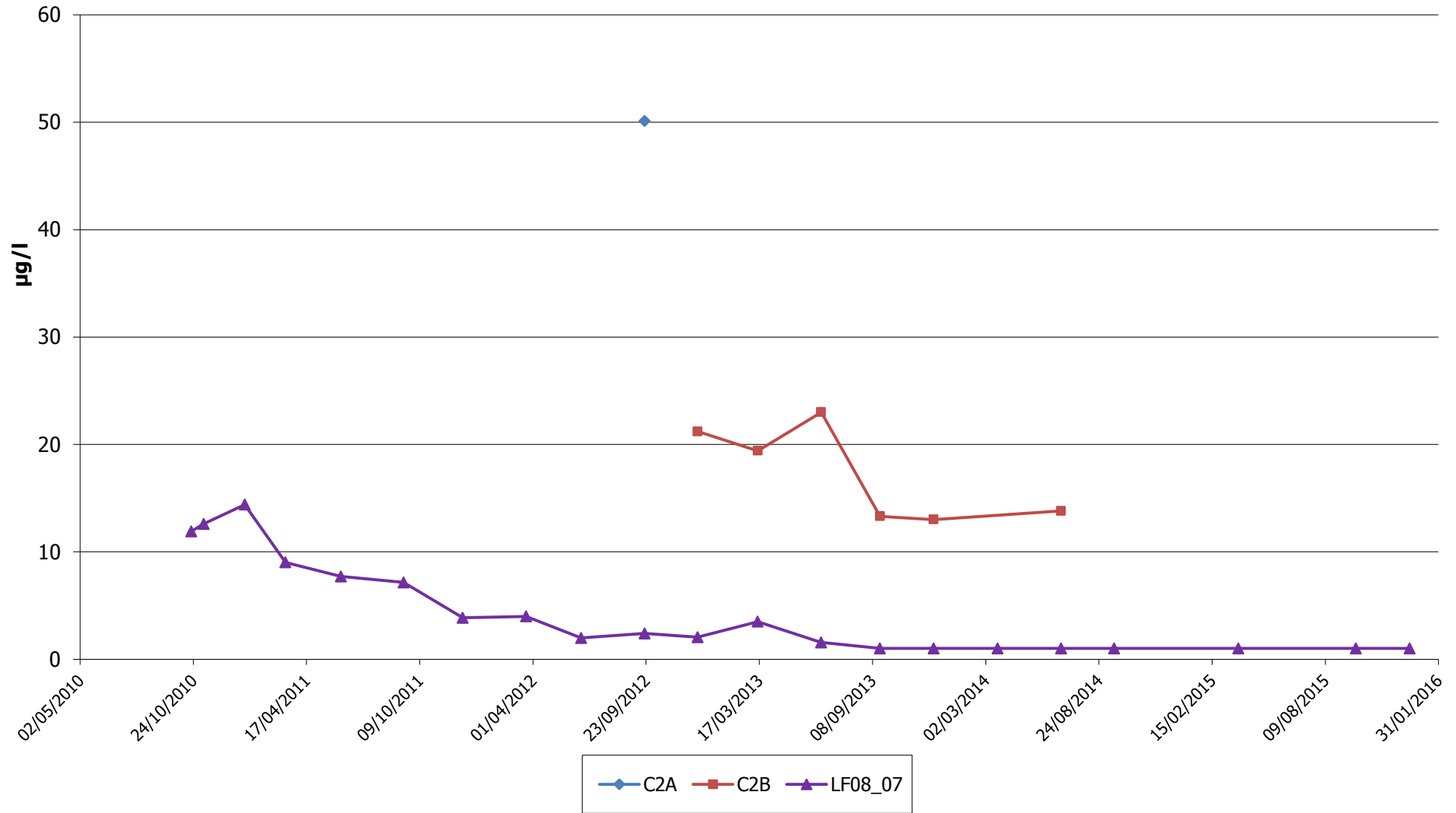
Appendix 3/3
Docksway Disposal Site - Benzene in Leachate



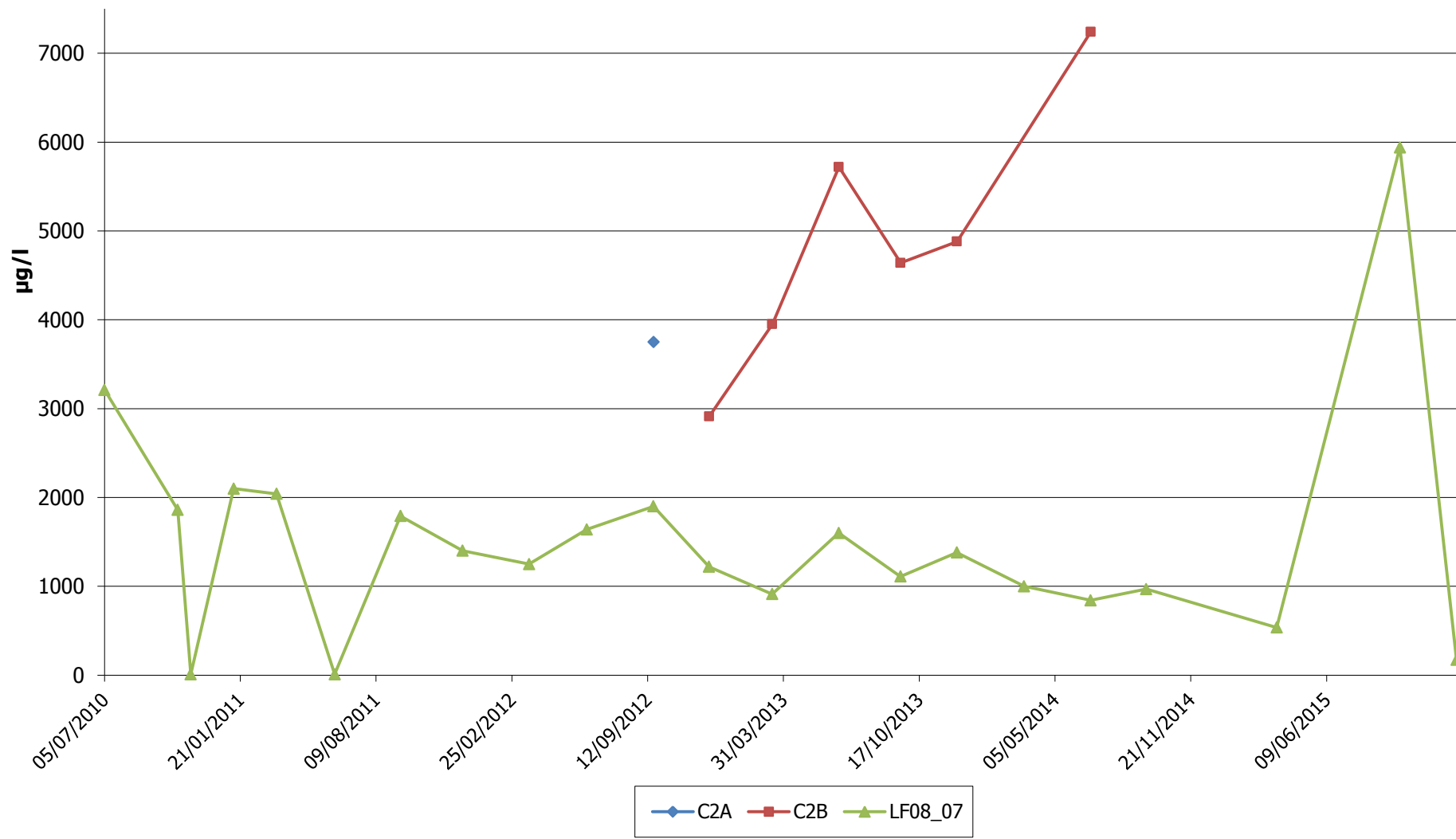
Appendix 3/4
Docksway Disposal Site - Naphthalene in Leachate



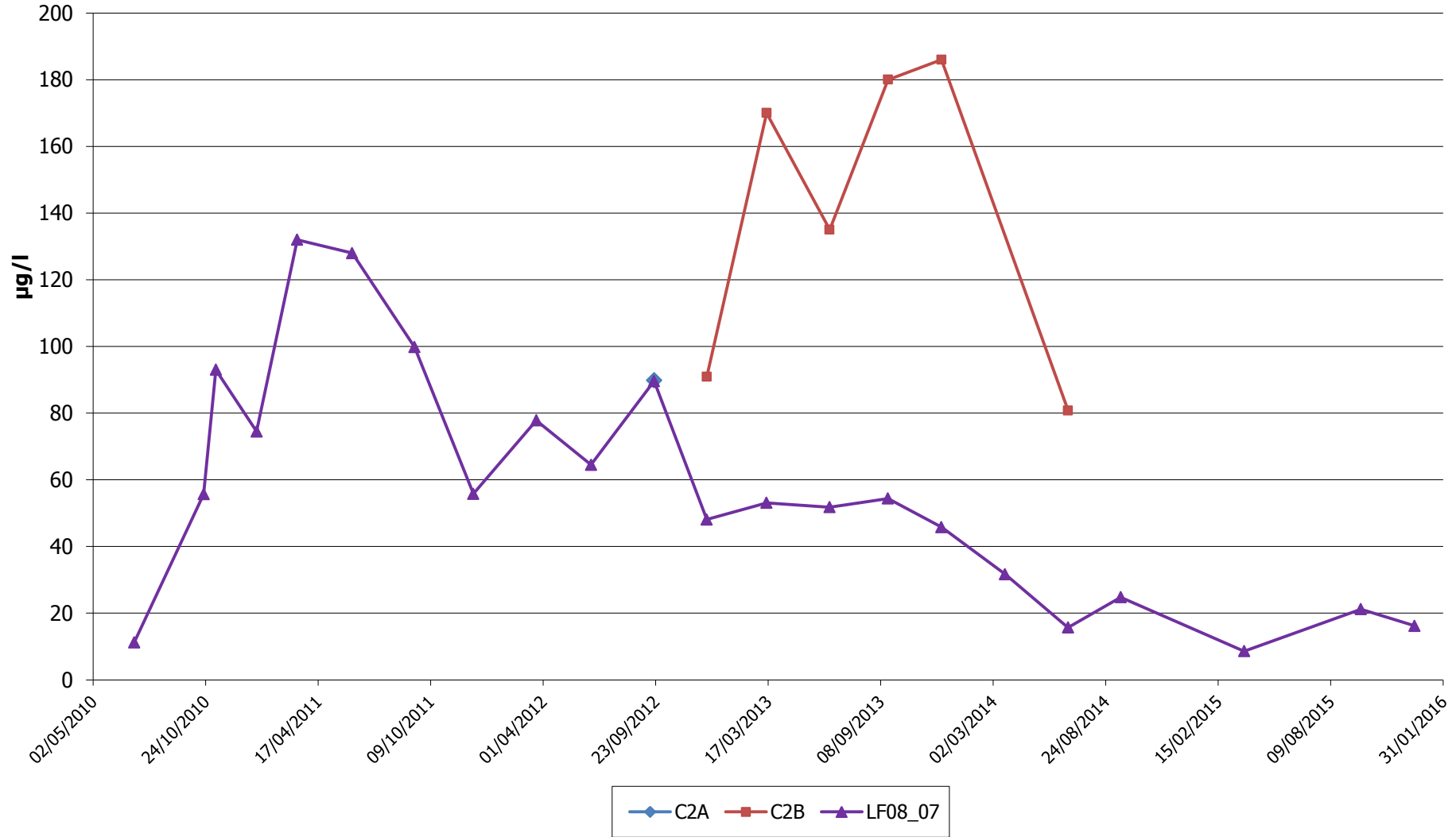
Appendix 3/5
Docksway Disposal Site - Xylene in Leachate



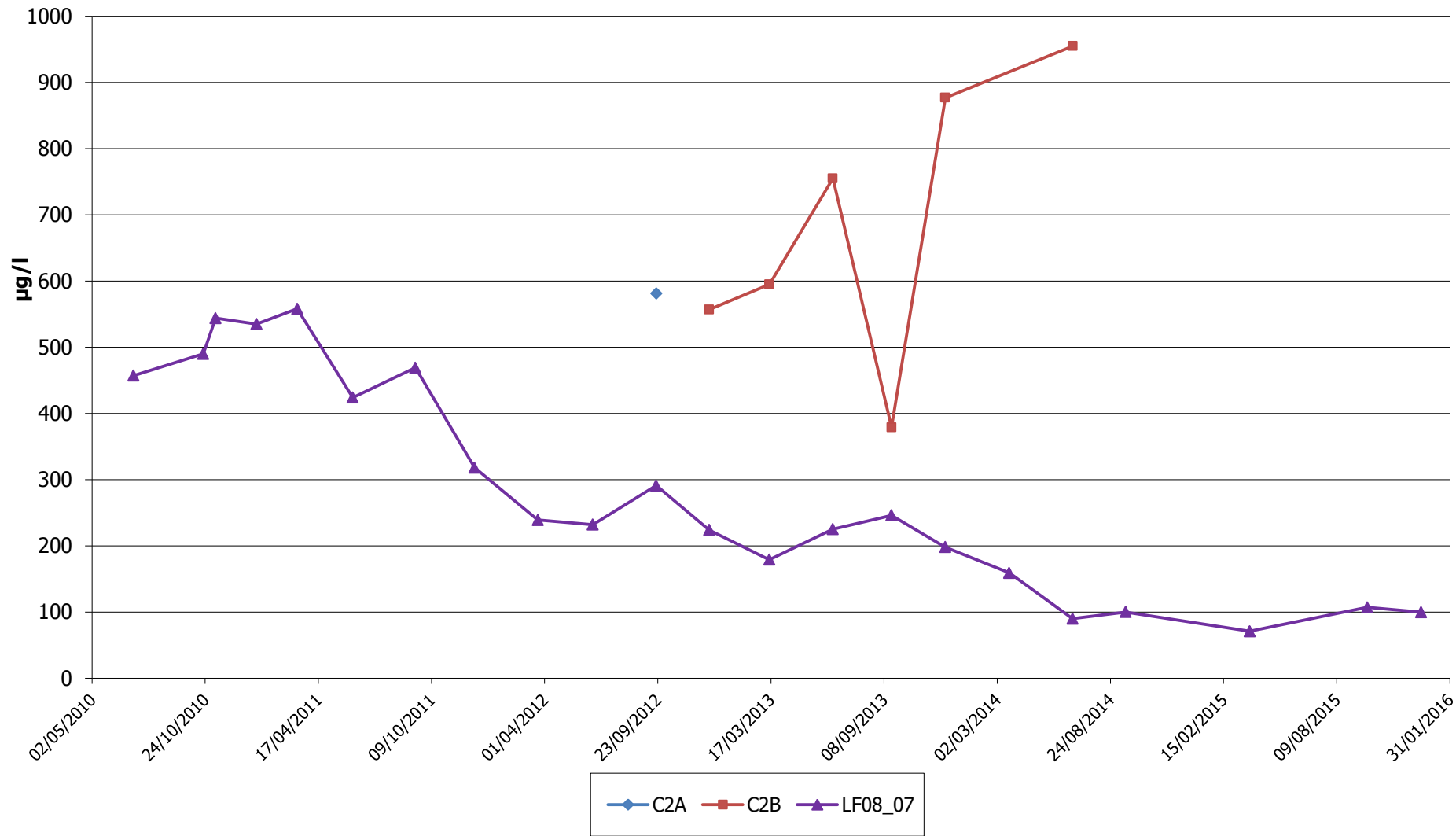
Appendix 3/6
Docksway Disposal Site - EPH in Leachate



Appendix 3/7
Docksway Disposal Site - Nickel in Leachate



Appendix 3/8
Docksway Disposal Site - Potassium in Leachate

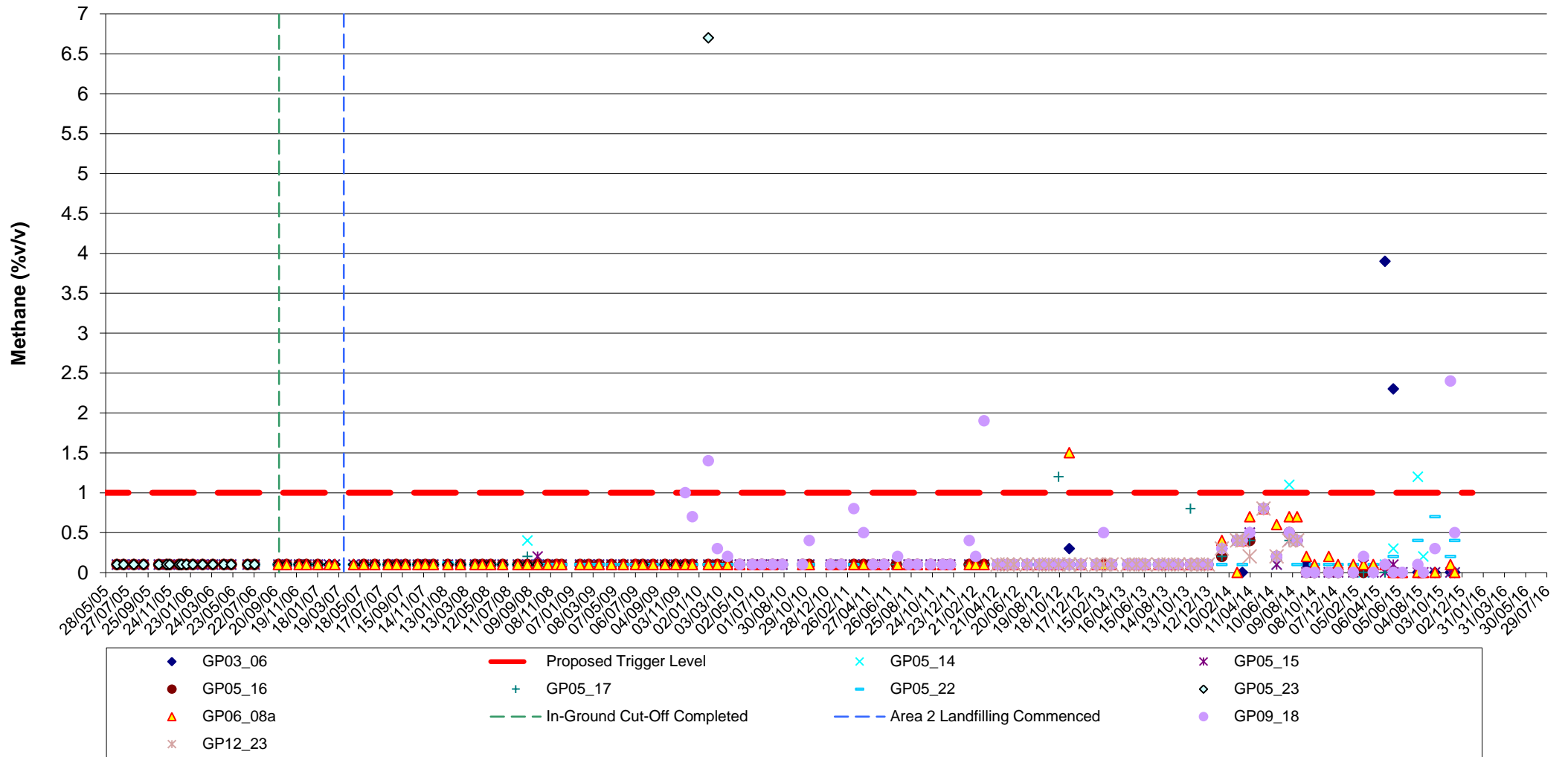


Appendix 4

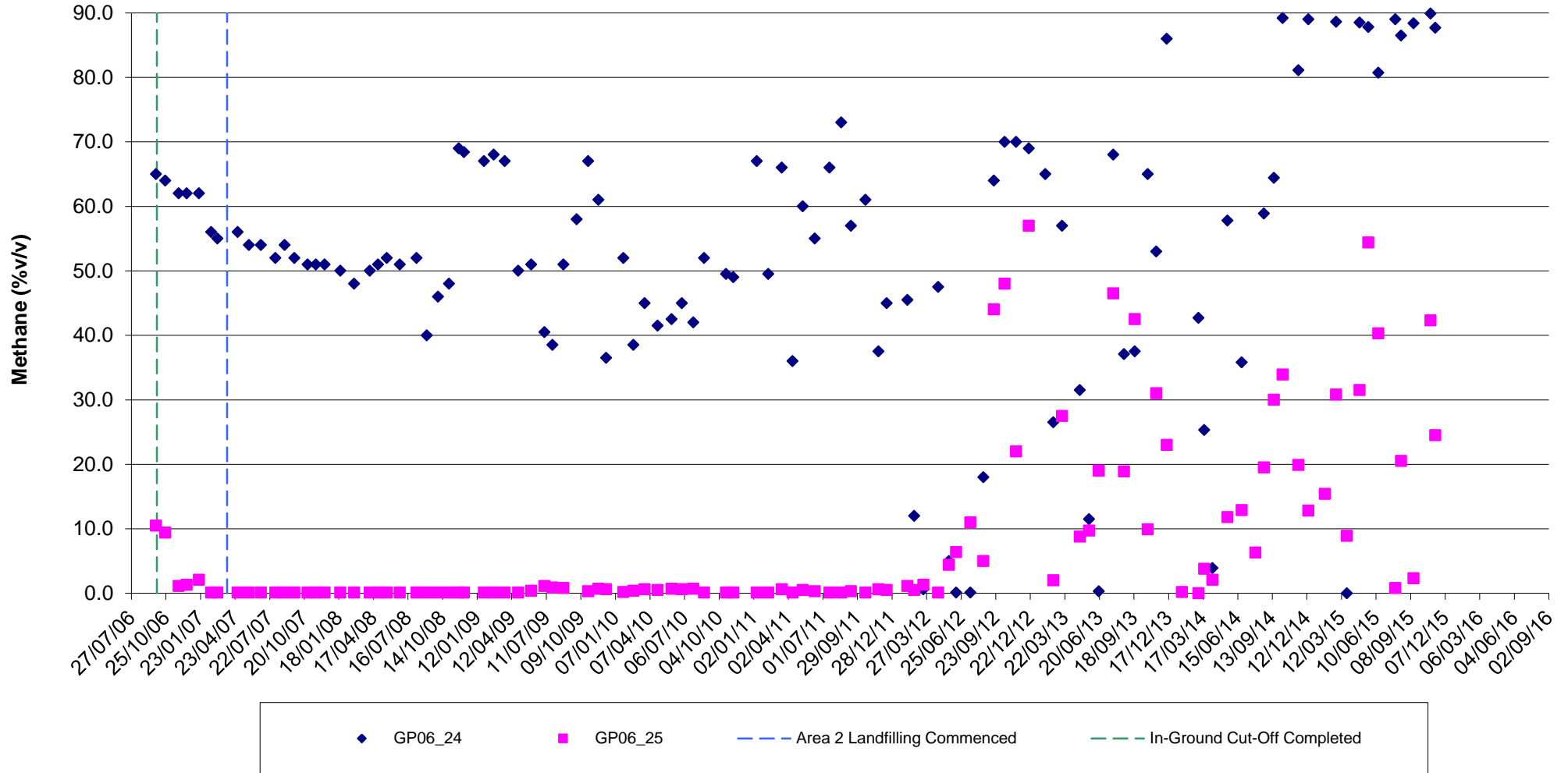
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Appendix 4/1

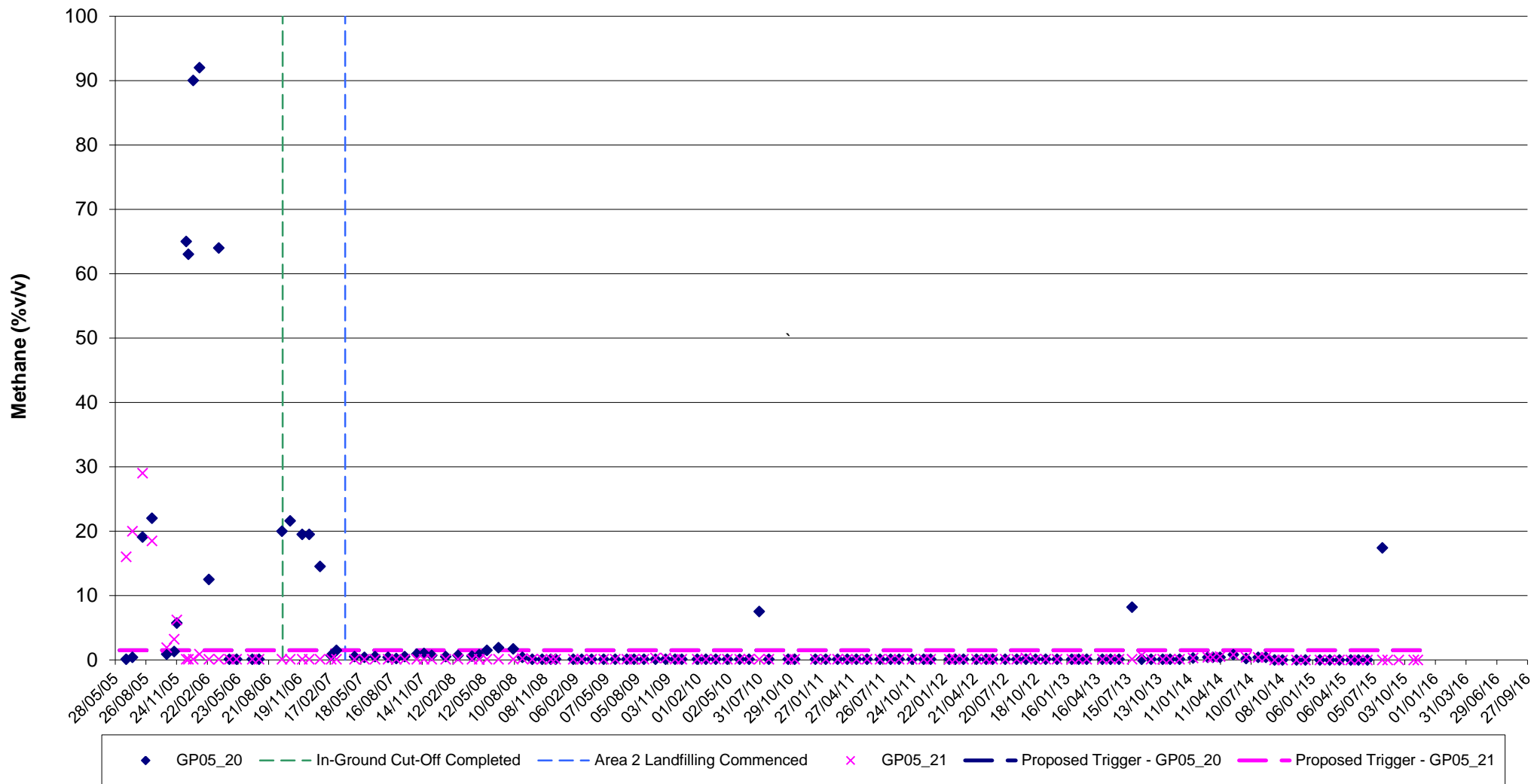
Docksway Disposal Site - Methane Concentrations in Area 2 Gas Monitoring Wells (Excluding GP05_20, GP05_21, GP06_24, GP06_25)



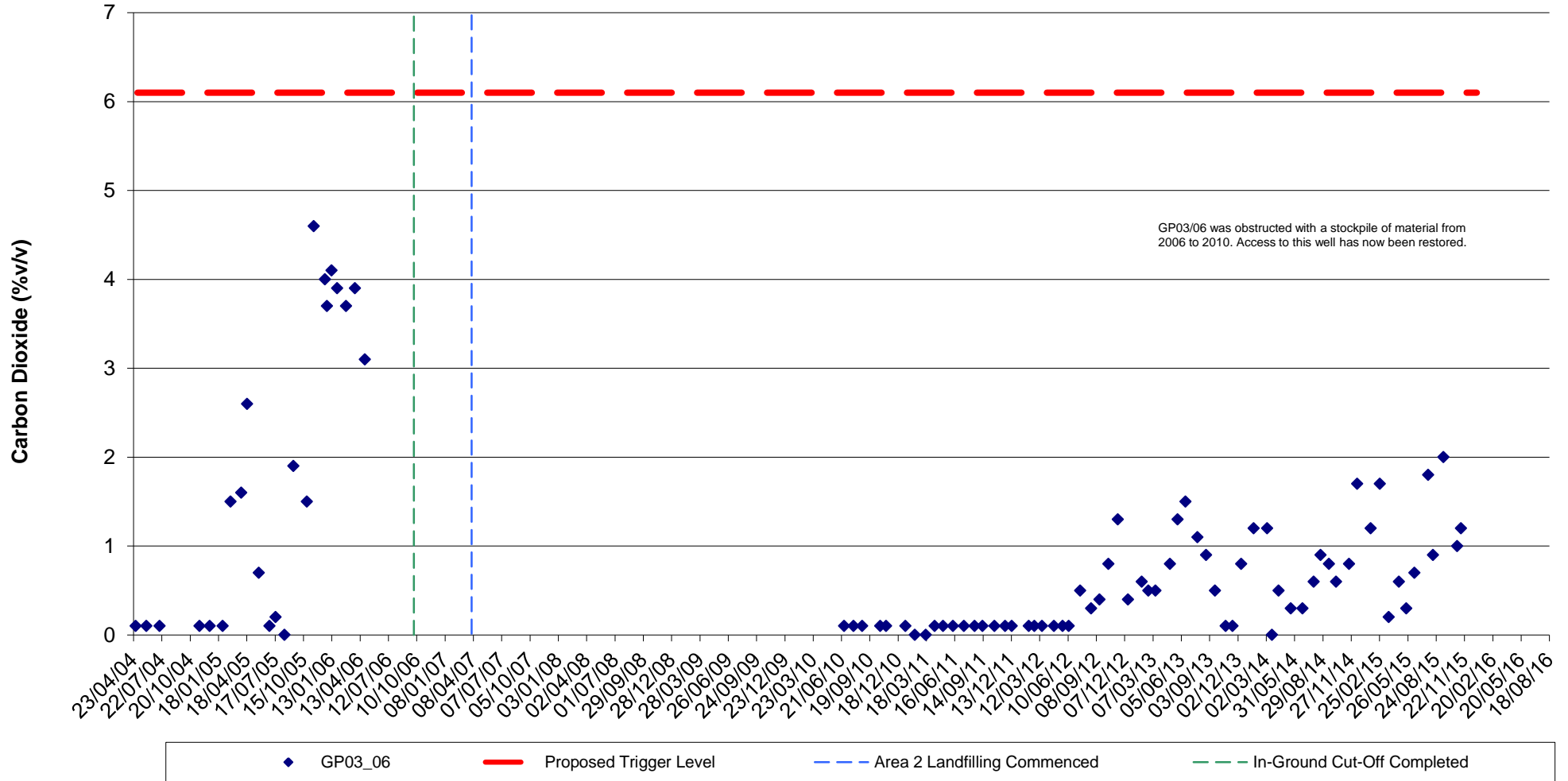
Appendix 4/2
Docksway Disposal Site
Recorded Methane Concentrations for GP06_24 and GP06_25



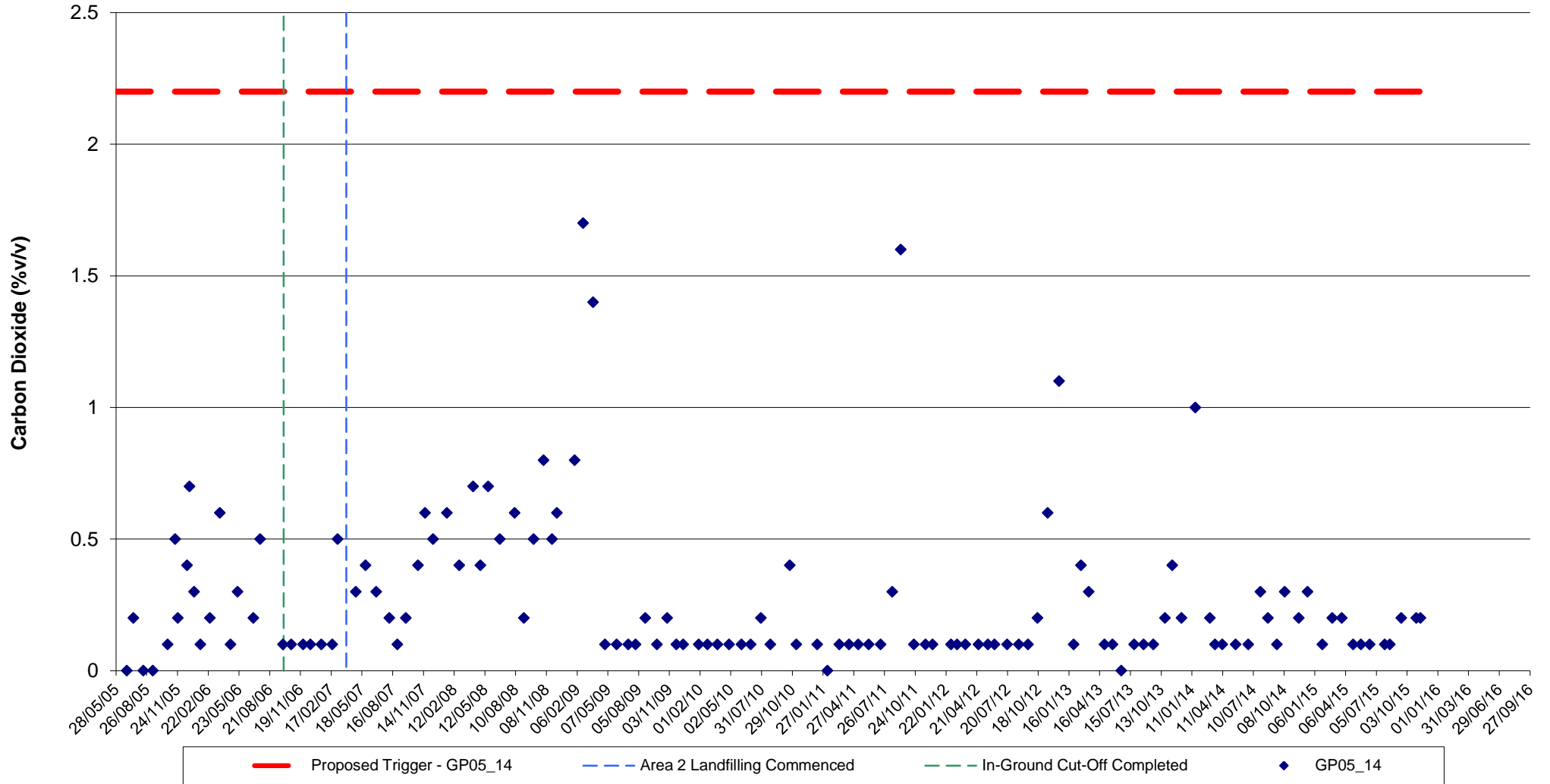
**Appendix 4/3
Docksway Disposal Site
Recorded Methane Concentrations in GP05_20 and GP05_21**



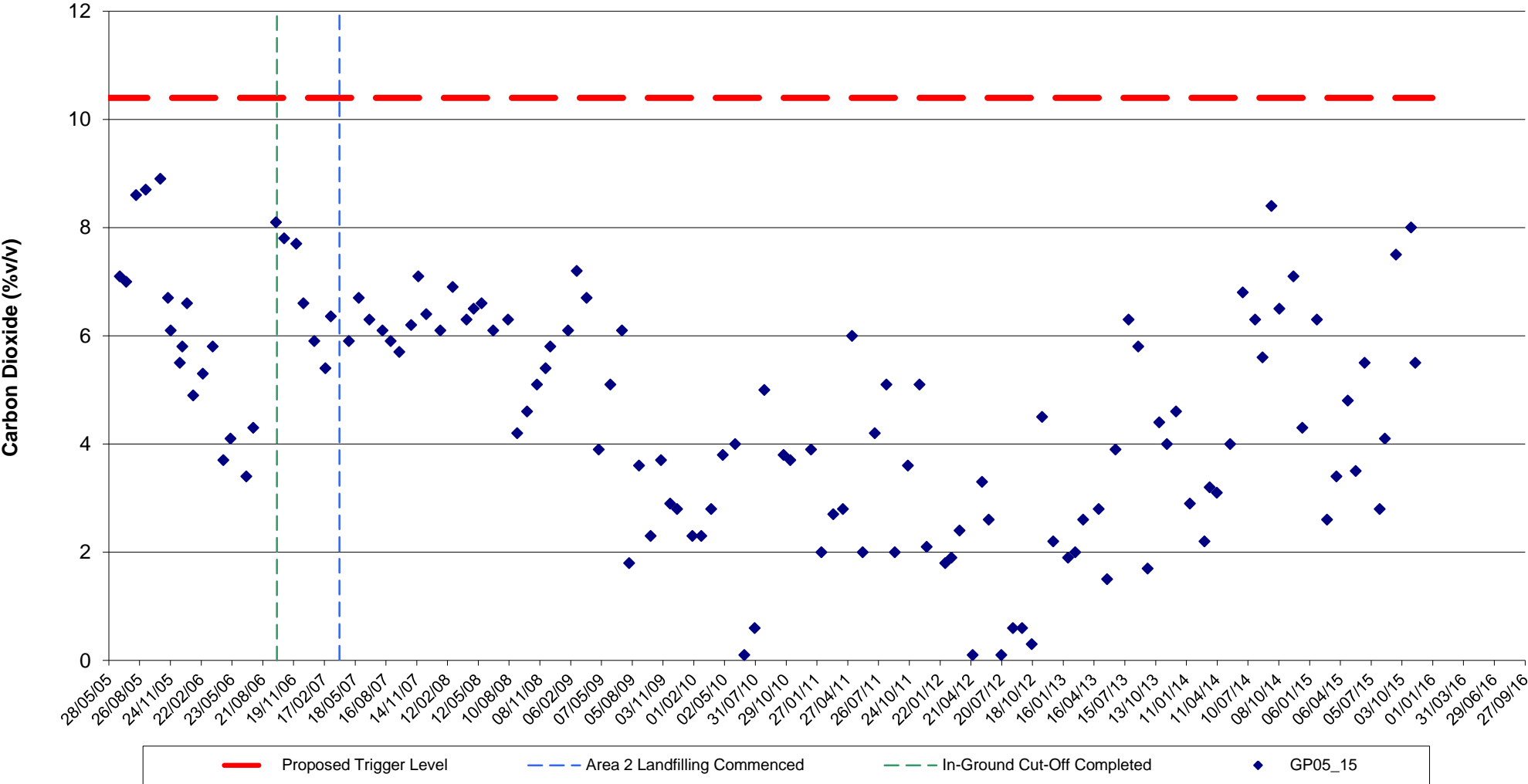
Appendix 4/4 Docksway Disposal Site Recorded Carbon Dioxide Concentrations in GP03_06



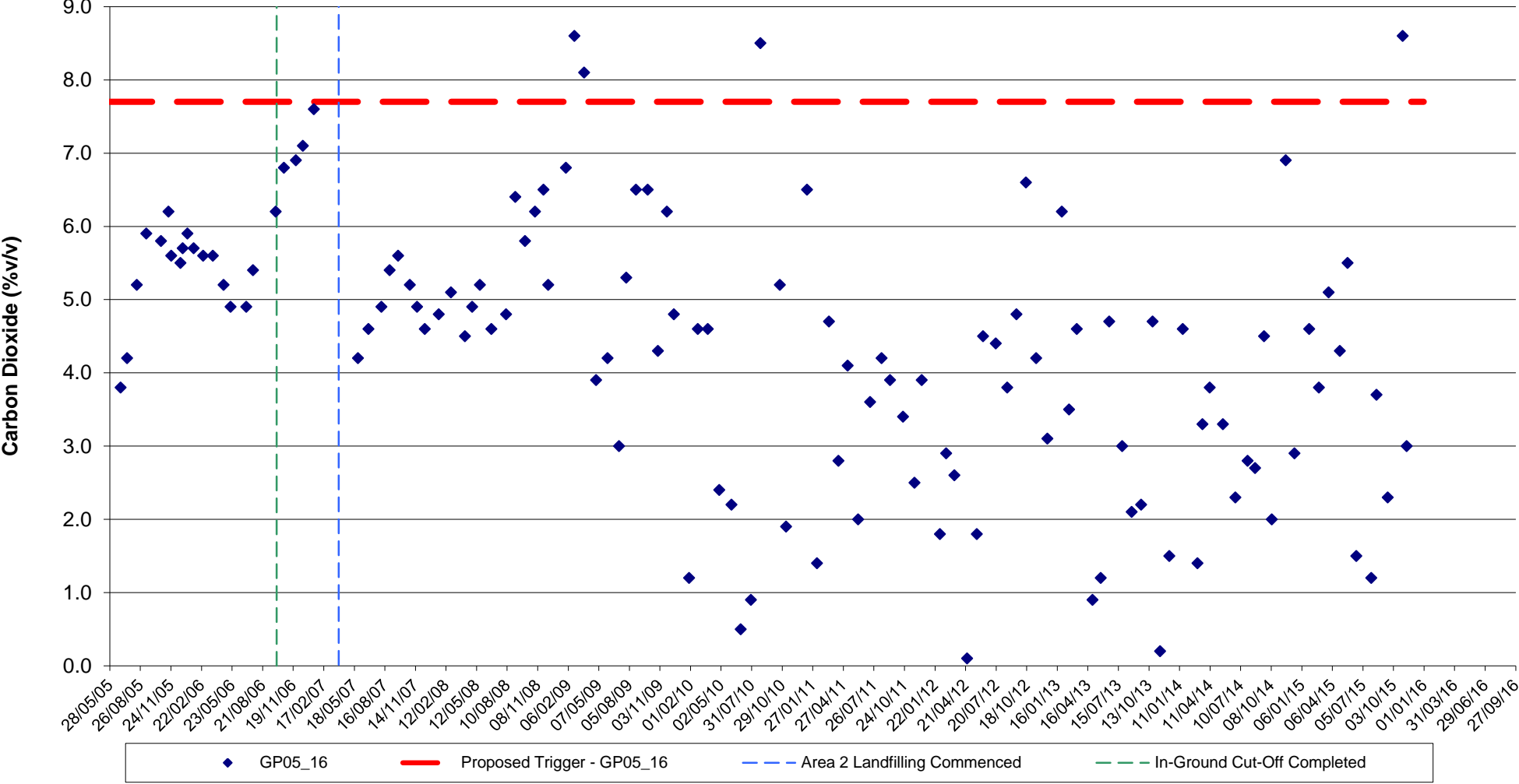
Appendix 4/6
Docksway Disposal Site
Recorded Carbon Dioxide Concentrations in GP05_14



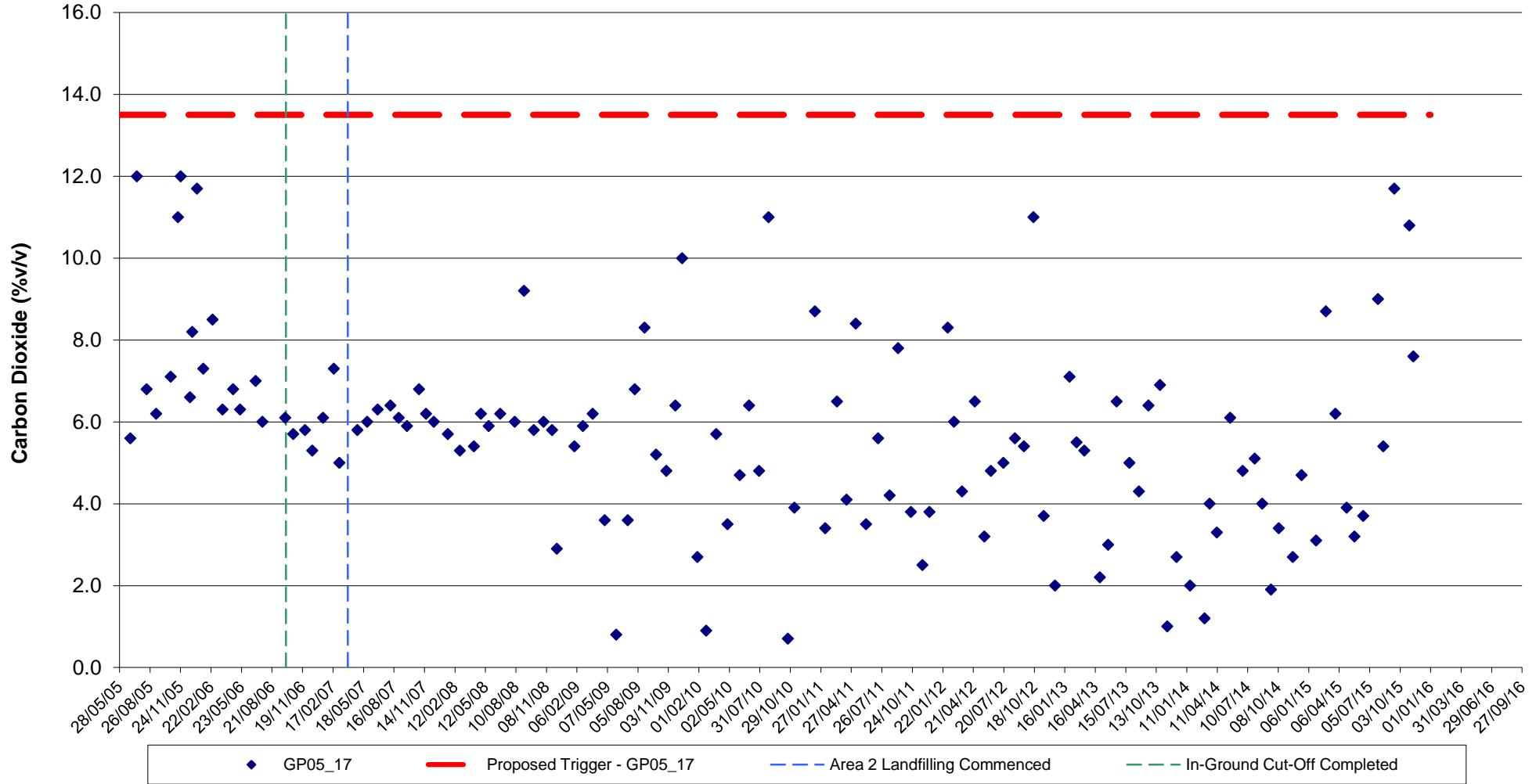
Appendix 4/7
Docksway Disposal Site
Recorded Carbon Dioxide Concentrations in GP05_15



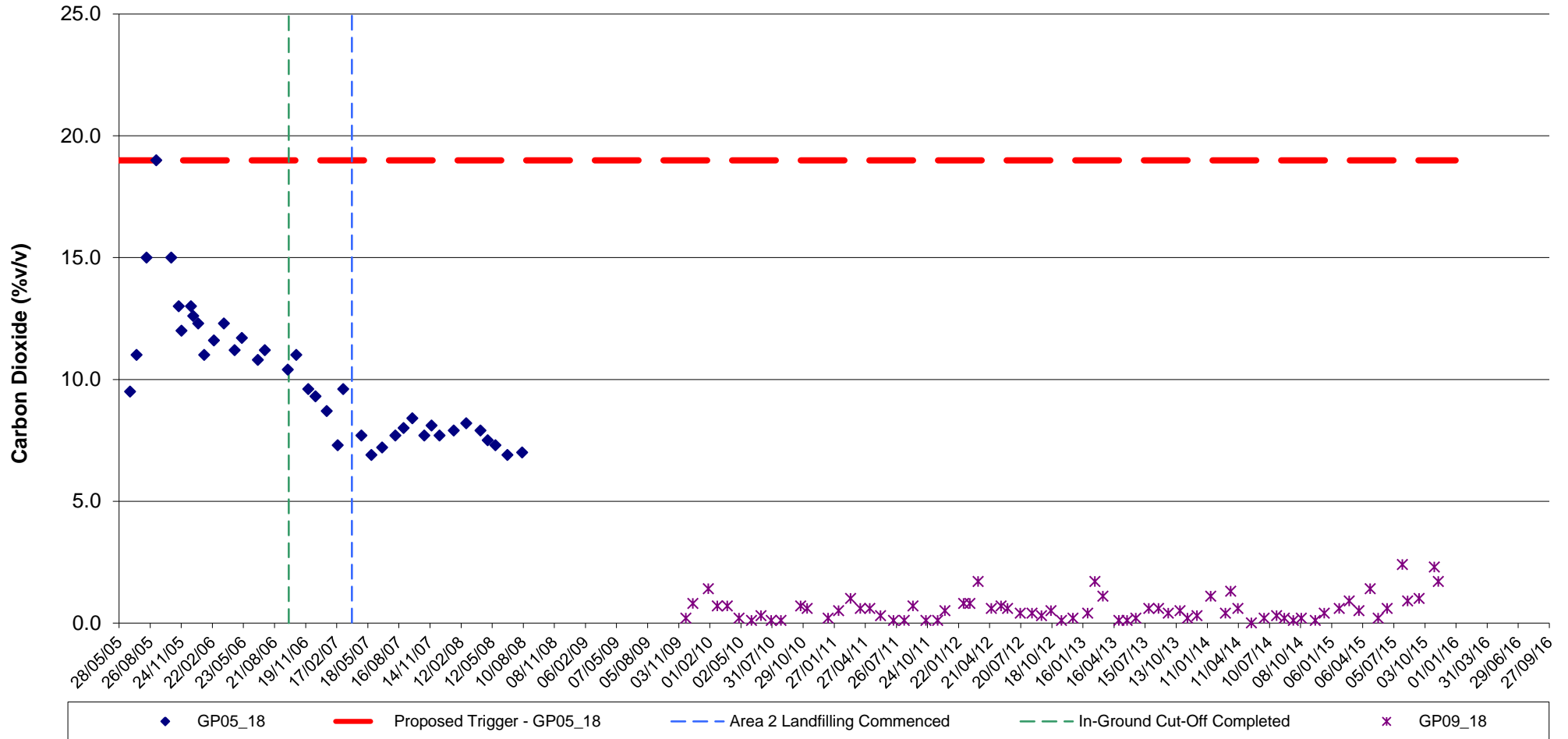
Appendix 4/8
Docksway Disposal Site
Recorded Carbon Dioxide Concentrations in GP05_16



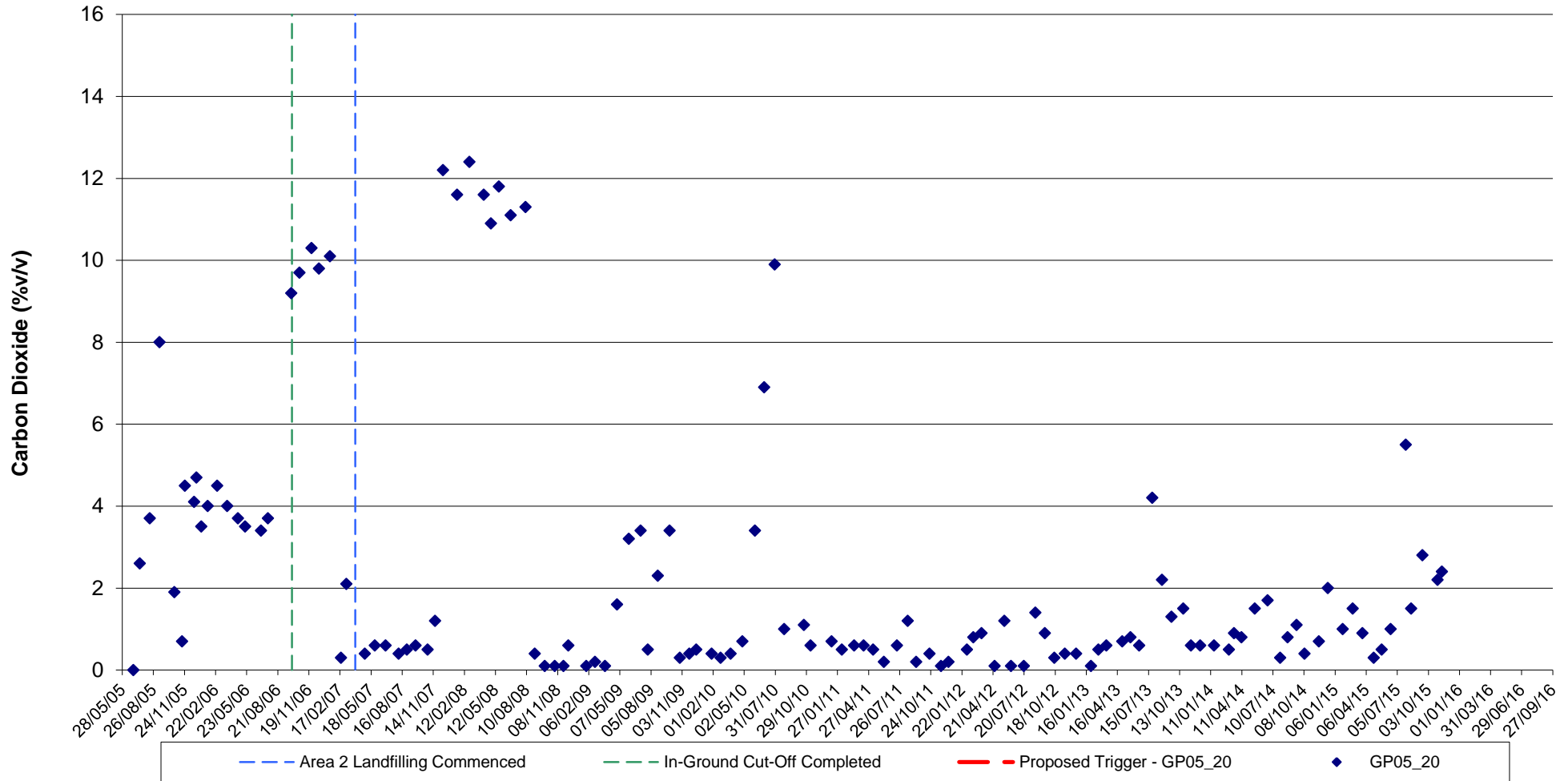
**Appendix 4/9
Docksway Disposal Site
Recorded Carbon Dioxide Concentrations in GP05_17**



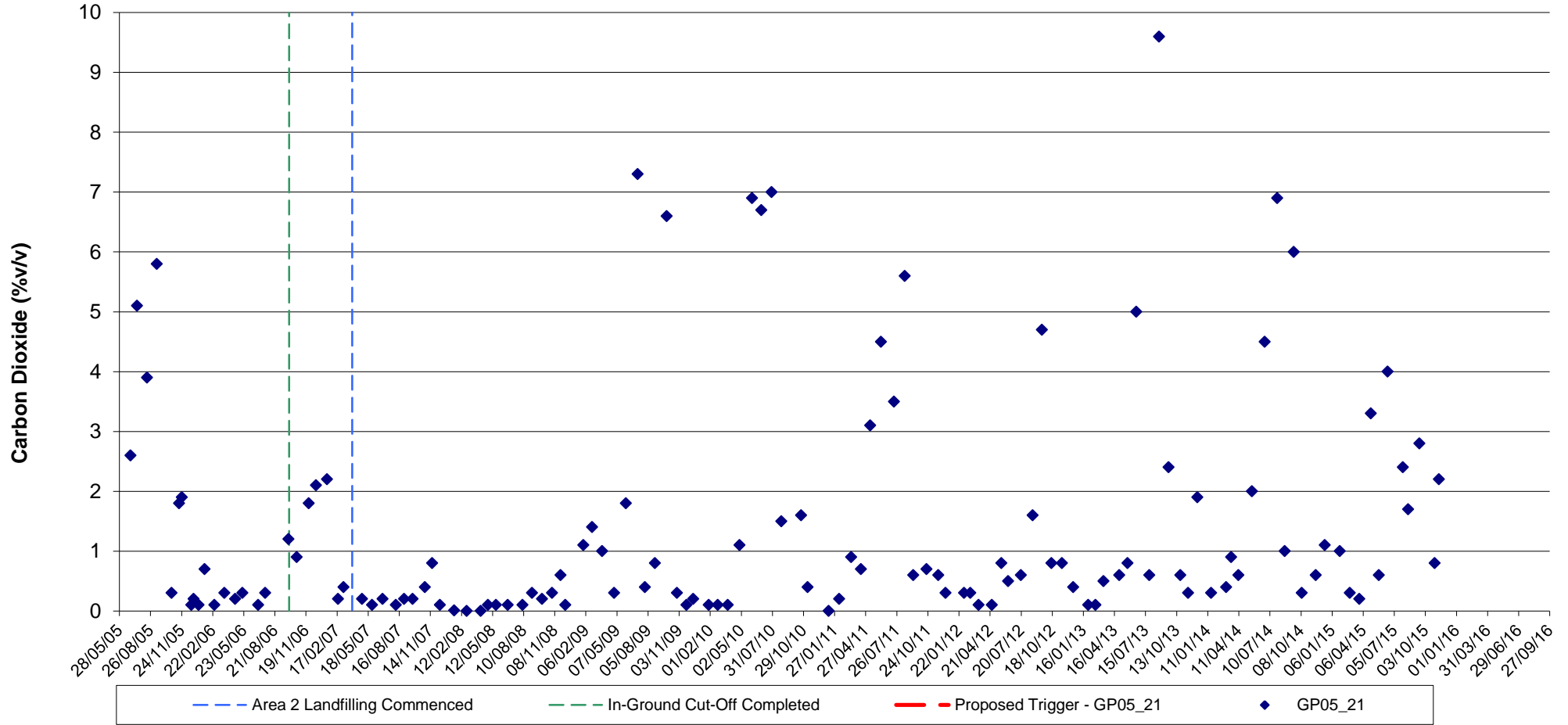
Appendix 4/10
Docksway Disposal Site
Recorded Carbon Dioxide Concentrations in GP05_18 and GP09_18



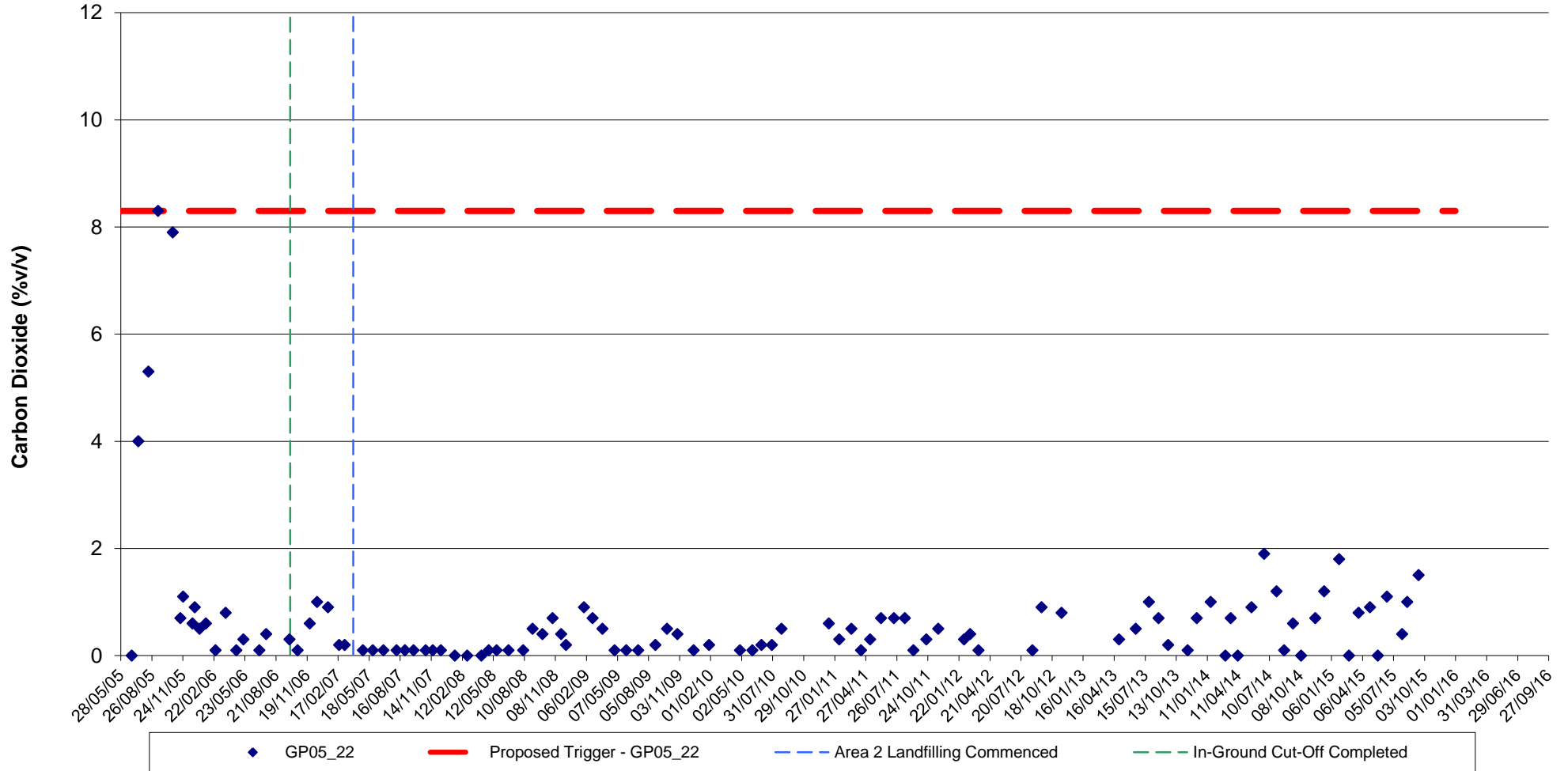
**Appendix 4/11
Docksway Disposal Site
Recorded Carbon Dioxide Concentrations in GP05_20**



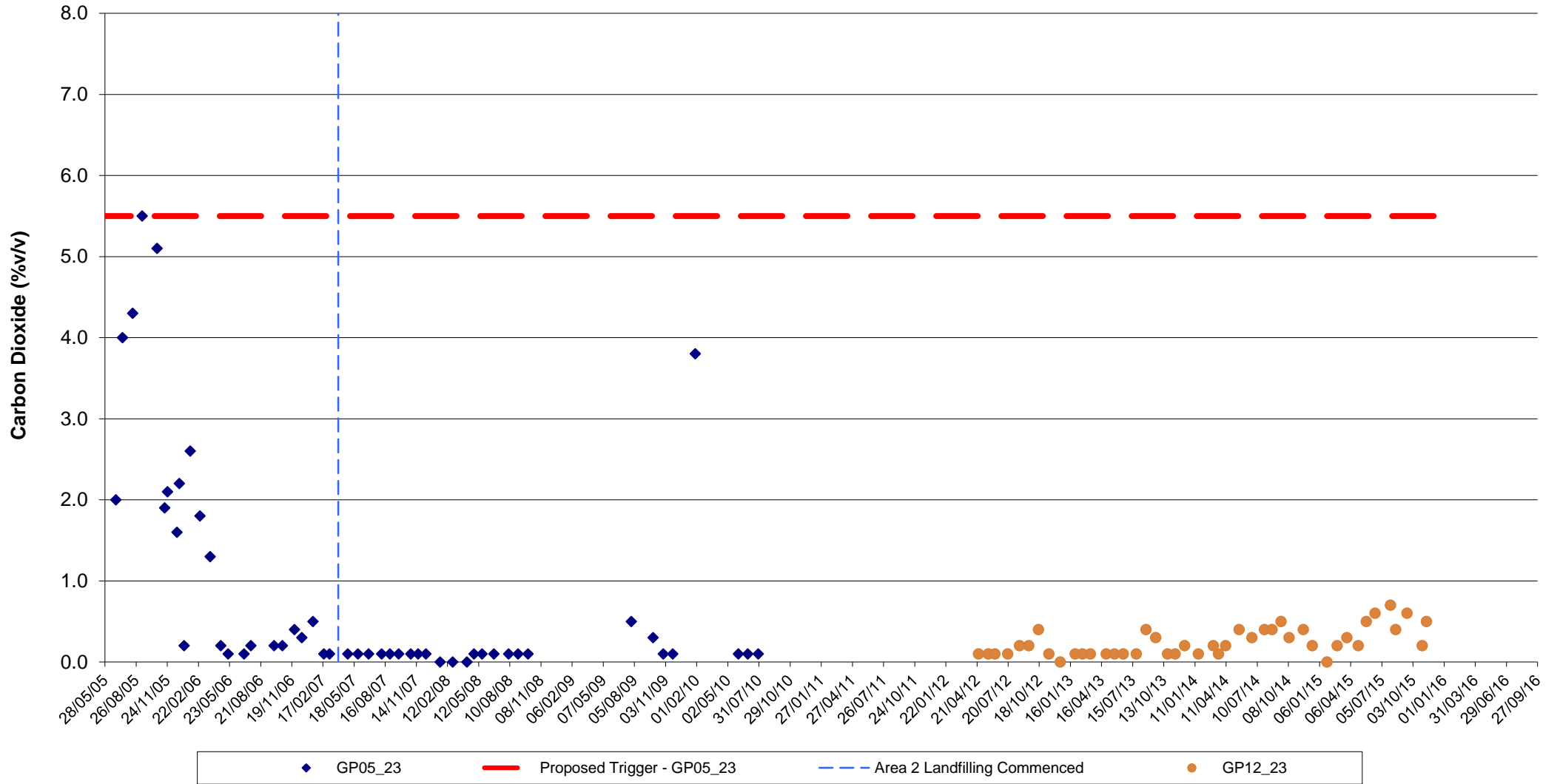
**Appendix 4/12
Docksway Disposal Site
Recorded Carbon Dioxide Concentrations in GP05_21**



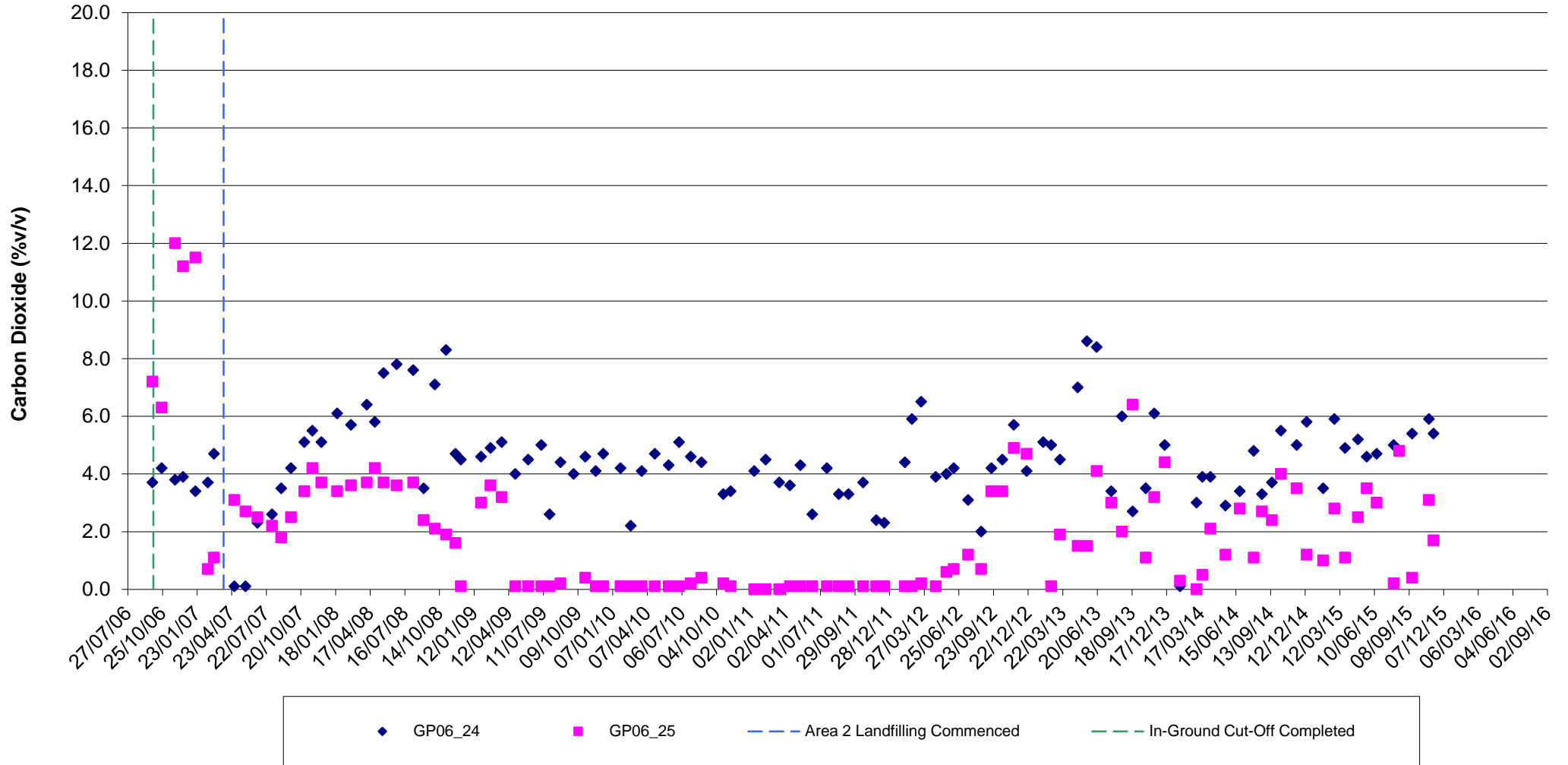
Appendix 4/13
Docksway Disposal Site
Recorded Carbon Dioxide Concentrations in GP05_22



Appendix 4/14
Docksway Disposal Site
Recorded Carbon Dioxide Concentrations in GP05_23 and GP12_23



Appendix 4/15
Dockway Disposal Site
Recorded Carbon Dioxide Concentrations for GP06_24 and GP06_25



Appendix 5

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Business Management System

Document No.:CAS 2.8
Revision No.:2
25/01/11

Annual permit report

Installation	Docksway
Permit reference	LP3135SB
Reporting period	Jan - Dec 2015
Permit Operator	Novera Energy

Author: Su Ruthven

Date: 15-Jan-16

Authorised to sign as representative of the Operator

Fugitive Emissions Review		Reporting period:	Jan - Dec 2015
Installation Name:		Permit reference	LP3135SB
Substances Released/Potentially	Description of event and any contamination/decontamination of the site which has occurred		
Landfill gas	Details of any notifiable events have been submitted to the Environment Agency in accordance with our notification procedure		
Spillages	No significant spillages, contamination or decontamination to report for this installation		

Site Management System Review	Docksway
Date of recent review / issue	Date next review required*
15/01/2013	2017

*Site Management Systems (SMSs) incorporate details regarding site protection and monitoring.

Site Closure plan review	Docksway
Date of recent review / issue	Date next review required*
27 February 2015	February 2019

The Permit requires that the site closure plan is reviewed at least every four years

Raw Materials (& Water) Assessment Table							
Site: Docksway		Reporting period: Jan - Dec 2015			Permit Reference: LP3135SB		

Raw Materials	Application	Current Measures to Ensure Efficiency and Waste Minimisation	Annual Quantity Used	Fate of Material	Environmental Impact Potential	Reason Alternatives are Not Practicable	Details of Process Modifications which Could Result in Savings
Landfill gas	Fuel for engines to produce electricity	Kilowatt generation from volumes processed is maximised through effective operation, maintenance and servicing of plant	Variable depending on site conditions	Combustion	Potentially flammable, explosive, toxic, asphyxiant, ecotoxic, corrosive and odorous, greenhouse gas	N/A - Combustion of landfill gas essential for environmental control	N/A - environmental benefits to be gained from conversion of methane to CO2
Lubricating oils	To ensure efficiency of utilisation plant is maintained in accordance with manufacturer's instructions	Efficient use of lubricating oil is maximised through oil analysis to identify requirement for oil changes	6000 litres of oil purchased in 2015	Reprocessing	Ecotoxic and odorous	Specification determined by engine manufacturer to ensure maximum performance and efficiency	Oil used is specialised for landfill gas fuel as recommended by the OEM. Oil change intervals are based on oil analysis therefore maximising efficiency and minimising use
Water	Coolant for engine block and domestic water supply	Cooling water is recirculated around the engines to maximise efficiency and minimise consumption	No water supply on site.	Treatment	Inert	N/A - Inert therefore best practicable environmental option	Re-use of water for coolant purposes ensures volumes used are as low as reasonably practicable. Cleaning practices assessed and minimal volumes used, cleaning practices are infrequent.
	Hygiene purposes	handwashing and (where available) toilet facilities		where installed toilet waste is removed from site and treated as sewerage	Inert	n/a	n/a
Glycol	Antifreeze for use in coolant water	Glycol is recirculated around the engines to maximise efficiency and minimise consumption	Glycol contained within enclosed-loop system is drained into a container for re-use. OEM* recommends change of glycol every 20,000 hours. Infnis policy is to change following natural depletion or contamination.	Reprocessing	Toxic, ecotoxic	Specification determined by engine manufacturer to ensure maximum performance and efficiency	Antifreeze mix is specific to engine type and pre-determined by the OEM*. Levels are topped-up following natural depletion or contamination
Battery Acid	In batteries used for engine start-up and to provide back-up power to ensure rapid restart following any loss of mains power supply	Battery use is essential minimised to the applications listed (see left)		Recycled	Corrosive	Portable electrical supply required for start-up	Minimal use of battery during start-up only therefore opportunity for savings is insignificant

*OEM: Original Engine Manufacturer

Waste Minimisation, Recovery and Disposal Assessment

Installation Name: Docksway Gas Utilisation Plant	Permit Reference: LP3135SB	Reporting period: Jan - Dec 2015
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Waste Stream	Application/Source	Current Measures to Ensure Efficiency and Waste Minimisation	Fate of Material	Reason Alternatives are Not Practicable	Details of Process Modifications which Could Result in Savings
Oil Filters (205ltr Drum) (EWC 16-01-07)	Engine maintenance	Predetermined by manufacturers' recommendations to ensure efficiency	Reprocessing	Oil and filtration devices predetermined by manufacturers to ensure efficiency	Not applicable: oil filters changed at pre-determined life based on oil analysis and differential pressure
Oil Contaminated Rags & Absorbents (205ltr Drum) (EWC 15-02-02)	Engine maintenance and housekeeping	Control measures in place to prevent spillage	Reprocessing	As above	No further modifications considered possible: Preventative maintenance and procedural practices minimise spillage and the requirement for oil absorbancy products
Waste Engine Oil (Bulk) (EWC 13-02-05)	Engine maintenance	Efficient use of lubricating oil is maximised through oil analysis to identify requirement for oil changes	Reprocessing	As above	No further modifications considered possible: Oil used is specific to the landfill gas fuel in use and as recommended by the OEM*. Oil change intervals are based on oil analysis therefore maximising efficiency and minimising use
Batteries (EWC 16-06-01)	Engine maintenance	Recharged	Recycled	Batteries essential for engine start-up and ensuring rapid restart	Batteries only replaced when they no longer hold a charge. Maintenance practices are in place to lengthen battery life
Fluorescent Tubes (EWC 20-01-01)	Lighting	Replacement when faulty or damaged	Reprocessing	Alternatives not considered practicable due to warm-up time of energy saving bulbs	Tubes are only replaced when they have expired
General Waste	Packaging	Waste streams which can be reprocessed or recycled are identified and segregation facilities provided where appropriate	Disposal	Materials not segregated/ reprocessed are produced in small quantities only making alternatives not viable	Not applicable as a result of small quantities only being produced
Waste water/effluent	Welfare facilities	Facilities are maintained to ensure minimal water usage	Road tanker to treatment plant	Connection to mains sewer not practical - quantities produced are small.	Not applicable as a result of small quantities only being produced

*Original Engine Manufacturer

Annual Reporting of Other Performance Indicators

Installation:	Docksway Landfill Gas Utilisation Plant	Permit Reference:	LP3135SB
Parameter	Jan - Dec 2015	Units	
Flare operation hours	699	hrs	
Gas engine downtime hours	584	hrs*	
Gas engine operation hours	8176	hrs	
Volume of landfill gas combusted	297,122	m3 (treated by flare)	
	3,475,352	m3 (treated by engines)	
	3,772,474	m3 (total treated by engines & flare)	

Operator's Comments:

This site was reclassified as a Directly Associated Activity following the implementation of the Industrial Emissions Directive. An engine was removed from the site in January 2014.

Reporting of Performance Indicators (Form Ref: PI1)

Installation:	Docksway Landfill Gas Utilisation Plant	Permit Reference:	LP3135SB
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Annual Production/Treatment (MWh)

Total production of energy	6833
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Environmental Performance Indicators

Parameter	Annual Average Jan - Dec 2015	Units	Trends in Environmental Performance	
			2013	2014
Total oxides of nitrogen (expressed as NO2) emission	2.0	Kg/MWh	2.4	2.1
Total carbon monoxide emission	4.4	Kg/MWh	4.0	4.9
Total engine downtime (downtime hrs/available operation time in hrs)	6.7	%	50.4	7.6

Reporting period	Energy Imported (Primary Energy Usage) (MWh)	Parasitics (MWh)	Energy Exported (MWh)	Energy Used on Site (MWh)	Site Efficiency
Jan - Dec 2015	10.6	305	6528	316	33.4

*site efficiency has been calculated as follows: ((Engine efficiency (%) x (gas to generation/total gas) x (power export / (power generation + imported power))).

Installation:	Docksway Landfill Gas Utilisation Plant	Permit Reference:	LP3135SB
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Accident Management Plan Review		Jan - Dec 2015
Current Review Date	Date of Next Review	
01 November 2015	Reviewed monthly following a review of notifiable events	

Permit requires that the accident management plan is reviewed at least every 2 years, or as soon as practicable after an accident (whichever is the earlier).

Operator's comments:
No accidents occurred during this period which would require amendment to the Accident Management Plan for this installation.

Installation: Docksway Landfill Gas Utilisation Plant	Permit Reference: LP3135SB
Emissions to Air Reporting Jan - Dec 2015	
Report Submission Date	16-May-15
Submitted to	David Willey

Summarised Report Detailing Progress Towards EMS Annual Improvement Targets & Objectives

Installation:

Docksway Landfill Gas Utilisation Plant

Permit Reference:

LP3135SB

Operators Comments

Targets and objectives are set annually. Detailed reviews of these are conducted on a quarterly and annual basis. An annual summary of the progress towards the FY15 targets and objectives was submitted to the EA in 2015. An annual summary of progress towards the FY16 objectives will be forwarded following the annual review later this year.