Dow Corning Ltd Site SPMP Report – 2016

The following items are included within the report:

1. H2 Infrastructure Monitoring Report
2. Spill Report
3. Landfill groundwater Sampling Programme and update on boreholes

H2 INFRASTRUCTURE MONITORING REPORT Period: 2016

Infrastructure Element	Monitoring Frequency	Scope of Monitoring	Summary of monitoring performed versus plan and key issues identified	Summary of Remediation Action Taken and/or planned
Bunds and Interceptors	(every 2-4 years depending on condition, volume & contents hazard)	A programmed visual engineering inspection and condition assessment will be undertaken for: • Foundations • Overall structure • External walls • Ground floor • Stairs and access ladders • Protective coatings • Gratings and covers • Joint sealants, and • Other observations The severity and extent of observed defects are assessed using a risk assessment matrix to establish a High, Medium or Low risk for the defect and determine the required response time for remedial attention. • High Risk – Requires attention in the short term i.e. repairs must be done within the year following the inspection. • Medium Risk – Will require attention in medium term, probably after next inspection. • Low Risk – Not urgent; will eventually require attention in the long term.	**Number of inspections carried out:** 13 out of 19 planned. **Outstanding Inspections:** Interceptors **I04** (W718); **I10** (W952 Storm); **I11** (W952 Chem); **I12** (W806 Cells 2 & 3); **I14 (**400 Secondary Bay & Brine Pond); **I15** (1307 Secondary Bay & Brine Pond) not inspected, as in constant use throughout 2016, &/or limited resource to coordinate/jet/prep. Will be inspected in 2017. **Note 1: Interceptors I14 (400 Bay) & I15 (1307 Bay):** Primary Bays & W820 Washdown bay completed, therefore inspections are only partially done – awaiting release of Secondary Bays & Brine Ponds by Area 5. **2016 High risk findings = 3No.** Bund **B06** (W712) – Localised damage to chemical resistant render/coating. Interceptor **I08** (W809 Storm) – Significant wear/voids & pitting to concrete slab. Interceptor **I14** (W820 Washdown Bay) – Acid tile damage/wear.	**'High Priority' Defects:** Repair packages were prepared in QTR 2 of 2016 to address the 2015 'High Priority' defects. A total of approx **£11.8K** has been quoted for to complete these, but there were holds on site & plant maintenance budgets in the 2nd half of 2016. These repairs are due to be addressed by end QTR 2 2017, if site & maintenance budgets allow. All 'High Priority' defects recorded in 2016 inspections have been added to the ongoing repair list & will be quoted for & agreed by end QTR 2 2017, with intended completion by end QTR 4 2017, if site & maintenance budgets allow. **'Medium Priority' Defects:** These assets will be reviewed at the next scheduled inspection unless otherwise highlighted as requiring immediate attention. (E.g. from Plant Operators, HONKS, Structural Inspections etc).

			2016 Low to Medium risk findings = 11No. **Typical Issues identified:** Minor acid tile damage. Minor surface cracks to slabs/walls/screeds <5mm wide. Minor chem pitting or condensate wear to slab. Minor joint sealant deterioration. Spalling to top courses of brickwork. (Note: W708 B03, B04 & B05 are non-compliant brickwork bunds).	

Infrastructure Element	Monitoring Frequency	Scope of Monitoring	Summary of monitoring performed versus plan and key issues identified	Summary of Remediation Action Taken and/or planned
Surfaced areas	Inspection frequency determined by risk score for each hardstanding area.	Appearance of cracks and evidence of fluids ingress into the subsurface; • Deterioration of sealed joints in concrete hardstanding; • Vehicular damage to containment kerbs; • Subsidence or movement; • Discolouration/staining • Evidence of surface spalling and/or chemical attack; and • Ponding and/or run off to non hardstanding areas.	**Number of inspections carried out:** 8 out of 8 planned. **2016 High risk findings = 6No.** Hardstanding **H10** (W410 Loading Bays) – Missing joint sealant. Hardstanding **H10** (W410 Warehouse) – Acid tile defects; concrete slab voids, missing joint sealant. Hardstanding **H14** (W1205/1206) – Localised cracks; concrete slab voids; missing joint sealant.	**'High Priority' Defects:** Repair packages were prepared in QTR 2 of 2016 to address the 2015 'High Priority' defects. A total of approx **£12.8K** has been quoted for to complete these, but there were holds on site & plant maintenance budgets in the 2nd half of 2016. These repairs are due to be addressed by end QTR 2 2017, if site & maintenance budgets allow. All 'High Priority' defects recorded in 2016 inspections have been added to the ongoing

		The severity and extent of observed defects will be assessed using the risk assessment matrix developed for the bund and interceptor inspection programme. This will establish a High, Medium or Low risk for the defect and determine the required response time for remedial attention. • High Risk – Requires attention in the short term i.e. repairs must be done within the year following the inspection. • Medium Risk – Will require attention in medium term, probably after next inspection. • Low Risk – Not urgent; will eventually require attention in the long term.	Hardstanding **H17** (W806) – Localised cracks; concrete slab voids; vegetation growth. Hardstanding **H18** (W406) – Localised cracks; missing joint sealant. Hardstanding **H19** (W403) – Localised cracks; concrete slab voids. **2016 Low to Medium risk findings = 2No.** **Typical Issues identified:** Minor surface cracks to slabs/walls/screeds <5mm wide. Minor chem pitting or condensate wear to slab. Minor acid tiling defects. Minor joint sealant deterioration.	repair list & will be quoted for & agreed by end QTR 2 2017, with intended completion by end QTR 4 2017, if site & maintenance budgets allow. **'Medium Priority' Defects:** These assets will be reviewed at the next scheduled inspection unless otherwise highlighted as requiring immediate attention. (E.g. from Plant Operators, HONKS, Structural Inspections etc).

Infrastructure Element	Monitoring Frequency	Scope of Monitoring	Summary of monitoring performed versus plan and key issues identified	Summary of Remediation Action Taken and/or planned
Chemical Sewer Inspections	BAT requirement for an inspection programme is every 3 years. i). It was agreed that the **Site Chemical Open Channel**	i). In line with NRW requirements, **Atec Drainage LTD** were invited to site in 2016 to carry out condition surveys of the open chemical channel network as follows: Finishing in 2016, Dragon in 2017 & Genesis in 2018. **Atec Drainage LTD - Scope of works included:** • Lifting grating covers & cleansing open channel runs, prior to surveying.	**i). Key issues identified to Open Chem Channel Network:** Civils Group completed the review on the first pass of these open channel reports & photographs (i.e. Finishing 2010; Dragon 2011; Genesis 2012) by end of 2012. A list of defects was compiled with a drawing showing each location. Environmental resource helped to populate this defect list based on chemical risk & continuous flow data, to prioritise repairs as follows:	**2017 Plan of Action:** **i). Open Channel Surveys:** - **Period: 2010-2012:** 15No 'Medium/Low Priority – 2s & 1s'. Due to holds on site & plant maintenance budgets in 2016, & due to the low severity of the defects, these repairs will be quoted for & agreed by end QTR 2 2017, if site & maintenance budgets allow.

	system would be split into 3 zones (Finishing, Dragon & Genesis), & inspected under a 3 year rolling programme.	• Provision of survey reports with photographs in standard format	‘5s’ High – repair in 2013 ‘4s’ High/Medium – repair in 2014 ‘3s’ Medium – repair in 2015 ‘2s & 1s’ Medium/Low – repair in 2016/17 The same approach will be applied to the 2nd pass of these open channel reports & photographs, for the Area/Period as follows: Finishing 2016; Dragon 2017; Genesis 2018.	**2016 Repairs:** Approx **£5K** was spent to repair W707 chem channel, which required further excavation/investigation work. Further acid tiling protection is required to W952 chemical channel. Vendor quote **£13K** is currently being reviewed & an order to be placed in QTR 1 2017, if site & maintenance budgets allow. **Period: 2016 Finishing Inspections:** Civils to review reports & photographs, & address any ‘5s – High’ in 2017, if site & maintenance budgets allow.
	ii). Similarly, it was agreed under IP12 that **underground chemical sewers** would be split into 3 zones (new basics, old basics and finishing) and that each zone would be inspected every 6 years under a	ii). In line with NRW requirements, **Atec Drainage LTD** were awarded the tender at start of QTR 3 in 2012, to carry out condition surveys of the underground chemical site sewer network (approx 12Kms) as follows: Genesis in 2012, Dragon in 2013, & Finishing in 2014. **Scope of works includes:** • Cleansing sewer runs and interconnecting chambers prior to surveying. • Upto 100% surveys of underground chemical sewer network.	**ii). Key issues identified to Underground Chem Sewer Network:** Civils Group reviewed all CCTV reports & MH surveys by QTR 2 2014, compiled a list of defects & a drawing showing each location. Environmental resource helped to populate this defect list based on chemical risk & continuous flow data, to prioritise repairs as follows: ‘1s’ – High to ‘9s’ – Low.	**ii). Underground Chem Sewer Surveys:** - **2016 Works:** A **Capital budget of £250K** was secured for the chem sewer repairs in 2016 & a robust overpumping procedure was enforced & agreed early in the year. By year end, a total of **£150K** was spent. The remaining **£100K** is to remain in the project budget for 2017. **Completed 2016 works – Approx £150k:** • 16No patch repairs to pipes

	rolling programme.	• CCTV surveys carried out of each sewer run. • Surveys & water testing of interconnecting chambers & manholes. • Provision of survey reports in standard format. The severity and extent of observed defects will be assessed using the risk assessment matrix developed for the bund and interceptor inspection programme. This will establish a High, Medium or Low risk for the defect and determine the required response time for remedial attention. • High Risk – Requires attention in the year after the inspection (at the latest). • Medium Risk – Will require attention in medium term, probably after next inspection. • Low Risk – Not urgent; will eventually require attention in the long term.		• 19No Manhole repairs or replacements A **Capital budget of £250K** has been secured for the chem sewer repairs in 2017. Civils Group has presented a programme, with the aim of spending as much of the £250K as possible. Any outstanding items from 2016 are now added to this 2017 programme. **2017 Repairs will aim to include:** • 14No MH (incl.3No from 2016) • 3No Invert caps (incl. 2No from 2016) • 20No Patch repairs to pipes (incl.1No from 2016) • 12No Excavations (incl.6No from 2016) • 6No Liner repair to pipe (where a patch repair is not suitable)
Spillways	(every 2-4 years depending on condition & contents hazard)	A programmed visual engineering inspection and condition assessment will be undertaken for the spillways: • Foundations • Overall structure • Spillway walls • Ground floor • Gratings and covers • Joint sealants • Evidence of surface spalling and/or chemical attack • Ponding	100% visual Inspection completed by QTR 4 2014 **Key issues identified:** • **High Priorities:** Exposed re-bar. Surface damage/pitting. Spalling concrete/holes. Condensate wear.	**'High Priority' Defects:** All 'High Priority' defects recorded in 2014 Spillway inspections were quoted for in QTR 2 2015 – **approx £1.5k.** Repairs not completed not completed in 2016 as plant could not be released for repair. Will aim to be repaired by end QTR 2 2017.

		• Other observations The severity and extent of observed defects are assessed using a risk assessment matrix to establish a High, Medium or Low risk for the defect and determine the required response time for remedial attention. • High Risk – Requires attention in the short term i.e. repairs must be done within the year following the inspection. • Medium Risk – Will require attention in medium term, probably after next inspection. • Low Risk – Not urgent; will eventually require attention in the long term.		

SPILLS REPORT YEAR END, 2016

Dow Corning has a reporting mechanism 'HONK's to easily capture any incidents or near misses on the Barry site which includes spills or emissions. All on-site personnel, both Dow Corning and Contractors raise HONK notifications on the detection of a spill. These are then added to our safety management system – GIMS.

There were 63 reported spill incidents in total from January 2016 to December 2016;
11 of these were <5kg, the remaining 52 were > 5kg.

All incidents were assessed for the potential to contaminate the ground. Most of the reported incidents had little or no potential to contaminate the ground. There were immediate Engineering mitigation measures in place or they were cleaned up immediately thereby reducing the possibility of contamination.

In addition a search was done within the safety management system to look for incidents of other abnormal ground events e.g. subsidence. No incidents came up for review in these searches.

The following have been included as they either had the potential to contaminate the ground or worthy of note for environmental reporting.

Incident Ref	Incident Summary	Actions taken including any remediation
22764	W707 - Hole in chemical sewer near 300 column. Noticed on a plant walk a hole in the chemical sewer site north of 300 column. Diameter was that of a large orange.	Civil engineer informed. Hole filled in and sewer checked.
23023	400 brine pond outlet was reported to be blocked on Wednesday 13th April night shift and was handed over onto days to for Cape to jet the outlet pipe-work. This was found to be heavily fouled with material but it was felt that there was an issue with the liner. Thursday morning we took the decision to empty out the pond to inspect – this has continued up to today where we have seen 6 issues from above – 4x repair patches that have come away and the liner is torn in 2 new places.	Pond cleaned and liner replaced. Brine pond cleaning regime updated. Civil bund and interceptor pit register updated, to ensure the pond inspection frequency is suitable.
23027	Diesel pump next to 400 pond has a self contained drip tray but a vent/exhaust that is directed to chippings. there is a black patch of diesel on the chippings where this has leaked	Soiled chippings removed. Vent contained to prevent further contamination

23083	A spill of liquor from 1307 brine pond was reported to the area 5 operators by a Veolia employee who was passing the corner of W1206. The previous shift had quenched via 200 into 1307 bay and at some point the discharge pipe from the bay into the pump pit has blocked. Levels have risen in both the secondary bay and the brine pond until the pond has overflowed onto the concrete area and road running into a chemical drain back to the chem sewer.	Level measurement installed in brine pond to give the operators early warning of this situation to allow action to be taken to prevent a spill.
23213	Small spill of hydraulic oil from Ainscough Crane - the seal failed on a filter pot on the 95te Ainscough Crane, CA-44	Driver and riggers used part of a spill kit to stem the flow from the side panel and a little bit spilt on the chippings. It was estimated at 2 to 3 kgs. The contaminated chipping were removed. The Ainscough mechanic was called in to replace the seal.

Landfill groundwater Sampling Programme and update on boreholes

1. Dow Corning Groundwater Sampling Programme (2010 onwards)

Q1 and Q3 Landfill Groundwater sampling reports were submitted to NRW during the course of the year.

Sampling Plan

The following quarterly sampling plan was implemented in 2009 to satisfy both SPMP (Site Protection and Monitoring Programme) and Landfill licence requirements (ref URS design of a site monitoring programme, 44382681, July 2006 and Dow Corning landfill CMS review, 49310733, October 2008). The only change for 2010 is the deletion of borehole 170 which has been lost for a long time now. No other changes are proposed for 2010.

Table 1 Quarterly Borehole and Surface Water Sampling programme

Q1 (LANDFILL)	Q2 (SITE)	Q3 (LANDFILL)	Q4 (SITE)
LF1	155	LF1	157
LF4	156	LF4	160
LF6	165	LF6	161
LF7	174	LF7	168
210	175	210	203
312	201	312	206
412	202	412	311
A2d	215	A2d	311a
E1s	B1	E1s	411
E1m	C2d	E1m	A1s
E1d	C3s	E1d	A1d
E2s	C3d	E2s	B2s
E2d	D1	E2d	B2d
E4s	D2s	E4s	
E4d	D2d	E4d	
Timber Pond	D3d	Timber Pond	
Cadoxton Pond		Cadoxton Pond	
Freshwater Pond		Freshwater Pond	
Cadoxton River SW2		Cadoxton River SW2	
Cadoxton River SW3		Cadoxton River SW3	
LF1,4,6.7 Gas		LF1,4,6.7 Gas	
Visual Stability		Visual Stability	
LF2 (**if not waterlogged**)		LF2 (**if not waterlogged**)	
LF3(**if not waterlogged**)		LF3(**if not waterlogged**)	

The above sampling programme is designed to satisfy the requirements for 6 monthly sampling of boreholes associated with the landfill area and annual sampling for other site boreholes for SPMP purposes.

The location of boreholes is shown in the borehole location plan (Appendix 2), which is now on the main site MUDS drawing for control purposes.

Table 2 Borehole status Jan 2017

Q1 (LANDFILL)	**Jan'17 status**
LF1 (if not waterlogged)	Unable to sample – borehole lost, collar destroyed.
LF4	Unable to sample
LF6 (if not waterlogged)	Unable to sample
LF7	OK
210	ok
312	ok
412	ok
A2d	ok
E1s	ok
E1m	ok
E1d	ok
E2s (if not waterlogged)	Unable to sample – borehole lost to reeds/timber pond
E2d (if not waterlogged)	Unable to sample – bore hole lost to reeds/timber pond
E4s	Unable to sample – bore hole lost
E4d	Unable to sample – bore hole lost
Timber Pond	ok
Cadoxton Pond	ok
Freshwater Pond	ok
Cadoxton River SW2	ok
Cadoxton River SW3	ok
LF1,4,6.7 Gas	Removed as a requirement in 2010
Visual Stability	
LF2 (**if not waterlogged**)	Unable to sample – bore hole collar full of solid waste, needs to be dug out, access to bore hole is restricted due to unstable ground surrounding bore hole.
LF3(**if not waterlogged**)	Unable to sample – bore hole lost.
170 - obsolete	Removed in 2010
CP1-D	New borehole
CP2-S	New borehole
CP2-M	New borehole
CP2-D	New borehole
LF10S	New borehole
LF10M	New borehole

LF10D	New borehole
LF11S	New borehole
LF11M	New borehole
LF11D	New borehole
LF12M	New borehole
LF12D	New borehole
LF13S	New borehole
LF13M	New borehole
LF13D	New borehole
LF14S	New borehole
LF14M	New borehole
LF14D	New borehole

Q2 (SITE)	Jan 2017 status	Q4 (SITE)	Jan'17 status
155	bore hole lost	157	Silty at bottom
156	ok	160	ok
165	No cap	161	ok
174	ok	168	Insufficient water for sampling
175	ok	203	ok
201	ok	206	ok
202	ok	311	ok
215	ok	311a	ok
B1	ok	411	ok
C2d	ok	A1s	ok
C3s	bore hole lost	A1d	ok
C3d	bore hole lost	B2s	ok
D1	ok	B2d	ok
D2s	ok		
D2d	ok		
D3d	lost		

The above table highlights the condition of the existing boreholes. A number of the boreholes are difficult to sample or have been lost. A project was initiated in 2014 to review the data and determine if there were any gaps in the data gathering. - It was determined that additional bore holes should be established in the old landfill area and in the habitat nature. Seven new boreholes were installed in November 2015 by an external Environmental Consultancy company, AECOM. Cost to install was ~ £100,000. Baseline sampling data has been taken and these boreholes have been added to the quarterly sampling plan and are included in the SPMP reports.

Monitoring Plan

Each sample in Table 1 will be monitored for the following determinants:

Table 3 Groundwater Monitoring Programme

Determinants	Comments
Hardness	**Only for Landfill samples** (for use in Cu/Zn EQS setting by EA)
COD	All
BOD	**Only for Site samples** (not required for landfill samples)
pH	All
Chloride	All
Alkalinity	All
Sulphates	All
Metals	All (Al,As,Cd,Cr,Cu,Fe,Hg,Mn,Ni,Pb,Se,Si,Sn,Zn) plus Ca,Mg
Ethyl benzene	All
Xylene	All (Ortha, Meta & Para)
Toluene	All

Cyclic siloxanes	All (D3,D4,D5,D6 and HMDS siloxanes)
Trimethylsilanol	All
Methanol	All

Other Monitoring Parameters

The following parameters will be monitored in addition to the requirements laid out in Tables 3.

- **Gauge water levels**: these will be measured for all boreholes every sample.

Trend Analysis for Copper and TMS (Trimethyl Silanol)

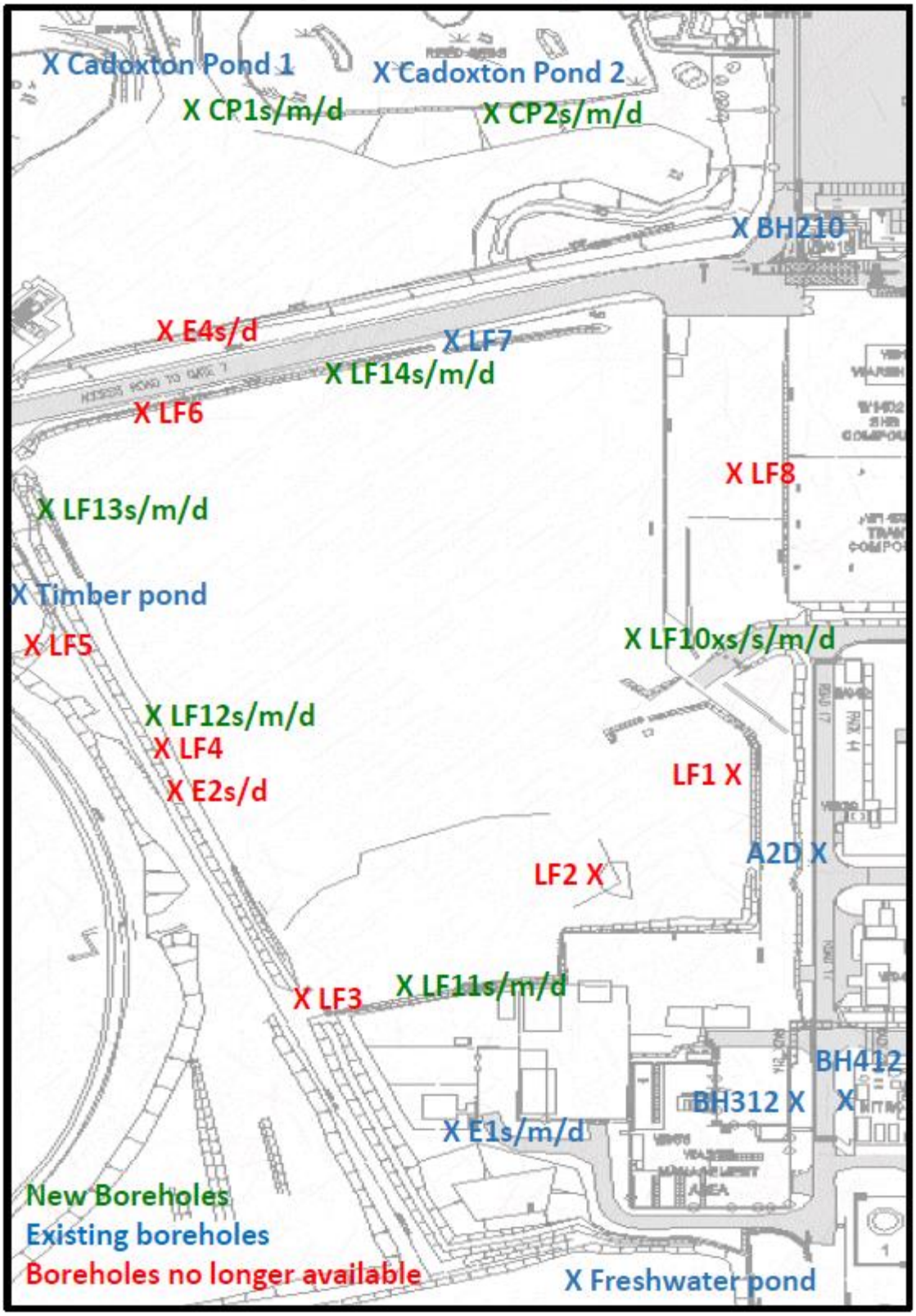
All landfill related boreholes and surface water samples (i.e. Q1 and Q3) sample results for copper and TMS* will be graphically reported to clearly illustrate trends. Graphs are to be submitted to the Agency along with landfill reporting forms every 6 months. This was ongoing in 2010. The latest Q3 report is enclosed (see Appendix 4).

*Note that the current test method for TMS provides inaccurate results so caution should be taken when looking at graphical trends.

APPENDIX 1 - Borehole Location Map On Landfill

Dow Corning INTERNAL

Landfill boreholes/surface water sample points – April 2016



APPENDIX 2 - 2016 Borehole Analytical Results

Max of Result value	Column Labels							
Row Labels	Aluminium	Arsenic	Benzene	Biological Oxygen Demand (BOD)	Boron	Cadmium	Calcium	Chemical Oxygen Demand
Q1								
A2d	13.1	24.4	11.5		466.4	3.2	3281.9	1495.0
E1d	13.1	24.4	1.0		159.1	3.2	214.7	15.0
E1m	271.2	47.5	1.0		1116.2	3.2	87.4	53.3
E1s	13.1	31.9	1.0		1576.6	3.2	134.7	73.2
Sw2	59.1	24.4	1.0		48.9	3.2	81.4	16.0
Sw3	54.9	24.4	1.0		55.9	3.2	235.2	35.0
Lf 7	13.1	53.09	1		784.133	3.2	4783.21	78
Bh 210	13.1	24.4	1		205.757	3.2	60.461	26.1
Bh 312	13.1	24.4	4.417		145.485	3.2	911.5	313
Bh 412	13.1	24.4	5.755		155.361	3.2	897.961	325
Timber Pnd	13.1	24.4	1		178.857	3.2	397.148	71.3
Freshw Pnd	13.1	24.4	1		120.132	3.2	222.147	44.6
Cad Pnd1	46.926	24.4	1		138.895	3.2	131.323	25.7
Cad Pnd2	36.402	24.4	1		175.398	3.2	126.886	24.8
Q2								
B1	12.2	30.4	1.0	1.0	3061.5	1.0		94.4
C2d	5.9	30.4	1.0	1.0	2121.9	0.9		54.9
D1	5.9	53.0	1.0	1.0	1942.9	1.8		41.9
D2d	5.9	30.4	1.0	6.0	1986.9	0.9		725.2
D2s	5.9	48.7	1.0	4.0	9497.2	1.7		200.0
Bh 156	5.9	30.4	1	2	1093.52	3.007		1288.8
Bh 165	5.9	35.489	1	11	5786.1	1.234		131
Bh 174	54.516	30.4	1	1	641.37	0.9		15
Bh 175	5.9	30.4	24.7	3	917.458	0.9		290
Bh 201	11.183	30.4	1	1	47.238	0.9		566
Bh 202	277.893	30.4	1	2	33.134	0.9		175.6
Bh 215	5.996	30.4	1	1	84.168	0.9		33.6
Q3								
A2d	15.8	10.0	10.7		481.6	1.3	3620.8	2250.0
E1d	15.8	10.0	1.0		159.0	0.6	217.7	30.0
E1m	15.8	35.7	1.0		1537.6	1.0	147.2	73.6
E1s	15.8	19.2	1.0		1742.1	0.6	240.7	102.0
Sw2	203.4	10.0	1.0		57.6	0.6	147.2	18.1
Sw3	227.6	10.0	1.0		87.0	0.6	530.0	76.3
Lf 7	15.8	53.678	1		717.835	1.242	464.47	49.8
Bh 210	15.8	10	1		508.668	0.6	147.2	52.2
Bh 312	15.8	10	1.606		144.345	0.6	1513.03	1600
Bh 412	15.8	10	1		405.591	0.6	844.3	154.8
Timber Pnd	15.8	10	1		221.037	0.6	424.96	75.4
Freshw Pnd	181.099	10	1		101.139	0.6	258.514	92.9

Row Labels	Aluminium	Arsenic	Benzene	Biological Oxygen Demand (BOD)	Boron	Cadmium	Calcium	Chemical Oxygen Demand
Cad Pnd1	86.924	10	1		219.562	0.6	147.2	29.9
Cad Pnd2	108.929	10	1		287.292	0.6	147.2	31.4
CP1-D	10.2	21.231	1		2098.93	1.039	180.064	94.8
CP2-D	10.2	18.471	1		2195.35	1	1225.78	149.4
CP2-M	10.2	12.7	1		622.494	1	574.044	191.7
CP2-S	10.2	12.7	1		2328.71	1	1149.59	180.6
LF10D	10.2	12.7	1		2089.24	1	360.637	259
LF10M	10.2	13.249	2.123		443.075	1	3177.69	1260
LF10S	10.2	14.045	1		434.84	1	3298.26	2073
LF11D	10.2	14.71	1		788.063	1	1615.55	1128
LF11M	10.2	13.44	1		797.781	1	1608.15	678
LF11S	10.2	14.291	1		311.45	1	95.326	79.2
LF12D	10.2	12.7	1		892.436	1	6472.81	2020
LF12M	10.2	12.7	1		449.788	1	1010.8	1018
LF13D	10.2	12.7	1		1923.02	1	3277.19	1115
LF13M	10.2	12.7	1		423.054	1	1850.17	600
LF13S	10.2	12.7	1		448.451	1	1199.11	822
LF14D	10.2	12.7	1		2047.39	1	2473.15	196.9
LF14M	10.2	12.7	1		833.573	1	292.317	38.2
LF14S	10.2	12.835	1		745.799	1	238.865	30.8
Q4								
A1d	4.3	21.1	1.0	1.0	349.5	0.4		98.6
A1s	4.3	21.1	1.0	1.0	361.3	0.5		104.0
B2d	27.7	21.1	1.0	1.0	357.1	0.6		55.3
B2s	4.3	53.4	1.0	1.0	154.7	1.9		125.0
Bh 157	4.3	21.1	1	2	3164.98	0.523		26.2
Bh 160	4.3	23.209	617.715	1	1360.351	0.919		34.5
Bh 161	11.452	21.1	1	1	337.644	0.4		27.8
Bh 203	4.3	21.1	1	3	1895.614	0.572		15
Bh 206	50.3	21.1	1	1	202.877	0.4		36.3
Bh 311	4.3	67.834	1	4	1003.054	2.6363		68.3
Bh 311a	4.3	21.1	1	1	117.845	0.4		32
Bh 411	4.3	199.452	1	5	1104.666	5.966		69.7

Max of Result value											
Row Labels	Chloride	Chromium	Copper	D4	D5	D6	Ethylbenzene	Hardness (mg equ. CaCO3/L)	HMDS	Iron	Lead
Q1											
A2d	837.1	4.4	13289.3	300.0	300.0	300.0	1.0	8328.0	300.0	860.8	69.4
E1d	222.5	4.4	3.9	300.0	300.0	300.0	1.0	1061.8	300.0	38.8	7.2
E1m	496.1	10.7	66.2	300.0	300.0	300.0	1.0	453.4	300.0	11670.7	10.8
E1s	127.3	12.6	2.5	300.0	300.0	300.0	1.0	767.3	300.0	16604.3	7.2
Sw2	40.0	4.6	7.0	300.0	300.0	300.0	1.0	274.0	300.0	144.0	7.2
Sw3	387.5	4.5	10.2	300.0	300.0	300.0	1.0	660.3	300.0	134.0	7.2
Lf 7	569.72	28.887	2.5	300	300	300	1	20371.8	300	50407.6	7.2
Bh 210	611.78	4.4	9.08	300	300	300	1	263.78	300	18.438	7.2
Bh 312	242.02	4.715	3.162	300	300	300	1	2298.65	300	2279.76	39.433
Bh 412	252.1	4.4	3.888	300	300	300	1	2271.44	300	142.559	38.934
Timber Pnd	468.3	4.4	14.87	300	300	300	1	1051.92	300	65.306	8.914
Freshw Pnd	508.41	4.4	6.156	300	300	300	1	607.955	300	156.044	7.2
Cad Pnd1	178.65	4.494	5.821	300	300	300	1	409.825	300	648.172	7.2
Cad Pnd2	152.29	4.4	5.32	300	300	300	1	399.804	300	169.406	7.2
Q2											
B1	1122.9	1.9	3.0	300.0	300.0	300.0	1.0		300.0	4846.2	15.3
C2d	444.0	1.9	3.0	300.0	300.0	300.0	1.0		300.0	4618.0	10.9
D1	320.9	1.9	3.0	300.0	300.0	300.0	1.0		300.0	2704.0	10.9
D2d	929.4	1.9	3.0	300.0	300.0	300.0	1.0		300.0	9097.9	8.2
D2s	258.0	2.2	3.0	300.0	300.0	300.0	1.0		300.0	11985.8	15.5
Bh 156	773.93	3.046	26823	300	300	300	1		300	21203.9	229.289
Bh 165	611.85	2.864	23.879	300	300	300	1		300	12649.3	21.709
Bh 174	25.97	1.9	6.293	300	300	300	1		300	34.278	8.2
Bh 175	41.54	1.9	3	15766	300	300	1		300	2384.3	24.748
Bh 201	27.58	1.9	191.684	300	300	300	1		300	7.1	9.93
Bh 202	237.32	1.9	20.186	300	300	300	1		300	7.1	21.581
Bh 215	26.77	1.9	3	1320	300	300	1		300	58.35	8.2
Q3											
A2d	914.5	2.5	13288.3	300.0	300.0	300.0	28.1	9184.8	300.0	831.2	70.2
E1d	223.4	2.5	3.0	300.0	300.0	300.0	1.0	1096.9	300.0	43.1	6.0
E1m	710.5	3.2	1.6	300.0	300.0	300.0	1.0	728.0	300.0	15443.3	6.0
E1s	484.6	2.5	1.6	300.0	300.0	300.0	1.0	1591.4	300.0	19877.8	6.0
Sw2	21.4	2.5	3.8	300.0	300.0	300.0	1.0	426.4	300.0	218.5	6.0
Sw3	473.0	2.5	17.8	300.0	300.0	300.0	1.0	1382.3	300.0	339.6	9.9
Lf 7	331.96	7.323	1.6	300	300	300	1	1983.93	300	42521.1	6
Bh 210	1736.39	2.5	1.6	300	300	300	1	735.481	300	43.1	6
Bh 312	312.12	2.5	1.6	300	300	300	35.735	3836.92	300	43.1	38.738
Bh 412	296.46	2.5	1.6	300	300	300	25.816	2438.02	300	6549.73	19.563
Timber Pnd	186.64	2.5	4.845	300	300	300	1	1129.25	300	138.667	6.998
Freshw Pnd	285.1	2.5	14.546	300	300	300	1	713.156	300	1629.76	11.8

Row Labels	Chloride	Chromium	Copper	D4	D5	D6	Ethylbenzene	Hardness (mg equ. CaCO3/L)	HMDS	Iron	Lead
Cad Pnd1	82.92	2.5	3.46	300	300	300	1	476.158	300	505.868	6
Cad Pnd2	326.87	2.5	2.582	300	300	300	1	479.823	300	512.842	6
CP1-D	823.83	1.5	1.8	300	300	300	1	1548.62	300	2730.87	10.4
CP2-D	1332.86	1.5	1.8	1.761	300	300	4.791	4456.85	300	12630.9	10.4
CP2-M	1252.41	1.5	1.8	300	300	300	4.282	2681.64	300	169.704	10.4
CP2-S	970.1	1.5	1.8	300	300	300	3.772	4310.23	300	9290.51	10.4
LF10D	985.15	1.5	1.8	300	300	300	12.928	2143.26	300	916.041	13.734
LF10M	798.76	1.5	7.724	300	300	300	1	8054.77	300	689.139	32.114
LF10S	828.2	1.5	5.1	300	300	300	11.839	8314.04	300	165.261	33.721
LF11D	709.42	1.5	1.8	300	300	300	1	5272.69	300	18399.7	10.4
LF11M	713.1	1.5	1.8	300	300	300	5.034	5253.03	300	19165.4	10.4
LF11S	172.29	1.5	1.8	300	300	300	5.334	284.563	300	423.032	10.4
LF12D	1319.33	1.5	1.8	300	300	300	9.567	16647.6	300	7699.45	29.02
LF12M	233.08	1.5	1.8	300	300	300	4.459	2623.76	300	3171.34	32.237
LF13D	364.17	1.5	1.8	300	300	300	4.593	9387.58	300	13368.5	11.323
LF13M	604.58	1.5	1.8	300	300	300	3.857	5153.43	300	2429.8	13.909
LF13S	346.09	1.5	1.8	300	300	300	5.905	3194.05	300	2164.41	25.924
LF14D	1638.47	1.5	1.8	300	300	300	3.567	7395.53	300	17749.5	10.4
LF14M	158.08	1.5	1.8	300	300	300	1	1203.31	300	7128.79	10.4
LF14S	147.9	1.5	1.8	300	300	300	1	1005.14	300	6711.57	10.4
Q4											
A1d	284.0	3.9	1.3	300.0	300.0	300.0	1.0		300.0	14013.5	9.7
A1s	218.0	3.9	1.3	300.0	300.0	300.0	1.0		300.0	11094.4	9.7
B2d	23.8	3.9	1.3	300.0	300.0	300.0	1.0		300.0	358.0	9.7
B2s	23.6	3.9	1.3	300.0	300.0	300.0	1.0		300.0	5856.7	12.3
Bh 157	249.29	3.9	5.925	300	300	300	1		300	12.653	9.7
Bh 160	862.56	3.9	1.3	300	300	300	1.254		923	565.01	9.7
Bh 161	123.51	3.9	9.41	300	300	300	1		300	20.14	9.7
Bh 203	706.14	3.9	251.318	300	300	300	1		300	73.962	9.7
Bh 206	36.12	3.9	3.097	300	300	300	1		300	40.013	9.7
Bh 311	719.35	3.9	1.3	300	300	300	1		300	2048.945	9.7
Bh 311a	79.84	3.9	4.846	300	300	300	1		300	2373.91	9.7
Bh 411	759.78	3.9	1.3	300	300	300	1		300	7907.895	9.7

Max of Result value										
Row Labels	M Alkalinity (Total Alkalinity)	Magnesium	Manganese	Mercury	Methanol	m-Xylene	Nickel	o-Xylene	P Alkalinity (As Carbonates)	pH
Q1										
A2d	88.0	32.3	510.8	4.5	3.0	1.5	81.9	7.4	0.0	6.7
E1d	328.0	127.7	13.1	4.5	3.0	1.0	1.7	1.0	0.0	7.9
E1m	562.0	57.1	605.9	4.5	3.0	1.0	4.9	1.0	0.0	8.2
E1s	702.0	104.7	1055.5	4.5	3.0	1.0	1.7	1.0	0.0	8.0
Sw2	280.0	17.2	25.9	4.5	3.0	1.0	1.7	1.0	0.0	8.2
Sw3	252.0	17.7	28.5	4.5	3.0	1.0	1.7	1.0	0.0	8.1
Lf 7	558	2046.66	1963.64	4.5	3	1	1.7	1	0	7.5
Bh 210	68	27.394	9.3	4.5	3	1	1.72	1	0	7.77
Bh 312	54	5.497	93.122	4.5	3	1	1.889	1	0	7.39
Bh 412	58	7.098	142.844	4.5	3	1	1.7	1	0	7.55
Timber Pnd	84	14.63	56.258	4.5	3	1	1.7	1	0	7.78
Freshw Pnd	98	12.932	95.019	4.5	3	1	1.7	1	0	8.1
Cad Pnd1	188	19.891	161.288	4.5	3	1	1.7	1	0	8.42
Cad Pnd2	214	20.148	87.371	4.5	3	1	1.7	1	0	8.64
Q2										
B1	1604.5		266.2	2.5	3.0	1.0	2.9	1.0	0.0	7.8
C2d	1290.7		732.8	15.3	3.0	1.0	2.4	1.0	0.0	7.9
D1	1052.2		573.4	2.5	3.0	1.0	6.8	1.0	0.0	8.0
D2d	244.0		351.6	2.5	3.0	1.0	2.4	1.0	0.0	7.4
D2s	462.0		7039.2	2.5	3.0	1.0	2.4	1.0	0.0	6.9
Bh 156	17.64		5813.72	28.6	3	1	70.819	1	0	5.49
Bh 165	821.688		1234.69	4.436	3	1	2.4	1	0	7.42
Bh 174	263.676		29.125	3.289	3	1	2.4	1	0	8.16
Bh 175	416.976		1129.88	2.5	3	1.56	2.4	3.89	0	7.9
Bh 201	115.64		54.538	5.803	3	1	2.4	1	0	7.84
Bh 202	184		3.9	2.5	3	1	2.4	1	158	11.33
Bh 215	120.596		34.377	2.5	3	1	2.4	1	0	8.2
Q3										
A2d	68.9	34.9	688.1	1.8	300.0	1.0	84.3	1.3	0.0	6.9
E1d	310.1	134.4	4.4	1.8	300.0	1.0	2.6	1.0	0.0	7.3
E1m	790.5	87.5	931.8	1.8	300.0	1.0	2.6	1.0	0.0	7.5
E1s	821.1	240.5	1636.9	1.8	300.0	1.0	2.6	1.0	0.0	7.4
Sw2	195.2	14.3	28.7	1.8	300.0	1.0	2.6	1.0	0.0	8.0
Sw3	174.2	14.3	38.1	1.8	300.0	1.0	2.6	1.0	0.0	7.8
Lf 7	614.394	200.133	2021.48	16.433	300	1	2.6	1	0	6.9
Bh 210	72.732	89.345	15.695	3.06	300	7.314	3.792	1	7.656	8.68
Bh 312	55.506	14.3	3.588	1.8	300	1	2.6	2.533	13.398	8.3
Bh 412	254.562	80.088	627.936	1.8	300	2.298	2.6	4.112	0	7.19
Timber Pnd	78.474	16.542	179.043	1.8	300	1	2.6	1	0	7.24
Freshw Pnd	78.474	16.427	730.763	1.8	300	1	2.6	1	0	7.32

Row Labels	M Alkalinity (Total Alkalinity)	Magnesium	Manganese	Mercury	Methanol	m-Xylene	Nickel	o-Xylene	P Alkalinity (As Carbonates)	pH
Cad Pnd1	176.088	26.372	286.818	1.8	300	1	2.6	1	0	8.03
Cad Pnd2	233.508	27.262	255.405	1.8	300	1	2.6	1	0	7.93
CP1-D	1130	266.877	2403.39	43.176	300	1	2.8	1	0	8.11
CP2-D	458.331	339.017	2792.48	3.233	300	1	2.8	1	0	7.57
CP2-M	421.501	303.121	3657.17	9.387	300	1	3.878	1	0	6.95
CP2-S	466	349.613	2571.48	15.379	300	1	2.8	1	0	7.86
LF10D	892.108	301.784	979.177	3.925	300	1	2.8	1.202	0	7.99
LF10M	62	29.1599	450.426	3.728	300	1	2.8	1.728	0	7.35
LF10S	61.3836	19.0136	242.725	17.479	300	1	2.8	3.956	0	7.3
LF11D	282.365	300.794	9174.08	2.912	300	1	2.8	1	0	7.16
LF11M	245.534	300.507	9184.47	0.915	300	1	2.8	1	0	7.29
LF11S	94.1215	11.3	230.088	4.261	300	1	2.8	1	0	7.95
LF12D	108	117.78	4256.6	0.511	300	1	24.428	1.707	0	7.27
LF12M	83.8909	24.2333	2512.65	0.978	300	1	2.8	1	0	7.63
LF13D	343.748	292.48	3497.51	2.716	300	1	5.395	1.052	0	6.96
LF13M	151.413	129.567	1611.16	0.494	300	1	18.669	1	0	7.51
LF13S	130.952	48.533	1065.53	0.4	300	1	2.8	1	0	8.02
LF14D	330	296.277	5082.73	1.193	300	1	2.8	1	0	7.12
LF14M	544	114.957	2034.23	1.579	300	1	6.034	1	0	7.78
LF14S	456.285	99.2454	2606.22	1.21	300	1	5.248	1	0	7.79
Q4										
A1d	180.1		4185.5	3.8	300.0	1.0	4.9	1.0	0.0	7.0
A1s	194.2		2985.9	10.0	300.0	1.0	4.9	1.3	0.0	6.9
B2d	170.1		480.5	2.5	300.0	1.0	4.9	1.0	0.0	7.8
B2s	236.2		2198.2	3.0	300.0	1.0	4.9	1.0	0.0	7.6
Bh 157	422.34815		73.393	24.956	300	1	4.9	1	0	7.74
Bh 160	648.5346		505.091	22.705	300	1	8.733	3.816	0	7.69
Bh 161	220.1815		27.94	7.149	300	1	4.9	1	0	8.16
Bh 203	166.13695		95.426	11.045	300	1	4.9	1	0	7.82
Bh 206	184.1518		21.763	24.32	12044	1	4.9	1	0	8.01
Bh 311	580.4785		917.102	12.064	300	1	4.9	1	0	7.69
Bh 311a	236.1947		331.161	8.508	300	1	4.9	1	0	7.12
Bh 411	612.5049		1759.005	8.666	300	1	4.9	1	0	7.44

Max of Result value							
Row Labels	p-Xylene	Seleniu m	Sulph ates	Tin	TMS	Toluen e	Zinc
Q1							
A2d	22.2	30.1	40.0	5.2	5.9	6.0	112.2
E1d	1.0	30.1	309.0	5.2	0.1	1.0	5.0
E1m	1.0	30.1	40.0	5.2	0.1	1.0	34.9
E1s	1.0	30.1	40.0	5.2	0.1	1.0	7.1
Sw2	1.0	30.1	40.0	5.2	0.1	1.0	11.8
Sw3	1.0	30.1	40.0	5.2	0.1	1.0	10.7
Lf 7	1	30.1	40	5.2	0.198	1	11.009
Bh 210	1	30.1	40	5.2	0.109	1	8.073
Bh 312	45.677	30.1	40	5.2	7.86	1	4.9
Bh 412	33.49	30.1	40	5.2	7.484	1	4.9
Timber Pnd	1	30.1	40	5.2	0.1	1	7.947
Freshw Pnd	1	30.1	40	5.2	0.1	1	9.055
Cad Pnd1	1	30.1	40	5.2	0.1	1	11.1
Cad Pnd2	1	30.1	40	5.2	0.1	1	6.747
Q2							
B1	1.0	4.6	40.0	2.2	0.1	1.0	2.9
C2d	1.0	4.6	40.0	2.2	0.4	1.0	1.2
D1	1.0	4.6	40.0	2.2	0.5	1.0	5.8
D2d	1.0	4.6	40.0	2.2	0.1	1.0	2.0
D2s	1.0	4.6	456.0	2.2	0.6	1.0	3.3
Bh 156	5.7	4.6	323	2.2	3.135	1	166.219
Bh 165	1.27	4.6	40	2.2	0.87	1	8.058
Bh 174	1	4.6	40	2.2	0.1	1	8.338
Bh 175	4.42	4.6	40	2.2	0.58	198.19	6.812
Bh 201	1	4.6	49.7	2.2	0.1	1	21.111
Bh 202	6.5	4.6	40	2.2	1.54	1	3.894
Bh 215	1	4.6	40	2.2	0.1	46.26	5.035
Q3							
A2d	5.7	26.1	40.0	4.7	4.9	43.8	121.7
E1d	1.0	26.1	40.0	4.7	0.1	1.0	2.6
E1m	1.0	26.1	40.0	4.7	0.1	1.0	3.0
E1s	1.0	26.1	40.0	4.7	0.3	1.0	4.2
Sw2	1.0	26.1	40.0	4.7	0.1	1.0	8.9
Sw3	1.0	26.1	40.0	4.7	0.3	1.0	19.8
Lf 7	1	26.1	40	4.7	0.1	1	5.82
Bh 210	1	26.1	40	4.7	0.328	1	2.054
Bh 312	14.515	26.1	40	4.7	4.494	25.199	2.568
Bh 412	1	26.1	90.5	4.7	3.906	1	2.097
Timber Pnd	1	26.1	40	4.7	0.1	1	2.765
Freshw Pnd	1	26.1	40	4.7	0.1	1	23.261

Row Labels	p-Xylene	Selenium	Sulphates	Tin	TMS	Toluene	Zinc
Cad Pnd1	1	26.1	40	4.7	0.1	1	4.991
Cad Pnd2	1	26.1	40	4.7	0.1	1	6.941
CP1-D	1	21.4	605	8.2	0.1	1	3.584
CP2-D	1	21.4	360	8.2	2	1	3.301
CP2-M	1	21.4	188	8.2	1.892	1	4.346
CP2-S	1	21.4	314	8.2	1.652	1	3.583
LF10D	1	21.4	250	8.2	2.537	1	1.677
LF10M	1	21.4	40	8.2	4.019	4.599	1.901
LF10S	1	21.4	40	8.2	4.067	1	1.695
LF11D	1	21.4	122	8.2	0.968	1	5.092
LF11M	1	21.4	40	8.2	0.952	1	4.228
LF11S	1	21.4	40	8.2	0.349	1	2.871
LF12D	1	21.4	40	8.2	1.728	1	7.994
LF12M	1	21.4	40	8.2	1.133	1	2.902
LF13D	1.161	21.4	119	8.2	1.024	1	5.002
LF13M	1	21.4	224	8.2	0.742	1	6.056
LF13S	1	21.4	65	8.2	1.118	1	2.931
LF14D	1.228	21.4	527	8.2	0.771	1	3.754
LF14M	1	21.4	40	8.2	0.1	1	4.756
LF14S	1	21.4	40	8.2	0.1	1	5.799
Q4							
A1d	5.9	9.3	40.0	7.1	1.1	1.0	4.7
A1s	6.2	9.3	40.0	7.1	1.0	1.0	4.2
B2d	1.0	9.3	40.0	7.1	0.1	1.4	4.0
B2s	1.0	9.3	40.0	7.1	0.1	1.0	3.6
Bh 157	1	9.3	63.8	7.1	0.109	1	5.305
Bh 160	1	9.3	182	7.1	0.1	7.951	3.685
Bh 161	1	9.3	40	7.1	0.1	1	8.766
Bh 203	1	9.3	40	7.1	0.1	1	50.261
Bh 206	1	9.3	78.5	7.1	0.1	1	4.112
Bh 311	1.179	9.3	40	7.1	1.007	1	3.55
Bh 311a	1	9.3	40	7.1	0.252	1	44.582
Bh 411	1.318	9.3	40	7.1	0.802	1	4.355

APPENDIX 3 – Gauge depths

Max of Result value	Column Labels	
Row Labels	Depth to Bottom	Depth to Water
Q1		
A2d	5.5	1.5
E1d	18.9	3.3
E1m	5.0	1.3
E1s	2.7	1.4
Lf 7	4.68	1.82
Bh 210	18	3.16
Bh 312	3.7	0.96
Bh 412	20.89	3.34
Q2		
B1	6.4	3.1
C2d	7.3	1.8
D1	6.4	3.1
D2d	6.8	3.5
D2s	6.8	1.0
Bh 156	1.72	0.8
Bh 165	3.27	0.77
Bh 174	6.18	3.58
Bh 175	4.6	2.24
Bh 201	13.9	3.15
Bh 202	18.7	3.3
Bh 215	3.7	0.82
Q3		
A2d	5.5	1.5
E1d	18.9	3.5
E1m	5.0	0.7
E1s	2.7	1.6
Lf 7	4.7	2.03
Bh 210	18.05	3.33
Bh 312	3.75	1.02
Bh 412	22	3.5
CP1-D	7.92	1.8
CP2-D	10.1	0.47
CP2-M	6.07	0.47
CP2-S	2.18	0.49
LF10D	9.04	1.97
LF10M	6.4	1.78
LF10S	5.3	0.9
LF11D	7.75	0.7
LF11M	6.85	0.6
LF11S	3.4	1.26
LF12D	8.45	2.6
LF12M	5.46	0.75
LF13D	8.42	3.2
LF13M	5.67	0.87
LF13S	3.04	1.7

Row Labels	Depth to Bottom	Depth to Water
LF14D	8.26	2.4
LF14M	6.8	0.7
LF14S	3.59	0.1
Q4		
A1d	6.4	1.1
A1s	3.4	2.2
B2d	4.7	0.7
B2s	1.7	0.6
Bh 157	3.82	1.08
Bh 160	13.9	0.82
Bh 161	2.4	0.65
Bh 168	1.72	1.25
Bh 203	16.86	1.52
Bh 206	2.33	0.61
Bh 311	7.5	0.9
Bh 311a	2.01	0.86
Bh 411	14.8	1.7

APPENDIX 4 – Q3 Landfill Groundwater sampling report

Q3-2016 Landfill Groundwater Sampling Results

The impact of bulk storage of materials on the landfill and its performance was monitored in quarter 3 of 2016 and the results shown in this report.

The quarterly sampling plan satisfies both SPMP (Site Protection and Monitoring Programme) and Landfill licence requirements (ref URS design of a site monitoring programme, 44382681, July 2006 and Dow Corning landfill CMS review, 49310733, October 2008).

This report provides sample results for boreholes. These boreholes are LF1, LF4, LF6, LF7, E1s, E1m, E1d, E2s, E2d, E4s, E4d, 210, 312, 412, A2d, Timber pond, Cadoxton pond (North), Cadoxton pond (South), Freshwater pond, Cadoxton River SW2, Cadoxton River SW3 and the Timber Pond. They have been assessed for copper and Trimethylsilanol (TMS) concentrations.

The graphs illustrated have been prepared from borehole and surface water samples taken for Q3-2007 up till Q3-2016

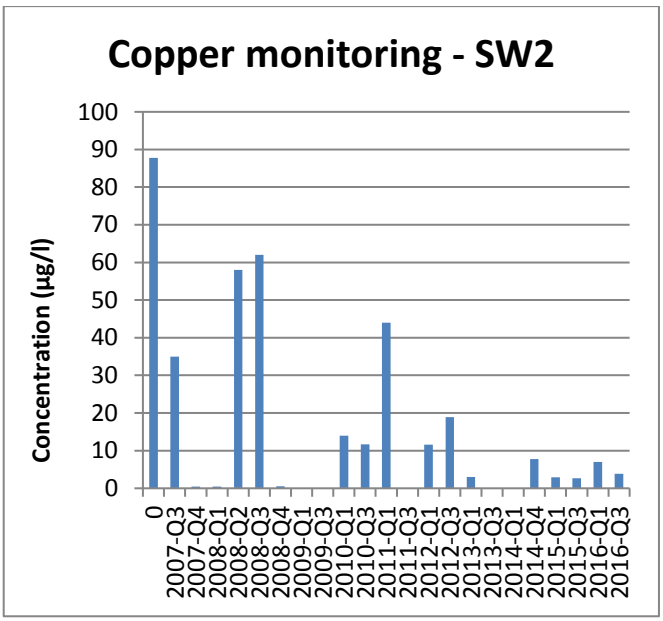
Some of the boreholes were not sampled during Q3 2016 due to being lost or inaccessible. These were: E2S, E2D, E4s, E4d, LF1, LF4 and LF6. These boreholes show no results on the charts.

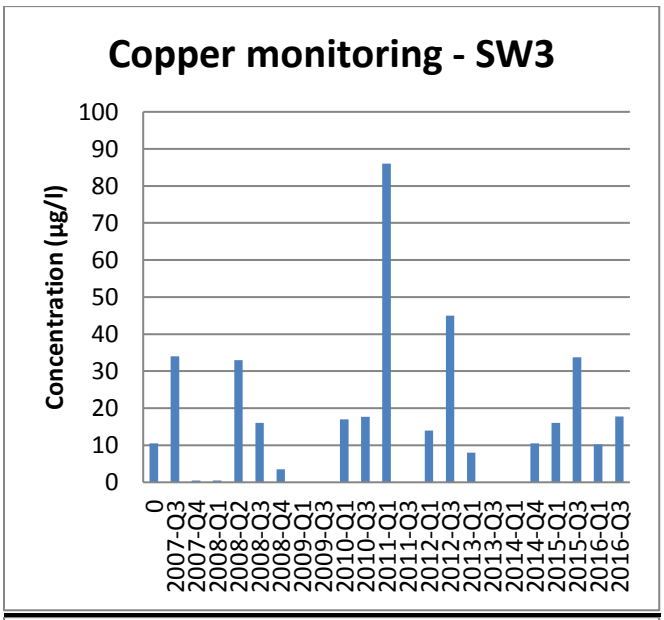
A number of new boreholes were sunk around the landfill area towards the end of 2015. We were unable to sample these in Q1 2016 due to not having the right equipment (the tubes are narrower than our existing boreholes). They were sampled for the first time in Q3 2016. The data for these is included in the spreadsheet, but no comparison charts will be created until there are 3 data points.

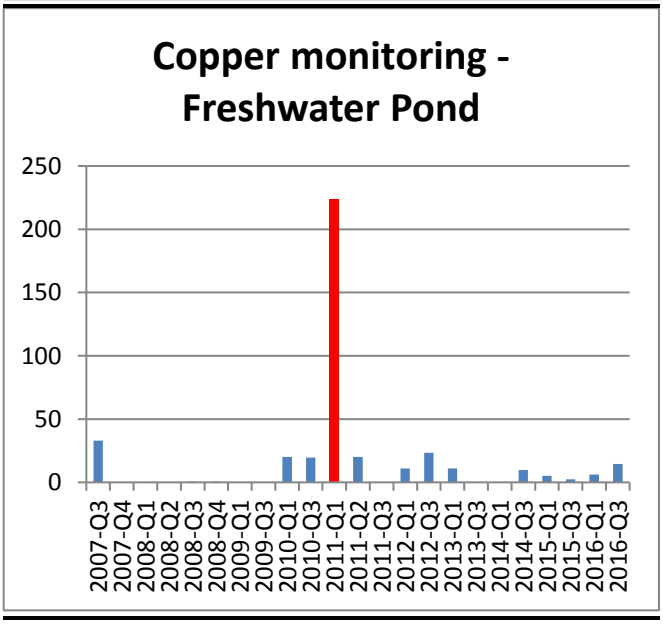
Leachate graphs.

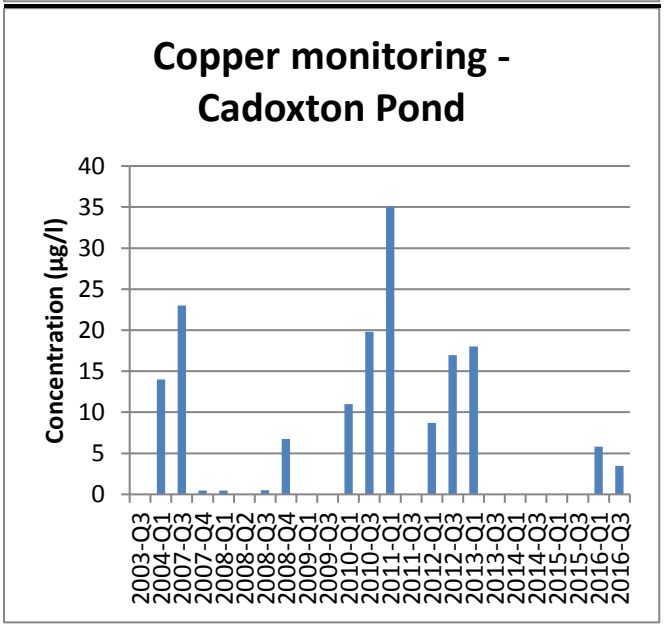
Copper

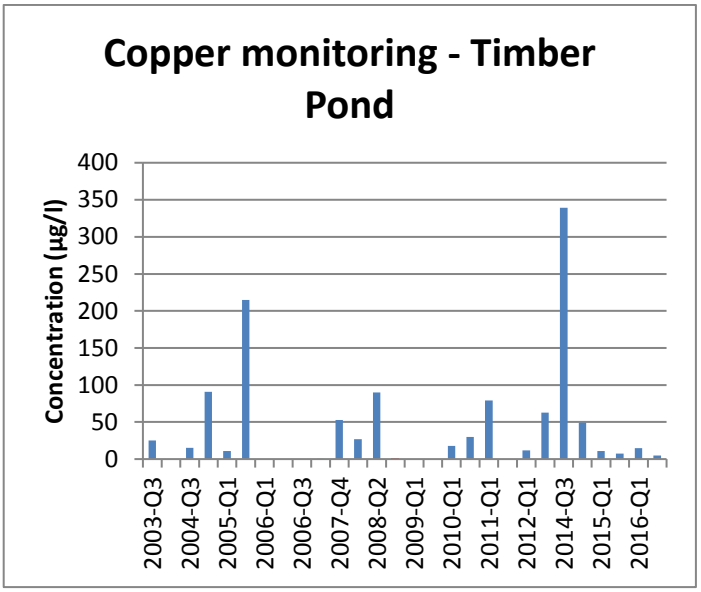
The detectable limit for Copper is 0.5 µg/l – any results below this will show on the graphs as 0

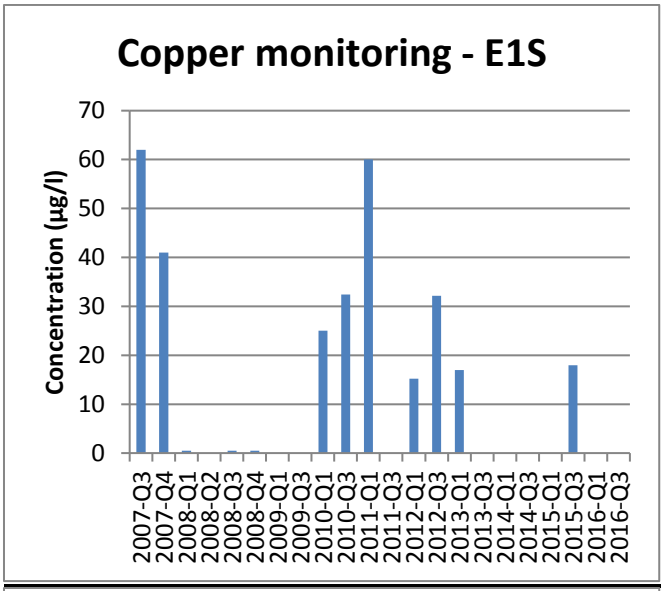


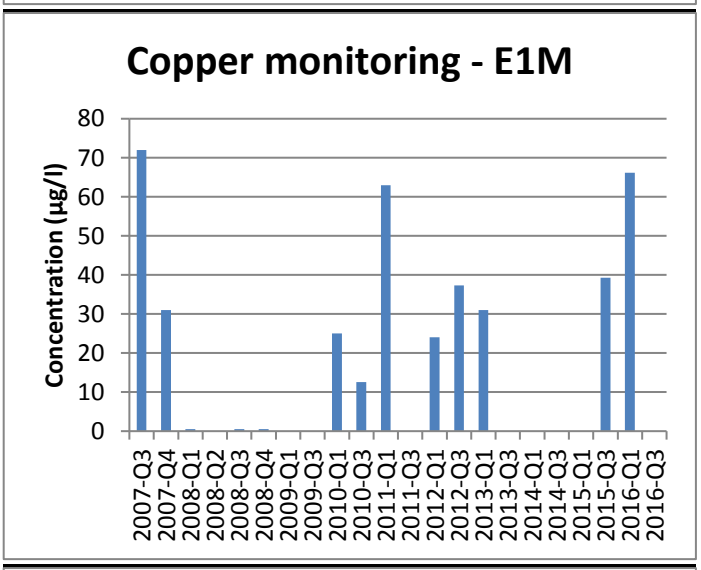







Copper monitoring - Timber Pond
Concentration (µg/l)
0
50
100
150
200
250
300
350
400
2003-Q3
2004-Q3
2005-Q1
2006-Q1
2006-Q3
2007-Q4
2008-Q2
2009-Q1
2010-Q1
2011-Q1
2012-Q1
2014-Q3
2015-Q1
2016-Q1


Copper monitoring - E1S
Concentration (µg/l)
0
10
20
30
40
50
60
70
2007-Q3
2007-Q4
2008-Q1
2008-Q2
2008-Q3
2008-Q4
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3
2013-Q1
2013-Q3
2014-Q1
2014-Q3
2015-Q1
2015-Q3
2016-Q1
2016-Q3


Copper monitoring - E1M
Concentration (µg/l)
0
10
20
30
40
50
60
70
80
2007-Q3
2007-Q4
2008-Q1
2008-Q2
2008-Q3
2008-Q4
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3
2013-Q1
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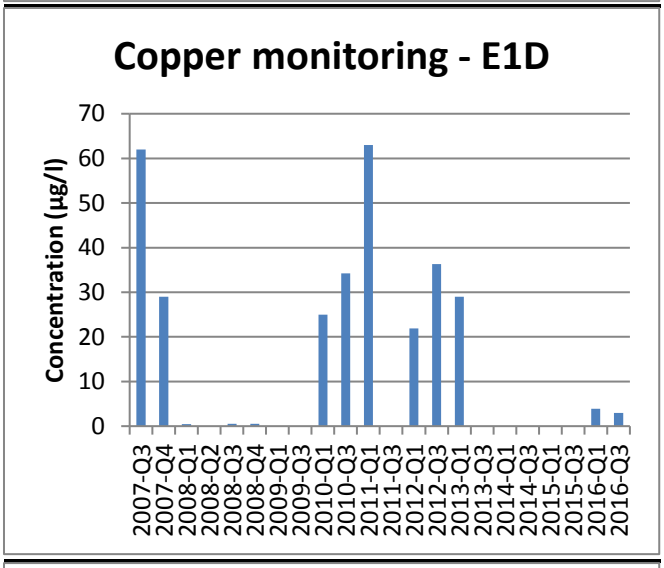
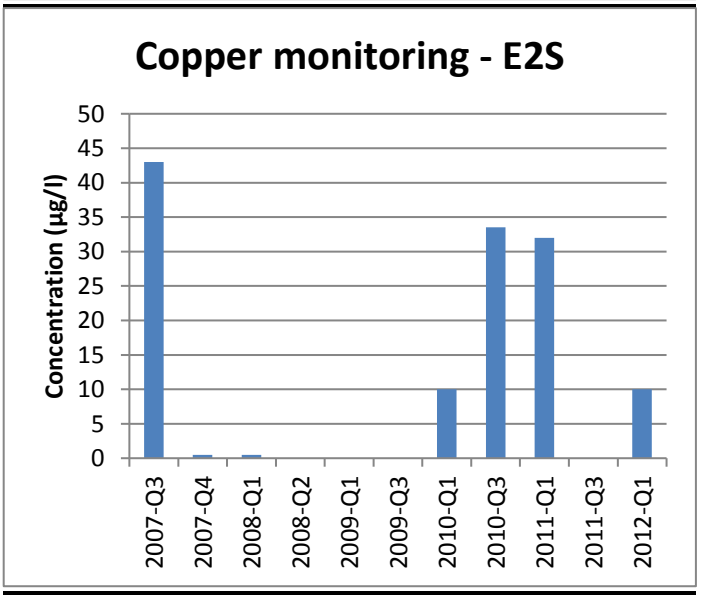
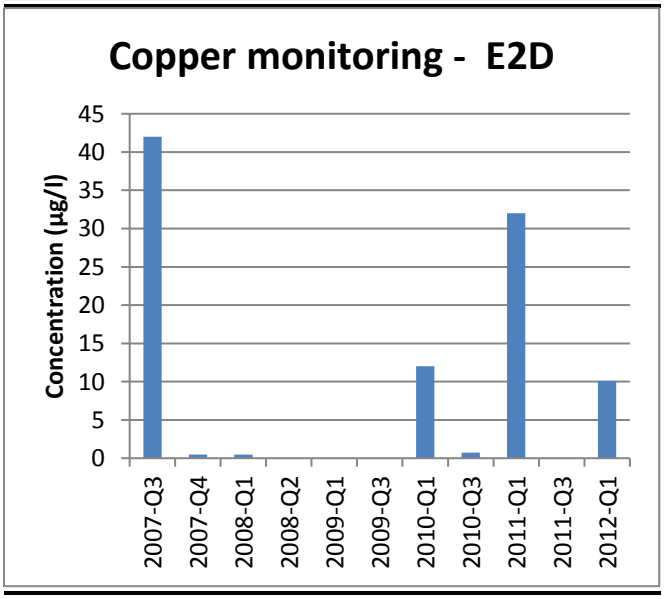
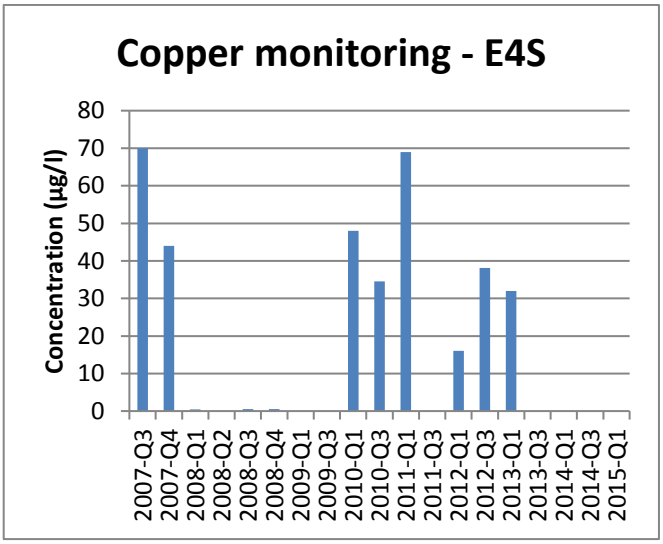
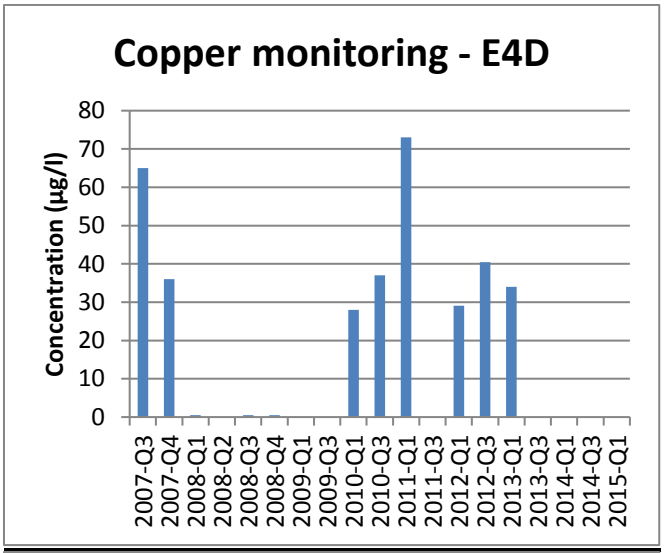
2014-Q1
2014-Q3
2015-Q1
2015-Q3
2016-Q1
2016-Q3

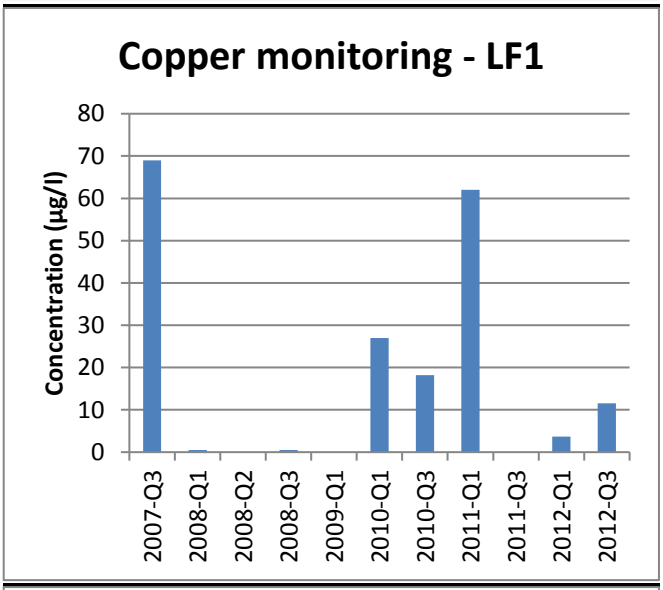

Copper monitoring - E1D
Concentration (µg/l)
0
10
20
30
40
50
60
70
2007-Q3
2007-Q4
2008-Q1
2008-Q2
2008-Q3
2008-Q4
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3
2013-Q1
2013-Q3
2014-Q1
2014-Q3
2015-Q1
2015-Q3
2016-Q1
2016-Q3

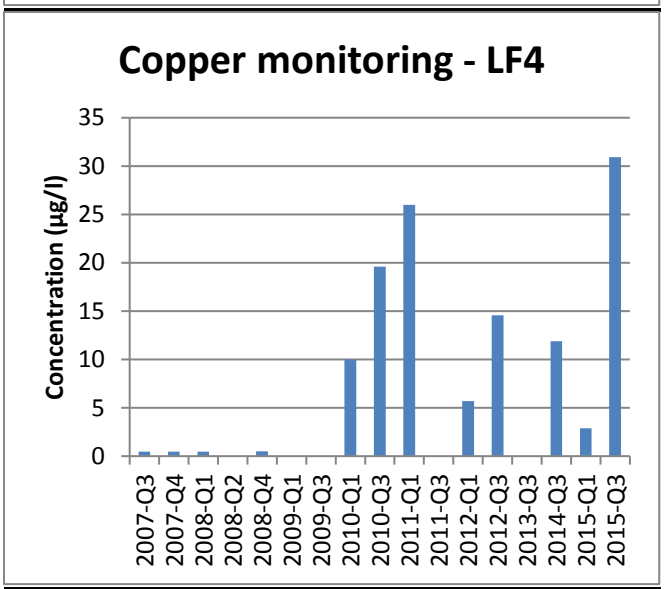

Copper monitoring - E2S
Concentration (µg/l)
0
5
10
15
20
25
30
35
40
45
50
2007-Q3
2007-Q4
2008-Q1
2008-Q2
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1

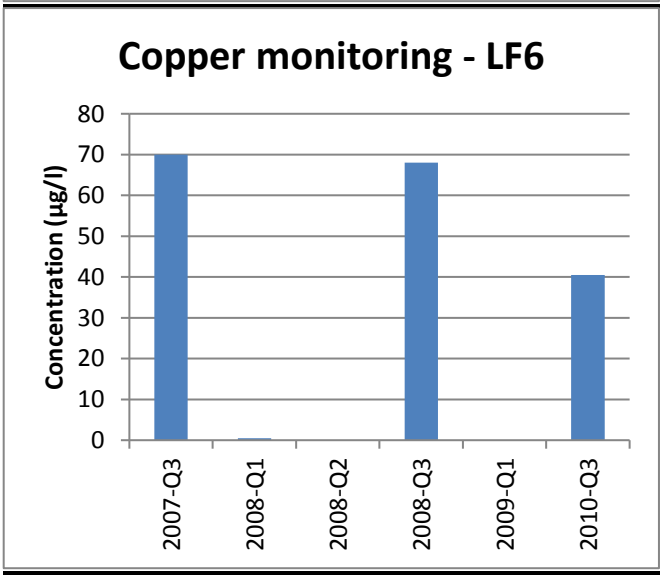

Copper monitoring - E2D
Concentration (µg/l)
0
5
10
15
20
25
30
35
40
45
2007-Q3
2007-Q4
2008-Q1
2008-Q2
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1

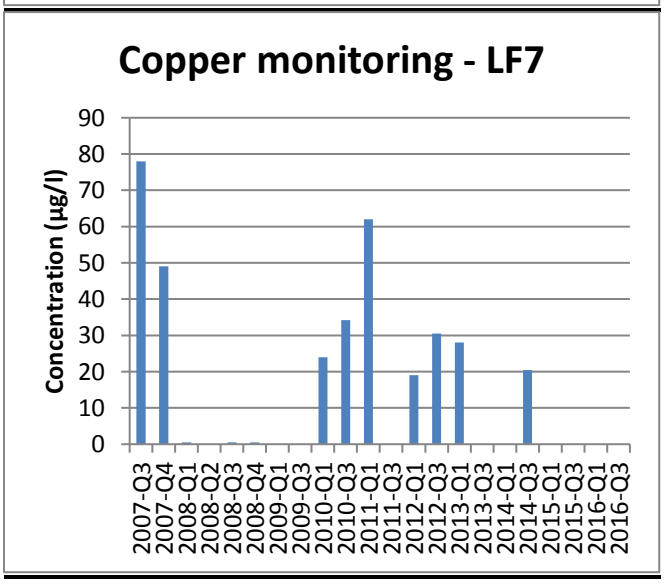

Copper monitoring - E4S
Concentration (µg/l)
0
10
20
30
40
50
60
70
80
2007-Q3
2007-Q4
2008-Q1
2008-Q2
2008-Q3
2008-Q4
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3
2013-Q1
2013-Q3
2014-Q1
2014-Q3
2015-Q1

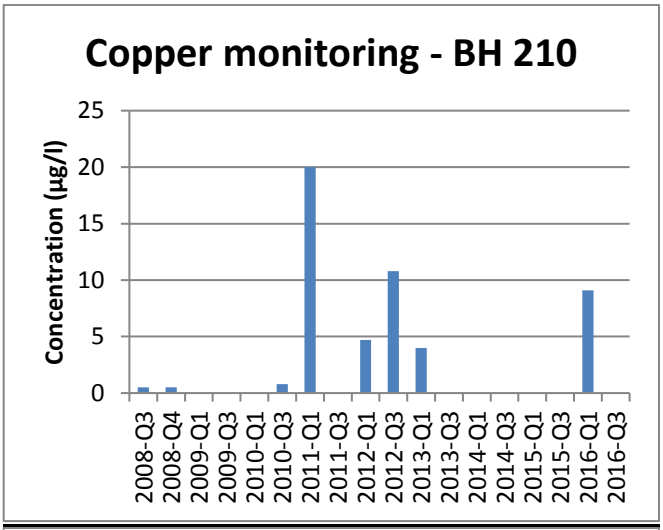

Copper monitoring - E4D
Concentration (µg/l)
0
10
20
30
40
50
60
70
80
2007-Q3
2007-Q4
2008-Q1
2008-Q2
2008-Q3
2008-Q4
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3
2013-Q1
2013-Q3
2014-Q1
2014-Q3
2015-Q1

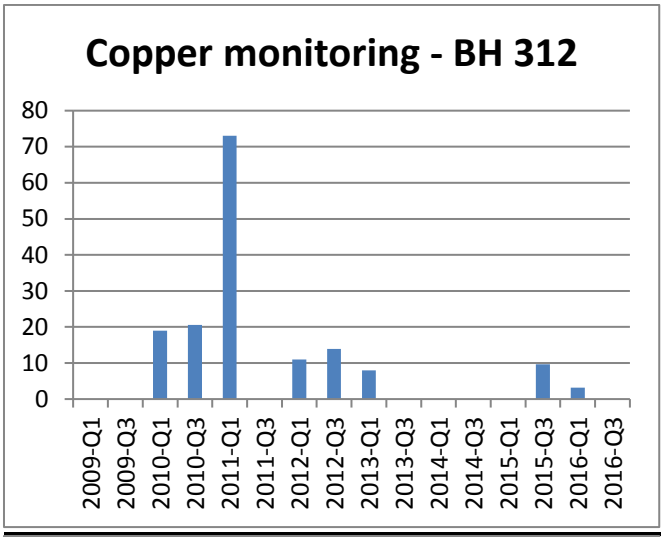

Copper monitoring - LF1
Concentration (µg/l)
0
10
20
30
40
50
60
70
80
2007-Q3
2008-Q1
2008-Q2
2008-Q3
2009-Q1
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3

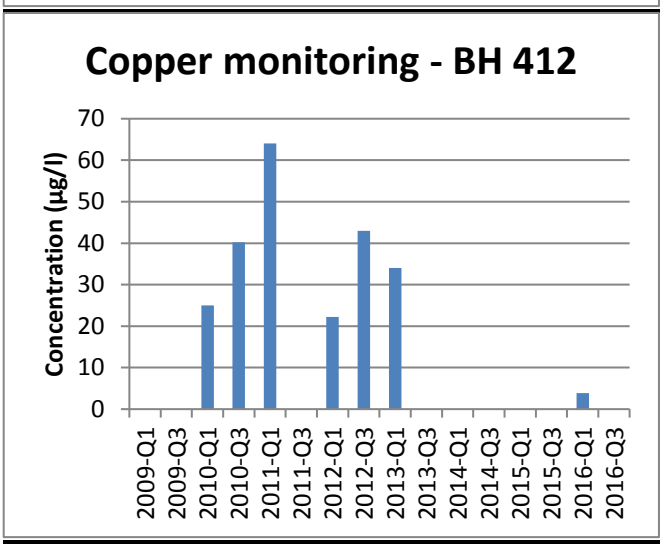

Copper monitoring - LF4
Concentration (µg/l)
0
5
10
15
20
25
30
35
2007-Q3
2007-Q4
2008-Q1
2008-Q2
2008-Q4
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3
2013-Q3
2014-Q3
2015-Q1
2015-Q3

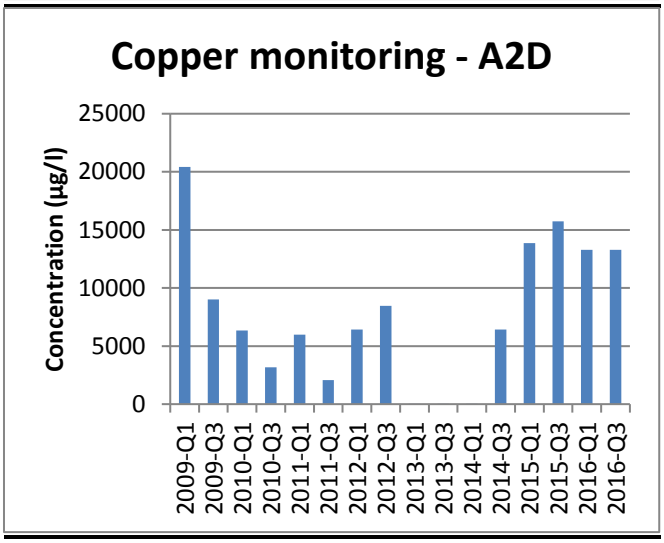

Copper monitoring - LF6
Concentration (µg/l)
0
10
20
30
40
50
60
70
80
2007-Q3
2008-Q1
2008-Q2
2008-Q3
2009-Q1
2010-Q3


Copper monitoring - LF7
Concentration (µg/l)
0
10
20
30
40
50
60
70
80
90
2007-Q3
2007-Q4
2008-Q1
2008-Q2
2008-Q3
2008-Q4
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3
2013-Q1
2013-Q3
2014-Q1
2014-Q3
2015-Q1
2015-Q3
2016-Q1
2016-Q3







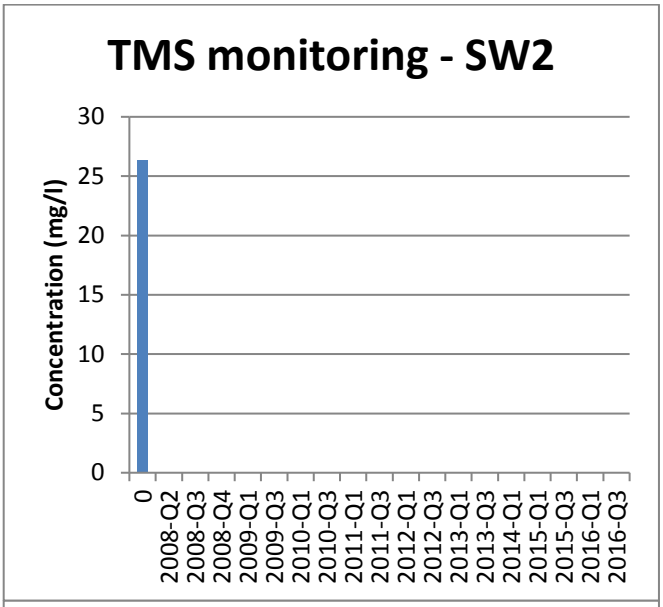


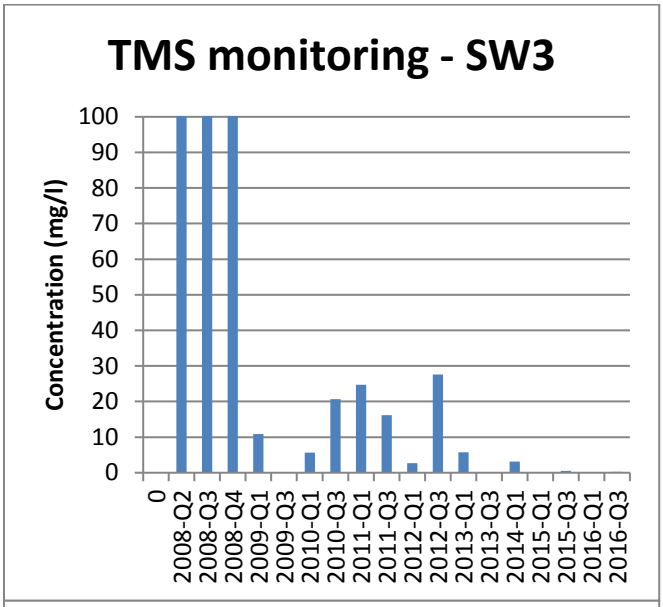
Comments

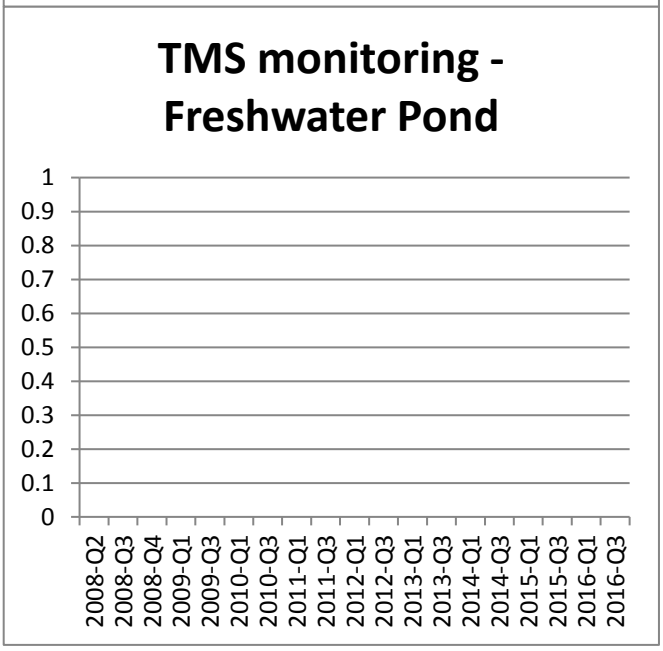
1. It was not possible to gain a sample from LF4 again this Quarter – this borehole has now been abandoned. LF12M/D have been sunk in this location and the results for this borehole are below detectable levels.
2. As mentioned in the previous reports the results over the past years appear to show fluctuation in the copper levels. It was suspected that the weather could play a part in the variation of the copper levels in the boreholes. Investigation of the weather data in combination with the sample days has been carried out but no specific trends have been identified.
3. All results of the sampling this quarter fall within the normal range of the sampling data.
4. The only borehole which measured a significant value for copper was A2d. The value was not as high as it has been in previous reporting periods. This borehole is situated in the middle of the site and therefore poses no risk to local sensitive receptors.

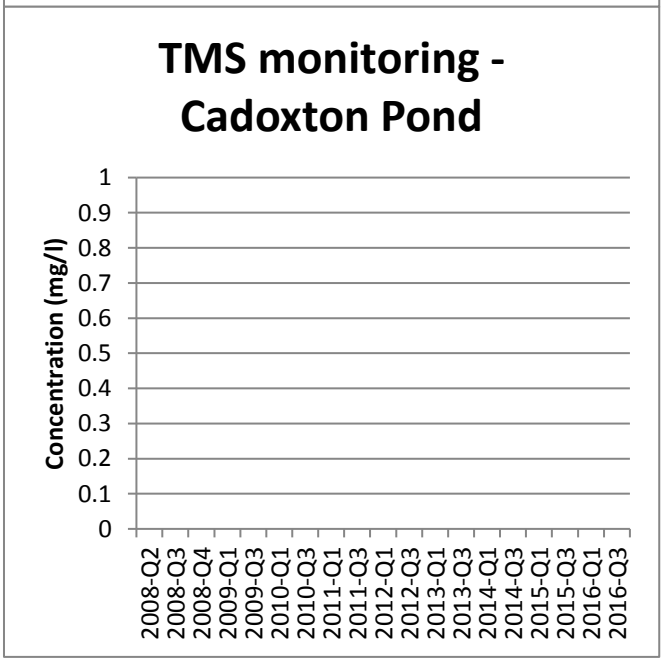
TMS

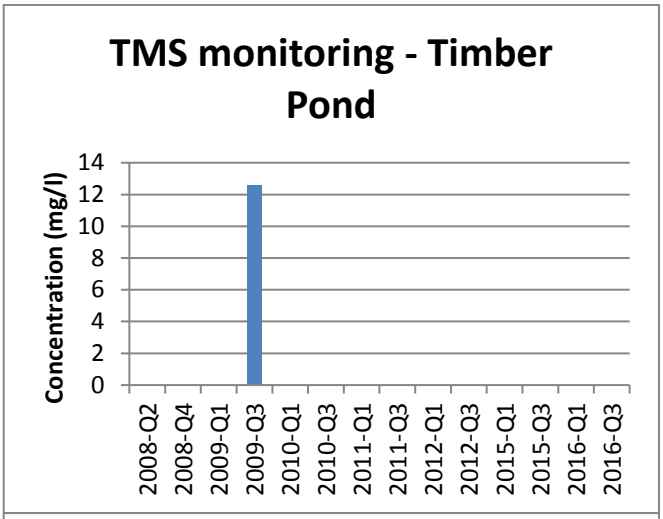
The detectable limit for Trimethylsilanol is 3 mg/l – any results below this will show on the graphs as 0

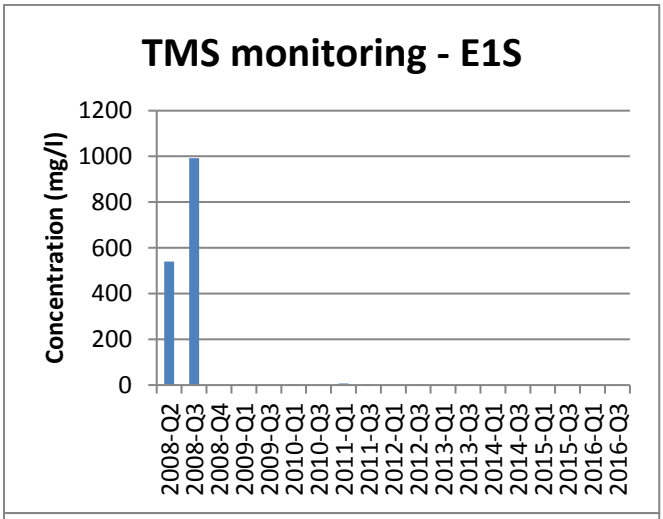


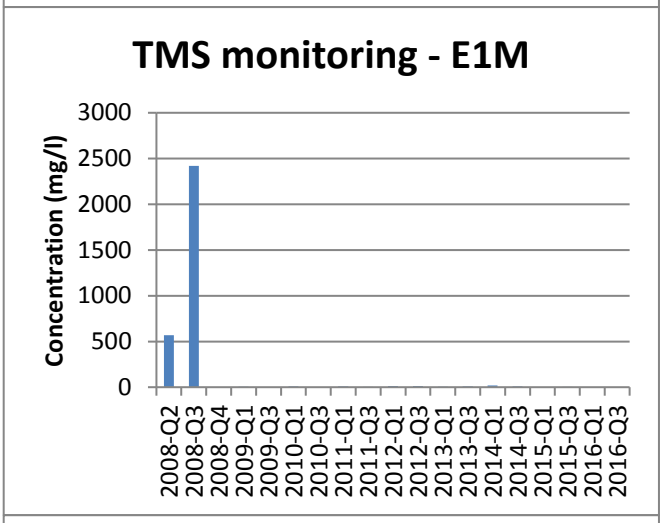


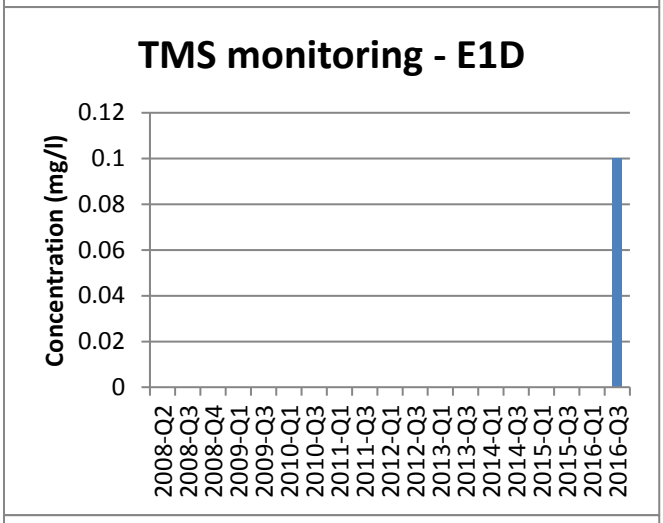


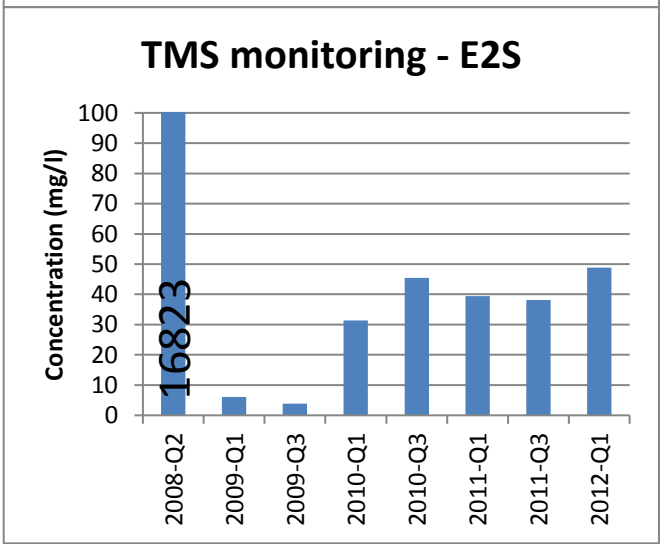


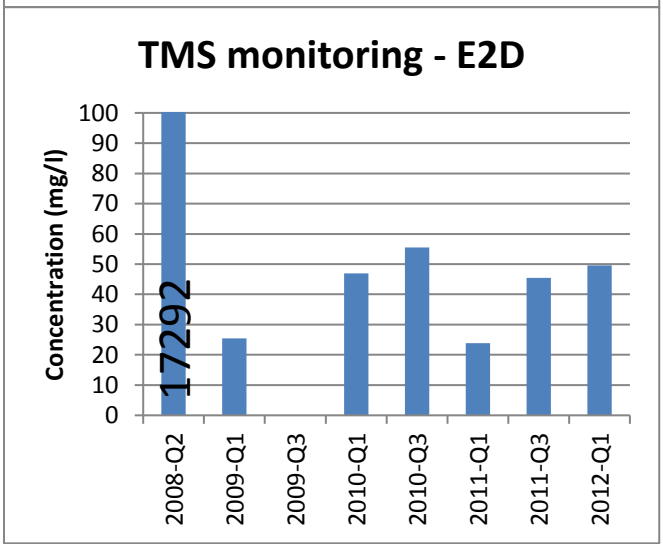

TMS monitoring - Timber Pond
Concentration (mg/l)
0
2
4
6
8
10
12
14
2008-Q2
2008-Q4
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3
2015-Q1
2015-Q3
2016-Q1
2016-Q3

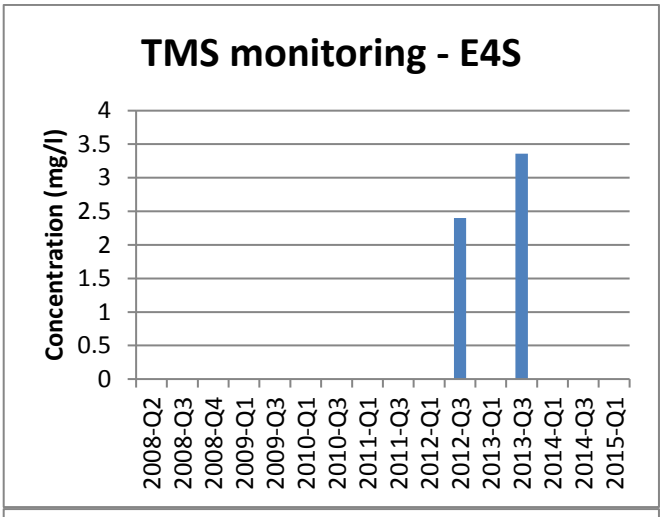

TMS monitoring - E1S
Concentration (mg/l)
0
200
400
600
800
1000
1200
2008-Q2
2008-Q3
2008-Q4
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3
2013-Q1
2013-Q3
2014-Q1
2014-Q3
2015-Q1
2015-Q3
2016-Q1
2016-Q3

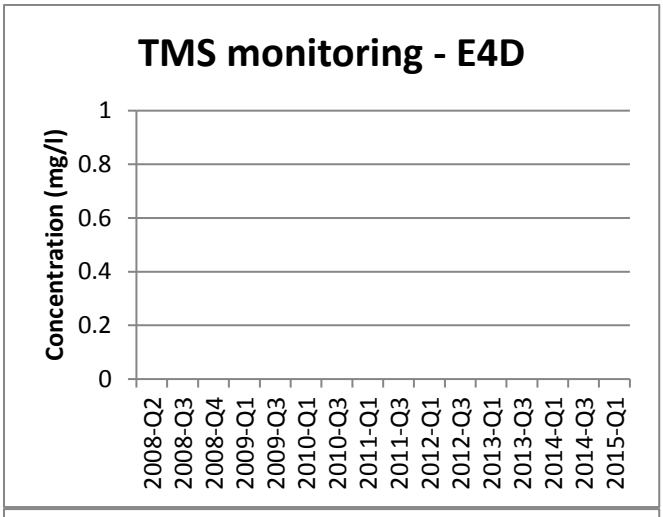

TMS monitoring - E1M
Concentration (mg/l)
0
500
1000
1500
2000
2500
3000
2008-Q2
2008-Q3
2008-Q4
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3
2013-Q1
2013-Q3
2014-Q1
2014-Q3
2015-Q1
2015-Q3
2016-Q1
2016-Q3

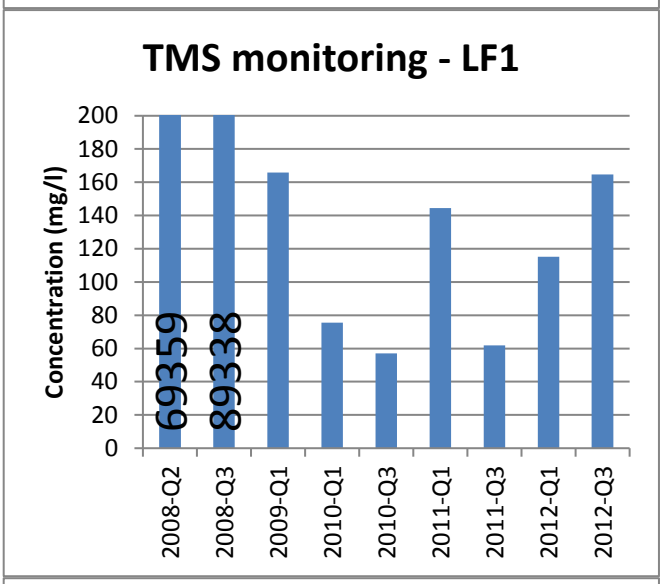

TMS monitoring - E1D
Concentration (mg/l)
0
0.02
0.04
0.06
0.08
0.1
0.12
2008-Q2
2008-Q3
2008-Q4
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3
2013-Q1
2013-Q3
2014-Q1
2014-Q3
2015-Q1
2015-Q3
2016-Q1
2016-Q3

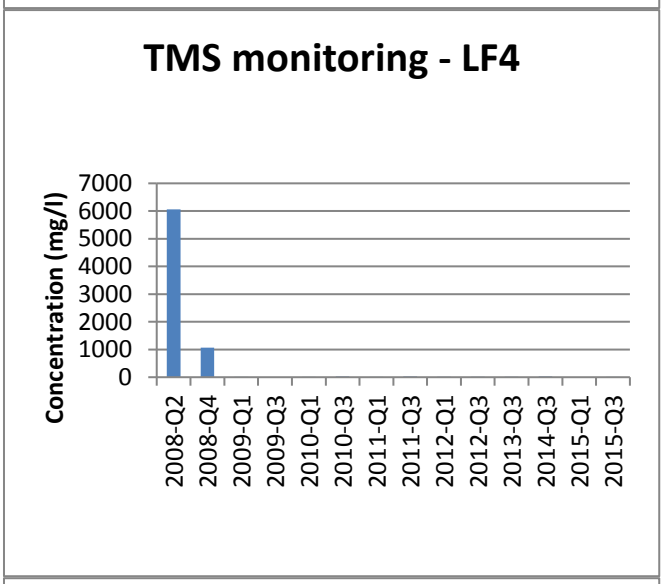

TMS monitoring - E2S
Concentration (mg/l)
0
10
20
30
40
50
60
70
80
90
100
16823
2008-Q2
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1

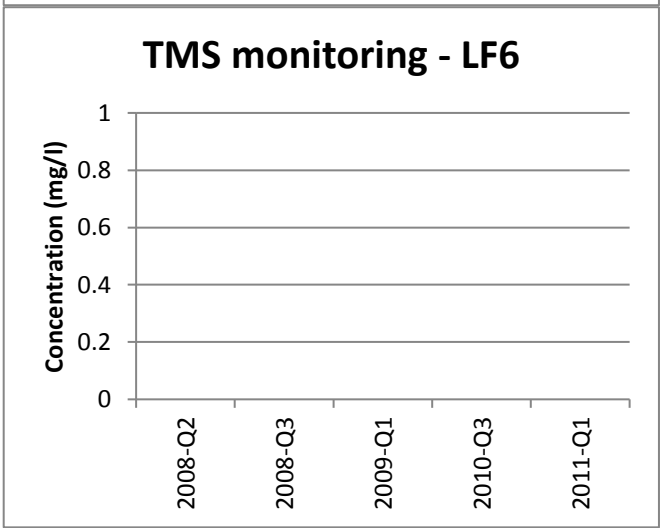

TMS monitoring - E2D
Concentration (mg/l)
0
10
20
30
40
50
60
70
80
90
100
17292
2008-Q2
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1

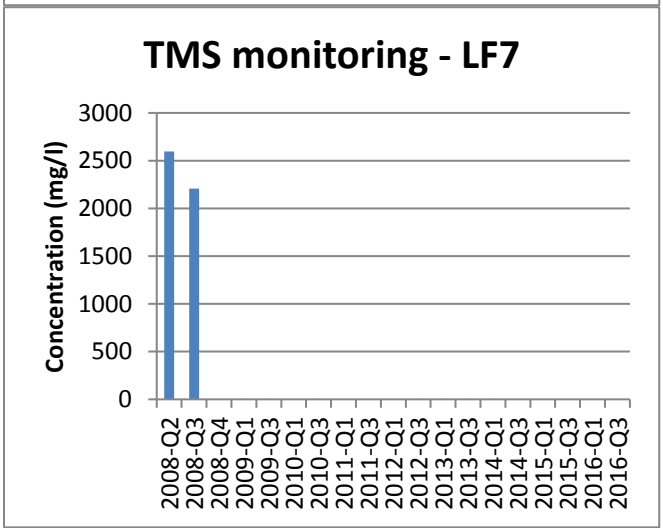

TMS monitoring - E4S
Concentration (mg/l)
4
3.5
3
2.5
2
1.5
1
0.5
0
2008-Q2
2008-Q3
2008-Q4
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3
2013-Q1
2013-Q3
2014-Q1
2014-Q3
2015-Q1

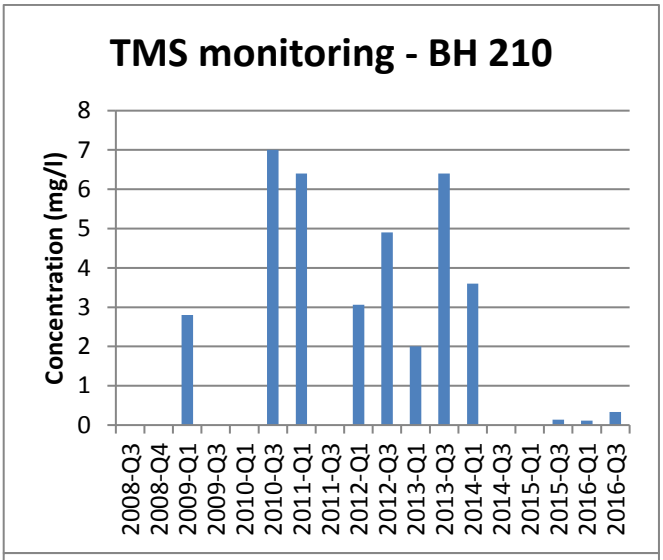

TMS monitoring - E4D
Concentration (mg/l)
1
0.8
0.6
0.4
0.2
0
2008-Q2
2008-Q3
2008-Q4
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3
2013-Q1
2013-Q3
2014-Q1
2014-Q3
2015-Q1

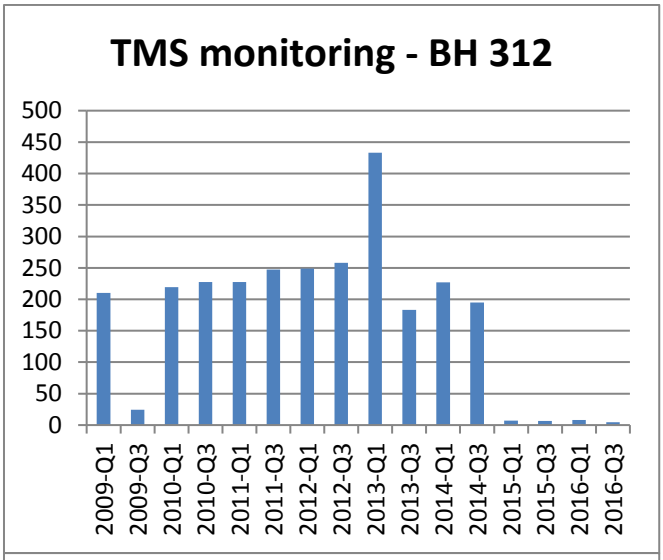

TMS monitoring - LF1
Concentration (mg/l)
200
180
160
140
120
100
80
60
40
20
0
69359
89338
2008-Q2
2008-Q3
2009-Q1
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3

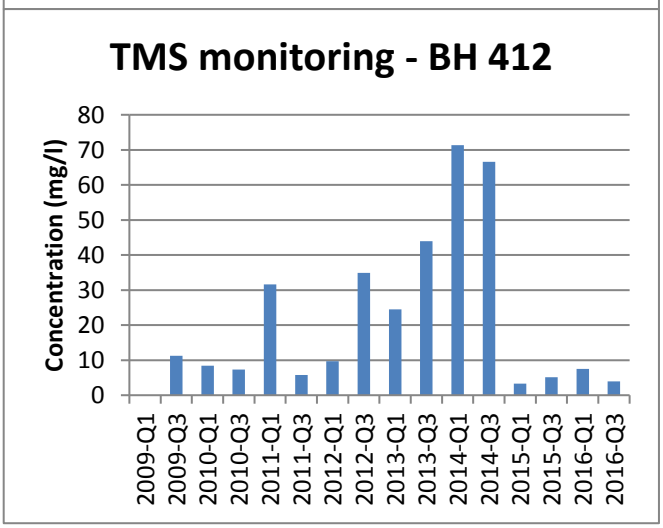

TMS monitoring - LF4
Concentration (mg/l)
7000
6000
5000
4000
3000
2000
1000
0
2008-Q2
2008-Q4
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3
2013-Q3
2014-Q3
2015-Q1
2015-Q3

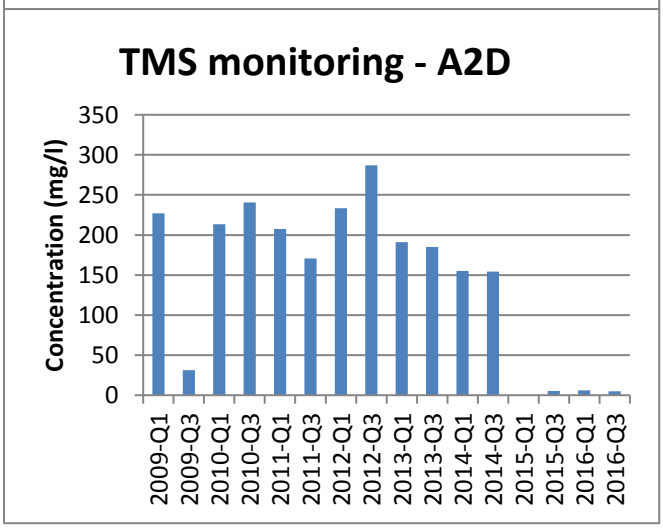

TMS monitoring - LF6
Concentration (mg/l)
1
0.8
0.6
0.4
0.2
0
2008-Q2
2008-Q3
2009-Q1
2010-Q3
2011-Q1


TMS monitoring - LF7
Concentration (mg/l)
3000
2500
2000
1500
1000
500
0
2008-Q2
2008-Q3
2008-Q4
2009-Q1
2009-Q3
2010-Q1
2010-Q3
2011-Q1
2011-Q3
2012-Q1
2012-Q3
2013-Q1
2013-Q3
2014-Q1
2014-Q3
2015-Q1
2015-Q3
2016-Q1
2016-Q3









Comments

1. No boreholes show significant TMS concentrations this quarter.
2. The results of sampling the boreholes shows the usual fluctuations.

The next report is to be completed for the next 6months.