Department of the Environment, Sustainability, Climate Change and Heritage

HM Government of Gibraltar

H.M Government of Gibraltar Environmental Statistics Report 2018

Contents

1. Air Quality

In Gibraltar, a formalised air quality monitoring programme is in operation consisting of a variety of methodologies, and taking place at selected locations. Developed in accordance with European Union (EU) directive requirements, air quality in Gibraltar since 2008 has been monitored using passive sampling, active (semi-automatic) sampling, and automatic point monitoring. Deployed at sites throughout Gibraltar, these work to provide a comprehensive understanding of variations in air quality according to location (urban/suburban), time, and season.

With some results available in real time, these as well as historical records, can be accessed by the public at www.gibraltarairquality.gi. The table below provides a record of activity on Gibraltar's air quality website in 2018.

Month	Number of Visits	Unique Visitors	Page Views
Jan-18	264	141	728
Feb-18	199	107	778
Mar-18	212	119	591
Apr-18	311	162	1,003
May-18	368	196	1,043
Jun-18	591	392	1,192
Jul-18	402	260	1,007
Aug-18	499	295	1,328
Sep-18	269	122	787
Oct-18	432	195	1,227
Nov-18	428	219	1,217
Dec-18	300	183	775

Gibraltar Air Quality Hits for 2018.

1.1 Annual Automatic Data Summary Reports

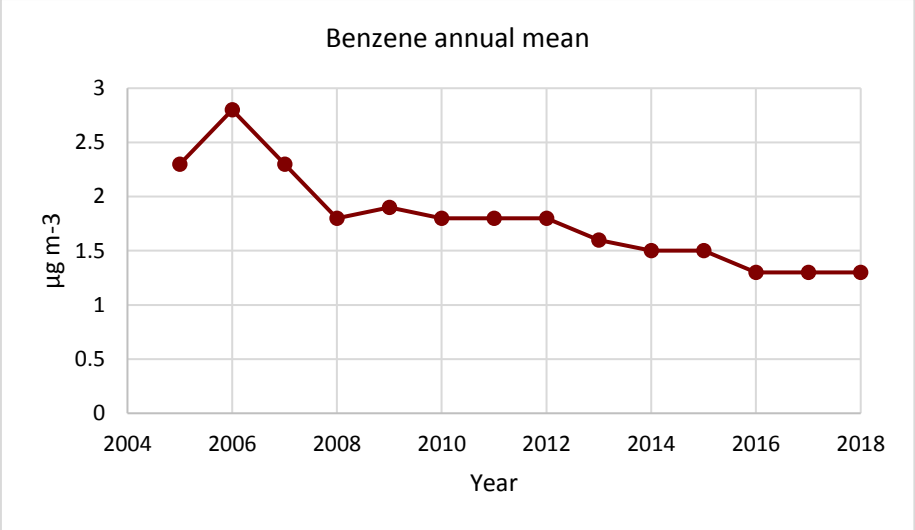
1.1.1 Rosia Road: 1st January to 31st December 2018

At Rosia Road, concentrations for pollutants such as benzene, carbon monoxide (CO), nitrogen dioxide (NO_2), and sulphur dioxide (SO_2) are logged. Records for 2018 are presented below.

1.1.1.1 Benzene

POLLUTANT	BENZ
Maximum hourly mean	193.7 µg m^{-3}
Maximum running 8-hour mean	65.8 µg m^{-3}
Maximum running 24-hour mean	25 µg m^{-3}
Maximum daily mean	22.8 µg m^{-3}
Data capture	93.8%

Rosia Road benzene results 2018.

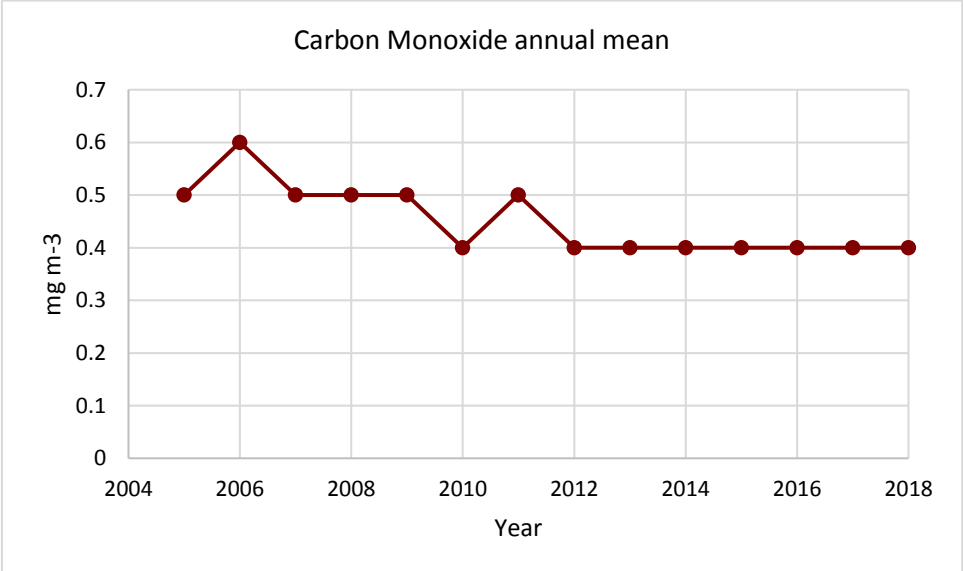


Rosia Road benzene annual mean.

1.1.1.2 Carbon Monoxide

POLLUTANT	CO
Maximum hourly mean	3.4 µg m^{-3}
Maximum running 8-hour mean	1.8 µg m^{-3}
Maximum running 24-hour mean	1.2 µg m^{-3}
Maximum daily mean	1.1 µg m^{-3}
Data capture	98.9 %

Rosia Road carbon monoxide monitored results 2018.

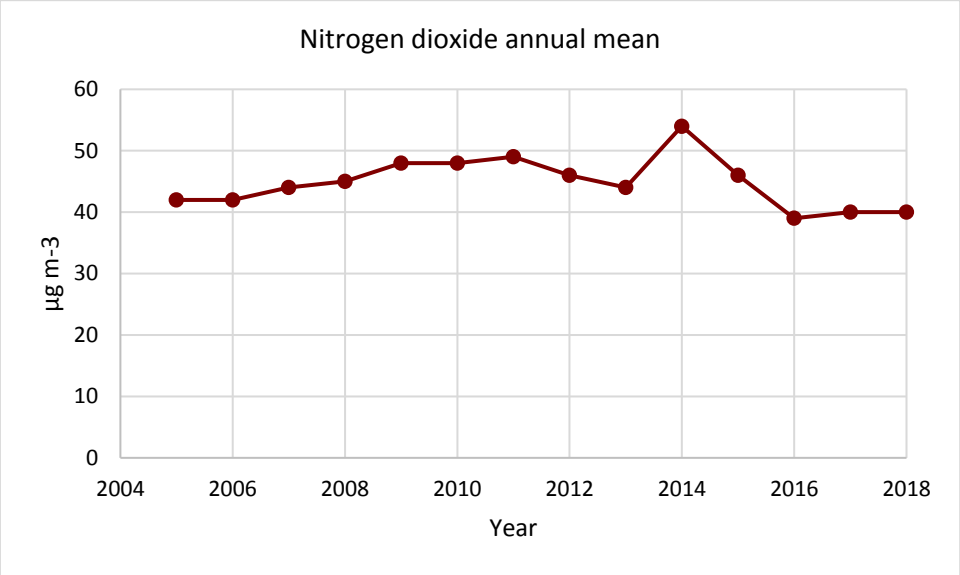


Rosia Road carbon monoxide annual mean.

1.1.1.3 Nitrogen Dioxide

POLLUTANT	NO_2
Maximum hourly mean	137 µg m^{-3}
Maximum running 8-hour mean	109 µg m^{-3}
Maximum running 24-hour mean	90 µg m^{-3}
Maximum daily mean	80 µg m^{-3}
Data capture	99%

Rosia Road nitrogen dioxide monitored results 2018.

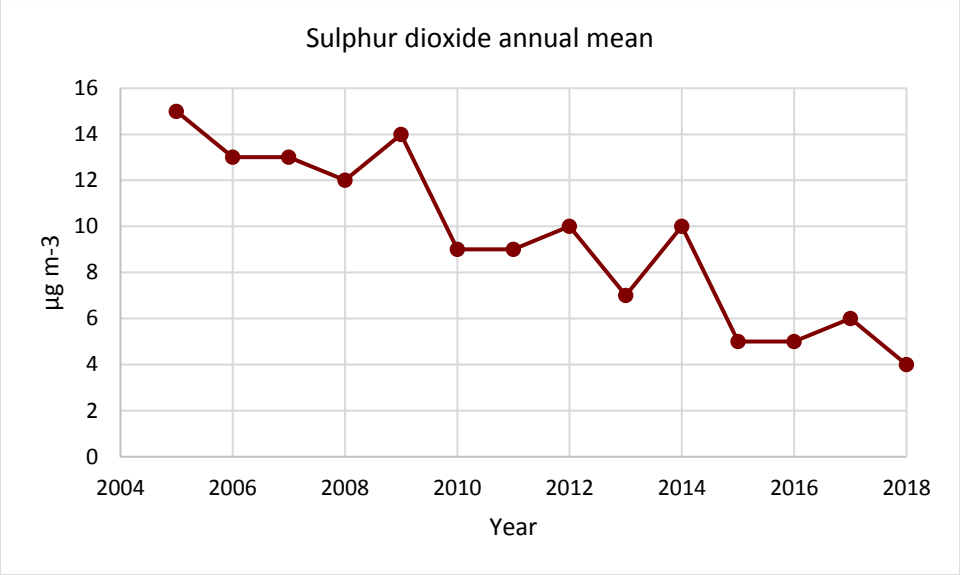


Rosia Road nitrogen dioxide annual mean.

1.1.1.4 Sulphur Dioxide

POLLUTANT	SO_2
Maximum hourly mean	75 µg m^{-3}
Maximum running 8-hour mean	36 µg m^{-3}
Maximum running 24-hour mean	19 µg m^{-3}
Maximum daily mean	14 µg m^{-3}
Data capture	98 %

Rosia Road sulphur dioxide monitored results 2018.



Rosia Road sulphur dioxide annual mean.

1.1.2 Exceedances

Pollutant	Public Health (Air Quality Limit Values) Rules 2002, (Amendment) Rules 2003 and (Ozone) Rules 2004	Exceedances
Carbon Monoxide	Running 8-hour mean > 10.0 mg m^{-3}	0
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	0
Sulphur Dioxide	Annual mean > 20 µg m^{-3}	0

Rosia Road pollutant exceedances for 2018.

Assessing available data, results show that no threshold exceedances were detected for Rosia Road in 2018.

1.1.3 South District Power Stations

The table below highlights the engine operating hours of South District power stations in 2018.

Engine Hours	Total 2018
GMES EX MOD Power Station (sets 7-9)	730
GMES South Temp. Gen. (Sets 21-30)	39,731
GMES SO Energy Temp (turbines 1+2)	922
Portman Temp. Gen. (Sets 1-6)	20,225

South District Power Stations engine hours in 2018.

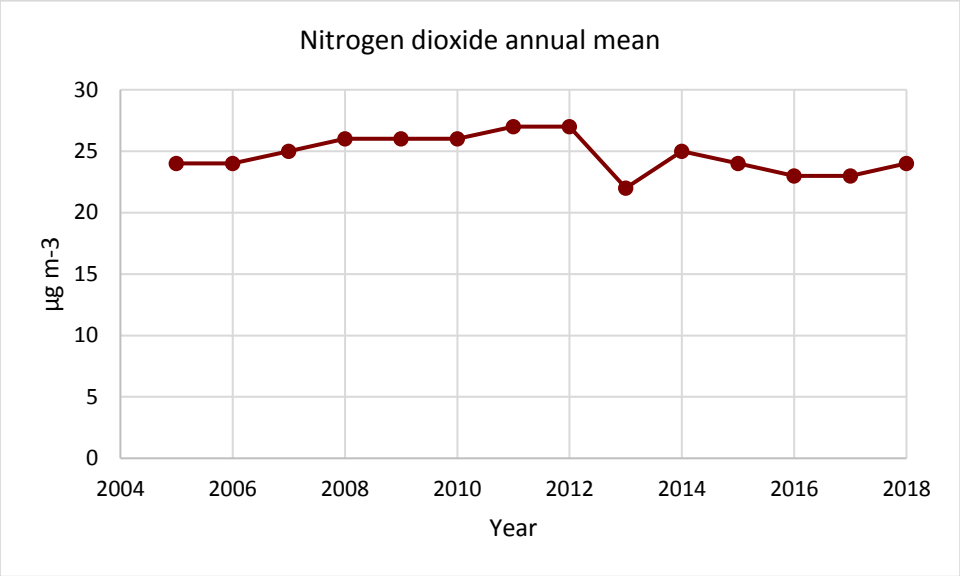
1.1.4 Bleak House: 1st January to 31st December 2018

At Bleak House, nitrogen dioxide and ozone (O_3) concentrations are monitored. Results for the suburban area in 2018 are listed below.

1.1.4.1 Nitrogen Dioxide

POLLUTANT	NO_2
Maximum hourly mean	105 µg m^{-3}
Maximum running 8-hour mean	80 µg m^{-3}
Maximum running 24-hour mean	57 µg m^{-3}
Maximum daily mean	55 µg m^{-3}
Data capture	97%

Bleak House nitrogen dioxide monitored results 2018.

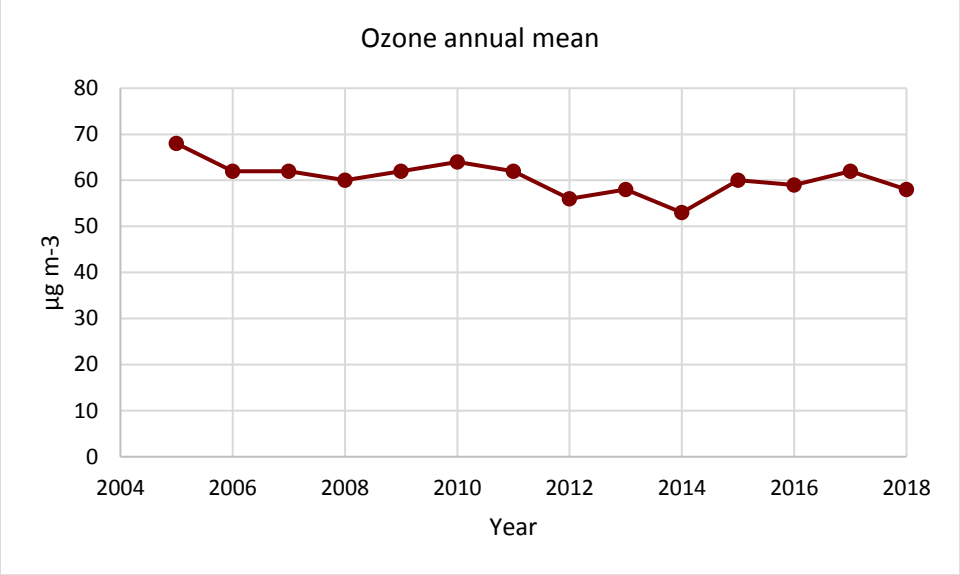


Bleak House nitrogen dioxide annual mean.

1.1.4.2 Ozone

POLLUTANT	O_3
Maximum hourly mean	131 µg m^{-3}
Maximum running 8-hour mean	117 µg m^{-3}
Maximum running 24-hour mean	110 µg m^{-3}
Maximum daily mean	109 µg m^{-3}
Data capture	96%

Bleak House ozone monitored results 2018.



Bleak House ozone annual mean.

1.1.5 Exceedances

Pollutant	Public Health (Air Quality Limit Values) Rules 2002, (Amendment) Rules 2003 and (Ozone) Rules 2004	Exceedances
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	0
Ozone	Running 8-hour mean > 120 µg m^{-3}	0

Bleak House pollutant exceedances for 2018.

Assessing available data, results show that no threshold exceedances were detected at Bleak House in 2018.

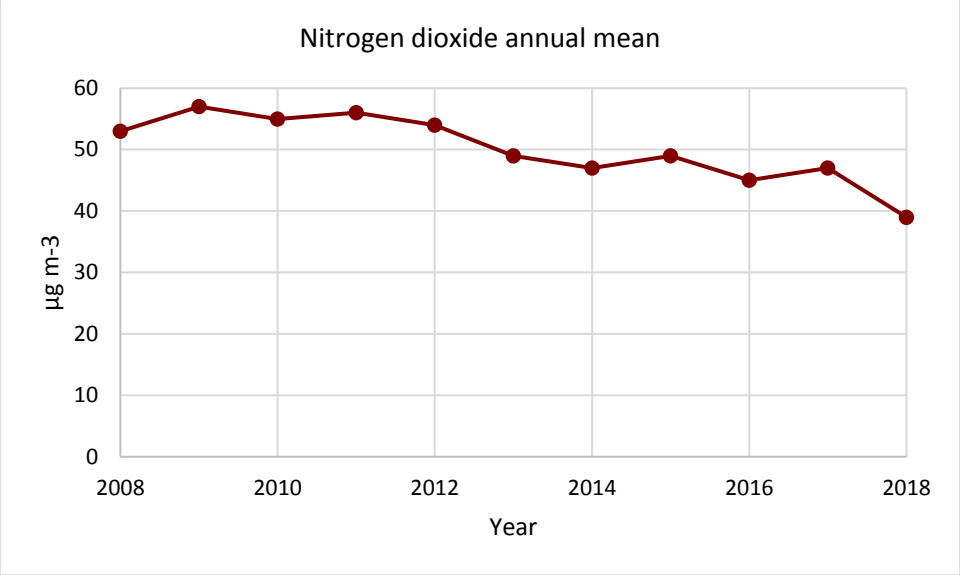
1.1.6 Witham's Road: 1st January to 31st December 2018

As the third automatic monitoring station, Witham's Road is located in the South District and within range of the South District power stations. Positioned here intentionally to observe the effects of traffic and power station emissions on pollutant levels, nitrogen dioxide is recorded at this site and has been regulated since 2008.

1.1.6.1 Nitrogen Dioxide

POLLUTANT	NO_2
Maximum hourly mean	144 µg m^{-3}
Maximum running 8-hour mean	111 µg m^{-3}
Maximum running 24-hour mean	96 µg m^{-3}
Maximum daily mean	90 µg m^{-3}
Data capture	93%

Witham's Road nitrogen dioxide monitored results 2018.



Witham's Road nitrogen dioxide annual mean.

1.1.7 Exceedances

Pollutant	Public Health (Air Quality Limit Values) Rules 2002, (Amendment) Rules 2003 and (Ozone) Rules 2004	Exceedances
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	0

Witham's road pollutant exceedances for 2018.

In 2018, no threshold exceedances were recorded at Witham's road.

1.2 Overview of Gibraltar's automatic air pollution measurement

To ensure the accuracy and reliability of all results documented by Gibraltar's air quality monitoring programme, substantial data capture is necessary. The table below provides an indication on Gibraltar's percentage of data capture, compared to that of the UK.

2018	CO	NO2	O3	PM10	SO2	Total
Number of Stations	7	158	76	77	28	172
Number of stations < 85 %	0	13	5	15	8	20
Number of stations < 90%	0	20	7	23	8	30
Network Mean (%) (UK)	96.9	93.6	94.5	89.7	84.7	92.2
Gibraltar Network Mean (%)	98.8	96.2	96.31	93.8	98.4	95.8

Data capture 2018.

1.3 Compliance with Air Quality Limit Values

To ensure compliance with air quality limit values, it is necessary to compare gathered data with relevant policy thresholds. Within this section, pollutants from the automatic monitoring framework

(carbon monoxide, nitrogen dioxide, sulphur dioxide and ozone) are evaluated, with failures to meet standards highlighted in red, and compliant values highlighted in green.

Air quality objective for CO (as maximum daily running 8hr mean)	Recorded levels (as maximum daily running 8hr mean)
10 mg m^{-3}	**1.8 mg m-3**

Automatic measurement for CO in 2018.

Air Quality Objective for NO_2	Recorded Annual Mean
40 µg m^{-3}	**40 µg m-3 (Rosia Road)** **39 µg m-3 (Witham's Road)** **24 µg m-3 (Bleak House)**

Recorded annual mean for NO_2 in 2018.

Air Quality Objective for NO_2 (1 hour mean)	Recorded exceedances
200 µg m^{-3} not to be exceeded more than 18 times per year	**0 (Rosia Road)** **0 (Witham's Road)** **0 (Bleak House)**

Exceedances recorded for one hour mean for Nitrogen Dioxide in 2018.

Air Quality Objective for SO_2 (Daily Mean)	Recorded exceedances
125 µg m^{-3} not to be exceeded more than 3 times per year	**0**
350 µg m^{-3} not to be exceeded more than 24 times per year	**0**

Recorded daily and hourly exceedances for sulphur dioxide in 2018.

Air Quality Objective for Benzene (Annual Mean)	Recorded Annual Mean
5 µg m^{-3}	**1.3 µg m^{-3}**

Recorded annual mean for Benzene in 2018.

Air Quality Objective for Ozone (Maximum Daily 8 Hour Mean)	Maximum rolling 8-hr mean (µg m^{-3})
120 µg m^{-3} not to be exceeded more than 25 days per calendar year, averaged over 3 years.	**117 µg m^{-3}** **Target value not exceeded**

Maximum rolling 8-hour mean for Ozone in 2018.

Reviewing the results, all pollutants tracked under the automatic monitoring framework were successful in meeting legislative thresholds.

1.4 Review of Gibraltar's non-automatic air pollution measurements

As part of Gibraltar's non-automatic monitoring programme, concentrations of particulates and heavy metals such as arsenic (As), cadmium (Cd), nickel (Ni), and lead (Pb) are measured. Assessed against limit values and objectives, the following series of data highlights compliant figures in green and non-compliant in red.

1.4.1 Lead

Air Quality Objective for Lead (measured as an annual mean)	Recorded Annual Mean
0.5 µg m^{-3}	**0.0069 µg m^{-3} (Rosia Road)**
	0.0054 µg m^{-3} (Bleak House)

Recorded annual mean for Lead in 2018.

1.4.2 Particulate Matter (PM_{10})

Air Quality Objective for PM_{10} (measured as an annual mean)	Recorded Annual Mean
40 µg m^{-3}	**27 µg m^{-3} (Rosia Road)**
	24 µg m^{-3} (Bleak House)
Air Quality Objective for PM_{10} (measured as a daily mean)	**No. of exceedances of maximum daily mean**
50 µg m^{-3} not to be exceeded more than 35 times in a year	**11 (Rosia Road)**
	12 (Bleak House)

PM_{10} recorded annual mean and compliance in 2018.

	2011	2012	2013	2014	2015	2016	2017	2018
% Data Capture	85	90	73	82	94	93	81	86
Annual Mean PM_{10} (40 µg m^{-3})*	34	34	36	36	31	28	28	27
Max. 24-hour mean PM_{10}	65	83	88	155	41	41	102	39
Days > 50 µg m^{-3} (35 day limit)*	25	18	15	17	16	11	11	11

Breakdown of PM_{10} statistics for Rosia Road.

1.4.3 Particulate Matter ($PM_{2.5}$)

Air Quality Objective for $PM_{2.5}$ (measured as an annual mean)	Recorded Annual Mean
20µg m^{-3}	**12 µg m^{-3}**

$PM_{2.5}$ recorded annual mean for 2018.

1.4.4 Arsenic, Cadmium, Nickel & Poly Aromatic Hydrocarbons (measured as Benzo(a)pyrene).

Pollutant	Parameter	Target Value	Recorded Average
Arsenic	Annual average	6 ng m^{-3}	**1.6 ng m^{-3} (Rosia Road)**
			1.3 ng m^{-3} (Bleak House)
Cadmium	Annual average	5 ng m^{-3}	**2 ng m^{-3} (Rosia Road)**
			1.6 ng m^{-3} (Bleak House)
Nickel	Annual average	20 ng m^{-3}	**12 ng m^{-3} (Rosia Road)**
			13 ng m^{-3} (Bleak House)
BAP	Annual average	1 ng m^{-3}	**0.065 ng m^{-3} (Rosia Road)**

4th Daughter Directive pollutant recordings for 2018.

Reviewing the results, all pollutants tracked under the non-automatic monitoring framework were successful in meeting legislative thresholds.

1.5 Diffusion Tube Networks

Integral to the non-automatic monitoring programme, a diffusion tube based method is used to assess monthly average concentrations of nitrogen dioxide and benzene at a number of sites across Gibraltar. Diffusion tube results are indicative only and not as reliable as the automatic monitoring network.

1.5.1 Summary of Hydrocarbon Results

Below, average hydrocarbon concentrations for benzene are shown. With a pollutant threshold of 5 µg m-3, the table highlights where compliance has been achieved, and also provides a comparison to the previous year's results to determine whether there are improvements being made.

Site ID	Site Name	2017 Benzene (µg m-3)	2018 Benzene (µg m-3)	Difference
gib1	Rosia Road	1.2	1	-0.2
gib15	Catalan Bay Road	0.5	0.5	0
gib16	Laguna Estate	0.7	0.6	-0.1
gib17	Kings Lines Fuel Depot	0.9	0.8	-0.1
gib18	Moorish Castle Estate	1.9	0.5	-1.4
gib19	North Mole	0.5	0.9	0.4
gib2	Bleak House	0.5	0.4	-0.1
gib20	Sundial Roundabout	1.3	1.1	-0.2
gib21	Anchorage Rosia Road	0.9	0.6	-0.3
gib3	Jumpers	1	0.8	-0.2
gib30	Governors Meadow House	0.7	0.5	-0.3
gib4	Devils Tower Road	0.6	0.6	0

gib5	Glacis Road	1.3	1.3	0
gib6	Queensway	1.1	1.1	0
gib7	Harbour Views	0.5	0.6	0.1

Average hydrocarbon concentrations for Benzene 2018.

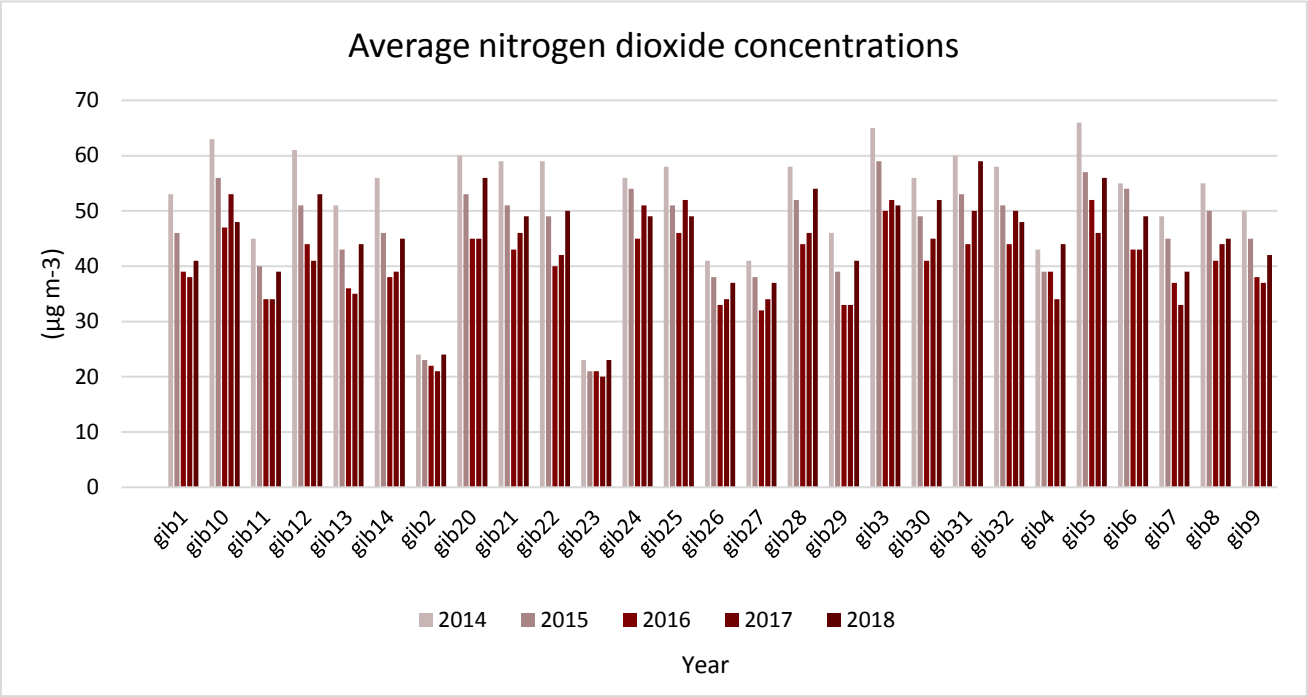
Compliance across all sites was achieved with readings measuring well below the 5 µg m-3 threshold.

1.5.2 Nitrogen Dioxide Network

The following table shows diffusion tube readings of nitrogen dioxide at a variety of locations throughout Gibraltar. The target limit for this pollutant is 40 µg m^{-3}.

Site ID	Site Name	2017 NO_2 (µg m-3)	2018 NO_2 (µg m-3)	Difference
gib1	Rosia Road	38	41	3
gib10	South Barracks Road	53	48	-5
gib11	Main Street	34	39	5
gib12	Water Gardens	41	53	12
gib13	George Don House	35	44	9
gib14	Prince Edwards Road	39	45	6
gib2	Bleak House	21	24	3
gib20	Sundial Roundabout	45	56	11
gib21	Anchorage Rosia Road	46	49	3
gib22	Rosia Promenade	42	50	8
gib23	Lathbury Industrial Park	20	23	3
gib24	Upper Withams Entrance	51	49	-2
gib25	Churchill House	52	49	-3
gib26	Alameda Gardens Theatre	34	37	3
gib27	Alameda Gardens Access Road	34	37	3
gib28	Rock Hotel	46	54	8
gib29	Gardiners Road	33	41	8
gib3	Jumpers	52	51	-1
gib30	Governors Meadow House	45	52	7
gib31	Dockyard Road	50	59	9
gib32	Woodford Cottage	50	48	-2
gib4	Devils Tower Road	34	44	10
gib5	Glacis Road	46	56	10
gib6	Queensway	43	49	6
gib7	Harbour Views	33	39	6
gib8	Red Sands Road	44	45	1
gib9	Lime Kiln Road	37	42	5

Average nitrogen dioxide concentrations in 2018.



Average nitrogen dioxide concentrations 2014-2015.

Analyzing results for nitrogen dioxide, it is noted that in 2018 there was an increase in concentrations recorded, most especially in the north side of Gibraltar. Areas including Water Gardens, the Sundial Roundabout, Devil's Tower Road, and Glacis Road experienced the highest increases, most likely because of additional vehicles on the roads created by construction. Although this has led to a spike, in an otherwise downward trend, nitrogen dioxide concentrations remain lower than those recorded in 2014, and should progressively decrease now that many of the new schools in these areas have been completed.

2. Natural Resources

2.1 Bathing Waters

The Bathing Water Directive (2006/7/EC), adopted in 15th February 2006, was transposed into Gibraltar law by the Environment (Quality of Bathing Water) Regulations 2009. In accordance with the requirements of this legislation, regular monitoring is carried out at Gibraltar's six bathing areas - Camp Bay, Catalan Bay, Eastern Beach, Little Bay, Sandy Bay Western Beach – and more. The number of samples taken at respective sites in 2018 are as follows:

Site Name	Number of samples taken
Camp Bay	50
Little Bay	50
Catalan Bay	49
Sandy Bay	49
Sandy Bay Outer Groyne	48
Eastern Beach	48
Eastern Beach Frontier Fence	48
Western Beach	444
GASA pier	12
Rosia Bay Beach	12

Rosia Bay Pier	12

Number of samples taken as part of Environment (Quality of Bathing Water) Regulations 2009 monitoring.

Further to these legislative requirements, there is also a need to monitor for two microbiological indicators of faecal contamination: *E Coli* and intestinal enterococci. Classified into four categories being: “excellent”, “good”, “sufficient”, or “poor”, the analyses of these samples consider the results over the current bathing season and the preceding three years instead of a single year’s result. In this way, classifications will be less susceptible to bad weather or one-off incidents, and provide results that are more reliable.

Camp Bay No. of occasions of low water quality

Year	E.Coli >500 cfu/100ml	Intestinal enterococci >185 cfu/100ml
2016	0	0
2017	0	0
2018	0	0

Incidences of Low Water Quality at Camp Bay.

Little Bay No. of occasions of low water quality

Year	E.Coli >500 cfu/100ml	Intestinal enterococci >185 cfu/100ml
2016	0	1
2017	0	0
2018	0	1

Incidences of Low Water Quality at Little Bay.

In 2018, one incidence of low water quality occurred at Little Bay where intestinal enterococci reached 196 cfu/100ml.

Catalan Bay No. of occasions of low water quality

Year	E.Coli >500 cfu/100ml	Intestinal enterococci >185 cfu/100ml
2016	0	1
2017	1	1
2018	0	0

Incidences of Low Water Quality at Catalan Bay.

Sandy Bay No. of occasions of low water quality

Year	E.Coli >500 cfu/100ml	Intestinal enterococci >185 cfu/100ml
2016	1	1
2017	0	0
2018	0	0

Incidences of Low Water Quality at Sandy Bay.

Eastern Beach No. of occasions of low water quality

Year	E.Coli >500 cfu/100ml	Intestinal enterococci >185 cfu/100ml
2016	2	1
2017	0	0
2018	0	0

Incidences of Low Water Quality at Eastern Beach.

Western Beach No. of occasions of low water quality

Year	E.Coli >500 cfu/100ml	Intestinal enterococci >185 cfu/100ml
2016	112	96
2017	43	36
2018	97	88

Incidences of Low Water Quality at Western Beach.

In 2018, the number of incidences of low water quality recorded at Western beach increased from 2017. As previously reported, this is the result of a sewage overflow pipe located in the neighbouring Spanish town of La Linea.

2.2 Potable Water Supply

In compliance with Gibraltar's Public Health Act, all water produced by Aquagib, Gibraltar's only utility supplier of potable water, must be analyzed to ensure its properties comply with the chemical and bacterial properties defined in this legislation. Carried out at the desalination plants and other locations throughout the distribution network, results for water quality recorded in 2018 are as follows;

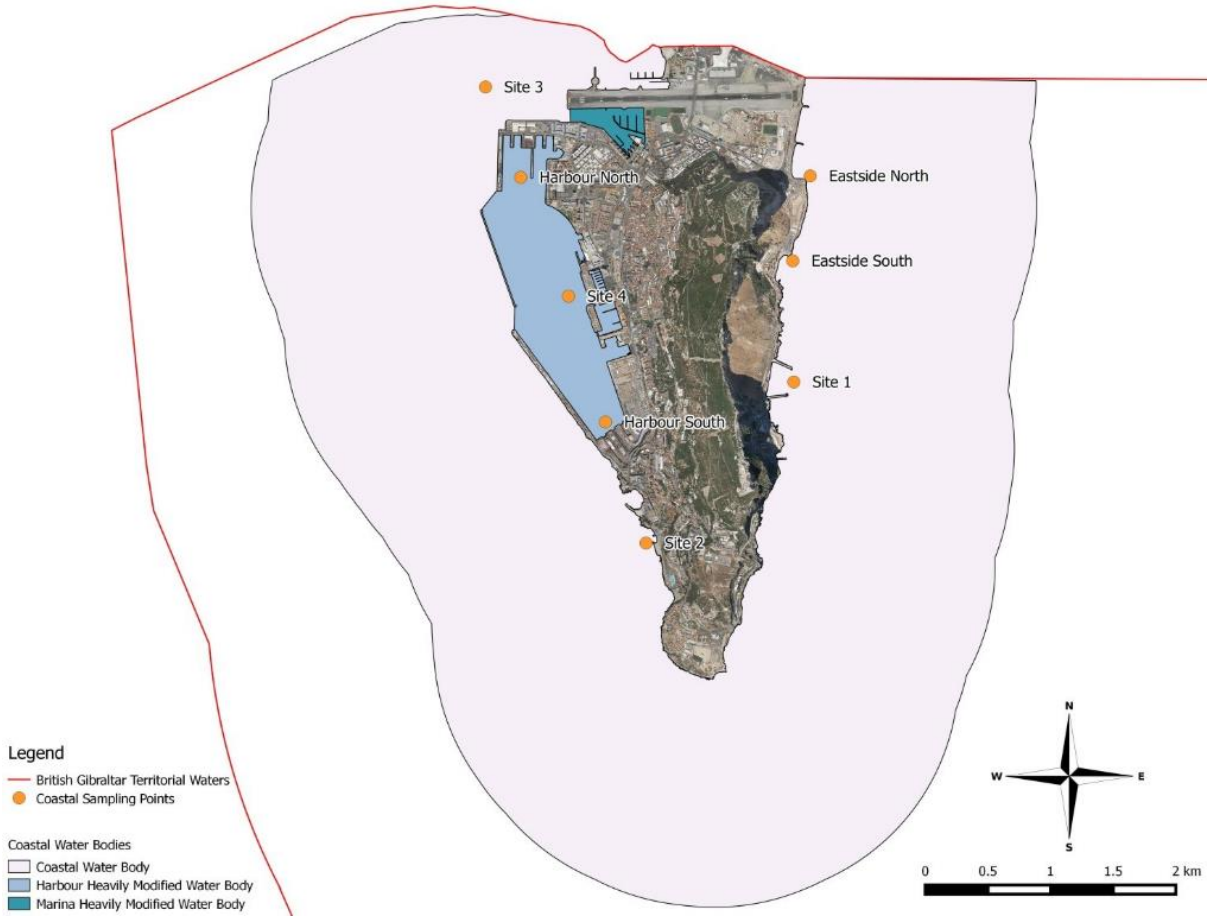
Member State	United kingdom (Gibraltar)				
Year	2018				
Parameter	Numbers of WSZ Monitored	Numbers of WSZ with Non-Compliance	Number of Analyses	Number of Analyses not complying	% of Analyses Complying
Microbiological parameters					
Escherichia (E.coli)	1	0	10	0	100
Enterococci	1	0	10	0	100
Chemical parameters					
Antimony	1	0	10	0	100
Arsenic	1	0	10	0	100
Benzene	1	0	10	0	100
Benzo(a)pyrene	1	0	10	0	100
Boron	1	0	10	0	100
Bromate	1	1	10	1	90
Cadmium	1	0	10	0	100

Chromium	1	0	10	0	100
Copper	1	0	10	0	100
Cyanide	1	0	10	0	100
1,2-dichloroethane	1	0	10	0	100
Fluoride	1	0	10	0	100
Lead	1	0	10	0	100
Mercury	1	0	10	0	100
Nickel	1	0	10	0	100
Nitrite as NO_3	1	0	10	0	100
Nitrate as NO_2	1	0	10	0	100
Pesticides – total	1	0	10	0	100
Polycyclic Aromatic Hydrocarbons	1	0	10	0	100
Selenium	1	0	10	0	100
Tetrachloroethane	1	0	10	0	100
and Trichloroethane	1	0	10	0	100
Trihalomethanes - Total	1	0	10	0	100
Indicator parameters					
Aluminium	1	0	10	0	100
Ammonium	1	0	10	0	100
Chloride	1	0	10	0	100
Colour	1	0	10	0	100
Conductivity	1	0	10	0	100
pH	1	0	10	0	100
Iron	1	0	10	0	100
Manganese	1	0	10	0	100
Odour	1	0	10	0	100
Oxidisability	1	0	10	0	100
Sulphate	1	0	10	0	100
Sodium	1	0	10	0	100
Taste	1	0	10	0	100
Coliform	1	0	10	0	100
Turbidity	1	0	10	0	100

National summary information on drinking water quality in water supply zones exceeding 1000m^3 per day as an average or serving more than 5000 persons.

2.3 Coastal Water Monitoring

The Department of the Environment and Climate Change carries out coastal water sampling on a regular basis at locations detailed on the map provided. In line with the Water Framework Directive (WFD) 2000/60/EC, a large variety of chemical and physio-chemical parameters are monitored at different locations and frequencies throughout the year.



Coastal water sampling points.

Chemical / physio-chemical parameters	Frequency
General	
Temperature	Monthly
Nutrient status - Total N, Total P, NO3, NO2, NH4, PO4	Monthly
Salinity	Monthly
Total suspended solids	Monthly
Dissolved |Oxygen (DO)*	Monthly
Transparency*	Monthly
Chlorophyll-a*	Monthly
pH*	Monthly
Specific pollutants	
Pesticides	
Alachlor	4 times per year
Atrazine	4 times per year
Chlorfenvinphos	4 times per year
Chlorpyrifos	4 times per year
Endosulfan (alpha-endosulfan)	4 times per year
Hexachlorobutadiene	4 times per year
Hexachlorocyclohexane (gamma-isomer, Lindane)	4 times per year

Simazine	4 times per year
Trifluralin	4 times per year
Metals	
Cadmium and its compounds	4 times per year
Lead and its compounds	4 times per year
Mercury and its compounds	4 times per year
Nickel and its compounds	4 times per year
Polyaromatic hydrocarbons	
Anthracene	4 times per year
Fluoranthene	4 times per year
Naphthalene	4 times per year
(Benzo(a)pyrene)	4 times per year
(Benzo(b)fluoranthene)	4 times per year
(Benzo(g,h,i)perylene)	4 times per year
(Benzo(k)fluoranthene)	4 times per year
(Indeno(1,2,3-cd)pyrene)	4 times per year
Chlorinated Hydrocarbons	
1,2-Dichloroethane	4 times per year
Dichloromethane	4 times per year
Hexachlorobenzene	4 times per year
Pentachlorobenzene	4 times per year
Trichlorobenzenes (1,2,4-Trichlorobenzene)	4 times per year
Trichloromethane (Chloroform)	4 times per year
TBT	
Tributyltin compounds (Tributyltin-cation)	4 times per year
Other hydrocarbons	
C10-13-chloroalkanes	4 times per year
Benzene	4 times per year
BDEs	
Brominated diphenylethers	4 times per year
DEHP	
Di(2-ethylhexyl)phthalate	4 times per year
Urons	
Diuron	4 times per year
Isoproturon	4 times per year
Phenols	
Nonylphenols (4-(para)-nonylphenol)	4 times per year
Octylphenols (para-tert-octylphenol)	4 times per year
Pentachlorophenol	4 times per year
Other pollutants	
Chromium	4 times per year
Copper	4 times per year
Zinc	4 times per year
Biological parameters	
Phytoplankton - Abundance & composition (Abn. & Comp.)	4 times per year
Benthic macroinvertebrates - Abundance, composition & biomass	Every 6 years

2.3.1 Coastal Monthly and Quarterly Recordings for 2018

Results compiled as part of the coastal water-monitoring programme in 2018 are as follows:

		Site 1. Sandy Bay 22/01/18	**Site 2. Camp Bay 22/01/18**	**Site 3. Runway 22/01/18**	**Site 4. Mid Harbour 22/01/18**
Analyte	***Units***				
Nitrogen as N	mg/l	<0.1	<0.1	<0.1	0.101
Ammoniacal Nitrogen, Filtered as N	mg/l	<0.0200	<0.0200	<0.0200	<0.0200
Nitrite, Filtered as N	mg/l	<0.00400	<0.00400	<0.00400	<0.00400
Nitrogen : Total Oxidised, Filtered as N	mg/l	<0.100	<0.100	<0.100	<0.100
Orthophosphate, Filtered as P	mg/l	<0.0100	<0.0100	<0.0100	<0.0100
Phosphorus : Total	mg/l	<0.0200	<0.0200	<0.0200	<0.0200
Chlorophyll, Acetone Extract	ug/l	0.98	1.6	1.2	1.3
Solids, Suspended at 105 C	mg/l	4.7	5.3	<3.00	<3.00
Nitrate, Filtered as N	mg/l	<0.100	<0.100	<0.100	<0.100

January 2018 Coastal Monitoring Results.

		Site 1. Sandy Bay 12/02/18	**Site 2. Camp Bay 12/02/18**	**Site 3. Runway 12/02/18**	**Site 4. Mid Harbour 12/02/18**
Analyte	***Units***				
Nitrogen as N	mg/l	<0.1	<0.1	<0.1	0.101
Ammoniacal Nitrogen, Filtered as N	mg/l	<0.0200	<0.0200	<0.0200	<0.0200
Nitrite, Filtered as N	mg/l	<0.00400	<0.00400	<0.00400	<0.00400
Nitrogen : Total Oxidised, Filtered as N	mg/l	<0.100	<0.100	<0.100	<0.100
Orthophosphate, Filtered as P	mg/l	<0.0100	<0.0100	<0.0100	<0.0100
Phosphorus : Total	mg/l	<0.0200	<0.0200	<0.0200	<0.0200
Chlorophyll, Acetone Extract	ug/l	0.97	0.94	1.1	1.5
Solids, Suspended at 105 C	mg/l	<3.0	3.6	<3.00	<3.00
Nitrate, Filtered as N	mg/l	<0.100	<0.100	<0.100	<0.100

February 2018 Coastal Monitoring Results.

		Site 1. Sandy Bay 27/04/18	**Site 2. Camp Bay 27/04/18**	**Site 3. Runway 27/04/18**	**Site 4. Mid Harbour 27/04/18**
Analyte	***Units***				
Nitrogen as N	mg/l	<0.1	<0.1	<0.1	<0.1
Ammoniacal Nitrogen, Filtered as N	mg/l	<0.0200	<0.0200	<0.0200	<0.0200
Nitrite, Filtered as N	mg/l	<0.00400	<0.00400	<0.00400	<0.00400

Nitrogen : Total Oxidised, Filtered as N	mg/l	<0.100	<0.100	<0.100	<0.100
Orthophosphate, Filtered as P	mg/l	<0.0100	<0.0100	<0.0100	<0.0100
Phosphorus : Total	mg/l	<0.0200	<0.0200	<0.0200	<0.0200
Chlorophyll, Acetone Extract	ug/l	5.1	4.4	2.2	3
Solids, Suspended at 105 C	mg/l	<3.00	<3.00	<3.00	16.5
Nitrate, Filtered as N	mg/l	<0.100	<0.100	<0.100	<0.100

April 2018 Coastal Monitoring Results.

		Site 1. Sandy Bay 24/06/18	**Site 2. Camp Bay 24/06/18**	**Site 3. Runway 24/06/18**	**Site 4. Mid Harbour 24/06/18**
Analyte	***Units***				
1,2,4-Trichlorobenzene	ug/l	<0.01	<0.01	<0.01	<0.01
1,2-Dichloroethane	ug/l	<0.1	<0.1	<0.1	<0.1
4-Nonylphenol Branched	ug/l	<0.4	<0.4	<0.4	<0.4
Anthracene	ug/l	<0.01	<0.01	<0.01	<0.01
Atrazine	ug/l	<0.003	<0.003	<0.003	<0.003
Benzene	ug/l	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	ug/l	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	ug/l	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	ug/l	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	ug/l	<0.01	<0.01	<0.01	<0.01
Cadmium	ug/l	<0.03	<0.03	<0.03	<0.03
Chlorfenvinphos	ug/l	<0.01	<0.01	<0.01	<0.01
Chloroform :- {Trichloromethane}	ug/l	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-ethyl	ug/l	<0.002	<0.002	<0.002	<0.002
Chlorpyrifos-methyl	ug/l	<0.001	<0.001	<0.001	<0.001
Chromium	ug/l	<0.5	<0.5	<0.5	<0.5
Chromium Hexavalent	ug/l	<0.3	<0.3	<0.3	<0.3
Copper	ug/l	0.343	<0.2	0.338	0.989
Di-2-(ethylhexyl) phthalate	ug/l	<0.2	<0.2	<0.2	<0.2
Dichloromethane :- {Methylene Dichloride}	ug/l	<0.5	<0.5	<0.5	<0.5
Diuron	ug/l	<0.1	<0.1	<0.1	<0.1
Endosulfan A	ug/l	<0.003	<0.003	<0.003	<0.003
Fluoranthene	ug/l	<0.01	<0.01	<0.01	<0.01
HCH -alpha	ug/l	<0.003	<0.003	<0.003	<0.003
HCH -beta	ug/l	<0.003	<0.003	<0.003	<0.003
HCH -delta	ug/l	<0.001	<0.001	<0.001	<0.001
HCH -epsilon	ug/l	<0.003	<0.003	<0.003	<0.003
HCH -gamma	ug/l	<0.003	<0.003	<0.003	<0.003
Hexachlorobenzene	ug/l	<0.001	<0.001	<0.001	<0.001
Hexachlorobutadiene	ug/l	<0.003	<0.003	<0.003	<0.003

Indeno(1,2,3-cd)pyrene	ug/l	<0.01	<0.01	<0.01	<0.01
Isoproturon	ug/l	<0.1	<0.1	<0.1	<0.1
Lead	ug/l	0.137	<0.04	0.794	0.137
Mercury	ug/l	<0.01	<0.01	<0.01	<0.01
Naphthalene	ug/l	<0.01	<0.01	<0.01	<0.01
Nickel	ug/l	0.314	<0.3	<0.3	<0.3
Pentachlorobenzene	ug/l	<0.001	<0.001	<0.001	<0.001
Pentachlorophenol	ug/l	<0.02	<0.02	<0.02	<0.02
p-tert-Octylphenol	ug/l	<0.1	<0.1	<0.1	<0.1
Simazine	ug/l	<0.003	<0.003	<0.003	<0.003
Tributyl Tin as Cation	ug/l	<0.0005	<0.0005	<0.0005	0.00064
Trifluralin	ug/l	<0.002	<0.002	<0.002	<0.002
Zinc	ug/l	1.79	0.693	5.9	1.68

June 2018 Coastal Monitoring Results.

		Site 1. Sandy Bay 23/07/18	**Site 2. Camp Bay 23/07/18**	**Site 3. Runway 23/07/18**	**Site 4. Mid Harbour 23/07/18**
Analyte	*Units*				
Nitrogen as N	mg/l	0.121	<0.1	<0.1	<0.1
Ammoniacal Nitrogen, Filtered as N	mg/l	0.027	<0.0200	<0.0200	<0.0200
Nitrite, Filtered as N	mg/l	<0.00400	<0.00400	<0.00400	<0.00400
Nitrogen : Total Oxidised, Filtered as N	mg/l	<0.100	<0.100	<0.100	<0.100
Orthophosphate, Filtered as P	mg/l	<0.0100	<0.0100	<0.0100	<0.0100
Phosphorus : Total	mg/l	<0.0200	<0.0200	<0.0200	<0.0200
Chlorophyll, Acetone Extract	ug/l	<0.500	0.96	<0.500	0.61
Solids, Suspended at 105 C	mg/l	<3	<3	<3	<3
Nitrate, Filtered as N	mg/l	<0.100	<0.100	<0.100	<0.100

July 2018 Coastal Monitoring Results.

		Site 1. Sandy Bay 18/09/18	**Site 2. Camp Bay 18/09/18**	**Site 3. Runway 18/09/18**	**Site 4. Mid Harbour 18/09/18**
Analyte	***Units***				
1,2,4-Trichlorobenzene	ug/l	<0.01	<0.01	<0.01	<0.01
1,2-Dichloroethane	ug/l	<0.1	<0.1	<0.1	<0.1
4-Nonylphenol Branched	ug/l	<0.4	<0.4	<0.4	<0.4
Anthracene	ug/l	<0.01	<0.01	<0.01	<0.01
Atrazine	ug/l	<0.003	<0.003	<0.003	<0.003
Benzene	ug/l	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	ug/l	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	ug/l	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	ug/l	<0.01	<0.01	<0.01	<0.01

Benzo(k)fluoranthene	ug/l	<0.01	<0.01	<0.01	<0.01
Cadmium	ug/l	<0.03	<0.03	<0.03	<0.03
Chlorfenvinphos	ug/l	<0.01	<0.01	<0.01	<0.01
Chloroform :- {Trichloromethane}	ug/l	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-ethyl	ug/l	<0.002	<0.002	<0.002	<0.002
Chlorpyrifos-methyl	ug/l	<0.001	<0.001	<0.001	<0.001
Chromium	ug/l	<0.5	<0.5	<0.5	<0.5
Chromium Hexavalent	ug/l	<0.3	<0.3	<0.3	<0.3
Copper	ug/l	0.32	<0.2	0.459	6.499
Di-2-(ethylhexyl) phthalate	ug/l	<0.200	<0.2	<0.2	<0.2
Dichloromethane :- {Methylene Dichloride}	ug/l	<0.5	<0.5	<0.5	<0.5
Diuron	ug/l	<0.1	<0.1	<0.1	<0.1
Endosulfan A	ug/l	<0.004	<0.003	<0.003	<0.003
Fluoranthene	ug/l	<0.01	<0.01	<0.01	<0.01
HCH -alpha	ug/l	<0.004	<0.003	<0.003	<0.003
HCH -beta	ug/l	<0.004	<0.003	<0.003	<0.003
HCH -delta	ug/l	<0.001	<0.001	<0.001	<0.001
HCH -epsilon	ug/l	<0.004	<0.003	<0.003	<0.003
HCH -gamma	ug/l	<0.004	<0.003	<0.003	<0.003
Hexachlorobenzene	ug/l	<0.001	<0.001	<0.001	<0.001
Hexachlorobutadiene	ug/l	<0.004	<0.003	<0.003	<0.003
Indeno(1,2,3-cd)pyrene	ug/l	<0.01	<0.01	<0.01	<0.01
Isoproturon	ug/l	<0.1	<0.1	<0.1	<0.1
Lead	ug/l	0.09	<0.04	2.763	0.254
Mercury	ug/l	<0.01	<0.01	<0.01	<0.01
Naphthalene	ug/l	<0.01	<0.01	<0.01	<0.01
Nickel	ug/l	<0.3	<0.3	<0.3	<0.3
Pentachlorobenzene	ug/l	<0.001	<0.001	<0.001	<0.001
Pentachlorophenol	ug/l	<0.02	<0.02	<0.02	<0.02
p-tert-Octylphenol	ug/l	<0.1	<0.1	<0.1	<0.1
Simazine	ug/l	<0.003	<0.003	<0.003	<0.003
Tributyl Tin as Cation	ug/l	<0.0005	<0.0005	<0.0005	0.00154
Trifluralin	ug/l	<0.002	<0.002	<0.002	<0.002
Zinc	ug/l	2.46	1.87	3.544	1.911

September 2018 Coastal Monitoring Results.

		Site 1. Sandy Bay 16/10/18	**Site 2. Camp Bay 16/10/18**	**Site 3. Runway 16/10/18**	**Site 4. Mid Harbour 16/10/18**
Analyte	***Units***				
Nitrogen as N	mg/l	<0.1	<0.1	<0.1	<0.1
Ammoniacal Nitrogen, Filtered as N	mg/l	<0.0200	<0.0200	<0.0200	<0.0200

Nitrite, Filtered as N	mg/l	<0.00400	<0.00400	<0.00400	<0.00400
Nitrogen : Total Oxidised, Filtered as N	mg/l	<0.100	<0.100	<0.100	<0.100
Orthophosphate, Filtered as P	mg/l	<0.0100	<0.0100	<0.0100	<0.0100
Phosphorus : Total	mg/l	<0.0200	<0.0200	<0.0200	<0.0200
Chlorophyll, Acetone Extract	ug/l	<0.500	1.58	<0.500	1.32
Solids, Suspended at 105 C	mg/l	<3.00	<3	<3	<3
Nitrate, Filtered as N	mg/l	<0.100	<0.100	<0.100	<0.100

October 2018 Coastal Monitoring Results.

2.4 Groundwater Monitoring

As part of the Department's groundwater monitoring schedule, samples are taken on a quarterly basis from two local aquifers: one located in the Northern Isthmus and one in the Southern bedrock. The results from samples taken in 2018 are as follows:

		Site 1. Silent Pool 08/01/18	**Site 2. Cemetery 08/01/18**	**Site 3. Frontier 08/01/18**	**Site 4. Four Corners 08/01/18**	**Site 5. Runway 08/01/18**
Analyte	***Units***					
Alkalinity to pH 4.5 as CaCO3	mg/l	197	52	184	282	359
Ammoniacal Nitrogen as N	mg/l	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
Chloride	mg/l	1230	185	199	44.6	194
Nitrite as N	mg/l	<0.00400	<0.00400	<0.00400	<0.00400	<0.00400
Nitrogen : Total Oxidised as N	mg/l	7.2	0.46	0.47	2.05	2.47
Carbon, Organic : Total as C :- {TOC}	mg/l	1.1	<0.7	<0.7	2.2	0.8
Solids, Suspended at 105 C	mg/l	-	<3	<3	<3	6.67
Arsenic	mg/l	<1	1.67	1.67	13.2	10.2
Cadmium	mg/l	<0.1	<0.1	0.409	<0.1	0.96
Lead	mg/l	<2	<2	<2	<2	111
Zinc	mg/l	6.2	17.3	155	11.6	539
Calcium	mg/l	110	51.5	82.6	78.2	108
Magnesium	mg/l	91.7	2.59	24.8	20	34.2
Potassium	mg/l	26.7	3.09	9.27	11.2	13.7
Sodium	mg/l	674	83.5	80.4	47.1	135
Sulphate as SO4	mg/l	188	<10	23.5	52.6	46.9
Mercury	mg/l	-	<0.01	<0.01	<0.01	0.0104
Bicarbonate as HCO3	mg/l	-	63.4	224	344	438
Nitrate as N	mg/l	-	<0.460	<0.470	<2.05	<2.47
Hydrocarbons Screen >C5 - C44	mg/l	<0.2	-	<0.2	<0.2	<0.2

1,2,3-Trichlorobenzene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
1,2,4-Trichlorobenzene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
1,3,5-Trichlorobenzene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
2,3,5,6-Tetrachloroaniline	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
2,3,5,6-Tetrachlorothioanisole	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Aldrin	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Chlorothalonil	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Chlorpropham	mg/l	<0.006	<0.006	<0.006	<0.006	<0.006
DDE -op	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
DDE -pp	mg/l	<0.001	<0.001	<0.001	0.00758	0.0389
DDT -op	mg/l	<0.004	<0.004	<0.004	<0.004	0.00546
DDT -pp	mg/l	<0.002	<0.003	<0.003	0.0364	0.0296
Dichlobenil :- {2,6-Dichlorobenzonitrile}	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Dieldrin	mg/l	<0.002	<0.003	<0.003	<0.003	<0.003
Endosulfan A	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Endosulfan B	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Endrin	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
HCH -alpha	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
HCH -beta	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
HCH -delta	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
HCH -epsilon	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
HCH -gamma :- {Lindane}	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Heptachlor	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Hexachlorobenzene	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Hexachlorobutadiene	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Isodrin	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Methoxychlor	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Pendimethalin	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Pentachlorobenzene	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Propachlor	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
TDE - op	mg/l	<0.001	<0.001	<0.001	<0.001	0.00107
TDE - pp	mg/l	<0.002	<0.003	<0.003	0.00444	0.005
Tecnazene	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Tri-allate	mg/l	<0.007	<0.008	<0.008	<0.008	<0.008
Trifluralin	mg/l	<0.002	<0.003	<0.003	<0.003	<0.003
Vinclozolin	mg/l	<0.002	<0.003	<0.003	<0.003	<0.003
cis-Chlordane	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001

cis-Heptachlor epoxide	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
trans-Chlordane	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
trans-Heptachlor epoxide	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Atrazine	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Atrazine-desethyl	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02
Atrazine-desisopropyl	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02
Azinphos-ethyl	mg/l	<0.006	<0.006	<0.006	<0.006	<0.007
Azinphos-methyl	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Bendiocarb	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Bupirimate	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Carbophenothion	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Chlorfenvinphos	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorpyrifos-ethyl	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Chlorpyrifos-methyl	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Coumaphos	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Cyanazine	mg/l	<0.006	<0.006	<0.006	<0.006	<0.007
Desmetryn	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Diazinon	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Dichlorvos	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Dimethoate	mg/l	<0.006	<0.006	<0.006	<0.006	<0.007
Ethion	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Ethofumesate	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Fenchlorphos	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Fenitrothion	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Fenpropimorph	mg/l	<0.007	<0.007	<0.007	<0.007	<0.008
Fenthion	mg/l	<0.008	<0.008	<0.008	<0.008	<0.009
Fonofos	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Iodofenphos	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Iprodione	mg/l	<0.008	<0.008	<0.008	<0.008	<0.009
Irgarol 1051	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Malathion	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Metalaxyl	mg/l	<0.008	<0.008	<0.008	<0.008	<0.009
Metazachlor	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Mevinphos	mg/l	<0.008	<0.008	<0.008	<0.008	<0.009
Napropamide	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Parathion-ethyl	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Parathion-methyl	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Phorate	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02
Pirimicarb	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Pirimiphos-ethyl	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Pirimiphos-methyl	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Prochloraz	mg/l	<0.007	<0.007	<0.007	<0.007	<0.008

Prometryn	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Propazine	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Propetamphos	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Propyzamide	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Simazine	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Terbutryn	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Triazophos	mg/l	<0.005	<0.005	<0.005	<0.005	<0.006
Trietazine	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Bifenthrin	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Cyfluthrin	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Cypermethrin	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Cypermethrin Identification	mg/l	Cypermethrin not detected.	Cypermethrin not detected.	Cypermethrin not detected.	Cypermethrin not detected.	Cypermethrin not detected.
Deltamethrin	mg/l	-	-	-	-	-
Flumethrin	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Lambda-cyhalothrin	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
cis-Permethrin	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
trans-Permethrin	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dichloroethane	mg/l	-	<0.1	<0.1	<0.1	<0.1
Benzene	mg/l	-	<0.1	<0.1	<0.1	<0.1
Bromodichloromethane	mg/l	-	<0.1	<0.1	<0.1	<0.1
Bromoform :- {Tribromomethane}	mg/l	-	<0.1	<0.1	<0.1	<0.1
Chloroform :- {Trichloromethane}	mg/l	-	<0.1	<0.1	<0.1	<0.1

January 2018 Groundwater Monitoring Results.

		Site 1. Silent Pool 19/04/18	**Site 2. Cemetery 19/04/18**	**Site 3. Frontier 19/04/18**	**Site 4. Four Corners 19/04/18**	**Site 5. Runway 19/04/18**
Analyte	***Units***					
Alkalinity to pH 4.5 as CaCO3	mg/l	182	56	151	276	332
Ammoniacal Nitrogen as N	mg/l	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
Chloride	mg/l	1150	145	112	42.4	173
Nitrite as N	mg/l	<0.00400	<0.00400	<0.00400	<0.00400	<0.00400
Nitrogen : Total Oxidised as N	mg/l	7.84	0.58	2.15	1.64	3.27
Carbon, Organic : Total as C :- {TOC}	mg/l	1.5	<0.7	0.8	2.9	1.4
Solids, Suspended at 105 C	mg/l	-	<3	3.07	<3	5.12

Arsenic	mg/l	<1	1.66	1.7	11	7
Cadmium	mg/l	<0.1	<0.1	0.189	<0.1	<0.1
Lead	mg/l	<2	<2	<2	<2	3.72
Zinc	mg/l	<5	26.2	93.6	6.44	29.3
Calcium	mg/l	114	44.5	51	80.2	95.2
Magnesium	mg/l	84.8	2.84	13.1	21.3	29.5
Potassium	mg/l	24.4	3.04	5.96	9.67	12.5
Sodium	mg/l	608	66.8	71.8	44.9	118
Sulphate as SO4	mg/l	174	<10	32.6	61.8	44.4
Mercury	mg/l	-	<0.01	<0.01	<0.01	<0.01
Bicarbonate as HCO3	mg/l	-	68.3	184	337	405
Nitrate as N	mg/l	-	<0.580	<2.15	<1.64	<3.27
Hydrocarbons Screen >C5 - C44	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2
1,2,3-Trichlorobenzene	mg/l	<0.01	<0.01	<0.02	<0.01	-
1,2,4-Trichlorobenzene	mg/l	<0.01	<0.01	<0.02	<0.01	-
1,3,5-Trichlorobenzene	mg/l	<0.01	<0.01	<0.02	<0.01	-
2,3,5,6-Tetrachloroaniline	mg/l	<0.001	<0.001	<0.002	<0.001	-
2,3,5,6-Tetrachlorothioanisole	mg/l	<0.001	<0.001	<0.002	<0.001	-
Aldrin	mg/l	<0.001	<0.001	<0.002	<0.001	-
Chlorothalonil	mg/l	<0.001	<0.001	<0.002	<0.001	-
Chlorpropham	mg/l	<0.006	<0.006	<0.009	<0.006	-
DDE -op	mg/l	<0.001	<0.001	<0.002	<0.001	-
DDE -pp	mg/l	<0.001	<0.001	<0.002	0.0063	-
DDT -op	mg/l	<0.003	<0.003	<0.006	<0.004	-
DDT -pp	mg/l	<0.002	<0.002	<0.004	0.025	-
Dichlobenil :- {2,6-Dichlorobenzonitrile }	mg/l	<0.001	<0.001	<0.002	<0.001	-
Dieldrin	mg/l	<0.002	<0.002	<0.004	<0.003	-
Endosulfan A	mg/l	<0.003	<0.003	<0.006	<0.004	-
Endosulfan B	mg/l	<0.005	<0.005	<0.008	<0.005	-
Endrin	mg/l	<0.003	<0.003	<0.006	<0.004	-
HCH -alpha	mg/l	<0.003	<0.003	<0.006	<0.004	-
HCH -beta	mg/l	<0.003	<0.003	<0.006	<0.004	-
HCH -delta	mg/l	<0.001	<0.001	<0.002	<0.001	-
HCH -epsilon	mg/l	<0.003	<0.003	<0.006	<0.004	-

HCH -gamma :- {Lindane}	mg/l	<0.003	<0.003	<0.006	<0.004	-
Heptachlor	mg/l	<0.001	<0.001	<0.002	<0.001	-
Hexachlorobenzene	mg/l	<0.001	<0.001	<0.002	<0.001	-
Hexachlorobutadiene	mg/l	<0.003	<0.003	<0.006	<0.004	-
Isodrin	mg/l	<0.001	<0.001	<0.002	<0.001	-
Methoxychlor	mg/l	<0.001	<0.001	<0.002	<0.001	-
Pendimethalin	mg/l	<0.01	<0.01	<0.02	<0.01	-
Pentachlorobenzene	mg/l	<0.001	<0.001	<0.002	<0.001	-
Propachlor	mg/l	<0.001	<0.001	<0.002	<0.001	-
TDE - op	mg/l	<0.001	<0.001	<0.002	<0.001	-
TDE - pp	mg/l	<0.002	<0.002	<0.004	0.00673	-
Tecnazene	mg/l	<0.001	<0.001	<0.002	<0.001	-
Tri-allate	mg/l	<0.007	<0.007	<0.01	<0.008	-
Trifluralin	mg/l	<0.002	<0.002	<0.004	<0.003	-
Vinclozolin	mg/l	<0.002	<0.002	<0.004	<0.003	-
cis-Chlordane	mg/l	<0.001	<0.001	<0.002	<0.001	-
cis-Heptachlor epoxide	mg/l	<0.003	<0.003	<0.006	<0.004	-
trans-Chlordane	mg/l	<0.001	<0.001	<0.002	<0.001	-
trans-Heptachlor epoxide	mg/l	<0.003	<0.003	<0.006	<0.004	-
Atrazine	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Atrazine-desethyl	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02
Atrazine-desisopropyl	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02
Azinphos-ethyl	mg/l	<0.006	<0.006	<0.006	<0.006	<0.006
Azinphos-methyl	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Bendiocarb	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Bupirimate	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Carbophenothion	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Chlorfenvinphos	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorpyrifos-ethyl	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Chlorpyrifos-methyl	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Coumaphos	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Cyanazine	mg/l	<0.006	<0.006	<0.006	<0.006	<0.006
Desmetryn	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Diazinon	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Dichlorvos	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Dimethoate	mg/l	<0.006	<0.006	<0.006	<0.006	<0.006
Ethion	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005

Ethofumesate	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Fenchlorphos	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Fenitrothion	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Fenpropimorph	mg/l	<0.007	<0.007	<0.007	<0.007	<0.007
Fenthion	mg/l	<0.008	<0.008	<0.008	<0.008	<0.008
Fonofos	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Iodofenphos	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Iprodione	mg/l	<0.008	<0.008	<0.008	<0.008	<0.008
Irgarol 1051	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Malathion	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Metalaxyl	mg/l	<0.008	<0.008	<0.008	<0.008	<0.008
Metazachlor	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Mevinphos	mg/l	<0.008	<0.008	<0.008	<0.008	<0.008
Napropamide	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Parathion-ethyl	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Parathion-methyl	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Phorate	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02
Pirimicarb	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Pirimiphos-ethyl	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Pirimiphos-methyl	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Prochloraz	mg/l	<0.007	<0.007	<0.007	<0.007	<0.007
Prometryn	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Propazine	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Propetamphos	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Propyzamide	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Simazine	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Terbutryn	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Triazophos	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Trietazine	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Bifenthrin	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Cyfluthrin	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Cypermethrin	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Cypermethrin Identification	mg/l	Cypermethrin not detected.	Cypermethrin not detected.	Cypermethrin not detected.	Cypermethrin not detected.	Cypermethrin not detected.
Deltamethrin	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Flumethrin	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Lambda-cyhalothrin	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
cis-Permethrin	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
trans-Permethrin	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dichloroethane	mg/l	-	<0.1	<0.1	<0.1	<0.1
Benzene	mg/l	-	<0.1	<0.1	<0.1	<0.1

Bromodichloromethane	mg/l	-	<0.1	<0.1	<0.1	<0.1
Bromoform :- {Tribromomethane}	mg/l	-	<0.1	<0.1	<0.1	<0.1
Chloroform :- {Trichloromethane}	mg/l	-	<0.1	<0.1	<0.1	<0.1

April 2018 Groundwater Monitoring Results.

		Site 1. Silent Pool 30/08/18	**Site 2. Cemetery 30/08/18**	**Site 3. Frontier 30/08/18**	**Site 4. Four Corners 30/08/18**	**Site 5. Runway 30/08/18**
Analyte	***Units***					
Alkalinity to pH 4.5 as CaCO3	mg/l	183	130	Unable to sample from this site - access to well restricted due to ongoing works.	Unable to sample from this site - access to well restricted due to ongoing works.	358
Ammoniacal Nitrogen as N	mg/l	<0.0300	<0.0300			<0.0300
Chloride	mg/l	1190	109			201
Nitrite as N	mg/l	<0.00400	0.0486			<0.00400
Nitrogen : Total Oxidised as N	mg/l	7.41	4.69			3.65
Carbon, Organic : Total as C :- {TOC}	mg/l	0.9	0.7			1
Solids, Suspended at 105 C	mg/l	-	4.83			6.03
Arsenic	mg/l	<1	2.18			5.94
Cadmium	mg/l	<0.1	<0.1			<0.1
Lead	mg/l	<2	<2			<2
Zinc	mg/l	6.72	136			36.7
Calcium	mg/l	112	68.5			98.4
Magnesium	mg/l	92.8	4.62			33.1
Potassium	mg/l	26.8	5.19			13.8
Sodium	mg/l	682	48.4			130
Sulphate as SO4	mg/l	195	15.5			44.8
Mercury	mg/l	-	<0.01			<0.01
Bicarbonate as HCO3	mg/l	-	159			437
Nitrate as N	mg/l	-	4.64			<3.65
Hydrocarbons Screen >C5 - C44	mg/l	<0.2	<0.2			<0.2
1,2,3-Trichlorobenzene	mg/l	<0.01	<0.01			<0.01
1,2,4-Trichlorobenzene	mg/l	<0.01	<0.01			<0.01
1,3,5-Trichlorobenzene	mg/l	<0.01	<0.01			<0.01
2,3,5,6-Tetrachloroaniline	mg/l	-	-			-

2,3,5,6-Tetrachlorothioanisole	mg/l	<0.001	<0.001			<0.001
Aldrin	mg/l	-	-			-
Chlorothalonil	mg/l	<0.001	<0.001			<0.001
Chlorpropham	mg/l	<0.006	<0.006			<0.007
DDE -op	mg/l	<0.001	<0.001			<0.001
DDE -pp	mg/l	<0.001	<0.001			0.0319
DDT -op	mg/l	<0.004	<0.004			<0.004
DDT -pp	mg/l	<0.003	<0.003			0.0233
Dichlobenil :- {2,6-Dichlorobenzonitrile }	mg/l	<0.001	<0.001			<0.001
Dieldrin	mg/l	-	-			-
Endosulfan A	mg/l	<0.005	<0.005			-
Endosulfan B	mg/l	-	-			<0.005
Endrin	mg/l	<0.004	<0.004			<0.004
HCH -alpha	mg/l	<0.004	<0.004			<0.004
HCH -beta	mg/l	<0.004	<0.004			<0.004
HCH -delta	mg/l	<0.001	<0.001			<0.001
HCH -epsilon	mg/l	<0.004	<0.004			<0.004
HCH -gamma :- {Lindane}	mg/l	-	-			-
Heptachlor	mg/l	<0.001	<0.001			<0.001
Hexachlorobenzene	mg/l	<0.001	<0.001			<0.001
Hexachlorobutadiene	mg/l	<0.004	<0.004			<0.004
Isodrin	mg/l	-	-			-
Methoxychlor	mg/l	<0.001	<0.001			<0.001
Pendimethalin	mg/l	<0.01	<0.01			<0.01
Pentachlorobenzene	mg/l	<0.001	<0.001			<0.001
Propachlor	mg/l	<0.001	<0.001			<0.001
TDE - op	mg/l	<0.001	<0.001			<0.001
TDE - pp	mg/l	<0.003	<0.003			0.00309
Tecnazene	mg/l	<0.001	<0.001			<0.001
Tri-allate	mg/l	-	-			-
Trifluralin	mg/l	<0.003	<0.003			<0.003
Vinclozolin	mg/l	<0.003	<0.003			<0.003
cis-Chlordane	mg/l	<0.001	<0.001			<0.001
cis-Heptachlor epoxide	mg/l	<0.004	<0.004			<0.004
trans-Chlordane	mg/l	<0.001	<0.001			<0.001
trans-Heptachlor epoxide	mg/l	<0.004	<0.004			<0.004
Atrazine	mg/l	<0.003	<0.003			<0.003
Atrazine-desethyl	mg/l	<0.02	<0.02			<0.02
Atrazine-desisopropyl	mg/l	<0.02	<0.02			<0.02
Azinphos-ethyl	mg/l	<0.006	<0.006			<0.006

Azinphos-methyl	mg/l	<0.003	<0.003			<0.003
Bendiocarb	mg/l	<0.005	<0.005			<0.005
Bupirimate	mg/l	<0.005	<0.005			<0.005
Carbophenothion	mg/l	<0.005	<0.005			<0.005
Chlorfenvinphos	mg/l	<0.01	<0.01			<0.01
Chlorpyrifos-ethyl	mg/l	<0.002	<0.002			<0.002
Chlorpyrifos-methyl	mg/l	<0.001	<0.001			<0.001
Coumaphos	mg/l	<0.005	<0.005			<0.005
Cyanazine	mg/l	<0.006	<0.006			<0.006
Desmetryn	mg/l	<0.005	<0.005			<0.005
Diazinon	mg/l	<0.001	<0.001			<0.001
Dichlorvos	mg/l	<0.004	<0.004			<0.004
Dimethoate	mg/l	<0.006	<0.006			<0.006
Ethion	mg/l	<0.005	<0.005			<0.005
Ethofumesate	mg/l	<0.005	<0.005			<0.005
Fenchlorphos	mg/l	<0.005	<0.005			<0.005
Fenitrothion	mg/l	<0.001	<0.001			<0.001
Fenpropimorph	mg/l	<0.007	<0.007			<0.007
Fenthion	mg/l	<0.008	<0.008			<0.008
Fonofos	mg/l	<0.001	<0.001			<0.001
Iodofenphos	mg/l	<0.001	<0.001			<0.001
Iprodione	mg/l	<0.008	<0.008			<0.008
Irgarol 1051	mg/l	<0.005	<0.005			<0.005
Malathion	mg/l	<0.002	<0.002			<0.002
Metalaxyl	mg/l	<0.008	<0.008			<0.008
Metazachlor	mg/l	<0.005	<0.005			<0.005
Mevinphos	mg/l	<0.008	<0.008			<0.008
Napropamide	mg/l	<0.005	<0.005			<0.005
Parathion-ethyl	mg/l	<0.004	<0.004			<0.004
Parathion-methyl	mg/l	<0.005	<0.005			<0.005
Phorate	mg/l	<0.02	<0.02			<0.02
Pirimicarb	mg/l	<0.004	<0.004			<0.004
Pirimiphos-ethyl	mg/l	<0.005	<0.005			<0.005
Pirimiphos-methyl	mg/l	<0.003	<0.003			<0.003
Prochloraz	mg/l	<0.007	<0.007			<0.007
Prometryn	mg/l	<0.005	<0.005			<0.005
Propazine	mg/l	<0.002	<0.002			<0.002
Propetamphos	mg/l	<0.005	<0.005			<0.005
Propyzamide	mg/l	<0.005	<0.005			<0.005
Simazine	mg/l	<0.003	<0.003			<0.003
Terbutryn	mg/l	<0.004	<0.004			<0.004
Triazophos	mg/l	<0.005	<0.005			<0.005
Trietazine	mg/l	<0.002	<0.002			<0.002
Bifenthrin	mg/l	<0.001	<0.001			<0.001
Cyfluthrin	mg/l	<0.003	<0.003			<0.003

Cypermethrin	mg/l	<0.002	<0.002			<0.002
Cypermethrin Identification	mg/l	Cypermethrin not detected.	Cypermethrin not detected.			Cypermethrin not detected.
Deltamethrin	mg/l	<0.002	<0.002			<0.002
Flumethrin	mg/l	<0.003	<0.003			<0.003
Lambda-cyhalothrin	mg/l	<0.002	<0.002			<0.002
cis-Permethrin	mg/l	<0.002	<0.002			<0.002
trans-Permethrin	mg/l	<0.001	<0.001			<0.001
1,2-Dichloroethane	mg/l	-	<0.1			<0.1
Benzene	mg/l	-	<0.1			<0.1
Bromodichloromethane	mg/l	-	<0.1			<0.1
Bromoform :- {Tribromomethane}	mg/l	-	<0.1			<0.1
Chloroform :- {Trichloromethane}	mg/l	-	<0.1			<0.1

August 2018 Groundwater Monitoring Results.

		Site 1. Silent Pool 08/10/18	**Site 2. Cemetery 08/10/18**	**Site 3. Frontier 08/10/18**	**Site 4. Four Corners 08/10/18**	**Site 5. Runway 08/10/18**
Analyte	***Units***					
Alkalinity to pH 4.5 as CaCO3	mg/l	187	151	152	279	360
Ammoniacal Nitrogen as N	mg/l	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
Chloride	mg/l	1260	92.9	72.4	41.5	234
Nitrite as N	mg/l	<0.00400	0.0179	<0.00400	<0.00400	<0.00400
Nitrogen : Total Oxidised as N	mg/l	7.01	5.33	4.21	0.37	1.77
Carbon, Organic : Total as C :- {TOC}	mg/l	1	1.4	<0.7	2.1	1.7
Solids, Suspended at 105 C	mg/l	-	8.23	<3	6.1	12.2
Arsenic	mg/l	<0.1	2.22	1.69	10.7	6.17
Cadmium	mg/l	<2	<0.1	0.389	<0.1	0.161
Lead	mg/l	14.1	4.56	<2	<2	33.7
Zinc	mg/l	117	83.4	205	<5	335
Calcium	mg/l	95.8	77.4	44.6	79.1	111
Magnesium	mg/l	27.6	5.53	10	22.8	37.5
Potassium	mg/l	723	5.99	4.54	6.85	14.9
Sodium	mg/l	196	48	73.2	41.6	158
Sulphate as SO4	mg/l	-	21.6	43.8	54.4	51.1
Mercury	mg/l	-	<0.01	<0.01	<0.01	<0.01
Bicarbonate as HCO3	mg/l	-	184	185	340	439

Nitrate as N	mg/l	-	5.31	<4.21	<0.370	<1.77
Hydrocarbons Screen >C5 - C44	mg/l	-	-	-	-	-
1,2,3-Trichlorobenzene	mg/l	-	<0.01	<0.01	<0.01	<0.01
1,2,4-Trichlorobenzene	mg/l	-	<0.01	<0.01	<0.01	<0.01
1,3,5-Trichlorobenzene	mg/l	-	<0.01	<0.01	<0.01	<0.01
2,3,5,6-Tetrachloroaniline	mg/l	-	<0.001	<0.001	<0.001	<0.001
2,3,5,6-Tetrachlorothioanisole	mg/l	-	<0.001	<0.001	<0.001	<0.001
Aldrin	mg/l	-	<0.001	<0.001	<0.001	<0.001
Chlorothalonil	mg/l	-	<0.001	<0.001	<0.001	<0.001
Chlorpropham	mg/l	-	<0.006	<0.006	<0.006	<0.006
DDE -op	mg/l	-	<0.001	<0.001	<0.001	<0.001
DDE -pp	mg/l	-	<0.001	<0.001	0.00887	0.0248
DDT -op	mg/l	-	<0.004	<0.004	<0.004	0.00408
DDT -pp	mg/l	-	<0.002	<0.002	0.0338	0.0204
Dichlobenil :- {2,6-Dichlorobenzonitrile }	mg/l	-	<0.001	<0.001	<0.001	<0.001
Dieldrin	mg/l	-	<0.002	<0.002	<0.003	<0.002
Endosulfan A	mg/l	-	<0.004	<0.004	<0.004	<0.004
Endosulfan B	mg/l	-	<0.005	<0.005	<0.005	<0.005
Endrin	mg/l	-	<0.004	<0.004	<0.004	<0.004
HCH -alpha	mg/l	-	<0.004	<0.004	<0.004	<0.004
HCH -beta	mg/l	-	<0.004	<0.004	<0.004	<0.004
HCH -delta	mg/l	-	<0.001	<0.001	<0.001	<0.001
HCH -epsilon	mg/l	-	<0.004	<0.004	<0.004	<0.004
HCH -gamma :- {Lindane}	mg/l	-	<0.004	<0.004	<0.004	<0.004
Heptachlor	mg/l	-	<0.001	<0.001	<0.001	<0.001
Hexachlorobenzene	mg/l	-	<0.001	<0.001	<0.001	<0.001
Hexachlorobutadiene	mg/l	-	<0.004	<0.004	<0.004	<0.004
Isodrin	mg/l	-	<0.001	<0.001	<0.001	<0.001
Methoxychlor	mg/l	-	<0.001	<0.001	<0.001	<0.001
Pendimethalin	mg/l	-	<0.01	<0.01	<0.01	<0.01
Pentachlorobenzene	mg/l	-	<0.001	<0.001	<0.001	<0.001
Propachlor	mg/l	-	<0.001	<0.001	<0.001	<0.001
TDE - op	mg/l	-	<0.001	<0.001	<0.001	0.00194
TDE - pp	mg/l	-	<0.002	<0.002	0.00498	0.00839
Tecnazene	mg/l	-	<0.001	<0.001	<0.001	<0.001

Tri-allate	mg/l	-	<0.007	<0.007	<0.008	<0.007
Trifluralin	mg/l	-	<0.002	<0.002	<0.003	<0.002
Vinclozolin	mg/l	-	<0.002	<0.002	<0.003	<0.002
cis-Chlordane	mg/l	-	<0.001	<0.001	<0.001	<0.001
cis-Heptachlor epoxide	mg/l	-	<0.004	<0.004	<0.004	<0.004
trans-Chlordane	mg/l	-	<0.001	<0.001	<0.001	<0.001
trans-Heptachlor epoxide	mg/l	-	<0.004	<0.004	<0.004	<0.004
Atrazine	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Atrazine-desethyl	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02
Atrazine-desisopropyl	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02
Azinphos-ethyl	mg/l	<0.006	<0.006	<0.006	<0.006	<0.006
Azinphos-methyl	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Bendiocarb	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Bupirimate	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Carbophenothion	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Chlorfenvinphos	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorpyrifos-ethyl	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Chlorpyrifos-methyl	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Coumaphos	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Cyanazine	mg/l	<0.006	<0.006	<0.006	<0.006	<0.006
Desmetryn	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Diazinon	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Dichlorvos	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Dimethoate	mg/l	<0.006	<0.006	<0.006	<0.006	<0.006
Ethion	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Ethofumesate	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Fenchlorphos	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Fenitrothion	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Fenpropimorph	mg/l	<0.007	<0.007	<0.007	<0.007	<0.007
Fenthion	mg/l	<0.008	<0.008	<0.008	<0.008	<0.008
Fonofos	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Iodofenphos	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Iprodione	mg/l	<0.008	<0.008	<0.008	<0.008	<0.008
Irgarol 1051	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Malathion	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Metalaxyl	mg/l	<0.008	<0.008	<0.008	<0.008	<0.008
Metazachlor	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Mevinphos	mg/l	<0.008	<0.008	<0.008	<0.008	<0.008
Napropamide	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Parathion-ethyl	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Parathion-methyl	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Phorate	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02

Pirimicarb	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Pirimiphos-ethyl	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Pirimiphos-methyl	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Prochloraz	mg/l	<0.007	<0.007	<0.007	<0.007	<0.007
Prometryn	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Propazine	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Propetamphos	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Propyzamide	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Simazine	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Terbutryn	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004
Triazophos	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Trietazine	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Bifenthrin	mg/l	-	<0.001	<0.001	-	-
Cyfluthrin	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Cypermethrin	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Cypermethrin Identification	mg/l	Cypermethrin not detected.	Cypermethrin not detected.	Cypermethrin not detected.	Cypermethrin not detected.	Cypermethrin not detected.
Deltamethrin	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
Flumethrin	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
Lambda-cyhalothrin	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
cis-Permethrin	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002
trans-Permethrin	mg/l	<0.001	-	-	<0.001	<0.001
1,2-Dichloroethane	mg/l	-	<0.1	<0.1	<0.1	<0.1
Benzene	mg/l	-	<0.1	<0.1	<0.1	<0.1
Bromodichloromethane	mg/l	-	<0.1	<0.1	<0.1	<0.1
Bromoform :- {Tribromomethane}	mg/l	-	<0.1	<0.1	<0.1	<0.1
Chloroform :- {Trichloromethane}	mg/l	-	<0.1	<0.1	<0.1	<0.1

October 2018 Groundwater Monitoring Results.

3. Habitats

3.1 Birds

3.1.1 Nesting Birds of Prey

As part of their work, the Gibraltar Ornithological and Natural History Society (GONHS) conducts bird of prey surveys on an annual basis during the breeding season. Records are kept on the nesting of Peregrines Falco *peregrinus*, Common Kestrel Falco *tinnunculus*, and Lesser Kestrel Falco *naumanni*. These records are shown in the following section.

3.1.1.1 Lesser and Common Kestrel

Year	Lesser Kestrel	Common Kestrel
2010	16	11
2011	18	9
2012	13	8
2013	5	5
2014	4	6
2015	4	7
2016	1	7
2017	1	8
2018	0	5

Pairs of Lesser Kestrel & Common Kestrel in Gibraltar.

In recent years, the presence of the Lesser Kestrel has steadily declined and has now been lost as a nesting species in in Gibraltar for the first time in several decades. This is mainly due to the loss of feeding habitats north of the border in Spain. A small captive breeding population is maintained by GOHNS, and it is hoped to be re-establish the population in coming years.

3.1.1.2 Peregrine Falcon (young fledged by site)

Year	North face	Catalan Bay	Both Worlds	Oil Tanks	Med Steps	Camp Bay	Mosque	Apes Den	Total
2010	0	0	3	2	0	2	0		7
2011	2	3	3	0		3	3		14
2012	0	3	2	0		1	2		8
2013	4	3	3	0	3	0	0		13
2014	3	1	2		0		0		6
2015	2	2	0	3		3	0	0	10
2016	3	3	3	0			3	2	14
2017	0	3	3	0	3	0	3	0	12
2018	0	3	3	2	0		3	2	13

Blank entries denote no pairs present at this site.

Locations and Breeding Success of Peregrines in Gibraltar.

3.1.2 Yellow-legged Gulls

As with previous years, licensed culling of yellow-legged gulls continues to take place. The table below provides an indication of the demographics being targeted, and shows that 3963 yellow-legged gulls were culled in 2018. This is 229 more than last year.

	Adults	1st/yr	2nd/yr	3rd/yr	Juvenile	Total
January	283	8	1	2	0	294
February	392	11	0	2	0	405
March	521	35	11	8	0	575
April	464	9	10	10	0	493
May	626	2	4	12	0	644
June	460	3	1	4	217	685
July	285	0	0	0	196	481
August (counts)	15	0	0	0	4	19
September (counts)	0	0	0	0	0	0

October (counts)	71	0	0	0	0	71
November	223	0	0	0	0	223
December	73	0	0	0	0	73
Total	3413	68	27	38	417	3963

Total Yellow-legged Gulls Culled in 2018.

3.2 Mammals

3.2.1 Barbary Macaques

In 2018, an increase in the Barbary Macaque population was noted. The table below provides an insight into how the Macaque population has continued to grow since the exportation of 30 in 2014.

Year	Population	Deaths	Births	Infant Deaths
2013	209	40	33	6
2014	196	27 (30 exported)	26	7
2015	158	7	39	3
2016	184	8	38	7
2017	198	28	27	8
2018	245	10	23	9

Barbary Macaque demographics.

This increase has been recorded before the effect of the new surgical contraception programme has been felt. It is expected that this will result in stabilisation and lowering of the population in coming years.

The table below provides an indication of the current distribution of macaques around Gibraltar.

Rock Gun	22
Middle Hill	21
Prince Philip's Arch	22
Cable Car Station	39
Ape's Den	42
Royal Anglian Way	43
Europa Advance	42
Farringdon	7
East Side	7
Total	245

Barbary Macaque population and distribution data.

4. Waste

4.1 Hazardous Waste

Hazardous waste materials are stored under strict license conditions, and then processed for trans-frontier shipment where they can be adequately disposed of. Typically consisting of waste oils and asbestos containing products, the table below shows a breakdown of total exported hazardous wastes in 2018.

Waste Code	Description of Waste	Total Exported (tonnes)
13 07 03*	Other Fuels (Including Mixtures)	8917.003M3
17 06 06*	Construction Materials containing asbestos	90
16 10 01*	Aqueous liquid wastes containing dangerous substances	20
16 01 07	Oil Filters	1.13
15 02 02	Absorbents	5.38
15 01 10*	Packaging containing residues of/or contaminated by dangerous packaging	2.85
14 06 03*	Other solvents and Solvent mixtures	22
12 01 15*	Waste blasting material containing dangerous substances	1441.84
	Oily water	60
16 02 11*	Discarded equipment containing chlorofluorocarbons, HCFC, HFC	9.3
16 02 13*	Discarded equipment containing hazardous components other than those mentioned in 16 02 09 to 16 02 12	66.9
15 02 02*	Absorbents	5.9
08 01 11*	Waste paint and varnish	15.5
16 05 04*	Gases in pressure containers (Including Halons) containing dangerous substances	0.25
18 01 03*	Wastes whose collection and disposal is subject to special requirements in order to prevent infection	86.75
18 01 08*	Medicines other than those mentioned in 180109	0.55
17 06 05*	Construction Materials containing asbestos	8.15
13 07 03*	Other Fuels	1.3
10 01 04*	Oily fly ash and dust	3.9
15 02 02*	Absorbents	7.5
13 05 02*	Sludges from oil/waste separators	2.5
14 06 02*	Other halogenated solvents and solvent mixtures	1
19 01 13*	Fly ash containing dangerous substances	1.3
19 01 11*	Bottom ash and slag containing dangerous substances	6.515
16 03 05*	Organic wastes containing dangerous substances	0.4
15 01 10*	Packaging containing residues of or contaminated by dangerous substances.	1.6
06 02 04*	Sodium and potassium hydroxide	2.5
15 01 08*	Cytotoxic & cytostatic medicines	1.76
20 03 01 20 03 03 20 03 99	Discarded mixed packaging	22904
08 01 17*	Wastes from paint or vanish removal containing organic solvents or other dangerous substances	168
16 06 01*	Lead batteries	91.1
17 06 05*	Construction Materials containing asbestos	13.4

12 01 16*	Waste blasting material containing dangerous substances	7.7
18 01 03*	Waste whose collection and disposal is subject to special requirements to prevent infection	53.8
17 05 03*	Soils and stones containing dangerous substances	280.867
17 06 05*	Construction Materials containing asbestos	14.37
08 01 11*	Waste paint and varnish	17.095
20 01 21*	Fluorescent tubes and other mercury containing waste	5.45
20 01 36	Discarded Electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 0135	4.8
16 02 11*	Discarded equipment containing Chlorofluorocarbons, HCFC, HFC	416
16 02 13*	Waste Electric and Electronic Equipment	687
16 07 08-	Wastes containing oils	43
13 07 03*	Other Fuels (Including Mixtures)	19420M3
13 07 03	Other Fuels (Including Mixtures)	14018M3
16 10 01*	Aqueous liquid wastes containing dangerous substances	76.72
16 05 06*	Lab chemicals consisting of containing dangerous substances, including mixtures of laboratory chemicals	0.55
16 01 07*	Oil Filters	1.65
15 02 02*	Absorbents, filter materials (Including oil filters not otherwise specified), wiping cloths and protective clothing damaged by dangerous substances	7.93
16 06 01*	Lead batteries	23.36
12 01 16*	Waste blasting material containing dangerous substances	1786.54
15 02 02*	Absorbents, filter materials (Including oil filters not otherwise specified), wiping cloths and protective clothing damaged by dangerous substances	11
15 01 10*	Packaging containing residues of or contaminated by dangerous substances	1.27
08 01 11*	Waste paint and varnish containing solvents or other dangerous substances	5.8
16 05 04*	Gases in pressure containers (Including Halons) containing dangerous substances	0.08
14 06 03*	Other solvents and solvent mixtures	0.62
16 05 06*	Laboratory chemicals consisting of or containing dangerous substances including mixtures of laboratory chemicals	1.3
17 06 05*	Construction Materials containing asbestos	4.13
13 07 03*	Other fuel (including mixtures)	0.28
10 01 04*	Oily fly ash and dust	5.45
18 01 03*	Waste whose collection and disposal is subject to special requirements to prevent infection	6.1
18 01 09	Medicines other than those mentioned in 180109	0.5
06 13 02*	Spent Activated Carbon (except 06 07 02)	12.45
18 01 08*	Cytotoxic & cytostatic medicines	0.4

19 08 11*	Sludges containing dangerous substances from the biological treatment of industrial waste water	20
15 02 02*	Absorbents, filter materials (Including oil filters not otherwise specified), wiping cloths and protective clothing damaged by dangerous substances	80
15 01 10*	Packaging containing residues of or contaminated by dangerous substances.	20
17 06 05*	Construction Materials containing asbestos	16.6
20 03 01, 20 03 03, 20 03 99	Mixed municipal waste, street-cleaning residues, municipal wastes not otherwise specified	8162

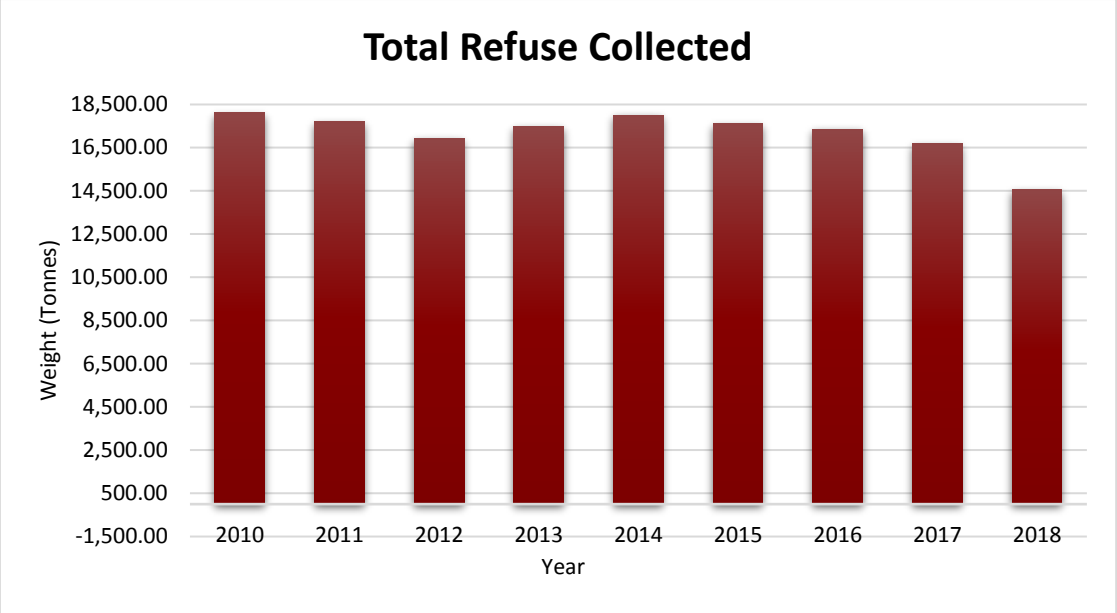
Trans-frontier shipments of hazardous waste in 2018.

4.2 Municipal Waste

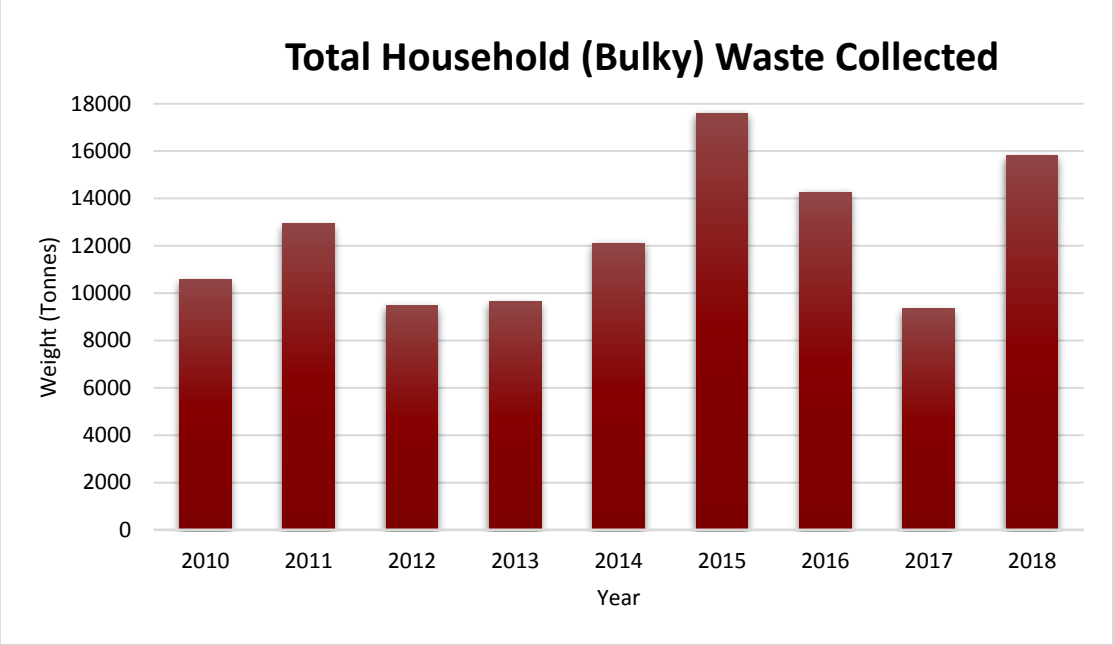
In the table and graphs below, data for municipal waste comprising of general refuse and household waste are shown.

2018 Month	Refuse Weight (TONs)	Household (Bulky) Weight (TONs)	Total Waste per Month Weight (TONs)
Jan-2018	1026.14	1454.56	2480.70
Feb-2018	1082.62	1255.64	2338.26
Mar-2018	824.18	1467.02	2291.20
Apr-2018	1247.94	1411.68	2659.62
May-2018	1280.54	1459.16	2739.70
Jun-2018	1196.74	1279.46	2476.20
Jul-2018	1190.96	1261.52	2452.48
Aug-2018	1447.38	758.38	2205.76
Sep-2018	1137.48	1421.82	2559.30
Oct-2018	1535.22	1392.66	2927.88
Nov-2018	1706.10	1485.18	3191.28
Dec-2018	887.08	1152.08	2039.16
Total	14562.38	15799.16	30361.54

Municipal waste in Gibraltar in 2018.



Annual refuse total comparison (2010-2018)

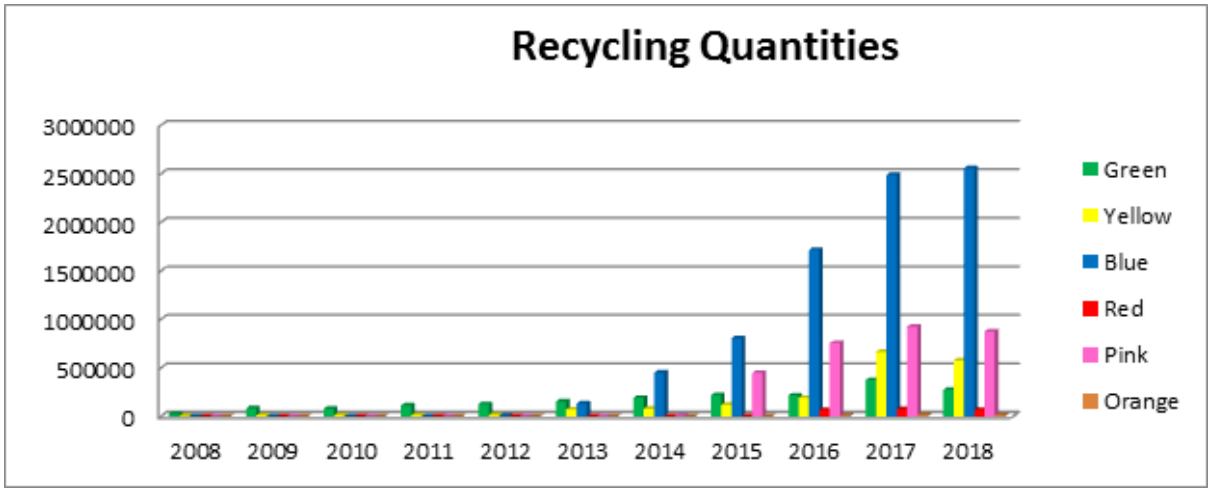


Annual bulky items total comparison (2010-2018).

2018 data indicates that although there has been a decrease in total refuse, there has been a significant increase in the amount of household bulky items being discarded locally.

4.3 Recycling

As the importance of reducing, reusing and recycling waste becomes more important in the midst of a climate emergency, 2018 records for local recycling are disappointing. Although paper and cardboard have achieved a slight increase, all other waste streams rates have decreased. With household waste increasing and recycling on a decline, the data highlights the need for further action and attention in this area.



Recycling quantities (2008-2018).

Year	Green Bin	Yellow Bin	Blue Bin	Red Bin	Pink Bin	Orange Bin
2018	275,000	576,440	2,558,627	65,840	874,500	10,430

*Weight given in Kilograms (Kgs)

Key Bin Colour	Items discarded
Green	Glass
Yellow	Plastic, cans and tetrabrik
Blue	Paper and cardboard
Red	Batteries
Pink	Waste Electrical and Electronic Equipment (WEEE)
Orange	Waste cooking oil

Recycling quantities for 2018.

4.4 WEEE

Due to the mixed and often hazardous nature of WEEE, regulations are in place to ensure that all categories of this waste are responsibly handled, treated and disposed of where necessary. The table below highlights which categories are encompassed under this umbrella of enforcement, and details how much is being treated and recovered to create a new life cycle.

Year: ***2018***	**Imported**		**Collected**		**Sent for treatment**		**Recovery**
Categories	**Quantity (No.)**	**Weight (tonnes)**	**Quantity (No.)**	**Weight (tonnes)**	**Quantity (No.)**	**Weight (tonnes)**	**%**
Large Household appliances	5324	60.672	2948	123.2542	12711	471.833	203.1484
Small Household appliances	22868	1648.152	183.007	1.047	4498	17.939	0.063526
IT and Telecoms Equipment	49825	6660.833	1634.008	12.557	11239	120.806	0.18852
Consumer Equipment	5899	14.979	220.359	3.163	2468	20.629	21.11623

Lighting equipment	28	28	587	1.436	8771	27.888	5.128571
Electrical and electronic tools	488	23.641	4	0.019	569	9.89	0.080369
Toys, Leisure & Sports Equipment	0	15.373	0	0	265	5.086	0
Medical devices	1159	3.457	0	0	152	1.197	0
Monitoring & Control Instruments	8	0.062	1	0.04	20	0.04	64.51613
Automatic dispensers	381	3.837	0	0	26	1.51	0
TOTALS	85980	8459.006	5577.374	141.5162	40719	676.818	

WEEE movements and recovery in Gibraltar in 2018.

4.5 Clinical Waste

Results for total clinical waste collected, transported and incinerated locally during 2018 are as follows.

Year 2018

Month	No. of Containers	Total Litres	Total Weight (Kgs)
January	5263	315780	39472.5
February	5015	300900	37612.5
March	4706	282360	35295
April	5148	308880	38610
May	5166	309960	38745
June	4694	281640	35205
July	4584	275040	34380
August	4708	282480	35310
September	4622	277320	34665
October	4884	293040	36630
November	4753	285180	35647.5
December	4643	278580	34822.5
Annual Total	58186	3491160	436395

Clinical waste collected 2018.

Year 2018

Month	No. of Containers	Total Litres	Total Weight (Kgs)
January	4336	260160	32520
February	0	0	0
March	0	0	0
April	0	0	0
May	4249	254940	31867.5
June	3901	234060	29257.5

July	3910	234600	29325
August	3958	237480	29685
September	4334	260040	32505
October	4665	279900	34987.5
November	4626	277560	34695
December	3888	233280	29160
Annual Total	37867	2272020	284002.5

Clinical waste locally incinerated 2018.

Year 2018

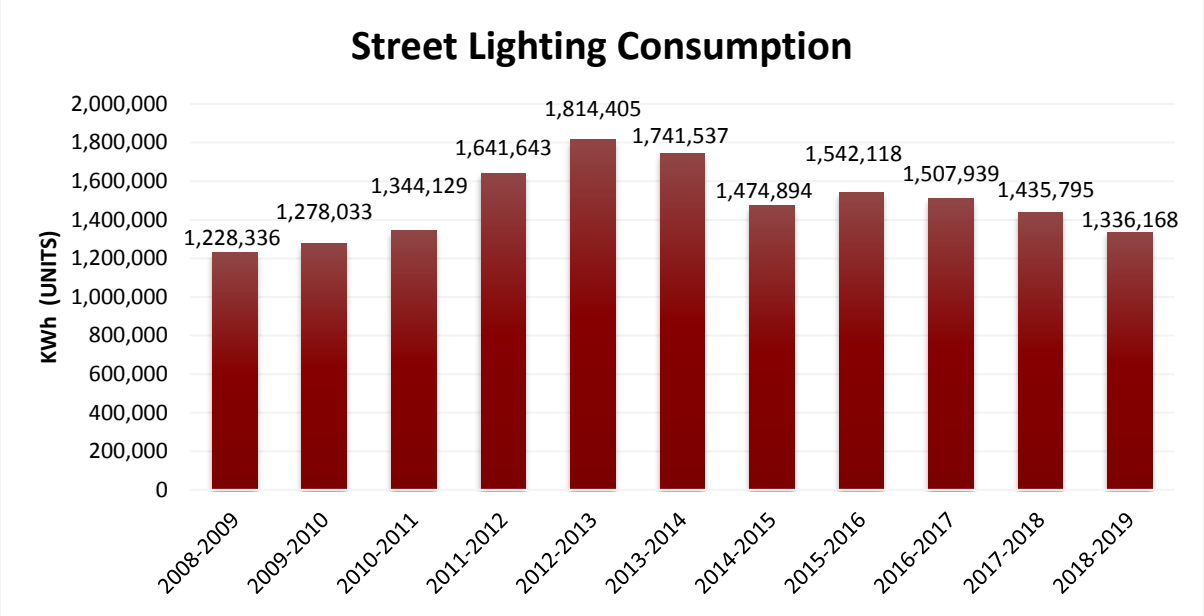
Month	No. of Containers	Total Litres	Total Weight (Kgs)
January	1503	90180	11272.5
February	5032	301920	37740
March	4669	280140	35017.5
April	5443	326580	40822.5
May	1192	71520	8940
June	767	46020	5752.5
July	339	20340	2542.5
August	1273	76380	9547.5
September	314	18840	2355
October	307	18420	2302.5
November	0	0	0
December	418	25080	3135
Annual Total	21257	1275420	159427.5

Clinical waste exported for incineration in 2018.

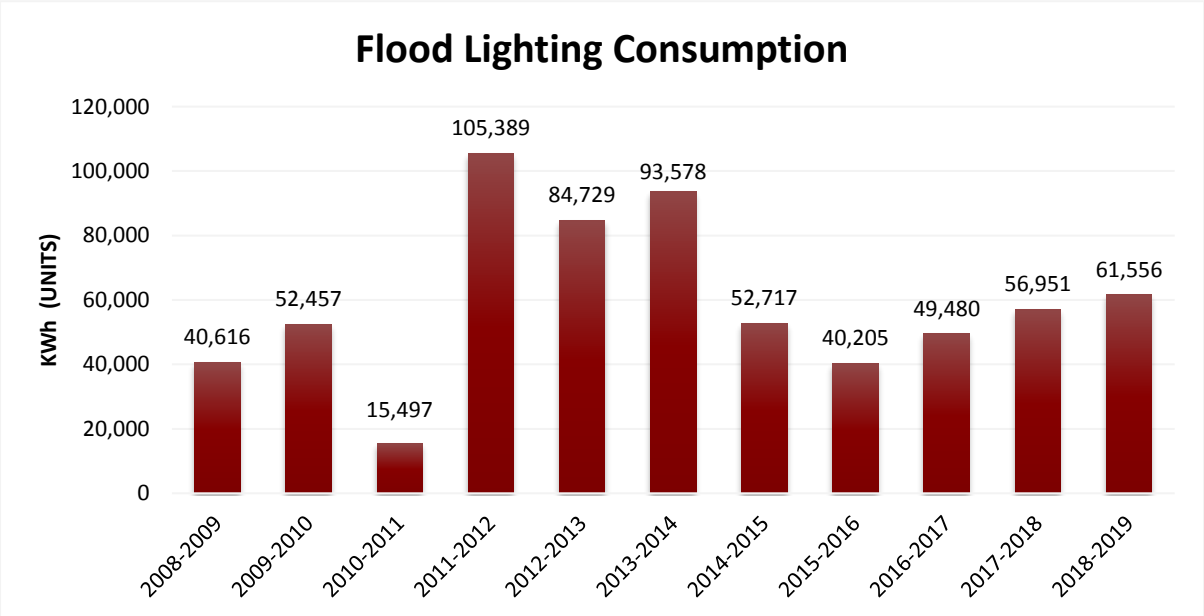
5. Energy

5.1 Lighting

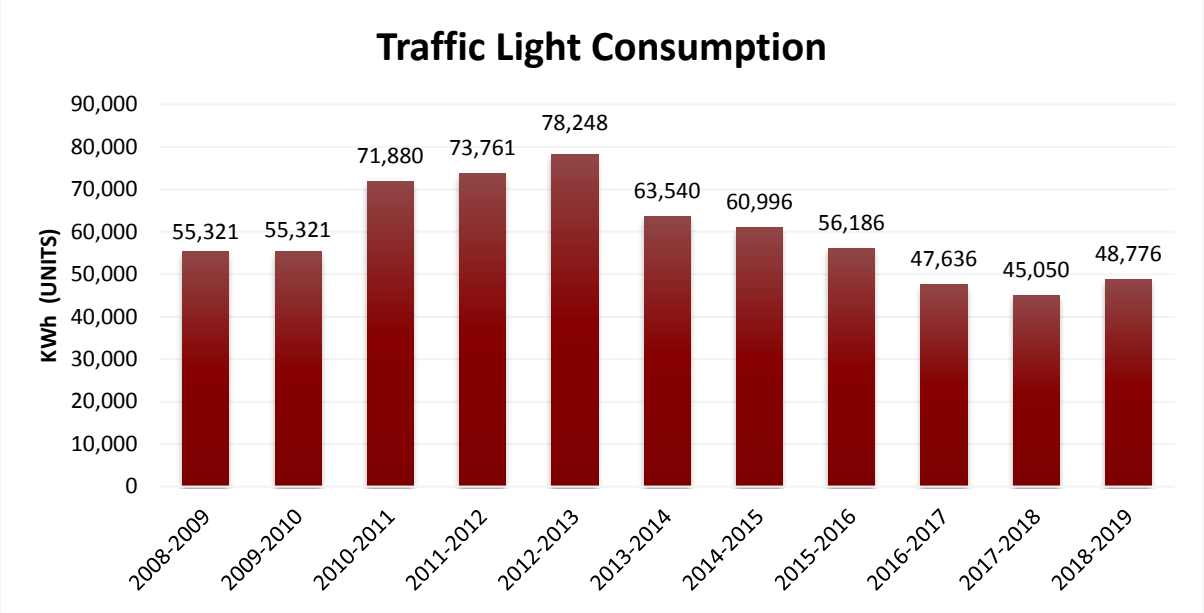
Records for total energy consumption from street, flood and traffic lighting in recent years are as follows:



Street lighting consumption.



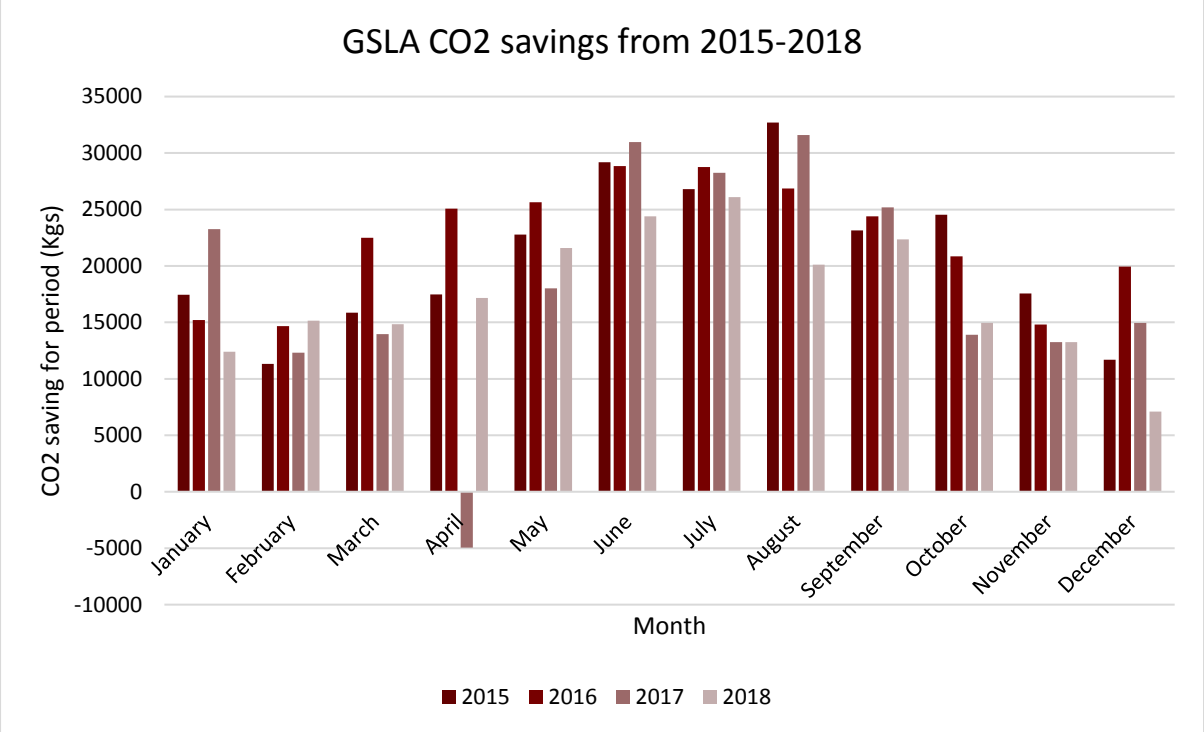
Flood lighting consumption.



Traffic light consumption.

5.2 Solar Energy

In line with EU targets for sourcing 20% of energy by 2020, H.M. Government of Gibraltar currently has a variety of solar energy projects underway. One of the existing projects is located at the GSLA pool, which is equipped with solar thermal systems. Carbon dioxide emissions savings that have been achieved by this project in recent years are illustrated below.



GSLA CO_2 savings from 2015-2018.