ANNUAL REPORT 2011

The Environment Matters

Department of the Environment
Government of Gibraltar

www.gibraltar.gov.gi/environment

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Executive Summary

The Department of the Environment, in conjunction with the Environmental Agency, continues to work towards improving the local environment and ensuring compliance with environmental legislation.

In relation to air quality Gibraltar once again met the majority of the European Commission's values for regulated pollutants, including benzene, sulphur dioxide, ozone and carbon monoxide. In 2010 Gibraltar failed to meet the limit value for nitrogen dioxide at both the Rosia Road and Witham's Road monitoring stations. A Time Extension Notification (TEN) application was submitted and subsequently granted in 2011 on the understanding that the Gibraltar Air Quality Action Plan was implemented. Data provided by the nitrogen dioxide diffusion tube network in the south district, particularly around the Jumpers area, and the new monitoring station at Witham's Road, confirmed that elevated nitrogen dioxide levels were the result of emissions from the OESCO power station and the Inter Services Generating Station (ISGS).

In 2010 Gibraltar also failed to meet the limit values for particulate matter (PM_{10}). This TEN was rejected due to the fact that Gibraltar met the limit values in 2009. During 2011, Gibraltar did not exceed the particulate matter (PM_{10}) annual mean or the 24 hour mean, this being a significant improvement. This reflected the on-going improvements resulting from the Air Quality Action Plan 2010 as well as the introduction and implementation of the Environment (Control of Dust) Regulations 2010. The Environmental Agency has been working in close cooperation with the Building Sector and related industries, advising them on the dust control methods now in force. The results are reflected in our compliance in 2011.

In 2011, AquaGib Ltd produced and supplied a total of 1,442,845 m3 of potable water, produced by the Reverse Osmosis Plants at Governor's Cottage and Waterport. "Check" and "Audit" monitoring were carried out in accordance with The Drinking Water Directive (DWD) 98/83/EC and the Public Health (Potable Water) Rules 1994. Gibraltar continues to produce potable water of a very high standard, both chemically and bacteriological. The Environmental Agency took 250 samples as part of its monitoring programme.

In relation to water quality, Gibraltar entered its third year of coastal water monitoring. Bathing water quality was yet again compromised at Western Beach. This was attributed to

discharges from a storm water drain in Spain to service La Linea. This Spanish drain acts as a combined sewage/storm water overflow which discharges into the Western Beach basin.

The Government of Gibraltar, in accordance with the requirements of section 17C(1) of the Nature Protection Act 1991 and Article 4(4) of the Habitats Directive 92/43/EC, designated the Southern Waters of Gibraltar SCI as a marine special area of conservation (SAC). The Southern Waters of Gibraltar Management Scheme was published in March 2011.

The Nature Conservation Area was extended on the 24th November 2011 under the Nature Conservation Area (Extension of the Upper Rock) Designation Order 2011 to include the Europa Foreshore, cliff habitat extending from Little Bay to Governor's Beach, Jacobs Ladder, Hole in the Wall and vegetated areas along the cliff to the east of the Naval Hospital. The area was extended to include the main large stands of the Gibraltar Candytuft and the Gibraltar Sea Lavender, both species protected under the Nature Protection Act (1991).

Public awareness and education were again a highlight of the Department's work as it hosted another World Environment Day, highlighting Forests and their importance in the battle against global warming and climate change, both locally and globally.

Works envisaged for 2012 include the revision of the Southern Waters Management Plan, further follow up of the Environmental Action & Management Plan and the development of a Green Procurement Policy for the public sector.

Minister's Foreword

This report summarises the work of the Department of the Environment and associated bodies during 2011. That was a year during most of which I was not Minister, but was, as I have been most of my life, active in environmental work, and therefore involved in at least some of what is reported here.

It would not be proper for me to comment in this foreword on work done in the year before I was in office. But I can recognise the dedication and commitment to the environment that I have found in the staff of the Ministry, Department of the Environment and Agencies and contractors.

I recognise their work as reflected in this report and look forward to reporting on 2012 in the next.

The report presents a number of challenges and already the huge impetus given to the environment by a new Government has gone some way to meeting these.

The environment is hugely important to our way of life, our economy and our health and wellbeing. Our international environmental obligations give Gibraltar a tremendous importance at the European level. Our responsibility to the wider world by leading by example is one that we will not shirk as we strive to keep the environment at the centre of the work of the Government.

The Hon Dr John Cortes
MBE, JP, C.Biol, CEnv
Minister for Health and the Environment

Chapter 1:

Air Quality

Photo Credit: Joseph Bonfante (Snr)

1.1 Introduction

This section of the report provides an overview of Gibraltar's air quality measurements for the calendar year of 2011. It includes data for the automatic and non-automatic monitoring networks.

The Gibraltar Air Monitoring Programme consists of three automatic monitoring stations measuring a variety of pollutants and a passive monitoring network measuring nitrogen dioxide and Volatile Organic Compounds through the use of diffusive samplers. The equipment deployed on the existing network is set out in Table 1.

Table 1.1 The Gibraltar Air Monitoring Programme

Location	Pollutants Measured	Equipment Types
Electricity Offices (Rosia Road)	Sulphur dioxide	API M100E (Ultraviolet flourescence)
	Oxides of nitrogen	API M200E (Chemiluminescence)
	Carbon monoxide	API M300E (Infrared Absorption)
	PM_{10} Gravimetry	R&P Partisol 2025
	$PM_{2.5}$ Gravimetry	R&P Partisol 2025
	PM_{10} Automatic	TEOM FDMS
	Poly Aromatic Hydrocarbons	Digitel High Volume Sampler
	Volatile Organic Compounds	Environment VOC71M Gas Chromatograph
	Wind speed & direction	Gill Windsonic
	Ambient temperature	Met One 592
Bleak House (Near Europa Point)	Oxides of nitrogen	API M200E (Chemiluminescence)
	Ozone	API M400E (Ultraviolet absorption)
	PM_{10} Gravimetry	R&P Partisol 2025
	Wind speed & direction	Gill Windsonic
	Ambient temperature	Met One 592
Witham's Road	Oxides of nitrogen	API M200E (Chemiluminescence)
	Wind speed & direction	Gill Windsonic
	Ambient temperature	Met One 592
Passive Network (Various locations)	Nitrogen Dioxide	Diffusive Samplers - Palmes Tubes at 27 sites
	Volatile Organic Compounds	Diffusive Samplers – SorbentTubes at 15 sites

The instrumentation deployed was selected to ensure robust measurements at the necessary level of accuracy and time resolution to meet the data quality objectives within the European Air Quality Directives and national legislation.

The primary objectives of the monitoring network are:

- To provide the public with rapid and reliable information on urban air quality.
- To monitor compliance with European Directives and local statutory instruments.
- To assist in developing new policies.

The monitoring equipment itself forms only one aspect of the overall Gibraltar Air Monitoring Programme. Appropriate maintenance and support, coupled with a well-designed and managed quality control regime, ensure that the raw monitoring data obtained are successfully processed, analysed and interpreted, in order to provide information and ensure compliance under the Air Quality Framework.

Gibraltar air pollutant measurements are underpinned by a rigorous quality assurance and control programme, central to which are crosschecked calibration standards that are traceable to and compared with internationally recognised meteorology standards.

The non-automatic network consists of a diffusion tube programme for Nitrogen Dioxide and Benzene, Toluene and Xylenes (BTEX) as well as three partisol filters (Gravimetric) units which are used to monitor particulate matter (PM_{10} & $PM_{2.5}$), Lead, Arsenic, Cadmium, Nickel and a Digital High Volume Sampler monitoring Poly Aromatic Hydrocarbons (measured as Benzo(a)pyrene).

In addition to meeting the Gibraltar Government's monitoring obligations, the data are disseminated in near real-time on the **www.gibraltarairquality.gi** web site. This web-based dissemination and reporting are an important tool for delivery of air quality data and descriptive statistics to a broad range of end users.

The site provides wide and unrestricted accessibility to air quality data and has been designed to be user-friendly, interactive and responsive. Users may download unlimited portions of the database in spreadsheet format or graphs. The website has proved, and continues to prove, popular as demonstrated in Table 1.2, overleaf.

Table 1.2 Gibraltar Air Quality Website Hits 2011

Month	Unique visitors	Number of visits	Hits
Jan	6,051	3,665	19,537
Feb	469	325	1,680
Mar	588	396	1,872
Apr	476	306	1,696
May	499	258	1,678
Jun	507	307	1,484
Jul	523	361	1,533
Aug	508	319	1,629
Sep	427	286	1,170
Oct	484	335	1,527
Nov	596	406	2,474
Dec	488	359	2,474
Total	11,616	7,323	37,773

1.2 Gibraltar Air Quality Standards

Standards and objectives are set for air pollutant concentrations in ambient air, over a given time period, that are considered to be acceptable in the light of what is known about the effects of each pollutant on health and on the environment. They can also be used as a benchmark to see if air pollution is getting better or worse.

The Gibraltar Ambient Air Quality Standards, in place for the purpose of local air quality management, are found in the Environment (Air Quality Standards) Regulations 2010. This transposed into Gibraltar law the latest Air Quality Directive 2008/50/EC (known as the CAFÉ Directive - Clean Air For Europe), which merged all existing air quality directives into a single Directive. It also lays down Air Quality values for $PM_{2.5}$.

A summary of the current Gibraltar Air Quality Objectives is set out in Table 1.3, overleaf.

Table 1.3: Summary of Current Gibraltar Air Quality Objectives

Pollutant	Objective	Measured as	To be achieved by
Benzene	5 µg/m^3	Annual Mean	1 January 2010
Carbon monoxide	10.0 mg/m^3	Maximum daily running 8 Hour Mean	1 January 2005
Lead	0.5 µg/m^3	Annual Mean	1 January 2005
Nitrogen dioxide	200µg/m^3 Not to be exceeded more than 18 times per year	1 Hour Mean	1 January 2010
	40 µg/m^3	Annual Mean	1 January 2010
Nitrogen Oxides**	(V) 30 µg/m^3	Annual Mean	19 July 2001
Ozone	120 µg/m^3	Daily maximum running 8 hr mean not to be exceeded more than 25 times per calendar year averaged over 3 years	1 January 2010
Particles[a] (PM10) (gravimetric)	50µg/m^3 Not to be exceeded more than 35 times per year	24 Hour Mean	1 January 2005
	40 µg/m^3	Annual Mean	1 January 2005
Sulphur dioxide	350µg/m^3 Not to be exceeded more than 24 times per year	1 Hour Mean	1 January 2005
	125µg/m^3 Not to be exceeded more than 3 times per year	24 Hour Mean	1 January 2005
	(V) 20 µg/m^3	Annual Mean	19 July 2001
	(V) 20 µg/m^3	Winter Mean (01 October – 31 March)	19 July 2001
Arsenic	6 ng/m^3	Annual Mean	31 December 2012
Cadmium	5 ng/m^3	Annual Mean	31 December 2012
Nickel	20 ng/m^3	Annual Mean	31 December 2012
PAH (Benzo[a]pyrene*)**	1 ng/m^3	Annual Mean	31 December 2012

Notes:

a. Measured using the European gravimetric transfer sampler or equivalent.

µg/m^3 – micrograms per cubic metre

mg/m^3 – milligrams per cubic metre

ng/m^3 – nanograms per cubic metre

** Assuming NOx is taken as NO_2

*** Benzo[a]pyrene is used as a marker for the carcinogenic risk of polycyclic aromatic hydrocarbons in ambient air.

(V) These standards are adopted for the protection of vegetation and ecosystems. All of the remainder are for the protection of human health.

1.3 Annual Automatic Data Summary Reports

Map showing locations of automatic monitoring stations

All the data in this report have been fully ratified. All gaseous pollutant mass units are at 20^{o}C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure.

Note: For a strict comparison against the objectives there must be a data capture of >90% throughout the calendar year.

1.3.1 Rosia Road: 1st January to 31st December 2011

Rosia Road air quality monitoring station has been in operation since early 2005, measuring the following parameters: Carbon Monoxide, Nitrous Oxides, Particulate Matter, Sulphur Dioxide, Metals and Polycyclic aromatic hydrocarbons (PAHs). The station is situated on a busy roadside, encapsulating measurements from vehicular traffic and the OESCO Power Station in the nearby area. Graphs 1.1 – 1.3 summarise the hourly mean data of CO, NO_2 & NO_2 respectively. Tables 1.4 & 1.5 show the data capture from specific pollutants measured on site and show that there was 1 exceedence relating to NO_2 in 2011.

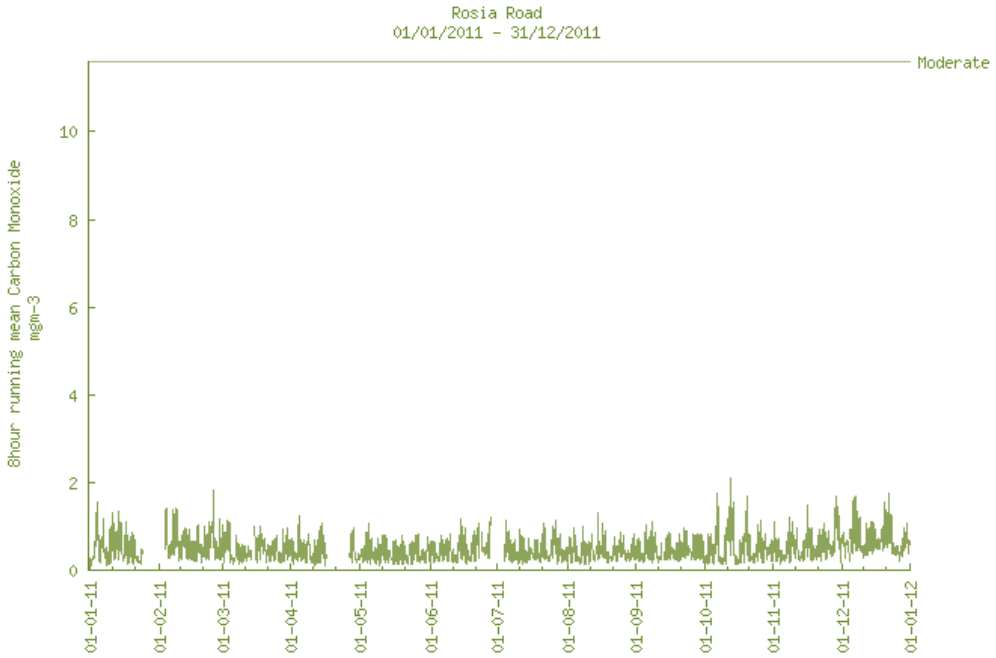
Table 1.4

POLLUTANT	BENZ	CO	NO_2	SO_2
Maximum hourly mean	103.45 µg m^{-3}	3.7 mg m^{-3}	197 µg m^{-3}	109 µg m^{-3}
Maximum running 8-hour mean	31.43 µg m^{-3}	2.1 mg m^{-3}	167 µg m^{-3}	53 µg m^{-3}
Maximum running 24-hour mean	13.23 µg m^{-3}	1.3 mg m^{-3}	139 µg m^{-3}	42 µg m^{-3}
Maximum daily mean	13.06 µg m^{-3}	1.3 mg m^{-3}	131 µg m^{-3}	37 µg m^{-3}
Average	1.84 µg m^{-3}	0.5 mg m^{-3}	49 µg m^{-3}	9 µg m^{-3}
Data capture	84.2 %	92.0 %	85.0 %	97.0 %

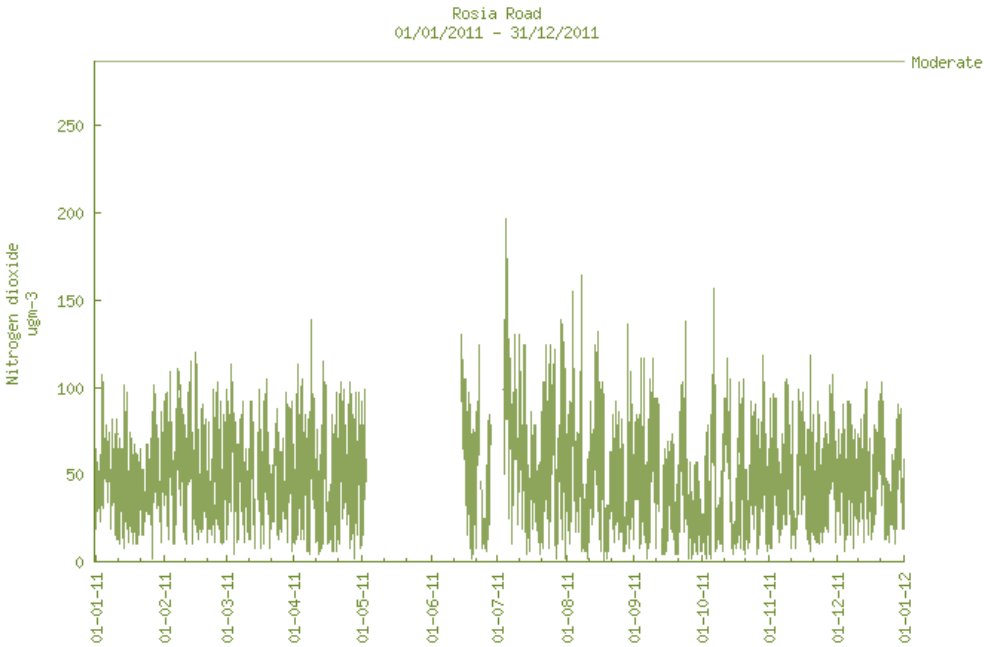
Table 1.5

Pollutant	Public Health (Air Quality Limit Values) Rules 2002, (Amendment) Rules 2003 and (Ozone) Rules 2004	Exceedences	Days
Carbon Monoxide	Running 8-hour mean > 10.0 mg m^{-3}	0	0
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	1	-
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	0	0
Sulphur Dioxide	Annual mean > 20 µg m^{-3}	0	-

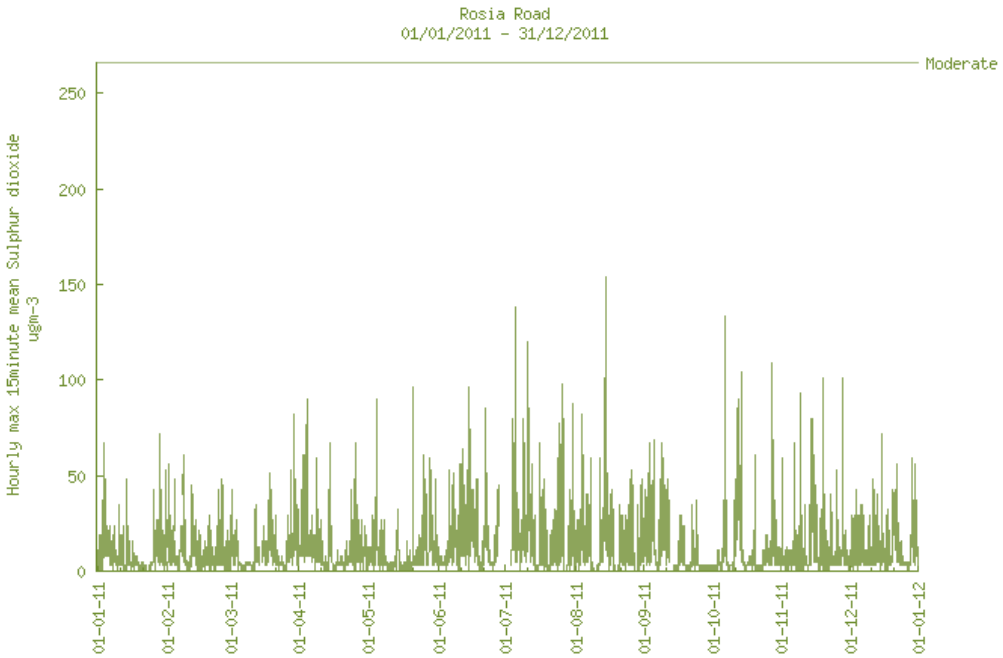
Graph 1.1: Hourly Mean Data for 1st January to 31st December 2011 of CO



Graph 1.2: Hourly Mean Data for 1st January to 31st December 2011 of NO_2



Graph 1.3: Hourly Mean Data for 1st January to 31st December 2011 of SO_2



1.3.2 Bleak House: 1st January to 31st December 2011

Bleak House air quality monitoring station has been in operation since February 2005. This location was chosen to give a background suburban area reading in comparison to roadside monitoring stations such as Rosia Road and Witham's Road stations. Tables 1.6 & 1.7 show the data capture and measurements for specific pollutants and show that there have been 75 exceedences in 15 days with regards to Ozone in 2011.

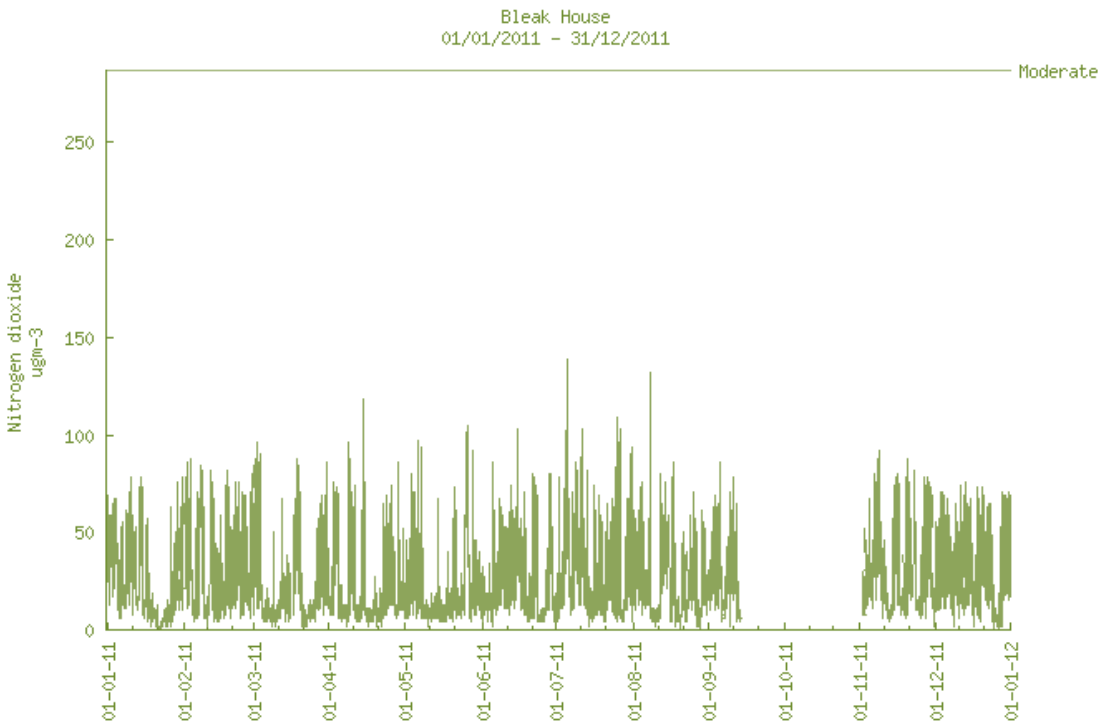
Table 1.6

POLLUTANT	NO_2	O_3
Maximum hourly mean	139 µg m^{-3}	144 µg m^{-3}
Maximum running 8-hour mean	101 µg m^{-3}	133 µg m^{-3}
Maximum running 24-hour mean	79 µg m^{-3}	123 µg m^{-3}
Maximum daily mean	78 µg m^{-3}	122 µg m^{-3}
Average	27 µg m^{-3}	61 µg m^{-3}
Data capture	85.0 %	99.0 %

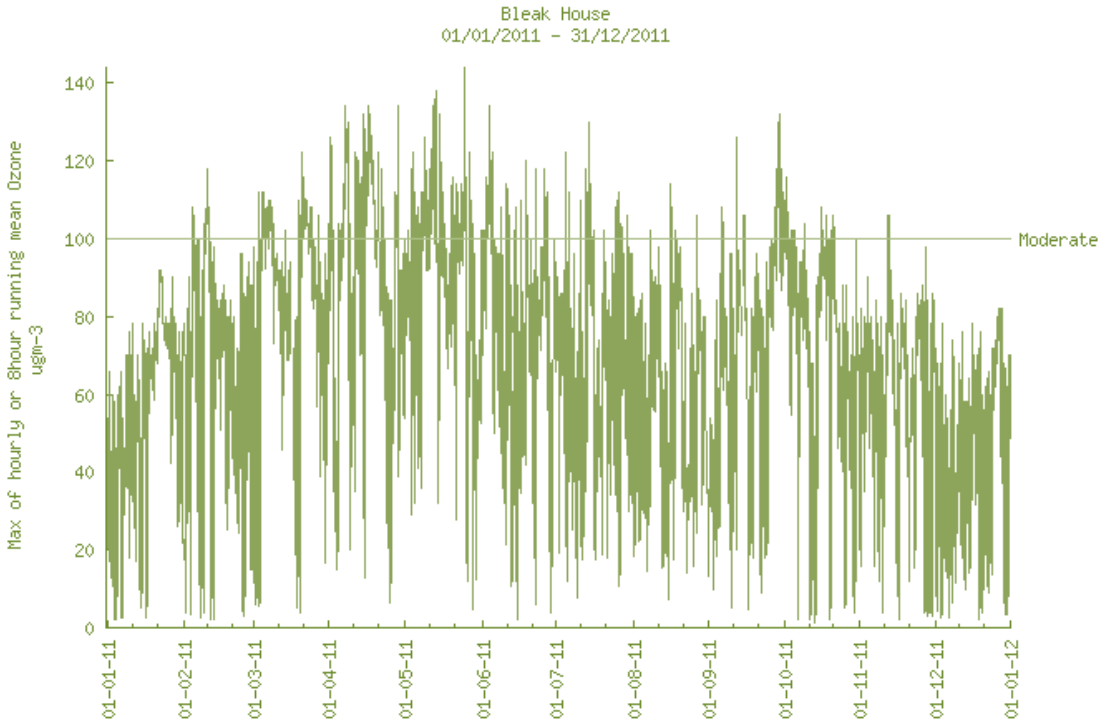
Table 1.7

Pollutant	Public Health (Air Quality Limit Values) Rules 2002, (Amendment) Rules 2003 and (Ozone) Rules 2004	Exceedences	Days
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	0	-
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	0	0
Ozone	Running 8-hour mean > 120 µg m^{-3}	75	15

Graph 1.4: Hourly Mean Data for 1st January to 31st December 2011 of NO_2



Graph 1.5: Hourly Mean Data for 1st January to 31st December 2011 of Ozone.



1.3.3 Witham's Road: 1st January to 31st December 2011

Witham's Road air quality monitoring station has been in operation since 2008. The station's location is roadside in an urban setting, where the OESCO and ISGS power stations are in the vicinity. This location was chosen to closely monitor the effect of traffic and emissions from the power stations. Tables 1.8 & 1.9 show the pollutants measured at Witham's Road and show that there was one exceedence in 2011 in terms of NO_2 annual mean values. Graph 1.3 illustrates hourly mean data for NO_2 in 2011.

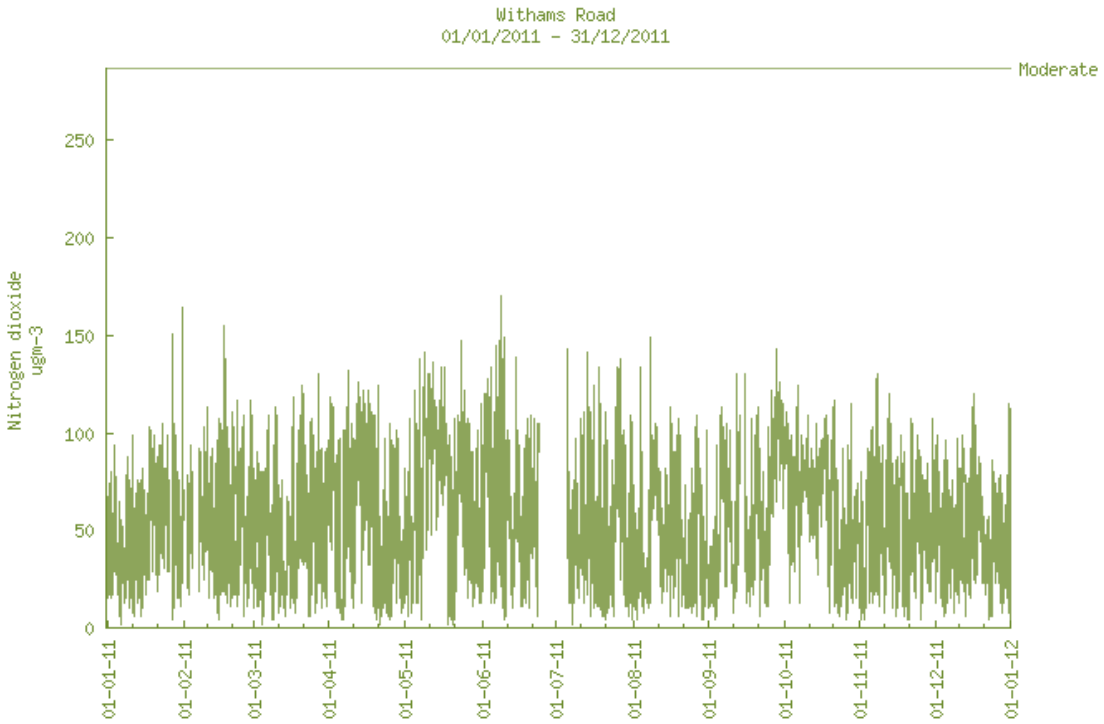
Table 1.8

POLLUTANT	NO_2
Maximum hourly mean	170 µg m^{-3}
Maximum running 8-hour mean	151 µg m^{-3}
Maximum running 24-hour mean	151 µg m^{-3}
Maximum daily mean	108 µg m^{-3}
Average	55 µg m^{-3}
Data capture	94.0 %

Table 1.9

Pollutant	Public Health (Air Quality Limit Values) Rules 2002, (Amendment) Rules 2003 and (Ozone) Rules 2004	Exceedences	Days
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	1	-
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	0	0

Graph 1.3 Hourly Mean Data for 1st January to 31st December 2011 of NO2



1.4 Overview of Gibraltar's automatic air pollution measurements

The data capture figures reflect data capture over the whole year, 1st January to 31st December 2011.

Table 1.10: Data capture in 2011 (%)

	UK	Gibraltar
NO_2 and NO_x	**93.5**	88
SO_2	94.6	97
CO	95.7	92
PM_{10} (grav.)	83.0	89
$PM_{2.5}$ (grav.)	95.4	96
O_3	95.9	99
Benzene	77	84.2

Gibraltar data capture has this year been slightly lower than from its onset in 2005. This is primarily due to servicing and repairs of the equipment. The Environmental Agency works closely with UK consultancy AEA Environment and Technology to continue to provide a high efficiency of data capture in the monitoring stations.

1.4.1 Carbon monoxide

Carbon monoxide (CO) is a colourless, odourless, poisonous gas produced by incomplete or inefficient combustion of fuel. It is produced predominantly by the road transport sector, particularly by petrol engines. It prevents the normal transport of oxygen by the blood, which in turn can lead to a significant reduction in the supply of oxygen to the heart, particularly in people suffering from heart disease.

This pollutant is measured at the Rosia Road station.

Table 1.11

Air quality objective for CO (as maximum daily running 8hr mean)	Recorded levels (as maximum daily running 8hr mean)
10.0 mg m^{-3}	**2.1 mg m^{-3}**

Gibraltar's recorded levels are well below the maximum permissible under the Air Quality Rules. The level recorded is slightly higher than last year's and in general, carbon monoxide levels over the last 7 years show that we are well within the recommended levels for this pollutant.

SUMMARY: There were no exceedences of the carbon monoxide air quality objectives within our National Rules or the European Limit Values.

1.4.2 Nitrogen Dioxide

Nitrogen oxides (NO_x) is a collective term used to refer to two forms of oxides of nitrogen, nitric oxide (NO) and nitrogen dioxide (NO_2). NO is mainly derived from road transport emissions and other combustion processes such as electricity supply. NO is not considered to be harmful to health, however, once released into the atmosphere, NO is very rapidly oxidised to NO_2 which can be harmful to human health, irritating the lungs and lowering resistance to respiratory infections such as influenza.

This pollutant is measured at Rosia Road, Witham's Road and Bleak House monitoring stations.

There are two air quality objectives for NO_2: a long-term annual mean objective, set to protect against long-term exposure to elevated NO_2 concentrations; and a short-term 1-hour objective set to protect against short-term elevated NO_2 concentrations.

Annual Objective

As per the Air Quality Directive 2008/50/EC, Gibraltar's annual mean air quality objective is NO_2 is 40 µg m^{-3}. It can be seen from table 1.12 that this level was exceeded at Rosia Road and Witham's Road stations.

Table 1.12

Air Quality Objective for NO_2	Recorded Annual Mean
40 µg m^{-3}	**49 µg m^{-3} (Rosia Road)** **56 µg m^{-3} (Witham's Road)** **27 µg m^{-3} (Bleak House)**

In 2010 Gibraltar was successful in its application for a Time Extension Notification. Gibraltar has until the end of 2014 to achieve compliance with the air quality objective for NO_2 of 40 µg m^{-3}. It is foreseen that the closure of the existing power stations will assist Gibraltar in complying with its EU requirements.

Hourly Objective

The 1-hour air quality objective for nitrogen dioxide is 200µg m^{-3} which cannot be exceeded more than 18 times per year.

Table 1.13

Air Quality Objective for NO_2 (1 hour mean)	Recorded 1 hour mean
200 µg m^{-3} not to be exceeded more than 18 times per year	**197 µg m^{-3} (Rosia Road)** **170 µg m^{-3} (Witham's Road)** **139 µg m^{-3} (Bleak House)**

SUMMARY: There were no exceedences of the 1-hour air quality objective for nitrogen dioxide throughout the monitoring sites.

1.4.3 Sulphur Dioxide

Sulphur Dioxide (SO_2) is produced when a material, including a fuel, containing sulphur is burned. Globally, much of the sulphur dioxide in the atmosphere comes from natural sources, but in Gibraltar the predominant source is the power stations and shipping burning fuel oils.

Even moderate concentrations of sulphur dioxide may result in a fall in lung function in asthmatics. Tightness in the chest and coughing occur at high levels and lung function of asthmatics may be impaired to the extent that medical assistance is required. Sulphur dioxide pollution is considered more harmful when particulate and other pollution concentrations are high.

This pollutant is measured at the Rosia Road station.

There are two air quality objectives set for SO_2, a daily mean objective and a 1-hour objective, as set out below.

Table 1.14

Air Quality Objective for SO_2 (Daily Mean)	Recorded Daily Mean
125 µg m^{-3} not to be exceeded more than 3 times per year	**37 µg m^{-3}**
350 µg m^{-3} not to be exceeded more than 24 times per year	**109 µg m^{-3}**

SUMMARY: There were no exceedences of either limit value for sulphur dioxide in 2011.

1.4.4 Benzene

Benzene is a volatile organic compound which is a minor constituent of petrol (approximately 1% by volume). The main sources of atmospheric benzene in Europe are the distribution and combustion of petrol. Of these, combustion by petrol vehicles is the single biggest source.

Possible chronic health effects include cancer, central nervous system disorders, liver and kidney damage, reproductive disorders and birth defects.

This pollutant is measured at the Rosia Road station. The air quality objective for benzene is 5 µg m^{-3}, measured as an annual mean. In 2011, the annual mean was measured at 1.84 µg m^{-3}, which is below the Benzene Annual Mean Limit Value.

Table 1.15

Air Quality Objective for Benzene (Annual Mean)	Recorded Annual Mean
5 µg m^{-3}	**1.84 µg m^{-3}**

SUMMARY: There was no exceedence of the Benzene annual mean objective in 2011.

1.4.5 Ozone

Ozone (O_3) is not directly emitted from any man-made source in significant quantities. In the lower atmosphere, O_3 is primarily formed by the sunlight-initiated oxidation of volatile organic compounds (VOCs) in the presence of nitrogen oxides (NO_x). The sources of VOCs are similar to those described for NO_x above, but also include other activities such as solvent use and petrol handling & distribution.

The chemical reactions do not take place instantaneously, therefore ozone measured at a particular location may have arisen from VOC and NO_x emissions many hundreds or even thousands of miles away. Maximum concentrations generally occur downwind of the source areas of the precursor pollutant emissions. Ozone irritates the airways of the lungs, increasing the symptoms of those suffering from asthma and lung diseases.

This pollutant is measured at Bleak House Station. The air quality target value for ozone is expressed as a maximum daily 8 hour mean of 120 µg m-3. This value should not be exceeded more than 25 days per calendar year, averaged over 3 years. The target value was exceeded on 15 days during 2011. The maximum hourly mean was recorded as 133 µg m-3, which is below the EU Information Threshold of 180 µg m-3 and the EU Alert Threshold of 240 µg m-3.

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.	**133 µg m^{-3}** **Target value exceeded on 15 days**

SUMMARY: There was no exceedence of the Ozone objective. Although the maximum rolling 8hr mean value is above the air quality objective for ozone, it should be noted that this is reflective of a 12 month cycle, not of a three year period. The target value of less than 120 µg m-3 averaged over three years has been achieved.

1.5 Overview of Gibraltar's non-automatic air pollution measurements

1.5.1 Lead

The majority of Lead (Pb) emissions arise from vehicles fuelled with leaded petrol. Industry, in particular secondary non-ferrous metal smelters, may contribute to emissions of lead in industrial areas, though none exist within Gibraltar. This source can become increasingly significant due to the reduction in the lead content of leaded petrol and the increasing use of unleaded petrol (leading to significant reductions in urban lead levels).

Even small amounts of lead can be harmful, especially to infants and young children. In addition, lead taken in by the mother can interfere with the health of the unborn child. Exposure has also been linked to impaired mental function, visual-motor performance and neurological damage in children, and memory and attention span.

The air quality objective for lead is 0.5µg m^{-3} measured as an annual mean to have been achieved by 2005. The 2011 annual mean was measured at 0.01µg m^{-3}.

Air Quality Objective for Lead (measured as an annual mean)	Recorded Annual Mean
0.5µg m^{-3}	**0.01µg m^{-3}**

SUMMARY: There was no exceedence of the lead annual mean objective.

1.5.2 Particulate Matter (PM_{10})

Fine particles are composed of a wide range of materials arising from a variety of sources including:

- combustion sources (mainly road traffic);
- secondary particles, mainly sulphate and nitrate formed by chemical reactions in the atmosphere, and often transported from far across Europe;
- coarse particles, suspended soils and dusts (e.g. from the Sahara), sea salt, biological particles and particles from construction work.

Particles are measured in a number of different size fractions according to their mean aerodynamic diameter. Most of the monitoring requirements are currently focused on PM_{10}, but the finer fractions such as $PM_{2.5}$ and PM_1 are becoming of increasing interest in terms of health effects. Fine particles can be carried deep into the lungs where they can cause inflammation and a worsening of the condition of people with heart and lung diseases. In addition, they may carry surface-absorbed carcinogenic compounds into the lungs.

There are two air quality objectives set for particulate matter (measured as the PM_{10} size fraction) - a daily mean objective and an annual mean objective.

The annual mean air quality objective for PM_{10} is 40µg m^{-3}, the daily mean objective is set at 50 µg m^{-3}, not to be exceeded on more than 35 days per year. These objectives were to be met by 2005. The 2011 corrected annual mean was measured as 38.0 µg m^{-3} and the daily mean of 50 µg/m^3 was exceeded on 44 occasions. However, following adjustments for natural sources, such as African dust and sea salt the annual mean has been reduced to 34.0 µg m^{-3} and the daily exceedences have been reduced to 25.

Air Quality Objective for PM_{10} (measured as an annual mean)	Recorded Annual Mean
40 µg m^{-3}	**34 µg m^{-3}**
Air Quality Objective for PM_{10} (measured as a daily mean)	**No. of exceedences of maximum daily mean**
50 µg m^{-3} not to be exceeded more than 35 times in a year	**25**

SUMMARY: The daily limit values have not been exceeded in 2011 as only 25 exceedences of the 35 permitted where recorded. The air quality objective for PM_{10}, measured as an annual mean was achieved.

Table 1.11 PM10 Statistics for Rosia Road

	2006	2007	2008	2009	2010	2011
Valid Days of Data	362	362	330	356		
% Data Capture	99	99	90	98	95	85
Annual Mean PM_{10} (40 µg m^{-3})*	39.7	45	41	38.2	40.6	38**
Max. 24-hour mean PM_{10}	91.9	249.8	179	79	130	65
Days > 50 µg m^{-3} (35 day limit)*	61	109	63	37	64	44***

*** Limit values – annual mean and maximum number of days; daily limit value can be exceeded**

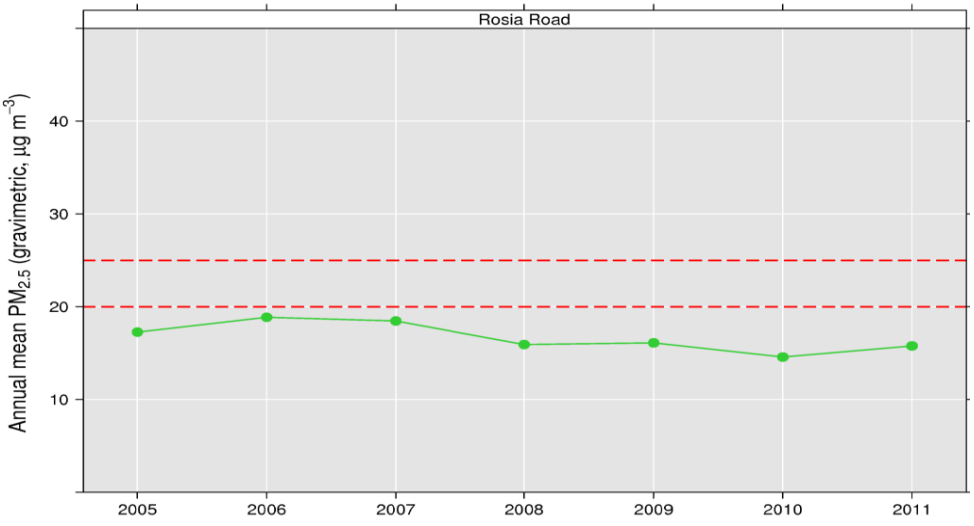
**** This figure has been reduced to 34 µg m-3 after adjustments for natural sources**

***** This figure has been reduced to an estimated 25 exceedences following the removal of natural components.**

1.5.3 Particulate Matter ($PM_{2.5}$)

Particulate matter $PM_{2.5}$ was measured at the Rosia Road station in compliance with Part 4 of the Environment (Air Quality Standards) Regulations 2011. The annual mean was measured at 16.0ug m^{-3}, a rise of 1.4 in comparison to 2010.

Graph 1.4: $PM_{2.5}$ concentrations from 2005 to 2011



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

Evidence suggests that there is no identifiable threshold below which these substances do not pose a risk to human health. Impact on human health and the environment occurs via concentrations in ambient air and via deposition. The major sources of these metals in the Gibraltar region are likely to be shipping and power generation. Target values are set with

the aim of minimising the harmful effects of airborne arsenic, cadmium and nickel on human health, paying particular attention to sensitive populations, and the environment as a whole.

Polycyclic Aromatic Hydrocarbons are toxic organic micro pollutants (TOMPS) that cause a wide range of effects, from cancer to reduced immunity to nervous system disorders that interfere with child development. There is no "threshold" dose - the tiniest amount can cause damage. Target values are set with the aim of minimising the harmful effects of airborne Polycyclic Aromatic Hydrocarbons on human health, paying particular attention to sensitive populations, and the environment as a whole. Benzo[a]pyrene is used as a marker for the carcinogenic risk of polycyclic aromatic hydrocarbons in ambient air. Monitoring in Gibraltar began in late 2005.

Table 1.12: Pollutants regulated by the 4th Daughter Directive

Pollutant	Parameter	Target Value	Recorded Average
Arsenic	Annual average	6 ng m^{-3}	0.10 ng m^{-3}
Cadmium	Annual average	5 ng m^{-3}	0.17 ng m^{-3}
Nickel	Annual average	20 ng m^{-3}	10.52 ng m^{-3}
BAP	Annual average	1 ng m^{-3}	0.10 ng m^{-3}

The annual averages recorded reveal that arsenic, cadmium, nickel and poly aromatic hydrocarbons are well below their corresponding target values in 2011.

1.6 Diffusion Tube Networks

Diffusion tube samplers are used to measure nitrogen dioxide (NO_2) and hydrocarbons across Gibraltar. Monitoring sites were selected to include areas likely to be affected by specific emission sources (such as heavy traffic, power generation plants, petrol stations, or vents from fuel storage), as well as general background locations.

NO_2 and hydrocarbon (BTEX) diffusion tubes are exposed for 4-week periods and are bias adjusted using data from co-location studies carried out at Rosia Road, Witham's Road and Bleak House. The precision of NO_2 and BTEX tubes was high and the accuracy was within the expected range for an indicative method such as diffusive samplers (+/-25%).

1.6.1 Summary of Hydrocarbon Results

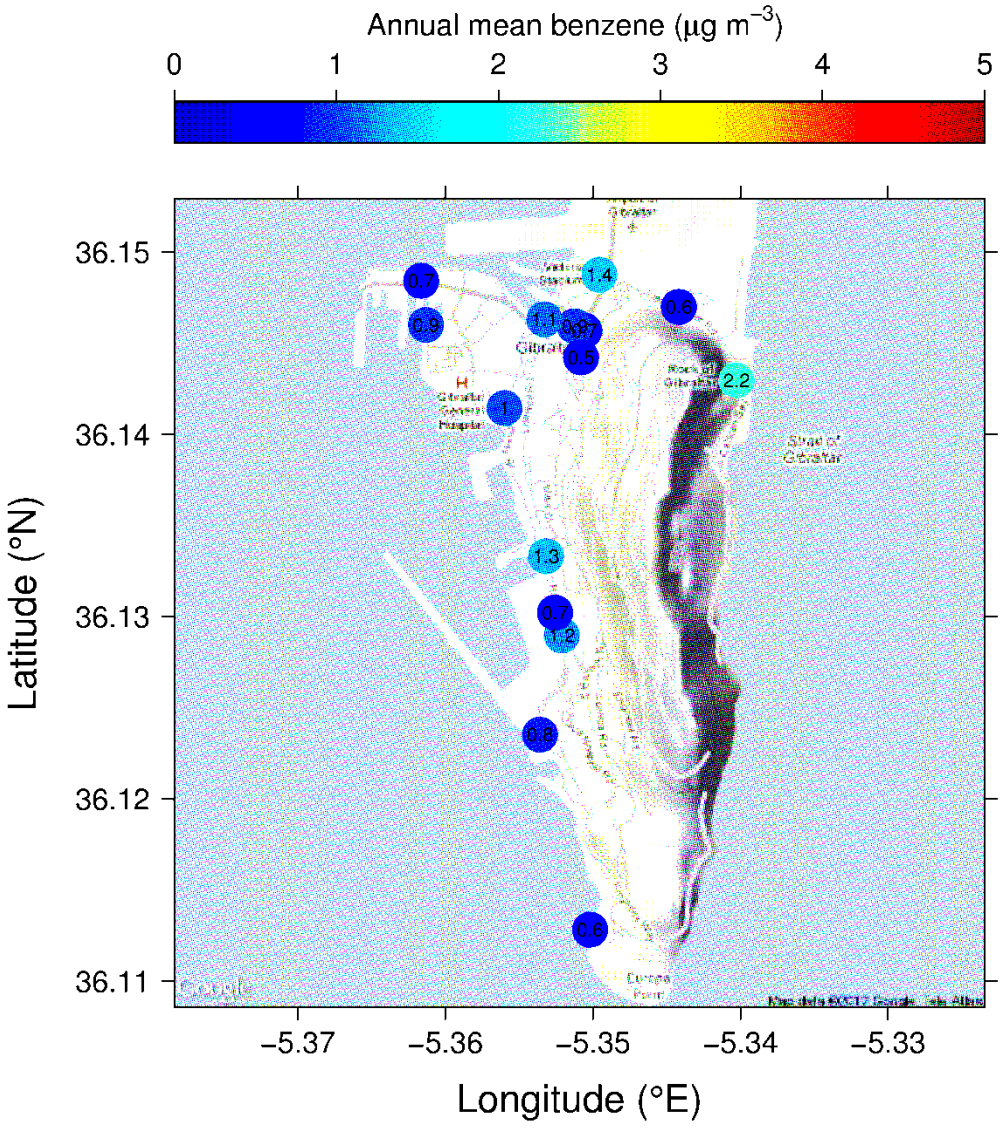
A summary of 2011 annual average hydrocarbon concentrations is shown in Table 1.13. Bias adjustment factors derived from the co-location study at Rosia Road have been applied to these annual means.

Table 1.13 Average hydrocarbon concentrations

Code	Site	Conc. (µg m^{-3})
GIB20	Sundial Roundabout	1.4
GIB5	Glacis Road	1.1
GIB4	Devils Tower Road	0.6
GIB1	Rosia Road	1.3
GIB3	Jumpers	1.2
GIB17	Kings Lines Fuel Depot	0.9
GIB19	North Mole	0.7
GIB30	Governors Meadow House	0.7
GIB7	Harbour Views	0.9
GIB21	Anchorage Rosia Road	0.8
GIB6	Queensway	1
GIB18	Moorish Castle Estate	0.5
GIB16	Laguna Estate	0.7
GIB2	Bleak House	0.6
GIB15	Catalan Bay Road	2.2

Annual mean benzene levels across Gibraltar in 2011 are shown in Figure 1.2 below. The concentrations measured were between 0.5 µg m^{-3} and 2.2 µg m^{-3}. Background concentrations at Bleak House and Catalan Bay Road were 0.6 µg m^{-3} and 2.2 µg m^{-3} respectively. During 2011 the highest levels were measured at the Catalan Bay Road (2.2 µg m^{-3}) and at the Sundial Roundabout (2 µg m^{-3}), two sites exposed to high volumes of traffic due to frontier congestion and new traffic circulation patterns as a result of the reopening of Dudley Ward tunnel.

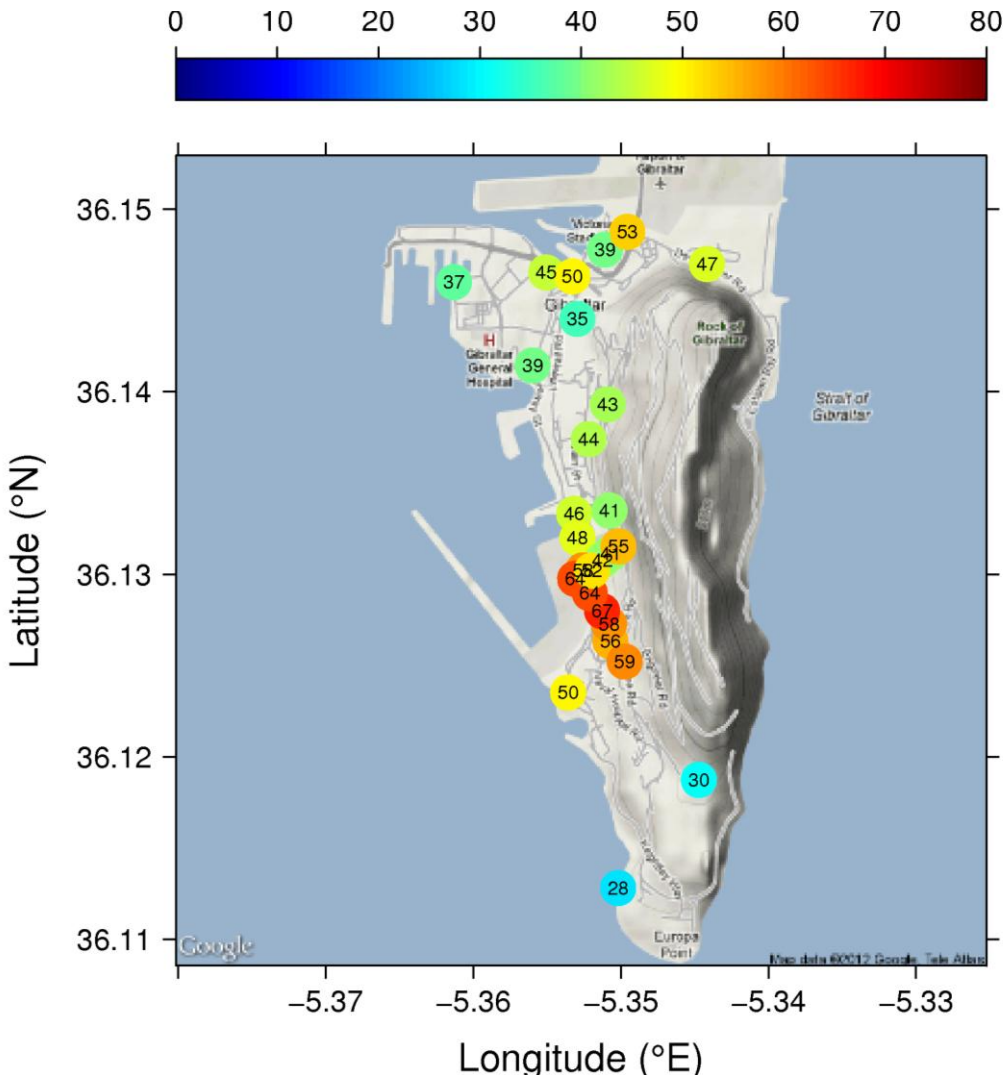
Figure 1.2 Annual mean benzene levels



- No sites had annual mean benzene concentrations greater than the EC Limit Value or Gibraltar Air Quality Objective of 5 µg m^{-3} in 2011.
- The highest levels of benzene were measured at Catalan Bay Road, indicative of the increased traffic flow towards Dudley Ward tunnel due to frontier queues.
- The highest annual mean benzene concentration was 2.2 µg m^{-3} measured at the Catalan Bay Road site, followed by 1.6 µg m^{-3} measured at Glacis Road. At all other sites the annual mean benzene concentration was 1.3 µg m^{-3} or less.
- Overall, results from the non-automatic network survey in 2011 are consistent with those obtained during the 2005-2010 surveys.

1.6.2 Nitrogen Dioxide Network

Figure 1.3 - NO_2 annual average concentrations for 2010



Annual mean NO_2 concentrations for 2011 range from 39 µg m^{-3} to 67 µg m^{-3} at kerbside sites, 39 µg m^{-3} to 58 µg m^{-3} at roadside sites and 28 µg m^{-3} to 37 µg m^{-3} at background sites.

The highest annual mean concentrations (67 µg m^{-3}) were measured at Churchill House followed by the Jumpers and Dockyards road sites at 64 µg m^{-3}. As can be seen in Table 1.14, other sites geographically close to these also exhibited elevated concentrations of NO_2.

Table 1.14: Annual Mean NO_2 Concentrations in Gibraltar 2011

Code	Site	Conc. (µg m^{-3})
GIB3	Jumpers	64
GIB31	Dockyard Road	64
GIB25	Churchill House	67
GIB10	South Barracks Road	56
GIB5	Glacis Road	50
GIB20	Sundial Roundabout	53
GIB32	Woodford Cottage	59
GIB4	Devils Tower Road	47
GIB24	Upper Witham's Entrance	58
GIB30	Governors Meadow House	58
GIB8	Red Sands Road	52
GIB28	Rock Hotel	55
GIB21	Anchorage Rosia Road	50
GIB22	Rosia Promenade	48
GIB12	Water Gardens	45
GIB14	Prince Edwards Road	44
GIB1	Rosia Road	46
GIB9	Lime Kiln Road	43
GIB13	George Don House	39
GIB26	Alameda Gardens Theatre	42
GIB7	Harbour Views	37
GIB29	Gardiners Road	41
GIB27	Alameda Gardens Access Road	41
GIB6	Queensway	39
GIB11	Main Street	35
GIB23	Lathbury Industrial Park	30
GIB2	Bleak House	28

Background concentrations of NO_2 fluctuate across Gibraltar with the highest concentrations around the Alameda Gardens, Harbour Views and the Main Street sampling locations.

These are indicative of the proximity to the electricity generating stations and high volumes of vehicular traffic in comparison to the typically secluded sampling points at Lathbury Industrial Park and Bleak House.

The number of sites which were greater than, or equal to, the EU annual mean Limit Value of 40µg m^{-3} for NO_2 concentrations increased during 2011 versus 2010, and stood at 21 sites in comparison with 18 sites in 2010.

1.8 Conclusions & Recommendations

The Ratified Data for the automatic air pollution monitoring network shows that there were no exceedences of the carbon monoxide, sulphur dioxide, ozone and benzene objectives contained in our national legislation or within the European Air Quality Directives.

Nitrogen dioxide exceeded the annual mean objective of 40 µg m^{-3} at both Witham's Road and Rosia Road. The annual mean at Rosia Road automatic monitoring station was 49 µg m^{-3}, an increase of 1 µg m^{-3} from 2009 and 2010. The annual mean for 2011 was therefore exceeded at this monitoring station. The annual mean at Witham's Road monitoring station was 56 µg m^{-3} an increase of 1 µg m^{-3} from 2010, maintaining the station's annual mean above the targeted annual mean of 40 µg m^{-3}. The NO_2 TEN application was submitted in 2010 and it was subsequently granted in 2011 on the understanding that the Gibraltar Air Quality Action Plan would be implemented. Data provided by the nitrogen dioxide diffusion tube network in the south district, especially around the Jumpers area, and the monitoring station at Witham's Road confirm that elevated nitrogen dioxide levels are the result of emissions from the OESCO and ISGS power stations. Modelling carried out previously also confirmed that these elevated levels are attributable to these power stations. It is expected that the closure of these stations in the future will facilitate compliance with the Directive. The closure of these two stations and the building of a modern and cleaner power station formed the basis of the TEN application. Emissions from traffic are also a significant contributing source and this will also have to be tackled to ensure future compliance.

During 2011, Gibraltar did not exceed the particulate matter (PM_{10}) annual mean or the 24 hour mean, this was a significant improvement on 2010 where national and European Limit Values were breached for the 24 hour mean, and illustrates the on-going improvements generated under the Air Quality Action plan 2010 as well as the introduction and implementation of the Environment (Control of Dust) Regulations 2010. The Environmental Agency has been working in close cooperation with the Building Sector and related industries in advising them on dust control methods.

The ratified data also showed that there were no exceedences of Lead, Cadmium, Arsenic, Nickel and Poly Aromatic Hydrocarbons.

Chapter 2:

Natural Resources

Photo Credit: Alex Zapata

2.1 Bathing Water

Water is a precious natural resource, which requires protection and management. The EU's efforts to ensure clean bathing waters date back to the 1970's. The 1976 Bathing Water Directive is being replaced by the 2006 Bathing Water Directive and will be repealed in its entirety in 2014.

Bathing water in Gibraltar refers to coastal waters (beaches). The new Bathing Water Directive, which was transposed into local legislation through the Environment (Quality of Bathing Water) Regulations 2009, deals with:-

- Monitoring, assessment and classification of bathing water quality. This classification is divided into excellent, good, sufficient and poor quality and all of these are linked to clear numerical quality standards based on bacteriological parameters. These classifications have to be in place by the end of the 2015 bathing season
- Bathing water profiles that describe the bathing waters and explain the potential impacts and threats to water quality. These will provide information about the bathing waters to citizens and will serve as a management tool for authorities managing those waters. The first profiles were complied during this year.
- Measures that have to be taken in exceptional circumstances that impact bathing water quality including information to the public.
- Checks and information on various pollutants that affect bathing water quality.
- Cooperation in the management of water shared between different Member States.

Gibraltar has six bathing areas, Camp Bay, Catalan Bay, Eastern Beach, Little Bay, Sandy Bay and Western Beach. These areas are monitored on a weekly basis during 15th April to 30th October each year. The EU minimum monitoring requirement is for fortnightly samples but Gibraltar is sampling more often than this requirement taking a total of 36 samples from Camp Bay, Little Bay, Sandy Bay and Catalan Bay. Western Beach and Eastern Beach have a stricter sampling routine with extra samples taken by the Environmental Agency.

Table 2.1 – Bathing Water Samples Taken in 2011

Name	No of Samples
Camp Bay	36
Catalan Bay	36
Eastern Beach	56
Little Bay	36
Sandy Bay	36
Western Beach	229

The Gibraltar beaches have in the past met the Mandatory Values and some of them have met the more stringent Guide Values consistently each year. In 2011 the bathing water quality at Western Beach again suffered deterioration and failed to meet the Mandatory Values on several occasions. This was attributed to discharges from a recently built storm water drain by the municipal authorities in Spain to service La Linea. This Spanish drain acts as a combined sewage/storm water overflow which discharges into the Western Beach basin.

Table 2.2 – Bathing Water quality for all beaches.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1. Camp Bay												
2. Catalan Bay												
3. Eastern Beach												
4. Little Bay												
5.Sandy Bay												
6.Western Beach												

Meets Guide Values set by National legislation and EEC Directive 76/160/EEC

Meets Mandatory Values set by National legislation and EEC Directive 76/160/EEC

Fails Mandatory Values set by National legislation and EEC Directive 76/160/EEC

The annual Bathing Water Report and Tourist Atlas for all EU bathing water can be viewed at http://ec.europa.eu/water/water-bathing/index_en.html. Further information on bathing waters can be found at Water Information System for Europe (WISE) http://www.eea.europa.eu/themes/water.

2.2 Potable Water Supply

AquaGib produces all of its potable water through desalination. Potable water is produced at two separate locations within Gibraltar. One plant is located at Governor's Cottage, which consists of four Reverse Osmosis Desalination Plants capable of a maximum production of 4,800 cm^3/day. The second is located at Waterport and consists of one reverse osmosis plant capable of a maximum production of 1500cm^3/day.

The Public Health Act Part III controls the supply and quality of potable water in Gibraltar. The Schedules of the Public Health (Potable Water) Rules 1994 contain the microbiological and chemical parameters to which potable water must adhere to.

Water quality is checked under a two tier sampling and analysis programme carried out throughout the year by both the Environmental Agency and Aquagib Ltd.

(a) The Environmental Agency carries out its own independent monitoring programme taking samples at consumers' taps. This programme is designed to meet the sampling criteria outlined in the Drinking Water Directive (DWD) 98/83/EC and our national legislation.

(b) AquaGib Ltd has its own "in house" water quality programme and also sends samples to laboratories in the United Kingdom. Samples are taken throughout the production, storage at service reservoirs, control points and consumer taps.

In 2011, AquaGib Ltd produced and supplied a total of 1,442,845 m^3 of potable water, through the Reverse Osmosis Plants at Governor's Cottage. "Check" and "Audit" monitoring were carried out in accordance with EC 98/83/EC and the Public Health (Potable Water) Rules 1994.

The purpose of the "check" monitoring is –

- To provide information on the (organoleptic and microbiological) quality of the water.
- To test the effectiveness of the water treatment.
- To check whether the water complies with the relevant parametric values laid down by the Directive and our national legislation.

The following parameters are included in the "check" monitoring carried out by the Environmental Agency:-

- Odour
- Taste
- Colour
- Turbidity
- pH
- conductivity
- Ammonium
- Hardness
- Chloride
- Residual Chlorine
- Total Coliforms
- Faecal Coliforms

The legislation requires that a minimum of 16 samples and a further 3 audit samples are undertaken in a given year taking into consideration the total volume of water produced. The Environmental Agency and Aquagib Ltd jointly took a total of 250 "check" and 10 "audit" samples during 2011.

The following table shows the number of samples taken in Gibraltar:-

Table 2.2 National summary information on drinking water quality in water supply zones exceeding 1000 m^3 per day as an average or serving more than 5000 persons.

Table 5A National summary information on drinking water quality in water supply zones exceeding 1000 m_3 per day as an average or serving more than 5000 persons					
Member State	United Kingdom (Gibraltar)				
Year	2011				
Parameter (1)	**Numbers of WSZ Monitored**	**Numbers of WSZ with Non-Compliance**	**Numbers. of Analyses**	**Numbers of Analyses not Complying**	**% of Analyses Complying**
Microbiological Parameters					
Escherichia coli (E.coli)	1	0	241	0	100
Enterococci	1	0	173	0	100
Chemical Parameters					
Aluminium	1	0	10	0	100
Antimony	1	0	10	0	100
Arsenic	1	0	11	0	100
Benzene	1	0	10	0	100
Benzo(a)pyrene	1	0	10	0	100
Boron	1	0	10	0	100
Bromate	1	0	10	0	100
Cadmium	1	0	11	0	100
Chromium	1	0	10	0	100
Colour$_3$	1	0	259	31	88
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
Iron	1	0	10	0	100
Lead	1	0	11	0	100
Manganese	1	0	10	0	100

Mercury	1	0	11	0	100
Nickel	1	0	10	0	100
Nitrate	1	0	11	0	100
Nitrite in distribution at the tap	1	0	11	0	100
Nitrate/nitrite formula[4]	1	0	11	0	100
Odour[3]	1	0	250	0	100
Pesticides-individual [2]	1	0	0	0	100
Pesticides – Total	1	0	286	0	100
Polycyclic Aromatic Hydrocarbons	1	0	50	0	100
Selenium	1	0	10	0	100
Sodium	1	0	11	0	100
Taste[3]	1	0	237	0	100
Tetrachloroethene and Trichloroethene	1	0	20	0	100
Trihalomethanes – Total	1	0	10	0	100

	Indicator		Parameters		
Ammonium	1	0	251	0	100
Chloride	1	0	202	3	98.5
Clostridium perfringens	1	0	69	0	100
Conductivity	1	0	250	0	100
Hydrogen Ion Concentration	1	0	250	0	100
Sulphate	1	0	11	0	100
Colony count 22_0C_3	1	0	69	5	92.7

2.3 Coastal water sampling

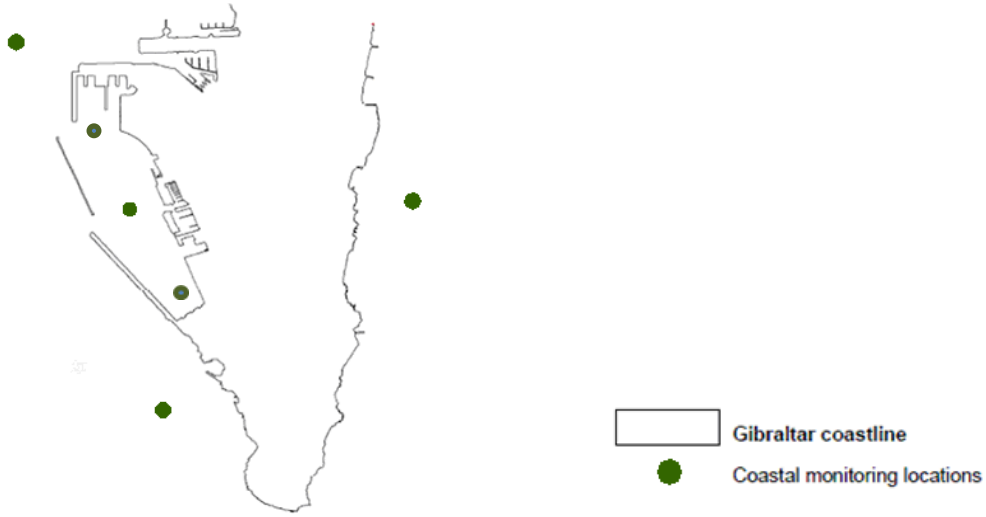
In order to comply with the requirements of the Water Framework Directive (WFD) 2000/60/EC requirements, good chemical and ecological status should be attained and maintained in Gibraltar coastal and ground waters by 2015. As part of the assessment of water quality status, the Department of the Environment has been undertaking chemical water quality and phytoplankton analysis in its coastal waters since July 2009. Ground water monitoring has also been carried out by Aquagib under contract to the Department of the Environment. This section of the annual report provides an overview of the data collected so far.

2.3.1 Coastal water monitoring programme

Sea water samples were collected for water quality analysis of the coastal waters of Gibraltar, within 500m of the shoreline (fig 2.1). Before 2010, four sampling sites were chosen around the coast of Gibraltar and these were increased to six in 2011. These consist of four core sites and two new investigative sampling points located in the Southern and Northern areas of the inner Harbour. The investigative sampling points were included in the programme to monitor levels of tributyltin. Tributylytin (TBT) is an active compound used in

vessel antifouling paint and is considered to be a toxic chemical having negative effects on human health and the environment.

Figure 2.1 Coastal water sampling locations



Monthly water quality monitoring was undertaken for nutrient levels, chlorophyll-a and suspended solids. Quarterly water quality monitoring was undertaken for priority substances and specific pollutants. Phytoplankton identification was also undertaken during the quarterly monitoring surveys to assist the assessment of the state of our coastal waters.

Table 2.3 – Chemical/Physio-chemical parameters measured.

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	
Priority substances	
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	4 times per year
(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

These results have fed into the creation of the Gibraltar Draft River Basin Management Plan which can be found online in the publications section of the Department of the Environment webpage www.gibraltar.gov.gi/environment/environment

2.3.2 Sediment monitoring programme

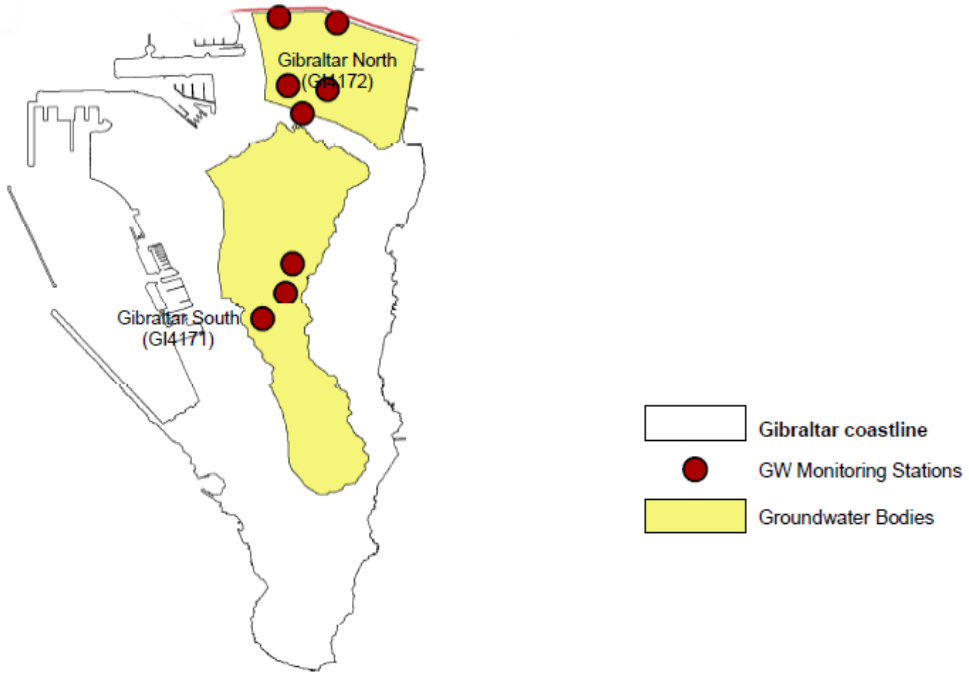
The sediment monitoring programme was started in late 2011. The locations used are the same ones those of the Coastal water monitoring programme (Fig 2.1). Van Veen Grabs (Fig 2.2) are used to obtain the samples from the sea bed. The samples are stored in glass containers and sent to the UK for analysis within 48 hours of their collection.

Figure 2.2 Van Veen Grabs used for collecting sediment samples.

2.3.3 Groundwater monitoring programme

An overview of the monitoring locations that form part of the groundwater monitoring programme is provided in Figure 2.3. There are currently 5 monitoring points in the Northern Isthmus aquifer, which is where Gibraltar has historically abstracted a proportion (up to 12%) of its total water supply. There are also 3 monitoring points in the Southern bedrock aquifer. This aquifer is recharged by rainfall percolating through the limestone bedrock as opposed to the Northern aquifer, which is predominantly recharged from the Sierra Carbonera district in neighbouring Spain.

Figure 2.3 Monitoring locations in the Northern Isthmus and Southern bedrock aquifers



A wide range of heavy metals, hydrocarbons and pesticides are monitored on a quarterly basis from each of the monitoring points. Additional in situ measurements, including water level (quantitative) measurements, are taken from each monitoring point to aid the water quality classification of Gibraltar's groundwaters. No exceedences in the chemical parameters monitored have been observed so far for the Northern Isthmus or Southern Bedrock aquifers.

Chapter 3:

Habitats

Photo credit: Farid Nouar

3.1 Habitats

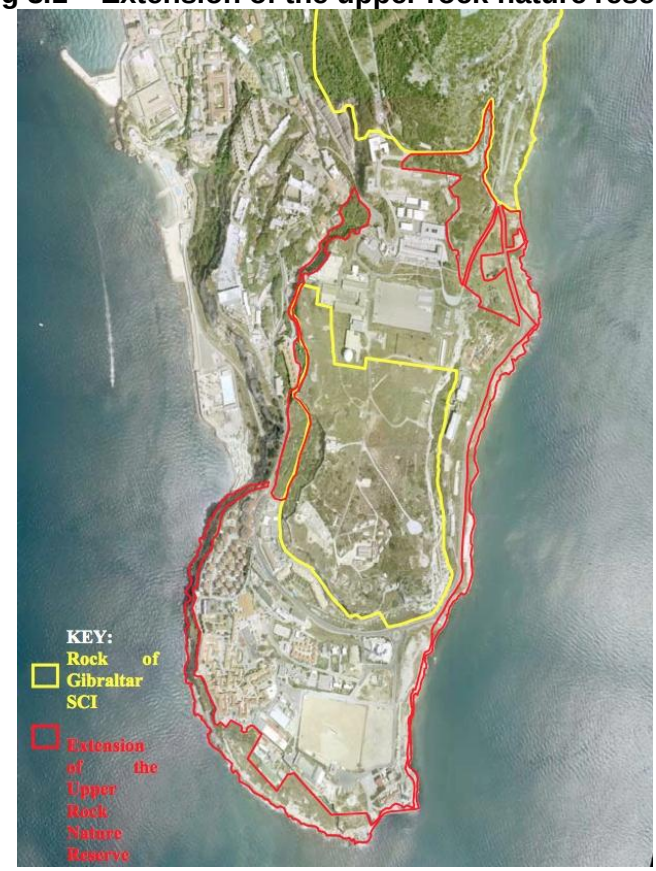
The EC Habitats Directive 92/43/EEC requires that Member States afford protection for certain species and habitats through the creation of European Sites (Sites of Community Importance (SCI) and Special Areas of Conservation (SAC).

Information contained in this chapter has been sourced from the Report on the Conservation of Terrestrial Flora & Fauna in Gibraltar 2011, Wildlife (Gibraltar) Ltd, as well as the Southern Waters of Gibraltar Management Scheme.

3.1.1 Upper Rock Nature Reserve

The nature conservation area was extended on the 24th November 2011 under the Nature Conservation Area (Extension of the Upper Rock) Designation Order 2011 to include the Europa Foreshore, cliff habitat extending from Little Bay to Governor's Beach, Jacobs Ladder, Hole in the wall and vegetated areas along the cliff to the east of the Naval Hospital. The area was extended to include the main large stands of the Gibraltar Candytuft "I*beris Gibraltarica"* and the Gibraltar Sea Lavender "*Limonium Emarginatum"*, both species protected under the Nature Conservation Act (1991).

Fig 3.1 – Extension of the upper rock nature reserve



3.1.2 Birds

3.1.2 (a) Nesting Birds of Prey Survey

The Gibraltar Ornithological and Natural History Society (GONHS) conducts surveys of birds of prey during the breeding season. The GONHS Bird of Prey Unit now surveys four species annually. These are the Peregrine *Falco peregrinus*, Common Kestrel *Falco Tinnunculus*, Lesser Kestrel *Falco Naumanni* and Little Owl *Athene Noctua*. The Tawny Owl *Strix Aluco* and Eagle Owl *Bubo Bubo* are also present in Gibraltar and sightings of these species are recorded. The Peregrine, Lesser Kestrel and Eagle Owl are included in Annex I of the Birds Directive. Most of the nesting sites of these species lie within the boundaries of the terrestrial SCI.

3.1.2 (b) Lesser Kestrel

Lesser Kestrels raised 31 young to fledging, but only 13 nests produced young, the smallest number since 2004. Several nests have been taken over by Feral Pigeons. Another concern is that a number of young were found dead at the base of the nesting cliffs, having been predated on by cats.

3.1.2 (c) Common Kestrel

Common Kestrels raised a minimum of 30 young from a minimum of 9 occupied nests, two fewer than last year.

Table 3.1 Pairs of Lesser Kestrel & Common Kestrel in Gibraltar

YEAR	LESSER KESTREL	COMMON KESTREL
2001	9	8
2002	9	9
2003	7	10
2004	9	10
2005	14	10
2006	15	10
2007	19	11
2008	21	11
2009	15	10
2010	16	11
2011	18	9

3.1.2 (d) Peregrine

The Peregrines raised more young (14) than last year (7), although numbers are still down on recent maxima of 20 (2009) and 23 (2006). Disturbance is possibly a contributing factor

to this decline. These 14 young were raised by six pairs, with one pair now absent. This pair occupied an eyrie in the area of Mediterranean Steps and was absent for the first time since the annual surveys began in 1974.

Table 3.2. Breeding success of Peregrines in Gibraltar.

YEAR	NORTH FACE	CATALAN BAY	BOTH WORLDS	OIL TANKS	MED STEPS	CAMP BAY	MOSQUE	TOTAL
2000	5	3	3	3	2			16
2001	4	2	2	2	3	0		13
2002	5	0	0	2	6	0		13
2003	4	0	0	3	5	0		12
2004	2	0	0	3	4	4		13
2005	2	0	0	2	2	3	0	9
2006	2	2	3	3	4	4	5	23
2007	3	0	3	2	0	1	3	12
2008	3	3	3	4	0	1	3	17
2009	2	2	4	3	3	4	2	20
2010	0	0	3	2	0	2	0	7
2011	2	3	3	0		3	3	14

3.1.2 (e) Little Owl

The Little Owl is Gibraltar's most common nocturnal bird of prey, but its nocturnal habits render the monitoring of population size difficult. Vocalisation enables the location of most pairs in the territory and the species was included in the surveys for the first time in 2010. Breeding success is impossible to gauge accurately, although young were recorded at three sites. Eight nest sites were identified, as in 2010. The pairs of Little Owls nesting at Catalan Bay and the cliffs behind Laguna Estate reared three young each. The pair at the Mosque at Europa Point bred successfully, as a recently fledged bird was found dead on the roadway, but others were unaccounted for.

3.1.2 (f) Tawny Owl

Tawny Owls were present at the Mount and were recorded as far as the Observatory at Jews' Gate where they were seen in February, April, September and three times in late October and November. Another was seen on 28th September calling from the top of the flagpole on the Moorish Castle. Nest boxes for these owls were provided in 2010 at the Botanic Gardens but none of the nest boxes were occupied and no birds were recorded in 2011.

3.1.2 (g) Eagle Owl

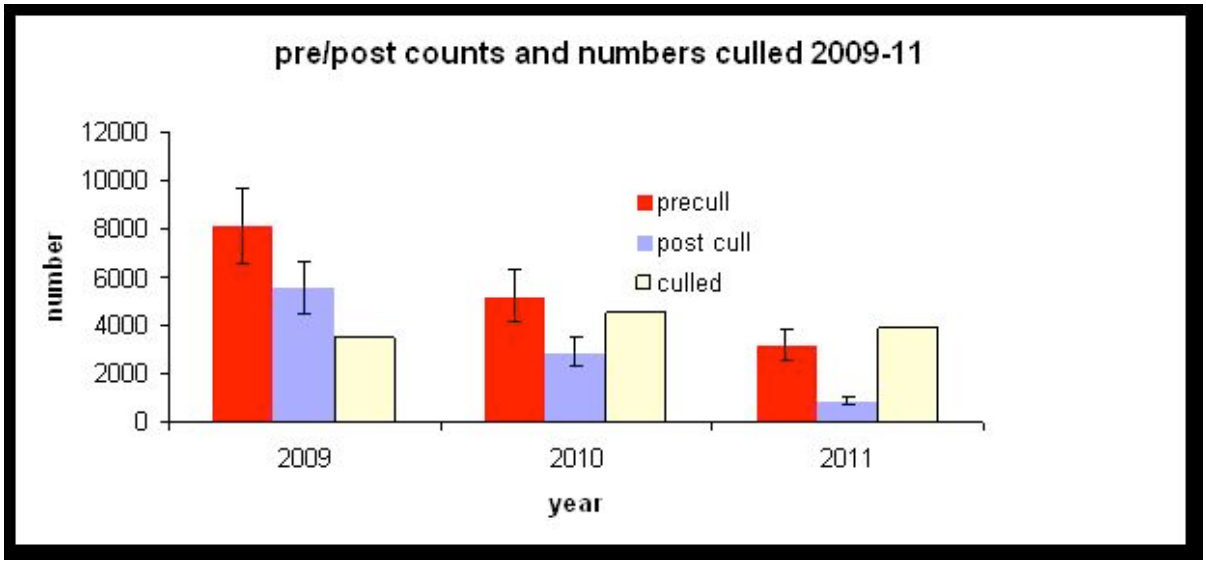
Eagle Owl nests were not located, but there was some evidence of the presence of the species at its usual sites, although there were no observations of the species in 2011. The Eagle Owl is a very secretive species, however, and this does not mean that it was not present at its usual localities on the Rock in 2011.

3.1.2 (h) Yellow legged gulls.

The main nesting sites for the yellow-legged Gull population in Gibraltar are the Upper Rock Nature Reserve and the Eastern Slopes. Guillem (2009, 2010) reported a significant decrease of the breeding Yellow-legged Gull population throughout Gibraltar from 2002-2010, including a significant decrease between 2009 and 2010.

This was confirmed by the Food and Environment Research Agency (FERA), which carried out pre- and post-cull counts on the eastern slopes that reflect this trend (see Figure 3.2).

Figure 3.2. Pre and post gull estimates on the eastern slopes. Courtesy FERA



The GONHS Gull Control Unit culled the species on a weekly basis except for the months of July, August and most of September when few gulls were present on the Rock. The total number of gulls eliminated during the year 2011 is 7277 fully fledged gulls, and 277 chicks. FERA also destroyed a total of 1645 eggs.

3.1.2 (i) Barbary Partridges.

GOHNS records show that the number of Barbary Partridges remains at a low in 2011.

Table 3.3 Barbary Partridges Bird Count.

Location	Bird Count
Windmill Hill Flats	10
Talus Slopes	5
Great Sand Slopes	6
Engineer Road Water Catchment	4
O'Haras Battery	1
Apes Den	1
Jews' Cementry	1
Middle Hill	1

Threats to this particular species include loss of open habitats, predation by Gulls and/or cats and the possibility of infection with avian pathogens by feral chickens (Perez 2006).

3.1.2 (d) Pigeons

The Pigeon population is reported to have increased, a survey carried out on behalf of Wildlife Gibraltar Ltd in 2011 recorded a minimum number of 834 birds.

3.1.3 Mammals

3.1.3 (a) Barbary Macaques

Five groups of macaques plus four subgroups continue to roam the terrestrial SCI (Table 3.4). The population at the beginning of 2011 was 191 +/- 5. The small error margin reflects a number of individuals that have not been observed when counts have taken place but were seen previously in each group.

Table 3.4 Barbary Macaques groups & subgrous.

GROUP	TOTAL	SUBGROUPS
Middle Hill	49	Middle Hill Rock Gun Catalan Bay/ Sandy Bay
Prince Philip's Arch	61	Prince Philip's Arch Cable Car Station
Anglian Way	29	Anglian Way/ St Michael's Cave Europa Advance
Apes Den	36	None
Farringdon's Area	11	None

The numbers remain stable with 186 during the last count. Breeding success resulted in 31 births and 18 deaths (Table 3.5).

Table 3.5 Barbary Macaques Births & Deaths

LOCATION	BIRTHS	DEATHS
Middle Hill	10	6
Prince Philips Arch	10	4
Anglian Way	5	4
Apes Den	5	4
Farrington's Area	1	0

3.1.3 (b) Bats.

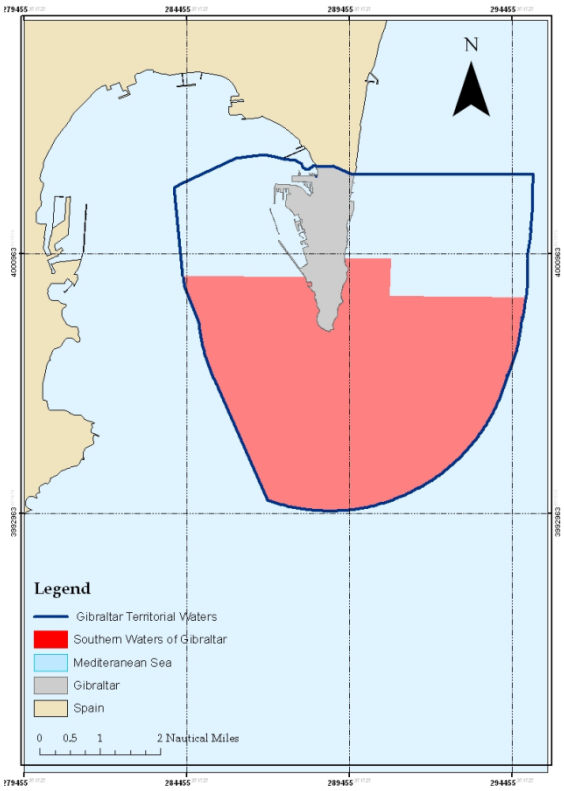
Monitoring took place up to and including September 2010, and this provided a two-year picture of the population of Schreiber's Bats Miniopterus schreibersi at the tunnel below O'Hara's Battery. No other sites harbouring Schreiber's Bats have been reported and this remains the only roost for the species.

3.2 Southern Waters of Gibraltar

In July 2006 the European Commission through decision 2006/613/EC accepted the UK's proposal, made at the request of the Government of Gibraltar, to list and adopt the Southern Waters of Gibraltar as a Site of Community Importance (SCI). The Government of Gibraltar, in accordance with the requirements of section 17C(1) of the Nature Protection Act 1991 and Article 4(4) of the European Commission's Habitats Directive 92/43/EC, has now designated the Southern Waters of Gibraltar SCI as a marine special area of conservation (SAC). A protection regime has been in existence since 1991 through the Nature Protection Act (1991) which is now supplemented by the Southern Waters of Gibraltar Management Scheme.

The marine SAC (Fig3.3), which extends three miles to the East and South of Gibraltar and stretches to the median line to the West of Gibraltar, has long been recognised as an important marine area due to its rich diversity in habitats and species. Sea cliffs and caves, reefs and sandy marine habitats all form part of the vast marine ecosystem found along the southern shores of Gibraltar. The abundance and richness of species found in this area is largely influenced by the strong currents and upwellings that are so characteristic of the Straits of Gibraltar.

Fig 3.3 – Southern Waters of Gibraltar



3.3 Southern Waters of Gibraltar Management Scheme

This Management Scheme was drawn up to enable the relevant authorities to carry out their responsibilities and functions in line with the requirements of the Nature Protection Act 1991 and with the regard to the nature conservation features for which the Southern Waters of Gibraltar European Marine Site has been designated.

The Management Scheme is concerned with promoting the sustainable use of a living, working environment. It does not aim to stop people using the Southern Waters of Gibraltar or prevent leisure activities or commercial development in the area. Instead it brings together all existing management measures in place and provides the mechanism by which these can be delivered so that they do not damage the habitats or species for which the site has been designated.

The management scheme will not be a static management plan, but an ongoing process that aids decision making and continually evolves to take account of changing issues and legal obligations. It sets out a regime to monitor the condition of the site's features and considers options to rectify any deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated.

Chapter: 4

Waste Management

Photo Credit: Brian Gordon

4.1 Background

The waste management strategy for Gibraltar has traditionally focused on the most self-sufficient method of handling local waste streams, namely energy from waste. This is governed by a certain extent by EU policy legislation. EU policy on waste is focusing on a shift from landfill to recycling. In August 2011 the Gibraltar Waste Management Plan was revised, fulfilling requirements of the EC Waste Framework Directive, the Hazardous Waste Directive and the Waste Oils Directive.

The purpose of the Waste Management Plan is to provide a framework to inform the decision making process, facilitating the efficient and sustainable waste management of all waste streams arising in Gibraltar. Information on the different waste streams and treatment options including forecasts of waste streams in the future also forms part of the Plan.

This chapter provides statistical information on Gibraltar's waste arising as well as details of waste management policies currently in place, including details on the increased recycling facilities and the introduction of waste electrical and electronic equipment legislation (WEEE).

4.2 Industrial Waste

Due to the absence of heavy industry in Gibraltar, the main sources of industrial waste are shipping, the Ministry of Defence (MOD), light industry and clinical/medical practices. A limited amount of hazardous material is also produced from municipal sources and via construction and demolition activities.

Industrial waste materials are stored locally under strict licence conditions until sufficient quantities have been gathered to warrant its transfrontier shipment. It predominantly consists of waste oils, asbestos and asbestos containing products. A detailed breakdown of locally produced hazardous wastes is given in Table 4.1

Table 4.1 Breakdown of Industrial Waste Arisings 2011.

EWC CODE	DESCRIPTION	TOTAL FOR 2011	UNITS
20 01 35*	discarded electrical and electronic equipment other than those mentioned in 20 01 21 and 20 01 23 containing hazardous components (21)	0.75	TON
20 01 21*	fluorescent tubes and other mercury-containing waste	0.26	TON
16 01 07*	oil filters	0.62	TON
15 02 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	2.62	TON
17 06 05*	construction materials containing asbestos (18)	0.82	TON
19 01 11*	bottom ash and slag containing dangerous substances	1.68	TON
12 01 16*	waste blasting material containing dangerous substances	679.42	TON
17 09 03*	other construction and demolition wastes (including mixed wastes) containing dangerous substances	324.72	TON
06 01 06*	other acids	5.362	TON
16 05 06*	laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals	0.306	TON
16 06 01*	lead batteries	0	TON
13 02 05*	mineral-based non-chlorinated engine, gear and lubricating oils	0.7	TON
11 01 07*	pickling bases	0.882	TON
09 01 02*	water-based offset plate developer solutions	3.663	TON
08 01 11*	waste paint and varnish containing organic solvents or other dangerous substances	15.438	TON
16 06 01*	lead batteries	0	TON
16 07 08*	wastes containing oil	0	TON
13 02 05*	mineral-based non-chlorinated engine, gear and lubricating oils	0	TON
08 01 13*	sludge's from paint or varnish containing organic solvents or other dangerous substances	25.63	M^3
17 05 03*	soil and stones containing dangerous	30	TON

	substances		
15 02 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	23	TON
17 05 03*	soil and stones containing dangerous substances	20.22	TON
18 01 03*	wastes whose collection and disposal is subject to special requirements in order to prevent infection	58.32	M^3
07 02 13	waste plastic	2.46	TON
08 03 17*	waste printing toner containing dangerous substances	0.5	M^3
13 04 01*, 02*, 03*	bilge oils from inland navigation, bilge oils from jetty sewers, bilge oils from other navigation	2700	M^3
12 01 16*	waste blasting material containing dangerous substances	593.144	TON
17 06 05*	construction materials containing asbestos (18)	380.1	M^3
17 05 04	soil and stones other than those mentioned in 17 05 03	0	TON
17 09 04	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	2624.14	TON
14 06 03*	other solvents and solvent mixtures	2.807	TON
06 03 13*	solid salts and solutions containing heavy metals	0.314	TON
16 05 04*	gases in pressure containers (including halons) containing dangerous substances	0.069	TON
20 01 35*	discarded electrical and electronic equipment other than those mentioned in 20 01 21 and 20 01 23 containing hazardous components (21)	6.64	TON
20 01 21*	fluorescent tubes and other mercury-containing waste	2.11	TON
16 01 07*	oil filters	3.378	TON
15 02 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	7.409	TON
16 07 08*	wastes containing oil	13.708	TON
19 08 11*	sludges containing dangerous substances from biological treatment of industrial	2.932	TON

	waste water		
16 02 11*	discarded equipment containing chlorofluorocarbons, HCFC, HFC	40.42	TON
16 02 13*	discarded equipment containing hazardous components (16) other than those mentioned in 16 02 09 to 16 02 12	163.64	TON
16 06 01*	lead batteries	44.69	TON
13 07 03*	other fuels (including mixtures)	5090.47	TON
13 04 01*, 02*, 03*	bilge oils from inland navigation, bilge oils from jetty sewers, bilge oils from other navigation	1653.462	TON
16 07 08*	wastes containing oil	3439.265	TON
19 01 13*	fly ash containing dangerous substances	15	TON
19 01 11*	bottom ash and slag containing dangerous substances	19.32	TON
16 01 07*	oil filters	2.96	TON
17 06 05*	construction materials containing asbestos (18)	90.94	TON
17 03 03*	coal tar and tarred products	22.36	TON
15 02 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	84.84	TON
13 05 02*	sludges from oil/water separators	19.802	TON
13 07 03*	other fuels (including mixtures)	1.04	M^3
20 03 01, 03, 09	mixed municipal waste, street-cleaning residues, municipal wastes not otherwise specified	30416.36	TON
17 09 03*	other construction and demolition wastes (including mixed wastes) containing dangerous substances	19.92	TON
16 06 01*	lead batteries	33.345	TON
18 01 03*	wastes whose collection and disposal is subject to special requirements in order to prevent infection	3.888	M^3
12 01 16*	waste blasting material containing dangerous substances	2283.14	M^3
08 01 11*	waste paint and varnish containing organic solvents or other dangerous substances	173.58	M^3
16 07 08*	wastes containing oil	2717.57	M^3

4.3 Municipal Waste

Municipal waste in Gibraltar is collected by Gibraltar Industrial Cleaners (GIC), a wholly owned Government company, and Master Service (Gib) Ltd, a private company.

In 2011, the total amount of municipal waste collected and sent to Spain for disposal was 30646.18 tonnes. This includes mattresses and bulky household items as illustrated in Table 4.2. Removing these items from the total volumes leaves 17691.06 tonnes of refuse, equating to 595 kg per person per year. Household waste generation saw a sharp increase from 2008 - 2009. There has been a reduction in levels since then, with an increase in household bulky items.

Table 4.2 Municipal waste in Gibraltar in 2011.

2011	HOUSEHOLD REFUSE	BULKY ITEMS	MATTRESSES
	WEIGHT/TONNES	WEIGHT/TONNES	WEIGHT/TONNES
JANUARY 2011	1,556.84	861.48	2.36
FEBURARY 2011	1,441.66	961.96	-
MARCH 2011	1,566.86	1,349.20	2.4
APRIL 2011	1,213.32	845.58	0.8
MAY 2011	1,556.32	1,043.20	1.98
JUNE 2011	1,538.78	1,119.96	0.46
JULY 2011	1,357.76	1,096.80	-
AUGUST 2011	1,447.26	1,393.92	-
SEPTEMBER 2011	1,502.04	1,173.56	1.26
OCTOBER 2011	1,533.82	1,206.80	0.8
NOVEMBER 2011	1553.68	1440.18	5.2
DECEMBER 2011	1422.72	743.8	3.42
YEARLY TOTAL	**17691.06**	**12936.44**	**18.68**

Fig 4.1 Refuse totals comparisons 1994-2011.

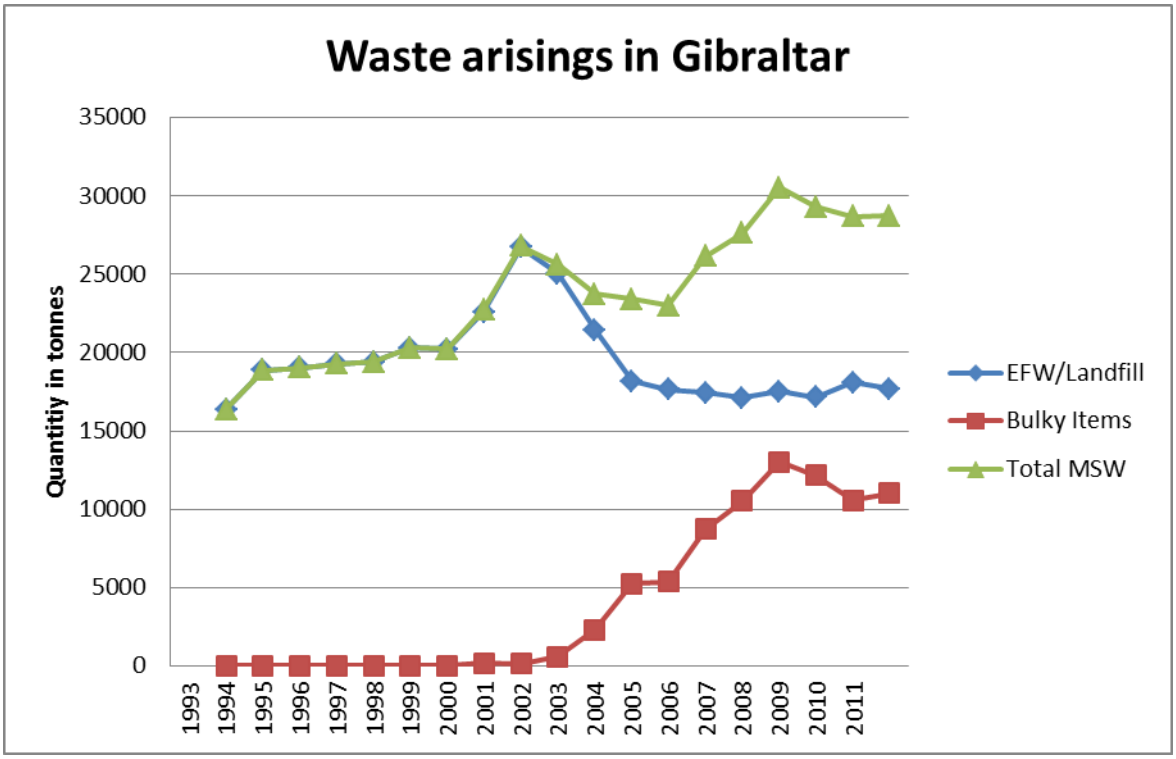
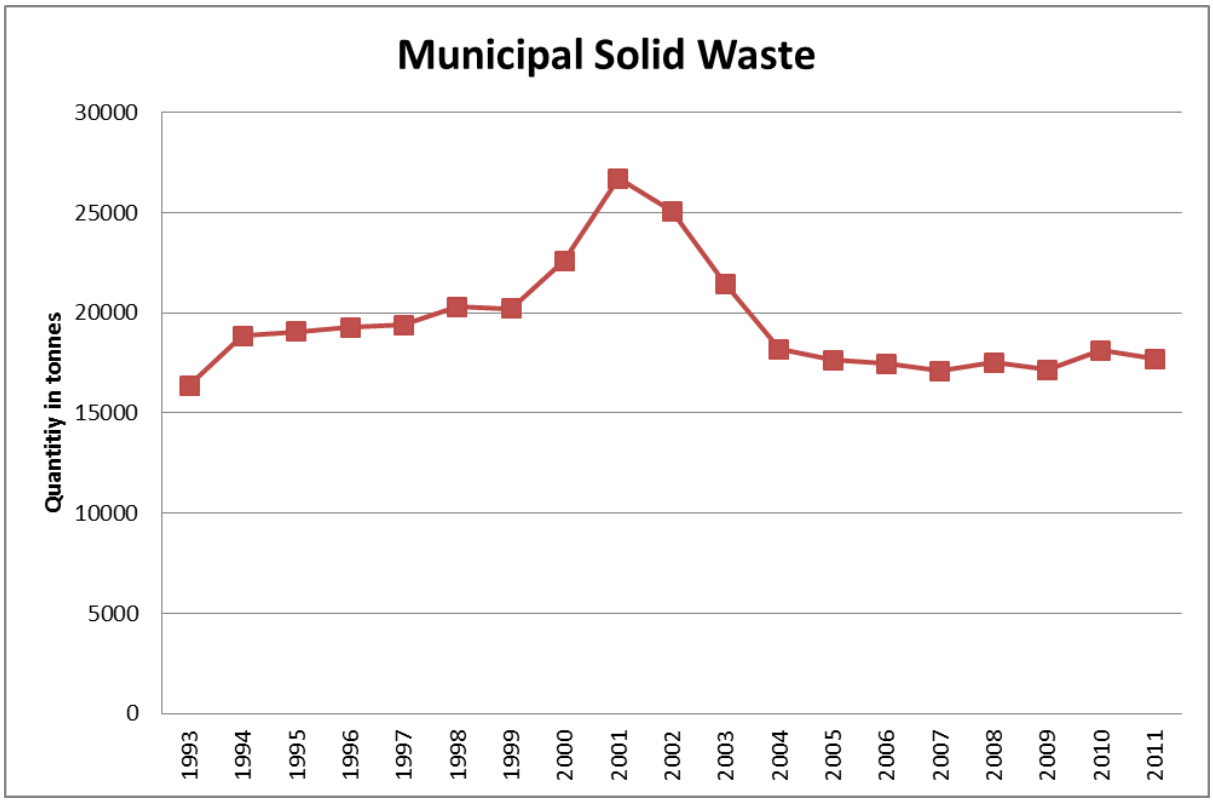


Figure 4.2 Municipal Solid Waste in Gibraltar 1993 - 2011



One of the targets set in the EU 5th Environment Action Programme (EAP) was to reduce the generation of municipal waste, per capita, per year, to the average 1985 EU level of 300 kg by the year 2000, and then stabilise it at that level. Data received from EU countries shows that the target was far from ever being reached. The average amount of municipal waste generated per capita per year in many western European countries still exceeds 550kg. Furthermore, there are notable differences among countries both in the amount and the development of waste generation. The annual generation per capita varies from 306 kg in Czech Republic to 453 kg in Greece and up to 802 kg in Denmark.

4.4 Recycling

4.4.1 Glass & Cans

Recycling rates for glass increased slightly from 2010 but the figures for recycling of cans show a decrease in the amounts recorded. The figures are as follows:

Table 4.3 Recycling figures for glass and cans.

	2009	2010	2011
% of cans recycled	1.60%	2.80%	1.73%
% of glass recycled	10.22%	12.10%	12.70%

These figures are extremely low compared with the target figures of 50% by 2020. Without a serious commitment from the local community, it will be difficult for Gibraltar to meet its targets. Separation of waste and subsequent recycling helps to save energy and natural resources as well as reducing our global carbon footprint.

Gibraltar's recycling bin locations in 2011 were:

Table 4.4 Recycling points in Gibraltar

Recycling points	Type of bins available
North District	
Gibraltar Airport Service Area	Glass/Cans
Glacis Estate - Archbishop Amigo House north	Glass/Cans/Household Batteries
Glacis Estate - Constitution House north	Glass/Cans
Bayside Rd - teachers' car park entrance	Glass/Cans/Household Batteries
Ocean	Glass/Cans

Village	
Mons Calpe Road - Coach Park Entrance	Glass/Cans/Household Batteries
North East District	
Laguna Estate - by refuse cubicle Ballymena House	Glass/Cans
Laguna Estate/Devil's Tower Rd - by refuse cubicle Ark Royal Hse	Glass/Cans/Household Batteries
Cemetery Road - by roundabout	Glass/Cans
East District	
Eastern Beach Road - 2 locations	Glass/Cans
Sir Herbert Miles Road - bus stop by William's Way Refuse Cubicle	Glass/Cans/Household Batteries
Sir Herbert Miles Road - Black Strap Cove layby	Glass/Cans/Household Batteries
South District	
Little Bay - promenade entrance	Glass/Cans
Camp Bay promenade	Glass/Cans
Rosia Road - by Rosia Battery	Glass/Cans
Rosia Road - by bus stop RGP HQ New Mole House	Glass/Cans/Household Batteries
Cumberland Road - by refuse enclosure (North)	Glass/Cans
Naval Hospital Road within refuse enclosure south	Glass/Cans
Europa Road - by bus stop Garrison Gym	Glass/Cans
Europa Road - behind bus stop ex-Casino lift	Glass/Cans/Household Batteries
Europa Road - lookout at top of path leading to Heathfield House, Witham's Road	Glass/Cans
Schomberg Estate entrance – South Barrack Road	
South West District	
Witham's Road - between Jumper's Building and St John's	Glass/Cans

Court	
Red Sands Road - by Governor's Meadow House	Glass/Cans
Red Sands Road - Grand Parade entrance	Glass/Cans
Rosia Road - footpath by Saluting Battery Promenade (north)	Glass/Cans/Household Batteries
West	
Queensway - Commonwealth Car Park	Glass/Cans
Reclamation Road - Leisure Centre	Glass/Cans
North West	
Edinburgh Estate - 2 locations (north and south)	Glass/Cans
Queensway - Westside School entrance	Glass/Cans
Varyl Begg Estate - St Paul's School entrance	Glass/Cans
Varyl Begg Estate - car park by Royal Sovereign House	Glass/Cans
Harbour Views Estate	Glass/Cans/Household Batteries
Bishop Caruana Road - beside rowing clubs	Glass/Cans/Household Batteries
Fish Market Road - by refuse cubicle	Glass/Cans/Household Batteries
Opposite St Bernard's Hospital entrance	Glass/Cans/Household Batteries
Harbour Views Road - parking by Bishop Fitzgerald School	Glass/Cans/Household Batteries
Devil's Tongue/Waterport Road junction footpath	Glass/Cans/Household Batteries
Within City Walls	
Grand Casemates - Service Area	Glass/Cans
Cloister Ramp	Glass/Cans/Household Batteries
Line Wall Road – opposite Irish	Glass/Household

Place	Batteries
Ince's Hall Entrance	Glass/Cans
Gibraltar Motorcycle Club Entrance – Brian Navarro Way	Glass

*Please note that the above include those that will be returned to bathing locations during the summer season & to current construction sites. The total number of locations for glass is 46, cans 44, & household batteries 17.

4.4.2 Waste Electrical & Electronic Equipment (WEEE)

The WEEE Directive was transposed into local law through the Environment (Waste) Regulations 2007 (WEEE Regulations). This legislation looks to minimise the environmental impacts of electrical and electronic equipment (EEE) when it reaches the end of its useful life. Systems need to be set up to facilitate and encourage the separate collection, subsequent treatment, re-use, recycling and ultimately environmentally sound disposal of WEEE.

These regulations have significant implications for importers, producers, retailers and end-users of EEE as well as those who treat or recover WEEE.

Importers of EEE need to declare how much EEE they are importing into Gibraltar. The relevant forms can be downloaded from the Department of the Environment website. Retailers and users of EEE need to ensure that items are disposed of correctly by being taken to the temporary WEEE park at the Europa Advance Road facility. Electrical and electronic equipment cannot be disposed of with household waste. When supplying a new product, retailers must offer a free take back in store to enable purchasers to return their WEEE when making a like for like purchase.

Detailed guidance on the WEEE regulations and their implications for you can be downloaded from the Department of the Environment website www.gibraltar.gov.gi/environment/environment.

Table 4.5 Quantities of WEE imported, collected, treated and recovered in 2011

	Imported		Collected	Sent for treatment	Recovery
Categories	*Quantity*	*Weight (tonnes)*	*Quantity*	*Weight (tonnes)*	*%*
Large Household appliances	1072	39.40	3839	29.51	74
Small Household appliances	518	30.57	103	0	0
IT and Telecommunications Equipment	41640	68.70	2356	3.88	5.6
Consumer Equipment	5703	11.40	755	4.44	38
Lighting Equipment	6580	55.30	400	0	0
Gas discharge lamps	0	0	0	0	0

Electrical and Electronic tools	373	72.19	0	0	0
Toys, Leisure and Sports Equipment	546	22.54	0	0	0
Medical Devices	21	32.00	0	0	0
Monitoring and Control Equipment	2961	43.79	0	0	0
Automatic Dispensers	383	14.19	10.30	0	0

Locally produced WEEE is collected and taken to an authorised facility in Spain.

4.4.3 Batteries

In 2010, measures were introduced to establish a scheme aiming at a high level of collection and recycling of batteries with quantified collection and recycling targets.

Table 4.6 Battery recycling figures

2011	Quantity (kilos)
Imported	1777
Collected	1070
Recovery %	60.21

This scheme includes the collection of data regarding all local battery imports. Battery recycling bins were placed throughout Gibraltar and their locations are listed in Table 3.3.

4.4.4 Other waste materials

The recycling of other waste materials continues. Recyclable material from our municipal waste is manually and automatically separated and processed at the Complejo Medioambiental Sur De Europa in Los Barrios (non-recyclable waste then goes into landfill). In addition to this, wood and metal items are sorted at the previous incinerator site at Michael Dobinson Way. A separate Civic Amenities Site is operated by Gibraltar General Support Services Ltd, located at Europa Advance Road. At this site, the public can also dispose of their bulky timber items, paint, white goods and other electrical items, mattresses, building debris and metal scrap.

4.5 Clinical Waste

The Clinical Waste Incinerator is located at Governor's Cottage, Europa Advance Road. This facility provides the collection, transport and incineration services to all local clinical and

medical waste producers (hospitals, laboratories, surgeries, medical, dental and veterinary clinics). In 2011 2,782,385 sixty litre containers of clinical waste were incinerated.

Table 4.7 monthly clinical waste collection

MONTH	TOTAL
JAN	227160
FEB	222000
MAR	241740
APR	225900
MAY	232980
JUN	223815
JULY	223380
AUG	246180
SEPT	230140
OCT	238860
NOV	236050
DEC	234180
TOTAL FOR 2011	2,782,385

Chapter 5:

Energy

5.1 Background

Gibraltar continues to strive to improve its energy efficiency throughout all sectors, as the most effective way to cut down our carbon footprint. Efforts are concentrated on the building sector as well as on plans to introduce renewable energy.

5.2 Energy Performance of Buildings

The Energy Performance of Buildings (EPBD) legislation and programme continues to work well with 68 additional properties certified in 2011, taking the total up to 337.

It is a legal requirement to obtain an Energy Performance Certificate for a building with fixed heating, cooling or mechanical ventilation, upon construction and prior to sale or rental. Failure to do so constitutes an offence and carries a fixed penalty fine.

The EPBD has been recast and will be transposed into local legislation during 2012. This will extend the scope of buildings that need to comply by removing certain thresholds and will also introduce the concept of nearly zero energy buildings.

5.3 Renewable Energy

The EU Directive on the Promotion of Use of Energy from Renewable Sources (2009/28/EC) establishes a common framework for the promotion of energy from renewable sources and sets mandatory targets for the overall share of the renewable energy sources in energy production and transport sectors. The effort to achieve the goal of 20% of energy from renewables by 2020 is divided among Member States. The UK's established target is 15% by 2020. The Government of Gibraltar has therefore revised its previous target of 10% of renewable energy by 2012 to reflect these new commitments. Our renewable energy targets are now for an overall share of 15% of our energy from renewables by 2020.

5.4 Import Duty Measures

Import duty is no longer payable on renewable energy products and it is envisaged that further environmentally friendly products will be exempted from import duty during 2012.

Chapter 6:

Environmental Health

6.1 Environmental Health

The Environmental Agency (EA) has an essential role in maintaining and improving the well-being of the community. Many of the services it provides seek to secure healthier and safer places for people to live and work. The Agency is contracted by the Government of Gibraltar and is responsible for the enforcement of Environmental and Public Health legislation. It is headed by the Chief Environmental Health Officer who together with Environmental Health Officers, Assistant Environmental Health Officers, Pest Control Operatives and administrative staff ensure that the Agency's responsibilities are met.

The Environmental Agency dealt with 580 nuisance complaints and 228 pest complaints from the public in 2011. Table 5.1 summarises the nature of these complaints.

Table 5.1 – Summary of complaints received by the EA in 2011.

Nature of Complaint	No of Complaints	Nature of Complaint	No of Complaints	Nature of Complaint	No of Complaints
Accumulations	89	Eavesgutters	1	Rodents	84
Air conditioning	9	Feral cats	11	Seagulls	3
Ants	19	Filthy premises	18	Sewage	72
Bees	5	Fitness	0	Smells	120
Bins	7	Fleas	17	Smoke/grit/dust	13
Chicken coops	4	Flies	4	Termites	3
Cockroaches	118	Fumes	9	Toilets	6
Dampness	54	Hoarding	0	Trees	10
Dangerous premises	20	Litter	9	Water	49
Defective premises	26	Mosquitoes	13	Other animals	1
Dog fouling	21	Pigeons	19	Other food	37
Drainage	67	Refuse cubicles	6	Other nuisance	37
Electric hazard	2			Other pests	24

Table 5.1 highlights the variety of complaints received (1,007 in total). One hundred and sixty five abatement notices were served under the provisions of the Public Health Act 1950.

Efficient and effective compliance with legislation is enforced by the Environmental Agency responding with appropriate levels of action to individual cases. Thirty four cases were referred for legal proceedings.

The Environmental Agency is responsible for numerous environmental health protection issues including:-

- The provision of housing reports for the Ministry for Housing and the inspection of housing in connection with disrepair in privately rented accommodation.
- The prevention and control of rats, mice and other pests of public health significance with the use of the latest environmentally friendly pesticides and techniques. If poison baits are used, tamper proof containers designed to prevent access of non-target species are used.
- The investigation and action on filthy and verminous premises.
- Control of pollution from both domestic and business premises, including smells.
- Investigation and action on drainage problems.
- The control and licensing of premises that are engaged in tattooing, skin-piercing or electrolysis.
- The control of feral pigeons.
- The licensing of pet shops.
- The inspection of hairdressers and nurseries.
- The investigation and tracing of contacts in connection with notifiable infectious diseases.
- The disinfection of premises after a notification of a notifiable infectious disease.
- The implementation of the Environment (Control of Dust) Regulations 2010. Since its implementation the Environmental Agency has issued a total of 131 Certificates of Approval, 80 of which were issued during 2011. A total of 8 Abatement Notices regarding dust control were served.

6.2 Food Hygiene

6.2.1 What is food hygiene?

Food hygiene is the practical process that ensures that the food you make, serve or sell is safe to eat.

6.2.2 What is food safety?

Food safety is the absence of any risk of harm arising from the consumption of food. Food safety describes the practice of managing food in such a way that the food is unlikely to cause any harmful effects to consumers.

6.2.3 What is food poisoning?

Contamination is the term that describes food in which something harmful or objectionable is present. If you consume contaminated food, there is a strong likelihood that you will suffer from food poisoning. Food may be contaminated with physical objects, chemicals or harmful bacteria. Bacteria from the salmonella and campylobacter groups cause the most common type of food poisoning in Gibraltar.

As part of their everyday duties, Environmental Health Officers investigate food poisoning cases once they are reported to the Environmental Agency. The Environmental Health Officer conducts a thorough investigation to trace the source of infection. This normally entails visiting households, interviewing affected persons and offering precautionary advice to prevent the spread of further infection. Any food establishment associated with an outbreak is inspected immediately and a thorough investigation is carried out into the handling, storage, preparation and cooking of any suspect food to identify any malpractice, which may have led to contamination. Food samples and health screening of food handlers may be carried out if deemed necessary.

6.2.4 Inspection of Food Premises

The Environmental Agency has a Food Team comprising of Environmental Health Officers and Assistant Environmental Health Officers that carry out programmed food hygiene inspection of the 471 food premises in Gibraltar. These premises consist of restaurants, supermarkets, delicatessens, bakeries, groceries and confectionery outlets, as well as one soda bottling plant. These Officers also advise the proprietors and employers of food premises on how to comply with the Food Hygiene Regulations 1977, and how to prevent food poisoning. The Environmental Agency works very closely with developers and

proprietors at the design stage of new food premises offering advice in their design and layout so that they comply with the law.

During 2011, 1551 inspections of food premises were carried out.

6.2.5 Registration of Food Premises

The Food and Drugs Act 1964 requires certain premises in which high risk foods are handled for sale to be registered by Government. Registration is granted subject to the premises complying with the Food Hygiene Regulations.

These premises are inspected in accordance with a risk rating allocated to each. The inspection programme is focussed on 'high risk' premises, for example, those that sell 'open food' (without wrapping). This is in line with the objective of risk-based, proportionate enforcement. The risk rating given (i.e. High, Medium or Low) requires officers to consider the following elements in each premises:

i. Potential Hazard
    a. The type of food and method of handling
    b. The processing of the food (if applicable)
    c. Consumer groups at risk
ii. Compliance
    a. With food hygiene and safety
    b. Structural and equipment requirements
iii. Confidence in management/control systems
iv. Significance of risk of contamination of food

During the inspection officers assess the structural condition of the premises, its cleanliness and will also question managers and staff about practices in food preparation. Observation within the business can identify poor food practices in relation to storage and potential cross contamination. The inspection will take into account the previous history of the business, the documented food safety management system that should be on site and being completed regularly, as well as what is observed. Additionally food safety training of key staff will be encouraged.

As a high proportion of Gibraltar's food businesses are small to medium the Agency has concentrated on giving advice and helping these businesses to put in place relevant food safety management systems.

The Agency also encourages food businesses to join a voluntary food hygiene rating scheme known locally as 'Grading at a Glance'. The scheme is based on six tiers with a zero rating being the lowest score. A broadly complaint business would be at the third tier within the proposed scheme.

Ratings are published on Environmental Agency's website and signs must also be displayed prominently at the entrance to the building.

Few businesses have joined the scheme so far (7) as it is not compulsory and there is a perception that joining the scheme will involve unnecessary cost. This is not the case as any outgoing in terms of implementing a written management system or training of the staff will serve to improve the premises hygiene rating and therefore ultimately its reputation which should mean an increase in business and profits.

The scheme will help consumers to make informed choices about where to eat or buy food and they will be able to easily compare one business with another.

The Agency also responds to complaints about food premises or food composition or quality standards.

If there is an imminent risk to public health at a food premise, an opportunity for it to close voluntarily will be made to the proprietor, failing which legal action will be taken. The number of these premises is low and over the last 2 years four premises have been temporarily closed. All of these premises are now broadly compliant. The Agencies consistent and proportionate approach to enforcement sends a clear message to businesses that poor hygiene standards will not be tolerated.

6.2.6 Food Sampling

Foods that are prone to give rise to bacterial food poisoning are those in which bacteria can multiply and live. These foods are those that have high protein contents such as cooked meals, meat and poultry products and meals prepared with meat and poultry. These foods, known as high-risk foods, are sampled frequently to ensure that they are free from food poisoning bacteria. Other foods are also sampled to ensure that they comply with compositional standards set down in food additives legislation.

A total of 186 samples were taken during 2011.

6.2.7 Food Alerts

The food team responds to food alerts from both the Food Standards Agency and the Rapid Alert System for Food and Feed of the European Community. These alerts advise Competent Authorities in different EU countries about problems associated with particular foods that have an impact on consumers. Depending on the nature of the alert, the food in question may be withdrawn from sale, surrendered to officers or in extreme cases seized under the provisions of the Food and Drugs Act.

6.2.8 Imported Food

The vast majority of food consumed locally is imported from countries worldwide through the land frontier with Spain. The Environmental Agency operates an inspection post at the commercial border and all food imported is subject to inspections as necessary. A small amount of food is imported by shipping and this is also inspected by Environmental Agency Health Officers. The inspection service is supplemented by a routine and random sampling programme.

6.2.9 Investigation of Food Complaints and Food Premises

The food team responds to complaints of unacceptable premises, poor practices of food handlers and the state of food. When a complaint is received concerning a food business, a visit is made as soon as possible and an investigation is undertaken.

6.2.10 Reported food poisoning cases

Table 5.2 shows the incidence of key laboratory confirmed food borne infections over the past 6 years. It is these cases that the Environmental Health Officers are required to follow up. These figures are, however, only a partial representation, as not all persons who have a diarrhoeal illness go to their GP and of those who do, not all will submit a specimen. This said, the incidence of all types of food poisoning is generally coming down.

Table 5.2 - Laboratory Confirmed Food borne infections (2006-2011).

Organism Isolated	2006	2007	2008	2009	2010	2011
Campylobacter Species	48	67	37	31	29	25
Salmonella species	22	14	26	18	12	11
Hepatitis A		4	2	4	3	0
Shigella species			1	2	0	0
Grand total	**70**	**85**	**66**	**55**	**44**	**36**

6.2.11 Food Hygiene Training

Environmental Health Officers of the Agency deliver Food Safety training for persons employed in the catering, food retail, healthcare and service industries.

Training courses are accredited by the Chartered Institute of Environmental Health (CIEH) and all our trainers are approved by the CIEH. Courses have been re-designed to be more relevant to specific business environments and are suitable for anyone working where food is prepared, handled or cooked.

The range of courses currently delivered is as follows:

CIEH Level 1 Award in Food Safety Awareness in Catering & Retail

CIEH Level 2 Award in Food Safety in Catering & Retail

CIEH Level 3 Award in Supervising Food Safety in Catering

During 2011/2012, one course was held at level 1 with a total of 8 candidates, six courses were held at Level 2 with 52 candidates and one course at level 3 with 5 candidates.

Chapter 7:

Noise

7.1 What is noise?

Noise can be defined as unwanted or harmful sound created by human activities and at times may affect our quality of life. Noise arising from vehicles, loud music, construction works etc. contributes to environmental noise.

7.2 Noise Complaints

Many of us may be affected at one time or another by neighbourhood noise. The noise could come from someone living near you playing loud music, construction activities in the street, or a business operating machinery.

7.2.1 How to complain about noise

- Approach whoever is responsible for the noise. You might find that the responsible party may not be aware that they are disturbing someone. The majority of noise complaints are solved amicably and informally.
- If the above does not resolve the issue, contact the Environmental Agency or the RGP both of which have powers to act against different sources of noise.

The Royal Gibraltar Police deals with noise arising from motor cycle, loud music from cars and licensed premises.

The Environmental Agency deals with noise problems arising from construction sites, air conditioning plant, generators etc. The Agency will also investigate problems with loud music coming from dwellings. It can also take action against the operators of licensed premises for causing a noise nuisance at any time of the day or night whilst Royal Gibraltar Police will invariably take action if the noise nuisance occurs after the licensed hours.

7.2.1 What actions can be taken

The two authorities have powers to deal with noise under their jurisdiction in different ways for example, the Royal Gibraltar Police have powers to report offenders and the Environmental Agency has powers to serve notices requiring any noise considered a nuisance, to be abated.

Table 7.1 Noise Complaints received by the Environmental Agency in 2011.

Source of Noise	No. of complaints
Establishments	9
Industrial	12
Shipping	0
Construction	14
Neighbours	15
Dogs	4
Misc	4
Alarms	1
Total	**59**

The Environmental Agency received a total of 59 noise complaints in 2011, a total of 3 Abatement Notices were served to deal with noise nuisances and on one occasion the institution of legal proceedings was necessary to abate the nuisance.

The total number of noise complaints received by the Royal Gibraltar Police in 2011 was 761. From this total, general noise complaints amounted to 333 calls and 428 were in relation to loud music. The total noise complaints received by both entities in 2011 were 825.

Chapter 8:

Public Awareness

8.1 Environmental Education

Environmental education explains how natural environments function and, in particular, how human beings can seek to manage their behaviour and ecosystems in order to live sustainably. It refers not only to education within the school system but to all efforts to educate the public including print materials, websites and media campaigns.

Environmental education is a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges and fosters attitudes, motivations and commitments to make informed decisions and take responsible action (UNESCO, Tbilisi Declaration, 1978).

It focuses on:

- Awareness and sensitivity to the environment and its challenges
- Knowledge and understanding of the environment and environmental problems
- Attitudes of concern for the environment and motivation to maintain or improve environmental quality
- Skills to identify and help resolve environmental concerns
- Participation in activities that lead to the resolution of environmental challenges

8.2 World Environment Day

World Environment Day (WED) is an annual event which aims to be the biggest and most widely celebrated global day for positive environmental action. WED activities take place all year round but culminate on 5th June every year, involving people from all over the world.

WED celebrations began in 1972 and have grown to become one of the main vehicles through which the UN stimulates worldwide awareness of the environment and encourages political attention and action. This was the 6th year that Gibraltar has participated.

Through WED, the UN Environment Programme is able to personalise environmental issues and enable everyone to realise not only their responsibility, but also their power to become agents for change in support of sustainable and equitable development. WED is also a day for people from all walks of life to come together to ensure a cleaner, greener and brighter outlook for themselves and future generations.

In 2011 WED celebrated the international year of forests. Local celebrations included the now traditional school presentations as well as a tree planting session at West View Promenade with representatives from each school.

8.3 Environmental Action Management Plan Awareness seminar

In January 2011, the Government launched its Environmental Action & Management Plan (EAMP). This document intended to serve as the road map for the implementation of the commitments previously established in the 2006 Environment Charter. The EAMP established general policy goals, identified specific action points, set out tentative timeframes and developed measures of success. It is currently under review.

The Department of the Environment held a seminar for all senior management staff of Government Departments, Authorities and Agencies. The aims of the plan were outlined and each organisation was tasked with producing their own internal environmental action & management plan, in line with the stated Government objectives.