AIR QUALITY
IN HONG KONG 2006

Air Science Group

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Environmental Protection Department

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The Government of the Hong Kong
Special Administrative Region

A report on the results from the Air Quality Monitoring Network (AQMN) (2006)

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Summary

This report summarises the 2006 air quality monitoring data collected by the Environmental Protection Department's monitoring network.

As a result of the enhanced vehicle emission control programme implemented by the Government since 2000, concentrations of respirable suspended particulates, nitrogen oxides and sulphur dioxide at roadside have been dropping gradually over the past few years.

Over the past years, concentrations of ozone have been on a slow rising trend, reflecting a deterioration in regional air quality. On this front, the Hong Kong Special Administrative Region Government and the Guangdong Provisional Government are implementing a Regional Air Quality Management Plan to improve air quality in the Pearl River Delta Region.

As in previous years, concentrations of sulphur dioxide, carbon monoxide and lead remained at levels well below their respective Air Quality Objectives limits in 2006.

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1. Introduction

The Environmental Protection Department (EPD) operates a network of 14 air quality monitoring stations for measuring concentrations of major air pollutants. It consists of 11 general stations for monitoring ambient air quality and 3 roadside stations for measuring street level air quality. Details of these monitoring stations are shown in Table B1 of Appendix B.

Additional monitoring facilities specifically designed for collecting Toxic Air Pollutants (TAPs) samples have been installed at the Tsuen Wan and Central/Western monitoring stations since 1997.

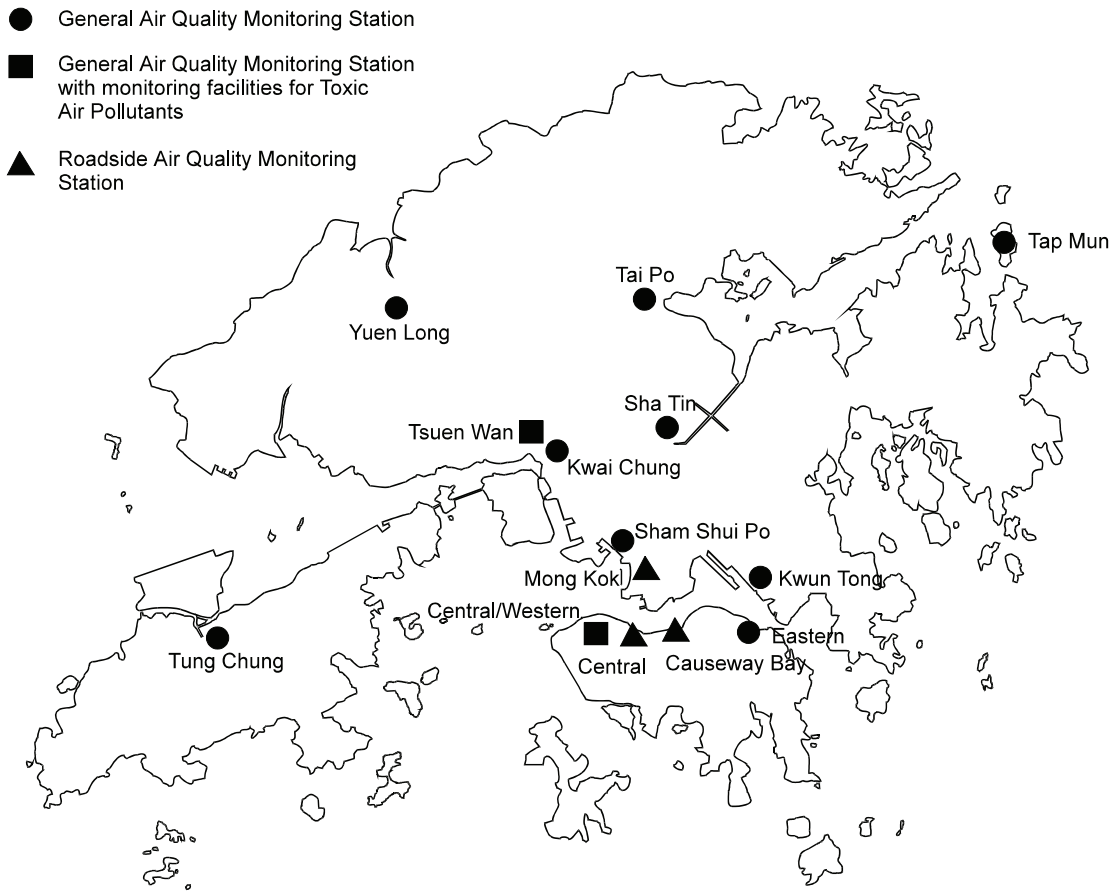


Figure 1: Location of EPD's Air Quality Monitoring Stations (2006)

Apart from EPD's network, the Hongkong Electric Co. Ltd. (HEC) and the CLP Power Hong Kong Limited (CLP) also operate a number of monitoring stations to assess the ambient levels of sulphur dioxide and nitrogen dioxide in the vicinity of their power generating stations. The locations of these monitoring stations and the relevant monitoring results in 2006 are at Appendix D.

2. Gaseous Pollutants

2.1 Sulphur Dioxide (SO_2)

Sulphur dioxide (SO_2) is formed primarily from combustion of sulphur-containing fossil fuels. In Hong Kong, power stations are the major sources of SO_2, followed by fuel combustion, marine vessels and vehicles.

Exposure to high levels of SO_2 may cause impairment of respiratory function and aggravate existing respiratory and cardiac illnesses. Prolonged exposure at lower levels may also increase the risk of developing chronic respiratory diseases.

Figure 2a: Sulphur Dioxide Monitoring 2006
(1-Hour Average Statistics)

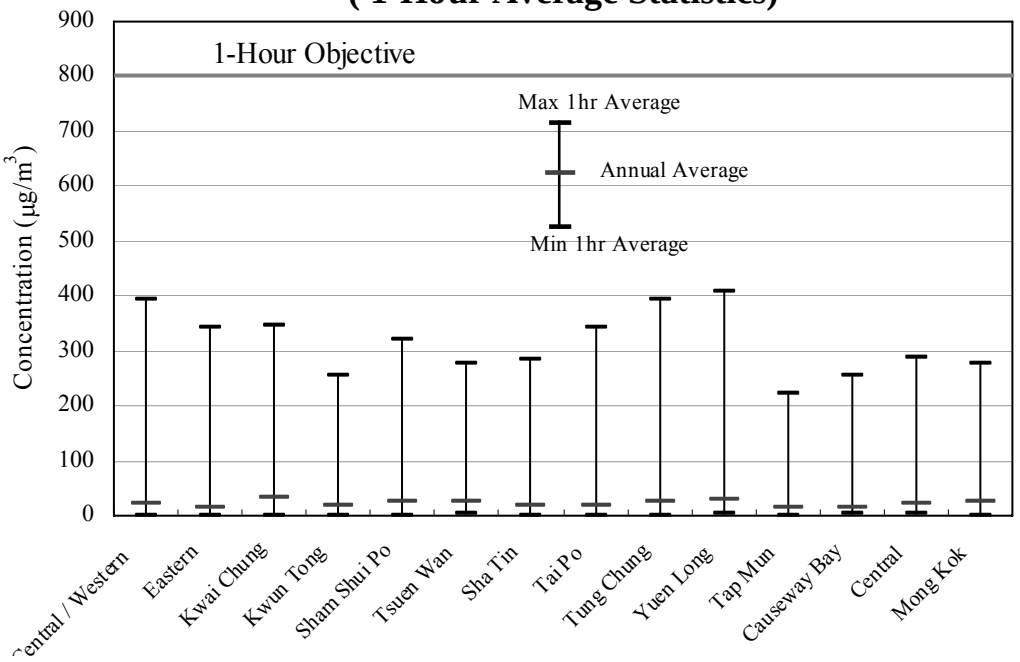


Figure 2b: Sulphur Dioxide Monitoring 2006
(24-Hour Average Statistics)

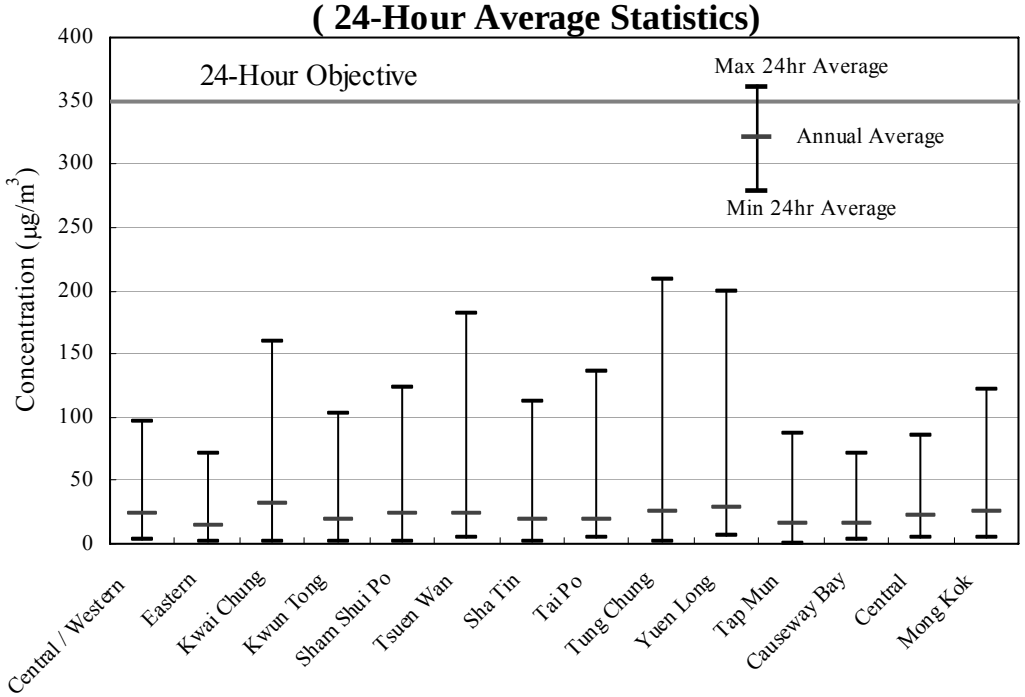
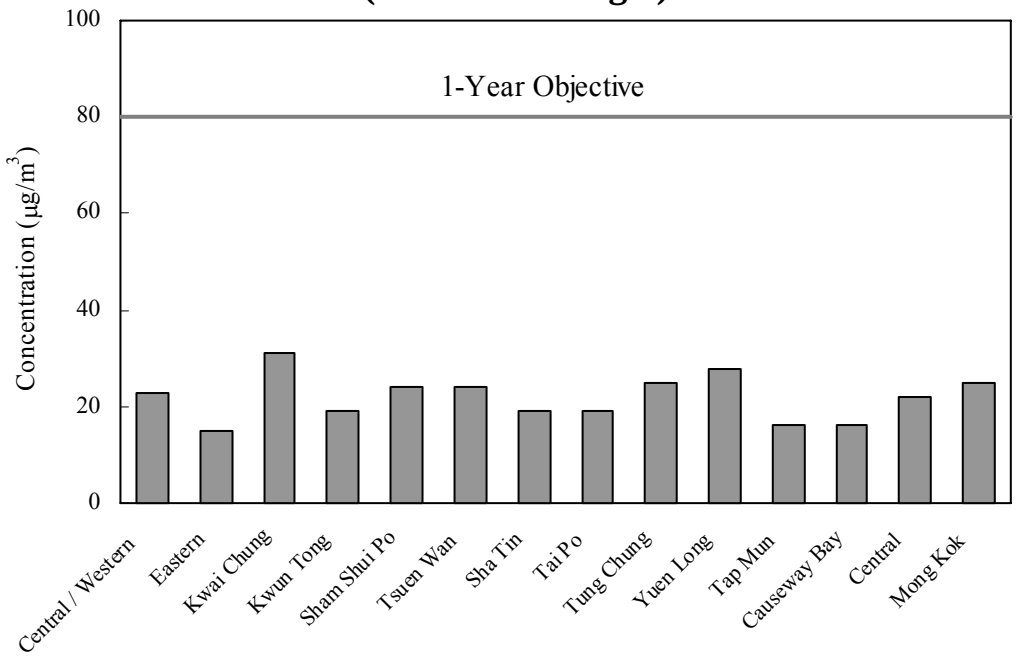


Figure 2c: Sulphur Dioxide Monitoring 2006
(Annual Average)



Sulphur dioxide was continuously measured at all the 14 monitoring stations in the monitoring network during 2006. As in previous years, SO_2 concentrations remained at a very low level throughout the territory in 2006. All of the 14 monitoring stations complied with the relevant short and long term Hong Kong Air Quality Objectives (AQOs) for SO_2 during the year. The highest 1-hour average (407 μg/m^3) was recorded at the Yuen Long station while the Tung Chung station had the highest 24-hour average (209 μg/m^3) in the year. As for the annual average, the Kwai Chung station recorded the highest value (31 μg/m^3) in the year. All these readings were well below their respective AQO limits.

2.2 Nitrogen Oxides (NO_x) and Nitrogen Dioxide (NO_2)

The various chemical species of the oxides of nitrogen are collectively termed as nitrogen oxides. From an air pollution standpoint, the most important nitrogen oxides in the atmosphere are nitric oxide (NO) and nitrogen dioxide (NO_2). These two gases, which are often mentioned jointly in the air pollution literature as NO_x, usually enter the atmosphere as a result of combustion processes. Emissions from power stations and motor vehicles are the two major sources of NO_x in Hong Kong. NO_x emissions from motor vehicles have greater impact on roadside air quality.

Nitrogen dioxide (NO_2) is mainly formed from oxidation of nitric oxide (NO) emitted from fuel combustion. Long-term exposure to NO_2 can lower a person's resistance to respiratory infections and aggravate existing chronic respiratory diseases.

Nitrogen dioxide was continuously measured at all the 14 monitoring stations in the monitoring network during 2006. In 2006, the highest 1-hour average (368 μg/m^3) and the highest 24-hour average (201 μg/m^3) were recorded at the Central and Mong Kok roadside stations, respectively. Among all 14 stations, the Central and Mong Kok roadside stations were the only two violating the 1-hour AQO for NO_2 (i.e., with the 1-hour AQO limit exceeded more than three times in the year) while non-compliance of the 24-hour AQO (i.e., with the 24-hour AQO limit exceeded more than once in the year) were observed at the 3 roadside stations and 2 other general stations.

All general stations complied with the annual AQO for NO_2 in 2006 while non-compliance was still observed at the 3 roadside stations. The Mong Kok roadside station recorded the highest annual average (97 $\mu g/m^3$) in the year.

Figure 3a: Nitrogen Dioxide Monitoring 2006
(1-Hour Average Statistics)

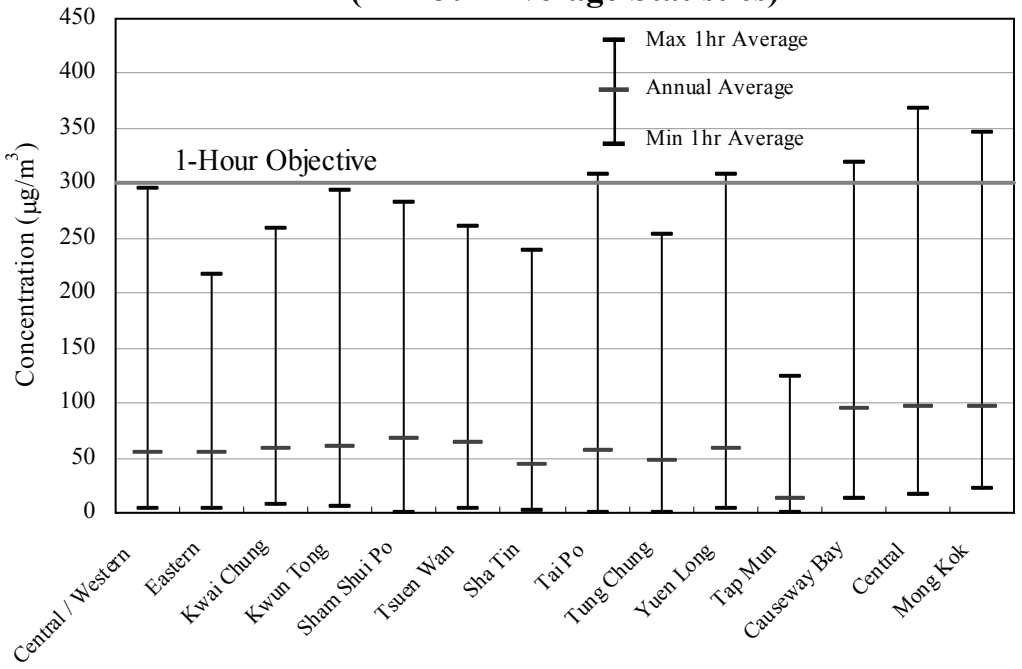


Figure 3b: Nitrogen Dioxide Monitoring 2006
(24-Hour Average Statistics)

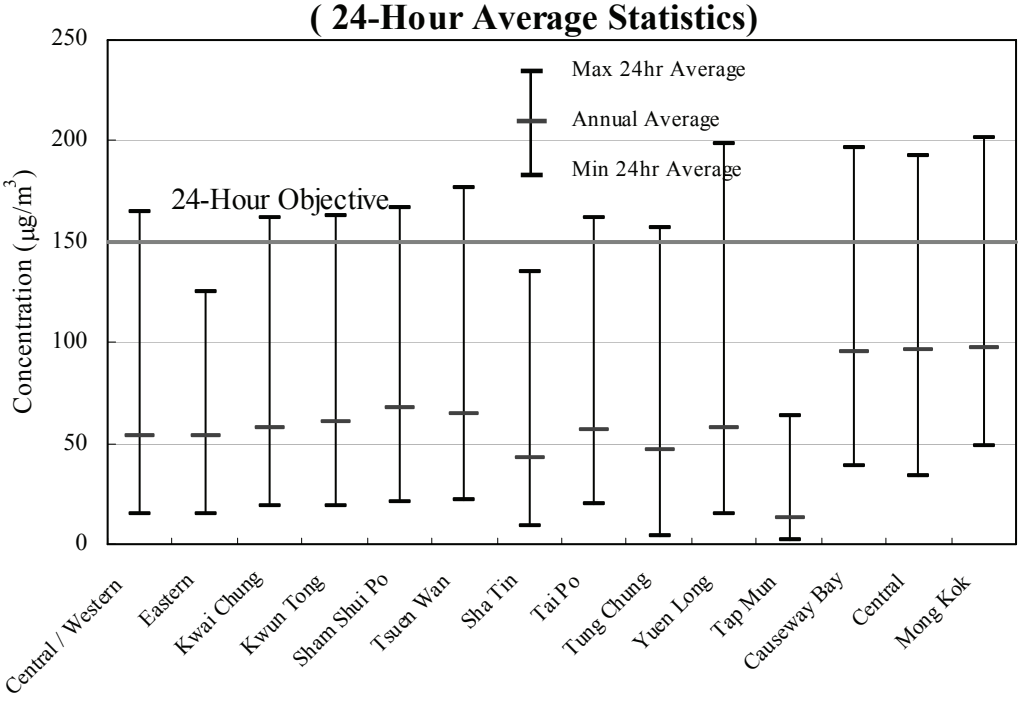
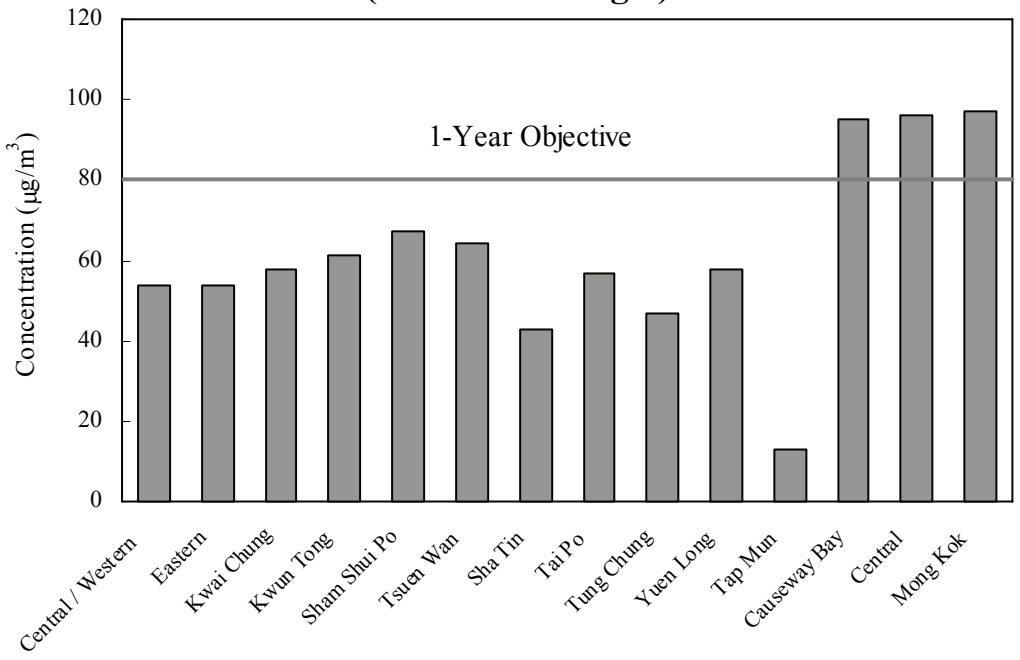


Figure 3c: Nitrogen Dioxide Monitoring 2006
(Annual Average)



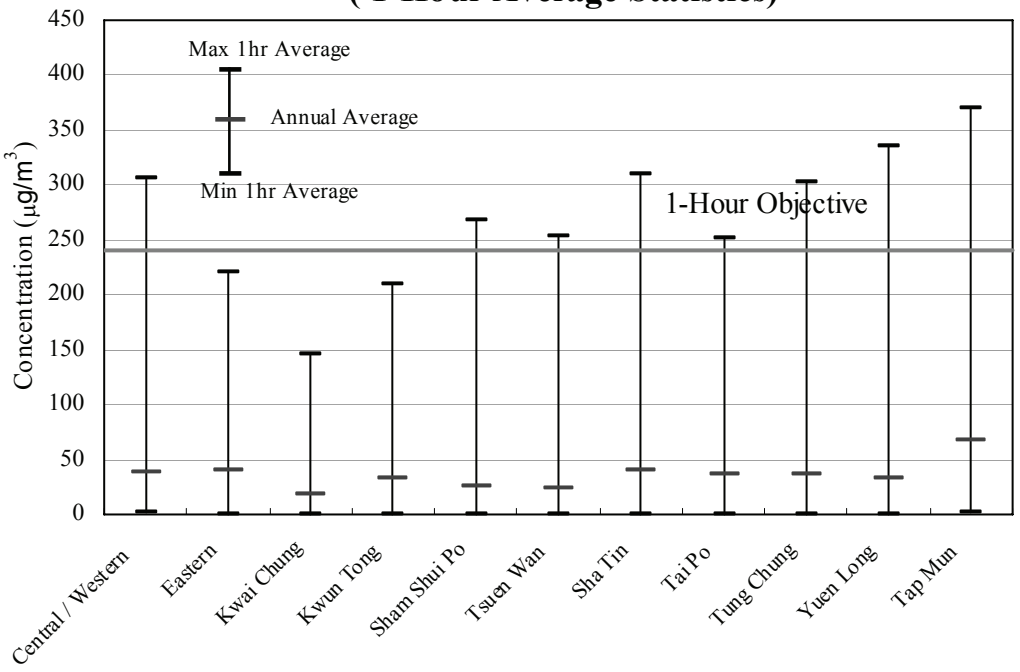
2.3 Ozone (O_3)

Ozone (O_3), a major constituent of photochemical smog, is formed by a series of complicated photochemical reactions of oxygen, nitrogen oxides and volatile organic compounds in the presence of sunlight and warm temperature. Being a strong oxidant, ozone can cause irritation to the eye, nose and throat even at low concentrations. At elevated levels, it can increase a person's susceptibility to respiratory infections and aggravate pre-existing respiratory illnesses such as asthma.

Among the 11 general monitoring stations measuring ozone in 2006, five of them violated the 1-hour AQO (i.e., with the 1-hour AQO limit exceeded more than three times in the year). The highest 1-hour average (370 $\mu g/m^3$) was recorded at the Tap Mun station.

In Hong Kong, elevated ozone incidents are mostly associated with very hot, fine and calm weather conditions in the region which favour the photochemical formation and accumulation of ozone. Such weather conditions mostly occur in summer and autumn, especially when Hong Kong and the Pearl River Delta Region is under the influence of subsiding air induced by a tropical cyclone located in the Western Pacific Ocean near Taiwan. For instance, Hong Kong became hot and hazy on 9 August when Tropical Storm Bopha skirted across southern Taiwan. Exceedances of hourly O_3 AQO limit were observed at 7 stations on that day.

Figure 4a: Ozone Monitoring 2006
(1-Hour Average Statistics)



2.4 Carbon Monoxide (CO)

Carbon monoxide (CO) comes mainly from vehicular emissions although a small amount of which may also come from incomplete combustion of fuels from factories and power stations. When it enters the bloodstream, CO can reduce oxygen delivery to the body's organs and tissues. Typical symptoms of CO poisoning include shortness of breath, chest pain, headaches, and loss of co-ordination. The health threat from CO is more severe for those who suffer from heart disease.

Carbon monoxide was continuously monitored at 7 stations including 4 general stations and 3 roadside stations during 2006. Similar to previous years, both the ambient and roadside CO concentrations remained at a very low level throughout the year. All 7 stations complied with the 1-hour and 8-hour AQOs for CO. In 2006, the highest 1-hour average (4490 $\mu g/m^3$) and the highest 8-hour average (3516 $\mu g/m^3$) were recorded at the Central and Causeway Bay stations, respectively; these values were around 15% and 35% of the respective AQO limits.

Figure 5a: Carbon Monoxide Monitoring 2006
(1-Hour Average Statistics)

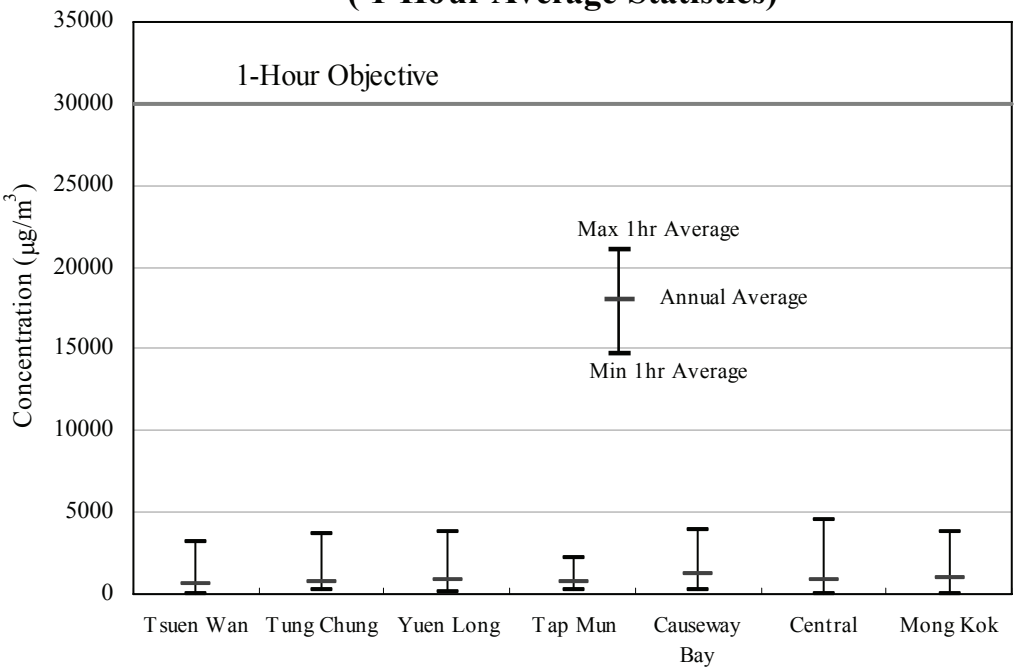
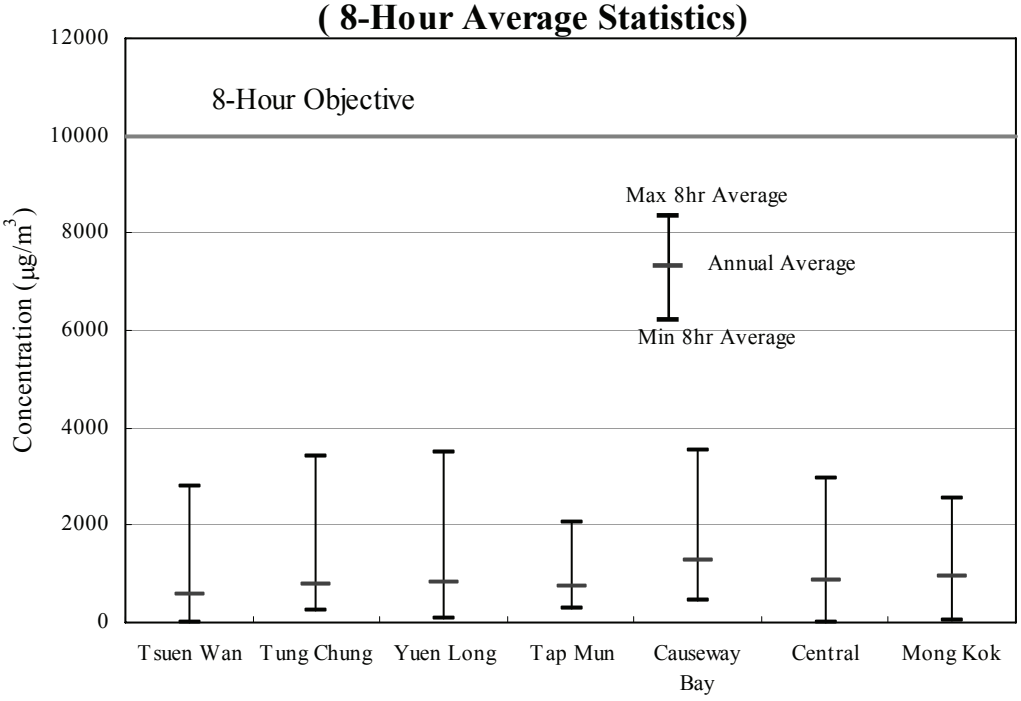


Figure 5b: Carbon Monoxide Monitoring 2006
(8-Hour Average Statistics)



3. Suspended Particulates

3.1 Total Suspended Particulates (TSP)

Total suspended particulates (TSP) are small airborne particulates such as dust, fume and smoke with diameters less than 100 micrometres. Major sources of TSP include power stations, construction activities and vehicle exhausts. TSP can be broadly divided into two major types. Suspended particulates with a nominal aerodynamic diameter of 10 micrometres or less are called respirable suspended particulates (RSP), or PM10 for short, and are usually of much greater health concern (see Section 3.2 below). On the other hand, suspended particulates that are larger than 10 micrometres in diameter mainly cause soiling and dust nuisance.

TSP measurement was conducted by sampling using High-volume samplers at 9 general stations and 1 roadside station during 2006.

The Yuen Long station, which had two counts of exceedance of the 24-hour TSP AQO limit, was the only station failing to comply with the 24-hour TSP AQO in 2006. It also recorded the highest 24-hour average (448 μg/m^3) in the year. Exceedance of the annual AQO for TSP (80 μg/m^3) was observed at the Mong Kok roadside station and 3 other general stations. As in the previous year, the highest annual average (110 μg/m^3) was recorded at the Mong Kok roadside station.

Figure 6a: TSP Monitoring 2006
(24-Hour Average Statistics)

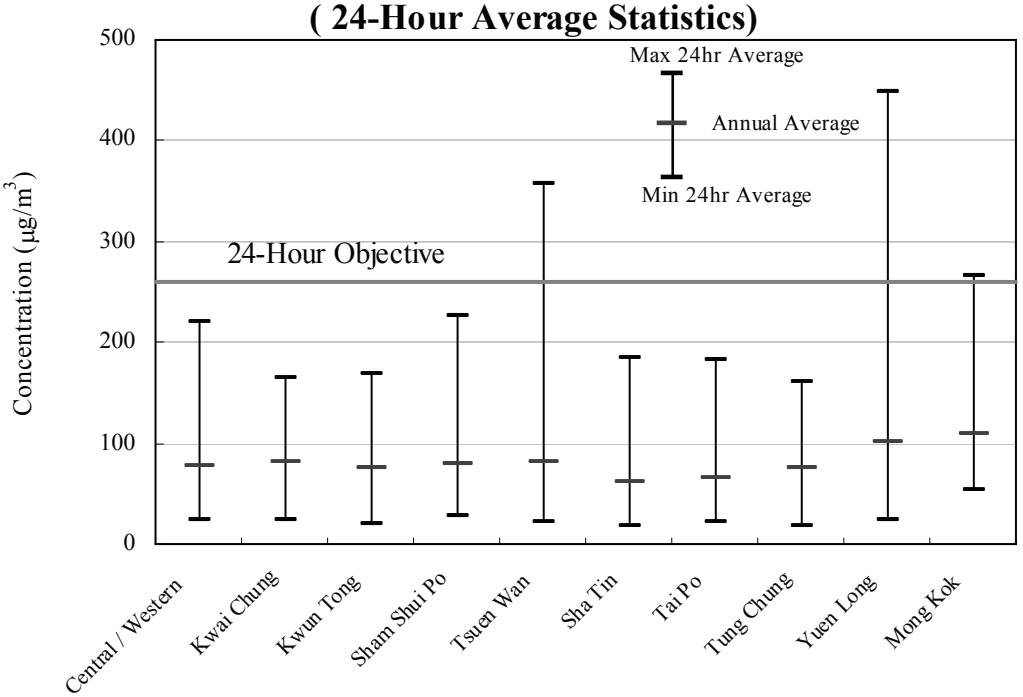
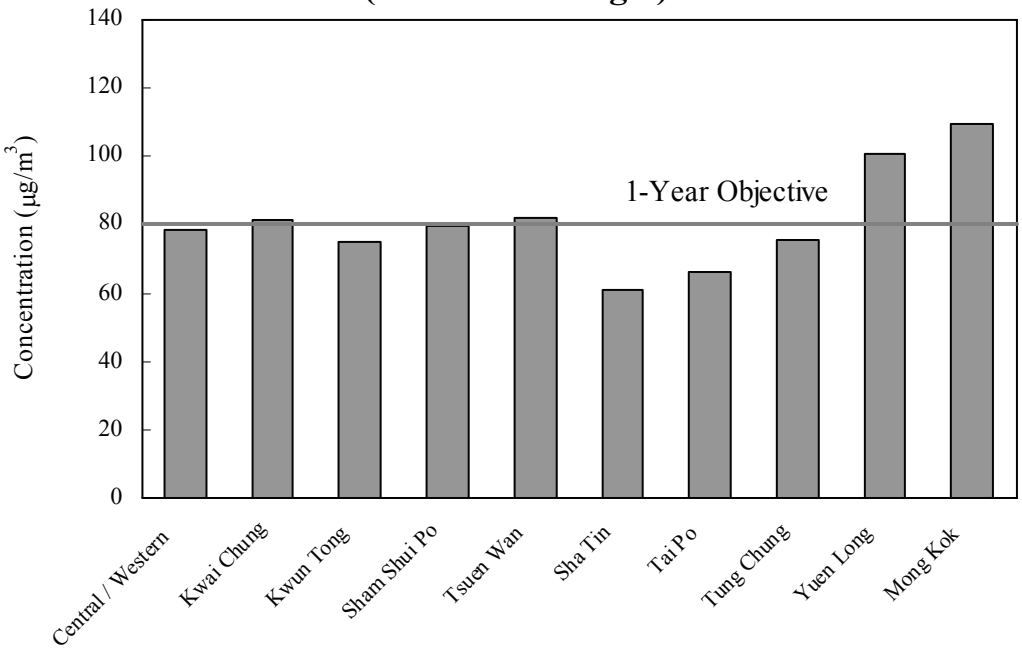


Figure 6b: TSP Monitoring 2006
(Annual Average)



3.2 Respirable Suspended Particulates (RSP)

Respirable suspended particulates (RSP) refer to those suspended particulates with nominal aerodynamic diameters of 10 micrometres or less. Combustion sources, in particular diesel vehicle exhaust and emissions from power plants, are the major sources of RSP in Hong Kong. Besides, RSP can be formed by atmospheric oxidation of sulphur dioxide and nitrogen oxides. Although to a lesser extent, crustal derived dust and marine aerosols are also sources of RSP.

RSP at high levels may cause chronic and acute effects on human health, particularly the pulmonary function, as they can penetrate deep into the lungs and cause respiratory problems. These effects are enhanced if high RSP levels are associated with higher levels of other pollutants, such as SO_2. The smaller particulates in RSP have a major impact on visibility.

RSP was continuously measured at all 14 monitoring stations in the monitoring network during 2006. Most of these stations were also equipped with high-volume sampler to collect particulate samples for chemical analysis.

The Central roadside station was the only station that violated the 24-hour RSP AQO (i.e., with the 24-hour AQO limit exceeded more than once in the year) in 2006. Exceedances of the annual AQO limit for RSP (55 $\mu g/m^3$) were observed at the 3 roadside stations and 4 other general stations. In 2006, the highest annual average (83 $\mu g/m^3$) was measured at the Causeway Bay roadside station while Tung Chung station recorded the highest 24-hour average (254 $\mu g/m^3$).

Figure 7a: RSP Monitoring 2006
(24-Hour Average Statistics)

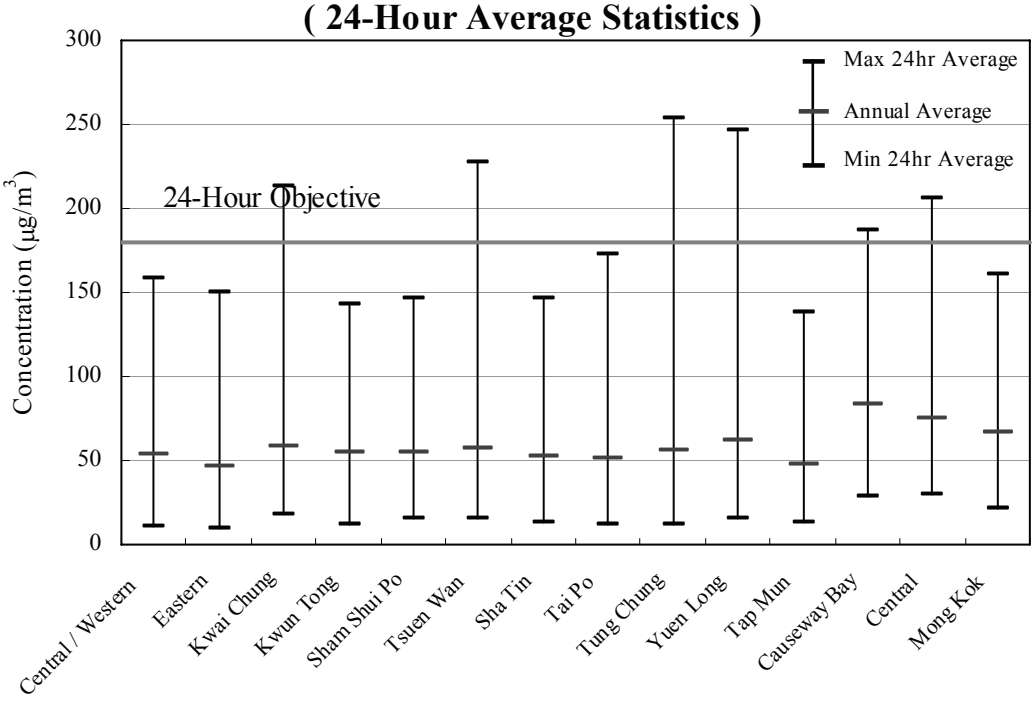
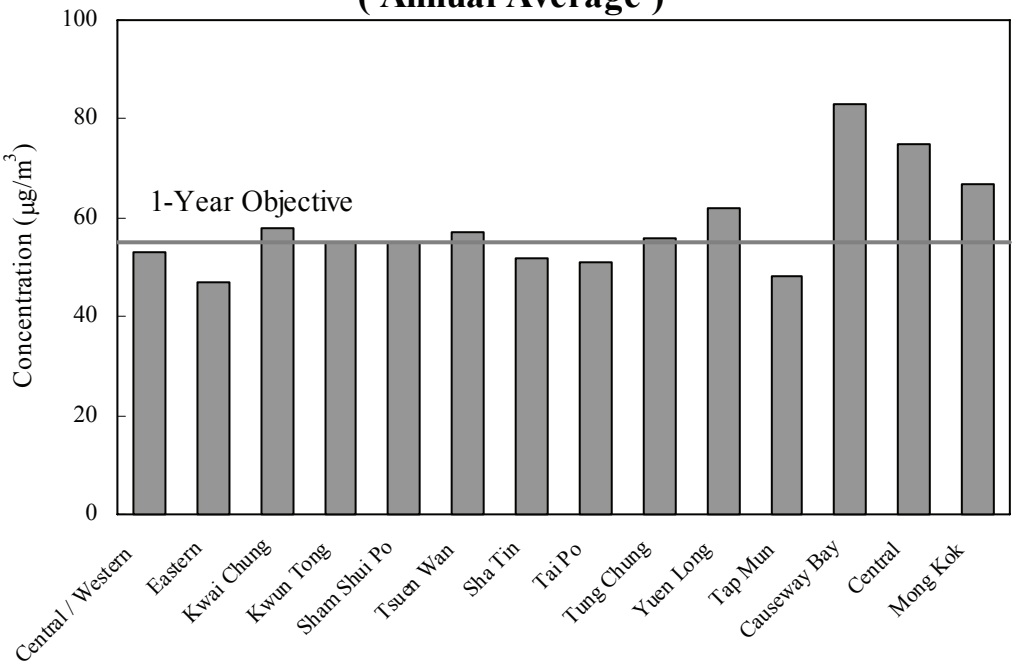


Figure 7b: RSP Monitoring 2006
(Annual Average)



3.3 Lead (Pb)

Lead is the only one criteria pollutant included in the AQO that is also a toxic air pollutant. In Hong Kong, the sale and supply of leaded petrol, which is a known major source of lead, was banned from 1 April 1999. As in previous years, the ambient lead concentrations continued to linger at very low levels during 2006. The overall 3-month averages, ranging from 12 ng/m^3 to 145 ng/m^3, were well below the AQO limit of 1,500 ng/m^3.

4. Toxic Air Pollutants (TAPs)

Two groups of toxic air pollutants (TAPs), viz. heavy metals and organic substances, were regularly monitored at the Central/Western and Tsuen Wan stations since mid 1997. Among the various TAPs monitored in 2006, 8 of them are considered more important in terms of their health impacts and their annual averages are summarised in Table C8. Detailed description of the TAPs monitoring operation is given in Appendix B4. The monitoring data collected so far indicate that the levels of toxic air pollutants in Hong Kong are comparable to those observed in other major cities.

5. Variation of Air Pollution Levels over Time

The concentrations of air pollutants in the atmosphere can change over a day, over the months of a year and in the period of several years.

5.1 Over a Day

The concentrations of most air pollutants generally follow the diurnal pattern of human activities and traffic. For instance, higher levels of NO_2 and RSP are usually observed in the morning and the evening rush hours when there are more traffic and human activities. Likewise, the lowest concentrations often occur from midnight to dawn when the traffic is at its minimum. To no surprise, this type of traffic induced diurnal pattern is much more distinct for pollutant levels at roadside.

Figure 8: 2006 Diurnal variations of NO_2

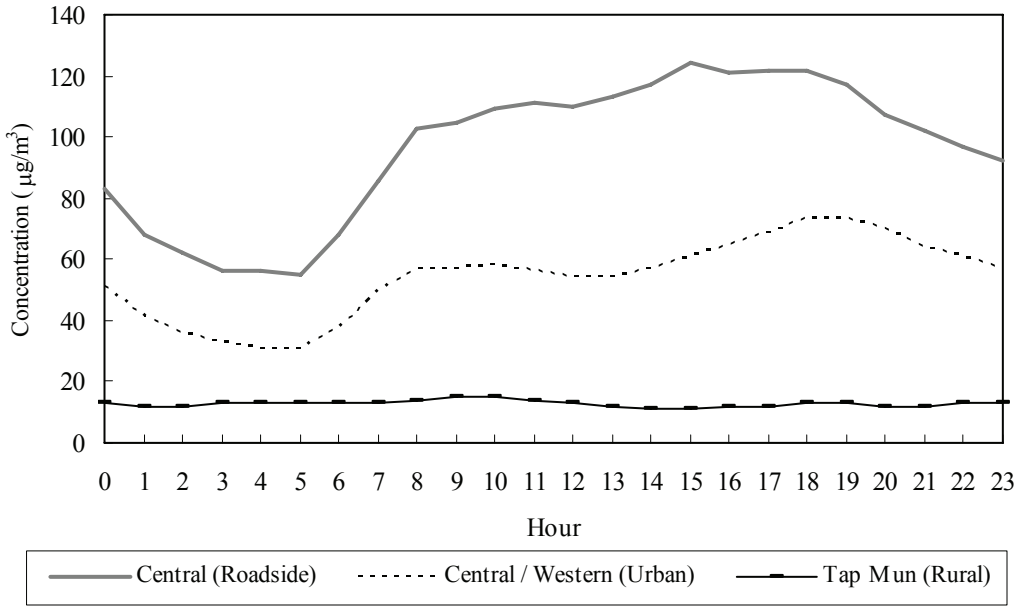
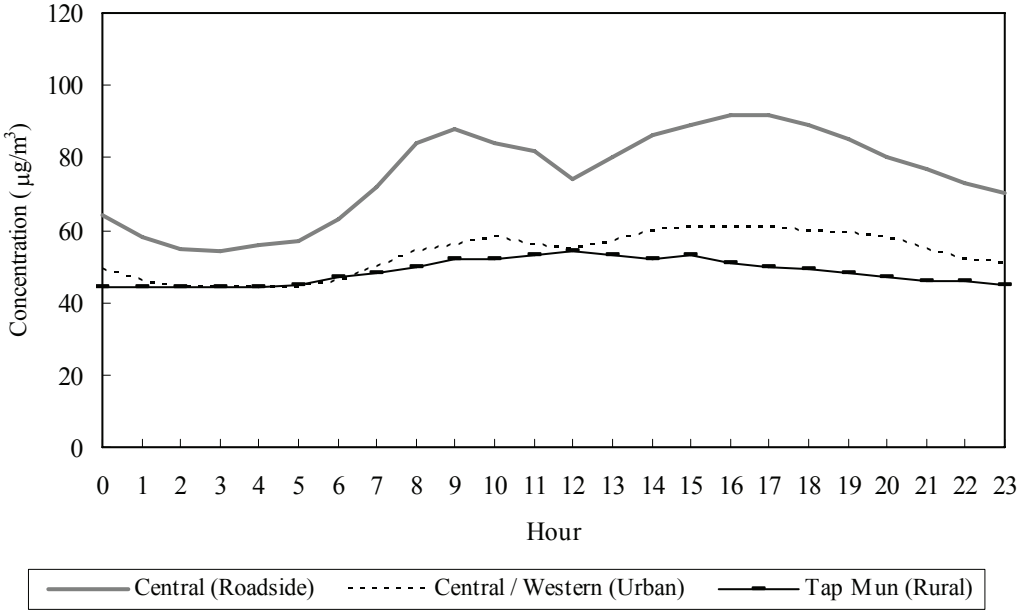
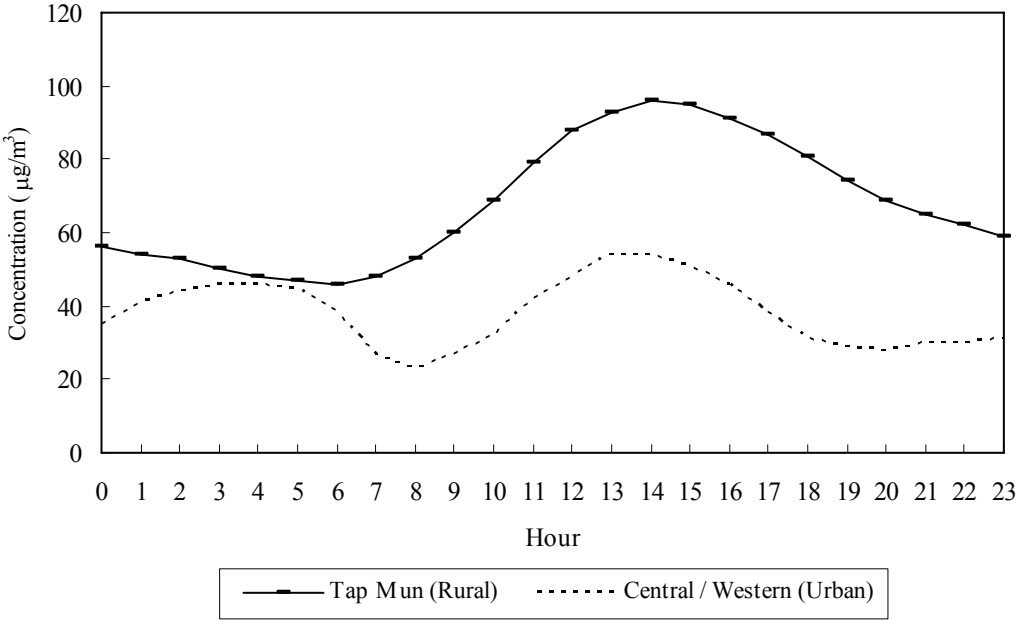


Figure 9: 2006 Diurnal variations of RSP



The diurnal pattern of ozone is different from that of NO_2 and RSP. Ozone is formed by photochemical reactions of its precursor pollutants such as NOx and volatile organic compounds (VOCs) under sunlight. Outside urban centres the ambient ozone levels start to build up before noon and peak in the afternoon, when precursor pollutants are accumulated and sunlight is strong. In urban areas, the lowest ozone concentrations are often observed during the rush hours. This is because a large amount of nitric oxide from the rush-hour traffic acts as an efficient scavenger of ozone, and sunlight is not strong enough for photochemical reactions to take place.

Figure 10: 2006 Diurnal variations of O_3



5.2 Over a Year

Concentrations of NO_2, RSP and O_3 are substantially lower in summer months (June to August) due to a number of reasons. The higher temperatures in summer months induce larger mixing heights, which favours the dispersion of pollutants. The rains in summer help to wash out pollutants more frequently. The south-westerly monsoon in summer also helps to replenish the region with cleaner oceanic air.

Figure 11: Monthly variations of NO_2 and RSP at Central / Western in 2006

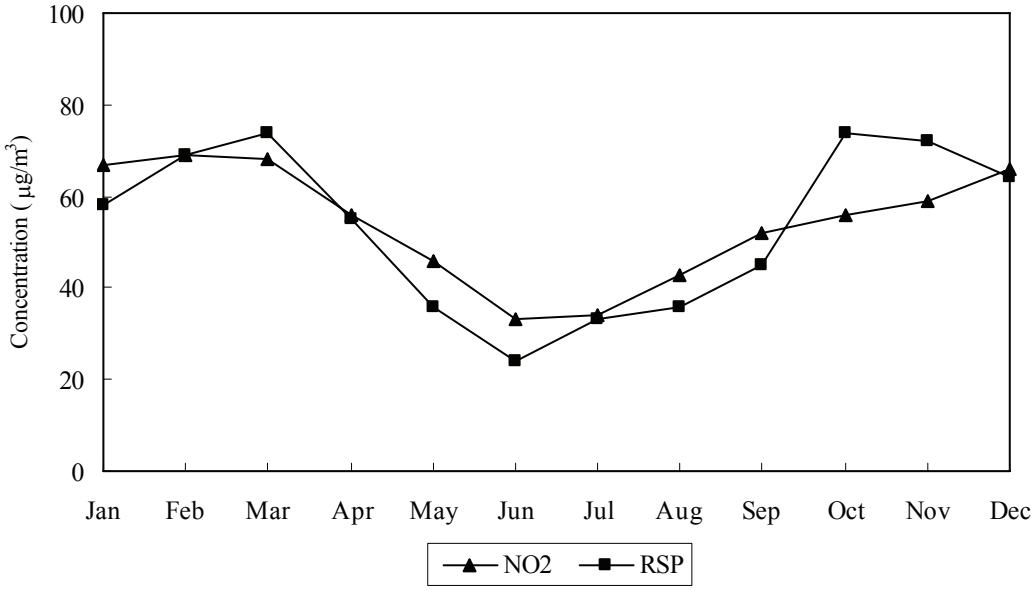
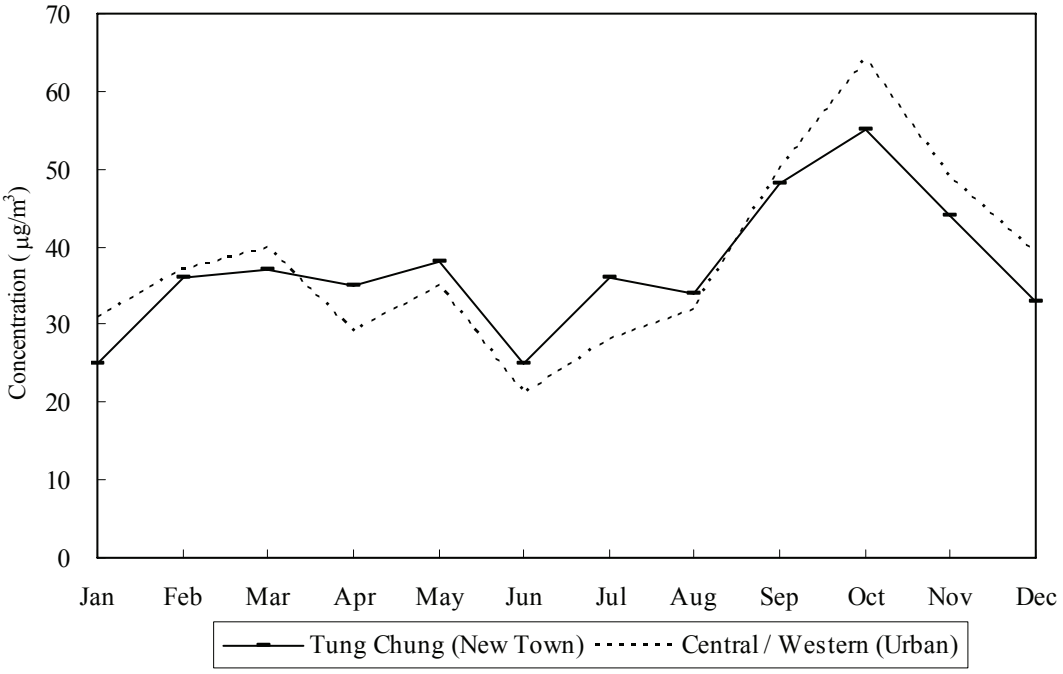


Figure 12: Monthly variations of O_3 in 2006



5.3 Long Term Trends

The long-term trends for various air pollutants presented in this section are based on annual average concentrations of pollutants recorded from various air quality monitoring stations categorised into 4 groups of land use types, namely Urban, New Town, Rural and Roadside as defined in Table 1 below.

Table 1: Classification of Air Monitoring Stations by Land Use Types

Land Use Type	Land Use Characteristics	Station
Urban	Densely populated residential areas mixed with some commercial and/or industrial areas	Central/Western, Eastern, Kwai Chung, Kwun Tong, Sham Shui Po and Tsuen Wan
New Town	Mainly residential areas	Sha Tin, Tai Po, Tung Chung and Yuen Long
Rural	Rural areas	Tap Mun (background station)
Roadside[1]	Urban roadside in mixed residential/ commercial area with heavy traffic and surrounded by many tall buildings	Causeway Bay and Central

5.3.1 Sulphur Dioxide (SO_2)

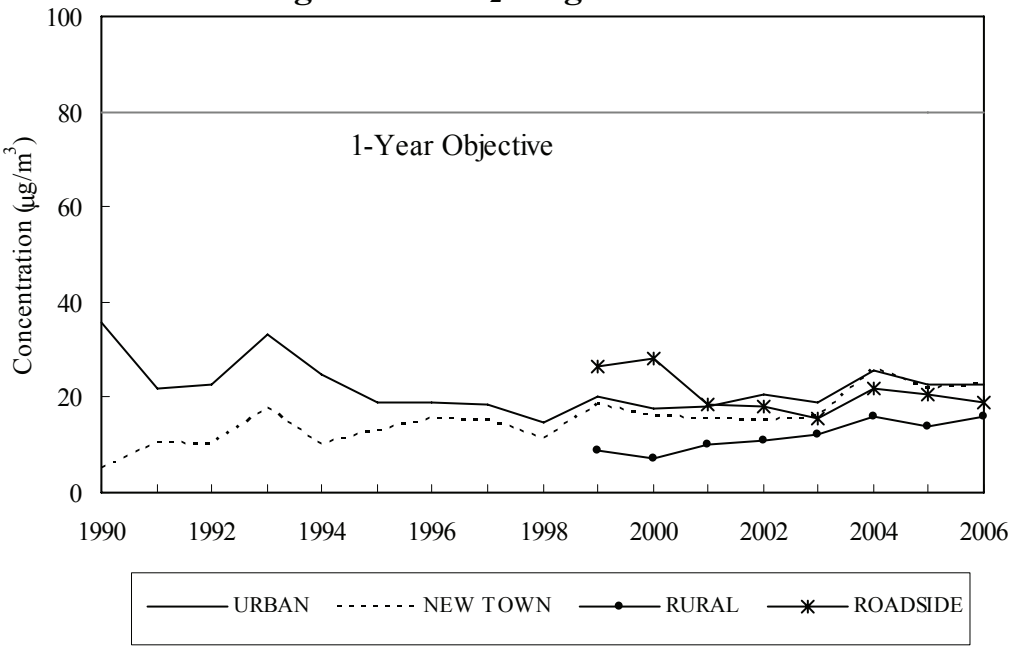
Since the implementation of the Air Pollution Control (Fuel Restriction) Regulations in 1990 for cutting sulphur content of industrial fuels and the Air Pollution Control (Motor Vehicle Fuel) Regulations in 1995 for controlling motor vehicle fuel quality, SO_2 concentrations in Hong Kong have reduced and remained at levels well below the annual AQO limit of 80 $\mu g/m^3$.

The moderate rising trends of the ambient concentrations of SO_2 over the past several years could be attributed to the increases in emissions from local power plants as well as from sources in the neighbouring region.

As a result of the introduction of ultra low sulphur diesel for vehicle fleet in late 2000, the average SO_2 concentration at roadside in 2006 (19 $\mu g/m^3$) dropped by almost 30% as compared with the 1999 value (27 $\mu g/m^3$).

[1] The current Mong Kok roadside station was commissioned in 2001. The station is not included in the trend analysis due to its relatively short history of measurement as compared with other stations. Therefore, the long-term trends for roadside stations are only based on data from the remaining 2 roadside stations, namely Causeway Bay and Central roadside stations.

Figure 13: SO_2 long term trend

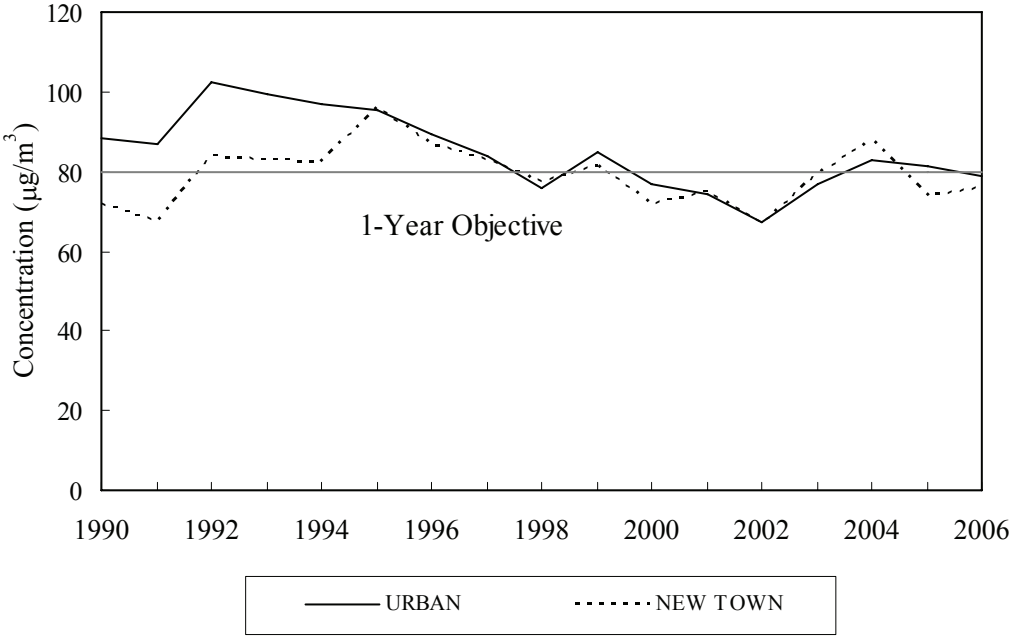


5.3.2 Total Suspended Particulates (TSP)

The TSP concentrations in the territory exhibited primarily declining trends from 1995 to 2002 but rebounded afterwards.

The rising trends of the TSP concentrations since 2002 could be mainly attributed to the increase in regional background TSP levels.

Figure 14: TSP long term trend

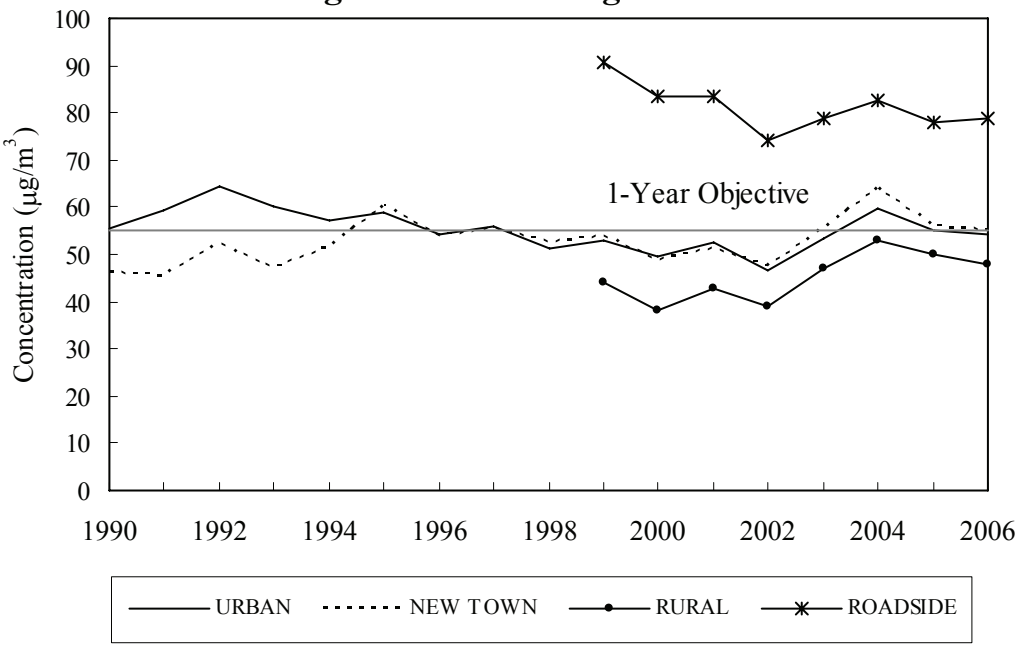


5.3.3 Respirable Suspended Particulates (RSP)

The RSP concentrations recorded in the territory showed a primarily downward trend between 1995 and 2002, rebounded afterwards to a higer level in 2004, then dropped again afterwards .

In Hong Kong, high level of RSP at roadside is a major air pollution concern, which is mainly attributed to the high concentration of vehicles especially diesel vehicles in urban areas. As a result of the implementation of various vehicle emission control measures in recent years, the annual average of RSP at roadside in 2006 reduced by 13% compared with 1999.

Figure 15: RSP long term trend



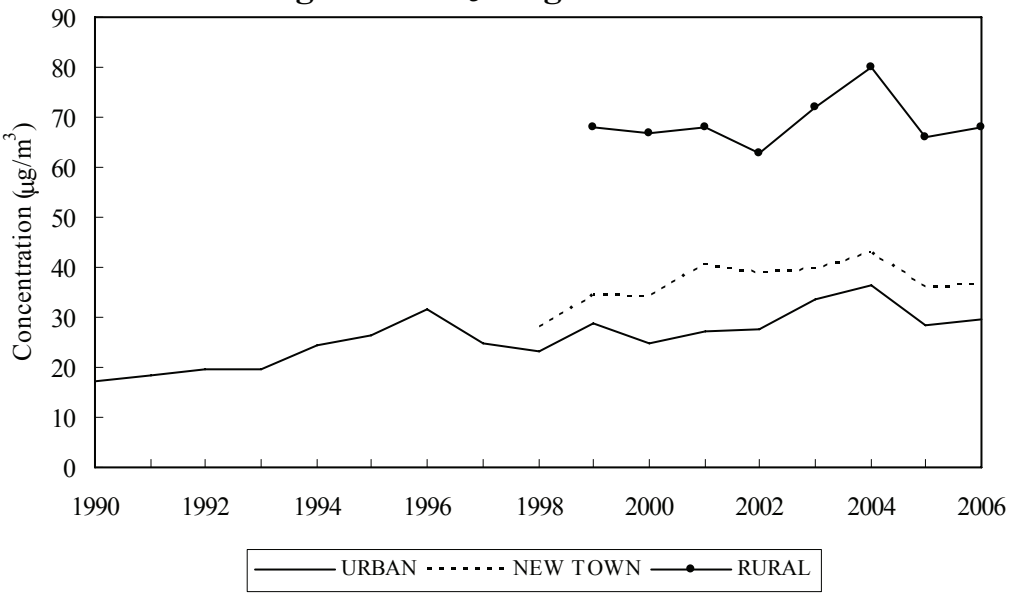
5.3.4 Ozone (O_3)

As nitric oxide emissions from motor vehicles can react with and remove ozone in the air, areas with heavy traffic normally have lower ozone levels than areas with light traffic. Hence, Tap Mun rural station has steadily recorded more than twice the ozone levels measured in urban areas since 1999.

The ozone concentrations in the territory have shown a moderate upward trend since 1990.

Ozone is a regional air pollution issue. The rising trend of ozone generally reflects deterioration in air quality on a regional scale over the past years. The Hong Kong Special Administrative Region Government and Guangdong Provincial Government are implementing a regional air quality management plan to improve air quality in the Pearl River Delta region.

Figure 16: O_3 long term trend

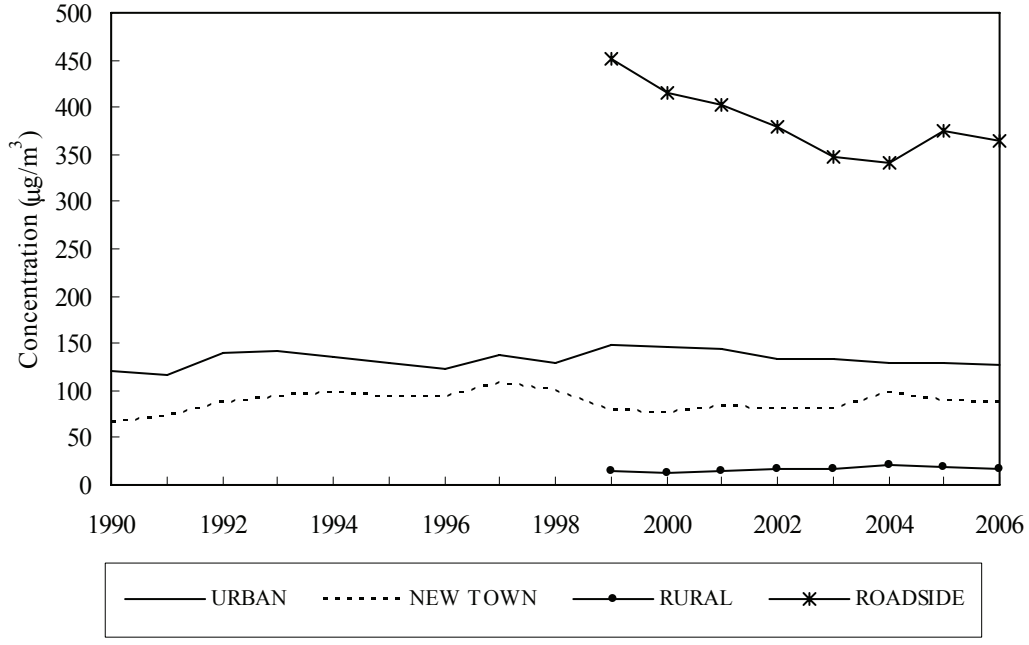


5.3.5 Nitrogen Oxides (NO_x) and Nitrogen Dioxide (NO_2)

The annual average of NO_x in urban areas has remained quite constant over the past decade.

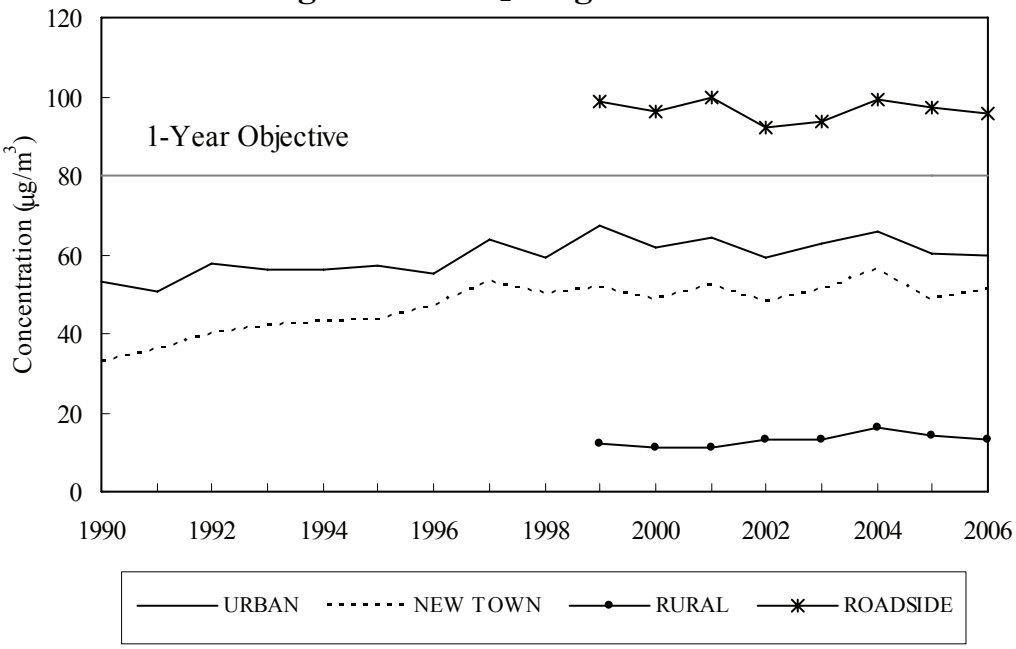
The roadside NO_x concentration has generally shown a decreasing trend over the past years, reflecting a reduction in NOx emission levels as a result of vehicle emission control measures implemented. The roadside NOx concentration in 2006 is 19% lower than the 1999 value.

Figure 17: NOx long term trend



NO_2 is mainly formed from the oxidation of nitric oxide, a major component of NO_x. The concentrations of NO_2 are dependent on the levels of NO_x as well as the concentrations of ozone and VOCs in the ambient air which promote the conversion of nitric oxide to NO_2. Since 1990, the NO_2 levels in urban and new town areas have exhibited slow rising trends similar to those of ozone.

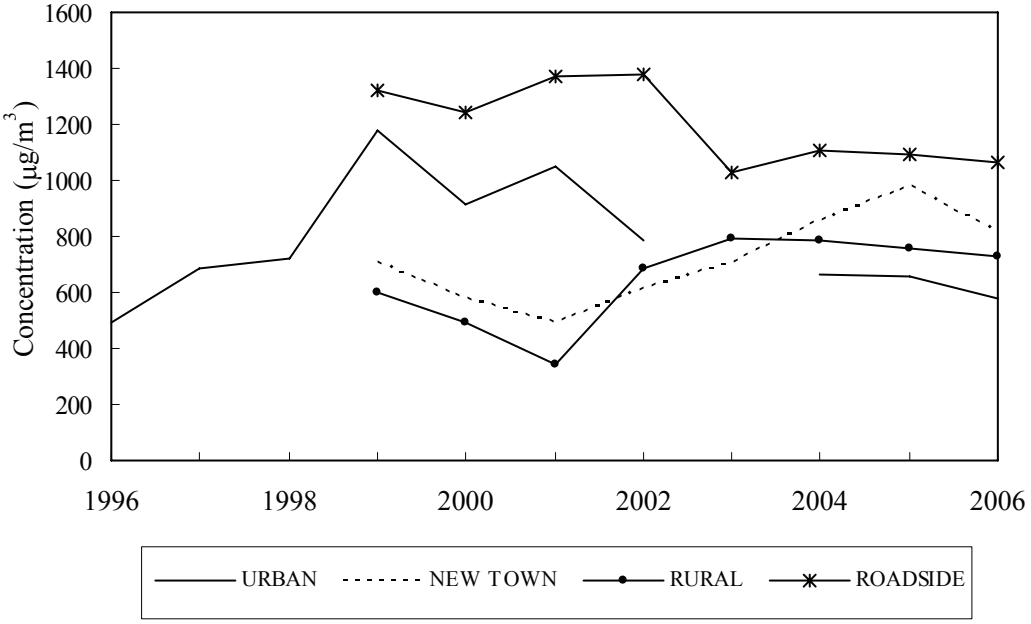
Figure 18: NO_2 long term trend



5.3.6 Carbon Monoxide (CO)

The concentrations of CO in Hong Kong remained at very low levels in the past several years. Even at the roadside close to the vehicular emission sources, the CO levels were well within the 1-hour AQO (30,000 μg/m^3) and 8-hour AQO (10,000 μg/m^3).

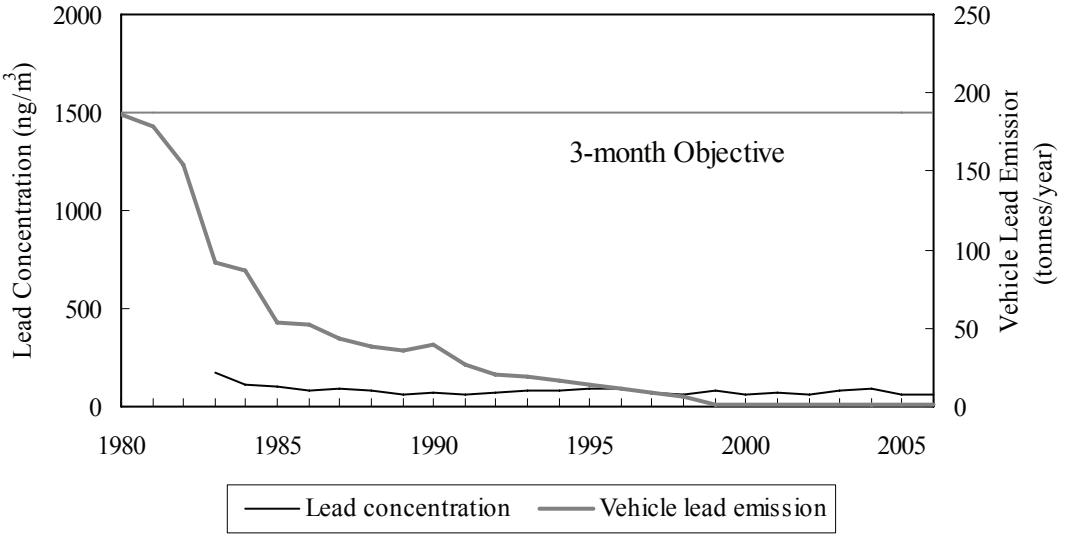
Figure 19: CO long term trend



5.3.7 Lead (Pb)

The ambient lead concentrations have been lingering at very low levels since the oil companies took voluntary action in reducing the lead content of petrol in the early eighties. Lead emissions from vehicles were further reduced as a result of the introduction of unleaded petrol in April 1992 and completely eliminated when the sale and supply of leaded petrol was banned in April 1999.

Figure 20 : Vehicle lead emission and lead concentration



Appendix A

Air Quality Objectives and their Compliance Status

Established in 1987, the Hong Kong Air Quality Objectives (AQO) for seven major air pollutants was set at levels to protect public health. The compliance status of the AQO has been used as the indicator of air quality in different districts in Hong Kong.

Table A1: Hong Kong Air Quality Objectives (AQO)

Concentration in micrograms per cubic metre [1]

Pollutant	Averaging Time				
	1 hour[2]	**8 hours[3]**	**24 hours[3]**	**3 months[4]**	**1 year[4]**
Sulphur dioxide (SO_2)	800		350		80
Total suspended particulates (TSP)			260		80
Respirable suspended particulates (RSP) [5]			180		55
Nitrogen dioxide (NO_2)	300		150		80
Carbon monoxide (CO)	30000	10000			
Photochemical oxidants (as ozone (O_3) [6])	240				
Lead (Pb)				1.5	

[1] Measured at 298K (25°C) and 101.325 kPa (one atmosphere).
[2] Not to be exceeded more than three times per year.
[3] Not to be exceeded more than once per year.
[4] Arithmetic means.
[5] Respirable suspended particulates mean suspended particulates in air with a nominal aerodynamic diameter of 10 micrometres or smaller.
[6] Photochemical oxidants are determined by measurement of ozone only.

Table A2: Percentage Time in compliance with Short-Term Air Quality Objectives in 2006

Station		O_3	NO_2		TSP	RSP	SO_2		CO	
		1-hr	**1-hr**	**24-hr**	**24-hr**	**24-hr**	**1-hr**	**24-hr**	**1-hr**	**8-hr**
General Station	Central/Western	99.94	100	99.73	100	100	100	100	--	--
	Eastern	100	100	100	--	100	100	100	--	--
	Kwai Chung	100	100	99.73	100	99.73	100	100	--	--
	Kwun Tong	100	100	99.72	100	100	100	100	--	--
	Sham Shui Po	99.96	100	99.44	100	100	100	100	--	--
	Tsuen Wan	99.99	100	99.72	98.33	99.73	100	100	100	100
	Sha Tin	99.93	100	100	100	100	100	100	--	--
	Tai Po	99.96	99.96	99.69	100	100	100	100	--	--
	Tung Chung	99.80	100	99.72	100	99.72	100	100	100	100
	Yuen Long	99.81	99.98	99.45	96.67	99.72	100	100	100	100
	Tap Mun	99.73	100	100	--	100	100	100	100	100
Roadside Station	Causeway Bay	--	99.98	97.25	--	99.72	100	100	100	100
	Central	--	99.88	95.30	--	98.88	100	100	100	100
	Mong Kok	--	99.93	98.60	98.31	100	100	100	100	100

Notes: "--" *Not measured*

Compliance with the short-term AQO

Table A2 shows the percentage time of compliance with the short-term AQO (i.e. 1-hour and 24-hour AQO) recorded at each of the monitoring stations in 2006. For NO_2, the compliance percentages of the 24-hour AQO were between 95% and 100% at various stations; its 1-hour AQO compliance rates were above 99% at all stations. Regarding RSP, the compliance percentages for its 24-hour AQO were above 98% at all stations. The compliance levels of 1-hour AQO for O_3 were also over 99% at all monitoring stations. For TSP, the compliance percentage of its 24-hr AQO was between 96% and 100% at various stations. As in previous years, all monitoring stations achieved full compliance with the short-term AQO for SO_2 and CO in 2006.

Compliance with the long-term AQO

Table A3 shows the compliance status of all monitoring stations with the long-term (annual) AQO in 2006. Similar to previous years, all monitoring stations achieved full compliance with the long-term AQO for SO_2 and lead in 2006. Compliance with the annual AQO for NO_2 was recorded at 11 out of 14 stations, same as 2005. The compliance rate for RSP in 2006 was slightly better than that in 2005. In 2006, 7 out of 14 stations met the annual AQO for RSP, as compared with 5 stations in 2005. The compliance rate for TSP also improved in the year, with 6 out of 10 stations meeting the annual AQO, as compared with 4 stations in 2005.

Table A3: Compliance Status of Long-Term (Annual) Air Quality Objectives in 2006

Station		NO_2	TSP	RSP	SO_2	Lead
		1-year	1-year	1-year	1-year	3-months
General Station	Central/Western	✓	✓	✓	✓	✓
	Eastern	✓	--	✓	✓	--
	Kwai Chung	✓	×	×	✓	✓
	Kwun Tong	✓	✓	✓	✓	✓
	Sham Shui Po	✓	✓	✓	✓	--
	Tsuen Wan	✓	×	×	✓	✓
	Sha Tin	✓	✓	✓	✓	--
	Tai Po	✓	✓	✓	✓	--
	Tung Chung	✓	✓	×	✓	✓
	Yuen Long	✓	×	×	✓	✓
	Tap Mun	✓	--	✓	✓	--
Roadside Station	Causeway Bay	×	--	×	✓	--
	Central	×	--	×	✓	--
	Mong Kok	×	×	×	✓	✓

Notes: "✓" *Complied with the AQO* "×" *Violated the AQO* "--" *Not measured*

Appendix B

Air Quality Monitoring Operation

B.1 Network Operation

The air quality monitoring network of 14 monitoring stations is operated by the Air Science Group of the Environmental Protection Department. The measurement of ambient concentrations of total suspended particulates (TSP), respirable suspended particulates (RSP), sulphur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3) and carbon monoxide (CO) have been accredited by the Hong Kong Laboratory Accreditation Scheme (HOKLAS) since August 1995.

In order to provide good representation of the air quality in areas of high population density, the locations of the 14 monitoring stations were carefully chosen by referencing to the United States Environmental Protection Agency's (USEPA) guidelines with practical consideration of the unique congested high-rise development of Hong Kong.

The details for the parameters monitored at each monitoring station and a list of equipment employed for measuring the air pollutants are summarised in Tables B2 and B3 respectively. In general, the concentration of gaseous pollutants and RSP are determined continuously by automatic analysers. Manually operated high volume samplers using the gravimetric methods are also used regularly to measure the TSP and RSP. In addition, meteorological parameters, including temperature and solar radiation, wind speed and direction, are also recorded continuously at each station as appropriate.

Wet and dry deposition samples are collected at 3 stations: Central/Western, Kwun Tong and Yuen Long. The parameters measured for all wet and dry samples include: pH, Na^+, K^+, NH_4^+, NO_3^-, SO_4^{2-}, Cl^-, F^-, Ca^{2+}, Mg^{2+}, formate and acetate in the filtrate.

B.2 Data Processing and Dissemination

At each monitoring station, signals from the continuous analysers and the meteorological instruments are first stored in a data logger and then sent back to the Data Processing Unit of the Air Science Group via dedicated telephone lines for further processing. After careful checking and validation, the monitoring data are disseminated to the public in the following manner:-

- Monthly release of the monitoring data recorded at the Mong Kok, Kwai Chung and Central/Western stations (up to June 1998)
- Monthly release of the Air Pollution Index (API) summary for all monitoring stations (since July 1998)
- Daily API reporting and forecast for three categories of land-use areas, viz., urban, industrial, and new development (from 6 June 1995 to 14 June 1998)
- Daily API reporting and forecast for individual station (from 15 June 1998 to 30 June 1999)
- Hourly API reporting for individual station (since 1 July 1999)
- Reporting of monitoring data in the annual reports "*Air Quality in Hong Kong"* and "*Environment Hong Kong"*
- Ad hoc provision of air quality data to the public, academics and environmental consultants upon request for the purposes of research and air quality assessment

- Establishment of the Environmental Protection Interactive Centre (EPIC) for the public to download air quality monitoring data (since March 2004)
  (http://www.epd.gov.hk/epd/epic/english/epichome.html)

The reporting and forecast of API will help the public (particularly susceptible groups such as the elderly, children and people with heart or respiratory illness) to decide on taking precautionary measures when necessary. The monitoring results are also regularly used to assist the formulation of air quality management plans and the evaluation on the effectiveness of the current air pollution control programmes.

B.3 Quality Control and Assurance

A quality policy is adopted to ensure that ambient air quality monitoring results from the monitoring stations attain a high degree of accuracy and precision. A quality system has been established in accordance with the HOKLAS criteria.

The accuracy of the monitoring network is assessed by performance audits. Similar to overseas standards, control limits of ±15% and ±10% are adopted for the gaseous pollutants and particulates respectively. In 2006, 432 audit checks were carried out on the stations' analysers and samplers. As shown in Figure B1 and based on the 95% probability limits, the accuracy of the network was within the specified control limits.

The precision, a measure of the repeatability, of the measurements is checked in accordance with EPD's quality manuals. In 2006, 1953 precision checks were carried out on the analysers and samplers. As shown in Figure B2 and based on the 95% probability limits, the precision of the network varied between -7.9 % and 6.9 %, which was again within target limits.

In addition to the above operation, a system audit to review the quality assurance activities is carried out on an annual basis on the monitoring network. A report outlining the deficiencies and corrective actions is compiled at the end of the audit.

B.4 Toxic Air Pollutants Monitoring Operation

The Air Science Group has installed in July 1997 additional monitoring facilities at the Tsuen Wan and Central/Western stations to measure regularly the levels of Toxic Air Pollutants (TAPs) in Hong Kong. The TAPs being monitored can be broadly classified as volatile organic compounds (e.g. benzene, perchloroethylene and 1,3-butadiene), dioxins and furans (e.g. 2,3,7,8-TCDF and 2,3,7,8-TCDD), carbonyl compounds (e.g. formaldehyde), polycyclic aromatic hydrocarbons (e.g. benzo(a)pyrene), and hexavalent chromium. Five distinct methods were used to analyse the collected samples for target TAPs (please refer to Table B4 for details). All these methods have stringent QA/QC criteria to ensure the data quality. Sampling media used include stainless steel canisters, Sep-Pak cartridges, polyurethane foams and bicarbonate impregnated filters. TAP samples are analysed by the Government Laboratory.

Table B1. Fixed Network Monitoring Stations: Site Information

Monitoring Station	Address	Area Type	Sampling Height (Above P.D.H.K.)	Above Ground	Date Start Operation
Central/Western (Upper Level Police Station)	1 High Street, Sai Ying Pun	Urban : Mixed residential/commercial	78m	18m (4 floors)	Nov 83
Eastern (Sai Wan Ho Fire Station)	20 Wai Hang Street, Sai Wan Ho	Urban : Residential	28m	15m (4 floors)	Jan 99
Kwai Chung (Kwai Chung Police Station)	999 Kwai Chung Road, Kwai Chung	Urban : Mixed residential/ commercial/industrial	19m	13m (2 floors)	Jan 99
Kwun Tong (City District Office)	6 Tung Yan Street, Kwun Tong	Urban : Mixed residential/ commercial/industrial	34m	25m (6 floors)	Jul 83
Sham Shui Po (Police Station)	37A Yen Chow Street, Sham Shui Po	Urban : Mixed residential/commercial	21m	17m (4 floors)	Jul 84
Tsuen Wan (Princess Alexandra Community Centre)	60 Tai Ho Road, Tsuen Wan	Urban : Mixed residential/ commercial/industrial	21m	17m (4 floors)	Aug 88
Sha Tin (Sha Tin Govt. Secondary School)	11-17 Man Lai Road, Tai Wai, Sha Tin	New Town : Residential	27m	21m (5 floors)	Jul 91
Tai Po (Tai Po Govt. Office Bldg.)	1 Ting Kok Road, Tai Po	New Town : Residential	31m	25m (6 floors)	Feb 90
Tung Chung (Tung Chung Health Centre)	6 Fu Tung Street, Tung Chung	New Town : Residential	34.5m	27.5m (4 floors)	Apr 99
Yuen Long (Yuen Long District Branch Offices Bldg.)	269 Castle Peak Road Yuen Long	New Town : Residential	31m	25m (6 floors)	July 95
Tap Mun (Tap Mun Police Station)	Tap Mun	Background : Rural	26m	11m (3 floors)	Apr 98
Causeway Bay	1 Yee Woo Street, Causeway Bay	Urban Roadside : Busy commercial/residential area surrounded by many tall buildings	6.5m	3m	Jan 98
Central	Junction of Des Voeux Road Central and Chater Road, Central	Urban Roadside : Busy commercial/financial area surrounded by many tall buildings	8.5m	4.5m	Oct 98
Mong Kok	Junction of Nathan Road and Lai Chi Kok Road	Urban Roadside : Busy commercial/residential area surrounded by many tall buildings	8.5m	3m	Jan 01

Note: P.D. = Principal Datum

Table B2. Summary of the Parameters Monitored in the Network (2006)

	PARAMETERS									
STATIONS	SO_2	NO_x	NO	NO_2	CO	O_3	RSP		TSP	MET[3]
							Cont [1]	Hi-Vol [2]		
Central/Western	✓	✓	✓	✓		✓	✓	✓	✓	✓
Eastern	✓			✓		✓	✓			✓
Kwai Chung	✓	✓	✓	✓		✓	✓		✓	✓
Kwun Tong	✓	✓	✓	✓		✓	✓	✓	✓	✓
Sham Shui Po	✓	✓	✓	✓		✓	✓	✓	✓	✓
Tsuen Wan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sha Tin	✓	✓	✓	✓		✓	✓		✓	✓
Tai Po	✓			✓		✓	✓		✓	✓
Tung Chung	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Yuen Long	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tap Mun	✓	✓	✓	✓	✓	✓	✓			
Causeway Bay	✓	✓	✓	✓	✓		✓			
Central	✓	✓	✓	✓	✓		✓			
Mong Kok	✓	✓	✓	✓	✓		✓	✓	✓	✓

Note:
[1] "Cont" denotes continuous monitoring.
[2] "Hi-Vol" denotes high-volume sampling.
[3] "MET" denotes meteorological parameters such as temperature, wind speed, wind direction, etc.

Table B3 List of Equipment Used in Measuring Air Pollutant Concentration

Pollutants	**Measurement Principle**	**Commercial Instrument**
SO_2	UV fluorescence	TECO 43A API 100E
NO, NO_2, NO_x	Chemiluminescence	API 200A
O_3	UV absorption	API 400, API 400A
SO_2, NO_2, O_3	Differential Optical Absorption Spectroscopy	Opsis AR 500 System
CO	Non-dispersive infra-red absorption with gas filter correlation	TECO 48C, API 300
TSP	Gravimetric	General Metals 2310
RSP	a) Gravimetric b) Oscillating microbalance	Graseby Andersen PM10 R&P TEOM Series 1400a-AB-PM10

Table B4 Sampling and Analysis Methods Used in Measuring Toxic Air Pollutants

Toxic Air Pollutants	Sampling and Analysis method	Sampling Instrument	Sampling Media	Sampling Schedule	Sampling Period
Benzene	USEPA Method TO-14A	Xontech 910A / RM 910A	Canister	Twice per month	24 hours
Perchloroethylene	USEPA Method TO-14A	Xontech 910A / RM 910A	Canister	Twice per month	24 hours
1,3-Butadiene	USEPA Method TO-14A	Xontech 910A / RM 910A	Canister	Twice per month	24 hours
Formaldehyde	USEPA Method TO-11A	Xontech 925 / RM 925	DNPH coated silica gel cartridge	Once per month	24 hours
Benzo(a)pyrene	USEPA Method TO-13	Graseby GPS1 / Tisch TE-1000	Polyurethane Foam and XAD-2 resin	Once per month	24 hours
Dioxin	USEPA Method TO-9A	Graseby GPS1 / Tisch TE-1000	Polyurethane Foam	Once per month	24 hours
Hexavalent Chromium	CARB SOP MLD 039	Xontech 920	Bicarbonate Impregnated Filter	Once per month	24 hours

Figure B1: Accuracy of Air Quality Monitoring Network, 2006

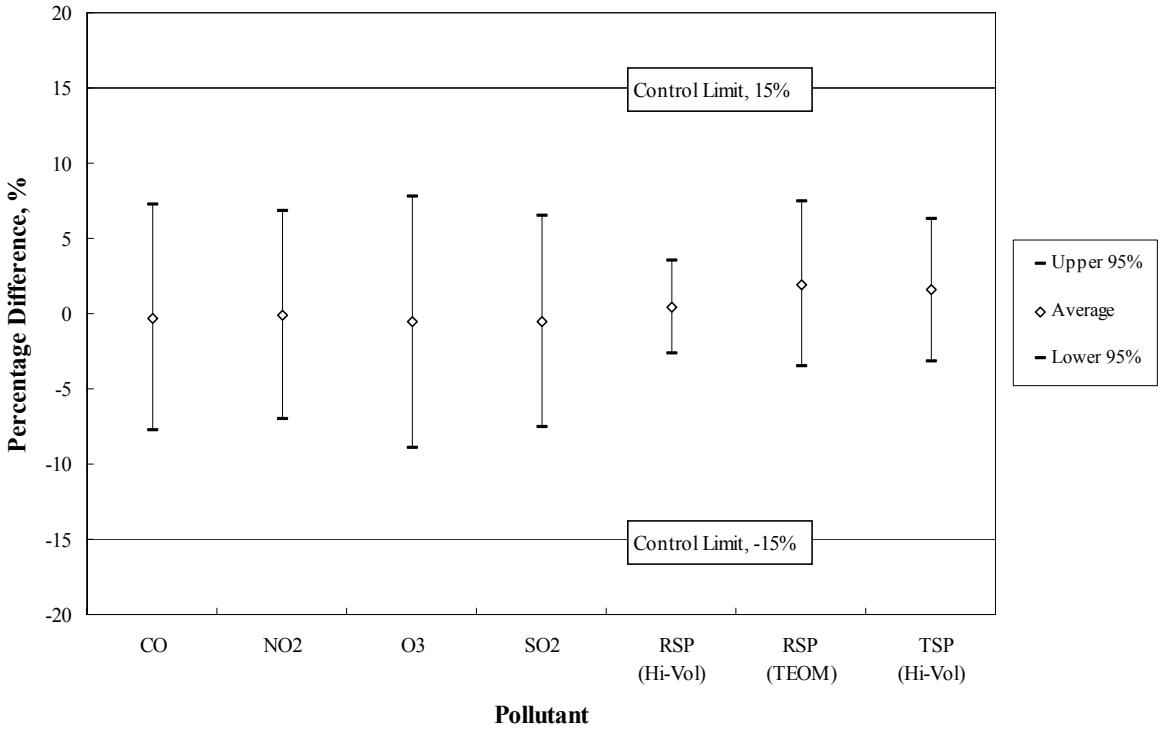
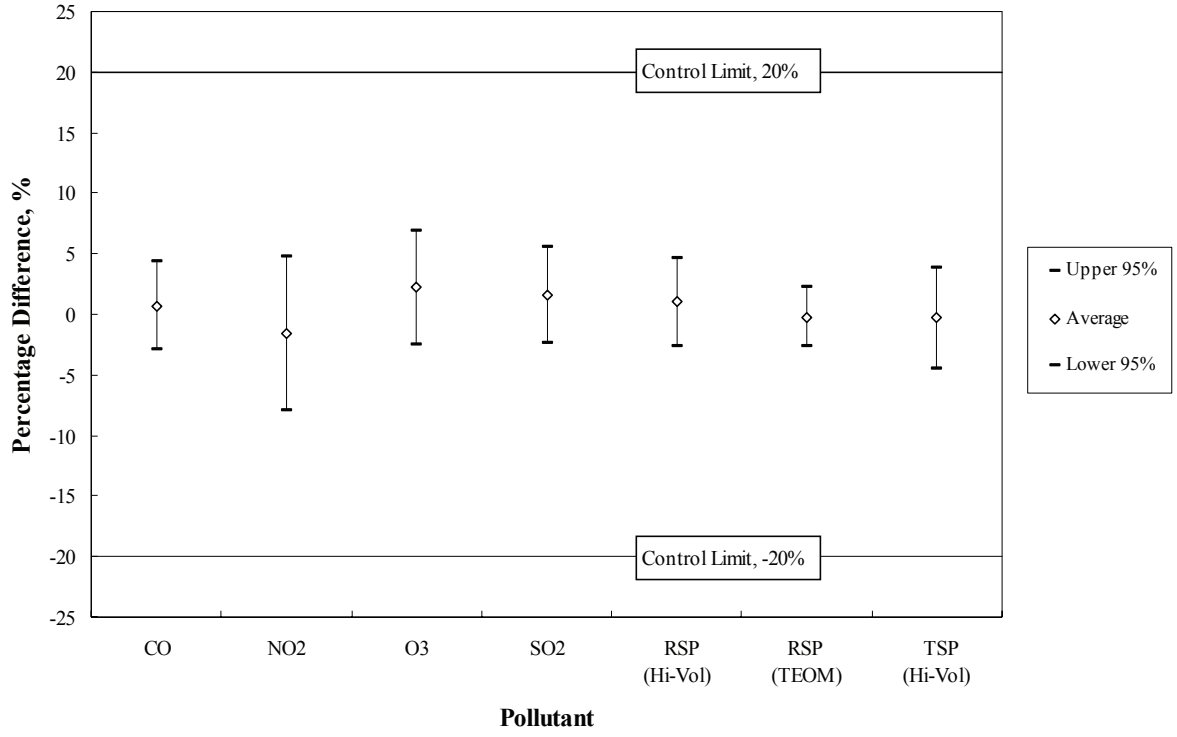


Figure B2: Precision of Air Quality Monitoring Network, 2006



Note: The Control Limits for RSP and TSP are ±10% for both Accuracy and Precision.

Appendix C

Tables of Air Quality Data

TABLE C1: THE HIGHEST 4 HOURLY POLLUTANT CONCENTRATIONS MEASURED IN 2006

Pollutant: Sulphur Dioxide *
(1-hour AQO = 800)

Station	1st High	2nd High	3rd High	4th High
Central / Western	392	313	298	272
Eastern	344	270	220	206
Kwai Chung	345	340	324	305
Kwun Tong	254	240	233	228
Sham Shui Po	321	318	256	256
Tsuen Wan	278	260	259	236
Sha Tin	284	271	226	219
Tai Po	342	318	278	277
Tung Chung	393	374	307	307
Yuen Long	407	385	358	353
Tap Mun	222	188	185	176
Causeway Bay	256	221	200	190
Central	287	264	241	241
Mong Kok	278	268	246	244

Pollutant: Nitrogen Oxides

Station	1st High	2nd High	3rd High	4th High
Central / Western	1022	1011	948	944
Kwai Chung	1154	1019	1012	936
Kwun Tong	1199	933	925	889
Sham Shui Po	1138	1079	1073	1072
Tsuen Wan	1065	971	924	871
Sha Tin	558	535	509	504
Tung Chung	466	422	412	407
Yuen Long	754	732	715	652
Tap Mun	174	161	157	149
Causeway Bay	1586	1413	1372	1355
Central	1776	1766	1742	1690
Mong Kok	1118	1117	1111	1109

Pollutant: Nitric Oxide

Station	1st High	2nd High	3rd High	4th High
Central / Western	581	538	525	510
Kwai Chung	617	563	560	514
Kwun Tong	677	503	498	497
Sham Shui Po	640	587	585	584
Tsuen Wan	623	560	497	477
Sha Tin	288	279	258	254
Tung Chung	209	198	191	183
Yuen Long	401	395	394	359
Tap Mun	60	49	46	45
Causeway Bay	910	779	778	769
Central	1046	1030	1018	978
Mong Kok	625	622	620	615

Note: 1. All concentration units are in micrograms per cubic metre.
2. Shaded 1-hour averages are above their respective AQO.
3. Only the asterisked pollutants have hourly AQO.

Pollutant: Nitrogen Dioxide *
(1-hour AQO = 300)

Station	1st High	2nd High	3rd High	4th High
Central / Western	296	271	264	263
Eastern	216	216	211	210
Kwai Chung	259	231	229	228
Kwun Tong	293	269	263	256
Sham Shui Po	283	264	257	251
Tsuen Wan	261	260	252	252
Sha Tin	239	238	230	230
Tai Po	307	304	302	294
Tung Chung	253	252	241	239
Yuen Long	307	302	279	274
Tap Mun	123	112	104	104
Causeway Bay	318	308	300	298
Central	368	340	337	318
Mong Kok	346	344	338	319

Pollutant: Carbon Monoxide *
(1-hour AQO = 30000)

Station	1st High	2nd High	3rd High	4th High
Tsuen Wan	3140	3070	3060	2910
Tung Chung	3670	3590	3550	3420
Yuen Long	3750	3730	3670	3600
Tap Mun	2170	2130	2130	2130
Causeway Bay	3910	3910	3790	3680
Central	4490	4030	3910	3450
Mong Kok	3790	3340	3340	2990

Pollutant: Ozone *
(1-hour AQO = 240)

Station	1st High	2nd High	3rd High	4th High
Central / Western	306	261	258	248
Eastern	221	217	209	205
Kwai Chung	146	125	124	118
Kwun Tong	209	143	139	138
Sham Shui Po	268	256	249	215
Tsuen Wan	254	229	222	211
Sha Tin	310	276	265	260
Tai Po	251	250	242	240
Tung Chung	302	302	301	299
Yuen Long	335	328	298	290
Tap Mun	370	367	358	357

Pollutant: Respirable Suspended Particulates

Station	1st High	2nd High	3rd High	4th High
Central / Western	274	272	271	267
Eastern	268	252	245	235
Kwai Chung	303	294	293	275
Kwun Tong	294	291	273	234
Sham Shui Po	284	275	266	261
Tsuen Wan	280	278	278	272
Sha Tin	269	247	245	234
Tai Po	323	320	313	309
Tung Chung	314	297	294	291
Yuen Long	293	290	288	287
Tap Mun	208	208	207	202
Causeway Bay	359	315	293	286
Central	393	356	341	324
Mong Kok	299	295	294	284

TABLE C2: THE HIGHEST 2 DAILY POLLUTANT CONCENTRATIONS MEASURED IN 2006

Pollutant: Sulphur Dioxide *
(24-hour AQO = 350)

Station	1st High	2nd High
Central / Western	96	94
Eastern	71	69
Kwai Chung	159	115
Kwun Tong	103	83
Sham Shui Po	123	116
Tsuen Wan	182	90
Sha Tin	112	72
Tai Po	136	105
Tung Chung	209	122
Yuen Long	199	119
Tap Mun	87	65
Causeway Bay	71	70
Central	85	79
Mong Kok	122	111

Pollutant: Nitrogen Dioxide *
(24-hour AQO = 150)

Station	1st High	2nd High
Central / Western	165	148
Eastern	125	108
Kwai Chung	162	142
Kwun Tong	163	143
Sham Shui Po	167	155
Tsuen Wan	177	139
Sha Tin	135	122
Tai Po	162	120
Tung Chung	157	132
Yuen Long	198	157
Tap Mun	63	43
Causeway Bay	196	190
Central	192	190
Mong Kok	201	176

Pollutant: Respirable Suspended Particulates *
(24-hour AQO = 180)

Station	1st High	2nd High
Central / Western	158	151
Eastern	150	142
Kwai Chung	213	140
Kwun Tong	143	143
Sham Shui Po	146	141
Tsuen Wan	227	142
Sha Tin	147	146
Tai Po	173	146
Tung Chung	254	164
Yuen Long	246	169
Tap Mun	138	136
Causeway Bay	187	174
Central	206	191
Mong Kok	161	158

Pollutant: Nitrogen Oxides

Station	1st High	2nd High
Central / Western	441	403
Kwai Chung	527	475
Kwun Tong	433	358
Sham Shui Po	644	467
Tsuen Wan	472	417
Sha Tin	265	249
Tung Chung	321	297
Yuen Long	416	365
Tap Mun	66	54
Causeway Bay	922	814
Central	957	837
Mong Kok	675	570

Pollutant: Nitric Oxide

Station	1st High	2nd High
Central / Western	210	192
Kwai Chung	255	239
Kwun Tong	205	178
Sham Shui Po	323	213
Tsuen Wan	224	193
Sha Tin	115	112
Tung Chung	116	114
Yuen Long	148	143
Tap Mun	13	10
Causeway Bay	502	449
Central	519	478
Mong Kok	349	272

Pollutant: Total Suspended Particulates *
(24-hour AQO = 260)

Station	1st High	2nd High
Central / Western	221	178
Kwai Chung	165	162
Kwun Tong	169	152
Sham Shui Po	227	170
Tsuen Wan	358	166
Sha Tin	185	154
Tai Po	183	147
Tung Chung	160	159
Yuen Long	448	267
Mong Kok	265	226

Pollutant: Ozone

Station	1st High	2nd High
Central / Western	125	110
Eastern	97	96
Kwai Chung	69	56
Kwun Tong	98	95
Sham Shui Po	92	85
Tsuen Wan	97	83
Sha Tin	114	110
Tai Po	94	88
Tung Chung	107	105
Yuen Long	116	99
Tap Mun	165	152

Pollutant: Carbon Monoxide *
(8-hour AQO = 10000)

Station	1st High	2nd High
Tsuen Wan	2778	2676
Tung Chung	3393	3391
Yuen Long	3483	3471
Tap Mun	2060	2056
Causeway Bay	3516	3516
Central	2948	2919
Mong Kok	2528	2500

Note: 1. *All concentration units are in micrograms per cubic metre.*
2. *Values for Carbon Monoxide are 8-hour averages.*
3. *Shaded 24-hour averages are above their respective AQO.*
4. *Only the asterisked pollutants have either 8-hour or 24-hour AQO.*

TABLE C3: 2006 MONTHLY AND ANNUAL AVERAGES OF GASEOUS POLLUTANTS

Pollutant: Sulphur Dioxide (Annual AQO = 80

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Central / Western	21	32	20	30	25	28	23	21	19	17	22	20	23
Eastern	15	18	12	12	12	9	17	16	20	14	16	17	15
Kwai Chung	29	40	29	45	32	35	43	27	25	21	21	21	31
Kwun Tong	15	19	13	18	21	18	24	24	23	14	17	18	19
Sham Shui Po	22	30	25	35	26	26	30	27	20	16	18	12	24
Tsuen Wan	23	33	26	24	22	20	26	23	20	24	21	21	24
Sha Tin	18	22	16	22	18	23	27	19	16	14	21 *		19
Tai Po		23 *	18	16	14	14	25	22	20	15	20	19	19
Tung Chung	36	40	35	19	21	15	14	24	17	23	31	32	25
Yuen Long	28	36	35	22	22	16	25	31	29	24	33	29	28
Tap Mun	16	16	17	14	12	10	18	15	16	16	20	22	16
Causeway Bay	16	23	16	15	12	7	13	19	22	14	18	21	16
Central	26	33	20	18	17	20	26	23	24	15	19	20	22
Mong Kok	17	26	20	29	22	24	29	30	24	23	26	26	25

Pollutant: Nitrogen Oxides

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Central / Western	116	132	121	110	74	63	60	69	82	68	89	96	90
Kwai Chung	160	174	176	192	169	178	163	144	145	135	140	143	160
Kwun Tong	150	158	138	143	125	125	124	118	130	107	123	134	131
Sham Shui Po	161	172	174	138	120	111	100	113	116	107	134	136	132
Tsuen Wan	143	156	169	143	117	119	109	105	106	107	122	123	126
Sha Tin	76	94	84	76	66	68	64	68	75	75	95 *		76
Tung Chung	111	107	109	62	57	49	37	53	65	73	86	94	75
Yuen Long	131	126	150	105	96	98	84	96	89	98	113	130	110
Tap Mun	15	14	21	17	13	13	15	16	16	12	18	20	16
Causeway Bay	467	459	398	388	344	340	354	375	337	324	361	461	384
Central	361	371	346	322	322	307	342	341	361	302	357	391	344
Mong Kok	340	347	334	326	310	308	305	330	326	337	364	400	335

Pollutant: Nitric Oxide

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Central / Western	32	41	35	35	18	20	17	17	20	8	19	20	23
Kwai Chung	63	69	69	89	77	90	78	62	58	44	49	50	66
Kwun Tong	53	57	47	56	47	54	49	42	44	25	36	42	46
Sham Shui Po	54	58	59	49	40	43	35	41	35	23	36	38	42
Tsuen Wan	48	54	63	51	41	50	40	34	30	20	31	31	41
Sha Tin	22	28	24	22	18	24	19	19	21	15	23 *		21
Tung Chung	32	29	30	17	13	17	10	13	14	11	18	17	18
Yuen Long	41	38	48	34	31	40	30	29	25	23	30	37	34
Tap Mun	2	2	2	3	2	1	2	2	3	2	2	2	2
Causeway Bay	236	229	192	196	173	182	184	191	161	137	164	224	189
Central	171	177	161	156	155	160	175	168	168	122	156	175	162
Mong Kok	157	157	149	155	145	159	152	161	147	140	166	184	156

Pollutant: Nitrogen Dioxide (Annual AQO = 80)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Central / Western	67	69	68	56	46	33	34	43	52	56	59	66	54
Eastern	66	68	66	51	44	30	34	44	57	65	67	65	54
Kwai Chung	64	69	70	56	52	39	45	50	56	68	65	67	58
Kwun Tong	68	72	66	58	52	42	49	53	63	69	69	70	61
Sham Shui Po	78	84	83	63	59	45	47	51	63	72	79	78	67
Tsuen Wan	70	74	72	64	54	42	48	53	60	76	75	75	64
Sha Tin	43	52	47	42	38	32	36	39	43	52	59 *		43
Tai Po		59 *	65	53	49	42	48	50	58	64	65	71	57
Tung Chung	63	62	62	36	37	23	22	33	44	56	59	67	47
Yuen Long	69	69	76	54	49	37	39	52	52	64	67	74	58
Tap Mun	12	11	18	13	10	10	13	13	11	9	15	17	13
Causeway Bay	106	109	105	88	80	62	73	84	92	114	110	119	95
Central	100	101	99	84	85	61	74	85	104	115	119	123	96
Mong Kok	100	107	106	89	88	65	72	83	102	123	110	119	97

Pollutant: Carbon Monoxide

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Tsuen Wan	570	540	530	600	270	500	640	650	600	580	830	670	581
Tung Chung	1010	870	1000	680	590	430	620	650	600	780	1040	1090	782
Yuen Long	1280	1190	1220	800	600	460	370	740	610	730	930	1160	841
Tap Mun	1020	650	590	570	580	610	680	530	590	830	1110	940	726
Causeway Bay	1510	1410	1410	1230	1200	1020	1020	1100	1140	1140	1420	1540	1261
Central	1060	1160	990	830	720	650	660	670	630	900	1080	1020	862
Mong Kok	1420	1160	930	710	640	650	710	830	800	1040	1370	1310	958

Pollutant: Ozone

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Central / Western	31	37	40	29	35	21	28	32	50	64	49	39	38
Eastern	21	30	40	34	38	30	30	32	52	61	52	50	40
Kwai Chung	16	21	22	15	16	10	11	14	24	27	29	26	19
Kwun Tong	29	35	37	22	30	12	15	23	39	54	48	37	32
Sham Shui Po	22	24	25	18	22	11	18	19	35	45	34	29	25
Tsuen Wan	17	14	27	19	25	11	16	20	37	41	36	29	24
Sha Tin	40	46	49	33	37	18	23	30	50	60	68 *		40
Tai Po		36 *	46	33	32	17	21	32	45	55	52	41	37
Tung Chung	25	36	37	35	38	25	36	34	48	55	44	33	37
Yuen Long	21	33	30	25	31	16	24	31	45	50	41	33	32
Tap Mun	63	74	74	59	61	38	46	61	75	99	87	74	68

Notes:

1. All units are in micrograms per cubic metre.

2. Asterisked values are below their respective minimum data requirement of 66% for number of data within the period.

3. Shaded monthly averages are below the minimum data requirements for number of data within a quarter.

4. Shaded annual averages are above their respective AQO.

TABLE C4: 2006 MONTHLY AND ANNUAL AVERAGES OF PARTICULATE POLLUTANTS

Pollutant: Total Suspended Particulates (Annual AQO = 80)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Central / Western	84	109	122	50	51	37	36	69	63	101	145	75	78
Kwai Chung	91	107	105	96	54	56	72	41	64	101	99	88	81
Kwun Tong	84	89	111	59	48	37	43	66	64	98	99	97	75
Sham Shui Po	84	86	117	61	60	42	43	78	66	104	144	72	79
Tsuen Wan	97	90	145	90	52	46	52	50	52	94	95	124	82
Sha Tin	58	107	72	48	48	29	34	46	57	87	116		61
Tai Po				93	45	27	55	37	61	98	93	95	66
Tung Chung	93	101	105	84	72	26	51	30	62	103	92	95	75
Yuen Long	141	124	180	88	56	41	46	57	63	120	133	164	101
Mong Kok	114	168	124	96	98	65	70	84	93	141	144	133	110

Pollutant: Respirable Suspended Particulates (Annual AQO = 55)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Central / Western	58	69	74	55	36	24	33	36	45	74	72	64	53
Eastern	51	59	66	50	30	20	31	32	39	65	63	54	47
Kwai Chung	57	67	70	57	41	36	47	44	52	79	76	67	58
Kwun Tong	56	66	70	58	39	28	42	41	48	74	75	62	55
Sham Shui Po	59	68	73	58	40	28	40	40	47	76	73	65	55
Tsuen Wan	57	66	72	53	39	30	42	44	50	80	76	70	57
Sha Tin	54	62	65	52	38	27	40	40	45	75	91 *		52
Tai Po		51 *	68	52	34	24	37	39	47	75	71	64	51
Tung Chung	66	72	75	47	38	24	32	37	49	79	77	76	56
Yuen Long	67	69	80	51	39	28	39	45	54	89	87	89	62
Tap Mun	54	56	61	51	32	22	33	34	44	65	64	61	48
Causeway Bay	83	88	98	84	67	59	71	75	78	103	100	86	83
Central	76	93	103	80	59	48	63	61	66	90	88	77	75
Mong Kok	65	75	85	66	50	38	54	56	60	90	86	74	67

Notes:

1. All units are in micrograms per cubic metre.

2. Asterisked values are below their respective minimum data requirement of 66% for number of data within the period.

3. Shaded monthly averages are below the minimum data requirements for number of data within a quater.

4. Shaded annual averages are above their respective AQO.

TABLE C5: 2006 HOURLY STATISTICS OF MAJOR AIR POLLUTANTS

Pollutant: Sulphur Dioxide

Station	No. of hours	Data capture rate %	<----------Percentiles----------> 10	25	50	75	90	95	98	99	Geometric mean	Arithmetic mean	Highest 1 hour	Highest 24 hour
Central / Western	8657	98.8	6	8	13	24	54	80	113	143	15	23	392	96
Eastern	8304	94.8	4	6	10	17	29	42	70	96	10	15	344	71
Kwai Chung	8596	98.1	6	10	18	39	72	101	141	169	20	31	345	159
Kwun Tong	8430	96.2	6	8	12	19	37	60	93	117	13	19	254	103
Sham Shui Po	8569	97.8	6	8	13	23	57	92	130	155	15	24	321	123
Tsuen Wan	8604	98.2	7	10	16	27	47	68	101	129	17	24	278	182
Sha Tin	7579	86.5	6	8	12	22	40	59	86	108	14	19	284	112
Tai Po	7561	86.3	5	8	12	20	35	53	94	127	13	19	342	136
Tung Chung	8514	97.2	6	10	17	29	52	76	116	147	18	25	393	209
Yuen Long	8607	98.3	9	13	19	30	48	70	133	179	21	28	407	199
Tap Mun	8559	97.7	7	8	12	18	29	40	59	75	13	16	222	87
Causeway Bay	8582	98.0	5	7	12	18	31	44	69	91	12	16	256	71
Central	8597	98.1	7	9	15	25	45	64	92	118	16	22	287	85
Mong Kok	8446	96.4	8	12	17	27	50	74	108	128	19	25	278	122

Pollutant: Nitrogen Oxides

Station	No. of hours	Data capture rate %	<----------Percentiles----------> 10	25	50	75	90	95	98	99	Geometric mean	Arithmetic mean	Highest 1 hour	Highest 24 hour
Central / Western	8647	98.7	24	40	65	103	170	247	379	507	65	90	1022	441
Kwai Chung	8596	98.1	64	94	139	199	275	332	440	522	136	160	1154	527
Kwun Tong	8465	96.6	45	77	114	162	228	282	378	470	108	131	1199	433
Sham Shui Po	8566	97.8	42	77	117	158	219	286	402	510	107	132	1138	644
Tsuen Wan	8604	98.2	39	76	110	153	218	283	386	460	103	126	1065	472
Sha Tin	7622	87.0	20	30	53	95	162	223	301	353	54	76	558	265
Tung Chung	8460	96.6	14	29	58	103	160	200	251	299	52	75	466	321
Yuen Long	8602	98.2	43	62	92	135	197	251	331	380	91	110	754	416
Tap Mun	8302	94.8	4	7	12	20	31	42	61	77	11	16	174	66
Causeway Bay	8601	98.2	155	242	351	487	650	766	914	1005	333	384	1586	922
Central	8590	98.1	116	184	315	451	602	709	881	1053	284	344	1776	957
Mong Kok	8438	96.3	154	249	335	413	492	547	625	692	307	335	1118	675

Pollutant: Nitric Oxide

Station	No. of hours	Data capture rate %	<----------Percentiles----------> 10	25	50	75	90	95	98	99	Geometric mean	Arithmetic mean	Highest 1 hour	Highest 24 hour
Central / Western	8646	98.7	1	3	8	22	58	96	169	243	9	23	581	210
Kwai Chung	8596	98.1	15	28	51	90	134	166	223	274	48	66	617	255
Kwun Tong	8465	96.6	8	18	33	58	96	129	176	237	30	46	677	205
Sham Shui Po	8565	97.8	4	16	32	51	82	120	190	251	26	42	640	323
Tsuen Wan	8604	98.2	4	13	29	53	87	118	185	230	24	41	623	224
Sha Tin	7622	87.0	1	3	8	24	59	90	134	164	9	21	288	115
Tung Chung	8464	96.6	1	3	7	23	53	72	99	121	9	18	209	116
Yuen Long	8602	98.2	6	11	23	43	73	101	141	167	22	34	401	148
Tap Mun	8302	94.8	0	1	1	2	3	5	10	17	2	2	60	13
Causeway Bay	8601	98.2	61	104	166	248	346	413	498	556	154	189	910	502
Central	8590	98.1	36	71	140	222	309	375	476	578	120	162	1046	519
Mong Kok	8438	96.3	60	107	154	199	243	274	320	360	137	156	625	349

Pollutant: Nitrogen Dioxide

Station	No. of hours	Data capture rate %	<----------Percentiles----------> 10	25	50	75	90	95	98	99	Geometric mean	Arithmetic mean	Highest 1 hour	Highest 24 hour
Central / Western	8647	98.7	19	30	49	70	93	113	145	166	45	54	296	165
Eastern	8304	94.8	21	33	54	71	87	99	119	139	47	54	216	125
Kwai Chung	8596	98.1	31	39	53	71	92	111	136	153	53	58	259	162
Kwun Tong	8465	96.6	28	40	57	75	96	112	140	164	54	61	293	163
Sham Shui Po	8566	97.8	30	41	63	86	109	125	152	172	59	67	283	167
Tsuen Wan	8604	98.2	29	41	58	80	105	125	148	164	56	64	261	177
Sha Tin	7622	87.0	16	24	36	56	79	97	121	142	36	43	239	135
Tai Po	7560	86.3	28	38	51	70	92	107	129	145	51	57	307	162
Tung Chung	8460	96.6	10	22	41	64	91	111	140	161	35	47	253	157
Yuen Long	8602	98.2	26	36	51	72	100	122	148	169	51	58	307	198
Tap Mun	8302	94.8	2	5	9	17	27	35	48	58	9	13	123	63
Causeway Bay	8601	98.2	49	67	91	119	144	161	185	206	87	95	318	196
Central	8590	98.1	45	64	91	121	153	173	198	221	87	96	368	192
Mong Kok	8438	96.3	53	67	91	122	148	165	183	199	89	97	346	201

Pollutant: Carbon Monoxide

Station	No. of hours	Data capture rate %	<----------Percentiles----------> 10	25	50	75	90	95	98	99	Geometric mean	Arithmetic mean	Highest 1 hour	Highest 8 hour
Tsuen Wan	8604	98.2	240	390	540	740	970	1100	1280	1480	504	581	3140	2778
Tung Chung	8479	96.8	400	530	700	980	1220	1390	1690	1920	712	782	3670	3393
Yuen Long	8600	98.2	350	530	770	1080	1410	1600	1940	2240	731	841	3750	3483
Tap Mun	8560	97.7	450	550	630	850	1130	1310	1510	1590	681	726	2170	2060
Causeway Bay	8507	97.1	800	920	1150	1490	1840	2070	2410	2640	1192	1261	3910	3516
Central	8596	98.1	230	460	800	1150	1490	1610	1960	2180	738	862	4490	2948
Mong Kok	8324	95.0	460	690	920	1270	1490	1610	1840	1960	870	958	3790	2528

Pollutant: Ozone

Station	No. of hours	Data capture rate %	<----------Percentiles----------> 10	25	50	75	90	95	98	99	Geometric mean	Arithmetic mean	Highest 1 hour	Highest 24 hour
Central / Western	8571	97.8	6	13	30	57	82	97	118	132	26	38	306	125
Eastern	8302	94.8	15	23	34	53	73	84	98	108	33	40	221	97
Kwai Chung	8513	97.2	5	7	13	28	43	52	62	69	14	19	146	69
Kwun Tong	8411	96.0	5	10	25	48	70	83	98	108	21	32	209	98
Sham Shui Po	8547	97.6	3	7	17	36	59	74	92	108	16	25	268	92
Tsuen Wan	8527	97.3	4	6	15	34	58	74	95	109	15	24	254	97
Sha Tin	7547	86.2	2	7	26	65	100	118	137	150	20	40	310	114
Tai Po	7560	86.3	8	14	27	55	82	100	117	131	26	37	251	94
Tung Chung	8452	96.5	4	10	30	53	80	98	127	154	23	37	302	107
Yuen Long	8495	97.0	5	8	20	43	75	97	128	155	19	32	335	116
Tap Mun	8503	97.1	21	36	60	94	122	139	159	172	54	68	370	165

Pollutant: Respirable Suspended Particulates (Continuous monitoring)

Station	No. of hours	Data capture rate %	<----------Percentiles----------> 10	25	50	75	90	95	98	99	Geometric mean	Arithmetic mean	Highest 1 hour	Highest 24 hour
Central / Western	8513	97.2	17	26	46	72	99	120	143	163	43	53	274	158
Eastern	8655	98.8	15	21	40	63	88	107	131	148	37	47	268	150
Kwai Chung	8648	98.7	24	35	51	73	100	117	140	161	50	58	303	213
Kwun Tong	8217	93.8	20	31	48	71	99	118	140	157	46	55	294	143
Sham Shui Po	8605	98.2	21	30	48	73	100	119	141	159	46	56	284	146
Tsuen Wan	8604	98.2	22	31	49	74	100	120	144	169	48	57	280	227
Sha Tin	7626	87.1	19	27	43	69	98	115	138	156	43	52	269	147
Tai Po	7624	87.0	17	25	43	68	99	118	142	159	41	51	323	173
Tung Chung	8585	98.0	18	26	48	75	107	130	158	179	45	56	314	254
Yuen Long	8466	96.6	21	30	52	83	115	140	173	198	50	62	293	246
Tap Mun	8536	97.4	17	24	42	64	90	107	127	142	40	48	208	138
Causeway Bay	8456	96.5	38	57	80	103	131	151	171	185	74	83	359	187
Central	8298	94.7	34	48	68	93	125	149	179	211	66	75	393	206
Mong Kok	8398	95.9	27	41	61	86	115	134	158	173	58	67	299	161

Note: *1. All concentration units are in micrograms per cubic metre.*
2. Annual averages calculated from less than 8 representative months are not published.

TABLE C6: 2006 TOTAL WET AND DRY DEPOSITION

(a) WET DEPOSITION

	Monitoring Station	Central / Western	Kwun Tong	Yuen Long
	WET DEPOSITION (TON/HA)	25863	25086	22334
	WEIGHTED MEAN pH (based on volume-weighted mean hydrogen ion concentrations ($[H^+]$)	4.59	4.51	4.57
	WEIGHTED MEAN pH (based on volume-weighted mean pH)	4.85	4.79	4.76
	NO. OF SAMPLES	96	97	94
Filtrate (Kg/Ha)	**NH_4^+**	7.14	9.17	7.22
	NO_3^-	21.98	27.84	19.88
	$SO_4^=$	43.22	49.92	38.43
	Cl^-	33.34	30.26	15.95
	F-	0.73	0.87	0.74
	Na^+	17.81	16.75	9.36
	K^+	6.48	6.39	5.55
	Formate	4.72	4.86	3.77
	Acetate	4.10	3.82	3.38
	Ca^{++}	4.42	3.86	3.45
	Mg^{++}	2.33	2.16	1.27

(b) DRY DEPOSITION

	Monitoring Station	Central / Western	Kwun Tong	Yuen Long
	NO. OF SAMPLES	26	26	26
Filtrate (Kg/Ha)	**NH_4^+**	0.48	0.44	0.67
	NO_3^-	12.24	11.46	9.63
	$SO_4^=$	14.73	10.06	12.27
	Cl^-	15.63	10.91	5.48
	F-	0.159	0.129	0.225
	Na^+	10.06	6.79	3.35
	K^+	0.84	0.67	0.66
	Formate	0.16	0.16	0.16
	Acetate	0.16	0.16	0.16
	Ca^{++}	8.67	7.31	7.68
	Mg^{++}	1.43	1.01	0.68

** Note: The weighted mean pH is calculated from the pH values measured by the Government Laboratory.*

TABLE C7: 2006 DIURNAL VARIATIONS OF AIR POLLUTANTS

Pollutant: Sulphur Dioxide

Station	Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
Central / Western	20	19	19	20	19	19	19	22	25	26	27	25	26	25	27	26	26	26	25	23	23	22	23	23
Eastern	13	13	12	12	12	12	13	16	15	15	17	17	16	17	15	16	16	17	15	16	17	17	14	13
Kwai Chung	28	25	23	24	22	21	22	24	28	31	34	35	35	36	38	39	38	37	36	36	34	31	30	29
Kwun Tong	16	15	15	14	14	14	15	17	19	20	22	21	21	22	22	23	23	22	20	19	19	18	18	17
Sham Shui Po	22	21	20	21	20	20	21	23	24	25	27	26	25	25	26	26	26	24	26	26	26	25	23	22
Tsuen Wan	20	18	17	18	17	17	18	20	24	26	28	29	29	29	30	30	30	29	27	25	23	22	21	21
Sha Tin	17	17	16	15	15	14	15	17	20	21	23	23	22	21	22	23	24	24	22	21	20	19	18	17
Tai Po	16	15	14	14	14	14	16	18	20	21	22	23	22	21	21	21	21	22	21	20	20	18	17	17
Tung Chung	21	20	20	21	19	19	19	21	24	27	29	30	30	31	32	32	34	31	28	27	26	25	24	23
Yuen Long	21	20	21	22	20	21	21	24	28	30	33	34	35	35	35	35	36	34	31	28	26	25	24	24
Tap Mun	14	13	13	15	15	15	15	16	19	21	22	22	21	20	17	17	17	15	14	13	13	13	14	14
Causeway Bay	14	14	13	13	12	13	15	17	19	19	19	20	19	19	19	19	19	17	16	15	15	15	14	14
Central	19	17	15	17	15	15	16	21	28	27	26	26	24	24	24	26	27	26	25	22	22	22	20	20
Mong Kok	21	20	20	20	20	20	21	23	25	28	30	29	29	28	29	29	29	28	27	25	24	23	23	23

Pollutant: Nitrogen Oxides

Station	Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
Central / Western	90	67	55	49	46	47	59	90	115	116	112	97	89	84	87	91	93	103	112	120	119	111	106	100
Kwai Chung	145	118	103	94	89	94	127	170	199	200	184	177	165	161	173	181	185	190	200	197	179	170	168	163
Kwun Tong	120	80	66	61	57	68	115	161	178	169	152	134	130	129	140	144	159	173	179	169	149	138	141	136
Sham Shui Po	118	86	73	67	64	70	110	148	170	167	153	142	132	131	137	145	156	163	171	169	156	152	146	137
Tsuen Wan	110	72	59	51	49	58	100	137	166	170	154	143	131	131	137	141	153	168	176	167	149	139	136	128
Sha Tin	92	71	59	52	50	55	81	101	98	80	69	59	54	54	58	62	67	76	86	95	100	99	100	97
Tung Chung	80	64	53	46	44	53	72	86	88	79	77	78	74	73	72	72	75	80	91	93	92	87	87	86
Yuen Long	114	94	81	70	66	75	111	139	131	111	100	94	89	91	95	100	114	126	141	144	138	135	135	133
Tap Mun	15	14	14	16	16	16	16	17	20	20	20	18	16	15	14	14	15	15	15	15	14	14	15	15
Causeway Bay	329	252	227	193	182	179	273	436	489	479	449	437	412	424	406	423	437	455	477	482	461	447	448	413
Central	287	204	174	151	149	148	216	335	485	472	434	401	368	366	375	405	409	443	469	447	406	384	369	348
Mong Kok	312	214	193	167	160	158	262	361	409	416	383	357	347	362	383	390	415	445	450	394	354	358	385	377

Pollutant: Nitric Oxide

Station	Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
Central / Western	25	17	12	10	10	10	14	26	38	39	35	27	23	19	19	20	18	22	25	31	32	31	30	28
Kwai Chung	62	49	41	37	35	37	54	77	92	92	81	75	66	63	67	69	71	74	81	82	74	71	71	70
Kwun Tong	42	24	18	17	15	20	41	65	75	70	59	48	45	42	46	47	53	59	63	59	51	47	50	48
Sham Shui Po	36	24	20	18	17	20	36	55	67	65	57	49	41	39	41	42	46	49	53	53	49	49	47	44
Tsuen Wan	34	18	13	12	11	14	33	51	67	69	59	50	41	39	39	40	45	52	58	55	48	45	45	42
Sha Tin	30	20	15	12	12	15	27	37	34	24	19	14	12	12	12	13	13	15	20	26	30	30	32	31
Tung Chung	23	16	11	10	9	13	23	29	28	23	20	19	17	14	13	12	12	14	18	21	23	22	24	25
Yuen Long	39	29	25	20	19	23	41	55	49	37	30	26	23	22	22	23	27	31	39	43	43	44	46	47
Tap Mun	1	1	2	2	2	2	2	3	4	4	4	3	2	2	2	2	2	2	1	1	1	1	1	1
Causeway Bay	160	118	104	87	81	80	132	225	256	247	228	217	200	205	192	201	210	221	236	241	230	225	226	208
Central	134	89	73	62	61	61	97	163	250	240	213	190	169	165	169	184	189	210	226	216	196	185	178	168
Mong Kok	147	93	81	68	64	63	122	179	206	207	184	165	156	162	172	174	190	209	214	185	164	167	186	183

Pollutant: Nitrogen Dioxide

Station	Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
Central / Western	51	41	36	33	31	31	37	50	57	57	58	56	54	54	57	61	65	69	73	73	70	64	61	57
Eastern	52	44	37	34	32	35	47	58	58	56	54	53	53	53	57	62	67	70	71	69	67	65	59	56
Kwai Chung	51	44	40	37	36	38	44	52	57	60	60	62	63	66	71	76	76	77	75	72	66	61	59	56
Kwun Tong	57	44	38	35	34	38	53	62	63	63	62	61	61	64	70	73	78	82	83	78	71	66	65	62
Sham Shui Po	62	48	43	39	38	41	55	64	68	68	67	67	68	71	75	80	86	88	90	87	81	77	73	69
Tsuen Wan	57	44	38	34	33	36	50	58	63	65	65	66	68	72	77	80	85	88	88	83	75	70	67	64
Sha Tin	46	40	36	33	31	33	40	45	46	43	40	37	35	36	39	42	47	52	55	55	55	53	51	49
Tai Po	56	50	43	41	41	43	51	60	60	55	51	48	47	48	50	54	62	72	79	78	73	67	64	61
Tung Chung	45	39	36	32	30	33	38	42	44	44	46	48	49	52	53	54	56	59	63	61	57	53	50	48
Yuen Long	55	49	44	40	37	40	48	55	57	55	53	54	54	57	61	65	73	79	81	78	72	68	65	61
Tap Mun	13	12	12	13	13	13	13	13	14	15	15	14	13	12	11	11	12	12	13	13	12	12	13	13
Causeway Bay	84	72	67	61	58	57	71	91	98	101	100	105	105	111	112	115	116	117	117	113	110	104	103	96
Central	83	68	62	56	56	55	68	86	103	105	109	111	110	113	117	124	121	122	122	117	107	102	97	92
Mong Kok	87	73	68	63	62	62	76	87	94	99	102	105	108	114	120	123	124	125	122	112	104	102	101	97

Pollutant: Carbon Monoxide

Station	Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
Tsuen Wan	550	490	460	430	440	460	540	610	660	640	610	570	550	550	560	570	600	630	680	700	690	670	650	600
Tung Chung	750	750	740	760	740	750	750	780	790	780	790	800	800	810	810	810	810	800	810	810	810	790	790	770
Yuen Long	850	800	790	760	740	750	800	890	890	840	810	800	780	780	790	800	820	860	920	940	940	940	940	920
Tap Mun	700	700	710	710	710	720	750	760	760	750	750	750	750	740	730	720	720	720	710	710	710	710	710	710
Causeway Bay	1390	1480	1420	1290	1210	1100	1010	1040	1120	1190	1250	1260	1240	1270	1240	1250	1230	1240	1310	1370	1400	1370	1310	1280
Central	870	720	600	510	460	450	500	620	820	970	1040	960	920	1000	990	1000	940	1000	1090	1020	1120	1130	1020	950
Mong Kok	1000	1070	1010	870	870	870	860	870	940	990	940	900	860	900	940	970	990	1020	1050	1050	1020	1020	1010	980

Pollutant: Ozone

Station	Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
Central / Western	35	41	44	46	46	45	38	27	23	27	32	42	48	54	54	51	46	38	31	29	28	30	30	31
Eastern	36	40	44	46	46	42	34	27	28	32	39	44	48	51	53	51	45	40	37	35	34	33	35	35
Kwai Chung	18	23	24	25	25	22	17	13	12	14	18	21	24	25	24	23	21	17	15	14	15	16	16	17
Kwun Tong	29	37	40	41	41	36	24	18	19	23	30	37	42	45	43	41	34	28	23	24	27	28	27	26
Sham Shui Po	22	31	34	35	35	32	20	14	14	19	24	30	35	37	37	33	27	21	16	15	16	17	17	18
Tsuen Wan	19	29	32	34	34	29	18	14	15	19	24	30	34	36	38	35	29	22	16	15	16	17	17	16
Sha Tin	28	32	34	35	34	30	24	21	25	35	45	56	65	67	66	63	56	48	41	36	32	31	30	28
Tai Po	28	30	32	32	31	28	23	20	25	34	43	53	61	64	65	62	54	42	33	29	28	29	28	27
Tung Chung	28	31	33	35	33	30	25	22	24	30	36	43	52	60	66	67	59	47	35	29	28	28	28	28
Yuen Long	21	24	26	28	27	24	18	16	19	27	37	49	60	63	62	58	48	36	25	21	20	19	19	19
Tap Mun	56	54	53	50	48	47	46	48	53	60	69	79	88	93	96	95	91	87	81	74	69	65	62	59

Pollutant: Respirable Suspended Particulates (Continuous Monitoring)

Station	Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
Central / Western	49	46	44	44	44	44	46	50	54	56	58	56	55	57	60	61	61	61	60	59	58	55	52	51
Eastern	43	42	41	40	40	41	43	45	45	47	47	48	48	49	51	52	52	52	51	51	50	49	47	45
Kwai Chung	51	47	46	45	46	48	52	55	58	59	58	58	58	59	62	66	70	71	70	69	65	61	57	54
Kwun Tong	50	47	46	45	45	46	49	53	56	58	58	56	56	58	60	61	62	62	62	62	60	56	54	52
Sham Shui Po	50	48	46	46	46	47	50	53	55	57	57	57	56	57	60	62	65	65	65	65	62	57	55	52
Tsuen Wan	49	46	45	44	44	45	48	51	56	59	61	61	59	63	67	67	70	70	66	65	62	57	54	52
Sha Tin	50	48	47	46	46	47	49	50	51	50	52	52	51	53	55	57	57	57	57	56	56	55	53	51
Tai Po	47	45	44	44	44	45	48	53	53	52	51	52	52	52	54	54	55	56	56	57	56	53	50	48
Tung Chung	50	49	47	47	47	48	50	52	53	54	55	58	60	64	66	68	68	66	63	61	59	56	55	52
Yuen Long	55	53	51	51	51	52	56	61	65	66	67	68	68	67	69	70	69	68	66	65	63	62	60	58
Tap Mun	44	44	44	44	44	45	47	48	50	52	52	53	54	53	52	53	51	50	49	48	47	46	46	45
Causeway Bay	73	59	54	51	51	52	63	77	86	91	90	88	83	92	94	97	101	104	107	107	102	95	92	86
Central	64	58	55	54	56	57	63	72	84	88	84	82	74	80	86	89	92	92	89	85	80	77	73	70
Mong Kok	58	51	48	47	47	49	55	64	70	72	72	69	68	73	76	77	82	84	83	82	78	73	68	64

Note: All concentration units are in micrograms per cubic metre.

TABLE C8: 2006 AMBIENT LEVELS OF TOXIC AIR POLLUT

Toxic Air Pollutants	Concentration Unit	Annual Averages [1]	
		Tsuen Wan	Central/Western
Heavy Metals			
Hexavalent chromium	ng/m^3	0.12	0.12
Lead [2]	ng/m^3	68	51
Organic Substances			
Benzene	$\mu g/m^3$	1.78	1.72
Benzo[a]pyrene	ng/m^3	0.29	0.15
1,3-Butadiene	$\mu g/m^3$	0.21	0.15
Formaldehyde	$\mu g/m^3$	3.91	3.54
Perchloroethylene	$\mu g/m^3$	0.75	1.29
Dioxins [3]	$pgI\text{-}TEQ/m^3$	0.066	0.060

Note:

[1] For TAP concentrations that are lower than the method detection limit (MDL), one half of the MDL is used in calculating the annual averages.

[2] For lead the reported figures are the respective 2006 annual average concentrations in the elemental analysis of total suspended particulates.

[3] The ambient level of dioxins is expressed here as toxic equivalent (I-TEQ) concentration of 2,3,7,8-Tetrachlorodibenzodioxin (TCDD) based on the International Toxic Equivalent Factors (I-TEF) of the North Atlantic Treaty Organisation (NATO/CCMS).

Appendix D

Monitoring Results of Sulphur Dioxide and Nitrogen Dioxide by HEC and CLP

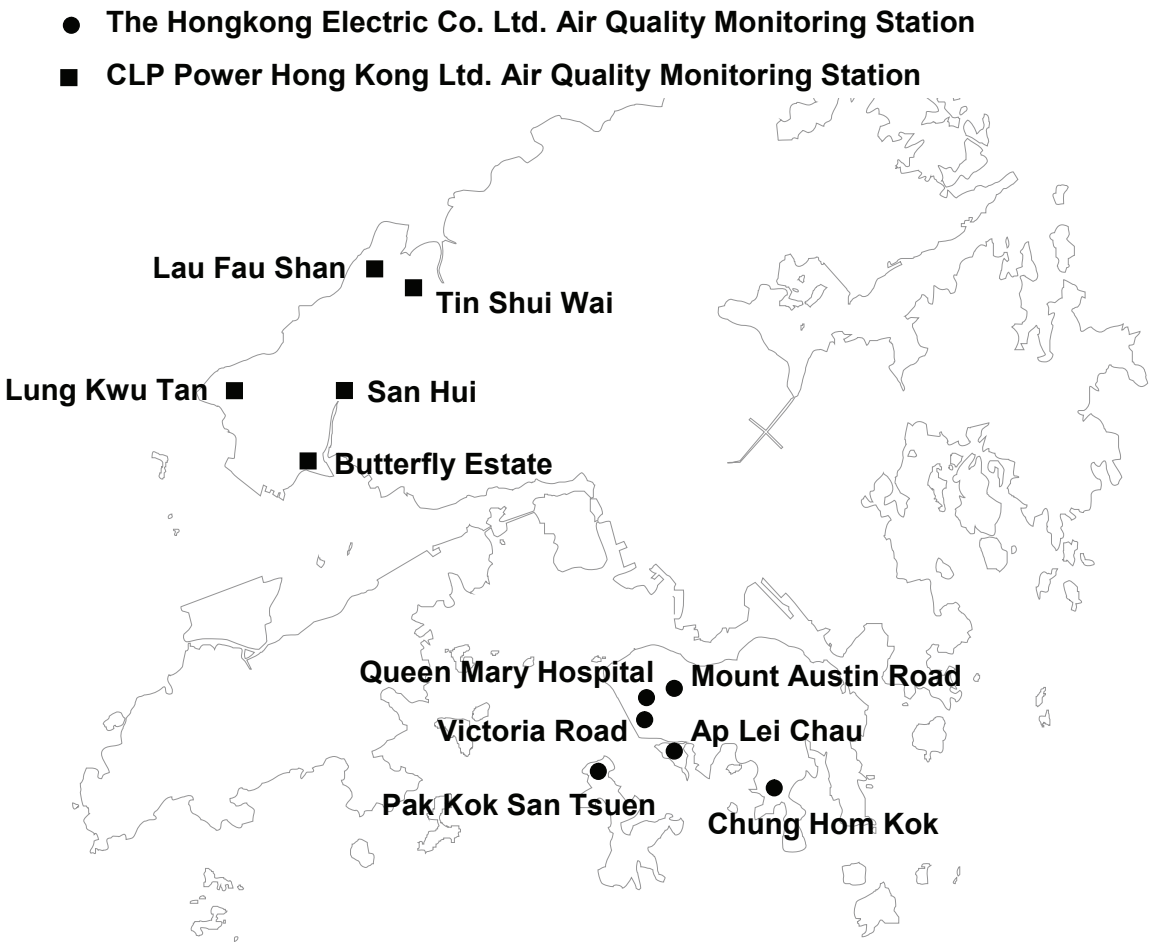


Figure D1 Location of HEC's & CLP's Air Quality Monitoring Stations for Sulphur Dioxide and Nitrogen Dioxide

D.1 The Hongkong Electric Co. Ltd. (HEC)

Air Quality Monitoring Stations	Annual Mean Concentration [1]	Range of Monthly Mean Concentration [1]
Sulphur Dioxide (SO_2) [2]		
Mount Austin Road [4]	--	20 - 35
Chung Hom Kok	15	3 - 35
Victoria Road	20	14 - 30
Queen Mary Hospital	15	11 - 25
Ap Lei Chau	12	7 - 18
Pak Kok San Tsuen [5]	--	8 - 45
Nitrogen Dioxide (NO_2) [2]		
Mount Austin Road [4]	--	11 - 40
Chung Hom Kok	22	12 - 42
Victoria Road	34	19 - 53
Queen Mary Hospital	30	9 - 50
Ap Lei Chau	20	9 - 33
Pak Kok San Tsuen [5]	--	10 - 38

D.2 CLP Power Hong Kong Ltd. (CLP)

Air Quality Monitoring Station	Annual Mean Concentration [1]	Range of Monthly Mean Concentration [1]
Sulphur Dioxide (SO_2) [2]		
San Hui	28	7 - 49
Tin Shui Wai	23	7 - 57
Butterfly Estate	17	5 - 26
Lung Kwu Tan	12	2 - 27
Lau Fau Shan [6]	--	12 - 27
Nitrogen Dioxide (NO_2) [3]		
San Hui	70	46 - 93
Tin Shui Wai	43	33 - 64
Butterfly Estate	41	21 - 63
Lung Kwu Tan	19	5 - 33
Lau Fau Shan [6]	--	29 - 52

Notes:

[1] All concentration units are in micrograms per cubic metre.

[2] There was no exceedance of AQO level in 2006.

[3] San Hui station recorded 2 counts of exceedance of 24-hour AQO limit for NO_2.

[4] Air monitoring discontinued in August 2006. There were insufficient data for the calculation of annual average.

[5] Air monitoring discontinued in October 2006. There were insufficient data for the calculation of annual average.

[6] Air monitoring commenced in July 2006. There were insufficient data for the calculation of annual average.