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FINAL DRAFT



ENVIRONMENTAL IMPACT ASSESSMENT

BORG EL ARAB LANDFILL GAS FLARING CDM PROJECT

Prepared By

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August 2005

SCOPED ENVIRONMENTAL IMPACT ASSESSMENT

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Onyx Alexandria has been responsible for municipal solid waste management in Alexandria governorate since 2001. Onyx has signed a 15 years contract with Alexandria governorate to collect, transfer, treat and dispose the municipal waste generated in Alexandria city and its districts. Onyx is using two landfills, one is located in Al-Hammam city while the other is located in Borg El-Arab city.

Borg El-Arab landfill is located 60 km to the west of Alexandria city on Alexandria-Matrouh road. In 2000, Alexandria governorate conducted an environmental impact assessment study for Borg El-Arab site. The study was reviewed by the Egyptian Environmental Affairs Agency (EEAA) and a letter of approval for the project was issued. According to the EIA, the landfill life time was estimated at 12 years. The average quantity of waste disposed of in the landfill is 2,200 t/d.

In 2003, it was decided to install an onsite leachate evaporator at the Borg El Arab facility. The evaporator technology uses extracted landfill methane as a fuel to evaporate the leachate collected from the existing and future lined disposal areas. The recovered landfill gas will mainly be used for the evaporation process. The excess landfill gas will be flared. This system has been approved by EEAA.

The **project objective** is to maximise the capture of landfill gas (LFG) from the landfill site. In addition to reducing the potential local impacts of odours and explosion or fire hazard associated with landfill gas, the project is aimed at reducing the fugitive emissions of methane, a greenhouse gas which contributes to global warming and climate change.

The **project activity** includes the installation of enhanced landfill gas extraction and flaring equipment for the destruction of the landfill methane that is collected from the existing and future disposal areas instead of releasing it to the atmosphere.

This project is intended to be qualified as a Clean Development Mechanism (CDM) project. As for local environment, the project involve activities that help achieve sustainable development goals of Egypt.

According to Law 4/94, an environmental impact assessment (EIA) study has to be conducted for new projects and project extensions. Therefore, Onyx Alexandria is conducting this EIA to investigate the environmental consequences, identify impacts, and to propose mitigation measures for the proposed CDM project activity. The report content is in line with the Egyptian environmental impact assessment guidelines.

The EIA guidelines provide a list of projects for which EIA reports are required. These projects are classified into three categories. Flaring of landfill gas in landfills is included in category B. Project which are listed in this category are required to conduct a scoped EIA where more focus on environmental aspects, setting mitigation measures as well as a monitoring plan should be done.

Section 2

Description of the Environment

2.1 SITE LOCATION

Borg Al-Arab Landfill site is located some 60 km away from the city of Alexandria to the west of the city (30°55'15.55"N, 29°26'34.73"E). The total area of the site is approximately 375,000 squared meters (2,500 m X 150 m). The site was a quarry used by Amerya Cement Company with an average depth of 15 m.

The site is located in an area close to Borg Al-Arab industrial zone and new Borg Al-Arab city. It is also close to a tourist area, where several hotels and recreational establishments exist. Few years ago, the site witnessed a controversial debate about the operational management of the landfill due to complaints received from the surrounding tourist villages. As a result, Alexandria governorate dedicated another site south of Al-Hammam city to be used during summer time instead of Borg El-Arab site. The location of the site is presented in Figure 2.1, shown below.

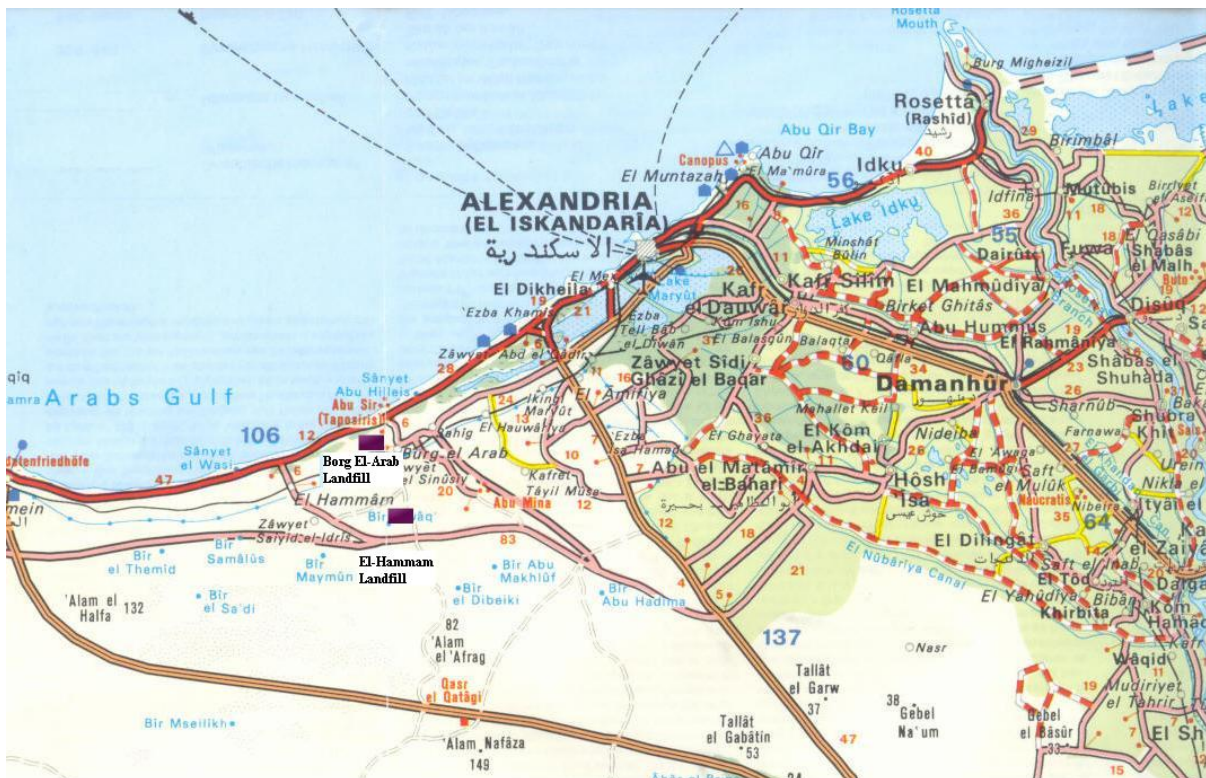


Figure 2.1. Location of Borg El-Arab Landfill

2.2 SITE LIFETIME

The landfill is designed to accommodate all municipal wastes from Alexandria governorate which amounts to 2,200 t/d. The landfill receives wastes during winter and

fall time only (October 1st- May 1st). It is proposed that the site will receive waste for the coming 12 years.

2.3 SITE CHARACTERISTICS

2.3.1 Climate

The climate in the site location is semi-arid Mediterranean climate. This type of climate is characterized by a brief, mild, rainy winter and long warm summer months with no rain.

2.3.2 Air Temperature

The monthly mean values of air temperature is shown in table 2.1. The variation of the monthly mean air temperature indicates a range from 14.1 °C in January to 31.5 °C in August.

Table 2.1. Mean Monthly Temperature at Borg El-Arab

Month	Mean Temp. (°C)
January	14.1
February	16
March	16.7
April	17.7
May	21.5
June	25.9
July	29.9
August	31.5
September	25.2
October	23
November	19
December	16

2.3.3 Rainfall

The annual rainfall at Borg El-Arab ranges from 180 to 250 mm/year, with most precipitation occurring in January. The maximum daily rainfall in the area is 10-12 mm. Monthly precipitation at Borg El-Arab are given in table 2.2, shown below.

Table 2.2. Monthly Precipitation at Borg El-Arab

Month	Precipitation (mm)
January	84.8
February	86
March	0.8
April	0.9
May	0.8
June	0.0
July	0.0
August	0.0
September	0.0
October	0.0
November	4.0
December	68.4

2.3.4 Wind Direction

The prevailing wind direction is North-Western. Figure 2.2 through 2.12 depict the wind roses for all months of the year.

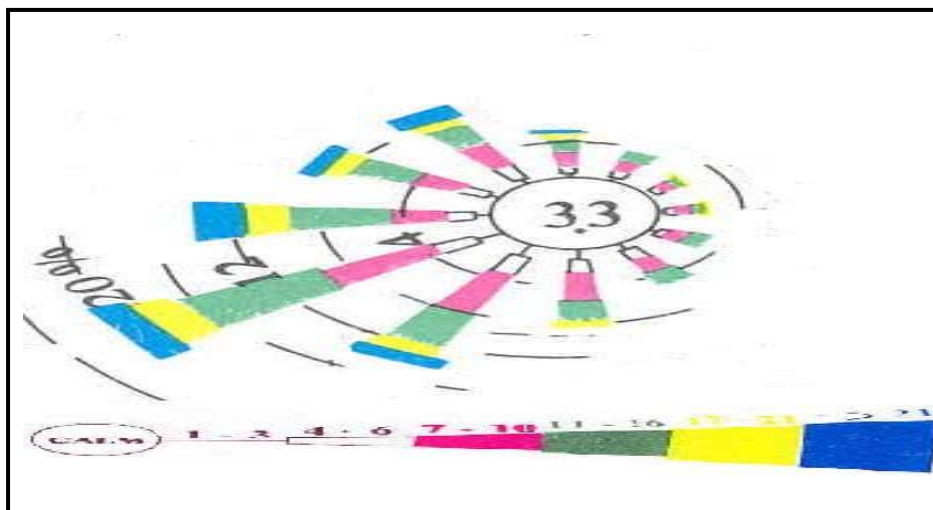


Figure 2.2 Wind Rose For January At Borg Al- Arab

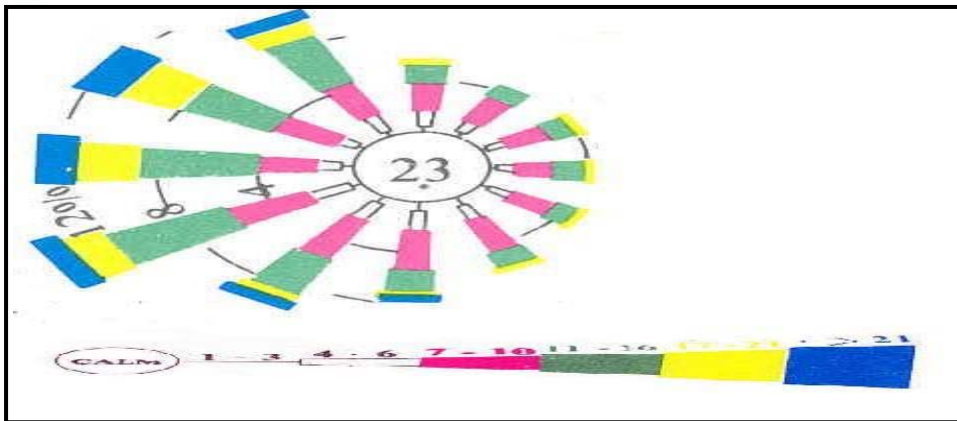


Figure 2.3 Wind Rose for February At Borg Al- Arab

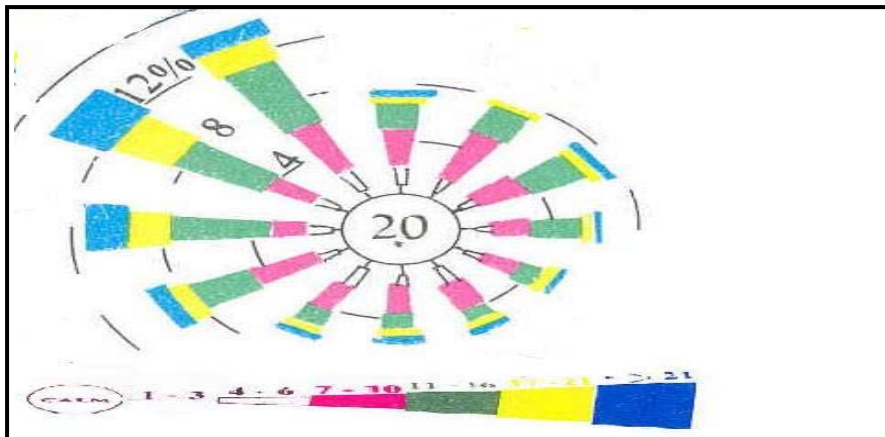


Figure 2.4. Wind Rose for March At Borg Al- Arab

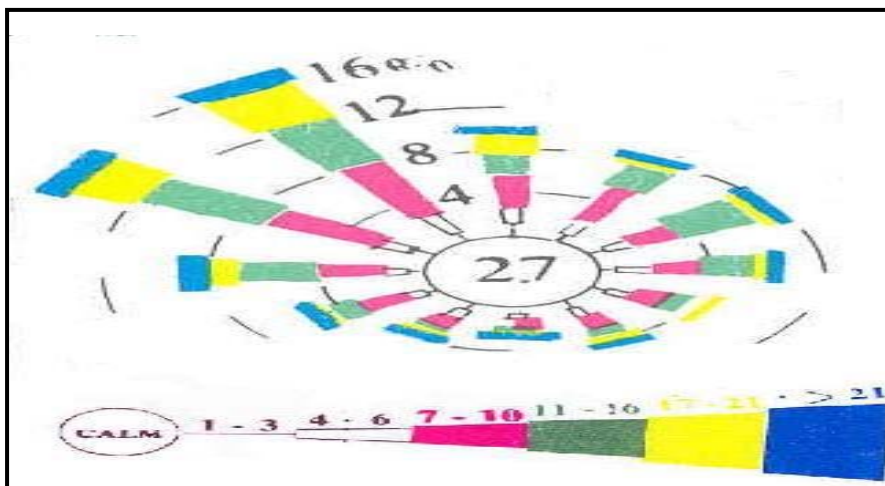


Figure 2.5. Wind Rose for April At Borg Al- Arab

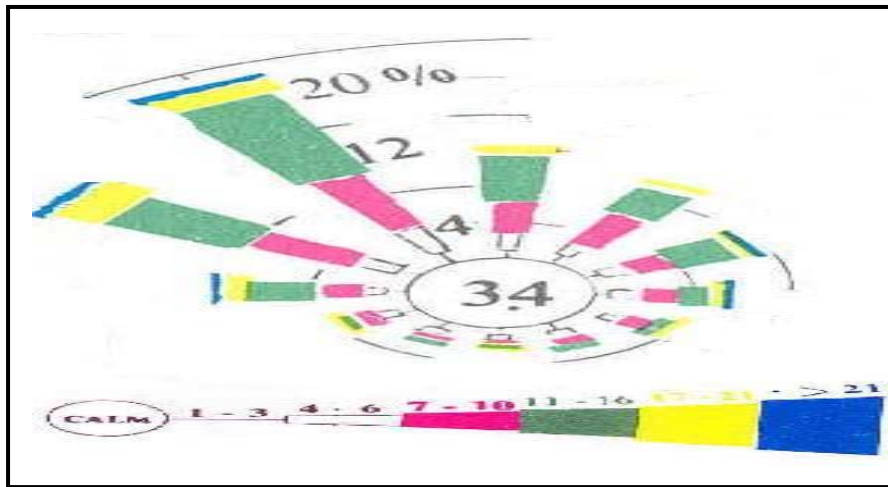


Figure 2.6. Wind Rose for May At Borg Al- Arab

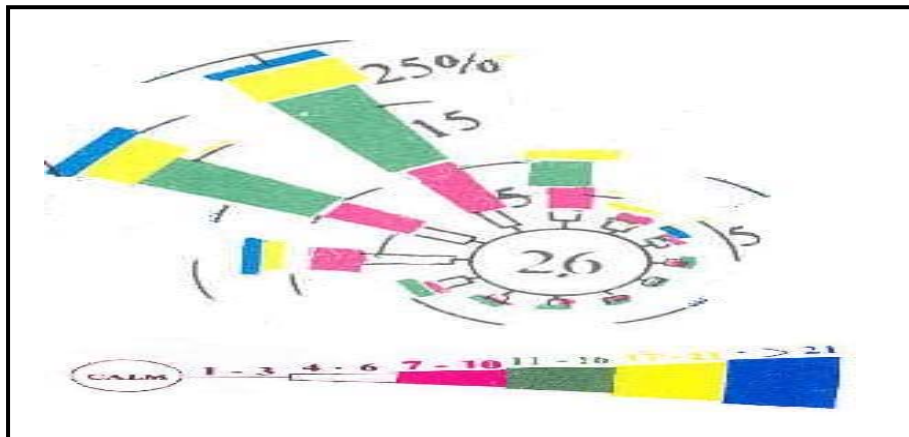


Figure 2.7. Wind Rose for June At Borg Al- Arab

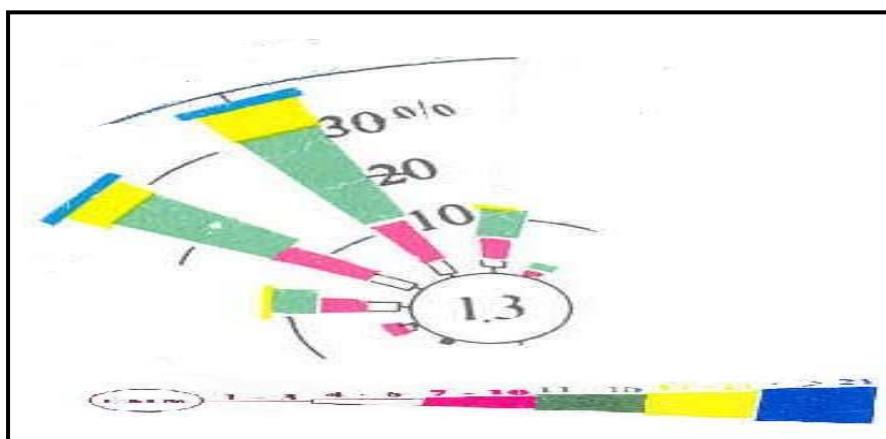


Figure 2.8. Wind Rose for July At Borg Al- Arab

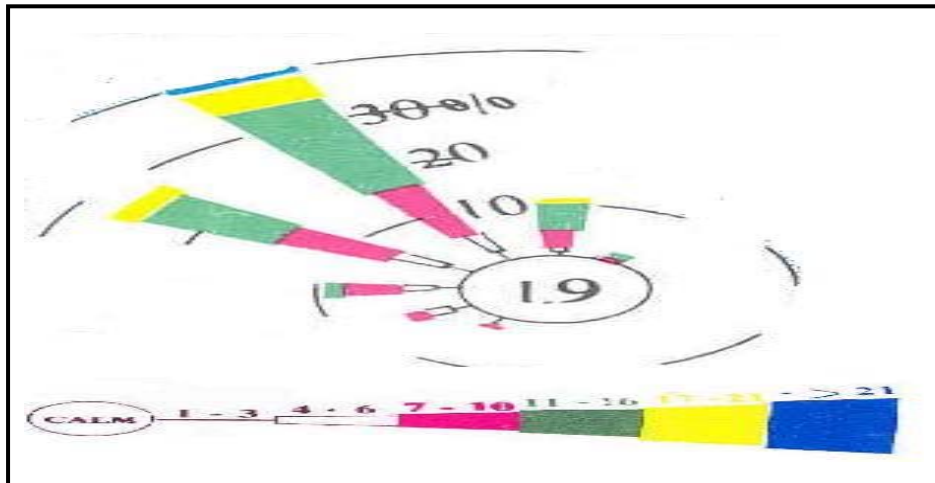


Figure 2.9. Wind Rose for August At Borg Al- Arab

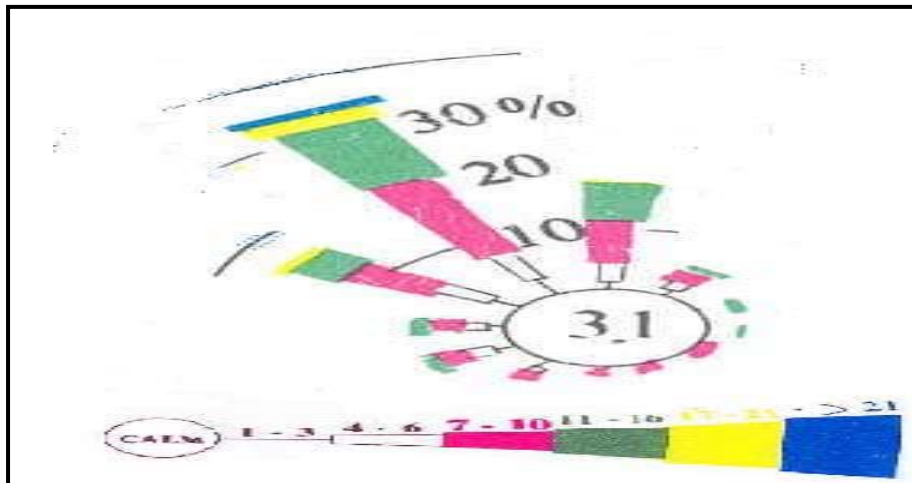


Figure 2.10. Wind Rose for September At Borg Al- Arab

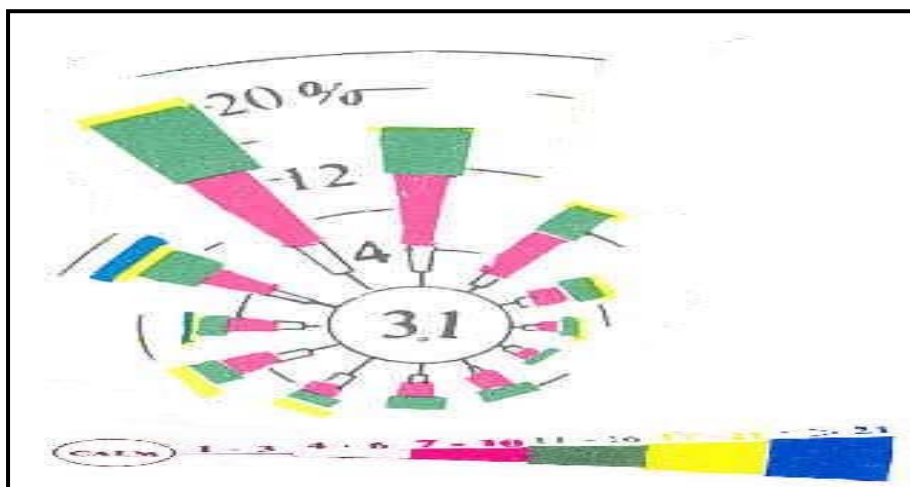


Figure 2.11. Wind Rose for October At Borg Al- Arab

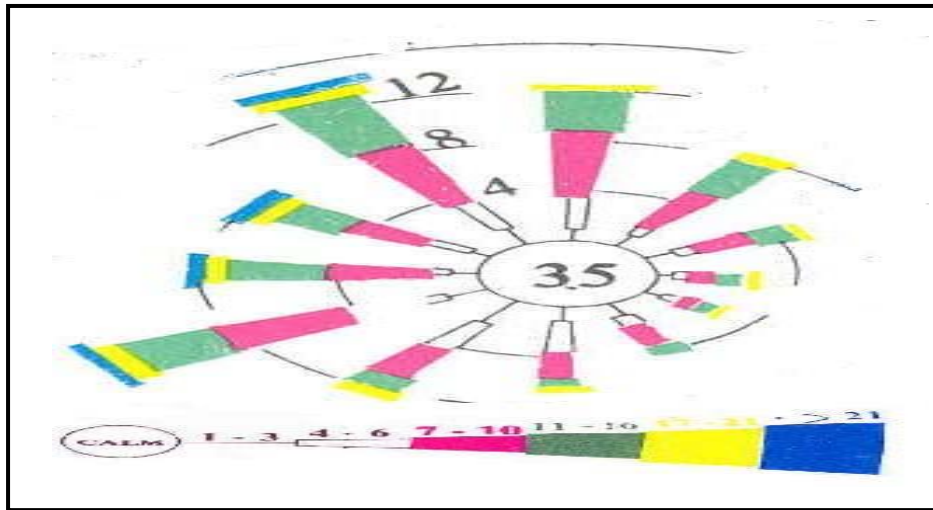


Figure 2.12. Wind Rose for November At Borg Al- Arab

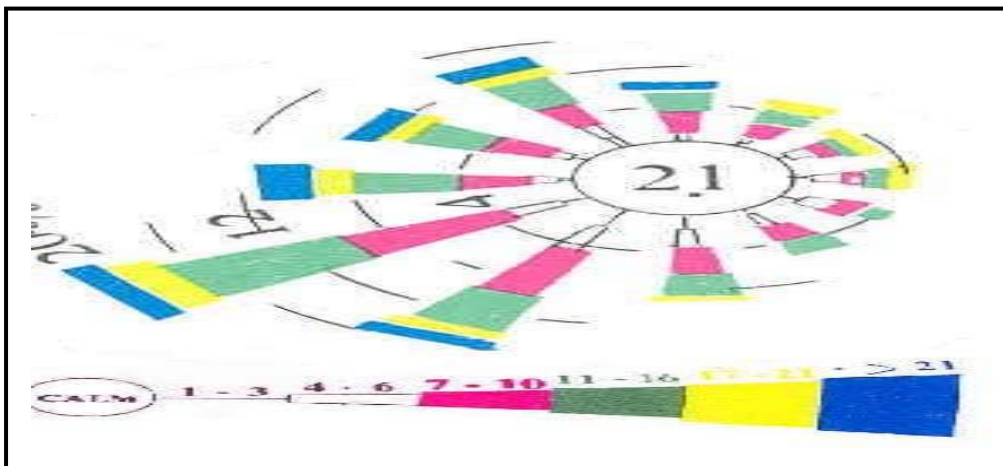


Figure 2.12. Wind Rose for December At Borg Al- Arab

2.3.5 Water Resources and Quality

No significant fresh surface water bodies exist within 10 km from the proposed site. The surface water of Maryut Mallahat, located to the south, is highly saline water and is not used for any commercial activity.

2.3.6 Sensitive Habitats and Species of Commercial Importance

No protected areas exist within or near the project site. The nearest protected area is El-Omeid protectorate, and is located some 100 km far from the project site.

2.3.7 Fauna and Flora

According to the findings of the approved EIA for the landfill, it is not known that any endangered species exist in the area. The landfill site is also away from any agricultural areas.

2.3.8 Soil and Hydrological Characteristics

The soil in the site has a low permeability coefficient and the underground water table was estimated to be very deep. Consequently, using the high density polyethylene (HDPE) layers will prevent underground water contamination. Two borehole tests were conducted for the site, the summary of these tests are summarized in the following Figures 2.13 and 2.14.

DR. M.A.MAHMOUD

SOIL MECHANICS LABORATORY

PROJECT : SANITARY LALDFILL
 LOCATION : BORG EL ARAB - ALEXANDRIA
 BORING No. :

GROUND LEVEL: - m
 DEPTH TO G.W.L: ---- m
 SCALE 1 : 50

BORING LOG

DEPTH (m)	STRATA		DESCRIPTION	S . P . T RESULTS		G.W.T
	LEGEND	DEPTH (m)		DEPTH (m)	N Values	
0.00		0.00				
1.00	[Pattern]	0.00	Br. yellow sandy silt	1.00	12	
2.00				2.00	16	
3.00				3.00	21	
4.00	[Pattern]	4.00	Yell. brown sandy silt	4.00	15	
5.00				5.00	16	
6.00				6.00	20	
7.00				7.00	19	
8.00	[Pattern]	8.00	Yell. brown pieces of cemented sand			
10.00				10.00		

END OF BORING 10.00 m

FIG. No. (2)

M.A. Mahmoud

Figure 2.13. Borehole Number 1

DR. M.A.MAHMOUD SOIL MECHANICS LABORATORY
 PROJECT : SANITARY LALDFILL GROUND LEVEL: - m
 LOCATION : BORG EL ARAB - ALEXANDRIA DEPTH TO G.W.L: ---- m
 BORING No. : 2 SCALE 1 : 50
BORING LOG

DEPTH (m)	STRATA		DESCRIPTION	S . P . T RESULTS		G.W.T
	LEGEND	DEPTH (m)		DEPTH (m)	N Values	
0.00		0.00				
1.00			Yell. brown silty fine sand	1.00	27	
2.00		2.00	Brown silty med./ coarse sand, and crushed shells	2.00	22	
3.00		3.00	Yell. brown silty fine/ med. sand	3.00	24	
4.00		4.00		4.00	33	
5.00			Yell. brown sandy silt	5.00	35	
6.00				6.00	42	
7.00		7.00	Yell. brown clayey sandy silt			
8.00		8.00				
9.00			Yellow pieces of cemented sand			
10.00		10.00				

END OF BORING 10.00 m

FIG. No. (3)

M.A. Mahmoud

Figure 2.14. Borehole Number 2

Borg Al- Arab landfill receives approximately 2,200 tons of municipal solid waste daily. This waste is characterized by its high organic matters content, which exceeds 60%. Landfill gas is produced from the breakdown of organic matter under anaerobic conditions. The landfill gas consists mainly of methane, carbon dioxide and very small fractions of volatile organic compounds, ammonia and hydrogen sulfide. Landfill gas is generated throughout the operational lifetime of the landfill and for many years after the closure of the site. Therefore, landfill gas must be managed to ensure that there is no risk to the surrounding environment.

Currently, the leachate generated from the landfilled waste is transported offsite to the nearest wastewater treatment facility. Part of the project activity is to commission an onsite evaporator (the BGVAP-K8IT system).

This technology has been used in many landfill sites operated by Onyx. Currently, no landfill in Egypt employs such technology and therefore this project will help transfer the knowledge and know-how of this treatment technology into this country.

Below is a brief summary of the equipment and technology proposed for this project:

The landfill gas collection system consists of the following components:

- Progressive vertical wells

In order to allow for the possibility to collect landfill gas prior to the completion of a disposal area progressive vertical wells are installed. This type of wells consists of a perforated pipe encircled by a concrete ring. They are mounted as waste filling progress.

- Vertical wells

When necessary, wells will also be drilled into the landfill once areas reach their final elevation and final cover has been applied. The vertical wells consist of a pipe perforated in its lower part, placed in a drilled borehole in the waste, backfilled with gravel and sealed at the surface.

Both well types will be equipped with wellheads that enable monitoring of gas flow and quality. Also valves are provided to allow adjustment of the available vacuum at each well.

- Leachate Pumping Systems

Submersible leachate pumps will be installed in the LFG extraction wells as part of this project. Pumping of the accumulated leachate increases LFG well collection efficiency.

- Collection Piping

A high-density polyethylene collection piping system will be installed to convey the landfill gas from the well network to the blower/flare/evaporator station. The layout of the future systems will be implemented in order to minimise the low points which could disturb or prevent the gas collection (due to condensate blockage).

The landfill gas combustion system consists of the following equipment:

- Leachate Evaporator

This system functions by evaporating the leachate in an evaporator and directing the evaporated leachate to a flaring unit where it is burned at a very high temperature (ranging from 900-1100 °C). The evaporator and flaring units (see description below) utilize part of the LFG generated from the landfill as the combustion fuel. The evaporator and flaring units have already been installed at the Borg El Arab landfill.

- **Enclosed Flare**

The project entails the installation of additional flaring units for the destruction of the captured LFG that is not utilized by the leachate treatment system.

Landfill gas flow: 2,000 m³/hr

Dimensions: length 7,000 X width 2,200 X height 8,500 mm

Flame temperature: 900- 1100 °C

Nominal power: 10,000 KW

CH₄ range: > 900 °C to 1,200 °C

Exhaust emissions: < French and Egyptian standards

Detailed specification of the flaring units are included in annex II.

- *Controls*

The flares will be equipped with automatic safety and monitoring controls (operator interface, air-fuel ratio, chamber temperature, UV sensor, emergency shut down, etc.)

- *Blower*

A centrifugal blower is used to create the required vacuum in the collection network to extract the LFG. The project entails the installation of additional capacity.

By implementing these technology approaches at the Borg El Arab Landfill, it is estimated Onyx will improve the landfill gas collection rate up to 70%

This section of the study reviews the solid waste management laws and regulations that are currently in effect in Egypt. This includes national laws and regulations as well as decrees issued by the Governor of Alexandria. The Egyptian legislation addressed the solid waste issue in a series of laws and decrees. The principal law governing solid waste management in Egypt is Law Number 38 for the year 1967 on General Public Cleaning and its executive regulations issued by Minister of Housing. The Environment Law number 4 for the year 1994 and its executive regulations issued by the Prime Minister's decree number 338/1995 also contain some articles governing general solid waste management.

Several other laws also address specific solid waste issues. For example, law number 48/1982 on the protection of the Nile and its canals prohibits dumping solid waste in the Nile River and its canals. Law number 140/1956 regarding the occupation of public ways and law number 84/1968 concerning public ways prohibit dumping solid waste on roads or in public areas.

4.1 LAW NUMBER 38/1967

4.1.1 General Public Cleaning

Law number 38/1967 on General Public Cleaning is the primary law governing the management of solid waste in Egypt. It came into force in 1967 and replaced all previous laws dealing with solid waste, including law 97/1956 on organization of solid waste collection and transfer, law 159/1953 on cleaning public squares, streets and highways and law 151/1947 on cleaning fences and unused areas. Since 1967, law 38/1967 has been amended four times. In 1968, the Minister of Housing issued the executive regulations for the law. Although the law and its executive regulations deal primarily with solid waste, they also address wastewater and fencing of open areas.

4.1.2 Solid Waste Management Provisions

Law 38/1967 and its executive regulations prohibit placing solid waste anywhere except in areas designated by the local council. This prohibition applies to treatment and disposal of solid waste as well as to temporary placement in an undesignated container. Article 1 of Ministry of Housing 134/1968 defines solid waste as refuse generated by individuals, residential units, non-residential buildings such as commercial establishments, camps, animal pens, slaughterhouses, markets, public areas, amusement parks, and means of transportation.

The law and its regulations require the local governmental authority responsible for general cleaning or a contractor licensed by the local authority to collect, transfer, and dispose solid waste. These operations must be in accordance with the specifications in the executive regulations as well as those of the local council. Specifications of dump sites as contained in the regulations area as follows:

- The site must be located in an easily accessible area opposite to the dominant wind direction. The distance between the site and residential areas should not be less than 250 m. An adequate dump area to accommodate the expected incoming quantities of wastes should be available at the site.

- A fence made of an appropriate material with a minimum height of 1.8 meters must surround the site. The fence must be provided with a gate of adequate size that permits entry of waste carrying vehicles and trucks.
- The site must have an appropriate water source to sprinkle wastes with water.
- The site must include an adequate number of toilets and showers for the cleanliness of workers.
- The waste must be placed in appropriate piles with side slopes of 1:2 or in special trenches. Moreover, the waste should be compressed and covered by soil at a minimum thickness of 15 cm. Then, it should be well-compacted and sprinkled with water.
- In case the waste will be transformed to compost, a proper place must be located for sorting different materials such as glass, tin, rubber, etc.
- In case of using incineration as the treatment method, the site must be equipped with one incinerator or more with an adequate capacity suitable for the received quantities of wastes. The waste must be fully incinerated and volatile materials should be controlled to prevent air pollution.

Law 38/1967 authorizes the local council to impose a fee of not more than two percent of the rent to fund solid waste management. This fee, along with all fines collected for violation of law requirements, must be placed in a general cleaning fund established by the local council. The fund must be used for general cleaning. These funds can be augmented by funds from the general budget to insure adequate funding for solid waste management. Law 38/1967 also requires owners of open land to remove accumulated waste and keep the land clean. The executive regulations authorize the local authority to remove solid waste from open land at the owner's expense in case the owner refrains within 15 days after notification.

4.1.3 Local Enforcement Authority

Article 11 of law 38/1967 authorizes implementation of the law by competent employees in local government, as identified by decree from the Minister of Justice. In 1976, the Minister of Justice issued decree number 3137, which identified the following local government employees as having authority to enforce law 38/1967:

- Governorate housing administrators
- Governorate health department administrators
- Engineering division administrators at town and district councils
- Municipal organization administrators and engineers
- Governorate or local unit general manager for urban environmental protection
- Governorate health affairs representatives working in environmental protection

- Physicians at health offices and units in towns, districts, and village units
- Environmental protection inspectors in local units
- Heads of village units in rural areas
- Technical personnel supervising cleaning services in local units
- Cleaning and draining inspectors and supervisors

Article 1 in presidential decree number 272 for the year 1982 transferred jurisdiction for general cleaning from the Ministry of Housing to the local administrative units. The Governor of Alexandria has issued the following decrees regarding the enforcement of law 38/1967.

- Governor's Decree Number 40 for the year 1994 prohibits the use of animal carts to haul waste and authorizes the traffic authority and utilities police to enforce this prohibition.
- Governor's Decree Number 163 for the year 1996 concerning the system of incentives for workers in the Central Administration for the Cleanliness and Beautification of Alexandria (CACBA) identifies enforcement responsibilities for various provisions of law 38/1967 for cleanliness inspectors, utilities police, and the traffic authority.
- Governor's Decree Number 1065 for the year 1998 authorizes the CACBA and all police agencies to enforce the waste hauling and dumping provisions of law 38/1967 within the boundaries of Alexandria Governorate.

In 2001, the governorate established the Solid Waste Inspection and Environmental Monitoring Administration (SWIEMA). Governor's decree number 1143 of 2001 delegated the authority to SWIEMA to enforce law 38/1967 instead of CACBA.

4.1.4 Penalties

Article 9 of law 38/1967 specifies penalties for violating the law. It establishes a fine up to LE 100 for violating the terms of the law, although fines can be higher if authorized by other laws. If wastes are deposited in an undesignated area, Article 9 authorizes local authorities to require the violating party to either remove the wastes or pay for the costs of their removal. A violator can resolve a claim made against him or her for violation of Articles 1 or 4 by removing the violation and paying an LE 10 fine within 24 hours of notification.

In 1998, the Governor of Alexandria issued decree 1065 for the year 1998 elaborating on the penalty for illegal hauling and dumping of waste. Article 1 in the decree authorizes seizure and retention of vehicles illegally hauling or dumping waste in public streets or at the entrances of the city. The vehicles can be retained for up to six months or until the violator pays a fine of LE 1,000. The seizure and fine are additional to those specified in law 38/1967.

4.2 ENVIRONMENT LAW NUMBER 4/1994

Law Number 4 for the year 1994 on the Environment is the first comprehensive environmental law to be issued in Egypt. One article in law 4/1994 addresses general solid waste management while another article addresses management of construction and demolition debris. In addition, two articles deal with solid waste management on ships and offshore platforms. Moreover, five articles address hazardous waste management.

Prime Minister's decree number 338 for the year 1995 issued the executive regulations for law 4/1994. The executive regulations contain two articles addressing general solid waste management and one article addressing the management of construction and demolition debris. Law 4/1994 and its executive regulations also contain provisions requiring establishments to conduct environmental impact assessment studies. Also, articles for establishments to control air and noise pollution, and address worker safety are present in the executive regulations. These provisions apply to solid waste management facilities such as recycling and composting plants, medical waste treatment facilities, and sanitary landfills.

4.2.1 Solid Waste Management Provisions

Similar to law 38/1967, law 4/1994 and its executive regulations prohibit the disposal or treatment of solid waste except in areas designated by the local authorities. Article 38 promulgates some specifications for solid waste treatment and disposal sites. The article states that it is prohibited to dump, treat or burn solid waste except in special sites, designated for such purpose. The site must be far from inhabited, industrial or agricultural areas as well as from waterways. The site must satisfy the following specifications, conditions and minimum permissible distances:

- It is strictly forbidden to burn any waste (other than the infectious waste referred to in paragraph one of this Article) in residential or industrial areas. Such waste shall be incinerated in special incinerators having the following specifications:
 - They shall be downwind in the populated areas.
 - They shall be at a distance of at least 1500 meters from the nearest residential area.
 - The capacity of the incinerator or incinerators shall be adequate to burn the waste transported thereto within 24 hours.
 - The incinerator shall be sited in a place with an adequate space to receive the expected waste according to the nature of activities in the urban area and the number of its inhabitants.
- In case of extreme necessity, and within a transition period not exceeding three years from the date of publication of the executive regulations, waste shall be allowed to be burned uncovered, subject to the following conditions:

- With a prior permit from the EEAA and the Civil Defense Department. Incineration shall be carried out under the supervision of both the municipal authority units and the Civil Defense Department.
- The place where the waste is incinerated stands at a minimum distance of 1.5 kilometers from populated, industrial and downwind areas.
- The municipal authorities shall allocate a site to receive the waste after carrying out an integrated study on the topography and nature of the area, and the quantity of waste required to be disposed of every 24 hours. The site shall be:
 - At a lower contour level than the surrounding area.
 - Of an area adequate for storing the garbage intended to be transported and for carrying out other operations normally effected on the site, such as sorting and any other related operations.
 - Supplied with a water source for emergency cases and other necessary uses.
 - Supplied with the necessary equipment for storing, sifting and disposing of ashes by burying them so that they will not be dispersed in the air or leak into the underground water.
- Infectious waste from hospitals and health centers shall be burned on site in incinerators especially designed for that purpose and capable of absorbing the collected quantities without congestion or storage near the incinerator. In case of necessity, and with the approval of the competent municipal authorities and EEAA, the waste of such units may be transported to the nearest hospital equipped with one or more incinerators, provided they can absorb the waste transported thereto. Such waste is transported in sealed containers which do not allow the dispersal of their contents in the air and the containers are incinerated together with their contents.
- In all cases, the incinerators shall be fitted with adequate technical methods to prevent the dispersal of ashes or the emission of gases except within the permissible limits as prescribed in Annex 6 of the executive regulations of law 4/94.
- Municipal authorities shall, in agreement with the EEAA, allocate sites where solid waste shall be dumped, treated or incinerated according to the provisions of this Article.

Article 39 of the executive regulations for law 4/1994 promulgates some specifications for solid waste containers and collection vehicles. Both the law and its executive regulations address the management and disposal of construction and demolition debris. They require all persons involved in exploration, excavation, construction and demolition

to take necessary actions to safely store, transport, and dispose of wastes generated by those activities. Article 41 of the executive regulations contains these specifications and requires local authorities to incorporate them into permits for exploration, excavation, construction and demolition.

4.2.2 Local Enforcement Authority

Local authorities are empowered to enforce Law 4/1994 and its executive regulations. The articles in Law 4/1994 and its executive regulations that address general solid waste management specify responsibilities of local or municipal authorities as follows:

- Designating sites for treatment, burning and disposal of solid waste (after consultation with EEAA)
- Granting permits (after consultation with EEAA) for transporting infectious medical waste to hospitals for incineration
- Implementing specifications for solid waste containers and collection vehicles
- Incorporating construction and demolition debris requirements into permits for exploration, excavation, construction and demolition and designating sites for disposal of those wastes.

Article 104 of Law 4/1994 states that inspectors of administrative authorities who have the capacity of judicial officers in matters relating to the environment shall be authorized to enforce the provisions of law and its executive regulations. In 1996, the Minister of Justice issued decree number 1353 authorizing several local government authorities to enforce Law 4/1994 and its executive regulations. This included governor's deputies, town mayors, district and village heads, and the managers of environment offices in the governorates.

Article 103 of Law 4/1994 gives every citizen and organization concerned with the protection of the environment the right to report violations of the law to competent authorities. Article 65 of the executive regulations reiterates this right and further requires the Ministry of Interior to form a police force specialized in environmental protection. This force is mandated to enforce the provisions of the law.

4.2.3 Penalties

The penalties for the solid waste management provisions of Law 4/1994 are found in Articles 86 and 87. The penalty for disposing, treating, or burning solid waste in an undesignated area is a fine ranging LE 1,000 to LE 20,000. In case of recidivism, the penalty is the fine plus imprisonment. These penalties are higher than those specified in Law 38/1967. Provisions of law 4 takes precedence over all other laws dealing with the same violations. Article 9 of Law 38/1967 also states that higher fines can be imposed if authorized by other laws.

The penalty for violating the provisions for management of construction and demolition debris is a fine ranging from LE 500 to LE 1,000. The court is given authority to suspend a violator's license and, in the case of recidivism, to revoke the license. The penalties for

violation of Law 4/1994 can be more severe if so prescribed by other law. However, solid waste management fines in Law 4/1994 are higher than those specified in any other law.

4.3 LAW FOR THE PROTECTION OF THE NILE AND ITS CANALS NUMBER 48/1982

Law number 48 for the year 1982 addresses protection of the Nile and its canals. The executive regulations for law were issued by the Minister of Irrigation's decree number 8 for the year 1983. The law and its executive regulations primarily focus on wastewater discharges to the Nile and its canals, but also contain articles that address solid waste.

4.3.1 Solid Waste Management Provisions

Both law 48/1982 and its executive regulations prohibit the disposal of solid waste in the Nile and its canals without permission of the Ministry of Irrigation. The executive regulations extend this prohibition to the temporary or permanent placement of solid wastes on the banks of the Nile and its canals. The executive regulations define solid wastes as solid materials (including refuse, garbage, sweeping materials, dry rubbish, fractured stones, construction and demolition debris, and workshop scraps) generated by individuals, residential units, non-residential units (governmental, commercial, industrial, tourist), and means of transportation.

4.3.2 Local Enforcement Authority

Article 19 of law 48/1982 authorizes irrigation engineers in the Ministry of Irrigation to enforce the law within their jurisdictions. Article 13 assigns the surface water police of the Ministry of Interior with the responsibility to assist the implementing authorities in identifying violations of law 48/1982. Moreover, the law assigns the same division to notify violators and remove the causes of violations. Article 89 of law 4/1994 increased the penalties for violation of Article 2 of law 48/1982.

4.3.3 Penalties

Article 16 of law 48/1982 establishes a penalty for violating Article 2 of up to one year in prison and a fine ranging from LE 500 to LE 2,000. In addition to payment of the penalty, violators must remove or rectify the violation within a period determined by the Ministry of Irrigation. If a violator fails to remove the violation within the allotted time, the ministry is authorized to remove it at the violator's expense. Article 89 in law 4/1994 reduced the lower limit of the fine for violation of Article 2 of Law 48/1982 to LE 200, but increased the upper limit to LE 20,000. The article contains the same language as found in article 16 of Law 48/1982 which authorizes the Ministry of Water Resources and Irrigation to require removal or rectification of the violation or remove it on its own at the expense of the violator. The article does not state that it is an amendment to the penalties in Law 48/1982, but Article 3 of the presidential decree issuing Law 4/1994 repeals all provisions of other laws running counter to the provisions of Law 4/1994.

4.4 LAWS CONCERNING PUBLIC WAYS

Two laws concerning public ways (highways, streets, and squares) contain restrictions on solid waste management and disposal. These are occupation of public ways law number 140 for the year 1956, and law number 84 for the year 1968. Although law number 106 for the year 1976 on building construction amended by law number 101 for the year 1996 does not contain specifications for the management of construction wastes, it does

contain a funding mechanism that can be used by local authorities to enforce laws 140/1956 and 84/1968.

4.4.1 Solid Waste Management Provisions

Law 84/1968 prohibits placing solid wastes on public ways. Law 140/1956 and its executive regulations, issued by Minister of Municipal and Rural Affairs decree number 395 for the year 1956 deal primarily with obtaining licenses for occupation of public ways within the borders of areas with local councils. One of the activities that require a license is placement of construction and demolition debris in a public way. The executive regulations for the law contain specifications for the management of construction and demolition debris. The law also allows the competent administrative authority to charge a fee for occupation of public ways.

4.4.2 Local Enforcement Authority

Article 21 of Law 140/1956 authorizes the Minister of Municipal and Rural Affairs and the Minister of Justice to enforce the law. Article 16 of that law authorizes the Minister of Municipal and Rural Affairs to specify the competent authorities for enforcement of the law's provisions. Article 1 in PD 272/1982 transferred jurisdiction for enforcement of Law 140/1956 and Law 84/1968 to local administrative units.

4.4.3 Penalties

Violation of Law 140/1956 and its executive regulations specifies a fine that ranges from LE 100 to LE 300. Violators are required to pay five times the occupation fee, two times of the court fees, and the cost to remove the debris. If the violator does not remove the debris, the local authority is authorized to do so at the expense of the violator. In addition, the governor can suspend the violator's construction and demolition license until the violation is removed. The violator can be imprisoned for up to one month and his fines can be increased to from LE 300 to LE 1,000 if the penalties are not paid.

Law 106/1976 is the general law concerning construction activities. Article 6 of the law requires individuals who receive a construction permit to pay a non-refundable fee. This fee amounts to one percent of the value of the construction and is deemed to cover expenses incurred by the governorate during or after construction. Article 4 of the executive regulations for the law, issued by Minister of Housing and Public Utilities decree 268 for the year 1996 allows the governorate to keep the revenues collected from the one percent fee in a special fund. This special fund is used to finance several activities, including removal of construction and demolition debris left by violators of the law. Thus, Law 106/1976 and its executive regulations do not have specifications for the management of construction and demolition debris, but rather create a financial mechanism for allowing enforcement of the provisions of laws 140/1956 and 84/1968.

4.5 OTHER LAWS AND REGULATIONS

4.5.1 Labour Law Number 137/1981

Law number 137 for the year 1981 requires employers to inform employees of the hazards associated with handling solid waste. Moreover, the same law requires employers to provide safety equipment and training to employees handling solid waste.

4.5.2 Traffic Law Number 155/1999

Article 72 of the traffic law 155 for the year 1999 states prohibits vehicle drivers from disposing refuse, waste, or any other item that pollutes public ways. The violator shall be fined not less than LE 50 or more than LE 500. In addition, the driver's license can be suspended for 30 to 60 days. Enforcement authority for this law is the traffic police in the Ministry of Interior.

4.5.3 General Egyptian Penal Law

In addition to the specific laws referenced above, the General Egyptian Penal Law contains two articles prohibiting throwing wastes. Article 377 provides for a fine up to LE 100 for throwing wastes in public roads. Article 378 provides for a fine up to LE 50 for throwing wastes on vehicles, buildings, gardens, and fenced land. Moreover, the same law prohibits disposing objects into the Nile or its canals that will obstruct navigation. Enforcement authority for the Penal Law lies with the Ministry of Justice and the Egyptian Courts.

This section provides preliminary assessment of the potential positive and adverse impacts resulting from the establishment of the proposed project at Borg El-Arab landfill. As previously noted, the project activity includes the installation of enhanced landfill gas extraction and flaring equipment for the destruction of the landfill methane that is collected from the existing and future disposal areas. Methane is a greenhouse gases, known for its contribution to global warming. The proposed project main activity is combusting the landfill gas to convert methane to carbon dioxide. Therefore, the project will result in positive environmental impacts where it will lead to decrease the amount of greenhouse gases released to the atmosphere. The main concern raised at landfills are the safety and risks of explosion.

To minimize the risks of fires and explosion, the proposed flares are made of stainless steel furnaces with internal fireproof concrete protection. The internal flare tubes are made also of stainless steel protected by ceramic fibers equipped with a tube flange for exhaust sample analysis. The proposed flares are equipped with flare and temperature control equipments. The temperature is regulated by air intake control equipments.

Also in terms of minimizing the explosion risks, the proposed flares are equipped with fully automatic controllers, automatic emergency switches and alarms. The flares are also equipped with the following:

- Manual and automatic on/off switch;
- Lightening arrestor;
- Flame temperature alarm;
- Landfill gas temperature alarm;
- Gas flow and temperature regulators;
- External emergency switch;
- UV radiation detection cells for flame control.

5.1 ENVIRONMENTAL HAZARD ANALYSIS (ENVHAZ)

An environmental hazard analysis (ENVHAZ) has been conducted for the whole landfill operations. The results of this analysis is included in annex III. Risks posed from the landfill operational activities are listed and ranked according to its severity and frequency to occur. Controls and additional suggested controls are also included in the table. The risk from collecting, pumping and treatment of landfill gas is also included in the analysis. Controls for mitigating risks from such operations include equipment safety precautions (such as alarms, safety valves, and automatic shutdown), daily inspection, and fire fighting extinguishers.

5.2 MANAGEMENT PLAN

Borg El-Arab landfill is currently operated in conformance with an operational and environmental management plan. The project will be integrated within this plan. The site manager is responsible for the overall environmental performance of the landfill. The operations manager is a full-time employee and is responsible for day to day reporting to the site manager on operational and environmental performance. The operations manager will be responsible for handling any complaints from local authorities on the environmental performance of the landfill. Also, supervising the implementation of day-to-day control duties at the facility, and undertaking environmental monitoring activities are among the responsibilities of the operations manager.

5.2.1 Site Management

A range of standard procedures to reduce environmental impact will be adhered to during operation. This includes air quality monitoring activities that will be conducted according to a pre-set monitoring plan.

5.3 ENVIRONMENTAL MONITORING

During the operation of Borg Al - Arab landfill, one of the most important activities is environmental monitoring. Monitoring will be carried out in conformance with an environmental monitoring plan. Onyx undertake a quarterly assessment for the different environmental issues in collaboration with University Alexandria. Currently Onyx is undertaking an air quality assessment study within the site boundaries. This study is scheduled to be repeated every year to evaluate status of ambient air quality. The monitoring plan entails the measurement of the following parameters:

- Total suspended particles
- PM₁₀ (at both ambient and working places)
- CH₄
- H₂S
- SO₂
- NO_x
- CO
- NH₃

The measurements are planned to be conducted in several locations within the site boundary as well as outside the site.

With the implementation of the Project, the flare monitoring data will be recorded and saved in the environmental register of the facility as part of the environmental management plan. The methane content in the flared landfill gas will be monitored as well

APPENDIX I: BGVAP SPECIFICATIONS

APPENDIX II: Flaring Units Specifications

APPENDIX III: ENVHAZ Analysis
