

**Solid Waste Management  
Privatization Procedural Manual**

**STREET AND  
PUBLIC FACILITY  
CLEANING SERVICES**



**SOLID WASTE TECHNICAL ASSISTANCE**



Ministry of State for Environmental Affairs



U.S. Agency for International Development



Egyptian Environmental Policy Program



# SOLID WASTE TECHNICAL ASSISTANCE



Ministry of State for Environmental Affairs



U.S. Agency for International Development



Egyptian Environmental Policy Program

**Egyptian Environmental Policy Program  
Solid Waste Technical Assistance Program  
Solid Waste Management Privatization Procedural Manual**

**CHAPTER 12**  
**STREET  
AND PUBLIC  
FACILITY  
CLEANING  
SERVICES**

# TABLE OF CONTENTS

<b>INTRODUCTION</b>	<b>1</b>
<b>STEP 1: INVENTORY AND ASSESS EXISTING CONDITIONS</b>	<b>2</b>
Define Current Practices	2
Assessing Public Interest and Service Expectations	4
<b>STEP 2: IDENTIFY AND ASSESS SERVICE OPTIONS</b>	<b>6</b>
Mechanical Street Sweeping	7
Manual Street Sweeping	12
Cleaning of Unpaved Streets	13
Level of Street Cleaning Effectiveness Desired	13
Litter Collection from Public Facilities	14
Litter Basket Service	16
Public Structure Washing	18
<b>STEP 3: COMPILE FINDINGS IN AN ASSESSMENT REPORT</b>	<b>21</b>
<b>STEP 4: EVALUATE STREET AND PUBLIC FACILITY CLEANING SCENARIOS</b>	<b>22</b>
Develop Preliminary Cost Estimates	22
Summarize Results	22

<b>STEP 5: SELECT PREFERRED STREET AND PUBLIC FACILITY CLEANING PROGRAM</b>	<b>23</b>
Calculate Rates/Tariffs and Evaluate Cost Recovery Methods	23
Solicit Final Stakeholder Input	23
Governorate Officials Select Preferred Street and Public Facility Cleaning Program	23
<b>STEP 6: IMPLEMENT THE SELECTED PROGRAM</b>	<b>24</b>
Establish Program Funding Mechanism	24
Procure a Contractor	24
Develop Organizational Structure for Contract Administration and Monitoring	25
Develop Public Awareness and Communications Program	25
<b>APPENDIX A: INSTRUCTIONS AND EXAMPLES FOR TECHNICAL SPECIFICATIONS</b>	<b>A-1</b>
<b>LIST OF TABLES</b>	
Table 12.1: Solid Waste System Components to be Evaluated	3
Table 12.2: Street Cleanliness Rating System	8



# INTRODUCTION

*Integration of street and public facility cleaning services with solid waste management services provides a means of improving aesthetics, reducing environmental degradation, and enhancing public health and welfare throughout the country.*

**S**treet and public facility cleaning is one of the most visible of all government services. Consciously or unconsciously, residents allow their opinions of the cleanliness of public streets to influence their feelings about their community and local officials. Visitors are likely to instinctively make their first, and often lasting, impression of a community based on the cleanliness of streets and other public facilities. Dust laden desert winds, together with the widespread practice of discarding solid waste on public streets and in public areas, creates a critical need for street and public facility cleaning in all populated areas of Egypt.

This chapter is intended as a guide for those tasked with improving or initiating street and public facility cleaning services. These services may include any of the following:

- Mechanical Street Sweeping.
- Manual Street Sweeping.
- Cleaning of Unpaved Streets.
- Litter Collection from Public Facilities.
- Litter Basket Service.
- Public Structure Washing.

Special emphasis has been placed on providing information to evaluate existing services, identify potentially applicable service alternatives, select the most appropriate alternatives based on selected design criteria, and create the technical documents required for service implementation.

---

*Planning for Residential and Commercial Solid Waste Collection can be broken down into the following six steps:*

- Step 1: Inventory and Assess Existing Conditions.*  
*Step 2: Identify and Assess Service Options.*  
*Step 3: Compile Findings in an Assessment Report.*  
*Step 4: Evaluate Street and Public Facility Cleaning Service Scenarios.*  
*Step 5: Select Preferred Street and Public Facility Cleaning Program.*  
*Step 6: Implement the Selected Program.*
- 



**Street cleaning vehicle.**

# STEP 1: INVENTORY AND ASSESS EXISTING CONDITIONS

As described in Chapter 2, Solid Waste Management Planning, examining all elements of the solid waste management system in the planning area is useful when considering a fundamentally changed or new integrated solid waste management (ISWM) system. The components of solid waste management and the cleaning of streets and other public infrastructure are interrelated. Identification of the most effective integrated system requires knowledge of existing practices that impact both types of services. In this case, the appropriate types and level of street sweeping and litter collection services will be largely dependent upon the level and effectiveness of existing solid waste storage and collection infrastructure.

## Define Current Practices

The first task is to obtain an understanding of the street cleaning services that already exist in the planning area. Street cleaning infrastructure exists at moderate to significant levels in every urban and rural governorate. Areas for improvement can be identified by assessing the current performance. Moreover, decisions will ultimately have to be made concerning which parts, if any, of the existing infrastructure will be integrated into the governorate's future street cleaning program.

In addition to the street cleaning services, the storage and collection elements of the existing waste management system will need to be evaluated. The evaluation should be conducted using performance criteria selected by the planning team. These might include, but not be limited to the following:

- Compliance with national laws and local ordinances.
- Cost effectiveness (cost/benefit).
- Health and safety.
- Environmental compatibility.
- Effectiveness (achievement of the desired outcome).
- Public acceptance.
- Efficiency (ratio of productive output of labor and material resources compared to input).

*Waste that is not effectively stored or collected ends up as litter and street debris.*

The relative importance assigned to each of these evaluation criteria will vary depending on the characteristics of the planning area and expectations of the general public.

Table 12.1 presents a list of elements of the solid waste management system that should be evaluated with respect to the evaluation criteria selected by the planning team.



**Traditional manual street cleaning.**

**Table 12.1: SOLID WASTE SYSTEM COMPONENTS TO BE EVALUATED**

Storage/handling practices	<ul style="list-style-type: none"> <li>• Adequacy of types and numbers of containers used (dwellings, commercial businesses, and waste pooling sites.)</li> <li>• Environmental and health and safety impacts.</li> <li>• Impediments to best practices.</li> </ul>
Collection service providers (governorate, private firms, NGOs)	<ul style="list-style-type: none"> <li>• Funding adequacy and sources.</li> <li>• Management.</li> <li>• Staffing and labor adequacy.</li> <li>• Equipment purchase, operation, and maintenance adequacy.</li> <li>• Operational practices and problems.</li> <li>• Impediments to efficient/high quality service.</li> </ul>
Collection service methods (costs, description, and amounts collected through each)	<ul style="list-style-type: none"> <li>• Door-to-Door.</li> <li>• Building-to-Building.</li> <li>• Waste pooling sites (number, types and conditions of containers, average spacing, etc.).</li> <li>• User friendliness.</li> </ul>
Uncollected (accumulated) waste	<ul style="list-style-type: none"> <li>• Amounts.</li> <li>• Sources.</li> <li>• Environmental, economic, and health and safety impacts.</li> <li>• Impediments to provision and use of universal collection service.</li> </ul>
Waste diversion systems	<ul style="list-style-type: none"> <li>• Informal sector scavenging (amounts and impacts).</li> <li>• Contribution to litter.</li> </ul>
Education and public awareness programs	<ul style="list-style-type: none"> <li>• Have they been used?</li> <li>• Were they successful?</li> <li>• Have the right audiences been targeted?</li> </ul>

Assessing the above waste management system elements addresses only the sources of the majority of materials that contribute to street sweepings and litter in your planning area. With a better understanding of the root causes of the litter and debris component of street sweepings, the existing street sweeping and litter collection service infrastructure can be assessed. This includes gathering and analyzing information on each of the following system components:

1. Organizational structure.
2. Management:
  - Training and experience.
  - Compensation.
  - Policies.
  - Adequacy.
3. Staff:
  - Training and skills.
  - Compensation.
  - Adequacy of uniforms, tools and equipment.
  - Deployment.

- Supervision.
- Operational practices and performance standards.
- Performance.

4. Equipment:

- Funding adequacy and sources.
- Adequacy.
- Age and remaining useful life.
- Sanitation and maintenance.
- Operation.

5. Operations:

- Hours and days of service.
- Frequency of service.
- Adequacy and efficiency of practices used.

6. National laws and local ordinances:

- Adequacy.
- Administrative structure.
- Enforcement.

*It is essential to be aware of and understand the existing attitudes and behavior of citizens and other stakeholders in order to identify an appropriate strategy to accomplish desired change.*

### **Assessing Public Interest and Service Expectations**

The next task is to determine how current street cleaning performance compares with the public's expectations. If the public is not satisfied with the current status, meeting their street and public facility cleaning expectations will require their support, and some attitude and behavioral changes on their part. The long term support and participation of residents and businesses are required to maintain clean streets and associated public infrastructure.

Planners should seek the following feedback from residents and business owners:

- Their knowledge and opinions of street cleaning and littering.
- The expectations they have for street cleanliness.
- Their ability and willingness to co-operate in the planning and implementation of litter reduction programs.
- The preferred level of street cleanliness.
- Their ability and willingness to pay for a cleaner community.
- Preferences regarding basis and method of service cost allocation and recovery.



**Street cleaning vehicle.**

Although there is typically latent support for litter reduction, not all residents and businesses can be expected to support it without some motivation. If ambivalent attitudes or objections to litter reduction can be identified and characterized, planners can design programs that can overcome them.

One way to gauge public support for litter reduction and cleaner streets is to survey residents and businesses about their attitudes toward the existing conditions. Telephone or door-to-door surveys can be administered to a representative cross-section of residents in the planning area. Responses received can then be tabulated, analyzed, and used to guide program design, program funding, and public education.

Another way to assess local attitudes toward street cleanliness and litter reduction is to conduct focus group research. Focus groups are a recognized, small group, survey technique in which a moderator asks a series of open-ended questions to a small sample of individuals (generally 10 to 25) who either are chosen at random or demographically representative of the planning area population. This survey approach enables moderators to gather qualitative data that are not easily gathered through more traditional phone or mail survey techniques. Though the results are rarely statistically valid, focus groups do provide more detailed information about a wider range of issues than multiple choice or true-false questions.

Developing a citizen's advisory committee or task force can provide another important component of a community outreach plan. Such citizen groups can include local civic and business leaders (and others who have influence) as well as local technical experts. Advisory committees can serve as valuable allies during the program planning process through the following activities:

- Building consensus.
- Involving stakeholders in the decision-making process.
- Soliciting public input and harnessing local resources.
- Educating possible opponents about the importance and value of clean streets and public facilities.
- Shaping public opinion.



---

### ***Rural Considerations***

***Smaller communities and the lower cost of living typically found in rural governorates provide advantages that can be exploited in planning for improved street and public area cleanliness. The consumption habits and lifestyles of rural families result in less generation of residential waste and litter in public places. Lower ownership of automobiles results in less traffic and related littering. The lower cost of living and lack of employment opportunities yields a pool of low cost labor available for the labor intensive street cleaning functions. Lastly, there is a community pride that still exists in smaller, more rural communities. Communications designed to change public behavior that appeals to this community pride may be particularly effective.***

***While financial resources are limited in rural governorates, the correspondingly lower need for street cleaning services, combined with the advantages inherent to rural living, facilitates achievement of street and public facility cleaning objectives.***

---

## **STEP 2:**

# **IDENTIFY AND ASSESS SERVICE OPTIONS**

**T**he next step in the planning process is identifying and assessing street and public facility cleaning options that have the potential to achieve the program and service goals established through the process defined in Chapter 2. At this point, service options can be narrowed down and basic parameters for provision of each service desired can be identified. The assessment process should take into account earlier policy decisions regarding compliance with laws and regulations, service areas to be included, geographical boundaries, and funding, in addition to the design criteria established by the planning team.

The first task in this step is identifying the parameters and narrowing down the options for each service that may be included within street and public facility cleaning services. The process should be applied to services that include the following:

- Mechanical street sweeping.
- Manual street sweeping.
- Cleaning of unpaved streets.
- Litter collection from public facilities.
- Litter basket service.
- Public structure washing.

The process of selecting options for the basic parameters of service can be facilitated by establishing and applying “design criteria” such as the following:

- Cost effectiveness (cost/benefit).
- Health and safety.
- Environmental compatibility.
- Effectiveness (achievement of the desired outcome).
- Public acceptance.
- Efficiency (ratio of productive output of labor and material resources compared to input).

---

### ***Rural Considerations***

*Rural governorates typically do not have the financial resources of urban governorates to provide comprehensive or capital intensive public services. Fortunately, at the same time, the need for capital intensive street cleaning services is correspondingly less. In view of the limited applicability or need for paved and curbed streets and associated traffic related public structures, street cleaning services such as mechanical sweeping or public structure washing are not needed. Roads and public areas can be kept sufficiently clean and litter free through manual sweeping of paved streets, cleaning of unpaved streets, placement of litter baskets in areas with heavy pedestrian traffic, and on-going litter collection from public areas.*

---

The relative importance of these design criteria will vary depending on the planning area demographics, expectations of the public, and objectives of government officials. Cost effectiveness will be a priority in every case. Calculating reasonable estimates of cost effectiveness for individual scenarios selected in Step 4 by applying the financial management and full cost accounting techniques described in detail in Chapter 3 is critical to the success of the process.

To help determine which services to include in the integrated cleaning program and in establishing the basic service parameters for each street cleaning service selected, each potentially applicable street and public facility cleaning service listed above is addressed separately below.

### **Mechanical Street Sweeping**

Mechanical street sweeping service typically consists of washing, sweeping and removing litter and debris from the entire paved surface area of primary streets. A mechanical street sweeper performs these tasks by mechanical means through the action of one or more brooms, or by suction through a vacuum or regenerative air system. When planning for implementation of mechanical street sweeping service the following basic parameters must be established:

- Definition of streets to be included.
- Level of street cleaning effectiveness desired.
- Hours of service.
- Days of service.
- Frequency of service.
- Type of mechanical street sweeper to be used.

Additional detailed specifications and minimum technical requirements designed to ensure that the service is performed in a manner compatible with design criteria must also be developed. These are discussed in detail in Appendix A.

*The first task is to decide which types of streets will receive which type of cleaning.*

To help you in the assessment, viable options for each of the basic service parameters listed above are discussed below.

#### **Definition of Streets to be Included**

The first task is to decide which streets in the service area should be designated for mechanical street sweeping. If the goal is to maintain a clean environment throughout the service area, then a good starting point would be to establish that all streets with paved surfaces would be either mechanically or manually swept, or both. Since mechanical street sweeping will include washing, and thus more efficient collection of dust, it should be considered for all heavily traveled highways, main arteries, and thoroughfares. All streets with more than two traffic lanes should be considered as well. Whatever criteria are used for the selection should be applied to all of the paved streets in the planning area.

The output from this exercise should be list of specific streets, or a clear and unambiguous definition of the types of streets, such as “primary”, to be included that ensures that all bidders (and the selected contractor) interpret it the same.

#### **Level of Street Cleaning Effectiveness**

Many factors effect street cleaning effectiveness. Parked cars are the by far the greatest deterrent to effective street cleaning. Where on-street parking is allowed, much of the street cleaning effort will likely be wasted, as over 90 percent of all debris typically lies within 1 meter (m) of the curb. Other major factors are the condition of street surfaces and curbs, traffic volumes, climate, topography, extent of construction and demolition projects, and public behavior.

The level of street cleaning effectiveness that you expect will largely dictate the service frequency and type of equipment required. To convey, and subsequently measure, the level of effectiveness of street cleaning that you expect,

a rational and objective method of measuring the extent and nature of street litter must be used. One method that has been employed widely in the field is rating by comparing actual conditions to predetermined photographic standards. This method was refined by New York City and assigns seven numerical values to describe conditions, ranging from the cleanest condition to the dirtiest as provided in Table 12.2

**TABLE 12.2: STREET CLEANLINESS RATING SYSTEM**

Numerical Value	Condition of Street
1	A clean street. No litter.
2	A clean street, except for a few traces or pieces of litter.
3	No concentration of litter. There are no piles of litter, and there are large gaps between pieces of litter, or small gaps between pieces of litter.
4	Litter is concentrated in spots; there may either be large gaps between piles of litter, or small gaps between pieces of litter.
5	Litter is concentrated and there are only small gaps between piles of litter.
6	Litter is highly concentrated with no gaps in the piles of litter. The litter is straight line along the curb.
7	Litter is very highly concentrated and there are no gaps between the piles of litter. The litter is a straight line along and over the curb.

*Effectiveness is a subjective term. The interpretation of "street cleaning effectiveness" will vary widely unless an effort is made to describe it quantitatively.*

Photographs clearly depicting street conditions that fit each one of the seven ratings can be used to illustrate to the potential service provider the street cleaning effectiveness that is required. This or any similarly designed system will provide a way to describe to the service provider what is expected, allow a fair basis for measuring compliance, and improve the effectiveness and quality of the service over the long term.

**Frequency of Service**

Each type of street in the planning area should be addressed individually to determine how often they must be swept to achieve the standard desired for the community. The principal questions that the planners have to answer in making the decision concerning frequency are:

- How clean should the street be kept? (This applies to both the visual and measurable standards described above.)
- What kinds of dirt and debris predominate?
- How much dirt and debris accumulate daily on the street?
- What standards of cleanliness do property, business owners, and residents want?
- What standard of cleanliness does the contracting agency want to achieve?
- Are there special circumstances that require extra attention in order to achieve a community-wide norm of cleanliness?

Before determining cleaning frequency for optimal productivity, planners must decide on the amount of dirt and debris per curb-kilometer that they are willing to allow to accumulate on the street between sweepings. This is

the “allowable loading” level. The rate of accumulation of street dirt and litter are primarily functions of the following:

- The availability and use of solid waste collection service.
- The availability and use of litter containers.
- Sweeping frequency.
- Sweeper removal effectiveness.
- Rainfall frequency.
- Traffic density.
- Parking.
- Trees.
- Catch basin maintenance.

***Whatever frequency is chosen, you should schedule cleaning of specific streets on specific days and in the same order so that residents and businesses can adjust their parking and travel to best accommodate it.***

The number of days’ worth of accumulated debris and the removal efficiency are the factors that determine the optimal cleaning frequency. Planners can estimate a day’s accumulation rate of dirt, debris, and litter on various types of streets in each part of the planning area by conducting field surveys. For many residential areas in Egypt that do not have formal solid waste collection systems the rate of accumulation may be as much as 500 kilograms (kg) per day per km (kg/day/km). Rates for areas with formal or universal waste collection service should be far less. Planners must also choose an “allowable loading”. Dividing the allowable loading by the estimated accumulation rate yields the theoretical number of days between sweepings. However, since no sweeper is 100 percent efficient, more frequent sweeping will be required to account for accumulation of “missed” litter and debris.

For central business districts, streets in open commercial market areas, and those exposed to frequent dust storms daily service may be needed if the intention is to maintain a high level of street cleanliness. Once-a-week sweeping should be the minimum considered for residential areas and industrial streets.

Whatever frequency is chosen, you should schedule cleaning of specific streets on specific days and in the same order so that residents and businesses can adjust their parking and travel to best accommodate it.

### **Hours of Service**

The next task in planning street cleaning operations is to determine at what time of day or night various types of streets should be cleaned. Questions that should be answered in determining the best time to provide service include the following:

- At what time are the fewest vehicles parked on the street to be cleaned?
- At what time is the traffic volume the lowest?
- Are some areas swept more easily than others?



**Traditional manual street cleaning tools.**

Cleaning should be performed when the streets are most free of vehicles. For example, this means that most business districts should be cleaned after midnight, but before stores open the next morning. If this work is scheduled to terminate in early morning, then the contractor can dispatch the same equipment to streets in residential areas to be serviced in daylight hours. This has several advantages. Residents may object to cleaning in their neighborhoods at night due to the noise, therefore, residential streets should be scheduled for sweeping during daytime hours when the majority of residents will be at work. Moreover, sweeper operators may find nighttime sweeping of residential streets difficult due to parked cars and poor visibility. Lastly, sweeping during the day provides visible evidence to the public that the fees for street cleaning service are being well spent.

*While the overall goal is not to unnecessarily restrict the hours that the contractor may perform mechanical sweeping service, sweeping on arterials and business streets during hours of heavy vehicular or pedestrian traffic must be prohibited.*

## Days of Service

Unless local circumstances dictate otherwise, mechanical sweeping should be allowed to take place on any day of the week. However, consideration should be given as to the best hours to provide services on major locally-celebrated feasts and religious and national holidays.

## Types of Equipment to Be Used

It is not essential to specify the type of mechanical sweeper that a private contractor should use to perform mechanical street sweeping service. However, it is useful to be familiar with the pros and cons associated with each type of mechanical sweeper to be able to evaluate the appropriateness and adequacy of equipment proposed by bidders in their tender offers.

Mechanical sweeping is typically performed using one or more of the following kinds of mechanical sweepers:

- Mechanical broom.
- Regenerative air.
- Vacuum assisted dry.
- Vacuum assisted wet.
- PM-10 capable.

**1. Mechanical broom sweepers:** The first self-contained street sweepers developed. This class of street sweeper is still utilized as the primary street sweeper type by a majority of municipalities in industrialized countries. They can be used in any weather condition for picking up heavy debris including:

- Construction dirt and debris left on roads.
- Heavily compacted dirt and debris on truck routes and industrial areas.
- Dirt accumulations on high traffic volume roads (arterials).
- Seal coat aggregate.
- Normal accumulation of dirt and debris in residential areas.

Mechanical broom sweepers are the “heavy duty” machines of the industry, with the capability to move the most material in the least amount of time. This general class of street sweeper utilizes a system of brooms and either a “squeegee” or belt conveyor to move debris from the ground into a hopper contained within the street sweeper. The removal efficiency for these machines is 50 percent, assuming a smoothly paved surface, particles greater than 400 microns, and the absence of parked vehicles.

Mechanical broom sweepers are very efficient when picking up large chunks of debris or aggregate particles, as well as small tree limbs, smashed cans, etc. A mechanical broom sweeper also can “dig into” and remove hard packed dirt and mud.

Dust control for this type of machine can be a problem because of the churning action of the brooms. The onboard street sweeper water spraying system (dust control) will generally mitigate dust when working in low debris areas. Users have found through past experience that on-board sprinkling systems on both “mechanical” and “air” sweepers do not always work adequately in areas containing moderate to heavy debris accumulations. The resulting dust can affect air quality, and if the dust is heavy enough, cause a traffic hazard. Because of this, a flush truck is usually assigned to work with mechanical sweepers to help mitigate dust.



**Parked cars are a significant obstacle for street cleaners, especially mechanical.**

***Mechanical broom sweepers are effective in removing larger particles, but are not effective in removing fine, pollutant-laden dust and dirt.***

In summary, mechanical broom sweepers are effective in removing larger particles, but are not effective in removing fine, pollutant-laden dust and dirt (smaller than 400 microns). These small particles contain the majority of pollutants found in the streets (i.e. oxygen demanding substances, nutrients, metals, oils). Although many improvements have been made in recent years (see below), mechanical broom sweepers still comprise about 90 percent of the street sweepers in use around the world. Mechanical broom sweepers typically cost between L.E. 400,000 and 800,000, and are less expensive to operate than vacuum sweepers.

- 2. Regenerative air sweepers.** These machines blow air onto the pavement and immediately vacuum it back to capture sediments. They utilize two outside gutter brooms to move debris underneath the street sweeper chassis and into a metal “pick-up” head. High velocity air is circulated through the pick-up head and the sweeper hopper. Debris picked up by the circulated air is deposited into the sweeper hopper. Dust control for this type of machine is through the use of a water spraying system, which, as with mechanical street sweepers, users have found to be inadequate in moderate to heavy debris areas. This type of sweeper is usually adequate for removal of light to moderate debris accumulation. Regenerative and vacuum air class street sweepers are generally inadequate for use in heavy and hard packed debris areas typically found in urban areas of Egypt. However, in areas of light debris accumulation, an air sweeper will leave far less residue behind than a mechanical sweeper. Regenerative air sweepers range in cost from L.E. 500,000 to L.E. 1.0 million.

---

### ***Tandem Sweeping***

***A regenerative air sweeper can follow behind a mechanical broom sweeper for the purpose of picking up residue left by the mechanical sweeper. Using this combination of mechanical and air sweepers for picking up debris in tandem will result in a very clean road surface. This method is often used by communities that have trouble meeting air quality attainment standards for small particulates less than 10 microns in size.***

---

- 3. Vacuum-assisted dry sweepers.** The essential elements of tandem sweeping are combined into a single unit without using water. The word “dry” differentiates these sweepers from the conventional sweepers which spray the pavement with water to facilitate pick-up. These sweepers cost between L.E. 400,000 and L.E. 800,000.
- 4. Vacuum-assisted wet sweepers** create a vacuum at the surface, but use water to suppress dust from its gutter broom. Vacuum sweepers have been shown to be more efficient in removing fine, pollutant laden dust and dirt particles than mechanical broom sweepers. Vacuum-assisted wet sweepers range in cost from L.E. 500,000 to L.E. 1.0 million.
- 5. PM-10 Capable Sweepers** are in a developmental stage. They utilize a combination of mechanical and air sweeper features to pick up debris and dust particulate down to 10 micron in size. They also incorporate an internal system of dry filters to retain all dust larger than 10 microns within the sweeper’s hopper. No water is used for dust control. All dust from the sweeping operation (even dust from the gutter brooms) is drawn into the sweeper pickup system and carried into the hopper and filtered. A strong point of the sweeper is that since water is not used for dust control, one employee can be used for sweeping rather than the

two to four employees that the tandem mechanical and air sweeper operation requires. The street sweeper as currently developed will pick up from light to moderately heavy debris. This type of street sweeper is slower than a mechanical sweeper, and on uneven road surfaces, it will occasionally leave debris behind. While this type of street sweeper cannot be used during rain periods or on wet roads, this limitation may not be a significant factor in Egypt.

Although any mechanical sweeper's ability to reduce street-related pollution depends on many factors including the condition of the street, the weather, the operator's skill, and the presence of parked cars, vacuum assisted dry sweeping appears to be the most effective for light debris and mechanical broom sweepers most applicable in areas with heavy debris. Studies reveal that either conventional mechanical broom or vacuum-assisted wet sweepers reduce non-point particulate pollution by 5 to 30 percent and nutrient content by 0 to 15 percent. On the other hand dry vacuum sweepers reportedly reduce non-point pollution by 35 to 80 percent and nutrients by 15 to 40 percent.

---

### **The Air Quality Link**

*Research has documented that much of the particulate matter (PM-10) and total suspended particulates (TSP) in urban areas can be traced to street surfaces. This material becomes entrained in the air through natural air flow and air flows generated by vehicular traffic. Thus, the street as an "area" (rather than point) source of urban pollution has prompted many governmental agencies to investigate how well existing street sweeping equipment and practices perform. Also because of this increasing recognition of the contribution of finer dirt particles from pavement surface to air pollution, vacuum sweepers are becoming more numerous. However, overall, street sweeping effectiveness is largely a function of sweeping frequency, number of passes per sweeping, equipment speed, and pavement conditions.*

---

### **Manual Street Sweeping**

Manual street sweeping typically includes the collection and removal of litter and debris from paved streets through the employment of manual sweepers and is widely practiced in most developing countries, Egypt included, due to the widespread availability and low cost of labor. It may be used as a complementary service to mechanical sweeping on primary streets to maintain a high level of cleanliness between mechanical sweeping. It typically serves as the only sweeping service on secondary streets and in commercial markets and some business districts.

If a new manual sweeping program will be implemented or manual sweeping services will be procured from the private sector, basic service parameters similar to those identified for mechanical sweeping service will need to be established. Basic service parameters include the following:

- Level of street cleaning effectiveness desired.
- Definition of streets to be serviced.
- Frequency of service.
- Hours of service.
- Days of service.

### **Level of Street Cleaning Service Desired**

The decision regarding the desired level of street cleaning effectiveness is critical. It will dictate the service frequency, the level of resources to be ap-



**Parking lots are public spaces that need to be included in the scope of cleaning services.**

plied, and subsequently the cost of the service. As discussed in the previous section on mechanical sweeping, effectiveness is a subjective term. To convey, and subsequently measure the level of effectiveness of street cleaning expected, a rational and objective method of measuring the extent and nature of street litter is needed (see Table 12.2).

### **Definition of Streets to Be Included**

Sound practice involves an equitable commitment of resources throughout the planning area, since the health and welfare of the community at large depends as much or more on the cleanliness of poor areas as it does on the more affluent ones. Therefore, all paved streets and roads that do not receive mechanical sweeping should be included in the manual street sweeping program.

### **Frequency of Service**

The appropriate service frequency will be largely dictated by the street debris accumulation rate and the street cleaning effectiveness level desired. You should refer to the Frequency of Service discussion under mechanical sweeping service for help in making this decision. Unless universal collection of residential and commercial solid waste has been in force for some period of time, it is likely that daily sweeping will be required in commercial business districts, and every other day sweeping in residential areas.

### **Hours of Service**

Not being subject to the constraints inherent with mechanical sweeping, manual sweeping can be provided during any or all daylight hours.

### **Days of Service**

Manual sweeping should be allowed to take place on any day of the week unless local circumstances dictate otherwise. It may be desirable to require the service provider to deploy more manual sweepers on Fridays and during major locally celebrated feasts and religious and national holidays.

## **Cleaning of Unpaved Streets**

If there are unpaved streets in the service area, provision should be made for cleaning them in order to maintain service equity among all residents. This service is addressed separately from street sweeping, since the streets cannot be “swept”. The service will more resemble litter collection and the service provider should collect and remove all loose litter and debris from all public portions of the street used for vehicular and pedestrian traffic on a regularly scheduled basis.

Planning for procurement and implementation of this service requires establishment of the following basic parameters:

- Level of street cleaning effectiveness desired.
- Definition of streets to be serviced.
- Frequency of service.
- Hours of service.
- Days of service.

### **Level of Street Cleaning Effectiveness Desired**

Deciding level of unpaved street cleaning effectiveness is desired is critical as this decision will affect the service frequency, the level of resources to be applied, and subsequently the cost of the service. To convey, and subsequently measure, the expected level of effectiveness of unpaved street cleaning, a rational and objective method of measuring the extent and nature of street litter must be applied (see Table 12.3)

### **Definition of Streets to Be Serviced**

Sound practice involves equitable provision of services among residents and businesses, since the health and welfare of the community at large depends as much or more on the cleanliness of poor areas as it does on the more affluent ones. Therefore, all unpaved streets and roads that do not receive manual or mechanical sweeping should be designated for cleaning service.

### **Frequency of Service**

The appropriate service frequency will be largely dictated by the street debris accumulation rate and the street cleaning effective level desired. Refer to the Frequency of Service discussion under Mechanical Sweeping Service for help in making this decision. Unless universal collection of residential and commercial solid waste has been provided to residents on unpaved streets for some period of time, it is likely that every other day cleaning will be required. If universal solid waste collection is instituted the frequency can be reduced to as little as weekly once residents and businesses learn to use the service on a regular basis.

### **Hours of Service**

Not being subject to the constraints inherent with mechanical sweeping, cleaning of unpaved streets should be able to be performed without negatively impacting pedestrian or vehicular traffic during any or all daylight hours.

### **Days of Service**

Unless local circumstances dictate otherwise, manual sweeping should be allowed to take place on any day of the week. It may be desirable to require the service provider to deploy more resources for cleaning unpaved streets on Fridays and during major locally celebrated feasts and religious and national holidays.

*Litter collection from public facilities is basically the same as manual street sweeping, except here the activity is confined to designated public facilities.*

### **Litter Collection from Public Facilities**

Another service to consider including within the group of street cleaning services is the collection of litter associated with public use of commercial or government facilities. For this service the service provider should provide manual labor to be on duty during all open hours to sweep up and remove all litter and debris from public facilities such as open commercial markets, places of worship, parks, gardens, squares, train stations, bus stops, and any others that you may want to include. This service should include collecting all litter from common areas of open commercial markets, emptying any litter baskets and other waste receptacles located therein, and placing collected litter and other solid waste into bins located in or immediately outside the market.

Litter collection from public facilities is basically the same as manual street sweeping, except here the activity is confined to designated public facilities. Planning for implementation of this service requires decisions to be made concerning the following basic parameters:

- Definition of public facilities to be serviced.
- Level of facility cleaning effectiveness desired.
- Frequency of service.
- Hours of service.
- Days of service.

### **Definition of Public Facilities to Be Serviced**

Many types of public facilities enjoy intensive use in both rural and urban areas of Egypt. Since most are associated with the purchase of goods or the

consumption of food and beverages, there is high potential for generation and discard of solid wastes. Public facilities to consider for this service include, but are not limited to the following:

- Open commercial markets.
- Places of worship.
- Parks.
- Gardens.
- Fountains.
- Memorials.
- Squares.
- Train stations.
- Bus stops.
- Museums.

To ensure that all bidders have a clear understanding of facilities that are included in the service, a list of specific facilities should be produced by the planning team.

***As many types of public facilities should be provided these services as the governorate can afford, as the cleanliness of these facilities will have a significant impact on how residents and visitors feel about the quality of the environment as a whole.***

### **Level of Cleaning Effectiveness Desired**

In view of their high visibility, it is in the best interest of residents and businesses to support the highest practically attainable level of cleanliness for public facilities. Residents will benefit from a higher quality of life, and businesses will benefit from the increased number of visitors and tourists that are attracted by improvements in area aesthetics and overall cleanliness.

The decision regarding the level of public facility cleaning effectiveness that you wish to maintain will largely dictate the service frequency, the level of resources to be applied, and subsequently the cost of the service. As explained in previous sections addressing street cleaning, effectiveness is a subjective term. To convey, and subsequently measure, the level of effectiveness of public facility cleaning that you expect, a rational and objective method of measuring the extent and nature of public facility cleanliness is needed. This can be accomplished using visual aids accompanied by narrative descriptions and assigned cleanliness ratings as described earlier (see Table 12.2).

### **Frequency of Service**

It will be practically impossible to maintain a high level of cleanliness at public facilities without having cleaning personnel on duty during all open hours. Thus, if the governorate is committed to maintaining a high level of cleanliness and it can cover the cost, it is highly recommended that the serv-



**A picture like this can be assigned a numerical value for the rating system.**



**Gutter brush on mechanical sweeper.**

ice provider have cleaning personnel in duty at each public facility during all hours that it is open.

### **Hours of Service**

Litter collection and sweeping at each public facility should be ongoing during all hours that it is open if you desire to achieve a high level of cleaning effectiveness.

### **Days of Service**

Litter collection and sweeping at each public facility should be provided every day that it is open if you desire to achieve a high level of cleaning effectiveness.

### **Litter Basket Service**

Litter destroys the attractiveness of a community and undermines the people's will to improve their environment. Litter also presents a danger to pedestrian and vehicular traffic, is a fire hazard, and provides breeding places for rats, insects, and other health hazards. Lastly, litter begets litter. If streets are littered, residents are more inclined to add to litter rather than manage waste in a more responsible way. Nevertheless, littering in urban areas in Egypt is ubiquitous. Some justify littering on grounds such as lack of waste collection service while others take the position that if manual sweepers are on duty then littering is harmless, since it will eventually get picked up. Most seem to be unaware of the consequences of their actions.

People generate litter in several ways:

- As pedestrians.
- As motorists either carelessly or purposefully.
- By carelessly storing household or commercial waste prior to collection.
- By indiscriminately discarding household waste.
- By poorly maintaining construction and demolition sites.
- By transporting waste or other materials in uncovered trucks.

There are three general methods of discouraging residents and business owners from discarding litter on streets and in other public areas:

- Creating and enforcing ordinances prohibiting littering.
- Using persuasion through anti-littering campaigns.
- Providing sufficient litter receptacles (baskets) to make the disposal of litter in these containers easy and convenient.

All three of these methods must be implemented together to see an appreciable reduction in the amount of litter that is generated in your service area.

Litter baskets are the primary receptacles used for collection of waste in public places. They are designed for casual disposal of waste by pedestrians. The availability and use of containers for disposal of waste generated in public places can have a direct impact on the level and expense of street sweeping services. Providing an adequate number of properly placed and highly visible containers for depositing public discards can significantly reduce the frequency and cost of street sweeping. Street sweeping and litter basket service plan development should take place simultaneously in order to optimize the synergy between the two activities. Both services should be universally and equitably provided and promoted throughout the entire planning area if you intend to improve the quality of life for residents and the attractiveness of the area to visitors and tourists.

Litter basket service includes the following elements that must be addressed whether the service is to be provided by the governorate or by a private contractor:

- Procurement.
- Distribution.
- Installation.
- Servicing (emptying contents).
- Sanitation.
- Maintenance and replacement.

*Litter baskets are the primary receptacles used for collection of waste in public places. They are designed for casual disposal of waste by pedestrians.*

Planning for implementation of litter basket service requires planners to consider the options available for the following basic parameters that dictate system design and performance:

- Placement of litter baskets.
- Number of litter baskets.
- Type of litter baskets.
- Standard for servicing.

### Placement of Litter Baskets

Any community effort to reduce the amount of litter must include placement of litter baskets at points convenient for public use. You should consider placement of litter baskets in all areas that are associated with high pedestrian traffic, e.g., parks, schools, fast food outlets, major bus stops, street corners, public buildings, commercial business districts, shopping centers, and open markets. The closer a litter basket is to the potential source of litter, the more effective it will be. Known productive locations for litter such as refreshment stands and heavily used parks and bus stops, should have adequate litter baskets conveniently located nearby.

If the governorate has a cleaning and/or beautification department that has placed and serviced litter baskets in the past their experience can be called upon to help identify all of the public areas that should have litter baskets.

### Number of Litter Baskets

No one can provide a reliable rule that will tell officials how many litter baskets should be placed along any street. However, in any area with heavy pedestrian traffic, such as shopping areas and business districts, at least three should be available in each block (assuming a block length of 150 m).

The total number of litter baskets to be placed in the service area will be a function of the lengths of streets and number of discrete areas that experience high pedestrian traffic, and the spacing that is selected. Litter baskets should be spaced in the selected areas at intervals that facilitate and motivate public usage. Experience has revealed that pedestrians will typically not walk more than 50 m to access a litter basket. Finally, you need to remember to require that the service provider keep a reserve of approximately 25 percent to replace damaged baskets and to meet peak demand during holidays and religious celebrations.

### Type of Litter Basket

The type of litter basket will have an impact on the level of usage. Criteria for selection can be summarized as follows:

1. **Volume:** Both volume and shape should be such that one collector can empty the container without undue effort. Volume should be between 30 and 100 liters (l).

2. **Attractiveness:** The more conspicuous a litter basket is the more litter it will attract. They should present a pleasing and inviting appearance, generally with an attractive community logo.
3. **Design:** Baskets should be sturdy and durable for prolonged useful life and to withstand abuse. They should be designed to permit easy and rapid emptying. Design should facilitate easy cleaning and maintenance.

Litter baskets can be open or closed-top. The former are less expensive, more accessible, and easier for pedestrians to use and for collectors to empty, but present a potential fire hazard that can be dangerous if someone tosses a lighted cigarette into accumulated litter. Contents are also subject to removal from high winds, birds, and other animals. The closed-top type is less likely to have its contents spill out onto the sidewalk or street. It can be constructed tightly enough so that if a fire is started it will be extinguished by lack of oxygen.

Both types of baskets have inherent disadvantages. If placed near food outlets, steel-mesh, and open-top containers often attract insects and other nuisances. Moreover, the litter in them has no protection from wind. Occasionally they catch fire. Covered containers with horizontal swinging doors beneath a metal canopy require frequent cleaning, as sticky residue accumulates on the doors. People are sometimes reluctant to push the sticky doors to deposit their discards.

Plastic bags and treated plastic inserts lessen the maintenance of litter baskets. Plastic bags are more costly, but provide the most sanitary service. Plastic inserts are more economical, but require more frequent cleaning.

Small post-mounted receptacles are an option that has gained a degree of popularity. They can be mounted on lighting standards or some types of street furniture. An advantage is that they are difficult to steal. They typically have a hinged bottom, kept closed by a spring. This facilitates emptying by manual sweepers patrolling the area who open and dump the contents of the basket into their litter container. Because they are small, more are required, and their use seems best adapted to business areas.

The exterior material can be aluminum, plastic, steel, or concrete. Steel has been the most commonly used material until recent years when plastic has become more prevalent. Steel has the advantage of low price. Aluminum and plastic are available in a greater variety of shapes. If you select plastic you need to ensure that the plastic will withstand high temperatures. The primary advantages of concrete are durability and its' "vandal-proof" characteristics.

### **Standard for Servicing**

The goal in establishing the service standard is to require emptying at a frequency that will preclude a litter basket from becoming more than 90 percent full. Experience has shown that pedestrians will be reluctant to use a litter receptacle if there is some probability of them coming in contact with the contents. Since litter baskets will be located along streets and at public facilities where manual sweepers will typically be on duty during all hours of heavy pedestrian use, they can minimize the occurrence of full or overflowing baskets by emptying them each time that they are working near them.

### **Public Structure Washing**

The appearance of public structures in the public right of way contributes to the overall impression residents and visitors have concerning the cleanliness



**Litter usually collects in gutters.**

***Maintaining the cleanliness of public structures is another service worth considering for inclusion in your overall streets and public facility cleaning program.***

and attractiveness of a community. Maintaining the cleanliness of these structures is another service worth considering for inclusion in your overall streets and public facility cleaning program. This service consists of mechanically washing public structures located in the public right-of-way of primary and secondary streets. Public structures can include, but are not necessarily limited to:

- Fountains, memorials and statues.
- Bridges, including abutments, columns, curbstone, and guardrails.
- Tunnels.
- Bus stations.
- Tram stations.
- Elevated roadways and pedestrian crosswalks.
- Traffic lights.
- Street light poles and lamps.
- Street signs.
- Traffic control signs.
- Advertising signs- (located in the public right-of way).
- Traffic control shelters.

In planning for implementation of this service decisions must be made concerning the following service elements:

- Types of structures to include.
- Level of cleaning effectiveness desired.
- Washing frequency.
- Hours of service.
- Days of service.

### **Types of Public Structures to be Included**

All of the types of public structures in the above list will suffer the negative effects of exposure to dirt, air emissions, and defacement from ambient and general societal sources. They need to be cleaned to extend their service and use to the public, both in function and in form. Thus, while the frequency of washing may vary considerably between types, it is in the best interest of the community to wash all such public structures on a regularly scheduled basis.

### **Level of Cleaning Effectiveness Desired**

The level of cleanliness achieved at the time of washing will be directly related to the following:

- Type of washing equipment used.
- Type of cleaning agent used.
- Washing technique.

To ensure that the service provider achieves the level of cleanliness desired it is critical that you specify the washing equipment, cleaning agent, and technique to be used for each type of public structure. Information concerning what to specify can be obtained by talking to washing equipment and cleaning agent vendors and/or the department in your local government currently responsible for washing public structures. It may be worthwhile to test proposed cleaning methods to ensure that the integrity of particularly sensitive materials such as granite and marble is not compromised by chemical or physical reactions.

### **Washing Frequency**

The frequency of washing necessary to maintain the level cleanliness desired will be dependent upon the exposure of various types of public structures to the following:

*In urban areas the relatively high exposure of public structures to the above sources of dirt and grime will require more frequent cleaning than these same types of structures located in rural areas.*

- Local weather conditions; e.g. exposure to dust from dust storms, etc.
- Automobile and truck exhaust.
- Air pollution from industrial sources.
- Public use and abuse; e.g., food and beverage residues on horizontal and vertical surfaces.

In urban areas the relatively high exposure of public structures to the above sources of dirt and grime will require more frequent cleaning than these same types of structures located in rural areas. Fountains, bus stations and tram stations, and bridge guard rails should be washed once monthly, and all other public structures listed above should be washed at least once every 3 months in urban areas.

### **Hours of Service**

All public structure washing should be during those hours of lowest use to maximize washing efficiency, as well as minimize public inconvenience and risks to their health and safety. This would typically be during the nighttime hours of midnight until 6:00 a.m. in the morning.

### **Days of Service**

Washing of public structures should be performed during the nighttime hours of the day of the week or month on which the impact on the public can be minimized. Due to the relatively high and extended hours of usage of areas contiguous to public structures on Thursday evenings, washing during Friday morning hours should be minimized.



## **STEP 3: COMPILE FINDINGS IN AN ASSESSMENT REPORT**

**T**he findings from completing the assessment of existing conditions and service options should be compiled and summarized in an assessment report for circulation among stakeholders and governmental officials to solicit their input. The process of developing this document will illuminate any fundamental systemic problems, and help identify the street and public facility cleaning service improvement options that may rectify them.

The document should include the following components:

- A summary of findings from the inventory and assessment of existing practices and conditions.
- An explanation of any obstacles and constraints to implementation of specific street and public facility cleaning services and ability to meet desired service levels.
- A summary of basic service parameters for each service under consideration.
- Preliminary recommendations of potentially viable options that appear worthy of inclusion in program scenarios in Step 4.
- Recommended schedule for implementation.

The highlights of the report findings should be presented in the mass media for public review and feedback from customer groups and government officials.



**Hand-pushed mechanical sweeper.**

## **STEP 4: EVALUATE STREET AND PUBLIC FACILITY CLEANING SCENARIOS**

*Changing any one of the services or parameters produces a new scenario that needs to be separately evaluated due to their interrelated impacts. For example, reducing the number of litter baskets is likely to result in more litter that must be subsequently handled as street sweepings.*

**T**he next step in the planning process is the comprehensive evaluation of the potentially viable service options identified in Step 2 and scrutinized in Step 3. This step involves formulating individual scenarios that can be evaluated using the design criteria established through planning team, governmental official and stakeholder input. Each scenario will consist of choosing combinations of individual services and associated service parameters.

Design criteria, as well as policy and service objective decisions made earlier in the planning process, must be applied to every scenario. As in Step 2, the decision making process will be facilitated by applying the design criteria established earlier. These may include, but not necessarily be limited to the following:

- Compliance with laws and regulations.
- Cost effectiveness and affordability.
- Health and safety.
- Environmental compatibility.
- Public acceptance.
- Efficiency.

The relative importance assigned to each of these design criteria in the scenario evaluation will vary depending on the input received from governorate officials and stakeholder groups. In every case it is highly likely that cost effectiveness and affordability will be a priority. Accurate evaluation of the cost effectiveness and affordability design criteria will require the application of full cost accounting principals and financial management tools described in detail in Chapter 3.

### **Develop Preliminary Cost Estimates**

Once the decisions regarding which services to include have been made for all parts of the service area, the next step is to apply full cost accounting techniques to each potentially viable street and public facility cleaning scenario using the approach described in Chapter 3. This step should consist of developing preliminary system cost estimates for both government and private provision of services.

Use of the financial management approach requires the designer to seek out and develop a great deal of cost and operational data for input. Data should be available from your governorate departments currently providing these services and from other governorates that have procured the services of the private sector. To use the approach for the purpose of calculating a preliminary cost estimate for each scenario please see Chapter 3.

### **Summarize Results**

The estimated cost and the assessment of the compatibility of each scenario with the design criteria should be summarized in spreadsheet form to facilitate comparison of all viable street cleaning improvement options analyzed by the planning team. The spreadsheet should be incorporated into a brief narrative report to solicit feedback from stakeholders and serve as the basis for final decision-making by the appropriate governorate officials. To facilitate this objective, several copies should be produced and widely disseminated among all interested parties.



## **STEP 5: SELECT PREFERRED STREET AND PUBLIC FACILITY CLEANING PROGRAM**

Once all of the scenarios have been subjected to all of the design criteria the final decision making process can begin. This consists of the following tasks:

- Calculate rates/tariffs and evaluate cost recovery methods.
- Solicit final stakeholder input.
- Provide governorate officials with information required to select the preferred program.

### **Calculate Rates/Tariffs and Evaluate Cost Recovery Methods**

Before selecting the preferred street and public facility cleaning program, the governorate needs to know if and how it will be able to pay for it. The planning team should use full cost accounting methods described in Chapter 3 to evaluate cost-related issues that apply to each of the scenarios under consideration. These include the following:

- Conducting a “willingness to pay” survey of residents and businesses.
- Developing tariff models.
- Examining “cost recovery” options.
- Selecting the method of fee collection.

The results will include proposed fee schedules for various categories of ratepayers, e.g., households and businesses, and identification of the pros and cons associated with each of the practical means for collecting fees from service users.

### **Solicit Final Stakeholder Input**

Once the planning team has calculated how much each of the program scenarios will cost each rate payer category, these groups will be better able to make informed decisions about the program they prefer. It is essential that a period of time be allowed for widespread dissemination of recommendations and feedback from, the public at large. Governorate officials might find it useful to host public meetings to discuss the preferred program and accompanying fee recovery systems.

### **Governorate Officials Select Preferred Street and Public Facility Cleaning Program**

Internal deliberation on the input received from the planning team and the general public can now take place among all of the appropriate governorate officials. An informed decision can now be made which will have the highest probability of achieving street cleaning program design goals, while being affordable to the majority of families and businesses in the governorate. In the unlikely event that officials select to change one or more of the service elements of a system scenario, the scenario should be subjected to Step 4 before receiving final approval.



**Non-uniformed street sweeper.**



## **STEP 6:**

# **IMPLEMENT THE SELECTED PROGRAM**

The planning team is now ready to begin the task of preparing a plan for implementation of the street and public facility cleaning program selected by governorate officials. If the services are to be provided directly by the governorate then an implementation plan should be developed. The plan should address the same issues and program elements that must be addressed when procuring private sector services.

If the governorate has decided to contract with the private sector for provision of recycling program services then the following tasks must be undertaken:

- Establish program funding mechanism.
- Procure a contractor.
- Develop organizational structure for contract administration and monitoring.
- Develop public awareness and communications program.

Each of these tasks is addressed briefly below.

### **Establish Program Funding Mechanism**

Before a contracted service commences, the means for funding the service after commencement of the service needs to be determined. Chapter 3 provides further information on how solid waste management services can be financed.

If a “user pays” principle is employed, the manner in which these fees are collected from industrial waste generators must be developed. If industrial management is only part of a larger scale integrated solid waste management project, the funding mechanism for the overall project will, more than likely, cover the industrial waste component. In either case, all of the necessary approvals and budgets will need to be in place before the service begins. As much information as possible about how the program will be funded needs to be provided in the Request for Tender (RFT). This will help assure prospective contractors that the project will go forward so long as their terms for providing it are reasonable. It will also assure them that it is worth their investment to submit a proposal in the detail that is required through the structured RFT process recommended in this manual.

### **Procure a Contractor**

The competitive procurement or bidding process requires the preparation of two major documents by the contracting agency:

- A Request for Qualifications (RFQ).
- A Request for Tender (RFT).

Both of the above documents are prepared under the guidance of a technical or tender committee. Chapters 4 and 5 provide guidance on how these documents are prepared and used.

The RFQ is used to pre-qualify contractors who then will be allowed to submit bids or tenders in response to the RFT. Generally it provides the contracting industry with an overview of the project and outlines the disciplines and level of expertise needed to perform the project. The RFQ provides guidance on how potential contractors should respond and how their responses will be evaluated.

The RFT is the document the pre-qualified bidders use to prepare their tenders. It generally consists of a book of conditions and annexes, including technical specifications. It provides great detail about the required services and typically becomes a part of the contract between the governorate and the selected contractor.



**Clean streets changes public perceptions of an area.**



**Streets must be monitored to determine the effectiveness of the cleaning services.**

The draft contract, general conditions of the contract, and appendixes are all part of the RFT. They ultimately will form the basis for the contract between the governorate and the successful bidder. Consequently, it is extremely important to prepare these documents carefully to ensure that the long-term contract relationship is properly formulated and that the responsibilities and risks are appropriately assigned between the parties.

Appendices to the general conditions are used to set forth specific information necessary to completely define the requirements of the work and to provide any information affecting the performance of the service. Typical topics covered include the following:

- Technical Specifications.
- Bidder's Technical Proposal.
- Facilities and Equipment.
- Contract Performance Letter of Guarantee.
- Supplemental Information.

Instructions on how to prepare draft contracts, general conditions, and appendixes are provided in Chapter 5. Specific instructions on how to prepare technical specifications for the appendixes of an RFT for street and public facility cleaning services are provided in Appendix A of this chapter.

### **Develop Organizational Structure for Contract Administration and Monitoring**

When a governorate signs a contract with a private sector contractor to provide any solid waste management service, the contract must be monitored by the governorate to ensure that the contract terms and conditions are being met, and that residents and businesses are being provided the services specified in the contract. The governorate must develop an organizational structure to administer and monitor the contract and contractor operations.

Contract monitoring and administration of a solid waste management and/or street cleaning services contract requires development of a governorate institutional infrastructure dedicated solely to that purpose. Refer to Chapter 6 for guidance in developing and implementing the organization and infrastructure for monitoring of solid waste management and street cleaning service contracts.

### **Develop Public Awareness and Communications Program**

A public awareness and communications program is critical to the successful implementation of any policy decision, particularly when it requires the support of the public and behavioral changes from constituencies. Street and public facility cleaning program success is largely dependent upon resident and business support and behavioral change. Motivating a behavioral change requires a comprehensive and professionally developed long-term plan to build public understanding of, support for, and participation in the program.

Refer to Chapter 7 for a description of how to manage a general public awareness and communications campaign. It describes the steps that must be conducted to implement a successful public awareness campaign. In addition, it provides guidelines on building a Public Awareness and Communications Team (PACT) within the contract monitoring organization to be responsible for managing such a campaign. It explains in simple terms who will do what, when, and how.





## APPENDIX A: INSTRUCTIONS AND EXAMPLES FOR TECHNICAL SPECIFICATIONS

This appendix provides detailed guidance for planning team preparation of the technical specifications to include in the appendices to the contract general conditions section of the Request for Tender (RFT). The technical specifications should include:

- Definitions
- General Description of Services.
- Service Specifications.
- Minimum Technical Requirements.
- Performance Standards.
- Performance Monitoring.
- Measurement and Payment.
- Penalties.

All important words or terms should be precisely defined in a glossary included as part of the RFT.

### General Description of Services

The general description of services can be divided into three sections:

- Scope of services.
- Background information.
- Summary of intent.

The content to include in each of these sections is described briefly below.

#### Scope of Services

The scope of services should begin the process of defining for the bidders the services that they will need to provide if they are successful in getting the contract. The scope of services should state that the contractor will furnish all labor, supervision, materials and supplies, permits, licenses, insurance, and equipment necessary for street and public facility cleaning services as specified for the planning area. All collected street sweepings and litter should be transported to the designated disposal facility. The contractor may divert street sweepings and litter to beneficial use subject to your review and approval on a case-by-case basis. The contractor should perform these services in conformance with the specifications and requirements contained in the RFT.

#### Background Information

So that bidders can submit a responsive proposal, you will need to provide them information concerning the scope of services to be provided. All relevant factual information obtained or created in the street and public facility cleaning program planning process should be summarized in clear tabular form and included in the introduction and background section to the service specifications in the RFT. Examples include, population, number of dwelling and commercial business units, land area by type of land use, kilometers (km) of primary, secondary, and unpaved roads, quantities of street sweepings and litter currently collected, and any information relating to provision of street and public facility cleaning services.

#### Service Specifications

The next task in preparing the technical documents for the RFT is developing service specifications. The primary objective of service specifications is to provide bidders with a clear understanding of what services you want the contractor to provide. They

#### Example of Summary of Intent

*The intent of the government as prescribed in this RFT is to provide Street and Public Facility Cleaning Services at the best price and with the highest quality of service. To this end, the governorate has provided some information to all Pre-qualified Bidders in order to assist them to compute fair and reasonable financial offers. However, it is the sole responsibility of Pre-qualified Bidders to exercise due diligence in assessing all existing work conditions and to ultimately rely on their own assessments in the calculation of prices submitted in the Tender Offer.*

tell the potential contractor what to do, where to do it, and when to do it. Service specifications for street and public facility cleaning services should specify the types of service to be provided and address the following parameters concerning service provision:

- Description of the service.
- Definition of units (litter baskets, streets, specific public facilities) to be serviced.
- Frequency of service.
- Hours of service.
- Days of service.

Service specifications begin the process of providing detailed information concerning the service that will be covered by the contract. Suggested wording for specifications that will typically be included in an RFT for street and public facility cleaning services are provided below. They have been grouped within the following common components of street and public facility cleaning service operations to facilitate your understanding and use:

- Work plans.
- Types of service to be provided.
- Hours of service.
- Types of waste to be collected in street cleaning.
- Transfer, processing, and disposal of street sweepings and litter.
- Street cleaning equipment.
- Reporting requirements.
- Changes in level of service.
- Handling of complaints.
- Public structure washing procedures.

### **Draft Work Plan**

As part of the tender offer, each bidder should be required to submit a draft work plan (DWP) that illustrates the bidder's understanding of the service requirements and describes exactly how the firm intends to perform them. The specification for the DWP should require that bidders address and include the following:

1. Maps of all proposed street cleaning routes, including a description of the rationale used in their development.
2. Proposed route time schedules.
3. Descriptions of the number and type of personnel and equipment to be deployed including the rationale for determining the number and type.
4. Performance criteria for mechanical sweeper operators and manual sweepers.
5. Proposed plan for recruiting and training laborers, equipment operators, and supervisory personnel.
6. Manufacturer's literature for all proposed primary street cleaning equipment proposed.
7. Description of the plan for transfer of street sweepings and litter from the point of collection to the designated transfer or disposal facility.
8. Plan for supplying water for mechanical sweepers.
9. Plans for administering and managing each type of street cleaning service including an organization chart.
10. Description of job training program for manual sweepers including safety and health training.
11. Plan for distribution, installation, daily servicing (emptying contents), sanitation, and maintenance of litter baskets.
12. Description of mechanical sweeper operator training and testing program.
13. Lists of all proposed street cleaning equipment indicating type, make, size and age.
14. Descriptions of record keeping and reporting systems for all information and data required to be maintained by the contractor.
15. Proposed procedures for oral and written communication with contract administration personnel.
16. Street cleaning equipment sanitation and preventative maintenance program and schedule.

17. Separate descriptions of plans for traffic control, washing, rinsing and wash water management procedures that will be used for washing each type of public structure.
18. Description of how the contract requirements.

### Preparation Work Plan

The selected contractor will need a preparation period of between 90 and 120 days between contract signing and implementation to mobilize all resources required to perform the service. To ensure the governorate that mobilization is occurring at an acceptable pace, the contractor should be required to submit a work plan for performing all preparation period activities. This plan is called the preparation work plan (PWP) and should be submitted no later than 30 days following the contract signing date. The PWP should provide schedules for the initiation, milestones, and completion of all preparation period activities including, but not necessarily limited to, the following:

1. Recruiting and training labor and supervisory personnel.
2. Procurement of supplies and equipment.
3. Rehabilitation of existing facilities.
4. Construction of new facilities.
5. Implementation of project management structure.
6. Implementation of information database and record keeping systems.
7. Final route design and scheduling.
8. Delivery of litter baskets where required.
9. Development and dissemination of any public information materials.

### Final Work Plan

The contractor should be required to submit a Final Work Plan (FWP) within 45 days of the contract signing date. The FWP should address each of the activities prescribed for the DWP and incorporate refinements and modifications discussed and agreed upon between the contracting agency and the contractor prior to execution of the contract. The FWP should include the PWP.

### Types of Service to Be Provided

The technical documents should also include specifications that define the service to be provided and address basic service parameters. The following are examples of service specifications that you should consider adopting for street and public facility cleaning.

1. **Cleaning Unpaved Streets:** The contractor shall gather and remove all loose litter and debris from unpaved streets three times per week. The work area shall include all public portions of the street between buildings that is used for vehicular and pedestrian traffic.
2. **Litter Basket Service:** The contractor shall procure, distribute, install, service daily (empty contents), sanitize and maintain waste litter baskets along streets and at public facilities having high volumes of pedestrian traffic shall be placed at intervals of not more than 50 meters (m) on both sides of all designated streets and at each corner of every intersection with another street.
3. **Litter Collection from Public Facilities:** The contractor shall provide manual labor to be on duty during all open hours to sweep up and remove all litter and debris from public facilities such as open general commercial markets, places of worship, parks, gardens, squares, train stations and bus stops, and any other sites that are listed in the RFT. This service shall include collecting all litter from common areas of open commercial markets, emptying all litter baskets and other waste receptacles, and placing collected waste into bins located in or immediately outside the market.
4. **Manual Sweeping:** The contractor shall manually sweep and remove all litter and debris a minimum of once daily from primary and secondary streets 7 days per week. Secondary streets shall include any road, passageway, or alley constructed of asphalt, stone, tile, and brick or concrete or is otherwise hard surfaced. The work area shall include the paved area between the normal curb lines of a street whether actual curb lines exist or not, including median islands, traffic islands, sidewalks, and areas adjacent to the street or parking lots.
5. **Mechanical Sweeping of Primary Streets:** The contractor shall mechanically wash, sweep and remove

all litter and debris along all curb-kilometers a minimum of three times weekly from all primary streets. The primary street shall include the paved area between the normal curb lines of a street, whether actual curb lines exist or not, including median islands, but shall not include traffic islands, sidewalks, areas adjacent to the street, or parking lots.

6. **Public Structure Washing:** The contractor shall mechanically wash public structures located in the public right-of-way of primary and secondary streets and listed in the technical specifications or shown elsewhere. Public structures can include but are not necessarily limited to those listed in the appendix.

### Hours of Service

1. **Allowance for Unusual Circumstances:** Inclement weather conditions and other events such as street repairing, utility repair, utility installation, building construction, police action, fire suppression, and neighborhood events may temporarily delay access to streets and roads. You should require that the contractor notify the contract administrator within a reasonable period of time whenever a street cleaning service cannot be provided for any of the above circumstances. Require that street cleaning services that are deferred be completed the next regularly scheduled workday.
2. **Cleaning of Unpaved Streets:** Cleaning of unpaved streets should take place during specified hours that are established to minimize impacts on residents and area traffic.
3. **Litter Basket Service:** You should require that litter baskets be emptied at least once daily 7 days per week. If possible, require that it be done during the same hours that manual street sweeping occurs on the route where the litter basket is located.
4. **Litter Collection from Public Facilities:** Litter collection from public facilities can be performed on a continuous basis during all normal open hours up to 7 days per week and 24 hours per day. Hours should reflect the standard of cleaning effectiveness desired and the ability of the governorate to pay for the service.
5. **Manual Sweeping Service:** Manual sweeping service should only occur between specified hours unless otherwise specified or permitted by the contract administrator. The hours should be set to minimize nuisance to pedestrian and vehicular traffic.
6. **Mechanical Sweeping:** Mechanical sweeping shall only occur between specified hours. The contractor should be required to schedule mechanical sweeping activities during these hours in a way that minimizes interference with vehicle and pedestrian traffic, and noise in contiguous residential neighborhoods.
7. **Public Structure Washing:** You should specify any hours or days of the week that you would not allow washing of public structures. This might include Thursday evenings and Fridays, as the public is likely to be using public structures the most on this day.
8. **Street Cleaning Service Time Changes:** Once schedules have been adopted and routes established, the contractor should minimize changing of times and routes. During times of severe weather, street cleaning services should be performed at the first opportunity unless rescheduled by the contract administrator. The contractor should be required to comply with all rescheduling instructions.
9. **Timing Consistency:** To the extent practically possible, the contractor should be required to commence all street cleaning services on each route at the same point, at the same time and follow the same route each time that the service is provided. The contractor should make every reasonable effort to schedule street cleaning services within 12 hours after residential and commercial waste collection service has been provided.

### Types of Waste to Be Collected Through Street Cleaning Services

- **Debris:** You should clearly define debris and specify that it include all materials normally picked up by a mechanical sweeper, such as sand, glass, paper, cans, rocks, shredded tires, leaves, and other materials on the surface of primary, secondary, and unpaved streets.

- **Litter:** You should define litter and specify that it include all randomly discarded solid waste materials found on primary, secondary, and unpaved streets and other public areas, or placed in litter baskets.
- **Street Sweepings:** You should define street sweepings and that it should include all solid materials collected from the mechanical and manual sweeping of primary and secondary streets, including debris and litter.

### Street Cleaning Equipment

Specify that the contractor shall have on hand at all times, and in good working order, such street cleaning equipment as shall permit the contractor to adequately and efficiently perform all street and public facility cleaning services specified in the RFT.

### Transfer, Processing, and Disposal of Street Sweepings and Litter

- **Compliance with Local Ordinances and Egyptian Laws:** You should specify that no street sweepings be transferred, processed, or disposed in a manner prohibited by local ordinance or Egyptian law.
- **Designated Processing and Disposal Facilities:** You should require that all street sweepings and litter be transported to designated transfer, processing, or disposal facilities, and that the weight is measured and recorded using certified scales.
- **Transfer of Street Sweepings and Litter on Public Streets:** The contractor should be prohibited from transferring street sweepings from street cleaning equipment to waste transfer vehicles in any manner that would result in obstructions to pedestrian or vehicular traffic, result in the creation of blowing dust and/or the spillage of any collected materials, or pose a health or safety threat to any individual or commercial business. You may want to specify that the contractor use front high load dumping sweeping equipment to keep sweepings transfer to one lane of travel, and also avoid dumping and reloading off the ground.

### Changes in Level of Service

Provisions for adding or modifying service should be addressed through specifications written as follows:

- **Additional Service:** The contractor shall extend street cleaning routes and services to new streets, public facilities, or public structures within 24 hours of notification.
- **Modification:** The (contracting agency) shall have the right to increase or decrease any street cleaning service frequency, provided that (the contracting agency) notifies the contractor of the new frequency at least 3 months prior to the time that the service change is to occur.

### Customer Service and Handling of Complaints

As part of the service, the contractor should be required to offer a system that facilitates the receipt, recording, and resolution of inquiries and complaints from residents and businesses. To ensure that this occurs you should include the following service specification:

- **Customer Service Office:** The contractor shall maintain a fully furnished and equipped customer service office with toll-free telephone access where complaints from Customers and notification of non-compliance with service specifications from contract monitors can be received 24 hours per day, 7 days per week.

### Public Structure Washing

To ensure that the washing of public structures is performed in a manner that is in compliance with your program design criteria and service objectives you need to specify washing frequency and procedures. The following provide examples of service specifications that address these issues.

- **Service Frequency:** The contractor shall wash fountains, bus stations and tram stations, and bridge guard rails once monthly. All other public structures listed for washing service shall be washed once every 3 months.

- **Traffic Control:** The contractor shall provide personnel to control and direct vehicular and pedestrian traffic flow during all times that work is being performed on primary and secondary streets.
- **Washing:** Washing shall consist of applying a cleaning detergent with water, and rinsing. The contractor shall deploy manpower and all specialized equipment in a manner, and for a length of time that will result in the removal of all dirt, soil, graffiti, grease, and any other residuals.
- **Wash Water Management:** The contractor shall control and remove wash and rinse water to prevent damage to surrounding vegetation and accumulation of any pools of freestanding water.

## Reporting Requirements

Requiring the contractor to prepare and submit monthly reports that address all aspects of street and public facility cleaning operations is the best way to maintain complete and up to date working knowledge of contractor activities and performance. Technical specifications should require the contractor to submit the following documents and reports:

- **Monthly Preparation Reports (MPR):** During the preparation period the contractor should be required to submit monthly preparation reports (MPR) to the contract administrator describing the progress made during the preceding month on each preparation activity. You should require the MPR to be submitted within no more than 15 days after the ending date of the month being reported on.
- **Route Maps and Schedules:** Sixty days prior to commencement of street cleaning services the contractor should provide the contracting agency with detailed color-coded maps indicating:
  - Route starting points, routing, and ending point for each street cleaning service.
  - Type and size of street cleaning equipment.
  - Number and type of personnel to be used.
- **Monthly Operations Reports (MOR):** During the contract operations period the contractor should submit monthly operations reports to the contracting agency that should include detailed information concerning the performance of each type of street cleaning service.
- **Annual Operations Reports (AOR):** The contractor should be required to submit an Annual Operations Report to the contracting agency summarizing the performance and results associated with each type of street cleaning service for each 12-month operations period.

## Minimum Technical Requirements

The purpose of the minimum technical requirements is to set conditions relating to “how” the contractor shall perform the specified services. Minimum technical requirements should clearly, but simply, state what you expect. In other words, minimum technical requirements establish guidelines that will ensure that the contractor provides the services in a manner that is compatible with each of the program design criteria.

### Example Minimum Technical Requirement for Street Cleaning Equipment Loading:

*Mobile equipment used for street cleaning shall not be loaded in excess of the manufacturer's gross vehicle weight (GVW) rating or in excess of the maximum weight specified by the Egyptian Roads and Bridges Authority.*

Minimal technical requirements should be developed that address all aspects of service provision. Suggested minimum technical requirements for street and public facility cleaning services are provided below. They have been grouped within the following common components of street cleaning service operations to facilitate your understanding and use:

- Customer Service and Complaint Handling.
- Litter Baskets.
- Manual Sweeper Clothing and Tools.
- Manual Sweeper Handcarts.
- Mechanical Street Sweeping Equipment.
- Public Structure Washing Equipment.

- Reporting Requirements.
- Street Cleaning Personnel.
- Street Cleaning Practices.

## Customer Service and Complaint Handling

The contractor should be required to offer a system that facilitates the receipt, recording, and resolution of inquiries and complaints from the public or contract monitors. To optimize usage the system must be widely publicized and easy to use. To ensure the implementation of a system that meets these objectives the contracting agency should establish requirements for each of the following related issues:

1. **Communications Equipment Requirements:** The contractor should be required to equip the customer service office with enough telephone lines to be able to answer all calls in less than 3 minutes, even during peak hours. The office should be equipped to transmit complaints to field supervisors through the use of two-way radio or cellular telephone communications. The office should also be equipped with facsimile equipment to facilitate transmission of written communication with the organization responsible for contract administration.
2. **Complaint Handling:** The ability and commitment of the contractor to expeditiously resolve all complaints is essential to maintaining the financial and behavioral support of citizens. As a first step the contractor should be required to record in a bound book all complaints, noting the name and address of each complainant, date and time of complaint, nature of complaint, and nature and date of resolution. The contractor should also be required to compile a summary statistical table of the complaint record in a form satisfactory to the contracting agency, which should reserve the right to examine it at any time.
3. **Complaint Resolution:** The logistics and timelines associated with resolution of complaints need to be specified in the minimum technical requirements. The contractor should be required to respond to all customer complaints within, at most, 12 hours. If a complaint involves a failure to perform service required in the contract, the contractor should perform the service in question within 12 hours of notification.
4. **Hours of Service:** To maximize public convenience the customer service office should be open during all hours that calls might be expected regarding street cleaning services. If the contractor is providing service during night time hours, then the office should be staffed 24 hours on each day that service is provided. Fewer hours might be acceptable if all service is provided within one or two daytime shifts only. However, it is better to err on the side of too many rather too few hours in order to maintain citizen support and satisfaction.
5. **Staffing:** The office should be staffed with a number of trained personnel adequate to ensure that citizens are able to reach a qualified customer service representative within three minutes of calling.
6. **Unresolved Complaints:** Provisions also need to be prescribed in the event of reports from contracting agency monitors or citizens that a complaint has not been resolved to the customer's satisfaction. In this case, the contractor should submit a detailed report outlining the nature of the complaint and the resolution or actions taken to resolve the complaint. If, in the opinion of the contracting agency the proposed resolution or actions taken are insufficient to satisfactorily resolve the claim, it should require the contractor to carry out a process to satisfactorily resolve the complaint.

## Litter Baskets

If the contractor is to provide the litter baskets, it is logical to include the provision of the baskets as part of litter baskets that meet your economic, technical, health, safety, environmental, and aesthetic performance criteria. To achieve your objectives, you should include the following minimum technical requirements for litter baskets:

1. **Change in Number of Litter Baskets Required.** You should specify that the contractor must distribute and service additional litter baskets, or retrieve existing litter baskets, when requested in writing.
2. **Distribution and Installation Plan:** The contracting agency needs assurance from the contractor that litter baskets will be delivered and installed in a timely and cost effective manner. To accomplish this

goal the contractor should be required to submit a distribution and installation plan with the tender offer. The requirement should specify the time period in which all litter baskets are to be delivered and installed, allowing a reasonable amount of time for installation, but not too far in advance of the date that litter basket service is scheduled to start.

3. **General:** Specify that the contractor must procure, deliver, install, empty, and maintain freestanding (fixed to ground) and/or pole mounted litter baskets that will be high quality, standard manufactured units that are durable, attractive, structurally sound, and vandal resistant. Also specify the interval (in m) between litter baskets and any other placement directions, such as at each corner of all intersections along both sides of all streets. Specific locations should be illustrated on maps included in the technical specifications.
4. **Maintenance:** To ensure the preservation and long life of litter baskets and to maximize availability to potential users, the contracting agency should require that the contractor monitor, control, sanitize and otherwise maintain them over the life of the contract. Litter baskets should be washed at least once every 3 months or according to the schedule and plan submitted by the contractor with the tender offer.
5. **Ownership:** To provide added incentive to maintain litter baskets at the highest practicable level, and to reduce potential liability to the governing body, ownership should remain with the contractor. The governing body should be given the option to purchase the litter baskets at the end of the contract period at a price to be specified in the service contract.
6. **Replacement:** Some litter baskets will need to be replaced from time to time over the contract period due to irreparable damage or theft. The contractor should be required to replace within a specified time period, and at his or her own expense, any litter basket that has been removed from its designated location or that is not fully functional and cannot be repaired. Replacement should be required within 2 days of notification from the governing agency.
7. **Technical Specifications:** You should require that litter baskets and mounting assemblies be performance tested by the manufacturer and meet or exceed all of the following minimum technical requirements:
  - Body: Impact resistant injection molded high-density polyethylene with all through color. Certified to contain ultraviolet stabilization provided by the equivalent of 0.5 percent of UV 531 stabilization compound and maintain integrity and functional performance during the warranty period when exposed to ultra-violet radiation of the sun and temperatures up to 50 degrees C.
  - Volumetric Capacity: Minimum volume of (specify a size between 20 and 40 l), excluding volume resulting from a crowned lid in the closed position.
  - Standards of Design: Designed to meet all relevant sections of ISO 9001.
  - Hood: Enameled mild steel or equivalent lid must be configured to ensure that it will not warp, bend, slump, or distort to such an extent that it no longer fits the body properly or becomes otherwise unusable. Hinged with integral aperture to minimize litter removal by birds. Self-locking and opened with standard key and closed with slam shut action.
  - Ease of Emptying: The hood shall open with a key and allow easy removal of the body. Body shall remount easily onto mounting brackets or inside the fixed container.
  - Mounting: All fasteners shall be corrosion resistant, free of sharp edges, and fasteners shall not penetrate the body where waste will be contained. They shall be easy to assemble and nuts must be self-locking and must be designed such that the public cannot remove them with ordinary tools.
  - Metal Components: Must meet the corrosion resistance requirements of 500 hours of salt spray exposure as described in American Society for Testing Materials (ASTM) B117.
  - Finish Surfaces: Interior surfaces shall be smooth and coated with a semi- or high-gloss finish. Exterior surfaces must be suitable for hot stamping on the body and must be free of sharp edges and corners, protrusions, or other structures that could pose a nuisance or hazard to humans.
  - Identification and Marking: The body shall be stamped with identification number and have a suitable area for affixing an appropriate label for public education and/or other information.
  - Color: Ultraviolet stabilized, non-fading color of your choice.

8. **Warranty:** To minimize service interruption, inconvenience to the public, and total system costs you should specify that the contractor supply litter baskets that have the longest practicable useful life. The warranty should be a minimum of 10 years for all parts; not prorated and should specifically provide for no-charge replacement of any component parts that fail due to materials or workmanship for a period of 10 years after installation. Specify that any failure under warranty must be replaced with a newly manufactured unit.

## Mechanical Street Sweeping Equipment

To ensure that the contractor utilizes mechanical street sweeping equipment that meets the contracting agency's technical, economic, service quality, health, safety, environmental, and aesthetic performance criteria, the RFT should include minimum technical requirements for the following:

1. **Ancillary Equipment:** Minimum technical requirements should include an article addressing the need to equip all mechanical street sweeping equipment with safety and emergency response accessories. It should require at a minimum that each vehicle be equipped with the following:
  - A fire extinguisher.
  - A first aid kit.
  - A shovel and broom for the removal of any waste spilled on streets or sidewalks.
  - An audible backup warning device that activates each time the vehicle backs up.
  - Two-way communication with a contractor supervisor and the contractor's dispatch/maintenance office.
  - Flares, flags, and wheel chock blocks for use when breakdowns occur on public streets.
  - 360 degree rotating amber lens flasher visible for 1 kilometer (km).
  - A rear mounted arrow board at least 75 centimeters (cm )x 150 cm.
2. **Appearance:** It is important for the contractor to maintain the appearance of the mechanical sweeping equipment. Clean, freshly painted equipment sends a message to the public that street cleaning should be perceived as a public service that is essential to a clean environment and a higher quality of life. The contractor should be required to paint all equipment at least once every 5 years.
3. **Dedicated Fleet Inventory:** The contracting agency will want to have a record of all of the equipment that the contractor intends to employ for mechanical street sweeping. This will provide assurance that the number and type of equipment is adequate, and for the agency to have on record in case of complaints from citizens and businesses concerning equipment operation. No later than 30 days prior to service commencement, and annually thereafter, the contractor should provide a list of the equipment to be used specifying the year, make, model, identification number and GVW.
4. **Dust Control:** You should require that the mechanical sweeper operator supply the proper air volume and pressure at all times to control dust in accordance with the performance standard.
5. **Equipment Parking and Storage:** A minimum technical requirement is needed to ensure that equipment maintenance and parking facilities meet environmental standards and do not create potential health or safety hazards. The contractor should be required to provide written notification to the contract administrator as to the parking location of all street cleaning equipment 30 days prior to the first day of service and annually thereafter. No equipment should be stored on any public street or other public property. Also, if any street cleaning equipment is kept within contract service area boundaries overnight, they should be emptied of all street sweepings, and be on private property within a building or fenced yard when not in use.
6. **Loading:** Overloaded vehicles increases maintenance costs, pose a threat to public safety and contribute unnecessarily to the deterioration of streets and roads. To prevent the contractor from overloading vehicles, the minimum technical requirement should not allow loading in excess of the manufacturer's GVW rating or in excess of the maximum weight specified by the Egyptian Roads and Bridges Authority.
7. **Maintenance:** Mechanical street sweepers have many moving parts that are exposed to dirt, dust, and other abrasives. These parts require consistent cleaning and maintenance to optimize functional use

and service life. Egyptian experience has demonstrated that inadequate maintenance of equipment has been a root cause of failure of government-provided street cleaning service. Even new equipment requires continuous preventative maintenance in order to function in a safe and operable condition over its expected useful life. While it certainly is in the interest of the contractor to maintain the equipment, it is also in the interest of the contracting party to do everything in its power to minimize any risk of service interruption caused by failure of the contractor to give vehicle maintenance the critical attention that it deserves. To that end, the contractor should be required to submit accurate records of repair in a monthly operations budget, documenting maintenance of all mechanical street sweeping equipment in a safe and operable condition. This will minimize the threat to worker and public health and safety and reduce vehicle impact on the surrounding environment.

8. **Markings and Identification:** To facilitate identification by the public, traffic police, and employees at transfer, processing, and disposal facilities all vehicles used in supervision and provision of street cleaning services should have highly visible lettering greater than 10 cm high on each side of the vehicle body indicating the name and customer service telephone number of the contractor, identification of the contracting agent, and vehicle identification numbers (numbered consecutively). The contractor's business name should contain the name of the contracting agency or implying ownership by it. In addition, all street sweeping vehicles should have the carrying capacity, in cubic meters (m<sup>3</sup>) and GVW, of the vehicle identified in numbers at least 12 cm in height displayed in the upper front corner of the left and right sides of the body.
9. **Mechanical Street Sweeper Operation:** The contracting agency is the guardian of the safety of the general public. It has the responsibility and authority to minimize the risk that mechanical sweeper operators might pose to public safety. To that end, establishment of minimum requirements regarding the licensing and driving skills of the contractor's mechanical street sweeper operators are warranted. Mechanical street sweepers should be operated only by personnel specifically trained safe and efficient operation of the specific item of equipment they operate. All operators should have all required permits and licenses and be able to make minor repairs and adjustments. The contractor should be required to provide documentation no later than 15 days prior to commencement of street cleaning services that all mechanical street sweeper operators have been provided operation and safety training and have passed a written examination and driving test.
10. **Number of Passes:** The mechanical street sweeper operator should be required to make as many passes as are necessary to meet the performance standard.
11. **Operating Speed:** On route, the operator should limit the mechanical sweeper speed to 10 km/hr, and where vehicles are parked, make every effort to clean the gutter as close to the parked vehicle as possible.
12. **Registration, Licenses, and Insurance:** The contractor should be required to use equipment registered, inspected, insured, and in compliance with all local ordinances and national laws pertaining to motor vehicle ownership and operation. This will reduce the risk of the contractor having improperly equipped mobile equipment on the road that could be a threat to public safety and general welfare. It will also ensure that the contractor has insurance to cover any property damage or injury to any motor vehicle operator or pedestrian.
13. **Reserve Equipment:** To minimize the risk of interruption or delays in service delivery the contractor needs to have an adequate level of equipment in reserve at all times. To achieve this goal the contracting agency should require that the contractor have available at all times, reserve equipment which can be put in service within 2 hours of any breakdown so that no interruption in regularly scheduled waste collection service occurs. Such reserve equipment should be required to correspond in size and capacity to the equipment normally used by the contractor to perform the street cleaning service.
14. **Safety/Daily Vehicle Inspection:** As an additional means of reducing the risk of contractor use of equipment that is unsafe or not fully functional, the contractor should be required to inspect mobile equipment daily before it leaves the yard. In addition, the contractor should be required to take out of service any equipment that does not pass inspection. Daily inspection reports should be made available to the contract administration agency upon request.

15. **Sanitation:** In addition to maintaining the appearance and mechanical functions, the contractor should be required to regularly wash and sanitize the mechanical street sweeping equipment to minimize odors and insect propagation, and to protect worker and public health. To that end, the contractor should be required to wash the exterior of all equipment with water and a degreasing agent. This should be performed at a minimum of weekly, and/or according to the schedule submitted as part of the final work plan.
16. **Sweeper Path:** The sweeper path should begin at the face of the curb, and include the flow line of the gutter. Unless blocked by parked vehicles, the curb and gutter should always be included within the sweeper path.
17. **Water Supply:** You should require that the contractor make arrangements with the local water utility to obtain water services. The cost of the water should be borne by the contractor.

### Manual Sweeper Clothing, Tools, and Equipment

Several minimum technical requirements are useful in helping to ensure that the contractor deploys manual sweepers that are properly equipped to perform their duties efficiently and with minimal risk to their own or the public's safety. Suggested minimum technical requirements to accomplish these objectives follow:

- **Hand Cart Technical Specification:** Manual sweeper carts should be required that meet or exceed all of the following technical specifications:
  - Body Material: Galvanized steel or rotationally molded tough UV-resistant linear high density polyethylene manufactured according to ISO 9001 quality control suitable for temperature range -70 C to 111 C (ASTM test standards D746 and D1525).
  - Frame (if any): Corrosion resistant GAM - hot galvanized steel after manufacture.
  - Frame (if any): Corrosion resistant GAM - hot galvanized steel after manufacture.
  - Frame (if any): Corrosion resistant GAM - hot galvanized steel after manufacture.
  - Paint finish: Tough stoved polyester.
  - Sweepings container: Two each plastic with wheels and capacity between 80 and 120 l must be easily removable through front or rear access door.
  - Tool carry space: Sufficient to allow easy storage and removal of shovel, broom, and rake.
  - Cart wheels: Minimum of two with minimum 30 cm diameter by 4 .0 cm wide rubber with grease fittings for hub and axle.
  - Warranty: 5 years on all parts and service.
- **Protective Clothing:** To ensure the health and safety of manual sweepers, require the contractor to provide and require them to appropriately use the following:
  - Safety shoes.
  - Reflective vests.
  - Identification badges.
  - Coveralls with contractor insignia (minimum of three sets).
  - Hats.
  - Gloves.
  - Dust masks (for selective use).
  - The opportunity and appropriate facilities to wash in hot water at the end of each day.
  - Tools and Equipment including a hand cart meeting the technical specifications, as well as a broom, rake, and shovel.

### Public Structure Washing Equipment and Supplies

To ensure that the contractor utilizes cleaning equipment, detergents, and procedures that are adequate to accomplish washing objectives, yet not pose a potential threat to public health and safety, or the environment, you should include minimum technical requirements similar to the following:

- **Cleaning Solution Technical Specifications:** The contractor shall only use cleaning solutions that do not harm the finish of any public structure, meet or exceed the following minimum technical specifications, and are approved by the contract administrator:

- Water-soluble and non-ionic.
  - Non-corrosive.
  - Non-foaming.
- **Washing Equipment Technical Specifications:** The contractor shall use hot water high pressure washing equipment that meets or exceeds the following minimum technical specifications:
    - Truck mounted equipped with a crane or boom for the operator.
    - Water pressure at the sprayer tip of not less than 100 kg per square centimeter (cm<sup>2</sup>).
    - Water temperature of at least 80 degrees C.
    - Water flow of at least 20 l per minute.

## Monthly Operations Reports

Requiring the contractor to prepare and submit monthly reports that address all aspects of street and public facility cleaning operations is the best way to maintain complete and up to date working knowledge of the adequacy of contractor activities and performance. On-going review and analysis of these reports provides an ideal mechanism for both the contractor and the contracting agency to identify trends and potential problem areas and expedite remedial measures that improve overall service.

Monthly operations reports must be timely to maximize their utility, and therefore should be submitted within 15 days of the end of the month being reported on. The information to be required in each monthly report and a summary annual report should include the following for each mechanical sweeper route:

- Sweeper route number and name of sweeper operator.
- Scheduled sweeping dates.
- Mechanical sweeper identification number performing each sweep.
- Total km scheduled for sweeping and total km swept.
- Time sweeping commenced and completed.
- Tonnes of street sweepings collected and disposed.
- Volume of street sweepings dumped (in m<sup>3</sup>).
- List of scheduled streets not swept; with explanation for missed streets.
- Approximate number of cars parked on streets.
- Water usage.
- Any other information useful for improving future mechanical sweeping service.
- Record of complaints received.
- Resolution for each complaint.

For manual sweeping and cleaning of unpaved streets the MOR should include for each route:

- Route number.
- Manual sweeper identification number.
- Total km scheduled for sweeping (cleaning).
- Total km swept or cleaned.
- Time sweeping (cleaning) commenced and completed.
- Total volume of street sweepings and/or litter collected in m<sup>3</sup> (daily for all routes combined).
- List of missed streets; with explanation for miss.
- Any other information useful for improving future manual sweeping and cleaning services.
- Record of complaints received daily.
- Resolution for each complaint.

For litter collection service from public facilities the MOR should include:

- Total number of personnel deployed each day.
- Total number of man-hours worked each day.
- Number of place litter was collected from each day.
- Volume of litter collected and disposed daily (total for all litter collection areas combined).
- Record of complaints received daily.

- Description of resolution for each complaint.
- Disposition of all litter collected; amounts transferred, recovered, and disposed.

For litter basket service the MOR should include:

- Update of the database of litter baskets.
- Number of times each litter basket was emptied each day.
- Estimated volume of litter collected in m<sup>3</sup>.
- Lists of litter baskets receiving maintenance or sanitation service.
- List of damaged and replaced litter baskets.

For public structure washing services the MOR should include the following:

- Washing date and time for each public structure by category (bridges, tunnels, fountains, etc.).
- Summary of total manpower, supplies, and equipment usage.
- Narrative description of any problems encountered and/or suggestions for improving service performance.
- A list of any damage observed on any public structures requiring attention and/or repair by the contracting agency.

## Street Cleaning Personnel

To ensure that the contractor trains and deploys street and public facility cleaning personnel in a manner that meets all of the contracting agency's economic, technical, health, safety, environmental, and aesthetic performance criteria, the RFT should contain minimum technical requirements that address each of the personnel related concerns described below.

1. **Competence and Skills:** It is in the interest of the contracting agency and the public to ensure that the contractor employs personnel that are competent and skilled for their particular job position. This can be conveyed to the contractor through a minimum technical requirement that requires the contractor (including any subcontractors) to only utilize management and administration staff, field supervisors, drivers, and laborers that have met certain training requirements appropriate for their respective trades.
2. **Demeanor:** The field personnel employed by the contractor will have considerable contact with those who provide the funding for the service. Long-term support for the service will be far more dependent upon the demeanor of the field personnel than on the performance of the contractor's upper management. Therefore, it is essential that the contracting agency convey the importance of worker demeanor and public diplomacy to the contractor through a minimum technical requirement that requires that workers be trained by the contractor in maintaining positive interaction with residents, business owners, and governorate representatives.
3. **Fees and Gratuities:** Fees that the public pay through general tax revenues or surcharges on utility bills should be sufficient to cover any needed street and public facility cleaning services. No resident or business owner should ever have to pay the contractor's employees for any service. Therefore, it is essential that the contracting agency require that the contractor not permit any employee, agent, or subcontractor to offer special service beyond the scope of the contract, or to request, solicit, demand, or accept, either directly or indirectly, any compensation or gratuity for services that fall within the scope of the contract.
4. **Field Supervision:** To facilitate governorate communication with the contractor and to ensure adequate management of all street cleaning personnel in the field it is essential that a minimum ratio of supervisors to work crews be specified. The contractor should be required to provide the names of all field supervisors in writing to the contract administrator. At the end of each shift the supervisor should be required to contact the contract monitoring unit for the purpose of exchanging information about the day's street and public facility cleaning activity. Finally, the field supervisor should be required to be present in his assigned area of responsibility at all times that crews are working, and have radio communication with the contractor's office and all mechanical street sweepers under supervision.

5. **Identification:** Require that any contractor employees that normally and regularly come in contact with the public wear some means of individual identification, such as a nametag or identification card.
6. **Scavenging:** Scavenging of materials from waste by street cleaning crews reduces productivity, is dangerous, and projects a negative image of the job, the contractor, and the service. Require the contractor to forbid any employee from placing any waste inside or on the outside of service vehicles except in the waste storage area of the vehicle. Moreover, require the contractor to prohibit crews from offloading any materials while on cleaning routes or during transfer of waste materials to designated facilities.

## Street Cleaning Practices

The minimum technical requirement should include a section addressing street cleaning personnel practices to ensure that the contractor employees conduct their activities in compliance with the service specifications and in a manner that does not directly or indirectly negatively impact the general public. The section on personnel practices should specify the minimum technical requirement listed below.

1. **Access to Private Property:** The contractor's employees should not be allowed to trespass or litter, cross property to adjoining premises, or meddle or tamper with property that does or should not concern them.
2. **Noise:** The noise associated with mechanical sweeping of streets can be unnecessarily loud and annoying if equipment operators do not make a conscious effort to minimize it. The contractor should be required to limit noise from equipment and the activities of street sweeping personnel to less than 75 decibels measured at 20 m distance.
3. **Property Damage:** Maneuvering mechanical street sweepers in heavy traffic or between parked vehicles create significant risk of damage to public and private property. To minimize this risk, the contractor should be held responsible for all costs associated with the repair and replacement of damaged property of any kind that can be ascribed to the actions of its equipment, employees, or agents. Moreover, street cleaning personnel should be required to immediately report any incident that might have caused damage to third party property to the field supervisor, who shall in turn inform the customer and contracting agency within 8 hours of such occurrence.
4. **Public Safety and Convenience:** To minimize safety hazards, inconvenience, and annoyance of the general citizenry it is important for the contractor to conduct his or her work without disturbing the public. To achieve this objective the contractor should be required to take all practicable steps to minimize obstruction to pedestrians and motor vehicle operators during the performance of all aspects of the street and public facility cleaning services.
5. **Spillage:** Street sweepings spilled and not picked up by the contractor's street sweeping crews sends a negative message to the public regarding the governorate's commitment to improving street and public facility cleaning. The contractor should be responsible for cleaning up litter around any of the litter baskets, and must be held responsible for removing any spillage of street sweepings or litter that occurs due to the action of the contractor's street cleaning equipment and/or personnel.
6. **Street Usage Rights:** The contractor should be granted the right to use the streets for the purpose of providing street and public facility cleaning services specified in the contract, but should not be granted exclusive use of such streets. The contractor must observe all local ordinances relating to obstructing streets, keeping passageways open and protecting same, and obey all laws and ordinances controlling or limiting those engaged in street cleaning service provision. When the contractor's equipment blocks the passage of pedestrians or vehicles, the contractor's equipment should be required to pull aside at the first opportunity and allow waiting vehicles to pass.
7. **Sweeper Operating Practices:** Sweeping practices should include:
  - Positioning gutter brooms at the proper angle to the gutter line, touching the curb.
  - Setting the main broom in a level position to assure debris pickup.

- Adjusting spray nozzles to keep dust, caused by sweeping to a minimum.
- Maintaining and adjusting center dirt reflector and main drag shoes, or any other device to direct debris and dirt into the path of the rear broom.
- Limiting sweeping speed to 10 km/hr.
- Sweeping a minimum 2.5 m wide path as measured with all brooms in the sweeping position.

### Performance Standards

Performance standards tell the bidders what the minimal acceptable levels of performance will be. Each service specification and minimum technical requirement needs a corresponding performance standard that is quantifiable. This provides a legitimate means for the contracting agency to evaluate contractor compliance by monitoring service performance and then comparing observed performance to the specified standard.

### Performance Monitoring

To be fair, the contractor should be informed of how his compliance with each of the service specifications and minimum technical requirement will be monitored and evaluated by the contract monitoring unit (see Chapter 6).

#### Example performance standard for mechanical sweeping service:

*“The contractor shall satisfactorily sweep a minimum of 90 percent of the total km scheduled for Mechanical Sweeping each day and satisfactorily sweep 100 percent of the total km scheduled for Mechanical Sweeping on at least 90 percent of all days that Mechanical Sweeping is performed each month.”*

#### Example of description of performance monitoring process

*“The Contract Monitoring Unit shall monitor all street and public facility cleaning services. The Contract Monitoring Unit Administrator shall assign Monitors to observe and evaluate contractor compliance with each of the Service Specifications and Minimal Technical Requirements contained in this Article.”*

#### Example performance standard for monitoring BTB service:

“The Contract Monitoring Unit administrator shall measure daily compliance with the standard by dividing the total km of streets reported not swept by the total km of streets scheduled for mechanical sweeping that day according to the schedule specified in the contractor’s Final Work Plan.”

(In this case, contract monitoring unit administrator, mechanical sweeping, and final work plan would have been clearly defined in a separate definitions section of the RFT.





