Public Version

Integrated Solid Waste Management Blueprint for Iskandar Malaysia
Series of Public Version Blueprint

Urban Planning

- Planning & Design Guidelines for Housing, Neighbourhood and Facilities for Iskandar Malaysia
- Area Character Statement Blueprint for Iskandar Malaysia
- Integrated Land Use Blueprint for Iskandar Malaysia
- Housing Management Blueprint for Iskandar Malaysia
- Maintenance and Operational Plan Blueprint for Iskandar Malaysia

Infrastructure and Utilities

- Integrated Solid Waste Management blueprint for Iskandar Malaysia
- Electricity Blueprint for Iskandar Malaysia
- Transportation Blueprint 2010-2030 for Iskandar Malaysia
- Road Layout Design Blueprint for Iskandar Malaysia
- Drainage and Storm water Management Blueprint for Iskandar Malaysia
- ICT Blueprint 2020 for Iskandar Malaysia

Environment

- Shoreline Management Plan for Iskandar Malaysia
- Environmental Planning Blueprint for Iskandar Malaysia
- Renewable Energy & Energy Efficiency Blueprint for Iskandar Malaysia

Others

- Social Development Intervention Strategy & Implementation Plan for Iskandar Malaysia
- Iskandar Malaysia Safety and Security Blueprint
- Enterprise GIS Roadmap for Iskandar Malaysia
- Investment and Marketing Strategic Roadmap for Iskandar Malaysia
- Human Capital Blueprint for Iskandar Malaysia
- Tanjung Puteri – Tourism Development Strategy Framework for Iskandar Malaysia
Acknowledgement

List of Agencies/Department involved in developing ISWM blueprint

Federal

Ministry of Housing and Local Government (PKPT)
Ministry of Health (KKM)
National Solid Waste Management Department (JPSPN)
Department of Environment (JAS)
Department of Town and Country Planning (JPBD)

State

State Economic Planning Unit (UPEN Johor)
Johor Bahru City Council (MBJB)
Central Johor Bahru Municipal Council (MPJBT)
Kulai Municipal Council (MPKu)
Pasir Gudang Municipal Council (MPPG)
Pontian District Council (MDP)
Local community

Other

Southern Waste Management Sdn Bhd
AECOM Maunsell (Consultants)
Foreword

Iskandar Malaysia is a National Project to develop a vibrant new region at the southern gateway of Peninsular Malaysia. A regional authority body Iskandar Regional Development Authority (IRDA) was formed with specific roles to plan, promote and facilitate in which to coordinate the economic, environmental and social planning, infrastructure development and management of Iskandar Malaysia. IRDA refers to The Comprehensive Development Plan (CDP) as the guiding document in developing Iskandar Malaysia, and subsequent to that, blueprints are prepared as a subset and supplementary document to CDP, which outlines detail findings, strategies, implementation and action plans.

The Integrated Solid Waste Management blueprint (ISWM) for Iskandar Malaysia has been prepared to assist the public and private sector and the community to work together in managing solid waste concerns within the Iskandar Malaysia region so that all can benefit in making the region a place to invest, work, live and play.

Integrated Solid Waste Management is the term applied to all of the activities associated with the management of society’s waste. The basic goal of Integrated Solid Waste Management is to manage society or community’s waste in a manner that meets public and environmental concerns and the public’s desire to reuse and recycle waste materials.

Solid waste management in this blueprint covers management of solid waste as defined in the Solid Waste and Public Cleansing Management Act 2007 (Act 672) or SWPMA 2007. Solid waste governed under the act is defined as controlled solid waste which includes solid waste from commercial, construction, household, industrial, institutional and public sources as well as solid waste which are imported for processing or disposal. Hence, other waste which is not governed under the SWPCMA 2007 such as scheduled waste (defined under the Environmental Quality (Scheduled Waste), Regulations 2005), sewage (defined in the Water Services Industry Act 2006) or radioactive wastes, (defined in the Atomic Energy Licensing Act 1984) are not included in the blueprint recommendations.

The preparation of this blueprint is therefore timely and is critically needed to address the solid waste management matters and land fill issues. This blueprint has incorporated a set of twenty-one Integrated (21) Solid Waste Management initiatives that can be mapped out to each strategy and to each of the pathways to deliver the desired result.

This blueprint outlines a set of new coordinating structure to manage new partnerships expected to come out from public agencies and private organisations in working together towards implementing and managing solid waste initiatives in Iskandar Malaysia so that people can feel at ease to live, invest, work and play in a sustainable Metropolis of International standing.

........................................

Ismail bin Ibrahim
Chief Executive
Background of IM and IRDA

Launched by the Government in November 2006, Iskandar Malaysia is envisaged to become a “Strong and Sustainable Metropolis of International Standing” set to spur economic developments that actuate Malaysia’s global potential.

Iskandar Malaysia is centrally located within South East Asia’s new economic zone and a short eight-hour flight radius from Asia’s burgeoning growth centres such as Bangalore, Hong Kong, Seoul, Shanghai, Singapore, Taipei and Tokyo.

Besides the strategic location and space for business expansion and quality living, Iskandar Malaysia has a package of good fundamentals and strengths such as existing infrastructure, cultural familiarity, friendly policies and an ease-of-doing business environment based on global best practices.

Driven by nine economic clusters – Electrical and Electronics, Petro and Oleo-chemicals, Food and Agro Processing, Logistics, Tourism, Health Services, Education Services, Financial Services and Creative Industries; Iskandar Malaysia aims to develop a strong, diversified, dynamic and global economy based on the foundations of nation-building; growth and value creation, as well as equitable and fair distribution amongst stakeholders.

There are five key economic zones within Iskandar Malaysia: Zone A – JB City Centre, Zone B – Greenfield of Nusajaya, Zone C – Western Gate Development, Zone D – Eastern Gate Development, and Zone E – Senai-Skudai. In Zone A, the development activities will be focused on: New Financial District, Danga Bay Integrated Waterfront City, Upgrading of Central Business District, Tebrau Plentong mixed development and enhancement of causeway infrastructure connecting Johor Bahru and Singapore. In Zone B, development is centred on the Johor New Administration Centre (JNAC) at Kota Iskandar, University Park in Edu-city, International Destination resort comprised of outdoor and indoor theme parks, and clean and green factories & warehouses at the Southern Industrial Logistics Clusters area. While in Zone C, the development is focused on the development of Free Trade Zone at Port of Tanjung Pelepas, Petrochemical and Maritime Industrial hub at Tanjung Bin, and Tanjung Bin Power Plants. Zone C also has the three Ramsar sites (Pulau Kukup, Tanjung Piai and Sungai Pulai). With Tanjung Piai being the conservation of RAMSAR called as the Southern-most tip of mainland of Asia, and the good land linkages through Second Link Access to Singapore. Zone D there is a mixed development with City of knowledge in Seri Alam, a Regional Distribution Centre in Kim-Kim, Pasir Gudang Industrial park, Tanjung Langsat Industrial Park, Pasir Gudang Port and Tanjung Langsat Port. The most northern part is Zone E – which included Universiti Teknologi Malaysia at Skudai, Senai International Airport, Senai Cargo Hub and Senai High Technology park and Senai Industrial Parks. Upon completion, the region will boast state-of-the-art facilities, infrastructure that is comprehensive, and toward becoming a one-stop business centre where living, entertainment, environment, and business will converge within a sustainable metropolis of international standing.

Iskandar Malaysia is already attracting an influx of foreign and high level corporate investments without forgetting the domestic investments, through its strategic location and accessibility by land, sea and air. In fact, the Ninth Malaysia Plan (2006–2010), the Federal government has allocated RM 6.83 billion for infrastructural development for the key success of the vision. The funding has been channelled to develop 30 projects comprising 8 road packages, 12 drainage packages, 6 river cleaning packages, and 4 public housing packages.

The government commissioned a feasibility study on the development of Iskandar Malaysia in July 2005. Then on 30 June 2006 the economic corridor, Iskandar Malaysia (formerly known as South Johor Economic Region – SIER) was established. And a year after the establishment, the Iskandar Regional Development Authority (IRDA) was formed as a statutory Federal government body to execute the Comprehensive Development Plan (CDP) for Iskandar Malaysia, the regional development blueprint.
Iskandar Regional Development Authority (IRDA) is the single authority or single point of reference for coordinating the implementation and approval of development programmes within Iskandar Malaysia. Established by Federal Act of Parliament – IRDA Act 2007 (Act 664), it is a Federal statutory body empowered to plan, promote and facilitate the development implementation of Iskandar Malaysia benchmarking against world standards. IRDA shall put emphasize on the planning for sustainable development, through conservation and equitable distribution of growth while promoting the region to become the preferred place to live, invest, work, and play. IRDA is empowered to:

- Establish national policy directions and strategies that have a direct impact on the development with Iskandar Malaysia.
- Coordinate the performance of development activities carried out by government departments and agencies in Iskandar Malaysia.
- Plan, promote, and facilitate to stimulate and undertake the development in Iskandar Malaysia.
- Act as the principal coordinating agent on behalf of government agencies in relation to receiving, processing and expediting the required approvals.

Three development principles have been the foundation of Iskandar Malaysia: nation building, growth and value creation, and fair distribution among its stakeholders. These principles will blend nicely with IRDA’s main role – Planning, Promotion and Facilitation.

Planning

- To integrate and recommend policies of Federal Government, State Government of Johor and relevant Local Authorities to enhance the well-being of Iskandar Malaysia.
- To identify and develop strategies to enhance infrastructure, skills, science and technology research in the development of Iskandar Malaysia.
- To develop blueprints in order to enhance the current Comprehensive Development Plan (CDP).

Promotion

- To undertake broad based promotion of Iskandar Malaysia to the general public and potential investors – both local and overseas.
- To drive, coordinate and monitor development of economic sectors, required enablers and social infrastructure.
- To use blueprints as points reference for policies, guidelines, legislations and design instructions for promotional tools.

Facilitation

- To provide consultation and information on investing in Iskandar Malaysia.
- To act as the principal coordinating agents on behalf of relevant government agencies in relation to receiving, processing and expediting the requisite approvals for investors in Iskandar Malaysia.
- To implement compliance of blueprints in order to fulfil investors’ needs and requirement.

IRDA refers to The Comprehensive Development Plan (CDP) as the guiding document in developing Iskandar Malaysia, and subsequent to that, blueprints are prepared as a subset and supplementary document to CDP, which outlines detail findings, strategies, implementation and action plans. IRDA has formulated blueprints to both guide and benchmark the implementation of policies, guidelines, legislations and design instructions as well as strategies on specific subjects such as land use, safety & security, environment and infrastructure to develop Iskandar Malaysia into a strong and sustainable metropolis of international standing.
Content

1.0 Introduction ........................................... 1
2.0 Background ............................................. 1
3.0 Vision for Solid Waste Management in Iskandar Malaysia .......... 2
4.0 Strategic Direction for Solid Waste Management .................. 3
5.0 Critical Considerations for Blueprint Development ............... 3
6.0 Key Initiatives: Areas of Focus and Targets ........................ 5
7.0 Implementation of Blueprint and Governing Council ............. 6
8.0 Action and Implementation Plan .................................. 7
9.0 Immediate/Short Term Initiatives and Long Term Programs ...... 8
10.0 Overview of Immediate Initiatives and Expected Outcomes .... 9
11.0 Overview of Medium and Long Term Programs ................. 10
1.0 Introduction

Iskandar Malaysia (IM), formerly known as the Iskandar Development Region (IDR) and South Johor Economic Region (SJER), comprise the new main southern development corridor in Johor, Malaysia. It covers an area of 2,217 sq km within the southernmost part of Johor and a population of 1.35 million which represents 43% of Johor’s population.

This area includes the entire district of Johor Bahru (including islands within the district), Mukim Jeram Batu, Mukim Sungai Karang, Mukim Serkat and Kukup Island in Mukim Ayer Masin, all within the district of Pontian. The Pihak Berkuasa Wilayah Pembangunan Iskandar (Iskandar Regional Development Authority (IRDA)) facilitates administration within IM.

In 2005, a Comprehensive Development Plan (CDP) was developed to address socio-economic development within IM in a holistic and sustainable fashion. In line with this plan, IRDA has developed a comprehensive Integrated Solid Waste Management Blueprint for IM. The blueprint is part of an exercise to enhance the CDP and aims to provide a strategic framework for integrated solid waste management in IM. The Blueprint is instrumental in establishing an advanced, environmentally sound, practical, long term sustainable solid waste management system for much of southern Johor.

2.0 Background

According to the Ministry of Housing and Local Government, over 22,000 tonnes of solid waste is generated daily. It is expected that Malaysia could potentially generate 7,772,402 tonnes of waste annually by 2015.
In view of this, the Integrated Solid Waste Management Blueprint (ISWMB) was developed to provide a strategic framework for integrated solid waste management in Iskandar Malaysia (IM) up to the year 2025.

The scope of the solid waste management in IM covers solid waste from commercial, construction, household, industrial, institutional and public sources and involves the entire life-cycle of solid waste from generation to final disposal.

3.0 Vision for Solid Waste Management in Iskandar Malaysia

The Iskandar Regional Development Authority has developed the Integrated Solid Waste Management Blueprint in line with the vision of Iskandar Malaysia as a strong and sustainable metropolis of international standing to meet the current and future needs of its citizens by providing a sustainable and integrated framework to managing solid wastes generated in the region. This will be achieved through:

• Elimination, reduction, reuse and recycling and the use of advanced treatment and disposal technologies and facilities in order to contribute to the sustainable development of Iskandar Malaysia and protection of public health and the environment

• Recycling systems and treatment technologies capable of generating beneficial by-products and with no or minimal emissions as far as practicable will be considered a priority with landfill disposal as a last resort; and

• Providing key strategies for the development of a participative and actively engaged public that is motivated to manage solid waste in an environmentally sustainable and socially responsible manner.

In order to achieve this vision, the Blueprint was developed with the following key objectives:

![Integrated Framework of Solid Waste Management](image_url)

Figure 3.0: Integrated Framework of Solid Waste Management
4.0 Strategic Direction for Solid Waste Management

Strategy 1: An Integrated Approach to Sustainable Solid Waste Management:
- In line with international best management practices and national plans and policies but adapted to local situation in a phased approach
- Building partnerships between all stakeholders including the public and private sector

Strategy 2: Apply the Waste Management Hierarchy:
- Elimination of waste
- Reduce waste at the source
- Reuse of products and materials
- Recover through recycling, treatment
- Final disposal of inerts and residues at sanitary landfill

Key Strategies

Strategy 3: Public Private Partnership and Public Engagement in Solid Waste Management:
- Awareness on the importance of waste elimination, minimization and recycling
- Education for ownership of solid wastes, payment for cost recovery

Strategy 4: Promotion of Sustainable Technologies to Manage Solid Waste:
- Priority to treatment and disposal technologies capable of producing a beneficial by-product
- Siting of solid waste facilities to take into consideration landuse and public and environmental sensitivity

Figure 4.0: Key Strategies for Solid Waste Management

5.0 Critical Considerations for Blueprint Development

Stage 1: The Blueprint was developed based on a review of existing local situation, identification of key issues including technical and institutional issues, existing landuse plans, development plans, legislation, and other framework plans.

Stage 2: Completion of an international review and benchmarking of similar practices from a number of other countries, to ensure that advanced and cost effective practices and technologies are being integrated, or at least fully considered, in the development of the Blueprint.
The blueprint was developed in stages and involved assessing existing waste infrastructure, reviewing various existing and future legislation, policies and plans (including development plans, solid waste management plans, environmental and landuse plans) at a national, state and local level, as well as obtaining private sector input, into a cohesive integrated framework.

![Diagram of blueprint development stages]

**Figure 5.0: Development Stage of Solid Waste Management Blueprint**
### 6.0 Key Initiatives: Areas of Focus and Targets

In order to achieve the four strategies outlined in the Blueprint, specific areas of focus and quantifiable targets have been developed as follows:

<table>
<thead>
<tr>
<th>Focus</th>
<th>Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus 1: Waste generation and collection</strong></td>
<td>➢ 100% environmentally sound waste collection extended to all areas including kampong, rural and squatter areas&lt;br&gt; ➢ Zero illegal dumping through licensing, strict enforcement and penalties&lt;br&gt; ➢ Provision of drop-off points for household hazardous wastes and treatment of all household hazardous waste as hazardous waste</td>
</tr>
<tr>
<td><strong>Focus 2: Reduction of solid waste through 3Rs (reduce, reuse and recycle)</strong></td>
<td>➢ Implementation of source separation scheme: household recyclables, commercial/industrial organics and landfill ban (of recyclables and certain organics)&lt;br&gt; ➢ Implementation of household source separation schemes&lt;br&gt; ➢ Provision of approximately 300 drop-off points&lt;br&gt; ➢ Introduction of recycling incentive scheme&lt;br&gt; ➢ Implementation of selected deposit refund or take back systems&lt;br&gt; ➢ Achieving household recycling rate of 30% from source separation scheme</td>
</tr>
<tr>
<td><strong>Focus 3: Waste Treatment and Disposal</strong></td>
<td>➢ Treatment of all waste that can be treated by 2025, focusing on long term pollution prevention, with recovery of by-products and energy&lt;br&gt; ➢ All non-hazardous by products from waste treatment to be utilized and recycled (compost, ash/char, energy/chemicals)&lt;br&gt; ➢ Commercial/Industrial organic waste collection and treatment in place by 2020&lt;br&gt; ➢ Not more than 10% of original waste (residues and inerts) to be landfilled by 2025&lt;br&gt; ➢ Eliminate pollution from landfills: Existing landfills upgraded and closed; new landfills to be for residual waste and inerts only</td>
</tr>
<tr>
<td><strong>Focus 4: Public awareness</strong></td>
<td>➢ All households and businesses to be fully educated by 2020 and working in line with public private partnership (PPP) model, to achieve waste avoidance, reduction, and recycling&lt;br&gt; ➢ Establish recycling promotion units at each LA&lt;br&gt; ➢ Develop and implement public awareness campaigns and activities by Corporation and IRDA&lt;br&gt; ➢ Inclusion of solid waste management in school curriculums</td>
</tr>
<tr>
<td><strong>Focus 5: Strategic facility planning and facility cost recovery</strong></td>
<td>➢ Implementation of site and technology specific considerations for all future waste facilities&lt;br&gt; ➢ Implementation of direct billing system for cost recovery for waste services and facilities</td>
</tr>
</tbody>
</table>
7.0 Implementation of Blueprint and Governing Council

The Blueprint was structured around five elements that are integral to the development of a holistic and sustainable solid waste management framework.

The Blueprint will be implemented in a phased approach to allow for a pragmatic and sustainable implementation by involving the various stakeholders at government, private and community levels.

<table>
<thead>
<tr>
<th>Coordination &amp; Integration</th>
<th>Capacity Building</th>
<th>Sustain &amp; Extend</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Blueprint roll-out and communication.</td>
<td>• Promotion of greater awareness among the community and businesses on waste elimination, minimization and recycling.</td>
<td>• Integrated of waste elimination in design and day to day operations.</td>
</tr>
<tr>
<td>• Guideline communication.</td>
<td>• Implementation of 3R programs.</td>
<td>• Use of solid waste technologies focusing on volume reduction, generation of beneficial by-products and with no/minimal emissions.</td>
</tr>
<tr>
<td>• Federal/state/local government and interagency alignment, communication and cooperation.</td>
<td>• Guidelines implementation.</td>
<td>• Cost recovery for waste services.</td>
</tr>
<tr>
<td>• Designation of roles and responsibilities.</td>
<td>• Cost recovery for waste services.</td>
<td>• Feasibility studies.</td>
</tr>
<tr>
<td>• Set up Integrated Solid Waste Management Steering Committee (ISWMSC).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In order to ensure the Blueprint is implemented as planned and is still relevant to Iskandar Malaysia over the 15 year planning period, the blueprint outlines the structure of an Integrated Solid Waste Management Steering Committee (ISWMSC) which will act as a governing council. The main functions of the ISWMSC are as follows:

- To oversee the effective and on time implementation and continued relevance of the Blueprint;
- To provide leadership and political will to achieve a seamless coordination between Federal and State agencies responsible for solid waste management;
- To provide strategic direction and input to the various implementation committees (i.e. Facilities, 3R and Education) in relation to improving the solid waste management practices and services in IM towards achieving a sustainable and quality standard of living;
- To facilitate and oversee the work of the implementation committees for deliberation and approval; and
- To monitor the progress of blueprint, adherence to the agreed outcomes of the various meetings, intervene and make decisions as appropriate.

8.0 Action and Implementation Plan

![Diagram of Action and Implementation Plan for Integrated Solid Waste Management]

These five elements were then used as a basis to develop an action and implementation plan which will be a critical tool to achieve the strategies outlined in the Blueprint. The action and implementation plan outlines the following:

- Roles and responsibilities for overseeing the implementation of the Blueprint.
- Implementation plan for key recommendations in the Blueprint. The plan includes specifics tasks to be undertaken, the party/parties responsible and the timeframe in which these tasks should be executed.
- A monitoring programme consisting of targets and key performance indicators (KPIs) to ensure key tasks (i.e. action items) are executed on schedule.
9.0 Immediate/Short Term Initiatives and Long Term Programs

A summary of the immediate initiatives as well as medium and long term programs that were developed based on the five key elements are provided below:

<table>
<thead>
<tr>
<th>Elements</th>
<th>Immediate Initiatives</th>
<th>Medium/Long Term Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roles and Responsibilities</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Institutional</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Programs</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Tools</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>7</td>
<td>21</td>
</tr>
</tbody>
</table>

**Figure 9.0: Action, Roles & Responsibilities and Monitoring Plan**

The action and implementation plan that was developed as part of the Blueprint was structured to complement the enforcement of the Solid Waste and Public Cleansing Management Act 2007 (SWPCMA 2007).

However, an interim action plan was developed to identify immediate initiatives that can be implemented in the interim period prior to the enforcement of the SWPCMA 2007. The responsibilities for overseeing the implementation of the interim plan will remain with the ISWMSC to ensure its implementation in a timely fashion.
10.0 Overview of Immediate Initiatives and Expected Outcomes

The action and implementation plan that was developed as part of the Blueprint was structured to complement the enforcement of the Solid Waste and Public Cleansing Management Act 2007 (SWPCMA 2007).

However, an interim action plan was developed to identify immediate initiatives that can be implemented in the interim period prior to the enforcement of the SWPCMA 2007. The responsibilities for overseeing the implementation of the interim plan will remain with the ISWMSC to ensure its implementation in a timely fashion.

Figure 10.0: Overview of Immediate Initiatives and Expected Outcomes
11.0 Overview of Medium and Long Term Programs

Medium and long term programs were identified for specific areas of concern outlined in the Blueprint as follows:

Definition of Roles and Responsibilities for:

- Planning of solid waste management services and facilities.
- Development of solid waste management facilities.
- Operation of solid waste management services and facilities.
- Closure of solid waste management facilities.
- Building development and approvals for solid waste management considerations.
- Source separation / recycling scheme and programmes.
- Public awareness and education programmes.
- Management of household hazardous waste.

Figure 11.0: Overview of Medium and Long Term Programs
Institutional arrangements were defined so as to provide a basis to execute the strategies outlined in the Blueprint by mandating certain requirements thereby enabling legal recourse in the event of non-compliance. Policies, legislation and plans to implement the strategies outlined in the Blueprint and to facilitate the achievement of key targets are provided below:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mandatory source separation</td>
</tr>
<tr>
<td>2.</td>
<td>Landfill ban of recyclables, leachable waste and organics</td>
</tr>
<tr>
<td>3.</td>
<td>Market support</td>
</tr>
<tr>
<td></td>
<td>• Percentage of recycled materials in specified products</td>
</tr>
<tr>
<td></td>
<td>• Deposit refund / take back system</td>
</tr>
<tr>
<td>4.</td>
<td>Management of household hazardous waste</td>
</tr>
<tr>
<td></td>
<td>• Source separation, collection and disposal</td>
</tr>
<tr>
<td>5.</td>
<td>Licensing of services and facilities</td>
</tr>
<tr>
<td></td>
<td>• Collection, treatment, and disposal activities, vehicles, and facilities</td>
</tr>
<tr>
<td>6.</td>
<td>Fines and Penalties for Non-compliance</td>
</tr>
<tr>
<td></td>
<td>• Poor performance</td>
</tr>
<tr>
<td></td>
<td>• Illegal dumping</td>
</tr>
<tr>
<td>7.</td>
<td>Direct Billing</td>
</tr>
<tr>
<td></td>
<td>• Utilities, assessment, pay per bag</td>
</tr>
</tbody>
</table>

**Figure 11.1: Outline of Implementational Strategies of Source Separator**
Infrastructure arrangements cover the specifications of vehicles for waste collection, collection and storage facilities in waste generating facilities, environmentally sound SW facilities and the transport network (capacity, quality and route).

1. Waste Collection
   - Vehicle standards
   - Rural and squatter area

2. Waste Facilities
   - Planning and development of new waste facilities
   - Closure of waste facilities

3. Standards and Design
   - Siting requirements
   - Building and storage specifications
   - Environmental performance standards

4. Recycling Drop-off Points
   - 300 drop off points and recycling collection centres
   - Three bin system

**Figure 11.2: Outline of Waste Collection Implementation**
A series of awareness and education programmes have been identified to achieve the strategies and goals set out in the Blueprint. These range from awareness and education campaigns to inculcate behavior change among the population to wider ranging government initiatives to drive reduction and recycling.

1. Public Awareness Programmes
   - Mass Media
   - Campaigns
   - Recycling Promotion Units

2. School Programmes
   - School recycling programme

3. Incentive Programmes
   - Coupons

4. Commercial & Industrial Reduction & Recycling Programmes
   - Promotion of source reduction
   - Exchange of recyclable goods
   - Take back system

5. Market Support for Recyclable Goods
   - Recycling drivers, grants and incentives
   - Waste disposal tax
   - Green labelling

**Figure 11.3: Outline of Public Awareness Programmes**
Tools for supporting the effective implementation of an integrated solid waste management system are outlined in the Blueprint. The medium and long term program for the development of appropriate tools provides a schedule for implementation as well as defining the agencies in charge.

1. Public Complaints System
   - Online
   - Toll free
   - SMS

2. GPS/RFID System
   - Adherence to collection schedule and scheme boundary
   - Weight of recordables

3. Enforcement
   - Manpower
   - Installation of CCTV

4. GIS and SWM Database
   - Administrative data
   - Planning data
   - Operational data

Figure 11.4: Outline of Public Complaints System