Public Private Partnership for Scientific Management of Landfill Sites of Mumbai
- Zone I
  - Wards A, B, C, D, E
- Zone II
  - Wards F(N), F(S), G(N), G(S)
- Zone III
  - Wards H(E), (H(W), K(E), K(W)
- Zone IV
  - Wards P(N), P(S), R(N), R(C), R(S)
- Zone V
  - Wards L, M(E), M(W)
- Zone VI
  - Wards N, S, T
### Projected Population & MSW Generation

<table>
<thead>
<tr>
<th>Year</th>
<th>Population (Million)</th>
<th>MSW (TPD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>12.8</td>
<td>6,100</td>
</tr>
<tr>
<td>2010</td>
<td>13.6</td>
<td>7,100</td>
</tr>
<tr>
<td>2015</td>
<td>14.4</td>
<td>8,100</td>
</tr>
<tr>
<td>2020</td>
<td>15.3</td>
<td>8,900</td>
</tr>
<tr>
<td>2025</td>
<td>15.9</td>
<td>9,800</td>
</tr>
<tr>
<td>2030</td>
<td>16.2</td>
<td>10,500</td>
</tr>
</tbody>
</table>
Present Scenario of Waste Disposal

- MSW is disposed at three disposal sites by open dumping

<table>
<thead>
<tr>
<th>Name of Site</th>
<th>Operational Since</th>
<th>Total Area (ha)</th>
<th>Height of Waste (m)</th>
<th>Future life (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gorai</td>
<td>1972</td>
<td>19.6</td>
<td>25</td>
<td>-</td>
</tr>
<tr>
<td>Mulund</td>
<td>1968</td>
<td>25</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>Deonar</td>
<td>1927</td>
<td>132</td>
<td>20</td>
<td>8</td>
</tr>
</tbody>
</table>

- A green field site of 141ha area at Kanjurmarg has been recently allotted by State Govt.
Layout of Gorai Disposal Site
Layout of Mulund Disposal Site
Layout of Deonar Disposal Site
Scientific Management Plan for Landfill Sites
Treatment and Disposal are areas of major deficiencies in SWM in Mumbai

A comprehensive solution addressing long term (25 years) need for management of MSW and C&D waste was required.

MCGM awarded a detailed study to IL&FS in July 2005 for development of integrated treatment and disposal plan for Mumbai
Site Management Plan for Mulund

LEGEND:
- Proposed Access Road
- Existing Road
- Green Belt
- Site for Biomethanation Plant
- Area to be Partially Closed
- MSW to be Relocated
- Finished Top
- Future Expansion & Emergency Operation

Site Allocation Index:
1. Green Belt I: 0.50 Ha.
2. Green Belt II: 0.50 Ha.
3. Area for Emergency Operation: 0.25 Ha.
4. Site for Biomethanation Plant: 0.50 Ha.
5. Area Proposed for Landfill: 1.00 Ha.
6. Site for Unused: 0.75 Ha.
Total Area: 2.00 Ha.

N Site Management Plan for Mulund

Clean-up MUMBAI
Site Management Plan for Deonar

Legend:
- Access Road
- Site for Future Use
- Area for Composting
- Landfill Area
- Area to be partially closed
- MSW to be Relocated
- Leachate Treatment Area
- Leachate Collection Area
- Alignment of Bund With Side Drain
- Finished Top

Management Plan for Deonar Site

Site Allocation Index:
1. Site for Future Use: 0.0300 Ha
2. Composting Unit I: 0.0070 Ha
3. Composting Unit II: 0.0165 Ha
4. Landfill Phase II: 0.0225 Ha
5. Leachate Treatment Area: 0.0030 Ha
6. Leachate Collection Tank: 0.0030 Ha
7. Landfill Phase I: 0.0165 Ha
8. Area to be Partially Closed: 0.0500 Ha

Total Area: 0.1200 Ha
Site Management Plan for Kanjur

Sanitary Landfill

Leachate Treatment

Composting Sheds

Future use and Emergency Landfill
## Strategy for Waste Management

<table>
<thead>
<tr>
<th>Site</th>
<th>Waste Allocation (tons)</th>
<th>Total Area (ha)</th>
<th>Closure Needs (ha)</th>
<th>Available for future (ha)</th>
<th>Proposed Waste Processing Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mulund</td>
<td>500</td>
<td>20</td>
<td>11</td>
<td>9</td>
<td>Bio-methanation</td>
</tr>
<tr>
<td>Deonar</td>
<td>2,000</td>
<td>132</td>
<td>52</td>
<td>80</td>
<td>Composting</td>
</tr>
<tr>
<td>Kanjur</td>
<td>4,000</td>
<td>141</td>
<td>Nil</td>
<td>120</td>
<td>Composting</td>
</tr>
<tr>
<td>Gorai</td>
<td>-</td>
<td>20</td>
<td>18</td>
<td>2</td>
<td>Scientific Closure</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6,500</strong></td>
<td><strong>313</strong></td>
<td><strong>81</strong></td>
<td><strong>211</strong></td>
<td><strong>-</strong></td>
</tr>
</tbody>
</table>

Sanitary Landfill is common to all the technologies selected.
Approach adopted

• A Public Private Partnership framework for implementing the projects.

• Partial closure of the site and clearing of existing waste considered as a separate project for bidding

• An integrated waste management facility would be bid out for each of the sites comprising of waste processing facilities (including for C&D Waste), SLF and closure
Contractual Structure

• Landfill Closure Contract for Gorai
• Concession Agreement for
  – Deonar
  – Mulund
  – Kanjur Village
Concession Agreement

- Deonar
- Mulund
- Kanjur Village
Broad Structure

- Exclusive grant of concession for implementation and operations of the Project during the concession period
- Assured quantity of waste supply to each of the sites
- Assured quality of waste in terms of Organic Fraction and level of key contaminants
- Review of technologies option available after a defined time period
- Payment of service charges (tipping fees) by MCGM on a per ton basis
- Concessionaire have the right to sub-contract any activities subject to retaining the responsibility for the work done
Payment Structure

• Contractor to be paid Service Charges (Tipping Fees) for management of incoming waste
• Sharing of CDM revenues (up to 50%)
• Rate Contract (fixed unit rate for works, payments based on measurements of works completed) for partial closure and infrastructure development
• Mobilization Advance
• Monthly payment schedule based on milestones
• Payment for operations and maintenance of partial closure area
Supervision and Monitoring

- **Monthly progress reports from the Contractor**
  - Status of progress of Works
    - Quantity
    - Percentage of the whole
    - Value
  - Quality assurance, test results and certificates
  - Safety statistics and environmental performance monitoring
  - Comparison of actual v/s planned progress
  - Details of unresolved disputes/claims
  - Details of revision in cash flow estimates

- **Appointment of Independent Engineer (third party)**
- **CDM validation, measurement, registration, monitoring and reporting**
Obligations of Concessionaire

- Implement and operate the Project as per agreed plan during the concession period
- Receive and manage agreed quantity of waste 365 days a year
- Mobilize resources for the Project
- Implement and Operate the Project as per agreed performance standards
- Comply with relevant provisions of environmental and all other related laws
- Obtain all necessary approvals and permissions for the Project during the period of concession
Terms Binding Operator

• Provision of performance security
• Operations to meet defined performance standards
• Minimum standards for process outputs
• Measures to check quantity going to landfill
• Liquidated damages in the event of delay/defaults
Obligations of MCGM

- Grant concession to the selected operator for the Project for its implementation and operation
- Provide access roads to the site
- Provide water and power connection to the site (Concessionaire to pay for the power and water consumed)
- Obtain CRZ, AAI and environmental clearance for proposed development
- Indemnify the concessionaire from environmental liabilities due to past operations
- Facilitate fund raising efforts of the Operator
• Concessionaire to be vested with the complete and lawful right, title and vacant possession of the Site by MCGM
• Execution of land lease agreement along with Concession Agreement
• Lease of Site to be co-terminus with the Concession Agreement
Payment Mechanism

• A special budget provision is proposed for payment of tipping fees to the selected operator

• The project will be funded from:
  – Private operator
  – Grant funding available for the project from JNNURM
  – Revenue from Carbon Credits generated by the project
  – Allocation of funds from MCGM budget (Tipping fees)
  – Revenue from sale of products (compost and electricity)
Typical Project Structure

- **Compost Company**
  - Off take Agreement
  - Equity Share Capital

- **Private Operator**
  - Construction and O&M Contracts

- **SWM SPV**
  - Concession + Land Lease Agreements
  - Term Debt
  - CDM-CER Revenue
  - Equity Share Capital
  - Equity Investors

- **MCGM**
  - Lenders

- **Special Account**

- **IE/IA**
- **Project Engineer**
- **Insurance Consultant**
**Bidding Strategy**

- **Selection of private operator on Build, operate, maintain and transfer basis**
- **Concession period** – 25 years
- **Operators’ Responsibilities**
  - Receive, process and dispose off waste received at the site during the concession period
  - Implement the facility within given timeframe and as per desired performance level
  - Mobilize funding for the project
  - Compliant with laws/rules
- **Operators’ rights**
  - Rights over revenue from sale of process outputs
  - Partial CDM benefits
- **MCGM’s obligations**
  - Make arrangement for delivery of waste at the site
  - Provide land at disposal site on lease during concession period
  - Payment of tipping fees
Pre-qualified bidders

- SembCorp Env. Mgt. Pvt. Ltd., Singapore with SITA Env. Solns. Australia
- IVRCL Infrastructure and Project Ltd, Hyderabad with Enkem
- Veolia Environmental Services Asia Pvt Ltd, Chennai
- United Phosphorus Limited, Mumbai with End-I Ag Germany
- Antony Waste Handling Cell Pvt. Ltd, Mumbai with Modern Asia Environmental Holdings, Thailand
- Unity Infraprojects Ltd, Mumbai with Han-jer Bio-Tech Energies Pvt Ltd.
- SPML, Delhi with SMEC Intl. Pvt Ltd
- ILISO/DSW, Durban with Garware
- Ambuja Cements Ltd., Mumbai with Eco-Save Systems Pvt Ltd.
- EA Infrastructure Operations Pvt. Ltd., Mumbai with AMA Italy, UDC Kuwait
- Ramky Enviro Engineers, Hyderabad with City of San Diego
- STRABAG-AG, Austria
## Proposed Capital Investment

(Rs. in Lakh)

<table>
<thead>
<tr>
<th>Project Components</th>
<th>Proposed Cost</th>
<th>Funds Approved under JNNURM</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Gorai</td>
<td>3,530.00</td>
<td>-*</td>
</tr>
<tr>
<td>▪ Mulund</td>
<td>8,130.00</td>
<td>2,430.00</td>
</tr>
<tr>
<td>▪ Deonar</td>
<td>17,620.00</td>
<td>11,020.00</td>
</tr>
<tr>
<td>▪ Kanjur</td>
<td>16,720.00</td>
<td>3,620.00</td>
</tr>
<tr>
<td>Shifting of Transmission Towers at Kanjur</td>
<td>720.00</td>
<td>720.00</td>
</tr>
<tr>
<td>IEC, Training and Capacity building</td>
<td>700.00</td>
<td>-***</td>
</tr>
<tr>
<td>Preparation of DPR</td>
<td>200.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>47,620.00</td>
<td>17,790.00</td>
</tr>
<tr>
<td>Cost for establishing project implementation mechanism and towards project preparation (as per CSMC approval in the 25th meeting on 5.3.2007) at 0.5%</td>
<td>---</td>
<td>89.00</td>
</tr>
<tr>
<td>TOTAL</td>
<td>47,620.00</td>
<td>17,879.00</td>
</tr>
</tbody>
</table>
**Grant of Funds (Rs. in Lakh)**

<table>
<thead>
<tr>
<th></th>
<th>GoI (35%)</th>
<th>GoM (15%)</th>
<th>MCGM (50%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6,257.65</td>
<td>2,681.85</td>
<td>8,939.50</td>
<td>17,879.00</td>
</tr>
</tbody>
</table>

JNNURM Funds (35% of Rs. 178.79 crore) for:
- Re-development of existing dump sites to reclaim a portion of land and to close the dumpsite in accordance with MSW Rules

Private sector participation (Rs. 254 crore) for:
- Setting up Composting and Bio-methanation Plants, Building and maintaining the new Landfill Facilities
Regulatory Clearances Received

• Environmental and CRZ Clearance - State and MoEF, GoI
  – Deonar and Mulund

• Environmental and CRZ Clearance - State
  – Kanjur Village

• In-principal Environmental and CRZ Approval – MoEF, GoI
  – Kanjur Village

• AAI Clearance
  – Deonar, Mulund and Kanjur

Clean-up MUMBAI
Thank you