MUMBAI METROPOLITAN REGION DEVELOPMENT AUTHORITY (MMRDA)
MUMBAI URBAN TRANSPORTATION PROJECT (MUTP)

COMMUNITY ENVIRONMENTAL MANAGEMENT PLAN (CEMP)
FOR
PERMANENT RESETTLEMENT SITE AT
PLOT NO. CTS 190 (pl.) MAJAS VILLAGE

JUNE 2002

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<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>BEST</td>
<td>Bombay Electric Supply and Transport Undertaking</td>
</tr>
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<td>BMC</td>
<td>Bombay Municipal Corporation</td>
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<tr>
<td>BSES</td>
<td>Baseline Socio Economic Society</td>
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<td>CEMP</td>
<td>Community Environment Management Plan</td>
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<tr>
<td>CO</td>
<td>Carbon monoxide</td>
</tr>
<tr>
<td>CRZ</td>
<td>Coastal Regulation Zone</td>
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<tr>
<td>DCR</td>
<td>Development Control Regulations</td>
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<td>EA</td>
<td>Environmental Assessment</td>
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<td>EHS</td>
<td>Environment, Health and Safety</td>
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<td>EMC</td>
<td>Environmental Management Committee</td>
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<td>EMP</td>
<td>Environment Management Plan</td>
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<tr>
<td>FSI</td>
<td>Floor Space Index</td>
</tr>
<tr>
<td>GOM</td>
<td>Government of Maharashtra</td>
</tr>
<tr>
<td>HC</td>
<td>Hydrocarbons</td>
</tr>
<tr>
<td>IBRD</td>
<td>International Bank of Reconstruction and Development</td>
</tr>
<tr>
<td>IDA</td>
<td>International Development Association</td>
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<tr>
<td>JVLR</td>
<td>Jogeshwari Vikhroli Link Road</td>
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<tr>
<td>MCBM</td>
<td>Municipal Corporation of Brihan Mumbai</td>
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<tr>
<td>MCGM</td>
<td>Municipal Corporation of Greater Mumbai</td>
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<td>MHADA</td>
<td>Maharashtra Housing and Area Development Authority</td>
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<td>MMR</td>
<td>Mumbai Metropolitan Region</td>
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<td>MMRDA</td>
<td>Mumbai Metropolitan Region Development Authority</td>
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**LIST OF ABBREVIATIONS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>MoEF</td>
<td>Ministry of Environment and Forest</td>
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<tr>
<td>MPCB</td>
<td>Maharashtra Pollution Control Board</td>
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<tr>
<td>MSEB</td>
<td>Maharashtra State Electricity Board</td>
</tr>
<tr>
<td>MTNL</td>
<td>Mahanagar Telephone Nigam Limited</td>
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<tr>
<td>MUTP</td>
<td>Mumbai Urban Transport Project</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organisation</td>
</tr>
<tr>
<td>NO(_2)</td>
<td>Nitrogen Oxides</td>
</tr>
<tr>
<td>OD</td>
<td>Operational Directive (of the World Bank)</td>
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<tr>
<td>PAH's</td>
<td>Project Affected Households</td>
</tr>
<tr>
<td>PCC</td>
<td>Project Coordinating Committee</td>
</tr>
<tr>
<td>PIA</td>
<td>Project Implementation Agency</td>
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<tr>
<td>PIC</td>
<td>Public Information Center</td>
</tr>
<tr>
<td>PIL</td>
<td>Public Interest Litigation</td>
</tr>
<tr>
<td>PMC</td>
<td>Project Management Consultants</td>
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<tr>
<td>RAP</td>
<td>Resettlement Action Plan</td>
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<tr>
<td>R &amp; R</td>
<td>Resettlement and Rehabilitation</td>
</tr>
<tr>
<td>RIP</td>
<td>Resettlement Implementation Plan</td>
</tr>
<tr>
<td>ROB</td>
<td>Road Over (RAIL) Bridge</td>
</tr>
<tr>
<td>SPARC</td>
<td>Society For The Promotion Of Area Resource Centre</td>
</tr>
<tr>
<td>SO(_2)</td>
<td>Sulphur Di Oxide</td>
</tr>
<tr>
<td>SRS</td>
<td>Slum Rehabilitation Society</td>
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<tr>
<td>TDR</td>
<td>Transfer of Development Rights</td>
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EXECUTIVE SUMMARY
Mumbai Urban Transport Project (MUTP) conceptualized in 1994 envisages substantial improvements in both the rail and the non-rail infrastructure primarily to encourage public transport. The Project is to be implemented jointly by Government of Maharashtra (GOM), Indian Railways, BEST, MCBM and MSRDC. A total of 19,000 Project Affected Households (PAH’s) are likely to be affected by the Project and required to be re-settled in accordance to Resettlement and Rehabilitation (R & R) policy adopted by GOM for MUTP. Resettlement Action Plan (RAP – April 2002) prepared by MMRDA provides the details of R & R Policy, socio-economic characteristics of PAH, resettlement entitlements and the institutional framework.

The applicable Indian Laws and World Bank Safeguard policies within which this resettlement will be carried out for this Sub-Project and overall MUTP are presented in Article 1.2 of this Report.

Therefore, as a part of Project preparation, a site specific Community Environmental Management Plan (CEMP) is prepared to meet the requirements of OP 4.01 guidelines published by the World Bank for each Sub-Project Site along with a Resettlement Implementation Plan (RIP).

MMRDA appointed M/s. ECON POLLUTION CONTROL CONSULTANTS in January 2002 to prepare a site-specific CEMP for permanent Resettlement Site at Majas where PAH’s from Jogeshwari Vikhroli Link Road would be resettled. This Site belongs to the Option ‘A” category of the RAP.

After evaluating the various alternative Sites in consultation with the PAH’s, Site comprising CTS No. 190 (pt.) of Village Majas was selected based on certain criteria.

The study involves preparation of baseline environmental assessment along JVLR, area surrounding the selected Site and focusing of environmental attributes of the selected Site.
The present social, economic and environmental status of these slums where PAH’s presently reside varies from settlement to settlement but by and large is poor in living and sanitary conditions.

The water supply is through stand posts. The sewage and sullage flows through open drains into the nearby nallah. Solid waste generated from the slums is haphazardly litter within and around the Plot. The slums are sometimes subject to water logging during the monsoon due to inadequate drainage facilities.

Based on consultation meetings with the PAH’s and information available with MMRDA, M/s ECON identified the environmental impacts during construction (Phase I) and also during post-implementation (Phase II) in Chapter 4.

In Chapter 5, a site-specific CEMP gives issue-wise mitigatory action for both; Phase – I (during construction) and Phase – II (post implementation). It also identifies the responsible agency, time frame for implementation along with its costs. The total cost for implementing CEMP for Phase – II (post implementation) is Rs. 2,75,000/-.

The CEMP costs for Phase – I (during construction) are not separately indicated as they are included in the individual construction contracts. MMRDA will ensure that all the recommended mitigatory actions for this phase are clearly specified in the Tender Documents.

The recommendations include formation and functioning of the EMC’s / Society /Apex body for the Housing Complex. For the guidance of the EMC’s, a typical maintenance schedule is presented. A list of Do’s and Don’ts in simple language along with its translation in local language to form a part of larger awareness training and participation programme is also included.

The implementation of the CEMP will be monitored by MMRDA through NGO’s / PMC’s based on the suggested indicators in Annexure 5.4. All necessary precautions and corrective action will be taken to ensure compliance to local laws pertaining environmental parameters.
CHAPTER 1

INTRODUCTION
1.1 Overview

1.1.1 Mumbai, over the last few decades, has emerged as the financial and commercial capital of India. Greater Mumbai's population that was around 4 million in 1961 is now 11.9 million in 2001. The urban growth has spread beyond the boundaries of Municipal Corporation of Greater Mumbai (MCGM) in the northern, northeastern and eastern directions mainly along the suburban rail corridors to form Mumbai Metropolitan Region (MMR). Greater Mumbai has an area of 438 sq. km and a population of 11.9 million and the MMR has an area of 4354 sq. km and a population of about 18 million. By 2011, MMR is expected to have a population of 22 million. MMR generates about 5% of national GDP and contributes to over one third of India’s tax revenues.

1.1.2 As a result of population growth and increase in private ownership of vehicles, public transport is under severe stress. Until now, solutions to Mumbai’s acute transport problems have been hindered by the likely magnitude of displacement and resettlement of slum dwellers by the fragmentation of institutional responsibilities and the inadequacy of financial resources.

1.1.3 The transport challenges of Mumbai are compounded by the fact that over 50% of Mumbai’s population lives in squatter settlements. These settlements are most often located on publicly owned land and land reserved for public purposes in the master plans, including the land reserved for roads, road widening and along the rail tracks. Managing the resettlement and rehabilitation of a large number of households and businesses therefore becomes a critical part of most transport projects.

1.1.4 Mumbai Urban Transportation Project (MUTP) has been conceptualized in 1994 to improve transportation in the Mumbai region.
The major components of MUP are:

1. Rail Transport Component
   - Railway system – Capacity, Optimization and Enhancement
   - Setting up new corridors
   - Purchase of rolling stock

2. Road Transport Component
   - Road Transport – Traffic Management (TM) and related measures including Area Traffic Control (traffic signal system), bus priority and rail station area transport integration.
   - Road Transport – Infrastructure, including roads and road even rail bridges.
   - Road Transport – Equipment (procurement of buses)

3. Resettlement and Rehabilitation.
   - Construction of 19,000 permanent dwelling units.
   - Construction of 6,000 transit dwelling units.
   - Land acquisition and R & R assistance.

Each component has related provisions for environmental protection and improvement, institutional capacity building and training.

1.1.5 Environmental Assessment Process and Impacts due to Sub-Projects

The EA consists of:
   - Sectoral Environmental Analysis (SLEA) of the three strategic transport options for MMR identified as part of CTS (1998).
   - Sub-project level Environmental Assessment undertaken by way of:
- Programmatic Level Environmental Assessment (PLEA) of generic sub-projects (1998).
- Micro-Level Environmental Assessment (MLEA) of sub-projects projects with a potential for significant environmental issues. (1998)
  - Consolidated EA, which brings together the updated findings of the above-mentioned documents into a comprehensive document. (2002).

Typical environmental impacts of subprojects have been categorized into impacts during the construction phase and during the operation phase. These impacts are expected to be in respect of the following environmental resources:

- Ambient Air Quality Deterioration
- Increase in Noise Levels
- Adverse Impacts on Ecology (Flora/Fauna)
- Population displacement
- Land degradation
- Surface and groundwater degradation
- Occupational health and safety
- Impacts on Traffic and road safety

1.1.6 GOM in March 1997 adopted an R & R Policy for the R & R of PAH affected by the MUTP. The main objective of the R & R Policy is to avoid or minimize the displacement by exploring all the viable alternative designs and where unavoidable execute the resettlement action plan to enable the Project Affected Persons to improve their living standards.

MMRDA has prepared RAP. This RAP contains the details on policy provisions and legal framework, magnitude of land acquisition and displacement, findings of socio-economic surveys and baseline characteristics, organizational responsibilities. The process adopted under two stage
resettlement, generic time table for construction of transit and permanent housing, and consolidated costs and budgets. The RAP also identified criteria for judging the completion of R & R and monitoring indicators for physical and financial progress. The RAP also describes the Community Environmental Management Plan (CEMP).

The dwelling units required for the resettlement of the PAH's are proposed to be procured in three different ways;

**Option A:** In this option building construction is directly contracted the PMU by following the World Bank procurement guidelines for works, on land obtained through TDR or land transferred by GOM. 7.97 ha. of land has been identified for constructing about 4000 dwelling units under this option.

**Option B:** The land and dwelling units are procured under this method by inviting competitive bids from developers against the TDR benefits that would accrue to the developers for land and the construction area. (Please refer to paragraph 33 for details of TDR). Approximately 12000 dwelling units will be constructed under this option and the Executive Committee of MMRDA has approved the evaluation of bids on 22 February 2002. Work is expected to be awarded shortly.

**Option C:** Dwelling units already constructed by Maharashtra Housing and Area Development Authority (MHADA) are purchased in this option at a price ranging between Rs.1,25,000/- and Rs. 2,00,000/- per dwelling unit depending upon the location. The TDR benefit accrues to MHADA in this case. 4000 Dwelling units under this option have already been procured.

1.1.7 Jogeshwari - Vikhroli Link Road (JVLR) (about 11 km) links the Eastern and Western Express Highways (EEH and WEH). The road provides, in particular, access between the Mumbai port area and the national highway NH8 (Mumbai Delhi). The JVLR scheme is an improvement of the existing road and should reduce congestion and reduce diversion to other congested parts of the
network (Bandra-Sion Link Road). The JVLR works comprise the widening to dual carriageway of the western section and other deficient sections, the traffic management and minor alignment improvements to the eastern section, which has already been widened, and junction improvements along the route. This would be taken up in two phases. The scheme links with intersection improvements at WEH and EEH and flyovers (being funded and executed by MSRDC). R and R of 858 PAH’s is involved for the JVLR.

Slum settlement exists along the Jogeshwari Vikhroli Link Road. These slums come in the way of widening the Jogeshwari Vikhroli Link Road. The Residents from Pratap Nagar, Sariput Nagar, Durga Nagar and Pameri Nagar are to be resettled at Permanent Housing Site developed at CTS No. 190 (pt.) of Village Majas. This Plot was chosen after evaluation of various alternative Sites and consultations with the PAH’s.

The PAH’s of Milind Nagar, Chandan Nagar and Haryali Nagar are in the process of being shifted to Resettlement Site at Dindoshi whereas PAH’s of Durga Nagar and Pameri Nagar are included in the list of PAH’s due to shifting of Jogeshwari Vikhroli Link Road alignment and fencing of road at junctions. Table 1.1 gives settlement wise details of Project Affected Households to be accommodated at Majas Site.
### TABLE NO. 1.1

SETTLEMENT WISE BREAKUP OF THE AFFECTED PAHS

<table>
<thead>
<tr>
<th>Sr No</th>
<th>NAME OF SETTLEMENT</th>
<th>RESIDENTIAL</th>
<th>RESIDENTIAL + COMMERCIAL</th>
<th>COMMERCIAL</th>
<th>TOTAL</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>PRATAP NAGAR</td>
<td>366</td>
<td>22</td>
<td>84</td>
<td>472</td>
</tr>
<tr>
<td>2</td>
<td>SARIPUT NAGAR</td>
<td>164</td>
<td>2</td>
<td>6</td>
<td>172</td>
</tr>
<tr>
<td>3</td>
<td>DURGA NAGAR</td>
<td>5</td>
<td>20</td>
<td>35</td>
<td>60</td>
</tr>
<tr>
<td>4</td>
<td>PAMERI NAGAR</td>
<td>27</td>
<td>1</td>
<td>5</td>
<td>33</td>
</tr>
<tr>
<td>5</td>
<td>MILIND NAGAR</td>
<td>231</td>
<td>3</td>
<td>26</td>
<td>260</td>
</tr>
<tr>
<td>6</td>
<td>CHANDAN NAGAR</td>
<td>29</td>
<td></td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>7</td>
<td>HARIYALI NAGAR</td>
<td>36</td>
<td>3</td>
<td>2</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td><strong>GRAND TOTAL</strong></td>
<td><strong>858</strong></td>
<td><strong>51</strong></td>
<td><strong>159</strong></td>
<td><strong>1068</strong></td>
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**NOTE:** Out of this total 1068, the MSRDC will resettle 331 PAH at Dindoshi. Therefore, MMRDA needs 737 structures for resettlement of PAHs at the Majas Site.
Aa a part of Option ‘A’ of RAP, a Plot at Majas Village has been finalized for permanent resettlement after due selection process, done in consultation with PAH’s. A CEMP is proposed to be prepared for resettlement of the PAH’s on this Plot. A map of Mumbai showing location to JVLR is enclosed as Annexure 1.1.

1.1.8 The main objective of the study is to improve the environment at the Resettlement Site and mitigate environmental impacts related to construction and post implementation phase. The specific objectives are as follows:

1. To identify the basic environmental and sanitation related issues such as water supply, sewage disposal, solid waste management, access road, storm water drain, mosquito nuisance, etc., for the proposed permanent dwelling units.

2. To identify the environmental and health impacts issues on the community.

3. To improve project affected person’s knowledge on environmental issues and enhance their ability to participate directly by identifying, evaluating and receiving the benefits among themselves.

4. To prepare the Community Environmental Management Plans for the permanent dwelling units at Plot CTS 190 (pt.) for construction phase and also post implementation of Permanent Housing.

M/s. ECON POLLUTION CONTROL CONSULTANTS have been appointed by MMRDA to prepare the site-specific CEMP for this Permanent Resettlement Site at Majas.
1.2 Applicable Indian Laws and World Bank Safeguards Policies.

1.2.1 The applicable Indian Laws and World Bank Safeguards with a brief overview that are applicable to the overall MUTP are presented in Annexure 1.2.

1.2.2 The Indian Laws and World Bank Safeguards Policies that are applicable to this CEMP / Sub-Project are:

   a) The Maharashtra (Urban Areas) Preservation of Trees Act, 1975
   b) The Maharashtra Co-operative Societies Act, 1960
   c) Maharashtra Regional and Town Planning Act, 1966
   d) Development Control Regulations for Greater Mumbai, 1991
   e) Environmental Assessment (OP 4.01)
   f) Involuntary Resettlement (OP 4.30)
ANNEXURE 1.1

MAP OF MUMBAI
ANNEXURE 1.2

APPLICABLE INDIAN LAWS AND WORLD BANK SAFEGUARDS POLICIES
A brief overview of key provisions of the policy, legal framework and safeguard policies applicable overall to the MUTP are provided below:

A. APPLICABLE INDIAN LEGAL REQUIREMENTS

1. LEGISLATION RELATED TO ENVIRONMENT:

There are various Acts, Rules and Notifications applicable for different environmental components such as Air Pollution, Water Pollution, Noise Pollution, Coastal Areas, Hazardous Materials Handling and Transport, Forest and Wildlife, etc. In addition, regulatory provisions by way of environmental clearance also exist. The applicable regulations are listed below.

i. Environmental (Protection) Act, 1986

This is an umbrella act for environmental protection. Various rules and notifications are issued from time to time under the provisions of this Act. Environmental Protection Rules (2000) specify standards for ambient air quality whereas Noise Pollution (Regulation and Control) Rules, 2000 provide for the ambient noise standards in public places. However legal mechanism to achieve these are not explicit in terms of emission at source in transport sector except for the vehicle emission norms like Euro II or Bharat II that have been prescribed. The Environmental Impact Assessment Notification, 1994 (as amended in May 1994) make environmental clearance mandatory for 29 categories of developmental projects listed in Schedule 1 of the notification. Railways are not
listed in schedule 1 and hence do not need environmental clearance. For other components under MUTP, MoEF has confirmed that environmental clearance is not required.

ii. Coastal Regulation Zone Notification 1991

The notification provides for determining certain areas between the Low Tide Line (LTL) and High Tide Line (HTL) and adjacent landward area as the Coastal Regulation Zone and its classification into CRZ I (ecologically sensitive), CRZ II (where development has already occurred) and CRZ III the residual area (largely rural in character). The notification also prescribes prohibited activities in CRZ and activities that can be taken up with the approval of MoEF. Reclamation being a prohibited activity cannot be undertaken in CRZ I. This restricts use of such lands for R & R. MoEF clearance is required for Borivali Virar Railway section that traverses the Vasai Creek and adjoining wetland which is a Coastal Regulation Zone though construction of such links is a permitted activity in CRZ. This clearance has been requested and is being processed.

iii. The Maharashtra Felling Of Trees (Regulation) Act 1964

GOM legislation requires every local authority to constitute a tree authority. No tree can be felled without the permission of this authority. Trees in the right of way of roads can be removed with the permission of this authority, which may prescribe transplanting or compensatory plantation.
II LEGISLATION RELATED TO R & R

i. **Land Acquisition Act 1894 (La Act):**

This act provides for compulsory acquisition of land for public purposes by paying compensation at the market rate with 30% solatium for the compulsory nature of acquisition and interest at 12 percent per annum from the date of notification.

ii. **Maharashtra Regional And Town Planning Act, 1966 (Mr&Tp Act):**

The Act provides for preparation of Development Plans (Master Plans). These plans designate land required for public purposes, which can then be acquired in conjunction with the provisions of Land Acquisition Act. The act also provides a statutory framework for formulation and enforcement of Development Control Regulations.

iii. **Development Control Regulations For Greater Mumbai 1991 (Dcrs):**

These regulations prepared under the MR & TP Act offer an alternative to acquisition under LA Act by way of Transfer of Development Rights (TDR). The permissible Floor Space Index (FSI) defines the development rights of every parcel of land in Mumbai. If a particular parcel of land is designated for a public purpose the landowner has an option of accepting monetary compensation under the LA Act 1894 or accept TDR (equivalent to the plot area times the permissible FSI), which can be sold in the market for use elsewhere in Mumbai. The DC Regulations have been amended to provide incentives for rehabilitation (including resettlement of slum dwellers) in 1997. For landowners prepared to provide 225 sq.ft. dwelling units free of cost to slum dwellers, the incentive is in the form of right to build and sell floor space equivalent to that required for slum...
rehabilitation subject to the maximum *in-situ* utilization of FSI of 2.5. The remainder of the total development rights can be used as TDR. In case of land designated for resettlement of slum dwellers affected by infrastructure projects, the land owner has an option of offering dwelling units to the project implementing agency free of cost and getting the benefit of maximum of TDR equivalent to floor area calculated at FSI of 3.5 (1 for land and 2.5 for the built-up area). The DCRs also set out the standards for building design and construction, provision of services like water supply, sewerage, site drainage, access roads, elevators, fire fighting etc. Buildings procured for R & R have to conform to these DCRs. Up-front clearance of the entire project is however not required under the DCR. Approvals are to be obtained for individual scheme, as it gets prepared.

iv The Maharashtra Co-Operative Societies Act 1960:

This act provides for establishing, registering and administering the co-operative societies. Housing co-operative is a special form of co-operative society, where the land and building is owned by the co-operative and its members have occupancy rights of apartment occupied by them. Sale and purchase of such units can take place only with the consent of the society. This is a common form of tenure in Mumbai’s apartment buildings and is widely understood.

B. **APPLICABLE WORLD BANK SAFEGUARD POLICIES**

Given that MUTP has been developed with the intention of mobilizing financial resources from the World Bank, project preparation has included a number of studies and assessments which have sought to address and meet the requirements of the World Bank’s environmental and social policies, often referred as the ‘safeguard’ policies. The next paragraphs provide a summary overview of how
these guidelines have been considered. Several policies were found not to have been triggered and are therefore not discussed any further.

i. **Environmental Assessment (OP 4.01):**

In the context of the Bank's Operational Policy (OP) 4.01 on Environmental Assessment, MUTP has been classified as category "A" project, largely on the basis of the large number of people requiring resettlement and rehabilitation. Because of the large-scale resettlement and the triggering of more than one safeguard policy the project is also classified as "SI" in terms of safeguard issues. A consolidated EA including SEA and sub-project specific EAs and EMPs have been prepared in compliance with the World Bank policy.

ii. **Cultural Property (OP 4.11):**

Mumbai with its history of nearly three hundred years is rich in cultural property particularly in the form of built heritage. GOM and MCGM are acutely aware of the need to conserve such heritage. GOM in 1995 with the involvement of NGOs listed over 600 buildings and precincts as of heritage significance. DCR 67 governs the development of these listed buildings and precincts. GOM has also constituted a Heritage Conservation Committee in 1995 to advise the Municipal Commissioner regarding development permission to be granted in case of listed buildings and precincts. No development permission can be granted of the listed buildings or within the precincts without the consent of the Heritage Committee. None of the MUTP sub-projects, except the pedestrian subways, directly or indirectly affect heritage buildings. Some of the pedestrian facilities in the Island City notably one near the CST would be located in the heritage precinct. The design consultants have been advised to take cognizance of this fact. In any case the proposals will be subject to the review of the Heritage Conservation Committee.
During the execution of works, if a “chance find “ of archaeological significance occurs, the contract requires the contractor to immediately inform the employer and stop further work. Employer will in turn inform the state Archaeology Department for further investigation.

In addition to the listed buildings, there are smaller common cultural properties like shrines, small temples or mosques within the project-affected communities. Thus this policy applies to the project. These have been identified during the BSES and the RIP’s cover their resettlement. In case of JVLR Phase I there are 9 small temples, which will be relocated according to the RIP prepared in consultation with the PAH’s.

iii. Natural Habitat (OP 4.04):

Mumbai’s notable natural habitat is limited to the 103 sq.km. National Park at Borivali, which is located in the northern part of the peninsula between the two rail corridors and the coastal wetlands in the eastern and western suburbs. The MoEF protects both through variety of legal and administrative mechanisms. The National Park is protected under the Indian Forest Act whereas the coastal wetlands are protected by the Coastal Regulation Zone (CRZ) Notification of 19 February 1991. None of the subprojects pass through these areas except a section of 4.5 km. of the Borivali - Virar Railway line that (total length 26 km.) crosses the Vasai Creek and the adjoining wetlands having degraded mangroves. The area of the wetland directly affected is less than 5000 sq.m. out of a total extent of wetland of 48 sq.km. Bridges traversing the CRZ are not prohibited but require environmental clearance. MoEF has already been approached for the approval under the CRZ Notification. In case of JVLR an area of 2000 sq.m. is observed to have dwarf and stunted mangroves. This also has weeds and garbage. The construction of road has been approved as a part of CZMP by MoEF. However suitable measures to enhance the growth of mangroves have been included in the
EMP. In an effort to provide immediate temporary transit accommodation for squatters, in response to a court order with stringent implementation schedule, resulted in an inadvertent breach of the coastal zone regulations at the transit sites at Mankhurd and Turbhe and Mandale. GOM has now undertaken to move all squatters currently housed in transit accommodation to their permanent accommodation within a period of not more than three years. Environmental audit of these transit camps has also been carried out to determine how the land under CRZ can be restored to its original status after the dismantling of transit houses. Thus, although the impacts on natural habitat are small, the policy applies, and has been complied with.

iv. Involuntary Resettlement (OP 4.30):

MUTP will require resettlement of about 19000 households (77000 persons). The World Bank Policy on Involuntary Resettlement is therefore applicable to the project. In compliance with this policy an R & R Policy has been prepared and adopted by GOM for MUTP. RAP and sub-project specific RIPs are being prepared. RIPs including CEMPs have been prepared for four sub-projects scheduled for commencement in the first year. The project is therefore in compliance with the policy.

v. Indigenous People (OP 4.20):

About 1% of the PAH’s belong to the Scheduled Tribes. A field based review was undertaken to determine if these PAH’s were subject to application of this Policy since they might have originally belonged to tribal communities in the distant past. As of now they are integrated with the city life and do not have their traditional habitat or follow traditional ways of life. More particularly, (a) they no longer have close attachment to ancestral territories; (b) they do not identify themselves or are identified by others as distinct cultural group; (c) they do not
speak an indigenous language; and (d) they no longer belong to customary social and political institutions. There is also a general reluctance to reveal the caste or tribe particularly pronounced when data is to be kept in public domain. It was determined by the review that the social impact of the project on such people is therefore similar to that on other PAH’s and thus the policy does not apply. No separate Indigenous Peoples Development Plan (IPDP) has therefore been prepared.
CHAPTER 2

SUB-PROJECT DESCRIPTION, ANALYSIS OF ALTERNATIVES AND SELECTION OF SITE
CHAPTER 2  SUB-PROJECT DESCRIPTION, ANALYSIS OF ALTERNATIVES AND SELECTION OF SITE

2.1 Background:

Under Option ‘A’ of RAP, various plots of land available along the Jogeshwari Vikhroli Link Road were reviewed. Since the PAH’s preferred to remain in the same locality preference was given to plots available in the JVLR region.

The land required to resettle PAPs from the four settlements affected by Jogeshwari Vikhroli Link Road is about 9400 sq.m. The Task Force on MUTP (II) Project had identified some Sites for rehabilitation and resettlement of affected hutment dwellers. According to their report and on going through the Development Plan for MCGM area, there is no suitable Site reserved for Public Housing / Housing for Dishoused (PH / HD) nearby where Project Affected Persons can be resettled. Hence, existing Sites where slums are located were proposed by the Task Force for rehabilitation by changing zoning and reserving them for R & R Project.

The key plan showing the locations Task Force and Consultant identified Sites in relation to JVLR alignment is attached as Annexure 2.1.

2.2 Task Force Identified Sites:

A ‘Task Force’ was appointed by GOM to identify possible Resettlement Sites around 1997. The following Sites were identified by them.

a) Land bearing CTS No. 16 (pt.) and 37 (pt.) of Village Majas (TF 1)
b) Land bearing CTS No. 375 (pt.), S.No. 11(pt.) S.No. 13(pt.) (TF 2)
c) Land bearing CTS No. 85 (pt.) of Village Paspoli, Taluka Kurla (TF 3)
2.2.1 Site Alternative No.1:

Land Bearing Cts No. 16(Pt.), 32(Pt.) And 37(Pt.) Of Village Majas (TF 1):

This land is situated on the north side of JVLR nearer its junction with Western Express Highway. This land admeasures 13,500 sq.m and falls in ‘No Development Zone’ as per the sanctioned D.P. of K-East Ward. The land is under private ownership on the east side of this land. The owner has developed a recreation and amusement centre known as ‘Fantasy Land’. The part of the land immediate to the west of ‘Fantasy Land’ is low lying with nallah passing through it and the western portion of this land has steep contours. In order to get the sizable leveled area for R & R project training and realigning of nallah at some portion is necessary. The owner of this land has handed over this portion of the land to the Government. However, the owner went in appeal under section 47 of the MR&TP Act 1966 for retaining the land which was held by the State Government. After hearing the appeal, the State Government passed the order on March 25, 1998 in favour of the owner of the land (M/s. Madhu Fantasy Land Pvt. Ltd) and the land is now under the owner’s possession and is unlikely to be available for R & R Project.

In case, compulsory acquisition is resorted for this land, there will be stiff opposition from the landowner to part with this land for R & R Project. It is also observed from the BMC’s report that this Site is required for R & R of PAPs due to alignment of JVLR between S.V. Road to Western Railway and Western Railway to Western Express Highway. Further, the State Government vide its Letter No. TPB 4396 1320CR 303 96VD-11 dated May 10, 1998 has passed the orders that the land may not be taken over by the MCGM.
2.2.2 Site Alternative No.2:

Land Bearing Cts No.375 (Pt.), S.No. 11(Pt.), S.No. 13 (Pt.) (TF 2):

This land is situated in the North Western Corner of Western Express Highway and Jogeshwari Vikhroli Link Road. This land falls in NDZ as per the sanctioned D.P. of K (East) Ward. However, this land is fully and densely encumbered with slums without any vacant pockets of land to undertake re-development scheme. There are 10 societies comprising of 5,226 tenements on the north of Jogeshwari Vikhroli Link Road. While three societies comprise of 1,002 tenements on the south of Jogeshwari Vikhroli Link Road have been formed. SRA has so far approved one scheme for rehabilitation and other societies are also in the process of applying to SRA for necessary approvals. The Site is not considered suitable for R & R purpose as there is no vacant pocket of land and rehabilitation of all these slums will be a major task by itself.

2.2.3 Site Alternative No.3:

Land Bearing Cts No. 85 (Pt.) Of Village Paspol, Taluka Kurla (TF 3):

This triangular piece of land is situated about 9km away from the junction of Western Express Highway and Jogeshwari Vikhroli Link Road and is surrounded by MCGM’s water pipeline on both sides and one side abutting Jogeshwari Vikhroli Link Road. The land admeasures about 40,000 sq.m and falls in NDZ as per the sanctioned D.P. of ‘L’ Ward. This land is also encumbered with encroachments having huts of different sizes. The accessibility of this Plot is affected due to the steep level difference of about 6 meters between Jogeshwari Vikhroli Link Road level and the existing ground level of the Plot. Since this Site is about 9 kms from Pratap Nagar and about 4 kms from Sariput Nagar. PAH’s expressed unwillingness to shift to this Site. In view of this, this Site is not considered suitable for R & R.
2.3 Consultant Identified Sites:

As the Task Force identified Sites were not found suitable due to various reasons mentioned above. The efforts were made to identify other suitable Sites as far as possible in close proximity of the four settlements namely Pratap Nagar, Sariput and Durga Nagar and Pameri Nagar.

a) Land bearing CTS No. 190 (pt.) of Village Majas (C 1)
b) Land bearing CTS No. 170 (pt.) of Village Majas (C 2)
c) Land bearing CTS No. 183 (pt.) and 190 (pt.) of Village Majas (C 3)

2.3.1 Site Alternative No.4:

Land Bearing Cts No. 190 (Pt.) Of Village Majas:

This land admeasures about 20,414 sq.m and is affected by Recreation Ground Reservation as per the revised sanctioned Development Plan of K (East) Ward. The land is situated at the junction of Jogeshwari Vikhroli Link Road and 44 feet wide road leading to Poonam Nagar. This piece of land is uneven and requires some cutting and tilling at places. There are a few hutments in some portion of the Plot, which has been excluded.

The vacant portion of land admeasuring about 9,400 sq.m is developable for rehabilitation of slum dwellers affected by Jogeshwari Vikhroli Link Road. This Plot can accommodate all PAH’s from the four settlements namely Pratap Nagar, Sariput and Durga Nagar and Pameri Nagar.

Since this plot is easily accessible from all the four settlements and abutting on Jogeshwari Vikhroli Link Road and can accommodate all PAPs, it is considered most suitable for rehabilitation of affected slum dwellers. During the informal public participation exercises, the slum dwellers have expressed their willingness to shift to this area. However, as this Plot was reserved for
Recreation Ground, the reservation has been deleted and due process of modification to the sanctioned D.P. has been completed by the appropriate authority.

This land belongs to M/s. Madhu Fantasy Land and negotiations have been carried out with them. M/s. Madhu Fantasy Land have parted with their land provided benefit of TDR as admissible under D.C. Regulations for Greater Mumbai, 1991 is available to them.

2.3.2 Site Alternative No.5:

Land Bearing Cts No. 175 (Pt.) Of Village Majas:

This Plot admeasures 5,200 sq.m and is reserved for Municipal Retail Market. Municipal Staff Quarters as per the sanctioned D.P. of K (East) Ward. Part of the Plot has been taken over by the MCGM and at present is vacant. This Plot is situated in the midst of Poonam Nagar Colony, which is developed with necessary infrastructure. Since the plot is reserved for Municipal Retail Market and Municipal Staff Quarters some area could be used for R & R Project. However, the area that would be available for rehabilitation purpose would be insufficient to accommodate all PAPs. Further, as this land is in possession of MCGM, NOC from MCGM would be necessary before considering the land of rehabilitation purpose. Deletion of reservation on part of land will be necessary.

As the Plot is not in level condition due to its uneven extraction, the cost of filling will be heavy and resulting into pile foundations adding to the cost. In view of the foregoing, although the Plot is conveniently located is not considered suitable for development.
2.3.3 Site Alternative No.6:

Land Bearing Cts No. 182 (Pt.) And 190 (Pt.) Of Village Majas:

The land admeasures about 42,233 sq.m and is situated adjoining the Fantasy Land and partly about on Jogeshwari Vikhroli Link Road. There are a few hutments abutting Jogeshwari Vikhroli Link Road. This land is situated in ‘No Development Zone’ as per the sanctioned Development Plan of K (East) Ward. The land is fairly leveled except some portions where there are small hills and valleys at the extreme eastern boundary of the Plot.

As per the provisions and D.C. Regulations, the land situated in NDZ can be permitted to be developed for Slum Rehabilitation. However, the prior permission of State Government will have to be obtained before taking any action in the matter.

This land belongs to Smt. Dosibai Nanabhoy Jeejibhoy and M/s. R.D. Hinduja. Negotiations were carried out with the owners when they showed their willingness to part with the land for rehabilitation of PAH’s provided the existing encroachments are accommodated under D.C. Rules. Change of zoning for NDZ to residential zone is necessary.

2.4 Selected Site:

After evaluating the various Sites and in view of PAH’s willingness to Site CTS No. 190 (pt.) is recommended for relocation of PAPs. The landowner M/s. Madhu Fantasy Land Pvt. Ltd. have given their consent in writing to deliver the land in lieu of TDR benefit. MMRDA is recommended to start the land acquisition proceedings of this Plot. MMRDA is in the process of preparing the Layout plans with tenements design to accommodate all PAH’s in accordance to the RAP prepared for MUTP. In addition, a RIP Report for
this selected Site is prepared and addresses actual public consultations carried out at the Site.

M/s SRS is engaged as the NGO for providing implementation support for the entire road project.

A tentative building Layout for this selected Plot is attached as Annexure 2.2. Some of the Exhibits of the Selected Site with its surroundings are attached as Annexure 2.3.
ANNEXURE 2.1

KEY PLAN FOR VARIOUS ALTERNATIVE SITES
NOTES

1) Sites suggested by Task Force (TF 1/2/3)
2) Sites suggested by Consultants (C-1/2/3)
3) Affected existing slum settlement

KEY PLAN SHOWING LOCATION OF ALTERNATE SITES
FOR PAH'S OF JVLR

Econ pollution control consultants
(Mumbai)
ANNEXURE 2.2

SITE LAYOUT PLAN
NOTES

1) LEVELS INDICATED ARE INVERT LEVELS OF S.W.D.
2) ARROWS INDICATED DIRECTION OF FLOW.
3) 'W' VARIES WILL BE 450, 600, 750, 900.
4) MINIMUM DEPTH OF S.W.D. = 300 mm.
5) PLINTH LEVEL OF BUILDINGS.
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CLIENT
M.M.R.D.A. (MUMBAI)

JOB
COMMUNITY ENVIRONMENT MANAGEMENT PLAN FOR PROPOSED PERMANENT RESETTLEMENT SITE AT MAJAS

TITLE
BUILDING LAYOUT PLAN FOR PLOT NO. CTS 190 (pt) WITH FORMATION LEVELS AND STORM WATER DRAIN

DRAWN
S.S. Kadam

DESIGNED
H.S. Thakker

CHECKED
G.K. Thavar

DATE
02.02.2002

APPROVED
V.N. Kharkar

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telno. 4443325
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DRG NO
econ/GD/01
ANNEXURE 2.3

EXHIBITS OF MAJAS
RE SETTLEMENT SITE
EXHIBIT 1: MAIN ENTRANCE TO THE PLOT ALONG JVLR. SLUMS ON THE OTHER SIDE OF JVLR VISIBLE IN BACKGROUND.

EXHIBIT 2: NORTH BOUNDARY OF THE PLOT SHOWS PLAYGROUND OF MATOSHREE SPORTS CLUB AND POONAM NAGAR IN THE BACKGROUND.
EXHIBIT 3: PICTURE SHOWS SOUTH BOUNDARY AND COMPOUND WALL PARALLEL TO JVLR.
NOTE: DURGA NAGAR IN BACKGROUND.

EXHIBIT 4: EASTERN BOUNDARY OF THE PLOT SHOWS HUTMENTS ON THE OTHER PLOT, WHICH CONTAINS THE TEMPLE AS WELL.
EXHIBIT 5: STORM WATER DRAIN PASSING ALONG EASTERN BOUNDARY OF THE PLOT NEEDS TO BE CLEARED OF FALLEN LEAVES.

EXHIBIT 6: EXTERNAL PART OF THE PLOT ALONG JVLR LITTERED WITH GARBAGE BY ILLICIT GARAGE OPERATOR.
EXHIBIT 7: PICTURE SHOWS EXTENT OF CUTTING DOWN ON THE PLOT AND ROOTS OF TREES EXPOSED.
CHAPTER 3

BASELINE ENVIRONMENT
3.1 **Environment Along JVLR:**

The environment along JVLR is affected by the dense residential development towards the Western Express Highway and ribbon settlement along the road. The surrounding region has “No Development Zone” in the property belonging to Aarey Colony and industrial & residential zone on the southern side. A lot of new residential developments have come up recently.

There are a few interesting features such as Jogeshwari Caves, Mahakali Caves, BMC’s Water Reservoirs on Vyravali Hills including a Botanical Park, Fantasy Land, Kamal Amrohi’s Film Studio and a Ganapati Immersion Pond with Recreational Park. A new sports complex is also coming up fast.

The entire region is hilly with gradual undulations. Entire natural storm water drainage is through natural watercourses like streams. There are a few abandoned quarries, which have become water bodies.

The ‘No Development Zone’ belonging to Aarey Colony has dense, full-grown vegetation of exotic trees and large tracks of grasslands. There is scanty vegetation in the region having a few trees and shrubs. Generally, the region is denuded of tree cover. The fauna observed during the visits to the region and as referred from other literature includes insects, reptiles, mammals and birds. The states of fauna in the region shows decline in the last 15 years, due to rapid habitat destruction.

Generally the environment is degraded due to unplanned, uncontrolled and haphazard growth in the region.
3.2 Present Status Of Environmental Parameters Along The JVLR Region:

Presently, JVLR surroundings have been adversely affected except in the ‘No Development Zone’ (NDZ) of Aarey Colony.

3.2.1 Air Pollution:

The air quality has generally deteriorated over time:

i) Due to heavy traffic on the Western Express Highway and JVLR resulting in automobile emissions.

ii) Due to Industrial Zone. However, this is not of large significance.

iii) Due to unhygienic, uncontrolled garbage/sewage disposal and lack of sanitary facilities.

3.2.2 Water Pollution:

The water quality in the surrounding natural watercourses is poor:

i) Due to sewage being discharged into streams/nallah.

ii) Due to industrial effluents being discharged into streams/nallahs. However this is on a small scale.

iii) Due to artificial changes in topography because of development/quarrying etc. resulting in changes natural storm water drainage.

iv) Due to automobile service centres discharging oil related effluents into streams/nallahs.

3.2.3 Noise Pollution:

The general ambient noise level during daytime is high mainly due to heavy traffic on the western express highway and JVLR. Noise levels of range of 80db are recorded as compared to 55 db of desirable level. Nighttime levels are recorded to be 83 db as against desirable levels of 45 db.
3.2.4 **Garbage And Sewage Disposal:**

There is no planned disposal system for the region. This results in open drainage from the residential settlements into streams/nallahs and almost no sanitary facilities, resulting into unhygienic open air toilets and contamination of soil, water and air. Garbage remains scattered all around thus contaminating air, water, and soil.

3.2.5 **Industries:**

There are some industries along Jogeshwari Vikhroli Link Road. However, they are not of hazardous types.

3.2.6 **Degradation Of Vegetation**

Natural flora and fauna have been affected by unplanned growth and development. However, there are no protected / endangered species of flora and fauna in the region.

3.2.7 **Archeological / Historical / Religious Sites**

There are no archeological sites in the vicinity of the selected Resettlement Site. Hence, there is no impact on them.

3.3 **Environmental Attributes Of The Selected Site:**

The selected Site is undulating with a gradient of about 4 metres from south to north. The storm water passes through natural stream flowing through the Plot. There are about three trees at Site. Rest of the Plot is almost barren with no vegetation left.

The air-quality at Site has deteriorated with time due to quarrying in the vicinity and high volume of automobile exhaust emission by vehicles passing on the Jogeshwari Vikhroli Link Road.
The Site is also subjected to high levels of noise due to traffic movement along the Jogeshwari Vikhroli Link Road. Daytime noise levels of range of 80 db are recorded as compared to 55 db of desirable noise level. Nighttime levels are recorded to be 83 db as against desirable level of 45 db.

Most of the settlements are in existence for over 25 years. Water supply here is inadequate. Community toilets are available but inadequate and in certain settlements they do not exist, compelling people to use open space near the road.

There is no planned sewage disposal system available at Site. This results in open drainage from residential settlement into streams and nallah. Garbage also remains scattered all around this contaminating air, water and soil. The living conditions of PAH's here remain unaesthetic and unhygienic.

The Plot has Matoshree Sports Club Property on West and North with playground of Matoshree Sports Club on the northern side. On the southern portion of the Plot is Jogeshwari Vikhroli Link Road. The entry to the Plot will be from the Service Road on the Jogeshwari Vikhroli Link Road to prevent disruption in traffic movement along the JVLR.

The east of the Plot has a Temple and some hutments, which are segregated from the free portion of the Plot available for development.

The selected Site has nothing of historical / religious significance, and it has no protected / endangered species of natural flora / fauna.

At the northern portion of the Plot is the playground of Matoshree Sports Club, which is two metres lower than this proposed Housing Plot.
The Site has been selected for resettlement and accepted by PAH’s for R & R and was found suitable in terms of

- Level and Condition of the Plot.
- Accessibility
- Availability of infrastructure services in the area such as water supply, sewerage, electricity, telephones, Storm Water Drain in the area.
- Existing development and other facility in the vicinity.
- Site is not affected by tidal waters and coastal area notification is not applicable.
CHAPTER 4

IDENTIFICATION OF ENVIRONMENTAL IMPACTS
The following environmental impacts are identified during construction and during post-implementation stage for this selected Site.

4.1 Impacts Identified During Construction - Phase I

The major activities associated with the construction of the sixteen buildings at the Majas Site are:

a) Piling for foundations
b) Preparing Form work
c) Cutting, bending and fixing re-inforcement
d) Casting concrete for slabs, columns and beams.
e) Erecting Internal Walls: Flooring
f) Fixing doors and windows, panels and frames.
g) Fixing Plumbing Lines.
h) Electrification including Lifts.
i) External and Internal Painting.
j) Internal Roads, Water Supply and Sewerage Lines.
k) Storm Water Drains and Compound Wall.
l) Other necessary Civil, Electrical and Mechanical Works.

In the process of carrying out the above construction activities, there are likely to be the following negative environmental impacts on

Air-quality
Noise.
Vibrations.
Water Quality
Soil contamination
Vegetation
Excess excavated earth
Health and Safety of Contract Workers

These impacts would affect the surrounding habitation and the construction workers working within the Plot.

For the following environmental parameters, the negative impacts expected are enlisted below each of them.

1. **Air-Quality**
   
i) Construction activities will increase dust specifically, due to transportation of materials loading, unloading of cement, excavated earth, gravel, sand, etc.

   ii) The construction machinery such as excavators, rollers, mixers, vibrators, dewatering pumps are likely to emit fumes of oxides of nitrogen and sulphur dioxide and soot.

2. **Noise Nuisance**
   
i) The noise levels are likely to increase during construction due to operation of machinery, banging of hammers, shouting of labourers, noise of vibrators, openings of form work, dropping of material from a height, etc. is likely to affect people in the surrounding areas as well as construction labourers / supervision engineering staff at Site.

   However, there is already some background noise due to the flow of traffic along the Jogeshwari Vikhroli Link Road.

3. **Vibrations**
   
i) In case, blasting activity is envisaged in the area, it will cause an impact on the structures in the surrounding area. Also, vibrations due
to driving of piles for foundation and operating piling equipment will have an impact on neighbouring structures with a possibility of damaging them.

4. **Water Quality**

   i) Wastewater emanating from the Site, especially from sand washing, washing of equipment, labour camps, cooking, washing of utensils, dumping of uneaten food, washing toilets, office establishment toilets, etc. is likely to further deteriorate water quality in the adjoining natural water course.

5. **Soil Contamination**

   i) The soil in the existing Plot is likely to get contaminated due to soil waste generation leachates, dumping of garbage, construction debris, construction chemicals and mineral oil leaking/drained from construction machinery. Leachates from these waters are likely to pollute the soil as well as ground water source within the Plot and in the vicinity.

6. **Vegetation**

   i) There are some shrubs and trees present at this Site. These trees may have to be felled to accommodate the various buildings and services within the Plot.

7. **Excess Excavation**

   i) The Plot is quite undulating and quite a bit of leveling will have to be done resulting in excavated material to be handled at the Site.
8. **Health and Safety of Construction Workers**

i) The impacts will be mostly related to environmental health and safety precautions during construction. Better control will result in less sickness and prevention of accidents at the Site.

4.2 **Impacts During Post-Implementation / Operation Stage**

Based on our experience of other Resettlement Sites we are enlisting here certain negative impacts on the urban infrastructure services and general issues. These negative impacts are detailed below:

1) **Water Supply and Quality**

   At most of the Resettlement Sites, it is observed the water pressure is low. This is due to the Site being located in slum areas and this is an inherent problem here. Sometimes due to cross-connections on W/S line passing through other services makes the water quality suspect.

2) **Sewerage and Sewage Disposal**

   Due to poor construction and workmanship, it is a common experience that chambers and line get broken, thus hampering the smooth flow of sewage in the sewers. Another common problem due to dumping of solid wastes in the sewer chambers the lines get choked.

   The above results in chambers overflowing with sewage and causing unaesthetic and unhealthy conditions in the surrounding areas.
3) **Solid Wastes Disposal**

Mostly due to lack of discipline, use solid collection and disposal is mismanaged. People have a tendency to throw garbage out of their windows creating unaesthetic and unhealthy situation around the buildings.

Improper garbage collection and disposal can give rise to health hazards, breeding of fly and mosquitoes and create foul smell in the area.

4) **Storm Water Disposal**

The common problem experienced is dumping of garbage in the Storm Water Drains. This will not only create unaesthetic and unhealthy conditions in the vicinity but also hamper the smooth discharge of rainwater thus creating water logging in the area.

5) **Lifts**

At most of the Resettlement Sites, lifts are either not commissioned or have stop working. The running cost of lifts is very steep plus the PAH’s are not used to staying in high rise buildings. The buildings are mostly GR + 7 thus creating lots of difficulties for the people staying on higher floors.

Due to prolonged non-use, these lift shifts tend to be used as refuse chutes thus compounding the problems further.

6) **Compound Wall**

At many Resettlement Sites absence of compound wall has led to unrestricted access and misuse of open spaces.
7) **Electricity**

The common electricity provided within the Complex tends to get misused mostly due to theft and illegal tapping. Sometimes, earlier bills before PAH’s have moved in remain unpaid.

8) **Workmanship**

At most Resettlement Sites, the structures due to bad workmanship develop cracks, leakages and dampness.

The impacts identified herein are proposed to be taken care by recommended mitigatory actions for each of them in the CEMP.
CHAPTER 5

COMMUNITY ENVIRONMENT MANAGEMENT PLAN
5.1 Objectives:

The objective of preparing CEMP is to provide access to basic urban environmental infrastructure services; and through community initiative and participation alleviate the environmental health risks of the community. The affected communities are largely squatters accustomed to a particular way of life. At the resettlement site, they will have to almost invariably adjust to the lifestyle of multi-storied buildings. The communities will be trained and motivated to follow a discipline that can avoid environmental problems. Separate Environmental Management Committees (EMCs) will be formed during RIP/CEMP preparation to take up this responsibility during post-resettlement stage. The CEMP provides in simple non-technical local language preventive maintenance schedule for water supply, sanitation, solid waste etc. The maintenance measures are translated into a simple non-technical format in the form of "Do's" and "Don'ts" in local languages for the use of the community at large.

CEMP is divided into two phases of implementation i.e. Phase - I involves mitigating impacts during construction of Permanent housing at the Majas Permanent Resettlement Site.

Phase II involves mitigation of impacts during post implementation of the Majas Permanent Resettlement Site.

5.2 Community Environmental Management Plan (CEMP) – Phase I:

It is proposed to construct about 16 buildings at Majas Permanent Resettlement Site. The construction activity is likely to generate impacts on the surroundings, which have been identified in Chapter 4 Phase I. Based on
our experience elsewhere; the mitigatory actions for each of them including time frame and agency responsible are included in Annexure 5.1 CEMP - Phase I. We recommend MMRDA to include these mitigatory actions by clearly specifying these actions as a part of conditions of Contract for construction of Permanent Housing. The costs for these mitigatory actions are deemed to be included in the construction contracts for Permanent Housing.

5.3 Community Environmental Management Plan (CEMP) – Phase II:

Phase II of the CEMP addresses impacts arising out of post implementation and operation stage of the Permanent Housing Site.

The environmental impacts identified during post implementation phase on various issues identified in Chapter 4.0 Phase II are based on our experience of other Resettlement Sites. An issue-wise, site-specific mitigatory actions along with the responsible agency and its costs for implementation are included in Annexure 5.1 CEMP Phase – II.

5.4 CEMP Costs:

The costs for CEMP - Phase II as indicated in Annexure 5.1 are Rs.2,75,000/- which does not include costs to cover departmental monitoring, consultants fees, incidental expenses and sundries. The Phase – I costs are not included here but are deemed to be included in the individual construction contracts.

5.5 Public Consultation:

Training And Awareness / Participation Programme:

The public awareness, training participation & consultation process will be made an integral part of the project implementation during both the phases of the CEMP / RIP.
The EMC are to be activated immediately through the local NGO’s. EMC’s will be involved in all the decision making process on environmental issues during both the phases.

Interaction with PAH’s through EMC members will be initiated immediately and carried out frequently through meetings, seminar and interactive workshops. The minutes of such meetings will be properly documented & followed up for implementation by the PIA / NGO’s.

After implementation of the Project Permanent Housing at the Site, the EMC’s will be involved in the operation & maintenance of the various infrastructural services of the permanent housing. Later the EMC’s will also be interacting within co-operative housing societies on a regular basis. Their services will be utilized in spreading environmental awareness in the surrounding areas and educating the PAH’s regarding the importance of good habits and maintenance of clear surroundings.

Useful information for EMC’s / Residents is presented as:

Annexure 5.2A - A List of Do’s and Don’ts in simple language to be circulated amongst EMC’s Residents at the Resettlement Site.

Annexure 5.2B - A List of Do’s and Don’ts in simple language to be circulated amongst Residents at the Resettlement Site.

Annexure 5.3 - A Translation of “synopsis” of Annexure 5.2 in local language.

Annexure 5.5 - Maintenance Schedule for Operation and Maintenance of infrastructural services.

Annexure 5.6 - Critical issues at a Resettlement Site with mitigatory actions.

Annexure 5.7 - Suggested Design Parameters for Urban Infrastructure Services.
5.6 Monitoring Indicators For Effective Implementation Of CEMP:

MMRDA shall monitor the effective implementation of the CEMP in both the phases. Annexure 5.4 gives a suggested format for issue-wise monitoring the implementation of the CEMP for both the phases by MMRDA. For the Phase – I CEMP during construction phase, the monitoring will be done through the PMC’s who will have environmental experts on their team for the purpose.

5.7 Interagency Co-Ordination:

As can be seen, a number of agencies are to be involved during both the phases of CEMP implementation. MMRDA should ensure close co-ordination between various agencies. Information technology networking by computer tools should be used by MMRDA to maintain this close co-ordination, to be backed up by regular contact at various levels.

5.8 Conclusions:

PAH’s who were residing in slums are proposed to be resettled in permanent houses at Majas site. To improve their social and environmental status, CEMP recommended for Phase I and II needs to be implemented effectively. A budget for total CEMP costs for both the Phase - II is Rs. 2,75,000/-. Other budgets for public consultations, monitoring CEMP and inter-agency co-ordination will be provided as a part of the Final Consolidated Environmental Assessment for MUTP.

The EMC’s need to be activated immediately through the local NGO’s. An awareness, training educational and participation programme needs to be initiated immediately and continued to merge with post implementation CEMP of permanent buildings at the Site. Monitoring indicators for CEMP implementation are also recommended in Annexure 5.4 for both the phases.
The Housing Complex will have PAH’s from other projects as well. Inter-agency co-ordination to establish proper Apex body, individual societies and EMC’s will have to be undertaken. The local NGO will play a very important role of bridging the social, economic and cultural divergence. The environmental status along with their social status of the PAH’s will improve on successful implementation of the CEMP.
ANNEXURE 5.1

MAJAS RE SETTLEMENT SITE CEMP PHASE - I
DURING CONSTRUCTION
## ANNEXURE 5.1  MAJAS RESETTLEMENT SITE CEMP - PHASE I - DURING CONSTRUCTION

<table>
<thead>
<tr>
<th>PARAMETERS FOR ENVIRONMENTAL ASSESSMENT</th>
<th>ENVIRONMENTAL ISSUES LIKELY TO HAVE IMPACT DURING CONSTRUCTION OF PERMANENT HOUSING (BASED ON EXPERIENCE OTHER SITES) ON THE RESIDENTS AT MAJAS RESETTLEMENT SITE</th>
<th>RECOMMENDED MITIGATORY ACTIONS</th>
<th>AGENCY RESPONSIBLE IMPLEMENTATION</th>
<th>AGENCY RESPONSIBLE SUPERVISION</th>
<th>TIME-FRAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIR QUALITY</td>
<td>Construction activities will increase dust specifically, due to transportation of materials loading, unloading of cement, excavated earth, gravel, sand etc. The construction machinery such as excavators, rollers, mixers, vibrators, dewatering pumps are likely to emit fumes of oxides of nitrogen and sulphur dioxide.</td>
<td>Use Ready Mix Concrete / Pre-fab members for concrete structures to the extent possible. All trucks/dumpers carrying construction materials that are likely to generate dust will be covered during transportation. All construction roads will be watered to keep dust under control. Trucks/dumpers with a valid PUC will be used for the Project.</td>
<td>CONTRACTORS PMC/MMRDA</td>
<td>C</td>
<td><strong>IMMEDIATE</strong> - 0 - 6 MONTHS</td>
</tr>
<tr>
<td>NOISE - NUISANCE</td>
<td>The noise levels are likely to increase during construction due to operation of machinery, banging of hammers, shouting by labourers, noise of vibrators, openings of form work, dropping of material from a height, etc. is likely to affect people in the surrounding areas as well as construction labourers/supervision engineering staff at Site.</td>
<td>No noise generating activities shall be carried out out during the night (10 p.m.- 6 a.m.). Any construction machinery generating excessive noise will be either enclosed, or other physical precautions such as provisions of noise barriers will be taken.</td>
<td>CONTRACTORS PMC/MMRDA</td>
<td>C</td>
<td><strong>MID-TERM</strong> - 6 MONTHS - 2 YEARS</td>
</tr>
</tbody>
</table>

**COSTS UNDER THESE HEADS ARE TO BE INCLUDED IN THE CONTRACT FOR CONSTRUCTION OF PERMANENT HOUSING.**

*IMMEDIATE - 0 - 6 MONTHS
**MID-TERM - 6 MONTHS - 2 YEARS
***LONG-TERM - 2 YEARS - 5 YEARS
CONTINUOUS
### ANNEXURE 5.1 MAJAS RESETTLEMENT SITE CEMP - PHASE I - DURING CONSTRUCTION

<table>
<thead>
<tr>
<th>Parameters for Environmental Assessment</th>
<th>Environmental Impacts Identified</th>
<th>Recommended Mitigatory Actions</th>
<th>Agency Responsible Implementation</th>
<th>Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3 VIBRATIONS</strong></td>
<td>However, there is already some background noise due to the flow of traffic along the Jogeshwari Vikhroli Link Road. In case, blasting activity is envisaged in the area it will cause an impact on the structures in the surrounding area. Also, vibrations due to driving of piles for foundation and operating piling equipment will have an impact on neighbouring structures.</td>
<td>Earmuffs/ear guards shall be provided in addition to hardhats for all construction workers on higher levels of noise while working in the vicinity of noise generating machine. All precautions to be taken during blasting and piling operations to prevent impact of vibration on structures in the surrounding areas.</td>
<td>CONTRACTORS **</td>
<td>C</td>
</tr>
<tr>
<td><strong>4 WATER QUALITY</strong></td>
<td>Waste water emanating from the site especially from sand washing, washing of equipment, labour camps, cooking, washing of utensils, dumping of uneaten food washing toilets, office establishment toilets, etc is likely to further deteriorate water quality in the adjoining natural water course.</td>
<td>Wherever necessary, the wastewater generated from sand washing plant will be pre-settled prior to disposal or possibly recycled after settling to conserve water where possible. Waste water generated from labour camps, offices, canteens etc. shall be properly treated by construction of temporary Septic Tanks prior to its disposal or discharge into the surrounding water bodies. Oil spillage will be prevented by providing splash trays below equipment, periodic inspection of equipment, and timely replacement of oil seals, controlled lubrication to prevent filling up of excess oil will be done. Oil shall be recovered by collection in large drums and sold to vendors for recycling rather than indiscriminately dumping it in the natural drain, which is a normal practice.</td>
<td>CONTRACTORS **</td>
<td>C</td>
</tr>
</tbody>
</table>

**Costs under these heads are to be included in the contract for construction of permanent housing.**

<p>| I IMMEDIATE | 0 - 6 MONTHS |
| MT MID-TERM | 6 MONTHS - 2 YEARS |
| LT LONG-TERM | 2 YEARS - 5 YEARS |
| C CONTINUOUS |</p>
<table>
<thead>
<tr>
<th>Parameters for Environmental Assessment</th>
<th>Environmental Impacts Identified</th>
<th>Recommended Mitigatory Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 SOIL CONTAMINATION</td>
<td>The soil in the existing plot is likely to get contaminated due to soil waste generation leachates, dumping of garbage, construction debris, construction chemicals, and mineral oil leaking/drained from construction machinery. Leachates from these waters are likely to pollute the soil as well as ground water source within the plot and in the vicinity.</td>
<td>Any type of soil contamination will be prevented by not allowing any leachates (either generated from garbage disposal, fertilizer, run off etc.) seeping into the soil. Efficiently manage garbage and solid waste generated from the development, its handling and disposal.</td>
</tr>
<tr>
<td>6 VEGETATION</td>
<td>Trees on the selected Resettlement Site may have to be felled.</td>
<td>In case some trees are to be felled, proper permission of Tree Authority will be obtained. Any other norms like transplantation suggested by Tree Authority will be adhered to. In case it is inevitable, proper rehabilitation measures will be taken. If some trees are cut, they will be transplanted if possible or compensatory plantation of three trees for every tree cut shall be carried out.</td>
</tr>
<tr>
<td>7 EXCESS EXCAVATION</td>
<td>Undulations arising out of excess excavated material and debris from the construction Site.</td>
<td>As far as possible, all cut and fill to be balanced at the Site. Excess earth to be filled in plinth. Excess earth to be disposed as per local laws.</td>
</tr>
<tr>
<td>8 HEALTH AND SAFETY OF CONSTRUCTION WORKERS</td>
<td>Environmental health of labourers. Accidents during working.</td>
<td>Construction of labour camps with proper facilities for water supply, sanitation, drainage and solid waste disposal according to contract conditions. After construction, safety practices like ear-plugs wearing helmets, safety lines, goggles, safety first-aid shoes, sign posts, barricading excavations, kits, electrical safety norms, etc. should be adopted at the Site.</td>
</tr>
</tbody>
</table>

* Costs under these heads are to be included in the contract for construction of permanent housing.

** TIME-FRAME

<table>
<thead>
<tr>
<th>IMEDIATE - 0 - 6 MONTHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT MID-TERM - 6 MONTHS - 2 YEARS</td>
</tr>
<tr>
<td>LT LONG-TERM - 2 YEARS - 5 YEARS</td>
</tr>
<tr>
<td>C CONTINUOUS</td>
</tr>
</tbody>
</table>
ANNEXURE 5.1

MAJAS RE SETTLEMENT SITE CEMP
PHASE – II
POST IMPLEMENTATION
### Parameters for Environmental Assessment

<table>
<thead>
<tr>
<th>URBAN INFRASTRUCTURAL SERVICES</th>
<th>ENVIRONMENTAL IMPACTS IDENTIFIED</th>
<th>RECOMMENDED MITIGATORY ACTIONS</th>
<th>AGENCY RESPONSIBLE</th>
<th>TIME FRAME</th>
<th>CEMP COSTS IN RUPEES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WATER SUPPLY &amp; QUALITY</strong></td>
<td>Inadequate water pressure and poor water quality.</td>
<td>Check quality of water regularly. Liase with Ward Office-W/S Department to set right defects.</td>
<td>EMC/EMC/WARD OFFICE</td>
<td>C</td>
<td>50,000.00</td>
</tr>
<tr>
<td><strong>SEWERAGE / AND SEWAGE DISPOSAL</strong></td>
<td>Chokeage of sewage lines and overflowing sewage chambers.</td>
<td>Prevent dumping of solid wastes in sewage chambers. Awareness and education programme to be implemented. Prevent chokage. Repairs to downtake system in the buildings. Clear chokages in sewer line.</td>
<td>NGO/EMC/EMC/LOCAL WARD OFFICE</td>
<td>C</td>
<td>50,000.00 (lumpsum)</td>
</tr>
<tr>
<td><strong>STORM WATER DISPOSAL</strong></td>
<td>Chokeage of Storm Water Drain due to indiscriminate garbage dumping in it. Mosquito breeding due to stagnant waters.</td>
<td>Clear Storm Water Drains. Spray chemicals for preventing mosquito breeding. Prevent dumping of garbage. Provide garbage collection system in all buildings. Regular connection of garbage for disposal. Awareness and education programme.</td>
<td>EMC/EMC/LOCAL WARD OFFICE</td>
<td>C</td>
<td>100,000.00 (1000 RMTO per spray)</td>
</tr>
<tr>
<td><strong>SOLID WASTES DISPOSAL</strong></td>
<td>Garbage collection and disposal mismanaged.</td>
<td></td>
<td></td>
<td>C</td>
<td>25000 (5 times a year @Rs. 5000/- per spray)</td>
</tr>
</tbody>
</table>

**IMMEDIATE** - 0 - 6 MONTHS  
**MT MId-TERM** - 6 MONTHS - 2 YEARS  
**LT LONG-TERM** - 2 YEARS - 5 YEARS  
**C CONTINUOUS**
**ANNEXURE 5.1 CEMP - POST IMPLEMENTATION AT MAJAS RESETTLEMENT SITE - PHASE II**

(Based on experience of similar projects)

<table>
<thead>
<tr>
<th><strong>PARAMETERS FOR ENVIRONMENTAL ASSESSMENT</strong></th>
<th><strong>ENVIRONMENTAL IMPACTS IDENTIFIED</strong></th>
<th><strong>RECOMMENDED MITIGATORY ACTIONS</strong></th>
<th><strong>AGENCY RESPONSIBLE</strong></th>
<th><strong>TIME FRAME</strong></th>
<th><strong>CEMP COSTS IN RUPEES</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>5 LIFT</td>
<td>Lifts not commissioned or malfunction due to poor operation and maintenance / misused as refuse chute.</td>
<td>Lift to be commissioned. Awareness and education programme to use lift. Reduce operation costs.</td>
<td>MHADA/EMC/NGO/MMRDA</td>
<td>C</td>
<td>—</td>
</tr>
<tr>
<td>6 COMPOUND WALL</td>
<td>Absence of Compound Wall leading to unrestricted access and misuse of open areas.</td>
<td>Complete Compound Wall. Increase security of the Complex.</td>
<td>MHADA/NGO/EMC/MMRDA</td>
<td>C</td>
<td>—</td>
</tr>
<tr>
<td>7 ELECTRICITY</td>
<td>Misuse of common electricity.</td>
<td>Electrical connections to be streamlined with the help from Power Supply Company. Pay pending bills.</td>
<td>BSES/NGO/SOCIETY/EMC</td>
<td>C</td>
<td>—</td>
</tr>
<tr>
<td>8 WORKMANSHIP</td>
<td>Poor workmanship resulting in cracks and leakages and dampness.</td>
<td>Carry out repairs to rectify cracks.</td>
<td>NGO/SOCIETY/EMC/MMRDA</td>
<td>C</td>
<td>—</td>
</tr>
</tbody>
</table>

**TOTAL COST IN CEMP PHASE - II** 2,75,000- 

**1)** The issues identified are based on our experience elsewhere.

**2)** MMRDA will ensure that these issues are adequately addressed before handing over possession to the PAH's. The costs are not indicated as these costs are deemed to be a part of proper construction and handing over of the Permanent Housing.

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*IMMEDIATE - 0 - 6 MONTHS
MID-TERM - 6 MONTHS - 2 YEARS
LONG-TERM - 2 YEARS - 5 YEARS
CONTINUOUS*
ANNEXURE 5.2 A

DO’S AND DON’TS TO BE CIRCULATED AMONGST EMC
ANNEXURE 5.2 A - DO'S / DON'TS TO BE CIRCULATED AMONGST EMC

(Based on our experience of similar projects for Resettlement Sites)

I. Water Supply Systems:
   1. Get both underground and overhead tanks cleaned and inspected every year.
   2. Suction Pump shall be protected and lubricated regularly. Any defects noted during operation shall be promptly reported.
   3. Any signs of leakage observed in the pipes shall be promptly attended to.
   4. Overhead Tanks cover will be locked and overflow prevented. Periodic cleaning shall be undertaken to prevent development of unhygienic/unhealthy conditions.

II. Sanitation:
   1. Sewer chamber cover is to be protected and unauthorized opening and removal shall be prevented.
   2. Sewer lines shall be maintained with the help of the local ward office of Municipal Corporation.
   3. Vent pipes must be maintained clean and protected from birds, which make nests in the cowl.

III. Solid Waste:
   1. Garbage shall be collected in each household and transferred to the bins provided below each building.
   2. The EMC will arrange to collect garbage from every building and dispose it to a pre-identified Municipal garbage collection pick point.
   3. Uncollected garbage shall promptly be reported to the concerned authority.
   4. Shop owners and hotels will not be allowed to dump their garbage in the domestic garbage collection point.
IV. **Storm Water Drain:**
1. It is important to ensure that the sweeper sweeping the pathway does not sweep leaves/debris in the Storm Water Drain.
2. The Storm Water Drain shall be checked and cleaned prior to monsoon to prevent flooding.
3. There should not be any water/sewage flowing in the Storm Water Drain in dry season. If some person has made an illegal connection it should be promptly reported and diverted to the sewers.
4. Rainwater downtakes at the terrace levels shall be checked and cleaned prior to the monsoon to prevent accumulation of rainwater in the terrace.

V. **Street Lights:**
1. The Street Lighting shall be protected from unauthorized tampering/tapping by the residents and outsiders.
2. Fused bulbs shall be promptly replaced by reporting to the maintenance staff.
3. Street Lights shall be switched off at sunrise to prevent wastage of power.

VI. **Green Areas, Garden And Trees:**
1. Leaves shall be removed from the area.
2. Plucking of leaves/flowers shall be controlled and discouraged.
3. The garden shall be protected from outside encroachers and anti-social elements.
ANNEXURE 5.2 B

DO’S AND DON’TS TO BE CIRCULATED AMONGST INHABITANTS
ANNEXURE 5.2 B DO'S / DON'TS TO BE CIRCULATED AMONGST INHABITANTS

(Based on our experience of similar projects for Resettlement Sites)

I. Water Supply Systems:
   1. Keep area surrounding your water tank clean.
   2. Keep water tank covers locked and do not allow people to dip or take water from the underground water tank.

II. Sanitation:
   1. Toilets are to be used and maintained properly.
   2. No other wastes shall be disposed in the toilet.
   3. Garbage and debris shall not be allowed to enter the sewage chamber.
   4. Water seal in the W.C. shall be maintained.
   5. Cloth rags, broken glass, brooms etc. shall not be put into the toilets.
   6. In case of chokage a licensed plumber or Municipal Authority shall be intimated to attend to the problems.

III. Solid Waste:
   1. Garbage shall not be thrown in open spaces, below the staircase or out of the kitchen window.
   2. If possible, Residents will segregate organic/inorganic the garbage prior to its disposal.
   3. Animals shall not be allowed to enter the garbage bins in the building.
   4. Garbage shall not be dumped into the Storm Water Drain or Sewers.

IV. Green Areas, Garden And Trees:
   1. Garden must be kept clean and no litter shall be thrown in the area.
   2. Garden shall be protected from stray cattle or animals.
   3. Cutting of trees shall be strongly resented and immediately reported to the concerned authorities.
ANNEXURE 5.3

A TRANSLATION OF ‘SYNOPSIS’ OF ANNEXURE 5.2 A AND 5.2 B IN LOCAL LANGUAGE
पाणी पुरवठा

1) भाष्यातील सारदेण टाकी समंजसाचा परिसर स्वच्छ ठेवा.
2) वर्षातून एकदा जमीनवरील व गधीवरील टाक्या साफ करावय व त्यांची पहाणी करावी.
3) पाणीच्या टाकीची झाकणे कळून लावून बंद ठेवावी व जमीनवरील टाकीतून कोणालाच पाणी काडून ठेवू नये.
4) पाणी दर चढवण्याचा पंप सुरक्षित जाणाने ठेवा. तसेच त्याला कायम वंगण करावे व काहीदोप आढळून तावळसाठी आवश्यक दुरक्षी करण्यात यावी.
5) पाण्याच्या नप्पोळधाने गडंवी आढळून त्यांची दुरक्षी तावळसाठी करावी.
6) गधीवरील टाक्याची झाकणे बंद ठेवणे आवश्यक आहे. तसेच ठारविक काळावधीनंतर त्या साफ कराव्या (वर्षातून दोन वेळा)

मल्लिन्सारण

1) संदास स्वच्छ ठेवणे.
2) संदासाच्या अन्य कच्चा ठाकू नये.
3) मल्लिन्सारण वेंचर्ची झाकणे नीट ठेवावी व ती उघडी ठेवू नये.
4) मल्लिन्सारण वाहीनी डागडूजी आवश्यक भासल्यास महानगरपालिकेच्या नियमाने करून ध्यानी.
5) कॅचरा, वाजिट, माती बंगरे गोपेंदी मल्लिन्सारण वाहीनी भरणार नाही याची काढी ध्यानी.
6) वायुवाजनसाठी ठेवलेल्या पाईंची नीट काढजी ध्यानी व पक्षी त्यांवर घरलो करणार नाहीत हे पहावे.
7) संदासाच्या अन्यत्र, कागद जाणार नाहीत असे पहावे.
8) पाणी पुरवठास कुप्पर किंवा महानगरपालिकेच्या संरक्षित खायासाठी दुरक्षीसाठी तोळवावे.

वनकचरा

प्रथेच संसाहीन घनकचरा एकूण करून तो उत्तरतीतील कचराकुळीत टाकावा.
घनकचरा इम्याती सोभावताच्या जागत अथवा चिकित्सकाच्या यादाची भिंती जोळ्याच वागत नाही.
प्रथेच इम्यातील कचरा एकूण करून तो महानगरपालिकेच्या मिळाल्या केलंदे. जाणी नेण्याची व्यवहार व्यवस्थापन समतले कर्यावी.
प्रथेच रुढीवाचाच्या कचरा विभागी करून म्हणजे घनकचरा काढेचे किंवा तत्सम अन्य सामान, ओले पदार्थ, अन्य अत्यंत वेगवेगळ्या करून टाकावा जेणेकरून त्यांची विलिवाव लावणे सोप्पे होईल.
1) प्रत्येक इमारतीतल कचराकुंडी तरसेच उंदी यापासून युर्वशित ठेवणे.
2) कचरा पावसाळी पाण्याच्या गटारात किंवा नलनिस्सारण वाहिनीमध्ये जाणार नाही याची काढली घ्यावी.
3) घनकचरा जर महापातलकेकडून उचलला गेला नसेल तर त्यासंस्कृत खात्यास सुचित करावे.
4) ठुकारांवर होळेल याचा कचरा वेळामध्ये एकत्रित करावा व त्याची वित्तेवाट लावावी

पावसाळी पाण्याची गटारे
रसते सफार्ट कामगारांची पावसाळी पाण्याच्या उपचार गटारामध्ये, राविव, आडांध्या पाळापाळी जाणार नाही याची काढली घ्यावी.
पावसाळी प्रमुखांची महत्त्वाची सखें पावसाळी गटारांची सफार्ट करण्यात येणे.
पावसाळी पाण्याच्या गटारामध्ये मलनिस्सारण वाहिनीतील याणपाणी जोडले जात नाही असे पहावे.
इमारतीच्या गंधवर्जन खाली येणारे पावसाळी पाण्याचे पाईप हे तपासून, ताफ आहेत ना हे पावसाळी प्रमुखांचे बघणे आवश्यक आहे.

स्तंभील दिवे
स्तंभील दिवे याद्यांच्या मृत्यूने अनिवृत्तपणे कुठे जोडणी केली जात नाही हे लक्ष देऊन पहावे.
जे दिवे निकाली झाले आहेत ते ठरत बदलण्यात येवे.
रूढीदय होताच दिवे मालवण्यात येवे.

गाडे व वागपणीचा
वाग स्वच्छ राहील व त्यामध्ये कचरा, कागदाचे कपडे, फलांची साले आदि टाकला जाणार नाहीत अशी काढली घ्यावी.
आडांवरुन पल्ल्याची पाने काहून टाकावी.
स्तंभील फिरण्याच्या भटक्या जनावरांपासून सरक्षण करावे
आडांवरुन पाने अथवा खुले खुंडण्यास मनाई करावी किंवा विशिष्ट भागापुरातीच म्हावानित करावी.
झाडे कापली जाणार नाहीत व कापणाच्या विरूद्ध त्यात कडक कारवाई केला जाउल अशी व्यवस्था करावी.
असामाजिक तत्त्वांपासून वागेचे सरक्षण करावे तसेच कुठेही अतिक्रमण होणार ।::: हयाची काढली घ्यावी.
ANNEXURE 5.4

MONITORING INDICATORS AT MAJAS RE SETTLEMENT SITE PHASE – I DURING CONSTRUCTION
<table>
<thead>
<tr>
<th>Parameters for Environmental Assessment</th>
<th>Recommended Mitigatory Actions</th>
<th>Agency Responsible for Implementation</th>
<th>Compliance to Required Stds/Good Housekeeping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment: Issues Likely to Have Impact During Construction of Permanent Housing (Based on Experience at Other Sites) on the Residents at Majas Resettlement Site</td>
<td><strong>Air Quality</strong>&lt;br&gt;Use Ready Mix Concrete/Pre-fab members for concrete structures to the extent possible. All trucks/dumpers carrying construction materials that are likely to generate dust will be covered during transportation. All construction roads will be watered to keep dust under control. Trucks/dumpers with a valid PUC will be used for the project.</td>
<td>Contractors PMC/MMRDA</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td><strong>Noise - Nuisance</strong>&lt;br&gt;No noise generating activities shall be carried out during the night (10p.m.-6a.m.). Any construction machinery generating excessive noise will be either enclosed, or other physical precautions such as provisions of noise barriers will be taken. Earmuffs/ear guards shall be provided in addition to hardhats for all construction workers on higher levels of noise while working in the vicinity of noise generating machine.</td>
<td>Contractors PMC/MMRDA</td>
<td></td>
</tr>
</tbody>
</table>
**ANNEXURE 5.4 MAJAS RESETTLEMENT SITE MONITORING INDICATORS - PHASE I - DURING CONSTRUCTION**

<table>
<thead>
<tr>
<th>PARAMETERS FOR ENVIRONMENTAL ASSESSMENT</th>
<th>RECOMMENDED MITIGATORY ACTIONS</th>
<th>AGENCY RESPONSIBLE FOR IMPLEMENTATION</th>
<th>ACTION TAKEN</th>
<th>COMPLIANCE TO REQUIRED STDS/GOOD HOUSEKEEPING</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 VIBRATIONS</td>
<td>All precautions to be taken during blasting and piling operations to prevent impact of vibration on structures in the surrounding areas.</td>
<td>CONTRACTORS</td>
<td>PMC / MMRDA</td>
<td></td>
</tr>
<tr>
<td>4 WATER QUALITY</td>
<td>Whenever necessary, the wastewater generated from sand washing plant will be pre-settled prior to disposal or possibly recycled after settling to conserve water where possible. Waste water generated from labour camps, offices, canteens, etc. shall be properly treated by construction of temporary Septic Tanks prior to its disposal or discharge into the surrounding water bodies. Oil spillage will be prevented by providing splash trays below equipment, periodic inspection of equipment, and timely replacement of oil seals, controlled lubrication to prevent filling up of excess oil will be done. Oil shall be recovered by collection in large drums and sold to vendors for recycling rather than indiscriminately dumping it in the natural drain, which is a normal practice.</td>
<td>CONTRACTORS</td>
<td>PMC / MMRDA</td>
<td></td>
</tr>
<tr>
<td>PARAMETERS FOR ENVIRONMENTAL ASSESSMENT</td>
<td>RECOMMENDED MITIGATORY ACTIONS</td>
<td>AGENCY RESPONSIBLE FOR IMPLEMENTATION</td>
<td>ACTION TAKEN</td>
<td>COMPLIANCE TO REQUIRED STDS/ENVIRONMENTAL ASSESSMENT</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>---------------------------------</td>
<td>--------------------------------------</td>
<td>--------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>5 SOIL CONTAMINATION</td>
<td>Any type of soil contamination will be prevented by not allowing any leachates (either generated from garbage disposal, fertilizer, run off etc.) seeping into the soil. Efficiently manage garbage and solid waste generated from the development, its handling and disposal.</td>
<td>MCBM PMC/ MMRDA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 VEGETATION</td>
<td>In case some trees are to be felled, proper permission of Tree Authority will be obtained. Any other norms like transplantation suggested by Tree Authority will be adhered to. In case it is inevitable, proper rehabilitation measures will be taken. If some trees are cut, they will be transplanted if possible or compensatory plantation of three trees for every tree cut shall be carried out.</td>
<td>MCBM PMC/ MMRDA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 EXCESS EXCAVATION</td>
<td>As far as possible, all cut and fill to be balanced at the Site. Excess earth to be filled in plinth. Excess earth to be disposed as per local laws.</td>
<td>CONTRACTORS PMC/MMRDA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 HEALTH AND SAFETY OF CONSTRUCTION WORKERS</td>
<td>Construction of labour camps with proper facilities for water supply, sanitation, drainage and solid waste disposal according to contract conditions. After construction, safety practices like ear-plugs wearing helmets, safety lines, goggles, safety shoes, sign posts, barricading excavations, first-aid kits, electrical safety norms etc. should be adopted at the Site.</td>
<td>CONTRACTORS PMC/MMRDA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ANNEXURE 5.4

MONITORING INDICATORS AT MAJAS RE SETTLEMENT SITE PHASE – II POST-IMPLEMENTATION
## ANNEXURE 5.4 MONITORING INDICATORS AT MAJAS RESETTLEMENT SITE - PHASE II - POST IMPLEMENTATION
(BASED ON EXPERIENCE OF SIMILAR PROJECTS)

<table>
<thead>
<tr>
<th>PARAMETERS FOR ENVIRONMENTAL ASSESSMENT</th>
<th>RECOMMENDED MITIGATORY ACTIONS</th>
<th>AGENCY RESPONSIBLE FOR IMPLEMENTATION</th>
<th>INFORMATION ON ACTION TAKEN</th>
<th>COMPLIANCE TO REQUIRED STDS/GOOD HOUSEKEEPING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 WATER SUPPLY AND QUALITY</td>
<td>Check quality of water regularly.</td>
<td>EMC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Liase with Ward Office-W/S Department to set right defects.</td>
<td>EMC/WARD OFFICE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 SEWERAGE / AND SEWAGE DISPOSAL</td>
<td>Prevent dumping of solid wastes in sewage chambers.</td>
<td>NGO/EMC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Awareness and education programme to be implemented.</td>
<td>NGO/EMC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prevent chokage.</td>
<td>NGO/EMC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Repairs to downtake system in the buildings.</td>
<td>NGO/EMC/MMRDA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clear chokages in sewer line.</td>
<td>EMC/WARD OFFICE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 STORM WATER DISPOSAL</td>
<td>Clear Storm Water Drains.</td>
<td>]</td>
<td>]</td>
<td>]</td>
</tr>
<tr>
<td></td>
<td>Spray chemicals for preventing mosquito breeding.</td>
<td>]</td>
<td>]</td>
<td>]</td>
</tr>
<tr>
<td></td>
<td>Prevent dumping of garbage.</td>
<td>]</td>
<td>]</td>
<td>]</td>
</tr>
<tr>
<td>4 SOLID WASTES DISPOSAL</td>
<td>Provide garbage collection system in all buildings.</td>
<td>]</td>
<td>]</td>
<td>]</td>
</tr>
<tr>
<td></td>
<td>Regular collection of garbage for disposal.</td>
<td>]</td>
<td>]</td>
<td>]</td>
</tr>
<tr>
<td></td>
<td>Awareness and education programme</td>
<td>]</td>
<td>]</td>
<td>]</td>
</tr>
</tbody>
</table>
(TO BE SUBMITTED EVERY MONTH TO MMRDA)

ANNEXURE 5.4 MONITORING INDICATORS AT MAJAS RESETTLEMENT SITE - PHASE II - POST IMPLEMENTATION
(BASED ON EXPERIENCE OF SIMILAR PROJECTS)

<table>
<thead>
<tr>
<th>PARAMETERS FOR ENVIRONMENTAL ASSESSMENT</th>
<th>RECOMMENDED MITIGATORY ACTIONS</th>
<th>AGENCY RESPONSIBLE FOR IMPLEMENTATION</th>
<th>INFORMATION ON ACTION TAKEN</th>
<th>COMPLIANCE TO REQUIRED STDS/GOOD HOUSEKEEPING</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 LIFT</td>
<td>Lift to be commissioned</td>
<td>MHADA/EMC/NGO/MMRDA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Awareness and education programme to use lift.</td>
<td>EMC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduce operation costs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 COMPOUND WALL</td>
<td>Complete Compound Wall.</td>
<td>MHADA/NGO/EMC/MMRDA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increase security of the Complex.</td>
<td>EMC/Society</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 ELECTRICITY</td>
<td>Electrical connections to be streamlined with the help from Power Supply Company.</td>
<td>BSES/NGO/SOCIETY/EMC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pay pending bills.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 WORKMANSHP</td>
<td>Carryout repairs to rectify cracks.</td>
<td>NGO/SOCIETY/EMC/MMRDA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ANNEXURE 5.5

MAINTENANCE SCHEDULE – A SAMPLE
## ANNEXURE 5.5
### MAINTENANCE SCHEDULE - A SAMPLE

<table>
<thead>
<tr>
<th>SR. NO</th>
<th>SERVICE</th>
<th>ACTION</th>
<th>AGENCY TO BE RESPONSIBLE FOR THE TASK</th>
<th>FREQUENCY</th>
<th>SUGGESTED ANNUAL COST Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WATER SUPPLY</td>
<td>i) Check quality of water</td>
<td>Samples to be analysed at external laboratory.</td>
<td>Once a year</td>
<td>5,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ii) Adequacy of pressure and supply hours.</td>
<td>EMC member/ MCBM ward office.</td>
<td>As and When necessary</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>iii) Check for any indication of leakages.</td>
<td>EMC Local Plumber.</td>
<td>Once a year</td>
<td>5,000.00</td>
</tr>
<tr>
<td>2</td>
<td>SEWAGE AND SEPTIC TANK</td>
<td>i) Ensure that sewage flows smoothly from all branches.</td>
<td>EMC member with help of local plumber.</td>
<td>Once a year</td>
<td>2,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ii) Ensure all chambers are properly covered and no debris is pushed in the chambers.</td>
<td>EMC members with help of local plumber.</td>
<td>Once a year</td>
<td>5,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>iii) Keep vent shafts clear from birds nests specially cowls which get choked with leaves and twigs collected by small birds.</td>
<td>EMC members with help of local plumber.</td>
<td>Once a year</td>
<td>1,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>iii) Septic Tanks shall be cleaned once in a year with the help of Municipal Bouzer meant for cleaning Septic Tanks.</td>
<td>EMC/ local ward office to clean Septic Tank.</td>
<td>Once a year</td>
<td>10,000.00</td>
</tr>
<tr>
<td>SR. NO.</td>
<td>SERVICE</td>
<td>ACTION</td>
<td>AGENCY TO BE RESPONSIBLE FOR THE TASK</td>
<td>FREQUENCY</td>
<td>SUGGESTED ANNUAL COST Rs.</td>
</tr>
<tr>
<td>---------</td>
<td>---------</td>
<td>--------</td>
<td>--------------------------------------</td>
<td>-----------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>3</td>
<td>STORM WATER DRAINS</td>
<td>i) Ensure that the sweeper does not sweep leaves, debris, etc. into the storm water drain.</td>
<td>Society/EMC Members</td>
<td>Monthly</td>
<td>1,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ii) A pre-monsoon check of all storm water drains shall be performed to ensure that there is no blockage in the drains.</td>
<td>EMC members</td>
<td>Yearly prior to rains and weekly during monsoon.</td>
<td>5,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>iii) All storm water down takes from terraces of buildings shall be checked to prevent accumulation of rain water in terraces.</td>
<td>Society/EMC member/secretary of each building.</td>
<td>Yearly prior to rains.</td>
<td>2,000.00</td>
</tr>
<tr>
<td>4</td>
<td>GARDEN AND TREES</td>
<td>i) Periodic watering of garden.</td>
<td>Gardener under supervision of EMC member.</td>
<td>Weekly</td>
<td>15,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ii) Raking of leaves.</td>
<td>Gardener under supervision of EMC member.</td>
<td>Weekly with extra precaution in monsoon.</td>
<td>5,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>iii) De-weeding of garden.</td>
<td>Gardener under supervision of EMC member.</td>
<td>Weekly with extra precaution in monsoon.</td>
<td>5,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>iv) Plantations of new saplings in pre-monsoon period.</td>
<td>Gardener under supervision of EMC member.</td>
<td>Weekly with extra precaution in monsoon.</td>
<td>10,000.00</td>
</tr>
<tr>
<td>5</td>
<td>PATHWAYS</td>
<td>i) Pathways to be swept clean daily.</td>
<td>EMC members/local sweeper.</td>
<td>To be checked periodically</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ii) Educate people to guard their pathways from encroachments and unauthorised disposal of garbage/debris in surrounding area.</td>
<td>Apex Body/GMC/ Consultants</td>
<td></td>
<td>15,000.00</td>
</tr>
<tr>
<td>SR. NO.</td>
<td>SERVICE</td>
<td>ACTION</td>
<td>AGENCY TO BE RESPONSIBLE FOR THE TASK</td>
<td>FREQUENCY</td>
<td>SUGGESTED ANNUAL COST Rs.</td>
</tr>
<tr>
<td>--------</td>
<td>---------</td>
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<td>-------------------------------------</td>
<td>-----------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>6</td>
<td>STREET LIGHTING</td>
<td>i) To be protected from authorized tampering by residents and outsiders.</td>
<td>EMC Member / Electricity Supply Co.</td>
<td>General alert</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ii) Fused bulbs to be replaced.</td>
<td>EMC Maintenance staff</td>
<td>As necessary</td>
<td>10,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>iii) Switch off street lights at sunrise to prevent wastage of power.</td>
<td>EMC Operating staff</td>
<td>Daily</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>SOLID WASTE AND GARBAGE</td>
<td>i) Segregation of waste by residents for disposal into garbage bins.</td>
<td>Training by EMC members/Consultants</td>
<td>Quarterly Programme</td>
<td>10,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ii) Check area around garbage bin is kept clean.</td>
<td>EMC Members</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>iii) Discourage direct throwing of garbage from houses.</td>
<td>EMC Members</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>iv) Encourage responsible behavior by awarding prizes to best kept surroundings.</td>
<td>Apex Body</td>
<td>Annually</td>
<td>5,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>v) Ensure transfer of garbage from individual bins to common disposal point by trained staff.</td>
<td>Society Secretary/EMC members to supervise the hired staff.</td>
<td>Regular checks preferably everyday</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>vi) Follow up with MCBM authorities for clearance of garbage from collection point.</td>
<td>Apex Body/EMC</td>
<td>5,000.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>vii) Keep dogs/cattle and scavengers from spreading the garbage and creating ugly sights.</td>
<td>All society members. EMC Members</td>
<td>Red alert</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>TELEPHONES</td>
<td>Repairs of faulty telephones/ lines will be managed by individual subscribers directly complaining to the supply company.</td>
<td>Subscriber MTNL</td>
<td>As and when necessary</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL** 116,000.00
ANNEXURE 5.6

CRITICAL PROBLEMS IN RESETTLEMENT SITES – A GENERAL NOTE
Critical problems along with its mitigatory actions relevant to new Resettlement Sites expected due to shifting of project-affected persons, cramped settlements to new developed buildings are as follows:

1. Non collection of refuse and garbage.
2. Garbage not disposed.
3. Leaking drain pipes.
4. Choked underground sewer lines.
5. Overflowing inspection chambers and gully traps.
6. Open spaces around building are not maintained properly.
7. No proper storm water drain collection and drainage system/blocked Storm Water Drains.
8. Bad condition of roads and streetlights due to proper maintenance.
9. Nuisance from shop owners or commercial establishments.
10. Plot maintenance of common amenities, garden, Balwadi, Welfare Centre, etc.
11. Removal of sludge from Septic Tank at specified intervals is not done.

PROPOSED MITIGATORY ACTIONS

Non-Collection And Disposal Of Garbage:

At present, these problems are prevalent in the hutments due to very high density of huts, inadequate passages, lack of cleanliness, indiscriminate dumping of garbage all over the area, specifically in the Storm Water Drains and low lying areas. This leads to putrefying of solids, fly nuisance and spread of diseases in the vicinity. It also causes sewer odour nuisance.
Proper garbage storage shall be planned for each building. Individual bins for each building must be provided. The residents shall be trained and coaxed into not throwing waste, refuse, etc. from the windows, instead use the bins provided for each building. The area surrounding the bins shall be properly tiled and will be provided with proper drainage to prevent stagnation of water and development of unsightly conditions. Residents will be taught about the importance of clean surroundings and its indirect benefits of their health by welfare workers / NGO.

A community-based organisation viz. the E.M.C. would be formed to handle cases of default and enforce compliance among the residents. A nominal contribution from each member shall be collected for handling the garbage.

**Leaking Drain Pipes:**

Normally drain pipes leak because of various reasons:

1. Poor workmanship.
2. Chokage caused by rags, lemon peels, vegetable matter, animal bones and sanitary napkins inadvertently flushed in the line.
3. Attempts by inadequately trained people by piercing the pipe with iron rods to cause water to flow, these leaks flow on the surface of the building causing unsightly conditions and affect the buildings badly.

All attempts shall be made to educate the occupants in hygiene and Do’s and Don’ts about use of personal toilets within their tenements. Adequately sized down takes and proper workmanship can reduce the problem of chokage substantially.

Similarly choked underground sewer lines is a problem caused due to inadequate sizing of sewers, insufficient slopes and indiscriminate dumping of garbage / debris into open chambers whose covers get stolen because of high scrap value of cast iron covers. Fibre reinforced concrete covers for manholes
will be provided. These covers are not likely to be removed since they have no scrap value. Hence, this will stop indiscriminate dumping of garbage in the drains.

Similarly the problem of overflowing inspection chamber and gully traps is also caused by missing chamber covers and can be resolved as above.

Improper formation levels and inadequate Storm Water Drains cause stagnation of water, other nuisance being dumping of solid waste into the storm water drain causes chokage and backing of water.

Proper design of formation levels, adequate velocities and capacity of Storm Water Drains and formation of Apex Body to manage the Complex and periodically clean the Storm Water Drain will mitigate problems relating to improper drainage and flooding in the region.

Municipal gangs equipped with a Septic Tank bouzer are available on payment. Proper road access shall be provided near each Septic Tank to permit proper cleaning each year.

Similarly road, street light, open space, R.G. Balwadi Welfare Center shall be managed properly by Apex Body formed by the members of community developers to maintain the society at a payment of charge by the members. The source of these charges could be a sinking fund created at the time of setting up of the society. However, stiff action should be taken for defaulters in terms of disposal of garbage on road, urination, spitting corners, etc. These can be inculcated in the population by showing them the benefits of clean and aesthetic surroundings, and fresh air available to the residents with the help from EMC, CBO & NGO etc.

Detailed addressing of various environmental parameters, problems and mitigatory measures and identification of agencies responsible for it is addressed in the CEMP.
ANNEXURE 5.7

SUGGESTED DESIGN PARAMETERS FOR URBAN INFRASTRUCTURE SERVICES (BASED ON PROVISION OF DC RULES)
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(BASED ON PROVISIONS OF DC RULES)

Site Development and Horticulture:

The site is undulating as is evident from the Contour Plan as well as from the physical inspection. A 12-mtr. wide road will connect it to Service Road Jogeshwari Vikhroli Link road at a level of 66.50 m at North-East portion of the plot and at a level of 61 mts. the road connects to Poonam Nagar road at Southwest portion of the plot. Hence, both these levels become mandatory. The site will be developed such that the formation is 150 mm above the adjacent road level to facilitate draining of storm water. The plinth level of buildings shall be 450 mm above the formation level.

The road has a drop in level of 42.5 m in 145 m length, which is a slope of 1:58. This is acceptable normally. Roads with gradient greater than 1:25 are considered steep. The road shall be lined with trees on both sides.

The RG's shall be developed with plantation of suitable trees, bushes and lawns. The sites shall be cut at higher parts and material removed shall be filled within the plot such that the plot is properly terraced with the gradient dropping from 66.50 m to 64 m in level with respect to Town Hall Datum.

Pathways:

Pathways shall be 3 m wide and paved at a camber on one side leading from the 12 m wide road on to the entrance of individual buildings. The pathways shall be either paved or finished in Bitumen black top surface. The pathways shall have storm water drain only on one side. The space between the pathways and the buildings shall also be greened wherever possible to have a good visual effect.
Roads:

Roads shall be constructed in accordance to the standard practice of MCGM road department. The sub-grade shall be consolidated to a California Bearing ratio of 4.0 followed by two Kachha Trap Metal Course Layer each of 90 mm thickness topped by 2 regular water bound Macadam layer each of 85 mm thickness.

This will be covered with Dense-grade 65 mm Asphalt Macadam Carpet covered by 10 mm Bitumen Seal Coat. The road shall have camber on both sides leading rainwater to the storm-water drain. The slope of the Camber shall be 1:36.

Storm-Water Drains:

The storm-water drain shall be designed to handle a peak rain intensity of 50 mm/hr, which is the norm followed by MCGM since this is a high-intensity residential area.

Co-efficient of runoff shall be 75%.

The quantity of storm water shall be worked out using the Rational Method recommended in Manual of Sewerage using run off rainfall intensity relationship. The 12 m wide road shall have draining on both sides whereas the pathways shall have drain only on one side, with camber leading storm water to that drain.

The drain shall have a longitudinal gradient enough to facilitate the flow and permit a non-silting velocity of 0.6 m/sec. Wherever the natural gradient is steep and the velocity exceeds 1.2 m/sec, drop arrangement would be provided in the storm water drain to prevent scouring of the drain surface.
The storm water drain shall be constructed in brick masonry with PCC coping at the top and smooth cement plaster on the sides and haunching on the bottom PCC which will be of M 100 grade minimum.

All good construction practices/specifications shall be followed to provide drains of good quality. The storm water drain shall be checked and cleaned of any debris thrown in prior to each monsoon, to prevent choking of drain and flooding of the plot.

Water Supply:

The water supply source shall be MCGM water main on the Poonam Nagar road. The quantity of water recommended by DC regulations is 180 liters per capita per day (lpcd). The quantity of water recommended for site development plots allotted for rehousing of slums is 90 litres per capacity per day. The environmental hygiene committee suggested certain optimum rates for community based population groups. In the code of basic requirement of water supply drainage & sanitation (IS 1172-1983) as well as National Building code a minimum of 135 liters per capacity per day is recommended for all residents provided with full flushing system for excreta disposal.

This 135 lpcd would also conform to a septic tank capacity of 142 liters per person for slum development as recommended by DC rules.

Hence it is proposed to provide 135 liters of water per capita per day. 50% of the daily water requirement will be the capacity of under ground services reservoirs.

It is proposed to split the complex into 5 units for water supply distribution. About 7 wings constitute one unit for which an underground service reservoir is provided.
Each underground service reservoir will be provided with a centrifugal pump to transfer water to individual overhead tanks of each wing within the unit.

Individual overhead storage tank equivalent to one day storage shall be provided on top of each wing. Individual underground service reservoir shall be provided near each group of 7 wings where the space is available.

The water shall be distributed to individual tenements by galvanized iron downtakes from overhead service reservoir above each wing. It is assumed that each residential tenement will, on an average, have five residents and each commercial establishment will have two persons for the purpose of computation of water supply & sewerage requirements.

**Sewerage:**

The sewage generated from toilets and kitchen sink shall be brought to the ground by vertical cast iron down takes. The kitchen lines/bath lines shall be connected to gully traps and soil lines shall be connected directly to the chamber. The chamber shall be interconnected using glazed stoneware/RCC Np2 class Hume pipes. The gradient provided shall be adequate to permit a non-silting velocity of 0.75 m/sec. The sewerage from the entire complex shall be conveyed by gravity to the RG area where a battery of septic tank is located.

The capacities of the septic tanks are based on APPENDIX 4 of DC regulation specifying a capacity of 141.6 liters (5 cubic feet) per capita.

A septic tank is a combined sedimentation and digestion tank where sewage is held for 24 hours during this period the solids settle down at the bottom. They are anaerobically digested resulting in reasonable reduction in volume of sludge, reduction of biodegradable organic matter and release of carbon dioxide methane and hydrogen sulfide. The effluent though clarified to a
large extent will still contain appreciable amount of dissolved and putresible organics.

It is observed that soak pits do not function satisfactorily leading to unaesthetic & unhygienic conditions.

We propose to provide an up flow anaerobic filter for secondary treatment of septic tank effluent. It is a submerged filter with stone media and septic tank effluent is introduced from the bottom through a flow reversal chamber. The microbial growth is retained on stone media making possible efficient digestion. The capacity of the unit is about .05 cum per capita. The effluent is clear and free from odour.

The Up flow anaerobic filter and its flow reversal chamber can be constructed as an extended part of the septic tank resulting in economy due to common walled construction and also saves space.

The septic tank & up flow filter shall be constructed in M20 grade RCC and designed on non crack theory based on IS 3370’s recommendations for water retaining structures to prevent any infiltration of ground water or leakage of seepage into the ground.

The septic tank & filter shall be located in the RG at the south end of the plot. The top slab shall be designed for soil over-burdens to permit plantation of a lawn with provision of manholes for access into the tanks when required for cleaning.

This method of sewage treatment does not require any operation expertise nor any maintenance, except for one annual cleaning for which agencies are available both with Municipal Corporation of Greater Mumbai and private parties. During cleaning, the agency pumps out sludge and liquid into a truck for disposal. The filter media may have to be cleaned with water pressure using a pump and fresh water. This option is also least expensive
and requires the least area as compared to sewage treatment plant or package plants available in the country.

The treated effluent shall be used in watering the trees and green area wherever possible since it will be rich in nutrients such as nitrogen and phosphorus. Excess treated sewage shall be used for greening the neighbouring plots if available or shall be disposed into the storm water drains ultimately leading to the nalla and eventually reaching the creek.

Street Lighting:

Adequate street lighting shall be provided to have an illumination intensity of 50 Lux at nighttime in the complex.

The 12-m wide road shall have lampposts at 30mts. interval on either side. There will be a 15 mts. staggering between the two sides effectively providing a lamppost at each 15 mts. interval alternating between the two sides of the road.

The pathways shall have lampposts at 15mts. interval. The lampposts shall be provided only on one side. They shall also illuminate open spaces between the buildings.

Sodium vapour lamps shall be used in the fittings provided on the lamp poles. These provide good illumination at lower power consumption and are likely to require less maintenance as compared to mercury vapour lamps.

Garbage and Solid Waste:

The residents shall be educated to dispose garbage in bins provided in each wing. The bins shall be emptied into a garbage collection point provided strategically near the road to permit a collection of garbage from the complex by the Municipal Garbage Truck.
The area shall be maintained clean by regular disinfecting of garbage bins spraying bleaching powder and preventing breeding of mosquitoes/flies.

The residents shall be trained to segregate glass, metal and plastic from the solid waste prior to disposal in the bins. This will permit proper composting at the Municipal solid waste disposal sites. The glass, plastic, metal, wastes shall be sold directly by residents for recycling to the scrap vendor either collectively or individually as found suitable.

The Environmental Management Committee shall endeavor to educate the residents so as not to throw the paper scrap, etc. into the complex and prevent spreading of unsightly conditions. To achieve this public awareness and participation will be carried out from time to time. A new incentive-based programme (like awards, trophies, cash incentives etc.) will be formulated and announced every year during social function like Annual Day/Republic Day or Independence Day.

The garbage bins shall have self-closing lids to keep garbage covered. They will be adequately sized to prevent overflow and shall be evacuated by nominated/appointed person daily. The person shall be paid wages from the maintenance expenses of the societies thus formed.

**Electrical:**

A substation shall be provided within the complex to cater to the power supply needs of the complex. All individual buildings shall be linked by cable and feeder pillar to the substation. The cables shall be adequately sized to cater to the tenements and shops.

This shall be done in adherence to the norms of Power Supply Company. An individual tenement will have a power meters capable of 10 ampere capacity. The load considered for each tenement is 1.5kw, which will be due to 2 lights, 2 points, 1 fan and 1 geyser provision made for each unit.
The tenement owners will pay the light charges directly on billing to the Electrical Supply Company. Light meters shall be located below the stairs for each wing. The fuse boxes and light meters shall be enclosed in a ventilated wooden cabinet with metal net doors to permit proper ventilation.

The door shall be locked and the key shall be kept with secretary of each wing to permit reading to be recovered by the supply company inspector. The cables shall be laid along the footpaths/pathways, road side, open spaces in cable trenches to prevent digging up of road in future to attend to faults or augmentation of cable capacities, etc.

**Telephones:**

Existing telephone shall be shifted to the complex by the Mahanagar Telephone Nigam Ltd. PVC conduits will be provided with brick masonry chambers to permit laying of telephone wires along the footpaths and PVC casing capping shall be provided inside the building to permit wiring of telephones. The internal wiring in the building is normally undertaken by MTNL at subscriber’s cost.

**Operation and Maintenance of Services:**

The operation and maintenance of various services implemented as a point of the project shall be handed over to the various Cooperative Housing Societies. Public Consultation – Cost Implementation. the EMC (already formed) shall continue to perform their role within the Community.