Environmental and Social Due Diligence Report (ESDDR)

Mumbai Metro Line-5 – Phase-I
(Thane – Bhiwandi)
(Proposed for The Asian Infrastructure Investment Bank Funding)

Final Draft Report
11 September 2023

Metro Project Implementation Unit
Mumbai Metropolitan Region Development Authority

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List of Acronyms

AC	Alternating current
AFC	Automatic Fare Collection
AFCONS	Asia Foundations and Construction Limited
AIIB	Asian Infrastructure Investment Bank
APMC	Agricultural Produce & Livestock Market Committee
ATPS	Automatic Train Protection System
BNMC	Bhiwandi Nizampur Municipal Corporation
BSNA	Bhiwandi Surrounding Notified Area
CCE	Continuous and Comprehensive Evaluation
CEA	Central Electricity Authority
CIM	Computer Integrated Manufacturing
CPCB	Central Pollution Control Board
CRZ	Coastal Regulation Zone
CTE	Consent to Establish
CTO	Consent to Operate
DC	Direct Current
DG	Diesel Genset
DPR	Detailed Project Report
E&M	Electricity and Mechanical system
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
EMoP	Environment Monitoring Plan
EPC	Engineering, Procurement and Construction
ESDD	Environmental and Social Due Diligence
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESP	Environmental and Social Policy
ESZ	Environmentally Sensitive Zone
ETP	Effluent Treatment Plan
EWCD	Elderly, Women, Children and Differently-abled
FIRR	Financial Internal Rate of Return
FLGRC	Field Level Grievance Redressal Committee
GESI	Gender Equality and Social Inclusion
GHG	Green House Gases
GIIP	Good International Industry Practices
GoM	Government of Maharashtra
GRM	Grievance Redressal Mechanism
HDPE	High Density Polyethylene
HSE	Health, Safety and Environment
IEA	Independent Evaluation Agency
Kv	Kilovolt
LA & RR	Land Acquisition and Resettlement & Rehabilitation
MCGM	Municipal Corporation of Greater Mumbai
MCZMA	Maharashtra Coastal Zone Management Authority
MIDC	Maharashtra Industrial Development Corporation
MML	Mumbai Metro Line
MMMOCL	Maha Mumbai Metro Operation Corporation Limited
MMR	Mumbai Metropolitan Region

MMRDA	Mumbai Metropolitan Region Development Authority
MoEF&CC	Ministry of Environment, Forest and Climate Change
MPCB	Maharashtra Pollution Control Board
MUTP	Mumbai Urban Transport Project
NOC	No Objection Certificate
OCC	Operation Control Centre
PAP	Project Affected Person
PCB	Polychlorinated biphenyls
PESO	Petroleum and Explosives Safety Organization
PIU	Project Implementation Unit
PMU	Project Management Unit
POP	Persistent Organic Pollutants
PPM	Project-affected Persons Mechanism
PST	Power Supply and Traction system
PUC	Pollution under Control
PWD	Public Works Department
PwD	Person with Disability
RAP	Resettlement Action Plan
R&R	Resettlement and Rehabilitation
RFCTLARR Act	Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act
RMU	Ring Main Unit
RoW	Right of Way
RP	Resettlement Plan
RSS	Receiving Sub Station
SC	Schedule Caste
SCADA	Supervisory Control and Data Acquisition
SDC	Software Testing and Development Centre
SDC	Social Development Cell
SEAC	State Level Expert Appraisal Committee
SEIAA	State Environment Impact Assessment Authority
SGNP	Sanjay Gandhi National Park
SIA	Social Impact Assessment
SLGRC	State Level Grievance Redressal Committee
ST	Scheduled Tribes
STP	Sewage Treatment Plant
SWM	Solid Waste Management
TDR	Transferrable Development Rights
TMC	Thane Municipal Corporation
UNFCCC	United Nations Framework Convention on Climate Change
WCA	The Workmen's Compensation Act

Executive Summary

Introduction

The Mumbai Metropolitan Region Development Authority (MMRDA) established during 1975, is engaged in long term planning, promotion of new growth centers, implementation of strategic projects and financing infrastructure development. Mumbai's public transport consists of suburban railway lines augmented by commuter rail on main lines, bus services, public taxis and auto rickshaws, as well as ferry services. Mumbai Metro Master Plan has been prepared to provide a rail-based mass transit facility to people residing in the areas that are not connected by existing Suburban Rail System to enable them to reach the stations within the distances of 1 km. The Master Plan includes 14 lines covering a length of 337.1 km, both underground and elevated. The proposed Project 'Mumbai Metro Line-05 (MML5)' is between Thane and Kalyan via Bhiwandi, and is expected to improve the public transportation facility between the connected areas by reducing the traffic congestion.

The MML5 Project will comprise construction of a 24.90 km elevated viaduct, 14 stations and a depot, and the systems components include provision of rolling stock and systems, including signaling, telecommunications, platform screen doors, electrical and mechanical, automatic fare collection, overhead equipment, traction, power supply and SCADA, lifts and escalators and depot machinery and plant. The MMRDA has divided the entire Metro 5 project into two phases, Phase-I – Thane (Kapurbawadi) to Bhiwandi (Dhamankar Naka) consisting of viaduct of 11.88 km with 6 stations and a depot at Kasheli and related facilities; and Phase-II – Bhiwandi (Dhamankar Naka) to Kalyan (Kalyan APMC) consisting of a viaduct of 13.02 km (including 3.5 Km underground) and having 7 elevated metro stations and 1 underground metro station. The MMRDA has approached The Asian Infrastructure Investment Bank (AIIB) for financing systems components of the MML5.

Need for ESDDR

AIIB is financing the systems, signaling, rolling stock, etc. of this MML5. Since the MMRDA project for the construction of the elevated metro line constitutes other components, these are part the project (though not funded by AIIB), and are covered under AIIB's Environmental and Social Policy (ESP), and an Environmental and Social Due Diligence (ESDD) is conducted and Environmental and Social Due Diligence Report (ESDDR) is prepared. The MMRDA has first taken up execution of Phase-I of the MML5, and as of June 7, 2023, 78.29% of the civil works (involving viaduct construction) are completed. The ESDDR assesses the Environmental, Social and Health & Safety status and performance of Project, and identifies compliance gaps, and arrives at a Corrective Action Plan to ensure compliance to applicable local, national and international legislation as well as AIIB's Environmental Social Framework (ESF). The ESDDR preparation methodology comprised Project Literature Review, Stakeholder Consultations, Analysis of Data/Information Collected, Identification of Environmental and Social Risks and Impacts, Identification of Environmental and Social management measures, Preparation of

ESDDR, Consultations on Draft Outputs/ Corrective Actions, Finalization of ESDDR and Disclosure of Final ESDDR.

Project Features

Phase I of Metro Line-05 starts from the Kapurbawadi station (Ch-0.321454) which will be constructed as part of Metro Line-04 project as this station is an interchange station of ML-4 & ML -5 and ends at Bhiwandi(Dhamankar Naka at Ch 12.200 km). The alignment starts from the planned Kapurbawadi station and runs along Kapurbawadi flyover. Alignment turns East towards Balkum from Kapurbawadi circle along the SSH-84 (Thane-Bhiwandi-Wadapa Road). Alignment crosses Kasheli Creek at chainage 3400 to 3900 and runs along the existing bridge. From the bridge alignment continues to follow Bhiwandi Road and Thane Road before terminating to Dhamankar Naka. Major alignment (more than 90%) is within the median of the existing roads. The entire project area is urbanized stretch and heavily populated.

Regulatory Framework- Environment

The key national and state policies, acts and regulations related to environment, that are applicable to the Project are, Environmental (Protection) Act 1986, Water (Prevention and Control of Pollution) Act 1974, Air (Prevention and Control of Pollution) Act 1981, Noise Pollution (Regulation and Control) rules 2000, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, Solid Waste Management Rules 2016, Construction and Demolition Waste Rules 2016, Forest (Conservation) Act 1980, Wildlife Protection Act 1972, CRZ Notification 2011, The Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) Act 1996, Contract Labour (Regulation and Abolition) Act 1970, Workmen Compensation Act 1923, etc.

As per the findings of the ESDD the following regulation needs to be added to the EIA report: and permissions are to be obtained:

- The Electricity related regulations, particularly of safety, as the electrical systems of MML-5 consists of Power Supply and Traction (PST) system, Electrical and Mechanical (E&M) system, Lifts and Escalators.
- International Convention on Hazardous Materials such as Persistent Organic Pollutants (POPs) including polychlorinated biphenyls (PCBs), as these are present in old transformers.
- International Convention on Atmospheric Emissions, as the SF6 is a potent GHG used in switchgear/ RMUs, which are used for the MML5.
- Policies and Manuals of MMRDA on Metro Rail System, and
- The World Bank Group EHSGs
- Update/ renew the relevant permissions and approvals and make English translated copies available to the Bank.

Project Impacts- Environmental

Apart from the listed impacts in the EIA, such as impacts related to air, water, land, waste generation, flora and fauna, noise, vibration, health and safety, energy, etc.,

the ESDDR has identified impacts such as noise and vibration during operations, as the Metro Line 5 alignment is passing close to residences and commercial establishments at Kapurbawadi. The viaduct edge is 3 m away from the nearest residential/ commercial buildings at Kapurbawadi. The ESDDR suggests that the noise and vibration impact, during operation of MML5, at this site needs to be assessed. Proper and site-specific noise and vibration prevention/ abatement/ mitigation measures need to be proposed and to be incorporated into the EMP and implemented on site.

ESDDR Findings - Environment

The ESDDR notes that the work sites lack a) proper barricading, signage, scrap/storage areas, working spaces, work table, resting/eating lunch areas, security cabins, etc. b) health and safety provisions such as proper earthings, observers for heavy machinery operations, etc. and c) proper housekeeping. The labour camp at the casting yard, that was visited was in good condition, quite clean with proper rooms, beds, sanitary facilities, cooking facilities, etc.

The ESDDR notes that with regard to the fatal incident of 18 May 2021, the investigation report should have a root cause analysis of the accident and recommend necessary safety measures to be taken to prevent such incidents. The GC has to endorse the report first and certify that the recommended safety measures are implemented and functioning. The details of distribution of this amount and dates paid to the victim's kin are not given.

The ESDDR notes from PIU that the Audit agency is appointed by the civil works contractor. There is a need for the monitoring agency to be independent of the contractor and the General Consultants.

The ESDDR notes from PIU that it has only one position for ensuring compliance with environmental safeguards and monitoring the implementation of the Environment Management Plan. The GC too has only one position and the contractor has one position. This requires engaging an External Monitoring Agency for quarterly monitoring of environmental and social safeguards and EMP and RAP implementation and for Mid-term and End-term evaluation.

Corrective Action Plan - Environment

Though the project civil works are nearing completion, the remaining civil works and the track work and electrical and mechanical works require close and frequent monitoring by an independent agency with substantial environmental and social as well as Health and Safety monitoring experience and expertise; particularly in view of the remaining works to be carried out at heights and in confined spaces and mostly electrical works. The Corrective Action Plan proposed under the ESDDR includes a) revising and updating the project Environment Impact Assessment as suggested, b) obtaining the pending approvals/ permissions, c) translating of approvals into English, d) assessing the impacts on the protected areas within 10 km of project, e) conducting a noise and vibration impact assessment and update the EMP, f) updating the Environment Management Plan, g) conducting a detailed

scrutiny of Contractor's sites and prepare a report, h) incorporating workers' GRM in Contractor's EMP, i)submission of Labour Returns Reports on Incidents, j) review of Independent Auditor's Terms of Reference (ToR) and make it focus on Safety issues and k) engaging an External Monitoring & Evaluation Agency.

Regulatory Framework and Impact Assessment- Social

The main legal and regulatory requirements applicable for social impacts of LA & RR pertain to Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (RFCTLARR) Act, 2013 and Resettlement and Rehabilitation Policy for Mumbai Urban Transport Project (MUTP), which together with measures proposed in the SIA and RAP, ensure compliance with AIIB's ESF.

Although the project is being executed primarily in an urban setting, LA & RR impacts are minimized by fixing the project alignment largely within the existing Right of Way of roads, and are further minimized (impacts on 94 structures avoided) by changes in designs, particularly of entry-exit structures of stations. The draft SIA and RAP report has been prepared and is being currently revised in the light of changes in impacts, new information now available through surveys, incorporation of Livelihood and Income Restoration Plan (LIRP), provisions for external monitoring etc. based on review and comments provided by AIIB.

LA & RR Impacts and Current Status

Construction works of the project commenced in August, 2019and78.29% of civil works are completed on stretches not involving acquisition of private land and R&R. While the process of acquisition of any of the private lands affected by the project works is yet to be completed, MMRDA has resettled 109 occupant households / business establishments from 4 project affected locations.

A total of 35.41 ha. land outside the current Right of Way is required, out of which 29.26 ha. is required permanently and 6.15 ha. temporarily for site office and casting yard. Out of permanent land required, 27.25 ha. is private land (26.73 ha. for depot owned by 58 persons) and 2.01 ha. is public land. While proposals for acquisition of 26.81 ha. private lands are submitted to the Competent Authority and are under process, the proposals for the balance 0.44 ha. private lands are being prepared for submission to the Competent Authority. Permissions for carrying out works on most of the public land required for the project are obtained.

In all 292 structures (108 residential and 184 commercial) are affected by the project. A total of 159 structures are located on private lands, and 67 of these are in formal buildings affected by viaduct at Kapurbawadi, the balance 92 are in the form of semi-pucca structures, and are probably occupied by non-title holders (legal titles are yet to be ascertained). Out of occupants of 292 structures and 58 depot land owners, 145 are identified as vulnerable due to poverty, social backwardness and households headed by women. The MMRDA has already resettled 109 PAPs (31 residential and 78 commercial) in nearby Rental Housing Resettlement colonies as per their preference, and out of 78 commercial PAPs, 63 have opted for residential tenements in lieu of shops and the balance 15 have chosen shops.

Eligibility and Entitlement

The MMRDA has developed an elaborate Entitlement Matrix covering various probable categories of PAPs, including (a) Owners of private lands, (b) Owners / formal tenants occupying structures on private lands; and Non-title holders such as (c) Encroachers occupying structures on private lands; and (d) Encroachers occupying structures on public lands, and their entitlements as per the provisions of the RFCTLARR Act and MUTP R&R Policy. The eligibility cut-off dates are also prescribed. The Entitlement Matrix is in compliance with National Laws, State Policies and AIIB's Environment and Social Framework and Environment and Social Standard 2: Land Acquisition and Involuntary Resettlement.

Consultation and Information Disclosure

MMRDA was not able to conduct public consultation prior to undertaking preparation of EIA & SIA primarily due to Covid-19 related restrictions. Although progress of78.29% of civil works has been achieved, the MMRDA has now held the public consultation on May 12, 2023 when construction works with physical impacts of LA & RR such as depot, entry/exit to depot, viaduct at Kapurbawadi junction and construction of certain stations, including their entry/exit structures, are only now being commenced. Further, specific consultations have been held with PAPs at locations, from where they are shifted and with owners of depot land. Such consultations are proposed to be also held with other PAPs yet to be shifted in future. The MMRDA has prepared brochures in different languages (Marathi, Hindi and English), which provide information about the basic features of the project, likely social impacts, framework for LA&RR, eligibility and entitlements, grievance redressal mechanism (including AIIB's PPM) and contact details, for distribution to all PAPs during various PAP consultations. A well-established system of Grievance Redress Mechanism for PAPs of LA & RR is set up and is made functional.

In addition to the applicability of provisions of RFCTLARR Act and MUTP R&R Policy related to livelihood restoration, MMRDA has proposed to assess, Post-R&R, the needs of those losing incomes / livelihoods, with specific attention to vulnerable PAPs, and undertake remedial measures for livelihood support as may be necessary, if the above entitlements are not found to be adequate. Further, the MMRDA will also develop measures for livelihood restoration (preferably in the form of a Livelihood and Income Restoration Plan) as a part of the revised SIA and RAP report. The MMRDA has also developed a Gender Equality and Social Inclusion (GESI) framework for the project, and the actions envisaged under the GESI Framework are primarily related to Operating Systems, the implementation of which is expected to commence in future.

Budget, Monitoring and Evaluation

A budget for RAP implementation has been developed involving a cost of Rs.11,119.48 lakhs. As MMRDA has been implementing many metro-rail systems simultaneously for some time now, it has a well-established institutional set up in the form of Metro PIU and LA & RR Implementation Unit as a part of the PIU, and specific officers are assigned responsibilities related to implementation and

monitoring of the project. It has been proposed to appoint external monitoring agency for bi-annual monitoring, including that of RAP implementation, and the Mid-term and End-term evaluation of RAP implementation will be carried out by an Independent Evaluation Agency (IEA).

Major Concerns for Social Safeguards

Based on the social due diligence carried out, the following major concerns are noted:

1. The draft SIA & RAP document is required to be revised in the light of changes in impacts, new information now available through surveys, incorporation of Livelihood and Income Restoration Plan (LIRP), requirement of external monitoring etc. based on review and comments provided by AIIB. Further, the SIA & RAP document is yet to be cleared by AIIB and publicly disclosed.
2. Specific consultations with PAPs, who have not been resettled so far, are yet to be carried out. The Information Brochures for PAPs are now prepared but are yet to be distributed to PAPs.
3. While most of the public lands have been obtained or project works have been allowed to be carried out on them, the process of acquisition of affected private lands (particularly for depot and entry-exit structures of stations) being carried out under RFCTLARR Act, is yet to be completed for all parcels, which needs to be expedited.
4. About 37%(109) of the PAPs are already resettled. Out of these 45% are relocated from private lands prior to completion of acquisition of concerned land parcels and about 81% of resettled commercial PAPs have opted for residential tenements. In view of this position, although concerned PAPs have chosen the resettlement options themselves, it is desirable for MMRDA to obtain formal written Consent Letters from such PAPs resettled in the past and likely to be resettled in future, in order to avoid any future disputes.
5. MMRDA faces challenges related to appropriate resettlement options, which ensure that losses are compensated at Replacement Cost and livelihood of all PAPs are restored, for residential and commercial PAPs from formal buildings at Kapurbawadi, and inadequate availability of alternative shops for commercial PAPs from other locations.
6. While significant number of vulnerable PAPs are identified and there is likelihood of loss of income and livelihood by commercial PAPs, which is the largest PAP group (184 out of 292), specific Livelihood and Income Restoration Plan is not included in the SIA & RAP document.
7. The Social Development Cell (SDC) of MMRDA, which is responsible for preparation of SIA & RAP documents and the LA & RR Implementation Unit of Metro PIU, mostly work independently, and better co-ordination and consultation among them is necessary for smooth implementation and monitoring of RAP.

8. It was difficult to obtain the basic information necessary for ESDD and was required to be searched and compiled due to absence of systematic efforts for information management made in the past in this regard.
9. While LA & RR are progressing, the internal monitoring is mainly restricted to stand alone review of progress, and even systematic reports are not generated. The mechanism for independent monitoring of social safeguards, including RAP implementation is yet to be put in place.

Corrective Action Plan – Social

Though the process of land acquisition has progressed, and 109 PAPs have been resettled, the remaining civil works (about 22%) require completion of the legal process of acquisition of lands, particularly for depot, and resettlement of 183 PAPs, including those occupying houses and shops in formal buildings and a large number of other commercial PAPs. Recently, MMRDA has made significant progress in carrying out consultations with public at large, owners of depot land and also with specific PAP groups; and has also prepared an Information Brochure for PAPs. The Corrective Action Plan proposed under the ESDDR primarily includes actions to address the concerns noted during Social Due Diligence, namely, a) revising and updating the project Social Impact Assessment and Resettlement Action Plan document, b) consulting PAPs yet to be shifted, c) distribution of Information Brochures, d) expediting actions for acquisition of lands, e) resolving constraints faced in resettling PAPs from formal buildings and commercial PAPs, f) preparing Livelihood and Income Restoration Plan and incorporating in RAP, g) improving internal co-ordination for better monitoring, h) improving information management, and j) engaging an External Monitoring & Evaluation Agency.

1. Introduction

1.1 Background

The Mumbai Metropolitan Region (MMR) is spread over 6,328 sq. km[1]. The MMR consists of nine Municipal Corporations viz. Greater Mumbai, Thane, Kalyan-Dombivali, Navi Mumbai, Ulhasnagar, Bhiwandi- Nizamapur, Vasai-Virar, Mira-Bhayandar and Panvel; and nine Municipal Councils viz. Ambarnath, Kulgaon-Badalapur, Matheran, Karjat, Khopoli, Pen, Uran, Alibaug and Palghar, along with more than 1,000 villages in Thane, Raigad and Palghar Districts. MMRDA is responsible for the balanced development of the MMR. The population of MMR is 23.598 million.

The Mumbai Metropolitan Region Development Authority (MMRDA) was established in accordance with the Mumbai Metropolitan Region Development Authority Act, 1974, on 26th January, 1975.Since its inception, MMRDA is engaged in long term planning, promotion of new growth centers, implementation of strategic projects and financing infrastructure development. The Regional Plan provides for a strategic frame work of MMR's sustainable growth. The objective behind establishing MMRDA was to make MMR a destination for economic activity by promoting infrastructure development and improving the quality of life. The MMRDA prepares plans, formulates policies and programs, implements projects and helps in directing investments in the Region.

1.1.1 Public Transport

Mumbai's public transport consists primarily of rapid transit on exclusive suburban railway lines augmented by commuter rail on main lines serving outlying suburbs, the bus services of the municipalities making up the metropolitan area, public taxis and auto rickshaws, as well as ferry services. The existing suburban rail system is under extreme pressure and the role of the bus system is limited for providing feeder services to suburban railways. There are constraints to expanding the road and rail network capacity. Many pockets in Island City and Suburbs are not served by rail based mass transport system. Mumbai Metro Master Plan has been undertaken to provide a rail based mass transit facility to people residing in the areas that are not connected by existing Suburban Rail System so as to enable them to reach the stations within the distances of ½ to 1 km. The Master Plan for Mumbai Metro along with phased implementation was approved by MMRDA, in its meeting, held on 28th May, 2004. The Master Plan includes 14 lines covering a length of 337.1 km, both underground and elevated. The Mumbai Metro Master Plan map is given below as Figure-1.

[1] mmrda.maharashtra.gov.in

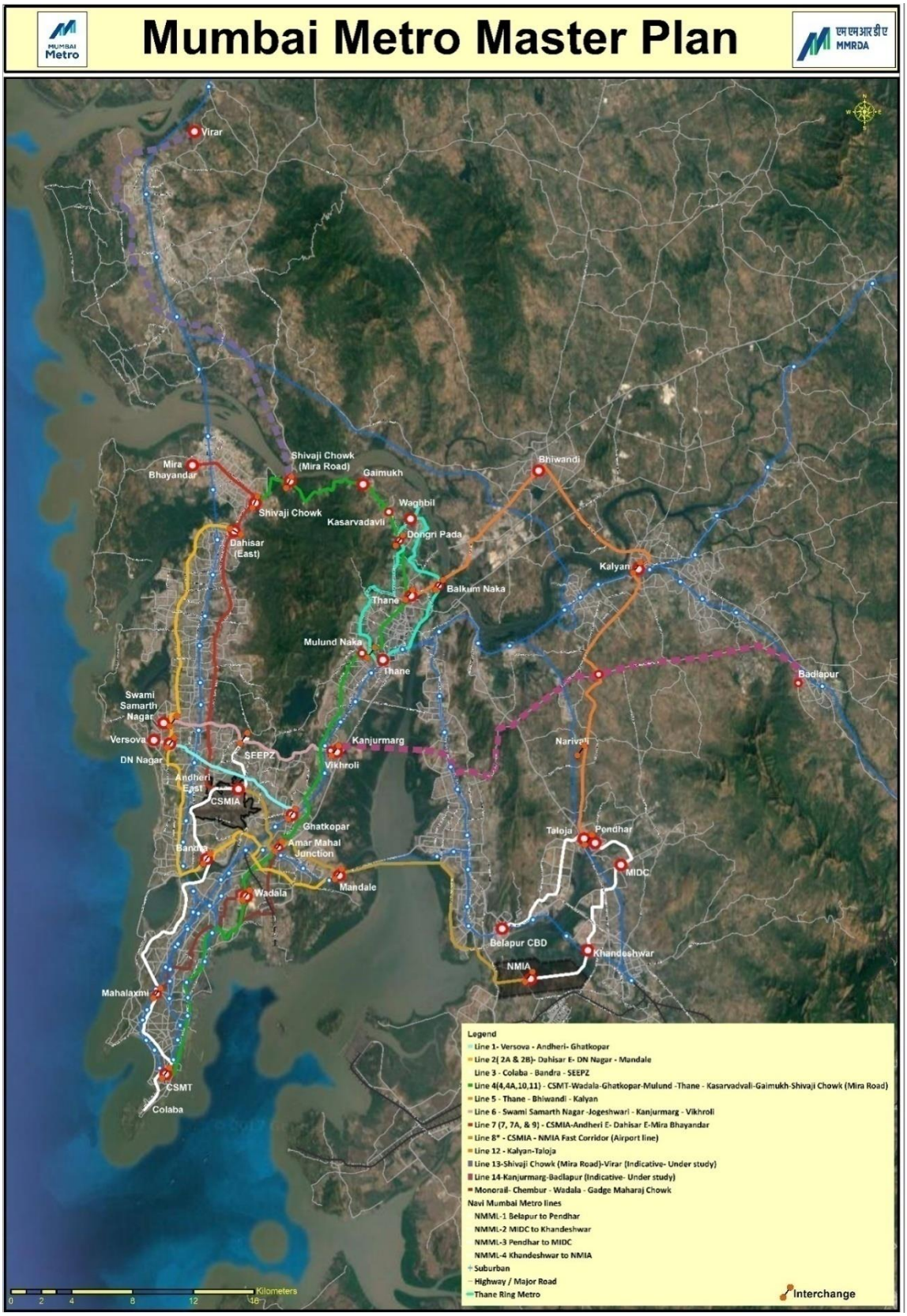


Figure 1: Mumbai Metro Master Plan

1.2 Mumbai Metro Line 5

1.2.1 Rationale

The key objective of the project is to address the rapidly increasing traffic demand in the MMR by developing an efficient public transportation system, i.e., proposed Metro Line-05 between Thane and Kalyan via Bhiwandi. Thane and Kalyan municipalities are major trip generating locations in Mumbai Metropolitan Region (MMR). These two municipalities have considerable working-class population. Bhiwandi is a hub for warehouses and small industries, which leads into major trip attraction zone. Besides having railway stations at Thane and Kalyan, most of the time suburban rails have passenger volume which is far more than the crush load and hence causes high level of discomfort to the commuters. The Project is expected to improve the public transportation facility between the connected areas by reducing the traffic congestion; catering the projected traffic demand in the area and decongesting the already saturated Mumbai Suburban Railway system by shifting the ridership to proposed metro route.

1.2.2 Present Status

The entire stretch of Metro-5 will connect Thane to Bhiwandi and Kalyan in Thane District in the North-Eastern parts of Mumbai Metropolitan Region and will comprise the construction of a 24.90 km viaduct, 14 stations and a depot. The systems' components include provision of rolling stock and systems, including signaling, telecommunications, platform screen doors, electrical and mechanical, automatic fare collection, overhead equipment, traction, power supply and SCADA, lifts and escalators and depot machinery and plant.

The MMRDA has divided the entire Metro 5 project into two phases, Phase-I – Thane (Kapurbawdi) to Bhiwandi (Dhamankar Naka) consisting of viaduct of 11.88 km with 6 stations and a depot at Kasheli and related facilities; and Phase-II – Bhiwandi (Dhamankar Naka) to Kalyan (Kalyan APMC) consisting of a viaduct of 13.02 km (including 3.5 Km underground) and having 7 elevated metro stations and I underground metro ststion. The stations in Thane-Bhiwandi section are Kapurbawadi in Thane (Common Station with Metro-4), Balkum Naka, Kasheli, Kalher, Purna, Anjur Phata and Dhamankar Naka. The metro corridor will be elevated and will be built substantially within the RoW of existing roads. The civil works contracts are based on `design and build' principle and all civil works involving the construction of viaduct, stations, tracks, depot etc. will be funded by the MMRDA and the works consisting of systems, signaling, rolling stock, etc. are proposed to be funded by the AIIB. Project plan is shown in Figure-2. The MMRDA has first taken up execution of Phase-I, and as of 07 June 2023, 78.29% of civil works are completed.

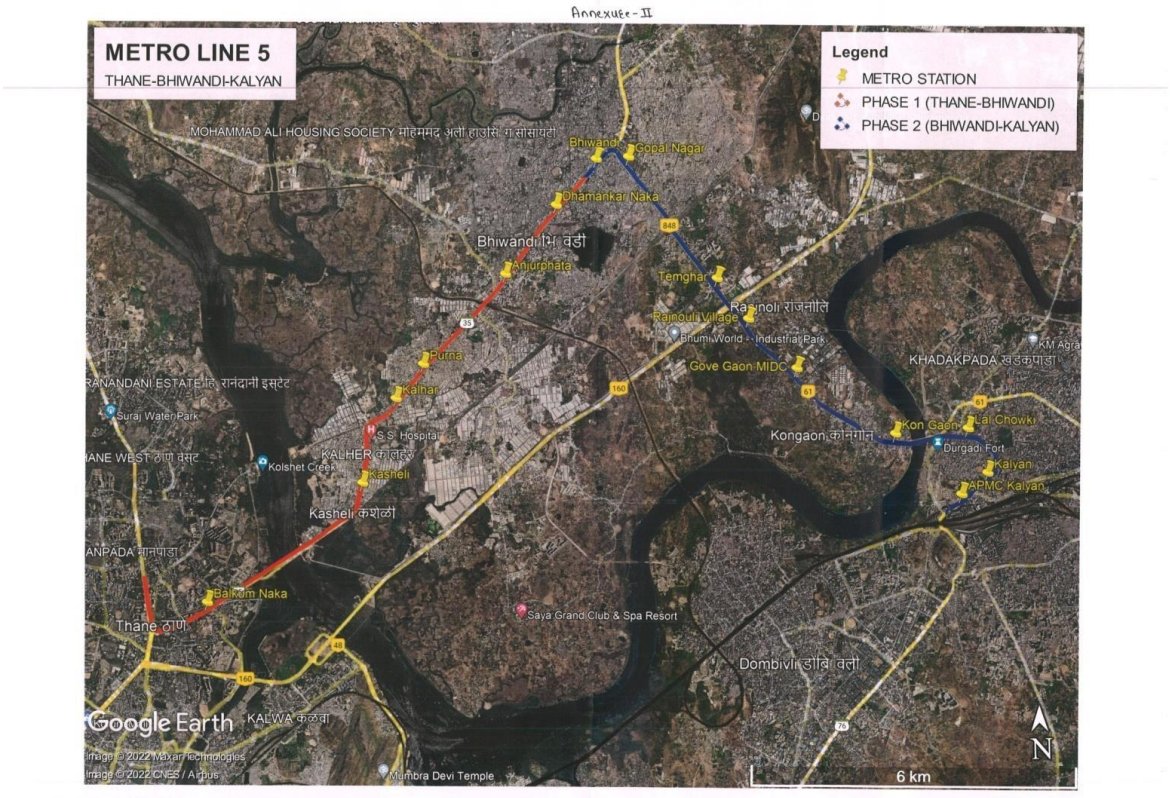


Figure 2: Mumbai Metro Line 5

1.3 AIIB Policies and Directives

1.3.1 Environmental and Social Framework (ESF)

AIIB recognizes that environmental and social sustainability is a fundamental aspect of achieving development outcomes consistent with its mandate to support infrastructure development and interconnectivity.

- AIIB screens and categorizes each proposed project based on their environmental and social risks and impacts
- Identifies actions to avoid, minimize, mitigate and/or offset impacts
- Includes provisions for disclosure of information and public consultation
- Every project should have Grievance Redress Mechanism (GRM) accessible to the general public/community

The Environmental and Social Framework approved in 2016 (Amended in February 2019, May 2021 and November 2022) includes an Environmental and Social Policy (ESP), which further includes Environmental and Social Standards (ESSs) and Environmental and Social Exclusion List (ESEL). The key objectives of the ESF are

- Ensure the environmental and social soundness and sustainability of each project
- Support integration of environmental and social aspects of projects into the decision-making process by all parties

- The Environment and Social Framework applies to all projects

The EIA study is being carried out in accordance to the AIIB's ESP which sets forth mandatory environmental and social requirements for each Project and ESSs which set out more detailed mandatory environmental and social requirements relating to the following

- ESS 1: Environmental and Social Assessment and Management
- ESS 2: Involuntary Resettlement
- ESS 3: Indigenous Peoples

Based on the proposed alignment and reconnaissance survey outcome, the ESSI and ESS 2 are applicable for this project.

ESS 1 (Environmental and Social Assessment and Management). Aims to ensure the environmental and social soundness and sustainability of projects and to support the integration of environmental and social considerations into the Project decision-making process and implementation. ESS 1 is applicable if the Project is likely to have adverse environmental risks and impacts or social risks and impacts (or both). The scope of the environmental and social assessment and management measures are proportional to the risks and impacts of the Project. ESS1 provides for both quality environmental and social assessment and management of risks and impacts through effective mitigation and monitoring measures during the course of Project implementation. The ESS 1 defines the detailed requirements of the environmental and social assessment to be carried out for any project to be financed by the AIIB.

ESS 2 (Involuntary Resettlement). Is applicable if the Project's screening process reveals that the Project would involve Involuntary Resettlement (including Involuntary Resettlement of the recent past or foreseeable future that is directly linked to the Project). Involuntary Resettlement covers physical displacement (relocation, loss of residential land or loss of shelter) and economic displacement (loss of land or access to land and natural resources; loss of assets or access to assets, income sources or means of livelihood) as a result of: (a) involuntary acquisition of land; or (b) involuntary restrictions on land use or on access to legally designated parks and protected areas. It covers such displacement whether such losses and involuntary restrictions are full or partial, permanent or temporary. The ESS 2 defined detailed requirements of resettlement planning of the projects involving involuntary resettlement.

Hence, the EIA study has been carried out to meet the requirements in AIIB's ESP and ESS 1. MMRDA has engaged a Social Consultant to identify important social aspects such as places of worship, other community assets, socio-economic set up, related to land acquisition and resettlement. The Social Consultant has prepared a Social Impact Assessment and a Resettlement Action Plan (RAP) in accordance with AIIB's ESP and ESS2.

ESS 3 (Indigenous Peoples). Is applicable if Indigenous Peoples are present in, or have a collective attachment to, the proposed area of the Project, and are likely to

be affected by the Project. This ESS is not applicable on the project as Indigenous Peoples are not present in the project area.

1.4 Rationale for ESDDR

The MMRDA has approached The Asian Infrastructure Investment Bank (AIIB) for financing component that comprises the provision of rolling stock and systems, including signaling, telecommunications, automatic fare collection, traction and power supply, and depot machinery and plant for the Metro-5 project. Though AIIB is funding only systems, signaling, rolling stock, etc., the other components of MML5 for the construction of the elevated metro constitutes part of the project (which are not funded by AIIB), and are covered under AIIB's Environmental and Social Policy (ESP), and an Environmental and Social Due Diligence is conducted and a report (ESDDR) is prepared for the MML5 Phase-I. Further, since the MMRDA has proceeded with certain project activities prior to its appraisal, the ESDDR includes an assessment of such actions to verify their compliance with AIIB's ESF and suggest corrective actions, as may be necessary.

1.5 Objectives of ESDDR

The objectives of the ESDDR are to independently review and assess the Environmental, Social and Health & Safety status and performance of Project, including all actions taken for acquisition of land, rehabilitation and resettlement and any other actions related to social impacts, and identify compliance gaps, issues, improvement opportunities, and develop a detailed time bound mitigation/follow-up/corrective action plan to ensure compliance to applicable local, national and international environmental and social legislation as well as AIIB's Environmental Social Framework (ESF). This typically entails:

1. Assessment & Verification of Project and its key components and aspects vis-à-vis with the requirements of applicable local, national and international environmental and social legislation, AIIB's ESF and good international industry practices (GIIP);
2. Undertaking the ESDD in line with AIIB's ESF requirements, which may, where applicable, include reviewing the adequacy of:
    - ❖ The Environmental and Social Impact Assessment (ESIA) process including the Environmental Impact Assessment (EIA), Social Impact Assessment / Resettlement Plan (SIA/RP) and Environmental and Social Management Plan (ESMP) as appropriate.
    - ❖ The Environmental and Social Management Systems of the Project to manage E&S risks and impacts on an ongoing basis in accordance with the provisions of the AIIB's ESF. Reviewing whether capacity and management structures are adequate and in place to manage environmental and social risks and impacts.
3. Reviewing the adequacy of proposed designs, measures and budgets, and recommending, where required, additional actions as necessary;

4. Reviewing the proposed monitoring systems and suggesting amendments as necessary;
5. Conducting an assessment of the processes and actions already taken for acquisition of land, rehabilitation and resettlement, and any other actions related to social impacts as against the requirements of applicable local, national and international social legislation, AIIB's ESF and good international industry practices (GIIP), which may wherever applicable, include assessing the adequacy of:
    - ❖ Information Disclosure and Consultation
    - ❖ Eligibility and Entitlements
    - ❖ Compensation for loss of assets due to physical and economic displacement
    - ❖ Rehabilitation and resettlement benefits, including for livelihood restoration and shifting
    - ❖ Relocation of Common Property Resources
    - ❖ Health and Safety
    - ❖ Grievance Redress Mechanism
    - ❖ Support to vulnerable PAPs, including the disabled, and actions for Gender Equality and Social Inclusion
    - ❖ Land Clearance
6. Based on the assessment, providing a detailed evaluation on compliance with AIIB's ESF; and
7. Developing a detailed and time bound Action Plan and Corrective Action Plan with follow-up and implementation plan details, parameters and outcome indicators to judge compliance to AIIB's ESF.

1.6 Approach and Methodology for ESDDR

1.6.1 Scope

The scope of this due diligence included review of environmental and social management practices of Mumbai Metro Line 5 – Phase 1. The Due Diligence study reviewed the available documents and assessed the compliance of environmental and social framework of AIIB with the respect to i) Regulatory clearances/permissions/consents (like environmental clearances, forest clearance, CRZ Clearance, National Highway/ PWD permissions, etc.), ii) Environmental Impact Assessment and integration of environmental management measures in to design and contracts; iii) Social Impact assessment / Resettlement Action Plan iv) Public consultations and information disclosure; v) Contractual Obligations for HSE Measures; vi) Implementation of Environmental and Social Management Plans and Health, Safety and Environment (HSE) Measures; vii) Institutional Arrangements; viii) Field Visit Observations and (ix) Environmental and Social Corrective Actions, etc.

1.6.2 Approach and Methodology

The methodology basically comprised the following steps:

1. Project Literature Review
2. Stakeholder Consultations
3. Analysis of Data/Information Collected
4. Identification Environmental and Social Risks and Impacts
5. Identification of Environmental and Social management measures
6. Preparation of ESDDR
7. Consultations on Draft Outputs/ Corrective Actions
8. Finalization of ESDDR
9. Disclosure of Final ESDDR

1.6.3 Project Literature Reviewed

The following Documents were reviewed for preparation of ESDDR.

- Environmental Impact Assessment (revised)
- Social Impact Assessment and Resettlement Action Plan
- Detailed Project Report
- Several Monthly Progress Reports
- Independent HSE Audit Reports (monthly reports)
- Incident Reports

As part of preparation of ESDDR, the ESDDR team had discussion with the Metro PIU, including officials of LA & RR Implementation Unit at MMRDA along with General Consultants, Viaduct Contractor, Independent HSE Audit Consultants during 17-20 April 2023 at MMRDA. During this period, field visits were undertaken by the ESDDR Team along with Metro PIU, MMRDA, General Consultants and Viaduct Contractor on 18-19 April, 2023. The entire Phase 1 of the Metro Line 5 was visited. The ESDDR was prepared based on review of safeguard documents, discussions, field visit observations and review of other documents collected from MMRDA.

2. Project Description

2.1 Project Outline

Phase-I of Metro Line-5 starts from the Kapurbawadi station (Ch-0.321454) which will be constructed as part of Metro Line-4 project as this station is an interchange station of ML-4 & ML-5 and ends at Bhiwandi (Dhamankar Naka at Ch 12.200 km). Start and the end coordinates of the alignment are 19°13'36.39"N, 72°58'37.92"E and 19°17'30.37"N, 73° 3'29.55"E. The alignment starts from planned Kapurbawadi station and runs along Kapurbawadi flyover. Alignment turns East towards Balkum from Kapurbawadi circle along the SSH-84 (Thane-Bhiwandi-Wadapa Road). Alignment crosses Kasheli Creek at chainage 3400 to 3900 and runs along the existing bridge. From the bridge alignment continues to follow Bhiwandi Road and Thane Road before terminating at Dhamankar Naka. Majorly alignment (more than 90%) is within the median of the existing roads. Entire project area is urbanized stretch and heavily populated. Land use along the alignment is mix of residential and commercial/industrial and traverses through the areas like Srinagar Colony, Ganesh Bawadi, Jawahar Nagar, Chirak Nagar, Sainath Nagar, Samata Naga, Kapurbawadi, Kolshet industrial area BMC colony, Ashok Nagar, Puranik Villas, Kalher, Nayan Sagar, Kopar, Tadkar wadi, Kailasnagar, Anjurphata, Oswal wadi, Bhiwandi, Narpoli.

2.2 Salient Features

Metro Line -5 (Phase –I) Project involves development of elevated metro rail corridor of 11.88 km, comprising of 6 no of elevated stations, 1 depot, staff quarters, operation control centre, receiving substation and allied facilities. Salient features of the project are given in Table 1 below

Table 1: Salient Features of MML 5 (Phase-I)

Feature	Details
Length	11.88 Km (Elevated)
Stations	6 Nos. (Dhamankar Naka, Anjurphata, Purna, Kalher, Kasheli, Balkum Naka)
Elevated/Underground	Elevated along Kapurbawadi to Bhiwandi.
Depot Location	Kasheli The works at the Depot that have environmental significance are as below: a) One Elevated exit Spur Line (approx. 217 m length) having 09 no. of spans with typical span of 28m will be constructed in CRZ- III with pile foundation & central single pier. b) Total length of approach road to depot in CRZ area is 185m. Portion of approach road Bridge in CRZ- IA area (135m) will be constructed on stilts (as per the CRZ notification,2011) while remaining portion i.e., 50m in CRZ-III will be constructed on embankment (elevated ramp). c) The power supply from MSETCL to RSS at the Depot is

	through an existing EHV line of MSETCL. The connection involves 4 foundation structures for installation of 220 KV EHV towers for power supply transmission line of 543 m to traction for Metro Line-5. Out of 4 foundation structures, 2 of the Foundation structure (2 nos. 8m X 8m) are in CRZ and thus permission under the CRZ Notification 2011 shall be required for this area.
Interchange stations	Kapurbawadi with Metro Line 4
Traction System	25 KV AC Single Phase Overhead Traction System.
Project Cost (As per GR for entire length)	Total Cost with Land – 6622.23 Cr. As per DPR, Total Completion Cost including all – Rs. 8416.51 Cr.
FIRR & EIRR	6.00% & 17.09%
Ridership (Daily Ridership)	2021: 2.29 Lakhs (PHPDT- 17957) 2031: 3.03 Lakhs (PHPDT- 26143) PHPDT – Peak Hour Peak Direction Traffic
Rolling Stock	Width: 3.20m, Height: 3.90m, Length: 21.84m Axle load: 17 Tons Seating Arrangement – Longitudinal Capacity-8 Coach Unit with 6 standees/Sqm-2352
Signaling System	Automatic Train Protection System (ATPS)
Gauge	1435 mm (Standard Gauge)
Design/Operating Speed	Design Speed = 90 Kmph, Operating Speed = 80 Kmph
Viaduct	Twin U Girder except Special Spans
Stations	Spine and Wings at Concourse Level, U Girder, and Inverted U Girder at Platform Level
Components funded by AIIB	1. Design, Manufacture, Supply, Installation, Testing, Commissioning of Standard Gauge Metro Rail coaches and training of maintenance staff after commissioning. 2. Design, Manufacture, Supply, Installation, Testing and Commissioning of Train Control and Signaling, Telecommunication. 3. Design, Manufacture, Supply, Installation, Testing and Commissioning of Platform Screen Door System. 4. Design, Manufacture, Supply, Installation, Testing and Commissioning of E&M, Fire Detection and Fire Suppression Systems including DG sets for Elevated stations as well as Kasheli car shed 5. Design, detailed Engineering, Supply, Installation, Testing and Commissioning of 220 KV/ 33KV Receiving cum Auxiliary Main Substation, 220KV/ 25KV single phase AC Traction Substation, OHE, Traction as well as Auxiliary SCADA, 33KV cables & ASS for line 5 including ASS & OHE in Kasheli Car Shed

	6. Design, Manufacture, Supply, Installation, Testing, Commissioning including Maintenance of Escalators & Lifts of 6 Elevated Stations. 7. Design, Manufacture, Supply, Installation, Testing and Commissioning of Automatic Fare Collection (AFC) systems for 6 Elevated Stations and AFC OCC, AFC Software Testing, and development Centre (SDC). 8. Manufacture, Supply, Installation, Testing, Commissioning of M&P for Kasheli Depot including training to maintenance staff of car shed

3. Environmental Due Diligence

3.1 Environmental Policy, Legal and Regulatory Framework

The Environment Impact Assessment has listed several key national and state policies, acts and regulations related to environment as relevant to the Project. These are given in the Table 2 below:

Table 2: National and State Environment Policy and Legislation

S. No	Act/ Rules/ Standards	Applicable Y/N				Reason of Applicability	Concerned Authority	Responsibility for obtaining permission	Implementation	Supervision-Construction Phase
		PC	C	PO	O					
1.	Environmental (Protection) Act, 1986	Y	Y	Y	Y	The Act will be applicable for the project both during construction and operation phase as it is likely to impact the various components of environment	MoEF&CC GoI, Forests & Env. Dept., GoM, CPCB, MPCB	Permission is not required under this act but the provisions of the act are applicable	Contractor: construction phase and MMMOCL: Operation Phase	MMRDA, Supervision Consultant
2.	Environmental Impact Assessment (EIA) Notification, 2006	N*	N	N	N	The metro/railway projects are not included in the Schedule of the Notification thus the project does not attract the conditions of EIA Notification 2006 and its further amendments; hence Environmental Clearance will not be applicable for the project. *However, Environmental Clearance may be applicable for establishing new quarries	MoEF&CC	Contractor: construction phase and MMMOCL: Operation Phase	Contractor: construction phase and MMMOCL: Operation Phase	MMRDA, Supervision Consultant
3.	Forest (Conservation) Act, 1980	Y	Y	N	Y	Applicable as the project would require clearing of mangrove area of 0.6983 Ha. forest clearance will be required for the project. Also, permission from High Court of Bombay will be required for cutting of Mangroves	MoEF&CC, Forest Dept. Govt of Maharashtra, Bombay High court	MMRDA	MMRDA, Forest Department, Contractor to follow the conditions of the permission	MMRDA, Supervision Consultant
4.	Wildlife Protection Act, (1972 and 1993)	N	N	N	N	Applicable as the project alignment is within 10 Km of some notified protected areas and ESZs.	MoEF&CC	MMRDA	MMRDA, Forest Department, Wildlife Department, Contractor to follow the conditions of the permission	MMRDA, Supervision Consultant

S. No	Act/ Rules/ Standards	Applicable Y/N				Reason of Applicability	Concerned Authority	Responsibility for obtaining permission	Implementation	Supervision-Construction Phase
5.	Water (Prevention and Control of Pollution) Act 1974	Y	Y	Y	Y	This act will be applicable and CTE is required to be obtained before construction or establishments of concrete batching plant, stone crusher, construction yard, workers' camp and stations, etc., and CTO is required to be obtained before operation of concrete batching plant, stone crusher, construction yard, workers' camp, depots and stations.	MPCB	Contractor	Contractor: construction phase and MMMOCL: Operation Phase	MMRDA, Supervision Consultant
6.	Air (Prevention and Control of Pollution) Act 1981 as amended in 1987	Y	Y	Y	Y	This act will be applicable and CTE is required to be obtained before construction or establishments of concrete batching plant, stone crusher, construction yard, workers' camp and stations, etc., and CTO is required to be obtained before operation of concrete batching plant, stone crusher, construction yard, workers' camp, depots and stations.	MPCB	Contractor	Contractor: construction phase and MMMOCL: Operation Phase	MMRDA, Supervision Consultant
7.	Noise Pollution (Regulation and Control) rules 2000 and its amendment 2010	N	Y	N	Y	These rules will apply to the project during the construction and operation phase. During the construction phase noise producing heavy construction equipment will be used and during the operation phase, the movement of the train and use of public address system at the stations may produce noise.	MPCB	Contractor	Contractor: construction phase and MMMOCL: Operation Phase	MMRDA, Supervision Consultant
8.	Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010	N	Y	N	N	No ancient monuments and archaeological sites within 300 m of the alignment. However, these rules will be applicable only for a chance finding of artifacts/ structures during excavation during the construction phase as there are.	Archaeological Dept. GoI, Dept. of Archaeology GoM, National Monuments Authority, New Delhi	MMRDA	MMRDA, Contractor to follow the conditions of the permission. Contractor will take permission in case of chance finding of any such item/structure during construction	MMRDA, Supervision Consultant
9.	Notification for use of fly ash, 2016	Y	Y	N	N	This law is applicable as there is the existence of coal-based thermal power plants within 300 km from the project alignment.	MoEF&CC	Contractor	Contractor	MMRDA/ PMU

S. No	Act/ Rules/ Standards	Applicable Y/N				Reason of Applicability	Concerned Authority	Responsibility for obtaining permission	Implementation	Supervision-Construction Phase
10.	The Explosives Act (& Rules), 1884	Y	Y	Y	Y	Applicable if any explosive will be stored and transported for the project	Chief Controller of Explosives	Contractor	Contractor	MMRDA, Supervision Consultant
11.	Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016	Y	Y	Y	Y	This rule is applicable as the project will involve the generation, storage, and disposal of hazardous waste like used oil, waste oil, greased cotton, empty paint, and oil barrels, empty containers of hazardous waste, etc.	MPCB	Contractor: construction phase and MMMOCL: Operation Phase	Contractor: construction phase and MMMOCL: Operation Phase	MMRDA, Supervision Consultant
12.	The Manufacture, Storage and import of Hazardous Chemicals Rules, 1989 as amended	N	Y	Y	Y	These rules may be applicable if there is the storage of any hazardous chemicals equal to or more than threshold quantities as per Schedules of the Act.	Authorities as Described in Schedule -5 of the Rules (MoEF&CC, CPCB, CCE, DC, CIM)	Contractor: construction phase and MMMOCL: Operation Phase	Contractor: construction phase and MMMOCL: Operation Phase	MMRDA, Supervision Consultant
13.	Solid Waste Management Rules, 2016	Y	Y	Y	Y	This rule is applicable as the project will involve the generation, storage, and disposal of municipal solid waste.	Local Bodies	Contractor: construction phase and MMMOCL: Operation Phase	Contractor: construction phase and MMMOCL: Operation Phase	MMRDA, Supervision Consultant
14.	Biomedical Waste Management Rules 2016 and amendments, 2016	Y	Y	Y	Y	This rule will be applicable as first aid centers will be established for the project both during construction and operation phase.	MPCB	Contractor: construction phase and MMMOCL: Operation Phase	Contractor: construction phase and MMMOCL: Operation Phase	MMRDA, Supervision Consultant
15.	Construction and Demolition Waste Management	Y	Y	N	N	This rule will be applicable during the construction stage only as the project mat involve demolition of the various structures like buildings, roads, etc. as required for clearing the RoW for the project.	Local Bodies	Contractor	Contractor	MMRDA, Supervision Consultant

S. No	Act/ Rules/ Standards	Applicable Y/N				Reason of Applicability	Concerned Authority	Responsibility for obtaining permission	Implementation	Supervision-Construction Phase
	Rules, 2016									
16.	Batteries (Management & Handling) Amendment Rules, 2010	N	Y	N	Y	This rule may be applicable if the project involves the handling, storage, and disposal of lead-acid batteries. Consumers and bulk consumers (100 or more lead-acid batteries in a year) will follow the rules and bulk consumers will file the return annually.	MPCB	Contractor: construction phase and MMMOCL: Operation Phase	Contractor: construction phase and MMMOCL: Operation Phase	MMRDA, Supervision Consultant
17.	E-Waste (Management) Rules, 2016	N	Y	N	Y	This rule will be applicable as it is likely that e-waste like computers, laptops, printers, etc. waste may be generated both during the construction and operation phase.	MPCB	Contractor: construction phase and MMMOCL: Operation Phase	Contractor: construction phase and MMMOCL: Operation Phase	MMRDA, Supervision Consultant
18.	Motor Vehicles Act, And Its amendment 2019	Y	Y	N	N	This rule will be applicable for all transportation vehicles, construction machinery and other vehicles.	Motor Vehicle Department	Contractor: construction phase and MMMOCL: Operation Phase	Contractor: construction phase and MMMOCL: Operation Phase	MMRDA, Supervision Consultant
19.	Minor Mineral and concession Rules, 1960	Y	Y	N	N	This rule will be applicable if sand/ earth/ aggregates or any other minor mineral will be extracted for the project. It is not likely that there may be a requirement for the establishment of a new quarry and borrow areas for this project & material may be procured from licensed vendor preferably. However, it will be applicable if any new borrow area or quarry is established	District Collector	Contractor	Contractor	MMRDA, Supervision Consultant

S. No	Act/ Rules/ Standards	Applicable Y/N				Reason of Applicability	Concerned Authority	Responsibility for obtaining permission	Implementation	Supervision-Construction Phase
20.	The Mining Act, 1952	Y	Y	N	N	This rule will be applicable if sand/ earth/ aggregates or any other minor mineral will be extracted for the project. It is likely that there may be a requirement for the establishment of a new quarry and borrow areas for the project.	Department of Mining, GoM	Contractor	Contractor	MMRDA, Supervision Consultant
21.	Mines & Minerals (Regulation and Development) Act 1957 and amendments,	Y	Y	N	N	This rule will be applicable if sand/ earth/ aggregates or any other minor mineral will be extracted for the project. It is not likely that there may be a requirement for the establishment of a new quarry and borrow areas for this project & material may be procured from licensed vendor preferably. However, it will be applicable if any new borrow area or quarry is established	Department of Mining, GoM	Contractor	Contractor	MMRDA, Supervision Consultant
22.	Petroleum and its amended rules, 2019	N	Y	N	Y	This rule will be applicable as the project may involve storage and handling of petroleum products equal to more than threshold quantities specified in the rule and permission from PESO may be required.	Petroleum and Explosives Safety Organization (PESO)	Contractor: construction phase and MMMOCL: Operation Phase	Contractor: construction phase and MMMOCL: Operation Phase	MMRDA, Supervision Consultant
23.	The Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996	N	Y	N	N	This rule is applicable as the project involves the hiring of labour for the construction.	Labor Department/ State Govt	Contractor	Contractor	MMRDA, Supervision Consultant
24.	The Maharashtra Building and Other Construction Workers (Regulation of Employment	N	Y	N	N	This rule is applicable as the project involves the hiring of labour for the construction.	Labour Department/ State Govt.	Contractor	Contractor	MMRDA, Supervision Consultant

S. No	Act/ Rules/ Standards	Applicable Y/N				Reason of Applicability	Concerned Authority	Responsibility for obtaining permission	Implementation	Supervision-Construction Phase
	and Conditions of Services) Rules, 2007									
25.	Contract Labour (Regulation and Abolition) Act, 1970	Y	Y	Y	Y	This law is applicable as the project involves hiring of contractual labour.	Ministry of Labor & Employment	Contractor	Contractor	MMRDA, Supervision Consultant
26.	National Forest Policy (Revised), 1988	Y	Y	Y	Y	This policy is applicable as the project involves diversion of forest land.	MoEF&CC and Forest Department, GoM	MMRDA	MMRDA and Contractor	MMRDA, Supervision Consultant
27.	Forest Conservation Rules (2003) and Guidelines issued to date by the State Govt. Maharashtra Felling of Trees (regulation) Act, 1964 The Maharashtra (Urban Areas) Protection and Preservation Act,1975,	Y	Y	N	N	Project may impact approx. 708 trees in RoW out of which 495 will be transplanted, 166 will be cut and 47 will be trimmed. Other than this, approx. 110 trees exists at depot site which may need to be removed from the site Permission will be required from Tree officer of the concerned local authority/Forest Department	Tree Officer/Local Designated District Authority/Tree Authority	MMRDA for project RoW/alignment and ancillary facilities Contractor: Planned facilities by contractor required for project construction	MMRDA for project RoW/alignment and ancillary facilities Contractor: Planned facilities by contractor required for project construction. forest department	MMRDA, Supervision Consultant

S. No	Act/ Rules/ Standards	Applicable Y/N				Reason of Applicability	Concerned Authority	Responsibility for obtaining permission	Implementation	Supervision-Construction Phase
28.	Guidelines to regulate and control ground water extraction in India, 2020	N	Y	N	Y	This act will be applicable if ground water extraction is required for the project.	Central Ground Water Authority	Contractor: construction phase and MMMOCL: Operation Phase	Contractor: construction phase and MMMOCL: Operation Phase	MMRDA, Supervision Consultant
29.	CRZ Notification 2011	Y	N	N	N	Applicable as the project alignment passes through the Coastal Regulation Zone as per the notification and requires to obtain CRZ clearance (Kasheli bridge site and Kasheli depot site)	MCZMA, MoEF&CC, SEIAA	MMRDA	MMRDA (Contractor to follow condition of the clearance obtained)	MMRDA, Supervision Consultant
30.	Workmen Compensation Act, 1923	N	Y	N	N	This Act provides for payment of compensation to workmen (or their dependents) in case of personal injury caused by accident or certain occupational diseases arising out of and in the course of employment and resulting in disablement or death.	Ministry of Labour& Employment	Contractor	Contractor	MMRDA, Supervision Consultant
31.	Minimum Wages Act, 1948	N	Y	N	N	The provision of the Minimum Wages Act, 1948 applies to every employer that employs more than 1000 employees in a state.	Ministry of Labour& Employment	Contractor	Contractor	MMRDA, Supervision Consultant
32.	Payment of Wages Act,1936	N	Y	N	N	This Act applies to all persons employed, whether directly or through contractors, in a factory or certain specified industrial or other establishments.	Ministry of Labour& Employment	Contractor	Contractor	MMRDA, Supervision Consultant
33.	Equal Remuneration Act, 1979	N	Y	N	Y	The Act is a Central Legislation and applies to the whole of India. The objective of the Act is to provide for protection against discrimination of women workers on the ground of sex, about the payment of equal remuneration in the matter of employment.	Ministry of Labour& Employment	Contractor	Contractor	MMRDA, Supervision Consultant
34.	Child Labor (Prohibition & Regulation) Act, 1986	N	Y	N	Y	Aims to eradicate any kind of child abuse in the form of employment and prohibit the engagement of children in any kind of hazardous employment, who have not completed 14 years of age.	Ministry of Labour& Employment	Contractor	Contractor	MMRDA, Supervision Consultant
35.	The Scheduled Tribes and Other	Y	N	N	N	This act is applicable as the project traverses through the scheduled areas	Concerned District	MMRDA	MMRDA (Contractor to follow the	MMRDA

S. No	Act/ Rules/ Standards	Applicable Y/N				Reason of Applicability	Concerned Authority	Responsibility for obtaining permission	Implementation	Supervision-Construction Phase
	Traditional Forest Dwellers Act 2006						Collector and DCF/DFO.		conditions of act and the approvals as obtained by MMRDA)	
36.	The National Waterways Act, 2016	Y	N	N	N	Permission will be required if the alignment traverses through any declared national waterway by IWAI. Permission obtained by MMRDA.	Inland Waterways Authority of India	Contractor	Contractor	MMRDA, Supervision Consultant
*Supervision during operation phase may be carried out by MMMOCL only or through an appointed agency.										

3.2 Due Diligence Findings on Legal and Regulatory Framework

The construction of Metro-rail system is not covered under the EIA Notification 2006, as informed by MoEF&CC to MMRDA through a letter dated 09 March 2016. But the Metro-rail system need to take other permissions and approvals as required by the relevant legislation (as mentioned under section 3.3).

While the list of legislation given in the Environmental Impact Assessment is relevant, the following needs to be added and the Environmental Impact Assessment updated accordingly:

1. Electricity Related Regulations, particularly of Safety
2. International Convention on Hazardous Materials
3. International Convention on Atmospheric Emissions
4. Regulation on Land Acquisition
5. Policies and Manuals of MMRDA on Metro Rail System
6. The World Bank Group EHSGs

3.2.1 Electricity Related Safety Regulation

The success of a Metro rail system lies in it's ability to provide efficient, fast, safe and comfortable travel to the commuters. Electrical systems play a major role in any Mass Rapid Transport (MRT) system in achieving the desired objectives. While providing backbone of 'Traction system' on which whole train operation works, Electrical systems ensure passengers facilities like Lighting and Airconditioning in the station and provide Life Safety systems like Firefighting systems for safety of passengers. Electrical System also consists of facilities like Lifts and Escalators for smooth movement of elderly as well as Persons with Disabilities (PwDs) in the stations at all times besides adding value to other systems by real time interface. Electrical systems consist of mainly the following four different streams; a) Power Supply and Traction (PST) system, b) Electrical and Mechanical (E&M) system, c) Lifts and d) Escalators.

In light of the above, the relevance of the following regulations needs to be discussed in the EIA and adopted, as the entire Mumbai Metro Line 5 will be operated using electricity and this involves working with electricity, setting up transformers, switch gears units, Ring Main Units (RMU), UPS for power backup, etc.

1. Central Electricity Authority (Safety Requirements for Operation, Construction and Maintenance of Electric Plants and Electrical Lines) Regulations 2011
2. Indian Electricity Act, 2003
3. Electricity Act (1910) and its Amendments (2004) and (2007)

3.2.1.1 Technical Standards and Regulations for the Indian Power Sector

Central Electricity Authority (CEA) is the technical agency making regulations consistent with the Electricity Act, 2003 under section 177 and carrying out the provisions of the Act. The following relevant regulations, which deal with health and safety requirements, are notified and published in the official gazette of the Government of India and available on the website of CEA:

(i) CEA (Installation and Operation of Meters) Regulations, 2006
(ii) CEA (Grid Standards for Operation & Maintenance of Distribution Lines) Regulations, 2010
(iii) CEA (amendment to the regulations on "Installation & Operation of Meters") Regulations, 2010
(iv) CEA (Measures Relating to Safety & Electric Supply) Regulations, 2010
(v) CEA (Technical Standards for Construction of Electric Plants and Electric Lines) Regulations, 2010
(vi) CEA (Safety Requirements for Construction, Operation and Maintenance of Electrical Plant and Electrical Lines) Regulations, 2011
(vii) CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) – Regulations 2010
(viii) CEA (Technical Standards for Connectivity to the Grid) (Amendment) Regulations 2010

3.2.2 International Conventions on Hazardous Materials

Stockholm Convention on Persistent Organic Pollutants (POPs) ensures the environmentally sound management and the disposal of POPs including polychlorinated biphenyls (PCBs). India has started using PCB free equipment, but existing equipment contaminated and cross contaminated with PCBs are also present. The convention gives governments until 2025 to phase out "in–place equipment" such as electrical transformers containing PCBs, as long as the equipment is maintained in a way that prevents leaks. It grants them another three years to destroy the recovered PCBs. The recovered PCBs must be treated and eliminated by 2028. If the MML5 is using any transformers (new or old), these need to comply with this.

3.2.3 International Convention on Atmospheric Emissions

UNFCCC (United Nations Framework Convention on Climate Change) is to stabilize GHG emissions[2] in the atmosphere at a level low enough to prevent dangerous anthropogenic interference with the climate system. The SF6 is a potent GHG used in switchgear/ RMUs. These components will be used for the MML5.This needs to be discussed and proper mitigation provided in the EIA.

[2]The six greenhouse gases that form part of the Kyoto Protocol to the United Nations Framework Convention on Climate Change include carbon dioxide (C02); methane (CH4); nitrous oxide (N2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulfur hexafluoride (SF6).

3.2.4 Policies and Manuals of MMRDA on Metro Rail System

The policies of MMRDA related to Metro Rail System and any manuals on Health and Safety, and their relevance to the MML5 need to be mentioned.

3.2.5 The World Bank Group EHSGs

The Asian Infrastructure Investment Bank applies the relevant health and safety provisions of internationally recognized standards, such as The World Bank Group's Environmental Health and Safety Guidelines and, as appropriate, industry-specific Environmental Health Safety Guidelines, to its Projects. This also requires documenting and reporting on accidents, diseases and incidents.

3.2.6 Climate Risk Assessment

The ESIA need to be updated duly reflecting the Climate Risk Assessment. The ESIA needs to take into account the following Climate Change Action Plans:

- Maharashtra State Adaptation Action Plan on Climate Change, 2014
- Mumbai Climate Action Plan, 2022
- Any other relevant national or state Climate Change Action Plan

The ESIA needs to take into account the following impacts among others:

- Impacts of Precipitation increase on the project
- Impacts of flooding and sea level rise
- Requirement of any flood risk assessment (flood modelling)
- Any other climate risk critical to Paris alignment for consideration of project

3.3 Permissions to be obtained – Status from Due Diligence

The Environmental Impact Assessment has listed several permissions to be obtained. During the due diligence the status of these has been noted and indicated against each permission to be obtained.

Table 3: Permissions to be obtained and Present Status

S. No.	Permission and Concerned Legislation	Authority Concerned	Responsibility of Obtaining	Responsibility of Implementation	Present Status
1	Forest Clearance under Forest (Conservation)Act,1980	State Forest Department, MoEF&CC	MMRDA for diversion of forest land within RoW and depot site	Contractor & MMRDA	Permission taken from respective municipal corporations and Forest Department
2	Tree Cutting permission as per Forest Conservation Act (1980), Forest Conservation Rules (2003) and Guidelines issued to date by the State Govt. Maharashtra Felling of Trees (regulation) Act, 1964, The Maharashtra (Urban Areas) Protection and Preservation Act,1975	Tree Officer/Local Designated By Respective District Authorities/ Forest Department	MMRDA for RoW and ancillary facilities, Contractor for Planned facilities by contractor required for project construction (in consultation with forest department	MMRDA, Contractor, Forest Department, Urban Local Bodies, viz., Thane Municipal Corporation and Bhiwandi Nizampur Municipal Corporation	Tree cutting permissions are obtained for cutting of 116 trees.
3	CRZ Clearance under CRZ Notification 2011	MCZMA, MOEFCC	MMRDA	Contractor & MMRDA	CRZ clearance issued on 06 April 2021, for at Kasheli Bridge a) 824 m passing through CRZ I area and b) 356 m passing through mangrove and its 50 m buffer zone, (Hence Total length falling in CRZ I Zone 1180 m) c) 1450 m alignment passes through CRZ III area and d) 650 m alignment passes across river (Total number of piers in CRZ area 132),and at Durgadi Fort, 20 m alignment passes

S. No.	Permission and Concerned Legislation	Authority Concerned	Responsibility of Obtaining	Responsibility of Implementation	Present Status
					through CRZ I area, b) 250 m alignment passes through CRZ III area, b) 320 m alignment passes across river (Total number of piers in CRZ area 24) High Court permission for working in mangroves, as mangroves are affected, to be submitted. Evidence of five times replanting of mangroves cut to be submitted duly pursuing with the Forest Department. The compensatory plantation will be carried out for the 0.6983 Ha. of diverted mangrove forest land by the forest department after receiving Stage-II Forest clearance and particularly in rainy season. For the said project, Stage 2 clearance will be obtained in approx. 5-6 months and accordingly in 1-2 years the compensatory plantation will be carried out by the forest department. MMRDA applied for CRZ clearance for the exit spur, approach road and EHV towers in CRZ at the Kasheli depot.
4	Mangrove Felling as per the directives of the Hon'ble Bombay High Court	The Bombay High Court	MMRDA	MMRDA	As above
5	Permission for groundwater extraction in view of Guidelines to control and regulate ground water extraction in India' vide notification	CGWA	Contractor	Contractor	As per the Contractor no groundwater is extracted

S. No.	Permission and Concerned Legislation	Authority Concerned	Responsibility of Obtaining	Responsibility of Implementation	Present Status
	number 3289(E) dated 24th September, 2020 by the Ministry of Jal Shakti (Department Of Water Resources, River Development and Ganga Rejuvenation), Central Ground Water Authority-Construction Phase				
6	Permission for groundwater extraction in view of Guidelines to control and regulate ground water extraction in India' vide notification number 3289(E) dated 24th September, 2020 by the Ministry of Jal Shakti (Department Of Water Resources, River Development and Ganga Rejuvenation), Central Ground Water Authority-Operation Phase	CGWA	MMMOCL	MMMOCL	This is yet to be obtained. MMRDA to confirm if groundwater is proposed for use during operations.
7	Environment Clearance for Stone Quarries under EIA Notification, 2006 and as amended	SEAC/SEIAA/ MoEF&CC	Contractor	Contractor	EC given on 19 Nov 2019 for the Vendor
8	Permission for Withdrawal of water from Surface Water bodies	Irrigation Department, Govt. of Maharashtra	Contractor	Contractor	As per the Contractor no surface water is withdrawn.
9	Traffic Diversion, Movement of transportationvehiclesasperCMVR,2020	Transport Department, Govt. of Maharashtra	Contractor	Contractor	This permission to be submitted.to the Bank
10	Consent to Establish and Consent to Operate from Batching Plant, Depots, Stations, Quarries, Stone Crushers, etc. under Air Act1981andWater Act 1974	MPCB	Contractor	Contractor	Obtained for the Ready-Mix Concrete Plant by the Vendor

S. No.	Permission and Concerned Legislation	Authority Concerned	Responsibility of Obtaining	Responsibility of Implementation	Present Status
11	Authorization for handling, storage, and disposal of hazardous waste under Hazardous and other waste (Management and Transboundary movement, 2016) and agreement with the authorized vendor	MPCB	Contractor	Contractor	License granted to vendor till 31 March 2026
12	Authorization for handling, storage, anddisposalofmunicipalwasteunderSolidWasteManagementRules,2016 and other waste including bio-medical waste, e-waste, plastic waste, battery waste as applicable	MPCB/Local Bodies	Contractor	Contractor	The Contractor engaged is "Sara Plast" for sanitary services, but this was during 2021. Latest evidence to be submitted. For Biomedical Waste from the clinic, permission is given from 01 Jan to 30 April 2023. This needs to be renewed. Needs to be updated.
13	Authorization for handling, storage, and disposal of construction & demolition wasteunderC&DWasteManagementRules, 2016	MPCB/Local District authorities	Contractor	Contractor	This permission needs to be submitted.
14	Storage of petroleum products under thePetroleumRules,2002asamended	Department of the ministry of petroleum and natural gas	Contractor	Contractor	This situation does not arise, as per contractor and GC.
15	RegistrationofWorkersunderCLA,1970	Labour & Employment Department, GoM	Contractor	Contractor	Contractor has obtained labour license and filing annual returns.
16	Storage of petroleum products under thePetroleumRules,2002asamended	Department of the Ministry of Petroleum and Natural Gas	Contractor	Contractor	As per contractor and GC this is not applicable
17	Pollution Under Control Certificate	Transport Department	Contractor	Contractor	PUC issued by Government of Maharashtra are available with the Contractor for the vehicles used for the project.

3.4 Potential Environment Risks/Impacts during Construction and Operation

The table below lists the likely environmental risks and potential impacts due to the project during construction and operations.

Table 4: Environmental Impacts and Mitigation

S. No.	Environmental Attributes	Potential Impact	Mitigation Measures Suggested
	Construction Phase		
1.	Air Environment	• Generation of Dust	• Compliance to CTEs and CTOs • Identified dust-generating plants and machinery such as batching plants shall be placed at a minimum distance of 500 m from residential and sensitive areas in a downwind direction as far as possible • Sprinkling of water • Dust screens where required • Regulation of construction timings near sensitive receptors and settlements • Covering of loose construction material, constriction debris, and transportation vehicles • Provision of wheel washing facilities • Provision of mask for workers
		• Gaseous Pollution	• Vehicles and machinery will be regularly maintained to conform to the emission standards • Construction camps and casting yards sites should be preferably sited more than 500 m away from the residential and sensitive area in a downwind direction • All construction and transportation should have valid PUC • Use of clean fuel like LPG for cooking at labor camps • The height of the stack shall be as per CPCB norms • Use of masks by workers engaged in construction
2.	Noise Environment	• The increased Noise level during construction due to various activities	• Properly maintained construction equipment, machinery, vehicles to be used • Noise levels of machinery used shall conform to the relevant standard • Regulation of timing of construction work generating noise pollution near the

			residential and sensitive areas • Temporary noise barriers shall be provided near the residential and sensitive areas (to be provided all along the RoW as the entire alignment is in urban area comprising of residential area, sensitive receptors, commercial/industrial area and mangrove habitat and at all these locations, ambient air quality standards are required to be maintained) • Ear plugs and muffs will be provided to workers as per requirement during construction activities
3.	Vibration	• Vibration in the nearby area (upto 25 m) due to piling • Vibration due to heavy construction equipment	• No historic building, old building or monument lies within 25 m of proposed alignment and thus no impact due to vibrations is anticipated due to piling works • Also, no impact due to vibration from piling is anticipated on flora & fauna as ecologically rich areas are at distance from project site • Properly maintained construction equipment and machinery to be used • Heavy vibrating machinery can be placed vibration absorption pads
4.	Water Environment	• Impact on rivers/creek due to construction activities near banks and construction pier inside the water bodies	• Bridges, piers, and other structures shall be constructed without affecting the original course and flow of water bodies • Stabilization and turfing of slopes along the water bodies will be done.
		• Siltation of water bodies	• Silt fencing around water bodies during construction will be installed to filter out the silt-laden runoff before entering to the water body • Turfing or pitching of embankments of affected water bodies will be done to prevent erosion that also causes siltation in the water bodies • No solid waste will be dumped in or near the water bodies or rivers • Excavated earth and other construction materials shall be stored away from water bodies
		• Water for construction	• Water source would be selected so that local availability is not affected • Camps will have separate water supply facilities so that local water sources are not affected
		• Contamination from wastes	• Provision of septic tanks to prevent any untreated sewage discharge from construction workers camps and sites to the water bodies

			• Sullage from septic tank shall be disposed of periodically through authorized agencies only • Oil interceptors shall be provided at construction machine maintenance yards • No waste shall be stored near to the water bodies and shall not be disposed of in any water bodies. Waste management rules shall be followed for the management and disposal of different types of waste
		• Contamination from fuel and wastes	• Vehicle maintenance will be carried out in a confined area, away from water sources, and it will be ensured that used oil or lubricants are not disposed to water courses • Fuel shall be stored in covered containers which should be placed on paved surfaces. Containment shall be provided to contain spillage if any. • Oil spill kits shall be provided for managing the oil spill and staff shall be trained to use them. • A drip tray shall be provided with all the vehicles and the machinery
		• Sanitation and waste water from construction sites and labor camps	• Proper sanitation facilities will be provided including toilets with water facilities etc. at labour camps and sites • Waste water from toilets and kitchen shall be disposed off through septic tanks and soak pits or modular STPs shall be provided. Treated water from STP shall be used for dust suppression and landscaping • Workers shall be educated not to contaminate the water bodies • Waste water from batching plants and transit mixers shall be properly treated before disposal • Regular monitoring shall be conducted for surface, ground water, and drinking water as per EMoP. If STP is installed then wastewater and treated water quality shall also be monitored on daily basis.
5.	Land Environment	• Loss of topsoil	• Topsoil on stripping shall be removed and stockpiled for plantation and greenbelt development. • Fertile land will be avoided for earth borrowing. If needed, topsoil will be separated and reused for plantation and greenbelt development.
		• Soil contamination	• Proper waste management as per the waste management rules • Proper storage of the fuel, waste oil, and construction material on paved surfaces in

			covered conditions • Minimizing the spillage of fuel, waste oil, and construction material • Oil and waste/waste water storage containers/tanks shall be inspected regularly for leakages
		• Land-use change	• An elevated corridor has been selected for the proposed project which minimizes the land requirement.
7.	Social Environment	Loss of land, structures, common property resources and livelihoods	These impacts are dealt in Social Due Diligence
		Utility shifting There are approx. 4 no. of utility to be shifted	• Utilities shall be shifted through the concerned dept. by paying the required fee. • New facilities shall be provided before disturbing the existing utilities as possible In case a new facility cannot be provided before disturbing the existing utility then concerned users shall be pre-informed about the same
8.	Waste Generation	Municipal Waste	• Municipal waste from site, labour camp and other project facilities shall be collected, segregated, treated and disposed off as per SWM Rules, 2016 • Source segregation of waste shall be adopted • Onsite treatment facility for food waste and other compostable waste shall be established • Recyclable waste shall be sold to authorized vendors only • Reject fraction of waste shall be disposed off through the local waste management agencies in the area • STP/Septic tank sludge shall be disposed off through the authorized vendors only • Permission for generation, storage and disposal of waste shall be obtained from concerned local bodies as applicable and condition of the permissions obtained shall strictly be followed
		C&D waste	• C&D waste shall be handled as per the Guidelines of C&D Waste Management Rules 2016. • Permission will be obtained from local bodies for disposal of C&D waste

		Hazardous waste	• The authorization shall be obtained from SPCB for storage handling and disposal of hazardous waste • Hazardous waste shall be disposed off only through an authorized vendor • Hazardous waste shall be stored in covered HDPE containers on the paved surfaces
		Bio medical waste	Bio medical waste from first aid centers shall be collected, stored, and disposed off as per the Bio medical waste management rules, 2016
		Other waste	Other waste like packaging waste, plastic waste, e-waste, battery, etc. may also be generated which shall be disposed-off as per the respective regulations in India
9.	Flora	The RoW will be cleared off the vegetation Approx. 708 nos. of trees are falling within the project RoW, Other than this, approx. 50 to 60 trees exists at depot site which may need to be removed from the site and impacting mangrove area of 0.6983 Ha. which is classified as reserve forest More than 3 km distance from notified ecological areas like SGNP and Thane Creek Flamingo Sanctuary	• Opting for the elevated corridor has minimized land requirement, forest diversion, and tree cutting • Planning shall be done to minimize tree cutting. Nos. of trees to be cut shall be finalized only after joint visit of the project team with concerned Govt. department • Only required trees shall be cut and other trees shall not be disturbed to the extent possible. • The transplantation approach shall be adopted for trees between the girth 30-75 cm as possible. • Compensatory plantation shall be carried out in consultation with the forest department as per the guidelines of concerned Tree Authority under Maharashtra (Urban Area) Tree Preservation Act, 1975 and its amendments • The strips of short stature trees/ shrubs may be planted along the corridor wherever possible in the available spaces • Only native species shall be planted • Green belts shall be developed at stations, depots, and along the corridor as possible • No impact anticipated on flora & fauna of SGNP and Thane Creek Flamingo Sanctuary
10.	Fauna (No significant wildlife found in area as the alignment traverse	Loss/ Defragmentation of Habitat and Degradation of Habitat Quality	• The adoption of an elevated corridors system will facilitate the movement of fauna across the corridor • Precautions will be taken to avoid leakage of chemicals, any hazardous materials due to construction activities. • Labour camps will be located far from the green habitats and labourers will be strictly

	through the urban area)		guided not to disturb the flora & fauna. • Contractual obligations should be enforced to prohibit any hunting, trapping and killing of wild faunal species • On any encounter with wild species, the forest department will be informed in case of handling will be required.
		Noise-Induced physiological and Behavioural Changes	• Since SGNP and Thane Creek Flamingo Sanctuary are at distance of 3.4 km and 8.0 km respectively no such changes on fauna of these areas is anticipated due to project but for additional safety, Noise walls/barriers shall be provided near the sensitive habitats.
		Injury/mortality to birds (A study was carried out to assess the extent of habitat loss of the birds due to tree cutting envisaged due to the project and no active nest site was found in this area)	•Construction sites shall be barricaded to prevent trespassing of any domesticated or wild fauna •Faunal movement will not be impacted due to the project as the project is elevated in nature •No machinery shall be parked outside the barricaded boundary which may harm/injure fauna
		Reduce access to water sources	•Creation of small ponds and improvement of water bodies will be done for the wild animals or birds for drinking need.
11.	Borrowing and Quarrying areas (However borrow area may not be required for the project and material may be purchased from licensed vendors)	• Land degradation if borrowing and quarrying areas are not restored or maintenance.	•All the borrow areas shall be opened and closed only after approval from an engineer. •All borrow areas shall be restored after borrowing is complete •Borrowed land must be reclaimed/restored to the acceptable level by the land owner.

12.	Health and Occupational Safety	Occupational risks on workers	•Child labour shall strictly be prohibited at work site and shall not be allowed at its supplier sites also •To provide and maintain safe work environment, safe plant and equipment's, and safe system of work. •To provide information, instruction training and supervision to execute the work in safe and healthy manner. •To provide suitable occupational health and safety management arrangements, •To provide appropriate personnel protective equipment. •Safe and convenient passage for vehicles and pedestrians will be arranged during construction work.
	Operations Phase		
1.	Noise and Vibration	• Generation of high noise and vibration due to movement of metro rail	• Noise and vibration mitigation measures are integrated with the project design to minimize noise and vibrations due to Rail & wheel interaction, pantograph, aerodynamic noise, etc. • Noise barriers should be erected in all residential/sensitive receptor locations along the alignment so as Ambient noise levels are not affected due to project. Further these noise barriers will also act as visibility barrier and barrier to prevent collision of avifauna with running train. • Proper maintenance shall be carried out for rail, rolling stock, etc. to minimize the noise and vibration generation • Noise & vibration monitoring shall be conducted along the corridor as per the proposed environment monitoring plan • Honking shall be prohibited near and within the station and depot areas
2.	Water Resources	• Requirement of water for drinking, cleaning, fire-fighting and landscaping purpose at stations, trains and depots	• Water shall be procured from ground sources, surface water sources, pipelines etc. only after obtaining permission from concerned agency. Conditions of the permission shall strictly be followed • Water requirement shall be minimized by installing water conservation fixtures • Water wastage shall be reduced by optimizing water usage and preventing wastage by provision of alarm systems with water tanks and timely repair & maintenance of leakages in pipelines & tanks

			• Rainwater harvesting shall be practices to harvest rain water form viaduct, stations and depots as feasible. Collected rainwater shall either be directly used or recharged to ground after appropriate treatment as per CGWB guidelines
3.	Water Quality	• Generation of sewage from toilets & kitchen at stations, depots and trains • Generation of effluent at maintenance depots and workshops	• Sewage generated shall be disposed off through the city sewerage system/septic tank as feasible as per CPCB norms. • Sewage shall be treated at generation site if generation exceeds 10 KLD within inhouse STP upto tertiary level. Treated water from STP shall be used for non-potable use within site like flushing and landscaping. • ETP shall be provided at depots. Effluent containing contaminants like chemicals, grease, oil, etc. shall be treated in ETP only upto tertiary level. ETP treated water shall be used for flushing purposes. • Sludge of STP and ETP shall be disposed off through authorized vendors only as per the law.
4.	Air Quality	• Overall project quality may improve due to modal shift from road to metro-rail system • Emissions due to operation of DG sets	• Water sprinkling, fountains and sprinklers shall be provided near the roads within and outside the station areas • Vehicles with valid PUC shall only be allowed to enter the station premises • MMMOCL shall coordinate with the concerned development authorities, so as to assure that width of the roads connecting the stations is adequate to handle the existing traffic and anticipated new traffic to prevent congestion near stations
5.	Waste	• Waste Generation	• Waste to be generated from maintenance depot and stations shall be segregated at source and shall be disposed off as per the Waste Management Laws in India • NOCs as applicable shall be obtained from concerned local bodies and SPCBs as applicable for generation, storage, treatment and disposal of the waste to be generated. Conditions of these permission shall be followed.
6.	Risk and Disaster	• Loss of life and property	• Emergency Response System Devices for real-time communication must be available at all sites. • The alarm system should be installed in control rooms and stations. • A specific Risk and Disaster Management Plan is to be formulated for the project
7.	Energy Consumption	• Consumption of electrical energy for	• Metro rail operation is more efficient than road transport • Alternate energy sources like solar power generation may be adopted to minimize the

		operation and stations.	energy requirement • Green building rating may be obtained for the stations and depot buildings • Energy star-rated equipment and fixtures will be used to minimize the energy consumption – e.g., energy-efficient motors and pumps, use of energy-efficient lighting, energy-efficient luminaries, adequate and illumination levels optimized as per tasks, and energy-efficient.

3.4.1 Environmental Management Plan

The environmental management plan that was prepared by EIA consultants is annexed to this report as Annexure 1. This needs to be revised keeping in mind the suggestions made under this section.

3.4.2 Environment Monitoring Plan

The environmental monitoring plan that was prepared by EIA consultants is annexed to this report as Annexure 2. This needs to be revised keeping in mind the suggestions made under this section.

3.5 Environment Due Diligence

As per Mumbai Metropolitan Region Development Authority (MMRDA) and General Consultants (GC), the design changes, method statement changes, and alignment changes were incorporated into the revised Environmental Impact Assessment.

3.5.1 Legal and Regulatory Related

The due diligence findings on the legal and regulatory provisions given in the Environmental Impact Assessment are given under section 3.2.

3.5.2 Permissions Required

The viaduct is crossing the Vasai creek (Kasheli) between Balkum and Kasheli. The creek is declared as National Waterway no. 53, by Ministry of Shipping, Inland Waterways Authority of India (IWAI). The Maritime Board while giving its permission for the viaduct crossing the creek, has specified that permission from National Waterways Authority of India need to be taken. Accordingly, the permission from IWAI is received.

A total of 708 trees are likely to be affected; out of which 495 to be transplanted, 166 to be cut and 47 to be trimmed. Out of these as on date, 397 are transplanted, 136 cut and 28 trimmed. All the tree cutting permissions need to be translated into English and submitted to the Bank along with originals. Similarly, all permissions/ approvals which are in other languages, be translated into English and submitted to the Bank.

3.5.3 Baseline Data

Presently the section 4.5 of the EIA, has the details of flora (terrestrial and aquatic) and fauna (terrestrial and avian) are provided in the Environmental Impact Assessment Report. The list of flora (terrestrial and aquatic) and fauna (terrestrial, aquatic and avian) needs to be updated with IUCN status for all the species.

3.5.4 Impacts on Biodiversity

Also, with respect to the two protected areas, Sanjay Gandhi National Park and Thane Creek Flamingo sanctuary falling within 10 km radius of the project, (and any other protected/ conserved areas), the ESIA should clearly state if any permissions/clearances required from Wildlife/ Forest authorities. Even if permissions/ clearances are not required, the ESIA should clearly state any other impacts on these areas due to project related activities, such as construction activities, noise, vibrations, transportation, quarrying, etc. needs to be assessed. If there are no impacts, then it should be clearly mentioned in the EIA para number 251 and 252 (and in the Executive Summary).

3.5.5 Contractor's Submissions

- The civil works contractor has submitted an EMP and SHE plan. This is approved by GC
- The civil works contractor is ISO:9001: 2015 certified, this certification is valid till 26 November 2023
- The civil works contractor has a labour license, valid till 31 December 2023.
- The civil works contractor has obtained an insurance under WCA 1923, which is valid till 09 November 2023.

3.5.6 Electrical Works and Safety

The Environment Management Plan needs to be updated with the health and safety aspects related to heights, electricity safety issues, replacement of transformers with PCBs, leak detection provisions for switchgear or RMUs with circuit breakers using SF6, etc.

3.5.7 Noise and Vibration

The Metro Line 5 alignment is passing close to residences and commercial establishments at Kapurbawadi. The viaduct edge is at 3 m away from the nearest residential/ commercial building. The noise and vibration impact, during operation of MML5, at this site needs to be assessed. Proper and site-specific noise and vibration prevention/ abatement/ mitigation measures need to be proposed and to be incorporated into the EMP and implemented on site.

3.5.8 Health Safety and Housekeeping Issues

During the field visits, it was noticed that a) work sites are not barricaded properly, b) no appropriate signage at the sites, c) scrap/ waste materials were dumped haphazardly on the sites, d) the temporary sheds erected to provide shade/ working place to the workers were all in tatters with torn sheets, e) sharp rusted objects were used for holding the reinforcement bars, f) work tables were made of damaged broken pieces of sharp corrugated sheets, g) earthing for the machines were given using flat bars slightly above the ground creating opportunities for trips, slips, and falls, h) concrete waste is thrown around at the site, i) security guards are sitting in the open without cabins, j) the workers lunch are at site had no proper arrangements for storing food, sitting, eating, etc., the overall housekeeping of the sites is lacking. On the day of the visits, a heavy machinery operator was operating the machinery alone without another worker guiding and watching machinery work. This needs to be corrected immediately and improvements need to be recorded.

3.5.9 Labour Camp

The labour camp at the casting yard, that was visited was in good condition, quite clean with proper rooms, beds, sanitary facilities, cooking facilities, etc.

3.5.10 Labour Returns by Contractor

The contractor (AFCONS) filed an Annual Return filed with Labour Commissioner for the Year ending with 31 December 2022. This was filed on 17th February 2023. The Annual Return for the year 2021 needs to be shared with the Bank.

3.5.11 Investigation Reports on the Accidents

As per the Metro PIU, with regard to the fatal incident of 18 May 2021, the investigation report is prepared by the Contractor. The root cause analysis of the accident needs to recommend necessary safety measures to be taken to prevent such incidents. The GC has to endorse the report first and certify that the recommended safety measures are implemented and functioning. The investigation report mentions corrective actions as *a) revise the method statement, b) briefing and training of revised method statement to engineer/ supervisor/ foreman/ worker/ operators, c) procedure must follow as per revised method statement, d) retraining of workmen ship as per revised method statement.* The GC should request the contractor to clearly mention specific actions proposed in the revised method statement, how these are different from the previous method statement and how will these prevent recurrence of such accidents. The report submitted by contractor on the Fatality incident says that an amount of Rs. 16,38, 525/- through a State Bank of India cheque dated 08 June 2021 is paid into the account of Labour Commissioner (Employee Compensation). The details of distribution of this amount and dates on which the victim's kin received the amounts are not given. The GC should request these details from the contractor and certify proper closure duly complying with the legislation.

Similarly, the investigation report for the accident happened on 13 November 2021, need to be submitted. As per the information from the GC and PIU, due to the fall of the reinforcement of a metro pillar under construction, four persons were injured and one was hospitalized for a week. The root cause analysis of the accident needs to recommend necessary safety measures to be taken to prevent such incidents. The GC has to endorse the report first and certify that the recommended safety measures are implemented and functioning.

3.5.12 Independent Safety Health Environment Audit

The Fifth Quarterly Independent Auditor's report mentions of no electrical hand gloves, no revised Hazard Identification and Risk Assessment and Method Statement. This has been updated as done in a follow up report. The Seventh Quarterly Independent Auditor's report mentions of "*Regarding accident of pier reinforcement fall, no action taken till date. No method statement are updated even after target date is crossed*" and "*Poor electrical workmanship. Poor cable joints with tape at Ovali Casting Yard*". The follow up report is silent on these.

The review of the independent audit reports at PIU, indicate there were no any significant findings or recommendations. It is learnt that from PIU that the Audit agency is appointed by the civil works contractor. There is a need for the monitoring agency to be independent of the contractor and the General Consultants. Hence, the Terms of Reference of the Independent Auditor need to be reviewed and revise it to focus more on the safety issues and scope to be revised to support the contractor in achieving the desired safety compliances.

3.5.13 Periodic Frequent Environmental and Social Monitoring

Though the project civil works are nearing completion, the remaining civil works and the track work and electrical and mechanical works require close and frequent monitoring by an independent agency with substantial environmental and social monitoring experience and expertise; particularly in view of the remaining works being to be carried out at heights and in confined spaces and mostly electrical works.

Presently the Metro PIU has only one position for ensuring compliance with environmental safeguards and monitoring the implementation of the Environment Management Plan. The GC too has only one position and the contractor has one position.

This requires engaging an External Monitoring Agency for quarterly monitoring of environmental and social safeguards and EMP and RAP implementation and for Mid-term and End-term evaluation.

4. Social Due Diligence

4.1 Current Status of LA & RR

Construction works of the project commenced in August, 2019on stretches not involving acquisition of private land and R&R, and 78.29%of civil works are completed. While the process of acquisition of any of the private lands affected by the project works is yet to be completed, MMRDA has resettled 109 occupant households / business establishments from 4 project affected locations. However, construction works with physical impacts of LA&RR such as depot, entry/exit to depot, viaduct at Kapurbawadi junction and construction of certain stations, including their entry/exit structures, are being now commenced.

4.2 Legal and Regulatory Requirements

The major policies, laws, rules and regulations related to social aspects, particularly for acquisition of land and R&R, required to be considered for the project and their applicability is described in the following table. Provisions of these instruments prescribe the eligibility and entitlements of various categories of project affected persons (PAPs).

Table 5: Legal Instruments Applicable to the Project

Legal Instrument	Main Purpose	Responsible Institution	Applicability
Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (RFCTLARR) Act, 2013, and various Notifications issued by Govt. of Maharashtra under it in 2014 & 2015.	The Act aims to pay fair compensation for private land and assets required for projects and also provide R&R benefits, including for livelihood support, to affected persons. GoM notifications of 2014 & 2015 prescribe matters such as multiplying factors for land compensation and financial values of R&R benefits	Competent Authority (Office of District Collector, Thane) on behalf of the project agency, which in this case is MMRDA	Yes. The private lands and assets affected by the project are required to be acquired.
Govt. of Maharashtra's Resolution about Direct Purchase of Land through Negotiations, 2015	To provide for direct purchase of land through negotiations by paying an amount 25%higher than the cash compensation	Competent Authority (Office of District Collector, Thane) on behalf of the project agency,	Yes. However, this is in the form of an alternative option to acquisition under RFCTLARR Act, 2013, which comes

	payable for land and assets under RFCTLARR Act, 2013	which in this case is MMRDA	into effect if offered by Govt. and accepted by PAPs.
Govt. of Maharashtra's Resettlement and Rehabilitation Policy for Mumbai Urban Transport Project (MUTP), 2000	To prescribe eligibility, entitlements, compensation for economic losses, grievance redress & related matters for all categories of PAPs (including those occupying public lands) and acquisition of private lands and assets for MUTP	Project Implementing Agency, which in this case is MMRDA	Yes. Occupants of structures located on public lands affected by the project are required to be resettled. MUTP R&R Policy is made applicable to Metro-5 & other projects of MMRDA, being implemented with the financial assistance of Multi & Bi lateral agencies.

No significant gaps exist in the provisions of RFCTLARR Act and MUTPR&R Policy when compared with the requirements of AIIB's Social Framework. The draft SIA/RAP proposes further measures to ensure compliance with AIIB's requirements. While, the RFCTLARR Act and MUTP R&R Policy do not specifically provide for Categorization and Screening of Projects and Assessment of Alternative Project Designs, these are addressed as a part of the pre-feasibility and feasibility studies carried out for the project (e.g., fixing the alignment largely within existing Right of Way of roads and choice of depot location) before deciding to take up the project for implementation. Efforts are made even during finalization of designs (e.g., of station entry-exit structures) to minimize impacts. Impacts on structures at Balkum Station, Kasheli Station, Kalher Station and Anjurphata Station, and also at a location of Kasheli viaduct were reduced by 94 structures by changing locations and designs for entry-exit structures.

4.3 SIA and RAP

MMRDA has prepared SIA and RAP report for MML-5 (Phase-I) with the help of consultants (EQMS India Pvt. Ltd.). The draft prepared in October, 2022 is being revised to primarily incorporate (a) changes in land requirement and number of structures impacted, (b) socio-economic and other details of owners of private land affected by depot, (c) details of PAPs whose structures located on private land were affected, (d) measures proposed for restoration of livelihoods of commercial and other vulnerable PAPs (e.g. below poverty line); and (d) other aspects related to assessment of land cost, external monitoring, estimates of replacement cost comparison etc. The revised SIA & RAP report, at least substantially compliant with all requirements, will be submitted latest by June 22, 2023.

4.4 Impact on Land and Surveys

Most of the project alignment is running through existing road and the land outside the current Right of Way (RoW) is required permanently for viaduct construction at only five locations (one private and four public lands), for entry-exit structures of stations at four locations (all private land), for depot and allied works at one location (private land); and temporarily at two locations (both public lands) for a site office and a segment casting yard. A total of 35.41 ha. (354,114.89 sq.m.) land is required to be obtained, the summary of which is given in the table below.

Table 6: Land requirement for the project

S. No.	Work Component	Public Land (sq.m.)	Private Land (sq.m.)	Total Land (sq.m.)
I	Permanent Requirement			
1	Viaduct	15,957.83	797.11	16,754.94
2	Entry-Exit of Stations	166.35	4,353.60	4,519.94
3	Depot and Allied Works	4029.00	267,311.00	271,340.00
	Total Permanent	20,153.18	272,461.70	292,614.88
II	Temporary Requirement			
1	Site Office and Casting Yard	61,500.00		61,500.00
	Grand Total	81,653.18	272,461.71	354,114.88

The public lands required for the project are either owned by Govt. of Maharashtra or by other public agencies. Those required permanently are allowed to be initially used and later formally transferred to MMRDA and those required temporarily are allowed to be used based on mutual terms and conditions agreed between the parties. The current status of obtaining of public lands required for the project is provided in the following table.

Table 7: Status of Obtaining Public Land (Permanently and Temporarily)

S. No.	Location	Extent of Public Land (sq.m.)	Status
I	Permanent Requirement		
1	Purna: Entry-Exit Structure for Station	166.35	State Govt. land under Gram Panchayat: No Objection obtained
2	Kasheli: Viaduct (Furniture Market)	8,106.10	PWD, State Govt. land acquired for road: NOC obtained from PWD
3	Balkum Naka-Kasheli Creek: Viaduct	836.40	MCGM land: Allowed use, issue of payment under consideration
4	Kasheli: Viaduct	32.33	State Govt. land: Used by Gram Panchayat for SCM Sports Complex, NOC being obtained
5	Kasheli North: Viaduct	6,983.00	State Govt. (Forest Land): Forest clearance will be obtained, no separate permission necessary

6	Kasheli Depot	4029.00	MCGM land (1,956 sq.m.): Permission to be sought State Govt. land (2,073 sq.m.): Permission to be sought
	Sub-total (Permanent)	20,153.18	
II	Temporary requirement		
1	Balkum Naka: Temporary Office / Site Office	1,500.00	MCGM land: Permission obtained
2	Dapode: Segment Casting Yard	60,000.00	State Govt. land: Permission obtained from Thane District Collectorate
	Sub-total (Temporary)	61,500.00	
	Grand Total	81,653.18	

The private lands are formally acquired through a legal process under the RFCTLARR Act, 2013 or purchased directly through negotiation if both parties agree. The legal process involves notification, joint measurement of lands and assets, identification of title holders and further steps following due process of acquisition / purchase. The status of surveys of private lands and their owners depends on the progress of legal process of acquisition / purchase of such land. The current status of acquisition of private lands required for the project is provided in the following table.

Table 8: Status of Acquisition of Private Land Permanently

S. No.	Location	Private Land (sq.m.)	Status
I	Entry-Exit Structures of Stations		
1	Kasheli	310.73	Proposal being prepared for submission to Thane Collector Office for acquisition
2	Kalher	115.87	Proposal being prepared for submission to Thane Collector Office for acquisition
3	Anjurphata	1,954.21	Proposal being prepared for submission to Thane Collector Office for acquisition
4	Dhamankar Naka	1,972.79	Proposal being prepared for submission to Thane Collector Office for acquisition
	Sub-total	4,353.60	
II	Viaduct at Kapurbawadi	797.11	Proposal sent to the Competent Authority for acquisition under Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (RFCTLARR) Act, 2013
III	Depot, RSS, OCC, Staff Quarters etc. at Kasheli	267,311.00	26.73 ha. being acquired in two parts by the Competent Authority (Office of District Collector, Thane) under the RFCTLARR Act, 2013. The process is at the stage of finalisation and declaration of Award
	Grand Total	272,461.71	

4.5 Use of Affected Lands

All public and private lands affected by the project permanently are located in urban areas of Thane, Bhiwandi Surrounding Notified Area (BSNA) and Bhiwandi. The locations of stations of Kapurbawadi and Balkum Naka fall in Thane Municipal Corporation (TMC) area, stations of Kasheli, Kalher, Purna are located in BSNA and stations of Anjurphata and Dhamankar Naka are in Bhiwandi Nizampur Municipal Corporation (BNMC) area. Almost 96% of all public lands (20,153.18 sq.m. or 2.02 ha.) required are located in BSNA and BNMC, which inter alia constitutes 40% land (at Kasheli Market) earlier acquired for the total planned width of the road but not developed and later encroached and another 36% is forest land along the road near the Kasheli creek and 20% forms part of land required for depot at Kasheli. Other small parcels of lands, which are vacant, are separate lands or those forming part of bigger land parcels used for other purposes (e.g., Sports Complex etc.). The remaining 4% public land required for the project is in Thane (between Balkum Naka and Kasheli Creek) and is also vacant.

Similarly, more than 98% of all private lands (272,461.71 sq.m. or 27.25 ha.) required are also located in BSNA and BNMC, which mostly constitutes 26.73 ha. land required for depot and allied activities such as RSS, OCC, Staff Quarters etc. at Kasheli. This parcel is used for production of rice once a year during monsoon and the land is without any structures; and no other economic activities are carried out on this land. Other private land requirement (4,353.60 sq.m. or 1.60%) in BSNA and Bhiwandi constitutes small parcels of land along the existing road required for entry-exit structures, most of which house semi-pucca structures. The remaining 0.30% land (797.11 sq.m.) located in Thane affected by the viaduct at Kapurbawadi mainly consists of 3 buildings with residences and commercial enterprises (67 numbers) and 2 commercial ground floor structures.

4.6 Land Ownership Pattern

The information on extent of private land held by either individuals or by individuals along with other legal heirs for depot land of 26.73 ha. is available (not available for other small land parcels affected by viaduct at Kapurbawadi and entry-exit structures of 4 stations). The details are provided in the following table.

Table 9: Land Ownership Pattern for Private Depot Land

S. No.	Land Holding (sq.m.)	Number of Land Parcels	Extent of Land Held (sq.m.)
1	Up to 5,000	44 *	32,126
2	5,000 + up to 10,000	2	14,285
3	10,000 + up to 15,000	3	35,791
4	15,000 + up to 20,000	6	108,660
5	20,000 + up to 25,000	2	49,029
6	25,000 + up to 30,000	1	27,420
	Total	58	267,311

* 3 Parcels are partly owned by MCGM and equal division of land is assumed.

Majority of land owners (76%) hold land of 5,000 sq.m. (half a ha.) or less. 41% of the total land is owned by 6 owners holding parcel sizes ranging between 15,000 sq.m. and 20,000 sq.m.

4.7 Impacts on Structures and Surveys

Since the alignment of the project is largely passing through the existing road, structures mostly located outside on public and private lands are affected for works to be carried out outside the current Right of Way (RoW) of the road. A total survey of 475 structures (133 residential, 338 commercial and 4 other category structures) identified in the corridor of impact is carried out. Subsequently, 89 structures were found to be not affected by project works. Out of the balance 386 structures at 13 locations (six locations for viaduct, six for stations and one for entry-exit to depot) impacts on 94structures were avoided after changes in location and designs of entry-exit structures of stations and the number of structures presently assessed to be affected by the project and need to be permanently removed are 292, the details of which are given in the table below.

Table 10: Types of Structures Affected at Different Locations

S. No.	Location	Residential	Commercial	Total	Structures on Pvt. Land
1	Kapurbawadi Jn. Viaduct (Single storey structures)	0	2	2	2
2	Kapurbawadi Jn. Viaduct (Mahavir CHS)	12	1	13	13
3	Kapurbawadi Jn. Viaduct (Jain House)	13	15	28	28
4	Kapurbawadi Jn.Viaduct (Mahalaxmi Apts.)	15	11	26	26
5	Kasheli Market Viaduct	31	55	86	
6	Kalher Viaduct (Portal Pier No. 220 B)	0	2	2	
7	Balkum Naka Station	0	3	3	
8	Kasheli Station	0	7	7	1
9	Purna Station *	0	2	2	1
10	Anjurphata Station	2	8	10	10
11	Dhamankar Naka Station	0	78	78	78
12	Depot Entry-Exit, Kasheli	35	0	35	
	Total	108	184	292	159

Out of the 292 structures affected, 159 are located on private land. 67 of these are in formal buildings affected at Kapurbawadi, the balance 92 are in the form of semi-pucca structures, and are probably occupied by non-title holders (legal titles are yet to be ascertained).

A census and mapping of 475 structures and socio-economic survey of their occupants has been carried out in November, 2020, June-July, 2021, March 2022, October, 2022 and April-May, 2023. Further, all the socio-economic information listed in the questionnaire could not be obtained from 7 occupants (5%) of residential structures and 39 occupants (12%) of commercial structures, either because such structures were found locked or occupants did not respond. While no structures exist on private land required for depot, which is not used for any economic purposes, the socio-economic survey of owners of depot land is being carried out.

4.8 Survey of Structures and Occupants

The salient features of surveys of 429 structures and their occupants (excluding locked and non-response cases) are as follows:

4.8.1 Residential

1. All the surveyed households were owners of structures in which they lived and 47% were living in pucca houses (permanent material of bricks and cement concrete for walls and roof respectively) and others in semi-pucca structures (material of bricks and tin). About 45% houses had an area more than 20 sq.m., 31% between 10 to 20 sq.m. and 24% had area up to 10 sq.m.
2. The proportion of males and females in the household population was marginally different at 52% and 48% respectively, and 69% were of an age between 15 to 60. About 56% of the individuals were married, 78% stayed in nuclear families and 89% households had 5 or less members.
3. About 99% over the age of 6 were literate, 62% had taken secondary or higher secondary school education, 14% were graduates and 21% had taken primary school education. 8 households belonged to socially backward community (Scheduled Castes and Tribes).
4. Nearly 45% of the population above an age of 14 was employed, who were mainly men and mostly were either self-employed or worked for private enterprises. Almost all of them had fixed location of work.
5. About 75% households had only one earning member and monthly income of 46% households was more than Rs. 10,000 per month, i.e., above the estimated poverty line considered applicable locally. This means 54% households (68 in number) were below poverty line.

4.8.2 Commercial

1. About 41% establishments were of more recent origin and started operating only in the year 2020 or thereafter. 35% came up in the prior 20-year period between the years 2000 and 2019, and the balance were older. 66%

establishments had areas exceeding 20 sq.m. and 23% between 10 and 20 sq.m.

2. About 72% were shops and 25% provided services, and all establishments were operated by the owners themselves without any employees. 94% establishments were operated by men and 77% of all operators were of an age between 18 and 59 years.
3. Almost all establishment operators were literate, 80% had taken secondary or higher secondary school education, 13% were graduates and 7% had taken primary school education.
4. About 83% establishments had a monthly income of more than Rs. 10,000 per month, i.e., above the estimated poverty line considered applicable locally for households. This means 18% operators (53 in number) could be below poverty line, if they did not have any other source of income.

4.8.3 Vulnerability

PAPs (households, including land owners, and operators of commercial enterprises) with incomes below the poverty line, those belonging to socially backward communities, women headed households and differently abled are considered vulnerable. The socio-economic surveys indicate the number of vulnerable PAPs as follows:

Table 11: Details of Vulnerable PAPs

S. No.	Type of Vulnerability	Number of Households / Business Operators
1	Households below poverty line	72
2	Operators with business income below poverty line	53
3	Socially backward households	9
4	Women headed households	11
	Total	145

The MMRDA has already resettled 109 PAPs (31 residential and 78 commercial) from two viaduct affected (Kapurbawadi and Kasheli) and two station affected (Kasheli and Dhamankar Naka) locations. 28 residential PAPs have been allotted residential tenements at Acme Rental Housing resettlement colony and 3 at Hub-town Rental Housing resettlement colony. Out of 78 commercial PAPs, 63 have opted for residential tenements in lieu of shops and the balance 15 have chosen shops. 44 PAPs opting for residential tenements have been resettled at Acme and 19 at Hub-town resettlement colony; and the 15 who have chosen commercial tenements, have been allotted shops at Acme, as per their preference. Details are provided in the table below.

Table 12: R&R Carried out (status as on 20th April, 2023)

S. No.	Project Affected Location and Type of Structure	Resettlement Site and Type of Tenement	Total PAPs

		Resi.	Com.	Acme		Hub-town	
				Resi.	Com.	Resi.	
1	Kapurbawadi (Viaduct)	5		5			5
2	Kasheli (Viaduct)	26	28	23	9	22	54
3	Kasheli (Station)		6	6			6
4	Dhamankar Naka (Station)		44	38	6		44
	Total	31	78	72	15	22	109

4.9 Resettlement Action Plan

The SIA/RAP report prepared for the project includes the Resettlement Action Plan, and the SIA/RAP document contains proposals for (a) Eligibility and Entitlement Matrix, (b) Relocation Options and Replacement Cost, (c) Information Disclosure and Consultation, (d) Grievance Redress Mechanism (e) Support for Restoration of Incomes and Livelihood, (f) Support to Vulnerable PAPs, (g) Gender Equality and Social Inclusion Framework, (h) LA & RR Budget, (i) Institutional Arrangements, (j) Implementation Schedule; and (k) Monitoring and Evaluation. The proposals related to Occupational and Community Health and Safety are dealt in the EIA and ESMP. The RAP proposals are largely in line with the AIIB's Social Framework.

4.10 Eligibility and Entitlement Matrix

This being a linear project affected in an urban setting, the categories of PAPs affected include Titleholders such as (a) Owners of private lands, (b) Owners / formal tenants occupying structures on private lands; and Non-title holders such as (c) Encroachers occupying structures on private lands; and (d) Encroachers occupying structures on public lands. The eligibility cut-off date for compensation for land and assets including R&R benefits, for those who have legal title is the date of notification for acquisition of land as per the RFCTLARR Act and the cut-off date for R&R entitlements for Non-titleholders is the date of completion of Census Survey (Baseline Socio-Economic Survey) as specified and verified by MMRDA as per the MUTP R&R Policy. Thus, all PAPs affected by the project are entitled for compensatory benefits (except those who have created interest in land or assets after the date of notification of acquisition / completion of census survey).

An elaborate and common Entitlement Matrix has been prepared covering various probable categories of PAPs and their entitlements, which is used for various projects being implemented by MMRDA with the financial assistance of Multi and Bi lateral agencies and which is included in draft SIA & RAP document. The basic features of the Entitlement Matrix applicable for this project is given in the following table.

Table 13: Basic Features of the Entitlement Matrix

Category of Loss	Compensation and R&R benefits for Titleholder PAPs	Compensation and R&R benefits for Non-Titleholder PAPs (MUTPR&R Policy)
Loss of land	The price for acquisition of land as per the RFCTLARR Act (at least 200% of Ready Reckoner* value of land) or as per the mutually agreed negotiated terms.	Not Applicable
Loss of house	A constructed house not less than 50 sq.m. in plinth area or one-time financial assistance for house construction of Rs. 5.5 lakhs as per the RFCTLARR Act.	Occupants: A house of 225 sq.ft. carpet area free of cost in multi-storied building in resettlement colony. Structure Owners: Replacement cost of lost structure
Loss of Non-residential structure	Either commercial tenement as Per the MUTPR&R Policy or compensation applicable to small traders as per the RFCTLARR Act.	Occupants: A shop of equivalent area With a maximum 750 sq.ft. out of which 225 sq.ft. carpet area free of cost and additional area at Ready Reckoner* rate in R&R colony or monetary amount of value of structure if more than 225sq.ft. Structure Owners: Replacement cost of lost structure
Transportation Cost for Displaced PAPs	One-timefinancialassistanceofRs.50,000/-to each family	Arrangement for actual transportation or payment of amount based on actual cost
Livelihood Assistance	One-timepaymentofRs.5lakhs per affected family as per the RFCTLARR Act.	For increased travel distance: Monetary compensation for 3-year travel Permanent loss of Livelihood: Monetary compensation equivalent to 1 year income, access to employment information and training facilities and assistance through community operated fund
Subsistence grant to displaced families for a period of one year	Rs.3,000 per month for a period of one year for each family after displacement. In case of SC, ST families additional Rs.50,000.	Not Applicable
One time resettlement allowance	Rs. 50,000 per family after shifting of house	Not Applicable
Stamp duty and Registration fee	The stamp duty and other fees payable for registration of house allotted to the affected families shall be borne by MMRDA.	The stamp duty and other fees payable for registration of house allotted to the affected families shall be borne by MMRDA.
Inflation Adjustment	All monetary values to increase by 5% every year (from 2014) unless rate of inflation is less than 5%	Not Applicable

* Ready Reckoner provides officially estimated unit prices of lands and buildings for each parcel of land based on market assessment from year to year used by the State Govt. for levy of Stamp Duty.

The Entitlement Matrix is in compliance with National Laws, State Policies and AIIB's Environment and Social Framework and Environment and Social Standard 2: Land Acquisition and Involuntary Resettlement. All the key impact categories of Title Holders (loss of land and structures used as residences and for businesses) and Non-title Holders (loss of structures used as residences and for businesses), loss of livelihoods and impacts on vulnerable PAPs, are adequately addressed.

4.11 Relocation Options and Replacement Cost

MMRDA has a ready stock of houses and shops in multi-storied buildings with all necessary amenities, procured free of cost against Transferable Development Rights (TDRs) under Rental Housing Schemes in Thane and nearby areas, which are used as resettlement colonies. MMRDA is giving a choice of location to affected PAPs, and is accordingly providing 320 sq.ft. carpet area houses to residential PAPs and shops of areas equivalent to affected commercial structures to commercial PAPs free of cost (area in excess of 225 sq.ft. but upto 750 sq.ft. is to be allotted by charging at Ready Reckoner rate) on ownership basis. While the compensation for land is at least double the official price estimated on the basis of market assessments and used for levying stamp duty, alternative permanent tenements / shops are being provided on ownership basis in new buildings of resettlement colonies located in nearby areas to all PAPs losing structures. The official estimates of prices of tenements / shops being provided are much higher than the replacement cost of structures lost by the Non-title holders and at least equal or little more than the structures lost by Title holders (earlier dwellings being located in Old bldgs. and compensation for assets being provided in addition to that for land under RFCTLARR Act, as per their legal status).

4.12 Information Disclosure and Consultation

MMRDA was not able to conduct general public consultation to inform people at large about the details of the project, how its likely environmental and social impacts will be assessed and about probable mitigation measures, as well as to note their concerns and take suggestions, prior to undertaking preparation of EIA & SIA primarily due to Covid-19 related restrictions. Although progress of 78.29% of civil works has been achieved, construction works with physical impacts of LA & RR such as depot, entry/exit to depot, viaduct at Kapurbawadi junction and construction of certain stations, including their entry/exit structures, are only now being commenced. In view of this, MMRDA decided to hold public consultation to reach out to various stakeholders, including those who may be benefitted and indirectly affected, even at this stage of progress of the project. Accordingly, the public consultation was held on May 12, 2023, in Collector Office at Thane.

The next stage of information disclosure and consultation is carried out at the time of surveys of PAPs (households and business operators) and their affected structures by the Consultants engaged for this purpose. People generally refuse to share their personal information unless they are satisfied with the purpose of survey, which also requires disclosure of related details and resolution of their

immediate queries. The SIA/RAP Consultants have carried out 8 consultations at different locations during May, 2020 and April, 2023, the details are as follows:

Table 14: Consultations carried out during Survey

Sr. No.	Date	Location	Number of Participants
1	8th February, 2020	Kasheli Market Viaduct	21
2	22nd May, 2020	Kapurbawadi Viaduct	9
3	16th June, 2021	Balkum Station	13
4	28th June, 2021	Kalher Station	8
5	1st July, 2021	Anjurphata Station	14
6	7th July, 2021	Dhamankar Naka Station	24
7	15th July, 2021	Kasheli Station	7
8	26th April, 2023	Purna Station	2

As may be seen from Table - 12 that MMRDA has so far resettled 109 PAPs from 4 project affected locations, i.e., Kapurbawadi Junction Viaduct, Kasheli Viaduct, Kasheli Station, and Dhamankar Naka Station. Directly affected PAPs are the most important stakeholders of the project and MMRDA has carried out 10 consultation meetingswith PAPs of these locations and some other locations, the details of which are as follows:

Table 15: Details of PAP Consultations

S. No.	Affected Locations	Number of Consultations	Dates of Consultations	Period of Allotments for Resettlement
1	Kapurbawadi Viaduct	3	16th January, 2020 13th July, 2022 25th July, 2022	26th July, 2022 to 22nd September, 2022
2	Kasheli Station	2	12th July, 2022 10th May, 2022	19th October, 2022
3	Dhamankar Naka Station	3	16th July, 2022 29th July, 2022 11th April, 2023	21st July, 2022 to 12th December, 2022
4	Kasheli Depot Entry-Exit	1	15th September, 2022	--
5	Kasheli Depot land	1	5th April, 2023	--

Note: No formal consultation was required to be carried out for shifting of PAPs from Kasheli viaduct location.

The proceedings, attendance and photographs for most of these consultations are recorded, and one sample documentation is provided in Annexure**–3**. These consultations have been held to mainly provide information to PAPs about details of the project and extent of impacts, nature of surveys, applicable policy and legal framework for LA & RR, eligibility and entitlements, grievance redressal mechanism, resettlement options, procedure for compensation / allotment and

other assistance proposed to be provided to them, and to understand their views and resettlement choices, clarify their queries and doubts and note their concerns for further course of action. Multiple meetings are held to progressively inform and consult PAPs on above specified aspects. In addition, more recently, MMRDA has carried out a separate consultation with the affected owners of depot land on 5th of April, 2023, and the proceedings are provided in Annexure-4.

As an important part of information disclosure and transparency, MMRDA has been disclosing the eligibility lists along with basic details of PAPs and their structures obtained through surveys in the concerned project affected communities, thereby providing an opportunity to the PAPs to raise any concerns or grievances about the same. A site visit to Acme resettlement colony for 34 PAPs from Dhamankar Naka was conducted on 11th April, 2023 to help them make their choice for resettlement. PAPs from Kasheli viaduct locations have willingly shifted without any need for formal consultations. Further, consultations with PAPs of other affected locations are yet to be held.

MMRDA has prepared brochures in different languages (Marathi, Hindi and English), which provide information about the basic features of the project, likely social impacts, framework for LA&RR, eligibility and entitlements, grievance redressal mechanism and contact details for distribution to all PAPs during various PAP consultations. The brochures also include information about AIIB's Project-affected Persons' Mechanism (PPM). The English version image of the Information Brochure is provided at Annexure–5. Further, actual implementation of LA & RR involves written communication and detailed consultations with PAPs, who meet concerned officials during various procedures involving eligibility, allotment etc. and also for their grievances. Hearings are conducted and written communication is also done with respect to Grievance Redressal by concerned Committees. MMRDA has set up an Information Desk in the LA & RR unit for people to examine project documents and seek necessary information.

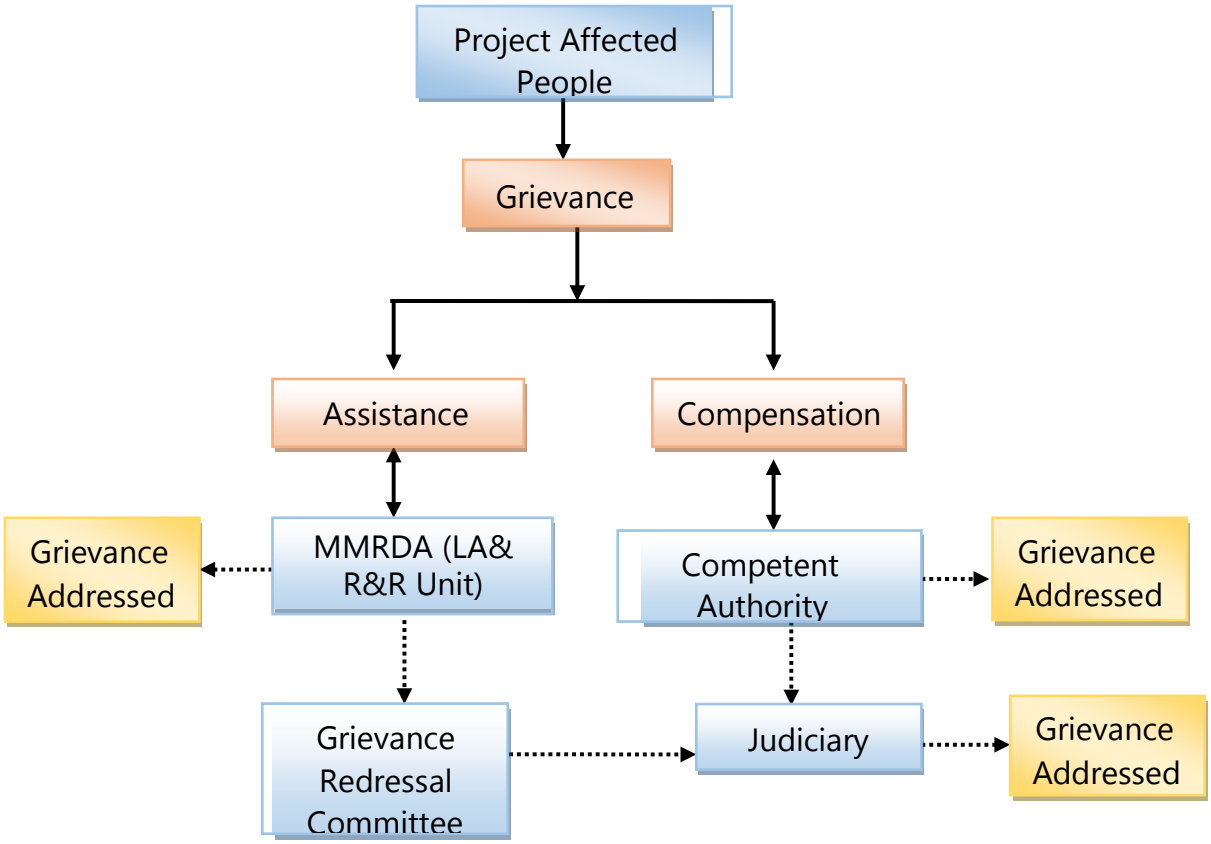
While important information about PAPs' concerns have been orally shared with them and some information will be disseminated through the brochure, the formal report of SIA and RAP has not been disclosed so far, which will be done once it is revised and finalised.

4.13 Grievance Redress Mechanism

MMRDA has a well-established system of adequately addressing various types of grievances associated with execution of such projects. The grievances related to execution of works on sites such as noise, dust, vibration, traffic management and access etc., and about conditions in labour camps, are primarily addressed by the EPC Contractor. If these are not resolved at that level, they are expected to be referred by the General Consultant to the Metro Project Implementation Unit (PIU), and are addressed and resolved by it (however, no such referral was required so far). The grievances related to legal process of acquisition of land and assets and payment of compensation are addressed through the remedies available under the

RFCTLARR Act. The grievances related to eligibility and entitlements of PAPs (primarily Non-title holders) are addressed and resolved first at the level of LA & RR Implementation Unit of Metro PIU, and if not resolved, these are heard and decided through a formal 2-tier mechanism of Field Level Grievance Redressal Committee (FLGRC) and the appellate Senior Level Grievance Redressal Committee (SLGRC). The following figure depicts the process of grievance redress related to LA & RR.

Figure 3: GRM for Land Acquisition and R&R



The details of cases handled by the FLGRC and SLGRC are provided in the following table. All these cases pertain to eligibility of PAPs for allotment of alternative accommodation.

Table 16: Grievances dealt by FLGRC & SLGRC (by 20th April, 2023)

Grievance Redressal Committee	No. of Cases Received	No. of Cases Resolved	No. of Cases Pending
Field Level Grievance Redress Committee	13	13	0
Senior Level Grievance Redressal Committee	7	0	7

4.14 Support for Livelihood and Assistance to Vulnerable PAPs

The proposed EntitlementMatrixhasprovisionsforrestorationoflivelihoodofthePAPs as indicated in Table - 13 above. Under the RFCTLARR Act, financial assistance in various forms, including livelihood assistance, is to be provided to PAPs losing their land and assets; and under the MUTP R&R Policy, monetary compensation is payable for increased travel distance (3-year travel) and permanent loss of livelihood (1year income) and other measures include access to employment information and training facilities, and assistance through Community Operated fund. The focus of support for livelihood is to ensure that the PAPs' pre-project living standards are improved or at least restored. As regards vulnerable PAPs, the LA&RR Implementation Unit will specifically monitor the R&R process for these households and resolve difficulties faced by them, if any, on priority. Currently, resettlement benefits have been provided to 109 occupants of affected structures, including those of 78 commercial structures, out of which 63 have taken residential tenements and 15 are allotted shops. If the above entitlements are not found to be adequate Post-R&R, the needs of those losing incomes / livelihoods, with specific attention to vulnerable PAPs, will be assessed and remedial measures for livelihood support will be undertaken as may be necessary. In view of significant number of commercial and vulnerable PAPs, and single earning member households, the MMRDA will develop measures for livelihood restoration (preferably in the form of a Livelihood and Income Restoration Plan) as a part of the revised SIA and RAP report.

4.15 Gender Equality and Social Inclusion (GESI) Framework

The MMRDA has developed and is implementing a Gender Equality and Social Inclusion (GESI) framework for other Metro projects, which will be applied to this project as well and is incorporated in the SIA and RAP report. The GESI Framework includes activities, indicators / targets, responsible agency and timelines for, among other matters, ensuring design standards for operating systems and facilities addressing needs, safety and public health of the Elderly, Women, Children and Differently-abled (EWCD), establishing gender inclusive Metro Operating Agency (now MMMOCL), develop GESI policy with GESI Advisory Committee and conduct training and multi-media modules etc. As actions envisaged under the GESI Framework are primarily related to Operating Systems and not much to the civil works in progress, the implementation for Metro-5 is expected to commence in future.

4.16 LA and RR Budget

The total estimated budget for LA & RR is Rs. 11,119.48 lakhs. However, the amounts indicated in the budget are notional, since the primary cost is of acquisition of private land and the actual cost will depend on the final award passed by the Competent Authority under the RFCTLARR Act. Further, the resettlement stock proposed to be used for providing alternative tenements and commercial spaces

(shops) to PAPs losing their structures are procured by the MMRDA free of cost under the Rental Housing Scheme, and as a result, do not have any actual cost. The cost of support measures for livelihood restoration, when estimated, would be additional. The entire cost of LA & RR will be borne by MMRDA from its own funds.

4.17 Institutional Arrangements

MMRDA is simultaneously implementing many Metro line projects, and has established a Metro Project Implementation Unit (PIU) few years ago, which is expanded from year to year. Metro PIU is headed by the Metropolitan Commissioner / Additional Metropolitan Commissioner, and is assisted by Directors (responsible for civil works and systems), Chief Engineers and other technical staff. PIU also consists of Land Acquisition and Rehabilitation and Resettlement (LA&RR) Implementation Sub-Unit and is headed by an Additional Collector / Deputy Collector. Although PIU is common, specific officers of PIU and LA&RR Implementation Unit are assigned tasks related to a particular Metro line. In addition, there are certain common divisions (Depts.) of MMRDA represented in PIU, like the Transport and Communications Division, which gets Detailed Project Reports (DPRs) prepared; Social Development Cell, which carries out SIA and RAP preparation; Environment Cell deals with EIA and environmental clearances; and Finance and Administration Division, Legal Cell and Public Relations Cell carry out tasks related to their domains. MMRDA further appoints separate project specific consultants – General Consultant, EIA & SIA Consultants, and such others depending on requirements. RAP implementation will be primarily carried out by the LA & RR Implementation Unit of Metro PIU in consultation and co-ordination with the Social Development Cell. However, this consultation and co-ordination needs further strengthening. The institutional arrangement of Metro PIU has developed all necessary capacities over time, which is demonstrated through successful completion and commissioning of two Metro lines so far and in the progress of execution of 5 other Metro lines achieved so far.

4.18 Monitoring and Evaluation

While efforts have been made to dovetail schedules of execution and RAP implementation as a part of project preparation, certain elements such as station locations and entry – exit structures of stations get finalized later in the project cycle in the design – build contracts (even depot location was decided later in this case), resulting in some changes in impacts delaying other activities related to surveys, consultations, delivery of compensation and R&R entitlements and actual resettlement. Another issue pertains to acquisition of private land, the legal process for which is required to be carried out by a competent authority external to Metro PIU and MMRDA, which could result in changes in timelines. The Metro PIU carries out overall monitoring of the progress of the project and co-ordinates between the RAP implementation and works execution. The Officer In-charge of the LA & RR Implementation Unit of the Metro PIU carries out the routine monitoring of progress of the LA & RR activities. However, no systematic progress reports against various targets are periodically prepared. With a view to periodically monitor

specific parameters / indicators expected to be achieved (as against internal monitoring of general progress) an external monitoring agency will be appointed for bi-annual monitoring, including that of RAP implementation.

The Mid-term and End-term evaluation of RAP implementation will be carried out by an Independent Evaluation Agency (IEA). The Mid-term evaluation will feed into overcoming the difficulties/ shortcomings found in the process, and improving the remainder of implementation activities.

4.19 Findings and Areas of Concern for Social Safeguards

Based on the review of draft Social Impact Assessment and Resettlement Action Plan document, discussions with the concerned official of MMRDA and interactions held with available PAPs at some affected and resettlement locations, the following observations are made about social due diligence.

1. The legal framework for social safeguards applicable for the project mainly consisting of RFCTLARR Act and MUTP R&R Policy cover all types of PAPs, and along with the Entitlement Matrix developed and measures being proposed in the SIA & RAP document, is adequate to meet the requirements of AIIB's ESF.
2. Efforts have been made to minimize the physical impacts of the project works resulting in reduction in the number of affected structures.
3. The draft SIA & RAP document is prepared but is required to be revised based on the comments earlier provided by the AIIB and the new information about revised land requirement, reduction in impacts on structures, details of structures on private lands, socio-economic details of depot land owners etc., which is already available or is being obtained. Further, the SIA & RAP document is yet to be cleared by AIIB and publicly disclosed.
4. The public consultation for the project could not be carried out prior to preparation of EIA and SIA due to Covid-19 restrictions, but is now carried out, and specific consultations with PAPs, who have not been resettled so far, are yet to be carried out.
5. Eligibility lists of PAPs are publicly disclosed in the affected community. Information brochures in multiple languages, including local, are prepared, but are yet to be distributed to PAPs.
6. While most of the public lands have been obtained or project works have been allowed to be carried out on them, the process of acquisition of affected private lands (particularly for depot and entry-exit structures of stations) being carried out under RFCTLARR Act, is yet to be completed for all parcels, which needs to be expedited.
7. Census survey, including mapping of structures and socio-economic survey of occupants has been carried out for all structures and vulnerable PAPs are identified.

8. Most of owners of private land parcels required for the depot hold less than a half hectare of land, and the socio-economic survey of PAPs of depot land is now completed.
9. About 37% (109) of the PAPs are already resettled. Out of these 45% are relocated from private lands prior to completion of acquisition of concerned land parcels and about 81% of resettled commercial PAPs have opted for residential tenements. In view of this position, although concerned PAPs have chosen the resettlement options themselves, it is desirable for MMRDA to obtain formal written Consent Letters from such PAPs resettled in the past and likely to be resettled in future, in order to avoid any future disputes.
10. MMRDA faces challenges related to appropriate resettlement options, which ensure that losses are compensated at Replacement Cost and livelihood of all PAPs are restored, for residential and commercial PAPs from formal buildings at Kapurbawadi, and inadequate availability of alternative shops for commercial PAPs from other locations.
11. The GRM for eligibility and entitlements of PAPs is put in place and is functional.
12. While significant number of vulnerable PAPs are identified and there is likelihood of loss of income and livelihood by commercial PAPs, which is the largest PAP group (184 out of 292), specific Livelihood and Income Restoration Plan is not included in the SIA & RAP document.
13. A Gender Equality and Social Inclusion (GESI) Framework developed for other Metro projects (ML 2A&B and 7) is being applied to ML-5 as well.
14. The budget for social safeguards is largely notional and the major cost will be for acquisition of private land (particularly depot) and final amount will depend on the actual legal award passed by the Competent Authority.
15. The Social Development Cell (SDC), which is responsible for preparation of SIA & RAP documents and the LA & RR Implementation Unit of Metro PIU, mostly work independently, and better co-ordination and consultation among them is necessary for smooth implementation and monitoring of RAP.
16. It was difficult to obtain the basic information necessary for ESDD and was required to be searched and compiled due to absence of systematic efforts for information management made in the past in this regard.
17. While LA & RR are progressing, the internal monitoring is mainly restricted to stand alone review of progress, and even systematic reports are not generated. The mechanism for independent monitoring of social safeguards, including RAP implementation is yet to be put in place.

5. Environmental and Social Corrective Action Plan

5.1 Introduction

Based on the Environmental and Social Due Diligence findings, this Environmental and Social Corrective Action Plan is prepared with timeline.

Table 17: Environmental and Social Corrective Action Plan

S.No.	Corrective Action	Responsible Agency/ Consultant	Remarks	Timeline
Environmental Corrective Action Plan				
1.	Revising and updating the project Environment Impact Assessment	Metro PIU/ EIA Consultant	The EIA needs to be updated by adding: ➢ Legislation as per 3.2 of this ESDDR ➢ Impacts as per 3.4 of this ESDDR ➢ Mitigation measures as per 3.6 of this ESDDR ➢ Hazardous materials such as PCBs ➢ GHG emissions such as SF6 ➢ Climate change impacts as given under 3.2.6 of this ESDDR ➢ Impacts on biodiversity as given under 3.5.4 of this ESDDR	30 June 2023
2.	Obtain the pending clearances/ approvals/ permissions	Metro PIU	The pending clearances such as Stage-II Forest Clearance, and for biomedical waste and hazardous waste, etc. need to be obtained before expiry (the SMS Envoclean's present CCA ends on 30 June 2023).	30 June 2023
3.	Translation of approvals into English	Metro PIU	All the permissions/ approvals which are in local language need to be translated into English and submitted to the bank.	30 June 2023
4.	The impacts on the two protected areas within 10 m of project.	EIA Consultants	The project impacts on the two protected areas (Sanjay Gandhi NP and Thane Creek Flamingo sanctuary falling within 10 km radius of the project, needs to be assessed,	30 June 2023

			if there are no anticipated impacts, it should be clearly mentioned in the EIA.	
5.	Update the Environment Management Plan	Metro PIU/ EIA Consultant	Update the EMP with health and safety aspects related to heights, electricity safety issues, replacement of transformers with PCBs, leak detection provisions for switchgear or RMUs with circuit breakers using SF6, etc.	30 June 2023
6.	Conduct a noise and vibration impact assessment and update the EMP	Metro PIU	At Kapurbawdi, the viaduct edge is at 3 m away from the nearest residential/ commercial building. The noise and vibration impact at this site needs to be assessed. Proper and site-specific noise and vibration prevention/ abatement/ mitigation measures need to be proposed and to be incorporated into the EMP. The Noise and Vibration studies for Phase-I will be carried out by MMRDA before operation phase of the project as most of the civil works has been completed. Further, the N & V study will also be carried out as a part of tract contract after the award of contract. The preliminary report of the same can be shared with AIIB once the Contractor appointed.	Before operation
7.	Conduct a detailed scrutiny of Contractors sites and prepare a report	Metro PIU GC Independent Auditor	Inspect all the sites and review safety and housekeeping practices and aspects as per 3.4 and 3.6 of this ESDDR; and update the Method Statements (MSIP) to ensure no recurrence of such incidents and practices.	30 June 2023
8.	Incorporate provision for formal GRM for workers in Contractor's EMP	Metro PIU	Workers' grievances should be handled by a Grievance Redressal Mechanism (with an assigned resource and procedure for resolution) at the Contractor's level to be overseen by the General Consultant (GC) and unresolved matters to be brought to the notice of Metro PIU by GC and resolved by the Metro PIU. This arrangement to be incorporated in the Contractor's Environmental	30 June 2023

			Management Plan. This workers Grievance Redress Committee to have representatives of workers and female workers.	
9.	Submission of Labour Returns	Civil Works Contractor	The contractor (AFCONS) filed an Annual Return filed with Labour Commissioner for the Year ending with 31 December 2022. This was filed on 17th February 2023. The Annual Return for the year 2021 needs to be shared with the Bank.	30 June 2023
10.	Reports on Incidents	Metro PIU GC	This report should conduct a root cause analysis of the accident and recommend necessary safety measures to be taken to prevent such incidents. The details of distribution of compensation paid and dates paid to the victim's kin are not given. Similarly, the investigation report for the incident happened on 13 November 2021, need to be submitted. The independent auditor repots for the months of February 2021 and November 2021 need to be submitted.	30 June 2023
11.	Review of Independent Auditor's ToR and make it focus on Safety issues.	Metro PIU GC	The independent contractors Terms of Reference to be reviewed and make the role more focused on safety and supporting to contractors.	30 June 2023
12.	External Monitoring & Evaluation	SDC and LA & RR Unit and Environment Expert (Tendering by Civil team), MMRDA	Engaging External Monitoring Agency for quarterly monitoring of environmental and social safeguards and EMP and RAP implementation and for Mid-term and End-term evaluation	30 Nov 2023
Social Corrective Action Plan				

13.	SIA & RAP Document	Consultant (EQMS) & SDC, MMRDA	Needs to be revised based on the comments earlier provided by AIIB and the new information available / being obtained, and needs to be disclosed to public following AIIB clearance	22June 2023
14.	Consultations with PAPs	LA & RR Unit, MMRDA	Consultations with PAPs at certain locations, which are yet to be resettled, need to be carried out	28 June 2023
15.	Information Brochures	SDC and LA& RR Unit, MMRDA	Multi-lingual brochures prepared, are now required to be distributed to PAPs	30 June 2023
16.	Acquisition of Private Lands	LA & RR Unit, MMRDA	Expediting actions for preparing and sending proposals for balance land parcels to Competent Authority	14 July 2023
17.	Surveys	Consultant (EQMS) & SDC, MMRDA	Incorporation of analysis of socio-economic survey of depot land owners in SIA & RAP document	22 June 2023
18.	Resettlement and Rehabilitation	LA & RR Unit, MMRDA	Resolving constraints faced in R&R of PAPs from buildings (Kapurbawadi) and commercial PAPs in general	30 July 2023
19.	Livelihood and Income Restoration Plan	Consultant (EQMS), SDC & LA & RR Unit, MMRDA	Developing Livelihood and Income Restoration Plan (LIRP) and incorporating it in SIA & RAP document	22 June 2023
20.	Institutional arrangement for RAP Implementation	SDC and LA& RR Unit, MMRDA	Improving co-ordination and consultation between SDC and LA & RR Implementation Unit with periodical meetings	Fortnightly Meetings
21.	Information Management and Internal Monitoring	LA & RR Unit, MMRDA	Assigning a dedicated resource for information management and strengthening system for tracking and compilation of information on RAP implementation	31 Aug 2023
22.	External Monitoring & Evaluation	SDC and LA & RR Unit (Tendering by Civil team), MMRDA	Engaging External Monitoring Agency for quarterly monitoring of environmental and social safeguards and EMP and RAP implementation and for Mid-term and End-term evaluation	4Aug 2023

6. Annexures

6.1 Annexure 1: Environmental Management Plan

Environmental Management Measures and allocation of Responsibilities in Planning/Design Phase

S.No.	Project / Environmental Component	Management Actions	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
1	Complying to Regulatory Requirements	• Contractor shall be responsible for obtaining all the permissions which may be required for carrying out the work at site and shall include but will not be limited to the following: o Tree Cutting permission o Permission for diversion of reserved forest land under Mangroves o Permission under CRZ Notification 2011 o Permission from Bombay High Court for Tree Cutting o Permission for ground water extraction from CGWA/State Water Resource Department o Permission for working on or near the waterbodies and for Withdrawal of water from Surface Water bodies o Consent to Establish and Consent to operate for Batching Plant, Stations, Quarries, and Stone Crushers etc. o Pollution Under Control Certificate o Other permission form Centre/State/Local bodies for execution of works as required • Contractor shall strictly comply with the conditions of statutory clearances as obtained by MMRDA or by themselves • Contractor shall prepare and submit the compliance reports of the conditions of clearance letter to MMRDA as per the requirement • Contractor shall prepare site specific EMP detailing the environment management and monitoring measures & plan inline with the project EMP, requirement of GoI and requirement of the international funding agencies (if any) • Contractor shall strictly comply with the environment management and monitoring plan and shall implement all the project activities considering the measures specified in EMP and EMoP • Strictly no child labour shall be allowed at work site and supplier sites	Contractor	MMRDA, Supervision Consultant
2	Rehabilitation and Resettlement	• Detailed SIA study and RAP is being formulated for the project in line with the RFCTLARR, 2013 for the project shall strictly be followed for acquisition of the land and providing the compensation to the affected population • The compensation to project affected persons shall be paid as per the Right to Fair Compensation & Transparency in Land Acquisition, Rehabilitation & Resettlement Act, 2013 and relevant Acts and guidelines of the Government of India and rules of concerned state governments.	MMRDA	MMRDA

		• Transparency shall be maintained with the land owners while sharing the project information and the details losses by affected land owners through regular consultation and meeting with the affected communities • Grievance Redressal Mechanism shall be developed. • No land shall be taken forcefully and without obtaining consent from land owner		
3	Micro-climate	• Preferring for transplantation (495 trees out of 708 trees) in place of cutting (166 trees to be cut and 47 to be trimmed out of 708) thereby reducing trees to be cut. Other than this, approx. 110 trees exists at depot site. Joint visits will be undertaken by the civil, planning and environment team to understand requirement of tree cutting which shall minimize the nos. of trees to be cut • Undertaking compensatory afforestation for each tree to be affected. as per guideline of concerned Tree Authority under Maharashtra (Urban Area) Tree Preservation Act, 1975 and its amendments. Total 4799 trees will be planted for affecting total 708 trees. Similarly compensatory afforestation will be undertaken for the affected 110 trees also. • Planned within and along the RoW of existing road, minimizing tree cutting, private land acquisition, impact on settlements and changing land use • Minimizing impact on forest land and environmentally protected areas • Adoption of green building technology for making project more energy efficient • Usage of low embodied material for construction like fly-ash • Provision of solar power plant at the roof top of stations/depot and other utility area • Provision of rain water harvesting system to harvest rain water and recharge ground water resources • Design of all structures above HFL of the nearby rivers • Measures adopted for water resources conservation such as usage of curing compound, water conservation fixtures etc. • Piers at waterbody crossings are so designed that they will occupy minimum space in the river bed. Modelling study are carried out to assess the impact of construction of river banks/beds. This will minimize the impact on the carrying capacity of the water bodies and will not aggravate the flooding.	Contractor	MMRDA, Supervision Consultant

		• Implementation of proposed environmental management plan to prevent impact on environmental components		
4	Land-Use	• RoW clearing activities are to be carried out with least disturbance to the surrounding by restricting the project activities within the define RoW • Before start of construction activities, sites for C&D waste disposal shall be identified. These sites should be at minimum 500 m distance from residential, sensitive and water body location and shall always be above the HFL of the nearest water body (Ulhas river). These sites should be provided with adequate drainage and silt arresting mechanism. • Preferably waste land and barren land shall be considered for establishment of the C&D waste disposal site. • Labour camp, storage yards, casting yards and plant site (batching plant, stone crushers) should be at minimum 500 m distance from residential, sensitive and water body location. • All the sites being used for the construction purposes temporary shall be restored back to the original condition.	Contractor	MMRDA, Supervision Consultant
5	Vegetation removal and tree felling and plantation	• A joint survey shall be undertaken by MMRDA team and forest department/municipal authority/Tree officer to identify the trees falling within the RoW. • MMRDA team shall work to identify the trees which are essentially required to be cut for the project development while saving the rest. The trees required to be cut shall properly be marked and shall only be cut • Transplantation shall be preferred over cutting for tree having girth size between 30 cm-75 cm. Transplantation shall be carried out in presence of expert and following proper approach while securing the root ball of the tree • In place of cutting, it is proposed to transplant 495 trees, cut 166 trees and trim 47 trees out of 708 trees within RoW. This has minimized tree cutting requirement • MMRDA shall carry out compensatory afforestation for the trees to be cut in forest area as per guideline of concerned Tree Authority under Maharashtra (Urban Area) Tree Preservation Act, 1975 and its amendments. Total 4799 trees will be planted for affecting total 708 trees • Approx 110 trees exist at depot site. Joint visits will be undertaken by the civil, planning and environment team to understand requirement of tree cutting which shall minimize the nos. of trees to be cut at depot site. Compensatory afforestation will also be undertaken for the affected 110 trees. • Adequate after care lime timely watering, provision of guarding etc. shall be undertaken for	MMRDA, Contractor	MMRDA, Supervision Consultant

		transplanted and planted trees to assure high survival rate • Transplantation and plantation shall be carried out during monsoon to assure higher survival rate • Top soil up to depth of 15 cm shall be extracted and stored separately so as it can be later used for plantation works • MMRDA shall strictly follow all the laws and regulations pertaining to tree cutting and shall comply with them • Green belt development plan shall be prepared for development of green belt at the locations wherever space is available along the corridor, in casting yards, labour camp locations, open areas etc. during construction phase and shall be implemented • Green belt development shall be carried out at all feasible locations such as along the corridor and at depot locations • No firewood extraction from trees shall be allowed. Firewood shall not be used for cooking or open burning. Workers shall be provided with clean cooking fuel and appropriate rest shelters & accommodation to prevent usage of wood for open burning & cooking purpose		
6	High Noise & Vibration Level Generation	• Barricading shall be provided all along the corridor to prevent unauthorized access during construction phase. These barriers will of full height and will also act as noise barrier • Entire corridor shall be provided with the noise cum visibility blocking barrier as the corridor lies in the heavily populated urban area. Noise barrier comprising of absorptive type metal panel and reflective type polycarbonate sheets can be located on edge of the viaducts to reduce the noise intensity to be generated due to metro movement. Height of these barriers can be kept 1.5-2.0 m above the top of rail. The barrier must be long enough to screen out a moving train along most of its visible path. Thus, length of the barrier shall be considered additional 1 m on both ends at proposed locations. • Provision of anti dumping floor and noise absorption material • Low speed compressor, blower and air conditioner • Mounting of under frame equipment and anti-vibration pad • Smooth and gradual control of door • Provision of GRP baffle on the via duct for elimination of noise transmission • Provision of sound absorbing material in the supply duct and return grill of air conditioner • Sealing design to reduce the aspiration of noise through the gap in the sliding doors and piping holes • Provision of bolsters less type bogies having secondary air spring • Ballast less track supported on two layers of rubber pads can be used to reduce track noise and ground vibrations	Contractor	MMRDA, Supervision Consultant

		• In sensitive areas, track on floating slab can be used to reduce track noise and ground vibrations • Trackside lubrication can be effective in avoiding wheel squeal, which often occurs as Metro rail vehicles traverses tight-radius curves. This installation automatically deposits a small amount of biodegradable lubricant on the top of the rail, and has effectively eliminated wheel squeal and associated complaints from nearby residents • To prevent development of surface irregularities on the rail, a fairly heavy rail section is to be used. Further, rail grinding at regular intervals by Rail grinding machine and also lubrication of rail by vehicle mounted lubricator have been contemplated • Rail shall be continuously welded and also shall be laid to fine tolerances so that any noise/vibration on account of irregular track geometry could be reduced. Rails should be grinded in regular basis to minimize the vibrations • The vibration generated from rail-wheel interaction will be greatly absorbed by the elastic fastening system proposed to be used. Resilient fasteners are used to fasten the rail to concrete track slabs or ballast less bed. • A ballast mat consists of a rubber or other type of elastomer pad that is placed under the ballast can be used for reducing vibrations. The mat generally must be placed on a concrete base to be effective • Other measures which can be taken to reduce vibrations are usage of resiliently supported ties in which concrete ties are supported by rubber pads • Wheel turning or wheel truing to re-contour the wheel, provides a smooth-running surface and remove wheel flats. The most dramatic vibration reduction results from removing wheel flats. However, significant improvements also can be observed simply from smoothing the running surface. Install wheel flat detector system to identify vehicles which are most in need of wheel truing. • Implement vehicle reconditioning programs, particularly when components such as suspension system, brakes, wheels, and slip-slide detectors will be involved. The regular regime of reconditioning helps not only mitigation of vibration but also in lower resultant defect generation. • In addition, it is proposed to provide skirting on coach shells covering the wheel, which will screen any noise coming from rail-wheel interaction from propagating beyond the viaduct		
7	Concrete Mixing, Batching Plants, Plants and Crushers etc.	• Consent should be obtained before establishment and operation of work sites for the establishment and operation from State Pollution Control Boards. • Compliance with relevant emission control legislation at the State level must be ensured for all equipment, machine, engineers, generators and vehicles which involve in the crushers, and concrete batching plants and material transfer. • At least 500, distance must be maintained between these plants and the human settlements/sensitive receptors/forest land/water bodies in the downwind direction. • All suggested mitigation measures for air and dust pollution, noise pollution, water pollution etc. shall strictly be implemented	Contractor	MMRDA, Supervision Consultant

		• Compliance report to the condition of these consents shall be prepared and submitted to respective SPCBs • Establishment of the casting yard, labour camps, storage yard, site offices etc. shall not require cutting of trees/clearing of any major vegetation • The disposal will not be allowed into a nearby watercourse or any nearby sensitive areas which may pollute surface water or can cause inconvenience to the community. • The construction camp, storage of fuel and lubricants should be avoided at the river bank.		
8	Environmental impacts due to installation of Construction machinery and the vehicles	• Fuel exhaust standards for all the engines/vehicles must be checked with those as defined under EPA, 1986 and Motor Vehicles Act, 1988 before deploying on the work. • Bureau of India Standard (BIS) norms must be complied for engines, machinery equipment's and vehicles. • PUC certificate shall be obtained for all the construction machinery & vehicles as appliable • Old machinery/engines/vehicles/loaders must not be used at site. • All machinery and the vehicles shall be properly and timely be services and maintained to prevent noise issues and accidents • All electrical/power equipment and heavy machinery shall be inspected prior installing and commissioning • Construction methodology and method statement for each construction activity/installation of heavy machinery shall be submitted for approval and shall comprise of guidelines on environment and safety management	Contractor	MMRDA, Supervision Consultant
9	Consumption of Water	• The priority shall be given to use surface water wherever surface water source is available. • Ground and Surface water may be used only after obtaining necessary permissions from the respective Government authorities. • Statutory permits must be obtained from the Central Ground Water Authority and concerned State Irrigation Departments as applicable. • Rain water harvesting provisions shall be made in design during both construction and operation phase • STP treated water shall be procured from nearby STPs and shall be used preferably for sprinkling and landscaping. • Minimizing water requirement by using water conservation measures such as covering the water tanks, providing visual notice for water conservation, low flow taps in toilets etc. • Regular inspection to detect leakage in water pipelines and water tanks.	Contractor	MMRDA, Supervision Consultant
10	Borrowing and Quarrying Activities	• Plan shall be submitted to engineer for approval of borrow area/quarry site location prior establishment. Plan shall comprise of the location details & photograph of borrow area, type and quantity of material expected to be borrowed, environmental & social sensitivity of borrow areas, nearest borrow area etc. • Procure materials from the licensed suppliers • Use quarry sites and sources permitted by Government. • Verify the suitability of all sourced material and obtain approval from the MMRDA prior procurement	Contractor	MMRDA, Supervision Consultant

		• If additional quarries/borrow areas are required after construction has started, obtain written approval from MMRDA and the clearances from respective concerned authorities • Statutory permits/clearances shall be obtained from the government bodies including SEIAA, MoEF&CC, SPCB, Mining Department etc., as applicable for the establishment of quarries and borrow areas. Conditions of these statutory permissions shall strictly be complied and report on compliance shall be submitted to the concerned authority on regular basis asper requirement • Specific routes shall be designated for transportation of material from borrow site to the construction site while avoiding village and small roads. Also, peak traffic hours shall be avoided for transportation of material • Logistic arrangements, development of haul roads should be with taken care for the minimum environmental disturbance. • In the case of the borrowing of the earth material an advance agreement must be signed between the executing agency and the owner of the land. • Excavation depth shall not exceed the permitted limit • Excavation activities shall not be undertaken during monsoon season • Garland drains shall be provided around the excavated pits and borrow sites to prevent entry of run-off from surroundings into the excavated pits • Borrow pits shall not be installed at the forest land/agricultural land/close to water bodies/existing roads/settlements • Minimum distance of 8 m shall be maintained between two borrow pits • The depth of borrow pits shall not exceed 45 cm and it may be dug out to a depth of not more than 30 cm after stripping the 15 cm top soil aside • Prior permission shall be obtained from District Collector for establishment of borrow area • For the redevelopment of the borrow area, the contractor shall evolve site-specific redevelopment plan for each borrow area location, which shall be implemented by contractor after the approval of the MMRDA • Borrow sites shall properly be restored and shall be stabilized with proper vegetation • Topsoil shall be preserved in stockpiles		
11	Procurement of Construction Material	• Materials shall be procured only from licensed and authorized suppliers • Suppliers shall be in possession of the valid clearance document for extraction and supplying of the material being procured from them	Contractor	MMRDA, Supervision Consultant
12	Labour Welfare	• Local people shall preferably be given employment • All the labor shall be followed and the license shall be obtained for hiring the labour and contractual labour • All facilities shall be provided to the labour as per the BOCWA, 1995 and BOCWR, 1996 • Occupational health and safety management plan for labour shall be followed	Contractor	MMRDA, Supervision Consultant
13	Safety enhancement and Disaster management	• The civil and structural designs of the proposed project must include the aspects of seismicity (Zone III), floods (Prone to floods) and ground subsidence of the area. • All the structures shall be designed above the HFL • Geological study including study on strata, soil type,	Contractor	MMRDA, Supervision Consultant

		Soil bearing capacity, rock structure etc. shall be carried out during the detailed project report. • System shall be established to receive updates from IMD on daily basis regarding specific & extreme weather Phenomenon like storms, heavy rainfall, flooding etc. and work shall be managed accordingly • Safe shelters shall be identified so as men and material can be transported to these locations during flood • To ensure the passage of the surface run-off to avoid the flooding the natural drainage system must not be clogged or changed. Proper cross drainage channels are to be provided at identified locations.		
14	Drainage	• Existing drains shall be checked for blockage prior start of work, if blocked shall be clean to prevent stagnation of water. These drains shall be kept clean all the time. Monthly monitoring of the drains shall be carried out • Temporary drainage system shall be provided at all construction sites, construction yards, labour camp locations and other temporarily occupied locations to facilitate draining of runoff and prevention of flood • Rain water harvesting shall be practices to use rainfall water at site for various purpose like water sprinkling etc. or shall be collected and recharged into ground (if water quality meets the criteria and if the water is not polluted) from all the permanent and temporary structures/sites established for the project • Oil & grease traps shall be provided with drains at parking lots, fuel storage area, refueling area etc. • Sedimentation tanks shall be provided with drains so as silt can be arrested from run-off prior entering into a water body • No material should be dumped into natural drains that may block, impede or alter drainage channels	Contractor	MMRDA, Supervision Consultant
15	Working on or near water bodies	• Construction methodology and method statement shall be submitted for carrying out works on or near water bodies detailing the measures on environment and safety management • Modeling study shall be carried out for each proposed pier location to assess its impact on the water flow, bed erosion, scouring, bank erosion etc. • No of piers in the water body shall be minimized by proper planning and usage of longer spans between the piers • Permissions from concerned authority shall be obtained prior initiation of any construction work on or near water body • Plan for management of water from dewatering activity, management of muck, wet slurry and mud shall be provided and followed • Plan for restoration of water body, removal of filled material and removal of temporary construction structures shall be placed in water body	Contractor	MMRDA, Supervision Consultant
16	Setting up of the labour Camp	• Camp locations should be carefully selected to avoid the land use categories: residential, sensitive and Eco sensitive areas. Distance of minimum 500 m shall be maintained between the said land use and labour camp locations. Camps sites shall preferably be established on waste and barren land so as the vegetation removal and tree cutting can be minimized. • Camps shall also be established at approx. 500 m distance from the water bodies to prevent any impact on the water body	Contractor	MMRDA, Supervision Consultant

		• NOC shall be obtained from the land owner and the concerned authority prior establishment of the labour camp. • Land shall be restored back to its original condition immediately after the completion of construction works and prior handing over the land back to the land owner. All waste materials, temporary/permanent structures etc. shall be removed from the camp site and the site shall be re-vegetated with the native species of trees • Training and awareness shall be provided to the labour to not indulge in the unfair practices • Labour camp should be enclosed with boundary wall. • Movement of the workers should be monitored by providing adequate security checks and all the workers shall be checked for availability of valid ID cards. • A cooked food canteen on a moderate scale shall be provided for workers so that they can have their meal at a definite place. All the wastes generated from the canteen shall be treated/disposed of as detailed in the other sections of the waste disposal. The labour need not to depend the nearby facilities for food and so interaction with the nearby community will be minimized. • Firewood and other conventional fuels like dung cakes, paper, waste materials etc. shall not be used for cooking and camp fire. Contractor must provide only clean fuel for cooking like LPG gas. • Health problems of the workers should be taken care of by providing basic health care facilities through a health center set up at the construction camps. The health center will have at least a doctor (part time), nurses, duty staff, medicines and minimum medical facilities to tackle first-aid requirements for minor accidental cases. Some arrangements will be made with the nearest hospital to refer patients of major illnesses or critical cases. The health center will carry out quarterly awareness programme of HIV – AIDS with the help of AIDS control society. Posters will be exhibited in the health care clinic for awareness. This will not only be beneficial for the labours/workers health but also very significant to protect the health of the nearby communities especially against the contagious diseases. • Facilities at the camp sites shall be provided as per BOCWA, 1996 so as to establish proper sanitation facility and waste management system at the site to prevent impact on air, water and soil quality of the area. Details are presented below: • Construction camps shall be provided with sanitary latrines and urinals with the water facility. Closed drainage systems and the proper sewage treatment system according to the local conditions should be provided for proper disposal meeting the standards as prescribed by CPCB. If sewage generation is more than 10 KLD then STP shall be provided if less than 10 KLD then sewage can be disposed through septic tank/soak pit. Soak pits shall not be provided within 100 m of the water body or any water source to prevent impact on water quality • Food waste shall be handed over to the piggeries or any pig farm in nearby areas. Food and other compostable waste can also be treated within the camp through composting (vermi composting/pit composting/organic waste convertors).		

		• All the municipal waste shall be disposed off through the authorized local waste management agencies only if any in-house treatment facility is not available • A Waste disposal and management plan will be prepared by the contractor before start of construction works and submitted to MMRDA for their review and approval. • There must be proper sewage and solid waste handling and management for the labour camps. The drainage must be proper in the camp area with no stagnancy of the water. Also, the drainage from the camps must not affect the domestic supply of the public water.		
17	Children and Women protection and rights	• Child labour shall strictly be prohibited at site • The contractor agencies are responsible to protect the women rights. Suitable care & welfare services are to be provided i.e. changing rooms, separate toilets, crèche, feeding rooms etc. as per BOCWA & BOCWR	Contractor	MMRDA, Supervision Consultant
18	Utility shifting	• Plan for shifting and reconstruction of utilities to be impacted shall be prepared prior start of construction. The plan shall be discussed and agreed upon with all the concerned agency • Utility shifting shall preferably be carried out through the concerned agency only and the compensation amount shall be paid as requested for the same. This compensation amount shall also be included in the project cost to prevent any impact • Utility shifting shall preferably be carried out while minimizing the disturbance to the community and its dependents. New facility shall be provided before dismantling the old facility. In case that is not possible, dependents/community shall be pre-informed about the discontinuation of the utility with the timeline of its restoration. Also, an alternative shall be provided to community in the block period. • Affected utilities like electric poles, water pipe lines, hand pumps, etc. shall be relocated with prior approval of the concerned agencies.	MMRDA, Contractor	MMRDA, Supervision Consultant
19	Ethnic Community and Indigenous People	• No ethnic community or indigenous people are found to exist in the project area during the study	MMRDA	MMRDA
20	Cultural and Religious site	• Develop a protocol for use by the Contractors in conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved. • Inform Archaeological Survey of India and/or State Department of Archaeology in case of finding any archaeological artifact/item	Contractor	MMRDA

Environmental Management Measures and allocation of Responsibilities in Construction Phase

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
1	Micro-climate	• Temporarily warming effect due to operation of large number of heavy construction machineries; • Continuous running of DG set at the construction camp; • Clearing of vegetative cover may also lead to rise in the temperatures in local area over long term.	Contractor	MMRDA, Supervision Consultant

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
		• Measures proposed to be taken to minimize the impact on micro-climate are given below • Compensatory plantation shall be carried out as per guideline of concerned Tree Authority under Maharashtra (Urban Area) Tree Preservation Act, 1975 and its amendments. Total 4799 trees will be planted for affecting total 708 trees • Other than this, approx. 110 trees exists at depot site. Joint visits will be undertaken by the civil, planning and environment team to understand requirement of tree cutting which shall minimize the nos. of trees to be cut. Compensatory afforestation will also be undertaken for the affected 110 trees. • Transplantation shall be preferred over the tree cutting. Trees having width between 30-75 cm shall preferably be planted. Transplantation shall be carried out following the scientific approach in appropriate season and with all the utilities available through an experienced agency only to assure the high survival rate of transplanted tree. • Survival rate of the plantation shall be maintained and additional trees shall be planted for every tree lost • Proper measures for tree care like provision of guards, watering, manuring etc shall be provided as required to protect tree from cattle and weather action • Plantation shall preferably be carried out with the native species having minimal aftercare requirement and high survival rate • Trees having high CO2 and other pollutant absorbing capacity shall preferably be planted • Exotic and ornamental species shall be avoided • Regular monitoring of the plantation shall be done on fortnight basis • Proper maintenance of machinery and oiling to minimize heating of the machinery and minimize the emissions • Monitoring of DG Sets for performance evaluations • Good quality of coolant shall be used to check the overheating of DG sets and other machineries.		
2	Air pollution and dust control measures	• Siting of stone quarry plant, batching plant, stone crushers plant should be done in down wind direction • Proper and prior planning and appropriate sequencing and scheduling of all major construction activities will be done, and timely availability of infrastructural supports needed for construction will be ensured to shorten the construction period vis a vis reduce pollution. • Construction materials shall be stored in covered condition to prevent the fugitive emissions. • Construction materials and debris shall be transported in the covered conditions. • Adequate dust suppression measures such as regular water sprinkling on unpaved haul roads, stone quarry, batching plant and stone crushers sites & fugitive dust during material handling,	Contractor	MMRDA, Supervision Consultant

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
		loading/unloading & other activities at haul road particularly at vulnerable areas near habitation shall be controlled especially in the dry seasons • Dust during loading and unloading will be controlled with careful handling and by following measures: ✓ Increasing moisture content: In some cases, slight moisture may be added to the material to reduce dust during loading. ✓ Reducing falling distance: Shortening the falling distance between the material discharge point and the material pile will slow material velocity and reduce particle impacts, lessening dust generation. ✓ Adding physical barriers at the loading point: Create walls or areas where personnel are removed from the affected area to avoid dust exposure could occur. • During construction period, all applicable clearances for air quality management and approvals such as 'Consent to Establish' and 'Consent to Operate' for batching plant, stone crushers area, stone quarry shall be obtained from the State Pollution Control Board and complying all the conditions. All vehicles operating for the Contractor shall obtain Pollution under Control (PUC) certificate. • Environmental clearances shall be obtained from authorities for establishing new quarries and crushers. Contractor shall strictly comply to all the conditions in the clearances. • DG sets shall b provided with stack of adequate height as per CPCB norms (H= h+0.2√KVA, where H= total height of the stack, h=height of the building in meters, KVA=total generator capacity of the set in KVA) • It will be ensured that all the construction equipment & vehicles are in good working condition, and maintained to keep emissions within the permissible limits. Idling of the vehicles shall be minimised and engines should be turned off when not in use to reduce pollution. • Only clean fuel shall be utilized for all cooking purposes at labor camps. • Raw materials shall be procured from nearest local sources. • Provision of wheel wash facility will be installed to contain project site dust within the site. • Recycled construction materials like fly-ash and sludge from cement plant for construction purpose may be utilized. • Temporary Electricity connections at the sites will be obtained to minimize usage of DG sets etc.		
3	Noise level Controlling measures	• Barricading (Temporary noise barrier) the construction site to minimize the noise level outside the site boundary. • Management of construction traffic to avoid residential areas. • Restriction on Honking at the project site.	MMRDA	Contractor and Supervisor Consultants

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
		• Heavy noise generating activities like piling preferably shall not be carried out at residential and sensitive areas during night time (10:00 PM to 6:00 AM). • Periodic monitoring (monthly level) of noise levels to check the level of pollutants and effectiveness of proposed EMP. • Stationary noise source like generator sets shall be provided with acoustic enclosures. The plants, equipment and vehicle used for construction should strictly conform to CPCB standards. Vehicles and equipment should be fitted with silencer and maintained accordingly. • All equipment should be fitted with silencers/noise mufflers and will be properly maintained to minimize its operational noise. Noise level will be one of the considerations in equipment selection, which will favour lower sound power levels. • Protection devices (earplugs or earmuffs) should be provided to the workers operating near high noise generating machines. • Hearing test for the workers prior to deployment at site and high noise areas followed by periodic testing at every six months. • Job rotations systems for workers who will be working in high noise level areas. • Noise barrier along the sensitive receptors which are with in the 100 m distance of the alignment shall be provided. • Barriers for restriction of noise, bird collision and visibility along the corridor during Operation Phase		
5	Vibration	• Prior construction, preconstruction surveys shall be conducted at locations close to piling to document the existing condition of buildings in case damage is reported during or after construction. Damaged buildings would be repaired, or compensation paid to the owners. • Notify the local people prior to undertake the construction activities associating with higher vibration level such as activities using vibrating rollers. • The vibrations should be reduced considerably by ensuring and keeping correct track geometry by advanced measurement. • Route heavily loaded trucks away from residential streets, if possible. Selects street with fewest homes, if no alternatives available. • Operate earthmoving equipment on the construction plot as far away from vibration-sensitive sites. • Phase demolition, earthmoving and ground-impacting operations so as all activities does not occur in the same time period. • Avoid night-time activities. People are more aware of vibration in their homes during the night-time hours. • Avoid impact pile driving where possible in vibration-sensitive areas. Drilled piles or use of a sonic or vibratory pile driver causes lower vibration levels where levels where geological conditions permit their use. However, continuous operation at a fixed frequency may be more	MMRDA	Contractor and Supervisor Consultants

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
		noticeable to nearby residents, even at lower vibration levels. Furthermore, the steady-state excitation of the ground may increase resonance response of building components. Resonant response may be unacceptable in cases of fragile buildings or vibration-sensitive manufacturing processes. Impact pile drivers, in contrast, produce a high vibration level for a short time (0.2 s) with sufficient time between impacts to allow any resonant response to decay. • Select demolition methods not involving impact, where possible. • Avoid vibratory rollers and packers near sensitive areas.		
6	Biological Environmental: Flora	• No labour camp shall be established on the forest land. • The boundary of the diverted forest land shall be suitably demarcated. No additional or new path will be constructed inside the forest area for transportation of construction materials for execution of the project work. • Alternate fuel shall be provided to the labours in the labour camps to ensure that no firewood will be used for cooking etc. • Smoking, hunting & fishing shall be prohibited. Contractor shall conduct regular awareness trainings related to non-use of firewood, prohibition on smoking in natural areas, bush fires accidents, safe handling of animals (if encountered), prohibition of fishing etc. • Noise will be kept under control by regular maintenance of equipment and vehicles. Noisy activity shall be prohibited during night in forest areas. • Dust control measures will be adequately applied with the dust generating activities. • Trees located outside the RoW will not be felled. Minimum number of trees will be felled within the Row with translocation of trees upto maximum possible extent will be performed as much as possible. • The loss of trees shall be compensated through compensatory plantations in the recognized CA land in accordance with requirement of Tree Authority. Standard size saplings with minimum height & minimum collar girth of native mixed species as approved by the State Govt. shall be planted in the selected CA land. The height and collar girth (specie wise) shall be measured & recorded at the time of plantation. Data of height, collar girth and survival percentage (species wise) twice a year (April & November month) shall be recorded & and maintained. • No labour camps shall be permitted in the vicinity of any water body in order to avoid the deterioration of water quality and any human induced impact on aquatic life nor shall workers be permitted to use waterbodies for bathing and washing. • Designates place will be used to store the construction material. Proper care will be taken that no spill of the construction material or the	Contractor	MMRDA, Supervision Consultant

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
		debris shall take place and get mixed into any river body or washed away in heavy rains. • Moreover, all provisions of Environmental Management Plan made for the air, water, noise pollution control will be implemented, and thus will also be helpful to control the negative impacts on the flora as well.		
7	Biological Environmental: Fauna	• Smoking, hunting & fishing shall be prohibited in the natural habitats/forests. • Awareness will be spread among the workers towards nature's conservation. • All staff / workers will be instructed not to chase/hunt if any wildlife seen near the project area. The incidence of sighting wildlife near project site should be reported to Forest Department for safe handling. • Construction activities will be avoided in night time near the natural habitats. • All kind of the pollution and noise causing machinery/engines will be properly serviced to keep the disturbance level at minimum or under the prescribed limits.	Contractor	MMRDA, Supervision Consultant
8	Waste Management	• Contractor shall follow and comply with all the rules pertaining to the management and disposal of waste in India • Contractor shall obtain NOC for generation, management and disposal of all kind of waste generated from SPCBs and local bodies as applicable. • Contractor shall follow and comply with the conditions of all the NOC obtained pertaining to the waste generation • Waste generated at the site shall be segregated at source and treated or re-used at site to the extent possible. Recyclable materials shall be segregated and sold to the authorized recyclers. Reject fraction of waste shall be disposed off through the authorized local waste management agencies in the area • If local agencies/facility for waste collection and disposal are not available for municipal and C&D waste, in the project area then contractor shall identify the sites for waste/construction debris disposal. Debris disposal sites shall be selected prior start of construction and approval shall be obtained from MMRDA prior the start of construction. • Any hazardous materials to be used will also need to be stored and handled correctly to prevent spills and pollution. Hazardous material shall be stored in covered conditions only in the confined location and shall be provided with the containment for any spillage. Hazardous waste containers shall properly be marked and kept in isolated locations only. Hazardous waste transportation shall be carried out only through the authorized transporters and TREM card shall be maintained for transportation • Hazardous waste shall be sold only to authorized vendors • Fuel/waste oil shall be stored in covered HDPE containers only on paved surface having provision	Contractor	MMRDA, Supervision Consultant

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
		of containment of spillage. Oil interceptors shall be provided with the drains near the fuel/waste oil storage. Oil spill management kits shall be available at the site to manage the spill, if any • Effort shall be made to re-use C&D waste to the possible extent such as filling material for casting yard or can be given to other local construction projects. Surplus shall be sent for recycling to the recyclers or for disposal at approved sites • Excavated soil shall be used for backfilling excavations and surplus shall be given to the other construction projects in vicinity or disposed off to the C&D waste disposal site • No dumping should be carried out outside the RoW including private and government land, road side, low lying areas, wetlands, water bodies, forest area, ecologically sensitive areas etc. • All the workers engaged in waste management shall be provided with the adequate PPEs like jackets, gloves, masks, face shield etc • Waste generation shall be minimized by providing adequate material storage and covering facility and providing training to the workers for proper handling of the material and machinery		
9	Top Soil Preservation and soil compaction prevention	• Top soil from the RoW shall be removed upto the depth of 15 cm and shall be stored for later usage for landscaping and dressing of the temporarily affected areas at the time of restoration • Top soil shall be stored in the form of stock piles. Slope and height of the stock pile shall be maintained as per the angle of repose of the material. Minimum distance of 250 m shall be maintained b/w the two stock pile to allow the access. These stock piles shall be sprinkled with water to minimise the erosion • Excavated earth/stock piles shall not be piled at construction site and shall regularly be removed. They shall be stored in covered condition to prevent erosion due to wind and water action. Height of the stock piles shall be maintained. High and very close stock piles shall be avoided. Drainage facility shall be provided in the stock pile area to prevent erosion/washing away of stock piles	Contractor	MMRDA, Supervision Consultant
10	Slope Protection, Stripping, stocking	• Excavated slopes shall be stabilised through appropriate engineering and biological measures like pitching, mulching, turffing, etc. • Excavated pits shall be stabilized by shoring to prevent any collapse of excavation and soil erosion • River bed slopes (Ulhas river) from where vegetation is removed or destabilized for construction of bridges shall be stabilized through appropriate biological and engineering methods • Approaches for bridges shall be stabilized and pitched as required to prevent any erosion	Contractor	MMRDA, Supervision Consultant
11	Management of stockpiles/ Construction Raw Material	• Loose construction material and excavated earth shall be stored and transported in covered conditions	Contractor	MMRDA, Supervision Consultant

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
		• Stockpiles of construction materials, top soil and excavated earth shall be located away from rivers, streams, fertile agricultural lands, recorded forest lands or inhabited area. • Appropriate measures like silt fence, perimeter dikes, water bars etc. be installed around stockpiles to retain silt from run-off.		
12	Drainage	• Temporarily drainage shall be provided at the construction sites, parking areas, casting yards, vehicle/machinery washing areas and excavated areas to divert the runoff. These drains shall be provided with sedimentation tanks to arrest the silt. • These drains shall be kept clean and shall remain functional. Drainage shall be inspected every month • Adequate cross drainage structures and longitudinal drains shall be provided in & along service roads (if any) to ensure the cross drainage of the run off as required. The cross-drainage of service road structure shall be connected to the nearest existing drainage system	Contractor	MMRDA, Supervision Consultant
13	Silt Management of water bodies and prevention of soil erosion	• Silt fencing around water bodies during construction will be installed to filter out the silt-laden runoff before entering to the water body • Turfing or pitching of embankments of affected water bodies will be done to prevent erosion that also causes siltation in the water bodies • No solid waste will be dumped in or near the water bodies or rivers • Excavated earth and other construction materials shall be stored away from water bodies • Excavation shall not be carried out during monsoon and excavated pits shall be covered with tarpaulin to prevent filling with water. Soil laden water filled in the pit shall be pumped into sedimentation tank and the settled silt shall be re-used within the project • Excavated earth/stock piles shall not be piled at construction site and shall regularly be removed. They shall be stored in covered condition to prevent erosion due to wind and water action. Height of the stock piles shall be maintained. High and very close stock piles shall be avoided. Drainage facility shall be provided in the stock pile area to prevent erosion/washing away of stock piles	Contractor	MMRDA, Supervision Consultant
14	Construction materials Transportation and haul road maintenance	• Water sprinklers must be working on the haul roads. • Speed limits should be below 20km/hr on haul roads. Over speeding shall be strictly prohibited • Trucks/loaders should be properly covered with no spillage of the materials • No vehicle shall be overloaded • Drivers shall be trained for defensive driving, first aid, fire extinguishing • Drivers shall be instructed to take only designated route for transportation of material and shall avoid peak traffic hours	Contractor	MMRDA, Supervision Consultant

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
15	Management of construction vehicles	• All transportation vehicles and machinery shall be provided with the drip trays and collected fuel shall be disposed off through authorized vendors only • All the construction vehicle shall regularly be serviced and maintained • PUC shall be procured for each construction vehicle • Construction vehicle shall be inspected on regular basis • All construction vehicle shall be parked only in designated locations • All drivers shall be provided induction training, defensive driving training, training for providing first aid and handling fire in vehicle • Drivers shall be instructed to follow the traffic rules, respect the designated speed limit and follow the designate routes • Wheel washing facility shall be provided at the exit point at site and the water from the wheel washing facility shall be channelized into sedimentation tank through proper leak proof drainage system. This water shall be re-used for sprinkling purpose as required	Contractor	MMRDA, Supervision Consultant
16	Water Quality	• The priority shall be given to use surface water wherever surface water source is available. Ground and Surface water may be used only after obtaining necessary permissions from the respective Government authorities. • Rain water harvesting shall be carried out where ever feasible. • STP treated water shall be precured from nearby STPs and shall be used preferably for sprinkling and landscaping. • Minimizing water requirement by using water conservation measures such as covering the water tanks, providing visual notice for water conservation, low flow taps in toilets etc. • Regular inspection to detect leakage in water pipelines and water tanks. • Labour camps, plant sites, casting yards, parking area, workshops, material and fuel storage areas should be located at minimum 500 m distance from the water body; • All necessary statutory approvals should be secured from local authorities' prior extraction of surface or ground water • All applicable water quality standards should be complied with, at all construction sites along the proposed alignment route during the entire period of construction activity; • It should be ensured that no liquid is discharged from any construction site/activity without treatment; • Site drainage should be retained in purpose-built lagoons for enough time to allow most sediment to settle out before discharge to natural or urban drains • Suitable drainage at construction site/camp should be provided to avoid formation of stagnant pool	Contractor	MMRDA, Supervision Consultant

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
		of water that leads to water logging and breeding of mosquitoes. • Excavation activities shall not be undertaken during monsoon season. All excavated pits and borrow area sites shall be covered with tarpaulins during rains. Garland drains shall be provided around the excavated pits and borrow sites to prevent entry of run-off from surroundings into the excavated pits. • Stockpiled soil and other loose material should be stored in covered areas or shall be covered with tarpaulin. Drains with sedimentation tanks shall be provided in these area to facilitate drainage of run-off and arresting the silt from run-off. • Sewage from toilets at labour camp and construction sites shall be disposed off complying to the guideline of CPHEEO and PHED. Sewage shall be disposed off through septic tanks and soak pits. Septic tanks shall be evacuated through authorized agencies only. Soak pits shall be not be provided anywhere within 100 m from any water body or where ground water table is less than 4 m. If sewage generation at one site is more than 10 KLD, then preferably STP shall be provided. Sewage shall be treated upto tertiary level and shall meet the discharge standards as specified by CPCB. Treated water shall be used at site for water sprinkling and landscaping. • Proper sanitation facilities (toilet with water facility) at the construction sites and labour camps shall be provided as per PHED norms • Oil and grease interceptors shall be provided with the drains at construction site, material storage area, parking sites and workshops		
17	Handling of Petroleum products, fuel, lubricants etc.	• Fuel and all hazardous materials/waste on-site should be stored on paved surface having the provisions of containments • Permission should be obtained for handling and use of the POL under MSIHC Rules, 1989 and Petroleum Rules 2002.	Contractor	MMRDA, Supervision Consultant
18	Oil Spill Management	• Any spillage of oil and lubricant must be immediately cleared. • Oil spill kits shall be provided at the site and the staff shall be trained to use these kits during emergency • A floating oil collection boom may be placed on waterbody to collect the oil in case of working inside or near the water body (especially for construction of bridges)	Contractor	MMRDA, Supervision Consultant
19	Management of Labour Camps and Labour Welfare Measures	• Labour camps shall be provided with all the facilities as per BOCWA, BOCWR including drinking water facility, sanitation facility, waste management facility, bedding, ventilation, lighting, drainage, toilets etc. • Labour camps shall be inspected on monthly basis • All the non-compliances pointed out during the inspections shall be closed at the earliest	Contractor	MMRDA, Supervision Consultant

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
20	Occupational Health and safety Management	Health Related Measures • Contractor shall have safety and health management system for all the construction activities to control and prevent any occupational accidents as per the National and International guidelines whichever is stringent as applicable • Contractor shall implement workers health awareness and surveillance program including health check-ups, regular health monitoring systems for the workers, vaccination drives for prevention of diseases and awareness program • Contractor shall establish occupational health centers at multiple locations and ensure availability of adequate first aid kits, first aiders, nurses, occupational officers at OHC 24 X 7 as per the National and International guidelines whichever is stringent as applicable • Workers shall be providing with the hydrating drinks like ORS as required to prevent heat stress/exhaustion • Provision of covered rest areas at regular intervals with proper facilities like resting desks, drinking water facility, toilets etc. at construction site. These rest shelters shall be inspected on monthly basis and the non-compliances shall be monitored regularly • Contractor shall provide all the facilities such as potable drinking water, toilets with water facility, kitchen area, clean cooking fuel, proper bedding, adequate no of toilets and bathing areas, maintenance of cleanliness and sanitation etc. at the labour camp site. Labour camp establishment shall strictly follow the BOCWA, 1996 • Ambulance with all the required facilities as per BOCWA, 1996, should be provided at all work sites to take injured persons to hospitals. • Emergency contact details (including nearest hospitals and health centers) should be displayed at appropriate locations at construction sites &labour camps. • Full time medical facility should be provided at each labour camp with first aid kits & first aider • Sufficient supply of potable water should be ensured for all workers and employees on-site. Conducting regular monitoring of drinking water quality at site and labour camps • Provision of dust and noise shields and maintenance of adequate distance between the workers and noise/dust generation activities as applicable • Contractor shall implement administrative controls like practicing job rotation, maintaining work hours of labour, implementing work permit system, implementing LOTO, for the workers to prevent continuous exposure to dust, noise, heat, etc. • Workers shall be provided proper training to handle any health-related emergency if any. • All workers and staff should be provided with Personal Protective Equipment (PPE) appropriate to their job on site to minimize exposure to the dust and noise like masks, ear plugs etc.	Contractor	MMRDA, Supervision Consultant

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
		• EMP for dust and noise control shall strictly be followed as suggested. • Framing and implementation of drugs/intoxicants prohibition policy by contractor during the construction phase • Ensuring availability of snake charmers at the site 24X7 for catching the snakes and contacts details of the snake catching organizations shall be provided at the site to handle the situation in case of sighting of a snake. Anti-venoms can be kept in the nearest hospitals/PHCs to treat the snake bites if any • Drinking water quality, air quality and noise level shall regularly be monitored at all the labour camps sites as per CPCB guidelines in regular intervals as suggested in EMoP Safety Related Measures • Safe work method statement including HIRA shall be prepared and implemented for all the construction activities • Provision of adequate fire detection and firefighting system at the site like extinguishers, sand buckets, fire blankets, usage of fire-resistant materials/wires etc. • Contractor shall prepare emergency preparedness plan to handle any contingency due to construction accidents and natural or man-made disasters like earthquakes, floods and dust storms • Contractor shall develop traffic management plan to prevent any traffic related accidents at or outside the site. Contractor shall provide defensive training to the drivers to minimize the accidents • Contractor shall fence all electric sub-stations, high-tension towers and other areas to minimize electrocution risk and shall also provide proper earthing, proper warning signs and conduct security patrols. • Contractor shall ensure provision of safe work environment, provision of competent supervision, provision of safe equipment & machinery and provision of proper training to ensure safety at work site • Contractor should appoint an agency to provide awareness about the prevention of STDs among the workers. The agency shall work in close coordination with NACO and SACS for organizing the awareness campaigns. Workers shall be provided with the condoms and diaphragms as required for minimizing spread of STDs • Regular home visit holidays shall be given to the workers to ensure their proper mental health • All workers shall be provided with job specific training, behavioural based safety training and awareness for ensuring the safety • Smoking shall be prohibited at the site to prevent the health and fire hazard • All construction sites should be barricaded with proper tamper proof fencing & security lighting and conduct regular security patrols and other security measures. All the construction activity		

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
		and storage of material shall be strictly within the RoW. All hazardous chemicals & waste and explosives (if any) shall be stored as per the guidelines in the respective laws • Avoiding usage of the chemicals or paints which may impact the health of the workers or community and shall encourage use of the VOC free paints etc. No banned material like asbestos shall be used at the construction site • All workers and staff should be provided with Personal Protective Equipment (PPE) like safety jackets, helmets, gloves, googles, life jackets in case of work on/near water body appropriate to their job on site to minimize exposure to the hazards • Coordination with local police to curb the anti-social activities and usage of drugs & narcotics. • Contractor will have regular monitoring and audits/inspection system for ensuring effective implementation of safety management system and shall ensure continuous improvement of its safety management system		
21	Traffic Congestion & Diversions and issues in access M	• Traffic management plan shall be prepared and submitted for the project to engineer for approval. Traffic management plan shall also consist of HIRA for traffic diversion • Site specific traffic management plans shall be prepared detailing about the traffic diversions measures required at various locations • Adequate nos. of traffic marshals shall be deputed at diversion site, construction yard and construction sites for management of traffic • Traffic control measures like signages, cautionary notices etc. shall be provided for managing the traffic and diversion as required • Plan transportation routes so that heavy vehicles do not use narrow local roads, except nearby delivery sites. • Schedule transport and hauling activities during non-peak hours. • Locate entry and exit points in areas where there is low potential for traffic congestion. • Keep the site free from all unnecessary obstructions. • Drive vehicles in a considerate manner. • Provide free access to households and businesses/shops along the ROWs during the construction phase • Parking of transportation/construction vehicles/machinery on road shall not be allowed on public roads • All activities including stockpiling of materials/debris etc. shall be exclusively undertaken within RoW • Proper traffic safety measures like provision of adequate barricading and safety signages shall be provided at all the roads to be blocked/diverted to prevent any accident. Site specific traffic diversion/management shall be prepared	Contractor	MMRDA, Supervision Consultant
22	Installation and Operation / Maintenance of	• A standard operating procedure shall be prepared and displayed at all the site for installation and operation of the electrical equipment	Contractor	MMRDA, Supervision Consultant

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
	Electrical Equipment in Construction Yards	• Earthing shall be done for all the electrical equipment • The electrical equipment should be inspected prior installation and regularly after installation • All the wires should be insulated and no bare wiring should be left. • Wires shall properly be managed and stacked and provided with color coding		
23	Handling of Heavy Machinery	• All the heavy machinery shall be inspected prior installation and shall be inspected on regular basis • The heavy machinery shall be inspected internal as well as through third party • Proper color coding, SLI etc. shall be maintained for the cranes/lifting machinery • The operator, helpers, riggers and the support staff shall properly be trained for handling heavy machinery • All the operations with heavy machinery shall be undertaken in presence of qualified supervisor and safety expert	Contractor	MMRDA, Supervision Consultant
24	Cultural and Religious site	• If construction work is carried out in the limits of prohibited area (within 100 meters) or regulated area (100-200 meters) of any designated heritage or archaeological sites and remains, permission should be obtained from the relevant authorities • Prescribed procedures for taking permission from the local authority or village Panchayat or local community should be done before excavation of any burial ground, graveyard or 'Idgah' if identified during construction • If valuable or invaluable articles such as coins, artifacts, structure or other geographic or archaeological rare discovered, the excavation should be stop and ASI shall be informed. • Work area shall be barricaded with hard barricading of appropriate height to prevent any accident in vicinity to such site • Adequate lighting shall be provided in the construction area during night time • No authorized entry shall be allowed within the RoW and construction zone • No machinery shall be staged, no material or debris shall be stored and no project facility/utility shall be located outside the RoW especially in vicinity to buildings of heritage, cultural and historical importance • Noisy activities shall be scheduled during night time (when the facility is closed for visitors) to minimize disturbance to tourist or shall be done on closure day • The area shall be restored back to original condition after completion of construction • All waste material including redundant material, debris, material, excavated muck, other waste etc. shall be left in the area after construction is completed	Contractor	MMRDA, Supervision Consultant

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
25	Management of Sensitive Receptors	• Community shall be consulted prior shifting of any such sensitive receptor. Alternate shall be provided for the community facilities like crematorium, public building, post office etc. if getting impacted. Till now no CPR is expected to get impacted due to project • Construction works near these sensitive receptors shall be scheduled in a way to minimize impact on user. • A schedule of construction shall be developed in consultation with the concerned control authority of user to minimize the impact. Time of noisy construction works shall be selected as per the sensitivity of receptor like night-time is sensitive for hospitals, day time is sensitive for schools etc. • No sensitive receptor shall be impacted or demolished without consent of the dependents/users/owner • Safety measures like barricading of adequate height, adequate lighting, gated access shall be provided to the construction site near these sensitive receptors to minimize the impact • The area shall be restored back to original condition after completion of construction • All waste material including redundant material, debris, material, excavated muck, other waste etc. shall be left in the area after construction is completed	Contractor	MMRDA, Supervision Consultant
26	Community Health	• All construction sites should be surrounded with secure tamper proof fence, with security lighting, regular security patrols and other security measures to prevent trespassing. Only authorised person shall be allowed to enter into the construction camps/sites. • Contractors shall have health and safety management system to effectively prevent any accidents happening at construction sites. • All materials and components should be stored and stacked safely in dedicated secure areas. • Avoid use of any paints containing lead or its compounds as well as high VoCs and any banned material like CFC, asbestos etc. • Public health system capacity relies on detecting, testing, contact tracing, and isolating those who are or might be sick, or have been exposed to known or suspected communicable diseases. It is important to stop broader community transmission and prevent communities from having to implement or strengthen further community mitigation efforts. This can be done by organizing regular community health check-ups. Awareness program and vaccination camps will be organized in the nearby settlements/villages. • Ensure that first aid kits are available in all working areas, supplied with adequate material and	Contractor	MMRDA, Supervision Consultant

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
		medicine as per the BOCWA 1996. Facility of ambulance needs to be ensured. • Record of all nearest hospitals and health centers should be kept at each construction sites. • EMP for dust and noise control shall strictly be followed as suggested. • Labour camps shall preferably be established at minimum distance of 500m from the residential/institutional areas • Framing and implementation of drugs/intoxicants prohibition policy by contractor during the construction phase		
27	Restoration of damaged property	• Any private, government or property of any party got damaged during construction shall be repaired/restored to its original condition	Contractor	MMRDA, Supervision Consultant
28	Post construction clean-up	• RoW and all the sites temporary occupied for construction and related activities shall be cleaned up and restored back to their original condition • The site shall be levelled and treated with vegetative measures • All the debris and redundant machinery shall be removed from the site as per the requirements under various legislation of GoI • Backfill any excavation and trenches, preferably with excess excavation material generated during the construction phase. • Use removed topsoil to reclaim disturbed areas. • Re-establish the original grade and drainage pattern to the extent practicable. • Restore access roads, staging areas, and temporary work areas. • Stabilize all areas of disturbed vegetation using weed-free native shrubs, grasses, and trees. • Remove all tools, equipment, barricades, signs, surplus materials, debris, and rubbish. Demolish buildings/structures not required for O&M. Dispose of in designated disposal sites. • Request in writing for inspection & approval from MMRDA that construction zones have been restored • Encroachment of any type or within the RoW, shall be discouraged. A systematic awareness among road-side communities shall be carried out, in association with the Local Governing Bodies. • Monitor the success of revegetation and tree re-planting. Replace all plants determined to be in an unhealthy condition.	Contractor	MMRDA, Supervision Consultant

Environmental Management Measures and allocation of Responsibilities in Operation Phase

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
1	Climate	• Solar PV cell shall be installed on roof top of all the buildings like station, maintenance depot to harness the solar energy; • To design the building in compliance to the Energy Conservation Building Code (ECBC) 2017 to reduce the power requirement; • Adoption of Green building rating system for station and depot is preferable • Minimizing/optimizing use of air conditioning system at maintenance depots.	MMMOCL	MMMOCL
2	Land-use	• Local development authorities of the affected area shall work on upgradation of basic facilities like drainage, waste management, water resources etc. of the area prior sanction of increase in FSI	MMMOCL	MMMOCL
3	Soil Quality	• Parking area must be paved to prevent the soil erosion from vehicular movement. The paving should with the perforated pavers to allow water to percolate and to minimize the rain runoff. • Parking areas should be provided with proper storm water drainage filtered with oil interceptors. • Hazardous chemicals & waste, used/waste oil and fuel shall be stored in covered areas only as per the guidelines given in MSIHC rules 1987, Hazardous Waste Management Rules, 2016 and material safety datasheets to prevent leakage and spillages. These shall be stored only in the paved areas provided with the provision of containment of the spillages, if any. • Oil spill management kit shall be available at all stations and depots. Staff shall be trained to use these kits for cleaning for spills. • Disposal of sewage through septic tank at stations and timely evacuation of the septic tanks. • No area should be left excavated or open after any repair & maintenance works • Fuel, waste oil & used oil should be stored in HDPE containers in isolated areas on paved surface. These paved surfaces should be provided with the drains and oil interceptors should be installed in the drains. • Authorization shall be obtained from SPCB for generation of hazardous waste • Waste generated should be properly collected and segregated at each station in twin bin system. Recyclable fraction of waste should be sold to authorized vendor periodically and non-recyclable/rejected version should be disposed on daily basis through local agencies in the area responsible for waste management	MMMOCL	MMMOCL
4	Water Resources	• Minimize water requirement by using water conservation measures such as providing visual notice for water conservation, low flow taps and dual flushing system in toilets etc. • Prevent leakage of water from water pipeline and water tanks by timely and regular inspections • Provision of STP preferably if sewage is more than 10 KLD. Using the STP treated water for flushing and landscaping • If sewage is disposed off in septic tank/soak pit, these shall be timely emptied and septage shall be	MMMOCL	MMMOCL

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
		disposed off through authorized agencies to nearby STP		
5	Water quality and Wastewater treatment	• Hazardous material, hazardous waste, other waste and fuel shall be stored in covered condition on paved surfaces • Proper toilet facilities with sewage treatment and disposal facilities should be provided at stations and depots accordance to CPHEEO and CPCB/SPCB norms. For sewage treatment and disposal septic tanks with soak pits or STPs can be provided depending on the quantum of the sewage generation. If sewage generation exceeds 10 KLD STPs shall be provided preferably. • Sewage and the wastewater from the depot/maintenance sites shall be treated upto the prescribed standards of CPCB. Treated water shall be re-used at site by deploying appropriate techniques like dual plumbing system for flushing, landscaping and dust suppression system • Waste shall be stored, managed and disposed off as per the waste management laws of country • ETPs shall be provided at the depots for treatment of waste water from repair and maintenance facilities. • No area should be left excavated or open after any repair & maintenance works so as there will not be chance of sediments getting mixed with the rainfall run-off • Proper storm water drainage system and rain water harvesting pits should be provided to harvest the storm water and recharge the same into ground water aquifer system to augment the ground water level and reduce the run-off into the surface water bodies. Along with the stations, it is also proposed to provide the pits at the viaducts to harvest the storm water from viaducts also • Storm water drains and pits shall be cleared every year prior start of monsoon	MMMOCL	MMMOCL
6	Air pollution	• Provide adequate height of the stack of DG set to have wider dispersion of the gaseous emission and also to attain the mixing height. • Regular stack monitoring of DG set will be done to check their emission level. • Water sprinkling to be carried out at maintenance depot and station area to minimise dust. • Sufficient parking space should be available at all the stations so as people can leave their private vehicle and travel in metro. Further parking of private vehicle should not lead to congestion on roads. • Wide access pathways and sufficient nos. of exit & entry should be provided at each station to minimize the congestion • Rumble strips should be provided on the roads in front of stations so as the speed of vehicle is	MMMOCL	MMMOCL

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
		regulated near station area and chances of accident is minimized • Adequate feeder services should be provided so as to maximize the catchment area of proposed metro system and minimize the usage of private vehicle to reach the station. These feeder buses should be integrated and linked to city bus services and other para-transit systems like auto rickshaws and Non-motorized vehicles (NMVs • Roads in the station area should be properly maintained and sprinkled with water • MMMOCL may coordinate with the concerned development authorities, so as to assure that width of the roads connecting the stations is adequate to handle the existing traffic and anticipated new traffic to prevent congestion near stations • Vehicles with valid PUC shall only be allowed to enter the station premises		
8	Noise and Vibration	• Maintenance of the noise barriers provided along the RoW and in depot area • Proper maintenance and timely servicing of the entire system (train, track, rail etc.) to minimize vibration • Rail grinding on a regular basis, particularly for rail that develops corrugations. Rail condition monitoring systems are available to optimize track conditions. • Wheel truing to re-contour the wheel, provide a smooth-running surface, and remove wheel flats. The most dramatic vibration reduction results from removing wheel flats. However, significant improvements also can be observed simply from smoothing the running surface. • Adjust night-time schedules to minimize train movements during the most sensitive hours. • Reduce the vehicle speed while passing through the sensitive areas. • Use the equipment that generates the lowest vibration levels during the night-time hours when people are most sensitive to vibration	MMMOCL	MMMOCL
9	Flora	• Proper aftercare and monitoring of trees transplanted for minimum 1 year and trees planted for minimum 3 years shall be done • Replanting the dead trees • Preferring native species for plantation • Planted trees shall not be cut for any purpose • Water sprinkling on flora of areas nearby stations/depots • Development of green belt at depot area as per CPCB guidelines for Green Belt Development, 2000 • Taking measures to attract birds for nesting on the planted trees	MMMOCL	MMMOCL

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
10	Development of Green belt	• Green belts shall be developed at depot site as per CPCB Green Belt Development Guideline • Only native species of trees are to be planted. • Arrangements for the watering must be ensured to achieve higher survival rate. • Dead saplings must be replaced with the new ones regularly.	MMMOCL	MMMOCL
11	Training for operational staff, construction workers & officers	• All the deployed staff must be well trained, well informed about their responsibilities and operation standards. • Trainings must be arranged at regular intervals on Safety, Health and Environment etc.	MMMOCL	MMMOCL
12	Emergency Response System	• Devices for the real-time communication must be available at all sites. • Alarm system should be installed at control rooms and stations.	MMMOCL	MMMOCL
13	Waste Handling and Disposal	• Waste to be generated from maintenance depot and stations shall be segregated at source and shall be disposed off as per the Waste Management Laws. • Any hazardous materials to be used will also need to be stored and handled correctly to prevent spills and pollution. • All the rules pertaining to the management and disposal of waste in India shall be followed • NOC for generation, management and disposal of all kind of waste generated from SPCBs and local bodies as applicable shall be obtained and all the conditions in the NOC obtained shall be followed • Waste generated at the train, stations and depot areas shall be segregated at source and treated to the extent possible. Recyclable materials shall be segregated and sold to the authorized recyclers. Reject fraction of waste shall be disposed off through the authorized local waste management agencies in the area • Any hazardous materials to be used will also need to be stored and handled correctly to prevent spills and pollution. Hazardous material shall be stored in covered conditions only in the confined location and shall be provided with the containment for any spillage. Hazardous waste containers shall properly be marked and kept in isolated locations only. Hazardous waste transportation shall be carried out only through the authorized transporters and TREM card shall be maintained for transportation • No dumping should be carried out outside the defined project area limit or on any private and government land, road side, low lying areas, wetlands, water bodies, forest area, ecologically sensitive areas etc. • All the workers/staff engaged in waste management shall be provided with the adequate PPEs like jackets, gloves, masks, face shield etc. • Waste generation shall be minimized by providing adequate material storage and covering facility and providing training to the workers for proper handling of the material and machinery	MMMOCL	MMMOCL

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
14	Health and safety	• There shall be standard operating procedure for operation and maintenance work and a system for implementation and continuous monitoring. • There shall be provision of competent supervision, safe work environment and provision of safe equipment to prevent work related accident during maintenance work in depot and substations. • Competent workers shall be inducted, and training and awareness program shall be administered for competency enhancement. • Proper administrative control shall be implemented like practicing job rotation, maintaining work hours, ergonomically designed work platforms, implementing work permit system and LOTO for maintenance work etc. • Worker health awareness and surveillance program to continuously monitor the health-related issues of the worker. • There shall be health centers equipment with medical practitioners for administering medical aids. • Provision of health and safety training and awareness program to workers to make them aware about the various hazards and risk which may encounter during their course of work. • All the staff should be given training for carrying out the work assigned keeping the safety as priority. • All staff should be provided with personal protective equipment like HT gloves, safety helmets, safety jackets, ear muffs, safety belts, welding masks, safety shoes, Googles, safety shoes, full body harness) as required • Periodic inspection of PPE should be done to ensure that they are in proper condition by keeping the records • Tests should be undertaken for workers working at heights prior joining. Work at height should be undertaken during day time only. • Fall arrest system should be provided at the areas which involves working at height • Induction training should be given to all the workers at the time of joining which should include awareness of the activities to be carried out by worker, tools involved, risks involved and personal protective equipment to be used • Health check-ups should be undertaken for workers every year • Proper signage about the stations, entry, exit, fire exit, directions, safety messages, conservation of energy & water, non-spitting, non-littering, restricted entry etc. should be provided at all the stations and inside the metro to make the passenger and staff about the risks involved and required safety measures to be taken • Adequate emergency exit should be provided in the metro and at station and the location of the same should be displayed at all the suitable locations. Along with the visual display, audio messages should also be communicated at the stations and in metro about the safety measures to be taken • Proper guards/safety provision should be made along the railings of elevated metro stations. Entry beyond	MMMOCL	MMMOCL

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
		the certain points should be restricted for the passengers • Entry to the control rooms, firefighting rooms, DG area and other similar areas should be restricted for passengers and entry of such areas should be guarded • Elevators provided should be regularly maintained and checked for proper functioning • Maintenance of the metro and other equipment should be carried out regularly as per the approved maintenance schedule • Functioning of metro, stations, electrical equipment & network, DG sets etc. should be audited and inspected by eligible third part on regular basis • All the platforms should be properly guarded to ensure people board & deboard in queue and do not stand beyond the demarcated area • Certified First aid trainer should be present at all the stations all the time • System of work permits should be issued in case any maintenance work is being undertaken at track, electrical wires, OHE, control room and any such area. LOTO system should be implemented to minimize the accidents • Every day PEP Talks should be taken up with the security & maintenance staff to communicate the major safety principle to be followed and kept in mind. • Safety meetings should be held monthly to discuss the existing safety practices and measures for improvising the procedures • Mock drills should be conducted to train staff for handling emergency situations • Emergency preparedness & response plan prepared for the project should be followed • Dos and Dont's during the natural calamity and accidents should be displayed at stations and in metro for passengers and staff so as they know what is to be done during and after emergency. • Trainings should be conducted for drivers on regular basis to train them about the safety procedures and strictly following the rules • Regular monitoring, servicing & maintenance of all the signaling, transmission and communication system to minimize the chances of accidents • Emergency contact numbers should be displayed at the stations & in metro • Photography should be restricted in the metro premises • Floors of stations and metros should be cleaned on daily basis • Lifting equipment engaged should be thoroughly and regularly examined before use • Fire-fighting equipment should be provided at all the locations, i.e., inside metro, stations at depot as per the granted NOC from local Fire Department. Fire evacuation plan should be displayed at all the desired locations • Accident records should be maintained. Accident reporting should be done within 1 day after accident and detailed root cause analysis should be carried out for each accident so as preventive measures can be taken to prevent any similar accidents in future		

S. No.	Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation	
			Planning, Implementation and Reporting	Supervision
		• Regular maintenance of the viaduct, piers, pier caps, OHE system should be done. Regular inspections should be carried out to detect any breakage, cracks or deformity		
15	Community Health	• In case of outbreak of any epidemic, all the prevention and control guidelines of Central and State Govt. shall strictly be followed. Also, signs, banners, posters may be displayed at stations to make aware the passengers about the precautions and appropriate behaviors etc. for the infectious diseases.	MMMOCL	MMMOCL
16	Traffic	• MMMOCL shall take measures like provision of additional feeder bus service and shared bicycle by MMMOCL. These buses will increase the catchment of the proposed metro route. Also, the feeder buses and city buses are planned on such routes that they get integrated with other modes of transportation like city buses, auto-rickshaws & NMVs. This will improve overall traffic pattern in the area and reduce the congestion.	MMMOCL	MMMOCL
17	Aesthetics	• Area under the viaduct and near the stations should be regularly monitored and no commercial establishments or slums should be allowed to come up • Color of the viaducts and piers should be kept white • Bills should not be allowed to be stick on the piers and other structures • Regular cleaning of the stations, nearby areas and the areas under via duct should be carried out • Area under viaducts and additional land if available near stations and depots should be used for development of green area	MMMOCL	MMMOCL

6.2 Annexure 2: Environmental Monitoring Plan

Attribute	Project Stage	Parameter	Special Guidance	Standards	Frequency	Duration	Location	Implementation
Air	Construction	SO_2, NO_x, PM_{10}, $PM_{2.5}$, CO,	High volume sampler to be located 50m from the plant in the Downwind direction. Use method specified by CPCB for analysis	Air (prevention and Control of Pollution) Rules, CPCB,2009	Fortnightly--24 hourly sample	24 hours Sampling	Along the corridor, casting yard batching plant &crusher	Contractor under the supervision of SC
	Operation				Two seasons in a year --24 hourly sample		At stations/depots	MMMOCL
Water (Drinking/GW/SW)	Construction	All essential characteristics and some of desirable characteristics as approved by MMRDA/Supervision consultant	Grab sample collected from source and Analyse as per Standard Methods for Examination of Water and Wastewater	Indian Standards for Inland Surface Waters (IS: 2296,1982) for surface water bodies, IS 10500 for ground water and drinking water	Four seasons per year	Grab Sampling	GW structures along corridor, GW structures being used by contractor and GW structure developed & being used by contractor. All surface water bodies intercepted by project. Drinking water quality monitoring at each labour camp & active construction site	Contractor under the supervision of SC
	Operation				Four seasons		GW structures developed at stations/depot/other locations being used	MMMOCL

							by MMMOCL. Drinking water quality monitoring at each station and depot	
Noise	Construction	Noise levels on dB (A) scale	Equivalent noise levels using an integrated noise level meter kept atadistanceof15from edge of pavement Equivalent noise levels using an integrated noise level meter kept atadistanceof15from edge of pavement	MoEF&CC Noise Rules, 2000	Fortnightly-24 hourly sample	Leq in dB(A) of day time and night time	Along the corridor, casting yard, batching plant & crusher	Contractor under the supervision of SC
	Operation				Three seasons per year --24 hourly sample		At station/depots	MMMOCL
Soil	Construction	Monitoring of Pb, SAR and Oil & Grease	Sample of soil collected to acidified and analysed using absorption Spectrophotometer	Threshold for each contaminant set by IRIS database of USEPA until national standards are promulgated	Two seasons per year	Grab Sampling	Along the corridor, casting yard, fuel storage area, material storage area, disposal sites developed by contractor/MMRDA batching plant & crusher and soil leachate sample at batching plant	Contractor under the supervision of SC
	Operation				Two seasons		Depot site	MMMOCL

H&S (including COVID-19)	Construction Operation	As per the H&S plan given in EMP	Comply with IFC EHS Guidelines on Occupational Health and Safety		Once a month for Normal Health check-up	Biweekly for COVID 19	Construction and labour camps	Contractor under the supervision of SC
Borrow area (if established)	Construction	As per Guidelines	Visual Observation	-	Once in a month	-	Borrow area location	Contractor under the supervision of SC
Ecology/Tree plantation/ Tree Transplantation	Operation stage	As per Design			Quarterly	-	Areas where plantation is being done	Contractor under the supervision of SC till contract period and MMMOCL post completion of contract

6.3 Annexure 3: Site Visits Photos (Safety Health and Environmental Issues)

Figure 4: Partial and improper barricading of work sites

Figure 5: Haphazardstorageof materials with rusted poles with sharp edges

Figure 6: Haphazard storage of scrap materials

Figure 7: Poorly constructed and fully torn shade for workers

Figure 8: Work tables with corrugated sheets with sharp edges

Figure 9: Poorly constructed worker lunch area with no facilities

Figure 10: Poor earthing of machinery leading to trips and falls

Figure 11: Burning of wood to repel mosquitoes on site

Figure 12: Poorly kept excavations risking worker and community safety

Figure 13: Sub-contractor's (vendor) workers with no PPE on site

6.4 Annexure 4: Proceedings of a PAP Consultation Meeting

1)Venue:

The details of the date, time and place of the Public consultation meeting were as follows:

Date	Time	Place
16/07/2022	12.00pm.to01.00p.m.	Balkum Site Office, Thane

The following officers from MMRDA and other People From Dhamankar Naka, Bhiwandi Affected PAP's were Present:

Sr. No.	**Metro Representatives**	**Designation**
1.	Shri. Ganesh Sangale	Dy.Collector,MMRDA
2.	Shri Atul Patil	ExecutiveEngineerMMRDAMetroPIU
3.	Shri. Rama Patil	Asst.CDO,MMRDA
4.	Shri. Santosh Kavale	Surveyor,MMRDA
5.	Shri.GaneshM.Chaudhari	DhamankarNaka,Bhiwandi
6.	Shri.SudarshanGupta	DhamankarNaka,Bhiwandi
7.	Shri.LaxmanParamdev Prajapati	DhamankarNaka,Bhiwandi
8.	Shri.GehrilalChimanlalJain	DhamankarNaka,Bhiwandi
9.	BhaskarSpareParts Smt.BhanumatiB.Mehata	DhamankarNaka,Bhiwandi
10.	Shri.BipiuN.Shah	DhamankarNaka,Bhiwandi
11.	Shri.PankajN.Shah	Dhamankar Naka, Bhiwandi
12.	Shri.BhupendraG.Doshi	Dhamankar Naka, Bhiwandi
13.	Shri.BharatKarmaiya	Dhamankar Naka, Bhiwandi
14.	Shri.AnandMorya	Dhamankar Naka, Bhiwandi
15.	Shri.AarifJitmal	Dhamankar Naka, Bhiwandi
16.	Shri.MitulShroff	Dhamankar Naka, Bhiwandi
17.	Shri.SureshKumarJain	Dhamankar Naka, Bhiwandi
18.	Shri.Mohd.YusufShaikh	Dhamankar Naka, Bhiwandi

The meeting was started at 12.00 p.m. and Shri. Ganesh Sangle, Dy.Collector, MMRDA welcomed all the attendees. He introduced all the MMRDA officers and explain in brief the outline of the meeting. The main objective of the meeting regarding the Shifting of PAP's at Achme, Thane, Rental Housing Scheme. In the meeting PAP's were raised about the issue regarding Shifting of the PAP's at Achme, Thane Rental Housing Scheme. Some attendees were agreed but few of the Attendees are in favor of compensation as per the MUTP policy & LARR Act, 2013. Only after the decision they will allow the demolished their structures, the Dy.Collector Shri.Sangale were explained that this issue will be put up for the consideration for the Hon.MC. Shri. Sangale Dy.Collector also discussed regarding residential tenements. All these surveyed PAP's were commercial shops as per the circular of MMRDA if commercial PAP willing to take residential tenements it is applicable asper the circular, the attendees were communicated that they will think on this issues and after the discussion they will submit the letter to MMRDA. The meeting was conclude with vote of thanks by Shri.RamaPatil, ACDO,MMRDA.

Mumbai metropolitan Region Development Authority

Attendance Sheet

PAPs Consultation of Dhamankar Metrostation Balkum — 16/07/2022, 11.30 am

Sr.No.	Name	Designation	Department	Contact No.	Email Id	Signature
1)	Ganesh Sangale	Dy.Collr	MMRDA	771502456	[illegible]	[signature]
2)	Atul D. P	EE	MMRDA	7506497673	[illegible]	[signature]
3)	[illegible]	38		8888200060	[illegible]	[signature]
4)	Sudarshan	3/13		915881099		[signature]
5)	[illegible]	22		97672061		[signature]
6)	[illegible]	44		79 203 861		[signature]
7)	BHASKA S ARE PARTS BHANOHATI . MEHRA			9096116299 02 425	JAYShah2918@gmail.com	
8)	Bipin N. SHAH			876733535		[signature]
9)	[illegible]			600669	76919	[signature]
10)	Anand [illegible]			96045445 22		Anand
11)	[illegible]	26		94216226 9		[signature]
12)	Mit Shroff	17,18,19		99 4 9		[signature]
13)	[illegible] Shaikh	43		950392 6026		[signature]
14)	[illegible]			8 01 0 90		
15)	Suresh Kumar	(28 334)	25	808777 1097		[signature]
16)	[illegible]			559338220		
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(Annexure-IIPhotographsDt.16.07.2022)

6.5 Annexure 5: Minutes of the Public Consultation Meeting

Minutes of the Public Consultation Meeting
Environmental and Social Aspects of the Phase I (Kapurbavadi-Dhamankar Naka Station) of Mumbai Metro Line-5

MMRDA is implementing the Phase I (Kapurbavadi-Dhamankar Naka Station) of Mumbai Metro Line-5project with the approval of Government of Maharashtra.

An informal public consultation meeting with the landowners of proposed car shed depot of Metro Line-5 at Kasheli focusing on the environmental and social aspects of the Phase I (Kapurbavadi-Dhamankar Naka Station) of Mumbai Metro Line-5projectwas organized on 5th April, 2023.

The letter sent to Talathi, Kalher for informing landowners of Kasheli depot about the said consultation is attached as ***Annexure-I***. The details of the date, time and place of the Public consultation meeting were as follows:

Date	Time	Place
05/04/2023	11.00 a.m. to 1.00 p.m.	Sub Divisional Magistrate Office, Bhiwandi

The following officers from MMRDA and other departments were present during the meeting:

Sr. No.	**Metro Representatives**	**Designation**
1.	Shri. Amit Sanap	Sub Divisional Magistrate, Bhiwandi
2.	Col. Anand Kumar Pahal	Chief Engineer, ML-5, MMRDA
3.	Smt. SuchitaBhikane	Deputy Collector, ML-5, MMRDA
4.	Shri.Maheyesh Sagar	Tahsildar, ML-5,MMRDA
5.	Shri. Bhavesh Joshi	Chief Development Officer, Social Development Cell, MMRDA
6.	Shri. Atul Patil	Executive Engineer,MMRDA
7.	Ms. Poonam Khopade	Officer on Special Duty, Environment, MMRDA

The meeting was started at 11:30 a.m. and Shri. Bhavesh Joshi welcomed all the attendees. He introduced all the MMRDA officers and briefly explained the outline of the consultation. Presentations on the Civil, Social, Environmental, Land Acquisition and Resettlement and Rehabilitation aspects of the project were made by Shri. Atul Patil, Shri. Bhavesh Joshi, Ms. Poonam Khopade and Smt. Suchita Bhikane respectively. The copies of presentation made during the consultation are attached as ***Annexure-IIA, IIB and IIC and IID*** respectively. Further, Shri. Amit Sanap explained the procedure of Land Acquisition in detail along with the various

acts studied for deciding the applicable factor as well as rate and also responded to the points raised by the participants.

The list of attendees along with the attendance record consisting of their names, organizations represented and the contact details is attached as ***Annexure – III.***The photographs of the meeting are attached as ***Annexure-IV.***

The most of the farmers were mostly agreed to give their land for the project and many repetitive suggestions were made by the participants. They were having three main concerns as mentioned below:

i) Give compensation to all the landowners of the Kasheli depot as per the factor 2 and as per the increased rates given in other projects like Bullet Train, Virar-Alibag Multimodal Corridor.
ii) To provide approach road on the remaining land for easy access to their fields.
iii) To provide job opportunities to the members of affected families.

The details of the points raised by the participants and the responses provided to their queries are as follows:

Sr. No.	Name of Participant and Points raised	Responses provided
1.	Shri.Vinod Raising Malade- survey no. 116 A& Others informed that total area of Kasheli village is 360 Ha., and out of that 100 Ha, Falls in Coastal Regulation Zone (CRZ). Approx. 100Ha, land of Kasheli village was taken by the Government for various projects like lying of water pipeline, Highways etc., and now only 160 Ha. Land is available. He informed that sale or purchase of land has not happened mostly in the Kasheli village hence rates of nearby villages having more ready reckoner rate shall be considered while deciding the compensation value. He further said that he will be ready to give his land only if increased rates are given.	It was informed that the rates of the surrounding villages will be considered only when there is no sell dead executed in that village for last 3 years. As sale deed executed in the Kasheli village, the rates of surrounding villages cannot be considered. It was also explained that all the circulars from 2015 were studied while deciding the factors as well as applicable rates.

2.	Shri. Prabhakar Narayan Tare requested to give details of land of each farmer affected by the depot as well as the applicable rates as per the LARR Act, 2013. He asked why there is difference in the rates given for Bullet train and Virar-Alibag Multimodal Corridor projects passing through Kalher and Kasheli area and the rate given by MMRDA. Further he said that the reservation of their farm lands has been done by MMRDA and demanded to apply same factor to all the land.	It was informed that The Survey no. wise chart of affected land was displayed in the area outside the meeting hall. It was explained that as per section 26 of LARR Act, 2013, the rate of the said land is proposed to be Rs.1961 per sq.m. which was determined taking into account the sale deeds or the agreements to sell registered for similar type of area during immediately preceding three years. It was also explained that for Kasheli Village, MMRDA is a planning authority and survey no wise details taken from MMRDA and after that the applicable factors were decided by the 2015 and 2017 circular of Government of Maharashtra. It was also informed that Factor 1 will be applicable for the area which is coming under zone such as residential, commercial and Industrial and Factor 2 will be applicable for the rest of the area. In the total 27 Ha. Area of kasheli depot, for some areas factor 1 will be applicable and for some areas factor 2 is applicable depending upon the zone under which the area falling. The proposed rate as per factor 2 is Rs. 7804 per sq.m. and the rate as per Factor 1 is Rs. 3902 per sq.m. It was clarified that in the bullet train projects land acquisition was carried out by 3 ways i.e. direct sale, sammatiniwada and compulsory acquisition as per the Central

		Government guidelines and for Kasheli depot land acquisition will be carried out as per the LARR Act, 2013 and mix factor i.e. factor 1 and 2 will be applicable for depot area. It was clarified that the reservation of the land is done by the town planning department by following due procedure and not by MMRDA. It was also informed that as per the type of reservation the factor is decided and reservation of land can't be changed once decided and hence same factor can't be applied to all the land.
3.	One of the landowners asked that MMRDA themselves decided the rate as per the survey carried out and decided factor not recorded on 7/12 document of farmers.	It was informed that to give technical and administrative information of the project the said meeting is called and till date as per section 11 and 19 of LARR Act, 2013 only notification was issued and after finalization of the rate individual letters will be sent to the farmers about their affected land and decided rates.
4.	Shri. Kishor Bhoir, Survey No. 18 requested to convert the Ready reckoner rate from Rs. 1951 per sq. m. to Guntha for easy understanding. He asked as MMRDA taking the land for depot, why not the transferable 4 FSI is provided on the remaining land. He further informed that the depot land comes under 200m periphery of Gaothan and therefore as per law, minimum 1 FSI shall be applicable for construction. He further asked that If MMRDA is taking exemption from Government for	It was informed that proposed per Guntha rate as per ready reckoner rate is Rs. 1,95,100/- for Factor 2, the rate will be 4 fold i.e. Rs. 7,80,400 per Guntha and for Factor 1, the rate will be 2 fold i.e. Rs. 3,90,200 per Guntha. It was informed that the as per the 2013 Act, the compensation will be provided and provision of giving transferable FSI is not there in the act. It was also clarified that FSI applicability is mainly related with the construction permission and

	27 Ha. Depot land from the CRZ and mangrove point of view then same exemption shall be applicable for the remaining parcel of land. It is requested that the cases related to occupancy and encroachment shall be handled by MMRDA to avoid the court cases and pendency of the proposal.	the rules for construction permission will not be applicable for land acquisition as compensation for land acquisition and construction permissions technically and administratively different things. It was informed that MMRDA is not taking any exemption for CRZ and mangrove area. MMRDA will take necessary clearance for the same. It was informed that the once the Land Acquisition notices issued to the farmers, they can raise the objection on that if any and further hearing and other procedure will be carried out by MMRDA as per the law.
5.	Shri. Milind Tare, 7 of Survey no. 118 informed that in Kasheli village very few area is available as residential zone and adjoining area of depot land falls in Industrial zone and suggested to convert the reservation of depot adjoining area as residential zone.	It was informed that the reservation was already done by the Town planning department and while finalization of Development Plan (DP) of the region as per procedure suggestion/objection was already taken and then DP was finalized and hence change of zone is not possible.
6.	Shri.Balaram Tare informed that he has 4 gunthe land out of which half will be taken for car depot construction and what he will do with the remaining parcel of land which will be very small.	It was informed that the land acquisition will be done as per the requirement of land for depot and remaining land can be used by them.
7.	Shri. Ashok Tare informed that they were ready to give their land for the project purpose only suitable compensation given. He suggested using government land in the adjoining area for depot purpose.	It was informed that the suitable location for any project will be decided as per the requirement of the project implementing agency. It was informed that for the 19.62 Ha. Depot land factor 2 will be applicable and for remaining 7.50 Ha. Land, factor 1 will be applicable

	He asked about the applicable factor to the depot land. It was asked that for 27 ha. depot land some relaxation will be given to MMRDA if any area is affected due to Coastal Regulation Zone (CRZ) and Forest as it's a public project and requested to give same relaxation to the remaining land.	subject to final preparation of proposal. It was clarified that depot is affected partly by CRZ and forest and MMRDA will take all the required permissions for the same.
8.	Shri. Ashok Tare, Shri. Prabhakar Tare and Shri. Lakshman Valavi asked about the provision of jobs for members of affected families.	It was informed that no such provision of providing guaranteed jobs to land owners is there in MMRDA. However, the suggestion is noted down.
9.	Shri. Vinod Raising Malade- survey no. 116 A & Others as well as Shri. Balaram Tare informed that the proposed DP road from the depot area was not shown in the presentations and demanded to provide approach road to farmers on the remaining land for approaching to their fields outside the depot compound wall.	It was informed that the map showing the approach road to depot and its periphery will be made available at Kasheli village and Sub Divisional Magistrate office.It was also clarified that MMRDA will check the feasibility to divert DP road and MMRDA will also check the legal provisions to provide approach road to the farmers and accordingly carry out further process for the same.
10	Shri. Vinod Raising Malade- survey no. 116 A & Others, Shri. Ashok Tare demanded to give compensation to all the farmers as per factor 2.	It was informed that the factors were decided by following due procedure and for the 19.62 Ha. Depot land factor 2 will be applicable and for remaining 7.50 Ha. land factor 1 will be applicable subject to final approval.

At the end of the meeting, shri. Bhavesh Joshi made an appeal to all the farmers to cooperate with the Consultant appointed by MMRDA to carry out Social Impact Assessment study and fill the details of family like education, occupation, income, affected land, affected business etc. in the Socio-Economic Form. The meeting was ended at 1:00 p.m. with vote of thanks by Smt. Suchita Bhikane. An appeal was made

by her to cooperate with MMRDA for smooth implementation of the public project.Lastly, refreshments were served to the attendees.

List of Annexure

Annexure I	:	The letter sent to Talathi, Kalher for informing landowners of Kasheli depot about the said consultation
Annexure IIA,IIB, IIC, IID	:	Presentation of MMRDA officials given during the consultation
Annexure III	:	The list of attendees
Annexure IV	:	Photographs of the Public Consultation meeting

Out of the above Annexures, only Annexure-III (Attendance Sheet) & IV (Photographs) are included here to avoid lengthy content.

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विषय :- मुंबई महानगर प्रदेश विकास प्राधिकरणामार्फत मुंबई मेट्रो टप्पा -५ (ठाणे- भिवंडी-कल्याण) साठी कारडेपोसाठी आवश्यक असणाऱ्या भूसंपादन करावयाच्या जमीन मालकांची चर्चा सत्र

सामाजिक विकास कक्ष तथा अप्पर जिल्हाधिकारी मुंबई महानगर प्रदेश विकास प्राधिकरण यांचे अध्यक्षतेखाली बैठक दि. ०५/०४/२०२३ वेळ - ११.०० वाजता उपविभागीय अधिकारी भिवंडी यांचे कार्यालयात

अ. क्र.	अधिकार अभिलेखाप्रमाणे खातेदारांचे नांव	स.नं.	मोबाईल क्र.	पत्ता	स्वाक्षरी
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४	अमृतलाल रामजी मात्ने	१०० पैकी	9324588558		VRMatre
५	नानासाहेब दशरथ धाकतोडे	१०८ पैकी	9561684797	N.N DHAKTOD	NNT
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	पार्वती रामदास		—	—	BLL
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	ज्योती नरेंद्र भोईर				BLL
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	कविता विष्णु आगिवले				
	प्रतिमा कृष्णा तरे				
	शिवानी पुरुषोत्तम केणे				
	भारती किरन तरे				
	मोहित किरन तरे				
	निशा सुधीर पाटील				
	वैशाली धनाजी झुंजारके				
	संगिता सचिन पाटील				
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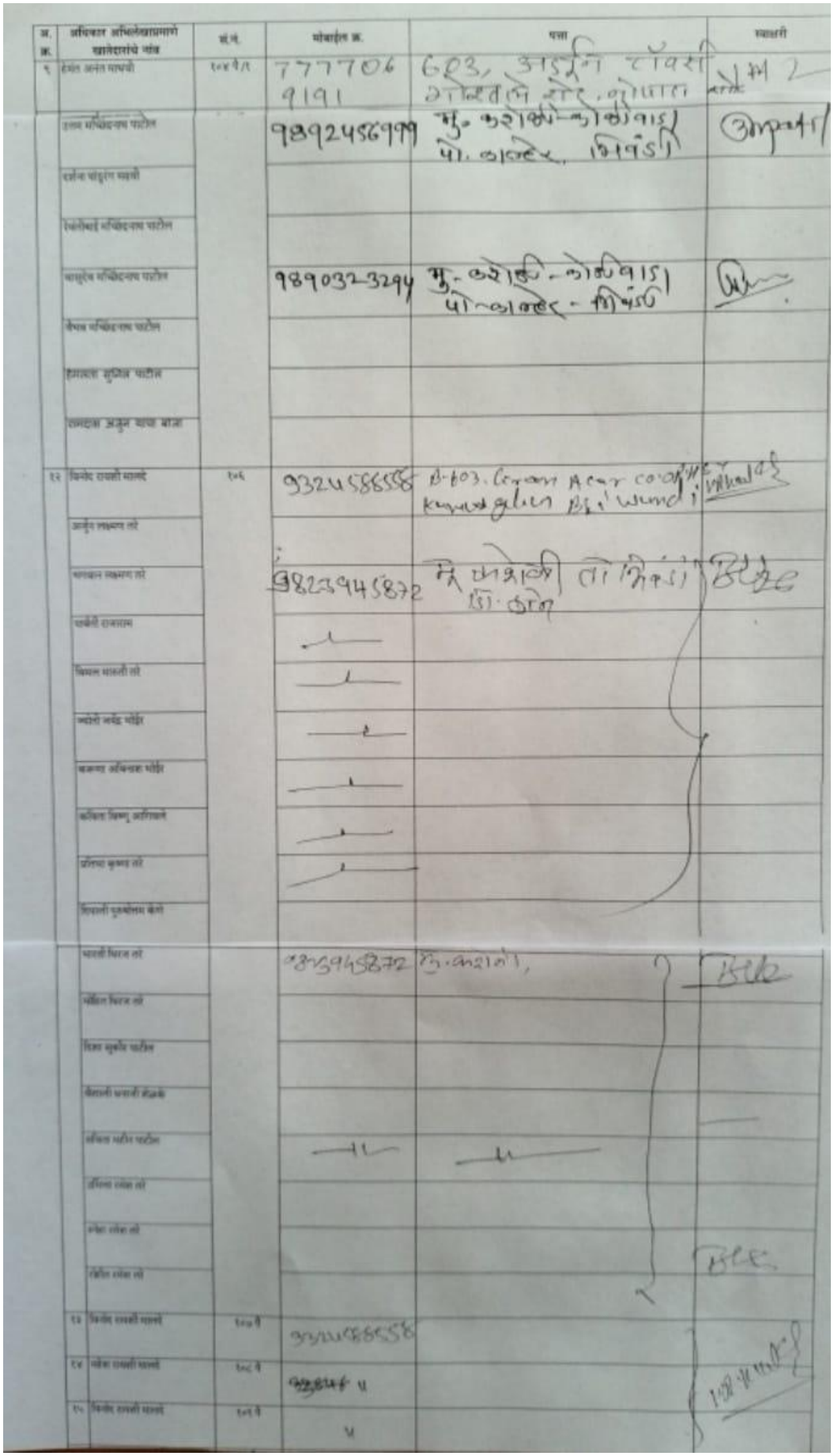

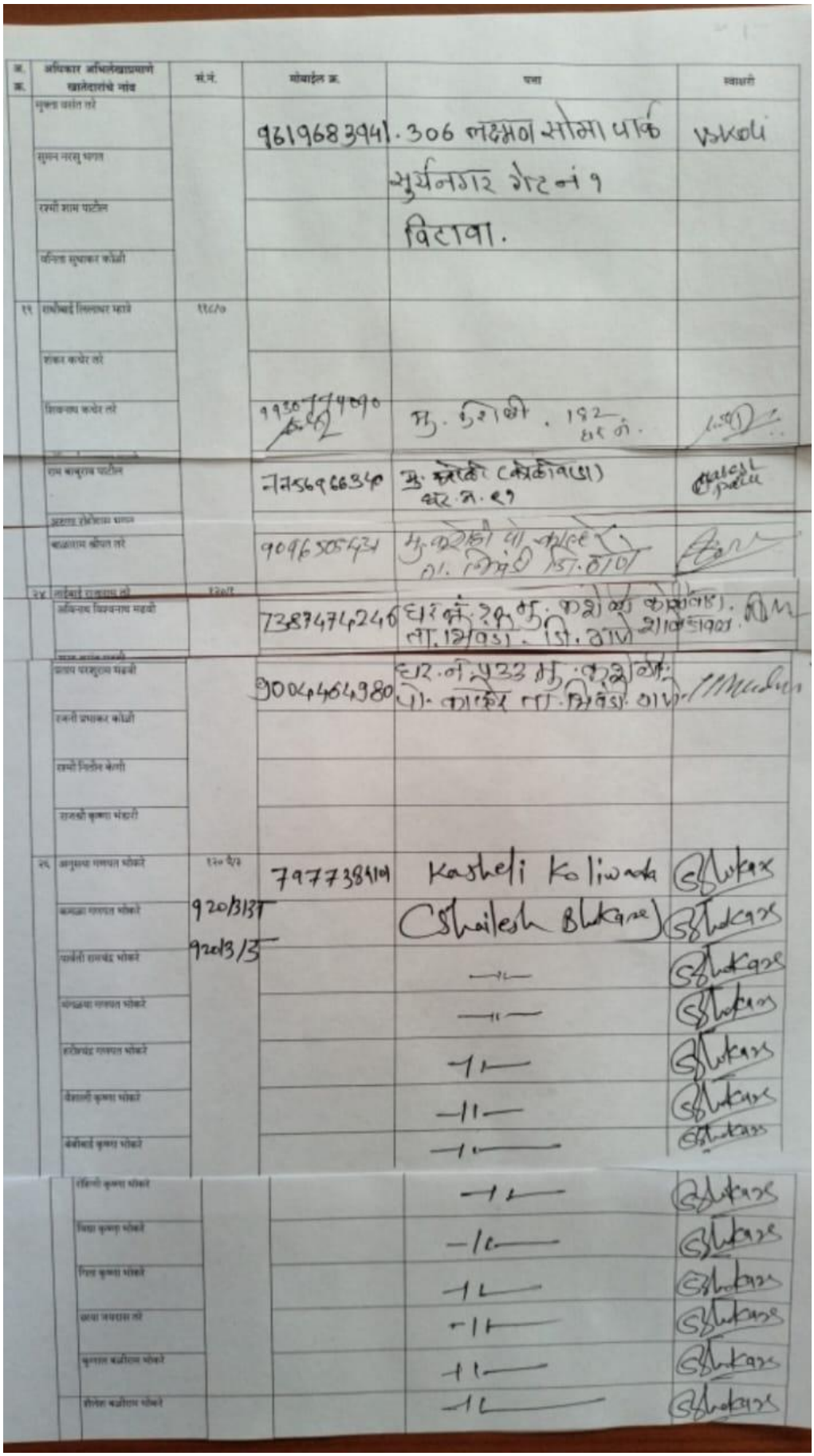

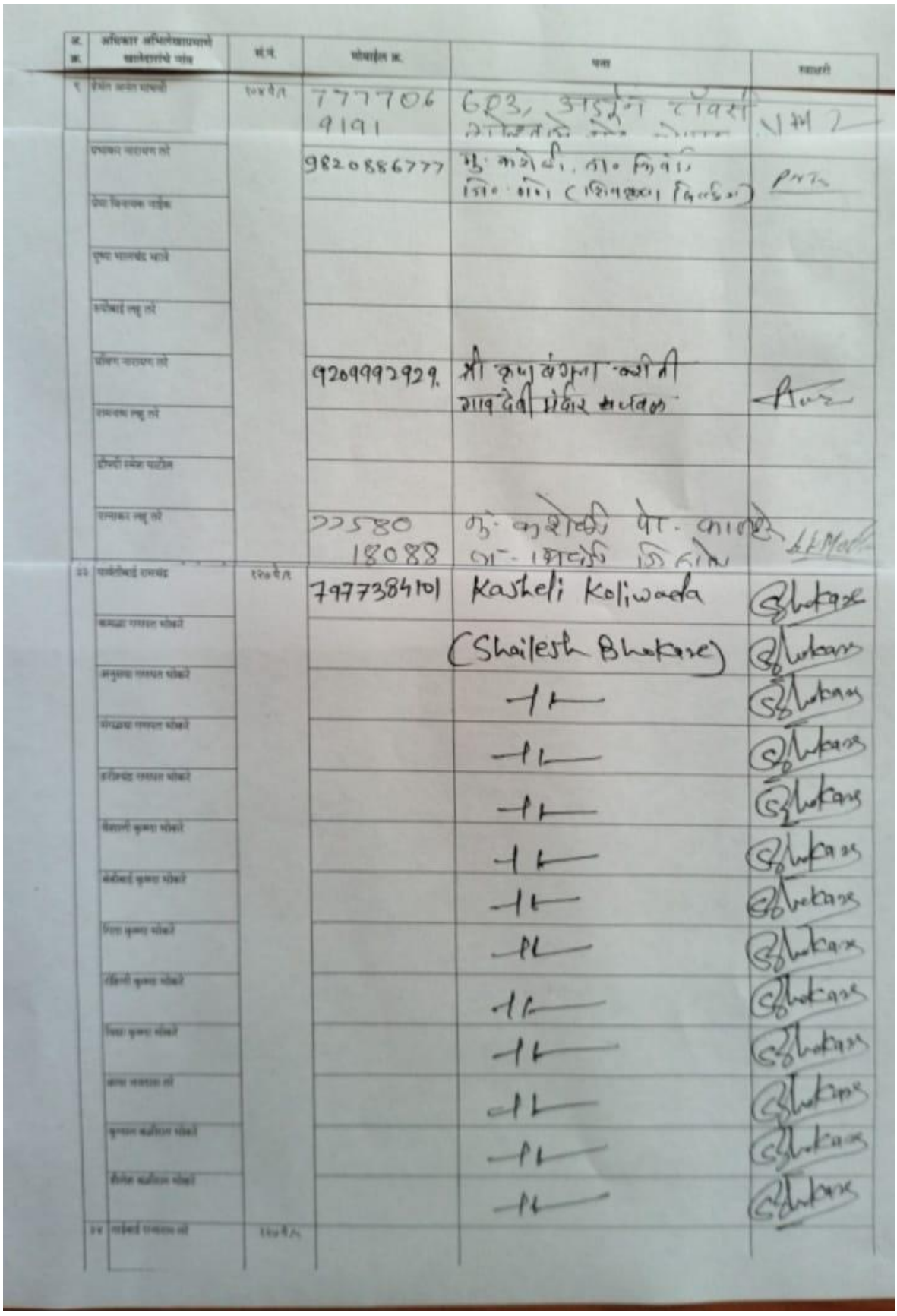
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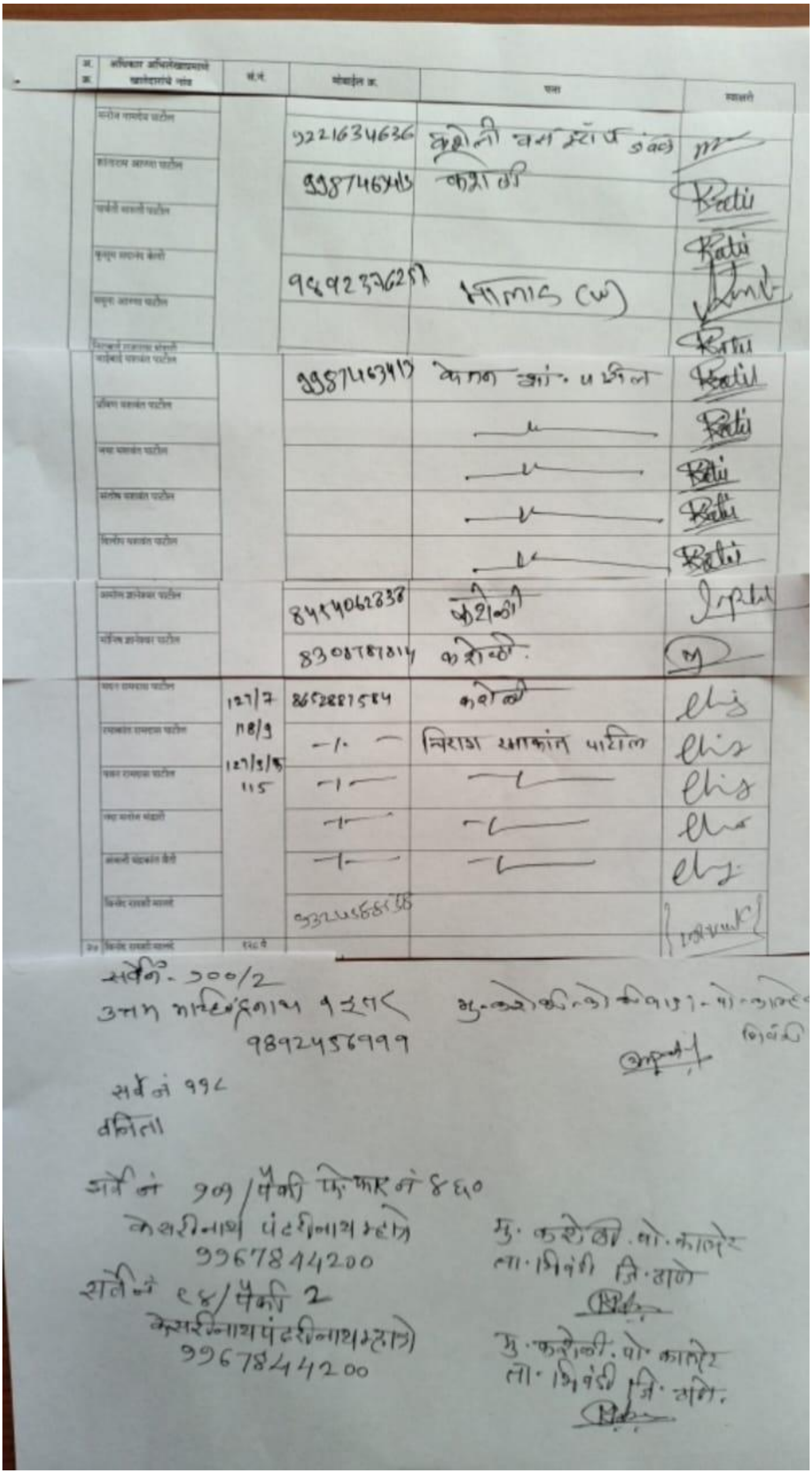

अ. क्र.	अधिकार अभिलेखाप्रमाणे खातेदारांचे नांव	सं.नं.	मोबाईल क्र.	पत्ता	स्वाक्षरी
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सामाजिक प्रभाव आणि सुरक्षितता


उप विभागीय अधिकारी तथा उप विभागीय दंडाधिकारी
SUB DIVISIONAL OFFICER & SUB DIVISIONAL MAGISTRATE
BHIWANDI

6.6 Annexure-6 :Information Brochure for PAPs

MUMBAI METRO LINE PROJECT — Thane-Bhiwandi-Kalyan

INFORMATION BROCHURE

Preface By Honourable Metropolitan Commissioner

Mr. S. V. R. Srinivas
Metropolitan Commissioner

MMRDA improve transport scenario of Thane - Bhiwandi-Kalyan Sub region. Thane and Kalyan are major trip generation location in MMR, considering population of working class lining in Thane and Kalyan. Bhiwandi is hub for warehouses and small industries, which makes it as a major trip attraction zone

Selection of a Metro System:
Metro system are superior to other because they provide higher carrying capacity, faster, smoother and safer travel, occupy less space and they are energy efficient.

Some salient features of Metro system are as follws

- Causes no air pollution.
- Low noise levels
- 1/5th energy/passenger KM compared to road-based system
- Is more reliable, comfortable, and safer than road-based system.
- Reduce travel time to 40-50% from other modes.

Metro Line 5, Thane-Bhiwandi-Kalyan section consists of 24.9 KM with 15 elevated stations. It will provide connectivity to Line 4 (Wadala - Kasarvadavli) station and with Line 12 (Kalyan - Taloja) at Kalyan.

Dept. Location is planned at Kasheli Village on land plot of 27.13 Ha.

Basic Features of the Project

The Mumbai Metropolitan Region Development Authority (MMRDA] has undertaken implementation of a 24.9 k.m. long and fully elevated Mumbai Metro Line 5 Project with 16 Stations. This Line starts from Thane Kapurbawdi and alignment passes through Kasheli, Kalher & Anjurphata through Dhamankar Naka via Rajiv Gandhi Elevated Bridge at Saibaba Mandir To Kalyan. This Line will connect important centers of Thane-Kalyan & Bhiwandi at Mumbai Suburbs. This Metro Line-5 will connect with Metro Line-4 (Wadala-Kasarvadavali) Metro : Line4-A (Kasarvadavli –Gaimukh) Metro Line-10 (Gaimukh-Shivaji Chowk) and Metro Line 12 (Kalyan- Taloja). This Metro Line will provide a transport network for Mumbai City, Mumbai Suburbs and Thane and will benefit the commuters of these areas. This Mumbai Metro L.ine Project 5 has been approved by the GoM and will be implemented by Mumbai Metropolitan Region Development Authority MMRDA. The GoM has declared Metro 5 Project as Vital Public Project' and as an 'Important Urban Transport Project'.

Framework for Land Acquisition and R&R Impacts

Most of the Metro Corridor falls within the Right of Way of roads thereby minimizing land acquisition and displacement. Public consultation meetings were held with Project Affected Persons | PAPs) at different locations during carrying out of the baseline census survey which provided useful inputs in finalizing design and implementation strategy. A detailed survey and Social Impact Assessment (SIA] has been carried out and further efforts have been made to minimize the impacts on structures. Although the Metro corridor will be elevated, land on the surface will be mainly required for landing (staircases & lifts] at station locations, at few places for construction of viaduct, allied facilities and for a depot. It is estimated that a total of 35.40 ha. land will be required for the Project; out of which 27.24 ha. Land is Private & 8.16 ha. Land is Government out of government land 2.01 ha. land is required for permanent and 6.15 ha. Land is required for temporary Metro Works. 27.13 ha. will be required for the depot. The private land will be acquired through negotiations under appropriate legal provisions and Govt. policies. As per current assessment, it is also observed that about 375 structures affected at Thane-Bhiwandi Locations The GoM has approved Rehabilitation and Resettlement (R&R] of the Project Affected Persons (PAPs] as per the MUTP R&R Policy as amended and approved by the Government in the year 2000.

Eligibility and Entitlements

All categories of PAPs in terms of ownership of land and buildings, use and type of structures are covered in the survey. PAPs who are squatters and are not legitimate occupants of lands and buildings but are covered in the baseline survey, actually affected by the project works and are included in the approved Eligibility List based on due verification, will be eligible to receive R& R entitlements, which include Alternative tenement, shifting charges of free transport arrangements and certain other assistance as per the R&R policy. PAPs occupying any new unauthorized structures or additional parts of existing structures built and occupied after the baseline survey and those enumerated in the survey but do not participate in the R&R, will not be eligible for the entitlements.

AN IMPORTANT "URBAN TRANSPORT PROJECT"

MUMBAI METRO LINE PROJECT **Thane-Bhiwandi-Kalyan**

Entitlement Details

Sr No.	PAP Category (as per use of Structure)	R & R Entitlement*
1	Residential PAP	Residential tenement free of cost in the building developed under SR scheme
2	Non-residential PAP	Commercial tenement equivalent to size of affected structures maximum upto 750 sq.ft. out of which 225 sq. ft. free of cost and additional area as per Ready Recknor rate in the building developed under SR Scheme
3	Residential+ Non-residential (R+C combined) PAP	Either as per Sr. No. 1 or 2 above

The entitlements will be provided in the Rental Housing Schemes at Thane & Kalyan MMR as per the vacant tenement availability. Particularly at Achme & Hub Town, Thane (W).

The post R &R entitlements includes allotment of 3 tenements per 100 tenements for Society Office, Balwadi and Welfare Centre and financial benefits related to Rs.20,000 per tenement to the registered Co-operative Housing Society of PAPs . No PAP is allowed to transfer or dispose the tenements in any manner within a period of 10 years from the date of allotment as per the provision approved by the Government for Slum Rehabilitation (SR) Schemes.

Information Disclosure

The MMRDA has set up a public information centre (PIC) in its office on 3rd Floor 'A' wing at MMRDA (old building) E-Block, Bandra- Kurla Complex, Bnadra (E), Mumbai- 400 051, where various documents providing information related to the project will be available for examination form 10.00 a.m. to 1.00 p.m. on Monday to Friday (except holidays)

Grievance Redress

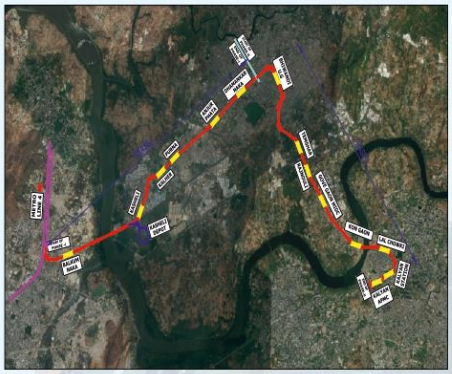
A separate two level mechanism has been constituted for redressal of grievance of PAPs. Individual PAPs having any grievances about eligibility and entitlements for R & R can make a written application along with related documentary evidence to the Field Level Grievance Redressal Committee (FLGRC) and can appeal to the Senior Level Grievance Redressal Committee (SLGRC) against the decision of the FLGRC.

AIIB's Policy on the Project-affected Peoples Mechanism (PPM) applies to this Project. The PPM has been established by AIIB to provide an opportunity for an independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by AIIB's failure to implement the ESP in situations when their concerns cannot be addressed satisfactorily through the GRM or the processes of AIIB's Management. Information on AIIB's PPM is available at: https://www.aiib.org/en/about-aiib/who-we-are/project-affected-peoples-mechanism/how-we-assist-you/index.html.

AN IMPORTANT "URBAN TRANSPORT PROJECT"

MUMBAI METRO LINE PROJECT — Thane-Bhiwandi-Kalyan

Salient Features



- **Length** : 24.9 Km (Fully Elevated)
- **No. of Stations** : 16 Nos.
- **Interchanges**
  - Kapurbawdi, Thane – Metro Line- 5
- **Other Features**
  - Rolling Stock: Fully air conditioned 6 coach train
  - Integration and seamless travel between all public modes
  - Commencement of operations in 2025

BENEFITS

- World class mass transit system
- Fully air conditioned
- Safest public transport mode
- Significant travel time reducation
- Automatic Fare Collection system

Contact Details:

The R & R work for the Mumbai Metro Line 5 project is being carried out by a unit headed by Additional Collector, Metro, From the premises of old building of MMRDA officials on 3rd Floor "A" wing, MMRDA Old Building, E-Block, Bandra-Kurla Complex, Bandra (E), Mumbai- 400 051.