

ENVIRONMENT ASSESSMENT OF MUTP III PROJECTS

VOLUME II -FINAL ENVIRONMENT ASSESSMENT REPORT

FOR DOUBLING OF PANVEL-KARJAT SECTION

Submitted to:

MUMBAI RAILWAY VIKAS CORPORATION LTD.

Submitted by:

▲ IL&FS Environment

IL&FS Environmental Infrastructure & Services Ltd.





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May 2019

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ABBREVIATIONS

AAQ	Ambient Air Quality
AAS	Atomic Absorption Spectroscopy
ACM	Asbestos Containing Material
ADB	Asian Development Bank
AH	Asian Highway
AIIB	Asian Infrastructure Investment Bank
ALARP	As Low As Reasonably Practicable
ANSI	American National Standards Institute
APHA	American Public Health Association
BaP	Benzo(a)Pyrene
bgl	Below Ground Level
BMTPC	Building Material & Technology Promotion Council
BOD	Biochemical Oxygen Demand
BP	Bank Procedures
C&D	Construction & Demolition
CaCO₃	Calcium Carbonate
CBD	Convention on Biological Diversity
CETP	Common Effluent Treatment Plant
CGWB	Central Ground Water Board
CHWTSDF	Common Hazardous Waste Treatment Storage and Disposal Facility
CIDCO	City and Industrial Development Corporation
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CR	Central Railways
CSTM	Chhatrapati Shivaji Maharaj Terminus
СТ	Census Town
dB	Decibel
DFC	Dedicated Freight Corridor
DFCCIL	Dedicated Freight Corridor Corporation of India Limited
DG	Diesel Generator
DGMS	Director General of Mines Safety
DO	Dissolved Oxygen
EA	Environment Assessment
EBRD	European Bank for Reconstruction and Development
EC	Electrical Conductivity
EIA	Environment Impact Assessment
EMG	Environmental Management Group
EMP	Environment Management Plant
EMT	Environment Management Team
EMU	Electrical Multiple Units
EPA	Environmental Protection Act
ESA	Eco-Sensitive Area
ESMP	Environment and Social Management Plan
FGD	Focused Group Discussion



FOB	Foot Over Bridge
GC	Gas Chromatography
GIS	Geographical Information System
GOI	Government of India
GOM	Government of Maharashtra
GPS	Global Positioning System
GRM	Grievance Redress Mechanism
GW	Ground Water
ICP	Inductively coupled plasma
IEC	International Electrotechnical Commission
IEISL	IL&FS Environmental Infrastructure & Services Ltd
IFC	International Finance Corporation
IMS	Integrated Management Systems
IS	Indian Standards
ISO	International Organization for Standardization
JICA	Japan International Cooperation Agency
JNPT	Jawaharlal Nehru Port Trust
Km	Kilometers
kV	kiloVolt
L/min	Litre Per Minute
LC	level Crossing
LISS	Linear Imaging Self Scanning Sensor
LPG	Liquefied Petroleum Gas
lps	Litre Per Second
m	Meters
M Corp	Municipal Corporation
m³/day	Cubic Meter Per Day
m³/hr	Cubic Meter Per Hour
mg/l	Miligram Per Litre
MIDC	Maharashtra Industrial Development Corporation
mm	Milimeter
MMR	Mumbai Metropolitan Region
MoEF&CC	Ministry of Environment, Forests and Climate Change
MRVC	Mumbai Railway Vikas Corporation
MSEDCL	Maharashtra State Electricity Distribution Company Limited
MSK	Medvedev-Sponheuer-KARnik Intensity Scale
MUTP	Mumbai Urban Transport Project
NABL	National Accreditation Board for Testing and Calibration Laboratories
NDIR	Non-Dispersive Infrared
NEDA	N-(1-naphthyl)-ethylenediamine di-hydrochloride
NGO	Non-Governmental organizations
NGT	National Green Tribunal
NH	National Highway
NH ₃	Ammonia
NOC	No Objection Certificate



O&M	Operation and Maintenance
O ₃	Ozone
OD	Operational Directive
OEM	Original Equipment Manufacturer
OHE	Over Head Equipment
OHS	Occupation Health Safety
OP	Operational Policies
PCC	Plain Cement Concrete
PM	Particulate Matter
PMC	Project Management Consultants
PPE	Personal Protective Equipment
PPV	Peak Particle velocity
PRO	Public Relation Officer
PTFE	Polytetrafluoroethylene
PUC	Pollution Under Control
PV	Photo Voltaic
RCC	Reinforced Cement Concrete
RDSO	Research Designs and Standards Organisation
RFO	Range Forest Officer
RKm	Route Kilometer
RMC	Ready Mix Concrete
RO	Reverse Osmosis
ROB	Road Over bridge
ROW	Right of Way
RUB	Road Under Bridge
SA	Social Assessment
SC	Schedule Caste
SEIAA	State Environment Impact Assessment Authority
SEZ	Special Economic Zone
SHE	Safety Health and Environment
SO ₂	Sulphur dioxide
SPCB	State Pollution Control Board
SPM	Suspended Particulate Matter
ST	Schedule Tribal
STEP	Sustainable Techno-solutions for Environmental Protection Pvt. Ltd
SW	Surface Water
ТСМ	Tetrachloro-mercurate
TDS	Total Dissolved Solids
TEOM	Tapered Element Oscillating Microbalance
TOR	Terms of Reference
ULB	Urban Local Bodies
USEPA	United States Environmental Protection Agency
WHO	World Health Organization
WTP	Water Treatment Plant
μ S/cm	microSiemens per centimeter



Executive Summary

The Mumbai Suburban Railway System has been the heart line of Mumbai, carrying more than 7.6 million people in and out of the main business district of Mumbai in more than 2,900 suburban train services. With the increasing population in the Metropolitan Region of Mumbai, there is ever growing demand of passenger traffic on the suburban railway system. The Mumbai Urban Transport Project (MUTP) was designed with a vision to improve the mass transportation services in Mumbai and meet the steadily growing demand of the Mumbai Suburban Railway System. Mumbai Railway Vikas Corporation (MRVC) is a Special Purpose Vehicle constituted by Ministry of Railways, Government of India and the Government of Maharashtra to implement railway projects under Mumbai Urban Transport Project (MUTP) to cater to the demands of the ever-growing passenger traffic of the Mumbai Metropolitan Region. The Mumbai Urban Transport Project (MUTP) was designed with a vision to improve the mass transport Project (MUTP) was designed with a vision to improve the mass of the ever-growing passenger traffic of the Mumbai Metropolitan Region. The Mumbai Urban Transport Project (MUTP) was designed with a vision to improve the mass transportation services in Mumbai and meet the steadily growing demand of the Mumbai Suburban Rail System. The components under MUTP III are comprised of the following components: ¹

- a) Quadrupling of Virar-Dahanu Road Section (63 RKm) on Western Railway
- b) Suburban corridor between Panvel-Karjat Section (30 RKm) on Central Railway
- c) Trespass control measures in 36 mid-sections on Suburban Railway of Mumbai
- d) Elevated corridor link between Airoli-Kalwa (3 RKm) on Central railway
- e) Procurement of additional rolling stocks comprising of 565 Electrical Multiple Units (EMUs) (47 rakes of 12 Cars)

Ancillary facilities for the project interventions such as the expansion required to accommodate additional 565 new EMU coaches, additional maintenance facilities, stabling lines, staff quarters, Stations and other buildings, etc.

The EA report of MUTP Project is divided into 5 Volumes including Volume I Environmental Assessment report for Virar- Dahanu stretch, Volume II for Panvel-Karjat, Volume III for Mid section trespass control, Volume IV for Airoli-Kalwa and Volume V for Procurement of 565 EMUs. Volume I to V present environmental impacts of the project components and inputs for the management of environment during the construction and operation phase for all the component of MUTP-III.

This is the Executive Summary of Volume II - EA Report for Panvel-Karjat stretch.

Scope of Work:

The scope of entire EA study is in accordance with the Terms of Reference set out in the Agreement signed between the MRVC and IEISL in association with STEP. The brief Scope of Work includes:

- 1. Environmental Assessment and preparation of Environmental Management Plan for all components of MUTP III
- 2. Detailed Baseline Environmental Monitoring for all the project components of MUTP III of various Environmental Attributes such as ambient air quality, noise and vibrations, water quality (surface and groundwater) and ecological profile.
- 3. Identification of all the environmental issues that may have negative/ positive impacts on the project influence area during various stages of project design, construction and operation.

¹ MRVC has sought loan from AIIB for the first three components of MUTP III i.e. a), b) and c)





- 4. Formulation of mitigation measures for the Environmental Impacts and opportunities for enhancement, with associated detailed cost estimates (wherever applicable), for all the impacts identified.
- 5. Public Consultation and Disclosure of the project and its impacts in accordance to the AIIB's Environmental and Social Policy (ESP).
- Preparation of Environmental Management and Monitoring Plan, comprising a set of remedial (prevention, mitigation and compensation) measures for each project component of MUTP III separately and specifically as well as formulate EMPs and strategies at a generic MUTP III level.
- 7. Formulation of Institutional Mechanism for the implementation and monitoring of EMP

Overall, the project will be implemented within applicable Indian legal framework and will also comply with the Applicable policy of AIIB. Based on the study of Environmental Impact Assessment Notification (EIA Notification) issued by Ministry of Environment, Forest and Climate Change (MoEFCC), it is our understanding that the proposed MUTP III components do not require environmental clearance from MoEFCC.

Project Components:

The brief about the main Project Components of Panvel- Karjat stretch are as follows:

Description	Panvel-Karjat Doubling Details
Length of the proposed alignment	30 km
Stations	No. of existing stations 5-Panvel, Chikale, Mohope, Chowk, Karjat
Length of rail Flyover	2 no. (1.4 Km & 1.3 Km)
Major Bridges	6
Minor Bridges	37
ROB	5
RUB	15
Tunnel Length	3 No; Nadhal (220 m), Wavarle (2600 m) and Kiravali (300 m)
Ancillary Facilities	The proposed ancillary facilities include construction of new platforms at all existing stations, Yard at Karjat area. Also, the parking facilities will be provided at all the stations. Total 8 number of stabling siding at Mohope (4) and Karjat Station (4).

The land requirement is kept at minimum and particularly, acquisition of private land was avoided. Total 65.5219 Ha. of land shall be acquired for the purpose of permanent usages. 57.1477 Ha. of land is under private ownership, 3.4665 Ha. of land is under government possession and 4.9077 Ha. to be diverted from the forest department.

There are 84 structures are likely to be affected as part of dismantling/demolition activity for the project. Out of the total structures, 64 are residential, 1 commercial structures, 17 boundary walls and 2 others are being impacted due to the proposed project. Total 4 common property resources are likely to be affected. Out of the total affected common property resources, 2 are toilets and 2 are other structures.

The construction work for Panvel-Karjat stretch will be carried out by 5 contract packages for earthwork-bridges, ancillary facilities, track linking, flyovers and tunneling. The project component of Panvel-Karjat will require approximately 12 lakh m³ of raw material. Cutting of 1 lakh m³ of soft rock is



expected near Mohope area. The remaining stretch has only hard rock formation. Thus, the Contractor will be required to handle the excavated material in environment friendly manner.

The construction work for Panvel-Karjat stretch will be carried out by around 400 labours.

Delineation of the Study Area:

The area within 200 m from the Railway boundary line on either side of the proposed alignment is the "Direct Impact Zone". All the baseline environmental profiling including environmental monitoring, biodiversity studies, socio-economic studies and public consultations are being carried out within the Direct Impact Zone.

In addition to the Direct Impact Zone, a larger area of influence up to 5 km stretch on either side of the proposed alignment is considered for identification of sensitive receptors through desktop research, which is considered as area of influence. The area of influence was demarcated in consultation with the AIIB and the MRVC.

Baseline Environmental Profile:

Baseline Environmental Profile for Panvel-Karjat stretch were carried out by undertaking several site investigations such as Site Familiarization Walks and Wind-Shield Survey, Detailed Reconnaissance Survey, Mapping of Sensitive receptors as a part of Strip Mapping and Baseline Environment Monitoring. Based on the baseline Environmental Profile, detailed Environmental Impacts are identified.

<u>Terrestrial and Aquatic Ecology:</u> In the Direct Impact Zone and Area of Influence, there are forest patches on either side. The alignment is passing through Matheran Eco-sensitive area which is semi evergreen as well as semi deciduos type of forests, due to which variety of floral and faunal species were observed in the vicinity. About 82 species of trees, 23 species of Shrubs, 31 species of herbs and 6 species of climbers were reported in the region. Floral species such as *Acacia auriculiformis, Acmella paniculata, Bacopa monnieri, Bauhinia purpurea, Caryota urens, Colocasia esculenta, Cyperus alternifolius, Delonix regia, Erythrina variegata, Mimosa pudiac, Nerium oleander, Pongamia pinnata, Persicaria glabra, Holarrhena pubescens are assessed as Least Concern ver 3.1 Wrightia tinctoria as Lower Risk/least concern ver 2.3 & Mangifera indica as Data Deficient ver 2.3 where as remaining 140 species are not assessed. Similarly, none of the floral species belongs to NT, VU, EN, Cr, EW, EX categories as defined by the IUCN. Three of the fish species were classified as Near Threatened as per IUCN (Ver 3.1). The area is rich in floral diversity.*

Avifauna studies reported 41 species of avi-fauna, 1 species of mammals, 9 species of reptiles and 7 species of butterflies were observed in the region. The species were checked for their conservation status according to Wildlife protection Act, 1972. No bird species belonging to Schedule I, II or III were observed in the area; reptilian species such as Checkered Kellback and Russel's viper belonging to Schedule II were observed in the study area. The region is fairly rich in faunal diversity. Three of the fish species were classified as Near Threatened as per IUCN (Ver 3.1). The faunal diversity was found to be fairly rich.

<u>Air Quality:</u> The monitoring of air on all sites was carried out for 24 hours and the results were obtained and compared with the permissible limits given National Ambient Air Quality Standards, 2009. It is observed that the pollution levels of all the pollutants are within the permissible range and no toxic gases were detected on Panvel-Karjat stretch. However, pollution levels are expected to increase during construction phase

<u>Water Quality:</u> The monitoring of water quality was carried out at 4 locations for surface water. In the water quality samples SW-1, SW-2 and SW-3, Total hardness, Total Dissolved Solids, Total alkalinity



and Magnesium is found exceeding the acceptable limit but within the permissible limit of drinking water standards IS: 10500-2012. Fluoride is found exceeding the acceptable limit of 1 mg/l but within the permissible limit of 1.5 mg/l as per IS: 10500-2012 in water quality sample SW-3 collected at Morbe Dam Spillway Channel. Copper is detected in water quality samples SW-1 and SW-2 which are exceeding the acceptable limit of 0.05 mg/l but within the permissible limit of 1.5 mg/l as per IS: 10500-2012. Total Coliform is detected in all the water quality samples which should not be detectable in 100 ml sample in drinking water sample as per IS: 10500-2012.

<u>Noise and Vibration Level Monitoring</u>: Noise level at all the 12 sampling locations is found to be higher than the Ambient Air Quality Standards in respect of Noise during both the times; day and night at most of the locations. However, creating a green corridor along both the sides of the alignment will help in reducing noise levels and will also help in maintaining the green cover in the vicinity.

The vibration monitoring was conducted at 12 monitoring locations in Panvel-Karjat stretch. At present, all the samples are falling in safe zone based on the comparison of the Permissible Peak Particle Velocity (PPV in mm/s) as per DGMS Circular No. 7 of 1997. During field investigation, the maximum PPV recorded is 5.59 mm/s (frequency of 39.3Hz) at NV12 (at Utility Pipeline below underpass at WTP within a railway boundary). All other monitoring locations recorded the value of PPV lower than that of the monitoring station NV12. In general, sampling location within the railway boundary has higher PPV values as compared to other location due to movement of the trains.

Legal and Administrative Framework and Applicable AllB Policies:

The EA study is being carried out in accordance to the AIIB's Environmental and Social Policy (ESP) and Environmental and Social Standards (ESS).

The AIIB's ESS1 Environment and Social Assessment and Management and ESS 2 Involuantry Settlement are applicable.

All the applicable Policies, Rules and Regulations by Government of India (GOI), Government of Maharashtra (GOM) and Indian Railways and other best practices in Occupational Health and Safety and Disaster Management have been considered for preparation of EA report including the ESMP. Mumbai High Court Order, 2005 and 2015 on Mangrove Areas is mainly applicable to the project.

Notification of Matheran and surrounding region as an Eco-Sensitive Zone, 2003; The Indian Forest Act,1927; The Forest (Conservation) Act,1980; The Forest (Conservation) Rules,1981, Environmental Protection Act (EPA), 1986 are mainly applicable to the project.

The administrative clearances required for the project are: NOC from Monitoring Committee, Matheran ESA as the proposed project passes through Matheran Eco-sensitive Zone and Forest Clearance from Forest Department. NOC And Consent to Establish and Operate for ready mix plants, Authorization for Handling, Generation, Storage, Use & Transportation of Hazardous and other wastes, NOC for water extraction for construction and allied works, mandatory legal Permission for Felling of Trees under Maharashtra felling of Trees (Regulation) Act, 1964. Also, PUC certificate for use of vehicles for all construction vehicles and License for use of Explosive for tunnelling shall be taken. Work related GO/ No GO certifcate from hired agency CIFMR (for tunnel blasting) and administrative clearance from Navi Mumbai Municipal Corporation and Dam Safety Organisation (for Morbe Dam) & MJP authorities (for water pipeline) need to be taken based on the project requirements before construction activity.

In addition to this, the contractor shall comply with requirements of The Child Labor (Prohibition and Regulation) Act, 1986, The Bonded Labor (Abolition) Act, 1976; Minimum Wages Act, 1948, The Payment of Wages Act, 1936, amended in 2005; Inter-State Migrant Workmen's (Regulation of Employment & Conditions of Service) Act, 1979; Building and Other Construction Workers' Welfare



Cess Act, 1996; Contract Labour (Regulation & Abolition) Act 1970 & Central Rules, 1971 and applicable health and safety norms.

Analysis of Alternatives:

An efficient suburban rail system running across the Mumbai Metropolitan Region (MMR). is one of the most crowded and overloaded suburban systems in the world carrying around 7.6 million people in more than 2900 train service every day. Mumbai is the largest and the most populous metropolis in the country and the projected population of total MMR is 34.0 million by 2031. Thus, to meet the demands of the ever-growing passenger traffic, MRVC has proposed to improve railway network connecting Panvel-Karjat.

The proposed two lines will run Suburban services between Panvel & Karjat considering significant growth in Navi Mumbai area and will support additional Mail/Express trains. The Double Corridor will provide direct connectivity of Navi Mumbai to other parts of the country. Employment Opportunity and Rise in Income level Opportunity for unskilled/ semiskilled/skilled people to work in the project. Induced developments such as local transportation and other small businesses will cater to increasing population in the project area.

In addition to this, considering technical feasibility, site suitability and site-specific environmental issues, MRVC has further devised two alternatives as follows:

Alternative 1: Proposed alignment parallel and adjacent to existing alignment with one tunnel at Wavarle

Alternative 2: Proposed alignment at distance from existing alignment starting from Ch. 21+300 along with 2 Tunnels at Wavarle and Kirawali

Alternative 2 is finalized by MRVC due to rerouting of tunnels through scarcely inhabited area which will minimize impact on local residents and also disturbance to landscape.

Stakeholder Consultation and Public Consultation:

Matheran ESA Monitoring Committee, Morbe Dam Division, Maharashtra Jeevan Pradhikaran, District Collector & District Magistrate, Habitation near Karjat, Mohope, Chowk, Chikhale and Panvel stations, habitation near Wavarle tunnel, habitation near Morbe dam, industries I;ocated near chowk station, habitation near Matheran Eco- Sensitive Zone and habitation of villages located closer to the railway track i.e. Wanjale, Poyanje, Barwai etc. were consulted. Public consultation was conducted on November 21, 2017. Overall stakeholders see the project as beneficial project and some have raised issues pertaining to land acquision. Discussion with Matheran ESA Monitoring Committee and other authorities is in progress to understand their requirements in terms of strengthening ESMP.

Environment Impact Assessment:

The activities, which will be carried out during construction and operation phase, are considered for identifying impacts of the project. The activities during construction phase include Clearing the ground for construction activity, Dismantling/Demolition activities before construction, Establishment and operation of the labour camps, Access Control and barrication, Relocation and Arrangements of utility lines for construction works,Tunneling;Collection of Construction material (as in sand mining, blasting for rocks, quarrying), Transfer of construction materials;Storage, handling and disposal of solid, hazardous and C&D waste material,Setting up the Ready Mix Concrete (RMC) Plant; Excavation works and Foundation works (Pile and concrete),Earth works/Landfill works, Laying of Railway Tracks, Assembling and its Mechanical installation of pre-fabricated components for FOB, ROBs, RUBs and Bridges near/around work site, O&M of all machineries, Electrical works as





installation of Overhead electrical structures (distance 50-60 m), Signaling post (400 m), power substation and Landscaping.

The operation phase would include operations of trains and railway stations and activities Improved Infrastructure such as new Tracks & Railway Stations, other facilities; Operation and Maintenance of new Tracks & Railway Stations, other ancillary facilities, landscaping.

Environment components considered for impact identification are as follows:

- Air Quality: Fugitive dust, gaseous emissions, fuel emissions, toxic emissions from chemicals, emissions from diesel DG sets, odour nuisance, increased air pollution along nearby roads due to newly introduced vehicular traffic, traffic congestion at rail crossings, increased air pollution due to Construction and Demolition Waste (C&D Waste)
- Water Quality: Excessive water withdrawal, water contamination, water stagnation, loss of seasonal floodplains, effect on the existing storm water drain
- Land: Soil erosion, flooding, land compaction, soil contamination, loss of productive soil/ land degradation, land fragmentation, compaction of land due to movement of heavy vehicle
- Noise & Vibration: Noise & vibration due to train movement, construction activities, metal fabrication, maintenance activities, DG sets
- Flora, fauna and Biodiversity: Felling of trees, loss of forest, disturbance to ecology and biodiversity, growth of invasive species
- Occupational Health & Safety: higher noise levels, mechanical shocks, visual disturbances, safety of workers
- Community Health & Safety: Exposure to hazardous materials, impact on community infrastructures as roads, sensitive receptors as schools, hospitals, health and safety of community, visual blight / aesthetic changes

From all the above mentioned environmental impacts, the critical environmental impacts are identified based on impact type and nature, extent of the impact, duration of the impact, Intensity - Bio Physical and Socio-economic impacts and likelihood. The impacts of the construction activities are considered as critical based on the following criteria:

- 1. Impact Type: Negative
- 2. Impact Nature: Direct
- 3. Extent of the Impact: Regional
- 4. Duration of the impact :Long Term/ Permanent
- 5. Intensity Bio Physical and Socio-economic: Medium/High
- 6. Likelihood: Definite

Critical Environmental Impacts based on the above criteria for construction and operational stages are as follows:

- Loss of Forest in Matheran Eco-sensitive area
- Felling of large size trees
- Excessive water withdrawal/consumption from ground and surface water sources
- Noise due to existing and/or additional train movement
- Generation of wastes especially debris due to tunneling and other construction works
- Impact on health and safety of workers
- Dust and Gaseous emission from heavy machinery and vehicles

Environment and Social Management Plan:

Environment and Social Management Plan (ESMP) has been prepared, based on the identified environmental attributes and type of the impacts. The main environmental attributes consist of Air,





Water, Noise and Vibration, Land, Flora-Fauna, occupational health and safety and Environmental health and safety. To cover all the environmental attributes, ESMP has been divided into following components.

- Air Quality Management Plan
- Water Quality Management Plan
- Noise and Vibration Level Management Plan
- Soil Quality and Erosion Management Plan
- Plant Site/Labour Camp Management Plan
- Waste Management Plan
- Tunnel Area Management Plan
- Flora and Fauna Management Plan
- Traffic Management Plan
- Construction Area Management Plan
- Occupational Health and Safety Plan
- Environmental Monitoring Plan

The Critical Environmental Impacts as against the various construction activities, mitigation measures and Environment Management Plan are given below.





	Critical Environmental Impacts and Mitigation Measures for Panvel-Karjat stretch					
Sr. No	Critical Environmental Impacts	Applicable Main Project Activities	ſ	Details of Project Activities		Mitigation Measure
1.	Loss of Forest in Matheran Eco-sensitive area	 Clearing the ground for construction activity e.g. bushes, scrub, trees cutting, dump wastes etc for construction of Major Bridges, Minor Bridges, embankment and laying of tracks 	1)	Approximately 4.9077 ha of Matheran Eco-sensitive area will be affected due to construction of the tunnels, bridges and embankment.	1)	In India, based on "The Forest Conservation Act, 1980" the removal of trees requires approval as well as transplanting to other locations. Moreover, in Maharashtra state, laws are in place for tree removal and transplanting. In Maharashtra State, the Maharashtra Felling of Tree (Act 1964) is in place and adherence to these standards will also be required. Based on the permission given by Tahsildar/RFO, the tree felling shall be carried out.
2.	Felling of large size trees	 Clearing the ground for construction activity e.g. bushes, scrub, trees cutting, dump wastes etc Dismantling / Demolition activities before construction 	1)	Approximately 1814 trees will be required to be cut in Panvel-Karjat stretch out of which 132 number of tress are falling within Matheran Eco-sensitive Area.	1) 2) 3) 4) 5)	Tree felling, clearing of vegetation and trimming of trees in accordance with the India railway Works manual, 2000. Plan for compensatory planting Transplantation plan of maximum trees/plants Type, number of trees to be planted and location of the green belt area shall be done by the contractor will support of MRVC and RFO MRVC shall not allow introduction of exotic species with known environmental setbacks (Eucalyptus, Australian Acacia, Prosopoisjuliflora, etc.)
3.	Excessive water withdrawal/ consumption from ground and surface water sources	 Excavation works and Foundation works (Pile and concrete) Earth works/Landfill works Assembling and its Mechanical installation of pre-fabricated components Landscaping 	1)	Sudden increase in water requirement is expected for the duration of 4 years during construction of the tunnels, bridges and embankment.	1) 2)	The contractor shall arrange for water required for construction in such a way that the water availability and supply to nearby communities remain unaffected. Rain Water Harvesting/Artificial Recharge structures shall be provided; wherever feasible
4.	Noise due to additional train movement	 Excavation works and Foundation works (Pile and concrete) Improved Infrastructure such as new Tracks & 	1)	Noise levels will increase due to additional train movement, vehicular movement for material transportation and use of heavy machinery &	1)	MRVC is planning to construct RCC boundary wall of the railway premises of 2.4 meter height at the locations where habitations are located very close to the railway boundary. Trees will be planted as a noise barrier





	Critical Environmental Impacts and Mitigation Measures for Panvel-Karjat stretch					
Sr. No	Critical Environmental Impacts	Applicable Main Project Activities	Details of Project Activities	Mitigation Measure		
		 Railway Stations, other facilities 3) Operation and Maintenance of new Tracks & Railway Stations, other ancillary facilities, landscaping 	vehicles	 Rubber packing betweens sleepers and tracks as absorber is included in the design to minimize vibration. 		
5.	Generation of wastes especially debris due to tunnelling and other construction works	 Dismantling / Demolition activities before construction Tunnelling 	 There are two tunnels on the existing line; a smaller tunnel at Nadhal (length 220 m) and a larger one at Wavarle (length 2600 m). The proposed alignment will have three tunnels one at Nadhal (length 220 m) and two near Wavarle village (length 2600 m+ 300 m) There are 84 structures are likely to be affected as part of dismantling/demolition activity for the project. 	 Debris generated due to the dismantling & demolition of the existing structures shall be suitably reused in the proposed construction as fill materials for embankments The disposal of debris shall be carried out only at sites identified for the purpose. The disposal site identification shall be done by the contractor and MRVC shall provide approval for the same The Contractor shall identify a separate area for temporary storage of the debris on the site. The temporary storage area shall have arrangement for dust suppression while loading and unloading. The debris shall be removed from the temporary storage area as early as possible to avoid any mosquito breeding issue or soil contamination. All arrangement for transportation of debris during construction including provision, maintenance, dismantling and clearing debris, where necessary shall be planned and implemented by the Contractor as approved and directed by MRVC. No debris disposal shall be done near any water bodies A detailed Waste Management Plan shall be prepared by the contractor for Panvel-Karjat and submit to MRVC for approval. 		
6.	Impact on health and safety of workers	 All the Project Activities during Construction and Operation Stages 	 The construction work for Panvel-Karjat stretch will be carried out by 5 contract 	 The building and other construction workers' (regulation of employment and conditions of service) act, 1996 requirements shall be followed. 		





	Critical Environmental Impacts and Mitigation Measures for Panvel-Karjat stretch					
Sr. No	Critical Environmental Impacts	Applicable Main Project Activities	Details of Project Activities	Mitigation Measure		
			packages for earthwork- bridges, ancillary facilities, track linking, flyovers and tunneling. The construction work is expected to have total 400 labours approx.	 All hazardous chemicals and materials shall be stored in dedicated area and covered. Ensure that a readily available first-aid unit and access to the ambulatory services All machinery and equipment should be covered with acoustic materials. Comprehensive traffic management plan should be prepared The labour camp should be adequately drained to avoid the accumulation of stagnant water. Drains and ditches within the labour camp area should be treated with bleaching powder on a regular basis. The contractor will ensure good health and hygiene of all workers to prevent sickness and epidemics. The workers should all be screened for the health problems before being considered for employment. Regular health check-up and immunization camps should all also be organized for the workers and nearby population. After completion of the construction; the contractor shall ensure the complete removal of the labour camps. The contractor should comply with the AIIB accepted guidelines on "Workers' accommodation: processes and standards- a guidance note by IFC and the EBRD". The contractor shall also comply with The Factories Act, 1948 and all the other relevant acts/rules applicable as per the Ministry of Labour and Employment, Gol 		
7.	Dust and Gaseous	1) Clearing the ground for	1) Vehicle movement for	1) Vehicles delivering loose and fine materials like		
	emission from neavy	construction activity e.g.	material transportation,	sand and tine aggregates shall be covered.		
	machinery and vehicles	cutting, dump wastes etc	material, blasting, tunnelling	Stockpiling of the construction material, earthwork		
		2) Dismantling / Demolition	installation and operation of	Unpaved haulage roads other dust prone areas and		





Critical Environmental Impacts and Mitigation Measures for Panvel-Karjat stretch					
Sr. No	Critical Environmental Impacts	Applicable Main Project Activities	Details of Project Activities	Mitigation Measure	
		 activities before construction 3) Collection of Construction material (as in sand mining, blasting for rocks, quarrying), Transfer of construction materials 4) Setting up the Ready Mix Concrete (RMC) Plant 5) Excavation works and Foundation works (Pile and concrete) 6) Earth works/Landfill works 7) Laying of Railway Tracks 8) Assembling and its Mechanical installation of pre-fabricated components for FOB, ROBs, RUBs and bridges near/around work site 9) O&M of all machineries 	RMC Plant, DG sets, dismantling activities, earthwork etc. will generate Dust and Gaseous emission	 construction yard shall be provided with water spraying arrangement. 3) Vehicular pollution check for all the vehicles 4) The excavated material shall be stored properly 5) The Ready-Mix Concrete plant for commercial purposes should be installed at a site with a buffer zone of approximately 100 m distance from human habitation of 1000 souls or more and major road and should not be located within 200 m from schools, colleges, hospitals and courts. All the machinery and equipment shall be regularly maintained. 6) The construction workers shall be provided with all requisite PPEs like helmet, face masks etc. 7) As far as possible, transport the material during night time (8 pm to 5 am). 8) Procure material only from approved quarry areas 9) Air quality monitoring for the same parameters, which were monitored during the baseline studies, shall be implemented by the Contractor by hiring the services of the NABL accredited and MoEF Notified laboratory 	





The important mitigation measures are as follows:

- Compensatory Tree Plantation shall be done in the ratio of 1:5.
- Only approved and licensed borrow pits and quarry sites (approved by MPCB) should be used for extraction of construction material to avoid any disfiguring of topography.
- The Contractor shall deploy a team for Safety,Health and Environment management on the construction site as specified in SHE manual prepared by MRVC.
- No construction camp shall be established in Matheran Eco-sensitive area. The contractor should comply with the AIIB accepted guidelines on "Workers' accommodation: processes and standards- a guidance note by IFC and the EBRD".
- A detailed traffic management plan shall be prepared by the contractor for Panvel-Karjat and submit to MRVC for approval.
- The hazardous waste generated during construction shall be managed as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
- The Contractor shall prepare a contract specific SHE plan. SHE plan shall be prepared based on the SHE Manual, Indian Railway Codes and Manuals and other applicable rules and regulations of the Central/State Government.

Environmental Monitoring Plan:

The key Environmental Performance Indicators that will be used to evaluate the effectiveness of the proposed environmental safeguards in relation to community health and safety in the project area are: Air Quality, Water Quality, Noise & Vibration Level, Surface Water Quality.

* Air Quality Monitoring

The air quality monitoring is recommended through NABL accredited and MoEF&CC approved laboratory during the construction phase of the project. The monitoring of air shall be conducted at the location of worksite, material stockyards, and haul roads.

Air quality shall be analyzed as per the National Ambient Air Quality Standards (2009), CPCB. Parameters: Suspended Particulate Matter (SPM), Particulate Matter (PM2.5 and PM10),Sulphur dioxide (SO2), Nitrogen oxides (NOx), Carbon Monoxide (CO), Hydrocarbons (HC).

Air quality shall be monitored at least at 3 locations once in 3 times in a year (3 seasons) during construction phase and once in a year in winter season during operation phase and compared with the AAQ monitoring results obtained during the baseline monitoring to record changes in the AAQ and undertake suggested measures to mitigate the adverse impacts. Continuous 24 Hours Monitoring should be carried out.

* Water Quality Monitoring

Water quality shall be monitored for surface water at minimum 4 locations having frequency of once in 3 months (4 times a year) throughout the project duration to cover seasonal variations and one year after the completion. Water quality shall be monitored through NABL accredited and MoEF&CC approved laboratory for the parameters of IS:10500-2012.

Noise and Vibration Level Monitoring

Noise and Vibrations are to be monitored for 24 hours at all locations on weekly basis during construction to cover maximum train traffic in a day.

Ambient Air Quality Standards in respect of Noise prescribed in Noise Pollution (Regulation and Control) Rules, 2000 (see rule 3(1) and 4(1)) shall be adopted for noise monitoring. Permissible limits of ground vibration specified by Director General of Mines Safety (DGMS) through its Circular No. 7 of



1997 shall be used for Vibration level monitoring. Vibration levels shall be monitored once in a year during construction phase.

Proposed Implementation Mechanism:

MRVC is the project implementing agency for MUTP-III projects. In that role, MRVC is accountable for satisfactory completion of the project works proposed under this Project. As the project implementing agency, MRVC, on behalf of GOM and IR, is responsible for financing and procuring all the contracts financed by the AIIB loan as well as for executing the identified works in the field, with due safeguards in consultation with the Western Railways (WR) and Central Railways (CR). MRVC will have a Contractors for implementation of civil/mechanical/electrical works. Also, MRVC will have a Project Management Consultants (PMC) to supervise the work at all the stages including successful implementation and monitoring of ESMP during construction stage. The project time line will be decided by MRVC. The details of the time line for procurement works, implementation of civil/mechanical/electrical out by the respective agencies (i.e. MRVC, Project Management Consultants and Contractors) will be mutually decided between MRVC and the contractor with support of PMC.

The details of the organizational structure of the proposed ESMG and ESMT for environmental management and monitoring during implementation are presented below.







Organization Structure for the Implementation of the proposed Project Under MUTP-III

Progress Monitoring and Reporting Arrangements:

A proper strategy is necessary for smooth implementation of the mitigation measures. For the implementation of proposed works under the ESMP, it is proposed to have a two-level institutional framework. It is proposed to constitute an Apex Committee to oversee the overall implementation of the proposed works and a Working Level Committee to monitor the implementation of works on the ground level.

The proposed institutional framework for implementing and monitoring the works proposed under the ESMP is shown below.





Proposed Institutional Framework for Monitoring of ESMP

Grievances Redressal Mechanism:

Grievance Redress Mechanism (GRM) is an arrangement for receiving, evaluating and facilitating the resolution of affected people's concerns, complaints, and grievances about the borrower/client's social and environmental performance on a project. MRVC will develop a Grievances Redressal Cell to receive and respond to the concerns, complaints, and grievances received from the stakeholders. The phone numbers and communication addresses for grievances will be displayed at various locations near construction site.

The Grievances Redressal Mechanism is presented below:

There will be Grievance Redress Committee to hear and redress the grievances, if any, of the project affected families and PAPs at local level as well as in the Head Quarter level in Mumbai. The Grievance Redress Mechanism will be at two levels. Tier 1 will consist of the Contactors and PMC. Tier 2 will be officers of MRVC. The working mechanism of Tier 1 and Tier 2 shall be as follows:

Tier 1: This will be the first level of grievance redress at field level and will consist of the Project affected persons representatives, Contactors and PMC. The Contractor at the field level to the extent possible will address the problem and try and resolve the complaint. The PMC will ensure the successful redress of the compliant and report to the Grievance Redress Cell. PMC will also monitor the implemented action in the field. The time taken at the field level to address grievances will be 14 days.

The field level PMC and Contractors will consider any grievance of PAFs, give its decision in writing within a stipulated time preferable within 2 week, and keep record of such decisions. If the aggrieved party is not satisfied with the decision, appeal could be made to Grievance Redress Committee at Head Quarter level.

Tier 2: This will include officers from MRVC. The members will include Chief Project Managers (CPM) and Deputy CPMs, Social Expert for Resettlement & Rehabilitation and Land Acquisition (1 staff) and Environment (1 staff). The Grievance Redress Committee (GRC) at Head Quarter level (HQGRC) shall be chaired by the respective CPM and Financial Advisor and Chief Account Officer (FA & CAO) officials from MRVC and nominated officer from MMRDA shall be the members of the committee. The time taken to redress grievances will be 2 weeks at this level. The GRC at Head Quarter level is presented below.



1		
I	CPM, MRVC	Chairman
II	FA & CAO, MRVC	Member
III	Deputy CPMs	Member
IV	Nominated Officer from MMRDA	Member
V	Environment Experts (1)	Member
VI	Social Expert (1)	Member

Grievance Redress Committee at the HQ will comprise of separate line of redress for Land Acquisition matters and Resettlement matters. For land acquisition the aggrieved person will first approach the concerned SDO, followed by the Deputy CPM and finally the CPM. Alternately, the concerned SDO can also route the unresolved grievances through the Collector and then the concerned Additional Divisional Commissioner.

For resettlement related matters, for non-title holders, the affected person will first approach the concerned Project Implementation Unit of MMRDA, then the Chief, Social Development Cell of MMRDA.

Public Relation Officer (PRO) will be a nodal person who will transmit the letter/telephonic grievances register to the respective departments e.g. Social, Environment, Civil, Mechanical, Electrical etc. within MRVC. Based on the response received from the technical team, PRO will respond back to the respective stakeholders via letter/email/telephonic communication regarding the complaints. PRO will also pass on the response of concerns, complaints, and grievances to the contactor and PMC for implementation of the actions suggested by MRVC on the grievances.

The PRO shall disseminate the roles and responsibilities of its members and encourage the public to approach it in case they have any concern related to project implementation. The complainant may take recourse to the Court of law, if dissatisfied with the verdict of the GRM.

Environmental Budget:

Based on the detailed expenditure calculated for the Environment Management, Total cost for ESMP - Mitigation Measures under the Scope of MRVC is INR 3,49,14,000 while Total cost for ESMP - Mitigation Measures under the Scope of Contractor is INR 3,73,24,826.67.

Conclusion:

The impacts of the proposed project will mainly be subjected to construction phase. However, strict adherence to the various mitigation measures as identified under the ESMP, strengthened by adequate environmental monitoring and good construction practices will go a long way in effective reducing the impacts to a minimum level.

The project will have significant positive impacts as increase in commuter's convenience, prevention of accidents and pollution, reduction in traffic congestion and fuel consumption. The Double Corridor will provide direct connectivity of Navi Mumbai to other parts of the country. Thus, Panvel can become a terminal station for trains towards southern Maharashtra, Goa, Karnataka, Tamil Nadu and Kerala, which will enhance the capacity for fast transport.

Thus it can be concluded that the proposed project is environmentally acceptable and will not only bring economic, social and environmental benefits to the local communities in the area but also makes a step forward in bringing better solutions for balanced growth throughout the region of Navi Mumbai and alleviate the issues of environment as encountered in rapidly growing metro cities.



Section 1 Introduction

1.1 Project Background

The Mumbai Suburban Railway System has been the heart line of Mumbai, carrying more than 7.6 million people in and out of the main business district of Mumbai in more than 2,900 suburban train services. With the increasing population in the Metropolitan Region of Mumbai, there is ever growing demand of passenger traffic on the suburban railway system. The Mumbai Urban Transport Project (MUTP) was designed with a vision to improve the mass transportation services in Mumbai and meet the steadily growing demand of the Mumbai Suburban Railway System. Ministry of Railways and Government of Maharashtra have jointly set-up the Mumbai Railway Vikas Corporation Limited (MRVC) for implementation of the railway projects under MUTP. MRVC has accordingly completed MUTP Phase I in 2012; MUTP Phase II sanctioned in 2008-09 is under progress and expected to be complete by 2019-20. MUTP Phase III (MUTP-III) is in the advanced planning stage and prefeasibility study for all the components has been carried out.

MRVC has decided to carry out Environment Assessment (EA) of all components under MUTP-III with an objective to minimize the overall environmental impacts during the construction and operation phases of these projects. MUTP-III is being considered for funding by the AIIB. AIIB's policy and procedures for EA are to ensure that development options under consideration are environmentally sound and sustainable, and that any environmental consequences are recognized early and suitably mitigated in the project design.

The MRVC has appointed IL&FS Environmental Infrastructure & Services Ltd. (IEISL) in association with Sustainable Techno-solutions for Environmental Protection Pvt. Ltd. (STEP) as Environmental Consultants for carrying out the "Environment Assessment of all components of MUTP-III", hereafter referred to as the "Study". An agreement was signed between MRVC, IEISL and STEP, vide CA No. MRVC/RFP/W/MUTP-3/EA/2015/99 to carry out the study.

The components under MUTP-III are comprised of the following components:²

- a) Quadrupling of Virar-Dahanu Road Section (63 RKm) on Western Railway
- b) Suburban corridor between Panvel-Karjat Section (29.6 RKm) on Central Railway
- c) Trespass control measures in 36 mid-sections on Suburban Railway of Mumbai
- d) Procurement of additional rolling stocks comprising of 565 Electrical Multiple Units (EMUs) (47 rakes of 12 Cars)
- e) Elevated corridor link between Airoli-Kalwa (3 RKm) on Central railway

Ancillary facilities for the project interventions such as the expansion required to accommodate additional 565 new EMU coaches, additional maintenance facilities, stabling lines, staff quarters, Stations and other buildings, etc.

The EA report of MUTP Project is divided into 5 Volumes, including Volume I Environmental Assessment (EA) report for Virar- Dahanu stretch, Volume II for Panvel-Karjat, Volume III for Mid section trespass control, Volume IV for Airoli-Kalwa and Volume V for Procurement of 565 EMUs. Volume I to V present environmental impacts of the project components and inputs for the management of environment during the construction and operation phase for all the component of MUTP-III. This document is Volume II- EA Report for Panvel-Karjat stretch.

² MRVC has sought loan from AIIB for first three components of MUTP-III



1.2 Objectives, Scope of Work and Methodology

The objectives of the EA study are:

- To identify potential impacts of all components of MUTP-III projects on all environmental attributes. This includes planning, design and construction, and operation phases of the project
- To assess the impacts and mitigate them through an implementable Environmental Management Plan
- To include post project monitoring and supervision mechanism in EMP to ensure its effective implementation
- To recommend suitable institutional mechanisms to monitor and supervise effective implementation of all EMPs

The scope of work is in accordance with the Terms of Reference set out in the Agreement signed between the MRVC and IEISL in association with STEP. The brief Scope of Work includes:

- 1. Environmental Assessment and preparation of Environmental Management Plan for all components of MUTP III as under:
 - a) Quadrupling of Virar-Dahanu Road section on Western Railway (admeasuring 63 RKm)
 - b) Double line corridor between Panvel-Karjat on Central Railway (admeasuring 30 RKm)
 - c) Double line elevated rail link between Airoli-Kalwa on Central Railway (admeasuring 3 RKm)
 - d) Mid-section trespass control measures for 36 locations on Suburban section of Mumbai on Central and Western Railways
 - e) Procurement of additional rolling stocks comprising of 565 Electrical Multiple Units (EMUs) (47 rakes of 12 Cars)

Ancillary facilities for the project interventions such as the expansion required to accommodate additional 565 new EMU coaches, additional maintenance facilities, stabling lines, staff quarters, Stations and other buildings, etc.

- 2. Detailed Baseline Environmental Monitoring for all the project components of MUTP III of various Environmental Attributes such as ambient air quality, noise and vibrations, water quality (surface and groundwater) and ecological profile.
- 3. Identification of all the environmental issues that may have negative/ positive impacts on the project influence area during various stages of project design, construction and operation.
- 4. Formulation of mitigation measures for the Environmental Impacts and opportunities for enhancement, with associated detailed cost estimates (wherever applicable), for all the impacts identified.
- 5. Public Consultation and Disclosure of the project and its impacts in accordance to the AIIB's Environmental and Social Policy (ESP).
- 6. Preparation of Environmental Management and Monitoring Plan, comprising a set of remedial (prevention, mitigation and compensation) measures for each project component of MUTP III separately and specifically as well as formulate EMPs and strategies at a generic MUTP III level.
- 7. Formulation of Institutional Mechanism for the implementation and monitoring of EMP.

Detailed methodology presented in the Inception Report submitted to MRVC in September 2016 and subsequently accepted by MRVC is detailed out in **Figure 1**.



Figure 1: Methodology of the Study





1.3 Purpose and Structure of Report

The EA report of MUTP Project is divided into 5 Volumes. Volume I comprise of EA report for Virar-Dahanu stretch, Volume II for Panvel-Karjat, Volume III for Mid section trespass control, Volume IV for Airoli-Kalwa and Volume V for Procurement of 565 EMUs. Volume I to V present environmental impacts of the project components and inputs for the management of environment during the construction and operation phase for all the component of MUTP-III. This document is Volume II EA Report for Panvel-Karjat Section.

Volume II is further arranged in 9 sections and annexure. The EA report for Panvel-Karjat stretch consists of:

Section 1 describes the project background and outlines the objectives and scope of work of the EA Study. The methodology adopted for the EA Study is also briefly explained in this section.

Section 2 describes the Project Area. The regional settings including its physical aspects, environmental and social milieu, growth, regional infrastructure and socio-economic aspects are explained for Panvel-Karjat stretch. The study area delineation is part of this section.

Section 3 describes the regulatory framework as per Indian Legal Requirements and applicable AIIB's Environmental and Social Framework for Panvel-Karjat stretch.

Section 4 describe the baseline environmental profile which mainly includes observations of site reconnaissance survey, strip mapping, landuse, ecology & biodiversity and baseline environmental condition of air, water, noise and vibration for Panvel-Karjat stretch.

Section 5 gives environmental impact identification and assessment for Panvel-Karjat stretch and ancillary facilities of this stretch.

Section 6 describes the analysis of alternatives for finalizing the alignment of Panvel-Karjat stretch.

Section 7 describes the stakeholder consultations conducted during the study in Panvel-Karjat stretch. The stakeholder consultation mainly categorized into Focus Group Discussion and Public Consultation.

Section 8 describes the Environmental and Social Management Plan for the identified Environmental impacts. The list of the environment related clearances or permissions required for the project with institutional arrangement is described here. The mitigation measures for the identified impacts on the environment attributes i.e. air, water, land, noise, vibration, flora-fauna, Occupational health & Safety and Environment, health and safety. Also, details of the Environment Management Plan for air, water, noise & Vibration, soil, labour camp, borrow area, quarry, flora-fauna, traffic, construction site, hazardous waste, landscaping and safety, health & environment is given in this section. The environment budget for implementation of these management plans are given in this section.

Section 9 contains conclusion of the Environment Assessment study.



Section 2 Description of Project Area

The MUTP III projects aim at meeting the increased needs of the commuters in the suburban areas of Mumbai. To understand the details of the MUTP-III project components and assess the various impacts of the proposed project components, a detailed review of the pre-feasibility reports, engineering drawing, project sheets and survey reports have been conducted.

2.1 Description of Project Components

Presently, a single line track connects Panvel with Karjat. This alignment traverses the Talukas of Panvel, Khalapur and Karjat of Raigad District of Maharashtra State. It caters to goods and a few long distance passenger trains. The Navi Mumbai area, especially around Panvel, has witnessed significant urbanization and population growth in recent years. The area between Panvel and Karjat is also developing very fast and there is increasing demand for extending the suburban rail services to Karjat. MRVC has therefore proposed a double line for extending the suburban rail services on the Panvel-Karjat section.

Description	Panvel-Karjat Doubling Details
Length of the proposed alignment	30 km
Stations	No. of existing stations 5-Panvel, Chikale, Mohope, Chowk, Karjat
Length of rail Flyover	2 no. (1.4 Km & 1.3 Km)
Major Bridges	6
Minor Bridges	37
ROB	5
RUB	15
Tunnel Length	3 No; Nadhal (220 m), Wavarle (2600 m) and Kiravali (300 m)
Ancillary Facilities	The proposed ancillary facilities include construction of new platforms at all existing stations, Yard at Karjat area. Also, the parking facilities will be provided at all the stations. Total 8 number of stabling sidings at Mohope (4) and Karjat Station (4).

The brief about the main Project Components is as follows:

There are two tunnels on the existing line; a smaller tunnel at Nadhal (length 220 m) and a larger one at Wavarle (length 2600 m). The proposed alignment will have three tunnels one at Nadhal (length 220 m), one at Wavarle (length 2600 m) and one at Kiravali (Length 300 m). As conveyed by MRVC, separation of minimum 20 m shall be maintained between the existing and proposed lines. There are 37 minor bridges and 6 major bridges in proposed alignment. There are two rail flyovers proposed (one near Panvel station and one near Karjat station) in the new alignment.

Morbe Dam is located on the North of the existing track near Chowk area. The proposed alignment is located between the existing track and the Morbe Dam. The shortest distance between the existing track and Morbe Dam embankment is approximately 374 m. The proposed ancillary facilities include construction of new platforms at all existing stations, Yard at Karjat area. Also, the parking facilities will be provided at all the stations.

2.2 Delineation of the Study Area

A case study approach was adopted to understand the various criteria for delineation of the Study area. EA studies of railway projects commissioned by International Funding Agencies such as AIIB,



JICA, ADB, World Bank were reviewed to understand the study area considered in those projects. There is a wide variation in the extent of study area considered for EA studies, ranging from 100 m up to 5 km on either side of the proposed rail corridor in the different studies conducted so far.

The Environment Impact Assessment (EIA) Guidelines of the Ministry of Environment, Forests and Climate Change (MoEF&CC) for linear infrastructure projects like highways suggest primary baseline data to be collected for the ROW as well as the area falling within 500 meters on either side of ROW.

In the case of the present EA study of MUTP III project components, the study area within 100 m on either side of the existing tracks or proposed alignment falls mostly within the railway land. Thus, the study area of 200 m is considered on either side of the Railway Boundary Line so that it covers the ROW, additional railway land and considerable land outside the railway boundary covering sensitive receptors such as habitations, natural sensitive features, agriculture land, health centres, educational institutes, religious places etc.

The area within 200 m from the Railway boundary line on either side of the proposed alignment is the "Direct Impact Zone". All the baseline environmental profiling including environmental monitoring, biodiversity studies, socio-economic studies and public consultations are being carried out within the Direct Impact Zone.

In addition to the Direct Impact Zone, a larger area of influence up to 5 km stretch on either side of the proposed alignments is considered for identification of sensitive receptors through desktop research which is considered as area of influence. The area of influence was demarcated in consultation with the AIIB and the MRVC. The direct impact zone and area of influence considered for the study is shown in *Figure 2.* As described, Direct Impact Zone delineated for the Panvel-Karjat is presented as *Figure 3.*



Figure 2: Area of Influence





Figure 3: Direct Impact Zone and Area of Influence delineated for the Panvel-Karjat Stretch

2.3 Description of the Project Area

The MUTP III projects are located in the districts of Mumbai city, Mumbai sub-urban, Palghar, Raigad and Thane of Maharashtra State. The proposed stretch from Panvel to Karjat lies in the administrative jurisdiction of Central Railway and falls in Panvel, Khalapur and Karjat Talukas of Raigad District of Maharashtra.

2.3.1 Physical & Environmental Profile

The Panvel-Karjat Stretch falls in the Raigad District of Maharashtra as shown in *Figure 4.* Panvel and Karjat Talukas are part of the extended Mumbai Metropolitan Region.



Figure 4: Panvel-Karjat Stretch



2.3.1.1 Topography

Though the Raigad District forms an important part of the traditional 'Konkan Plain', ruggedness and uneven topography form the governing theme in its physical features. Prominent on the eastern horizon, stands the main Sahyadrian scarp with a crestline of peaks and saddles. Here the major streams that drain the land of the District receive their source waters. Westwards, the main Sahyadrian Range has several transverse subsidiary hills, many of which with varying heights almost reach the coastline to form headlands or promontories.

2.3.1.2 Geomorphology, Geology and Soils

The District has three physiographic divisions i.e. (i) Coastal zone in West covers about 20 percent of the District (ii) Central zone covers about 1/3 rd of the District, consisting of fertile land in low lying area (iii) Hilly zone in the Eastern part highly uneven in altitude and covered with forest. This hill range is characterized by ruggedness and uneven topography, with crestline of peaks and saddles forming the eastern horizon. The geology of the entire District consists of dark-coloured volcanic lava flows and laterites. These are spread out in the form of horizontal sheets or beds and constitute the innumerable spurs, hills and hill ranges; bold, flat-topped ridges; lofty peaks and plateaus with impressive cliffs. These hill ranges and plateaus form a part of the famous Western Ghats. In the plains and valleys the lava flows occur below a thin blanket of soil of variable thickness. The lava flows are dominantly basaltic composition and cover an extensive region in the Deccan and frequently present step-like appearance to the hills and ridges. They are commonly termed as "Deccan Traps."The soils in the District are formed from the Deccan Traps which is predominating rock formation with small out crops of Laterite at a few places in the Poladpur Taluka and Matheran Hill. The soils are grouped as Forest, Varkas, Rice, Khar or Saline, Coastal Alluvium and Laterite as per the location and topographical situation.

2.3.1.3 Climate

The climate of this District is typical of that on the west coast of India, with plentiful and regular seasonable rainfall, oppressive weather in the hot months and high humidity throughout the year. Relative Humidity is on an average over 80 percent during the south-west monsoon season. In the rest of the year the relative humidity is between 65 percent and 75 percent. The summer season from March to May is followed by the south-west monsoon season from June to September. The period from December to February is the cold season.

2.3.1.4 Rainfall

The normal annual rainfall over Raigad district ranges from 2200 mm to more than 3000 mm in the plains and it is above 5000 mm in the hills terrains. The average annual rainfall for Panvel and Karjat taluka is 3016 mm and 3670 mm respectively. The rainfall increases rapidly from the coast towards the Western Ghats on the eastern border of the District. The region receives most part of the rainfall between June and September months out of the South-West monsoon with 85 rainy days. July is the wettest month of the year with mean monthly rainfall of 1181.2 mm. October and November forms the post-monsoon or the retreating monsoon seasons.

2.3.1.5 Wind

South West Monsoon winds are very strong and blow from West or South-West during monsoon season. During the period from October to December winds are generally moderate but sometimes strong winds blow in October months and blow from directions between North-East and South-East Directions. In the three months from January to March, the winds continue to be moderate and are predominantly from directions between North and East. In April while there is a slight strengthening of



wind, the direction is variable. In May there is a further strengthening of winds and the directions of blow are between South-West and North-West.

2.3.1.6 Hydrologeology

Deccan Trap Basalt of upper Cretaceous to lower Eocene is the major rock formation and intruded by a number of dykes. Hilly zone in the study area is highly uneven in altitude and covered with forest. This hill range is characterized by ruggedness and uneven topography, with Crestline of peaks and saddles forming the eastern horizon. Konkan forested hills are situated at the centre of the district comprising parts of Panvel, Khalapur; an extension of the Sahyadri hills formed by the offshoots of the Sahyadri, which runs parallel to the drainage pattern of the district. The hill in general attains height above 200 meters MSL. The spot heights of 791 meters at the northern boundary of the district at Malang gad and 766 meters near Matheran are recorded.

The major water bearing formations are basically recent alluvium comprises of sand and gravel of Pleistocene age and ground water occurs under phreatic conditions in alluvial formations. Deccan trap basalts of Upper- cretaceous to Eocene Geological Age is the other prominent basaltic rock formation wherein groundwater occurs in weathered/fractured/jointed vesicular/massive formation under pheratic or unconfined condition and also under semi- confined to confined condition at deeper aquifers.

2.3.1.7 Drainage

The Panvel-Karjat Region lies in the North part drained by three main river systems: the Ulhas draining northwards to meet the Bassein Creek in the Thane District; the Gadi or Panvel River and other streams draining the lands of Panvel into the Panvel or Ulva Creek, and the Patalganga, Bhogawati and Amba draining the areas of Apta, Khalapur, Pen and Nagothna. In the North-eastern extremity of the District, the land is hilly and highly eroded with gullies, streams and local chasms, but towards the main Ulhas stream it develops a more subdued appearance. Eastwards, nearer the Sahyadrian scarps, plateau features girdled with steep sides follow in succession to reach the Sahyadrian crestline. The valley of the Pej River is broad and is separated from that of the Ulhas by the Dhak Plateau and its projecting hill ranges. The Ulhas drainage is separated from that of the Panvel and Patalganga Rivers by the Khandala offshoot of the main Sahyadrian range and its continuation in the slopes. The Patalganga River has its source in the Khandala portion of the Sahyadrian scarp. The Panvel drainage has a South-western orientation and it drains the Northern parts of the Raigad District in a fanlike pattern with the Kamrang, Kasadi and Kalundri as main streams, for a major part of alluvial formations.

2.3.1.8 Groundwater Development

Ground water in Deccan Trap Basalt occurs mostly in the upper weathered and fractured zones down to a depth range of 10 - 15 m bgl under unconfined condition. The water bearing strata at deeper depth exists under semi confined to confined conditions. The dug wells in these areas show rapid decline in water level during the onset of summer period and practically go dry in peak summer months. In foot hill zones the water table is relatively shallower near water course. The yield of dug wells tapping upper phreatic aquifer ranges between 45 to 60 m³/day, whereas that of bore wells varies from 0.50 to > 20 m³ /hr. depending upon the local hydro-geological conditions, however in most of the bore wells the yield is recorded up to 5 m³/hr.

In major part of the study area, pre-monsoon depth to water level ranges from 2 to 5 m.bgl. Mean post-monsoon depth to water level range of 2 to 5 m bgl is observed in the Khalapur and Karjat Taluka whereas it is <2 m.bgl for Panvel Taluka.


Panvel, Khalapur and Karjat Taluka fall under "Safe zone" categorization for groundwater utilization by CGWA.

The physiography, geology and rainfall of the district plays a major role in the ground water resource availability and sustainability. The high, steep hill ranges, isolated hillocks, undulation etc give rise to high run off, rather than natural recharge. The district despite of high rainfall of (2200 – 5000 mm) faces water scarcity situation following January or February month extending to the entire summer months till the onset of monsoon. Therefore, it is recommended to conserve the rain fall and run-off water through storage in tanks, ponds and other masonry structures.

2.3.1.9 General Landuses

The landscape within the Raigad District can be distinctly divided into five regions, namely, Karjat-Khopoli Region and Panvel Flats, where the quadrupling of the Panvel-Karjat rail stretch is proposed under MUTP-III, Alibag-Shrivardhan Coastal Lands, Central Interior Region and the Foothill Zone of the Sahyadris towards the eastern district boundary. The proposed MUTP III project of Panvel-Karjat stretch lies in the Northern part of the District. Karjat-Khopoli Region, with its rugged and hilly terrain presents a dynamic landscape influenced by the development of hydro-electric power. Below the pylons carrying the power lines, industrial progress is much in evidence, especially along the Mumbai-Pune highway. Favourable location, adequate water supply from the tail waters from Khopoli hydroelectric works, local supply of raw material and the arterial road communications have given rise to industrial development. Urban activity is visible on the roadside settlements. Karjat is also experiencing urbanization through industrial activity. Away from the busy highways and towards the rural settlements in the valleys, the landuse is eminently agricultural. Paddy is the main crop and nucleated hamlets are seen along the hill slopes. The low plateau tops denuded of their earlier vegetation offer a rough grassland appearance with occasional scrub. The elevated hill ranges carry a somewhat better vegetation cover of monsoonal character, especially in the hilly areas of Prabal and Matheran, the latter being famous as a hill station. To the North-west of Karjat-Khopoli Region, lie the Panvel Flats. Here, the landform is dominated by low flats and knolls. Rice cultivation gains in importance. But, salt flats partly reclaimed for agriculture and sluggish water courses present a marked contrast. Forests are situated mostly on the higher slopes and spurs of the hill ranges and the great deal scattered since lower slopes and flatter tops of the hills are, invariably, cultivated revenue lands or *malki* and *inam* forests. Thus, the Government forests are mostly relegated to the middle, poorer and infertile hill slopes which could not be of much use to the villages.

2.3.1.10 Transport

Raigad District is connected to Mumbai by Sion-Panvel Expressway. The Mumbai-Pune Expressway and NH-4 passes through Panvel. The NH-17, which starts at Panvel, traverses the whole District. The Central Railway line from Mumbai to Pune passes through Karjat with Extension Line from Karjat to Khopoli. Panvel Junction is the most important railway station in the District; it is connected to Mumbai (by both the Harbour Line and Main Line of Central Railway), Thane (by Trans-Harbour Line), Roha, Vasai (Western Railway) and Karjat. The Konkan Railway line also connects Panvel and towns further down South of the District. All trains, ranging from passengers to Rajdhani stop here and it is considered the gateway for travelling South. The main ports are Jawaharlal Nehru Port Trust (JNPT) which is part of MMR, Mandava, Revas, Murud and Shrivardhan.

2.3.1.11 Physical Growth and Issues

The major growth stimulators in this Region are its development as a suburban business district, announcements of an international airport, extended railway lines, sea-link connecting Navi Mumbai to South Mumbai and the upcoming metro corridor. The Navi Mumbai area, especially around Panvel, has witnessed significant urbanization and population growth in recent years. The area between



Panvel and Karjat is also developing rapidly. Navi Mumbai has become a major growth centre as a result of large industries, population expansion and its subsequent rail linkages with Mumbai CSTM and Panvel. The Kurla-Kalyan and Kalyan-Karjat sections are currently over saturated and there is no scope of adding more trains on this route. Therefore, the only future alternative for south bound trains is through Panvel–Karjat route. This would drive further growth in this Region. Panvel is surrounded by some major MIDC managed regions e.g. Patalganga, Taloja, Nagothane, Roha, Khopoli. The JNPT port is also located near Panvel. New SEZs announced by the Government are being established around Panvel. New Panvel is planned as an extension to the existing Panvel Town. New Panvel is just adjacent to the proposed Navi Mumbai International Airport. A Reliance SEZ is coming up in the vicinity. Social infrastructure in the Region is well placed with the presence of excellent educational institutions, hospitals, playground and parks. Due to its strong connectivity with Mumbai, Pune and Thane; comparatively less congested living environment, availability of affordable housing and good social infrastructure, Panvel is emerging as a preferred housing destination.

Due to good rail and road connectivity to Mumbai, the areas beyond Badlapur have seen much development in the recent years. Karjat, Neral and surrounding areas have seen a recent spurt in residential development due to its scenic locale, fresh air and quieter living environment. Previously viewed as weekend destinations, these locations have now assumed an affordable housing destination status with a number of township projects with spacious homes and good amenities to choose from. Thus, these locations beyond Kalyan have seen immense development due to availability of quality construction, better living and facilities at affordable rates, good road and rail connectivity. As Karjat is a part of Mumbai metropolitan area, MMRDA has cleared Karjat for advanced Urban Planning with minimum FSI of 1.0 and CIDCO is being entrusted with town planning and implementation. The new housing policy has removed many procedural hurdles, which will facilitate ultra-modern urbanization of the area. The Region also boosts of scenic hill stations that attract lakhs of tourists throughout the year, which include Matheran, Khandala, Bhimashankar, Malshej Ghat, Lonavala and others.

Khalapur is a town in Karjat sub-division of Raigad District. It is a suburb of Karjat. It is an industrial area with many chemical, plastic and steel units. This industrial belt is well suited for medium and large-scale industries as it provides good connections to both Mumbai and Pune via the Expressway and also the Konkan-Goa Road (NH-17). With pollution rules and regulations becoming more stringent in and around Mumbai, this belt is developing fast, as many affected companies are setting up their units here as it is less polluted with the advantage of close proximity to the metropolis.

The major growth stimulators expected in this region are the proposed four lane Kalyan–Karjat Highway, doubling of the railway line between Panvel-Karjat, multi modal Virar–Vasai–Kalyan–Alibaug four lane highway.

2.3.1.12 Sensitive Environmental Areas

The Sahyadris or Western Ghats which form the eastern boundary of the District have rich biodiversity hosting a variety of floral and faunal species. Offshoots of these Western Ghats are the Matheran, Khandala, Lonavala and other hill ranges. Matheran Eco-Sensitive Zone (ESZ) and the Karnala Bird Sanctuary are located in this Region. The proposed alignment is passing through Matheran ESZ. Around 4.9077 Ha of Forest land is to be diverted for the proposed project, which is 0.019% of total area of Matheran ESZ. Around 40 Ha (0.4 sq. km.) of area of Matheran ESZ is falling under Direct Influence Zone (200 m from the proposed boundary) of the Project Area. Karnala Bird Sanctuary is located about 8 km from the project area towards East of the proposed alignment.

The Morbe Dam located near Khalapur lies close to the existing Panvel-Karjat railway line. Morbe Dam is a gravity dam on the Dhavari River near Khalapur. The Morbe Dam is the main water source for the city of Navi Mumbai. It was built by the Water Supply and Sanitation Department of the



Government of Maharashtra. The height of the dam above lowest foundation is 59.1 m while the length is 3,420 m⁷. The volume content is 18,075 TCM³ and gross storage capacity is 119.804 MCM⁴.

The minimum distance of dam structure from the proposed alignment is 374 m. The proposed tunnel at Wavarle is at distance of 1404 m from edge of the dam as shown in *Figure 5.* Hence, consultation was conducted with NMMC to understand dam safety aspects and is elaborated in *Section 7.1.3.*



Figure 5: Morbe Dam and its distance from proposed alignment

2.3.1.13 General Environmental Quality

The Panvel-Karjat Region is surrounded by major MIDC industrial areas located in Taloja, Patalganga and Khopoli that house polluting industries. The effluents from these industries are discharged into the CETPs within the MIDC areas and are constantly monitored by the MPCB to check the functioning of the CETPs and their compliance to the effluent disposal standards. The problem of air pollution arises due to heavy traffic density near Panvel and Kamothe area. There is the typical problem of non-availability of buffer zone between the residential and the industrial zones, resulting in problems of air pollution and nuisance. Quarrying activity was rampant in the Region, mainly in the Panvel Taluka, erasing most of hilly portions in the Region.

2.3.1.14 Proneness to Natural Disasters

Proneness to natural disasters is very low in this Region. Landslides do occur in some of the hill slopes where improper construction methods are practiced. The natural topography of the Region helps in good storm water drainage, thus, reducing the possibility of floods. However, in some of the highly urbanized areas like Panvel water logging does occur in the low-lying areas during heavy rainfall. This region falls in Zone III: Moderate Damage Risk Zone (MSK VII) as per the Earthquake Hazard Map of BMTPC.

 ³ Source: <u>http://india-wris.nrsc.gov.in/wrpinfo/index.php?title=Morbe_Dam_D04373</u> as accessed on Feb 15, 2017
 ⁴Source: <u>https://www.nmmc.gov.in/morbe-dam1</u> as accessed on Feb 15, 2017



2.3.2 Socio-economic Profile

Panvel-Karjat Stretch is spread over Panvel, Khalapur and Karjat Talukas of Raigad District. Population of Raigad District, as per census 2011, is 26,34,200 which increased by around 19% in the last decade. Raigad District is covered by 15 Talukas, namely, Alibag, Pen, Murud, Panvel, Uran, Karjat, Khalapur, Mangaon, Roha, Sudhagadh, Tala, Mahad, Mahasala, Shrivardhan and Poladpur.

As per Census 2011, 44% of the total district population is based in Panvel, Khalapur and Karjat Talukas which indicates the high developmental growth in these Taluks. Average household size of Panvel, Khalapur and Karjat Talukas is 4.5. Sex ratio of Panvel Taluka is 889 and Khalapur Taluka is 899 which are lower than that of Raigad District (959). Sex ratio of Karjat Taluka is 966, higher than that of the Raigad District. In general, ST population of Panvel, Khalapur and Karjat Talukas is higher than the SC population. SC population of Panvel Taluka is 6.64% while ST population is 8.66%. SC population of Khalapur Taluka is 6.5% and ST population is 13.85%. Karjat Taluka has 5.43% of SC population and 22.19% ST population which is highest amongst all the three Talukas of the Study area. The tribal in Raigad District mainly belong to the Katkari tribal community. Average literacy rate in the Study area ranges from 70-80% with male literacy rate higher than the female literacy rate in all the three Talukas. On an average, 40% of the total population is working population in Panvel, Khalapur and Karjat Talukas, which has almost remained same as in the last decade. In general, male working population is higher than the female working population in Panvel, Khalapur and Karjat Talukas work as main workers.

The economic activity of the District is primarily agriculture based. The agriculture sector has absorbed a major percentage of workers in the District. Rice is the main crop of the District. Good garden crops like Coconut, Arecanut, etc. are grown in the District depending upon the availability of water. Industrially, Raigad District as a whole is not much developed except for Khopoli, Karjat, Panvel and Taloje Panchnad Towns. These towns have industrial units manufacturing steel pipes and medicines. The State Industrial Policy is based on the basic decision of encouraging industries in the developing and under-developed areas of the District and to disperse industries from the heavily congested areas of Mumbai, Thane and Pune.

Proposed alignment in Panvel-Karjat stretch falls within Panvel, Khalapur and Karjat Talukas of Raigad District. A total of 28 settlements (urban/rural) are located within the Panvel-Karjat stretch. Out of 30, 3 are urban areas (municipal corporation/municipal council/census town) and rest all are rural areas (villages). As per Census 2011, Panvel, Kalundre and Karjat are the urban areas whereas the remaining 27 are villages. Mudre Bhudruk and Pimploli Khurd mention in land acquisition data of MRVC are not listed in Census 2001 and Census 2011 data, as they are merged with neighbouring Panchayat. Hence, these villages are not considered for analysis. The list of the urban and rural areas located within the Direct Impact Zone along this stretch is shown in **Table 1**.

Taluka Urban Areas		Rural Areas
Panvel Taluka	Panvel (M Cl) Kalundre (CT)	Vichumbe, Usarli Kh, Chikhale, Borle (Bherle), Sangade, Belavali, Bhingar, Bherle,Bhingarwadi,Mohope, Poyanje, Pali Bk,Barwai, Bhokarpada
Khalapur Taluka		Lodhivali, Nadhal, Chowk Manivali, Hatnoli, Morbe, Bhilvale, Borgaon Bk, Wavarle
Karjat Taluka Karjat (M Cl)		Halivali, Deulwadi, Kirawali, Brahamnoli, Vanjhale

Table 1: List of Urban and Rural areas within the Direct Impact Zone of Panvel-Karjat Stretch

Source: Census 2011



Amongst the 30 urban/rural areas, habitations of Panvel (M Cl), Vichumbe, Usarli Kh, Chikhale, Sangade, Bhingar, Poyanje, Barwai, Lodhivali, Nadhal, Chowk Manivali, Hatnoli, Wavarle, Bhilvale, Halivali, Deulwadi, Kirawali, Bramhnoli, Vanjhale Karjat (M Cl) are falling within the Direct Impact Zone. The settlements of 2 urban areas and 16 rural areas are falling within the Direct Impact Zone. Rest all of the rural areas have farm lands/pasture lands/barren lands falling within the Direct Impact Zone.

The Urban Development Dept. (UDD), Govt of Maharashtra (GOM), has specified the area for Navi Mumbai Airport Influence Notified Area (NAINA) vide the Notification No. TPS-1712/475/CR98/12/UD-12 dated 10th January 2013⁵. The notification has also appointed CIDCO as a Planning Authority for a planned and orderly development within a radial distance of about 25 km from the proposed International Airport site Navi Mumbai.

Panvel Junction Railway station Chikhale Railway Station Mohope Railway Station Chowk Railway Station Chowk Railway Station

The NAINA region with respect to the proposed alignment is present in Figure 6.

Figure 6: NAINA boundary and existing Panvel-Karjat alignment

As per the NAINA notification, villages in our study area which are also listed in Schedule II of NAINA are as follows.:

- Panvel Taluka: Chikhale, Vichumbe, Usarli Kh, Borle (Bherle), Sangade, Belavali, Bhingarwadi, and villages excluding area under Matheran ESZ for Bhingar, Bherle, Mohope, Poyanje, Pali Bk, Barwai, Bhokarpada
- Khalapur Taluka: Morbe, Bhilvale, Hatnoli, and villages excluding area under Matheran ESZ for Lodhivali, Nadhal, Chowk Manivali, Borgaon Bk, Wavarle
- Karjat Taluka: No village under NAINA

The provisions of Development Plan for NAINA shall also be applicable to these villages, however, presently; development plan is not finalized.

⁵ Source: <u>https://cidco.maharashtra.gov.in/pdf/SPA/Naina English Gazette notification.pdf</u>



• Socio-economic Aspects of the Urban Areas:

As per Census 2011, Panvel (M Cl) has highest population, i.e. 1,80,020 which has drastically increased over last decade. Karjat (M Cl) has population of 29,663 while Kalundre (CT) has population of 6,626. Average household size in the urban areas is 4. Sex ratio of Panvel (M Cl) and Karjat (M CI) is almost equal i.e. 946 which is higher than the sex ratio of year 2001 as 893 for Panvel (M Cl) and 933 for Karjat (M Cl). The increase in sex ratio in last decade shows the trend of inmigration in these areas. As per Census 2011, Kalundre (CT) has sex ratio of 885 which is lesser than 931; the sex ratio as per Census 2001 which indicates the trend of out-migration in this area. SC population in Panvel (M Cl), Karjat (M Cl) and Kalundre (CT) is increased from 4.73% to 8.03%, 4.32% to 12.45% and 4.19% to 5.61%, respectively in last decade. This indicates trend of in-migration of SC population in this area. The urban areas have ST population lesser than 5% of total population. The urban areas have literacy rate ranging from 77% to 84%. Male literacy rate in all the urban areas is higher than the female literacy rate. Percentage of workers in all the urban areas is ranging between 35-38%. Out of total male and female in urban areas, 51-55% of male are working while only 13-19% of female are working. About 90% of the working population is working as main workers in the urban area. In urban areas, 91-93% of the male workers are working as main workers while female main workers range from 79-84%. All the workers in urban areas are working in industries, manufacturing and related activities and government/private offices. All the urban areas also receive floating population from nearby villages.

• Socio-Economic Aspects of the Rural Areas:

As per Census 2011, 7 villages of Panvel Taluka, 6 villages of Khalapur Taluka and 5 villages of Karjat Taluka are falling within the Study area. As per Census 2011, out of all the 27 villages of the study area, Vichumbe Village has highest population, i.e. 6,332, followed by Chowk Manivali Village having population of 3,309. Villages of Borle (Bherle), Mohope, Pali Bk, Morbe and Borgaon Bk have population lesser than 500. Average household size in the rural area ranges from 4 to 5.

Mohope, Poyanje, Pali Bk, Belavali, Bhingar, Borgaon Bk, Brahamnoli, Kirawali have sex ratio greater than 1000. For most villages, sex ratio ranges between 900 to 1000, except for villages of Vichumbe, Usrali Kh, Borle and Morbe, which have sex ratio less than 900. Reduction in sex ratio over a decade can be attributed to male out-migration in this area. Vichumbe and Usrali Kh Villages have highest percentage of SC population, i.e. 16% of its total population. Barwai, Nadhal and Kirawali Villages have SC population ranging from 11% to 13% while all the remaining villages have SC population below 5%. Bherle Village has highest ST population. Morbe, Bhokarpada and Morbe have no ST population. Bhokarpada Village has highest percentage of literate population while Pali Bk has lowest at 25%. In general, male literacy rate is higher than the female literacy rate. Majority of the villages in the study area have working population less than 50%. Bhingar Village has highest working population is higher than the female working population. Most of the people are working as marginal workers.

The Demographic and Socio-economic Profile of Panvel-Karjat stretch are presented in *Annexure* 1.

The Katkaris are one of the most marginalized communities of India, being designated as 'Particularly Vulnerable Tribal Groups (PVTGs)' within the Scheduled Tribes. Spread in pockets in Gujarat and Maharashtra, a substantial population (approx. 1,10,000) is spread across all of Raigad district. This annual ritual of migration is more pronounced in the Talukas of south Raigad for example, Mahad,



Mhasla etc. compared to the Talukas like Panvel, Karjat, Alibag etc. in north Raigad, and that's also due to water scarcity in that region during the summers.⁶

2.4 Land Requirements and Acquisition

The proposed project shall require land for different purposes. Acquisition of land shall make affected families may be degraded by land and/or house and income opportunity. Therefore, every effort has been made to keep land requirements to the barest minimum by realigning the alignments away from private property / human habitation. After planning, the land requirement is kept at minimum and particularly, acquisition of private land was avoided.

Table 2 indicates village wise land details with chainage from Panvel. Total 65.5219 Ha of land shall be acquired for the purpose of permanent usages. 58.1477 Ha of land is under private ownership, 3.4665 Ha of land is under government possession and 4.9077 Ha to be diverted from the forest department.

Sr No	Village	CH: From	CH: To	Private Land	Government Land	Forest Land	Total	
Pan	Panvel Taluka							
1	Usroli Khurd	1425	2700	0.7697	0.0180	0.0000	0.7877	
2	Chikhale	2700	5100	4.9910	0.0330	0.0000	5.0240	
3	Sangde	5100 5750	5470 6585	1.4310	0.0240	0.0000	1.4550	
4	Belavali	5470	5750	0.2171	0.0000	0.1715	0.3886	
5	Bhingar	6585	8150	1.4810	0.0000	0.0570	1.5380	
6	Bhingarwadi	8150	8430	0.1652	0.0000	0.0000	0.1652	
7	Bherle	8430	8600	0.2074	0.0078	0.2700	0.4852	
8	Mohape	8600	9400	1.8440	0.0000	0.0000	1.8440	
9	Poyanje	9400	10665	6.7760	0.1930	0.0000	6.9690	
10	Barwai	10693 12000	11715 13875	1.9627	0.0000	1.2067	3.1694	
11	Pali Budruk	11715	12000	0.1290	0.0000	0.0000	0.1290	
	Sub-Total			19.97	0.2758	1.7052	21.9551	
Kha	Khalapur Taluka							
12	Lodhivali	13980	14870	0.9770	0.2346	0.0000	1.2116	
13	Nadhal	14894	16610	2.5823	0.0562	0.0000	2.6385	
14	Chouk-Manivali	16490	17500	1.6300	0.3140	0.0000	1.9440	

Table 2: Land Acquisition Details

⁶ Source: <u>http://www.indiafellow.org/blog/2017/12/an-introduction-to-katkari-tribes-of-maharashtra/</u>



Sr No	Village	CH: From	CH: To	Private Land	Government Land	Forest Land	Total
15	Hatnoli	17700	20068	1.4440	0.0890	0.0000	1.5330
16	Bhilavale (Niwade)	20068	21559	0.1400	0.6448	0.0000	0.7848
17	Morbe	20990	21200	0.1199	0.0000	0.0000	0.1199
18	Vavarle	21559	24800	5.5510	0.5882	0.0000	6.1392
	Sub-Total			12.4442	1.9268	0.0000	14.3710
Karja	at Taluka						
19	Kiravali	24800	26400	2.1673	0.2688	2.4975	4.9336
20	Brahamnoli	26400	26657	1.2170	0.0000	0.0000	1.2170
21	Vanjhale	26657	28137	5.3892	0.3557	0.7050	6.4499
22	Deulwadi	28137	29440	12.0629	0.6394	0.0000	12.7023
23	Mudre Bhudruk	29440	29601	3.0090	0.0000	0.0000	3.0090
24	Halivali	29400	29601	0.8840	0.0000	0.0000	0.8840
	Sub-Total			24.7294	1.2639	3.2025	29.1958
	Total			57.1477	3.4665	4.9077	65.5219

There are 84 structures are likely to be affected as part of dismantling/demolition activity for the project. Out of the total structures, 64 are residential, 1 commercial structures, 17 boundary walls and 2 others are being impacted due to the proposed project. Total 4 common property resources are likely to be affected. Out of the total affected common property resources, 2 are toilets and 2 are other structures.



Section 3 Legal and Administrative Framework and Applicable Policies

3.1 Applicable Legislation and AllB's Environmental & Social Policy

The Project will be implemented within the Indian legal framework (both Central and State / Region level) and will also comply with the safeguard policies of the AIIB. The applicable Indian environmental regulations, AIIB policies/directives and Government of Maharashtra (GoM) directives for the projects are presented in this section.

It is our understanding that the proposed MUTP III components are not covered under the Environmental Regulatory Framework of the MoEF&CC. The AIIB Policies, which are applicable to the Project, are being reviewed such that the Project gets designed and implemented with full compliance to the requirements of these policies. As the Panvel-Karjat stretch is going to receive the funds from the AIIB; the applicability of the AIIB policies are assessed in detail for Panvel-Karjat stretch.

3.1.1 Applicable Indian Legal Requirements

All the applicable Policies, Rules and Regulations by Government of India (GOI), Government of Maharashtra (GOM) and Indian Railways and other best practices in Occupational Health and Safety and Disaster Management have been considered for preparation of ESMP.

Clearances/ NOC/ approvals required under Indian legislative Rules and Regulations were understood after review of the environmental regulatory framework, the judicial and National Green Tribunal (NGT) pronouncements and discussion with the concerned regulatory authorities.

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

• Environmental (Protection) Act, 1986

This is an umbrella Act for environmental protection. Various rules and notifications are issued from time to time under the provisions of this Act. Environmental Protection Rules (2000) specify standards for Ambient Air Quality whereas Noise Pollution (Regulation and Control) Rules, 2000 provide for the ambient noise standards in public places. However, legal mechanisms to achieve these are not explicit in terms of emission at source in transport sector except for the vehicle emission norms like Euro II or Bharat II that have been prescribed. The Environmental Impact Assessment Notification 1994 (as amended in May 1997) make environmental clearance mandatory for 29 categories of developmental projects listed in Schedule I of the notification. Railways are not listed in Schedule I and hence, do not need environmental clearance.

• Air (Prevention and Control of Pollution) Act, 1981

Regular checking of emissions from construction machinery and all vehicles will be require to keep check on air emissions as prescribed by the Act.

• Water Prevention and Control of Pollution) Act, 1974

Various parameters in Effluents from construction sites and workshops will have to be controlled as per standards prescribed by the Act.



• Noise Pollution (Regulation and Control Act), 2000

DG sets at construction sites and workshops should be provided with acoustics enclosures to control noise pollution.

• Construction and Demolition Waste Management Rules, 2016

The rules require waste generators who generate more than 20 tons or more in one day or 300 tons per project in a month to segregate the waste into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar and also require to submit waste management plan with approvals from the local authority.

In case of handling C&D waste, the Contractor shall use the waste at site to the maximum extent and remaining waste shall be handled the as per Construction and Demolition Waste Management Rules, 2016.

• Solid Waste Management Rules, 2016

The rules require waste generator to segregate and store the waste generated in three separate streams namely bio-degradable, non-biodegradable and domestic hazardous wastes in suitable bins and handover segregated wastes to authorised waste pickers or waste collectors. If quantity of solid waste generated is more than 5 metric tonnes per day, authorization is required from the State Pollution Control Board.

Solid waste generated in the labour camps and site clearing is not expected to be more than 2 tons per day. Solid waste generated in labour camp plan will be included in labour camp management plan. The contractor will be responsible for safe and environmentally sound management of solid waste as per Solid Waste Management Rules, 2016.

• The Maharashtra (Urban Areas) Preservation of Trees Act, 1975

GoM legislation requires every local authority to constitute a Tree Authority. No tree can be felled without the permission of this authority. If any person, including an officer of the urban local authority or an officer of the State Government or the Central Government proposes to fell a tree, will have to obtain the permission of the Tree Authority for felling of trees in the right of way and follow the Tree Authorities stipulations in respect of transplanting or compensatory plantation.

• Maharashtra Felling of Trees (Regulation) Act, 1964 and its Amendments

This Act makes better provision for regulating the felling of certain trees in the State of Maharashtra, for the purpose of the preservation thereof, and for the protection of the soil against erosion. There are restrictions on felling of 15 species of trees which are specified in the Schedule of the said Act (called as "Scheduled Trees") without the previous permission of the concerned authority.

In the State of Maharashtra tree felling permission (i.e. excluding urban areas) is issued by the tree authority i.e. Range Forest Officer under the Act.

As per section 3(1B) of the Maharashtra Felling of Trees (Regulation) Act, 1964; the permission to fell trees shall be granted subject to the condition that the applicant shall plant equal number of trees of the same or any other species as the Tree Officer may direct, on the same site or other suitable place in the vicinity in the ensuing plantation season.



• National Green Tribunal (NGT) Orders

National Green Tribunal has made it mandatory to obtain environmental clearances for Indian Railway projects before any work begins on the ground in a case of Vikrant Tongad Vs Noida Metro Rail Corporation & Others on 31st May, 2016⁷. However, Supreme Court has stayed the NGT order on 15th September, 2016 in a judgement of Dedicated Freight Corridor Corporation of India Ltd (DFCCIL) and the Metro Rail against the order passed by the green tribunal that they are required to seek ECs for all their projects. Hence, environment clearance for railways is not required at present⁸.

• Flyash Utilisation Notification, 1999 and subsequent amendments

The provisions under the notification are as follows:

- Every construction agency engaged in construction of buildings within radius of 300 km of coal or lignite based thermal power plants shall use only flyash based product for construction such as cement or concrete, fly ash bricks or tiles or blocks or clay fly ash bricks or tiles or blocks or cement fly ash bricks or tiles or blocks or similar products or combination or aggregate of them in every construction project. This provision is also applicable to all construction agencies of Centre or State or Public or Private sector. The design approving agency or agency undertaking construction shall comply to provisions and submit returns to State Pollution Control Board or Committee as applicable.
- The notification states that the coal or lignite based thermal power plants shall within a radius of three hundred kilometers bear the entire cost of transportation of ash to the site of road construction projects under Pradhan Mantri Gramin Sadak Yojna and asset creation programmes of the Government involving construction of buildings, road, dams and embankments.
- It is mandatory to use ash based bricks or products in all Government Scheme or programmes e.g. Mahatma Gandhi National Rural Employment Guarantee Act, 2005 (MNREGA), Swachh Bharat Abhiyan, Urban and Rural Housing Scheme, where built up area is more than 1000 square feet and in infrastructure construction including buildings in designated industrial Estates or Parks or Special Economic Zone.
- Provisions for use of fly ash, fly ash based products, construction technique in building material, road embankments shall be mentioned in tender documents.
- Use of flyash to fill up void created from soil borrow area as part of embankment project.

"Study Report on Use of Coal Ash in Railway Embankment" by Research Designs and Standards Organisation (RDSO)⁹ states that

- Railway embankment is quite different from road embankment due to the fact that they are designed for higher axle loads and very tight safety tolerance therefore, coal ash cannot be used directly in railway embankment.
- The study reveals that fly ash is cohesionless and highly erodible in nature, has low density and high void ratio, as such, it may not behave as ideal material for construction of railway embankments.

 ⁷ Source: <u>http://www.indiaenvironmentportal.org.in/files/Noida%20Metro%20NGT%20Judgement%202016.pdf</u>
 ⁸Source: <u>http://www.thehindu.com/news/national/SC-stays-NGT-order-asking-Railway-Metro-to-seek-EC-for</u>
 projects/article14436256.ece

⁹ Source: <u>http://www.rdso.indianrailways.gov.in/works/uploads/File/s_005.pdf</u>



- To overcome these inherent geotechnical short comings, construction of embankment with fly ash requires specialised method wherein fly ash has to be used in combination with naturally occurring soil.
- Extensive monitoring of field performance of embankment constructed with fly ash on an experimental basis is required before usage of fly ash could be propagated on wider scale.

"Use of Flyash as Admixture in Concrete" by Research Designs and Standards Organisation (RDSO)¹⁰ states that

- It is generally agreed that the use of flyash, particularly as an admixture rather than as a replacement of cement.
- Admixtures are used to accelerate or retard the setting time of concrete, to reduce water content and improve strength and to increase slump or reduce cement content and to improve the overall durability of concrete. Admixtures can be defined as materials other than water, cement and aggregate, added to concrete immediately before or during mixing.
- To utilize flyash as admixture, flyash shall confirm to IS: 3812 Part-1 2003 formulated by Bureau of Indian Standard (BIS).

Hence, utilization of flyash in construction shall be adhered to Flyash Utilization Notification.

• MoEF&CC Eco-Sensitive Area Notifications

The notifications mention the prohibitive/ restricted activities and the minimum distance to be maintained for any sort of activities such as non-establishment of any industrial unit adjacent to the eco-sensitive zone, no construction activities to be entertained in the vicinity and quarrying and mining to be strictly prohibited. In addition to the above activities tree felling, ground water extraction, increased noise levels, discharge of effluent and solid waste disposal are also strictly restricted activities in the ESA.

• Matheran and surrounding region as an Eco-Sensitive Zone, 2003 (as amended in 2004)

- o In areas other than Matheran Municipal limits:-
 - There shall be no reduction in Tribal Area, Forest Zone, Green Zones and Agricultural Area.
 - All development activities including additions, alterations, demolitions, repairs, renovations and restorations of buildings shall require prior approval of the Monitoring Committee and shall be subject to heritage clearance if necessary
- Quarrying and Mining activities shall be banned in the Eco-sensitive Zone and no fresh mining lease shall be granted.
- There shall be no felling of trees whether on Forest, Government, Revenue or private lands, without the prior permission of the State Government in case of forest land, and the respective District Collector in case of Government, Revenue and private land, as per procedure which shall be laid down by the State Government.

¹⁰Source:http://www.rdso.indianrailways.gov.in/works/uploads/File/Pamphlet%20on%20Use%20of%20Fly%20ash%20as%20A dmixture%20in%20Concrete.pdf





 Extraction of ground water for industrial, commercial or residential complexes shall require prior written permission, including the amount that can be extracted, from the State Ground Water Board. No sale of ground water shall be permitted except with the prior approval of the Monitoring Committee constituted under paragraph 4 of this notification. All steps shall be taken to prevent contamination or pollution of water, including from agriculture activities.

• Regulations related to Social Aspects:

The Acts & Regulation dealing with social aspects applicable to the project will be covered in detail in Social Impact Assessment study. The relevant Act & Regulation are as follows:

- The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013
- Maharashtra Project Affected Persons Rehabilitation Act, 1986 including SRA scheme (as amended)
- The Child Labour (Prohibition and Regulation) Act, 1986, The Bonded Labor (Abolition) Act, 1976
- Minimum Wages Act, 1948, The Payment of Wages Act, 1936, amended in 2005
- o Maharashtra Labour Welfare Fund Act, 1953 (as amended)
- The Equal Remuneration Act 1976, Workmen's Compensation Act, 1923
- Inter-State Migrant Workmen's (Regulation of Employment & Conditions of Service) Act, 1979
- o Building and Other Construction Workers' Welfare Cess Act, 1996
- o Contract Labour (Regulation & Abolition) Act 1970 & Central Rules, 1971

3.1.2 Applicability of AIIB's Environmental and Social Framework (ESF)

The EA study is being carried out in accordance to the AIIB's Environmental and Social Policy (ESP) which sets forth mandatory environmental and social requirements for each Project. And Environmental and Social Standards (ESS) which set out more detailed mandatory environmental and social requirements relating to the following¹¹:

- > ESS 1: Environment and social assessment and management
- > ESS 2: Involuntary Resettlement
- ➢ ESS 3: Indigenous People

ESS 1 Environment and Social Management and ESS 2 Involuntary Resettlement are applicable for this project.

The ESS 1 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. ESS 1 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 Bank.

¹¹ <u>https://www.aiib.org/en/policies-strategies/ download/environment-framework/Final-ESF-Mar-14-</u> 2019-Final-P.pdf





The ESS 2 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.

Thus, the EA study has been carried out to meet the requirements in AIIB's ESP and ESS 1.

MRVC has engaged a Social Consultant to identify important social aspects such as places of worship and other community assets, socio-economic set up, issues related to land acquisition and resettlement. The Social Consultant has prepared a Social Impact Assessment and a Resettlement Planning Framework accordance with AIIB's ESP and ESS2.



Section 4 Baseline Environmental Profile

Baseline Environmental Profile for Panvel-Karjat stretch were carried out by undertaking several site investigations such as Site Familiarization Walks and Wind-Shield Survey, Detailed Reconnaissance Survey, Mapping of Sensitive receptors as a part of Strip Mapping and Baseline Environment Monitoring. The details of all these site investigations are described in following sections.

4.1 Site Reconnaissance Surveys

Site Reconnaissance Surveys of the MUTP III project areas were conducted to understand the general characteristics of the project areas.

4.1.1 Site Familiarization Walks & Wind-Shield Survey

Site Familiarization Walks involve systematic observations made on foot and Wind-Shield Survey involves systematic observations made through a moving vehicle for general examination of the Study area prior to the detailed field study.

Reconnaissance surveys include collecting primary information necessary for evaluating the Panvel-Karjat stretch and identify areas of concern while conducting the Detailed Reconnaissance Survey. Following observations were made during Site Familiarization Walks & Wind-Shield Survey.

• There are a total of three stations in the Panvel-Karjat stretch, namely Chikhale, Mohope and Chowk.

Sr. No.	Station	Chainage from CSTM-Diva (Km)	Chainage from Panvel Station (Ch.)
1.	Panvel	Km 68/16	Ch. 0+000
2.	Chikhale	Km 71/14-15	Ch. 3+830
3.	Mohope	Km 77/24-26	Ch. 9+622
4.	Chowk	Km 85/9-10	Ch. 17+240
5.	Karjat	Km 99/28-30	Ch.27+930

[•] The major landuse in this area is agriculture – crop land. In general, people cultivate rice and vegetables depending on the seasons and water availability.

- o Major population is concentrated at Panvel and Karjat.
- Proposed tracks are crossing Kalundre River between Ch.0+600 to Ch.0+700 (Km 68/39-45). Kirki River is passing along the southern side of the proposed tracks. The proposed tracks are crossing the minor streams/tributaries of Kirki River at Ch. 5+100 (Km 73/2-3). Similarly, Ulhas River is passing on the eastern side of the proposed tracks closer to the Karjat Station. The proposed tracks are crossing the minor streams/tributaries of Ulhas River.
- In addition to the urban settlements of Panvel and Karjat areas, some rural habitations are located close to the proposed tracks, which mainly include Chikhale, Sangade, Bhingar, Mohope, Poyanje, Barvai, Lodhivali, Chowk, Hatnoli, Wavarle, Kirawali, Deulwadi and Halivali.
- Few industries are located along the NH-4 and AH-47.
- The route has one small tunnel (Dandphata Tunnel) before Chowk Station between Ch. 14+756 to Ch.14+975 (Km 82/14-19) and a longer tunnel (Wavarle Tunnel) starting at Km 90/12 and ending at Km 93/7 between Chowk and Karjat Stations.
- $\circ~$ Matheran Forest area exists between Mohope and Karjat Stations.
- After crossing the Chowk Station while moving towards Karjat Station, Morbe Dam is present at minimum distance of 374 m, parallel to the existing railway line between Ch. 17+600 to 21+600 (Km 85/27-89/11).



- The area houses the water treatment plant between Ch. 12+900 to 13+300 (Km 80/14-81/13) and pipelines supplying water to Navi Mumbai area from the Morbe Dam on the left side of the existing Mohope-Chowk track.
- There are several religious structures on both sides of the existing railway track, which may be considered as sensitive receptors enroute. However, none of the religious structures are located within the proposed railway boundary.
- o The study area does not have any heritage structure or archeologically important building.

4.1.2 Detailed Reconnaissance Survey

Detailed Reconnaissance Survey includes collecting primary information necessary for evaluating and identifying areas of concern. The detailed site reconnaissance survey was carried out along all the three-proposed stretch to observe the following aspects:

- Details of route vis-à-vis topography of the area plain, rolling or hilly.
- Location of all the main features of the project which mainly includes major bridges, minor bridges, ROBs, RUBs, level crossings, etc.
- Existing means of communication bus, shared auto-rickshaws, jeep tracks, railway network, etc.
- Constraints during construction on account of access roads, creeks, rivers, residential areas, slums, religious places, schools, colleges, government offices, post offices and other sensitive receptors enroute the proposed alignments
- o Climatic conditions temperature, rainfall, humidity
- Tracing of the route of the proposed alignments to understand the areas passing through forest land or eco-sensitive areas
- \circ $\;$ Locations where the alignment is crossing with railway lines and existing roads
- Ecology or environmental factors along the proposed alignments
- \circ $\;$ Identification of sensitive locations for environmental monitoring

The key observations of the detailed site reconnaissance survey for Panvel-Karjat stretch are presented in *Table 3.*

Description of the Area	Key Observations
Panvel Station at Ch. 0+000 (Km 68/16) and area between Panvel and Chikhale Stations	 Panvel Station is surrounded by dense habitation mainly residential and commercial complexes. Access road to Panvel Station is in good condition. The proposed tracks are going to cross the Kalundre River at Br. No. 68/2 at Ch.0+600 to Ch.0+700 (Km 68/39-45) and Kirki River at Br. No. 73/1 at Ch. 5+100 (Km 73/2-3). The area between Panvel and Chikhale Stations is mainly covered by farmland. Rice and vegetables are mainly grown in this area.
Chikhale Station at Ch. 3+830 (Km 71/14-15) and area between Chikhale and Mohope Stations	 Internal approach road to Chikhale Station is narrow and in poor condition. Narrow bridge need to be crossed for accessing the station. Hence, material and equipment movement may be impacted if this road will be used during construction. Chikhale Station is located next to the RUB Br. No. 71/1 at Ch. 3+677 (Km 71/11-12). Considerable filling material will be required to raise the height near the Chikhale Station. Station condition is extremely poor – may need to construct a new station to cater to the needs of increased traffic. Additional Railway Bridge over the Mumbai-Pune Express Highway crossing the alignment at Ch.4+019 (Km 72/1-2) for the proposed tracks on the Eastern side of the platform will need to be constructed. Likely impact on the traffic on Mumbai-Pune Express Highway Section during construction of additional Railway Bridge over the Express Highway for the proposed tracks.

Table 3: Key Observations: Panvel-Karjat Stretch



Description of the Area	Key Observations
	 Towards the Southern side of the existing station and proposed tracks there is no habitation at Chikhale Station. A RUB is located adjacent to Chikhale Station, which is surrounded by farmland on both sides.
	 The area is electrified but has frequent power shut-downs. The proposed track will cross Kirki River at Ch. 5+100 (Km 73/2-3), very close to Chikhale Station while moving towards Mohope Station. The major bridge Br.No. 73/1 will be constructed at this location.
	 Except the scattered habitations of Chikhale, Sangade and Bhingar Villages, the area between Chikhale and Mohope Stations is covered by farmlands. The area is mainly dependent on paddy and vegetable cultivation. Few households of Sangade and Bhingar Villages are located very close to the
	 existing railway track. The approach road for reaching Bhingar Village passes through a RUB Br. No. 75/2. A new RUB construction at Ch. 7+327 (Km 75/2-3) will be required to cater to the proposed tracks. Movement of the villagers /vehicles through the underpass may get obstructed during the period of construction. Alternate route may have to be used by the villagers during the construction period. Utility Corridor crosses the approach road to Bhingar Village. High Pressure Gas Pipeline of CALL and HPCL - Mumbai Pupe Solapur Pipeline (MPSPL) (petroleum)
	Difference of OAL2 and the OL2 Midmbal Funce Colaput Fipeline (Mi OFE) (perfored in product pipeline) is passing parallel to the approach road to Bhingar village. Utmost care needs to be taken to ensure that the heavy truck movement during construction stage would not damage these buried pipelines.
Mohope Station at Ch. 9+622 (Km 77/24-26) and area between Mohope and Chowk Stations	 Mohope railway station and its surroundings can be only accessed through a single road on the eastern side, which is circuitous and narrow. Material movement during construction stage will not be possible through this narrow road. Station Master mentioned that they are facing public agitations for almost past 10 years. The land of Poyanje Village was acquired to construct new railway station. But the station is named as "Mohope" which is an adjoining village. The villagers expected to name the station as "Poyanje" and not as "Mohope". On account of the issues between Poyanje Villagers and the Railways, presently village has stopped water supply to the Mohope Station. Also, material transportation for railway works was objected by the villagers in the past. The other side of the station has Barvahi River and farm land. Gas Pipeline of GAIL crosses approach road to the Station. Utility (Power) Lines on Northern side of existing track (Pole 78/7) may need to be objected by the villagers.
	 Water Treatment Plant (WTP) having Capacity 450 MLD is located enroute from Mohope to Chowk Station, at Bhokarpada Village, which is operated by Navi Mumbai Municipal Corporation (NMMC). The WTP is located in the Southern side of the existing railway track at Ch. 12+900 to 13+300 (Km 80/14-81/13). The treated water storage tank is located on the Northern side of the existing railway track. Raw water is sourced from Morbe Dam (which is at higher elevation). The raw water flows under gravity to the WTP (this pipeline is laid parallel to the highway). After chemical treatment/post chlorination, the treated water is pumped to the elevated storage tank in the Northern side (on the Hill) across from the railway track. The treated water is conveyed through two pipelines, one is of Maharashtra Jeevan Pradhikaran Scheme and the other one is of NMMC. The utility water lines crosses thrice through the existing alignment. First from dam side at chainage 17+463 and then flows parallel to the alignment, adjacent to the old puna highway, then connects to the WTP system and crosses alignment again at chainage 12+920 and last at chainage 12+763 from where the lines moves towards Navi Mumbai for water distribution. These water pipelies at the said crossover point are protected by bridges to maintain the structural integrity of the system, 85/1 near dam , 80/4 near WTP and 80/3 (major bridge). HPCL - Mumbai Pune Solapur Pipeline (MPSPL) (petroleum product pipeline)



Description of the Area	Key Observations
	 crosses the approach road to Bhokarpada Village which is a RUB. One additional bridge needs to be constructed for the proposed track close to Bhokarpada. Movement of the WTP staff/vehicles going to WTP (elevated storage reservoir) area through this RUB may get obstructed during the period of construction.
	 The first tunnel before Chowk railway station between Ch. 14+756 to Ch. 14+975 (Km 82/14-19), starts from Dandphata Village and ends in Varose Village. A quarry is under operation near the tunnel.
	 Few resorts exist in this area. Few houses were also noticed on its either sides at the exit of the Tunnel (Varose Village). This area will get impacted due to construction of additional tunnel between Dandphata and Varose. The proposed tracks near Dandphata will be at higher elevation than the average
	ground level. Hence, considerable filling/material handling will be required to raise the height and to meet the elevation difference.
	 Water pipeline was observed near the railway line at Nadhal Village. The pipeline is abandoned, as reported by the villagers nearby. The pipeline was installed to convey water from reservoir near Morbe Dam. After Varise Village, the area closer to NH-4 is covered by industries.
Chowk Station	Approach road to the Chowk Station is narrow, after crossing the RUB
at Ch. 17+240 (Km 85/9-10) and area	• Water supply pipelines, which supply water to towns/villages under Maharashtra Jeevan Pradhikaran Scheme and NMMC, are located very close to the existing tracks. Due care should be taken during the construction stage.
between Chowk and	• Level Crossing is observed enroute to Chowk Station (North) and Morbe Dam.
Karjat Stations	• The shortest distance between the existing track and Morbe Dam embankment is approximately 374 m. Morbe Dam is the main source of water supply to NMMC area and many other towns/villages.
	• Towards the Northern side of the existing station / track, the habitation is located very close to the station. Few houses of Chowk Village will get impacted due to the proposed alignment.
	 A tribal colony is located near Morbe Dam. After Morbe Dam, from Wavarle Village the tunnel starts at Km 90/12 and ends at Km 93/7 in Halivali Village.
	• Habitation of Wavarle Village is located very close to the existing tunnel. The new tunnel will affect the houses of Wavarle Village located on the northern side of the existing tunnel. Some weekend homes are located on the southern side of the existing tunnel.
	 The approach road near the entrance of Wavarle Tunnel is narrow. Hence, transportation of goods/material and tunneling equipment may become a problem during construction stage.
	• The habitation of Halivali Village is located at a distance of 0.5 km from the end point of Wavarle Tunnel, on southern side of the proposed track. Similarly, habitation of Kirawali village is located on the northern side of the proposed track, at distance of 0.6 km from the tunnel end point. Hence, these habitations will be
	 After end of the Wavarle Tunnel, the habitations of Halivali, Kirawali, Bamnoli and Deulwadi villages are located very close to the proposed tracks. A similar scenario is observed in Kariat Municipal Council area too.
Karjat Station	• Karjat Station is surrounded by dense habitation of Karjat Municipal Council.
at Ch.27+930	Eastern side of the station area is denser as compared to the western side.
(R111 99/28-30) and	 Access to the Karjat Station is also narrow on both East and West sides. Kariat Station area has mixed landuse
surroundings	Ulhas River flows very close to the Karjat Station area.

In addition to the station area and surroundings in Panvel-Karjat Road Stretch, the field visit to all the major bridges, few minor bridges, existing ROB, RUB and level crossings were conducted to

understand the environmental impacts, constraints during construction and finalisation of the sampling locations. The some of the important features are presented below in photographs.



Chikhale Railway Station

WTP near Bhokarpada village







RUB at Bhingar Village

Matheran Forest Area and Farm Land

4.2 Mapping of Site Sensitivities and Preparation of Strip Maps

Strip mapping is being carried out as part of the EA study with an objective to incorporate physical, social and natural environment data in a spatial format. This includes plotting the physical features, natural features, and sensitive receptors within the ROW and the Direct Impact Zone. Strip maps are prepared for the entire stretch of the proposed alignments on Panvel-Karjat, stretch.

Strip mapping indicating environmental features along the stretch up to 200 m on either side of the proposed railway boundary is carried out to assess the impact on existing environmental features/resources/utilities in the immediate vicinity. The strip maps are a series of maps with the same scale. A set of maps containing existing tracks, proposed alignment, demarcated Direct Impact Zone, proposed MUTP-III project activities along with the sensitive receptors are prepared as part of strip mapping exercise. The strip size is decided based on the width of the stretch of the study area and the shape of the alignment. In general, the linear stretch of the proposed alignment is divided into strips with grid size of 1 km x 0.7 km. Some geographic overlap between adjacent maps is considered as shown in *Figure 7.*

The percentage of the overlap area depends on the shape of the alignment and the Direct Impact Zone. To cover the full study area the percentage of overlap is considered as 10% or 20% in Panvel-Karjat stretch.



Figure 7: Grid Size for Strip Map

Thematic maps showing sensitive receptors, sensitive ecological zones, archaeological monuments, natural disaster and general landuse-landcover is prepared to present a complete scenario of the baseline environmental conditions in the study area. In addition to detailed strip mapping within the



Direct Impact Zone, mapping of the sensitive receptors is done for the project influence area of 5 km stretch on either side of the proposed alignments.

The list of features marked is shown in *Table 4* below; this list is further populated with any site-specific receptors during the detailed ground-truthing work.

Sensitive Receptors	Physical Features
Habitations / Settlements – types incl	Proposed Alignment
Slume urban rural etc	National and state highways, district and
- Horitago Structuros	villago roade
Crowowards / cromotion ground	
Graveyards / cremation ground	• Turiner(S)
Schools / Anganwadi / Homestead /	Bridges (major / minor)
Colleges	• Culverts
 Hospitals / Health Centres 	 Dams / Bandharas/Reservoirs
 Public services 	 MIDC industrial area / other industries /
 Grain / Cement Storage yards 	Power Plant
 Church / Temples / Mosques / Road-side 	 Water Treatment Plant / Water Supply
Shrines – Permanent as well as semi-	Pipelines
permanent structures	Railway Over Bridges (ROB)
Water bodies – river / creek / canal /	Railway Under Bridges (RUB)
ponds	Foot Over bridges (FOB)
Salt pans	• Level Crossings
• Aqua farms	Platforms
Protected Ecrests / Pesenved Ecrests /	• Itility Lines – Dower water sowage
• Flotected Folesis / Reserved Folesis /	• Other ninglings, etc.
Social Folestry aleas	other pipelines, etc.
Gauchar Land / grazing lands	• Low Lying / water logging areas
• Plantations (chickoo, coconut, etc.) /	Railway Siding
Large Trees	 Railway ROW or the Railway Land
 Sand mining / river dredging areas/Stone 	boundary
quarries	Construction Areas (presently, bridges under construction, etc.)

Table 4: List of Features for Strip Mapping

Mapping of the sensitive receptors for the project influence area of 5 km stretch on either side of the proposed alignments for all the Panvel-Karjat stretch is presented in **Annexure 2**.

Two phase methodology was adopted for preparation of strip maps.

Phase -1: Identification of sensitive receptors based on secondary information

The sensitive receptors were identified through various types of secondary information available in public domain. The base of landuse-landcover map was analyzed to understand the general landuse pattern of the area. In addition, the mapping of few of the sensitive receptors like schools, colleges, police stations, post offices, petrol pumps, fire stations and other public services, church/temples/mosques/road-side shrines, water bodies, sand mining/river dredging areas/stone quarries, aqua farms, salt pans and heritage structures was done through secondary information. This information was verified on ground through detailed field survey. In addition, the information collected through detailed site reconnaissance survey was added as additional information. The physical features like major bridges, minor bridges, culverts, ROBs, RUBs, level crossings and tunnels were mapped based on the information provided by MRVC. Similarly, the identification of sensitive receptors in the project influence area has been carried out based on desktop research.

Phase-2: Detailed Field Survey for verification of the sensitive receptors

A detailed survey was conducted in the Direct Impact Zone to verify the sensitive receptors and physical features, which were identified through secondary information. Additional sensitive receptors



and physical features were mapped by walking along the proposed alignment and area within the Direct Impact Zone. Some of the sensitive receptors in the project influence area were verified on ground during the detailed field survey.

For identification of sensitive receptors and demarcation of the physical features, Global Positioning System (GPS) devices were utilized. In addition, the GPS survey was conducted to confirm the use of each of the building units/complexes. i.e. residential, commercial, industrial and institutional. Through ground truthing, all the sensitive receptors, physical features and building uses was verified. Photographs of each type of sensitive receptor and land use category were also collected. Additionally, this survey also has helped in collecting the geographical coordinates of the villages falling on the alignment and their special features such as agricultural land and settlements.

All the GPS based information, landuse-landcover maps, administrative boundaries, existing railway tracks, road connectivity and other physical features of MUTP-III projects have been converted into Geographical Information System (GIS) platform for preparation of the strip maps.

The analysis of the strip map has been used as a tool for identification of environmental impacts of the study area.

The Strip maps for Panvel-Karjat stretch are presented in Annexure 3.

4.3 Landuse

Land use of the Study area has been analyzed based on satellite data interpretation and on-ground verification during field surveys. The study area includes both; urban and rural area which has changed over a period of time. Hence, change in land use pattern over the period of 2005-06 to 2011-12 is studied in detail. Data from IRS P6, Linear Imaging Self Scanning Sensor (LISS III) is available¹² for Kharif (Aug –Nov), Rabi (Jan- Mar) and Zaid (April- May) seasons which were used to derive information on the spatial and temporal variability of different land use / land cover categories.

Key observation of Panvel-Karjat stretch from the land use / land cover analysis is described as follows:

- There is not much change in the landuse from 2005-06 and 2011-12 except the increase in the spread of the urban area.
- Major Landuse is Panvel-Karjat area is Agriculture–Crop land.
- Built up area is very sparse in the study area. Major urban built up area is concentrated at Panvel and Karjat and small rural settlements are seen all along the track.
- Hilly forest area is seen between Mohope and Karjat which is Matheran Eco-sensitive zone
- Another major landuse is waste/scrub land, mainly near Mohope, Chowk and Karjat stations.
- Kalundre River is the only major water body crossing the alignment at Panvel. Minor streams of Kirki river and Ulhas river are crossing the alignment in Sangade village and Karjat respectively.

The Landuse maps for Panvel-Karjat stretch is presented in Annexure 4.

4.4 Ecology and Biodiversity

Biodiversity is defined as species, genetic, and ecosystem diversity in an area, sometimes including associated abiotic components such as landscape features, drainage systems, and climate (*Swingland*, 2000).

¹² Source: <u>http://bhuvan.nrsc.gov.in/</u>



In last few years, rate of species loss has increased drastically. Depletion of biodiversity is mainly due to intense anthropogenic pressure owing to "Population Explosion" mainly for expansion of agriculture, over exploitation of forests for day to day needs, over grazing and illicit felling, shifting cultivation, development activities like, irrigation, construction of hydro-electric dams, road construction including mining activities- all leading to dysgenic selection. This indicates that assessing biodiversity is a must for MUTP-III project.

Aspects related to ecology and biodiversity that must be given High Priority for Conservation during MUTP-III Project are as follows:

- Support endemic, rare, declining habitats/species/genotypes
- Support genotypes and species whose presence is a prerequisite for the persistence of other species
- The activities related to project which may act as a buffer, linking habitat or ecological corridor, or play an important part in maintaining environmental quality
- Support habitats, species populations, ecosystems that are vulnerable, threatened throughout their range and slow to recover
- Support particularly large or continuous areas of previously undisturbed habitat
- The activities related to project which may act as refuge for biodiversity during climate change, enabling persistence and continuation of evolutionary processes
- Support biodiversity for which mitigation is difficult or its effectiveness unproven including habitats that take a long time to develop characteristic biodiversity, the areas which are currently poor in biodiversity but have potential to develop high biodiversity with appropriate Intervention

The major ecology prevailing in the study area is as follows:

1. Forest ecosystem:

Semi-evergreen Forest:

Semi-evergreen forests are found in the Western Ghats, Andaman and Nicobar Islands, and the Eastern Himalayas. Such forests have a mixture of the wet evergreen trees and the moist deciduous trees. The forest is dense and is filled with a large variety of trees of both types.

The proposed alignment is passing through the Matheran Forest at 4 locations between Ch. 8+100 to 8+900, 11+650 to 14+150, 14+700 to 15+100 and 22+950 to 25+900.

Objective:

The main objective of ecology & biodiversity study for MUTP-III project is to establish the baseline terrestrial & aquatic biodiversity status in the Project Influenced Area to evaluate the prevailing ecological conditions & to identify, quantify the impacts associated with the project related activities on the prevailing ecology & to mitigate the same. Overall, the objectives of study are as follows:

- To make an inventory/checklist of plants & fauna found in the study area
- To analyze the status of flora and fauna within Direct Impact Zone and Area of Influence
- To assess impacts of the proposed alignments in Panvel-Karjat stretch on flora and fauna

Reconnaissance survey was conducted in Panvel-Karjat stretch to study the flora and fauna present in the study area. The details of the flora and fauna of the study area are given in the following sections.

Details of the different habitat types in this region, based on Google Earth, have been provided in





Annexure 5.

4.4.1 Terrestrial Flora

The terrestrial flora in area of influence is a mixed ecosystem of tree covered, urban built-up and marshy land covered. Baseline studies have been carried out on vegetation with reference to and distribution of the species in the study areas. To select the locations, firstly, major habitat types were observed (i.e., wetlands, ponds, riverside, semi-dried streams, natural flora growths, rocky outcrops, open scrubs); in addition, disturbed sites were also observed. In these locations, accessibility was checked for, and in areas easily accessible the strip mapping exercise was carried out along the proposed alignment in which detailed tree census were studied which will directly be impacted by the proposed alignment. Also, the vegetation stature observed in the area of influence mostly comprises of native flora. List of Terrestrial Flora prevailing in Panvel-Karjat Stretch is presented as **Table 5**.

Sr.No.	Botanical Name	Family	Common Name	Native/Exotic
Trees				
1	Acacia auriculiformis	Mimosaceae	Australian acacia	E
2	Acacia catechu	Mimosaceae	Khair	N
3	Acacia nilotica	Mimosaceae	Babool	N
4	Aegle marmelos	Rutaceae	Bel	N
5	Albizia lebbek	Mimosaceae	Siris	N
6	Annona reticulata	Annonaceae	Ramphal	E
7	Annona squamosa	Annonaceae	Sitaphal	N
8	Areca catechu	Arecaceae	Supari	N
9	Artocarpus altilis	Moraceae	Vilayati Pahanas	E
10	Artocarpus heterophyllus	Moraceae	Phanas	N
11	Azadirachta indica	Meliaceae	Neem	N
12	Barringtonia acutangula	Leythidaceae	Datriphal	N
13	Bauhinia purpurea	Fabaceae	Kanchan	E
14	Bauhinia racemosa	Fabaceae	Apta	N
15	Bombax ceiba	Bombaceae	Kaante Savar	N
16	Butea monosperma	Fabaceae	Palas	N
17	Capparis decidua	Capparaceae	Nepati	N
18	Catunaregam spinosa	Rubiaceae	Ghela	N
19	Carica papaya	Caricaceae	Papaya	E
20	Caryota urens	Arecaceae	Fish tail palm	N
21	Cassia fistula	Fabaceae	Bahava/ amaltaas	N
22	Casuarina equisetifolia	Casuarinaceae	Suru	N
23	Cocos nucifera	Arecaceae	Naral	Un
24	Cordia dichotoma	Boraginaceae	Shelu	N
25	Delonix regia	Fabaceae	Gulmohar	E
26	Erythrina variegata	Fabaceae	Pangara	N
27	Eucalyptus globulus	Myrtaceae	Nilgiri	E
28	Ficus benghalensis	Moraceae	Vad	N
29	Ficus elastica	Moraceae	Indian rubber tree	N
30	Ficus hispida	Moraceae	Bokeda	N
31	Ficus racemosa	Moraceae	Umber	N
32	Ficus religiosa	Moraceae	Pimple	N
33	Helicteres isora	Sterculiaceae	Murud sheng	N
34	Holarrhena pubescens	Apocynaceae	pandra kuda	N
35	Holoptelea integrifolia	Ulmaceae	Vavla	E
36	Lagerstroemia speciosa	Lythraceae	Taman	N
Sr.No.	Botanical Name	Family	Common Name	Native/Exotic

Table 5: List of Terrestrial Flora prevailing in Panvel-Karjat Stretch





37	l eucaena leucocephala	Fabaceae	Subabul	F
38	Madhuca indica	Sapotaceae	Mahua	N
39	Mangifera indica	Arecaceae	Amba	N
40	Manilkara zapota	Sapotaceae	Chikoo	E
41	Melia azaridach	Meliacea	Bakan neem	N
42	Michelia champaca	Magnoliaceae	Son chafa	N
43	Morus alba	Moraceae	Tuti	N
44	Morinda pubescens	Rubiaceae	Dhaula	N
45	Moringa oleifera	Moringaceae	Shevga	N
46	Neolamarckia cadamba	Rubiaceae	Kadam	N
47	Nerium oleander	Apocynaceae	Kaner	E
48	Oroxylum indicum	Bignoniaceae	Tetu	N
49	Parkia biglandulosa	Mimosaceae	Chenduphul	E
50	Parkinsonia aculeata	Fabaceae	Vilaiti-kikkar	E
51	Peltophorum pterocarpum	Fabaceae	Tambadsheng	N
52	Phoenix sylvestris	Arecaceae	Khaiur	Ν
53	Pithecellobium dulce	Mimosaceae	Veelavati Chinch	E
54	Plumeria alba	Apocynaceae	Dev Champa	Е
55	Polvalthia longifolia	Annonaceae	Aasuphal	N
56	Pongamia pinnata	Fabaceae	Karanj	Ν
57	Prosopis cineraria	Fabaceae	Shami	Ν
58	Psidium guajava	Myrtaceae	Peru	Е
59	Pterospermum acerifolium	Sterculiaceae	Muchkund	N
60	Sterculia guttata	Sterculiaceae	Kukar	Ν
61	Ricinus communis	Euphorbiaceae	Erandel	Ν
62	Roystonea regia	Arecaceae	Royal palm	E
63	Samanea saman	Fabaceae	Rain tree	E
64	Schleichera oleosa	Sapindaceae	Kusum	Ν
65	Spathodea campanulata	Bignoniaceae	Pichkari	E
66	Sterculia urens	Sterculiaceae	Bhutya	Ν
67	Syzygium cumini	Myrtaceae	Jamun	Ν
68	Tabernaemontana alternifolia	Apocynaceae	Nag kuda	Ν
69	Tabernaemontana divaricata	Apocynaceae	Ananta	Ν
70	Tamarindus indica	Fabaceae	Imli	E-N
71	Terminalia catappa	Combretaceae	Deshi Badam	Ν
72	Terminalia crenulate	Combretaceae	Ain	Ν
73	Terminalia bellerica	Combretaceae	Baheda	Ν
74	Tectona grandis	Verbenaceae	Sagwan	Ν
75	Terminalia arjuna	Combretaceae	Arjun	Ν
76	Terminalia tomentosa	Combretaceae	Ain	N
77	Thespesia lampas	Malvaceae	Ban Kapas	N
78	Thespesia populnea	Malvaceae	Gajadanda	N
79	Thevetia peruviana	Apocynaceae	Pila Kaner	E
80	Wrightia tinctoria	Apocynacee	Kala kuda	N
81	Xylia xylocarpa	Mimosaceae	Jambha	N
82	Ziziphus mauritiana	Rhamnaceae	Ber	Ν
Shrubs				
1	Abrus precatorius	Fabaceae	Gunj	Ν
2	Abutilon indicum	Malvaceae	Mudra	N
3	Argemone mexicana	Papaveraceae	Firangi Dhotra	E
4	Azanza lampas	Malvaceae	Raan Bhindi	N
5	Calliandra haematocephala	Fabaceae	Powder puff	E
6	Calotropis gigantea	Asclepiadaceae	Rui	N
Sr.No.	Botanical Name	Family	Common Name	Native/Exotic



7	Canna indica	Cannaceae	Kardal/ Indian shot	E
8	Clerodendrum inerme	Verbenaceae	Vaniai	N
9	Datura metel	Solanaceae	Dhatura	N
10	Euphorbia antiquorum	Euphorbiaceae	Narasva	Е
11	Hibiscus rosa-sinensis	Malvaceae	Jaswand	N
12	Ipomea carnea	Convolvulaceae	Besharam	E
13	Ixora coccinea	Rubiaceae	Bakora	N
14	Jasminum malabaricum	Oleaceae	Ban Mogra	Ν
15	Jasminum sambac	Oleaceae	Mogra	N
16	Justicia adhatoda	Acanthaceae	Adulsa	N
17	Lantana camara	Verbenaceae	Ghaneri	E
18	Lawsonia inermis	Lythraceae	Henna	N
19	Leea macrophylla	Leaceae	Hathikana	N
20	Parthenium hysterophorus	Astaraceae	Congress grass	E
21	Sida acuta	Malvaceae	Chikna	N
22	Urena lobata	Malvaceae	Van bhendi	E
23	Vitex negundo	Verbenaceae	Nirgundi	N
Climbe	rs			
1	Bougainvillea spectabilis	Nyctaginaceae	Bogainvel	E
2	Clerodendrum thomsoniae	Verbenaceae	Bleeding heart	E
3	Cuscuta reflexa	Convolvulaceae	Amar vail	N
4	Ipomoea hederifolia	Convolvulaceae	Lal pungli	E
5	Ipomoea obscura	Convolvulaceae	Bokadi	E
6	Mucuna pruiens	Fabaceae	Khaj Khuiri	N
Herbs			-	
1	Abelmoschus esculentus	Malvaceae	Bhendi	Un
2	Abelmoschus moschatus	Maivaceae	Ranbhendi	N
3	Acmelia paniculata	Asteraceae	Akal kara Driekh Ameropth	
4	Amaranthus spinosus	Scrophyloroicoco	Prickly Amaranth Brobmi	E
5	Bacopa mornien Bacopa mornien	Nyotoginaaaaa	Didiiiii	
7	Blumea oxyodonta	Asteraceae	Burondo	N
8		Ameranthaceae	Kombda	N
9	Chromolaena odorata	Compositae	Ritter hush	N
10	Cleome viscosa	Cleomaceae	Pivala tilavan	N
11	Colocasia esculenta	Araceae	Taro Arvi	P-N
12	Crotalaria filipes	Fabaceae	Fatfati	Un
13	Cynodon dactylon	Poaceae	Dhurva	E-N
14	Cyperus alternifolius	Cyperaceae	Umbrella palm	E
15	Cyperus eragrostis	Cyperaceae	Nut grass	E
16	Datura stramonium	Solanaceae	Dhatura	N
17	Dendrocalamus gigantenus	Poaceae	Bamboo	N
18	Dolichos biflorus	Fabaceae	Horsegram	N
19	Euphorbia hirta	Euphorbiaceae	Dudhi	P-N
20	Haplanthodes verticillatus	Acanthaceae	Jhankara	N
21	Ipomoea aquatica	Convolvulaceae	Kalmi saag	N
22	Mimosa pudica	Mimosaceae	Lazalu	E
23	Ocimum basilicum	Lamiaceae	Ram Tulsi	P-N
24	Ocimum tenuiflorum	Lamiaceae	Holly Basil	N
25	Persicaria glabra	Polygonaceae	Shiral	E
26	Physalis minima	Solanaceae	Ran popti	E
27	Portulaca oleracea	Portulacaceae	Ghol	Un
28	Scoparia dulcis	Scrophulariaceae	Meethi Patti	E
29	Tridax procumbens	Compositae	Coat button	E
Sr.No.	Botanical Name	Family	Common Name	Native/Exotic



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30	Typha angustata	Typhaceae	Cattails	E
31	Xanthium strumarium	Asteraceae	Ghagare	E
1.11.		Taxa		

Hb - Herb, Cl- Climber, Sh -Shrub, Tr – Tree

Photographic representing of the Flora observed in the study area is shown below:



4.4.2 Tree Cutting

MRVC has identified 1814 trees which will be cut for construction of the proposed alignment in Panvel-Karjat stretch. The major trees which will be impacted in Panvel-Karjat stretch are mainly Neem, Umber, Mango, Subabhul, Jambhul, Agasti, Savri, Banyan tree and Ashoka. MRVC had conducted a detailed survey for identification of the tress which will be removed due to the proposed new alignment. Chainagewise tree survey details are attached as *Annexure 6.*

4.4.3 Terrestrial Fauna

The catchment area of proposed project was divided as per landuse for conducting the study related to Avian Fauna. Survey was carried out by visual encountering as well as searching for indirectly evidences. Birds were recognized by their unique songs and calls. Notable behaviours of the bird such as feeding, nesting, or breeding and the associated habitats were also observed and accordingly the records were made. The bird species were observed during the survey in each habitat type all through the day & list of birds sighted were reported (Procedure as per Rosenstock et al 2002; Ruiz-Jaen and Aide, 2005). Chance sightings during regular monitoring were also noted in Direct Impact Zone and Area of Influence for avian fauna, mammals, Reptilian and Lepidopterian. Signs such as



scat, feeding signs, pug marks, burrows and dens were looked for presence of mammals. For proper accuracy, the burrows and dens were checked if they are active or abandoned. Based on the landuse of the study area, the main habitats for avian fauna are tree-covered & urban built-up area.

List of the Terrestrial Fauna prevailing in Panvel-Karjat Stretch is presented as Table 6.

Sr No.	Scientific Name	Common Name	Schedule
AVIAN fa	una		
1	Turdoides striatus	Jungle Babbler	IV
2	Pycnonotus cafer	Red Vented Bulbul	IV
3	Pycnonotus jocosus	Red Whiskered Bulbul	IV
4	Merops orientalis	Small Green Bee Eater	
5	Halcyon smyrnensis	White-throated Kingfisher	IV
6	Streptopelia chinensis	Spotted Dove	IV
7	Columba livia	Blue Rock Pigeon	
8	Alcedo atthis	Small Blue Kingfisher	IV
9	Vanellus indicus	Red-wattled Lapwing	IV
10	Bubulcus ibis	Cattle Egret	IV
11	Egretta garzetta	Little Egret	IV
12	Ardeola grayii	Indian Pond Heron	
13	Nycticorax nycticorax	Black-crowned Night-Heron	
14	Dicrurus macrocercus	Black Drongo	IV
15	Corvus splendens	House Crow	
16	Corvus macrorhynchos	Jungle Crow	
17	Acridotheres tristis	Common Myna	IV
18	Sturnus pagodarum	Brahminy starling	IV
19	Saxicola caprata	Pied Bushchat	
20	Ammomanes phoenicura	Rufous-tailed lark	IV
21	Phalacrocorax niger	Little Cormorant	IV
22	Saxicoloides fulicata	Indian Robin	
23	Copsychus saularis	Oriental Magpie-Robin	
24	Psittacula krameri	Rose-ringed Parakeet	IV
25	Milvus migrans	Black Kite	
26	Centropus sinensis	Greater Coucal	
27	Passer domesticus	House sparrow	
28	Amaurornis phoenicurus	White-breasted Waterhen	IV
29	Porphyrio poliocephalus [#]	Grey-headed Swamphen	IV
30	Mycteria leucophala	Painted Stork	IV
31	Anastomus oscitans	Asian Openbill-Stork	IV
32	Pseudibis papillosa	Red-naped ibis	IV
33	Plegadis falcinellus	Glossy ibis	IV

Table 6: List of Terrestrial Fauna prevailing in Panvel-Karjat Stretch





Sr No.	Scientific Name	Common Name	Schedule
34	Merops orientalis	Green bea eater	
35	Athene brama	Spotted owlet	
36	Rhipidura albicollis	White throated fantail	
37	Prinia socialis	Ashy prinia	
38	Zosterops palpebrosus	Oriental white eye	
39	Amandava amandava	Red avadavat	
40	Elanus caeruleus	Black winged kite	
41	Accipiter badius	shikra	
MAMMAL	S		
1	Funambulus palmarum	Indian Palm Squirrel	
REPTILE	S		
1	Eutropis carinata	Brahminy skink	
2	Calotes rouxii	Forest calotes	
3	Calotes versicolor	Oriental garden lizard	
4	Bungarus caeruleus	Common Krait	IV
5	Xenochrophis piscator	Chekered Keelback	II
6	Ahaetulla nasuta	Vine snake	
7	Lycodon aulicus	Wolf snake	
8	Echis carinatus	Saw scaled viper	IV
9	Daboia russelii	Russel's viper	II
LEPIDOP	TERIAN		
1	Danaus genutia	Common Tiger	
2	Moduza procris	Commandor	
3	Euchrysops cnejus	Gram blue	
4	Eurema hecabe	Common grass yellow	
5	Danaus chrysippus	Plain Tiger	
6	Catopsilia pomona	Common Emigrant	
7	Euploea core	Common Indian Crow	

4.4.4 Aquatic Fauna

Aquatic ecosystems provide home to many species including phyto-planktons, zooplanktons, aquatic plants, insects, molluscs, *etc.* They are organized at many levels from smallest building blocks of life to complete ecosystems, encompassing communities, populations, species and genetic levels. All aquatic ecosystems are generally colonized by the representatives of Arthropoda and Mollusca. Benthic invertebrates occupy the bottom of the water body. The functional role of benthic communities in the trophic dynamics of river ecosystem is well acknowledged. The composition and distribution of benthic organisms over a period of time provide index of an ecosystem.

Pisci fauna

Information about the local fishes was collected through consultation with the local fishermen. Fish occurrence was determined by collecting samples using different fishing gears like cast net, scoop net, hand net, hook-line, pot and open local devices methods. Also, visual observations in different



habitats were made. Fishes were identified upto the species level following Jayaram (1981), Menon (1987) and Talwar and Jhingran (1997). IUCN Red Data list (2006) was used to assess threatened, endangered and vulnerable species in the study area.

List of the Aquatic Fauna prevailing in Panvel-Karjat Stretch is presented as Table 7.

Sr.No	Family	Scientific Name
1	Cyprinidae	Labeo rohita
2		Catla catla
3		Cyprinus carpio carpio
4		Puntius sarana orphoides
5		Puntius sophore
6		Cirrhina mrigala
7		Amblypharyngodon mola
8		Tor tor *
9	Claridae	Clarius batrachus
10	Siluridae	Ompok bimaculatus *
11		Wallago attu*
12	Mastacembelidae	Mastacembelus armatus
13		Channa punctata
14	Channidae	Notopterus chitala
15		Dussumieria elopsoides
16	Notopteridae	Sardinella longiceps
17	Clupeidae	Stolephorus indicus
18		Hilsa kelee
19		Johnius dussumieri
20		Rastrelliger kanagurta
21	Sciaenidae	Katsuwonus pelamis
22	Scombridae	Glossogobius giuris
23	Gobiidae	Periophthalmodon schlosseri
24	Stromateidae	Pampus argenteus

Table 7: List of Aquatic Fauna prevailing in Panvel-Karjat Stretch

Source: Department of Fisheries, Thane

Some of the flora and fauna prevailing area is presented below in photographs.







Snake in the waterbody near Matheran ESZ

4.4.5 Result and Discussion

In the Direct Impact Zone and Area of Influence, there are forest patches on either side. The alignment is passing through Matheran Eco-sensitive zone which is semi evergreen as well as semi deciduas type of forests, due to which variety of floral and faunal species were observed in the vicinity. About 82 species of trees, 23 species of Shrubs, 31 species of herbs and 6 species of climbers were reported in the region. Floral species such as *Acacia auriculiformis, Acmella paniculata, Bacopa monnieri, Bauhinia purpurea, Caryota urens, Colocasia esculenta, Cyperus alternifolius, Delonix regia, Erythrina variegata, Mimosa pudiac, Nerium oleander, Pongamia pinnata, Persicaria glabra, Holarrhena pubescens are assessed as Least Concern ver 3.1 Wrightia tinctoria as Lower Risk/least concern ver 2.3 & Mangifera indica as Data Deficient ver 2.3. Similarly, none of the floral species belongs to NT, VU, EN, Cr, EW, EX categories as defined by the IUCN. Three of the fish species were classified as Near Threatened as per IUCN (Ver 3.1). The area is rich in floral diversity.*

Avifauna studies reported 41 species of avi-fauna, 1 species of mammals, 9 species of reptiles and 7 species of butterflies were observed in the region. The species were checked for their conservation status according to Wildlife protection Act, 1972. No bird species belonging to Schedule I, II or III were observed in the area; reptilian species such as Checkered Kellback and Russel's viper belonging to Schedule II were observed in the study area. The region is fairly rich in faunal diversity. Three of the fish species were classified as Near Threatened as per IUCN (Ver 3.1).

4.5 Matheran Eco-sensitive Zone

Matheran is a hill station nestled in the interiors of Western Ghats in Maharashtra, which have been declared as an Eco Sensitive zone by the MoEF. MoEF issued notification dated February 4, 2003, (amended on January 16, 2004) declared total area of 251.56 sq.km as Matheran Eco-Sensitive zone, sanctioned in Regional Plan for Mumbai Metropolitan Region, 1996-2011.

Matheran and its surroundings declared as the Eco-Sensitive Zone (ESZ) cover the hill range from Matheran in South to Malangad in the North and the surrounding plain land at Neral, Vangani, Badlapur, Ambernath, Panvel, Khalapur and Karjat. It also includes the Prabhal Fort, Peb Fort and Chanderi Fort and area of the Matheran Hill Station Municipal Council.

The distribution of Eco-Sensitive zone comprises of forestlands, agricultural lands and tribal areas¹³. Where,

¹³Source:http://mahenvis.nic.in/pdf/Newsletter/nletter_Matheran%20Ecologically%20Sensitive%20Hill%20Station%20of%20Ma harashtra.pdf



Matheran Municipal Area= 7.2 sq. km.Forest Zone area= 207.51 sq. km.Green Zone 1 area= 11.91 sq. km.Green Zone 2 area= 21.88 sq. km.

Quarry Zone area = 0.02 sq. km.

Around 4.9077 Ha of Forest land is to be diverted for the proposed project, which is 0.019 % of total area of Matheran ESZ. Around 40 Ha (0.4 sq. km.) of area of Matheran ESZ is falling under Direct Influence Zone (200 m from the proposed boundary) of the Project Area.

Map of Proposed Rail Stretch along with Matheran ESZ is presented as Annexure 7.

Map of Matheran Eco Sensitive Zone declared by MoEF notification is presented in Annexure 8.

Permissible developmental activities in Matheran Eco-Sensitive Zone (ESZ)

The said notification also provides Permissible developmental activities in Matheran ESZ as tabulated in **Table 8.**

Table 8: Permissible Developmental Activities in Matheran Eco-Sensitive Zone (ESZ)

Zones	Permissible developmental activities in Matheran ESZ
FOREST ZONE	When any land is situated outside Reserve Forest, Protected Forest, Acquired Forest or Forests as defined as per the Supreme Court's Order dated 12th December 1996, the development of such land shall be regulated in accordance with the provisions for Green Zone 2.
GREEN ZONE 2	 Dwelling Units for the bona fide use of the holder as per Revenue Department records of any cultivated land, held exclusively for the purpose of agricultural activities. Horticulture, floriculture, and, agricultural and allied activities of rice and poha mill, poultry farms, cattle stables, piggeries and sheep farms. Religious places, crematorium and cemetery. Schools, pre primary school and health centre. Clinics and dispensaries. Roads and bridges, railways, underground pipelines and cables, electricity
	transmission lines, communication towers, small check dams for watershed management, ropeways etc. The minimum plot size shall be 0.4 ha.
GREEN ZONE 1	 Dwelling Units for the bona fide use of the holder as per Revenue Department records of any cultivated land, held exclusively for the purpose of agricultural activities. Holiday resort and holiday homes. Educational, medical, social, cultural and religious institutions along with residential quarters and shops for the staff on plots not be less than 2.5 ha. Schools, pre primary school and health centre. Clinics, dispensaries and health centres. Storage of LPG cylinders. Horticulture, floriculture, and, agricultural and allied activities of rice and poha mill, poultry farms, cattle stables, piggeries and sheep farms. Religious places, crematorium and cemetery. Parks, gardens, play fields, camping grounds with public conveniences. Roads and bridges, railways, underground pipelines and cables, electricity transmission lines, communication towers, small check dams for watershed management The minimum plot size shall be 0.4 ha.



Zones	Permissible developmental activities in Matheran ESZ
URBANISABLE ZONE 2	 Dwelling Units for the bona fide use of the holder as per Revenue Department records of any cultivated land, held exclusively for the purpose of agricultural activities. Non-polluting scientific institutions Schools, pre primary school and health centre Clinics, dispensaries and health centres With the prior approval of the Monitoring Committee, hotels, tourists resorts, holiday homes, motels and club houses Houses for residential purposes only Parks, gardens, play fields and camping grounds with public conveniences Religious places, crematorium and cemetery. Horticulture, floriculture, and, agricultural and allied activities of rice and poha mill, poultry farms, cattle stables, piggeries and sheep farms Retail shops, whole sale shops, restaurants and banks Government offices Garages, petrol pumps, automobile repair workshops With prior approval of the Monitoring Committee, public services and utility establishment of water treatment plant, sewage treatment plant, solid waste treatment and disposal facilities electricity substation, gas works, fire brigade, police station, telephone exchange, bus shelters, terminals and depots Roads and bridges, railways, underground pipelines and cables, electricity transmission lines, communication towers, small check dams for watershed management The minimum plot size for item (b) to (f) of paragraph 4.1 shall be 2,000 sq. m
URBANISABLE ZONE 1	In preparing the sub Zonal Master Plan for Matheran Municipal Council area the recommendations of the report titled Matheran: A Comprehensive Heritage Listing Proposal commissioned by the Mumbai Metropolitan Region Heritage Conservation Society shall be taken into account.
	The development of lands within the Urbanisable Zone 1 of Neral and Wangani falling outside the area under the Layout prepared as a part of the final Regional Plan 1973 shall be regulated in accordance with the provisions for Green Zone 1.

The proposed rail alignment passes through Green Zone and Forest Zone. Existing and proposed railway line passes through small patches of forest and boundary of Matheran Eco-Sensitive Zone at Village Barwahi, Bherle Mohope, Bhingarwada, Lodhivali, Haliwali & Wavarle.

The proposed alignment is passing through the Matheran Eco-Sensitive zone at 4 locations between Chainage point 8+100 to 8+900, 11+650 to 14+150, 14+700 to 15+100 and 23+950 to 25+900. The details of proposed alignment passing through various zones of Matheran ESZ are presented in **Table 9**.

Particulars of proposed alignment passing through Matheran ESZ		Length of alignment passing through various zones of Matheran ESZ	
Chainage	Length of alignment	Forest Zone	Green Zone
8+100 to 8+900	800 m	250 m (between 8+ 100 to 8+300, 8+550 to 8+600)	550 m
11+650 to 14+150	2500 m	1825 m (between 12+000 to 13+150 & 13+225 to 13+900)	400 m



14+700 to 15+100	400 m	NA	400 m
22+950 to 25+900	2950 m	250 m (between 24+400 to 25+650)	1050 m
Total length of alignment	6650 m	2325 m	2400 m

From above **Table 9**, it can be inferred that total length of alignment which is passing through Matheran ESZ is 6650 m, out of which 2325m is passing through Forest zone out of which 2200 m will be in Wavarle tunnel (T2). Remaining 2400 m is Green Zone 1& 2 where railway projects are permitted. Entry point of Wavarle Tunnel T2 is located outside Matheran ESZ at 22+900 and exit point is inside Matheran ESZ at 25+500. Nadhal Tunnel (T1) and Kirawali tunnel (T3) in Green zone outside of Matheran ESZ.

Secondary data such as regulatory framework, project reports, regional plans, published literature on Matheran biodiversity was also reviewed through desktop research.

A summary of literature review is included in Table 10.

Taxon	Complete Citation	Remarks
Flora	PATWARDHAN, D. A. Matheran Eco sensitive area: Time to catch a positive spirit!.	Olea dioica, Mangifera indica, Eugenia jambolana, Ficus glomerata, Heterophragma roxburghii, Bridelia retusa and Memecylon umbellatum. Predominant tree species on the slopes are Terminalia tomentosa, Lagerstroemia parviflora, Adina cordifolia, Garuga pinnata, Dillenia pentagyna, Pongamia glabra, Schleichera trijuga and Bombax malabarica
	http://mahenvis.nic.in/pdf/Newslet ter/nletter_Matheran%20- Ecologically%20Sensitive%20Hill %20Station%20of%20Maharashtr a.pdf	Anjani, Eugenia jambolana, Mangifera indicia (Mango), Ficus retusa (Banyan tree), Ficus religiosa (Peepal) and Olea dioica (Rose Sandal Wood) Cylea pelta (Mothi pahadvel), Asclepias Curassavica (Haldi) Calotropis gigantea
	PATWARDHAN, D. A. Matheran Eco sensitive area: Time to catch a positive spirit.	Ratufa indica
Mammals	http://mahenvis.nic.in/pdf/Newslet ter/nletter_Matheran%20- Ecologically%20Sensitive%20Hill %20Station%20of%20Maharashtr a.pdf	Bonnet Macaque, Barking deer, Grey Mongoose, Common Palm Civet, Rhesus Macaque Black, Common Langur, Three- striped Palm Squirrel and Indian porcupine
Avifauna	http://mahenvis.nic.in/pdf/Newslet ter/nletter_Matheran%20- Ecologically%20Sensitive%20Hill %20Station%20of%20Maharashtr a.pdf	Asian koel, Asian Palm Swift, Asian paradise– flycatcher, Black Drongo, Common pigeon, Crested hawk Eagle, Indian Blue Robin, Copper smith Barbet ,Red –breasted flycatcher, Shikra, Scaly –breasted Munia ,Indian Golden Oriole, Tyler's leaf warbler ,Jungle Myna, Crimson –backed Sunbird
Herpetofauna	http://mahenvis.nic.in/pdf/Newslet ter/nletter_Matheran%20- Ecologically%20Sensitive%20Hill %20Station%20of%20Maharashtr a.pdf	bark Gecko, Monitor Lizard, spotted Rock Gecko, Indian rock python, Decan Banded Gecko, spectacled Cobras, bamboo pit Viper

Table 10: Literature review on Matheran Biodiversity





Taxon	Complete Citation	Remarks
	Modak, N., Padhye, A., & Dahanukar, N. (2014). Delimiting the distribution range of <i>Indirana</i> <i>leithii</i> (Boulenger, 1888)(Anura: Ranixalidae), an endemic threatened anuran of the Western Ghats, based on molecular and morphological analysis. <i>Zootaxa</i> , 3796(1), 62- 80.	Indirana leithii reported (Common name: Matheran Indian frog)
Amphibian	Biju, S. D., Garg, S., Mahony, S., Wijayathilaka, N., Senevirathne, G., & Meegaskumbura, M. (2014). DNA barcoding, phylogeny and systematics of Golden-backed frogs (Hylarana, Ranidae) of the Western Ghats-Sri Lanka biodiversity hotspot, with the description of seven new species. <i>Contributions to</i> <i>Zoology</i> , 83(4).	Hylarana malabarica reported
	http://mahenvis.nic.in/pdf/Newslet ter/nletter Matheran%20- Ecologically%20Sensitive%20Hill %20Station%20of%20Maharashtr a.pdf	Common Indian Toad, Indian Bullfrog, Common Indian Tree Frog, Ramanella Montana and Skittering Frog
Lepidopteran	http://mahenvis.nic.in/pdf/Newslet ter/nletter_Matheran%20- Ecologically%20Sensitive%20Hill %20Station%20of%20Maharashtr a.pdf	Blue Mormon ,Blue oak leaf ,Chestnut ,Common Jezbel ,Vindhyan bob ,Golden angle ,Common Blue Bottle
Arachnid	Amarasinghe, T. (2012). TAPROBANICA the Journal of Asian Biodiversity.	

Based on the literature review and site reconnaissance, the major ecosystem prevailing in the study area is of Matheran ESZ is consisting of flora and fauna as presented in **Table 5**, **Table 6** and **Table 7**.

4.6 Morbe Dam and Water Supply Facilities

Morbe Dam is located on the North of the existing track near Chowk area. The proposed alignment is located between the existing track and the Morbe Dam. The shortest distance between the existing track and Morbe Dam embankment is approximately 374 m.

Morbe Dam, located on Dhavri River, tributary of river Patalganga in Karjat Taluka stands at a height of 194 ft. above sea level with surface area of around 9,780 sq km. It was constructed by MJP (Maharashtra Jeevan Pradhikaran), Government of Maharashtra in 1999, who then granted possession of Morbe dam to NMMC in November 2002. NMMC areas depends upon Morbe dam to meet its water requirements which is about 450 MLD. The silent features of Morbe dam is as follows:

Specification	Attributes
Distance from city (NMMC Jurisdiction)	31 km
Type of dam	Gravity
Impounds	Dhavari river
Height	53.40 m
Length	3,250 m





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Dam volume	18,075 x 10 ³ m ³
Total Capacity	19,089 x 10 ⁴ m ³
Surface area	978 Ha

Source: Environment Status Report of NMMC, 2015-16

Water Treatment Plant (WTP) having Capacity 450 MLD is located enroute from Mohope to Chowk Station, at Bhokarpada Village which is operated by Navi Mumbai Municipal Corporation (NMMC). The WTP is located in the Southern side of the existing railway track at Ch. 12+900 to 13+300 (Km 80/14-81/13). The treated water storage tank is located on the Northern side of the existing railway track. Raw water is sourced from Morbe Dam (which is at higher elevation). The raw water flows under gravity to the WTP (this pipeline is laid parallel to the highway). After chemical treatment/post chlorination, the treated water is pumped to the elevated storage tank in the Northern side (on the Hill) across from the railway track. The treated water is conveyed through two pipelines, one is of Maharashtra Jeevan Pradhikaran Scheme and the other one is of NMMC. The map showing locations of water supply facilities with reference to the proposed Panvel-Karjat route is presented in *Figure 8.*

The utility water lines crosses thrice through the existing alignment. First from dam side at chainage + 17463 and then flows parallel to the alignment, adjacent to the old puna highway, then connects to the WTP system and crosses alignment again at chainage + 12920 and last at chainage 12763 from where the lines moves towards Navi Mumbai for water distribution. These water pipelies at the said crossover point are protected by bridges to maintain the structural integrity of the system, 85/1 near dam , 80/4 near WTP and 80/3 (major bridge).






Figure 8: Locations of water supply facilities with reference to the proposed Panvel-Karjat route

Baseline Environmental Monitoring 4.7

Baseline environmental monitoring in a project area is important to assess prevailing quality of various environmental attributes such as air, water, noise, vibration, flora, fauna and biodiversity. It is also required in order to assess impacts of the proposed project on the environment.

To undertake baseline environmental monitoring, following approach is adopted:

- Direct Impact Zone of 200 m on either side of the proposed alignments is considered for the assessment of the baseline environmental status
- Detailed site reconnaissance was conducted to map the environmental features such as reserved forest, sanctuaries, national parks, natural habitats, rivers, lakes and ponds; physical features as habitations, religious structures, archaeological monuments, hospitals, health centers, schools, colleges, anganwadi, tunnel(s), bridges, dams, irrigation canals along with other sensitive receptors.
- Various EA and EIA studies for metro and railway projects are reviewed to understand the methodology adopted for environment monitoring.
- An extensive list of monitoring locations is prepared based on detailed site reconnaissance, which was verified by IEISL team along with key experts for its sensitivity, its surroundings and likely impacts of proposed project on the same. Based on the ground truthing, the monitoring locations were finalized.
- Monitoring of all environment parameters is being conducted by the appointed MOEF&CC approved and National Accreditation Board for Testing and Calibration Laboratories (NABL) accredited agencies.

4.7.1 **Ambient Air Quality Monitoring**

4.7.1.1 Parameters for Monitoring

Ambient Air Quality is an important parameter to assess existing level of air quality and to evaluate impacts due to proposed project activities. Ambient Air Quality is monitored in the study area for parameters:

- Suspended Particulate Matter (SPM) •
- Particulate Matter (PM2.5 and PM10) •
- Sulphur dioxide (SO₂)
- Nitrogen oxides (NOx) •
- Ammonia (NH₃)
- Carbon Monoxide (CO)
- Ozone (O₃)
- Lead, Nickel, Arsenic •

4.7.1.2 Methodology Adopted for Sampling

Residual Suspended Particulate Matter (SPM) and Particulate Matter (PM 2.5 and PM10)

Air is drawn through a size-selective inlet and through a 20.3 X 25.4 cm (8 X 10 in) filter at a flow rate, which is typically 1132 L/min. Particles with aerodynamic diameter less than the cut-point of the inlet are collected, by the filter. The mass of these particles is determined by the difference in filter weights prior to and after sampling. The concentration of PM10 in the designated size range is calculated by dividing the weight gain of the filter by the volume of air sampled.



Similarly, for particulate matter of size 2.5 is collected on 47 mm polytetrafluoroethylene (PTFE) filter over a specified sampling period. Each filter is weighed before and after sample collection to determine the net gain due to the particulate matter.

Sulphur dioxide (SO2)

Modified West & Gaeke Method (IS 5182 Part 2 Method of Measurement of Air Pollution: Sulphur dioxide).

Sulphur dioxide from air is absorbed in a solution of potassium tetrachloro-mercurate (TCM). A dichlorosulphitomercurate complex, which resists oxidation by the oxygen in the air, is formed. Once formed, this complex is stable to strong oxidants such as ozone and oxides of nitrogen and therefore, the absorber solution may be stored for some time prior to analysis. The complex is made to react with para-rosaniline and formaldehyde to form the intensely coloured pararosaniline methylsulphonic acid. The absorbance of the solution is measured by means of a suitable spectrophotometer

Nitrogen oxides (NOx)

Modified Jacobs & Hochheiser Method (IS 5182 Part 6 Methods for Measurement of Air Pollution: Oxides of nitrogen).

Ambient nitrogen dioxide (NO₂) is collected by bubbling air through a solution of sodium hydroxide and sodium arsenite. The concentration of nitrite ion (NO-2) produced during sampling is determined calorimetrically by reacting the nitrite ion with phosphoric acid, sulphanilamide, and N-(1-naphthyl)-ethylenediamine di-hydrochloride (NEDA) and measuring the absorbance of the highly coloured azo-dye at 540 n m.

Ammonia (NH3)

Indophenol method (Method 401, Air Sampling and Analysis, 3rd Edition) Ammonia in the atmosphere is collected by bubbling a measured volume of air through a dilute solution of sulphuric acid to form ammonium sulphate. The ammonium sulphate formed in the sample is analyzed colorimetrically by reaction with phenol and alkaline sodium hypochlorite to produce indophenol. The reaction is accelerated by the addition of Sodium Nitroprusside as catalyst.

Carbon Monoxide

Carbon Monoxide in ambient air is analyzed by Gas Chromatography Method as per IS 5182 (Part-X): 1999.

Ozone (O3)

Micro-amounts of ozone and the oxidants liberate iodine when absorbed in a 1% solution of potassium iodine buffered at pH 6.8 + 0.2. The iodine is determined spectrophotometrically by measuring the absorption of tri-iodide ion at 352 nm.

Lead, Nickel, Arsenic

The Atomic Absorption Spectroscopy (AAS) technique makes use of absorption spectrometry to assess the concentration of an analyte in the sample. The method is based on active sampling using PM10 High Volume Sampler and then sample analysis is done by atomic absorption spectrophotometer.



4.7.1.3 Ambient Air Pollutants and Measurement Procedures

Air quality pollutants are monitored as per the Guidelines for Ambient Air Quality, by Central Pollution Control Board, Ministry of Environment & Forests 2009. The details of National Ambient Air Quality Standards, 2009, sampling instrument, frequency, sampling principle and the period of sampling for each parameter were referred.

4.7.1.4 Ambient Air Quality Monitoring Locations and Results

The sampling location and criteria for selection of the sampling locations for Ambient Air Quality Monitoring in Panvel-Karjat stretch are presented in *Table 11.*

Sr.	Sample	Date of	Description	Criteria for	Chainage	Locatio	n details
No	Code	Sampling	location	Selection	from Panvel	Latitude	Longitude
1	AAQ-1	02-05-2017	Habitation near Mohope Station between Pole No. 77/24 to 77/34	Proximity to construction work & increased rail traffic	Between Chainage: 9+700 - 9+800	18.942738	73.197058
2	AAQ-2	03-05-2017	Chowk Station area between Pole No.85/12 & 85/16	Proximity to construction work & increased rail traffic	Between Chainage: 17+300 - 17+400	18.903025	73.240827
3	AAQ-3	04-05-2017	Habitation near Proposed new ROB at Pole No. 90/1	Proximity to construction work & increased rail traffic	Near Chainage: 22+100	18.917286	73.279838
4	AAQ-4	05-05-2017	Habitation near Karjat Station between Pole No. 94/18 to 94/20	Proximity to construction work & increased rail traffic	Between Chainage: 29+200 – 29+300	18.922322	73.322338

Table 11: Ambient Air Quality Monitoring Locations for Panvel-Karjat Stretch

The Map showing the air sampling location is presented below as Figure 9.



Figure 9: Air Quality Monitoring Location Map

The Analytical Results of Ambient Air Quality Monitoring is presented in *Table 12*.

Parameters	AAQ-1	AAQ-2	AAQ-3	AAQ-4	Limits*
Particulate Matter (size less than 10 μm) or PM10, μg/m ³	66.8	63.5	57.2	54.6	100
Particulate Matter (size less than 2.5 μm) or PM2.5, μg/m ³	34.5	31.3	28.7	27.4	60
Sulphur Dioxide (SO2), µg/m ³	13.4	12.7	15.4	14.9	80
Nitrogen Dioxide (NO2), µg/m ³	22.7	21.1	19.8	18.3	80
Ozone (O3), µg/m ³	7.2	6.0	4.1	4.7	100
Lead (Pb), µg/m³	*BDL	BDL	BDL	BDL	1.0
Carbon Monoxide (CO),mg/m ³	0.30	0.28	0.23	0.21	2.0
Ammonia (NH3), µg/m ³	N.D.	N.D.	N.D.	N.D.	400
Benzene (C6H6), µg/m ³	#N.D.	N.D.	N.D.	N.D.	5.0
Benzo (a) Pyrene particulate phase only, ng/m ³	N.D.	N.D.	N.D.	N.D.	1.0
Arsenic (As), ng/m ³	N.D.	N.D.	N.D.	N.D.	6.0
Nickel (Ni), ng/m ³	N.D.	N.D.	N.D.	N.D.	20.0

Table 12: Analytical Results of Ambient Air Quality Monitoring

*National Ambient Air Quality Standards prescribed by Ministry of Environment and Forests, Government of India vide Gazette Notification G.S.R. 826(E) dated 18.11.2009 # N.D. – Not Detected, *BDL – Below Detectable Limit

4.7.1.5 Results and Discussion

The monitoring of air on all sites was carried out for 24 hours and the results were obtained and compared with the permissible limits given National Ambient Air Quality Standards, 2009.

It is observed that the pollution levels of all the pollutants are within the permissible range and no toxic gases were detected on Panvel-Karjat stretch. However, pollution levels are expected to increase during construction phase.





4.7.2 Water Quality Monitoring

In order to create a baseline of water quality, water samples from Panvel-Karjat was collected and analyzed. The water samples in Panvel-Karjat region were collected from surface fresh water.

4.7.2.1 Methodology Adopted for Sampling

For surface fresh water, water the sampling was carried out by grab sampling method. Samples were collected from well-mixed section of the river (main stream) 30 cm below the water surface whereas Samples from Morbe dam site collected from the outgoing canal.

For analyzing dissolved oxygen (DO) of water a sample is collected in a DO bottle using a DO sampler. Similarly, for bacteriological samples sterilized bottle container been used to avoid any contamination. pH, colour, temperature parameters were monitored onsite and for rest of the parameters water samples were collected in clean bottle container and stored in icebox maintaining temperature below 4^oC and transferred to laboratory for further analysis.

4.7.2.2 Water Pollutants and Measurement Procedures

Standard procedure for water analysis given in American Public Health Association (APHA) where followed. The Indian standards for drinking water IS 10500:2012 for surface water sample were used for analysis of the fresh water quality.

4.7.2.3 Water Quality Monitoring Locations and Results

The sampling location and criteria for selection of the sampling locations for Water Quality Monitoring in Panvel-Karjat stretch are presented in *Table 13.*

Sr.	Sample	Date of	Description	Criteria for	Chainage	Locatio	n details
No	Code	Sampling	of the location	Selection	Panvel	Latitude	Longitude
1	SW-1	03-05-2017	Surface water at Kalundre River	Water use for agriculture Construction of new bridge at Kalundre River	Near Chainage: - 0+700	18.9857861	73.1264361
2	SW-2	03-05-2017	Pond at Mohope Station	Pond water used for fishing (local), washing clothes Proximity to construction work at station	Between Chainage: 9+500- 9+600	18.9445527	73.1952666
3	SW-3	04-05-2017	Morbe Dam Spillway Channel water at Chowk Station	Water use for agriculture Proximity to construction work	Near Chainage: 18+000	18.900905	73.246522

Table 13: Water Quality Monitoring Locations





Sr.	Sample	Date of	Description	Criteria for	Chainage	Location details		
No	Code	Sampling	of the location	Selection	Panvel	Latitude	Longitude	
4	SW-4	04-05-2017	Surface water stream near Karjat Station	Water use for agriculture Proximity to construction work	Between Chainage: 29+200 - 29+300	18.92144	73.322183	

The Map showing the water sampling location is presented below as Figure 10.



Figure 10: Water Quality Monitoring Location Map

The Analytical Results of Water Quality Monitoring in Panvel-Karjat stretch is as presented in **Table 14.**

Sr. No	Test Parameters	Unit	SW-1	SW-2	SW-3	SW-4	Indian Sta Drinkin (IS 1050	ndards for g Water)0:2012)
							Acceptable Limit	Permissible Limit
1	рН		8.21	8.29	7.36	7.27	6.5-8.5	No Relaxation
2	Colour	Hazan	4	4	3	3	5	15
3	Conductivity	µS/cm	1529	1443	1221	767		
4	TDS	mg/L	985	922	788	492	500	2000
5	DO	mg/L	5.6	5.8	5.6	6.0	Not less than 5 mg/l*	
6	BOD	mg/L	<3	<3	<3	<3	2.0 mg/l*	
7	COD		<5	<5	<5	<5	150 mg/l**	
8	Total hardness as	mg/L	352	284	288	236	200	600

Table 14: Analytical Results of Fresh Water Quality Monitoring



Sr. No	Test Parameters	Unit	SW-1	SW-2	SW-3	SW-4	Indian Sta Drinkin (IS 1050	ndards for g Water)0:2012)
							Acceptable	Permissible Limit
	CaCO3						Linit	Linit
9	Total alkalinity as CaCo3	mg/L	310.0	296.3	316.2	233.5	200	600
10	Calcium as Ca	mg/L	64.0	56.0	62.4	48.0	75	200
11	Magnesium as Mg	mg/L	46.7	35.0	32.1	28.2	30	100
12	Chloride as Cl ⁻	mg/L	210.6	205.4	163.1	74.4	250	1000
13	Residual chlorine	mg/L	<0.2	<0.2	<0.2	<0.2	0.2	1
14	Sulphate as SO4 ²⁺	mg/L	122.8	92.3	24.1	17.7	200	400
15	Fluoride as F	mg/L	0.7	0.6	1.2	1.0	1.0	1.5
16	Nitrate as NO3	mg/L	28.9	27.4	34.0	19.4	45	No relaxation
17	Boron as B	mg/L	0.27	0.11	<0.01	<0.01	0.5	1.0
18	Phenolic Compounds	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	0.002
19	Cyanides	mg/L	<0.02	<0.02	<0.02	<0.02	0.05	No relaxation
20	Oil & Grease	mg/L	<1.0	<1.0	<1.0	<1.0	1.0	No relaxation
21	Cadmium as Cd	mg/L	<0.003	<0.003	<0.003	<0.003	0.003	No relaxation
22	Total Arsenic as As	mg/L	<0.01	<0.01	<0.01	<0.01	0.01	0.05
23	Copper as Cu	mg/L	0.14	0.15	<0.01	0.04	0.05	1.5
24	Lead asPb	mg/L	<0.01	<0.01	<0.01	<0.01	0.01	No relaxation
25	Iron as Fe	mg/L	0.07	0.06	0.02	0.04	0.3	No relaxation
26	Total Chromium as Cr	mg/L	<0.05	<0.05	<0.05	<0.05	0.05	No relaxation
27	Selenium as Se	mg/L	<0.01	<0.01	<0.01	<0.01	0.01	No relaxation
29	Zinc as Zn	mg/L	<0.01	<0.01	<0.01	<0.01	5	15
30	Aluminium as Al	mg/L	0.01	<0.01	<0.01	<0.01	0.03	0.2
31	Mercury as Hg	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	No relaxation
32	Anionic Detergents	mg/L	<0.2	<0.2	<0.2	<0.2	0.2	1.0
33	Total Coliforms MPN/100ml		20	<10	<10	<10	Shall not be detectable in 100ml sample	Shall not be detectable in 100ml sample

* As per A-I Catergory of fresh water for Unfiltered Public water supply after approved disinfection by MPCB ** As per A-IV Catergory of fresh water for Unfiltered Public water supply after approved disinfection by MPCB



4.7.2.4 Results and Discussion

- In all the water quality samples, Total hardness and Total alkalinity is found exceeding the acceptable limit but within the permissible limit of drinking water standards IS: 10500-2012.
- In water quality samples SW-1, SW-2 and SW-3, Magnesium is higher than the acceptable limit of 30 mg/l but within permissible limit of 100 mg/l as per IS: 10500-2012.
- Total Dissolved Solids are found exceeding the acceptable limit of 500 mg/l in water quality samples SW-1, SW-2 and SW-3 but within the permissible limit of 2000 mg/l as per drinking water standards IS: 10500-2012.
- Fluoride is detected in water quality sample SW-3 collected at Morbe Dam Spillway Channel. Fluoride is found exceeding the acceptable limit of 1 mg/l but within the permissible limit of 1.5 mg/l as per IS: 10500-2012.
- Copper is detected in water quality samples SW-1 and SW-2 which are exceeding the acceptable limit of 0.05 mg/l but within the permissible limit of 1.5 mg/l as per IS: 10500-2012.
- Total Coliform is detected in all the water quality samples which should not be detectable in 100 ml sample in drinking water sample as per IS: 10500-2012. The presence of coliform indicates the practice of open defecation near these waterbodies. Also, sewage water is discharged into the waterbodies in case of Kalundre River and stream near Karjat Station.

4.7.3 Noise Level Monitoring

4.7.3.1 Methodology Adopted for Sampling

Ambient Noise level monitoring was carried in the direct impact zone of the proposed alignment in Panvel-Karjat Stretch. The ambient noise level monitoring was carried out using **Digital Sound Level Meter** with free-field microphone which meets the Accuracy of noise measurement as per IEC 804 (BS 6698) Grade I or ANSI Type I or equivalent IEC 61672-1(2002-05) Class-I near various sensitive receptors like Residential area, Commercial area, School, Hospital, Institutes, religious places etc. Also, the areas where major construction works were also considered for noise level monitoring on the field was carried out throughout the day and night. The noise levels where observed and based on the observation parameters like Leq, L10, L50, L90, Lday, Lnight to understand the noise pollution in day and night time. The formula used for the calculation is given below.

Leq= 10 log Σ (10) 10 × *ti tt*

*i=n i=*1

n= number of sound samples, Li=The noise level of any ith sample,

ti= time duration of ith sample, tt= total time period of event

Leq: - Leq is that statistical value of sound pressure level that can be equated to any fluctuating noise level. The human ear does not respond uniformly to sounds of all frequencies being less efficient to low and high frequencies as compared to medium range frequencies. In order to obtain sound level which, cover wide range of frequencies and conforms approximately to the response of the human ear, frequency weighting filter is used. Resultant sound level obtained is A weighted sound. Therefore, we measure sound level as Leq dB(A).

Ln: The Ln is a statistical measure indicating how frequently a particular Sound level is exceeded. The value of Ln will represent the sound pressure level that will exceed for N% of the gauging time.



4.7.3.2 Standards adopted for Noise Level Monitoring

Ambient Air Quality Standards in respect of Noise prescribed in Noise Pollution (Regulation and Control) Rules, 2000 (see rule 3(1) and 4(1)) are used for analysis of ambient noise levels in the study area. The Ambient Air Quality Standards in respect of Noise is described in *Table 15*.

Area	Category of	Limits in dB	(A)Leq
Code	Area/Zone	Day time	Night Time
(A)	Industrial Area	75	70
(B)	Commercial Area	65	55
(C)	Residential Area	55	45
(D)	Silence Zone	50	40

 Table 15: Ambient Air Quality Standards in respect of Noise (see rule 3(1) and 4(1))

Note: -

- 1) Day time shall mean from 6.00 a.m. to 10.00 p.m.
- 2) Night time shall mean from 10.00 p.m. to 6.00 a.m.
- Silence zone is an area comprising not less than 100 meters around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority
- 4) Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.

4.7.3.3 Noise Level Monitoring Locations and Results

The sampling location and criteria for selection of the sampling locations for Ambient Noise Level Monitoring in Panvel-Karjat stretch are presented in *Table 16.*



Table 16: Noise & Vibration Level Monitoring Locations

Sr.	Sample	Date of	Type of Sensitive	Description of the	Criteria for Selection	Distance from the outer most	Chainage	Locatio	n details
No	Code	Sampling	Receptor	location		proposed tracks	from Panvel	Latitude	Longitude
1	NV1	17-05-2017	Residential Area	Multi-storey Building near Br.70/1	Located near minor bridge 70/1 Construction activity due to proposed extension of bridge	17 m	Between Chainage: 2+000 -2+100	18.97796505	73.13627871
2	NV2	17-05-2017	Residential Area	Houses near RUB 75/2 at Bhingar village	Located near RUB 75/2 Construction activity due to proposed extension of RUB Proximity to construction work at station & increased rail traffic	24 m	Between Chainage: 7+300-7+400	18.95824098	73.18085202
3	NV3	18-05-2017	Residential Area	Houses above Wavarle tunnel	House located above tunnel Construction activity due to proposed tunnelling work	Within proposed railway boundary	Between Chainage: 22+700 - 22+800	18.91903472	73.28820744
4	NV4	18-05-2017	Residential Area	Houses near Br.94/3 at Karjat	Located within proposed rail boundary & minor bridge 94/3 Proximity to construction work & increased rail traffic	Within proposed railway boundary	Between Chainage: 29+200 29+300	18.92221046	73.32226195
5	NV5	19-05-2017	Religious Place	Temple at Varose village	Located near RUB 83/1 & Minor bridge 83/2 Construction activity due to proposed extension work	60 m	Near Chainage: 15+300	18.90438518	73.22131608
6	NV6	19-05-2017	School	ZP Primary School at Barwahi village	Located at hilltop at higher elevation level than the railway track Proposed work required cutting of hill (upto 19 m)	37 m	Between Chainage: 11+400 - 11+500	18.92870777	73.19956978



Sr.	Sample	Date of	Type of Sensitive	Description of the	Criteria for Selection	Distance from the outer most	Chainage	Location	n details
No	Code	Sampling	Receptor	location		proposed tracks	from Panvel	Latitude	Longitude
7	NV7	20-05-2017	School	Secondary School at Mohope village	Open space between receptor and railway tracks Proximity to construction work & increased rail traffic	120 m	Near Chainage: 9+800	18.94264178	73.19676814
8	NV8	20-05-2017	School	ZP Primary School at Wavarle village	Located above tunnel Construction activity due to proposed tunnelling work	50 m	Between Chainage: 22+600 - 22+700	18.91891868	73.28789929
9	NV9	21-05-2017	Major Construction Work	Major Bridge 70/3 (Construction of RUB)	Construction activity due to proposed RUB	Within proposed railway boundary	Between Chainage:2+7 00-2+800	18.97589299	73.14305276
10	NV10	21-05-2017	Major Construction Work	Major Bridge 68/2 (Construction of new bridge)	Construction of new bridge	Within proposed railway boundary	Near Chainage: 0+700	18.98601	73.1268
11	NV11	22-05-2017	Major Construction Work	Nadhal tunnel (Construction of new tunnel)	Construction of new tunnel	Within proposed railway boundary	Between Chainage: 14+800 - 14+900	18.90398	73.21733
12	NV12	22-05-2017	Major Construction Work	Utility Pipeline below underpass at WTP, between Chainage: 80/14 to 80/15	Proximity to construction work & increased rail traffic	Within proposed railway boundary	Near Chainage: 13+000	18.91688497	73.20642214



The Map showing the Noise Level Monitoring location is presented below as Figure 11.



Figure 11: Noise Level Monitoring Location Map

The Analytical Results of Ambient Noise Level Monitoring in Panvel-Karjat stretch is as presented in *Table 17.*

Sample code	Type of Sensitive Receptor	Distance from the outer most proposed tracks	L10	L50	L90	Leq	L day	L night	Ln	Ambi Qu Stand resp No (see r and	ent Air ality lards in ect of bise ule 3(1) 4(1))
										Day	Night
NV1	Residential Area	17 m	66	79	72	58	81	86	66	55	45
NV2	Residential Area	24 m	59	70	81	78	58	83	89	55	45
NV3	Residential Area	Within proposed railway boundary	71	83	80	57	85	91	71	55	45
NV4	Residential Area	Within proposed railway boundary	71	81	79	59	83	89	71	55	45
NV5	Religious Place	60 m	70	84	82	55	85	91	70	50	40

Table 17: Anal	vtical Results of A	mbient Noise Leve	el Monitorina in l	Panvel-Kariat Stretch
	,		/·····g·····g·····g	



Sample code	Type of Sensitive Receptor	Distance from the outer most proposed tracks	L10	L50	L90	Leq	L day	L night	Ln	Ambi Qu Stand resp No (see ru and Day	ent Air ality ards in ect of bise ule 3(1) 4(1)) Night
NV6	School	37 m	63	71	68	51	73	79	63	50	40
NV7	School	120 m	64	71	68	53	72	78	64	50	40
NV8	School	50 m	63	72	67	54	74	79	63	50	40
NV9	Major Construction Site	Within proposed railway boundary	68	74	70	61	76	82	68	75	70
NV10	Major Construction Site	Within proposed railway boundary	64	73	69	54	75	80	64	75	70
NV11	Major Construction Site	Within proposed railway boundary	63	72	68	53	73	79	63	75	70
NV12	Major Construction Site	Within proposed railway boundary	73	82	77	63	83	89	73	75	70

4.7.3.4 Results and Discussion

Noise level at all the sampling location is found to be higher than the Ambient Air Quality Standards in respect of Noise (see rule 3(1) and 4(1)) during both the times; day and night at most of the locations. During day time the noise level is exceeding as per the Ambient Air Quality Standards in respect of Noise (see rule 3(1) and 4(1)) for all the samples which are mainly residential area, religious places, schools and major construction site. Thus, addition of new trains will further add to noise levels. Passing trains movements were the major source of noise apart from the other vehicular movements. However, creating a green corridor along both the sides of the alignment will help in reducing noise levels and will also help in maintaining the green cover in the vicinity.

4.7.4 Vibration Level Monitoring

4.7.4.1 Methodology Adopted for Sampling

The vibration level monitoring was carried in the direct impact zone of the proposed alignment in Panvel-Karjat stretch. The Vibration level monitoring was carried out using "**Mini-Seis III** instrument make **White Industrial Seismology, Inc**.USA", (Serial number: 7243 & 0529) near various sensitive receptors like residential area, commercial area, school, hospital, institutes, religious places etc. Also, the areas where major construction works were also considered for vibration level monitoring for generating the base line of the vibration level before stating the construction work.

4.7.4.2 Standards adopted for Vibration Level Monitoring

In order to protect surface structures from the deleterious effect of ground vibration, regulations have been formulated in different countries. These regulations vary from country to country depending on the type and the construction materials used. In India, the Director General of Mines Safety (DGMS) through its Circular No. 7 of 1997 specified the permissible limits of ground vibration for different types of structure shown in



Table 18.

The DGMS Circular has categorised surface structures into two categories based on the ownership. For each category, there are three types of structure for which permissible peak particle velocity (PPV) has been specified depending on the frequency. This circular does not make reference to any scientific study conducted in India or abroad. Perhaps it was based on the experience of the DGMS on controlled blasting close to surface structures.



Noise & Vibration Monitoring on Panvel-Karjat Stretch

Sr.	Type of structure	Dominant ex	citation freq	uency, Hz
NO		< 8 Hz	8-25 Hz	> 25 Hz
(A) B	uildings/structures not belonging to the owner			
1.	Domestic houses/structures (Kutcha, brick & cement)	5	10	15
2.	Industrial buildings (RCC and framed structures)	10	20	25
3.	Objects of historical importance and sensitive structures	2	5	10
(B) B	uildings belonging to the owner with limited span	of life		
1.	Domestic houses/structures (Kutcha, brick & cement)	10	15	25
2.	Industrial buildings (RCC and framed structures)	15	25	50

Table 18: Permissible PPV (mm/s) as per DGMS Circular No. 7 of 1997

Permissible PPV (mm/s) as per DGMS Circular No. 7 of 1997 for various Dominant excitation frequency is considered for as the standard for assessing damage to structures due to ground vibration. The sampling locations in the study area are the Buildings/structures not belonging to the owner.

The sampling location and criteria for selection of the sampling locations for Vibration Level Monitoring in Panvel-Karjat stretch are the same as Noise Level Monitoring which is presented in *Table 16*. Also, the Map showing the Vibration Level Monitoring location is presented as *Figure 11*.

The Analytical Results of Vibration Level Monitoring in Panvel-Karjat stretch is as presented in *Table 19.*

Sample code	Type of Sensitive Receptor	PPV (mm/sec)	Dom.Exc. Freq(Hz)	Vector sum (mm/sec)	Acoustic dBL	DGMS mm/sec
NV1	Residential Area	1.78	26.9	2.16	106	>25: 15
NV2	Residential Area	1.52	34.1	1.78	106	>25: 15
NV3	Residential Area	1.27	34.1	1.65	106	>25: 15
NV4	Residential Area	2.03	32.0	2.03	106	>25: 15
NV5	Religious Places	2.03	34.1	2.29	106	>25: 10
NV6	School	2.29	30.1	2.41	106	>25: 15
NV7	School	2.29	128	2.54	112	>25: 15
NV8	School	2.03	128	2.03	116	>25: 15
NV9	Major Construction Work	1.52	170.6	1.65	112	>25: 25
NV10	Major Construction Work	1.78	128	1.91	112	>25: 25
NV11	Major Construction Work	2.29	22.2	2.41	106	8-25: 20
NV12	Major Construction Work	5.59	3.5	5.84	118	<8: 10

Table 19: Analytical Results of Vibration Level Monitoring

* Permissible PPV (mm/s) as per DGMS Circular No. 7 of 1997 is considered for (A) Buildings/structures not belonging to the owner.

The waveform data in comparison with the DGMS standards for the above selected events in Panvel-Karjat Stretch is given in *Annexure* 9.

4.7.4.3 Vibration Modelling

Attenuation of vibration with distance from track centreline is one of the important issues that must be considered while studying environmental effects of train induced ground vibration. Without considering the mechanism behind occurrence and propagation of vibrations during passage of a train, measured particle velocities at different distances from track centreline are used here to establish an attenuation relation. Attenuation of vibration with distance from track centreline is one of the important issues that must be considered while studying environmental effects of train induced ground vibration. Without considering the mechanism behind occurrence and propagation of vibrations during passage of a train, measured particle velocities at different distances from track centreline is one of the important issues that must be considered while studying environmental effects of train induced ground vibration. Without considering the mechanism behind occurrence and propagation of vibrations during passage of a train, measured particle velocities at different distances from track centreline is centreline are used here to establish an attenuation relation.

The maximum observed PPV of 5.59 mm/sec at Panvel-Karjat is considered for predicting the future vibration impact after commissioning the MUTP-III. Factor of safety as 3 and maximum PPV of 5.59 mm/sec was used for predicting the vibration attenuation in Panvel-Karjat stretch. It is evident that the vibration reduces with respect to increase in the distance from the centre of the proposed railway track.

Vibration scenario for multiple combinations in the form of Passenger–Passenger crossing (P-P), Passenger–Freight crossing (P-F) was calculated. The highest Vibration Level for 3 trains crossed is 8.34 mm/sec for Passenger – Freight combination as shown in *Table 20*.

Sr.	Vibration Scenarios due to Multiple Train Crossings	PPV Value C/L of the	e in mm/s f e proposed	rom the I track
NO		10 m	25 m	50 m
1.	2 trains at a time: 1 local /EMU and another long distance express train	4.88	1.62	0.7
2.	2 trains at a time: 1 local /EMU and another Goods train	5.22	1.91	0.9
3.	2 trains at a time: 2 local/EMU	4.88	1.62	0.7
4.	3 trains at a time: all 2 local /EMU; 1 express train	8.34	4.86	2.1
5.	3 trains at a time: all 2 local /EMU; 1 Goods train	7.66	2.72	1.25

Table 20: Vibration Scenario for Panvel-Karjat stretch due to multiple train crossing

4.7.4.4 Results and Discussion

The sources of the vibration and noise induced by the trains are mainly the rolling stock, track and the interaction between them. The vibration induced by the train first causes the vibration of track structure and then, propagate through the strata to the surrounding environment. In order to establish the existing/ambient vibration levels from traffic and other sources, vibration monitoring was conducted on the Panvel- Karjat stretch.

The vibration monitoring was conducted at 12 monitoring locations in Panvel-Karjat stretch. At present, all the samples are falling in safe zone based on the comparison of the Permissible Peak Particle Velocity (PPV in mm/s) as per DGMS Circular No. 7 of 1997. During field investigation, the maximum PPV recorded is 5.59 mm/s of NV12 against the observed frequency of 39.3Hz which is at Utility Pipeline below underpass at WTP, between Chainage: 80/14 to 80/15 which is quite normal vibration level due to rail traffic. NV12 sampling location is within a railway boundary. All other monitoring locations recorded the value of PPV lower than that of the monitoring station NV12. However, at present all the samples are falling in safe zone which may change after addition of two more tracks under MUTP-III. At present very minimum number of trains passes through the existing Panvel-Karjat route. Hence, the PPV values of NV3, NV4, NV9, NV10, NV11 and NV12 falling in safe zone which may change after addition of two more tracks under MUTP-III.

Vibration modelling was carried for multiple scenarios and it is found that vibration level decrease as the distance increases. Maximum vibration levels were observed at 10 m from centre line of proposed track when 3 trains travel at a time which includes all 2 local /EMU and 1 express train. The proposed railway boundary will be around 10 m from the centre line of proposed track, thus there will not be any sensitive receptors. Hence, it can be concluded that there will be no damage to sensitive receptors beyond 10 m of centre line of proposed track.





Section 5 Environment Impact Assessment

5.1 Activities Identified for Impact Assessment

The activities which will be carried out during preconstruction, construction and operation phase are considered for identifying impacts of the project. As the preconstruction phase of the project is already completed, no pre-construction activities are considered for impact identification. The preconstruction activities included site survey, geotechnical investigations which formed basis for the design of the proposed project.

The list of activities during construction and implementation phase considered for impact identification are given in *Figure 12* followed by detailed description of activities.

Construction Phase	 Clearing the ground for construction activity e.g. bushes, scrub, trees cutting, dump wastes etc Dismantling / Demolition activities before construction Establishment and operation of the labour camps Access Control and barrication Relocation and Arrangements of utility lines for construction works Tunneling Collection of Construction material (as in sand mining, blasting for rocks, quarrying), Transfer of construction materials Storage, handling and disposal of soild, hazardous and C&D waste material Setting up the Ready Mix Concrete (RMC) Plant Excavation works and Foundation works (Pile and concrete) Earth works/Landfill works Laying of Railway Tracks Assembling and its Mechanical installation of pre-fabricated components for FOB, ROBs, RUBs and bridges near/around work site O&M of all machineries Electrical works as installation of Overhead elecrical structures (distance 50-60 m), Signalling post (400 m), power sub-station Landscaping
Operational Phase	 Improved Infrastructure such as new Tracks & Railway Stations, Railway Platforms & other facilities Operation and Maintenance of new Tracks & Railway Stations, other ancilliary facilities, landscaping

Figure 12: Activities identified for impact assessment

Out of the total activities identified for all the components of MUTP-III projects; the activities applicable for Panvel-Karjat stretch. Also, the activities will be implemented in different way based on the requirement of the project component. The applicability and description of the activities are listed in the following section.



1) Clearing the ground for construction activity e.g. bushes, scrub, trees cutting, dump wastes etc.

The site is required in cleared and graded condition before the construction activities. It will involve the removal of trees, clearing of shrubs and vegetation, removing waste dumps that might affect the construction process in the future. The site will be cleared within the range of railway land and within influential area of the project activities, and necessary site formation and other operations. Ground clearing will be done by using JCB before initiating the earthwork activity for Panvel-Karjat stretch due to space availability for easy movement of JCB.

During site clearance, it is crucial to keep damage of original landscapes and the biological environment to minimum. Environmental features such as trees, shrubs will be removed only if it is necessary to construct, maintain, and operate the new MUTP-III infrastructure. Replanting/Relocation of trees or plantation of additional trees will be undertaken as per Maharashtra Felling of Trees Regulation Act, 1964 in concurrence with local Tree authority or Forest department; wherever applicable.

Replantation or Relocation of the trees will be carried out to the maximum possible extent. Shrubs and grass removed in ground clearing will be utilized in laying bottom layers of the earthwork to minimize the impact during construction. As conveyed by MRVC officials, plantation of new trees and relocation of existing trees and also maintenance of plantation will be responsibility of the Contractor for 3 years.

The construction activities such as settling of labour camps, laying of utility lines and tracks, setting up a ready mix concrete plant, signaling etc. will require clearing of the ground. The clearing activities will have an impact on the environment, as the activities will lead to dust generation, loss productive soil cover, compaction of soil. Solid waste and construction and demolition waste already dumped at the project sites will be cleared disposed of in accordance with the applicable regulations.

Panvel-Karjat
 Approximately 1814 trees will be required to be cut in Panvel-Karjat stretch out of which 132 number of tress are falling within Matheran Eco-sensitive Zone. To minimize the impact of tree cutting, new plantation will be carried out in the ratio of 1:5. Thus, around 9070 trees will be planted throughout the stretch.
 MRVC has estimated generation of 2,54,000 Cu.m of soil during the excavation work. The excavated soil will be utilised for following purposes:

 Filling back in the embankment, foundation, approach road etc,
 Raising of nearby low-lying villages

• Making building/Road material, etc by the contractor

2) Dismantling or Demolition activities before construction

Dismantling or Demolition activities will include activities causing major structural alterations such as wrecking, pulling, knocking or cutting down of any building, structure, edifice etc. Demolition activities will have an impact on the environment as the activities will lead to dust generation, noise and vibration by the machines, hand-tools, and falling/collapsing parts of the building/structures.

MRVC has prepared a detailed list of various structures as building, temples, ticket counters, huts, toilets, maintenance room; staff quarters etc. are to be dismantled at various locations along the Panvel-Karjat stretch.

The demolition of the existing structures will lead to generation of waste building materials as debris, rubble, wood, metal etc. The Contractor will be responsible to manage the waste



generated from dismantling and demolition activities. The waste generated from the demolition activities will be reused at the site to the maximum possible extent. Recyclable materials as metal, wood will be sold off to the authorized recyclers. In case, any demolition waste that can't be used at the site, the contractor to handle the waste as per Construction and Demolition Waste Management Rules, 2016. The Contractor shall identify local C&D waste disposal site in congruence with local authority to dispose of the demolition waste.

Panvel-KarjatIt is envisaged that waste generation from demolition activities in
Panvel-Karjat stretch will be minimal as identified PAPs are less than
500. Maximum quantity of waste generated from demolition activities
will be used during filling of the embankment.As estimated by MRVC, total 207 MT steel (Steel Cover shed, height
gauges, FOB) and 18,000 Cu.m of C&D waste will be generated from
Dismantling or Demolition activities. The steel will be taken by the
Contractor which will be used as scrap and recycled and other C&D

waste will be used for filling up the low laying areas.

3) Establishment and operation of the labour camps

The labour camps shall be set up by the contractor as per the Occupational Safety and Health standards (Indian or international). The labour camps will be set up by the contractor at suitable location as per the construction site for Panvel-Karjat stretch. Labour camps will need to be set up close to the construction works. The contractor shall provide labour camps with adequate drainage, clean and sanitary premises, crèches, cooking facilities, adequate and convenient water supply, adequate toilet facilities, and sewage disposal facilities. The cooking facilities shall be provided with LPG so that no fire wood will be burned for cooking. Designated solid waste storage sites will be identified in consultation with municipal councils, Panchayat.

Panvel-Karjat	The constr	uctio	n work for N	IUTP-III com	ponents	will be	carried o	ut by
-	packages	for	earthwork,	tunneling,	flyover	and	bridges.	The
	constructio	on wo	ork is expecte	d to have tot	al 400 lab	ours (/	Approxima	ate)

4) Access control and barrication

Access control and barrication is to prevent the entry of unauthorized persons on construction sites which are located in built-up areas and alongside vehicular and pedestrian traffic routes.

Fencing the construction site will also protect people from accidents. Barricading will be required between existing and proposed railway line and also between constructions site and households, roads near the site for Panvel-Karjat stretch.

The sides of excavations/foundations can be supported by sheet piling or bracing to guard against the danger to workers from fall or dislodgement of earth, rock or other material. Guardrails or barriers around construction area can be erected to prevent workers or other persons from falling into them. Barriers can be placed to prevent vehicles being driven into the construction area.

Embankment will used as approach road for vehicles used in construction to the maximum possible extent to reduce the need of construction additional access roads for Panvel-Karjat stretch.

Panvel-Karjat RUBs will be functional throughout the construction phase. Barrication will be done to protect existing tracks using G.I. sheets to ensure smooth operations on existing tracks.





5) Relocation and Arrangements of utility lines for construction works

MRVC has carried out utility survey which would help to understand the network of available utilities leading into the project premises. The utilities encountered commonly on site for construction work include electricity, water, telecommunication, drainage, overhead and underground cables etc.

The necessary permissions required to relocate the utility lines as per the construction plan will be taken from concerned government departments. It is essential to ensure that no existing utilities in the vicinity of the sites are affected by any of the project activities.

Certain Utilities are required to be maintained for construction works. The following basic utilities shall be required to provide a safe and healthy working environment for workers:

- Temporary water supply shall be required for drinking water purposes
- Temporary electricity supply for lighting and other construction use. If electricity supply is not available or consistent, DG set can be used as and when required.
- Temporary telecommunication link between the site and concerned organization for both security and communication
- Toilets at construction site

In the case when temporary utilities are available, all such temporary utilities, including electrical fittings shall be weather-proof. Water supply will also be required for water spraying as a part of dust pollution abatement measures.

The construction workers and contract labors will use toilet and drinking water facility at the nearby stations during carrying out a construction activity. Drinking water facilities shall be provided by the contractor for labours at the construction site. One drinking water facility shall be available to the workers at a distance of 500 m at the construction site.

Stationwise utility shifting data is presented **Annexure 10** with details.

Panvel-Karjat Utilities such as gas pipeline, water pipeline are observed which will be either protected or relocated suitably in consensus with the concerned department.

6) Tunneling

Tunneling activity is only applicable to Panvel-Karjat section. There are two tunnels on the existing line; a smaller tunnel at Nadhal and a larger one at Wavarle. The proposed alignment will have three tunnels one at Nadhal (length 220 m) and two near Wavarle village (length 2600 m+ 300 m).

Tunneling in Panvel-Karjat area is planned to be carried out by Drilling and Blasting Method (DBM) by MRVC. MRVC will appoint an external agency to design the blasting and monitor the tunneling and blasting works. The agency will develop appropriate blasting design considering geology, safety, blast geometry etc.

The principle of constructing large sectioned tunnel using DBM is to subdivide the tunnel section into several arched smaller sections for easier control and safer support during excavation¹⁴. The newly formed surfaces are often required to be temporarily supported by girder sections, nails,

¹⁴ Safety of New Austrian Tunnelling Method (NATM) Tunnels





and shotcrete¹⁵. After the tunnel formed by drill and blast process, the newly formed tunnel surface is to be lined with an in-situ concrete lining to stabilize the exposed soil or rock faces.

As tunneling entails excavation and blasting, which will lead to rock movement, minor fragmentations, vibration and dust generation. Due to Tunneling, environmental effects such as geomorphologic alteration, changes in surface and ground water level, changes in erosion phenomenon, disturbance natural inhabitants of animals and plants and increase of dust concentration in the atmosphere.

Tunneling will also lead to generation of noise from various activities as blasting, operation of machines, instruments, loading-unloading, tunnel excavation, traffic and transportation around the tunnel etc.

One of the most significant undesirable impacts on the environment is disposing of excavated materials during the tunnel excavation. However, the contractor will reuse the excavated material to the extent possible, the disposal of waste materials can create detrimental effects on environment such as water pollution, soil contamination and pollution of natural ecosystems. Also, there will be an impact on soil due to temporary stockpiling of inert of construction waste.

Tunneling operations can change the direction of groundwater flow and cause environmental impacts on soil chemistry. Water flows in the springs and where the water naturally comes out, may be decreased due to groundwater discharge from drainage of surrounding grounds of the tunnel site. Disposal of waste water remained from tunneling also have undesirable impacts on the environment.

Range of sanitary and hygiene as well as health and safety concerns for the workforce. Air pollution inside the tunnel during construction will impact on health, safety, and environment. Important aspect which need to consider during design is fire and smoke emergency and evacuation needs in case of accident. During construction, safety of the workers due to rock/mud slide would be an important issue to be addressed.

Navi Mumbai Municipal Corporation (NMMC) takes care of the Morbe Dam operations. The engineering team from the respective authority is called Dam safety Organization under Water Resources department of NMMC.

As per the Indian Railway Permanent Way Manual (IRBM), Morbe Dam is on upstream side of Panvel-Karjat section, so it is classified in the category of Railway affecting Work (RAW)¹⁶. IRBM describes the term "Railway affecting Work" may broadly be taken to mean any work which if not constructed and maintained properly, or not operated properly may result in danger to Railway Line (Bridge/ embankment). This may include tanks, storage works, canals, bunds, etc. MRVC is discussing the matter related to RAW with NMMC on continues basis. Also, MRVC is considering the aspects related to Vigilance over Railway Affecting tanks during heavy rains¹⁷ and Weather warnings and action to be taken¹⁸ as per IRBM for Morbe dam.

MRVC is also planning to engage the independent consultant for safe and speedy execution of the work of Tunneling and excavations of cuttings. MRVC is planning to engage CSIR-Central

¹⁵ Source: <u>https://ec.europa.eu/research/success/en/env/0002e.html</u>

¹⁶ Paragraph 726 of Indian Railway Permanent Way Manual

http://www.indianrailways.gov.in/railwayboard/uploads/directorate/civil_engg/downloads/acs_irpm/irp wm-i2.pdf

¹⁷ Paragraph 727 of Indian Railway Permanent Way Manual

¹⁸ Paragraph 728 of Indian Railway Permanent Way Manual

Institute of Mining & Fuel Research (GOI), Nagpur (CIMFR) or any other similar agency with experience in tunneling. The broad scope of consultancy is as follows: -

A. Geotechnical Assessment of Tunnel site

- Aerial survey and generation of 3D map of the surface for further use and merger with geological data and generation of topographic profiles.
- Geological evaluation of exploratory drill holes being done by MRVC. Providing guidance to MRVC for exploratory drilling of bore holes.
- Based on the details of geological/geotechnical investigation data available with MRVC and being generated above, including Geo-technical assessment of the rock, appointed agency will do Rockmass characterisation and geological mapping. Geological mapping to be extrapolated to 15 m on either side of Tunnel alignment.
- Preparation of sub-surface Model of rock formation based on the details taken from geotechnical investigation.
- Preparation of Geological sections along tunnel alignment.

B. Structural stability assessment of the strata based on the geological investigation including rock formation and suggestion for support.

- Design of most suitable cross section of the tunnel considering the requirement for two Railway tracks, ventilation, Fire safety, OHE, pathway, drainage, cable duct and other structures if any.
- Study and recommendation for minimum safe clear distance between existing and proposed tunnel using 3D Modelling techniques OR as decided by CSIR-CIMFR for excavation of Tunnel-1/2.
- Proof check of preliminary support required during construction of tunnel.
- C. Proof check of Design of Ventilation system for new tunnel with periodic monitoring
- D. Investigations into fire safety of the long tunnel and necessary guidelines/requirements for prevention
- E. Suggested rock excavation methodology and tunnelling methodology suitable for the proposed tunnels (1, 2 and 3) and open excavations
 - Design of blasting techniques, controlled blasting techniques for open excavation of cutting and underground excavation of tunnel
 - Ground vibration monitoring trials and work out of attenuation characteristics. Establishment of damage potential of the ground vibrations vis-à-vis existing tunnel/structures existing about the alignment.
- F. Periodic monitoring of stability of the existing tunnels during excavation of the new tunnel, including stability of private houses and other structures such as Morbe Dam, one small dam near Wavarle and other structures in the vicinity of work preferably through an IoT based seismograph network
 - Deployment of seismographs for continuous monitoring of ground vibrations preferably through IoT based systems.





- Periodical appraisal and evaluation of blast designs and blast performance.
- G. Vetting of technical specification for execution of work
- H. Proof Check of drawings, blasting methodology for underground and open excavations, Support design, waterproofing design, Rock support arrangement design, Construction methodology/scheme submitted by contractor
- I. The protection/support scheme for existing Tunnel-1 [Ch 14756 to Ch 14975] that is presently unlined
- J. Technical support and periodic monitoring during execution of work.

After the completion of preliminary findings and most suitable methodology for excavation near the existing tunnels and Morbe dam, shall be adopted and communicated to the relevant stakeholder party. The preliminary findings of the blasting and tunnelling study will be presented as complementary study to this EA report and disclosed later.

Panvel-Karjat	About 3 km length of tunneling work is involved which would lead to generation of approximately 2.5 lakh m ³ of waste generation. Excavation
	during tunneling will generate 10,60,000 Cum of the rocks which will be utilized during construction work to the extent possible.

The MRVC will prepare an Emergency Response Plan in case of break of Morbe Dam which will be presented as complementary document to this EA report later.

7) Collection of Construction material (as in sand mining, blasting for rocks, quarrying), Transfer of construction materials

Various construction material as soil, aggregates, cement, crushed sand etc will be required by the contractor. As directed by MRVC, the contractor shall use cement silos for cement storage for Panvel-Karjat stretch. Soil required for earthwork, blanketing will be used from cutting to the possible extent, and remaining will be procured. All the construction material will be collected from authorized quarries only. The contractor may open a new quarry or partner with existing quarry owner/s. The contractor is required to submit location of the quarries, the material movement plan and borrow area management plan along with the proposal including the Environmental Clearance taken by the sand miners and quarry operators as per existing Rules for this activity.

The construction material will be stored on site and only required quantity will be procured. The construction material will be transported in dumpers to the project site on daily basis during the construction phase. Considering full cycle of project, collection and transportation of construction material from quarry will be a major activity of project to impact the surroundings.

Panvel-Karjat	The project	component	of	Panvel-Karjat	will	require	earthwork	of
	approximatel	y 12 lakh m ³ .						

8) Storage, handling and disposal of solid, hazardous and C&D waste material

It is envisaged that there will be no e-waste generation due to construction activities. Thus, ewaste management is not considered as an activity for impact identification.

During construction phase, hazardous waste such as waste oil, grease, asbestos sheets, soaked cotton with oil/grease will be generated.



The contractor will be responsible for safe and environmentally sound management of hazardous and other wastes. The contractor is required to send or sell the hazardous and other wastes generated during construction to an authorized actual user or shall be disposed of in an authorized disposal facility. Packaging, labeling, and transport of hazardous and other wastes is required to be done as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

Solid waste will be generated from the daily activities in the labour camps and also during clearing of the site. Solid waste generated in labour camp plan will be included in labour camp management plan. The contractor will be responsible for safe and environmentally sound management of solid waste as per Solid Waste Management Rules, 2016.

In case of C&D waste, the Contractor shall handle the waste as per Construction and Demolition Waste Management Rules, 2016 in addition to using the waste at site.

Panvel-Karjat Applicable

9) Setting up the Ready-Mix Concrete (RMC) Plant

A batch plant of Ready Mix concrete will be set up at the construction site considering requirement of the project.

The site selection of setting up Ready Mix Concrete plant should be as per the Guidelines for Ready Mix Concrete Plant (RMC)¹⁹ issued by Maharashtra Pollution Control Board, Mumbai vide notification no. MPCB/AS(T)/TB/B-4363 on 7th November, 2016.

The RMC plant shall be set up away from sensitive location such schools, colleges, hospitals and habitations as prescribed in the guidelines. The RMC plant requires 'Consent to Establish' from the Maharashtra Pollution Control Board with necessary measures to control Air, Water and Noise pollution. MRVC will facilitate the Contractor with necessary information to obtain the Consent for RMC.

The Contractor shall also follow the "Guidelines on use of Ready Mixed Concrete" are also published by RDSO²⁰ which specifies quality of raw material to be used, material storage in RMC.

Panvel-Karjat Applicable

10) Excavation works and Foundation works

Excavation will start after locating and identifying all utility services, such as electrical, water and add other utilities in the area. The excavated material can be re-utilized in filling, preparing embankments, etc. Excavation and filling can be carried out simultaneously to avoid double handling. Inspection of excavation slopes and/or supporting systems daily for to control erosion or deterioration of soil cover will be crucial during construction works.

Pile foundation will be carried out in river area all other places will have concrete foundation. A pile foundation usually consists of a base of spread footing or grillage supported by piles at their bottom. Concrete foundation involves earth excavation, leveling, placing PCC and concrete footings. Open foundation can also be used depending on the soil strata.

Temporary river training structures as cofferdams will be erected so that the water flow will bypass the foundation area of the bridges. These structures will be removed after completion of

¹⁹ Source: <u>http://mpcb.gov.in/consentmgt/pdf/RMC_Gazette_circular.pdf</u>

²⁰ Source: <u>http://www.rdso.indianrailways.gov.in/uploads/files/1296815273584-page_5.pdf</u>



the construction work. Mud muck generated during foundation work will be utilized in earthwork to the maximum possible extent.

Panvel-Karjat Open foundation will be used for most of the structures whereas Pile foundation is considered for construction of flyovers.

11) Earth works/Landfill works

Earthworks firstly require surface layers to be removed. The ground is then excavated down or built up to the level where the railway tracks will be laid. Earth sourced from other locations or construction debris generated during demolitions work can be used for embankments. Earthwork can also be required for improvement of some of the pre-existing embankments, laying of drainage, installing pumps, laying pipes, building storage tanks and building culverts (drains) which allow rainwater to flow underneath, and away from, the railway especially in case of Panvel-Karjat stretch.

The formation may be in an embankment or a cutting depending upon the rail level and general contour of the area. The height of the embankment will also depend on the high flood level of the area and a reasonable free board is provided above this level. Layered filling is usually used for filling of embankments as per upward horizontal layer filling at full width of horizontal section.

Storm water being the greatest threat to a railway track, proper drainage is the most prominent factor for track maintenance. At present, there is no drainage along the existing railway track. In Panvel-Karjat stretch, the proposed embankment will be at similar elevation level as existing.

As discussed with MRVC officials, the proposed design has consideration for provision of additional storm water drains all along the proposed tracks of Panvel-Karjat stretch. The storm water drains will be cleaned regularly before monsoon. Slope protection measures such as stone gabions, retention walls are also included in the design of proposed track.

Panvel-Karjat	Earthwork of approximately 12 lakh m ³ of raw material to be procured. Cutting of 1 lakh m ³ of soft rock is expected near Mohope area.
	The remaining stretch have only hard rock formation. Boulders generated from hard rock cannot be used in embankment as it leaves loose pockets in the surrounding. Thus, the Contractor will be required to handle the excavated material in environment friendly manner.

12) Laying of Railway Tracks

New railway tracks will be built on earthen embankment which will form the rail foundation. Ballast consists of crushed stone which is placed and packed below sleepers for load distribution, longitudinal and latitudinal stability and to provide drainage to the railway. A ballast hopper will place the ballast over the embankment and between the tracks and sleepers.

Continuous welded rails will be formed by welding rails together to form a seamless rail track. Concrete rail sleepers are placed along the rail alignment as a base support for the rail. Temporary railway track will be laid on which the track mountable machinery will be used to place the continuous welded rails. Temporary tracks will then be removed once continuous rail tracks are placed properly. Railway sleepers will be procured from Railway Board approved Sleeper Plants.

Panvel-Karjat Applicable

13) Assembling and Mechanical installation of pre-fabricated material for FOB, ROBs, RUBs, flyovers and bridges near /around work site

Prefabricated material has improved quality of bridge elements and systems as they are constructed in a controlled environment using high quality materials and standardized production processes, which leads to an extension of the structure service life.

Prefabrication is preferred in most projects it reduces bridge construction costs and life-cycle costs. Steel and pretension concrete beams are two of the most common prefabricated elements on typical bridges. Pier columns, Pile cap footings used more prefabricated elements to build bridges faster. The prefabricated material will be transported to the site and then assembled at the site.

The prefabricated material assembled at site will be installed using mechanical instruments. This will reduce the construction time drastically than the conventional methods.

Steel girders from RDSO approved workshops will be used for major bridges. Girders will be fabricated at any of the 84 workshops all over India. Girders will be transported by trailers to the site and then assembled.

Panvel-Karjat Applicable

14) O&M of all heavy vehicles and machinery

O& M of all heavy vehicles and machinery will carried out as based on type of machinery and vehicle, maintenance schedule. Waste generated during O&M of machinery will be handled as per applicable rules.

DG sets will be used as emergency power source. Various types of vehicles as tanker, dumper, dozer, roller, grader will be used in construction which would need regular maintenance.

Panvel-Karjat Applicable 5 to 6 number of D.G sets will be used during construction

15) Electrical works as installation of Overhead electrical structures (distance 50-60 m), Signaling post (400 m), Installation of power sub-station

Overhead electrical structure is to supply electricity to the moving trains. The key objective of Overhead electrical structure is thus to ensure uninterrupted uniform, reliable and safe supply of power to trains.

Over-head equipment includes masts that are installed along the rail alignment to support the equipment which provides electricity to operate trains. This power supply is accessible to trains can at all times. The structures are placed at distance of 50 to 60 m for straight alignment and 30-50 m for curves. The contractor needs to ensure is that no damage occurs to the existing OHE while installing new ones. A typical OHE is shown in *Figure 13*.







Figure 13: Typical structure of OHE

Signaling includes the use and working of signals, points, block instruments, and other allied equipment for the safe and efficient running of trains. Signaling enables the movement of trains to be controlled in such a way that the existing tracks are utilized to the maximum.

Railways need electrical power for signaling, points and other systems which would need laying cables in surrounding areas to the line of route, as well as the construction of several electrical cabinets. Signaling structures are also installed along the rail route.

The construction of a power substation for additional power requirement will be close to the existing sub-stations, nearby railway line. The construction of a new substation will be done considering the future additional loads.

Panvel-Karjat New substation is planned at Panvel and another substation at Karjat will be suitably relocated. Shifting of transmission lines will be involved.

16) Landscaping

Landscaping mainly include the addition of plants, manipulation of terrain and the construction of structures. Landscaping activity in the project would focus on enhancing the appearance and creating useable space. Trees, which can be relocated, will be relocated to the maximum possible extent. Landscaping will create user friendly spaces near station.

Panvel-Karjat Applicable

17) Improved Infrastructure such as new Tracks & Railway Stations, other facilities

New tracks and railway station will increase the carrying capacity of the route. Yard remodeling, platform building, construction of staff quarters etc will have capacity to accommodate additional riders due to increased capacity for Panvel-Karjat stretch.

Panvel-Karjat Applicable

18) Operation and Maintenance of new Tracks, new EMUs & Railway Stations, other ancillary facilities, landscaping

Maintenance facility for traction, general services, signaling, stabling lines etc will be developed based on standard practice recommended by OEM's and other Railways standard. Addition water tanks and toilets shall be installed (if required) to meet the additional requirements at the stations. The additional sewage shall be discharged in the municipal drains if the municipal drains are passing in the nearby area or septic tanks shall be provided.

Panvel-Karjat Maintenance facilities required for additional trains will be developed in the any of the existing car shed at car shed by augmentation of the existing facilities.

5.2 Parameters for Impact Identification

Environment components considered for impact identification are as follows:

- Air Quality
- Water Quality
- Land
- Noise & Vibration
- Flora, fauna and Biodiversity
- Occupational Health & Safety
- Environment Health & Safety

Various indicators are considered for these environment components to identify impacts particular to the activities. The detailed list of monitoring indicators with respect to various environment components is given in *Figure 14.*





AIR

Fugitive dust emissions in atmosphere
Dust and Gaseous emission from heavy machinery and vehicles
Emissions from diesel DG sets
Odour nuisance
Increased air pollution along nearby roads due to newly introduced vehicular traffic
Traffic congestion at rail crossings
Emissions due to use of wood or other bio mass fuels in camps
Toxic emissions /odour of chemicals, paints, fumes, lubricants etc. during rolling stock maintenance
New landscaping/Plantations improving ambient air quality

WATER

•Excessive water withdrawal/consumption from ground and surface water sources •Impact on quality of ground and surface water •Loss of seasonal flood plains •Flooding/erosion due to Flow obstruction/ changes in stream courses in canals/ creeks/ natural courses and increased sedimentation •Railway embankment affecting local drainage •Washing of trains -sending contaminants to storm water •Water stagnation and creation of temporary breeding habitats for mosquito/other vectors of disease

Impact on existing Storm water management

LAND

Land value appreciation
Soil erosion and flooding due to change in Regional physical settings such as alterations/oxbows/high embankments, Filling in low lying areas, Altered topography, drainage pattern
Change in landuse pattern due to fragmentation of land and Strip/ribbon development
Loss of productive soil due to construction activities
Compaction of land due to movement of heavy vehicles

•Soil contamination due to Fuel /oil spills

OHS

•Crewmembers are usually exposed to higher noise levels and repeated mechanical shocks and/or vibration from locomotives, rolling stocks and machinery •Health impacts on the workers due to emissions from heavy equipment and other mobile sources •Impact on safety of workers •Design safety and associated impacts •Visual Impacts due to use of reflective

FLORA & FAUNA

Felling of Large trees
Disturbance in local ecology and bio-diversity

due to cuttings of tree branches and shrubs •Effect on endemic and endangered species

•Loss of forest land and mangroves

Effect on migratory birds

•Effect on estuarine and riverine ecology •Disturbance to breeding locations/nesting site / habitats

D: 1

materials/ signages

•Disturbance to aquatic flora, fauna breeding during construction- additional piling for doubling •Disturbance to migratory corridors and impact on animal crossings

•Lack of proper maintenance during operation phase of greenbelt and landscaping created as part of MUTP-III project

•Possibility of invasive species growth, unwanted vegetation growth in RoW

NOISE & VIBRATION

Increase in Noise level
Noise and vibration due to train movement on

sensitive receptors •Noise and vibrations due to Metal Fabrication and

assembling etc

-Noise due to EMU Maintenance activities in the workshops/ carshed

•Vibration impact on existing structures due to additional train movements

•Noise & Vibration due to diesel DG sets

EHS

Impact on Health and Safety of communities
 Exposure of workers & passersby to hazardous materialslike asbestos used
 Community severance due to lack of access

 Impact on amenities/ facilities in an area including cultural and community properties (markets, gathering spaces, playgrounds, cemetries, gaochar land)

Impact on common infrastructure in an area including handpumps, common wells, toilets, electric lines/poles, access roads, pedestrian routes etc.
Impact on sensitive receptors like religious places, hospitals, school, places of heritage importance etc.
Disturbance to tribal / sensitive / vulnerable PAFs/ settlements

Impact on existing railway operations

•Temporary reduction in income due to placing of construction equipments, activities in the areas around the project site

Improved income and economic profile of the area
 Visual blight / aesthetic issues due to construction, signages, demolition affecting people
 Change in demographic configuration

Design safety and associated impacts

•Visual Impacts due to use of reflective materials/ signages

•Impact on mobility of differently abled people

Figure 14: Monitoring indicators for various Environment Parameters considered for impact identification





5.3 Impact Identification Matrix

The impacts identified from the project activities are further classified as per type, nature, likelihood of occurrence, significance and extent of the impacts. These parameters identified are also defined to suggest the appropriate mitigation measures. The definitions used to characterize the impacts are given below:

- Type of Impact
 - **Positive Impact** An impact that is considered to represent an improvement on the baseline or introduces a positive change.
 - **Negative Impact** An impact that is considered to represent an adverse change from the baseline or introduces a new undesirable factor.

• Nature of Impact

- Direct impact –Impacts that result from a direct interaction between a planned project activity and the receiving environment/receptors (e.g. between occupation of a site and the preexisting habitats or between an effluent discharge and receiving water quality)
- Indirect impact– Impacts that result from other activities that are encouraged to happen as a consequence of the Project (e.g. in-migration for employment placing a demand on resources).
- Cumulative Impact– Impacts that act together with other impacts (including those from concurrent or planned future third-party activities) to affect the same resources and/or receptors as the Project

Likelihood

Likelihood - the likelihood that an impact will occur

- Unlikely The impact is unlikely to occur.
- Likely The impact is likely to occur under most conditions.
- Definite The impact will occur.

Magnitude of impact is decided based on extent, duration and intensity of the impact.

- Extent
 - o On-site impacts that are limited to the boundaries of the development site.
 - Local impacts that affect an area in a radius of 5 km around (area of influence) the development site.
 - Regional impacts that affect regionally important environmental resources or are experienced at a regional scale which is beyond 5 km from the development site
 - National impacts that affect nationally important environmental resources or affect an area that is nationally important/ or have macro-economic consequences.

Duration

- Temporary impacts are predicted to be of short duration and intermittent/occasional.
- Short-term impacts that are predicted to last only for the duration of the construction period.
- Long-term impacts that will continue for the life of the Project but ceases when the project stops operating.
- Permanent impacts that cause a permanent change in the affected receptor or resource (e.g. removal or destruction of ecological habitat) that endures substantially beyond the project lifetime.

• Intensity

Intensity can be considered in terms of the sensitivity of the biodiversity receptor (i.e. habitats, species or communities) and ability of people/communities affected by the Project to adapt to changes brought about by the Project.



- Negligible the impact on the environment and community is not detectable.
- Low the impact affects the environment and community in such a way that natural functions, processes and livelihood are not affected.
- Medium where the affected environment is altered but natural functions, processes and livelihood continue, although in a modified way.
- High where natural functions, processes and livelihood are altered to the extent that they will temporarily or permanently cease (come to an end).

• Significance

- Negligible Significance: An impact of negligible significance (or an insignificant impact) is where a resource or receptor (including people) will not be affected in any way by a particular activity, or the predicted effect is deemed to be 'negligible' or 'imperceptible' or is indistinguishable from natural background variations.
- Minor Significance: An impact of minor significance is one where an effect will be experienced, but the impact magnitude is sufficiently small (with and without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value.
- Moderate Significance: An impact of moderate significance is one within accepted limits and standards. The emphasis for moderate impacts is on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that 'moderate' impacts have to be reduced to 'minor' impacts, but that moderate impacts are being managed effectively and efficiently.
- Major Significance: An impact of major significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. A goal of the EIA process is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted. An example might be the visual impact of a development. It is then the function of regulators and stakeholders to weigh such negative factors against the positive factors such as employment, in coming to a decision on the Project

The Environment Impact Assessment matrix for Panvel-Karjat stretch is attached as Table 21.



Sr.	Environmental	Environmental Impact		Type an	d Nature	e of Impac	:t	Significance - Magnitude											Likelihood			
No	Attribute		Impao	ct Type		Impact Nature Impact Nature Direct Indirect Cumulative On-site				Extent			Durat	ion		Intensit So	y - Bio ocio-ec	Physical a onomic	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On- site	Local	Regional	National	Temporary	Short Term	Long Term	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
	Impact Assessment for t	he activities applicable to P	anvel-Kar	jat stretch	1									•					•			1
1	Activity: Clearing the gro	ound for construction activity	ty e.g. bus	shes, scrul	b, trees o	cutting, du	ump wastes e	etc (The	e const	truction ac	tivities inc	cludes settlin	ng of labou	ır camp	s, laying of ι	utility lines	and tra	cks, settir	ng up a	ready mi	c concre	te plant,
	Air Quality	Dust and Gaseous emissions in atmosphere from heavy machinery, vehicles and ground clearing																				
	Air Quality	Emissions from diesel DG sets																				
	Air Quality	Odour nuisance due to accumulated waste material																				
	Water Quality	Impact on existing Storm water management																				
	Land	Land erosion and flooding due to change in Regional physical settings such as alterations / oxbows/ high embankments, filling in low lying areas, Altered topography, drainage pattern																				
	Land	Change in landuse pattern due to fragmentation of land and Strip/ribbon development																				
	Land	Loss of productive soil due to clearance activity																				
	Land	Compaction of land due to movement of heavy vehicles																				
	Noise and Vibration	Noise & Vibration due to diesel DG sets																				
	Fauna and Flora	Felling of Large trees in Matheran Eco-sensitive Zone																				
	Fauna and Flora	Disturbance in local ecology and bio-diversity due to cuttings of tree branches and shrubs																				
	Fauna and Flora	Loss of forest land in Matheran Eco-sensitive Zone																				
	Fauna and Flora	Effect on estuarine and riverine ecology																				
	Fauna and Flora	Disturbance to aquatic flora, fauna breeding during construction- additional piling for doubling																				

Table 21 : Impact Identification: Panvel-Karjat stretch





Sr.	Environmental	Environmental Impact	act Type and Nature of Impact Impact Type Impact Nature								Sig	nificance -	Magnit	ude				Likelihood				
No	Attribute		Impa	ct Type		Impact N	ature			Extent			Durat	ion		Intensit So	y - Bio ocio-ec	Physical a onomic	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On- site	Local	Regional	National	Temporary	Short Term	Long Term	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment and other mobile sources																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on Health and Safety of communities																				
	Environmental Health and safety	Impact on sensitive receptors like religious places, hospitals, school, places of heritage importance etc.																				
	Environmental Health and safety	Disturbance to tribal / sensitive / vulnerable PAFs/ settlements																				
	Environmental Health and safety	Improved income and economic profile of the area due to increase in employment opportunities in the area																				
	Environmental Health and safety	Visual Impacts due to use of reflective materials/signages																				
2	Activity: Dismantling / De	emolition activities	Į	,	_						1			Į	,			<u> </u>				
	Air Quality	Dust and Gaseous emissions in atmosphere from heavy machinery, vehicles and ground clearing																				
	Air Quality	Emissions from diesel DG sets																				
	Air Quality	Traffic congestion at rail crossings																				
	Water Quality	Impact on existing Storm water management																				
	Land	Land erosion and flooding due to change in Regional physical settings such as alterations / oxbows/ high embankments, filling in low lying areas, Altered topography, drainage pattern																				
	Land	Compaction of land due to movement of heavy vehicles																				
	Noise and Vibration	Increase in Noise level																				
	Noise and Vibration	Noise & Vibration due to diesel DG sets																				

Section 5: Environmental Impact Assessment



Sr.	Environmental	Environmental Impact		Type an	d Nature	e of Impac	ct					Sig	nificance -	- Magnit	ude				Likelihood			d
No	Attribute		Impa	ct Type		Impact N	ature			Extent			Durat	ion		Intensit	y - Bio	Physical	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On-	Local	Regional	National	Temporary	Short	Long	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
	Fauna and Flora	Felling of Large trees						site					Term	Term								
		located within the private premises																				
	Fauna and Flora	Disturbance in local ecology and bio-diversity due to cuttings of tree branches and shrubs																				
	Occupational Health and Safety	Exposure to higher noise levels and repeated mechanical shocks and/or vibration from dismantling activities																				
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment and other mobile sources																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on Health and Safety of communities																				
	Environmental Health and safety	Impact on amenities / facilities in an area including cultural and community properties (markets, gathering spaces, playgrounds, cemeteries, gaochar land)																				
	Environmental Health and safety	Impact on common infrastructure in an area including hand pumps, common wells, toilets, electric lines/poles, access roads, pedestrian routes etc.																				
	Environmental Health and safety	Impact on sensitive receptors like religious places, hospitals, school, places of heritage importance etc.																				
	Environmental Health and safety	Disturbance to tribal / sensitive / vulnerable PAFs/ settlements																				
	Environmental Health and safety	Visual blight / aesthetic issues due to construction, signages, demolition affecting people																				
	Environmental Health and safety	Improved income and economic profile of the area																				
	Environmental Health and safety	Visual Impacts due to use of reflective materials/signages																				



Section 5: Environmental Impact Assessment



Sr.	Environmental	Environmental Impact		Type an	d Natur	e of Impac	t					Sig	nificance	- Magnit	ude					Likelihood		
No	Attribute		Impact Type Impact Nature Impact Nature Positive Negative Direct Indirect Cumulative Compact Nature							Extent		_	Durat	ion		Intensit So	y - Bio ocio-ec	Physical conomic	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On- site	Local	Regional	National	Temporary	Short Term	Long Term	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
3	Activity: Installation and	operation of labour camps			,		1					,		1							ł	
	Air Quality	Dust and Gaseous emissions in atmosphere from heavy machinery, vehicles and ground clearing																				
	Air Quality	Emissions from diesel DG sets																				
	Air Quality	Odour nuisance due to improper management of solid waste																				
	Air Quality	Increased air pollution along nearby roads due to newly introduced vehicular traffic																				
	Air Quality	Emissions due to use of wood or other bio mass fuels in camps																				
	Water Quality	Impact on quality of ground and surface water due to discharge of untreated wastewater																				
	Water Quality	Loss of seasonal flood plains																				
	Water Quality	Water stagnation and creation of temporary breeding habitats for mosquito/other vectors of disease																				
	Water Quality	Impact on existing storm water management																				
	Land	Change in landuse pattern due to fragmentation of land and strip/ribbon development																				
	Land	Loss of productive soil due to construction activities																				
	Land	Compaction of land due to movement of heavy vehicles																				
	Land	Soil contamination due to Fuel / oil spills																				
	Noise and Vibration	Increase in noise level																				
	Noise and Vibration	Noise and vibrations due to metal fabrication and assembling etc																				
	Noise and Vibration	Noise & vibration due to diesel DG sets																				
	Fauna and Flora	Disturbance in local ecology and bio-diversity due to cuttings of tree branches and shrubs																				


Sr.	Environmental	Environmental Impact		Type an	d Nature	e of Impac	t					Sig	nificance -	Magnit	ude					L	ikelihoo	d
No	Attribute		Impac	ct Type		Impact N	ature			Extent			Durat	ion		Intensit So	y - Bio ocio-ec	Physical a onomic	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On- site	Local	Regional	National	Temporary	Short Term	Long Term	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
	Fauna and Flora	Disturbance to breeding locations/nesting site / habitats																				
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment and other mobile sources																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on Health and Safety of communities																				
	Environmental Health and safety	Impact on common infrastructure in an area including hand pumps, common wells, toilets, electric lines/poles, access roads, pedestrian routes etc.																				
	Environmental Health and safety	Visual blight / aesthetic issues due to construction, signages, demolition affecting people																				
	Environmental health and safety	Change in demographic configuration																				
	Environmental Health and safety	Visual Impacts due to use of reflective materials/signages																				
4	Activity: Access control	and barrication																				
	Air Quality	Dust and Gaseous emissions in atmosphere from heavy machinery and vehicles																				
	Air Quality	Increased air pollution along nearby roads due to newly introduced vehicular traffic																				
	Air Quality	Traffic congestion at rail crossings																				
	Water Quality	No Impact																				
	Land	Loss of productive soil due to barricading																				
	Land	Compaction of land due to movement of heavy vehicles																				
	Noise and Vibration	Increase in Noise level																				
	Noise and Vibration	Noise and vibrations due to metal fabrication and assembling etc																				
	Noise and Vibration	Noise & vibration due to diesel DG sets																				



Sr.	Environmental	Environmental Impact		Type an	d Natur	e of Impac	t					Sig	nificance -	Magnit	ude					L	ikelihoo	d
No	Attribute		Impa	ct Type		Impact N	ature			Extent			Durat	ion		Intensit	y - Bio	Physical a	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On-	Local	Regional	National	Temporary	Short	Long	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
	Fauna and Flora	Disturbance in local		-				site	-	_			Term	Term					-		-	
		ecology and bio-diversity due to cuttings of tree branches and shrubs																				
	Fauna and Flora	Disturbance to breeding locations/nesting site / habitats in Matheran Eco- sensitive Zone																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on Health and Safety of communities																				
	Environmental health and safety	community severance due to lack of access																				
	Environmental Health and safety	Impact on amenities / facilities in an area including cultural and community properties (markets, gathering spaces, playgrounds, cemeteries, gaochar land)																				
	Environmental Health and safety	Impact on common infrastructure in an area including hand pumps, common wells, toilets, electric lines/poles, access roads, pedestrian routes etc.																				
	Environmental Health and safety	Temporary reduction in income due to placing of barricading equipments, activities in the areas around the project site																				
	Environmental Health and safety	Visual blight / aesthetic issues due to construction, signages, demolition affecting people (barricading material and activity)																				
	Environmental Health and safety	Visual Impacts due to use of reflective materials/signages																				
	Environmental Health and safety	Impact on mobility of differently abled people																				
5	Activity: Relocation, arra	ngements of utility lines for	construc	tion works	;																	
	Air Quality	Dust and Gaseous emissions in atmosphere from heavy machinery, vehicles and relocation/installation of utility lines																				
	Air Quality	Emissions from diesel DG sets																				
	Water Quality	No Impact						1										1				



Sr.	Environmental	Environmental Impact		Type an	d Natur	e of Impac	;t					Sig	nificance	- Magnit	ude					L	ikelihoo	d
No	Attribute		Impac	ct Type		Impact N	ature			Extent			Durat	tion		Intensity	y - Bio	Physical	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On-	Local	Regional	National	Temporary	Short	Long	Permanent	Nealiaible	Low	Medium	High	Unlikelv	Likely	Definite
	Lond	Loop of productive soil		liogatio	2			site	2000	riograna		lomporary	Term	Term				linouluit				2011110
	Land	due to construction																				
	Land	Compaction of land due to movement of heavy vehicles																				
	Noise and Vibration	Increase in Noise level							_													
	Noise and Vibration	Noise & vibration due to diesel DG sets																				
	Fauna and Flora	No Impact																				
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment and other mobile sources																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on health and safety of communities																				
6	Activity: Collection of Co	onstruction material (as in s	and minin	g, blasting	for roc	ks, quarry	ing), Transfe	r of co	onstruct	ion materia	als							•				
	Air Quality	Dust and Gaseous emissions in atmosphere from heavy machinery, vehicles and quarrying activity																				
	Air Quality	Increased air pollution along nearby roads due to newly introduced vehicular traffic																				
	Water Quality	Water stagnation and creation of temporary breeding habitats for mosquito/other vectors of disease																				
	Land	Land erosion and flooding due to change in Regional physical settings such as alterations / oxbows/ high embankments, filling in low lying areas, Altered topography, drainage pattern																				
	Land	Change in landuse pattern due to fragmentation of land and Strip/ribbon development																				
	Land	Loss of productive soil due to construction activities																				
	Land	Compaction of land due to movement of heavy vehicles																				
	Noise and Vibration	Increase in Noise level																				
	Noise and Vibration	Noise & vibration due to diesel DG sets																				





Sr.	Environmental	Environmental Impact		Type an	d Nature	e of Impac	t					Sig	nificance -	Magnit	ude					L	ikelihoo	d
No	Attribute		Impa	ct Type		Impact Na	ature			Extent			Durati	ion		Intensit So	y - Bio ocio-ec	Physical a	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On-	Local	Regional	National	Temporary	Short	Long	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
	Fauna and Flora	Felling of Large trees						Site					Term	Term								
	Fauna and Flora	Disturbance in local ecology and bio-diversity due to cuttings of tree branches and shrubs																				
	Fauna and Flora	Disturbance to breeding locations/nesting site / habitats in Matheran Eco- sensitive Zone																				
	Occupational Health and Safety	Exposure to higher noise levels and repeated mechanical shocks and/or vibration from machinery																				
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment and other mobile sources																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on Health and Safety of communities																				
	Environmental Health and safety	Improved income and economic profile of the area																				
7	Activity: Assembling and	Mechanical installation of	Pre-fabric	ated comp	onents	near /arou	nd work site	for F	OB, ROI	Bs, RUBs a	and bridge	s										
	Air Quality	Dust and gaseous emissions in atmosphere from heavy machinery, vehicles, assembling and mochanical installation																				
	Air Quality	Emissions from diesel DG sets																				
	Water Quality	Loss of seasonal flood plains																				
	Water Quality	Water stagnation and creation of temporary breeding habitats for mosquito/other vectors of disease																				
	Land	Loss of productive soil due to fabrication activities																				
	Land	Compaction of land due to movement of heavy vehicles																				
	Land	Soil contamination due to fuel / oil spills																				
	Noise and Vibration	Increase in noise level																				
	Noise and Vibration	Noise and vibrations due to metal fabrication and assembling etc																				
	Noise and Vibration	Noise & Vibration due to diesel DG sets																				
	Fauna and Flora	Loss of forest land in Matheran Eco-sensitive																				





Sr.	Environmental	Environmental Impact		Type an	d Natur	e of Impac	t					Sig	nificance ·	- Magnit	ude					L	ikelihoo	d
No	Attribute		Impac	ct Type		Impact N	ature			Extent			Durat	ion		Intensity	y - Bio pcio-ec	Physical a	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On-	Local	Regional	National	Temporary	Short	Long	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
		Zone						site					Term	Term								
	Fauna and Flora	Disturbance to breeding locations/nesting site / habitats in Matheran Eco- sensitive Zone																				
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment and other mobile sources																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on Health and Safety of communities																				
	Environmental Health and safety	Improved income and economic profile of the area																				
	Environmental Health and safety	Visual blight / aesthetic issues due to fabrication, signages, demolition affecting people																				
	Environmental Health and safety	Visual Impacts due to use of reflective materials/signages																				
8	Activity: Earth works/La	ndfill works						1							1	1						
	Air Quality	Dust and Gaseous emissions in atmosphere from heavy machinery, vehicles and earth works																				
	Air Quality	Emissions from diesel DG sets																				
	Air Quality	Traffic congestion at rail crossings																				
	Water Quality	Loss of seasonal flood plains																				
	Water Quality	Flooding/erosion due to Flow obstruction/changes in stream courses in canals/ natural courses and increased sedimentation																				
	Water Quality	Railway embankment affecting local drainage																				
	Water Quality	Impact on existing Storm water management																				
	Land	Land erosion and flooding due to change in Regional physical settings such as alterations / oxbows/ high embankments, filling in low lying areas, Altered topography, drainage pattern																				
	Land	Change in landuse pattern due to fragmentation of land and Strip/ribbon																				





Sr.	Environmental	Environmental Impact	Dact Type and Nature of Impact									Sigi	nificance -	· Magnit	ude					L	ikelihoo	d
No	Attribute		Impac	ct Type		Impact N	ature			Extent			Durat	ion		Intensit	y - Bio ocio-ec	Physical a	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On-	Local	Regional	National	Temporary	Short	Long	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
		development						site					Term	Term								
	Land	Loss of productive soil due to construction activities																				
	Land	Compaction of land due to movement of heavy vehicles																				
	Noise and Vibration	Increase in Noise level																				
	Noise and Vibration	Noise & vibration due to diesel DG sets																				
	Fauna and Flora	Effect on estuarine and riverine ecology																				
	Fauna and Flora	Disturbance to breeding locations/nesting site / habitats in Matheran Eco- sensitive Zone																				
	Occupational Health and Safety	Exposure to higher noise levels and repeated mechanical shocks and/or vibration from machinery																				
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment and other mobile sources																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on health and safety of communities																				
	Environmental Health and safety	Impact on sensitive receptors like religious places, hospitals, school, places of heritage importance etc.																				
	Environmental Health and safety	Disturbance to tribal / sensitive / vulnerable PAFs/ settlements																				
	Environmental Health and safety	Improved income and economic profile of the area																				
	Environmental Health and safety	Visual blight / aesthetic issues due to construction, signages, demolition affecting people																				
	Environmental health and safety	Design safety and associated impacts																				
	Environmental Health and safety	Visual Impacts due to use of reflective materials/signages																				
9	Activity: Excavation and	Foundation works					I									I		·		I		
	Air Quality	Dust and Gaseous emissions in atmosphere from heavy machinery and vehicles																				





Sr.	Environmental	Environmental Impact		Type an	d Nature	e of Impac	t					Sig	nificance -	Magnit	ude					L	ikelihoo	d
No	Attribute		Impac	ct Type		Impact Na	ature			Extent			Durati	ion		Intensity	y - Bio ocio-ec	Physical a	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On-	Local	Regional	National	Temporary	Short	Long	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
	Air Quality	Emissions from diesel DG sets						Site					lerm	Term								
	Air Quality	Traffic congestion at rail crossings																				
	Water Quality	Impact on quality of ground and surface water																				
	Water Quality	Flooding/erosion due to Flow obstruction/changes in stream courses in canals/ natural courses and increased sedimentation																				
	Water Quality	Water stagnation and creation of temporary breeding habitats for mosquito/other vectors of disease																				
	Land	Land erosion and flooding due to change in Regional physical settings such as alterations / oxbows/ high embankments, filling in low lying areas, Altered topography, drainage pattern																				
	Land	Loss of productive soil due to excavation activities																				
	Land	Compaction of land due to movement of heavy vehicles																				
	Noise and Vibration	Increase in Noise level																				
	Noise and Vibration	Noise & Vibration due to diesel DG sets																				
	Fauna and Flora	Effect on estuarine and riverine ecology																				
	Fauna and Flora	Disturbance to breeding locations/nesting site / habitats in Matheran Eco- sensitive Zone																				
	Fauna and Flora	Disturbance to aquatic flora, fauna breeding during construction- additional piling for doubling																				
	Occupational Health and Safety	Exposure to higher noise levels and repeated mechanical shocks and/or vibration from machinery																				
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment and other mobile sources																				
	Occupational Health and Safety	Impact on safety of workers																				





Sr.	Environmental	Environmental Impact		Type an	d Natur	e of Impac	t					Sig	nificance -	- Magni	ude					L	ikelihoo	d
No	Attribute		Impac	ct Type		Impact N	ature			Extent			Durat	ion		Intensit	y - Bio	Physical	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On-	Local	Regional	National	Temporary	Short	Long	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
	Environmental Health	Impact on Health and		_				site		_			Term	Term							-	
	and safety	Safety of communities																				
	Environmental Health and safety	Impact on sensitive receptors like religious																				
		places, hospitals, school,																				
		importance etc.																				
	Environmental Health and safety	Disturbance to tribal / sensitive / vulnerable PAFs/ settlements																				
	Environmental Health and safety	Improved income and economic profile of the area																				
	Environmental Health	Visual blight / aesthetic																				
	and safety	issues due to construction, signages,																				
		demolition affecting																				
	Environmental health and safety	Design safety and associated impacts																				
	Environmental Health and safety	Visual Impacts due to use of reflective																				
10	Activity: Laying of Railw	ay Tracks		<u> </u>											ļ	1			1			
	Air Quality	Dust and Gaseous												[-	[
		emissions in atmosphere from heavy machinery and vehicles																				
	Air Quality	Emissions from diesel DG sets																				
	Air Quality	Traffic congestion at rail crossings																				
	Water Quality	No Impact																				
	Land	Compaction of land due to movement of heavy vehicles																				
	Noise and Vibration	Increase in Noise level																				
	Noise and Vibration	Noise and vibrations due to laying of tracks																				
	Noise and Vibration	Noise & vibration due to diesel DG sets																				
	Fauna and Flora	Effect on estuarine and riverine ecology																				
	Fauna and Flora	Disturbance to breeding locations/nesting site / habitats in Matheran Eco- sensitive Zone																				
	Occupational Health and Safety	Exposure to higher noise levels and repeated mechanical shocks and/or vibration from locomotives, rolling stocks and machinery																				





Sr.	Environmental	Environmental Impact		Type an	d Nature	e of Impac	t					Sigi	nificance -	Magnit	ude					L	ikelihoo	d
No	Attribute		Impac	ct Type		Impact Na	ature			Extent			Durati	ion		Intensity	y - Bio	Physical a	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On-	Local	Regional	National	Temporary	Short	Long	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment						site					Term	Term								
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on health and safety of communities																				
	Environmental Health and safety	Impact on sensitive receptors like religious places, hospitals, school, places of heritage importance etc.																				
	Environmental Health and safety	Disturbance to tribal / sensitive / vulnerable PAFs/ settlements																				
	Environmental Health and safety	Improved income and economic profile of the area																				
	Environmental Health and safety	Visual blight / aesthetic issues due to construction, signages, demolition affecting people																				
	Environmental health and safety	Design safety and associated impacts																				
	Environmental Health and safety	Visual Impacts due to use of reflective materials/signages																				
11	Activity: Overhead electr	rical structures installation (distance	50-60 m), lı	nstallatio	on of sign	aling post (4	00 m)	and Ins	tallation of	electrical	sub-station										
	Air Quality	Dust and Gaseous emission in atmosphere from heavy machinery and vehicles																				
	Air Quality	Emissions from diesel DG sets																				
	Water Quality	No Impact																				1
	Land	Loss of productive soil due to construction activities																				
	Land	Compaction of land due to movement of heavy vehicles																				
	Noise and Vibration	Increase in Noise level																				
	Noise and Vibration	Noise and vibrations due to Metal Fabrication and assembling etc																				
	Noise and Vibration	Noise & Vibration due to diesel DG sets																				
	Fauna and Flora	Disturbance in local ecology and bio-diversity due to cuttings of tree branches and shrubs																				





Sr.	Environmental	Environmental Impact	npact Type and Nature of Impact Impact Type Impact Nature									Sigi	nificance -	Magnit	ude					L	ikelihoo	d
No	Attribute		Impac	ct Type		Impact N	ature			Extent			Durati	ion		Intensity Sc	y - Bio ocio-ec	Physical a	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On-	Local	Regional	National	Temporary	Short	Long	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
	Fauna and Flora	Loss of forest land in Matheran Eco-sensitive Zone						site					Term	Term								
	Fauna and Flora	Disturbance to breeding locations/nesting site / habitats in Matheran Eco- sensitive Zone																				
	Occupational Health and Safety	Exposure to higher noise levels and repeated mechanical shocks and/or vibration from locomotives, rolling stocks and machinery																				
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment and other mobile sources																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on Health and Safety of communities																				
	Environmental Health and safety	Disturbance to tribal / sensitive / vulnerable PAFs/ settlements																				
	Environmental Health and safety	Improved income and economic profile of the area																				
	Environmental Health and safety	Visual blight / aesthetic issues due to construction, signages, demolition affecting people																				
	Environmental health and safety	Design safety and associated impacts																				
	Environmental Health and safety	Visual Impacts due to use of reflective materials/signages																				
12	Activity: Storage, handlin	ng and disposal of solid, ha	zardous a	nd C&D wa	aste mat	erial																
	Air Quality	Dust and gaseous emissions in atmosphere from heavy machinery and vehicles																				
	Air Quality	Odour nuisance																				
	Air Quality	Increased air pollution along nearby roads due to newly introduced vehicular traffic																				
	Water Quality	Impact on quality of ground and surface water due to run off/ leachate from waste material																				
	Water Quality	Loss of seasonal flood plains if waste storage area is created in the flood																				





No	Attribute						L					Sigr	nificance -	Magnit	ude					L	ikeiinoo	a
			Impac	t Type		Impact Na	ature			Extent			Durati	on		Intensity	y - Bio	Physical a	and	L	ikelihoo	d
										[]						So	ocio-ec	onomic				Γ
			Positive	Negative	Direct	Indirect	Cumulative	On- site	Local	Regional	National	Temporary	Short Term	Long Term	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
		plain area																				
	Lond	Loog/ contomination of																				
	Land	LOSS/ Contamination of productive soil due to storage/disposal of waste material in open land																				
	Land	Compaction of land due to movement of heavy vehicles																				
	Fauna and Flora	Disturbance in local ecology and bio-diversity due to cuttings of tree branches and shrubs for construction of platform/room for waste storage in Matheran Eco- sensitive Zone																				
	Fauna and Flora	Disturbance to breeding locations/nesting site / habitats in Matheran Eco- sensitive Zone																				
	Occupational Health and Safety	Health impacts on the workers due to continued exposure to the waste material																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on Health and Safety of communities																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on Health and Safety of communities																				
13	Activity: Landscaping																					
	Air Quality	Dust and Gaseous emission in atmosphere from heavy machinery and vehicles																				
	Air Quality	Emissions from diesel DG sets																				
	Air Quality	New landscaping / Plantations improving ambient air quality																				
	Water Quality	Excessive water withdrawal/consumption from ground and surface water sources																				



Sr. Environmental	Environmental Impact		Type an	d Nature	e of Impac	t					Sig	nificance -	Magnit	ude					L	ikelihoo	d
No Attribute		Impac	ct Type		Impact N	ature			Extent			Durati	ion		Intensit	y - Bio pcio-ec	Physical onomic	and	L	ikelihoo	d
		Positive	Negative	Direct	Indirect	Cumulative	On-	Local	Regional	National	Temporary	Short	Long	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
Land	Land erosion and flooding due to change in Regional physical settings such as alterations / oxbows/ high embankments, filling in low lying areas, Altered topography, drainage pattern						site					Term	Term								
Land	Change in landuse pattern due to fragmentation of land and strip/ribbon development																				
Land	Loss of productive soil due to construction activities																				
Noise and Vibration	Increase in noise level																				
Noise and Vibration	Noise and vibrations due to Metal Fabrication and assembling etc																				
Noise and Vibration	Noise & Vibration due to diesel DG sets																				
Fauna and Flora	Disturbance to breeding locations/nesting site / habitats in Matheran Eco- sensitive Zone																				
Occupational Health and Safety	Crewmembers are usually exposed to higher noise levels and repeated mechanical shocks and/or vibration from locomotives, rolling stocks and machinery																				
Occupational Health and Safety	Impact on safety of workers																				
Environmental Health and safety	Impact on Health and Safety of communities																				
Environmental Health and safety	Improved income and economic profile of the area																				
Environmental Health and safety	Visual blight / aesthetic issues due to construction, signages, demolition affecting people																				
Environmental health and safety	Design safety and associated impacts																				
Environmental Health and safety	Visual Impacts due to use of reflective materials/signages																				
14. Activity: Construction of	the Ancillary facilities like	ard, Platf	orms, tick	eting are	ea, Parking	g area, stabli	ng lin	e etc.	•						l		-				
Air Quality	Dust and Gaseous emission in atmosphere from machinery and vehicles																				





Sr	Environmental	Environmental Impact	t Type and Nature of Impact Significance - Magnitude								1	ikelihoo	d									
No	Attribute		Impa	ct Type		Impact N	ature			Extent			Durat	ion		Intensit	v - Bio	Physical a	and	L	ikelihoo	d
																So	ocio-ec	onomic				
			Positive	Negative	Direct	Indirect	Cumulative	On-	Local	Regional	National	Temporary	Short	Long	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
	Air Quality	Increased air pollution along nearby roads due to newly introduced vehicular traffic						Sile					Term	Term								
	Water Quality	Impact on existing Storm water management																				
	Land	Land erosion and flooding due to change in Regional physical settings such as alterations / oxbows/ high embankments, Filling in low lying areas, Altered topography, drainage pattern																				
	Land	Compaction of land due to movement of heavy vehicles																				
	Noise and Vibration	Noise & Vibration due to machineries																				
	Fauna and Flora	Felling of Large trees																				
	Fauna and Flora	Disturbance in local ecology and bio-diversity due to cuttings of tree branches and shrubs																				
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment and other mobile sources																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on Health and Safety of communities																				
	Environmental Health and safety	Improved income and economic profile of the area due to increase in employment opportunities in the area																				
	Environmental Health and safety	Visual Impacts due to use of reflective materials/signages																				
15	. Activity: Improved Infras	tructure such as new Track	s & Railwa	ay Stations	s, other f	acilities																
	Air Quality	No Impact																				
	Water Quality	No Impact																				
	Land	Land value appreciation																				
	Land	Change in landuse pattern																				
	Noise and Vibration	Noise and vibration due to train movement on sensitive receptors																				



Sr.	Environmental	Environmental Impact	Type and Nature of Impact Significance - Magnitude										L	ikelihoo	d							
No	Attribute		Impac	t Type		Impact N	ature			Extent			Durat	ion		Intensity So	y - Bio ocio-eco	Physical a onomic	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On- site	Local	Regional	National	Temporary	Short Term	Long Term	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
	Noise and Vibration	Vibration impact on existing structures due to additional train movements																				
	Fauna and Flora	No Impact																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on Health and Safety of communities																				
	Environmental Health and safety	Impact on amenities / facilities in an area including cultural and community properties (markets, gathering spaces, playgrounds, cemeteries, gaochar land)																				
	Environmental Health and safety	Impact on common infrastructure in an area including hand pumps, common wells, toilets, electric lines/poles, access roads, pedestrian routes etc.																				
	Environmental Health and safety	Improved income and economic profile of the area																				
	Environmental health and safety	Change in demographic configuration																				
	Environmental Health and safety	Health issues - communicable diseases due to migrant workers																				
	Environmental health and safety	Design safety and associated impacts																				
	Environmental Health and safety	Visual Impacts due to use of reflective																				
16	Activity: Operation and I	Maintenance of new Tracks,	new EMU	s & Railwa	y Statio	ns, other	ancillary faci	lities,	landsca	ping				<u> </u>	<u> </u>				<u> </u>			
	Air Quality	Dust and Gaseous emissions in atmosphere from heavy machinery and vehicles																				
	Air Quality	Increased air pollution along nearby roads due to newly introduced vehicular traffic																				
	Air Quality	Reduction in Traffic congestion at rail crossings																				
	Water Quality	Increase in water withdrawal/consumption from ground and surface water sources																				



S	r. Environmental	Environmental Impact	Type and Nature of Impact									Sig	nificance -	Magnit	ude					L	ikelihoo	d
N	o Attribute		Impa	ct Type		Impact N	ature			Extent			Durati	on		Intensit	y - Bio	Physical a	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On-	Local	Regional	National	Temporary	Short	Long	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
	Water Quality	Water stagnation and creation of temporary breeding habitats for mosquito/other vectors of disease						site					Term	Term								
	Water Quality	Increase in sewage and solid waste generation																				
	Water Quality	Impact on existing Storm water management																				
	Land	Change in landuse pattern due to fragmentation of land and Strip/ribbon development																				
	Land	Compaction of land due to movement of heavy vehicles																				
	Land	Soil contamination due to Fuel / oil spills																				
	Noise and Vibration	Increase in Noise level																				
	Noise and Vibration	Noise and vibration due to train movement on sensitive receptors																				
	Noise and Vibration	Noise and vibrations due to Metal Fabrication and assembling etc																				
	Fauna and Flora	Disturbance in local ecology and bio-diversity due to cuttings of tree branches and shrubs in Matheran Eco-sensitive Zone																				
	Occupational Health and Safety	Exposure to higher noise levels and repeated mechanical shocks and/or vibration from locomotives, rolling stocks and machinery																				
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment and other mobile sources																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on Health and Safety of communities																				
	Environmental Health and safety	Improved income and economic profile of the area																				
	Environmental health and safety	Change in demographic configuration																				



Sr.	Environmental	Environmental Impact		Type an	d Nature	e of Impac	t					Siq	nificance ·	- Magnit	ude					L	ikelihoo	d
No	Attribute		Impac	t Type		Impact N	ature			Extent			Durat	ion		Intensity	y - Bio	Physical	and	L	ikelihoo	d
				T		T	1		I		r					Sc	ocio-ec	onomic	T			
			Positive	Negative	Direct	Indirect	Cumulative	On- site	Local	Regional	National	Temporary	Short Term	Long Term	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
17.	Activity: Setting up and o	operation of the Ready Mix (Concrete (RMC) Plan	it	•	•											•				
	Air Quality	Dust and Gaseous emissions in atmosphere due to heavy machinery, vehicles and operation of RMC Plant																				
	Water Quality	water withdrawal/ consumption from ground and surface water sources																				
	Water Quality	Loss of seasonal flood plains																				
	Water Quality	Water stagnation and creation of temporary breeding habitats for mosquito/other vectors of disease																				
	Land	Land erosion and flooding due to change in Regional physical settings such as alterations / oxbows/ high embankments, filling in low lying areas, Altered topography, drainage pattern																				
	Land	Loss of productive soil due to construction activities																				
	Land	Compaction of land due to movement of heavy vehicles																				
	Land	Soil contamination due to Fuel / oil spills																				
	Noise and Vibration	Increase in Noise level																				
	Noise and Vibration	Noise & Vibration due to diesel DG sets																				
	Fauna and Flora	Disturbance to breeding locations/nesting site / habitats in Matheran Eco- sensitive Zone																				
	Occupational Health and Safety	Exposure to higher noise levels and repeated mechanical shocks and/or vibration from machinery																				
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment and other mobile sources																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on Health and Safety of communities																				
	Environmental Health and safety	Improved income and economic profile of the area																				





Sr.	Environmental	Environmental Impact	pact Type and Nature of Impact									Sig	nificance -	Magnit	tude	
No	Attribute		Impac	ct Type		Impact N	ature			Extent			Durat	ion		Intens
			Positive	Negative	Direct	Indirect	Cumulative	On- site	Local	Regional	National	Temporary	Short Term	Long Term	Permanent	Negligibl
	Environmental Health and safety	Visual blight / aesthetic issues due to														
		construction, signages, demolition affecting people														
	Environmental Health and safety	Visual Impacts due to use of reflective materials/signages														
18.	Activity: Operation and M	Anintenance of heavy vehicl	es, machi	nery and D	OG sets											
	Air Quality	Dust and Gaseous emissions in atmosphere from heavy machinery and vehicles														
	Air Quality	emissions from diesel DG sets														
	Water Quality	Impact on quality of ground and surface water														
	Water Quality	Water stagnation and creation of temporary breeding habitats for mosquito/other vectors of disease														
	Land	Loss of productive soil due to construction activities														
	Land	Soil contamination due to Fuel / oil spills														
	Noise and Vibration	Increase in Noise level														
	Noise and Vibration	Noise & Vibration due to diesel DG sets														
	Fauna and Flora	Disturbance to breeding locations/nesting site / habitats in Matheran Eco- sensitive Zone														
	Occupational Health and Safety	Crewmembers are usually exposed to higher noise levels and repeated mechanical shocks and/or vibration from locomotives, rolling stocks and machinery														
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment and other mobile sources														
	Occupational Health and Safety	Impact on safety of workers														
	Environmental Health and safety	Impact on Health and Safety of communities														
19.	Activity: Impact on Math	eran Eco-sensitive Zone														
	Air Quality	No Impact														
	Water Quality	No Impact														

				L	ikelihoo	d
sity So	/ - Bio cio-ec	Physical a onomic	and	L	ikelihoo	d
е	Low	Medium	High	Unlikely	Likely	Definite



Sr.	Environmental	Environmental Impact		Type an	nd Nature	e of Impac	t					Sig	nificance -	Magnit	ude					L	ikelihoo	d
No	Attribute		Impa	ct Type		Impact N	ature			Extent			Durat	ion		Intensit	y - Bio	Physical conomic	and	Li	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On-	Local	Regional	National	Temporary	Short	Long	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
	Land	Land erosion and flooding due to change in Regional physical settings such as alterations / oxbows/ high embankments, filling in low lying areas, Altered topography, drainage pattern						site					Term	Term								
	Land	Change in landuse pattern due to fragmentation of land and Strip/ribbon development																				
	Noise and Vibration	Increase in Noise level																				
	Noise and Vibration	Noise & Vibration due to diesel DG sets																				
	Fauna and Flora	Disturbance in local ecology and bio-diversity due to cuttings of trees																				
	Fauna and Flora	Loss of forest land in Matheran Eco-sensitive Zone																				
	Fauna and Flora	Disturbance to breeding locations/nesting site / habitats in Matheran Eco- sensitive Zone																				
	Occupational Health and Safety	Crewmembers are usually exposed to higher noise levels from due to heavy vehicles and machinery																				
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment and other mobile sources																				
	Occupational Health and Safety	Impact on safety of workers																				
19.	Activity: Tunneling																					
	Air Quality	Dust and Gaseous emissions in atmosphere from heavy machinery and vehicles																				
	Air Quality	Increased air pollution along nearby roads due to newly introduced vehicular traffic																				
	Water Quality	Impact on quality of groundwater																				
	Land	Land erosion and flooding due to change in Regional physical settings such as alterations /oxbows/ high embankments, Filling in low lying areas, Altered topography, drainage pattern																				





Sr.	Environmental	Environmental Impact	Type and Nature of Impact Significance - Magnitude								L	ikelihoo	d									
No	Attribute		Impao	t Type		Impact N	ature			Extent			Durat	ion		Intensit So	y - Bio ocio-ec	Physical onomic	and	L	ikelihoo	d
			Positive	Negative	Direct	Indirect	Cumulative	On- site	Local	Regional	National	Temporary	Short Term	Long Term	Permanent	Negligible	Low	Medium	High	Unlikely	Likely	Definite
	Noise and Vibration	Increase in Noise level																				
	Noise and Vibration	Vibration impact on existing structures																				
	Fauna and Flora	Loss of forest land in Matheran Eco-sensitive Zone																				
	Fauna and Flora	Disturbance in local ecology and bio-diversity in Matheran Eco-sensitive Zone																				
	Occupational Health and Safety	Workers are usually exposed to higher noise levels and repeated mechanical shocks and/or vibration from machinery																				
	Occupational Health and Safety	Health impacts on the workers due to emissions from heavy equipment and other mobile sources																				
	Occupational Health and Safety	Impact on safety of workers																				
	Environmental Health and safety	Impact on Health and Safety of communities																				
	Environmental Health and safety	Improved income and economic profile of the area																				
	Environmental Health and safety	Visual blight / aesthetic issues due to construction, signages, demolition affecting people																				
	Environmental Health and safety	Health issues - communicable diseases due to migrant workers																				
	Environmental Health and safety	Design safety and associated impacts																				



5.4 Results and Discussions

Specific Impact on Matheran Environment Sensitive Zone (MESZ) due to proposed project:

Around 4.9077 Ha of Forest land is to be diverted for the proposed project, which is 0.019% of total area of Matheran ESZ. There is change in landuse pattern with this conversion of land from forest to non-forest use.

The land in concern supports a variety of indigenous species. These trees support a variety of birds, mammals, reptiles and insects. The details are provided vide table 6 and 7 in Sub section 4.4.3 in Chapter 4 Baseline Environmental Profile.

A total of 132 trees will be cut. The predominant species to be cut includes Mangifera Indica, Cocos Nucifera, Eucalyptus, Delonix Regia etc. The detailed tree survey with chainage is provided Annexure 6. The loss of these trees due to site clearing for the development of railway alignment will lead to disturbance of local ecosystem, with loss of feeding, nesting and breeding habitat and will have direct and indirect impact on the both micro and macro scale ecosystem of Matheran Environment Sensitive Zone (MESZ).

The alignment as passes through the MESZ also causes fragmentation of ecosystem. The alignment runs alongside the existing alignment till Chainage 21+900 and take a slight detour from chainage 22+200 due to space, rail curvature, structural stability concerns of existing tunnels and less impact on Wavarle village (as listed in Chapter 7 - Analysis of Alternatives), causing fragmentation of the ecosystem. However being an linear infrastructure project it isn't causing an linear parting of ecosystem as in the MESZ zone from chainage 22+900 to 25+500 the proposed alignment gets underground with tunneling keeping the above strata intact with trees and shrubs. There is no cutting of trees/shrubs in this zone.

The underground tunnel may cause disturbance to the species found in the edge of the MESZ, as the alignment touches the outer buffer zone of Matheran Environment Sensitive zone (as presented in table 9 section 4.5) causing an immediate effect on the habitat and the species. However the impact here is less significant as the project only touches certain outer parts of the eco sensitive zone. The proposed allignment will also triggers major ecological phenomenons, i.e. Habitat frgamentation and Edge effect. Habitat fragmentation would dramatically reduce the quality of habitat for those species that require large tracts of undisturbed land which may include certain carnivores birds like crested hawk eagle etc, but the fragmentation has already been observed as there is existing railway tracks and other prevalent human activities well established in the area. Thus, the incremental impact of the proposed tracks is expected low. Another effect which can be seen here is Edge effect as the fragmentation is happening in the outer zones of the MESZ, it shall increase the edge habitat and the Edge species. In order to identify the species zonation wise and their interrelationship and impact due to developments around MESZ, a separate ecological study of the ecosystem is suggested by the respective Matheran Authority.

Another important impact seen from the project is the affect on the quality and flow of groundwater in the Matheran Environment sensitive Zone and others near area due to tunnel activity. However proposal to keep tunnels at very shallow level and lining of tunnel to cap the groundwater will help control the adverse affect of tunneling on ground water quality and flow.

Adequate study and tests will be done by the CIMFR to understand the groundwater flow pattern before finalizing any construction methodology for tunneling and proposing the right methodology for groundwater recharge and drainage for water seepage. Further strategies to address the issue like grouting and shotcreting will be planned at this stage only.

The MRVC has been holidng consultations with Matheran Matheran Environmental Protection Authority. Details of the project were shared with Matheran Eco Sensitive Authority on 13.06.2017



and a report on specific impacts on Matheran Eco sensitive zone and mitigation measures was submitted to Authority on 28.02.2018. A detailed presentation was also made to the authority during the official meeting on 03.05.2018. Further, ADTP/ Raigad had requested for submitting superimposed final alignment on MMRDA Map for further remarks /recommendations,which also has been submitted on 4th April 2019, attached vide **Annexure 18**. MRVC understands the Matheran is an eco-senstive fragile environment hence all suggestions as pointed by the committee will be taken care during construction and operation phase.

Overall Impact due to Proposed Project :

Overall, the environmental impacts of the various construction activities on each of the environmental attributes are summarized as follows:

- 1. Air:
 - Fugitive dust emissions in atmosphere
 - Dust and Gaseous emission from heavy machinery and vehicles
 - Emissions from diesel DG sets
 - Odour nuisance
 - Increased air pollution along nearby roads due to newly introduced vehicular traffic
 - Traffic congestion at rail crossings
 - Emissions due to use of wood or other bio mass fuels in camps
 - Increased air pollution due to Construction and Demolition Waste (C&D Waste)

2. Water:

- Excessive water withdrawal/ consumption from ground and surface water sources
- Impact on quality of ground and surface water
- Loss of seasonal flood plains
- Flooding/erosion due to Flow obstruction/ changes in stream courses in canals/ natural courses and increased sedimentation
- Water stagnation and creation of temporary breeding habitats for mosquito/other vectors of disease
- Railway embankment affecting local drainage
- Impact on existing storm water management

3. Land:

- Soil erosion and flooding due to change in Regional physical settings such as alterations/oxbows/high embankments, filling in low lying areas, Altered topography, drainage pattern
- Loss of productive soil/ Land degradation due to construction activities including quarrying and sand mining activity
- Compaction of land due to movement of heavy vehicles
- Soil contamination due to Fuel /oil spills and other wastes
- Generation of wastes

4. Noise:

- Increase in Noise level due to construction activity, machinery movement and operation DG sets
- Noise due to existing and/or additional train movement on sensitive receptors
- Noise due to Metal Fabrication, assembling etc

5. Flora and Fauna:

- Felling of Large trees outside and inside Matheran Eco-sensitive Zone
- Disturbance in local ecology and bio-diversity due to cuttings of tree branches and shrubs
- Impact on Matheran Eco-sensitive Zone



- i. Loss of forest land in Matheran Eco-sensitive Zone Disturbance to flora, fauna breeding during construction- additional piling for doubling, embankment and laying of track from the forest area
- ii. Change in landuse pattern due to fragmentation of land and Strip/ribbon development
- iii. Disturbance in local ecology and bio-diversity due to cuttings of trees
- iv. Impact on the quality and flow of groundwater due to dewatering/discharge of groundwater during tunneling in Matheran ESZ
- v. Disturbance in local ecology and bio-diversity in Matheran Eco-sensitive Zone due to tunneling activity

6. Occupational health & Safety:

- Crewmembers/ workers are usually exposed to higher noise levels and repeated mechanical shocks and/or vibration from locomotives, rolling stocks and machinery
- Health impacts on the workers due to emissions from heavy equipment and other mobile sources
- Impact on safety of workers
- Exposure of workers & passersby to hazardous materials like asbestos used
- Design safety and associated impacts
- Visu0al Impacts due to use of reflective materials/ signages

7. Environment, Health and Safety:

- Impact on Health and Safety of communities
- Community severance due to lack of access
- Impact on amenities/ facilities in an area including cultural and community properties (markets, gathering spaces, playgrounds, cemeteries, gaochar land)
- Impact on common infrastructure in an area including hand pumps, common wells, toilets, electric lines/poles, access roads, pedestrian routes etc.
- Impact on sensitive receptors like religious places, hospitals, school, places of heritage importance etc.
- Disturbance to tribal /sensitive/ vulnerable PAFs/ settlements
- Impact on existing railway operations
- Temporary reduction in income due to placing of construction equipments, activities in the areas around the project site
- Visual blight / aesthetic issues due to construction, signages, demolition affecting people
- Health issues communicable diseases due to migrant workers
- Impact on mobility of differently abled people

From all the above mentioned environmental impacts, the critical environmental impacts are identified based on impact type and nature, extent of the impact, duration of the impact, Intensity - Bio Physical and Socio-economic impacts and likelihood. The impacts of the construction activities are considered as critical based on the following criteria:

- 1. Impact Type: Negative
- 2. Impact Nature: Direct
- 3. Extent of the Impact: Regional
- 4. Duration of the impact :Long Term/ Permanent
- 5. Intensity Bio Physical and Socio-economic: Medium/High
- 6. Likelihood: Definite



Critical Environmental Impacts based on the above criteria for construction and operational stages are as follows:

- Loss of Forest in Matheran Eco-sensitive Zone and subsequent disturbance to ecology
- Felling of large size trees
- Excessive water withdrawal/consumption from ground and surface water sources
- Noise due to existing and/or additional train movement
- Impact on health and safety of workers
- Dust and Gaseous emission from heavy machinery and vehicles
- Impact on Health and Safety of communities
- Loss of productive soil due to construction activities



Section 6 Analysis of Alternatives

An efficient suburban rail system running across the Mumbai Metropolitan Region (MMR) is at the core of the transport system of Mumbai city. This suburban rail system is one of the most crowded and overloaded suburban systems in the world carrying around 7.6 million people in more than 2900 train service every day. Mumbai is the largest and the most populous metropolis in the country and the projected population of total MMR is 34.0 million by 2031.Thus, to meet the demands of the evergrowing passenger traffic, MRVC has proposed to improve railway network connecting Panvel-Karjat.

In case of 'No Project Alternative' scenario i.e. without proposed double line corridor between Panvel-Karjat, the increasing population will depend more on road transport, more GHG intensive personal vehicles. Thus, the increased road traffic will lead to vehicular congestion, increase in GHG emissions adversely affecting the environment. Thus, the railway is a more environment friendly alternative for transport.

MRVC in Phase–III of MUTP has proposed a double line for extending the suburban rail services on the Panvel-Karjat section. The proposed expansion work includes modification of platforms at existing stations, additional sub-station at Panvel, new stabling sidings and construction of ROBs, RUBs, tunnels on the proposed alignment. The Yard is proposed near Karjat Station.

The proposed corridor from Panvel to Karjat lies in the administrative jurisdiction of Central Railway and falls in Panvel, Khalapur and Karjat Talukas of Raigad District of Maharashtra. Sensitive features as agriculture land, Morbe Dam, habitations are present in the study area.

The physical, socio-economic and environmental factors are analysed for the proposed alignments. Analysis of physical environment includes evaluation of transportation infrastructure, material sourcing, disposal of waste material, land. Analysis of socio-economic environment includes evaluation of overall socio-economic development of the area. Analysis of environmental environment includes analysis of biological features as tree cover, quality of air, water, noise and other environment features.

• Physical Factors:

- The proposed two lines will run Suburban services between Panvel & Karjat considering significant growth in Navi Mumbai area and will support additional Mail/Express trains.
- Panvel is a junction station with trains from/to CSTM, Diva, Uran, JNPT, Karjat and Roha. Addition of two new lines is proposed as the existing Kurla-Kalyan and Kalyan-Karjat sections are over saturated and the only future alternative for South bound trains is through Panvel– Karjat route.
- With double corridor line, trains on the Konkan Railway Corporation Ltd (KRCL) to Madgaon, Mangalore and Ernakulam from Pune will be diverted through this route, which will increase the carrying capacity of the route.

Socio-economic Factors:

- The Double Corridor will provide direct connectivity of Navi Mumbai to other parts of the country. Thus, Panvel can become a terminal station for trains towards southern Maharashtra, Goa, Karnataka, Tamil Nadu and Kerala, which will enhance the capacity for fast transport.
- Employment Opportunity and Rise in Income level Opportunity for unskilled/skilled/skilled people to work in the project. Induced developments such as local transportation and other small businesses will cater to increasing population in the project area.

• Environmental Factors:

- The disposal of waste generated during construction work will be handled in environment friendly manner.
- The construction materials to be used are soil, aggregates, cement, crushed sand etc. All the construction material will be collected from authorized quarries in sustainable manner with



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minimal impact on environment. Minimum impact on the environmental components i.e. air, water, noise, vibration, soil which will be mitigated through implementation of the Environment Management Plan.

- The overall impact of the project is likely to be insignificant on the biological environment except in terms of loss of trees which will be minimized with proposed compensatory tree plantation in the ratio of 1:5.
- The impact on air quality and noise will be temporary only during construction phase and will be mitigated with necessary noise and air pollution control measures. Air quality, noise levels are likely to improve around the railway crossings due to the provision of ROBs/RUBs at all level crossings.

MRVC has conducted detailed field investigations and pre-feasibility study to understand the characteristics of present system, assess the present and future ridership in the project area. Accordingly, MRVC has undertaken planning of alignment, economic and sensitivity analysis for the proposed routes based on projected growth potential of area, projected traffic demand, extension of existing station before alignment planning.

The proposed new alignment is proposed to design in parallel and in juxtaposition to the existing stretch on account of following reasons:

- The proposed alignment is part of expansion of existing alignment, as it will utilize most of the existing rail infrastructure.
- Due to presence of existing alignment and availability of railway land at some sections, land acquisition will be minimised. If alternate route is planned away from existing alignment, it will pass through major habitation areas and would lead land acquisition to larger extent.
- The financial, environmental and social costs can be kept minimum considering the availability of railway land and road approaches near the existing alignment, major settlement near stations.

In addition to this, considering technical feasibility, site suitability and site specific environmental issues, MRVC has further devised two alternatives as follows:

Alternative 1: Proposed alignment parallel and adjacent to existing alignment on RHS (South) with one tunnel

Alternative 2: Proposed alignment at distance from existing alignment on LHS (North) starting from Ch. 21+300 along with 2 Tunnels

The alternatives are presented in *Figure 15* and *Figure 16*.





Figure 15: Proposed alignment parallel and adjacent to existing alignment on RHS with one tunnel (Alternative 1)



Figure 16: Proposed alignment at distance from existing alignment on LHS starting from Ch. 21+300 along with 2 Tunnels (Alternative 2)



Table 22 presents the analysis for these two proposed alternatives for Panvel-Karjat Stretch.

Parameters	Alternative 1 (Proposed alignment parallel and adjacent to existing alignment on RHS with one tunnel)	Alternative 2 (Proposed alignment at distance from existing alignment on LHS starting from Ch. 21+300 along with 2 Tunnels)	Recommendation
Technical Feasibility	 Technically tunnelling was not feasible adjacent to existing tunnel at Wavarle as it would have led to danger to existing tunnel which is unlined. 	 No danger to the existing Wavarle tunnel as proposed tunnel is planned at a distance of 600 m from existing tunnel at Wavarle. 	 Detailed geological and hydro geological investigations must be carried out before designing, planning and executing tunnel
Site Suitability	 Panvel-Karjat Highway and WTP at Bhokarpada are adjacent to existing alignment on RHS. Thus, accommodating 2 new sub-urban lines at some locations would be difficult without shifting the existing structures. Difficulty in accommodating proposed suburban terminus at existing Karjat Station and ROB near Karjat Station. 	 As no major structures are present in the proposed boundary on LHS of existing alignment, 2 new sub- urban lines can be accommodate0d. Open land is available just before existing Karjat Station to accommodate new suburban terminus. 	 works to prevent any environment and health hazard. Tunnelling shall be carried out under the supervision of an expert agency. Borrow material shall not be taken from Matheran Eco- sensitive Zone. Earth available from
Social Impact	 Land acquisition at Wavarle would have caused rehabilitation of many households in Wavarle village. 	 Rerouting of tunnels through bypassing the Wavarle village area will avoid rehabilitation in Wavarle village to large extent. 	cutting to the extent possible shall be used for filling during construction.Labour camps shall
Environmental Impacts	 Proposed alignment will be passing through Matheran ESZ adjacent to existing alignment. Hence, disturbance to ecology and bio-diversity of the area is expected minimal. 	 As the proposed through Matheran ESZ is passing through tunnel at Wavarle, disturbance to the ecology of the area will be minimal. 	not be set up in Matheran Eco- sensitive zone.

Table 22: Analysis of	Alternative for	Panvel-Karjat Stretch
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Conclusion:

During the study, stakeholder consultations have also been carried out with the local communities and other stakeholders to understand their requirements. The proposed project is much needed in today's time for convenience of people and development of the region. Overall, it will generate positive social, environmental, and economic impacts and their negative impacts can be mitigated through appropriate safeguard measures.



Section 7 Stakeholder Consultation

Environmental management being collective responsibility of communities and the Government, Consultation with people is crucial aspect of the project. Consultation is used as a tool to inform and educate public about the proposed project and its alternative scenario.

AllB's ESP requires that affected groups and non-governmental organizations (NGOs) be consulted as a part of the environmental assessment of projects with potentially significant impacts (Category A projects).

As per the AIIB's Environmental and Social standards (ESS) guidelines Project proponents are required to build consultations into project planning, so that information can be exchanged with stakeholder groups early enough and the Environment and Social Management Plan for the entire project cycle can be prepared in consultation with the stakeholders.

The benefits of stakeholder consultation include fewer conflicts with stakeholders, avoid delays in the project clearance process, improved decision making process and secure greater transparency and accountability. Environmental and Social Management Plans derived in consultation with stakeholders are more effective.

Methodology adopted for the stakeholder consultation is as follows:

- Identification of all stakeholder groups (typically integrated with social assessment)
- Identification of the key issues around which consultation will be needed (scoping)
- Determining the necessary level of consultation
- Identification of key consultation points
- Selection of consultation techniques
- Defining a communication methodology
- Development of a budget for impact mitigation

Stakeholder consultation was initiated after environmental screening and also after preparation of draft Environment Assessment report. For Category A projects, the project affected groups are consulted throughout the project phase to capture opinions of various groups and individuals.

In this study, the stakeholders were consulted using two type of consultation were carried out for this project.

- 1. Focused Group Discussion
- 2. Public Consultation

7.1 Focused Group Discussion

Focused Group Discussions were undertaken using following techniques:

- One-to-one discussions with key agencies including the MRVC, various governmental agencies, Industries and Voluntary Agencies, Activists in project area
- One to one discussion with select members of the communities in the Direct Impact Zone
- Semi-structured questionnaire based surveys of the small groups in the Direct Impact Zone

These would help capture various opinions of groups and individuals. However, detailed discussions and surveys of each household do not fall within the purview of this assignment and shall be conducted while carrying out the Social Impact Assessment.







7.1.1 Stakeholders Consulted

The stakeholders consulted for Panvel-Karjat stretch are as follows:

- Department of Environment, Government of Maharashtra
- Matheran ESZ Monitoring Cell
- Additional Chief Secretary (forest), Revenue and Forest Department, Government of Maharashtra
- District Collectorate, Alibaug
- Rural Hospital & school



- Gram Panchayats
- Navi Mumbai Municipal Corporation
- Local people in project surroundings especially project affected people
- Farmers in project surroundings
- Representatives of social organizations as Pravasi Sangathna Khopoli, Pravasi Sangathna Chowk; Netaji Palkar Mandal

The overall objective of meeting various Government departments were to understand the implications of the Regulatory requirements of the MUTP III projects. Also, the another objective was to inform the relevant Government departments about the proposed MUTP-III project which will be passing through their jurisdiction.

7.1.2 Output of the FGDs with the Stakeholders

The details of Discussions carried out along the Panvel-Karjat Stretch with local community and industries/institutes (other than Government department) is summarized in *Table 23.*



Sr. No.	Stakeholder specifications	Location & description of location	Stakeholders details	Major Health/ Environmental/ Social Issues Identified	Stakeholder awareness about the project/ Views on project
1	Formal Settlers near existing and new alignment: Land / House owners	Habitation near Karjat Station (on the East and West side of the Karjat Station)	Demography: 15-20 Daily needs shops. Livelihood: Shopkeeper vendors	 Health issue: No health issue. Environmental Issues: Noise and Vibration issues, since the shops are adjacent to the Karjat Railway Station. Social Issues: No social issues. 	Project awareness: Aware about the project. Overall response: More than 35,000 commuters travel everyday from Karjat Station. Since all good hospitals, school/colleges are in Panvel & Kalyan city. Since there is no connectivity to Panvel city, Karjat residents travel to Kalyan (which is 1 hr from Karjat Station via Karjat -CST local train) to avail these services. When the suburban corridor is created, residents from Karjat will reach Panvel in 20 min. Hence, the project is viewed as beneficial in terms of infrastructure development and economical benefits.
2	Formal Settlers near existing and new alignment: Land / House owners	Habitation in Wanjale village. It is located on the West side of the Karjat Railway Station at a distance of 2.83 km	Demography:160-170families/withaverage4-5members per family/average income perfamily400-500Rs/day).day).Livelihood:Dailywagelabourersinnearby farms, animalhusbandry and other	 Health issue: No major issue. Environmental Issues : No Noise and Vibration issues Social Issues: No social issues 	 Project awareness: Not aware about project before therefore project briefing was given during FGD. Overall response: There are approx. 350 residents from Wanjale village travel everyday to Panvel city, via bus. The residents have to first reach Karjat Station using share auto (Rs.15) and then travel to Panvel city using Bus service (Rs. 40). It takes around 2 hrs to reach the Panvel City, however if

Table 23: Outcome of Stakeholder Discussions Undertaken along Panvel-Karjat Stretch





Sr. No.	Stakeholder specifications	Location & description of location	Stakeholders details	Major Health/ Environmental/ Social Issues Identified	Stakeholder awareness about the project/ Views on project
			businesses like construction.		the project is executed then the travel time will be reduced to 20 minutes and the travel expense will also reduce to Rs.10. Hence, the project is beneficial impact of the project in terms of infrastructure development and economical benefits.
3	Formal Settlers near existing and new alignment: Land	Habitation near Wavarle Tunnel.	Demography: 15-20 people in the Raigad Enterprises of Explosives	Health issue: No major issue. Environmental issue: Noise and vibration, air pollution issue as there	Project awareness: Aware about project Overall response: Viewed as a
	/ House owners	Raj Enterprises Godown is located near the Wavarle Tunnel approx. 200 m. Surrounding area 200 acres belongs to Raj Enterprise Godown. The Godown is used for the storage of explosives.		 will be blasting during the construction of Tunnel. Since the godown has explosives used for blasting, safety of the area is a major issue. Social issues: No social issues. 	beneficial impact of the project in terms of infrastructure development and economical benefits.
4	Formal Settlers near existing and new alignment: Land / House owners	Habitation near Morbe Dam. As per locals the name of the Village is Vadvihir Koyna Village. The Village is approximately 212 m from the proposed new alignment. The Railway Station	Demography:30-35families/withaverage4-5members per family/average income perfamily150-200 Rs/day).Livelihood:Dailywagelabourers,	 Health issue: No major issue. Environmental issues: Noise and vibration issue, since the existing track is 200 m away from the Village. Social issue: The existing residents in the Village are resettled to this location from the area around the Koyna dam when the dam was constructed. Morbe dam (approx. 	Project awareness: Aware about project Overall response: During the construction of the existing Nadhal tunnel in 1994, approximately 25 houses in Wadhiv village were destroyed during construction of tunnel. 10-12 buffaloes were killed due to noise and vibration. The new alignment is 200 m away from the



Sr. No.	Stakeholder specifications	Location & description of location	Stakeholders details	Major Health/ Environmental/ Social Issues Identified	Stakeholder awareness about the project/ Views on project
		nearest to the inhabitants is Chowk Station (4.5 km)	shop vendors.	500 m from the village) authority have provided them land in the Village. The land ownership lies with Morbe dam authorities.	village, the residents of this village are not very keen to support the project.
5	Formal Settlers near existing and new alignment: Land/House owners	Habitation on the East side of Chowk Railway Station .The habitation is approx. 200 m from Chowk Railway Station.	Demography: 50-60 families/ with average 4-5 members per family/ average income per family 500-700 Rs/ day). Livelihood: Daily wage labourers, shop vendors	 Health issue: No major issue. Environmental issues: Noise and Vibration issue, since the residents are adjacent to the existing tracks. Social issue: The new alignment will pass through the residents of the Ambedkar Nagar Colony, There are 20-25 houses who will be resettled in order to construct the new alignment. The land survey was already conducted. Water Supply is this locality is scarce. 	Project awareness: Aware about the project Overall response: Understand that they need to give land for public interest as the project will be beneficial to the all Villagers in the surrounding areas. Currently the residents travel to Panvel via Bhusawal train in the morning or by bus. Bus stop is on the West side of the Chowk Station and it takes half an hour to travel by bus. Whereas due to the project, the travel time to Panvel will be 20 min. Since infrastructure like hospitals and schools are in Panvel city, the project is viewed as beneficial in terms of access to the infrastructure to the residents of the Chowk village.
6	Formal Settlers and institutions near existing and new alignment: Land /House owners/	Industries at Chowk: Agrawal Movers and Packers The warehouse is near Chowk Railway Station, approx. 100 m from the	Demography : 100- 150 Workers	Health issue: No major issue.Environmentalissue: NoEnvironmentalissue. Nonoise/vibration issues	 Project awareness: Not aware about project, briefing was done during FGD. Overall response: There are about 20-25 workers who travel from Mumbai daily, currently they travel through Mumbai -Bhusawal train which halts at



eholder fications	Location & description of location	Stakeholders details	Major Health/ Environmental/ Social Issues Identified	Stakeholder awareness about the project/ Views on project
	new alignment.		Social issue: No major issue.	Chowk Station. In the morning and in the evening they travel by bus to Panvel Station. It takes around 1 hr to reach Panvel Station via bus and the fare is Rs.20. The project would be beneficial for them in terms of access to infrastructure and there will be economical benefits.
Settlers existing new	Matheran Eco Sensitive Zone.	Demography:100-110families/withaverage4-5	Health issue:No major issue.Environmentalissue:No	Project awareness: Aware about project
ent: Land e owners	The nearest habitation near Matheran Eco- Sensitive Zone is Barwai	members per family/ average income per	Environmental issue. No noise/ vibration issues	Overall response: Viewed as a beneficial project in terms of infrastructure development and
	Village. The new alignment is approx. 300	day.	Social issue: No major issue.	economical benefits.
	m from the new alignment.	Livelihood: Daily wage labourers		
	nearest (2.49 Km) to the Barwai Village.			
Settlers	Poyanje Village is on the	Demography: 40-50	Health issue: No major issue.	Project awareness: Not aware about
existing new	East side of the Mohope Railway Station at	families/with average 4-5 members per	Environmental issue: No	MUTP-III Project, Briefing was done during FGD.
ent: Land	approx. 390 m. The new	family/average	Environmental issue. No noise/	Overall response: Viewed as a
e owners	alignment is approx. 200	Income per family		beneficial impact of the project in terms
	village.		Social issue: No major issue.	of infrastructure development and
		Livelihood: Daily wage labourers in		economical benefits .However, residents of the Village are not
	Settlers existing new ent: Land e owners Settlers existing new ent: Land e owners	holder icationsLocation & description of locationicationsnew alignment.new alignment.new alignment.Settlers existing new ent: Land e ownersMatheran Eco Sensitive Zone.The nearest habitation near Matheran Eco- Sensitive Zone is Barwai Village. The new alignment is approx. 300 m from the new alignment. Mohope railway Station is nearest (2.49 Km) to the Barwai Village.Settlers existing new ent: Land e ownersPoyanje Village is on the East side of the Mohope Railway Station at approx. 390 m. The new alignment is approx. 200 m from the Poyanje village.	Inolder icationsLocation & description of locationStakenoiders detailsicationsof locationdetailsnew alignment.new alignment.Settlers existing new ant: Land ownersMatheran Eco- Sensitive Zone.Demography: 100- 110 families/ with average 4-5 members per family/ average income per family 200-300 Rs/ day.Village.The nearest habitation near Matheran Eco- Sensitive Zone is Barwai Village.Demography: 100- 110 families/ with average income per family 200-300 Rs/ day.Village.The new 	Holder ications Location & description of location Stakeholders details Major Health/ Environmental/ Social Issues Identified new alignment. new alignment. Social Issue: No major issue. Settlers existing new ant: Land owners Matheran Eco Sensitive Zone. Demography: 100- 110 families/ with average 4-5 members per family/ average income per family 200-300 Rs/ day. Health issue: No major issue. Village. The nearest habitation near Matheran Eco- Sensitive Zone is Barwai Village. Demography: 200-300 Rs/ day. Health issue: No major issue. Settlers existing new alignment. Mohope railway Station is nearest (2.49 Km) to the Barwai Village. Demography: 40-50 families/with average 4-5 members per family/average income per family/ wage labourers Health issue: No major issue. Settlers existing new ant: Land o owners Poyanje Village is on the existing new alignment is approx. 300 m from the Poyanje village. Demography: 40-50 families/with average family/average income per family/ 170-200 Rs./ day). Health issue: No major issue. Environmental issues Issue: No noise/ vibration issues Social issue: No major issue. Social issue: No major issue.



Sr. No.	Stakeholder specifications	Location & description of location	Stakeholders details	Major Health/ Environmental/ Social Issues Identified	Stakeholder awareness about the project/ Views on project
			nearby farms.		frequent travelers. If needed, the residents travel via bus or auto or at times by Bhusawal Mumbai train which halts at Mohope Station.
9	Formal Settlers near existing and new alignment: Land / House owners	Adivasi Pada It is located in Barwai Village.	Demography:40-50families/withaverage4-5membersperfamily/averageincomeincomeperfamily170-200 Rs/ day).Livelihood:Dailywagelabourersin nearby farms.	Health issue: No major issue. Environmental issue: The Barwai residents (including children) travel everyday 1-1.5 Km to fetch water. Barwai residents would like to have water connection in their Village. No noise/ vibration issues Social issue: No major issue	Project awareness: Aware about project Overall response: Not ready to share their views.
10	Formal Settlers near existing and new alignment: Land / House owners	Bhingarvillage(Habitation near ChikhaleStation)The new alignment isapprox. 100 m from theVillage. Chikhale RailwayStation is the nearestStation.	Demography:500families/withaverage4-5members per family/average income perfamily150-200Rs/day).Livelihood:DailyWages	Health issue: No major issue. Environmental issue: Loss of agricultural land/Crops as the land to be acquired for the project	 Project awareness: Aware about the project Overall response: Viewed as a beneficial impact of the project in terms of infrastructure development and economical benefits.



Sr. No.	Stakeholder specifications	Location & description of location	Stakeholders details	Major Health/ Environmental/ Social Issues Identified	Stakeholder awareness about the project/ Views on project
11	Formal Settlers near existing and new alignment: Land / House owners	Habitation near Chikhale Station. It is located at the boundary of Chikhale Station and new	le Demography : 20 members in family/ average income per family 300-400 Rs/ day). w g Livelihood: Farming.	Health issue: No major issue. Environmental issue: Loss of agricultural land/ crops due to the project	Project awareness: Aware about project as the land survey has been conducted and notices has been issued. Overall response: Viewed as a
		alignment is passing through their land.		lihood: Farming. Social issue: Owns house opposite to Chikhale Railway Station which is adjacent to the boundary of the land to be acquired for the project.	beneficial project in terms of infrastructure development and economical benefits. However, the stakeholders are concerned about the rehabilitation process and compensation for land.
12	Formal Settlers near existing and new alignment: Railway staff Quarters	Railway Colony, Panvel	Demography: 20-25 families Livelihood: Railway Employees	Health issue: No major issue.Environmentalissue: No noise/ vibration issuesSocial issue: No major issue.	 Project awareness: Aware about the project Overall response: Viewed as a beneficial impact of the project in terms of access to infrastructure and economical benefits.
13	Formal Settlers near existing and new alignment: Land / House owners	Panvel Station (Habitation near ROB Panvel).This residential complex is located on the East side of Panvel Station which is near to the new proposed ROB.	Demography: 80-90 families with average 4-5 members per family. Average income per family 300-400 Rs./ day Livelihood: Job holders	Health issue: No major issue. Environmental issue: The proposed ROB is passing over Kalundre river. Social issue: No major issue.	 Project awareness: Aware about the project Overall response: Viewed as a beneficial impact of the project in terms of access to infrastructure and economical benefits.
7.1.3 Discussion with Government officials

MRVC is holding several ongoing consultations with the government stakeholders since the initial planning phase of the project and the details are provided vide table below :

Sr. No	Name of the Department	Details of the discussions	Action taken by MRVC
1	Matheran ESZ Monitoring Committee - District Collector & District Magistrate District Collector's Office At/PO - Alibag, District - Raigad Pin - 402 201	1. Meeting was conducted with Ms. Pallavi Latkar (Matheran ESZ Committee Member) on 20 th April, 2018. Discussions were carried out to understand further course of action after submission of Study report on Matheran Study area. Ms. Latkar guided to obtain remarks from ADTP before next meeting with Matheran ESZ Committee.	
		2. In the Matheran ESZ meeting scheduled on 3 rd May, 2018 with all the Committee members, the Committee directed MRVC to take necessary approvals from Forest department. Based on the recommendations of Forest Department, the Committee will consider the proposal.	 MRVC has submitted the proposal to respective Forest Depmt of the district on 1st Feb 2018 for forest to non-forest diversion of land. Refer to Annexure 19.
		3. The Matheran ESZ Committee has asked for submission of alignment drawings to District Collectorate of the zone, Alibaugh. The request is to superimpose final alignment along with tunnels details (location with chainage and length) on the MMRDA sanctioned MEPA plans.	3. MRVC has submitted all the required documents to Matheran ESZ Committee on 4 th April, 2019. The response from Matheran ESZ Committee is awaited. The recommendations from the authority on the Matheran eco-sensitive conservation shall be incorporated into the construction methodology near the concerned areas and documented in the updated EA report. Refer to Annexure 18.
2	Morbe Dam division of Navi Mumbai Municipal Corporation, City Engineer Department, 2nd Floor office, Navi Mumbai	The meeting was conducted on 24 April, 2018 to understand dam safety aspects undertaken by NMMC.	MRVC has submitted maps to NMMC showing existing and proposed alignment, survey numbers, utilities for the area in the vicinity of Bhokarpada WTP





Sr. No	Name of the Department	Details of the discussions	Action taken by MRVC
	Municipal Corporation Office	 NMMC has mentioned following key points: Dam Safety Organization (DSO) under Water Resources Department (WRD), Maharashtra performs the functions like conducting inspections of large dams (pre/ post monsoon), inspecting instruments in dams & gates, scrutiny of emergency action plan etc. Besides this, the organization also carries out Dam break analysis. After submission of data by MRVC, NMMC through the Dam Safety Organization will undertake "Dam Integrity Test". Output of the study with suggestions/recommendation will be provided to MRVC, if any. Thus, after receiving dam integrity results, MRVC can suitably address the recommendations during its construction activities. Also, NMMC had shared their views on doing a Joint safety assessment later if required 	and Morbe Dam. The same shall be forwarded to the Dam Safety Organisation. Nashik for their subsequent action. The official letter is provided <i>Annexure 17.</i> Based on the initial submissions the preliminary joint survey has commenced. The first survey was done on 13 th May 2019 between MRVC, NMMC officials and DSO team. Simultaneously MRVC has appointed CIMFR for pre excavation analysis, the results of the same shall be shared by MRVC with NMMC and DSO for further action.
3	Maharashtra Jeevan Pradhikaran for Water Supply to Navi Mumbai - Ground Floor, Maharashtra Jeevan Pradhikaran Office, HDFC Circle, Sector 1A, New Panvel	The meeting was conducted on 24 April, 2018 to understand concerns related to WTP operated by MJP.MJP is planning upgradation WTP and pipelines. Details of which are shared with railways.	The sections where the alignment crosses over the existing water lines will be structurally protected by bridges/culverts.



Sr. No Name o	of the Department	Details of the discussions	Action taken by MRVC
4 District Magistra (Asst. D Plannin Mr. Kira (Reside Raigad) District Magistra Collecto Alibag, Pin - 40	Collector & District ate- Mr. Girolla birector Town g, Raigad) an Panbude nt Dy. Collector, Collector & District ate, District or's Office, At/PO - District – Raigad 2 201	The meeting was conducted on 24 April, 2018 to understand further course of action related to Matheran ESZ. Much earlier, the officers had directed MRVC to prepare analysis of alternative for selecting the new proposed alignment route and present in meeting scheduled on 3 rd May,2018. Accordingly, presentation was made to Matheran ESA Committee members on 3 rd May, 2018.	MRVC has submitted all the required documents to Alibuagh Distirct Collectorate on 4 th April, 2019. The response from Matheran ESZ Committee is awaited.

The minutes of the meeting conducted with Morbe Dam Division and MJP is attached as Annexure 11.

7.2 Public Consultation

Public Consultation is aimed to understand the public perception, identify issues associated with the project and their impacts on the local people as well as their expectations from the project. Public consultation helps in evolving a suitable mechanism through which problems associated with the development are scientifically investigated and resolved. This participatory two way process enables the participation of the local people in the decision making process. The Consultations are meant to inform people about the project, environmental aspects and likely environmental and social impacts due to proposed project. The Consultations would also seek their views/concerns, for consideration while conducting the EA study and preparation of an implementable ESMP.

Public consultation is intended to enhance people's participation in the project by improving communication, interaction and joint decision making between different stakeholders. Through public participation, all parties are well informed about the project, likely impact on environment & society as well range of views on issues and mitigation proposals. Most importantly, a good public participation process will result in better decision making process which is sensitive and responsive to public concerns and values.

The Public Consultations were conducted in accordance with the AIIB's ESP and ESS 1 Guidelines to inform the local inhabitants of the area, residing within 5 km on either side of the proposed project. The methodology of Public Consultation undertaken is as follows:

- IEISL-STEP ((Social Assessment Consultants) and M/s Voyants (Social Assessment Consultants) along with the MRVC officers coordinated with the local bodies to inform people about the process and to seek their support in identifying suitable venue for the meetings.
- The local residents were invited to attend the Public Consultations by publishing newspaper advertisement and also during focused group discussions.
- Executive summary of the project especially related to environment and social assessment was made available on MRVC website and at district collectorate office

Separate Public Consultations was organized for Panvel-Karjat area.



During the public consultation, the issues are discussed in accordance with the defined objectives. The issues discussed during consultation are as follows:

- Specific Environmental issues
- Extent of likely adverse impacts due to the project from both environment and social perspectives •
- Expectation of the people from the project •
- Identification and protection of culturally sensitive sites along the project stretch
- Perception of the existing project stretch and usage •
- Benefits and problems faced if any from the existing stretch •
- Impact on environment and livelihood due to project

The locals were informed about the proposed project and likely impacts during the construction and operational phases, based on the first had experience of the IEISL-STEP team gathered during the reconnaissance surveys, baseline monitoring and the focus group discussions held with the locals during the surveys to identify the sensitive receptors on either side of proposed alignment.

Public Consultation was held for Panvel-Karjat stretch at Chowk Station on 7th Nov, 2017 as it is at the centre of the alignment, thus a convenient location for people in the study area. The consultation was arranged in a Pandal equipped with 200 plus seating capacity. Before starting the consultation, sheets for attendance and points of discussions were circulated among the stakeholders. Executive summary of the project especially related to environment and social assessment was circulated. Various stakeholders as locals in the vicinity of existing alignment, local representatives, farmers, representatives of social organizations as Buddhist Village Committee, Chowk; Pravasi Sangathna Khopoli, Pravasi Sangha Chowk, Netaji Palkar Mandal attended the meeting.

MRVC officials explained people about the proposed Double line Corridor on Panvel-Karjat stretch and all positive development it will bring in future. Details of proposed alignment, proposed ancillary facilities, land requirement in various villages, project affected persons, tree cutting etc. were shared with people. The environment concerns as loss of biodiversity, tree cutting along the rail corridor especially in Matheran Eco Sensitive Zone, construction of tunnels near Nadhal and Wavarle village and safety & mitigation measures for the same were also explained. Socio-economic survey team has also had interaction with the locals to understand their concerns. The Land Acquisition Act, 2013 by Govt. of India and amendment of the act by Govt. of Maharashtra in year 2015 for compensation model was also explained.

Prevailing environmental and social issues in the project area and likely impacts of the projects were informed to the locals during public consultations and their concerns/suggestions/objections were recorded as proceeding of these meetings.



Summary of discussions during Public Consultation held for Panvel-Karjat stretch is presented in Table 24.



Sr. No.	Points Discussed during Consultation	Remarks
1.	 Suggestions to incorporate safety measures near Wavarle tunnel section such as access road, bridge for crossing over, evacuation roads for emergency purposes. 	 All the necessary suggestion will be incorporated in project design.
2.	 Concern about the water supply to farming because of water requirement for the proposed project 	 Appropriate measures will be taken to ensure that agriculture water supply in not affected.
3.	 Demand of trial run on existing single railway line for running local train first before taking up the double line corridor work. 	 The concerns will be conveyed to concerned authority for further action.
4.	 Discussions related to improving of railway connectivity on existing route: Demand to start shuttle services and more passenger trains on existing route on immediate basis to ease out travelling from Chowk to Panvel for ease of commuters. Demand of local train on this route as this is the industrial development zone and many residential projects are coming up in this region Demand to halt long distance trains which are passing through Chowk station in peak hours. Demand of halt of local/passenger trains at Chowk and Khopoli station Demand to provide the timeline and inform the stakeholders about start of local trains on Panvel-Karjat route. 	 The concerns will be conveyed to concerned authority for further action.
5.	 Discussions related to improvement in amenities at existing railway infrastructure: Change of inconvenient location and timing of Ticketing Counter at Chowk station Need of water supply and cleanliness at Chowk station premises. Improvement in road connecting Chowk to Mumbai-Pune National Highway to curb accidents. Demand for proper accessible roads and flyover bridges to railway for commuters. Provision of Street lighting in railway premises/acquired land Provision of ROBs/Subways of at least 30 ft dimension to avoid water logging 	 The concerns will be conveyed to concerned authority for further action. Relevant suggestions will be incorporated in proposed project components.
6.	 Discussions related to land acquisition: Demand to clear issues related to compensation of 1995 railway project before taking up new project. Demand to consider people residing on private land and not holding any legal documents like 7/12 of land etc for compensation by MRVC. Demand to employ 1 person from the project affected family in the railways. This is because compensation for land 	 MRVC officials informed that the details of land acquisition will be finalized only after the joint measurement is taken place between District Collector and MRVC officers. It will then be shared with the public. Compensation for land acquisition will be as per Land Acquisition, Rehabilitation and Resettlement Act, 2013 and Maharashtra Land Acquisition Act, 2015.

Table 24: Summary of discussions during Public Consultation held for Panvel-Karjat stretch

acquisition won't be sufficient and also



Sr. No.	Points Discussed during Consultation	Remarks
	 most of them are dependent on land for their survival. Locals requested that they shall be consulted before land acquisition. Appropriate compensation should be given to all the project affected individuals as per the Maharashtra Land Acquisition Act, 2015. People also asked proper compensation for construction of new house and for loss of livelihood in addition to compensation shall be in line with compensation of Navi Mumbai Airport (NAINA). 	
7.	 Limited availability of information related to proposed project 	 MRVC will display banners of Project Information at the stations on the existing alignment. MRVC will also set up Grievance Redressal System to address the issues of the stakeholders.
8.	 A common meeting shall be arranged between decision makers and community representatives to connect existing route to CST 	 The concerns will be conveyed to concerned authority for further action.

The attendance sheet and the suggestions/queries raised by the local community are attached as **Annexure 12** and **Annexure 13**, respectively.

After the final disclosure of the documents another round of public consultations shall be conducted across the alignment and reports shall be updated.



Section 8 Environment and Social Management Plan

Environment and Social Management Plan (ESMP) has been prepared, based on the identified environmental attributes and type of the impacts. The main environmental attributes consist of Air, Water, Noise and Vibration, Land, Flora-Fauna, occupational health and safety and Environmental health and safety. To cover all the environmental attributes, ESMP has been divided into following components.

- Air Quality Management Plan
- Water Quality Management Plan
- Noise and Vibration Level Management Plan
- Soil Quality and Erosion Management Plan
- Plant Site/Labour Camp Management Plan
- Waste Management Plan
- Flora and Fauna Management Plan
- Traffic Management Plan
- Construction Area Management Plan
- Occupational Health and Safety Plan
- Environmental Monitoring Plan

8.1 Acquisition of Clearances or Permissions

The project has several components, which would need certain permission or clearances from several authorities in environment sector. A brief summary has been prepared for necessary clearances or permission required for the project along with procedural guidelines and responsible authority.

Refer Table 25 for the summary of required permissions or clearances.



Table 25: Environment related Clearances or	Permissions required for the Project
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Sr. No.	Clearances or Permissions required	Applicable Acts/Rules	Key areas where applicable for Panvel- Karjat Stretch	Procedural Guidelines to obtain Permission	Concerned Department	Responsibility	Projected Timeline
1.	Development activities within Matheran Eco- Sensitive Zone	Notification of Matheran and surrounding region as an Eco-Sensitive Zone, 2003 (as amended in 2004)	Existing and proposed railway line passes through small patches of forest and boundary of Matheran Eco-sensitive Zone at Village Barwahi, Bherle, Mohope, Bhingarwada, Lodhivali and Haliwali	 Application to Monitoring Committee, Matheran ESA Review of Monitoring Committee Decision and Recommendations by Monitoring Committee 	Monitoring Committee, Matheran ESA	MRVC	Before start of construction
2.	Forest Clearance ²¹ (For tree cutting in Matheran Eco-sensitive area)	The Indian Forest Act,1927 The Forest (Conservation) Act,1980 The Forest (Conservation) Rules,1981	Existing and proposed railway line passes through small patches of forest and boundary of Matheran Eco-sensitive Zone at Village Barwahi, Bherle Mohope, Bhingarwada, Lodhivali and Haliwali	 Application to Divisional Forest Officer/ District Collector Scrutiny of application by Chief Conservator of Forest to give recommendations Recommendation forwarded to Nodal Officer Recommendation forwarded to State Government Recommendation forwarded to Regional office (if Area<40 Ha) or to Head Office (if Area>40 Ha) Decision by Regional Empowered Committee (at Regional Office) or Forest Advisory Committee (at Head Office) Forest Department decides the 	Forest Department	MRVC	Before start of construction

²¹Source: <u>http://www.moef.gov.in/citizen/specinfo/forflow.html</u>





Sr. No.	Clearances or Permissions required	Applicable Acts/Rules	Key areas where applicable for Panvel- Karjat Stretch	Procedural Guidelines to obtain Permission	Concerned Department	Responsibility	Projected Timeline
				land details for compensatory plantation will and conduct the plantation.			
З.	Felling of Trees ²² (For Tree cutting in the areas other than Matheran Eco-sensitive Zone)	Maharashtra felling of Trees (Regulation) Act, 1964 and subsequent amendments	All along the stretch having large trees	 Application to Forest Department(Tree Authority) Site Inspection by Round Officer Submission of report by Round Officer to Tree Authority Advertisement in local newspaper by Tree Authority to call objections from public Enquiry of Public Objections by Tree Authority Decision on Application with or without conditions Replanting of trees as per section 3(1B) of the Act Forest Department decides the land details for compensatory plantation will and conduct the plantation 	Forest Department (Tree Authority) ²³	Contractor	Before start of construction/ site clearing activity
4.	NOCAndConsenttoEstablishandOperateforreadymixplants	Water (Prevention and Control of Pollution) Act, 1974; Air (Prevention and Control of Pollution)	Applicable	 Application to Regional Office, SPCB Verification of Site and Technical details Decision of Consent after 	State Pollutiol.l.n Control Board	Contractor	Before start of construction

²² Source: <u>http://www.mahaforest.nic.in/internal.php?id=40</u>
 ²³ "Tree Officer" i.e. Range Forest Officer is the authority to grant the tree felling permission.District Collector is the Appellate Authority.





Sr. No.	Clearances or Permissions required	Applicable Acts/Rules	Key areas where applicable for Panvel- Karjat Stretch	Procedural Guidelines to obtain Permission	Concerned Department	Responsibility	Projected Timeline
		Act, 1981 & The Noise Pollution (Regulation and Control) Rules, 2000 and subsequent amendments		verification			
5.	Authorization for Handling, Generation, Storage, Use & Transportation of Hazardous and other wastes	Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016	Demolition of existing station buildings/ platforms; Construction of tunnels; Maintenance of heavy machinery and vehicles	 Application to Regional Office, SPCB Verification of Site and Technical details Decision of Consent after verification 	State Pollution Control Board	Contractor	Before start of construction
6.	NOC for water extraction for construction and allied works ²⁴	Guidelines/ Criteria for evaluation of proposals/ requests for ground water Abstraction, issued under Environmental Protection Act (EPA), (1986)	Applicable	• Application to Regional Director, CGWB with project information as Site Plan and location map, details of water requirement, Project approval letter from State Government, Report on water availability etc. ²⁵	Ground Water Authority	Contractor	Before start of construction
7.	PUC certificate for use of vehicles for all construction vehicles ²⁶	The Central Motor Vehicles Act 1988 & The Central Motor Vehicles Rules,1989	All vehicles in Use shall obtain Pollution Control Check certificates and shall be driven by personnel with proper license	 PUC from authorised testing centres 	Department of Transport	Contractor	Before start of construction

 ²⁴If the quantity of ground water withdrawal exceeds 100 m³/ day for Industrial/ Infrastructural /Mining Projects then NOC is required to be obtained.
 ²⁵Source: <u>http://www.cgwa-noc.gov.in/LandingPage/DocRecInf.htm</u>
 ²⁶Source: <u>http://chdtransport.gov.in/Forms/CMVR_1989.pdf</u>





Sr. No.	Clearances or Permissions required	Applicable Acts/Rules	Key areas where applicable for Panvel- Karjat Stretch	Procedural Guidelines to obtain Permission	Concerned Department	Responsibility	Projected Timeline
8.	License for use of Explosive for tunnelling	The Explosives Act,1884 & The Explosive Rules, 2008	Safe transportation, storage and use of explosive material while construction of the tunnels	 Application to Chief Controller of Explosives Verification of project details by the Authority Decision about grant or refusal of license 	Department of Explosives	MRVC	Before start of construction





Besides this, in Administrative framework following non-enforced yet important permissions from respective department are required for the implementation of construction work :

- A GO or No GO certificate from hired agency CIMFR (Central institute of Mining and Fuel Research). CIFMR (Central Institute of Mining and Fuel research-GOI) is engaged as an investigative agency for conducting Pre-Construction Geological investigation; following are their phases of scope of work-
 - Geotechnical assessment, rock classification and 3D mapping
 - Pre Excavation analysis, Proof checks and Structural Stability
 - Strengthening of existing tunnels if required
 - Support During Execution of work

During Pre Excavation analysis phase the investigative agency shall check for the stability of the structures (existing Tunnel, Morbe dam, and existing human settlement structures) and devise a safe and progressive methodology for excavation near the structures. Continuous monitoring through deployment of seismographs for ground vibrations preferably through IoT based systems; there shall be periodical appraisal and evaluation of blast designs and blast performance. These are the set TOR for the scope of work of CIFMR. Study by CIMFR will help us to understand whether the existing proposal of project allignment etc is acceptable or not.

Dam Safety Organisation and Navi Mumbai Municipal Corporation - MRVC has been holding consulations with NMMC officials on continuous basis. The details are aleady discussed in previous chapter 7.1.3. Any update on the same shall be revised in the same section of the chapter.

In addition to these clearances, the Contractor shall also abide by the requirements of following regulations:

- o Building and Other Construction Workers' Welfare Cess Act, 1996
- o Contract Labour (Regulation & Abolition) Act 1970 & Central Rules, 1971
- o The Child Labor (Prohibition and Regulation) Act, 1986, The Bonded Labor (Abolition) Act, 1976
- o Minimum Wages Act, 1948, The Payment of Wages Act, 1936, amended in 2005
- o Maharashtra Labour Welfare Fund Act, 1953 (as amended)
- The Equal Remuneration Act 1976, Workmen's Compensation Act, 1923

Inter-State Migrant Workmen's (Regulation of Employment & Conditions of Service) Act, 1979

8.2 Institutional Arrangement

MRVC is the project implementing agency for MUTP-III projects. In that role, MRVC is accountable for satisfactory completion of the project works proposed under this Project. As the project implementing agency, MRVC, on behalf of GOM and IR, is responsible for financing and procuring all the contracts financed by the AIIB, as well as for executing the identified works in the field, with due safeguards in consultation with the Western Railways (WR) and Central Railways (CR). MRVC will have contractors for implementation of civil/mechanical/electrical works. Also, MRVC will have a Project Management Consultants (PMC) to supervise the work at all the stages including successful implementation and monitoring of ESMP during construction stage. The project time line will be decided by MRVC. The details of the time line for procurement works, implementation of civil/mechanical/electrical works and activities to



be carried out by the respective agencies (i.e. MRVC, Project Management Consultants and Contractors) will be mutually decided between MRVC and the contractor with support of PMC.

For the implementation of the proposed projects under MUTP-III, it is proposed to have Environment and Social Management Group (ESMG) within PMC for environmental management and monitoring. Also, the contractor should have Environment and Social Management Team (ESMT) for successful implementation of ESMP. MRVC should form an Emergency Response Cell which will comprise of combine team members of PMC, the contractor and MRVC. The ESMG and ESMT shall be formed separately for Panvel-Karjat stretch.

Figure 17 presents the details of the organizational structure of the proposed ESMG and ESMT for environmental management and monitoring during implementation.

8.2.1 Roles and Responsibility

The team responsible for execution of the ESMP and their designated levels of responsibilities are delineated below:

- The Project Proponent MRVC will be responsible for providing all the necessary funding and administrative support to the ESMP; and be ultimately responsible for carrying out the project with total commitment to environmental matters. Environment cell of MRVC shall have 1 staff member. The Environmental staff of MRVC shall be responsible for regular communication with PMC, providing guidance, reviewing the submissions from PMC and Contractors, and reporting to the funding agency on regular basis. MRVC will also be responsible to redress the grievances of the stakeholders during construction phase.
- 2. The **Project Management Consultants (PMC)** will be responsible to supervise the work of all the stages during construction. PMC shall form an Environment and Social Management Group (ESMG) with following designated responsibility.
 - Supervise the work related to successful implementation & monitoring of ESMP during construction stage
 - Regular monitoring the compliance related to Environment, Safety, Health and Social (ESHS) as per the Safety, Health and Environment (SHE) Manual prepared by MRVC

PMC will be responsible for coordinating the activities of monitoring and managing compliance of the ESMP with the Contractor. The responsibilities include technical, community and administrative matters related to the ESMP, including liaison with the general public in the project area, other parties and regulatory bodies on environmental issues related to the project. The team will also be responsible for keeping the local communities informed of the environmental compliance of the project and properly address any issues of their concern.





Figure 17: Organization Structure for the Implementation of the proposed Project Under MUTP-III

The ESMG shall comprise of following members having a professional background related to Environment, Safety, Health and Social (ESHS). Chief ESHS Manager

- o Environmental Engineers
- o Safety Experts
- o Environmental Inspectors
- o Others; based on the Project Requirements

Adequate, qualified and trained SHE Professionals with required support staff to be deployed at each worksite at each shift. The supervisors and workmen shall be provided in all the departments



related to SHE. The additional staff with other expertise e.g. transportation, fire, occupational health etc shall also be included in the team based on the project requirements.

The report related to compliance related to ESMP shall be submitted to MRVC on regular basis.

3. The **Construction Contractor** will be responsible for successful implementation of the project. The contractor should ensure full compliance with environmental matters related to construction activities, as laid down in the ESMP. The Construction Contractor will ensure that all his workers are properly briefed in environmental matters in terms of the Dos and Don'ts while they work on the project. The contractor should form an Environment Management Team (ESMT) for meeting the requirements of ESMP.

The ESMT shall comprise of following team core and support members having a professional background related to SHE.

Core Team:

- Chief ESHS Manager / Head
- o Environmental Manager
- Health and Safety Manager
- o Social Manager

All the core team members shall have the educational qualification as per the designated roles and professional experience of more than 15+ year. The core team shall have handled the similar type of assignments in the past professional work.

Support Team:

- SHE Manager
- Safety Steward
- SHE Electrical Engineer
- SHE(Fire) Engineer
- Occupational Health officer
- Environment Engineer
- SHE Traffic Engineer
- o Maintenance Manager
- Labour Welfare Officer
- Others; based on the Project Requirements

Adequate, qualified and trained SHE Professionals with required support staff to be deployed at each worksite at each shift. The supervisors and workmen shall be provided in all the departments related to SHE. The additional staff with other expertise e.g. transportation, fire, occupational health, safety, Environment etc shall also be included in the team based on the project requirements.

Contractors are required to develop Contractor's Environmental and Social Management Plans (CESMP). In addition, the contractor should comply with Safety, Health and Environment (SHE) manual prepared by MRVC. The report related to compliance related to ESMP shall be submitted to MRVC on regular basis.

8.2.2 Rapid Response Mechanism

The Contractor shall use Rapid Response Toolkit to address unexpected and potentially urgent Safeguards events or incidents using guideline for Incident Categorization and Notification.





- The Contractor shall classify events or incidents related to social, environmental, occupational health & safety as Indicative, Serious and Severe.
- **Indicative** is a relatively minor and small scale event or non-compliance that is limited in its immediate effects but may be indicative of wider-scale issues within a project that could lead to serious or severe incidents or conditions. This exceeds a routine non-compliance in that it appears to be part of a broader pattern of non-compliance that could lead to more serious events

Box 1 – Examples of Indica	tive Events		
Environmental	Social	Occupational Health & Safety	
Small-volume hydrocarbon	Small-scale crop damage or	Chronic underuse of personal	
or chemical spills	livestock deaths	protective equipment (PPE) by	
		Works Contractor	
Localized dust, light, or	Grievances due to project use	Local increase in the occurrence of	
noise pollution	of public roads	communicable disease	
Illegal hunting of wildlife	Project interference with locally	Numerous minor, but recurring job	
(non-endangered)	significant events and sites	site injuries	
Small volume sediment,	Vehicle damage to public or	Poor "housekeeping" at site, e.g.,	
pesticide, or fertilizer run-off	private roads caused by Works	littering and random disposal of solid	
into local waterways	Contractors	waste	
Minor off-site disposal of	Nuisance-level contact between	Lack of understandable warning or	
solid waste from project	employees and community	traffic control signage	
Poor quality or delayed site	Minor instances of	Multiple "slip and trip" hazards	
restoration and revegetation	inappropriate behavior of	throughout the site	
	security forces or other		
	Contractor personnel		
Poorly functioning erosion-	Overloading of local	Poorly organized or sporadic health	
control measures	commercial services from use	& safety induction and training	
	by project personnel		

• Serious is an event or condition that is causing or will cause significant harm to workers or community members, the type or extent of impact that would require an urgent response and that could pose a significant reputational risk for the Bank.

Box 2 – Examples of Serious E	3ox 2 – Examples of Serious Events or Conditions				
Environmental	Social	Occupational Health & Safety			
Large-volume hydrocarbon or	Widespread crop damage or	Numerous injuries requiring off-			
chemical spills	livestock deaths	site medical attention			
Poaching of threatened or	Systematic mistreatment of	Outbreak of life-threatening			
endangered species, or	communities by project workers,	communicable disease			
systematic over-exploitation of	incidence of gender-based violence				
local resources	(GBV)				
Large-volume or long-term	Impacts to protected physical	Presence of Unexploded			
sediment, pesticide, or	cultural resources	Ordinance (UXO) at worksite			
herbicide runoff into waterways					
Large-scale deforestation	Significant incidence of inadequate	Absence of first aid resources at			
-	resettlement compensation	work site			
Failure to implement the	Significant and repeated community	Absence of health & safety plan			
agreed environmental	impacts from project vehicles and	and training			
restoration program	construction activities				

• Severe is an event or condition of sufficient seriousness and highly significant harm that it may, in addition to the harm caused, pose a corporate risk to the Bank. Such an event may exceed the Task Team's resources. Resolving the event or condition will also require the notification and engagement of the Bank's Senior Management





Box 3 – Examples of Severe Ever	nts or Conditions	
Environmental	Social	Occupational Health & Safety
Hydrocarbon or chemical spills requiring large-scale remediation	Forced resettlement of communities	Worksite fatalities
Systematic poaching or hunting and trafficking of threatened or endangered species	Systematic incidence of GBV	Multiple instances of serious communicable diseases among workforce or community
Sediment, pesticide, or herbicide runoff causing permanent damage to waterways	Significant damage to nationally protected environmental areas or to UNESCO World Heritage sites	Criminal and political attacks at worksite
Large-scale deforestation or destruction of internationally recognized critical habitat	Human trafficking	Forced labor by project's Works Contractor
Major river contamination causing decimation of fish population	Repeated human rights abuses by site security forces	Works Contractor is unresponsive regarding ongoing worksite risks of bodily injury

- The Contractor will communicate news of the event according to its category and then proceed with consultation and resolution activities: an Indicative Event is reported by Contractor to Emergency Response Cell and a Serious Event is escalated to Project Proponent (MRVC) and severe event is escalated to the funding agency say, AIIB.
- The communication shall be immediate within 24-48 hrs of the event.

8.2.3 Progress Monitoring and Reporting Arrangements

A proper strategy is necessary for smooth implementation of the mitigation measures. For the implementation of proposed works under the ESMP, it is proposed to have a two-level institutional framework. It is proposed to constitute an Apex Committee to oversee the overall implementation of the proposed works and a Working Level Committee to monitor the implementation of works on the ground level.

The Apex Committee shall comprise of the senior officials from MRVC, Central Railway (CR) and Western Railway (WR). The Apex Committee shall be the decision and policy making body to implement the MUTP-III projects including suggested environmental mitigation measures. The Apex Committee will report the progress of the works to the AIIB on a regular basis. Under the Apex Committee, it is proposed to constitute a Working Level Committee to monitor the implementation of the ESMP by the appointed Contractor.

The Working Level Committee shall comprise of the Contractor, Project Management Consultant and Field Level Officers from MRVC. The Working Level Committee shall be responsible for implementation of all the proposed mitigation measures on the ground level and will ensure periodic monitoring of environmental parameters outlined in the ESMP. The committee shall monitor the compliance with environmental mitigation measures through periodic inspection (at least biweekly). A report of periodic inspection shall be prepared based after field observations, data compilation and results. The PMC environmental inspector will evaluate compliance with mitigation measures. The performance of the following indicators to be surveyed and reviewed:

- i. General conduct of work
- ii. Labor provisions and occupational health and safety
- iii. Noise and vibration control
- iv. Air quality, dust control and site cleanliness
- v. Traffic management



- vi. Drainage and wastewater
- vii. Solid waste and spoil handling and disposal
- viii. Hazardous waste management
- ix. Protection of Community Values
- x. Environmental monitoring and other indicators selected for the work at hand

The Working Level Committee shall ensure full participation of all key stakeholders and meaningful coordination in planning and time bound implementation of the mitigation measures proposed under the ESMP. It shall be responsible for co-ordinating with the local administrative bodies and other stakeholders. It shall also oversee the day to day work of all the contractors appointed under this Project and provide a monthly progress report to the Apex Committee. In addition to monthly progress report, Environmental Supervision Reports and Environmental Monitoring Reports should be prepared on monthly basis. The Working Level Committee should also develop quarterly reports on implementation of ESMP. All these reports shall be submitted to AIIB on quarterly basis.

The proposed institutional framework for implementing and monitoring the works proposed under the ESMP is shown in *Figure 18.*



Figure 18: Proposed Institutional Framework for Monitoring of ESMP

8.2.3.1 Project Monitoring and Reporting

The Project Monitoring and reporting frequency is mentioned below in Table 26.

No.	Particulars	Frequency of updation	Reporting Responsibility	Monitoring responsibility
1.	Compliance Status report/Progress Report: Environmentally & socially sensitive sites, status of conduct of EIA/SIA, and	Monthly	The Contractor– Environment and Social Management Team PMC - Environment	PMC - Environment and Social Management Group MRVC-Environmental Cell
	these sites.	Quarterly	and Social Management Group	

Table 26: Project Monitoring and Reporting





2.	Environment and social site visit report a. plan vs actual	Monthly	PMC - Environment and Social Management Group	MRVC-Environmental Cell
	b. exceptions noted in visit	Quarterly	MRVC- Environmental Cell	Working Level Committee
3.	Progress of grievance Redressal	Monthly	PMC - Environment and Social Management Group	Working Level Committee
		Quarterly	Public Relation Officer (PRO) of Compliant Redressal Cell	Working Level Committee
4.	ESMP Compliance Report	Quarterly	MRVC- Environmental and Social Cell	AIIB

8.3 Contractor's Environmental and Social Management Plan

The portions of this ESMP that are applicable to construction, specifically those sections that are to be performed by the Contractor. Since this ESMP and provisions in bid documents are general specifications, it is the Contractor's responsibility to prepare a Contractor's Environmental and Social Management Plan (CESMP) for meeting the requirements in the bid documents. The CESMP is to addresses how the Contractor will perform the mitigation measures described in the EA, in terms of location and frequency; and commitment of labour, equipment, other resources and expenditure; as applicable to a particular requirement. The CESMP is expected to contain site- and media-specific sub-plans to address the following:

- i. Air Quality management Plan
- ii. Water Quality and Drainage Management Plan
- iii. Noise and Vibration Level Management Plan
- iv. Soil Quality and Erosion Management Plan
- v. Water Use Management Plan
- vi. Construction Site Management Plan
- vii. Labour Camp Management Plan
- viii. Borrow Area and Quarry Area Management Plan
- ix. Waste Management Plan
- x. Afforestation and Plantation Plan
- xi. Traffic Management Plan
- xii. Utilities Relocation Plan
- xiii. Material Handling & Storage Plan
- xiv. Communication Plan
- xv. Occupational Health and Safety Plan



- xvi. Emergency Preparedness Plan
- xvii. Fuel and Hazardous Materials Management Plan
- xviii. Chance Find Procedures
- xix. Training, etc.

Sections 8.4-8.16 of this ESMP provide general guidance on and reference to the above-mentioned sub plans to be developed by the Contractors.

8.3.1 Mitigation Measures for Environmental Impacts

The mitigation measures has been identified for the anticipated environmental impacts identified for environmental attributes such as Air, Water, Land, Noise & Vibration, Flora & Fauna, Occupational health & Safety and Environment Health & Safety. As the preconstruction phase of the project is already completed, no pre-construction activities are considered for impact identification. The activities during construction and implementation phase considered for impact identification and mitigation.

Mitigation measures for each of the environmental impact during construction stage and operation stage are presented in *Table 27* and *Table 28*, respectively.





Environmenta	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
Air	 Fugitive dust emissions in atmosphere Dust and Gaseous emission from heavy machinery and vehicles 	 Vehicles delivering loose and fine materials like sand and fine aggregates shall be covered. Loading and unloading of construction materials, Stockpiling of the construction material, earthwork, unpaved haulage roads other dust prone areas and construction yard shall be provided with water spraying arrangement. Vehicular pollution check for all the vehicles used during construction, operation and inspection shall be made mandatory. The excavated material shall be stored properly so that it does not generate fugitive emissions. Location of storage areas should be selected such that it is downwind of the habitation area and also there is no run off from the storage site during monsoon. The Ready-Mix Concrete (RMC) plant for commercial purposes should be installed at a site with a buffer zone of approximately 100 m distance from human habitation of 1000 souls or more and 200 m from schools, colleges, hospitals and courts. The Contractor should comply with all the statutory requirements while obtaining 'Consent to 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Photographic documentation Report of vehicular pollution check Consent to establish received from MPCB for RMC Plant Records of the vehicular movements (start time, end time, material of travel, travel route etc) machinery and equipment maintenance register Consent document received from MRVC regarding the procurement of the material from the licensed quarries Ambient air quality monitoring results

Table 27: Mitigation measures proposed for the Anticipated Environmental Impacts





Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 Establish' from the Maharashtra Pollution Control Board. The RMC plant shall have measures to control Air, Water and Noise pollution as per the Guidelines for RMC Plant for sitting criteria of RMC Plant in the State of Maharashtra²⁷.Flyash shall be used in accordance with Flyash Utilisation Notification, 1999 and subsequent amendments and as per specifications approved by MRVC. As far as possible, it is recommended for the areas with heavy traffic to transport the material during night time (8 pm to 5 am). All the machinery and equipment shall be regularly maintained. The Contractor shall keep routine maintenance records for inspection by MRVC. The Contractor shall procure material only from the approved quarry areas (approved by MPCB) with prior consent from MRVC. Air quality monitoring for the same parameters, which are monitored during the baseline studies, shall be implemented by the Contractor by hiring the services of the NABL accredited and MoEF&CC Notified laboratory. National Ambient Air Quality Standards 2009 				

²⁷ Source:<u>http://mpcb.gov.in/consentmgt/pdf/RMC_Gazette_circular.pdf</u>



Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		shall be used for comparison of the ambient air quality during construction phase. MRVC will monitor that the AAQ monitoring program and air pollution control measures are scrupulously implemented.				
Air	• Emissions from diesel DG sets	 DG sets shall be Central Pollution Control Board (CPCB) compliant. An appropriate sampling port location must be ensured in DG sets as prescribed in Emission Standards notified by Ministry of Environment, Forest & Climate Change (MOEF&CC), 2013. Low sulphur diesel should be used in DG sets as well as machinery, wherever possible. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Compliance report of DG sets as per CPCB Sampling and fuel details of the DG sets
Air	• Emission due to welding activity	 The most common gases emitted during welding are ozone, nitrous gases and carbon monoxide. Phosphine and phosgene are the other gases that may be produced during welding. Gases are generated due to the high temperature and ultraviolet (UV) radiation from the welding process. The contractor shall reduce health hazards by choosing a correct welding helmet and by using the proper shielding gas and welding parameters. The contractor shall provide proper 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Health checkups on regular basis Record of the training programs





Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 information to workers about hazards of their tasks. The welder should be informed of operating techniques and all procedures that reduce welding fumes. The contractor shall provide training programs including proper ways to perform tasks and proper work practices to reduce fumes. This program shall include safety training, monitoring the good safety practices and good environmental practices. 				
Air	Odour nuisance	 Domestic solid waste at construction labour camp should be segregated The non- biodegradable and recyclable waste shall be sold off. Efforts shall be made that bio-degradable waste is composted through pit- composting/bin-composting. Non-biodegradable and non-saleable waste shall be disposed of by burying the waste in a secured manner. Burning of the waste shall not be carried out at the construction site and labour camps. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks of the labours camps	 Report of the adopted waste management system Regular record of quantity of the waste composed and recyclable waste sold off.
Air	 Increased air pollution along nearby roads due to newly introduced vehicular traffic 	 Alternate access routes shall be provided for additional vehicle movement for transportation of the construction material. To avoid disruption of the existing traffic due to construction activities, 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Traffic Management Plan Compliance records of the traffic management Plan



Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
	• Traffic congestion at rail crossings	 comprehensive traffic management plan should be drawn up by the Contractor and get the approval from the MRVC for the same. The broad guidelines for preparation of Traffic Management Plan is given in Section 8.12. As far as possible, it is recommended for the areas with heavy traffic to transport the material during night time (8 pm to 5 am). 				 Records of the vehicular movements (start time, end time, material of travel, travel route etc)
Air	 Emissions due to use of wood or other bio mass fuels in camps 	 LPG cylinders or community kitchens may be provided in the labour camps to avoid any tree cutting for fuel wood. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks of the labours camps	 Records of the LPG cylinders
Air	 Increased air pollution due to Construction and Demolition Waste (C&D Waste) 	 During interior demolition work above the first floor, debris chutes shall be used. Demolition debris shall be kept in controlled area and sprayed with water mist to reduce debris dust C&D waste will be cleared as per C&D Waste Management Rules, 2016 on sites identified by Municipal Corporation/ ULBs by Contractor. Recycle the debris as much as possible. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Photographic documentation C&D waste management plan and Compliance report as per C&D Waste Management Rules, 2016
Water	 Excessive water withdrawal/ consumption 	• The contractor shall arrange for water required for construction in such a way that the water availability and supply to nearby communities remain unaffected.	Contractor	Environment Management Group of Project	Regular checks on site	 Permission from CGWB (if required to be taken) Daily water





Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
	from ground and surface water sources			Management Consultancy		consumption records
Water	Impact on quality of ground and surface water	 The Contractor must comply with the requirements of the Central Ground Water Board (CGWB) for discharge of water arising from dewatering. Any water obtained during dewatering shall either be re-used for construction purpose or recharge to the ground water at suitable aquifer levels. If reuse or groundwater recharge is not possible, then the contractor shall discharge water obtained from dewatering to the nearby drainage system with necessary permissions. The Contractor shall submit plan of utilizing the waste water for approval of MRVC. Fuel oil shall be stored away from water using catchment pit for spills collection. No vehicles or equipment should be parked, re-fuelled or repaired near water bodies to avoid contamination in water bodies from fuel and lubricants. All equipment operators, drivers, and warehouse personnel should be trained in immediate response for spill containment and eventual cleanup. Emergency response procedures and reporting shall be made readily available by the Implementing Agency/Contractor in simple and local language. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Compliance report of for discharge of water arising from dewatering Construction site management plan approved by MRVC Photographic documentation Emergency response procedures approved by MRVC Training report for immediate response for spill containment and eventual cleanup Location, availability and condition of drinking water and toilet on site and labour camp Water Quality





Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 All wastes arising from the construction should be disposed in an environmentally accepted manner so as not to block the flow of water in the channels. Labour construction camps shall be avoided along the embankments and road alignments, and should be located away from habitation and river course. One drinking water facility shall be available to the workers at a distance of 500 m at the construction site. The Contractor should provide adequate and safe water supply for the use of the workers in labour camp. The contractor shall install RO of adequate capacity for providing safe drinking water to the labours. 1 tap for 25 labours shall be provided for easy access to drinking water. The contractor shall also provide water for other domestic usages in the labour camp. Drinking water must meet IS 10500:2012 or WHO drinking water standards. Water quality must be monitored 3 times in a year (once in 4 months) on regular basis. Install mobile toilets fitted with anaerobic treatment facility at construction sites. 1 toilet seat/15 labour shall be provided at the construction site. Based on the shifting of the construction locations, the toilets shall be shifted. The toilet should 				monitoring reports as prescribed in Environment Monitoring Plan





Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 be placed in such a way that all the labours will have access to the toilet within 500 m from the ongoing construction site. Adequate care shall be taken not to install mobile toilets in the natural drainage areas. The open defecation near the water bodies shall not be permitted. Minimum 100 m distance shall be kept between natural waterbody and toilets. All construction camps should be provided with sanitary toilets. The toilets shall be linked to the nearby sewerage system. In case, there is no sewerage system in nearby areas, septic tank / soak pits should be provided in the construction labour camps with the provision to use the overflow for plantation. 1 toilet seat, 1 urinal, 1 wash basin and 1 bathroom for 15 labours shall be provided at the labour camps with availability of sufficient water. The wastewater from the camps should not be allowed to be discharged into existing surface water bodies, wetlands, water logged areas or river. The piling work which may increase sedimentation level of the river shall be undertaken during low flow period. Water quality monitoring for the same 				





Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		parameters, which were monitored during the baseline studies, shall be implemented by the Contractor by hiring the services of the NABL accredited and MoEF&CC Notified laboratory. The Indian standards for drinking water IS 10500:2012 for surface and ground water sample shall be used for analysis of the fresh water quality. MRVC will monitor that the water quality monitoring program and water pollution control measures are scrupulously implemented.				
Water	Impact on surface water quality due to bridge construction	 No bunding or disturbing the natural course of water in rivers without permission from MRVC Site In charge All efforts should be made by the contractor to prevent river bank from collapsing into the waterway during bridge construction The construction materials falling in the river water should not increase turbidity level hence all necessary precautions needs to be taken. The piling work which may increase sedimentation level of the river shall be undertaken during low flow period. To minimize the loss of fine sediment to suspension, steel pile casing and watertight cofferdam should be pumped out to 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Photographic documentation Water quality sampling reports



Environmental	Environmental	Mitigation measures	Responsibility		Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 generate a dry working environment prior to carrying out sediment dredging/ excavation. To minimize any adverse water quality impact during installation and removal of cofferdam, silt curtains should be deployed. The silt curtains shall be used to completely enclose the cofferdam installation and removal works, seawall modification and pile installation works. The Contractor should be responsible for the design, installation and maintenance of the silt curtain to minimize the impacts on water quality. The design and specification of the silt curtains should be submitted by the Contractor to MRVC for approval. Hauling and storing of construction material 15-20 m away from water courses. The haul route to be approved and finalized by MRVC site incharge 				
Water	 Loss of seasonal flood plains Flooding/erosi on due to Flow obstruction/ changes in stream 	 Side drain should be constructed to maintain natural drainage pattern Earth available from cutting shall be used for filling for construction of embankments to the extent possible. Turfing of embankment slopes shall be done along the stretch. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Photographic Documentation Site inspection report



Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
	courses in canals/ natural courses and increased sedimentation					
Water	Water stagnation and creation of temporary breeding habitats for mosquito/other vectors of disease	 Source reduction and effective drainage are the main forms of mosquito control. Use of WHO approved larvicides or Anti-Mosquitoes (AM) pesticides to supplement source reduction shall be carried out. Good housekeeping practice along with removal food waste daily and cleaning the bins regularly in labour camps shall be carried out by the Contractor. Periodic removal of aquatic weed which gives shelter to vectors shall be carried out by the Contractor to control the water borne or the vector diseases Drainage system shall be developed on the site in the material storage areas to avoid the accumulation of stagnant water in monsoon season. Also, the drainage shall be maintained on regular basis to avoid any chocking or cleaning issues 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Procurement and usage records of WHO approved larvicides or Anti-Mosquitoes (AM) pesticides Photographic documentation and report for Good housekeeping practice Records for removal of aquatic weed Monitoring report of the drainage system





Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance Indicator
Attributes	Issue		Implementation	Supervision	Frequency	
Water	 Railway embankment affecting local drainage Impact on existing Storm water management 	 The drains shall be maintained on regular basis to avoid water logging or flooding. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Photographic documentation
Land	 Soil erosion and flooding due to change in Regional physical settings such as alterations/oxb ows/high embankments, filling in low lying areas, Altered topography, drainage pattern 	 During monsoon, construction work shall be avoided at erosion prone location. Only approved and licensed borrow pits and quarry sites (approved by MPCB) should be used for extraction of construction material to avoid any disfiguring of topography. The quarry shall have Borrow and Quarry Area Management Plan. Since the borrow areas are unidentified at this stage and will be outside the study area, the impacts cannot be gauged and ESMP cannot be prepared on that aspect. Hence, the broad guideline for Borrow area management and Quarry Area Management Plan has been given in Section 8.7.1 and Section 8.7.2. A detailed Borrow Area Management Plan shall be prepared by the contractor after identification of the approved and licensed borrow pits and quarry sites and submitted to MRVC for the consent. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Detailed Borrow Area Management Plan and Quarry Area Management Plan approved by MRVC Implementation report for Borrow Area Management Plan and Quarry Area Management Plan Photographic Documentation





Environmental	Environmental	Mitigation measures	Responsibility		Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 Earth available from cutting shall be used for filling for construction of embankments. Turfing of embankment slopes shall be done along the stretch wherever required. Slope protection frames, dry stone pitching, and masonry retaining walls can be provided as required for slope stabilization based on ground conditions. The tunneling work shall be carried out without disturbing the environment, ecology and nearby habitation. A detailed Tunnel Area Management Plan is provided as Section 8.9. 				
Land	Loss of productive soil/ Land degradation due to construction activities including quarrying and sand mining activity	 Top soils of the borrow pit sites should be conserved and restored after excavation is over as per broad guideline for Borrow Area Management Plan has been given in Section 8.7.1. The topsoil shall be re-laid on the area after taking the borrow earth to maintain fertility of the agricultural field, finishing it to the required levels and satisfaction of the farmer. Contractor shall relaid the topsoil at all locations that has been opened up for construction, including temporarily acquired land for traffic detours, storage, materials handling or any other construction related or incidental 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Detailed Borrow Area Management Plan and Quarry Area Management Plan approved by MRVC Implementation report for Borrow Area Management Plan and Quarry Area Management Plan Photographic Documentation





Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		activities.				
Land	Compaction of land due to movement of heavy vehicles	 Periodic checking shall be carried out by the Implementing agency/Contractor to assess the effectiveness of stabilization measures viz. turfing, stone pitching, galvanized metal mesh etc. taken during construction phase. To prevent soil compaction in the adjoining productive lands beyond the RoW, the movement of construction vehicles, machinery and equipment shall be restricted to the designated haulage route. Contractor shall submit material movement plan along with proposal to MRVC. Based on the approval from MRVC the haulage routes shall be finalized. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Assessment report of effectiveness of stabilization measures Photographic Documentation
Land	Soil Contamination due to improper debris management	 Debris generated due to the dismantling & demolition of the existing structures shall be suitably reused in the proposed construction as fill materials for embankments The disposal of debris shall be carried out only at sites identified for the purpose. The disposal site identification shall be done by the contractor and MRVC shall provide approval for the same The Contractor shall identify a separate area for temporary storage of the debris 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Photographic documentation Onsite monitoring for debris Waste storage and disposal





Environmental	Environmental	Mitigation measures	Responsibility		Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 on the site. The temporary storage area shall have arrangement for dust suppression while loading and unloading. The debris shall be removed from the temporary storage area as early as possible to avoid any mosquito breeding issue or soil contamination. o All arrangement for transportation of debris during construction including provision, maintenance, dismantling and clearing debris, where necessary shall be planned and implemented by the Contractor as approved and directed by MRVC. o No debris disposal shall be done near any water bodies 				
Land	• Soil contamination due to Fuel /oil spills and other wastes	 Fuel and lubricants should be stored at the predefined storage location The storage area should be paved with gentle slope to a corner and connected with a chamber to collect any spills of the oils. Domestic solid waste at construction labour camp should be segregated into biodegradable and non-biodegradable waste. The non- biodegradable and recyclable waste shall be sold off. Efforts shall be made that bio-degradable waste is composted through pit-composting/bincomposting. Non-biodegradable and non-saleable waste shall be disposed of 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Construction site management plan approved by MRVC Photographic documentation Solid Waste Management Plan approved by MRVC Compliance report for implementation of the Solid Waste Management Plan





Environmental	Environmental	Mitigation measures	Respons	sibility Supervision		Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 by burying the waste in a secured manner. All efforts should be made to minimize the hazardous waste generation. Unavoidable hazardous waste shall be managed as per Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. For the detailed management of Hazardous waste at Site, refer Section 8.10.3. 				
Noise and Vibration	 Increase in Noise level due to construction activity, machinery movement and operation DG sets 	 All construction equipment and machinery shall be timely serviced and properly maintained to minimize its operational noise Stationary noise making equipments shall be placed along un-inhabited stretches. Construction activity and timing shall be regulated to minimize the intensity of the noise impact. Protection devices (earplugs or earmuffs) shall be provided to the workers Construction equipment and machinery shall be fitted with silencers or isolated using acoustic medium wherever possible 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Maintenance schedule and records of the compliance for construction equipment and machinery Construction site management plan approved by MRVC Construction Activity Implementation Plan approved by MRVC Compliance report of Construction Activity




Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
						Implementation Plan
Noise and Vibration	Noise and vibration due to existing and/or additional train movement on sensitive receptors	 Noise barriers near noise sensitive locations by multi layered plantations shall be provided based on the availability of the space within the railway boundary as per the Flora and Fauna Management Plan given in Section 8.11. Also, MRVC is planning to construct RCC boundary wall of the railway premises of 2.4 meter height at the locations where habitations are located very close to the railway boundary. This wall will act as a permanent noise barrier. The concrete wall shall be designed to absorb excess noise. Rubber packing betweens sleepers and 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Monitor survival rate of trees for the first three years Noise and Vibration monitoring report as prescribed in Environment Monitoring Plan
		 tracks as absorber is to be included in the design to minimize vibration. Noise and vibration monitoring shall be carried out along the track at identified locations during construction stages to ensure the effectiveness of mitigation measures. Noise level shall be monitored as per the Ambient Air Quality Standards in respect of Noise prescribed in Noise Pollution (Regulation and Control) Rules, 2000 (see rule 3(1) and 4(1)). Vibration level shall be monitored as per the the permissible limits of ground vibration 				





Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		specified by Director General of Mines Safety (DGMS) through its Circular No. 7 of 1997.		_		
Noise and Vibration	 Noise and vibrations due to Metal Fabrication and assembling etc 	 The construction equipment and machinery should be fitted with acoustic enclosures and a routine maintenance of construction equipment shall be carried out to control the noise levels from these sources. Metal Fabrication and assembling activities should be carried out in area where nearby there are no settlements 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	Maintenance schedule and records of the compliance for construction equipment and machinery
Noise and Vibration	 Noise & Vibration due to DG sets 	 Use of DG sets shall be kept minimum by taking power connection from the concern authority. The DG sets and other construction equipment and machinery should be fitted with acoustic enclosures and a routine maintenance of the DG sets and other construction equipment shall be carried out to control the noise levels from these sources. An appropriate sampling port location must be ensured in DG sets as prescribed in Emission Standards notified by MOEF&CC, 2013. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Compliance report of DG sets as per CPCB Sampling and fuel details of the DG sets
Flora and Fauna	Felling of Large trees	 As per the survey conducted by MRVC, around 1814 trees in Panvel-Karjat stretch will be affected due to the proposed alignment and the ancillary 	Contractor	Environment Management Group of Project	Regular checks on site	 Monitor survival rate of trees for the first three years Records of the





Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 facilities. In India, based on "The Forest Conservation Act, 1980" the removal of trees requires approval as well as transplanting to other locations. Moreover, in Maharashtra state, laws are in place for tree removal and transplanting. In Maharashtra State, the Maharashtra Felling of Tree (Act 1964) is in place and adherence to these standards will also be required. Based on the permission given by Tahsildar/RFO, the tree felling shall be carried out. The roots of the dead trees should be thoroughly removed. The trees that are likely to fall should be safely removed from areas falling within the jurisdiction of the railways all along the proposed alignment. MRVC shall not allow introduction of exotic species with known environmental setbacks (Eucalyptus, Australian Acacia, Prosopoisjuliflora, etc.). The plantation shall be carried along alignment and the compensatory afforestation in the ratio of 1:10 shall be carried out. This will enhance the overall ecological condition of the area. The areas outside the railway boundaries 		Management Consultancy		species planted on the site • Photographic documentation



Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
Flora and	• Disturbance in	 for plantation shall be identified with support of Regional Forest Officer (RFO). Type, number of trees to be planted and location of the green belt area shall be done by the contractor will support of MRVC and RFO. The contractor shall carry out the plantation activity with support of plantation experts who can plant as well as nurture the green belt area. Avoid cutting of tree branches and 	Contractor	Environment	Regular	• Monitor survival
Fauna	local ecology and bio- diversity due to cuttings of tree branches and shrubs	 o Planting of the extent possible. o Planting native trees/plants during the landscaping stage of a project can increase the biodiversity in an area o Tree Plantation shall be done in the ratio of 1:5. 	Contractor	Management Group of Project Management Consultancy	checks on site	 Monitor survival rate of trees for the first three years Records of the species planted on the site Photographic documentation
Flora and Fauna	Loss of forest land	 Approximately 4.9077 ha of will be affected in Panvel-Karjat stretch due to construction of the bridges and embankment. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Monitor survival rate of trees for the first three years Records of the species planted on the site Photographic documentation



Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
Flora and Fauna	 Effect on riverine ecology Disturbance to aquatic flora, fauna breeding during construction-additional piling for doubling, embankment and laying of track from the forest area 	 Construction activity shall be avoided during night hours near forest area i.e. Matheran eco sensitive area Poaching must be strictly banned in the forest area. It shall be ensured by the contractor that no hunting or fishing is practiced at the site by any of the worker/staff member. All site workers/staff members shall be aware of the location, value and sensitivity of the wildlife resources. Awareness programme on Environment and Wildlife Conservation shall be provided to the work force. Labour camps and office site for the project shall be located outside and away from the forest area i.e. Matheran Ecosensitive area and any other forest located in the vicinity of the construction site The temporary storage of construction materials and heavy vehicle movement shall be not allowed in Matheran Ecosensitive area. Wastewater, sewage, solid waste and any other waste generated due to construction activity or labour camps shall not be allowed to dispose in Matheran Eco-sensitive area. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Construction Activity Implementation Plan approved by MRVC Compliance report of Construction Activity Implementation Plan Records of the awareness programs conducted for on Environment and Wildlife Conservation



Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 (Protection) Act, 1972 shall be strictly adhered to. Regular training programs shall be conducted for the workers on protection of Matheran Eco-sensitive area. 				
Cultural resources	 Impact on fossils, acheological treasures, graves of historical importance 	 If any object of archeological or historical importance found while excavation, the contractor follow the instruction as mentioned in Section 8.15. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Report or listing of the objects of archeological or historical importance
Occupational	Crewmembers	 Contractor shall develop through 				• Detailed Safety,
health &	/ workers are	understanding about Building and Other				Health and
Safety	usually exposed to higher noise levels and repeated mechanical shocks and/or vibration from locomotives, rolling stocks and machinery	 Construction Workers (Regulation of Employment and Conditions of Service) Act 1996, State Building and Other Construction Workers' Rules, Building and Other Construction Workers' Welfare Cess Act, 1996 and Central Rules, 1998, The Factories Act 1948 not only to satisfy the Inspectors' perspective but the use of legislation as the strong tool for effective Safety, Health and Environment management at construction work sites. The contractor shall ensure that all his 				Environment Management Plan (based SHE manual, Indian Railway Codes and Manuals and other applicable rules and regulations of the Central/State Government) approved by MRVC • Compliance report
		employees/workmen are covered under 'Workmen Compensation Act' and shall				for detailed Safety, Health and



Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 pay compensation to his workmen as and when the eventuality for the same arises. The contractor shall comply with Safety, Health and Environment (SHE) Manual prepared by MRVC. Within 4 weeks of the notification of acceptance of the tender, the Contractor shall prepare a contract specific SHE plan. SHE plan shall be prepared based on the SHE Manual, Indian Railway Codes and Manuals and other applicable rules and regulations of the Central/State Government. Workers should be provided with adequate personal protective equipment such like hand gloves, safety shoes, safety goggles, hard safety helmets. Ear plugs or ear muffs shall be given to person involved with heavy noise generating machinery All electrical equipments installed shall have shock preventive mechanisms like automatic shutdown. Training should be provided to workers about hazards related to the job, usage of tool box, health and safety. Workers shall be given job rotation to minimize the impact of higher noise levels and repeated mechanical shocks and/or vibration from locomotives, rolling 				Environment Management Plan Procurement and distribution records for PPEs Workers' training records for hazards related to the job, usage of tool box, health and safety Compliance report of the equipments as per design safety and industrial standards



Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		stocks and machinery.				
Occupational	Health impacts	• All equipment and machinery to be used	Contractor	Environment	Regular	Compliance report
health &	on the workers	shall comply with the design safety and		Management	checks on	of the equipments
Safety	due to	industrial standards.		Group of	site	as per design
	emissions from	o All equipment and machinery shall be		Project		safety and
	heavy	inspected and certified by competent		Management		industrial standards
	equipment and	person.		Consultancy		Records of the
	other mobile	• Pre-checks or inspection, maintenance				periodic health
	sources	and servicing of all machinery &				check ups
		equipments should be done as per				• Records of the
		Scheduled.				SHE audits
		 Necessary measures should be taken to provent the emission from vehicles such 				
		as taking PLIC covering the exhaust of				
		vehicles with preventive equipment like				
		spark arrestor etc				
		 ○ Periodical medical checkups like lung 				
		function test etc. shall be carried out				
		• Pre-medical checkups for all workers				
		should be done before employment with				
		health fitness certificate.				
		• The workers working near such				
		machinery should wear adequate PPEs.				
		• Regular SHE audits shall be conducted				
		by the contractor with support of expert				
		technical team on regular basis. The				
		frequency of the audit shall be as per the				
		SHE manual. The audit report shall be				
		submitted to MRVC on timely basis.				
		Based on the suggestions given in the				









Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 emission at safe height. All machinery and equipment should be covered with acoustic materials. Alternative options for movement of locals should be provided. Pedestrian passageways shall be provided near settlement on both sides. The labour camp should be adequately drained to avoid the accumulation of stagnant water. The labour camp shall be developed as per the detailed Plant site/Labour Camp Management Plan given in Section 8.8. The contractor will ensure good health and hygiene of all workers to prevent sickness and epidemics. Measures shall be taken to prevent breeding at site by the contractor. The workers should all be screened for the health problems before being considered for employment. Regular health check-up and immunization camps should all also be organized for the workers and nearby population. After completion of the construction; the contractor shall ensure the complete removal of the labour camps. The contractor should comply with the AIIB accepted guidelines on "Workers' accommodation: processes and standards- a guidance note by IFC and 				 Compliance report for implementation of Labour Camp Management Plan Health check up records of the workers Compliance report for the AIIB accepted guidelines on "Workers' accommodation: processes and standards- a guidance note by IFC and the EBRD Records of the accidents and dangerous occurrences at construction site Emergency Response Plan approved by MRVC Compliance report for implementation of approved Emergency



Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 the EBRD". The contractor shall also comply with The Factories Act, 1948 and all the other relevant acts/rules applicable as per the Ministry of Labour and Employment, Gol. The Contractor shall deploy a team for Safety, Health and Environment management on the construction site as specified in SHE manual prepared by MRVC. All accidents and dangerous occurrences shall immediately be informed verbally to the MRVC, followed by a written communication giving brief about incident of accident, date/ time of occurrence. This will enable the MRVC to reach to the scene of accident dangerous occurrences to monitor/ assist any rescue work and/ or start conducting the investigation process so that the evidences are not lost. The Contractor shall prepare as required under the relevant rules of State Building and Other Construction Workers' Rules, an Emergency Response Plan for all work sites as part of the Contractor SHE Plan. The Contractor shall develop a Work Permit system, which is a formal written system used to control certain types of work that are potentially hazardous. A 				Response Plan • Work Permit System approved by MRVC



Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		work permit is a document, which specifies the work to be done, and the precautions to be taken. Work Permits form is an essential part of safe systems of work for many construction activities.				
Occupational health & Safety	• Exposure of workers & passersby to hazardous materials like asbestos used	 Efforts shall be made to avoid the storage of hazardous chemicals near any residential area. Hazardous chemicals shall be labeled and stored in locked facility under authorized person. Contractors shall be required to adopt and maintain safe working practices. Usage of appropriate signage in local language at the construction sites should be displayed generously and visibly to make the travelers aware of the ongoing work. Adequate lighting and fluorescent signage shall be provided at the construction sites. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Compliance report for detailed Safety, Health and Environment Management Plan Photographic documentation
Occupational health & Safety	Design safety and associated impacts	 All equipment and machinery to be used shall comply with the design safety and industrial standards. Each and every machine and tools should be inspected by the operator and supervisor before start of work. Regular inspection and maintenance of the rail lines and facilities shall be carried out to ensure track stability and integrity in accordance with national and international track-safety standards. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Compliance report for equipment and machinery as per design safety and industrial standards. Inspection and maintenance schedule of machines, tools, rail lines and other



Environmental	Environmental	Mitigation measures	Responsibility		Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 The workers shall be trained for usage of all type of equipment and machinery Implementation of an overall safety management program equivalent to internationally recognized railway safety programs is prescribed. Work area should be barricaded and provided with measures to prevent trespassing. To further ensure public safety, the right-of- way close to habitation shall be fenced. 				 facilities Photographic documentation Compliance report for implementation of detailed Safety, Health and Environment Management Plan
Occupational health & Safety	 Visual Impacts due to use of reflective materials/ signages 	 The signages should comply with industrial standard. Use of reflective jackets and other safety PPE should be as per requirements. 				 Photographic documentation Procurement and distribution records of PPEs
Community Health & Safety	 Impact on Health and Safety of communities 	 Efforts shall be made to avoid use of current community access for storage and heavy vehicle movement. To avoid disruption of the existing traffic due to construction activities, Comprehensive Traffic Management Plan should be drawn up by the concessionaire and get the approval from the Competent Authority for the same. The broad guideline for preparation of Traffic Management Plan is given in Section 8.12. Installation of temporary speed bumps to control speed near designated pedestrian crossing 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Photographic documentation Comprehensive Traffic Management Plan approved by MRVC Compliance report for implementation of Traffic Management Plan Construction Area Management Plan approved by



Environmental	Environmental	Mitigation measures	Responsibility		Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 areas/school areas/ market places/ religious places/ human habitations. Clear notification on construction schedule and contents shall be made for the communities. The Contractor shall prepare Construction Area Management Plan as per the guidelines provided in Section 8.13. The camps should be at sufficient distance from such area and labours should be instructed about not using such areas for trespassing and for other activities Alternative options for movement of locals should be provided. All exhaust should be provided stacks to release of gaseous emission at safe height. Efforts shall be made to avoid the storage of hazardous chemicals near any residential area. A statement of the Contractor's policy and procedures for identifying and estimating hazards activities and the measures for addressing the same shall be submitted to MRVC. 				MRVC • Compliance report for implementation of Construction Area Management Plan
Community Health & Safety	Community severance due to lack of	 Efforts shall be made to avoid use of open ground, community properties. Efforts shall be made to avoid use of 	Contractor	Environment Management Group of	Regular checks on site	Construction Area Management Plan approved by
	access	current community access for storage and heavy vehicle movement.		Project Management		MRVC



Environmental	Environmental	Mitigation measures	Responsibility		Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		 Work area should be barricaded to ensure public safety. Access to such area should be prohibited for locals and passersby. Contractor should have plan for crowd handling. Contractors should display appropriate signage in local language at the construction sites to make the travelers aware of the ongoing work 		Consultancy		Compliance report for implementation of Construction Area Management Plan
Community Health & Safety	 Impact on amenities/ facilities in an area including cultural and community properties (markets, gathering spaces, playgrounds, cemeteries, gaochar land) 	 Efforts shall be made to avoid use of open ground, community properties. The camps should be at sufficient distance from such area and labours should be instructed about not using such areas for trespassing and for other activities. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Construction Area Management and Material Movement Plan approved by MRVC Compliance report for implementation of Construction Area Management and Material Movement Plan
Community Health & Safety	 Impact on common infrastructure in an area including hand pumps, common wells, toilets, electric 	 Efforts shall be made to avoid dismantling any such community infrastructure. If there is necessary then contractor should provide other alternative options for locals and it is nearby to old area. All community utilities likely to be impacted, such as sources of water, 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Construction Area Management Plan approved by MRVC Compliance report for implementation of Construction Area Management



Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Supervision Performance	
Attributes	Issue		Implementation	Supervision	Frequency	Indicator	
	lines/poles, access roads, pedestrian routes etc.	community centers, etc. shall be relocated to nearby suitable places.				Plan	
Community Health & Safety	• Impact on public utility lines	 The utilities encountered commonly on site for construction work include electricity, water, telecommunication, drainage, overhead and underground cables etc as per the survey conducted by MRVC. The utility lines crossing the railway line are mainly water pipelines. The necessary permissions required to relocate the utility lines as per the construction plan shall be taken by the contractor. It is essential to ensure that no existing utilities in the vicinity of the sites are affected by any of the project activities. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Photographic documentation Permission letter for relocating the utility lines 	
Community Health & Safety	 Impact on sensitive receptors like religious places, hospitals, school, places of heritage importance etc. Disturbance to tribal 	 Work area should be barricaded nearby sensitive receptors to avoid or minimize impact. The work scheduled should be arranged to avoid any nuisance to such facility during the work time. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Construction work schedule approved by MRVC Compliance report for implementation of Construction work schedule 	





Environmental	Environmental	Mitigation measures	Responsibility		Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
	/sensitive/ vulnerable PAFs/ settlements • Impact on existing railway operations					
Community Health & Safety	Temporary reduction in income due to placing of construction equipments, activities in the areas around the project site	 Avoid using of agricultural land for storage of construction materials and equipments. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Construction Area Management and Material Movement Plan approved by MRVC Compliance report for implementation of Construction Area Management and Material Movement Plan
Community Health & Safety	 Visual blight / aesthetic issues due to construction, signages, demolition affecting people 	 Work area should be barricaded to ensure public safety. Access to such area should be prohibited for locals and passersby. Contractors should display appropriate signage in local language at the construction sites to make the travelers aware of the ongoing work. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Construction Area Management Plan approved by MRVC Compliance report for implementation of Construction Area Management Plan
Community Health &	Health issues - communicable	 Pre-medical checkups for all workers should be done before employment with 				Records of the health checkups for





Environmental	Environmental	Mitigation measures	Responsibility		Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
Safety	diseases due to migrant workers	 health fitness certificate. The contactor shall prepare a health management plan to avoid disease spread in the area e.g. Sexually transmitted diseases (STDs)/HIV. Consultation and medication of any affected person should be monitored. Periodical medical checkups should be done for all workers. 				the workers
Community Health & Safety	 Impact on mobility of differently abled people 	 Alternate access routes shall be provided which are suitable to differently able. 	Contractor	Environment Management Group of Project Management Consultancy	Regular checks on site	 Construction Area Management and Material Movement Plan approved by MRVC Compliance report for implementation of Construction Area Management and Material Movement Plan





Environmental	Environmental	Mitigation measures	Responsibility		Supervision	Performance	
Attributes	Issue		Implementation	Supervision	Frequency	Indicator	
Water	 Loss of seasonal flood plains Flooding/ erosion due to Flow obstruction/ changes in stream courses in canals/ natural courses and increased sedimentation Water stagnation and creation of temporary breeding habitats for mosquito/other vectors of disease 	 The side drains constructed to maintain natural drainage pattern shall be maintained on regular basis to avoid water logging or flooding. Turfing of embankment slopes shall be done along the stretch. The turfing area shall be maintained on regular basis. Source reduction and effective drainage are the main forms of mosquito control. Use of WHO approved larvicides or Anti-Mosquitoes (AM) pesticides to supplement source reduction shall be carried out. 	MRVC	Environment Management Group of Project Management Consultancy	Premonsoon checks on site	 Photographic Documentation Site inspection report Monitoring report of the drainage system 	
Water	Increase in water use and sewage discharge at stations	 Addition water tanks shall be installed (if required) to meet the additional water requirements. Additional toilets shall be built (if required) to meet the requirements at operation stage. 				•	

Table 28: Mitigation measures	proposed for the Antici	pated Environmental Im	pacts during Operation Stage





Environmental	Environmental	Mitigation measures	Responsibility		Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
Noise and	. Noise and	 The additional sewage shall be discharged in the municipal drains if the municipal drains are passing in the nearby area or septic tanks shall be provided. 	MBVC	Environment	Pogular	Monitor
Vibration	 Noise and vibration due to existing and/or additional train movement on sensitive receptors 	 Noise barriers near noise sensitive locations by multi layered plantations shall be provided based on the availability of the space within the railway boundary as per the Flora and Fauna Management Plan given in Section 8.11. Also, MRVC is planning to construct RCC boundary wall of the railway premises of 2.4 meter height along with the noise barrier at the locations where habitations are located very close to the railway boundary. This wall will act as a permanent noise barrier. Rubber packing betweens sleepers and tracks as absorber is to be included in the design to minimize vibration. Noise and vibration monitoring shall be carried out along the track at identified locations during operation stage to ensure the effectiveness of mitigation measures. Noise level shall be monitored as per the Ambient Air Quality Standards in respect of Noise prescribed in Noise Pollution (Regulation and Control) Rules, 2000 	MRVC	Environment Management Group of Project Management Consultancy	Regular checks on site	 Monitor survival rate of trees for the first three years Noise and Vibration monitoring report as prescribed in Environment Monitoring Plan



Environmental	Environmental	Mitigation measures	Responsibility		Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
		(see rule 3(1) and 4(1)). Vibration level shall be monitored as per the the permissible limits of ground vibration specified by Director General of Mines Safety (DGMS) through its Circular No. 7 of 1997.				
Occupational health & Safety	 Crewmembers/ workers working on the tracks/platforms are usually exposed to higher noise levels and repeated mechanical shocks and/or vibration from locomotives, rolling stocks and machinery 	 MRVC shall support Western and Central Railway to follow SHE manual during operation stage. Workers should be provided with adequate personal protective equipment such like hand gloves, safety shoes, safety goggles, hard safety helmets. Ear plugs or ear muffs shall be given to person involved with heavy noise generating machinery All electrical equipments installed shall have shock preventive mechanisms like automatic shutdown. Training should be provided to workers about hazards related to the job, usage of tool box, health and safety. Workers shall be given job rotation to minimize the impact of higher noise levels and repeated mechanical shocks and/or vibration from locomotives, rolling stocks and machinery. 	MRVC	Environment Management Group of Project Management Consultancy	Regular checks on site	 Detailed Safety, Health and Environment Management Plan (based SHE manual, Indian Railway Codes and Manuals and other applicable rules and regulations of the Central/State Government) approved by MRVC Compliance report for detailed Safety, Health and Environment Management Plan Procurement and distribution records for PPEs Workers' training





Environmental	Environmental	Mitigation measures	Respons	sibility	Supervision	Performance
Attributes	Issue		Implementation	Supervision	Frequency	Indicator
						records for hazards related to the job, usage of tool box, health and safety • Compliance report of the equipments as per design safety and industrial standards
Occupational health & Safety	 Visual Impacts due to use of reflective materials/ signages 	 The signages should comply with industrial standard. Use of reflective jackets and other safety PPE should be as per requirements. 	MRVC	Environment Management Group of Project Management Consultancy	Regular checks on site	 Photographic documentation Procurement and distribution records of PPEs



8.4 Air Quality Management Plan

Air quality will be affected by various emissions due to fuel combustion from the operation of construction equipment, diesel generating sets and machines; emissions due to use of wood or other bio mass fuels in camps, fugitive emissions from vehicles used for the transportation of construction materials and localized increased traffic congestion in construction areas. During the construction phase, there will be increased vehicular movement for the transportation of materials to the project site. Large quantity of dust is likely to be generated at the site and the proposed transportation routes of the construction materials.

The Central Pollution Control Board (CPCB) has set up standards with regard to the ambient air quality levels and emission levels. These standards will have to be met, and stipulations to the effect will be provided in construction contract agreement. In addition, the contractors are required to develop Contractor's Environmental and Social Management Plan (CESMP) for air quality management. Following is a guideline for preparation of air quality management plan to minimize impacts on air quality in Panvel-Karjat areas.

Construction Phase:

For Air Quality Management during construction, refer Table 27.

Operation Phase:

- 1) Air quality of the area is likely to be improved as reduction in emissions due to shifting of community from road transportation to railway transportation.
- 2) Plantation along the proposed route is likely to improve the air quality of the area.
- 3) Air quality monitoring for the same parameters, which are monitored during the baseline studies, shall be implemented by the MRVC by hiring the services of the NABL accredited and MoEF&CC Notified laboratory. Ambient air quality monitoring shall be done for the first year of the operation to understand the impact of operation of the trains on the sensitive receptors and monitor the effectiveness of the mitigation measures suggested.

8.5 Water Quality Management Plan

Excessive consumption of water from ground and surface water sources can impact quality of ground and surface water. During construction of bridges surface water quality will be impacted. Flooding/erosion, increased sedimentation, loss of seasonal flood plains leads to changes in stream courses and affects storm water management. Hence, the contractors are required to develop Contractor's Environmental and Social Management Plan (CESMP) for water quality management. Following is a guideline for preparation of water quality management plan to minimize impacts on water quality in Panvel-Karjat areas.

Construction Phase:

- Drainage shall be designed as per provisions of Indian Railway Works Manual. As per the provision in the Indian Railway Works, sanitary sewer and storm water drainage shall be designed separately. Size of storm water sewer depends on storm water run-off, selfcleansing velocity and construction material. Hence, the drainage shall be designed specific to the site conditions for the complete alignment.
- 2) Where ever, the proposed embankment of railways is higher than the existing rail tracks, separate storm water drainage should be included in the design itself. MRVC has already included the water drainage in the design. The drains shall be maintained on regular basis to avoid water logging or flooding.



In addition to these, for Water Quality Management during construction, refer Table 27.

Operation Phase:

No impact on water quality is envisaged during operation phase.

8.6 Noise and Vibration Level Management Plan

Ambient noise and vibration level may increase temporarily in the close vicinity of various construction activities, maintenance workshops of vehicles and earthmoving equipment. This noise and vibration level will attenuate far with increase in distance from the source. In general, impact due to noise and vibration during construction activities will be minimal to inhabitants since most of the built-up areas are small villages and spaced at considerable distance from each other. However, there may be sensitive locations especially schools and hospitals that are closer to the worksites where increase in the noise and vibration level may be felt due to use of construction equipment and increased traffic movement. Noise levels may also increase due to night transportation of the materials as proposed and may affect the inhabitants abutting the roads.

The CPCB has set up standards for ambient noise levels in various activity zones. Suitable conditions will be incorporated in the construction contract agreement, to ensure compliance of these standards. In addition, the contractors are required to develop Contractor's Environmental and Social Management Plan (CESMP) for noise and vibration level management. Following is a guideline for preparation of noise and vibration level management plan to minimize impacts of noise and vibration in Panket-Karjat areas.

Construction Phase:

For Noise & Vibration Level Management during construction, refer **Table 27**.

Operation Phase:

- 1) Noise barriers near noise sensitive locations by multi layered plantations shall be provided based on the availability of the space within the railway boundary as per *Section 8.11.* Also, MRVC is planning to construct RCC boundary wall of the railway premises of 2.4 meter height at the locations where habitations are located very close to the railway boundary. The concrete wall shall be designed to absorb noise. This wall will act as a permanent noise barrier.
- 2) Noise barriers near noise sensitive locations by multi layered plantations shall maintain by MRVC through the third party who is expert in the area of nurturing and maintaining the plantation area at least for initial 3 years of the plantation. The possible locations for noise barriers are listed in **Annexure 15**.
- 3) Noise and vibration monitoring shall be carried out along the track at identified locations during operation phase to ensure the effectiveness of mitigation measures.

8.7 Soil Quality & Erosion Management Plan

Land erosion may have cumulative effect that includes damage to embankment roads and drainage problem. Land may get contaminated due to inappropriate disposal of liquid waste, (lubricating oil and fuel spills, waste oil and lubricant and vehicle/equipment washing effluent) and hazardous waste (fuel filters, oily rags) likely to be generated from repair and maintenance of transport vehicles, construction equipment and machinery especially if the vehicle depots are planned in the areas near groundwater sources. Soil may also get contaminated due to inappropriate disposal of domestic solid waste and untreated sewage from construction labour camps. Soil in the adjoining productive lands beyond the ROW, haulage roads, and construction camp area may get compacted due to movement of vehicles,



machinery, and equipment. Hence, the contractors are required to develop Contractor's Environmental and Social Management Plan (CESMP) for soil quality and erosion management. Following is a guideline for preparation of soil quality and erosion management plan to minimize impacts on soil quality in Panvel-Karjat areas.

Construction Phase

For Soil Quality Management during construction, refer **Table 27.**

8.7.1 Borrow Area Management Plan

Borrow areas will be identified by contractor. The contractor may open new borrow area or jointly manage the borrow area with partner agency/quarry owner. The finalization of locations identified by contractor depends upon the formal agreement between land owners and contractor and its suitability from civil engineering perspective as well as environmental consideration.

The contractor can also opt for Ready Mix Concrete directly purchased from another private party (third party). The Contractor should ensure that the third party has 'Consent to Establish' from the Maharashtra Pollution Control Board. Also, the RMC plant of the third party shall have measures to control Air, Water and Noise pollution as per the Guidelines for Ready Mix Concrete Plant (RMC) for sitting criteria of RMC Plant in the State of Maharashtra²⁸.

Following precautions have to be taken to restrict unauthorized borrowing by the contractor in case of Panvel-Karjat stretch.

- The Contractor shall only procure material from licensed borrow pits and approved quarry sites (approved from MPCB). The contractor may open new quarry or jointly manage the quarry with partner agency/quarry owner. The contractor is required to submit location of the quarries, the material movement plan and borrow area management plan along with the proposal to MRVC.
- Finalizing borrow areas for borrowing earth and all logistic arrangements as well as compliance to environmental requirements, as applicable, will be the sole responsibility of the Contractor.
- 3) The Contractor will obtain environmental clearance for the borrow area as per EIA Notification 2006 and comply with the conditions stipulated under the environmental clearance granted by State Environment Impact Assessment Authority (SEIAA). The Contractor will submit the copy of clearance letter to the MRVC before commencement of material extraction.
- 4) The Contractor will not start borrowing earth from select borrow area until the formal agreement is signed between the land owner and the Contractor and a copy is submitted to the MRVC.
- 5) Borrow pits should be selected from barren land / wasteland to the extent possible. It is recommended that borrowing from agricultural land should be minimized to the extent possible considering minimum loss of productive land and feasibility of restoration to productive use.
- 6) To the extent possible borrow areas should be sited away from inhabited areas. Nonproductive, barren lands, raised lands and waste lands are recommended for borrowing earth.
- 7) To avoid any embankment slippage, the borrow areas will not be dug continuously, and the size and shape of borrow pits will be decided by the Engineer. The depths in borrow pits to be regulated so that the sides may be limited to 25% steepness.
- 8) Precautionary measures as the covering of vehicles will be taken to avoid spillage during transport of borrow materials. To ensure that the spills, which might result from the

²⁸ Source: <u>http://mpcb.gov.in/consentmgt/pdf/RMC_Gazette_circular.pdf</u>



transport of borrow and quarry materials do not impact the settlements, it will be ensured that the excavation and carrying of earth will be done during day time only.

- 9) The unpaved surfaces used for the haulage of borrow materials will be maintained properly to avoid any accidents.
- 10) Redevelopment of the borrow areas to mitigate the impacts will be the responsibility of the Contractor. The Contractor shall evolve site specific redevelopment plans for each borrow area location, which shall be implemented after the approval of the Engineer-in-Charge.
- 11) The Contractor will keep record of photographs of various stages i.e., before using materials from the location (pre-project), for the period borrowing activities (construction Phase) and after rehabilitation (post development), to ascertain the pre and post borrowing status of the area.
- 12) The Contractor should provide completion certificate of redevelopment of each borrow pit issued by the land owner.

8.7.2 Quarry Area Management Plan

Quarries generally required to provide material for rail construction sites, can have significant adverse environmental effects, especially on ecologically sensitive areas. Quarries can become environmental hotspots and can significantly affect the visual appearance of an area. Special mitigation and management measures are often required to avoid or minimize the environmental and impacts of due to quarry operations. The ESMP stipulations will be applicable for new quarries to be identified and operated by Contractors. In case contractor use the existing licensed quarry a copy of the valid quarry license and lease / sub-lease agreement should be submitted to MRVC.

The quarry areas shall be identified by the contractor which are mainly operational government stone quarry. For using these quarry areas, the Contractor has obtained necessary statutory permission from MPCB. However, selection of new quarry following guidelines should be followed:

- The quarry material will be obtained from licensed sites only, which operate with proper environmental clearances, including clearances under the Air Act. If the Contractor wants to open a new Quarry, then he has to obtain necessary environmental clearance from MoEFCC and lease license from Directorate of Geology and Mines.
- 2) New quarry will be at least 1.5 km away from the settlement, forest and other ecologically sensitive areas and 500 m away from the water bodies
- 3) The Contractor shall identify alternative quarry sites along the whole corridor based on required quantity and environmental considerations and obtained approval from MRVC.
- 4) The Contractor should obtains Quarry Lease Deed / License from the Department of Mines and Geology and provide copy of the same to the MRVC prior to start of the material extraction.
- 5) The Contractor shall estimate water requirement for dust suppression at quarry sites during operation and for water spraying on kutcha (non-metal) haul road and ensure availability water by identifying sources and obtaining necessary permission
- 6) The Contractor shall prepare quarry sites operation and redevelopment plan considering surrounding land uses, local needs and agreement with the landowner
- 7) Only licensed blaster i.e. short-firer certificate holder will be responsible for quarry Blasting
- 8) Permits for transportation, storage and use of explosive, as will be required, shall be obtained from the Controller of Explosive
- 9) Whenever so advised by the Project Engineer, controlled blasting e.g. using less charge, restricting depth and dia or drill holes, cut-off blasting etc. shall be undertaken.
- 10) The contractor shall preserve topsoil from the quarry compound, if any, by stripping and stacking aside separately at corners



- 11) All workers safety measures such as helmets, footwear, earplugs, facemasks etc. shall be undertaken
- 12) The contractor shall ensure adequate metallic access road for material movement
- 13) Water sprinkling shall be done to minimize dust generated due to crushing/Vehicle movement
- 14) The contractor shall ensure redeveloping the quarry area within 2 months (or as will be agreed upon) of completion of quarry material collection
- 15) All the quarries should be rehabilitated as per approved rehabilitation plan immediately after completion of quarry material extraction. The restoration of Quarry will be done as per the conditions of the owner before handing over the site back to the owner.

Operation Phase

No impact is envisaged on soil during operation phase.

8.8 Plant Site/Labour Camp Management Plan

Improper location and management of construction camps may lead to adverse impacts on environment viz. (i) loss of vegetation due to use of wood as fuel for cooking (ii) deterioration of water quality in nearby surface water bodies due to discharge of untreated waste water and solid waste dumping (iii) compaction and contamination of soil due to uncontrolled disposal of solid waste (iv) Poor sanitation may result in transmission of communicable diseases among the workers and the host communities. The labour camps will be set up for Panvel-Karjat stretch.

Influx of labour during construction will also have impact on social setting of the area such as:

- Risk of social conflict between the local community and the construction workers, which may be related to religious, cultural or ethnic differences, or based on competition for local resources.
- Influx of additional population as family members of workers, traders, suppliers and other service providers due longer timeframe of project, particularly in areas where the local capacity to provide goods and services is limited.
- Increased risk of illicit behavior and crime as theft, physical assaults, substance abuse, prostitution and human trafficking
- Gender-based violence as inappropriate and criminal behavior, such as sexual harassment of women and girls, exploitative sexual relations, and illicit sexual relations with minors due to large influx of male labour
- The presence of construction workers and service providers (and in some cases family members of either or both) can generate additional demand for the provision of public services, such as water, electricity, medical services, transport, education and social services.
- The influx of people may bring communicable diseases to the project area, including sexually transmitted diseases (STDs) adding burden on the health infrastructure of the area.
- A significant increase in demand for goods and services due to labor influx may lead to local price hikes and/or crowding out of community consumers.
- Delivery of supplies for construction workers and the transportation of workers can lead to an increase in accidents and traffic issues.

The contractors are required to develop Contractor's Environmental and Social Management Plan (CESMP) to manage Plant Site/Labour Camp. Following is a guideline for preparation of Plant Site/Labour Camp management plan to minimize impacts in Panvel-Karjat areas.



Construction Phase:

- All camps should maintain a minimum distance of 500 m from habitation and water bodies. No productive land should be utilized for construction camp. No construction camp shall be established in Matheran ESZ area. All sites must be graded, ditched and rendered free from depressions to avoid water stagnation. Safety of the labours should also be considered during the site selection for the labour camps. The labour camp location should not involve trespassing for accessing the construction site.
- 2) Accommodation and ancillary facilities for workers should be erected and maintained to the standards and scales approved by MRVC.
- 3) The Contractor should provide adequate and safe water supply for the use of the workers in labour camp. The contractor shall install RO of adequate capacity for providing safe drinking water to the labours. 1 tap for 25 labours shall be provided for easy access to drinking water. The contractor shall also provide water for other domestic usages in the labour camp. Drinking water must meet IS 10500:2012 or WHO drinking water standards. Water quality must be monitored 3 times in a year (once in 4 months) on regular basis.
- 4) All construction camps should be provided with sanitary toilets. The toilets shall be linked to the nearby sewerage system. In case, there is no sewerage system in nearby areas, septic tank / soak pits should be provided in the construction labour camps with the provision to use the overflow for plantation.1 toilet seat, 1 urinal, 1 wash basin and 1 bathroom for 15 labours shall be provided at the labour camps with availability of sufficient water. The wastewater from the camps should not be allowed to be discharged into existing surface water bodies, wetlands, water logged areas or river. Minimum 100 m distance shall be kept between natural waterbody and toilets.
- 5) The contactor shall discuss the matter related to number of labours, quantity of solid waste generated and suitable method of the waste disposal with urban local bodies/panchayat where the labour lamp is located. Based on guidance from the local bodies/panchayat, the arrangements regarding solid waste disposal shall be done. If there is no possibility of the providing solid waste management service by local bodies/panchayat, the contractor shall manage the solid waste on their own by taking following steps:
 - a. Domestic solid waste at construction labour camp should be segregated into biodegradable and non-biodegradable waste.
 - b. Efforts shall be made that bio-degradable waste is composted through pitcomposting/bin-composting.
 - c. The non- biodegradable and recyclable waste shall be sold off. Non-biodegradable and non-saleable waste shall be disposed of by burying the waste in a secured manner.
- 6) Solid waste, waste water and sewage generated in the labour camps shall not be allowed to dispose in Matheran Eco-sensitive area.
- 7) LPG cylinders or community kitchens may be provided in the labour camps to avoid any tree cutting for fuel wood.
- 8) At every workplace, the Implementing Agency/Contactor in collaboration with local health authorities will ensure that a readily available first-aid unit including an adequate supply of sterilized dressing materials and appliances is made available.
- 9) Drainage system shall be developed in the labour camps to avoid the accumulation of stagnant water in monsoon season. Also, the drainage shall be maintained on regular basis to avoid any chocking or cleaning issues.
- 10) Drains and ditches within the labour camp area should be treated with bleaching powder on a regular basis.
- 11) Access to the ambulatory services should be provided to approach the nearest hospital in case of an emergency.



- 12) The contractor will ensure good health and hygiene of all workers to prevent sickness and epidemics.
- 13) The Contractor should provide a crèche for the children of the workers in the labour camps.
- 14) The Contractor should ensure that all precautions to protect the workers from insect and pest to reduce the risk to health. This includes the use of insecticides.
- 15) Strict control shall be imposed over alcohol and substance abuse in the labour camp.
- 16) The workers should all be screened for the health problems before being considered for employment. Regular health check-up and immunization camps should all also be organized for the workers.
- 17) After completion of the construction; the contractor shall ensure the complete removal of the labour camps.
- 18) The contractor should comply with the AIIB accepted guidelines on "Workers' accommodation: processes and standards- a guidance note by IFC and the EBRD"²⁹. The contractor shall also comply with The Factories Act, 1948 and all the other relevant acts/rules applicable as per the Ministry of Labour and Employment, Gol³⁰.
- 19) Labor Influx Management Plan:
 - i. The Contract shall abide by the Gender Policy of the project.
 - ii. The Contractor shall provide information regarding Worker Code of Conduct in local language(s).
 - iii. The Contractor shall provide cultural sensitization training for workers regarding engagement with local community and curbing of gender-based violence.
 - iv. The Contractor shall source the local workforce to the maximum possible extent.
 - v. The Contractor shall maintain records of gender information as number of women employed, number of toilets available for women and other facilities for children and women.
 - vi. Contractor to hire workers through recruitment offices and avoid hiring "at the gate" to discourage spontaneous influx of job seekers.
 - vii. The Contractor shall pay adequate salaries for workers to reduce incentive for theft;
 - viii. The Contractor shall pay salaries into workers' bank accounts rather than in cash;
 - ix. Creation of supervised leisure areas in workers' camp.
 - x. The Contractor shall keep provision of \sanctions (e.g., dismissal) for workers involved in criminal activities.
 - xi. The Contractor shall arrange for Information campaigns on STDs, substance abuse prevention and management among the workers.
 - xii. The Contractor shall arrange for entertainment and events for workers within camp to reduce incentives for mixing with local community.
 - xiii. The Contractor shall arrange for vaccination of workers against common and locally prevalent diseases;
 - xiv. The Contractor shall provide road safety training and defensive driving training for staff.

Operation Phase:

No impact is envisaged due to labour camps during operation phase.

8.9 Tunnel Area Management Plan

Tunneling being technology intensive and critical work, it is important that MRVC to deploy highly skilled and technically well-equipped team for investigation, planning, design, construction of tunnel to monitor safe construction. Structural stability of tunnel is of utmost importance not only to prevent environmental hazards but also to avoid adverse impacts on social environment. Out of all the

³⁰ Source: <u>http://labour.gov.in/http://labour.gov.in/</u>



²⁹Source: <u>http://documents.worldbank.org/curated/en/604561468170043490/Workers-accommodation-processes-and-standards-a-guidance-note-by-IFC-and-the-EBRD</u>



stretches, Panvel-Karjat stretch has 3 proposed tunnels. Hence, following measures should be implemented to minimize impacts due to tunneling in Panvel-Karjat stretch.

- 1) Detailed geological and hydro geological investigations must be carried out before designing, planning and executing tunnel works to prevent any environment and health hazard.
- 2) The project site comprises Deccan trap basaltic rock which is mostly impervious to percolation. Thus, during monsoon, huge run-off of surface water is fore seen in project areas especially in hilly areas. Hence, Catchwater Drain shall be provided in cutting area.
- 3) MRVC has planned to use Drilling and Blasting Method (DBM) for tunneling in Panvel-Karjat Section. In DBM, it is possible that due to sequential excavation pattern groundwater levels and flow pattern are altered which can cause seepage of water from roof or sidewalls during tunnelling. Thus, continuous pumping shall be utilized to dewater the site.
- 4) All tunneling activities shall be executed in timely manner such as timely application of liner, removal of waste debris etc. to prevent any environmental and health hazards.
- 5) Collection, transportation, disposal and treatment of dust and muck material generated during tunnelling shall be carried out in a systematic manner. The excavated material should be transported in covered vehicle from the tunnel excavation sites such that it does not spill during movement.
- 6) MRVC shall allow the Contractor to resale the excavated material such as hard rock boulders. The Contractor will be responsible for obtaining necessary approval for using/disposing the material. The Contractor will have to submit action plan on award of contract. The excavated materials can be used as construction material, ballast or aggregate after crushing for which the Contractor shall pay royalty to the Government.
- 7) As planned by MRVC, Central Institute of Mining and Fuel Research (CIMFR) will be appointed to plan and monitor the tunneling work. The monitoring agency shall prepare safety management plan, contingency plans and emergency procedures to deal with adverse events such as face collapses or lining failures which can happen due to uncertain geological conditions. The draft ToR prepared by MRVC for CIMFR is incorporated as Annexure 16.
- 8) The monitoring agency shall ensure that the Contractor shall abide by IS 4081: 1986; Safety code for blasting and related drilling operations and IS 4756 :1978; Safety code for Tunneling work and all other relevant safety rules/regulations/guidelines.
- 9) Explosives shall be stored in proper designed and approved licensed magazine.
- 10) During the excavation process, the water seepage if significant can be properly drained and groundwater recharge measure put in place. Before the tunnelling starts, a ground water map will be obtained from relevant state and central departments. Tests for groundwater need to be done if preliminary investigation reveals presence of ground water table in the alignment of the tunnel. Further strategies to address the issue like grouting and shotcreting can be planned at that stage only.
- 11) The contractor shall identify the nature and quantity of hazardous waste generated as a result of his activities and shall file a "Request for Authorization" along with a map showing the location of storage area to Maharashtra Pollution Control Board (MPCB). Outside the storage area, the contractor shall place a 'display board', which will display quantity and nature of hazardous waste, on date. Hazardous Waste needs to be stored in a secure place. It shall be the responsibility of the contractor to ensure that hazardous wastes are stored, based on the composition, in a manner suitable for handling, storage and transport. The labelling and packaging is required to be easily visible and be able to withstand physical conditions and climatic factors. The contractor shall approach only Authorized Recyclers or purchasers of Hazardous Waste for disposal of Hazardous Waste, under intimation to the MRVC. Overall, the hazardous waste generated during tunneling shall be managed as per the Hazardous and Other Wastes (Management and Transboundary)

Movement) Rules, 2016. The quantities of excavated rock and its % reuse is provided in table provided in following waste management plan.

- 12) The workers shall be trained for executing the emergency evacuation plan. Also, the training shall be provided to the workers once in a month regarding safety, health and environment.
- 13) Local community shall be informed in advance regarding schedule of blasting works. A detailed off site plan shall be prepared by the contractor. The contractor shall take approval from MRVC before implementing the off site plan.
- 14) Controlled blasting shall be done by the contractor to minimize the impacts of blasting on nearby habitations and structures.
- 15) All the necessary dust control measures suggested in mitigation plan shall be taken during tunneling activity to suppress the emissions.
- 16) Sufficient lighting shall be provided in tunnel areas, excavation sites to enable safe equipment operation. Emergency lighting system shall also be provided in case of failure of the main source to ensure safe equipment operation, safe shut-down, evacuation, etc.
- 17) During tunneling, supply of sufficient fresh air shall be ensured especially at confined locations. Provision of ventilation shafts at times of tunnel progress is an important factor to be considered.
- 18) All the blasting and tunneling activities shall adhere to all the BIS standards and also comply with the specification of the railway works manual.

8.10 Waste Management Plan

The waste generated during the construction stage mainly includes construction debris, solid waste and hazardous waste. The contractors are required to develop Contractor's Environmental and Social Management Plan (CESMP) for waste management. Following is a guideline for preparation of waste management plan to minimize the environmental impacts in Panvel-Karjat areas.

8.10.1 Construction Debris/Excavation Material Management Plan

Construction debris/waste is generated due to dismantling and demolition of existing structures and excavation activities. Improper disposal of debris causes decrease in soil fertility and water pollution. Careless disposal of debris can obstruct waterways causing siltation in water bodies and reduce capacity. Unleaded demolition wastes will cause traffic blockage and dust causing inconvenience and health risks. The following mitigation measures shall be implemented to minimize impacts of the construction debris/waste in Panvel-Karjat stretch.

- 1) During the site clearance and disposal of debris, the contractor shall take full care to ensure that public or private properties which are outside the railway boundaries are not affected; there are no dwellings below the dumpsite and the traffic is not interrupted.
- 2) Debris generated due to the dismantling & demolition of the existing structures shall be suitably reused in the proposed construction as fill materials for embankments, construction of ROBs/RUBs, approach roads and landscaping to the extent possible. Only the remaining debris shall be disposed in the identified debris disposal site.
- 3) The Contractor shall identify a separate area for temporary storage of the debris on the site. The temporary storage area shall have arrangement for dust suppression while loading and unloading. The debris shall be removed from the temporary storage area as early as possible to avoid any mosquito breeding issue or soil contamination.
- 4) The Contractor shall at all times ensure that the entire existing canal, drains and water bodies within and adjacent to the site are kept safe and free from any debris.
- 5) The disposal of debris shall be carried out only at sites identified for the purpose. The disposal site identification shall be done by the contractor and MRVC shall provide approval for the same.



- 6) All arrangement for transportation of debris during construction including provision, maintenance, dismantling and clearing debris, where necessary shall be planned and implemented by the Contractor as approved and directed by MRVC.
- 7) The debris dumpsites have to be suitably rehabilitated by planting local species of shrubs and other plants so that the landscape is coherent with the local environment.
- 8) Care should always be taken to maintain the hydrological flow in the area and dumping sites do not contaminate the water sources such as rivers, lakes and other water bodies.
- 9) The locations of Disposal sites have to be selected such that; the disposal site is at least 1000 m away from residential area, located leeward side of wind and other sensitive locations like forest areas, schools, hospital, important religious places etc.
- 10) Public perception about the location of debris disposal site has to be obtained before finalizing the location. Permission from the village/local community is to be obtained for the disposal site selected.
- 11) The Contractor shall practice following reuse Plan for C&D waste.

Sr.	Type of structure	Total	C&D Waste (in Cum) @ 70%	Reuse Plan
NO.			Cement Concrete	Reinforced Cement Concrete	
1	Steel (Steel Cover shed, height gauges, FOB)	207 MT	-	-	Will be taken away by contractor. The same will be used as scrap and recycled.
2	Buildings, ROB	18000 cum	7200 Cum	10800 Cum	Will be used for filling up low lying area.

12) The Contractor shall practice following reuse Plan for Excavation Earthwork.

Proposed Intervention	Quantity of excavation	Temporary Staking	Possible Re-use	Quantity Re- used/disposal
Excavation of soil	2,54,000 Cum	Alongside set- back zone	Filling back in the embankment, foundation, approach road etc.	25%
		Govt. land within 5 Km. radius	Raising of nearby low-lying villages	25%
			Will be taken away by contractor, which can be used for making building/Road material, etc.	50%
Excavation of Rock	10,60,000 Cum	Private vacant land (Providing compensation and making agreement)	Boulder filling behind abutment, face wall, retaining wall etc.	10%
			Stone pitching on slope	
			Stone filling in gabions	
			RR Masonary boundary wall	
			Soling in foundation of bridges	
			Soling for road work	





Proposed Intervention	Quantity of excavation	Temporary Staking	Possible Re-use	Quantity Re- used/disposal
			Will be taken away by contractor, which can be used for making building/Road material, etc.	90%

8.10.2 Solid Waste Management Plan

The main source for the solid waste generation will be labour camps. The solid waste management guideline is as follows.

- 1) The contactor shall discuss the matter related to number of labours, quantity of solid waste generated and suitable method of the waste disposal with urban local bodies/panchayat where the labour lamp is located. Based on guidance from the local bodies/panchayat, the arrangements regarding solid waste disposal shall be done. If there is no possibility of the providing solid waste management service by local bodies/panchayat, the contractor shall manage the solid waste on their own by taking following steps:
 - a. Domestic solid waste at construction labour camp should be segregated into biodegradable and non-biodegradable waste.
 - b. Efforts shall be made that bio-degradable waste is composted through pitcomposting/bin-composting.
 - c. The non- biodegradable and recyclable waste shall be sold off. Non-biodegradable and non-saleable waste shall be disposed of by burying the waste in a secured manner.

8.10.3 Hazardous Waste Management Plan

Hazardous waste generation such as asbestos, lubricating oil and fuel spills, waste oil and lubricant and vehicle/equipment washing effluent, fuel filters, oily rags are likely to be generated from demolition of structures, repair and maintenance of transport vehicles, construction equipment and machinery especially if the vehicle depots are planned in the construction areas.

8.10.3.1 Asbestos Waste Management Plan

Asbestos will be generated from the demolition activity to be carried out in Panvel-Karjat stretch. Asbestos fibers are primarily an inhalation hazard resulting in carcinogenic effect. Hence, the generated Asbestos waste needs to be disposed off in safe and environmental friendly manner as per the applicable regulations and guidelines³¹. The WBG's EHS Guidelines³² specify that the use of Asbestos Containing Material (ACM) should be avoided in new buildings and construction or as a new material in remodelling or renovation activities. Following measures shall be adopted by the contractor to manage the Asbestos Waste.

- 1) The contractor shall carry out removal, repair, and disposal of ACM in a way that it minimizes worker and community asbestos exposure levels.
- 2) The contractor shall develop an Asbestos Management Plan for the Existing facilities with ACM. The Asbestos Management Plan shall clearly identifies the locations where the ACM is present, its condition (e.g., whether it is in friable form or has the potential to

³² Environmental, Health, and Safety (EHS) Guidelines of IFC: General EHS Guidelines: Occupational Health And Safety



³¹ Applicable rules and available guidelines:

Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016

Good Practice Note of Work Bank on Asbestos: Occupational and Community Health Issues



release fibers), procedures for monitoring its condition, procedures to access the locations where ACM is present to avoid damage, and training of staff who can potentially come into contact with the material to avoid damage and prevent exposure. The plan should be made available to all persons involved in operations and maintenance activities.

- 3) Asbestos Management Plan shall describe the work in detail in plans and project, including but not limited to the following:
 - a. Ensuring safe access, restricting access and ensuring adequate lighting while handling
 - b. Containment of interior areas by Negative pressure enclosure
 - c. Protection of walls, floors, and other surfaces with plastic sheeting
 - d. Construction of decontamination facilities for workers and Personal protective equipment
 - e. Overalls fitted with a hood; boots without laces (laced boots are hard to decontaminate); respiratory protective equipment.
 - f. Removing the ACM using wet methods, and promptly placing the material in impermeable containers
 - g. Final clean-up with special vacuums and dismantling of the enclosure and decontamination facilities
 - h. Disposal of the removed ACM and contaminated materials in an approved landfill site as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
 - i. Other requirements for specific types of ACM, configurations and characteristics of buildings or facilities, and other factors affecting the work shall be enumerated in the plans and specifications.
- 4) Contractor shall notify to the MPCB and MRVC of the removal and disposal according to applicable regulations as indicated in the technical requirements and cooperates fully with representatives of the relevant agency during all inspections and inquiries.
- 5) Equipment to be considered for Dismantling shall include 500 and 1000-gauge polythene sheeting and duct tape, warning tape and notices, Bolt cutter, Webbing straps and rope, Garden-type sprayer containing wetting agent. Bucket of water and rags, Asbestos waste container, polythene sack, Lockable skip for larger quantities of waste, asbestos warning stickers.
- 6) The construction site will mainly have Asbestos Containing Sheets as roofing material. The contractor shall adopt approved removal method for asbestos removal. Following aspects shall be considered while removing the Asbestos Containing Sheets from the roof.
 - a. Avoid or minimize breaking the Asbestos Containing Sheets.
 - b. If fasteners hold the sheets in place, dampen and remove them, and place them in the waste container.
 - c. If the sheets are bolted in place, dampen and cut the bolts while avoiding contact with the AC.
 - d. Remove the bolts or fixings carefully and place them in the waste container.
 - e. Lower large pieces to the ground. Do not drop them or use rubble chutes. Stack sheets carefully.
 - f. Where there are several Asbestos Containing Sheets and other large items, place them in a lockable skip.
 - g. Double-wrap large pieces in 1000-gauge polythene sheeting. Seal with duct tape.
 - h. Attach asbestos warning stickers.
 - i. Caution: Avoid crushing Asbestos Containing debris on the ground.



- j. Place small pieces in the asbestos waste container and dispose the material as specified in Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
- 7) Contractor shall provide adequate protection to its personnel handling asbestos, including respirators and disposable clothing.

8.10.3.2 Other Hazardous Waste Management Plan

Following measures shall be undertaken in case of generation of lubricating oil and fuel spills, waste oil and lubricant and vehicle/equipment washing effluent, fuel filters, oily rags:

- 1) No refueling of vehicles within 20 m of any watercourse.
- 2) Fuel and lubricants should be stored at the predefined storage location that needs to be identified by the Contractor in consultation with MRVC. The storage area should be paved with gentle slope to a corner and connected with a chamber with provision of impervious liners to collect any spills of the oils.
- 3) All efforts should be made to minimize the hazardous waste generation.
- 4) Unavoidable hazardous waste shall be collected and stored separately in labeled containers. The contractor shall identify the nature and quantity of hazardous waste generated as a result of his activities and shall file a "Request for Authorization" along with a map showing the location of storage area to Maharashtra Pollution Control Board (MPCB). Outside the storage area, the contractor shall place a 'display board', which will display quantity and nature of hazardous waste, on date. Hazardous Waste needs to be stored in a secure place. It shall be the responsibility of the contractor to ensure that hazardous wastes are stored, based on the composition, in a manner suitable for handling, storage and transport. The labelling and packaging is required to be easily visible and be able to withstand physical conditions and climatic factors. The contractor shall approach only Authorized Recyclers or purchasers of Hazardous Waste for disposal of Hazardous Waste, under intimation to the MRVC. Hazardous waste material shall be disposed in the nearest Common Hazardous Waste Treatment Storage and Disposal Facility (CHWTSDF). Prior to transporting the hazardous waste, its packaging must be marked and sent to the CHWTSDF with proper manifests as required by the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
- 5) Overall, the hazardous waste generated during tunneling shall be managed as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

8.11 Flora and Fauna Management Plan

As per the survey conducted by MRVC, around 1814 trees in Panvel-Karjat stretch will be affected due to the proposed alignment and the ancillary facilities. The proposed alignment is passing through the Matheran eco-sensitive areas. Following measures should be implemented to minimize the impact on flora-fauna in Panvel-Karjat Areas.

Construction Phase:

- In India, based on "The Forest Conservation Act, 1980" the removal of trees requires approval as well as transplanting to other locations. Moreover, in Maharashtra state, laws are in place for tree removal and transplanting. In Maharashtra State, the Maharashtra Felling of Tree (Act 1964) is in place and adherence to these standards will also be required. Based on the permission given by Tahsildar/RFO, the tree felling shall be carried out.
- 2) Plantation at the railway stations and vacant lands shall be carried out as a part of this project. As suggested in the Indian Railway Works Manual, 2000, on all construction

projects, bulk afforestation of suitable variety should be done in vacant land as an environmental improvement measure.

- 3) The green belt development shall prevent noise pollution, land degradation due to activities during construction phase, enhance the tree cover in the area and thus help increase biodiversity of the area, provide aesthetic value to the project site and prevent soil erosion in the area.
- 4) The plantation shall be carried along alignment and the compensatory afforestation in the ratio of 1:5 for terrestrial flora. In case of tree cutting in Matheran Eco-sensitive area, compensatory afforestation in the ratio of 1:10 may be required as evident in other infrastructure projects in the area. This will enhance the overall ecological condition of the area.
- 5) Type, number of trees to be planted and location of the green belt area shall be done by the contractor will support of MRVC and RFO. The contractor shall carry out the plantation activity with support of plantation experts who can plant as well as nurture the green belt area.
- 6) To ensure that the plantation activity is a success, efforts should target the capacitybuilding of nurseries that must be equipped with saplings of jungle tree and shrub species. It must be understood that most of the nurseries have only a few species, and that, too, with several exotic species. There is a bias in species selection for nurseries – they tend to be fast-growing, low-maintenance, or with known anthropogenic benefits. Hence, we miss out on the hundreds and hundreds of slow-growing, high-maintenance species of no known benefits to the man but with undeniable ecological benefits. While clearing woodlands to make way for infrastructure, we cut several floral species belonging to the second category but carry out compensatory plantation with species of the first category which harms ecology. Hence, MRVC shall ensure that the contractor keep on the lookout for such well-equipped nurseries or attempt to create one themselves.
- 7) The species for plantation shall be decided based on the floristic composition of the study area. MRVC shall not allow introduction of exotic species with known environmental setbacks (Eucalyptus, Australian Acacia, Prosopoisjuliflora, etc.).
- 8) The roots of the dead trees should be thoroughly removed.
- 9) The trees that are likely to fall should be safely removed from areas falling within the jurisdiction of the railways all along the proposed alignment.
- 10) Labour camps and office site for the project shall be located outside and away from the forest area i.e. Matheran and other nearby forest area.
- 11) The temporary storage of construction materials and heavy vehicle movement shall be not allowed in Matheran Eco-sensitive area.
- 12) Wastewater, sewage, solid waste and any other waste generated due to construction activity or labour camps shall not be allowed to dispose in Matheran Eco-sensitive area.
- 13) All work areas shall be smoothened and graded in a manner to conform to natural appearance of the landscape as directed by MRVC.
- 14) Construction activity shall be avoided during night hours near forest area i.e. Matheran Eco-sensitive area
- 15) Poaching must be strictly banned in the forest area. It shall be ensured by the contractor that no hunting or fishing is practiced at the site by any of the worker/staff member. All site workers/staff members shall be aware of the location, value and sensitivity of the wildlife resources.
- 16) Awareness programme on Environment and Wildlife Conservation shall be provided to the work force.
- 17) The Forest (Conservation) Act, 1980 & subsequent amendments and the Wildlife (Protection) Act, 1972 shall be strictly adhered to.


Operation Phase:

- 1) The honking shall be prohibited in the Matheran Eco-sensitive area.
- 2) Matheran Eco-sensitive area shall have speed limit to avoid any accidents. The speed limit shall be decided by MRVC.
- 3) During the operation phase the MRVC either through the appointed contractor or through its own resources will monitor survival rate of trees for the first three years. By this time the plants will grow and will sustain through natural process.
- 4) Planning for plantation, nursery, planting & care of young trees and maintenance shall be carried out as per Indian Railway Works Manual.

8.12 Traffic Management Plan

Construction Phase:

The Contractor shall develop, assess, and implement appropriate management measures for traffic management wherever the construction activity will affect or likely impact the efficiency and safety of road and related transport networks (including traffic flow, access, parking and user safety). Traffic management plan shall be prepared in consultation with the relevant road authority, transport operator, and emergency services, as relevant. This will be required for movement of man, material and machinery to the construction site nearest to the railway premises. . Hence, the contractors are required to develop Contractor's Environmental and Social Management Plan (CESMP) including the traffic management plan . A detailed traffic management plan shall be prepared by the contractor for Panvel-Karjat and submitted to MRVC for approval. The broad guideline for preparation of Traffic Management Plan is as follows:

- 1) The basic requirements of Road Traffic Management to be followed during construction activity to ensure that:
 - a. Road capacity is sufficient to accommodate construction vehicle traffic volumes and that disruptions are minimized
 - b. Appropriate warning and information signs are installed to provide advance warning of changed traffic conditions
 - c. Information and guidance is provided on how to make the construction site safe from construction vehicles
 - d. Understand the requirements of barricades for pedestrians, public transport passengers, motorists, cyclists etc.
 - e. The movements and choice of construction vehicles are considered
 - f. Work activities are planned and undertaken to minimize any adverse impacts and to ensure that the traffic normalcy is resumed in shortest possible time
 - g. Suitably trained staff perform daily inspections on implemented Traffic Management Plans
 - h. Measures for managing parking impacts, including any proposed alternative parking arrangements are developed
 - i. Pedestrian impacts are identified and managed
- 2) Necessary permissions shall be obtained from traffic department of urban/rural local bodies and Road Authorities such as Commissioner of traffic. Details of the barricade construction, area of enclosure and period of work are required to be submitted to the satisfaction of the authority.
- 3) All vehicles involved in the excavation and/or demolition process and departing the property with demolition materials, spoil or loose matter must have their loads fully covered before entering the public roadway. Prior to the commencement of work, suitable measures are to be implemented to ensure that sediment and other materials are not





tracked onto the roadway by vehicles leaving the site. It is an offence to allow, permit or cause materials to pollute or be placed in a position from which they may pollute water.

- 4) Loading and Unloading During Construction shall have following requirements:
 - a. All loading and unloading associated with construction must be accommodated on site.
 - b. If, during excavation, it is not feasible for loading and unloading to take place onsite, a Works Zone on the street may be considered. Prior approval is required from authorities.
- 5) Any materials, vehicles, refuse, skips or the like, under any circumstances, must not obstruct the public way.
- 6) For special operations including the delivery of materials, and erection and dismantling of on-site tower cranes which warrant the on street use of mobile cranes, permits must be obtained from authorities for the use.
- 7) In the case of full road closures and partial road closures, which can create significant traffics disruptions, the authorities shall be informed well in advance and necessary permissions to be obtained.
- 8) Mobile cranes operating from the road must not be used as a method of demolishing or constructing a building.
- 9) Special operations and the use of mobile cranes must comply with the approved hours of construction.
- 10) Contractor shall ensure that demolition and construction related impacts (including construction noise and vibration, loading, issues associated with construction workers and vehicles, traffic issues, management of the construction site) from the site can be dealt with expeditiously and cooperatively.
- 11) Traffic Management Plan shall address following sections:
 - a. Site location and road network
 - b. Approved development
 - c. Overall principles for traffic management
 - d. Hours of work
 - e. Truck routes
 - f. Traffic and parking effects
 - g. Pedestrians
 - h. Consultation
 - i. Pedestrian and traffic management plan
 - j. Construction site access, including the efficient and safe egress and ingress of vehicles
 - k. The movement of trucks on and off the site to be managed and controlled by appropriately qualified site personnel in accordance with a Safe Work Method Statement and Traffic Control Plans
 - I. Truck movements to and from the site to be restricted. Contractor shall provide a diagram showing designated truck routes
 - m. Parking management, including on and off street and remote parking and access haulage management, including works to facilitate haulage vehicles, the restriction of haulage vehicles in peak traffic periods
 - n. Pedestrian activity across the site access driveways will be managed and controlled by appropriately qualified site personnel
 - o. Appropriately qualified traffic controller's pedestrian warning signs to be displayed at appropriate locations will supervise reversing movements to and from
 - p. Pedestrian arrangements, construction activity and erection of safety fencing will be provided



- q. Mass movement of vehicles in and out of construction site such as RMC delivery Trucks
- r. Debris removal from site etc. Preferred time non-peak hours
- s. Restriction on movement of vehicles through congested roads, narrow lanes having sharp turning radius
- t. Safety in transporting heavy machinery at site such as use of slings, hoists or jacks for blocking or preventing falling or shifting of machinery
- u. Neutral position of motors / Engines and parking brakes set during parking and stoppage to be ensured
- v. Speed and overload restrictions
- w. Compliance under Central Motor Vehicles Rules, 1989 and latest amendments
- 12) Material Movement Plan also shall be prepared by the contractor and submitted to MRVC for approval. The contractor shall ensure the regular movements of the existing trains and safety of the workers while material movement from East to West or West to East.

Based on these guidelines Contractor shall prepare detailed traffic management plan and material movement plan and get the same approved by MRVC.

Operation Phase:

After construction, the railway operations will be handed over to Western/Central railway department. The concerned department will ensure traffic dispersal on proposed routes as per their operational guidelines.

8.13 Construction Area Management Plan

During the construction period, there is a possibility that the commuters' access will be affected in Panvel-Karjat stretch. Following measures shall be adopted to reduce the inconvenience to the commuters.

- Contractor to visit the site and make sure of requirement of temporary alternate approach pathways required during construction, areas for storage of construction material and areas & extent to which removable barricading may be required for access control. All measures required shall be provided at no extra costs to ensure that commuter's movement is safe and least affected.
- 2) No casting yard shall be created on productive lands.
- 3) The signage, barricading and other safety and environmental monitoring requirements shall be as per EMP and to be provided at no extra costs.
- 4) The contractor is required to prepare detailed construction methodology plan covering these areas and get the same approved from MRVC before commencement of construction work.
- 5) The contractor shall implement the approved Traffic Management Plan and Material Movement Plan.
- 6) Rehabilitate temporary access roads prior to the contractor leaving the site
- 7) Clearly identify and notify primary routes to the site and issue to all suppliers and Subcontractors.
- 8) The Contractor shall plan access routes to the site for construction purposes in conjunction with MRVC and affected Landowners. If the route is passing through the private property, agreements shall be made before starting the construction work. The Contractor shall clearly mark all access roads.
- 9) Where new access roads are constructed, this must be done according to design and specifications agreed by MRVC. MRVC shall ensure the aspect related to natural drainage and erosion while finalizing the access roads.



- 10) All damaged roads shall be rehabilitated using suitable measures. In the event of rehabilitation work being required on private roads, such work shall be done as per the agreed condition with the private land owner.
- 11) Access roads should be maintained in good condition by attending to potholes, and storm water damage as soon as these develop due to construction activities
- 12) All the hazardous material shall be stored properly on the construction site.
- 13) Clear notification on construction schedule and contents shall be made in the communities. Notice will be put prior 15 days of work through the section of the alignment at all public relevant platforms for. e.g. Gram Panchayat/Parishad etc.
- 14) The utilities encountered commonly on site for construction work include electricity, water, telecommunication, drainage, overhead and underground cables etc as per the survey conducted by MRVC. The utility lines crossing the railway line are mainly water pipelines. The necessary permissions required to relocate the utility lines as per the construction plan shall be taken by the contractor. It is essential to ensure that no existing utilities in the vicinity of the sites are affected by any of the project activities. A detailed utility relocation plan shall be prepared as a part of Contractor's Environmental and Social Management Plan (CESMP).

8.14 Occupational Health and Safety Plan

Construction Phase:

The safety aspects like (i) safety of construction workers, (ii) safety of road users including pedestrians and cyclists (iii) safety of cattle (iv) safety of local community (iv) unsafe/ hazardous traffic conditions due to construction vehicle movement need to be considered during the construction stage. Children are most vulnerable to injury due to vehicular accidents. Work area should be barricaded for safety of community. In addition, following measures should be implemented to related to Safety, Health and Environment during construction in Panvel-Karjat.

- Contractor shall develop through understanding about Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996, State Building and Other Construction Workers' Rules, Building and Other Construction Workers' Welfare Cess Act, 1996 and Central Rules, 1998, The Factories Act 1948 not only to satisfy the Inspectors' perspective but the use of legislation as the strong tool for effective Safety, health and Environment management at construction work sites.
- 2) The contractor shall ensure that all his employees/workmen are covered under 'Workmen Compensation Act' and shall pay compensation to his workmen as and when the eventuality for the same arises.
- 3) The contactor shall prepare a health management plan to avoid disease spread in the area e.g. Sexually transmitted diseases (STDs)/HIV.
- 4) The contractor shall comply with Safety, Health and Environment (SHE) Manual prepared by MRVC.
- 5) Within 4 weeks of the notification of acceptance of the tender, the Contractor shall prepare a contract specific SHE plan. SHE plan shall be prepared based on the SHE Manual, Indian Railway Codes and Manuals and other applicable rules and regulations of the Central/State Government.
- 6) SHE Plan shall include detailed policies, procedures and regulations which, when implemented, will ensure compliance of the contract provisions. The SHE Plan shall include following but not to be restricted to:
 - i. All electrical equipment installed shall have shock preventive mechanisms like automatic shutdown.



- ii. Workers should be provided with adequate personal protective equipment such like hand gloves, safety shoes, safety goggles, hard safety helmets. Ear plugs or ear muffs shall be given to person involved with heavy noise generating machinery.
- iii. Training should be provided to workers about hazards related to the job, usage of tool box, health and safety.
- iv. Workers shall be given job rotation to minimize the impact of higher noise levels and repeated mechanical shocks and/or vibration from locomotives, rolling stocks and machinery
- v. Workers shall be trained about personal track safety procedures.
- vi. Pre-checks or inspection, maintenance and servicing of all machinery & equipment should be done as per scheduled.
- vii. Necessary measures should be taken to prevent the emission from vehicles such as taking PUC, covering the exhaust of vehicles with preventive equipment like spark arrestor etc.
- viii. Periodical medical checkups like lung function test etc. shall be carried out.
- ix. The building and other construction workers' (regulation of employment and conditions of service) act, 1996 requires that
 - ✓ No child labour should be involved in any of the activities
 - ✓ Only competent person should allow on heavy work.
 - ✓ All equipment and machinery shall be inspected before starting the work and all are certified by the competent person.
 - ✓ Every worker should be provided training related to job safety and other hazards related to job.
 - ✓ Periodical medical checkups shall be organized for workers.
 - ✓ Each worker shall be given personal protective equipment (PPE) which is mandatory to use while working.
 - ✓ Each incident should be reported so that preventive measure can be taken to avoid reoccurrence of such incident.
- x. All hazardous chemicals and materials shall be stored in dedicated area and covered. Signboard and labeling should be done. Also, every chemical shall have material safety data sheet (MSDS). Continuous supervision should be provided in the area.
- xi. At every workplace, the Implementing Agency/Contactor in collaboration with local health authorities will ensure that a readily available first-aid unit including an adequate supply of sterilized dressing materials and appliances is made available. Access to the ambulatory services should be provided to approach the nearest hospital in case of an emergency.
- xii. The use of corrugated roofing sheets containing asbestos fibers shall not be permitted.
- xiii. All equipment and machinery to be used shall comply with the design safety and industrial standards.
- xiv. All equipment and machinery shall be inspected and certified by competent person.
- xv. Preventive maintenance and servicing of equipment and machinery should be done to avoid any incident and breakdown.
- xvi. Each and every machine and tools should be inspected by the operator and supervisor before start of work.
- xvii. Regular inspection and maintenance of the rail lines and facilities shall be carried out to ensure track stability and integrity in accordance with national and international track-safety standards.
- xviii. The workers shall be trained for usage of all type of equipment and machinery.
- xix. Implementation of an overall safety management program equivalent to internationally recognized railway safety programs is prescribed. Work area should be barricaded and provided with measures to prevent trespassing. To further ensure public safety, the right-of-way close to habitation shall be fenced.



- xx. Alternative options for movement of locals should be provided. Pedestrian passageways shall be provided near settlement on both sides.
- xxi. Measures shall be taken to prevent breeding at site by the contractor
- xxii. All machinery and equipment should be covered with acoustic materials. All exhaust should be provided stacks to release of gaseous emission at safe height.
- xxiii. Efforts shall be made to avoid the storage of hazardous chemicals near any residential area. Hazardous chemicals shall be labeled and stored in locked facility under authorized person. Contractors shall be required to adopt and maintain safe working practices. Usage of appropriate signage in local language at the construction sites should be displayed generously and visibly to make the travelers aware of the ongoing work. Adequate lighting and fluorescent signage shall be provided at the construction sites.
- xxiv. The Contractor shall deploy a team for Safety, Health and Environment management on the construction site as specified in SHE manual prepared by MRVC.
- xxv. Efforts shall be made to avoid use of current community access for storage and heavy vehicle movement.
- xxvi. To avoid disruption of the existing traffic due to construction activities, comprehensive traffic management plan should be drawn up by the concessionaire and get the approval from the Competent Authority for the same. The broad guideline for preparation of Traffic Management Plan is given in *Section 10.11*. Installation of temporary speed bumps to control speed near designated pedestrian crossing areas/school areas/ market places/ religious places/ human habitations.
- xxvii. Efforts shall be made to avoid use of open ground, community properties.
- xxviii. The camps should be at sufficient distance from such area and labours should be instructed about not using such areas for trespassing and for other activities.
- xxix. Efforts shall be made to avoid dismantling any such community infrastructure.
- xxx. If there is necessary then contractor should provide other alternative options for locals and it is nearby to old area.
- xxxi. All community utilities likely to be impacted, such as sources of water, community centers, etc. shall be relocated to nearby suitable places.
- xxxii. Work area should be barricaded nearby sensitive receptors to avoid or minimize impact.
- xxxiii. The work scheduled should be arranged to avoid any nuisance to such facility during the work time.
- xxxiv. Avoid using of agricultural land for storage of construction materials and equipment.
- xxxv. A statement of the Contractor's policy and procedures for identifying and estimating hazards, and the measures for addressing the same shall be submitted to MRVC.
- xxxvi. Work area should be barricaded to ensure public safety. Access to such area should be prohibited for locals and passersby. Contractor should have plan for crowd handling.
- xxxvii. Contractors should display appropriate signage in local language at the construction sites to make the travelers aware of the ongoing work.
- xxxviii. Pre-medical checkups for all workers should be done before employment with health fitness certificate.
- xxxix. Regular SHE audits shall be conducted by the contractor with support of expert technical team on regular basis. The frequency of the audit shall be as per the SHE manual. The audit report shall be submitted to MRVC on timely basis. Based on the suggestions given in the audit report; improvement measures shall be taken by the contractor.
 - xl. All accidents and dangerous occurrences shall immediately be informed verbally to the MRVC, followed by a written communication giving brief about incident of accident, date/ time of occurrence. This will enable the MRVC to reach to the scene of accident



dangerous occurrences to monitor/ assist any rescue work and/ or start conducting the investigation process so that the evidences are not lost.

- xli. The Contractor shall prepare as required under the relevant rules of State Building and Other Construction Workers' Rules, an Emergency Response Plan for all work sites as part of the Contractor SHE Plan.
- xlii. The Contractor shall develop a Work Permit system, which is a formal written system used to control certain types of work that are potentially hazardous. A work permit is a document, which specifies the work to be done, and the precautions to be taken. Work Permits form is an essential part of safe systems of work for many construction activities.

Operation Phase:

The proposed new railway line will be handed over to Western/Central railways for operation. The health and safety of workmen shall be ensured as per Health and Safety Guidelines of Railways. MRVC shall support Western and Central Railway to follow SHE manual during operation stage.

8.15 Tentative Chance Find Procedure

Heritage resources or Burial Graves etc. of archaeological importance may be identified during construction or accidently exposed. The initial procedure when such sites are found aim to avoid any further damage. The following steps and reporting structure must be observed in both instances:

- The worker or group (identifier) who identified or exposed the burial ground must cease all activity in the immediate vicinity of the site.
- > The identifier must immediately inform his/her supervisor of the discovery.
- > The supervisor must ensure that the site is secured and control access.
- The supervisor must then inform the relevant Site In charge personnel responsible for at least the following portfolios: Community Liaison (CL), Environmental Control (EC) and Health and Safety (HS).
- Further the supervisor has to inform the employer about the discovery after making all necessary provisions to secure the discovery, barricading etc.

8.16 Environmental Monitoring Plan

The objective of environmental monitoring plan is to:

- Evaluate the performance of mitigation measures proposed in the ESMP
- Suggest improvements in management plan, if required.
- Enhance environmental quality
- Comply with the Statutory and community obligations
- Warn significant deteriorations in environmental quality for further preventive action

This exercise will aid implementation of mitigation measures by way of generating a continuous feedback system in structured format. At the same time, this could be used for conducting corrective action in respect of pitfalls as noticed during inspections. Effectiveness of the proposed mitigation measures during the construction period will be monitored using key environmental performance indicators, which are described below.

The key Environmental Performance Indicators that will be used to evaluate the effectiveness of the proposed environmental safeguards in relation to community health and safety in the project area are:

- Air Quality
- Water Quality
- Noise & Vibration Level



- Surface Water Quality
- Ground Water Quality

a) Air Quality Monitoring

The air quality monitoring is recommended through NABL accredited and MoEF&CC approved laboratory during the construction phase of the project. The monitoring of air shall be conducted at the location of worksite, material stockyards, and haul roads.

Air quality shall be analyzed as per the National Ambient Air Quality Standards (2009), CPCB. Parameters: Suspended Particulate Matter (SPM), Particulate Matter (PM2.5 and PM10), Sulphur dioxide (SO2), Nitrogen oxides (NOx), Carbon Monoxide (CO), Hydrocarbons (HC).

Air quality shall be monitored once in 3 times in a year (3 seasons) during construction phase and once in a year in winter season during operation phase and compared with the AAQ monitoring results obtained during the baseline monitoring to record changes in the AAQ and undertake suggested measures to mitigate the adverse impacts. Continuous 24 Hours Monitoring should be carried out.

The detailed Ambient Air Quality Monitoring Plan is presented in *Table 29.* The additional locations if required; shall be identified by the Contractor with help of Environment Cell of MRVC.

Water Quality Monitoring

Water quality shall be monitored on monthly basis throughout the project duration to cover seasonal variations and one year after the completion. Water quality shall be monitored through NABL accredited and MoEF&CC approved laboratory. Both Surface and groundwater should be monitored for the parameters of IS:10500.

The detailed Water Quality Monitoring Plan is presented in *Table 30.* The additional locations if required; shall be identified by the Contractor with help of Environment Cell of MRVC.

* Noise and Vibration Level Monitoring

Noise levels are to be monitored for 24 hours at each location on weekly basis during construction to cover maximum train traffic in a day. However, vibration levels shall be monitored once in a year.

. Following parameters will be recorded while monitoring:

- Noise levels in dBA
- o Peak Particle Velocity (PPV) in mm/s
- Acceleration
- o Displacement
- Vibration Decibel (dB)
- Height of the instrument
- o Distance of the recording instrument from the existing track

Ambient Air Quality Standards in respect of Noise prescribed in Noise Pollution (Regulation and Control) Rules, 2000 (see rule 3(1) and 4(1)) shall be adopted for noise monitoring. Permissible limits of ground vibration specified by Director General of Mines Safety (DGMS) through its Circular No. 7 of 1997 shall be used for Vibration level monitoring. Continuous 24 Hours Monitoring should be carried out. The detailed Noise and Vibration Level Monitoring Plan is presented in *Table 31*. The additional locations if required; shall be identified by the Contractor with help of Environment Cell of MRVC.





Table 29: Air Quality Monitoring Plan

Sr	Sample	Description of the	Criteria For	Locatio	on details	Monito	oring Frequency	Implemer	ntation	
No	Code	location	Selection	Latitude	Longitude	Construction Phase	Operation Phase	Construction Phase	Operation Phase	Supervision
1	A1	Habitation near Mohope Station between Chainage: 77/24 to 77/34	Proximity to construction work & increased rail traffic	18.94274	73.19706	3 times in a year (3 seasons)	3 times in a year (3 seasons) during first year of operation	Contractor	External agency	MRVC
2	A2	Chowk Station area between chainage 85/12 & 85/16	Proximity to construction work & increased rail traffic	18.90303	73.24083	3 times in a year (3 seasons)	3 times in a year (3 seasons) during first year of operation	Contractor	External agency	MRVC
3	A3	Habitation near Proposed new ROB at Chainage: 90/1	Proximity to construction work & increased rail traffic	18.91729	73.27984	3 times in a year (3 seasons)	3 times in a year (3 seasons) during first year of operation	Contractor	External agency	MRVC
4	A4	Habitation near Karjat Station between Chainage: 94/18 to 94/20	Proximity to construction work & increased rail traffic	18.92232	73.32234	3 times in a year (3 seasons)	3 times in a year (3 seasons) during first year of operation	Contractor	External agency	MRVC

Table 30: Water Quality Monitoring Plan

SI	Sample	Description of the		Locatio	on details	Monitoring Free	quency	Implemer	ntation	
No	Code	location	Criteria for Selection	Latitude	Longitude	Construction Phase	Operation Phase	Construction Phase	Operation Phase	Supervision
1	SW1	Surface water at Kalundre River	Exact Location to be decided on site conditions	18.98579	73.12644	Monthly	-	Contractor	-	MRVC
2	SW2	Pond at Mohope Station	Exact Location to be decided on site conditions	18.94455	73.19527	Monthly	-	Contractor	-	MRVC
3	SW3	Morbe Dam Spillway Channel water at Chowk Station	Exact Location to be decided on site conditions	18.90091	73.24652	Monthly	-	Contractor	-	MRVC
4	SW4	Surface water stream near Karjat Station	Exact Location to be decided on site conditions	18.92144	73.32218	Monthly	-	Contractor	-	MRVC



C	Comula	Type of	Description	Critorio for	Locatio	n details	Monitoring	Frequency	Implemer	ntation	
No	Code	Sensitive Receptor	of the location	Selection	Latitude	Longitude	Construction Phase	Operation Phase	Construction Phase	Operation Phase	Supervision
1	NV1	Residential Area	Multistory Building near Br.70/1	Located near minor bridge 70/1 Construction activity due to proposed extension of bridge	18.97797	73.13628	Noise level: Once in a week during construction Vibration level: Once in a year	Noise & Vibration level: Quarterly during first year of operation	Contractor	External agency	MRVC
2	NV2	Residential Area	Houses near RUB 75/2 at Bhingar village	Located near RUB 75/2 Construction activity due to proposed extension of RUB Proximity to construction work at station & increased rail traffic	18.95824	73.18085	Noise level: Once in a week during construction Vibration level: Once in a year	Noise & Vibration level: Quarterly during first year of operation	Contractor	External agency	MRVC
3	NV3	Residential Area	Houses above Wavarle tunnel	House located above tunnel Construction activity due to proposed tunneling work	18.91903	73.28821	Noise level: Once in a week during construction Vibration level: Once in a year	Noise & Vibration level: Quarterly during first year of operation	Contractor	External agency	MRVC
4	NV4	Residential Area	Houses near Br.94/3 at Karjat	Located within proposed rail boundary & minor bridge 94/3 Proximity to construction work & increased rail traffic	18.92221	73.32226	Noise level: Once in a week during construction Vibration level: Once in a year	Noise & Vibration level: Quarterly during first year of operation	Contractor	External agency	MRVC
5	NV5	Religious Places	Temple at Varose village	Located near RUB 83/1 & Minor bridge	18.90439	73.22132	Noise level: Once in a	Noise & Vibration	Contractor	External agency	MRVC





C .	Sample	Type of	Description	Critorio for	Locatio	n details	Monitoring	Frequency	Implemer	ntation	
No	Code	Sensitive Receptor	of the location	Selection	Latitude	Longitude	Construction Phase	Operation Phase	Construction Phase	Operation Phase	Supervision
				83/2 Construction activity due to proposed extension work			week during construction Vibration level: Once in a year	level: Quarterly during first year of operation			
6	NV6	Schools	ZP Primary School at Barwahi village	Located at hilltop at higher elevation level than the railway track Proposed work required cutting of hill (upto 19 m)	18.92871	73.19957	Noise level: Once in a week during construction Vibration level: Once in a year	Noise & Vibration level: Quarterly during first year of operation	Contractor	External agency	MRVC
7	NV7	Schools	Secondary School at Mohope village	Open space between receptor and railway tracks Proximity to construction work & increased rail traffic	18.94264	73.19677	Noise level: Once in a week during construction Vibration level: Once in a year	Noise & Vibration level: Quarterly during first year of operation	Contractor	External agency	MRVC
8	NV8	Schools	ZP Primary School at Wavarle village	Located above tunnel Construction activity due to proposed tunneling work	18.91892	73.28790	Noise level: Once in a week during construction Vibration level: Once in a year	Noise & Vibration level: Quarterly during first year of operation	Contractor	External agency	MRVC
9	NV9	Major Construction Work	Major Bridge 70/3 (Construction of RUB)	Construction activity due to proposed RUB	18.97589	73.14305	Noise level: Once in a week during construction Vibration level:	Noise & Vibration level: Quarterly during first year of operation	Contractor	External agency	MRVC





Sr. Sample		Type of	Description	Critorio for	Locatio	on details	Monitoring	Frequency	Impleme	ntation	
No	Code	Sensitive Receptor	of the location	Selection	Latitude	Longitude	Construction Phase	Operation Phase	Construction Phase	Operation Phase	Supervision
							Once in a year				
10	NV10	Major Construction Work	Major Bridge 68/2 (Construction of new bridge)	Construction of new bridge	18.98601	73.12680	Noise level: Once in a week during construction Vibration level: Once in a year	Noise & Vibration level: Quarterly during first year of operation	Contractor	External agency	MRVC
11	NV11	Major Construction Work	Nadhal tunnel (Construction of new tunnel)	Construction of new tunnel	18.90398	73.21733	Noise level: Once in a week during construction Vibration level: Once in a year	Noise & Vibration level: Quarterly during first year of operation	Contractor	External agency	MRVC
12	NV12	Major Construction Work	Utility Pipeline below underpass at WTP, between Chainage: 80/14 to 80/15	Proximity to construction work & increased rail traffic	18.91688	73.20642	Noise level: Once in a week during construction Vibration level: Once in a year	Noise & Vibration level: Quarterly during first year of operation	Contractor	External agency	MRVC



The contractor shall monitor following aspects:

- Daily visual observations of visible dust at project sites and labour camps
- Daily visual observations of water use and drainage at project sites and labour camps
- Daily inspection of solid waste segregation, storage, recycling and disposal; proper storage/handling of hazardous materials and fuels
- Daily visual inspections of Community Health and Safety Accident, injury, inconvenience, delay, loss of income
- Weekly visual inspections of accident records and other records at construction site

MRVC also should monitor these aspects through PMC on quarterly basis.

8.17 Environmental Budget

this Report which needs to be borne. The proposed mitigation costs have been bifurcated in three parts as described below for Panvel-Karjat stretch.

- 1) Costs which may be incurred by the contractor on environmental measures
- 2) Cost may be incurred by the contractor which is already included as works (Civil/ mechanical/ electrical/labour amenities etc) but, related to Safety, Health and Environment
- 3) Cost to be incurred by MRVC during construction and/or operation stage

Following assumptions has been taken while preparing the estimates of expenditure on proposed mitigation measures and ESMP.

- Construction duration is considered as 4 years (48 months). Out of total 48 months; work will be on hold during 4 months of monsoon every year. Hence, actual months of construction will be 32 months.
- Number of labours working on construction site will be 1000.

Based on the detailed expenditure calculated for the Environment Management, Total cost for ESMP - Mitigation Measures under the Scope of MRVC is INR 3,49,14,000 while Total cost for ESMP - Mitigation Measures under the Scope of Contractor is INR 3,73,24,826.67. Hence, the total cost for the Environmental Management for Panvel-Karjat stretch is INR 7,22,38,826.67.

The BoQ format for the cost related to the environmental budget under the scope of the Contractor is presented in *Annexure 14*.

8.18 Grievances Redressal Mechanism

Grievance Redress Mechanism (GRM) is an arrangement for receiving, evaluating and facilitating the resolution of affected people's concerns, complaints, and grievances about the borrower/client's social and environmental performance on a project.

The existing mechanisms of addressing project related complaints has been reviewed. As per the existing system Project affected People can approach concern land acquisition authority of District Collector office or concern Dy. CPM of the project. Both these authorities will redress the concern at their level if it is within their authority otherwise it will be forwarded to District Collector office or HQ office of MRVC for redressal. The complainant may take recourse to the Court of law, if not satisfied or otherwise also.

A Grievance Redress Mechanism having Grievance Redress Committees (GRCs) in Panvel-Karjat alignments has been suggested to supplement the existing system. The GRCs will have



representatives from the community, local NGOs and the implementing agency. The Complaints received by the GRCs will be handled according to the existing procedures, which are in tandem with the Bank's requirements..

The Project-affected People's Mechanism (PPM) has been established by the 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 its ESF in situations when their concerns cannot be addressed satisfactorily through Project-level GRM or AIIB Management's processes. It has been advised that a multi-tier GRM will be constituted for the Project in line with the prescriptions of the PPM Policy of the Bank, building on the existing complaint mechanisms.

MRVC will develop a Grievances Redressal Cell to receive and respond to the concerns, complaints, and grievances received from the stakeholders. The phone numbers and communication addresses for grievances will be displayed at various locations near construction site. The grievances will be received by following ways:

- Letter to Grievances Redressal Cell
- Telephonic grievances on the phone number linked to Grievances Redressal Cell. The grievances received telephonically will be noted in the telephonic grievances register.
- Grievances communicated to the field staff of MRVC/PMC/Contractor verbally by the stakeholders. The field staff of MRVC/PMC/Contractor should insist the stakeholders to give the written complaint which will be given to the Grievances Redressal Cell.

The Grievances which can be addressed shall include but not limited to:

- Noise pollution due to vehicular traffic, machinery etc.
- Air pollution due to construction activities
- Contamination of waterbodies due to disposal of any type of waste such as solid waste from labour camps, construction and demolition waste, oil spills etc.
- Use of productive land for material transportation or storage or labour camps without necessary permissions from concerned authority
- Issues related to compensation for land acquired
- Damage to any cultural or physical resources outside the project area
- Misbehaviour of labour with the local community
- Improper construction site management, improper storage or disposal of waste / debris material, inadequate safety practices, damage to cultural or public properties and issues between the labour force and the local community.
- Grievances related to land acquisition, compensation and resettlement will include issues such as computation of compensation, land measurement, eligibility, non-inclusion in the list of PAPs, valuation of structures, trees etc.

There will be Grievance Redress Committee to hear and redress the grievances, if any, of the project affected families and project affected people at local level as well as in the Head Quarter level in Mumbai. The Grievance Redress Mechanism will be at two levels. Tier 1 will consist of the Contactors and PMC. Tier 2 will be officers of MRVC. The working mechanism of Tier 1 and Tier 2 shall be as follows:

Tier 1: This will be the first level of grievance redress at field level and will consist of the Project affected persons representatives, Contactors and PMC. The Contractor at the field level to the extent possible will address the problem and try and resolve the complaint. The PMC will ensure the successful redress of the compliant and report to the Grievance Redress Cell. PMC will also monitor



the implemented action in the field. The time taken at the field level to address grievances will be 14 days.

The field level PMC and Contractors will consider any grievance of project affected families, give its decision in writing within a stipulated time preferable within 2 week, and keep record of such decisions. If the aggrieved party is not satisfied with the decision, appeal could be made to Grievance Redress Committee at Head Quarter level.

Tier 2: This will include officers from MRVC. The members will include Chief Project Managers (CPMs) and Deputy CPMs, Social Expert (1 staff) and Environment Expert (1 staff). The Grievance Redress Committee at Head Quarter level shall be chaired by the respective CPM and Financial Advisor and Chief Account Officer (FA& CAO) officials from MRVC and nominated officer from MMRDA shall be the members of the committee. The time taken to redress grievances will be 2 week at this level. The GRC at Head Quarter level is presented below.

1	CPM, MRVC	Chairman
11	FA & CAO, MRVC	Member
	Deputy CPMs	Member
IV	Nominated Officer from MMRDA	Member
V	Environment Experts (1)	Member
VI	Social Expert (1)	Member

Grievance Redress Committee at the Head quarter will comprise of separate line of redress for Land Acquisition matters and Resettlement matters. For land acquisition the aggrieved person will first approach the concerned Sub divisional Officer (SDO), followed by the Deputy CPM and finally the CPM. Alternately, the concerned SDO can also route the unresolved grievances through the Collector and then the concerned Additional Divisional Commissioner.

For resettlement related matters, for non-title holders, the affected person will first approach the concerned Project Implementation Unit of MMRDA, then the Chief, Social Development Cell of MMRDA.

Public Relation Officer (PRO) will be a nodal person who will transmit the letter/telephonic grievances register to the respective departments e.g. Social, Environment, Civil, Mechanical, Electrical etc. within MRVC. PRO will be part of both the tiers. Based on the response received from the technical team, PRO will respond back to the respective stakeholders via letter/email/telephonic communication regarding the complaints. PRO will also pass on the response of concerns, complaints, and grievances to the contactor and PMC for implementation of the actions suggested by MRVC on the grievances.

The PRO shall disseminate the roles and responsibilities of its members and encourage the public to approach it in case they have any concern related to project implementation.

The complainant may take recourse to the Court of law, if dissatisfied with the verdict of the GRM. Project Affected Families are expected to approach the court of law after exhausting the remedy of GRC mechanism. However, establishment of grievance redress mechanism does not bar any one from approaching the court of law.



Section 9 Conclusion

Navi Mumbai is developed as alternative growth centre aimed to decongest Mumbai by siphoning off the over concentration of jobs and population in Mumbai. The Navi Mumbai area has witnessed rapid urbanization and population growth in recent years on account of new development as international airport, Panvel as junction for southbound trains and rapid industrialization. The rapid regional development has increased the demand for physical, social and commercial infrastructure in Panvel - Karjat area. Thus in conjunction with the need of the area, Mumbai Rail Vikas Corporation (MRVC) has proposed the double line corridor between Panvel & Karjat. This will facilitate direct connectivity of Navi Mumbai to other parts of the country.

The impacts of the proposed project will mainly be subjected to construction phase. However, strict adherence to the various mitigation measures as identified under the ESMP, strengthened by adequate environmental monitoring and good construction practices will go a long way in effective reducing the impacts to a minimum level.

The project will have significant positive impacts as:

- The proposed two lines will run Suburban services between Panvel & Karjat considering significant growth in Navi Mumbai area and will support additional Mail/Express trains. Thus, the running of fast suburban services in future will increase commuter's convenience.
- The introduction of double line rail corridor will lead to savings on account of prevention of accidents and pollution and will also save time of commuters travelling by various modes of road transport.
- Reduction in traffic congestion will save the capital investment, vehicle operating cost, fuel consumption.
- With double corridor line, trains on the Konkan Railway Corporation Ltd (KRCL) to Madgaon, Mangalore and Ernakulam from Pune will be diverted through this route, which will increase the carrying capacity of the route.
- The Double Corridor will provide direct connectivity of Navi Mumbai to other parts of the country. Thus, Panvel can become a terminal station for trains towards southern Maharashtra, Goa, Karnataka, Tamil Nadu and Kerala, which will enhance the capacity for fast transport.

Thus it can be concluded that the proposed project is environmentally acceptable and will not only bring economic, social and environmental benefits to the local communities in the area but also makes a step forward in bringing better solutions for balanced growth throughout the region of Navi Mumbai and alleviate the issues of environment as encountered in rapidly growing metro cities.



ANNEXURE





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ANNEXURE 1: DEMOGRAPHIC AND SOCIO-ECONOMIC PROFILE OF THE STUDY AREA





	Demographic & Socio-economic Profile for Panvel-Karjat Stretch No. of Average Sex Ratio % of % of SC % of ST																								
Sr. No	Name of the Place	No House	. of eholds	Total Po	opulation	Ave Hous Si	rage ehold ze	No. of	Males	No. of I	Females	Sex (Fer 1000 (Ratio nale/ males)	% of	Males	% Fem	of ales	SC Po	pulation	% oʻ Popu	f SC lation	ST Pop	ulation	% oʻ Popu	f ST lation
		2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
D1	Raigad District	478933	611790	2207929	2634200	5	4	1117628	1344345	1090301	1289855	976	959	51	51	49	49	53667	134952	2	5	269124	305125	12	12
T1	Panvel Taluka	90008	176364	422522	750236	5	4	224560	397228	197962	353008	882	889	53	53	47	47	12195	49799	3	7	36575	48162	9	6
T2	Khalapur Taluka	39187	46520	183604	207464	5	4	98220	109225	85384	98239	869	899	53	53	47	47	5052	13494	3	7	25437	30793	14	15
Т3	Karjat Taluka	36467	44451	184420	212051	5	5	94724	107870	89696	104181	947	966	51	51	49	49	3041	11507	2	5	40914	50756	22	24
1	Panvel (M Cl)	23894	43107	104058	180020	4	4	54963	92484	49095	87536	893	946	53	51	47	49	4924	14464	5	8	2753	4301	3	2
2	Kalundre (CT)	1784	1672	7584	6626	4	4	3928	3515	3656	3111	931	885	52	53	48	47	318	372	4	6	184	218	2	3
3	Vichumbe	486	1624	2163	6332	4	4	1194	3512	969	2820	812	803	55	55	45	45	23	1012	1	16	39	152	2	2
4	Usarli Kh	237	628	1114	2608	5	4	602	1397	512	1211	850	867	54	54	46	46	3	412	0	16	49	170	4	7
5	Chikhale	298	443	1937	1899	7	4	1038	998	899	901	866	903	54	53	46	47	0	4	0	0	354	36	18	2
6	Borle (Bherle)	148	52	777	216	5	4	380	119	397	97	1045	815	49	55	51	45	27	8	3	4	0	22	0	10
7	Sangade	157	106	724	514	5	5	358	268	366	246	1022	918	49	52	51	48	0	9	0	2	0	271	0	53
8	Belavali	270	367	1422	1660	5	5	707	816	715	844	1011	1034	50	49	50	51	0	3	0	0	0	19	0	1
9	Bhingar	304	354	1420	1563	5	4	729	810	691	753	948	930	51	52	49	48	0	5	0	0	0	10	0	1
10	Bherle	139	172	595	736	4	4	306	354	289	382	944	1079	51	48	49	52	0	0	0	0	595	731	100	99
11	Bhingarwadi	147	169	777	832	5	5	397	429	380	403	957	939	51	52	49	48	0	8	0	1	0	20	0	2
12	Mohope	75	80	396	386	5	5	184	182	212	204	1152	1121	46	47	54	53	4	0	1	0	0	0	0	0
13	Poyanje	422	475	2114	2231	5	5	1067	1110	1047	1121	981	1010	50	50	50	50	100	100	5	4	307	375	15	17
14	Pali Bk	44	53	160	222	4	4	81	109	79	113	975	1037	51	49	49	51	0	0	0	0	145	202	91	91
15	Barwai	250	282	1224	1306	5	5	651	681	573	625	880	918	53	52	47	48	218	174	18	13	253	302	21	23
16	Bhokarpada	193	147	1030	766	5	5	585	397	445	369	761	929	57	52	43	48	4	14	0	2	0	0	0	0
17	Lodhivali	575	514	2384	2005	4	4	1252	1040	1132	965	904	928	53	52	47	48	25	41	1	2	194	262	8	13
18	Nadhal	196	418	900	1911	5	5	478	995	422	916	883	921	53	52	47	48	55	209	6	11	625	901	69	47
19	Chouk Manivali	537	735	2472	3309	5	5	1271	1716	1201	1593	945	928	51	52	49	48	56	65	2	2	312	921	13	28
20	Hatnoli	544	674	2611	2837	5	4	1394	1483	1217	1354	873	913	53	52	47	48	66	132	3	5	188	242	7	9
21	Morbe	120	69	563	344	5	5	279	183	284	161	1018	880	50	53	50	47	0	7	0	2	200	0	36	0
22	Bhilvale	168	189	786	878	5	5	405	443	381	435	941	982	52	50	48	50	0	45	0	5	385	514	49	59
23	Borgaon Bk	27	39	164	188	6	5	83	94	81	94	976	1000	51	50	49	50	0	0	0	0	0	2	0	1
24	Wavarle	248	274	1305	1361	5	5	700	687	605	674	864	981	54	50	46	50	10	26	1	2	304	348	23	26
25	Halivali	214	330	1093	1523	5	5	586	794	507	729	865	918	54	52	46	48	6	82	1	5	43	133	4	9
26	Deulwadi	76	298	440	1339	6	4	231	672	209	667	905	993	53	50	48	50	0	71	0	5	0	55	0	4
27	Kirawali	373	260	1885	1260	5	5	969	624	916	636	945	1019	51	50	49	50	33	151	2	12	208	134	11	11
28	Karjat (M CI)	5594	6820	25531	29663	5	4	13206	15248	12325	14415	933	945	52	51	48	49	1104	3693	4	12	877	1418	3	5
29	Brahamnoli	31	43	137	167	4	4	63	78	74	89	1175	1141	46	47	54	53	0	1	0	1	105	118	77	71
30	Vanjhale	143	166	708	737	5	4	382	385	326	352	853	914	54	52	46	48	0	9	0	1	90	72	13	10



	Demographic & Socio-economic Profile for Panvel-Karjat Stretch																								
Sr. No	Name of the Place	Literate P	opulation	Male I	Literate	Female	Literate	Liter Rate	acy (%)	Ma Liter Rate	ale racy e (%)	Fen Liter Rate	nale racy e (%)	Total \	Workers	Total Wor	Male kers	Total F Wor	⁻ emale kers	% Wor	of kers	% of Worl	Male kers	% c Fem Work	of ale kers
		2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
D1	Raigad District	1458324	1939994	822913	1059692	635411	880302	66	74	74	79	58	68	913995	1072969	588943	753843	325052	319126	41	41	53	56	30	25
T1	Panvel Taluka	288670	575681	168843	319292	119827	256389	68	77	75	80	61	73	157321	287203	121119	226392	36202	60811	37	38	54	57	18	17
T2	Khalapur Taluka	123013	150641	72369	84432	50644	66209	67	73	74	77	59	67	72741	80044	54611	62924	18130	17120	40	39	56	58	21	17
Т3	Karjat Taluka	112949	150685	65795	82766	47154	67919	61	71	69	77	53	65	74364	86164	49959	60214	24405	25950	40	41	53	56	27	25
1	Panvel (M Cl)	80493	151693	44433	79450	36060	72243	77	84	81	86	73	83	36341	67994	29966	51435	6375	16559	35	38	55	56	13	19
2	Kalundre (CT)	5949	5074	3220	2798	2729	2276	78	77	82	80	75	73	2343	2419	2036	2027	307	392	31	37	52	58	8	13
3	Vichumbe	1470	4856	922	2833	548	2023	68	77	77	81	57	72	1033	2615	729	2113	304	502	48	41	61	60	31	18
4	Usarli Kh	734	2039	435	1138	299	901	66	78	72	81	58	74	480	893	312	747	168	146	43	34	52	53	33	12
5	Chikhale	1420	1461	841	809	579	652	73	77	81	81	64	72	779	666	426	540	353	126	40	35	41	54	39	14
6	Borle (Bherle)	518	154	302	85	216	69	67	71	79	71	54	71	389	100	239	73	150	27	50	46	63	61	38	28
7	Sangade	520	273	302	159	218	114	72	53	84	59	60	46	201	183	172	152	29	31	28	36	48	57	8	13
8	Belavali	895	1220	524	636	371	584	63	73	74	78	52	69	1050	686	541	477	509	209	74	41	77	58	71	25
9	Bhingar	922	1102	544	631	378	471	65	71	75	78	55	63	572	798	368	554	204	244	40	51	50	68	30	32
10	Bherle	166	365	111	209	55	156	28	50	36	59	19	41	321	331	166	214	155	117	54	45	54	60	54	31
11	Bhingarwadi	528	661	303	367	225	294	68	79	76	86	59	73	253	244	169	209	84	35	33	29	43	49	22	9
12	Mohope	279	299	141	153	138	146	70	77	77	84	65	72	129	141	93	111	36	30	33	37	51	61	17	15
13	Poyanje	1249	1583	736	855	513	728	59	71	69	77	49	65	869	915	598	622	271	293	41	41	56	56	26	26
14	Pali Bk	25	55	21	36	4	19	16	25	26	33	5	17	100	83	51	49	49	34	63	37	63	45	62	30
15	Barwai	558	846	378	477	180	369	46	65	58	70	31	59	420	513	381	419	39	94	34	39	59	62	7	15
16	Bhokarpada	825	636	507	354	318	282	80	83	87	89	71	76	385	246	363	233	22	13	37	32	62	59	5	4
17	Lodhivali	1816	1606	981	853	835	753	76	80	78	82	74	78	924	706	726	559	198	147	39	35	58	54	17	15
18	Nadhal	376	1042	240	600	136	442	42	55	50	60	32	48	390	905	270	561	120	344	43	47	56	56	28	38
19	Chouk Manivali	1717	2158	952	1186	765	972	69	65	75	69	64	61	937	1226	729	995	208	231	38	37	57	58	17	15
20	Hatnoli	1905	2046	1103	1128	802	918	73	72	79	76	66	68	1130	935	761	811	369	124	43	33	55	55	30	9
21	Morbe	306	220	184	125	122	95	54	64	66	68	43	59	208	103	148	84	60	19	37	30	53	46	21	12
22	Bhilvale	356	451	232	260	124	191	45	51	57	59	33	44	335	320	258	261	77	59	43	36	64	59	20	14
23	Borgaon Bk	115	151	64	80	51	71	70	80	77	85	63	76	93	49	49	48	44	1	57	26	59	51	54	1
24	Wavarle	691	827	443	453	248	374	53	61	63	66	41	55	513	438	391	359	122	79	39	32	56	52	20	12
25	Halivali	796	1144	469	630	327	514	73	75	80	79	64	71	338	536	299	429	39	107	31	35	51	54	8	15
26	Deulwadi	307	1031	183	540	124	491	70	77	79	80	59	74	144	535	117	419	27	116	33	40	51	62	13	17
27	Kirawali	1282	950	743	506	539	444	68	75	77	81	59	70	650	432	498	351	152	81	34	34	51	56	17	13
28	Karjat (M CI)	19134	23531	10479	12522	8655	11009	75	79	79	82	70	76	8333	10350	6683	8035	1650	2315	33	35	51	53	13	16
29	Brahamnoli	17	91	12	48	5	43	12	54	19	62	7	48	63	70	42	38	21	32	46	42	67	49	28	36
30	Vanjhale	442	531	260	293	182	238	62	72	68	76	56	68	228	251	221	212	7	39	32	34	58	55	2	11



	Demographic & Socio-economic Profile for Panvel-Karjat Stretch Male Main Famale Main % of Male % of Male Male Marine Famale Marrine % of Male % of Female																								
Sr. No	Name of the Place	Main V	Vorkers	Male Wor	Main rkers	Female Wor	e Main kers	% of Wor	Main kers	% of Ma Worl	Male iin kers	e % of Female Main I s Workers		Marginal	Workers	Male M Wor	larginal kers	Female M Worl	Aarginal kers	% of Ma Work	rginal ers	% of Marg Wor	Male ginal kers	% of F Marg Worl	emale Jinal <u>kers</u>
		2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
D1	Raigad District	664689	858825	484273	641655	180416	217170	73	80	82	85	56	68	249306	214144	104670	112188	144636	101956	27	20	18	15	44	32
T1	Panvel Taluka	126407	250535	105689	204698	20718	45837	80	87	87	90	57	75	30914	36668	15430	21694	15484	14974	20	13	13	10	43	25
T2	Khalapur Taluka	55288	67818	46408	55450	8880	12368	76	85	85	88	49	72	17453	12226	8203	7474	9250	4752	24	15	15	12	51	28
Т3	Karjat Taluka	49732	62844	38510	47766	11222	15078	67	73	77	79	46	58	24632	23320	11449	12448	13183	10872	33	27	23	21	54	42
1	Panvel (M Cl)	34121	61532	28563	47551	5558	13981	94	90	95	92	87	84	2220	6462	1403	3884	817	2578	6	10	5	8	13	16
2	Kalundre (CT)	2076	2186	1852	1875	224	311	89	90	91	93	73	79	267	233	184	152	83	81	11	10	9	7	27	21
3	Vichumbe	957	2282	706	1877	251	405	93	87	97	89	83	81	76	333	23	236	53	97	7	13	3	11	17	19
4	Usarli Kh	297	807	275	680	22	127	62	90	88	91	13	87	183	86	37	67	146	19	38	10	12	9	87	13
5	Chikhale	483	634	348	514	135	120	62	95	82	95	38	95	296	32	78	26	218	6	38	5	18	5	62	5
6	Borle (Bherle)	227	99	159	73	68	26	58	99	67	100	45	96	162	1	80	0	82	1	42	1	33	0	55	4
7	Sangade	100	143	90	120	10	23	50	78	52	79	34	74	101	40	82	32	19	8	50	22	48	21	66	26
8	Belavali	385	657	354	459	31	198	37	96	65	96	6	95	665	29	187	18	478	11	63	4	35	4	94	5
9	Bhingar	327	644	284	473	43	171	57	81	77	85	21	70	245	154	84	81	161	73	43	19	23	15	79	30
10	Bherle	8	228	7	206	1	22	2	69	4	96	1	19	313	103	159	8	154	95	98	31	96	4	99	81
11	Bhingarwadi	207	195	144	172	63	23	82	80	85	82	75	66	46	49	25	37	21	12	18	20	15	18	25	34
12	Mohope	96	122	83	106	13	16	74	87	89	95	36	53	33	19	10	5	23	14	26	13	11	5	64	47
13	Poyanje	545	697	426	544	119	153	63	76	71	87	44	52	324	218	172	78	152	140	37	24	29	13	56	48
14	Pali Bk	43	70	42	45	1	25	43	84	82	92	2	74	57	13	9	4	48	9	57	16	18	8	98	26
15	Barwai	398	342	366	299	32	43	95	67	96	71	82	46	22	171	15	120	7	51	5	33	4	29	18	54
16	Bhokarpada	343	244	335	232	8	12	89	99	92	100	36	92	42	2	28	1	14	1	11	1	8	0	64	8
17	Lodhivali	782	614	687	504	95	110	85	87	95	90	48	75	142	92	39	55	103	37	15	13	5	10	52	25
18	Nadhal	246	836	210	529	36	307	63	92	78	94	30	89	144	69	60	32	84	37	37	8	22	6	70	11
19	Chouk Manivali	778	1113	639	933	139	180	83	91	88	94	67	78	159	113	90	62	69	51	17	9	12	6	33	22
20	Hatnoli	984	857	686	759	298	98	87	92	90	94	81	79	146	78	75	52	71	26	13	8	10	6	19	21
21	Morbe	178	57	134	45	44	12	86	55	91	54	73	63	30	46	14	39	16	7	14	45	9	46	27	37
22	Bhilvale	128	209	110	192	18	17	38	65	43	74	23	29	207	111	148	69	59	42	62	35	57	26	77	71
23	Borgaon Bk	53	47	34	46	19	1	57	96	69	96	43	100	40	2	15	2	25	0	43	4	31	4	57	0
24	Wavarle	511	393	391	332	120	61	100	90	100	92	98	77	2	45	0	27	2	18	0	10	0	8	2	23
25	Halivali	281	354	250	289	31	65	83	66	84	67	79	61	57	182	49	140	8	42	17	34	16	33	21	39
26	Deulwadi	87	497	82	401	5	96	60	93	70	96	19	83	57	38	35	18	22	20	40	7	30	4	81	17
27	Kirawali	509	392	434	320	75	72	78	91	87	91	49	89	141	40	64	31	77	9	22	9	13	9	51	11
28	Karjat (M Cl)	7212	9287	5929	7346	1283	1941	87	90	89	91	78	84	1121	1063	754	689	367	374	13	10	11	9	22	16
29	Brahamnoli	21	70	21	38	0	32	33	100	50	100	0	100	42	0	21	0	21	0	67	0	50	0	100	0
30	Vanjhale	144	244	139	207	5	37	63	97	63	98	71	95	84	7	82	5	2	2	37	3	37	2	29	5



ANNEXURE 2: SENSITIVE RECEPTORS IN THE AREA OF INFLUENCE OF PANVEL-KARJAT STRETCH







end							Infrastructure
Railway Station		Railway Tunnel	巍	Water Body	•	Infrastructure	Bus Depot
C/L of Existing Bailway Track	- + +	Minor Bridges	4	, Health Center		Mangrove	Power station
					•		Sewage Treatment Plant
 C/L Proposed Railway Track 	<u> </u>	Major Bridges	ſ	Institution	•	Stone Quarrying	Water Treatment Plant
- Matheran Eco Sensitive Zone Boundary	۵	Level Crossing	♦	Religious Place	•	Industries	Bridges
- Matheran Forest Boundary				Heritage & Monuments	✾	Plantation	Fire Brigade Station
Buffer 5 Km							Waste Dump

Legend

•

IR
IR-BD
IR-POW
IR-STP
IR-WTP
IR-BR
IR-FBS
IR-WD

Project Name: Environmental Assessment of all MUTP-III Projects Client Name: Mumbai Railway Vikas Corporation (MRVC) Contract Agreement No.: MRVC/RFP/W/MUTP-3/EA/2015/99 Scale: 0 0.5 1 4 Kilometers ▲IL&FS Environment IL&FS Environmental Infrastructure & Services Ltd.



ANNEXURE 3: STRIP MAPPING FOR DIRECT IMPACT ZONE OF PANVEL-KARJAT STRETCH



Double Line Corridor between Panvel-Karjat section Chainage : 0:000 to 0:800

Strip Map No: 01



Legend



	111166
	Park
Disc.	Auto
ous Place	Bus
trico	Publ
uies	Pow
	Gas
ition	Wate
	Over
Landuse	Hand
Construction	Cana
	Pum
tructure	Kabr
nercial	Shar
	Com
ential	Storr
	Petro

Infrastructure	IR
Parking	IR-P
Auto stand	IR-AS
Bus Depot	IR-BD
Public toilet	IR-PT
Power station	IR-POW
Gas pipeline	IR-G-PL
Water supply pipeline	IR-WS-PL
Over head Tank	IR-OHT
Handpump	IR-HP
Canal	IR-CN
Pump House	IR-PH
Kabristan, Shamshanghat,Morchery	IR-Mo
Community Hall	IR-CH
Storm water drains	IR-SWD
Petrol Pump	IR-PP
Utility Line	IR-UL

Environmental Assessment of all MUTP-III Projects
Client Name:
Mumbai Railway Vikas Corporation (MRVC)
Contract Agreement No.:

Project Name:

	MRVC/RFP/W/MUTP-3/EA/2015/99						
Sc	cale:						
0	0.0325	0.065	0.13	0.195	Kilometers 0.26		
Lefs Environment							

IL&FS Environmental Infrastructure & Services Ltd.

Double Line Corridor between Panvel-Karjat section Chainage : 0:800 to 0:1700

Strip Map No: 02



Legend



er 200m	•	Religious Place
fer 200m 7 km		Industries
		Institution
		Mixed Landuse
	\land	New Construction
	\bullet	Infrastructure
	\bigcirc	Commercial
	\bigcirc	Residential

c	CONTRACTOR SOLUTION	
	Infrastructure	IR
	Parking	IR-P
	Auto stand	IR-AS
	Bus Depot	IR-BD
	Public toilet	IR-PT
	Power station	IR-POW
	Gas pipeline	IR-G-PL
	Water supply pipeline	IR-WS-PL
	Over head Tank	IR-OHT
	Handpump	IR-HP
	Canal	IR-CN
	Pump House	IR-PH
	Kabristan, Shamshanghat,Morchery	IR-Mo
	Community Hall	IR-CH
	Storm water drains	IR-SWD
	Petrol Pump	IR-PP
	Utility Line	IR-UL

Proj	iect	Name:	

Environmental Assessment of all MUTP-III Projects

Client Name:			
Mumbai Railv	vay Vikas (Corporatior	ו (MRVC)
Contract Agree MRVC/RFP/V	ement No. V/MUTP-3/	: /EA/2015/9	9
Scale:			
0 0.0325 0.065	0.13	0.195	0.26
▲IL&FS Envir	ronment		

IL&FS Environmental Infrastructure & Services Ltd.

Double Line Corridor between Panvel-Karjat section Chainage : 0:1700 to 0:2600

Strip Map No: 03



Legend



IL&FS Environmental Infrastructure & Services Ltd.

0.26

Double Line Corridor between Panvel-Karjat section Chainage : 0:2600 to 0:3400 Strip Map No: 04

MRVC/RFP/W/MUTP-3/EA/2015/99

IL&FS Environmental Infrastructure & Services Ltd.

0.26

Scale:

0 0.0325 0.065

LIGES Environment



Mixed Landuse

Infrastructure

Commercial

Residential

New Construction

Proposed North Railway Boundary

Minor Bridges

Major Bridges

鰴

*

Level Crossing

Water Body

Recreational

Open Area

Plantation

Double Line Corridor between Panvel-Karjat section Chainage : 0:3400 to 0:4300



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Double Line Corridor between Panvel-Karjat section Chainage : 0:4300 to 0:5100

Strip Map No: 06



Legend



Project Name:

Double Line Corridor between Panvel-Karjat section Chainage : 0:5100 to 0:5900

Strip Map No: 07



Legend



Project Name:

Double Line Corridor between Panvel-Karjat section Chainage : 0:5900 to 0:6800

Strip Map No: 80



Contract Agreement No.:

Water supply pipelin

Kabristan, Shamshanghat,Morchery

Over head Tank

Handpump

Pump House

Community Hall

Utility Line

Storm water drains Petrol Pump

Canal

Institution

 \wedge

Mixed Landuse

Infrastructure

Commercial

Residential

New Construction

Proposed South Railway Boundary

Proposed North Railway Boundary

Minor Bridges

A Major Bridges

Chainage

Level Crossing

Water Body

Recreational

Open Area

Plantation

IR-WS-PL

IR-OHT

IR-HP

IR-CN

IR-PH

IR-Mo

IR-CH

IR-SWD

IR-UL

MRVC/RFP/W/MUTP-3/EA/2015/99						
Scale:				Kilomotora		
0.0325	0.065	0.13	0.195	0.26		
≜ IL&FS	Enviro	nment				

IL&FS Environmental Infrastructure & Services Ltd.

Double Line Corridor between Panvel-Karjat section Chainage : 0:6800 to 0:7600 Strip Map No: 09





Double Line Corridor between Panvel-Karjat section Chainage : 0:7600 to 0:8400 Strip Map No: 10



Double Line Corridor between Panvel-Karjat section Chainage : 0:8400 to 0:9300 Strip Map No: 11



Matheran Forest Boundary

IL&FS Environmental Infrastructure & Services Ltd.
Double Line Corridor between Panvel-Karjat section Chainage : 0:9300 to 0:10200





Double Line Corridor between Panvel-Karjat section Chainage : 0:10200 to 0:11000

Strip Map No: 13

LIGES Environment

IL&FS Environmental Infrastructure & Services Ltd.



Residential

Open Area

Plantation

Double Line Corridor between Panvel-Karjat section Chainage : 0:11000 to 0:11900



Double Line Corridor between Panvel-Karjat section Chainage : 0:11900 to 0:12700

Strip Map No: 15



Major Bridges

Recreational Open Area Plantation Forest

	Industries
	Institution
	Mixed Landuse
\land	New Construction
	Infrastructure
\bigcirc	Commercial
\bigcirc	Residential
	Matheran Ecosensitive Zone Bounda

Matheran Forest Boundary

	Bus Depot				
	Public toilet				
	Power station				
	Gas pipeline				
	Water supply pipeline				
	Over head Tank				
	Handpump				
	Canal				
	Pump House				
	Kabristan, Shamshanghat,Morchery				
	Community Hall				
	Storm water drains				
ry	Petrol Pump				
	Utility Line				

N-O-FL	11
R-WS-PL	Contract Agreement No.:
R-OHT	
R-HP	MRVC/RFP/W/MUTP-3/E/
R-CN	
R-PH	Scale:
R-Mo	0 0.045 0.09 0.18
R-CH	
R-SWD	
R-PP	
R-UL	IL&FS Environmental In
	1



0 27

Double Line Corridor between Panvel-Karjat section Chainage : 0:12700 to 0:13600

Strip Map No: 16



Utility Line

Matheran Forest Boundary

Stone Qaurrying

IR-UL

IL&FS Environmental Infrastructure & Services Ltd.

Double Line Corridor between Panvel-Karjat section Chainage : 0:13600 to 0:14500





Double Line Corridor between Panvel-Karjat section Chainage : 0:14500 to 0:15300

Strip Map No: 18

IL&FS Environmental Infrastructure & Services Ltd.



Legend



Double Line Corridor between Panvel-Karjat section Chainage : 0:15300 to 0:16100





Double Line Corridor between Panvel-Karjat section Chainage : 0:16100 to 0:17000





Double Line Corridor between Panvel-Karjat section Chainage : 0:17000to 0:17800

Strip Map No: 21





Railway Station
 C/L of Existing Railway Track
 C/L of Proposed Railway Tracks
 Proposed North Railway Boundary
 Proposed South Railway Boundary



Mixed L
 New Co
 Infrastru
 Mining
 Comme
 Resider
 Cattle S

Mixed Landuse New Construction Infrastructure Mining Commercial Residential Cattle Shed

Public toilet Power staton Gas pipeline Water supply Over head Ta Handpump Canal Pump House Radristan, Shamhangh Community H Storm water d Petro Pump Utility Line

IR-PT IR-PCW IR-G.PL IR-WS-PH IR-WS-IR-WS IR-PH IR-M0 IR-PH IR-M0 IR-PH IR-M0 IR-PH IR-WC IR-PH IR-UL

IR-AS IR-BD

Mumbai Railway Vikas Corporation (MRVC)
Contract Agreement No.:
MRVC/RFP/W/MUTP-3/EA/2015/99

Environmental Assessment of all MUTP-III Projects

Scale: ______Kilometers 0 0.0325 0.065 0.13 0.195 0.26

LIGES Environment

Project Name:

Client Name:

IL&FS Environmental Infrastructure & Services Ltd.

Double Line Corridor between Panvel-Karjat section Chainage : 0:17800 to 0:18800

Strip Map No: 22





- Proposed North Railway Boundary
- Proposed South Railway Boundary
 - Chainage
 - - Level Crossing
- Strip Map_1 km*0.7 km
- Plantation 畿 North Railway Buffer 200m South Railway Buffer 200m Religious Place Industries Institution

Mining

- Infrastructure Commercial Residential Cattle Shed

Contract Agreement No.: MRVC/RFP/W/MUTP-3/EA/2015/99 Scale: 0 0.0325 0.065 0.26 LIGES Environment IL&FS Environmental Infrastructure & Services Ltd.

Double Line Corridor between Panvel-Karjat section Chainage : 0:18800 to 0:19500



Leg	ena							Enviror	nmental Assess	ment of	all MUT	P-III Proiects
	Railway Station		Major Dridgoo		Water Body		Mixed Landuse	Olivert N				
	C/L of Existing Railway Track	Ķ	Major Bridges		Recreational	\land	New Construction	Mumb	a me: ai Railway Vika	s Corpor	ation (I	MRVC)
	 C/L of Proposed Railway Tracks 	+	Minor Bridges	\land	Open Area	●	Infrastructure					
	 Proposed North Railway Boundary 		North Railway Buffer 200m	**	Plantation	●	Mining	Contrac	t Agreement N	0.:	4 5 /00	
	Proposed South Railway Boundary		South Railway Buffer 200m	•	Religious Place	\bigcirc	Commercial		/RFP/W/MUTP	-3/EA/20	15/99	
			Strip Map_1 km*0.7 km		Industries	\bigcirc	Residential	Scale:	_			Kilometers
		0	Chainage		Institution		Cattle Shed	0 0.0325	0.065 0.13	0.19	-5	0.26
			Level Crossing		Institution			≜ IL∉FS	Environment			
									IL&FS Environme	ntal Infrastri	ucture & S	Services Ltd.

Double Line Corridor between Panvel-Karjat section Chainage : 0:19500 to 0:20400





Double Line Corridor between Panvel-Karjat section Chainage : 0:20400 to 0:21300

Strip Map No: 25



Legend













Double Line Corridor between Panvel-Karjat section Chainage : 0:22800 to 0:23700

Strip Map No: 28



Open Area

Plantation

Religious Place

Stone Quarrying

Commercial

Existing Railway Tunnel

Proposed Railway Tunnel

Scale:

0 0.0325 0.065

LIGES Environment

0 195

IL&FS Environmental Infrastructure & Services Ltd.

0.26

Major Bridges

Minor Bridges

North Railway Buffer 200m

South Railway Buffer 200m

Double Line Corridor between Panvel-Karjat section Chainage : 0:23700 to 0:24600





Double Line Corridor between Panvel-Karjat section Chainage : 0:24600 to 0:25400

Strip Map No: 30



Leg	end							Project I	Name:			
	Railway Station	C^{2}	Strip Map_1 km*0.7 km	٠	Industries	•	Cattle Shed	Enviror	nmental A	ssessme	nt of all M	UTP-III Projects
	C/L of Existing Railway Track	0	Chainage		Institution		Matheran Ecosensitive Zone Boundary	Client N	ame:			
	C/L of Proposed Railway Tracks	▲	Level Crossing				Matheran Forest Boundary	Mumb	ai Railway	/ Vikas C	orporation	ı (MRVC)
	 Proposed North Railway Boundary 		Water Body		Mixed Landuse		Forest	Contrac	t Aaroom	ent No ·		
	 Proposed South Railway Boundary 		Recreational		New Construction		EXSISTING-TUNNEL-PK	MRVC	/RFP/W/M	/UTP-3/F	A/2015/9	9
A.			Open Area		Intrastructure							
	Major Bridges	ى	Plantation		Commonsial		Proposed Railway Tunnel	Scale:				Kilometers
-4-	Minor Bridges	•	Religious Place		Residential			0 0.0325	0.065	0.13	0.195	0.26
	North Railway Buffer 200m				1 condonnal			≜ IL&FS	Environ	ment		
	South Railway Buffer 200m								IL&FS Env	/ironmental	Infrastructure	& Services Ltd.

Double Line Corridor between Panvel-Karjat section Chainage : 0:25400 to 0:26300





Double Line Corridor between Panvel-Karjat section Chainage : 0:26300 to 0:27100 Strip Map No: 32





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Double Line Corridor between Panvel-Karjat section Chainage : 0:27100 to 0:28100 Strip Map No: 33





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Double Line Corridor between Panvel-Karjat section Chainage : 0:28100to 0:29000





Double Line Corridor between Panvel-Karjat section Chainage : 0:29000 to 0:29500 Strip Map No: 35



Project Name: Legend Infrastructure IR-P IR-AS IR-BD Environmental Assessment of all MUTP-III Projects Parking Railway Station Water Body Mixed Landuse Auto stand 👫 Major Bridges Bus Depot Client Name: C/L of Existing Railway Track Recreational New Construction IR-PT IR-POW \wedge Public toilet Power station Mumbai Railway Vikas Corporation (MRVC) C/L of Proposed Railway Tracks Open Area Infrastructure Gas pipeline Water supply pip Over head Tank IR-G-PL IR-WS-P IR-OHT Amor Bridges Proposed North Railway Boundary Mining Plantation Contract Agreement No.: North Railway Buffer 200m Proposed South Railway Boundary Commercial Handpump IR-HP Religious Place MRVC/RFP/W/MUTP-3/EA/2015/99 Canal IR-CN IR-PH South Railway Buffer 200m Residential Pump House Industries Strip Map_1 km*0.7 km Cattle Shed Kabristan, Shamshanghat,Morchery Scale: IR-Mo Chainage Community Hall Storm water drains Petrol Pump IR-CH IR-SWD IR-PP 0 0.0325 0.065 Institution 0.26 盗 Level Crossing Utility Line IR-UL LIGES Environment

IL&ES Environmental	Infrastructure &	Services Ltd
ILAFS Environmental	initiastructure c	a Services Liu.

Double Line Corridor between Panvel-Karjat section Chainage : 0:29500 to Karjat Station Strip Map No: 36

IL&FS Environmental Infrastructure & Services Ltd.







ANNEXURE 4: LANDUSE MAP OF OF PANVEL-KARJAT





Legend

- Railway Station
- C/L of Existing Railway Track
- C/L Proposed Railway Track
- Proposed North Railway Boundary Major Bridges
- Proposed South Railway Boundary
- Railway Tunnel Minor Bridges

Buffer 5 Km

- Level Crossing



LAND USE / LAND COVER MAI MAHARASHTRA

Project Name:

100 C			Environmental Assessment of all MUTP-III Projects								
		CI	ent N	ame:							
ses	Classes										
	Grass / Grazing	M	Mumbai Railway Vikas Corporation (MRVC)								
Grass/Grazing					ay thui	00.00.0					
	Barren / Waste Lands										
	Salt Affected Land	Co	Contract Agreement No.:								
d	Gullied/Ravinous Land										
-	Scrub Land	MI	RVC/F	RFP/W	//MUTP-3	3/EA/201	5/99				
	Sandy Area										
riantabon	Barren Rocky	S	cale:								
an Culturation	Rann		0.5		0	0					
ng Culuvation	Wetlands / Water bodies	0	0.5	1	2	3	4				
	Water bodies						Kilometers				
emi Evergreen	Rivers/Streams/Canals			1							
	Inland Wetland	A	IL & EC	Env	ironmor	+					
ition	Coastal Wetland	/ 22	IEd D		lonner	it in the second s					
	Snow and Glaciers										
OTO YON	Snow/Glassiers			11 & F	S Environm	ental Infras	structure & Services Ltd				



ANNEXURE 5: HABITAT TYPES OF FLORA AND FAUNA IN PANVEL-KARJAT STRETCH








































ANNEXURE 6: CHAINAGEWISE TREE SURVEY DETAILS





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
1	CH 0900	BOR	0.25M	2.5M
2		BOR	0.35M	3.10M
3		JUNGLI	0.35M	3.50M
4		JUNGLI	0.45M	2.10M
5		JUNGLI	0.30M	2.50M
6		JUNGLI	0.65M	3.40M
7		BOR	0.25M	2.0M
8		BOR	0.30M	3.50M
9		BOR	0.45M	2.50M
10		JUNGLI	0.75M	3.50M
11		BABHUL	0.30M	3.40M
12		JUNGLI	0.25M	2.50M
13		JUNGLI	0.35M	3.50M
14		CHINCH	0.45M	3.50M
15	CH 1000	JUNGLI	0.40M	4.20M
16		CHINCH	1.20M	4.50M
17		BOR	0.40M	3.50M
18		JUNGLI	0.80M	4.10M
19		CHINCH	1.20M	4.50M
20		JUNGLI	0.35M	2.80M
21	CH 1900	NILGIRI	1.45M	5.20M
22		BABHUL	0.60M	3.50M
23		JUNGLI	0.40M	2.0M
24		BOR	0.45M	3.50M
25		JUNGLI	0.65M	4.00M
26		BOR	0.6M	2M
27		BOR	0.40M	2.50M
28		BOR	0.50M	2.10M
29		UMBR	0.75M	2.40M
30		CHINCH	0.90M	4.40M
31		JUNGLI	0.30M	2.10M
32	CH 2000	JUNGLI	0.80M	6M
33		JUNGLI	1.60M	4.80M
34		CHINCH	0.80M	4M
35	CH 2100	JUNGLI	0.30M	2.80M
36		JUNGLI	0.40M	3.20M
37		BOR	0.35M	2.50M
38		BOR	0.40M	3.0M
39		LIMB	0.25M	3.50M
40		JAMB	0.60M	2.50M
41		BOR	0.65M	4.00M
42		BOR	0.35M	3.00M
43	1	BOR	0.30M	2.00M
44		JUNGLI	0.25M	3.50M
45		BOR	0.35M	3.50M
46		BOR	0.60M	4.05M
47	CH 2200	BOR	0.35M	2.50M
48		MANGO	0.45M	4 10M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
49		BOR	O.25M	2.50M
50		BADAM	0.35M	4.40M
51		BOR	0.25M	1.80M
52		BOR	0.40M	2M
53		BOR	0.80M	4.40M
54		MANGO	0.70M	5.50M
55		BADAM	0.65M	6.10M
56		MANGO	0.25M	3.50M
57		MANGO	0.30M	4.10M
58		MANGO	0.25M	4.50M
59		BADAM	0.35M	3.80M
50		BOR	0.34M	4.10M
51		JAMBHUL	0.50M	2.50M
52		BOR	0.65M	4.50M
63		JAMBHUL	0.40M	5.10M
54 54		JAMBHUL	0.25M	3.50M
)5			0.85M	4.50M
36		JAMBHUI	0.25M	3 80M
57 57		BADAM	0.65M	6.50M
58 58		MANGO	0.45M	4 20M
39 39		BADAM	0.30M	3.50M
70			0.65M	4 40M
71			0.85M	6.50M
72			0.00M	8.50M
73			1 10M	8M
74			0.90M	8 80M
75			1.05M	7 20M
76			0.90M	8 10M
77		MANGO	0.36M	4.50M
78		BAMBILT	0.45M	4.50M
70			0.30M	3.50M
30			0.30M	8.50M
21	CH 2300	BOR	0.30M	0.5M
22	0112300		0.45M	4.40M
22			0.05M	5.10M
24		BOR	0.05M	3.10M
25			0.90M	4.10M
26			0.45M	4.20M
00 07			0.05M	4.40M
00			0.45M	0.20M
20			0.43101	4.20IVI
<u>)0</u>			0.90101	4. I UIVI
7U				5. IUIVI
11				4.20IVI
1∠ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			0.451/1	4.40IVI
13 14			0.25IVI	3.40IVI
14 VC			0.451/1	4.20IVI
<u>כו</u>			0.55M	4.50M
90		JUNGLI	U.85M	3.40M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
97		UMBR	0.55M	4.40M
98		BOR	0.45M	3.50M
99		BOR	0.35M	4.40M
100		BOR	0.50M	4.20M
101	CH2400	JUNGLI	0.30M	4.00M
102		BOR	0.40M	5.00M
103		LOKHANDI	0.40M	2.00M
104		CHINCH	0.45M	4.00M
105		BOR	0.50M	3.00M
106		JUNGLI	0.60M	4.00M
107		UMBR	1.05M	6.00M
108		UMBR	1.10M	6.00M
109		JUNGLI	0.35M	2.00M
110		BOR	0.40M	2.50M
111		CHINCH	0.70M	2.00M
112		JUNGLI	0.50M	4.00M
113		JUNGLI	0.60M	3M
114		BOR	0.80M	4.00M
115		UMBR	0.90M	4.00M
116		UMBR	1.10M	4.00M
117		UMBR	0.45M	2.50M
118		SUBABHUL	0.35M	2.00M
119		JUNGLI	0.40M	1.50M
120		BAMBU T	0.25M	2.00M
121		BAMBU T	0.25M	2.00M
122		JUNGLI	0.520M	2.00M
123		SUBABHUL	0.55M	2.50M
124		JUNGLI	0.45M	2.00M
125		BOR	0.40M	2.00M
126	CH 2500	JAMBHUL	1.20M	5.00M
127		MANGO	0.55M	3.00M
128		JUNGLI	0.45M	3.00M
129		SUBABHUL	1.20M	7.00M
130		JUNGLI	1.10M	7.00M
131		SUBABHUL	0.80M	6.00M
132		JUNGLI	0.75M	4.00M
133		JUNGLI	0.80M	4.00M
134		JAMBHUL	0.85M	5.00M
135		CHINCH	0.90M	7.00M
136		BAMBU T	0.25M	5.00M
137		JUNGLI	0.95M	6.00M
138		JUNGLI	1.10M	5.00M
139		CHINCH	0.50M	2.00M
140		BOR	0.40M	1.50M
141	CH 2600	JUNGLI	1.20M	6.00M
142		JUNGLI	0.95M	5.00M
143		JUNGLI	0.85M	4.00M
144	1	JUNGLI	0.54M	2.00M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
145		PALAS	0.45M	2.00M
146		JUNGLI	0.90M	5.50M
147		JUNGLI	1.10M	5.50M
148		JUNGLI	1.25M	6.00M
149	CH 2700	BOR	0.40M	2.00M
150		BOR	0.55M	2.00M
151		BOR	0.40M	2.00M
152		UMBR	0.80M	2.00M
153		BOR	0.70M	2.00M
154		SHIMLA	0.80M	4.00M
155		BOR	0.50M	2.00M
156		PALAS	0.40M	2.00M
157		CHINCH	1.40M	5.00M
158		SHIMLA	0.40M	4.00M
159		BOR	0.40M	1.50M
160		BOR	0.60M	3.00M
161		SHIMLA	0.60M	4.00M
162		JUNGLI	0.70M	5.00M
163		CHINCH	1.30M	5.00M
164		JUNGLI	0.50M	4.00M
165		UMBR	0.70M	3.00M
166		KATHOR	0.55M	2.50M
167		BOR	0.60M	2.00M
168		BOR	0.90M	4.00M
169		LOKHANDI	0.70M	4.00M
170		UMBR	1.40M	7.00M
171		BOR	0.60M	3.00M
172		LOKHANDI	0.70M	5.00M
173		SHIMLA	0.70M	5.00M
174		UMBR	0.78M	3.00M
175		LOKHANDI	0.50M	4.00M
176		LOKHANDI	0.70M	1.50M
177		UMBR	1.10M	3.50M
178		UMBR	1.40M	4.50M
179		UMBR	2.10M	6.00M
180		BOR	0.40M	2.00M
181		BOR	0.45M	4.00M
182		UMBR	1.90M	7.00M
183		UMBR	0.70M	3.00M
184		SHIMLA	0.40M	2.00M
185		SHIMLA	1.00M	7.00M
186		SHIMLA	0.40M	5.00M
187		SHIMLA	0.80M	4.00M
188		UMBR	0.40M	2.00M
189		SHIMLA	0.40M	3.00M
190		JUNGLI	0.70M	6.00M
191		UMBR	0.80M	5.00M
192		JUNGLI	0.40M	2.00M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
193	CH 2800	JUNGLI	0.90M	5.00M
194		CHINCH	0.70M	7.00M
195		CHINCH	0.80M	4.00M
196		SALAR	0.40M	4.00M
197		UMBR	0.70M	3.00M
198		UMBR	1.00M	7.00M
199		CHINCH	1.50M	8.00M
200		BOR	0.40M	3.50M
201		DHAMN	0.40M	3.00M
202		BOR	0.60M	4.50M
203		BOR	0.40M	3.00M
204		BOR	0.70M	4.00M
205	CH 2900	SHIMLA	0.70M	7.00M
206		JUNGLI	0.50M	3.50M
207		DHAMN	0.40M	5.00M
208		BOR	0.40M	3.00M
209		UMBR	0.80M	4M
210		JUNGLI	1.60M	9M
211		JUNGLI	0.60M	5.00M
212		SUBABHUL	0.90M	7.00M
213		KATHOR	0.40M	2.50M
214		KATHOR	0.60M	3.00M
215		SUBABHUI	0.40M	4 00M
216			0.70M	7.00M
217			0.80M	6.00M
218		SUBABHUI	0.50M	4 00M
219	CH 3000		0.80M	4 00M
220		SUBABHUI	0.50M	6.00M
221			0.90M	9.00M
222		UMBR	0.60M	7 00M
223		JUNGI	0.50M	2 00M
224		SUBABHUL	0.50M	6M
225		BOR	0.40M	4 00M
226		MANGO	1.10M	9.00M
227		SUBABHUL	0.40M	4.00M
228		SUBABHUL	0.40M	5.00M
229		SUBABHUL	0.80M	6.00M
230		CHINCH	0.70M	3.00M
231		SHIMLA	0.60M	8.00M
232		SUBABHUL	0.40M	5.00M
233		CHINCH	0.90M	4.00M
234		SUBABHUI	0 70M	8 00M
235		JUNGL	1 00M	9 00M
236			0.40M	8 00M
237		SUBABHUI		7 00M
238		SUBABHUI	0.30M	7.00M
230		SUBABHUI	1 00M	10.00M
240			0.60M	1 50M
240		SUBABHUL	0.60M	1.50M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
241		SUBABHUL	0.40M	1M
242		JAMBHUL	0.70M	9.00M
243		SUBABHUL	1.00M	10.00M
244		SUBABHUL	0.60M	1.50M
245		SUBABHUL	0.40M	1.00M
246		JAMBHUL	0.70M	10.00M
247		SUBABHUL	0.90M	11.00M
248		MANGO	1.50M	10.00M
249		SUBABHUL	0.40M	1.00M
250		BOR	0.30M	2.00M
251		SUBABHUL	0.40M	3.00M
252		MANGO	0.60M	5.00M
253		NILGIRI	1.00M	10.00M
254		SUBABHUL	1.00M	7.00M
255		SUBABHUL	0.70M	2.50M
256		NILGIRI	1.20M	12.00M
257		SHEVGA	0.60M	5.00M
258		SUBABHUL	0.40M	4.00M
259		SUBABHUL	0.40M	2.00M
260		SINDHI	1.50M	4.00M
261		SHEVGA	0.50M	4.00M
262		SUBABHUL	0.40M	3.00M
263		SHIMLA	0.40M	4.00M
264		SUBABHUL	0.50M	3.00M
265		PERU	0.40M	3.00M
266		SUBABHUL	0.40M	3.00M
267		SUBABHUL	0.60M	7.00M
268		SUBABHUL	0.40M	8.00M
269	CH 3100	SHIMLA	0.40M	5.00M
270		UMBR	0.90M	5.00M
271		SUBABHUL	0.40M	2.00M
272		SUBABHUL	0.45M	4.00M
273		PANGRA	0.50M	4.00M
274		SUBABHUL	0.50M	6.00M
275		SUBABHUL	0.40M	2.00M
276		SUBABHUL	0.40M	6.00M
277		JUNGLI	0.50M	4.00M
278		SUBABHUL	0.40M	7.00M
279		SUBABHUL	0.45M	1.80M
280		UMBR	0.40M	3.00M
281		SALAR	0.70M	5.00M
282		SUBABHUL	0.60M	8.00M
283		SUBABHUL	0.70M	9.00M
284		SUBABHUL	0.40M	5.00M
285		SUBABHUL	0.40M	5.00M
286		SHIMLA	0.50M	6.00M
287	CH 3200	SUBABHUL	0.40M	3.00M
288		SUBABHUL	0.50M	3.00M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
289		JUNGLI	0.70M	8.00M
290		SUBABHUL	0.60M	10.00M
291		JUNGLI	0.70M	8.00M
292		BOR	0.70M	4.00M
293		JUNGLI	0.90M	8.00M
294		SUBABHUL	0.60M	7.00M
295		JUNGLI	0.60M	7.00M
296		NILGIRI	0.80M	9.00M
297		NILGIRI	0.70M	8.00M
298		NILGIRI	1.50M	10.00M
299		NILGIRI	0.80M	7.00M
300		NILGIRI	0.70M	9.00M
301		NILGIRI	0.50M	7.00M
302		NILGIRI	1.00M	10.00M
303		JUNGLI	0.40M	4.00M
304		NILGIRI	0.90M	11.00M
305		NILGIRI	1.10M	11.00M
306		BOR	0.55M	2.00M
307		NILGIRI	1.10M	11.00M
308		SHIMLA	0.40M	3.00M
309		BOR	0.40M	6.00M
310		BABUL	1.10M	7.00M
311		BOR	0.50M	4.00M
312		SHIMLA	0.60M	7.00M
313		SUBABHUL	0.60M	9.00M
314		SHIMLA	0.40M	8.00M
315		JUNGLI	0.70M	8.00M
316		BOR	1.00M	9.00M
317		SHIMLA	0.50M	8.00M
318	CH 3300	SHIMLA	0.40M	6.00M
319		SHIMLA	0.50M	4.00M
320		SHIMLA	0.40M	5.00M
321		SHIMLA	0.40M	6.00M
322		BOR	0.40M	4.00M
323		BOR	0.50M	6.00M
324		SHIMLA	0.40M	7.00M
325		UMBR	0.40M	3.00M
326		BOR	1.40M	3.00M
327		UMBR	0.35M	1.00M
328		SHIMLA	0.40M	3.00M
329		BOR	0.50M	4.00M
330	CH 3400	UMBR	0.60M	2.50M
331		UMBR	0.70M	2.00M
332		BOR	0.45M	3.00M
333		JUNGLI	0.50M	4.00M
334		SHIMLA	0.45M	5.00M
335		BOR	0.60M	3.00M
336		NILGIRI	1 10M	12.00M



Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
337		NILGIRI	0.50M	6.00M
338		BOR	0.60M	3.00M
339		JUNGLI	0.70M	5.00M
340		SHIMLA	0.40M	2.00M
341		BOR	0.60M	4.00M
342		BOR	0.80M	5.00M
343		BOR	0.60M	4.00M
344		JUNGLI	0.70M	5.00M
345	CH 3500	UMBR	0.40M	4.00M
346		BOR	0.30M	3.00M
347		UMBR	0.60M	7.00M
348		UMBR	0.50M	4.00M
349		BOR	0.40M	3.00M
350		BOR	0.50M	4.00M
351		BOR	0.40M	4.00M
352		BOR	0.30M	2.00M
353		BOR	1.50M	8.00M
354		NILGIRI	0.90M	11.00M
355		NILGIRI	1.10M	12.00M
356		BOR	0.40M	4.00M
357		JUNGLI	0.80M	6.00M
358		BOR	0.40M	3.00M
359		BOR	0.40M	2.00M
360		BOR	0.40M	6.00M
361		UMBR	0.50M	5.00M
362		BOR	0.70M	6.00M
363		MANGO	0.80M	9.00M
364		MANGO	1.00M	7.00M
365		SHIMLA	0.50M	7.00M
366		JUNGLI	0.40M	3.00M
367	CH 3600	BOR	0.40M	4.00M
368		BOR	0.40M	3.00M
369		UMBR	0.30M	3.00M
370		JUNGLI	0.40M	3.00M
371		BOR	0.40M	2.50M
372		UMBR	0.45M	2.00M
373		BABUL	0.90M	7.0M
374		BABUL	1.20M	8.00M
375		BABUL	0.70M	5.00M
376		SUBABHUL	0.60M	7.00M
377		BABUL	0.90M	5M
378		UMBR	0.70M	4.00M
379		UMBR	0.40M	3.00M
380		ΑΡΤΑ	0.50M	3.00M
381		SUBABHUL	0.40M	3.00M
382		UMBR	0.70M	5.00M
383		BOR	0.70M	6.00M
384		SUBABHUI	0.40M	7.00M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
385		BOR	0.40M	3.00M
386		UMBR	0.40M	4.00M
387		SUBABHUL	0.50M	4.00M
388		BOR	0.30M	1.00M
389	CH 3700	UMBR	0.40M	3.00M
390		APTA	0.50M	3.00M
391		SUBABHUL	0.40M	3.00M
392		UMBR	0.70M	5.00M
393		SUBABHUL	0.40M	7.00M
394		BOR	0.40M	3.00M
395		UMBR	0.40M	4.00M
396		SUBABHUL	0.50M	3.00M
397		BOR	0.30M	1.00M
398		UMBR	0.40M	4.00M
399		UMBR	0.40M	5.00M
400		UMBR	0.80M	7.00M
401		BOR	0.30M	4.00M
402		BOR	0.40M	4.00M
403		BOR	0.30M	4.00M
404		BOR	0.60M	4.00M
405		SUBABHUL	0.40M	3.00M
406		SUBABHUL	0.70M	5.00M
407		UMBR	0.30M	4.00M
408		JUNGLI	0.80M	8.00M
409		SUBABHUL	0.40M	5.00M
410		SUBABHUL	0.60M	8.00M
411		SUBABHUL	0.40M	7.00M
412		BOR	0.70M	6.00M
413		BOR	0.40M	6.00M
414		UMBR	0.40M	4.00M
415		UMBR	0.40M	2.00M
416		BOR	0.80M	5.00M
417		SUBABHUL	0.70M	2.00M
418		SUBABHUL	0.40M	4.00M
419		BOR	0.40M	3.00M
420		BOR	0.40M	4.00M
421	CH 3800	BOR	0.50M	3.00M
422		BOR	0.40M	3.00M
423		BOR	0.70M	5.00M
424		BOR	0.40M	4.00M
425		UMBR	0.40M	3.00M
426		UMBR	0.45M	6.00M
427		UMBR	0.50M	5.00M
428		BABUL	1.00M	10.00M
429		BOR	0.70M	6.00M
430		BOR	0.70M	8.00M
431		BOR	0.60M	5.00M
432		UMBR	0.40M	2.00M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
433		UMBR	0.30M	2.00M
434		UMBR	0.30M	2.00M
435		SUBABHUL	0.40M	4.00M
436		UMBR	0.60M	3.00M
437		BOR	0.80M	7.00M
438		BOR	0.70M	5.00M
439		BOR	0.60M	6.00M
440		BOR	0.70M	9.00M
441		BOR	0.50M	3.00M
442		BOR	0.90M	2.50M
443		BOR	0.80M	4.00M
444		BOR	0.70M	6.00M
445		BOR	0.70M	3.00M
446		BOR	0.80M	4.00M
447		BOR	0.90M	6.00M
448	CH 4100	BOR	0.90M	3.00M
449		JUNGLI	0.60M	3.00M
450	CH 4500	JUNGLI	0.90M	4M
451		LIMB	1.10M	4.00M
452		ASHOKA	0.55M	2.00M
453	CH 4800	KHAIR	0.40M	4.00M
454		KHAIR	0.40M	3.00M
455	CH 5000	BOR	0.40M	3.00M
456		BOR	0.30M	3.00M
457		BOR	1.50M	3.00M
458		JUNGLI	0.35M	4M
459		BOR	0.40M	5M
460		MANGO	0.85M	4M
461		MANGO	1.50M	3M
462		MANGO	1.00M	4M
463		BOR	0.50M	3M
464		BOR	0.40M	4M
465		BOR	0.55M	2M
466		JUNGLI	0.60M	3M
467	CH 5100	JUNGLI	0.30M	3M
468		JUNGLI	0.40M	3.00M
469		JUNGLI	0.35M	4.00M
470		JUNGLI	0.80M	5.00M
471		JUNGLI	0.50M	4M
472		JUNGLI	1.40M	2M
473		MANGO	1.60M	7.00M
474		BOR	0.35M	3.00M
475		JUNGLI	1.40M	6M
476		JUNGLI	1.50M	4M
477	CH 5600	JUNGLI	0.75M	3M
478		KATSEVR	5.00M	7.00M
479		KATSEVR	1.20M	5.00M
480		KATSEVR	1.10M	4M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
481	CH 5700	KHAIR	0.45M	3.00M
482		KHAIR	0.85M	3.00M
483		KHAIR	0.95M	3.00M
484		KATSEVR	0.50M	3.00M
485		KATSEVR	0.90M	3.00M
486	CH 5800	KATSEVR	0.80M	2.00M
487		KATSEVR	0.85M	2.00M
488	CH 5900	KATSEVR	0.85M	2M
489		KHAIR	0.100M	4.00M
490		KHAIR	0.75M	4.00M
491		KHAIR	0.50M	3M
492		KHAIR	0.45M	2.00M
493	CH 6000	KATSEVR	0.70M	7M
494		KATSEVR	1.20M	4M
495		KATSEVR	1.10M	5M
496		KATSEVR	2.00M	10M
497		SHEVGA	1.50M	2.00M
498		МОН	1.00M	5.00M
499		KHAIR	1.00M	5.00M
500		KATSEVR	0.90M	4.00M
501		MANGO	1.20M	5.00M
502	CH 6100	KATSEVR	0.35M	1.50M
503		KATSEVR	0.45M	3M
504		MANGO	0.85M	4.00M
505		MANGO	1.10M	5.00M
506		KHAIR	0.90M	5.00M
507		KHAIR	1.00M	3.50M
508		KHAIR	1.00M	2.00M
509		KHAIR	0.50M	5.00M
510		KHAIR	1.00M	5.00M
511	CH 6200	KHAIR	0.70M	5.00M
512		KHAIR	0.45M	3.00M
513		KATSEVR	0.75M	5M
514		CHAFA	0.60M	2M
515		KATSEVR	0.45M	2M
516		KATSEVR	0.40M	3M
517		BOR	1.10M	5M
518		BOR	0.40M	3M
519		BOR	0.45M	2M
520		BOR	0.80M	5M
521		KATSEVR	0.55M	4.00M
522	CH 6300	KATSEVR	0.40M	2.00M
523		UMBR	0.50M	2.00M
524		KATSEVR	1.10M	4.00M
525		KATSEVR	0.60M	3.00M
526		KHAIR	0.40M	2.00M
527		KHAIR	0.45M	1.50M
528	1	I KHAIR	0.50M	4M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
529		KHAIR	0.40M	3M
530		KHAIR	0.65M	ЗM
531		KHAIR	0.50M	2M
532		BOR	0.40M	2.00M
533		BOR	0.50M	3M
534		KHAIR	0.40M	2M
535		KHAIR	0.60M	3M
536		KHAIR	0.50M	2M
537		KHAIR	0.40M	3M
538		KHAIR	0.60M	2M
539		KHAIR	0.60M	3M
540		KHAIR	0.40M	3M
541		BOR	0.35M	2M
542	CH 6400	KATSEVR	0.40M	2M
543		KHAIR	0.90M	2M
544		KHAIR	0.40M	2M
545		KHAIR	0.90M	2M
546		KHAIR	0.40M	3M
547		KHAIR	0.40M	3M
548		KHAIR	0.40M	3M
549		KHAIR	0.50M	2.50M
550		KHAIR	0.40M	2M
551		BOR	0.40M	2M
552		BABHUL	0.95M	3M
553		KHAIR	0.60M	2M
554		KHAIR	0.40M	3M
555		KHAIR	0.80M	9.00M
556		KHAIR	0.40M	3M
557		KHAIR	0.60M	2M
558		KHAIR	0.70M	3M
559		KHAIR	0.65M	3M
560		KHAIR	0.70M	4M
561		KHAIR	0.70M	2.00M
562	CH 6500	KHAIR	1.10M	3M
563		KHAIR	1.40M	3M
564		BOR	1.15M	3M
565		KHAIR	0.60M	4.00M
566	CH 6600	BOR	0.70M	3M
567		BOR	0.90M	4.0M
568		BOR	0.40M	3M
569		BOR	0.45M	3M
570		JAMBHUL	1.80M	4.00M
571		BOR	0.40M	2.0M
572		BOR	0.45M	3M
573	CH 6700	KHAIR	0.70M	2M
574		BOR	0.80M	3M
575		BOR	0.90M	2.00M
576	CH 6800	JAMBHUL	1.10M	4M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
577		BOR	0.60M	3.00M
578		BOR	0.50M	4.00M
579	CH 7000	KHAIR	0.50M	2.00M
580		SAGWAN	0.60M	4.00M
581	CH 7100	SHEVGA	0.70M	3M
582		MANGO	1.10M	4.00M
583		MANGO	1.00M	5.50M
584		UMBR	0.60M	4.00M
585		SHEVGA	0.40M	2.00M
586		COCONUT T	0.60M	2M
587		BOR	0.60M	3M
588		SHEVGA	0.90M	4.00M
589		MANGO	0.80M	3M
590		MANGO	0.90M	2M
591		MANGO	1.10M	5M
592		MANGO	0.50M	5M
593		SHEVGA	0.70M	5M
594		SHEVGA	0.45M	5M
595		SHEVGA	0.90M	4.00M
596		MANGO	0.85M	4.00M
597		SHEVGA	0.90M	3M
598	CH 7200	ZETROBA	1.10M	2M
599		MANGO	0.50M	5M
600		RAMFAL	0.60M	1.10M
601		PERU	2.00M	4.00M
602		SHEVGA	0.40M	3M
603		SHEVGA	0.90M	7.00M
604		SHEVGA	0.45M	5M
605		BOR	0.45M	5M
606		BAMBU T	0.90M	1.10M
607		BAMBU T	0.85M	4M
608		KATSEVR	0.90M	5M
609	CH 7300	BOR	0.45M	4M
610		BOR	0.60M	4M
611		BOR	0.75M	5M
612		BOR	0.45M	5M
613		KHAIR	0.85M	4M
614		SHEVGA	0.90M	5M
615		SHEVGA	0.70M	7M
616		SHEVGA	0.85M	10M
617		BOR	0.85M	4M
618		BOR	0.90M	5M
619		SHEVGA	0.45M	4M
620		KATSEVR	0.60M	4M
621		SHEVGA	0.75M	5M
622		SHEVGA	0.45M	5M
623		SHEVGA	0.85M	4M
624		LIMB	0.90M	5M





Chainagewise Tree Survey Details for Panvel-Karjat Section					
SI No.	Ch.no	Name of tree	Girth	Height	
625		BOR	0.70M	7M	
626	CH 7400	KATSEVR	0.60M	4M	
627		KATSEVR	0.70M	4M	
628		KATSEVR	0.80M	5M	
629		BAMBU T	0.80M	5M	
630		BAMBU T	0.90M	4M	
631		BAMBU T	1.10M	5M	
632		BAMBU T	0.50M	7M	
633		BAMBU T	0.70M	10M	
634		BOR	1.10M	4M	
635	CH 7500	KHAIR	1.10M	5M	
636	CH 7600	MANGO	1.50m	3M	
637		MANGO	1.20m	4M	
638	CH 7800	MANGO	1.80m	5M	
639		JUNGLI	0.90M	3M	
640		KHAIR	0.45M	4M	
641	CH 8000	MANGO	1.90m	7M	
642		JUNGLI	0.55m	3M	
643	CH 8300	JUNGLI	0.9M	8M	
644	CH 8400	JUNGLI	0.90m	7M	
645		JUNGLI	0.80m	6m	
646	CH 8600	SHIMLA	0.40m	2M	
647	CH 8700	SHIMLA	0.40m	3M	
648		SUBABHUL	0.40m	2M	
649		JUNGLI	0.30m	3m	
650		SUBABHUL	0.40M	4m	
651		SUBABHUL	0.40m	4m	
652		SUBABHUL	0.70m	5M	
653		SUBABHUL	0.40m	3M	
654		BOR	0.40M	3M	
655		SUBABHUL	0.40m	4m	
656		SUBABHUL	0.40m	6M	
657	CH 8800	SUBABHUL	0.50M	4M	
658		SUBABHUL	0.30M	2M	
659		SUBABHUL	0.40M	2M	
660		SUBABHUL	0.70M	3M	
661		MANGO	1.00M	7M	
662		SUBABHUL	0.80M	8M	
663		JUNGLI	1.30M	7M	
664		SUBABHUL	0.40M	2M	
665		SUBABHUL	0.50M	3M	
666	CH 8900	MANGO	1.30M	7M	
667		SUBABHUL	0.50M	2M	
668		SUBABHUL	0.40M	2.5M	
669		SUBABHUL	0.40M	2M	
670		SUBABHUL	0.50M	2M	
671		LIMB	0.70M	5M	
672		JUNGLI	0.80M	4M	





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
673		SHIMLA	0.90M	8M
674		JUNGLI	1.30M	2M
675		HIVER	0.50M	3M
676		JAMBHUL	2.3M	3M
677		NILGIRI	1.70M	9M
678	CH 9000	MANGO	2.00M	8M
679		JUNGLI	0.45M	ЗM
680		MANGO	0.70M	4M
681		SUBABHUL	0.40M	1M
682		SUBABHUL	0.70M	2M
683		SUBABHUL	0.50M	2M
684		SUBABHUL	0.90M	2.5M
685		JUNGLI	0.75M	ЗM
686		JUNGLI	0.60M	2.5M
687		SUBABHUL	0.40M	4M
688	CH 9100	SUBABHUL	0.40M	2M
689		UMBR	0.60M	2M
690		BOR	0.70M	5M
691		UMBR	0.70M	4M
692		UMBR	0.80M	6M
693	CH 9200	JUNGLI	1.20M	7M
694		JUNGLI	1.60M	8M
695		JUNGLI	0.40M	2M
696		MANGO	1.00M	8M
697		KHAIR	0.80M	7M
698		SHEVGA	0.80M	ЗM
699		JUNGLI	0.40M	3M
700		UMBR	0.80M	5M
701		UMBR	1.00M	6M
702	CH 9300	UMBR	0.80M	ЗM
703		MANGO	0.80M	ЗM
704		JUNGLI	0.40M	2M
705		KHAIR	0.70M	10M
706		JUNGLI	0.40M	2M
707		KHAIR	0.40M	2M
708		KHAIR	0.50M	2M
709		BOR	0.30M	2M
710		JUNGLI	1.00M	9M
711		JUNGLI	0.90M	9M
712		JUNGLI	1.10M	9M
713	CH 9400	SUBABHUL	1.00M	9M
714		JUNGLI	1.10M	8M
715		JUNGLI	1.25M	11M
716	1	JUNGLI	2.00M	10M
717	1	MANGO	0.90M	1.50M
718		CHINCH	0.70M	ЗM
719	1	JUNGLI	2.10M	11M
720		JUNGLI	1.50M	9M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
721		JUNGLI	2.20M	10M
722		JUNGLI	0.95M	10M
723		MANGO	0.70M	4.00M
724		BADAM	1M	7M
725		MANGO	1.95M	6M
726		MANGO	2M	7M
727		JAMBHUL	0.80M	6M
728		JAMBHUL	0.75M	7M
729		JUNGLI	1.40M	10M
730		JUNGLI	2.10M	6M
731	CH 9500	JUNGLI	0.40M	ЗM
732		JUNGLI	0.45M	3M
733	CH 9600	JUNGLI	1.60M	9M
734		JUNGLI	1.10M	7M
735		SUBABHUL	0.70M	7M
736		BOR	0.40M	3M
737		JUNGLI	0.50M	4M
738		JUNGLI	1.30M	4M
739		JUNGLI	1M	5M
740	CH 9700	BADAM	0.70M	5M
741		BADAM	0.80M	5M
742		SUBABHUL	1.50M	2M
743		SUBABHUL	1.70M	8M
744		JUNGLI	1.80M	10M
745		SUBABHUL	0.40M	7M
746		SUBABHUL	0.60M	8M
747	CH 9900	JUNGLI	1M	8M
748		KHAIR	0.40M	3M
749		KHAIR	0.40M	3M
750		JUNGLI	1M	8M
751		SUBABHUL	2.10M	10M
752		JUNGLI	1.30M	10M
753	CH 10100	JUNGLI	1.60M	11M
754		SUBABHUL	2.10M	10M
755		JUNGLI	1.30M	10M
756		JUNGLI	1.60M	11M
757		SUBABHUL	0.70M	6M
758		SUBABHUL	0.80M	6M
759	CH 10200	SUBABHUL	1.40M	10M
760		JUNGLI	1.30M	9M
761		JUNGLI	1.30M	10M
762		NILGIRI	1M	6M
763		JUNGLI	1.20M	8M
764		JUNGLI	0.50M	3M
765		JUNGLI	0.80M	6M
766		JAMBHUL	1.10M	8M
767		AVALA	0.50M	7M
768		AVALA	0.50M	6M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI	Ch.no	Name of tree	Girth	Height
NO.	01140000		0.0014	414
769	CH 10300		0.80M	41/1
770			0.40M	
771			0.00M	41/1
770		MANGO	0.80M	41/1
774		MANGO ROD	0.90M	41/1
775			0.30M	211/1
775		MANGO	0.60M	31VI
770		MANGO		
770			0.40M	31VI
770			0.40M	41/1
779			0.90101	
780	CU 40500			
781	CH 10500		0.40M	6IVI
782			0.00M	6IVI
783			0.80M	31VI
784		SUBABHUL	0.60M	4M
785			0.80M	5101
786			1.80M	1.50M
787				1.60IVI
788			0.40M	2101
789			MIC8.0	31VI
790			0.30M	4IVI
791			0.70M	4M
792		SUBABHUL	0.70M	5M
793		JUNGLI	0.80M	5M
794		UMBR	0.50M	310
795		JUNGLI	0.70M	4M
796		UMBR	0.40M	3M
797		JUNGLI	1.40M	8M
798		SUBABHUL	2.10M	10M
799		JUNGLI	1M	10M
800		JUNGLI	2.30M	11M
801		SUBABHUL	1.20M	10M
802		JUNGLI	2M	10M
803	01140000	UMBR	0.70M	7M
804	CH 10600	UMBR	0.90M	7 M
805		JUNGLI	2.20M	11M
806		JUNGLI	0.70M	4M
807	CH 11000	JUNGLI	1.40M	11M
808		JUNGLI	1.30M	9M
809		JUNGLI	2M	10M
810		JUNGLI	2M	10M
811	CH 11100	JUNGLI	1.60M	/M
812		SHIMLA	0.40M	2M
813		JUNGLI	2.20M	1.5M
814		JUNGLI	0.70M	/M
815		UMBR	0.30M	1.5M

0.80M

2M



816

JUNGLI



Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
817		JUNGLI	0.90M	3M
818		JUNGLI	0.50M	1.5M
819		SUBABHUL	0.90M	5M
820		JUNGLI	2M	7M
821		UMBR	1M	3M
822		UMBR	2M	4M
823		JUNGLI	2.60M	10M
824		JUNGLI	1.20M	8M
825		UMBR	1.80M	5M
826		NILGIRI	0.80M	5M
827	CH 11200	JUNGLI	1.30M	10M
828		JUNGLI	0.95M	9M
829		JUNGLI	1M	10M
830		JUNGLI	2.10M	11M
831		JUNGLI	2.50M	11M
832		UMBR	0.80M	2M
833		UMBR	0.80M	4M
834		UMBR	1M	4M
835	CH 11400	UMBR	1.20M	5M
836		SHIMLA	0.50M	4M
837		SHIMLA	0.40M	3M
838		UMBR	1M	6M
839		SHIMLA	0.30M	2M
840		UMBR	0.30M	1.5M
841		SHIMLA	0.6M	3M
842		JUNGLI	0.30M	1M
843		SHIMLA	0.40M	4M
844		SHIMLA	0.40M	3M
845		SHIMLA	0.50M	3M
846		SHIMLA	0.80M	4M
847	CH 11500	UMBR	0.70M	4M
848		JUNGLI	0.60M	3M
849		SHIMLA	0.40M	2M
850		SHIMLA	050M	2M
851	CH 11800	UMBR	0.80M	4M
852		JUNGLI	0.30M	2M
853		SHIMLA	0.35M	3M
854		UMBR	0.40M	2M
855		UMBR	0.70M	2M
856	CH 11900	SHIMLA	0.60M	3M
857		JUNGLI	0.60M	4M
858		UMBR	0.40M	3M
859		UMBR	0.40M	1.5M
860		SHIMLA	0.90M	4M
861	CH 12000	SHIMLA	0.60M	4M
862		SHIMLA	0.50M	3M
863	CH 12100	SHIMLA	0.70M	4M
864		SHIMLA	0.80M	3.5M





Chainagewise Tree Survey Details for Panvel-Karjat Section					
SI No.	Ch.no	Name of tree	Girth	Height	
865		UMBR	0.90M	4M	
866	CH 12200	SHIMLA	0.60M	2M	
867		UMBR	0.80M	4M	
868		SHIMLA	0.30M	2M	
869		SHIMLA	0.70M	4M	
870		JUNGLI	0.80M	5M	
871		SHIMLA	0.40M	4M	
872		JAMBHUL	0.70M	5M	
873		SHIMLA	0.80M	3M	
874	CH 12300	SHIMLA	0.40M	3M	
875		SHIMLA	1M	4M	
876		SHIMLA	0.60M	3M	
877		JUNGLI	0.30M	2M	
878		SHIMLA	0.40M	3M	
879		SHIMLA	0.40M	4M	
880		SHIMLA	0.40M	2M	
881		JUNGLI	0.60M	4M	
882		SHIMLA	0.60M	2M	
883		SHIMLA	0.40M	3M	
884		UMBR	0.30M	1M	
885		UMBR	0.60M	2M	
886		SHIMLA	0.40M	3M	
887	CH 12400	SHIMLA	0.30M	2M	
888		SAG	0.30M	1M	
889		UMBR	0.70M	3M	
890		UMBR	1M	4M	
891		JUNGLI	1M	4M	
892		BOR	0.40M	3M	
893		SHIMLA	0.40M	2M	
894		SHIMLA	0.60M	3M	
895		SHIMLA	0.40M	2M	
896		JUNGLI	1.30M	5M	
897		SHIMLA	0.60M	5M	
898	CH 12500	SHIMLA	0.50M	4M	
899		JUNGLI	0.40M	3M	
900		UMBR	0.70M	4M	
901		SHIMLA	0.40M	3M	
902		SHIMLA	0.40M	2M	
903		SHIMLA	0.40M	4M	
904		SHIMLA	0.50M	4M	
905		SHIMLA	0.40M	4M	
906		SHIMLA	0.40M	3M	
907		SHIMLA	0.40M	3M	
908		SHIMLA	0.40M	2.5M	
909	CH 12600	SHIMLA	0.45M	4M	
910		SHIMLA	0.60M	5M	
911		SHIMLA	0.70M	5M	
912		SHIMLA	0.30M	2M	





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
913		SHIMLA	0.90M	6M
914	CH 12700	SHIMLA	0.40M	2M
915		SHIMLA	0.40M	2.5M
916		SHIMLA	0.45M	4M
917		SHIMLA	0.50M	ЗM
918		SHIMLA	0.40M	2M
919		UMBR	0.50M	ЗM
920	CH 12800	SHIMLA	0.30M	2M
921		SHIMLA	0.40M	2M
922		SHIMLA	0.60M	ЗM
923		UMBR	0.60M	2M
924		UMBR	0.40M	2M
925		UMBR	0.80M	4M
926		JUNGLI	0.40M	2M
927		SHIMLA	0.40M	2M
928		JUNGLI	0.40M	2M
929		JUNGLI	0.45M	2M
930	CH 12900	UMBR	0.50M	2M
931		UMBR	0.80M	4M
932		UMBR	0.70M	4M
933	CH 13000	SHIMLA	0.40M	2M
934		SUBABHUL	0.40M	4M
935		JUNGLI	0.40M	2M
936	CH 13100	UMBR	0.50M	3M
937		UMBR	0.6M	4M
938		SHIMLA	0.60M	4M
939	CH 13200	JUNGLI	0.60M	4.5M
940		UMBR	0.80M	4M
941		LIMB	0.90M	3.5M
942		UMBR	0.50M	3M
943		UMBR	0.40M	2M
944		UMBR	0.30M	2M
945		UMBR	0.40M	2M
946		SAG	0.40M	1.5M
947		SUBABHUL	0.80M	ЗM
948		JUNGLI	2.40M	8M
949		COCONUT T	0.80M	ЗM
950		MANGO	0.60M	2M
951		ASHOKA	0.80M	10M
952		JUNGLI	1.70M	8M
953		COCONUT T	0.80M	2M
954		COCONUT T	0.80M	4M
955	CH 13300	COCONUT T	0.90M	4M
956		COCONUT T	0.80M	3M
957		ASHOKA	0.40M	3M
958		JUNGLI	0.50M	2M
959		SHIMLA	0.40M	4M
960		SHIMLA	0.50M	4M





Chainagewise Tree Survey Details for Panvel-Karjat Section					
SI No.	Ch.no	Name of tree	Girth	Height	
961		SHIMLA	0.40M	3M	
962	CH 13400	UMBR	0.60M	3M	
963		UMBR	0.80M	4M	
964		UMBR	0.40M	2M	
965		UMBR	0.40M	2.5M	
966		SHIMLA	0.50M	4M	
967		KHAIR	0.40M	2M	
968		JUNGLI	0.80M	5M	
969		UMBR	0.40M	2M	
970	CH 13500	UMBR	0.55M	3M	
971		SUBABHUL	0.40M	2M	
972		SUBABHUL	0.50M	3M	
973		UMBR	0.60M	2M	
974		SHIMLA	0.40M	2M	
975	CH 13600	SHIMLA	0.60M	3M	
976		SHIMLA	0.40M	2M	
977		SHIMLA	0.30M	2M	
978	CH 13700	JUNGLI	0.30M	2M	
979		UMBR	0.40M	2M	
980		UMBR	0.40M	3M	
981		UMBR	0.40M	3M	
982		SHIMLA	0.40M	3M	
983		SHIMLA	0.60M	4M	
984		SHIMLA	0.40M	3M	
985		JUNGLI	0.60M	4M	
986	CH 13900	UMBR	0.40M	2M	
987		UMBR	0.40M	3M	
988	CH 14000	SHIMLA	0.50M	3M	
989		JUNGLI	2M	7M	
990		UMBR	0.90M	2M	
991		JUNGLI	0.60M	2M	
992		SHIMLA	0.40M	3M	
993	CH 14100	APTA	0.40M	2M	
994		SHIMLA	0.70M	4M	
995		SHIMLA	0.35M	2M	
996		JUNGLI	0.70M	3M	
997		SHIMLA	0.60M	5M	
998		JUNGLI	0.50M	2M	
999		SHIMLA	0.70M	2M	
1000		UMBR	0.60M	4M	
1001		UMBR	0.30M	2M	
1002		UMBR	0.60M	5M	
1003		JUNGLI	0.80M	3M	
1004		MANGO	1.50M	10M	
1005	CH 14200	JAMBHUL	1.50M	10M	
1006		MANGO	1.60M	9M	
1007	CH 14300	MANGO	2.30M	11M	
1008		MANGO	2.50M	12M	





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
1009		MANGO	2M	11M
1010		JUNGLI	0.70M	4M
1011		MANGO	1M	5M
1012		MANGO	2.70M	11M
1013		MANGO	1.70M	11M
1014	CH 14400	MANGO	1.20M	10M
1015		MANGO	2.80M	11M
1016	CH 14500	MANGO	2.40M	11M
1017		MANGO	2.70M	12M
1018	CH 14900	MANGO	2.60M	10M
1019		MANGO	3M	12M
1020		MANGO	2.70M	12M
1021	CH 15000	JAMBHUL	2M	11M
1022	CH 15100	MANGO	2.40M	12M
1023		MANGO	2.50M	12M
1024		MANGO	0.80M	9M
1025		JUNGLI	0.40M	3M
1026		MANGO	1M	10M
1027		MANGO	2.70M	11M
1028		MANGO	1.00M	11M
1029		JUNGLI	1.30M	13M
1030	CH 15200	JUNGLI	0.40M	3M
1031	01110200	MANGO	1M	6M
1032		JAMBHUI	0.90M	10M
1033		JAMBHUL	1.20M	12M
1034		JUNGLI	0.6M	4M
1035		MANGO	3.00M	12M
1036		SINDH	0.50M	1.50M
1037		JUNGLI	1M	4M
1038	CH 15300	MANGO	2.60M	12M
1039		JUNGLI	0.65M	4M
1040		SHIMLA	0.40M	2M
1041		SHIMLA	0.40M	3M
1042		SHIMLA	0.80M	3M
1043		JUNGLI	1.50M	12M
1044		SINDHI	2M	12M
1045		VAD	4.50M	12M
1046		MANGO	1.30M	11M
1047		MANGO	1.20M	8M
1048		SHIMLA	0.45M	1.5M
1049		SHIMLA	0.40M	2M
1050		JUNGLI	1.40M	13M
1051		MANGO	2M	13M
1052		MANGO	0.80M	7M
1053		APTA	0.60M	2M
1054	CH 15400	SINDHI	0.80M	1.50M
1055	-	MANGO	0.80M	5.5M
1056		MANGO	1.30M	10M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
1057		JUNGLI	1.20M	11M
1058		SHIMLA	0.40M	2M
1059		SHIMLA	0.50M	3M
1060		SHIMLA	0.40M	2M
1061	CH 15700	APTA	0.40M	2M
1062	CH 15900	UMBR	1.30M	13M
1063		SHIMLA	0.60M	4M
1064		JUNGLI	0.40M	3M
1065		JAMBHUL	0.60M	4M
1066	CH 16000	JUNGLI	0.80M	3M
1067		JAMBHUL	2.20M	9M
1068		JUNGLI	0.80M	6M
1069		JUNGLI	0.80M	4M
1070		LIMB	0.60M	3M
1071		JUNGLI	0.50M	1M
1072		SHIMLA	0.40M	3M
1073	CH 16100	SHIMLA	0.50M	3M
1074		UMBR	0.30M	2M
1075		SHIMLA	0.40M	2M
1076			0.40M	1M
1077	CH 16200	UMBR	0.50M	3M
1078	01110200		0.30M	2M
1079			0.40M	2M
1080			0.60M	2M
1081			0.70M	3M
1082		SUBABHUI	0.80M	4M
1083		KHAIR	0.60M	2M
1084		UMBR	0.80M	3M
1085			0.50M	3M
1086			1M	6M
1000			1 30M	7M
1088		SHIMLA	0.40M	2M
1000		KHAIR	0.40M	5M
1003			0.00M	2M
1030		SUBABHUI	0.00M	4M 6M
1007			1M	5M
1092			1 1 1	6M
1000			1 M	5M
1004			0.50M	2M
1095				71/1
1007			0.00101	5M
1097			0.70101	
1090			0.00101	
11099			0.70101	
1100				
1101			0.80101	41VI
1102			0.70101	IVIC
1103			TIVI	
1104	1	IJANIBHUL	1 1 M	TOM





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
1105		CHINCH	0.80M	4M
1106		CHINCH	0.90M	6M
1107		CHINCH	1M	7M
1108		JUNGLI	1.40M	11M
1109		JUNGLI	0.50M	5M
1110		UMBR	0.40M	4M
1111		UMBR	0.60M	4M
1112		CHINCH	1M	7M
1113		SUBABHUL	0.80M	5M
1114	CH 16400	SUBABHUL	0.40M	4M
1115		UMBR	0.40M	2M
1116		UMBR	0.50M	3M
1117		UMBR	0.90M	6M
1118		UMBR	0.40M	4M
1119		UMBR	0.70M	7M
1120		UMBR	0.90M	7M
1121		UMBR	0.40M	4M
1122		CHINCH	0.40M	3M
1123		UMBR	0.80M	6M
1124	CH 16500	UMBR	0.90M	11M
1125		MANGO	0.50M	4M
1126		SUBABHUL	0.40M	4M
1127		NILGIRI	0.80M	10M
1128		UMBR	0.40M	2M
1129		JUNGLI	0.40M	2M
1130		SUBABHUL	0.30M	2M
1131		SUBABHUL	1M	4M
1132		UMBR	0.80M	6M
1133		JUNGLI	0.70M	4M
1134		SUBABHUL	0.70M	6M
1135		SUBABHUL	0.40M	4M
1136		UMBR	1M	7M
1137		SUBABHUL	0.70M	6M
1138		UMBR	1.60M	6M
1139		SUBABHUL	0.50M	4M
1140		SUBABHUL	0.40M	4M
1141	CH 16600	SUBABHUL	0.80M	6M
1142		SUBABHUL	0.90M	7M
1143		UMBR	0.80M	5M
1144		NILGIRI	0.70M	6M
1145		SUBABHUL	0.50M	6M
1146		SUBABHUL	0.80M	6M
1147		UMBR	1.30M	8M
1148		JUNGLI	0.70M	4M
1149		UMBR	0.70M	6M
1150	CH 16700	UMBR	0.90M	10M
1151		UMBR	0.40M	3M
1152		SUBABHUL	0.80M	10M



Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
1153		JUNGLI	0.70M	8M
1154		JUNGLI	0.60M	5M
1155		JUNGLI	0.80M	9M
1156		JUNGLI	0.90M	6M
1157	CH 16800	JUNGLI	0.80M	7M
1158		SUBABHUL	0.50M	6M
1159		JUNGLI	0.80M	8M
1160		JUNGLI	0.60M	5M
1161	CH 16900	SUBABHUL	0.90M	8M
1162		JUNGLI	0.70M	6M
1163		JUNGLI	0.80M	7M
1164		JUNGLI	0.90M	9M
1165		JUNGLI	0.90M	4M
1166		UMBR	1M	6M
1167		UMBR	0.50M	ЗM
1168		SUBABHUL	0.80M	4M
1169		SUBABHUL	0.90M	7M
1170		SUBABHUL	0.40M	ЗM
1171	CH 17000	SUBABHUL	0.70M	5M
1172		SUBABHUL	0.80M	6M
1173		JUNGLI	0.70M	4M
1174		SUBABHUL	0.40M	4M
1175		UMBR	0.60M	2M
1176		SUBABHUL	0.60M	6M
1177		UMBR	0.60M	4M
1178		JUNGLI	1M	7M
1179		JUNGLI	1.30M	6M
1180		JUNGLI	0.40M	2M
1181		UMBR	0.60M	ЗM
1182		UMBR	0.40M	2M
1183	CH 17100	UMBR	0.80M	4M
1184		UMBR	0.60M	2M
1185		SHIMLA	0.60M	4M
1186		MANGO	0.70M	3M
1187		SAG	0.50M	1M
1188		JUNGLI	0.40M	ЗM
1189		UMBR	0.40M	2M
1190		BOR	0.30M	2M
1191		JUNGLI	0.50M	ЗM
1192		SUBABHUL	0.40M	ЗM
1193		SUBABHUL	0.60M	4M
1194		SUBABHUL	0.40M	3M
1195		SUBABHUL	0.50M	3M
1196	CH 17200	SUBABHUL	0.40M	2M
1197		SUBABHUL	1M	2M
1198		SUBABHUL	0.80M	3M
1199		JUNGLI	0.70M	ЗM
1200		BAMBU	0.40M	4M





SI

1239

1240

1241

1242

1243

1244

1245

1246

1247

1248

CH 17600

Ch.no	Name of tree	Girth	Height
	SHIMLA	0.40M	2M
	SUBABHUL	0.40M	2M
	UMBR	1M	4M
	SUBABHUL	0.50M	2M
	JUNGLI	0.80M	4M
	JUNGLI	0.90M	5M
CH 17300	JUNGLI	0.50M	ЗM
	SHIMLA	0.50M	2M
	JUNGLI	0.40M	2M
	UMBR	1M	3M
	UMBR	1M	8M
	BOR	0.40M	2M
	UMBR	0.50M	ЗM
	UMBR	0.40M	2M
CH 17400	UMBR	1.4M	4M
	JUNGLI	0.40M	2M
	UMBR	0.40M	2M
	JAMBHUL	1M	10M
	SUBABHUL	0.90M	8M
	UMBR	0.80M	5M
	JUNGLI	1M	4M
	JUNGLI	0.40M	2M
	UMBR	0.50M	2M
	JAMBHUL	1.50M	10M
	JUNGLI	0.50M	2M
	UMBR	0.90M	3M
	UMBR	1M	8M
	UMBR	0.30M	1M
	SHIMLA	0.40M	3M
	BOR	0.30M	2M
	JUNGLI	1M	5M
	JUNGLI	0.50M	3M
CH 17500	SHIMLA	0.40M	2M
	JUNGLI	0.70M	4M
	JUNGLI	0.70M	4M
	JUNGLI	1.20M	10M
	JUNGLI	0.70M	2M

1.90M

2M

1.40M

0.70M

0.40M

0.70M

0.60M

0.90M

0.40M

1.10M

1M

7M

8M

8M

7M

2M

4M

5M

7M

2M

7M

10M

MANGO

MANGO

MANGO

JUNGLI

JUNGLI

UMBR

JUNGLI

MANGO

UMBR

SUBABHUL

SUBABHUL



	Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height	
1249		JUNGLI	0.70M	4M	
1250		UMBR	0.30M	2M	
1251	CH 17700	JAMBHUL	0.80M	7M	
1252		MANGO	0.90M	5M	
1253		UMBR	0.50M	3M	
1254		JUNGLI	0.40M	2M	
1255		JUNGLI	0.50M	3M	
1256		UMBR	1M	8M	
1257		UMBR	0.90M	7M	
1258		JUNGLI	0.40M	2M	
1259		JUNGLI	0.80M	4M	
1260		JUNGLI	1M	8M	
1261		SHIMLA	0.50M	3M	
1262		BOR	0.30M	2M	
1263		JUNGLI	0.60M	4M	
1264		UMBR	0.80M	4M	
1265		SHIMLA	0.60M	4M	
1266		UMBR	0.80M	5M	
1267		SHIMLA	0.70M	1M	
1268		JUNGLI	0.40M	3M	
1269		JUNGLI	0.50M	3M	
1270		JUNGLI	40M	2M	
1271		JUNGLI	0.30M	2M	
1272		SHIMLA	0.40M	3M	
1273		UMBR	0.20M	1M	
1274		PIMPLE	0.80M	6M	
1275		PIMPLE	1.10M	10M	
1276		SHEVGA	1M	7M	
1277		UMBR	1.30M	9M	
1278		BOR	0.90M	6M	
1279		JUNGLI	0.80M	4M	
1280		JUNGLI	1.40M	11M	
1281		CHINCH	1M	10M	
1282	CH 17800	SUBABHUL	0.90M	7M	
1283		JUNGLI	0.70M	4M	
1284		KARANJ	0.80M	4M	
1285		SHIMLA	0.60M	7M	
1286		JUNGLI	0.70M	3M	
1287		PIMPLE	2M	9M	
1288		JUNGLI	0.90M	7M	
1289		VAD	1M	9M	
1290	CH 17900	SUBABHUL	0.60M	4M	
1291	1	UMBR	0.70M	7M	
1292	1	MANGO	0.90M	8M	
1293	1	VAD	1M	10M	
1294	1	LIMB	0.45M	3M	
1295		BADAM	0.60M	4M	
1296		UMBR	0.70M	4M	





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI	Ch.no	Name of tree	Girth	Height
1207			0.70M	<u></u>
1297			0.70M	
1290			0.50M	/ IVI /IVI
1299			0.50M	6M
1300			0.35M	3M
1307		BADAM	0.00M	6M
1302		BADAM	0.40M	3M
1303	CH18100		0.40M	6M
1305	01110100		0.70M	4M
1306	CH 18200		0.40M	2M
1300	01110200		0.40M	3M
1308			0.70M	2M
1300	CH 18300		0.50M	3M
1303	01110300		0.00M	2M
1310			0.40M	<u>4M</u>
1312			0.70M	
1312			0.00M	5M
1314			0.00M	8M
1314			0.30M	8M
1316		NILGIBI	0.80M	9M
1317		NILGIRI	1M	10M
1318			0.80M	5M
1319			0.60M	4M
1320	CH 18400	SHIMIA	0.70M	5 00M
1321		KHAIR	0.40M	2M
1322		UMBR	0.30M	1 50M
1323		SUBABHUL	0.40M	3M
1324		UMBR	0.80M	5M
1325		JUNGLI	0.80M	5M
1326		UMBR	0.80M	5M
1327		JUNGLI	0.70M	5.00M
1328		SUBABHUL	0.60M	2M
1329		CHINCH	0.70M	5M
1330		JUNGLI	0.50M	3.00M
1331		LIMB	0.80M	4.00M
1332		JUNGLI	0.80M	5M
1333		JAMBHUL	0.40M	2M
1334		CHINCH	0.30M	1.50M
1335		CHINCH	0.40M	ЗM
1336		CHINCH	0.80M	5M
1337		JUNGLI	0.80M	5M
1338	CH 18500	JUNGLI	0.40M	2M
1339		UMBR	0.80M	5M
1340		UMBR	0.40M	2M
1341		CHINCH	0.40M	4.00M
1342		UMBR	0.70M	5.00M
1343		SUBABHUL	0.60M	2M
1344		SUBABHUL	0.70M	5M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
1345		UMBR	0.50M	3.00M
1346		UMBR	0.60M	3M
1347		UMBR	0.40M	2M
1348		UMBR	0.60M	2M
1349		UMBR	0.40M	3M
1350		UMBR	0.70M	5.00M
1351		UMBR	0.60M	2M
1352	CH 18600	UMBR	0.70M	5M
1353		UMBR	0.50M	3.00M
1354		CHINCH	0.70M	5.00M
1355		UMBR	0.60M	2M
1356		UMBR	0.70M	5M
1357		MANGO	0.60M	2M
1358		SUBABHUL	0.70M	5M
1359		NILGIRI	0.50M	3.00M
1360		CHINCH	0.60M	ЗM
1361		UMBR	0.40M	2M
1362		UMBR	0.40M	2M
1363		UMBR	0.30M	1.50M
1364		MANGO	0.40M	ЗM
1365		SUBABHUL	0.80M	5M
1366		NILGIRI	0.80M	5M
1367		JUNGLI	0.40M	2M
1368		UMBR	0.80M	5M
1369		UMBR	0.40M	2M
1370		CHINCH	0.40M	4.00M
1371		UMBR	0.70M	5.00M
1372		SUBABHUL	0.60M	2M
1373	CH 18700	UMBR	0.70M	5M
1374		NILGIRI	0.50M	3.00M
1375		SUBABHUL	0.60M	2M
1376		SUBABHUL	0.70M	5M
1377		UMBR	0.50M	3.00M
1378		JUNGLI	0.40M	2M
1379		UMBR	0.30M	1.50M
1380		JUNGLI	0.40M	3M
1381		UMBR	0.80M	5M
1382			0.80M	5M
1383		SUBABHUL	0.70M	5.00M
1384		JUNGLI	0.40M	2M
1385		JUNGLI	0.30M	1.50M
1386		JUNGLI	0.40M	31/1
1387		JUNGLI	0.80M	5M
1388		JUNGLI	0.80M	5M
1389	CH 18800		0.80M	5M
1390			0.70M	5.00M
1391			0.60M	2M
1392	1	JUNGLI	U.70M	5171





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
1393		JUNGLI	0.50M	3.00M
1394		SUBABHUL	0.80M	4.00M
1395		JUNGLI	0.80M	5M
1396		JUNGLI	0.40M	2M
1397		JUNGLI	0.30M	1.50M
1398		JUNGLI	0.40M	3M
1399	CH 18900	UMBR	0.80M	5M
1400		UMBR	0.80M	5M
1401		SUBABHUL	0.40M	2M
1402		SUBABHUL	0.80M	5M
1403		SUBABHUL	0.40M	2M
1404		SUBABHUL	0.40M	4.00M
1405		SUBABHUL	0.70M	5.00M
1406		JUNGLI	0.60M	2M
1407	CH 19000	SUBABHUL	0.70M	5M
1408		UMBR	0.50M	3.00M
1409		JUNGLI	0.80M	5M
1410		UMBR	0.80M	5M
1411		JUNGLI	0.70M	5.00M
1412		SUBABHUL	0.60M	2M
1413	CH 19100	BOR	0.70M	5M
1414		UMBR	0.50M	3.00M
1415		UMBR	0.80M	4.00M
1416		UMBR	0.80M	5M
1417		JUNGLI	0.40M	2M
1418		UMBR	0.80M	5M
1419		JAMBHUL	0.60M	2M
1420		SUBABHUL	0.70M	5M
1421		UMBR	0.50M	3.00M
1422	CH 19200	UMBR	0.60M	2M
1423		UMBR	0.70M	5M
1424		SHIMLA	0.50M	3.00M
1425		BOR	0.40M	2M
1426		JUNGLI	0.30M	1.50M
1427		JUNGLI	0.40M	3M
1428		JUNGLI	0.80M	5M
1429		UMBR	0.80M	5M
1430		SHIMLA	0.70M	5.00M
1431		KHAIR	0.40M	2M
1432		UMBR	0.30M	1.50M
1433		SUBABHUL	0.40M	3M
1434		UMBR	0.80M	5M
1435	CH 19300	SHIMLA	0.80M	5M
1436		JUNGLI	0.80M	5M
1437	1	JUNGLI	0.70M	5.00M
1438		JUNGLI	0.60M	2M
1439	1	JUNGLI	0.40M	3M
1440		MANGO	0.80M	5M





	Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height	
1441		MANGO	0.80M	5M	
1442		MANGO	0.40M	2M	
1443		JUNGLI	0.80M	5M	
1444		JUNGLI	0.40M	2M	
1445		UMBR	0.40M	4.00M	
1446		SUBABHUL	0.70M	5.00M	
1447		SUBABHUL	0.60M	2M	
1448		JUNGLI	0.70M	5M	
1449		MANGO	0.50M	3.00M	
1450		UMBR	0.60M	3M	
1451		JUNGLI	0.40M	2M	
1452	CH 19400	UMBR	0.60M	2M	
1453		JAMBHUL	0.40M	3M	
1454		MANGO	0.70M	5.00M	
1455		UMBR	0.60M	2M	
1456		UMBR	0.70M	5M	
1457		UMBR	0.50M	3.00M	
1458		CHINCH	0.70M	5.00M	
1459		UMBR	0.60M	2M	
1460		UMBR	0.70M	5M	
1461		MANGO	0.60M	2M	
1462		SUBABHUL	0.70M	5M	
1463		NILGIRI	0.50M	3.00M	
1464		CHINCH	0.60M	3M	
1465		UMBR	0.40M	2M	
1466		JAMBHUL	0.40M	2M	
1467		CHINCH	0.30M	1.50M	
1468		CHINCH	0.40M	3M	
1469		CHINCH	0.80M	5M	
1470		JUNGLI	0.80M	5M	
1471		JUNGLI	0.40M	2M	
1472		JUNGLI	0.80M	5M	
1473	CH 19500	SHIMLA	0.40M	2M	
1474		BOR	0.40M	4.00M	
1475		JUNGLI	0.70M	5.00M	
1476		UMBR	0.60M	2M	
1477		SHIMLA	0.50M	3.00M	
1478		UMBR	0.40M	2M	
1479		JUNGLI	0.30M	1.50M	
1480		JUNGLI	0.40M	3M	
1481		JUNGLI	0.80M	5M	
1482		JUNGLI	0.80M	5M	
1483		SHIMLA	0.70M	5.00M	
1484		UMBR	0.40M	2M	
1485		JUNGLI	0.30M	1.50M	
1486		JUNGLI	0.40M	3M	
1487		JUNGLI	0.80M	5M	
1488	CH 19600	SHIMLA	0.80M	5M	





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
1489		UMBR	0.80M	5M
1490		JUNGLI	0.70M	5.00M
1491		SUBABHUL	0.60M	2M
1492		CHINCH	0.40M	ЗM
1493		CHINCH	0.80M	5M
1494		JUNGLI	0.80M	5M
1495	CH 19700	JUNGLI	0.40M	2M
1496		UMBR	0.60M	2M
1497		UMBR	0.70M	5M
1498		UMBR	0.50M	3.00M
1499		CHINCH	0.70M	5.00M
1500		UMBR	0.60M	2M
1501		UMBR	0.70M	5M
1502	CH 19800	MANGO	0.60M	2M
1503		JAMBHUL	0.70M	5M
1504		UMBR	0.50M	3.00M
1505		JUNGLI	0.60M	ЗM
1506		UMBR	0.40M	2M
1507		JUNGLI	0.40M	2M
1508	CH 20000	KATSEVR	0.30M	1.50M
1509		KATSEVR	0.40M	ЗM
1510	CH 20100	UMBR	0.60M	2M
1511		UMBR	0.70M	5M
1512		MANGO	0.50M	3.00M
1513		JUNGLI	0.70M	5.00M
1514		MANGO	0.60M	2M
1515		UMBR	0.70M	5M
1516		JUNGLI	0.60M	2M
1517		PIMPLE	0.70M	5M
1518		BEHDA	0.50M	3.00M
1519		BEHDA	0.60M	3M
1520		JUNGLI	0.80M	5M
1521		UMBR	0.80M	5M
1522		COCONUT T	0.70M	5.00M
1523		CHINCH	0.60M	2M
1524		MANGO	0.40M	3M
1525		JAMBHUL	0.80M	5M
1526		JUNGLI	0.80M	5M
1527		JUNGLI	0.40M	2M
1528			0.60M	2M
1529	CH 20300		0.70M	5M
1530			0.50M	3.00M
1531			0.70M	5.00M
1532		UMBR	0.60M	2M
1533			0.70M	5M
1534		JUNGLI	0.60M	2M
1535		JUNGLI	0.30M	1.50M
1536		JAMBHUL	0.40M	3M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
1537		UMBR	0.60M	2M
1538		UMBR	0.70M	5M
1539	CH 20400	BEHDA	0.50M	3.00M
1540		KAJU	0.70M	5.00M
1541	CH 20500	JUNGLI	0.60M	2M
1542		JAMBHUL	0.70M	5M
1543		MANGO	0.60M	2M
1544		SAG	0.70M	5M
1545		JUNGLI	0.50M	3.00M
1546		KAJU	0.60M	ЗM
1547		KAJU	0.80M	5M
1548		KAJU	0.80M	5M
1549		KAJU	0.80M	5M
1550		MANGO	0.40M	2M
1551		JUNGLI	0.80M	5M
1552	CH 20600	BEHDA	0.40M	2M
1553		BEHDA	0.40M	4.00M
1554		COCONUT T	0.70M	5.00M
1555		COCONUT T	0.60M	2M
1556		PERU	0.70M	5M
1557		UMBR	0.50M	3.00M
1558		MANGO	0.60M	3M
1559		MANGO	0.40M	2M
1560		MANGO	0.60M	2M
1561		MANGO	0.40M	3M
1562		MANGO	0.70M	5.00M
1563		MANGO	0.60M	2M
1564		UMBR	0.70M	5M
1565		UMBR	0.50M	3.00M
1566		CHINCH	0.70M	5.00M
1567	CH 20700	МОН	0.60M	2M
1568		UMBR	0.70M	5M
1569	CH 20800	JUNGLI	0.60M	2M
1570		JUNGLI	0.70M	5M
1571		JUNGLI	0.50M	3.00M
1572		JUNGLI	0.60M	ЗM
1573		JUNGLI	0.40M	2M
1574		JUNGLI	0.40M	2M
1575		JUNGLI	0.70M	5.00M
1576		JUNGLI	0.60M	2M
1577		JUNGLI	0.70M	5M
1578	CH 20900	JUNGLI	0.60M	2M
1579		JUNGLI	0.70M	5M
1580		JUNGLI	0.50M	3.00M
1581		JUNGLI	0.60M	3M
1582		JUNGLI	0.80M	5M
1583		JUNGLI	0.80M	5M
1584	CH 21000	LIMB	0.80M	5M





Chainagewise Tree Survey Details for Panvel-Karjat Section				
SI No.	Ch.no	Name of tree	Girth	Height
585		JUNGLI	0.40M	2M
586		JUNGLI	0.80M	5M
587		JUNGLI	0.40M	2M
588		JUNGLI	0.40M	4.00M
589		JUNGLI	0.70M	5.00M
590		JUNGLI	0.60M	2M
591	CH 21400	NILGIRI	0.70M	5M
592		NILGIRI	0.50M	3.00M
593		NILGIRI	0.60M	3M
594	CH 21500	NILGIRI	0.40M	2M
595		ASHOKA	0.40M	2M
596		ASHOKA	0.40M	4.00M
597		ASHOKA	0.70M	5.00M
598		ASHOKA	0.60M	2M
599		ASHOKA	0.70M	5M
603	CH 22000	Babhul/Acacia Nilotica	0.50M	3M
604	CH 22100	Mango/Mangifera Indica	0.8M	3M
605		Mango/Mangifera Indica	0.8M	3M
606		Mango/Mangifera Indica	0.8M	3M
607		Mango/Mangifera Indica	0.8M	3M
608		Mango/Mangifera Indica	0.8M	3M
609		Mango/Mangifera Indica	0.8M	3M
610		Guava/Psidium Guajava	0.8M	3M
611		Coconut/Cocos Nucifera	0.7M	4M
612		Coconut/Cocos Nucifera	0.7M	4M
613		Coconut/Cocos Nucifera	0.7M	4M
614		Coconut/Cocos Nucifera	0.7M	4M
615		Coconut/Cocos Nucifera	0.7M	4M
616		Coconut/Cocos Nucifera	0.7M	4M
617	CH 22200	Mango/Mangifera Indica	0.8M	3M
618		Mango/Mangifera Indica	0.8M	3M
619		Mango/Mangifera Indica	0.8M	3M
620		Coconut/Cocos Nucifera	0.7M	4M
621		Coconut/Cocos Nucifera	0.7M	4M
622	CH 22300	Mango/Mangifera Indica	0.8M	4M
623		Mango/Mangifera Indica	0.8M	4M
624		Mango/Mangifera Indica	0.8M	4M
625		Mango/Mangifera Indica	0.8M	4M
626		Mango/Mangifera Indica	0.8M	4M
627		Mango/Mangifera Indica	0.8M	4M
628	CH 22400	Mango/Mangifera Indica	0.8M	4M
629		Mango/Mangifera Indica	0.8M	4M
630		Mango/Mangifera Indica	0.8M	4M
631		Mango/Mangifera Indica	0.8M	4M
632		Mango/Mangifera Indica	0.8M	4M
633		Mango/Mangifera Indica	0.8M	4M
643	CH 23400	Mango/Mangifera Indica	0.8M	4M
644		Mango/Mangifera Indica	0.8M	4M


	Chainage	ewise Tree Survey Details for Pan	vel-Karjat Sect	ion
SI No.	Ch.no	Name of tree	Girth	Height
1645		Mango/Mangifera Indica	0.8M	4M
1646		Mango/Mangifera Indica	0.8M	4M
1647		Mango/Mangifera Indica	0.8M	4M
1648		Mango/Mangifera Indica	0.8M	4M
1649		Mango/Mangifera Indica	0.8M	4M
1650		Mango/Mangifera Indica	0.8M	4M
1651		Mango/Mangifera Indica	0.8M	4M
1652		Mango/Mangifera Indica	0.8M	4M
1653	CH 23500	Mango/Mangifera Indica	0.8M	4M
1654		Mango/Mangifera Indica	0.8M	4M
1655		Mango/Mangifera Indica	0.8M	4M
1656		Mango/Mangifera Indica	0.8M	4M
1657		Mango/Mangifera Indica	0.8M	4M
1658	CH 23600	Mango/Mangifera Indica	0.8M	4M
1659		Awla/Phyllanthus Emblica	0.6M	4M
1660		Chafa/Plumeria	0.4M	3M
1661		Nilgiri/Eucalyptus	0.8M	5M
1663	CH 23800	Mango/Mangifera Indica	0.6M	3M
1685	CH 26000	Mango/Mangifera Indica	0.6M	3M
1686	CH 26100	Babhul/Acasia Nilotica	0.5M	3M
1687		Babhul/Acasia Nilotica	0.6M	3M
1693	CH 26700	Nilgiri/Eucalyptus	0.8M	6M
1694		Nilgiri/Eucalyptus	0.8M	6M
1695		Nilgiri/Eucalyptus	0.8M	6M
1696		Nilgiri/Eucalyptus	0.8M	6M
1697		Gulmohar/Delonix Regia	0.8M	5M
1698		Gulmohar/Delonix Regia	0.8M	5M
1699		Gulmohar/Delonix Regia	0.8M	5M
1700		Gulmohar/Delonix Regia	0.8M	5M
1701		Gulmohar/Delonix Regia	0.8M	5M
1702	CH 26800	Gulmohar/Delonix Regia	0.8M	5M
1703		Gulmohar/Delonix Regia	0.8M	5M
1704		Gulmohar/Delonix Regia	0.8M	5M
1705		Gulmohar/Delonix Regia	0.8M	5M
1706	CH 26900	Peeple/Ficus Religiosa	1M	5M
1707		Peeple/Ficus Religiosa	1M	5M
1708		Supari/Areca Catechu	0.7M	5M
1709		Supari/Areca Catechu	0.7M	5M
1710		Banyan/Ficus Bengalensis	1M	5M
1715	CH 27400	Babhul/Acacia Nilotica	0.6M	3M
1729	CH 28800	Banyan/Ficus Bengalensis	0.8M	4M
1730		Banyan/Ficus Bengalensis	0.8M	4M
1731		Mango/Mangifera Indica	0.8M	5M
1732	CH 28900	Tamarind/Pithecellobium Dulce	0.5M	ЗM
1733	CH 29000	Mango/Mangifera Indica	0.8M	5M
1734		Tamarind/Pithecellobium Dulce	0.5M	ЗM
1735		Mango/Mangifera Indica	0.8M	5M
1736	CH 29100	Peeple/Ficus Religiosa	0.8M	4M



	Chainage	wise Tree Survey Details for Panve	I-Karjat Sect	ion
SI No.	Ch.no	Name of tree	Girth	Height
1737	CH 29200	Babhul/Acacia Nilotica	0.5M	3M
1738	CH 29300	Teak/Tectona Grandis	0.7M	4M
1739		Teak/Tectona Grandis	0.7M	4M
1740		Teak/Tectona Grandis	0.7M	4M
1741		Teak/Tectona Grandis	0.7M	4M
1742	CH 29400	Gulmohar/Delonix Regia	0.7M	4M
1743		Gulmohar/Delonix Regia	0.7M	4M
1744		Gulmohar/Delonix Regia	0.7M	4M
1745		Gulmohar/Delonix Regia	0.7M	4M
1746		Gulmohar/Delonix Regia	0.7M	4M
1747	CH 29500	Gulmohar/Delonix Regia	0.7M	4M
1748	CH 29600	Teak/Tectona Grandis	0.7M	4M
1749	Karjat Yard to	Neem/Azadiracta Indica	0.8M	4M
1754	Karjat Station	Neem/Azadiracta Indica	0.8M	4M
1755	Area	Ashoka/Saraca Asoka	0.3M	2M
1756		Beefwood tree/Casuarina Equisetifolia	0.8M	5M
1757		Beefwood tree/Casuarina Equisetifolia	0.8M	5M
1758		Coconut/Cocos Nucifera	0.7M	4M
1759		Coconut/Cocos Nucifera	0.7M	4M
1760		Coconut/Cocos Nucifera	0.7M	4M
1761		Fig/Ficus Racemosa	0.8M	5M
1762		Gulmohar/Delonix Regia	0.8M	5M
1763		Fig/Ficus Racemosa	0.8M	5M
1764		Fig/Ficus Racemosa	0.8M	5M
1765		Mango/Mangifera Indica	0.8M	5M
1766		Mango/Mangifera Indica	0.8M	5M
1767		Mango/Mangifera Indica	0.8M	5M
1768		Mango/Mangifera Indica	0.8M	5M
1769		Mango/Mangifera Indica	0.8M	5M
1770		Mango/Mangifera Indica	0.6M	4M
1771		Mango/Mangifera Indica	0.6M	4M
1772		Mango/Mangifera Indica	0.6M	4M
1773		Mango/Mangifera Indica	0.6M	4M
1774		Mango/Mangifera Indica	0.6M	4M
1775		Mango/Mangifera Indica	0.6M	4M
1776		Mango/Mangifera Indica	0.6M	4M
1777		Mango/Mangifera Indica	0.6M	4M
1778		Jambhul/Syzgium Cumini	0.8M	5M
1779		Jambhul/Syzgium Cumini	0.8M	5M
1780	_	Jambhul/Syzgium Cumini	0.8M	5M
1781		Coconut/Cocos Nucifera	0.7M	4M
1782	_	Coconut/Cocos Nucifera	0.7M	4M
1783	_	Neem/Azadiracta Indica	0.8M	4M
1784		Neem/Azadiracta Indica	0.8M	4M
1785	_	Badam/Prunus Dulcis	0.6M	4M
1786	1	Mast Tree/Polylathia Longifolia	0.4M	4M
1787	_	Mast Tree/Polylathia Longifolia	0.4M	4M
1788		Mast Tree/Polylathia Longifolia	0.4M	4M





	Chainagev	vise Tree Survey Details for Panve	I-Karjat Sect	ion
SI No.	Ch.no	Name of tree	Girth	Height
1789		Mast Tree/Polylathia Longifolia	0.4M	4M
1790		Mast Tree/Polylathia Longifolia	0.4M	4M
1791		Mast Tree/Polylathia Longifolia	0.4M	4M
1792		Mast Tree/Polylathia Longifolia	0.4M	4M
1793		Mast Tree/Polylathia Longifolia	0.4M	4M
1794		Guava/Psidium Guajava	0.4M	3M
1795		Australian Acacia/Acacia Auriculiformis	0.6M	4M
1796		Mango/Mangifera Indica	0.6M	4M
1797		Banyan/Ficus Bengalensis	0.8M	5M
1798		Rain Tree/Samanea Saman	0.7M	4M
1799		Australian Acacia/Acacia Auriculiformis	0.7M	4M
1800		Copper Pod/Peltrophorum Pterocarpum	0.7M	4M
1801		Mango/Mangifera Indica	0.7M	3M
1802		Mango/Mangifera Indica	0.7M	3M
1803		Mango/Mangifera Indica	0.7M	3M
1804		Banyan/Ficus Bengalensis	1M	6M
1805		Peeple/Ficus Religiosa	1M	5M
1806		Guava/Psidium Guajava	0.3M	2M
1807		Coconut/Cocos Nucifera	0.6M	ЗM
1808		Babhul/Acacia Nilotica	0.3M	2.5M
1809		Babhul/Acacia Nilotica	0.3M	2.5M
1810]	Babhul/Acacia Nilotica	0.3M	2.5M
1811		Nilgiri/Ecucalyptus	0.6M	4M
1812		Nilgiri/Ecucalyptus	0.6M	4M
1813		Gulmohar/Delonix Regia	0.7M	4M
1814		Mango/Mangifera Indica	0.7M	4M



ANNEXURE 7: MAP OF PROPOSED RAIL STRETCH ALONG WITH MATHERAN ESZ

Panvel-Karjat Double Line Corridor - Railway Tunnel Map



Legend

Railway Station		Existing Railway Tunnel
 C/L of Existing Railway Track		Proposed Railway Tunnel
 C/L of Proposed Railway Track	~ \$ ~ \$ ~	Minor Bridges
 Matheran Eco Sensitive Zone Boundary	afrafr	Major Bridges
 Matheran Forest Boundary	۵	Level Crossing

 Project Name:

 Environmental Assessment of all MUTP-III Projects

 Client Name:

 Mumbai Railway Vikas Corporation (MRVC)

 Contract Agreement No.:

 MRVC/RFP/W/MUTP-3/EA/2015/99

 Scale:

 0
 0.3
 0.6
 1.2
 1.8
 2.4

 ■
 ■
 ■
 Kilometers

 MIL&FS
 Environment
 IL&FS Environmental Infrastructure & Services Ltd.



ANNEXURE 8: Boundary of Matheran Eco-sensitive Zone





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ANNEXURE 9: ANALYSIS OF THE WAVEFORMS IN COMPARISON WITH THE DGMS STANDARDS FOR SAMPLING LOCATIONS IN PANVEL-KARJAT STRETCH





ANNEXURE 10: STATIONWISE UTILITY SHIFTING IN PANVEL-KARJAT STRETCH





		Station wise	Utility	Shifting	For Pany	/el-Karjat	Stretch
Sr. No.	Station	Structure Name	No's	L	В	Area	Remarks
1			1	3.65	3.65	13.32	
2		GRP Building	1	19.4	6.9	133.86	
3		Running Staff Lobby	1	31.8	6.76	214.97	All India SC & ST Railway Employees Association is included
4		Senior Section Engineer (Tr.D)	1	31.6	6.8	214.88	A shed in which Batteries etc Stored and one record room, both included
5		CRMS	1	13.3	6.8	90.44	
6		OHE Distribution Depot	1	18.35	6.9	126.62	
7		RCD Recording Room	1	10.43	4.25	44.33	RCD Staff Room also included
8		Indian Oil Depot	1	50.22	18.85	946.65	
9	Banyal	Combined Booking Lobby	1	25	16	400.00	
10	Fanver	Compression Room	1	3.22	1.6	5.15	
11		Temple	1	5	4.3	21.50	
12		U G Tank	1	1450	00 Lts	N/A	Pumping Room (13.2*13.2 m) above that UG Tank
13		Over Head Tank	1	1400	00 Lts	N/A	
14		U G tank	1			N/A	Pumping Room of Height 2.5 m above that U G tank
15		Over Head Tank	1			N/A	
16		Septic Tank	1	5	2.7	13.50	at Compression room at Combined Booking Lobby
17		RB III/I	1	16	8	128.00	
18		RB IV	2	25	10.9	272.50	RB IV/1 & RB IV/2
19		RB II	2	18.2	7.9	143.78	RB II/A-I & RB II/B-I



		Station wise	Utility	Shifting	For Panv	el-Karjat	Stretch
Sr. No.	Station	Structure Name	No's	L	В	Area	Remarks
20		RB II	3	26.9	7.9	212.51	RB II/C-I & RB II/D-I & RB II/E-I
21		RB II	4	35.5	7.9	280.45	RB II/A-II, RB II/B-II, RB II/C-II, RB II/D-II
22		RB II	5	40	8	320.00	RB II/I/A, RB II/I/B, RB II/I/C, RB II/I/D, RB II/I/E
23		RB I	4				RB I/II/A, RB I/II/B, RB I/II/L, RB I/II/M, G+1
24		RB I	4	40	8	320.00	RB I/II/C, RB I/II/D, RB I/II/J, RB I/II/K, G+1
25		RB I	4				RB I/II/E, RB I/II/F, RB I/II/G, RB I/II/H, G+1
26		RB-II	10+1	20.25	17.3	350.33	RB II/MS/I (1 to 10) , G+2 Building, + one Panvel crew rest room
27		RB-III	2	17.3	9.3	160.89	RB III/SS 4 & RB III/SS 5
28		RB-II	2	17.6	6.4	112.64	RB II/G-I (7.8*6.4 m) & RB II/F-I (7.8*6.4 m), D/s B/w them is 2 m
29		RB-I	16	18.8	15.8	297.04	RB I/MS/O (1 to 16), G+3
30		RB-I	16	18.8	15.8	297.04	RB I/MS/N (1 to 16), G+3
31		Railway quaters	4	31.4	6.4	200.96	RB-I/F,RB-I/G, RB-I/H, RB-I/I
32		RB III	8	27.53	18	495.54	MS/RB III/ 1 to 8, G+1
33		Water pipe	1	10 m	m Dia	N/A	passing through SSE to DN flow meter Room
34		DN Flow Meter Room	1	5	4	20.00	Infront of SSE office and at existing line
35		Pipe line carrying petrol	3			N/A	From Indian Oil Depo to DN Flow Meter Room (one pipe of 20mm dia and another 2 of 50mm dia each
36		Railway Building (Contractor)	1	16	4.5	72.00	Between DN Flow Meter room and Gang Hut No.4
37		SSE(p-Way)	2	4.5	2.9	13.05	Near to Level Crossing, Each size of



			Station wise	Utility	Shifting	For Panv	/el-Karjat	Stretch
Sr. No.	Sta	ation	Structure Name	No's	L	В	Area	Remarks
			Trolly Room					4.5*2.9
38			Gang Hut No.4	1	10	7	70.00	Near to Level Crossing
39			Podi gate Room	1	9.8	3.7	36.26	Near to Level Crossing
40			Sub Station	1	205	66	13530	
41			Fire Station	1	27.2	13.2	359	Besides Sai Temple
42			Sub Station Building	1	13	10.1	131	Besides Fire Station
43			Sub Station	1	28.8	17.7	510	Besides Fire Station
44				1	22.7	7.6	173	
45			P-Way Stores	1	22.7	9.9	225	Near SSE (P-Way) Office
46				1	22.7	9.9	225	
47			SSE(p-Way) Office	1	14.5	5	73	
48			Toilet	1	2	2	4	at SSE (P-Way) Office
49			Electric line	1			N/A	Crossing kalundri River parallel to existing Bridge
50			Septic tank on	1	7.7	2.83	21.79	back of suburban station building
51			back of suburban station bld	1	3.45	3.45	11.90	back of suburban station building
52			Water pipe line 40 mm dia	1			0.00	
53			Cast iron pipes	6			0.00	
54	Mid-	68/39-41	Water Pipe Line	1	1200m	m (Dia)	N/A	MIDC pipe line passing through Kalundari river. Pier loaction of Flyover to be decided accordingly.
55	Section		Water Pipe Line	1			N/A	Water pipe line is passing through Br No. 69/3





			Station wise	Utility	Shifting	For Pan	vel-Karja	t Stretch
Sr. No.	Sta	ation	Structure Name	No's	L	В	Area	Remarks
56			Compound Wall					Compound wall of Pvt Bld at 31.62m from existing line.
57		69/3-4	Gas pipe line	1			N/A	Passing through Br 69/2
58		69/14-18	Compound Wall	1				30.8m from existing track.
59		70/3-5	Road					
60		70/6-7	Private Huts	1				30m from existing line. Usarli Village.
61	Chikhale		Road Paralel to track					32m from existing track
62	Mid-	72/3-4	HP Pipe Line	1			N/A	HP
63	Section	72/13-14	GAS PIPE LINE	1			N/A	GAIL
64			Pond	1				20m from PF-1.
65			Open drain bet Pond & PF					
66			WAITING+ BOOKING OFFICE	1				
67			PANEL ROOM	1				
68	Mohape		RELAY ROOM	1				
69			IPS ROOM	1				
70			BATTERY ROOM	1				
71			OFC ROOM	1				
72			DG SET ROOM	1				
73			COP on PF-1	1				
74			FOB on PF-1	1				
75	Mid-	78/13-14	HP Pipe Line	1			N/A	HP



			Station wise	Utility	Shifting	For Pan	vel-Karjat	t Stretch
Sr. No.	Sta	ation	Structure Name	No's	L	В	Area	Remarks
76	Section	79/13-14	HP Pipe Line	1				HP
77		80/10-11	Road					Passsing through Br 80/3 and going to village.
78		80/11-12	Water Pipe Line	6			N/A	Water pipe line of Navi Mumbai Municipal Corporation (NMMC) Passing through Br No. 80/3
79		80/11-12	Road	1				Passsing through Br 80/3 and going to water reservoir.
80			Water Pipe Line					Water pipe line of Navi Mumbai Municipal Corporation (NMMC) Passing through Br No. 80/4
81		85/10-18	Water pipe Line	1	50 mr	m (Dia)	N/A	
82		85/30-34	Road	1				6m wide raod at 21m from existing track, parallel to track.
83		85/34-36	Pipe Line					Passing through Br No. 86/1
84		85/34-36	Bridge for pedestrian					1.5m wide pedestrian Bridge parallel to Br No. 86/1 at 53m distance from existing Bridge.
85		89/2-3	Water Pipe Line	1	50 mr	n (Dia)	N/A	-
86		89/12-13	FOB	1				2.5m wide in cutting for crossing of pedestrian
87		89/12-13	Water Pipe Line		40m	m dia		Passing through FOB



ANNEXURE 11: MINUTES OF THE MEETINGS OF THE DISCUSSIONS HELD WITH GOVERNMENT OFFICIALS





Minutes of Meeting- 20 April, 2018

Project: "Environment Assessment of all components of MUTP- III Projects"

Venue: Grassroots office, WEH

Attended by:

- Matheran ESA: Pallavi Latkar
 (Matheran ESA Committee Member, Representative from Grassroots- an Environmental Organization)
- o M/s STEP: Jyoti Palekar
- o M/s IEISL: Adavaita Deshmukh

Comments received from Ms. Pallavi Latkar (Matheran ESA Committee Member) are as follows:

- Minutes of meeting with Matheran ESA dated 23.08.2017 shall be referred for further communication with Matheran ESA. The MOM required MRVC to submit Detailed Project Report with mapping and obtain remarks from ADTP, Raigad. EIA shall be carried out.
- MMRDA has been asked to prepare zonal master plan for Matheran ESA marking zones for smaller area in detail. However, zonal plan is not yet ready.
- MRVC shall submit letter with detailed report to Collector, Raigad after obtaining comments from ADTP, Raigad to discuss this agenda in meeting of monitoring committee.
- MRVC shall circulate summary of report to all committee members before meeting called for discussion of MUTP-III.
- Green Highways (Plantation & Maintenance) Policy-2015 can be referred to strengthen the impact on biodiversity of the area. The policy describes 3 tiered plantations with yearly maintenance plan.
- As Matheran ESA Committee has no executionary powers, the Committee can only give suggestions/recommendations and direct MRVC to other relevant departments as Forest, ADTP etc. Presently, there is no action plan for Matheran ESA Committee.
- Action Point for MRVC:
 - MRVC shall submit DPR to concerned agencies as stated in Minutes of Meeting issued by Matheran ESA.
 - MRVC shall also obtain remarks from ADTP before proceeding for discussion with Matheran ESA Committee.
 - MRVC shall also discuss the report with Forest Secretary (Mr. Kharge) and Chairman, Matheran ESA Committee (Mr. Gorade, Retd. IAS Officer)



Minutes of Meeting- Morbe Dam Division- 24 April, 2018

Project: "Environment Assessment of all components of MUTP- III Projects"

- Meeting with Mr. Sonawane (Executive Engineer , Morbe Dam Division)
 - Venue: City Engineer Department, 2nd Floor office, Navi Mumbai Municipal Corporation Office
 - Attended by:
 - o MRVCL: Mr. Mehmoodmiya
 - o M/s STEP: Mrs. Jyoti Palekar
 - o M/s IEISL: Ms. Adavaita Deshmukh
 - **Points discussed** during the meeting are as follows:
 - o NMMC is receiving 450 MLD water supplies from Morbe dam by gravity.
 - The Salient Features of Morbe Dam are as follows:

Sr.No.	Parameters	Details
1.	River name	Dhavri river (Branch of Patalganga river)
2.	Type of dam	Earthen dam
3.	Catchment area	57.89 sq km
4.	Reservoir capacity	190.89 MCM
5.	Net capacity	165.37 MCM
6.	Supply capacity per day	450MLD
7.	Length of dam	3520 m (across river)
8.	Width of dam	450 m (across river)
9.	Height of dam	53.40 m (across river)
10.	Top of dam	93.00 m
11.	Highest water level	90.50 m
12.	Full storage level	88.00 m
13.	Overflow channel width	26.50 m
14.	Overflow channel doors	2 Nos (Circular-12x3 m)

- During construction existing tunnel near dam, relocation of staff quarters for dam facility was carried out.
- WTP at Bhokarpada has WTP of NMMC and WTP of MJP.
- o Inlet and outlet pipeline of WTP is of diameter 2042 mm.
- Presently 58 labours are working at Morbe dam and 65 labours at WTP.
- Dam Safety Organization under WRD, Maharashtra performs the functions like conducting inspections of large dams (pre/ post monsoon), inspecting instruments in dams & gates, scrutiny of emergency action plan etc. Besides this organization also carry out Dam break analysis.
- MRVC shall submit maps showing existing and proposed alignment, survey numbers, utilities for the area in the vicinity of WTP and Morbe Dam.





- After submission of data by MRVC, NMMC through the Dam Safety Organization will undertake dam integrity test. Output of the study with suggestions/recommendation will be provided to MRVC.
- Access near WTP may get affected during construction. MRVC to consider this aspect during construction.
- \circ $\;$ There has been no incidence reporting cracking or vibration during tunneling.



Minutes of Meeting- Maharashtra Jeevan Pradhikaran (MJP)- 24 April, 2018

Project: "Environment Assessment of all components of MUTP- III Projects"

- Meeting with Mr.S K. Dashore (Sub-Divisional Engineer, Maharashtra Jeevan Pradhikaran)
 - o Venue: Ground Floor, MJP Office, HDFC Circle, Sector 1A, New Panvel
 - Attended by:
 - M/s STEP: Mrs. Jyoti Palekar
 - o M/s IEISL: Ms. Adavaita Deshmukh
 - **Points discussed** during the meeting are as follows:
 - MJP uses source water from Patalganga River.
 - The water is treated at WTP of 115 MLD capacity and supplied by gravity to Panvel, Kalamboli, Karanjale, JNPT and 25 villages by gravity.
 - There are 2 intake pipeline of 965 mm diameter of length 5.2. km from source to WTP.
 - Main Balancing reservoir (MBR) to WTP pipeline is of 500 m length and 1320 mm diameter.
 - Supply line from MBR to villages is of diameter 1320 mm.
 - Outlet pipelines from MBR to WTP and WTP to villages are crossing the existing alignment.
 - MJP pipelines are purchased in the year 1984 and commissioned in the year 1989.
 Hence, all the pipelines will be replaced with new ones.
 - MJP is planning to increase capacity of WTP from 115 MLD to 228 MLD. Capacity of MBR will also be enhanced from 5 MLD to 12.5 MLD.
 - Proposal plan of expansion is submitted to Railways by MJP.
 - Protection of pipeline is during construction of proposed railway line is the only concern.



ANNEXURE 12: ATTENDANCE SHEET OF THE PUBLIC CONSULTATION HELD AT CHOWK STATION FOR PANVEL-KARJAT STRETCH

5. No.	Name of Participant	Occupation	Place/Village	Contact Details	Signature
ानु. क्र.	व्यक्तीचे नाव	व्यवसाय	ठिकाण/गाव	संपर्काची माहिती	स्वाक्षरी
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8	Jyoti Paleko	STEP Consultary	STEP	98 22283540	Lydel
9	Braj ki shor	Service	mrvc	77/8825257	ByR
10	R. R. Sonawane	SSE/ MRVC	Mamban	8433921207	R
11	Nich Shah	JL& FS Env Jonment	- Mumbal MRVC	992030307	A

Attendance Sheet

. No.	Name of Participant	Occupation	Place/Village	Contact Details	Signature
नु. क्र.	व्यक्तीचे नाव	व्यवसाय	ठिकाण/गाव	संपर्काची माहिती	स्वाक्षरी
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S. No.	Name of Participant	Occupation	Place/Village	Contact Details	Signature
अनु. क्र.	व्यक्तीचे नाव	व्यवसाय	ठिकाण/गाव	संपर्काची माहिती	स्वाक्षरी
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Attendance Sheet

5. No.	Name of Participant	Occupation	Place/Village	Contact Details	Signature	
ानु. क्र.	व्यक्तीचे नाव	व्यवसाय	ठिकाण/गाव	संपर्काची माहिती	स्वाक्षरी	
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S. No.	Name of Participant	Occupation	Place/Village	Contact Details	Signature	
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	Dahy Dal	• • •		9823453	Dal	
	Vinayals	212	321018	95946496	Danen	

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S. No.	Name of Participant	Occupation	Place/Village	Contact Details	Signature
भनु. क्र.	व्यक्तीचे नाव	व्यवसाय	ठिकाण/गाव	संपर्काची माहिती	स्वाक्षरी
31	212/00/22219		ata	21-3, m2	
32	रिपक फोट		कोपनी	9029863667	Back
33	रिम राम केलग		क्युंबे	LLLEGLZL	80y.
34	5+11/201 -7/900		(a) zza)	9-18-7398102	- Jawent
35	अविनाध आनन्द		उस्ती रतुद	9807866774	अतिनाश
36	संतोध होगरे		1973112	993021236	sterhoggs
32	मिलोग म. काछेमकाट	4210012	2011172	9761-899878	dl
38	91651114 onl. 3112	2 के ति	hun	77988683	or BI
39	17775 21. 3132	10	241mly 2	99754757	thue
40	LART G. UIEU	RIHT	कारवई 0	8605802680	R.B. M.H.
41	51201 211.14216	_a	cell g.	95200609	& Hengel
42	पार्ड्या रामाम्झे	-11-	वारवर्ग	19 96230150	79 Stelle
43	भू साद अज्ञानानान कान्न	L. I.C. Histor Rik	-UTA	932418007	n Assle
54 -	KITIOK RT- VOIK	रोती	मोर्क		10 C 10

6. No.	Name of Participant	Occupation	Place/Village	Contact Details	Signature
न्. क्र.	व्यक्तीचे नाव	व्यवसाय	ठिकाण/गाव	संपर्काची माहिती	स्वाक्षरी
	6219 51195	नोकरो	32101236	9850984798	Faices
	ASHOK P DHIPPAL	BIGNES	CHOWIK	916741424	o Asid
	H101-12129 - 2128	Brighes	Chowix.	9158914646	Commut
	मिलीए ल सार्वके	B-Gon-	chorog	8888373847	Q. c 811,
	प्रवाय महानांतकर	लीकेरी	chowk	7709050494	Ranay
	विवित्र जोवति	Therefie	CHOWK	7057110292	lits
	5912 3 234197 UTET C	0.791-	Peros Chitchere	932214940	4 Aster
	Mohan G. l. Adsul	Storia	chowic	997540356	I MON
	Goriki 4		etry.	901171374	7 21 8 2
	SACHIN BHAGA KADAV	Farmer	Poyanje	9819530126	pul
	UL higz storigton	Rich	allas	9922225#	Fr Bu
	19914 1912 111	होती	AILAS	985001434	Bir
	सुर्शीर् नाः स्नुमने	व्य १५१२	-चीकु	9422696305	Emegn
	नेप्रायण हा. रनुमान		- utg	u	- 112

Attendance Sheet

S. No.	Name of Participant	Occupation	Place/Village	Contact Details	Signature
अनु. क्र.	व्यक्तीचे नाव	व्यवसाय	ठिकाण/गाव	संपर्काची माहिती	स्वाक्षरी
1	B.J. Pingale	Teacher	chowlk	93266674	Bragor
2	01212014012		बाटगवर्व	961935700L 9619357006	011212101
5,	वार इन्स र पनार		केलवरी		वारक्लाग्
4	राम सुदाम ठाडकी	c.	Ferent		214-23.32
5	व्य्युनात्र माञ्चती पार्टीत	न ब्रोती	चित्रले 8	286956763	Receptur
6	on and fi Elagrach	alanti	chout	897599937	y Bula
7	2475721 43614 4915	-b-	al		- Du
8>	Prabhakar Shangashia	Job	Chowle		d
a)	वावेंद्र परिश्वायवे	नान्डरी	Gianx	983351568	9 700
10 -	र्तानंद्र अभागे ज्याताने		-alos		fil
11)	or to 12h on enternie	त्राता	Ruth	77988683 77 02	Bio
12	कारि नाथ देड	2)A	RETEIN	88795755	so pron
(13)	4600 + 25 - 2122	ant	1215	887957555	0 4'20153. Mitel
15)	Goly again	TUMICA	Zalindige	7276555 492	Lijofen

Attendance Sheet

Public Consultation at Chowk Railway Station on date November 21, 2017

Public	Consultation for "Panve	l-Karjat Suburba Transport Proje	in Corridor (Doub ect-III (MUTP-III) रॅग्लाची (बरेगी लाटन	le Line)" under Mu	mbai Urban क सल्लामसलत
म्यूटीपी-	III प्रकल्पातगत "पनवल-क Name of Participant	Occupation	Place/Village	Contact Details	Signature
ਤ. NO. ਮੁਜ क	व्यक्तीचे नाव	व्यवसाय	ठिकाण/गाव	संपर्काची माहिती	स्वाक्षरी
)	Parts in hirld	Their	3)31 M	9969236	SP
2	परि. ए.स्. मोरे	नोनरेः	5x1er in age	9969236538	Str.
3	अजित थे. प्रवार	नील्व्या	32113Taga	865256697	+ Dung
4	36-(01 21 - 324	-	34001 298	9222245720	3 अलला ३१ ग्रेरव
5	काक दिगप्रयाद भोण्ड	20	346ी श्वर्द	g 22038506	s Roy
6	राजेरा. यं मालुस	RIAN	हातनोली	9970143702	Rhp
7)	विष्णू माम्नी पारील		1220ले	992=73954	Vm
8)	Eleniz Hizantu	1219 -	12200	981975093	Inderty
3)	दलात्रय माफ्ता परित	-	IN LEAM	98339949576	Drokel_
10	सताप मार्थ्य पार्श्व	2100	(2/29/M	9930658719	1 G-30
11	निम्हत्ती नामदेव Q 2र्देहर	2101	1912112	750613199	o husda
10	21161 212 3181	होरारि	2154)	8120104	Since 1
12	1 2100 213 4a12	() 2 ()	misicil	932325	7349 C
13	Zille	1)	misin	- 0 13 3 -	
14	रधुनाथ हेल्	Att > 101	EIN		
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Attendance Sheet

ायूटीपी-	·।।। प्रकल्पांतर्गत ''पनवेल-कर्	Transport Proje र्नत उपनगरी कॉरिडॉ	ct-III (MUTP-III) रसाठी (दुहेरी लाइन)	" याकरिता सार्वजनि	क सल्लामसलत
. No.	Name of Participant	Occupation	Place/Village	Contact Details	Signature
नु. क्र.	व्यक्तीचे नाव	व्यवसाय	ठिकाण/गाव	संपर्काची माहिती	स्वाक्षरी
1>	काश्रीनाम् हान्सेष	रे बोर्स -	पोर्शने	992194140	15 Ged
2]	र्गापाळ मार्र्स्रायोस्	बे बोर्स्ड	पार्यज	703033836363	Aller
3)	23221272011214	R211.	क्रिगार	9029693683	-Shy
4)	דרבינק או איז איז	रोती ।	2/195	9970062465	hailul
5)	कु प्रशाद शावी जोंद्रेय	श्रेती	- झिंगार्	3286108840	Bh
6)	नापरगद्दन महेंधन	15 STI	Mouse Spec	932473026	2 Plyon Ke
\mathcal{D}	2103 राजीयली	ottapat	र्ज्यन	810821427.	2 RAJUC
8)	वाकाराम धर्ता फडन	TOLE	- STICIE	9503665732	Bhade
5)	2117713 45 4412	2nnl	nitit	\$\$ \$\$\$3\$\$33 \$7	भारत के के कि
10)	311211 64	aid)	Wash	26198652	भागा त्विह हो
")	571. 41. miza	मोल्ड रो	nig. Nisd moon	865270417	o galale
\$2)) Bix.04.9010	et	213 76761	9969056194	Amas
137) जी - देन फिडेक	· dista	1902113	8655673 85	s pheet
14)	श्रकीय नामदेव प	ारोज. होता	मिगार	8976808	S Banor
15)	प्रकाश - का . पा	के - शोगी	सिंगार.	80970303	201= 18 P.L.PA

Public एमयटीपी-	Consultation for "Panve	-Karjat Suburb Transport Pro र्तत उपनगरी कॉरि	an Corridor (Doub ject-III (MUTP-III) डॉरसाठी (दुहेरी लाइन	le Line)" under Mu)" याकरिता सार्वजनि	mbai Urban क सल्लामसलत
S. No.	Name of Participant	Occupation	Place/Village	Contact Details	Signature
अन. क्र.	व्यक्तीचे नाव	व्यवसाय	ठिकाण/गाव	संपर्काची माहिती	स्वाक्षरी
١.	Ujwala Sapre		Usarli	9421569457	Aspe
2.	Prachi Sapre		Usarlt	9673636066	Facto
3.	Amaga Kallam		Nery	981977063	· 0-
4	Aibert Shinde	*	Chowk	9168886146	TIM
5	Kashinoth choryhe		poyense	9769847051	Ashory
6	B.K. Patil		Mohpe		Bu
7	s.p. choryhe		poyanje	880697-39	81Bhz
8	J. N. mok	_	poyanje	993051762	Anok
9	्राहीपार्शहाल रहिता भ		१३ विश्व केंग्स् ना	9967689345	Rikshind
10	मारुगी उ. जादुव		०४ इतिर भगाथना		4 Jor SINE
11	सखाराम् गणपग		हालीवली		sh-p
12.	उशा तक्सन वारामारे		बारवर्द्धाकि	गराने -=	341
13	नामदेव महारू कडव		पोयन		3410712
14	Sachin Jedhov		Khopoli	89 280 2098	Jachi-
15.5	भागमा रवड मेनम		215	830834488	8 Caller



ANNEXURE 13: SUGGESTIONS/QUERIES RAISED BY THE LOCAL COMMUNITY AT THE PUBLIC CONSULTATION OF PANVEL-KARJAT STRETCH



3thand : HIRART DIEIZ UIRIN (121204)

Points of Discussion

Public Consultation at Chowk Railway Station on date November 21, 2017 Pate 21/11/2017

Public Consultation for "Panvel-Karjat Suburban Corridor (Double Line)" under Mumbai Urban Transport Project-III (MUTP-III) एमयुटीपी-।।। प्रकल्पांतर्गत "पनवेल-कर्जत उपनगरी कॉरिडॉरसाठी (दुहेरी लाइन)" याकरिता सार्वजनिक सल्लामसलत **Points of Discussion** S.No. Name of Person **Contact Details** अनु.क्र व्यक्तीचे नाव संपर्काची माहिती चर्चेचे मुद्दे वडील मार्ग्ता भहादुप्पटेन ्रीमानांव्या 211327 मोवादला भंबाई पनवेल भूलठा हराक्राउ) पार्टीत अठाला याहिंद कर्तन मार्ग फामालेला रेज्वेमल्ये भूलगा २६ माब्य पारील 3161211 (12/20m) अनगा कड लोक पारील 010021 HOIM U Mati 21 otto Sure 1995 241001 अलग द्रतानां में या पारील 9930658719 Read) 132 01210 भुनना तिल्यू पारील भेवा अर्वेन Zicity HILLAND र्ष हरा आग्हाला भोकरी UILA HORTI 3150 12200 2418/221 ZIET 517-011 SI3 LEJAIN YOU तर आग्हों २ 1६ लार कुछ 8286 9567 (२) हल्लाकार्ग द्वारा तर्गरा odfred putit 9833994576 \$219113 412/m artor रेल्वेला र्यादरम किल 9819750931 20 10 (1995 2710) RIEdenied uitor 9920739546 27COLGIA ठलिं। 6 H135 2/1201 AZ अस्ति दीनां कार आग्हों कार्य 020112 हेशा भारत स्ताल्हाला 2नवे भिन्नेकीला २-१२ लियानी मोकरी।मिलावी हिन्द विनंत

अलिंग्य मास पारीता

S.No.	Name of Person	Contact Details	Points of Discussion
अनु.क्र	व्यक्तीचे नाव	संपर्काची माहिती	चर्चेचे मुद्दे
P	ईगे उत्रहा गो- जिग्ह	75.97:- 2195 TT:- 20101427 TT-21205	कर्जन - प्लेबल लोकल लावकरात लावना युद्ध कर क

Points of Discussion

S.No.	Name of Person	Contact Details	Points of Discussion
ननु.क्र	व्यक्तीचे नाव	संघर्काची माहिती	चर्चेचे मुद्दे
	C	Hight	Dona n'as Realed don adre
D	Adding Stop	FF87808188	54141301255
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		ust -	हिल्हा त्यापुमाने देंगी
		(2 मेक्टतेर्ध हार्धि लाख
			obiai cuizar dellar
			feed share
		C	3 BILL INSTRU MER AND BED
			forder in the proved
			- Detter carl Dielog
			SILE YEIDE STUSIAILE
			ALD' 4161.
		(छ आभचे। साइतीव 602
			2 in the trade in them.
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			20et1 3116.


Carlos and the	Name of Person	Contact Details	Points of Discussion
अनु.क्र	व्यक्तीचे नाव	संपर्काची माहिती	चर्चेचे मुद्दे
1	RAJESIA YORD	j)	ROW
			Right of way to one
2			Niesery & Foundause
2	VIJAY DEBHATH	98602.82)57	Height of Alless,
			The Road to propary
	P. in Press in the		From Pupkisny
	Rajestister J	aren & Othereegs	Somhogis done by
	& Rogisshual	Enfelpenses	Rly line & overbeller
	10/A_ 10 B/2	village Vosase	
	Lostivali	Nathal 4	Excess sam water stering
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			equivalent to Ajepost ale
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			and in part dance once.
			0440.94

Publi एमयूटीपं	ic Consultation for "Pan गे-।।। प्रकल्पांतर्गत ''पनवेल-	vel-Karjat Suburban Corr Transport Project-III (I कर्जत उपनगरी कॉरिडॉरसाठी	idor (Double Line)" under Mumbai Urban MUTP-III) (दुहेरी लाइन)" याकरिता सार्वजनिक सल्लामसलत
S.No.	Name of Person	Contact Details	Points of Discussion
अनु.क्र	व्यक्तीचे नाव	संपर्काची माहिती	चर्चेचे मुद्दे
	सुचीर एन रनुमंते	मु.पो - जॉकु	चौकु स्टेशनची अग्रीम एकर हा)
	नारायन रा. हनुमंते	मो. 9422696305	जामन सपादित केले थार
			मेबदक मिलवा म्यान कर्ज
			केफ हारे. त्याया मिनेय
			सुद्रधा साज सार गरा
	र्श किश्मण	to in the	रेले सामी जामेन तसेन घर
	713120	8087053413	पग रोके नारान भोवपण्या स
	-)-(-(ZI.J. 43	All complined on Zampy

Attendance Sheet

. No.	Name of Participant	Occupation	Place/Village	Contact Details	Signature
नु. क्र.	व्यक्तीचे नाव	व्यवसाय	ठिकाण/गाव	संपर्काची माहिती	स्वाक्षरी
1) -	They they a	TETE	Tida	787501549-	Finde
1	सतिवि		मानिवली		,
			and	Heren	Antering
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-	de Stitera	11 5112	(1) (1/00)	q].	
2)	01900 2	E121418	1 340	1/11/11/1	276610
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Publ एमयूटीप	ic Consultation for "Pan गी-III प्रकल्पांतर्गत ''पनवेल-	vel-Karjat Suburban Corrio Transport Project-III (M कर्जत उपनगरी कॉरिडॉरसाठी (dor (Double Line)" under Mumbai Urban IUTP-III) दुहेरी लाइन)" याकरिता सार्वजनिक सल्लामसलत
S.No.	Name of Person	Contact Details	Points of Discussion
अनु.क्र	व्यक्तीचे नाव	संपर्काची माहिती	चर्चेचे मुद्दे
V	11, 380111 111, 3800 61 2416118)	2 9392824146	HUIGO GORT

Public Consultation for "Panvel-Karjat Suburban Corridor (Double Line)" under Mumbai Urban Transport Project-III (MUTP-III) एमयूटीपी-।।। प्रकल्पांतर्गत "पनवेल-कर्जत उपनगरी कॉरिडॉरसाठी (दुहेरी लाइन)" याकरिता सार्वजनिक सल्लामसलत S.No. Name of Person **Contact Details Points of Discussion** व्यक्तीचे नाव संपर्काची माहिती चर्चचे मुद्दे २ वि 2 498711 983351568 आइभा विभाग नाम न वरे मु- मिन्दार् मुन्दा मुन्दा मुन्दा मुन्दा स्ट मुन्दा मुन्दु मुन व्यक्तीचे नाव संपर्काची माहिती चर्चेचे मुद्दे अनु.क्र Y 7h- 17/2015 Gain. अभिजल किसन ७८७० 5497 अग्रहाला नार्डरा हता SILE

S.No.	Name of Person	Contact Details	Points of Discussion
भनु.क्र	व्यक्तीचे नाव	संपर्काची माहिती	चर्चेचे मुद्दे
	- 21निछ नगमिदेव अवार	HIETY 9702378784	स्पद्ध अगमनी जामीन कर्जात त पनवेच मार्ग करिता नेकी साह तरा आम्हाने कुडल्यारी प्रकारण
			अभ्रतम् रास्त दारवज्ज देव्यात २१ वि तरि नो भरोन्दी जरहा उमार दिवाया में हा भर दर्भ
			अही वहन्डी सोर्ड 2714 रेज्य उन थी तरि त्याचा उनास्छ। बाह्यव सोखदेवी द्याव
			अगमनी इत्वम सके हुम् सातीला उद्दापु ? क्लोकी अवनामर कोला हगाइ

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अनु. क व्यक्तीचे नव संपर्काची माहिती चर्चचे मुदुर महें दू दताल ये लारवड़ आल आमन्ती जमान या म राजी हि १२११मुद्धे उ गोकरी हमा त आभ रेवेतेचे दाश्यदि हमा वाहीच पैसे हमा	lo. Name of Person	Contact Details	Points of Discussion
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त्रोंजे 88883740 10 राजे जामान या म नोफरो हमा व आप रेटेवेचे दार्थांढे हमा वाहीज पैसे हमा .	HEG Grinz	वारवड गाव	Billitar and and
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S.No.	Name of Person	Contact Details	Points of Discussion
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5.NO.	Name of Person	Contact Details	Points of Discussion
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Public Consultation at Chowk Railway Station on date November 21, 2017

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S.No.	Name of Person	Contact Details	Points of Discussion
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Public Consultation at Chowk Railway Station on date November 21, 2017

Points of Discussion

S.No.	Name of Person	Contact Details	Points of Discussion
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S.No.	Name of Person	Contact Details	Points of Discussion
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.No.	Name of Person	Contact Details	Points of Discussion
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Name of Person	Contact Details	Points of Discussion
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दिनांक : २१/११/२०१७.

मिलाई देवते चिकास काला रेशन लि. उम्सी.

अर्जदार :- बौध्द ग्रामस्थ मंडळ (डॉ.आंबेडकर नगर चौक), चौक, ता.खालापूर, जि.रायगड.

विषय :- कर्जत-पनवेल रेल्वेमार्गावरील चौक आंबेडकर नगर येथील पुर्नवसनाबाबत.

महोदय,

आम्ही चौक बौध्दवाडा व चौक रेस्ट हाऊसच्या नजीक पूर्वापार राहत असूनसन १९६० सालामध्ये मुंबई—पुणे महामार्ग नं. ४ हा राष्ट्रीय महामार्ग तेथून जात असल्यामुळे तहसिलदार कार्यालयाकडून पुर्नवसन म्हणून स.नं. २७ मध्ये २२ प्लॅट मा. तहसिलदार श्री. खुर्शीद साहेब यांच्या हस्ते प्लॅटचे नियोजन करण्यात आले. त्यानंतर बाकी राहिलेली घरे कुटुंब हळूहळू आर्थिक परिस्थितीप्रमाणे घरे बांधून राहिली. अशा प्रकारे आम्ही सरकारच्या विकास कामात कोणत्याही प्रकारचा अडथळा निर्माण न करता सहकार्याच्या भावनेतून दिलेले जागेत राहू लागलो.

त्यानंतर चौक ग्रामपंचायत हद्दीतील चौक बाजारपेठेतील लोकसंख्या वाढ झाल्यामुळे ग्रामपंचायतीच्या ठरावानुसार स.नं. २७ मध्ये उपविभागीय अधिकारी, पनवेल यांचेमार्फत १५० प्लॉट पाडून नगररचनेकडून त्याचा नकाशा तयार करून आम्हा दलीत वस्तीच्या चारही बाजूने कुठल्याही प्रकारची आमच्या वस्तीसाठी राखीव जागा न ठेवता आमच्या वहीवाटीच्या जागेत देखील अतिक्रमण करून प्लॉट देण्यात आले.

तसेच रेल्वेसारख्या सार्वजनिक उपक्रमाला आम्ही कुठल्याच प्रकारे विरोध न करता सहकार्याच्या भावनेतून जागा देण्यास तयार आहोत. परंतु सदरहू घरे विस्थापीत होत असताना आमच्या खालीलप्रमाणे मागण्या आहेत.

१) प्रत्येक कुटुंबातील एका सदस्यास रेल्वेमध्ये कायम स्वरुपी नोकरी मिळावी.
२) तीन गुंठे जागा प्रत्येक ॲसेसमेंटप्रमाणे घरासाठी देणे. ती सुध्दा विनामुल्य दयावी.

- ३) २०१८ प्रमाणे घराचे व्हॅल्युएशन दर (रेट) देणे. ते सुध्दा
- ४) रेल्वे प्रकल्पग्रस्त दाखला देणे.
- ५) व्यवसायासाठी स्टेशनवर मोफत स्टॉल उपलब्ध करून परवाना देण्यात यावा.
- दोन वेळा पुर्नवसन झाले आहे याचा विचार करावा.
- ७) पुर्नवसीत जागेत बौध्दमंदीर बांधून देणे.
- ८) सार्वजनिक मोकळे मैदान, लायब्ररी, रस्ते, पिण्याचे पाण्याची सुविधा, दिवाबत्ती, शौचालय अशा मुलभूत सुविधा उपलब्ध करून देणे.
- ९) स.नं. २७ चौक मानिवली येथील पर्जन्यमापक केंद्राच्या शेजारील सरकारी जागा देण्यांत यावी.

वरील सर्व बाबींचा सहानुभूतीपूर्वक विचार करून योग्य ती दखल घेऊन आमच्यावर होणारा अन्याय दूर करावा ही आपणांस नम्र विनंती.

चौक रेल्वे स्टेशन शेजारील जागा स.नं. २०८० झाला आहे त्यांचे नावाची यादी खालीलप्रमाणे :--

अ.क्र.	नाव	स.नं.	सही
१.	काळूराम बारकू सोनावणे	CK-42	
२.	अनिल किसन सोनावणे	CK-43	ang tair panga
ર.	अनिल किसन सोनावणे	CK-44	त्र देखील्ला देखेल् इ. देखील्ला देखेल
Υ.	रमेश सुरेश जाधव	CK-46	영국 가지 동네 영화
بر.	दिनेश सुरेश जाधव	CK-47	tale total water the
ξ .	राम गणपत जाधव	CK-48	मा, युक्तर-अम् के मेर
9.	जिवन आत्माराम जाधव	CK-50	
٤.	हेमंत आत्माराम जाधव	CK-49	
٩.	निलेश नारायण पवार	CK-	
<u></u> ٩٥.	मंगेश्न नारायण पवार	CK-	
११.	सिध्दार्थ अशोक सताणे	CK-51	
१२.	राजेंद्र अशोक सताणे	CK-52	
१३.	सुदाम तुकाराम पवार	CK-53	

१४.	राम कान्हू पवार	CK-54	
१५.	गोविंद कान्हू पवार	CK-55	5
१६.	नितीन कान्हू पवार	CK-56	
१७.	लक्ष्मण रामचंद्र मोरे	CK-57	
१८.	हरिश्चंद्र सावळाराम गायकवाड	CK-59	
१९.	अशोक दुपट	CK-58	

टीप : सर्व मागण्या मान्य झाल्याशिवाय पुर्नवसन करू देणार नाही.

आपले नम्र,

बौध्द ग्रामस्थ मंडळ (डॉ.आंबेडकर नगर चौक), चौक, ता.खालापूर, जि.रायगड

मिगार स्द OATE: / मार रतने विकास अपरिशान कि, मेखर मार 29/99/2090 шत्म ए उनाम्ही स्वाली सही करणारे सब जकल्पग्रस्त होसकरी या निवेदनाहारे आपल्या निदर्शनास आणू सन्छित्तो की, 15 सन १९९४ मध्ये रेल्यने आम्मा जमिनी आदिग्रहीत केल्या सानेकी रोतन-योना रापमे १९५०/ मात्र रोहा उत्ता भाव देण्यात उत्ताला जो अत्मन कमी, अल्प होता. तरीही आम्ही होतकरी बाधवांनी देशाहत लयात येरून पुढे चांगला मोबदला मिडावा म्हणून कोर्यत दाबा दारवला केला आह. आज तागत 22 वर्षे आली मुझासनाकडून योभ ती जामवाही साली नाही आम्हाला यावाबतीत दुःरन होत्ते. योभ्य तो भोबदला मिछाना न आपण तो मिळपून द्यावा जवकरात जवकर द्यावा यायगाठी आमरी आपणास विनती करीत आहोत. त्यानंतरन् नवीन आहीग्रहणी - साही आपण आयवाही करावी निर्मितन्य आग्ही आणपास साहकाम 955. त्यान्य प्रमाण त्यानेकी आगराला प्रकल्प यूरत (रेल्वे) असी प्रमाणपत्र देर्जेच प्रशासनाने न्हेयुल केले होते त' ही दाम आले माही. प्रसेष होत्व साला प्रकल्प्यास्त ममाप्रमत्र देणने केंग्वस्था ख्यान सासक ट्रांट्रबातील एका व्यक्तीस्त त्याच्या त्रिस्नाप्रकार्ण आपल्पा अर्थाचा अस्मिन राहन जायम स्वक्षेपी मोन्द्री देखाल यहनी जेणकरून त्या कुट्बान्या उपरातिनासान्या अख्न खरले. आपण भर्नसना अगराल, आपगाला मात कारीच अहाक्य जारी. आम्ही शतकरी जन्मी जगाने पालनकते असलो तरी ही बराल नमुद नुलेली आयम स्वरत्भी रेल्येन जोकरी (मलेक अटेबान) आमप आणनकर्ती व्होंने उत्ताप आपम सासाही जिस्पीतन् सकारात्मक पाउल उचलून अस्तापित आधिग्रहणा कागीदर हे जाम लडीमा ज्याल याबहुल आकंच्या मजगत मिलमात्र दाँठा जाही. आता अधित्रहणाच्या (नोटियी) बादित शेतकयांना आजगा बाजारफावाच्या चार- 42 रक्छम देलाचे उाज्यान संस्कारने छखल डोकोत्ती आहे. त्याविषमी शोत्तकुमाना गरदर्शकृते. ही स्तालती ह्यावी, शातक मांद्राती चर्मा, संनाद करून त्यांचे मामाधान शरेल उत्ता लोडगा द्राटलास विरोध मानकेल. आपण सहसम्पर्ध होतन्छ-मांची नामाजी आहेवून घेणार

THAT IF नारीन आद्यों आम्हाला करवात्री आहे. रवंतर त्या त्या जानात जाउन र्शतक-भाना मार्गरकन के जन के जरून सोड्यू राकती. निर्मितम् आग्नमं सामायान आएल्मा हाती आहे. उत्तारी आपणास युर्ज सारकाय 30 (4) बद्दल उत्तापम युगतः निर्द्रानु रसा . जिनदन वर-पर्यत से परिचिवाल याबद्दल आमरी उर्ष अग्रानादी आहोत जो खातान कमा, अवप होता. तंगोही अगरी होतकरी साधतांनी हमाहत वादतान जिप्राह्य पूर्व नाजाला मावदला जिहावा प्रधान कार्यात दाना दात्रा दात्रा दात्रा दात्रा जान जान जिल्लाम जान को जा का जान 9) Sail ausann Entrise, 19:0112 9503665)32 19 2) - Sit Aragnit 511969 21:25 19:012 2506131999 Alinak 2121 412105 19/2112 9880875428 5) ATUSILIN NELI 2172 PHONE 9819538112 5) MARI 2160 HILL ARE THING 9029692683 प्रकाश काशिनाय पार्टल बिगगर 8097030318 ER24 & TELD & & Photos 9930665484 a) अशोक नामदेव पारील. 8976808355 101 ATTAIN 1471-42 412121 - 986795 4081 99) पदर्गनाम ठाठापत वरे कि कि का अभानी पालान कार्स आस्तको समीही प्राणि जाग्रह कार्यनी जायन der top रत्यत्त जातनी (अलब, कुई बात) आमय आमय आमय सालवर्त्त सात CALLE sudd cantered registered transmitted discu 3 and Marine allerigen spiller e and cashe canol allered atthese and ATTE LATS KINDER अगमा आध्यारपा किस्टियी) सामित राम कमानी माजाय Were and and a same to the trans they are the property and आहे. त्याविषयी योगकुयांग्या भारत्यान्द्रता स्ताहिती द्वाती, योगकुमांद्रा cial stall apost current francing elson sister most ascenter विरोध मामला आपम देवनमपूर्व यासक-गानी नामाजी हगहेबुम दायार





निवास : मु. पो. चौक, ता. खालापूर, जि. रायगड - ४१० २०६. प्रमणध्वनी: ९३७०८ २१४१७

दिनांक : २१/११/२०१७.

Fr1571

मुंबई रेल्वे विकास कार्पोरेशन,

महोदय,

नवीन दुपदरी रेल्वे लाईन होत आहे ही जनतेकरिता आनंददायी बातमी आहे. परंतु दुपदरी रेल्वे लाईन करीत असताना खालील नमूद केलेल्या बाबींबाबत शेतकऱ्यांना न्याय मिळावा याकरिता खाली शेतकऱ्यांच्या सबंधीत मुद्दे न्याय मिळण्याच्या उद्देशाने लेखी देत आहे. त्याचा प्राधान्यक्रमाने विचार व्हावा.

१) शेतकऱ्यांची जमीन संपादीत करताना शेतकऱ्यांना विश्वासात घेऊन शेतकऱ्यांच्या जमीनीला योग्य तो मोबदला मिळावा.

२) शेतकऱ्यांच्या मुलांना नोकरीत समाविष्ट करून घ्यावे.

३) पहिली रेल्वे लाईन गेली त्या वेळेचे शेतकऱ्यांचे प्रश्न प्रलंबीत आहेत. ते प्राधान्यक्रमाने सोडवावेत.

४) रेल्वे स्टेशन ते हायवेपर्यन्त रस्ते, वहानतळ याचा प्रामुख्याने विचार व्हावा.

 पोक रेल्वे स्टेशनसमोर NH-4 मुंबई—पुणे मार्ग आहे. त्याची उंची समान पातळीवर (एकसारखी) करावी. जेणेकरून प्रवाशांना रोड क्रॉस करून जाणे सोईचे ठरेल.
देल्वे स्टेशन सर्व सुविधांनी सुसज्ज असावे.

७) पनवेल-कर्जत रेल्वे मार्गावरून जाणाऱ्या सर्व गाडयांना चौक येथे थांबा असावा.

८) चौक रेल्वे स्टेशन तिकीटघर ते NH-4 हायवे (मुंबई—पुणे मार्ग जुना) तीस फूट रोड करणेंत यावा.

९) स्ट्रीट लाईटची व्यवस्था करावी.

वरील मागण्यांचा सहानुभूतीपूर्वक विचार करावा ही नम्र विनंती.

आपला,

(श्री. देवेंद्र साटम) माजी आमदार

न्वधान सक Fris महाराष्ट्र विधानसभा सातम निवास : मु. यो. चौक, ता. खालापूर, जि. रायगड - ४१० २०६. म्रमणव्वनी: ९३७०८ २१४१७ 78 23 / 29/2094 2704101019, tig and tar correst ZEA acordine RIA 21/201 -The FORRITZ STIGLING (TIM) माना रिकेके स्तियेहन स्रोक्त अगेडोल द्वाहे द्यालग दाहानुभूतों युर्वेक त्विन्धार व्यतावन 27, 497 014 - ciem------Edie Erich (FIISTI - 37 THERE)

VAT TIN : 27250181540V Dated : 1st April 2006

।। जय श्रीकृष्ण ।।

मे. किशोर गोवर्धनदास तना

प्रोप्रा. पुरुषोत्तम लालजी तन्ना

होलसेल लेव्ही साखर विकेते - ता. खालापूर । ता. कर्जत

लेव्ही परवाना नं. : ९/८९ • अन्नधान्य परवाना : ४/२०१० • अन्न भेसळ : १५०७/०८ • फटाके : KOL 35/E • साखर : ३/२०१०

बाजारपेठ, खोपोली - ४१० २०३, ता. खालापूर, जि. रायगड. 🕿 : (०२१९२) २६३३७२

दिनांक : ३ - १८- 5-7

药.:

प्रति, मा. प्रशांतदादा ठाकुर — आमदार अध्यक्ष — रायगड जिल्हा, भा.ज.प. पनवेल, तालुका पनवेल, जिल्हा रायगड

यांसी

विषय : खोपोली रेल्वे प्रवासींच्या समस्या बाबत व पनवेल — चौक, पनवेल — उरण डि. एम. यु. सेवा सुरू करणे बाबत.

महोदय.

आपण पनवेल प्रवासी संघटना यांच्या खुप समस्या सतत निवारण करून नविन नविन सुविधा प्राप्त करण्याचे सतत प्रयत्नांत आहात. त्याबददल आपले मन:पुर्वक अभिनंदन.

(१) पनवेल — चौक ही लोकल त्वरीत सुरू करणे आवश्यक आहे. कारण खालापुर तालुक्यातील नागरीकांना खुप सेवा आवश्यक आहे. (२) पनवेल — उरण डि. एम. यु. लोकल सेवा सुरू होणे देखील तेवढेच आवश्यक आहे.

(३) खोपोली, लौजी, डोलवली, केळवली या स्थानका वर पाणी, शेड, स्वच्छता गृहे, तिकिट खिडकी अशा समस्यांचे तातडीने सोडविणेत यावा.

(४) खोपोली येथे आरक्षण सेवा पुर्वीची वेळ सायंकाळी ४.३० वाजे पर्यत होती. ती सेवा अचानक ३ वाजे पर्यत केली आहे. त्याचे एैवजी संपुर्ण वेळ असणे आवश्यक आहे. ती तातडीने सुरू करणे. (५) खोपोली प्रवासी संघटना सतत मा. डि. आर. एम. साो. मध्य रेल्वे मुंबई यांचें कडे मागण्या मागणी बाबत पत्र व्यवहार करीत आहे. (भोखन प्रत) (६) खोपोलीहुन कर्जत ज्या लोकल आहेत त्यांना कर्जत मुंबई असे
VAT TIN : 27250181540V Dated : 1st April 2006

5. :

मे. किशोर गोवर्धनदास तना

।। जय श्रीकृष्ण ।।

प्रोप्रा. पुरुषोत्तम लालजी तन्ना

होलसेल लेव्ही साखर विकेते - ता. खालाप्र । ता. कर्जत

लेव्ही परवाना नं. : ९/८९ • अन्नधान्य परवाना : ४/२०१० • अन्न भेसळ : १५०७/०८ • फटाके : KOL 35/E • साखर : ३/२०१०

बाजारपेठ, खोपोली - ४१० २०३, ता. खालापूर, जि. रायगड. 🕿 : (०२१९२) २६३३७२

दिनांक :

कनेक्शन आहे, त्या लोकल सर्व खोपोलीला आणाव्यात व कर्जत येथे थांबत असलेल्या लोकल खोपोली येथे प्रवास वाढवावा, त्यामुळे जेष्ठ नागरीकांना व प्रवाशांना सामान घेउन चढ उतार करणे व प्रवास करणेचा त्रास होणार नाही. कारण खोपोली ते कर्जत जेवढा वेळ लागतो तेवढा वेळ त्या गाडया कर्जतला उभ्या असतात.

(७) खोपोली नगरपालिका व रेल्वे प्रशासन यांचे सहकार्याने काही प्रश्न सुटण्या सारखे असल्यास त्याही बाबत विचार करणे जरूरीचे आहे.

(८) खोपोली येथे तिकीट खिडकी एकच आहे. तशी दुसरी खिडकी बहिरी देवस्थान येथे जरूरी आहे. तेथे जरूरी आहे. कळावे.

आपले विश्वासु,

पुष्ठद्राइ २३६ २७९ -श्री किशोर तना

प्रत / श्री पियुष गोयल, मा. नामदार रेल्वे मंत्री, नवि दिल्ली प्रत / श्री देवेंद्रजी फडणवीस, मा. मुख्यमंत्री, महाराष्ट् राज्य, मंत्रालय, मुंबई

प्रत / मा. डि. आर. एम. साहेब, मुंबई

प्रत / मा. आमदार श्री सुरेशजी लाड, कर्जत, जिल्हा रायगड

प्रत / मा. माजी आमदार श्री देवेंद्रजी साटम, चौक

प्रत / सौ. सुमनताई मोहन औसरमल, मा. नगराध्यक्ष, खोपोली नगर परिषद, खोपोली

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प्रत / सर्व पत्रकार



अध्यक्ष
 श्री. पांडूरंण सटू दळवी
 मो. ९९२३८८४२९१

- उपाध्यक्ष
 श्री आनंद शांताराम सोनावणे
 मो. ९९६७७९०७३९
- कार्याध्यक्ष
 श्री. दत्तात्रेच शंळर शेंडे
 मो. ९४०४२१७५८२
- सचिव
 श्री. नितीन शांताराम पाटील
 मो. ९४२२४९३१३२
 फोन : ०२९९२-२६५९२०
- सदस्य श्री. रविंद्र महादेव शाबादे फोन : ०२१९२-२६५७५५

श्री. अनंत रामचंद केदारी फोन : ९४२३३७५८३७

श्री. परेश प्रभुदास मजेठिया मो. ९४२२४८६६४६

श्री. महेंद्र शशिकांत भंडारे मो. ९४२२३८३४२३

श्रीमती प्रियांका विश्वास फाळे मो. ८१४९६७८०२८

श्रीमती ज्योती प्रदीप पवार मो. ८९८३६४८२३२ ९४२२३५८७२८

श्री. पांडूरंग कृष्णा साळुंखे मो. ९२२५५५१०१५

ॲड. अंकुश सुखदेव मंडलीक मो. ९८२२२२४०५१

कायदेशीर सल्लागार ॲड. शैलेश संतोष पालांडे मो. ९८२३३८०६४३

प्रवासी संघटना खोपोली

नोंदणी क्र. : महाराष्ट्र - ९४/०७ (राषगड) कार्यालयीन पत्ता : १०३, आशियाना अपार्टमेंट, विणा नगुर, स्वोपोसी, ता. स्वालापूर, जि. राषगड, मराहाष्ट्र. पिन-४१०२०३

प्रती, डि. आर. एम. , मध्य रेल, छत्रपती शिवाजी टर्मिनस, मुबई– ४०० ००१.



विषय :- खोपोली स्टेशन पर खोपोली यात्रीयों को सुविधाओंसे संम्बधित मांगे।

महोदय.

हम आपसे उपर लिखे विषय को सामने रखते हुये खोपोली यात्रीयोंके लिए लोकल गाडी और सुविधा देने के हेतु आपसे नप्रतापुर्वक बताना चाहते है की हम गए पंधरा साल से रेल प्रशासन को Letter लिखते आ रहे है लेकीन आज तक उस पर कुछ भी अमल नहीं हुआ ह<u>ै।</u>

आज खोपोली यात्रीयोंके लिये नयी लोकल गाडी का कुछ भी प्रस्ताव रेल प्रशासन के पास नही हैं आज खोपोली आने और जाने के लिये गाडी में बहुत भिड होती है जिस वजहसे सभी यात्रीयोंको बहुत तकलीफ उठानी पडती है इसलीए हम आपसे Request करते है की सुबह और शाम के समय में लोकल गाडी की और अन्य मांगे करते ह<u>ै।</u>

खोपोली स्टेशन की नई इमारत बनाने के लीये और वहाँ कामकाज शुरु करने के लीये रेल प्रशासन को धन्यवाद।

१) खोपोली से सि. एस. टी. के लिये सुबह ७. २० से ९. १६ के दरम्यान लोकल गाडी -२) खोपोली से सि. एस. टी. के लिये शाम ०५. ५५ से ०८. ०८ के दरम्यान लोकल द ३) महीला एवं पुरुष शौचालय आधुनिक सुविधासहीत बडा बनवाने हेतु ४) खोपोली मेन मार्केट के रास्ते का कांकरीट (C.C.Road) बनवाने हेत् ५) स्टेशन के नई इमारत में एक ही तिकट खिडकी खुली होनेसे यात्रीयोंकों तिकट निकालने के लीये भारी भीड होती है इसलिए वहा दुसरी तिकट खिडकी खुली करना ६)स्टेशन प्लेटफार्म पर Train Indicator and Proper Announcer की व्यवस्था की जाये ७) पिने के पानी की व्यवस्था प्लेटफार्म पर एवं स्टेशन के नई इमारत में की जाये ८) यात्रीयो को बैठने के लिये Extra Chair लगवाना और FOB का निर्माण जल्द कराना, ९) खानपान संबंधीत Extra Canteen खोला जायें १०) खोपोली स्टेशनपर सुरक्षा व्यवस्था की कमी को लेकर स्टेशनपर proper RPF & GRP और T.C. की Posting की जाये लौजी, डोलवली, केलवली, पलसदरी इन स्टेशनो पर रिटर्न तिकीट तथा शेड, की सुविधा देना उपरोक्त मुदुदो पर आप ध्यान देकर खोपोली यात्री को अच्छी सुविधा प्रदान करे धन्यवाद. पांडुरंग दळवी दत्तात्रेय र्शेडे

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आनंद सोनावणे

(अध्यक्ष प्रवासी संघटना)

(कार्याध्यक्ष प्रवासी संघटना)

(उपाध्यक्ष प्रवासी संघटना)



निवास : मु. पो. चौक, ता. खालापूर, जि. रायगड - ४१० २०६. भ्रमणध्वनी: ९३७०८ २१४१७

दिनांक : २१/११/२०१७.

मुंबई रेल्वे विकास कार्पोरेशन,

विषय :- गुंणगे-कर्जत (जि. रायगड, महाराष्ट्र) सब-वे शुरु करने के संदर्भ में ।

महोदय,

मैं, श्री. देवेंद्र साटम (भूतपूर्व विधानसभा सदस्य शिवसेना, कर्जत—खालापूर विधानसभा, जि. रायगड, महाराष्ट्र राज्य) क्षेत्र में रेल मंत्रालय ने तैयार किए हुए 'सब वे' के संदर्भ में निवेदन कर रहा हूँ।

१. गुणगे—कर्जत यह सब—वे रेल मंत्रालयने कर्जत स्टेशन से नजदीक तैय्यार किया है। २. कर्जत शहर में बडी बाजारपेठ होने के कारन कर्जत गाँव और शहर इनके बीच संपर्क के लिए लोगोंको, व्यापारीयोंको बहुत सुविधा इस सब—वे के कारन होती है।

३. आज के दिन यह सब—वे बहुतसी असुविधाओंके कारन बंद हो चुका है। परिणामवश लागोंको करीबन ४ कि.मी. चलने की तथा अपना वाहन ले जाने की जरुरत हो रही है।

इसलिए यह सब—वे शुरु होना जरुरी हैं। मैं आपसे बिनती कर रहा हूँ की, इस प्रश्न का महत्व ध्यान में लेते हुए यह सब—वे शुरु करने के आदेश निर्गमित किए जाए।

धन्यवाद !

आपका भवदीय,

(देवेंद्र वि. साटम)

साथ में :- दि. १०/६/२०१४ में दी हुई निवेदन की प्रत.



महाराष्ट्र विधानसभा



निवास : मु. पी. चौक, ता. खालापूर, जि. रायगड - ४१० २०६. प्रमणध्वनी: <u>२३७०८ २१४१७</u>

यजी आमदार

2329646060

90108/2092

प्रति, मा.ना.श्री.सदानंद गौडा साहेब, रेल मंत्री, भारत सरकार, नई दिल्ली.

विषय : मु.गुप्रगे-कर्जत (जि.रायगड, महाराष्ट्र राज्य) सब वे शुरु करने के

महोदय,

मे, श्री.देवेंद्र साटम (भूतपुर्व विधान-सभा सदस्य शिवसेना, कर्जत-खालापूर विधानसभा, जि. रायगड, महाराष्ट्र राज्य) क्षेत्र में रेल - मंत्रालय ने तैयार किए हुए 'सब-वे' के संदर्भ में निवेदन कर

- (9)
- गुणगे-कर्जत यह सब-वे रेल-मंत्रालयने कर्जत स्टेशनसे नजदीक तैय्यार किया है। कर्जत यह शहर में बडी बाजारपेठ होने के कारन कर्जत गाँव और शहर इनके बीच संपर्क के (\mathbf{S})
- लिए लोगोंको, व्यापारीयोंको बहुत सुविधा इस सब-वे के कारन सुविधा होती है। आज के दिन यह सब-वे बहुतसी असुविधाओंके कारन बंद हो चुका है। परिणामवश लोगोंको (3) करीबन ४ कि.मी. चलने की तथा अपना वाहन ले जाने की जरूरत हो रही है।

इसलीए यह सब-वे शुरु होना जरुरी हैं। मैं आपसे बिनती कर रहा हूँ की इस प्रश्न का महत्व ध्यान में लेते हुए यह सब-वे शुरु करने के आदेश निर्गमित किए जाए।

धन्यवाद !

आपका भवदीय.

प्रत रवानाः

(देवेंद्र गि.साटम)

- 9. मा.ना.श्री.अनंत गीते अवजड उद्योग मंत्री, भारत सरकार. 2.
 - मा.श्री.श्रीरंग बारणे खासदार,

मावळ लोकसभा मतदार क्षेत्र.



निवास : मु. पो. चौक, ता. खालापूर, जि. रायगड - ४१० २०६. भ्रमणध्वनी: ९३७०८ २१४१७

दिनांक : २१/११/२०१७.

मुंबई रेल्वे विकास कार्पोरेशन,

विषय :- पनवेल-कर्जत (जि. रायगड, महाराष्ट्र) लोकल रेल सेवा शुरू करने के संदर्भ में ।

आदरणीय महोदय.

मैं, श्री. देवेंद्र साटम, भूतपूर्व विधान—सभा सदस्य (कर्जत—खालापूर विधानसभा मतदार क्षेत्र जि. रायगड, महाराष्ट्र राज्य) आपसे इस आवेदनद्वारा विनम्रतापूर्वक पनवेल-कर्जत लोकल रेल सेवा शुरू करने के संदर्भ में नीचे दिये हुए मुद्दोंके आधारपर बिनती कर रहा हूँ।

१. पनवेल-कर्जत रेल मार्ग पर एक्सप्रेस और माल-वहातूक सेवा उपलब्ध हो चुकी है। २. पनवेल-कर्जत यह निवासी और इंडस्ट्रियल परिसर नई मुंबई से नजदीक है। और भविष्य में निर्मान होनेवाले 'नैना सिटी (शहर)' में यह परिसर प्रधानरूपमें समाविष्ट हो गया है।

३. पनवेल-कर्जत, नई मुंबई परिसर में पाठशालाएँ, अभियांत्रिकी महाविद्यालय, विश्वविद्यालयों की संख्या देखते हुए, इन शिक्षा-संस्थाओंमें पढनेवाले विदयार्थीओंके दृष्टीसे प्रस्तावित रेल मार्ग का फायदा उन्हे होनेवाला है ।

४. मैं आपसे निर्देश करता हूँ की, कर्जत, खालापूर, पनवेल परिसर में बडी संख्या में लोग मुंबई, नई मुंबई शहरों में नौकरी, व्यापार आदी कारन जाते है। या मुंबई, नई मुंबई से आते है।

५. नई मुंबई क्षेत्र में कोकण भुवन, सिडको, जैसी शासकीय तथा निमशासकीय कार्यालय हैं, उनसे पनवेल-कर्जत-खालापूर की जनता का संपर्क विशेष रुपसे होना अत्यावश्यक है। पनवेल-कर्जत रेलसेवा का प्रस्तावित मार्ग कर्जत, खालापूर, पनवेल यह तीन तालुका-क्षेत्र से जा रहा है। इसी कारन इस प्रस्तावित रेल मार्ग का लाभ इन तालुका क्षेत्र के साथही नई मुंबई की जनता को हो सकता है।



निवास : मु. पो. चौक, ता. खालापूर, जि. रायगड - ४१० २०६. भ्रमणध्वनी: ९३७०८ २१४१७

६. मैं विशेष रुपसे निर्देश करता हूँ की, विद्यमान स्थिती में मध्य रेल से मुंबई-कर्जत रेल—सेवा व्हाया कल्यान उपलब्ध है। लेकीन जब किसी कारन 'मुंबई—कर्जत' रेल—सेवा खंडीत हो जाती है, तब 'ट्रॅफिक जाम' के परिस्थिती निर्मान हो जाने के कारन कर्जत—पनवेल एक्सप्रेस मेल ट्रॅक काउपयोग किया जाता है। इसलिए की यह रेल मार्ग पुरे रूपसे सुरक्षित आहे.

७. मै निर्देश करता हूँ की, अगर कर्जत—पनवेल रेल मार्ग लोकल—स्वरूप में शुरू किया जाए तो कर्जत—मुंबई प्रवास में लगनेवाले वक्त में बचत हो सकती हैं ८. मैं विशेष रूप में आपसे निर्देश करता हूँ की १ जुलै २०१२ से मुंबई-पुणे प्रगती एक्सप्रेस इस रेल मार्गपर चौक रेल स्थानक, ता. खालापूर, जि. रायगड यहाँ रूकती है। इन मुद्दोंपर विचार करते हुए 'कर्जत-पनवेल' रेल मार्ग शुरू होना उचित और महत्वपूर्ण है। इसलिए उस क्षेत्र का प्रतिनिधी होने के कारन मैं जनताकी ओर से जनताकी हितके कारन 'कर्जत-पनवेल' लोकल रेलसेवा शुरु करने की बिनती करता हुँ।

आपका भवदीय.

HIS & -221 4 61-

(देवेंद्र वि. साटम) माझी डाम्प्रार

साथ में :- दि. १०/६/२०१४ में दी हुई निवेदन की प्रत.

वधान लभा माजी आमदार महाराष्ट्र विधानसभा हा राष्ट्र निवास : मु. पो. चौक, ता. खाळापूर, जि. रायगड - ४१० २०६. प्रमणव्वनी: 63006 २९ साटम ay a G (31201 प्रति. मा.नामदार श्री.सदानंद गौडा रेल मंत्री, भारत सरकार, नई दिल्ली. विषय : पनवेल-कर्जत (जि.रायगड, महाराष्ट्र) लोकल रेल - सेवा शुरू आदरणीय महोदय, में, श्री.देवेंद्र साटम, भूतपूर्व विधान-सभा सदस्य (कर्जत-खालापूर विधानसभा मतवार - क्षेत्र जि.रायगड, महाराष्ट्र राज्य,) आपसे इस आवेदनव्दारा विनम्रता पूर्वक पनवेल-कर्जत लोकल रेल सेवा शुरु करनेके संदर्भ में नीचें दिये हुए मुद्दोंके आधारपर पनवेल-कर्जत रेल मार्गपर एक्सप्रेस और माल-वहातूक सेवा उपलब्ध हो चुकी है। (9) पनवेल-कर्जत यह निवासी और इंडस्ट्रीयल परिसर नई मुंबई से नजदीक है। और (5)भविष्यमें निर्माण हासेनेवाले 'नैना सिटी (शहर)' में यह परिसर प्रधानरूपमें समाविष्ट हो गया है। पनवेल-कर्जत, नई मुंबई परिसर में पाठशालाएँ, अभियांत्रिकी महाविद्यालय, (३) विश्वविद्यालयोंकी संख्या देखते हुए, इन शिक्षा-संस्थांओंमे पढनेवालोओंकी विदयार्थीओंके दृष्टीसे प्रस्तावित रेल-मार्गका फायदा उन्हे होनेवाला है। में आपसे निर्देश करता हूँ की, कर्जत, खालापूर, पेनवेल परिसर में बडी संख्यामें (8) लोग मुंबई, नई मुंबई शहरोंमें नौकरी, व्यापार आदी कारन जाते है। यश मुंबई, नई मुंबई क्षेत्र में कोकण भुवन, सिडको, जैसी शासकीय तथण निमशासकीय (9) कार्यालय हैं, उनसे पनवेल-कर्जत-खालापूर की जनतास का संपवर्क विशेष रूपसे होना अत्यावश्यक हैं। पनवेल-कर्जत रेलसेवा का प्रस्तावित मार्ग कर्जत, खालापूर, पनवेल यह तीन तालुका-क्षेत्र से जा रहा हैं। इसी कारण इस प्रस्तावित रेल-मार्ग का लाभ इन तालुका-क्षेत्र के साथही नई मुंबई की जनता को हो सकता है।



- ILLI T T T T





निवास : मु. पो. चौक, ता. खालापूर, जि. रायगड - ४१० २०६. म्रमणध्वनी: <u>१३७०८ २१४१७</u> ८<u>२</u>-१७५७०७०

> (६) मैं विशेष रुपसे निर्देशस करता हूँ की, विद्यमान स्थितीमें मध्य रेल से मुंबई-कर्जत रेल-सेवा व्हाया कल्याण उपलब्ध है। लेकिन जब किसी कारन 'मुंबई-कर्जत' रेल-सेवा खंडित हो जाती है, तब 'ट्रॅफिक-जाम' के परिस्थिती निर्माण हो जाने के कारन कर्जत-पनवेल एक्सप्रेस मेल ट्रॅक का उपयोग किया जाता है। इसलिए की यह रेल-मार्ग पूर्ण रुपसे सुरक्षित है।

- (७) मैं निर्देश करता हूँ की, अगर कर्जत-पनवेल रेल मार्ग लोकल-स्वरुपस में शुरु किया जाए तो कर्जत-मुंबई प्रवास में लगनेवालें वक्तमें बचत हो सकती हैं।
- (८) मैं विशेष रूपमें आपसे निर्देश करता हूँ की 9 जुलाई २०१२ से मुंबई-पुणे प्रगती एक्सप्रेस इस रेल मार्गपर चौक-रेल स्थानक, ता.खालापूर, जि.रायगड यहाँ रुकती है।

इन मुद्दोंपर विचार करते हुए 'कर्जत-पनवेल' रेल मार्ग शुरु होना उचित और महत्वपूर्ण है। इसलिए उस क्षेत्रका प्रतिनिधी होने के कारन में जनताकी ओरसे जनताके हितके कारन 'कर्जत-पनवेल' लोकल रेलसेवा शुरु करनेकी बिनती करता हूँ।

आपका भवदीय.

TICZ. (देवेंद्र गि.साटम)

प्रत रवाना :

9. मा.ना.श्री.अनंत गीते

अवजड उद्योग मंत्री, भारत सरकार.

२. मा.श्री.श्रीरंग बारणे

खासदार,

मावळ लोकसभा मतदार क्षेत्र.



महाराष्ट्र विधानसभा





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निवास : मु. यो. चौक, ता. खालापूर, जि. रायगड - ४१० २०६. प्रमणखनी: <u>१३७०८ २१४१७</u>

प्रति, मा.ना.श्री.सदानंद गौडा साहेब, रेल मंत्री, भारत सरकार, नई दिल्ली.

> विषय : मु.गुप्रगे-कर्नत (नि.रायगड, महाराष्ट्र रान्य) सब वे शुरु करने के संदर्भ में !

महोदय,

मै, श्री.देवेंद्र साटम (भूतपुर्व विधान-सभा सदस्य शिवसेना, कर्जत-खालापूर विधानसभा, जि. रायगड, महाराष्ट्र राज्य) क्षेत्र में रेल - मंत्रालय ने तैयार किए हुए 'सब-वे' के संदर्भ में निवेदन कर रहा हूँ।

- (१) गुणगे-कर्जत यह सब-वे रेल-मंत्रालयने कर्जत स्टेशनसे नजदीक तैय्यार किया है।
- (२) कर्जत यह शहर में बडी बाजारपेठ होने के कारन कर्जत गाँव और शहर इनके बीच संपर्क के लिए लोगोंको, व्यापारीयोंको बहुत सुविधा इस सब-वे के कारन सुविधा होती है।
- (३) आज के दिन यह सब-वे बहुतसी असुविधाओंके कारन बंद हो चुका है। परिणामवश लोगोंको करीबन ४ कि.मी. चलने की तथा अपना वाहन ले जाने की जरुरत हो रही है।

इसलीए यह सब-वे शुरू होना जरूरी हैं । मैं आपसे बिनती कर रहा हूँ की इस प्रश्न का महत्व ध्यान में लेते हुए यह सब-वे शुरु करने के आदेश निर्णमित किए जाए।

धन्यवाद !

आपका भवदीय.

(देवेंद्र गि.साटम)

प्रत रवाना :

- 9. मा.ना.श्री.अनंत गीते
- अवनड उद्योग मंत्री, भारत सरकार. २. मा.श्री.श्रीरंग बारणे
 - खासदार,

मावळ लोकसभा मतदार क्षेत्र.



श्री. मोतिराम दत्तान्नेय ठोंबरे

सदस्य शिक्षण व क्रिडा समिती, रायगड जिल्हा परिषद अलिबाग



निवास : मु. हातनोली, पो. चौक, ता. खालापूर, जि. रायगड. मोबाईल : ९९७००६१८५४ संपर्क कार्यालय :– चौक फाटा, पूर्वा हॉटेलच्या बाजुला, चौक

जा. क्र. प्रति, दिनांक : 21/11/17

मा.मुख्य प्रकल्प प्रबंधक,

मुंबई रेल्वे विकास कार्पोरेशन,

तळ मजला, नविन प्रशासकिय इमाारत,

छत्रपती शिवाजी महाराज टर्मिनस,

मुंबई ४००००१

विषय – चौक परिसरातील रेल्वे प्रवाशांच्या मागण्या संदर्भात.

महोदय,

मी आपणास या पत्राद्वारे कळवु इच्छितो कि, माझ्या चौक जि.प.मतदार संघातुन कर्जत पनवेल रेल्वे मार्ग जात आहे त्या मध्ये प्रामुख्याने चौक हे रेल्वे स्टेशन येत आहे सुमारे १५ वर्षापुर्वी रेल्वे स्टेशन झाले आहे. गेल्या १० वर्षापासुन या रेल्वे मार्गावर माल वाहतुक सुरु झाली आहे. त्या नंतर काहि एक्सप्रेस गाडया प्रवासी वाहतुक करत आहेत.त्या मधिल फक्त भुसावळ पुणे भुसावळ हि गाडी चौक येथे थांबा घेत आहे.त्यामुळे प्रवाशांचे थोडया प्रमाणात प्रवासाची सोय होत आहे.

माझ्या चौक मतदार संघामध्ये ३० — ४० खेडे गाव असुन चौक हे त्यांचे मुख्य बाजारपेठ आहे तसेच चौक गावाला लागुन पाताळगंगा औदयोगिक क्षेत्र आहे. चौक येथुन व्यापारी वर्गाला तसेच कामगारांना व परिसरातील विद्यार्थी वर्गाला शिक्षणासाठी मुंबई येथे दररोज जावे लागते तरी आपण मी या निवेदणात प्रामुख्याने काहि प्रमुख मागण्याचं निवेदन देत आहे.

प्रमुख मागण्या

१ मुंबई पुणे मुंबई प्रगती एक्सप्रेस या गाडीला चौक येथे थांबा मिळावा.

२ पनवेल नांदेड पनवेल या गाडीला चौक येथे थांबा मिळावा

३ कर्जत पनवेल कर्जत लोकलसेवा सुरु करावी.

- ४ चौक प्लॅटफॉर्मची लांबी वाढविणे, स्वच्छता राखणे, पिण्याच्या पाण्याची सोय तसेच विद्युत दिव्यांची सोय करणे
- ५ तिकिट खिडकि कायमस्वरुपी चालु ठेवणे व रिईविशन सेवा चालु करणे
- ६ कर्जत पनवेल DMU शटल चालु करण्यात यावे.

सदर मागण्यांचे निवेदन मी गेल्या १० वर्षापासुन देत आलो आहे

तसेच येथिल स्थानिक खासदार श्रीरंग बारणे साहेब यांच्या मार्फत रेल्वे अधिकारी व रेल्वेमंत्री यांना निवेदन देऊन त्यांच्या बरोबर या विषयावर चर्चा करण्याात आली आहे. वरील मागण्यांचा योग्य विचार करुन मागण्या मान्य कराव्यात व प्रवाशांना दिलासा द्यावा नाहितर लोकशाहि मार्गाने सर्व रेल्वे प्रवाशांना घेऊन रेल्वे मार्ग रोखुन धरला जाईल

प्रत रवाना

१ श्री पियुष गोयल साहेब रेल्वेमंत्री भारत सरकार २ श्री श्रीरंग बारणे साहेब खासदार मावळ ३ श्री मनोहर भोईर साहेब आमदार उरण

भ के Thombool
 (श्री मोतिराम ठोंबरे)
 चौक जि. प. सदस्य

()

स्थापना २७/२/१९८३



जिल्हा रायगड

॥ प्रवाशी हिताय। प्रवाशी सुखाय ॥

यशवंत गो. सकपाळ, ब्लॉक नंबर २०२, प्राजक्ता, (औदुंबर सोसायेटी) चौक (मानिवली), मोबा. ९३२६१५३७३७

1902-99.05.51

अध्यक्ष गजानन केशव कोशे

उपाध्यक्ष श्रीकृष्ण चंबावडे

*फार्यवाह× चशवंत सकपाळ

*उपकार्यवाह× वानन मोरे

2010ीविदा2 रजनीकांत शहा

*शब्स्य ×

अविनाश कोशे वनराज जैन मुरलीघर साखरे दत्तात्रेर दबके नरेंद्र शहा हसन शेख महेश पोतदार विनायक देशमुख कमळाकर पोळेकर र्यशवंत हातमोडे अनिल खंडागळे पंकज़ शहा पंढरीनाथ सास्वरे विजय ठाकरे अभिजीत चौधरी मोरेश्वर गोरे शेखर मोरे अविनाश चौधरी स्देश महागावकर वा. के. आपटे राजेंद्र चौधरी स्धीर हनुमंते

> «अल्लागार » जनार्दन भरतुक (पत्रकार)

ज्यति क मा.मुख्य प्रकल्प प्रबंधक, मुंबई रेल्वे विकास कार्पोरेशन, तळ मजला, नविन प्रशासकिय इमारत, छत्रपती शिवाजी महाराज टर्मिनस, मंबई ४००००१

विषय :- प्रवाशी संघ चौकतर्फे प्रवाशी जनतेच्या मागण्या/समस्याबाबत

- १. कर्जत-पनवेल-कर्जत लोकल सुरु करणे विषयी
- २. मुंबई-पुणे-मुबई प्रगती एक्स्प्रेस (१२१२५, १२१२६) ला जाता येता एक्स्प्रेसला चौक येथे व पनवेल नांदेड पनवेल (१७६१३, १७६१४) एक्स्प्रेसला चौक येथे थांबा देणे बाबत.
- ३. पुणे-कर्जत-पुणे पॅसेंजर चौक पर्यंत नेणेषाबत.
- ४. कर्जत (B) तिकीट खिडकीची वेळ वाढविणे बाबत.
- ५. चौक रेल्वे स्टेशनच्या प्लॅट फॉर्मची लांबी वाढविणे, चौक रेल्वे स्टेशनची डागडुगी, रंगकाम, स्वच्छता गृहाची दुरुस्ती व पिण्याच्यापाण्याची व्यवस्था होणे बाबत.

१) आमचे चौक गाव हे छत्रपती शिवाजी महाराज यांचे सरदार सरनौबत नेताजी पालकर यांचे जन्मगांव म्हणून इतिहासात प्रसिध्द आहे. विविध संस्थांद्वारे त्यांच्या कार्याचा जागर सुरु आहे.

चौक रेल्वे स्टेशनची उभारणी सुमारे १५ वर्षापुर्वी झाली असुन, २००७ पासुन पनवेल-कर्जत रेल्वे मार्गावर माल वाहतुक सुरु झाली आहे. प्रवासी संघ चौक १९८३ पासून कार्यरत असून, संघाच्या सततच्या पाठपुराव्याने १ जुलै, २०१२ पासुन चौक रेल्वे स्टेशनवर भुसावळ पुणे भुसावळ (११०२५, ११०२६) या एक्सप्रेस गाडीला, थांबा मिळाला असुन, या परिसरांतील नागरिकांची थेट प्रवासासाठी चांगली सोय झाली आहे. सदर मार्गावर कर्जत-पनवेल कर्जत लोकल सुरु करण्यांत यावी.

२) चौक गाव हे ४०-५० खेडयांची प्रमुख बाजारपेठ असुन, जवळच रसायनी – पाताळगंगा औद्योगिक क्षेत्र असुन, पनवेल कर्जत मार्गावरील खालापूर तालुक्यांतील एकमेव रेल्वे स्टेशन असुन सदर स्टेशन वरुन, मुबई -पुणे-मुंबई प्रगती एक्सप्रेस, हुबळी लो.टि. टर्मिनस हुबळी, चेन्नई-अहमदाबाद-चेन्नई, पुणे एर्नाकुलम पुणे, यशवंतपुर-जयपुर-यशवंतपुर पनवेल- नांदेड -पुणे या एक्सप्रेस मेल जात असुन, त्यांना चौक येथे थांबा नाही, तरी आपणांस विनंती की, या पैकी मुंबई-पुणे-मुंबई प्रगती एक्सप्रेस (१२१२५,१२१२६) व पनवेल--नांदेड--पनवेल (१७६१३,१७६१४) या गाडयांना चौक रेल्वे स्टेशनवर जाता-येता थांबा मिळावा, ही विनंती.

(कार्यवाह)

ग. के. कोशे (अध्यक्ष)

कुपया भात्रे

(2)



॥ प्रवाशी हिताय। प्रवाशी सुआय॥ प्रवाशी संघ, चौक ता. स्वालापुर

जिल्हा राषगड



स्थापना २७/२/१९८३

«अध्यक्ष» गजानन केशत कोशे

> *उपाध्यक्ष* श्रीकृष्ण चंबावडे

कार्यवाह **चशवंत सकपाळ**

* उपकार्यवाह * **वानन नोरे**

20ाजीवका2 रजनीकांत शहा

***सदस्य** *

अविनाश कोशे वनराज जैन मुरलीधर साखरे दत्तात्रेय दबके नरेंद्र शहा हसन शेख महेश पोतदार विनायक देशमुख कमळाकर पोळेकर चशवंत हातमोडे अनिल खंडागळे पंकज शहा पंढरीनाथ साखरे विजय ठाकरे अमिजीत चौधरी मोरेश्वर गोरे शेखर मोरे अविनाश चौधरी सदेश महागावकर वा. के. आपटे राजेंद्र चौधरी स्धीर हनुमंते

> अल्लागाट * जनार्दन भरतुक (पग्रकार)

• ई) पुणे—कर्जत पॅसेंजर ही एकमेव गाडी कर्जत येथे बराच वेळ थांबत असते, सदर गाडी चौक—पनवेल पर्यंत नेण्यात यावी, तिचा उपयोग स्थानिक प्रवाशांना थेट प्रवासासाठी चांगला होईल व रेल्वेचे उत्पन्न वाढेल याचा विचार व्हावा.

४) भिसेगांव बाजुला असलेली कर्जत (B) ही तिकीट खिडकी— ८.३० ते ४.३० वा. खुली असते, या बाजुला २, ३, EMU हे तिन प्लॅटफॉर्म आहेत. या तिन्ही प्लॅट फॉर्मवरुन खोपोली, मुंबईकडे जाणाऱ्या लोकल्स, एक्सप्रेस, मेल गाडयांची खुप वर्दळ असते, मात्र वरील खिडकी (B) व्या वेळा व्यतिरिक्त नियमित प्रवाशांना कर्जत (A) तिकिट खिडकीवरुन तिकीटे काढण्यासाठी सुमारे २० मिनीटांचा कालावधी लागतो, त्यामुळे ट्रेन निघुन जाणे, यामुळे वेळेचा अपव्यय होतो, तरी विनंती की, सदर खिडकी (B) सकाळी ६.०० ते रात्रौ १०.०० पर्यंत २ सत्रात चालु ठेवावी ही विनंती, या आवश्यक सुचनेचा विचार व्हावा.

५) चौक रेल्वेचा प्लॅट फॉर्मची लांबी वाढविणे, स्टेशनची डगडुगी, रंगकाम, स्वच्छतागृह दुरुस्ती, पिण्याच्या पाण्याची चांगली व्यवस्था व्हावी. रायगड जिल्हयांतील इतिहास प्रसिध्द अशा चौक गांवी असलेल्या परिसरांतील नागरिकांच्या प्रवासी संघाच्या मागण्या, समस्या बाबतचा विचार या मिटींगमध्ये करण्यांत यावा, ही नम्र विनंती.

कर्यिवाद यशवंत गो. सकपाळ

अध्यक्ष ग. के. कोशे

पत माहितीसाठी व आवश्यक शिफारसीसाठी, १. मा. ना. पियुशभाई गोयल, रेल्वे मंत्री दिल्ली २. मा. ना. प्रकाशभाई मेहता, पालक मंत्री, रायगड ३. मा. खासदार श्रीरंग (अप्पा) बारणे, मावळ मतदार संघ ४. मा. आमदार सुरेश भाऊ लाड (कर्जत) ५. मा. आमदार मनोहर शोठ भोईर (उरण) ६. मा. आमदार प्रशांत दादा ठाकूर (पनवेल) ७. मा. आमदार जयंत भाई पाटील (विधान परिषद), अलिबाग ८. मा. आमदार बाळाराम पाटील (शिक्षक मतदार संघ), पनवेल ९. मा. आदिती तटकरे अध्यक्ष, मा. श्री. आस्वाद पाटील उपाध्यक्ष, रा.जि.प. अलिबाग १० मा. सभापती सौ. श्रध्दा साखरे, मा. उपसभापती विश्वनाथ पाटील, ११.मा. सरपंच, उपसरपंच, सदस्य ग्रु.ग्रा. पंचायत चौक १२.मा. सरपंच, उपसरपंच, सदस्य ग्रु.ग्रा. पंचायत तुपगांव १३.मा. सरपंच, उपसरपंच, सदस्य ग्रु.ग्रा. पंचायत आसरे १४.मा. सरपंच, उपसरपंच, सदस्य ग्रु.ग्रा. पंचायत लोधिवली (Chim ग. के. कोश सकपाळ 21. an onizi (अर्घ्यक्ष) (कार्यवाह) 1) श्री जनादिन भरतुक, पत्रकार योव-JUIZA 488 विजय विश्वनाथ अन्तरे, योषु 39 र्या पहरीनाथ आत्माराम स्तारवरे UGRINIZKIKal

BUTUR INDAGAR ALEUR ARIAN TROS STIN ॥ प्रवाशी हिताय । प्रवाशी सुखाय ॥ स्थापना २७/२/१९८-प्रवाशी संघ, चौक ता. खालापर जिल्हा राषगड अशावंत गो. सकपाळ, ब्लॉक नंबर २०२, प्राजक्ता, (औटुंबर सोसायटी) चंकि (मानिवली), मोबा, ९३२६१५३७३७ ज्याः क दि. MATOTOT อบิส ろ ot'a 485 1B JEILS 9191510144 9 19803 8 Stal and sup support 2000 えんこう ころしかをわしいのが 23921 H. HEIDI 936 415 E ruh 6 STORAIG UT FICOLO z.ton 6 YRIDI OF BIGHE tis 2191 9001221 HEIG 1214 12121 184 (2) toul, akan Helt 3110931 99 272 92 R.m. - mars 21212 21211962 93 1521 ASI'S 22124. (2)(arm.) hily -42851 21112 24 944174 ZUNTIN 35 21 TR 2 1 11 15 Sile δ 25431 21/14/12 26/21/992 50511 910 MILAIN Jair 9500 9 94 NOD, GICIPA Imree A 90 20101021 8115 enito 302 mbic Noshbann दिळीय खा-ATT. J. 316/01 10 MP 10 29 Sig - 1- m 2 32 reiz 401-22-CP125 STIER 7-201 3150 23 Ballandich -210 an 2121200 28 21512 27 1000 101 1 222122 4.2-192-2 24 10 MORA 20/11/13 Manul 2thay his 28 Mallappa-S. Chandakawate 20 H.DRodo etukan magha. HIMENZ (TERE) 9121201 25 415271 the CRohe 5411 - 6. 30 39 gaan - Dint EKALD 9) Cropinate Darapurates Bhilderle golten 32

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मुफ्रा लिवदनातर द्रहरत महावा हिलाने) ॥ प्रवाशी हिताय । प्रवाशी सुखाय ॥ स्थापना २७/२/१९८३ प्रवाशी संघ, चौक ता. खालापूर जिल्हा रायगड -tid Duar Leas JAIS aldizion th 73 Kiedon Co 71'211 - ZIJEKO aldus E 10 22 (21 21) (al 21) (al 37 त्रुधिकेश शहरा हाग EL हरू प्रविध खनाजी सालेकर Bulle vo ylaor भितेग सुहाम निकाळने नितेश रेविंद्र हेशमूख 09 तेजस बाळासोहव देशमुख्य खीसिह्हां आंसवाल. रोहिन दिर्गित करूर tor ध्य रिनेश बार्फ सक्यारक dinesh ७९ स्मुनिका उत्तरमार्थ आन्दान 08 Last Galine Sidad S.A. Phennul ष्ट्रअस्तम् स्तुनिल फराह Thete 02 अनंत भारती आवेषे 20 तन्मय विद्राल जमान 331- Tagan LITTUS 1095 -ह्याजी पांडूरग ठांग्रे (टेन्नरी 52 53 31034 020011 Wing12 (21)02 ८४ परेश्डराज होरेआम्ड मिरलाटे भाष 21 221 212 21 JICH 54 RC ८९ रीगेमा नव्दुभार मात्रुसर अभाद दलामेख दलका 50 \$1411.18 63not CC 35100 Ce -1-21 2771 SADP eo guot Bairaz MATH naitan Bhushan ११९त लारामप 69 (-15) But KIN ez दिलीय जनार (1941 6P) ((2)76 57151 42 24 41 Dillep उमेश राजभेर 3 no भगगेर ५२० 26 24

Page : Date : ९६ कालुराम देवाको काल्यान डेवारक eve Ettyla yniad 5 mayapat ९ जन्मेश सुशतकर Jannes [m(n a . 29 Sp]s 2221 १०० स्मितेश होकर चाहारी Sindes 2115 909 21000 21818 902 19181 PICIN go up 903 matwetry मिरलाहर रा. याहरो. 900 904 relph4 Sasialos 21. Chinmay 900 Got 21 21: GOUT १०७२)होन स्तुश - चांधरा Photoethal त्रांचरी 904 किंग्राम दलालय Therel १०० प्रसार हा. - ट्रांडार्डा 990 कार दलिनेद मंडातमा lateer 241205 2192 201218 999 मनिष मुश्लीधन ज्नास्व 992 Jest ditiger 993 317101 79. drata131 g11752 37. 4012 114 सं ग्रा प्रमाद वलाहा. 115 P.M. CITA बारापर, लि, हविज जाहात (तुपआंव) 116 2121 618 के पटार्घन 117. 31214 Putwardian A 10 en 46 1012 38401 2110 RIE 118) #TARAL 21321 119 2 Aniles 920 manzi वसंत पादणवूर केस म थामन लामप्रांड 21 kufr रमठा रतिग्नेष योधरी 271191292 922 न्धापिक अलगाउ विषिटाव डिरानेहा 923 416 Blace अतीय दावेचंद ओसमाल 128 125 Moet of nam 224 watt 27421 yzert yinain PPotd 126 करिति 26मा 127 44 Salv. 128 Ution EUTINAN



- यशवंत गोपाळ सकपाळ संघटक, नेताजी पालकर मंडळ, चौक

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रायगड जिल्ह्यांतील (पुर्वीच्या वृत्र्लाबा) खालापूर पेटा (तालुक्यांतील) मुंबई पुणे हमरस्त्यावर वसलेले, माथेरान

प्रबळच्या दऱ्या-खोऱ्यांतून वाहणाऱ्या धावरी नदी शेजारी वसलेले (१८°५०' उत्तर, ७३°१०पूर्व) चौक शहर छत्रपती शिवाजी महाराज, त्यांचे उजवे हात म्हणून समजले जाणारे सरनौबत नेताजी पालकर यांचे जन्मगांव म्हणून इतिहासात प्रसिद्ध आहे.

असे हे इतिहास प्रसिद्ध चौक —

पारतंत्र्याच्या कारकिर्दीत १६ मार्च १७८१ रोजी कॅप्टन मॅकीच्या नेतृत्वाखाली लढणाऱ्या ब्रिटीश सैन्याची आणि परशुराम



बापुंच्या नेतृत्वाखाली मराठ्यांच्या सैन्य दलाची लढाई चौक येथे झाली अशी इतिहासात नोंद आहे.

चौकचा प्रवाशी बंगला (डाक) १८२० साली २०६७ रु. खर्चून बांधला असून, ८ सप्टेंबर १८५६ रोजी बांधलेल्या मराठी शाळेत (दगडी) अनेक विद्यार्थी शिकले आहेत. नुकताच शाळेचा २००६ साली शतकोत्तर सुवर्ण महोत्सव झाला.

नेताजी पालकर —

इतिहास अभ्यासक तात्या कनौले यांच्या मते नेताजी पालकरांचा जन्म १६२१-२२ च्या सुमारास झाला असावा. (राजे शिवछत्रपतींचा जन्म १६३०) नेताजी पालकरांनी आपले शरीर व्यायामाने कमावलेले होते. तलवारबाजी, तिरकमठा, भाला, खंजीर चालविण्यांत ते तरबेज

मताली, प्रलंकर भाग, वि

आपल्या तरुण वयात, नेताजीने आपल्या २०-२५ सवंगडचां सह गावाच्या संरक्षणाची जबाबदारी घेतली, व्यंकोजी वाघ या भिल्ल दरोडे खोराने चौक परिसरात खूप दशहत निर्माण केली होती. त्याचा बंदोबस्त नेताजी पालकरांनी केला, नेताजींची कामगिरी शिवरायांपर्यंत पोहचली.



पालकर यांचे जन्मस्थान

नेताजी पालकर शूर, बुद्धीमान, अनुभवी होते, त्यांचा उपयोग शिवाजी महाराजांना स्वातंत्र्यासाठी होणार होता, त्यामुळे नेताजींना त्यांनी जवळ घेतले.

चौकमधील वास्तव्य –

नेताजी पालकर आपला बराच वेळ जंगलात भटकंती करण्यांत, तसेच माथेरान येथील ट्री हील, (चौक पॉईंट) जवळील वाघाची गुहा (Panthers Cave) येथे घालवित तेथील पिसारनाथाचे दर्शन घेत असत, चौकच्या मारुती मंदिराजवळच्या परिसरात त्यांचे वास्तव्य असे.

१६५५ ते १६६० च्या कालावधीत राजे शिवछत्रपती दाभोळ च्या स्वारीवर गेले असता, स्वराज्याची जबाबदारी नेताजी पालकरांवर टाकली होती, असे इतिहासाचे पुरावे आहेत.

अफजलखानाचा वध —

जावळीच्या अरण्यात नेताजी पालकरांच्या सैन्याने, अफजलखानाच्या सैन्यावर तयारीसह हल्ला चढविला, अफजल खानाच्या वधाच्या वेळी नेताजी पालकरांनी बजावलेली कामगिरी, तो इतिहास विसरणे शक्य नाही.

समर भूमी छावणी —

औरंगजेबाचा मामा शाहिस्तेखान याने पुण्याहुन मराठा

THEFT



जाणीव



(छावणी) चा विजय स्तंभ

स्वराज्यातील कोकणपट्टी व आरमार करण्यासाठी ३ झबेग सरदार कारतलबखान व राय बागन यांना ३० हजार फौजे निशी कोकणवर पाठविले होते. लोणावळा नजिकच्या आंबे नळीच्या घाटात खालापूर तालुक्यांतील उंबरखिंड येथे शके १५८२ फेब्रुवारी १६६१ रोजी खानाच्या सैन्याचा, एका बाजूने स्वतः शिवाजी महाराज व दुसऱ्या बाजुने नेताजी पालकर यांनी मुठभर मावळ्यांच्या मदतीने पराभव केला, सरनोबत नेताजी पालकर —

and and and and and and and

जावळीच्या अरण्यात अफजल खानाच्या फौजेवर नेताजी

वाघासारखें तुटुन पडले, तर उंबर खिंडी त कारतलब खानाच्या अफाट सेनेस त्यांनी खडे चारले, या परादाक माढा इ ला शिवरायांनी नेताजीस, सरनोबत हा किताब बहाल केला. <u>सौरउर्जे चा गांव</u> चावणी —

खा ला पा पू र तालुक्यांतील चावणी (छावणी) गां वी शिवरायांच्या सैन्याचा तळ होता, या ठिकाणीच उंबर खिंड आहे.



समरभूमी उबरखिड (छावणी) चा विजय स्तंभ समवेत शिवसेना शाखाप्रमुख राजू डफाळ (पं.सदस्य) व अशोक मोरे

खोपोली-पाली रस्त्या पासून सुमारे ५ कि.मी. अंतरावर चावणी गांव असून, चावणी गावाच्या २७६ घरामधअये आज सौरउर्जेचा वापर होत आहे, या गावांलगतच्या अंबानदीवर शिवदुर्ग मित्र लोणावळा यांच्या पुढाकाराने व ग्रामस्थ चावणी-परिसर यांच्या सहकार्याने किर्ती

स्तंभ उभारला आहे. दर वर्षी २ फेब्रुवारीला येथे मोठा विजयोत्सव साजरा होतो.

१६६२ साली शाहिस्तेखानाचा बंदोबस्त करताना, इतिहास कारांच्या मते, त्यांचे संपूर्ण नियोजन व सल्ला नेताजी पालकरांनी, शिवाजी महाराजांना दिला होता, आपल्या पेक्षा वयाने मोठे असलेल्या नेताजींना, महाराज काकाजी म्हणत असत.

नेताजींचे धर्मांतर ---

राजे शिवाजी महाराज यांची, आग्रा येथे नजर कैद, तेथून शिवाजी महाराज गमिनी काव्याने १६६६ साली निसटले हा इतिहास साऱ्यांना ज्ञात आहे.

पन्हाळा गडाच्या स्वारीच्या वेळी नेताजी पालकर आपल्या सैन्यासह हजर झाले नाहीत, पन्हळगडाची किल्लेदारी आपल्या मेहुण्याला द्यावी, अशी त्यांची मागणी होती, वशिलेबाजी व सैन्यातील बेशिस्त महाराजांना मान्य झाली व त्यांनी नेताजी पालकरांना बडतर्फ केले, असे इतिहास सांगतो.

१६६६ साली महाराजांनी आपली आग्रा येथून केलेली सुटका, नेताजींचे जयसिंगाच्या कारवाईने मोगलांस सामिल होणे, आणि २४ ऑक्टोबर १६६६ साली, महाराजांच्या सुटकेचा वचपा म्हणुन, औरंगजेबानी मिर्झा राजे जयसिंगाकडून किल्ले धारुर येथे नेताजी पालकरांना अटक केली या साऱ्या इतिहासांतील घटना.

धर्मांतर केलेस तरच जगशील, असा फास घालून औरंगजेबाने नेताजींना बाटवले, त्यांचा महमंद कुलीखान झाला, या प्रति शिवाजींचा उपयोग त्याने खैबर खिंडीतील दऱ्या खोऱ्यात काबुल येथे पाठवून केला.

काबुल कंधाहार येथे, महाराजांवर रुसून, बादशहाच्या फौजेत ९ वर्षे मंहमंद कुलीखान बनून चाकरी केली, आणि तब्बल ९ वर्षानंतर दिलेरखानाबरोबर कुलीखानाला दख्खनच्या स्वारीवर मराठ्यांच्या पायबंदासाठी औरंगजेबने पाठविले.

पन्हा शिवाजी महाराजांकडे —

महमंद कुलीखानाच्या मोगली फौजा, महाराष्ट्राकडे निघाल्या, औरंगजेबाने केलेला छळ, भयंकर अपमान, जाच व २७ मार्च १६६७ रोजी महंमद कुलीखान होणे, या साऱ्या गोष्टी नेताजी पालकरांना आठवल्या, महाराष्ट्र आणि शिवरायांची थोरवी, जिजाबाईंचे पुत्रवत प्रेम या साऱ्या गोष्टी आठवल्या.

बाटूज मुसलमान झालेला हा नेताजी पालकर, शिवाजी महाराजांच्या सैन्यावर तुटुन पडेल, त्याच्या जोडीला मराठ्यांच्या पराभवासाठी शर्तचि प्रयत्न करणारा दिलेरखान होता.

जाणीव

मात्र नेताजी महाराजांकडे पळून जाऊन, सामिल होण्याची संधी पहात होते. मोगलांच्या छावणीतून नेताजी सटकले, तेव्हा महाराजांची स्वारी, रायगडावर होती. तेथे महाराजांची भेट झाली. ''झालं गेलं गंगेला मिळाले'', घडलेल्या गोष्टीला प्रायश्चित्त घेता येते, हा आपला माणूस परका राहता कामा नये, तो परत आपला झाला पाहिजे, असे विचार महाराजांच्या मनांत आले,

बाटणे काय, आणि शुद्ध होणे काय, सर्व भावनांचे खेळ, महाराजांनी आषाढ शुद्ध चतुर्थी १९ जून १६७६ रोजी विधीपुर्वक हिंदु धर्मात घेतले, या ठिकाणी शिवाजी महाराजांच्या मनाचा मोठेपणा लक्षात येतो. राज्यशकट चालविताना, साऱ्यांना जवळ घेऊन प्रेम देऊन आपलेसे केले म्हणूनच राज्य स्थापन झाले.

नेताजी पालकरांनी महाराजांना सामिल होऊन औरंगजेबाला एक नवीन धक्का दिला, आणि नेताजींना शुद्ध करुन महाराजांनीही औरंगजेबाला त्याहून जोराचा धक्का दिला.



<u>तामासाचा</u> जहागिरी — वावाही इाताहासा काराच्या मते. छत्रपती शिवाजी महाराजांच्या निधनानं तर.





(१६८०) स्वराज्याची स्थिती कोलमडली, नेताजी पालकर मिर्झा राजे जयसिंगाना जाऊन मिळाले, तेव्हा त्यांना नांदेड जिल्ह्यातील तामसा येथील जाहागिरी मिळाली. १७२० साली नरसोजी राजे पालकर (मुलगा) यांची तामसा येथे मन्सुब व जहागिरी होती.

तामसातील जूना भाग हा पूर्णपणे नेताजींच्या मालकीचा होता. नेताजी पालकरांचा १७१२ च्या सुमारास मृत्यू झाला, त्यांची समाधी २१ फुट × १४ फुट आकाराची तामसा येथे नदी किनारी आहे. नेताजी पालकरांचे वंशज ---

नेताजी पालकरांचे नांदेड जिल्ह्यांतील पिंगळी, हदगांव तसेच



पालकर यांची सातवी पिढी कै. रंगराव पालकर व आठवी पिढी कै. गणपतराव पालकर (माजी आमदार, हदगाव)

नागपुर येथे वंशाज आहेत. त्यांचे ८ वे वंशाज स्वातंत्र्य सेनानी गणपत रंगराव पालकर व स्वातंत्र्य सेनानी अप्पासाहेब रंगराव पालकर यांची



स. नेताजी पालकर यांची आठवी पिढी कै. आप्पासाहेब पालकर स्वा. सैनिक (फोटो) श्रीमती गजराबाई, अजिंक्य पालकर दहावी पिढी व नेताजी पालकर मंडळाचे संघटक यशवंत सकपाळ चौक

९वी, १०वी पिढी असून तेथे वास्तव्य करित आहे.

हदगांवचे माजी आमदार कै. गणपतराव पालकर यांच्या ९ जून १९८८ च्या पत्रानुसार त्यांचे घर नेताजी पालकरांचा नातु नेतुजी पालकर यांचे पासून आलेले आहे, ते पहिल्या बाजीराव पेशव्यांचे घोडदळ प्रमुख होते. त्यांच्या मध्यस्थिने मराठ्यांस निजामांकडून चौथाई व सरदेशमुखी देवविली. नेतुजी पालकरांना ५२ गावांची जहागिरी मिळाली होती.

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५ सप्टेंबर २०१० रोजी नेताजी पालकरांचे वंशज श्रीमती गजराबाई आप्पासाहेब पालकर (८वी पीढी), अशोक गणपतराव पालकर (९वी पीढी) यांची भेट घेतली व समाधी स्थळ असलेल्या तामसा शहरांत, समाधी जिर्णोद्धारासाठी प्रयत्नशील असलेल्या जागृती मंचाच्या श्री. भारतजी वाळके यांची भेट झाली. चौकाला स्मारक व्हावे —

इतिहासाचा वारसा असलेल्या चौक शहरांत, ग्रुप ग्रामपंचायत चौकच्या विद्यमाने, नेताजी नाट्य मंडळ या संस्थेद्वारे श्री शिवजयंती उत्सवांत तीन दिवस स्थानिक कलाकारांचे नाटकाचे प्रयोग होत असत. चौक शहरांत नेताजी सहकारी भात गिरणी सोसायटी, सरनौबत नेताजी पालकर विद्यामंदीर चौक (या शाळेचा ११ जून २०११ रोजी सुवर्णमहोत्सव), नेताजी पालकर मंडळ, नेताजी पालकर मार्गावरील नेताजी पालकर जन्मस्थळ. या संस्थातर्फे नेताजी पालकरांच्या कार्याचे जागरण सुरु आहे. चौक रेल्वे स्टेशनला ''नेताजी पालकर नगर" नाव देण्याबाबत सर्व पुर्तता झाली आहे. नेताजी पालक मंडळातर्फे दर वर्षी शालेय विद्यार्थ्यांसाठी किल्ले स्पर्धेचे आयोजन चौक, हातनोली, तुपगांव या गाव पातळीवर करण्यांत येत आहे. ग्रुप ग्रामपंचायत चौकचा हिरक महोत्सव —

११ जून १९५१ रोजी स्थापन झालेल्या ग्रुप ग्रामपंचायत

चौकचा हिरक महोत्सव (६०वर्षे) ११ जून २०११ रोजी येत आहे. या सरनोबत नेताजी पालकरांच्या जन्म स्थळाचे दुरुस्ती, डागडुगी, नुतनीकरणाचे काम सुरु आहे. यासाठी ग्रुप ग्रामपंचायत चौक दानशुर नागरिक बंधू भगिनी यांचे आर्थिक व वस्तु रुपाने सहकार्याने झाली आहे.

हिरक महोत्सवात दानशुर नागरिक, संस्था, ग्रुप ग्रामपंचायत, पंचायत समिती, जिल्हा परिषद, लोक प्रतिनिधी यांच्या सहकार्याने नेताजी पालकरांचे स्मारक होणे गरजेचे आहे.

ऐतिहासिक गावाचा ऐतिहासिक वारसा जपण्याच्या कामी, साऱ्यांचे सहकार्य उपयोगी पडेल, अशी आशा आहे.

जय शिवाजी । जय नेताजी ।।





स्थापना आंतरोक्ट १९८६ लाजी पालकर मेडेइ चीक

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जून २०१२

मेव्हणा गैरहजर राहिला. शिवाजींनी त्याला शिक्षा केली. ते मतमेदाचे कारण होते. सैन्यातील बेशिस्त महाराजांना मान्य जव्हती.

१६६६ साली महाराजांची आग्राहन सुटका झाली. त्याचा वचपा म्हणून २४ ऑक्टोंबर १६६६ रोजी किल्ले धारूर येथे नेताजींना मिर्झा राजे जयसिंगकिडून अटक झाली. 'धर्मांतर केले तर' जगशील' असा फास टाकून, १७ मार्च १६६७ रोजी मुहम्मद कुलिखान म्हणून धर्मांतर केले. बाटून मुसलमान झालेल्या नेताजीला, ९ वर्षांनी शिवाजी महाराजांवर चाल करण्यासाठी पाठविले. पुन्हा महाराजांकडे

मोगलांच्या सैन्यातून संघी साघून, कूलीखान सटकला. महाराजांना रायगडावर भेटला. नत मस्तक झाला. जो आपला होता. तो आपला करण्यासाठी झाले गेल मंगेला मिळाले असे माणन आषाद शु.४ शके १५९८ अर्थात २९ जून १६७६ रोजी, धार्मिक विधी कुरून परत हिंद केले. तामसाची,जहायिरी

छत्रपती शिवाजी महाराजाच्या निधनानंतर स्वराज्याची स्थिती विघडली नेताजी पालकर मिर्झा राजे जयसिंगाला मिळाले. त्यांना नांदेइ जिल्ह्यातील तामसाची जहागिरी मिळाली. नेताजीचा मृत्यू १७१२ च्यां सुमारास झाला, -1 14

नेतार्जीचे वंशज 🥓 नेताजी पालकरांचे वंशज नांदेड जिल्ह्यातील पिंगळी, हदगाव तसेच नागपूर येथे आहेत. त्यांची ८ वीं ९ वी पिढी पिंगळी येथे वास्तव्य करीत आहे. त्यांची भेट झाली असून, उपसरपंच अशोकराव पालकर यांनी चौकच्या जन्मस्थळाला भेट दिली आहे.

चौक शहरात

नेताजी नाट्य मंडळ, नेताजी सहकारी भात गिरणी, सरनौबत नेताजी पालकर विद्यालय, नेताजी .पालकर मंडळ, सरनौबत नेताजी पालकर, सिनिअर ग्रुप या संस्था नेताजी मालकरांच्या कार्याचे जाएरएं। करीत आहेत.

नेताजीचे चौकला स्मारक सरनौबत नेताजी पालकरांचे नेताजी पालकर मार्गावरील जन्मस्थळावर स्मारक, नेताजी पालकर बालोद्रान आदी कार्यासाठी राष्ट्र पुरूष तथा: थोर व्यकी यांचे स्नारक, योजना अंतर्गत, प्रशासकीय मान्यता मिळाली आहे. चौकच्या रेल्वे स्टेशनला साजरा केला जातो. निर्मालक निर्मालकर नगर नाव, व नेताजी पालकरांचे स्मारक या चौकवासियांच्या मागण्या लवकरूच मार्गी लागतील अशी आशा आहे.

> जय जिजाई। जय शिवराय। जय नेताजी यशवंत सकपाळ, चौक 28943636



मराठा बेटल' या पुत्तकांचा अनुवाद पढरीनाथ सावत यांनी केला असून, त्यात बारा दर्षाचा, मोठ्या हाडपेराचा उंच, धिप्पाड, ताकदवान नेताजी पालक्रांचे त्यातं वर्णन असून, घावरी नदीच्या काठी . खेळणाऱ्या धाकटी बहीण गंगा (३वर्षे) व मामे बहीण काशी (७ वर्षे) यांचे वर्णन असून, 'हर हर महादेव' हीं मराठ्यांची घोषणा करून काठीने निवडुंगाला (मोगलाना)'झोडपीत होता. असा उल्लेख आहे.

१६५५ ते १६६० च्या कालावधीत राजे शिव छत्रपती दलोळच्या स्वारीवर गेले असता, स्वराज्याची जबाबदारी नेताजीवर टाकली होती.

अफजल खानाचा वध

के जावळीच्या अरण्यात अफजल खानाच्या वधाच्या वेळी, नेताजीनी बजावलेली कामगिरी, इतिहास विसरणे शक्य नाही.

लमर भूमी चावणी (छावणी) -औरंगेजेबच्या मामा शाहिस्तेखान याने, कोकण जिंकण्यासाठी, सरदार कारतलबखान व कुलकर्णी यांना ३० हजार फौजेसह पाठविले होते. लोणावळा नजिक आंबेनळीच्या घाटात, खालापूर तालक्यांतील उंबर खिडीत, २ फेब्रुवारी १६६१ रोजी खानाच्या प्रचंड सैन्याचा स्दतः शिवाजी महाराज व नेताजी पालकर यांनी मुठभर सैन्थाच्या सहाय्याने गनिमी काव्याने पराभव केला. याबदल महाराजांनी त्यांना 'सरनौबत' हा किताब बहाल करून सरत्तेनापती केले. नेताजी पालकर व त्यांची ताकद यांच्या हकिकती मराठा इतिहासात सापडतांत. चावणी येथे २ फेब्रुवारीला विजय स्तुभाजवळ विजय दिन

्र नेताजीचे थर्मातर

रायगडावर सापडलेल्या शहाजी-शिवाजी दप्तरातील नोंदी नुसार शिवाजी-नेताजी यांच्यात नायकेल मॉकनिलन, यांनी लिहिलेल्या 'इन दाईल्ड गंभीर मतभेद झाले. एका हर्ल्स्याच्या वेळी नेताजीचा د ما سود و رو در این اور است و برو ما و مرد است اور است. در ما سود و رو در است است و مرد و برو ما و ما و سر است او است ا a marine A. D. S. Sugar

हिंदवी स्वराज्याची स्थापना करताना शिवाजी महाराजांनी अनेक विश्व-ासु सहकाऱ्यांची फौजच तयार करुन मराठी मुलुखात आपला दबदवा निर्माण केला. त्या शुरवीरांमध्ये सरनोबत नेताजी पालकर यांचाही समावेश होता. नेताजींनी मुस्लिम धर्म स्वीकारला होता. . पण शिवाजी महाराजांनी त्यांना पुन्हा हिंदू धर्मात घेतले. आज त्या घटनेला बरोबर ३३६ वर्षे. पूर्ण होत आहेत. त्यानिमित्ताने नेताजींच्या आठवर्णीना दिलेला हा उजाळा.

R

URIDO

रायगड जिल्ह्यातील खालापूर तालुक्यातील माथेरान, प्रबळच्या दऱ्या-खोऱ्यातून वाहणाऱ्या धावरी नदी रोजारी वसलेले चौक गाव, "छत्रपती' शिवाजी महाराज यांचे तरदार, "प्रति शिवाजी"-सरनोवत नेताजी (नेतोजी) पालकर यांचे जन्म गाव म्हणून इतिहासात प्रसिद्ध आहे.

पालकर घराण्याचे प्रथम पुरूष विश्वासराव चोक यथे स्थायिक झाले होते. विश्वास राव धार्मिक वृत्तीच, सतत वाचन, मनन, युद्ध प्रवीण होते. नेताजीच्या वडिलांचे नाव घोंडोजी व आई शातावाई, इतिहास संशोगक तात्या कनौले यांचा मते, नेताजींचा जन्म इ. स. १६२१-२२ च्या दरम्यान असावाः धोडूच्या काळातच पालकर घराणे भोसले घराण्याशी जोडले गेले. वंयाच्या दहाव्या वर्षीच नेतोजींचे मालती बाईशी लम्न झाले.

नेताजी पालकरांनी आपले शरीर व्यायामाने कनावले होते. तलवार बाजी, तिरकनठा, भाला: खंजीर चालविण्यात ते तरवेज होते. या तरणाबांड, मोलादी शरीरयष्टीच्या तलवारबाज तर्रुणाला त्युचा भाऊ संताजी याची साथ मिळाला.

आपल्यः तरुण दयात, आपल्या रावगड्यासह संरक्षणाची जबाबदारी स्वीकारली. व्यंकांजी वाघ या दरोडेखोराचा बंदोबस्त केला. नेताजीची कामगिरी शिवरायांपर्यंत पोचली. नेताजी शूर. दुद्धीमान. अनुभवी, धाडरंगे होते. स्वराज्यासाठी शिवयांनी त्यांना जदक केले.

चौक़ मधील वास्तव्य

नेताजी आपला बराच वेळ जंगलात भट्रकती ,करीत, माथेरान जवळील पिसारनाथ मंदिरात त्याचे गुरू रहात. चौकच्या हनुमान मंदिराजवळ त्यांचे जन्मस्थान असून, परिसरात त्यांचे दाडे होते.

TE MOST ज ताठनी पालकरा, A.36 Browlease tar अस्म स्था काच्या 9 0 जन्म 209 ४ मंदिरा शेजारील सरनोबत नेताजी पालकर जन्म सरनौबत नेताजी पालकर सिनिअर ग्रपतफे यांचे आयोजन करण्यात येत असून, २ फेब्रुवारी २०१३ पासून विजय दिनानिमिताने घावणी येथे भव्य अशी मशाल रॅली नेताजी पालकर जन्मस्थळापासून काढण्याल येते. या रॅलीला येधे राष्ट्रपुरूष तथा धोर व्यक्ती यांची स्मारके युप अमापंचायत चौक दोन्ही वेशीवर नेताजी पालकार स्मृती कमानीची उभारणी सुरू झाली आहे. चौक रेल्वे स्टेशनला च्याख्यानमाला. क्रिकेट सामने, आरोग्य शिबिर शेव-नेताजी प्रेमीचा दिवसेदिवस वांगला सर्नौबत तायक्कांडो संघालफे महिलासाठी मोफल वृंगीचे आयोजन केले जात आहे. चौक ग्रुप ग्रामपंचायत चौकतर्फ चौक शहराच्या पूर्तता झाली आहे. लावकरच सदरचे नामांतर ऐतिहासिक गावांचा ऐतिहासिक वार्रसा जपण्यास्या कामी, सर्व नागरिक, संस्था यांचे स्थळ व पुरातन मुजोबा देवस्थानचा जीर्णोद्धार युप ग्रामपंचायत चौक्र व दानशूर नागरिक यांच्या लगत्रद्धा ज्येष्ठ नागरिक भवनाजवळ, स्मारक जय जिजाऊ! जय शिवराय! जय नेताजी नेताजी पालकर नगर नाव देण्याबाबतची 232 894 3122 894 3122 6120 01 110 110 110 110 व बालोद्यानाचे काम प्रगती पथावर आहे. सहकायनि करण्यात आला आहे. होईल, अशी आशा आहे. सहकार्य मोलाचे ठरेल. प्रतिमाद मिळल आहे. व पुतले उभारवे. व यशवंतराव देशमुख कनिष्ठ महाविद्यालयात =भेरू गर्भ मे

सत्कार आयोजित केले जात असून, १९ १९८६ साली स्थाप्तन झालेले नेताजी पालकर मंडळ, चौक तर्फ सौक, तुपगाव, चौक मध्ये, चौक परिसंसतील विद्यार्थी शिक्षेण हातनोली, नानिवली गावपातळीवर दिवाळी निमित्ताने शालेय विद्याध्यांसाठी सातत्याने २८ वर्ष दिन्नहो स्वज्ञेचे आयोजन केले जात असून, निबंध स्पर्धा, चित्रकला स्पर्धा, गुणवताचे पुढाकाराने, शिवसेना शाखा चौक लगतच्या मेताजी पालकर नागदिर असलेल्या हनुमान जून ३०१० रोजी नेताजी पालकर मंडळाच्या वेत आहेत.

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गुणवंत विद्याध्यांचा सत्कार होत आहे. सरनौबत नेताजी पालकर विद्यामंदिर प्रश्नोधनकार ठाकरे खुले नाट्यपृद्द) शिवजयंती नेताजी सहकारी भात गिरणी सोसायटीतर्फे (आताच्या चोक शहरात नेताजी नाट्य मंडळातर्फ, निमित्ताने सतत ३ दिवस नाटके होत असत नेताजींच्या कार्याचा जागर नेताजी नाट्य मंडळाच्या मंचावर दरवर्षी

人間でのうち 一日の日前のための日本ののからのです。

िंधिकालीन

चौकचा प्रयासी बंगला (डाक) १८२० साली 🕌 २०६७ रू. रर्वचून बांधला आहे. ८ सप्टेंबर १८५६ रोजी बांधलेल्या पोलीस गेट समोरील मराठी शाळेतून' (दगडी) अनेक विद्यार्थी शिकत आहेत. १ ऑगस्ट १९२० रोजी स्थापन झालेल्या लो. टिळक मोफ्र्स वाचनालय, चौक हे चौकचे सांस्कृतिक केंद आहे.

पारतंत्र्यात १६ माचे १७८१ रोजी कॅप्टन वेकीच्या नेतृत्वाखाली लढणाऱ्या भ्रिटिश लेन्याची य परशुराम बाप्ट्या नेतृत्वाखाली मराठचांच्या सेन्य दलाची लढाई चौक येथे असलेले (१८ अंश, ५० उत्तर, ७६ अंश ११ यूर्व)' चौक शहर छन्नपती शिवाजी महाराज य'चे उजवे हात समजले जाणारे प्रति शिवाजी रायगड जिल्ह्यातील (पूर्वीच्या कुंलाबा) रवालापर केन /-----रिज्ञालापूर पेटा (तालुक्यातील मुंबई-पुणे राष्ट्रीय महामार्गावर बसलेले, माथेरान प्रबळच्या द्च्या खोऱ्यांतून वाहणाऱ्या धावरी नदी शेजारी सरनोबत नेताजी (नेतांजी), पालकर यांचे जन्मगाव म्हणून इतिंहास प्रसिद्ध आहे. माल्याची इतिहास्मात नोंद आहे.

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तुझ्या दर्शडेखोर चोरांना मागे घे, तुला ५००० रु. देतो.'' यावर नेताजी म्हणाले ''आम्ही थोर शिवाजींचे अनुयायी आहोत. चोर दरोडेखोर नाहीत, तुझ्या राजापासून महाराष्ट्राला स्वतंत्र ठेव,'' असे म्हणून नेताजींनी तलवारीच्या मुठीवर ''आम्हा विजापुरला खजिना घेऊन जाह आहोत करण्यासाठी निशाण उभारले आहे, एवढे लक्षात हात घट्ट केला. शिवराय सुध्दा या लढाईच्या वेळी सैन्य विश्वाप्रामाताने चाल करीत आले. 'हर हर हजर होते. 'अल्ला हो अकबर' करीत विजापुरी महोदेव' करीत मराठे निघाले. नेताजीमध्ये दहा माणसांचे बळ आले. नेताजी शत्रुवर तुटून पडले. विजापुरी सरदार खाली पडला. त्या धुम्मचक्रीत स्वतःच्या घोड्याच्या टाचेखाली तुडकून ठार हैराण केले. विजापुरी सेनापती जेरीस(विजापुरी सैन्याला दगड व बाणांनी आला. त्याने मराठी सेनापतीची मांडलेले तुच्छता दर्शन विचार..... नेताजींची व विजापुरी सेनापतीशी सुरक्षित जागी झालेली भेट. त्याने ३०० गावकरी खिंडीतील गडग्याचे रक्षण करण्यासाठी तीर, कमठे, भाले घेऊन सखं झाले. काही गावक-यांनी भेट घेण्यासाठी जासुस पाठविला. मार्ग रोखला. पारसराताल २००-डोंगरावरुन मोठे दगड ढकलले. झाला. शत्रुचे खूप सैन्य ठार झाले. अशी ही लढाई व नेताजीनी जिंकली. नेताजींवर खुप शिवरायांनी जखमा होत्या. अशा ter. त्यांना .आलिंगन शिवराय अवस्थत विजापूरसाठी कल्याणहून सुटलेला खजिना ग्न्हाडावर बंदुकीचा मारा झाला. त्यात एक जण ठार एक जण जखमी झाला. एक मुसलमान सरदार नेताजीला म्हणाला, ''तुझ्या बहिणीला होऊन पडलेल्या आंगतून भळ-भळ रक्त वाहणाऱ्या हालचाल न करणाऱ्या नेताजीला तो रेला असे समजून शत्रु सैन्य निघून गेले. अंगात नेताजी रात्री घरी परतला. वरातीची आई घेऊन ५०० घोडेस्वार एक मुसलमान सरदार बोरघाटाकडे निघालेला. खजिन्याबरोबर ४०० विजापुरला घेऊन जातो, ती बड्या सरदाराची वेगम होईल, तुला सैन्यात मोठी जागा मिळेल. आमच्या बरोबर चल'', नेताजीनी तलवारीच्या मुठीवर घट्ट हात धरला. क्षणार्धात बोलणाऱ्याच्या छातीतून तलवार आरपार गेली. शत्रु सैन्याने जखमी होईपर्यंत नेताजीवर वार केले. बेशुध्द अशक्तपणा असून सुध्दा घडधाकट शरीराचा संशस्त्र घोडेस्वार, नेताजी जवळ ३०० मावळे. शिवाय मराठ्यांची मोठ्या असणाऱ्या नेताजी काकांनी गावच्या थेट चिंचोळ्या खिडीत शत्रू सैन्याच्या अगोदर १०० घोडे, नार उंच गडगा घालून शत्रुचा रास्वे गंजलेली. 'हा खजिना शिवरायांनी नेताजीला सांगितले. शत्रु गावकचांच्या सहकायनि झाडे तोडून तसेच विजापुरला पोहचता कामा नये.' सैन्य बोरघाटाकडे कूच करताना शिवरायांपेक्षा वयाने ८-९ वर्षाने डावपेचास सुरुवात केली व खालापूर वडिलांना हकिकत सांगितली. रबालापूरची लढाई कु-हाडीने पाठविले. दगडाचा मिळते त्या ठिकाणी मुसलमान सैन्याने वरातील रोखले. वधुवरांना बाजूला घेऊन जाणाऱ्या झोडपणाऱ्या व रयातून शत्रुंचे पांढरे स्वत ोजारी असलेल्या वडगांव येथील वराशी ठरलेले गंगा या नेताजींच्या बहिणीचे रूम्न माणिक गडा पाहणाऱ्या नेताजीचा पराक्रम त्यात वर्णन केला आहे. चौक परिसरात त्यावेळी रयत व विजापुरी सैन्य यांच्यात चकमकी होत. ९ वर्षे वयाच्या होते. धावरी नदी पाताळगंगेला ज्या ठिकाण वर्ष), नंगा (७ वर्ष), ह काशी (३ वर्ष) भावंडांचे आले आहे. 'हर-हर महादेव' ही मराठ्यांची रण गर्जना. करीत मजबुत अशा. काठीने निवहुंगाल ्र धावरी नदी काठी खेळणाऱ्या नेताजी (१२ लिहिलेल्या 'नेताजी 'मालकर'' या पुस्तकात वर्षान मिचेल मॅकमिलन या इंग्रजी लेखकाने साथ दिली आणि इतिहासात चौकचे अनन्य हनुमान मंदिराजवळच नेताजींच्या जन्म स्थानावर नेताजीने स्वीकारली. या दरोडेखोरांचा बंदोबरत तरुणाची कामगिरी शिवरायांपर्यंत पोहचली. या तरणाला स्वराज्यासाठी आपल्या सहकाऱ्यात सामिल करुन घेतले. त्याने महाराजांना उत्तम साधारण महत्व नोंदवले गेले. आज चौकच्या दरोडेखार खूप मातला होता. गरीब दुबळ्यांना केला. शूर, बुष्ट्रीमान, धाडसी अशा या चौकर्ट्या तो छळत असे. चौकच्या संरक्षणाची जबाबदारी ारिसरात आपले सवंगडी जमा केले. चौक भटकंती असे. या विभागात व्यंकोजी बाघ हा कमावलल हात. था तरणाबाड पालादा शरोराच्या तरुणाला भाऊ संताजीची साथी मिळाली. चौक गरिसरातील जंगलात सर्वगड्यांसह नेतार्जीची सहिणीच्या लग्नाची बरात अनेक जण नतमस्तक होत आहेत. धोंडुजींच्या काळातच पालकर घराणे, भोसले घराण्याशी जोडले गैले. नेताजीचे शरीर व्यायामाने जन्म. १६२१-२२ घ्या सुमारास झाला. धोडोजी व झांताबाई हे त्यांचे माता-पिता होते. दलाची चौक येथे लढाई झाली अशी इतिहासात लढणाऱ्या ब्रिटीश सैन्याची आणि परशुरामबापूच्या लढणाऱ्या मसाठ्यांच्या सैन्य चौक गावात नेताजी (नेतोजी) पालकरोचा मुंबई-पुणे महामागविरील चौक हे इतिहास प्रसिष्ट् गाव. आपल्या पारतत्र्यांच्या काळात १६ मार्च १७८१ रोजी कॅप्टन मॅकीच्या नेतृत्वाखाली पत्करावे लागले, या जिवाला जीव देणाऱ्या सहकाऱ्यांची मदत झाली. काहिंना हुतात्म्य माणकोपंत संबनिस आदी सर्व जाती-धर्माच्या मेहत्तर, जिवा महाला, हिरोजी फर्जद, संताजी प्रतापराव गुजर, सिस्दी हिलाल, मोरोपंत पिंगळे, देशपांडे, सरनौबत नेताजी पालकर, मदारी इम्रान खान, येसाजी कंक, शिवा काशिद, दावलजी गडगे, झंबकजी डबीर, निरोजी शहाणे, वापरुन रुद्धाया करताना गड किल्ले ताब्यात घेताना नरवीर तानाजी मालुसरे, बाजी प्रभु धनाजी, बर्हिजी नाईक, रघुनाधराव कोरडे, सहकान्यांमुळेच आपले स्वराज्य स्थापियले . जिल्ह्यातील रायगड किल्ल्यावर महाराजांचा स्वराज्य मिळविताना महाराजांना पःकिय शत्रुंचा तसेच स्वकियांचा खुप त्रास झाला. गनिमी कावा आपला रायगड जिल्हा (पुर्वीचा कुलाबा) हा शिवशाहीतील महत्वाचा जिल्हा. या जिल्ह्याने राजे शिवछत्रपतींचा पराक्रम अनुभवलेला. या राज्यभिषेक सुध्दा झालेला. आपले राज्य, इतिहास प्रसिद्ध चीक नेतृत्वाखाली नोंद आहे.

सरनौडात नेतानी पालकर

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सरनोबत नेताजी पालकर

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जम्महीका श्री साहेक सशाहा मेंडह, यिह्य वली (श्रेकील) तानाजी मालूसरे : शिवाजी महाराजांचे विश्वासु सहाराजांनी कोंढाणा किल्ला सर करण्याची जवावदारी तानाजीवर सोपविली होती. ४ फेब्रुवारी १६७० रोजी त्यात तानाजी धारातिर्थी पडले. त्यावर 'गड आला पण सरदार पोलादपूर तालुक्यातील उमरठचे ! शिवाजी सिंह गेला' असे शिवाजी महाराजांनी दुःखित मनाने राजे शिवछन्नपतींना असे अनेक जीवाला जीव किल्लेदार उदयभान व तानाजी योंची लढाई झाली. देणारे मावळे मिळाले. त्यांच्या सहाय्याने महाराजांनी सौ. रुपाली राजेश शिंदे, घोसाळवाडी Rev HUCHE 2000 त्या शूर वीरांना विनम्र आदरांजली ! आपले राज्य चालविले. FECO. 'अजन कांचन करवंदीच्या देशा' अशा महाराष्ट्र राज्यात मुंबई, या भागास कोकण म्हणतात कोकणातील पुर्वीचा कुलाबा आजचा रायगड राजे छत्रपतींचा जिल्हा म्हणून ओळखला • छत्रपती शिवाजी महाराजांची राजधानी, स्वामी रायगड जिल्ह्यातील काही शिवकालीन नररत्नांचा कान्होजी आंग्रे – यांचे मुळ आख्नांव शकपाळ. त्यांचे वडील तुकोजी शिवाजी महाराजांच्या सैन्यात ठाणे, रायगड, रत्नागिरी, सिंघुदुर्ग डी. देशमुख यांचा रामशास्त्रीबाणा, भूदानाचे प्रणेते विनोबा आठवले, नेताजी पालकर यांच्या कामगिरीमुळे रायगडचे आंग्रे, भाई कोतवाल, स्वाध्याय परिवाराचे पांडूरंगशारत्री रामदासांचे शिवथरघळ, डॉ. बाबासाहेब आंबेडकरांच भावे, आद्य क्रांतीवीर वासुदेव बळवंत फडके, कान्होजी चवदार तळ्याचा सत्याग्रह, भारताचे पहिले अर्थमंत्री सी रायगडातील नररले िधिवकालीन नाव सर्वत्र गेले आहे. विचार करुया

जातो.

नादेड प्रतापगडावर जे युद्ध झाले, त्यांत नेताजी पालकरांचा पराक्रम अतुलनीय होता. नेताजी पालकर स्वराज्याचे नेताजी पालकर चौक गांवचे. शिवाजी महाराजांचे उजवे हात प्रतिशिवाजी म्हणून त्यांना ओळखत असत. सर सेनापती (सरनौबत) होते. नेताजी पालकर आपल्या अज्ञातवासात माथेरानला चौक पॉईंटजवळ पोकळ जागेत राहत. त्या खडकाला नेताजी पालकर गुहा' म्हणून ओळखले जाते. नेताजी पालकर यांची समाधी जिल्ह्यात हदगांव येथे आहे. अनेन्स्रन्से

सरनौबत हुद्यावर होतो. कान्होजीना राजे छत्रपतींकडून

१६९४ मध्ये सरखेल पद मिळाले. कान्होजी आंग्रेनी आपल्या कारकिर्दीच्या काळात ४ वर्षात कोकणांतील सर्व किल्ले

मोंगलांकडून परत मिळविले. अलिबाग, जवळील कुलाबा किल्ला हे त्यांचे मुख्य ठाणे होते. त्यांची अलिबाग येथे

समाधी आहे.

シレート

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	त नेतानी पालकर	(छावणी) देथे दर वर्षी विजयदिन म्हणून साजरा रर केला जातो. नी ५० इजाराची तरतुद	शेमडी गावापासून ५ किमी अंतरावर रक्ताचा र ओहळ ओळखल्या. जाणाऱ्या ठिकाणी या 0 विजयाचे प्रतिक म्हणून 'विजयस्तम' उमारला . आहे विद्यमान उपसभापती निवरती पिंगळे यांनी	, शासकिय कार्यक्रम साजरा व्हाबा म्हणून पंचायत 1 समिती सेस फंडातून रुपये पन्नास हजाराची 1 तरतुद करावी असा ठराव मांडला आहे. त्याची अंमलबजावणी गातातींगानन नेम्प्ल कर्म के	विजय दिनाला पानिपतकार विश्वास पार्टील, सरनौबत नेताजी पालकर यांचे ८वे वंशज अशोक ^{गणपतरा} व पालकर (नांदेड) आर्दिची प्रामुख	उपस्थिती लाभणार अस्त्र, हजारो शिवप्रेमी, नेताजी प्रेमी विजयदिनाला छावणीला जमणार आहेत.	ऐतिहासिक चौक शहरात पुप ग्रामपंचायतीच्या पुढाकाराने होणारा शिवजयंती उत्सव भव्य-दिव्य असा साजरा केला जातो. पुर्वी नेताजी नाट्य मंडळातर्फ या निमित्ताने ३ दिवस स्थानिक्त
(A) (A)	() सरनोत	कृष्णा भारकर कुलकर्णी याने राजांच्या कपाळात वार केला. त्या कृष्णा भारकर कुलकर्णीचे राजां तुकडे-तुकडे केले.	समर भूमी छावणी औरंगजेबचा जामा शाहिस्तोखान याने सरदा करतलबखान व रायबाधीन देशमुख हिला ३ हजार सैन्यासह कोकणच्या मोहिमेवर पाठविले	र फडुवारा १९६१ राजा स्वतः शिवाजी महाराज नेताजी पालकरांना घेवून खानाच्या समावाराल उमे ठाकले: चौल, कल्याण, पनवेल, नागोठण या राजांच्या ताब्यातील कोकण प्रांत त्याल	ताब्यात ध्यावयाचा होता. खालापूर तालुक्यातील ऊंबरखिंडीत घनदाट जंगल, अवघड डॉगरकडे, अडचणीचे रस्ते, विंचोळी वाट. एका बाजूने	जरपारण्ढ । शवाण्या महाराज आणि दुसऱ्या बाजूने सरनौबत नेताजी पालकर अशी कोंडी करुन मोगल सेन्याची दाणादाण केली. शत्रुका यमसदनास पाठविले. 'मरणापेक्षा शरण जा'	असा सल्ला रायबाधने खानाला दिला. मौल्यवान सामान, युघ्द साहित्य, खजिन्याने भरलेले पेटारे, हत्ती. घोडे टाकून करतलबखान मागे परतला. उंबरखिंडीत खानाचा पराभव झाला. शिवराय, नेतार्जींच्या रणनितीचा विजय. म्हणून चावणी
	अफजल खानचा चध सातारा, कोरेगाव, कडच्या, मुलुखाची राख रांगोळी करीत अफजलखान वाईकेडे आला.	अफजलखान शिवाजीराजे यांची प्रतापगडावर भेट होणार होती. अफजलखान मेटीसाठी नाही तर राजांना ठार मारण्यासाठी आलेला, ही खात्रीलायक बातमी रुस्तुमेजमानने राजांना	दिली. खानाचा वकिल कृष्णा भारकर कुलकर्णी याने राजांची अनेक गुपिले खानाला सांगितली, या भेटीच्या वेळी नेताजी पालकर, मोरोपंत पिंगळे, कमळाजी साळुखे, येसाजी कक यांनी व्यूहरचना	केली. राजांच्या अगावर चिलखत असल्याने त्यांचे प्राण वाचले. राजांनी अफजलखनचा कोधळा काढला. राजांवर वार करणाऱ्या सय्यद बंडाला जिवा महालाने ठार केले. खानाचा वकिल			
)	शहाजी राजे कायम मोहिमेवर असत, राजमातां जिजाईंचे कारमारावर लंश असे शिवरायांच्या चढाया, ल्ढाया-मोहिमा त्यांच्या	मार्गदर्शाखाली होत होत्या. सईंबाई गरोदर होत्या. १४ मे १६५६ रोजी प्रुंस्दरावर राष्ट्रवीर शंभुराजांचा जन्म झाला. त्यावेळी सईंबाईंची संगूर्ण देखरेख. जबाबदारी सरनोबत नेताजी	पालकर पार पाडीत होते. सिद्दी-पोर्तुगीज-इंग्रज या शत्रुविरुष्टद लडून कोकण किनास सत्तेखाली आणण्या करिता शिवसायांनी २४ ऑक्टोंबर १६५७ रोजी कोकणावर स्वारी केली. पोर्तुगीजांना	नाके नऊ आणळे. सिद्धी-इग्रंज राजांच्या या झंझावाताने गांगरून गेले. शिवरायांनी दाभोळ स्वारीवर जाताना स्वराज्याची संपूर्ण जबाबदारी नेतार्जीवर सोपवलेली होती. हे इतिहासाला ज्ञात	आहि,		

ता इक्कामाठा आरोलन, रक्षावनी

गुरुवार दि. ३१ जानेवारी ते ०६ फेब्रुवारी २०१३ उन्हादिं विशेष्मेन-

चौकचे सरनौबत नेताजी पालकर

पान ने. ५ वक्तन

कलाकारांची नाटके होत. चौकला शेतक-यांची नेताजी सहकारी भात गिरणी सोसायटी आहे. सरनौबत नेताजी पालकर विद्यामंदिर ज्ञानदानाचे कार्य करीत आहे. नेताजी पालकर मंडळातफें गेली अनेक वर्षे चौक, तुपगांव, हातनोली पातळीवर किल्ले स्पर्धा आयोजित केली जात असून, ग्रामपंचायतीकडून या उपक्रमाला मदत मिळत आहे. चोक शहर व परिसरात सरनौबत नेताजी पालकर सिनिअर ग्रपदारे कीडा सामने एस.एस.सी. व्याख्यानमाला, आरोग्य शिबीरे आदींचे आयोजन केले जात असून, यंदा या ग्रुपच्या पुढाकाराने शिव-नेताजी प्रेमींची भव्य मशाल रॅली नेताजी पालकर जन्म स्थळ चौक ते विजय स्तंभ चावणी पर्यंत आयोजित केली आहे.सरनौबत नेताजी पालकर तायक्वाँडो प्रशिक्षण केंद्र चौकतर्फे यंदापासून विद्यार्थीनी, स्वियांना आत्म संरक्षणासाठी अन्याय, अत्याचाराच्या विरुध्द लढण्यासाठी, तायक्याँडोचे मोफत वर्ग सुरु करण्यात आले आहेत. नेतार्जीचे चौकला स्मारक शिवसेना शाखे समोरील हनुमान

मंदिराजवळ सरनोबत नेताजी पालकर

मार्गावर असलेल्या नेताजी पालकर यांच्या जन्मस्थळाची डागडुजा, सुशोभिकरण ग्रुप-प्रामपंचायत निधी व लोकवर्गणीतून १९ जून २०१० रोजी झाले आहे. सदर जन्म स्थळावर स्मारक बांधणेकरिता २०१२-१३च्या आर्थिक वर्षात जिल्हा नियोजन मंडळाकडून शासकिय मान्यता मिळून राष्ट्रपुरुष तथा थोर व्यवती यांची स्मारके अंतर्गत नज लाख रुपयाचा निधी प्राप्त झाला आहे. चौक या ऐतिहासिक गावातील रेल्वे स्टेशनला नेताजी पालकर नगर नाव देण्याबाबत आवश्यक त्या शिफारशी पाठविल्या आहेत.

ऐतिहासिक चारसा

खाळापूर तालुक्यातील चौक-खालापूर यावणी ही राजे शिवछत्रपती सरनोयत प्रति शिवाजी नेताजी पालकर यांच्या पराक्रमाची ऐतिहासिक गावे असून ती सर्वांना प्रेरणादायी आहेत. हा ऐतिहासिक वारसा जपण्यासाठी साऱ्यांचे सहकार्य मिळत असून, या गावांना ऐतिहासिक दर्जा प्राप्त होणे महत्वाचे असून, या कामी साऱ्या शिव-नेताजी प्रेमींचे, हितचिंतकांचे प्रयत्न मोलाचे ठरणार आहेत.

• जय जिजाऊ! जय शिवराय! जय नेत्राजी!





- ३१ जानेवारी ते ०६ केब्रुवारी २०१३ द्यावी शरणागती, म्हणे आम्हाला, राजांनी शरणागता अभय दिघला।।९।। जी.जो यशवत गोपाळ सकपाळ (0505453555) संघटक, नेताजी पालकर मंडळ, चौक कसा त्यावा, एवबा फौज फाद, करतलब खान, विंतातुर झाला।१।। जी.जी. जोडिला माहुरस्या, देशमुखांची शयबाधन, ३० हजार सेन्य, मोहिमेला ॥४॥ जी.जी. . डबरसिंडीच्या विजय दिनाचा आज ३५३ वर्षे, या घटनेला, यशवंताचे कवन, विजय दिनाला ।।१०।। जी.जी. खानाच्या सैन्या, मिळे न थारा, दहा माणसांचे बळ, नेताजीला 1001 खानाला बजावले, खड्या शब्दात, जा शरण, शिवाजी राजाला ॥८॥ जी.जी. ओरंगजेवचा मामी, शाईरते खान, कोकंग जिंकण्या, धांडळा करतलवखान रायगड जिल्ह्यामधी... चौक गांव मशहुर, तिथे जन्मले, शूर आणि वीर त्यांचे नावे, सरनीवत नेताजी पालकर, वंदन करु, या शूर विराला ॥धू। सेन्य अडवणीने, हेराण झाले, मावळ्यांनी, चढविला हल्ला ॥६॥ जी.जी. सामिल केले स्वराज्यासाठी, दौकचा शूर, सामिल झाला ॥२॥ जी.जी. उंबरखिंडीत, जंगल यनदाट, उत्तरण्या, सिंचोळी वाट रायबाधनचा विचार पटला, भेटण्या राजाला, वकील धाडला शत्रु फॉज, बावे संरावेश, त्याच्या वरी, तलवारीचा मारा जय जिजाऊ ! जय शिवसय ! जय नेताजी ! १६६१ साली ३ फेब्रुवारीला, उबरखिंडीत, खानाचा पराभव झाला सा. हक्कासाठी आंब्रोलन तुंगारण्यात, लमविले मावळे, भर अरण्यात, शत्रुसैन्य आले प्रतापगडी, त्याचा कोथळा काढला ॥३॥ जी.जी. त्याचा बंदोबस्त, नेतार्जीनी केला।१।(जी,जी ्पोवाडा राय बाधन होती, शांत, सारा हाहाकार होती पहात नेताजींची पसरली किंती, राजांना समजली महती राजांच्या बंदोबस्ता, अफजलखान धाडला राजांचा पराक्रम, विजापूर दरबारी गेला चालवित तिरकमवा, भाला नि खेजीर आदिल शाहीला, घोका निर्माण झाला व्यायामाने कमविले, त्यांनी शरीर, मातला व्यकोजी वाय, दरोडेखोर वणी विराव दिन विशेषांक कर्तत्वाचा त्यांच्या, इतिहास गाने यशवंत गोपाळ सकपाळ(चोक) उमरववे मालुसरे तानाजी प्राणपणाने लढले बाजी शिव छत्रपती, आपुले राजे

गाउँ पोनारे प्राक्रमाचे

शुर वीरांची, नररत्नांची, जी असे खाण महाराष्ट्र हे राज्य आपले, असे महान करु गुण गौरव, त्यांच्या कार्याचे ॥१॥ मान बिंदु, साऱ्या महाराष्ट्राचे ॥२॥ रवराज्य स्थापण्या, सहास्य मावळ्यांचे ॥३॥ शिवरायांचा तो, बाले किल्ला रायगड आपुला, प्रसिद्ध जिल्हा

गाऊ पोवाडे, परक्रमाचे ॥४॥ अलिबागचे आंग्रे कान्होजी चौकचे पालकर नेताजी

A A A A A A A A A A A A A A A A A A A	तानाजी मालूसरे : शिवाजी महाराजांत्रे विश्वास सरदार पोलादपूर तालुक्यातील उमरठवे ! शिवाजी महाराजांनी कौढाणा किल्ला सर करण्याची जवाबदारी तानाजीवर सोपविली होती. ४ फेब्रुवारी १६७० रोजी किल्लेदार उदयमान व तानाजी यांची लढाई झाली. सिंह नेला असे शिवाजी महाराजांनी टु:खित मनाने स्टले. राजे शिवछत्रपतींना असे अनेक जीवाला जीव देणारे मावळे मिळाले. त्यांच्या सहाराजांनी झापले राज्य चालविले.	ત્યા સૂપ ધીપાંના વિનમ आवरપાजली ! सૌ. ष्पाली राजेश शिंदे, घोसाळवाडी स्मरुशिका श्वी नरींदेव सो. (શोकी) (सुंखाण भ्योत्सां 2000	
	रिवितालीन रायगडातील नररते आजन काचन करवंदीच्य देशा अथा महाराष्ट्र राज्यात मुंबई डाणे, रायगड, रत्नागिरी, सिंघुदुर्ग या भागास कोकण हणतात कोकणातील पुर्वाचा कुलाबा	जातो.	अज्ञातवासात माथरानला चाक पाइटजवळ पाकळ जागत राहत. त्या खडकाला 'नेताजी पालकर गुहा' म्हणून ओळखले जाते. नेताजी पालकर यांची समाधी नांदेड जिल्ह्यात हदगांव येथे आहे, अब्हेल्ल्यन्त े

की, ''आमरी आपल्या मुल्द्रात आलो, ही आम चूम झाली, आम्हाला क्षमा कता, आम्हाला िलित जारम यावे, आपले तीर्थरम् शहरजी यजे आणि जारतला खान यांची जुनी दोस्ती विनंतो, जीवदान धावे, ही आळवणी पाहून म महापाओपुदे हात पसल्पन तकिलाने सांगितल होती, त्यांचे प्रेमाचे संगंध होते, आपण आम्होल। शरणागरती द्यावी," यकिलावी सारखी आर्लवे, होती. मंगल सैन्यास, महाराजांनी ट्रिसे, अभय, सांगण्यास वकिल निवाला, महाराजांचा, हाराजांगे प्रदय द्वरते, त्यांनी वकिलास सांगितले, 'अभित्यादहडे दयेची याचना वरणान्या खानाला सांगा, तुम्हाला अभय दिले आहे, या प्रदेशातू-सानाच्या सैन्याची सर्वत्र दाणादाण उडाली सांगावा. धुपारण्यात सांगण्यातः आला. संग्राम संपत्स, मोगली फौजांना, आपत्स होपार खातमा गरलेले पेटारे, हती. घोडे, सोन्याची भांडी म युष्य साहित्य सुंगारण्यात टायून दिले. स्वर्तिन्याने राठा सैन्याच्या हातात पिळाली. जंबरजिडीतील वाचल्याबद्धल आनंद झाला, मौत्यवान सामान खानाचा पराभव झाला, तो विजय दिवस म्हणने र फेब्रुवारी १६६१ या शिवाजी महाराज व सरदार नेताजी पालक्रांच्या विजयाच्या घटनेला टिकाण वावणी (उंबरखिंड) या इतिहासातील राजे शिव छत्रपतीचे उजवे हात, प्रति शिवाज महत्पाच्या दिकाणी रवांच्या स्मृतीसाठी स्पारक लेणे मरलेवे आधे. या बाबत सर्वानी प्रयत्नवील यसावेता गोपाळ सकपाळ नेताणी पालक यांचे जन्मस्यक वीक, पत्तायमा गरिले पाहिजे, असे विजयदिनानिमिताने वाटते जय गहाराष्ट्रा जय शिवाजी। जय नेताजी। 0226943036 निधून जा, मान संडणी घावी लागेरत.' संघटक, नेताजी पालकर मंडक, आज ३५१० वर्ष आली. range statter gere \$ 2328943636 डोताजी-वामपूर मंडह बिरस्थाण, गान्देवर रूळणारी जाळीदार झालर, मननटावर, छातीवर, पाठीवर, क्वयेवर पोलाती सुबक नथीदार पट्टआ, विताखतात गुंधलेल्या, पाणीदार डोळे, फाळीमोर दादी, मुखावर स्पित यमरेगर पहेदार तलवार, पाठीवर विशाल ठरलं कानात सलणारे मोल्याने चौकरे, भया क्याक सामा असलेले शिलाजी महागाज, उपर खिडीच्या यादेयर, हल्यारबंद मायळतांच्या समयेत, अश्वारानु गरूडासारले घनस्तीत नाक, पढणीदार मुक्या The second Par la सैन्याधी दाणादाण ती पहल होती. सर्वत्र हाहा. 臣 .रपद शब्दात चजाउले.... 'छात लाहत, आपण गुर्ख, गाहिरतेखानाट्यां हुद्धूमते, आपली कौज, शिवाजीसारट्या सिंहाच्या जलखात आण्ट्रत सोउलोत, आपन यापूर्वी लेळविलेले सर्व यश पुरुक्ट गेले. पुरपुच्या तावसीतून तवीची मुटका हीण्यासाठी शिवाजीस शरण जा, शिवाजी फार दिलदार आहे. शरणागतीने उरदोल्या फोजेने शरण जाणे योग्य हा विचार पटला खानाने एक इतिया येवा गाय असलेन्या शयबायन्त्र हे म्हणणे यगरताल खानाल पेवली, मरणापेक्षा वयिन्न महाराजांताई पाठविला. तो अपल्या हाधम प्याधांत्रह जंगलात्त्या काठ्याफुट्यत्तुन कारतत्व खानायन्द्रन शरणागतीचा निरोप घेरकन शिवाली महासणांना वरिष्तांनी मुजस केला आल्याचे सांगितले. चोढयावरून महाराज त्याचे कार उडाला होता, तरीही खानामा आगह.. निःस्थपधदेवा वांष फुटला. खानाला रायवाधन घोडणवर स्वार होती. शायन्तायन्त्या राहस्ता यकिस्ताची शिषाई होणन संगान न्याहाळत होते. महायानांना जेत्रायास निताला. प्राण थाचु राक्सील.' हणाने एकत होते. अभा विवाद वाटेतून माघारी मिल्मे शक्यम स्टिते: राध्यवाधन भाव सर्व परिस्थिती पहात होती, पुढचा रत्सा कठीण आहे, हे तिला वेवले होते. त्या धनधोत, अस्ण्याल, यानाचे सैन्य पाण्यावादून हेराण झाले, सेन्य केवेन "आगे सर्वों" हा खानाया पुळबुण्ड, रायबाधन कारतलब खान पुंगा स्ट्र्यात येण्यापूर्वीच फोन, अरप्याच्या मध्यावर अल्यावर नौबती झडल्या, वादी वाजली, फौज सेरावेश घायू लागली आणि अचानक झालेल्या, शेताडो मायळ्यांच्या तलावारीच्या हल्ल्यांनी भयभीत झाली. त्यांच्यावर नेताली अंगाल पोत्नादी रित्तखल, मस्तकावर पोलादी िकिंगि-मत्वकरांना आग्रेजाती नमजत होते, मात्र तो शांत होती. पालकर तलवारींचे वार करीत होते. रणाभुमीत महाताज पहात होती. खानावी सै-याची

> कारतलबखान मोहिमेवर निघाता तेत्वा सराजांपयीत गुप्तहेरांनी गोचुंवल्या. कारतला ाल्ला मंसलत झाली, फौजेच्या हालचाली गनि तुंगारण्यात उत्सन, सहााद्रीपर्यत चतुन फींजा पाठविल्या, त्यांचा बंदोबस्त केला पाहिजे नेन्याला सांगितले. स्यानेकी उंगर छिन्दीत पनदाट जंगल, अवधड डॉगर कडे, आडवळणीचे सामानसुमान कर्ल न्यायचे हा प्ररन होता. एक जाउनन, वंबरखिडीतून कोकणात रतरण्यात रस्ते, अरुद वाटा असताना मोठा फौजफाटा, एक माणूस पुढे सरकेल आशी, वियोकी वाट, शिवाजी महाराज राजगडावर होते. शाहिस्तेरवान जानाने लोहगड तिरुच्याच्या दक्षिणोत्तर नेताजींची कामगिरी

रुमारे ३० हजार सैन्यासह, फॉर्जने विवदड, कोगव, वडगाव मार्ग कुच केली.

कारतलंबरान बर्रबर, अमरतिह चोहन, जसवंतराव व रायवाघनला मोहिमेवर पाठविले.

अस्मराष्ट्रा, BILLEN.

भुम्भुन

औरंगजेबना मामा शाहिरतेखानने चायाण सर केले, नंतर कारतलगरबान उझकेन याने परिज्याचा शाहिस्तेखान पुण्यांत आला असता. त्याच्या रनात वेगळाच विचार आला. ज्झनेन सरदार किल्ला जिंकला. पायसाळ्यानंतर कोकण प्रांत, मावल प्रांत जिंकाया अस्म त्याया मनसुबा होता, गरतलब खान याला बालावून, शिवाजींच्या ागोठणे हा कोकण मांतातील प्रदेश ताब्यात पनवेल व जेबर खिडीतील संग्राम गब्यातील चील, वरूपाण, मिवंडी, ण्याची कामगिरी तोपवित्ती.

> शिवस्यांगयेत पोचली. त्यांच्या शौर्याचा, पंराक्रम त्यांना केलेला बंदोबस्त, सारी कामगिरी

ाचा उपगोग स्वराज्यासाठी होणार होता, असी पाणसे शिवरायांनी हेरली, त्यांत नेताली पालक सुध्या होते. १६५५ ते १६६० मध्ये महाराज

दामोळचा। स्वासीवर गेले असता, स्वराज्याह

ण्बाबदार्थं त्यांनी नेताजीवर सोएवली होती.

विजापूर दरबारापर्यंत पहिंचिता, आदिलयाहीला मोठा धोका निर्माण झाला, विजापूरचा बादशहा आदिलशहांच्या निधनांनंतर, केम्मदी साहिबाने कोकणातील राजे शिवफन्नपतीचा पराक्रम बताढय अफंजल रवानावर सोपविती. त्यानेच शिवाजी भोसलेंचा बंदोन्स्त करण्याची कामगिरी शहाजी राजांचा बेड्या ठोकल्या होत्या. संभाजी गहाराजांना धोक्याने मारले होते. जावळीच्या अरण्यात, नेताजी पालकसंच्या सैन्याने अफजल खानाच्या वषाच्या देळी, नेताजीची कर्तवगारी, त्या वेळची तयारी, त्यांनी बजारलेली कामगिरीचा जानाच्या सैन्यावर हल्ला केला. इतिहास विसरणे शक्य नाही.

कला असता, त्यांनी कडेकपोरी सहणी-या

मावळ्यांना संघाटित लेले, सर्व जाती दर्माच्या सहकाः यांच्या सहारयाः रे शिवराज्य निर्माण केले

जिसरे, वौकवे नेताजी (नेताजी) पालकर, आर्

जीवाला जीव देणारे सहकारी लाभले म्हणून

इतिहास अभ्यासम् तात्था

त्यामध्ये रायगड जिल्हांतील उमरठवे लानाजी

शियाजी शहाराजांच्या जीवन फार्याचा अभ्यास

खोनर

चालविषयात ते तरबेज होते. व्यकोजी वाय या

मित्त दर्धडेखोराने, चौक परिस्रांत निर्माण केलेली दहशत, नेताजी पाल्करांनी सवंगड्यासह

१६२१-२२ च्या सुमारास झाला असावा,

कमायले.जे शरीर, तिरकमठा, माला,

मते नेताजी पालकर्शना

2115211

अफझल खानाया वय

अस्यता शिवाजी महराज की जय'' असा पुकार आला कि, प्रत्येक प्रेरित होतो, अंगात एक स्रूति निर्माण

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लेते, शिव वरित्र म्हणजे, सामाजिक, राजकीर

E S

परियर्तनत्वे एक प्रेरणास्रोत आहे.

छत्रपत

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समाहीका शी लाहें सराहा मंडह, सरदार पोलादपूर तालुक्यातील उमरठचे ! शिवाजी महाराजांनी कोढाणा किल्ला सर करण्याची जवाबदारी Filiziant (2) tailor तानाजी मालूसरे : शिवाजी महाराजांचे विश्वासू तानाजीवर सोपविली होती. ४ फेब्रुवारी १६७० रोजी सिंह गेला' असे शिवाजी महाराजांनी दुःखित मनाने किल्लेदार उदयभान व तानाजी यांची लढाई झाली. त्यात तानाजी धारातिर्थी पडले. त्यावर 'गड आला पण राजे शिवछन्रपतींना असे अनेक जीवाला जीव देणारे मावळे मिळाले. त्यांच्या सहाय्याने महाराजांनी सौ. रुपाली राजेश शिंदे, घोसाळवाडी सुवर्ण भर्योत्साह 2000 त्या शूर वीरांना विनम आदरांजली ! आपले राज्य चालविले. HECH. वाणे, रायगड, रत्नागिरी, सिंधुदुर्ग देशा' अशा महाराष्ट्र राज्यात मुंबई, आजचा रायगड राजे छत्रपतींचा जिल्हा म्हणून ओळखला डी. देशमुख यांचा रामशास्त्रीबाणा, भूदानाचे प्रणेते विनोबा 'अजन काचन करवदीच्या या भागास कोकण म्हणतात कोकणातील पुर्वीचा कुलाबा . छत्रपती शिवाजी महाराजांची राजधानी, स्वामी भावे, आद्य क्रांतीवीर वासुदेव बळवंत फडके, कान्होजी रामदासांचे शिवधरघळ, डॉ. बाबासाहेब आंबेडकरांचा त्यांचे वडील तुकोजी शिवाजी महाराजांच्या सैन्यात चवदार तळयाचा सत्याग्रह, भारताचे पहिले अर्थमंत्री सी. आंग्रे, भाई कोतवाल, स्वाध्याय परिवाराचे पांड्रंगशारत्त्री आठवले, नेताजी पालकर यांच्या कामगिरीमुळे रायगडचे रायगड जिल्ह्यातील काही शिवकालीन नररत्नांचा कान्होजी आंग्रे - यांचे मुळ आस्नांव शक्ष्पाळ. सरनौबत हुदयावर होतो. कान्होजीना राजे छन्नपतीकडून रायगडातील नररले धिावकालीन नाव सर्वत्र मेले आहे. विचार करुया !

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नेताजी पालकर चौक गांवचे. शिवाजी महाराजांचे ओळखले जाते. नेताजी पालकर यांची समाधी नांदेड अज्ञातवासात माथेरानला चौक पॉईटजवळ पोकळ जागेत राहत. त्या खडकाला 'नेताजी पालकर गुहा' म्हणून प्रतापगडावर जे युद्ध झाले, त्यांत नेताजी पालकरांचा पराक्रम अतुलनीय होता. नेताजी पालकर स्वराज्याचे सर सेनापती (सरनौबत) होते. नेताजी पालकर आपल्या उजवे हात प्रतिशिवाजी म्हणून त्यांना ओळखत असत जिल्ह्यात हदगांव' येथे आहे, व्या जिल्ह्यात

१६१४ मध्ये सरखेल पद मिळाले. कान्होजी आंग्रेंनी आपल्या कारकिर्दीच्या काळात ४ वर्षात कोकणांतील सर्व किल्ले मोंगलांकडून परत मिळविले. अलिबाग, जवळील कुलाबा किल्ला हे त्यांचे मुख्य ठाणे होते. त्यांची अलिबाग येथे

समाधी आहे.



घरोघरी अंथालय चळवळ, चौक, ९३२६१५३७३७

इशांळगड! रायगड जिल्ह्यातील खालापूर तालुक्यात चौक जवळ असणारा किल्ला. इशांळगड हा विशाळगड, इरसालगड, जीन खोड, सॅडल हिल या नावांनी सुद्धा ओळखला जातो. लष्करी ठाणे किंवा संरक्षण दृष्ट्या विशेष महत्त्व नसलेला इशांळगड अनेक नामवंत किल्ल्यांच्या घेऱ्यात असल्यामुळे संदेशवहन करण्यासाठी एक उपयुक्त किल्ला म्हणून ओळखला जातो. इर्शाळगड जवळ असणाऱ्या चांक गावात स्वराज्याचे सरसेनापती नेताजी पालकर यांचा जन्म झाला. इर्शाळगडाचा स्वतःचा इतिहास जरी ज्ञात नसला तरी ऐतिहासिक पार्श्वभूमी असणाऱ्या भूमीवर उभा • असल्यामुळे इर्शाळगडा से वेगळे महत्व आहे.

रायगड जिल्ह्यात असणाऱ्या किल्ल्यांना स्वतः चा असा इतिहास आहे. परंतु इर्शाळगडासारखे काही किल्ले आहेत ज्यांचा इतिहास आज अज्ञात आहे. इतिहासाचा अभ्यास करणाऱ्या इतिहास संशोधकांना इर्शाळगडासारखे किल्ले नेहमीच आव्हान देत असतात. कोकण आणि घाट यांना जोडणाऱ्या पनवेल लोणावळा मार्गावरील बोरघाट जो आज खंडाळा घाट म्हणून परिचित आहे. या वाटेकर असणारा इर्शाळगड हे टेहेळणीचे प्रमुख ठाणे होते. इर्शाळगडाच्या पश्चिमेस पनवेल, वायव्येस प्रबळगड व मलंगगड, उत्तरेस.चंदेरी व पेब किल्ले, ईशान्येस माथेरान, पूर्व स खंडाळा घाट व नागफणी, दक्षिणेस माणिकगड व सांकशी किल्ला, नैऋत्येस कर्नाळा किल्ला अशा नामवंत किल्ल्यांची मांदियाळी असल्यामुळे या किल्ल्यांच्या संदेश

वहनातील दुवा म्हणून इशळिगड महत्वाचा होता.

माथेरानवर शिवाजी शिडी नावाची वाट आहे. असे म्हणतात की , <u>शिवाजी महाराज चौक</u> वरोसे मार्गे धावरीनदी ओलांडून वरोसेदरीतून माथेरानवर आले होते. हाच मार्ग आज शिवाजी शिडी म्हणून ओळखला जातो. वरोसे गाव हे इशळिंगडाच्या घेऱ्यात आहे. शिवाजी महाराज या भागात येणार म्हणजे संदेशवहन आणि सुरक्षेची या भागातील जबाबदारी नक्कीच इर्शाळगडाने सांभाळली असणार. <u>शिवाजी महाराजांनी प्रबळगडास देखील</u> भेट दिली होती, असे म्हणतात त्या वेळी प्रबळगडावर खजिना सापडला होता. हा खजिना सुरक्षितपणे राजगडावर

जाण्यासाठी इर्शाळगडाचे योगदान नक्कीच असणार. शिवाजी महाराजांशी निगडित गोष्टींचे आपल्याला नेहमीच कुतूहल आणि अप्रूप असते. <u>इ</u>थे तर साक्षात स्वराज्याचे सैन्यदल प्रमुख, स्वराज्याचे सरनौबत नेताजी पालकर यांचे जन्मस्थान चौक. त्या मुळे इर्शाळगडाचा आढावा घेताना अपरिहार्यपणे चौकची दखल घ्यावीच लागते. <u>मृतराव्या अवराव्या शतकात चौक ही या परिसरातील</u> <u>मध्यवर्ती बाजारपेठ होती.</u> त्यामुळे बाजारपेठेचे संरक्षण आणि टेहेळणी या दृष्टीने इर्शाळगड महत्वाचा होता. भुरटे चोर, लुटारू, दरोडेखोर, परकीयसत्ता यांचे नेहमीच या बाजारपेठेवर लक्ष असायचे. अशाच एका व्यंकोजी वाघ नावाच्या लुटारुस नेताजी पालकर यांनी चौक यासून पाच कि.मी. वर असणाऱ्या वडगाव येथे गाठले होते. या ठिकाणी उडालेल्या चकमकीत नेताजीने व्यंकोजीला ठार केले होते.

कालानुरूप गोष्टी बदलत असतात, तद्वत मराठा साम्राज्याचा अस्त होऊन इंग्रजांचे राज्य सुरु झाले. किल्ले पुन्हा वापरात येऊ नयेत म्हणून इंग्रजांनी किल्ले तोफांचा



मारा करून निकामी केले. दऱ्या डोंगरांचे संरक्षण दृष्ट्या महत्व कमी होऊन ती थंड हवेची विश्राम स्थळे आणि पर्यटन स्थळे म्हणून विकसित होऊ लागली. माथेरान, खंडाळा, लोणावळा ही थंड हवेची ठिकाणे नावारूपाला येऊ लागली. या ठिकाणी युरोपियन लोकांचा वावर वाढू लागला. माथेरानवरून दिसणाऱ्या इर्शाळगडास या लोकांनी सेंडल हिल नाव ठेवले. स्थानिक यास जिन खोड म्हणत. दोन्हीचा अर्थ एकच घोड्याच्या पाठीवरील चामड्याचे खोगीर. इर्शाळगड लांबून

घोडयाच्या पाठीवरील खोगिरा सारखाच दिसतो. माथेरानची वर्दळ चौक वरूनच होत होती. नेरळ वरून रेल्वेमार्ग माथेरानला आला आणि चौकची ही वर्दळ पण थांबली. चौकसारख्या बाजारपेठा होत्या तिथेच राहिल्या. पनवेल, कर्जत, खोपोली विकसित होऊ लागले आणि बघता बघता इर्शाळगड सह चौक परिसर

स्टबद राण अधता इशाळगड सह चोक काळाच्या पडद्याआड गेला.

> काळाच्या पडद्याआड गेलेला इर्शाळगड आजही बघण्यासारखा आहे. मुंबई पुणे राष्ट्रीय महामार्ग क्र. चार वर चौक येथे उतरावे. चौक च्या उत्तरेस इर्शाळगडाच्या पायथ्याला नढाळ गाव आहे. इथपर्यंत गाडी रस्ता आहे. इथून पुढे चालत जावे लागते. डोंगर पठारावर गडाच्या पूर्वे स असणाऱ्या इर्शाळवाडीत पोहोचण्यास साधारण तासभर वेळ लागतो. वाडीत थोडी विश्रांती घ्यावी आणि ताज्या दमाने पुन्हा.चालण्यास सुरवात करावी. इथून समोर दिसणारा इर्शाळगड साधारण शंभर मीटर उंचावलेला आहे. उत्तरेकडे एक आणि दक्षिणेकडे एक असे दोन कातळ प्रस्तर गड माथ्यावर असून त्यांच्या मधोमध खिंड आहे. इर्शाळवाडीतून माथ्यावर असुणाऱ्या दक्षिण कातळाचा पायथा गाठावा. कातळकडा उजवीकडे ठेऊन पश्चिमेकडे आडवे जावे आणि खिंड गाठावी. इर्शाळवाडी ते खिंड साधारण दिड तासांची चढाई आहे. खिंडीत वर चढण्यासाठी साधारण वीस मीटरची चढाई असून ही चढाई घसाऱ्याची आहे. चढाई करताना थोडी काळजी घ्यावी. खिंडीत पाण्याचे टाके आहे तसेच खिंडीच्या खाली नेढे अर्थात कातळात आरपार

त्मापन आकर मडक, चोक. नेमानी पालकर मडक, चोक. संघटक- अखतेन स्कणाढ 0328

खोदलेली गुहा आहे. या नेढ्यात बसून पूर्व आणि पश्चिम दोन्ही बाजूंचा परिसर न्याहाळता येतो.

खिंड चढून वर आल्यावर दक्षिण आणि उत्तर टोकांवर असणारे प्रस्तर आपले लक्ष बेधून घेतात. दक्षिण प्रस्तराचा माथा गाठणे तसे सोपे आहे मात्र उत्तर प्रस्तर साधारण वीस बाबीस मीटर उंचीचा असून त्याच्या माथ्यावर जाण्यासाठी प्रस्तरारोहणाचे साहित्य आणि तज्ञांचे मार्गदर्शन गरजेचे आहे. हे सर्व असेल तरच उत्तर प्रस्तरावर चढाई करावी अन्यथा दक्षिण प्रसराचा माथा गाठून चाहुदिशांचा परिसर न्याहाळावा. गडावर तट , बुरुज नसले तरी काही गुहा व पाण्याची टाकी आहेत. एका गुहेत इर्शाळ देवीचे स्थान आहे. हे सर्व व्यवस्थित वधून आल्या वाटेने सुखरूप पायथा गाठावा. पायथ्याला आल्यावर परतीच्या प्रवासात चौकला आवर्जून भेट द्यावी. सरनौबत नेताजी पालकर यांच्या नावाने असणारे माध्यमिक विद्यालय गावात आहे ते पहावे. नेताजी पालकर यांचे स्मृतीस्थान म्हणून गावात एक चौथरा आहे त्याचे दर्शन घ्यावे. गेली काही वर्षे दोन फेब्रुवारी रोंजी साजऱ्या होणाऱ्या चौक ते उंबरखिंड या नेताजी पालकर यांच्या पालखी यात्रेची माहिती येथे मिळते. शाहिस्तेखानाचा सरदार कार्तलबखान आणि रायबाधन यांचा शिवाजी महाराजांनी उंबरखिडीत दारुण पराभव केला होता. या संग्रामात सरनाबत नेताजी पालकर यांचा सिंहाचा वाटा होता. त्या रणसंग्रामाची स्मृती म्हणून हा पालखी सोहळा संपन्न होत असतो. छत्रपती शिवाजी महाराजांचा इतिहास महाराष्ट्राला नव्हे तर देशाला आपल्या ओघवत्या शैलीत सांगणारे आज़च्या तरुण पिढीतील आघाडीचे आणि सुप्रसिद्ध शिवव्याख्याते प्रशांत देशमुख याच चौक गावात रहातात. त्यांची आवर्जून भेट घ्यावी. जेणेकरून ऐतिहासिक वारसा असलेला इर्शाळगड पाहिल्यानंतर छत्रपती शिवाजी महाराज आणि आपला इतिहास . यातील काही अनमोल गोष्टी ऐकायला मिळतील आणि खऱ्या अथनि इर्शाळगड दर्शन परिपूर्ण होईल !

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यशवंत गोपाळ सकपाळ बाबाजी सदन नेताजी पालकर मार्ग, मु. पो. चीक, जि. रायगड



জার্যবান্<u>ট</u>

विषय :-- प्रवाशी संघ चौकतर्फे प्रवाशी जनतेच्या मागण्या/समस्याबाबत

चशवंत सकपाळ

अवकार्यवाह वामन मोरे

२०१जीनदा२
 रजनीकांत शहा

***शब्रय** *

अविनाश कोशे वनराज जैन मुरलीधर साखरे दत्तात्रेय दबके नरेंद शहा हसन शेख महेश पोतदार विनायक देशमुख कमळाकर पोळेकर र्यशवंत हातमोडे अनिल खंडागळे पंकज़ शहा पंढरीनाथ साखरे विजय ठाकरे अमिजीत चौधरी मोरेश्वर गोरे शेखर मोरे अविनाश चौधरी सुदेश महागावकर वा. के. आपटे राजेंद चौधरी सुधीर हनुमंते

*सल्लागार * जनार्दन भरतुक (पञकार) १. कर्जत—पनवेल—कर्जत लोकल सुरु करणे विषयी

मुंबई ४००००१

- २. मुंबई—पुणे—मुबई प्रगती एक्स्प्रेस (१२१२५, १२१२६) ला जाता येता एक्स्प्रेसला चौक येथे व पनवेल नांदेड पनवेल (१७६१३, १७६१४) एक्स्प्रेसला चौक येथे थांबा देणे बाबत.
- ३. पुणे-कर्जत-पुणे पॅसेंजर चौक पर्यंत नेणेषाबत.
- ४. कर्जत (B) तिकीट खिडकीची वेळ वाढविणे बाबत.
- ५. चौक रेल्वे स्टेशनच्या प्लॅट फॉर्मची लांबी वाढविणे, चौक रेल्वे स्टेशनची डागडुगी, रंगकाम, स्वच्छता गृहाची दुरुस्ती व पिण्याच्यापाण्याची व्यवस्था होणे बाबत.

१) आमचे चौक गाव हे छत्रपती शिवाजी महाराज यांचे सरदार सरनौबत नेताजी पालकर यांचे जन्मगांव म्हणून इतिहासात प्रसिध्द आहे. विविध संस्थांद्वारे त्यांच्या कार्याचा जागर सुरु आहे.

चौक रेल्वे स्टेशनची उभारणी सुमारे १५ वर्षापुर्वी झाली असुन, २००७ पासुन पनवेल—कर्जत रेल्वे मार्गावर माल वाहतुक सुरु झाली आहे. प्रवासी संघ चौक १९८३ पासुन कार्यरत असुन, संघाच्या सततच्या पाठपुराव्याने १ जुलै, २०१२ पासुन चौक रेल्वे स्टेशनवर भुसावळ पुणे भुसावळ (११०२५, ११०२६) या एक्सप्रेस गाडीला, थांबा मिळाला असुन, या परिसरांतील नागरिकांची थेट प्रवासासाठी चांगली सोय झाली आहे. सदर मार्गावर कर्जत—पनवेल कर्जत लोकल सुरु करण्यांत यावी.

२) चौक गाव हे ४०-५० खेडयांची प्रमुख बाजारपेठ असुन, जवळच रसायनी -- पाताळगंगा औद्योगिक क्षेत्र असुन, पनवेल कर्जत मार्गावरील खालापूर तालुक्यांतील एकमेव रेल्वे स्टेशन असुन सदर स्टेशन वरुन, मुंबई --पुणे--मुंबई प्रगती एक्सप्रेस, हुबळी लो.टि. टर्मिनस हुबळी, चेन्नई--अहमदाबाद--चेन्नई, पुणे एर्नाकुलम पुणे, यशवंतपुर--जयपुर--यशवंतपुर पनवेल-- नांदेड --पुणे या एक्सप्रेस मेल जात असुन, त्यांना चौक येथे थांबा नाही, तरी आपणांस विनंती की, या पैकी मुंबई--पुणे--मुंबई प्रगती एक्सप्रेस (१२१२५,१२१२६) व पनवेल--नांदेड--पनवेल (१७६१३,१७६१४) या गाडयांना चौक रेल्वे स्टेशनवर जाता--येता थांबा मिळावा, ही विनंती.

यशवंत/ सकपाळ

(कार्यवाह)

ग. के. कोशे

॥ प्रवाशी हिताय । प्रवाशी सुखाय ॥

स्थापना २७/२/१९८३



प्रवाशी संघ, चौक ता. स्वालापूर





«अध्यक्ष» गजानन केशव कोशे

> *उपाध्यक्ष* श्रीकृष्ण चंबावडे

कार्यवाह **चशवंत सकपाळ**

अवयकार्यवाह वामन मोरे

«छाजीनदा२» रजनीकांत शहा

***सदस्य** *

अविनाश कोशे वनराज जैन मुरलीधर साखरे दत्तात्रेय दबके नरेंद्र शहा हसन शेख महेश पोतदार विनायक देशमुख कमळाकर पोळेकर चशवंत हातमोडे अनिल खंडागळे पंकज शहा पंढरीनाथ साखरे विजय ठाकरे अभिजीत चौधरी मोरेश्वर गोरे शेखर मोरे अविनाश चौधरी सुदेश महागावकर वा. के. आपटे राजेंद्र चौधरी स्धीर हनुमंते

«अल्लागा२ » जनार्दन भरतुक (प्रयकार) जा. क पुणे—कर्जत पॅसेंजर ही एकमेव गाडी कर्जत येथे बराच वेळ थांबत असते, सदर गाडी चौक—पनवेल पर्यंत नेण्यात यावी, तिचा उपयोग स्थानिक प्रवाशांना थेट प्रवासासाठी चांगला होईल व रेल्वेचे उत्पन्न वाढेल याचा विचार व्हावा (FMU / 75 कराती)

४) भिसेगांव बाजुला असलेली कर्जत (B) ही तिकीट खिडकी— ८.३० ते ४.३० वा. खुली असते, या बाजुला २, ३, EMU हे तिन प्लॅटफॉर्म आहेत. या तिन्ही प्लॅट फॉर्मवरुन खोपोली, मुंबईकडे जाणाऱ्या लोकल्स, एक्सप्रेस, मेल गाडयांची खुप वर्दळ असते, मात्र वरील खिडकी (B) च्या वेळा व्यतिरिक्त नियमित प्रवाशांना कर्जत (A) तिकिट खिडकीवरुन तिकीटे काढण्यासाठी सुमारे २० मिनीटांचा कालावधी लागतो, त्यामुळे ट्रेन निघुन जाणे, यामुळे वेळेचा अपव्यय होतो, तरी विनंती की, सदर खिडकी (B) सकाळी ६.०० ते रात्रौ १०.०० पर्यंत २ सत्रात चालु ठेवावी ही विनंती, या आवश्यक सुचनेचा विचार व्हावा.

५) चौक रेल्वेचा प्लॅट फॉर्मची लांबी वाढविणे, स्टेशनची डगडुगी, रंगकाम, स्वच्छतागृह दुरुस्ती, पिण्याच्या पाण्याची चांगली व्यवस्था व्हावी. रायगड जिल्हयांतील इतिहास प्रसिध्द अशा चौक गांवी असलेल्या परिसरांतील नागरिकांच्या प्रवासी संघाच्या मागण्या, समस्या बाबतचा विचार या मिटींगमध्ये करण्यांत यावा, ही नम्र विनंती.

क्रयिवाह यशवंत गो. सकपाळ अध्यक्ष ग. के. कोशे

प्रत माहितीसाठी व आवश्यक शिफारसीसाठी, १. मा. ना. पियुशभाई गोयल, रेल्वे मंत्री दिल्ली २. मा. ना. प्रकाशभाई मेहता, पालक मंत्री, रायगड ३. मा. खासदार श्रीरंग (अप्पा) बारणे, मावळ मतदार संघ ४. मा. आमदार सुरेश भाऊ लाड (कर्जत) ५. मा. आमदार मनोहर शोठ भोईर (उरण) ६. मा. आमदार प्रशांत दादा ठाकूर (पनवेल) ७. मा. आमदार जयंत भाई पाटील (विधान परिषद), अलिबाग ८. मा. आमदार बाळाराम पाटील (शिक्षक मतदार संघ), पनवेल ९. मा. आदिती तटकरे अध्यक्ष, मा. श्री. आस्वाद पाटील उपाध्यक्ष, रा.जि.प. अलिबाग १०मा. सभापती सौ. श्रध्दा साखरे, मा. उपसभापती विश्वनाथ पाटील, ११.मा. सरपंच, उपसरपंच, सदस्य ग्रु.ग्रा. पंचायत चौक १२.मा. सरपंच, उपसरपंच, सदस्य ग्रु.ग्रा. पंचायत तुपगांव १३.मा. सरपंच, उपसरपंच, सदस्य ग्रु.ग्रा. पंचायत आसरे १४.मा. सरपंच, उपसरपंच, सदस्य ग्रु.ग्रा. पंचायत लोधिवली ग. के. कोशे सकपाळ यशवंत 21. ay m21 (कार्यवाह) (अर्ध्यक्ष)
॥ प्रवाशी हिताय। प्रवाशी सुखाय ॥ स्थापना २७/२/१९८-प्रवाशी संघ, चौक ता. खालापुर जिल्हा राषगड यशवंत गो. सकपाळ, ब्लॉक नंबर २०२, प्राजक्ता, (औदुंबर सोसायटी) चोक (मानिवल्री), मोबा. ९३२६१५३७३७ दि. जानि-क्र A STOTIGTS DUG 400 orid ろ Bhilm, 919803 grill and ish and H 8 ちょうしょうとう 217 47 4 Est our substan 2 ころしかをしろしいので 22921 H. HE121198L 415 22 8 auch Englary UN Acolor 0 -citon 75 YRIDT OF BIGHG L JIS 0 3191 2153. 21 29121 9001221 HEIR 185 12700 तार्गन्त्र CHOUL akan Herry 99 9 92 12 - marsin 2.m 210) & 21812/195 93 BZI ASHS 22/21. 97 (motor) 2111-12 24 94 LIFE ZUNDIH 60091 98 21 12 2 JULINS 301 SUIL allydia Helallanz 5011 25421 910 mindin 9500 9 This Jald 9L A annia emel sterz, 98 Ardshormin 0/021 8115 enis 302-hbic 20 सी. ज. आदोलन जिम्माछ Gooly AT. SID 29 Jon 21 32 VER 901-22 सन्दर्भा अजन जाधन CP125 23 Techaha. an enertain Britenakon Zeia 21512 20 27 1000 101 1 4.219201 2221224 24 20/11/13 Manul 2thay his 28 Mor D Mallappa-S. Chandakawate Mip Rodatt 20 MISIMUL HIMAZ (OFFE 415271 25 Mar (Roher) Pilip Mark 20 621129 stuart mi-30 Eng Sing Iquan EUMIS INZAT 39 Crepingth Dorahurath Bhilewle golden 32

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is a donar decer prian point) ॥ प्रवाशी हिताय । प्रवाशी सुखाय ॥ प्रवाशी संघ, चौक ता. खालापूर स्थापना २७/२/१९८३ जिल्हा रायगड -ci à ou'ar dear EQ YAIS AIGISTION 4H Ry she and angles 20 22(212))062218195 रहाछि वर्षे होताह (इकी विहिन्द 23 EQ MADE INCIPE POPL 23 ७० प्रतिग अहाम निकाळने: ७१ मिलेश रविद्व हराम्यत. Bull ७२ तेनस बाळासोहव देशमुब्ध-७३ सिट्हांड ओसवाल. का होड़ित दिारित करने ७५ दिनेरा वाट्य सकपाट dinesh ७९ अनिका उत्सरमाश्य आगद ज 08 Labor Galfiel Hidao) S.A. Bherry व्य असम् स्तुनिल फराह 02 अमन मायनी झांववणे 20 तन्मय विद्धा नमान Turener > डाः विषक राजसंद लाष3 2 - आजाजी पांडरग ठोंग्रे (टेंझरी) 53 31054 90011 WINGR (2110) त्र परिश्वराज हारिभ्राम्ड जिरल्ह ामाल 54 ८९ र्योगेश नवकुमार मालुसर ZILS Co भुभाद दतारीय दलका CC हुम्ल द्वादमानाम हजुमन ce नेद्रेश रोंगा अमिएP es quoi Barrar Martan Bhushan eg मरत लागम्प सारो (चाड) But ez Train 35712 (Myai UP) 5 Dubep ७ उमेश राजभूर 1-40+ 6 51151 yz 2 4i er भ्रथमशे भ्रायी por to

mim zin saud ९६ कालुराम देवासी Emorapati' eye Ettyles yourd) 23 Jannes ९८ जन्मेश सुरावकर् ee offering, 2018 pla १०० स्मित्तेश शंकर चाहार Singles 909 21005 2118 Dothen 902 Ugilei - 218185. 903 Marin an with mater drilly १०४ सिरलाहर रा. याहरी. ChINMAY goy relphi 21. 24 Sidios 900 (gal 21 21: 4001) terry १०७२)हीन मनीश चीहरा Epowelha Theles 904 किराम दत्तालय सांचरी 900 परमाद हा. टार्डार्डा huffy. Emediteen 990 प्रकाश दलियेद मंडलिमा S. Church 999 24121000 2192 20142 ११२ मनिए मुर्लोशन् क्रांश्वरे J&Vdtgit 993 517101 79. datalat 114 211202 34. 4012 15 र्स मना प्रमाम वेलाग. ता. खातापर, लि, रावजे 6180 116 नरेश राम आधाव (तुप्रांव) 117 31214 7. 46. 46451 Putwardhan Alc Reen 118) = 46 1012 32101 3110 119 Strater 2132) DiAnie g manzi and 41601 an 925 21 (कर्मन यामन लामाइ kut 2011enzy? 922 रमठा रतेणनाथ संधिरा 923 APPZIA Selfer Ald All orlighton 313 Bleane S 128 sialy fiding minut Tilly wat 128 Moel ds. niant Ploton 26 27421 42821 4INGIL करिति रसि 127 Bala 244 अस्तिले हार्गानेवले 128

Date 1. sthootonber 2017

Central Minister,

Railways, Delhi India

10,

Sub: Regarding Kongat - Panvel Rail mute issues,

I undersigned "shree Romesh kashinath shinde" Sir, At-Halivali Tal-Kazjat Dist-Ruigad state-Mahorashta Indian Pail depositment have already started rail facility on known Ponnel Route. Known is central place for robarning all other Locations of maharastra Hence new voute tangat parvel will definately boast the growth of knowld and supportedings preeping this faith, we have handovered our & Ogricultural land to rail depostment. At time of development many things about service mod for emergency, overbridge for farmers to transport Poors one side to other side of rail route. on kargat porrivel only, there is tunnel of 3 know but there is no only safety provisions made. or any one provisions for emergency disaster. Pail track of pargat-poorvel is near about no ft down toom ground level. Animals, formers have to cross the railtrack to cor go on forms. There is expectations of averbidge at center place but till date, we are keeping our lives in danges everyday

for sake of development of country, we handovered own lands with very low cost, also last own income from agriculture we have assured with jobs in railways but till date we are waiting for same only. Area must be notified as rail affected area, shis Area must be notified as rail affected area, shis connouncement is also pending, we are not getting or certificates of kompt forwel sail affected area. please consider these issues on urgent basis. above we formers are always with you & government of

The tarmed are aways with your but otherside India for betterment of transport system but otherside of it our land & we must not be thrown like stone on

Trequest you to take associtive action against above problem as soon as possible. Hoping for positive response

Thanking you.

yous faithfully RRhine [Mo. Romesh Kashinath Shinde] former of Karnet Pormel sail offected

Fortact No. : 9923128720

दिनांक:२१/११/२०१७

प्रति,

मा.मुख्य प्रबंधक साहेब, अतिरिक्त माहिती किंवा शंकामुख्य प्रकल्प प्रबंधक - ख, मुंबई रेल्वे विकास कॉरपोरेशन मर्या. तळमजला, नविन प्रशासकीय इमारत, दादाभाई नौरोजी रोड, जे.जे.महाविदयालयासमोर, मुंबई छत्रपती शिवाजी महाराज टर्मिनस - ४००००१

विषय :	प्रकल्पग्रस्त असल्याने नोकरी मिळणेबाबत.
राहणार :	मोहपे, पो.पोयंजे, ता. पनवेल, जि. रायगड
अर्जदार :	श्री.यशवंत शंकर पवार

महोदय,

मी वरील अर्जवार आपणांस विनंती अर्ज करतो की, मौजे मोहपे, पो. पोयंजे, ता. पनवेल, जि. रायगड येथील सर्व्हे नं. ५७/१, ५७/२अ ही जमिन मिळकत कर्जत - पनवेल रेल्वेमध्ये समाविष्ट झालेली आहे. त्यामुळे आम्ही प्रकल्पग्रस्त आहोत. तसा दाखला माझेकडे आहे. परंतु त्याबाबतचे वाढीव पेमेंट व प्रकल्पग्रस्त आहोत. तसा दाखला माझेकडे आहे. परंतु त्याबाबतचे वाढीव पेमेंट व प्रकल्पग्रस्त असल्याने नोकरी मिळालेली नाही. तरी आता माझा मुलगा अभिजीत यशवंत पवार, वय - १९ वर्षे, शिक्षण - १४वी पास आहे. तरी त्यास आपल्यास कार्यालयात समाविष्ठ करून त्यास लवकरात लवकर नोकरी मिळावी. आमच्या कुटूंबाकडे दुसरे कोणीही कमावते नाही. उदरनिर्वाहाचे आणखी कोणतेही साधन नाही. तरी माझे मुलास आपण नोकरी दयावी हि विनंती. कळावे.

आपला विश्वास्

22102 zing Mari

श्री.यशवंत शंकर पवार

HA 19 000 UISSIEY मेन्-तिशेष- इ-मंगर्ग आदिकारी माहेब पत्र रहे व्यायगड आखिना यार्डक अर्जी जलावार - क्रियायनेत सेकर पवार राज मीछोर्प-ता पन्वेरे नाइ निहात प्रते भूवे टिनका की विषय - जमानी से पारन वह्व -मरोद्रभू मोरीपे- रेघोट्ड जलीन आमन्यी मंडि मोरोपे गा पत्वेरे सेवील जमीन २१० ४७/ २५ - ०-२८-७ हो जलीत मत्रेरे ४७/ २४ - ०-४८- ८ हो जलीत मत्रेरे टोत आमारे बहुक मा आमत कडी का रामन मिकाली लाअगर विनंति प्रविक कर्कावतीकती शोती रेन्द्र खालने अपुमलाने अपुरुष साधन आहे - हो छोडीको केरोजगार मुवक आही मला या रोती देश्या शिवाय आगर्या छासका र साधक गार (यायुके आल्मी ही जानीन 41-7 Annas 21120010 दिल्लान सालनी छपासमाट रहिल Kalead (M. K परंगु तरी देखारेइ रोली मुडस्म हा आविजनि हिताना संबद्ध आहे - आविजनिक हित एकोत च्छेता मा अन्द्रपासाझे डाकीत देर्पर सार्क रिक्त करणाट गर्छ- मरें द्या बहट अगहान छ-उन्नाम भर्याई हथ्क या जहांह

रकः, पतिरंश समय 90,000/- दराखार का काक या काम वकुठ दर्मात यावी Man 21 जर्मानी, माझी - 20 हाइता-कार्ता छार्रे बार कोम नेप्रत छार्रेग लागमि छारुत ती वाढती आहेत - या जांगीय व्ययादन गुर्दे आफन्दी हा छोट्यान्यर कतान्ने बिकझान होईरेंड मा करिता साउन्नी िंगान रुपूर माने साउाय जपनी 20,000 -र्वायकार जमने गाम मा मारे रक्नम इंग्रेंग स्वी- तसेन्त्र सामदे समढेहना द्राः आउाँची छ छिकमात भर्याई हुएक मिर्गेबाहम -01 940001- 4EVAT 251 - 542 +11 - 21 40 रुगाः रणन मावी-'त्रीम मा उक्ती से साथ 13 के मर पाल्यगरत साली खारे छारुग सर्वला ांगेन जावा व माल प्रहम् गरन हथ व द्वागुहक्कार्स मिक्वी तजवित मा का मी आरानी पोस्क सार्व छाछन ाम्याम्य न वेखर जोर्स माम साराधम हे न्यरें मेल आश्चार पर्यत नोक की हिम्मा एड मुरा मिड त्या सामार ाही सासकीय आमित जिभवा जान्य 100 (a) (achill a) and Alegor

देगे मार्जी खाझे माई रूणने खार्थ - प्रदायाता मिरणा-भा दगर व्यवत्थती मलाकी देगोत भव्यात-कत्म कोकरी देंगे सम्म खेत कमेखतर मोटोर्य परिसरोंग होणान्ता रेखे रहेशकवर मल एक दिमानःमा गाक (क्टात्म) २५७ माना जोगे कहान मी माई व माई छडवाने (पुनर्द्युक " भाग्य प्रकार कर राहक-216 प्रताम मार्क राजी र देवार्ट त छामल विश्वार adis servicing 2.25

पनवेले र राइ रेस दिला के १७ में २० मेण्डवासी इपारक र जोबाश न्यासी राज्यमंत्री यांना तिवेदन पनवेल (वार्ताहर) केंद्रीय रेल्वे राज्यमंत्री श्री. सुरेश कलमाडी यांना पनवेल जिवसेना विभाग प्रमख भी जगदीश गायकर न व यांनी पोयजे (पनवेल) विभागा-तील शोतकऱ्यांच्या समस्या -बाबत नकतेच निवेदन दिले. Trees Engle and and all a R त्यात शेतजमोनीस योग्य भाव, A CONTRACTOR 3 कुटुंबातील किमान एकास माडी यांनी या अजींचा योग्य 1 नोकरो द्यावी आदी विविध विचार करून ते प्रश्न सोड-मागण्यांचा या निवेदनात उल्लेख बिण्याचे आश्वासन दिले. केला आहे. यावर श्री, कल-

दाखला क्रमांक :- / १९९- २०००. दाखला देणेत येतो की, श्री. अन्श १७ मुक्काम :- मोटोप तालुका :- पनने रु जि जमिन यनलेप ज्यति रेल्व मार्ज जूस पाद. १८९४ मधील तरतूदीनुसार संपादीत करण्यात आली उ	न्हां रायगड येथील खालील वर्णनाची साठी भूसंपादन कायदा आहे.
रवातेदाराचे नांव स.नं./हि.नं. गट नंबर	<u>संपादीत क्षेत्र</u> आकार हे.आर
2) 310 $21-52$ 4912 2) 471 $21-52$ 4912 2) 471 $21-52$ 4912 2) 471 $21-52$ 4912 3) 212190 $21-52$ 4912 3) 212190 $21-52$ 4912 4) 19171912 $21-52$ 4912 2) 212190 $21-52$ 4912 2) 212190 $21-52$ 4912 2) $21-52$ 4912 4912 2) $21-52$ 4912 4912 2) $21-52$ 4912 4912 2) $21-52$ 4912	30/9. 0-85-10. Ju 23- 0-45-5
4) 3412 hinizin 41214 1414 (382211212 21521	
६ वेन्नः-हे.आर पॉईट ८-६९-	- 3
 रणी भूसंपादन कायदा कल्म ४ त कल्म ६ ची अधिसूचना राजपंत्रांत प्रसिध्दीची तारीख २) निवाडा घाषित केल्याची तारीख ३) संपादन समयी जमिन कोणाच्या नावे होती व निवाडा कोणाच्या नावे झाला आहे. ४) मोबदला रक्कम कोणाच्या नांवे आदा केली व किती 	- कलम दि. १९-८-९५ कलम दि. १०-१०-९५ - तरिक २९- १०-९६२ - संपादन सार्ग्या - नाव ज्याभूद मुख्या - नाव ज्याभूद मुख्या - नाव ज्याभूद मुख्या - जाजू सामू स्वानदारा - जाजू सामू स्वानदारा - जाजू सामू स्वान्दारा - जाजू सामू स्वान्दारा

सदरचा दाखला श्री. यशगेन होकर् एकार् रा. आरोप ता जनमेह जिल्हा :- रायगड यांनी दिलेल्या अर्जावरून देण्यांत आला. 2211



GOVERNMENT OF MAHARASHTRA

Form of Certificate to be issued to the Other Backward Classes, Nomadic Tribe (C) Dhangar and its synonyms and Nomadic Tribe (D) Vanjari and its Synonyms.

souments Verified :-

1. Application of Shri. ABHIJIT YASHWANT PAWAR, Dated: 22/9/2008

2. School Leaving /Bonafide issued by the Head Master/Principal of MADHYAMIK VIDYAMANDIR,

POYANJE REG.NO.828 DATED-28-08-2008

3. Affidavit made before Executive Magistrate PANVEL Dated: 02-09-2008

4. Xerox Copy of Ration Card No.0545477

5. Caste Certificate of FATHER, YASHWANT SHANKAR PAWAR, No. 362/06 Dated 31/01/2006 issued by S.D.O.PANVEL

6. Other Certficate/s: FATHER SCHOOL LEAVING CERTI.REG.NO.4 DATED-30-09-1991

7. Other Affidavit/s:

8. Other Document/s:

This is to Certify that Shri. ABHIJIT YASHWANT PAWAR son/daughter of YASHWANT SHANKAR PAWAR of Village - MOHOPE, Taluka - PANVEL, District - RAIGAD of the State of Maharashtra, belongs to the AGRI Caste/Community at Sr. No.169 which is recognised as a OTHER BACKWARD CLASS under Government Resolution No. CBC/1467 दि.13/10/1967 as amended from time to time.

Shri. ABHIJIT YASHWANT PAWAR and his/her family ordinarily resides in Village - MOHOPE, Taluka - PANVEL, District - RAIGAD of the State of MAHARASHTRA.



T.NO. : C/MHRAPA/41917/2008

Printed: 22/09/2008

Sub Divisional Officer

Panvel Division RAIGAD DISTRICT

दाखला दाखला क्रमांक :- / ee- 2000. दाखला देणेत येतो की, श्री. मन्द्रावन क्योंकर पवार् करोरे मुक्काम : माहोपे तालुका :- जन्ने हु जिल्हा -रायगड येथील खालील वर्णनाची जमिन वनलेर ज्यारे रेखे मार्र मुसंपादना साठी भूसंपादन कायदा १८९४ मधील तरतूदीनुसार संपादीत करण्यात आली आहे. खातेदाराचे नांव स.नं./हि.नं. संपादीत क्षेत्र आकार गट नंबर हे.आर 2) 310 21-27 4912 46 9. O-85-Le. Enl 2135 4911 zumain alma 4912 - yu 23- 0-46-6 2/2190 2132 YONX Anials and unix 555 3412 सिंधु एकशाराम मडग वन :- हे.आर पॉईट 6-99-3 5 १ करणी भूसंपादन कायदा कलम ४ व कलम ६ ची - कलम दि. १९- - - ९ भु अधिसूचना राजपंत्रांत प्रसिध्दीची तारीख कलम दि. १०-१०-९५ २) निवाडा घाषित केल्याची तारीख रिष् २९- १०-९६ संपाद सत्या वर् नमूद जुबल्या र रवागदारांच्या नांचे जाफी होगी-:--३) संपादन समयी जमिन कोणाच्या नावे होती व निवाडा कोणाच्या नावे झाला आहे. ४) मोबदला रक्कम कोणाच्या नांवे आदा केली

व किंती

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सदरचा दाखला श्री. यशानेत क्वेलर् प्यार्थ रा. मारोपे ता जनमेह जिल्हा :- रायगड यांनी दिलेल्या अर्जावरून, देण्यांत आला.



8+0= 0 अधिका-याची सही रास्तमाव / अ. शि. दुकान क्रमांकग्रेडिएए संदर्भ क्रमांक हि. हि मयल कारता निरीक्षक | शिधावाटप पुरवठापत्रिकेत / शिधापत्रिकेत समाविष्ट असलेली नावे Heroff Herall पितेने पत्रिकेस दहा रुपये, दुय्यम पत्रिकेस वीस रुपये. * रेशनसंबंधी तक्रारीकरिता टोल फ्री नंबर * जुना पुरवठा / शिधापत्रिका क्रमांक OUXUX CoCMEनांक तहासलदार । १८००-२२-४९५० मिना १९६७ प्रमुखाशी 000 200 कुटुब (एमटीएनएल/बीएसएनएल) THE 3) उनकी नित रखते पतार १८ भ झातेश राहानेत पतार १४ र) यहातेत रांतर पतार ») fortell elected unit वय नाव शुल्क.---म Reelay ye Ch H Ch अनु-विक्रीम ल्यूब्वता धावकरण का होता महाराष्ट्राचे राज्यप्रस्त मांच्या आदेशानुसार नावाने दिल्याची तारीखः १७192198. नियंत्रक, शिधाबाटप, मुंबई. शिधावाटप क्षेत्र/...राठाठाठ्य जिल्हा सिलिंडर एक / दोन जिल्हाधिकारी कौटुंबिक पुरवठापत्रिका/शिधापत्रिका - Allerer w w अर्ज क्रमांकः नागरिकत्वः आरतीय कुटुंब प्रमुखावे नावः सुनिता श्रश्वतेत पतार पुरवत्रापत्रिका / शिधापत्रिका Presenting यः ३० सपूर्ण पत्ताः भू. मोहोपे पो . पोष्टात्रे , ता . पननेक कुटुंब प्रमुखावी सही किंवा डाव्या कोड कमांक गॅस वितरकाघे नाव व ठिकाण : ग्राहक क्रमोंक / मीटर क्रमांक : गॅस वापरत असल्यास नोंदणीकृत ग्राहकाचे नाव S * रेशनसंबंधी तक्रारीकरिता टोल फ्री नंबर * SE No.1584239 यूनिटे अधिकाऱ्याची सही निरीक्षक / शिधावाटप १८००-२२-४९५० किंवा १९६७ (एमटीएनएल/बीएसएनएल) अर्ज क्रमांक : हाताच्या आंगठयाचा ठसा दिश्यम पत युनिटांची संख्या मुले 0 H-Sh-H Ch. प्रौढ 2

होगः सी दे माख्यमिक विद्यामं दिर, परित्रे ज. र. ज. ८२८ बोनाफाईड सर्टिफिकेट दाखला देण्यात येतो को, कुमार/कुम्री पतार आभिजीत राहावल हा/ ही विद्यार्थी / विद्यार्थीनी माह्यामेक विद्यालया - मध्ये आमच्या ... दिनांक ?२।०६१२००६ पासून ... हनाज पर्यंत शिकत असून तो / त्री इयत्ता इता तवी मध्ये शिकत आहे / होता. त्याची / तीची जन्मतारीख शाळेच्या जनरल रजिस्टर प्रमाणे अंकी 291901998 (अक्षरी एकवीस झॉक्टोबर एको-) अशी असून त्याची / तीवी जात हिंदू - आगरी आहे व त्याचे / तीचे जन्मस्थळ पार्यने ता पनवला हे आहे. त्याची / तीची CCCCC CC तर्तएक चृंएगली आहे. असा हाखला देण्यात येतो.

मुख्याध्यापक सही ----सुधागड एज्युकेशन सोसायटीचे हुद्दा --- माध्यमिक विद्यामंदीर, पौर्यजे, ता. पनवेल, जि. रायगड

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दिनांक: 221021 2002



महाराष्ट्र शासन महसूल व वन विभाग तहसिलदार व कार्यकारी दंडाधिकारी कार्यालय पनवेल

तलाठी प्रशिक्षण केंद्र, जुना ठाणानाका, साई नगर, ता. पनवेल, जि. रायगड. पिन : ४१० २०६ दुरध्वनी / फॅक्स क्र. ०२२ २७४५२३९९ E mail : <u>tahsildarpanvel@yahoo.com</u>

महसूल शाखा : पत्र क्र. हक्कनोंद/कात-४/५८७/२०१३

दिनांक - 22/92/2033

वाचले :- १) श्री. यशंवत शंकर पवार, रा. पोयंजे, ता. पनवेल यांचा अर्ज दि.१८/१/२०१३.

२) तलाठी सजा पोयंजे यांचेकडील चौकशी अहवाल दि.२९/४/२०१३.

३) मुंबई कुळवहिवाट शेतजमिन अधिनियम- १९४८

दाखला

दाखला देण्यात येतो की, श्री. यशवंत शंकर पवार व इतर यांची मौजे-मोहोपे, ता. पनवेल येथे

खालील वर्णनांची सामाईक शेतजमिन आहे. ते पनवैल तालुक्यातील शेतकरी आहेत.

जमिनीचे वर्णन

गावाच नाव	स.नं/हि.नं	क्षेत्र	आकार
मौजे- मोहोपे	५७/२अ	0-53-5	9-40
	30/3	०-६८-८	3-30

तहसिलदा

प्रत :- श्री. यशंवत शंकर पवार, रा. पोयंजे, ता. पनवेल यांना त्यांच्या दिनांक-१८/१/२०१३ च्या अर्जान्वये अग्रेषित.

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१९८४ च्या अधिनियम एकच्या कलम १२(२) खालील नोटं।सीचा नमुना

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या द्वारे नोटीस देण्यात येते की, वरील खटल्यात आपणास हितसंबंधी व्यक्ति मानण्यात आले असून सदर खटल्याबाबत १९८४ च्या अधिनियम एकच्या कलम ११ अन्वये दिनांक 🖑१ / ೨० /१९९५ रोजी माझ्याकडून निवाडा देण्यात आला तो खालील प्रमाणे :-

१) सदर जमिनीचा तपशीलः-

गट नं./सव्हें नं.

संपादित क्षेत्र

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२) सदर जमिनीबाबात द्यावयाच्या मोबदल्याची रक्कम रु.

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३) ८० टक्के आगाऊ दिलेली रक्कम रु.

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४) शिल्लक राहिलेकी देणगी रक्तम रु.

५) सदर मोबदल्याची वाटणी खालीलप्रमाणे केली आहे. ९५५२ 🖤 ५

अापणास प्रदान करावयाची रक्कम रु. योग्यरित्या अधिकृत केलेल्या मुख्त्यारामार्फत दिनांक 21 1199 रोजी सकाळी ११-०० वाजता रेस्ट राजादी कार्यालय रायिज होस सालाब, कार्यालय यथ हजरे रहावे. सदर रक्कम आवश्यक तर आक्षेप करून आपणास घेता येईल. तसे केल्यास सदर बाब न्यायालयाकडे नेण्याच्या हक्कास बाध येणार नाही. हजर रहाण्यास कसूर केल्यास रकमेवर व्याज मिळणार नाही. टिप् 6 - बाजादीस स्टास स्टास कार्याता ठाँठा हो

2011 211200013

विशेष-मूमी संपादन अधिकारी, (ल. पा.) रायगड-अलिबाग

अलिबाग

दिनांक 201 3 1889

।। सत्यमेव जयते ।। 'साक्षर रायगड, स्वयंपूर्ण रायगड', 'स्वच्छतेकडून समुद्धीकडे'

🔲 घरपट्टी व पाणीपट्टी वेळेत भरुन सहकार्य करावे.

- 🗋 पाणी जपून वापरा.
- पाणी उकळून व गाळून पिणे आरोग्यास हितकारक.
- बालविवाह टाळा स्त्रीभूण हत्या थांबवा

RIA Þ * 1. जावक त म्मवेल, जि

> मा . जिल्हाधिकारी साहेब रा.जि.प. अलिबाग ता . अलिबाग जि . रायगड

निवेदन : ग्रुप ग्रामपंचायत उसर्ली खुर्द कडुन सविनय सादर.

विषय : मौजे उसर्ली खुर्द गावाकरीता सुविधा मिळणेवावत .

महोदय,

वरिल विययान्वये आपणास विनंती करण्यात येते की, मौजे उसर्ली खुर्द गावाच्या पच्छिमेकडुन कोकण रत्वे व उत्तरे कडुन कर्जत रेल्वे दक्षिणेकडुन गाढी नदी गेली असल्यामुळे उसर्ली खुर्द गाव दोन्ही रेल्वेच्या व नदीच्या मध्यभागी आहे.तसेच कोकण रेल्वे साधारणतः १९६६ सालापासुन गेलेली असुन दर वर्षी पावसाव्या पाण्यामुळे उसर्ली खुर्द गाावाला धोका निर्माण होत आहे.सदरहु गााव सन २००५ या साली १०० टकके पुरग्रस्थ झाले झाले होते. सध्या अस्तीत्वात असलेल्या उसर्ली खुर्द गवाजवळील कर्जत रेल्वे ठिकाणी एक अंडरग्राऊंड मोरी (रोड अंडर ब्रिज/सबवे) मुळे मोठे अपघात होतात व भविष्यात असे अपघात होण्याचा संभव आहे.

तसेच सदर रस्त्यामधुन उसर्ली खुर्द ,शिवकर ,मोहा,मोहचापाडा ,चिखले ,विचुंवे ,पाली वांगणी,लोणीवली,अंबिवली ही दहा गावातील ग्रामस्थ वाहणावरून ये-जा करीत असतात त्यामुळे सदर उसर्ली खुर्द येथे एक अंडरग्राऊंड मोरी(रोड अंडर ब्रिज/सबवे) अरूंद असल्यामुळे माठे वाहण जाण्यास खुप अडचण निर्माण होते त्यामुळे उसर्ली खुर्द गावाचा व इतर पुढील गावांचा विकास होणे कठिण झाले आहे तसेच या रस्त्यामधुन हाजारे वाहने व नागरीक ये-जा करीत असतात व लोकवस्तीचे प्रमाण मोठया प्रमाणात वाढलेले आहे व कोकण रेल्वेच्या कॉसिंगवर उसली खुर्द मेन गेट वर गेट वंध असल्यावर वाहनांना व शाळेतील मुलांना आणि ग्रामस्थांना तासोंतास थांबावे लागत आहे त्यामुळे सदर मेन गेट नागरकिांस अत्यंत धोाका दायक आहे व अपघात होण्याची दाट शक्यता आहे व प्राथमिक शाळा ही १ ली ५ वी पर्यत असल्यामुळे लहान मुलांना कोकण रेल्वे कॉस करून जावे लागते त्युळे मुलांना जिव मुठित धरून जाणे येणे करावे लागत आहे.



निर्मल ग्राम पुरस्कार प्राप्त - सन २००८ 🎇

🚨 जन्म, मृत्यू व विवाह नोंद २१ दिवसांचे आत ग्रा. पं. कार्यालयात करा.

- आपला परिसर स्वच्छ ठेवा.
- आपले आरोग्य आपल्या हाती
- घरोघरी वैयक्तिक शौचालय बांधा
- 🗅 एडस् म्हणजे मृत्यू
- 🔲 प्लास्टिक पिशव्यांच्या वापरांस बंदी

जा. क. दिनोक :/ग्रा.प./आस्था २०१७ ग्रुप ग्रामपंचायत उसली-खुर्द दिनांक २० /१७ /२०९७





ANNEXURE 14: BOQ FORMAT FOR THE COST RELATED TO THE ENVIRONMENTAL BUDGET UNDER THE SCOPE OF THE CONTRACTOR





Cost related to Environmental Measures under Scope of Contract				ntractor	
Sr.	Description	Unit	Quantity	Rate	Amount
1.	Dust management by water sprinkling/ spraying in the loading-unloading areas for construction material, earthwork, stockpile of the excavated material, unpaved haulage roads other dust prone areas and construction vard	INR			
2.	Air Quality Monitoring as per as per the National Ambient Air Quality Standards (2009) at the identified locations Sampling should be done once in 4 months for the construction duration of 3 years. (Refer Environment Monitoring Plan)	INR			
3.	Fumigation and spraying of anti-mosquito breeding disinfectants at all the mosquito breeding locations At least 3 times a year	INR/Sq.m			
4.	Water Quality Monitoring as per IS 10500:2012 (except radioactive residues) or Schedule VI of Environment Protection Rules based on the applicability (Refer Environment Monitoring Plan)	INR			
5.	Protection devices (earplugs or earmuffs) shall be provided to the workers operating near high noise generating machines	INR			
6.	Acoustic enclosures for DG sets and other construction equipment and machinery	INR			
7.	Noise Barrier	INR			
8.	Noise monitoring as per the Noise Pollution (Regulation and Control) Rules, 2000 containing noise standards for Residential, Commercial and Silent zones during day and night time (Refer Environment Monitoring Plan)	INR			
9.	Vibration Monitoring as per the standards (ISO Standards on vibration (ISO 2631/2- 1989, ISO 8041-1990, and ISO 4866-1990) or any other international standard to be finalised after discussion with MRVC) (Refer Environment Monitoring Plan)	INR			
10.	Cost towards hazardous waste management on the site	INR/Ton (direct landfill)			
11.	Spraying of insecticides in labour lamps on regular basis (as per A guidance note by IFC and the EBRD)	INR/Sq.m			

A. Cost related to Environmental Measures under Scope of Contractor





	Cost related to Environmental Measures under Scope of Contractor				
Sr. No.	Description	Unit	Quantity	Rate	Amount
12.	Organizing regular health check-up and immunization camps At least 2 times a year	INR			
13.	Provide adequate personal protective equipments for the works on regular basis				
	Hand gloves	INR			
	Safety shoes	INR			
	Safety goggles	INR			
	Safety Jacket	INR			
	Safety helmets	INR			
	Ear plugs	INR			
14.	Regular Training to the workers related to Health and Safety	INR			
15.	Conduct Safety, Health and Environment audit on regular basis	INR			
16.	First Aid facility on site (First aid kit and first aid room)	INR			
17.	Monthly illumination monitoring by lux meter for all the locations	INR			

B. Cost related to Works (Civil, Mechanical, Electrical, labour Amenities etc) under Scope of Contractor

Cost related to Works (Civil, Mechanical, Electrical, labour Amenities etc) under Scope of Contractor					
Sr. No.	Description	Unit	Quantity	Rate	Amount
1.	Installation of mobile toilets fitted with anaerobic treatment facility at construction site (1 toilet seat/15 labour-within 500 m)	INR			
2.	Providing drinking water facilities at the construction site (within 500 m)	INR			
3.	Provision of Chamber to collect any spills of the oils in fuel and lubricants storage area	INR			
4.	Provision of Sanitary toilets, urinal, bathrooms, wash basin in the labour camps (1 toilet seat, 1 urinal, 1 wash basin and 1 bathroom for 15 labours)	INR			
5.	LPG cylinders or community kitchens may be provided in the labour camps to avoid any tree cutting for fuel wood	INR			
6.	Cost towards solid waste management in the labour camps	INR			
7.	Provision of adequate and safe water supply for the use of the workers (RO of 3500 litre/hr + 1 tap/25 labours)	INR			



Co	Cost related to Works (Civil, Mechanical, Electrical, labour Amenities etc) under Scope of Contractor				
Sr. No.	Description	Unit	Quantity	Rate	Amount
8.	Water Quality Monitoring as per IS 10500:2012 or WHO drinking water standards for the drinking water provided in labour camps.	INR			
	Water quality must be monitored 3 times in a year (once in 4 months) on regular basis for construction duration of 3 years				
9.	Cutting down trees including cutting trunks & branches and stacking the material as directed with 15 m lead and lift up to 1.5 m etc. complete including up roofing and refilling the pit with material as directed (excluding extra material required for refilling)				
	Girth between 30 cm to 60 cm	INR			
	Girth between 60 cm to 90 cm	INK			
	Girth between 90 cm to 1.5 m	INR			
	Girth between 1.5 m to 3 m	INR			
	Girth between 3 m to 4.5 m	INR			



ANNEXURE 15: PROBABLE LOCATIONS FOR INSTALLING NOISE BARRIERS





C		Chainage of habitation from		Chainage of habitation		
Sr.	Description	CST (K	im)	from Panvel Station (Ch.)		
NO.		From	То	From	То	
1.	Habitation near Panvel Railway	68/16	69/2	0+000	0+900	
	station to Habitation near					
	Kalundre River bridge crossing					
2.	Residential habitation, Panvel	69/8	70/11	1+700	2+400	
3.	Habitation near Sangade Village,	73/18	74/3	5+900	6+100	
	Chikhale					
4.	Habitation near Bhingar Village	75/4	75/7	7+200	7+400	
5.	Habitation near Varose Village	83/2	83/6	15+200	15+400	
6.	Habitation near Varose Village	83/13	83/17	15+700	15+900	
7.	Habitation near Chowk Railway	85/6	85/21	17+200	17+500	
	station					
8.	Habitation near Karjat Railway	99/18	99/28-30	-	-	
	station					



ANNEXURE 16: DRAFT TOR PREPARED BY MRVC FOR CIMFR



Draft Terms of Reference (TOR)

1. Background: -

- **1.1.** To enable the Mumbai Suburban Railway System to meet the demands of the ever-growing passenger traffic, Ministry of Railway and the Government of Maharashtra set up MRVC, an SPV for implementation of the railway projects under MUTP (Mumbai Urban Transport Project). The cost of the project is shared equally by MoR & GoM.
- **1.2.** MUTP III has been approved in the Budget of 2015-16 and it includes the subject projects of double line commuter corridor between Panvel-Karjat Section (29 Km) on Central Railway
- **1.3.** The pre-feasibility study for all the components of MUTP III has been carried out by MRVC and the study reports are available for details of each component.
- 1.4. The existing Panvel-Karjat line has two unlined Tunnels of 2692 m and 214 m length in western ghats near Mumbai in Maharashtra. Nadhal tunnel of length 214 m between Ch 14613 m and Ch 14827 m and Vavarle tunnel starts at Ch 22526 m and extends to Ch 25218 m. The proposed alignment of New corridor is running parallel to existing line from Panvel to Ch 21700 and thereafter gets diverted towards North-East side upto Karjat. The diverted alignment will be at about 600m away from existing alignment. The proposed alignment will have three tunnels i.e. one near Nadhal of 220 m parallel to existing tunnel at a separating distance of around 15 m from the existing tunnel, one near Wavarle of 2600 m at about 600 m away from existing tunnel and one additional tunnel of 300 m near Kirawali. There are several open excavations proposed at CH:14700-15100, 20900 to 22900, 25500-25550, 26050-26125, 26425-26750 that will involve trenching of around 2600 m varying in depth from about 5m to 20m. Further detailed Engineering Consultancy covering FLS for fixing up alignment, Geotech investigations, Utility Survey, Land Planning, Preparation of Plans etc. is in progress.
- **1.5.** Construction of New Tunnel Parallel to existing tunnel poses lot of Risk/complications for safe excavation without having any adverse effect on existing tunnel. Based on the General Arrangement Drawings (GADs) prepared by the MRVC Consultant and approved by the Stakeholders, the detailed designs and detailed drawings (Good for construction drawings) are to be prepared for Tunnel by Detail Design Consultant (DDC) of MRVC.

2. Objective and Scope of consultancy:

2.1. MRVC has engaged consultant for final location survey including the geological investigations of the strata along the tunnel's proposed alignment. MRVC intends to seek Scientific Support and investigation for the proposed

alignment at designated places between chainages [14700 to 26750] for validation and reaffirmation of the investigations and proposals by the DDC. Geotechnical investigation report with borehole log details will be shared with CSIR-CIMFR for geological assessment of the strata. The cores taken during boring will be made available for any further testing. The broad scope of consultancy is as under: -

- **2.2.** Aerial survey, 3D Mapping and Rockmass classification:
 - **2.2.1.** Aerial survey and generation of 3D map of the surface for further use and merger with geological data and generation of topographic profiles.
 - **2.2.2.** Based on the details of geological/geotechnical investigation data available with MRVC and being generated above, including Geo-technical assessment of the rock, CSIR-CIMFR will carry out
 - **2.2.2.1.** Rockmass characterisation and preparation of sub-surface Model of rock formation.
 - **2.2.2.2.** Geological mapping. Geological mapping to be extrapolated to 15 m on either side of Tunnel alignment and preparation of Geological sections along tunnel alignment
 - **2.2.3.** Geophysical sub-surface investigation at designated locations/ low cover areas along the proposed alignment will be undertaken by MRVC separately at different locations as per requirements of the project and the data including soft format will be shared with CSIR-CIMFR for further investigations, rockmass assessment and merger with CSIR-CIMFR report.
- **2.3.** Proof Check of Structural stability assessment of the strata based on the geological investigation including rock formation and suggestion for support.
 - **2.3.1.** Proof check of most suitable cross section of the tunnel considering the requirement for two Railway tracks, ventilation, Fire safety, OHE, pathway, drainage, cable duct and other structures if any.
 - **2.3.2.** Proof check and study the recommendation for minimum safe clear distance between existing and proposed tunnel using 3D Modelling techniques OR as decided by CSIR-CIMFR for excavation of Tunnel-1/2.
 - **2.3.3.** Proof check of preliminary & other support required during construction of tunnel.
- **2.4.** Proof check of Design of Ventilation system for new tunnel with periodic monitoring of air Quality.
- **2.5.** Proof check and recommendation for fire safety of the long tunnel and necessary guidelines/requirements for prevention.

- **2.6.** Rock excavation methodology and tunnelling methodology suitable for the proposed tunnels (New Tunnel no 1, 2 and 3) and open excavations.
 - **2.6.1.** Proof check and recommendation of design of blasting techniques and sequences, controlled blasting techniques for open excavation of cutting and underground excavation of tunnel
 - **2.6.2.** Ground vibration monitoring trials and work out of attenuation characteristics. Establishment of damage potential of the ground vibrations vis-à-vis existing tunnel/structures existing about the alignment.
- 2.7. Regular monitoring of ground vibrations in order to control any blast induced damage to existing Structures in the vicinity of work preferably through an IoT based seismograph network during excavation.
 - **2.7.1.** Monitoring at Existing tunnels No 1 & 2 during excavation of the new tunnel,
 - **2.7.2.** Monitoring at Existing structures including private houses and other structures.
 - **2.7.3.** Monitoring at Morbe Dam near Vavarle.
 - **2.7.4.** Deployment of seismographs for continuous monitoring of ground vibrations preferably through IoT based systems.
 - **2.7.5.** Periodical appraisal and evaluation of blast designs and blast performance.
- **2.8.** Vetting of technical specification for execution of Tunneling work and recommendations.
- **2.9.** Proof Check of Drawing and Designs.
 - **2.9.1.** Proof Check of Tunnel GAD's, detailed drawings and working drawings for all component of tunnel and open cut excavation.
 - **2.9.2.** Proof Check of blasting methodology, blast design, blast sequence, blasting material for underground and open excavations,
 - **2.9.3.** Proof Check of Support design, waterproofing design, Rock support arrangement design, Construction methodology/scheme/sequence submitted by contractor.
- 2.10. Technical support during execution of work.
 - **2.10.1.** Technical support and periodic monitoring during execution of work.
 - **2.10.2.** Periodic Review of classification of rockmass during tunnelling by NATM method.
- 2.11. Study the stability and condition of existing unlined tunnels at Nadhal/Vavarle and submission of the most suitable scheme for strengthening/ rehabilitation with sequence of execution, cost estimate, technical specifications for existing Tunnels if required.

3. PHASES OF STUDY:-

The consultancy will be carried out in 4 Phases that are identified as under:-

Phase I: Geotechnical assessment, rock classification and 3D mapping. (item No 2.2)

3.1. Surface mapping, geological logging and assessment of the subsurface geological variables in the existing tunnel for extrapolation through mapping and modelling, basic ventilation and fire safety appraisal. Preparation of report based upon the investigations.

Phase II: Pre Excavation analysis, Proof checks and Structural Stability. (Item No 2.3 to 2.6, 2.8, 2.9)

- **3.2.** Pre-excavation analysis for the stability of the structures mentioned above and devise a safe and progressive methodology for excavation near the structures.
- **3.3.** Proof check of cross section, construction methodology, blast design, preliminary ventilation scheme and fire analysis/design.
- 3.4. Detailed ventilation and fire safety design proof check.
- **3.5.** Vetting of Bill of Quantities, Technical specification, Special conditions for bid process.

Phase III: Strengthening of existing tunnels if required. (Item No 2.11)

3.6. Rehabilitation scheme for existing Tunnels including evaluation of existing support, excavation methodology and vetting of blast designs.

Phase IV: Support During Execution of work (Item No 2.7, 2.10)

3.7. Technical support and Monitoring during execution such as blasting, rock classification, support design, ground vibrations monitoring by deploying/commissioning seismographs at the site. Periodic monitoring of ventilation and fire safety deployments.

4.0 NORMS AND STANDARDS:

All the plans and proposals shall comply to IRS codes and Manuals, Indian Railways SOD 1676mm Gauge, Good Engineering practices and related instructions issued by Indian Railway and the world-wide practices being used in the tunnelling.

5.0 OBLIGATIONS OF THE CLIENT:

During the course of Project, MRVC shall provide but not limited to following:

 a) Existing scaled drawing / plans / yard plan / map / study report if any including toposheets & geotech survey report and copies of code of practice (IRS Codes and Manuals) preferably in soft form.

- b) Details of land availability & cost
- c) Existing code of conduct / manuals/ reports if applicable to work
- d) All co-ordination with Railway or concerned authorities likely to be involved
- e) Hassle free access of site for CSIR-CIMFR officials or its contractor including vehicle movement & communication facilities
- f) Any approvals if required for conducting tests, trials for blasting, mechanical or chemical excavation and not restricted to blasting.
- g) MRVC shall bear any statutory chargers to be paid to the railway or any other statutory Body against their work.
- h) MRVC shall promptly convey their necessary approvals to proposals, reports, plans and other contractual matters referred by CSIR-CIMFR.
- i) MRVC shall ensure timely allocation of funds and release of CSIR-CIMFR fee for smooth and timely execution of the project.

6.0 OBLIGATION OF CONSULTANT:

- a) Will provide all technical know-how and designs for blasting and supporting with respect to aims and objectives of the study.
- b) Will arrange visits to the site by the Scientists to ensure collection data pertaining to this study and deploy 4 to 6 project assistants for regular geological appraisal and vibration monitoring.
- c) Will provide field reports on visits, draft and final reports.
- d) Will not be associated with any societal problem arising during project work.
- e) Will assist to Railway & MRVC if any problem faced during work on implementation of recommendation given and clarify site immediately as requested.

7.0 TIME SCHEDULE:

As the work is proposed to be executed in 4 phases, the tentative duration of services for the various phases is as under: -

Phase-I	=	02 Months
Phase-II	=	02 Months
Phase-III	=	02 months
Phase-IV	=	36 months

Duration of the consultancy can be extended as per mutually extended conditions.



ANNEXURE 17: Official Letter to NMMC from MRVC





मुंबई रेलवे विकास कॉर्पोरेशन लि.

(भारत सरकार, रेल मंत्रालय का एक सार्वजनिक उपक्रम)

MUMBAI RAILWAY VIKAS CORPORATION LTD. (A PSU of Govt. of India, Ministry of Railways)

No. MRVC/PNVL/KJT/Utility

Dated: 04.04.2019

Executive Engineer Morbe Dam Division City Engineer Department 2nd floor, Navi Municipal corporation office Palm Beach Road Belapur, Navi Mumbai.

Sub: Panvel - Karjat Double Line Suburban Railway Corridor

Mumbai Railway Vikas Corporation Ltd (MRVC), a Public Sector Undertaking under Ministry of Railways, Government of India has been entrusted the task of implementation of Double line Suburban Railway Corridor Project Between Panvel and Karjat as a part of Mumbai Urban Transport Project (MUTP). Details of the project have been shared with NMMC vide this office letter No. MRVC/W/REOI/PPH-III/EA Studies dtd 13.06.2017 addressed to Commissioner, NMMC.

Proposed double line Railway suburban corridor will be laid adjacent to existing Panvel-Karjat single line towards Morbe Dam side. In reference to the meeting held on 23rd April, 2018 at NMMC office Belapur, please find enclosed the map showing the alignment of Proposed Panvel-Karjat double line Suburban Railway Corridor with the affected survey numbers as discussed.

Activities near Morbe Dam will involve blasting and heavy machine work for construction of tunnels or cuttings. Controlled blasting will be used for construction of tunnels and for cuttings.

Therefore it is requested to advise the necessary safety precautions/ guidelines required to be taken during the construction work, so as to ensure the safety of the Morbe dam.

DA: (I) Map with plotted alignment of existing and proposed railway track with survey numbers.

(II) Panvel-Karjat alignment.

OC

नवी मुंबई महानगरपालको

040419 Mukesh Kumar (Dy. CPM-I/MRVC)

दूसरी मंजिल, चर्चगेट स्टेशन भवन, मुंबई - 400 020. 2nd Floor, Churchgate Station Bldg., Mumbai 400 020. Tel. : 022-22195398 / 399 • Fax : 022-2209 6972 • Website : www.mrvc.indianrailways.gov.in CIN : U45203MH1999GOI120765

जा.क्र.नमुंमपा/का.अ.(मोरबे)/ १९६ /२०१९. दिनांक :- १५ /०४ / २०१९.

प्रति, अधिक्षक अभियंता, धरण सुरक्षितता संघटना नाशिक ४

> विषय: मोरबे धरणाच्या खालील बाजूस असलेल्या एकेरी पनवेल-कर्जत रेल्वेमार्गाला लागून आणखीन दुहेरी रेल्वे मार्ग करणेबाबत.

संदर्भ: मुंबई रेल्वे विकास कार्पोरेशन लि. यांचे दि. ०४/०४/२०१९ चे पत्र.

उपरोक्त सदंर्भिय विषयानुसार मोरबे धरण हे नवी मुंबई महानगरपालिकेच्या अखत्यारीत असुन मोरबे धरणाच्या खालील बाजुला पनवेल-कर्जत हा एकेरी रेल्वे मार्ग आहे व त्यास लगत दुहेरी रेल्वे मार्ग करण्याचे काम मुंबई रेल्वे विकास कार्पोरेशन लि. ने हाती घेतले आहे. मोरबे धरणाच्या खालील बाजुस असणा-या रेल्वेच्या जागेत मोठ्या प्रमाणात उत्खनन करावे लागणार आहे. सदर ठिकाणी Activities Near Morbe Dam Will Involve Blasting and Heavy Machine Work for Construction of Tunnels and for Cuttings साठी Controlled Blasting Will Be Used For Construction Of Tunnels For Cutting करणार आहे, असे नवी मुंबई महानगरपालिकेस रेल्वेने कळविलेले आहे. परतुं त्यासाठी धरणाच्या सुरक्षिततेच्या दृष्टीकोनातून नवी मुंबई महानगरपालिकेस मार्गदर्शक सुचना व योग्य ती काळजी / खबरदारीचे उपाय सुचविण्यास रेल्वेने कळविलेले आहे. तरी रेल्वेस उपरोक्त काम करण्यासाठी आपणाकडून योग्य ते सुरक्षिततेचे उपाय / मार्गदर्शक सुचना देण्यात याव्यात, जेणेकरून मोरबे धरणाच्या सुरक्षिततेस धोका पोहचणार नाही.

सोबत सदंर्भिय पत्र, मोरबे धरण व अस्तित्वात असलेल्या पनवेल-कर्जत रेल्वे मार्गाचा नकाशा जोडण्यात येत आहे.

सोबत : १) सदंर्भिय पत्र, २) नकाशा

सखानक नवी मुंबई महानगरपालिका

_{ð ८}नवी मुंबई महानगरपालिका

के मान काहर अभियंता योगा माहितास्त रतादर. eered (2)



ANNEXURE 18: Official Letter to Matheran Monitoring Committee from MRVC




मुंबई रेलवे विकास कॉर्पोरेशन लि.

(भारत सरकार, रेल मंत्रालय का एक सार्वजनिक उपक्रम)

MUMBAI RAILWAY VIKAS CORPORATION LTD. (A PSU of Govt. of India, Ministry of Railways)

No. MRVC/PNVL-KJT/EIA

Date: 04.04.2019.

To, The District Collector, Raigad, Alibag.

> Sub : Implementation of the Railway Projects under MUTP Phase-III (Panvel-Karjat double line suburban Railway corridor)

- **Ref**: i) This office letter No. Even dtd 28.02.2018.
 - ii) Matheran Monitoring Committee Meeting dated 03.05.2018.
 - iii) Minutes of 7th meeting of Matheran Monitoring Committee held on 03.05.2018.

MRVC has discussed details of the proposed project "Panvel-Karjat suburban corridor (Double line Stretch on Panvel-Karjat section @ 28 Km on Central Railway)" under MUTP-III with the Committee during the meeting held on 23.08.2017, as the proposed alignment passes through Matheran Eco-sensitive Zone. As discussed in the meeting report on assessment of biodiversity of Matheran Eco-sensitive Zone, specific impact on biodiversity and mitigation measures was submitted vide letter referred above at (i).

Subsequently, the presentation on the project was made before the committee during the meeting held on 03.05.2018 at Alibag. As per the minutes of this meeting, dtd 22.05.2018 "Since the report/remarks of ADTP are awaited, decision on this will be taken after the receipt of the report of ADTP, Raigad".

As discussed with ADTP, Raigad please find enclosed herewith the required additional details of area of Panvel-Karjat suburban corridor as marked on MMRDA map of Matheran Eco sensitive Zone, with survey numbers, tree details, cutting/filling details etc. falling in the Eco sensitive zone along with village wise alignment map.

It is requested to forward the above documents to ADTP/Raigad and advise him to submit the report/remark to Matheran Monitoring committee, for issue of NOC by Matheran Monitoring committee for Panvel-Karjat double line Suburban Railway Corridor Project.

Encl : As above.

4.04.19. (Mukesh Kumar) **Dy.Chief Project Manager-I**

Copy/-The Chairman, Matheran Monitoring Committee, Alibaug: For kind information.

Copy/- ADTP/Raigad: Advance copy of the details are submitted for further necessary action please.

नोंदणी शाखा

HOC PACTOR

नाधिकारी कार्यालय, रायगड दूसरी मंजिन्द्रायमण्ट स्टेशन भवन, मुंबई - 400 020. उपलिबाग. 2nd Floor, Churcheste Station Bldg., Mumbai 400 020. Tel. : 022-22195398 / 399 • Fax : 022-2209 6972 • Website : www.mrvc.indianrailways.gov.in CIN : U45203MH1999GOI120765



ANNEXURE 19: Official Letter to District Forest Department from MRVC





मुंबई रेलवे विकास कॉर्पोरेशन लि.

(भारत सरकार, रेल मंत्रालय का एक सार्वजनिक उपक्रम)

MUMBAI RAILWAY VIKAS CORPORATION LTD. (A PSU of Govt. of India, Ministry of Railways)

दि :- २४/०४/२०१९.

जा.क. MRVC/W/150/PNVL-KIT/FOREST LAND

प्रति. उप वनसंरक्षक, अलिबाग, वनविभाग, अलिबाग.

विषय:- पनवेल ते कर्जत उपनगरीय कॉरीडोर (दुहेरी रेल्वे) साठी वन जमिनीचे डायर्व्हजन होणेबाबत प्रस्ताव.

संदर्भ:-१. या कार्यालयाचे पत्र दिनांक ०७/०३/२०१९.

२. आपले पत्र क्र. ब/२०/जमिन/५२०७/२०१८-१९ अलिबाग दि १३/०३/२०१९ चे पत्र.

मा. महोदय.

उपरोक्त विषयांकित प्रकरणी पनवेल ते कर्जन उपनगरीय कॉरीडोर (दुहेरी रेल्वे) मार्गासाठी भूसंपादनाचे काम या कार्यालयामार्फत सुरू आहे. सदर दुहेरीकरणामध्ये मौजे:- बेलवली, मिंगार, बारवई व भेरले, ता.पनवेल, मौजे लोधिवली, वावर्ले, ता. खालापूर, व मौजे:- किरवली व वांजळे, ता.कर्जत, जिल्हा रायगड असे एकुण ८ गावामधील **९.१० हे. आर** क्षेत्र वन जमीनीचे बाधित होत आहे.

त्यास अनुसरून वन जमिनीचा डायर्व्हजनचा प्रस्ताव आपल्या कार्यालयाकडे त्रुटी पुर्तता करून संदर्भ क.९ च्या पत्रान्यये जमा केला आहे. त्यास अनुसरून आपल्या कार्यालयाकडून संदर्भ क.२ च्या पत्रान्यये त्रुटी पुर्तता करणेस कळपिले आहे. त्रुटी पुर्तता तपशिल खालीलप्रमाणे-

	<u>उ</u> त्र.	काढलेल्या त्रुटी	केलेल्या त्रुटी पुर्तता
HA SING PARTY	31. क. प	काढलेल्या त्रुटी ऑनलाईन प्रस्तापात मुद्दा क्रमांक B मध्ये B (i) मध्ये यापुर्वी पनसंवर्धन अधिनियमांतर्गत सादर करण्यात आलेल्या प्रस्तायाची मंजुरी प मंजुरी घेण्यात आलेल्या प्रस्तायाचाबाबतची माहिती देण्यात यावी असे कळविण्यात आलेले होते. तथापी सदर प्रकल्पाकरीता या पुर्वी प्रस्ताय दाखल करण्यात आलेला नसल्याचे नमुद केले आहे. परंतु पनवेल ते कर्जत रेल्ये प्रकल्पाकरीता पुर्वी 10.6470 हेक्टर पनक्षेत्र मागणीचा प्रस्तायास केंद्रशासनाकडील पत्र क्र.8-c/047/99/FC-875/ Dt. 28/03/2001 अन्यये मान्यता घेणेत आलेली आहे. तरी त्याबाबतचा तपशिल जक्त टॅब मध्ये नसद करणे आप्रप्रक आहे	केलेल्या त्रुटी पुतता पुर्वी पनवेल ते कर्जत न्यु बि.जी. लाईनसाठी, केंद्र शासनाकडील पत्र क्र. 8-c/047/99/FC- 875/ Dt. 28/03/2001 पन क्षेत्र 90.६४७ हे. आर ला मंजुरी मिळालेली होती. सदर प्रकल्पाला येगळ्या हेड खाली मंजुरी मिळालेली होती. व आताच्या पनयेल - कर्जत उपनगरीय कोरीडोरला येगळ्या हेड खाली मंजुरी मिळाली आहे. आताच्या दुहेरी रेल्ये मार्गाकरीता पुर्यी पन जमिनीची मंजुरी घेतलेली नाही.
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2	ऑनलाईन प्रस्तापात जोडण्यात आलेली KML file चुकिची जोडण्यात आलेली आहे. तरी अचुक आखणी मार्ग दर्शविणारी KML file ऑनलाईन प्रणालीवर अपलोड करण्यात यावी.	ऑनलाईन प्रस्तापात अचुक KML file अपलोख करण्यात आलेली आहे. ऑनलाईन प्रस्तापात सादर करण्यात आलेली
\$	ऑनलाइन प्रस्तावात सादर करण्यात आलला प्रोजेक्ट नोट ही सही प शिक्यानिशी स्कॅन करून अपलोड करण्यात आलेल्याचे नमुद केले आहे. तथापी प्रत्यक्षात तशी सही शिक्याची प्रोजेक्ट नोट ऑनलाईन प्रणालीपर अपलोड जोडण्यात आलेली नाही. तरी याबाबत पुर्तता करण्यात यावी.	प्रोजेक्ट नोट व इतर कागदपत्र सही व शिक्यानिशी स्कॅन करून अपलोड करण्यात आलेले आहेत. पुनःश्च प्रोजेक्ट नोट सही व शिक्यानिशी स्कॅन करूनऑनलाईन प्रणालीवर अपलोड करण्यात आलेली आहे.

परील नमुद सर्व त्रुटीची पुर्तता करण्यात आलेली आहे. सदर त्रुटी पुर्तता कार्यालयाकडे जमा करीत आहोत. त्याप्रमाणे पुढील कार्यवाही होणेस विनंती. **सोबत:** ऑनलाईन प्रत व प्रोजेक्ट नोट.

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SSE

(मुकेश कुमार) उप मुख्य परियोजना प्रबंधकना, मुंबई रेल्ये विकास कार्पोरेशन लि., मुंबई.

24.04.19

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Amol Mandale <panvelkarjat2017@gmail.com>

Email Alert From System Administrator of Online Submission and Monitoring of Forests Clearances Proposal(OSMFCP) portal

monitoring-fc@nic.in <monitoring-fc@nic.in> To: panvelkarjat2017@gmail.com Cc: monitoring-fc@nic.in

Tue, Apr 23, 2019 at 3:33 PM

This is to acknowledge that a proposal seeking prior approval of Central Government under the Forest (Conservation) Act 1980 as per the details given below has been successfully reuploaded on the portal of the Ministry of Environment, Forest and Climate Change Government of India.

1. Proposal No.	: FP/MH/RAIL/26924/2017
2. Proposal Name	Diversion Of Forest Land For Panvel - Karjat : Doubling Railway Line (Panvel - Karjat Section) In Raigad Dist
3. Category of the Proposal	: Railway

- 4. Date of Submission : 07/07/2017
- 5. Name of the Applicant with Contact Details

Name	: MUKESH
Mobile No.	: 7777011377
State	: Maharashtra
District	: Mumbai City
Pincode	: 400020
6. Area Applied (ha.)	: 9.1

The same has been forwarded to DFO for the processing.

(System Administrator)

*** This is a system generated email, please do not reply. ***

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मुंबई रेलवे विकास कॉर्पोरेशन लि.

(भारत सरकार, रेल मंत्रालय का एक सार्वजनिक उपक्रम)

MUMBAI RAILWAY VIKAS CORPORATION LTD. (A PSU of Govt. of India, Ministry of Railways)

जा, क. MRVC/W/150/Forest land.

दि. ०१.०२.२०१८

प्रति

मा. उप. वनसंरक्षक,

रायगड.

विषय :- <u>वन जमिनीचे डायव्हर्जन होणेबाबत प्रस्ताव.</u>

पनवेल ते कर्जत उपनगरीय कॉरीडोर साठी भूसंपादन (रेल्वे मार्गाचे दुहेरीकरणासाठी)...

मा. महोदय,

उपरोक्त विषयांकित प्रकरणी पनवेल ते कर्जत रेल्वे मार्गाचे दुहेरीकरणासाठी भूसंपादन करण्याचे काम तातडीने हाती घेण्याचे निर्देश देण्यात आलेले आहेत. सदर कामांचा समावेश मुंबई रेल विकास कॉर्पोरेशन लि. च्या अर्थसंकल्प २०१७-१८ मध्ये करण्यात आलेला आहे.

सदर पनवेल ते कर्जत रेल्वे मार्गाचे दुहेरीकरणामध्ये मौजे:- बेलवली, भिंगार, भेरले व बारवई, ता. पनवेल, मौजे लोधिवली, वावर्ले, ता. खालापूर, व मौजे:- वांजळे, देऊळवाडी (किरवली), ता. कर्जत, जिल्हा रायगड असे एकुण ८ गावामधील ८.१४ हे. आर क्षेत्र वन जमीनीचे येत आहे. सदर वन जमीनीचे क्षेत्र रेल्वे मार्गाचे दुहेरीकरणासाठी भूसंपादीत करणे आवश्यक आहे. त्यानुसार सदर वन जमीनीचाप्रस्ताव तयार करून पुढील कार्यवाहीसाठी सादर करीत आहोत. तरी योग्य ती कार्यवाही लवकरात लवकर व्हावी हि विनंती.

सोबत : वन जमिनीचा साठी प्रस्ताव पेज क्र. १ ते १२३

02-18

(मुकेश कुमार) उप मुख्य परियोजना प्रबंधक - । मुंबई रेल विकास कॉपरिशन लि. मुंबई.

दूसरी मंजिल, चर्चगेट स्टेशन भवन, मुंबई - 400 020. 2nd Floor, Churchgate Station Bldg., Mumbai 400 020. Tel. : 022-22195398 / 399 • Fax : 022-2209 6972 • Website : www.mrvc.indianrailways.gov.in

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