



# COMPREHENSIVE MASTER PLAN FOR PORT WITH PLANNING HOIZON 2047

FOR MUMBAI PORT AUTHORITY

September 2024


Harbour of Progress & Prosperity

SAGARMALA
PORT-LED PROSPERITY

Prepared by

MUMBAI PORT AUTHORITY

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# PREFACE

As we embark on a pivotal journey toward the future of India's maritime infrastructure, the Comprehensive Port Master Plan 2047 for Mumbai Port Authority marks a significant milestone in Mumbai's enduring legacy as a gateway for global trade. The ever-evolving demands of maritime commerce, regional economic development, and the critical call for sustainable practices have guided the formulation of this Master Plan, ensuring that Mumbai Port remains at the forefront of India's growth in the maritime sector.

Mumbai Port, with its rich history and strategic geographical location, has been an integral part of the nation's economic lifeline for over a century. The transformation of the global maritime landscape, coupled with advances in technology and environmental consciousness, underscores the importance of a forward-thinking vision. This Master Plan, with its horizon set for 2047, aims to not only modernize our port operations but also ensure we are prepared to meet the dynamic challenges of the coming decades.

Aligned with key national initiatives like Maritime India Vision 2030, Sagarmala and PM Gati Shakti, this plan integrates future traffic projections, advanced infrastructure development, and sustainability-focused initiatives. From optimizing cargo handling and enhancing connectivity to embracing green port initiatives and digitization, every facet of port operations is poised for enhancement. Special attention has been given to fostering the growth of cruise tourism, urban water transport and ship repair facilities, which are expected to contribute significantly to regional and national development.

This plan embodies our commitment to transform Mumbai Port into a world-class maritime hub by 2047, facilitating economic growth, creating employment opportunities, and contributing to the nation’s maritime leadership on a global scale. We are confident that this Master Plan will not only shape the future of Mumbai Port but also serve as a blueprint for excellence in the Indian port sector.

As custodians of this historic port, we remain steadfast in our dedication to its growth, modernization, and sustainability. We invite all stakeholders, including industry, government, and the people of Mumbai, to join us in realizing the vision set forth in this Master Plan, ensuring that Mumbai Port continues to thrive as an enduring symbol of India's maritime prowess.

राजीव जलोटा भा.प्र.से.
अध्यक्ष
(समकक्ष सचिव, भारत सरकार)

**Rajiv Jalota** IAS
Chairperson
(Rank of Secretary, GoI)

**मुंबई पत्तन प्राधिकरण**
**Mumbai Port Authority**
(पत्तन, पोत परिवहन और जलमार्ग मंत्रालय, भारत सरकार)
(Ministry of Ports, Shipping and Waterways, Government of India)

## MESSAGE

As Chairperson of the Mumbai Port Authority, it is my privilege to present the *Maritime Amrit Kaal Vision (MAKV) 2047*. This visionary document is not just a blueprint for the future of Mumbai Port, but a crucial component of India's strategic maritime ambitions. Mumbai Port has long been a pillar of the nation's economic growth, a gateway for global trade, and a key driver of regional development. However, the challenges and opportunities of the 21st century demand that we reimagine and reshape the port to meet future demands while preserving its legacy.

The *Port Master Plan 2047* lays out a transformative vision designed to make Mumbai Port a global leader in maritime trade, infrastructure, and sustainability by the time India celebrates 100 years of independence. This plan aligns closely with national policies such as *Maritime India Vision 2030*, *PM Gati Shakti*, and the *Sagarmala* initiative, all of which are focused on enhancing port infrastructure, improving connectivity, and promoting sustainable growth.

The Master Plan addresses future traffic projections, port expansion, enhanced connectivity through multi-modal transportation, and a comprehensive land-use strategy to ensure that every asset within our jurisdiction is optimized for efficiency and growth. Importantly, the Plan also places a strong emphasis on green port initiatives, adopting advanced technologies that reduce our environmental footprint while improving operational efficiencies.

At the heart of this Master Plan is a vision for transforming Mumbai Port into a multi-functional hub that not only excels in cargo handling but also promotes cruise tourism, urban water transport, and ship repair activities. With anticipated growth in cargo volumes and passenger traffic, we are positioning Mumbai Port to become a leader in both national and international maritime trade.

I am deeply committed to seeing this vision through and ensuring that Mumbai Port continues to thrive in an increasingly competitive global landscape. We cannot achieve this without the support of our stakeholders—government bodies, industry partners, and the communities around us. Together, we can realize the immense potential that this Master Plan holds and take Mumbai Port to new heights of excellence by 2047.

RAJIV JALOTA
CHAIRPERSON

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## MESSAGE

It is with great pride and optimism that I introduce the Comprehensive Port Master Plan 2047, a forward-looking document that charts a transformative journey for Mumbai Port over the next two decades. This Master Plan represents our commitment to creating a port that is not only equipped to handle future demands but also plays a pivotal role in advancing India's maritime ambitions on the global stage.

Mumbai Port, with its long-standing history as one of India's most important maritime hubs, is poised for a new era of growth and modernization. The Port Master Plan 2047 lays out a detailed strategy to enhance the Port's operational capacity, address traffic management, and improve the efficiency of our land-use practices. The plan also integrates cutting-edge technology, ensuring that Mumbai Port remains a leader in port digitalization and automation.

One of the key objectives of this Master Plan is to foster sustainable growth. In line with India's environmental commitments, the plan emphasizes green port initiatives, which include reducing carbon emissions, enhancing energy efficiency, and implementing eco-friendly technologies. The incorporation of these sustainability measures ensures that Mumbai Port not only meets global standards but also contributes to the broader national goal of fostering an environmentally responsible maritime sector.

The plan also envisions Mumbai Port as a dynamic hub for cruise tourism, urban water transport, and ship repair services. With its strategic location and deep historical significance, Mumbai Port is ideally positioned to become a major player in these growing sectors. By improving passenger and cargo handling infrastructure, upgrading our berthing and storage facilities, and integrating multi-modal connectivity, we are ensuring that the Port is fully equipped to handle the increasing demands of the future.

I firmly believe that the success of the Port Master Plan 2047 depends on strong collaboration with our stakeholders—industry partners, government agencies, and the people of Mumbai. We are committed to engaging with all of these key stakeholders to ensure the successful execution of this plan and to maximize its potential for economic growth, job creation, and sustainable development.

Together, we can build a future where Mumbai Port is not just a gateway for global trade but a symbol of India's maritime strength and vision for the future.

**ADESH TITARMARE**
**DEPUTY CHAIRPERSON**

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# LEADERSHIP & EXPERTISE BEHIND PORT MASTER PLAN 2047

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| **Key Officials** | |
| Shri. Rajiv Jalota | Chairperson, MbPA |
| Shri. Adesh Titarmare | Deputy Chairperson, MbPA |
| **General Administration Department** | |
| Shri. Pawan Bahekar | Secretary, MbPA |
| Shri G.S. Rathod | Manager (HR) |
| Shri. G. B. More | Senior Dy. Secretary |
| Shri. Arvind Apendkar | Dy. Secretary |
| **Legal Division** | |
| Shri Pramod H. Salvi | Chief Law Officer |
| **Marine Department** | |
| Capt. Bhabatosh Chand | Dy. Conservator |
| Capt.J.P. Tiwari | Assistant Commissioner of Ports |
| Capt. Ravikumar Shinde | Harbour Master |
| **Traffic Department** | |
| Shri. B.S. Shinde | Traffic Manager |
| Shri A.S.Sengar | Sr. Dy. Traffic Manager |
| Shri S.M. Deshmukh | Sr. Dy. Traffic Manager |
| Shri S.H. Tiwari | Sr. Dy. Traffic Manager |
| Shri S. B. Mulik | Sr. Dy. Traffic Manager |
| **Mechanical & Electrical Engineering Department** | |
| Shri A. Ganesan | Chief Mechanical Engineer |
| Shri. Kulkarni.A.B. | Dy. CME |
| Smt. Jaripatke M.P | Dy. CME |
| **Civil Engineering Department** | |
| Shri A.P.B. Mattoo | Chief Engineer |
| Shri. Ajay Utra | Deputy Chief Engineer, SPA |
| Shri. A. M. Sonkusle | Deputy Chief Engineer |
| Shri. A.W. Kardhekar | Deputy Chief Engineer |
| Shri. S. R. Balakrishnan | Superintending Engineer |
| Shri. Nihar Deorukhkar | Executive Engineer, SPA |
| **Planning Department** | |
| Shri. Dilip Shekdar | Advisor Planning |
| Miss Bhavana Nadagoudar | Associate Planner |
| Miss Shirin Shaikh | Urban Designer |
| Miss Sonali Upasni | Urban Designer |
| Miss Akshaya Kudale | Junior Planner |
| Miss Gayathri M P | Junior Planner |
| **Estate Department** | |
| Shri. Girish Shirsat | Estate Manager |

| | |
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| **Finance Department** | |
| Smt. Madhuri Varade | FA & CAO |
| Shri Pritam Rao | Sr. Dy. FA & CAO |
| **Information Technical Wing** | |
| Shri Sanjay Joglekar | Chief Technical Officer |
| **Other Key Officials** | |
| Dr. R. D. Tripathi | Executive Director, Mumbai Port Sustainability Foundation |
| Shri Sarbodaman Mukherjee | Assistant Director-Strategic Management |
| Shri. Nilesh Acharekar | Chief Security Officer |
| **Experts Consulted** | |
| Shri.N.G. Mirajkar | Ex-Chief Engineer, MbPA |
| Shri S.V. Madbhavi | Ex-Chief Engineer, MbPA |
| Capt.A.W. Karkare | Ex-Deputy Conservator, MbPA |

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# List of Abbreviations

| Abbreviation | Full Form |
|---|---|
| AMNS | Arcelor Mittal Nippon Steel |
| AQI | Air Quality Index |
| BCG | Boston Consulting Group |
| BOT | Build Operate Transfer |
| BPCL | Bharat Petroleum Corporation Limited |
| BPS | Ballard Pier Mole Station |
| BPTG | Bombay Port Trust Grain Depot Railway |
| BPTV | Bombay Port Victoria Dock Railway |
| BPX | Ballard Pier Extension |
| CAGR | Compound Annual Growth Rate |
| CSL | Cochin Shipyard Limited |
| CST | Chhattrapati Shivaji Terminus |
| CD | Chart Datum |
| DCT | Domestic Cruise Terminal |
| DEP | Designated Export Place |
| DMIC | Delhi-Mumbai Industrial Corridor |
| DMP | Disaster Management Plan |
| DWT | Dead Weight Tonnage |
| EBS | Enterprise Business Suite |
| EOMS | Estate Operations Management System |
| EXIM | Export Import |
| FCB | First Chemical Berth |
| FDI | Foreign Direct Investment |
| FO | Furnace Oil |
| FRM | Fertilizer Raw Material |

| | |
|---|---|
| FSRU | Floating Storage Regasification Unit |
| FTP | Foreign Trade Policy |
| FY | Financial Year |
| GIS | Geographic Information System |
| GHG | Green House Gas |
| GMB | Gujarat Maritime Board |
| GRSE | Garden Reach Shipbuilders & Engineers |
| GVA | Gross Value Added |
| HDD | Hughes Dry Dock |
| HFO | Heavy Fuel Oil |
| HFHSD | High Flash High Speed Diesel |
| HPCL | Hindustan Petroleum Corporation Limited |
| HSD | High Speed Diesel |
| ID | Indira Dock |
| IMD | India Meteorological Department |
| IMO | IMO guidelines |
| IOCL | Indian Oil Corporation Limited |
| JD | Jawahar Dweep |
| JICA | Japan International Co-operation Agency |
| JNPA | Jawaharlal Nehru Port Authority |
| JSW | Jindal South West |
| KPI | Key Performance Indicators |
| LNG | Liquefied Natural Gas |
| LPG | Liquefied Petroleum Gas |
| MAP | Mono Ammonium Phosphate |
| MbPA | Mumbai Port Authority |
| MCA | Model Concession Agreement |

| | |
|---|---|
| MDL/MDSL | Mazgaon Dock Shipbuilders Limited |
| MFDC | Maharashtra Fisheries Development Corporation |
| MICT | Mumbai International Cruise Terminal |
| MIV | Maritime India Vision |
| MMB | Maharashtra Maritime Board |
| MMRDA | Mumbai Metropolitan Region Development Authority |
| mnT | Million Tonnes |
| MOP | Muriate of Potash |
| MOT | Marine Oil Terminals |
| MS | Motor Spirit (Petrol) |
| MTDC | Maharashtra Tourism Development Corporation |
| MTHL | Mumbai Trans Harbour Link |
| MTPA | Million Tonnes Per Annum |
| MW | Mega Watt |
| NPP | New Pir Pau |
| OCT | Offshore Container Terminal |
| O-D | Origin Destination |
| OEM | Original Equipment Manufacturer |
| OGPD | Orange Gate Prince's Dock |
| OHE | Over Head Electric system |
| ONGC | Oil and Natural Gas Corporation |
| OPP | Old Pir Pau |
| PD | Prince's Dock |
| PDI | Pre-Delivery Inspection |
| PMMSY | Pradhan Mantri Matsya Sampada Yojana |
| PSU | Public Sector Undertaking |
| POL | Petroleum, Oil, and Lubricants |

| | |
|---|---|
| POSCO | Pohang Iron and Steel Company |
| POZ | Port Operational Zone |
| RCD | Rail Container Depot |
| SCADA | Supervisory Control and Data Acquisition |
| SCB | Second Chemical Berth |
| SCOMET | Special Chemicals, Organisms, Materials, Equipment, and Technologies |
| SDCL | Sagarmala Development Company Limited |
| SPA | Special Planning Authority |
| SSPS | Sagarmala Seaplane Services |
| STC | State Trading Corproation |
| SWOT | Strength, Weakness, Opportunity, Threat |
| TAMP | Tariff Authority for Major Ports |
| TCB | Third Chemical Berth |
| TEU | Twenty-foot Equivalent Unit |
| VD | Victoria Dock |
| VLCC | Very Large Crude Carrier |
| VTMS | Vessel Traffic Management System |
| WDFC | Western Dedicated Freight Corridor |
| WGTK | Wadala-Ghatkopar-Thane-Kasarvadavali |
| YGPD | Yellow Gate Prince’s Dock |

# EXECUTIVE SUMMARY

### 1. Introduction

The Mumbai Port Authority (MbPA) has developed a "Comprehensive Master Plan with a Planning Horizon of 2047" to address the evolving demands of global maritime trade, regional economic development, and environmental sustainability. The plan aims to modernize and expand Mumbai Port's capacity to handle future traffic, optimize land use, and enhance connectivity while adhering to national and international guidelines.

The Master Plan's objectives align with national policies like the Maritime India Vision 2030, PM Gati Shakti, the Sagarmala Project, and other key government initiatives to support India's maritime sector's growth. These policies aim to develop world-class port infrastructure, enhance cargo and passenger movement, promote sustainable practices, and increase India's share in global maritime trade.

### 2. Objectives and Scope

The primary objectives of the Comprehensive Master Plan are to:

- **Optimize Traffic and Infrastructure:** Develop traffic scenarios for 2047, considering future cargo projections, industrial growth in the hinterland, and carbon emission commitments.
- **Enhance Connectivity and Land Use:** Address connectivity gaps, ensure efficient multimodal transport, and create a master plan for land use within the port area, including existing and unused land parcels.
- **Promote Sustainability and Technological Innovation:** Implement green port initiatives, digital transformation, and automation to enhance operational efficiency.
- **Achieve Economic Growth:** Facilitate cruise tourism, urban water transport, and port-related activities to boost regional and national economic development.

The scope includes developing a port land use plan, ensuring zero waiting time for cargo movement, and obtaining comprehensive environmental clearances for proposed projects.

### 3. Current Situation and Regional Setting

- **Location and Regional Context:** Mumbai Port, located on the west coast of India, is a natural harbor protected by the Mumbai Peninsula. It serves as a major gateway for

trade, handling diverse cargo such as crude oil, chemicals, dry bulk, breakbulk, and automobiles.

- **Connectivity Improvements:** Key infrastructure developments are proposed to enhance port connectivity, including:
- **Road and Rail Projects:** Enhancing national highways and metro-rail networks to facilitate faster cargo evacuation and reduce congestion.
- **Inland Waterways:** Developing water transport routes to support urban decongestion.
- **Maritime Infrastructure:** Expanding berths, jetties, and storage facilities to handle increased cargo and cruise traffic.

**4. Key Projects in the Pipeline**

The Master Plan identifies several critical projects to expand and modernize Mumbai Port's infrastructure:

- **Third Chemical Berth:** Constructing new berths to manage increased chemical cargo.
- **New Fish Jetty at Mallet Bunder:** Developing new facilities to support the fisheries sector.
- **Port Digitalization and Automation:** Implementing advanced technologies, including Supervisory Control and Data Acquisition (SCADA) for marine oil terminals, vessel tracking systems, and digital port operations.
- **Monetization of Harbour Wall Berths:** Restructuring and optimizing existing berths for increased cargo handling capacity.
- **Cruise Terminal Development:** Transforming Mumbai into a cruise tourism hub with dedicated terminals to handle domestic and international cruise traffic.

**5. Studies and Strategic Inferences**

The plan includes several studies conducted to analyze current port performance and future growth potential:

- **Traffic Studies:** Predicting cargo growth up to 2047 and identifying capacity constraints.
- **Environmental Assessments:** Evaluating the environmental impact of proposed projects and developing a comprehensive environmental management plan.
- **Stakeholder Consultations:** Engaging with industry stakeholders to gather insights and align future development with market demands.

## 6. Future Proposals and Action Plan

The Master Plan sets a strategic vision for Mumbai Port by 2047, emphasizing sustainable growth, technological innovation, and infrastructure enhancement:

- **Cruise Tourism:** Establishing Mumbai as the cruise tourism capital of India with world-class terminals and facilities to handle up to 2.29 million cruise passengers annually.
- **Marina Development:** Building new marinas to support yacht tourism and recreational activities, enhancing the port's appeal.
- **Green Port Initiatives:** Implementing carbon neutrality measures, using sustainable energy sources, and promoting biodiversity to minimize environmental impact.
- **Ship Repair Facilities:** Expanding ship repair services to boost revenue and reduce turnaround times.
- **Urban Water Transport:** Developing water taxi and ferry infrastructure to ease urban congestion and promote sustainable transport.

## 7. Implementation Strategy and Monitoring

The plan provides a phased approach to project implementation, detailing cost estimates, funding strategies, and timelines. It includes key performance indicators (KPIs) such as cargo traffic, turnaround time, ship berth day output, cruise passenger traffic, and annual operating revenue to monitor progress.

## 8. Disaster Management Plan

The revised Disaster Management Plan (2024) outlines a risk assessment and vulnerability analysis for potential hazards, such as cyclones and industrial accidents. It establishes a Crisis Management Group (CMG) and Incident Response Teams (IRTs) for effective emergency response.

## 9. Summary and Conclusion

The Comprehensive Master Plan for Mumbai Port Authority aims to transform the port into a world-class maritime hub by 2047. It focuses on modernizing infrastructure, enhancing cargo handling capacity, promoting sustainable practices, and ensuring seamless multi-modal connectivity. With strategic investments, innovative technologies, and a commitment to environmental stewardship, Mumbai Port is poised to play a vital role in India's maritime future.

# 1 INTRODUCTION

## 1.1 Planning Efforts in the Past

a) BCG prepared a report titled 'Deep dive – MbPT' under Project Unnati in 2015. The main objectives of the study were:

- Benchmark operational and financial performance of ports.
- Capability maturity assessment for key processes and functional capabilities.
- Detailed deep-dive diagnosis and root cause analysis for the identified opportunity areas to understand underlying reasons for performance bottlenecks.
- Develop practical and actionable solutions on the basis of root cause findings, and develop a comprehensive improvement roadmap.

b) Mumbai Port Authority had prepared a Draft Master Plan for its port area in 2016 under Sagarmala programme through M/s AECOM and McKinsey.

## 1.2 Need for Port Master Plan

The Union Budget 2022 set the roadmap to achieve Hon'ble Prime Minister's vision of India, in its 100 $^{th}$ year of independence, which has been christened, as Amrit Kaal. The Amrit Kaal is a significant era "marking Azadi Ka Amrit Mahotsav and having entered into the 25-year-long lead up to India @100," with impetus on four major focal points-

(1) Inclusive Developments
(2) PM Gati Shakti
(3) Productivity Enhancement
(4) Climate Action and Energy

With the above vision and initial level estimates, it is contemplated that the port capacity of India required in 2047 will be around six times the present port capacity. This has necessitated to undertake port planning by each port for the horizon of 2047.

The Ministry of Ports, Shipping & Waterways (MoPSW) therefore vide OM from Under Secretary, Ministry of Ports, Shipping & Waterways Shipping No.M-25021/36/2021-SM dated 25.04.2022 has asked all the Major Ports Authorities to prepare a Comprehensive Master Plan 2047 for entire port area including

- Cargo projections (considering future industrialization in the hinterland)
- Land use planning & optimization
- Connectivity gaps

- Hinterland multimodal connectivity
- Future fuels (like LNG, $H_2$)
- Warehousing etc.

The ultimate aim should be to achieve efficient logistics for enhancing economic development. All the major ports were also asked to plan for state of art cruise terminals catering to the ferries, cruise ships, Ro-Pax ferries etc.

In accordance with the above OM, Mumbai Port Authority has prepared a Master Plan for its port area for the planning horizon of 2047.

## 1.3 Traffic Studies

In order to understand the current port performance, future market, projection of cargo & infrastructure requirement along with other focus areas such as Ship Repair, Urban Water Transport and Fisheries for the planning horizon of 2047, MbPA had appointed CRISIL Limited as a consultant to undertake the following studies;

1) Traffic Study for Mumbai Port Authority
2) Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA

## 1.4 Objectives of Master Plan Preparation

The objectives of preparation of Comprehensive Master Plan for Ports with planning horizon of 2047 are indicated below:

(1) Map out the origin-destination of key cargo (accounting for greater than 95% of the total traffic) at the Port and develop traffic scenarios for a period of 25 years (2047), considering carbon emission commitments.
(2) Identify key constraints along the logistics chain (Port and including connectivity to hinterland).
(3) Develop a port land master plan for the Port with planning horizon of 2047.
(4) Develop land use and development plan for existing used and unused land parcels.
(5) Achieve ZERO waiting time for inward as well as out bound cargo i.e., ship, rail, truck carrying cargo to/from port should not be required to wait.
(6) Ports should have bunkering facilities for LNG, $H_2$ etc.
(7) Obtain comprehensive environment clearance for all projects proposed under the Master Plan.

## 1.5 Scope of Work

(1) To identify the vision/priority area for the Port considering future economic outlook in the hinterland, India's economy and overall technology development trends.

(2) To benchmark with similar port (similar in terms of either hinterland, location, commodity type, stage of development or such similar parameters) and identify the best practices for the port to follow.

(3) To identify Key Performance Indicators (KPI) through which the implementation of the plan would be monitored regularly.

(4) To detail out economic outcomes such as employment generation, export potential, income generations and other benefits that may accrue through establishment of such plan.

(5) To study the existing environmental settings and suggest specific Environment Management Plans considering the infrastructure projects and development plans.

(6) To prepare conceptual disaster management and emergency services plan.

## 1.6 Draft Port Master Plan-2047

On the basis of the traffic surveys and the guidelines given by the Ministry of Shipping, a Draft Comprehensive Master Plan for Port with planning horizon 2047 for Mumbai Port Authority has been prepared. taking into consideration the inputs provided on the future traffic and the benchmarking and operational improvements suggested for this port.

## 1.7 Applicable Policies & Guidelines for Maritime Sector in India

Ports and shipping policies in India aim to support the port sector through various measures. The government has allowed up to 100% FDI through the automatic route for projects related to building and maintaining ports and harbours. Private ports have more freedom with their prices because the government lets non-major ports set their own tariffs in consultation with the State Maritime Boards. The Model Concession Agreement (MCA) was introduced to bring transparency and uniformity to contractual agreements for major ports and was revised in recently to make major ports in the country more investor-friendly. The Major Port Authorities Bill-2021, was passed to decentralize decision making and reinforce excellence in major port governance. To set up modern floating infrastructure along the coast, guidelines for floating structures were also made. Following are some the prominent initiatives taken by government in ports and shipping sector of India.

### 1.7.1 Maritime India Vision 2030 (MIV)

Maritime India Vision 2030 is formulated by Ministry of Ports, Shipping and Waterways to build and upgrade port and maritime infrastructure in the country. Maritime India Vision 2030 has identified 150+ initiatives across ports, shipping & waterways sub-sectors which will propel Indian maritime sector to its next level of growth in the new decade. The following key guiding principles were incorporated to define the MIV 2030:

(1) Analyze current and future challenges to define initiatives
(2) Drive innovation by utilizing latest technology
(3) Create time-bound action plan
(4) Benchmark to understand current standing and adopt best-in-class practices
(5) Address capability building and human resources
(6) Explore ideas to achieve "Waste to Wealth"

MIV 2030 outlines 10 key themes which are essential for India to secure its place at the forefront of the Global Maritime Sector:

(1) Develop best-in-class Port infra structure
(2) Drive E2E Logistics Efficiency and Cost Competitiveness
(3) Enhance Logistics Efficiency through Technology and Innovation
(4) Strengthen Policy and Institutional Framework to Support all Stakeholders
(5) Enhance Global Share in Ship Building, Repair and Recycling
(6) Enhance Cargo and Passenger Movement through Inland Waterways
(7) Promote Ocean, Coastal and River Cruise Sector
(8) Enhance India's Global stature and Maritime Co-operation
(9) Lead the World in Safe, Sustainable & Green Maritime Sector
(10) Become Top Seafaring Nation with World Class Education, Research & Training

| | Key Performance Indicator | Current (2020) | Target (2030) |
|---|---|---|---|
| 1 | Major Ports with >300 MTPA cargo handling capacity | - | 3 |
| 2 | % of Indian cargo transshipment handled by Indian ports | 25% | >75% |
| 3 | % of cargo handled at Major Ports by PPP/ other operators | 51% | >85% |
| 4 | Average vessel turnaround time (containers) | 25 hours | <20 hours |
| 5 | Average container dwell time | 55 hours | <40 hours |
| 6 | Average ship daily output (gross tonnage) | 16,500 | >30,000 |
| 7 | Global ranking in ship building and ship repair | 20+ | Top 10 |
| 8 | Global ranking in ship recycling | 2 | 1 |
| 9 | Annual cruise passengers | 4,68,000 | >15,00,000 |
| 10 | % share of Indian seafarers across globe | 12% | >20% |
| 11 | % share of renewable energy at Major Ports | <10% | >60% |

**Figure 1.1 Key Targets of MIV-2030**
*(Source: Report on MIV 2030)*

### 1.7.2 PM Gati Shakti

Prime Minister Gati Shakti, also called the National Master Plan for Multi-modal Connectivity, is a $1.2 trillion mega project that was announced on August 15, 2021. The goal of this project is to make manufacturing in India more competitive and help the Indian economy grow. The goal of the plan is to connect all of India's economic zones with multimodal infrastructure and bring together all of the relevant government departments to make a digital platform for more complete and integrated project planning. It will link the Indian Roadways, Indian Railways, Indian Airways, and Indian Waterways so that goods can move more easily. It will also make it easier to keep track of current projects and give the community information about upcoming connectivity projects. The main goals of the plan are to keep the economy at $5 trillion and then grow it to $20 trillion by 2040.

### 1.7.3 Sagarmala Project

The Sagarmala programme is the flagship programme of the Ministry of Ports, Shipping, and Waterways in India, aimed at promoting port-led development by exploiting India's 7517 km of coastline, 14500 km of potentially navigable waterways and its strategic location on key international maritime trade routes. The Sagarmala Program was initiated by the Government of India after cabinet approved it in 2015. The programme aims to modernize India's ports and integrate the development of ports, industrial clusters, the hinterland, and efficient evacuation systems through road, rail, inland, and coastal waterways, making ports the drivers of economic activity in coastal areas. Sagarmala Seaplane Services (SSPS) is an ambitious project

announced in January 2021 and being implemented by the Sagarmala Development Company Limited to facilitate faster and hassle-free travel across the country through seaplane services under a hub-and-spoke model. The Sagarmala Development Company Limited (SDCL) oversees developing and making plans for projects in the Sagarmala project's national perspective plan.

### 1.7.4 Major Port Authorities Act-2021

The Major Port Authorities Act-2021, is an act passed in India to regulate, operate, and plan for the 12 major ports in the country and to vest the administration, control, and management of these ports upon the Boards of Major Port Authorities. The act covers the following major ports:

(1) Deendayal (formerly Kandla)
(2) Mumbai
(3) JNPA
(4) Mormugao
(5) New Mangalore
(6) Cochin
(7) Chennai
(8) Kamarajar (formerly Ennore)
(9) V. O. Chidambarnar
(10) Visakhapatnam
(11) Paradip
(12) Kolkata (including Haldia)

The act aims to promote port infrastructure expansion and facilitate trade and commerce, decentralize decision-making and instil professionalism in major port governance and reorient the governance model in central ports to a landlord port model in accordance with global practice. The board of the Major Port Authority will have 11 to 13 members, and it has been suggested that an adjudicatory board be set up to do the work of the old TAMP for major ports.

### 1.7.5 Foreign Trade Policy 2023

New Foreign Trade Policy (FTP) 2023 was launched on 31$^{st}$ March 2023. This newly launched policy is not limited to the coming 5 years and will instead focus on long-term plans and will be revised as and when required on a regular basis. The vision is to take India’s export goods and services to US$ 2 trillion by 2030. Exports of FY23 are estimated to be US$ 760 billion

against US$ 676 billion in the previous year. Key approaches of the policy are based on 4 pillars i.e.

(1) Move from Incentive to Remission
(2) Export Promotion through Collaboration
(3) Ease of doing business, reduction in transaction costs and e-incentives
(4) Emerging Areas, e-commerce developing districts and streamlining SCOMET policy.

Aims and objective of FTP 2023 are summarized below.

- Government restated sector specific 2030 targets – US$ 1 trillion Merchandise Exports and US$ 1 trillion Service oriented exports.
- Additional 4 new towns (Faridabad, Mirzapur, Moradabad and Varanasi) have been designated as Towns of Export Excellence in the existing list of 39 towns, for apparels, handicraft, carpet and handloom.
- Provision for merchanting trade, introduction of trade settlement in rupees for export benefits • Introduction of amnesty scheme for one-time settlement of default in export obligation
- Exemption of dairy sector from maintaining average export obligation • Special advance authorization scheme for apparel and clothing sector
- Value limit extended for exports through courier from INR 5 lakhs to INR 10 lakhs per consignment
- Recognition of exporters based on export performance rating, leading to better branding opportunities in export markets, exporters to achieve higher recognition and reduce transaction cost
- Encourage e-commerce exports • Creation of e-commerce warehousing facilities at designated zones
- Streamline SCOMET Policy – Simplifying licensing process and reducing bureaucratic hurdles to make industry easy to comply with export regulations.

Sectors that will be benefited from the FTP 2023

- Textile & Apparels
- Dairy Sector
- Green technology products
    - Eligible for reduced export obligation condition under EPCG Scheme

- New additions in sector - Battery Electric Vehicles, Farming Equipment, water treatment, rainwater harvesting & filters and green hydrogen.

Around 98% of the traffic handled by MbPA is industrial cargo like POL, Chemicals, Iron & Steel, etc. The port handled 59.9 mn tons in FY22, out of which outbound traffic contributed 32% and rest 68% inbound traffic. Total outbound traffic includes transhipment and exports. Exports of MbPA are hardly 20% of total traffic, which consists of POL, Iron & Steel, Sugar & others. New FTP 2023 focuses more on Textile, Dairy and Green technology-oriented exports. Target is to encourage e-commerce trade and facilitate the warehousing facilities for the same. No developments or initiatives are mentioned in FTP 2023 for the type of cargo exported from MbPA. Hence, due to differences in target industries, new FTP 2023 does not create any impact on MbPA traffic.

### 1.7.6 Pradhan Mantri Matsya Sampada Yojana (PMMSY)

The Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India is implementing Pradhan Mantri Matsya Sampada Yojana – A scheme to bring about ecologically healthy, economically viable, and socially inclusive development of the Fisheries sector of India. The key objectives of PMMSY are as follows:

- Harness the potential of the fisheries sector in a sustainable, responsible, inclusive and equitable manner
- Enhance fish production and productivity through expansion, intensification, diversification and productive utilization of land and water
- Modernize and strengthen the value chain including post-harvest management and quality improvement
- Double fishers and fish farmers' incomes and generate meaningful employment
- Enhance the contribution of the fisheries sector to Agricultural GVA and exports
- Ensure social, physical and economic security for fishers and fish farmers
- Build a robust fisheries management and regulatory framework

# 2 LOCATION & REGIONAL SETTING

## 2.1 Mumbai Port

Mumbai Port is the second oldest port of the country established in 1873 and has been handling huge volumes of cargo for many years. The Port commemorated its 150 years of its magnificent history, an enduring symbol of the city's indomitable spirit and its unbreakable bond with the sea. Changing trends in shipping industry viz. increase in ship size and evolution of containerization technology and subsequent development of a second port across the bay have brought Mumbai Port to a stage of metamorphosis.

Mumbai Port is one of the major ports located on the west coast of India, commissioned more than a century ago is a natural harbour, situated at latitude 18° 54' N and longitude 72° 49' E, protected on the east by mainland and sheltered by Mumbai Peninsula on the west. The location of the port is shown in the Figure 2.1.


**Figure 2.1 Location of Mumbai Port**

The bay nearly rectangular in shape, measures about 36 km north to south and about 15 km East to West. The entrance to the harbour is from the South-West between Pong's reef at the southernmost tip of Mumbai and Thal Reef lying off the mainland to the southwest. The distance between these reefs is about 11 km. The main harbour channel is, for the greater part, a natural channel following the longitudinal axis of the harbour approaching to the docks. The main harbour accommodates the Indira Dock and the Ballard Pier. Further northeast of the harbour is located Jawahar Dweep accommodating the POL berths. The Pir Pau chemical berth is at the northern extremity of the harbour's deep water. In addition, there are 59 general ship anchorages straddling the main harbour channel from south Karanja buoy northwards as far as the Indira Dock approach channel.

Crude and POL products are handled from the jetties at Jawahar Deep and chemicals are handled at Pir Pau. Dry bulk, break bulk, automobiles and passengers are handled at Indira dock and Ballard Pier.

However, despite of technical constraints and competition from surrounding existing and upcoming ports, Mumbai Port is making effort to open new avenues for port activities and at the same time changing its approach towards water transports, ship repairing and water front development.

## 2.2 Geographic Profile

### 2.2.1 Meteorology

The climate of Mumbai generally shows a regular seasonal variation and the general character of the weather is more nearly related to the season. Mumbai is subject to the influence of both the SW and NE monsoon winds prevalent over the sub-continent. However, the former is more strongly marked along the west coast than the latter. The fair weather period is from October to June when it is generally sunny and dry. In the latter half of May, the weather becomes hot, sultry and humid as the conditions build up for the onset of SW monsoon. The "break" of the monsoon is accompanied by heavy rains, often lasting for several days. For the next two or three months there are periods of heavy rains interspersed with periods of less intensity. Towards the end of August, the monsoon begins to slacken and eventually recedes from Mumbai by the end of September.

#### *2.2.1.1 Winds*

During the fair weather period from October to June, the general wind direction is from the NW-NE quarter. From June, for two or three months, the wind has an almost constant SW

direction. The south-west monsoon winds are relatively stronger than the north-east winds. The maximum wind speed recorded is 150 km/h during the cyclonic storm of 1948.

#### *2.2.1.2 Rainfall*

The SW monsoon period starting about mid-May is the season for heavy rains. Nearly all the rainfall in Mumbai occurs during this period. The average yearly rainfall is about 2098 mm, of which 1965 mm (93.66%) occur during June to September. Usually maximum monthly rainfall occurs in July. The average monthly rainfall in July is 709 mm. There is practically no rainfall from December to April.

#### *2.2.1.3 Temperature*

The mean of the highest air temperature recorded in Mumbai is 35° C in the months of March, April and May while the mean lowest is 16° C recorded in the month of January. Mean daily maximum and minimum temperatures are 31° C and 24° C respectively.

#### *2.2.1.4 Visibility*

At Mumbai from November to March smog hangs over the land, obscuring everything in view. This happens only for short periods most often shortly after sunrise but also occasionally in the evenings. Visibility is generally good for most part of the year.

#### *2.2.1.5 Relative Humidity*

Mean yearly relative humidity at 0830 hours is 77% while the same at 1730 hours is 71%. The monthly average is lowest in February (62%) and highest in July to September (85%).

#### *2.2.1.6 Cyclone*

In general, the west coast of India is less prone to cyclonic storms compared to the east coast. From the information reported by India Meteorological Department (IMD) a total of 1034 disturbances occurred in the Bay of Bengal during the period 1891 to 1970 of which 363 intensified to cyclonic storms, the rest being ‘depressions’. On an average the number of cyclonic disturbances per year during this period was about 13. However, if the data is updated to 1990, the number of cyclonic events per annum works out to be 16, varying from a minimum of 8 to a maximum of 18. It is observed from the tracks of the cyclones in the Arabian Sea from 1877 to 1992 that only 10 storms endangering the Mumbai coast have occurred in the above said period i.e. at a frequency of once in 12 years.

**Cyclone Nisarga**

Cyclone Nisarga had notable impacts on the port operations in Mumbai as it approached the western coast of India in June 2020. In anticipation of the cyclone's landfall, maritime activities

at the Mumbai port were suspended as a precautionary measure. This included halting vessel movements, loading and unloading operations, and other port activities to ensure the safety of ships, cargo, and personnel. The cyclone's strong winds and rough seas disrupted shipping operations in and around Mumbai port. Vessels were advised to seek shelter or move to safer locations to avoid the brunt of the cyclone.

**Cyclone Taukte**

It was a cyclonic storm occurred in 17th and 18th March 2021, that emerged from Arabic sea and touch the Mumbai Port waterfront. Minor damages to the waterfront were observed. In short, the harbour water of Mumbai Port is calm and less affected by any cyclonic activity.

### 2.2.2 Oceanography

#### *2.2.2.1 Tides*

The tides in the Mumbai region are of the semi-diurnal type i.e. characterized by occurrence of two high and two low waters every day. There is a marked inequality in the levels of the two low waters in a day. The various tide levels with respect to Chart Datum reported at Mumbai are shown below:

**Table 2.1 Tide Levels w.r.t Chart Datum**

| Sr.No. | Particulars | Details |
|---|---|---|
| 1 | Highest High Water (HHW) | +5.39 m |
| 2 | Mean High Water Springs (MHWS): | +4.42 m |
| 3 | Mean High Water Neap (MHWN) | +3.30 m |
| 4 | Mean Sea Level (MSL) | +2.51 m |
| 5 | Mean Low Water Neap (MLWN) | +1.85 m |
| 6 | Mean Low Water Springs (MLWS) | +0.76 m |
| 7 | Lowest Low Water | - 0.44 m |

*(Source: Final Report on Master Plan for Mumbai Port prepared by AECOM)*

The distance from the Mumbai floating light to the Elephanta island is 26 km, and it will take 1½ to 2 hours to navigate this distance. Probability curves for HHW and tide levels 1 and 2 hours before HHW indicate that virtually on all occasions the tide level will exceed + 2.7 m two hours before high water and + 3.0 m one hour before high water. Hence larger vessels taking advantage of this tide, should therefore, enter the channel between two and one hour before high water and berth within one hour after high water.

#### *2.2.2.2 Currents*

The currents in the Mumbai region in the near shore zone are tide induced with reversal at high and low waters. The currents in the creeks are also affected by the freshets which result in not only increasing the strength of the ebb current but also limiting the propagation of the tide upstream. The normal maximum currents inside the harbour are about 2 to 3 knots although 4 knots occur on ebb flow during the monsoons.

#### *2.2.2.3 Waves*

The significant waves entering the harbour are the long period swell waves generated by deep sea storms. These mainly arise just before and during the monsoon and their direction of approach is normally from South – West. Whatever the wave-front orientation outside the harbour, the waves running up the harbour tend to be refracted in to a constant pattern. Waves are also substantially attenuated by the time they reach the berthing facilities in the harbour. As the Mumbai harbour is sheltered, no significant wave climate exists within the harbour area. The wave height reaches a maximum of 1.5 m under normal conditions with wave period ranging from 6 to 10 s. The offshore and nearshore wave rose diagram is as shown in Figure 2.2.

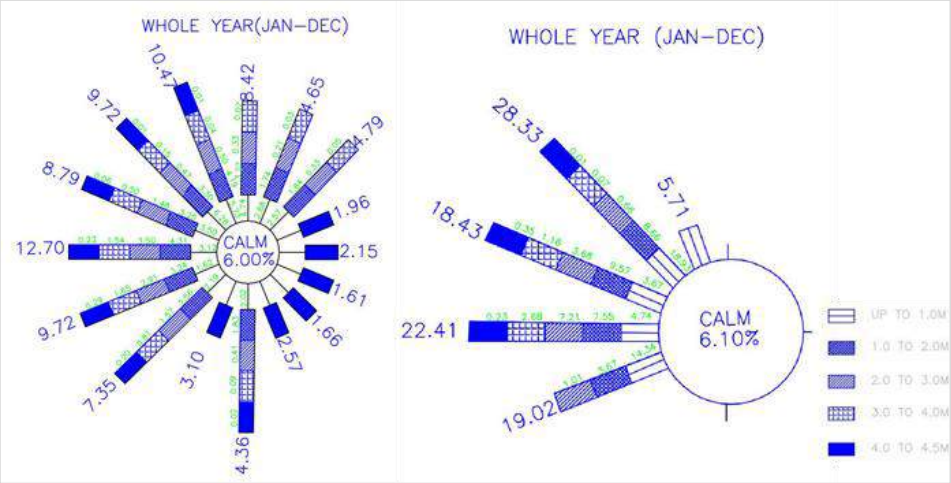



**Figure 2.2 Offshore and Near Shore Waverose Diagram**
*(Source: Final Report on Master Plan for Mumbai Port prepared by AECOM)*

### 2.2.3 Geology of the Area

The geological origin of rocks in the Mumbai region is that of the Deccan traps- a series of vast lava flows accompanied by volcanic eruptions at the close of Cretaceous period. Over the Deccan Plateau, the flow strata have remained nearly horizontal, but in the Mumbai area, they are inclined as much as 150 towards west. The type of rock is amygdaloidal basalt showing different grades of weathering from slightly to completely weathered.

This basalt layer is overlain by residual soil which in turn is overlain by marine clay. In general, the colour of marine clay is grey to dark black and its nature is soft to very soft. These are silty marine clays. At some places, these are mixed with fine to medium sized sand and gravels and at some places with gravels of weathered rock. The thickness of this layer is variable. The residual soil is the weathering product of underlying basalt. These are reddish brown in colour. These are hard to very hard in strength.

The Deccan trap basalt are of two types viz., amygdaloidal basalt and compact basalt. The difference between these two is that amygdaloidal basalt contains gas cavities whereas compact basalt does not. The basalt in the area of Pir Pau and Jawahar Dweep are of amygdaloidal type. These basalts are fine grained and show thin to thick bands of weathering. At some places, these rocks are highly jointed and show weathering and staining along these joints. Otherwise these are fresh and are strong to very strong in strength.

## 2.3 Connectivity

### 2.3.1 Direct Port Connectivity

MbPA operates its own railway from Raoli Junction, Wadala Yard to Indira Dock for handling originated / destined cargo traffic from / to hinterland. At present, EXIM cargo such as Iron & Steel, Sugar, Wheat, Gypsum, Machineries, and domestic cargo such as Cement, MOP, Fly Ash are handled by MbPA Railway. EXIM cargo is handled at BPTV station (inside Docks) and BPTG station (outside docks). Domestic cargo/non-port cargo is being handled at BPTG only.

MbPA is well connected to the hinterland through major and local road network of Mumbai city. Following are the key road networks connecting MbPA to its hinterland are as follows:

- **National Highway 8** – Delhi to Mumbai via Jaipur, Gandhinagar and Surat, caters to north bound cargo. This is a six lane road network connecting cargo generation clusters in the North to JNPT port. It is a part of the golden quadrilateral project. The majority of the cargo from Gujarat and Rajasthan hinterland will utilize this route.
- **Old National Highway 3** – Delhi to Panvel via Agra, Bhopal and Nashik, caters to central region bound cargo. This is a four lane road network connecting cargo generation clusters in UP and MP via Agra. This road will serve the requirement of Central Maharashtra and part of Northern Cluster.

- **National Highway 4** – Thane to Chennai via Belgaum, Bangalore and Ranipet, caters to South-East bound cargo. This is a four lane network connecting 3 main industrial networks at Pune, Chennai and Bangalore. NH 65 merges into NH 40 at Pune.
- **National Highway 66** – Cochin to Panvel via Goa, caters to South-West bound cargo. NH 66 is a four lane road and part of the stretch is two lane roads which are being widened to 4 lanes with a provision to expand to six lanes to accommodate future expansions.


**Figure 2.3 Existing and Proposed Rail Connectivity to Mumbai Port**
*(Source: MbPA Report on Planning Proposals)*


**Figure 2.4 Existing Road & Rail Connectivity to MbPA**
*(Source: Traffic Study Report prepared by CRISIL)*

### 2.3.2 Mumbai City Connectivity and Impact on MbPA Traffic Evacuation

Cargo evacuation by road and rail from MbPA to hinterland has serious interference with passenger traffic. Passenger traffic has preference over cargo on all roads passing through Mumbai Metropolitan Region. Mumbai Metropolitan Region Development Authority (MMRDA) is implementing large-scale infrastructure upgradation plan including creation of new flyovers, construction of a web of Metro, creation of new roads, etc. to ease traffic in MMRDA. All these infrastructures proposed to be constructed in coming years are likely to ease passenger traffic on roads of Mumbai. It is also likely to distribute the massive traffic load on existing roads that are also used by MbPA for evacuating cargo. Easing and distribution of traffic loads between multiple infrastructures would create way for faster than timeless evacuation of cargo from MbPA. It is believed that the present restriction on use of roads for cargo transportation would be eased. The upcoming infrastructure developments of MMRDA is likely to immensely improve road evacuation of cargo from MbPA and is unlike to impact rail evacuation of cargo from MbPA using railways.

### 2.3.3 Coastal Road

MMRDA is planning to construct a Coastal Road, which will run along the western coast of Mumbai from Marine Drive to Kandivali. The proposed coastal road will ease traffic on Western Express Highway leaving way for movement towards North India including Gujarat

### 2.3.4 Trans-Harbour Link

The Mumbai Metropolitan Region Development Authority (MMRDA) has proposed several road projects to improve city transpiration. One of the significant infrastructures affecting MbPA cargo evacuation towards Pune and Navi Mumbai is construction of Mumbai Trans Harbour Link (MTHL), which is a 22 km long bridge connecting Sewri in Mumbai with Ulwe in Navi Mumbai. This will be a 6 lane access controlled bridge with 16.5km marine viaducts and 5.5km land viaducts. On the Sewri end it will connect the eastern freeway. A 4 lane Sewri-Worli elevated corridor is also planned which will ultimately connect MTHL to Worli seaface (close to Bandra Worli sealink). On Ulwe end it will connect to Navi Mumbai International airport and Mumbai-Pune express highway. MTHL is expected to cater 70,000 vehicles on daily basis.

The construction of this sea link project began in April 2018, now it is in advanced stage of construction. It is estimated to be fully operational by 2024. Once completed it will be the longest sea bridge in India.


**Figure 2.5 Mumbai Trans Harbour Link**
*(Source: Traffic Study Report prepared by CRISIL)*

### 2.3.5 Samruddhi Mahamarg

Samruddhi Mahamarg aims to reduce the travel time between Mumbai to Nagpur from current 16 hours to 7 hours. The length of the project will be 701 km starting from Nagpur till Amne village in Thane district. This will be a 120m wide 6 lane highway with 8 lane provision in future. Samruddhi Mahamarg will pass through 10 districts, 26 talukas, 392 villages of Maharashtra and is estimated to directly impact around 36% of the State population residing along the Expressway.

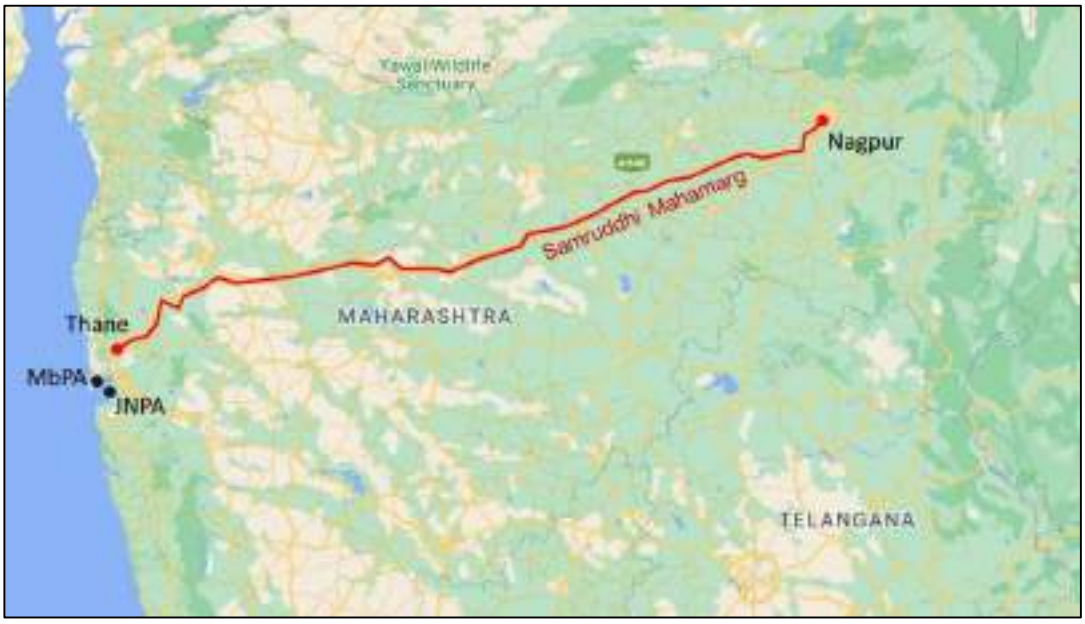



**Figure 2.6 Samruddhi Mahamarg**
*(Source: Traffic Study Report prepared by CRISIL)*

The major districts that will be directly covered are Nagpur, Wardha, Amravati, Washim, Buldhana, Jalna, Aurangabad, Nashik, Ahmednagar and Thane. Samruddhi expressway is estimated to contribute 6% to the National Trunk and Freight Infrastructure. Around 30,000 to 35,000 vehicles will use this expressway daily. It will connect several industrial areas, the Delhi-Mumbai Industrial Corridor (DMIC), the Western Dedicated Freight Corridor (WDFC), dry ports of Wardha and Jalna and Mumbai's JNPT. Mumbai–Nagpur–Raipur–Angul Gas pipeline will run along the expressway as a part of National Gas Grid.

### 2.3.6 Virar – Alibaug Multi Modal Corridor

MMRDA is planning to develop a 126 km long Multi-Modal Corridor between Virar and Alibaug. The project will improve connectivity to Virar, Bhiwandi, Kalyan-Dombivali, Panvel, Taloja, Uran and Alibag. This project will be executed in 2 phases. Phase-1 will connect Virar to Uran (79 kms) and Phase-2 will connect Uran to Alibaug (42 kms). It will intersect NH-8 (Delhi-Mumbai), NH-3 (Agra-Mumbai), NH-4 (Chennai- Mumbai), Bhiwandi Bypass, Mumbai-Pune Expressway and Mumbai-Vadodara Expressway. It will also be linked with other key projects like the Trans Harbour Link and the Dedicated Freight Corridor. The travel time between Virar and Alibaug will be reduced by 50%. Currently this project is in its initial stages of development and land acquisition survey is under process. This corridor is expected to be completed and opened in 2030. This will ease traffic moving towards MIDC Chiplun, Mahad, etc. It will also provide an alternate road to existing Goa highway. Any traffic movement between Mumbai Port and JSW steel plant at Dharamtar will find it easier and faster to reach destination.

### 2.3.7 Metro-Rail Connectivity in Mumbai

The proposed metro routes in Mumbai aim to connect all remote locations that are not currently serviced by the existing suburban train system. This will provide a fast and efficient alternative to personal cars and reduce the number of cars on the roads of Mumbai, leading to a surplus capacity of existing roads for vehicles.


**Figure 2.7 Mapping of Existing & Under Construction Metro Rail**
*(Source: Traffic Study Report prepared by CRISIL)*

The metro line no 4, predominantly known as Wadala-Ghatkopar-Thane-Kasarvadavali (WGTK) metro line is likely to offer maximum benefit to MbPA. This line is likely to improve connectivity between eastern and western suburbs of Mumbai and the neighbouring city of Thane. The line is approximately 32 km long and will have 32 stations, of which 28 stations will be elevated, and 4 stations will be underground. 9.2 km extension of line no 4 i.e from Wadala to Chhattrapati Shivaji Terminus (CST) has also been proposed. The route of the WGTK metro line is as follows:

- Starting CST to Wadala (proposed), and further from Wadala the metro line will run northwards, parallel to the Harbour Line of the suburban railway, up to Mulund.
- From Mulund, the metro line will continue towards the east, crossing the Eastern Express Highway and the Thane Creek, and then enter Thane city.
- In Thane, the metro line will run along the Ghodbunder Road up to Kasarvadavali.

Wadala is a critical junction while evacuation cargo from MbPA to hinterland. Shift of passengers using vehicles from road to Metro will ease congestion at the Wadala junction and further connectivity towards Eastern Expressway Highway and Western Expressway High. The WGTK metro line is expected to have a significant impact on the critical junctions of the

road connecting MbPA with Navi Mumbai and Pune. The metro line is expected to provide a faster and more efficient mode of transportation, which will reduce the travel time for commuters and reduce congestion on the roads.

### 2.3.8 Inland Waterways in Maharashtra

Multiple waterways movement opportunities have been identified in Maharashtra across Mumbai, Palghar, Raigadh, ratnagiri and Sindhudurg region. Operational waterways and development of NW 53 will support decongestion of Mumbai Road traffic.


Figure 2.8 Inland Waterways in Maharashtra

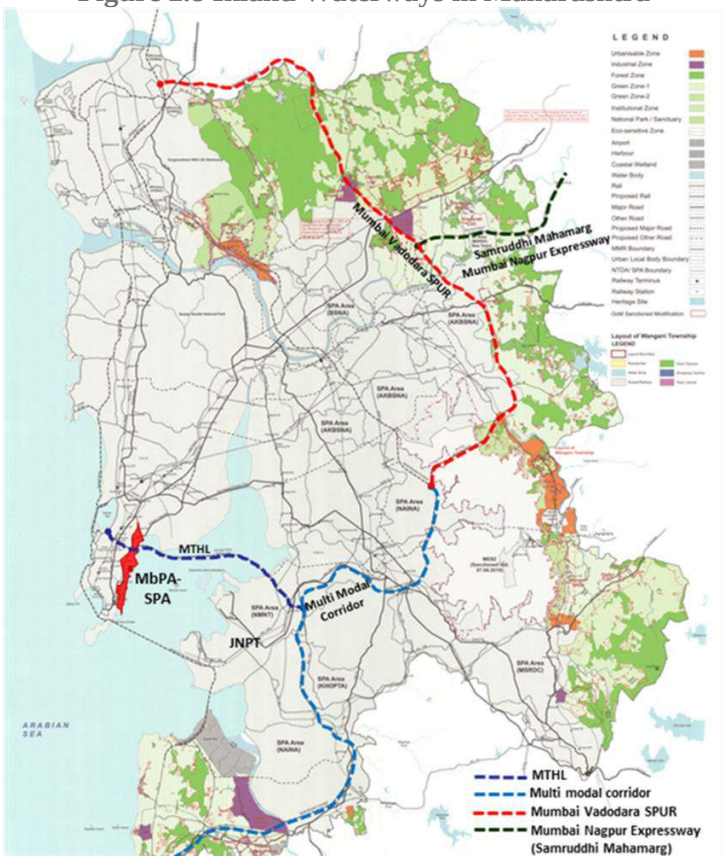



Figure 2.9 Existing & Proposed Connectivity to MbPA

## 2.4 Extent of Area

The total land area in possession of Mumbai Port is 939.98 ha. However, the area under consideration for the preparation of Comprehensive Master Plan of Mumbai Port Authority covers a total area of approximately 7155 ha including port water limits.

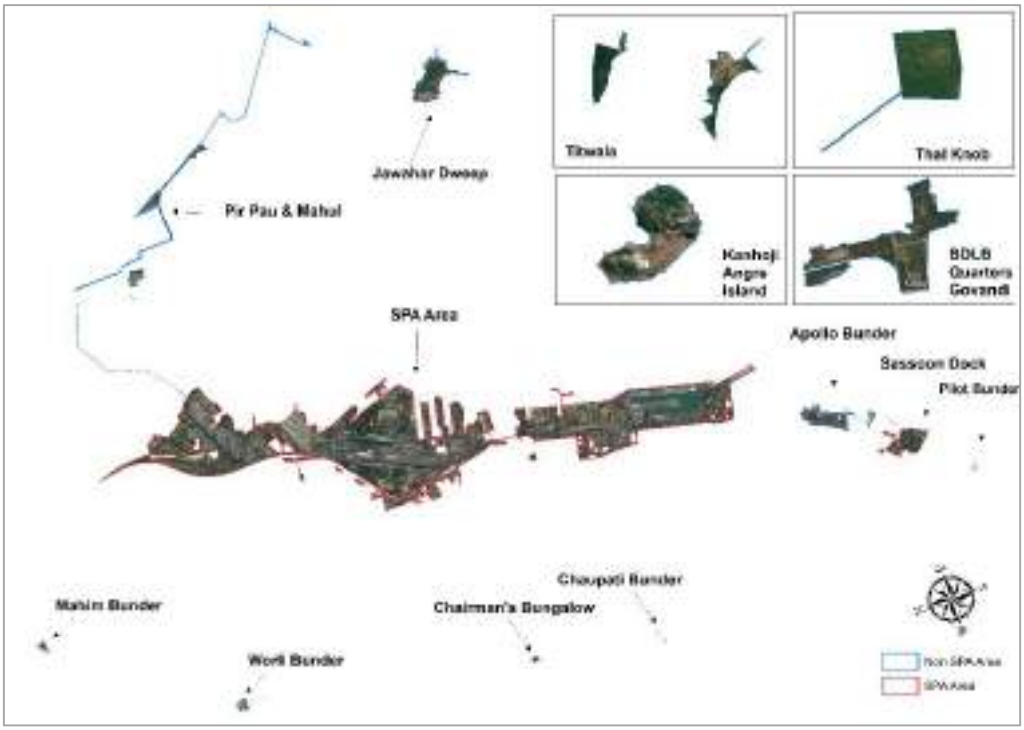



**Figure 2.10 Total Land Area under the possession of MbPA**
*(Source: Estate Department, MbPA)*

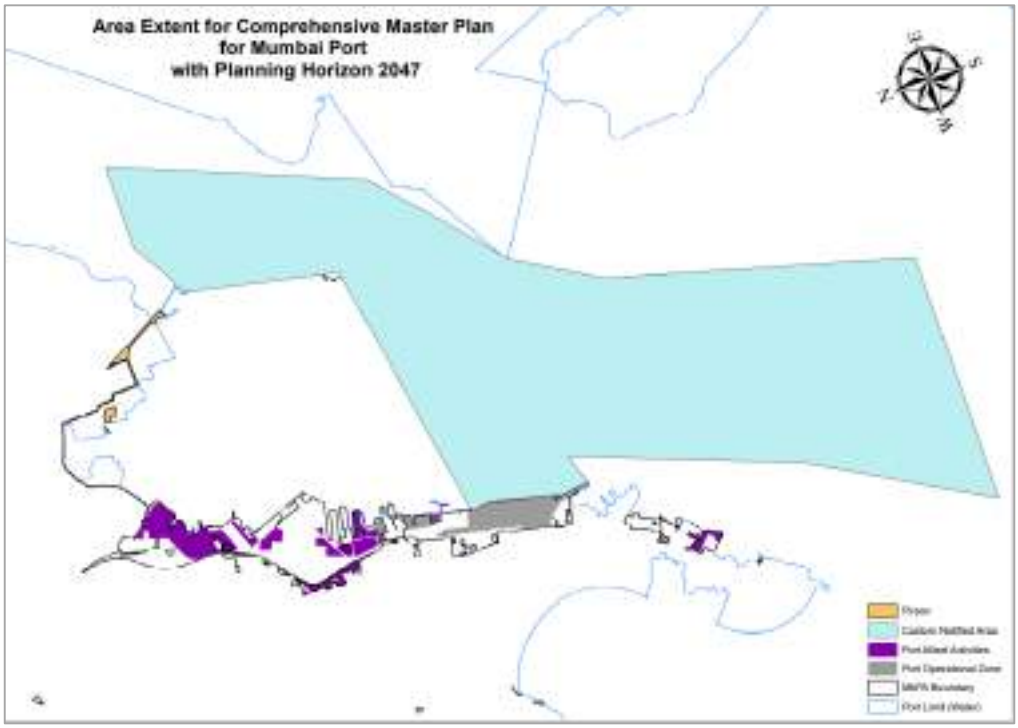



**Figure 2.11 Extent of Planning Area for Master Plan**

The port is geographically spread into different areas based on the type of cargo to be handled.

- Main Harbour in Ballard area – for handling dry bulk, breakbulk, general cargo, automobiles
- Jawahar Dweep (Butcher island) – for handling Crude and POL products
- Pir Pau – for handling chemicals

Mumbai port was handling coal at Haji Bunder and this has been discontinued due to environmental considerations. The Prince's & Victoria Docks have been closed and filled up to create stack yard for containers. The extent of port area is shown in Figure 2.12.

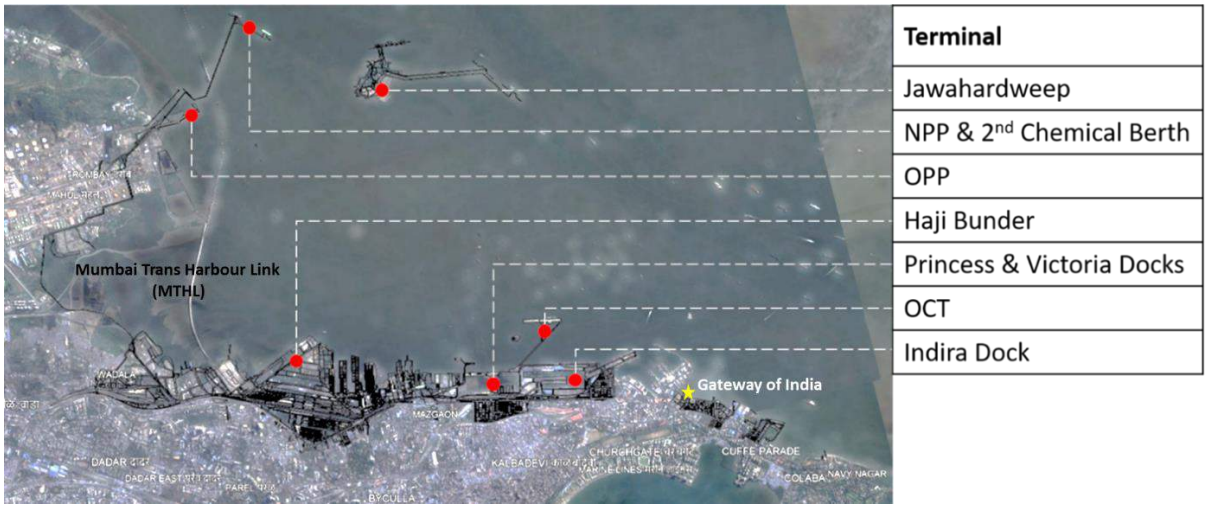



**Figure 2.12 Extent of Port Area of MbPA**
*(Source: Final Report on Master Plan for Mumbai Port prepared by AECOM)*

Ministry of Ports, Shipping and Waterways (Government of India) had recognised the need for transformation of Mumbai Port, and the Government of Maharashtra actively co-operated by granting MbPA the status of a Special Planning Authority (SPA). The Urban Development Department, Government of Maharashtra, vide their notification No.TPB-4317/492/CR-289/2017/UD-11 dated 23.04.2018 appointed MbPA as 'Special Planning Authority' under Section 40 (1B) of the MR & TP Act, 1966 for an area of 966.30 ha along the eastern waterfront. This has enabled MbPA to undertake preparation of a Master Plan of its Estates and its subsequent implementation. MbPA as SPA has completed all the statutory actions under MR & TP Act 1966 and has submitted the Draft Planning Proposal to the State Government for sanction and sanction of the same is awaited.

Existing land use plan of entire MbPA SPA area was prepared at the time of preparing Planning Proposal. Majority of SPA land towards east & south of Orange Gate is currently under Port

related uses which includes Indira dock, Victoria Dock, Prince Dock, International Cruise Terminal and Offshore Container Terminal. As per records of Estate Department (MbPA) and actual site survey then conducted, the existing area under port related uses was 156.16 ha. The existing lands under port use is shown in the figure below.

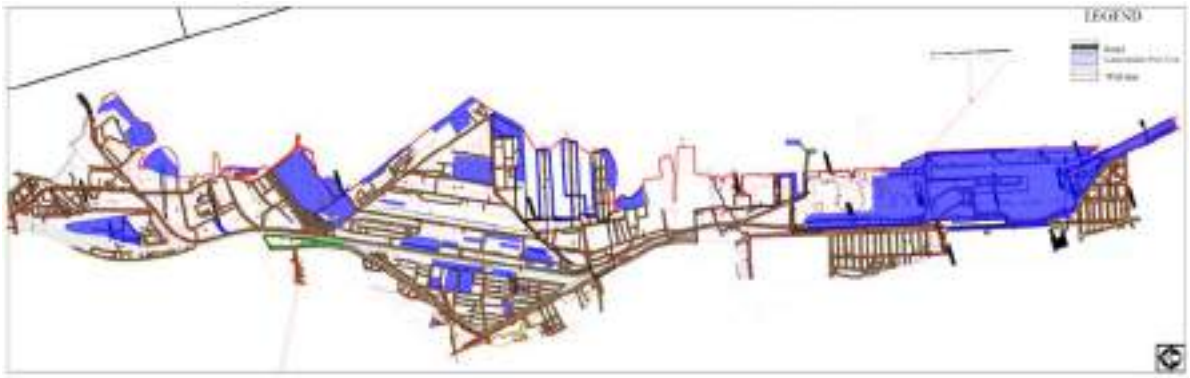



**Figure 2.13 Existing Lands under Port Use**

MbPA in its Planning Proposal, prepared as SPA, has proposed lands for port activities as "Port Allied Activity (PA)" zone and "Port Operational Zone (POZ)". Areas falling under PA zone include Sewree Tank Farms in North, area adjoining Sewree Gaothan, few land parcels within Redevelopment Site 1, numerous land parcels in Unit 2 & 6, Darukhana area, Lakdi bunder, Frere Basin, Mallet Bunder and Sassoon Dock. Areas falling under POZ zone include the lands along Indira Dock and Ballard Pier. In addition to the custom bound area, the lands falling under PA zone and POZ zone as per the Planning Proposal of SPA is also included under the extent of area for preparation of comprehensive master plan for the planning horizon 2047.

## 2.5 Existing Land Use of Port Operational Area

The core port operational area comprises of Indira Dock, Victoria Dock & Prince's Dock. The gross area for core port operational area is approximately 27 ha.

Major land use that identified at the time of survey are as follows:

(1) **Port Storage/Operation Area:** All the open areas of ID and VD which are used for storage of cargo, loading and unloading of materials near berths and sheds are shown under this category.

(2) **Multipurpose Use:** These are basically the areas along the roads and existing sheds which are open and temporarily being used for multiple activities like parking, stacking of goods etc.

(3) **Port Utilities:** All the port related amenities like weigh bridge, fire station, sub stations, parking, baggage scanners, pump rooms and toilets falls under this category.

(4) **Roads:** All existing roads of Port is kept under this category.

(5) **Waterbody:** The basin area is kept under waterbody

(6) **Area given to Cochin Ship Yard:** The dry dock area which is given to CSL is shown separately under this category.

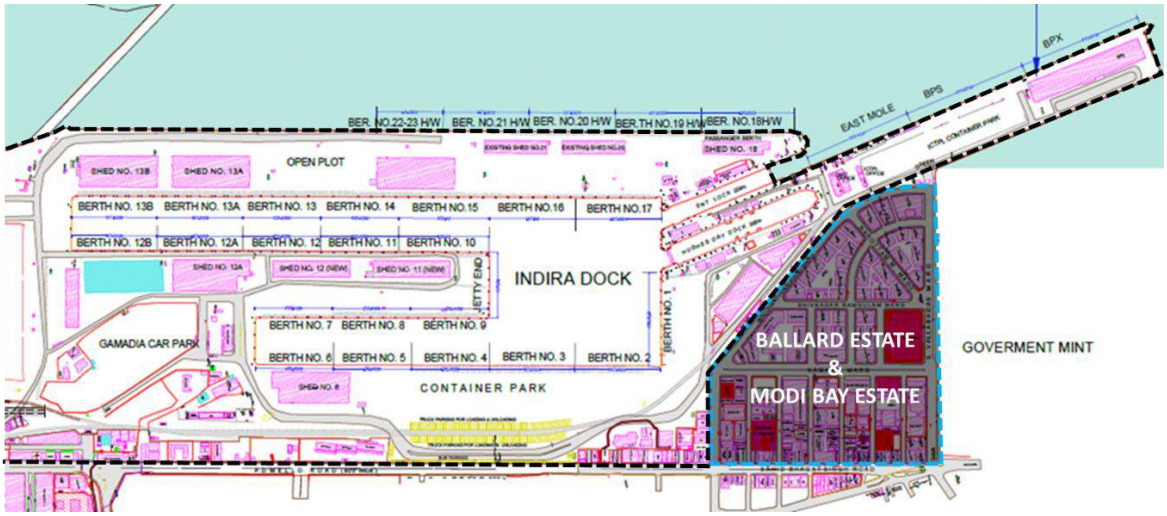



**Figure 2.14 Existing Land Use of Core Port Operational Area**

The existing land use area statement of the core port operational area is given below:

**Table 2.2 Existing Land Use of Port Area**

| Area Statement | |
|---|---|
| **Categories** | **Area (sq.m.)** |
| Port Storage/Operation Area | 4,20,719.97 |
| Multipurpose Use (Parking, Staking etc.) | 10,698.03 |
| **Port Utilities** | |
| Weigh Bridge Area | 3,919.51 |
| Fire Station | 532.57 |
| Toilets | 160.60 |
| Sub Station | 1,839.79 |
| Pump Rooms | 2,647.76 |
| Baggage Scanner | 39.33 |
| Parking | 1,861.74 |
| | |
| Roads | 1,51,259.34 |
| Area given to CSL | 16,600.09 |
| Waterbody | 2,49,402.89 |

*(Source: MbPA in house Draft Master Plan)*

The existing land use plan of port area is attached in Annexure-1.

## 2.6 Movement Pattern within Port Operational Area

There are four main points of entry/exit within Port. They are Yellow Gate, Blue Gate, Green Gate and Orange gate.

(1) Yellow Gate-Indira Dock is for pedestrian movement, ships store / provisions movement port users' vehicle movement ship's crew movement and employees' vehicle of the port.
(2) Orange Gate-Indira Dock are for trucks moving in and out of the cargo vehicles.
(3) Green Gate-Indira Dock is for movement of port employees as well as for the passengers using cruise terminal.
(4) Blue Gate-Indira Dock is only for pedestrian movement.
(5) Yellow Gate-Prince Dock for port employees' movement.

All the vehicles including heavy trucks entering and exiting from Orange Gate and Yellow Gate Indira Dock passes through 3 major junctions near Gamadia Complex and travels towards different berths at Indira Dock and further towards Blue and Green Gate.

All the port employees or other pedestrians entering and exiting from Yellow Gate Prince's Dock also has to pass through these junctions in order to reach to their destination. These junctions are currently acting as the major point of conflict between trucks/vehicles and pedestrian/cycle movements within port which may lead to be the reason of accidents within port in future.

## 2.7 Existing Infrastructure within Port

### 2.7.1 Port Railways

Mumbai Port Authority Railway was established in 1915. MbPA is having its own rail network system from Wadala to Docks. Trains will be received up to Wadala Exchange Yard and therefrom moved to various sidings/depots. The MbPA Railway takes off from Raoli Junction situated on the Harbour branch line of Central Railway. The conventional double line working is resorted to for receiving and dispatching trains to and from MbPA Railway.

The MbPA Railway is having 10 kms of route length between Indira Dock and Wadala and has an extensive network of track of about 51 kms. It serves the Docks as well as the important sidings on the Port Trust Estates. For managing the Port Railway System, MbPA has hired one high power locomotive from M/s RITES Ltd. The Railway handled around 1.16 million tons of traffic during 2021-22. For handling ICD traffic, a full-fledged Rail Container Depot siding

had been set up at Cotton Depot (RCD) with facilities for reception, stacking etc. of containers. It can handle two trains of 45 wagons with double discharge facilities.

At Wadala, the port has developed marshalling yard where the port's rail borne cargo is interchanged with Trunk railways. Central railways allow on an average 3 movements of rakes at Wadala towards North for MbPA's freight trains during non-peak hours without affecting the city passenger traffic windows.

Thus, Central Railways locomotives run up to Wadala, the interchange point. MbPA's locomotive takes over from Wadala to Indira Dock as well as Grain Depot.

At present, all rail borne traffic from MbPA undergo this change over due to the availability of Over Head Electric (OHE) system only up to Wadala and non-availability of OHE system from Wadala to Indira Dock as well as Grain Depot.

### 2.7.2 Internal Road Connectivity

Mumbai Port Authority owns and maintains about 63 km long Roads in MbPA Estate. The Main Roads are about 20 km in length and the secondary roads are about 43 km in length as shown in Figure 2.15.

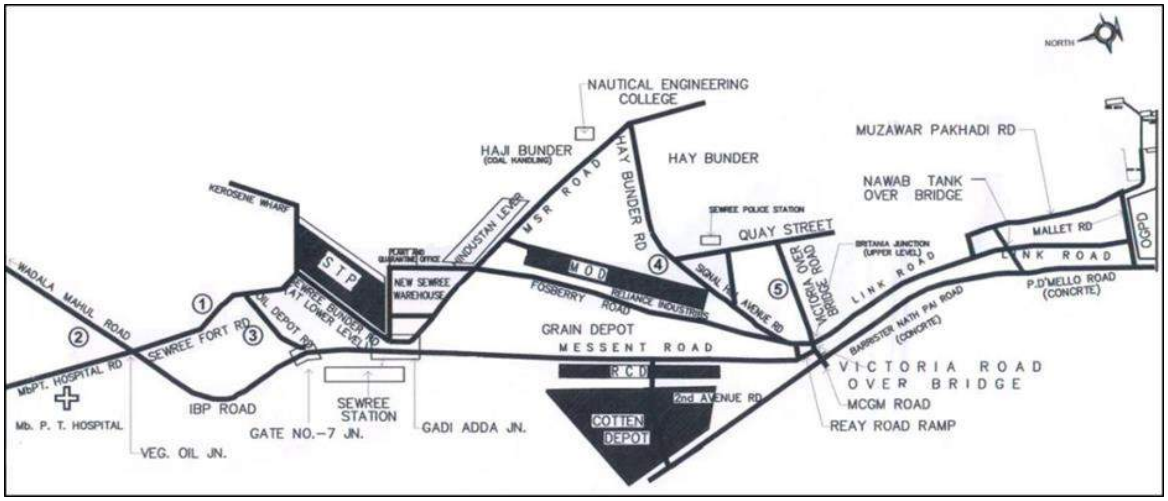



**Figure 2.15 Internal Road Connectivity in Mumbai Port**
*(Source: Final Report on Master Plan for Mumbai Port prepared by AECOM)*

MbPA as SPA has prepared a Planning Proposal u/s 115 of the MR&TP Act for the area along eastern waterfront. The modified road connectivity including the proposed roads is shown Figure 2.16.

**Figure 2.16: Proposed Road Connectivity in Mumbai Port**
*(Source: MbPA Report on Planning Proposals)*

### 2.7.3 Water Supply & Sewerage

**Water Supply:** As shown in plan below, water supply network within port is spread uniformly and caters to entire area of port. Majority of the shed and offices are connected with water supply network.

**Sewerage:** As shown in plan below, sewer network is existing only in a part portion of the port. Sheds along the berth 13ID to 22ID are not connected to sewer network.

Also there are only 4 public toilets within entire Port area. These toilet blocks are at Blue Gate, Green Gate, Grey Gate and near berth 19ID. There is no provision of public toilets in the northern part of the port. Area near Yellow Gate Indira Dock, Gamadia complex, near Berth no 10ID to 12ID and around Berth no 13ID to 22ID does not have access to public toilets.


**Figure 2.17 Water Supply and Sewer Network within Port Area**

### 2.7.4 Port Navigational Channel

The main navigational Harbour Channel is, for the great part, a natural deep-water fairway and the channel has been deepened to 15 meters only close to facilities. With a mean high water

neap tide of 3.3 meters, the channel is adequate to meet the requirement of most of the cargo vessels, passenger ships and tankers. With good lighting arrangements navigation is allowed at the port round the clock. This channel also acts as a common channel to Mumbai and JN port.

The Mumbai harbour channel is presently maintained at a depth of 15 m. The total length of the dredged channels of Mumbai Port is about 30.4 km. A major part of the dredged channels (length 26.36 km) is the main harbour channel running between the Prong's Reef at the western end of the harbour and the oil berths at Jawahar Dweep. The entrance channel to the Indira Dock and Harbour wall berths take off from the main harbour channel at a distance of about 10 km from the Prongs reef. There is a dredged channel about 2 km long which takes off from the northern end of Jawahar Dweep to the Pir Pau Oil terminal.


**Figure 2.18 Navigation Channel to Mumbai Port**
*(Source: Final Report on Master Plan for Mumbai Port prepared by AECOM)*

The details of approach to the various berthing facilities are given in Table 2.3.

**Table 2.3 Approach to Various Berthing Facilities**

| Sr. No. | Approach From Main Channel | Length (km) | Min Width (m) | Min Depth (m) |
|---|---|---|---|---|
| 1 | To Indira Dock approach | 2. 30 | 429 | 8.5 |
| 2 | ID Approach to ID entrance | 0.80 | 40 | 8.2 |
| 3 | To Jawahar Dweep (JD-1, JD-2, JD-3) | 2.5 | 300 | 10.5 |
| 4 | Jawahar Dweep to SCB | 1.35 | 300 | 10.5 |
| 5 | SCB to NPP | 0.75 | 200 | 9.0 |
| 6 | NPP to OPP | 5.27 | 122 | 4.5 |

*(Source: MbPA in house Draft Master Plan)*

## 2.8 Existing Facilities

Cargo handling infrastructure facilities at MbPA is widespread in different areas. Bulk, general cargo and automobiles are being handled at main harbour near Colaba area. Crude and POL are handled at Jawahar Dweep located at Butcher Island. Chemicals are being handled at Pir Pau near Mahul, Trombay. Trombay Thermal Power Station operates a jetty near Pir Pau to import coal for the power plant.

The following sections indicate the location mapping of each liquid berths and general cargo berths. Berth specifications like length, depth, maximum vessel size allowed and traffic handled at each berth along with capacity gives the capacity utilisation of berths are also mentioned in the following sections.

**Table 2.4 Cargo Handled in April 2023 to March 2024**

| Commodity | Import (in MnT) | Export(in MnT) | Total(in MnT) |
|---|---|---|---|
| POL | 2.12 | 4.64 | 6.75 |
| LPG | 1.26 | 0 | 1.26 |
| Crude | 19.31 | 9.57 | 28.87 |
| POL Transhipment | 0 | 1.92 | 1.92 |
| Iron and Steel | 3.63 | 1.75 | 5.39 |
| Coal (TPC) | 2.66 | 0 | 2.66 |
| Stream Cargo | 15.19 | 0.11 | 15.3 |
| Agri Products | 0.12 | 0 | 0.12 |

| | | | |
|---|---|---|---|
| Cement | 0.27 | 0 | 0.27 |
| Chemicals | 1.79 | 0.01 | 1.8 |
| Automobile | 0.03 | 0.17 | 0.2 |
| Fertilizer | 0.55 | 0 | 0.55 |
| Lube/Base Oil | 1.01 | 0.02 | 1.03 |
| LNG | 0 | 0 | 0 |
| Others | 1.09 | 0.05 | 1.14 |
| **Total** | **49.03** | **18.23** | **67.26** |

In addition to cargo handling infrastructure facilities, MbPA has provisions and dedicated spaces for other facilities such as ship repair, fisheries and urban water transport as well. The succeeding sections mainly discusses about the following aspects of MbPA:

(1) Sector 1: Liquid Handling Berths
(2) Sector 2: General / Multipurpose Cargo Handling Berths
(3) Sector 3: Bunkering Facility at MbPA
(4) Sector 4: Ship Repair
(5) Sector 5: Fisheries
(6) Sector 6: Urban Water Transport

### 2.8.1 Sector 1: Liquid Bulk Terminals

MbPA has two terminals to handle POL and chemicals namely; Jawahar Dweep and Pir Pau.

**Jawahar Dweep:**

Jawahar Dweep is a marine oil terminals having five jetties i.e JD 1 to JD5. Entire infrastructure is owned, operated and maintained by MbPA. Crude, Diesel, Naphtha, M.S and Black Oil/HFO are handled at this terminal with 5 different product pipeline networks. JD 1, JD 2 and JD 3 were commissioned first during 1950s and can handle panamax tankers. JD 4 and JD 5 are dedicated for crude handling. JD 4 was commissioned during 1980s and JD 4 can handle suez max tankers dead freighted to the permissible draft. JD 1, JD 3 and JD 4 have 5 × 12" marine loading arms each while JD 2 has 3 × 12" marine loading arms. These jetties handle crude oil, white oil and black oil POL products. JD5 was commissioned in January 2021 and can cater to fully loaded suezmax and partly loaded VLCC ( Up to 2,81,000 DT).The berths at Jawahar Dweep are connected to the mainland by a set of submarine pipelines as detailed in the Table 2.5 hereunder. These pipelines are, in turn, connected to the two oil refineries of BPCL and

HPCL and also to the marketing terminal of IOC. ONGC has also laid a dedicated subsea pipeline. The crude from the offshore is transported through subsea pipeline upto Uran- Pirpau – JD. The crude is exported (coastal) through JD4.

**Table 2.5 Details of Submarine Pipelines at Jawahar Dweep**

| Sr. No. | Nomenclature | Product | Diameter (inches) |
|---|---|---|---|
| 1. | C1 & C2 | Crude | 42 |
| 2. | B1 | Black oil | 36 |
| 3. | W1 | Naphtha | 30 |
| 4. | W2 | HSD | 30 |
| 5. | W3 | MS | 30 |
| 6. | FW | Fresh water | 8 |

All the berths have been provided with firefighting facilities as per statutory requirement. At Jawahar Dweep BPCL had 8 tanks for storing HSD/SKO/FO with a total capacity of 189,620 KL. These are being revamped by BPCL as per OISD conditions after the fire accident in 2017.

**JD 5:**

Mumbai Port Authority has been catering to the requirement of BPCL and HPCL refineries since the year 1954 by providing handling facilities with the first three berths namely Berth no. 1,2&3 at Jawahar Island. Subsequently, due to the expansion of the refineries, increase in size of tankers, MbPA added one more berth in the island namely fourth oil berth in the year 1984, which could handle larger vessels and upto 98,000 tonnes parcel size. This does not give economy in freight charges since Oil PSUs are required to bring Suez Max tanker with dead freighting resulting in the avoidable expenditure to the tune of Rs.200 crores every year.It is in this context that the fifth oil berth was formed which can cater to fully loaded Suezmax vessels and partly loaded VLCC.

**a) Highlights**

- Fifth Oil berth was constructed with cost sharing by the Oil PSUs to the tune of 50%.
- Work commenced in May 2016. Completed in December 2020.

**b)** Berth Commissioned on 30.1.2021.

**Benefits:**

- Saving to National Exchequer to the extent of Rs.200 crores every year due to larger vessels and larger parcel size

- The output (rate of unloading) will increase from average of 3500 T/ hour to 7000 T/ hour resulting in saving of shipping cost to oil PSUs. Improvement in ship Turnaround time.
- The Turnaround time will also improve.
- Fully loaded Suezmax vessels (1,40,000 t) and partly loaded VLCC up to 2,81,000 DT can be handled, resulting in rearranging the logistics and reduction of logistic costs.
- Capacity: 22 MMTPA-Largest berth in terms of berth capacity among all Major Ports of India.

**c) Technology:**

- Quick Release Mooring Hooks – resulting in faster mooring of vessels. Auto release of hooks during emergency through remote system avoiding damage to berths and vessels.
- Berth Aid system: First of its kind among major ports. Will help pilots guiding the tugs for safe berthing, using display at the screen
- Shore Gangway: Will facilitate the boarding of the officials and Customs to oil tankers at the fastest time for start of the pumping of oil cargo.
- Marine loading arms: 5 nos. of 20" size and 2 nos. of 8" size.
- New 42" subsea pipeline added in order to have separate pipelines for BPCL and HPCL. Berth was commissioned on 30.1.2021.


**Figure 2.19 Marine Oil Terminals at Jawahar Dweep**
*(Source: Traffic Study Report prepared by CRISIL)*

**Figure 2.20 Fifth Oil Terminal at Jawahar Dweep**

**Pir Pau:**

Pir Pau is oil pipeline section handling chemicals and products at 3 jetties i.e Old Pir Pau, First Chemical Berth and Second Chemical Berth. Third Chemical Berth is under construction. POL products and chemical products are handled at the Pir Pau for local industries around. These are located at the northern extremity of the harbour's deep waters. While the old jetty is nearer to the shore, the new jetties, constructed during 1996 & 2016 is located about 2 km offshore of the old one. Due to construction of MTHL, old Pir pau is handling only barges.

The handling is on Land lord model, wherein basic infrastructure such as Berths. Electrical and firefighting facilities are provided. The users namely, HPCL, BPCL, AEGIS Logistics, Sealord Containers, TATA Power have laid their pipeline from their storage facilities to the Pirpau berths. The marine loading arms are also provided by the respective users. MbPA has also facilitated the movement of the products from oil refinery at Mahul to the storage facilities at Wadala and Sewri through the pipeline.


**Figure 2.21 Chemical Terminals at Pir Pau**
*(Source: Traffic Study Report prepared by CRISIL)*

**Table 2.6 Specifications of Liquid Handling Berths**

| Berth | Length (m) | Draft (m) | Cargo Type | Max. Vessel Size Permissible | |
|---|---|---|---|---|---|
| | | | | LOA (m) | DT |
| JD 1 | 244 | 11.30 | Crude & POL | 225.5 | 70,000 |
| JD 2 | 244 | 10.80 | Crude & POL | 225.5 | 48,000 |
| JD 3 | 244 | 11.30 | Crude & POL | 225.5 x 28.56 | 70,000 |
| JD 4 | 493 | 12.50 | Crude & POL | 297 | 1,25,000 |
| JD 5 | 363 | 16.8 | Crude & POL | 369 | 2,81,000 |
| OPP | 174 | 3.5 | POL | - | - |
| FCB | 197 | 10.5 | Chemical | 197.0 | 47,000 |
| SCB | 230 | 13 | Chemical | 230.0 | 72,600 |
| TCB | Under-Construction | | | | |

*(Source: Traffic Study Report prepared by CRISIL)*

### *2.8.1.1 Traffic Handled and Capacity Utilisation*

The figure below shows the commodities handled at each berth in last 5 years. JD 4 and JD 5 handles crude exclusively, rest other POL products are handled at JD 1, 2 and 3. Pir Pau jetties are used to handle Chemical and POL products.

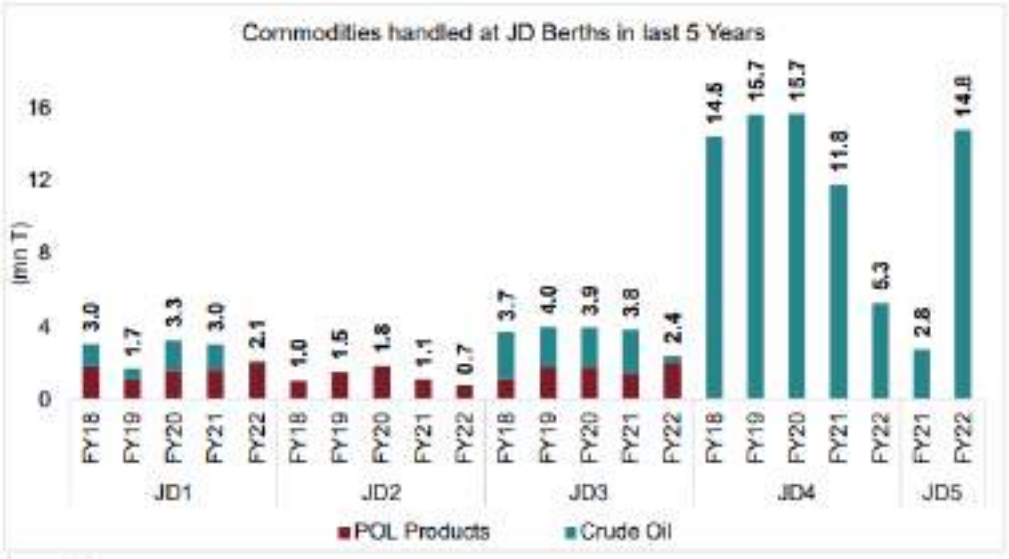



**Figure 2.22 Berth wise Commodities Handled at Jawahar Dweep in last 5 years**
*(Source: MbPA & Traffic Study Report prepared by CRISIL)*

*Note: Commodities handled at JD berths during the year 2023-2024 are as follows:*

1. ***JD 1:** Crude Oil = 0.25 mnT, POL products = 2.03 mnT, Total = 2.28 mnT*
2. ***JD 2:** Crude Oil = 0 mnT, POL products = 1.04 mnT, Total = 1.04 mnT*
3. ***JD 3:** Crude Oil = 0.54 mnT, POL products = 1.82 mnT, Total = 2.36 mnT*
4. ***JD 4:** Crude Oil = 6.33 mnT, POL products = 0 mnT, Total =6.33 mnT*
5. ***JD 5:** Crude Oil = 16.22 mnT, POL products = 0 mnT, Total = 16.22 mnT*

*(Source: Annual Report on Traffic and Performance 2023-2024)*

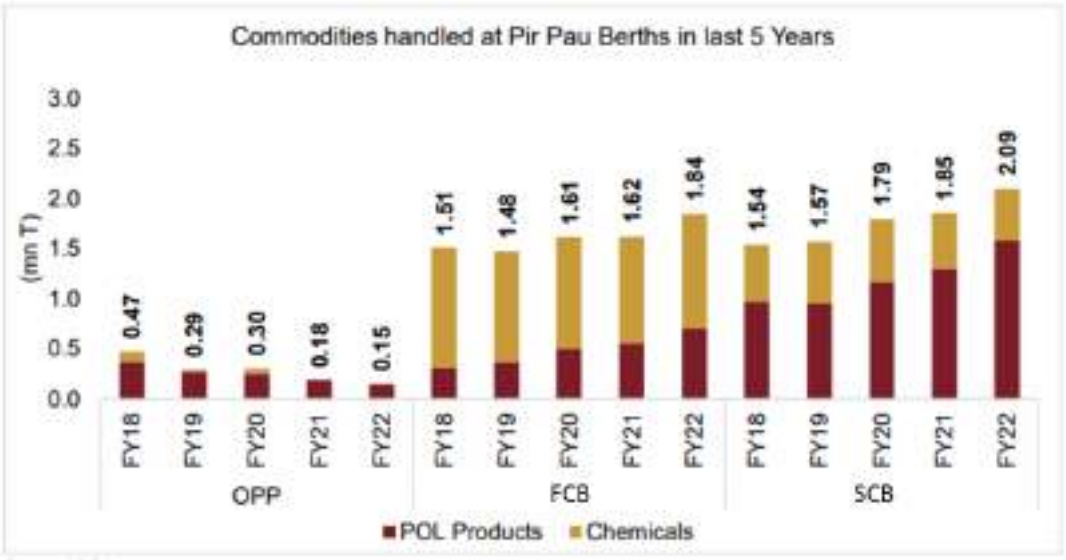



**Figure 2.23 Berth wise Commodities Handled at Pir Pau in last 5 years**
*(Source: MbPA & Traffic Study Report prepared by CRISIL)*

*Note: Commodities handled at Pir Pau berths during the year 2023-2024 are as follows:*

1. ***OPP:** POL Products= 0.11 mnT, Chemicals = 0 mnT, Total = 0.11 mnT*
2. ***FCB:** POL Products= 0.64 mnT, Chemicals= 1.04 mnT, Total = 1.69 mnT*
3. ***SCB:** POL Products = 1.79 mnT, Chemicals= 0.74 mnT, Total = 2.54 mnT*

*(Source: Annual Report on Traffic and Performance 2023-2024)*

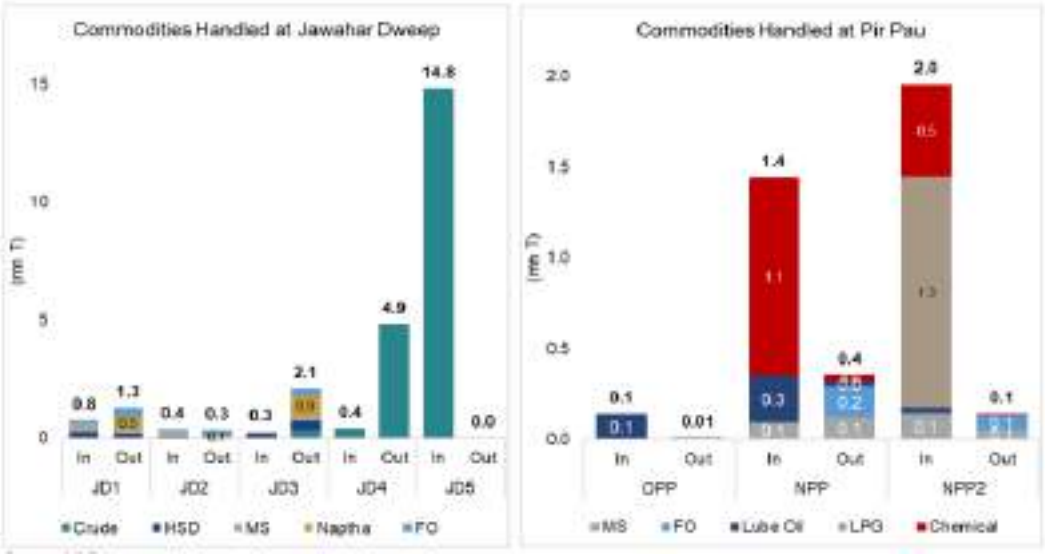



**Figure 2.24 Berth wise Inbound& Outbound Commodities handled at Liquid Terminals in FY22**
*(Source: MbPA & Traffic Study Report prepared by CRISIL)*

*Note: Berth wise Inbound& Outbound Commodities handled at Liquid Terminals in FY23-24 are as follows:*

1. ***JD1***

***Import:*** *Crude Oil=0 mnT, HSD=0.12 mnT, MS= 0.12 mnT, Naphtha= 0 mnT, FO=0.06mnT*

***Export:*** *Crude Oil=0.25 mnT, HSD=0.50 mnT, MS= 0.11 mnT, Naphtha= 0.79 mnT, FO=0.29mnT*

2. ***JD2***

***Import:*** *Crude Oil=0 mnT, HSD=0.08 mnT, MS= 0.19 mnT, Naphtha= 0 mnT, FO=0.10mnT*

***Export:*** *Crude Oil=0 mnT, HSD=0.21 mnT, MS= 0.06 mnT, Naphtha= 0.06 mnT, FO=0.32mnT*

3. ***JD3***

***Import:*** *Crude Oil=0.05 mnT, HSD=0.06 mnT, MS= 0.20 mnT, Naphtha= 0 mnT, FO=0.02 mnT*

***Export:*** *Crude Oil=0.49 mnT, HSD=0.35 mnT, MS= 0.16 mnT, Naphtha= 0.60 mnT, FO=0.39 mnT*

4. ***JD4***

***Import:*** *Crude Oil=3.03 mnT, HSD=0 mnT, MS= 0 mnT, Naptha= 0 mnT, FO=0 mnT*

***Export:*** *Crude Oil=3.29 mnT, HSD=0 mnT, MS= 0 mnT, Naphtha= 0 mnT, FO=0 mnT*

5. ***JD5***

***Import:*** *Crude Oil=16.22 mnT, HSD=0 mnT, MS= 0 mnT, Naphtha= 0 mnT, FO=0 mnT*

***Export:*** *Crude Oil=0 mnT, HSD=0 mnT, MS= 0 mnT, Naphtha= 0 mnT, FO=0 mnT*

6. ***OPP***

***Import:*** *HSD= 0 mnT, MS= 0 mnT, FO=0 mnT, Lube Oil= 0.10 mnT, LPG= 0 mnT, Chemicals=0 mnT*

***Export:*** *HSD= 0 mnT, MS= 0 mnT, FO=0.014 mnT, Lube Oil= 0.0019 mnT, LPG= 0 mnT, Chemicals=0 mnT*

7. ***NPP***

***Import:*** *HSD= 0.01 mnT, MS= 0.02 mnT, FO=0 mnT, Lube Oil= 0.32 mnT, LPG= 0 mnT, Chemicals=1.04 mnT*

***Export:*** *HSD= 0 mnT, MS= 0 mnT, FO=0.25 mnT, Lube Oil= 0.02 mnT, LPG= 0 mnT, Chemicals=0.008 mnT*

8. ***NPP2***

***Import:*** *HSD= 0.63 mnT, MS= 0.25 mnT, FO=0 mnT, Lube Oil= 0.05 mnT, LPG= 1.26 mnT, Chemicals=0.74 mnT*

***Export:*** *HSD= 0 mnT, MS= 0 mnT, FO=0.15 mnT, Lube Oil= 0 mnT, LPG= 0 mnT, Chemicals=0.002 mnT*

*(Source: Annual Report on Traffic and Performance 2023-2024)*

As shown in the table below, altogether JD terminal's capacity utilized was 44.33% in FY22-23 and 49.44% in FY23-24. Pir Pau terminal's capacity utilization rate is around 73.68% in FY22-23 and 78.77% in FY23-24.

**Table 2.7 Berths Occupancy in FY22-23 & FY 23-24 – Liquid Cargo**

| Berth No. | Berth Occupancy (in %) | |
|---|---|---|
| | FY 2022-23 | FY 2023-24 |
| Jawahar Dweep 1 | 52.13 | 52.80 |
| Jawahar Dweep 2 | 12.00 | 27.93 |
| Jawahar Dweep 3 | 47.85 | 51.70 |
| Jawahar Dweep 4 | 40.68 | 45.02 |
| Jawahar Dweep 5 | 69.01 | 69.77 |
| **Total at Jawahar Dweep** | **44.33** | **49.44** |
| New Pir Pau (NPP) | 74.38 | 79.68 |
| New Pir Pau 2 (NPP2) | 72.98 | 77.86 |
| Total at Pir Pau | **73.68** | **78.77** |

*(Source: Annual Report on Traffic and Performance 2023-2024)*

### 2.8.2 Sector 2: General / Multipurpose Cargo

MbPA has 30 General / Multipurpose cargo handling berths consisting of 27 berths of Indira Dock, 2 berths of Ballard Pier and 1 Offshore Container Terminal.

#### *2.8.2.1 Indira Dock*

Berths at Indira Docks has a draft ranging from 7 m to 9.14 m and the length of berths are from 130 m to 183 m. The Indira dock works on a lock-gate system with a lock length of 228.6 m and a width of 30.5 m, through which vessels can enter and leave the docks at any state of tide. There are 21 berths inside the basin and 5 berths along the harbour wall (Table 2.8). The design depth available inside dock basin berth and at outside berths is 8.84 to 9.14 m and 8.5 m, respectively. The depth of berths inside the basin can be further increased by 1.2 m by impounding water by electric pumps**.** Berths at Indira Docks handle Iron & Steel, automobiles, cement, fertiliser, food grains, project cargo, etc.


**Figure 2.25 Berths at Indira Dock**
*(Source: Traffic Study Report prepared by CRISIL)*

Note: ID 5 to ID 8 are with Cochin Shipyard for Ship Repair Operations, no cargo handled by MbPA. No cargo handled at ID 17 due to its proximity to Lock Gate.

**Table 2.8 Berth-wise Details at Indira Dock**

| Name of Berth | Width of Wharf (m) | Length of Wharf (m) | Designed Draft (m) | Berth Type |
|---|---|---|---|---|
| 1 Indira Dock | 13.72 | 180 | 9.1 | Multi-purpose berth |
| 2 Indira Dock | 13.99 | 158 | 9.1 | Multi-purpose berth-RORO Ramp |
| 3 Indira Dock | 13.84 | 158 | 9.1 | Multi-purpose berth |
| 4 Indira Dock | 13.84 | 158 | 9.1 | Proposed to be handed over to CSL |
| 5 Indira Dock | 13.82 | 158 | 9.1 | Handed Over to Cochin Shipyard Ltd. |
| 6 Indira Dock | 13.84 | 158 | 9.1 | |
| 7 Indira Dock | 18.36 | 152 | 9.1 | |
| 8 Indira Dock | 18.36 | 152 | 9.1 | |
| 9 Indira Dock | 13.42 | 152 | 9.1 | Proposed to be handed over to CSL |
| J/E Indira Dock | 18.97 | 130 | 9.1 | Multi-purpose berth |
| 10 Indira Dock | 18.29 | 152 | 9.1 | Multi-purpose berth |
| 11 Indira Dock | 18.29 | 152 | 9.1 | Multi-purpose |

| | | | | |
|---|---|---|---|---|
| | | | | berth |
| 12 Indira Dock | 13.72 | 152 | 9.1 | Multi-purpose berth |
| 12A Indira Dock | 18.26 | 180 | 9.1 | Multi-purpose berth |
| 12B Indira Dock | 18.26 | 180 | 9.1 | Multi-purpose berth |
| 13B Indira Dock | 16.61 | 180 | 9.1 | Multi-purpose berth |
| 13A Indira Dock | 16.61 | 180 | 9.1 | Multi-purpose berth |
| 13 Indira Dock | 16.61 | 158 | 9.1 | Multi-purpose berth |
| 14 Indira Dock | 20.29 | 158 | 9.1 | Multi-purpose berth |
| 15 Indira Dock | 20.29 | 158 | 9.1 | Multi-purpose berth |
| 16 Indira Dock | 16.30 | 158 | 9.1 | Multi-purpose berth |
| 17 Indira Dock | 16.54 | 158 | 9.1 | Not used for cargo handling due to proximity to lock gate |
| 18 Indira Dock | 9.22 | 183 | 8.7 | Multi-purpose berth |
| 19 Indira Dock | 27.13 | 168 | 8 | Multi-purpose berth |
| 20 Indira Dock | 18.26 | 168 | 8 | Multi-purpose berth |
| 21 Indira Dock | 18.26 | 168 | 8 | Multi-purpose berth |
| 22/23 Indira Dock | | 431 | 7.7 | 150 mtrs. Handed over to Coast Guard |

*(Source: Final Report on Master Plan for Mumbai Port prepared by AECOM)*

As can be seen from the figures, berths 1 to 17 are inside the dock basin and berths 18 to 23 are outside along the dock wall. Berth Nos. 5, 6 ,7 and 8 ID are handed over to CSL for Ship Repair Facilities. Further, CSL has requested for Berth Nos. 4 ID and 9 ID and the proposal is under consideration. Berth no. 17 ID which is close to the lock gate is used for berthing of supply vessels and port's craft. The principal cargo handled are steel, sugar, yellow peas, fertilizers, project cargo, cars and containers. There are 11 sheds with a total area of 72675 $m^2$. In addition, there are 31 open plots with a total area of 249356 $m^2$.

### *2.8.2.2 Ballard Pier Berths*

There are two berths on the southward extension of Indira Dock named Ballard Pier. The Ballard Pier Extension (BPX) and the Ballard Pier Mole Station (BPS) are the two berths. The BPX has a modern passenger terminal building which houses check-in baggage facilities, a lounge, duty-free shop, curio and handicraft stalls, toilets etc. Berths at Ballard Pier has a draft of 9.6 m to 10.4 m. BPS and BPX berths of Ballard Pier are passenger cum cargo berths. The International Cruise Terminal is under development at BPX berth.

**Table 2.9 Berth-wise Details at Ballard Pier**

| Name of Berth | Width of Wharf (m) | Length of Wharf (m) | Designed Draft (m) | Berth Type |
|---|---|---|---|---|
| Ballard Pier Station | 10.24 | 244 | 10.0 | Multi-purpose berth |
| Ballard Pier Extension | 22.38 | 244 | 10.7 | Passenger cum Cargo Berth |

*(Source: Final Report on Master Plan for Mumbai Port prepared by AECOM)*


**Figure 2.26 Berths at Ballard Pier**
*(Source: Traffic Study Report prepared by CRISIL)*

### *2.8.2.3 Offshore Container Terminal (OCT)*

Presently, Offshore Container Terminal is only handling car carriers.


**Figure 2.27 Offshore Container Terminal (OCT) Berth**
*(Source: Traffic Study Report prepared by CRISIL)*

**Table 2.10 Berths Specifications – General / Multipurpose**

| Berth | Length (m) | Draft (m) | Cargo Type | Max. Vessel Size Permissible | |
|---|---|---|---|---|---|
| | | | | L x B (m) | DWT |
| ID - 1 to 17 | 130 - 180 | 8.84 to 9.14 | Multipurpose | 179.8 x 27.4 | - |
| ID - 18 to 21 | 168 - 183 | 8.5 | | 160.2 x 21.34 | - |
| BPS | 244 | 9.6 | Multipurpose | 182.8 x 25.9 | 64,000 |
| BPX | 244 | 10.4 | Multipurpose | 221.0 x 28.5 | 72,000 |
| OCT | 350 | 9.3 | Containers | - | - |

*(Source: Traffic Study Report prepared by CRISIL)*

### *2.8.2.4 Capacity Utilisation*

General / Multipurpose cargo berths at Indira Dock, Ballard Pier and OCT handle automobiles, iron & steel, project cargo, finished fertiliser, cement, calcite chips, food grains, chemicals, etc. Below table lists berth wise traffic handled in FY21 & 22 along with total berth capacity and berth occupancy percentage.

**Table 2.11 Berths Occupancy in FY22-23 & FY23-24 – General/Multipurpose Cargo**

| Sr. No. | Berth | Berth Occupancy (%) | |
|---|---|---|---|
| | | FY22-23 | FY23-24 |
| 1 | ID 1 | 35.70 | 37.93 |
| 2 | ID 2 | 26.29 | 33.47 |
| 3 | ID 3 | 27.66 | 8.42 |
| 4 | ID 4 | 2.93 | 3.43 |
| 5 | ID 9 | 0.00 | 2.07 |
| 6 | ID Jetty End | 17.53 | 21.88 |
| 7 | ID 10 | 18.42 | 13.86 |
| 8 | ID 11 | 6.59 | 4.72 |
| 9 | ID 12 | 20.89 | 10.69 |
| 10 | ID 12 A | 12.58 | 11.74 |
| 11 | ID 12 B | 25.64 | 100.00 |
| 12 | ID 13 | 62.13 | 2.74 |
| 13 | ID 13 A | 67.74 | 26.79 |
| 14 | ID 13 B | 6.96 | 10.96 |
| 15 | ID 14 | 16.11 | 0.48 |
| 16 | ID 15 | 22.89 | 25.34 |
| 17 | ID 16 | 44.32 | 20.61 |
| 18 | ID 18 | 48.88 | 44.78 |
| 19 | ID 19/20 | 69.57 | 67.72 |
| 20 | ID 21 | 85.63 | 76.34 |
| 21 | ID 22/23 | 0.00 | 0.00 |
| 22 | BPS | 69.26 | 64.59 |
| 23 | BPX | 75.37 | 68.51 |
| **Total** | | **33.18** | **28.57** |
| 24 | OCT 1 | 27.41 | 36.02 |
| 25 | OCT 2 | 28.25 | 39.12 |
| **Total** | | **27.83** | **37.57** |

*(Source: Annual Report on Traffic and Performance 2023-2024)*

*Note: ID 5 to ID 8 are with Cochin Shipyard for Ship Repair Operations, no cargo handled by MbPA. No cargo handled at ID 17 due to its proximity to Lock Gate Note: '*' represents calculated capacity of each berth based on berth occupancy of mentioned in government sources.*


**Figure 2.28 Bunders at MbPA**
*(Source: Traffic Study Report prepared by CRISIL)*

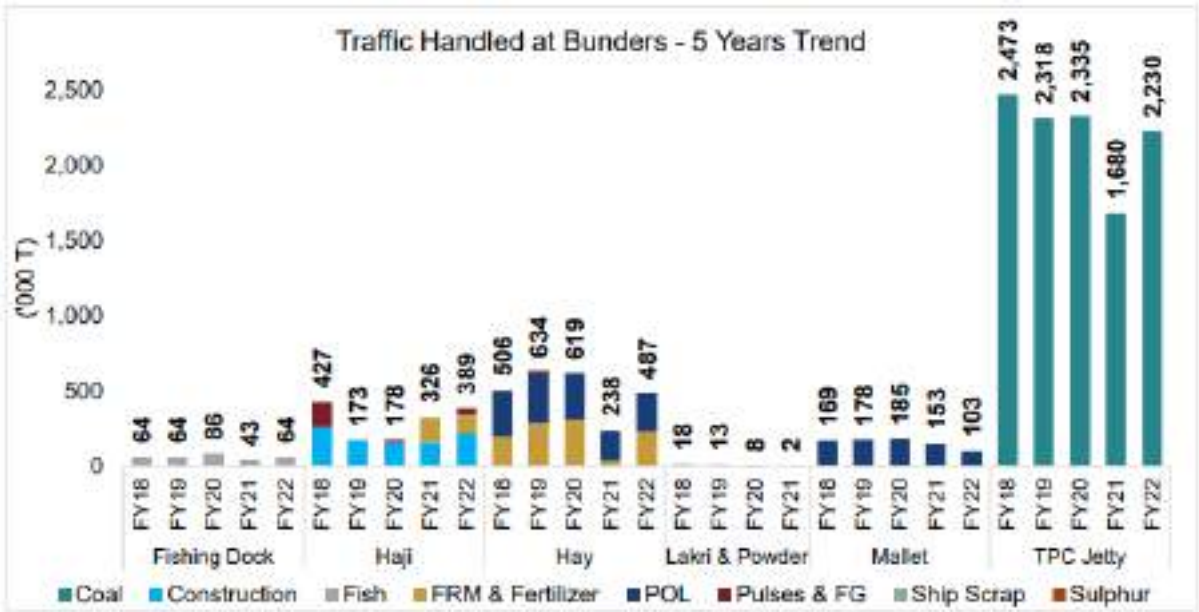



**Figure 2.29 Commodity Wise Traffic handled at Bunders in last 5 Years**
*(Source: Traffic Study Report prepared by CRISIL)*

*Note: Commodity wise traffic handled at Bunders in FY23-24 are as follows:*

1. ***Hay Bunder:*** *Base Oil (0.10 mnT), HSD (0.16 mnT), Furnace Oil (0.01 mnT), MOP (0.14mnT), Ammonium Sulphate (0.02 mnT), Rock Phosphate (0.11 mnT), Gypsum (0.004mnT)*
2. ***Mallet Bunder:*** *HSD (0.03 mnT), Furnace Oil (0.08 mnT)*
3. ***Haji Bunder/CFS/TPC:*** *MOP (0.08 mnT), Ammonium Sulphate (0.01 mnT), Rock Phosphate (0.012 mnT), Calcite Chips (0.015 mnT), Coal (2.65 mnT), Gypsum (0.22 mnT)*
4. ***Other Bunders:*** *Fish-Sassoon Dock (0.02mnT), Fish-New Fish Jetty (0.02mnT)*

*(Source: Annual Report on Traffic and Performance 2023-2024)*

The figure above shows commodities handled at Bunders in last 5 years. Fishing Dock includes Sassoon dock and new fish jetty. The existing Trombay Thermal Power Station imports its coal using TPC jetty. The power plant does not have any capacity augmentation plans. Hence, the coal traffic calling to TPC jetty is likely to remain stagnant for future years. The last five years traffic has fluctuated between 1.6 mn T to 2.5 mn T. The 1.6 mn T traffic of FY 21 could be discarded as lower capacity utilization of power plant induced by Covid lock down. Such underutilization of power plant is unlikely to take place in future. Hence the coal traffic for Trombay Thermal Power Station at TPC jetty is likely to remain constant in the range of 2.5 mn T The fishing dock at Sassoon dock is operating at full capacity. The fish landing and processing centre is unlikely to bring more fish catch in future. Hence the traffic at fishing dock or at Sassoon dock is likely to remain in the range of 60,000 tonnes to 80,000 tonnes annually. MbPA is likely to witness negligible growth of fertilizer volumes at Port. The increasing congestion around MbPA authority, both on road as well as railway has created bottlenecks in evacuation of cargo from MbPA. The primary consumer of fertilizer (farmers) are located at far off places from MbPA. The existing fertilizer plant, namely Rashtriya chemicals and Fertilizers (RCF) located in the vicinity of MbPA has substantially reduced its fertilizer import volume using MbPA.

#### *2.8.2.5 Storage Facilities*

The details of the available storage area at MbPA is illustrated in the following table.

**Table 2.12 Available storage area at MbPA**

| Location | Storage Area Type (sq.m) | | |
|---|---|---|---|
| | Open | Covered Transit Shed | Covered Warehouse |
| Indira Dock | 249,356 | 72,675 | 17,983 |
| Victoria Dock | 9,571 | 5,088 | - |
| Prince's Dock | 10,832 | - | 3,960 |

| | | | |
|---|---|---|---|
| CFS | 10,832 | 15,048 | 119,947 |
| Haji Bunder | 38,202 | 3,795 | - |
| Hay Bunder | 9,000 | 6,564 | - |
| OCT | 4903 TEU | - | - |
| Mallet Bunder | - | - | 11,250 |
| Frere Basin | - | - | 9,884 |
| Total | 748,658 | 103,170 | 163,024 |
| Total (ha.) | 74.9 | 10.3 | 16.3 |
| Liquid Storage | ~487,800 Tons | | |

*(Source: Traffic Study Report prepared by CRISIL)*

### 2.8.3 Sector 3: Bunkering Facility

All the ships plying on Indian coast including ships owned and operated by Indian Navy, Indian Coast Guard, port and harbour crafts, offshore vessels and coastal vessels are dependent on bunker procurement locally. This is a saturated market that grows with growth in number ships and increase in frequency of sailing. The existing refineries of HPCL and BPCL located in Mumbai have been supplying bunkers to all the ships that are operating around Mumbai. The figure below shows the number of ship calling in Mumbai region.

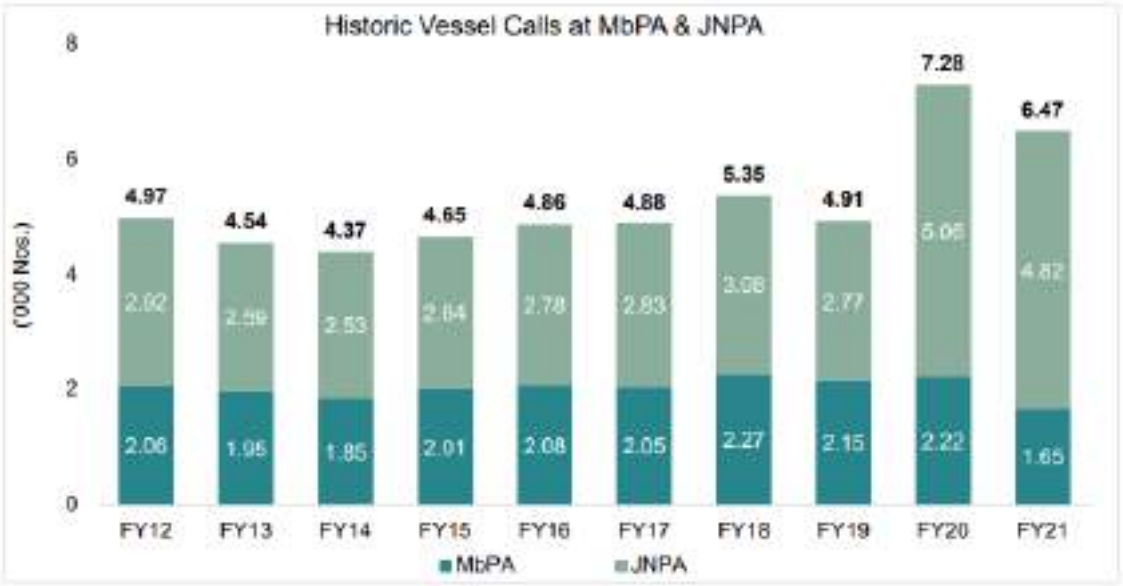



**Figure 2.30 Total Vessel Call at MbPA & JNPA**
*(Source: Traffic Study Report prepared by CRISIL)*

*Note: Number of cargo vessels handled by MbPA during the year 2023-24 is 2014 and the number of cargo vessels handled by MbPA during the year 2023-24 is 118.(Source: Annual Report on Traffic and Performance 2023-2024)*

The government of India has created a vision to develop bunkering terminals at various major/prominent ports of India. India has a refining capacity of close to 300 mn tonnes. Though, India has deficit in crude oil production, also known as a net exporter of finished petroleum products. The heavy fuel oil bunkers generated from Indian refineries were exported to some of the bunkering hubs including Singapore for supply of fuel to oceangoing ships. MbPA with availability of more than 20 mn tonnes capacity refinery offers natural opportunities for development of international bunker terminal. The dynamics of bunkering industry is driven by the price and quality of fuel. The quality of fuel is defined IMO guidelines. The commercial shipping industry prefers to choose cheapest bunker in the limits of quality guidelines prescribed by IMO. The bunkers supplied by international bunkering terminals including Singapore, Fujairah, Rotterdam are considered to be the cheapest. Hence, commercial ships operating in international routes preferred to align their bunker procurements during voyage from international established cheaper locations of bunkering.

Mumbai is strategically located on the west coast of India, making it an essential stopover for ships traveling to and from the Middle East and Europe. This location makes Mumbai an ideal location for bunkering services, as ships need to re-fuel when crossing the Indian Ocean. When ships call to ports, they require fuel for their voyage, and bunkering services provide them with the necessary fuel. Therefore, the more ships that call at a port, the greater the demand for bunkering services, which can lead to the growth of the bunkering business.

Indian Coast Guard in Indian Navy ships mostly use high-speed diesel. These ships have very high-powered engine that requires quick start at highest rpm. Whereas commercial ships have large slow speed engines which is powered by heavy fuel oil (HFO). Supply to naval ships would be undertaken using existing infrastructure as it has been now. OMCs mainly HPCL and BPCL would have to create tank farms for storage and supply of HFO as bunkers to commercial ships deployed on international trade. This could be undertaken in consultation with HPCL and BPCL.

### 2.8.4 Sector 4: Ship Repair

The Mumbai Port waterfront stretches across a vast area and includes various activities across different sections. The Mumbai Port waterfront undertakes a wide range of diversified activities from Hay Bunder to Indira Dock. Ship repair, ship refurbishment, ship recycling is some of the main activities undertaken between Hay Bunder to Mallet Bunder. The whole area is unmaintained with garbage spread all over the place. Mazagon Docks undertake new building

and repair of naval ships. This is an exclusive gated facility for shipbuilding and repair. No other activities could be carried out. The area can be divided into 2 segments namely Alcock yard and Mazagon Docks main yard. Both are for Mazagon docks leased from MbPA and presently falls under Ministry of Defence. At present repairs for small vessels, barges and fishing vessels are being carried out at bunders area of MbPA.

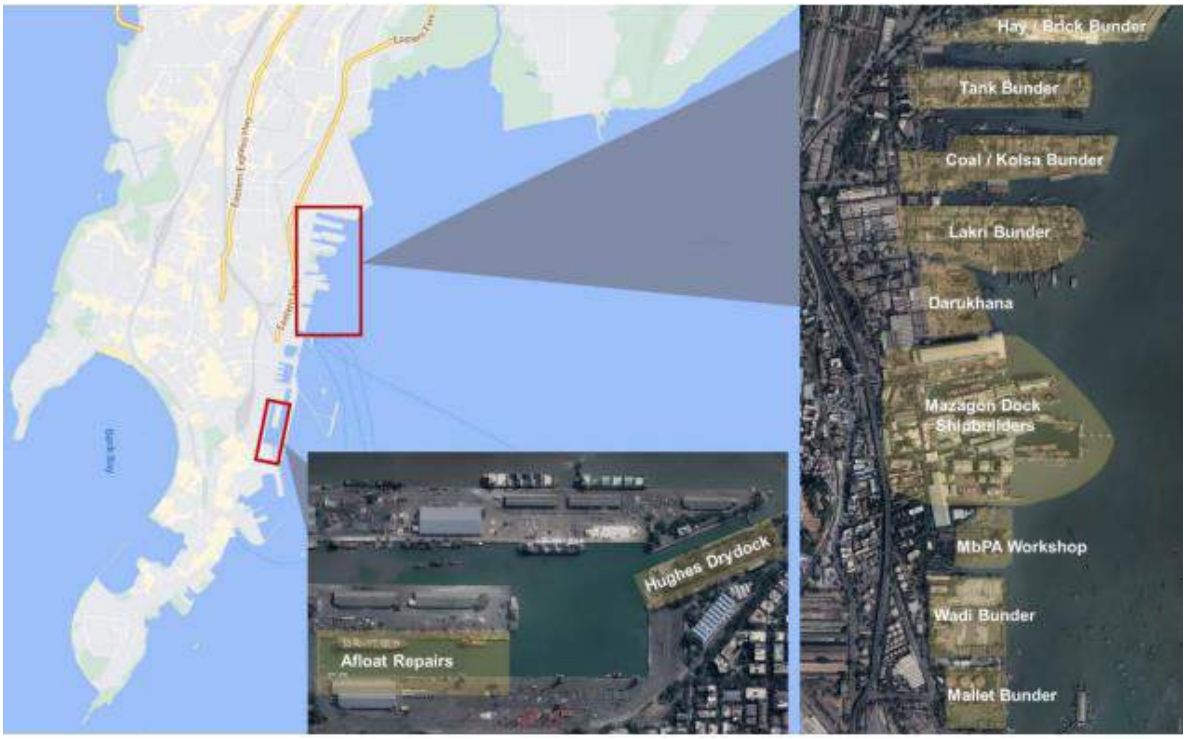



**Figure 2.31 Ship Repair Locations at MbPA**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

### *2.8.4.1 Bunder Area & Darukhana*

Hay Bunder has facility for handling the fertilisers and the liquid bulk. The liquid bulk is handled by VVF . IOCL has handling facility for supply of HFHSD wherein the cargo is pumped from the facility at Sewri through the pipeline . The supply is mainly to Indian Navy and Indian Coast guard vessels. There are warehouses and storage spaces around as well for cargo handling and storage. The picture below shows fuel loading at Hay Bunder.

**Figure 2.32 Diesel Loading at Hay Bunder**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Tank Bunder area has several barges berthed for repair or laid up condition. Ship repair services are available in this area, with several small repair workshops. The area also has few warehouses, commercial spaces, and port-related infrastructure. The picture below shows existing ship repair activities at Tank Bunder.


**Figure 2.33 Existing Ship Repairs at Tank Bunder**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Coal Bunder and Lakri Bunder is presently used for ship repair activities. There are several idle barge and laid up vessels berthed in these areas.

**Figure 2.34 Existing Ship Repairs at Coal & Lakri Bunders**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

**Figure 2.35 Existing Ship Repairs at Bunders – I**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Darukhana has been historically known for its ship breaking activity. The old vessels are dismantled and their parts are recycled. This process was carried out using beaching method. Presently, ship dismantling activities have stopped and a substantial area is being used for undertaking ship repair (mostly shallow water barges). There are several ship repair workshops that specialize in repairing and refurbishing vessels of all sizes. All the yards have been given earmarked waterfront and land area by MbPA on lease. Some of these yards are also undertaking new building of small ships. Below figure depicts ship repair activities at Darukhana and Lakri Bunder.

**Figure 2.36 Existing Ship Repairs at Darukhana and Lakri Bunder**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

The slipway at Mumbai Port workshop has winches. They may not be operational as they have not been used over a period of time. The Darukhana ship repair facility is makeshift one. The vessels are pulled in with tidal support. Part of the slipway is submerged in water upto a depth, where the ship could be floated out due to its own buoyancy. At high tide, the support system on which the ship is resting is removed. This allows ships to be transferred to carriageway and traverse towards water. Slipways are the launching track of the yard, which acts as the means to leave the vessel out at the water body and make the vessel afloat in water. The launching way or the slipway could be a straight way in which the vessel can be launched from the slip way in fore and aft position. The slipways could be of varying length that could be built

according to the plots available to the repair yards. Darukhana and Lakri Bunder presently repairs small ships and barges using slipway method, even though there is no slipway.

#### *2.8.4.2 MbPA Workshop Area*

Mumbai Port has a workshop area between Mazagon dock and Wadi Bunder. The area has 6 slipways for ship repair activity. There is adequate land area available beside SBI Mazagon branch & Mazagon Dock Sports Club & Library. It also has several workshops with unused and abandoned equipment and machinery. The location is sharing boundary walls with Mazagon Docks. The slipways were used to repair small vessels and port crafts. MbPA leased the land under workshop area to Mazgaon Dock Shipbuilders Limited for their expansion of existing unit.

Existing workshops in this area include oil disposal godown, shipwright shop, fitting shop, blacksmith & chain testing shop, boiler shop, tin smith shop, moulding shop, etc. The ship repair yard will require various facilities to support ship repairs, and maintenance. This will include workshops, storage areas, cranes, and other equipment needed for repair. It will be used for repair of ships and will need to be able to accommodate vessels of different sizes. The workshops could be used for the fabrication and assembly of ship components, and will require specialized equipment such as welding machines, lathes, and cutting tools. The storage areas will be used for the storage of materials and equipment needed for repair. Below subsequent figures depict present condition of the workshops.

#### *2.8.4.3 Hughes Dry Dock (HDD) at Indira Dock*

MbPA has a dry dock at Hughes Dock. This could repair multiple ships independently by placing an intermediate caisson gates. The gate and caissons are all designed as floating components that can be deballasted and towed away. The dimensions of this dry dock are presented in Table 3.15:

**Table 2.13: Dry Dock Dimensions**

| Dock | Length (m) | Width (m) | Depth (m) |
|---|---|---|---|
| Hughes Dry Dock | 304.8 | 30.08 | 9.75 |

*(Source: MbPA)*

The length can be divided into two compartments of variable length. Two caissons can be used but presently there is only one caisson. The maximum size of the vessel that can be dry docked is 190 m in length and 27 in width.

In October 2018, the Hughes Dry Dock along with Berths 5, 6, 7 & 8 in Indira Dock have been handed over to Cochin Shipyard Limited (CSL) who have set up CSL's Mumbai Ship Repair Unit. All the activities of Ship Repairs at Indira Docks is with the CSL and they are maintaining all Dry Docking facilities and providing services to various ships with priorities to Naval and Coast Guard Vessels. As per Concession Agreement with CSL, there is exclusivity clause whereby MbPA cannot develop any new facility for ship repairs inside Indira Dock for 10 years from the date of handing over of HDD.

Now, it has been planned to give one more berth viz. 9 in Indira Dock to CSL for expansion of their ship repair facilities.

Views the dry dock with vessels docked inside are presented in Figure 4.35 to Figure 4.38.

**Figure 2.37 View of Dry Dock with Two Vessels Docked**

**Figure 2.38 View of Dry Dock with Three Vessels Docked**

**Figure 2.39 General View of Hughes Dry Dock**

**Figure 2.40: View of Dry Dock with Single Vessel Docked**

HDD has been handed over to Cochin Shipyard for operations and management along with all the facilities and structures.

#### *2.8.4.4 Flotillas and Harbour Craft Facilities*

For effective operations and management, the port has fleet of flotillas, i.e., dock tugs, harbour tugs, pilot launch and mooring launches. Four pilot launches, two Harbour tug and four Dock Tugs are part of the port flotilla. Apart from this port has hired 4 harbour tugs, two mooring launches, two pilot launches and two security patrolling boats for the operations. Port also owns a survey vessel called 'Sanshodhinee', equipped with 'State-of-the-Art' navigation and survey equipment for carrying out hydrographic surveys in the harbour.

### 2.8.5 Sector 5: Fisheries

MbPA has been playing a significant role in the development of fisheries infrastructure in the region. Due to its strategic location, it is an important hub for the distribution and export of seafood products. MbPA has taken several initiatives to support the development of the fisheries sector in Mumbai region. Some of them are as follows:

- Development of Fishery Wharf & Sassoon Dock - MbPA has developed the facilities for the fishing activity at Sassoon Dock and the Fishery wharf. These facilities are equipped with modern amenities such as cold storage, ice plants, and fish handling equipment.
- Extension of Fishery Terminal at Mallet Bunder – MbPA has proposed for extension of existing fishery Terminal at Mallet Bunder to provide fish landing facilities to the increased number of fishing vessels along with facilities for unloading and marketing of the fish catch for the fishermen of Mazagon and nearby fishing villages at Mallet Bunder. It consists of provision of safe landing and berthing facilities for Mechanized Fishing Vessels (MFVs) to operate throughout the fishing season.

Total Marine fish production of Mumbai city has grown from 0.09 million Tonnes in FY12 to 0.16 million Tonnes in FY22 at a CAGR of 5.3%. Fish traffic at Mumbai zone has grown from

at a CAGR of 10% followed by Sassoon Dock and Ferry Wharf at 5% and 4.8% respectively. Below chart depicts historic marine fish production in Mumbai City.

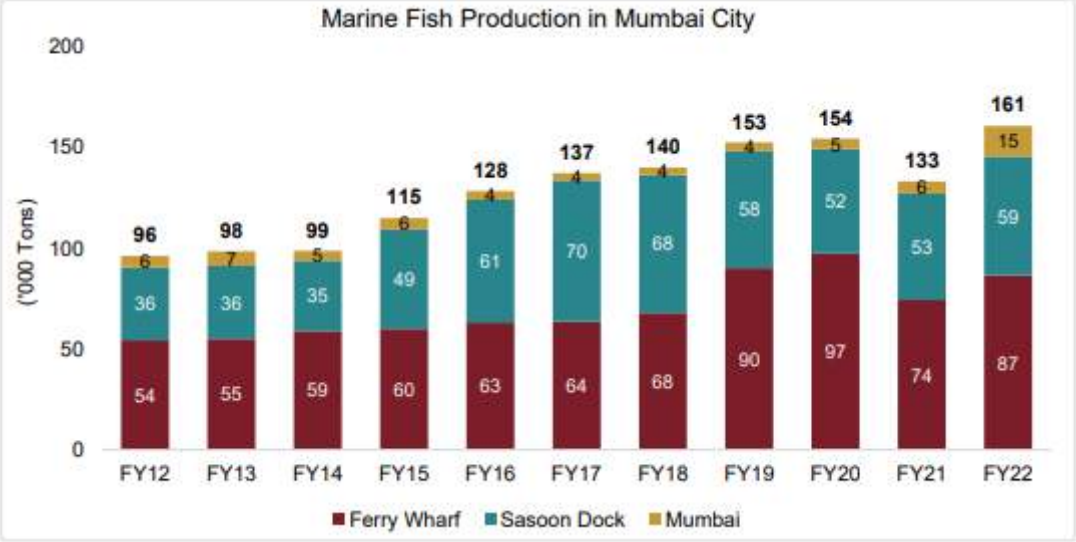



**Figure 2.41 Marine Fish Production in Mumbai City**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Total Marine fish production of Mumbai city in FY22 was 0.16 million Tonnes i.e. around 37% of marine fish production of Maharashtra. Ferry Wharf contributed around 54% to total marine fish production of Mumbai city. Mumbai Zone produced around 0.015 million Tonnes 9% of marine fish. Fish catch of Sassoon Dock was 0.06 million Tonnes i.e. around 37% of total Marine fish production in Mumbai city. Below chart depicts zone wise share of marine fish production in Mumbai City in FY22.

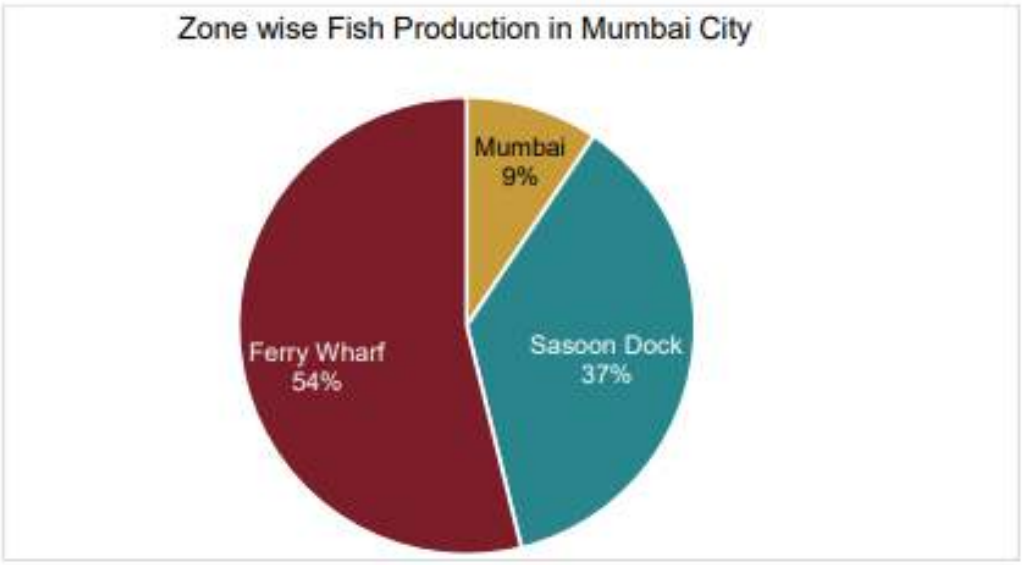



**Figure 2.42 Zone wise Fish Production in Mumbai City**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Ferry Wharf, Mallet Bunder and Sassoon Dock are the dedicated fish handling locations at MbPA harbour.


**Figure 2.43 Fish Handling Location at MbPA**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

### *2.8.5.1 Ferry Wharf*

Mumbai Port Authority developed and managed Ferry Wharf, also known as Bhaucha Dhakka, is a prominent fishing hub. It serves as an essential center for commercial and artisanal fishing operations in the region, as well as a docking site for passenger ferries to nearby islands and coastal villages. Commercial and traditional fishing operations are undertaken from Ferry Wharf. Local fishermen mostly use mechanised boats for their fish catch from ferry Wharf. All types of fish species are caught and brought to Ferry Wharf including pomfret, mackerel, and prawns. The catch is then sorted, cleaned, and prepared for sale. Below figure shows the designated shed for storage, sorting, auctioning and trading of Fish catch. The location is mostly over crowded with fishermen and fish catch. The road connecting the fishing wharf is in reasonable condition. Fish captured by Fishermen are auctioned and traded at Ferry Wharf (Bhaucha Dhakka). Wholesale fish auctions take place at the wharf, where traders and retailers come to purchase freshly caught fish and other sea seafood. Some of the catch is also

transported to other local markets or even exported. The area at Mallet Bunder, beside the Ferry wharf is used for repair of nets, supplying of ice for fishing vessels, etc.

**Figure 2.44 Ferry Wharf Berthing Area**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Below figure shows the jetties available for docking fishing boats and unloading the fish catch. The jetties are old and would need repair and upgrades to extend the life of infrastructure. The corners of Jetties have eroded at some of the locations. The Location is over crowded with boats and road vehicles waiting for evacuation of fish catch.

**Figure 2.45 Fishing Vessels Parked at Ferry Wharf**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*


**Figure 2.46 Constraints at Ferry Wharf**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

The figure above shows the issues faced by fishermen at Bhaucha Dhakka jetty. The first picture shows that jetty has several damaged pillars that pose a threat to the boats used by fishermen. Second picture show the present condition of metal sheds that were installed a few years ago, they have corroded, with clearly visible holes. This corrosion and the resulting holes lead to leakage, especially during the monsoon season. Third picture shows the condition of auction hall, fishermen are facing space constraints due to the storage of goods by operators. Additionally, leakages have been observed in the hall during the monsoon season. The fourth picture shows the presence of damaged and unused WC structure at jetty. The operators demand either to repair or remove the structure to generate additional space on jetty.

#### *2.8.5.2 Mallet Bunder*

The waterfront area around Mallet Bunder is heavily silted. The location does not undertake any cargo handling operation, except for supply of fuel. It has few warehouses and dock area which is open to Sea. The location would require to be dredged extensively before any kind of cargo handling operation, ship repair or fishing related activities is undertaken.

**Figure 2.47 Mallet Bunder Jetty Area**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Following are some of the broad activities undertaken at Mallet Bunder and same is reflected in site visit photographs

- Barge water/fuel tankers call to Mallet Bunder for loading of fuel for supply to ships. There is no tank farm located in surrounding areas with connected pipelines for supply of fuel to these small barge tankers. Road tankers are used for suppling fuel to these barge tankers.
- Mallet Bunder supports fishing activities by supplying ice, water, etc to fishing boats plying in the region. Mallet Bunder does not have any ice plant. Ice is brought in trucks from ice plants located in Navi Mumbai. Ice is supplied to fishing boats in a crude way shown in the image below.

Mallet Bunder has several warehouses. The largest warehouse is used by Mumbai police for storing seized items. An open shed is used by fishing community for repairing their fishing net. It also has warehouse for Mumbai Port Yacht club. The activities of Mumbai Port yacht club have ceased to be operational for last several years. Hence, these warehouses are unused along with a few more warehouses in Mallet Bunder.

### *2.8.5.3 Sassoon Dock*

Sassoon Dock is one of the oldest and most prominent fishing landing jetty in Mumbai. Sassoon Dock has berths for docking fishing boats and unloading the catch. It is a hub for all kinds of fishing activities and is one of the busiest and largest docks in the city. It has been a vital centre for fishing and fish trade since its establishment in the late 19th century.

The activities undertaken at Sassoon Dock include the landing of fishing boats, the processing and sorting of fish and other seafood. The Fish and other sea food auctioning, sale and distribution to various markets and customers is undertaken at Sassoon Dock. The dock is equipped with modern facilities for handling and processing the fish, including refrigeration and ice-making facilities, which help to ensure the freshness and quality of the catch. Below figure shows the fishing vessels docked at Sassoon Dock.

**Figure 2.48 Fishing Vessels Parked at Sassoon Dock**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Old Sassoon Dock Fish Jetty often experience congestion due to fishing vessel traffic and limited space. Dredging can be done to deepen the water and create more space for vessels to carry operations even during low tide. The dock's infrastructure, including jetties and auction halls, requires maintenance and upgrading. During peak hours, the available space on the jetty becomes insufficient to accommodate the crowd. Below figure shows the infrastructure at Old Sassoon Dock.

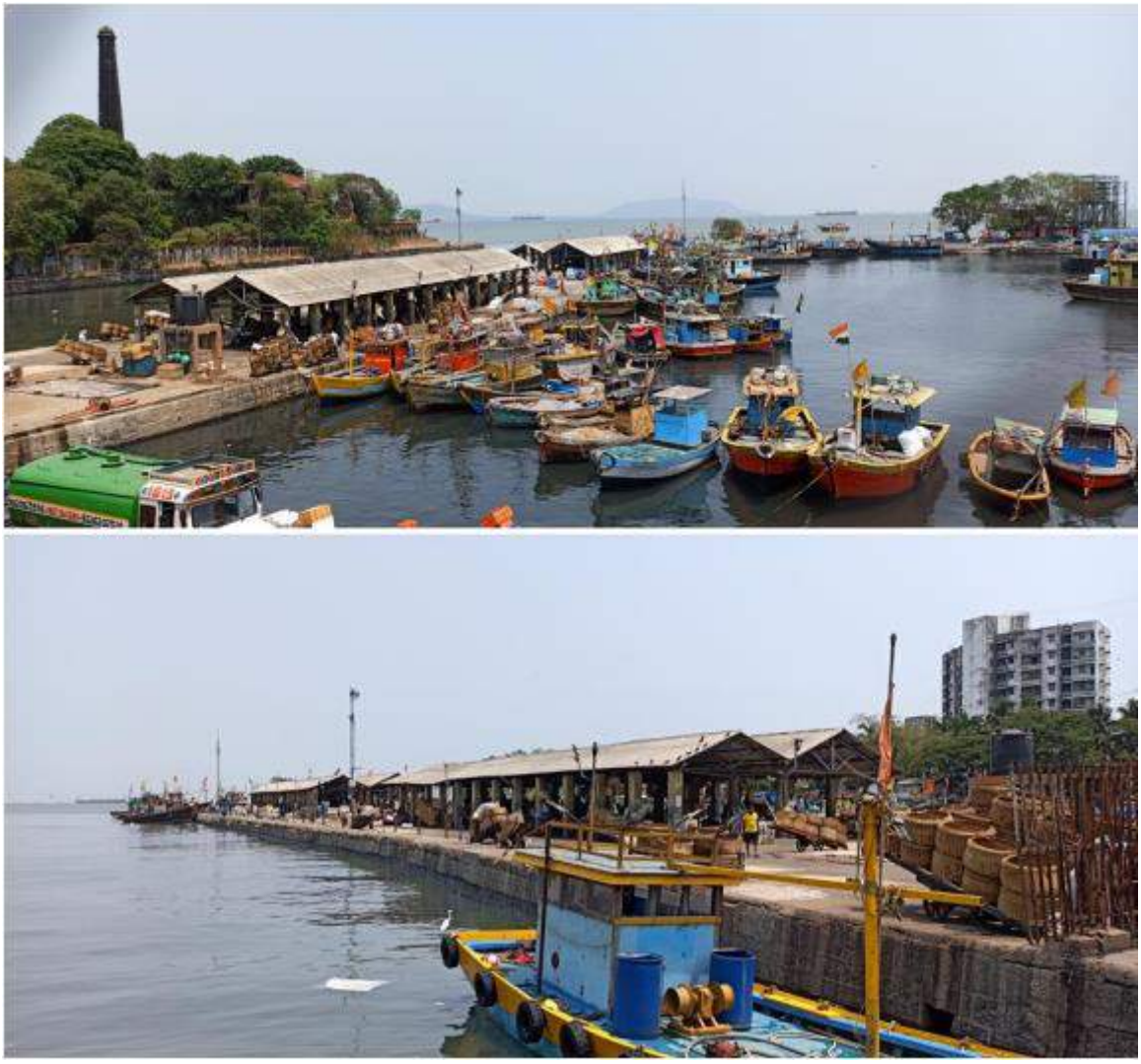


**Figure 2.49 Old Sassoon Dock**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Fishing boats reach the harbour generally during night hours and moored along the wharves of old and new Sassoon dock. Unloading of the fish is carried out manually using small bamboo or plastic baskets, lifted up to quay top then transferred to bigger baskets dragged through floor to the auction hall. At the new Sassoon dock quay, due to high tidal difference there is considerable height difference between the deck of boats and quay top requiring high manpower inputs and causing much inconvenience. The fish auction practiced in old and new Sassoon dock is “shout auction” and “precontract sale”. Shout auction is predominantly seen at old Sassoon dock, the new Sassoon dock practices both shout and pre-contract sale. Generally, fish sale at old Sassoon dock goes for domestic purpose while the fish sold at new dock goes for fish processing and export. Below figure shows the available infrastructure at New Sassoon Dock.


**Figure 2.50 New Sassoon Dock**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

An Ice factory is operational at Sassoon docks having capacity of 50 tons per day. However, the demand for ice stands at 500 tons per day for Sassoon docks. To meet the ice requirement, additional supplies are sourced from ice factories located in Vashi, Taloja, and Ambernath. Presently, 4 ice crushing units are operational at Sassoon dock ice factory. Below figure shows the operational ice factory at Sassoon Docks.

**Figure 2.51 Operational Ice Factory at Sassoon Dock**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Government of Maharashtra has mandated Maharashtra Fisheries Development Corporation (MFDC) to renovate and modernize the existing facilities at Sassoon Dock. A large ice plant of 500 TPD capacity for tube ice and 50 TPD capacity for flake ice has been proposed by MFDC to meet the increasing demand of ice at Sassoon Docks. MFDC had started the work of construction of the plant and some portion of the same has been done. Recently it has floated

tender to complete the balance work and make the plant operational. Below figure shows the under construction ice plant at Sassoon Docks.

**Figure 2.52 Under Construction Ice Plant at Sassoon Dock**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Sassoon dock is equipped with diesel pumps specifically designed to meet fuel requirements of fishing vessels. Diesel is collected in barrels and transported to fishing vessels with the help of hand carts. The easy availability of diesel at Sassoon dock, along with sufficient storage spaces, facilitates the smooth supply of fuel to fishing vessels. Below figure shows the fueling station and hand carts loaded with diesel barrels for supply to fishing vessels.

**Figure 2.53 Fueling Station nearby Sassoon Dock**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

There are around 972 registered trawlers operating at Sassoon dock. The typical trawlers are of length about 15 to 16 m with a beam of about 5 to 6 m requiring the draft of about 3 m in loaded condition. Average fish catch per trawler during its voyages varies between 5 to 6 t. Table 3.16 describes salient features of the fishing vessels at Sassoon dock.

**Table 2.14 Details of Existing Fishing Vessels at Sassoon dock**

| No. of Registered Trawlers | Average Load per Boat per trip | Fishing Days | Duration of each trip | No. of fishing trips per trawler (Annual) |
|---|---|---|---|---|
| 972 | 5 to 6T | 300 days | 10 to 15 days | 24 to 30 |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Sassoon Dock has started an art festival including their fishing market. Sassoon Dock Art Festival is an annual event that showcases the work of talented artists from all over. The festival takes place at the historic Sassoon Dock. The dock and its fishing market is transformed into a vibrant art gallery during the festival. The visitors and photography enthusiasts are allowed to

visit the area and see the life of fisherman along with fishing activity. The festival features a wide range of artistic paintings, sculptures, multimedia installations, etc.

### 2.8.6 Sector 6: Urban Water Transport

Passenger transport between Mumbai and destinations across the harbor, such as Mandwa and Alibaug, predominantly relies on ferry boats, Catamaran and speedboat services. This service has flourished as an alternative transportation mode because the alternate mode of transport using road is time-consuming. Consequently, passenger and tourist transportation via waterways has emerged as a favored option for tourists and locals alike. This mode provides a swift and picturesque mode of transport that circumvents congested roads. Below are some of the prominent routes and modes of transportation.

- Ferry services – Gateway to Mandwa, Mora, Elephanta
- Speed Boat services – Gateway to Mandwa
- Ro-Ro Services – DCT to Mandwa

The figure below shows ferry service connectivity between MbPA and several destinations across harbour. MbPA has 2 terminals at ferry wharf and 1 Ro-Pax terminal at Princess Dock for coastal passenger. Short distance destinations connected to MbPA for passenger movement are Elephanta, Mora, Rewas and Mandwa.


**Figure 2.54 Jetties and Route Connectivity in MbPA Region**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Note: Yellow routes represents connectivity to/from MbPA

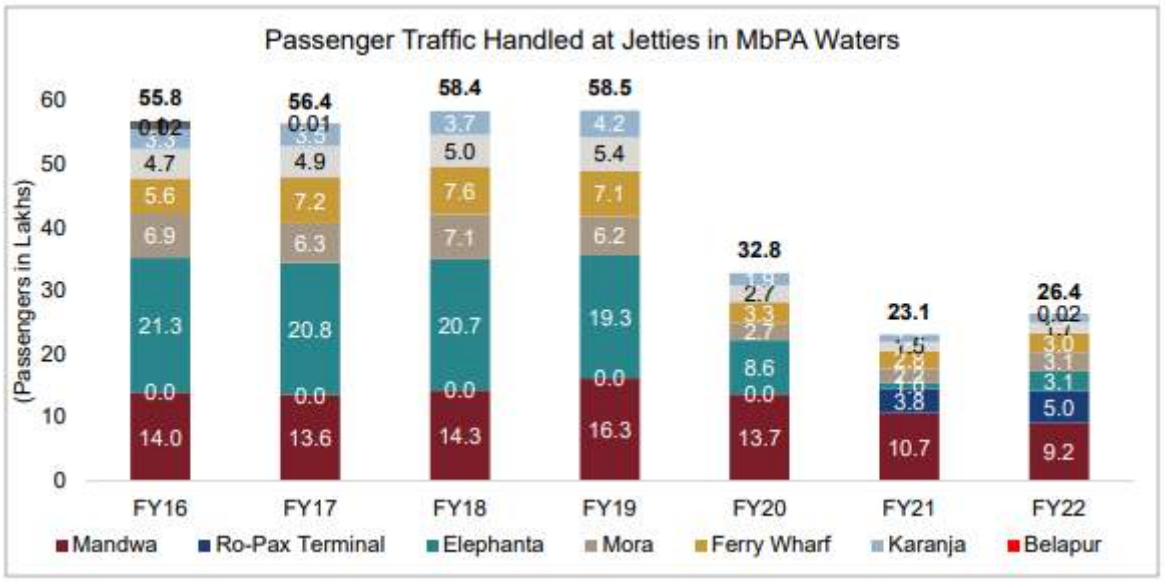



**Figure 2.55 Passenger traffic handled by Jetties located in MbPA and nearby region**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

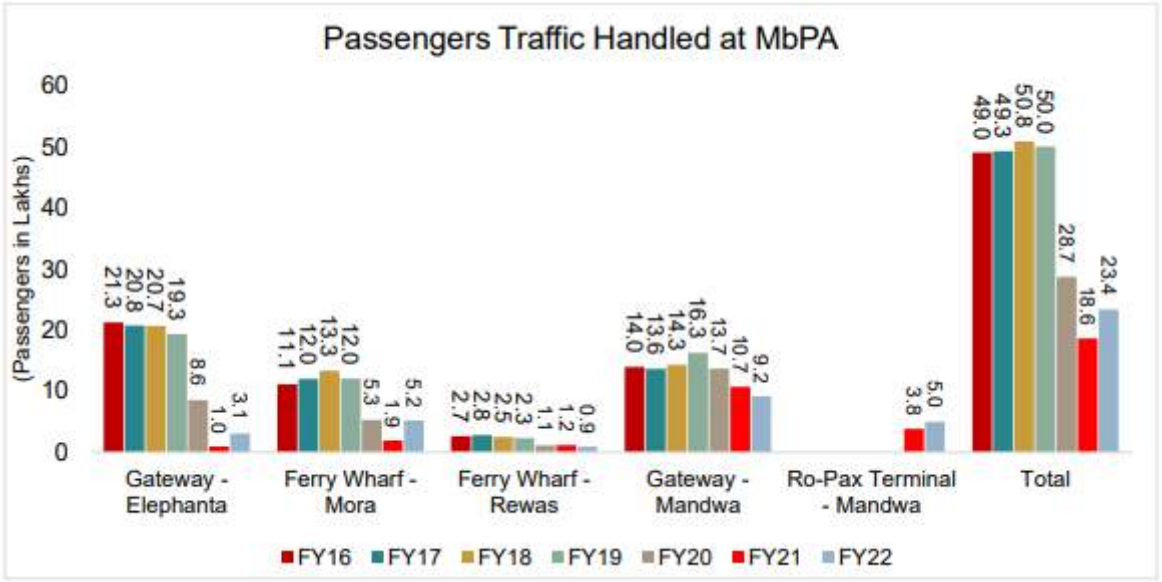



**Figure 2.56 Passenger Traffic handled in MbPA Region**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Route wise historic traffic trend of traffic handled between MbPA and prominent destinations across harbour are depicted in the figure above. The route to Elephanta experiences the heaviest traffic, followed by those to Mora and Mandwa. The majority of travelers to Elephanta and Mandwa are tourists, while the MbPA-Mora route predominantly serves daily commuters traveling for work-related purposes. The subsequent figure delineates the types of passengers journeying on routes connected to MbPA.

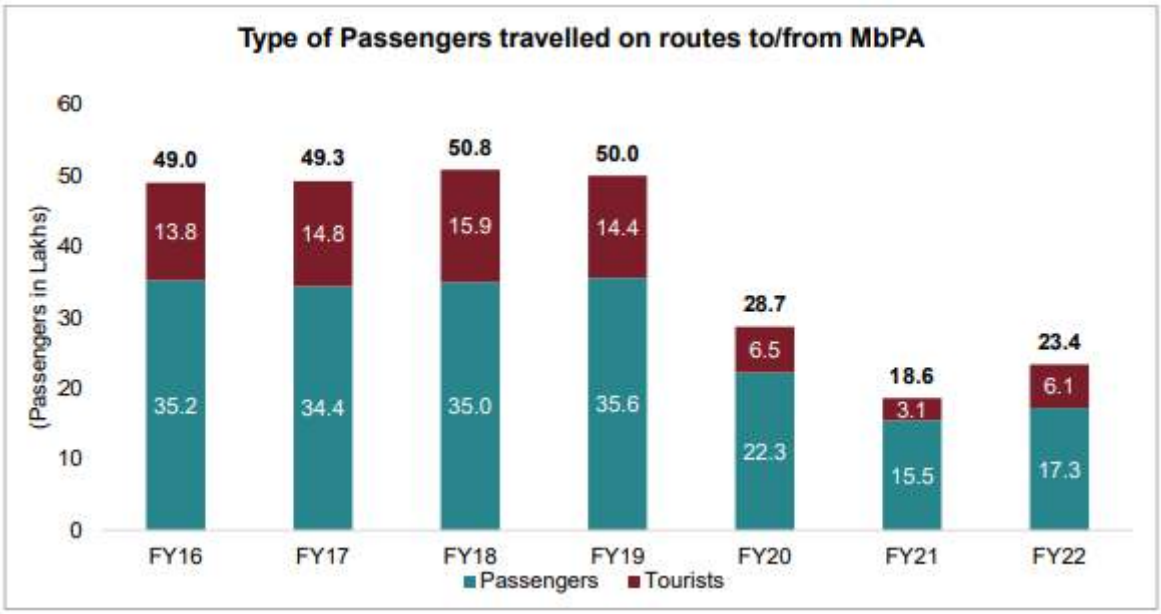



**Figure 2.57 Passenger Traffic handled in MbPA Region**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

### *2.8.6.1 MbPA - Ferry Wharf & Ro-Pax Terminal*

Ferry Wharf and Ro-Pax terminal at MbPA offer passenger transport services to the mainland locations situated on the other side of the water, such as Uran, Rewas, Mandwa, and Elephanta. Regular service from the Ferry Wharf is provided to Mora and Rewas, with intermittent service to Elephanta. The figure below maps the locations of the passenger handling infrastructure at MbPA.


**Figure 2.58 MbPA Ferry Wharf**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

As shown in the figure above, Ferry Wharf and fishing jetty, both shares the common concrete gangway. Center joining section forming Y junction is used for vehicle and truck parking. This concrete gangway is used by pedestrians and passengers' vehicles, along with fishermen and their supply vehicles. The figure below above shows the present condition of passenger jetty.

The concrete jetty is in fair condition for handling passengers along with their 2 wheelers. The ferry wharf for passengers is of around 312 m length. Permissible vessel size is 13.72 m beam and 4.57 m draft. However, draft is subject to dredging / sounding / rise of tides. Presently two vessels are berthed simultaneously, each providing ferry service to Mora and Rewas / Elephanta. Ferry service to Elephanta is not regular, it is arranged only on demand, that too with 40 passengers. Among all, Mora is the busiest route.

**Figure 2.59 Vessel Berthing Infrastructure at Ferry Wharf**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Ferry service frequency on each route is summarized below;

**Ferry Wharf - Mora**

- Frequency: 17 times a day, in every 30 mins during peak hours and during non-peak hours ferry service is scheduled in every 0.45 mins to 1 hour
- Fare: Adult – INR 80 and Child – INR 39

**Ferry Wharf - Rewas**

- Frequency: Weekdays - 6 trips a day, in every 2 hours, Weekends - 9 trips a day, in every 1 to 1.5 hours.
- Fare: Adult - INR 100 and Child - INR 50

**Figure 2.60 Passengers waiting for Ferry Services**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

The figure below shows the passengers waiting for ferry arrival. As captured during the site visit, no proper waiting arrangement exists at the wharf. The available seating arrangement is in a damaged condition and unsuitable to use. The first picture figure above shows the 2-wheeler loading in ferry vessel to Mora. Passengers who bring their vehicle on the ferry face difficulties during the boarding and off boarding process. At present, operators use make-shift arrangements i.e., a wooden plank is utilized for this purpose. As shown in the second picture of the figure, same entry/exit gate is used by passengers and vehicles. This situation becomes challenging for bikers to navigate through the crowd, particularly during peak hours.

**Figure 2.61 Passenger Vehicle handling at Ferry Wharf**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

The figure below shows the ro-pax terminal at MbPA. This terminal provides passenger and vehicle transportation service to Mandwa. This service commenced from August 2020, and till today it has received great response from Mumbai people. The entire ro-pax terminal is built on 1.5 acres of land area.

**Figure 2.62 Ro-Pax Terminal at MbPA**

At present, single vessel is deployed on this route i.e., M2M ferries. This vessel has capacity of 500 passengers and 145 vehicles. The vessel is fully utilised during weekends. Ferry service frequency on the route is summarized below;

**Mumbai - Mandwa**

- Frequency: 2-3 trips a day in weekdays and 4-5 trips a day in weekends
- Fare: Adult – INR 380 to INR 1,500 depending upon type of seating, 2WH – INR 1,020 to INR 1,720, Bike – INR 210, Cycle – INR 110


**Figure 2.63 Ro-Pax Vessel Plying on Mumbai – Mandwa Route – M2M Ferries**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

The figure below shows the route connectivity from MbPA (Ferry Wharf and Ro-Pax terminal).


**Figure 2.64 Route Connectivity Mapping of Ferry Wharf**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

As shown above, MbPA is connected to 4 locations on other side of water. Operational details of ferry service to 4 different locations are listed below.

**Table 2.15 Operational Details of Ferry Service**

| Sr. No. | Particulars | Ferry Wharf -Elephanta | Ferry Wharf - Mora | Ferry Wharf - Rewas | Ro-Pax Terminal - Mandwa |
|---|---|---|---|---|---|
| 1 | Operational | Closed in Monsoon | Closed in Monsoon | Closed in Monsoon | 365 Days |
| 2 | Operational Time | 7:00am to 7:00pm | 6:00am to 8:00pm | 6:00am to 5:00pm | 6:00am to 7:30pm |
| 3 | Distance (km) | 23 | 10 | 16 | 19 |
| 4 | Travel Time | 1 Hr. & 30 Mins. | 45 Mins. | 1 Hr.& 45 Mins. | 1 Hr |
| 5 | Frequency | On Demand | 1 Hour | 2 Hour | - |
| 6 | Peak Hours | - | 8:00am to 10:00am & 5:00pm to 7:00pm | 8:00am to 10:00am, 4:00pm to 5:00pm | Friday, Saturday & Sunday |
| 7 | Fare (INR) | 200 | Pax. Full 80 & Child 39, Bike 100 | Pax. Full 100 & Child 50, Bike 100 | Pax. 380, Bike 210, Car 1,020, Bus 3,300 |
| 8 | Purpose | Tourists | Fish Sellers, Working Class, Retail Shoppers, Tourists, Others | Fish Sellers, Working Class, Retail Shoppers, Tourists, Others | Tourists |
| Vessel Details | | | | | |
| 9 | Operators (no.) | 8 | 8 | 8 | M2M Ferries |
| 10 | Vessel | 20 Wooden Launch | 20 Wooden Launch | 20 Wooden Launch | Ro-Pax Ferry |
| 11 | Vessel Capacity | up to 80-90 Pax | up to 80-90 Pax | up to 80-90 Pax | up to 500 Pax. & 150 Vehicles |
| 12 | Vessel Size (m) | L-16.7, W-6.7, D-1.8 | L-16.7, W-6.7, D-1.8 | L-16.7, W-6.7, D-1.8 | - |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

## 2.9 Constraints and Threat

Mumbai Port used to be in the forefront in terms of handling cargo but over a period of years, it has lost its premier position due to various reasons but following are the main ones.

### 2.9.1 Constraint in evacuating cargo

If port has to regain or at least ensure not to lose cargo to other ports, then a study is required to be undertaken of existing cargo, present infrastructure and identify ways and means to overcome hurdle and bottlenecks.

As per the data provided by Mumbai Customs, the top commodity that are handled can be segmented into following

1) Crude Oil 2) Product Oil 3) LPG 4) Steel Plates, Coils and wire rods 5) Base Oils 6) Chemicals 7) Agro products 8) Cement 9) Cars & trucks

Among these crude oils, product oil, LPG are captive cargoes. Whereas other products are being handled due to proximity of factories, consumer base and availability of storage space, tank farm of Aegis Logistics at Mahul. Hence the biggest challenge is attrition of such cargo due to external factors.

Wadala-Kurla rail connectivity is utmost important. This project comprises of laying a dedicated freight line of 4.41 km length from Raoli Junction Wadala to Kurla to establish a direct link between MbPA rail network and 5th and 6th lines being laid between Kurla to Kalyan by central railway to facilitate smoother evacuation. The cost of it is pegged at about Rs.210 Crore. It is understood that the talks are going on at ministerial level. Besides cargo evacuation it will effectively reduce truck movement on the road leading to reduction in GHG emission.

1) Vehicular movement restriction:
2) Non- availability of dedicated corridor for road/ railway.
3) Port related Railway goods traffic is allowed during non-peak hours of local trains as per the time slot available. Restriction on cargo handling due to city proximity. (Environmental pollution issues)


**Figure 2.65: Key Challenges faced by MbPA**

### 2.9.2 Berthing restrictions

Being an old port, the available draft at various location is as follows:

1) Indira Dock: Indira dock has a limitation due to which vessels with beam over 28 m cannot enter. The maximum permissible draft is 9.2 m.
2) Harbour wall: The harbour wall berths have a maximum permissible draft is 8.2 m. Berthing restriction due to less channel width.
3) BPX & BPS: BPS and BPX berths are deeper having draft of 10 m and 10.7 m respectively.
4) Priority given to passenger vessels over cargo vessels.
5) OCT: At OCT berths current water depths are about 11 below CD.

Tidal restriction gives only 4 hrs. window for deep draft vessels.

At present the higher draft location namely BPS, BPX are being used for cruise terminal and steel cargo. OCT is being used for export of vehicles and harbor wall is being used for other cargo. Utilization of inside berths of Indira Dock is less comparative to outside berth for cargo vessels.

Considering the above constraints, Mumbai Port has restricted potential for cargo except for POL products, chemicals, gases and bulk cargo handled at anchorage.

### 2.9.3 New Ports and Terminals in the Neighbouring Area

Recently Adani Ports& SEZ Ltd. has taken over Dighi Port Ltd. The sanctioned capacity of the port is 23.65 MMTPA and will be enhanced to 140 MMTPA. Present waterfront length is 1625

meters and in future it will be 6175 meters. Altogether there will be 20 berths with a draft of 16 meters at certain berths and 17.3 meters' depth in the channel.

Thus in the immediate future, Dighi will be a threat to Mumbai. At present IMC Tankage company is developing tank farms at the cost of Rs. 86 crores.

Mumbai Port liquid chemical and base oil cargo moves to Mahad, Lote Parashuram, Rasayani, Silvasssa and Vapi. Considering the proximity of Dighi to Mahad and Lote Parashuram, due to restriction on evacuation of cargo from Mumbai, there are chances that cargo of this area presently handled at Pir Pau may get diverted to Dighi.

At present JSW Plant at Dolvi, ships export steel cargo through Mumbai and to a lesser extent by containers through JNP. Road distance from Dolvi to Mumbai is 75 kms and Dolvi to Dighi is 76 kms. During day time there is restriction on truck movement in the city leading to delay. Whereas Dolvi to Dighi will have no restriction on the movement. Thus in future Dighi is a potential threat to Mumbai.

Considering this alternate solution is needed to ensure steel cargo remains with Mumbai. Recently consortium comprising JM Baxi Group and others has acquired lease rights of JNPA terminal i.e. shallow water berth and coastal berth. In order to generate traffic, JM Baxi group may cajole auto exporters to shift to the terminal at JNPA.

Also, there are plans to establish facility for car exports at Dighi. Pune to Dighi is about 170 km. But the road access from Pune to Dighi is via Tamhini Ghat. Hence negotiating curves will be difficult for road trailers carrying cars. Hence may not be feasible in the immediate future. Considering this, the immediate threat is JNPA.

The main complaint of auto exporters is the condition of roads, resulting into damages to export cars. Almost 3% of the cars bound for export have had damages because of road condition. Though beautification of Indira Dock was undertaken, road condition has not improved. Also car cleaning and inspection facility may be expanded.

Multi-level car parking facility was planned, but considering uncertainty of the auto trade it may not be financially viable proposal, unless auto exporters are collectively interested to construct such facility under PPP.

Agro produce are cyclical in nature and there is no certainty about assured movement of cargo. For example, in 2017-18, 19000 tons of sugar was imported, whereas in 2021-22 FY, 5 lakh tons of sugar was exported. Sugar production is mainly from Western Maharashtra area.

Similarly, in 2017-18 pulses imported were 6.83 lakh tons, whereas in 2021-22 it was 3.12 lakh tons. But all India import of pulses for 2021-22 stood at 26.99 lakh tons an all-time high. This indicates that there are lot of variables that need to be taken into account to ensure customer remains captive.

Adani Ports and Special Economic Zone (APSEZ), has signed a Memorandum of Understanding (MoU) with India Pulses & Grain Association (IPGA) to handle pulses across its ports in the country. Main USP of APSEZ is warehousing facility and rail connectivity; thereby faster evacuation to hinterland is achieved.

# 3 STUDIES & INFERENCES

## 3.1 Studies Conducted in the Past and its Implementation

### 3.1.1 Master Plan 2035 prepared by AECOM & McKinsey

The team of McKinsey and AECOM had prepared Master Plan-2035 for Mumbai Port as a part of Sagarmala assignment. The major capacity augmentation requirements and proposals suggested by the team of McKinsey and AECOM are as follows:

**Ship Repair**

- Developing a ship repair yard at Mumbai Port is a win-win situation for all stakeholders. Mumbai Port Authority shall generate additional source of revenue from ship repair activity in the form of fixed rentals and profit-sharing.
- MbPA ship repair yard could be the most competitive yard for ships less than 100 m long on the west coast of India.
- The first step should be to refurbish the existing HDD. it is preferable to develop HDD separately as an independent unit by partnering with a private ship repair company.
- Floating dock is considered as a complementing facility for the HDD and could be taken up as a separate project along with the HDD development.

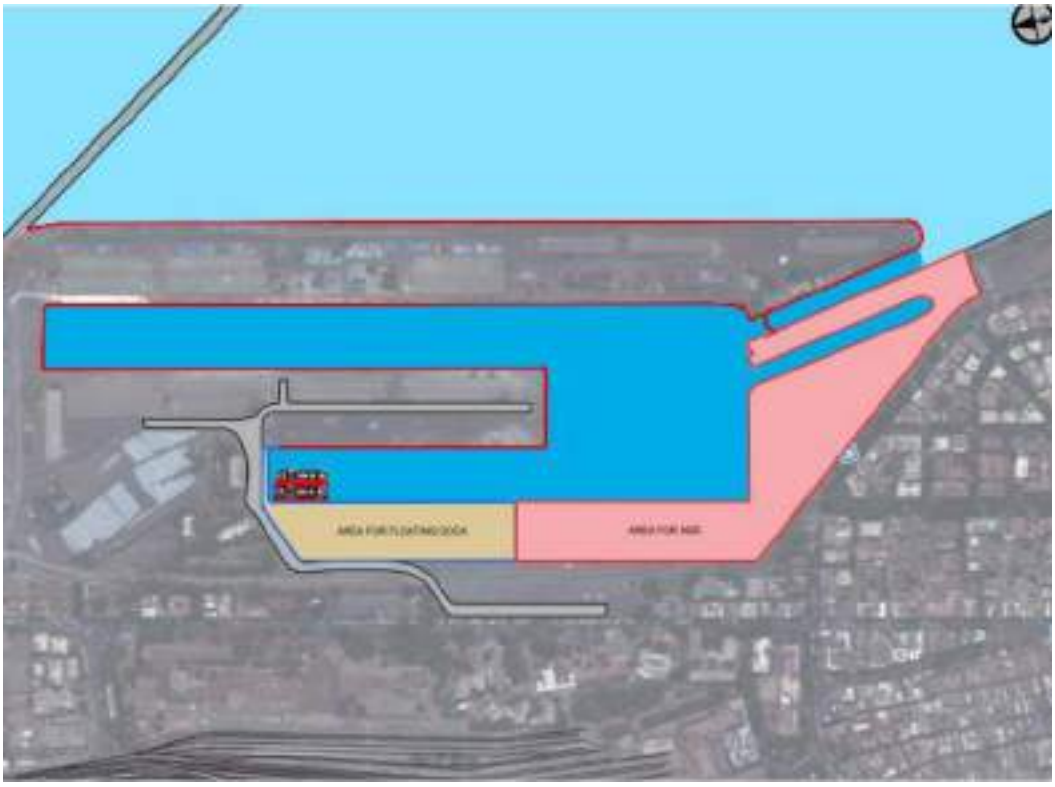


**Figure 3.1 Proposed Plan for Creating Dry Docking Facilities at Indira Dock**
*(Source: Final Report on Master Plan for Mumbai Port prepared by AECOM)*

**Redevelopment of Indira Dock**

Two options were considered for redevelopment of Indira Dock viz. complete closure of the dock including the berths and the dry dock, filling it up and using the reclaimed area for using the space for commercial purposes or partial closure of the dock keeping the dry dock open and operational.

**Figure 3.2 Complete Closure of Indira Dock**
*(Source: Final Report on Master Plan for Mumbai Port prepared by AECOM)*

It was proposed that the entire western arm be utilised for lay berths for the dry docking facilities and the berths on eastern side shall handle the cargo and other port usages such as storage of cargo etc.

**Cruise Terminal**

Mumbai port is already handling cruise vessel and currently these are being handled at BPX berth. However, this berth being one of the deeper berths at the port is in great demand and vessels having higher draft are first lightened here and then proceed to India dock or to harbour wall berths. Keeping in view of the location of BPS and BPX berths being close to the city, it is suggested that a long terms view be taken to develop these berths and the entire backup area for a cruise terminal and associated facilities.

**Oil Handling Facilities**

It was assessed that with the development of JD5, second chemical berth and the FSRU for LNG, there may not be any additional requirement for berths.

The storage tanks associated with berth JD5 are already being developed on the area to be reclaimed on the Jawahar Dweep. Additional tank farms would need to be developed. For this

purpose, suitable area as shown in the figure below, towards the eastern side of Jawahar Dweep Island could be reclaimed.


**Figure 3.3 Proposed Reclamation for Additional Storage Tanks**

*(Source: Final Report on Master Plan for Mumbai Port prepared by AECOM)*

**Berth Requirements**

**Table 3.1 Berth Requirements**

| Sr. No. | Commodity | Total Berths Needed | | |
|---|---|---|---|---|
| | | 2020 | 2025 | 2035 |
| 1 | Break Bulk | 3 | 4 | 8 |
| 2 | Iron and Steel | 3 | 4 | 6 |
| 3 | Ro-Ro Cars and Containers | 2 | 2 | 2 |
| **Total Number of Berths** | | **8** | **10** | **16** |

*(Source: Final Report on Master Plan for Mumbai Port prepared by AECOM)*

The suggested plan for augmentation of berthing facilities is as below:

- **Year 2025-** Provide additional berth of 300 m length and 35 m width along OCT for steel.
- **Year 2030/35 -** Provide additional berths (total 600 m length and 35 m width) with berthing line slightly west of the berthing line of OCT (to clear off the turning circle).

This shall be preferably connected to the approach trestle of OCT, which is wide enough to support the proposed traffic.

### 3.1.2 BCG Benchmarking Study incorporated in AECOM Report

#### *3.1.2.1 Highlights of BCG Study*

BCG, as part of their benchmarking study, has looked into the operation of the berths and has suggested various measures for improving the performance. The report of BCG pertaining to Mumbai Port is given in the Appendix 1. The key observations are as follows:

1) Only 55% cargo (≈34 MT) is handled by MbPA. The rest is directly managed by third parties.
2) Due to draft and beam size limitations, Indira dock manages only 6 MTPA on 27 berths. Modern vessels have an average beam size of 32 meters, which the lock gate limits entry into the inside berths as it has beam size limitations of 27–28 meters. As a result, inside berths are underutilized and have low occupancy while the outside berths have extremely high occupancy.
3) Old infrastructure / lack of mechanization, difficult to sustain mechanization: The port's cranes are of extremely low capacity, which brings down productivity. Low capacity cranes also necessitate reliance on ship cranes as the berth infrastructure is so old that it cannot withstand modern equipment and heavy cranes, rendering mechanization difficult to sustain.
4) Mumbai port has recently decided to discontinue coal handling at Haji Bunder (1.8 MT) because of significant pollution issues in the nearby areas.
5) Analysis has revealed that container handling at MbPA proves to be costlier for customers than JNPT. Multiple handling charges at MbPA limit the cost effective catchment area from MbPA to only around 8 km from the port. Further deep-dive and customer interviews have revealed several reasons why MbPA will not receive substantial container volumes in the future. With JNPT in its proximity, and given JNPT's scale, it is unlikely that MbPA will be able to compete with JNPT for container volumes.
6) Despite a minor dip last year, steel volumes at MbPA have picked up. The total volume of steel handled last year was around 4.7MT, which was at a CAGR of 13% over the last three years given the immense signs of growth in the manufacturing and construction sectors, these volumes are only expected to grow in the near future. Current steel productivity can be increased by installing multipurpose gantry cranes on the berth. Currently, steel cargo at the berth is being handled by ship cranes that limit berth productivity owing to their

design and limited capacity. BPS already has sufficient load bearing capacity strength to handle a 35.5 MT crane, and also has the rail track to support a rail mounted crane. The only capital expenditure required is in terms of purchasing and installation of the crane. MbPA can evaluate the opportunity of handling steel using a multipurpose crane at BPS on a PPP mode.

7) The Offshore Container Terminal berth is built to have two berths in phase 1. The OCT was planned to handle container volumes, however, after careful evaluation of the prospects for OCT, not much container traffic can be expected at the terminal. Therefore, MbPA should consider handling alternate commodities at OCT.
8) Vehicle volume at Mumbai port has increased by 80% over the last 3 years due to a significant increase in exports. 83% of the vehicles exported are from Maharashtra belt, which currently are operating as captive customers. 17% of the remaining export is from Haryana (Maruti Suzuki), which is largely because of the vessel sharing agreements that the company has with other OEMs.
9) Evacuation through busy Mumbai: Since the port is located in the southern-most part of Mumbai, evacuation through road leads to cargo going through the busy Mumbai city traffic, which makes evacuation very slow and inefficient.

#### *3.1.2.2 Implementation of BCG Proposals*

##### Initiative 1: Install Quick Release Systems on berths

**Initiative Overview -** Reduce non-working time in way of reducing mooring time by implementing quick release system on all Jawahar Dweep berths.

**Action: Implemented**

In the first phase global tenders have been invited on 01.10.2015 for installation of Quick Release Hooks at Jetty No. 1 at Jawhar Dweep (JD) and First Chemical Berth at Pir Pau. This work is awarded on 29.12.2015 and QRS installations completed in October 2016

##### Initiative 2: Set up sample testing facilities at JD

**Initiative Overview -** Policy changes to ensure usage of common / HPCL's testing laboratory on Jawahar Dweep for all vessels.

**Action: Implemented**

Various discussion held with users. HPCL and ONGC have their labs on the JD island. Three main users HPCL, ONGC, and BPCL (uses HPCL Lab) utilize the laboratory at JD and hence

there is no time lost. IOC have only one or two ships in a month calling at JD. They have laboratory at Sewree. IOC has been asked to utilize Lab facility at JD. IOC is not willing to utilize the HPCL Lab as its operation is outsourced by HPCL to pvt. company which is not acceptable to the Quality Assurance Department of IOC. However, IOC assured that no delay will be caused and within the 2 hrs. permitted for completion of other works at shipside as gangway fixing, haulage checking, sample taking, loading arm fixing etc., they would complete testing and no delay will be caused on account of sample testing for commencement of ships discharge. Action completed as 3 main users utilize lab at JD but a minor user IOC finds it unviable to set up a lab for their one or two ships visiting a month. Notwithstanding, the issue has been referred to Joint Secretary (Port) to take up with Petroleum Ministry to persuade I.O.C.to do needful, by letter dtd. 21.12.2015. Ministry desired that MbPA takes up with I.O.C.L. suitably. Accordingly, needful is done and being followed up with I.O.C.L., by Dy. Conservator.

### Initiative 3: Improve flow rate by leasing tank farms at JD and implementing low performance penalties

**Initiative overview -** Average flow rate achieved at Jawahar Dweep is very low, in comparison to the installed capacity. While unloading is dependent on the pumping capacity of vessels, loading flow rate can be significantly improved. This will lead to a faster turn-around time on berths.

**Action:** Bring JD 5 plans of creating tank farms forward and implement low performance penalties

Project has been implemented.

### Initiative 4: Shift coal to Dharamtar

**Initiative Overview -** Mumbai port has recently decided to discontinue coal handling at Haji Bunder (1.8 MMT) because of significant pollution issues in the nearby areas. In order to retain part of the revenues, MbPA should move aggressively to partner with nearby ports—Dharamtar/PNP or TATA Power to shift coal handling. Additional capacity exists at both Dharamtar/PNP and TATA power to manage 1.8–2 MMT annually. In case of Dharamtar/PNP, MbPA will stand to earn lighterage charges, whereas at TATA power, MbPA will continue to earn part of wharfage charges.

**Action: Implemented**

Coal Handling at Haji Bunder is stopped and shifted out of MbPA w.e.f. 24.09.2015. Discussion held with MD of Tata Power, but they declined citing non-availability of land. Efforts on to partner with the coastal ports which use MbPA anchorage for transshipment, to retain / attract coal to such ports. Three vessels are already shifted to Dharamtar. Series of meetings held with Director, MAHAGENCO the major user of Haji Bunder facility, (over60%) and they have been persuaded to use alternative port.

### Initiative 5: Provide better customer service to OEMs and reduce vehicle damage

**Initiative Overview -** Vehicle volume at Mumbai port has increased by 80% over the last 3 years due to a significant increase in exports. 83% of the vehicles exported are from the Maharashtra belt, which currently are operating as captive customers. 17% of the remaining export is from Haryana (Maruti Suzuki), which is largely because of the vessel sharing agreements that the company has with other OEMs. Provide dedicated yard space to OEMs

**Action: Implemented**

Dedicated storage area provided at RCD, MOD, Frere Basin and inside docks totaling about 1,30,000 sq. mtrs. allotted. Besides handling of cars at O.C.T. berth allowed. This facility added approx. 25000 sq. mtrs. of storage area for cars prior to loading on ship, besides a clean and new berth wharf facility. Fuel supply is required only for Maruti cars which amounts to about 1000 liters per month and they have been allowed to create fueling facility in the form of mobile tankers but due to small consumption, they are continuing with large Jerry cans.

An inter disciplinary Core team comprising officers from Traffic, Civil Engineering, and Mechanical and Electrical Engineering, C.I.S.F. and the Trade Representative has been formed to tackle/ sort out issues. A dedicated lane for movement of export cars in convoy of 15, is formed for the peak period of 11 to 12 days from 20th to 30th / 31st of month. This lane is cleaned. The potholes are filled up and gate movement smoothened. Asphalting of a diversion road completed by 15th November 2015. Damages to car have reduced substantially to less than 1%, as reported by the trade members of Core Committee and other users. (September 2021).

PDI facility and storage at MOD has been discontinued by Port User. Apart from providing area for PDI facilities in Frere Basin, the users have been provided area in Gamadia Plot for washing facility, in case of any cleaning of vehicle is required at later stage.

### Initiative 6: Installation of higher capacity shore crane will help increase productivity by ~20%

**Initiative Overview -** Current steel productivity can be increased by installing multipurpose gantry cranes on the berth. Currently, steel cargo at the berth is being handled by ship cranes that limit berth productivity owing to their design and limited capacity. Usage of berth cranes will instantly increase productivity by at least 20%.

**Action: Dropped**

Due to operational constraint as below, modification (deletion) in the recommendation at Sr. No. 4.1 was sought from BCG, but not accepted by BCG. This recommendation contrasts with the recommendations at 4.2 for which action is underway as the project is being monitored at PMO and MOS level. The 4.2 recommendation renders 4.1 recommendation unviable economically. Therefore, action on the recommendation No. 4.1 is kept on hold. After reviewing the implementation of recommendation at Sr. No. 4.2, further action will be taken on Sr. No.4.1.

Constraints for implementations of Sr. No. 4.1- i) Navigational issues: The boom of crane at BPS interferes with the vessels that are entering or exiting docks. ii) Frequent shifting of vessel - BPS is deep berth @ 9.5 mtrs draft, so as soon as vessel reaches to 8.5mtrs, it is shifted to other berths at Harbour wall to make way for next 9.5 mtrs. draft vessel which is waiting for berth. iii) Weak wharf: The wharf is 70 to 80 years old and hence there is a serious doubt on the structural integrity of Harbour wall, to take the load on cranes iv) Eventual shifting steel handling to OCT. The restructuring of OCT project is on and hence in foreseeable future say within 1 year, the steel may be handled at O.C.T., thus rendering BPS berth and consequently cranes idle. B.C.G. revised its recommendation and agreed to "keep this on hold" till action on initiative No. 4.2 is decided / taken. DROPPED.

However, in future, BPX / BPS will be used mostly for passenger vessels and Harbour Wall Berths are to be allotted on PPP basis, there is no requirement

### Initiative 7: Use of second OCT berth for steel handling

**Initiative Overview -** The Offshore Container Terminal (OCT) berth is built to have two berths in phase 1. The OCT was planned to handle container volumes, however, after careful evaluation of the prospects for OCT, not much container traffic can be expected at the terminal. Therefore, MbPA should consider handling alternate commodities at OCT. One of these berths can be used to handle additional steel cargo. However, since the terminal was originally built to handle containers, it is only designed to handle spread load. It may not be possible to handle

steel coils, which are commodities with point load on the berth. With minor changes on the berth and steel handling, it is still possible to use OCT as a steel berth

**Action: Implemented**

The use of second O.C.T. berth for steel handling is implemented on trial basis from November 2015. (Details- The O.C.T. is built on B.O.T. basis only for handling container ships. The berths are ready but cranes are not installed yet. The recommendation is to use the berth for alternative cargoes. Due to contractual issues, this facility cannot be straight away used for alternative cargoes. It is used at present by mutual consent for automobile handling. Trial operation of discharging a steel vessel held in November 2015 and proved successful. Concession agreement requires amendment which is being discussed with concessionaire and requires Government sanction. Besides structuring of O.C.T. project is on in which steel handling is also permissible activity. As and when required, OCT berths are used for handling Import Steel Cargo vessels.

#### *3.1.2.3 Road Evacuation*

1) Removal of duplication between CISF and MbPA – Define clear role mandates for CISF and MbPA Officials and invest in developing common IT solutions for both CISF and MbPA.

   **Action: New POS (Iportman) is under development under EBS project, the requirements be covered in the development.**

2) Revamp the physical layout of check post

   a) Gate in – Push MbPA checkpoint further inside the port premises to allow parallel processing of > one trucks at a time.

      **Action: Implemented**

      VDS Chowkey has been shifted inside, so that trucks having DEP can come directly to VDS chowkey, instead of waiting at gate in queue for DEP and VDS.

   b) Gate out – Move the fine payment counter inside to lie first in sequence for trucks. Move the MbPA counter inside to allow space for parallel processing.

      **Action: Implemented**

      MbPA staff collecting fine and checking documents and cargo has been shifted inside.

3) Block Freeway exit outside OGPD for Public Vehicles.

Action: MbPA has prepared a detailed traffic evacuation plan covering the area of OGPD, Mallet Bunder, Ganesh Mandir area of Mazgaon. According to the said evacuation, entry from OGPD area to P.D'mello road is allowed. The evacuation plan takes care of the blockage on road due to multiple crossing in front of OGPD. The evacuation map is as follows:

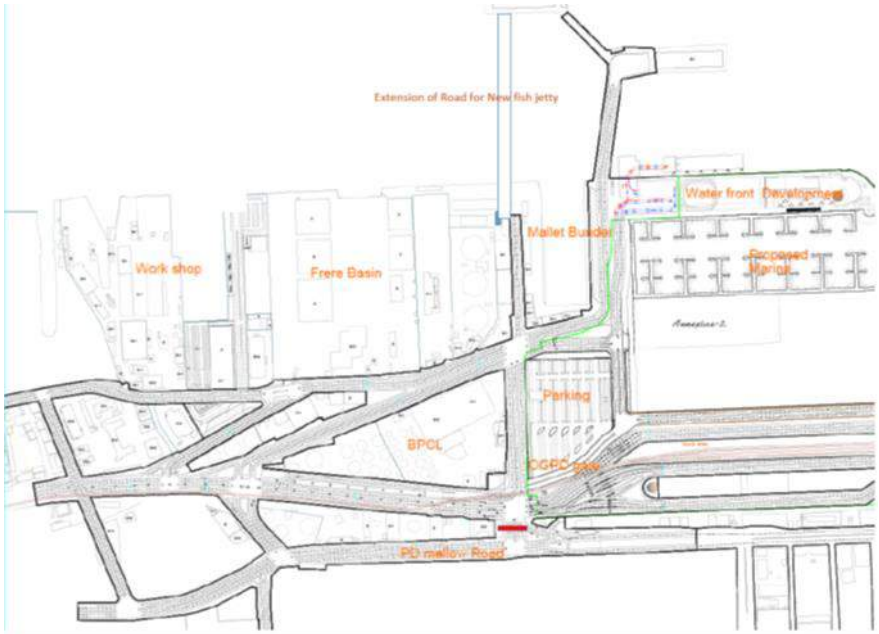



**Figure 3.4 Evacuation Plan**

*(Source: MbPA in house Draft Master Plan)*

4) Split Port bound cargo between orange and yellow –

a) Split Port bound cargo between MbPA road and Mujavar pakhadi road at the Y junction.

**Action:** It is not possible to use YGPD gate for cargo movement as it is exclusively used for the movement of port employees. However, with help of MbPA Security, the queue from Ganesh temple (Y junction) is being managed. In the recent past, CSO has initiated action for controlling the movement of vehicles on MbPA Link Road. It is proposed that Port bound vehicles will not be allowed to cross Reay Road Toll Naka, unless the vehicles have requisite documents ready. Thus it is expected to reduce the traffic congestion in front of OGPD gate .

b) Reconstruct YGPD to align it with existing gates and widen it for easier access

**Action: Instead of reconstructing YGPD gate,** a detailed proposal for shifting the existing OGPD inside the Port area at a distance of 150m from the existing locations

has been prepared. The number of entry points has been increased from 2 to 6, to have a smooth flow of trucks with sufficient space for waiting. Further, a central control room is proposed to control the entire incoming and outgoing traffic movement. The proposal is at design stage.

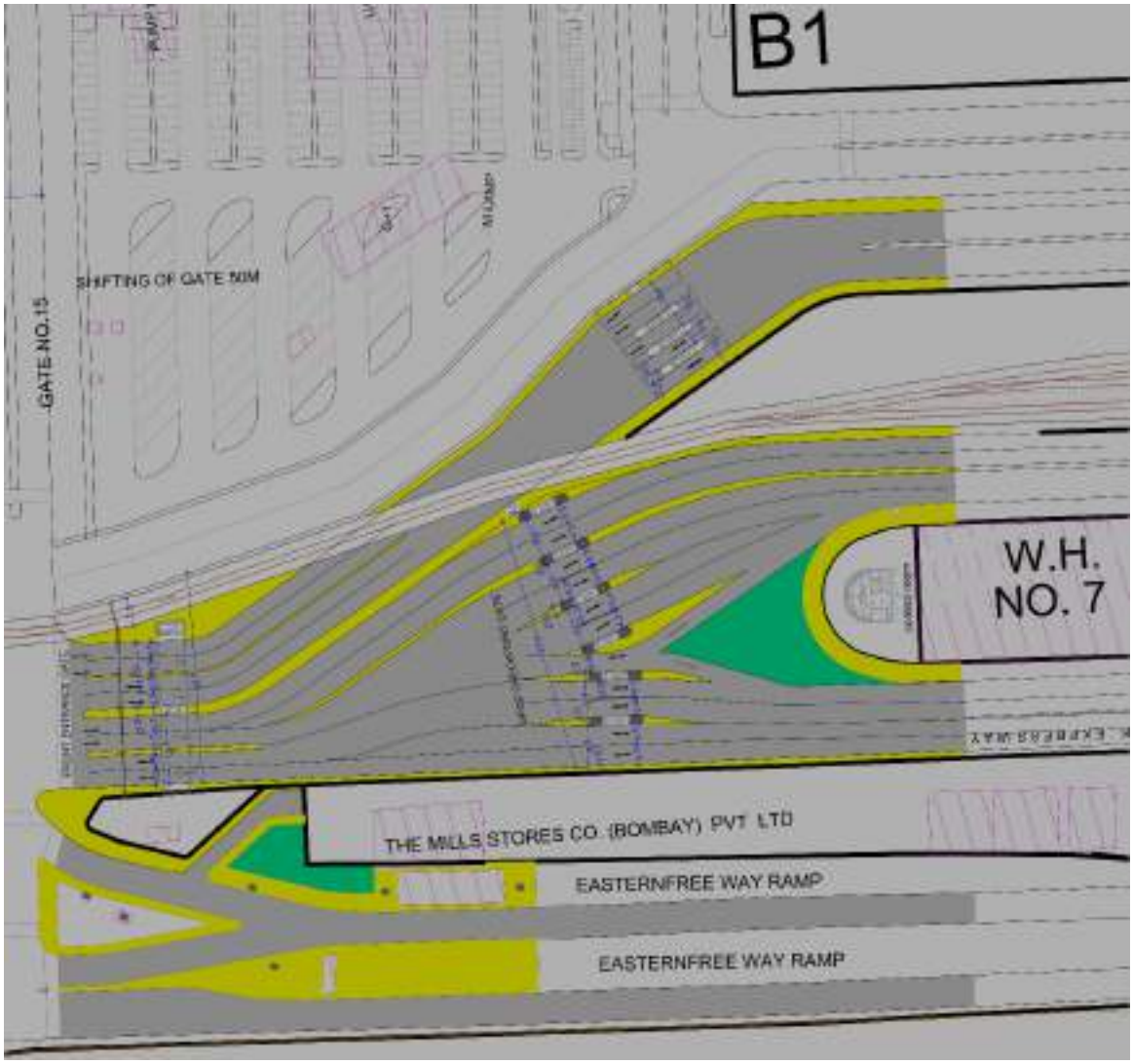



**Figure 3.5: Shifting of OGPD inside the Port**
*(Source: MbPA in house Draft Master Plan)*

## 3.2 Traffic study -2016 for Traffic Management Solutions for Mumbai Port

A study was conducted by a consultant in 2016 to arrive at Traffic Management Solutions for Mumbai Port Area. The consultant studied the traffic movement within port and suggested several short term and long term interventions needed for Port. Few major issues identified as per the study report are listed below.

(1) Parking of trucks is done in a haphazard manner everywhere in the port.

(2) Storage areas are not demarcated properly, goods are dumped in and around the port area.

(3) There are four weighing bridges located within port area, out of which only three are operational. Trucks before leaving the port area, has to weigh the tonnage carrying capacity from the port. If in case, commodity capacity of trucks weighs either less or more as per the axle loading permissible limits, trucks have to revert back to the storage area for loading and unloading of required quantity. Since the weigh bridges are located far from the storage area, trucks are forced to travel same distances for loading and unloading. This create more traffic on the roads as same truck keep on rotating between storage area and weigh bridge locations. This creates chaos and jamming along the road.

(4) There is no dedicated space for truck parking. Trucks are parked near the junction around Gamadia Complex causing major traffic congestion.

(5) Lot of port employees enters from blue or yellow gate to the port area. As a result, lot of pedestrian movement exists but there is absence of dedicated infrastructure for cycles and pedestrians.

(6) In front of orange gate, it is found that the freight traffic is getting delayed due to document verification process of CISF. This leads to congestion and causes major traffic problem in the eastern ferry road. Since large number of freight traffic is getting delayed due to document verification process by an average 60 to 90 seconds, the vehicle is queue up in the Eastern Ferry Road.

(7) It was observed that in front of yellow gate passenger vehicles are getting delayed due to vehicles carrying ship provision/stores which are being detained at gate by CISF for checking of goods to be taken inside docks, thus hindering the traffic movement in front of yellow gate.

**Figure 3.6 Open Storage/Operation Area at 1ID, 2ID, 3ID& Parking Lot near Blue Gate**

## 3.3 New Studies Conducted & Projections for 2047

As part of preparation of Comprehensive Master Plan of Mumbai Port Authority for Planning Horizon 2047, MbPA has appointed CRISIL Limited to undertake detailed study to understand the current port performance, future market, infrastructure requirements and demand assessment in the following sectors:

1) Traffic
2) Ship Repair
3) Fisheries
4) Urban Water Transport

### 3.3.1 Traffic Study

CRISIL Limited had conducted a detailed comprehensive study covering the following domains:

- Hinterland, Completion & Connectivity Analysis
- Commodity Analysis
- Traffic Projections & Ship Calls
- Berthing & Storage Planning
- Action Plan

#### *3.3.1.1 Hinterland, Competition and Connectivity Analysis*

MbPA has niche cargo focus. Majority of the customers of MbPA have long term loyalty and cargo commitment with MbPA. Hence, the presence of competition ports in the hinterland have limited influence on MbPA business prospects. The primary hinterland of MbPA includes the immediate geographical area falling in the radius of 200 km. There are several alternative ports in the 200 km radius of MbPA. However, the niche commodity segment of MbPA restricts migration of cargo from MbPA to competing ports. Majority of traffic handled at MbPA is originated / destined within Mumbai Metropolitan Region extended to Maharashtra state. The existing ports in the vicinity namely JNPA, Dharamtar, Dighi and Jaigad would pose very limited competition. Dharamtar and Jaigad handles more than 80% of total Maharashtra's non-major ports traffic. More than 90% of traffic handled at these ports is for captive used, and rest is consumed locally. Hence, there is negligible threat to MbPA business from these ports. Hazira and Dahej handled 92.4 Mn T in FY22. Around 30% of south Gujarat traffic is handled by captive users, 5% by GMB and rest 64% by private parties.

**Table 3.2 Competition Mapping for MbPA**

| Features | JNPA | Dharamtar | | Dighi | Jaigad | Dahej | Hazira |
|---|---|---|---|---|---|---|---|
| | | JSW | PNP | | | | |
| Draft (m) | 15 | 4.5 | 4.0 | 9 | 18.5 | 14 | 14 |
| Rail Connectivity | ✓ | X | ✓ | X | X | ✓ | X |
| Max. Vessel Size (LOA m) | 370 | 115 | 78 | 325 | 350 | 300 | 350 |
| FY22 Traffic (mn T) | 76 | 16.9 | 3.3 | 0.2 | 22.4 | 33.01 | 24.59 |
| Capacity (mn T) | 138.9 | 34 | 5.0 | 30 | 55 | 36.8 | 35 |
| Capacity Utilization | 55% | 50% | 66% | 0.7% | 41% | 90% | 70% |
| Threats to MbPA | Moderate | X | Low | Low | Low | X | X |
| Reasoning | Planning provisions for non-container cargo as well | 100% Captive | Low draft, dependent on MbPA anchorage. Not suitable for EXIM | Less traffic handled, No rail line, hilly road terrain | 97% Captive, rest consumed locally. Alternate option for JSW's share in MbPA's anchorage traffic | More than 90% users located within port area | |

*(Source: Traffic Study Report prepared by CRISIL)*

It is also expected that development of Vadhvan port (COD expected in FY32) may divert some of the main line container traffic from JNPA and JNPA will have some vacant capacity. The terminals at JNPA is constrained by concession agreement to handle cargo other than container. Recently in the new concession that is awarded to J M Baxi group, has been allowed to handle Ro-Ro traffic. Similarly, it can also be expected that going ahead, JNPA will also allow handling of cargo such as Ro-Ro and steel at its other terminals in their renewed concessions. In this regards Mumbai port may face some competition from JNPA in future with respect to clean break bulk cargo such as car export, steel etc.

Cargo evacuation by road and rail from MbPA to hinterland has serious interference with passenger traffic. Passenger traffic has preference over cargo on all roads passing through Mumbai Metropolitan Region. Mumbai Metropolitan Region Development Authority (MMRDA) is implementing large-scale infrastructure upgradation plans for passenger mobility. These infrastructures proposed to be constructed in coming years are likely to ease passenger traffic on existing roads of Mumbai. A large number of personnel vehicles bound passengers are anticipated to shift to Metro. This would reduce load on common roads used by both cargo and passengers. It is believed that the present restriction on use of roads for cargo transportation would be eased. There is unlikely to be any difference in situation for rail cargo. The passenger traffic as well as schedule of suburban trains are likely to either remain same or further increase. Hence, there is unlikely to be any positive impact for cargo transportation from MbPA using Railways. The upcoming W-DFC connecting Delhi NCR to JNPA would not be able to connect to MbPA due to city congestion. Hence, the upcoming infrastructure developments of MMRDA is likely to immensely improve road evacuation of cargo from MbPA and is unlike to impact rail evacuation of cargo from MbPA using railways.

#### *3.3.1.2 Traffic Analysis*

Potential commodities for MbPA are selected based on the trade rationale and present traffic at the nearby port. MbPA would be able to divert cargo due to ports logistics positioning. Captive cargo is discarded from further study. Also, dirty dry cargo has been excluded. Coal volume handled by MbPA is either for Trombay Thermal Power Station or transhipped to Dharamtar/PNP. Commodities identified for higher business prospects at MbPA are analysed to understand the present Indian scenario, Maharashtra's overview and additional share that MbPA could attract.

**Table 3.3 O-D Mapping of Key Commodities handled at MbPA (mn T)**

| Sr. No. | Commodities | FY 23-24 | Movement |
|---|---|---|---|
| 1 | Crude & POL | 39.81 | BPCL & HPCL unloads crude oil at Mumbai Port whereas ONGC loads crude oil at Mumbai. Both the HPCL & BPCL refineries are connected to jetty through pipeline network. |
| 2 | Stream Cargo | 15.29 | This dry bulk volume is handled at anchorage for transhipment to nearby ports i.e Dharamtar, PNP and Karanja. Around 35.85% of total cargo is iron ore, 35.62 % coal and rest Limestone and Dolomite |

| | | | |
|---|---|---|---|
| 3 | Coal | 2.66 | Entire volume is moved to Trombay Thermal Power Station jetty |
| 4 | Chemicals | 1.79 | Traders and manufactures located Maharashtra and South Gujarat imports Chemicals |
| 5 | Iron & Steel | 5.38 | JSW and POSCO are the users, more than 50% of total export is by JSW and 50% of total imports by POSCO. AMNS plant in Surat also uses MbPA for exports. |
| 6 | Lube Oil | 1.03 | Majorly imported by industries located in Taloja and nearby areas |
| 7 | Pulses & FG | 0.116 | Imported by traders / suppliers and distributed locally |
| 8 | Fertilizers | 0.55 | More than 95% of FRM imported by RCF. Top 10 fertilizer importers contribute to more than 95% of total imports. Majority of them are located within primary hinterland of MbPA |
| 9 | Motor Vehicles | 0.2 | Top 6 automobile companies contribute to more than 95% of total automobile imports. Mumbai, Pune, Nashik, Aurangabad and Nagpur are the auto hubs. |
| 10 | Others | 0.434 | - |
| **Total** | | **67.26** | |

*(Source: Annual Report on Traffic & Performance 2023-24)*

#### *3.3.1.3 Traffic Projections & Ship Calls*

Before arriving at traffic projections for MbPA, certain assessments were carried out. The size of the total relevant market for each commodity is studied. Per commodity, the key drivers for future volume developments is identified. Competition, expansion plans of companies operating in the state or elsewhere and using MbPA and other competing ports are considered. Hinterland connectivity and alternate infrastructure availability level analyses are considered as well. These assessments are incorporated while projecting the market volume that MbPA will be able to attract till FY53.

**Table 3.4 Commodities wise Traffic Projections for MbPA 30 Years (mn T) - Realistic Scenario**

| Commodities | FY25 | FY28 | FY33 | FY38 | FY43 | FY48 | FY53 |
|---|---|---|---|---|---|---|---|
| POL Products | 8.2 | 8.7 | 9.6 | 10.3 | 11.1 | 11.1 | 11.1 |
| LPG | 1.5 | 1.8 | 2.2 | 2.7 | 3.2 | 3.5 | 3.9 |
| Crude | 21.7 | 23.0 | 25.9 | 27.9 | 29.5 | 29.8 | 29.8 |
| POL Transhipment | 7.4 | 7.6 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 |
| Iron & Steel | 4.2 | 5.1 | 4.3 | 3.9 | 4.1 | 3.4 | 3.2 |
| Coal (TPS) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| Stream Cargo | 12.1 | 15.0 | 20.5 | 25.7 | 27.8 | 27.8 | 27.8 |
| Agri Products | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Cement | 0.7 | 0.8 | 1.1 | 1.4 | 1.8 | 2.3 | 3.0 |
| Chemicals | 1.9 | 2.2 | 2.8 | 3.4 | 3.9 | 4.0 | 4.0 |
| Automobile | Refer table below | | | | | | |
| Fertilizer | 0.5 | 0.6 | 0.7 | 0.8 | 0.8 | 0.8 | 0.8 |
| Lube Oil | 1.7 | 1.8 | 1.7 | 2.1 | 2.5 | 2.8 | 3.1 |
| LNG | 0.0 | 0.0 | 1.2 | 1.6 | 2.1 | 2.9 | 3.8 |
| Others | 3.3 | 3.7 | 4.5 | 5.1 | 5.1 | 5.1 | 5.1 |
| **Total** | **66.1** | **73.1** | **84.9** | **95.4** | **102.3** | **104.1** | **106.2** |

*(Source: Traffic Study Report prepared by CRISIL)*

**Table 3.5 Automobile Traffic Projections for MbPA 30 Years - Realistic Scenario**

| Vehicles | FY22 | FY23 | FY28 | FY33 | FY38 | FY43 | FY48 | FY48 |
|---|---|---|---|---|---|---|---|---|
| Automobile ('000 units) | 122 | 102 | 177 | 175 | 189 | 207 | 238 | 259 |

*(Source: Traffic Study Report prepared by CRISIL)*

Note: Actual data for FY23 not available

**Table 3.6 Commodity wise Annual Ship Calls at MbPA**

| Annual Ship Calls | FY25 | FY28 | FY33 | FY38 | FY43 | FY48 | FY53 |
|---|---|---|---|---|---|---|---|
| POL Products | 408 | 433 | 476 | 513 | 550 | 550 | 550 |
| LPG | 77 | 90 | 109 | 133 | 158 | 175 | 193 |
| Crude (ONGC) | 72 | 72 | 72 | 72 | 72 | 72 | 72 |
| Crude (BPCL) | 51 | 54 | 61 | 65 | 65 | 65 | 65 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Crude (HPCL) | 19 | 21 | 26 | 31 | 38 | 39 | 39 |
| POL Transhipment | 164 | 168 | 173 | 173 | 173 | 173 | 173 |
| Iron & Steel | 202 | 236 | 183 | 152 | 149 | 105 | 88 |
| Iron & Steel Coastal | 21 | 29 | 42 | 55 | 67 | 74 | 79 |
| Coal (TPS) | 51 | 51 | 51 | 51 | 51 | 51 | 51 |
| Stream Cargo (Coal +Iron Ore) | 273 | 339 | 463 | 580 | 627 | 627 | 627 |
| Agri Products | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| Cement | 14 | 20 | 33 | 50 | 70 | 95 | 133 |
| Chemicals | 131 | 151 | 191 | 230 | 264 | 275 | 275 |
| Automobile | 40 | 56 | 55 | 59 | 65 | 75 | 81 |
| Fertilizer | 24 | 27 | 31 | 35 | 35 | 35 | 35 |
| Lube Oil | 86 | 88 | 83 | 101 | 120 | 138 | 150 |
| LNG | 0 | 0 | 13 | 17 | 23 | 31 | 41 |
| Others | 143 | 164 | 197 | 222 | 222 | 222 | 222 |
| **Total** | **1794** | **2017** | **2277** | **2557** | **2767** | **2820** | **2892** |

*(Source: Traffic Study Report prepared by CRISIL)*

**Table 3.7 Traffic Distribution under each mode of Transportation (mn T)**

| Commodities | Mode | % Share | FY25 | FY33 | FY43 | FY53 |
|---|---|---|---|---|---|---|
| POL Products, LPG & Crude | Pipeline | 100% | 39.0 | 45.5 | 51.6 | 52.7 |
| Iron & Steel | Road | 95% | 3.7 | 3.3 | 2.7 | 1.6 |
| | Rail | 5% | 0.2 | 0.2 | 0.1 | 0.1 |
| Iron & Steel Coastal | Water | 100% | 0.4 | 0.8 | 1.3 | 1.5 |
| Coal (TPS) | Water | 100% | 2.2 | 2.2 | 2.2 | 2.2 |
| Stream Cargo (Coal + Iron Ore) | Water | 100% | 12.1 | 20.5 | 27.8 | 27.8 |
| Agri Products | Road | 95% | 0.3 | 0.3 | 0.3 | 0.3 |
| | Rail | 5% | 0.02 | 0.02 | 0.02 | 0.02 |
| Cement | Road | 100% | 0.7 | 1.1 | 1.8 | 3.0 |
| Chemicals | Road | 50% | 1.0 | 1.4 | 1.9 | 2.0 |
| | Rail | 50% | 1.0 | 1.4 | 1.9 | 2.0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Automobile | Road | 100% | 0.1 | 0.2 | 0.2 | 0.3 |
| Fertilizer | Road | 100% | 0.5 | 0.7 | 0.8 | 0.8 |
| Lube Oil | Road | 100% | 1.7 | 1.7 | 2.5 | 3.1 |
| LNG | Pipeline | 100% | - | 1.2 | 2.1 | 3.8 |
| Others | Coastal | 78% | 2.5 | 3.5 | 4.0 | 4.0 |
| | Road | 11% | 0.4 | 0.5 | 0.6 | 0.6 |
| | Rail | 11% | 0.4 | 0.5 | 0.6 | 0.6 |
| **Total** | Pipeline | - | 39.0 | 46.7 | 53.7 | 56.5 |
| | Road | - | 8.3 | 9.1 | 10.7 | 11.6 |
| | Rail | - | 1.5 | 2.1 | 2.6 | 2.7 |
| | Water | - | 17.3 | 27.1 | 35.3 | 35.5 |
| | **Total** | - | **66.1** | **84.9** | **102.3** | **106.2** |

*(Source: Traffic Study Report prepared by CRISIL)*

### *3.3.1.4 Berthing and Storage Planning*

Requirement of infrastructure enhancement for cargo handling is studied based on the berth capacity and storage area availability. After the detail analysis of utilisation of present infrastructure, it is understood that additional infrastructure may be required to handle projected traffic till FY53.

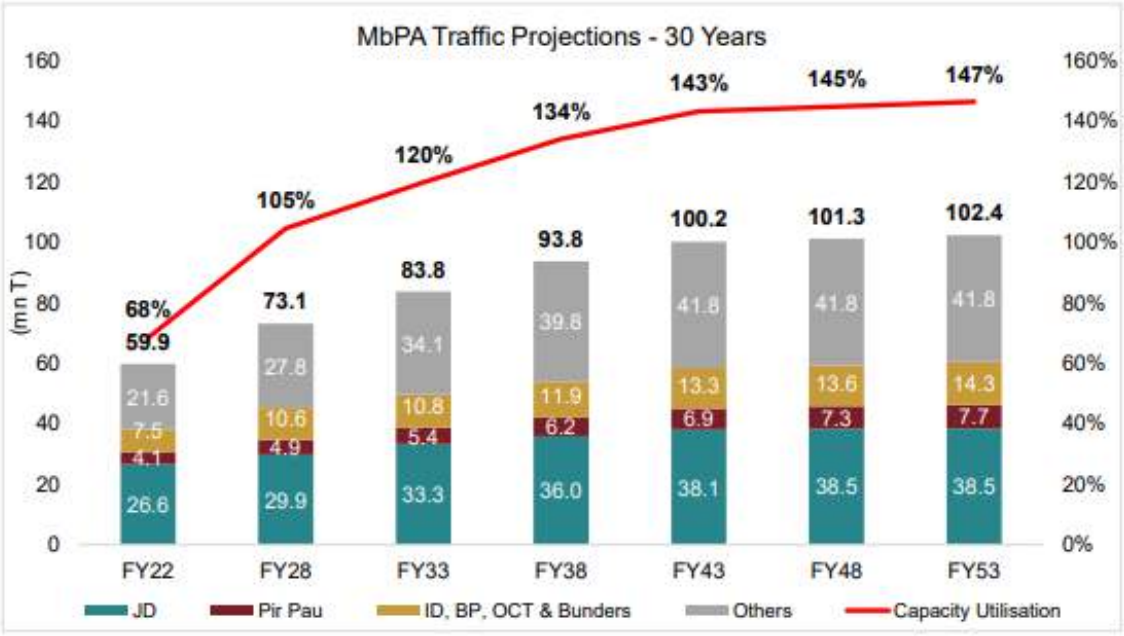



**Figure 3.7 MbPA Traffic Projections and Utilization of Existing Capacity in next 30 years**

*(Source: Traffic Study Report prepared by CRISIL)*

*As depicted in chart above, capacity over 100% utilisation demands for additional infrastructure. In order to accommodate projected traffic, new berths need to be developed.*

**Jawahar Dweep (JD)**

JD berths presently have catered to petroleum products requirement of both the Refineries. Expansion of refineries would lead to higher volume. There exists possibility of refineries pro crude in larger ships and berthing them in lightered condition. The parcel size of shipments, should ideally, increase with the increase in throughput of crude. Larger parcel size would lead to increase in ship dimensions. Alternatively, the number of ship calls would increase, if Refineries choose to import crude in same ship sizes presently importing. There would be requirement of one additional berth for petroleum products. *The existing capacity at Pir Pau would fall short of projected traffic. Hence, there would be requirement of additional infrastructure.*

**Pir Pau**

The berth is already constructing a liquid terminal (NPP 3) with additional capacity of 2 MTPA. The estimated capacity at Pir Pau after commissioning of NPP3 would be 7 million tonnes. The additional demand would be due to rise in traffic of Petroleum products. *The additional berth at JD would be able to accommodate incremental traffic of Crude and Petroleum products both at JD and Pir Pau.*

**Indira Docks, Ballard Pier Berths, OCT & Bunders**

The berths are allocated for handling multiple products in smaller shipments. It also handles lightered liquid cargo in inner-harbour of Indira Docks. The existing BPS and BPX berths are available for cargo handling during monsoon only, when cruise handling is not in operation. Hence, the 4-month cargo handling capacity of berth the berths have been assumed to be 2 million tonnes. The OCT is presently handling automobiles only. Automobile traffic is presently handled at OCT berth with less than 20% berth occupancy. The projected automobile traffic may not require additional infrastructure as existing would suffice the purpose. Going forward, it is assumed that OCT could handle some of other breakbulk cargo namely Iron and Steel whenever the berth is not handling automobiles. The Iron and Steel could be unloaded or loaded on to trailers using Mobile Harbour Cranes or ships gear. The total achievable capacity of Indira, BP, OCT & Bunders have been assumed to be 12.2 MTPA. *There would be requirement of creating an additional berth with a capacity of 2.1 MTPA.*

**Anchorage**

Anchorage utilisation at MbPA is high. JSW is the largest customer of MbPA using substantial share of Anchorage for its Dolvi Plant. There would be a requirement for augmenting capacity of Anchorage. However, any capacity augmentation has financial risks for MbPA. JSW is also using a combination of Anchorage and cargo handling at JSW Jaigad followed by moving cargo using coastal mini bulk carrier. It is not clear, what will be share of cargo handling by JSW at anchorage and using coastal mini bulk carrier. This uncertainty leads to following 2 options of anchorage upgradation for MbPA

1. MbPA could offer JSW an option to invest on creating dedicated anchorage points to be used for JSW cargo on priority. The anchorage tariffs of MbPA could be adjusted suitably to help JSW recover investment
2. MbPA could increase deep draft anchorage. This will lead to faster turnaround of ships at the outer harbour anchorage. Ships 1st call to outer harbour anchorage. They take around 3 days to part unload ship's cargo onto barges. The lightered ship is called to shallow draft anchorage for further discharge. Increasing depth of shallow draft anchorage from 8m to draft to 9m draft would lead to shifting of ships from deep draft anchorage to shallow draft anchorage after single day discharge. This is likely to increase turnaround of ships at outer harbour anchorage and inner harbour anchorage.

MbPA would be required to develop infrastructure for handling LNG cargo using PPP. The existing contract for installation of FSRU is delayed. There is uncertainty over commissioning of FSRU unit. However, looking at the demand for cleaner energy, there would be an opportunity for FSRU unit at MbPA. Hence, a provision for installation of FSRU unit has been considered in the 2047 plan.

Storage area and slots available at MbPA are sufficient enough to handle projected traffic.

- POL is considered as captive cargo. The storage infrastructure required is already in place. There exist dedicated pipelines from Jawahar Deep to storage area. Hence, it is assumed that future expansion would mostly be created by Oil Refineries at their plant.
- The traffic for coal by Tata Power Station at Trombay would remain constant. Hence does not require any additional infrastructure.
- All the cargo that are handled in stream are transported to river jetties using barges. These cargoes are not stored or handled at MbPA infrastructure.

- The requirement of storage infrastructure is limited to few commodities i.e iron & steel, agri products, cement, automobile, fertiliser, and other break bulk commodities. MbPA historically has handled more than around 6 mn T of iron & steel traffic. There exists sufficient backup area for storage of steel coils.

### 3.3.2 Ship Repair Assessment in MbPA

#### *3.3.2.1 Need for Ship Repair*

A ship is a floating structure, which requires regular repair and maintenance to retain its seaworthiness. Thus, repair and maintenance of ships is a regulatory requirement. The repair, maintenance, and seaworthiness of a ship are monitored by third party based on certain guidelines issued by international bodies, which is endorsed and implemented by respective governments. This independent body, called classification society and government appointed regulatory authority, undertakes periodic survey and inspection of ship and issues necessary for permission and certificate. A ship without these certificates is not allowed to trade. Hence, undertaking periodic repair and maintenance is one of the essential tasks of a ship owner. The major reasons for MbPA to switch towards ship repair domain are as follows:

- Dry-docking repair is a statutory requirement for ships to carry out regular business.
- Stringent statutory requirements have mandated compulsory repairs and maintenance.
- Ship repair is a stable business.
- The availability of ship repair infrastructure is much less compared to the demand

#### *3.3.2.2 Recommendations- (MIV 2030)*

MIV 2030 recommended to declare 2 ship repair clusters to enhance the ship repair capability in India. It emphasizes on infrastructure required, cluster management, fiscal and regulatory recommendations, establishing of small repair facilities for inland and fishing vessels.

**Establish Small Repair Facilities for Fishing & Inland Vessels**

- Setting up 2 facilities in each state near the fishing harbour. One facility to be setup in each National Waterway (1 to 5) near Industry clusters.
- Warehousing facilities to meet needs of these repair facilities. Creation of a common portal for locating repair yards and major clusters
- Shared funding model amongst GOI, state govt, and ship owners based on ownership model of repair hubs

- Workforce to follow best practices and meet necessary standards. Based on demand, training of workforce for advanced repairs of vessels can be done at CoETC.

**Key Guidelines to Initiate Ship Repair Cluster**

- Select one of the 3 locations (Maharashtra, Goa and Cochin regions) based on the parameters - whether shipyard has capability to repair medium to large vessels, minimum concentration of suppliers nearby and empty land space available to build a cluster.
- Shortlist the types of repairs based on docking infrastructure and repair facilities available
- Define fiscal incentives to engage OEMs to setup service centers and warehouses to stock spares
- Identify investments required in the logistics infrastructure to further ease the movement of goods and people

**Infrastructure Recommendations**

- Ship repair yards should maintain minimum draft near the docks as per the requirements of vessels coming for repair
- Ancillary industries should be established in the hinterland of the ship repair clusters.
- OEMs should be incentivized to service centers to support equipment repair for vessels and logistical requirements for moving parts & people in and around the cluster area
- Good housing facilities to ensure workers don't have to travel long distances every day thereby ensuring higher availability in the yard
- Authorize global ship repair agencies to build floating dry docks to supply repair services during peak times of the year at lower cost of operations.
- Build warehouses with storage capabilities to stock inventory for at least 3 months, live tracking of parts & equipment and semi-automated / automated part handling capabilities
- Setup road, rail and water logistics to enable faster and low-cost transportation of goods and people.

#### *3.3.2.3 Indian Ship Repair Market*

India, located on the major trading route, has a well-established market potential for ship repair units. Increase in overseas trade and the impact of increase in foreign ships plying on Indian

markets have created the need for more number of repair and maintenance infrastructures. IMO regulations and classification societies have introduced stringent regulations, which need corresponding repair works to be done at regular intervals so as to meet their standards.

The need for technology upgradation has also increased. Owners and managers of ship repair yards have realised importance of technology upgradation, as only comfort of low labor cost is not likely to make Indian yards competitive in the global market.

The Indian Ship repair industry has an exciting future ahead, which can be supported by the following points:

- There is a substantial untapped market potential available for existing and new upcoming ship repair units in India, because of the wide demand-supply gap. At present, the Indian repair yards cater to less than 50 % of the repair requirements of the domestic Indian flagged vessels. Moreover, most of India's large-sized vessels and specialised offshore vessels have to go abroad for their repair requirements, due to lack of facilities available within the country.
- The demand is likely to grow even further in the years to come, due to addition in the Indian mercantile fleet, as well as the increasing traffic at the Indian ports. Moreover, Indian ship repair industry can also have access to repair market of foreign flag ships, provided it can provide competitive and quality-oriented repair services.
- Changes in trading patterns, international regulations requiring more conversions & retrofitting of new equipment as well as stricter norms enforced by the classification societies etc., are likely to give rise to higher demand for ship repair / retrofitting units in India. In terms of management, manpower, and skills, basic framework is available with Indian shipyards. They have been repairing ships in India for several years. A majority of the workers and management personnel working in international Asian yards are Indians. They have been trained in Indian shipyards and repair yards in the initial years of their careers. Hence, talent is available locally for ship repair yards.

With a large reservoir of skilled / experienced manpower at economical rates, the prospects for Indian repair units are brighter. However, ship repair yards in India need to focus on training needs of its workers at shop floor. They also need to work towards increasing retention of employees at their shipyards, who migrate to international ship repair yards for better remuneration.

In the present scenario of ship repair industry in India, it has been found that there is a large demand supply gap of infrastructure in the country. Due to unavailability of infrastructure, ships operating in India have to go to foreign yards to meet their repair and maintenance requirement. In some of the cases, migration of ships to other countries for repair and maintenance is due to commercial reasons also. Foreign repair yards, due to assistance of government and availability of cheap material, spares, and productive manpower are found to be more competitive compared to Indian ship repair yards. This has led to a large number of Indian ships going to foreign yards for undertaking their routine repair and maintenance. There still exist a large fleet, which has natural commercial advantages of getting repaired locally in India. However, unavailability of local infrastructure is driving them to foreign ship repair yards. Following chart depicts number of ship repairs undertaken by Shipping Corporation of India (SCI) for major categories of their fleet in the last 10 years.

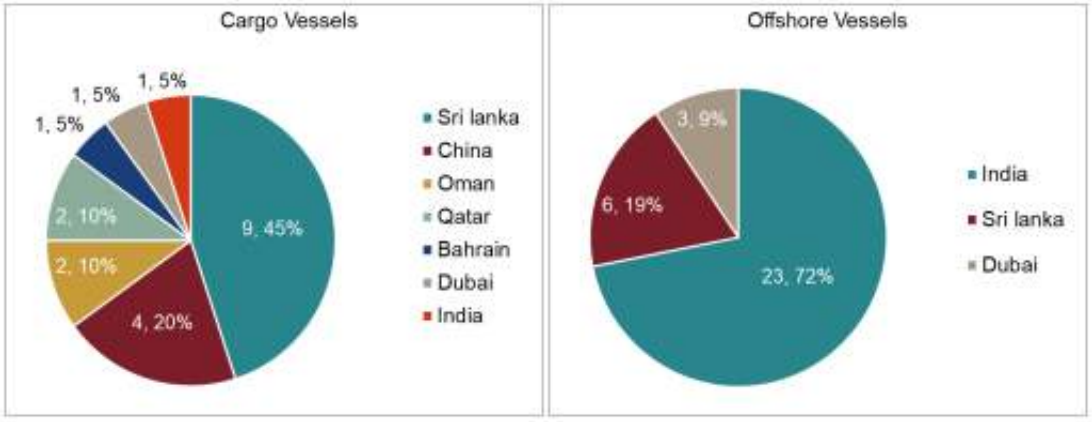



**Figure 3.8 No. of SCI Vessels Repaired between 2012-2021 – Cargo & Offshore**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

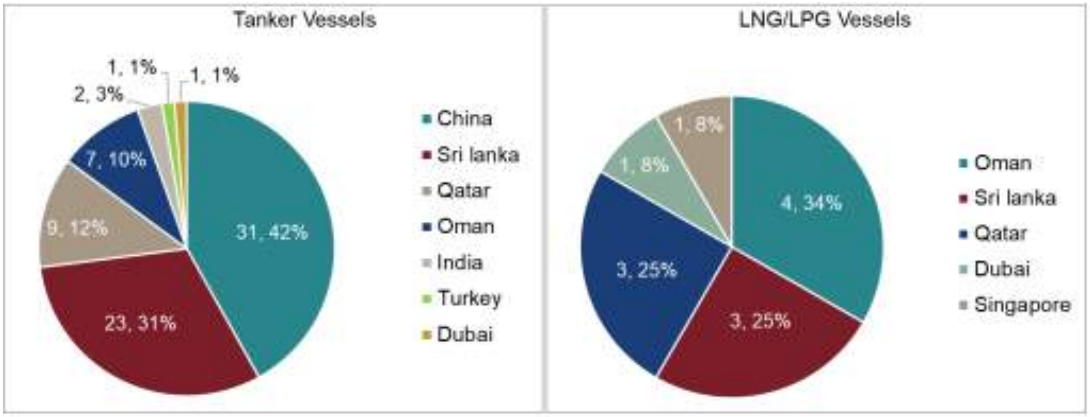



**Figure 3.9 No. of SCI Vessels Repaired between 2012-2021 – Tanker & LNG/LPG**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

As can be seen in Figure 5.5 & Figure 5.6, SCI takes 45% of its cargo vessels to Sri Lanka (Colombo) for repair, followed by 20% to China, 10% to Oman (Duqm), 10% to Qatar & 5% each in India, Bahrain & Dubai in last 10 years (2012-2021). Around 72% of offshore vessels i.e. 23 Nos. are repaired in India in last 10 years (2012-2021) and remaining 19% in Sri Lanka and 9% in Dubai.

#### *3.3.2.4 Repair Revenue of Shipyards*

Over the last 10 years, the ship repair revenue of Indian shipyards has seen significant growth. CSL, GSL and MDSL contribute maximum to the ship repair revenue. The expansion of infrastructure by CSL along with acquisition of several new infrastructures for repair activities could be attributed to the growth. Some of the defence shipyards including GSL and MDSL have diversified into repair of Naval and Coast Guard ships.

Cochin Shipyard Limited (CSL) have invested in expanding and upgrading their repair infrastructure to accommodate a wider range of vessels and more complex repair projects. The company has begun to operate repair facilities at multiple locations, including HDD of MbPA, CSL Kolkata Ship Repair Unit, CSL Andaman & Nicobar Ship Repair Unit (Port Blair). CSL has been able to increase its capacity to simultaneously handle more ships leading to increased repair revenue.

Shipyards that have historically focused on naval shipbuilding, such as Mazagon Dock Shipbuilders Limited (MDSL) and Garden Reach Shipbuilders & Engineers (GRSE), have started undertaking repair and maintenance projects for the Indian Navy. These strategic partnerships have not only increased the ship repair revenue for these shipyards but also enhanced their technical expertise and capabilities. Similarly, Goa shipyard building ships for Indian Coast Guard have begun undertaking repair activities.

The repair activities with other shipyards are limited to smaller vessels including barges, port crafts and inland vessels. The ship repair infrastructure is relatively limited with other smaller shipyards. The shipyards in India lack the necessary facilities, equipment, and dry docks to accommodate larger vessels or those with specific requirements.

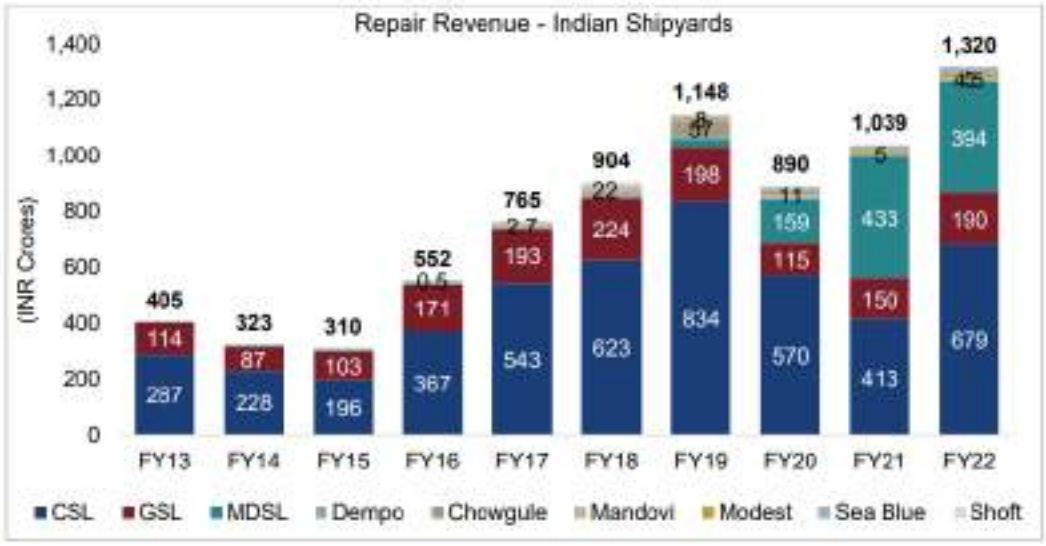



**Figure 3.10 Repair Revenue of Indian Shipyards in last 10 years**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

### *3.3.2.5 Growth Trends in India*

Coastal vessels have seen significant growth in vessel addition as compared to overseas vessel. Total number of coastal vessels grew from 187 in 1992 to 1,027 in 2021. Total overseas vessel has grown from 254 in 1992 to 464 in 2021. Below figure broadly describes 30 years of growth by Indian shipping industry.

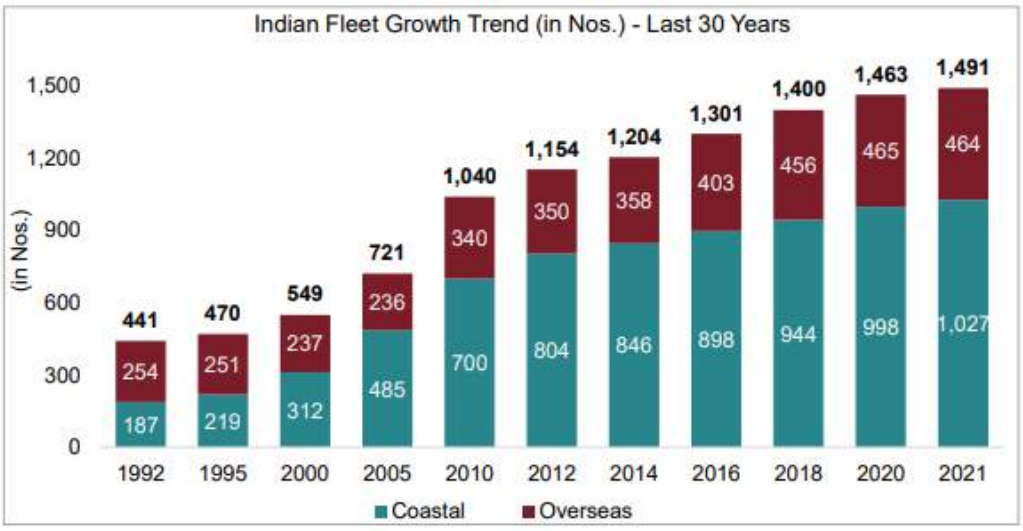



**Figure 3.11 Cumulative Vessel Addition in Indian Fleet (in Nos.) – Last 30 years**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Indian shipping fleet consists of vessels ranging from below 2,000 DWT to above 300,000 DWT. In the present operational fleet, 63% of vessels are of less than 2,000 DWT. In year 2021, only 14 new vessels were added to the fleet consisting 8 vessels of less than 2,000 DWT and 6 vessels having DWT from 5,000 to 9,999.

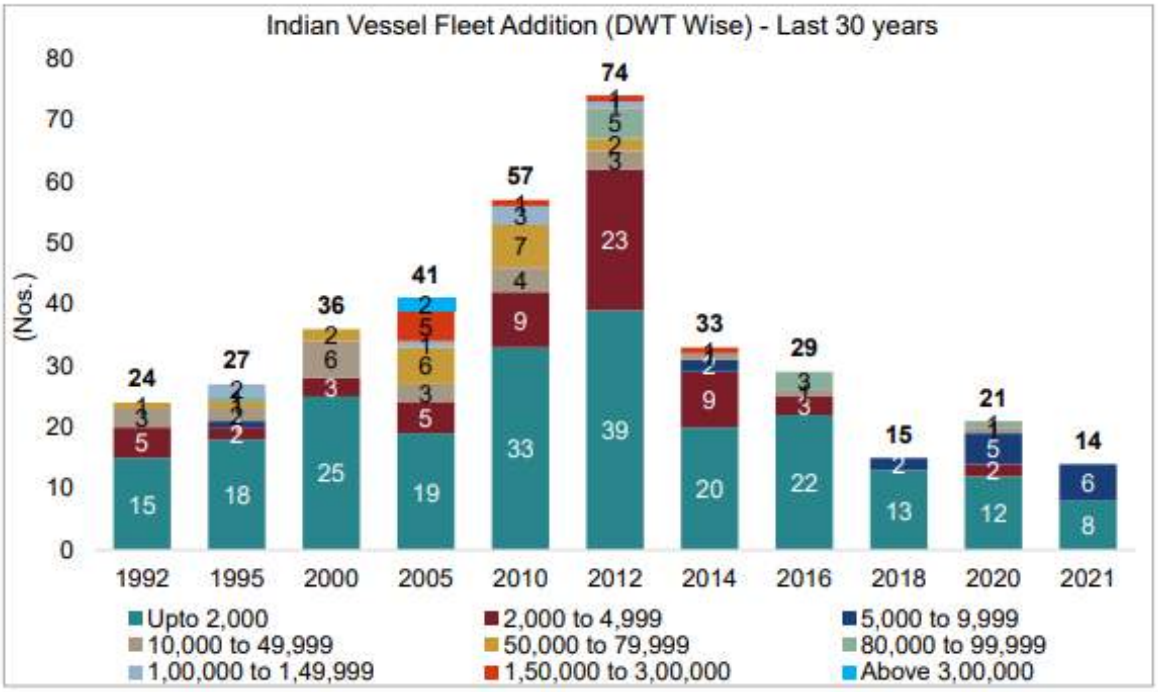



**Figure 3.12 Indian Vessel Addition in last 30 years**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

### *3.3.2.6 Competitive Analysis*

This section compares competitiveness of MbPA's ship repair facilities with other ship repair yards in the west coast of India. Depending on competitive advantage a shipyard has compared to MbPA's ship repair, they have been categorised as high potential competition, moderate competition, or no competition. Ship repair yards located on the west coast of India, Middle East, Oman, and Sri Lanka would provide competition to MbPA's shiprepair yard. The ship repair yard located on the east coast of India does not offer any type of competition to the proposed ship repair at MbPA. It is unlikely that any ship located on the west coast of India would migrate to east coast for repair. There have been exceptions for large ships requiring highly value of repairs. Large-scale and value of repairs justify high mobilisation cost of ship from west coast to east coast. Following section outlines competitive advantage of MbPA's ship repair yard with other ship repair yards located on the west coast of India.

Table 3.8 speculates competition scope and scale for ship repair at Mumbai Port with other repair yards on India's west coast:

**Table 3.8 Competition Analysis of Shipyards on West Coast of India**

| Sr. No. | Shipyard | Promoter | Location | Market Focus | Status |
|---|---|---|---|---|---|
| **High Potential Competition** | | | | | |
| 1 | Hughes Drydock | MbPA | Mumbai, MH | | Functional |
| 2 | Lavgan | Chowgule Global | Jaigad, MH | Coastal ,Offshore | |
| **Moderate Competition** | | | | | |
| 3 | Goa | Goa Shipyard | Goa | Coastal ,Offshore | Functional |
| 4 | Modest Infrastructure | Dempo Group | Bhavnagar, Gujarat | Offshore, Tankers | |
| 5 | Dempo Shipbuilding & Engineering | Dempo Group | Bandora, Goa<br>Bainguinim, Goa | Barges, Tankers | |
| 6 | Mandovi Dry docks | Mandovi Drydocks | Pilgao, Goa<br>Rassaim, Goa | Mini Bulk Carriers, Barges | |
| 7 | Cochin | Cochin Shipyard | Kochi, Kerala | Offshore, Rigs, Coastal, Navy | |
| 8 | Sea Blue Shipyard | Sea Blue Shipyard | Kochi, Kerala | Barges, Tugs, Patrol, Cargo | |
| 9 | Shoft Shipyard | Shoft Shipyard | Dahej, Gujarat | Cargo, Barges | |
| 10 | Kurul | Konkan Barge Builder | Alibag, MH | Barges | |
| **Good Infrastructure - No Competition** | | | | | |
| 11 | Naval Dockyards | MOD | Mumbai, MH | Indian Navy | Functional |
| 12 | Mazagon Docks | MDSL/MOD | Mumbai, MH | Indian Navy | |
| **Competition at Planning Stage** | | | | | |
| 13 | Shipyard at Plot - 2 under shipyard cluster in Belapur creek | Maharashtra Maritime Board | Navi Mumbai, MH | Tugs, barges, speed boats, yachts, cruise liners ships / boats / hovercrafts / seaplanes or other cargo or | RFP floated for selection of developer on DBFOT basis |
| 14 | Shipyard at Plot - 4 under shipyard cluster in Belapur creek | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 15 | Shipyard at Plot - 5 under shipyard cluster in Belapur creek | | | passenger ships | |
| 16 | Shipyard at Plot - 6 under shipyard cluster in Belapur creek | | | | |
| 17 | Shipyard at Plot - 7 under shipyard cluster in Belapur creek | | | | |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

## High Potential Competition

There are 2 high potential competitors of proposed ship repair yard in Mumbai based on their location advantages, suitable infrastructure to undertake ship repair activity, technical knowhow, etc. The first one is Hughes Dry dock owned by MbPA only (leased to CSL for operation for 30 years) and second one is Lavgan shipyard owned by Chowgule Global Pvt. Ltd. at Jaigad, Maharashtra.

**Table 3.9 Competitiveness comparison among high potential competitors**

| Shipyard | Advantages | | | | Market Focus | | | | | Competition |
|---|---|---|---|---|---|---|---|---|---|---|
| | Market | Location | Connectivity | Ancillary | Naval | Rigs | Offshore | Commercial | Coastal | MbPA |
| Hughes Drydock | ***** | ***** | ***** | *** | ✓ CG | X | ✓ | X | X | ***** |
| Lavgan | ***** | *** | *** | *** | ✓ CG | ✓ | | X | ✓ | ***** |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Note:

1. No. of star indicates share by importance. All comparisons with respect to MbPA and is relative in nature
2. CG indicates Coast Guard Vessels

## Moderate Potential Competition

Companies that qualify to compete with MbPA based on their location advantages, suitable infrastructure to undertake ship repair activity, technical knowhow, etc., but lack competitive advantages, have been categorised under “Moderate Competition”. The competition posed by them to the ship repair at MbPA would be moderate.

**Table 3.10 Competitiveness Comparison with companies having moderate competition**

| Shipyard | Advantages | | | | Market Focus | | | | | Competition |
|---|---|---|---|---|---|---|---|---|---|---|
| | Market | Location | Connectivity | Ancillary | Naval | Rigs | Offshore | Commercial | Coastal | MbPA |
| Goa | **** | **** | **** | **** | ✓ | X | ✓ | X | ✓ | **** |
| Modest | *** | **** | **** | ** | X | X | X | ✓ | ✓ | *** |
| Dempo | *** | *** | *** | ** | X | X | ✓ | ✓ | ✓ | *** |
| Madovi | *** | *** | *** | ** | X | X | ✓ | ✓ | ✓ | *** |
| Cochin | *** | ***** | **** | **** | ✓ | ✓ | ✓ | ✓ | ✓ | *** |
| Sea Blue | *** | **** | ** | ** | X | X | X | ✓ | ✓ | *** |
| Shoft | *** | **** | *** | *** | ✓CG | X | X | ✓ | ✓ | *** |
| Kurul | ** | *** | ** | ** | X | X | X | X | ✓ | *** |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Note:

1. No. of star indicates share by importance. All comparisons with respect to MbPA and is relative in nature.
2. CG indicates Coast Guard Vessels.

The infrastructure required for ship building and repair may look similar, but they are far different in practical terms. A shipbuilding yard can, technically, undertake both new-building and repair activity. However, commercially, it is unviable to undertake ship repair activity at a shipyard designed for ship building. Most of the shipbuilding yards in India have undertaken ship repair activity out of compulsion arising out of slowdown, and not out of choice.

In the event of shipbuilding gaining pace, all the shipyard that had focused on new-building and had started undertaking repair to increase utilisation of their yard, are likely to again start new-building activity and forsake repair of ships.

A ship repair yard designed for repair activity cannot undertake new building activity due to infrastructure constraints. Conditions required for new-building and repair is different. In case of new-building, the shipyard needs to plan in advance and procure equipment and machinery with enough inventories for spares. In addition, shipbuilding projects run for a longer duration of time. A typical new-building project could take anywhere between 12 months and 18 months for completion. Hence, the shipyard with the new-building focus has enough time for planning, scheduling, and inventory management of all the material and equipment. However, in case of

ship repair, it is not possible to follow the same procedure. All of the commercial ships require less than 18 to 20 days for completion of repair. Every ship that comes for repair is a different ship. The makers of equipment and machinery are different. There are hundreds of different kinds of critical spare required during repair of ships. It is not possible for the ship repair yard to maintain inventory of all such spares. They have to always depend on equipment suppliers for the procurement of these spares at the time of repair. Even original equipment suppliers do not keep all types of spares at every location. Moreover, India having smaller volume of repairs, it is not viable for the equipment suppliers to maintain complete inventory locally. At times of need, they are procured from global warehouses and supplied to the ship repair yard. This reduces competitiveness of yards located in location with poor logistics and connectivity.

### Good Infrastructure-No Competition

Several repair infrastructures have been developed along the west coast of India. However, these infrastructures have different product focus. The following table depicts the shipyards located on the west coast, which has good infrastructure, but due to differential product focus, do not compete with MbPA for ship repair activity.

**Table 3.11 Competitiveness Comparison with Companies with Good infrastructure**

| Shipyard | Advantages | | | | Market Focus | | | | | Competition |
|---|---|---|---|---|---|---|---|---|---|---|
| | Market | Location | Connectivity | Ancillary | Naval | Rigs | Offshore | Commercial | Coastal | MbPA |
| Naval Dockyards | X | ***** | ***** | **** | ✓ | X | X | X | X | X |
| MDSL | X | **** | **** | **** | ✓ | X | X | X | X | X |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Note:

1. No. of star indicates share by importance. All comparisons with respect to MbPA and is relative in nature.

### MMB Planned Shipyards (Competition)

Maharashtra Maritime Board has proposed shipyard cluster in Belapur region of Navi Mumbai. The proposed development is in RFP stage. It will take few years to start the repair operations at these shipyards. The proposed shipyards will cater to repair needs of smaller vessels in the region, focusing mainly on barges, fishing vessels, passenger vessels, etc. Below table lists these planned repair yards in the region.

**Table 3.12 Competitiveness Comparison with yards in Planning Stage**

| Shipyard | Advantages | | | | Market Focus | | | | | Competition |
|---|---|---|---|---|---|---|---|---|---|---|
| | Market | Location | Connectivity | Ancillary | Naval | Rigs | Offshore | Commercial | Coastal | MbPA |
| Shipyard Cluster, Belapur | **** | ***** | ***** | ** | ✓ CG | X | X | ✓ | ✓ | ***** |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Note:

1. No. of star indicates share by importance. All comparisons with respect to MbPA and is relative in nature.
2. CG indicates Coast Guard Vessels.


**Figure 3.13 Ship Repair Locations nearby- Belapur**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

### *3.3.2.7 Demand – Supply Gap Assessment*

India is strategically located on the busiest maritime route in the world. The Indian Ocean is a major oceanic corridor for international maritime trade, and India's location on the eastern shore of the Indian Ocean makes it a key player in the region's maritime trade and commerce.

The Indian Ocean is a vital sea lane for maritime trade, connecting the major ports of India, the Middle East, and Africa. The maritime route passing through the Indian Ocean is also known as the Indo-Africa Maritime Route, which connects the Arabian Sea and the Red Sea with the African ports on the east coast.

India is strategically located on this route, with its west coast facing the Arabian Sea and its east coast facing the Bay of Bengal, which is connected to the Indian Ocean. India's western coast is home to some of the prominent ports of India which are important transhipment hubs for cargo moving between Asia and Africa. The eastern coast of India also has several ports, which serve as important gateways for India's trade with Southeast Asia and the Far East.

The maritime trade route between India and Europe, connects the ports of India on the west coast with the ports of Europe, passing through the Arabian Sea, the Red Sea, and the Mediterranean Sea. The Arabian Gulf, also known as the Persian Gulf, is an important sea lane that connects the ports of the Middle East and South Asia. The Gulf is home to some of the world's largest oil and gas reserves and is a major source of revenue for the countries in the region.

There is huge volume of trade carried out in the region which gives prominence to ports located on the west coast of India. Due to lack of advanced ship repair infrastructure in the region, vessels calling on the west coast ports of India have to go to other locations i.e. Colombo, Middle East, China for carrying out their repairs and scheduled dry docking.

Proposed ship repair at MbPA could target these vessels subject to increase in adequate depth availability in the Mumbai Harbour region to handle these big vessels / carriers. Proposed ship repair at MbPA could also target smaller vessels calling at non-major ports of the west coast, barges, fishing vessels, etc. These vessels require less depth as compared to big vessels. Following chart depicts prominent maritime routes in the region and major ports of India.

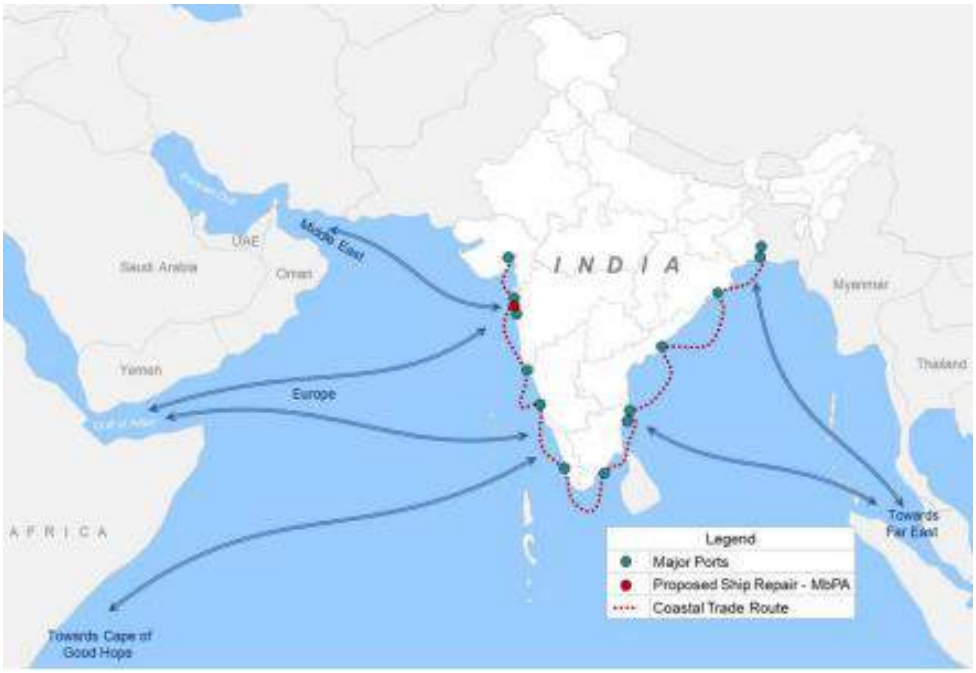



**Figure 3.14 Prominent Maritime Trade Route w.r.t MbPA**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

#### *3.3.2.8 Number of Ships*

Ports on the west coast of India handled 866 million tonnes of traffic in FY21. Gujarat and Maharashtra ports contributed 78% to the total traffic handled on the west coast. In FY21 12,704 number of vessels called at major ports on west coast. JNPA and MbPA handled 14% and 5% of the total vessel calls respectively, followed by ports of Deendayal, MbPA, Cochin, New Mangalore and Mormugao. Non-major ports of Gujarat and Maharashtra contributed 51% share to the total traffic handled in FY21.

The proposed ship repair yard at MbPA would be primarily targeting the vessels calling on the major and non-major ports of west coast. Annual vessel calls at MbPA has decreased in last 10 years from 2,156 in FY11 to 1,652 in FY21 at a CAGR of -3% Whereas vessel calls at JNPA has increased from 3,100 in FY11 to 4,819 in FY21 at a CAGR of 5%. Share of MbPA in the total vessel calls at ports of west coast has decreased from 9% in FY11 to 5% in FY21. Following chart depicts historic vessel calls at major ports of west coast based on ship size (DWT).

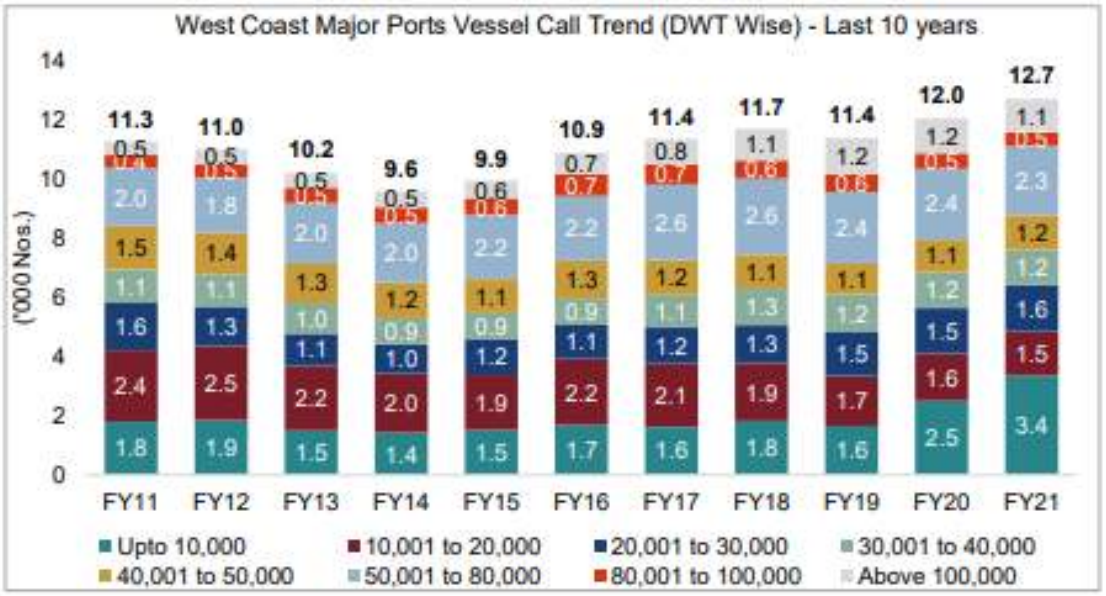



**Figure 3.15 Vessel Call Trend at Major Ports of West Coast of India – DWT Wise**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

### 3.3.3 Demand Assessment for Fisheries

#### *3.3.3.1 Ferry Wharf Fishing Infrastructure Upgradation*

The existing fish jetty at Ferry Wharf has been designed to cater to 300 boats. The jetty is now being used by more than 1,500 boats which creates congestion. Therefore, MbPA has proposed the expansion of the existing jetty. The details of the project are given in section 4.8.

The details of the existing fishing vessel using the ferry wharf such as overall length of boats, average landing per trip, duration of each fishing trip etc. are described in below table.

**Table 3.13 Details of Fishing Vessel at Ferry Wharf**

| Overall Length of Boats (Average) | No.of Boats | Average Landing per Boat (Ton per trip) | No.of days in fishing season | Duration of each trip (days) |
|---|---|---|---|---|
| 14 m Trawlers | 36 | 4 | 270 | 4 |
| 16 m Trawlers | 194 | 5 | 270 | 4 |
| 18 m Trawlers | 740 | 5 | 270 | 8 |
| 18 m Trawlers Migratory | 202 | 5 | 270 | 8 |
| 20 m Trawlers | 114 | 6 | 270 | 10 |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

### 3.3.4 Demand Assessment for Urban Water Transport

#### *3.3.4.1 Ro-Pax Service*

At present MMB manages short haul passenger ferry services for river crossing. Recently, MMB has given some new permissions to several operators for short haul and long-haul service as well. The table below shows the list of newly permitted routes that are likely to be connected to MbPA (Ferry Wharf or Gateway). Most of the operators are presently operating ferry and ro-pax service for across the river movement.

**Table 3.14 Newly Permitted Long-Haul Routes by MMB**

| Sr. No. | Long Haul Routes | Operators with Permission (No.s) |
|---|---|---|
| 1 | Gateway/Ferry Wharf – Dharamtar | 5 |
| 2 | Ferry Wharf – Dighi / Agardanda | 1 |
| 3 | Ferry Wharf – Jaigad (via Dighi & Dhabol) | 1 |
| 4 | Mumbai – Goa (via Jaigad & Vengurla) | 1 |
| 5 | Ferry Wharf – Maharashtra & Goa | 1 |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

During the in-person interaction with MMB, it was understood that MMB is planning to operational below listed routes for passenger and ro-pax movement at earliest. The construction works of terminal at many places have already started and likely to be completed in a year.

**Table 3.15 Upcoming Routes for Passenger Water Transport (Ro-Ro)**

| Sr. No. | Route | Terminal | Current Status of Terminal | Established Date of Commencement |
|---|---|---|---|---|
| 1 | From MbPA to - | Mora | WIP | Sep. 2024 |
| 2 | | Kashid | WIP | Oct. 2023 |
| 3 | | Dighi | Approval Awaited | Oct. 2024 |
| 4 | Narangi - Kharwadeshwari | Narangi | Jetty Completed, Road WIP | Feb. 2024 |
| | | Kharwadeshwari | Road Completed, Jetty WIP | Feb. 2024 |
| 5 | Vasai - Bhayander | Vasai | WIP | May. 2023 |
| | | Bhayander | Completed | May. 2023 |
| 6 | Gorai - Borivali | Gorai | Forest Clearance Awaited | Sep. 2024 |
| | | Borivali | Forest Clearance Awaited | Sep. 2024 |
| 7 | Manori - Marve | Manori | WIP | Sep. 2023 |
| | | Marve | Completed | Sep. 2023 |
| 8 | Karanja - Rewas | Karanja | Completed | Sep. 2023 |
| | | Rewas | WIP | Dec. 2023 |
| 9 | Ambadave - Toradi | Ambadave | WIP | July. 2023 |
| | | Toradi | Completed | Mar. 2023 |
| 10 | Dabhol - Veldur | Dabhol | Jetty Already Existing | - |
| | | Veldur | WIP | Jun. 2023 |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

**Table 3.16 Upcoming Routes for Passenger Water Transport (Passengers)**

| Sr. No. | Route | Terminal | Current Status of Terminal | Established Date of Commencement |
|---|---|---|---|---|
| 1 | Arnala - Arnala Fort | Arnala | Work Completed | Sep. 2023 |
| | | Arnala Fort | WIP | Sep. 2023 |
| 2 | Malvan - Sindhudurg | Malvan | Work Completed | Oct. 2022 |
| | | Sindhudurg | Jetty Already Existing | N.A. |

| | | | | |
|---|---|---|---|---|
| 3 | Radio Club / Gateway - Belapur, Elephanta, Mandwa | Radio Club | In Tendering Process | Dec. 2024 |
| | | Belapur | Jetty Already Existing | N.A. |
| | | Elephanta | Clearance Awaited | Dec. 2024 |
| | | Mandwa | - | - |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Above highlighted routes would be connected to MbPA for ro-pax service. Operator would require to deploy vessel similar like M2M ferry in these routes. Existing ferry terminals at other side of these routes are capable of handling small ro-pax vessels. MMB is developing ro-pax infrastructure (like Ro-pax in Mandwa) at other side of the newly permitted routes to accommodate Ro-Pax vessel. The table below shows the infrastructure and facilities available at Ro-Pax Terminal of MbPA. Benchmarking to this terminal, MMB should develop similar terminal infrastructure at Dighi, Kashid and Mora to operationalise the newly permitted routes.

**Table 3.17 Ro-Pax Terminal – Infrastructure and Facilities**

| Sr. No | Parameters | Units | Value |
|---|---|---|---|
| 1 | Area | sq.m | 5,371.9 (~1.5 Acres) |
| 2 | Ro-Ro Ramp | m | 85 |
| 3 | Vessel Size (LXW) | m | 94.6 x 17.6 |
| 4 | Vessel Draught | m | 2.4 |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

MMB is planning to complete construction of Ro-Pax terminal at Dighi, Kashid and Mora by end of 2024. Operators have already got permission, procurement of Ro-Pax vessel would take few months. MbPA does not require to take any actions till the time Ro-Pax terminal gets developed on other side of the routes. Once Ro-Pax terminal gets developed and operators are ready with vessels, MbPA need to give permission to berth their vessels at Ro-Pax terminal.

MbPA's Ro-Pax terminal is currently under-utilised. The terminal is only used by passengers moving to/from Mandwa. At present only 1 vessel is deployed on this route. Looking at the demand, operator have scheduled 2-3 trips a day in weekdays and 4-5 trips a day during weekends. Sailing time between Mandwa and Mumbai is around 1 hours. Vessel spends around 30 – 40 mins on berth for passengers alighting and boarding for next trip. Considering the present ferry service operation, the capacity of Ro-Pax terminal is calculated below.

**Table 3.18 M2M Ferry Terminal – Capacity Utilization Assessment**

| Parameters | Units | Weekdays | Weekends |
|---|---|---|---|
| Operational Hours | Hrs. / Day | 8 | 15 |
| **Berth utilized in single trip** | | | |
| • Vessel Mooring Time (alight and board) | Mins / Trip | 40 | 30 |
| • Vessel Turnaround, Misc. | Mins / Trip | 20 | 20 |
| Time taken on berth | Mins / Trip | 60 | 50 |
| **Daily Trips Calculation** | | | |
| Ideal Trips (Capacity) | No. / Day | 8 | 18 |
| Ideal Trips (Optimum Capacity at 75%) | No. / Day | 6 | 13 |
| Trips as per existing schedule | No. / Day | 2 | 4 |
| Spare Capacity for additional trips | No. / Day | 4 | 9 |
| Weekly Trips Calculation | No. / Day | | |
| **Weekly Trips Calculation** | | | |
| Ideal Trips (Capacity) | No. / Week | 86 | |
| Ideal Trips (Optimum Capacity at 75%) | No. / Week | 63 | |
| Trips as per existing schedule | No. / Week | 20 | |
| Existing Capacity Utilization | Of total Capacity | 32% | |
| Spare Capacity for additional trips | No. / Week | 43(68%) | |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

As shown in table above, existing Ro-Pax terminal is under-utilized at 32%. This terminal has capacity to handle 63 ship calls a week, however only 20 ship calls a week are handled

currently. The terminal still has capacity to handle an additional 43 ship calls a week. This spare capacity could be utilized by the newly permitted long-haul routes. At present, MbPA does not need to develop any additional infrastructure for passenger / tourist handling. The existing infrastructure is adequate to handle passenger traffic for new routes / developments.


**Figure 3.16 Proposed Location for Additional Ferry Terminal**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

The required additional Ro-Pax terminal in future should replicate the existing Ro-Pax terminal at MbPA. The figure above maps the location of two options where additional terminal should be constructed.

✓ Option I – Existing Ro-Pax terminal to be expanded by installing additional ramp.

✓ Option II – On southern side of Ro-Pax terminal, there exists m-shed which is in not usable condition. MbPA could demolish that and built a Ro-Pax terminal in future.

#### *3.3.4.2 Passenger Ferry Services*

At present, Ferry Wharf at Mumbai port provides ferry service to Mora, Rewas and Elephanta (occasionally). Most of the commuters are fishermen / fish sellers. Residents of Mora and Rewas alight at ferry wharf to reach Bhaucha Dhakka fishing jetty. Other than fishermen, daily commuters also include office going people and workers employed nearby port area. Ferry service is the only option for residents of Rewas, rail connectivity is not available on this route

and by road connectivity is way too time consuming. Residents of Uran (Mora Jetty) used to highly prefer ferry service over any other mode till few years back. However, in last few years' foot falls on the jetty have reduced drastically. During the site visit it was understood that better road and rail connectivity have taken over the ferry business. The table below shows the time – Distance – Fare comparison between ferry service and other available mode.

**Table 3.19 Time-Distance-Cost Comparison between Mora – Ferry Wharf and its Alternate Options**

| Sr. No. | Route | Mode | Time (Min) | Distance (km) | Fare (Rs.) |
|---|---|---|---|---|---|
| **Option I - Ferry Route** | | | | | |
| 1 | Uran - Mora Ticket Counter | Auto | 20 | 4.5 | 30 |
| 2 | Mora Ticket Counter - Mora Jetty | Walking | 10 | 0.5 | - |
| 3 | Mora jetty - New Ferry Wharf | Ferry | 55 | 9.5 | 80 |
| 4 | Mora jetty - New Ferry Wharf | Taxi | 20 | 6 | 50 |
| Total | | | 105( 1hr.45mins) | | |
| **Option II - Road & Rail** | | | | | |
| 1 | Uran - Juinagar | Bus | 60 | 30 | 45 |
| 2 | Juinagar- CSMT | Train | 50 | 31 | 20 |
| 3 | CSMT - Market | Walking | 10 | 1 | 0/28 |
| Total | | | 120 (2 hrs.) | 62 | 70 |
| **Option III - Direct Rail (Upcoming Connectivity)** | | | | | |
| 1 | Uran – Belapur | Train | 30 | 30 | 15 |
| 2 | Belapur - CSMT | Train | 60 | 38 | 20 |
| 3 | CSMT - Market | Walking | 10 | 1 | 0/28 |
| Total | | | 100 (1 hr.40 mins) | 69 | 60 |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

As shown in table above, ferry service to Mumbai is costlier than any other alternate mode available. Though distance is less, but difference in transit time is not so noticeable. Ferry route saves around 40km distance and 15 mins, but costs around INR 100 higher. Daily workers have

shifted to Option II in last few years. Increasing ticket fee, poor connectivity and infrastructure at Mora jetty have also moved people to opt for alternate mode. Rail connectivity to Uran is under construction and likely to get operational soon, this upcoming direct rail option would provide fasters and cheapest alternate mode to reach south Mumbai. Daily workers traveling to South Mumbai is more likely to shift on Option III in future. However, fishermen / fish sellers and people for retail shopping are likely to continue using ferry service. For such people, ferry service is more convenient to travel with their bulk luggage.

#### *3.3.4.3 Traffic Projections*

**Table 3.20 Traffic Projections at Ferry Wharf of MbPA (Annual Traffic in Lakhs)**

| Scenarios | FY25 | FY27 | FY32 | FY37 | FY42 | FY47 |
|---|---|---|---|---|---|---|
| **Ferry Wharf - Mora** | | | | | | |
| Optimistic | 5.7 | 6.1 | 7.1 | 8.4 | 10.0 | 12.1 |
| Realistic | 5.7 | 6.1 | 7.1 | 8.2 | 9.5 | 10.9 |
| Pessimistic | 5.7 | 6.1 | 7.0 | 8.0 | 9.1 | 10.3 |
| **Ferry Wharf - Rewas** | | | | | | |
| Optimistic | 1.0 | 1.1 | 1.3 | 1.7 | 2.3 | 3.1 |
| Realistic | 1.0 | 1.1 | 1.3 | 1.6 | 2.0 | 2.4 |
| Pessimistic | 1.0 | 1.1 | 1.3 | 1.5 | 1.6 | 1.9 |
| **Total Ferry Wharf** | | | | | | |
| Optimistic | 6.8 | 7.2 | 8.4 | 10.2 | 12.3 | 15.2 |
| Realistic | 6.8 | 7.2 | 8.4 | 9.8 | 11.4 | 13.3 |
| Pessimistic | 6.8 | 7.2 | 8.3 | 9.4 | 10.7 | 12.1 |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

**Table 3.21 Passenger Traffic Projections at Ro-Pax Terminal of MbPA (Annual Traffic in Lakhs)**

| Scenarios | FY25 | FY27 | FY32 | FY37 | FY42 | FY47 |
|---|---|---|---|---|---|---|
| **Ro-Pax - Mandwa** | | | | | | |
| Optimistic | 7.4 | 8.7 | 10.6 | 13.5 | 17.1 | 21.8 |
| Realistic | 7.4 | 8.7 | 10.6 | 13.1 | 15.3 | 18.9 |
| Pessimistic | 7.4 | 8.7 | 10.6 | 12.4 | 14.2 | 16.0 |
| **Ro-Pax - Dighi via Kashid** | | | | | | |
| Optimistic | 0.0 | 1.9 | 2.7 | 3.7 | 4.9 | 6.5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Realistic | 0.0 | 1.9 | 2.7 | 3.6 | 4.6 | 5.9 |
| Pessimistic | 0.0 | 1.9 | 2.6 | 3.3 | 4.0 | 4.9 |
| **Ro-Pax - Mora** | | | | | | |
| Optimistic | 0.0 | 2.7 | 4.0 | 5.3 | 6.9 | 9.3 |
| Realistic | 0.0 | 2.7 | 4.0 | 5.1 | 6.6 | 8.4 |
| Pessimistic | 0.0 | 2.7 | 3.6 | 4.7 | 5.8 | 6.9 |
| **Total Ro-Pax Terminal** | | | | | | |
| Optimistic | 7.4 | 13.4 | 17.3 | 22.4 | 28.9 | 37.7 |
| Realistic | 7.4 | 13.4 | 17.3 | 21.8 | 26.5 | 33.2 |
| Pessimistic | 7.4 | 13.4 | 16.8 | 20.4 | 24.1 | 27.8 |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

**Table 3.22 Vehicle Traffic Projections at Ro-Pax Terminal of MbPA (Annual Traffic in Lakhs)**

| Scenarios | FY25 | FY27 | FY32 | FY37 | FY42 | FY47 |
|---|---|---|---|---|---|---|
| **Ro-Pax - Mandwa** | | | | | | |
| Optimistic | 1.9 | 2.2 | 2.6 | 3.4 | 4.3 | 5.5 |
| Realistic | 1.9 | 2.2 | 2.6 | 3.3 | 3.8 | 4.7 |
| Pessimistic | 1.9 | 2.2 | 2.6 | 3.1 | 3.5 | 4.0 |
| **Ro-Pax - Dighi via Kashid** | | | | | | |
| Optimistic | 0.0 | 0.5 | 0.7 | 0.9 | 1.2 | 1.6 |
| Realistic | 0.0 | 0.5 | 0.7 | 0.9 | 1.2 | 1.5 |
| Pessimistic | 0.0 | 0.5 | 0.6 | 0.8 | 1.0 | 1.2 |
| **Ro-Pax - Mora** | | | | | | |
| Optimistic | 0.0 | 1.9 | 2.7 | 3.7 | 4.9 | 6.5 |
| Realistic | 0.0 | 1.9 | 2.7 | 3.6 | 4.6 | 5.9 |
| Pessimistic | 0.0 | 1.9 | 2.6 | 3.3 | 4.0 | 4.9 |
| **Total Ro-Pax Terminal** | | | | | | |
| Optimistic | 1.9 | 4.6 | 6.1 | 7.9 | 10.4 | 13.6 |
| Realistic | 1.9 | 4.6 | 6.1 | 7.8 | 9.6 | 12.1 |
| Pessimistic | 1.9 | 4.6 | 5.9 | 7.2 | 8.6 | 10.1 |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Note: Mora and Dighi route are assumed to get operationalise by FY26.

## 3.4 Stakeholder Consultation

### 3.4.1 Consultation by CRISIL

*Stakeholder Consultation – Ship Repair*

As part of demand assessment study on ship repair, CRSIL had consulted the following stake holders:

**Table 3.23 List of Stakeholders consulted for Ship Repair**

| Sr. No. | Organisation | Name of the attendee | Designation of the attendee |
|---|---|---|---|
| 1 | Indian National Ship owners Association (INSA) | Mr. Anil Devli | Managing Director |
| 2 | ProComm Professional Communication | Mr. Farrokhi Bengal | Managing Director |
| 3 | The Orient Engineering & Ship Repair Works | Mr. Shetye | Technical Manager |
| 4 | Marine Engineering Consultancy & Services | Mr. Aditya Rai | Managing Director |
| 5 | United India Marine Services | Mr. Kamlesh Kumar | Chief Executive Officer |
| 6 | Excel Marine Services Pvt. Ltd. & Quality Marine Services Pvt. Ltd. | Mr. Yashpal Mahajan | Director in both companies |
| 7 | Ashapura Marine Tech International | Mr. Aniket Gaikwad | Assistant manager, Radio Surveyor |
| 8 | Shree Laxmi Enterprises | Mr. M Mishra | Chief Executive Officer |
| 9 | PRO Marine Solutions Pvt. Ltd. | Mr. Sudeesh Nair | Service Manager |
| 10 | Jai Durga Contractor | Mr. Rajesh Dongre | Proprietor |
| 11 | I.V.& Sons Engineering Works | Waseem Vanu | Proprietor |
| 12 | Homa Engineering Works | Mr. More | Assistant General Manager |
| 13 | Maaniyar Enterprises | Mr. Shibin Ra | Project Manage |
| 14 | D.S. Marine Repair | Mr. Chandrakant Dalvi | Partner |
| 15 | Mars Ship Repairs Pvt. Ltd | Ashok Kumar Pandey | Director |
| 16 | Shri Renuka Marine Service | Prabhu Jagde | Proprietor |
| 17 | Prabhat Marine Services | Sunil Tripathi | Director |
| 18 | Marks Marine Radio Pvt. Ltd. | Mr. A. Chaugule | Director |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

The main inference from the stake holder consultation regarding ship repair are as follows:

- Ship repair industry in India lacks basic competence. Indian ship owners are forced to get their ships built and repaired at international ship repair yards. There have been unprecedented delays in delivery of new building orders.
- The infrastructure along with ancillary has to be created around ship repair facility. The availability of spares and ancillary is required.
- Work productivity and timely delivery of ships is essential.
- Ships in coastal waters have no other options to look for repair even if the ship yards are inefficient. There is huge mobilisation cost associated with taking a coastal ship to an international ship repair yard for repair.
- Competence of ship repair yard at MbPA has to be at par with international ship repair companies operating in the region.
- Presently other than HDD no dry docks are available in MbPA. If a slipway is developed, it would mainly be utilized by small boats, tugs, and launches with lengths ranging from 20-25 meters and weighing between 200-250 tons.
- Vessels have fixed schedules and limited time when they visit ports. During this time, they must undergo repairs, maintenance, and servicing to avoid disrupting their operations. So, time is a crucial factor in shipping industry. Vessels calling at MbPA could be targeted for repair subject to availability of dry dock, slipways.

### *Stakeholder Consultation – Fisheries*

The following comments were received post stakeholder consultation regarding fisheries

**Ferry Wharf (Bhaucha Dhakka)**

- No ice factory is present near Fishing jetty. Ice is procured all the way from Ambernath, Vashi, Taloja etc.
- Current capacity of the jetty is for 300 boats, but 1,200 boats are accommodated at present. Daily 100 Vessels come on Jetty for fish selling. Space issue was observed during site visit.
- Existing metal shed is corroded and requires replacement before monsoon of 2023.
- Bridge that connects Bhaucha Dhakka to Ferry wharf road is in poor state. Also heavy traffic is observed on this road in rush hours.
- During low tide, silt can be observed in space between Bhaucha Dhakka and Mallet bunder. Dredging will be required here for smooth operation of supply vessels.

- The first floor of Bhaucha Dhakka is currently lying vacant. This space can be used by operators to keep their goods.
- Underwater pillars of the jetty possess the biggest threat to the fishing boats. Some of the pillars are damaged and broken. So when a fishing vessel approaches to jetty, because of these broken submerged pillars the vessels hit them and get damaged. Immediate action is required here.
- washrooms are available on Jetty and one of them is not in use. It also occupies space and is very unhygienic for the fishes kept nearby. Construction quality is weak so it should be either repaired or removed so that space can be utilized.

**Sassoon Dock**

- An ice plant and ice crusher unit is present nearby the dock which has a daily capacity of 50 Tons. This ice is mainly utilized in Sassoon dock itself. Daily 25-50 tons of ice is sold.
- On an average 500 Tons per day of ice is required at Sassoon dock. So this requirement is fulfilled from Taloja, Vashi, Ambernath etc. This ice is ordered by Operators.
- Earlier there were fish processing units like Firoz, Sonia etc. Now no unit exists here as they are shifted to Taloja. Fish catch is collected at Sassoon dock and transported to Taloja for processing.
- Old jetty has traffic issues in peak hours due to narrow approach roads.
- New Public toilets were present but not operational.
- Between two auction halls (sheds) there was an empty plot which was earlier used for parking Ice trucks. Then construction of ice plant was started on this plot and stopped at initial stage itself. Operators demand either completion of this project or using this land for parking. MFDC has floated tender to complete the remaining works of this plant.
- At old Sassoon dock, dredging is required for fishing vessels due to unavailability of required draft during low tide.

### *Stakeholder Consultation – Urban Water Transport*

The following comments were received post stakeholder consultation regarding urban water transport demand assessment of MbPA:

- Currently, approx. 50 tickets are sold daily from Ferry Wharf to Rewas. For Mora, around 350 tickets are sold. Before COVID, these numbers were nearly double.

- The regular travellers include students, fishermen, shopkeepers, and people with jobs in South Mumbai. During the morning peak time, which is from 8 AM to 11 AM, the majority of passenger traffic is incoming at Ferry Wharf. In the evening, the peak time is from 5 PM to 7 PM. Currently, there is a Ferry service available from Gateway of India to Elephanta. However, a Ferry service can also be arranged from Ferry Wharf upon demand, requiring a minimum of 40 passengers. The cost for this service is Rs 8,000 for 40 passengers, and the travel time is approximately 1 hour.
- Presently, the fare for a one-way journey from Ferry Wharf to Mora is Rs. 80, while the estimated fare for the Uran to CSMT local is around Rs. 20. This difference in fare is expected to be beneficial for daily commuters, as they will be able to save money in their monthly travel budgets.
- Operators feel the biggest threat to their business will be MTHL and Uran local. They have a fear that once these projects are operational, ferry passengers will get shifted to these modes.
- Ferry services experience a boom only during the holiday season, such as April and May. During the non-season period, it becomes challenging for ferry operators to cover their expenses. Even providing salaries to the 4-5 employees working on each ferry becomes difficult due to the reduced passenger flow.
- People working on the vessels do not have accommodation arrangements. They often sleep on the ferries and have to use paid public bathrooms for their needs.
- Around 80-100 passengers were needed to cover the trip expenses. However, now, sometimes there are hardly 20-40 passengers available for a trip. The introduction of Ro-Ro services has had a significant impact on the ferry services. It has successfully shifted the passenger crowd, especially tourists and business people, from ferries to Ro-Ro.
- Cleanliness is not maintained due to unavailability of ample dustbins at Ferry Wharf.
- Seating arrangements at jetty are inadequate and in bad condition.
- Unpleasant smell of fish from neighboring Bhaucha Dhaka, makes some passengers uncomfortable.
- Some passengers bring their 2 wheelers on ferry but loading and unloading at ferry wharf is difficult. A wooden plank is used to connect ferry and jetty for transferring 2 wheelers. Also there is no separate way for 2 wheelers to enter Ferry Wharf jetty. 2wheelers are navigated from passenger crowd in waiting area.

- Travelling by ferry during monsoons is risky and the ferries are often delayed due to weather conditions.
- Upon reaching Mora jetty, passengers have to walk for almost 500 meters from ferry to auto stand. It is very inconvenient.
- There are connectivity issues with bus services from Ferry Wharf to CSMT and nearby places.

### 3.4.2 Consultation by MbPA

The following cargo stakeholders were consulted:

- Pulses/Sugar/Calcite Chips/Other Agri Products
- Steel
- Automobiles

The details of the stakeholder meetings conducted by MbPA are given in Annexure.

## 3.5 Key Inferences of Study by CRISIL on Port Traffic, Ship Repair, Fisheries & Urban Water Transport

After analysing the studies conducted in the past and by CRISIL Ltd, the following key inferences were drawn in conjunction with the preparation of comprehensive master plan for MbPA:

- The inside berths of Indira Dock are underutilized due to draft and beam size limitation. The lock gate mechanism at Indira Dock also restricts the vessels with beam size more than 28 m. On the contrary, the outside berths at Indira Dock have extremely high occupancy.
- Low capacity cranes also necessitate reliance on ship cranes as the berth infrastructure is so old that it cannot withstand modern equipment and heavy cranes, rendering mechanization difficult to sustain.
- Since MbPA is not able to cater to container cargo as expected at the construction of Offshore Container Terminal (OCT), the possibilities of handling alternate commodities at OCT should be explored.
- The port being located at the southernmost side of the island city; the city traffic can have adverse impacts on cargo evacuation in terms of speed and efficiency. Vehicular movement restrictions, non-availability of dedicated corridor for road/railway, permission for existing port related railway goods traffic to ply on Indian railways

during non-peak hours of local trains as per the time slot available. and restriction on cargo handling due to city proximity makes cargo evacuation very slow and inefficient. The upcoming infrastructure developments of MMRDA is likely to immensely improve road evacuation of cargo from MbPA and is unlike to impact rail evacuation of cargo from MbPA using railways.

- Considering the percentage share of export cars being damaged due to poor road condition, it is necessary to augment the condition of existing roads. The car cleaning and inspection facilities may be expanded.
- Multi-level car parking facility can be planned to ensure optimum utilization of land and to provide covered parking spaces for export vehicles.
- MbPA has niche cargo focus. Majority of the customers of MbPA have long term loyalty and cargo commitment with MbPA. Hence, the presence of competition ports in the hinterland have limited influence on MbPA business prospects.
- Majority of traffic handled at MbPA is originated / destined within Mumbai Metropolitan Region extended to Maharashtra state. JNPA will also allow handling of cargo such as Ro-Ro and steel at its other terminals in their renewed concessions. In this regards Mumbai port may face some competition from JNPA in future with respect to clean break bulk cargo such as car export, steel etc.
- The commodity wise traffic projections of MbPA for 30 years as depicted in Table 3.4 indicates a tremendous rise in the volume of commodities such as cement, lube oil, LNG and automobiles in the upcoming years. However, the volume of steel cargo is expected to decline gradually in the upcoming years.
- Considering the future demands, there is need for additional infrastructure and in order to accommodate projected traffic, new berths need to be developed. Storage area and slots available at MbPA are sufficient enough to handle projected traffic.
- There would be requirement of one additional berth for petroleum products. The existing capacity at Pir Pau would fall short of projected traffic. Hence, there would be requirement of additional infrastructure.
- Anchorage utilisation at MbPA is high. JSW is the largest customer of MbPA using substantial share of Anchorage for its Dolvi Plant. There would be a requirement for augmenting capacity of Anchorage.
- India, with its vast coastline and maritime history had a thriving shipping industry. As a result, ship repair is a crucial aspect of this industry, and the government has

implemented various policies and initiatives to promote the growth of the ship repair industry. Maritime India Vision 2030 is formulated by Ministry of Ports, Shipping and Waterways to build and upgrade port and maritime infrastructure in the country.

- There is huge volume of trade carried out in the region which gives prominence to ports located on the west coast of India. Due to lack of advanced ship repair infrastructure in the region, vessels calling on the west coast ports of India have to go to other locations i.e. Colombo, Middle East, China for carrying out their repairs and scheduled dry docking.
- Proposed ship repair at MbPA could target these vessels subject to increase in adequate depth availability in the Mumbai Harbour region to handle these big vessels / carriers. Proposed ship repair at MbPA could also target smaller vessels calling at non-major ports of the west coast, barges, fishing vessels, etc. These vessels require less depth as compared to big vessels.
- The existing fish jetty at Ferry Wharf has been designed to cater to 300 boats. The jetty is now being used by more than 1,500 boats which creates congestion. Therefore, MbPA has proposed the expansion of the existing jetty. The proposal includes construction of fish jetty to Mallet Bunder.
- Existing Ro-Pax terminal is under-utilized at 32%. This terminal has capacity to handle 63 ship calls a week, however only 20 ship calls a week are handled currently. The terminal still has capacity to handle an additional 43 ship calls a week. This spare capacity could be utilized by the newly permitted long-haul routes.
- At present, MbPA does not need to develop any additional infrastructure for passenger / tourist handling. The existing infrastructure is adequate to handle passenger traffic for new routes / developments.

# 4 PROJECTS COMPLETED & IN PIPELINE

## 4.1 Third Chemical Berth

**Background:** With the Ujjwala Yojna, there is demand for increase in LPG from present 0.9 MMTPA to 1.5 MMTPA. Presently berth occupancy of First Chemical Berth and Second Chemical Berth at Pir Pau is more than 74 %. To cater the increased demand, the construction of Third Chemical Berth was necessary. Govt. of India has sanctioned the estimate for the project amounting to Rs.161 crores. BPCL, HPCL, IOCL, Tata Power and AEGIS Logistics are the main users.

**Benefits of the project:** (i) Port handling capacity will be increased by 2 MMTPA for Crude Oil. (ii) Increase in revenue to Port, (iii) Employment generation during Construction- approx. 1.2 Lakhs man-days. (iv) boost in economic development to local population.

**Salient Features:**

| **Features** | **Details** |
|---|---|
| Name of the Project | Construction of Third Chemical Berth at Pirpau, MbPA |
| Funding | 50% from Sagarmala. |
| Brief of project | Land Lord Model. The Port. Develops infrastructure. The users do the laying of Pipelines/Marine Loading Arms and Operation & Maintenance. BPCL, HPCL, IOCL, TATA POWER AND AEGIS LOGISTICS are the main users. |
| Size of End platform | 39 m x 19.7 m |
| Approach Trestle | 325 m long x 14 m wide |
| Dolphins | Breasting Dolphins 2 Nos (22 m x 13.5m)<br>Mooring dolphins 4 Nos (12 m x 12 m). |
| Other components: | 1.Control room / control tower building and platform<br>2.Users room at unloading platform<br>3.Cone Fenders (2000 dia, 4 nos), Arch Fenders 300H (5 nos)<br>4.Quick Release Mooring Hooks (QRMH)-8 |
| **Scheduled Completion of Project** | August 2024 (Civil + Fire Fighting |

*(Source: S.E. MbPA)*

## 4.2 Triangular Plot at Pirpau for setting up of storage tanks (Near Old Pirpau Berth)

**Background:** Mumbai Port is handling the Liquid bulk chemicals and the POL at the Pirpau Terminal. There are three berths, viz. old Pir Pau Berth, 1st Chemical Berth and 2nd Chemical Berth.

**Salient Features:**

It is necessary to make facilities for storage area. One such plot admeasuring an area of 7500 sq.m has been leased out on tender so that storage facilities can be build.

## 4.3 STC Tanks (Development of Tank Terminal for Storage of Base Oil at Mallet Bunder)

Base oil is an important commodity handled in Docks and Pir Pau through lighterage activity of mother ship discharging into barges at stream. Barges come alongside at 14-Victoria dock berth and old Pir Pau berth. They prefer berths outside of docks as it doesn't restrict their entry and exit activity through lock gates of docks.

There are three variants of Base Oil. Ultra 2 (which is used for Engine Oil and Transformers), Bright Stock (which is used for Gears) and Solvents (which is processed for making lube oil). The major stakeholders are IBP, Castrol, JRE, APAR industry and VVF for handling the Base oil. The Base Oil is handled at three locations, namely Indira Dock and Victoria Dock (1.18 MT), Hay Bunder (0.14 MT) and Pir Pau (0.46 MT). The total quantity handled was 1.78 Million Tonnes in the year 2021-22. While IBP, Castrol, VVF and APAR have their tankages outside the docks, JRE have tankages inside the docks. The cargo are pumped from barges to the tankers, and the waiting period will reduce to a larger extent if the storage facility is nearby. It is in this context that Mumbai Port has decided to allot the land which was used by the STC earlier and handed over back to Mumbai Port. Due to high lease rentals in the area, Port has proposed two options, first on the Lease and if it does not succeed then the other option of allotment on PPP mode with royalty will be explored. The expected timeline for the award is October 2024.

## 4.4 Restructuring of Offshore Container Berth

**Background:** Under Master Plan for development of Mumbai Port prepared by Japan International Co-operation Agency (JICA), The project was conceptualized for Construction of Offshore Container Terminal PPP basis to cater the growing demand of container cargo. MbPA signed an agreement with M/s ICTPL in 2007 for development of this project on PPP basis with a date of commencement as 02.12.2010 for handling of container with a capacity of 9.6 MMPTA capacity in phase 1 or could not proceed with the procurement of the equipment and presently, the operator is allowed to handle Ro-Ro vessels for export of vehicles and steel. The matter has been referred to arbitration, followed by the reference to the Conciliation Committee. The decision is expected to be finalised by October 2024.

## 4.5 New Fish Jetty (at Mallet Bunder)

**Background:** The proposed project is for Construction of New Fish Terminal with approach trestle at Mallet Bundar Ferry Wharf, Mazgaon. The proposal is an extension of the existing fish jetty popularly known as New Ferry Wharf or Bhaucha Dhakka. The existing fish jetty is 122.35 m long x 38.15 M wide is proposed to be further expanded by addition of another 131 m x 61.50m of landing jetty. The expansion will meet the requirement of the 1296 fishing boats registered and operating at Ferry wharf. It will generate more place for fishing boats, will ease in fishing activity, generation of local employment and increase in revenue of fishing community. The project is approved by Ministry of Fisheries.

**Salient Features:**

| Features | Details |
|---|---|
| Name of the Project | Construction Of New Approach Trestle With Expansion Of Existing Fish Terminal At Ferry Wharf |
| Estimated cost: | Rs. 96.60 crore (Revised cost Rs.121.41 Crore based on lowest accepted offer). |
| Type of project | EPC |
| Funding | 100% funding under PMMSY (Pradhan Mantri Matsya Samapada Yojana).<br>50 % approved by the Ministry of Fisheries.<br>50% Sagarmala. |
| Location and alignment of New Fish Jetty | Parallel and contiguous to the alignment of existing old fish jetty. |
| Description of project | The project envisages – Expansion of existing fish jetty (from 300 to 1300 boats), and Providing a new approach road to segregate fish lorry movement from the movement of passengers to the passenger terminal at Ferry wharf. |
| Size of the New Fish Jetty: | 131 m x 61.50 m |
| Approach Trestle | A dedicated new approach trestle/Bridge of length 250 m and 16.30 m wide from Mallet Bunder (offshore) |
| Auction halls: | Two auction halls of size 100 m X 10.23 m each with fish loading/ parking area. |
| Restaurant cum Fishermen Rest shed: | Unique restaurant at ground floor and fishermen rest room on the first floor of 127 sq. m each. |
| Workshop: | Workshop catering to mechanical, electrical and carpentry related repairs to fishing vessels |

*(Source: S.E.MbPA)*

The Project *is expected to be completed by November 2025*.

**Figure 4.1 Proposed New Fish Jetty at Mallet Bunder**

*(Source: Advisor Project, MbPA)*

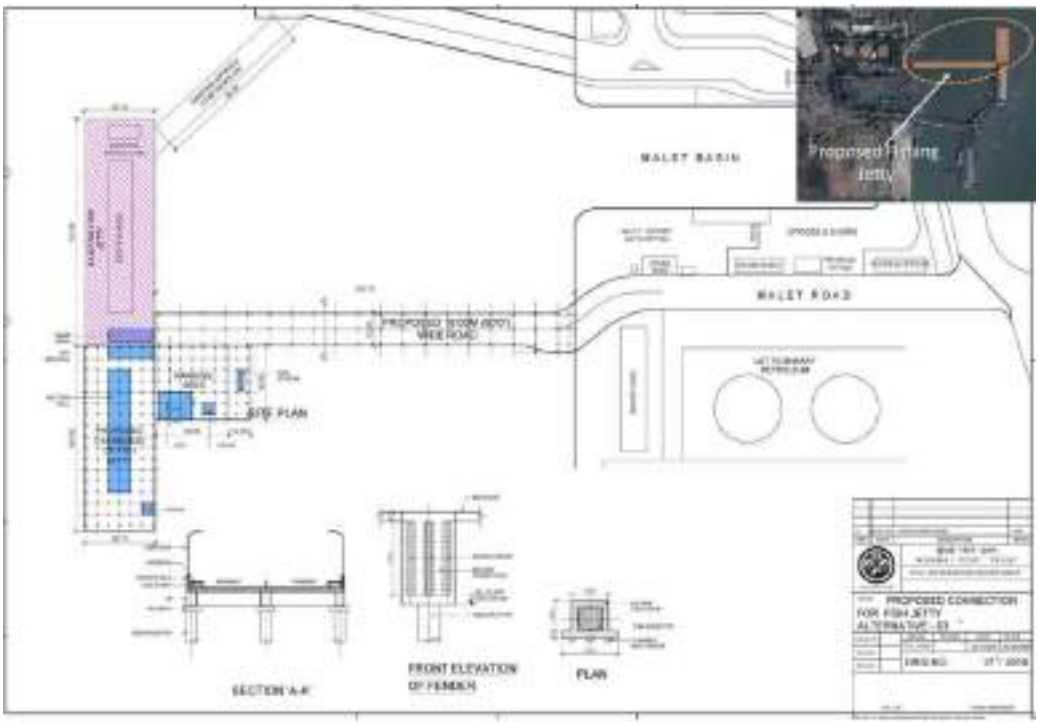



**Figure 4.2 Layout of Proposed New Fishing Jetty Connecting Mallet Bunder at MbPA**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

## 4.6 Monetisation of Existing Harbour Wall Berths

The Major Ports have been mandated to examine the privatization of existing berths to facilitate efficiency in the Port operation. Accordingly, under MIV 2030, it has been

decided to monetize Harbour Wall Berths Nos.18 to 21 ID. This is brown field Project. The existing Berths of total length 640 m will be given on PPP mode.

**Benefits:** It will increase efficiency in operation & cost competitiveness. The project will avoid deviation of cargo to other ports.

Bids have been received and will be awarded by May 2024.

**Salient Features:**

| Features | Details |
|---|---|
| Name of the Project | Upgradation, Equipping, Operation, Maintenance and Transfer of Harbour Wall Berths (18 ID to 21 ID) at Indira Dock, Mumbai on PPP mode. |
| Estimated cost: | Rs.150 Crores |
| Mode of execution | PPP (30 Years) |
| Area under PPP | 33,000 Sq. M. |
| Funding | 100% Private |
| Location | Indira Dock, Mumbai |
| Capacity increment | 3.40 MMTPA |
| Work awarded to | Under tendering |

*(Source: S.E.MbPA)*

## 4.7 Mumbai International Cruise Terminal

**Background:** The proposed terminal is an iconic International Cruise Terminal planned with Central governments vision of promoting Cruise tourism. At new cruise terminal at least 300 ships are likely to visit Mumbai Port annually. The International cruise terminal is being developed on Public & Private funding.

**Benefits:** The project will boost the economy through Cruise Tourism. The project will help developing Mumbai port as home port for cruise vessels. The terminal will generate revenues for multi modal travel agencies viz. Tourist Buses, Taxis, Airport transfer etc. The project is expected to generate 500+ direct and 1000+ indirect employment generation opportunities.

**EPC Salient Features:**

| Features | Details |
|---|---|
| Name of the Project | UPGRADATION AND MODERNIZATION OF MUMBAI INTERNATIONAL CRUISE TERMINAL AT INDIRA DOCK. |
| Estimated cost: | EPC- Rs. 363.85 Crores |
| Funding | 50% From Sagarmala (₹139.15 crore) and Ministry of Tourism (₹50 crore). |
| Location | BPX, Indira Dock, Ballard Estate, Mumbai |

| | |
|---|---|
| Brief of project | MbPA is constructing a bare shell RCC structure and connected infrastructure development works (Rs. 363.85 Crores). Ministry has approved the revised estimated total expenditure of the project Rs. 363.85 crores. This includes civil work Rs.188.63 crores, Mechanical & Electrical works Rs. 61.17 crores, GST Rs. 45.00 crores and contingencies Rs. 8.50 crores. Work is in progress. |
| Construction area | 4.2 lakh sq. feet |
| Scheduled date of Completion of Project | **31.12.2024** |

*(Source: S.E.MbPA)*

**Present Status:**

- ✓ Physical Progress: 80%
- ✓ Financial Progress: (Overall Civil + Mechanical): 68%

**MICT PPP Salient Features:**

| Features | Details |
|---|---|
| Name of the Project | "DEVELOPRNENT, OPERATION AND MAINTENANCE OF MUMBAI INTERNATIONAL CRUISE TERMINAL (MICT) AT INDIRA DOCK ON DBFOT (PPP) BASIS". |
| Estimated cost: | PPP- Rs. 192 Crores |
| Funding | Fully by the operator SPV – M/s. Ballard Pier Private Limited |
| Location | BPX, Indira Dock, Ballard Estate, Mumbai |
| Brief of project | MbPA has constructed a bare shell RCC structure under EPC contract. The Operator will invest for the refurbishing & interiors and will operate and maintain for 30 years. The PPP contract has been awarded on 07.10.2021. concessionaire fulfilled CP on 21.11.2022. MbPA has constructed a bare shell RCC structure and handed over to the concessionaire. CP fulfilled on 21.11.2022 and the scheduled completion is 20.11.2024. PPP Operator will carry out internal works and maintenance during license period. The Operator (Concessionaire) has created site office at MICT Building (2nd Floor) for his staff for carrying out Development works. The staff has deployed by the Operator at site office since May, 2023. Flooring & Fire Fighting work started. Renovation of Green gate is in progress. |
| Construction area | 4.2 lakh sq. feet |
| Scheduled date of Completion of Project | **20.11.2024** |

*(Source: S.E.MbPA)*

**Present Status-** Concessionaire has started mobilization of vendors at site from 15.06.2023. Flooring & Firefighting work started. Renovation of Green gate is in progress.

## 4.8 Augmentation of Vessel Tracking System

- ✓ Estimated cost: Rs.10.76 crore
- ✓ Contract Awarded: :13.7.2020
- ✓ Completion slated by: 09.9.2023.
- ✓ MbPA, JNPA started using new VTS from: 19-12-2022 and Navy started using from: 22-02-2023

**Under Progress:**

- ✓ Integration with Second Radar Transceiver at Colaba, Shewa and JD completed, however awaiting official mail from M/s Wartsilla under Progress
- ✓ Integration of VTS – PMIS with IPortman
- ✓ Microwave Link application submission under process
- ✓ Third Party Inspection and Site Acceptance Test (FAT)

## 4.9 Port Enterprise Business Suite (EBS)

- ✓ Total Cost of Project: (MbPA share :70.69 Cr.) PS, MM, FICO PM Module of ERP implemented.

**Under Progress:**

- ✓ Implementation of CRM under progress – Customer Registration and Film shooting module migrated to production server
- ✓ HCM parallel run is in the progress
- ✓ iPortman Parallel re-run started again
- ✓ Green gate to Head office laying of OFC and laying of OFC Ring network, Structure cabling at balance locations
- ✓ IT Security related work: Enabling Patch server, Bringing all desktops under Domain and Active Directory, Log collection and Monitoring
- ✓ Scanning and Digitization: 1.3519 Crs of documents have been scanned out of 2,10,29,921 documents.
- ✓ Operationalization of Port Center –IT Help desk and Service Centre.

## 4.10 Supervisory Control and Data Acquisition (SCADA)

The present status of the project as under:

- ✓ Date of Award of Contract for SCADA: 24-02-2023.
- ✓ Contract Award value: Rs. 25.84 cr.
- ✓ Financial assistance: Rs. 11.285 cr. (sanctioned under Sagarmala)
- ✓ Scheduled Completion date: 21-12-2023
- ✓ Scheduled/Planned Physical Completion: 89.18%
- ✓ Actual Physical Completion: 73.52 %
- ✓ Financial Completion: 25.22 %




**Figure 4.3 Installing and Commissioning of SCADA system for pipeline operations at JD & Pirpau**

*(Source: MEED, MbPA)*

# 5 PROPOSALS/ ACTION PLAN

## 5.1 Vision 2047

After studying the existing situation, constraints for the development, market situation, traffic studies, proposals for the horizon 2047 have been crafted with the following vision:

- **Vision Statement 1:** Global Cruise Tourism Hub with World Class Cruise Facilities, Domestic Cruise Destinations and Island Tourism Circuits
- **Vision Statement 2:** Providing the best Urban Water Transport facilities to Mumbai
- **Vision Statement 3:** Hybrid Port as a hub for Lighterage & Liquid Cargo Handling
- **Vision Statement 4:** Thriving Ship Building/Ship Repair Ecosystem with next gen capabilities
- **Vision Statement 5:** Green fuels driving Green Port Operations
- **Vision Statement 6:** Technology Enabled Smart Port for Seamless, Efficient Operations & Maintenance
- **Vision Statement 7:** A Hub for Research, Innovation, Consultancy and Skill Development in the Port and related Sectors

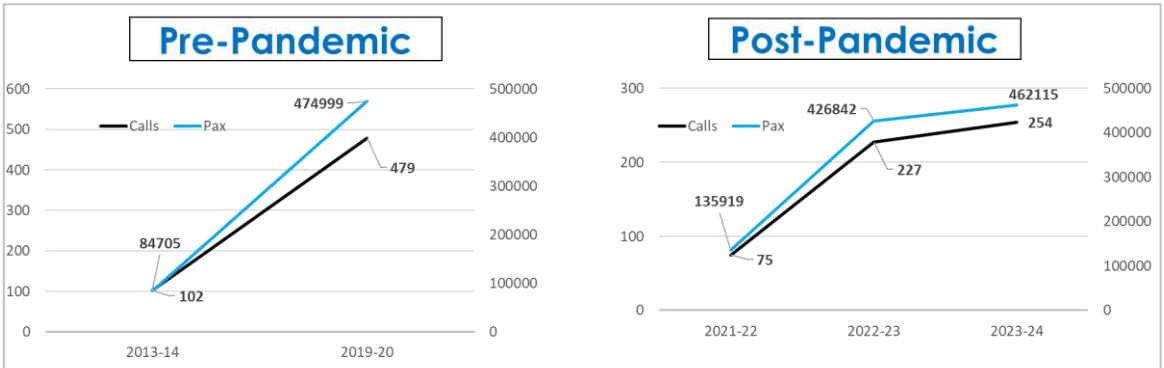
## 5.2 Transforming Mumbai as the Cruise Tourism Capital of the Country

India has an enormous coastline of 7500 kilometres across 9 states, 2 union territories and 2 island territories with almost 40% of the population in these geographies. These coastline states and territories of India have an estimate of more than 200 ports and an unparalleled natural, cultural, religious, historic and heritage tourism assets. There is also a huge potential of ships home ported at India undertaking coastal tours to countries across the Indian Ocean Rim under bilateral and multi-lateral treaties.

Presently, India has a very small share of the world cruise tourism market with more than 23-million cruise passengers. Pre-pandemic data for 2019 shows India at 13th position in terms of passenger volume with USA, Germany and UK being the front runners. In Asia pacific region India stood at 4th place behind China, Taiwan, and Singapore.

### 5.2.1 Cruise Statistics

The cruise ship/passengers of 102/84705 in 2013-14 increased to 479/474999 in 2019-20 i.e. more than 400% increase in cruise ships as well as in passengers' footfall. Post pandemic, the cruise liners are reigniting the business and optimistically looking at creating business value.




| Fin. Year | No. of Vessels | No. of Pax. |
|---|---|---|
| 2018-19 | 319 | 2,82,850 |
| 2019-20 | 479 | 4,74,999 |
| 2020-21 | Pandemic Period | |

| Fin. Year | No. of Vessels | No. of Pax. |
|---|---|---|
| 2021-22 | 75 | 1,35,919 |
| 2022-23 | 227 | 4,26,842 |
| 2023-24 | 254 | 4,62,115 |

**Figure 5.1 Cruise Statistics of MbPA**

*(Source: Traffic Department Mumbai Port Authority)*

Mumbai has been the major homeport for India due to its historical cruise throughput, geographic position, population and linkages. Mumbai is capturing some 80% of the overall cruise call traffic based upon its historical trend and future deployment scenarios.

### 5.2.2 Future Projections for Cruise

As per the Bermello Ajamil Report 2016, Mumbai Port has a projection to achieve 22.97 lakhs annual cruise passengers (moderate scenario) by 2041/42 and 464 cruise calls (mid scenario) by 2041/42. Total includes homeporting calls of 21.2 lakhs and port of calls of 1.8 lakh.

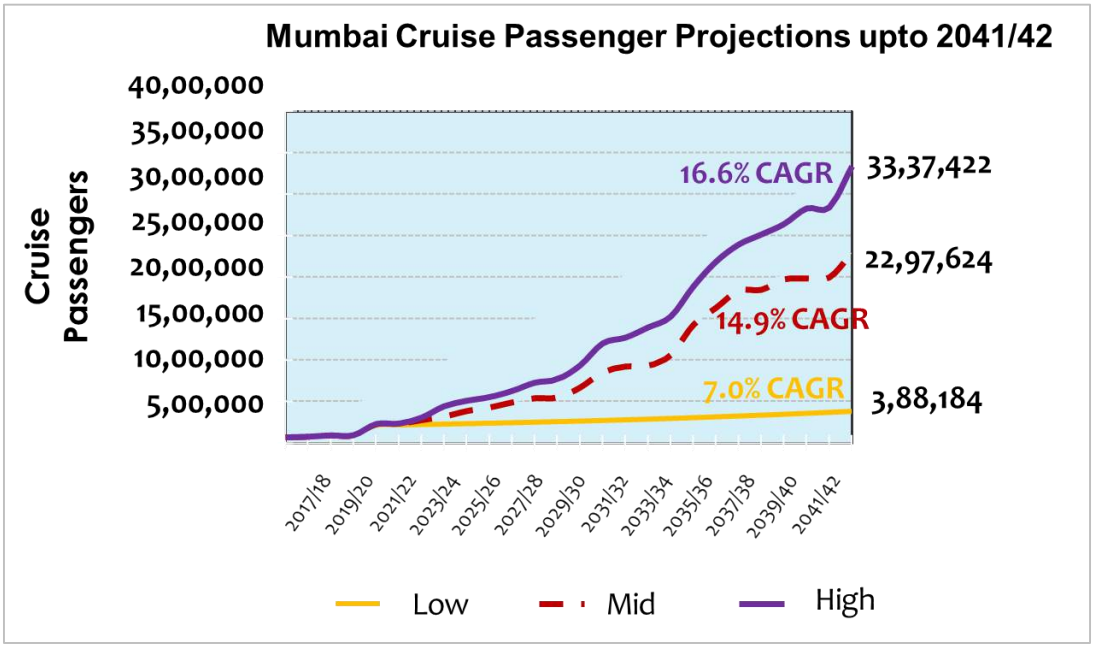



**Figure 5.2 Cruise Projections for Mumbai**

*(Source: Bermello Ajamil Report 2016)*

### 5.2.3 Key Requirements for Cruise Passengers

The site would provide for a state-of-the-art cruise facility. It would provide for a terminal building, ground transportation area, staging area, parking, baggage sorting building, storing/provisioning building, staff and cruise visitor parking and space for gangway systems (2 per vessel) that would allow for truck access underneath and provide for a wide range of cruise vessels. Cruise Passengers have a set of key requirements to ensure a smooth and enjoyable experience. These requirements include:

- **Shore side facilities:** Berthing infrastructure, pedestrian, vehicular access, traffic control, cleanliness, sanitary facilities, etc.
- **Embarkation/ Disembarkation facilities:** Check-in counters, immigration counters, faster immigration clearances, baggage scanning machines, Door Frame Metal Detectors (DFMDs), waiting areas, parking space, uniform SOP applicability.
- **Marine operations:** Pilots, gangway, bollards, mooring, provisions and baggage loading, etc.
- **Security:** Faster clearances as per uniform SOP.

In detailed terms, following facilities are required.

- Two gangways are required
- Homeport Baseline: 3,200 passenger and Peak of 4,500 passenger's plus
- Ample check-in areas and drop-off areas for embarking luggage
- Proper luggage handling systems and ample luggage areas
- Duty-free shops and restrooms
- Parking facilities and well-placed signage.
- Efficient immigration counters and customs & security facilities
- Baggage screening and ground transportation services
- Provisioning/servicing areas
- Information technology infrastructure and reception facilities
- Food & beverage operations and adequate seating areas
- Ancillary facilities such as tourist information booths, guides, and clean public toilets
- Sufficient space for Coaches, taxis, private vehicles etc.

### 5.2.4 Berths prioritized for International v/s Domestic Cruise

BPX has been prioritized for international cruise vessels, BPS for domestic cruise vessel. Third vessel if arrived at a same time is berthed at OCT or 18ID based on navigational/operational challenges. As brought out in B & A report, total 5 berths need to be dedicated to cruise operations by 2041 to meet the growing demand and accordingly 2/3 berths need to be dedicated to domestic cruise. The berth shall be 20-25 m wide with 150 to 250 tonnes bollard strength and designed to accommodate ship of 350 m with draught of 9.5 to 10.5 m. Remaining berths will be utilized for servicing International ships.


**Figure 5.3 Present and Future Cruise Scenario at MbPA**

### 5.2.5 Cruise Ships to be Homeported at Mumbai

Mumbai is positioned as a key homeport due to its extensive maritime and tourism infrastructure. Mumbai's cruise terminal is strategically located close to major heritage sites and the city centre. The port's infrastructure development is crucial to meet the growing demand for homeported ships. By taking into consideration 6000 passengers per ship (Arrival + Embarkation), around 5 (Five) cruise ships will have to be homeported at Mumbai Port to achieve the homeport projections of 21.25 lakhs by 2041/42. Each ship is projected to make 2 calls in a week potentially handling 12000 passengers per week. If 5 ships are handled, the approx. passengers that will be handled will be 60,000 passengers in 1 week, 2,40,000 in 1 month and around 21.60 lakhs in one cruise season of 9 months.

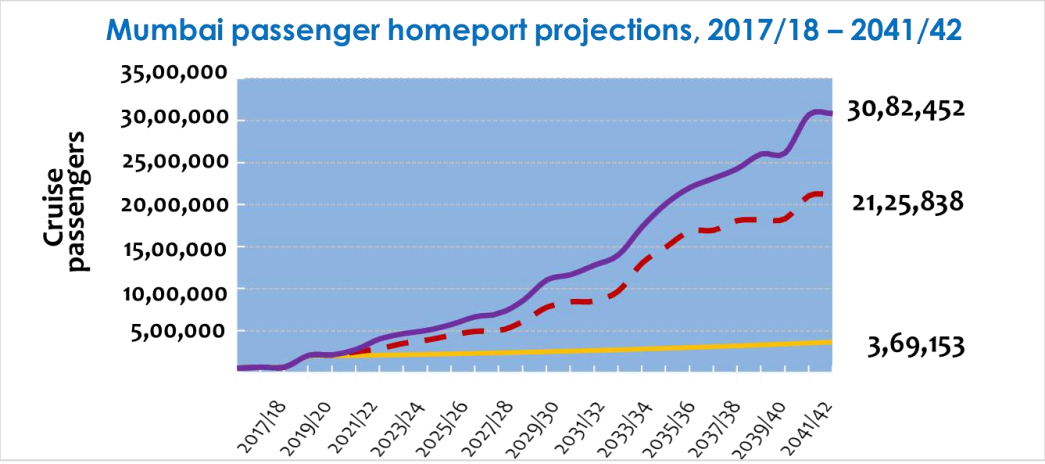



**Figure 5.4 Mumbai Homeport Projections**

*(Source: Bermello Ajamil Report 2016)*

### 5.2.6 Cruise Terminals required at MbPA to cater to 2.29 Million Cruise Passengers

Currently, Mumbai has only Cruise Terminal and two Cruise Berths (BPX and BPS). Based upon historic precedent when demand reaches 80%, another berth is typically required to meet future needs. Mumbai will need 5 berths over the period to meet demand. 3rd Berth required by 2024-25, 4th by 2033-24 and 5th by 2038-39.

Each cruise terminal provides for two-part phasing plan to complete the development of the required cruise facilities over time and as needed based upon the projection modelling. Should the projections move forward or back in time, then the development phasing would be adjusted accordingly. This option also allows for the expansion of the cruise terminal to accommodate a second/third homeport vessel or a port of call ship simultaneously. The Phase 1 configuration would accommodate a single 350 meter plus vessel on a 400-meter berth face.

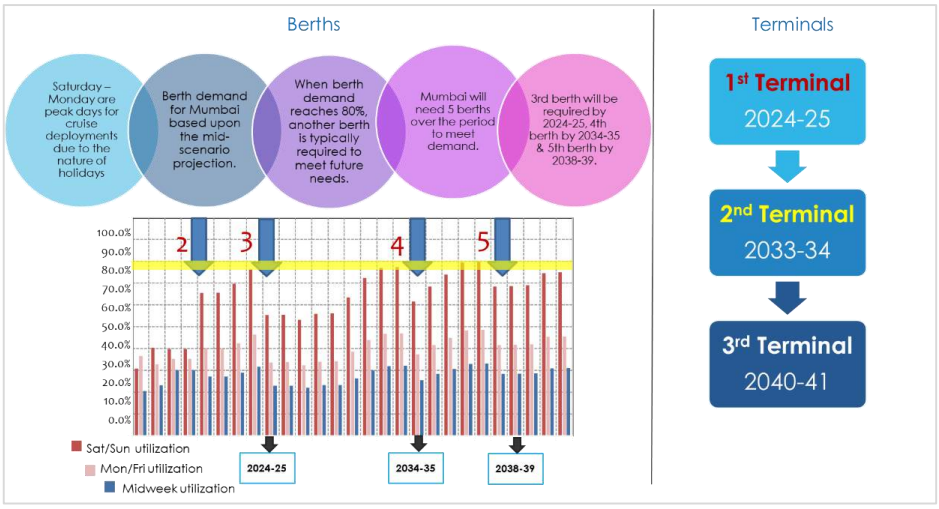



**Figure 5.5 Future Cruise Infrastructure Requirements**

*(Source: Bermello Ajamil Report 2016)*

**Proposal for Additional berths & terminal:** To cater to the projected passenger and cruise calls, two more berths are proposed by extending the existing OCT berths. A terminal building can be constructed on the berth to serve the passengers.

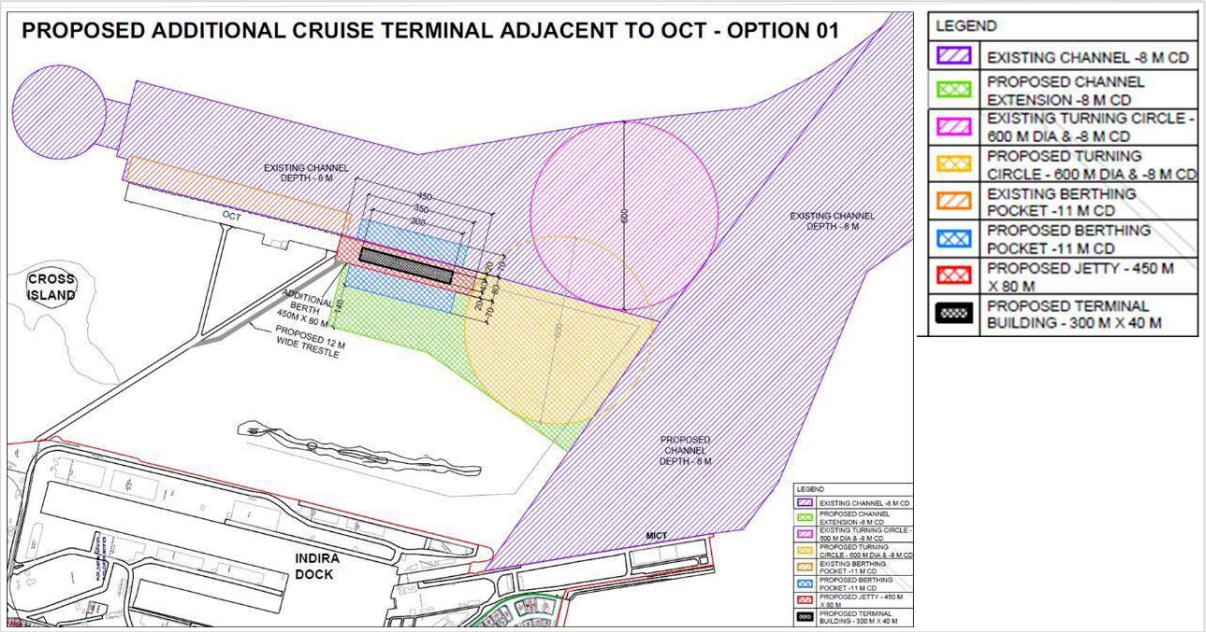



**Figure 5.6 Draft Proposal for Additional Cruise Terminal**

### 5.2.7 Ancillary Facilities needed for Supporting Cruise

To support cruise operations effectively, Mumbai Port needs to have following ancillary facilities to enhance the overall experience for cruise passengers and ensure smooth port operations.

- **Cruise Terminal:** A dedicated terminal with check-in counters, baggage handling, security screening, customs and immigration facilities, comfortable waiting areas, restrooms, etc.
- **Shuttle Services:** Transportation services to ferry passengers between the port and key locations in Mumbai, such as hotels, tourist attractions, and the airport.
- **Duty Free Shops:** Shops and restaurants within the terminal offering a variety of goods and dining options for passengers.
- **Medical Facilities:** First aid and emergency medical services to handle any health-related issues that may arise.
- **Wi-Fi and Communication Services:** High-speed internet access and communication facilities to keep passengers connected.

- **Parking Facilities:** Adequate parking spaces for taxis, buses, private vehicles, and possibly long-term parking for passengers.
- **Faster Immigration:** Faster and adequately staffed customs and immigration services to handle the influx of international passengers. As per International Best Practices, every passenger should be cleared within 90 seconds.
- **Seamless Customs/CISF Services:** Faster and seamless Customs and Security services to be available for cruise passengers.
- **Tour Operators and Travel Agents:** On-site presence of tour operators and travel agents to assist passengers in planning their trips and booking shore excursion tours.
- **Financial Services:** ATMs, currency exchange counters, and banking services for passengers needing financial transactions.
- **Safety and Security:** Enhanced security measures, surveillance systems, and personnel to ensure the safety of passengers and their belongings.
- **Tourism Information Kiosks:** Well-designed kiosks by MTDC and India Tourism will enhance the passenger experience by providing convenient and accessible information and services, encouraging exploration and spending in local areas.

Developing these facilities can significantly boost Mumbai Port's appeal as a cruise destination, providing a seamless and enjoyable experience for passengers.

### 5.2.8 Economic Benefits

Transformation of Mumbai as the Cruise Capital of the country is expected to add Rs. 29,000 Cr. to the economy and provide direct and indirect employment opportunities of additional 2 lakhs jobs in Mumbai.

## 5.3 Development of Marina

Mumbai Port Authority (MbPA) is embarking on the development of a Marina as part of its Port Master Plan to enhance recreational and commercial facilities at Mumbai Harbour. The project aims to integrate world-class amenities and services, supporting the maritime and tourism sectors. The marina will be a significant addition to Mumbai's waterfront, catering to domestic cruise passengers, yachts, and other marine activities, contributing to the overall economic and social development of the region.

### 5.3.1 Project Site Overview

- Location off Cross Island (500 m offshore Prince’s dock).

- Within the enclosed breakwater and tranquil conditions.
- Facility for 215 yachts.
- Connected to shore by Approach Trestle of 5 m wide.
- Other ancillary such as administrative buildings, canteens, substations, restrooms, septic and storage tanks, fuel stations, and workshops, ensuring comprehensive support for marina operations.
- Estimated cost: Rs.320 crore (tentative)
- Commissioning by October 2027.

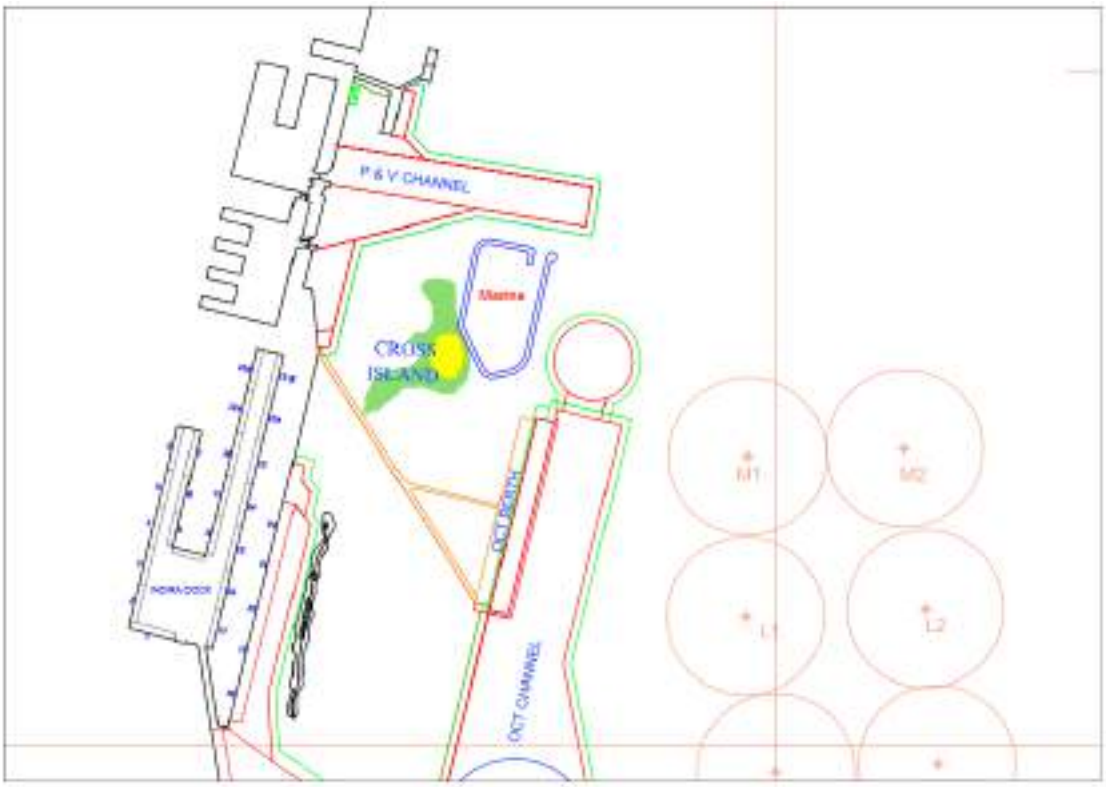



**Figure 5.7 Proposed Marina at Cross Island**

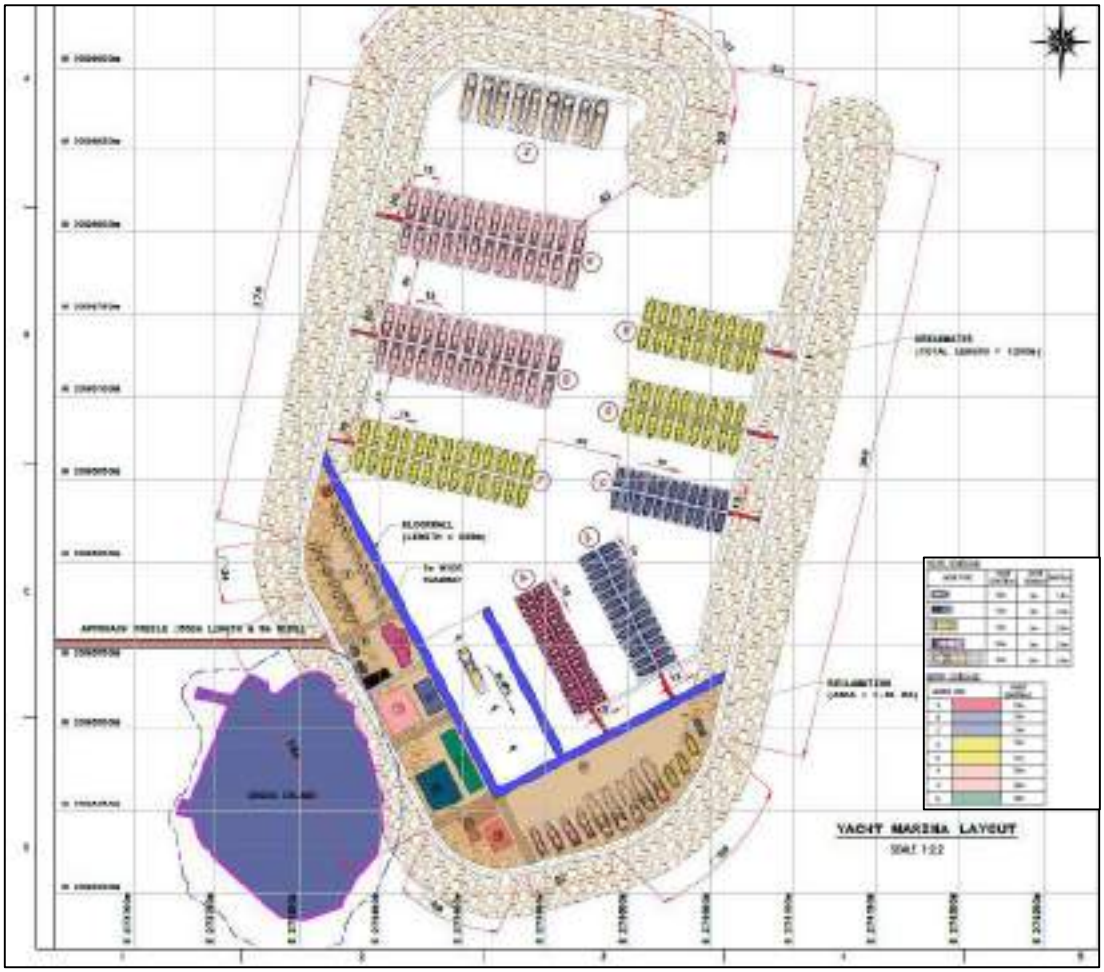



**Figure 5.8 Yacht Marina Layout**

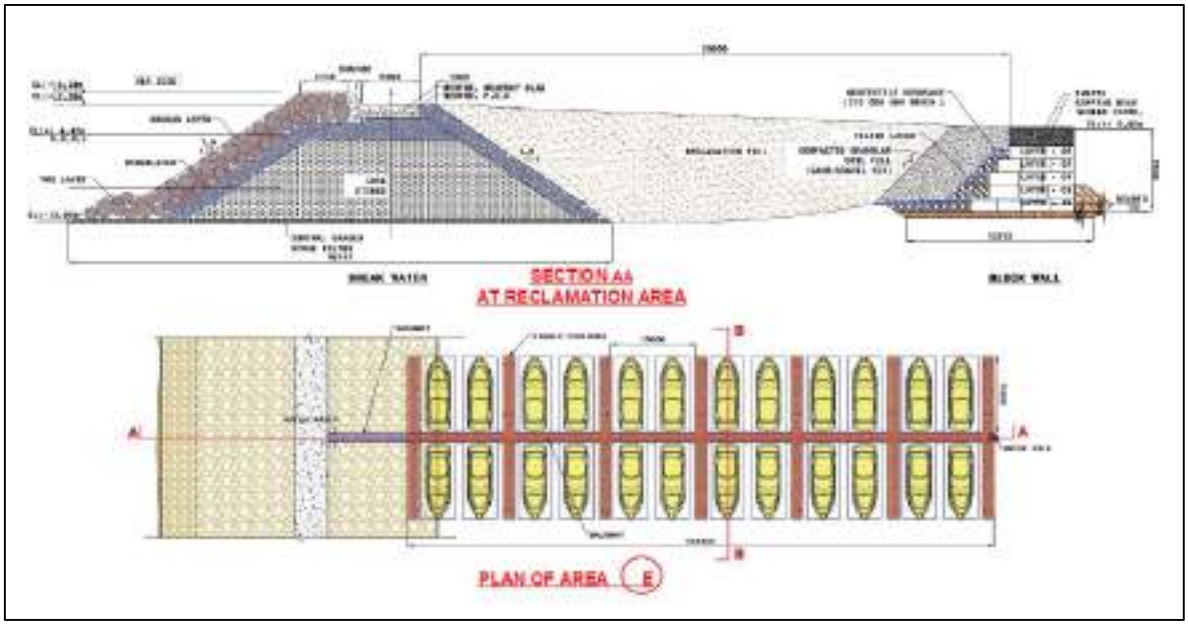



**Figure 5.9 Yacht Marina Layout Details**

### 5.3.2 Economic and Social Impact

The development of the marina is expected to have a substantial impact on the local economy and community:

- **Tourism and Recreation:** The marina will attract tourists and recreational users, boosting local businesses such as hotels, restaurants, and retail outlets.
- **Job Creation:** Construction and operation of the marina will create numerous job opportunities, contributing to the economic growth of the region.
- **Urban Development:** The marina will complement the urban landscape, enhancing Mumbai's appeal as a world-class city with modern waterfront amenities.

### 5.3.3 Implementation Schedule

The project implementation is planned as follows:

- Receipt of Final Report: September 15, 2024
- Design and Final Estimate: October 15, 2024
- Government Sanction: January 15, 2025
- Environmental Clearances: April 2025
- Invitation of Bids and Award: February 15, 2025
- Commencement and Completion: April 15, 2025, to October 15, 2027

The development of the Marina at Mumbai Harbour is a transformative project under the Port Master Plan. It aims to create a vibrant waterfront that enhances Mumbai's maritime infrastructure and supports recreational, commercial, and tourism activities. By integrating state-of-the-art facilities and infrastructure, the marina will position Mumbai as a premier destination for marine leisure and commerce, contributing to the city's growth and development.

## 5.4 Proposed Land Use Plan

### 5.4.1 Proposed Land Use Plan for ID, PD, VD

Based on the outcome of the various studies conducted, suggestions given by the consultants and through stakeholder consultation, a land use plan for the core port area covered by Indira Dock, Prince’s Dock, Victoria Dock, BPS and BPX is prepared. The land use plan covers the following activities;

a) Multipurpose & Over Dimensional Cargo
b) Cement Terminal

c) Base Oil
d) EXIM Automobiles
e) Coastal Cargo
f) Ship Repairing
g) Cruise Terminal- Domestic & International
h) Water front development

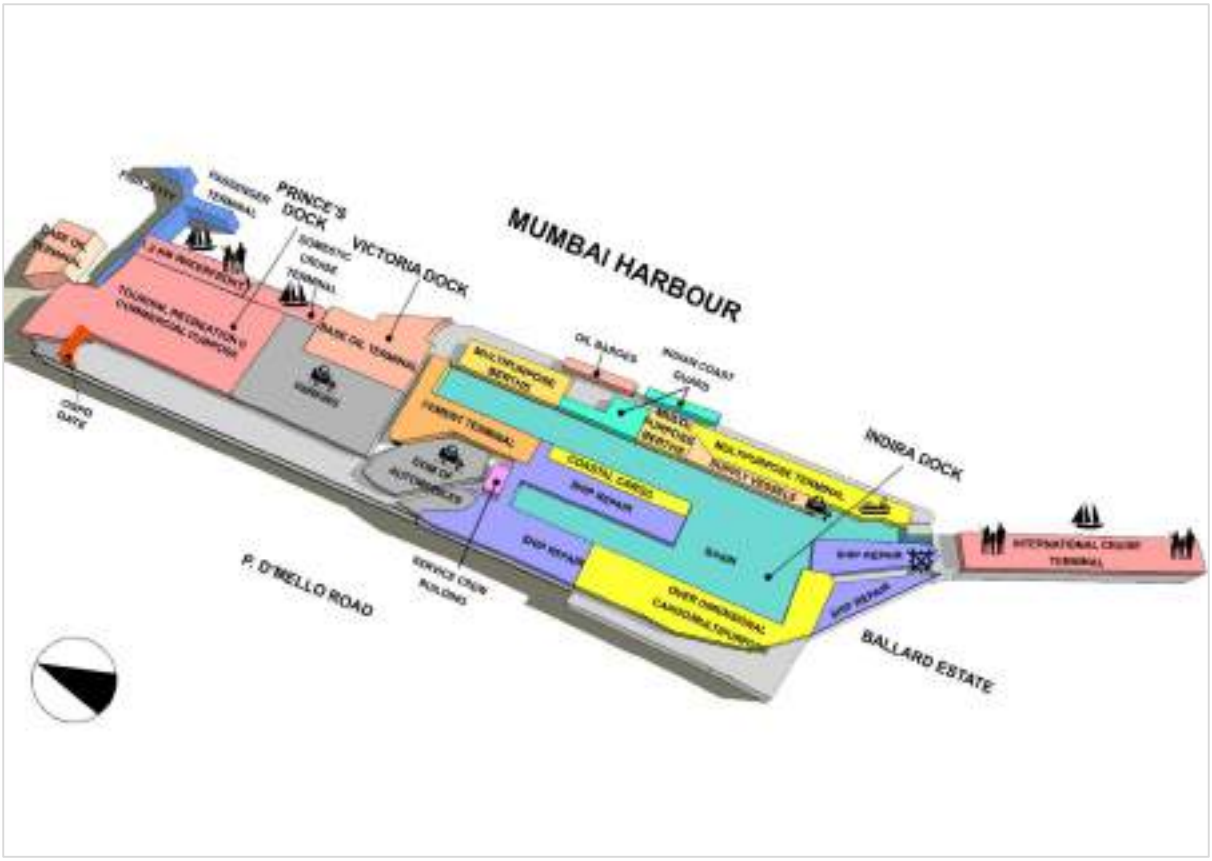



**Figure 5.10 Proposed Zoning for Port Operational Area**

**Table 5.1 Proposed Land Use Statement for Port Operational Area**

| Sr. No. | Proposal | Location | Berth Details | Approx. Area (sq.m) |
|---|---|---|---|---|
| 1 | Mumbai International Cruise Terminal (MICT) | BPX | Cruise Terminal Berth-1 | 45,093 |
| | | | Cruise Terminal Berth-2 (Dynamic) | 18,895 |
| 2 | Multipurpose Terminal/Berths | ID | Berths 18, 19,20 and 21 | 97,560 |
| 3 | Supply Vessels | ID | Berths 16 & 17 | 23,348 |
| 4 | Ship Repair | ID | Berths 5,6,7,8,9 and HDD | 1,56,529 |
| 5 | Over Dimensional Cargo/ Multipurpose | ID | Berths 1,2,3 | 76,780 |
| 6 | Coastal Cargo | ID | Berths 10,11,12 | 24,148 |
| 7 | EXIM Automobiles | ID | Gamadia Car Parking | 52,567 |
| 8 | Cement Terminal | ID | Berths 12A, 12B | 48,405 |
| 9 | Base Oil | VD & Mallet Bunder | Berths 12/14 VD | 55,762 |

| | | | | |
|---|---|---|---|---|
| 10 | Parking | VD | - | 1,05,234 |
| 11 | Tourism, Recreation & Commercial Zone | PD | - | 1,34,022 |
| 12 | Domestic Cruise Terminal (DCT) | PD | - | 1,66,211 |
| 13 | Service Crew Building | ID | - | 5439 |
| 14 | Indian Coast Guard | ID | Berths 13,14 | 18,308 |

### *Proposal 1 – Mumbai International Cruise Terminal (MICT)*

The new vision of MbPA focusses on establishing Mumbai as a 'Cruise Tourism Capital of the Country', taking up projects towards improvement of life of Mumbaikars and value addition and employment generation in Mumbai's Economy by developing an exemplary central business district based on principles of sustainability and a futuristic and transparent development model, replete with state-of-art features.

MbPA is in the process of setting up the International Cruise Terminal at BPX. Out of the two berths at BPX, one shall be exclusively used by cruise ships while the other one shall have a dynamic usage i.e., the second berth may serve cruise ships as well as cargo ships depending on the ship calls and frequency. The cruise terminal is designed to handle 10,000 passengers a day and is expected to handle 200 cruise ships in a year. The responsibility for operation and maintenance of the cruise terminal has been already outsourced.

As and when the demand for cruise and its allied activities increases, MbPA shall plan an earmark area for developing additional passenger terminals and cruise berthing facilities to accommodate the increasing demand.

### *Proposal 2 – Multipurpose Terminal*

Table 3.4, indicates the cargo volume trends in the upcoming years. Hence, berths 18,19, 20 and 21 at Indira Dock have been allocated for handling multipurpose cargo as these berths have higher draft compared to inner berths. The available draft is approximately - 8.5 CD. MbPA has already decided to operate these berths through private operator under PPP mode. The appointment of concessionaire is under process.

### *Proposal 3- Supply Vessels*

Berths 16 & 17 at Indira Dock are allocated exclusively for supply vessels as they are located near the entrance lock gate of Indira Dock. The vessels will be berthed here for a shorter duration so as to have minimum disturbance to the movement of vessels passing through the lock gate channel. The area allocated at the berth is 23, 348sq.m.

### *Proposal 4- Ship Repair*

As indicated in section 5.5.2, the following locations have been identified for ship repair.

- Darukhana & Lakri Bunder (Small Ship Segment (Barges, Port Crafts)
- Indira Docks (Ships up to 30,000 DWT)
- Workshop Area (Ships up to 85,000 DWT)

At present, Hughes Dry Dock and berths 5,6, 7 and 8 at Indira Dock is operated by Cochin Shipyard Limited (CSL). The existing operational area of CSL is approximately 49760 sq.m. CRISIL in its study on traffic recommended berth no. 12 and 13 to be converted as ship repairing berths. However, the berth no. 5, 6, 7, 8 are already being used by CSL for ship repairing. Hence, in addition to HDD and berths 5,6, 7 and 8, it is proposed to develop ship repair facilities at berths 9 also. Hence the total proposed ship repair operational area at ID will be approximately 1,56,529 sq.m.

### *Proposal 5- Over Dimensional Cargo / Multipurpose*

The over dimensional cargo mainly requires large size yard near the berth with proper road access. Considering proximity to railways and good road access, berths 1, 2 &3 at Indira Dock are already being used for over dimensional cargo. The same land use is retained along with the multipurpose cargo with priority to over dimensional cargo.

### *Proposal 6 – Coastal Cargo*

From Table 3.4, it is observed that the Coastal Cargo shall marginally increase in the coming years. Hence, dedicated berths and storage facilities for Coastal Cargo is planned at berths 10,11 and 12 at Indira Dock.

### *Proposal 7-EXIM Automobiles*

From Table 3.4, it can be observed that the EXIM of Automobiles will double by FY 53. Hence, Gamadia Car Park and the adjoining land has been earmarked for the storage and parking of EXIM automobiles. It is proposed to construct a G+1 car parking system at Gamadia Car Park for optimal utilization of existing area and some area of VD also may be utilized for the same on demand basis. It is also proposed to shift the yellow gate police station to Mazgaon area. The vacated land is proposed to be amalgamated in the Gamadia Park increasing the capacity of parking of EXIM automobiles.

### *Proposal 8- Cement Terminal*

Studies conducted by CRISIL Ltd identified the need to evaluate back up area to install 2-4 silo with 15000 – 17000-ton capacity and further circulation of trucks and bagging plant. As additional 1-2 MTPA is required to handle the demand for cement in future, it is proposed to have a dedicated Cement Terminal at 12A and 12B ID and its adjacent area for setting up of cement silos yard. It is proposed to develop the dedicated mechanized cement terminal through PPP mode for 30 years. The cement silos should be developed through state of art infrastructure to have zero emission/ pollution. The area earmarked is inclusive of the area required for pumping purpose.

### *Proposal 9- Base Oil*

According to the CRISIL survey on base oil, it is expected that the import of base oil will increase from 0. 62 MTPA to 0.91 MTPA by 2053. Presently, the berthing of base oil mother vessel takes place at 14 VD. Considering the projections, additional area is proposed for the storage of base oil at STC plot at Mallet Bunder and at Victoria Dock. The total area of the land is 55,762 sq.m.

### *Proposal 10- Parking*

It is observed that there is haphazard parking of trucks that are entering the port awaiting for loading and unloading of cargo. It is proposed to use the Victoria Dock for parking of trucks as well as EXIM vehicles after undertaking the land filling process.

### *Proposal 11- Tourism, Recreation & Commercial Zone*

An area admeasuring 1,34,022 sq.m has been earmarked at Prince's dock, outside the custom notified area, for tourism, recreation and commercial purposes.

### *Proposal 12- Domestic Cruise Terminal (DCT)*

Domestic Cruise Terminal located at Prince's Dock with the iconic Terminal Building overlook the eastern waterfront with state of art infrastructure on 7000 sq. m. Cruises were plying from Mumbai to Goa till Covid-19.

### *Proposal 13- Service Crew Building*

It is envisaged to have a consolidated building for all the service crew of MbPA staff having facilities such as dormitory, canteen and restroom facilities. These facilities is also proposed to

be extended to the service crew of private operators on rental basis. Hamallage building has been identified to be developed as Service Crew Building.

*Proposal 14-Indian Coast Guard*

MbPA has allocated 13/14 ID open area, 15 ID shed and berth 23 UD to Indian Coast Guard. The same has been retained in the proposed land use as well.

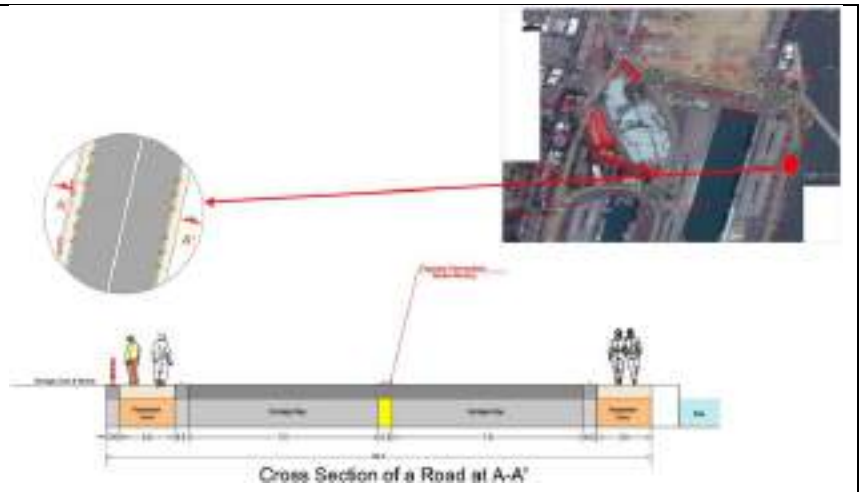
### 5.4.2 Proposals for Improvement of Circulation within Port

#### *5.4.2.1 Short Term Interventions*

**Table 5.2 Short Term Interventions for Improvement of Circulation within Port**

| Sr. No. | Measures | Proposed Roads |
|---|---|---|
| 1 | Road Markings and Signage Plan | Existing Mumbai Port road network has lack of road markings and signage's. Hence, informatory and cautionary signage's and road markings are proposed on all the links of the port. |
| 2 | Solar Studs and Delineators | Solar Studs and Delineators are proposed on all roads of Mumbai port to distinguish between road and the storage areas especially during night time. These solar studs shall be installed at every 2.5m on the edge of the road. Delineators have been proposed along the edge of footpath to distinguish between the footpath and storage areas at every 10m. |
| 3 | Junction Improvements | Junction near the new yellow gate where the weighbridge is located is under heavy congestion due to axle load clearance and hence weighbridge should be shifted from the junction and also the Improvements to Junctions, in terms of segregating traffic flows, road markings and signage, to be carried out at nodes-J6, J1, J7 and J15.<br>  <br>A rotary of 18m radius is proposed at junctions J1, J7 and J15 with proper channelization to reduce conflicting movements at the junctions. The proposed traffic arrangement is as shown below.<br>Gamadia car parking space has also been increased by demolishing the wall near MbPA Police Station. |

| | | |
|---|---|---|
| | |  |
| 4 | Shifting of Orange gate security check inside the port | It has been observed that there is along queue in front of orange gate, due to verification process done by CISF, hence orange gate and CISF Security check is shifted by150 m inside the port.   |
| 5 | Provision of entry gate for oversized truck at orange gate | Since when an oversized truck cannot enter into the port at orange gate, an additional gate has been proposed at orange gate of width 10.0mt. |
| 6 | Pedestrian facilities | The pedestrian movement in the study area is neglected in the study area, and no footpaths are found in the study area, the footpaths should be constructed all the links of port. |

| | | |
|---|---|---|
| | |  |
| 7 | Proposed Weigh Bridges | A weigh bridge has been proposed on New Dock Yard and near Berth No . 6.<br>  |
| 8 | Realigning the road from blue gate to green gate | Road from blue gate towards green gate should be made straight instead of curved road at Ambedkar Bhavan. |

*(Source: Report on "Traffic Study to arrive at Traffic Management Solutions for Mumbai Port Area" prepared by SLS Transport Training Institute & Consultancy)*

#### *5.4.2.2 Long Term Intervention*

**Table 5.3 Long Term Interventions for Improvement of Circulation within Port**

| Sr. No. | Measures | Proposed Roads |
|---|---|---|
| 1 | Shifting of Yellow Gate Police station | Yellow Gate Police station to be shifted ,so as to maximize Gamadia Car Parking Complex space. |

*(Source: Report on "Traffic Study to arrive at Traffic Management Solutions for Mumbai Port Area" prepared by SLS Transport Training Institute & Consultancy)*

#### *5.4.2.3 Other Proposals*

There is no existing bus service inside the port for carrying potters and employees is not adequate and hence proposing bus service in port area with a frequency of 30 minutes. It is ideal to have a bus that will originate from Yellow Gate at ID and circulate all around the port. Buses will have a capacity of 16-25 people. It is also proposed to have a bus shelter near Yellow Gate at ID.

### 5.4.3 Permissible Uses in Port Allied Activities Zone

As indicated in section 2.4, the planning area under consideration is inclusive of the lands falling under Port Allied Activities zone (PA) and Port Operational Zone (POZ) as per the Planning Proposal of SPA. The POZ zone comprises of ID, PD & VD. The area under PA zone as well as POZ is indicated in Figure 2.11. MbPA as an SPA has already declared the main activities permissible in respective zones in its Development Control & Promotion Regulations (DCPR). Even though plot level usage has not been assigned to the lands falling under PA zone, the main activities that are likely to happen in those areas should be as per the DCPR provisions as indicated in the following table.

**Table 5.4 Activities permitted in Port Allied Activities Zone**

| Land Use Zone | Sub Zone | Main Activities/ Character |
|---|---|---|
| Port Allied Activities Zone | Port Storage | Godowns and warehouses used for storage of port containers/ materials outside the Custom bound area with all supporting services and facilities including offices, restaurants. |
| | Industry | Tanks farms for Petroleum Storage, petroleum processing, Fueling Stations, Auto Repair Workshops, Wood/ steel |

| | | |
|---|---|---|
| | | Workshops, Fabrication Workshops, Public-Garage, Assembly Units, Printing Press. |
| | Fish Industries and Tourism | Fishing activities, storage, markets, Ice Plants, fish processing and other related activities along with tourism, recreational and cultural activities of the fishing communities. |

### 5.4.4 Proposed Zoning for MbPA Waters


**Figure 5.11 Proposed Zoning for MbPA Waters**

*Proposal 1-Development of Trestle at JD and Pir Pau*

New pipeline trestle from Old Pir Pau to first chemical berth replacing the existing trestle. The connection to Jawahar Deep which is about 1.8 km will also be taken into account while considering the layout. The new trestle will be connected to Jawahar Deep from Pir Pau. The alignment of the trestle shall be decided after carrying out detailed feasibility study.


**Figure 5.12 Development of Trestle at JD & Pir Pau**

### *Proposal 2- Development at JD*

Reclaimed land at JD to be handed over to HPCL - 5 ha.


**Figure 5.13 Development at JD**

### *Proposal 3- Development at Pir Pau*

Reclaimed land at Pir Pau - 5 ha.

**Figure 5.14 Development at Pir Pau**

### *Proposal 4- Development of Barge Terminal at Old Pir Pau*

- Water Supply – barges / tankers
- Bunker supply (Fuel) – barges / tankers
- Garbage Disposal – DG Shipping Portal – Empanelled vendors through Swacch Sagar Portal – MPCB live tracking of vehicles – designated MCGM landfill sites
- Sludge and Slop Reception and Disposal – Dirty water mixed with oil – treated and disposed at the designated sites identified by MPCB.


**Figure 5.15 Development of Barge Terminal at Old Pir Pau**

*Proposal 5- Development at OCT & Flotillas*

- Extension of existing OCT by 350m southwards
- Development of New OCT for Offshore General Cargo Handling towards south of existing OCT – length 600m
- Planning of Flotillas near OCT

## 5.5 Ship Repair

### 5.5.1 Market Focus for MbPA

Gujarat and Maharashtra are the major maritime states in the western region of India. They contribute around 78% to the total traffic handled on the west coast region. The huge amount of cargo handling witnesses large number of ship calls at the ports. Size of ships calling at the west coast ports ranges from 2,000 DWT to above 1,00,000 DWT. Due to draft restrictions not all ships calling on west coast can be targeted for repair at MbPA. There is a limited scope for large commercial ships due to draft restrictions at MbPA. Based on the lightship draft of vessels in following tables, vessels having draft up to 6 m could be targeted for repair at MbPA. Indira Dock has maximum draft of 9 m. Due to restriction of lock gate, vessels up to 27 m width could get repaired in Indira Dock. The workshop area of MbPA is highly silted. Proposed dry docks at the workshop area could target ships up to 6 m draft, subject to heavy dredging carried out for achieving the required draft.

### 5.5.2 Ship Repair Location Identification

ID, Workshop area, Darukhana & Lakri Bunder are the most probable locations for development of ship repair facilities at MbPA. Recently, Mumbai port had floated tender for granting license to deploy FDD at selected locations in Mumbai Harbour. Below chart discusses the probable locations for ship repair at MbPA, their target market and viability.


**Figure 5.16 Ship Repair Location Identification at MbPA**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Since the Workshop area is lease to MDL, the activity will be carried out by them.

Below figure depicts the slipways and FDD locations proposed by MbPA in recently floated tenders.

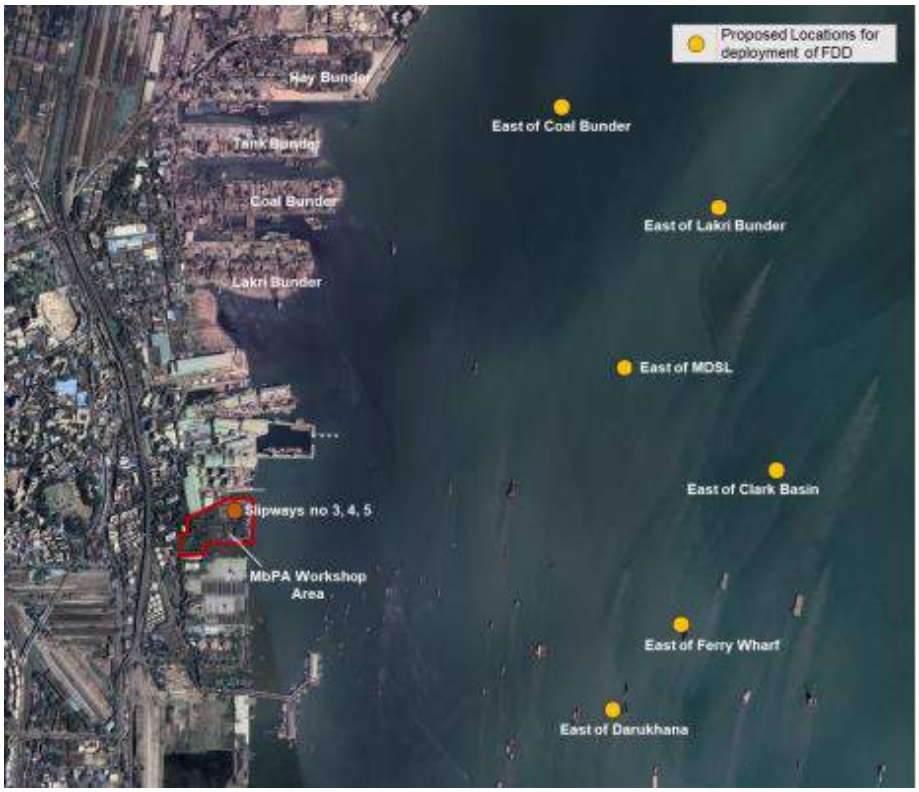



**Figure 5.17 Ship Repair Locations proposed by MbPA**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

*Since the workshop area is leased to Mazgaon Dock Shipbuilders Limited. The ship building and repair activity will be carried out by MDL.*

### (1) Darukhana & Lakri Bunder - Small Ship Segment (Barges, Port Crafts)

Darukhana, in the Mumbai Port area, is a place with unorganised ship repair in makeshift arrangement. Previously, it was primarily involved in dismantling ships. Darukhana, presently, undertakes repairing of smaller vessels such as barges, boats, and port crafts.

Darukhana has draft limitations. This restricts ships calling for repair and construction. The location is particularly suitable for the repair of smaller vessels. Hence, development of small segment ship repair units for organised repair activities is the most suitable option available at Darukhana. By focusing on smaller crafts and barges, Darukhana can carve out a niche for itself in the local ship repair industry.

The strategy to transform Darukhana into ship repair would involve dividing Darukhana into distinct plots, each designated for ship repair yards, and leasing these out to interested operators

for periods of 3 to 5 years. This approach could significantly enhance revenue generation while allowing the port to review and adjust the whole infrastructure periodically.

One of the biggest advantage of Darukhana is its location outside the customs bound area, removing the complexities and restrictions usually associated with customs regulations. This feature makes it an attractive proposition for companies seeking an operational environment with lower paper work.

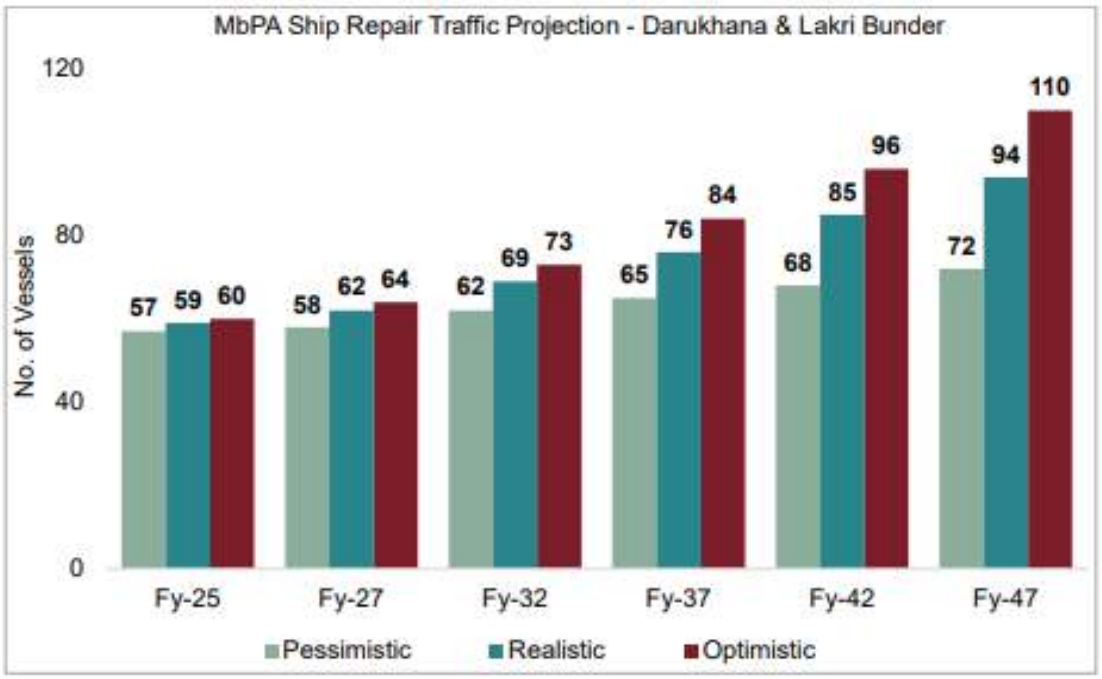



**Figure 5.18 Ship Repair Projection for MbPA – Darukhana & Lakri Bunder**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Hence, by organising Darukhana more efficiently and leveraging its unique suitability for smaller vessels, Mumbai Port can maximise its earning potential. Even with the competition from Navi Mumbai, a wellmanaged and focused ship repair units could generate a profitable niche in the market.

### (2) Indira Docks - Ships upto 30,000 DWT

Indira Docks, within Mumbai Port, currently undertakes Cargo operation and it also houses a dry dock managed by Cochin Shipyard. The depth inside Indira docks is 9.14 m maintained by impounded dock system. The outer berths of Indira docks have lower depth or berthing draft compared to berths inside Indira Docks. This generates a higher importance for the berths located inside Indira Docks. A trade off between whether to use the inside berths for cargo handling or convert them into additional ship repair units that could cater to the market not targeted by Cochin Shipyard is essential.

Cochin Shipyard managed infrastructure at Indira docks primarily serves local specialized crafts, vessels from the Navy, and the Coast Guard. The size of the ships that can be accommodated inside Indira Docks is limited due to the lock gate restriction. The width of lock gates is 30.48 m. However, allowing for clearance on both sides, we have assumed maximum size of vessels with width of 27 meters inside Indira Docks. Moreover, higher margin of safety has been considered due to old lock gates and channel connecting Indira Docks to open sea.

Despite the lock gate width restriction, there's an untapped demand in the commercial ship repair sector, especially for vessels under 30,000 Deadweight Tonnes (DWT). However, it's important to note that creating a dedicated ship repair yard within the docks would require the use of space currently used for cargo operations. This change might raise concerns about potential loss of revenue from ongoing cargo operations. The development of a new ship repair infrastructure within Indira Docks appears to provide higher prospects. Below chart shows the historic traffic handled at berths of Indira Dock i.e. 12, 12A, 12B, 13, 13A and 13B that are proposed for development of ship repair facility.

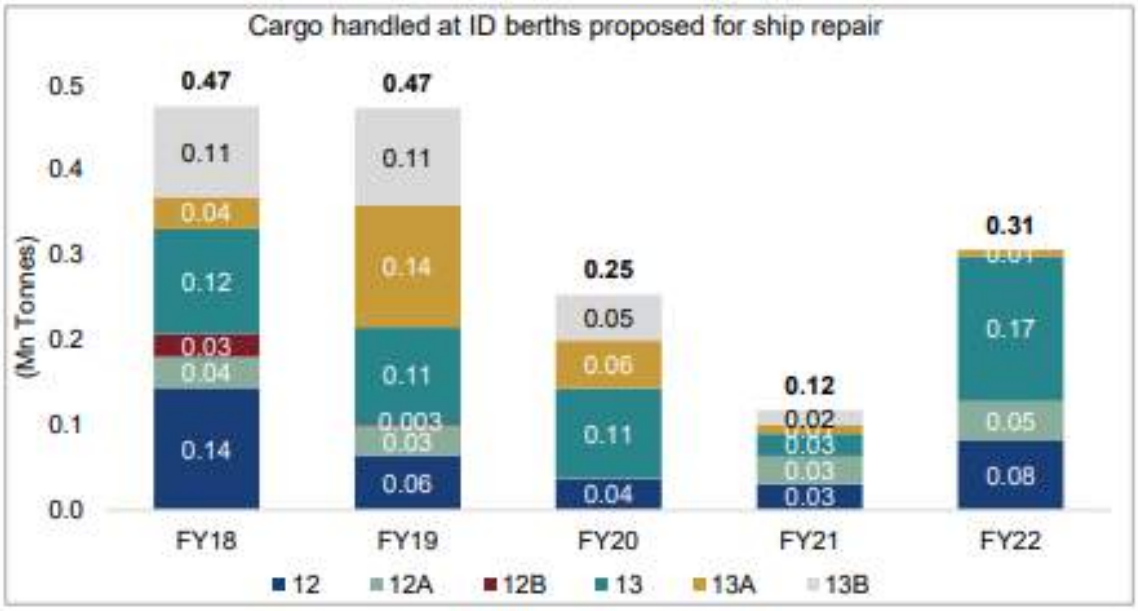



**Figure 5.19 Cargo Handled at ID Berths Proposed for Ship Repair**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

*Note: Cargo handled at ID berths proposed for ship repair in the FY23-24 are as follows: 12ID (0.09 mnT), 12A ID (0.082 mnT), 12B ID (0 mnT), 13 ID (0.009 mnT), 13A ID (0.17 mnT), 13B ID (0.033 mnT)*

*(Source: Annual Report on Traffic & Performance 2023-24)*

Above figure depicts that in last 5 years' highest traffic handled at the 6 berths inside ID proposed to be converted for ship repair is 0.47 mn tonnes. In FY22 the cargo handled at these 6 berths is around 300,000 Tonnes (0.3 million Tonnes). This could be handled at other berths

as Indira docks overall has lower utilisation. Hence, evaluating prospects of developing a ship repair yard is promising. The projected cargo traffic at Indira docks in Fy-53 would be able to accommodate growth even after loss of 6 berths namely 12, 12 A, 12 B, 13, 13 A and 13 B. The development of the new ship repair yard would require some adjustment of existing operations; it would not adversely affect the overall cargo operations or the revenue they generate for Mumbai Port. Below table shows the present and projected berth occupancy of berths at Indira Docks.

**Table 5.5 Additional Berth Infrastructure Requirement Analysis**

| Sr. No. | Berths | Traffic (mn T) | | Berth Occupancy | | Additional Berth Requirement |
|---|---|---|---|---|---|---|
| | | FY22 | FY53 | FY22 | FY53 | |
| 1 | JD | 25.4 | 39.8 | 49% | 74% | Available berths are adequate to projected traffic of Crude, POL products & Lube Oil |
| 2 | Pir Pau | 4.1 | 6.4 | 78% | 80% | NPP3 likely to be commence in FY25, this would create additional capacity |
| 3 | Indira, BP & Other Docks | 7.8 | 14.1 | 32% | 63% | Available berths capacity is sufficient to handle increasing traffic |
| 4 | OCT | 0.5 | 0.5 | 24% | 20% | OCT is used to handle Automobile traffic, highly underutilised at present. Available space could easily accommodate projected traffic |
| 5 | Anchorage (Coal & Iron Ore) | 9.9 | 27.8 | - | - | - |
| | Anchorage (Others) | 2.7 | 4.0 | - | - | - |
| 6 | TPS | 2.2 | 2.2 | - | - | - |
| 7 | OPL Wadala | 2.6 | 3.2 | - | - | - |
| 8 | ONGC BH Crude to refineries | 4.7 | 4.7 | - | - | - |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Mumbai Ports, OCT terminal with a present capacity of 2 Million tonnes is handling 0.5 million tonnes cargo. There would be loss of BPS and BPX terminals by allocating to cruise terminal. Both the terminals presently have an annual capacity of 2.0 million tonnes. The proposed cruise operations is operational for 8 months only, excluding monsoon. This leaves both the berths available for handling clean cargo during monsoon period. The cargo handling capacity of BPS and BPX would get re-rated to 0.6 million tonnes. Factoring in all these developments, there exist additional spare capacity for creation of a dedicated ship repair infrastructure within Indira Docks. It would involve the careful allocation and organization of space within the dock to cater to this specific commercial segment.

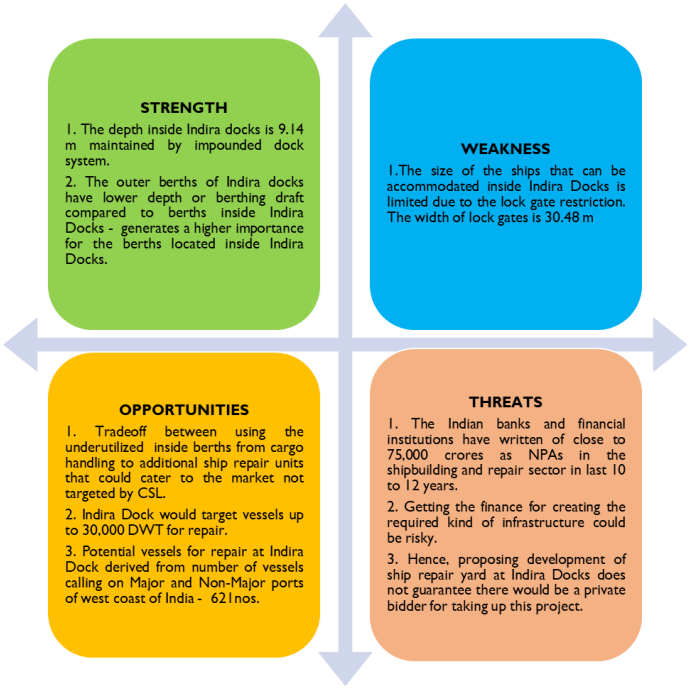



**Figure 5.20 SWOT for Ship Repair at ID**

The development of a new ship repair yard within Indira Docks would focus on addressing the specific needs and constraints of commercial vessels upto 30,000 DWT. This reorganisation of infrastructure could also offer substantial financial benefits to Mumbai Port. By converting underutilized infrastructure into a productive ship repair yard for commercial vessels, Mumbai Port can generate more revenue. Mumbai Port has gained substantial revenue by allocating ship repair yard of HDD to Cochin Shipyard. The Port used to earn a revenue of around 9.5 crores and the salary expenses along with repair and maintenance of whole infrastructure was around 9 Crores in the year Fy-16, just prior to handing over to Cochin Shipyard. Cochin Shipyard as part of the deal, is giving Mumbai Port a fixed sum of Rs 15 Crores annually, it has transferred all the employees of HDD from Mumbai Port books to Cochin Shipyard books and pays their

salary. The actual profit of MbPA from ship repair at HDD surged from 0.5 Crores to Rs 15 Crores net by handing over to Cochin Shipyard.

By strategically reallocating resources and reorganizing space, Mumbai Port can create a dedicated repair yard for commercial vessels under 30000 DWT. This move can tap into an unmet demand, generating additional revenue for Mumbai Port, while also contributing to the wider commercial shipping industry.

The proposed ship repair would have to be developed under Public-Private Partnership.

Indira Dock would target vessels upto 30,000 DWT for repair. Potential vessels for repair at Indira Dock are derived from number of vessels calling on Major and Non-Major ports of west coast of India. Below chart depicts ship repair projection for Indira Dock

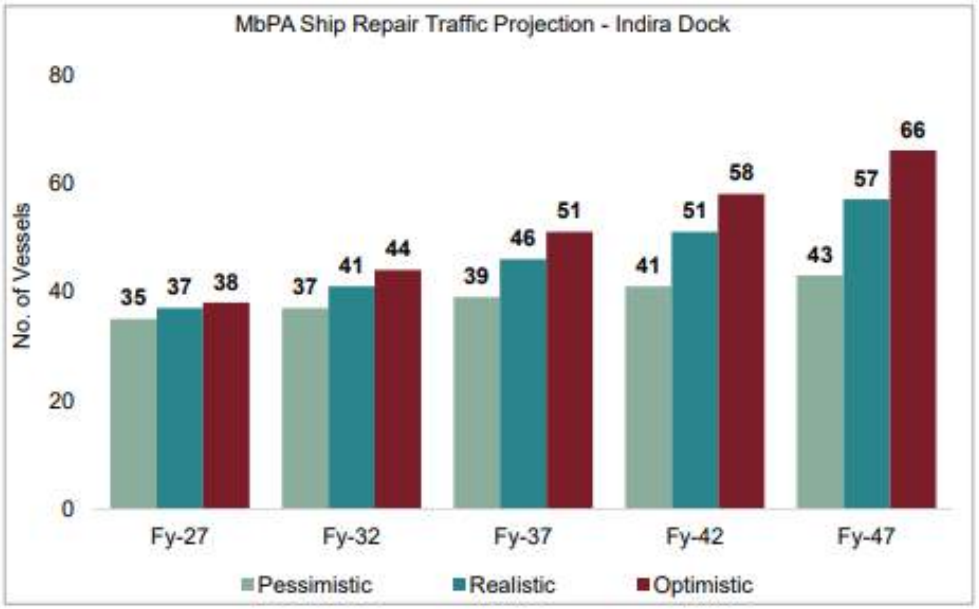



**Figure 5.21 Ship Repair Projection for MbPA – Indira Dock**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

Mumbai Port is well positioned to serve the consistent demand for commercial ship repairs in West Coast of India. Currently, the repair of ships within the port is primarily conducted at Indira Docks (HDD) and Darukhana. Indira Docks, however, faces the constraint of a lock gate restriction, allowing only ships of a width up to 27 meters. Darukhana, on the other hand, caters mostly to small craft and barge repairs.

### 5.5.3 Revenue Generation Potential

#### *5.5.3.1 Small Ship Segment (Barges, Port Crafts)*

Ship repair facility at Darukhana and Lakri Bunder would repair barges and small vessels mainly. The average cost of repair of these vessels is 20 to 25 lakhs. Below figure depicts revenue projection from ship repair at Darukhana and Lakri Bunder.

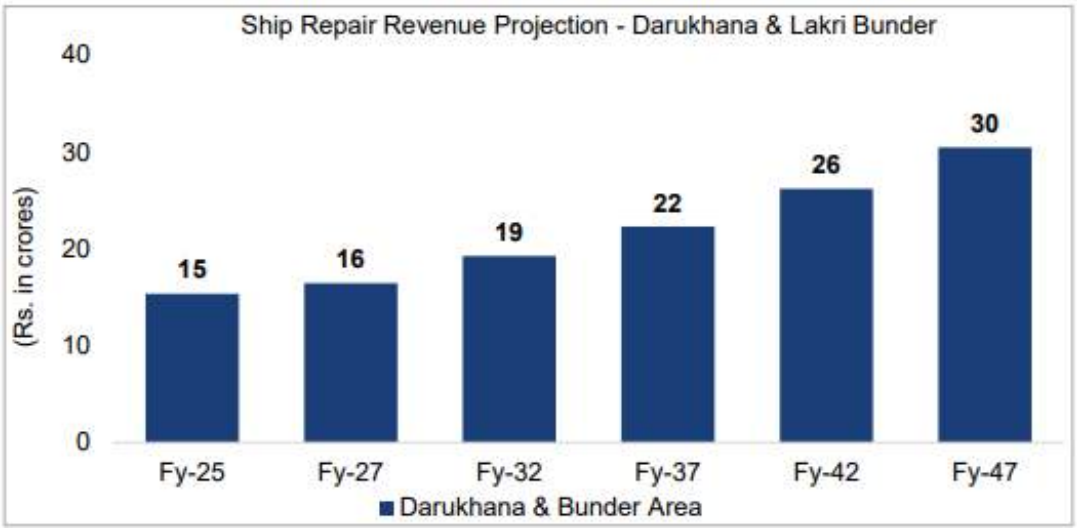



**Figure 5.22 Ship Repair Revenue Projection – Darukhana & Lakri Bunder**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

#### *5.5.3.2 Ships up to 30,000 DWT*

Proposed ship repair facility at Indira Docks would repair vessels upto 30,000 DWT. The average cost of repair of these type vessels is discussed in Table 23. Below figure depicts revenue projection from ship repair at ID.

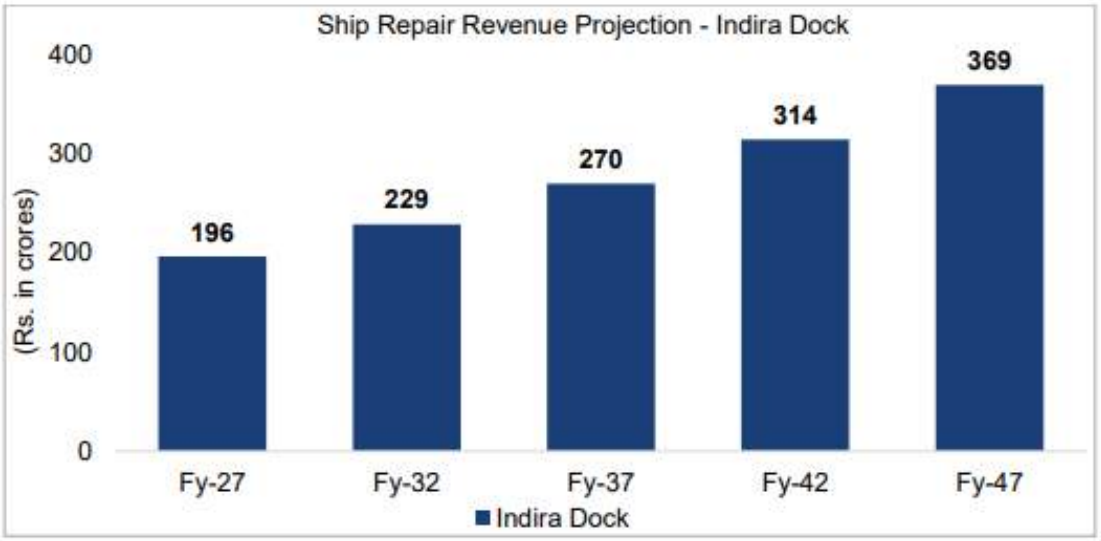



**Figure 5.23 Ship Repair Revenue Projection – Indira Dock**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

#### *5.5.3.3 Revenue / Royalty for MbPA*

MbPA may take 7% of total revenue generated at proposed ship repair infrastructure at Indira dock, Darukhana and Lakri bunder as royalty.

## 5.6 Fisheries

### 5.6.1 Action Plan

The Fishing Jetty (Ferry Wharf) of Mumbai Port would need to diversify its revenue sources to become sustainable. The condition of Jetty is bad in the absence of sustainable revenue source. Though, Mumbai Port has plans to upgrade the fishing infrastructure by creating additional jetty connecting to Mallet Bunder, it does not have any plans to commercialise or monetise Mumbai port's investment from Fishing jetty. The only source of income from Fishing jetty has been the nominal charges port generates from fishing boats. These charges are linked to GRT of the fishing boats. The Fishing boats are very small sized in Mumbai region. There are very few trawlers operating in area. Hence, these vessels have low GRT. The revenue collected from them is lower.

Any investments related to Fishing activity is perceived to be social promotion activity by Government or any other Government owned agencies. Majority of the fishing infrastructure, including fishing harbour, jetties for unloading of fish catch, fish processing Centre, auction, hall, etc are all constructed using government funding. This is undertaken for promotion of fishing activity and welfare of fishing community. The fishing activity has not been considered an industry for revenue collection by Government bodies. Hence, any proposal of Mumbai Port to monetise fishing activities at Bhaucha Dhaka would not be appreciated by the fishing community as well as government bodies.

Mumbai Port would have to work on a persuasive proposal to convince the fishing community agree to pay additional tariffs in the interest of their own community and fishing industry. The sole purpose of additional tariff would be to upgrade infrastructure for the benefit of fishermen. It should be communicated well that the additional monetary collection from fishermen for their fish catch in Mumbai Port area would be used to develop better infrastructure for fishing community. It will also be used for judicious upkeep of existing infrastructure related to fishing.

### 5.6.2 Revenue Generation Potential

Some of the possible avenues of Revenue for MbPA from fishing are as follows

- Revenue from Fishing Boats/Trawlers (Already Collected)
- Revenue linked to Fish Catch
- Revenue from Value added services
- Revenue from Fish Tourism
- Conservation/Development Fee levied on Trucks entering area

#### *5.6.2.1 Revenue Linked to Fish Catch*

Volume-based fees from fish catch could serve as a fair and effective method of revenue collection for Mumbai Port. Essentially, this approach means that fishing boats would pay a fee proportionate to the volume of the fish catch as well as value of product. The tariff becomes linked to the earnings of the community and does not create any kind of fixed burden. The boat with higher catch as well as revenue pays higher compared to the ones with lower catch leading to lower revenue realisation. A further detailed implementation of the concept is explained below.

The tariff proposed for collection from fishing activity has to be perceived as a nominal tariff that could be trivial for anybody. However, the nominal tariff proposed per KG of fish catch extrapolated over thousands of tonnes of fish catch could generate substantial revenue for Mumbai Port from fishing activities at Bhaucha Dhakka.

It’s essential to consider the average earnings of the fishermen and the market prices of the catch. This would help to set a reasonable tariff that wouldn't generate financial burden on the fishermen while it would ensure reasonable revenue for Mumbai port. Most of the fish catch sold in Mumbai is at a price ranging between Rs 80/Kg to Rs 800/Kg. Charging a nominal percentage of the estimated market value of the catch that does not disturb the buy power of the consumers should be a welcome move. Say a tariff of 1% to 3% would generate a revenue of Rs 0.8 to Rs 2.4 a kg on lower side and Rs 8 a kg to Rs 24 a Kg on the higher side for Mumbai Port. Alternatively, MbPA could charge a flat fee per KG volume of Fish catch. For instance, a fee of Rs 1 per Kg of fish. Since, the fisherman undertakes a mix catch of fishes. The net average tariff levied on them by Mumbai Port would be less than 0.4% of the average market price of fish assuming average price is Rs 250/kg. Below chart shows the projected revenue for MbPA from fisheries at Ferry Wharf.

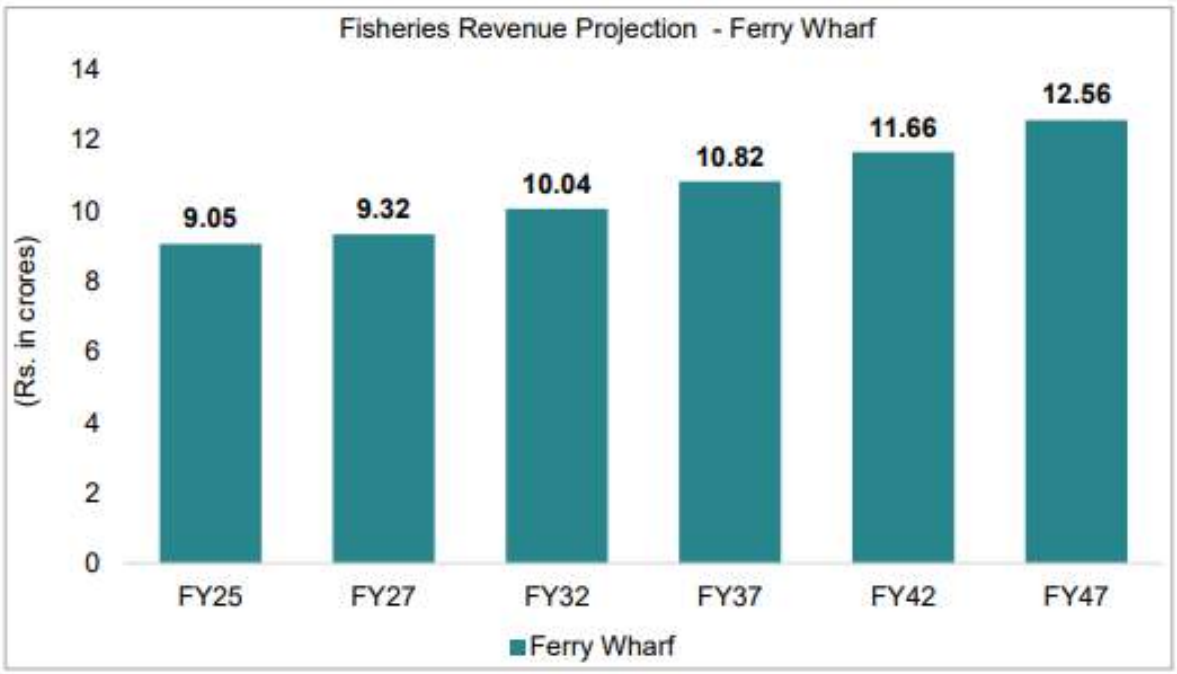



**Figure 5.24 Revenue Generated for MbPA from Fishery – Ferry Wharf**
*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

### *5.6.2.2 Revenue from Value Added Services*

MbPA has several vacant warehouses at Mallet Bunder located adjacent to Fishing Jetty. The new Fishing jetty proposed by MbPA will have direct connectivity and approach from Mallet Bunder. Mumbai Port could auction the existing and idling warehouses of Mallet Bunder for fish processing.

### *5.6.2.3 Revenue from Fish tourism*

Mumbai Port could promote its fishing jetty as a tourist spot and encouraging people to visit to buy fresh fish or learn about the industry. Sassoon dock organises such a festival. A similar festival is organised by Sula Wines in their vineyard where they organise vineyard tours, wine tasting workshops and also music concerts. Mumbai Port could work towards making its Bhaucha Dhakka more lively space with adding a concept of Fish food festival at periodic intervals. This would include stalls with a variety of fishes cooked in wide range of cultural cooking styles in India. This would make fishing and fish tourism quite popular near Ferry Wharf and it would generate substantial revenues for Mumbai Port.

### *5.6.2.4 Conservation/Development Fee levied on Trucks Entering Area*

Levy a nominal conservation fee or development fee in the form of truck parking from all the trucks using ferry wharf. This would include trucks supplying ice to the Fishing boats, Trucks

calling to Ferry wharf to collect Fish catch. A tariff of Rs 100/per-truck-per 2-hour slot would be nominal in the present economic condition.

## 5.7 Action Plan for Urban Water Transport

### 5.7.1 Passenger Handling Facilities at MbPA

The figure below shows the mapping of locations where passengers are being handled by MbPA. Detailing of each jetty / terminal is already done in above section.


**Figure 5.25 Passenger Handling Facilities at MbPA**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

The table below shows the jetties and terminals at MbPA along with route connectivity and traffic handled in FY22. Apart from ICT, rest all locations handle short haul water transport service. Ferry Wharf, Ro-Pax terminal and Gateway provides ferry service to other side of the waters i.e., Navi Mumbai and Mandwa.

**Table 5.6 Passenger / Tourist Handling Facilities at MbPA**

| Locations | Routes | Distance | Type | FY 22 Traffic (Lakhs) |
|---|---|---|---|---|
| Ferry Wharf | Elephanta (Occasional) | Short Haul | Ferry | 0.2 |
| | Mora | Short Haul | Ferry | 5.0 |
| | Rewas | Short Haul | Ferry | 0.9 |

| | | | | |
|---|---|---|---|---|
| Ro-Pax Terminal (Princess Dock) | Mandwa | Short Haul | Ro-Pax | 6.4 |
| Gateway | Elephanta | Short Haul | Ferry & Yacht | 3.0 |
| | Mandwa | Short Haul | Ferry | 9.0 |
| | JNPA | Short Haul | Ferry | - |
| Sassoon Dock | Mora | Short Haul | Ferry | 0.2 |
| ICT (BPX) | Domestic & International | Long Haul | Cruise | - |
| DCT (Prince's Dock) | Re-Creational Activities | - | - | - |

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

### 5.7.2 Tourism Development Plans of MbPA by SPA

Government of Maharashtra appointed MbPA as Special Planning Authority for re-development of ~14 km length of waterfront from Colaba to Wadala. SPA has already prepared a Master Plan for the entire waterfront (excluding Apollo Bunder) and submitted to State Government for approval. MbPA's vision behind this development is to make Mumbai city the cruise tourism capital of India, developing best quality passenger water transportation as alternative to increasing traffic congestion on roads and railways, improve connectivity, maximise green spaces, promote tourism, rehabilitation of slums and market area, etc. The figure below shows the land use plan along the waterfront that is already designated for tourism and passenger development.

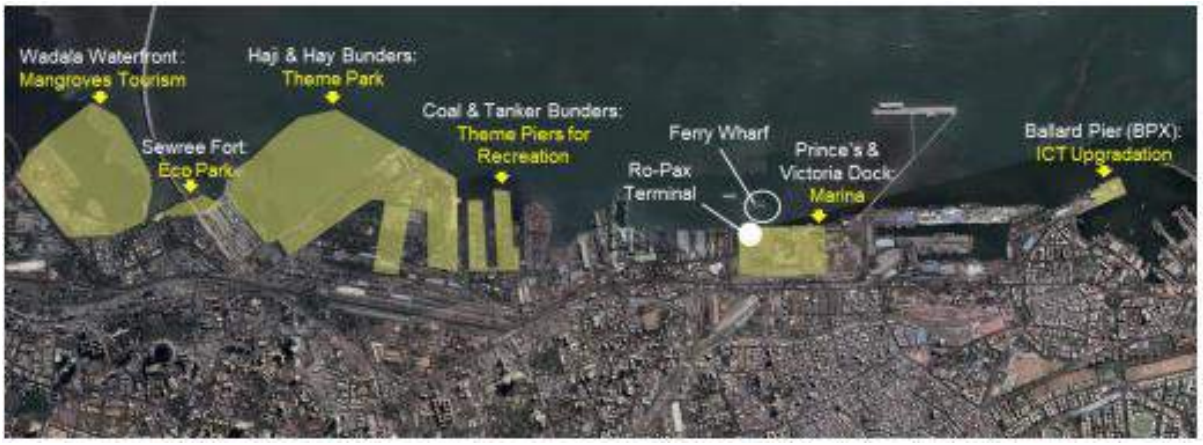



**Figure 5.26 Designated Areas by MbPA for Tourism / Passenger Infrastructure Development**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

- Ballard Pier: BPX has been already developed for international cruise terminal. The redevelopment of terminal building is under progress.
- Prince's Dock: 1.2 km waterfront has been already developed for water transport terminals. The southern portion is proposed to be developed as 2nd DCT Terminal for

Water Taxi, Harbour Cruise, Floating Restaurants, Hover Crafts etc. The DCT 1 is fully developed.

- Victoria Dock: The waterfront of Prince's Dock has been already developed with recreational promenade along with multi cuisine restaurants. The Ro-Pax terminal is also developed and commissioned. A proposal of Marina has been already prepared and bids have been invited under PPP mode.
- Coal Bunder & Tank Bunder: Both the bunders are proposed for Theme Pier for cultural and recreational purpose
- Hay Bunder: Some waterfront part of Hay Bunder particularly Brick Bunder is proposed for development of tourism area with promenade and theme streets.
- Hay Bunder & Haji Bunder: Some part of these bunders is proposed to be developed as Theme Park (Central Park) covering an area of about 145 ha. with various themes of garden, promenade, thick plantation, miniature replica of 7 islands of Mumbai, ropeway to Elephanta etc.
- Sewree Fort: 10ha. Area behind Sewree Fort is being developed as Eco Park
- Wadala Waterfront: The remaining waterfront up to Wadala is covered with thick mangroves. MbPA could develop floating board walks along the boundary as a part of Mangrove Tourism.

Ferry Wharf needs immediate attention of MbPA to improvise passenger facilities. Existing RO-Pax terminal could be used for next 15 years, however additional would be required to handling growing traffic. MbPA already has upgradation / modification plans at ICT and DCT.

MbPA shall also explore the feasibility and infrastructure development necessity for Mumbai-Navi Mumbai water taxi or water metro service post commissioning of Navi Mumbai International Airport.

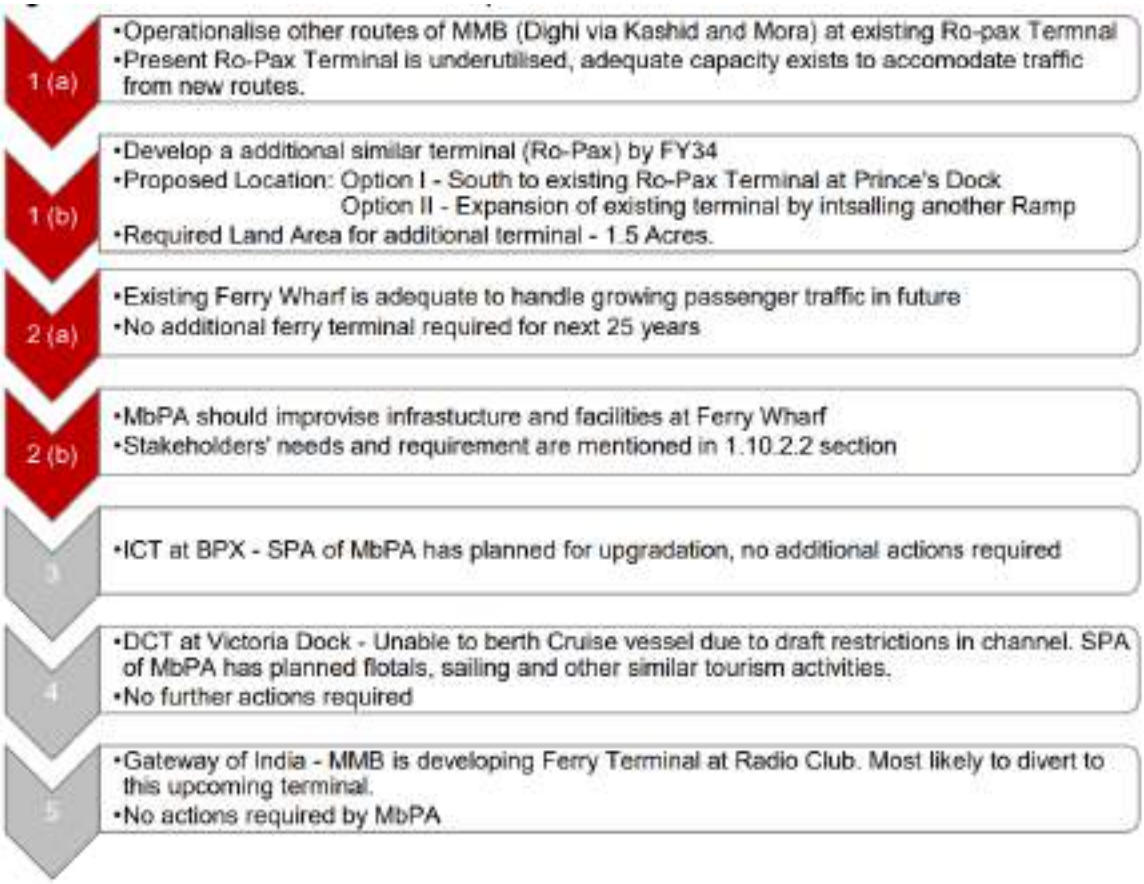



**Figure 5.27 Action Plan for Urban Water Transportation**

*(Source: Report on Demand Assessment for Ship Repair, Water Transport & Fisheries for MbPA prepared by CRISIL)*

### 5.7.3 Steps to be taken for Ferry Wharf Improvisation

- Loading and unloading of 2 wheelers vehicles at ferry wharf is done on stairs. Currently a wooden plank is used to transfer 2 wheelers between jetty and ferry which is risky. A convenient provision is required for the same.
- Lack of Public bus transport to take passengers from Jetty to different parts of the Mumbai city. Many a times cab services like Ola, Uber are not easily available at ferry wharf. Passengers have to bargain with Local taxies who sometimes refuse to go by meter and are overpriced. Regular public transport service should be made available at Ferry Wharf for last mile connectivity.
- People working on vessels have no accommodation arrangements. They generally sleep in ferries and have to use public bathrooms which are paid. Proper provision for vessel crew at berth area needs to be developed.
- Lack of cleanliness in Jetty area. Foul odour from nearby fishing jetty is also an issue for many passengers. Ample dustbins should be installed at Jetty area.

- Considering daily passengers, the ticket price is bit higher as compared to Railways & Bus. This could be made more affordable by subsidizing.
- At present, 2 wheelers and pedestrians have same in/out gate. This creates chaos in peak time. Crowd management should be done in waiting area.
- No proper seating arrangement on jetty exists. Existing benches are damaged. Chairs or benches should be installed in waiting area of jetty.

## 5.8 Green Port Initiatives

Against the backdrop of global efforts to combat climate change and reduce greenhouse gas (GHG) emissions, India made a significant commitment during the 26th meeting of the Conference of Parties (C0P26) in Glasgow, Scotland, in 2021, pledging to achieve Net Zero emissions by 2070. According to the United Nations Conference on Trade and Development (UNCTAD), the maritime sector is responsible for about 2.8% of global GHG emissions. The Ministry of Ports, Shipping and Waterways (MoPSW) outlined the Long-Term Low-Carbon Development Strategy, spelling out its various climate action strategies through Maritime India Vision 2030, 'Harit Sagar' Green Port Guidelines, Amrit Kaal vision document 2047. The Mumbai Port Authority (MbPA) has further aligned its efforts with these guidelines and has been contributing to a sustainable blue economy in and around Mumbai.

Mumbai Port has become first major port to quantify its carbon footprint and identify significant carbon contributors, following GHG protocol, and work to assess value chain carbon contributions are underway.

Resource allocation and advanced planning is on to tackle Scope 1 emissions. Action to tackle Scope 2 emission has already been initiated through procurement of Renewable Energy (RE) Power to meet more than 80% of port operations' power demand. A separate study is commissioned to assess Scope 3 emissions. The Port is confident to align its net zero targets along with the national targets set by our Honourable Prime Minister Shri Narendra Modi ji.

**Environmental Sustenance**

Ports provides place and facilitates loading and unloading of cargo and passengers to and from ships and by itself does not generate air and water effluents. However, during the entire operation of loading, unloading and transportation to hinterland, generation of waste and pollutants cannot be ruled out because of fugitive emissions, emissions from transport,

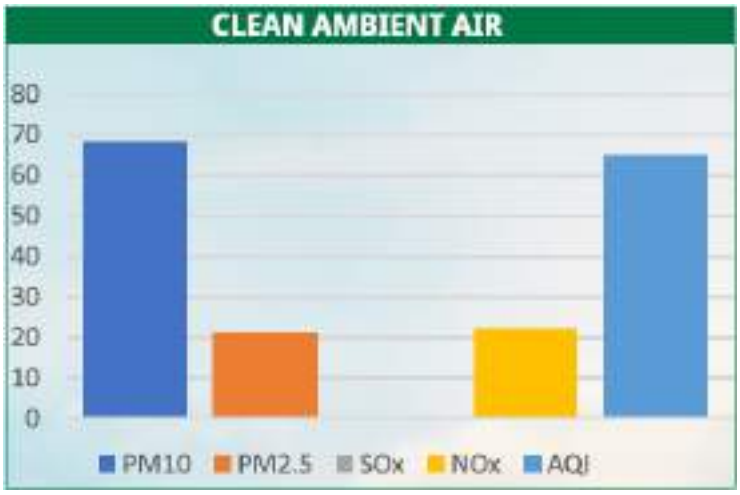
emissions from ships, etc. Mumbai Port has always taken a holistic view of the entire process and adopted the best possible solution of the time. Mumbai Port is in the process of exploring the possible options to transfer cargo from rail to ships and vice versa to reduce GHG emissions from cargo traffic. A few important initiatives and current scenario of sustainability are briefly enumerated below.

### 5.8.1 Strategic Sustainability Initiative

With the passage of time, size of city and cargo transport needs of its hinterland have grown. To reduce pressure on the city traffic, minimize pollution due to transportation of goods through city and maintain harmony with nature, Mumbai Port decided to reorganize its operations and carved its business to create a separate port infrastructure away from city and across the harbour to handle containerized cargo, which became a separate legal entity in 1989.

Currently Mumbai Port handles liquid bulk, project cargo (breakbulk), LPG, automobiles, steel, food grains, etc. at berths and dry bulks at anchorages in a sustainable and environment friendly manner, leading to a healthy environmental quality in and around port bringing succour to the citizens.

Owing to clean operations and its effective monitoring, the Air Quality Index (AQI) of the port area remains fairly good throughout the year.




### 5.8.2 Shore Power

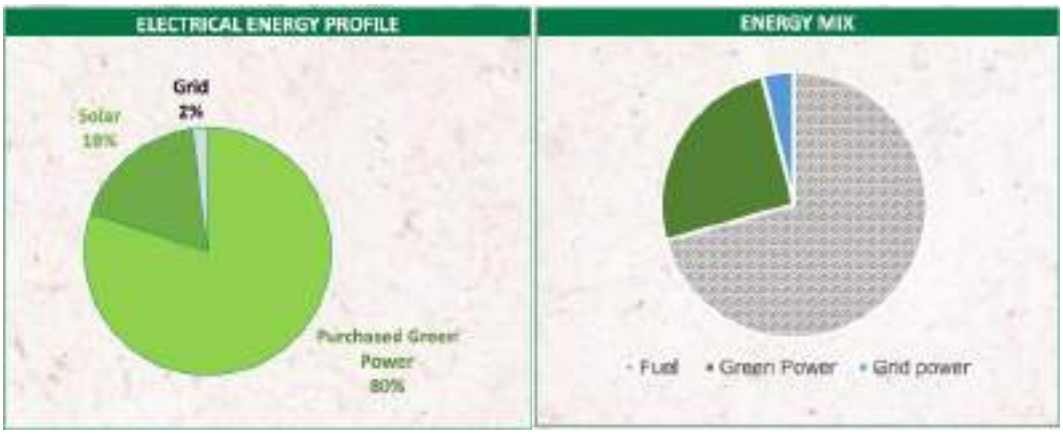
Although air quality parameters are well within the desired limits, Mumbai Port has decided to provide clean alternative power (shore power) to ships at berths, enabling ships to switch off their auxiliary engines and cut down fossil fuel led emissions. This move will further improve air quality of the Port and the city. Shore power provisioning has been phased in following manner:

- **Phase-I:** Shore power to port crafts has been implemented.
- **Phase-II:** Providing shore power to cruise vessels is under implementation pipeline with investment of Rs. 150 crores to feed 270 mega units per day to cruise vessels.
- **Phase-III:** Between 2028-2030 all tanker handling berths shall be provided with shore power eliminating use of fossil fuels at berth.

### 5.8.3 Sustainable Energy

Total operational power requirement of Mumbai port is around 4.8 lakh KWH per month, of which 1.8 lakh KWH is generated through 1.4 MW rooftop, solar PV. Balance power is purchased from the power distribution company as Green/RE power.

Mumbai Port is targeting to become surplus renewable power producer and 100% self-produced renewable power user by converting all usable rooftop spaces into solar energy surfaces.




### 5.8.4 Carbon Neutrality

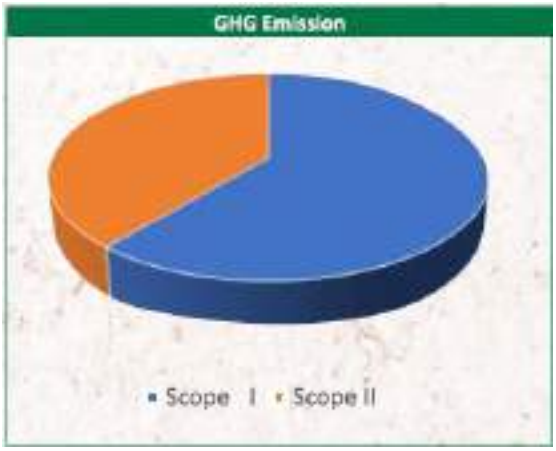
Mumbai Port has become first major port to quantify its carbon footprint and identify significant carbon contributors and aims to become carbon neutral by 2040. Following initiatives have been taken to attain carbon neutrality, after identifying Scope-I and Scope -II GHG emissions:

- Replacement of conventional tugs by Green Tugs in a phased manner starting from 2027 to 2040.
- Replacement of Diesel-powered Pilot/Mooring launches by Zero emission/Green launches.

SCOPE-I DISTRIBUTION

- Replacement of conventional high-power lights with Smart LED lighting and energy efficient pumps leading to 70% savings in energy consumption.
- Channelizing the electrification of third-party cargo-handling equipment.

- Green Fuel production, handling, storage, bunkering to 'facilitate conversion of entire ecosystem to zero emission.
- Attaining self-sufficiency in running the entire port ecosystem on RE-Power.
- Shore power to curb emissions from ships at berths.





### 5.8.5 Carbon Sequestration

Utilizing scientific knowledge about carbon sequestration potential of Bamboo, Mumbai Port Authority started bamboo plantation drive with a target to cover all available and suitable spaces with Bamboo. The corporate entities operating in Mumbai are encouraged to support the drive and initial target of planting more than 1 lakh saplings on 132 identified plots through CSR. Bamboo plantation shall also generate employment and economic opportunities for local inhabitants.

### 5.8.6 Ecology and Biodiversity

Mumbai Port has been able to sustainably coexist and nurture ecologically sensitive habitations of pink flamingos, mangroves, mudflats etc.

### 5.8.7 Eco-Park

To give impetus to the conservation efforts and educate general public about ecological importance of these habitats, an Eco-park is proposed to be created utilizing about 10 acre of existing sparse mangrove area within operational boundary of the port.

Initial studies for development and conservation plan have been completed and resource allocation is under process, to make the park unique in having aspects of conservation, nature tourism and mangrove related education and research as its integral components.

### 5.8.8 Circularity

Mumbai port Authority relies on Zero Waste Policy and believes that right material at wrong place

becomes waste hence the material in excess or likely to become waste is shifted/transferred to the place where it can be used either directly or converted into its alternatives (recycling).

Commonly encountered materials such as wood, paper, plastics, rubber, oily bilge, oil sludge, slops, paint drums, paint chips, cans, cardboard, unusable electronic and electrical appliances, used batteries, compostable materials, sewage, materials generated during civil construction and demolition activities, are properly collected and recycled. During 2023-24 about 10000 tons of such material and 10000 KL of oil residues has been recycled.

Tunnel Muck (sediment generated during tunnelling) generated from Mumbai Coastal Undersea Tunnel project and Ahmedabad-Mumbai Bullet Train project is being utilized for essential reclamation in Mumbai Port areas, thereby preserving the equivalent edaphic ecosystem from additional damages and eliminating carbon emission for transport of muck to distant places for disposal.

### 5.8.9 Dredging

To accommodate growing ship size and maintain safe navigational depth, frequent dredging and clearance of the silt is an intrinsic port activity. Maintenance dredging is kept to its minimum by scientific estimation of the depth requirements and ensuring only as much dredging that is needed for safe navigation. Sustainable use of the dredged material is an overall ecosystem conservation approach. To explore possibility of such utilization a pilot research

project has been under process in association with the department of Civil Engineering, IIT Bombay.

### 5.8.10 Diversity, Equality and Inclusion(DEI)

Mumbai Port Authority has always been on the forefront for providing conducive working atmosphere for individuals of different races, ethnicities, religions, abilities, genders, poiitical perspectives and backgrounds. It provides a work environment that respects and values diverse voices and perspectives of different individuals in developing business landscape.

Two employees, representing the lowest hierarchy, are included in the highest management i.e. Mumbai Port Authority Board, ensuring equitable participation by every stakeholder.

The employees constitute 16% of women, 2% of divyangjan, 49% from lesser developed communities,

For harmonious industrial relations, employee unions have been provided with adequate voice and wage negotiations are done in a democratic process every 5 years for staff and 10 years for officers. Men and women employees have equal promotion rights, irrespective of the type of post.

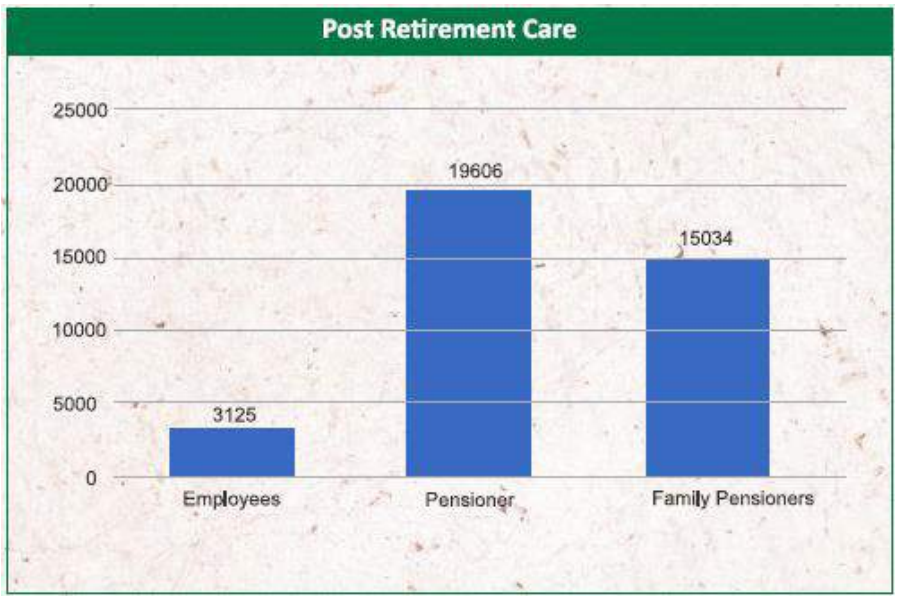
Grievance redressal mechanisms have representations from all groups of employees or user groups.

Berth allotment process is most equitable and transparent and quite unique to Mumbai Port.

Mumbai Port Authority guarantees social security for its employees and their dependents during the service by providing free comprehensive medical coverage, gratuity, provident fund and other post-retirement benefits including pension to all its employees.

Pension scheme covers retired employees for whole of his/her life followed by family pension after the death-of the pensioner to his/her dependents including spouse, dependent girl child and dependent divyang child for whole of her/his life.

Employees and their dependents get full medical benefits even after retirement.




### 5.8.11 Community Outreach

Society has been one of the key stakeholders of the Mumbai Port since beginning, however because of operational reasons those who are not directly connected with the port do not get an opportunity to know more about the activities of the Port; shipping and other logistics operations happening inside port boundary. The Mumbai Port has started a programme 'Outside Community Inside' facilitating citizens in familiarization to the Mumbai port activities. The 'Outside Community lnside' will be observed from 26"' November to December every year, facilitating community and port interaction.

### 5.8.12 Centre of Excellence on Environmental, Social & Governance (ESG) and Circularity

To give impetus to sustainable initiatives and drive a change, Mumbai Port Authority, on its 150th anniversary, created a "Centre of Excellence on Environment, Social and Governance (ESG) and Circularity". The centre shall help maritime organizations in improving their ESG, climatic resilience, adaptation, and circularity performance. The centre has been functioning under Mumbai Port -Sustainability Foundation, a Not for Profit entity incorporated under Section 8 of the Companies Act to channelize more concentrated efforts in making a positive change to the ecosystem functioning.

### 5.8.13 Water Conservation

Mumbai Port receive treated water from Brihanmumbai Municipal Corporation (BMC) and distribute for human consumption in households, colonies and offices apart from supplying to ships for on-board human consumptions. The waste water from such supplies pass through

drainage/sewerage network maintained by the BMC except for the Port's Colony at Colaba, where the waste water is treated by Mumbai Port itself through a separate 250 KL per day sewage treatment plant. The treated waste water is reused in maintenance of Sagar Upwan, a botanical garden owned and maintained by the Mumbai Port.

## 5.9 Port Digitalization

Mumbai Port Authority (MbPA), one of India's largest and most historic ports, is currently undergoing a transformative journey to modernize and digitalize its operations. In alignment with the Maritime India Vision 2030 (MIV 2030), MbPA's digitization initiatives are designed to enhance operational efficiency, optimize resource management, improve safety and security, and foster sustainable practices. This Chapter provides a detailed overview of the key digitization projects and strategic initiatives being undertaken by MbPA, along with future plans and technological advancements aimed at creating a more connected, efficient, and sustainable port ecosystem.

### 5.9.1 Overview of Current Digitization Projects

#### *5.9.1.1 SAP – EBS Implementation*

The SAP Enterprise Business Suite (EBS) is being fully implemented to replace older applications that were developed internally. This comprehensive software solution aims to integrate various business functions across the port's operations, streamlining processes and eliminating redundancy. Key modules under this implementation include:

- Financial Accounting and Controlling (FICO)
- Human Capital Management (HCM)
- Customer Relationship Management (CRM)
- Materials Management (MM)
- Supplier Relationship Management (SRM)

These modules will enable a seamless flow of information and improve decision-making processes. The full go-live for the SAP EBS implementation is scheduled for Q3 2024, aligning with the broader goals of MIV 2030.

#### 5.9.1.2 iPortman – Port Operations Software

iPortman is a sophisticated port operations software being developed to handle marine cargo traffic and railway operations. This system will play a crucial role in generating port revenue by optimizing the movement of goods and improving the efficiency of logistics. The iPortman

software is expected to be fully operational by Q2 2024 and is a significant component of the MIV 2030 strategy.

#### *5.9.1.3 Augmentation of Vessel Traffic Management System (VTMS)*

The augmentation of the existing VTMS, known as Sagar-Drishti, involves enhancing navigational assistance, traffic regulation, and sequencing. This upgraded system will improve the safety and efficiency of vessel movements within port limits. The enhanced VTMS is targeted for implementation by Q2 2024, with the aim of reducing waiting times and minimizing the risk of accidents.

#### *5.9.1.4 GIS-Based Estate Operations Management System (EOMS)*

A Geographic Information System (GIS)-based Estate Operations Management System is being implemented to provide comprehensive oversight of estate management activities. This includes:

- **Billing and Permits Management**: Streamlining the process for issuing permits and managing billing for over 3,000 tenants.
- **Inspection and Legal Case Handling**: Improving transparency and ease of access to lease records, facilitating faster resolution of disputes and legal cases.

The EOMS is expected to be fully operational by Q3 2024, offering improved access to data and efficient management of estate operations.

### 5.9.2 Key Strategic Ongoing Projects

#### *5.9.2.1 Implementation of Helpdesk and Active Directory*

A new Helpdesk system is being implemented to maintain the IT infrastructure across Mumbai Port. This user-friendly platform will provide 24/7 support, monitor service level agreements (SLAs), and ensure quick resolution of issues. Additionally, the integration of an Active Directory will enhance the monitoring and management of end-user computing devices. The project is set for completion by Q3 2024.

#### *5.9.2.2 IT Audits – ISO and Cyber Security Compliance*

Continuous IT audits, focusing on ISO standards and cybersecurity, are conducted to identify potential vulnerabilities and ensure compliance with global security standards. These audits help bridge gaps and protect the port’s digital assets from cyber threats. This is an ongoing initiative, reflecting MbPA's commitment to maintaining a robust cybersecurity framework.

#### *5.9.2.3 Upgradation of E-Office Platform*

The e-Office platform, a digital document and workflow management system, is being upgraded to version 7.0. This upgrade will migrate the platform to the cloud, enabling faster and more secure access to documents and 24/7 support. The upgrade is expected to be completed by Q3 2024, further enhancing the port's operational efficiency.

#### *5.9.2.4 Sagar Setu – Digital Dashboard and MIS Reporting*

The Sagar Setu platform will integrate various port and maritime stakeholders, providing a unified dashboard and management information system (MIS) for real-time reporting. This initiative aims to streamline decision-making processes and improve operational visibility, with a target completion date of Q3 2024.

### 5.9.3 Advanced Strategic Projects

#### *5.9.3.1 AI-Based Chatbot Platform*

An Artificial Intelligence-based chatbot platform will be introduced on the Mumbai Port website to handle queries from both employees and customers. The chatbot will cover a range of topics, including payments, estate management, legal matters, and HR policies. By delivering prompt responses and analyzing customer sentiments, the chatbot will significantly enhance the user experience. This platform is planned for deployment in Q2 2024.

#### *5.9.3.2 Smart Fuel Management for Tugboats*

A smart fuel management system will be implemented using IoT-based sensors on tugboats to monitor operations and optimize fuel consumption. This system will also help control emissions, aligning with environmental sustainability goals. The project is scheduled for completion by Q4 2024.

#### *5.9.3.3 Capex Projects Monitoring and Progress Management*

To manage capital expenditure effectively, MbPA has implemented SAP modules such as Project Systems (PS) and Plant Maintenance (PM). These modules are supported by customized dashboards that provide real-time updates and analytics for executive-level decision-making.

#### *5.9.3.4 EHS (Environment, Health, and Safety) Application Deployment*

The deployment of an EHS application is planned for Q2 2025. This cloud-based application will manage and track risk assessments, safety training, compliance, emergency response, hazardous materials management, and air and water quality monitoring. The initiative aims to ensure regulatory compliance and promote sustainable practices within the port environment.

### 5.9.4 Future IT Initiatives (Next 5 Years)

Mumbai Port Authority has outlined several IT initiatives for the next five years, categorized into three strategic areas under MIV 2030:

**Category 1: Driving Logistic Efficiency**

- **Real-Time Underwater Keel Clearance Tools:** To enhance the safety and efficiency of vessel movements by providing accurate under-keel clearance data based on environmental conditions.
- **Online Dredging Monitoring System:** Leveraging 5G technology to enable real-time transmission of dredging data for performance optimization.

**Category 2: Must-Have Solutions**

- **Remote Sensing for Cargo Operations:** Utilizing electronic eye technology to monitor and manage ship-to-shore and shore-to-ship cargo loading and unloading.
- **Next-Generation Vessel Traffic Management System (VTMS):** Enhancing communication within port limits using advanced 5G connectivity.

**Category 3: World-Class Solutions**

- **AI/ML-Based Cybersecurity Systems:** Implementing advanced AI and machine learning-based cybersecurity measures to detect and mitigate cyber threats.
- **VR/AR-Based Training for Workforce Development:** Developing virtual and augmented reality training programs to build a smart, tech-savvy workforce.

### 5.9.5 Technological Promises and Applications

#### *5.9.5.1 IoT and Sensor Integration*

Mumbai Port Authority is embracing IoT and sensor integration across its infrastructure to enable real-time monitoring of various parameters such as equipment status, cargo conditions, and environmental factors. This data will support predictive maintenance strategies, optimize workflows, and enhance safety protocols.

#### *5.9.5.2 Data Analytics and Artificial Intelligence*

The port leverages AI-driven analytics to derive actionable insights from large volumes of data generated by port operations. Predictive analytics helps in forecasting demand, optimizing routes, and managing inventory, ultimately improving decision-making and operational efficiency.

#### *5.9.5.3 Green Technologies*

MbPA is committed to sustainable practices, including the electrification of equipment, the use of renewable energy sources, and the implementation of pollution monitoring and waste management systems. These green technologies help reduce the port's environmental footprint and promote a sustainable operational model.

#### *5.9.5.4 Digital Twins and Simulation*

Digital twins—virtual replicas of physical port systems—are being developed to simulate and test various operational scenarios without disrupting actual processes. This approach allows for data-driven decision-making and continuous optimization of port operations.

Mumbai Port Authority's digitization initiatives are geared towards creating a technologically advanced, efficient, and sustainable port ecosystem. By investing in modern IT infrastructure, embracing innovative technologies, and fostering a culture of continuous improvement, MbPA is well-positioned to enhance its global competitiveness and operational resilience. These efforts align with the broader goals of the Maritime India Vision 2030, paving the way for a future-ready port that meets the demands of a rapidly evolving maritime sector.

### 5.9.6 Future Outlook

While the potential benefits of these technological advancements are substantial, their success depends on responsible implementation, addressing challenges such as data privacy, cybersecurity, and the digital divide. A focus on ethical use and comprehensive training for the workforce will be essential to maximize the positive impact of these digital transformations on the port and its stakeholders. Ultimately, the promise of technology at MbPA lies in its potential to improve operational efficiency, enhance safety and security, and contribute to a more sustainable and resilient global supply chain.

## 5.10 Supervisory Control and Data Acquisition (SCADA) & Automation of Marine Oil Terminals

Mumbai Port Authority (MbPA), a key player in India's maritime industry, has implemented a Supervisory Control and Data Acquisition (SCADA) system at its Marine Oil Terminals (MOT) at Jawahar Dweep (JD) and PirPau. This initiative is part of the Maritime India Vision 2030, aiming to incorporate world-class port technology solutions to enhance safety, efficiency, and compliance with industry standards, particularly those outlined by the Oil Industry Safety Directorate (OISD).

The SCADA and automation project at Mumbai Port's Marine Oil Terminals is a direct response to recommendations made by the OISD Safety Audit. The goal is to automate and monitor pipeline operations, reducing risks associated with manual control and ensuring safe and efficient terminal operations. This aligns with India's broader vision to modernize its ports and enhance their global competitiveness.

### 5.10.1 Project Overview

#### *5.10.1.1 Scope of Work*

The SCADA and automation system at Mumbai Port encompasses several critical components:

- **SCADA-Based PLC Control System:** The core of the project is the SCADA-based Programmable Logic Controller (PLC) system, which will automate control and monitoring of operations.

**Figure 5.28 PLC System Panel at Marine Oil Terminal, Jawahar Dweep**

- **Instrumentation and Integration:** This involves installing and integrating oil pipeline valves, fire and gas detection systems, process camera CCTV networks, public announcement systems, and other essential components.

**Figure 5.29 CCTV & Public Announcement System at Jetties (on the left), Jetty Manifold Pipelines, Valves and Marine Loading Arms (on the right)**

- **Upgradation of Existing Systems:** Existing valves are being upgraded and automated. This includes providing new oil flow meters, pressure and temperature transmitters, level transmitters, and retrofitting existing systems with gearboxes and actuators.

**Figure 5.30 Pressure Transmitters / Temperature Transmitters on Oil Pipelines**

- **Control Rooms:** Two SCADA control rooms have been established. The control room at PirPau and the Master Control Room at MOT-Jawahar Dweep will manage operations across the terminals.

**Figure 5.31 Master Control Room of SCADA at Marine Oil Terminal, Jawahar Dweep**

### *5.10.1.2 Major Equipment and Systems*

The project includes the installation and integration of various advanced systems and equipment:

- **Motor Operated Valves (MOVs):** A total of 73 new MOVs have been installed, 91 existing valves retrofitted with gearboxes and actuators, and 71 existing MOVs integrated with the SCADA and PLC systems.
- **Control Systems:** Two control rooms equipped with PLC systems for SCADA, two fire alarm control panels, and two repeater panels.

- **Detection and Surveillance Systems:** 31 gas detectors, 5 gas control panels, 18 CCTV cameras, 14 network panels, and 3 uninterruptible power supplies (UPS) have been installed to ensure continuous monitoring and safety.

**Table 5.7 Salient Features of SCADA Project**

| Features | Details |
|---|---|
| Name of the Project | Installing and Commissioning of SCADA and Automation System at Marine Oil Terminals at Jawahar Dweep (JD) and PirPau, MbPA. |
| Awarded Cost | Rs.25.84 Crore |
| Actual Cost | Rs.27.1 Crore |
| Sagarmala funding | Rs.22.57 Crore ( 83% of Actual cost) |

#### *5.10.1.3 Benefits of the Project*

The SCADA and automation system offers several advantages, enhancing both operational and economic aspects of the Marine Oil Terminals:

- **Compliance and Safety:** By automating operations and integrating advanced detection systems, the project fulfills OISD's safety recommendations, reducing the likelihood of accidents and enhancing overall safety.
- **Efficiency and Reliability:** Automated control reduces the need for manual intervention, increases operational efficiency, and minimizes the turnaround time for vessels. This is particularly important during inclement weather conditions, ensuring year-round operability.
- **Economic Impact:** The enhanced efficiency leads to reduced operational costs and improved turnaround times, benefiting key stakeholders like BPCL, HPCL, ONGC, IOCL, Tata Power, and Aegis Logistics.
- **Centralized Monitoring and Control:** The centralized control rooms allow for comprehensive monitoring from a single location, enabling quicker response times and more efficient management of the terminals.
- **Ease of Operation:** The system reduces reliance on manual labor, simplifies record-keeping of operational logs, and facilitates the generation of reports, contributing to more streamlined operations.

The implementation of the SCADA and automation system at Mumbai Port's Marine Oil Terminals is a transformative project that enhances safety, efficiency, and operational reliability. By leveraging cutting-edge technology, the Mumbai Port Authority aligns with

global standards, reinforcing its position as a critical hub in India's maritime sector and contributing to the nation's economic growth. The project's success sets a precedent for the modernization of other ports across India, showcasing the benefits of integrating advanced technological solutions in the maritime industry.

# 6 KEY PERFORMANCE INDICATORS (KPI)

Key Performance Indicators (KPIs) are crucial metrics used to assess the performance of organizations. For Mumbai Port, KPIs are particularly significant as they provide insights into the port's operational efficiency, cargo handling capacity, turnaround times, revenue generation, and environmental impact. This chapter provides a comprehensive overview of the KPIs for Mumbai Port, analysing their current status, future targets, and strategic importance.

## 6.1 Cargo Traffic

Cargo traffic is a fundamental measure of port activity. It represents the volume of goods handled and is a direct indicator of the port's capacity and efficiency. Increasing cargo traffic is crucial for maintaining the port’s competitive edge and financial health.

**Table 6.1 Cargo Traffic Performance and Targets**

| Year | Cargo Traffic (MMT) | Cargo Traffic (MMT) |
|---|---|---|
| 2022-23 | 63.61 | - |
| 2023-24 | 67.26 | 5.74 |
| 2024-25 | 70.00 | 4.07 |
| 2025-26 | 71.50 | 2.14 |
| 2026-27 | 73.00 | 2.10 |
| 2027-28 | 74.00 | 1.37 |
| 2028-29 | 75.00 | 1.35 |

Inference: The port has shown a steady increase in cargo traffic from 63.61 MMT in 2022-23 to a projected 75 MMT by 2028-29. The gradual increase reflects an expected enhancement in operational efficiency and capacity expansion initiatives.

## 6.2 Turnaround Time

Turnaround time is a critical metric that measures the time taken for a vessel from its arrival to departure. It encompasses the duration taken for cargo handling and administrative procedures. Reducing turnaround time enhances port efficiency, reduces congestion, and increases throughput.

**Table 6.2 Turnaround Time Performance and Targets**

| Year | Average Turnaround Time (Hours) | Improvement (Hours) |
|---|---|---|
| 2022-23 | 67.42 | - |
| 2023-24 | 63.00 | 4.42 |
| 2024-25 | 62.00 | 1.00 |
| 2025-26 | 61.00 | 1.00 |
| 2026-27 | 60.00 | 1.00 |
| 2027-28 | 59.00 | 1.00 |
| 2028-29 | 58.00 | 1.00 |

Inference: The port aims to reduce the average turnaround time from 67.42 hours in 2022-23 to 58 hours by 2028-29. Continuous improvements in operational procedures, automation, and port management strategies are crucial to achieving these reductions.

## 6.3 Ship Berth Day Output (SBDO)

Ship Berth Day Output (SBDO) measures the average amount of cargo handled per ship per day while docked at the port. Higher SBDO indicates better utilization of port resources and greater efficiency in cargo handling operations.

**Table 6.3 SBDO Performance and Targets**

| Year | SBDO (Tonnes/Day) | Improvement (%) |
|---|---|---|
| 2022-23 | 10,035 | - |
| 2023-24 | 11,152 | 11.14 |
| 2024-25 | 11,500 | 3.12 |
| 2025-26 | 11,750 | 2.17 |
| 2026-27 | 12,000 | 2.13 |
| 2027-28 | 12,250 | 2.08 |
| 2028-29 | 12,500 | 2.04 |

Inference: SBDO is projected to increase from 10,035 tonnes per day in 2022-23 to 12,500 tonnes per day by 2028-29. This improvement reflects investments in better cargo handling equipment and optimized labour practices.

## 6.4 Idle Time at Berth

Idle time at berth measures the percentage of time a berth is not in use between two consecutive vessel operations. Reducing idle time enhances berth utilization, increases throughput, and improves overall port efficiency.

**Table 6.4 Idle Time Performance and Targets**

| Year | Idle Time at Berth (%) | Reduction (%) |
|---|---|---|
| 2022-23 | 36.69 | - |
| 2023-24 | 29.17 | 7.52 |
| 2024-25 | 28.00 | 1.17 |
| 2025-26 | 27.00 | 1.00 |
| 2026-27 | 26.00 | 1.00 |
| 2027-28 | 25.00 | 1.00 |
| 2028-29 | 24.00 | 1.00 |

Inference: Idle time is expected to decrease from 36.69% in 2022-23 to 24% by 2028-29. This reduction is aimed at increasing berth occupancy rates through improved scheduling and quicker vessel turnaround.

## 6.5 Cruise Passenger Traffic

Cruise passenger traffic measures the number of passengers handled at the port's cruise terminal. This KPI highlights the port's role in promoting tourism and enhancing passenger services.

**Table 6.5 Cruise Passenger Traffic Performance and Targets**

| Year | Cruise Passengers | Growth (%) |
|---|---|---|
| 2022-23 | 283,894 | - |
| 2023-24 | 430,010 | 51.48 |
| 2024-25 | 528,298 | 22.85 |
| 2025-26 | 669,587 | 26.73 |
| 2026-27 | 817,019 | 22.04 |
| 2027-28 | 958,308 | 17.28 |
| 2028-29 | 1,017,114 | 6.13 |

Inference: The port aims to increase cruise passenger traffic from 283,894 in 2022-23 to over 1 million by 2028-29. This growth is supported by the development of cruise facilities and marketing efforts to position Mumbai as a leading cruise destination.

## 6.6 Annual Operating Revenue

Annual operating revenue measures the total income generated from port operations, including cargo handling, berth occupancy, and passenger services. It is a key financial metric indicating the port's profitability and financial health.

**Table 6.6 Annual Operating Revenue Performance and Targets**

| Year | Revenue (INR Crores) | Growth (%) |
|---|---|---|
| 2022-23 | 2,219 | - |
| 2023-24 | 2,300 | 3.65 |
| 2024-25 | 2,370 | 3.04 |
| 2025-26 | 2,440 | 2.95 |
| 2026-27 | 2,510 | 2.87 |
| 2027-28 | 2,580 | 2.79 |
| 2028-29 | 2,650 | 2.71 |

Inference: The port's annual operating revenue is projected to grow from INR 2,219 crores in 2022-23 to INR 2,650 crores by 2028-29. This growth reflects the port’s expansion efforts, increased cargo traffic, and improved service offerings.

## 6.7 Operating Ratio

The operating ratio measures operating expenses as a percentage of total revenue. It is a key indicator of cost efficiency and financial management. A lower operating ratio indicates higher profitability.

**Table 6.7 Operating Ratio Performance and Targets**

| Year | Operating Ratio (%) | Improvement (%) |
|---|---|---|
| 2022-23 | 45.33 | - |
| 2023-24 | 44.00 | 1.33 |
| 2024-25 | 43.00 | 1.00 |
| 2025-26 | 42.00 | 1.00 |
| 2026-27 | 41.00 | 1.00 |
| 2027-28 | 40.00 | 1.00 |
| 2028-29 | 39.00 | 1.00 |

Inference: The operating ratio is expected to decrease from 45.33% in 2022-23 to 39% by 2028-29. Improved cost management and operational efficiency are essential to achieving these.

# 7 DISASTER MANAGEMENT PLAN 2019 (Revised-2024)

## 7.1 Introduction

The Mumbai Port Authority Disaster Management Plan (DMP) is a detailed blueprint aimed at ensuring preparedness, risk mitigation, effective response, and swift recovery from potential disasters at the Mumbai Port. As per the Disaster Management Act 2005 and the National Policy on Disaster Management 2009, this plan aligns with global best practices, national guidelines, and focuses on safeguarding human lives, property, and the environment. The plan is structured around the four phases of disaster management: mitigation, preparedness, response, and recovery, ensuring a holistic approach to managing disasters.

## 7.2 Profile of Mumbai Port

Mumbai Port, located on the west coast of India, serves as a major hub for maritime trade. Spread over 400 square kilometers, it is protected by the mainland of Konkan on its east and the island of Mumbai on its west. The port handles various types of cargo, including petroleum, chemicals, dry bulk, and break-bulk cargo, and operates several terminals and berths. With its own railway network and a fleet of diesel locomotives, Mumbai Port is strategically important for India's trade and economic activities. The port is managed by the Mumbai Port Authority (MbPA), an autonomous entity under the Ministry of Ports, Shipping, and Waterways, Government of India.

## 7.3 Objectives of the Disaster Management Plan

The key objectives of the DMP are:

- **Preparedness:** Develop robust protocols and training programs for anticipating and managing potential disasters effectively.
- **Risk Mitigation:** Integrate disaster risk reduction (DRR) measures into all development projects and operations.
- **Effective Response:** Ensure rapid mobilization and coordination among various agencies and departments during emergencies.
- **Recovery and Reconstruction:** Develop comprehensive strategies for rehabilitation and reconstruction following a disaster.

## 7.4 Key Components of the Plan

### 7.4.1 Risk Assessment and Vulnerability Analysis

The plan identifies several potential hazards, including:

- **Natural Disasters:** Cyclones, floods, earthquakes, and tsunamis.
- **Marine Accidents:** Vessel collisions, groundings, and oil spills.
- **Human-Induced Threats:** Fires, explosions, terrorism, and civil disturbances.
- **Technical Failures:** Power outages, communication breakdowns, and transport accidents.

Each hazard is evaluated based on its probability, potential impact on property and people, and the time required to restore facilities. The vulnerability assessment considers the port's infrastructure, operations, and its proximity to densely populated urban areas.

### 7.4.2 Mitigation Measures

The plan emphasizes a multi-pronged approach to mitigate risks, including:

- **Structural Measures:** Construction of cyclone shelters, maintenance of drainage systems, retrofitting critical infrastructure, and installing oil spill response equipment.
- **Non-Structural Measures:** Developing risk transfer mechanisms (e.g., insurance), promoting public awareness and preparedness, and integrating indigenous knowledge and practices into disaster management strategies.
- **Environmental Sustainability:** Adopting green practices such as afforestation, maintaining natural water bodies, and complying with environmental laws to minimize the impact of climate change.

## 7.5 Preparedness and Response Planning

### 7.5.1 Crisis Management Group (CMG) and Incident Response Teams (IRTs)

The Crisis Management Group (CMG), chaired by the Chairman of MbPA, coordinates all disaster management efforts. The CMG includes senior officials from various departments (e.g., Traffic, Marine, Fire, and Security) and is responsible for policy formulation, planning, and decision-making in emergencies. Incident Response Teams (IRTs) are established to manage site-specific responses, comprising personnel from different port departments and external agencies like CISF, Coast Guard, and local fire services.

### 7.5.2 Emergency Response Protocols

The DMP outlines standard operating procedures (SOPs) for different emergencies, including:

- **Fire and Explosion Response:** Immediate activation of fire services, coordination with the Crisis Management Group, and evacuation of affected areas.

- **Marine Accident Response:** Deployment of oil spill containment equipment, coordination with the Coast Guard, and ensuring the safety of all personnel.
- **Terrorism and Security Threats:** Collaboration with CISF and local law enforcement, securing port perimeters, and evacuation if necessary.

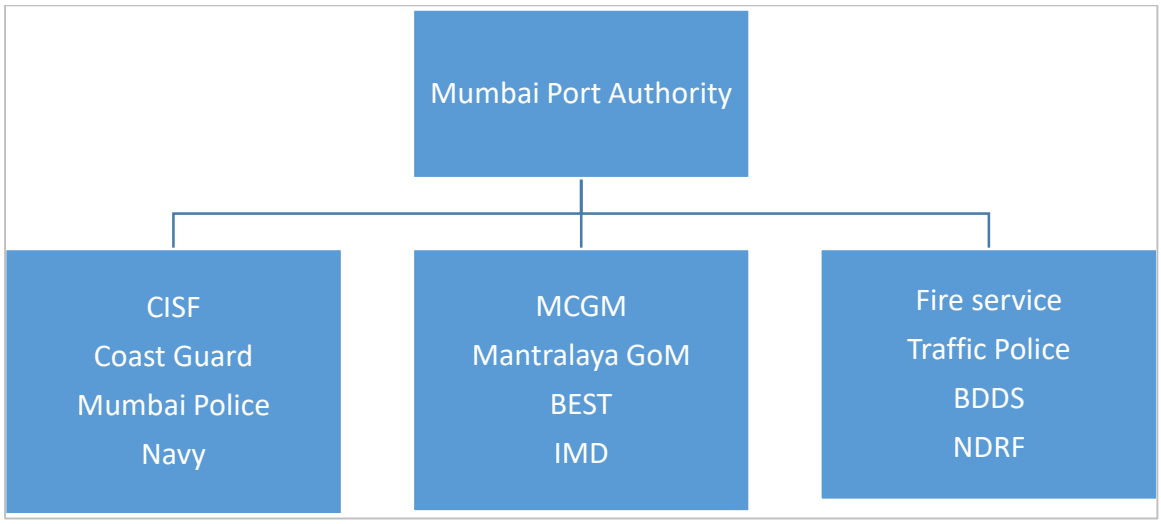
### 7.5.3 Communication and Coordination Framework

Effective communication is crucial for disaster response. The DMP includes:

- **Alert Mechanisms:** Use of VHF radios, satellite phones, public address systems, and digital platforms to disseminate warnings and updates.
- **Inter-Agency Coordination:** Collaboration with the State Disaster Management Authority (SDMA), National Disaster Management Authority (NDMA), and other relevant agencies for a unified response.

## 7.6 Institutional Framework and Responsibilities

- **Mumbai Port Authority (MbPA):** The MbPA is responsible for maintaining its own disaster plan as per the Ministry of Shipping guidelines. It provides assistance to local, state, and national authorities as needed.
- **Coordination with External Agencies:** The port's DMP is aligned with the National Disaster Management Plan (NDMP) and includes coordination with the **Crisis Management Group (CMG)**, **District Disaster Management Authority (DDMA)**, and other entities to ensure a coherent response.
- **National and State Level Frameworks:** The plan aligns with national frameworks, ensuring effective coordination between central, state, and local levels.



## 7.7 Hazard-Specific Prevention and Mitigation Measures

The plan outlines detailed prevention and mitigation measures for various hazards:

- **Cyclone and Flood Management:** Construction of shelters, flood barriers, and embankments; evacuation plans; and dissemination of early warnings to the public.
- **Marine Accidents and Oil Spills:** Installation of oil containment equipment, training personnel in spill response, and regular drills with relevant agencies like the Coast Guard.
- **Fire and Explosion Control:** Regular inspection and maintenance of fire safety equipment, conducting mock drills, and ensuring compliance with safety regulations.
- **Security Threats:** Strengthening surveillance, securing access points, and coordination with law enforcement agencies.

## 7.8 Recovery and Reconstruction Strategies

The recovery phase involves:

- **Rapid Assessment:** Conducting quick damage assessments post-disaster to prioritize areas for immediate action.
- **Restoration of Services:** Ensuring the swift restoration of essential services such as water supply, electricity, and transportation.
- **Rehabilitation and Reconstruction:** Long-term strategies include rebuilding damaged infrastructure, providing support to affected communities, and implementing lessons learned to enhance future resilience.

## 7.9 Capacity Development

The plan focuses on continuous capacity development through:

- **Training Programs:** Regular training for port personnel on disaster response protocols and safety procedures.
- **Mock Drills and Exercises:** Conducting periodic drills to test response plans and improve coordination among various departments and agencies.
- **Public Awareness Campaigns:** Educating port users, local communities, and stakeholders about disaster preparedness and safety measures.

## 7.10 Monitoring, Evaluation, and Plan Management

- **Regular Review and Updates:** The DMP is a dynamic document, regularly reviewed and updated to incorporate new information, best practices, and lessons learned from past incidents.
- **Performance Indicators:** Key performance indicators (KPIs) such as response times, recovery duration, and the effectiveness of mitigation measures are monitored to assess the plan's success.

The Mumbai Port Authority's Disaster Management Plan is a comprehensive and proactive framework designed to manage various disaster scenarios, ensuring the safety of life, property, and the environment. The plan's focus on preparedness, mitigation, coordinated response, and recovery ensures that Mumbai Port remains resilient and continues to function efficiently, even in the face of potential disasters. By fostering a culture of safety, enhancing inter-agency collaboration, and leveraging technology, the DMP aims to minimize the impact of disasters and ensure the continuity of port operations.

Few recommendations for future enhancements include:

- **Adopt Advanced Technologies:** Leverage AI and big data analytics for predictive modeling and early warning systems.
- **Strengthen Community Involvement:** Engage local communities in disaster preparedness activities and incorporate local knowledge into planning.
- **Enhance Coordination Mechanisms:** Improve inter-agency communication channels and establish clear protocols for joint operations.
- **Continuous Capacity Building:** Expand training programs to include advanced skills and knowledge on emerging threats and global best practices in disaster management.

# 8 PROJECT IDENTIFICATION PHASING, COSTING, IMPLEMENTATION & MONITORING

## 8.1 Statement of Projects identified

Details of various projects including tentative costs and timeline are given in the following table:

**Table 8.1 Statement of Projects identified for Port Master Plan 2047**

| Sr. No. | Project Description | Department | Implementation Method/ Agency | Present Status | Start Date | Target Completion Date | Cost (₹ Cr.) |
|---|---|---|---|---|---|---|---|
| 1 | Third Chemical Berth | Civil | EPC /MbPA | Substantially completed | 25.02.2022 | 30.08.2024 | 213.46 |
| 2 | Marina at Cross Island | Civil | | | | October 2027 | 320.00 |
| 3 | New Fish Jetty (at Mallet Bunder) | Civil | MbPA | Work in progress | 2.11.2023 | 01.11.2025 | 121.41 |
| 4 | MICT | Civil | EPC /MbPA | Work in progress | 12.09.2017 | 31.12.2024 | 363.85 |
| 5 | SCADA | MEED | MbPA | Completed | 24.02.2023 | 31.07.2024 | 27.2 |
| 6 | Development of Trestle at JD and Pir Pau | Civil | EPC | Planning Stage | November 2024 | October 2028 | As per DPR |
| 7 | Second ROPAX Terminal | Civil | EPC | DPR Submitted | - | - | 84 |
| 8 | Additional Reclamation at JD for LNG | Civil | EPC | Study by CWPRS | April 2025 | December 2027 | 150 |
| 9 | Additional Land – HPCL Products | Civil | By HPCL | | October 2025 | April 2029 | 400 |
| 10 | Additional Land – COT Ancillary | Civil | By HPCL / BPCL | | October 2025 | April 2029 | 2500 |
| 11 | Additional Land – BPCL | Civil | By BPCL | | October 2025 | April 2029 | 400 |
| 12 | RCF Plot at Pirpau | Civil | By AEGIS | Work in progress | | 2025 | 100 |
| 13 | CTTL Triangular Plot | Civil | By AEGIS | Work in progress | | 2025 | 150 |
| 14 | Additional cruise terminals | Civil | | | | | 1862 |
| 15 | SAP – EBS Implementation | MEED | By TechM | Work in progress | | October 2024 | 79 |

| Sr. No. | Project Description | Department | Implementation Method/ Agency | Present Status | Start Date | Target Completion Date | Cost (₹ Cr.) |
|---|---|---|---|---|---|---|---|
| 16 | iPortman – Port Operations Software | MEED | By TechM | Work in progress | | October 2024 | |
| 17 | Augmentation of Vessel Traffic Management System (VTMS) | MEED | By Wartsilla | Completed | | August 2024 | 17 |
| 18 | GIS-Based Estate Operations Management System (EOMS) | MEED | By Cdac | Phase 1 Completed Phase 2 work in progress | | Mar-25 | 3 |
| 19 | IT Audits – ISO and Cyber Security Compliance | MEED | IIT Kanpur | Implementation of ISMS under ISO 27001:2013 (Re-certification for 27001:2022 under process) | | Completed | 1 |
| 20 | Upgradation of E-Office Platform | MEED | NICSI | eOffice Lite 6.4.2 (eFile) NIC Product implemented since April 2021. In November 2023 system migrated to RailTel Cloud Infra with DR and Manpower Support. Upgradation to eOffice version 7.x under process | | Completed | 3 |
| 21 | Sagar Setu – Digital Dashboard and MIS Reporting | MEED | | | | | 3 |
| 22 | AI-Based Chatbot Platform | MEED | By Graymetrics | Work in progress | | Nov-24 | 0.15 |
| 23 | Smart Fuel Management for Tugboats | MEED | Part of Sr.No.24-30 activities | | | | |
| 24 | EHS (Environment, Health, and | MEED | We have detailed discussions with Chennai IIT and they have given the proposal to Implement the same as per MIV 2023 | | | | 50 |

| Sr. No. | Project Description | Department | Implementation Method/ Agency | Present Status | Start Date | Target Completion Date | Cost (₹ Cr.) |
|---|---|---|---|---|---|---|---|
| | Safety) Application Deployment | | guidelines. First round of discussions happened and the second round of discussions planned in 2nd week of Oct 2024 | | | | |
| 25 | Real-Time Underwater Keel Clearance Tools | MEED | | | | | |
| 26 | Online Dredging Monitoring System | MEED | | | | | |
| 27 | Remote Sensing for Cargo Operations | MEED | | | | | |
| 28 | Next-Generation Vessel Traffic Management System (VTMS) | MEED | | | | | |
| 39 | AI/ML-Based Cybersecurity Systems | MEED | | | | | |
| 30 | VR/AR-Based Training for Workforce Development | MEED | | | | | |
| 31 | Shore Power | MEED | EPC | Presentation on DPR is made on 06.09.2024. | July 2025 | July 2027 | 150 |
| 32 | Augmentation of firefighting facilities at Pirpau | MEED/ Civil | MbPA | Work in progress | August 2023 | 11.01.2025 | 58.85 |
| Total Project Cost | | | | | | | 7057 |
| Total Project Cost (including GST) | | | | | | | 8327 |
| Approx. Total Project Cost | | | | | | | 8500 |

## 8.2 Comprehensive Environmental Clearance:

Once the Port Master Plan is approved, comprehensive environment clearance for all the above projects proposed under the Master Plan shall be obtained.

## 8.3 Economy Development & Employment

### 8.3.1 Economy

As per the present statistics, the revenue generation is Rs 29 crores per MMT. The total cargo is expected to increase up to 104 MMT by 2047. As per the present calculations, the total revenue generated is expected to Rs 3016 crores. The cruise development will add Rs. 29,000 Cr. to the economy.

### 8.3.2 Employment

The present direct employment of MbPA in the dock area is around 3000. Other direct and indirect employment would be 200%, i.e., 6000. Therefore, total existing employment is 9000 for cargo movement of 67 MMT. By 2047, the employment based on the port activity is expected to be around 12,000. As per the study report on future projections for cruise, it is expected to create 2 lakh employment opportunities.

# 9 CONCLUSION

The Comprehensive Master Plan for Mumbai Port Authority with a planning horizon of 2047 outlines an ambitious roadmap to transform Mumbai Port into a premier maritime hub that will serve as a critical gateway for India's global trade. The plan integrates the goals of enhancing port capacity, optimizing land use, and improving multimodal connectivity while adhering to the highest standards of environmental sustainability and technological advancement.

The Master Plan aligns with India's national maritime policies, including the Maritime India Vision 2030, PM Gati Shakti, and the Sagarmala Project, which collectively aim to strengthen India's maritime sector and elevate the country's global standing. By addressing key areas such as port modernization, expansion of infrastructure, green port initiatives, and digital transformation, the plan ensures that Mumbai Port will be equipped to handle future traffic demands, promote sustainable practices, and foster economic growth.

Key initiatives in the plan include the construction of new terminals and berths to accommodate increased cargo and passenger traffic, the development of cruise and yacht tourism facilities, and the enhancement of urban water transport and ship repair services. These projects are designed not only to improve operational efficiency but also to generate significant economic benefits for the region and the nation. Furthermore, the focus on sustainability through initiatives like carbon neutrality, renewable energy use, and biodiversity promotion reflects a commitment to minimizing environmental impact while supporting economic activities.

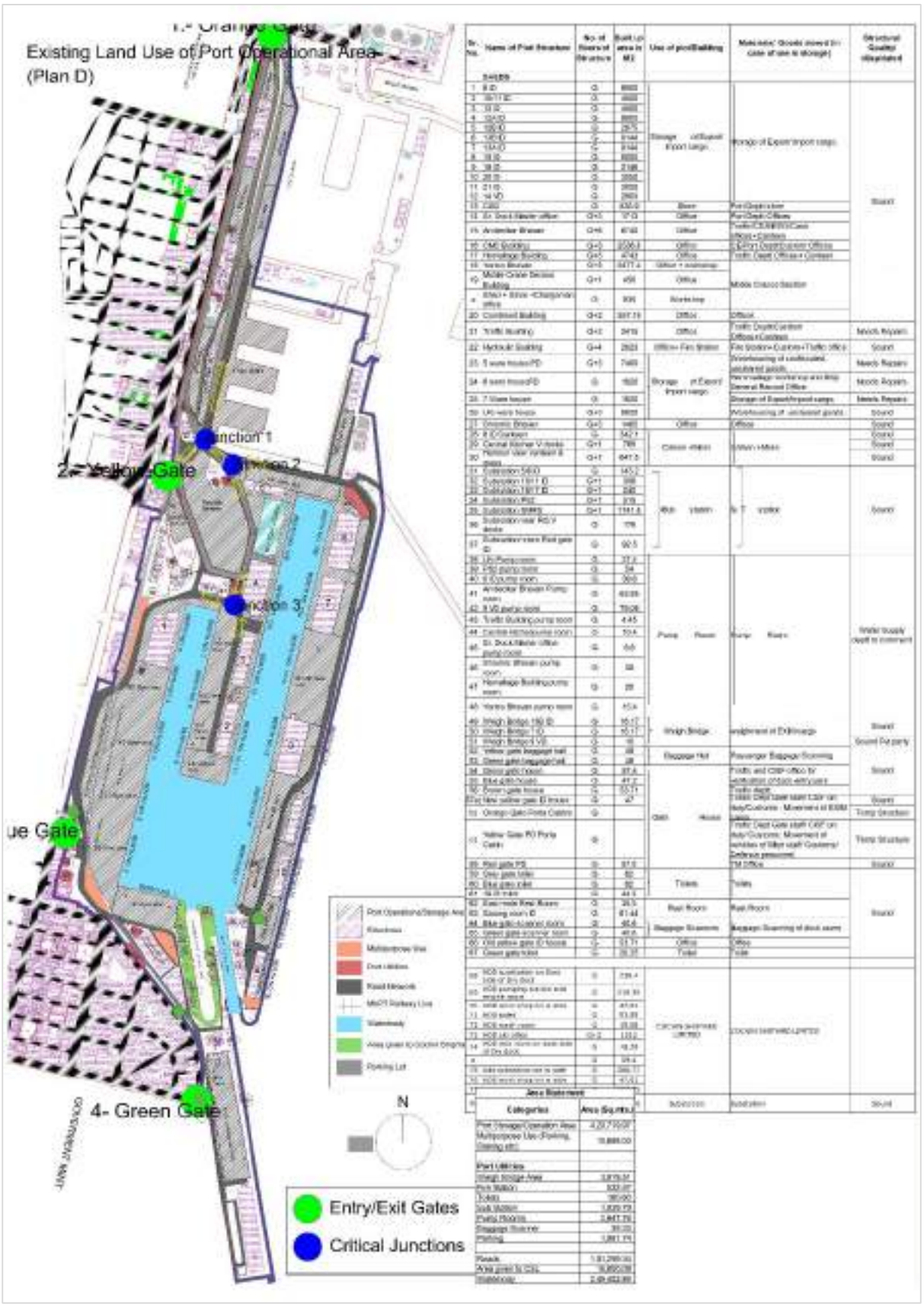
The plan's phased approach to project implementation, with clear timelines, funding strategies, and defined key performance indicators (KPIs), ensures a structured pathway toward achieving the long-term objectives. Regular monitoring and evaluation of progress will facilitate timely adjustments and continuous improvement, ensuring the successful realization of the port's vision.

Moreover, the integration of advanced digital technologies, such as Supervisory Control and Data Acquisition (SCADA) systems and digital port operations, will drive operational excellence and enhance the port's competitiveness in the global market. The commitment to developing a comprehensive environmental management plan and a robust disaster management framework demonstrates the port's dedication to resilience and safety.

In conclusion, the Comprehensive Master Plan for Mumbai Port Authority is a visionary and strategic blueprint that positions the port as a leader in the global maritime sector. Through innovative projects, sustainable practices, and strategic investments, Mumbai Port is set to become a modern, efficient, and environmentally responsible maritime hub by 2047. This transformation will not only strengthen Mumbai's position in global trade but also contribute significantly to India's economic development and its aspirations to be a leading maritime nation. With this master plan, Mumbai Port is well-prepared to navigate the challenges and opportunities of the future, ensuring long-term prosperity and sustainability for the port, its stakeholders, and the wider community.

# ANNEXURES

# ANNEXURE- 1: Existing Land Use of Port Operational Area



# ANNEXURES-2: Stakeholder Consultation by MbPA

## Stakeholder Meeting with Trade

**A. Interactive Meet with Trade of Pulses/Sugar/Calcite Chips/Other Agri Products on 19.01.2022**

(1) Traffic Manager I/c gave brief about global market scenario due to Ukraine war and high production of wheat and sugarcane in Maharashtra. This will result in increase in export of wheat, sugar and other agriculture products. He requested the members present, to inform their requirement of space, rail/rakes etc. for handling of the export.

(2) Traffic Manager I/c informed that, Government has issued guidelines to give priority berthing for vessels exporting wheat.

(3) Shri Sanjay H. Gajra, of M/s. Srinath Agencies informed that, trade is expected to export 2.5 - 3 million tonnes of wheat in near future. 80%of the wheat cargo and 90% sugar will be received through railway network.

(4) Member present informed that,

a) Road at BPX is in bad condition and asphalting work needs to be carried out.
b) One additional 80 tonnes capacity weighbridge be installed at P&V Docks.
c) Two sheds be erect at Indira Dock for storage of agriculture cargo.
d) To provide canteen facility for the workers, as the present facility near Hamallage Building is not sufficient.

Sr. DTM OD informed that:

a) Superintending Engineer, MbPA has been requested to carry out asphalting work of road at BPX.
b) Permission letter has been issued to M/s. JRE Enterprises for operation of weighbridge at 14VD.
c) Area for storage of agriculture cargo identified/earmarked and permission to erect temporary sheds has been granted. Will be pursued.

d) As regards canteen facility, trade was requested to issue formal request letter.

**B. ON 12.07.2023**

**Operational Issues**

- To identify and provide increased storage spaces in outlying areas.

- Clarification on free days granted by MbPA for handling of Pulses to be issued.
- Dedicated space shall be provided by MbPA to Labours of CHAs/Agents.
- To ascertain whether the sheds are optimally utilized, if not then the proposal to extend the long term storage beyond 180 days may be initiated.
- To resolve issue related to Tally Clerk.
- To post sufficient Assessors and Auditors.
- Providing of space for keeping nets and other cargo handling equipment, as stevedoring charges are high in MbPA.

**Logistics Costs**

- To explore reduction of stevedoring charges. Action by: Sr. DTM (Resources)
- Shri Sanjay of Shrinath Agencies informed that there is difference of Rs200 to 250 per ton cost in MbPA charges vis-å-vis other Ports. To compare MbPA port charges vis-à-vis Kandla, Angre, Jaigad, Hazira.

**Commodities**

- A call will be taken whether to handle bulk unbagged sugar in docks i.e. raw sugar/bagged sugar etc.
- Handling of broken rice through MbPA to be explored and price analysis tobe carried out with regards to handling through container vis-à-vis breakbulk.
- To target export of wheat & rice.

**Billing Issues**

- Committee comprising of Officers from Traffic, FA & CAO, P&R and a representative from Trade shall be formed to look after issues related to online payment and issues related to EBS.

**Cleanliness**

- Cleanliness of wharf and storage areas to be carried out entirely by CHAs/Agents. - New Policy to be framed alongwith Agents.
- All leftover packing materials shall be removed from the docks by CHAs/Agents through agency appointed by MbPA.
- SoP for cleanliness to be framed by trade and will be considered after joint discussions.
- Tarpaulins to be provided subject to recovery of MbPA charges. - To be part of Policy to be framed

**C. ON 31.07.2023**

Traffic Manager welcomed all the Trade representatives and briefly explained the purpose of the meeting. Dy. Traffic Manager, Hamallage informed that this meeting is being held pursuant to Trade meeting held by Chairperson, MbPA on 12.07.2023. He also informed that the directives have been received to frame a policy / SOP for cleanliness of wharves and Storage areas. Further, Dy. Traffic Manager, Hamallage requested Trade representatives to put up their views in the matter.

- MANSA representatives informed that vessel operations are carried out in MbPA either on liner terms or on free out basis. They also informed that in case of liner terms the Vessel Agents make payments towards the stevedoring charges and also arranges for transportation of cargo from hookpoint. However, in case of free out basis, payment of stevedoring charges and transportation of cargo from hookpoint are looked after by the Handling agents concerned appointed by the receiver of the cargo. Hence, they requested that in case of free out basis cargoes, handling agents and receivers may be made responsible for cleanliness of Wharf.
- Shri Hiren Ved suggested that a deposit be accepted from vessel agents/ handling agents concerned for ensuring cleanliness of wharf. Shri Gajra informed that in case of sugar and PTA cargo, though wharves are washed after its handling, stains are not completely removed. Sr. Dy. Traffic Manager, OD also showed his concurrence to above. Sr. Dy. Traffic Manager, OD also informed that handling of sugar/ PTA cargo adversely affects handling of subsequent cargo on the same wharf.

- Shri Gajra informed that large volume of sugar has been handled in the past and also substantial quantity is expected this season post monsoon.

- Traffic Manager also pointed out that there is spillage of cargo on road and other areas of Port while its movement through dumpers. Shri Vikas informed that they have made suitable arrangements in their dumpers for handling of bulk cargoes, so as to minimize the spillage. Shri Gajra informed that they would also take suitable measures to minimize the spillage of cargo, during their sugar cargo handling.

- Dy. Traffic Manager, Hamallage informed that as per Circular No. TM/A/15/92 dated 31.12.2021, a penalty of Rs.5000/- is imposed on CHBs/ Importers/ Exporters concerned for dunnage, plastic, etc. left over behind after clearance of the cargo.

- Dy. Traffic Manager, Hamallage informed that a suggestion was received for levy of cleanliness Cess on Port charges (wharfage) based on cost incurred by Port for cleanliness of wharves and storage areas. BCBA and Port Users opposed the levy of any cess citing that Port charges are already high. They also informed that any additional increase in the form of cess may affect the volume of cargo to be handled at Port. Under the circumstances, all agreed that the present system of levy of penalty against the defaulters under abovesaid circular dated 31.12.2021, may be continued.

- Dy. Traffic Manager, Hamallage informed that Port is ready to provide tarpaulines for covering the cargo stored in storage areas as per the requirement of the Trade, on recovery of charges due. Trade representatives informed that they would examine the suggestion of Port and revert back on the above issue. In the meanwhile, they also requested to provide the details of size and thickness for such tarpaulin and the charges involved in the matter. Dy. Traffic Manager, Hamallage assured to provide the information.

  The size of Tarpaulin is 5x5.5 sq.mtr. and its GSM is 610(± 5%).

- Sr. Dy. Traffic Manager, Resources informed that the directives have been received after the abovesaid meeting dated 12.07.2023, to explore the reduction of stevedoring charges. Trade representatives informed that Port is not providing any facilities, however stevedoring charges @50% of regular stevedoring charges are recovered when no Port labours are supplied. They also informed that Vessel Agents are required to make all the arrangements for staff and labours, under abovesaid circumstances. Hence, the stevedoring charges needs to be reduced. Sr. Dy. Traffic Manager (Resources) requested to provide the details of cost incurred by them for stevedoring activities and to provide justification for their demand for reduction in stevedoring charges. Port Users agreed to provide the same.

- On the issue of SOP/ Policy for cleanliness, Dy. Traffic Manager, Hamallage summarized that same will be prepared considering following issues –

  a) Lodgment of cleanliness deposit by Vessel / handling agents concerned prior to berthing of their vessel and its forfeiture in case of failure to clean the wharf.
  b) Cleanliness of open areas will be governed by above said circular dated 31.12.2021.

- Traffic Manager once again requested all to take necessary measures to ensure cleanliness in Docks. The meeting ended with vote of thanks.

## Interactive Meet with Automobile Trade

The agenda wise issues raised by the trade and replies given by MbPA are shown below:

| Sr. No. | Agenda Point | Issues raised by the Trade | Replies given by MbPA |
|---|---|---|---|
| i) | PDI Facility | There is space crunch at Frere Basin, as sometimes, the pulses are stored in FRB warehouses. Resultantly the trailers carrying vehicles are kept waiting. | It was informed that except in the cases of exigencies, the pulses will not be stored at FRB warehouse. The trade was requested to share the details of waiting trailers on the WhatsApp group, to resolve the issue of waiting trailers immediately. |
| ii) | Lack of sufficient Illumination | • Limited illumination at FRB.<br>• The work of installation of light tower is going on at a sluggish pace.<br>• To keep open the OGPD Gate No. 4 for vehicle movements.<br>• In RCD, the issue of snake spotting have been noticed.<br>• Inadequate illumination at 12BID North and on approach road from 5ID, 12BID and Gamadia to OCT. | • The lighting at FRB will be strengthened.<br>• Issue will be taken up with CE and CME Officials.<br>• The OGPD Gate 4 is already kept open. Whenever there is surge in vehicle movements, the trade was requested to share on WhatsApp group, so that immediate preventive action can be taken to avoid clogging.<br>• The overgrown bushes/ vegetation around the RCD will be cleaned and also Shed Supdt. RCD will be directed to contact Sarpamitra.<br>• Lightings at 12BID and on approach roads will be strengthened. Special Night onsite round post 7:00 p.m. will be arranged to identify the exact locations where strengthening of illumination is required. |
| iii) | | • Restrictions of car carriers for night berthing during monsoon season at OCT – 1.<br>• Channel draught may be increased to 8.5 mtrs.<br>• 12BID near to entrance of OCT can be used for providing PDI facilities or for washing of cars. | • ICTPL informed that it is difficult to navigate car carriers during night. However, if tide is suitable and weather is clear, night berthing may be permitted.<br>• CE will be requested to check if any capital dredging is required.<br>• The issue will be examined during night onsite round. ICTPL informed that they starting facility whereby the vehicles will |

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| | | • Area of finger berths at P & V Docks can be explored for storage. | be washed and cleaned at one place before entering OCT.<br>• Area has been kept for ICTPL. Will work out jointly with ICTPL for betterment of trade. |
| iv) | Dedicated storage space & Month end space crunch | • Most of the volume is handled in the last 10 days of the month. There is an issue of lack of adequate storage space for vehicles. The vessels are deep trade vessels and hence rescheduling of vessels may not be possible.<br>• Cases of trespassing are noticed and hence there is needs of temporary barricading. | • Spread over and planning of schedules of vessels carrying vehicles by lines over the entire month is required. Whenever there is sudden surge of vehicles, OEMs can share expected volume of vehicles in advance in the middle of months by breaking into 3 periods (5th to 15th, 15th to 22nd and crunch period from 22nd to 5th of next month), MbPA can manage the storage space accordingly. The office of Operation Docks will be Nodal Point for consolidation of information. Shifting of specific number of vehicles to OCT 48 hrs. in advance as against 24 hrs. may be considered by ICTPL.<br>• Temporary barricading will be carried out by CE. |
| v) | Waiver of toll charges | Toll charges shall be waived | Already waived. |
| vi) | CISF issue – delay in unloading | Dedicated CISF staff is not available for 24 x 7 hrs. at the time of unloading of vehicles from the trailers. | MbPA will hold a meeting with CISF to resolve this issue. |
| vii) | Trailer permit – 24 hrs. from trailier entry | Presently trailer permit is valid upto 8:00 a.m. irrespective of time of issuance of permit. Thus, the facility of 24 hrs. is not available. | Internal order will be issued on recovery of charges for 24 hours from entry of vehicles/issuance of permit. |
| viii) | Working of Customs Examination Centres | Customs Examination Centres are not working on 24 x 7 hrs. One additional Customs Examination Centre is required at FRB to ease out the load at UB Centre. | Meeting will be arranged with Customs to discuss the issue and also the issue can be raised by the Trade monthly CCFC meeting. |
| ix) | Dedicated CCTV cameras in the yards | Cases of damage of vehicles by trucks and trespassing have been noticed. There is need of CCTV Cameras in the yards | To begin with, CCTV cameras will be installed in the sheds, which are non-dedicated yards for storage of vehicles, as dedicated yards have sufficient security. |

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| x) | Multi-level Car parking | Need of multi-level car parking lots in the docks. | a) The possibility of building multi-level car parking lot may be developed jointly with the investment contribution from all stakeholders (OEMs, Lines, Agents, ICTPL).<br>b) MbPA will provide land for building.<br>c) Expensive to build and it is capital intensive.<br>d) PPP operator may have certain apprehensions about continuous usage of parking lot.<br>e) To develop methodology with all stakeholders.<br>f) Cost distribution to be worked out. OEMs, Lines, ICTP can contribute and share burden.<br>g) Possibility of storing Steel Cargo at Ground Floor can also be explored and Steel Trade can also be required to invest.<br>h) Steering Committee comprising of members from all stakeholders like OEMs, Lines, Agents, CHAs, ICTPL, MbPA may be formed. MbPA will invite tender.<br>i) Shri R.N. Shaikh, Sr. Dy. Traffic Manager, HO and Shri Sanjeev Kumar, Dy. Traffic Manager, Operation Docks will represent MbPA.<br>j) The following members of trade consented for becoming members of Steering Committee:<br>i) Mr. Hiren Ved, Parekh Marine Ag.,<br>ii) Mr. Bhandary, ICTPL,<br>iii) Mr. Rahul Kekan, M/s. Volkswagen,<br>iv) Mr. Chikka, Maruti,<br>v) Mr. Prasad, Nikhil Logistics,<br>vi) Other OEMs/Lines/ CHAs would inform their representatives shortly. |

**A. On 04th March 2022**

- It was informed that the MLCP needs to be developed on PPP basis, because higher capital investment is required. As per estimated quotation obtained by M/s. CRISIL, the total cost of developing MLCP would be approx. Rs. 371 Crores. The proposed capacity of MLCP will be around 10,000 cars. It may be developed phase wise, say 5000 cars in first phase and then next phases. MbPA will contribute by providing land as its share in the project. Each OEM may contribute. Each Line may contribute. Others

like Ship Agents, Fleet Operators, ICTPL may also contribute. Thus OEMs, Lines, Agents, ICTPL and Fleet Operators together may participate in equity of the proposed MLCP to about 50% and the remaining 50% will be of PPP operator.

- The issues discussed during the meeting are enumerated as under:
  (i) Ground floor of the proposed MLCP may be used for storing Steel Cargo (Import and Export) and therefore the Steel Stakeholders also needs to be involved.

  (ii) The stacking pattern of storing cars on board ship can be replicated on the ground.

  (iii) The expenditure on project can be bifurcated into two parts i.e. 30% equity and balance 70% to be funded by the Bank for investment purpose. Therefore, the contribution by various stakeholders towards equity participation shall be within a reasonable amount.

  (iv) A phase wise development can be planned by taking into consideration a period span of 10 to 20 years. M/s. CRISIL to develop contour of the project. The capacity may be increased in a phased manner.

  (v) The project would be feasible if the dwell time is not very high for the cars.

  (vi) There should be an agreement between OEMs and Lines for bringing of more car carrying vessels, which is absent now.

  The participation of OEMs as stakeholder in the project is of paramount importance. Unless OEMs participate, remaining stakeholders i.e. lines, agents, etc. would be hesitant to participate. The OEMs to take a call on it. Similarly, all Lines, Agents should also participate together in the project as stakeholder. The project needs to be developed as a joint project. All the stakeholders will be part of Committee involved in development of MLCP. Based on volume of export, the percentage of stake by the exporters/stakeholders can be considered.

  (vii) Besides the stake share, there will be an additional cost for storage of cars that will levied by the operator.

- Current scenario of congestion was also discussed:

  (i) The dwell time has increased to 15 / 20 days. Hence there is increased and wide spread congestion in the storage area. Some of the areas, roads, which have never been used for storage of cars are being now used for storage of cars.

(ii) It was suggested to the trade to bring car carriers (ships) in the mid- month also to free up congested storage space.

(iii) Due to various reasons, the ship calls are not going to increase in coming months.

(iv) To tide over the situation, invariably there is a need of developing a MLCP in Mumbai Port.

(v) All the stakeholders should give confirmation in writing whether they are ready to participate in MLCP as stakeholder and invest in MLCP or not.

(vi) National Institute of Industrial Engineering (NITIE) has been engaged by MbPA to work on optimisation of space, operations, processes, etc. Based on the report received from NITIE, storage areas will be allocated as per this report.

(vii) In case MLCP is not developed, in due course there would be restrictions on the storage spaces for storage of cars.

(viii) Similarly, a meeting be held with Steel stakeholders and their views will be obtained.

Dy. Chairman welcomed all the attendees i.e. vessel agents, OEMs, Logistics players and discussed about volume projection for the year 2023-24. It was assured that all out efforts will be taken to meet the expectations of the Trade. He said that Mumbai Port expects to reach 2 Lakhs cars export. The private ports may offer discounts, but that they would increase prices when volume increases and it is a vicious cycle. Whereas, Mumbai Port being a government port, has lot of transparency in the rates levied. He requested Trade to come forward with the suggestions for increasing cargo throughput. He assured that MbPA is ready to extend concessions basis volume commitment.

**B. ON 23.02.2023**

Dy. Chairman welcomed all the attendees i.e. vessel agents, OEMs, Logistics players and discussed about volume projection for the year 2023-24. It was assured that all out efforts will be taken to meet the expectations of the Trade. He said that Mumbai Port expects to reach 2 Lakhs cars export. The private ports may offer discounts, but that they would increase prices when volume increases and it is a vicious cycle. Whereas, Mumbai Port being a government port, has lot of transparency in the rates levied. He requested Trade to come forward with the

suggestions for increasing cargo throughput. He assured that MbPA is ready to extend concessions basis volume commitment.

**Volkswagen**

Dy. Chairperson informed that the volume of Volkswagen cars was 89,082 during the year 2017-18 which has been reduced to 43,064 in the year 2021-22 whereas the projection for this year is 52,000. Shri Rahul Kekan of Volkswagen was requested to brief on this issue.

Shri Rahul Kekan of Volkswagen informed as under.

- Overall exports of Skoda has gone down. Their plan is to produce electrical vehicles. It is in the planning phase. They are looking at exporting electrical vehicle beyond 2027. With regards to reduction in volume, one of the major reasons is unavailability of semi-conductors. In year 2022, there was a shortage of semi-conductors and it is likely to continue in 2023. Same is the case with Maruti. He also informed that his company imports luxury cars like Porsche, Lamborghini and Audi.

- They are in the ramping phase but again the problem of semi- conductor is more serious than 2022. Last year they were hoping that the situation would improve. They produced cars in anticipation and kept in the factory without semi-conductors and somehow they arranged to ship in the last quarter and projections were achieved.
- Further it was informed that this year, they are not going to get parts for the first quarter and therefore they had to cancel their production. This is affecting their volume and also revenue because they had planned for 3 shift operations. He informed that it's not good for the company as well as for business. This is the issue they are facing across and they don't want to lose on the volumes of exports as it adversely effects the revenue. As of now, they would be completing exports of 48,000 cars and they would complete the projections going forward. He also informed that last year they started exporting Skoda.

**Maruti Cars**

Dy. Chairperson informed that the volume of Maruti Cars was 41,050 during the year 2021-22 which has been reduced to 24,144 this year upto Jan 2023. Shri Chikka of Maruti was requested to brief on this issue.

Shri Chikka informed as under.

- For Maruti Suzuki, they are maintaining the ratio of 2000 to 3000 cars per month. They are also doing export from Mundra and catering to European countries and Latin America. At a time, they load 4000 cars that is why they are shifting bigger volumes to Mundra. The exports of Maruti cars depends on the market, which is volatile and they are handling about 1 lakhs vehicles from Mundra. Maruti and TATA used to export from JNPA previously but they were expected to come in window for containers which was not possible.
- Mr Chikka raised the issue of lot of dry grass at Frere Basin which may catch fire during summer. He requested to remove the dry grass. Mr Chikka informed that they did 34,000 odd exports. This year also they are maintaining the same ratio. If the semi-conductors issue improves, they may do higher numbers. They do exports from JNPA, Mundra, Enore Port, Pipavav, Mumbai and Chennai. They have recently started operations from Pipavav but from mundra they do 1 lakhs vehicles per year and from Mumbai they do 30,000 to 34,000 vehicles per year.
- Dy Chairman requested Mr. Chikka as to what are the expectations from the port to take the numbers from 30,000 to 50,000 vehicles per year from Mumbai Port. Dy Chairman requested Mr Chikka to get back in this matter after consultation with his management.
- Mr Chikka informed that, if for any reasons the vessel gets delayed then space becomes a constraint. He requested to increase storage space for accommodating higher volume.
- Dy Chairman replied that, if need be, additional storage space will be created even by demolishing existing warehouse subject to volume commitment and requirement of storage area vis-à-vis additional volume of cars. He requested Mr. Chikka to get back with the details of additional area required vis-à-vis additional volume of cars. He also directed Chief Engineer to attend to the issue of dry Grass.

**TATA Motors**

- Dy. Chairperson informed that total volume of 11,277 during 2017-18 has been reduced to 5,111. He requested TATA representative to brief on this issue.
- Shri Nirmal Balayar of TATA, informed that volumes are down because currently it is cheaper to export through containers. They are doing from Nhava Sheva as destination ships are not calling Mumbai port. They plan to export electrical vehicles

also. He brought to the notice that TATA uses Mumbai Port for commercial vehicles, however there is trespassing at RCD because of no proper fencing. Further, Mr. Nikhil of Nikhil Logisitics informed that though security is deployed at RCD,

- Dy. Chairperson informed that the fire audit at RCD has to be done. He directed Deputy Conservator to send PFSO and get the Fire Audit done.
- Shri Rahul Kekan stated that there are certain destinations for which vessel does not call Mumbai Port. Under the circumstance, OEMs have no choice but to call to those ports like Mundra. Maruti Cars has huge volume for exports at Mundra and hence big ships call at Mundra.
- Dy. Chairperson directed Traffic Manager to form a team of officers to negotiate with the OEMs for increasing volume. He directed Sr. DTM (OD) to talk to TATA in the matter. He also directed Chief Engineer to resolve the issue of fencing at RCD Yard.
- In connection with the fire incident which happened in the recent past, Shri Rahul Khekan, informed that they have met on 07th Feb 2023 and actions have been taken on the points discussed. He further informed that his team from Fire and safety is in port and is inspecting the area and they will give suggestions thereafter. He conveyed thanks for this cooperation and was looking forward to the actions already discussed.
- Dy. Chairperson assured that fire safety is critical and report of VJTI experts is awaited.
- Shri Nikhil of Nikhil Logistics requested to provide CCTV/Security at Loading points. Deputy Chairman clarified that an Advance Surveillance system will be in place about 9 months, till that time, Nikhil Logistics to make arrangement of CCTV Cameras.

**Parekh Marine**

Shri Hiren Ved of M/s. Parekh Marine informed that from around 2-3 months they are having issues in storage of import cars high end Lamborghini and Porsche. He requested for some area dedicated to storage of these high value cars. He also stated that security at this area is important. He further stated that they will inform 10-15 days prior to arrival of vessel to keep space available for 500 top end imported cars.

- Sr. DTM (OD) informed that, if advance information is received from the OEMs or Agents regarding requirement of storage of high value cars, then necessary arrangement can be made.

- Chairperson stated that agent must know in advance how many vessels are going to come in next 6 to 8 months with imported cars. This data shall be shared with operations team so that necessary arrangements can be made.
- Rahul Kekan informed that they would be able to give projection for imports on lines of projections being given for exports.
- Shri Hiren Ved further brought to the notice that the container rates for Jan 2022, were Rs.3900 for 20 ft and Rs.6700 for 40 ft., whereas the rates have gone down. For Jan 2023 it is Rs.600 for 20 ft. and Rs.650 for 40 ft., and for Feb 23 for 20 ft. Rs.550 and 40 ft. Rs.570. Therefore cars traffic in part is likely to be diverted to JNPA for shipment through containers.
- While elaborating the reasons for such reduction in rate of containers, Shri Ved informed that the freight rate comes down due to abundance of empty Containers.
- Shri Ved informed that when dredging was in progress at 18-21 ID Harbour wall berths during 13.12.2022 to 22.12.2022 and BPS and BPX berths during 25.10.2022 to 28.10.2022 and 3.2.2023 and 4.2.2023, it was discussed in OG meeting that PCC vessels will have to wait for berthing in case break bulk steel cargo vessel is berthed at OCT. This led to fear in PCC vessel principals due to uncertain delays PCC vessels will face in Mumbai Port at short notice.
- In the absence of any priority to PCC vessels to berth at ICTPL and when MbPA berth becomes vacant, the Break Bulk steel cargo vessel working at ICTPL is shifted to vacant MbPA berth, with shifting charges on Port account. However, if MbPA berth is not vacant break bulk steel cargo vessel if shifted to stream to accommodate PCC vessels (to prevent waiting of PCC vessels, and if the same break bulk steel cargo vessel is shifted and berthed back to ICTPL berth, then shifting charges will be on break bulk steel cargo vessel account.

## Interactive Meet with Steel Trade

**ON 18.11.2021**

The agenda wise issues raised by the trade and replies given by MbPA are shown below:

| Sr. No. | Agenda Point | Issues raised by the Trade | Replies given by MbPA |
|---|---|---|---|
| i) | Shortage of storage space (Open and Covered) | i) Due to poor weather conditions, most of the steel cargo requires covered storage (CR) spaces. There is lack of covered storage space for steel cargo in MbPA.<br>ii) Temporary roof can be erected at 11ID, 13AID to create additional space. Also provision of temporary extension of shed would be useful. Temporary storage space can be created at 5-6ID.<br>iii) Gates at 20-21ID are small.<br>iv) Increase number of gates at OGPD from 2 to 4. | i) Shortage of covered storage is more seen in export cargoes, as cargo needs to be aggregated over a period of time. Substantial sugar and rice was exported from MbPA in last year. Above factors contributed to shortage of storage space in the docks. Sugar handlers have agreed to construct their own sheds near 2 ID to 5 ID. Additional warehouses at 20-21ID are being made available for storage of steel export cargo. Further, 13AID has been taken for repairs and the contractor has been told to take half portion of shed for repairs and keep remaining half for usage. Some of the old cargoes, gear, junk materials, etc. lying in some warehouses will be removed and such warehouses will be utilized for storage of steel cargoes. An idea of multi-level car parking is under consideration. Consequently, the areas occupied by the vehicles will be freed and such areas can be utilized for steel cargo. Also the ground floor of the multi-level car parking lot can be kept for storage of steel cargo.<br>ii) The issue will be examined alongwith by CE for creation of storage space covered with temporary roof. Site meeting will be held. Space between 12 & 12ID can be utilized. ICTPL informed that a storage area of approx. 1 lakh sq. ft. can be created near OCT for storage of steel |

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| | | | cargo through investment and participation of all stakeholders and advised to form a Committee of all stakeholders.<br>iii) Additional door can be opened at 20-21ID.<br>iv) The proposal of 6 gates has been planned. |
| ii) | Despite making advance payments, interest is being charged | Interest is charged for export consignment, inspite of depositing advance payment in PD Account. | Issue will be resolved, as it is system related. Will be placed before Steering Committee. |
| iii) | Shed repairs to be carried out | Sheds are in dilapidated conditions and needs repairs. | Repairs to sheds like 13AID are underway. Last year 6 ID and 13BID sheds have been repaired. |
| iv) | Online DEP is very slow causing delay in Gate Entry / Permit | Improvement in issuance of DEPs is required. | Issue is being resolved. Offline DEPs from gate are being allowed. Also manual DEPs are being allowed. Periodical permits for more than one day can be issued on discounted rates of entire duration of DEP period. |
| v) | Customs Examination on weekends | Arrangement for customs examination of cargo / out of charge should be available on weekends. | All issues faced by trade will be taken up during meeting with Customs on receipt of request from trade. |

**ON 3RD MAY 2023**

Traffic Manager informed that during last month, Traffic of Export Steel cargo increased by 47.59% and Import Steel cargo by 9.29 %. The aggregate growth in Steel cargo is 28.77% as compared to corresponding period of the last year.

The discussions on the issues listed in agenda are as under:

**Projection for export / import for financial year 2023-2024**

Dy. Chairperson requested trade to inform the projected volume of cargo expected to be handled during F.Y. 2023-2024.

Representative of M/s. JSW Steel informed that their orders are normally booked for 2 months in advance and volume of trade is mostly dependent on the Government's policies. Hence, it is difficult to predict cargo potential for the entire financial year. He mentioned that in last few months they handled approx. 1.75 to 2.00 lakh MTs. of steel cargo.

**Optimal utilization of the storage area in docks particularly covered storage area**

Trade informed that monsoon season is in proximity. For storage of Import cargo, they require dedicated warehouses. Trade further informed that the remains of bulk cargo like sugar, pulses and mud led to damage of the steel coils.

Dy Chairperson informed that MbPA has developed a temporary shed policy, whereby temporary sheds can be erected by the Port Users, subject to the conditions laid down under the policy. The temporary sheds erected by the Port Users in Docks and Outlying areas will be permitted for utilization on common user basis. The trade was informed to utilize facility of temporary shed facility.

**To examine feasibility, if the export CR coils can be stacked ground + 2 High**

Dy. Traffic Manager Cargo Accountal requested trade to stack CR Coils on Ground + 2 high, to accommodate more cargo.

Trade informed that in factories there are special arrangements for stacking such type of cargoes. Such facilities are not available in MbPA's covered storage area and it may lead to damage of the cargo. Hence, trade informed that it is feasible to stack CR Coils on ground + 1 high.

Trade further informed that 21 days' free storage of export cargo are allowed in MbPA. But if the coils get damaged during stacking, then the cargo will be moved back (shut out) and for that they have to pay demurrage for the entire period of stay. Trade requested to address this issue.

**To examine feasibility of reducing the number of shipping bills of export steel**

Dy. Traffic Manager Cargo Accountal informed that there are more than 500 shipping bills in one vessel. Completing data entry of many Shipping Bills in the system, till loading of cargo on the ship is a voluminous and hectic job. Manpower and other resources are wasted in it. Dy. TM (CA) requested trade to club shipping bills into few numbers to make it easier and faster to make data entry in system.

Trade informed that they dispatch the cargo invoice wise. It is received from two to four factories at a time. It will not be feasible to club Shipping Bills into single consignment due to issues related to GST compliance.

**Storage of import project cargo consignment wise at one place**

Sr. Dy. Traffic Manager (OD) requested trade to store project cargo consignee wise at one place and specifically the booms of the cranes to be over stacked, so that minimum space get occupied.

Trade informed that over stacking booms is not possible, as it may get damaged, if the booms slip or fall due to over stacking. Further,repairing booms is a costly affair.

**Suggestions for reducing stay of export steel / project cargo in docks**

Trade requested to allow storage of cargo in shed, port-wise and size wise to enable faster clearance of cargo.

Dy. Traffic Manager, Cargo Accountal informed that storage of export cargo in shed and feeding of export cargo to vessel under the hook is the responsibility of Shipper/CHA. Port is permitting 21 days before and if the cargo is stored in the shed vessel wise as was being done in case of storage of containers in yard, shifting of the cargo for loading on vessel will be faster.

Trade informed that storage space in shed is allotted to more than one CHA. Resultantly, the sorting of cargo for feeding to vessel is restricted, as the cargo of more than one CHAs are stored in shed. The trade requested to nominate separate shed for each CHA, so that the trade could benefit

This issue was specifically related to M/s. JSW and 02 CHB. It was declared in meeting that they will be permitted storage in two separate sheds.

**Suggestions for reducing modifying the MbPA processes involved in export / import**

Trade informed that there is acute shortage of staff in the docks and single MbPA staff is being posted in more than two to three sheds. Resultantly the delivery process and other works gets delayed. The trade requested to increase the MbPA staff at the operational locations. Trade further informed that in some other ports all formalities are completed at the Gate only, for which there are various software, which are being used.

**Suggestions for reducing logistics time and cost**

With regards to the reducing logistic time, trade informed that MbPA is situated in the heart of the city and they get limited time window of maximum 10 hours for movement of cargovia roads, due to road traffic issues.

With regards to reducing cost, trade requested that the increase in port charges in recent SOR i.e. 7.12% is quite high. They further requested that the free period of 6 days granted for delivery of cargo is very less. The free days shall be granted based on volume of the cargo handled.

Representative of M/s. Tata Steel informed that they take delivery to Ahmadabad via road, as there are no railway siding facilities available in their factory.

Chairperson suggested transporting cargo through the railway networks instead of road, as it will be faster. Dy. Commissioner (Goods) Central Railway expressed his eagerness to extend his co-operation to the trade.

Dy. Chairperson offered to extend the free period, if the trade is committed to bring 25 percent more cargo.

**Suggestions for reducing turnaround time of vessels carrying steel / project cargo**

Trade requested that two 16 tons shore cranes installed in 2/3 Indira Docks creates an obstacle to free movement of cargo.

CME informed that the process of disposal of shore crane is in progress.

Trade informed that movement of cargo from railway siding at 3/4 ID to Harbour Wall is time consuming. The trade requested for allowing railway siding and storage at Victoria Docks to reduce the timing of movement of cargo to Harbour Wall.

Chairperson suggested trade to identify more storage places in port. He directed Mr. Dilip Shekdar, Advisor Planning to co-ordinate with trade in identifying such locations.

**Suggestions for increasing ship berth day output of steel/project cargo vessel**

Trade informed that due to non-availability of pilots and tugs there is a delay in removing the vessel from the berth.

Dy. Conservator informed that they are in the process of hiring two tugs within next two months and six pilots within next three months. He further informed that tugs will also be utilize inside docks.

**Regarding the transportation of CR/HR coils in Mumbai Port**

Sr. Dy. Traffic Manager, OD informed that Dock Safety strictly follows the safety guidelines for safe movement of steel cargo within docks premises. Recently a coil toppled from trailer at 2 Indira Docks.

Trade informed that they are aware of the incident and they are taking enough care in lashing coils on trailer before each movement.

**Suggestion from the trade to increase volume in MbPA**

Trade requested to consider and levy lower wharfage for cargo which is brought from longer distance, to make it economical for them. Trade also requested to provide office space to their staff inside docks.

Chairperson informed trade to forward the requests in writing to the concerned departments for taking suitable decision by MbPA.

**ON 14.07.2023**

**Operational issues**

(i) Creation of additional storage facilities for CR coils.
(ii) The cargoesshall be segregated and then stored at the shed to avoid shortage in delivery of cargo.
(iii) Creation of temporary extension of Roof of 6 ID, 11 ID and 12 ID for storage of Coilsfor additional storage space.

(iv) Allowing labour to pass in/out through Blue & Green Gate also in addition to Yellow Gate to avoid wastage of time.

(v) Deployment of Shore cranes for lifting of steel coils.

It was informed that the issue of deployment of shore cranes can be considered, subject to receipt of commitment from the Port Users on the volume of the cargo to be handled by them

**Logistics costs / Billing issues**

(i) Recovering of royalty @ 25% instead of 50% of stevedoring charges when MbPA labour is not deployed.

(ii) Consider reducing wharfage charges.

(iii) In respect of shut out cargo, not to levy demurrage from day one, as the Customs procedure takes more than 12 to 15 days.

(iv) In case of back to town cargo, demurrage charges shall be levied from the date of sailing of the vessel.

**Cleanliness / Maintenance**

(i) Maintenance of Sheds to be carried out to avoid damage to the cargo by passage of water through the doors of the sheds.

(ii) Maintenance of Sheds to be carried out to stop leakage of water at 13A, 13B and 15 ID shed causing damage to the coils

**Miscellaneous issues**

(i) To carry out analysis of the rates of the Kandla and Chennai Port. Logistics charges are high in Mumbai Port as compared to other ports.

(ii) A Joint meeting shall be held with the Customs to resolve the issues of delay caused due to Custom procedure. It was informed that the Trade Association may take up these issues with Customs in CCFC meeting held at Customs House.

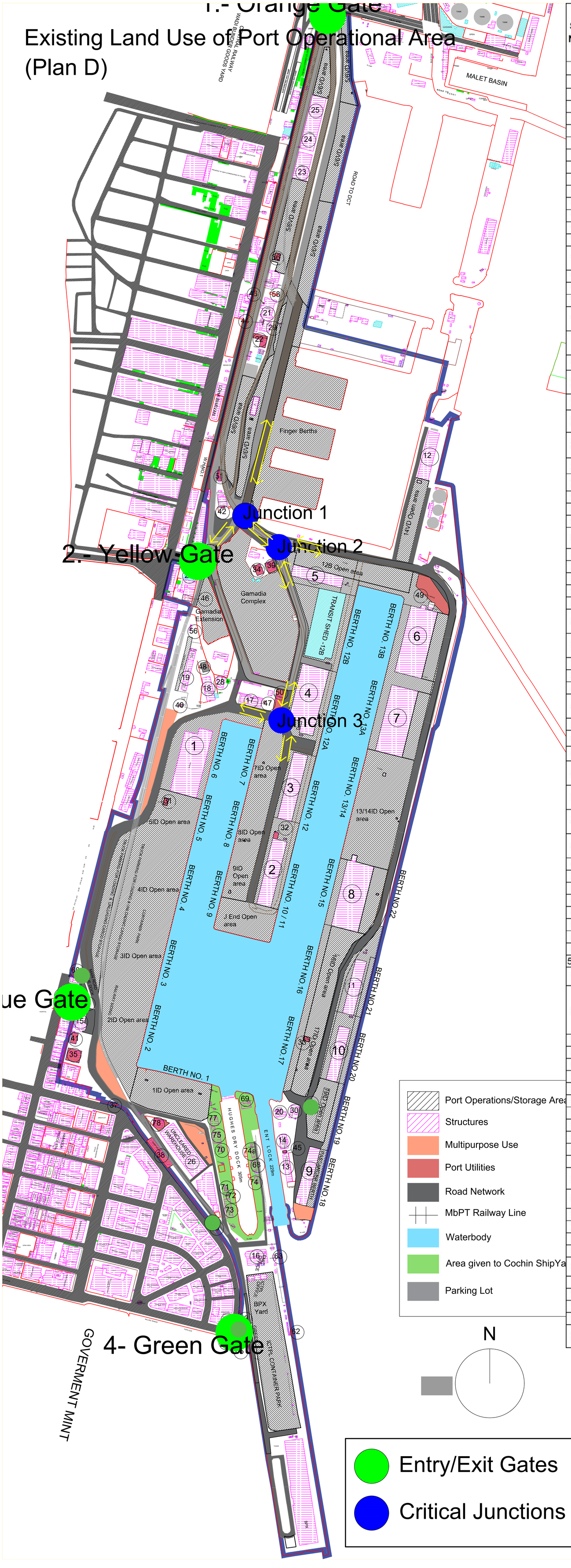
(iii) Provision of canteen facilities shall be made at 18/19/20 ID for the usage of transporters/Labours. It was informed that efforts will be made to provide the mobile canteen facility through outsourcing.

(iv) Port Users to provide information every month about the No. of shipments/Tonnage to be handled.

# ANNEXURE-3: Chronology of Events

| | |
|---|---|
| October 2015 | • A report titled 'Unlocking National Ports Potential: Deep Dive – MbPT' was prepared under Project Unnati by the Boston Consulting Group, setting the stage for transformative developments. |
| June 2016 | • A detailed Traffic Study was conducted by SLS Transport Training Institute and Consultancy to devise strategic traffic management solutions for the Mumbai Port area. |
| August 2016 | • A comprehensive Master Plan for Mumbai Port was developed by AECOM under the Sagarmala Program, aiming to drive modernization and expansion. |
| April 2022 | • Release of Office Memorandum from MoPSW regarding "Preparation of Comprehensive Master Plan for Ports with planning horizon of 2047". |
| 2023 | • CRISIL carried out an updated Traffic Study for the Mumbai Port Authority, offering insights into evolving transport dynamics.<br>• A Demand Assessment for ship repair, water transport, and fisheries for MbPA was undertaken by CRISIL to gauge future needs and opportunities.<br>• Traffic Study Report prepared by CRISL was accepted by Board under Resolution No.145 dated 27.10.2023 |
| 2022-23 | • MbPA conducted numerous stakeholder meetings with trade such as Pulses/Sugar/Calcite Chips/Other Agri Products, automobile trade, steel trade etc. |
| July 2024 | • MbPA organised a One Day Port Master Plan 2047 Workshop to formally conclude all the discussions on Port Master Plan 2047 |
| September 2024 | • The Draft Comprehensive Master Plan for Mumbai Port Authority, with a planning horizon extending to 2047, reached completion and the Board of Mumbai Port Authority approved on the same on Board Meeting held on 20th September 2024. |

# Existing Land Use of Port Operational Area (Plan D)




Port Operations/Storage Area
Structures
Multipurpose Use
Port Utilities
Road Network
MbPT Railway Line
Waterbody
Area given to Cochin ShipYa
Parking Lot

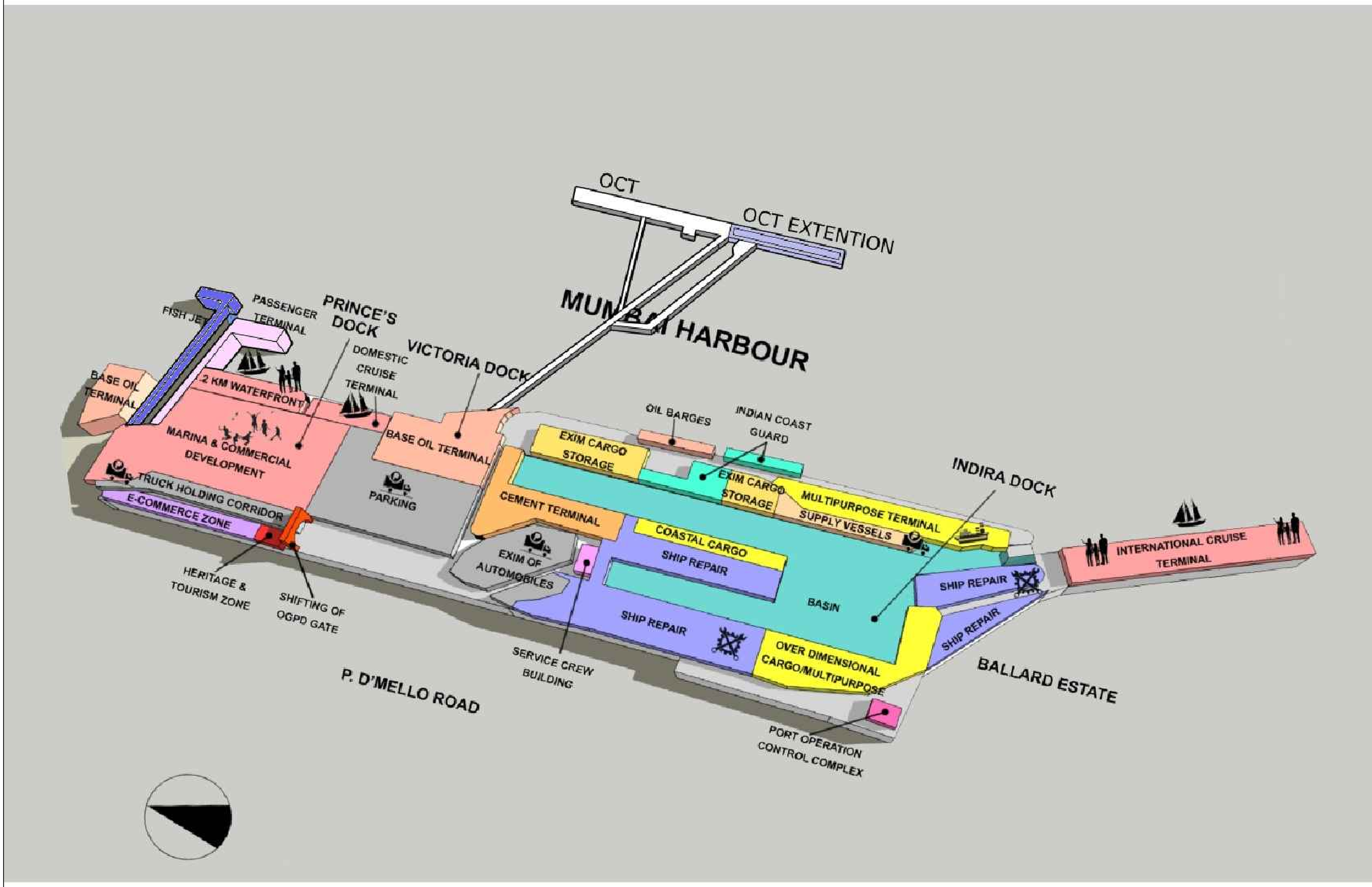
N

Entry/Exit Gates

Critical Junctions

| Sr. No. | Name of Plot/ Structure | No. of floors of Structure | Built up area in M2 | Use of plot/Building | Materials/ Goods stored (In case of use is storage) | Structural Quality/ dilapidated |
|---|---|---|---|---|---|---|
| | **SHEDS** | | | | | |
| 1 | 6 ID | G | 8500 | Storage of Export/ Import cargo. | Storage of Export/ Import cargo. | Sound |
| 2 | 10/11 ID | G | 4500 | | | |
| 3 | 12 ID | G | 4500 | | | |
| 4 | 12A ID | G | 8900 | | | |
| 5 | 12B ID | G | 2875 | | | |
| 6 | 13B ID | G | 9144 | | | |
| 7 | 13A ID | G | 9144 | | | |
| 8 | 15 ID | G | 9000 | | | |
| 9 | 18 ID | G | 3146 | | | |
| 10 | 20 ID | G | 3050 | | | |
| 11 | 21 ID | G | 3050 | | | |
| 12 | 14 VD | G | 2603 | | | |
| 13 | CSD | G | 835.9 | Store | Port Deptt store | |
| 14 | Sr. Dock Master office | G+3 | 1713 | Office | Port Deptt Offices | |
| 15 | Ambedkar Bhavan | G+6 | 6740 | Office | Traffic/CE/MEED/Cash offices+Canteen | |
| 16 | CMC Building | G+3 | 2536.8 | Office | CE/Port Deptt/Custom Offices | |
| 17 | Hamallage Building | G+5 | 4743 | Office | Traffic Deptt Offices+ Canteen | |
| 18 | Yantra Bhavan | G+5 | 5477.4 | Office + workshop | | |
| 19 | Mobile Crane Section Building | G+1 | 450 | Office | Mobile Crance Section | |
| a | Shed + Store +Chargeman office | G | 935 | Workshop | | |
| 20 | Combined Building | G+2 | 557.19 | Office | Offices | |
| 21 | Traffic Building | G+2 | 3415 | Office | Traffic Deptt/Custtom Offices+Canteen | Needs Repairs |
| 22 | Hydraulic Building | G+4 | 2623 | Office+ Fire Station | Fire Station+Custom+Traffic office | Sound |
| 23 | 5 ware house PD | G+3 | 7400 | Storage of Export/ Import cargo. | Warehousing of confiscated, uncleared goods. | Needs Repairs |
| 24 | 6 ware housePD | G | 1820 | | Hammallage workshop and Ship General Record Office. | Needs Repairs |
| 25 | 7 Ware house | G | 1820 | | Storage of Export/Import cargo. | Needs Repairs |
| 26 | U/c ware house | G+3 | 8920 | | Warehousing of uncleared goods. | Sound |
| 27 | Shramic Bhavan | G+3 | 1465 | Office | Offices | Sound |
| 28 | 6 ID Canteen | G | 342.1 | Cateen +Mess | Cateen +Mess | Sound |
| 29 | Central Kitchen V docks | G+1 | 785 | | | Sound |
| 30 | Harbour view canteen & mess | G+1 | 647.5 | | | Sound |
| 31 | Substation 5/6 ID | G | 143.2 | Sub station | Sub station | Sound |
| 32 | Substation 10/11 ID | G+1 | 306 | | | |
| 33 | Substation 16/17 ID | G+1 | 240 | | | |
| 34 | Substation PS2 | G+1 | 515 | | | |
| 35 | Substation SMRS | G+1 | 1741.8 | | | |
| 36 | Substation near RG V docks | G | 176 | | | |
| 37 | Substation/ store Red gate ID | G | 92.5 | | | |
| 38 | U/c Pump room | G | 37.4 | Pump Room | Pump Room | Water Supply deptt to comment |
| 39 | PS2 pump room | G | 54 | | | |
| 40 | 6 ID pump room | G | 39.6 | | | |
| 41 | Ambedkar Bhavan Pump room | G | 62.95 | | | |
| 42 | 9 VD pump room | G | 79.08 | | | |
| 43 | Traffic Building pump room | G | 4.45 | | | |
| 44 | Central kitchenpump room | G | 10.4 | | | |
| 45 | Sr. Dock Master office pump room | G | 5.6 | | | |
| 46 | Shramic Bhavan pump room | G | 38 | | | |
| 47 | Hamallage Building pump room | G | 20 | | | |
| 48 | Yantra Bhavan pump room | G | 15.4 | | | |
| 49 | Weigh Bridge 13B ID | G | 16.17 | Weigh Bridge | weighment of EXIM cargo | Sound |
| 50 | Weigh Bridge 7 ID | G | 16.17 | | | |
| 51 | Weigh Bridge 9 VD | G | 10 | | | Sound Pvt party |
| 52 | Yellow gate baggage hall | G | 48 | Baggage Hall | Passenger Baggage Scanning | Sound |
| 53 | Green gate baggage hall | G | 48 | | | |
| 54 | Green gate house | G | 87.4 | Gate House | Traffic and CISF office for verification of dock entry uers | |
| 55 | Blue gate house | G | 47.2 | | | |
| 56 | Brown gate house | G | 53.71 | | Traffic deptt. | |
| 57a) | New yellow gate ID house | G | 47 | | Traffic Dept Gate staff/ CISF on duty/Customs : Movement of EXIM cargo. | Sound |
| b) | Orange Gate Porta Cabins | G | | | | Temp Structure |
| c) | Yellow Gate PD Porta Cabin | G | | | Traffic Dept Gate staff/ CISF on duty/ Customs: Movement of vehicles of Mbpt staff/ Customs/ Defence personnel. | Temp Structure |
| 58 | Red gate PD | G | 57.5 | | TM Office | Sound |
| 59 | Grey gate toilet | G | 62 | Toilets | Toilets | Sound |
| 60 | Blue gate toilet | G | 62 | | | |
| 61 | 19 ID toilet | G | 44.2 | | | |
| 62 | East mole Rest Room | G | 35.5 | Rest Room | Rest Room | |
| 63 | Sarang room ID | G | 61.44 | | | |
| 64 | Blue gate scanner room | G | 40.6 | Baggage Scanners | Baggage Scanning of dock users | |
| 65 | Green gate scanner room | G | 40.6 | | | |
| 66 | Old yellow gate ID house | G | 53.71 | Office | Office | |
| 67 | Green gate toilet | G | 20.25 | Toilet | Toilet | |
| | | | | | | |
| 68 | HDD substation on East side of Dry dock | G | 230.4 | COCHIN SHIPYARD LIMITED | COCHIN SHIPYARD LIMITED | |
| 69 | HDD pumping station and engine room | G | 219.35 | | | |
| 70 | HDD work shop on w side | G | 47.61 | | | |
| 71 | HDD toilet | G | 53.55 | | | |
| 72 | HDD wash room | G | 19.68 | | | |
| 73 | HDD old office | G+2 | 1512 | | | |
| 74 | HDD rest room on east side of Dry dock | G | 78.28 | | | |
| a | | G | 59.4 | | | |
| 75 | Hdd substation on w side | G | 266.77 | | | |
| 76 | HDD work shop on w side | G | 47.61 | | | |
| 77 | | | | | | |
| 78 | | | | Substation | Substation | Sound |

| Area Statement | |
|---|---|
| **Categories** | **Area (Sq.mts.)** |
| Port Storage/Operation Area | 4,20,719.97 |
| Multipurpose Use (Parking, Staking etc) | 10,698.03 |
| | |
| **Port Utilities** | |
| Weigh Bridge Area | 3,919.51 |
| Fire Station | 532.57 |
| Toilets | 160.60 |
| Sub Station | 1,839.79 |
| Pump Rooms | 2,647.76 |
| Baggage Scanner | 39.33 |
| Parking | 1,861.74 |
| | |
| Roads | 1,51,259.34 |
| Area given to CSL | 16,600.09 |
| Waterbody | 2,49,402.89 |

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STAMP OF DATE OF APPROVAL OF PLANS

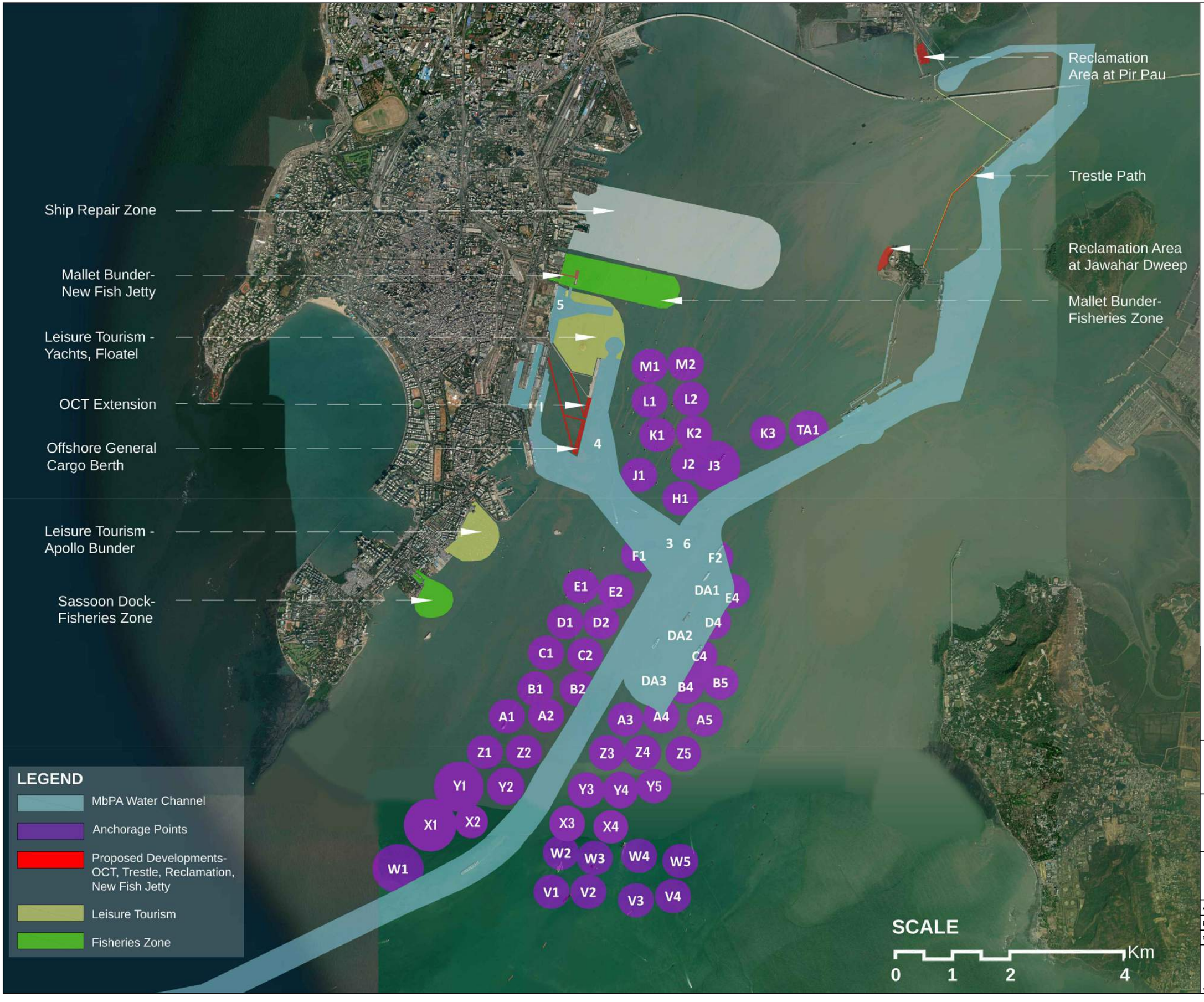
ISO 9001-2000 PORT

मुंबई पत्तन प्राधिकरण
**MUMBAI PORT AUTHORITY**
**CIVIL ENGINEERING DEPARTMENT**
**SPECIAL PLANNING AUTHORITY, MbPA**

TITLE **PROPOSED ZONING OF PORT OPERATIONAL AREA**

| | | DRAWN | CHECKED | DATE | SCALE |
|---|---|---|---|---|---|
| A.E.E.(D) | | Kirti K. | Gayathri | 26-09-2024 | AS SHOWN |
| E.E.(D) | | | | | |
| S.E.(D) | | **DWG.NO. SPA/38/2024** | | | |

ADVISOR PLANNING DY. C.E. CHIEF ENGINEER

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मुंबई पत्तन प्राधिकरण

**MUMBAI PORT AUTHORITY**

**CIVIL ENGINEERING DEPARTMENT**

**SPECIAL PLANNING AUTHORITY, MbPA**

TITLE **PROPOSED ZONING OF MBPA WATERS**

| | | DRAWN | CHECKED | DATE | SCALE |
|---|---|---|---|---|---|
| A.E.E.(D) | | Akshaya K. | Gayathri | 26-09-2024 | AS SHOWN |
| E.E.(D) | | | | | |
| S.E.(D) | | **DWG.NO. SPA/37/2024** | | | |

ADVISOR PLANNING DY. C.E. CHIEF ENGINEER