



CHENNAI PORT AUTHORITY COMPREHENSIVE MASTER PLAN 2047



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EXECUTIVE SUMMARY

Chennai Port's earlier Master Plan, prepared by M/s. AECOM in 2016, was based on infrastructure assessment, the cargo-handling capacity of the port and expected cargo projections up to the year 2035. In their report M/s. AECOM noted that there was no need for capacity augmentation at Chennai Port till the year 2035.

Then envisaged scenario, however, has transformed considerably with the evolution of the trade requirements, the maritime vision of the nation (Maritime India Vision, 2030 – MIV2030), the acquisition of Kamarajar Port by Chennai Port and a strategic shift towards the land-lord model, and has necessitated a revision in the Chennai Port Master Plan.

Moreover, the Ministry of Ports, Shipping and Waterways (MoPSW), vide OM M-25021/36/2021 dated 25.04.2022, directed all Major Ports to prepare a comprehensive Master Plan with a planning horizon up to 2047, i.e., for the entire “Amrit Kaal” leading India to 100 years post-Independence.

Accordingly, this ‘Comprehensive Master Plan 2047’ document for Chennai Port was prepared. This report captures, assesses and evaluates existing port infrastructure and proposes infrastructural interventions based on the regional trade scenario, current market trends and effective land utilization by leveraging capital and efficiency of private sector partners.

All the projects identified in this ‘Comprehensive Master Plan 2047’ aim to align Port's development roadmap with the Government of India's Blue Economy Maritime Vision 2047 and duly consider ongoing and upcoming initiatives, such as National Logistics Policy, PM Gati Shakti initiatives and climate action.

Current Traffic and Future Projections

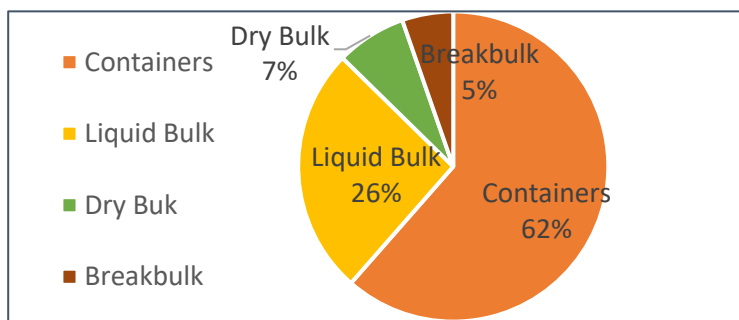
Chennai Port is one of the largest ports in southern India and handles close to 50 MTPA of cargo traffic annually. A notable reduction in cargo throughput during 2019-2021 was mainly due to the impact of a global pandemic – the Covid19, which severely paralyzed global businesses and caused sudden supply-chain disruptions. The cargo handled at Chennai Port in the last five years is mentioned below –



(In '000 Tonnes)

Cargo Category	2021-22	2020-21	2019-20	2018-19	2017-18
Containers	30925	26768	26710	31263	29905
Liquid Bulk	13005	11269	14816	14928	14973
Dry Buk	2401	3193	2104	4567	4432
Breakbulk	2233	2322	3129	2254	2433
Total	48564	43552	46759	53012	51743

Table E-1: Last 5-year Cargo Traffic Volume at Chennai Port



It can be observed that Containers and POL cargo together constitute more than 80% of the total traffic handled at the Chennai Port.

Figure E-1: Breakup of Cargo Traffic at Chennai Port

Traffic Projection

Traffic projections up to 2047 are done in two stages. First, up to 2035 and the second, beyond 2035 leading up to 2047. Traffic projections for the next 10 to 12 years, i.e., up to 2035, are detail oriented, include cargo category-wise in-depth analysis and based on the current market trends, regional trade scenario, industrial cluster assessment, Maritime India Vision - 2030 document (prepared by BCG in December 2020), and the M/s. AECOM report (2016-17) on Chennai Port Master Plan.

However, similar projection beyond 10 to 12 years into future, i.e., beyond 2035, may lose its effectiveness as it may become a biased projection based on the historic trends. Black swan events, which are extremely rare and have severe consequences, such as, trade sanctions, legal restrictions, natural disaster, etc., may significantly alter the course of Port's future. Therefore, for projections beyond 2035 and leading up to 2047, scenarios planning methodology is used which captures the impact of diverse factors on trade and connectivity, considers multiple future scenarios and lays out optimal development roadmap with contingent measures.



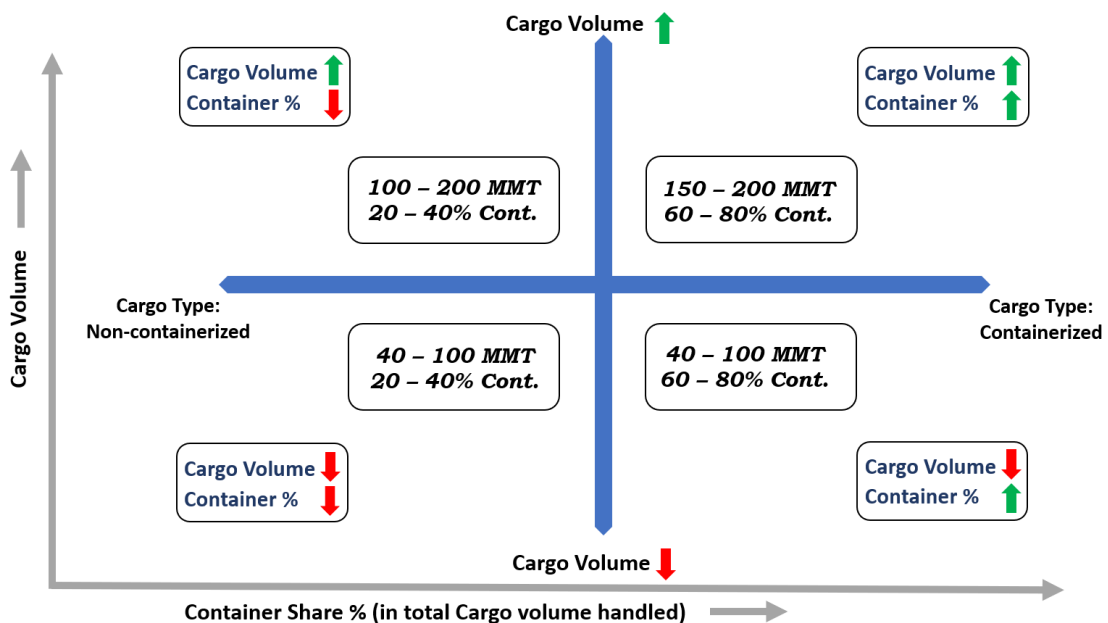
The cargo traffic projections for FY25, FY30 and FY35 are tabulated below:

#	Category	Commodities	Projections (MMT)		
			FY2025	FY2030	FY2035
1	Petroleum Oil	Crude & POL	12.5	12.5	12.5
2	Other Liquids	Edible Oil & Chemicals	2.0	2.7	3.7
3	Container	Containerized Cargo	33.2	41.6	52.0
4	Break-Bulk	Iron & Steel, Project, Granite Blocks, etc.	2.3	2.6	3.2
5	RoRo	Cars, Buses, MAFI	0.2	0.3	0.3
6	Sensitive Dry Bulk	Muriate of Potash, Sulphur, Urea, Food Grain, silica sand, sugar, etc.	0.5	0.5	0.5
7	Other Dry Bulk	Rock Phosphate, Dolomite, Limestone, Iron ore pellet, Shredded scrap, Barytes, etc.	3.9	3.9	4.0
#	Total	---	54.6	64.1	76.2

Table E-2: Cargo Traffic Projections for Chennai Port

For cargo traffic projections beyond 2035 and up to 2047, more than 50 diverse factors, which can impact EXIM trade and logistics, were analysed. All these factors, in some way or the other, influence freight flow by shifting port of import/export, diversions/ modal shift in the cargo routing, change in cargo volume and type.

Whilst change in port of import/export and routing do not require much infrastructural planning from the Port's perspective, change in cargo volume and type do have a major role in identifying and planning infrastructure projects for the future, thus ensuring business continuity for the Port. This helped us create four distinct but *plausible scenarios for 2047* which are depicted below:





Containers

Chennai Port handles around 1.5 Mn TEUs per year of container cargo. Due to fierce competition amongst Adani Ennore Container Terminal (AECT), Kattupalli International Container Terminal (KICT), and Navayuga Container Terminal (NCT), which cater to the same hinterland, Chennai Port container market share has reduced from 62% to 51% since 2017-18. The container cargo forecast at the Chennai Port is made with a vision to maintain the existing market share of 50% and not to let it erode further.

MIV 2030 report estimates container traffic to grow by 25-30 MMT till FY 2030 (1.3 – 1.6 Mn TEUs) in the Southern AP and North TN region. For Chennai Port to maintain its current market share of 50%, the port must attract half (i.e. 0.7 Mn TEUs) of the expected growth till FY 2030. Therefore, Chennai Port shall plan to add sufficient capacity to handle 2.2 Mn TEUs (1.5 + 0.7) per year by the year 2030. This growth is at 4% CAGR, lesser than M/s. EY's projections of 5%-7% CAGR for containers in the southern AP and North TN region as per their container market study (2018).

POL

The majority of the POL cargo consists of crude imports by CPCL Manali Refinery. Since the CPCL plant is operating at near-full capacity and there are no plans of refinery capacity increment in the Chennai region. The earlier proposal of CPCL to increase the plant capacity in the Chennai region has been modified to a new refinery facility at Nagapattinam. Hence, there shall not be a significant increase in the POL import traffic at the Chennai Port. Moreover, the coastal POL products may shift to KPL as OMCs like IOCL are developing terminals at KPL.

Port Capacity – Current status and future augmentation

Chennai Port has three docks – Bharathi Dock, Ambedkar Dock and Jawahar Dock have a total of 27 berths. The major commodities handled in Chennai Port are Containers, POL, Automobiles, Fertilizers and other general cargo. All cargo grades that can be handled at Chennai Port are grouped into 7 categories, as mentioned below, based on their unique requirement of berth type, cargo handling equipment, storage requirements, and connectivity.



These cargo grades are then mapped to the ideal berths at Chennai Port, optimally suiting the cargo requirement. The capacities of those berths are then compared against the forecasted growth of the cargo to assess the berth capacity augmentation requirement. The requirement of sea-side infrastructure, at-berth infrastructure, storage infrastructure, connectivity and value-add infrastructure are also assessed in order to holistically identify the capacity augmentation needs of the Chennai Port.

#	Category	Commodities	Ideal Berth/s	Desired Berth Capacity (MMTPA)	Projections (MMT)		
					FY2025	FY2030	FY2035
1	Petroleum Oil	Crude & POL	BD1, BD3, Bunker	23.4	12.5	12.5	12.5
2	Other Liquids*	Edible Oil & Chemicals	BD2, NQ, SQ2	3.7	2.0	2.7	3.7
3	Container#	Containerized Cargo	CTB 1-4 & SCB 1-3	51.6	33.2	41.6	52.0
4	Break-Bulk	Iron & Steel, Project, Granite Blocks, etc.	WQ 3-4, CQ	5.0	2.3	2.6	3.2
5	RoRo	Cars, Buses, MAFI	WQ 1-2, CB 1-2	2.9	0.2	0.3	0.3
6	Sensitive Dry Bulk	Eg: Muriate of Potash, Sulphur, Urea, Food Grain, silica sand, sugar	SQ 1, JD 1, 3, 5	9.9	0.5	0.5	0.5
7	Other Dry Bulk	Eg: Rock Phosphate, Dolomite, Limestone, Iron ore pellet, Barytes, Shredded scrap	JD 2, 4, 6	7.4	3.9	3.9	4.0
#	Total	---	27 Berths	103.9	54.6	64.1	76.2

Table E-3: Cargo Category wise berth capacity and cargo projections

It can be observed from the table above that the cargo growth in item nos. 2 and 3 are expected to match up with the desired berth capacity in the year 2035, therefore, capacity augmentation projects need to be taken up well before the year 2035 to meet the forecasted demand. Likewise, sea-side infrastructure, such as, approach channel width and depth, turning circle, depth at berth, tug boat requirement, etc.; cargo storage infrastructure, such as, cargo sheds, tank farms, paved storage, etc. and connectivity infrastructure such as internal roads/bridges, rail network and sidings, pipelines, coastal transshipment etc. are studied in detail to identify the shelf of projects that may be taken up by the Chennai Port till 2047.



The ongoing list of projects at Chennai Port is mentioned below:

- i. Development of Bunker Berth
- ii. Goods shed at Jolarpettai
- iii. Multi-Modal Logistics Park (MMLP) at Mappedu
- iv. Trailer Parking area at 24B (BD II) backup area
- v. Drive-through Container scanner
- vi. Development of dry dock at Timber Pond and Boat Basin by ICG
- vii. Privatization of oil docks and bunker berth
- viii. Four-lane Elevated Corridor from Maduravoyal to Chennai Port

In order to continue meeting the trade requirements and further facilitate EXIM trade for the regional businesses, a shelf of projects identified for the Chennai Port along with the implementation timelines is mentioned below at table E.4. While we exercised all due diligence in envisioning market variables and uncontrollable factors to forecast cargo and identify projects to meet future demand, since the time horizon is of 25 years, it is suggested that this Comprehensive Master Plan 2047 be revisited during 2035, 2 years before the completion of concession agreement tenure for PSA terminal, alongside the feasibility study for new container terminal in place of existing PSA terminal.

All the projects listed below closely align Port's development with the development roadmap envisaged in the Government of India's Blue Economy Maritime Vision 2047 and planned to meet evolving regional trade requirements up to 2047.

SN	Project description	Implementation method/ Agency	Start Date	Target Completion Date	Tentative Cost (Cr.)
Near-Term Projects (next 3 years, up to 2025)					
1	Goods Shed at Jolarpettai	Self	2021	2023	5
2	Parking area for at least 500 trucks @ BDII backup area	Self-funded	2023	2023	53
3	Enhanced Gate throughput through digital initiatives	EBS	2022	2023	44.45
4	Road infrastructure assessment study by consultants	Self-funded	2023	2023	2
5	Outsource O&M of BD1 & 3	PPP	2024	2026	50
6	Outsource O&M of Bunker Berth	PPP	2023	2024	200
7	Widening of JD entrance	Self-funded	2023	2025	180



SN	Project description	Implementation method/ Agency	Start Date	Target Completion Date	Tentative Cost (Cr.)
8	Mobile container scanner @gate10	Self + DoL	2023	2025	40
9	Cargo Sheds near EXIM Godowns	Self + Sagarmala, PPP	2023	2025	90
10	Internal road upgradation/ new Road Over Bridge(s)	Self + Sagarmala	2024	2025	300
11	MMLP at Mappedu	PPP	2023	2025	1500
12	Chennai Port-Maduravoyal flyover	NHAI	2023	2025	6000
13	Chartering of Tug Boat(s)	Self-funded	2023	2025	12Cr./tug/yr.
14	Dredging of container berths	PPP Operator	2024	2025	3
15	Dredging of JD East (15 mtrs.)	Self-funded	2024	2025	3
16	Dredging of turning circles BD+AD	Self + Sagarmala	2024	2025	25
17	Widening of AD entrance to 180 m	Self	2024	2025	30
Medium-term Projects (3 to 10 years, up to 2032)					
18	Pavement at Coastal berth backup area for car storage by car OEM(s)	Self-funded	2025	2026	20
19	Rail siding at EXIM cargo sheds	Self	2025	2025	20
20	Edible Oil storage tanks north of INS Adyar	Long-term lease	2025	2027	160
21	JD berths including SQ1 on PPP	PPP	2025	2028	1200
22	Land Reclamation north of northern break water	Self	2026	2031	500
23	Drive-through container scanner near gate 10	self	2027	2030	100
24	Container Terminal at CCT & BD2	PPP	2029	2033	900
25	Parking area for 500 trucks each near gate '1' ad gate '10'	Self	2031	2032	100
Long-Term Projects (10 to 25 years, up to 2047)					
26	Strengthening of WQ berths (30 mtrs. Seawards, reclaim 6.5 acres)	Self	2035	2037	1000
27	Demolition of North Groin, make BD and WQ berths continuous	Self + Sagarmala	2035	2037	800
28	Expansion of Cruise Pax. Terminal	PPP	2037	2039	250
29	Dredging of Docks/berths/channel	Self + Sagarmala	2037	2038	1000
30	Container terminal in place of PSA	PPP	2035	2039	2000
31	Additional road over bridges	Self + Sagarmala	2039	2041	1000
32	Parking Plazas for private cars/ cargo vehicles	PPP	2039	2041	150
33	External Road Connectivity - Northern Side Sea Link up to Outer Ring Road approx. 30 kms*	NHAI	2040	2045	18000
34	Mega Cont. Terminal/CFSS/ ICDs*	PPP	2040	2045	36000
35	Mega Multi-Cargo Terminal, cargo storages*	PPP	2040	2045	36000
36	Marina, Ro-Pax*	PPP	2040	2042	200
37	Hotels, Lounges, Restaurants, Water Park*	PPP	2040	2042	200

Table E-4: Shelf of Projects identified for Chennai Port up to 2047

*Contingent measures, to be taken up based on reassessment during 2035.



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1. INTRODUCTION

1.1. Background

M/s. AECOM had prepared Master Plan for Chennai Port in 2016. They studied the traffic handled at Chennai Port. The highlights of the AECOM report are below:

- Container and POL constitute more than 80% of the port Cargo volume.
- Roughly 1.5 million TEUs container traffic may reduce to 0.9 mn TEUs by 2020 and 1.2~1.4 mn by 2025 due to significant competition from Krishnapatnam, Katupalli and Ennore ports.
- The Crude Oil import (~10 MMTPA) by CPCL for the Manali refinery may increase as the refinery operates at near capacity, catering to increasing hinterland demand. The coastal petroleum products, however, are expected to shift to KPL as Oil companies have been shifting their terminals at Ennore.

AECOM recommended that there is no need for capacity augmentation at the Chennai Port and that the port should focus on enhancing the efficiency and productivity of the existing facilities.

Cargo handled	Current Capacity at Desired Occupancy	Actual Traffic (MMTPA) FY 2020	AECOM Projections (MMTPA)				
			FY2020	FY2025		FY2035	
				Base	Optimistic	Base	Optimistic
Crude & POL	23.4	13.4	13.3	13.1	18.8	14.3	19.2
Dry, Breakbulk, Edible oil etc	28.9	6.6	17.6*	13.9	22.2	18.1	35.5
Containers	51.6	26.7	17.4	23.2	27.0	38.6	46.3
Total	103.9	46.8	48.3	50.2	68.0	71.0	101.0

Table 1-1: AECOM Traffic Projections vs. Actual cargo handled in FY 2020

*Thermal Coal and Iron Ore handling was envisaged contingent on permission from the Hon'ble High Court of Madras.



Chennai Port is facing severe competition from neighbouring ports since around five ports cater to the same hinterland. Despite stiff competition and the devastating impact of the COVID19 pandemic during 2019-2021, Chennai Port achieved significantly higher Container Traffic volume in FY2020 than the container cargo projections of the AECOM report for FY2020. The higher container throughput may be attributed to a higher increase in the container market forecasted in the AECOM report and the attractive container-related schemes of the port such as DPD/DPE, competitive vessel-related charges, better traffic flow measures and eased out customs procedures. A significant difference between the actual volume of Dry and Breakbulk cargo and the projected volume of these cargoes by AECOM is due to the optimistic assumption of handling coal and iron ore upon permission of the Hon'ble Supreme Court. The break-up of these categories is mentioned below -

Cargo handled	Actual Traffic (MMT)		AECOM Projections (MMT)					Remarks
	FY19	FY20	FY20	FY25 Base	FY25 Optimistic	FY35 Base	FY35 Optimistic	
Edible oil	1.4	1.2	1.7	1.8	2.1	3.0	3.4	
Coal & Iron Ore	0	0	6.3	0.3	7.3	0.4	12.9	Contingent to permission by Hon'ble SC
Steel	1.5	2.4	1.9	2.5	2.9	3	5.5	
Limestone	1.9	0.3	2.1	2.3	2.5	1.2	1.2	
Dolomite	0.6	0.3	0.6	0.5	0.5	0.3	0.3	
Fertilizer	0.3	0.2	0.7	0.8	0.9	1	1.4	
Others (Highly Fragmented)	2.8	2.2	4.3	5.7	6	9.2	10.8	
Total	8.5	6.6	17.6	13.9	22.2	18.1	35.5	

Table 1-2: Break-up of Dry/Break-bulk, Edible Oil, etc. Actual Traffic vs. AECOM Projections



Due to the continued restriction on handling dusty cargo, such as coal and iron ore, at Chennai Port, the projected traffic of Coal and Iron Ore was not achieved at Chennai Port. Though there was an increase in the steel products, there has parallelly been a shortfall in other cargos like Limestone, Dolomite, fertilizers and other highly fragmented dry bulk cargos mainly due to stiff competition and marginally due to COVID19 impact.

1.2. Recent Development

After a recent acquisition of Govt of India's shares in Kamarajar Port Ltd., Chennai Port fully acquired the KPL, Kamarajar Port Limited. This strategic acquisition aims to bring operational and financial synergies. It will help Chennai and Kamarajar port to better face the regional competition and provide enhanced services to the port users. Chennai Port would aim to maximize utilization of its existing capacity to handle clean cargo such as Containers, cars, Liquid Cargo, cruise, passenger traffic, etc. while KPL will carry out major expansion projects and create additional capacities for all other types of bulk, dry and liquid cargo.

MIV 2030 Report elaborates Ministry of Shipping, Ports and Waterways (MoPSW) vision of privatising berths at Major Ports under the PPP basis to bring enhanced productivity and efficiency using state of the art infrastructure and private investments, thereby reducing the total logistics cost. Currently, out of 26 berths in Chennai Port, 7 berths are operated under the PPP model. This report further studies the possibilities of PPP projects on oil berths, multi-cargo berths and the bunker berth.

The enactment of the Major Port Authorities Act, 2021, has provided enhanced control to the Boards of the Major Ports. The faster decision making and agility to respond to rapidly changing global and regional scenarios need a fresh outlook on the Chennai Port vision.

Based on these developments, Chennai Port 'Master Plan 2035' was revised and after Chennai Port Board's approval vide BR No. 158 dated 28.01.2022, the revised 'Master Plan 2035' was communicated to the Ministry of Ports, Shipping and Waterways (MoPSW) and Indian Ports Association (IPA) via email dated 18.02.2022. This 'Master Plan 2035' laid out the infrastructural roadmap till the year 2035.



Subsequently, the MoPSW vide OM M-25021/36/2021 dated 25.04.2022 directed all Major Ports to prepare a comprehensive Master Plan with a planning horizon up to 2047, i.e., for the entire “Amrit Kaal” leading India to 100 years post-Independence. Based on the new directions of the MoPSW, the Master Plan 2035, approved by the Port’s Board in January 2022, was evaluated and found to be in line with the Ministry’s guidelines.

Recognizing the extent of deliberations and due-diligence involved in the preparation of ‘Master Plan 2035’ and finding that the report covers the scope of Master Plan study as per the MoPSW, the same projects are proposed in this ‘Comprehensive Master Plan 2047’ up to the year 2035, with minor changes in the implementation timelines, and in addition new projects have been identified to cover the remaining planning horizon, i.e., from 2035 to 2047. All the projects identified in this ‘Comprehensive Master Plan 2047’ aim to align Port’s future roadmap with the National Vision 2047 and duly consider ongoing and upcoming initiatives, such as, National Logistics Policy, PM Gati Shakti initiatives and climate action.

1.3. Outline of the Report

This Master Plan for Chennai Port is a revised document, prepared in January 2022, and is based on the latest market scenario and the Maritime Vision (2030) of India. This report is organised in the following sections:

Section 1	Introduction
Section 2	Port Site and Conditions
Section 3	Details of Existing Facilities
Section 4	Performance and Capacity assessment
Section 5	Details of Ongoing Developments
Section 6	Traffic Projections
Section 7	Capacity Augmentation Requirements
Section 8	Road and Rail – Internal Network and External Connectivity
Section 9	Infrastructure Planning up to 2047 and Shelf of Projects
Section 10	Land usage at Chennai Port



2. THE PORT AND SITE CONDITION

2.1. Chennai Port Location

The location of Chennai Port is shown below:



Figure 2-1: Location of the Chennai Port

Chennai Port is the third oldest and about 140 years old, among the twelve major ports of India. It has the strategic advantage of having entire South India as its hinterland and is emerging as a hub port on the East Coast of India. Chennai Port is located at latitude 13°06' N and longitude 80°18' E on the southeast coast of India and in the northeast corner of Tamil Nadu. Port location is on the flat eastern coastal plain. The location advantage enables the port to handle a variety of cargo comprising containers, liquid & breakbulk cargo.

The port comprises of three dock systems viz. Ambedkar Dock, Jawahar Dock and Bharathi Dock. It has a total of 27 berths with a total quay length of around 6 km. The maximum draft available is 17.4 m at some of these berths. The port is approached through a 7.0 km channel with water depths in the outer channel being 19.2 m at chart datum and that of the inner channel being 18.6 m at chart datum. The Port has a total land area of approx. 330 ha. (approx. 284 ha. inside custom-bonded area and approx. 46 ha. outside custom-bonded area) and water spread area of 159 ha.



2.2. Rail and Road Connectivity

The below figure shows the rail and road connectivity of the Chennai Port to its hinterland.

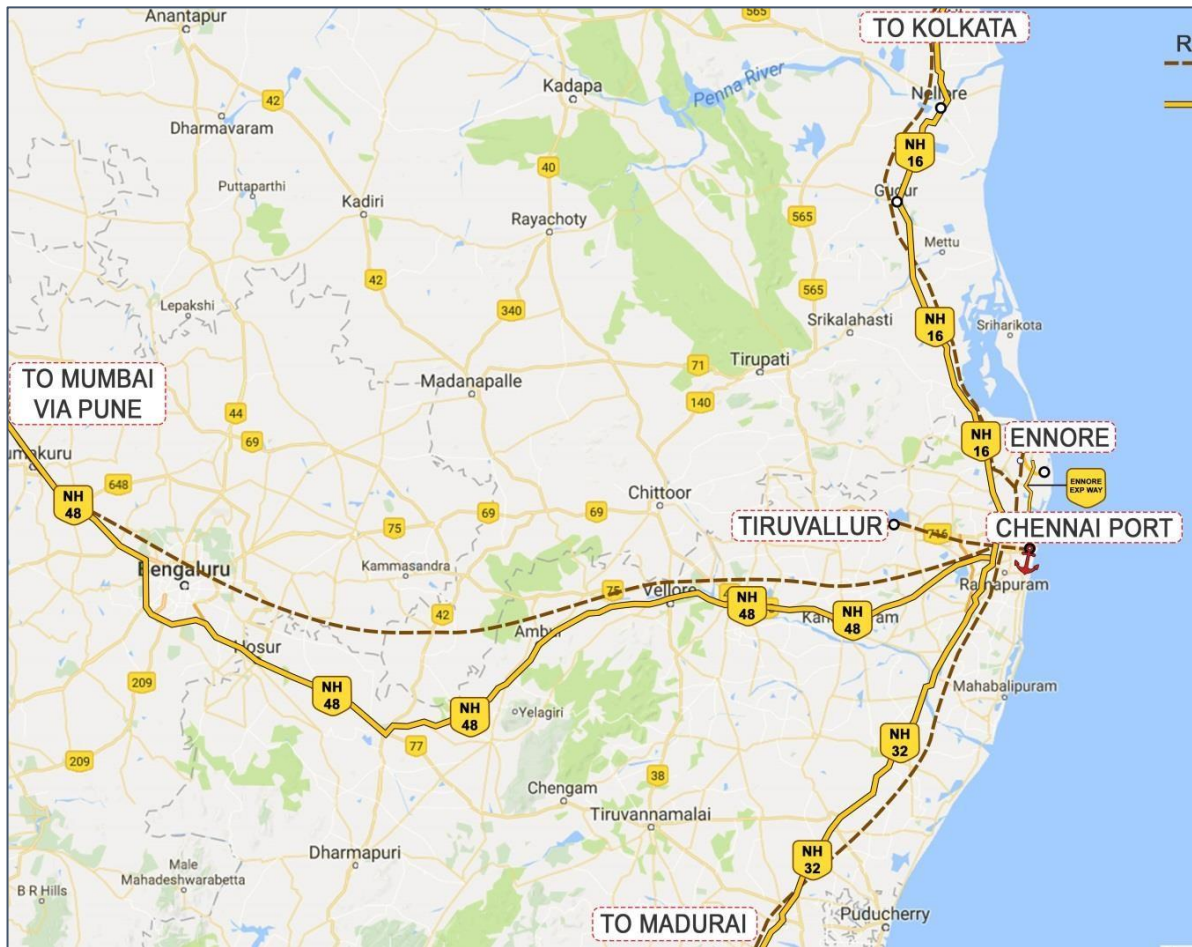


Figure 2-2: Rail and Road Connectivity to/ from Chennai Port

2.2.1 Rail connectivity

Chennai Port is well connected with the Indian railway network. The Port is linked to the Southern Railway network through Chennai Beach Railway Station which connects Chennai Port to Southern parts of Tamil Nadu and through Royapuram Railway Station which connects the Southern Railway Trunkline to Kolkata, New Delhi, Bangalore, Coimbatore etc. The Port also has an internal rail network of about 30 kms.

2.2.2 Road Connectivity

Chennai is well connected to other major cities through national highways. It is connected to Kolkata through NH16 (Old NH 5), to Mumbai through NH 48 (Old NH 4) and to Kanyakumari through NH 32 (Old NH 45).



2.3. Site Conditions

2.3.1 Meteorology

The climate in the region has a typical monsoon character. Two monsoons dominate the Chennai climate - the SW summer monsoon and the NE winter monsoon. The summer monsoon starts around May and holds until September. The NE monsoon starts by the latter half of October and lasts until February of the following year. The summer monsoon is stronger than the winter monsoon and the months between both monsoons form a transition period of calmer weather. Storms occur, particularly in the autumn months.

Winds

The wind rose indicating the wind climate near Chennai is given in the below figure:

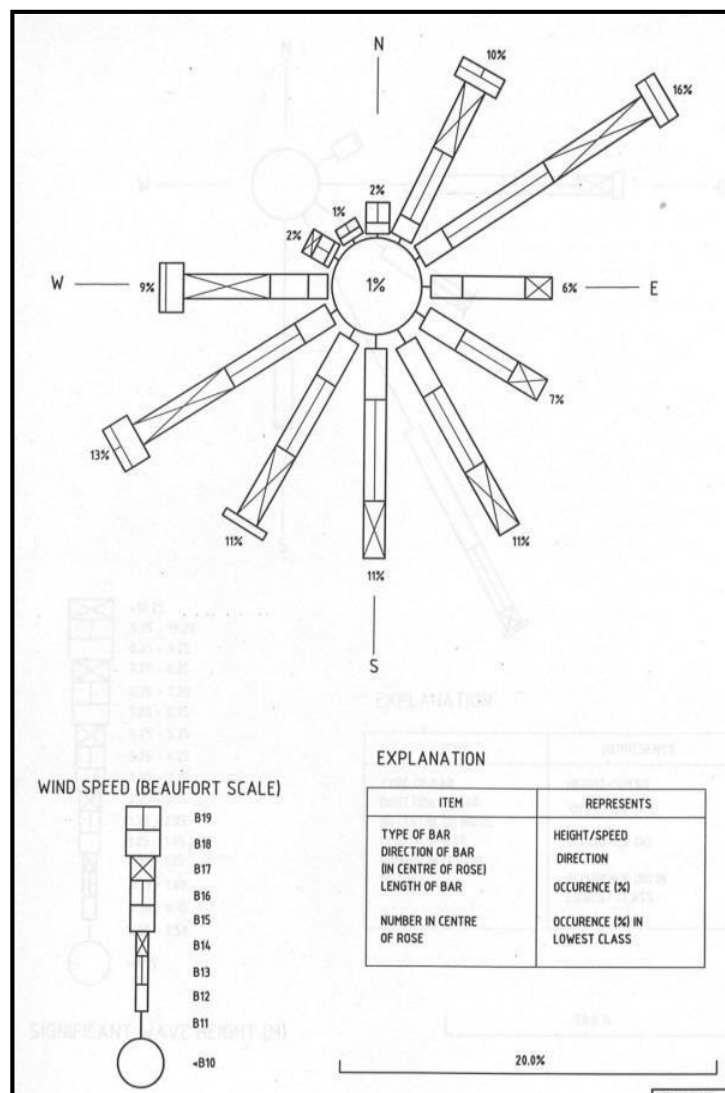


Figure 2-3: Wind Rose Diagram for Chennai Region



The geographical position of the coast makes the region experience the NE monsoon between October to February and the SW monsoon from May to September. South to southeast wind direction also occurs frequently, mainly during the transition period between the two monsoons.

The wind conditions that prevail in deep waters during the monsoons are summarized below.

- NE Monsoon:
 - Wind direction: 049° - 087°, relative to the North
 - Wind speed: 5.9 - 7.5 m/s
- SW Monsoon:
 - Wind direction: 153° - 263°, relative to the North
 - Wind speed: 2 - 12 m/s

Rainfall

The region gets rainfall during October and November from NE Monsoon. During this time, temperatures are lower and humidity is high. June to September may receive a certain amount of rainfall as well. The pre-monsoon rainfall is almost uniform throughout the Chennai district. The coastal regions receive more rainfall than the interior ones. The NE and SW monsoons are the major donors, with 54% and 36% contributions respectively to the total annual rainfall. During a normal monsoon, the district receives rainfall of around 1,200 mm.

Air Temperature

The average monthly air temperature varies from 37° C in May and June to about 29° C during December and January. The average minimum temperature varies from 28° C in May to June to 21° C in January and February. The highest recorded temperature is 43° C and the lowest recorded temperature is 15° C.



2.3.2 Oceanography

Tides

The tides at Chennai are semi-diurnal with a tidal range, relative to the Chart Datum (CD), as follows:

– Highest high water level	(HHWL)	+ 1.50 m
– Mean high water springs	(MHWS)	+ 1.10 m
– Mean high water neaps	(MHWN)	+ 0.80 m
– Mean Sea Level	(MSL)	+ 0.54 m
– Mean low water neaps	(MLWN)	+ 0.40 m
– Mean low water springs	(MLWS)	+ 0.10 m
– Lowest low water	(LLWL)	- 0.10 m

Currents

Chennai Port has observed the following current patterns in their area:

In January, the current sets South Westward or Northward at a rate of 1 to 1.5 knots. But it is irregular in February (Northward parallel with the coast 1.5 knots). During March, April and May, the current sets Northward at 1 to 3 knots. In June variable but sometimes Southward and weak in July and in August southward or against the wind from 2 to 3 knots at times. In September, the current sets South and South-westwards and in October, Southerly along the coast. In November and December, the current sets South Westerly or Southerly along the coast.

Waves

As the near-shore area off Chennai is sheltered from the westerly winds by the mainland, the strong southerly to westerly winds during the southwest monsoon does not cause high waves due to the limited fetch available. Consequently, the wave conditions at Chennai are moderate.

Waves at Chennai approach predominantly from two directions:

- 135° N during March-September, and
- 090° N during November-January

During the transition period (during February and October), waves approach from 115° N. The wave height is around 2.5 – 3 m with a wave period of 10 s during the northeast monsoon and 2 – 2.5 m with a wave period of 6 s during the southwest monsoon.



The wave rose diagram for offshore Chennai is shown in the below figure:

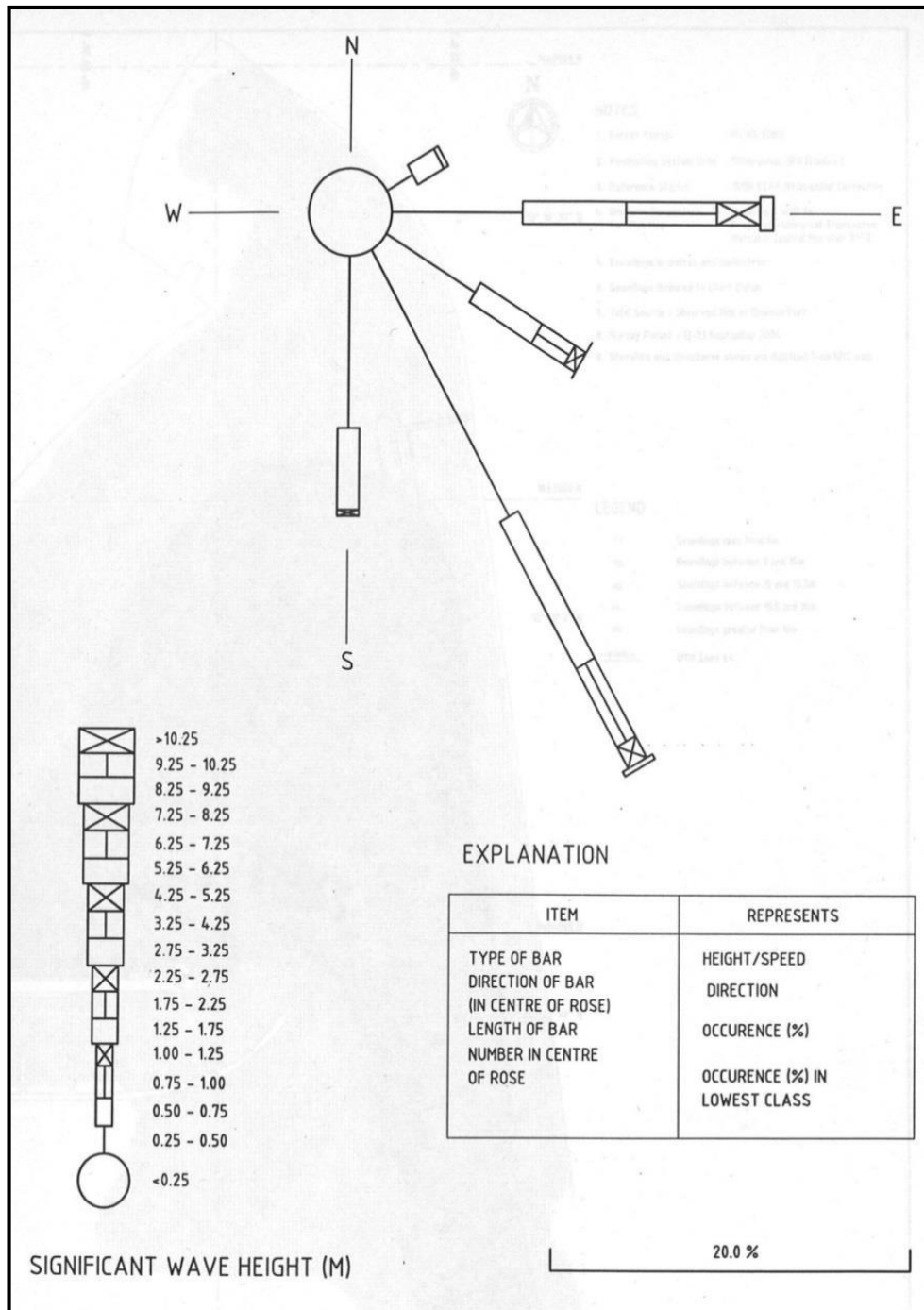


Figure 2-4: Wave Rose Diagram for Chennai Offshore region



3. DETAILS OF EXISTING FACILITIES

3.1. Existing Facilities

Chennai Port has three Docks - Bharathi Dock, Ambedkar Dock and Jawahar Dock. The existing Container Terminals are situated in Bharathi Dock and Ambedkar Dock. Bharathi Dock contains 10 berths, Ambedkar Dock has 11 berths, and Jawahar Dock contains 6 berths, all totalling to 27 berths. The major commodities handled in the Port are Crude oil & POL products, Containers, Automobiles, Edible oil, and general cargo. The locations of these docks are shown in the following Figure:



Figure 3-1: Location of Docks at Chennai Port

Entrance Channel:

Length of Channel	-	About 7 kms
Depth of Inner Channel	-	18.6 m at Chart Datum
Depth of Outer Channel	-	19.2 m at Chart Datum
Width of Channel	-	The width of channel gradually increases from 244 m to 410 m at the bent portion, then maintains a constant width of 305 m

Outer Harbour:

Inner Harbour:

<i>Infrastructure</i>	<i>Dimension</i>	<i>Infrastructure</i>	<i>Dimension</i>
Eastern Breakwater	590 m	Eastern Breakwater	1325 m
Northern Breakwater	460 m	Northern Breakwater	575 m
Outer Arm	1000 m		
Turning Circle	560		

The details of three docks with their berths are brought hereunder:



3.2. Bharathi Dock (BD)

Bharathi Dock is a relatively new addition to the port having been constructed during the late sixties and early seventies of the 20th Century. It provides handling facilities for POL, edible oil and containers. The entrance to the Dock is 350 m wide. Particulars of berths at Bharathi Dock have been presented in the below Table.

Name	Commodity	Length (m)	Scheduled Depth (from CD) (m)
26B (BD I)	POL	356	-16.0
24B (BD II)	Multi	382	-17.4
27B (BD III)	POL - Crude	325	-17.4
20B (CTB I)	Containers	200	-13.9
21B (CTB II)	Containers	200	-13.9
22B (CTB III)	Containers	200	-13.9
23B (CTB IV)	Containers	285	-15.5
1B (Coastal Berth)	Multi - Coastal	130	-11.9
2B (Coastal Berth)	Multi - Coastal	130	-11.9
25B Bunker Berth (Under Construction)	Bunkering Fuel and Edible Oil	182	-9.0

Table 3-1: Details of Berths at Bharathi Dock

3.2.1 POL Berths – 26B and 27B (BD I and BD III)

The POL berths are shown in Figure 3.2. 26B - BD I, commissioned in 1972, has been designed to handle tankers up to 100,000 DWT, while 27B - BD III, commissioned in 1986, has been designed for 140,000 DWT tankers. BD I berth has been provided with 5 × 12" marine loading arms while BD III has been provided with 4 × 16" + 2 × 12" marine loading arms. Both the berths are served by 1 × 42" pipeline for crude oil; 1 × 20" pipeline for white oils and 2 × 14" pipeline for black oils. There are separate service lines for LDO/FO/LO bunkers. These berths are provided with firefighting facilities including tower monitors served by a firefighting pump house with requisite pumps and connecting pipelines. The reception facilities, in accordance with the MARPOL Convention, have been provided for receiving ballast, sludge and slop.



Figure 3-2: POL Berths - 26B and 27B (BD I & BD III)

3.2.2 Multi-Cargo Berth - 24B (BD II)

The berth 24B (BD II) with the backup area is shown in Figure 3.3. This berth was originally commissioned in 1977 to handle iron ore carriers up to 150,000 DWT. It was designed for receiving, stockpiling, reclaiming, weighing, sampling and ship loading with the facilities consisting of two rotary wagon tipplers, two lines of conveyors, two rail-mounted stackers, two rail-mounted bucket-wheel reclaimers and two rail-mounted ship loaders. Later, with the decision to shift iron ore handling to Kamarajar port and, due to the ban on iron ore exports, the iron ore loading and unloading facilities have been dismantled. The berth is presently used for handling edible oil imports.



Figure 3-3: Berth 24B (BD II)



3.2.3 Container Berths - 20B, 21B, 22B and 23B (CTB 1, CTB2, CTB3, CTB4)

Chennai Port was the first port to start container handling operations in 1983. This was later handed over to Chennai Container Terminal Private Limited (CCTPL), a Special Purpose Vehicle, formed by the consortium of M/s P&O Australia Ports Pty. Limited, and three others in 2001 for development, operation and management of the container terminal on a Build, Operate and Transfer (BOT) basis for 30 years. In 2006, DP World, one of the world's largest container terminal operators, acquired P&O Steamship Navigation Company, UK thereby acquiring the 75% stake held by it. In 2008, DP World acquired the balance stake held by other consortium members effectively controlling 100% stake in CCTPL.

The Container Terminal with four berths CTB 1 to 4, rechristened as 20B to 23B, has a quay length of 885 m. It can accommodate container vessels up to 6,400 TEU capacity. The total yard area is 17.5 ha and accommodates 3,960 ground slots with a holding capacity of 19,800 TEUs. It has 330 reefer plugs. The yard also houses a Container Freight Station of 6,500 m² area. The terminal is served by 7 Quay cranes and 22 RTGs. Its capacity is 1.6 MTEU per annum.

The berths with the backup area are shown in the below figure:



Figure 3-4: Container Terminal in the Bharathi Dock



3.2.4 Coastal Berths – (1B and 2B)

Taking into account the increasing demand for coastal shipping, and the strategic location of Chennai Port on the maritime map of the country, the port in 2019 commissioned a coastal terminal, a set of two berths, near the northern sheltering arm of Ambedkar Dock. This terminal will be outside the custom bonded area of the port and have a capacity of 1 MTPA.

The Coastal Terminal has a wharf structure of 260 m × 16 m to 19.5 m constructed with piled structure with a depth of (-)11.88m CD to accommodate vessels up to 30,000 DWT. The adjacent reclaimed area of about 16 000 Sqm has been developed as a backup area for the storage of cargo. A dedicated road is provided with a width of 9.0 m from the coastal road along the shore. The Coastal terminal was inaugurated by the Hon'ble Shipping Minister in November 2019.



Figure 3-5: Coastal Berths (1B and 2B)

3.2.5 Bunker Berth – (25B)

The bunker berth is 182 meters long and 16.5 meters wide with depth alongside to suit a vessel with maximum draft of 8.3 meters. It is situated at the northern arm of the northern breakwater. The rated capacity of this berth is 1 MTPA. This berth is envisaged to make Chennai Port a bunkering hub on the east coast of India.

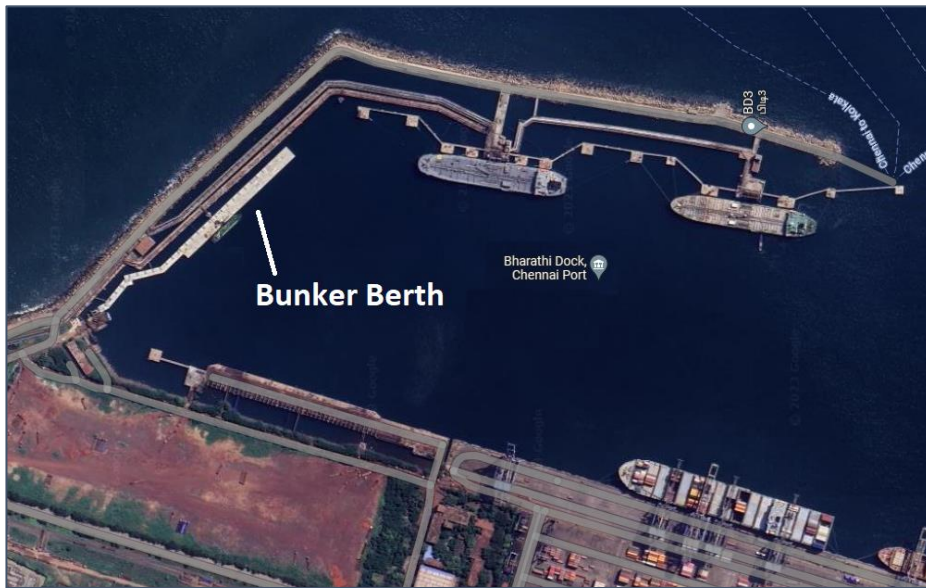


Figure 3-6: Bunker Berth at Bharathi Dock

3.3. Dr. Ambedkar Dock (AD)

Dr. Ambedkar Dock is the oldest original dock, more than 125 years old. It has 11 berths, with a total quay length of around 2,310 m. The entrance width of the dock is 125 m. The components are North Quay, West Quay, South Quay and East Quay, where the second container terminal is located. It also has two finger jetties which are presently used by the Navy and Coast Guard. These berths cater to automobiles, passengers, general cargo, fertilizers and containers. Berth particulars and the commodities handled are presented in the below Table:

Name	Commodity	Length (m)	Scheduled Depth (from CD) (m)
19A (North Quay)	GC/Liquid Bulk	198	-8.5
18A (West Quay I)	GC/Ro-Ro/Other Liquids	171	-11.0
17A (West Quay II)	GC/Ro-Ro/Other Liquids	171	-12.0
16A (Centre Quay)	GC/Food grains	171	-12.0
15A (West Quay III)	GC/Food grains	171	-12.0
14A (West Quay IV)	GC/Passenger	171	-11.0
13A (South Quay I)	Fertilizer / GC/Dry Bulk	246	-9.5
6A (South Quay II)	Fertilizer / GC/Dry Bulk/Liquid Bulk	179	-9.5
5A (Second Container Berth – I)	Containers	287	-15.5
4A (Second Container Berth – II)	Containers	270	-15.5
3A (Second Container Berth – III)	Containers	275	-15.5

Table 3-2: Dr. Ambedkar Dock Berths



3.3.1 North Quay and West Quay Berths – 14A, 15A, 16A, 17A, 18A, 19A (WQ4, WQ3, CB, WQ2, WQ1 and NQ)

The berths with their backup area /sheds are shown in the below figure:



Figure 3-7: North Quay and West Quay Berths

The 19A (NQ) berth is used for handling general cargo and edible oil. 18A (WQ 1) & 17A (WQ 2) are used to handle car carriers for automobile exports. These berths have a backup area of over 54,400 m² (WQ 1 and WQ 2 = 32,992 m² + car yard = 21, 402 m²) in two plots. 16A (CB) and 15A (WQ 3) are used for handling general cargo and food grains. They have transit sheds behind. 14A (WQ 4) handles general cargo as well as passenger vessels. For this purpose, it is provided with a passenger station with all infrastructures.

3.3.2 South Quay Berths – 6A and 13A (SQ2 and SQ1)

13A (SQ 1) handles general cargo, dry bulk and fertilizers while 6A (SQ 2) handles fertilizers and edible oil/Phosphoric acid. The phosphoric acid tanks of Madras Fertilisers Ltd. and edible oil tanks of IMC are located just behind this berth.

The berths with their backup area are shown below:



Figure 3-8: South Quay Berths

3.3.3 Container Berths – 3A, 4A and 5A (SCB3, SCB2, SCB1)

Chennai Port awarded the second container terminal to Chennai International Container Terminal Private Limited (CITPL), a Special Purpose Vehicle, formed by the consortium of M/s Singapore Port Authority and SICAL Logistics Pvt Limited in 2007 for development, operation and management of the container terminal on a Build, Operate and Transfer (BOT) basis for a period of 30 years. It was commissioned in 2009.

The Container Terminal with three berths SCB 1 to 3, rechristened as 3A to 5A, has a total quay length of 832 m. The total yard area is 27.2 ha including 7.8 ha of the reclaimed area. It accommodates 3,440 ground slots with a holding capacity of 17,200 TEUs. It has 304 reefer plugs. The terminal is served by 7 Quay cranes and 18 RTGs. Its capacity is 1.5 MTEU per annum.

The berths with the backup yard are shown below:



Figure 3-9: Container Terminal in Dr. Ambedkar Dock

3.4. Jawahar Dock (JD)

Jawahar Dock was created during the early sixties. The basin dimension is 655 m × 152 m. The total quay length is around 2 × 650 m with 3 berths each on either side. The entrance width of the dock is narrow and can permit only Panamax carriers. The particulars of the berths are presented in Table 3.3. The design dredge depth of the dock is - 14.0 m CD.

Name	Commodity	Length (m)	Scheduled Depth (from CD) (m)
12J (JD I)	Fertilizer/Dry Bulk	218	-14.0
7J (JD II)	Fertilizer/Dry Bulk/ Edible Oil /Other Liquid bulk	218	-14.0
11J (JD III)	Fertilizer/Dry Bulk	218	-14.0
8J (JD IV)	Dry Bulk/Edible Oil	218	-14.0
10J (JD V)	Fertilizer/Dry Bulk	218	-14.0
9J (JD VI)	Dry Bulk	218	-14.0

Table 3-3: Berths at Jawahar Dock

3.4.1 JD East Berths – 7J, 8J and 9J (JD2, JD4 and JD6)

The existing berth structures are of varying types along the length. Initial 518 m from the basin entrance was constructed in 1964 with monoliths. Thereafter, the berth length was increased by another 137 m with a combination of diaphragm wall



and piles in 1981. During 2006-07 additional structures supported on piles were constructed for strengthening of apron behind both the berths.

The land width between the JD east quay and the western boundary of CITPL along the JD East back-up area is about 140 m. These berths were used to handle coal, but with the ban on handling coal, the yard area is presently vacant except for an area of 3,000 m². This area is occupied by a tank farm and small buildings. There are, however, vacant space and unused buildings on the southwest and southeast direction of the existing yard. 8J (JD II) & 9J (JD VI) are presently used for handling fertilizers and edible oils. Phosphoric tankers are also handled here and the cargo is discharged into the nearby tank farms.

3.4.2 JD West Berths – 10J, 11J and 12J (JD5, JD3 and JD1)

Similar to JD East Berths, the existing berth structures on the JD West are of varying types along its length. Initial 518 m from the basin entrance was constructed in 1964 with monoliths. Thereafter, the berth length was increased by another 137 m with a combination of diaphragm wall and piles in 1981. During 2006-07 additional structures supported on piles were constructed for strengthening of apron behind both the berths. These berths are used for handling general cargo, fertilisers and dry bulk cargo. These berths have transit sheds behind them.

The berths with their respective backup area are shown below:

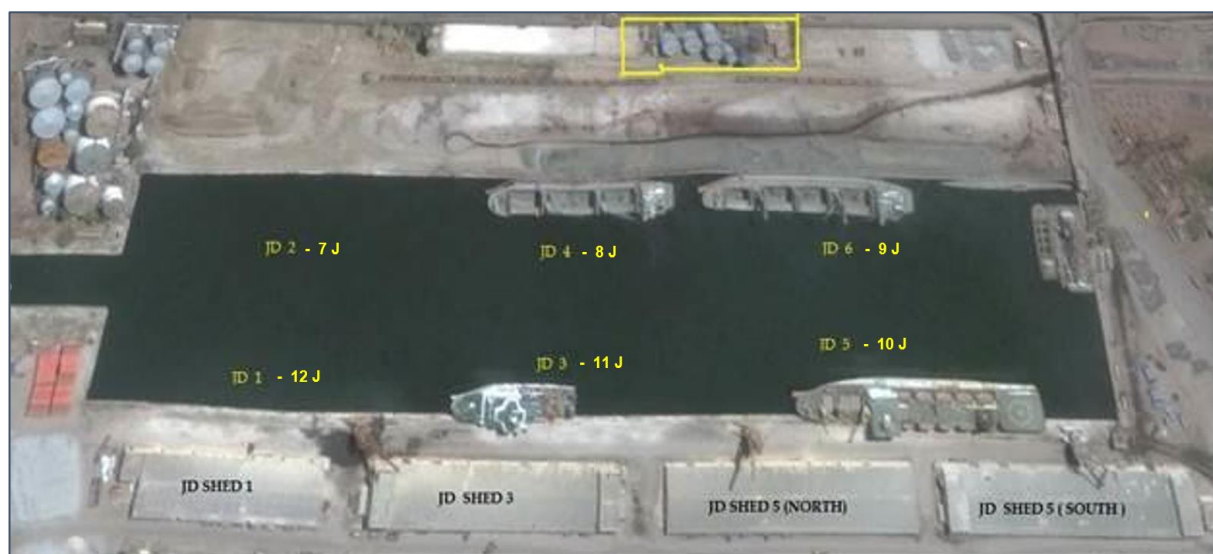


Figure 3-10: Jawahar Dock Berths



3.5. Timber Pond and Boat Basin

A dry dock on a PPP basis was envisaged at the Timber Pond and Boat Basin as one of the measures to optimize the use of port infrastructure to generate additional revenue. Accordingly, tenders were invited through PPP Mode but failed to yield a satisfactory response. Though Cochin Shipyard Limited (CSL) was offered to take up the project on a nomination basis, they communicated their inability to take up the project.

During 2015, the Indian Coast Guard (ICG), evinced interest to develop Dry-Dock facility through their funds on a long-term lease basis, and later in 2019 ICG informed that the Ministry of Defence (MoD) has sanctioned the project of leasing of Timber Pond for a period of 99 years from Chennai Port.

Subsequently, ChPA approved the leasing of Boat Basin and Timber Pond for a period of 99 years to the Indian Coast Guard for Development of Dry Dock/Ship repair facility subject to the approval of the Ministry of Ports, Shipping and waterways. Empowered Committee approved the proposal vide lt. dt. 10 Oct 2019.

Currently, ChPA is pursuing with the ICG for completion of balance payments towards upfront premium and other mandatory formalities.

3.6. Other facilities at the Port

The cargo handling and storage equipment's available at the Port are indicated below:

S. No.	Equipment	Numbers	Capacity
1.	Diesel Electric Locomotive	7	700 HP
2.	Harbour Mobile Crane	2	100 T lifting capacity

Table 3-4: Cargo Handling Equipment at Chennai Port

Transit Shed / Over Flow shed	4 no. – 14,468 m ²
Warehouse	13 no. – 48,328 m ²
Exim Godown	2 no. – 9,256 m ²
Open Space	13,43,069 m ²

Table 3-5: Cargo Storage Facilities at Chennai Port



3.7. Bulk Liquid Storage and Linkages

In Chennai Port, the liquid bulk traffic is almost 25 % of the total traffic. The traffic comprises mainly crude oil for the Manali Refinery of Chennai Petroleum Corporation Ltd., POL product exports, Edible oil/Molasses and chemicals. While crude oil and POL products are handled at 26B (BD I) & 27B (BD III), Molasses/Edible oil are handled at 24B (BD II), 19A (NQ), 18A (WQ 1), 17A (WQ 2), 6A (SQ II), 7J (JD II) & 8J (JD IV). Some of the agencies have their own tankage within the port custom bound area while some others are having their tankage outside the port limits. The details of the tankages and linkage are given hereunder.

3.7.1 Tankage and Linkage on the Northern Side

On their northern side of the port, near Gate 2 and at Biden Place, the following agencies have their tank farms:

- India Oil Corporation Foreshore Tank Farm
- IMC Ltd.
- Kaleeswari Refinery Pvt. Ltd.
- Integrated Service Point Pvt. Ltd.

The locations of these tank farms are shown below:

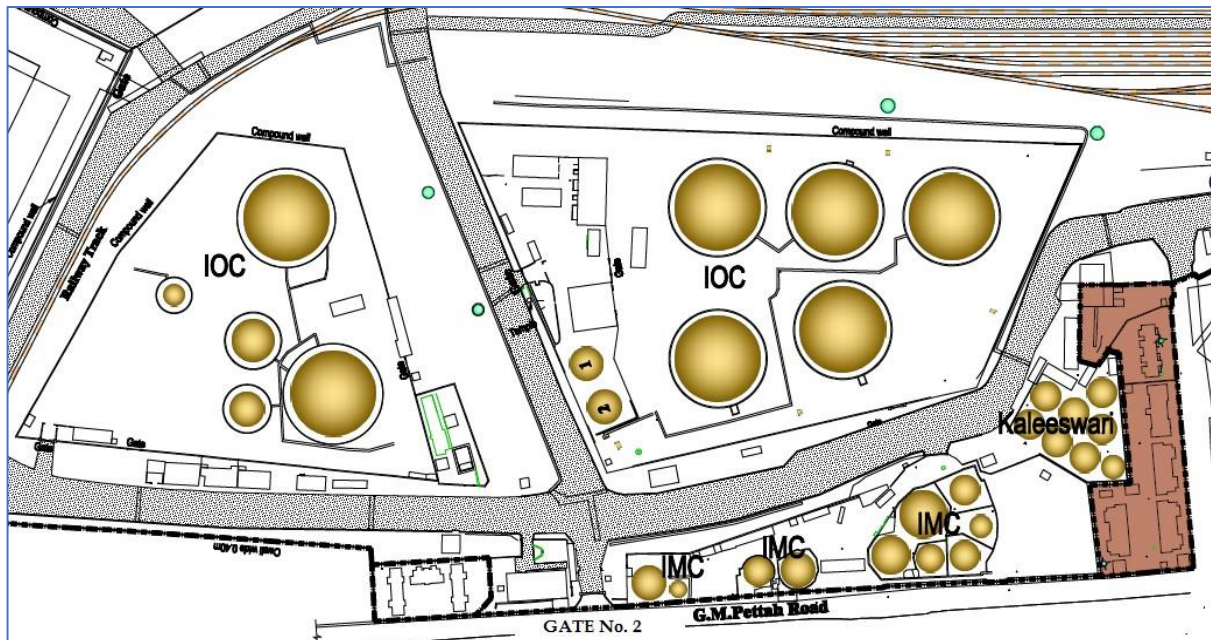


Figure 3-11: Tank Farms of IMC, IDC and Kaleeswari - Near Gate No. 2

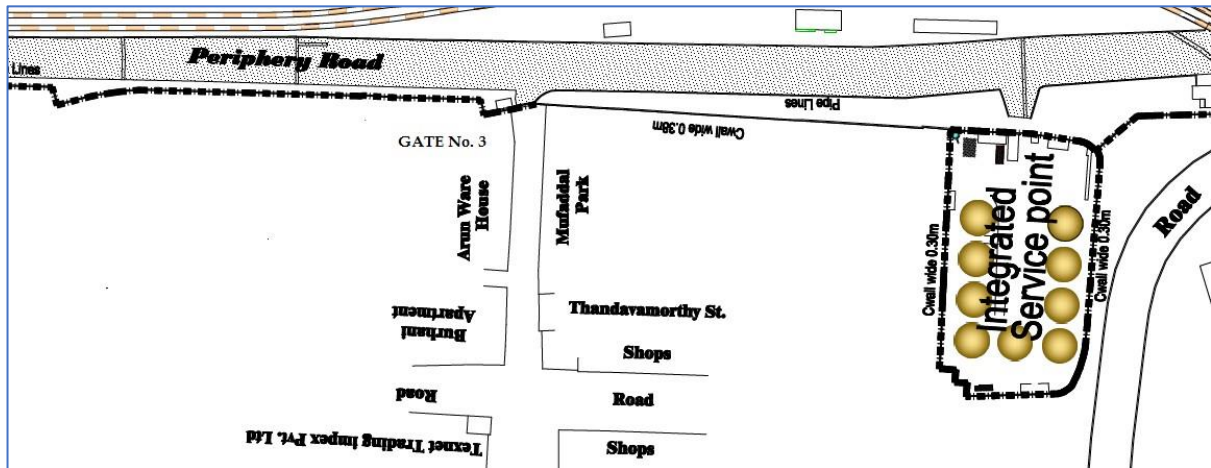


Figure 3-12: Tank Farms of Integrated Service Point - Near Gate No. 3

The details of the tankages and the linkages are shown in below table:

Details of Tank farm within Port Custom bound Area Northern side near GATE No. 2						
S.No.	Name of Licensee	Product	No. of Tanks	Total Capacity (kL)	Linkage	
					Berth	Connection
1	Indian Oil Corporation Ltd.	POL Products	10	128494	BD I	1 x 20" + 1 x 16" + 3 x 14"
					BD III	1 x 20" + 2 x 14"
2	IMC Ltd..	Molasses	11	33,402	BD I	1 x 12" + 1 x 8"
		Edible Oil			BD II	1 x 12" + 2 x 8"
3	Kaleesuwari Refinery Pvt Ltd.	Edible Oil	8	24,803	BD II	1 x 12"
4	Integrated Service Point Pvt. Ltd.	Edible Oil	9	18,430	NQ - WQ 1	1 x 14" + 1 x 10"
Outside Custom bound Area						
S.No.	Party Name	Product	Linkage			
			Berth		Connection	
1	Chennai Petroleum Corporation Ltd.	Crude Oil	BD I		1 x 42"	
			BD III		1 x 30"	
2	Hindustan Petroleum Corporation Ltd.	LSHS	BD III		1 x 16"	
		Bitumen	BD II		1 x 12"	
3	TCL	Chemical	BD III		1 x 8"	
4	Ruchi	Edible Oil	BD II		1 x 12" + 1 x 8"	
			NQ - WQ 2		1 x 8"	
5	KTV	Edible Oil	BD II		1 x 10"	

Table 3-6: Liquid Bulk Storage Facilities at Chennai Port



3.7.2 Tankage and Linkage on the Southern Side

On the southern side of the port, near SQ II & JD II, the following agencies have their tank farms:

- IMC Ltd.
- JRE Tanks Terminals Pvt. Ltd.
- Kaleesuwari Refinery Pvt. Ltd.
- Madras Fertilizers Ltd.
- Oswal Oil & Vanaspati Industries
- Suraj Agro Infrastructure (India) Pvt. Ltd.
- AVR Storage Tank Terminals Pvt. Ltd.

The locations of these tank farms are shown below:

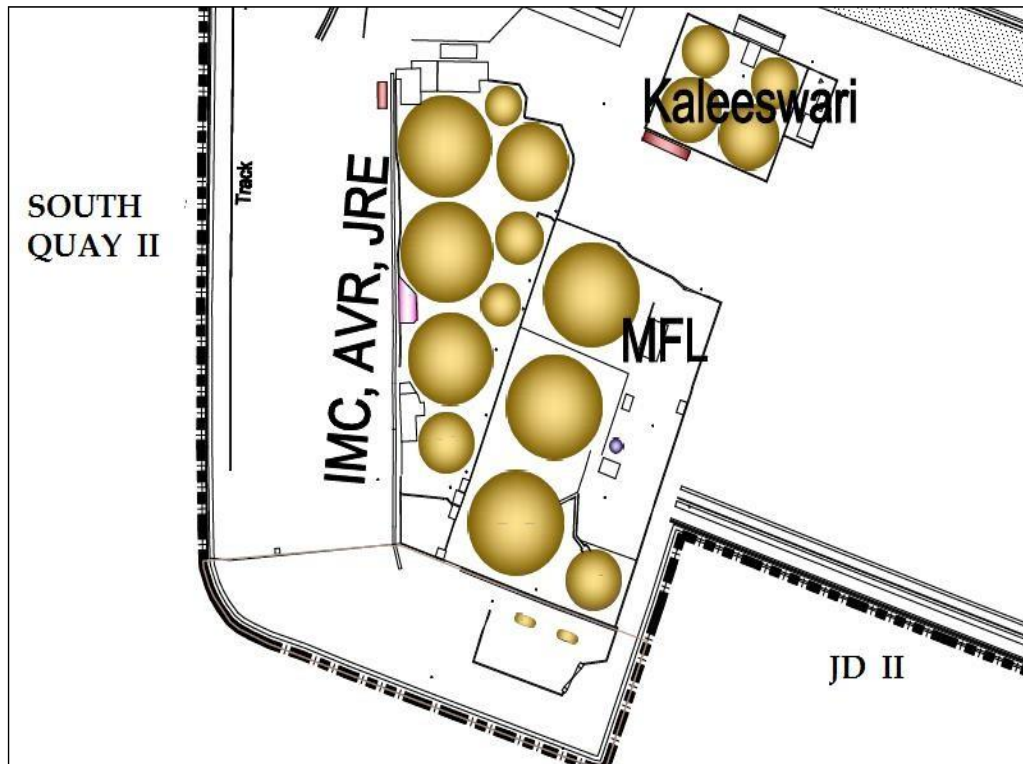


Figure 3-13: Tank Farms of MFL, IMC, JRE, AVR & KRL near SQ II and JD II

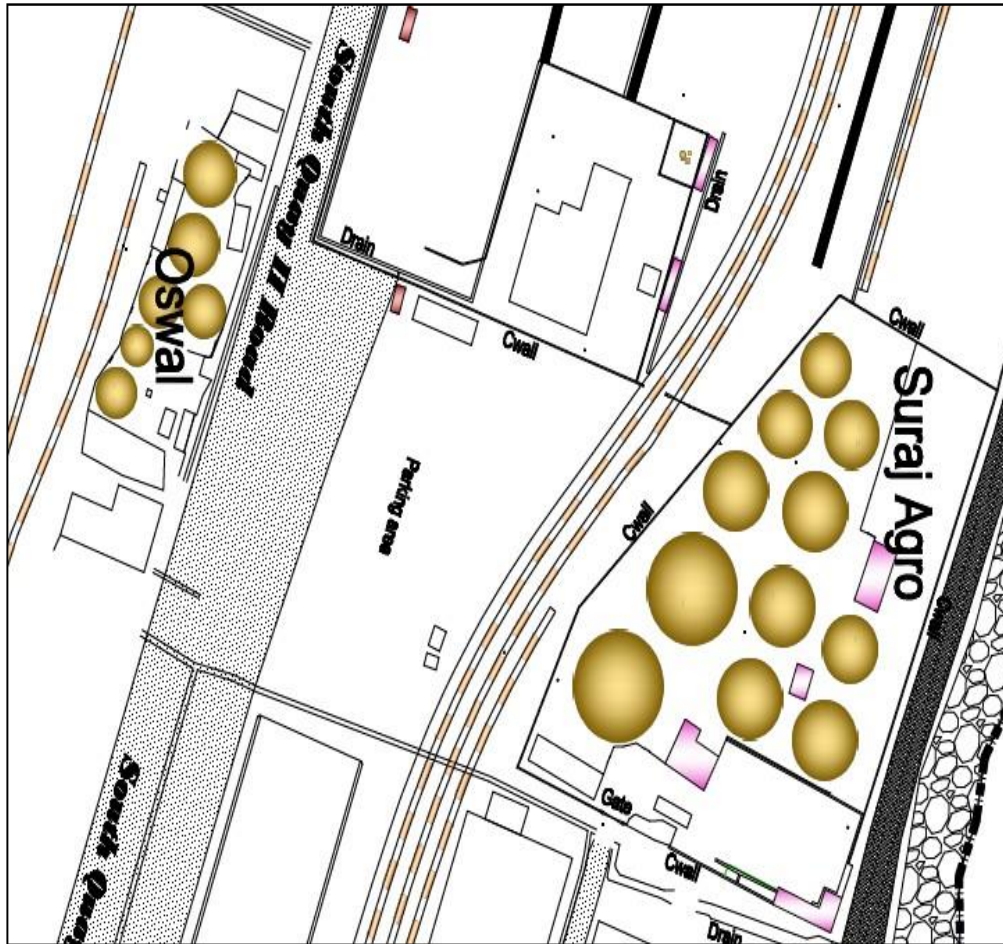


Figure 3-14: Tank Farms of Suraj Agro & Oswal at JD East

The details of tankages and the linkages are shown in the following table:

S. No.	Name of Licensee	Product	No. of Tanks	Total Capacity (kL)	Linkages	
					Berth	Pipelines
1	Madras Fertilisers Ltd.	Phosphoric Acid	4	20,770	JD IV	1 x 12"
2	IMC Ltd.	Molasses	5	15,035	SQ II - JD II	1 x 18" + 1 x 10"
		Edbile Oil			SQ II	1 x 6"
3	AVR Storage Tank Terminals Pvt. Ltd.	Edible Oil	3	6549		
4	JRE Tank Terminals Pvt. Ltd.	Molasses	1	4310		
5	Rajpetro Specialities Pvt. Ltd.,	Edible oil	12	27091		
6	Kaleesuwari Refinery Pvt. Ltd.	Edible oil	4	11,796	SQ II	1 x 8"
7	Suraj Agro Infrastructure (I) Pvt. Ltd.	Non-Hazardous	11	45,700	JD II - JD IV	1 x 18" + 1 x 8"
		Edible Oil			SQ II	1 x 8"
8	Oswal Oils & Vanaspati Industries	Edible Oil	6	9,966	JD II - JD IV	2 x 8"
					JD II - JD VI	1 x 8"

Table 3-7: Details of Tank Farms within Custom Bonded area on the Southern Side



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4. PERFORMANCE AND CAPACITY METRICS

4.1. General

The total cargo handled through the existing facilities, during the last 5 years is presented in the following Table.

(In '000 Tonnes)

Cargo Type	Commodity	2021-22	2020-21	2019-20	2018-19	2017-18
LIQUID BULK	POL - CRUDE	8180	8180	10281	10256	10338
	PRODUCT	2049	2049	3139	3041	3159
	EDIBLE OIL	874	874	1212	1421	1327
	CHEMICALS	120	120	110	123	138
	OTHER LIQUID	45	45	74	87	86
	Total Liquid Bulk	13005	11268	14816	14928	15111
CONTAINER	CCTL	14095	10404	9332	12649	12477
	CITPL	16828	16361	17357	18589	17401
	INNER HARBOUR	2	3	21	25	27
	TOTAL Container	30925	26768	26710	31263	29905
DRY BULK	LIMESTONE	73	1770	346	1864	1259
	CEM. CLINKERS	0	0	8	84	457
	CLAY	0	0	0	6	10
	BARYTES	850	380	602	859	874
	FERTILIZER	268	338	187	251	230
	SILICA SAND	87	86	111	124	38
	OTHER DRY BULK CARGO	571	172	113	158	261
	GYPSUM	188	145	235	421	368
	DOLOMITE	56	142	334	609	437
	COBBLE STONE	202	130	159	157	183
	SCRAP	106	30	9	34	41
	WHEAT	0	0	0	0	274
	TOTAL Dry Bulk	2401	3193	2104	4567	4432
BREAKBULK	IRON & STEEL	1400	1900	2411	1523	1787
	RO-RO	227	176	243	165	181
	PROJECT CARGO	191	155	204	184	83
	OTHER/MISC	337	60	21	92	33
	GRANITE	78	33	250	290	349
	TOTAL Breakbulk	2233	2324	3129	2254	2433
GRAND TOTAL		48564	46759	43553	46759	53012

Table 4-1: Cargo Handled at Chennai Port during last 5 years



Some of the key observations are as follows:

- The reduced cargo throughput during FY2020 and FY2021 is due to the impact of the Covid 19 pandemic which severely disrupted the supply chain.
- Container and Liquid cargo contribute to more than 80 % of the traffic volume at Chennai Port.
- Chennai Port has a long-term agreement for the export of Hyundai and Kia automobiles and this requires sufficient backup area.
- Edible oil is handled at BD II, NQ, SQ 2 and JD 2 berths since the tank farms are situated at two locations – one near Gate 2 and the other on the JD east.

4.1.1 Performance of Berths

(In million Tonnes)

SI	Berth	ID.	Type of Cargo Handled	2021-22	2020-21	2019-20	2018-19	2017-18
DR. AMBEDKAR DOCK:								
1	North Quay	19A	Passenger/General/Liquid Bulk	0.00	0.00	0.04	0.08	0.14
2	West Quay - I	18A	General/RO-RO/Liquid Bulk	0.44	0.44	0.34	0.35	0.32
3	West Quay - II	17A	General/RO-RO/Liquid Bulk	0.23	0.26	0.19	0.20	0.13
4	Centre Quay	16A	General/Food Grains	0.17	0.19	0.34	0.37	0.35
5	West Quay - III	15A	General/Food Grains	0.55	0.43	0.56	0.57	0.45
6	West Quay - IV	14A	General/Passenger	0.14	0.12	0.04	0.06	0.07
7	South Quay - I	13A	General/Dry Bulk	0.30	0.13	0.31	0.27	0.59
8	South Quay - II	6A	General/Dry Bulk/Liquid Bulk	0.06	0.04	0.13	0.12	0.22
JAWAHAR DOCK:								
9	Jawahar Dock - I	12J	Dry Bulk/General	0.19	0.37	0.54	0.56	0.66
10	Jawahar Dock - II	7J	Dry Bulk/Liquid Bulk/General	1.11	2.17	1.64	2.84	2.31
11	Jawahar Dock - III	11J	Dry Bulk/General	0.38	0.41	0.41	0.94	0.58
12	Jawahar Dock - IV	8J	Dry Bulk/Liquid Bulk/General	1.36	1.14	0.78	0.34	0.46
13	Jawahar Dock - V	10J	Dry Bulk/General	0.33	0.40	0.36	0.96	0.90
14	Jawahar Dock - VI	9J	Dry Bulk/Liquid Bulk/General	0.15	0.20	0.25	0.09	0.52
BHARATHI DOCK:								
15	Bharathi Dock - I	26B	POL	1.18	1.41	2.32	2.18	2.32
16	Bharathi Dock - II	24B	POL/Other Liquid	0.77	0.60	1.06	1.11	1.08
17	Bharathi Dock - III	27B	POL	9.65	8.48	10.76	10.73	10.90
CONTAINER TERMINAL:								
18	CCTL - I	20B	Containers	14.09	10.40	9.33	12.65	12.48
19	CCTL - II	21B	Containers					
20	CCTL - III	22B	Containers					
21	CCTL - IV	23B	Containers					
22	CITPL - I	5A	Containers	16.83	16.36	17.36	18.59	17.40
23	CITPL - II	4A	Containers					
24	CITPL - III	3A	Containers					
COASTAL TERMINAL								
25	CB- 1	1B	Coastal Cargo incl. cereals, pulses, iron & Steel etc	0.0002	0.0004	-	-	-
26	CB-2	2B		-	-	-		
	OVERALL		Overall	48.56	43.55	46.76	53.01	51.88

Table 4-2: Traffic Volume (in MMT) at Chennai Port Berths



SI.	Berth	ID.	Desired Capacity Utilisation (%) of Berths				
			2021-22	2020-21	2019-20	2018-19	2017-18
DR. AMBEDKAR DOCK:							
1	North Quay	19A	0.00	0.00	5.71	11.43	19.71
2	West Quay - I	18A	48.89	48.89	37.78	38.89	35.56
3	West Quay - II	17A	23.00	26.00	19.00	20.00	13.00
4	Centre Quay	16A	11.33	12.67	22.67	24.67	23.33
5	West Quay - III	15A	28.95	22.63	29.47	30.00	23.68
6	West Quay - IV	14A	7.37	6.32	2.11	3.16	3.68
7	South Quay - I	13A	16.67	7.22	17.22	15.00	32.78
8	South Quay - II	6A	6.00	4.00	13.00	12.00	22.00
JAWAHAR DOCK:							
9	Jawahar Dock - I	12J	6.55	12.76	18.62	19.31	22.76
10	Jawahar Dock - II	7J	35.81	70.00	52.90	91.61	74.52
11	Jawahar Dock - III	11J	12.67	13.67	13.67	31.33	19.33
12	Jawahar Dock - IV	8J	68.00	57.00	39.00	17.00	23.00
13	Jawahar Dock - V	10J	15.00	18.18	16.36	43.64	40.91
14	Jawahar Dock - VI	9J	6.52	8.70	10.87	3.91	22.61
BHARATHI DOCK:							
15	Bharathi Dock - I	26B	38.51	30.00	49.36	46.38	49.36
16	Bharathi Dock - II	24B	38.50	30.00	53.00	55.50	54.00
17	Bharathi Dock - III	27B	53.61	47.11	59.78	59.61	60.56
CONTAINER TERMINAL:							
18	CCTL - I	20B	53.17	39.25	35.21	47.74	47.1
19	CCTL - II	21B					
20	CCTL - III	22B					
21	CCTL - IV	23B					
22	CITPL-I	5A	67.05	65.18	69.16	74.06	69.3
23	CITPL-II	4A					
24	CITPL-III	3A					
COASTAL TERMINAL							
25	CB- 1	1B	0.03	0.05			
26	CB- 2	2B					
OVERALL			47.05	42.20	45.62	51.72	50.61

Table 4-3: Berth-wise utilization level during last 5 years



Sl.	Berth Name	Percentage of Berth Occupancy (%)				
		2021-22	2020-21	2019-20	2018-19	2017-18
DR. AMBEDKAR DOCK:						
1	North Quay	52	42	55	61	62
2	West Quay - I	40	39	38	46	70
3	West Quay - II	21	25	24	27	24
4	Centre Quay	30	20	34	38	55
5	West Quay - III	50	36	51	53	71
6	West Quay - IV	37	39	40	63	58
7	South Quay - I	75	62	82	97	92
8	South Quay - II	64	47	32	34	50
JAWAHAR DOCK:						
9	Jawahar Dock - I	43	32	51	60	66
10	Jawahar Dock - II	43	50	47	59	57
11	Jawahar Dock - III	42	31	48	63	55
12	Jawahar Dock - IV	43	43	43	43	42
13	Jawahar Dock - V	62	32	51	64	59
14	Jawahar Dock -VI	46	32	64	97	53
BHARATHI DOCK:						
15	Bharathi Dock - I	56	51	75	68	81
16	Bharathi Dock - II	54	41	60	79	78
17	Bharathi Dock - III	58	50	61	75	80
COASTAL BERTH						
25	Coastal Berth 1	32	11	-	-	-
26	Coastal Berth 2	42	5	-	-	-
CHENNAI CONTAINER TERMINAL PVT LTD (TERMINAL - I)						
18	Container Berth - I	39	34	17	15	0
19	Container Berth - II	38	39	33	26	24
20	Container Berth - III	45	34	31	38	31
21	Container Berth - IV	45	37	31	43	48
CHENNAI INTERNATIONAL TERMINAL PVT LTD (TERMINAL - II)						
22	Second Container Berth - I	16	19	14	39	39
23	Second Container Berth - II	47	49	43	46	49
24	Second Container Berth - III	39	32	29	37	46
TOTAL OCCUPANCY		45	36	46	53	54

Table 4-4: Berth Occupancy level during last 5 years



4.1.2 Containers

Containers constitute about 60% of Chennai Port traffic. The container terminal is operated by international operators – Chennai Container Terminal Pvt Ltd. Operated by M/s. DP World, and Chennai International Terminal Pvt Ltd operated by M/s. PSA. Chennai Port is catered by more than 30 CFS in and around Chennai.

The container throughput of the neighbouring ports and that of the two terminals at Chennai Port are studied. The container data is tabulated below –

Terminal Name		Capacity (TEUs)	Traffic Handled (TEUs)					Capacity Utilization in FY21	Market Share				Remarks
			FY 18	FY 19	FY 20	FY21	CAGR		FY 18	FY 19	FY 20	FY 21	
Chennai Container Terminal	CCTL	12,00,000	6,46,482	6,55,385	4,83,518	5,39,074	-6%	45%	26%	24%	18%	22%	Market share eroded by 11% from FY18 to FY20
Chennai International Terminal	CITPL	12,50,000	9,01,584	9,63,167	8,99,336	8,47,727	-2%	68%	36%	35%	33%	34%	
Adani Ennore Container Terminal	AECT*	8,00,000	2,682	57,051	1,30,781	2,00,448	321%	25%	0%	2%	5%	8%	* Considered Phase 1 only
Kattupalli International Container Terminal	KICT	12,00,000	4,93,260	5,92,409	6,90,644	5,40,334	3%	45%	20%	21%	25%	22%	
Navayuga Container Terminal	NCT	20,00,000	4,81,716	5,06,168	5,43,244	3,34,947	-11%	17%	19%	18%	20%	14%	
Total		64,50,000	25,25,724	27,74,180	27,47,523	24,62,530	-1%	43%					

Table 4-5: Market Share of Container Terminals in North Tamil Nadu and South AP Region

Chennai Port is catered by more than 30 CFSs in and around Chennai.

Details	CCTL	CITPL	Overall
DPD	42%	37%	39%
DPE	50%	36%	41%



Table 4-6: DPD and DPE share of both container terminals at Chennai Port

4.1.3 Berth Capacity

Sl. No	Berth	Type of Cargo Handled	Rated Capacity (MMT)	Desired Capacity (in MTPA)
DR. AMBEDKAR DOCK:				
1	North Quay	Passenger/General/Liquid Bulk	1.00	0.70
2	West Quay - I	General/RO-RO/Liquid Bulk	1.40	0.90
3	West Quay - II	General/RO-RO/Liquid Bulk	1.50	1.00
4	Centre Quay	General/Food Grains	2.20	1.50
5	West Quay - III	General/Food Grains	2.70	1.90
6	West Quay - IV	General/Passenger	2.70	1.90
7	South Quay - I	General/Dry Bulk	2.60	1.80
8	South Quay - II	General/Dry Bulk/Liquid Bulk	1.40	1.00
Total			15.50	10.70
JAWAHAR DOCK:				
9	Jawahar Dock - I	Dry Bulk/General	4.20	2.90
10	Jawahar Dock - II	Dry Bulk/Liquid Bulk/General	4.40	3.10
11	Jawahar Dock - III	Dry Bulk/General	4.30	3.00
12	Jawahar Dock - IV	Dry Bulk/Liquid Bulk/General	2.80	2.00
13	Jawahar Dock - V	Dry Bulk/General	3.10	2.20
14	Jawahar Dock - VI	Dry Bulk/Liquid Bulk/General	3.30	2.30
Total			22.10	15.50
BHARATHI DOCK:				
15	Bharathi Dock - I	POL	6.70	4.70
16	Bharathi Dock - II	POL/Other Liquid	2.80	2.00
17	Bharathi Dock - III	POL	25.70	18.00
18	Bunker Berth	Bunker	1.00	0.70
Total			35.20	24.70
CONTAINER TERMINAL:				
18	Container Berth - I	Containers	31.30	26.50
19	Container Berth - II	Containers		
20	Container Berth - III	Containers		
21	Container Berth - IV	Containers		
22	Second Container Terminal - I	Containers	29.50	25.10
23	Second Container Terminal - II	Containers		
24	Second Container Terminal - III	Containers		
COASTAL TERMINAL				
25	CB1	Coastal Cargo including cereals, pulses, iron & steel, metal scrap, stone timber etc.	1.00	0.70
26	CB2			
OVERALL			135.60	103.90

Table 4-7: Berth-wise Rated and Desired Capacities

*Desired occupancy at container berth is calculated at 85% and that of other berths at 70%.



5. DETAILS OF ONGOING DEVELOPMENTS

5.1. General

Recognizing the long-term vision of migrating to a landlord port model and understanding the evolving traffic scenarios, Chennai Port has initiated action for creating additional infrastructure facilities and identifying projects to be given on a PPP basis. The ongoing projects are:

- i. Development of Bunker Berth
- ii. Goods shed at Jolarpettai
- iii. Multi-Modal Logistics Park (MMLP) at Mappedu
- iv. Trailer Parking area at 24B (BD II) backup area
- v. Drive-through Container scanner
- vi. Development of dry dock at Timber Pond and Boat Basin by ICG
- vii. Privatization of oil docks and bunker berth
- viii. Four-lane Elevated Corridor from Maduravoyal to Chennai Port

The details of above ongoing projects are brought hereunder:

5.2. Development of Bunker Berth

Based on the recommendation of M/s AECOM India Private Limited who prepared “Technical note on Setting up of Bunkering Terminal at Chennai Port”, an exclusive and integrated Bunker Terminal project with reserved land area for bunker storage tanks has been taken up by the Chennai Port at Bharathi Dock. The construction work of Bunker berth is completed and it is designed to accommodate Bunker Tankers up to 10,000 DWT and LOA up to 150m. The designed length of the bunker berth is 180m and the width is 18m wide. An approach trestle which could accommodate three-tier pipe racks capable of carrying up to 4 Nos. x 300 mm dia. pipelines in each tier, is also a part of this project.



The Bunker Berth has a capacity of 1 MTPA and an area of about 2.5 Ha. of land is earmarked for locating the Bunker tank farms which can be set up by the interested agencies. This area will accommodate about 25,000KL to 30,000KL tankage structures with associated infrastructure. This area will encourage interested agencies to set up their tankage and use the berthing facility, thereby enhancing the bunker traffic at Chennai Port. The Port can provide right-of-way for pipelines from the storage tanks to this berth. Currently, Chennai Port is in talks with Indian Oil, which currently carries out bunkering at Chennai Port, to work out PPP mode of operation for the bunker berth.

The location of the berthing facility and the area for the tank farm are shown in the following Figure:

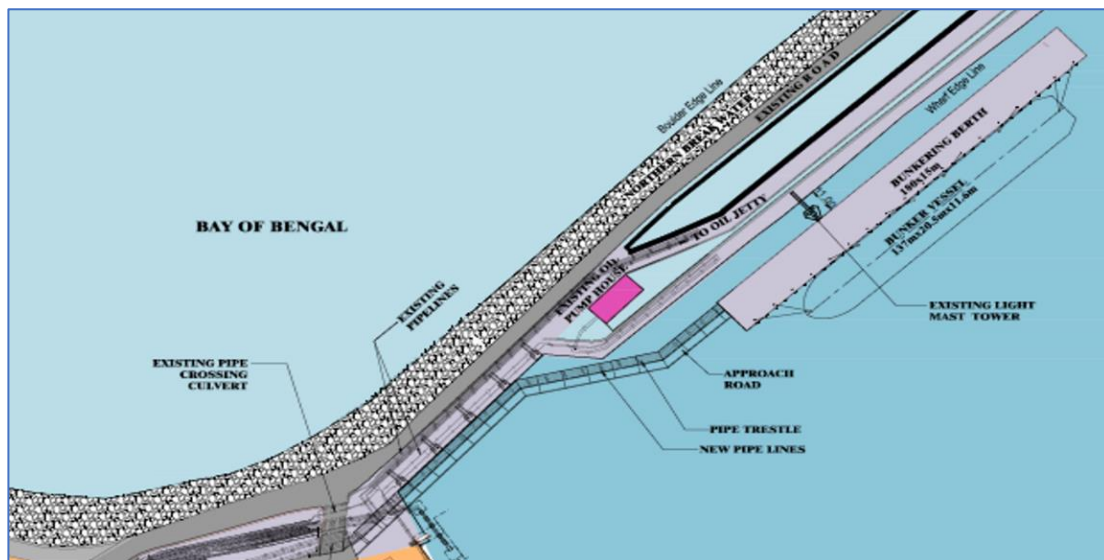


Figure 5-1: Layout of Bunker Berth

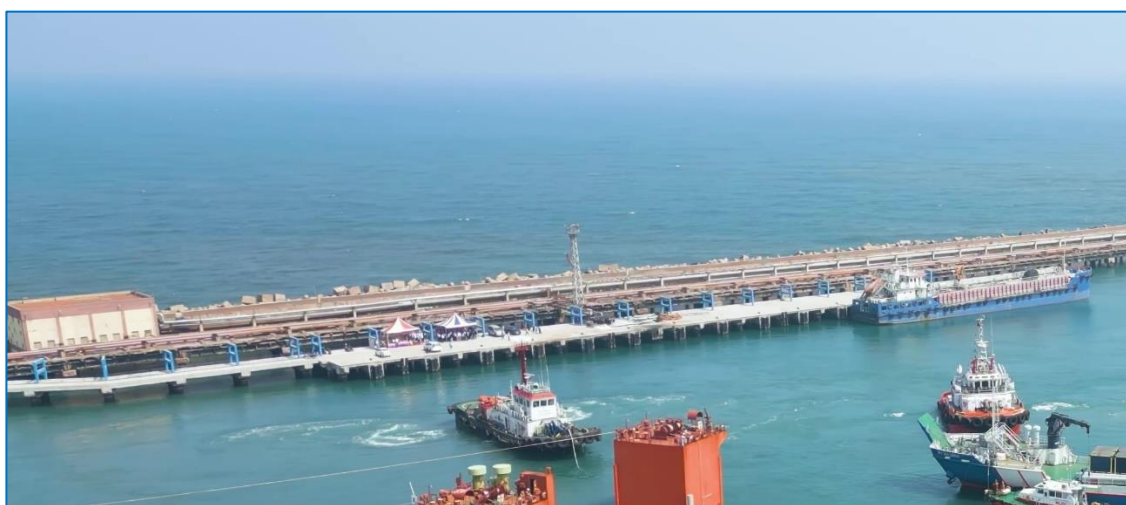


Figure 5-2: Completed picture of Bunker Berth



5.2.1 Bunker Traffic Potential

During 2009 -10 Chennai Port experienced the maximum bunker traffic of about 1.75 lakh T. This was even without the basic infrastructure required. Subsequently, though, the volumes gradually dropped down. Now, because of the permission for OPL bunkering and an exclusive bunker terminal, there are good prospects of bunker traffic picking up. The category wise vessel traffic at Chennai Port for the past 5 years is presented in the following Table 5.2. Taking the average and applying the stem volumes, the potential is established.

Vessel Category	2015-16 (#Vessels)	2016 - 17 (#Vessels)	2017 - 18 (#Vessels)	2018 -19 (#Vessels)	2019 -20 (#Vessels)	Avg calls/yr	Avg Stem/vessel (MT)	Annual Bunker Need (MT)
Dry Bulk carriers	151	172	127	120	88	132	300	39,600
Liquid Bulk carriers	445	402	478	478	430	447	500	2,23,500
Breakbulk vessels	382	321	326	325	352	341	400	1,36,400
Container vessels	755	705	699	683	594	687	800	5,49,600
Total	1,733	1,600	1,600	1,606	1,464	1,607	--	9,49,100

Table 5-1: Chennai Port Vessel Traffic and Bunker Requirements

It gives an optimistic picture of when all vessels will be taking bunkers, leading to a total traffic of around 1.0 MTPA. This may not happen. For a realistic estimate, a certain percentage of a total number of vessels calling at ChPA may be taken, which may then be gradually increased at a rate of 10% per annum.

On the other hand, IOCL assumes a mean figure of 120 T bunker-stem per vessel which gives the possible traffic as 0.19 MTPA only.

S. No.	Year	Bunker Volume (T)	Total Vessel Calls
1.	2010 - 11	1,27,127	2,181
2.	2011 - 12	82,164	2,043
3.	2012 - 13	62,259	1,928
4.	2013 - 14	62,528	1,804
5.	2014 - 15	48,059	1,790
6.	2015 - 16	52,386	1,733
7.	2016 - 17	61,963	1,600



8.	2017 - 18	54,426	1,600
9.	2018 - 19	64,807	1,606
10.	2019 - 20	49,513	1,464
11.	2020-21	46,497	1,315

Table 5-2: Actual Bunker Traffic for the last 10 years

*These volumes include bunkers supplied to the Indian Navy and Coast Guard Vessels

IOCL has tankage at the Foreshore Terminal. It has the following storage capacities: IFO 180 - 19,020 MT; IFO 380 - 16,325 MT; and MGO - 17,400 MT. The supplies are made through barges. IOC has presently two barges – one for white oil and the other for black oil.

The bunker barges are handled through a small jetty at the root of the northern breakwater of Bharathi Dock and to the west of BD II berth. This is closer to the IOCL Foreshore Terminal and connected by 2 × 10” lines for FO and 1 × 8” line for HSD. HPCL and IMC have each 1 × 8” line for FO. The layout of the barge jetty and the satellite picture are shown below:

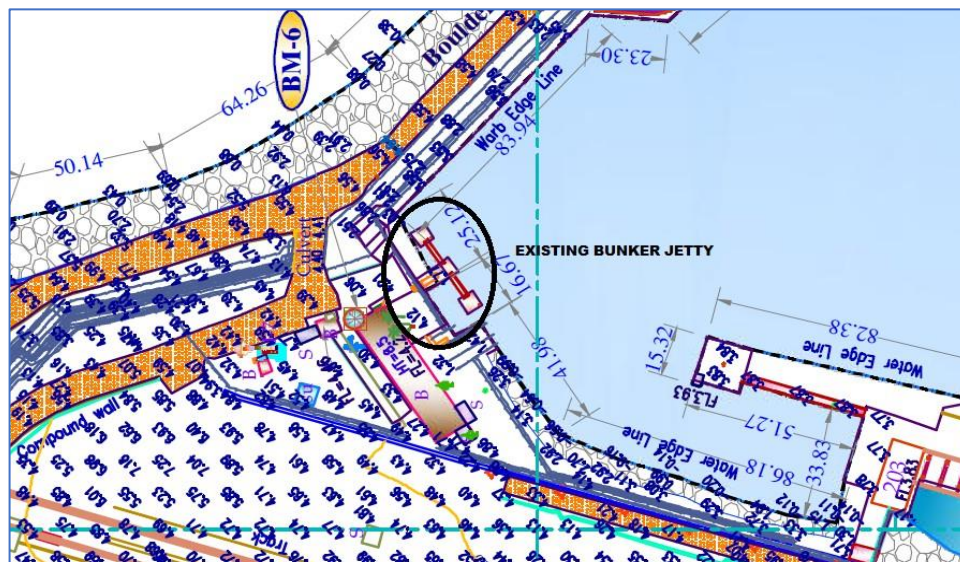


Figure 5-3: Location and Layout of the Existing Bunker Jetty



Figure 5-4: Satellite Picture of the Existing Bunker Jetty

5.3. Goods shed at Jolarpettai

Chennai Port intends to enhance the port infrastructure and boost its cargo warehousing and handling capacity by establishing an inland logistics node similar to railway goods shed on railway land at Jolarpettai.

The area of Jolarpettai is arrived at on the basis of industrial concentration and rail & road connectivity of the region to Chennai and Bangalore. It is envisaged that this goods shed facility would facilitate shuttle service of container rakes to/from the port. The containers from the nearby cargo centres can arrive at the goods shed via road and then can be transferred to rail for connecting to the vessels at the ChPA. With Jolarpettai acting as an extended gateway to the port, it is likely to tap into the exports, generating from areas like Karur, Erode, Salem, Madurai - which will then be competitively placed with respect to ports like Chennai, Tuticorin and Cochin. The rail service would not only augment the rail share and circumvent road congestion but also ease movement for cargo generated in the Chennai cluster.

The scheduled rail facility would reduce variability in transit times thereby reducing the chances of missing vessels. The multimodal movement of containers will also reduce the cost of transportation to the port. Indian Railways has selected Chennai Port through an online tendering process and has awarded the contract to develop a goods shed facility at Jolarpettai.

Jolarpettai is ~220 kms from Chennai and the identified rail parcel is along the existing railway junction. It falls on the Bengaluru-Chennai line. The proposed facility



is envisaged to be built on railway land at JTJ. The possession of the land would remain with the Railways and the port would develop a common user goods shed facility for a share in the terminal handling charges.

The development of a rail linked facility like an MMLP/ Dry Port / Goods shed could alleviate the issues faced by the city-locked port. This goods shed can act as an extended gate of the port wherein the containers from various centres could get aggregated and move to the port using rail shuttle services.

In an earlier Techno-Economic Feasibility study by a consultant viz. Ernst & Young (E&Y), appointed during 2018-19 by SDCL, for a similar project, the consultant indicated that the proposed facility at Joalrpet Jn. (JTJ) is strategically thought and placed to retain/augment container traffic at Chennai Port. The location is well suited to cater to cargo generating clusters like Bengaluru, Hosur, Coimbatore Mysuru, Erode, Karur, Salem, Namakkal, Krishnagiri, Tiruppur, Pollachi amongst others. This study considered a 30 Acres leased land at JTJ. The recommendations were to develop a facility on about 16 acres of land in Phase I and later on 24 acres of land in Phase II. The consultant has arrived at a total capital cost of Rs.109 Cr (including the upfront land lease cost for Phase I and the development cost including equipment). The computed NPV of the project was calculated at Rs.19.5 Cr while IRR was 13%. However, the approval of leasing of land from Indian Railways did not materialize.

Subsequently, Southern Railway called e-tenders for Development of Goods shed at Jolarpettai on a revenue-sharing basis. ChPA participated in the tender and became the successful bidder. Southern Railway issued LOA to Chennai Port. Chennai Port is developing this goods shed at Jolarpettai with a target completion date of March' 2023.

5.4. Multi-Modal Logistics Park (MMLP) at Mappedu

The Ministry of Road Transport and Highways (MoRTH) is promoting setting up of 35 Multimodal Logistics Park (MMLPs) across India through NHAI. Chennai is the first site chosen for such development. The project envisages facilities like packaging, warehousing, cold storages, commercial and administrative buildings, logistics, cross-docking, etc. The MMLP at Mappedu is planned to be developed on 184.27 Acres, in which ChPA has offered 121.4 Acres of land parcel which was acquired from SIPCOT



on 99 years lease. TIDCO of GoTN is facilitating remaining land parcel. The land parcel is 13 to 14 kms from NH-48(NH4), 4-5km from the upcoming Peripheral Ring Road, and 12 Kms from the nearest railhead of Kadambattur station. Rail connectivity will be provided from Kadambattur Station. This location is apt for an automobile hub due to its proximity from industrial areas in Sriperumbudur, Irungattukkotai & Oragadam.

MoRTH has approved NHA, ChPA, GoTN and Railways as equity partners in this project. NHLML of NHA will be the implementing agency through an SPV 'Chennai MMLP Pvt. Ltd.', comprising NHLML of NHA, ChPA, TIDCO of GoTN and RVNL of Indian Railways. Total estimated cost of this project is Rs. 1423.50 Cr. (including Rs. 782.58 Cr. which will be invested by the PPP developer).

The project will be developed in three phases through Public-Private Partnership with the SPV providing land and connectivity and the actual MMLP infrastructure to be developed by a private developer. The foundation stone for this project was laid by Hon'ble Prime Minister on 26th May 2022. NHLML issued LoA on 11th Nov' 2022 and signed the Concession Agreement on 26th Dec' 2022 for development, operation and maintenance of MMLP Mappedu on DBFOT basis for 45 years.



Figure 5-5: MMLP at Mappedu



5.5. Trailer Parking Yard at 24B (BD II) berth backup area

In order to provide a smoother flow of trailer traffic within and outside the port, a buffer parking area on the backup area of 24B(BDII) berth is being planned. The BDII backup area of approximately 83,000 sqm will provide a parking facility for approx. 500 trucks. Two toilet blocks, a canteen and an office area are also planned along with the provision for illumination of the yard, CCTV, RFID etc. The estimated cost of is approximately Rs. 53 Cr. Pavement work is expected to be over by December 2023.

The facility is expected to reduce the trailer load on the city as well as port roads. It will help smoothen the trailer flow and reduce congestion on the roads. The trailers parked on a designated area within the port would provide a sense of security for the drivers as well the trailer owner. It would help in avoiding diversion of cargo to the competitor ports, improving vessel and port productivity, curbing air and noise pollution from idling of trailers in road congestion, and monetizing port assets.

5.6. Drive-through Container Scanner

The Letter of Intent (LoI) to M/s. Rapiscan System Pte. Ltd. (RSPL), Singapore has been issued by IPA on 09/07/2019 for procurement of 4 nos. Drive Through X-Ray Container System (Road) System for JNPT, VoCPT, ChPA & KoPT. The Work order has been issued to RSPL and the contract agreement has been signed on 16/10/2019 for supply, installation and commissioning of one no. Drive Through X-Ray Container Scanning (Road) System in Chennai Port at the total cost of approx. Rs.46,25,21,855/-

The site approval for the installation of 6 MV & 3.5 MV Accelerator-based Container Scanner has been accorded by AERB in September 2018. Layout Approval for installation of 6MV & 4MV Accelerator-based Drive Through Container Scanner has been accorded by AERB in December 2019. AERB has accorded the permission for procurement of 6MV & 4MV (Dual Energy) Accelerator-based Drive Through Container Scanner in December 2020. Factory Acceptance Test (FAT) has been conducted at the factory of M/s. Rapiscan in Stoke/UK during December 3-4, 2020 by the third party "BUREAU VERITAS". FAT reports have been reviewed in IPA and are satisfactory and acceptable. The DTCS arrived at Chennai Port on 23.02.2021.



The facility was inaugurated by the Hon'ble Minister of Ports, Shipping and Waterways on 14th Augh 2022. M/s. Rapiscan completed training of the Customs officials, who after obtaining TLD badges will carry out the trial run for 30 days. Thereafter, upon AERB's approval regular operation will start.

The location chosen for DTCS will reduce the crossing of the inward and outward flow of traffic, thereby reducing road congestion and associated delays in the port.

5.7. Development of dry dock at Timber Pond and Boat Basin by ICG

[Leasing of the Boat Basin and Timber Pond to the Indian Coast Guard for berthing infrastructure, pollution response team (East) and slipway]

Development of Dry Dock at Timber Pond and Boat Basin was envisaged under PPP mode to optimize the use of Port facilities and increase revenue to the port. Accordingly, tenders were invited through PPP Mode, but they failed to yield satisfactory responses. Later, Cochin Shipyard Limited (CSL) was offered to take up the project on a nomination basis, they communicated their inability to take up the project.

During 2015, the Indian Coast Guard (ICG) evinced interest to develop a Dry-Dock facility through their funds on a long-term lease basis and agreed to pay an upfront premium. In April 2019, ICG informed that the Ministry of Defence has sanctioned this ICG the project of leasing of Timber Pond / Boat Basin area from ChPA for 99 years.

Subsequently, ChPA approved the leasing of Boat Basin and Timber Pond for a period of 99 years to the Indian Coast Guard for Development of Dry Dock/Ship repair facility subject to the approval of the Ministry of Ports, Shipping and waterways. Empowered Committee approved the proposal vide lt. dt. 10 Oct 2019.

Currently, ChPA is pursuing with the ICG for completion of balance payments towards upfront premium and other mandatory formalities.



5.8. Four-lane elevated corridor from Chennai Port to Maduravoyal

The Project proponents are NHA, ChPA and GoTN; and NHA is the implementing agency. The project, under a BOT model, commenced during 2011 was stalled due to the intervention of GoTN during 2012, citing violation of alignment along the Cooum river. After pursuance of MoS & ChPA, GoTN issued NoC for the revised alignment with certain conditions.

Now, the project is proposed as a Double Deck Elevated Road with 13 entry/exit ramps for Public and Port traffic under EPC mode; Tier-1- Local Traffic and Tier -2 – Port Traffic. The total planned length of this road is 20.935 kms with 4 lane width. The foundation stone for this project was laid by the Hon'ble Prime Minister on 26th May 2022.

The project corridor commences at Chennai Port (Gate 10) near War Memorial and passes along the banks of Cooum river up to Koyambedu and then joins with the existing elevated road crossing Maduravoyal interchange at NH4. The capital cost of the project is approx. Rs. 6,000 Crores. The location and alignment of this elevated corridor are shown below:



Figure 5-6: Location and Alignment of the Chennai Port-Maduravoyal Elevated Corridor

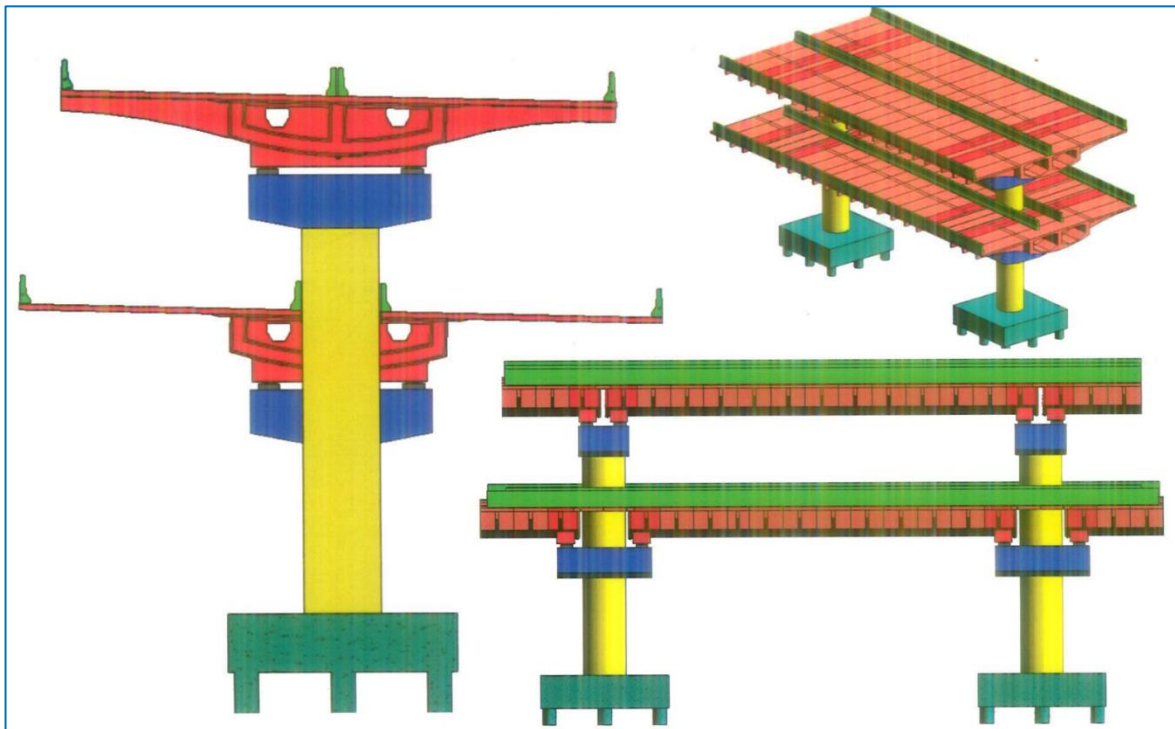


Figure 5-7: Profile, Cross-Section and Plan of the Elevated Corridor

This project will establish 24x7 direct connectivity to the Port from the outer ring road, spurring a new growth of cargo volume at Chennai Port. This project will give an impetus to the connecting hinterland for increased industrialization and port-led development. Besides catering to the EXIM trade, the lower tier of the elevated corridor, meant for public transport, will ease out congestions on the city road, reduce the travel time for public and reduce emissions.

5.9. Privatization of Oil and Bunker Berths

During the Review Meeting at Chennai on 19.12.2019 with the Chairmen of all Major Ports, Secretary (Shipping) suggested exploring the possibility of providing existing berths / infrastructure under PPP mode so that in near future the Ports smoothly shift to Landlord model. Based on the above direction, Chennai Port is exploring possibilities of setting up the dedicated facilities at the existing Berths 26B & 27B by Port Dependent Industries (PDI) for handling POL and other liquid cargoes as per the Policy for the award of waterfront and associated land to Port Dependent Industries in Major Ports (Captive Policy).



At the time of writing this report, i.e. Feb 2023, the oil berths at Chennai Port, viz. BD-I (26B) and BD-III (27B), were used by M/s. Chennai Petroleum Corporation Ltd. (CPCL) and M/s. Indian Oil Corporation Ltd. (IOCL) for handling Crude and POL. M/s. CPCL evinced their interest in taking these oil berths on captive/PPP basis subject to repair and refurbishment of these berths. Pursuant to mutual understanding, Chennai Port has initiated action to undertake repairs under the technical guidance of M/s. National Technology Centre for Ports, Waterways and Coasts (NTCPWC) at IIT-Madras.

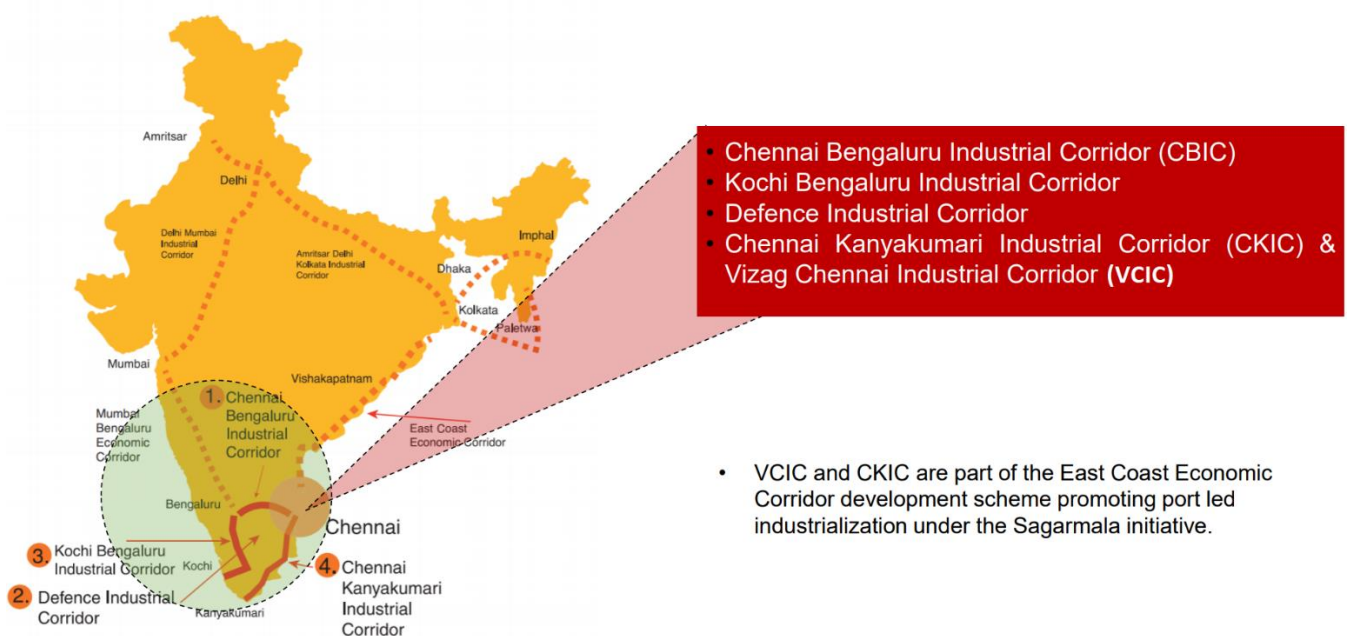


6. TRAFFIC PROJECTIONS

6.1. General

Chennai Port is one of the largest major ports in the Southern part of the country. It handles about 50 MTPA of traffic and is situated strategically and well connected both by rail and road to serve the hinterlands of Tamil Nadu, Southern Andhra Pradesh and Southern Karnataka. Liquid Bulk and Containers cargo constitute more than 80% of the Chennai Port Traffic. The port is one of the largest container ports in the country handling more than 1.5 MTEUs. Along with containers, the port also handles large volumes of POL, Limestone, Steel and dolomite.

Chennai Port is suitably located at the Economic Corridors, which envisage holistic development. These important Economic Corridors are planned and many segments are operational around Chennai. An illustrative picture is below:



In the southern part of Vizag-Chennai Industrial Corridor (VCIC South), a Coastal Employment Unit (CEU) of approx. 300 acres area is planned which will come up as a manufacturing hub and promote port-led industrialization. This project covers Chennai, Thiruvallur and Kancheepuram districts and has linkage to Chennai-Bangalore Industrial Corridor (CBIC). Gov. of Tamil Nadu expects an investment of approx. Rs. 40,000 Cr. by the private developers and creation of over 38,000 jobs. Chennai and Ennore ports will serve as a gateway port for this port. The potential industries in this area are Petrochemicals, Steel, Electronics and Shipbuilding.



The southern Andhra Pradesh districts, especially Anantpur, Kadapa, Nellore, Chittoor, which is served by Chennai and Ennore Ports, has many industrial clusters and special economic zones (SEZ) which are operational or under planning phase. Few important industrial clusters are Kopparthi-Kadapa Engineering Cluster (Size: 87 acres, Investment: ~Rs. 21 Cr.), Gandrajuapalli – Chittoor Silk and Garment Cluster (Size: 100 acres, Investment: ~Rs. 40 Cr.). At Chittoor and Kadapa districts there are two notified SEZs for IT/ITES on an area of 80 acres and 50 acres respectively. In addition, an area of 77 acres is notified in Kadapa for Biotech SEZ and a large area of 2550 acres is notified in Nellore as an SEZ for multi-product. These projects will significantly influence planning and development of the Chennai Port.

6.2. Major Commodities and their Projections

(In '000 Tonnes)				
Commodity	2024-25	2029-2030	2034-35	2046-47 (Best Case)*
LIQUID BULK				
POL - CRUDE	10256	10256	10256	12000
PRODUCT	2241	2241	2241	1000
EDIBLE OIL	1741	2442	3424	6200
CHEMICALS	134	156	181	1000
OTHER LIQUID	95	110	128	800
TOTAL LIQUID BULK	14467	15205	16230	21000
CONTAINER				
CCTL	14187	17178	20800	40000
CITPL	20850	25245	30567	40000
INNER HARBOUR	28	34	41	50
Outer Harbour Mega Term.	-	-	-	80000
TOTAL CONTAINER	35065	42458	51408	160000
DRY BULK				
LIMESTONE	1701	1461	1255	3500
BARYTES	939	1088	1261	2500
DOLOMITE	609	609	609	1200
GYPSUM	460	533	618	1200
Fertilizer	251	251	251	500
COBBLE STONE	157	157	157	300
SILICA SAND	135	157	182	400
MAIZE/PULSES	57	57	57	100
SALT/INDUSTRIAL SALT	44	44	44	100
OTHER DRY BULK CARGO	68	78	90	200
TOTAL DRY BULK	4422	4436	4524	10000
BREKBUK				
IRON & STEEL	1713	2084	2536	6000
RO-RO	250	270	295	700
GRANITE	249	192	149	500
PROJECT CARGO	201	233	270	800
OTHER/MISC	95	110	128	1000
TOTAL BREKBUK	2508	2890	3378	9000
GRAND TOTAL	56462	64988	75540	200000

Table 6-1: Commodity-wise cargo traffic projections (*details in Ch. 9)



6.2.1 Containers

As per the Maritime India Vision 2030 document, the container traffic is expected to be 3-5 Million TEUs for the South AP and North TN clusters as shown below.

Exhibit 1.38 | Cluster-wise potential Container Traffic by 2030

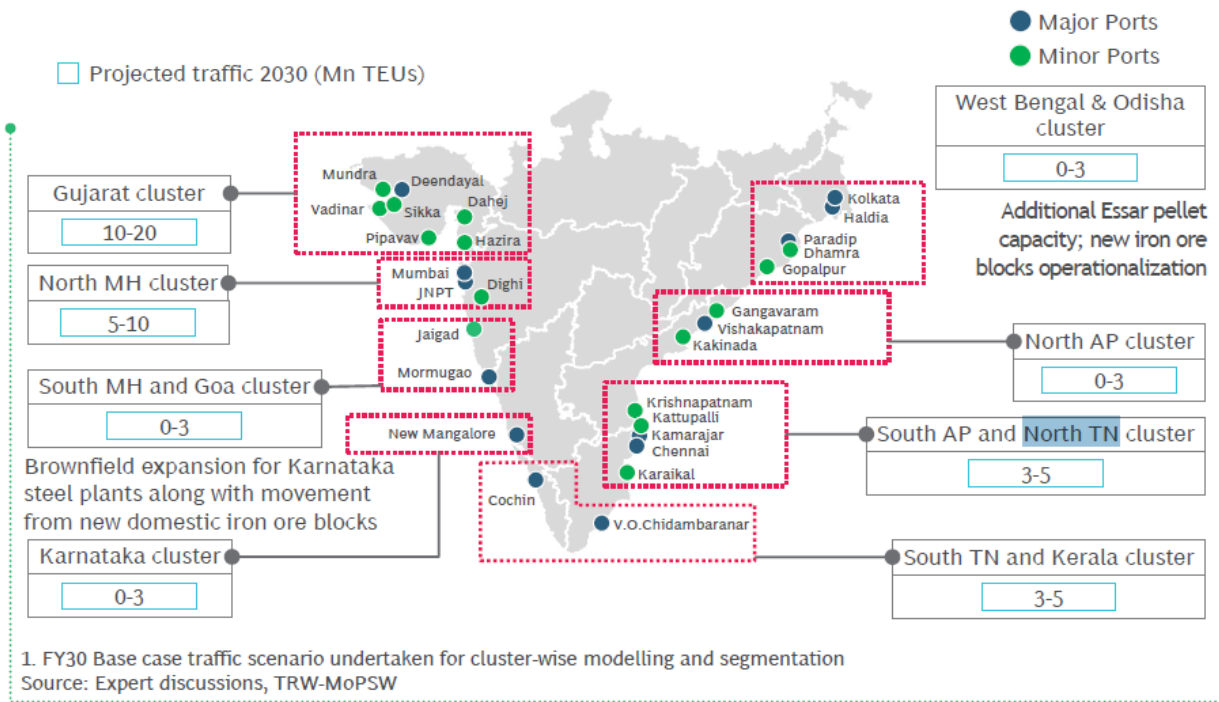


Figure 6-1: Container cargo traffic potential (Source: MIV 2030 Report pg. 39)

Exhibit 1.42 | Capacity Expansion aligned with potential growth in 2030 traffic

Cluster name	Key traffic growth areas	Key capacity addition projects by Major ports	Expansion opportunities for future evaluation by Major ports
South AP and North TN duster	<ul style="list-style-type: none"> Coal: 60-80 MTPA growth potential Containers: 25-30 MTPA growth potential 	<ul style="list-style-type: none"> ~40 MTPA coal capacity addition through new bulk terminals and modification of iron ore berth at Ennore New Container terminal (~30 MTPA capacity) additional in Phases at Ennore 	

Figure 6-2: Capacity Expansion Projects (Source: MIV 2030 report pg. 42)



The hinterland of Chennai Port is shared among the 5 Container Terminals Chennai Container Terminal Pvt. Ltd (CCTPL) and Chennai International Terminal Pvt. Ltd. (CITPL) at Chennai Port, Adani Ennore Container Terminal (AECT) at Kamarajar Port Ltd., Kattupalli International Container Terminal (KICT) at Kattupalli and Navayuga Container Terminal (NCT) at Krishnapatnam. There is stiff competition among these ports for handling the Container Volume. The total traffic handled in these terminals has grown at a CAGR of 4.3% as mentioned below. Based on the inputs of BCG MIV 2030 and the traffic growth in the region, container traffic was projected at a growth rate of 4.6%.

	Actual Traffic (Mn.TEUs)			CAGR	Forecast Growth Rate	Projected Traffic (Mn.TEUs)			Growth between FY20 and FY30	
	FY 18	FY 19	FY 20			FY 25	FY 30	FY 35		
TOTAL OF 5 TERMINALS	2.53	2.77	2.75	4.30%	4.60%	3.44	4.31	5.39	1.55 Mn. TEUs	30 MMT

Table 6-2: Container Cargo Forecast for South AP and North TN region

Chennai Port commanded a 51% market share in FY20. The traffic projection for Chennai Port with 3 different market shares is mentioned below. While estimating the container traffic projection for Chennai Port, it is assumed that Chennai Port will be able to sustain a 50% market share in the region.

	Market Share	Projected Traffic in Mn. TEUs		
		FY 25	FY 30	FY 35
ChPA Traffic Projection based on Market Share (%)	50%	1.72	2.15	2.70
	40%	1.38	1.72	2.16
	30%	1.03	1.29	1.62

Table 6-3: Chennai Port Container Projection Scenarios

Transshipment at Chennai Port

The below table shows the container traffic of Major Ports in 2018-19. On the West Coast of India, JNPT has the highest volume and highest direct destination containers. On the East Coast, Chennai Port has the highest volume of direct destination container volume and this suggests that Chennai Port has a great potential for Transshipment owing to the existence of mainline vessel connectivity.



PORT NAME	CONTAINER TRAFFIC (IN Lakh TEUs) 2019-20				PERCENTAGE OF DIRECT DESTINATION
	TRANSHIPPED FROM INTERNATIONAL PORTS	INDIAN COASTAL	DIRECT DESTINATION	GRAND TOTAL	
KOLKATA	6.68	0.071	0	6.75	0%
HALDIA	1.02	0.67	0	1.69	0%
PARADIP	0	0.12	0	0.12	0%
VISHAKAPATNAM	4.2	0.38	0.46	5.04	9%
KAMARAJAR	0	0.04	1.27	1.31	97%
CHENNAI	7.85	0.72	5.27	13.84	38%
V.O.CHIDAMARANAR	5.8	1.66	0.58	8.04	7%
COCHIN	2.31	3.26	0.63	6.2	10%
NEW MANGALORE	0	1.53	0	1.53	0%
MORMUGOA	0.244	0.074	0	0.32	0%
MUMBAI	0	0.26	0.01	0.27	4%
JNPT	0.851	0.36	49.1	50.31	98%
DEENDAYAL	0.4	3.67	0.4	4.47	9%
TOTAL	29.35	12.81	57.72	99.89	58%

Table 6-4: Container transshipment details for the Major Ports (Source: IPA)

Feeder vessels carry containers from ports like Kolkata/Haldia and Vizag to international transshipment ports like Singapore, and later, mainline vessels pick these containers from International Ports. There is a potential to divert some of these containers by transshipping containers from Chennai Port instead of international ports as some of the connecting Mainline vessels are already calling Chennai Port. Transportation cost analysis by McKinsey suggested that there is an overall reduction in cost while transshipping these containers from Chennai instead of Singapore.

More than half of the Chennai Port container volumes are transhipped from international ports. Apart from coastal and feeder vessels, Chennai Port has been serving Mainline vessels which connect to European, Middle East and Far East Asian countries.

Year	Transshipment Volume (TEUs)
2017-18	194
2018-19	861
2019-20	628

Table 6-5: Container transshipment volume at Chennai Port for the last three years



As seen from the table, there was no appreciable transshipment taking place at Chennai Port till 2019-20. Chennai Port entered into an agreement with a shipping line for the transshipment of containers from Chennai Port. Chennai Port shall pursue with other shipping lines for entering into similar agreements.

Month	# of transshipment vessels	Transshipment Volume (TEUs)
Jul-2020	13	10,068
Aug-2020	13	11,620
Sep-2020	13	11,263
Oct-2020	13	11,249
Nov-2020	13	8,170
Dec-2020	13	11,952
Jan-2021	13	11,292
Feb-2021	10	8,017
Mar-2021	11	7,130
Total	112	90,761

Table 6-6: Container transshipment volume handled by shipping lines during 2020-21 at ChPA

In case a new transshipment hub is developed in the southern tip of India, there is a potential that Chennai Port container traffic may get diverted owing to the fact that the majority of the existing containers are transhipped at international ports such as Colombo, Singapore, Dubai etc.

6.3. POL

The port currently handles about 12 MTPA of POL, of which about 10 MTPA of crude oil is being imported by CPCL Manali Refinery. Since the refinery Capacity is 10.3 MMT and there are no plans to increase this capacity, the volume is expected to be stable over the projected period. In relation to POL product traffic, OMC's are shifting to the Ennore Port and hence there is no traffic increment envisaged for the POL products at Chennai Port.

6.4. Iron and Steel

Initiatives such as 'Make in India' and the growth of the automobile sector in the Chennai Region is expected to increase the Iron Steel trade.



Exhibit 1.30 | 14 to 20 MTPA coastal movement potential for Steel

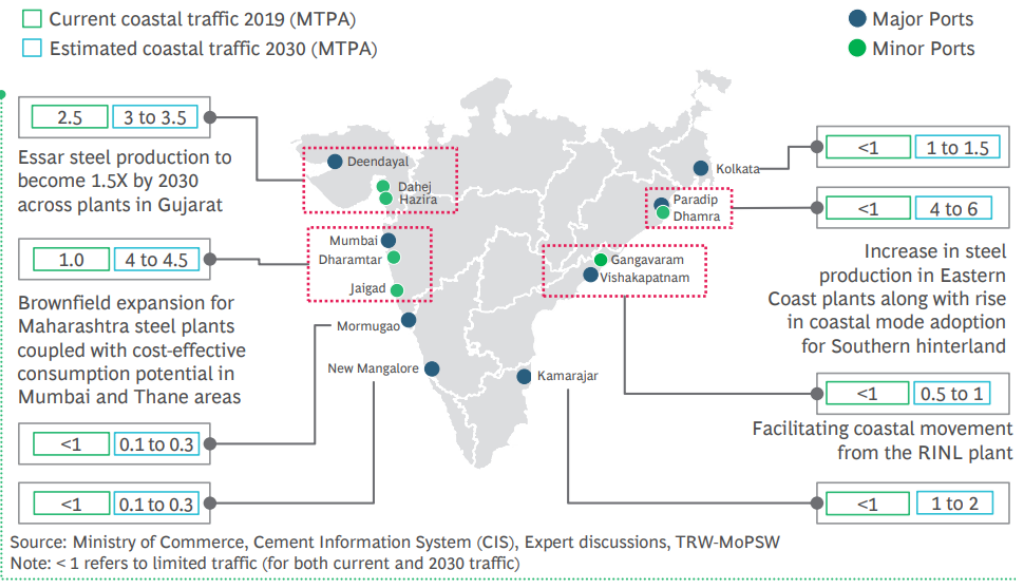


Figure 6-3: Coastal movement potential for Steel (Source: MIV 2030 report pg. 34)

6.5. Limestone

JSW, the major importer, has acquired the Chettinad terminal at KPL and AECOM reported that Limestone is expected to be replaced by a substitute for cement production. The volume of Limestone can decline over the years. The cargo has been projected at 1.2 MMT by 2035. The expected flow of cement is depicted below.

Exhibit 1.28 | 13 to 18 MTPA coastal movement potential for cement

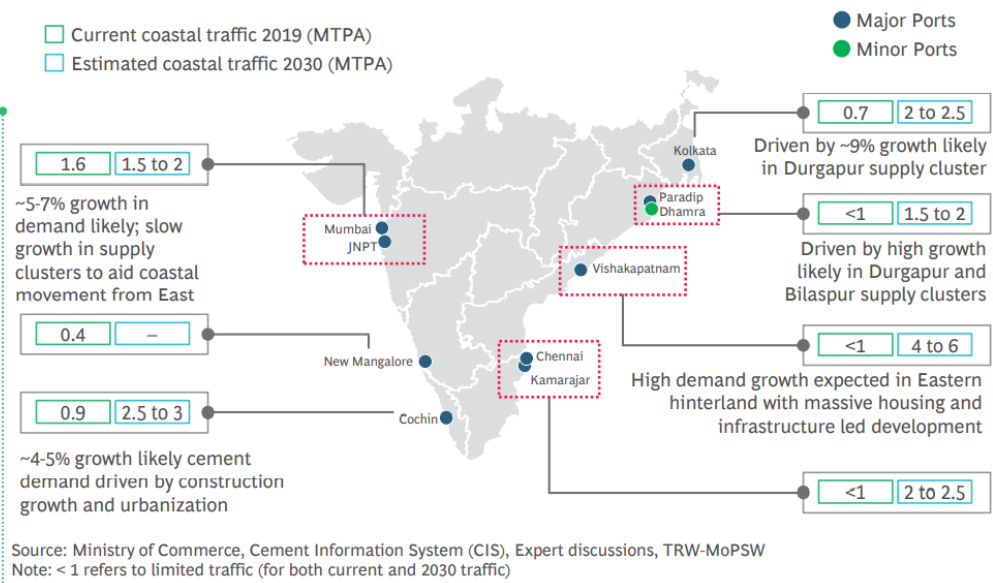


Figure 6-4: Coastal movement potential for Cement (Source: MIV 2030 report pg. 33)



6.6. Automobile

Chennai has become a hub for automobile manufacturing with major players such as Ford, Hyundai, Nissan, Kia etc. Chennai Port has signed a long-term contract with Hyundai and Kia. Considering the growth potential of the automobile sector, the traffic is projected to grow at a rate of 3% from FY2025.

6.7. Fertilizers

As per the Ministry of Chemicals and Fertilizer, Rail has been the primary mode of transport for long-distance movement of fertilizer, even for movement between coastal plants and coastal consumption centers. However, to promote coastal shipping, the government has taken policy initiatives such as relaxation of cabotage for foreign flag vessels allowing them to engage in coastal trade for carriage of fertilizers by sea and providing subsidy equal to notional railway freight through coastal and inland waterways under NBS (Nutrient-based Subsidy) and UFS policies. Based on these the expected cargo potential is as under:

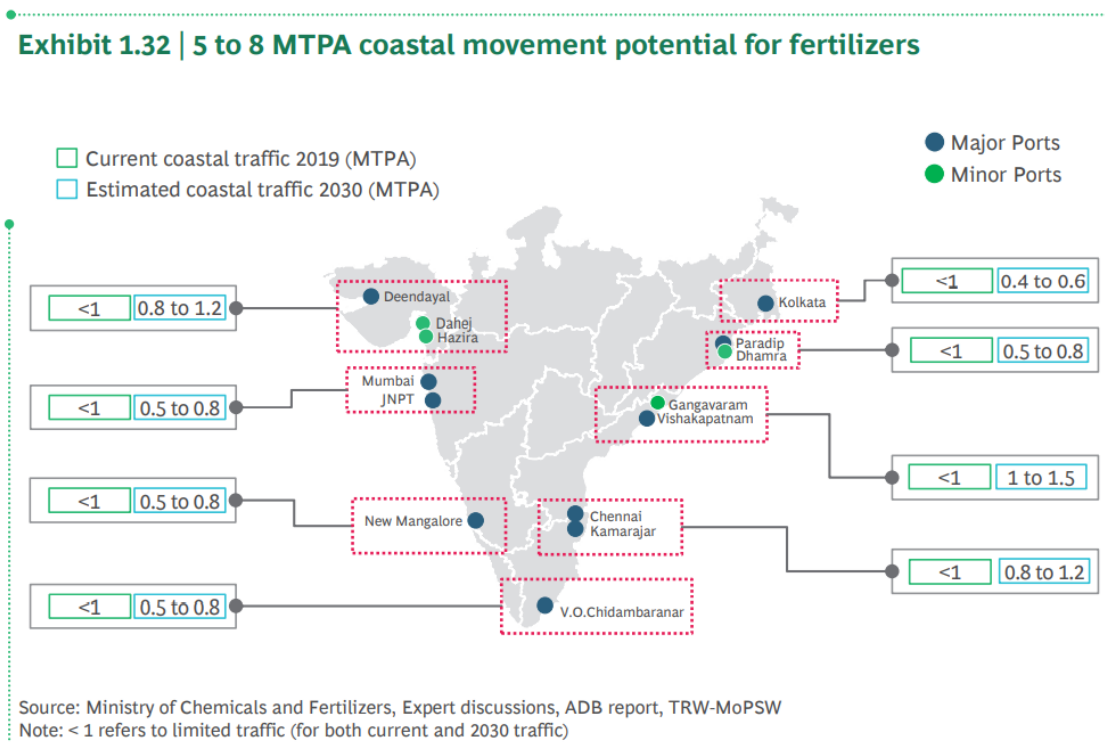


Figure 6-5: Coastal movement potential for fertilizers (Source: MIV 2030 pg. 36)



6.8. Cruise Passengers

Globally, the cruise industry has experienced a steady growth of 6% CAGR in the last few years, with new and premium cruises accounting for more than 50% of the current market.

The Indian cruise market is small but growing steadily driven by rising disposable incomes and government interventions. The Government has taken several measures in the last five years to boost the growth of cruise passengers such as Standardized Operating Procedures (SOPs) for cruise vessels, E-visa facility has been extended to five seaports, namely Mumbai, Mormugao, New Mangalore, Cochin and Chennai and reduction of port charges with all Major Ports required to charge a uniform single rate per GRT.

Recently, Chennai Port has upgraded to a state-of-the-art International Cruise Terminal in 2018 which can accommodate 1000 passengers. In addition, Chennai port is providing an on-arrival berthing facility to the cruise liners. The Cruise Passenger forecast up to 2030 is given below –

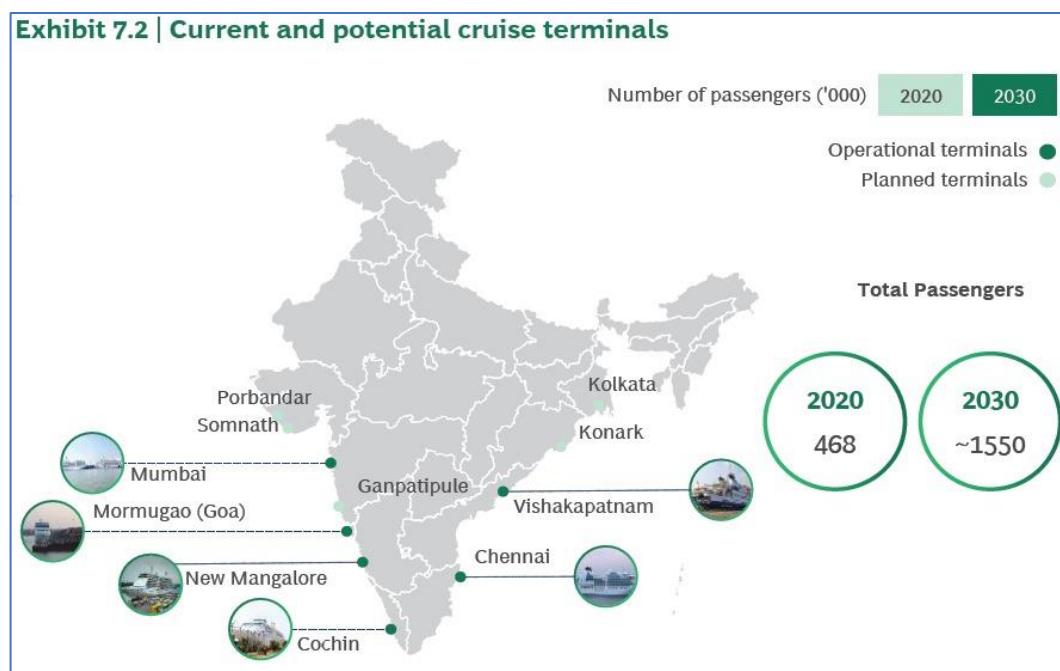


Figure 6-6: Cruise Passenger Traffic potential (Source: MIV 2030 report pg. 188)



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7. CAPACITY AUGMENTATION REQUIREMENTS

7.1. Requirement for Capacity Expansion

Based on the handling equipment requirement, Storage requirement and mode of evacuation, seven categories of cargoes have been identified. Each of the seven categories of the cargoes is mapped to a set of ideal berths which can optimally handle that cargo, provide storage facilities and easy inward and outward access to the Port. Below is the list of seven categories of cargo, mapped to ideal berths and highlighting the present capacity of the port to handle these cargoes.

#	Category	Handling equipment	Storage area requirement	Ideal Berth/s	Capacity (MMTPA)
1	Petroleum Oil	Pipeline	Tank Farms	BD1, BD3, BB	23.4
2	Other Liquids	Pipeline, Drums	Tank Farms	BD2, NQ, SQ2	3.7
3	Container	Quay Crane, RTGS, RS	Container Stacking Yard	CTB 1-4 & SCB 1-3	51.6
4	Break-Bulk	HMC, road/rail for evacuation from wharf	Paved Yard / Unpaved Yard	WQ 3-4, CQ	5.0
5	RoRo	Water spraying facility at wharf	Paved Yard	WQ 1-2, CB 1-2	2.9
6	Sensitive Dry Bulk	HMC, Hopper	Covered Warehouses	SQ 1, JD 1, 3, 5	9.9
7	Other Dry Bulk	HMC	Open Unpaved	JD 2, 4, 6	7.4
	Total			27 Berths	103.9

Table 7-1: Cargo Category wise Port Capacity

In order to ascertain the capacity augmentation requirement, we have analysed sea-side infrastructure such as approach channel width and depth, turning circle, depth at berth, tug boat requirement, etc.; at-berth infrastructures such as quay length, type of berth, backup area, cargo handling equipment, etc.; cargo storage infrastructure such as cargo sheds, tank farms, paved storage, etc. and connectivity infrastructure such as internal roads, rail network and sidings, pipelines, coastal transshipment etc. and studied in detail to identify the shelf of projects that may be taken up by the Chennai Port till 2047. At-berth infrastructure capacity and the projected cargo traffic are compared in the below table –



#	Category	Commodities	Port Capacity (MMTPA)	Forecast (MMT)		
				FY25	FY30	FY35
1	Petroleum Oil	Crude & POL	23.4	12.5	12.5	12.5
2	Other Liquids	Edible Oil & Chemicals	3.7	2.0	2.7	3.7
3	Container	Containerized Cargo	51.6	33.2	41.6	52.0
4	Break-Bulk	Iron & Steel, Project cargo, Logs, Machinery, Granite Blocks, Barytes J. Bags	5.0	2.3	2.6	3.2
5	RoRo	Cars, Buses, MAFI	2.9	0.2	0.3	0.3
6	Sensitive Dry Bulk	Ammonium Sulphate, Muriate of Potash, Sulphur, Urea, Food Grain, silica sand, raw sugar, industrial salt, Soda Ash	9.9	0.5	0.5	0.5
7	Other Dry Bulk	Rock Phosphate, Dolomite, Limestone, Iron ore pellet, Gypsum, Shredded scrap, Heavy melting scrap, Barytes, Cobble Stone, Cement Clinkers, Ferro slag.	7.4	3.9	3.9	4.0
	TOTAL		103.9	54.6	64.1	76.2

Table 7-2: Infrastructure capacity Vs. Cargo projections of FY 2030

It is evident from the above table that except for the other liquid and container categories, Chennai Port has sufficient at-berth handling capacity for all other categories of cargo till the year 2035. In order to identify the capacity augmentation project, we must also consider the vessel handling capabilities and cargo evacuation infrastructure, especially with respect to the new vessel types/sizes and new cargo evacuation means.

Capacity sufficiency till the year 2035 with respect to vessel handling capabilities (with increasing vessel sizes), berth facilities and cargo handling equipment are tabulated below and also dealt with in detail in the following sections:



Capacity Assessment: Metrix					
#	Category	Generic Cargo Types	Vessel Handling	Berthing Facility	Cargo Handling
1	Petroleum Oil	Crude & POL	⊗	✓	✓
2	Other Liquids	Edible Oil & Chemicals	✓	⊗	⊗
3	Container	Containerized Cargo	⊗	⊗	⊗
4	Break-Bulk	Iron & Steel, Project cargo, Logs, Machinery, Granite Blocks, Barytes J. Bags	✓	✓	⊗
5	RoRo	Cars, Buses, MAFI	✓	⊗	✓
6	Sensitive Dry Bulk	Ammonium Sulphate, Muriate of Potash, Sulphur, Urea, Food Grain, silica sand, raw sugar, industrial salt, Soda Ash	⊗	✓	⊗
7	Other Dry Bulk	Rock Phosphate, Dolomite, Limestone, Iron ore pellet, Gypsum, Shredded scrap, Heavy melting scrap, Barytes, Cobble Stone, Cement Clinkers, Ferro slag, Mil Scale	⊗	✓	⊗

Figure 7-1: Infrastructure Assessment

7.1.1 Petroleum Oil

The combined berth capacity of 22.7 MTPA at BD1 and BD3 was found to be sufficient against the forecasted demand of 12.5MMT in 2035. Therefore, it is felt that capacity augmentation at berth is not required till 2035. BD I and BD III depth A/S 16 meters and 17.4 meters; designed for 100,000 DWT and 140,000 DWT tankers respectively. In 2018, BD III handled a lightened VLCC, which is the largest category of crude oil tankers. Since 2018, three such vessels have been handled to date. Therefore, BD III can accommodate most of the oil tankers with the draft as a limiting factor at 16 meters. As far as the vessel handling capabilities are concerned, the requirement of an additional tug boat may become a necessity, since at present the requirement is being met with the help of a tug boat from Kamarajar Port.

Oil handling will not affect common evacuation facilities viz. road, rail etc. as 80% of the petroleum cargo is crude oil, which is handled through a 42" pipeline. Berths are also served by 1 × 20" pipeline for white oils and 2 × 14" pipeline for black oils. There are separate service lines for LDO/F0/LO bunkers. The existing oil pipelines are sufficient to cater to the forecasted demand till 2035.



There is an estimated CAPEX of Rs.55 Cr and Rs.48 Cr during 2022-25 and 2028-29 on the maintenance of BD1&3 berths and thereafter infrastructure maintenance cost Rs.2Cr/year. The port, in line with its vision to transition to a landlord port model, shall, therefore, find avenues to transfer the O&M of these berths through relevant modes such as PPP. Indian Oil Corporation (IOC), the 100% stakeholder of CPCL, maybe the best party to operate these berths, considering their huge import volume of crude oil.

Hence, with regard to petroleum oils, Chennai Port shall outsource O&M of BDI & BDIII and engage an additional tug boat of 60T bollard pull capacity for handling large vessels such as VLCC.

7.1.2 Chemicals and Edible Oils

The combined berth capacity of 3.7 MMTPA at BD2, NQ and SQ2 was found to be just sufficient against the forecasted demand of 3.7 MMT in 2035. Therefore, it is felt that capacity augmentation at berth may be required closer to the year 2035.

NQ and SQ 2 have depth A/S 8.5 and 9.5 meters which can handle ships of 11,000 & 20,000 DWT respectively, BD 2 has 17.4 meters depth with a quay length of 382 meters which can handle 120,000 DWT ships.

Recently, Krishnapatnam has emerged as the hub port for handling edible oils. A large number of edible oil companies have settled around Krishanapatnam port. It is observed that the vessels carrying crude edible oil at Krishnapatnam are all less than 200 meters (100 to 190 meters) with parcels ranging from 5000 to 20,000 MT per ship.

KPL, Kamarajar Port Ltd., handles a large number of chemicals for the Chennai hinterland. The chemical tankers calling KPL are from 5000 DWT to 35000DWT in size (100 to 150 meters in LOA).

Edible oils and chemicals are stored in specialized tanks at/near the port and then transported to the factories via road. Road evacuation will be assessed together with other cargo.

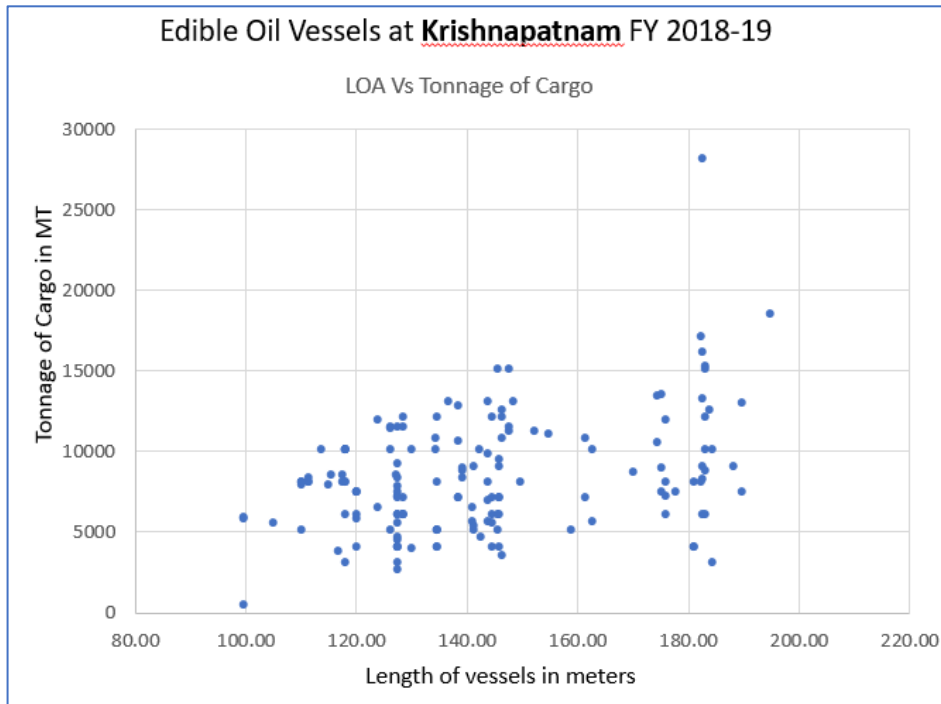


Figure 7-2: Edible Oil vessel calls at Krishnapatnam (FY 2018-19)

Chemical Vessels at KPL FY 19-20

Name of Ship	Length in meters	Max draft in meters
Tiger Reliance	124	8.7
Tiger Prosperity	112	7.9
Tiger Peace	114	7.5
Tiger Autumn	114	8.2
Dae Won	149	10
Jal Pari	115	---
Estolar	112	
Eastern Chemi	114	8.4
Dangbang Chemi	113	---

Figure 7-3: Chemical tanker vessel calls at KPL (FY 19-20)



If Chennai Port wants to attract these cargoes, additional and specialized tanks may be required. Since the handling of edible oil is scattered at many berths viz. BD1-3, NQ, WQ1-2, SQ2, JD2,4 & 6, the port may identify specific berths for the northern tank farms (Bunker Berth) and the southern tank farms (JD 2 & 4).

In order to standardize the handling of such liquid cargo at Chennai Port, it is proposed to have facilities at the Northern as well as Southern sides of the harbour. Chennai Port may consider an elongation of the Bunker berth to 220 meters from the existing planned length of 180 meters, by extending a mooring dolphin eastward, for addressing the berthing requirement of the edible oil vessels, or, BD I may also be utilized for the same. In either case, Chennai Port shall maintain flexibility of handling edible oil/chemicals at bunker berth and/or BDI when going for a PPP of these berths. Alternatively, Chennai Port may continue handling the edible oils at BD II till the year 2030, thereafter shifting edible oil handling to NQ or WQ 1 berths to cater to the existing tank farms north of gate no.7. The New tank farm(s) development shall be undertaken at the southern end of the port and the specialized handling of the edible oil/chemicals may be taken up at the JD berths. Zonal development of tank farms in the south region of the port will facilitate efficient use of resources such as pipeline trestle, designated land area for right-of-way, common loading and unloading facilities for trailer and tank wagons such as gantry loading structures, common fire-fighting facility, etc. For the southern tank farms, JD2 and JD4 may be considered for edible oil handling as SQ2 may become unsuitable (JD entrance widening).

An area of 50,000 sqm area near the southern end of the port and an area of 15,000 sqm to the east of the E1/E2 warehouse are earmarked for the development of edible oil / chemical tank farms. The location of the southern tank farm, near the southern part of the port, is suggested to keep the continuity of berth and backup area of the JD east berths intact, for possible containerization in future.

A block cost estimate for developing tank farm in the earmarked area by importers/ operator is arrived as per the June'2020 valuation of the tank farms by M/s. Covenant Insurance Surveyor. The valuation of two tank farms in 8900 sqm and 10000 sqm area inside the Port is Rs. 22.96 crores and Rs. 23.2 crores respectively. Therefore, extrapolating the same valuation, the development cost of tank farms in an area of 65,000 sqm (50000 + 15000) sqm would be roughly Rs. 160 crores.

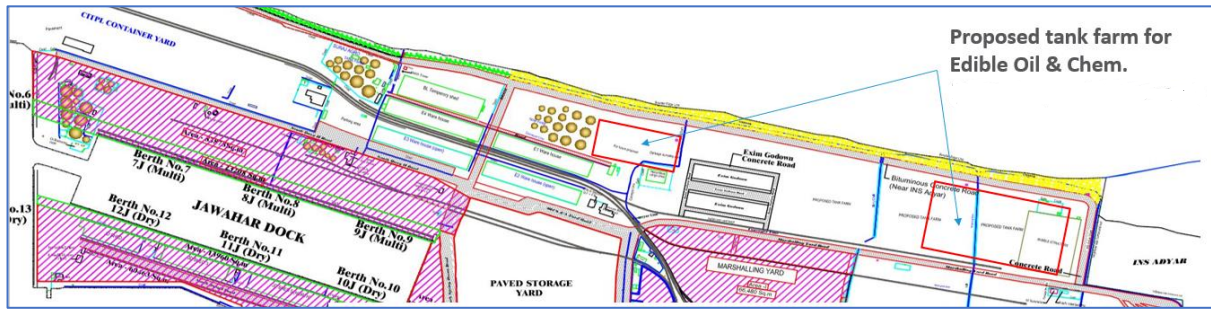


Figure 7-4: Proposed area earmarked for tank farm development

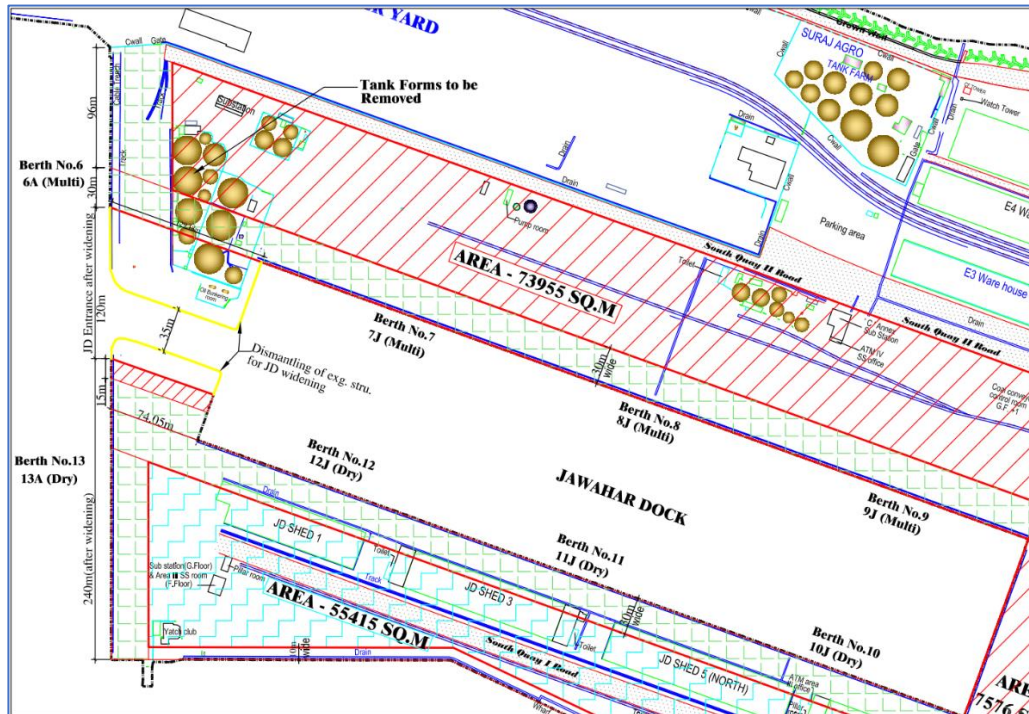


Figure 7-5: Widening of JD entrance

The old and weak structure at the entrance of Jawahar dock requires maintenance and presents itself as a great opportunity to streamline operations and infrastructure in this area to make it more attractive to the prospective PPP operators. Demolishing eastern protrusion of JD entrance to align with JD East berths will increase the length of JD East berths by 130 meters to a total of 785 meters and widen JD entrance by 85 meters to 120 meters. This will unlock crucial backup/waterfront area at the JD East berth and increase efficiency and capacity.

Hence, with regard to chemicals and edible oils, Chennai Port may consider the handling of edible oil / chemicals at bunker berth (or) BDI, development of tank farms in the earmarked area in the southern part of the port, widening of JD entrance and finally the relocation of exiting tank farms located at JD east berths to the earmarked area at the southern limit of the port as and when their license period gets over.



7.1.3 Containers

The combined berth capacity of 51.6 MMTPA at first and second container terminals may barely be sufficient for the expected container volume in 2035. As per the Maritime India Vision 2030 document, the growth in container volume for North Tamil Nadu and Southern AP region will be around 25-30 MMT by the year 2030. As per the data of FY2020, Chennai Port enjoys a 50% market share, which has reduced from 62% in FY2018. If Chennai Ports intends to maintain the same 50% market share by 2030, it will approximately be handling around 2.15 Mn TEUs PA by FY2030 and 2.70 Mn TEUs by FY2035.

Terminal Name		Capacity (TEUs)	Traffic Handled (TEUs)				Capacity Utilization in FY20	Market Share		
			FY 18	FY 19	FY 20	CAGR		FY 18	FY 19	FY 20
Chennai Container Terminal	CCTL	12,00,000	6,46,482	6,55,385	4,83,518	-13.5%	40%	26%	24%	18%
Chennai International Terminal	CITPL	12,50,000	9,01,584	9,63,167	8,99,336	-0.1%	72%	36%	35%	33%
Adani Ennore Container Terminal	AECT*	8,00,000	2,682	57,051	1,30,781	598.3%	16%	0%	2%	5%
Kattupalli International Container Terminal	KICT	12,00,000	4,93,260	5,92,409	6,90,644	18.3%	58%	20%	21%	25%
Navayuga Container Terminal	NCT	20,00,000	4,81,716	5,06,168	5,43,244	6.2%	27%	19%	18%	20%
Total		64,50,000	25,25,724	27,74,180	27,47,523	4.3%	43%			

	Market Share	Projected Traffic in Mn. TEUs		
		FY 25	FY 30	FY 35
ChPT Traffic Projection based on Market Share (%)	50%	1.72	2.15	2.70
	40%	1.38	1.72	2.16
	30%	1.03	1.29	1.62

Figure 7-6: Market-share analysis for container cargo at ChPA

If Chennai Port intends to be a transshipment hub on the east coast of India, then it further needs to augment its container handling capacity ambitiously.

It is apparent that the container handling capacity of Chennai Port, i.e. 2.5 Mn TEUS PA, strains at the existing throughput of only 1.5 Mn TEUs PA. It is, therefore, recommended to augment the handling capacities as well as evacuation infrastructure in order to retain the same market share in future.



The existing concession agreements have a provision for the upgradation and renewal of container handling equipment at the terminals by the operator in 15 to 20 years of operation. This clause may be expedited and additional land and other facilities may be offered to the terminal operators in order to increase the volume in short term.

With a joint effort of the port authority and the terminal operators, an increase in container handling capacity may be achieved. As highlighted below, the container handling capacity of the Chennai Port may be increased from 2.5 Mn TEUs PA to 3.7 Ms TEUs PA by the year 2025.

The Port and Container Terminal Operators shall:

PORT	TERMINALS
Dredge approach channel, turning circle, depth A/S to 17/18 meters	Verify and strengthen berth to withstand 17/18 meters depth
Common user CFS facility with rail siding	Leasing increased area for yard space
Deploy additional tugs for large container vessels	Deploy additional RTGs, RS, Straddle carriers
Operationalize <u>Jolarpettai</u> goods shed with fixed rails service	Push for transshipment

Additional measures such as:

- Additional yard area of 1 & 2 Hectares to CCTL & CITPL
 - Deployment of 3 additional quay cranes by CITPL
 - Above measures are expected to increase the joint capacity of these terminals to 3.7 Mn TEUs PA.
- [CCTL: 1.7 Mn TEUs PA]
[CITPL: 2.0 Mn TEUs PA]

In addition, by 2031, when the concession duration of the first container terminal will be getting over, the BD II berth may be given along with the existing berths of the first container terminal to the new PPP operator. The inclusion of the BDII berth will increase the container handling capacity to 4.5 Mn TEUs PA by the year 2033.

The new terminals shall be as follows:

New container terminal proposed details(2030):
 Quay Length: 1267 meters (885+382)
 Backup area: 36.5 hectares (25+11.5)
 Quay Cranes: 12 Nos (22 rows reach)
 Ground Slots: 7,500
 Capacity: 2,500,000 TEUs PA

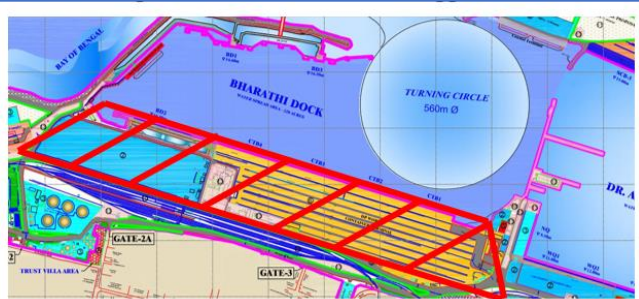


Figure 7-7: Development Plan for 3rd Container Terminal at ChPA

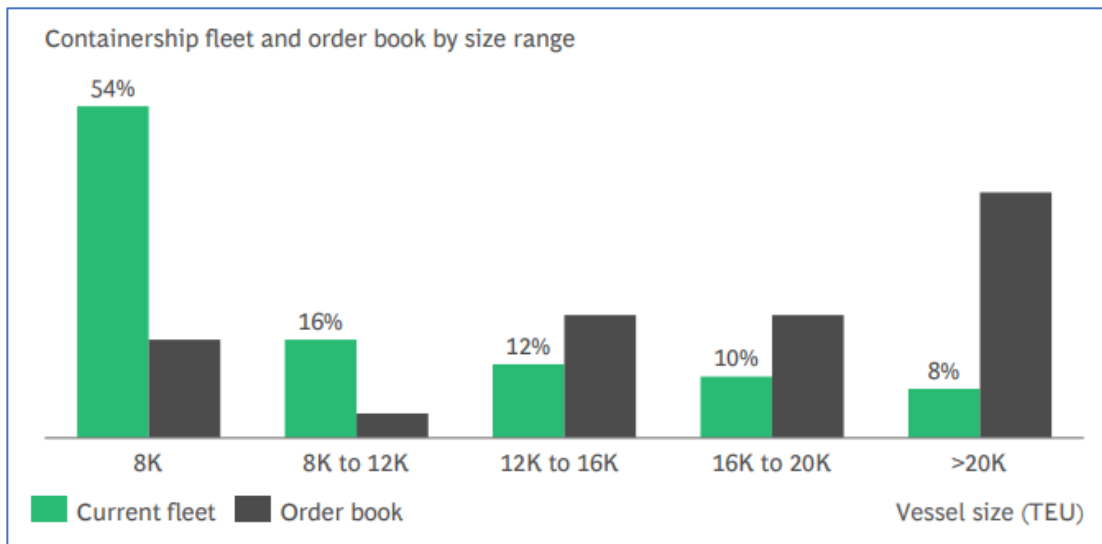


Figure 7-8: Container Fleet Operational Vs. Order book size

Besides, the enhancement of berths and handling equipment, Chennai Port shall also plan for a parking plaza, catering to the trailers and trucks. This facility will reduce road congestion inside and outside the port and facilitate reliable, efficient and cost-effective transportation between port and CFSs.

In order to cater to the growing container market, Chennai Port may look into vertical integration by providing a CFS facility within the port limits. The CFS facility may come up at the western yard where cargo aggregation for import and export boxes may happen. The M1 and M2 warehouses may be utilized for stuffing and de-stuffing of the boxes under Customs supervision. In line with the Chennai Port vision to become a transshipment hub on the East Coast of India, this CFS facility can be cost-effectively and efficiently utilized in inter-terminal transfer of containerized cargo for transshipment purposes. This facility may be in addition to the CONCOR facility which is to the west of the first terminal.

The scarcity of land/space at Chennai Port acts as a severe bottleneck in increasing the cargo handling capacity at the port. In order to retain the market share and organically grow with the growing demand, Chennai Port will be requiring additional land for serving the trade competitively. Chennai Port shall consider land reclamation measures to the north side of the northern breakwater, as shown in the diagram below:

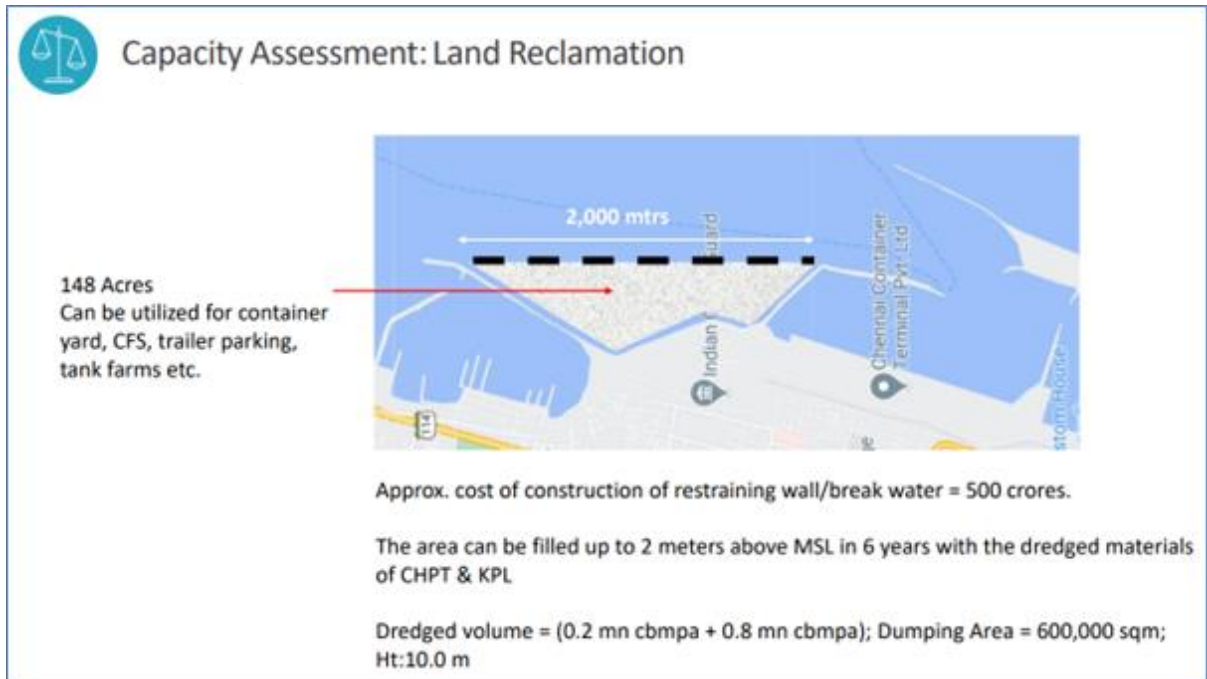


Figure 7-9: Land Reclamation Potential at ChPA

This reclaimed land parcel will be a contiguous land with the container terminal and a straight flow of trailers and container rake can easily be established. The reclaimed land can first be utilized for container-related value-add activities. This area can later be converted into another container terminal. Since the vision of Chennai Port is to be a transshipment hub on the east coast, additional land area for development as a container yard would be a necessity.

Hence, with regard to the handling of containers, Chennai Port shall continuously take steps to meet the demand by augmenting its capacities. In the short term, the port may give additional land area to the terminal operators, deepen the depths alongside the container berths, terminal operators to deploy additional quay cranes, expedite the completion of the Maduravoyal connectivity project, establish a parking plaza, the inclusion of BDII in container terminal and land reclamation to the north of the northern breakwater.



7.1.4 Break-Bulk

The combined berth capacity of 5.2 MMTPA at CQ, WQ3 and WQ4 is found to be sufficient against the forecasted demand of 3.2MMT in 2035. Therefore, it is felt that capacity augmentation at these berths may not be required till 2035. The Identified berths have 11~12 meters depth that can handle 30~35000 DWT vessels with a length over 200 meters. Therefore, these berths can easily accommodate Panamax break-bulk vessels. The break-bulk vessels are generally as big as or smaller than a Panamax vessel.

If there is an additional requirement for cargo sheds, then it may be constructed to the south/East side of the EXIM Godowns. This will keep the backup area to the east of JD(East) Berths free for development as a container terminal at a later date. In the short-term, the existing covered sheds may be revamped. The additional area, if required, is earmarked to the east/south of the EXIM godowns.

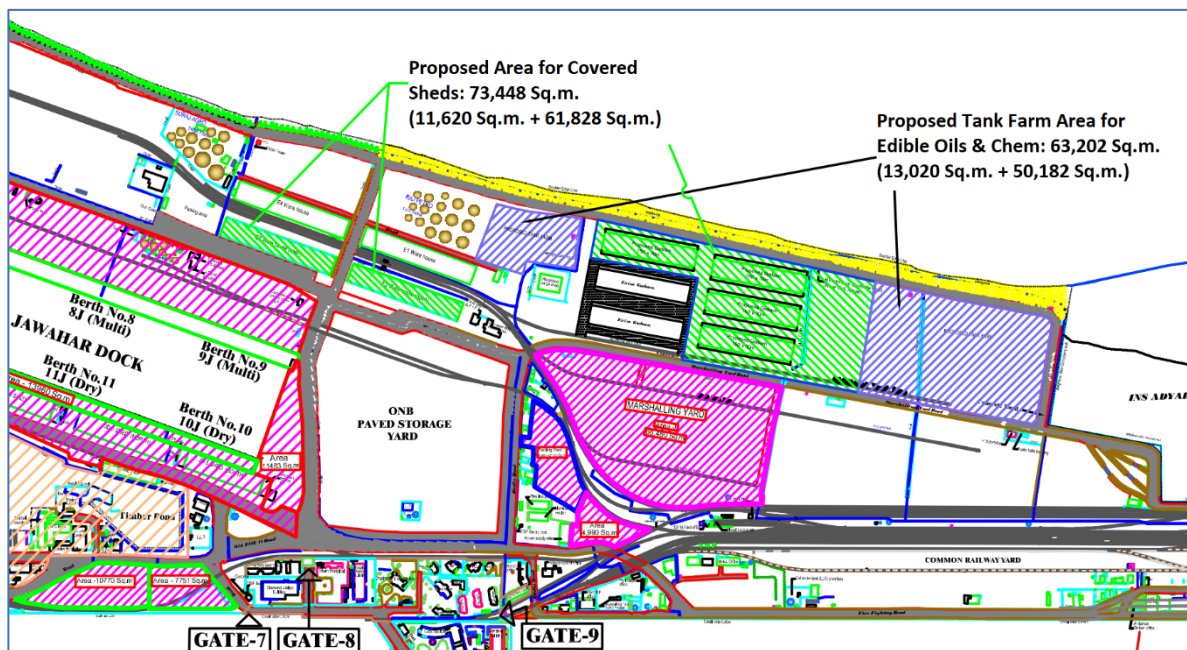


Figure 7-10: Proposed development for break-bulk cargo

Therefore, there is no additional berth infrastructure required for handling break-bulk cargo till 2035. The port is sufficient with its current berth infrastructure to cater to the break-bulk demand till 2035. If need be, cargo sheds may be constructed in the earmarked area. A provision for Solar Panel Roofing shall be provided for the upcoming warehousing projects (Cargo Sheds) to increase the share of renewable energy at the port.



7.1.5 Ro-Ro

The combined berth capacity of 2.9 MMTPA at WQ1, WQ2 and Coastal berths is found to be sufficient against the forecasted demand of 0.3 MMT in 2035. Therefore, it is felt that capacity augmentation at berth is not required till 2035.

The Identified berths have 11~12 meters depth that can handle 30~35000 DWT vessels with a length over 200 meters. Hence, these berths can easily accommodate RORO vessels catering to automobile exports from this region. There is no infrastructure required for handling RORO cargo till 2035.

If the port intends to attract KPL RORO cargo, the coastal berth will require additional pavement for the storage of cars and a screen to protect cars from the sea splash.

7.1.6 Sensitive Dry Bulk (Sensitive to weather and require covered sheds)

The combined berth capacity of 9.9 MMTPA at SQ1, JD1, JD3 and JD5 berths is found to be sufficient against the forecasted demand of 0.5 MMT in 2035. These berths have 9.5~13 meters depth and can handle 20~70000 DWT vessels with a length over 200 meters. Hence, these berths can easily accommodate dry bulk vessels carrying sensitive cargo which require covered sheds.

The depth, however, may need to deepen at the JD East berths to allow for ships with 14 meters draft. Repair of quay-side sheds at JD 1, 3 and 5 may be undertaken depending on the requirement of the trade. Additional sheds, if required, may be planned to the east/south of the EXIM godowns.

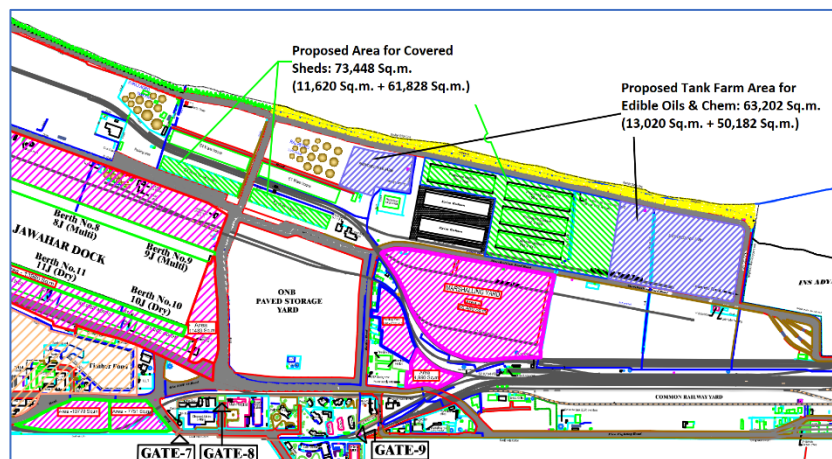


Figure 7-11: Proposed development for Sensitive Dry-bulk cargo



Hence, for the Sensitive Dry Bulk cargo, the Port may consider deepening the JD East berths, repairing the covered sheds at JD 1, 3 and 5 and establishing new sheds, if required, at the earmarked area. A provision for Solar Panel Roofing shall be provided for the upcoming warehousing projects (Cargo Sheds) to increase the share of renewable energy at the port.

7.1.7 Other Dry Bulk (Typically stored in open unpaved area)

The combined berth capacity of 7.4 MMTPA at JD2, JD4 and JD6 is found to be sufficient against the forecasted demand of 4.0 MMT in 2035. The Identified berths have 14 meters depth and can handle up to 70000 DWT vessels with a length over 200 meters. The depth, however, may need to deepen based on the evolving requirement of the trade to allow for ships with more than 14 meters draft.

Hence, if the structural strength permits, the JD west berths may be dredged to 15~16 meters to allow for ships with a deeper draft in future.



8. ROAD AND RAIL – INTERNAL NETWORK AND EXTERNAL CONNECTIVITY

8.1. General

For efficient performance of a port, cargo delivery and evacuation infrastructure play a key role. Hence, effective internal and external road and rail connectivity is crucial for the sustenance of the Chennai Port. The connectivity of rail and roads to Chennai Port hinterland has been shown below in Figure 8.1.

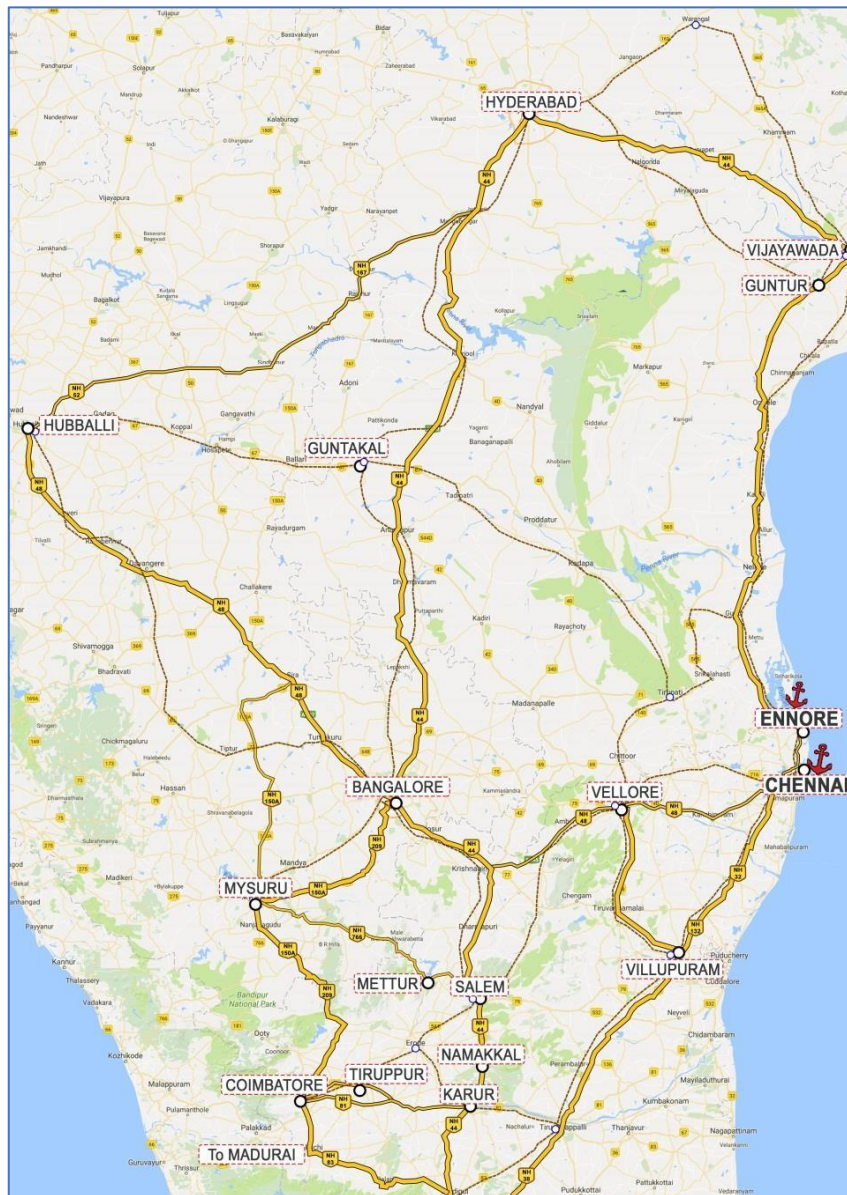


Figure 8-1: Rail and road connectivity to/ from Chennai Port



8.2. Modal share of Cargo Traffic

The cargo handled at the port could be classified under three major heads – dry/breakbulk, containers and liquid bulk. While liquid bulk mostly is evacuated through pipelines, the other two are evacuated through road and rail. At Chennai Port, the proportion of traffic handled through these three modes for the past 5 years are presented in the following Table.

Period	Total Traffic Handled (MMT)	RAIL		ROAD		PIPELINE	
		Tonnage (MMT)	Share (%)	Tonnage (MMT)	Share (%)	Tonnage (MMT)	Share (%)
2020-21	43.55	5.13	12%	28.02	64%	10.4	24%
2019-20	46.76	2.94	6%	30.21	65%	13.6	29%
2018-19	53.01	5.02	9%	34.48	65%	13.51	25%
2017-18	51.88	5.03	10%	33.06	64%	13.79	27%
2016-17	50.21	5.41	11%	32.42	65%	12.38	25%

Table 8-1: Modal Split of Cargo Traffic at Chennai Port

8.3. Evacuation through Road

The Port has all 10 Gates for entry and exit. Gate no. 1 & 10 are well connected. Gate no. 2, 3 & 7 open into small arterial roads, while Gate no. 8 is non-functional. Gate No. 4, 6 & 9 are railway gates that connect to the Southern Railway lines. As Gate 10 is operated only in the night hours, more than 90% of road evacuation occurs through Gate 1.

The location of the Gates and their connectivity is shown in the following Figure.



Figure 8-2: Internal Road Connectivity at ChPA



Figure 8-3: Internal Road Connectivity - from Gate 1 to Bharathi Dock



Figure 8-4: Internal Road Connectivity - from Dr. Ambedkar Dock to Jawahar Dock



Figure 8-5: Internal Road Connectivity - from Marshalling Yard to Gate 10

8.3.1 Connectivity of Container Terminals

Chennai Port has two container terminals, viz. Chennai Container Terminal Private Limited (CCTPL) and Chennai International Container Terminal Private Limited (CITPL).

DP World is operating the CCTPL and PSA is operating the CITPL. Both the terminals get the export and import containers through Gate no. 1.

The container trailers moving containers to and from the CFSs located on the northern side take Ennore High Road, Kasimedu Fishing Harbour Road and Suryanarayana Road to reach Chennai Port through Gate no. 1. CWC operated seal verification centre is located approximately 5km north of Chennai Port. Chennai Port is located in the heart of the city, the approach road towards Chennai Port Gate 1 is restricted to a single lane and this hinders the smooth flow of traffic.

Gate no. 1 is an 8-lane gate complex that has 4 import and 4 export gates. The import and export gates are divided into 3 covered roof structures and 1 open gate to allow ODC (over dimension cargo) packages each at either end of the 8 gates complex.



Once the gate passes are verified, the container trailers move towards their respective terminals. In front of the container scanner complex, separate dedicated single-lane roads are made available for CCTPL and CITPL. This dedicated single lane road to CCTPL is around 1.3 km which will take the loaded container trailers directly into the terminal gate and then to the yard from the backside entry. To ease the movement of trailers into the terminal, the empty trailers have a temporary road in front of the northern side, then the trailers follow the same road till BD II berth, and it has to take the road parallel to the berth BD II to reach CCTPL's back-end gate.

The container trailers bound for CITPL have to cross the CCTPL yard boundary area in the single-lane road. After crossing the CCTPL out gate area, 4 lane road is available all the way to the central workshop. The loaded container trailers come out from the out- gate of CITPL and follow the same incoming route but in the extreme west lane dedicated to the CITPL till CCTPL junction. At this junction, CCTPL loaded container trailers join the loaded container trailers from the CITPL. Just beyond gate no. 4 both the terminal loaded trailers take the peripheral road to reach gate no. 1 to exit from the port.

Empty trailers bound for CITPL make use of the coastal road to enter the terminal through its western gates. The same road has to be utilised for accessing Coastal Berth. The empty trailers are allowed to go out from gate 2A at night from 11 p.m. to 4 a.m. Gate no. 2 is handling oil tankers, tippers and all other cargos. During peak days of the week, long trailers ques are visible in front of the Terminal Gates and this leads to a higher transit time of trailers to reach the terminals.



Figure 8-6: Internal Road Connectivity of Container Terminals



8.3.2 Connectivity of Ambedkar Dock and Jawahar Dock Berths

Dr. Ambedkar Dock consists of NQ, WQ1, WQ2, CQ, WQ3, WQ4, SQ1, SQ2, SCB1, SCB2 and SCB3. Jawahar Dock consists of JD1, JD2, JD3, JD4, JD5 and JD6. Both docks are utilizing the ONB yard for stacking their cargo while the Ro-Ro cargo is parked in the yard parallel to the southern side of the ONB yard, which is paved with bitumen.

JD 1, JD 3 and JD 5 are using the western side road of Jawahar Dock and JD2, JD4 and JD6 are using the eastern side road. Both are 2 lane roads. The incoming cargo for Jawahar Dock and Dr. Ambedkar Dock moves from gate no. 10 through a firefighting road that runs parallel to the compound wall.



Figure 8-7: Road Connectivity of Jawahar Dock and Dr. Ambedkar Dock

8.4. Improvement to the Internal Road Network

8.4.1 Development of Internal Road Network/ Construction of Flyover/ ROB

IITM had conducted a simulation study on the congestion issue at the port and attributes the criss-cross movement of the vehicles of the two container terminals CCTL and CITPL as one of the main reasons. Moreover, as per the AECOM report, container trailers remain outside terminals but within port limits for quite a long time, therefore AECOM recommended introducing by-passes roads for easy movement of containers. At present, the road leading from Gate no. 1 to the CCTL entry gate is being used by both the terminal operators for trailer movement thus this section of the road



has high trailer density. Hence, to overcome the present issue of severe trailer traffic inside the port and to cater to the needs of future projects, the development of an internal road network including Flyover / Road overbridge (RoB) may be required.

The Madurayoval Express Highway is expected to significantly alleviate the current road connectivity issues.

8.4.2 Trailer/ Truck Parking Yard

At present, all the incoming traffic at Gate no. 1 is moving towards their respective terminals to unload the loaded containers or to fetch the loaded containers. In this process, the trailers and trucks without proper passes or paperwork also move along with the trailers and trucks having a proper pass and paperwork which leads to confusion and congestion in the roads leading to the terminals. Moreover, trucks and trailers are parked randomly on the side of busy roads and on open lands which obstruct the moving traffic.

The trailers should be discouraged from parking inside the Port area as it leads to idling trailers being parked within the port. With the introduction of RFID, only those vehicles with work proof shall be permitted inside the port. It is suggested to provide parking areas for each terminal separately. However, the BDII backup area is currently planned for development as a parking area for 800+ trailers on more than 80,000 sqm. area. Facilities like canteen, bathrooms, toilets and restrooms are planned for development under this project. In addition, a check-post may be established to allow the vehicles out of the proposed parking area only if they possess the complete paperwork to fetch or unload the containers from both terminals. These measures will reduce the queuing and congestion in the roads leading to the terminals.



8.5. External Road Connectivity

Chennai is well-connected with other major cities in the North by NH-5 (Chennai-Kolkata), West by NH-4 (Chennai – Bangalore / Hyderabad etc.) and South by NH-45 (Chennai – Dindugal/ Tiruchirappalli). The road network linking Chennai to other parts of India is highlighted below:

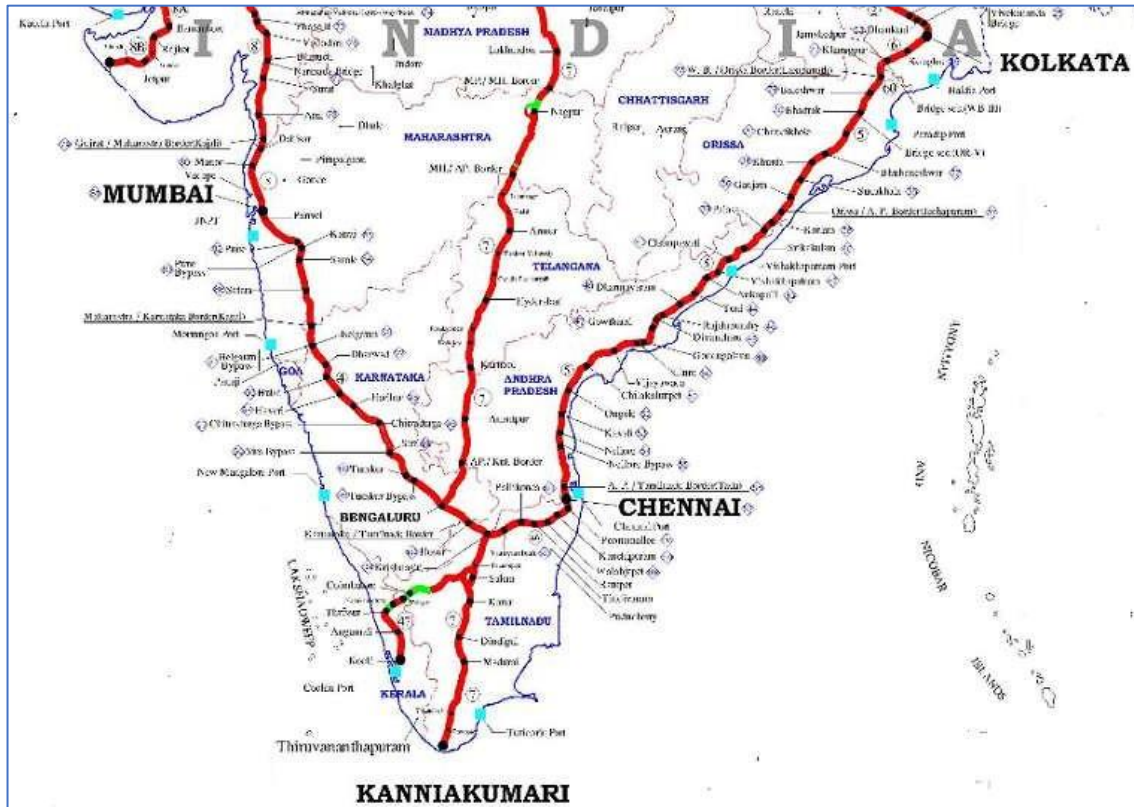


Figure 8-8: National Highway Network linking Chennai

NH 45 from the south is connected with NH 4 & NH 5 through outer and inner ring roads bypassing the city.

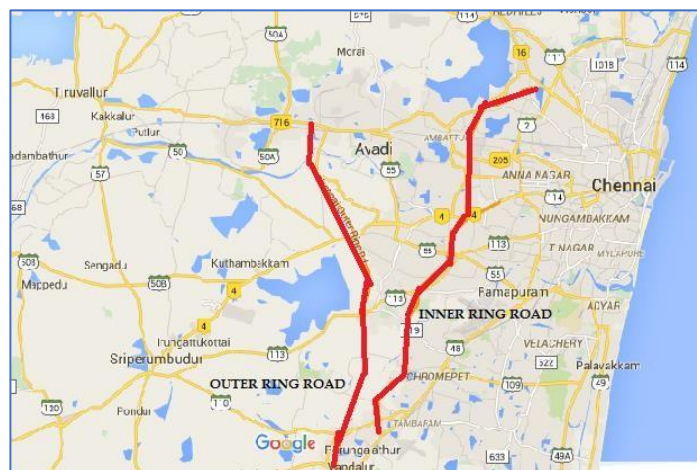


Figure 8-9: Outer and Inner Ring Road bypassing Chennai



To improve the connectivity of the Port to the National Highway network by strengthening the connecting roads from the Port, the following projects viz., Chennai Ennore Port Road Connectivity Project (Northern Corridor of the Port) has been completed and put to use and the development work of New Four Lane Elevated Road from Chennai Port to Maduravoyal (Southern Corridor of the Port) is in progress.

8.5.1 Chennai-Ennore Port Road Connectivity Project (Formerly EMRIP)

The project network road comprises widening and strengthening of existing roads connecting Port to National Highways viz., 30.1 km with 6.0 km of Ennore Expressway, 1.6 km of Ennore Expressway (inside Fishing Harbour), 9 km of Thirvottiyur-Ponneri-Panchetty road (TPP) and 5.4 km of Manali Oil Refinery Road (MORR), totalling 30.1 Km. The project also involved the construction of groynes along the seashore for coastal protection. The Project was executed through SPV comprising NHAI, Chennai Port, Kamarajar Port Limited and GoTN and NHAI was the executing authority.

The project road has been completed and put to use. This project is playing a significant role in ease of vehicular movement at the North end of the Port and reducing turnaround time for the trailers, thereby minimising transportation cost and carbon emission.

8.5.2 Four-lane Elevated Corridor from Maduravoyal to Chennai Port

The Project proponents are NHAI, ChPA and GoTN; and NHAI is the implementing agency. The project under the BOT model commenced during 2011 was stalled due to the intervention of GoTN during 2012, citing violation of alignment along Cooum river. After pursuance of MoS & ChPA, GoTN issued NoC for the revised alignment with certain conditions, based on the recommendations of the Technical Committee.

Now, the project is proposed as a Double Deck Elevated Road with 13 entry/exit ramps for Public and Port traffic under EPC mode; Tier-1- Local Traffic and Tier -2 – Port Traffic. The total planned length of this road is 20.935 kms with 4 lane width. The foundation stone for this project was laid by the Hon'ble Prime Minister on 26th May 2022. The project corridor commences at Chennai Port (Gate 10) near War Memorial and passes along the banks of Cooum river up to Koyambedu and then joins with the existing elevated road crossing Maduravoyal interchange at NH4.

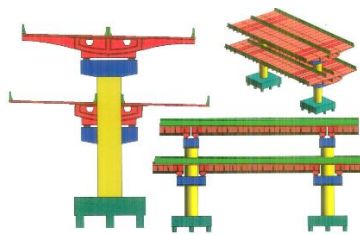
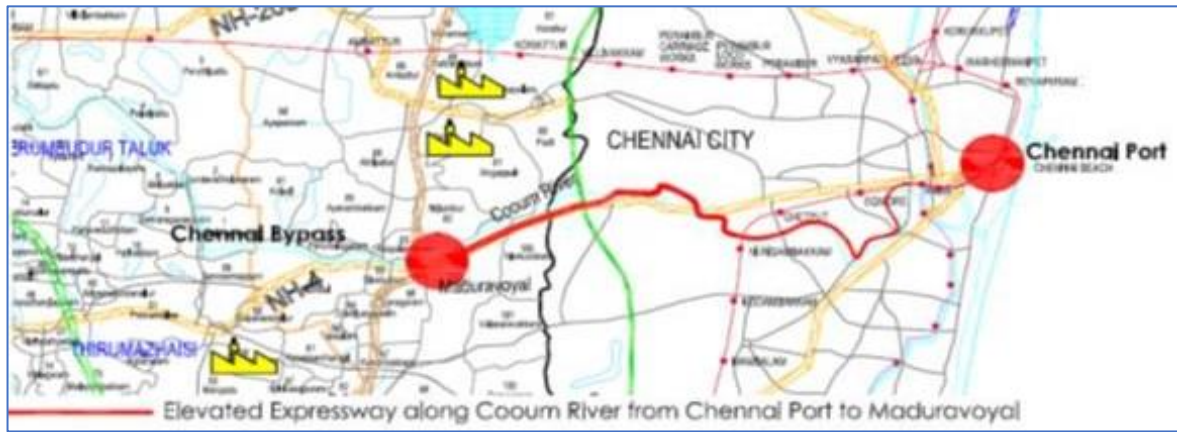


Figure 8-10: Location and Alignment of Chennai Port-Maduravoyal Elevated Corridor

8.6. Internal Rail Network

8.6.1 Overview

Chennai Port is served with two rail entry / exit arrangements connecting the Indian Railway network - one connecting Chennai Beach Station to the Port Marshalling yard at the southern end through Gate no. 9; and the other connecting Royapuram Station with Bharathi Dock at the northern end through Gate no. 4. Bharathi Dock linkage was mainly for handling iron ore at BD II berth. As of date, the iron ore traffic has been stopped and this Gate no. 4 remains closed. The overall port railway network is shown below:



Figure 8-11: Chennai Port Railway Plan



8.6.2 Port Marshalling Yard

Port Marshalling yard is at the southern end of the port and is connected to the Southern Railway network through Chennai Beach station with a single line. This Marshalling yard distributes the railway traffic to the various docks inside the port. Port Marshalling yard is the feeding yard for the Second Container Terminal, Jawahar Dock and CONCOR yards. In addition, this yard also handles loading / unloading of Port's other general cargo handled in Eastern and Western yards. The layout of the Port Marshalling yard is such that entry/ exit to all sidings including Chennai Beach is on the Northern end of this yard.

Incoming trains with electric locos are received at the eastern end of the yard and the electric engine is released. Port owned diesel locos shunt the rakes to the various feeder yards like CONCOR yard or CITPL yard or for handling general cargo for placement. After unloading / loading, the rake is brought back to the Central yard by the Port's diesel loco and forms a train. The train is attached with electric loco and dispatched to Chennai beach station through Gate no. 9.

This marshalling yard consists of 4 lines of Eastern yard, 6 lines of Central Yard and one line of Western Yard. The railway network at the Marshalling Yard is shown below:



Figure 8-12: Railway Network at the Marshalling Yard



8.6.3 Jawahar Dock, CITPL and CONCOR Linkages

Jawahar Dock East and West are served by railway lines linked to the marshalling yard. Cargo is loaded/unloaded onto and from railway rakes at the dockyard siding. The second container terminal CITPL has 2 rail sidings in its yard, the containers are loaded onto the rail rakes. From here the loaded rakes are moved to the marshalling yard. DLI is handling JD west line. From here DLI is picking the containers from CITPL or CCTPL and loading into the rakes and moving them to the marshalling yard. The CITPL yard has the capacity to handle 10 incoming and 10 outgoing rakes per day.

The first container terminal, CCTPL, does not have railway siding inside its yard. Since the containers in the port are handled by CONCOR, a separate siding for CONCOR has been provided west of Ambedkar Dock. This siding can handle a full rake. CONCOR is the only operator handling rail-bound container traffic of CCTPL from its rail terminal and that of CITPL from the yard sidings of CITPL. The total container traffic handled by CONCOR by rail, for both operators, is about 2 rakes a day, mainly to and from its ICD at Whitefield in Bengaluru. The reason is the limited equipment (2 reach stackers only) provided at the yard. In case additional 2 reach stackers are provided, each rake can be loaded and unloaded in less than 4 hours, which would enable handling 5 rakes per day. The layout of the railway network linking CITPL, JD EAST, JD WEST and CONCOR Yard is shown below:



Figure 8-13: Railway Network linking CITPL, JD and CONCOR Yard



8.6.4 Bharathi Dock – 24B (BD II) berth Linkage

Bharathi Dock – BD II is served by rail connectivity through Royapuram Railway station. A railway yard with 5 reception lines, 4 dispatch lines and unloading facilities with tipping arrangements are available, mainly handling iron ore for exports. Since Chennai Port is banned from handling iron ore and coal due to environmental issues, this railway yard area and railway lines are kept idle and Gate no. 4 exit / entry lines are non-operational.

The layout of the railway network as existing at BD II yard is shown below:



Figure 8-14: Railway Network at BD II Yard - Bharathi Dock

8.7. Sea Connectivity and trade links

8.7.1 Overview

Chennai Port has expansive sea connectivity and trade relations around the globe. It connects and trades with Far-East, Middle and West Asia, Europe, Africa, Americas and Australia.

While Chennai Port has global connectivity through sea, the change in origin and /or destination of cargo impact the trade volume and/or commodity type. Change in commodity and type of cargo further impact the infrastructure projects that the Port will plan and undertake. These impacts on cargo type and cargo volume are studied in great detail in Chapter 9 of this document.



An overall view on the origin-destination of cargo is shown in the below table:

Distribution of Import Cargo at Chennai Port during 2021-22 in Metric Tonnes						
Sn.	Origin	Commodities Handled				Total
		Dry Bulk	Liq. Bulk	Brk. Bulk	Containers	
1	Coastal	528,896	2,800,095	1,750	1,726,096	5,056,837
2	USA	9,941	3,299	18	-	13,258
3	CIS*	-	408,356	22	-	408,378
4	Japan	-	-	66,907	-	66,907
5	Germany	-	-	18	-	18
6	West Europe	-	3,266	4,624	-	7,890
7	South America	-	311,601	-	-	311,601
8	East Africa	67,200	912,589	76	-	979,865
9	West Africa	53,000	128,302	-	-	181,302
10	South Africa	119,943	254,787	-	-	374,730
11	SE Asian countries	-	721,076	5,725	-	726,801
12	Others	459,709	5,864,927	944,439	-	7,269,075
13	Overseas contnrs.	-	-	-	14,461,548	14,461,548
	Total	1,238,689	11,408,298	1,023,579	16,187,644	29,858,210

Table 8-2: Origin of Import Cargo at Chennai Port FY2021-22

Distribution of Export Cargo at Chennai Port during 2021-22 in Metric Tonnes						
Sn.	Destination	Commodities Handled				Total
		Dry Bulk	Liq. Bulk	Brk. Bulk	Containers	
1	Coastal	25,291	546,434	11,431	1,518,234	2,101,390
2	USA	360,393	-	74,639	-	435,032
3	Japan	-	73,249	10,267	-	83,516
4	West Europe	-	2,000	178,965	-	180,965
5	South America	-	-	8,588	-	8,588
6	East Europe	-	-	36,687	-	36,687
7	East Africa	-	-	24,263	-	24,263
8	West Africa	-	-	16,875	-	16,875
9	South Africa	-	-	73,709	-	73,709
10	SE Asian Countries	160,820	-	282,137	-	442,957
11	Others	616,242	795,114	491,000	-	1,900,348
12	Overseas Contnrs	-	-	-	13,218,879	13,218,879
	Total	1,161,742	1,415,793	1,208,561	14,737,113	18,523,209

Table 8-3: Destination of Export Cargo from Chennai Port FY 2021-22



8.7.2 Commodity-wise origin-destination study

As highlighted in the section 8.7.1, the change in origin/destination affects the cargo volume/type. Such changes are accounted for in great detail under Chapter 9. A brief snippet of the cargo origin and destination is given below:

Sn.	Commodity	Import Cargo		Export Cargo	
		Origin	Qty. ('000 MT)	Origin	Qty. ('000 MT)
1	POL (Crude)	Brazil	275	-	0
		Iraq	3,162	-	0
		West Asia	2,536	-	0
		Nigeria	913	-	0
		Angola	255	-	0
		Congo	128	-	0
		<i>Total</i>	<i>7,269</i>	<i>Total</i>	<i>0</i>
2	POL (Product)	West EU	3	China	394
		West Asia	42	Japan	73
		Malaysia	80	Bangladesh	106
		Singapore	111	East Asia	289
		East Asia	111	West Asia	5
		<i>Total</i>	<i>347</i>	<i>Total</i>	<i>867</i>
3	Edible Oil	CIS*	408	Gyandzha	2
		USA	3	-	0
		Argentina	33	-	0
		Malaysia	183	-	0
		Indonesia	285	-	0
		Thailand	46	-	0
		<i>Total</i>	<i>958</i>	<i>Total</i>	<i>2</i>
4	Minerals/ Ores Dry Bulk	-	0	USA	158
		-	0	Malaysia	24
		-	0	Singapore	45
		-	0	Indonesia	8
		-	0	West Asia	615
		<i>Total</i>	<i>0</i>	<i>Total</i>	<i>850</i>
5	Food Grains	-	0	Singapore	15
		-	0	Thailand	69
		<i>Total</i>	<i>0</i>	<i>Total</i>	<i>84</i>



Sn.	Commodity	Import Cargo		Export Cargo	
		Origin	Qty. ('000 MT)	Origin	Qty. ('000 MT)
6	Iron & Stell	Belgium	1	Italy	38
		China	46	EU	11
		Japan	57	USA	51
		East Asia	526	Japan	9
		-	0	Malaysia	10
		-	0	Singapore	164
		-	0	Indonesia	6
		-	0	Bangladesh	15
		-	0	Thailand	67
		-	0	East Asia	297
		-	0	West Asia	21
		-	0	Africa	15
		-	0	Mozambique	52
		<i>Total</i>	<i>630</i>	<i>Total</i>	<i>756</i>
		7	Machinery	China	53
Japan	10			Poland	29
Malaysia	1			EU	10
East Asia	36			USA	16
EU	1			Bangladesh	25
-	0			Others	10
<i>Total</i>	<i>101</i>			<i>Total</i>	<i>102</i>
8	Vehicles	China	2	West Europe	55
				USA	8
				Mexico	21
				Singapore	16
				Sri Lanka	8
				Chile	85
				Mozambique	10
				Others	28
		<i>Total</i>	<i>2</i>	<i>Total</i>	<i>241</i>
9	Containers	<i>Total</i>	<i>14,461</i>	<i>Total</i>	<i>13,219</i>
	All Cargo	Grand Total IM	23,768	Grand Total EX	16,121

Table 8-4: Commodity-wise origin/destination Study FY2021-22



9. INFRASTRUCTURE PLANNING UP TO 2047 AND SHELF OF PROJECTS

9.1. Infrastructure Planning up to 2047

9.1.1 Cargo Projections and its limitations

This 'Comprehensive Master Plan 2047' is built upon in-detail cargo traffic projections, identification of port infrastructure and its capacity assessment, evolving trade requirements, environmental sustainability and cleaner energy adoption. A thorough analysis of industrial clusters, hinterland connectivity, mode of transportation, waterfront and land utilization was carried out to identify a series of projects with an implementation plan and execution timelines.

The cargo traffic projections up to 2035 are based on granular details of market assessment and close interaction with stakeholders. While Chennai Port partners and customers could give valuable insights for the next 5 to 10 years, many were hesitant to comment any further than 10 years into the future. While cargo forecasting may remain usable over a shorter to mid-term duration, say 5 to 10 years, but lose its effectiveness over a long term primarily because projections typically become biased prediction of a future based on historic conditions and trends. Moreover, such projections over a longer horizon make the organization less robust as it prepares for only one possible/preferred outcome. Step changes and black swan events are bound to occur, such as Political unrest, technological innovations, consumption pattern, trade sanctions, natural disasters, etc. which can cause tremendous changes.

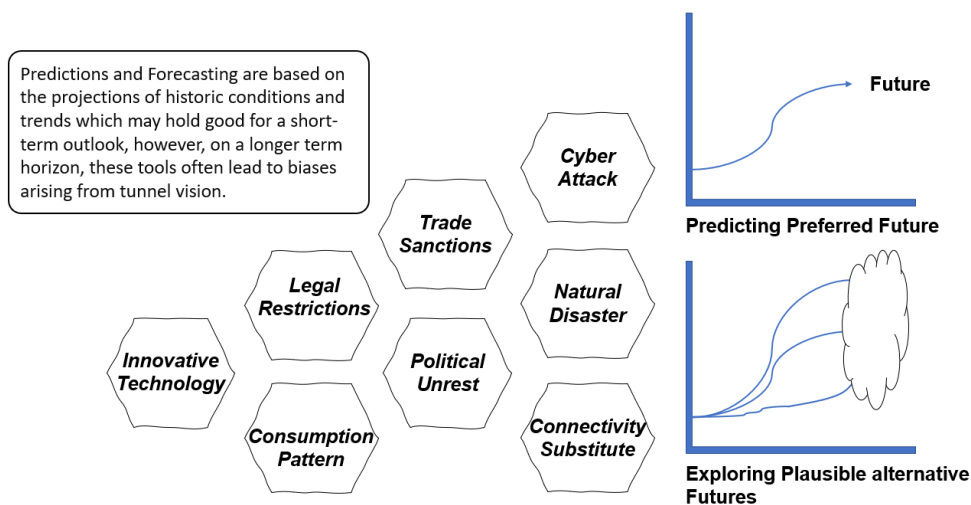


Figure 9-1: Forecasting vs Scenario Planning



Therefore, instead of predicting and planning for one possible future outcome, we have explored multiple plausible alternatives for 2047 to prepare and equip Chennai Port to face most of the future outcomes. We have deployed scenario planning methodology to remain robust enough to handle changes in global/regional supply chain, economy, political and social factors and the environment.

Scenario Planning methodology has been used and deployed by many leading firms to chart out progress plans in the distant future and set up contingency measures and plans to pivot and maintain business continuity.

In light of the new environmental sustainability goals, depleting coastlines and rising sea levels, we must consider a broader aspect of the factors that can impact the port's functioning.

9.1.2 Scenario Planning

Scenario Planning is a structured methodology to create different potential future scenarios instead of predicting just one future outcome to better understand potential risks, blind spots and new opportunities. Essentially, it is a method of shifting from prediction of events to preparing for effects. Since it is impossible to explore all potential futures, we have explored a handful of plausible alternative futures that together capture the most relevant uncertainties.

Through scenario planning, we identify and evaluate common projects which are useful in all potential future scenarios and set contingency measures to steer towards different strategic initiatives based on the impact of unforeseen driving forces and new opportunities created in the future.

There are four steps involved in creating and analyzing different scenarios to identify optimal projects. First, key driving forces which can impact ports functioning are brainstormed and listed. Second, impact of all listed driving forces on the port's functioning are weighed. Thirdly, out of all the impacts, two most critical impact are shorted. And lastly, these two impacts are plotted on X and Y axis and the resulting four quadrants become the four plausible alternatives, which capture most of the relevant uncertainties and driving forces. All four steps are highlighted below:

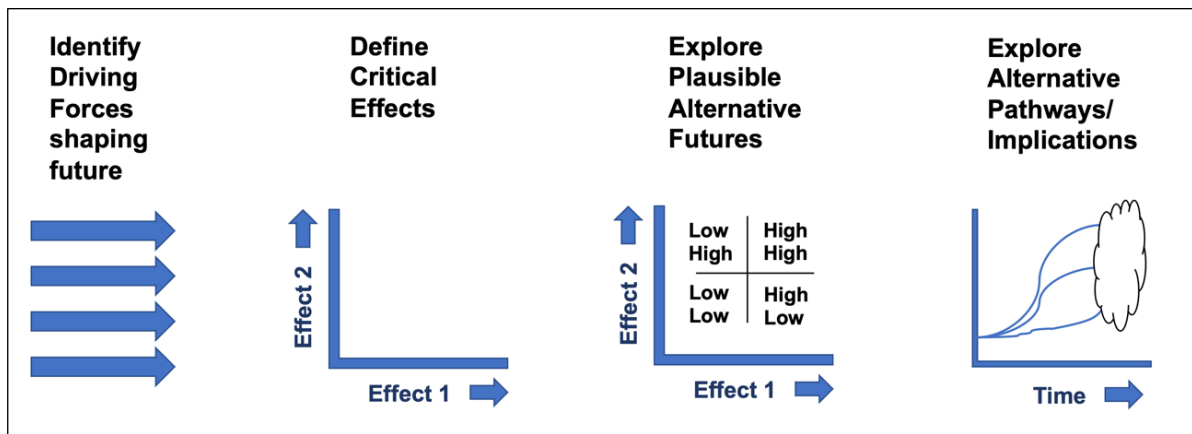


Figure 9-2: Scenario Planning Steps

The driving forces can broadly be classified into three categories, viz. i) internal factors (those which are fully under control of the Port Management), ii) influenceable factors (those on which Port has mild control or influence) and, iii) external factors (where Port does not have any control, such as Political, Economic, Social, Technical, Legal, Environmental, etc.)

To begin with, we have identified over 50 driving forces that can change the course of Port's future and analysed their impact on the Chennai Port. The internal factors were sub-divided into infrastructure-related and services-related. These two were further sub-divided into 4 categories. For each of these 4 categories, we brainstormed and identified around 15 key driving forces.

Likewise, influenceable factors were bifurcated into two, viz. connectivity and trade partners. We have identified over 15 key driving forces under the influenceable factors. Lastly, under external factors, we have used the PESTEL framework to identify over 20 key driving forces.

It was discovered that the each of those driving forces, in some way or the other, were impacting import locations or sourcing region, export destinations, routing, mode of transport, cargo volume and cargo type. The identified key driving forces are mentioned in the following diagram.

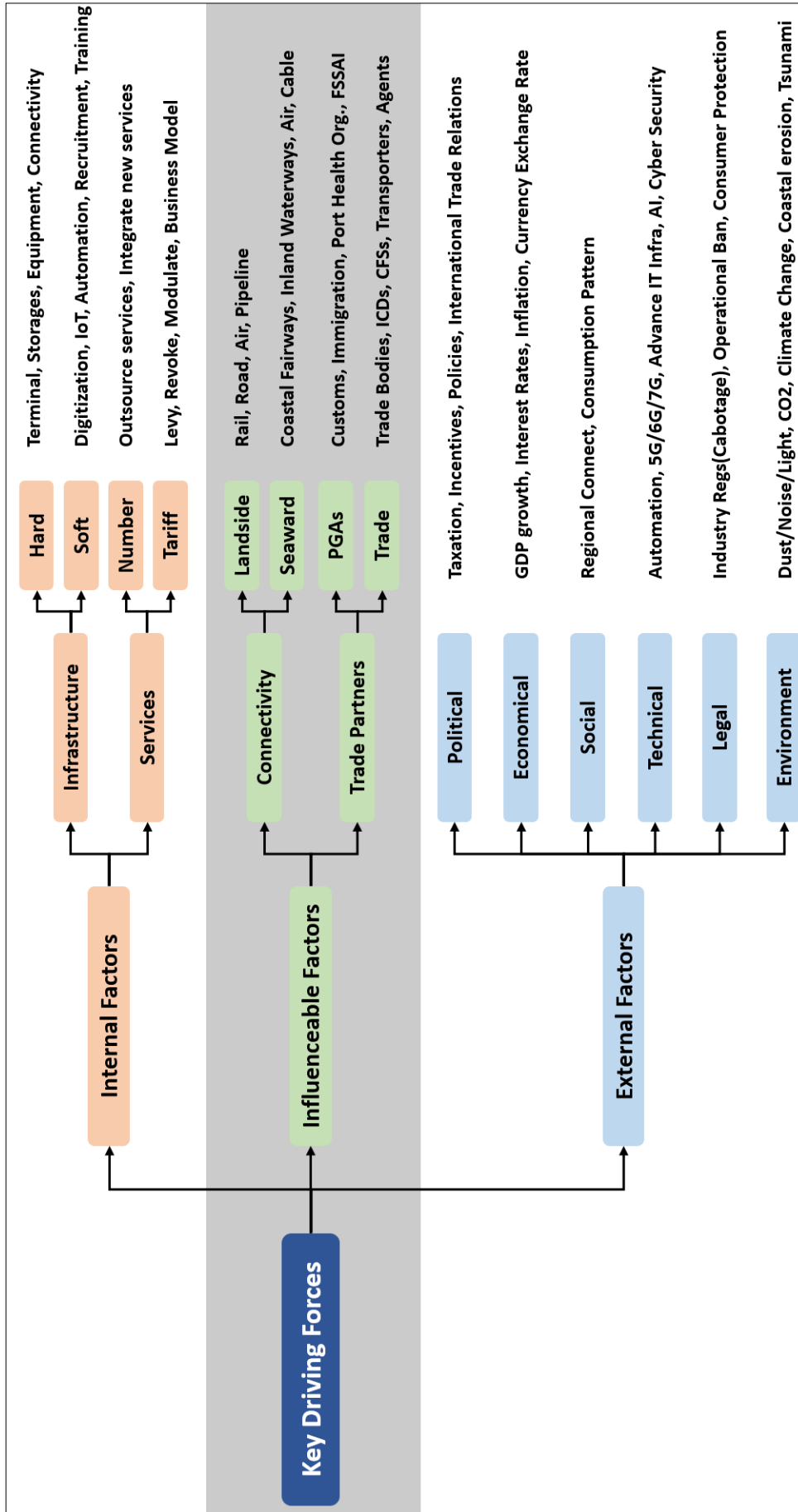


Figure 9-3: Key Driving Forces which may impact Chennai Port Operations



Now, very often two or more events cause the same effect, for example, an earthquake, a pandemic, economic collapse, etc. will have a common effect that all of them will reduce the flow of products/ cargo from that region. Likewise, more than 50 events were analysed which were found to have around five different impacts.

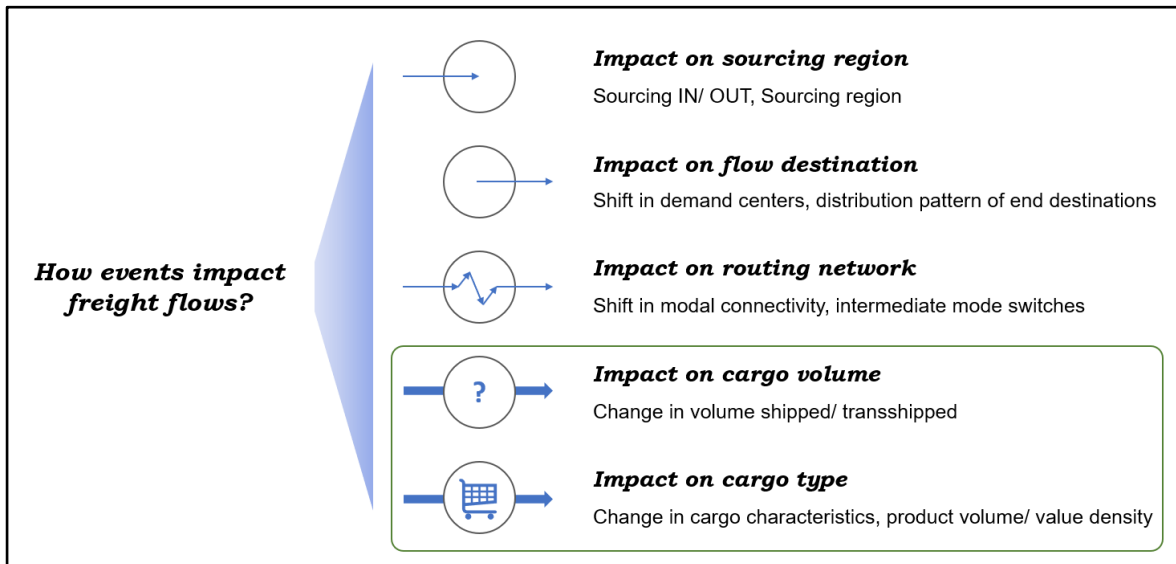


Figure 9-4: Critical impact of Key Driving Forces

All these impacts eventually boil down to changes in cargo volume and cargo type which will move through the Port, a nodal gateway hub in EXIM trade. Cargo volume and cargo type are also the most critical aspect which will define the course for future infrastructure projects at Chennai Port, be it seaside, at the waterfront or the surrounding port lands.

Seaside developments include anchorage, approach channels, turning circles, docks, tug boats, etc. Waterfront developments include cargo terminals, Jetties, dry/floating docks, marinas, etc. Port land development includes Pax Terminal, warehouses, tank farms, open storages, parking plazas, CFSs, road/rail networks, control towers, administrative buildings, canteens, hotels, restaurants, etc.

For the purpose scenario planning exercise, cargo type is broadly categorized into containerized and non-containerized (non-containerized cargo includes all cargo other than container cargo). At present, container cargo share at Chennai Port is around 65%. We are preparing the port to respond to the changing scenario in both cases, i.e., when the container share reduces below 40% or increases above 80%.



Similarly, we have assessed possibilities wherein total cargo at Chennai Port grows to 200 MMTPA or reduces much below the current levels to 40 MMTPA.

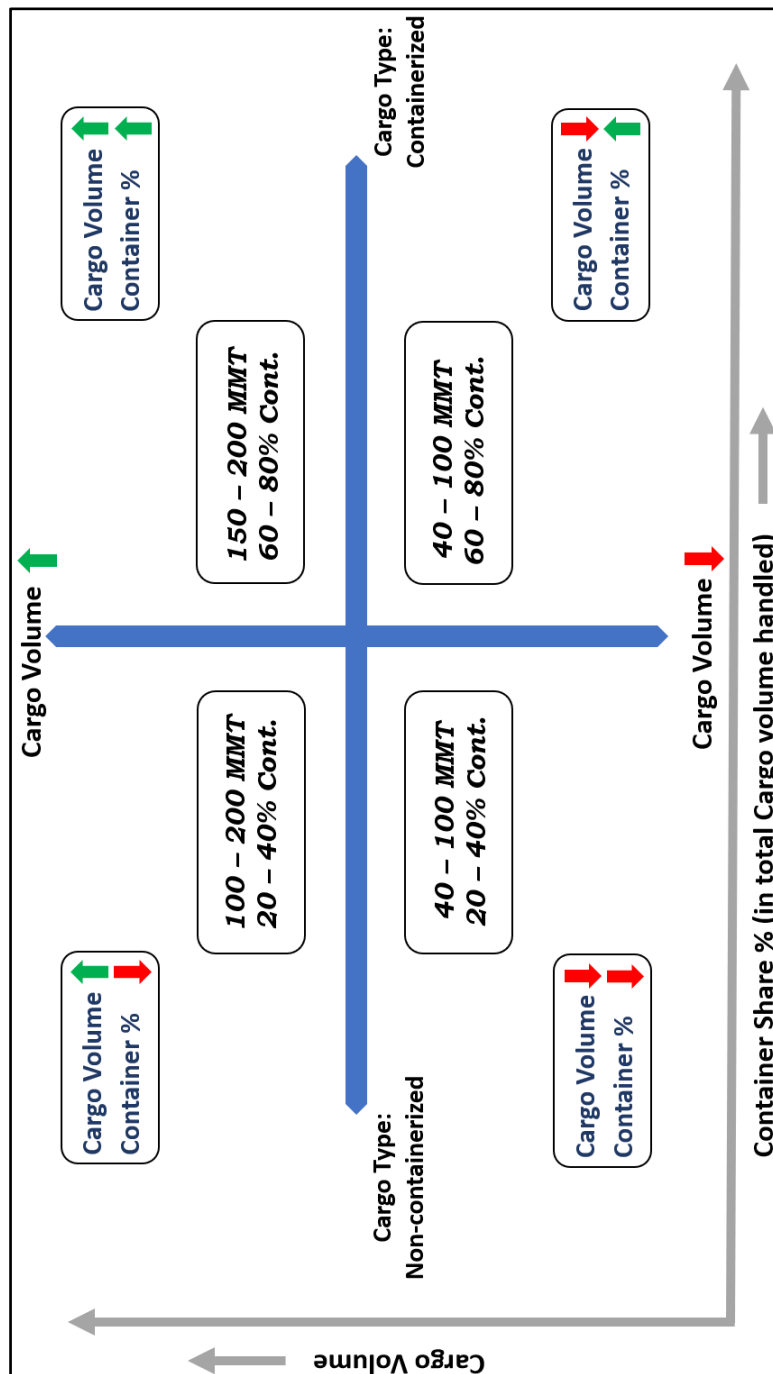


Figure 9-5: Four Plausible Scenarios for Chennai Port

Accordingly, four scenarios will be created, as shown above, i) higher total cargo and higher share of containerized cargo, ii) higher total cargo and reduced share of containerized cargo, iii) lower total cargo and higher share of containerized cargo, and iv) lower total cargo and lower share of containerized cargo. For all these potential scenarios, lists of optimal projects and development plan were created.

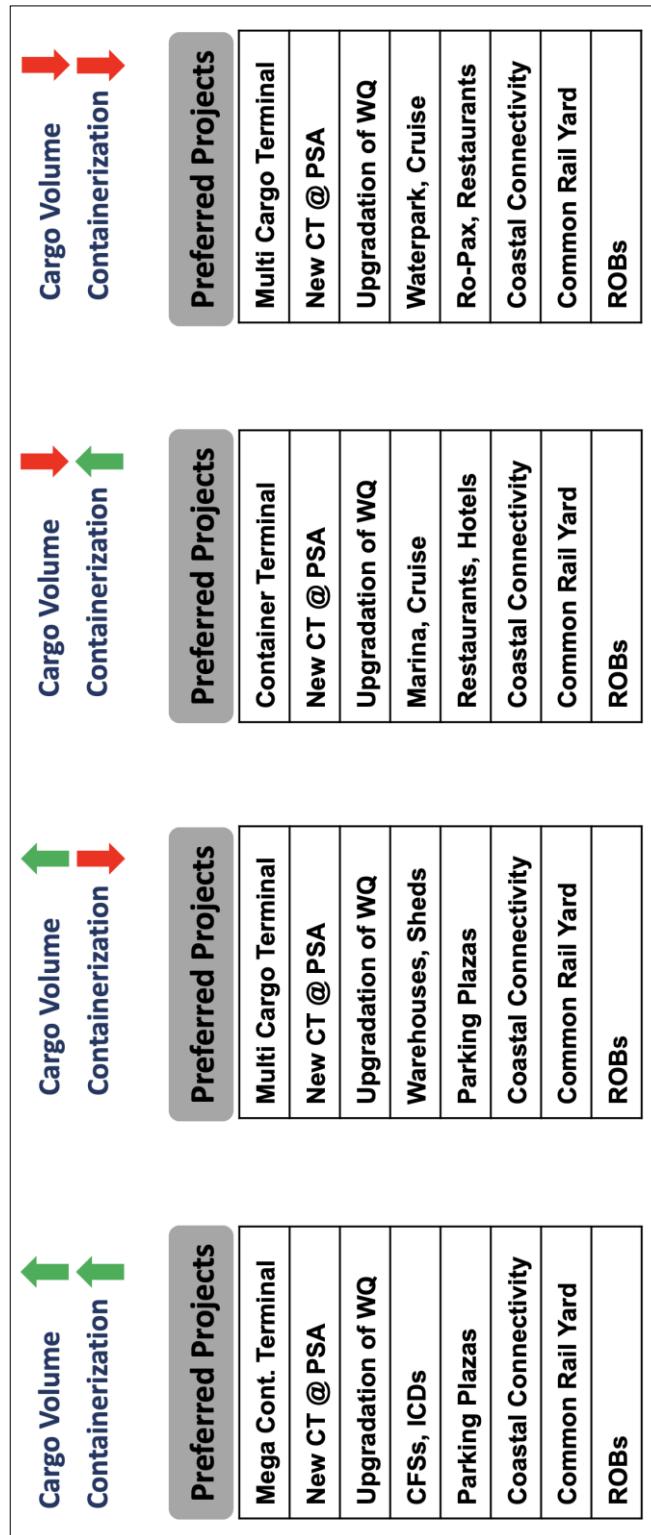


Figure 9-6: Optimal Projects for Chennai Port in four scenarios

All the common projects were separately listed with an implementation plan. All uncommon projects were analyzed in greater detail to check for potential risks and concerns when other potential future pans out. With proper risk management, a set of projects are identified to be taken up between 2035 and 2047, contingent upon a mid-term review of the plan during 2037.

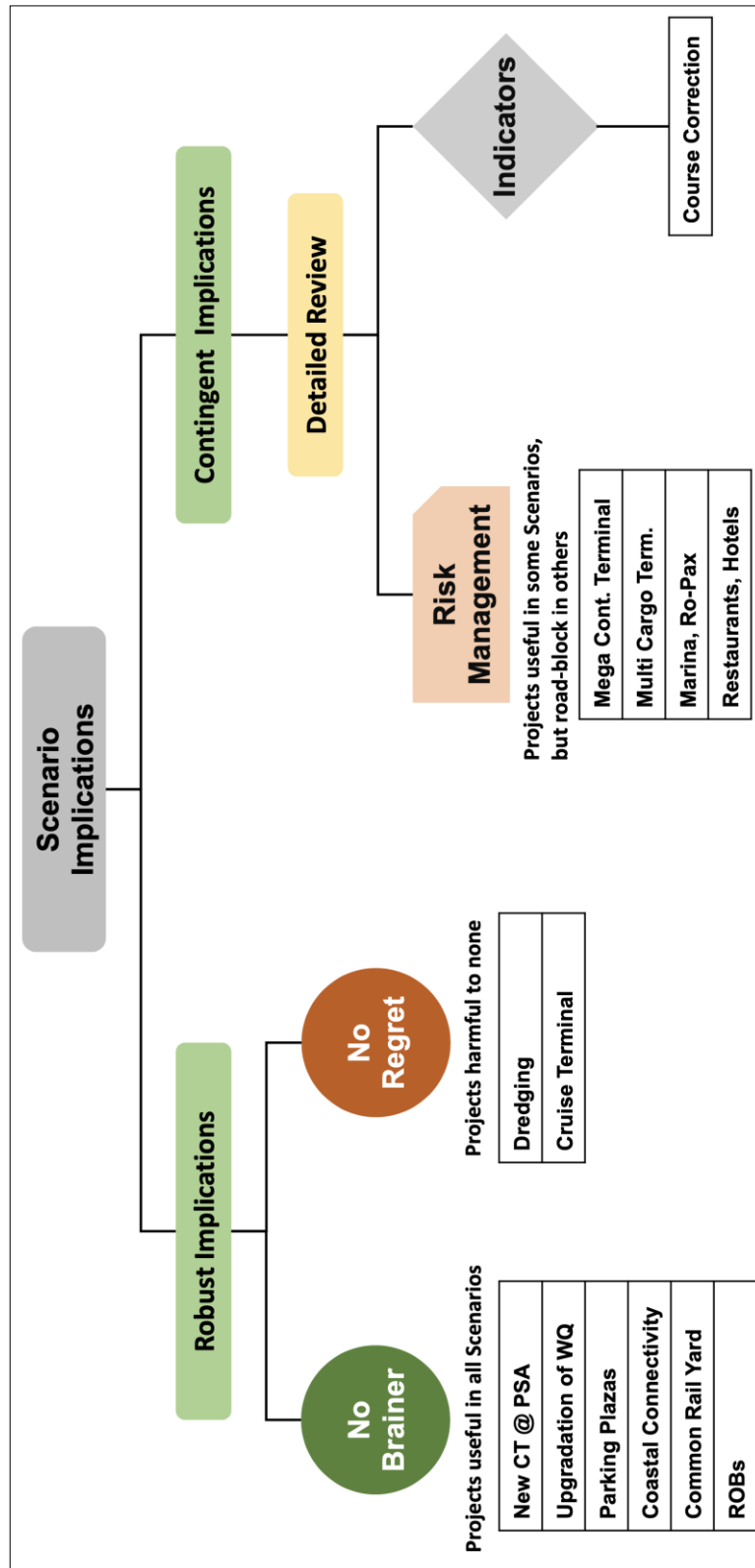


Figure 9-7: Scenario Implications and decision-making

An in-detail review and risk management were carried out for projects which are found to be extremely useful in one or more scenario/s but acted as a roadblock in other scenario/s. The table attached below showcases the contingent implications of such projects.



Risk Management		Effective decision-making in mobilizing resources at appropriate time to adapt to changing scenarios and steer towards one or more alternate futures.	
Projects	Leading Indicators	Review Timeline	
Mega Container Terminal	New FTAs, new trade routes, increasing trade domination on India East-Coast, improved trade relations with ASEAN region, continued growth in GDP	2035 (alongside feasibility study for new CT in place of PSA)	
Multi-Cargo Terminal	In addition to above, container cargo share reducing below 50%.	2035	
Marina, Ro-Pax	Alternative trade routes/ mode (North Sea route/ China's Silk Road Project), subdued cargo growth, higher disposable income, growth in Chennai-based Yacht Clubs, crowded city traffic	2035	
Restaurants, Hotels, Water Park	Subdued cargo growth, stagnated cargo, increased community engagements	2035	

Figure 9-8: Risk Management for Chennai Port while selecting infra projects

Based on the above, projects were identified for implementation between 2035 and 2047. Considering 25 years long planning, it is suggested to carry out a mid-term review of this Comprehensive Master Plan 2047 during 2035, alongside the feasibility and market study for new container terminal in place of currently operating CITPL or PSA, whose concession agreement tenure is due to complete in 2037. While enlisting critical projects up to 2047, a through consideration was given to the Vision 2047, PM Gati Shakti initiatives and Climate Action.



9.1.3 Climate Action up to 2047

In year 2022, the Union Cabinet of the Government of India approved India's updated Nationally Determined Contribution (NDC) which is to be communicated to the United Nations Framework Convention on Climate Change (UNFCCC). This updated NDC seeks to enhance India's contributions towards strengthening the global response to the threat of climate change.

In order to contribute to the national goal, Chennai Port has identified some important measures that will be considered and acted upon in each of its infrastructural development project. It is to be recalled here that the Major Ports are moving towards land lord port model and almost all of the infrastructural development, especially machineries and cargo handling equipment, are to be planned on PPP basis. Therefore, Chennai Port will ensure that the concessionaire of each of the planned projects shall consider, all but not limited to, below environmental measures during planning, implementing and operational phase of those project.

1. Shift to renewable energy

Machineries running on fossil-fuel shall be shifted to electricity and the source of electricity generation shall be to shift to renewables, such as solar. Moreover, the port shall earmark land area and engage public or private organization to open fuel bunks for H2 or other cleaner fuels.

2. Upgrading Infrastructure

Infrastructure at Chennai Port shall be updated to improved energy as well as operational efficiency, such as LED lights, LNG/H2 bunkering, scrubber.

3. Shore power to vessel

Chennai Port is currently providing shore power to Navy vessels and has a plan to scale similar facility to all berths.

4. Optimizing vessel, quay and yard operations

Reducing pre-berthing detention time to zero, shortening vessel turnaround time, zero wait times for rakes, trailers, etc., and using efficient equipment.

5. Modal shift and promote clean transportation

Chennai Port and its PPP partners shall encourage industry participation to increase use of electrical equipment and cleaner vehicles. Modal shift from road to rail or coastal shall be encouraged and facilitated.



6. Green Procurement

Port Authority and its operators shall jointly ensure that their procurement policies are in line with the environmental goals and that they purchase and procure environmentally friendly products and services.

7. Encouraging sustainable supply chain

Port and its stakeholders shall plan and increase awareness about sustainable supply chain management practices, such as reducing packaging waste and using fuel efficient transportation modes.

8. Sustainable land use practices

Port Authority shall monitor that all the upcoming projects on PPP mode or otherwise shall be planned and executed such that the natural habitats, flora and faunas and wetlands are preserved and that the *green cover* to be increased.

9. Collaborating with stakeholders, awareness and outreach

Chennai ports shall collaborate with stakeholders, such as shipping companies, government agencies, and environmental organizations to implement sustainable practices, reduce emissions, recycling, waste management, and water conservation. The Port shall raise awareness and encourage the adoption of environmentally friendly practices.

10. Measuring and Monitoring Emissions

At present, Chennai Port is measuring the Ambient Air Quality 24x7 and displaying it to the public through LED screens at conspicuous places. In addition, measuring and monitoring emission levels will be required to track Port's progress towards its sustainability goals.

11. Flood Risk

Chennai is a rapidly developing city with dense population and key coastal infrastructure. The city lies in the Low Elevation Coastal Zone (LECZ) and is highly sensitive to flooding. The city faced massive flooding in 2004 due to Tsunami and later during 2005 and 2015. Chennai City gets its rains in the Northeast monsoon from October to December. It has two rivers, Adyar and Cooum and one major canal - Buckingham Canal, these are macro drainages for the city of Chennai. (*Habitat International 2016, Shazade Jameson, Isa Baud*)



Asian Development Bank (ADB) is jointly working with the Government of Tamil Nadu to prepare and implement Integrated Urban Flood Management. The work includes commissioning of one integrated urban flood management system in the Chennai-Kosasthalaiyar basin comprising 588 km of new stormwater drains, 175 km of upgraded stormwater drains, 11 km of rehabilitated stretches in four primary channels, one upgraded and one new stormwater pumping stations, and 23,000 catchpits with rainwater harvesting structures constructed. ([*Integrated Urban Flood Management for the Chennai-Kosasthalaiyar Basin Project: Report and Recommendation of the President | Asian Development Bank \(adb.org\)*](#))

In line with the city's storm water drainage planning, Chennai Port Authority shall ensure that all the upcoming infrastructure at the Port via PPP agreements or otherwise, shall consider flood risk and do adequate contingency planning which shall include but not limited to below:

- Assess the risk based on the historic flooding events, topography and climate projections
- Identify vulnerable infrastructure and assets and ensure protection
- Maintain and upgrade infrastructure with long-term sustainability plans
- Implement flood mitigation measures - tidal barriers, mangrove, groins
- Develop exclusive flood management plans and keep it updated
- Flood warning system to alert well in time
- Training and Drills on emergency response and evacuation procedures
- Engage stakeholders to build support for each other
- Apt coastal/waterfront management to ensure sustainable growth

9.1.4 Cargo Handling Capacity Projections

Based on the development plan of the Chennai Port and the shelf of projects identified in this Comprehensive Master Plan 2047, a high-level estimate of the capacity of Port at 5-year interval, i.e., during 2025, 2030, 2035, 2040 and 2047, has been calculated. The Port capacity is the total annual cargo handling capacity of all of its berths. At present, the rated annual cargo handling capacity of Chennai Port is 135.6 MMTPA.



The capacity of a container berth is directly proportional to the number of quay cranes, average moves per hour and the number of container slots in the yard, and inversely proportional to the dwell time of containers at the Terminal. Similarly, for a non-container berth, its capacity is directly proportional to the discharge/load rate and the storage area, and inversely proportional to the cargo dwell time.

Therefore, in arriving at the tentative capacities at different stages leading up to 2047, it is assumed that the capacity of existing berths shall be increased by approximately two folds by the use of upgraded and efficient machineries, increasing cargo storage by increasing stack height, reducing dwell time, etc. The table 9-1 below tabulates tentative cargo handling capacity of Chennai Port.

Berth Group	Current Capacity	Tentative annual cargo handling capacity in MMT				
		2025	2030	2035	2040	2047
BD1 + BD3 + Bunker Berth	33.4	33.4	33.4	33.4	33.4	33.4
BD2 + CCTPL (DPW)	34.1	35.6	35.6	80	80	80
NQ	1	1	1	1	0	0
WQ 1 – 4, CQ	10.5	10.5	10.5	15	20	20
SQ1	2.6	2.6	4	4	4	4
SQ2	1.4	0.6	0.6	0.6	0.6	0.6
JD 1 – 6	22.1	22.1	30	30	30	30
CITPL (PSA)	29.5	38.6	38.6	38.6	60	60
Coastal Berth	1	1	2	2	2	2
Outer Harbour	NA	NA	NA	NA	NA	120
Total	135.6	145.4	155.7	203.6	229.0	350.0

Table 9-1: Tentative Annual Cargo Handling Capacity of Chennai Port in MMTPA

Explanation:

An in-detail explanation for port capacity requirement is provided in 'Chapter 7 – Capacity Augmentation Requirements'. However, a brief is provided below.

The combined annual cargo handling capacity of BD1, BD3 and Bunker Berth are kept the same till 2047, since these berths are planned to be operated on PPP basis tentatively by CPCL or IOCL for feeding to the nearby Oil refinery at Manali. The



crude import for Manali refinery is not expected to increase beyond 12 MMTPA, therefore there is no requirement for increasing the capacity of these berths. Additionally, since all the new refineries are being set outside the city limit and those locations will more aptly be served by Kamarajar Port than Chennai Port. The existing capacity of bunker berth is expected to meet bunker demands till 2047 without needing upgradation. Therefore, the capacity of these berths is kept the same till 2047.

CCTPL is expected to upgrade some of its infrastructure in a short-term to increase efficiency and cargo handling capacity. Thereby, its existing cargo handling capacity of 31.3 MMTPA will become 32.8 MMTPA by 2025. The capacity of BD2 berth is planned to remain same as its current capacity till it is combined with other container berths at Bharathi Dock to become the third container terminal at Chennai Port, after the concession agreement period of CCTPL or DPW gets over. After the merger, the combined capacity of this third container terminal at Chennai Port would become 80 MMTPA or 4.15 million TEUs PA by 2035.

There is no plan for the upgradation of infrastructure at NQ berth. Moreover, after the demolition of North Groin, which will make the Bharathi Dock and Ambedkar Dock berths continuous, during 2035-37 North Quay will not be there.

WQ 1-4, including the CQ, are planned to continue to be operated by the Port for a foreseeable future. The infrastructure at these berths is planned to be upgraded during 2035 and later, these berths may be extended seawards by 30 meters to renew berths and increase depth alongside. This renewal is expected to increase the cargo handling capacity of these berths to 20 MMTPA by 2040.

SQ1 and SQ2 along with all the 6 berths of JD are planned to be given on PPP basis during 2025-28. Therefore, once the concessionaire takes up these berths and upgrades the infrastructure by 2028, it is expected that the capacity will increase to 34 MMTPA (JD 1 – 6: 30 MMTPA + SQ1: 4 MMTPA). After the widening of the JD entrance, the length of SQ1 & SQ2 would reduce to approx. 240 & 120 meters respectively and capacities may capacities may become to 4 MMTPA & 0.6 MMTPA.

CITPL is expected to upgrade its infrastructure in the short term, increasing its existing cargo handling capacity from 29.5 MMTPA to 38.6 MMTPA by 2025. And after this concession period gets over, i.e., by 2037, the new terminal is expected to have a capacity of 60 MMTPA.



With the large incentivization and encouragement to Coastal Shipping by the Government of India and the upgradation of port infrastructure, the capacity of the coastal terminal is expected to double to 2 MMTPA by 2030.

Lastly, the planned outer harbour with a quay length of over 2,000 meters is expected to be operational by 2045 with a capacity of 120 MMTPA by 2045.

Finally, based on the proposed projects, the annual cargo handling capacity of Chennai Port is expected to cross 200 MMTPA by 2035 and is planned to reach close to approx. 350 MMTPA by 2047.

9.1.5 Comprehensive Environment Clearance

Chennai Port is proactively taking steps to obtain one time Environment Clearance for development/ improvement of 6 infrastructure facilities at Chennai Port. These projects include improvement at berths, relocation of sand trap, development of multi-level car parking, cargo storage sheds and tank farms. At the time of writing this report, Government of Tamil Nadu has approved and recommended the proposal to the MoEF&CC, Government of India. Chennai Port is in the process of preparing final documents for submission to MoEF&CC for CRZ clearance and Environment Clearance.

As per the EIA Notification of 2006 Cl. 9, the environmental clearance granted for a project shall be valid for 5 years. This period of validity may be extended by the regulatory authority concerned by a maximum period of five years provided an application is made to the regulatory authority by the applicant within the validity period, together with Form 1, and Supplementary Form 1A, for Construction projects or activities. In this regard, the regulatory authority may also consult the Expert Appraisal Committee or State Level Expert Appraisal Committee as the case may be.

Notwithstanding above, Chennai Port will strive to obtain a comprehensive EC for all the projects having implementation timeline within the period of validity for that CRZ/ Environment Clearance.



9.2. Shelf of Projects

Based on the analysis carried out in all the earlier Chapters of this Comprehensive Master Plan, especially Chapter 6, 7, 8 and 9, containing cargo projections, capacity augmentation requirement, connectivity and climate action, the major projects identified for the Chennai Port are listed below.

All these projects aim to align Port's development with the development roadmap envisaged in the Government of India's Blue Economy Maritime Vision 2047 and are planned to meet evolving regional trade requirements in an environmentally sustainable manner up to 2047. A mid-term review is suggested to be carried out during 2035.

SN	Project description	Implementation method/ Agency	Start Date	Target Completion Date	Tentative Cost (Cr.)
Near-Term Projects (next 3 years, up to 2025)					
1	Goods Shed at Jolarpettai	Self	2021	2023	5
2	Parking area for at least 500 trucks @ BDII backup area	Self-funded	2023	2023	53
3	Enhanced Gate throughput through digital initiatives	EBS	2022	2023	44.45
4	Road infrastructure assessment study by consultants	Self-funded	2023	2023	2
5	Outsource O&M of BD1 & 3	PPP	2024	2026	50
6	Outsource O&M of Bunker Berth	PPP	2023	2024	200
7	Widening of JD entrance	Self-funded	2023	2025	180
8	Mobile container scanner @gate10	Self + DoL	2023	2025	40
9	Cargo Sheds near EXIM Godowns	Self + Sagarmala, PPP	2023	2025	90
10	Internal road upgradation/ new Road Over Bridge(s)	Self + Sagarmala	2024	2025	300
11	MMLP at Mappedu	PPP	2023	2025	1500
12	Chennai Port-Maduravoyal flyover	NHAI	2023	2025	6000
13	Chartering of Tug Boat(s)	Self-funded	2023	2025	12Cr./tug/yr.
14	Dredging of container berths	PPP Operator	2024	2025	3
15	Dredging of JD East (15 mtrs.)	Self-funded	2024	2025	3
16	Dredging of turning circles BD+AD	Self + Sagarmala	2024	2025	25
17	Widening of AD entrance to 180 m	Self	2024	2025	30
Medium-term Projects (3 to 10 years, up to 2032)					
18	Pavement at Coastal berth backup area for car storage by car OEM(s)	Self-funded	2025	2026	20
19	Rail siding at EXIM cargo sheds	Self	2025	2025	20
20	Edible Oil storage tanks north of INS Adyar	Long-term lease	2025	2027	160
21	JD berths including SQ1 on PPP	PPP	2025	2028	1200



SN	Project description	Implementation method/ Agency	Start Date	Target Completion Date	Tentative Cost (Cr.)
22	Land Reclamation north of northern break water	Self	2026	2031	500
23	Drive-through container scanner near gate 10	self	2027	2030	100
24	Container Terminal at CCT & BD2	PPP	2029	2033	900
25	Parking area for 500 trucks each near gate '1' ad gate '10'	Self	2031	2032	100
Long-Term Projects (10 to 25 years, up to 2047)					
26	Strengthening of WQ berths (30 mtrs. Seawards, reclaim 6.5 acres)	Self	2035	2037	1000
27	Demolition of North Groin, make BD and WQ berths continuous	Self + Sagarmala	2035	2037	800
28	Expansion of Cruise Pax. Terminal	PPP	2037	2039	250
29	Dredging of Docks/berths/channel	Self + Sagarmala	2037	2038	1000
30	Container terminal in place of PSA	PPP	2035	2039	2000
31	Additional road over bridges	Self + Sagarmala	2039	2041	1000
32	Parking Plazas for private cars/ cargo vehicles	PPP	2039	2041	150
33	External Road Connectivity - Northern Side Sea Link up to Outer Ring Road approx. 30 kms*	NHAI	2040	2045	18000
34	Mega Cont. Terminal/CFs/ ICDs*	PPP	2040	2045	36000
35	Mega Multi-Cargo Terminal, cargo storages*	PPP	2040	2045	36000
36	Marina, Ro-Pax*	PPP	2040	2042	200
37	Hotels, Lounges, Restaurants, Water Park*	PPP	2040	2042	200

Table 9-2: Shelf of Projects identified for the Chennai Port up to 2047

*Contingent measures, to be taken up based on reassessment during 2035.



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10. LAND USAGE AT CHENNAI PORT

10.1. Layout with Proposed Near-term Projects

Attached in Annex 1.

10.2. Layout with Proposed Mid-Term Projects

Attached in Annex 2.

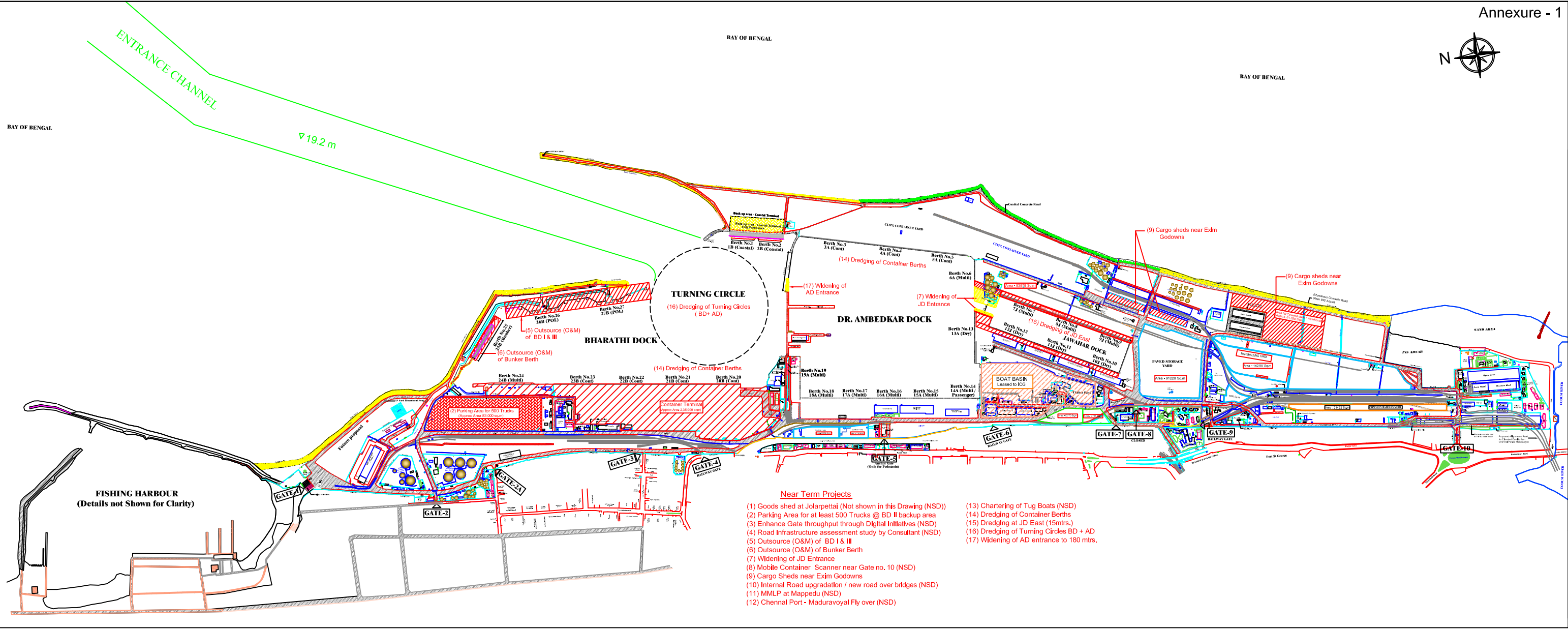
10.3. Layout with all Proposed Projects till year 2047

Attached in Annex 3.

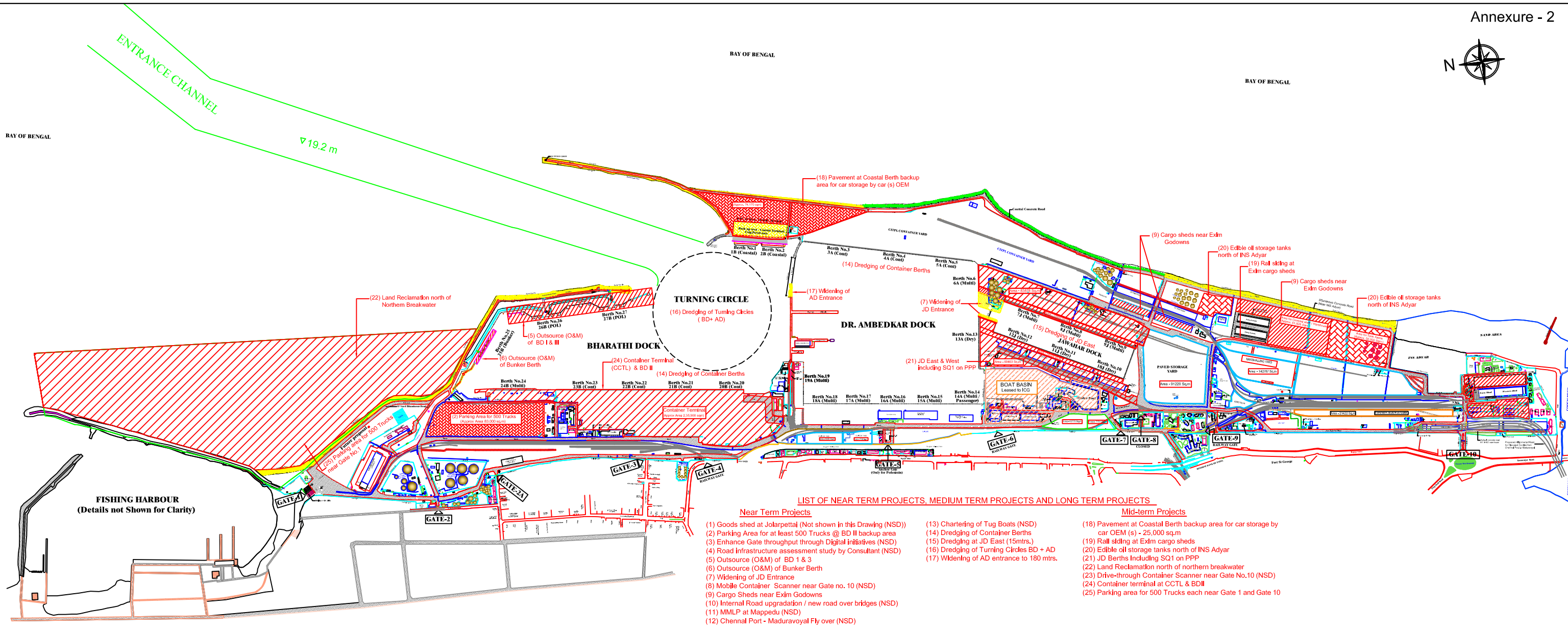
10.4. Layout of Outside Custom Bonded Area

Attached in Annex 4.

END OF THE REPORT



- Near Term Projects**
- (1) Goods shed at Jolarpettai (Not shown in this Drawing (NSD))
 - (2) Parking Area for at least 500 Trucks @ BD II backup area
 - (3) Enhance Gate throughput through Digital Initiatives (NSD)
 - (4) Road Infrastructure assessment study by Consultant (NSD)
 - (5) Outsource (O&M) of BD I & III
 - (6) Outsource (O&M) of Bunker Berth
 - (7) Widening of JD Entrance
 - (8) Mobile Container Scanner near Gate no. 10 (NSD)
 - (9) Cargo Sheds near Exim Godowns
 - (10) Internal Road upgradation / new road over bridges (NSD)
 - (11) MMLP at Mappedu (NSD)
 - (12) Chennai Port - Maduravoyal Fly over (NSD)
 - (13) Chartering of Tug Boats (NSD)
 - (14) Dredging of Container Berths
 - (15) Dredging at JD East (15mtrs.)
 - (16) Dredging of Turning Circles BD + AD
 - (17) Widening of AD entrance to 180 mtrs.



LIST OF NEAR TERM PROJECTS, MEDIUM TERM PROJECTS AND LONG TERM PROJECTS

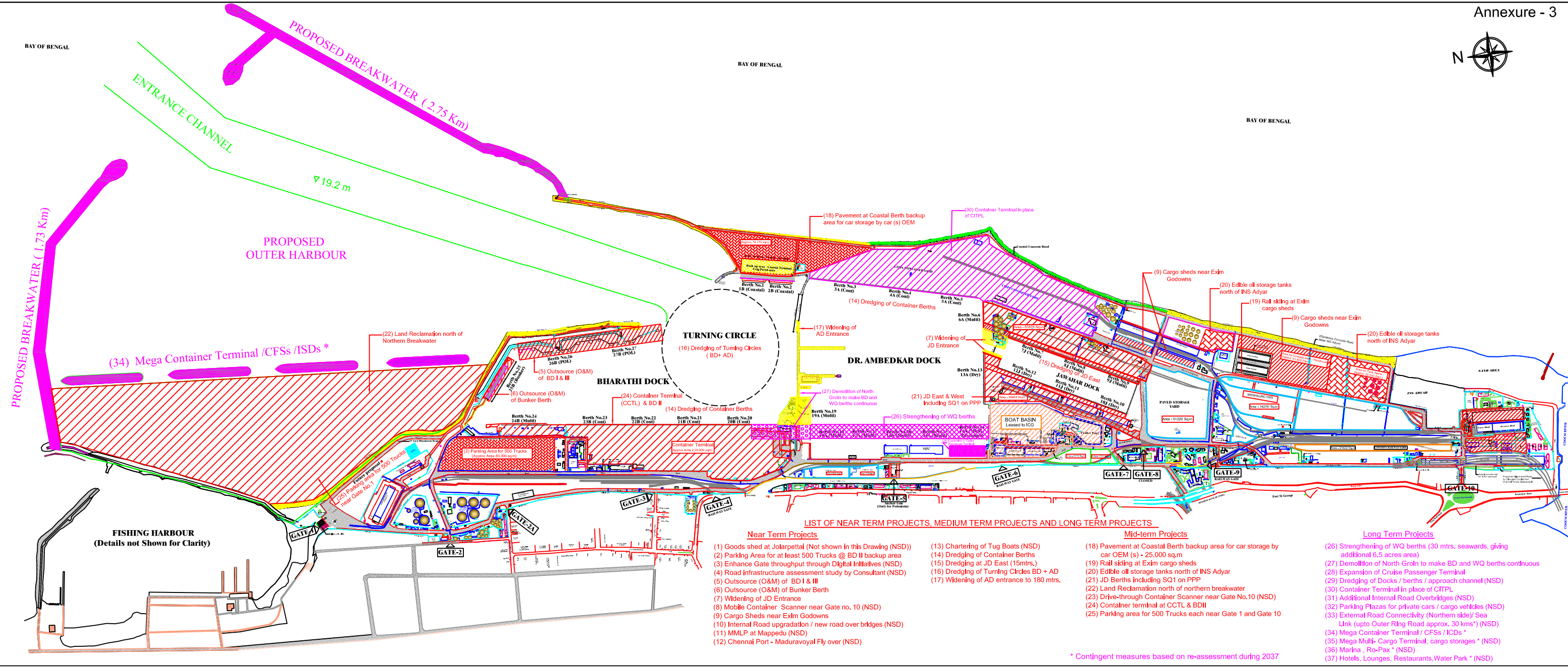
Near Term Projects

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- (2) Parking Area for at least 500 Trucks @ BD II backup area
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- (4) Road infrastructure assessment study by Consultant (NSD)
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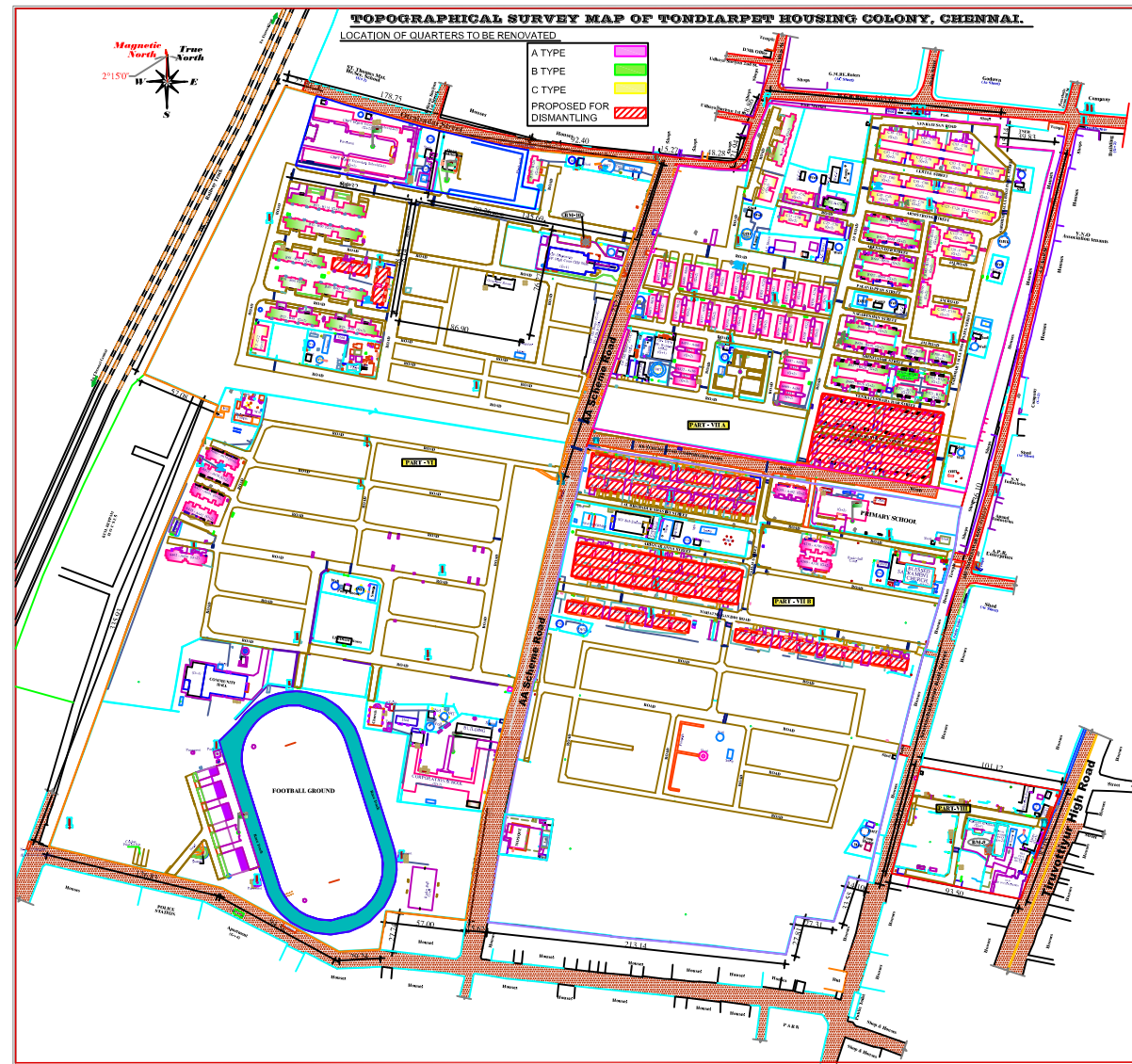
- (13) Chartering of Tug Boats (NSD)
- (14) Dredging of Container Berths
- (15) Dredging at JD East (15mtrs.)
- (16) Dredging of Turning Circles BD + AD
- (17) Widening of AD entrance to 180 mtrs.

Mid-term Projects

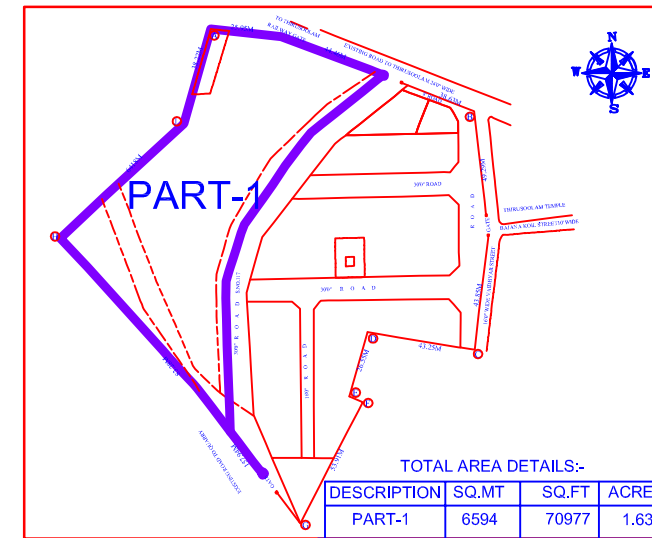
- (18) Pavement at Coastal Berth backup area for car storage by car OEM (s) - 25,000 sq.m
- (19) Rail siding at Exim cargo sheds
- (20) Edible oil storage tanks north of INS Adyar
- (21) JD Berths Including SQ1 on PPP
- (22) Land Reclamation north of northern breakwater
- (23) Drive-through Container Scanner near Gate No.10 (NSD)
- (24) Container terminal at CCTL & BDII
- (25) Parking area for 500 Trucks each near Gate 1 and Gate 10



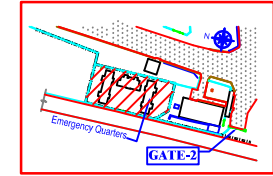
- LIST OF NEAR TERM PROJECTS, MEDIUM TERM PROJECTS AND LONG TERM PROJECTS**
- | | | |
|--|--|---|
| <p>Near Term Projects</p> <ol style="list-style-type: none"> (1) Goods shed at Jolarpettai (Not shown in this Drawing (NSD)) (2) Parking Area for at least 500 Trucks @ BD II backup area (3) Enhance Gate throughput through Digital Initiatives (NSD) (4) Road Infrastructure assessment study by Consultant (NSD) (5) Outsource (O&M) of BD I & III (6) Outsource (O&M) of Bunker Berth (7) Widening of JD Entrance (8) Mobile Container Scanner near Gate no. 10 (NSD) (9) Cargo Sheds near Exim Godowns (10) Internal Road upgradation / new road over bridges (NSD) (11) MMLP at Mappedu (NSD) (12) Chennai Port - Maduravoyal Fly over (NSD) | <p>Mid-term Projects</p> <ol style="list-style-type: none"> (13) Chartering of Tug Boats (NSD) (14) Dredging of Container Berths (15) Dredging at JD East (15mtrs.) (16) Dredging of Turning Circles BD + AD (17) Widening of AD entrance to 180 mtrs. | <p>Long Term Projects</p> <ol style="list-style-type: none"> (18) Pavement at Coastal Berth backup area for car storage by car OEM (s) - 25,000 sq.m (19) Rail siding at Exim cargo sheds (20) Edible oil storage tanks north of INS Adyar (21) JD Berths including SQ1 on PPP (22) Land Reclamation north of northern breakwater (23) Drive-through Container Scanner near Gate No.10 (NSD) (24) Container terminal at CCTL & BDII (25) Parking area for 500 Trucks each near Gate 1 and Gate 10 (26) Strengthening of WQ berths (30 mtrs. seawards, giving additional 6.5 acres area) (27) Demolition of North Groin to make BD and WQ berths continuous (28) Expansion of Cruise Passenger Terminal (29) Dredging of Docks / berths / approach channel (NSD) (30) Container Terminal in place of CITPL (31) Additional Internal Road Overbridges (NSD) (32) Parking Plazas for private cars / cargo vehicles (NSD) (33) External Road Connectivity (Northern side) Sea Link (upto Outer Ring Road approx. 30 kms*) (NSD) (34) Mega Container Terminal / CFSS / ICDs * (35) Mega Multi- Cargo Terminal, cargo storages * (NSD) (36) Marina, Ro-Pax * (NSD) (37) Hotels, Lounges, Restaurants, Water Park * (NSD) |
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- * Contingent measures based on re-assessment during 2037



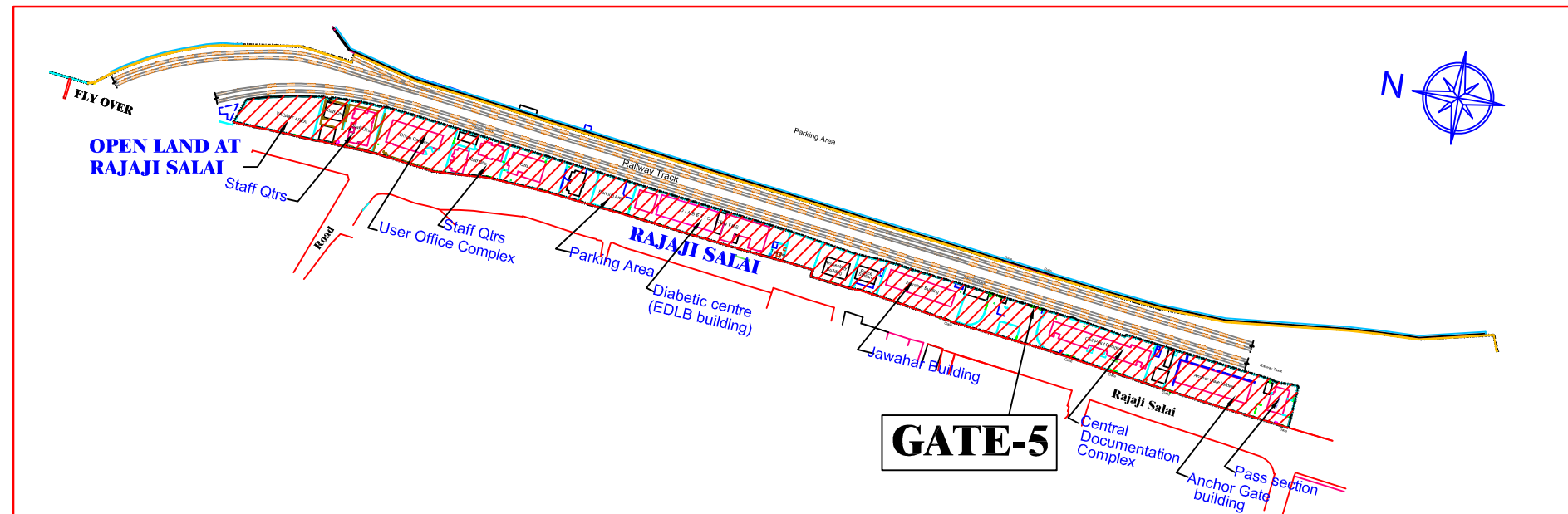
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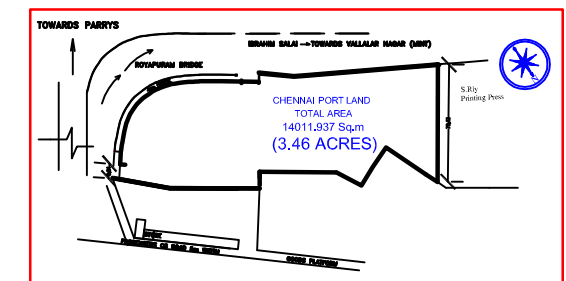


LAND AT GM PETTAI



RAJAJI SALAI NEAR GATE No.5

LAND OUTSIDE CUSTOM BOND AREA



LAND AQUIRED FROM SOUTHERN RAILWAY