

# EXECUTIVE SUMMARY

## Multi-Modal Logistics Hub

Consultancy Services for Preparation of Development Plan for Pithampur-Dhar-Mhow  
Investment Region of Madhya Pradesh sub-region of DMIC

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# 1. MULTI-MODAL LOGISTIC HUB

## 1.1. INTRODUCTION

1. The multimodal logistics hub (MMLH) has been conceived as an early bird project in the development of the Pithampur-Dhar-Mhow investment region of the Madhya Pradesh (MP) sub-region of the Delhi-Mumbai Industrial Corridor (DMIC). The MMLH is envisaged as a facility that will improve the logistics integration of the region and thereby driving the industrial growth with improvement in cost competitiveness of the industry.

2. The MMLH will provide facilities and services for collection, distribution, storage and transportation of goods meant for exports and imports at competitive cost and fast turnaround times. The significant presence of large, medium and small industries in the region and increasing use of containers, in international and domestic trade, make evident significant potential demand for such facilities and services. The logistics hub will be positioned to improve efficiency of operations of existing industry in the region as well as improve the strategic attractiveness of the region as an investment destination for various categories of industries, warehousing and logistics operators.

## 1.2. DEMAND FOR LOGISTIC HUB

### 1.2.1. Demand Indicators and Attributes

3. Demand assessment is an important step in planning for any infrastructure facility, more so, when it has to be planned as a PPP project and commercial viability is important. The demand for a facility such as a logistics hub is dependent on a number of parameters and may not be directly manifested through a simple set of parameters. For ascertaining the actual demand and its attributes number of parameters have been studied and analyzed. The main demand indicators include the following:

- Road Transport and Traffic Characteristics.
- Container Traffic at existing ICDs or similar facilities.
- Industrial Production

### 1.2.2. Road Transport and Traffic Characteristics

4. To capture the Inter-Regional and Intra-Regional traffic, traffic surveys have been conducted at 26 survey points, from which locations were identified for Origin-Destination (OD) Surveys and Traffic Volume Count (TVC). 72 hours TVC and 24 hours OD Surveys were conducted. 25 types of commodities have been covered in the Origin and Destination surveys conducted for the project.

5. Based on the TVC the general road transport and traffic characteristics have been studied in detail. From the analysis and tables generated from the OD Surveys, a detailed movement of goods to and from the region have been studied. Both containerized movement and bulk movement was taken into account while arriving at demand for MMLH, as certain amount of goods which could be containerized are still moving as bulk goods due to lack of state-of-the-art facilities. These goods could be captured by the MMLH in future. The movement of goods is categorized into two major sub-heads; domestic traffic and EXIM traffic. Domestic traffic is the goods destined to elsewhere in the country and coming in the study area from elsewhere in the country. EXIM traffic is goods coming from port or destined to port. For the base year demand and demand forecast, only EXIM goods were considered as MMLH would be focusing mainly on the EXIM movement.

**Domestic Traffic:** From the OD analysis it is estimated that a total of 1,35,006 tones/day are domestic outgoings from the study area of Immediate Influence Area<sup>1</sup> (IIA) . Level of containerization shows 11.88% for total Domestic exports; 47.07% of domestic outgoing goods are moving as packed goods and 27.51% of domestic outgoing goods are moving in loose. A total of 1,12,793 tonnes/day are domestic incoming to the study area of IIA of which 11.68% is containerized. Further, about 51.60% of domestic incoming goods are moving as packed goods and 26.05 % of domestic incoming goods are moving in loose.

<sup>1</sup> Comprising of 5 districts of Ujjain, Shahjapur, Dewas, Indore and Dhar.

*EXIM Traffic:* From the OD analysis it is estimated that everyday a total of 22,480 tonnes of commodities are getting exported through the Ports from the study area of IIA. Level of containerization is 18.95% for total exports; 37.46% of exports are moving as packed goods and 27.78% of export goods are moving in loose. In case of imports, a total of 27,096 tonnes of commodities are being imported via the Ports to the study area of IIA every day. About 14.32% of total imports are containerized, while about 37.12% of imports are moving as packed goods and 31.43% of export goods are moving in loose.

### **1.2.3. Container Traffic at existing ICDs or similar facilities**

6. There are several Inland Container Depots (ICD's) and warehousing facilities available in the vicinity of the hinterland, catering to the needs of the foreign and domestic trade. A preliminary study of facilities revealed that expectations of foreign trade are not met and demand for such facilities is growing at significant pace. Three Inland Container Depots (ICDs) within the Investment Region; CONCOR-ICD at Pithampur, Allcargo Global Logistics Limited at Pithampur and ICD Dhannad, combined are handling about 35000 TEUs per annum. CONCOR is handling the maximum containerized traffic (about 85-90%) as the other two are comparatively new ventures.

7. The containerized traffic movement from CONCOR is studied in detail. The EXIM traffic generated from ICD CONCOR in the last 6 years shows an annual growth of 11% in EXIM traffic.

### **1.2.4. Industrial Production**

8. Considering that the Multi Modal Logistic Hub will serve the Industrial areas in the districts of Indore, Dhar, Dewas, Ujjain and Shahjapur; and some amount of through traffic, the potential demand in the five districts are calculated. The catchment area for the potential demand primarily includes industrial areas of Pithampur, Dewas and Indore. Large, Medium and Small Industries have been considered. Even the existing competing facilities as explained above have been considered to understand the scale of potential demand for Multi Modal Logistic Hub. The total production from the Immediate Influence Area has been converted in volume terms in equivalent TEU's to indicate the scale of total potential and is found to be in the range of 6.6 lakh TEUs as on March 2007. Out of this more than 50% production can be attributed to industries that are known to be exporting products to foreign countries. Assuming that only 60% volume produced by such export oriented units is actually exported, the total exports volume will be equivalent to over 200,000 TEUs per annum. While it is understood that not all the exports can be containerized, even a fraction of the total volume will be able to justify a multi-modal logistics facility oriented towards handling container cargo. Looking into the past trends of production and projecting the production for a short term of basis of 15 years, considering exponential growth, it is observed that an annual growth of 11% in production would be experienced.

### **1.2.5. Relationship**

9. The EXIM traffic generated from ICD CONCOR is compared to the production of goods within the region (IIA). The log linear relationship between annual EXIM traffic and annual Production for years between 2003 and 2008 is plotted and a relation between them is been evolved. It is seen that an 11% growth in production results in 15% growth in EXIM traffic.

## **1.3. DEMAND ASSESSMENT**

### **1.3.1. Demand Forecasting**

10. Two approaches have been used for demand forecasting based on regional and national parameters. First the elasticity of growth in container traffic in the region is estimated with respect to the regional NSDP growth. As part of the second approach the elasticity of growth in volume of EXIM traffic is established with respect to the GDP growth of the country. It has been found that the elasticity of regional EXIM traffic with respect to regional economy is significantly lower at about 1.25 compared to that of national EXIM traffic with respect to the national economy being 1.5. Assumed elasticity of EXIM traffic in relation to Economic Growth is shown in Table 1.

**Table 1: Assumed Elasticity of EXIM Traffic in Relation to Economic Growth**

Year	2009	2014	2019	2024	2029	2034	2039	2041
Pessimistic	1.25	1.25	1.25	1.25	1.25	1.20	1.10	1.10
Likely	1.25	1.25	1.40	1.40	1.30	1.20	1.10	1.10

11. Based on these elasticity factors, base year traffic and rise in level of containerization; demand forecast for various level of growth elasticities and diversions have been worked out. There have been five scenarios selected and summary description is as given in Table 2.

**Table 2: Summary Description of Selected Scenarios**

Elasticity Scenario	Pessimistic			Likely		
	No	Low	Moderate	No	Low	Moderate
Incremental Containerization						
Network Scenario						
PS1 Rau – Dahod Link						
PS2 Nagda – Ratlam Link	Scenario 1					
PS2 followed by PS 1					Scenario 2	Scenario 4
PS2 followed by PS 3					Scenario 3	Scenario 5

**Scenario 1:** Assumes that the Rau-Dahod link does not come up during the project period and only the Nagda-Ratlam link is used for rail transportation. The elasticity value remains constant at 1.25 before it starts declining beyond year 2031. The level of containerization remains constant at present levels. The empty containers contribute 30% of the total traffic for the entire project period. This is a very conservative scenario taking a very pessimistic view on diversions and quite conservative view on growth.

**Scenario 2:** Assumes that the **Rau-Dahod** link does not come up till year 2021 during which period only the Nagda-Ratlam link is used for rail transportation. However, beyond 2021 the Rau-Dahod link is assumed to be operational thereby changing the diversion dynamics. The elasticity value remains constant at 1.25 till 2016, increases to 1.4 for the period 2017-2026, declines to 1.3 for the period 2027-2031 before it starts declining in a pattern similar to the previous scenario. The level of containerization, however, is assumed to increase slowly from the present levels. Initially it is assumed that 1.5% of presently non-containerized traffic will get containerized and the conversion rate will slowly increase to about 2.9% by year 2041. Of this containerized traffic the converted MMLH demand is estimated based on the diversion curves. The base traffic used is port cities bound traffic and the information on exact quantum of EXIM traffic is not available. Such low rate of containerization was assumed to stay on a conservative side. The empty containers contribute 30% of the total traffic for the entire project period. This is also a moderate scenario though more realistic on diversion and growth estimates. This can be considered a likely scenario.

**Scenario 3:** Assumes that the **Rau-Dahod** and **Rau-Khandwa** links do not come up till year 2021 during which period only the Nagda-Ratlam link is used for rail transportation. However, beyond 2021 both Rau-Dahod and Rau-Khandwa links are assumed to be operational thereby changing the diversion dynamics. The elasticity scenario is same as in Scenario 2. The level of containerization is also assumed to increase slowly from the present levels following a pattern same as in described in Scenario 2. The empty containers contribute 30% of the total traffic for the entire project period. This is also a moderate scenario though more realistic on diversion and growth estimates. This can be considered a likely scenario.

**Scenario 4:** This scenario is identical to scenario 2 except for the conversion rate of non-containerized traffic to containerized traffic. Initially it is assumed that 2.0% of presently non-containerized traffic will get containerized and the conversion rate will slowly increase to about 5.6% by year 2041. This is a slightly optimistic scenario in terms of growth but can be considered fairly realistic.

**Scenario 5:** This scenario is identical to scenario 3 except for the conversion rate of non-containerized traffic to containerized traffic. Initially it is assumed that 2.0% of presently non-containerized traffic will get containerized and the conversion rate will slowly increase to about 5.6% by year 2041. This is a slightly optimistic scenario in terms of growth but can be considered fairly realistic.

12. The projected container traffic at the MMLH in the above Scenarios is given in Table 3.

**Table 3: Projected Container Traffic at the MMLH in Various Scenarios**

Scenario	2009	2014	2019	2024	2029	2034	2039	2041
1	57,574	70,852	86,859	108,857	137,637	172,815	213,632	231,865
2	65,424	81,294	102,268	254,988	332,605	427,004	540,436	593,124
3	65,424	81,294	102,268	272,172	355,019	455,780	576,856	633,095
4	65,424	81,584	103,152	259,471	338,979	435,998	553,070	607,628
5	65,424	81,584	103,152	276,957	361,823	465,380	590,342	648,576

13. Projected Container Traffic at the MMLH and Projected Empty Container Movement under Various Scenarios has been worked out. Out of the five scenarios Scenario 3 has been considered as the likely scenario for further physical and financial planning for MMLH.

## **1.4. CONCEPT PLAN**

### **1.4.1. Facilities and Functions**

14. A multimodal complex is more than just a handling terminal: it is a large distribution center. Its infrastructure may include warehousing and office functions, customs related services, refrigerated storerooms, freezing chambers, hazardous freight storage facilities, service and repair areas, public catering outlets, recreational facilities, etc. Infrastructural amenities at such distribution hubs may vary depending on location, business specificity and main objectives.

15. At the core of the MMLH will be the transportation and handling functions, primarily served by ICD infrastructure. The ICD will be supported by the CFS for administrative, legal and other logistical support in form of bonded customs facility, offices and storage space for logistics operators and agents and other support services.

16. Apart from these core functions a number of support and value adding services or functions will form a part of the logistics hub. To complete overall logistics integration a processing zone has been planned to provide value addition through provision of services like process outsourcing, inventory management, packaging and customization etc. The major support functions at the MMLH will include the following:

- Truck Terminal and Workshops
- Warehousing
- Processing
- Packaging
- Trade and Commercial Functions
- Basic amenities, utilities and services

17. The activities performed at the facility are directly dependent of the envisaged functions. The major core activities performed at the MMLH will include the following:

- Receipt and dispatch / delivery of cargo.
- Transit operations by rail/road to and from serving ports.
- Temporary storage of cargo and containers.
- Customs clearance.
- Consolidation and desegregation of LCL cargo.
- Container handling and stacking.
- Stuffing / De-stuffing of containers.
- Maintenance and repair of container units.

18. After finalizing the functions and activities; based on the main mode of transport that will access the hub, the handling system selected, the varying stacking densities and circulating area; area requirements for each component have been worked out. The area requirements for various major functional components are Container Yard, CFS, Packaging/Stripping, Cargo Warehouse, Container Repair Facility, Railway Siding and Truck Access. Additional covered areas to be provided are offices, maintenance workshop, canteen, guesthouses, etc. Additional paved area to be provided are internal roads, boundaries, parking, maintenance yard etc.

19. In addition to the operational areas inside the MMLH, substantial additional land acquisition and civil works costs are typically incurred for access to the MMLH and for supporting infrastructure. Areas required for rail spur to the MMLH, access and perimeter roads, and areas for supporting infrastructures (i.e., water filtration, sewage treatment) are some possible extra needs.

20. The parameters taken for the recommendation of the space norms are Total surface area including Expansion Area, Container Terminal area, Container Slots, Warehouse Area, Office Space, Loading/Unloading Track Capacity, Rail Yard area and Parking Stalls. These recommendations for space norms are worked out based on selected national and international space averages. A detailed component-wise area requirement has been worked out based on traffic to be handled by MMLH (demand), average dwell time, average turnaround time, share of cargo (EXIM, reefer, hazardous, etc) and other space norms as derived from national and international averages.

21. Based on the above calculations, the total area for the core ICD functions adds up to about 76Ha for year 2029. Further, considering the additional area for geometric considerations of rail sidings, value addition services, facilities, incidental spaces, roads and area for future expansion a total area of 150-200 Ha is considered.

#### **1.4.2. Site Delineation**

22. After interaction with Government of Madhya Pradesh, site located along the NH-3 Bypass near Pithampur has been delineated for the purpose of MMLH. Considering the long term demand, an area of 182.1 hectares have been considered so that infrastructure investments are not duplicated and land acquisition problems are not faced at the time of future expansion. The selected site is delineated by three important aspects as follows:

- **Indore SEZ:** Western side of the proposed site for MMLH is delineated by Indore SEZ. Although there is no boundary wall on site as of now for the SEZ.
- **NH-3 Bypass:** Southern edge of the proposed site is delineated Bypass for NH-3 which is under construction at the present. It is expected that the Bypass will be inaugurated by end of 2009 and ready to use.
- **Propose Indore-Dahod Rail Link:** The northern edge of the proposed site for the MMLH is delineated by the proposed railway line between Indore and Dahod. It is recommended that a broad gauge rail link from Indore to location of MMLH be pursued with Indian Railways on an urgent basis to make the logistic hub a success story.

23. Refer Figure 1 for delineation of the Site for MMLH.

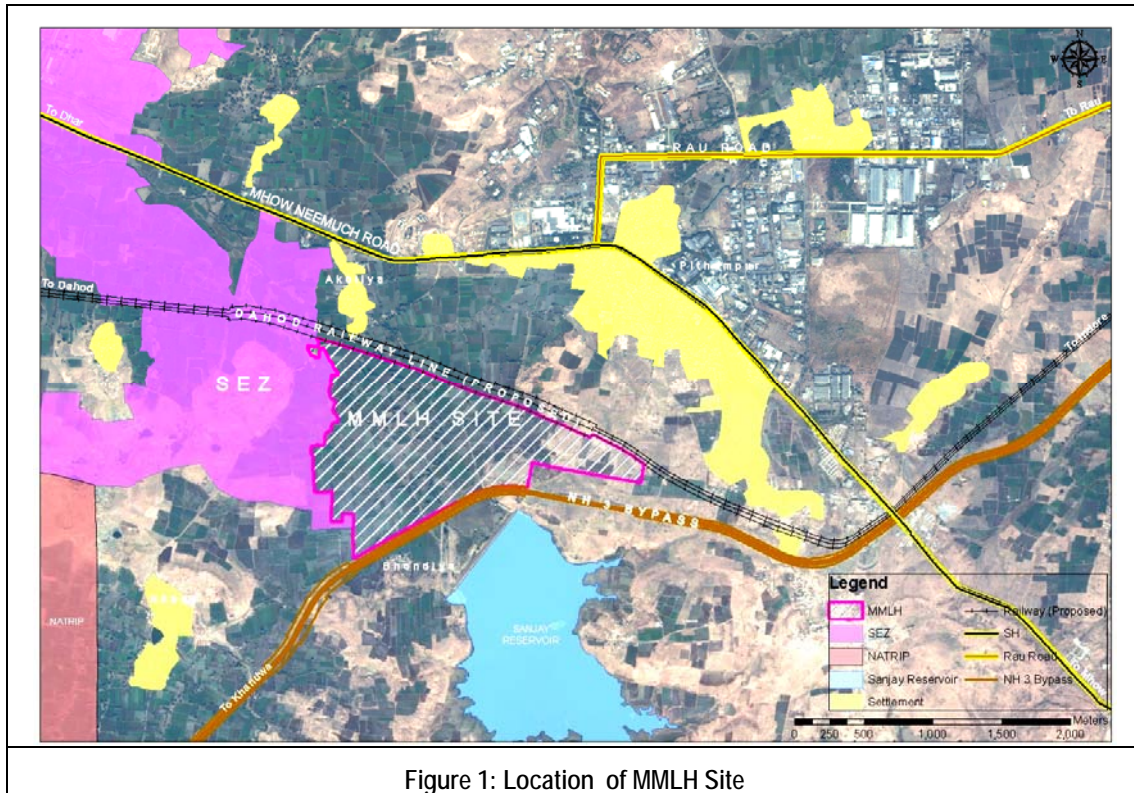


Figure 1: Location of MMLH Site

**1.4.3. Site and Built Up Area Program for MMLH**

24. The proposed site areas and built up area for the MMLH is structured under following main components/product mix.

- Bonded Area
- Gate Complex
- Total Movement Area
- Stacking Area including Movement Areas
- Area under CFS facilities
- Area of Truck Terminal
- Other Parking Areas
- Warehousing Area
- Processing and Packages Area
- Service Areas
- Open and landscaped spaces

25. The details of the area program for the MMLH are given in the Table 4.

Table 4: Area Program for MMLH

S. No.	Activity/Project Component	Land Development (in Ha)	Built up area (in sq.m.)
1	Railway Siding	17.1	
2	Stacking Area	29.3	
3	CFS	23.0	37000
4	Hazardous Container	3.8	6000
5	Workshop/Repair	8.3	5000
6	Processing/Packaging	6.2	15000
7	Warehouses	10.5	45000
8	Terminal Facilities(for 1000 trucks)	9.9	5500
9	Gate Complex and Administrative Facilities	5.1	10600
10	Commercial Complex	4.4	18000
11	Expomart	4.7	10800
12	Roads	28.2	

11	Parking	1.3	
12	Green Buffer/Drain	21.2	
13	Utilities	9.0	
	Total	182.0	152900

#### **1.4.4. Infrastructure Development Strategy**

26. Following are some of the key initiatives required for improving the overall connectivity of the MMLH site with rest of the region and country.

##### **Prioritization of Rail Projects**

- Conversion of Indore-Rau meter gauge to broad gauge.
- Extension of broad gauge to Pithampur. (Both a and b will evaluate broad gauge route availability to the industrial area)
- Conversion of Ratlam-Indore meter gauge including Rau-Mhow meter gauge section to broad gauge. This will enable broad gauge link to Mumbai-Gujarat.
- Construction of new Chhota Udepur-Pithampur broad gauge line. This will further shorten distance to Gujarat and Mumbai and will also enable junction facilities to the DFC.
- Conversion of Mhow-Khandwa meter gauge with re-gradation of the alignment. This will provide shortest route to Mumbai and South India.

##### **Entry from NH-3 to Proposed Site of MMLH**

27. A single signal free entry is recommended from NH-3 to the proposed site of MMLH. The signal free entry to the site can be promoted by taking an advantage of the level difference between the site and the highway. Hence, it is recommended to develop a signal free traffic junction by promoting an under pass to facilitate the entry to the hub.

##### **Promotion of Railway Sidings**

28. Development of railway sidings is important aspect of the MMLH. It is important to state here that site for MMLH is located on southern side of the proposed railway station at Pithampur. To develop railway sidings for the MMLH it is only possible to take an access from the proposed rail station as it is a signalized zone for regulating rail movement. The proposed railway sidings for the logistic hub are developed based on likely design for the station. However, the final design of the railway sidings can be finalized with mandate of Indian Railways. The important aspects for design of railway siding are as follows.

- A loop is proposed from the proposed railway station at Pithampur to develop the railway sidings. The railway sidings will be developed within the proposed site of the MMLH. The layout of the railway sidings will be parallel to the proposed railway station at Pithampur to minimize loss of site area of MMLH.
- The CSR (Clear Standing Room) for trains is taken as 720m with 1:12 angle to plan the arterial sidings for use of MMLH.
- Total of seven rail rakes are proposed for the sidings in the MMLH to handle rail based traffic for container movement, which can be developed in a phased manner. The design of railway sidings is based on the guidelines for promoting a loop, along with space for reversing the engine by providing an overrun on both sides of the loops. It is likely that maximum number of trains per day required to handle the container traffic at MMLH will not exceed forty in number as per the projected traffic for year 2041. The total projected traffic for horizon year is in the range of 450-500 thousand TEUs. With the use of latest technology available for gentry' cranes and stackers a full train can be unloaded and loaded within three hours at modern and state-of-the-art logistic hubs.

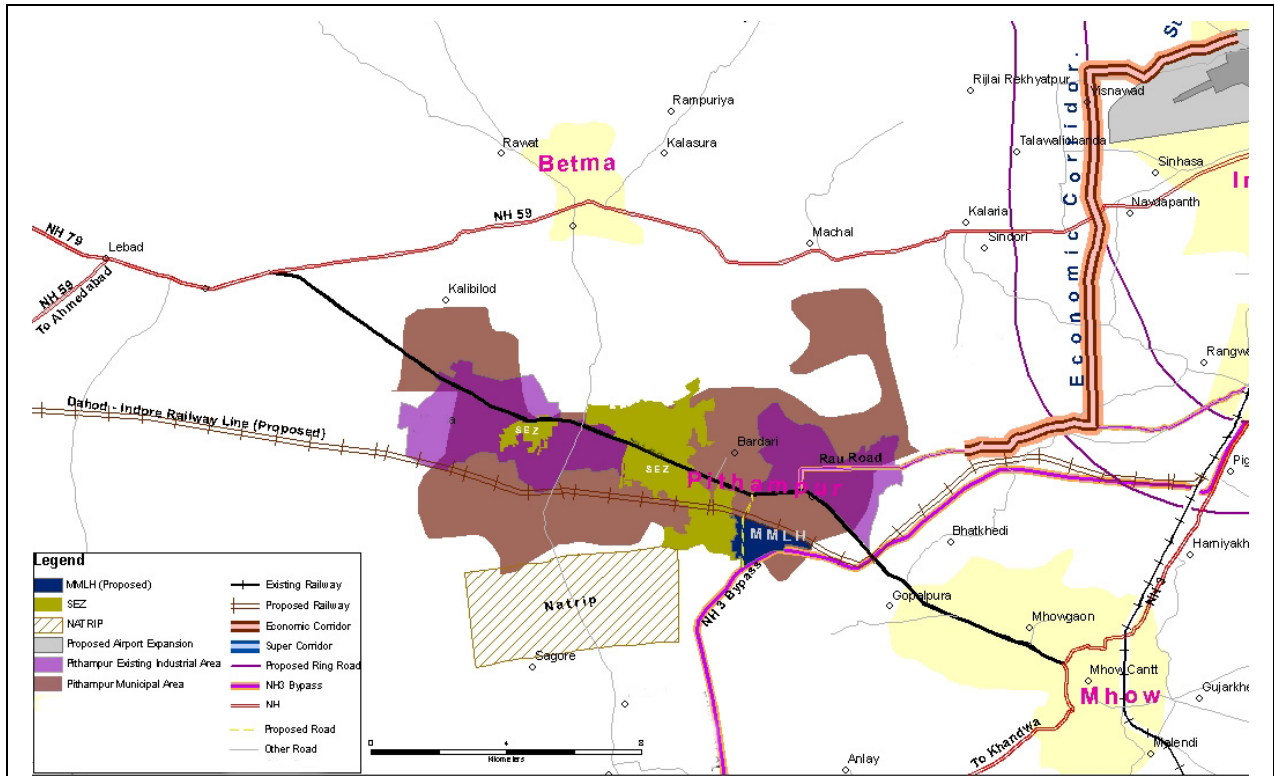


Figure 2: Existing and Proposed Connectivity of MMLH Site

## PROJECT COST AND FINANCIAL VIABILITY

### 1.4.5. Preliminary Cost Estimates

29. Project costing for the MMLH is done in five parts:

- Land acquisition cost<sup>2</sup>
- Common physical infrastructure cost (railway infrastructure, road infrastructure, power, water and sewerage infrastructure and green buffers)
- Development cost of buildings (CFS, administrative buildings, warehouses, terminal facilities, expo-mart etc.)
- Cost of equipment like reach stackers, gantry, and weigh-bridges etc necessary for operations of logistics hub
- Manpower Cost

30. The overall project cost for the MMLH was estimated as Rs 5,997 millions<sup>3</sup>. Infrastructure cost for the Logistics Hub as a whole is approximately Rs. 1800 millions. The building components and related cost for the site is Rs. 1,813 millions. Cost of the equipment is approximately Rs. 1713 Millions including the replacement cost. The phase-wise costing is as shown in Table 5.

<sup>2</sup> The land values estimates are based on latest recorded land values of three villages falling within the site. The government owned land costing has also been including in the preliminary project costing.

<sup>3</sup> Excludes manpower costs, which has been considered as an O&M cost for the financial analysis.

**Table 5: Phase-wise Costing of MMLH Development**

Components	Cost(In Million INR)				Total (in Million INR)
	2012-2016	2017-2021	2022-2031	2032-2041	
Land Acquisition and Site Development Cost <sup>4</sup>	603	39	20	11	672
Infrastructure Costs	808	451	384	156	1800
Building Development Cost	393.1	1179.8	150.0	90.0	1813
Equipment Cost (including replacement)	257	195	524	737	1713
<b>TOTAL CAPITAL COSTS</b>	<b>2061</b>	<b>1865</b>	<b>1078</b>	<b>993</b>	<b>5997</b>

### 1.4.6. Financial Analysis

#### Revenue Model

31. The revenue generating activities/services are as follows:

- Stuffing/de-stuffing of the containers – both for export and import
- Storage of the containers- both empty and filled
- Truck Parking
- Commercial development of activities to support MMLH

32. The tariff rates for each of the above stated activities/services have been fixed after review of the existing tariff rates in the similar/ close to similar logistic hubs/ICDs (ICD-Dadri, ICD-Tuglakabad, ICD-Dhannad, AllCargo Global Logistics Limited and ICD-Pithampur).

33. The finally derived demand for the MMLH is in form of containers, both filled and empty, heading towards/from exports/imports. These containers have been categorised into containers which are likely to carry:

- General commodities,
- Hazardous goods, and
- Commodities which require refrigeration.

34. The projected traffic demand at MMLH is shown Table 6.

**Table 6: Projected Traffic Demand at MMLH**

Traffic	Unit	2014	2016	2021	2026	2031	2036	2041
Export loaded containers	TEU/annum	29591	32076	41131	110628	143427	182977	230447
Import loaded containers	TEU/annum	27315	29608	37968	102118	132394	168902	212720
Export Empty Containers	TEU/annum	11056	11984	15368	41334	53588	68365	86101
Import Empty Containers	TEU/annum	13332	14452	18532	49843	64621	82440	103828
Total Container Traffic	TEU/annum	81294	88120	112999	303924	394031	502685	633095
Truck Traffic (vehicle per day)	Vehicles/day	140	153	196	523	679	865	1089

35. Of the total containers stated in the table the breakup of the general, hazardous and reefer containers are as follows:

- General containers – 85%
- Containers carrying Hazardous goods – 5%
- Reefer Containers – 10%

<sup>4</sup> The cost also includes the share of government land available inside the site- around 16.83 and site grading and levelling. For the purpose of private land acquisition (165.27 Ha) around 519 Million INR is required.

## Result of Financial Analysis

36. Based on the inputs and various assumptions, the financial analysis has been undertaken. Financial results are derived on the parameters such as Project IRR, Equity IRR, NPV, Payback and Profitability ratio. The results are summarized below:

- Project returns (FIRR) is 17.30% for thirty years horizon period.
- Project Payback period is 15 years
- NPV(discounted) of the project is 1184 Million INR for thirty year horizon period
- Profitability Ratio is 1.18 for thirty year horizon period.

### **1.5. PPP MODEL FOR MMLH**

37. With the project characteristics such as demand built up over the period of 30 years, financial viability of 17.3% and back ended project returns it is suggested that Co-operation PPP Model be adopted for the proposed project. Under this approach, private sector developer will be invested with the responsibility of entire project development, planning, design, finance, management and operation of the facility. Government would be responsible for acquiring the land and providing to the developer on lease basis. at nominal rentals. The developer will be entitled to recover the investment thro' various revenue streams identified in the financial analysis chapter. The Concession period for the project will be about 30 - 32 years inclusive of Construction period.