Vijaydurg Port Private Limited

Detailed Project Report for Development of Vijaydurg Port

Volume I: Executive Summary

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1. Introduction

M/s Vijaydurg Port Private Limited (VPPL) has been granted a BOOT Concession by the Government of Maharashtra for development, management and operating a Greenfield Port at Vijaydurg in Sindhudurg district of Maharashtra. With this development VPPL envisions to serve the State by way of offering an efficient facility for maritime industry and give an impetus to development of industries in the hinterland with cost effective logistics for import and export of raw materials and finished goods.

VPPL has signed a concession agreement with Maharashtra Maritime Board (MMB) for development of a Greenfield port at Vijaydurg, which is located along the west coast of India at about 50 km (coastal distance) south of Ratnagiri city, in the state of Maharashtra.

Towards this end VPPL has appointed HOWE India Private Limited (HIPL), who have proven track record in planning and design of ports, for preparation of Detailed Project Report (DPR) for development of Greenfield Port at Vijaydurg.

2. Compilation of Existing Data of Project Site

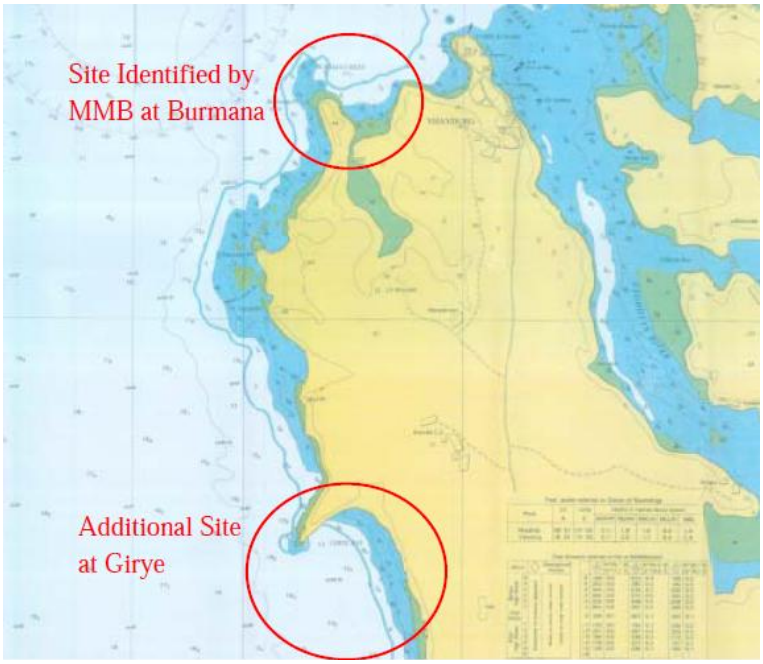
2.1 Location of Port Site

For the initial assessment MMB, based on the techno economic feasibility studies prepared by M/s Consulting Engineering Services (CES), had proposed the port location within the area between Burmana reef and Vijaydurg fort. The proposed location is almost at the northern most part of Sindhudurg district along the coast and is part of revenue taluka of Devgad. The 12th century Vijaydurg fort is located very close to this site. Therefore any large scale port development in the vicinity could be a problem as it may impose severe restrictions on the movement of visitors to the Fort which can be an emotive issue as it is associated with the name of Chatrapati Shivaji

Maharaj. The land area available for development is limited and further the approach to this site from the land side is from the side of village that is situated right behind and could present problems of dislocation to the village. Therefore the location suggested by CES is technically suitable but it has got some constraints on the marine as well as land side which would restrict its potential for expansion.

There exists another promising location, within the port limits which has deep water very close to the shore and has huge back up area for development. This site is located in Girye Bay. As could be observed from the naval hydrographic as well as MMB charts, the deep water contours at this site are very close to the shore with 10 m contour at a distance of 800 m and 20 m contour at a distance of 3500 m only. The following **Figure 2.1** indicates the location of Girye Bay and the suggested location by MMB Vijaydurg.

Figure 2.1 – Potential Locations of Port Development



2.2 Site Conditions

Meteorological and Oceanographic Data

The average daily maximum temperature varies from 29° C to 32° C while lowest varies from 20° C to 26° C.

Mean yearly relative humidity at 0830 hours is 71% while the same at 1730 hours is 74%.

The average yearly rainfall is about 2538 mm, of which 2378 mm (94%) occur during June to September. Usually maximum monthly rainfall occurs in July. The average monthly rainfall in July is 838mm. There is practically no rainfall from December to April.

General visibility in the area is good. However, during rains and squalls, the visibility deteriorates.

The tides in the region are of the semi-diurnal type i.e. characterised by occurrence of two High and two Low Waters every day. The tidal levels at Vijaydurg with respect to Chart Datum (CD) varied from a minimum of +0.4 m CD to maximum of about +2.1 m CD.

It can be observed that the predominant wind directions are NNW and NW and the direction of wind from W, NW and NNW together occur around 47% of the time.

The analysis of wave heights shows that the predominant directions of waves in the deep sea are from SSW to SW. It is observed that waves are more than 1 m, 2 m and 3m in height for around 78%, 22%, and 6% of the time respectively. The results of extracted transformed wave heights and periods for an entire year at various points show that the

predominant wave directions are W, WSW and SW at offshore locations (15 and 20 m contour) near the proposed port site at Burmana, whereas nearshore at the 5 m contour, waves are mostly NW. The Girye Bay site is more exposed to wave action in comparison to Burmana. Wave heights of more than 1 m are observed about 47%, 52%, 62% and 65% at depths 5m, 10m, 15m and 20m respectively. The predominant wave directions are SW and WSW at all the location near the proposed port site.

The currents measurements were carried out at Girye as well as Burmana Site. It is observed that currents are mainly tide induced with reversal at high and low waters. The maximum observed surface current speeds are about 2 knot at Girye and about 1.5 Knots at Burmana.

Geotechnical Data

Onshore as well as Marine Geotechnical investigations were carried out by M/s DBM Geotechnics and Constructions Pvt Ltd. at Girye and Burmana sites.

The onshore investigations at both the sites reveal that nearshore soil profile consist of brownish white sand with gravels or sea shells up to a depth ranging from 2 m to 10 m below bed level. This is followed by weathered rock laterite for a thickness of about 5 to 10 m, followed by hard rock basalt. The onshore data at higher elevations reveal that soil layer immediately at surface comprise of the highly weathered reddish brown laterite up to a depth ranging from 13 to 24 m below the ground levels. This layer is further underlain by highly weathered Basalt.

The marine investigations reveal that weathered rock laterite is found at much shallower depths as compared to deeper water depths. At some of the locations in Girye the bed comprise of about 3 m layer of marine clay followed by dense sand layer of about 6 to 10 m thickness, which is followed by a layer of laterite and finally highly weathered Basalt. Similar soil is encountered at Burmana site.

Topographic Information

The topography of the area at Burmana site is uneven. The limited land surface is irregular in shape and is surrounded by small plateaus of about 10 to 25 m high. The Girye Bay site has large waterfront available with reasonable even land surface but the depth of backup area is limited as it is surrounded by plateaus of about 35 to 50 m high. However the land at the plateaus of fairly even without any water bodies, habitation. No greenery is seen in the backup area.

Transport Linkages

The nearest railway link is the Mumbai – Mangalore Broad Guage line of Konkan Railway & the nearest station is Vaibhavwadi, which is approximately 70 km away from the identified location. Moreover National Highway (NH) 17 runs parallel to the coastline at a distance of about 60 km which is connected by State Highway (SH) 115 though MSH 4 to the site.

Water and Power Sources

Water demand for the port has to be met from fresh water bodies to be identified, which are likely to be at quite a distance. It is observed that the potable water for the towns and villages in the area is being brought through a long pipe line laid over ground along the road though Padel, Tirlot villages.

The electric power needs to be sourced from the Maharashtra State Electricity Distribution Company Ltd (MAHADISCOM).

3. Traffic Forecast

3.1 Traffic Studies

VPPL appointed M/s I-maritime Consultancy Private Ltd. for conducting the Traffic studies for Vijaydurg Port for assessing the quantity of various cargos likely to go through the proposed port.

As per the I-maritime report the traffic estimates have been divided into two parts – port induced and divertible hinterland traffic. Port induced traffic is the throughput that originates if VPPL is able to facilitate the development of certain captive industrial units in its immediate hinterland. These industrial units include facilities such as imported coal based thermal power plants (4000 MW), clinker grinding units (10 MTPA) and petroleum refineries (18 MTPA). Macro understanding suggests a demand for such units in the region. Such units will be captive for Vijaydurg Port with least risk of shifting to any new port developed in proximity of the port in near future.

Later VPPL appointed M/s Tach Infra Consultancy to advise them on further conceptualizing the port and more particularly to explore different alternatives of inducing cargo. Tach Infra visualized Vijaydurg as clean & green port in the initial development and in line with this vision, an alternative cargo profile was drawn comprising of Agro and Horti handling complex, Sugar complex, Fertilizer complex, Edible oil & Refineries, Agro Tourism and International Container Transhipment Terminal.

3.2 Final Traffic Forecast Figures Adopted for Port Planning

HIPL has not conducted any traffic studies for this project. However, an attempt was made, after due consultations with client, in reconciling the two pictures, the one presented by I Maritime and the second by Tach Infra and recasting the designed traffic for the port, as per the following hypothesis:

1. The port needs cargoes that enable its sustenance in the first place.
2. The primary cargo viz., coal should remain a thrust area. Enough and proven technology is available to handle this cargo with least pollution as is done in modern ports.
3. Iron ore is not a cargo to be counted at any stage and the volumes as projected by I-Maritime in second and third phase are too meagre for any meaningful Infrastructure for a major modern port. As and when it comes it could be handled at the multipurpose berths.
4. Fertilizer and Sugar should be serious cargoes on a long term basis.
5. Import of Clinker and export of Cement are the cargoes that can be aimed, after due collaboration with industry players.
6. Edible oil traffic can contribute to the basket albeit in a small way.
7. Containers may develop very slowly and the port may serve as feeder port in due course of time and when some leading container lines shows interest. It will also depend on their inland transport cost.
8. As for Crude, POL and LNG though no traffic be taken for the purpose of viability analysis, provision shall be made in the master plan so that such facilities are not ruled out in the distant future, in case a specific user approach the port.
9. Road and rail connectivity are an important prerequisite for any mass movement of cargos from and to the hinterland and all assumptions of traffic forecast should be seen on that basis.

In line with the above, the traffic forecast for planning of all facilities for the proposed port as modified is summarized as under in **Table 3.1**:

Table 3.1 – Adopted Traffic Forecast for Vijaydurg Port

S. No.	Commodity	I/E	Traffic Forecast (MTPA)		
			2015	2020	2025
Dry Bulk					
1.	Coal(Hinterland)	I	1.58	10.9	26.09
2.	Coal(Port generated)	I	4.00	8.00	16.00
3.	Cement	E	1.62	4.25	4.99
4.	Clinker	I	3.00	7.00	10.00
5.	Bauxite	E	0.10	0.10	0.10
General/Breakbulk					

7.	Fertilizer and FRM	I	1.00	1.50	2.00
8.	Sugar	E	0.50	1.00	1.50
Liquid Bulk					
9.	Edible Oil	I	0.25	0.50	1.00
10.	Crude (Provisional)				
11.	POL (Provisional)				
12.	LPG /LNG (Provisional)				
Containers					
13	Containers	I/E	0.00	4.33	15.25
	Total in Million Tonnes		**12.05**	**37..58**	**76.93**

Note: Although no specific traffic is earmarked for Crude and POL in the adopted traffic figures, the port facility requirements etc. would be worked out for these cargo for the throughputs as estimated in I-maritime report so that such facilities are not ruled out in the distant future, in case a specific user approach the port.

4. Phase 1 Development Plan of Vijaydurg Port

4.1 Establishment of Planning Parameters

Based on the available site data and the market projections, the planning parameters for development of the proposed port at Vijaydurg were established. These comprised of the phase wise facility requirements in terms of berths, land area for operations and storage, rail and road connectivity, other infrastructure requirements and also the design data on waves, wind, geotechnical, topography, design ship sizes for various commodities etc.

4.2 Preparation and Evaluation of Alternative Layouts

Alternative layouts were developed at the Burmana as well as Girye sites. These were evaluated using multi criteria analysis. The key factors such as capital cost of development, faster implementation schedule, scope for future expansion and environmental issues were given due considerations while arriving the recommended option of port development.

4.3 Recommended Development Plan of Vijaydurg Port

Both the locations within the Vijaydurg port limit have certain advantages as well as disadvantages. However it is concluded that in terms development of major port for handling of multiple cargo Girye site is much better, but the initial investment as well as the time needed for phase 1 development will be significantly higher as compared to site at Burmana. It is therefore proposed to move forward in the following manner:

- Start with Burmana Site as Phase 1a of the Vijaydurg port development with two barge berths for handling clinker transported from Gujarat through coastal shipping and cement export, for which there seems to be an immediate demand. These berths could be used for handling of the project cargo also.
- Start with construction at Girye bay as Phase 1b development with three multipurpose berths mainly for handling coal, fertilizers and other dry bulk in ships upto Panamax size. Due to uncertainty in traffic during initial years, provide handling equipment capable of handling variety of cargo, keeping a provision for complete mechanisation consequent to traffic built up.
- Further develop the Burmana bay site for port related industries such as ship building and ship repair facilities.
- Due to the advantages of having deep draft port as well as vast storage area available at the Girye site, expand for dry bulk, containers and liquid bulk facilities, requiring large storage area, over the master plan horizon.

The recommended master plan layouts of Vijaydurg port at Burmana and Girye sites are shown in attached **Figures 4.1 and 4.2** respectively.

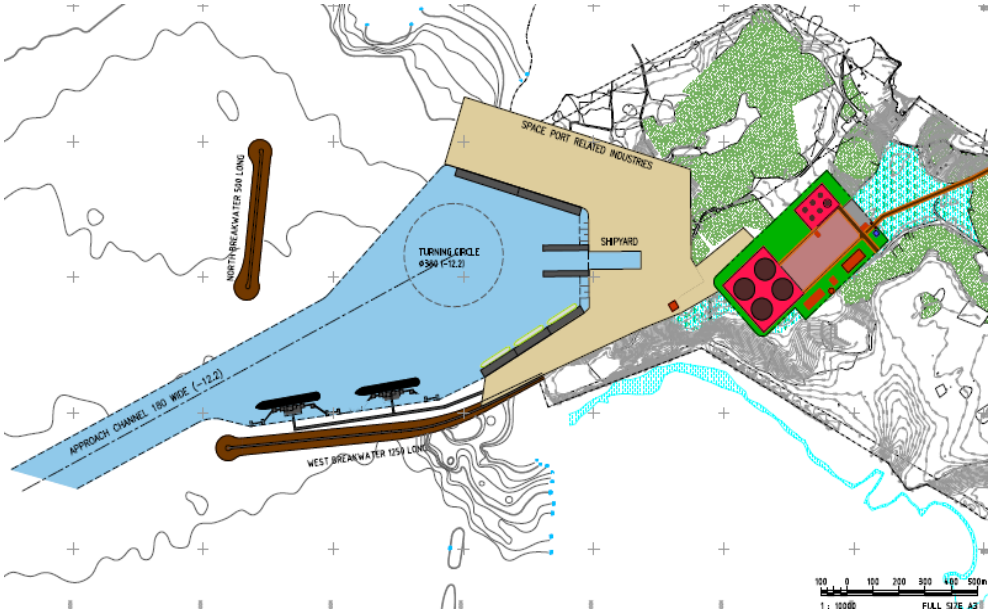


Figure 4.1: Proposed Phase 1 Layout at Burmana

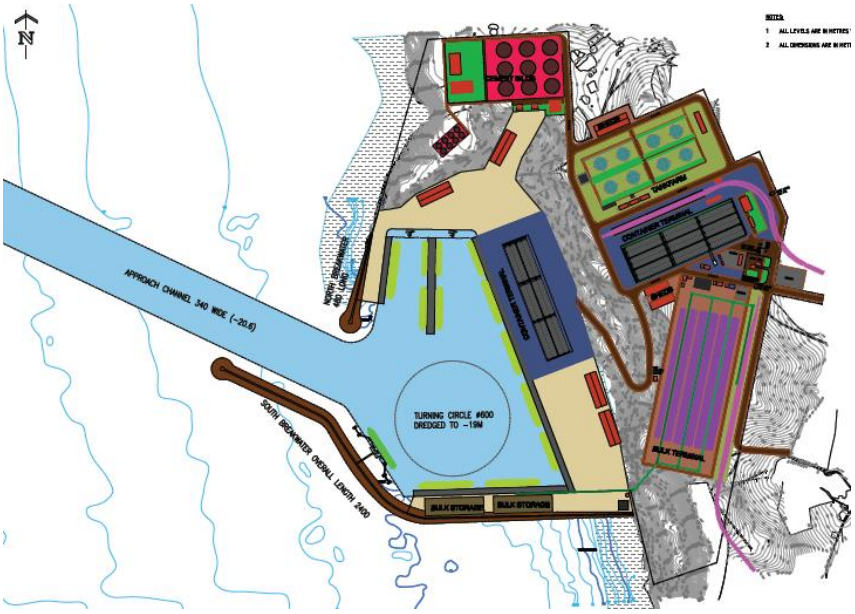


Figure 4.2: Proposed Phase 1 Layout at Burmana

4.4 Phase 1 Development Plan of Vijaydurg Port

Based on the assessment of the initial likely traffic and other considerations, the recommended phase 1 development plan of Vijaydurg port is given below in **Table 4.1**:

Table 4.1 – Summary of Phase 1 Marine Layout

Parameter	Burmana Site	Girye Site
Maximum Ship Sizes (DWT)		
Dry Bulk- Coal	-	80,000
Cement , Clinker	10,000	-
Other dry bulk and General Cargo	-	40,000
Breakwaters		
Length of North Breakwater (m)	-	-
Length of South Breakwater (m)	210	1570
Navigational Areas		
Length of Approach Channel (m)	250	500
Width of Approach Channel (m)	125	205
Depth at Approach Channel (m below CD)	8.9	15.5
Depth at Manoeuvring Areas (m below CD)	8.0	14.0
Diameter of Turning Circle (m)	250	480
Number of berths (Total Berth length) (dredged depth at berth)		
Barge Berths for Clinker/Cement, Project cargo	2 (300 m) (-9.0 m CD)	-
Multipurpose Berths	-	3 (800 m) (-15.5 m CD)

It is estimated that with the proposed development as above the Vijaydurg port will have a capacity of about 12.94 MTPA, with a scope of immediate expansion as basic infrastructure like dredging, breakwater and external infrastructure linkages would be ready.

The recommended phase 1 development plan for sites at Burmana and Girye are presented in **Figure 4.3** and **4.4** respectively.

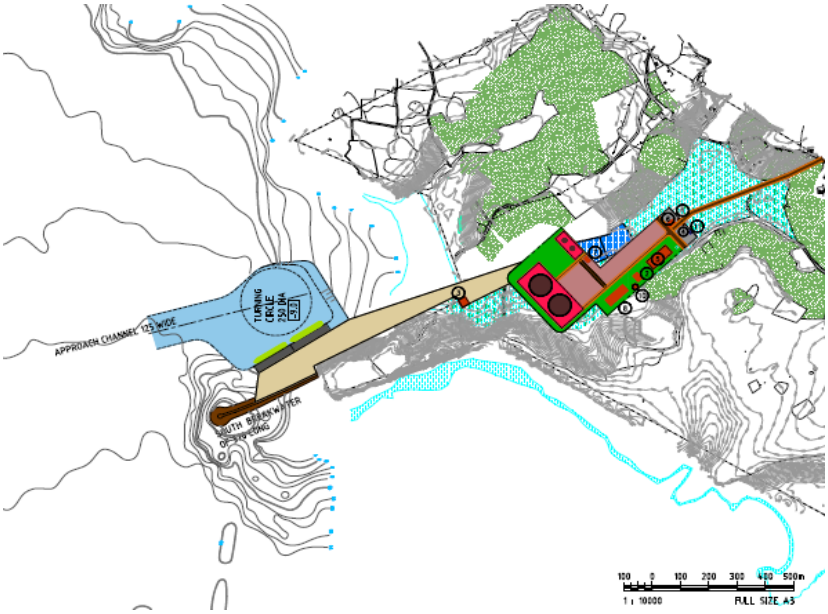


Figure 4.3: Proposed Phase 1 Layout at Burmana

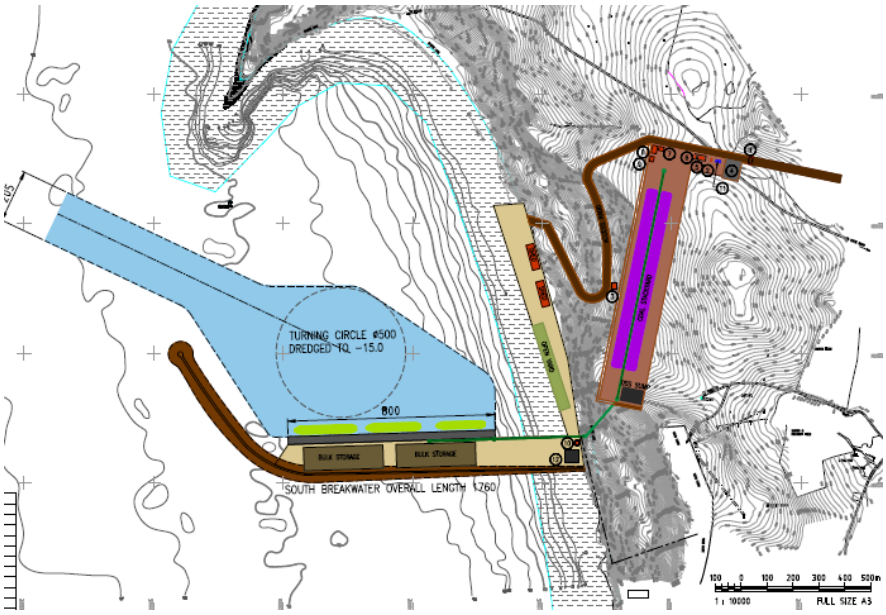


Figure 4.4: Proposed Phase 1 Layout at Girye

5. Engineering Details of Port Development

5.1 Marine Facilities

Breakwaters

Only south breakwater would be required to provide adequate tranquility to phase 1 marine facility. The length of proposed breakwaters is 210 m at Burmana site and 1570 m at Girye site. The breakwaters are proposed to be rubble mound type with accropodes provided as artificial armour units on sea side to absorb the wave forces. For construction of breakwaters at Burmana and Girye, it is estimated that about 3.0 million tonnes of stones of various sizes would be required. Significant site grading is required in the port backup area at Girye site, which will result in availability of 4.5 million cum of laterite rock. Though this material can not be used for the breakwater armour layer, the same is suitable for use in the core layer of the breakwater and thus majority of the rock needed for the breakwater construction would be readily available at site itself. For the armour units and under layers, suitable type and sizes of rock would be obtained through the identified quarries and transported to site.

Berths

At Girye the proposed multipurpose berths shall handle dry bulk, containers, fertilizers etc. All the berths are continuous and in the same line. In view of the common ship to shore transfer system of these cargo, these berths should be contiguous to the land so that the operational area is not restricted. These berths will have provision for installation of rail mounted gantry bulk unloaders or container cranes at a later date, as and when traffic builds up. The total length of the multipurpose berths is 800 m at Girye and which offers flexibility for berthing of two handymax and one panamax size ships or two panamax and one handysize ships simultaneously or in other combinations. Provision is made in the 350 m berth length towards sea side to enable increasing the dredged depth till the design dredged level.

Similarly at Burmana also the proposed barge berths of total 300 m length would be continuous to the land to offer flexibility in providing equipment to suit the preference of the user (handling cement/clinker).

The proposed berths will be built in the lee of the respective breakwaters. To provide flexibility in cargo handling operations the space between the berths and breakwaters will be filled with suitable material to provide immediate storage area behind berths.

The structural arrangement of berths at Girye and Burmana shall be typical bored cast in situ pile foundation supporting the superstructure comprising of combination of precast and cast-in situ beam and slab elements. To make the berth contiguous to land a stone pitching would be provided over a stable slope underneath the berth.

Dredging and Reclamation

The capital dredging for commissioning of the Phase 1 of the port is estimated to be around 0.12 million cum at Burmana site and 0.6 million cum at Girye site.

Based on the outcome of model studies the expected annual maintenance dredging volumes are estimated to be about 30,000 cum and 20,000 cum for sites at Girye and Burmana respectively.

Site Grading

At Girye the main backup area for cargo storage would be located at elevated levels, where the existing ground levels range from +45 to +75 m CD. The material available from cutting for the coal stockyard would be about 4.5 million cum, which will be utilised for the construction of breakwater core and reclamation behind berths at Girye and Burmana.

Equipment

Phase 1 of the development at Vijaydurg Port at Girye site comprises of only three multipurpose berths. In view of the significant traffic throughput of coal, it is proposed to provide fully mechanised coal handling system, connected conveyor system from berth till the coal stockyard, at the eastern end of the continuous multipurpose berths during the initial phase itself. This berth will be provided with two mobile harbour cranes so as to have flexibility in handling break bulk cargoes and other dry bulk cargoes also. The other two multipurpose berths are provided with four mobile harbour cranes to handle cargoes like containers, Fertilizer, Sugar, Bauxite, Edible oil etc.. As all these berths are continuous the there is a flexibility in deployment of the mobile harbour cranes to any of these berths.

The other dry bulk and break bulk cargo would be transferred between berth and storage areas using dumper and pay loaders or trailer and fork lift combinations. A fleet of dedicated Dumpers/ TTs shall be put in operation to ensure faster vessel loading, non-stop till the vessel is completed.
Port shall be equipped with all such facilities and handling equipment necessary to handle the expected volume as projected.

The general cargoes like bagged food grains, granite, black stone etc. will be handled using wire rope net slings at the jetty by MHCr.

For handling liquid cargoes like Edible oils and chemicals, if any flexible hoses shall be provided the jetty which will be connected to the onshore tanks through a pipeline.

5.2 Port Infrastructure

Storage Areas

Cement and clinker, which would be handled on the Burmana site, would be stored in silos and covered sheds respectively.

At Girye site open storage would be provided for storage of dry bulk commodities such as coal, bauxite etc. Covered sheds would be provided for storage for fertilizers, sugar and other break bulk requiring covered storage.

Buildings

Suitable number of buildings as per their functional requirements shall be provided in the port area. The total floor area of buildings proposed at the Burmana and Girye site is approximately 500 sqm and 2500 sqm respectively.

Rail Connectivity

The nearest rail head to Vijaydurg Port is Vaibhavwadi Road station on the Mumbai – Mangalore broad gauge line of Konkan railway. The route length from Vaibhavwadi Road station to Vijaydurg Port along the proposed alignment will be 70 km tentatively.

It is proposed that this external rail connectivity project will be executed by a SPV formed with Ministry of Railways (MoR). The port link is termed as 'Project Line' henceforth. The Project Line will be the external rail connectivity from the take-off station upto the port boundary.

Road Connectivity

The nearest exit for the port is NH 17 is presently two lane road. It is inadequate to deal with the likely traffic in near future. Thus it is recommended to have road link from port to the NH 4, connecting to the golden quadrilateral.

Power Supply and Distribution

Based on the proposed port facilities the total installed power load for phase 1 development are calculated to be around 4.5 MVA. This is expected to go upto 40 MVA

over the master plan horizon. The electric power needs to be sourced from the Maharashtra State Electricity Distribution Company Ltd (MAHADISCOM). To meet the initial port development requirements it is proposed to install one diesel generator of 2 MVA in each of the two substations proposed at Girye site. Similar arrangement is envisaged at Burmana site but shall be based on actual user requirements. These would work as standby in the later stages of port development once the system is connected to external power grid to provide power backup for lighting and emergency loads during failure of mains.

Water Supply and Distribution

It can be seen from above that daily water demand for the Phase I Development is estimated to be about 180 cum. Out of this the potable water demand is about 65 cum and balance can be raw water only. The total water demand over master plan horizon would increase to about 1,500 cum.

Main water requirements for the port would be for the dust suppression system of the dry bulk cargoes, which are proposed to be handled at Girye.

There is no government or any other assured water supply source for industrial consumption in the surrounding areas. To meet the water demand of the present proposed development, it is proposed to provide a small desalination plant of capacity 500 cum per day for captive use. The same would be provided adjacent to the root of the south breakwater on the north side.

Drainage, Sewerage and Solid Waste

Storm Water Drainage at the port will be through a system of underground covered drains provided to discharge the collected runoff. At the coal stockyard, the drainage system would comprise of buried perforated drain lines connected to open concrete trenches. An impervious layer will be placed in the ground below these transverse drain lines. The storm water runoff from the coal stockyard will be collected and taken

to the settling pond, via trenches and buried pipelines. Before discharging the collected storm water into the main drainage system of the port it would be passed through the necessary filters for further reduction of PPM.

For sewerage disposal, it is proposed to have a septic tank/soak pit which would store the refuse.

Harbour Crafts and Navigational Aids

Adequate harbour crafts in form of tugs, launches and mooring boats and aids to navigational for the safe traverse of the ships in and out of port shall be provided.

S. No.	Harbour Craft	Number
1	Tugs 40 T bollard pull	2
2	Pilot cum Security Vessels	1
3	Mooring Boats	2

Navigational aids are such as fairway buoys, port and starboard buoys, leading / transit lights, beacons and Vessel Traffic Management Information System (VTMIS) etc, which are installed on land or in water for guidance to all vessels for safe and regulated navigation in channels, anchorages, berths and docks. VTMIS will have the requisite communication, Radar system integrated into it.

IT and Security System

A state of the art IT system would be setup at the port to deliver services of high quality. Security system of the port shall be provided as per the requirements of ISPS code.

Fire Fighting System

The fire fighting system shall be designed to be capable of both controlling and extinguishing fires. The fire fighting system for multipurpose berths and terminal areas

will be a freshwater system with a separate pump house with pumps which will draw water from fresh water tanks/reservoirs.

A centralised fire station will be provided for attending to all calls which will house two mobile fire tenders. One fire tender will be provided with snorkel attachment.

A fire station of 300 sqm area shall be provided near the coal stockyard at Girye.

Pollution Control

The source of pollution for the Vijaydurg port shall be the dust emission from the dry bulk cargoes for which it is proposed to provide dust control equipment for efficient control of dust pollution to the environment during storage and handling of dry bulk cargoes at the berth & stockyard.

A system consisting of pumps, storage tank, nozzles for dust suppression at discharge / feeding points of belt conveyors have been proposed at each transfer tower for efficient dust control. In addition to above suitable spray system shall also be provided at ship unloader, coal stockyard & wagon loading station.

5.3 Port Administration and Management

For managing the various cargo terminals proposed at Vijaydurg port suitable organisation structure has been proposed. The levels of management have been designed as three levels - top, middle and operational (shop floor level). The operational or shop floor levels consist of Asst. Manager/Shift In charge, and their subordinate supervisors and staff/operatives. Based on the assessment of manpower required for port operations (including stevedoring) as well as port administration for phase 1 development, total O&M Staff is estimated to be around 50 at Burmana site and 200 at Girye site, in addition to about 30 port administration personnel located centrally and managing both port locations.

5.4 Environmental Management Plan

Environmental Management Plan (EMP) for the Vijaydurg Port is classified into the following categories:

- Land Environment
- Water Environment
- Air Environment
- Control of Noise
- Greenbelt Development

Suitable measures have been suggested so as to mitigate the impacts on the environment as a result of port development. The EMP shall be monitored by Environmental Cell of Vijaydurg Port.

5.5 Corporate Social Responsibility

VPPL proposes to have a restoration plan prepared by conservation specialists approved by Archaeological Survey of India (ASI). Based on the draft restoration plan approved by ASI, VPPL will arrange to carry out restoration works as per the guidelines of the ASI and under its supervision. The entire area which is under the administrative control of ASI will remain so during and after such restoration.

The restoration effort will also include the improving access outside the monument limits and will focus on 'Street Revitalization' on the area within the vicinity. The work will broadly include:

- Street up-gradation,
- Installation of public amenities and
- Detailed mapping of the vicinity and the fort highlighting the heritage sites in and around Vijaydurg.

6. Cost Estimates and Implementation Schedule

6.1 Cost Estimates

The capital cost estimates have been prepared for the Phase 1 development of the project.

The capital cost of Phase 1 development at Burmana site and Girye Site works out to **Rs. 109 Crores** and **Rs. 976 Crores** respectively. The annual operation and maintenance costs of the phase 1 facilities work out to **Rs. 3.8 Crores** at Burmana site and **Rs. 49.2 Crores** at Girye site.

Table 6.1 - Capital Cost Estimates for Phase 1 Development of Burmana Site

S. No.	Item	Capital Cost (Rs. In crores)
1.	Project Preliminaries and Site Development	5
2.	Dredging and Reclamation	22
3.	Breakwaters	15
4.	Berths	27
5.	Buildings	1
6.	Stockyards	0
7.	Roads And Railways	9
8.	Equipment	0
9.	Utilities And Others	16
10.	Port Crafts and Aids to Navigation	0
	Total	**95**
	Contingencies @ 10%	9
	Engineering and Project Management @ 5%	5
	GRAND TOTAL	**109**

Table 6.2 - Capital Cost Estimates for Phase 1 Development of Girye Site

S. No.	Item	Capital Cost (Rs. In crores)
1.	Project Preliminaries and Site Development	22
2.	Dredging and Reclamation	124
3.	Breakwaters	230
4.	Berths	126
5.	Buildings	4
6.	Stockyards	55
7.	Roads And Railways	15
8.	Equipment	175
9.	Utilities And Others	96
10.	Port Crafts and Aids to Navigation	2
	Total	**849**
	Contingencies @ 10%	85
	Engineering and Project Management @ 5%	42
	GRAND TOTAL	**976**

The estimates given here do not include the following items:

- External linkages for rail, road, as these are proposed to be developed on BOT basis
- Rail exchange yard outside the port boundary
- Specialized handling and storage facilities for Liquid bulk, cement/clinker as these are proposed to be installed by respective users
- Port crafts, as these are proposed to be leased out
- Financing and Interest Costs

6.2 Project Implementation and Phasing of Investment

The construction time of Phase 1 development of the project at Burmana site is expected to be around 20 months, whereas at Girye site it is likely to take 36 months. This has been worked out taking into account all the items of the project, the various activities involved and the duration of each activity. However it would be possible to commission the facilities in phases at Girye starting 26 months from start of construction.

7. Viability Analysis

A profitability analysis for the proposed development has been carried out with the following objectives:

- to establish a realistic and reasonable tariff, comparable to those available for similar cargoes at nearby ports, that provide adequate returns after meeting all the costs
- to assess the viability of the project in terms of Financial Internal Rate of Return (FIRR) considering the revenue generated at the proposed tariff and the costs of operations including the investments costs and debt service charges

The post-tax FIRR for the Project works out to **13.15** %, which is fair considering the present market. However it is to be kept in mind that government support in providing external infrastructure linkages to the project in the form of rail, road connectivity and power will be a pre-requisite for the successful implementation of the project.

8. Way Forward

The proposed site of Vijaydurg port offers many advantages for it development as a major port serving the immediate and extended hinterland at reasonable capital outlay.

VPPL have made significant progress with the project since its taking over as detailed below:

1. Following Studies and Investigations have been completed through various agencies:
   a. Market study for assessment of traffic potential for proposed port
   b. Topographic survey at proposed port sites at Girye and Burmana
   c. Sea bed engineering surveys, current and tidal measurements at proposed port sites at Girye and Burmana
   d. Onshore Geotechnical Investigations at proposed port sites at Girye and Burmana
   e. Marine Geotechnical Investigations at proposed port sites at Girye and Burmana
   f. Mathematical model studies on the proposed port layouts at Girye and Burmana sites
   g. Port connectivity study to establish the suitable rail and road linkages to port
2. The Detailed Project Report for "Development of Vijaydurg Port" has been completed.
3. An application has been filed in MoEF for getting the terms of reference cleared for conducting EIA studies.

The following is suggested as the future course of action for the development of Vijaydurg Port:

1. Close Liaison with MMB and other government agencies for allocation of required land area for the project
2. Arrange for tie ups with industries to set up their base in the immediate vicinity for using Vijaydurg port as the gateway port for their cargoes.
3. Conduct baseline environmental studies along with preparation of EIA report.
4. Simultaneously the local communities could be educated about the positive effects of the project so that they will feel a sense of participation.

For the future course of action for the port development following is suggested:

5. Close Liaison with MMB and other government agencies for allocation of required land area for the project
6. Arrange for tie ups with industries to set up their base in the immediate vicinity for using Vijaydurg port as the gateway port for their cargoes.
7. Conduct baseline environmental studies along with preparation of EIA report. Carry out mathematical model studies for impact of port development on the coastline.